Fiat Trattori

FIAT

805 C

SERVICE DIRECTIONS

SERVIZIO ASSISTENZA TECNICA E RICAMBI

06910046

Reprinted

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SUBJECT INDEX

SERVIZIO ASSISTENZA TECNICA E RICAMBI

IMPORTANT

The wear limits shown for certain items are to be considered as recommended values and they are not binding.

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PREFACE

- *This manual is divided in sections marked with two digits numbers (i.e. 00 - 10, etc.) and having an independent page numbering within each section.*
- *The subject matter can be easily located in the index reported below.*
- *Each page reports at the bottom right hand side the print number and printing date.*
- *The sheets object of future updating will be identified by the same print number followed by a capital letter (i.e. 1st up-dating No. 603.54.173/A, etc.) and the new date of issue.*
  These sheets will be sent together with the index reprint, suitably updated.

INDEX

SERVIZIO ASSISTENZA TECNICA E RICAMBI

IDENTIFICATION DATA

Technical designation	607.700
Engine type	CO 3/75 V.50

PERFORMANCE AND WEIGHT

Engine nominal output	80 HP
Weight in working order (with ballast)	5,150 kg (11,354 lb)

Speeds

1st Forward	2.5 KPH (1.55 MPH)
2nd »	3.6 KPH (2.23 MPH)
3rd »	4.5 KPH (2.79 MPH)
4th »	5.5 KPH (3.41 MPH)
5th »	7.9 KPH (4.90 MPH)
6th »	10.1 KPH (6.27 MPH)
1st Reverse	2.9 KPH (1.8 MPH)
2nd »	6.5 KPH (4.03 MPH)

ENGINE

Diesel, 4-stroke cycle, direct injection.

Number of cylinders	4
Bore and stroke	110 x 120 mm (4.330 x 4.724 in)
Piston displacement	4,562 cm^3 (278.4 cu.in)
Compression ratio	17 : 1
Maximum power speed	2,100 rpm
Quantity of main bearings	5

Counterbalance weights type vibration damper.

Timing

O.H.V. with camshaft in crankcase.

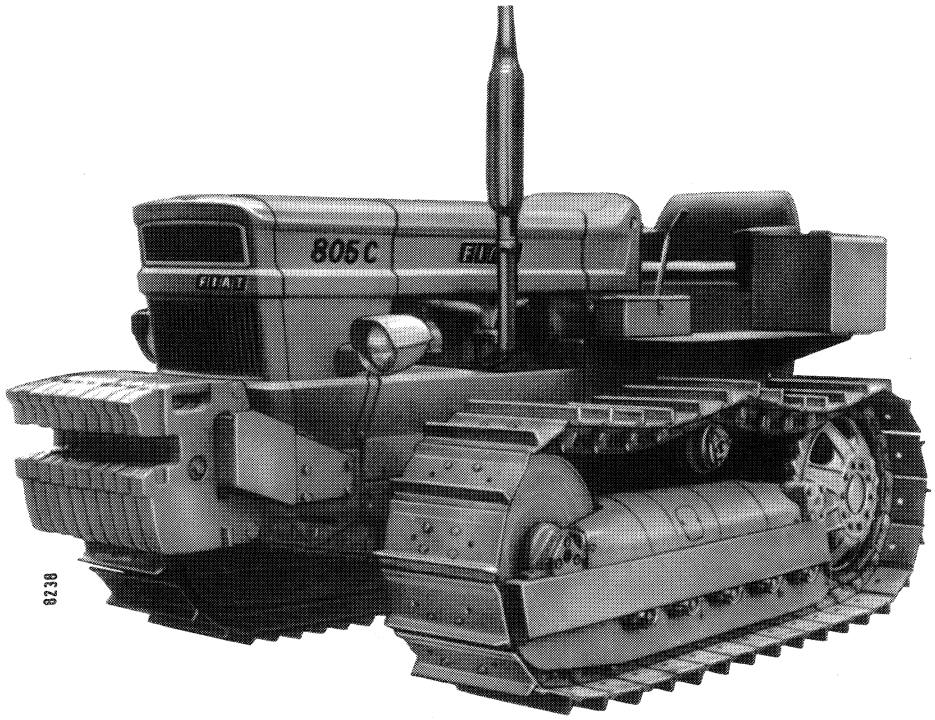
Intake	beginning	10° before T.D.C.
	end	54° after B.D.C.
Exhaust	beginning	54° before B.D.C.
	end	10° after T.D.C.

Valve gap for timing check . . . 0.25 mm (.010 in)

Operating valve gap (cold and hot engine):

— intake . . . . . 0.25 mm (.010 in)

— exhaust . . . . . 0.30 mm (.011 in)



GENERAL SPECIFICATIONS

Feeding

Air filtration is ensured by an oil-bath air filter fitted with centrifugal pre-cleaner.

Fuel feeding is ensured by:

— double diaphragm lift pump, cam actuated;
— CAV distributor type fuel injection pump, type DPA 3342 F 030 with in-built mechanical governor and automatic timing device;
— fuel supply pressure at pump inlet: 0.2 kg/cm² (2.8 psi).

Fuel filtration by means of a strainer on lift pump and two cartridge type filters in series on the delivery line to the injection pump (the first filter incorporates a water separator).

Fixed advance for beginning of injection before T.D.C. . . . . 18°

Injection order 1-3-4-2

Pressure setting of injectors . 195 to 205 kg/cm² (2770 to 2915 psi)

Lubrication

Forced-flow system with gear pump and strainer on suction line; full-flow filtration on delivery line by paper cartridge filter, fitted with by-pass valve (differential pressure 1 to 1.2 kg/cm² (14 to 17 psi).

A pressure relief valve is fitted on the filter body:
— lubricating pressure at rated speed 4.5 to 5 kg/cm² (64 to 71 psi)

Engine/oil pump rpm ratio . . . . . 1 : 1.454

A warning light (red) on the dash-board indicates abnormal lube oil pressure.

Cooling

Water forced flow circulated by centrifuge pump, vertical tubelets radiator and sucking fan.

Water temperature is controlled by a thermostat checking the water flow into the radiator.

Thermostat specifications:

— opening temperature . 83 ± 2° C (177 to 185° F)
— maximum opening temperature 94° C (201° F)

The temperature is shown by an electrical temperature gauge fitted on the dash-board.

Tacho-hourmeter

Mechanical type, controlled by timing gears:

— engine/P.T.O. ratio . . . . . 2 : 1
— engine speed referred to the hour-meter . . . . . 1,800 rpm

TRANSMISSION

12″ dual plate master clutch, oil bath over center type engagement with mechanical hand lever control.

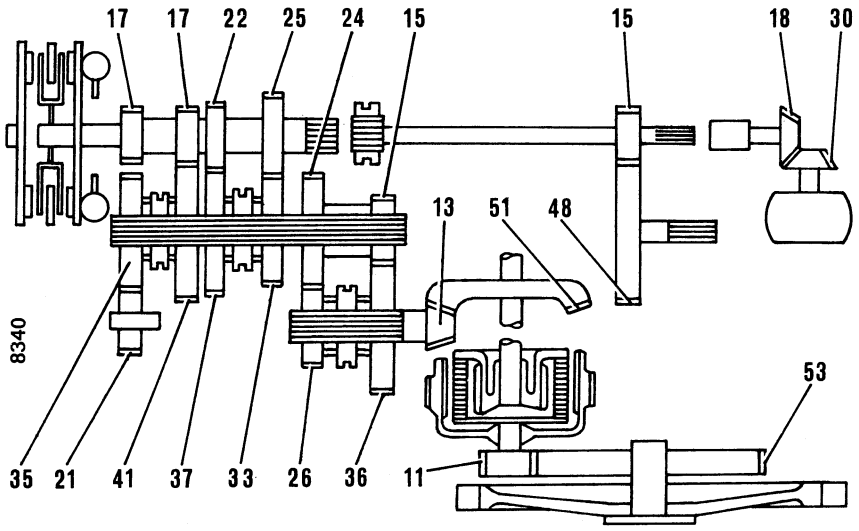
Gearbox with reduction unit incorporated, constant mesh elliptic gears actuated by sliding sleeves: 6 forward and 2 reverse speeds.

Gearbox and reduction unit controlled by two separate levers.

Gearbox and P.T.O. lube oil pump fitted in the transmission housing.

Bevel gear type main reduction and single reduction spur gear final drives.

Transmission layout



Dry-type multiple disc steering clutches mechanically controlled, actuated by two hand levers.

Band type brakes actuated by two lateral pedals and parking brake actuated by a hand lever.

Overall speed reduction ratio at drive sprockets.

Overall speed reduction ratio at drive sprockets:

	speeds			
	1st	2nd	3rd	Reverse
Low range 1 :	109.410	76.296	59.882	99.399
Normal range 1 :	49.386	34.439	27.030	42.159

UNDERCARRIAGE - SUSPENSIONS

Track frames each fitted with 5 track rollers and 1 carrier roller.

Idlers, track rollers and carrier rollers life-time lubricated.

Quantity of shoes per track . 36

Shoes width . . . . . 400 - 500 mm ($15\,^3/_4$ - $19\,^{11}/_{16}$ in)

Ground contact area:

— with $15^3/_4''$ (400 mm) shoes 14,240 cm² (2,202 sq.in)

— with $19^{43}/_{64}''$ (500 mm) shoes 18,300 cm² (2,831 sq.in)

Ground pressure:

— with $15^3/_4''$ (400 mm) shoes . 0.35 kg/cm² (4.9 psi)

— with $19^{43}/_{64}''$ (500 mm) shoes 0.29 kg/cm² (4.1 psi)

Track tension adjustment . . . . . mechanical

Rear suspension by means of oscillating beam resting on track frames with lubricated bushes allowing for the independent oscillation of the track frames.

Front suspension by means of transversal leaf spring.

DRIVE TAKE OFF

Rotation (from rear end) . . . . anticlockwise

Speed . . . . . same as engine

Control . . . . . hand lever

POWER TAKE-OFF (540 rpm)

Rotation . . . . . clockwise

Speed (with engine at 1,728 rpm) . . . 540 rpm

Speed (with engine at 2,100 rpm) . . . 656 rpm

Splined shaft { diameter . . . . . $1\,^3/_8$ in; splines 6

Hand lever control (same as for drive take-off).

BELT PULLEY

Pulley diameter . 280 or 320 mm (11.02 or 12.6 in)

Rim width . . . 175 mm (6.9 in)

Angular speed at engine maximum power speed (2,100 rpm) . . . . . 1260 rpm

Corresponding linear speed:

— with 280 mm (11.02 in) pulley diam.: 18.5 m/sec (60.7 ft.sec)

— with 320 mm (12.6 in) pulley diam.: 21.1 m/sec (69.22 ft.sec)

HYDRAULIC LIFT

With incorporated single effect cylinder.

Operation . . . . . position control

Gear type pump driven directly from timing gears, mod. Plessey A 25 X.

Independent hydraulic circuit.

Category of the three point linkage: 2nd and 3rd.

Nominal lifting capacity, max. stroke and max. lifting load at arm ends (see page 2, section 40).

ELECTRICAL SYSTEM

Voltage . . . . . 12 V

Alternator 32 Amp. max. current Fiat model . . . . . A 12 M 124/12/42 X

Voltage regulator FIAT model . . . . RC 2/12 B

Starter motor, 4 HP Marelli model . . MT 62 BA

No. 1 battery with following specifications:

— Marelli type . . . . . 6 ATP 27

— Titano type . . . . . 6 DE 12 F

— nominal tension . . . . . 12 V

— nominal capacity { Marelli . . . . . 143 amp. hr.; Titano . . . . . 136 amp. hr.

Front head light, 130 mm ($5\,^1/_8$ in) diameter, equipped with 45/40 W bulbs and rear flood light equipped with 35 W bulb and built-in switch.

Circuit protection by 7, 8 Amp fuses.

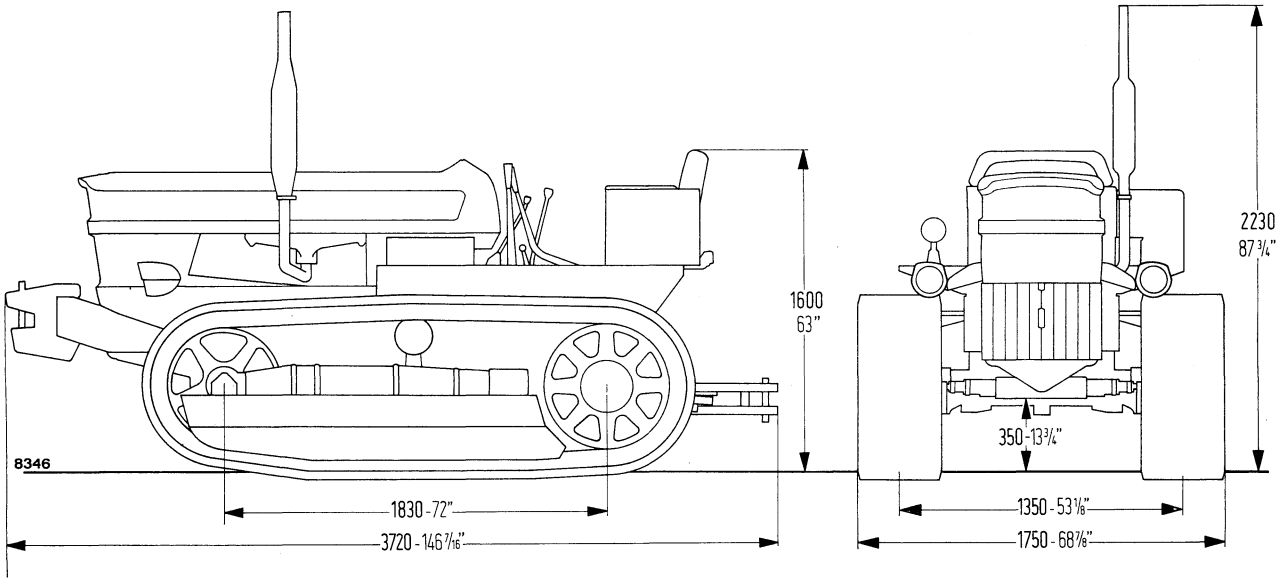
One dash-board light and battery charge indicator light (5 W bulb).

Charge indicator relay protected by a fuse.

Six position light and starting switch and starter push button or 4 position pre-heater and starting switch.

The starter motor, alternator circuit and pre-heater plugs are unprotected.

