

***Fiat Trattori***  
**FIAT**

***90 C***  
***120 C***

***WORKSHOP***  
***MANUAL***

***DIREZIONE SVILUPPO POST-VENDITA***

Reprinted



# **Fiat Trattori**

## **FIAT**

# **90 C**

# **120 C**

## **WORKSHOP**

## **MANUAL**

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## **FOREWORD**

- *The manual is divided into separately numbered sections.*
- *Two-digit sections contain:*
  - *Tractor specification (00);*
  - *Tractor sub-assembly specification and data (10 - Engine; 20 - Power 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-hand corner of the front page.*
- *Revised sheets will carry the same print number followed by a capital letter (e.g. first revision 603.54.180-A; second revision 603.54.180-B; etc.) and new issue date.*  
*Revised sheets will be accompanied by the updated contents sheet.*
- *Wear limits recommended for some parts are not binding, being given for guidance only.*

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# C O N T E N T S

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**IDENTIFICATION DATA**

Marketing Code  
Engineering Code

Engine type

**PERFORMANCE AND WEIGHT**

Output at flywheel, DGM/DIN

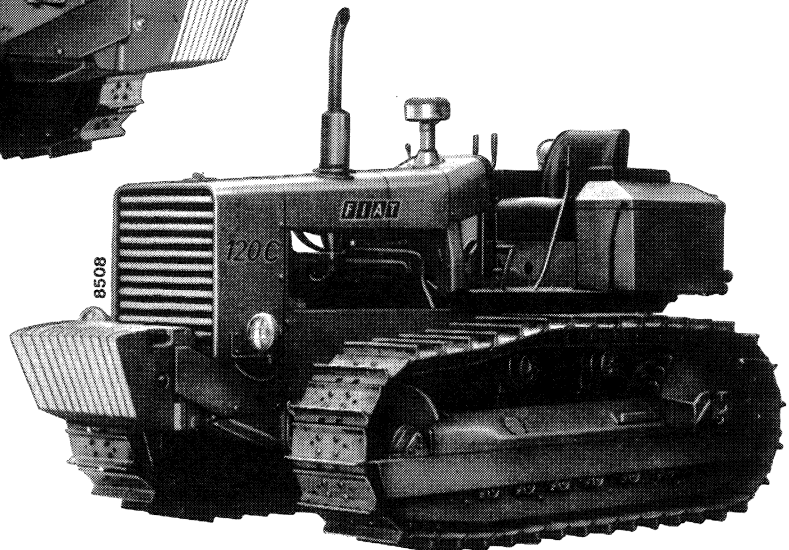
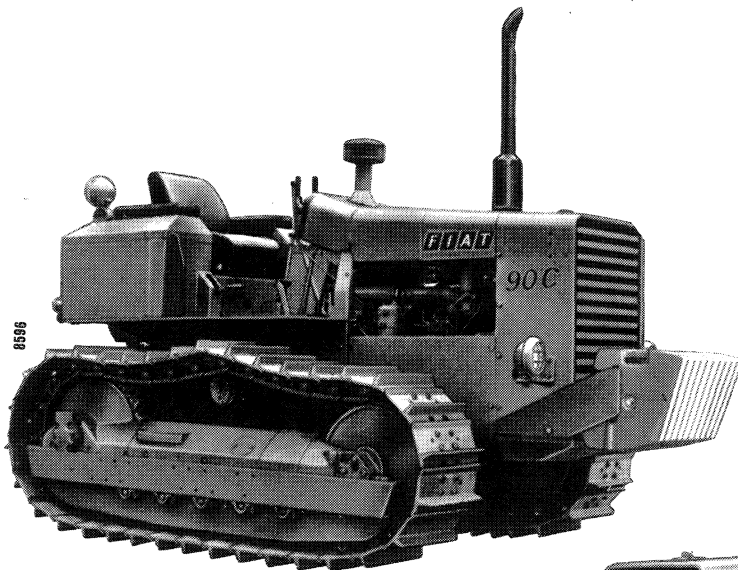
Operating weight (full ballast, no driver)

**ENGINE**

Cycle  
Injection  
Number of cylinders  
Bore and stroke

Total displacement

| 90 C                                                | 120 C                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 90 C<br>610.770                                     | 120 C<br>610.870                                                                              |
| FIAT-OM C03 130T<br>Var. 2300                       | FIAT-OM CP3/100<br>Var. 21 FIAT<br>fuel pump<br>FIAT-OM CP3/100<br>Var. 22 BOSCH<br>fuel pump |
| 98 metric HP<br>(72 kw)<br>6950 kg<br>(15325 lb)    | 120 metric HP<br>(88 kw)<br>7650 kg<br>(16868 lb)                                             |
| 4 stroke Diesel, naturally aspirated<br>Direct      |                                                                                               |
| 4<br>115 x 130 mm<br>(4.53 in x 5.11 in)<br>5401 cc | 6<br>110 x 130 mm<br>(4.33 in x 5.11 in)<br>7412 cc                                           |



## SPECIFICATION

Compression ratio  
 Engine speed, full load  
 Engine speed, full torque  
 No. of main bearings  
 Dynamic balancer

## Valvegear

Inlet opens  
 Inlet closes  
 Exhaust opens  
 Exhaust closes

Valve clearance (for timing check)

Valve clearance:

- Inlet
- Exhaust

## Fuel System

Air cleaner  
 Precleaner  
 Fuel filters

Supply pump

- Drive

Injection pump

- BOSCH

- FIAT

- Speed governor

- Advance

- BOSCH

- FIAT

Spray nozzles

Injectors

Release pressure

Firing order

Lubrication

Pump drive

| 90 C                                       | 120 C                             |
|--------------------------------------------|-----------------------------------|
| 17.4 : 1                                   | 17.4 : 1                          |
| 2000 rpm                                   | 2000 rpm                          |
| 1200 rpm                                   | 1400 rpm                          |
| 5                                          | 7                                 |
| in sump                                    | —                                 |
| Pushrod operated OHV                       |                                   |
| 8° BTDC                                    | 10° BTDC                          |
| 60° ABDC                                   | 54° ABDC                          |
| 60° BBDC                                   | 54° BBDC                          |
| 8° ATDC                                    | 10° ATDC                          |
| .20 mm (.008 in)                           | .25 mm (.010 in)                  |
| .30 mm (.012 in)                           | .25 mm (.010 in)                  |
| .50 mm (.020 in)                           | .30 mm (.012 in)                  |
| Oil-bath or dry                            |                                   |
| Centrifugal, self - cleaning               |                                   |
| 2 in - line cartridges,<br>paper and cloth |                                   |
| Double - diaphragm                         |                                   |
| Cam                                        |                                   |
| In - line                                  |                                   |
| PES4A90D -<br>770931                       | PES6A90D                          |
| —                                          | PES6A90B<br>410:L4/177            |
| All-speed, integral                        |                                   |
| 26° 30' ± 30'                              | 25° ± 30'                         |
| —                                          | 25° ± 30'                         |
| 4 orifice                                  | 4 orifice                         |
| see page 9,<br>section 10                  | see pages 11 and 13<br>section 10 |
| 200 ± 5 kg/cm <sup>2</sup>                 | 200 ± 5 kg/cm <sup>2</sup>        |
| 2845 ± 71 psi                              | 2845 ± 71 psi                     |
| 1-3-4-2                                    | 1-5-3-6-2-4                       |
| Forced feed, gear pump                     |                                   |
| Crankshaft                                 |                                   |

**Oil filter**

**Relief valve**

— Lubricant pressure at governed speed

**Cooling**

**Radiator**

**Fan**

**Temperature control**

**Tractor Meter**

**Function**

**Drive**

**Hourmeter speed**

**Drive ratio**

**POWER TRAIN**

**Master Clutch**

**Type**

**Control**

**Pump**

**Transmission**

**Control**

**Bevel Drive**

**Final Drives**

**Steering Clutches**

**Brakes**

**90 C**

**120 C**

**Pump inlet strainer and outlet cartridge**

**In filter**

**4 to 4.5 kg/cm<sup>2</sup> (57 to 64 psi)**

**Water, centrifugal pump**

**4 - deep, vertical tube**

**Suction, sheet metal**

**Thermostat**

**Dash - mounted**

**Engine rpm and working hours**

**Timing train**

**1700 rpm**

**1 : 2**

**Twin - plate, oil - bath, 14 in**

**Overcentre**

**Hand lever**

**Lobe, integral**

**5 - speed, sliding spur gears**

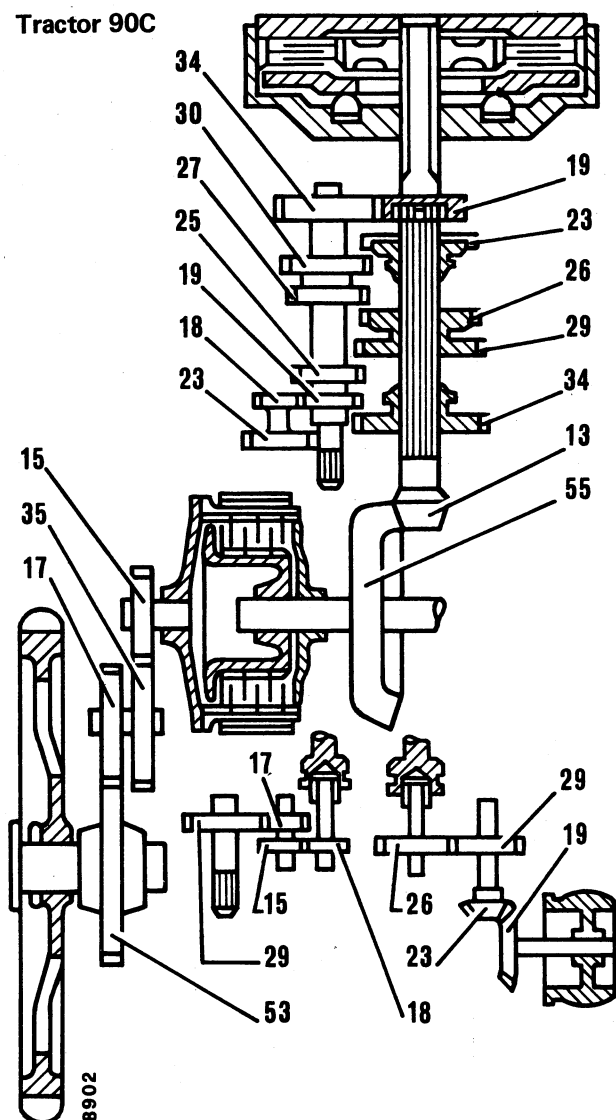
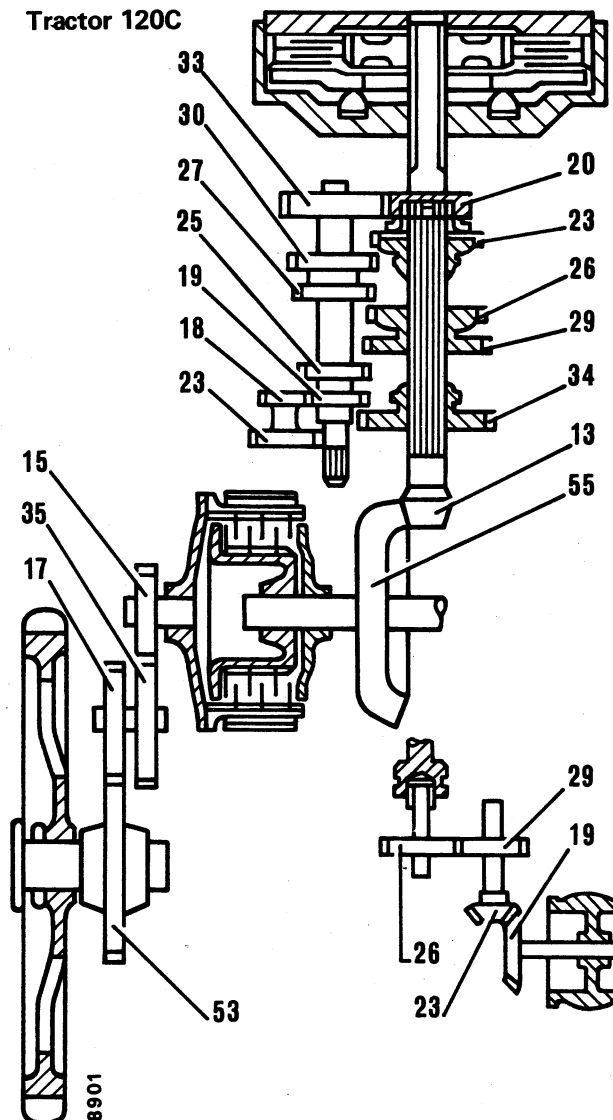
**Hand lever**

**Spiral**

**Double reduction, spur**

**Dry multiplate, hydraulic power  
assisted, lever controlled**

**Band, latched pedals, hand  
operated parking brake**

**SPECIFICATION****POWER TRAIN SCHEMATICS****Tractor 90C****Tractor 120C**

| TRACTOR SPEEDS | 90 C              |     | 120 C |     |
|----------------|-------------------|-----|-------|-----|
|                | At governed speed |     |       |     |
|                | kph               | mph | kph   | mph |
| First          | 2.8               | 1.7 | 3.0   | 1.9 |
| Second         | 4.3               | 2.7 | 4.7   | 2.9 |
| Third          | 5.2               | 3.2 | 5.6   | 3.5 |
| Fourth         | 6.5               | 4   | 7.1   | 4.4 |
| Fifth          | 9.0               | 5.6 | 9.0   | 5.6 |
| Reverse        | 3.6               | 2.2 | 3.9   | 2.4 |

**UNDERCARRIAGE — SUSPENSIONS**

Track rollers  
Carrier rollers  
Idlers and rollers  
Track shoes per chain

Shoe width

Track area

- 450 mm shoes
- 600 mm shoes

Ground pressure

- 450 mm shoes
- 600 mm shoes

Track release

Rear suspension

Front suspension

**POWER TAKE - OFF**

Type

Shaft

- 540 rpm (90 C only)
- 1000 rpm

Control

Shaft speed

Engine speed:

- 90 C
  - 540 rpm
  - 1000 rpm
- 120 C
  - 1000 rpm

**BELT PULLEY DRIVE**

Rotation (from rear)

Speed (at full throttle)

**BELT PULLEY**

Dia.

| 90 C                                                                                           | 120 C                                                                                          |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 5                                                                                              | 6                                                                                              |
| 1                                                                                              | 2                                                                                              |
| Lubricated for life                                                                            |                                                                                                |
| 34                                                                                             | 38                                                                                             |
| mm 450 - 600<br>(17 <sup>3</sup> / <sub>4</sub> - 23 <sup>5</sup> / <sub>8</sub> in)           | 450 - 600 mm<br>(17 <sup>3</sup> / <sub>4</sub> - 23 <sup>5</sup> / <sub>8</sub> in)           |
| 16137 cm <sup>2</sup> (2501 in <sup>2</sup> )<br>21516 cm <sup>2</sup> (3335 in <sup>2</sup> ) | 19215 cm <sup>2</sup> (2978 in <sup>2</sup> )<br>25620 cm <sup>2</sup> (3971 in <sup>2</sup> ) |
| .43 kg/cm <sup>2</sup> (6.1 psi)<br>.33 kg/cm <sup>2</sup> (4.7 psi)                           | .40 kg/cm <sup>2</sup> (5.7 psi)<br>.31 kg/cm <sup>2</sup> (4.4 psi)                           |
| Hydraulic                                                                                      |                                                                                                |
| Track frame borne cross bar, lubricated<br>for life track frame pivot bushes                   |                                                                                                |
| Transverse double leaf spring                                                                  |                                                                                                |
| 540 or<br>1000 rpm                                                                             | 1000 prm                                                                                       |
| Independent                                                                                    |                                                                                                |
| 1 <sup>3</sup> / <sub>8</sub> in<br>6 - spline                                                 | —                                                                                              |
| 1 <sup>3</sup> / <sub>8</sub> in<br>21 - spline                                                | 1 <sup>3</sup> / <sub>8</sub> in<br>21 - spline                                                |
| Hand lever                                                                                     |                                                                                                |
| 540 rpm<br>1000 rpm                                                                            | —<br>1000 rpm                                                                                  |
| 1374 rpm<br>1789 rpm                                                                           | —<br>—                                                                                         |
| —                                                                                              | 1650 rpm                                                                                       |
| In transmission                                                                                |                                                                                                |
| Clockwise                                                                                      | Clockwise                                                                                      |
| 1118 rpm                                                                                       | 1212 rpm                                                                                       |
| 360 mm (14.17 in)                                                                              | 360 mm (14.17 in)                                                                              |

Width  
Speed (at full throttle)  
Surface speed  
**REMOTE CONTROL HYDRAULICS**

Type

Control valve

Oil reservoir

Return oil filter

Gear pump

- AM
- PM

2, 3 or 4 pairs of female quick-connect  
half couplings, type

#### ELECTRICAL SYSTEM

Voltage

Alternator

Voltage regulator

- AM
- PM

Starter

Batteries (under hood)

No. off

Voltage

Capacity

Head lamp dia

- Bulb

Flood lamp / switch

- Bulb

Fuses (seven off, six in box)

Panel light and charge indicator bulbs

Charge warning relay

Lighting / starter switch

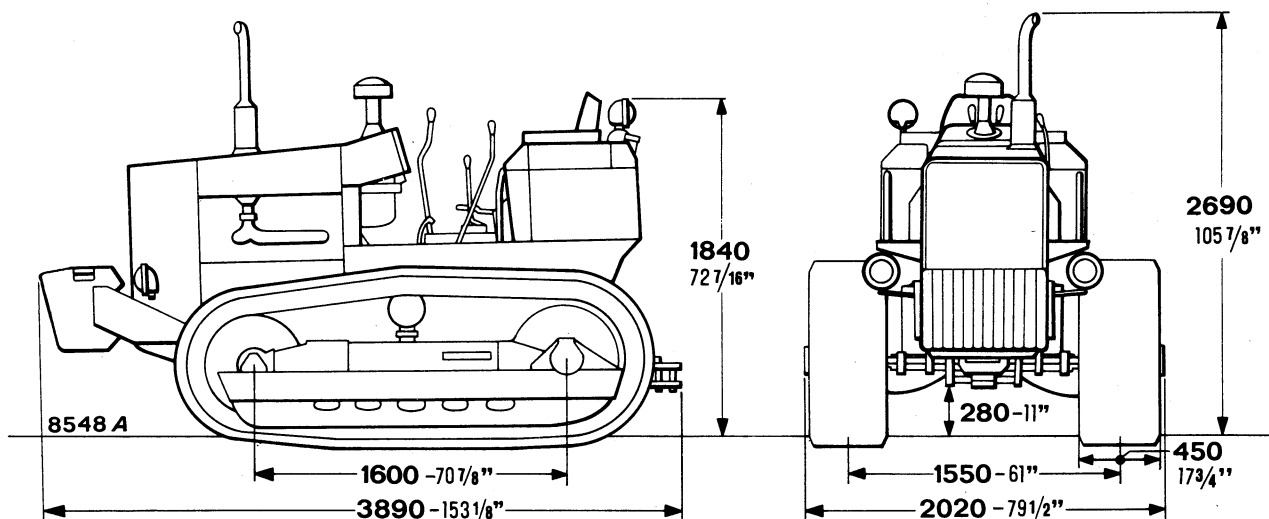
Starter button

Starter and alternator circuits

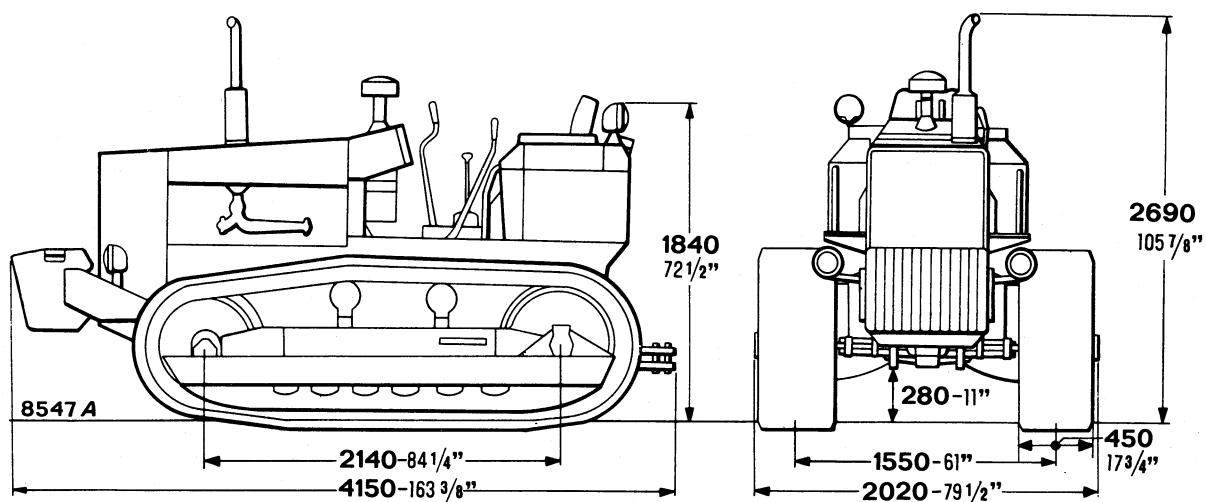
| 90 C                                                  | 120 C                                                      |
|-------------------------------------------------------|------------------------------------------------------------|
| 200 mm (7.9 in)<br>1213 rpm<br>22.9 m/sec (75 ft/sec) | 200 mm (7.9 in)<br>1316 rpm<br>24.8 m/sec (81 ft/sec)      |
|                                                       | O.R.M.I., RH fender<br>mounted                             |
|                                                       | 2, 3 or 4 sections<br>with float position in No. 2         |
|                                                       | Welded sheet metal                                         |
|                                                       | Strainer in tank                                           |
|                                                       | Crankshaft driven<br>SALAMI 3,5 P55/S<br>SALAMI 3,5 PA42/S |
|                                                       | AEROQUIP, 1/2 in,<br>for 3/4 in piping                     |
|                                                       | 24 V                                                       |
|                                                       | FIAT A 12M 124/24/26                                       |
|                                                       | MARELLI RC 2/24<br>MARELLI RTT 110 CT                      |
|                                                       | MARELLI MT 43 P                                            |
| Marelli 6ATM 15YB                                     | Marelli 6ATP21<br>or Titano<br>6D E 10F                    |
|                                                       | 2                                                          |
|                                                       | 12 V                                                       |
| 77 Ah                                                 | 110 Ah                                                     |
|                                                       | mm 130 (5.12 in)                                           |
|                                                       | 45/50 W                                                    |
|                                                       | 35 W                                                       |
|                                                       | 8 A                                                        |
|                                                       | 10 W                                                       |
|                                                       | Fused                                                      |
|                                                       | Six - position                                             |
|                                                       | 60 A                                                       |
|                                                       | Not fused                                                  |

**DIMENSIONS**

**90 C Tractor**



**120 C Tractor**



## SPECIFICATION

## CAPACITIES

| Description                                                                                                 | Lubricant        |          |      |       |        |      |       | International Designation                                             |
|-------------------------------------------------------------------------------------------------------------|------------------|----------|------|-------|--------|------|-------|-----------------------------------------------------------------------|
|                                                                                                             | FIAT Designation | Capacity |      |       |        |      |       |                                                                       |
|                                                                                                             |                  | 90 C     |      |       | 120 C  |      |       |                                                                       |
|                                                                                                             |                  | litres   | kg   | Pints | litres | kg   | Pints |                                                                       |
| Engine oil                                                                                                  | } AGERTER (1)    | 13.9     | 12.5 | 24.5  | 20     | 18   | 35    | } API "CD" Service Series 3<br>Single grade oil to "MIL - L - 2104 C" |
| — Sump, filter and lines                                                                                    |                  | 11.7     | 10.6 | 20.6  | 16.2   | 14.7 | 28.5  |                                                                       |
| — Sump and filter                                                                                           |                  | 11.1     | 10   | 19.5  | 15     | 13.5 | 26    |                                                                       |
| — Sump only                                                                                                 |                  | —        | —    | —     | .22    | .2   | .4    |                                                                       |
| Fuel pump oil                                                                                               |                  | —        | —    | —     | .11    | .1   | .2    |                                                                       |
| Governor oil                                                                                                |                  | 2.4      | 2.2  | 4.2   | 2.1    | 1.9  | 3.7   |                                                                       |
| Air cleaner oil (2)                                                                                         |                  | 17.7     | 16   | 31    | 17.7   | 16   | 31    |                                                                       |
| Twin plate clutch oil                                                                                       |                  |          |      |       |        |      |       |                                                                       |
| Track idler and roller oil                                                                                  | } AGERTER30      | —        | —    | —     | —      | —    | —     |                                                                       |
| Starter oil (pinion end head)                                                                               |                  | —        | —    | —     | —      | —    | —     |                                                                       |
| Transmission oil                                                                                            | } AW 90/M        | 23.8     | 21.5 | 42    | 23.8   | 21.5 | 42    | } SAE 90 - EP oil to "MIL-L-2105B"                                    |
| Final drive oil (each)                                                                                      |                  | 12.2     | 11   | 21.5  | 12.2   | 11   | 21.5  |                                                                       |
| Belt pulley oil                                                                                             |                  | 1.7      | 1.5  | 3     | 1.7    | 1.5  | 3     |                                                                       |
| PTO oil                                                                                                     |                  | .6       | .5   | 1     | .6     | .5   | 1     |                                                                       |
| Steering clutch oil                                                                                         | } AP51 above 0°C | 2.8      | 2.5  | 5     | 2.8    | 2.5  | 5     | } SAE20W hydr. oil                                                    |
| Remote control oil                                                                                          |                  | 26.7     | 24   | 47    | 26.7   | 24   | 47    |                                                                       |
|                                                                                                             | } AP31 below 0°C |          |      |       |        |      |       | } SAE10W hydr. oil                                                    |
|                                                                                                             |                  |          |      |       |        |      |       |                                                                       |
| Lubricators                                                                                                 | G9 grease        | —        | —    | —     | —      | —    | —     | Lithium - calcium grease to NLGI 2                                    |
| Coolant (water and PARAFLU 11, 50 — 50 mixture) { 90 C, 18 Litres ( 4 Gall.)<br>120 C, 27 Litres ( 6 Gall.) |                  |          |      |       |        |      |       |                                                                       |
| Fuel { Standard, 148 Litres (32.5 Gall.)<br>Supplementary, 80 Litres (17.6 Gall.)                           |                  |          |      |       |        |      |       |                                                                       |

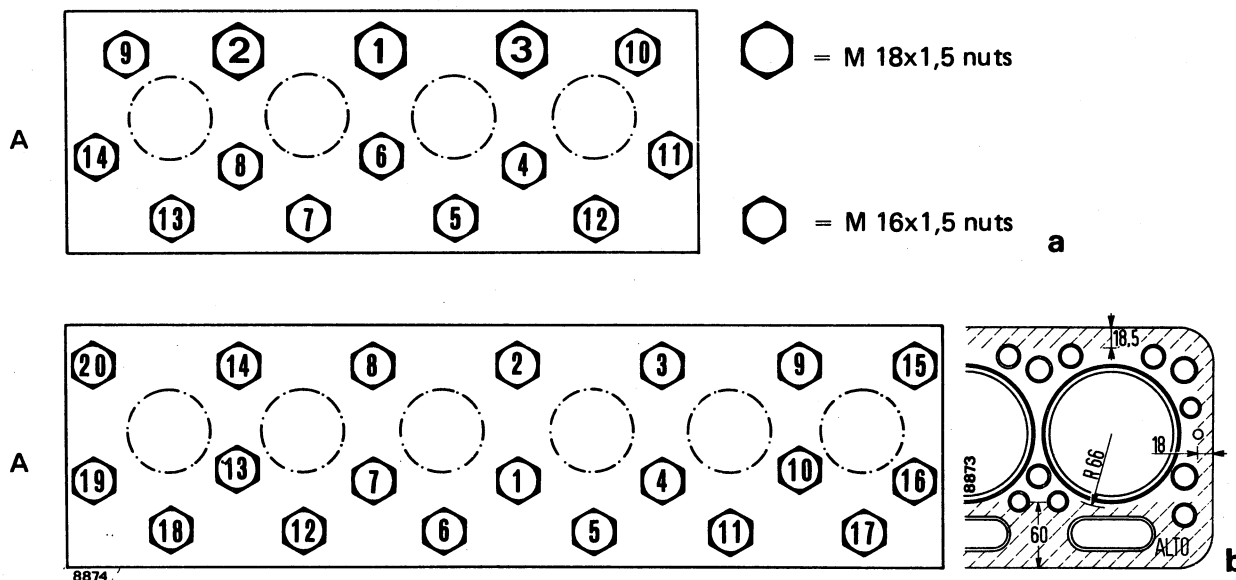
(1) 10W below - 15°C, 20W down to - 15°C, 30 up to 35°C and 40 above 35°C.

