

FIAT

trattori

355 C

455 C

505 C

605 C

**WORKSHOP
MANUAL**

06910045

Product: New Holland Fiat 355C,455C,505C,605C Tractors Service Repair Manual
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SERVIZIO ASSISTENZA TECNICA E RICAMBI

IMPORTANT

The Imperial weights and measures are given for operators' convenience and, though the closest approximation is sought, they are normally rounded off for practical reasons.

In case of discrepancies only the metric units should be considered.

The wear allowances indicated for some items are given for guidance only.

Any reference made in the manual to "front", "rear", "right-hand" and "left-hand" is as viewed facing the direction of forward travel from the driver's seat.

A.M. = Ante-modification — P.M. = Post-modification.

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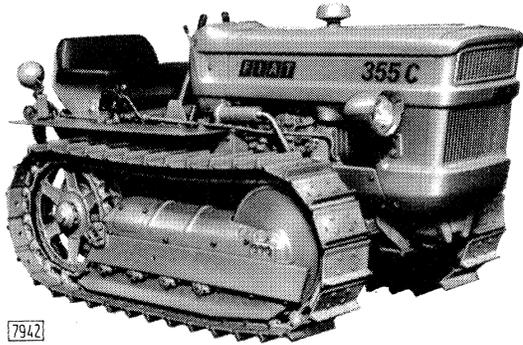
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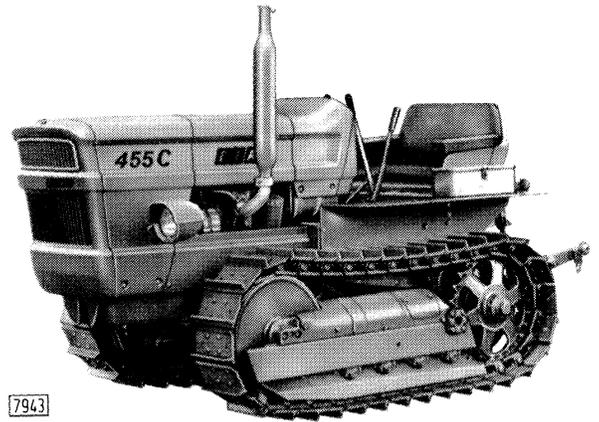
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AGRICULTURAL CRAWLER TRACTORS



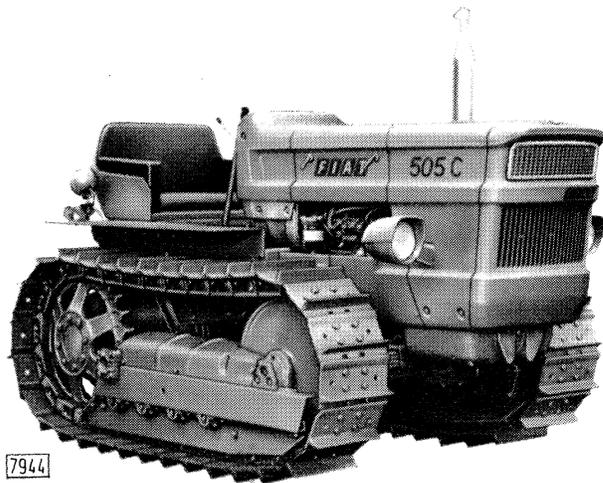
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Model 355 C



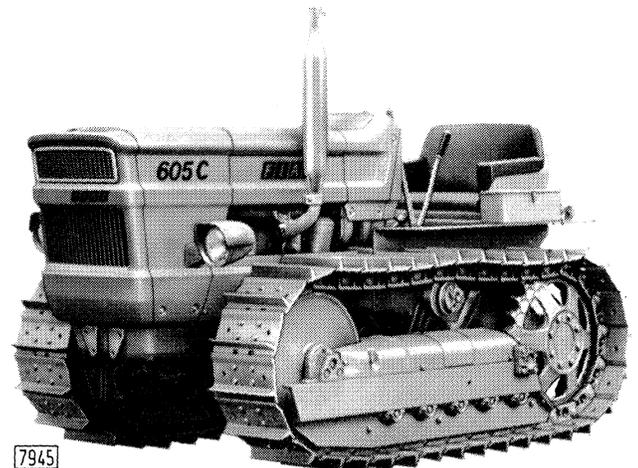
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Model 455 C



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Model 505 C



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Model 605 C

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GENERAL

FOREWORD

The information given in this manual applies to the standard versions of Models 355 C, 455 C, 505 C, and 605 C.

Data and descriptions which do not carry any type reference apply to the four models.

SPECIFICATION

IDENTIFICATION DATA

Chassis Type	Engineering Code
355 C	632.500
455 C	632.200
505 C	634.200
605 C	636.200

ENGINE

Tractor Type	355 C	455 C	505 C	605 C
Engine Type	8025.02.011	8035.02.210 ⁽¹⁾ 8035.02.310 ⁽²⁾	8035.02.372 ⁽²⁾	8045.02.211 ⁽¹⁾ 8045.02.311 ⁽²⁾
Cycle	Diesel	Diesel	Diesel	Diesel
Strokes	Four	Four	Four	Four
No. of cylinders	2	3	3	4
Bore	100 mm. (3.94 in.)	100 mm. (3.94 in.)	100 mm. (3.94 in.)	100 mm. (3.94 in.)
Stroke	110 mm. (4.33 in.)	110 mm. (4.33 in.)	110 mm. (4.33 in.)	110 mm. (4.33 in.)
Capacity	1728 cm ³ (106.44 cu. in.)	2592 cm ³ (159.16 cu. in.)	2592 cm ³ (159.16 cu. in.)	3456 cm ³ (210.88 cu. in.)
Compression ratio	17 to 1	17 to 1	17 to 1	17 to 1
Camshaft rotation (as seen from fan side)	Clockwise	Clockwise	Clockwise	Clockwise
Main bearings	Three	Three	Three	Three
Firing order	1 (180°)-2 (540°)	1-2-3	1-2-3	1-3-4-2
Rated engine speed	2500 r.p.m.	2400 r.p.m.	2600 r.p.m.	2200 r.p.m.
Max. no-load speed	2700 r.p.m.	{ 2650 r.p.m. ⁽¹⁾ 2600 r.p.m. ⁽²⁾	2800 r.p.m.	2400 r.p.m.
Min. no-load speed	600 to 650 r.p.m.	{ 650to700r.p.m. ⁽¹⁾ 650 r.p.m. ⁽²⁾	650 r.p.m.	{ 650to700r.p.m. ⁽¹⁾ 650 r.p.m. ⁽²⁾
Alternator-to-engine speed ratio	1.83 to 1	1.83 to 1	1.83 to 1	1.83 to 1
Oil pump-to-engine speed ratio . . . . .	.5 to 1	.5 to 1	.5 to 1	.5 to 1
Water pump/fan-to-engine speed ratio	1.42 to 1	1.42 to 1	1.42 to 1	1.42 to 1
Hourmeter rating	1750 r.p.m.	1600 r.p.m.	1840 r.p.m.	1600 r.p.m.
Output (fan, air cleaner and exhaust silencer removed)	35 HP	45 HP	50 HP	56 HP

⁽¹⁾ Bosch injection pump.
⁽²⁾ C.A.V. injection pump.

Valvegear

Pushrod operated overhead valves.

Inlet opens 3° B.T.D.C.

Inlet closes 23° ABDC.

Exhaust opens 48° 30' B.B.D.C.

Exhaust closes 6° ATDC.

Valve clearance:—

- For timing check45 mm. (.018 in.)
- Normal (cold)25 mm. (.010 in.)

Fuel System

Oil-bath air cleaner.

Fuel pump outlet line filters:—

- One cartridge, water separator (355 C).
- Twin, in-line, cartridge (water separator on first) (455 C-505 C-605 C).

Fuel injection pump:—

- In-line, plunger type pumping elements (355 C).
- Distributor type, Bosch or C.A.V. (455 C-505 C-605 C).

Lift pump:—

- Piston type (355 C).
- Twin-diaphragm type (455 C-505 C-605 C).

Automatic Advance Variator:—

- Mechanical (355 C).
- Hydraulic (455 C-505 C-605 C).

Four-orifice nozzle injectors

Release pressure 225 to 235 kg/cm² (3,200 to 3,342 p.s.i.)

Lubrication System

Forced-feed, gear type pump, featuring oil pressure regulating valve.

Normal lubricating oil pressure 3 to 4 kg/cm² (42.7 to 56.9 p.s.i.)

Oil filters:—

- Inlet line, gauze.
- Outlet line, full-flow, cartridge type, by-pass valve.

Cooling System

Vane type centrifugal water pump.

Wax type thermostat.

Vertical tube radiator core and fan.

MASTER CLUTCH

Dry single plate, overcentre engagement (355 C-455 C-505 C).

Dry twin plate, overcentre engagement (605 C).

Manual lever, mechanical.

GEARBOX AND SPEED-REDUCTION UNIT

Sliding-mesh gear, three forward and one reverse ratios. Integral speed-reduction unit for a total of six forward and two reverse ratios.

Single gear selector lever.

BEVEL DRIVE

Centre bevel gear train in axle case.

BRAKES

Band-type on steering clutch drums.

Two independent pedals.

Brake lock lever (parking).

STEERING CLUTCHES

Dry, multi-plate, thrust spring, withdrawal sleeve.

Manual lever.

HUB-REDUCTION FINAL DRIVE

Spur gear train.

POWER TAKE-OFF

Transmission type.

Manual lever.

Engine speed at standard 540 r.p.m.:—

- Models 355 C-505 C 2160 r.p.m.
- Models 455 C-605 C 1970 r.p.m.

BELT PULLEY

Manual lever.

Diameter width 250 x 150 mm. (9.84 x 5.90 in.)

Rated speed:—

- Model 355 C 1300 r.p.m.
- Model 455 C 1248 r.p.m.

- Model 505 C 1352 r.p.m. Track carriage assemblies with five track rollers and one top idler (605 C).
- Model 605 C 1144 r.p.m.

UNDERCARRIAGE

Four track roller carriage assemblies (355 C-455 C-505 C). Recoil spring type track tension assembly.
 Transverse leaf spring front suspension.
 Transverse rear suspension bar resting on track carriages.

