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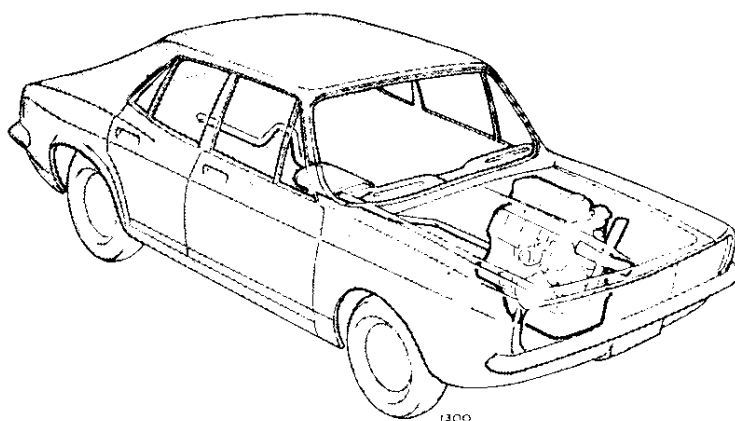
سایت آموزش مهندسی مکانیک

SECTION B

ENGINE

Sub-Section

Engine differences with single 1,75 or twin 1,50 carburettors	BA
Oil Cooler	BB



1300

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**ENGINE
DATA**

1250 and 1500 Engines
 1250/1500 Engines fitted with twin Weber 40 DCOE carburettors
 1500 Plymouth Cricket Engines
 1300 and 1600 Engines – Variations from 1250/1500 Engines
 Tightening torque figures

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GENERAL	'1250' Single and Twin carburettor	'1500' Single carburettor	'1500' Twin carburettor
Number of cylinders	4	4	4
Capacity—standard bore (actual)	1248 cc	1498 cc	1498 cc
Capacity—standard bore (actual)	76.16 cu in	91.41 cu in	91.41 cu in
Stroke	2.53in (64,3mm)	As '1250'	As '1250'
Bore – A grade	3.0945 – 3.0949in (78,600 – 78,610mm)	3.3906 – 3.3910in (86,121 – 86,131mm)	As '1500'
B grade	3.0949 – 3.0953in (78,610 – 78,620mm)	3.3910 – 3.3914in (86,131 – 86,141mm)	As '1500'
C grade	3.0953 – 3.0957in (78,620 – 78,630mm)	3.3914 – 3.3918in (86,141 – 86,151mm)	As '1500'
D grade	3.0957 – 3.0961in (78,630 – 78,640mm)	3.3918 – 3.3922in (86,151 - 86,161mm)	As '1500'

	Single Carb	Twin Carb		
Compression ratio	9.2:1	9.2:1	9.2:1 HC 8.0:1 LC	9.2:1
Compression pressure (lb/in ²)	170/180	150/160*	170 – 180 HC 150 – 160 LC	150 – 160*
Compression pressure (kg/cm ²)	11.95/12.66	10.55/11.25	11,95 – 12,66 HC 10,55 – 11,25 LC	10,55 – 11,25

*Lower compression pressures of this engine are due to later closing of inlet valve.

Fuel octane requirement (Research method)				
High compression		97 min (B.S. rating 4 star)	As '1250'	As '1250'
Low compression			91 min (B.S. rating 2 star)	

Performance (DIN standard 70,020)	Single Carb	HC	LC
*Max B.H.P. @ r.p.m.	53 @ 5000	63 @ 5000	57 @ 5000
*Max torque – (lb ft)	66 @	80 @	74 @
– (kgm)	9.12 3000	11.1 3000	10.23 3000
– (Nm)	89 r.p.m.	108 r.p.m.	100 r.p.m.
	Twin Carb		
*Max B.H.P. @ r.p.m.	66 @ 6000		75 @ 5400
*Max torque – (lb ft)	65 @		81 @
– (kgm)	9 4,500		11.2 3,750
– (Nm)	87 r.p.m.		109 r.p.m.

*As obtained on engine test bed

CYLINDER BLOCK

Material	Cast iron	Cast iron	Cast iron
Max. oversize (with or without liners)	+ 030in (0,76mm)	As '1250'	As '1250'
Cylinder liner – outside diameter	3.241 – 3.242in (82,32 – 82,34mm)	3,537 – 3,538in 89,83 – 89,86mm)	As '1500'
Cylinder liner – interference fit	.002 – .004in (0,050 - 0,101mm)	As '1250'	As '1250'