(2) Change oil when sediment is 1 cm or 1/2 in deep on bottom.

**ENGINE BLOCK – CYLINDER HEAD**

| Engine Block                                       | 90 C                                     |                                                | 120 C              |                    |
|----------------------------------------------------|------------------------------------------|------------------------------------------------|--------------------|--------------------|
|                                                    | mm                                       | in                                             | mm                 | in                 |
| Block bore dia.                                    | 122.000 to 122.040                       | 4.8031 to 4.8047                               | 118.000 to 118.035 | 4.6456 to 4.6470   |
| Liner O.D.                                         | 121.920 to 121.970                       | 4.8000 to 4.8020                               | 117.920 to 117.970 | 4.6425 to 4.6445   |
| Liner fitted clearance in block                    | .030 to .120                             | .0012 to .0047                                 | .030 to .115       | .0012 to .0045     |
| Liner I.D.                                         | 115.000 to 115.022                       | 4.5275 to 4.5284                               | 110.000 to 110.022 | 4.3307 to 4.3316   |
| Max. liner ovality and taper (1)                   | .15                                      | .006                                           | .15                | .006               |
| Liner I.D. oversize                                | .6                                       | .024                                           | .6                 | .024               |
| Liner protrusion                                   | .130 to .160                             | .0051 to .0063                                 | .150 to .180       | .0060 to .0071     |
| Max. liner top flatness error                      | .030                                     | .0012                                          | .030               | .0012              |
| Liner shim thickness                               | 3.18 - 3.21 - 3.24<br>3.27 - 3.30 - 3.33 | .1251 - .1264 - .1275<br>.1287 - .1299 - .1311 | .05 - .075 - .10   | .002 - .003 - .004 |
| Camshaft housing bore dia.<br>in block, 90 C       | 49.055 to 49.090                         | 1.9313 to 1.9327                               | —                  | —                  |
| Camshaft bush housing bore<br>dia. in block, 120 C |                                          |                                                | 49.000 to 49.025   | 1.9291 to 1.9301   |
| Tappet housing bore dia.                           | 27.000 to 27.033                         | 1.0630 to 1.0643                               | 27.000 to 27.033   | 1.0630 to 1.0643   |
| Tappet oversize                                    | .2 - .4                                  | .008 - .016                                    | .2 - .4            | .008 - .016        |
| Main bearing housing bore dia.                     | 84.206 to 84.226                         | 3.3152 to 3.3160                               | 80.626 to 80.646   | 3.1742 to 3.1750   |
| <b>Cylinder Head</b>                               |                                          |                                                |                    |                    |
| Valve guide housing bore dia.                      | 14.000 to 14.018                         | .5512 to .5519                                 | 14.000 to 14.018   | .5512 to .5519     |
| Guide oversize                                     | .08                                      | .0031                                          | .08                | .0031              |
| Valve seat angle                                   | 90° ± 10'                                | 90° ± 10'                                      | 90° ± 10'          | 90° ± 10'          |
| Injector protrusion                                | 3.30 to 3.90                             | .1299 to .1535                                 | 3.30 to 3.90       | .1299 to .1535     |
| Maximum<br>Valve fitted depth below<br>head top    | 4.20                                     | .1653                                          | 4.20               | .1653              |
| — Inlet                                            | .20 to .60                               | .008 to .024                                   | .10 to .50         | .004 to .020       |
| — Exhaust                                          | .40 to .80                               | .016 to .032                                   | .10 to .50         | .004 to .020       |
| Maximum                                            | .90                                      | .036                                           | .70                | .028               |
| Cylinder head height                               | 99.780 to 100.000                        | 3.9283 to 3.9370                               | 99.80 to 100.20    | 3.9291 to 3.9449   |
| Max. head skimming depth                           | .5                                       | .020                                           | .5                 | .020               |

(1) Over swept area parallel and at right angles to crankshaft centre line.

**ENGINE BLOCK – CYLINDER HEAD**

Head tightening diagram and scrap view of head gasket.

a. 90 C Tractor — b. 120 C Tractor — A. Fan side

**NOTE**

- 90 C Tractor — Position gasket with "ALTO" mark uppermost on block top. Lower head and tighten hold-down screws to the prescribed torque adhering to the sequence shown.
- 120 C Tractor — Apply a coat of "WELLSEAL JOINTING COMPOUND" on block top. Clean grease marks off steel face of gasket and coat shaded area (b) with jointing compound. Lie on top of block with "ALTO" mark uppermost. Lower head in position and tighten hold-down nuts to the prescribed torque adhering to the sequence shown.
- Torque hold-down fasteners in three stages as indicated hereunder.

**90 C Tractor**

| Stage          |       | 1  | 2   | 3   |
|----------------|-------|----|-----|-----|
| M16 x 1.5 nuts | kgm   | 10 | 18  | 25  |
|                | lb ft | 72 | 130 | 181 |
| M18 x 1.5 nuts | kgm   | 10 | 25  | 33  |
|                | lb ft | 72 | 181 | 239 |

**120 C Tractor**

| Stage          |       | 1  | 2   | 3   |
|----------------|-------|----|-----|-----|
| M16 x 1.5 nuts | kgm   | 10 | 16  | 23  |
|                | lb ft | 72 | 116 | 166 |

**CRANKGEAR**

|                                                   | mm                         |                  | in                        |                  |
|---------------------------------------------------|----------------------------|------------------|---------------------------|------------------|
|                                                   | 90 C                       | 120 C            | 90 C                      | 120 C            |
| <b>Crankshaft – Bearings</b>                      |                            |                  |                           |                  |
| Main journal dia.                                 | 79.782 to 79.800           | 76.202 to 76.220 | 3.1410 to 3.1417          | 3.0000 to 3.0008 |
| Main journal undersize                            | .254 – .508 – .762 – 1.016 |                  | .010 – .020 – .030 – .040 |                  |
| Main bearing wall thickness                       | 2.172 to 2.178             |                  | .0855 to .0857            |                  |
| Main bearing undersize                            | .254 – .508 – .762 – 1.016 |                  | .010 – .020 – .030 – .040 |                  |
| Main journal running clearance in bearing         | .050 to .100               |                  | .002 to .004              |                  |
| Max. clearance                                    | .180                       |                  | .0071                     |                  |
| Crankpin dia.                                     | 72.482 to 72.500           | 69.860 to 69.878 | 2.8536 to 2.8543          | 2.7504 to 2.7511 |
| Crankpin undersize                                | .254 – .508 – .762 – 1.016 |                  | .010 – .020 – .030 – .040 |                  |
| Big end bearing wall thickness                    | 2.064 to 2.070             | 1.886 to 1.892   | .0812 to .0815            | .0742 to .0745   |
| Big end bearing undersize                         | .254 – .508 – .762 – 1.016 |                  | .010 – .020 – .030 – .040 |                  |
| Crankpin running clearance in bearing             | .058 to .103               |                  | .0023 to .0040            |                  |
| Max. clearance                                    | .180                       |                  | .0071                     |                  |
| Thrust washer thickness                           | 2.31 to 2.36               |                  | .0910 to .0929            |                  |
| Thrust washer oversize                            | .101 – .254 – .508         |                  | .004 – .010 – .020        |                  |
| Width of main bearing housing over thrust washers | 49.780 to 49.930           |                  | 1.9598 to 1.9657          |                  |
| Length of corresponding main journal              | 50.000 to 50.050           |                  | 1.9685 to 1.9705          |                  |
| Crankshaft end float                              | .07 to .27                 |                  | .003 to .011              |                  |
| Max. clearance                                    | .40                        |                  | .016                      |                  |

# ENGINE: Data

## CRANKGEAR

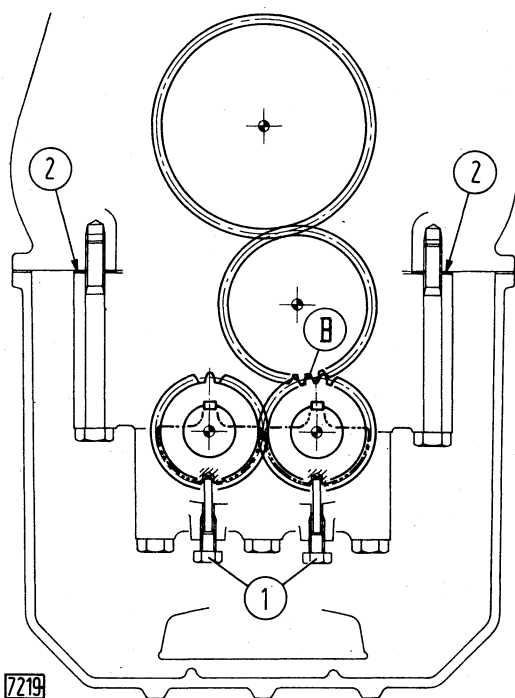
|                                                                                                            | 90 C               |                  | 120 C              |                  |
|------------------------------------------------------------------------------------------------------------|--------------------|------------------|--------------------|------------------|
|                                                                                                            | mm                 | in               | mm                 | in               |
|                                                                                                            |                    |                  |                    |                  |
| Max. crankpin and main journal ovality and taper after grinding                                            | .005               | .0002            | .005               | .0002            |
| Max. crankpin and main journal ovality and taper                                                           | .03                | .0012            | .03                | .0012            |
| Main journal misalignment (outer journals over V-blocks and cranks 1-6, 120 C tractor, vertical up) T.I.R. | .05                | .002             | .1                 | .004             |
| Crankpin misalignment relative to main journals (in both directions)                                       | .25                | .010             | .25                | .010             |
| Crankshaft flange runout on periphery (T.I.R.)                                                             | .025               | .001             | .025               | .001             |
| Crankshaft flange eccentricity (T.I.R.)                                                                    | .04                | .0016            | .01 to .03         | .0004 to .0012   |
| <b>Connecting Rods</b>                                                                                     |                    |                  |                    |                  |
| Small end bore dia.                                                                                        | 44.000 to 44.025   | 1.7323 to 1.7333 | 44.000 to 44.025   | 1.7323 to 1.7333 |
| Small end bush O.D.                                                                                        | 44.069 to 44.120   | 1.7353 to 1.7370 | 44.078 to 44.117   | 1.7353 to 1.7369 |
| Small end bush interference in rod                                                                         | .044 to .120       | .0017 to .0047   | .053 to .117       | .0021 to .0046   |
| Small end bush fitted I.D. after reaming                                                                   | 40.025 to 40.035   | 1.5758 to 1.5762 | 40.025 to 40.035   | 1.5758 to 1.5762 |
| Big end bore dia.                                                                                          | 76.692 to 76.713   | 3.0194 to 3.0202 | 73.720 to 73.735   | 2.9024 to 2.9029 |
| Conn. rod axis misalignment 125 mm (5 in) from rod centreline.                                             | ± .025             | ± .001           | ± .025             | ± .001           |
| Max. rod weight allowance                                                                                  | gr 15              | 1/2 oz           | gr 15              | 1/2 oz           |
| <b>Pistons</b>                                                                                             |                    |                  |                    |                  |
| O.D. 35 mm (1 in) above base of skirt at right angles to pin                                               | 114.820 to 114.840 | 4.5205 to 4.5212 | 109.838 to 109.858 | 4.3243 to 4.3251 |
| Piston working clearance in liner                                                                          | .160 to .202       | .0063 to .0079   | .142 to .184       | .0056 to .0072   |
| Max. clearance                                                                                             | .30                | .012             | .30                | .012             |
| Piston oversize                                                                                            | .6                 | .024             | .6                 | .024             |

**CRANKGEAR**

|                                                        | 90 C             |                  | 120 C            |                  |
|--------------------------------------------------------|------------------|------------------|------------------|------------------|
|                                                        | mm               | in               | mm               | in               |
| Gudgeon pin dia.                                       | 40.000 to 40.006 | 1.5748 to 1.5750 | 40.000 to 40.006 | 1.5748 to 1.5750 |
| Gudgeon pin bore in piston                             | 40.006 to 40.012 | 1.5750 to 1.5753 | 40.006 to 40.012 | 1.5750 to 1.5753 |
| Pin clearance in piston                                | .000 to .012     | .0000 to .0005   | .000 to .012     | .0000 to .0005   |
| Pin oversize                                           | .2 - .5          | .008 - .020      | .2 - .5          | .008 - .020      |
| Pin clearance in small end bush                        | .019 to .035     | .0007 to .0014   | .019 to .035     | .0007 to .0014   |
| Maximum clearance                                      | .10              | .004             | .10              | .004             |
| Max. piston weight allowance                           | gr 10            | 1/3 oz           | gr 10            | 1/3 oz           |
| Ring clearance in piston groove                        |                  |                  |                  |                  |
| Top                                                    | .065 to .092     | .0025 to .0036   | .055 to .082     | .0022 to .0032   |
| Second                                                 | .055 to .082     | .0022 to .0032   | .055 to .082     | .0022 to .0032   |
| Third                                                  | .045 to .072     | .0018 to .0028   | .045 to .072     | .0018 to .0028   |
| Fourth (120 C Tractor)                                 | —                | —                | .045 to .072     | .0018 to .0028   |
| Max. clearance                                         |                  |                  |                  |                  |
| Top and second                                         | .30              | .012             | .30              | .012             |
| Third (90 C Tractor), third and fourth (120 C Tractor) | .20              | .008             | .20              | .008             |
| Ring gap in liner                                      |                  |                  |                  |                  |
| Top                                                    | .40 to .60       | .016 to .024     | .40 to .60       | .016 to .024     |
| Second                                                 | .40 to .60       | .016 to .024     | .40 to .60       | .016 to .024     |
| Third                                                  | .30 to .45       | .012 to .018     | .40 to .60       | .016 to .024     |
| Fourth (120 C Tractor)                                 | —                | —                | .30 to .45       | .012 to .018     |
| Max. gap                                               | 1.20             | .047             | 1.20             | .047             |

**CRANKGEAR**

| Dynamic Balancer (90 C Tractor)    | mm               | in                 |
|------------------------------------|------------------|--------------------|
|                                    |                  |                    |
| Shaft dia.                         | 34.920 to 34.935 | 1.3748 to 1.3754   |
| Bearing housing bore dia.          | 38.626 to 38.646 | 1.5207 to 1.5215   |
| Bearing wall thickness             | 1.816 to 1.822   | .0715 to .0717     |
| Shaft running clearance in bearing | .047 to .094     | .0018 to .0037     |
| Gear journal dia. on shaft         | 30.041 to 30.062 | 1.1827 to 1.1835   |
| Gear bore dia.                     | 30.000 to 30.021 | 1.1811 to 1.1819   |
| Journal interference fit in gear   | .020 to .062     | .0008 to .0024     |
| Balancer shim thickness            | .05 – .10 – .15  | .002 – .004 – .006 |
| Oil pump gear backlash             | .11 to .17       | .0043 to .0067     |
| Balancer gear backlash             | .13 to .19       | .0051 to .0075     |

**BALANCER TIMING**

- Position flyweights by means of screws 1 (290965) and ensure that both drive and driven balancer gears are correctly fitted. To do this check the position of the driving key relative to the teeth.
- Turn the crankshaft until piston No. 1 reaches T.D.C. on compression stroke.
- Fasten the housing to the caps with interposed shims 2 selected to obtain .11 to .17 mm (.0040 to .0067 in) backlash in position B.
- Remove screws 1.

**VALVEGEAR**

|                                                              | mm               | in               |
|--------------------------------------------------------------|------------------|------------------|
| Valve gear backlash                                          | .04 to .12       | .0016 to .0047   |
| Camshaft bush O.D. (120 C Tractor)                           | 49.098 to 49.136 | 1.9330 to 1.9345 |
| Bush interference fit in block (120 C Tractor)               | .073 to .136     | .0029 to .0053   |
| Bush fitted I.D. (120 C Tractor)                             | 46.055 to 46.090 | 1.8132 to 1.8145 |
| Camshaft journal dia.                                        |                  |                  |
| — 90 C tractor                                               | 48.950 to 48.975 | 1.9272 to 1.9281 |
| — 120 C tractor                                              | 45.950 to 45.975 | 1.8090 to 1.8100 |
| Camshaft journal clearance in block (90 C) or bushes (120 C) | .080 to .140     | .0031 to .0055   |
| Max. clearance                                               | .25              | .010             |
| Thrust plate clearance in shaft recess                       | .060 to .110     | .0024 to .0043   |
| Max. tappet O.D.                                             | 26.939 to 26.960 | 1.0606 to 1.0614 |
| Tappet clearance in block                                    | .040 to .094     | .0016 to .0037   |
| Max. clearance                                               | .15              | .006             |
| Tappet oversize                                              | .2 — .4          | .008 — .016      |
| Idler gear jackshaft O.D.                                    | 29.959 to 29.980 | 1.1795 to 1.1803 |
| Idler gear bush fitted I.D.                                  | 30.040 to 30.061 | 1.1827 to 1.1835 |
| Jackshaft clearance in bush                                  | .060 to .102     | .0027 to .0040   |
| Max. clearance                                               | .25              | .010             |
| Bush interference fit in idler gear                          | .009 to .073     | .0003 to .0029   |
| Rocker shaft dia.                                            | 21.015 to 21.036 | .8274 to .8282   |
| Rocker bore dia.                                             | 21.040 to 21.070 | .8283 to .8295   |
| Shaft clearance in rocker                                    | .004 to .055     | .0001 to .0022   |
| Max. clearance                                               | .100             | .004             |
| Spacer spring length                                         |                  |                  |
| — Free                                                       | 95               | 3.74             |
| — Under 2.25 to 2.75 kg (5 to 6 lb)                          | 62               | 2.44             |
| Valve guide O.D.                                             | 14.028 to 14.039 | .5523 to .5527   |
| Valve guide oversize                                         | .080             | .0031            |
| Guide interference fit in head                               | .010 to .039     | .0004 to .0015   |
| Valve guide protrusion                                       |                  |                  |
| — Inlet                                                      | 2                | .079             |
| — Exhaust                                                    | 9                | .354             |
| Valve stem dia.                                              | 7.945 to 7.960   | .3128 to .3134   |
| Valve guide fitted I.D. after reaming                        | 7.990 to 8.010   | .3145 to .3153   |
| Valve stem clearance in guide                                | .030 to .065     | .0012 to .0025   |
| Max. clearance                                               | .130             | .0051            |

**ENGINE:  
Data****VALVEGEAR**

|                                                                       | mm                                                       | in               |
|-----------------------------------------------------------------------|----------------------------------------------------------|------------------|
| Valve head dia.                                                       |                                                          |                  |
| Inlet                                                                 |                                                          |                  |
| — 90 C                                                                | 48.200 to 48.500                                         | 1.8976 to 1.9094 |
| — 120 C                                                               | 42.700 to 43.000                                         | 1.6811 to 1.6929 |
| Exhaust                                                               |                                                          |                  |
| — 90 C                                                                | 40.700 to 41.000                                         | 1.6024 to 1.6142 |
| — 120 C                                                               | 36.200 to 36.500                                         | 1.4252 to 1.4370 |
| Valve face angle                                                      | 45° 15' $\begin{smallmatrix} -0 \\ +5 \end{smallmatrix}$ |                  |
| Max. valve eccentricity over one revolution with stylus on valve face | .04                                                      | .0016            |
| Cam lift                                                              |                                                          |                  |
| — 90 C                                                                | 7.107                                                    | .2798            |
| — 120 C                                                               | 7.300                                                    | .2874            |
| Valve lift                                                            |                                                          |                  |
| — 90 C                                                                | 12.255                                                   | .4825            |
| — 120 C                                                               | 12.441                                                   | .4898            |
| Valve fitted depth                                                    | See page 1                                               |                  |
| Valve spring length                                                   |                                                          |                  |
| — Free                                                                | 49.3                                                     | 1.9409           |
| — Under 22.5 to 24.9 kg. (50 to 55 lb)                                | 42                                                       | 1.6535           |
| — Under 61.1 to 67.5 kg. (135 to 149 lb)                              | 29.5                                                     | 1.1614           |

**LUBRICATION – COOLING**

|                                    |                             |     |
|------------------------------------|-----------------------------|-----|
| Oil pump                           | Gear                        |     |
| Type                               | Crankshaft                  |     |
| Drive                              | 1.45 to 1                   |     |
| Drive ratio                        | .71 to 1                    |     |
| — 90 C                             | 4 to 4.5 kg/cm <sup>2</sup> |     |
| — 120 C                            | 5 kg/cm <sup>2</sup>        |     |
| Warm oil pressure on full throttle | 57 to 64 psi                |     |
| Relief valve crack - off setting   | 71 psi                      |     |
| Relief valve spring length         |                             |     |
| Free                               | 69.7 to 71.3                |     |
| Under 11 kg                        | 48.5                        |     |
| Water pump                         | Centrifugal, vane           |     |
| Type                               | 1.384 to 1                  |     |
| Drive ratio                        |                             |     |
| Thermostat                         | SAVARA or Behr-Thomson      |     |
| Make                               |                             |     |
| Opening temperature                | 83 ± 2° C                   |     |
| — 90 C                             | 79 ± 2° C                   |     |
| — 120 C                            | 94° C                       |     |
| Fully open at                      |                             |     |
| Valve travel when fully open       |                             |     |
| — 90 C                             | 7.5                         | .30 |
| — 120 C                            | 10                          | .40 |

**Model 90C — BOSCH PUMP CALIBRATION DATA**

Type PES4A90D . . . . — 770931

**PUMP DATA**

Element: EPPK320P 10Z - 9003227;      Dia. 9 mm (.35 in) ; Pitch: 15 mm (.59 in) Helix: L.H.  
Check valve: 9009574      Valve spring: 9009576      Spring length: 32.1 to 32.5 mm (1.26 to 1.28 in)  
Valve adapter: 9009577      Adapter torque: 4.5 to 5 kgm (32 to 36 lb ft)

GOVERNOR: EP/RSV 325 - 1000A 4B 1078DL

SUPPLY PUMP: FP/KF22A D23/2      Supply pressure : 1.8 to 2.5 kg/cm<sup>2</sup> (25.6 to 35.5 psi)

INJECTORS { FIAT EPPZ 10F1 — 767407 (+)  
BOSCH 8828484  
C.A.V. EPPZ 60F7 — 771024  
OMAP EPPZ 70F7 — 770944

Nozzle holder { FIAT KB82 S1F11 — 767406  
BOSCH KBL82 S166/4 — 8828487  
C.A.V. BKBL 82S 5399 — 771030  
OMAP OKLL 82S 7850 — 770945

Nozzle { FIAT DLL 150S 51F — 767404  
BOSCH DLLA 150S 527 — 8828488  
C.A.V. BDLL 150S 6694 — 771025  
OMAP OLL 150S 51F — 770945 } orifice dia.: .30 mm (.012 in)  
No. of orifices: 4

Release pressure { 195 to 205 kg/cm<sup>2</sup>      Spring: WSF 2044/6X — 656829 (+)      Spring length { 27 to 27.5 mm  
2773 to 2916 psi      1.06 to 1.08 in

Delivery pipes { FIAT - 6 x 1.5 x 270/345 mm  
BOSCH - CAV - OMAP - 6 x 1.5 x 290/365 mm

DRIVE COUPLING: PZR7F 3X 4X 1X - 760566 770962 758116

**ASSEMBLY DATA**

Pump rotation (drive end): Clockwise

Firing order: 1 - 3 - 4 - 2

Plunger lift to spill cut - off: 2.2 ± .05 mm (.086 ± .02 in)

Pump timing 26° to 27° BTDC

Max. fuel control travel: .1 mm (.004 in)

Governor spring adjustment: Screw in fully and back off through (2 turns).