TRANSMISSION RATIOS AND TRAVEL SPEEDS

Gear	Gearbox Ratios	Speed Reduction Ratios	Gearbox Speed Reduction Ratios	Engine-to-sprocket Ratios				Max. Travel Speed K.P.H. (M.P.H.)			
				Model 355 C	Model 455 C	Model 505 C	Model 605 C	Model 355 C	Model 455 C	Model 505 C	Model 605 C
1st	$\frac{1}{2.938}$	$\frac{1}{1.823}$	$\frac{1}{5.355}$	148.431	145.075	164.923	148.431	1.7 (1.05)	1.7 (1.05)	1.8 (1.11)	1.7 (1.05)
2nd	$\frac{1}{2.938}$	1	$\frac{1}{2.938}$	81.428	80.135	90.475	81.428	3.1 (1.92)	3.0 (1.86)	3.3 (2.05)	3.1 (1.92)
3rd	$\frac{1}{1.172}$	$\frac{1}{1.823}$	$\frac{1}{2.137}$	59.242	58.301	65.824	59.242	4.3 (2.67)	4.2 (2.61)	4.5 (2.79)	4.2 (2.61)
4th	$\frac{1}{0.853}$	$\frac{1}{1.823}$	$\frac{1}{1.555}$	43.099	42.415	47.888	43.099	5.9 (3.66)	5.7 (3.54)	6.2 (3.85)	5.8 (3.60)
5th	$\frac{1}{1.172}$	1	$\frac{1}{1.172}$	32.499	31.983	36.110	32.499	7.8 (4.84)	7.6 (4.72)	8.2 (5.09)	7.7 (4.78)
6th	$\frac{1}{0.853}$	1	$\frac{1}{0.853}$	23.644	23.268	26.271	23.644	10.7 (6.65)	10.4 (6.46)	11.2 (6.96)	10.6 (6.59)
1st Reverse	$\frac{1}{1.563}$	$\frac{1}{1.823}$	$\frac{1}{2.848}$	78.952	77.699	87.725	78.953	3.2 (1.98)	3.1 (1.92)	3.4 (2.11)	3.2 (1.98)
2nd Reverse	$\frac{1}{1.563}$	1	$\frac{1}{1.563}$	43.313	42.625	48.125	43.313	5.8 (3.60)	5.7 (3.54)	6.1 (3.80)	5.8 (3.60)

Bevel drive ratio:—

- Models 355 C-455 C-605 C (10/44) 4.400 to 1
- Model 505 C (9/44) 4.890 to 1

Hub-reduction final drive ratio:—

- Models 355 C-505 C-605 C 6.300 to 1
- Model 455 C 6.200 to 1

Overall ratio (bevel and hub):—

- Models 355 C-605 C 27.720 to 1
- Model 455 C 27.280 to 1
- Model 505 C 30.800 to 1

P.T.O. drive ratio:—

- Models 355 C-505 C 4.000 to 1
- Models 455 C-605 C 3.642 to 1

Belt pulley drive ratio 1.923 to 1

HYDRAULIC LIFT UNIT

Position-controlled lift with integral single cylinder (Models 455 C-505 C-605 C) and two single acting external cylinders (Model 355 C).

Engine driven gear type hydraulic pump drawing from lift body (455 C-505 C-605 C) or gearbox (355 C).

Rated output:—

- Model 355 C 18.5 litres/min. (4 Gall./min.)
- Model 455 C 17.8 litres/min. (3⁷/₈ Gall./min.)
- Model 405 C 19.3 litres/min. (4¹/₄ Gall./min.)
- Model 605 C 16.3 litres/min. (3¹/₂ Gall./min.)

Relief valve setting 145 to 155 kg/cm²
(2,062 to 2,204 p.s.i.)

Three-point linkage capacity:—

- Models 355 C-455 C Category 1
- Models 505 C-605 C Category 1 and 2

Rated load:—

- Model 355 C 1000 kg (2,205 lb.)
- Models 455 C-505 C-605 C 1200 kg (2,646 lb.)

Nominal lift capacity:—

- Model 355 C 880 kgm (6,365 lb. ft.)
- Models 455 C-505 C-605 C 840 kgm (6,075 lb. ft.)

ELECTRICAL SYSTEM (12 Volts)

Battery capacity at 20 hour discharge rate:—

- Model 355 C 77 Ah
- Models 455 C-505 C 110 Ah
- Model 605 C 136 or 143 Ah

Alternator FIAT A 12 M - 124/12/42 X-M

— Maximum rating . . . 53 Amps.

Voltage regulator FIAT RC 2/12 B

Alternator warning relay . SIPEA or WEPOO

Starter:—

- Model 355 C FIAT M 125 - 3/12 V. 2
- Models 455 C-505 C FIAT M 125 - 3/12
- Model 605 C MARELLI MT 38 G A - QB

Output rating:—

- Models 355 C-455 C-505 C 3 kW
- Model 605 4 H.P.

WEIGHTS

Operating weight:—

- Model 355 C 2035 kg. (4,487 lb.)
- Model 455 C 2140 kg. (4,718 lb.)
- Model 505 C 2500 kg. (5,512 lb.)
- Model 605 C 2750 kg. (6,063 lb.)

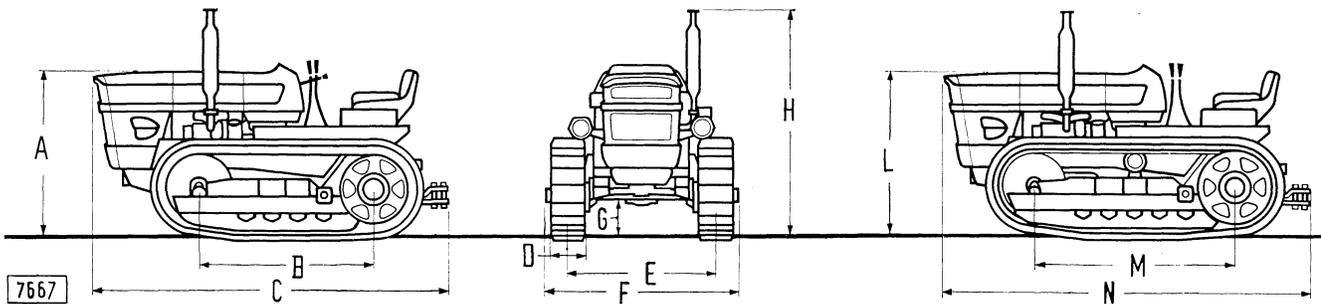


Fig. 1 - Overall Dimensions of Standard Tractors - mm. (in.).

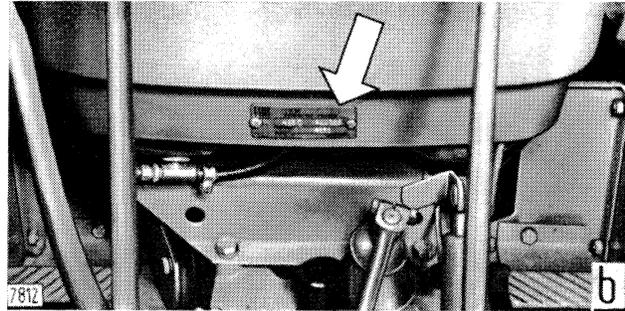
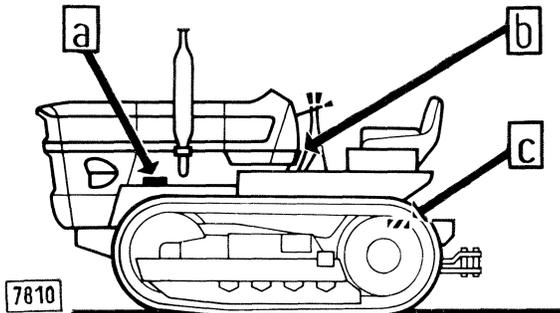
Model	A	B	C	D	E	F	G	H	L	M	N
355 C	1125 (44 ¹ / ₄)	1293 (50 ⁷ / ₈)	2460 (97)	250 (10)	900 (35 ³ / ₈)	1182 (46 ¹ / ₂)	250 (10)	1605 (63 ³ / ₄)	—	—	—
455 C	1210 (47 ⁵ / ₈)	1293 (50 ⁷ / ₈)	2675 (105 ¹ / ₄)	250 (10)	1010 (39 ³ / ₄)	1292 (50 ⁷ / ₈)	250 (10)	1650 (65)	—	—	—
505 C	1230 (48 ³ / ₈)	1318 (51 ⁷ / ₈)	2675 (105 ¹ / ₄)	310 (12 ¹ / ₄)	1100 (43 ³ / ₄)	1440 (56 ³ / ₄)	270 (10 ⁵ / ₈)	1655 (65 ¹ / ₈)	—	—	—
605 C	(L)	(M)	(N)	310 (12 ¹ / ₄)	1100 (43 ³ / ₄)	1440 (56 ³ / ₄)	270 (10 ⁵ / ₈)	1655 (65 ¹ / ₈)	1230 (48 ³ / ₈)	1528 (60 ¹ / ₈)	2785 (109 ⁵ / ₈)

CAPACITIES

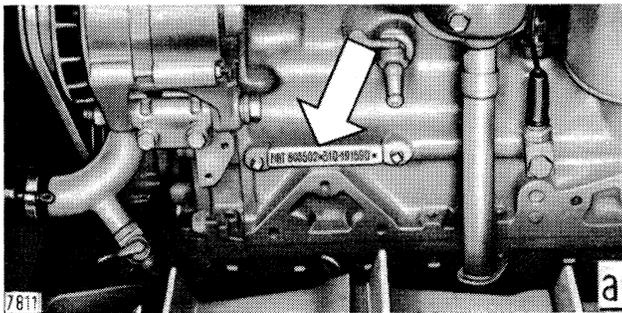
Description	Kg.	Litres	Imp. Units	Type of Fluid			
				FIAT Designation	International Designation		
Fuel:—							
— Model 355 C	—	34	7½ Gall	} Diesel oil (decanted and filtered)			
— Models 455 C - 505 C - 605 C	—	54	12 Gall				
Coolant:—							
— Model 355 C	—	7	1½ Gall	} Water (1)			
— Models 455 C - 505 C . .	—	13	2¾ Gall				
— Model 605 C	—	14	3 Gall				
Engine oil							
Sump, filters and lines (2):—							
— Model 355 C	3.8	4.2	7¼ Pints				
— Models 455 C - 505 C . .	6.8	7.5	1⅔ Gall				
— Model 605 C	10.5	11.5	2½ Gall				
Sump only (2):—							
— Model 355 C	3.2	3.6	6⅓ Pints				
— Models 455 C - 505 C . .	6.0	6.8	1½ Gall				
— Model 605 C	9.5	10.5	2⅓ Gall				
Injection pump/governor oil (2) (355 C)15	.16	⅓ Pint	oliofiat AMBRA 20 W/40	SAE 20 W-40 Multigrade deter- gent oil to MIL-L- 2104 B containing EP additives		
Air cleaner oil (2):—							
— Model 355 C . . . . .	.50	.55	1 Pint			
— Models 455 C - 505 C - 605 C	.85	.94	1⅔ Pints				
Gearbox/bevel drive/P.T.O. (455 C - 505 C - 605 C) oil .	11.1	12.5	2¾ Gall				
Gearbox/bevel drive/P.T.O. and hydraulic lift (355 C) oil (2) .	15.75	17.6	4 Gall				
Hub-reduction oil (each):—							
— Models 355 C - 455 C . .	.85	.95	1⅔ Pints				
— Models 505 C - 605 C . .	5 (3)	5.5 (3)	9⅔ Pints				
Belt pulley oil . . . . .	.4	.44	¾ Pint			
Track rollers and idler wheel oil .	—	—					
Hydraulic lift oil (455 C - 505 C - 605 C) (2)	3.2	3.5	6¼ Pints	grassofiat G 9	Lithium-base grease to NLGI No. 2		
Grease nipples	—	—					

(1) At the beginning of the cold season use Fiat or other approved anti-freeze
 (2) Use **oliofiat AMBRA 10 W/30** (SAE 10 W-30) for temperatures below 0° C.
 (3) 7 Kg. - 7.8 litres (1¾ Gall) for Hill version

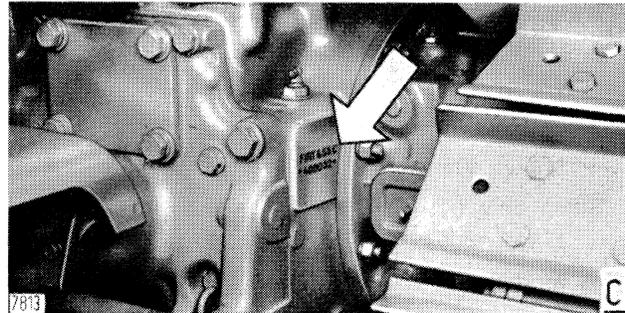
IDENTIFICATION DATA



Data Plate.