GENERAL SPECIFICATIONS



FILL UP DATA

ITEMS	LUBRICANTS			
	FIAT type	Quantity kg	Quantity Imp. Gal.	International Specifications
Engine sump, filter and lines	« **oliofiat AMBRA 20 W/40** » oil for temperature above 0° C (32° F)	14	3.4	multigrade detergent oil, level « MIL-L-2104 B » with characteristics « EP »
Engine sump and filter . . .		12.1	2.7	
Engine sump only		11.5	2 3/4	
Air filter (*)		0.75	.75 qt	
Master clutch	« **oliofiat AMBRA 10 W/30** » oil for temperature below 0°C (32°F)	8	7 3/4 qt	
Hydraulic lift		8	7 3/4 qt	
Auxiliary hydraulic system .		16.5	4	
Rollers and idlers	« **oliofiat AMBRA 20 W/40** » oil	2	1/2	
Transmission housing . .	« **oliofiat AW 90/M** » oil	21	5	oil level « MIL-L-2105 B » (SAE 90-EP)
Final drives (each)		4	.9	
Belt pulley		0.9	1/4	
Grease nipples	« **grassofiat G 9** » grease	—	—	consistency NLGI 2

Capacity of:

— engine cooling system (water) . . . . . 17.6 lt (3.87 Imp. Gal.)

— fuel tanks
- main . . . . . 80 lt (17.6 Imp. Gal.)
- supplementary . . . . . 48 lt (10.5 Imp. Gal.)

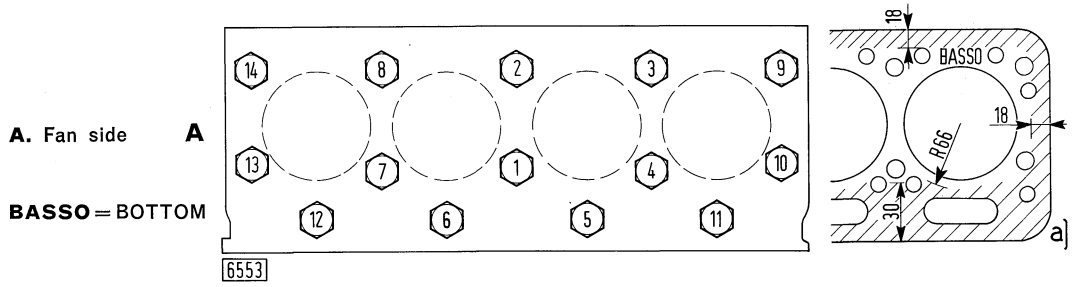
(*) Replace the oil in the air cleaner should it be excessively dirty or a deposit about 1 cm (1/2 in) high be found in the bowl.

CYLINDER BLOCK - CYLINDER HEAD

DESCRIPTION	mm	in
Cylinder block		
Diameter of cylinder liner bores on cylinder block	118.000 to 118.035	4.6456 to 4.6469
Outside diameter of liners	117.920 to 117.970	4.6425 to 4.6444
Fit clearance between liners and their seats on cylinder block	0.030 to 0.115	.00118 to .0045
Bore of cylinder liners	110.000 to 110.022	4.3307 to 4.3315
Max. admissible out-of-round or taper of liners due to wear (1)	0.15	.0059
Oversize on cylinder liner bore	0.6	.0236
Extension of cyl. liners above cyl. block	0.15 to 0.18	.0058 to .0070
Max. permissible difference of extension among liners	0.03	.0011
Thickness of liner adjustment shims	0.05-0.075-0.10	.0019-.0029-.0039
Diameter of camshaft journal seats on cyl. block	49.555 to 49.590	1.9312 to 1.9326
Diameter of tappet seats	27.000 to 27.033	1.0630 to 1.0643
Oversize range of spare tappets	0.2-0.4	.0078-.0157
Diameter of crankshaft main bearing seats	80.626 to 80.646	3.1742 to 3.1750
Cylinder head		
Diameter of standard valve guide seats on cyl. head	14.000 to 14.018	.5512 to .5582
Oversize range of spare valve guides	0.08	.0031
Valve seat angle on cyl. head	89° 50′ to 90° 10′	
Protrusion of injector with respect to cyl. head lower surface	3.3 to 3.9	.1299 to .1535
Max. permissible protrusion	4.2	0.16
Valve recession with respect to cyl. head	0.1 to 0.5	.0039 to .0196
Max. admissible recession	0.7	.0275
Nominal height of cyl. head between machined surfaces	99.80 to 100.20	3.929 to 3.968
Max. admissible thickness of material to be grinded	0.5	.0196

(1) Measure in the direction parallel and perpendicular to the crankshaft center line in the ring working area.

Cylinder head tightening sequence and gasket detail (a)



Note

— The cross-hatched part shows the metal surface to be smeared with collant Wellseal-Jointing before assembly.

— The tightening torque value of the nuts securing the cylinder head must be reached in the following three phases: **1st phase 9 kgm (65.1 lb.ft); 2nd phase 18 kgm (130.2 lb.ft); 3rd phase 23.5 kgm (169.9 lb.ft).**

ENGINE: General specifications

CRANK GEAR

DESCRIPTION	mm	in
Crank gear		
Diameter of main journals:		
— standard	76.202 to 76.220	3.0000 to 3.0007
— undersized 0.254 mm (.0100 in)	75.948 to 75.966	2.9900 to 2.9907
— undersized 0.508 mm (.0200 in)	75.694 to 75.712	2.9800 to 2.9807
— undersized 0.762 mm (.0300 in)	75.440 to 75.458	2.9700 to 2.9707
— undersized 1.016 mm (.0400 in)	75.186 to 75.204	2.9600 to 2.9607
Thickness of main bearings:		
— standard	2.172 to 2.178	.0854 to .0856
— undersized on inner diameter 0.254 mm (.0100 in)	2.299 to 2.305	.0904 to .0906
— undersized on inner diameter 0.508 mm (.0200 in)	2.426 to 2.432	.0954 to .0956
— undersized on inner diameter 0.762 mm (.0300 in)	2.553 to 2.559	.1004 to .1006
— undersized on inner diameter 1.016 mm (.0400 in)	2.680 to 2.686	.1054 to .1056
Clearance between bearings and main journals	0.050 to 0.100	.0019 to .0039
Max. admissible clearance due to wear	0.180	.00707
Diameter of con-rod journals:		
— standard	69.860 to 69.878	2.7503 to 2.7510
— undersized 0.254 mm (.0100 in)	69.606 to 69.624	2.7403 to 2.7410
— undersized 0.508 mm (.0200 in)	69.352 to 69.370	2.7303 to 2.7310
— undersized 0.762 mm (.0300 in)	69.098 to 69.116	2.7203 to 2.7210
— undersized 1.016 mm (.0400 in)	68.844 to 68.862	2.7103 to 2.7110
Thickness of con-rod bearings:		
— standard	1.886 to 1.892	.0742 to .0745
— undersized on inner diameter 0.254 mm (.0100 in)	2.013 to 2.019	.0792 to .0794
— undersized on inner diameter 0.508 mm (.0200 in)	2.140 to 2.146	.0842 to .0844
— undersized on inner diameter 0.762 mm (.0300 in)	2.267 to 2.273	.0892 to .0894
— undersized on inner diameter 1.016 mm (.0400 in)	2.394 to 2.400	.0942 to .0944
Clearance between bearings and con-rod journals	0.058 to 0.103	.00228 to .00405
Max. admissible clearance due to wear	0.180	.00707
Thickness of crankshaft thrust washers:		
— standard	2.310 to 2.360	.0908 to .0928
— oversized 0.101 mm (.0039 in)	2.411 to 2.461	.0948 to .0968
— oversized 0.254 mm (.0100 in)	2.564 to 2.614	.1008 to .1028
— oversized 0.508 mm (.0200 in)	2.818 to 2.868	.1108 to .1128
Width of main journal support with thrust washers	49.780 to 49.930	1.9598 to 1.9657
Length of main journal	50.000 to 50.050	1.9685 to 1.9704
End float of crankshaft	0.070 to 0.270	.0027 to .0106
Max. admissible end float due to wear	0.400	.0157

CRANK GEAR

(continued)

DESCRIPTION	mm	in
Max. out-round and tapering of main and con-rod journals after grinding	0.01	.00039
Max. out-of-round and tapering of main and con-rod journals due to wear	0.03	.00118
Max. permissible disalignment of main journals with crankshaft supported by end journals (total reading on dial)	0.05	.0019
Max. tolerance on con-rod journals alignment with the crankshaft center line	0.25	.0098
Flywheel mounting flange alignment: — max. permissible run-out with respect to crankshaft center line with dial plunger applied on a diameter of 148 mm (5.82 in) (total reading)	0.25	.0098
Max. out-of-round of flywheel mating seat with crankshaft with respect to main journals (total reading on dial)	0.04	.00157
Connecting rods		
Diameter of con-rod small end bush seat	44.000 to 44.025	1.7323 to 1.7332
O.D. of con-rod small end bush	44.078 to 44.117	1.7353 to 1.7368
Fit interference between bush and con-rod small end	0.053 to 0.117	.0021 to .0045
Bore of con-rod small end bush (after press-fitting)	40.025 to 40.035	1.5757 to 1.5761
Diameter of bearing housing bore on con-rod big end	73.720 to 73.735	2.9023 to 2.9029
Max. deviation from parallelism between the con-rod center lines at 125 mm (4.921 in)	± 0.025	± .00098
Max. permissible weight difference among con-rods	15 gr	1/2 oz.
Pistons		
Diameter of standard piston measured at right angle with the pin center line at 30 mm (1.18 in) from the skirt base	109.855 to 109.875	4.3249 to 4.3257
Clearance between piston and liner	0.125 to 0.167	.0049 to .0065
Max. permissible clearance due to wear	0.30	.0118
Oversize of spare piston	0.6	.0236

ENGINE: General specifications

CRANK GEAR

(continued)

DESCRIPTION	mm	in
Diameter of standard piston pin	40.000 to 40.006	1.5748 to 1.5750
Diameter of piston pin seats on piston bosses	40.006 to 40.012	1.5750 to 1.5752
Fitting of piston pin on piston bosses	0.000 to 0.012	.0000 to .00047
Oversizes of spare piston pins	0.2-0.5	.0078-.0196
Clearance between piston pin and con-rod small end bushes	0.019 to 0.035	.00074 to .00137
Max. admissible clearance due to wear	0.100	.0039
Max. permissible weight difference among pistons fitted on the same engine	10 g	1/3 oz.
Fit clearance between rings and their grooves (vertically):		
— 1st ring	0.055 to 0.082	.0021 to .0031
— 2nd ring	0.055 to 0.082	.0021 to .0031
— 3rd ring	0.045 to 0.072	.0017 to .0027
— 4th ring	0.045 to 0.072	.0017 to .0027
Max. admissible clearance due to wear:		
— 1st and 2nd ring	0.30	.0118
— 3rd and 4th ring	0.20	.0078
Ring-end gap (measured with piston fitted on liners):		
— 1st ring	0.40 to 0.60	.015 to .023
— 2nd ring	0.40 to 0.60	.015 to .023
— 3rd ring	0.40 to 0.60	.015 to .023
— 4th ring	0.30 to 0.45	.011 to .017
Max. permissible gap due to wear	1.20	.047

CRANK GEAR

(continued)

DESCRIPTION	mm	in
Vibration damper		
Diameter of counterbalance weight pins	34.920 to 34.935	1.3748 to 1.3753
Diameter of bearing seats on counterbalance weights	38.626 to 38.646	1.5207 to 1.5215
Thickness of bearings	1.815 to 1.822	.0714 to .0717
Clearance between counterbalance weight bearings and pins	0.047 to 0.094	.0018 to .0037
Inside diameter of counterbalance weight gears	30.000 to 30.021	1.1811 to 1.1819
Diameter of gear pins	30.041 to 30.061	1.1827 to 1.1835
Interference between pins and gears	0.020 to 0.061	.0007 to .0024
Thickness of adjustment shims between cyl. block and weight housings	0.05-0.10-0.15	.002-.0039-.0058
Backlash between driving weight, oil pump and crankshaft gear teeth	0.11 to 0.17	.0043 to .0066
Backlash between counterbalance weight gear teeth	0.12 to 0.18	.0047 to .0070

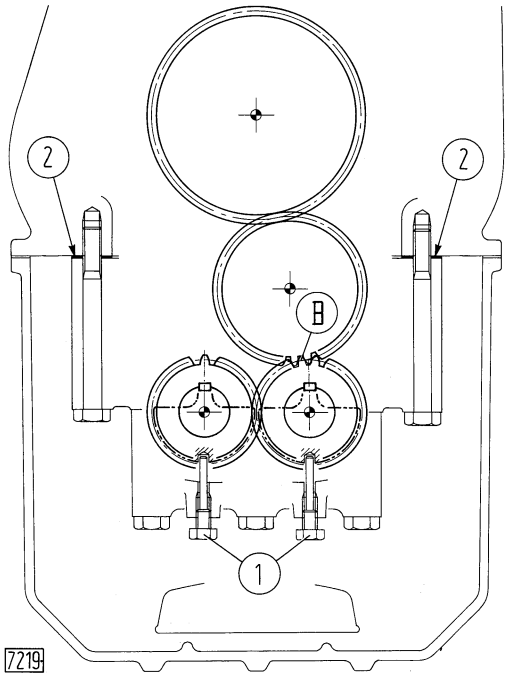
PHASING OF COUNTERBALANCE WEIGHTS

— Position the weights with screws **1** (290965) and make sure that the weight driving and driven gears are correctly installed checking the position of the keys with respect to the teeth (driving gear key in register with an empty space of the teeth, driven gear key in register with a tooth).

— Rotate the crankshaft so as to bring No. 1 piston at T.D.C. in compression stroke.

— Secure the housing to the caps placing setting shims **2** so as to obtain a backlash of 0.11 to 0.17 mm (.0043 to .0066 in) in position **B**.

— Remove screws **1**.