# ENGINE: Data

## TEST PLAN

**PROCEDURE A** : BOSCH machine, WSF 2044/4X injector springs, EFEP 182 nozzles.  
 RABOTTI machine, FIAT 656829 injector springs, EFEP 182 nozzles.  
 Release pressure: 175 kg/cm<sup>2</sup> (2489 psi) Piping: 2 x 6 x 600 mm

**PROCEDURE B** : Machine equipped with production injectors as fitted on engine.  
 Release pressure: 195 to 205 kg/cm<sup>2</sup> (2773 to 2916 psi) Piping: 2 x 6 x 600 mm

**Fuel data** : Density at 37° to 43°C 820 to 840 gramme/litre.

| THROTTLE | SPEED<br>rpm         | CONTROL ROD<br>STROKE<br>mm | PROCEDURE A                    |                 | PROCEDURE B                    |                 |
|----------|----------------------|-----------------------------|--------------------------------|-----------------|--------------------------------|-----------------|
|          |                      |                             | Injector<br>delivery           | Pump<br>output* | Injector<br>delivery           | Pump<br>output* |
|          |                      |                             | cm <sup>3</sup> per 1000 shots |                 | cm <sup>3</sup> per 1000 shots |                 |
| Idling   | 325 $\pm 0_{-10}$    | 6 $\pm 0,5$                 | 16 $\pm 1$                     | —               | 20 $\pm 1$                     | —               |
| Full     | ● 1000 $\pm 0_{-10}$ | 10 $\pm 0,1$                | 87 $\pm 2$                     | 348 $\pm 3$     | 82 $\pm 2$                     | 328 $\pm 3$     |
| Full (1) | 500 $\pm 10$         | 10,1 $\pm 0,1$              | 77 $\pm 2$                     | 308 $\pm 3$     | 79 $\pm 2$                     | 316 $\pm 3$     |
| Full (2) | 100                  | —                           | 120 min.                       | —               | 120 min.                       | —               |

● Governor cut - in range 1000 to 1010 rpm.

\* Control rod stop adjustment.

(1) Maximum fuel control testing.

(2) Excess fuel testing.

## ON-BENCH PERFORMANCE DATA

Test Plan:

- Engine on bench with fan, air cleaner and exhaust silencer removed;
- Barometric pressure: 740  $\pm 5$  Hg at 239 metres (785 ft) above sea level;

- Ambient temperature 20°  $\pm 3^{\circ}$ C;
- Relative humidity 70%  $\pm 5\%$ ;
- Fuel density 830  $\pm 10$  grammes/litre.

| Throttle           | Engine<br>rpm | Metric HP         |                    | Time to<br>burn<br>250 cc (15 in <sup>3</sup> )<br>of fuel<br>(seconds) |
|--------------------|---------------|-------------------|--------------------|-------------------------------------------------------------------------|
|                    |               | 2 - hour run - in | 50 - hour run - in |                                                                         |
| Maximum, full load | 2000          | 91 min.           | 93 min.            | 46 to 47,5                                                              |
| Maximum            | 1000          | 46 min.           | 47 min.            | 88,5 to 93,5                                                            |
| Maximum, no load   | 2170 $\pm 10$ | —                 | —                  | —                                                                       |
| Minimum, no load   | 650           | —                 | —                  | —                                                                       |

**Model 120 C — FIAT PUMP CALIBRATION DATA**

**Type PES6A90B410 : L4/177 — 770977**

**PUMP DATA**

Element: EPPK202 F 5Z - 766061      Dia.: 9 mm (.35 in) ;    Pitch: 12 mm (.59 in) ; Helix: L.H.

Check valve: PVE161 S2Z - 755708      Valve spring: PSF 9S3X - 754799

Spring length: 32.4 to 32.9 mm (1.27 to 1.29 in) ;    Valve adapter: PRV 122S1X — 746368 ;    Adapter torque: 4.5 to 5 kgm (32 to 36 lbft)

GOVERNOR: RPVA 250 - 1000 F 144 — 768226

SUPPLY PUMP: FP/KS22A:L4/4 - 763150 — Supply pressure: 1.6 to 1.8 kg/cm<sup>2</sup> (22.7 to 25.6 psi)

|           |   |        |                        |
|-----------|---|--------|------------------------|
| INJECTORS | { | FIAT   | EPPZ 10F1 — 767407 (+) |
|           |   | BOSCH  | 8828484                |
|           |   | C.A.V. | EPPZ 60F7 — 771024     |
|           |   | OMAP   | EPPZ 70F7 — 770944     |

|               |   |        |                        |
|---------------|---|--------|------------------------|
| Nozzle holder | { | FIAT   | KB82 S1F11 — 767406    |
|               |   | BOSCH  | KBL82 S166/4 — 8828487 |
|               |   | C.A.V. | BKBL 82S 5399 — 771030 |
|               |   | OMAP   | OKLL 82S 7850 — 770942 |

|        |   |        |                         |   |                                                      |
|--------|---|--------|-------------------------|---|------------------------------------------------------|
| Nozzle | { | FIAT   | DLL 150S 51F — 767404   | } | orifice dia.: .30 mm (.012 in)<br>No. of orifices: 4 |
|        |   | BOSCH  | DLLA 150S 527 — 8828488 |   |                                                      |
|        |   | C.A.V. | BDLL 150S 6694 — 771025 |   |                                                      |
|        |   | OMAP   | OLL 150S 51F — 770945   |   |                                                      |

Release pressure { 195 to 205 kg/cm<sup>2</sup> ; Spring: WSF 2044/6X — 656829 (+) ; Spring length { 27 to 27.5 mm  
2773 to 2916 psi } 1.06 to 1.08 in

|                |   |                                                           |
|----------------|---|-----------------------------------------------------------|
| Delivery pipes | { | FIAT - 6 x 1.5 x 345/280/310/345/440/500 mm               |
|                |   | BOSCH - CAV - OMAP - 6 x 1.5 x 370/255/305/370/460/525 mm |

DRIVE COUPLING: PZR7F1X - 758116

**ASSEMBLY DATA**

Pump rotation (drive end): Clockwise

Firing order: 1 - 5 - 3 - 6 - 2 - 4

Plunger lift to spill cut-off: 2.2 ± .05 mm (.020 ± .002 in)

Pump timing: 25° ± 30' BTDC.

Governor spring pin protrusion above lock ring: .5 to 1.5 mm (.020 to .060 in)

Max. fuel control travel: .4 to .5 mm (.016 to .020 in)

# ENGINE: Data

## TEST PLAN

**PROCEDURE A** : BOSCH machine, WSF 2044/4X injector springs, EFEP 182 nozzles.

RABOTTI machine, FIAT 656829 injector springs, EFEP 182 nozzles.

Release pressure: 175 kg/cm<sup>2</sup> (2489 psi) Piping: 2 x 6 x 600 mm

**PROCEDURE B** : Machine equipped with production injectors as fitted to engine.

Release pressure: 195 to 205 kg/cm<sup>2</sup> (2773 to 2916 psi) Piping: 2 x 6 x 600 mm

**Fuel data** : Density at 37° to 43°C 820 to 840 gramme/litre.

| THROTTLE | SPEED<br>rpm                                             | CONTROL ROD<br>STROKE<br>mm | PROCEDURE A                    |                 | PROCEDURE B                    |                 |
|----------|----------------------------------------------------------|-----------------------------|--------------------------------|-----------------|--------------------------------|-----------------|
|          |                                                          |                             | Injector<br>delivery           | Pump<br>output* | Injector<br>delivery           | Pump<br>output* |
|          |                                                          |                             | cm <sup>3</sup> per 1000 shots |                 | cm <sup>3</sup> per 1000 shots |                 |
| Idling   | 300 $\begin{smallmatrix} +0 \\ -10 \end{smallmatrix}$    | 9 $\pm 0,5$                 | 23 $\pm 1$                     | —               | 21 $\pm 1$                     | —               |
| Full     | • 1000 $\begin{smallmatrix} -10 \\ +0 \end{smallmatrix}$ | 12,2 $\pm 0,1$              | 75 $\pm 2$                     | 450 $\pm 3$     | 67 $\pm 2$                     | 402 $\pm 3$     |
| Full (1) | 500 $\pm 5$                                              | —                           | —                              | 408 $\pm 3$     | —                              | 384 $\pm 3$     |
| Full (2) | 200                                                      | —                           | 120 min.                       | —               | 120 min.                       | —               |

● Governor cut-in range 1000 to 1010 rpm.

\* Control rod stop adjustment.

(1) Maximum fuel control testing.

(2) Excess fuel testing.

## ON - BENCH PERFORMANCE DATA

Test Plan:

(785 ft) above sea level;

— Engine on bench with fan, air cleaner and exhaust silencer removed;

— Ambient temperature: 20°  $\pm$  3°C;

— Barometric pressure 740  $\pm$  5 Hg at 239 metres

— Relative humidity: 70%  $\pm$  5%;

— Fuel density: 830  $\pm$  10 grammes / litre.

| Throttle           | Engine<br>rpm | Metric HP         |                    | Time to<br>burn<br>250 cc (15 in <sup>3</sup> )<br>of fuel<br>(seconds) |
|--------------------|---------------|-------------------|--------------------|-------------------------------------------------------------------------|
|                    |               | 2 - hour run - in | 50 - hour run - in |                                                                         |
| Maximum, full load | 2000          | 111 min.          | 113 min.           | 37.4 to 39                                                              |
| Maximum            | 1000          | 59 min.           | 60 min.            | 73.8 to 77.8                                                            |
| Maximum, no load   | 2170 max.     | —                 | —                  | —                                                                       |
| Minimum, no load   | 550 to 600    | —                 | —                  | —                                                                       |

**Model 120 C — BOSCH PUMP CALIBRATION DATA**  
**Type PES6A90D . . . . . — 770934**

**PUMP DATA**

Element: EPPK320 P 10Z - 9003227 ; Dia.: 9 mm (.35 in) Pitch: 15 mm (.59 in) Helix: L.H.

Check valve: 9009574 ; Valve spring: 9009576 ; Spring length: 32.1 to 32.5 mm (1.26 to 1.28 in)

Valve adapter: 9009577 ; Adapter torque: 4.5 to 5 kgm (32 to 36 lbft)

GOVERNOR: RQV 325 - 1000

SUPPLY PUMP: FP/KS22A D23/2 — Supply pressure: 1.8 to 2.5 kg/cm<sup>2</sup> - (25.6 to 35.5 psi)

|           |   |        |                        |
|-----------|---|--------|------------------------|
| INJECTORS | { | FIAT   | EPPZ 10F1 — 767407 (+) |
|           |   | BOSCH  | 8828484                |
|           |   | C.A.V. | EPPZ 60F7 — 771024     |
|           |   | OMAP   | EPPZ 70F7 — 770944     |

|                  |   |        |                        |
|------------------|---|--------|------------------------|
| Nozzle<br>holder | { | FIAT   | KB82 S1F11 — 767406    |
|                  |   | BOSCH  | KBL82 S166/4 — 8828487 |
|                  |   | C.A.V. | BKBL 82S 5399 — 771030 |
|                  |   | OMAP   | OKLL 82S 7850 — 770942 |

|        |   |        |                         |                                                      |
|--------|---|--------|-------------------------|------------------------------------------------------|
| Nozzle | { | FIAT   | DLL 150S 51F — 767404   | } orifice dia.: .30 mm (.012 in); No. of orifices: 4 |
|        |   | BOSCH  | DLLA 150S 527 — 8828488 |                                                      |
|        |   | C.A.V. | BDLL 150S 6694 — 771025 |                                                      |
|        |   | OMAP   | OLL 150S 51F — 770945   |                                                      |

Release pressure { 195 to 205 kg/cm<sup>2</sup> ; Spring: WSF 2044/6X — 656829 (+) ; Spring length { 27 to 27.5 mm  
2773 to 2916 psi } 1.06 to 1.08 in

|                 |   |                                                           |
|-----------------|---|-----------------------------------------------------------|
| Delivery pipes: | { | FIAT - 6 x 1.5 x 345/280/310/345/440/500 mm               |
|                 |   | BOSCH - CAV - OMAP - 6 x 1.5 x 370/255/305/370/460/525 mm |

DRIVE COUPLING: PZR7F1X - 758116

**ASSEMBLY DATA**

Pump rotation (drive end): Clockwise

Firing order: 1 - 5 - 3 - 6 - 2 - 4

Plunger lift to spill cut-off: 2.2 ± .05 mm (.086 ± .002 in)

Pump timing: 25° ± 30' BTDC.

Max. fuel control travel: .3 to .4 mm (.012 to .016 in)

# ENGINE: Data

## TEST PLAN

**PROCEDURE A** : BOSCH machine, WSF 2044/4X injector springs, EFEP 182 nozzles.

RABOTTI machine, FIAT 656829 injector springs,

EFEP 182 nozzles.

Release pressure: 175 kg/cm<sup>2</sup> - (2489 psi) Piping: 2 x 6 x 600 mm

**PROCEDURE B** : Machine equipped with production injectors as fitted to engine.

Release pressure: 195 to 205 kg/cm<sup>2</sup> - (2773 to 2916 psi) Piping: 2x6x600 mm

**Fuel data** : Density at 37° to 43° C: 820 to 840 gramme/litre.

| THROTTLE        | SPEED<br>rpm                                             | CONTROL ROD<br>STROKE<br>mm | PROCEDURE A                    |                  | PROCEDURE B                    |                  |
|-----------------|----------------------------------------------------------|-----------------------------|--------------------------------|------------------|--------------------------------|------------------|
|                 |                                                          |                             | Injector<br>delivery           | Pump<br>output * | Injector<br>delivery           | Pump<br>output * |
|                 |                                                          |                             | cm <sup>3</sup> per 1000 shots |                  | cm <sup>3</sup> per 1000 shots |                  |
| Idling          | 325 $\begin{smallmatrix} +0 \\ -10 \end{smallmatrix}$    | 8 ± .5                      | 20 ± 1                         | —                | 24 ± 1                         | —                |
| Full            | • 1000 $\begin{smallmatrix} -10 \\ +0 \end{smallmatrix}$ | 10,4 ± .1                   | 75 ± 2                         | 450 ± 3          | 67 ± 2                         | 402 ± 3          |
| Full (1)        | 500 ± 5                                                  | 10,7 ± .1                   | —                              | 408 ± 3          | —                              | 384 ± 3          |
| Excess fuel (2) | 100                                                      | 15 ± .1 <sup>(o)</sup>      | 100 to 110                     | —                | 105 to 115                     | —                |

● Governor cut-in range 1000 to 1010 rpm.

\* Control rod stop adjustment.

(o) Control rod stop adjustment on cap (pump drive side).

(1) Maximum fuel control testing.

(2) Excess fuel testing.

## ON - BENCH PERFORMANCE DATA

Test Plan:

- Engine on bench with fan, air cleaner and exhaust silencer removed;
- Barometric pressure: 740 ± 5 Hg at 239 metres

(785 ft) above sea level;

- Ambient temperature: 20 ± 3°C;
- Relative humidity: 70% ± 5%;
- Fuel density: 830 ± 10 grammes / litre.

| Throttle           | Engine<br>rpm | Metric HP         |                    | Time to<br>burn<br>250 cc (15 in <sup>3</sup> )<br>of fuel<br>(seconds) |
|--------------------|---------------|-------------------|--------------------|-------------------------------------------------------------------------|
|                    |               | 2 - hour run - in | 50 - hour run - in |                                                                         |
| Maximum, full load | 2000          | 111 min.          | 113 min.           | 37.4 to 39                                                              |
| Maximum            | 1000          | 59 min.           | 60 min.            | 73.8 to 77.8                                                            |
| Maximum, no load   | 2210 ± 10     | —                 | —                  | —                                                                       |
| Minimum, no load   | 650           | —                 | —                  | —                                                                       |

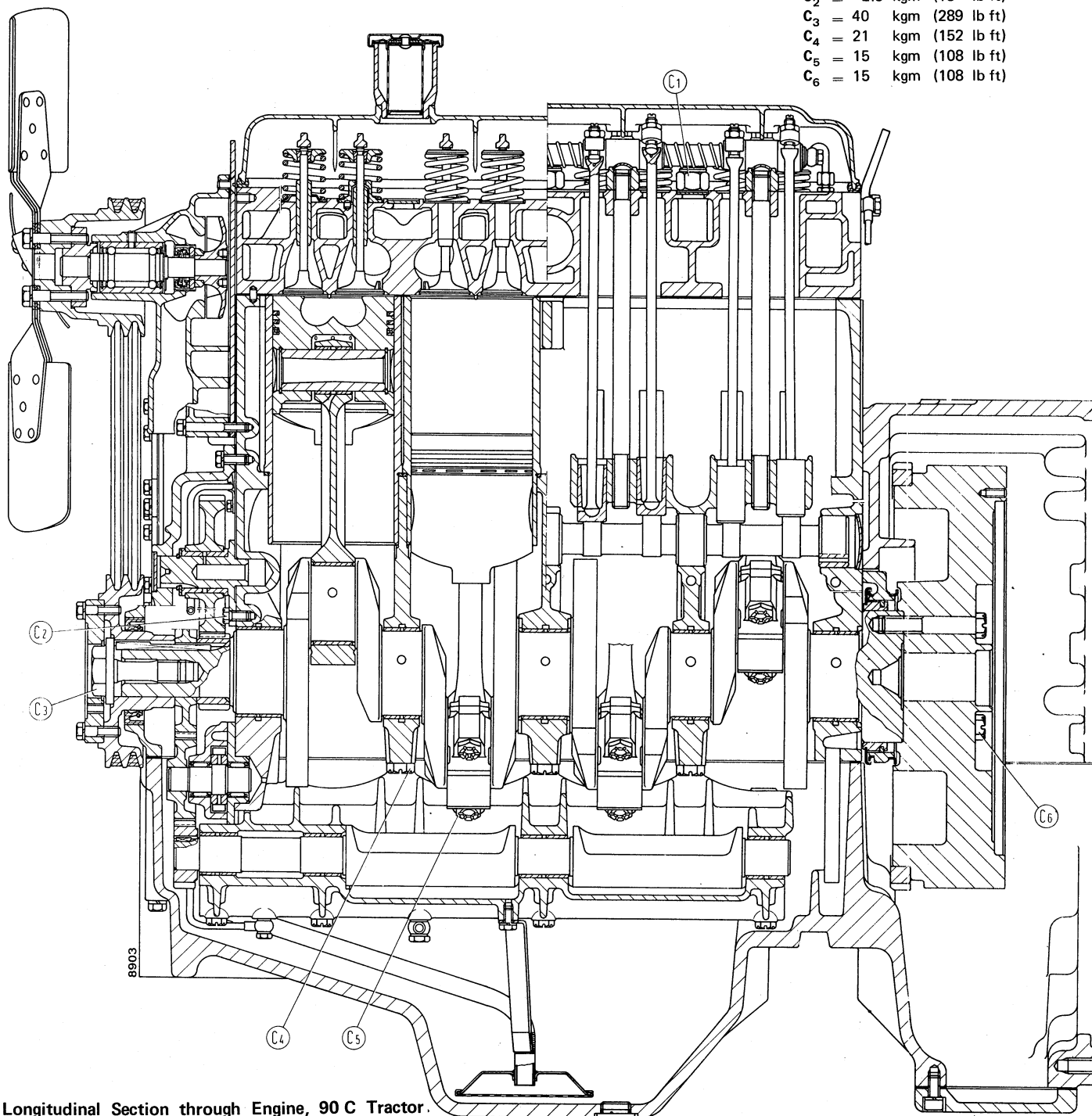
**TIGHTENING TORQUE DATA**

| DESCRIPTION                                   | Thread Size                         | Reference                        | Torque         |                   |
|-----------------------------------------------|-------------------------------------|----------------------------------|----------------|-------------------|
|                                               |                                     |                                  | kgm            | lb ft             |
| Nut, cylinder head<br>— 90 C<br>— 120 C       | M16 x 1.5<br>M18 x 1.5<br>M16 x 1.5 | C <sub>1</sub> , pages 17 and 18 | 25<br>33<br>23 | 181<br>239<br>166 |
| Screw, fuel pump shaft to gear                | M 8 x 1.25                          | —                                | 2,5            | 18                |
| Screw, idler gear jackshaft                   | M 8 x 1.25                          | C <sub>2</sub> , pages 17 and 18 | 2,5            | 18                |
| Screw, crankshaft pulley<br>— 90 C<br>— 120 C | 22 x 1,5<br>22 x 1,5                | C <sub>3</sub> , pages 17 and 18 | 40<br>57       | 289<br>412        |
| Screw, main bearing cap<br>— 90 C<br>— 120 C  | M16 x 1,5<br>M16 x 1,5              | C <sub>4</sub> , pages 17 and 18 | 21<br>17       | 152<br>123        |
| Screw, conn. rod cap<br>— 90 C<br>— 120 C     | M14 x 1,5<br>M13 x 1,5              | C <sub>5</sub> , pages 17 and 18 | 15<br>12,5     | 108<br>90         |
| Screw, balancer housing (90 C)                | M10 x 1,25                          | —                                | 5              | 36                |
| Screw, balancer housing to block (90 C)       | M10 x 1,25                          | —                                | 5              | 36                |
| Screw, flywheel                               | M14 x 1,5                           | C <sub>6</sub> , pages 17 and 18 | 15             | 108               |