Engine Number



Chassis Number

Fig. 2 - Location of Identification Data on the Tractor

SPARE PARTS

Whenever replacement parts are required it is essential that only genuine spares should be fitted to ensure efficient running.

When ordering, please state:—

- Tractor model.
- Chassis type and number.
- Engine type and number.
- Spare part number (see the Spare Parts Catalogue).

ENGINE

DESCRIPTION

The FIAT engines fitted to crawler tractors Models 355 C-455 C-505 C and 605 C are high-speed, 4-stroke, in-line Diesel units.

Engine Block - Single casting, dry cylinder liners, crankshaft and camshaft housings, valve tappet bores.

Cylinder Head - Integral valve seats.

Valvegear - Helical train, pushrod operated camshaft, overhead valves. Inlet valves incorporate a fin to increase air turbulence.

Crankgear - Crankshaft running on 3, 4, 5 bearings (Models 355 C, 455 C and 505, 605 C respectively) of the thin-shell type.

Light-alloy pistons, one compression ring and two oil control rings.

A flyweight-type dynamic balancer in the engine sump (605 C) reduces engine and engine-induced vibrations. On models 455 C and 505 C, an analogous result is obtained through a suitable belt pulley/engine flywheel balance.

Air Breathing - Through an oil-bath air cleaner.

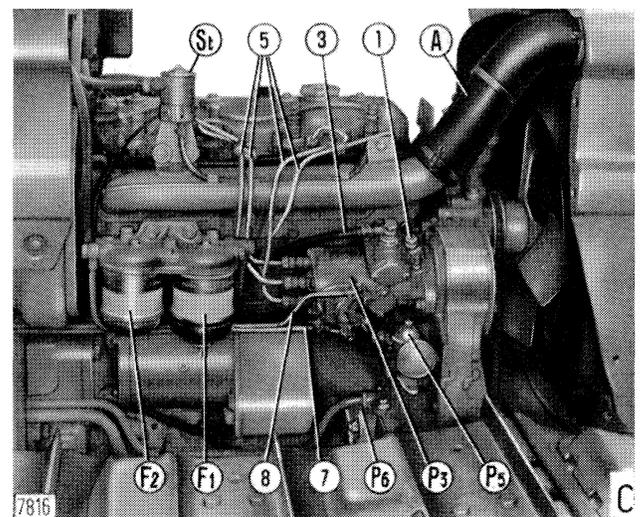
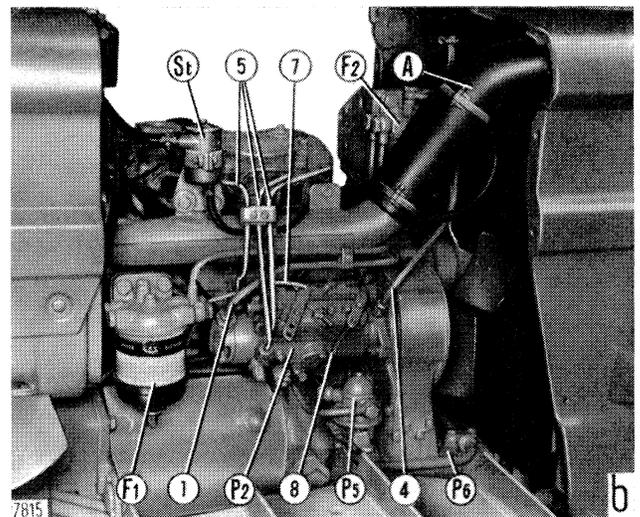
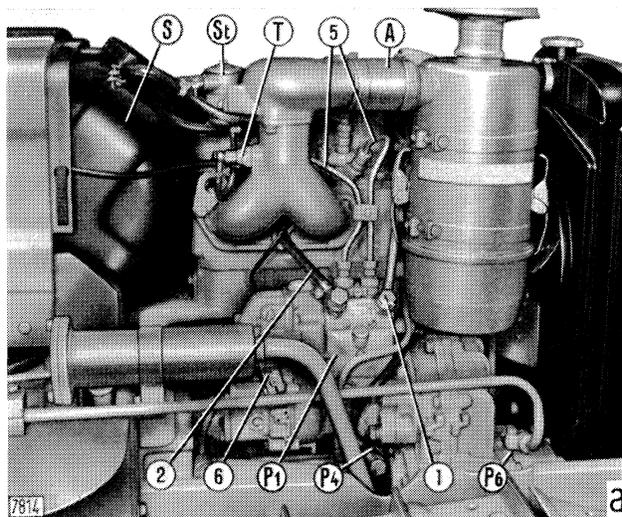


Fig. 3 - Right-hand Side Views of the Engines

- (a) - Model 355 C
- (b) - Models 455 C and 505 C
- (c) - Model 605 C

A. Inlet manifold - F₁. First fuel filter - F₂. Second fuel filter - P₁. FIAT (Bosch licence) in-line fuel injection pump - P₂. C.A.V. distributor type fuel injection pump - P₃. Bosch distributor type fuel injection pump - P₄. Piston-type fuel lift pump - P₅. Diaphragm-type fuel lift pump - P₆. Hydraulic lift pump - S. Fuel tank. - St. Thermostarter bowl - T. Thermostarter - 1. Fuel injection pump inlet line - 2. Fuel leak-back line - 3. Fuel return line - 4. Fuel leak-back line to second fuel filter - 5. Fuel lines to injectors - 6. Throttle lever - 7. Throttle linkage - 8. Shut-off linkage.

Fuel Injection System - In-line piston type injection pump (355 C), Bosch or C.A.V. distributor type injection pump (455 C-505 C-605 C) and 4-orifice fuel injectors.

Cooling System - Centrifugal water pump, radiator and fan. Wax element thermostat.

Lubrication System - Forced-feed, camshaft driven pump. Pressure relief valve on outlet line.

Engine Starting - 12 Volt electromagnetically operated starter motor. Thermostarter (if applicable).

PERFORMANCE DATA

TEST PLAN

Engine on bench with fan, air cleaner and exhaust silencer removed.
 Atmospheric pressure 740 ± 5 mm. Hg.
 Ambient temperature 20° ± 3°
 Relative humidity 70% ± 5.
 Fuel density 830 ± 10 gram/litre.
 Injection pump leak back fuel temperature 54° ± 2 °C.
 (Bosch and C.A.V. injection pumps only).

Injection timing B.T.D.C. cylinder No. 1 on compression stroke:—
 — Model 355 C 16° to 18°
 — Model 455 C
 — Bosch 7° to 9°
 — C.A.V. 16° to 18°
 — Model 505 C (C.A.V.) 16° to 18°
 — Model 605 C
 — Bosch 7° to 9°
 — C.A.V. 15° to 17°

PERFORMANCE DATA (BENCH)

Model 355 C	Engine r.p.m.	Engine H.P.		Time to burn 100 cm ³ (6 cu. in.) of fuel seconds
		2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2500	31.5 or over	33 or over	47.4 or over
Maximum torque ⁽¹⁾	1600	20.5 or over	21.5 or over	80.4 or over
Maximum (no-load) ⁽¹⁾	up to 2700	—	—	—
Minimum (no-load) ⁽²⁾	600 to 650	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	2160	—	29.7 or over	55.1 or over

Model 455 C	Engine r.p.m.	Engine H.P.		Time to burn 100 cm ³ (6 cu. in.) of fuel seconds
		2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2400	42 or over	44 or over	{ 36.7 or over ⁽³⁾ 35.4 or over ⁽⁴⁾
Maximum torque:—				
— Bosch ⁽¹⁾	1400	28.5 or over	30.5 or over	53.5 or over
— C.A.V. ⁽¹⁾	1600	30 or over	32 or over	50.8 or over
Maximum (no-load):—				
— Bosch ⁽¹⁾	up to 2650	—	—	—
— C.A.V. ⁽¹⁾	up to 2600	—	—	—
Minimum (no-load):—				
— Bosch ⁽²⁾	650 to 700	—	—	—
— C.A.V. ⁽²⁾	650	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	1970	—	{ 39.5 or over ⁽³⁾ 38.6 or over ⁽⁴⁾	{ 42.3 or over ⁽³⁾ 41.8 or over ⁽⁴⁾

⁽¹⁾ Full throttle - ⁽²⁾ Throttle at idle - ⁽³⁾ Bosch pump - ⁽⁴⁾ C.A.V. pump

Performance Data (Bench) - Continued.

Model 505 C	Engine r.p.m.	Engine H.P.		Time to burn 100 cm ³ (6 cu. in.) of fuel seconds
		2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2600	47 or over	49 or over	31.5 or over
Maximum torque ⁽¹⁾	1600	32 or over	34 or over	47.8 or over
Maximum (no-load) ⁽¹⁾	up to 2800	—	—	—
Minimum (no-load) ⁽²⁾	650	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	2160	—	43.8 or over	37.7 or over

Model 605 C	Engine r.p.m.	Engine H.P.		Time to burn 250 cm ³ (15.2 cu. in.) of fuel seconds
		2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2200	{ 50.5 or over ⁽³⁾ 50 or over ⁽⁴⁾	53 or over	{ 77 or over ⁽³⁾ 76.9 or over ⁽⁴⁾
Maximum torque:—				
— Bosch ⁽¹⁾	1600	39 or over	41 or over	103.4 or over
— C.A.V. ⁽¹⁾	1400	34 or over	36 or over	112.7 or over
Maximum (no-load) ⁽¹⁾	up to 2400	—	—	—
Minimum (no-load):—				
— Bosch ⁽²⁾	650 to 700	—	—	—
— C.A.V. ⁽²⁾	650	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	1970	—	49 or over	{ 85 or over ⁽³⁾ 84 or over ⁽⁴⁾

PERFORMANCE DATA (P.T.O.)

Same test conditions as for bench testing.