ENGINE: General specifications

TIMING

DESCRIPTION	mm	in
Backlash between timing gear teeth	0.04 to 0.12	.0015 to .0047
Diameter of camshaft journals	49.450 to 49.475	1.9467 to 1.9477
Fit clearance between camshaft journals and their seats on cyl. block	0.080 to 0.140	.0031 to .0055
Max. permissible clearance due to wear	0.25	.0098
End float between camshaft thrust plate and the relevant seat on camshaft	0.030 to 0.080	.0011 to .0031
O.D. of standard tappets (in correspondance with max. diam.)	26.939 to 26.960	1.0605 to 1.0613
Max. clearance between tappets and their seats on cyl. block	0.040 to 0.094	.0015 to .0037
Max. admissible clearance due to wear	0.15	.0058
Range of oversized spare tappets	0.2-0.4	.0078-.0157
Diameter of idle gear pin	29.959 to 29.980	1.1794 to 1.1802
Inside diameter of idle gear bush (press-fitted and reamed)	30.040 to 30.061	1.1826 to 1.1835
Fit clearance between idle gear pin and bush	0.060 to 0.102	.0023 to .0040
Max. admissible clearance due to wear	0.25	.0098
Fit interference between idle gear pin and its seat	0.009 to 0.073	.0003 to .0028
Diameter of rocker arm shaft	21.015 to 21.036	.8273 to .8286
Inside diameter of rocker arm	21.040 to 21.070	.8283 to .8285
Clearance between rocker arms and shaft	0.004 to .055	.0001 to .0021
Max. clearance due to wear	0.150	.0058
Specifications of rocker arm spacer springs:		
— free length	95	3.74
— test length (test load 2.3 to 2.9 kg - 5 to 6.3 lbs)	62	2.44
O.D. of standard valve guides	14.028 to 14.039	.5523 to .5529
Fit interference between standard valve guides and their seats on cyl. head	0.010 to 0.039	.00039 to .00153
Protrusion of valve guide from cyl. head upper surface — intake	2	.078
Protrusion of valve guide from cyl. head upper surface — exhaust	9	.354
Oversize of outside diameter of spare valve guides	0.08	.0031
Bore of valve guides (press-fitted and reamed)	7.990 to 8.010	.3145 to .3153
Diameter of valve stem	7.945 to 7.960	.3127 to .3133
Fit clearance between valve stem and valve guide	0.030 to 0.065	.0011 to .0025
Max. admissible clearance due to wear	0.130	.0051

TIMING

(continued)

DESCRIPTION	mm	in
Diameter of valve head:		
— intake	42.700 to 43.000	1.6811 to 1.6929
— exhaust	36.200 to 36.500	1.4252 to 1.4370
Seating surface angle on valve	45° 10′ $^{-0}_{+10'}$	
Max. out-of-round of valve head on one complete turn guiding the valve by the stem, with the indicator plunger set on center of sealing surface	0.04	.0015
Min. cam lift: intake and exhaust	7.300	.2874
Real cam lift: intake and exhaust	12.512	.4925
Valve recession below cyl. head surface	See page 1	
Specifications of intake and exhaust valves spring:		
Free length	49.3	1.940
Test length under a load of 22.5 to 24.9 kg (50 to 55 lbs)	42	1.653
Test length under a load of 61.1 to 67.5 kg (134 to 150 lbs)	29.5	1.161

LUBRICATION AND COOLING

Oil pump		
Make and type	FIAT, gear	
Drive	crankshaft gears	
Engine/pump ratio	1 : 1.454	
Normal lube pressure, with engine at operating temperature and max. rpm	4.8 to 5.2 kg/cm²	68.2 to 73.9 psi
Pressure relief valve setting	5 kg/cm²	71 psi
Specifications of the pressure relief valve spring:		
— free length	69.7 to 71.3 mm	2.74 to 2.00 in
— test length under a load of 11 kg (24.2 lb)	48.5 mm	1.90 in
Water pump		
Type	centrifugal, vane	
Engine/pump ratio	1 : 1.573	
Gap between impeller and pump body (1)	0.2 to 0.8 mm	.0078 to .0314 in
Thermostat		
Type	BEHR-THOMSON	
Starts opening at	83 ± 2°C	178 to 185°F
Max. opening at	94°C	201°F
Min. valve stroke corresponding to final opening temp.	7.5 mm	.2953 in

(1) For pre-modification water pump.

ENGINE: General specifications

MASTER TEST PROCEDURE FOR C.A.V. INJECTION PUMP TYPE DPA 3342 F 030 - 770997

Test A:

— Bosch test rig equipped with injectors with pressure spring WSF 2044/4 X and nozzles EFEP 182.

— Rabotti test rig type equipped with standard rig graduated ring, pressure spring FIAT 656829 and nozzles EFEP 182.

Injector pressure setting . . 175 kg/cm² (2489 psi)

Pressure pipes . . . . . 2 x 6 x 865 mm

Test B:

— Test ring with engine injectors (nozzle holders type KB 70 S 1 F 10 and nozzle type DLL 145 S 60 F).

Injector pressure setting . . 195 to 205 kg/cm² (2775 to 2915 psi)

Pressure pipes . . . . . 1.5 x 6 x 700 mm

Test fluid . . . . . FIAT CFB

Temperature of test fluid . . 30° + 5° C

Test rig supply pressure . . 0.2 kg/cm² (2.8 psi)

Pump rotation looking from drive end . . . . . counterclockwise

Injection sequence 1-3-4-2

General data

Distance measured between governor cover stud and metering valve pin . . 53 to 54 mm (2.086 to 2.125 in)

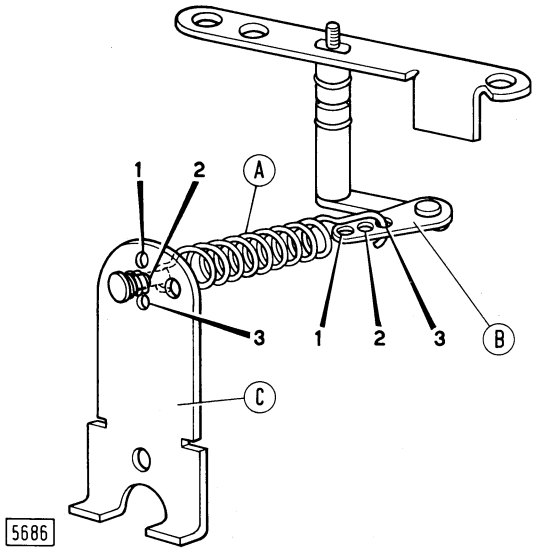
Control spring mounting holes as indicated in sketch.

Distance between cam ring rollers . . . . . 49.93 mm (1.965 in)

TYPE OF TEST	Order No.	Throttle lever setting (6)	Pump rpm	Internal feed pressure kg/cm²	Advance (7) degrees	TEST A		TEST B
						Single element output cm³ per 1000 strokes	Backleakage cm³ per 100 strokes	Single element output cm³ per 1000 strokes
Transfer pump	1-2	—	100	⩾ 1	—	—	—	—
Advance setting	3	—	500	—	6.5 to 7.5	—	—	—
	4		1050	—	8 to 8.5	—	—	—
	5		180 max	—	1.8 to 2.5	—	—	—
Automatic advance cut-off (1)	6	—	300	—	0	—	—	—
Full advance position (2)	7	—	—	—	—	—	—	—
Setting of pressure regulating valve Backleakage	8-9-10 (3)	Max	1050^{+0}_{-20}	—	—	60.5 to 62.5 (8)	⩾ 14	66.5 to 68.5 (8)
Max fuel delivery	11-12		500 ± 5	—	—	59.5 to 62.5 (8)	—	66 to 69 (8)
Fuel check for starting (1)	13	Max	100	—	—	⩾ 57	—	—
Engine stop	14	Max	200	—	—	⩽ 4	—	—
Throttle operation (low idle) (4)	15	Min	200	—	—	⩽ 5	—	—
Governor setting (max speed) (5)	16	Max	1150	—	—	⩽ 3	—	—
	17		1050^{+0}_{-20}	—	—	60.5 to 52.5	—	—

(1) Test to be carried out with the manual retard device actuated.
(2) Test necessary only on three cylinder engines.
(3) Throttle lever with max stop screw backed out, adjust the delivery by turning the adjusting plates.
(4) Throttle lever with min stop screw backed out.
(5) Adjust the throttle lever max stop screw.
(6) Keep the stop control lever excluded and put it in stop position only for test No. 14.
(7) Verify with tool 290743 and adjust by means of shims.
(8) Spread between deliveries 2 mm³/cycle.

The diagram indicates clearly the hole numbers in the governor control arm (C) and the throttle lever link (B), in which the main governor spring (A) is assembled.



ENGINE TEST DATA

TEST CONDITIONS

Engine without fan air cleaner and exhaust muffler.
Pressure: 740 ± 5 mm of mercury (Torino altitude).
Ambient temperature: 20 ± 3° C.
Relative humidity: 70 % ± 5.
Fuel specific weight: 830 ± 10 gr/liter.
Fixed injection advance before TDC in cylinder No. 1 in compression: 14° ± 1°.

Throttle lever setting	rpm		Power output of engine runned-in for a total of:				Fuel consumption time (250 cm³) sec.
	Engine	P.T.O.	2 hours HP		50 hours HP		
			On test rig	At P.T.O.	On test rig	At P.T.O.	
Max (under load)	2100	656	⩾ 74	⩾ 70.3	⩾ 76	⩾ 72.2	55 to 58
Max	1000	313	⩾ 35.5	⩾ 33.7	⩾ 36.5	⩾ 34.7	115.4 to 121.8
Max (no load)	2300 ± 20	719 ± 6	—	—	—	—	—
Low idle (no load)	600 to 650	188 to 203	—	—	—	—	—

ENGINE: General specifications

TORQUE SPECIFICATIONS

DESCRIPTION	Thread (M = metric)	References	Torque (*)	
			kgm	lb ft
Screw, engine to clutch housing	M 12 x 1.25	—	10.5	75.9
Screw, clutch housing to sump	M 10 x 1.25	—	6	43.4
Nuts for screws securing engine to clutch housing	M 12 x 1.25	—	10.5	75.9
Screw, engine side supports	M 14 x 1.5	—	16.5	119.3
Nut, cylinder head studs	M 16 x 1.5	C_1, page 11	23.5	169.9
Screw, rocker arm shaft supports	M 10 x 1.25	—	5	36.2
Screw, injection pump drive gear	M 8 x 1.25	—	2.5	18
Screw, timing idle gear shaft	M 8 x 1.25	C_2, page 11	3	21.6
Screw, crankshaft pulley	M 18 x 1.5	C_3, page 11	30	216.9
Screw, main bearing cap	M 16 x 1.5	C_4, page 11	14.5	104.9
Screw, con-rod cap	M 13 x 1	C_5, page 11	13	94
Screw, vibration damper housings	M 10 x 1.25	—	5	36.2
Screw, vibration damper housings to cylinder block	M 10 x 1.25	—	5	36.2
Screw, flywheel	M 12 x 1.5	C_6, page 11	9.5	68.7
Nut, splined bush on injection pump camshaft	$^9/_{16}$"-18 UNF	—	8.3	60
Screw, injection pump to support	M 8 x 1.25	—	2.5	18

(*) Lubricate with engine oil.

MASTER CLUTCH

Type	dual plate oil-bath, over centre type	
Quantity of driven plates	2	
Plate material	steel with syntherized material lining on each face	
Control	mechanical with hand lever	
Oil pump	lobe type, incorporated in the clutch	
Pump feeding pressure with engine at rated speed	0.1 to 0.5 kg/cm² (1.4 to 7.1 psi)	
Filter	with metal mesh filter	
	mm	in
O.D. of driven plates	304.546 to 305.054	11.9899 to 12.0100
Thickness of driven plates	6.985 to 7.239	.2749 to .2850
— wear limit	5.5 (1)	.2165 (1)
Nominal thickness of intermediate pressure plate	14	.5512
Backlash between teeth of pressure plates and clutch support	0.10 to 0.40	.0039 to .0157
Backlash between teeth of driven plates and clutch shaft	0.26 to 0.50	.0102 to .0196
Backlash between brake inner hub splines and clutch shaft	0.010 to 0.106	.00039 to .00417
O.D. of throw-out collar support	57.970 to 58.000	2.2822 to 2.2834
Inside diameter of throw-out collar	58.300 to 58.400	2.2952 to 2.2991
Clearance between throw-out collar and its support	0.300 to 0.430	.0118 to .0169
O.D. of throw-out collar	71.970 to 72.000	2.8333 to 2.8364
Inside diameter of oil pump body front bush	72.050 to 72.100	2.8365 to 2.8385
Inside diameter of oil pump cover rear bush	72.030 to 72.104 (2)	2.8377 to 2.8387 (2)
Clearance between throw-out collar and:		
— front bush	0.050 to 0.130	.0019 to .0051
— rear bush	0.030 to 0.134	.0011 to .0052
Max. clearance due to wear (front and rear bushes)	0.25	.0098

(1) Check that lube grooves are still visible.
(2) Dimension to be obtained after press-fitting of bush.

TRANSMISSION: General specifications

MASTER CLUTCH

(continued)

	mm	in
O.D. of oil pump driving gear	83.965 to 84.000	3.3056 to 3.3070
Inside diameter of seat on oil pump body	84.100 to 84.130	3.3109 to 3.3121
Clearance between oil pump body and driving gear	0.100 to 0.165	.0039 to .0064
O.D. of oil pump driven gear	131.960 to 132.000	5.1951 to 2.1968
Inside diameter of the relevant seat on oil pump body	132.100 to 132.140	5.2007 to 5.2023
Clearance between driven gear and its seat on pump body	0.100 to 0.180	.0039 to .0070
Thickness of oil pump gears	6.985 to 7.000	.2749 to .2756
Axial play of oil pump on throw-out collar	0.050 to 0.300	.0019 to .0118
Clearance between toggle levers and their hinging pins	0.016 to 0.077	.0006 to .0030
Max. clearance due to wear between levers and pins	0.20	.0078
Clearance between hinging pins and toggle links	0.032 to 0.077	.0012 to .0030
Max. clearance due to wear	0.15	.0058
Thickness of clutch brake lining	6	.236
— wear limit	4	.157
Specifications of pressure plate return springs:		
— free length	58	2.283
— test length under a test load of 26.3 to 28.9 kg (56 to 64 lbs)	31	1.220
Adjustment of master clutch	See page 11	

GEARBOX - REDUCTION UNIT

Type	constant mesh, helical teeth gears controlled by sliding sleeves	
Speeds	6 forward and 2 reverse	
Controls	one lever for the gearbox and one for the reduction unit	
	mm	in
Backlash between the teeth of gearbox and reduction unit gears	0.15 to 0.25	.0058 to .0098
Backlash between the splines of gearbox and reduction unit shaft and the relevant gears	0.03 to 0.11	.0011 to .0043
Backlash between the front engagement teeth of gearbox and reduction gears and the relevant sliding sleeves	0.03 to 0.11	.0011 to .0043
Diameter of reverse shaft	24.967 to 25.000	0.9829 to 0.9842
Inside diameter of reverse gear bush	25.060 to 25.100 (1)	0.9866 to 0.9881 (1)
Clearance between bush and reverse shaft	0.060 to 0.133	.0023 to .0052
— wear limit	0.25	.0098
Clearance between gearbox driven gears and their bushes	0.060 to 0.120	.0023 to .0047
Diameter of p.t.o. shaft front end	19.967 to 20.000	.7860 to .7874
Inside diameter of relevant bush on driving gears shaft	20.040 to 20.092 (2)	.7889 to .7910 (2)
Clearance between bush and p.t.o. shaft	0.040 to 0.125	.0015 to .0049
— wear limit	0.35	.0137
Clearance between speed shifting rods and their seats	0.000 to 0.085	.0000 to .0033
Width of engagement control fork pads	13.890 to 14.000	.5468 to .5512
Width of fork pad groove on engagement sliding sleeves	14.400 to 14.600	.5669 to .5748
Clearance between fork pads and their grooves on engagement sleeves	0.400 to .0710	.0157 to .0279
Specifications of gearbox, reduction unit and p.t.o. speed selector detent springs:		
— free length	34.5	1.358
— test length under a load of 16.2 to 17.9 kg (36 to 39 lb)	24	.944

(1) Dimension to be obtained after press-fitting, with reaming.
(2) Dimension to be obtained after press-fitting, without reaming.