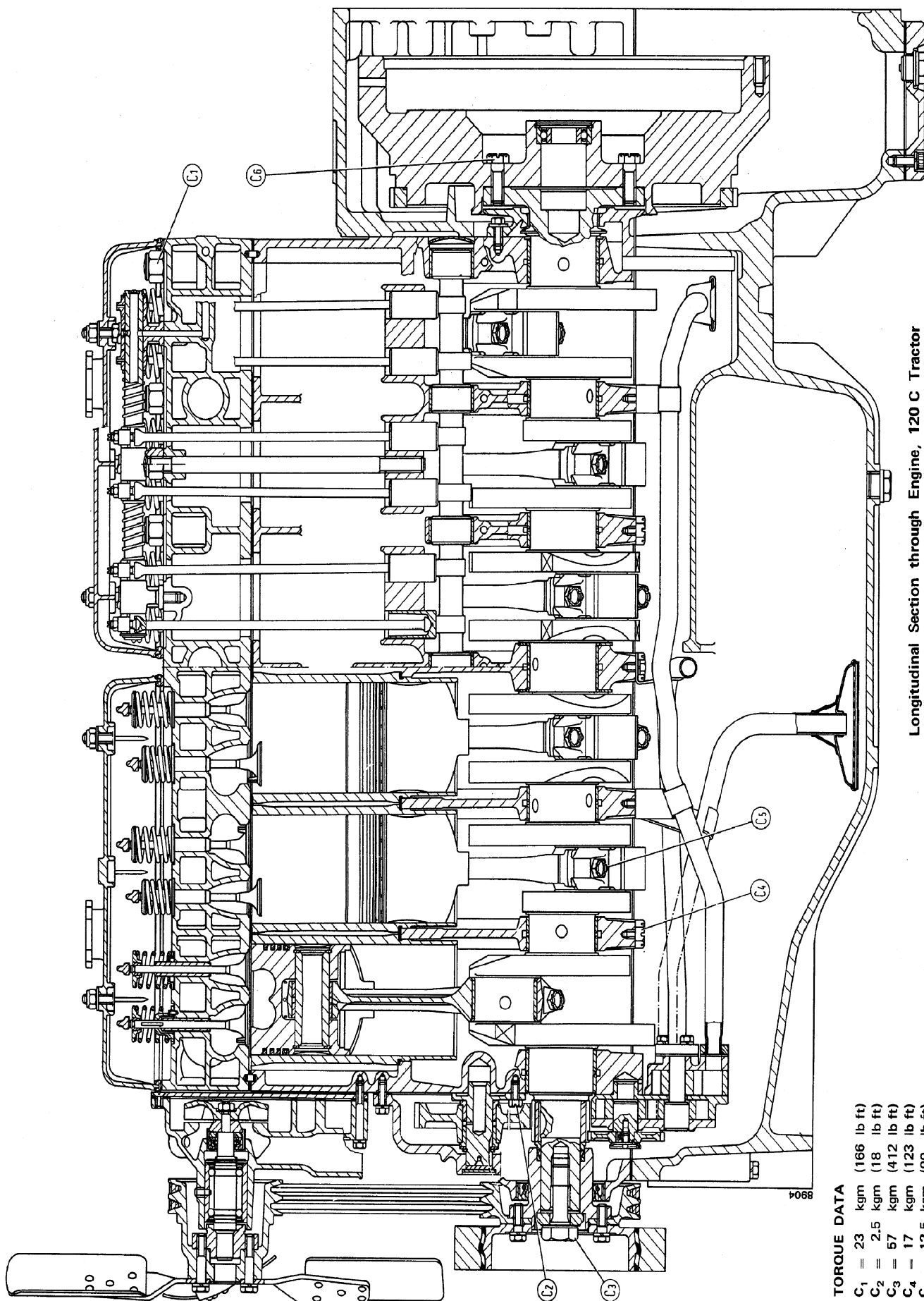


**TORQUE DATA**

|       |   |     |     |             |               |
|-------|---|-----|-----|-------------|---------------|
| $C_1$ | { | 25  | kgm | (181 lb ft) | M 16x1.5 nuts |
|       |   | 33  | kgm | (239 lb ft) | M 18x1.5 nuts |
| $C_2$ | = | 2.5 | kgm | (18 lb ft)  |               |
| $C_3$ | = | 40  | kgm | (289 lb ft) |               |
| $C_4$ | = | 21  | kgm | (152 lb ft) |               |
| $C_5$ | = | 15  | kgm | (108 lb ft) |               |
| $C_6$ | = | 15  | kgm | (108 lb ft) |               |



**Longitudinal Section through Engine, 90 C Tractor.**



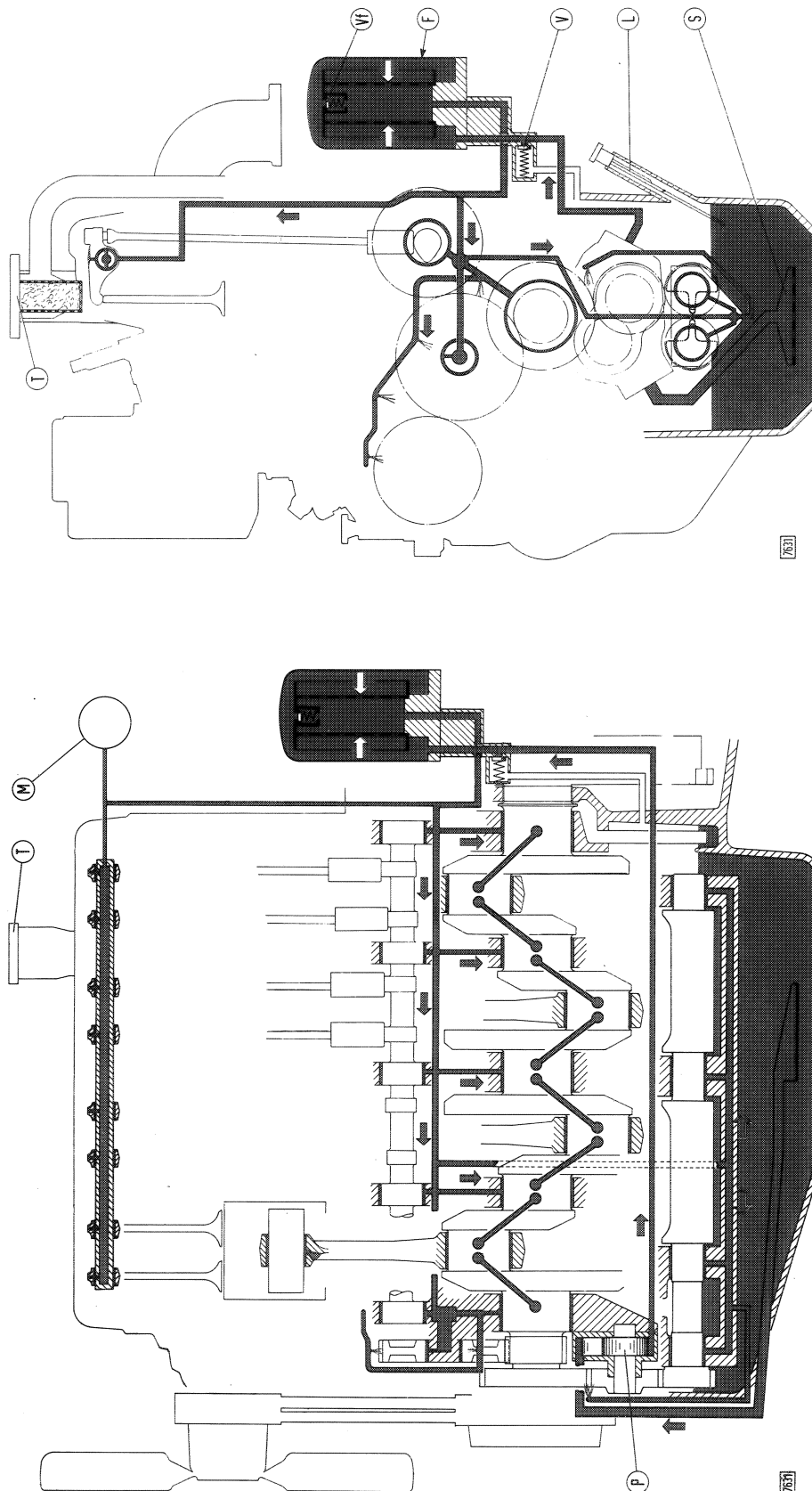
## TORQUE DATA

|                |        |     |      |        |
|----------------|--------|-----|------|--------|
| C <sub>1</sub> | = 23   | kgm | (166 | lb ft) |
| C <sub>2</sub> | = 2.5  | kgm | (18  | lb ft) |
| C <sub>3</sub> | = 57   | kgm | (412 | lb ft) |
| C <sub>4</sub> | = 17   | kgm | (123 | lb ft) |
| C <sub>5</sub> | = 12.5 | kgm | (90  | lb ft) |
| C <sub>6</sub> | = 15   | kgm | (108 | lb ft) |

Longitudinal Section through Engine, 120 C Tractor

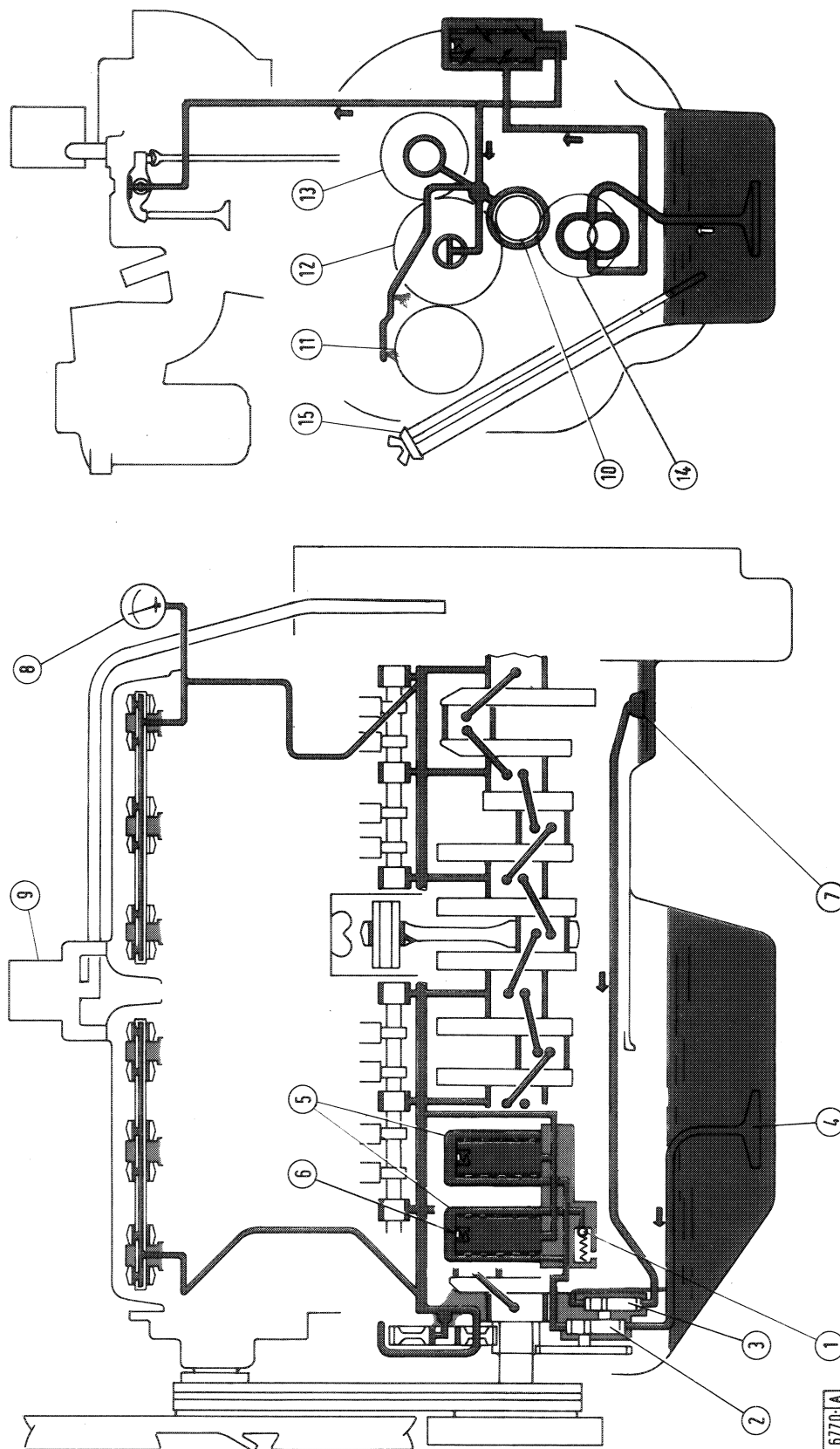
DIREZIONE SVILUPPO POST-VENDITA

# ENGINE: Lubrication System Diagram - 90 C



F. Filter - L. Dipstick - M. Pressure gauge - P. Oil pump - S. Suction scoop - T. Filler plug - V. Relief valve - Vf. Bypass valve.

**ENGINE:  
Lubrication System  
Diagram - 120 C**



1. Relief valve - 2. Feed pump - 3. Scavenge pump - 4. Suction strainer - 5. Oil filter - 6. Bypass valve - 7. Pump inlet filter  
8. Pressure gauge - 9. Vent - 10. Crankshaft pinion - 11. Fuel pump gear - 12. Idler gear - 13. Camshaft gear - 14. Oil pump gear  
15. Dipstick and filler.

**MASTER CLUTCH**

|                                       | mm                                     | in                              |
|---------------------------------------|----------------------------------------|---------------------------------|
| Type                                  | Twin plate,<br>oil - bath, over centre |                                 |
| No. of plates                         | 2                                      |                                 |
| Plate material                        | Steel with sintered<br>coating         |                                 |
| Control                               | Manual lever                           |                                 |
| Oil pump                              | Lobe, in clutch                        |                                 |
| Supply pressure at governed speed     | .1 to .5 kg/cm <sup>2</sup>            | 1.5 to 7 psi                    |
| Oil filter                            | Metal mesh                             |                                 |
| Driven plate O.D.                     | 355.3 to 355.8                         | 13.988 to 14.008                |
| Driven plate thickness                | 7 to 7.5                               | .27 to .29                      |
| — Minimum thickness                   | 5.5 <sup>(1)</sup>                     | .216 <sup>(1)</sup>             |
| Intermediate pressure plate thickness | 15 ± .15                               | .590 ± .006                     |
| Coupling sleeve spline backlash       | .010 to .106                           | .0004 to .0042                  |
| Carrier O.D.                          | 57.970 to 58.000                       | 2.2823 to 2.2835                |
| Sleeve I.D.                           | 58.300 to 58.400                       | 2.2953 to 2.2992                |
| Carrier clearance in sleeve           | .300 to .430                           | .0118 to .0169                  |
| Sleeve O.D.                           | 71.970 to 72.000                       | 2.8335 to 2.8346                |
| Oil pump body bush I.D.               | 72.050 to 72.100                       | 2.8366 to 2.8386                |
| Oil pump cover bush I.D.              | 72.030 to 72.104 <sup>(2)</sup>        | 2.8358 to 2.8387 <sup>(2)</sup> |
| Sleeve clearance:                     |                                        |                                 |
| — Pump body bush                      | .050 to .130                           | .0020 to .0051                  |
| — Pump cover bush                     | .030 to .134                           | .0012 to .0053                  |
| Max. clearance                        | .25                                    | .010                            |

(1) Lube marks should show on plate face.

(2) Fitted and reamed.

# POWER TRAIN: Data

## MASTER CLUTCH

|                                         | mm                              | in                              |
|-----------------------------------------|---------------------------------|---------------------------------|
| Oil pump drive gear locating dia.       | 83.965 to 84.000                | 3.3057 to 3.3071                |
| Dia. of gear locating recess in pump    | 84.100 to 84.130                | 3.3110 to 3.3122                |
| Gear clearance in locating recess       | .100 to .165                    | .0040 to .0065                  |
| Oil pump driven gear O.D.               | 131.960 to 132.000              | 5.1953 to 5.1968                |
| Dia. of gear recess in pump body        | 132.100 to 132.140              | 5.2008 to 5.2024                |
| Gear clearance in pump body             | .100 to .180                    | .0040 to .0071                  |
| Oil pump gear width                     | 6.985 to 7.000                  | .2750 to .2756                  |
| Pump end float on sleeve                | .050 to .300                    | .0020 to .0120                  |
| Relay lever I.D.                        | 32.927 to 32.966                | 1.2963 to 1.2979                |
| Relay lever bush O.D.                   | 33.009 to 33.030                | 1.2995 to 1.3004                |
| Bush interference fit in lever          | .043 to .103                    | .0017 to .0040                  |
| Relay lever bush I.D.                   | 28.020 to 28.072 <sup>(1)</sup> | 1.1031 to 1.1052 <sup>(1)</sup> |
| Relay lever pivot dia.                  | 27.967 to 28.000                | 1.1011 to 1.1024                |
| Pivot clearance in bush                 | .020 to .105                    | .0008 to .0041                  |
| Brake lining thickness                  | 6                               | .236                            |
| — Min. thickness                        | 3.5                             | .138                            |
| Pressure spring length:                 |                                 |                                 |
| — Free                                  | 58                              | 2.28                            |
| — Under 26.3 to 28.9 kg - (58 to 64 lb) | 31                              | 1.22                            |
| Master clutch adjustment                | See page 11                     |                                 |

(1) Not reamed.

**TRANSMISSION**

| Type                                                | mm                                                        | in                                             |
|-----------------------------------------------------|-----------------------------------------------------------|------------------------------------------------|
|                                                     | Five speed                                                |                                                |
| Gears                                               | Spur, sliding                                             |                                                |
| Control                                             | Manual lever                                              |                                                |
| Selector shaft clearance in housing                 | .040 to .125                                              | .0016 to .0049                                 |
| Selector fork width                                 | 11.890 to 12.000                                          | .4681 to .4724                                 |
| Width of fork recess on gears                       | 12.290 to 12.400                                          | .4838 to .4882                                 |
| Fork clearance on gear                              | .290 to .510                                              | .0114 to .0201                                 |
| Transmission / splitter / PTO detent spring length: |                                                           |                                                |
| — Free                                              | 91.5                                                      | 3.6024                                         |
| — Under 5.7 to 6.3 kg (12.5 to 13.9 lb)             | 50                                                        | 1.9685                                         |
| Gear spline backlash                                | .010 to .106                                              | .0004 to .0042                                 |
| Gear backlash                                       | .150 to .250                                              | .0060 to .0100                                 |
| Bevel pinion bearing fit in housing                 | <div> <div>Clearance</div> <div>Interference</div> </div> | <div> <div>.0020</div> <div>.0005</div> </div> |

**BEVEL DRIVE**

|                                         |                                                                                                                                                              |                                                                  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Type                                    | Spiral                                                                                                                                                       |                                                                  |
| Reduction ratio (55/13)                 | 4.231 to 1                                                                                                                                                   |                                                                  |
| Pinion bearings                         | <div> <div>Parallel roller</div> <div>Ball</div> </div>                                                                                                      |                                                                  |
| Pinion adjustment                       | Shims (see page 10)                                                                                                                                          |                                                                  |
| Pinion shim thickness                   | <div> <div>1.90-1.95-2.00-2.05-2.10</div> <div>2.40-2.45-2.50-2.55-2.60</div> <div>2.65-2.70-2.75-2.80-2.85</div> <div>2.90-2.95-3.00-3.05-3.10</div> </div> | <div> <div>.0750 to .1220</div> <div>.0020 in steps</div> </div> |
| Bevel drive backlash                    | .180 to .230                                                                                                                                                 | .0071 to .0090                                                   |
| Crown wheel bearings                    | Two, tapered roller                                                                                                                                          |                                                                  |
| Crown wheel bearing backlash adjustment | Lock rings (see page 10)                                                                                                                                     |                                                                  |

# POWER TRAIN: Data

## STEERING CLUTCHES

| Type                                               | mm                                                                | in                   |
|----------------------------------------------------|-------------------------------------------------------------------|----------------------|
|                                                    | Dry multiplate hydraulic power assisted,<br>manual lever operated |                      |
| No. of pressure springs<br>Pressure spring length: | 6 outer and 6 inner                                               |                      |
| — Free                                             |                                                                   |                      |
| — Inner                                            | 127                                                               | 5                    |
| — Outer                                            | 142                                                               | 5.6                  |
| — Inner under 50 to 55.2 kg (110 to 122 lb)        | 86                                                                | 3.4                  |
| — Outer under 116.9 to 128.9 kg (258 to 284 lb)    | 96                                                                | 3.8                  |
| No. of clutch plates                               | 11 off                                                            |                      |
| — Driving (steel)                                  | 11 off                                                            |                      |
| — Driven (asbestos)                                |                                                                   |                      |
| Drive plate thickness                              | 2.42 to 2.58                                                      | .0953 to .1016       |
| Driven plate thickness                             | 5.3 to 5.5                                                        | .2087 to .2165       |
| — Min. driven plate thickness                      | 4.3 to 4.5                                                        | .1693 to .1772       |
| Total pack thickness                               | 85 to 89                                                          | 3.3464 to 3.5039     |
| — Min. pack thickness                              | 79 (1)                                                            | 3.1102 (1)           |
| Drive plate spline backlash on inner drum          | .30 to .60                                                        | .0120 to .0240       |
| Driven plate backlash on outer drum                | .10 to .40                                                        | .0040 to .0160       |
| Hand lever bush I.D.                               | 22.040 to 22.092 (2)                                              | .8677 to .8698 (2)   |
| Hand lever pivot dia.                              | 21.948 to 22.000                                                  | .8641 to .8661       |
| Pivot clearance in bush                            | .040 to .144                                                      | .0016 to .0057       |
| — Max. clearance                                   | .25                                                               | .0100                |
| Pressure plate hub I.D.                            | 55.150 to 55.220                                                  | 2.1712 to 2.1740     |
| Ring gear shaft dia.                               | 54.970 to 55.000                                                  | 2.1642 to 2.1653     |
| Shaft clearance in hub                             | .15 to .25                                                        | .0060 to .0100       |
| Sleeve pivot dia.                                  | 19.967 to 20.000                                                  | .7861 to .7874       |
| Fork elongated hole dia.                           | 20.040 to 20.092                                                  | .7890 to .7910       |
| Pivot clearance in fork                            | .040 to .125                                                      | .0016 to .0049       |
| Relay shaft dia.                                   | 29.967 to 30.000                                                  | 1.1798 to 1.1811     |
| Bush I.D.                                          | 30.040 to 30.092 (2)                                              | 1.1827 to 1.1847 (2) |
| Shaft journal clearance in bush                    | .040 to .125                                                      | .0016 to .0049       |
| — Max. clearance                                   | .25                                                               | .0100                |
| Clutch servo adjustment                            | See page 14                                                       |                      |

(1) If no one driven plate is worn out, restore initial pack thickness by adding a drive plate to contact moving pressure plate.

(2) Not reamed.

**STEERING CLUTCH SERVO**

|                                                                                                                                                                                                                                                                                                            | mm                                                                                                                                                                                                                                             | in                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Pump</b><br>Type<br>Model<br>Make<br>Actuation<br>Rotation (drive end)<br>Drive ratio<br>Rated speed (at 2000 engine rpm)<br>Rated output<br>On - bench output at 1445 rpm and 80 kg/cm <sup>2</sup> (1338 psi)<br>— New (overhauled) pump<br>— Used pump<br>Test oil temperature<br>Test oil viscosity | Gear<br>C 18 X<br>FIAT/PLESSEY<br>Valve timing gear<br>Clockwise<br>1.148 to 1 (gear ratio 25/50x62/27)<br>2296 rpm<br>18.8 litres/min<br>33 Pt/min<br>11.1 litres/min<br>20 Pt/min<br>8.1 litres/min<br>14 Pt/min<br>55° to 65° C<br>SAE 20 W |                                                                                                 |
| Gear journal dia.<br>Bearing bore dia.<br>Journal clearance in bearing<br>— Max. clearance                                                                                                                                                                                                                 | 17.400 to 17.424<br>17.450 to 17.470<br>.026 to .070<br>.20                                                                                                                                                                                    | .6850 to .6860<br>.6870 to .6878<br>.0010 to .0027<br>.008                                      |
| Pump gear dia.<br>Pump body bore dia.<br>Max. pump body inlet wear                                                                                                                                                                                                                                         | 37.230 to 37.250<br>37.270 to 37.294<br>.10                                                                                                                                                                                                    | 1.4657 to 1.4665<br>1.4673 to 1.4683<br>.004                                                    |
| Pump bearing width<br>Gear width<br>— Min. gear width<br>Gear and bearing housing width in pump body<br>Gear end float in pump body with bearings in position (o)<br>Gear backlash                                                                                                                         | 16.863 to 16.878<br>13.190 to 13.215<br>12.94<br>47.070 to 47.120<br>.1 to .2<br>.41 to .53                                                                                                                                                    | .6639 to .6645<br>.5193 to .5203<br>.5094<br>1.8531 to 1.8551<br>.004 to .008<br>.0161 to .0209 |
| <b>Filter</b>                                                                                                                                                                                                                                                                                              | Metal cartridge on pump inlet                                                                                                                                                                                                                  |                                                                                                 |
| <b>Hydraulic servo construction</b>                                                                                                                                                                                                                                                                        | Servovalve and relief valve, interlock valve permitting individual clutch operation, two control valves and two power cylinders                                                                                                                |                                                                                                 |

(o) Pump overhaul.

# POWER TRAIN: Data

## STEERING CLUTCH SERVO

|                                            | mm                          | in               |           |       |              |              |            |
|--------------------------------------------|-----------------------------|------------------|-----------|-------|--------------|--------------|------------|
| Dia. of plunger seat in servovalve body    | 18.016 to 18.034            | .7093 to .7100   |           |       |              |              |            |
| Plunger O.D.                               | 17.982 to 18.000            | .7079 to .7087   |           |       |              |              |            |
| Plunger clearance in servovalve seat       | .016 to .052                | .0006 to .0020   |           |       |              |              |            |
| Dia. of plunger seat in actuating valve    | 18.016 to 18.034            | .7093 to .7100   |           |       |              |              |            |
| Plunger O.D.                               | 17.989 to 18.000            | .7082 to .7087   |           |       |              |              |            |
| Plunger clearance in valve seat            | .016 to .045                | .0006 to .0018   |           |       |              |              |            |
| Relief valve setting                       | 75 to 85 kg/cm <sup>2</sup> | 1067 to 1209 psi |           |       |              |              |            |
| Servo cylinder bore dia.                   | 34.025 to 34.064            | 1.3396 to 1.3411 |           |       |              |              |            |
| Servo piston O.D.                          | 33.975 to 34.000            | 1.3376 to 1.3386 |           |       |              |              |            |
| Piston working clearance in servo cylinder | .025 to .089                | .0010 to .0035   |           |       |              |              |            |
| Valve spring data                          | Length                      |                  | Test load |       |              |              |            |
|                                            | Free                        |                  | Loaded    |       | kg           | lb           |            |
|                                            | mm                          | in               | mm        | in    |              |              |            |
|                                            | — Servovalve plunger        | 34.5             | 1.3583    | 26    | 1.0236       | 1.82 to 2.02 | 4 to 4.4   |
|                                            | — Actuating valve plunger   | 37               | 1.4567    | 30    | 1.1811       | 9.3 to 10.3  | 20.5 to 23 |
| — Outer lever shaft support                | 33                          | 1.2992           | 19        | .7480 | 55.4 to 61.2 | 122 to 135   |            |

## BRAKES

|                                       |                                             |                                 |
|---------------------------------------|---------------------------------------------|---------------------------------|
| Type                                  | Band, acting on steering clutch outer drums |                                 |
| Actuation                             | Mechanical, twin pedals and manual lever    |                                 |
| No. of linings to each band           | 6 off                                       |                                 |
| Lining thickness                      | 6.2 to 6.5                                  | .2441 to .2559                  |
| — Minimum thickness                   | 3.5                                         | .1378                           |
| Lining width x length                 | 92 x 135                                    | 3.6220 x 5.3150                 |
| Drum O.D.                             | 342                                         | 13.46                           |
| Brake lever bush I.D.                 | 30.040 to 30.092 <sup>(1)</sup>             | 1.1827 to 1.1847 <sup>(1)</sup> |
| Brake lever pivot dia.                | 29.967 to 30.000                            | 1.1798 to 1.1811                |
| Pivot clearance in lever              | .040 to .125                                | .0049                           |
| Band spring length                    |                                             |                                 |
| — Free                                | 155                                         | 6.102                           |
| — Under 39.2 to 43.2 kg (86 to 95 lb) | 115                                         | 4.527                           |
| Brake adjustment                      | See page 12                                 |                                 |

(1) Fitted, not reamed.