Model 355 C	r.p.m.		Engine H.P.		Time to burn 100 cm ³ (6 cu. in.) of fuel seconds
	Engine	P.T.O.	2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2500	625	30 or over	31.4 or over	47.4 or over
Maximum torque ⁽¹⁾	1600	400	19.5 or over	20.4 or over	80.4 or over
Maximum (no-load) ⁽¹⁾	up to 2700	up to 675	—	—	—
Minimum (no-load) ⁽²⁾	600 to 650	150 to 162	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	2160	540	—	28.3 or over	55.1 or over

Model 455 C					
Maximum (full load) ⁽¹⁾	2400	659	39.9 or over	41.8 or over	{ 36.7 or over ⁽³⁾ 35.4 or over ⁽⁴⁾
Maximum torque:—					
— Bosch ⁽¹⁾	1400	384	27.1 or over	29.1 or over	53.3 or over
— C.A.V. ⁽¹⁾	1600	438	28.5 or over	30.4 or over	50.8 or over
Maximum (no-load):—					
— Bosch ⁽¹⁾	up to 2650	up to 728	—	—	—
— C.A.V. ⁽¹⁾	up to 2600	up to 713	—	—	—
Minimum (no-load):—					
— Bosch ⁽²⁾	650 to 700	178 to 192	—	—	—
— C.A.V. ⁽²⁾	650	178	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	1970	540	—	{ 37.5 or over ⁽³⁾ 36.7 or over ⁽⁴⁾	{ 42.3 or over ⁽³⁾ 41.8 or over ⁽⁴⁾

⁽¹⁾ Full throttle - ⁽²⁾ Throttle at idle - ⁽³⁾ Bosch pump - ⁽⁴⁾ C.A.V. pump

Performance Data (P.T.O.) - Continued.

Model 505 C	r.p.m.		Engine H.P.		Time to burn 100 cm ³ (6 cu. in.) of fuel seconds
	Engine	P.T.O.	2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2600	650	44.7 or over	46.6 or over	31.5 or over
Maximum torque ⁽¹⁾	1600	400	30.4 or over	32.3 or over	47.8 or over
Maximum (no-load) ⁽¹⁾	up to 2800	up to 700	—	—	—
Minimum (no-load) ⁽²⁾	650	162	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	2160	540	—	41.6 or over	37.7 or over

Model 605 C	r.p.m.		Engine H.P.		Time to burn 250 cm ³ (15.2 cu. in.) of fuel seconds
	Engine	P.T.O.	2 hour run-in	50 hour run-in	
Maximum (full load) ⁽¹⁾	2200	604	{48 or over ⁽³⁾ 47.5 or over ⁽⁴⁾	50.3 or over	{77 or over ⁽³⁾ 76.9 or over ⁽⁴⁾
Maximum torque:—					
— Bosch ⁽¹⁾	1600	438	37.1 or over	38.9 or over	103.4 or over
— C.A.V. ⁽¹⁾	1400	384	32.3 or over	34.2 or over	112.7 or over
Maximum (no-load) ⁽¹⁾	up to 2400	up to 658	—	—	—
Minimum (no-load):—					
— Bosch ⁽²⁾	650 to 700	178 to 192	—	—	—
— C.A.V. ⁽²⁾	650	178	—	—	—
P.T.O. at 540 r.p.m. ⁽¹⁾	1970	540	—	46.5 or over	{85 or over ⁽³⁾ 84 or over ⁽⁴⁾

⁽¹⁾ Full throttle - ⁽²⁾ Throttle at idle - ⁽³⁾ Bosch pump - ⁽⁴⁾ C.A.V. pump

COMPRESSION TEST

If engine performance is found to be unsatisfactory, check the injection system (overhauling nozzles and injection pump) and the compression in each cylinder.

To check engine compression use tester Part No. **291310** proceeding as follows:—

- Remove the injector from each cylinder.
- Fit dummy injector Part No. **292631** in place of the injector of the cylinder under test, and seal the housing using the associated copper washer.
- Hold the injection pump in engine stop condition and take the readings driving the engine through the starter.

In good running conditions, compression should be 26 to 28 kg/cm² (370 to 398 p.s.i.) as recorded at 40 °C sump oil temperature, 760 mm. Hg (sea level) atmospheric

pressure with the engine running at 210 to 280 r.p.m. The minimum compression which is acceptable for a used engine is 22 kg/cm² (313 p.s.i.).

The maximum compression differential between cylinders is not to exceed 3 kg/cm² (42.7 p.s.i.).

In this connection it should be noted that every 100 metres (328 ft.) altitude increase from sea level results in 1% (approx.) decrease in compression.

Insufficient compression may be due to faulty valves and seats, pistons and associated rings, cylinder liners or cylinder head gaskets.

Note: The purpose of the compression test is to assess the consistency of compression in the cylinders and to obtain an indication of the degree of wear affecting the parts which help to seal the combustion chambers. Therefore, the test results should not be taken as an absolute indication of engine efficiency.

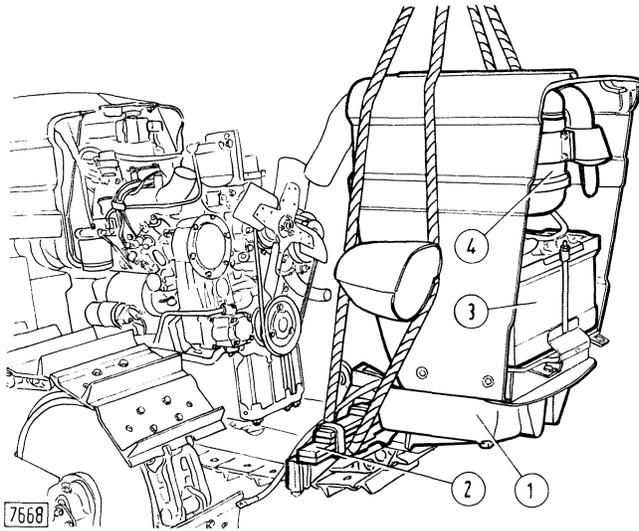


Fig. 4 - Removing the Front Mounting, Radiator and Front End Panelling (455 C - 505 C)

1. Front mounting - 2. Suspension - 3. Battery - 4. Air cleaner.

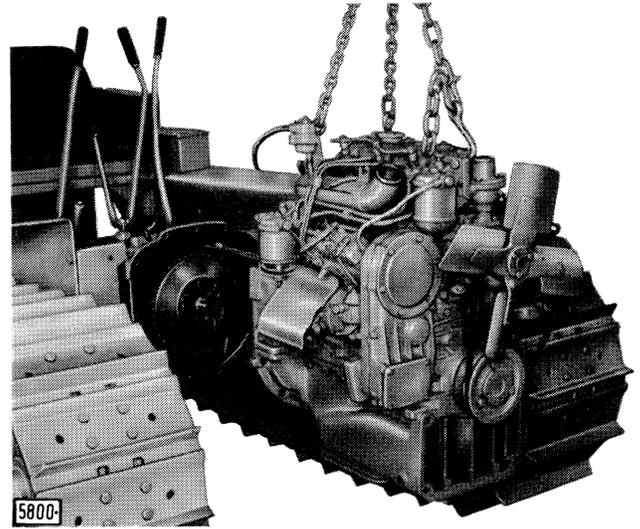


Fig. 5 - Removing (or Refitting) the Power Unit using Lifting Chain Part No. 290740 (455 C - 505 C)

TO REMOVE

Drain the cooling system, remove the lower side and centre panels, disconnect battery positive lead and starter positive cable.

Remove two slippers (28) and two suspension spring mounting brackets (27) (see Fig. 107). Place a stand under the gearbox.

Attach a lifting chain (see Fig. 4) and take up the weight, remove the suspension retaining screws, disconnect the piping and the electrical cables and lift off the mounting with attached battery, radiator and front end panelling.

Disconnect and remove the dashboard, take off the bonnet, the firewall (disconnecting the master switch and throttle linkage) and the fuel tank assembly.

Disconnect the hydraulic lift pipes (if applicable) from the associated pump.

Attach lifting chain Part No. **290740**, take up the weight, remove the gearbox retaining screws and withdraw the power unit (see Fig. 5).

To overhaul, place the engine on rotary stand Part No. **290090** using the brackets shown in Fig. 6.

TO REFIT

- Fill the clutch shaft housing in the flywheel with grassofiat G 9 or other approved grease.
- Attach the power unit to the transmission case with caution to avoid jamming the flywheel teeth against the clutch drive plate.
- For the correct tightening torque figures see page 169.

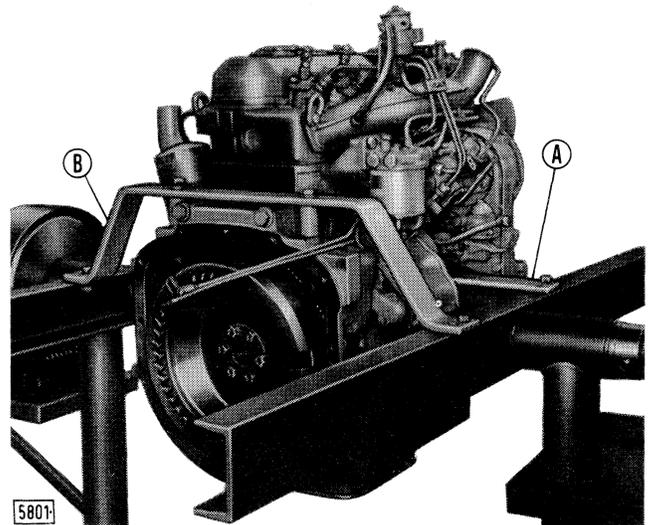


Fig. 6 - The Engine in position on Rotary Stand Part No. 290090

A. Front brackets part Nos. **290737** and **290738** - B. Rear bracket part No. **290739** (455 C - 505 C).

ENGINE BLOCK AND CYLINDER HEAD

BLOCK AND HEAD DATA

<p>Engine Block</p> <p>Liner bore diameter machining oversize (see Fig. 8)</p> <p>Tappet housing machining oversize range (see Fig. 18)</p> <p>Camshaft bearing housing diameter</p> <p>Main bearing housing diameter</p>	<p>.2 mm (.008 in.)</p> <p>.1 - .2 - .3 mm. (.004 - .008 - .012 in.)</p> <p>See Fig. 14</p> <p>80.587 to 80.607 mm. (3.1727 to 3.1735 in.)</p>
<p>Cylinder Liners</p> <p>A.M. standard liner I.D. ⁽¹⁾—</p> <p>— Grade A</p> <p>— Grade B</p> <p>P.M. Standard liner I.D. ⁽¹⁾ (see Fig. 8)</p> <p>I.D. machining oversize range ⁽²⁾</p> <p>Spare liner O.D. oversize</p> <p>Interference fit</p>	<p>100.000 to 100.012 mm. (3.9370 to 3.9374 in.)</p> <p>100.012 to 100.024 mm. (3.9374 to 3.9379 in.)</p> <p>100.000 to 100.018 mm. (3.9370 to 3.9377 in.)</p> <p>.2 - .4 - .6 - .8 mm (.008 - .016 - .024 - .032 in.)</p> <p>.2 mm. (.008 in.)</p> <p>.080 to .160 mm. (.0031 to .0062 in.)</p>
<p>Cylinder Head</p> <p>Valve guide oversize (see Fig. 9)</p> <p>Nominal height</p>	<p>.2 mm. (.008 in.)</p> <p>.92 mm. (3.622 in.)</p>

⁽¹⁾ Fitted liner diameter to be obtained after reboring and re-dressing. A maximum .1 mm. (.004 in.) machining oversize is allowed in production.
⁽²⁾ The tolerance of each A.M. liner oversize is .024 mm. (.0009 in.) to be divided in two grades, A and B (.012 mm. - .0005 in.-each).