TRANSMISSION: General specifications

GEARBOX - REDUCTION UNIT

(continued)

Gearbox and p.t.o. lubrication oil pump type	gear	
Drive	driven by gearbox driving shaft	
Gearbox driving shaft/pump speed ratio	1 : 0.814	
Filter of gearbox and p.t.o. lube oil	mesh type, on pump suction	
	mm	in
Backlash between oil pump drive gear teeth	0.15 to 0.25	.0058 to .0098
Diameter of driving gear shaft seat on pump body	16.016 to 16.043	.6305 to .6315
Diameter of driving gear shaft	15.982 to 16.000	.6292 to .6299
Clearance between pump body and shaft	0.016 to 0.061	.0006 to .0024
Max. clearance due to wear	0.150	.0058
Inside diameter of oil pump driven gear	12.016 to 12.043	.4730 to .4740
Diameter of driven gear pin	11.982 to 12.000	.4717 to .4724
Clearance between driven gear and its pin	0.016 to 0.061	.0006 to .0024
Diameter of gear seats on pump body	32.520 to 32.555	1.2802 to 1.2816
Outside diameter of gears	32.461 to 32.500	1.2779 to 1.2795
Radial clearance between gears and their seats on pump body	0.020 to 0.094	.0007 to .0037
Max. clearance due to wear	0.150	.0058
Depth of gear seats on pump body	12.000 to 12.043	.4724 to .4740
Thickness of pump gears	11.973 to 12.000	.4713 to .4724
Gear end-float on pump body	0.000 to 0.070	.0000 to .0027
Max. clearance due to wear	0.150	.0058

BEVEL GEAR

Type	spiral teeth
Bevel gear reduction ratio 13/51	1 : 3.923
Bevel pinion shaft front and rear bearings	tapered roller
Adjustment of pinion roller bearings and axial adjustment of pinion with respect to the crown	rings (see page 12)
Set of pinion tapered roller bearing adjustment shims	1-1.5-1.7-1.75-1.8-1.9-2-2.2-2.25-2.3 mm (.0394-.0591-.0669-.0689-.0709-.0748-.0787-.0866-.0885-.0906 in)
Set of pinion position adj. shims with respect to the crown	3.4-3.5-3.6-3.7-3.8-3.9-4-4.1-4.2-4.3-4.4-4.5-4.6-4.7-4.8-4.9-5-5.1-5.2 mm (.1339-.1378-.1417-.1457-.1496-.1535-.1575-.1614-.1654-.1693-.1732-.1772-.1811-.1850-.1890-.1929-.1969-.2008 in)
Normal backlash between the bevel gear teeth	0.20 mm (.0078 in)
Crown wheel shaft bearings	tapered roller
Setting of backlash between bevel gear teeth	rings (see page 12)
Set of adj. shims for bevel crown wheel tapered roller bearings	0.15-0.20-0.50 mm (.0058-.0078-.0196 in)

STEERING CLUTCHES

Type	multiple dry discs	
Control	mechanical actuation by hand lever	
Quantity of pressure spring per clutch	6	
	mm	in
Specifications of springs:		
— free length	113	$4\,^{7}/_{16}$
— test length under a test load of 141 to 155 kg (310 to 340 lb)	73	$2\,^{7}/_{8}$
Quantity of discs — driving (steel)	11	
Quantity of discs — driven (asbestos compound)	11	
Thickness of each driving disc	2.35 to 2.65	.0924 to .1042
Thickness of each driven disc	4.90 to 5.10	.1929 to .2008
— min. thickness due to wear	4.5	.1772
Total thickness of the complete stack	79.75 to 85.25	$3\,^{1}/_{8}$ to $3\,^{11}/_{32}$
— min. thickness of the stack due to wear	74 (1)	$2\,^{29}/_{32}$ (1)
Backlash between the inner drum and driving disc teeth	0.10 to 0.40	.0039 to .0157
Backlash between the outer drum and driven disc teeth	0.10 to 0.40	.0039 to .0157
Backlash between the inner splines of the driving and driven drums and the splines of the relevant shafts	0.03 to 0.11	.0011 to .0043
Diameter of disengagement fork pin	29.967 to 30.000	1.1798 to 1.1811
Bore of relevant bush	30.040 to 30.092 (2)	1.1826 to 1.1847 (2)
Clearance between bush and fork pin	0.040 to 0.125	.0015 to .0049
— max. clearance due to wear	0.3	.0118
Diam. of diseng. sleeve seats on the bevel gear wheel shafts supports	68.954 to 69.000	2.7146 to 2.7165
Inside diam. of disegagement sleeves	69.030 to 69.104	2.7177 to 2.7206
Clearance between diseng. sleeves and the relevant supports	0.030 to 0.150	.0011 to .0059
— max. clearance due to wear	.05	.0196
Diameter of diseng. sleeve pins	19.967 to 20.000	.7860 to .7874
Diameter of pin seats on fork lever	20.020 to 20.072	.7881 to .7902
Clearance between sleeve pins and fork lever	0.020 to 0.105	.0007 to .0041

(1) Should this limit be reached without any driven disc being near the wear limit, it is possible to re-establish the original thickness of the stack by adding a driving disc against the mobile pressure plate.

(2) Dimension to be obtained after press fitting without reaming.

TRANSMISSION: General specifications

STEERING CLUTCHES

(continued)

	mm	in
Diameter of deseng. lever pin	27.967 to 28.000	1.1010 to 1.1023
Inside diameter of pin bush	28.040 to 28.092 (1)	1.1039 to 1.1059 (1)
Clearance between pin and bush	0.040 to 0.125	.0015 to .0049
Max. clearance due to wear	0.25	.0098
Adjustments of steering clutches	see page 14	

BRAKES

Type	band, acting on the steering clutch outer drums	
Control	mechanical with independent pedals and simultaneous actuation of the brakes by hand lever	
	mm	in
Quantity of linings per band	6	
Thickness of lining	6.5	1/4
Min. thickness due to wear	4	5/32
Width and developped length of one lining	90 x 119	3 1/2 x 4 11/16
Outside diameter of drum	295	11 5/8
Diameter of interm. lever pin	29.940 to 30.000	1.1797 to 1.1811
Bore od of interm. lever pin bush	30.040 to 30.092 (1)	1.1826 to 1.1847 (1)
Clearance between bush and interm. lever pin	0.040 to 0.152	.0015 to .0059
Max. clearance due to wear	0.400	.0157
Diameter of brake control lever pin	24.967 to 25.000	.9829 to .9843
Inside diameter of hole on band control levers	25.000 to 25.130	.9843 to .9894
Clearance between band l. and r.h. control levers and theirs pins	0.000 to 0.163	.0000 to .0064
Diameter of brake control push-rod	13.890 to 14.000	.5468 to .5512
Diameter of push-rod seat on control lever	14.000 to 14.110	.5512 to .5555
Clearance between control lever and push-rod	0.000 to 0.220	.0000 to .0086
Diameter of parking brake shaft	19.870 to 20.000	.7822 to .7874
Bore of shaft bush	20.040 to 20.092 (1)	.7889 to .7910 (1)
Clearance between bush and shaft	0.040 to 0.222	.0015 to .0087

(1) Dimension to be obtained after press-fitting, without reaming.

BRAKES

	mm	in
Specifications of brake band return springs:		
— free length	84	$3\,^{5}/_{16}$
— test length under a load of 15.7 to 17.7 kg (34.5 to 39 lb)	59	$2\,^{21}/_{64}$
Adjustment of brakes	see page 14	

FINAL DRIVES

Type of reduction (each)	one couple of spur gears	
Final reduction ratio (11/53)	1 : 4.818	
Total reduction ratio (main and final)	1 : 18.902	
	mm	in
Backlash between driving and driven gear teeth	0.15 to 0.25	.0058 to .0098
Fitting between bull gear spline and its shaft:		
— max. interference	0.050	.0019
— max. clearance	0.048	.0018
Sprockets		
Quantity of teeth	27	
Pitch diameter	694	$27\,^{5}/_{16}$
Width of teeth	52	$2\,^{3}/_{64}$
Setting of sprocket tapered roller bearings	See page 13	
Range of shims for setting the sprocket bearings	0.1-0.2-0.5-1	.0039-.0078-.0197-.0394

P.T.O.

Drive	driven by the gearbox main shaft
Engagement	sleeve controlled by hand lever
Reduction ratio between P.T.O. driving and driven gears	15/48 = 1 : 3.2

TRANSMISSION: General specifications

P.T.O.

(continued)

Engine speed with P.T.O. at 540 rpm	1,728 rpm	
Diameter of P.T.O. output spline	1 3/8 in	
Quantity of splined teeth	6	
Rotation (seen from the back of the tractor)	clockwise	
	mm	in
Backlash between the teeth of the P.T.O. engag. splines	0.050 to 0.121	.0019 to .0017
Backlash between the P.T.O. driving and driven gear teeth	0.10 to 0.20	.0039 to .0078
Clearance between the groove on the sliding sleeve and the relevant P.T.O. engagement fork	0.40 to 0.71	.0157 to .0279
Diameter of P.T.O. engagement fork shaft	19.967 to 20.000	.7860 to .7874
Diameter of shaft seat on the relevant support	20.000 to 20.052	.7874 to .7894
Clearance between shaft and its seat on the support	0.000 to 0.085	.0000 to .0033
Inside diam. of P.T.O. inner control lever seat	22.000 to 22.052	.8661 to .8681
Diameter of P.T.O. inner control lever pin	21.967 to 22.000	.8618 to .8661
Clearance between bush and inner lever pin	0.000 to 0.085	.0000 to .0033

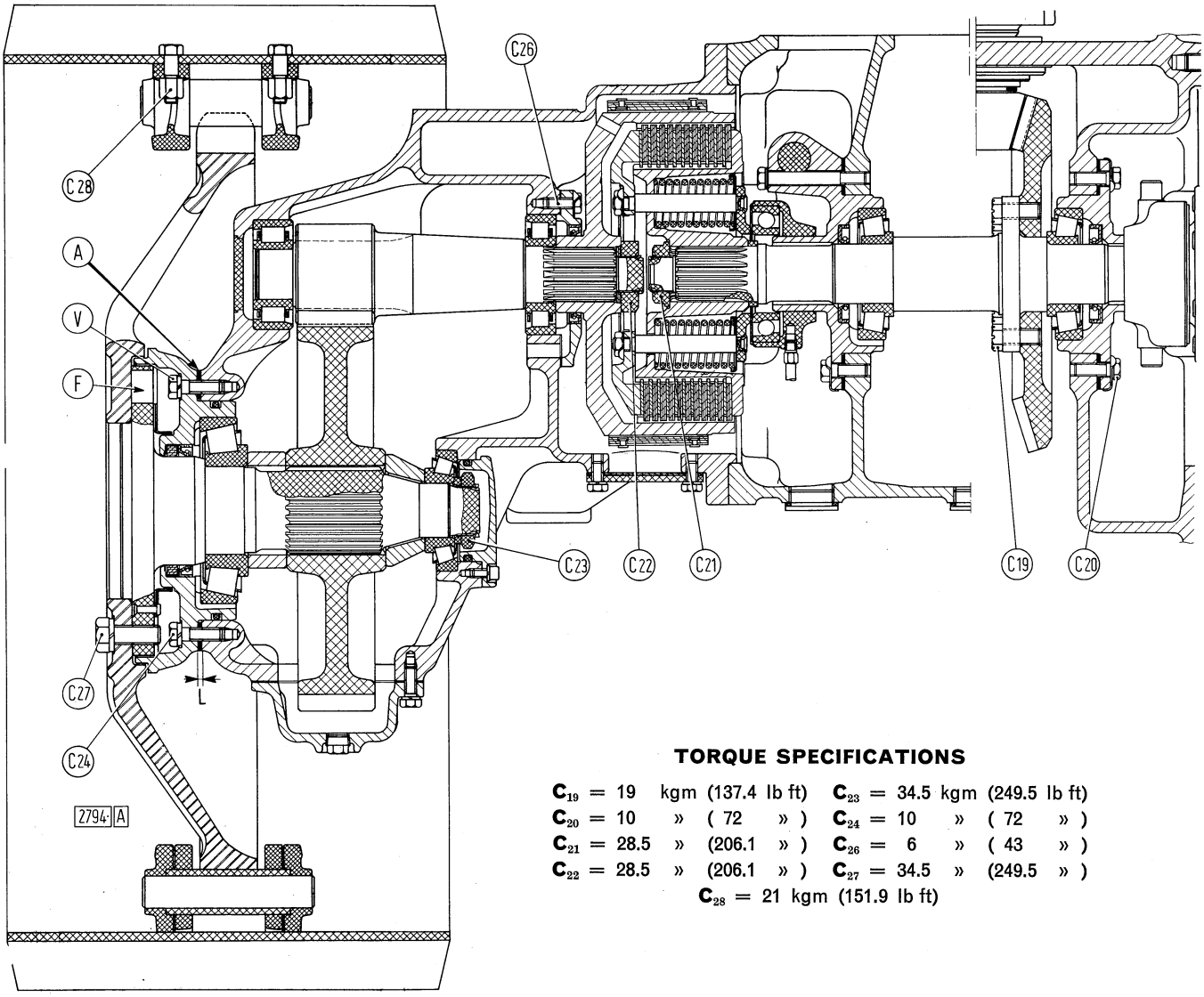
BELT PULLEY

Drive	P.T.O. shaft	
Engagement	hand lever, the same controlling the P.T.O.	
Position of the pulley fitted on the tractor	right or left	
Pulley diameter	280 or 320 mm	11 1/64 or 12 5/8 in
Rim width	175 mm	6 7/8 in
Reduction ratio of pulley driving and driven gears	18/30 = 1 : 1.666	
Speed with engine at rated speed	1,260 rpm	
Corresponding speed with 280 mm ⌀ pulley	18.5 m/sec	60.7 ft/sec
Corresponding speed with 320 mm ⌀ pulley	21.1 m/sec	69.2 ft/sec
Backlash between the teeth of the pulley bevel gear	0.15 mm	.0058 in
Thickness of shims for positionning the driving bevel gear	1.6-1.7-1.8-1.9-2-2.1-2.2-2.3-2.4 mm (.063-.066-.070-.074-.078-.082-.086-.090-.094 in)	
Thickness of shims for positioning the driven bevel gear	2-2.1-2.2-2.3-2.4-2.5-2.6-2.7-2.8-2.9-3 mm (.078-.082-.086-.090-.094-.098-.102-106-.110-.114-.118 in)	