**FINAL DRIVES**

|                                               | mm                            | in                                       |
|-----------------------------------------------|-------------------------------|------------------------------------------|
| Type                                          | Spur, double reduction        |                                          |
| Final drive ratio (15/35 x 17/53)             | 7.275 to 1                    |                                          |
| Overall ratio                                 | 30.777 to 1                   |                                          |
| First reduction backlash                      | .20 to .30                    | .008 to .012                             |
| Second reduction backlash                     | .25 to .35                    | .010 to .014                             |
| <b>Sprockets</b>                              | 27 off                        |                                          |
| No. of teeth                                  | 737                           | 29.015                                   |
| Pitch circle dia.                             | 59 to 61                      | 2.32 to 2.40                             |
| Face width                                    |                               |                                          |
| Rear suspension bar inner support spigot dia. | 99.900 to 99.950              | 3.9331 to 3.9350                         |
| Outer support bush wall thickness             | 3.44 to 3.56                  | .1354 to .1401                           |
| Dia. of bush housing bore in outer support    | 107.200 to 107.250            | 4.2205 to 4.2224                         |
| Spigot clearance in bush                      | .130 to .470                  | .0051 to .0185                           |
| Interbush fitted gap                          | 0 to .3                       | 0 to .0120                               |
| Sprocket bearing adjustment                   | See page 12                   |                                          |
| Sprocket bearing shim thickness               | .3 - .8 - 1 - 1.2 - 1.4 - 1.5 | .012 - .032 - .040 - .048<br>.056 - .060 |

**POWER TAKE - OFF**

|                                          |                             |
|------------------------------------------|-----------------------------|
| Drive                                    | Main shaft                  |
| Actuation                                | Manual lever on PTO housing |
| Reduction ratio, 90 C tractor            |                             |
| — 540 rpm                                | 2.54 to 1                   |
| — 1000 rpm                               | 1.78 to 1                   |
| Reduction ratio, 120 C tractor, 1000 rpm | 1.65 to 1                   |
| Engine speed:                            |                             |
| — 90 C                                   |                             |
| — 540 rpm                                | 1374 rpm                    |
| — 1000 rpm                               | 1789 rpm                    |
| — 120 C                                  |                             |
| — 1000 rpm                               | 1650 rpm                    |
| Splined shaft dia.                       | 1 3/8"                      |
| No. of splines                           |                             |
| — 540 rpm                                | 6 off                       |
| — 1000 rpm                               | 21 off                      |
| Rotation (from rear)                     | Clockwise                   |

# POWER TRAIN: Data

## POWER TAKE-OFF

|                                                   | mm           | in             |
|---------------------------------------------------|--------------|----------------|
| Sleeve backlash (1000 rpm)                        | .010 to .106 | .0004 to .0042 |
| Gear backlash (540 rpm)                           | .15 to .25   | .0060 to .0100 |
| Actuator pad clearance in sleeve groove (540 rpm) | .050 to .260 | .0020 to .0102 |
| Fork clearance in gear groove (540 rpm)           | .100 to .240 | .0040 to .0094 |

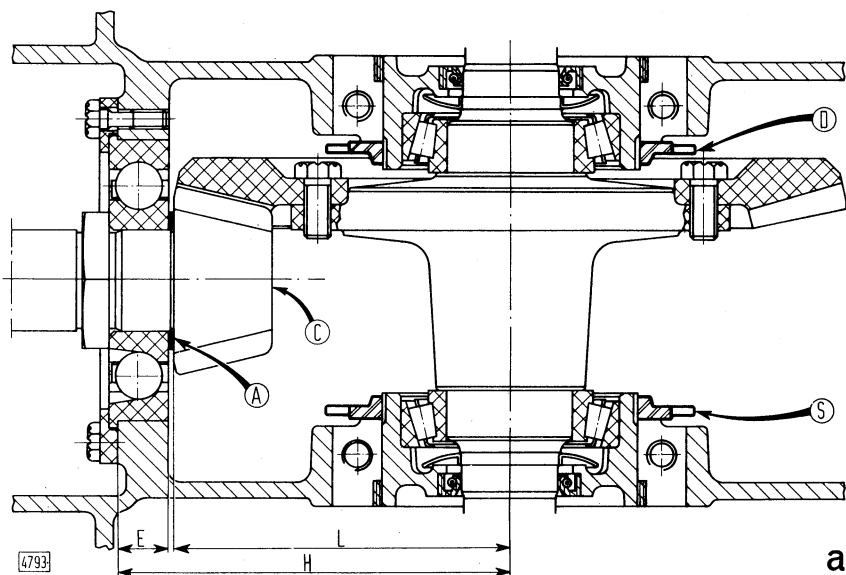
## BELT PULLEY

|                                             |                                |                |
|---------------------------------------------|--------------------------------|----------------|
| Drive                                       | Main shaft                     |                |
| Actuation                                   | Manual lever on pulley housing |                |
| Pulley position                             | Right                          |                |
| Pulley size                                 |                                |                |
| — Diameter                                  | 360                            | 14.17          |
| — Width                                     | 200                            | 7.87           |
| Reduction ratio                             |                                |                |
| — 90 C                                      | 1.65 to 1                      |                |
| — 120 C                                     | 1.21 to 1                      |                |
| RPM at governed speed:                      |                                |                |
| — 90 C                                      | 1213 rpm                       |                |
| — 120 C                                     | 1316 rpm                       |                |
| Surface speed                               |                                |                |
| — 90 C                                      | 22.9 m/sec                     | 75 ft/min      |
| — 120 C                                     | 24.8 m/sec                     | 81 ft/min      |
| Bevel drive backlash                        | .15 to .25                     | .0060 to .0100 |
| Bevel drive backlash control shim thickness | .2 — .5                        | .008 — .020    |
| Bevel drive adjustment                      | See page 11                    |                |

**TIGHTENING TORQUE DATA**

| DESCRIPTION                                             | Thread Size | Reference                 | Torque |      |
|---------------------------------------------------------|-------------|---------------------------|--------|------|
|                                                         |             |                           | kgm    | lbft |
| <b>Master Clutch</b>                                    |             |                           |        |      |
| Screw, clutch support to flywheel                       | M12 x 1.25  | C <sub>1</sub> , page 11  | 10     | 72   |
| Screw, sleeve to support                                | M12 x 1.25  | C <sub>2</sub> , page 11  | 8      | 58   |
| Screw, clutch - transmission sleeve                     | M14 x 1.25  | C <sub>3</sub> , page 11  | 12.5   | 90   |
| Screw, oil pump cover                                   | M 8 x 1.25  | C <sub>4</sub> , page 11  | 2      | 14   |
| <b>Transmission</b>                                     |             |                           |        |      |
| Nut, clutch shaft                                       | M24 x 1.5   | C <sub>5</sub> , page 11  | 34     | 246  |
| Nut, layshaft                                           | M60 x 1.5   | C <sub>6</sub> , page 11  | 60     | 434  |
| Nut, main shaft                                         | M45 x 1.5   | C <sub>7</sub> , page 11  | 35     | 253  |
| Screw, layshaft rear hearing                            | M12 x 1.5   | C <sub>8</sub> , page 11  | 10     | 72   |
| <b>Bevel Drive - Steering Clutches</b>                  |             |                           |        |      |
| Screw, differential cap                                 | M16 x 1.5   | C <sub>9</sub> , page 12  | 19.5   | 141  |
| Screw, ring gear to shaft                               | M16 x 1.5   | C <sub>10</sub> , page 12 | 31     | 224  |
| Lock ring, steering clutch sleeve to pressure plate     | M70 x 1.5   | C <sub>11</sub> , page 12 | 32     | 231  |
| Nut, steering clutch inner lever to fork                | M24 x 1.5   | C <sub>12</sub> , page 12 | 26     | 188  |
| Nut, steering clutch inner drum on ring gear shaft      | M45 x 1.5   | C <sub>13</sub> , page 12 | 95     | 687  |
| Nut, steering clutch outer drum hub on final drive gear | M42 x 1.5   | C <sub>14</sub> , page 12 | 95     | 687  |
| Screw, steering clutch outer drum to hub                | M14 x 1.5   | C <sub>15</sub> , page 12 | 18     | 130  |
| <b>Brakes</b>                                           |             |                           |        |      |
| Nut, pedal to lever pivot                               | M12 x 1.25  | —                         | 7.5    | 54   |
| Nut, inner lever to campin                              | M22 x 1.5   | C <sub>16</sub> , page 12 | 35     | 253  |
| <b>Final Drives - Sprockets</b>                         |             |                           |        |      |
| Nut, final drive gear to hub                            | M20 x 1.5   | C <sub>17</sub> , page 12 | 54     | 390  |
| Screw, final drive housing to transmission case         | M14 x 1.5   | C <sub>18</sub> , page 12 | 16     | 116  |
| Lock ring, sprocket to driven gear hub                  | M92 x 2     | C <sub>19</sub> , page 12 | 95     | 687  |
| Screw, suspension bar inner support                     | M12 x 1 25  | C <sub>20</sub> , page 12 | 7      | 50   |
| Nut, suspension bar                                     | M64 x 2     | C <sub>21</sub> , page 12 | 95     | 687  |

# POWER TRAIN: Bevel Drive Adjustment



## PINION POSITION RELATIVE TO RING GEAR (Fig. a).

Measure dimension E of bearing and read correction figure stamped on bevel pinion.  
Shim thickness A will be:

$$A = H - (L + E)$$

where

**A** = Final shim thickness

**H** = 233 mm (9.173 in), housing to ring gear centerline

**E** = Bearing width up to shoulder

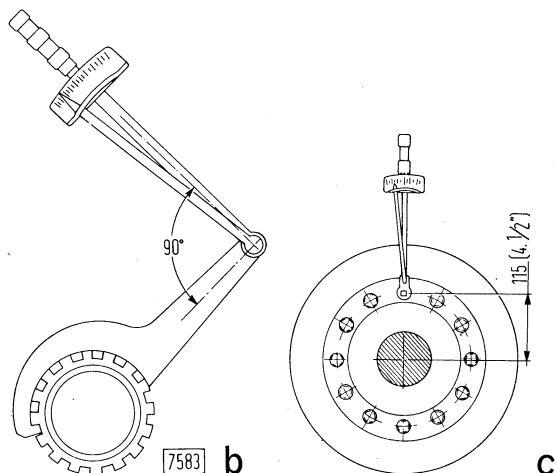
**L** = 199.5 (7.854 in) ± **C**, back of pinion to ring gear centerline, corrected

**C** = Correction figure (in mm) stamped on pinion.

Round off to nearest .05 mm (.002 in) down to use shims of page 3.

## RING GEAR BEARING PRELOAD AND BEVEL DRIVE BACKLASH (Figs. a, b, c).

- Tighten differential cap screws ( $C_9$ , pag 12) to 19.5 kgm (141 lb ft) and back off through half a turn to facilitate sliding of housing.
- Set initial backlash to 1 mm (.04 in) and position R.H. lock ring **D** to permit installation of stop.
  - Tighten L.H. lock ring **S** to 15 kgm (108 lb ft) as shown in Fig. b, simultaneously turning the ring gear to settle the tapered roller bearings.
  - Back off lock ring **S** and retighten to 5 kgm (36 lb ft), simultaneously turning the ring gear. If necessary, slightly increase the torque to permit stop installation.
  - Back off lock ring **S** and tighten R.H. lock ring **D** through the same amount until the prescribed .20 mm (.008 in) backlash is obtained, noting that 1 lock ring tooth is equivalent to .10 mm (.004 in) change in backlash.
  - On completion of adjustment ring gear rotating torque should be .6 to .9 kgm (4.3 to 6.5 lb ft), equivalent to .4 - .6 kgm (2.9 to 4.3 lb ft) as obtained by applying torque wrench 291269 as shown in Fig. c.
  - Install the lock ring stops and tighten the caps to 19.5 kgm (141 lb ft).



# **MASTER CLUTCH ADJUSTMENT**

The clutch is correctly adjusted when a distinct click is heard on engagement and hand lever effort is 18 to 20 kg (40 to 44 lb). When the load is reduced to 11-12 kg (24 to 26 lb) and click is faded, adjust as follows:

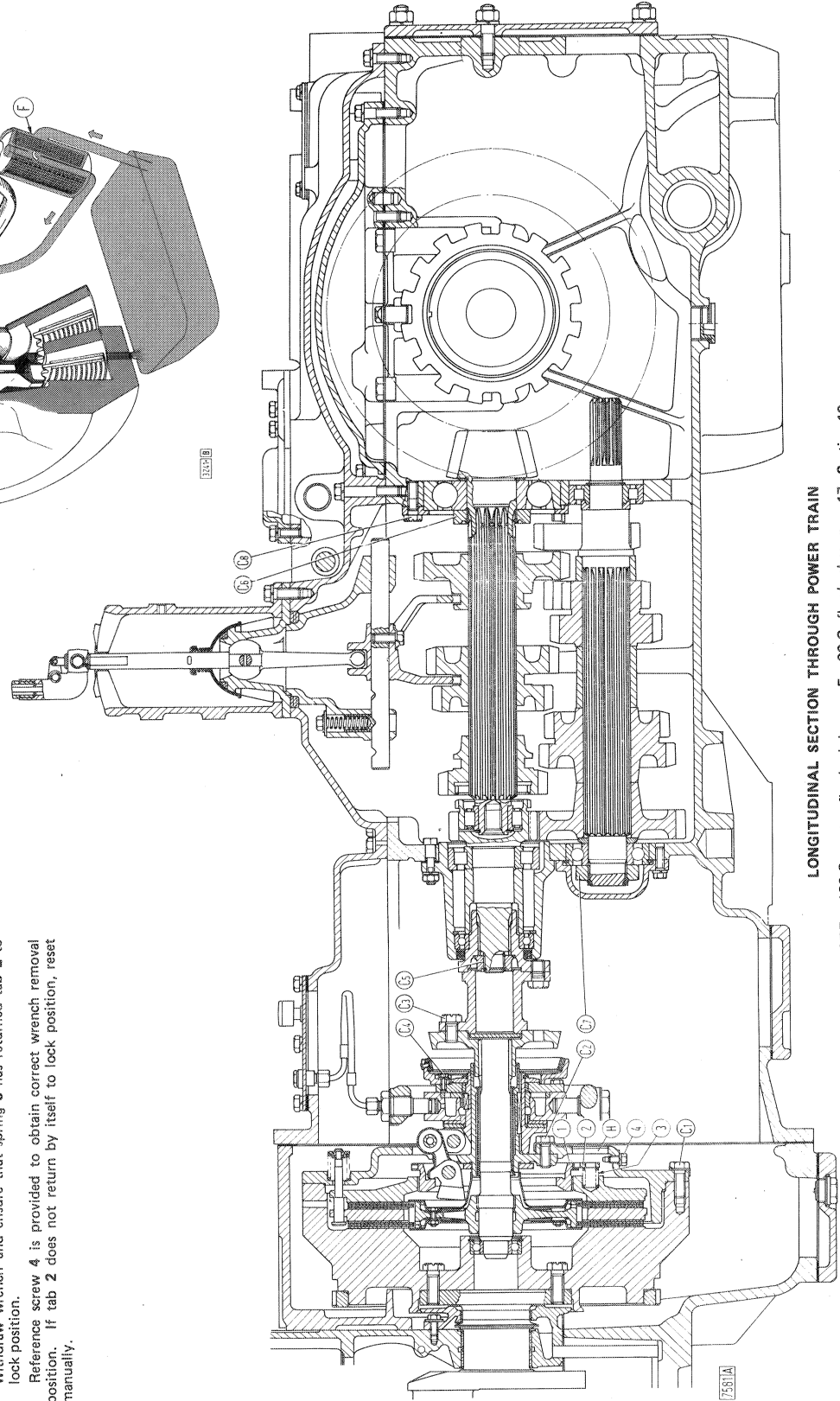
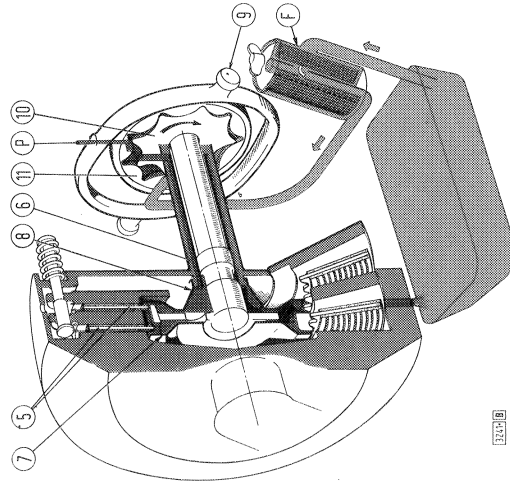
- Remove top inspection cover and align clearance hole H to inspection aperture.
- Insert wrench 290954 in the clearance hole and push forward to release lock ring 1 from tab 2.
- Turn wrench clockwise (to back off lock ring) to increase hand lever effort or counterclockwise to reduce the effort.
- Withdraw wrench and ensure that spring 3 has returned tab 2 to lock position.

Reference screw 4 is provided to obtain correct wrench removal position. If tab 2 does not return by itself to lock position, reset manually.

## **TORQUE DATA**

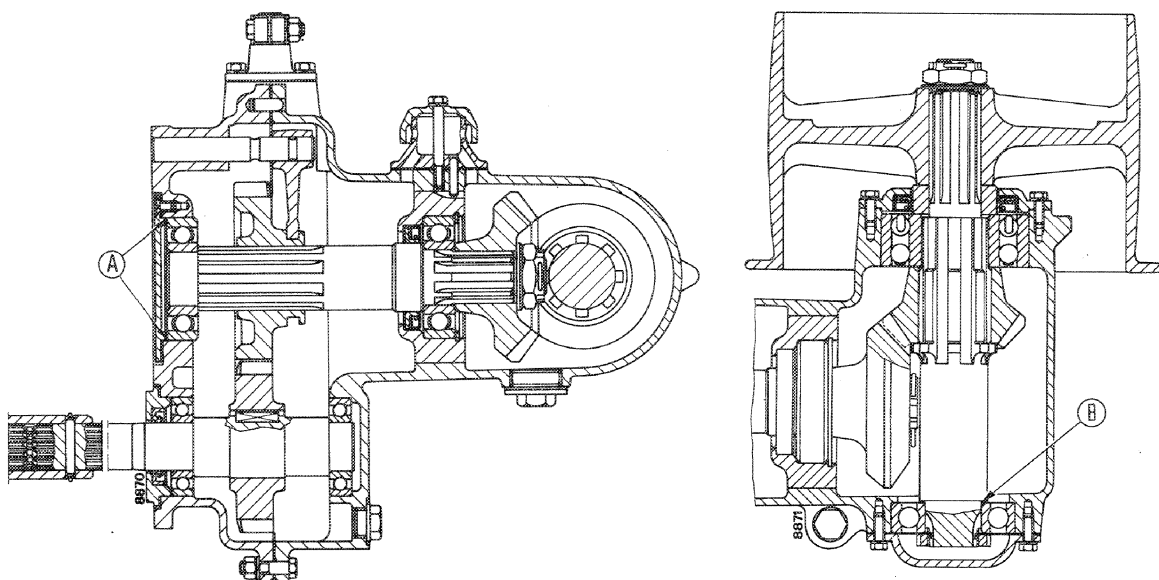
|                  |      |     |      |        |
|------------------|------|-----|------|--------|
| C <sub>1</sub> = | 10   | kgm | (72  | lb ft) |
| C <sub>2</sub> = | 8    | kgm | (58  | lb ft) |
| C <sub>3</sub> = | 12.5 | kgm | (90  | lb ft) |
| C <sub>4</sub> = | 2    | kgm | (14  | lb ft) |
| C <sub>5</sub> = | 34   | kgm | (246 | lb ft) |
| C <sub>6</sub> = | 60   | kgm | (434 | lb ft) |
| C <sub>7</sub> = | 35   | kgm | (253 | lb ft) |
| C <sub>8</sub> = | 10   | kgm | (72  | lb ft) |

- MASTER CLUTCH CIRCUIT COOLING**
- F. Oil filter
  - P. Pressure point
  - 5. Driven plates
  - 6. Sleeve carrier
  - 7. Front oil catcher
  - 8. Rear oil catcher
  - 9. Inner lever
  - 10. Oil pump drive gear
  - 11. Oil pump driven gear



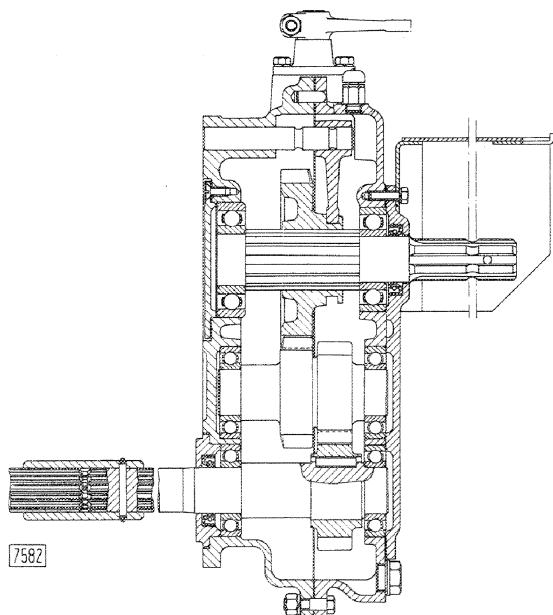
**LONGITUDINAL SECTION THROUGH POWER TRAIN**

**NOTE** — 120 C tractor flywheel shown. For 90 C flywheel see page 17, Section 10.

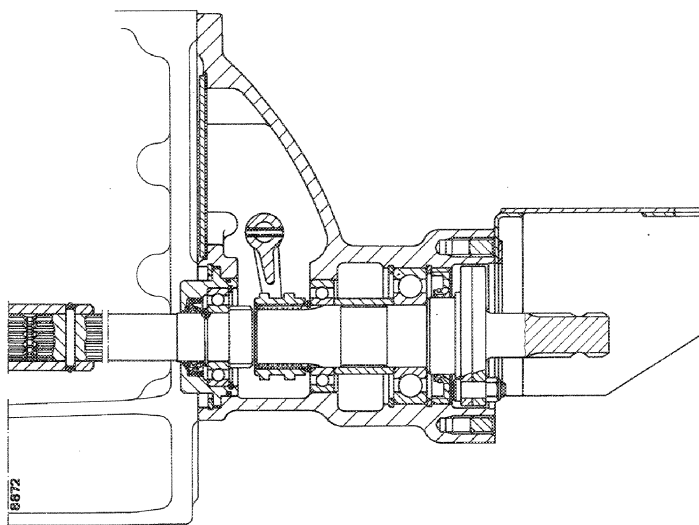


#### BELT PULLEY BEVEL DRIVE ADJUSTMENT

Alter bevel gear position by means of shims A and B until correct tooth contact and .15 to .25 mm (.006 to .010 in) backlash are obtained.



540 rpm PTO, 90 C tractor



1000 rpm PTO, 90 C and 120 C tractors

## SPROCKET BEARING ADJUSTMENT (Fig. a)

- Remove protector plugs and fit engine oil lubricated screws  $C_{2,0}$  to the threaded holes in inner support 4.
- Slowly turn sprocket to settle bearings, simultaneously tightening two screws  $C_{2,0}$  progressively and alternately up to 5 kgm (36 lb ft).
- To bring about sprocket rotation (15 to 20 rpm) with power train fitted to the tractor, run engine at part throttle, disengage steering clutch of opposite sprocket, select 1st gear and engage master clutch.
- Read clearance L between inner support 4 and bearing carrier 5 by taking two diametrically opposed measurements on the vertical centerline at right angles to screw centerline.