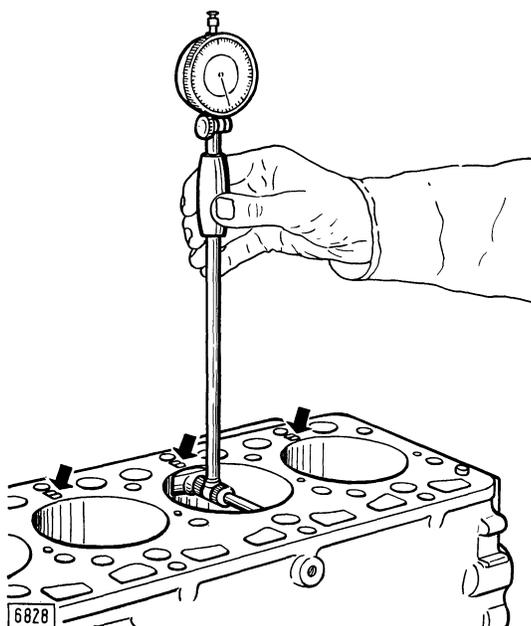


Fig. 7 - Checking Cylinder Liner I.D. using a Dial Gauge
 Arrows indicate the grade of fit (A.M.)

ENGINE BLOCK

Ensure that the block is free from damage. Wash the casting in hot water and soda, subsequently rinsing in cold water.

Clean the internal passages using petrol and blow dry with compressed air.

Prior to fitting head and sump gasket ensure that the associated block faces are clean, check face parallelism and, if necessary, reface with a grinder.

CYLINDER LINERS

A.M. standard liners are graded as A and B according to their bore (see Data Table). The letters are stamped on the block top next to each liner (see Fig. 7). P.M. liners are ungraded.

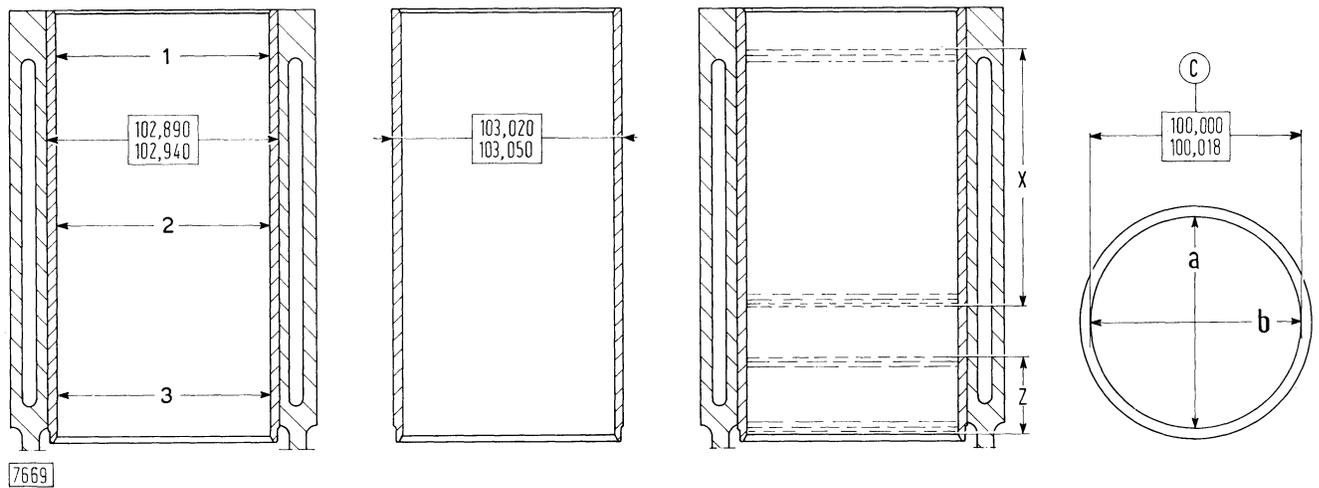


Fig. 8 - Liner and Block Details and Wear Data

a, b. Liner bore measuring points - C. P.M. fitted liner dimension (For A.M. liner see Data Table) - Z. Liner wear inspection length for assessment of piston fit; reading to be taken in plane b - X. Liner wear inspection length for assessment of out-of-roundness and taper; reading to be taken in planes a and b - 1, 2, 3. New/rebored liner dimensional check points; readings to be taken in planes a and b.

Inspect the liners for wear as follows:—

- Check the liner bore over the working length (see Fig. 8) as swept by the piston rings.
- The diameter reading should be taken in both the upper and lower part of the working length in plane parallel to the crankshaft (a) and in plane at right angles to it (b).
- Compare the reading to establish the amount of liner out-of-roundness and taper.

To assess the piston working clearance check the liner bore diameter in lower part (Z) in plane (b) only.

If out-of-roundness or taper in excess of .12 mm. (.0047 in) is detected, rebore to the oversize values specified in the Data Table, fitting pistons of the same grade (A.M pistons and liners only) and oversize. If A.M. oversize pistons are fitted, measure their diameter to assess the grade (not stamped in production).

To renew the liners press the old liners out from the bottom of the crankcase, using plate Part No. **292507** and press-fit the new liners from the top using plate Part No. **291501**.

Then bore and grind each liner as specified. Check the bore diameter by means of a dial gauge positioned in a and b (see Fig. 8) and take the readings in planes 1, 2 and 3.

If considerable out-of-round is detected, rebore to .2 mm. (.008 in.) oversize and use oversize liner.

CYLINDER HEAD

Check head flatness by placing the cylinder head on a surface plate and, if necessary, re-dress by scraping, or grinding if distortion is more severe.

When grinding, the maximum amount of material which can be removed should not exceed .5 mm. (.02 in.).

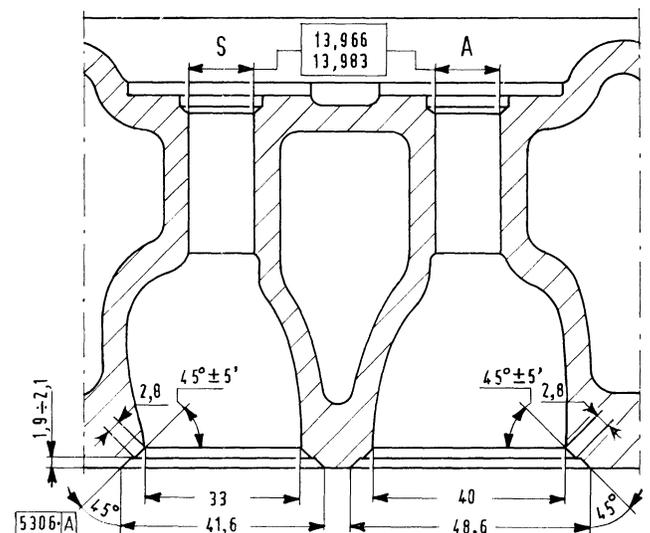


Fig. 9 - Valve Seat and Valve Guide Details

A. Inlet valve - S. Exhaust valve.

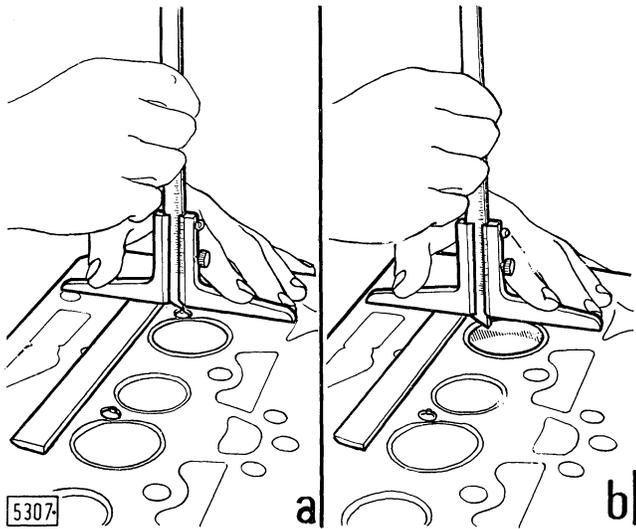


Fig. 10 - Checking Fuel Injector Protrusion (a) and Valve Depth in Cylinder Head

Injector protrusion = 2 to 2.5 mm. (.078 to .094 in.) - Valve depth = .7 to 1.1 mm (.027 to .043 in.) - Max. valve depth = 1.4 mm. (.055 in.).

When grinding place a copper washer of suitable thickness inside the injector seat to maintain protrusion value unchanged (see a, Fig. 10).

To recut the valve seats use tool Part No. **291113** and hand cutter Part No. **A. 60419** (292913). Check that the valve depth in the cylinder head is as shown in Fig. 10.

When refitting the cylinder head note the following:—

- Thoroughly clean both crankcase and head surfaces.
- Fit the gasket (self-adhesive) with the mark **ALTO** (see d, Fig. 11) facing toward the cylinder head.
- Position the cylinder head and tighten the retaining screws according to the sequence given in Fig. 11.

OIL SUMP

In the course of overhaul, wash the oil sump in hot water and soda and rinse in cold water.

Ensure that the sump is free from damage or distortion, and inspect for oil leaks.

Check split seals (6 and 7, Fig. 25) and, if necessary, renew.

Using jointing compound, apply the gasket assembly onto the sump and retighten the screws to the specified torque.

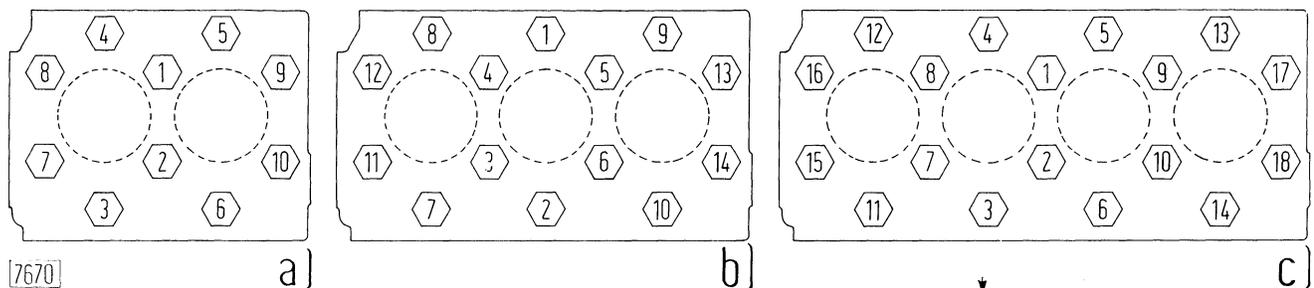
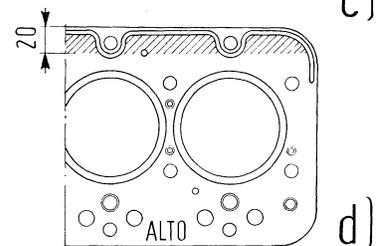


Fig. 11 - Cylinder Head Tightening Sequence

(a) Model 355 C - (b) Models 455 C - 505 C - (c) Model 605 C - (d) Cylinder head gasket (the shaded area shows the adhesive portion).