TORQUE SPECIFICATIONS

DESCRIPTION	Thread (M = metric)	References	Torque (*)	
			kgm	lb ft
Dual plate oil bath master clutch				
Self-locking screw, clutch support to flywheel	M 8 x 1.25	C_{10}, page 11	2.7	19.5
Screw, sleeve support to clutch support	M 12 x 1.25	C_{11}, page 11	10.5	75.9
Self-locking screw, sleeve to clutch/gearbox coupling joint	M 12 x 1.5	C_{12}, page 11	10.5	75.9
Screw, clutch brake outer ring to oil pump cover	M 6 x 1	C_{13}, page 11	1.2	8.6
Screw, brake inner ring to clutch/gearbox coupling joint sleeve	M 10 x 1.25	C_{14}, page 11	6	43
Self-locking screw, cover to oil pump body	M 8 x 1.25	—	2	14.5
Gearbox and reduction unit				
Nut, sleeve to gearbox driving shaft	M 28 x 1.5	C_{15}, page 11	23	166.4
Ring nut, P.T.O. hub to gearbox driving shaft	M 35 x 1.5	C_{16}, page 11	36	260.4
Nuts, gearbox driven shaft	M 32 x 1.5	C_{17}, page 11	63	455.7
Bevel gear				
Nut, bevel pinion	M 32 x 1.5	C_{18}, page 11	63	455.7
Self locking screw, crown to shaft	M 14 x 1.5	C_{19}, page 13	19	137.4
Screws, crown shaft supports	M 12 x 1.5	C_{20}, page 13	10	72
Steering clutches				
Nut, steering inner drum to crown shaft	M 32 x 1.5	C_{21}, page 13	28.5	206.1
Nut, steering outer drum to final drive input pinion	M 32 x 1.5	C_{22}, page 13	28.5	206.1
Final drives				
Nut, final drive bull gear shaft	M 45 x 1.5	C_{23}, page 13	34.5	249.5
Screw, final drive hous. outer cover	M 12 x 1.25	C_{24}, page 13	10	72
Nut, final drive hous. to gearbox	M 16 x 1.5	C_{25}, page 14	23	166.4
Screw, driv. shaft inner bearing cover	M 10 x 1.25	C_{26}, page 13	6	43
Sprockets				
Screw, sprocket to final drive hub	M 18 x 1.5	C_{27}, page 13	34.5	249.5

(*) Lubricate with engine oil.



TORQUE SPECIFICATIONS

C_{19} = 19 kgm (137.4 lb ft)		C_{23} = 34.5 kgm (249.5 lb ft)	
C_{20} = 10 » (72 »)		C_{24} = 10 » (72 »)	
C_{21} = 28.5 » (206.1 »)		C_{26} = 6 » (43 »)	
C_{22} = 28.5 » (206.1 »)		C_{27} = 34.5 » (249.5 »)	
C_{28} = 21 kgm (151.9 lb ft)			

SETTING OF THE SPROCKET TAPERED ROLLER BEARINGS

— Pre-install the final drive driven shaft complete with all the components, tightening the relevant securing nut at a torque of 34.5 kgm (249.5 lb ft).

— Remove the six screws securing the final drive housing cover and through holes **F**, install three screws **V** (M 12 x 1.5 x 30) without spring washers and lubricated with engine oil, at 120° from each other.

— Tighten each of the three screws **V** at a torque of 0.2 kgm (1.4 lb ft) and rotate the final drive bull gear shaft so as to ensure the bedding-in of the tapered roller bearings.

— Re-establish the torque at 0.2 kgm (1.4 lb ft) and rotate the final drive bull gear shaft.

— Bring the torque of each screw **V** at 0.35 kgm (2.5 lb ft), rotating subsequently the shaft so as to bed-in bearings.

— Re-establish the torque at 0.35 kgm (2.5 lb ft), rotate the shaft and check the above mentioned tightening.

— Measure gap **L** between the final drive housing and the relevant cover, in three positions at 120° from each other.

— Work out the average value of the three readings and, subsequently, establish the thickness of the stack of shims as follows:

$$\mathbf{A = L + 0.10}$$

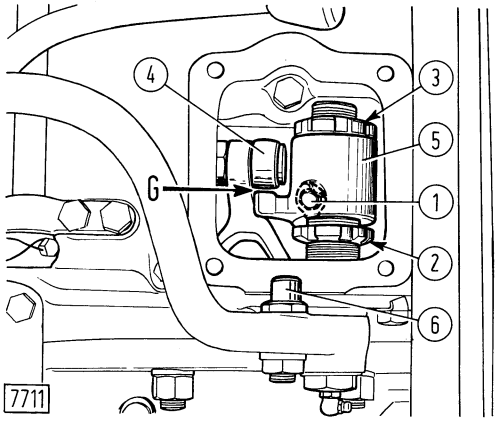
being:

A = stack of shims to be installed;
L = average value of the gap between final drive housing and its cover;
0.10 = value in mm of the running clearance of the bearings and the elastic deformation caused by the three screws **V**.

— Should it be necessary to round off the value of the shim stack, it is advisable to do in excess, whithin 0.10 mm.

TRANSMISSION: Setting of steering clutches and brakes

SETTING OF THE STEERING CLUTCHES



With steering clutches adjusted, the free travel of the hand control levers, measured at the handle, must be 11 to 12 cm ($4^5/_{16}$ to $4^3/_4$ in).

When, as a consequence of the wear of the clutch discs, the free travel decreases to 6 cm ($2^3/_8$ in), adjust the control of each clutch as follows:

— remove the inspection cover;

— remove screw **1** with the relevant ring stop plate **2** and unscrew the latter 3 to 4 turns;

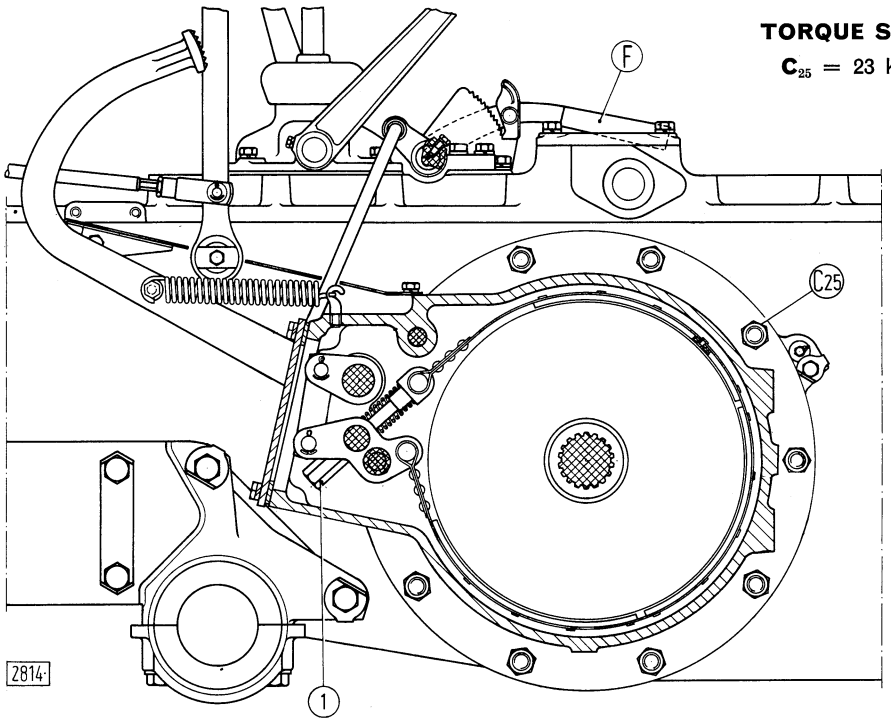
— with steering clutch on and the hand lever against front stop **6**, push roller **4** towards the center line of the tractor (overcoming the load of the return spring), so as the fork lever, on which the roller is fitted, can have its full travel and keep it in this position;

— screw up ring **3** so as between roller **4** and the flat area of cam **5** there is a 3 mm ($^1/_8$ in) gap **G** measured with a feeler gauge;

— remove the feeler gauge, screw up completely ring **2** against cam **5** and lock it with the relevant safety plate;

— check that the free travel of the hand lever is within the above mentioned values, otherwise act on cam **6**, rotating it properly and repeat the adjustment of the clearance between spring and cam.

Note - In order to compensate the normal wear of the clutch discs, it is not necessary, generally, to act on cam stop **6**.



TORQUE SPECIFICATION

C_{25} = 23 kgm (166.4 lb ft)

ADJUSTMENT OF THE BRAKES

With brakes properly adjusted, the free travel of the brake pedals must be 4 to 5 cm ($1^1/_2$ to 2 in).

When, as a consequence of the wear of the linings, this travel is more than 7 cm ($2^1/_{32}$ in) it is necessary to adjust each brake as follows:

— move parking brake hand lever **F** downward;

— remove from the final drive housing the front cover and screw up setting nut **1** until the brake pedal travel is 40 to 50 mm ($1^1/_2$ to 2 in);

— re-install the front cover.

TRACK CHAINS

Quantity of links (per track):			
— r.h. (marked D)		35	
— l.h. (marked S)		36	
— master link		1	
Quantity of shoes (per track)		36	
		mm	in
Width of shoes:			
— standard		400	15 3/4
— optional		500	19 43/64
Total ground bearing area	with 400 mm (15 3/4 in) shoes	14,240 cm²	2,202 sq.in
	with 500 mm (19 43/64 in) shoes	18,300 cm²	2,831 sq.in
Specific ground pressure	with 400 mm (15 3/4 in) shoes	0.35 kg/cm²	4.9 psi
	with 500 mm (19 43/64 in) shoes	0.29 kg/cm²	4.1 psi
Quantity of track rollers (per track)		5	
Quantity of carrier rollers (per track)		1	
Height of shoe grousers Height of links Thickness of links on rolling race flanks Link pitch		See page 5	
Outside diameter of bush		44.920 to 45.020	1.768 to 1.771
Bore of bush hole on links		44.740 to 44.800	1.761 to 1.763
Fit interference between bushes and their seats on links		0.120 to 0.280	.0047 to .0110
Diameter of pins		29.980 to 30.040	1.179 to 1.181
Bore of pin hole on links		29.790 to 29.850	1.172 to 1.174
Fit interference between pins and their seats on links		0.130 to .0250	.0051 to .0098
Inside diameter of bushes		30.360 to 30.510	1.195 to 1.201
Clearance between pins and bushes		0.320 to 0.530	.0125 to .0208

TRACK RECOIL SPRING

Track tension adjustment	mechanical	
Recoil spring specifications:		
— free length	466	18 11/32
— length under a test load of 3,940 to 4,360 kg (8,690 to 9,610 lb)	415	16 11/32

UNDERCARRIAGE: General specifications

IDLERS AND TRACK ROLLERS

	mm	in
Diam. of shaft in correspondence of bushes { idler	55.120 to 55.150	2.1700 to 2.1712
Diam. of shaft in correspondence of bushes { track roller	54.970 to 55.000	2.1641 to 2.1653
Inside diameter of bushes	55.213 to 55.364 (1)	2.1737 to 2.1796 (1)
Clearance between shafts and bushes { idler	0.063 to 0.244	.0024 to .0096
Clearance between shafts and bushes { track roller	0.213 to 0.394	.0083 to .0155
— max. clearance due to wear	1.50	.0591
Outside diameter of bushes	63.970 to 64.000	2.5184 to 2.5197
Inside diameter of bush housings	63.913 to 63.959	2.5162 to 2.5179
Fit interference between bush and seat	0.011 to 0.087	.0004 to .0034
Outside diam. of bush housing	95.067 to 95.102	3.7427 to 3.7441
Diameter of bush housing seat	95.000 to 95.035	3.7402 to 3.7415
Fit interference between bush housing and its seat	0.032 to 0.102	.0012 to .0040
End float of idlers and rollers	0.250 to 0.700	.0098 to .0275
Diameter of idlers and rollers on rolling areas	See page 5	
Idler position setting shims	0.5	.0196

CARRIER ROLLERS

Inside diameter of bushes	40.085 to 40.180 (1)	1.5781 to 1.5818 (1)
Diameter of shaft in correspondence with the bushes	39.975 to 40.000	1.5737 to 1.5748
Clearance between shaft and bushes	0.085 to 0.205	.0033 to .0080
Max. clearance due to wear	1.20	.0472
Diameter of bush seats on roller	49.900 to 49.940	1.9646 to 1.9661
Outside diameter of bushes	50.000 to 50.025	1.9685 to 1.9694
Fit interference between bushes and seats on roller	0.060 to 0.125	.0023 to .0049
Diameter of carrier rollers on rolling area	See page 5	

FRONT SUSPENSION AND TRACK FRAMES CONNECTION

Diameter of seat for spring central support bushes	34.800 to 34.950	1.3701 to 1.3759
Outside diameter of bushes	35.000 to 35.130	1.3780 to 1.3831
Interference between bushes and seats	0.050 to 0.330	.0019 to .0129
Inside diameter of bushes	30.050 to 30.100 (2)	1.1830 to 1.1850 (2)
Diameter of trunnion pin	29.979 to 30.000	1.1804 to 1.1811
Clearance between pin and bushes	0.050 to 0.121	.0019 to .0047
Idler setting shims	0.5	.0196
Clearance between block and inner and outer idler guide plates	2	.0787
Diameter of rear suspension bar at track frame reaction brace bush seat	79.954 to 80.000	3.1477 to 1.1496
Inside diameter of rear suspension bar bushes (after press-fitting)	80.080 to 80.420	3.1519 to 3.1653
Clearance between bar and bushes	0.080 to 0.466	.0031 to .0183
Max. clearance due to wear	1.50	.0591