- Average the two readings arithmetically and determine split shim thickness:

$$A = L - .55$$

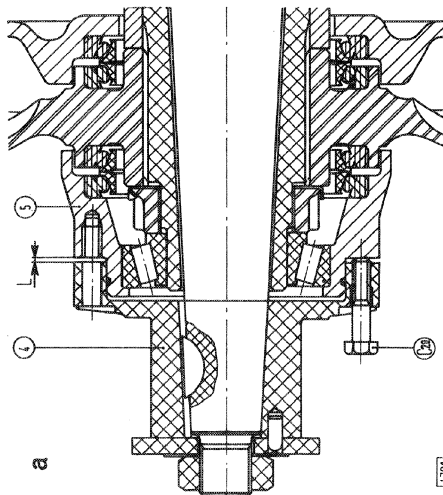
where

A = Shim thickness.

L = Clearance between inner support and bearing carrier.

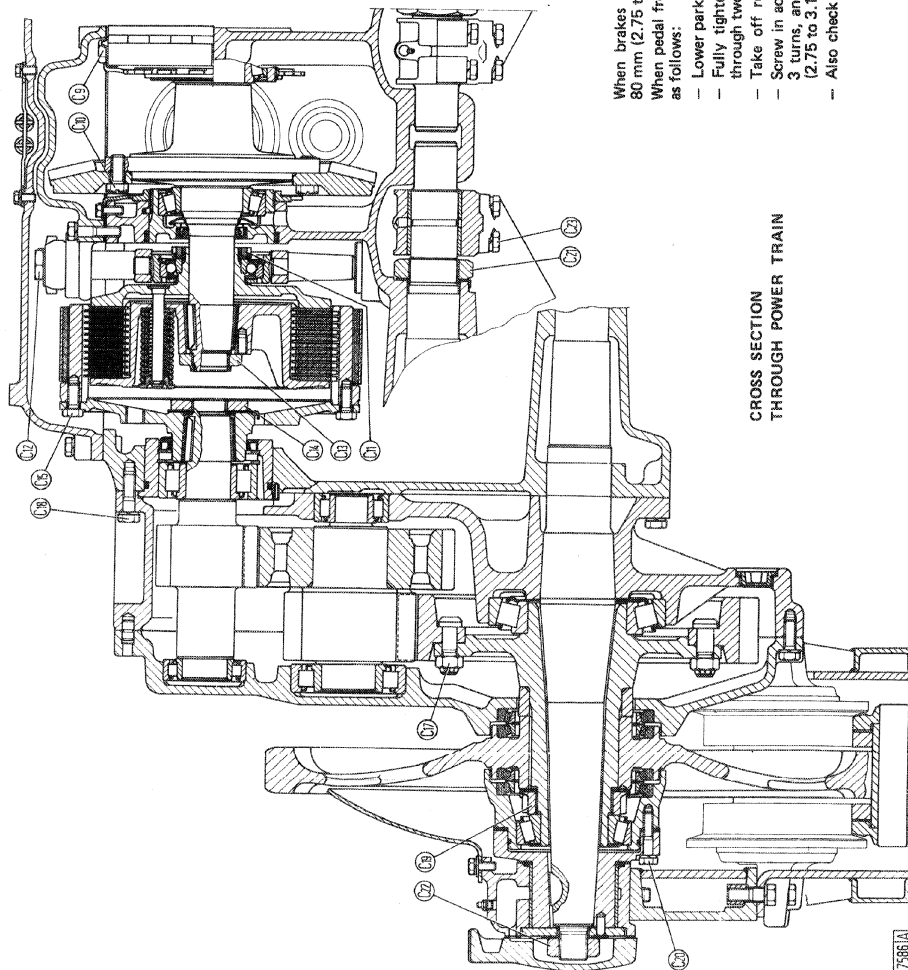
.55 = .50 mm, deflection resulting from tightening + .05 mm, fitted clearance.

- If necessary, round off upward rather than down.
- Fit the two shim packs, remove the two screws, tighten screws  $C_{2,0}$  and refit protector plugs to inner support.



## TORQUE DATA

|          |   |                      |
|----------|---|----------------------|
| $C_9$    | = | 19.5 kgm (141 lb ft) |
| $C_{10}$ | = | 31 kgm (224 lb ft)   |
| $C_{11}$ | = | 32 kgm (231 lb ft)   |
| $C_{12}$ | = | 26 kgm (188 lb ft)   |
| $C_{13}$ | = | 95 kgm (687 lb ft)   |
| $C_{14}$ | = | 95 kgm (687 lb ft)   |
| $C_{15}$ | = | 18 kgm (130 lb ft)   |
| $C_{16}$ | = | 35 kgm (253 lb ft)   |
| $C_{17}$ | = | 54 kgm (390 lb ft)   |
| $C_{18}$ | = | 16 kgm (116 lb ft)   |
| $C_{19}$ | = | 95 kgm (687 lb ft)   |
| $C_{20}$ | = | 7 kgm (50 lb ft)     |
| $C_{21}$ | = | 95 kgm (687 lb ft)   |
| $C_{22}$ | = | 65 kgm (470 lb ft)   |
| $C_{23}$ | = | 17 kgm (123 lb ft)   |



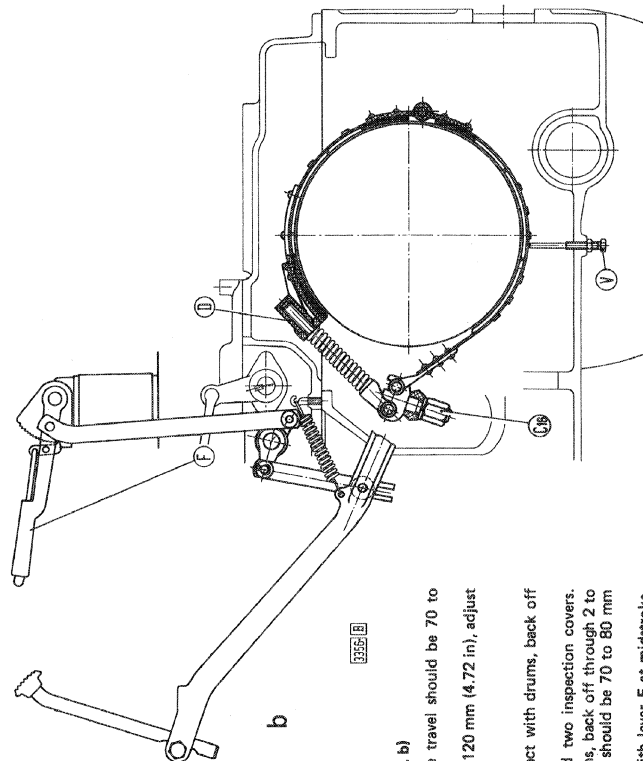
CROSS SECTION  
THROUGH POWER TRAIN

## BRAKE ADJUSTMENT (Fig. b)

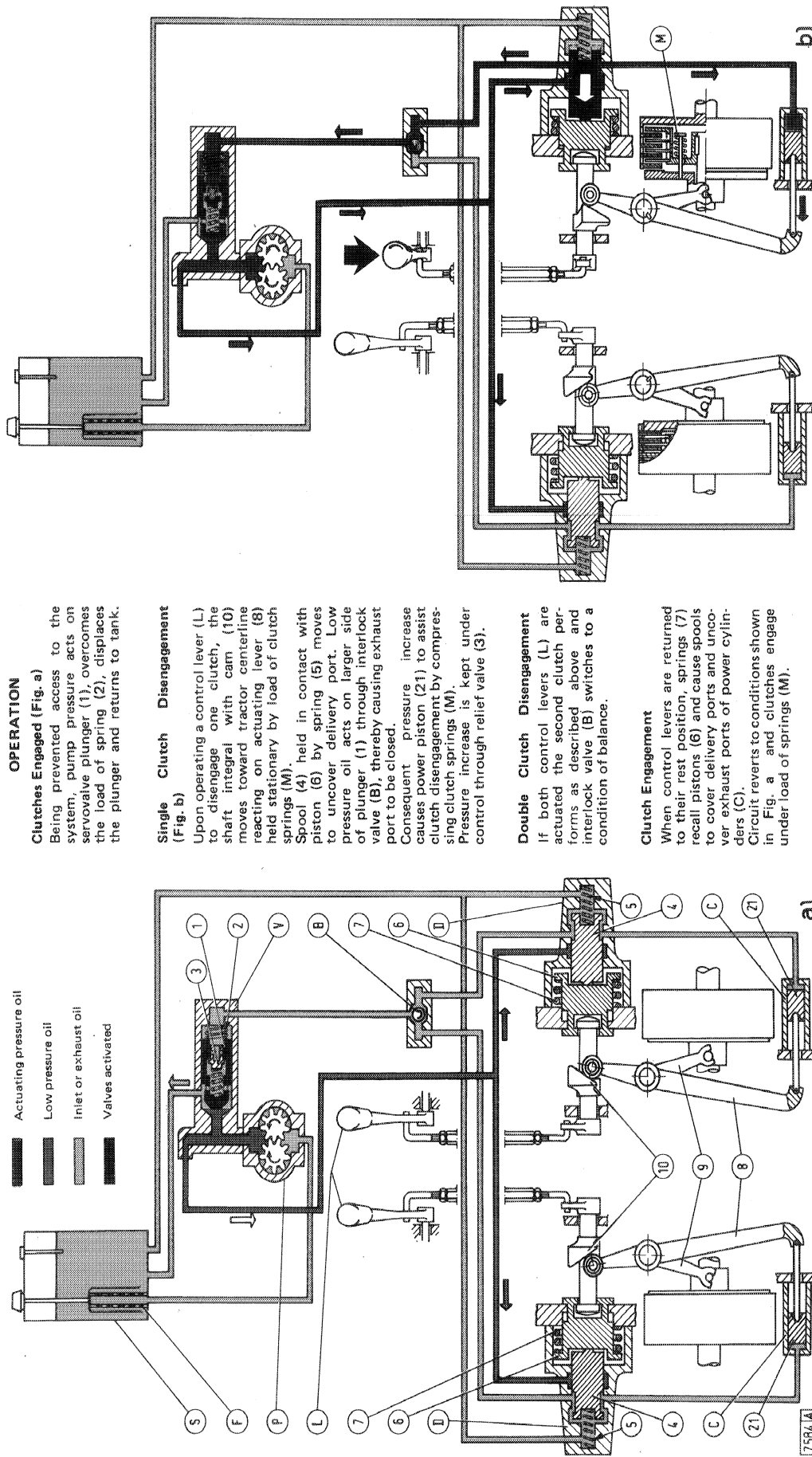
When brakes are correctly adjusted, pedal tip free travel should be 70 to 80 mm (2.75 to 3.15 in).

When pedal free travel is found to have increased to 120 mm (4.72 in), adjust as follows:

- Lower parking brake lever F.
- Fully tighten screws V to bring linings in contact with drums, back off through two turns and lock their nuts.
- Take off rear footboards, front seat guard and two inspection covers.
- Screw in adjusting nut D to pull bands over drums, back off through 2 to 3 turns, and check pedal free travel; free travel should be 70 to 80 mm (2.75 to 3.15 in) on both pedals.
- Also check that brake application is obtained with lever F at midstroke.







## OPERATION

**Clutches Engaged (Fig. a)**  
Being prevented access to the system, pump pressure acts on servovalve plunger (1), overcomes the load of spring (2), displaces the plunger and returns to tank.

**Single Clutch Disengagement (Fig. b)**  
Upon operating a control lever (L) to disengage one clutch, the shaft integral with cam (10) moves toward tractor centerline reacting on actuating lever (8) held stationary by load of clutch springs (M).

Spool (4) held in contact with piston (6) by spring (5) moves to uncover delivery port. Low pressure oil acts on larger side of plunger (1) through interlock valve (B), thereby causing exhaust port to be closed. Consequent pressure increase causes power piston (21) to assist clutch disengagement by compressing clutch springs (M). Pressure increase is kept under control through relief valve (3).

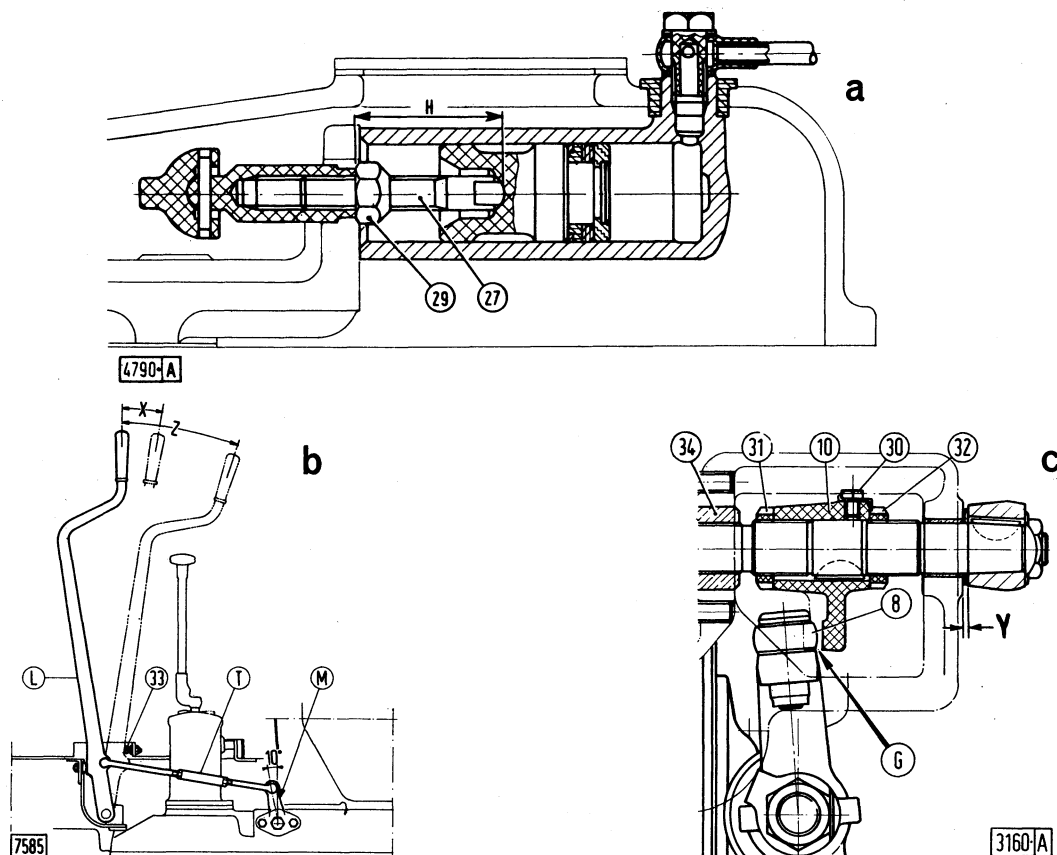
**Double Clutch Disengagement**  
If both control levers (L) are actuated the second clutch performs as described above and interlock valve (B) switches to a condition of balance.

**Clutch Engagement**  
When control levers are returned to their rest position, springs (7) recall pistons (6) and cause spools to cover delivery ports and uncover exhaust ports of power cylinders (C). Circuit reverts to conditions shown in Fig. a and clutches engage under load of springs (M).

## HYDRAULIC SYSTEM DIAGRAM

B. Interlock valve - C. Power cylinder - D. Control valve - F. Pump inlet filter - L. Control lever - M. Clutch spring - P. Pump - S. Fluid reservoir  
V. Servovalve - 1. Plunger - 2. Relief valve - 3. Relief spring - 4. Spool - 5. Spool spring - 6. Piston - 7. Piston spring - 8. Actuating lever - 9. Withdrawal lever - 10. Withdrawal cam - 21. Power piston.

# POWER TRAIN: Steering Clutch Servo Adjustment



## Power Piston Pushrod Inspection and Adjustment (Fig. A).

Remove power cylinder with attached piston.

Ensure that clutch concerned is engaged.

Take up all inner lever play.

Check length H from end of pushrod 27 to cylinder mounting flange. The correct length is 52 to 54 mm (2.05 to 2.12 in). To adjust, slacken locknut 29, screw in or back off pushrod as necessary, and retighten locknut 29.

Lubricate end of pushrod with grassofiat G9 or other approved grease and refit power cylinder.

Repeat same procedure on opposite pushrod ensuring that length H is identical.

## Control Lever Free Travel Check and Adjustment (Figs b and c).

If clutches are correctly adjusted, free travel X of control levers should be 55 mm (2.16 in) as measured at the grip.

To check proceed as follows:

- Move levers L fully forward against stops and ensure that outer relay levers M lie 10° forward of vertical. To adjust, rotate turnbuckles T as necessary.

- Measure free travel with engine off, moving levers slowly up to instant when greater resistance is felt, stopping before levers M move across toward tractor centerline. When free travel is found to have decreased to 15 mm (.59 in) adjust each linkage as follows:

- Remove inspection covers.
- Take off screw 30 and lock ring tab.
- Separate lock ring 32 from lever 10 by backing off through 4 - 5 turns.
- Screw in lock ring 31 to slide lever 10 along shaft until clearance G between lever and roller 8 is 2.5 to 3 mm (.10 to .12 in) with control lever in rest position.
- Retighten inner lock ring 32 until contact with lever 10 is established and lock with tab.
- Repeat same procedure on opposite clutch and check that free travel is 55 mm (2.16 in) on both levers L.

## Total Lever Travel Check and Adjustment (Fig. b).

Total travel Z of control levers L should be approximately 215 mm (8.46 in) at grip.

Check with engine running and master clutch disengaged. To adjust, turn stop screw 33 as necessary.

**Note:** On assembly, fit carrier 34 to obtain a gap Y of 3.5 to 4.5 mm (.14 to .18 in).

**TRACK CHAINS**

|                                                                   | 90 C                   |                      | 120 C                  |                      |
|-------------------------------------------------------------------|------------------------|----------------------|------------------------|----------------------|
|                                                                   | mm                     | in                   | mm                     | in                   |
| Track links per chain                                             | 33 off                 |                      | 37 off                 |                      |
| — R.H. links (marked D)                                           | 33 off                 |                      | 37 off                 |                      |
| — L.H. links (marked S)                                           | 1 off                  |                      | 1 off                  |                      |
| — Coupling link                                                   | 34 off                 |                      | 38 off                 |                      |
| Track shoes per chain                                             | 34 off                 |                      | 38 off                 |                      |
| Shoe width                                                        |                        |                      |                        |                      |
| — Standard                                                        | 450                    | 17.7                 | 450                    | 17.7                 |
| — Optional                                                        | 600                    | 23.6                 | 600                    | 23.6                 |
| Ground contact area                                               |                        |                      |                        |                      |
| — 450 mm shoes                                                    | 16137 cm <sup>2</sup>  | 2501 in <sup>2</sup> | 19215 cm <sup>2</sup>  | 2978 in <sup>2</sup> |
| — 600 mm shoes                                                    | 21516 cm <sup>2</sup>  | 3335 in <sup>2</sup> | 25620 cm <sup>2</sup>  | 3971 in <sup>2</sup> |
| Specific ground pressure                                          |                        |                      |                        |                      |
| — 450 mm shoes                                                    | .43 kg/cm <sup>2</sup> | 6 psi                | .40 kg/cm <sup>2</sup> | 5.6 psi              |
| — 600 mm shoes                                                    | .33 kg/cm <sup>2</sup> | 4.7 psi              | .31 kg/cm <sup>2</sup> | 4.4 psi              |
| Track rollers per chain                                           | 5 off                  |                      | 6 off                  |                      |
| Carrier rollers per chain                                         | 1 off                  |                      | 2 off                  |                      |
| Grouser height<br>Link height<br>Link working width<br>Link pitch | } See page 5           |                      |                        |                      |
| Bush O.D.                                                         | 51.92 to 52.04         |                      | 2.0441 to 2.0488       |                      |
| Dia. of bush housing bore in link                                 | 51.74 to 51.80         |                      | 2.0370 to 2.0394       |                      |
| Bush interference fit in link                                     | .12 to .30             |                      | .0047 to .0120         |                      |
| Pin dia.                                                          | 34.98 to 35.05         |                      | 1.3772 to 1.3799       |                      |
| Pin housing bore in link                                          | 34.79 to 34.85         |                      | 1.3697 to 1.3720       |                      |
| Pin working clearance                                             | .13 to .26             |                      | .0051 to .0102         |                      |
| Bush I.D.                                                         | 35.20 to 35.57         |                      | 1.3858 to 1.4004       |                      |
| Pin clearance in bush                                             | .15 to .59             |                      | .0060 to .0232         |                      |

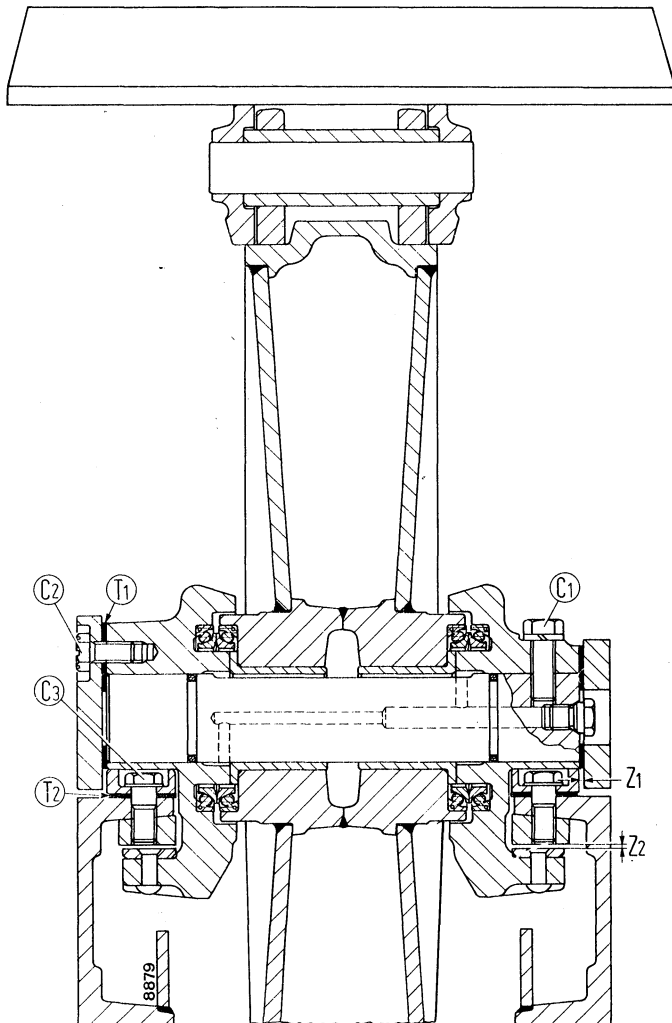
**TRACK RELEASE**

| Adjustment                                  | Hydraulic |       |
|---------------------------------------------|-----------|-------|
|                                             |           |       |
| Recoil spring length                        |           |       |
| — Free                                      | 585       | 22.24 |
| — Under 6650 to 7350 kg (14663 to 16207 lb) | 485       | 19.09 |



**TIGHTENING TORQUE DATA**

| DESCRIPTION                                                | Thread Size    | References                            | Torque |      |
|------------------------------------------------------------|----------------|---------------------------------------|--------|------|
|                                                            |                |                                       | kgm    | lbft |
| <b>Track Chains</b><br>Nut, track shoe                     | 5/8"-18 UNF-2B | —                                     | 46     | 333  |
| <b>Track Idlers</b><br>Screw, idler shaft to outer support | M16 x 1.5      | C <sub>1</sub> , page 5               | 24     | 173  |
| Screw, outer plate                                         | M14 x 1.5      | C <sub>2</sub> , page 5               | 18     | 130  |
| Screw, cylinder support to track frame                     | M18 x 1.5      | —                                     | 35     | 253  |
| Screw, slide bar                                           | M16 x 1.5      | C <sub>3</sub> , page 5               | 19     | 137  |
| Screw, rod seal housing and cover                          | M10 x 1.25     | —                                     | 7      | 51   |
| Idler regulating valve                                     | M18 x 1.5      | —                                     | 14     | 101  |
| Idler overload valve                                       | M30 x 1        | —                                     | 12     | 87   |
| Plug, vent, track release                                  | M18 x 1.5      | —                                     | 14     | 101  |
| Screw, idler support to yoke                               | M16 x 1.5      | —                                     | 24     | 173  |
| <b>Carrier Rollers</b><br>Screw, thrust plate              | M10 x 1.25     | C <sub>4</sub> , page 5               | 5      | 36   |
| Nut, roller shaft to bracket                               | M14 x 1.5      | C <sub>5</sub> , page 5               | 15     | 108  |
| Screw, roller bracket                                      | M14 x 1.5      | C <sub>6</sub> , page 5               | 16     | 116  |
| <b>Track Rollers</b><br>Screw, roller bracket to frame     | M16 x 1.5      | C <sub>7</sub> , page 5               | 24     | 173  |
| <b>Front Suspension</b><br>Nut, spring link bracket        | M24 x 2        | —                                     | 48     | 347  |
| Nut, spring bolt                                           | M16 x 1.5      | —                                     | 19.5   | 141  |
| Nut, damper spring bolt                                    | M12 x 1.25     | —                                     | 7      | 51   |
| <b>Rear Suspension</b><br>Nut, inner support               | M35 x 2        | C <sub>22</sub> , Section 20, page 12 | 65     | 470  |
| Screw, inner support cap                                   | M14 x 1.5      | C <sub>23</sub> , Section 20, page 12 | 17     | 123  |