VALVEGEAR

VALVEGEAR DATA

<p>Valve Timing Data</p> <p>Inlet opens</p> <p>Exhaust opens</p> <p>Inlet closes</p> <p>Exhaust closes</p> <p>Valve clearance:—</p> <p>— For timing check</p> <p>— Normal</p> <p>Cam lift:—</p> <p>— Inlet</p> <p>— Exhaust</p> <p>Valve lift:—</p> <p>— Inlet</p> <p>— Exhaust</p>	<p>3° ± 5° BTDC</p> <p>48° 30' ± 5° BBDC</p> <p>23° ± 5° ABDC</p> <p>6° ± 5° ATDC</p> <p>.45 mm. (.018 in.)</p> <p>.25 mm. (.01 in.)</p> <p>5.705 mm. (.2245 in.)</p> <p>5.777 mm. (.2273 in.)</p> <p>9.3 mm. (.366 in.)</p> <p>10.2 mm. (.402 in.)</p>
<p>Camshaft</p> <p>Journal running clearance (see Fig. 14)</p> <p>— Wear allowance</p> <p>Bearing interference fit</p>	<p>.080 to .160 mm. (.0031 to .0062 in.)</p> <p>.20 mm. (.008 in.)</p> <p>.070 to .150 mm. (.0027 to .0059 in.)</p>
<p>Valves, Valve Guides and Springs</p> <p>Valve stem working clearance (see Fig. 16)</p> <p>— Wear allowance</p> <p>Standard valve guide O.D.</p> <p>Spare valve guide O.D. oversize</p> <p>Valve guide interference fit</p> <p>Valve spring data:—</p> <p>— A.M. inner spring</p> <p>Free length</p> <p>Length under 6.55 to 7.55 kg (14.44 to 16.64 lb.) (valve closed)</p> <p>Length under 15.4 to 16.7 kg (33.95 to 36.82 lb.) (valve open)</p> <p>— A.M. outer spring:—</p> <p>Free length</p> <p>Length under 19.3 to 21.7 kg (42.55 to 47.84 lb.) (valve closed)</p> <p>Length under 36.4 to 39.4 kg (80.26 to 86.87 lb.) (valve open)</p> <p>— P.M. single spring ⁽¹⁾:—</p> <p>Free length</p> <p>Length under 30.1 to 33.9 kg (66.37 to 74.74 lb.) (valve closed)</p> <p>Length under 48.1 to 52.1 kg (106.06 to 114.88 lb.) (valve open)</p>	<p>.023 to .053 mm. (.0009 to .0020 in.)</p> <p>.20 mm. (.008 in.)</p> <p>13.988 to 14.016 mm. (.5507 to .5517 in.)</p> <p>.2 mm. (.008 in.)</p> <p>.005 to .050 mm. (.0002 to .002 in.)</p> <p>51 mm. (2.008 in.)</p> <p>37.5 to 38.5 mm. (1.475 to 1.515 in.)</p> <p>26.8 to 28.8 mm. (1.055 to 1.139 in.)</p> <p>63 mm. (2.480 in.)</p> <p>40.5 to 41.5 mm. (1.593 to 1.633 in.)</p> <p>29.8 to 31.8 mm. (1.173 to 1.251 in.)</p> <p>66.5 mm. (2.617 in.)</p> <p>40.5 to 41.5 mm. (1.593 to 1.633 in.)</p> <p>29.8 to 31.8 mm. (1.173 to 1.251 in.)</p>
<p>Tappets</p> <p>Spare crowned tappet oversize range (see Fig. 18)</p> <p>Tappet working clearance</p> <p>— Wear allowance</p>	<p>.1 - .2 - .3 mm. (.004 - .008 - .012 in.)</p> <p>.030 to .068 mm. (.0012 to .0027 in.)</p> <p>.15 mm. (.0060 in.)</p>

⁽¹⁾ A red mark identifies single springs

Valvegear Data - Continued.

Rockers	
Rocker bush O.D.	21.030 to 21.060 mm. (.8279 to .8291 in.)
Bush housing diameter	20.939 to 20.972 mm. (.8243 to .8256 in.)
Bush interference fit . . . . .	.058 to .121 mm. (.0023 to .0047 in.)
Fitted bush I.D.	18.016 to 18.034 mm. (.7092 to .7099 in.)
Rocker shaft diameter	17.982 to 18.000 mm. (.7079 to .7086 in.)
Rocker working clearance in shaft . . . . .	.016 to .052 mm. (.0006 to .0020 in.)
— Wear allowance . . . . .	.20 mm. (.008 in.)
Rocker spacer spring:—	
— Free length	59.5 mm. (2.343 in.)
— Length under 4.7 to 5.3 kg (10.4 to 11.7 lb.)	44 mm. (1.732 in.)
Valve Timing Gears	
Backlash . . . . .	.08 mm. (.003 in.)
Idler gear jackshaft diameter	31.975 to 32.000 mm. (1.2589 to 1.2598 in.)
Idler gear bush fitted I.D.	32.050 to 32.075 mm. (1.2617 to 1.2627 in.)
Idler gear bush running clearance on jackshaft . . . . .	.050 to .100 mm. (.0020 to .0040 in.)
— Wear allowance . . . . .	.15 mm. (.0060 in.)
Idler gear thrust washer thickness	1.450 to 1.500 mm. (.0580 to .0590 in.)

CAMSHAFT

To take out the camshaft, remove the thrust plate (7) retaining screws (5, Fig. 13).

To inspect, place the camshaft over V-blocks and, using a dial gauge, check the eccentricity, which should not exceed .02 mm. (.0008 in.).

Check both camshaft journals and associated bearings for wear and excessive running clearance. If the running clearance is found to exceed .20 mm. (.008 in.) the bearings should be renewed, if necessary, together with the camshaft itself.

To withdraw the bearings use a universal extractor and to refit use punches of suitable size.

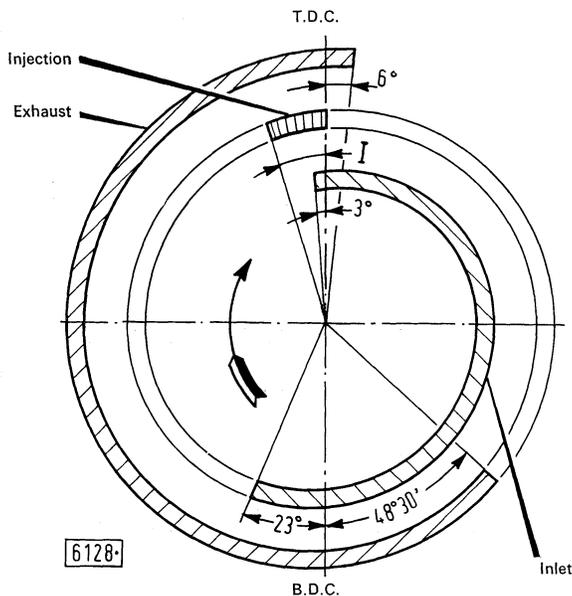


Fig. 12 - Valve Timing Diagram

A max. 5° angular tolerance is allowed - The above diagram applies to .45 mm. (.0177 in.) valve clearance - I = 16° to 18° (355C); 7° to 9°, Bosch pump (455 C - 605 C); 16° to 18°, C.A.V. pump (455 C - 505 C); 15° to 17°, C.A.V. pump (605 C).

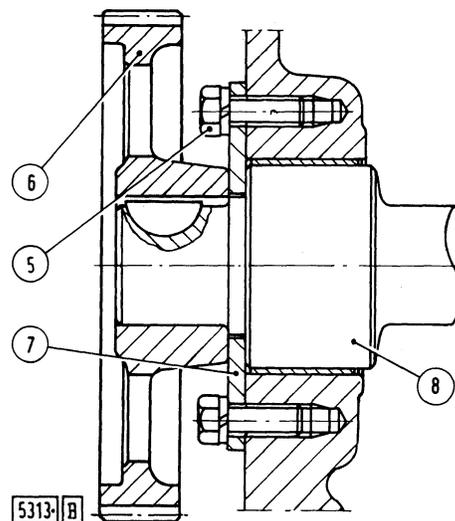


Fig. 13 - Sectional View of Camshaft Drive

5. Thrust plate retaining screws - 6. Drive gear - 7. Thrust plate - 8. Camshaft.

New fitted bearing bore diameter should be reamed to the values specified in Fig. 14.

VALVES VALVE GUIDES AND SPRINGS

To remove and refit the valves use tool Part No. **291050** (see Fig. 15). After removal, clean the valves and check the stems for distortion and score marks.

If the valves show signs of defective sealing, hone together with the seats using air honer Part No. **290064** or hand honer Part No. **290891**. Subsequently, the parts involved should be carefully washed to eliminate all abrasive matter. If necessary, rebore the valve seats (see pages 19 and 20) and regrind the valves as necessary (see Fig. 16). The minimum land below valve head chamfer should not be less than .5 mm. (.020 in.).

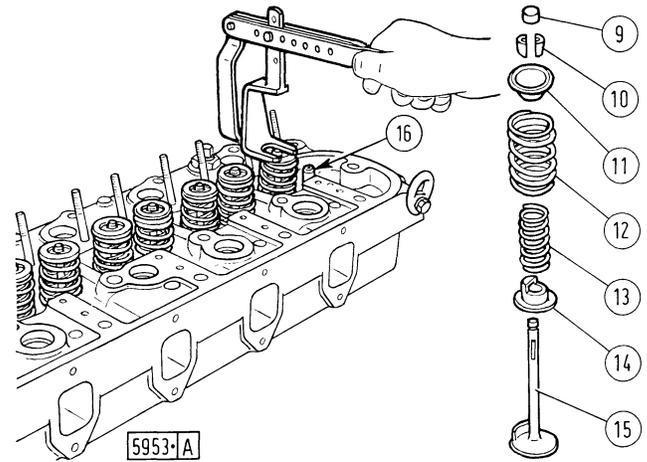
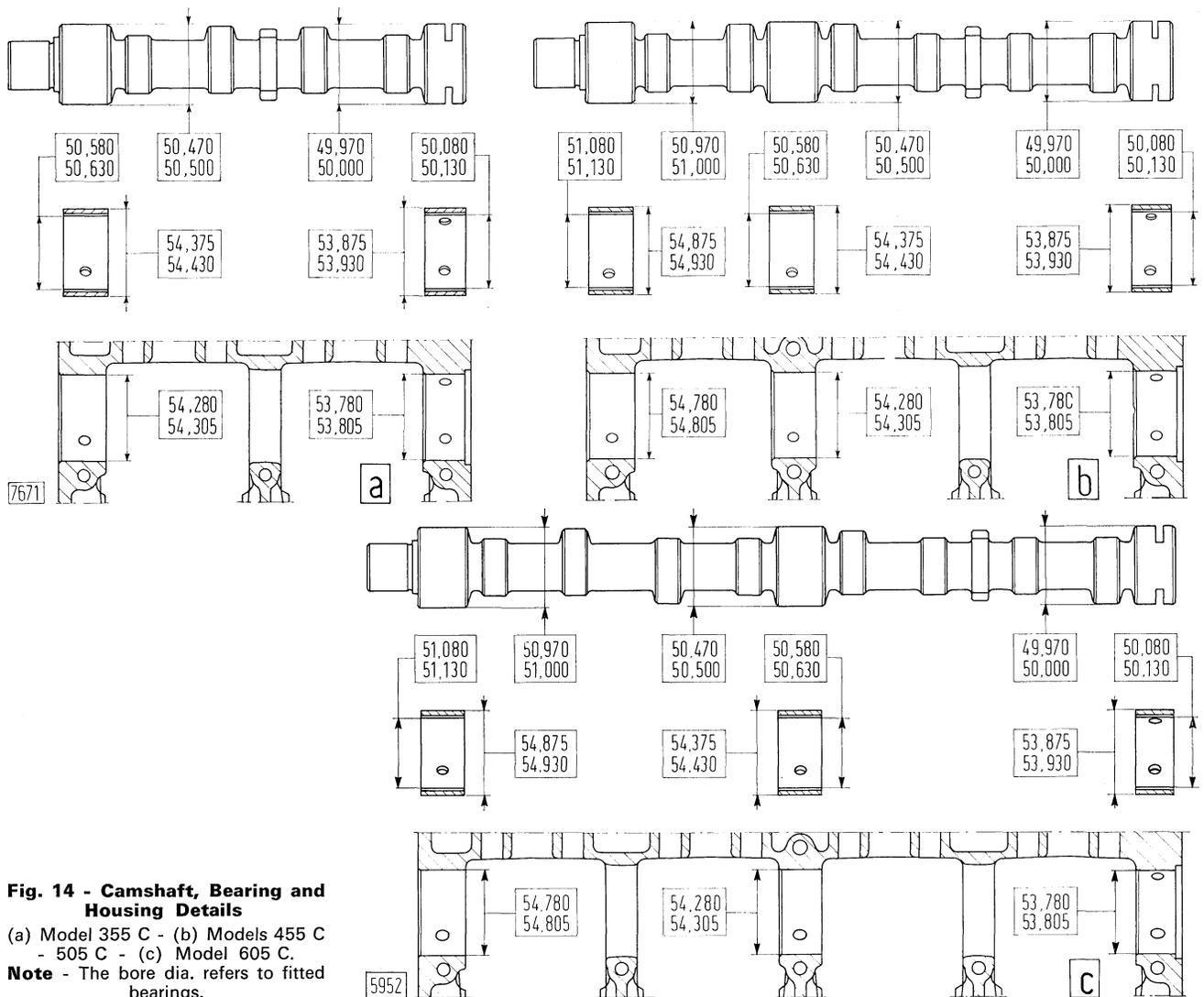