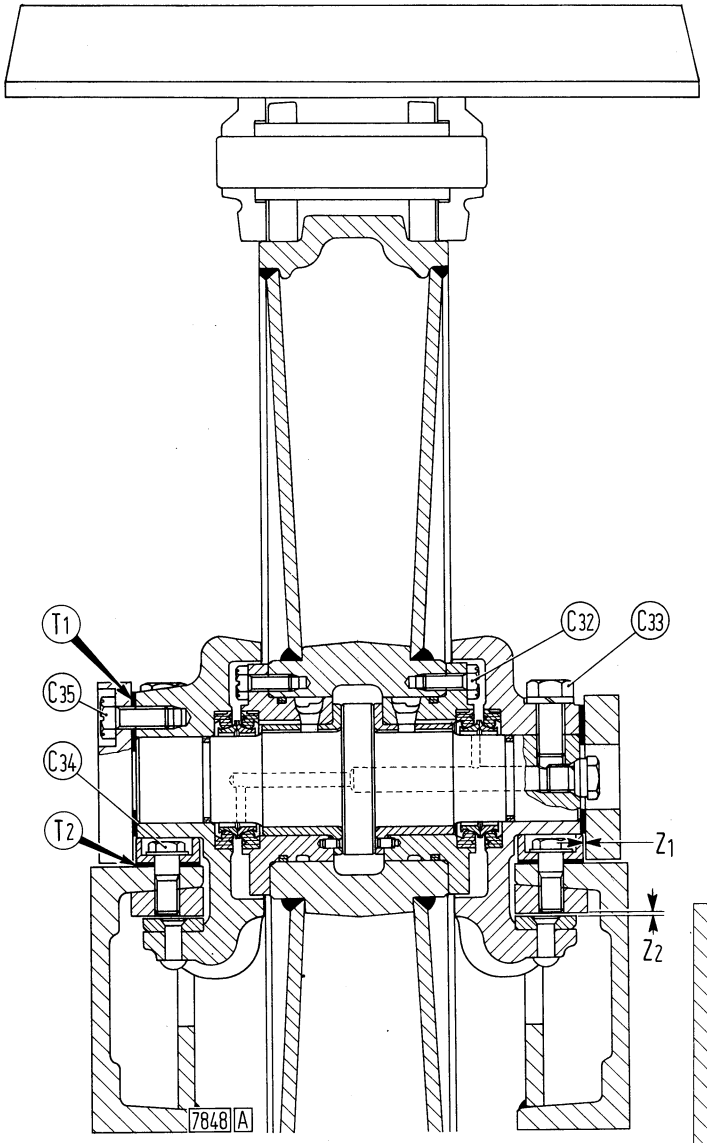
(1) Dimension to be obtained after press-fitting, without reaming.
(2) Dimension to be obtained after press-fitting, by reaming.

TORQUE SPECIFICATIONS

DESCRIPTION	Thread (M = metric)	References	Torque (*)	
			kgm	lb ft
Track chain				
Nut, track shoe	$^{9}/_{16}$"-18 UNF	—	21	151
Screw, master pin	M 16 x 1.5	—	20	144.6
Track recoil system				
Self-locking screw, idler bush housing	M 10 x 1.25	C_{32}, page 4	7	50.6
Screw, idler shaft to its supports	M 16 x 1.5	C_{33}, page 4	23	166.3
Screw, idler support guide	M 14 x 1.5	C_{34}, page 4	11.5	83.2
Self-locking screw, idler support plate	M 14 x 1.5	C_{35}, page 4	17.5	126.5
Screw, idler to fork	M 14 x 1.5	—	16	115.7
Carrier roller				
Self-locking screw, thrust washer	M 10 x 1.25	C_{36}, page 4	6.5	47
Screw, cover to roller	M 10 x 1.25	C_{37}, page 4	6	43.4
Nut, shaft to support screw	M 14 x 1.5	C_{38}, page 4	15.5	112
Screws, roller support	M 16 x 1.5	C_{39}, page 4	19	137.4
Track roller				
Self-locking screw, bush housing	M 10 x 1.25	C_{40}, page 4	7	50.6
Screw, roller support to track frame	M 16 x 1.5	C_{41}, page 4	25.5	184.4
Front suspension				
Screw, spring central support plate	M 14 x 1.5	—	11.5	83.2
Screw, spring pad	M 16 x 1.5	—	17.5	126.5
Screw, r. and l.h.s. spring pads	M 14 x 1.5	—	17.5	126.5
Rear suspension				
Screw, suspension bar caps to final drive hounsings	M 20 x 1.5	—	33	238.6
Screw, suspension bar outer bush to frame brace	M 16 x 1.5	—	25.5	184.4
Screw, r. and l.h.s. track frames to supports	M 16 x 1.5	—	25.5	184.4

(*) Lubricate with engine oil.

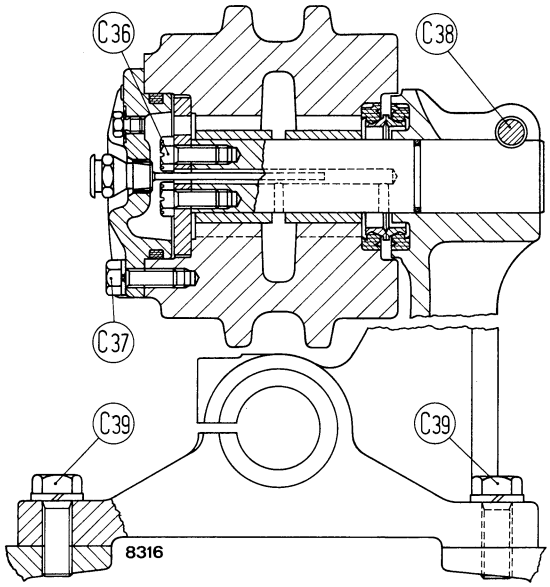
UNDERCARRIAGE: Wheel sections



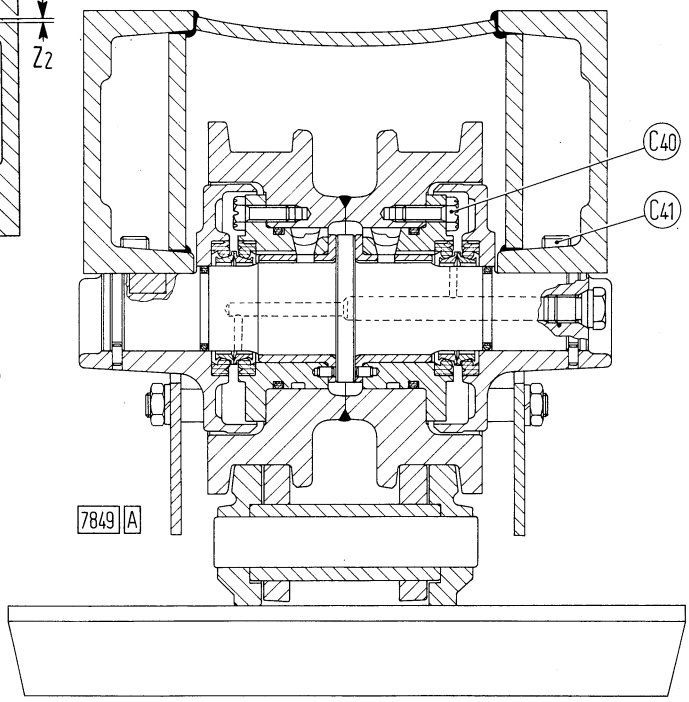
Idler section

Z_1 = 0.5 to 1 mm (.0196 to .0393 in).
Clearance to be obtained by acting on shims T_1.

Z_2 = 0.5 to 1 mm (.0196 to .0393 in).
Clearance to be obtained by acting on shims T_2.



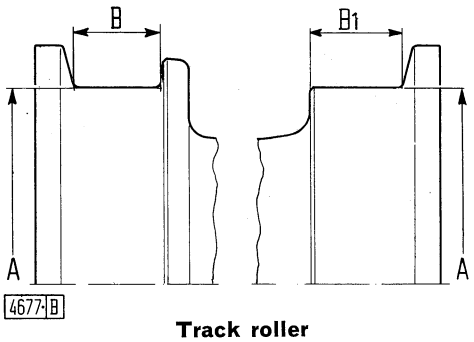
Carrier roller section



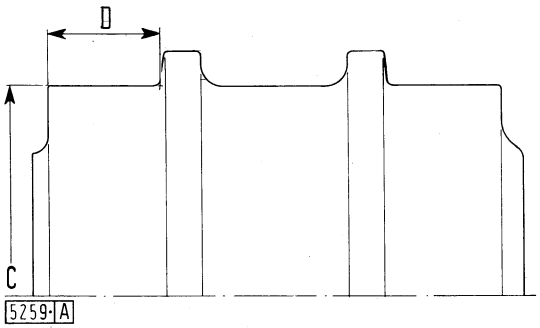
Track roller section

TORQUE SPECIFICATIONS

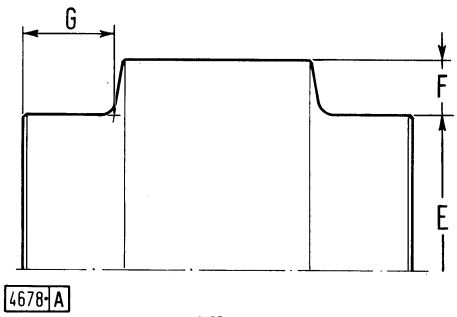
C_{32}	= 7	kgm	(50.6 lb ft)
C_{33}	= 23	»	(166.3 »)
C_{34}	= 11.5	»	(83.2 »)
C_{35}	= 17.5	»	(126.5 »)
C_{36}	= 6.5	»	(47 »)
C_{37}	= 6	»	(43.4 »)
C_{38}	= 15.5	»	(112 »)
C_{39}	= 19	»	(137.4 »)
C_{40}	= 7	»	(50.6 »)
C_{41}	= 25.5	»	(184.4 »)



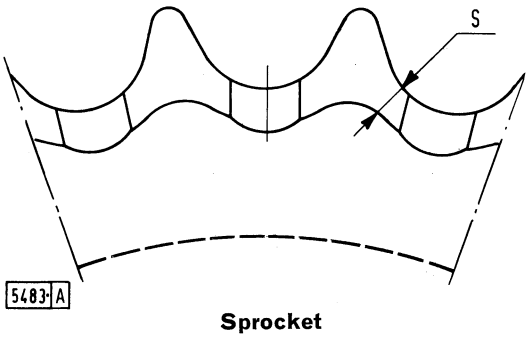
Track roller



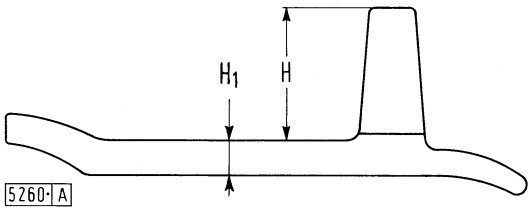
Carrier roller



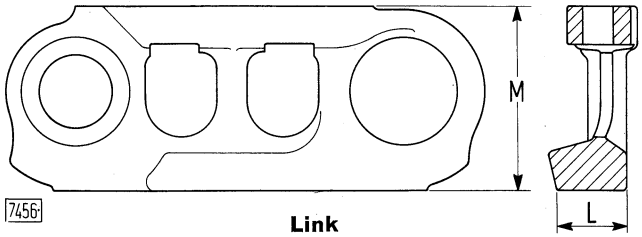
Idler



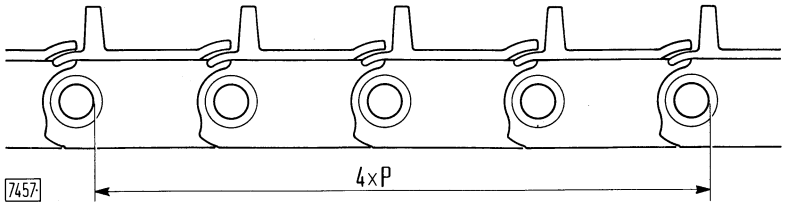
Sprocket



Shoe



Link



Chain

PROFILES OF THE UNDERCARRIAGE COMPONENTS

DIMENSION		A	B	B_1	C	D	E	F	G	H	H_1	L	M	P	S
Nominal dimension	mm	185	36	36	155	34	550	15	24	43 to 45	8.5 to 9.5	33	83	160	10 to 11
	in	$7\,^{9}/_{32}$	$1\,^{13}/_{32}$	$1\,^{13}/_{32}$	$6\,^{1}/_{8}$	$1\,^{5}/_{16}$	$21\,^{21}/_{32}$	$^{19}/_{32}$	$^{15}/_{16}$	$1\,^{11}/_{16}$ to $1\,^{25}/_{32}$	$^{11}/_{32}$ to $^{3}/_{8}$	$1\,^{5}/_{16}$	$3\,^{1}/_{4}$	$6\,^{5}/_{16}$	$^{25}/_{64}$ to $^{7}/_{16}$
Wear limit (*)	mm	171	50	43	143	40	540	20	29	22 (°)	—	—	79	163.5	6 (°)
	in	$6\,^{3}/_{4}$	2	$1\,^{11}/_{16}$	$5\,^{5}/_{8}$	$1\,^{9}/_{16}$	$21\,^{1}/_{4}$	$^{25}/_{32}$	$1\,^{9}/_{64}$	$^{7}/_{8}$ (°)	—	—	$3\,^{7}/_{64}$	$6\,^{7}/_{16}$	$^{15}/_{64}$ (°)

(*) The wear limit shown correspond, normally, to the thickness of the hardened section and, within this values, it is still possible to carry out the repair by adding material. Should it be preferred the complete renewal of the components, it is possible to run them beyond this limit.

(°) The wear limit might change considerably according to the working conditions.