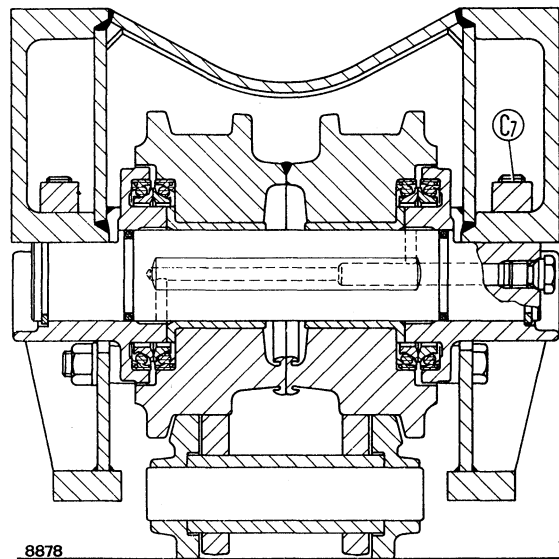


Section through track idler

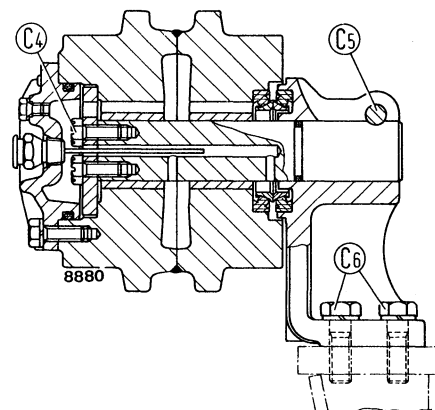
$Z_1 = .5 \text{ mm } (.020 \text{ in})$  approx., to be obtained by altering thickness of shims  $T_1$   
 $Z_2 = .5 \text{ mm } (.020 \text{ in})$  approx., to be obtained by altering thickness of shims  $T_2$

#### TIGHTENING TORQUE DATA

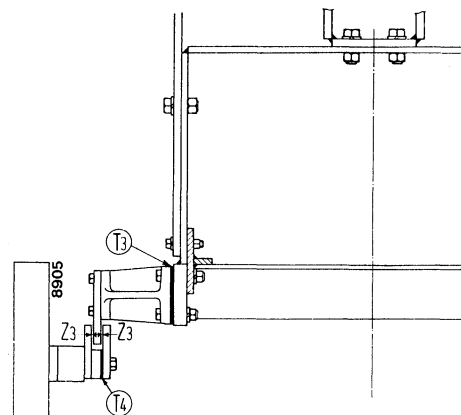
|                                            |                                            |
|--------------------------------------------|--------------------------------------------|
| $C_1 = 24 \text{ kgm } (173 \text{ lbft})$ | $C_4 = 5 \text{ kgm } (36 \text{ lbft})$   |
| $C_2 = 18 \text{ kgm } (130 \text{ lbft})$ | $C_5 = 15 \text{ kgm } (108 \text{ lbft})$ |
| $C_3 = 19 \text{ kgm } (137 \text{ lbft})$ | $C_6 = 16 \text{ kgm } (116 \text{ lbft})$ |
| $C_7 = 24 \text{ kgm } (173 \text{ lbft})$ |                                            |



Section through track rollers



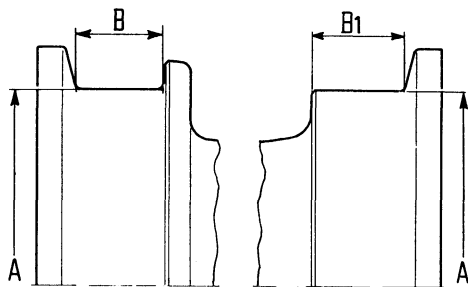
Section through carrier roller



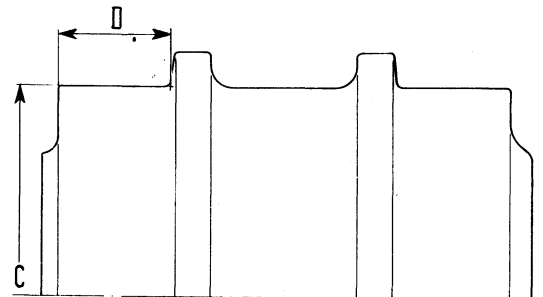
Track frame connection diagram (120 C)

$Z_3 = 1 \pm .5 \text{ mm } (.040 \text{ in} \pm .020 \text{ in})$  - Clearance to be obtained by altering thickness of shims  $T_3$  and  $T_4$

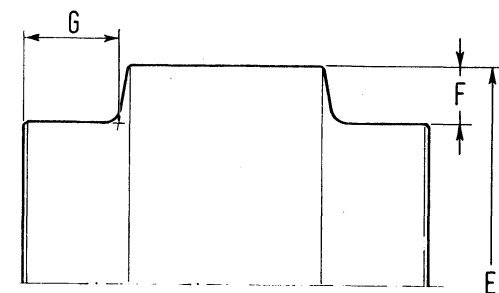
# **UNDERCARRIAGE: Sprocket Idler and Roller Profiles**



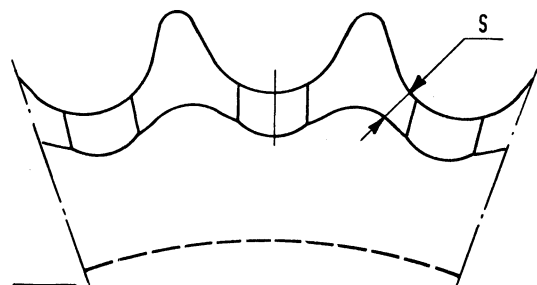
Track roller



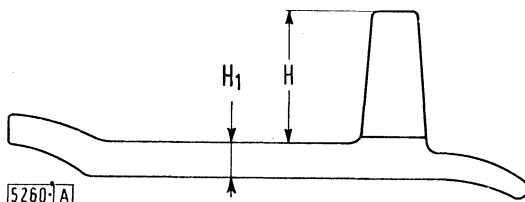
Carrier roller



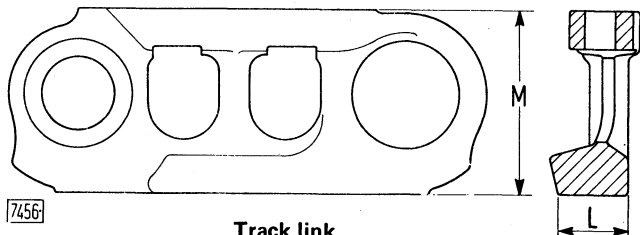
Track idler



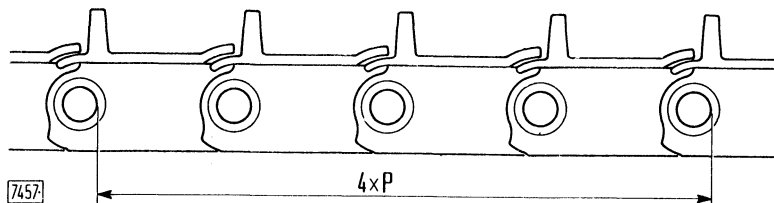
Sprocket



Track shoe



Track link



Track chain

## **TRACK CHAIN DIMENSIONS**

| SIZE     | A       | B    | B <sub>1</sub> | C    | D    | E           | F            | G    | H            | H <sub>1</sub> | L            | M    | P     | S   |
|----------|---------|------|----------------|------|------|-------------|--------------|------|--------------|----------------|--------------|------|-------|-----|
| Nominal  | mm 185  | 39   | 32             | 155  | 38   | 542 ± 0.5   | 30 to 31     | 31   | 52 to 53.5   | 11 to 12       | 35.5 to 36   | 95   | 170   | 15  |
|          | in 7.28 | 1.53 | 1.26           | 6.10 | 1.50 | 21.34 ± .02 | 1.18 to 1.22 | 1.22 | 2.05 to 2.11 | .43 to .47     | 1.40 to 1.42 | 3.74 | 6.69  | .59 |
| Max.     | mm 173  | 51   | 38             | 143  | 44   | —           | —            | 36   | 27 (o)       | —              | —            | 91   | 173.5 | (o) |
| wear (*) | in 6.81 | 2.01 | 1.50           | 5.63 | 1.73 | —           | —            | 1.42 | 1.06 (o)     | —              | —            | 3.58 | 6.23  | (o) |

(\*) Down to bottom of hard case. Resurfacing possible for some items at max. wear. Where renewal is anticipated max. wear limit may be extended.

(o) Max. wear limit may vary considerably with operating conditions.



**FLUID RESERVOIR – OIL FILTER**

|               | mm                                      | in       |
|---------------|-----------------------------------------|----------|
| Construction  | Wetded sheet metal                      |          |
| Location      | R.H. fender                             |          |
| Tank capacity | 26.7 litres                             | 47 Pints |
| Type of oil   | See page 8, Section 00                  |          |
| Oil filter    | In tank, metal cartridge on return line |          |

**A. M. PUMP**

|                                                                               |                              |                  |
|-------------------------------------------------------------------------------|------------------------------|------------------|
| Type                                                                          | Needle roller mounted gears  |                  |
| Make                                                                          | SALAMI                       |                  |
| Model                                                                         | 3.5 P55/S                    |                  |
| Drive                                                                         | Crackshaft through U - joint |                  |
| Rotation (drive end)                                                          | Anticlockwise                |                  |
| Drive ratio                                                                   | 1 : 1                        |                  |
| Rated speed (at 2000 engine rpm)                                              | 2000 rpm                     |                  |
| Rated output at governed speed                                                | 110 litres/min               | 194 Pt/min       |
| On-bench output                                                               | See curves, page 5           |                  |
| Test oil temperature                                                          | 55° to 65° C                 |                  |
| Test oil viscosity                                                            | SAE 20 W                     |                  |
| Gear journal dia.                                                             | 27.691 to 27.700             | 1.0902 to 1.0905 |
| Min. journal dia.                                                             | 27.550                       | 1.0846           |
| Pump body bore dia.                                                           | 60.960 to 60.979             | 2.4000 to 2.4007 |
| Max. pump body inlet wear                                                     | .12                          | .0047            |
| Bearing width                                                                 | 26.300 to 26.313             | 1.0354 to 1.0359 |
| Gear face width                                                               | 33.000 to 33.016             | 1.2992 to 1.2998 |
| Min. gear width                                                               | 32.600                       | 1.2835           |
| Gear and bearing housing width in pump body                                   | 92.500 to 92.554             | 3.6417 to 3.6438 |
| Max. height difference between pump body and gear-bearing pack                | .130                         | .0051            |
| Gear and bearing end float in pump body (also applicable to overhauled pumps) |                              |                  |
| — Min.                                                                        | .080                         | .0031            |
| — Max.                                                                        | .180                         | .0071            |
| Back pressure shim thickness                                                  | 3.230 to 3.250               | .1272 to .1279   |
| End float control shim thickness                                              | .10 – .20                    | .004 – .008      |

# REMOTE CONTROL HYDRAULICS: Data

## P. M. PUMP

|                                                                                  | mm                         | in               |
|----------------------------------------------------------------------------------|----------------------------|------------------|
|                                                                                  | Gear                       |                  |
| Type                                                                             | SALAMI                     |                  |
| Make                                                                             | 3 PA 42/S                  |                  |
| Model                                                                            | Crankshaft through U-joint |                  |
| Drive                                                                            |                            |                  |
| Rotation (drive end)                                                             | Anticlockwise              |                  |
| Pump drive ratio                                                                 | 1 : 1                      |                  |
| Rated speed at governed speed                                                    | 2000 rpm                   |                  |
| Rated output at governed speed                                                   | 80 litres/min              | 141 Pints/min    |
| On-bench output                                                                  | See curve, page 5          |                  |
| Test oil temperature                                                             | 55° to 65° C               |                  |
| Test oil viscosity                                                               | SAE 20 W                   |                  |
| Gear journal dia.                                                                | 31.644 to 31.660           | 1.2458 to 1.2464 |
| Bush fitted I.D.                                                                 | 31.750 to 31.766           | 1.2500 to 1.2506 |
| Journal clearance in bush                                                        | .090 to .122               | .0035 to .0048   |
| Max. clearance                                                                   | .15                        | .0060            |
| Pump body bore dia.                                                              | 60.960 to 60.979           | 2.4000 to 2.4007 |
| Max. pump body inlet wear                                                        | .120                       | .0047            |
| Bearing width (each)                                                             | 38.445 to 38.460           | 1.5136 to 1.5142 |
| Gear face width                                                                  | 25.984 to 26.000           | 1.0230 to 1.0236 |
| Min. gear width                                                                  | 25.784                     | 1.0151           |
| Total gear and bearing width                                                     | 107.874 to 107.920         | 4.2470 to 4.2488 |
| Gear and bearing housing width in pump body                                      | 108.000 to 108.054         | 4.2520 to 4.2541 |
| Gear and bearing end float in pump body<br>(also applicable to overhauled pumps) |                            |                  |
| — Min.                                                                           | .080                       | .0030            |
| — Max.                                                                           | .200                       | .0080            |

**AUXILIARY VALVES**

|                                      | mm                                                   | in             |
|--------------------------------------|------------------------------------------------------|----------------|
| Type                                 | Spring return spool                                  |                |
| Make                                 | SALAMI                                               |                |
| Model                                | VD 80                                                |                |
| Location                             | Banked (up to 4) on RH fender, oil reservoir mounted |                |
| Control                              | Manual levers                                        |                |
| Relief valve setting                 | 120 kg/cm <sup>2</sup>                               | 1707 psi       |
| Spool clearance in valve body        | .006 to .008                                         | .0002 to .0003 |
| Relief valve spring length:          |                                                      |                |
| — Free                               | 70                                                   | 2.75           |
| — Under 93 ± 4.5 kg (205 ± 10 lb)    | 60                                                   | 2.36           |
| Interlock valve spring length:       |                                                      |                |
| — Free                               | 76                                                   | 2.99           |
| — Under .35 ± .017 kg (.77 ± .04 lb) | 46                                                   | 1.81           |
| Spool return spring length:          |                                                      |                |
| — Free                               | 56                                                   | 2.20           |
| — Under 21 ± 1.05 kg (46 ± 2.3 lb)   | 35                                                   | 1.38           |
| Float spool spring length:           |                                                      |                |
| — Free                               | 86                                                   | 3.38           |
| — Under 25 ± 1.25 kg (55 ± 2.75 lb)  | 41                                                   | 1.61           |
| Float spool detent spring length:    |                                                      |                |
| — Free                               | 32                                                   | 1.26           |
| — Under 23.5 ± 1.35 kg (52 ± 3 lb)   | 22                                                   | .87            |

**TIGHTENING TORQUE DATA**

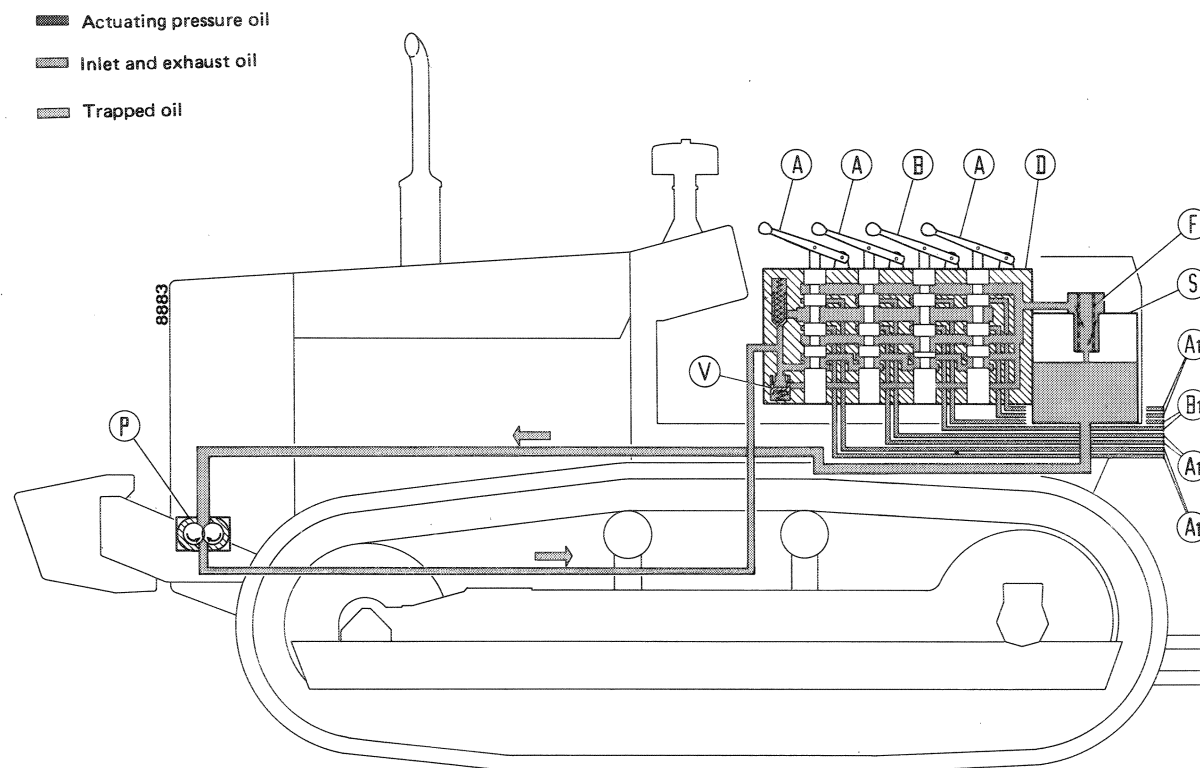
| DESCRIPTION                          | Thread Size | Torque |       |
|--------------------------------------|-------------|--------|-------|
|                                      |             | kgm    | lb ft |
| Screw, pump flange and cover to body | M16 x 1.5   | 7.5    | 54    |
| Nut, valve tie bolt                  | M12 x 1.5   | 7.7    | 56    |

# REMOTE CONTROL HYDRAULICS: System Schematics

## DESCRIPTION

Optional spool type remote control valves (D) can be used to actuate implements or equipment operated by double-acting hydraulic cylinders.

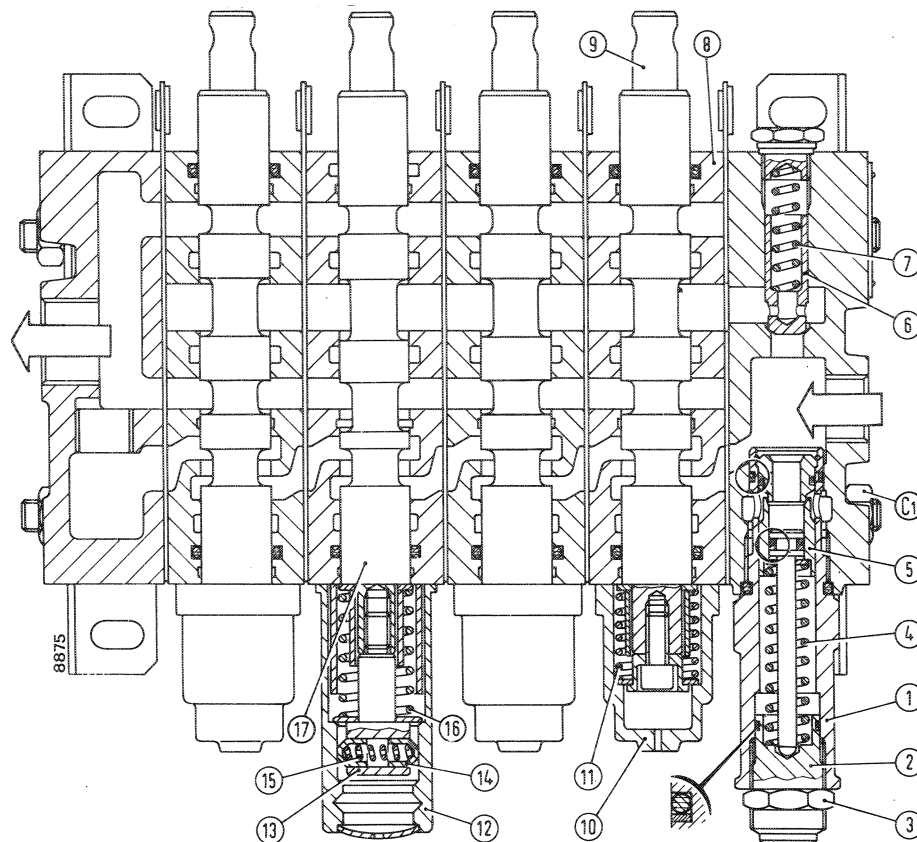
These valves are banked (up to 4) on the R H fender and actuation is separate though levers A and B. Relief valve (V) set to crack off at 120 kg/cm<sup>2</sup> (1707 psi) is housed in the front valve. Remote control circuit below is shown with control levers in neutral. Pump pressure flows through valve bodies as arrowed and returns to tank via paper filter (F).



Remote control valve system schematics

A. Double-acting valve control lever - B. Float valve control lever - A<sub>1</sub>. Double-acting cylinder coupling - B<sub>1</sub>. Float circuit coupling - D. Remote control valves - F. Paper filter on return line - P. Pump - S. Reservoir - V. Relief valve.

# REMOTE CONTROL HYDRAULICS: Operation - Curves

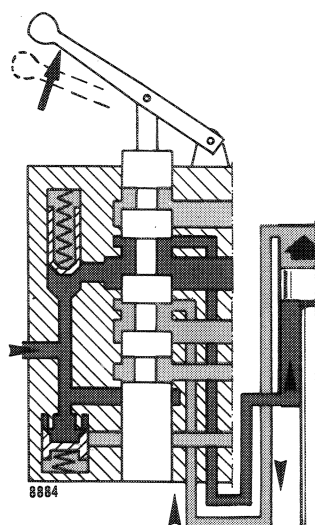


Section through 4-spool remote control valve for double-acting cylinders

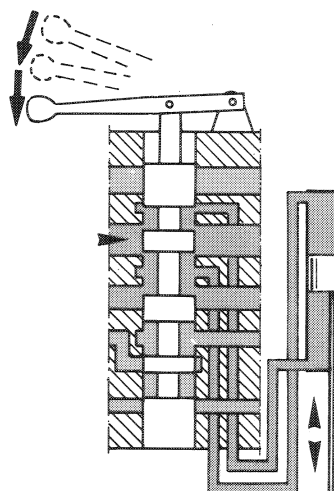
Note - Second spool incorporates float position.

C<sub>1</sub>. Tie bolt nut - 1. Relief valve (crack-off at 120 kg/cm<sup>2</sup> or 1707 psi) - 2. Relief valve setting adjuster - 3. Nut - 4. Relief valve spring - 5. Plunger - 6. Check valve - 7. Check valve spring - 8. Control valve body - 9. Spool - 10. Cap - 11. Spool return spring - 12. Sleeve - 13. Detent housing - 14. Detent plunger - 15. Detent spring - 16. Float spool return spring - 17. Float spool.

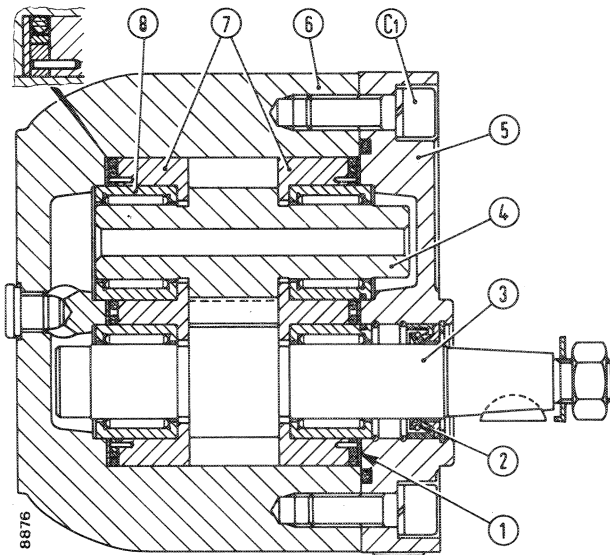
## OPERATION



**a. Raise - Lower.** When either lever A or lever 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 (6). Delivery pressure is proportional to cylinder requirement and is checked by relief valve (1). 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.

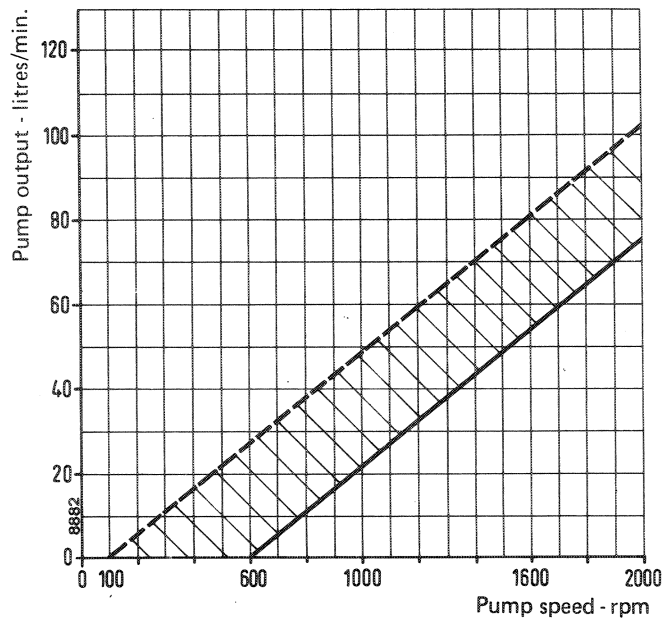


**b. Float position.** When lever B is moved fully forward beyond lower position, where it is restrained by a stop, float spool takes position shown in (b) and connects pump delivery and cylinder chambers to exhaust. No pressure exists in cylinder lines, and piston slides freely.