Fig. 15 - Removing (or Refitting) the Valves and A.M. Springs using Tool Part No. 291050

9. Valve lock cap - 10. Split cones - 11. Upper cup - 12. Outer spring - 13. Inner spring - 14. Intake valve lower cup - 15. Intake valve - 16. Valve guide.



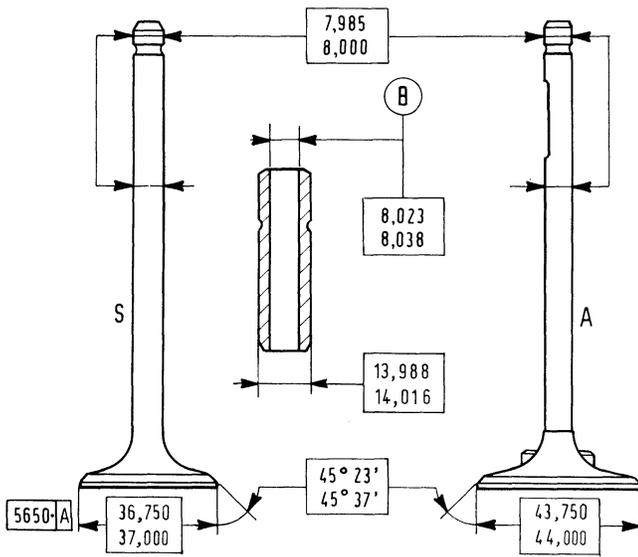


Fig. 16 - Valve and Guide Details

A. Inlet valve - B. Fitted diameter - S. Exhaust valve.

Note - The minimum land below valve head chamfer is .5 mm. (.020 in.)

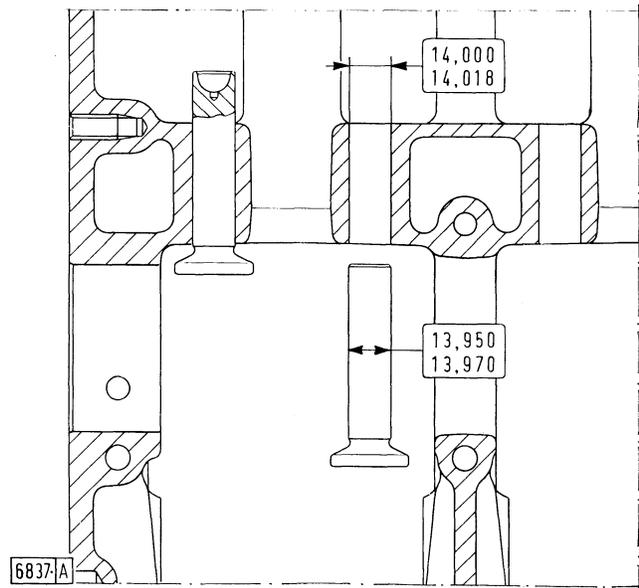


Fig. 18 - Tappet and Housing Details

To renew the valve guides use drift Part No. **291046** (see a, Fig. 17).

The valve guide bore surface should be perfectly smooth and free from score marks and evidence of pick-up.

The guides must be tight in their seats, otherwise renew using oversize guides (see Data Table).

After refitting, each guide should be reamed with tool Part No. **291177** (b, Fig. 17).

Check spring length (see Data Table).

Note: On refitting, make sure that the smaller pitched coils face toward the cylinder head mating plane.

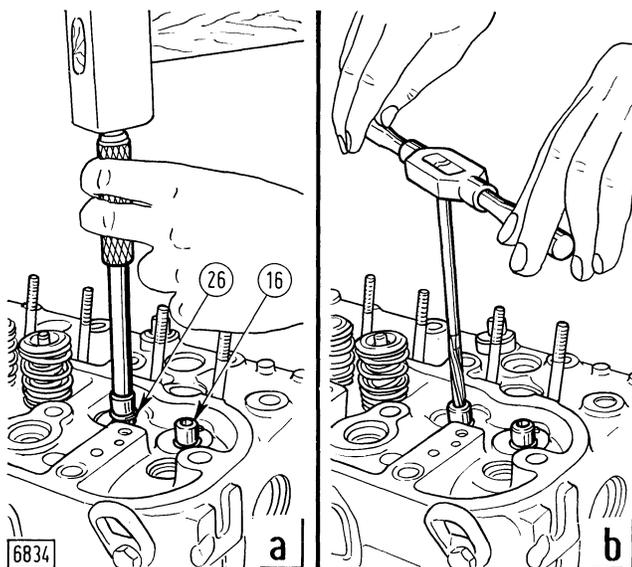


Fig. 17 - Refitting and Reaming the Valve Guides

a. Fitting the guide using drift Part No. 291046 - b. Reaming guide inner face using tool Part No. 291177 - 16. Valve guide - 26. Retaining ring.

TAPPETS PUSH RODS AND ROCKERS

Check tappet working clearance (see Fig. 18).

If excessive clearance is detected, renew using oversize tappets and open out the associated housing bores (see Data Table).

The surface in contact with the cam should be perfectly smooth, without any pits or dents.

The push rods should be perfectly straight, the contact surfaces between rods and adjusting screws should not show any sign of pick-up or abnormal wear. Renew as necessary.

To separate end bracket (20, Fig. 19) from rocker shaft (17) withdraw screw (V₁).

Check both the rocker shaft and bushes for wear and play. The contact surfaces of adjusting screws and rockers should be smooth and free from any sign of pick-up.

Inspect the rocker toes. When re-grinding becomes necessary, take care to remove as little material as possible.

TO ADJUST THE VALVE CLEARANCE

Use spanner Part No. **290886** and a feeler gauge (see Fig. 20). The correct clearance is .25 mm. (.010 in.) for both inlet and exhaust valves.

To adjust the valve clearance of 2/3-cylinder engines (355 C-455 C-505 C) proceed as follows:—

- Bring the valves of the cylinder involved in a condition of balance, turn the crankshaft by one full turn and adjust the clearance.
- Repeat the same procedure on the remaining cylinders.

In practice, the adjustment of 3-cylinder engines (piston at T.D.C. on compression stroke) can be performed when two valves of the other two cylinders (inlet valve for one and exhaust valve for the other) balance in the maximum opening position.

Cylinder matching for valve clearance adjustment on four-cylinder engines (605 C) is 1-4 and 2-3. Adjust a cylinder when the valves of the matching cylinder are in a condition of balance.

VALVE GEAR INSPECTION AND TIMING

Check the gears for damage or excessive wear.

Also check the tooth contact surfaces of each gear train which should be smooth and free from dents; running clearance should be .10 to .12 mm. (.0040 to .0047 in.).

When the Bosch or C.A.V. injection pump drive gear is to be renewed, note that it is marked with the engine model designation as the angular position of number "4", indicating the meshing position with respect to

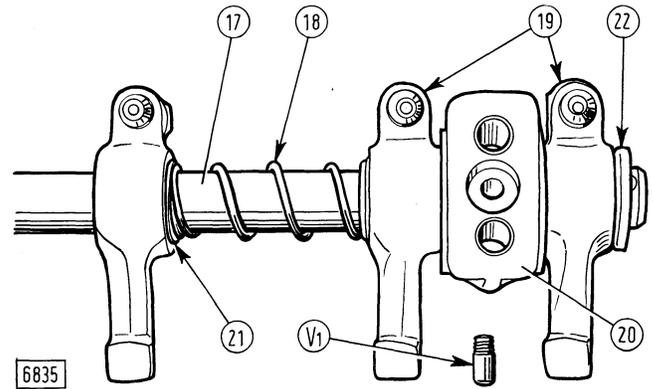


Fig. 19 - Rocker Assembly

V₁. Bracket-to-shaft retaining screw, featuring lubrication hole - 17. Rocker shaft - 18. Spring - 19. Rockers - 20. Bracket - 21. Thrust washer - 22. End cup.

the shaft key, differs with the make of distributor type pump, as follows:—

- Model 455 C, Bosch pump, marked 8035, 127° 52 min. ± 15 min.
- Models 455 C-505 C, C.A.V. pump, marked 8035, 188° 54 min. ± 15 min.
- Model 605 C, Bosch pump, marked 854, 52° 53 min. ± 15 min.
- Model 605 C, C.A.V. pump, marked 8045, 173° 24 min. ± 15 min.