UNDERCARRIAGE

HYDRAULIC PUMP

Type	gear, drawing oil from hydraulic lift body	
Model	A 25 X	
Make	FIAT (PLESSEY licence)	
Drive	engine timing gears	
Rotation (looking from drive end)	clockwise	
Engine/pump speed ratio	1 : 1.156	
Max. speed (with engine at 2,100 rpm)	2,428 rpm	
Nominal delivery at max. speed	27.6 lt/min	6.07 G.P.M.
Delivery on test bench at 1,445 rpm and pressure 145 to 155 kg/cm² (2,062 to 2,205 psi):		
— new or overhauled pump not below	15.3 lt/min	3.36 G.P.M.
— used pump not below	11 lt/min	2.42 G.P.M.
Test oil temperature	55 to 65°C	131 to 145°F
Test oil viscosity	SAE 20 W	

	mm	in
Diameter of driving and driven shafts	17.400 to 17.424	.6850 to .6860
Diameter of shaft seat on support bearings	17.450 to 17.470	.6870 to .6877
Running clearance of shafts in bearings	0.026 to 0.070	.0010 to .0027
— wear limits	0.1	.0039
Diameter of bearing locations in pump body	37.270 to 37.294	1.4673 to 1.4683
Max. wear on pump body on suction area in correspondence with the gears	0.1	.0039
Width of bearings	19.796 to 19.812	.7793 to .7799
Width of gears	18.323 to 18.348	.7213 to .7223
Width of gear and support seats on pump body	58.072 to 58.122	2.2862 to 2.2882
End float of gears and bearing in pump body (to be obtained during overhaul as well)	0.100 to 0.207	.0039 to .0081

HYDRAULIC LIFT PLANT: General specifications

HYDRAULIC LIFT

Type	position control, with single-acting cylinder incorporated	
Bore and stroke	95 x 137 mm	3.74 to 5.39 in
Total capacity	971 cm^3	59.25 cu.in
Cylinder safety valve setting	200 to 210 kg/cm^2	2845 to 2987 psi
Pressure relief valve setting	145 to 155 kg/cm^2	2062 to 2204 psi
Nominal lifting capacity	1456 kg	3210 lb
Three-point implement carrier, category	2nd and 3rd	
Maximum liftable weight at implement carrier lower links:		
— with vertical tie-rods connected to the front holes	1,520 kg	3,350 lb
— with vertical tie-rods connected to the rear holes	1,800 kg	3,968 lb
Maximum lift stroke at implement carrier lower links:		
— with vertical tie-rods connected to the front holes	720 mm	28.34 in
— with vertical tie-rods connected to the rear holes	600 mm	23.62 in
	mm	in
Diameter of piston	94.980 to 95.000	3.7393 to 3.7401
Inside diameter of cylinder barrel	95.036 to 95.071	3.7415 to 3.7429
Running clearance of piston	0.036 to 0.091	.0014 to .0036
Diameter of rockshaft at bushing locations:		
— right-hand side	59.970 to 60.000	2.3610 to 2.3622
— left-hand side	64.970 to 65.000	2.5578 to 2.5590
Inside diameter of rockshaft bushings (fitted):		
— right-hand side	60.100 to 60.170 (1)	2.3661 to 2.3688 (1)
— left-hand side	65.100 to 65.170 (1)	2.5629 to 2.5657 (1)
Assembly clearance of rockshaft in bushings	0.100 to 0.200	.0040 to .0079
Interference fit of bushings in hydraulic lift body	0.020 to 0.102	.0007 to .0040
Thickness of washers for max. lift stop adjustment screw	0.45 to 0.55	.0177 to .0216
Thickness of washers for lift arms end float adjustment	5.4-5.5-5.6-5.7 5.8-5.9	.212-.216-.220-.224 .228-.232
Lift arms end float	0.1 to 0.3	.0039 to .0118
Clearance between control spool, control valve plunger and relevant seats on control valve body (parts selected and mated by grinding)	0.025 to 0.035	.0009 to .0013
Cylinder discharge valve spring specifications:		
— free length	22	.87
— length under a test load of 2.3 to 2.6 kg (5 to 5.7 lb)	10	.39
Control valve plunger spring specifications:		
— free length	46	1.81
— length under a test load of 1.8 to 2.2 kg (4 to 4.8 lb)	20	.79
Hydraulic lift adjustments	See page 4	

(1) Dimension to be obtained after press-fitting, with reaming.

AUXILIARY CONTROL VALVE

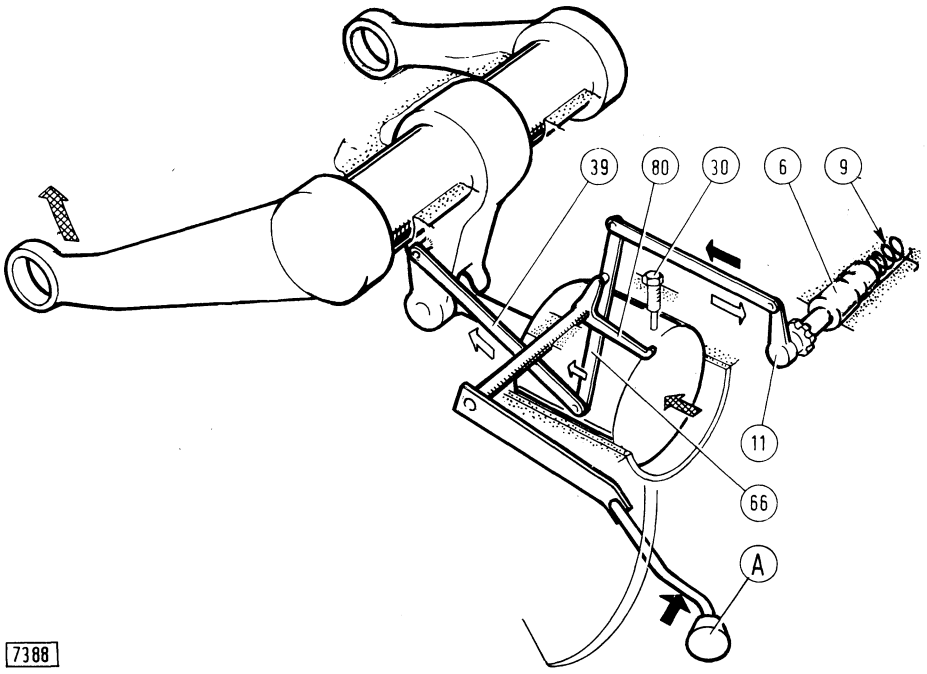
Use	control of single or double-acting hydraulic cylinders	
Control	independent hand lever	
Assembly clearance between distributing spool and bore in valve body (mated parts after grinding)	0.015 to 0.020 mm	.0005 to .0007 in
Pressure relief valve	the same valve, removed from the normal control valve cover, is used	

TORQUE SPECIFICATIONS

DESCRIPTION	Thread (M = metric)	Torque (*) kgm	Torque (*) lb ft
Hydraulic pump			
Screws, pump to engine timing cover	M 6 x 1	1	7.2
Nuts, screws for pump elements	$^3/_8$"-24 UNF	4.2	30.4
Nut pump drive sleeve	$^7/_{16}$"-20 UNF	2.8	20
Lift			
Screws, lift support to tractor	M 10 x 1.25	6.3	45.5
	M 14 x 1.5	18	130.2
	M 16 x 1.5	25.5 (°)	184.5 (°)
	M 16 x 1.5	23.5 (*)	170 (*)
Nuts for studs securing lift support to tractor body	M 16 x 1.5	23	166.4
Screws, lift body to relevant support	M 14 x 1.5	16.5	119.4
Nuts, for studs securing lift body to relevant support	M 14 x 1.5	16.5	119.4
Nuts, control valve to lift body	M 10 x 1.25	6	43.4
	M 14 x 1.5	16	115.7
Nuts, rear cover studs	M 12 x 1.5	14	101.2
Cylinder safety valve	M 24 x 1.5	3.5	25.3
Plug, pilot valve	M 24 x 1.5	6.5	47
Nut, lift arms to shaft	M 14 x 1.5	16	115.7
Screws, top link support	M 16 x 1.5	23	166.4

(*) Lubricate with engine oil - (°) Material R 100 - (*) Material R 80.

HYDRAULIC LIFT PLANT: Operation - Adjustments



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OPERATION

Moving control lever **A** toward the top of the sector, the linkages motions are indicated by the black arrows and the control spool **6** is rotated in delivery position.

As soon as the piston moves, lever **39**, connected to inner arm, acts upon the rocker arm **66** in the direction shown by the light arrows and tends to bring the spool back in neutral position. This latter condition shows itself when the lift arms reach the position selected with lever **A** on the relevant sector.

SCHEMATIC DIAGRAM SHOWING THE OPERATION OF THE VALVE SPOOL DURING ARMS LIFTING CONTROL (The sense of motion is reversed for arms lowering).

A. Lift control lever - **6.** Control valve spool - **9.** Spool return spring - **11.** Spool control lever - **30.** Arms max. lift adjusting screw - **39.** Link connected to the actuating arm - **66.** Rocker arm - **80.** Rocker arm transfer lever (stops the lift arms raise when the screw 30 is reached).

SETTING THE MAXIMUM LIFT ARMS TRAVEL (figs. a, b)

With at least 50 kg (110 lb) load on the lift arms, and the engine running at medium speed, operate as follows:

— set lift control lever **A** at the highest point in the control quadrant with one movement only;

— scribe two assembly marks S_1 on the hydraulic lift body and S_2 on the r.h.s. arm;

— slowly unscrew a few turns the arm max. lift stop screw **10** until the pressure relief valve blows open;

— stop the engine and check that the residual travel **d** between marks S_1 and S_2 is 4 to 5 mm (.158 to .197 in). If the residual travel is higher, increase the quantity of shims **N**, if it is lower decrease it.

SENSITIVITY ADJUSTMENT (fig. c)

With a 50 kg (110 lb) load, engine running at medium speed operate as follows:

— bring sensitivity lever **18** horizontal, in a forward position;

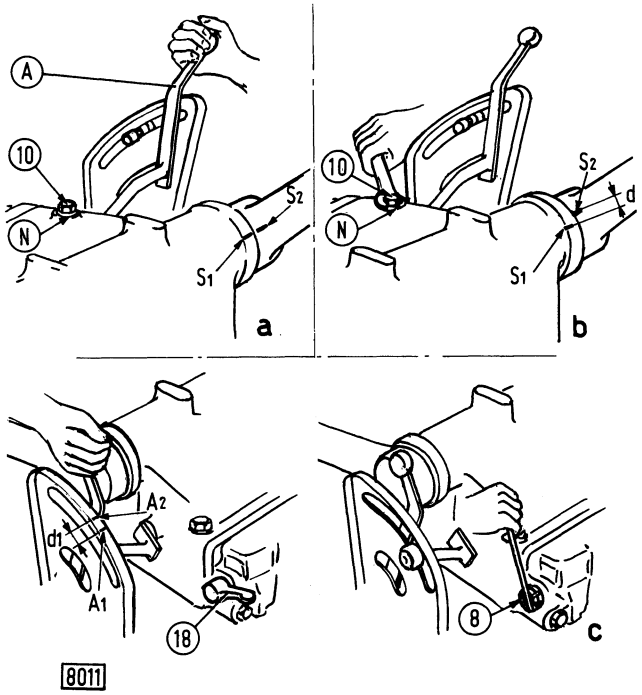
— starting from the upper end, shift the hydraulic lift control lever down to about the centre of the sector;

— scribe a mark A_1 on the sector perifery;

— gradually move the lever up until the arms start raising;

— mark on the sector the new position of the lever A_2;

— distance d_1 between these two marks must be 7 to 10 mm (.275 to .394 in);



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— if the distance is greater, remove the sensitivity lever and screw up plug **8**, if smaller, unscrew it;

— after a final check, refit the sensitivity lever, arranging it as horizontally as possible.

GENERATOR

Alternator	
Type (3-phase, self-rectifying)	FIAT A 12 M-124/12/42 X
Nominal voltage	12 V
Rotation (pulley end)	clockwise
Cut-in speed at 12 V (20° C - 68° F)	950 to 1,050 rpm
Current output delivered to battery at 14 V, 5,000 rpm and at operating temperature (°°)	above 42 amp.
Max. current (°°)	approx 53 amp.
Field winding resistance at 20° C (68° F):	
— across collector rings	4.1 to 4.5 ohms
— across connection 67 and ground at 500 rpm	4.5 to 4.8 ohms
Resistance of each armature statoric phase	0.11 ± 0.005 ohms
Speed of alternator installed (at engine rated power speed)	4,446 rpm
Engine/alternator speed ratio	1 : 2.117
Voltage regulator	
Model	FIAT RC 2/12 B
Alternator speed for checking and setting purpose	5,000 rpm
Battery capacity	40 to 50 amp. hr
Thermic stabilization current	7 amp.
2nd stage test current	2 to 12 amp.
2nd stage setting voltage	13.9 to 14.5 V
1st stage test current	25 to 35 amp.
1st stage setting voltage	less than 2nd stage voltage by 0.2 to 0.7 V
Resistance between terminal 15 and ground	26 to 30 ohms
Resistance between terminals 15 and 67, with open contacts	5.35 to 5.95 ohms
Armature air gap	1.45 to 1.55 mm (.057 to .061 in)
Gap between contacts of 2nd stage	0.35 to 0.55 mm (.014 to .022 in)
Magnetic switch	
Type	SIPEA
Excitation winding resistance	27 to 31 ohms
Contact opening voltage	5.3 to 5.7 V

(°°) These specifications apply to alternators with properly bedded brushes.

ELECTRICAL SYSTEM: General specifications

STARTING MOTOR

Type	MARELLI MT 62 BA	
Voltage	12 V	
Nominal power output	4 HP	
Rotation (looking from drive end)	clockwise	
Poles	4	
Excitation (windings)	in series - in parallel	
Engagement	armature axial drive with friction coupling	
Control	solenoid	
	mm	in
I.D. between poles	83.25 to 83.35 83.65 to 83.85	3.277 to 3.282 3.293 to 3.301
O.D. of armature	82.346 to 82.400 82.946 to 83.000	3.242 to 3.244 3.266 to 3.268
Pinion and gear ratio	9/130	
Data for test bench		
Performance test under load (at 20°C - 68°F):		
— current	less than 950 amp.	
— speed	1,300 to 1,900 rpm	
— voltage	8.5 V	
— torque output	2.3 kgm (16.6 ft.lb)	
Stall test (at 20°C - 68°F):		
— current	less than 1,900 amp.	
— voltage	7 V	
— torque output	more than 5 kgm (36 ft.lb)	
No-load test (at 20°C - 68°F) (1):		
— current	less than 140 amp	
— voltage	12 V	
— speed	700 to 1,400 rpm	
Mechanical specifications test		
Spring pressure on brushes (not worn)	0.8 to 1 kg (1.8 to 2.4 lb)	
Mica under cutting	1 mm (.039 in)	
Clutch coupling efficiency: slip torque	12 to 16 kgm (87 to 115.5 ft.lb)	
Diameter of commutator	47.36 to 48.16 mm (1.8645 to 1.8960 in)	
— max. throw	0.03 mm (.0012 in)	
Solenoid		
Resistance of winding (at 20°C - 68°F)	0.825 to 1.025 ohms	
Absorption at 12 V	less than 14.6 amp.	
Stall voltage (min.)	8 V	
Lubrication (at overhauling)		
Coupling helix	FIAT MR 3 grease	
Drive end bushing	FIAT MR 3 grease	

(1) The data are obtained by feeding only the auxiliary winding in series and in parallel.