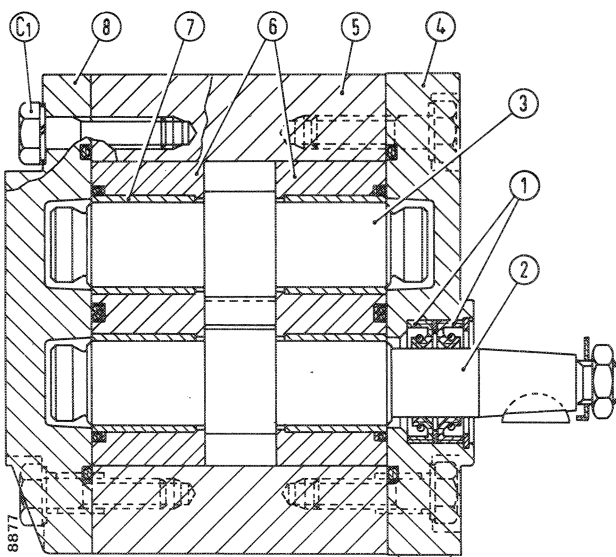
Section through AM SALAMI 3.5 P55/S Pump.

C<sub>1</sub>. Pump screw - 1. End float shims - 2. Seal - 3. Drive gear - 4. Driven gear - 5. Flange - 6. Pump body - 7. Bearing carrier - 8. Bearing.



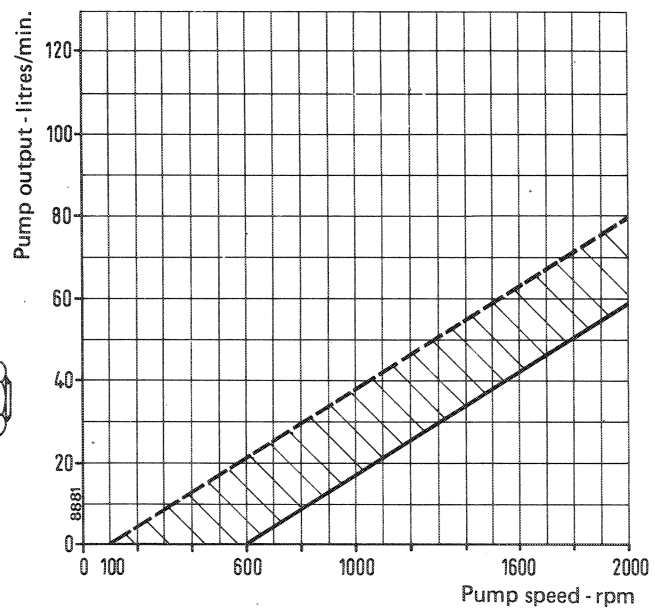
Speed-output Curves (AM SALAMI 3.5 P55/S).

Test pressure . . . . . 210 kg/cm<sup>2</sup> (2987 psi)  
Oil temperature. . . . . 55° to 65° C



Section through PM SALAMI 3.5 PA 42/S Pump.

C<sub>1</sub>. Pump screw - 1. Seal - 2. Drive gear - 3. Driven gear - 4. Flange - 5. Pump body - 6. Bearings - 7. Bushes - 8. Cover.



Speed-output Curves (PM SALAMI 3.5 PA 42/S).

Test pressure . . . . . 210 kg/cm<sup>2</sup> (2987 psi)  
Oil temperature. . . . . 55° to 65° C

**CHARGING SYSTEM**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Alternator</b><br>Type (3-phase, self-rectifying)<br>Rated voltage<br>Cut-in speed at 24 V and 20° C (*)<br>Output at 28 V on battery at 7000rpm after warm-up (*)<br>Max. rating (*)<br>Max. speed<br>— Continuons<br>— Peak (15 minutes)<br>Field resistance at 20° C<br>— Across slip rings<br>— Across terminal 67 and ground at 500 rpm<br>Stator phase resistance (each)<br>Rotation (pulley end)<br>On-tractor alternator speed (at governed speed)<br>Drive ratio | FIAT A 12 M 124/24/26<br>28 V<br>1050 ± 50 rpm<br>26 A min.<br>32 A approx<br><br>9000 rpm<br>10000 rpm<br><br>18 ± .5 Ohms<br>18.5 ± .5 Ohms<br>.28 ± .015 Ohms<br>Clockwise<br>4337 rpm<br>2.168 to 1                                                                                                                                |
| <b>Voltage Regulator</b><br>Type<br>— A.M. (electromechanical)<br>— P.M. (electronic)<br>Alternator test speed<br>Battery capacity (20 hour rate)<br>Warm-up current<br>Stage 2 test current<br>Stage 2 regulating voltage<br>Stage 1 test current<br>Stage 1 regulating voltage<br>Regulating voltage<br>Resistance across terminal 15 and ground at 15° to 35° C<br>Open contact resistance across terminals 15 and 67<br>Armature-core gap<br>Stage 2 contact gap         | MARELLI RC2/24<br>MARELLI RTT 110 CT<br>5000 rpm (1)<br>4000 rpm (2)<br>90 to 110 Ah<br>3.5 A (1)<br>3 to 5 A (1)<br>28 ± 0.5 V (1)<br>12 to 20 A (1)<br>.4 to 1 V lower than stage 2 (1)<br>27.7 ± .3 V (2)<br>120 ± 8 Ohms (1)<br>16.8 ± 1 Ohms (1)<br>1.5 ± .05 mm (1) (.060 ± .002 in (1))<br>.45 ± .1 mm (1) (.018 ± .004 in (1)) |
| <b>Battery Charge Relay</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SIPEA TS 5240 or WEPOO 90003                                                                                                                                                                                                                                                                                                           |

(\*) Bedded-in brushes

(1) A.M. regulator

(2) P.M. regulator

# **ELECTRICAL SYSTEM: Data**

## **STARTER**

|                                   | mm                                 | in                                     |
|-----------------------------------|------------------------------------|----------------------------------------|
| Type                              | <b>MARELLI MT 43 P</b>             |                                        |
| Voltage                           | <b>24 V</b>                        |                                        |
| Rated output                      | <b>4 HP (metric)</b>               |                                        |
| Rotation (pinion end)             | <b>Clockwise</b>                   |                                        |
| No. of poles                      | <b>4 off</b>                       |                                        |
| Field winding                     | <b>Compound</b>                    |                                        |
| Drive                             | <b>Sliding armature and clutch</b> |                                        |
| Operation                         | <b>Solenoid</b>                    |                                        |
| Pole shoe inside dia.             | { 83.25 to 83.35<br>83.65 to 83.85 | { 3.2775 to 3.2815<br>3.2933 to 3.3012 |
| Armature dia.                     | { 82.346 to 82.4                   | { 3.2420 to 3.2441                     |
| Pinion/ring gear tooth ratio      | { 82.946 to 83                     | { 3.2656 to 3.2677                     |
|                                   | <b>9/130</b>                       |                                        |
| <b>Test Bench Data</b>            |                                    |                                        |
| Running torque at 20° C           |                                    |                                        |
| – Current                         | <b>260 A max.</b>                  |                                        |
| – Speed                           | <b>2400 to 2700 rpm</b>            |                                        |
| – Voltage                         | <b>21 to 21.5 V</b>                |                                        |
| – Torque                          | <b>1.2 kgm</b>                     | <b>8.7 lbft</b>                        |
| Lock torque at 20° C              |                                    |                                        |
| – Current                         | <b>1400 A max</b>                  |                                        |
| – Voltage                         | <b>14.3 to 14.5 V</b>              |                                        |
| – Torque                          | <b>6.5 kgm max.</b>                | <b>47 lb ft max.</b>                   |
| Light running torque at 20° C     |                                    |                                        |
| – Current                         | <b>65 A max.</b>                   |                                        |
| – Voltage                         | <b>24 V</b>                        |                                        |
| – Speed                           | <b>950 to 1700 rpm</b>             |                                        |
| <b>Mechanical Data</b>            |                                    |                                        |
| Brush spring load (used brushes)  | <b>.8 to 1 kg</b>                  | <b>1.8 to 2.2 lb</b>                   |
| Mica undercut depth               | <b>1</b>                           | <b>0.40</b>                            |
| Clutch slip torque                | <b>12 to 16 kgm</b>                | <b>87 to 116 lbft</b>                  |
| Commutator dia.                   | <b>47.36 to 48.16</b>              | <b>1.8645 to 1.8961</b>                |
| Max. out-of-round                 | <b>.03</b>                         | <b>.0012</b>                           |
| <b>Solenoid</b>                   |                                    |                                        |
| Resistance at 20° C               | <b>3 to 3.4 Ohms</b>               |                                        |
| Current consumption at 24 V       | <b>8 A max</b>                     |                                        |
| Min. activation voltage           | <b>8 V</b>                         |                                        |
| <b>Lubrication (for overhaul)</b> |                                    |                                        |
| Starter drive helical splines     | <b>grassofiat MR 3</b>             |                                        |
| Drive end bush                    | <b>Engine oil</b>                  |                                        |

(1) Series and auxiliary windings only

**FUSES**

| FUSE                                          | RATING<br>(Ampère) | PROTECTED CIRCUIT                                                                      |
|-----------------------------------------------|--------------------|----------------------------------------------------------------------------------------|
| 1                                             | 8                  | — Power point.                                                                         |
| 2                                             | 8                  | — Battery charge relay.                                                                |
| 3                                             | 8                  | — R.H. panel light - Front R.H. parking light - Rear L.H. tail and number plate light. |
| 4                                             | 8                  | — L.H. panel light - Front L.H. parking light - Flood light - Rear R.H. tail light.    |
| 5                                             | 8                  | — Headlamps, low beam.                                                                 |
| 6                                             | 8                  | — Headlamps, high beam.                                                                |
| 7                                             | 8                  | — Voltage regulator (in-line).                                                         |
| Unprotected circuits: Starter and alternator. |                    |                                                                                        |

**LIGHTING AND SIGNALLING**

|                                          |                   |
|------------------------------------------|-------------------|
| <b>Headlamps</b>                         | 2 off             |
| Double filament bulb - high and low beam | 50/45 W           |
| Parking bulb                             | 10 W              |
| <b>Flood</b>                             | 1 off - Bulb 35 W |
| <b>Tail</b>                              | 2 off - Bulb 10 W |
| <b>Panel</b>                             | 2 off - Bulb 10 W |
| <b>Battery charge indicator</b>          | Bulb 10 W         |

**BATTERIES**

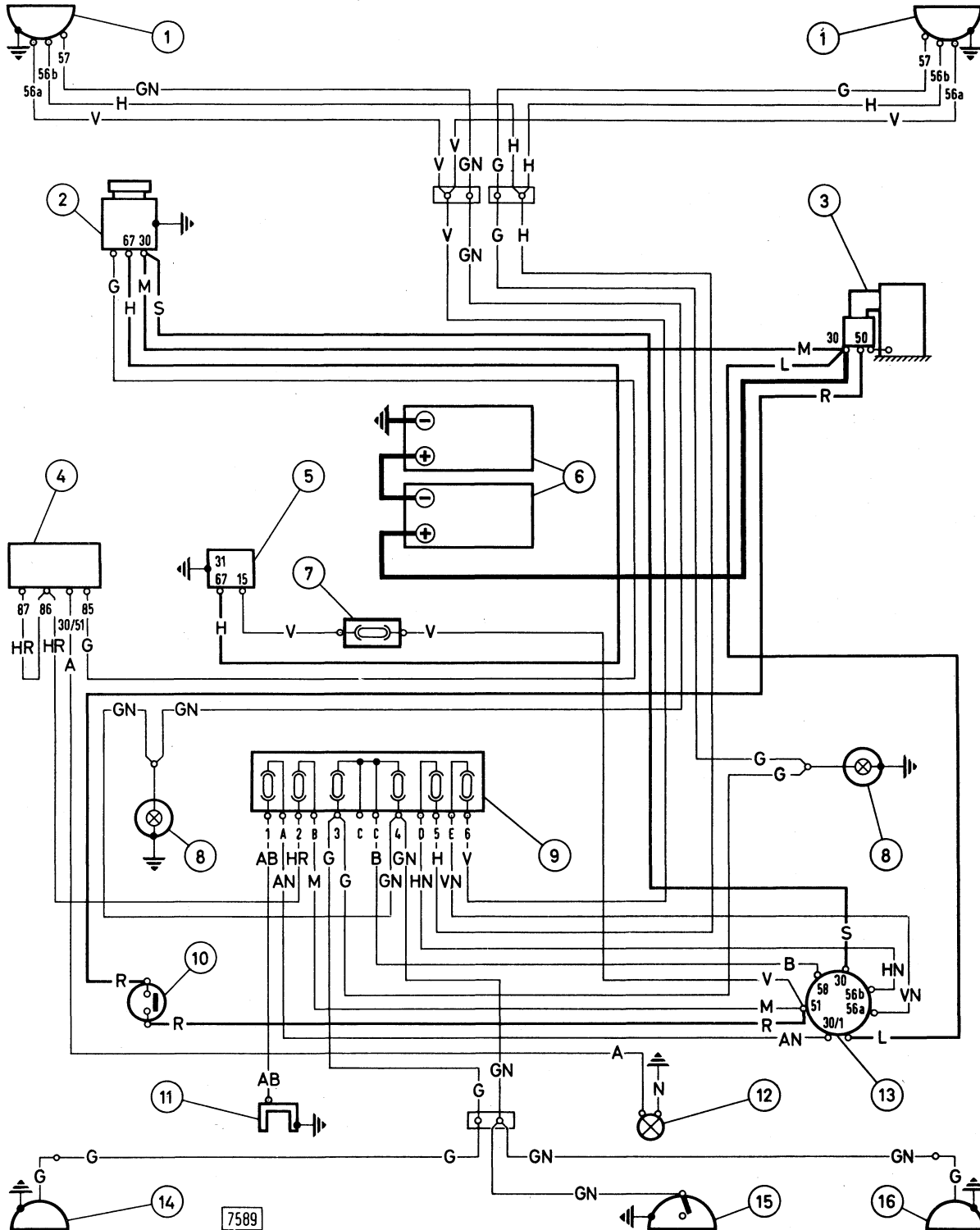
|                                              |                                                     |
|----------------------------------------------|-----------------------------------------------------|
| Type (2, series) { 90 C<br>120 C             | Marelli 6ATM15YB<br>Marelli 6ATP21 or Titano 6DE10F |
| Rated voltage (each)                         | 12 V                                                |
| Capacity (20 hour rate) { 90 C<br>120 C      | 77 Ah<br>110 Ah                                     |
| Overall dimensions (length x height x width) |                                                     |
| — Marelli 6ATM15YB                           | 308 x 174 x 205 mm (12 x 6.8 x 8 in)                |
| — Marelli 6ATP21                             | 510 x 175 x 230 mm (20 x 6.9 x 9 in)                |
| — Titano 6DE10F                              | 508 x 190 x 244 mm (20 x 7.5 x 9.6 in)              |
| Weight (including electrolyte)               |                                                     |
| — 90 C                                       | 25.5 kg (54 lb)                                     |
| — 120 C                                      | 40 kg (88 lb)                                       |

**LIGHTING/STARTER SWITCH SIPEA, 6-POSITION, 60 A**

|                                   |                                                                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Switch positions                  | — Circuits completed                                                                                                            |
| Position 0<br>30 30/1             | — Off (except power point).                                                                                                     |
| Position I<br>30-51 30/1          | — Starter button - Battery charge indicator - Voltage regulator.                                                                |
| Position II<br>30-51 30/1-58      | — Starter button - Battery charge indicator - Voltage regulator - Panel lights - Parking and number plate lights - Flood light. |
| Position III<br>30-51 30/1-58-56b | — As position II plus low beam.                                                                                                 |
| Position IV<br>30-51 30/1-58-56a  | — As position II plus high beam.                                                                                                |
| Position V (*)<br>30 30/1-58      | — Panel lights - Parking and number plate lights - Flood light.                                                                 |

(\*) Key removable.

# ELECTRICAL SYSTEM: Wiring Diagram



- 
1. Headlamps and parking lights.
  2. Alternator.
  3. Starter.
  4. Battery charge relay.
  5. Voltage regulator.
  6. Batteries (12V, series).
  7. Voltage regulator fuse.
  8. Panel lights.
  9. Fuse box.
  10. Starter button (60 A).
  11. Power point (single pole).
  12. Battery charge indicator.
  13. Lighting / starter switch.
  14. Tail / number plate light.
  15. Flood light / switch.
  16. Tail light.

#### CABLE COLOUR CODE

|                |           |                           |
|----------------|-----------|---------------------------|
| A = Light blue | M = Brown | AB = Blue, white tracer   |
| B = White      | N = Black | AN = Blue, black tracer   |
| G = Yellow     | R = Red   | GN = Yellow, black tracer |
| H = Grey       | S = Pink  | HN = Grey, black tracer   |
| L = Dark blue  | V = Green | HR = Grey, red tracer     |
|                |           | VN = Green, black tracer  |



**10 – ENGINE**

|                                    |                                       |                                  |                                     |
|------------------------------------|---------------------------------------|----------------------------------|-------------------------------------|
| <b>290740</b>                      | Hook, lift, engine.                   | <b>A65024</b><br><b>(292174)</b> | Tester, tappet lift.                |
| <b>293002/1</b>                    | Bracket, universal (use with 290090). | <b>A52106</b><br><b>(290896)</b> | Wrench, tappet.                     |
| <b>290955/1</b>                    | Spacer, cylinder liner.               | <b>A94029</b><br><b>(290900)</b> | Cutter, barrel seat.                |
| <b>290956</b>                      | Spacer, cylinder liner.               | <b>A65020</b><br><b>(290895)</b> | Installer, plunger.                 |
| <b>291174</b>                      | Straightedge, liner protrusion.       | <b>291449</b>                    | Puller, gear and sleeve.            |
| <b>290947</b>                      | Remover/replacer, tappet.             | <b>A42105</b><br><b>(291190)</b> | Puller, valve.                      |
| <b>291046</b>                      | Remover/replacer, valve guide.        | <b>A65033</b><br><b>(290979)</b> | Wrench, drive coupling retention.   |
| <b>290944</b>                      | Reamer, valve guide.                  | <b>A65021</b><br><b>(292424)</b> | Screwdriver, pump plug.             |
| <b>A90424/1</b><br><b>(290687)</b> | Taps, injector sleeve.                | <b>293217</b>                    | Cover, on-bench pump test.          |
| <b>A42110</b><br><b>(290633)</b>   | Puller, injector sleeve.              | <b>290898</b>                    | Support, injector.                  |
| <b>291350</b>                      | Burnisher, injector sleeve.           | <b>290986/1</b>                  | Wrench, rack stroke, 90 C.          |
| <b>291467</b>                      | Cutter, injector seat.                | <b>291468</b>                    | Wrench, rack stroke, 120 C.         |
| <b>290950</b>                      | Crank handle, 90 C.                   | <b>290977</b>                    | Puller, governor flyweight carrier. |
| <b>291504</b>                      | Puller, crankshaft pulley hub, 90 C.  | <b>293208</b>                    | Wrench, flyweight nut, 90 C.        |
| <b>291182/1</b>                    | Puller, water pump impeller.          | <b>290981</b>                    | Wrench, flyweight nut, 120 C.       |
| <b>290965</b>                      | Screws, balancer timing, 90 C.        | <b>A52107</b><br><b>(292730)</b> | Wrench, flyweight lock ring, 120 C. |
| <b>291494</b>                      | Hook, lift, sump, 120 C.              |                                  |                                     |

**Fuel Injectors**

|                                  |                                                     |
|----------------------------------|-----------------------------------------------------|
| <b>291337/2</b>                  | Wrench, dismantler.                                 |
| <b>A65026</b><br><b>(291357)</b> | Cleaner, nozzle.                                    |
| <b>291195</b>                    | Pressure gauge kit, injector and pump element test. |

**Injection Pump**

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| <b>290312</b>                    | Plate (use with 290239).                    |
| <b>A65023</b><br><b>(290904)</b> | Adjuster, fuelling bush.                    |
| <b>A90339</b><br><b>(290902)</b> | Reamer, rack bush.                          |
| <b>290984</b>                    | Adjuster, rack, 120 C.                      |
| <b>290985</b>                    | Extension, rack adjuster (use with 290984). |
| <b>291188</b>                    | Gauge, rack stroke.                         |
| <b>A65022</b><br><b>(290903)</b> | Installer, tappet.                          |
| <b>A65019</b><br><b>(290901)</b> | Fork, tappet.                               |

**20 – POWER TRAIN**

|                 |                                                                |
|-----------------|----------------------------------------------------------------|
| <b>290954</b>   | Wrench, oil-bath master clutch.                                |
| <b>292265</b>   | Remover/replacer, oil-bath clutch, 90 C.                       |
| <b>291363</b>   | Compressor, master clutch spring, 90 C.                        |
| <b>291519</b>   | Compressor, master clutch spring, 120 C.                       |
| <b>292888</b>   | Pilot, transmission/clutch cover.                              |
| <b>291217</b>   | Wrench, ring gear lock ring.                                   |
| <b>291216</b>   | Guard, ring gear shaft seal.                                   |
| <b>291222</b>   | Driver, ring gear shaft seal.                                  |
| <b>291022</b>   | Hook, lift, final drive.                                       |
| <b>291421/1</b> | Stop, final drive annulus.                                     |
| <b>291382</b>   | Gauge, frame alignment (use with 291572).                      |
| <b>292761</b>   | Pilot, sprocket outer support dowel seat drill (17.5 mm dia.). |

|                 |                                                                          |
|-----------------|--------------------------------------------------------------------------|
| <b>292762</b>   | Pilot, sprocket outer support dowel seat reamer (18 mm dia.).            |
| <b>291569</b>   | Reamer, sprocket outer support dowel seat, 18 mm dia. (use with 292762). |
| <b>291667</b>   | Hook, lift, track roller.                                                |
| <b>291427</b>   | Puller, screw, track roller bracket.                                     |
| <b>291417</b>   | Support, overhaul, roller.                                               |
| <b>291671</b>   | Hook, lift, fuel tank.                                                   |
| <b>291214</b>   | Bracket, steering clutch.                                                |
| <b>291221</b>   | Support, overhaul, steering clutch.                                      |
| <b>291374</b>   | Puller, steering clutch inner drum and sprocket outer support.           |
| <b>291229</b>   | Puller, steering clutch drum outer hub.                                  |
| <b>291377</b>   | Puller, steering clutch lever.                                           |
| <b>291219/1</b> | Compressor, steering clutch spring.                                      |
| <b>291418</b>   | Stop, steering clutch outer drum hub.                                    |
| <b>291376</b>   | Wrench, steering clutch drum nut.                                        |
| <b>291215</b>   | Hook, brake spring.                                                      |
| <b>290721</b>   | Wrench, sprocket lock ring.                                              |
| <b>291409</b>   | Remover, sprocket shaft.                                                 |
| <b>290583</b>   | Adapter, sprocket shaft.                                                 |
| <b>291411</b>   | Adapter, sprocket shaft.                                                 |
| <b>291412</b>   | Nut, sprocket shaft.                                                     |
| <b>291228</b>   | Wrench inner sprocket shaft nut.                                         |

**Kit for hand press 291387**

|               |                                               |
|---------------|-----------------------------------------------|
| <b>293334</b> | Plate, track idler bracket (use with 291588). |
| <b>291588</b> | Remover, roller and idler bracket.            |
| <b>293333</b> | Puller, screw, track idler bracket.           |
| <b>292291</b> | Remover, sprocket shaft.                      |

|               |                               |
|---------------|-------------------------------|
| <b>292302</b> | Remover, sprocket shaft.      |
| <b>292305</b> | Remover, sprocket shaft.      |
| <b>290586</b> | Steady, sprocket shaft.       |
| <b>292303</b> | Pin, remover, sprocket shaft. |

**30 – UNDERCARRIAGE**

|                 |                                       |
|-----------------|---------------------------------------|
| <b>291379/1</b> | Remover/replacer, coupling pin.       |
| <b>291384</b>   | Wrench, track shoe nut.               |
| <b>293653</b>   | Gauge, link spacing.                  |
| <b>291573</b>   | Tester, track release overload valve. |

**Kit for Hand Press 291387**

|               |                             |
|---------------|-----------------------------|
| <b>291389</b> | Remover, pin.               |
| <b>291391</b> | Plate, track chain support. |
| <b>291388</b> | Remover/replacer, bush.     |
| <b>291380</b> | Spacer, bush.               |
| <b>291392</b> | Jig, link bush assembly.    |
| <b>291390</b> | Installer, pin and bush.    |

**Kit for Hand Press 292451**

|               |                           |
|---------------|---------------------------|
| <b>292452</b> | Bracket, installer, link. |
| <b>292453</b> | Bracket, remover, link.   |
| <b>292454</b> | Anvil, pin removal.       |
| <b>292455</b> | Spacer, coupling link.    |

**50 – ELECTRICS****Starter**

|               |                                     |
|---------------|-------------------------------------|
| <b>292307</b> | Adapter, clutch torque dynamometer. |
| <b>290973</b> | Dresser, commutator.                |