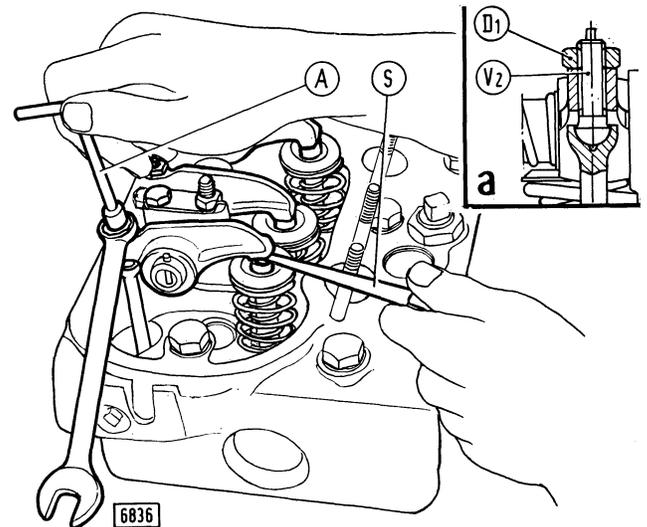


Fig. 20 - Adjusting Valve Clearance

a. Detail of rocker adjusting screw - A. Spanner Part No. 290886 - D₁. Locking nut - S. Feeler gauge - V₂. Adjusting screw.

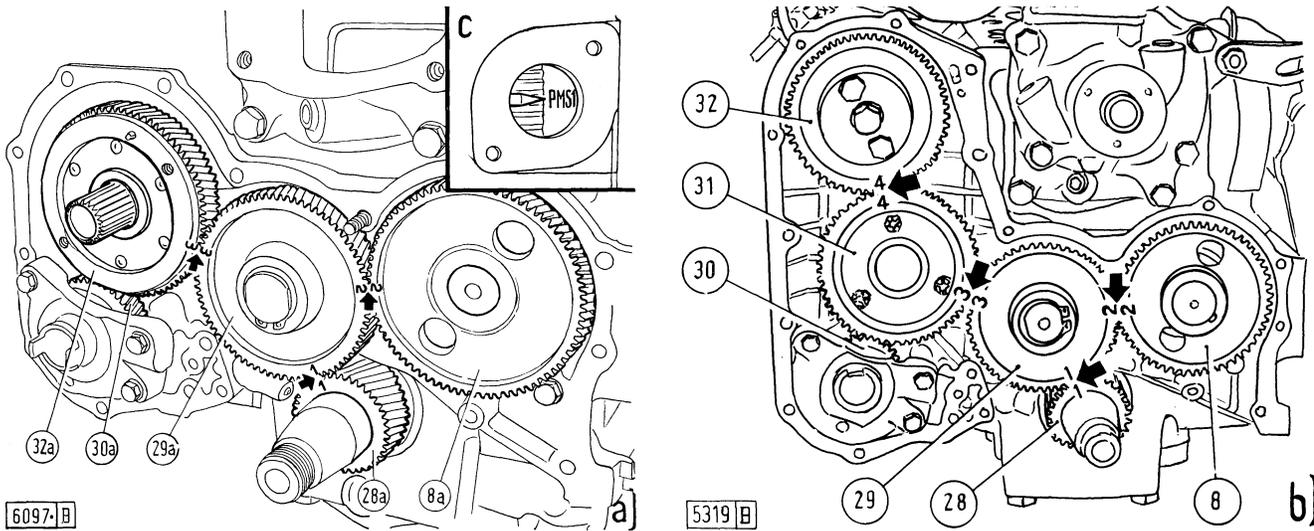


Fig. 21 - Valve Timing

(a) Model 355 C - (b) Models 455 C - 505 C - 605 C - (c) Detail of flywheel timing pointer indicating T.D.C. (P.M.S.) of piston 1. The arrows point to reference numbers 1-1, 2-2, 3-3 and 4-4 which should line up when cylinder No. 1 is at T.D.C. (P.M.S.) on compression stroke.

8 and 8a. Camshaft drive gear - 28 and 28a. Drive pinion - 29 and 29a. Idler gear - 30 and 30a. Hydraulic lift pump gear - 31. Fuel lift pump gear - 32 and 32a. Fuel injection pump gear.

Following gear removal, refit and time the valve gears (see Fig. 21) as follows:—

— Rotate the crankshaft until the piston of cylinder No. 1 is at T.D.C. (P.M.S.) in compression stroke.

— Refit the drive gears and line up pairs 1-1, 2-2, 3-3, 4-4 (see Fig. 21).

To check the valve timing angles (see Fig. 12) adjust the valve clearance to .45 mm. (.017 in.).

CRANKGEAR

CRANKGEAR DATA

Crankshaft and Bearings	
Main journal running clearance . . . . .	.043 to .090 mm. (.0017 to .0035 in.)
— Wear allowance . . . . .	.180 mm. (.0071 in.)
Crankpin running clearance . . . . .	.021 to .058 mm. (.0008 to .0023 in.)
— Wear allowance . . . . .	.180 mm. (.0071 in.)
Spare main and big-end bearing undersize range (see Figs. 22 and 29) ⁽¹⁾254 - .508 - .762 - 1.016 mm. (.010 - .020 - .030 - .040 in.)
Main journal crankpin machining undersize range (see Fig. 22) ⁽¹⁾254 - .508 - .762 - 1.016 mm. (.010 - .020 - .030 - .040 in.)
Crankshaft end float . . . . .	.082 to .334 mm. (.0032 to .0131 in.)
— Wear allowance . . . . .	.40 mm. (.0157 in.)
Spare thrust washer thickness oversize . . . . .	.127 mm. (.0050 in.)

⁽¹⁾ Crankshafts featuring .1 mm. (.0040 in.) undersize main journals/crankpins and bearings may be fitted in production only.

Crankgear Data - Continued.

<p>Pistons</p> <p>Standard diameter, at 50 mm. (1.97 in.) from skirt base (see Fig. 27) applicable to:—</p> <ul style="list-style-type: none"> — A.M. pistons (1st solution) <ul style="list-style-type: none"> Grade A Grade B — A.M. pistons (2nd solution) <ul style="list-style-type: none"> Grade A Grade B — P.M. pistons (3rd solution) <p>Standard diameter at the base of the skirt and on the main axis, applicable to:—</p> <ul style="list-style-type: none"> — A.M. pistons (1st solution) — A.M. pistons (2nd solution) — P.M. pistons (3rd solution) <p>Spare piston oversize range</p> <p>P.M. piston working clearance at 50 mm. (1.97 in.) from the skirt base</p> <ul style="list-style-type: none"> — Wear allowance (A.M. and P.M. pistons) <p>Ring side clearance:—</p> <ul style="list-style-type: none"> — 1st compression ring <li style="padding-left: 20px;">Wear allowance — 2nd oil control ring — 3rd oil scraper ring <li style="padding-left: 20px;">2nd and 3rd ring wear allowance <p>Ring gap:—</p> <ul style="list-style-type: none"> — 1st compression ring — 2nd oil control ring — 3rd oil scraper ring <p>Maximum wear gap</p> <p>Gudgeon pin clearance in pistons</p> <p>Spare gudgeon pin oversize</p> <p>Gudgeon pin bore machining oversize in piston</p>	<p>99.834 to 99.846 mm. (3.9304 to 3.9309 in.)</p> <p>99.846 to 99.858 mm. (3.9309 to 3.9314 in.)</p> <p>99.822 to 99.834 mm. (3.9300 to 3.9304 in.)</p> <p>99.834 to 99.846 mm. (3.9304 to 3.9309 in.)</p> <p>99.828 to 99.840 mm. (3.9302 to 3.9307 in.)</p> <p>99.886 to 99.910 mm. (3.9325 to 3.9335 in.)</p> <p>99.874 to 99.898 mm. (3.9320 to 3.9329 in.)</p> <p>99.880 to 99.892 mm. (3.9322 to 3.9327 in.)</p> <p>.02 - .04 - .06 - .08 mm. (.008 - .016 - .024 - .032 in.)</p> <p>.160 to .190 mm. (.0063 to .0075 in.)</p> <p style="padding-left: 40px;">.30 mm. (.0118 in.)</p> <p>.090 to .122 mm. (.0035 to .0048 in.)</p> <p style="padding-left: 40px;">.50 mm. (.020 in.)</p> <p>.050 to .082 mm. (.0020 to .0032 in.)</p> <p>.040 to .072 mm. (.0016 to .0028 in.)</p> <p style="padding-left: 40px;">.20 mm. (.008 in.)</p> <p>.35 to .55 mm. (.0138 to .0216 in.)</p> <p>.30 to .45 mm. (.0118 to .0177 in.)</p> <p>.25 to .40 mm. (.0098 to .0157 in.)</p> <p style="padding-left: 40px;">1.00 mm. (.040 in.)</p> <p>.003 to .017 mm. (.0001 to .0006 in.)</p> <p style="padding-left: 40px;">.20 mm. (.008 in.)</p> <p style="padding-left: 40px;">.20 mm. (.008 in.)</p>
<p>Connecting Rods</p> <p>Gudgeon working clearance in small-end (see Fig. 29)</p> <ul style="list-style-type: none"> — Wear allowance <p>Small-end bush interference fit</p> <p>Small-end bush bore dia. machining oversize</p>	<p>.014 to .029 mm. (.005 to .0011 in.)</p> <p style="padding-left: 40px;">.06 mm. (.0024 in.)</p> <p>.063 to .140 mm. (.0025 to .0055 in.)</p> <p style="padding-left: 40px;">.20 mm. (.008 in.)</p>
<p>Flyweight-type Dynamic Balancer (605 C)</p> <p>Intermediate gear running clearance (19, Fig. 32) ⁽²⁾</p> <p>Flyweight drive gear shaft running clearance ⁽²⁾</p> <p>Drive gear shaft running clearance ⁽²⁾</p> <p>Sleeve spline tooth backlash</p> <p>Flyweight drive gear shaft end running clearance</p> <p>Flyweight pin working clearance</p> <p>Bush interference fit</p> <p>Idler gear running clearance ⁽³⁾</p> <p>Gear tooth backlash</p>	<p>.050 to .100 mm. (.0020 to .0040 in.)</p> <p>.050 to .100 mm. (.0020 to .0040 in.)</p> <p>.050 to .100 mm. (.0020 to .0040 in.)</p> <p>.028 to .106 mm. (.0011 to .0042 in.)</p> <p>.013 to .061 mm. (.0005 to .0024 in.)</p> <p>.020 to .073 mm. (.0008 to .0029 in.)</p> <p>.040 to .100 mm. (.0016 to .0040 in.)</p> <p>.013 to .061 mm. (.0005 to .0024 in.)</p> <p style="padding-left: 40px;">.080 mm. (.0031 in.)</p>

⁽²⁾ Bush interference fit .063 to .140 mm. (.0025 to .0055 in.)

⁽³⁾ Bush interference fit .037 to .101 mm. (.0014 to .0040 in.)

CRANKSHAFT

Withdraw the belt pulley hub using tool Part No. **291504** to take out the crankshaft.

Wash the shaft and inspect carefully. Even the slightest cracks necessitate crankshaft renewal.

Check both main journals and crankpins:—

— Pick-up or scratch marks can be remedied by means of zero grade emery cloth.

— Score marks, ovality or taper in excess of .050 mm. (.002 in.) necessitate journal skimming to the nearest oversize dimension (see Data Table).

After re-grinding, blend the journal fillets and round lubricating hole edges as shown in Fig. 22.

Subsequently, check the crankshaft noting that:—

— Ovality of the journals should not exceed .008 mm. (.0004 in.).

— Taper of each journal should be lower than .012 mm. (.0005 in.).

— Maximum misalignment with the shaft over V-blocks should be .05 mm. (.002 in.) (see D, Fig. 23).