BATTERY

Type		MARELLI 6 ATP 27 or TITANO 6 DE 12 F
Nominal voltage		12 V
Nominal capacity (at 20 hr discharge)	MARELLI	143 amp. h
	TITANO	136 amp. h
Overall dimensions (length x width x height)	MARELLI	510 x 216 x 230 mm (20 x 8.5 x 9 in)
	TITANO	508 x 216 x 244 mm (19.9 x 8.5 x 9.6 in)
Weight, with electrolyte		50 kg (110 lb)

FUSES

Seven 8 amp fuses: six located in a box and one in a cylindric holder (free fuse).

FUSES	PROTECTED CIRCUITS
1	As spare.
2	Fuel level indicator - Engine water temperature gauge - Engine oil lack of pressure indicator - Magnetic switch.
3	R.h. front parking light - L.h. rear parking light - Parking lights spy and switch-board light - Connector - Plate light.
4	L.h. front parking light - R.h. rear parking light - Rear flood-light.
5	Dimmed front headlights.
6	Driving front headlights.
7	Voltage regulator.

The starting, alternator and starting aid (optional) circuits have no fuse protection.

LIGHTING AND INDICATORS

Two front headlamps with parking light incorporated with 45/40 W double filament bulb (dimmed and driving lights) and 5 W (parking) bulb.

A rear floodlight with 35 W lamp.

Two rear parking lights with 5 W bulb.

A plate light with 5 W bulb.

A parking lights spy and switch-board light with 5 W bulb.

A battery charging plant warning light with 5 W bulb.

A engine lubrication oil pressure warning light with 5 W bulb.

ELECTRICAL SYSTEM: General specifications

LIGHTING AND STARTER SWITCH

SIPEA Type, 6-position, 60 amp.

Switch positions	CONNECTED EQUIPMENT
Position 0 (°) 30 30/1	All circuits off.
Position I 30-51 30/1	Starting push-button - Alternator warning light - Voltage regulator - Fuel level indicator control - Oil pressure warning light switch - Engine cooling water electrical thermometer transmitter.
Position II 30-51 30/1-58	Like position I, plus front and rear parking and plate lights - Parking light spy and switch-board light, rear flood-light.
Position III 30-51 30/1-58-56b	Like position II plus dimmed headlights.
Position IV 30-51 30/1-58-56a	Like position II plus driving headlights.
Position V (°) 30 30/1-58	Front rear parking and plate light - Parking light spy and switch-board light - Rear flood-light.

(°) The key can be removed.

GLOW PLUG AND STARTER SWITCH

SIPEA Type, 4-position, 60 amp.

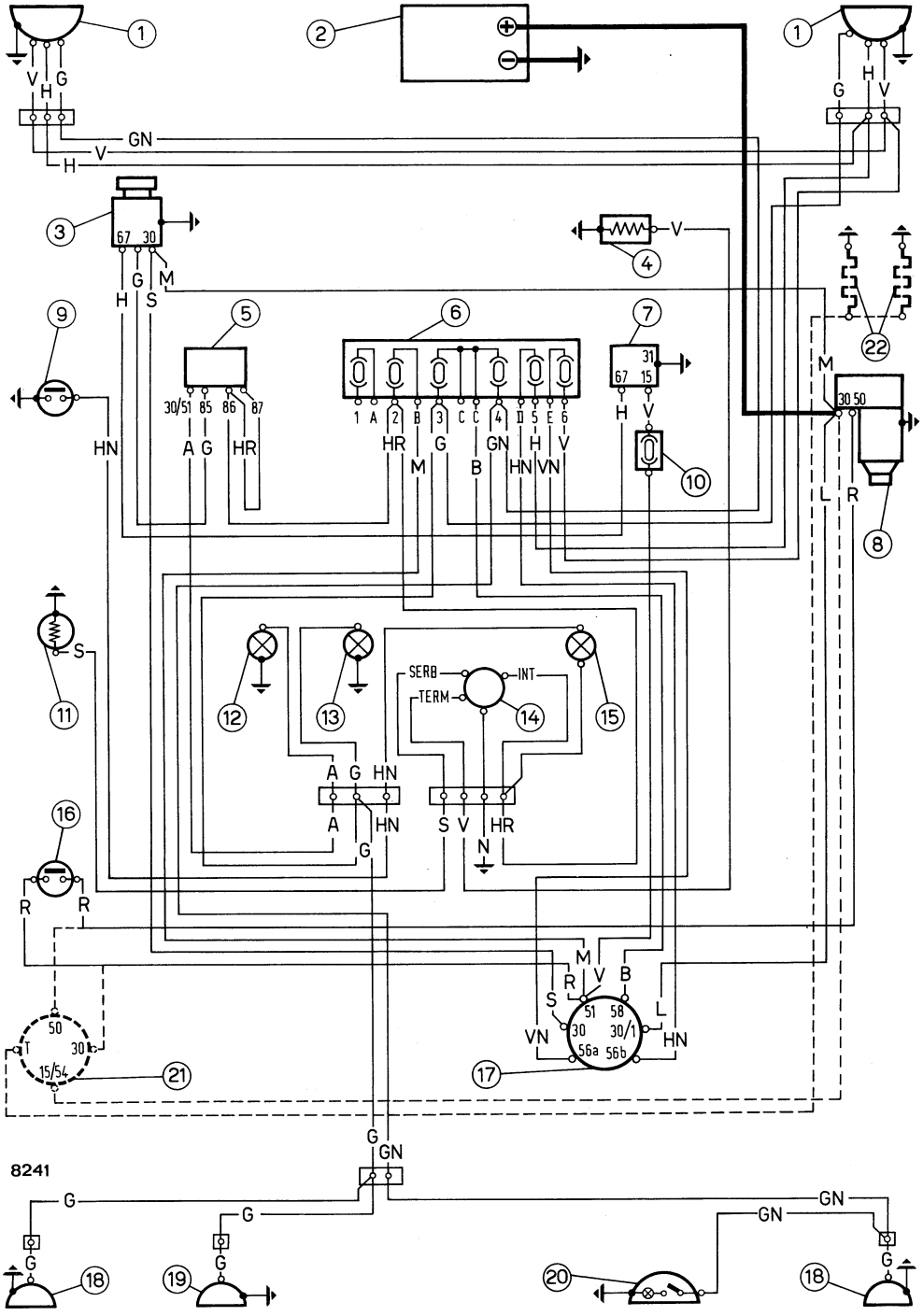
Switch positions	CONNECTED EQUIPMENT (*)
Position 0 30 15/54	Circuit off.
Position I 30 15-54-T	Glow plugs on.
Position II 30-50 15/54-T	Glow plugs and starting motor.
Position III 30-50 15/54	Starting motor.

(*) The working possibility of the glow plugs and starter switch is conditioned by the position of the lighting and starter switch.

ELECTRICAL SYSTEM: Wiring diagram (12V)

CABLE COLOUR CODE

A = Light blue
B = White
G = Yellow
H = Grey
L = Blue
M = Brown
N = Black
R = Red
S = Pink
V = Green
GN = Yellow striped black
HN = Grey striped black
HR = Grey striped red
VN = Green striped black



Note - The dash line indicates the application (optional) of the glow plugs **22** and their switch **21** which replaces push-button control **16**.

1. Dimmed and driving headlights and parking light - **2.** Battery - **3.** Alternator - **4.** Sending unit for engine unit temperature gauge - **5.** Sending unit for spy lamp (12) - **6.** Fuse box - **7.** Voltage regulator - **8.** Starting motor - **9.** Switch for low engine lube oil pressure warning light - **10.** Voltage regulator fuse - **11.** Fuel level indicator control - **12.** Battery charging plant warning light - **13.** Parking lights spy lamp - **14.** Fuel level indicator and engine cooling water temperature gauge - **15.** Engine lubrication oil pressure warning light - **16.** Engine starting push-button switch - **17.** Lights control switch - **18.** Tail lights - **19.** Plate light - **20.** Rear flood light with built-in switch - **21.** Glow plugs and starter control switch (optional) - **22.** Glow plugs (optional).

10 - ENGINE

293002/1 Universal bracket, engine to turnover stand.

290740 Lifting tackle, engine.

290955/1 { Set of spacers, cylinder liner protrusion
290956 { check.

A 60419 (292913) Set of cutters, valve seat refacing.

291467 Milling cutter, injector holder.

291350 Punch, injector holder installation.

291174 Straightedge, cylinder liner protrusion check.

290944 Reamer, valve guides.

290947 Puller, tappets.

291046 Punch, removal (installation) valve guides.

290950 Bar, crankshaft turning.

A 90424/1 (290687) Set of taps, injection holder removal.

A 42110 (290633) Puller, injector holder.

A 60077 (292190) Holder, conrod pin reaming.

291182/1 Puller, water pump impeller.

290965 Setscrews, vibration damper weights.

291504 Puller, crankshaft front end hub.

293183 Guide, crankcase rear support seals.

293184 Punch, crankcase rear support seals.

Injectors

A 65026 (291357) Kit, injector nozzle cleaning.

290898 Support, injector disassembly.

291195 Kit, adaptors and gauge for testing injectors.

291337/2 Wrench, injectors disassembly.

Distributor type, fuel injection pump

290761 Instrument panel, to check distributor type fuel injection pumps (includes 1 pressure gauge with scale 0 to 10 kg/cm², 1 pressure gauge with scale 0 to 1.5 kg/cm², 1 vacuum meter with scale 0 to 760 mm Hg and a graduated glass).

290763 Support, to mount injection pump on bench.

290752 Plate, to support injection pump (for support 290239).

290741 Guide, throttle pivot removal.

290742 Guide, throttle and stop pins O rings installation.

290743 Gage, advance check.

290744 Tool, to install and remove transfer pump rotor (to be used w/ torque wrench).

290745 Guide, to install O rings on advance variator exclusion device.

290746 Guide, advance plug O rings installation.

290747 Wrench, hydraulic head rotor lock.

290748 Plug, pump sealing test.

290749 Adaptor, transfer pump pressure test.

290750 Adaptor, fuel return line.

290751 Adaptor, fuel feed lines.

290753 Adaptor, sealing test with compressed air.

290754 Wrench, delivery adjusting screws.

290755 Connection, with relief valve to check roller to roller dimension.

290756 Flexible joint.

290757 Scribing tool, crankcase mounting flange.

290758 Tool, used on cam ball head bolt.

290759 Guide, control shaft installation.

290764 Adaptor, drain on test bench.

290765 Pipe set, to connect injection pump to bench.

292298 Pipe set, injection pump to injectors for test « A ».

SERVICE TOOLS

20 - TRANSMISSION

290954 Wrench, oil bath clutch adjustment.

291363 Retainer, oil bath clutch springs.

292265 Hoist, oil bath clutch removal (installation).

290991 Caliper, bevel gear pinion positioning (from serial No. **26377**).

290995 Protection, bevel gear shaft support seals.

291022 Lifting tackle, final drives.

291029 Stop, final drive bull gear.

291026 Pin, sprocket outer bearing housing.

290997 Retainer, removal/installation steering clutch springs.

290996 Wrench, steering clutch drum nut.

291027 Screws, sprocket shaft removal.

30 - UNDERCARRIAGE

291006 Caliper, frame parallelism check.

291572 Pipe, caliper.

291667 Lifting tackle, track roller.

291427 Puller, track roller supports (screw type).

291417 Support, roller overhaul.

291430 Punch, roller bushes.

292447 Wrench, outer bush of track suspension bar.

291589 Plate, idler support removal (with press **291387**).

291588 Rods, roller supports removal (with press **291387**).

TRACK CHAINS

291005/1 Punch, master pin removal/installation.

291385 Wrench, track shoe nut.

292676 Wrench, track tension adjustment.

291015 Template, link pitch.

Tools to be used with hand-press 291387

291008 Punch, pin removal.

291010 Plate, pin removal/installation.

291007 Punch, bush removal/installation.

291012 Spacer, bush removal.

291011 Back plate, bush installation.

291009 Pin, pin and bush installation.

Tools to be used with stationary press 292451

292434 Bracket, link installation.

292435 Bracket, link removal.

292436 Anvil, pin removal.

292437 Spacer, master bush removal installation.

40 - HYDRAULIC LIFT PLANT

Pump

291233 85 HP diesel engine, hydraulic lift pump (in alternative to electric motor **291235**).

291235 Two speed electric motor (720 - 1445 rpm), driving the hydraulic lift pump (in alternative to diesel engine **291233**) fitted with:

290385 - driving joint.

291231 Pump test rig (in alternative to test rig **292574**) fitted with:

290418 - pressure connection;

290419 - suction connection;

290448 - reduction, suction line;

290445 - suction line;

290447 - delivery line;

290434 - screws, delivery connection;

290436 - screws, suction connection.

292574 Pump test rig (in alternative to rig **291231**) fitted with:

290330 - delivery connection;

290331 - suction connection;

290424 - suction and delivery lines;

290358 - screws, securing delivery connection;

290359 - screws, securing suction connection.

Hydraulic lift

293199 / **293198** Protection and punch, installation of r. h. seal on lift arms shaft.

292768 / **293198** Protection and punch, installation of l. h. seal on lift arms shaft.

292650 Hydraulic lift test bench.

290284 Hand pump for check of valve settings.

290824 Adaptor, pressure relief valve setting check.

290826 Adaptor, cylinder safety valve check.

290834 Adaptor, drain valve setting check.

291259 Wrench, removal (installation) of cylinder oil inlet line.

50 - ELECTRICAL SYSTEM

Alternator

A 76035 (**290683**) Attaching tool, diode installation plate.

A 90340 (**290686**) Reamer, diode locations (with **76035** and electric drill).

A 76029 (**290681**) Back-up plate negative diode removal with press **Ap 5074 (290021).**

A 76031 (**290682**) Back-up plate negative diode installation, with press **Ap. 5074 (290021).**

A 76027 (**290679**) Removal tool, diode (negative) with press **Ap 5074 (290021).**

A 76028 Installation tool, diode (negative), with press **Ap 5070 (290021).**

A 76032 (**291195**) Back-up plate support diode removal and installation.

Starting motor

292307 Adaptor, starter drive clutch slippage test (to be used in conjunction with torque wrench).

290973 Mica undercutter.

SERVICE TOOLS

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