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ENGINE

	'1250' Single and Twin carburettor	'1500' Single carburettor	'1500' Twin carburettor
Valve stem diameters			
Inlet valve, standard	.3110 – .3115in (7,899 – 7,912mm)	As '1250'	As '1250'
Inlet valve + 3	.3140 – .3145in (7,975 – 7,988mm)	As '1250'	As '1250'
Inlet valve + 15	.3260 – .3265in (8,280 – 8,293mm)	As '1250'	As '1250'
Inlet valve + 30	.3410 – .3415in (8,661 – 8,764mm)	As '1250'	As '1250'
Exhaust valve, standard	.3095 – .3100in (7,861 – 7,874mm)	As '1250'	As '1250'
Exhaust valve + 3	.3125 – .3130in (7,937 – 7,950mm)	As '1250'	As '1250'
Exhaust valve + 15	.3245 – .3250in (8,242 – 8,255mm)	As '1250'	As '1250'
Exhaust valve + 30	.3395 – .3400in (8,623 – 8,636mm)	As '1250'	As '1250'
Valve springs – type	Single	As '1250'	Twin
– free length	1.745in (42,32mm)	As '1250'	Outer 1.51in (38,35mm) Inner 1.20in (30,48mm)
– length fitted	1.505in (38,23mm)	As '1250'	Outer 1.34in (34,03mm) Inner 1.005in (25,52mm)
– load fitted	70lb (31,75kg)	As '1250'	Outer 53lb (24,04 kg) Inner 17lb (7,71 kg)
	Twin		
	As '1500' Twin Carb		
CAMSHAFT			
Drive	Chain	As '1250'	As '1250'
Number and type of bearing	3 – Aluminium tin	As '1250'	As '1250'
Journal diameter – front	1.9345 – 1.9352in (49,136 – 49,154mm)	As '1250'	As '1250'
– centre	1.7470 – 1.7477in (45,373 – 44,391mm)	As '1250'	As '1250'
– rear	1.5595 – 1.5602in (39,611 – 39,629mm)	As '1250'	As '1250'
Bearing internal diameter – front	1.9365 – 1.9375in (49,187 – 49,212mm)	As '1250'	As '1250'
– centre	1.7490 – 1.7500in (44,424 – 44,450mm)	As '1250'	As '1250'
– rear	1.5615 – 1.5625in (39,662 – 39,687mm)	As '1250'	As '1250'
Bearing running clearance	.0013 – .0030in (0,033 – 0,076mm)	As '1250'	As '1250'
End float	.004 – .009in (0,101 – 0,228mm)	As '1250'	As '1250'

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	'1250' Single and Twin carburettor	'1500' Single carburettor	'1500' Twin carburettor
CRANKSHAFT			
Throw	1.264 – 1.266in (32,10 – 32,15mm)	As '1250'	As '1250'
Number and type of bearing	5 – steel shell, aluminium tin lined	As '1250'	As '1250'
Diameter of main journals 'A'	2.1245 – 2.1252in (53,962 – 53,980mm)	As '1250'	As '1250'
Diameter of main journals 'B'	2.1145 – 2.1152in (53,708 – 53,726mm)	As '1250'	As '1250'
Maximum undersize for regrinding	.040in (1,01mm)	As '1250'	As '1250'
Diameter of crankpin 'A'	1.9995 – 2.0000in (50,787 – 50,800mm)	As '1250'	As '1250'
Diameter of crankpin 'B'	1.9895 – 1.9900in (50,533 – 50,546mm)	As '1250'	As '1250'
End float thrust washers	Two steel semi-circular, copper lead faced	As '1250'	As '1250'
End float	.002 – .008in (0,05 – 0,20mm)	As '1250'	As '1250'
Main bearing running clearance	.0005 – .0025in (0,012 – 0,063mm)	As '1250'	As '1250'
CONNECTING ROD			
Material	Alloy steel	As '1250'	As '1250'
Type	H section	As '1250'	As '1250'
Distance between centres	4.964 – 4.966in (126,08 – 126,13mm)	As '1250'	As '1250'
Big end bearings	Steel shell, aluminium tin lined	As '1250'	As '1250'
Big end bore (without bearings)	2.1460 – 2.1465in (54,508 – 54,521mm)	As '1250'	As '1250'
Big end running clearance	.0009 – .0024in (0,022 – 0,060mm)	As '1250'	As '1250'
Big end side clearance	.007 – .012in (0,177 – 0,304mm)	As '1250'	As '1250'
Small end bore – bush in connecting rod and piston bore			
– high grade	.9378 – .9379in (23,820 – 23,823mm)	As '1250'	As '1250'
– medium grade	.9377 – .9378in (23,818 – 23,820mm)	As '1250'	As '1250'
– low grade	.9376 – .9377in (23,815 – 23,818mm)	As '1250'	As '1250'
GUDGEON PIN			
Type	Floating	As '1250'	As '1250'
Location	Circlips	As '1250'	As '1250'
Diameter – service grade	.9377 – .9378in (23,818 – 23,820mm)	As '1250'	As '1250'
– high grade – blue inside pin	.9376 – .9377in (23,815 – 23,818mm)	As '1250'	As '1250'
– medium grade – white inside pin	.9375 – .9376in (23,812 – 23,815mm)	As '1250'	As '1250'
– low grade – green inside pin	.9374 – .9375in (23,810 – 23,812mm)	As '1250'	As '1250'
– yellow inside pin			
class of fit	Thumb push fit at 68°F (20°C)	As '1250'	As '1250'
Length	2.621 – 2.625in (66,57 – 66,67mm)	2.934 – 2.938in (74,52 – 74,62mm)	As '1500'

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ENGINE

ENGINE

	'1250' Single and Twin carburettor	'1500' Single carburettor	'1500' Twin carburettor
PISTON			
Type	Slotted upper skirt	As '1250'	As '1250'
Material	Aluminium alloy tin plated	As '1250'	As '1250'
Height	2.98in (75,7mm)	As '1250'	As '1250'
Compression identification	Flat crown	Recessed crown	As '1500'
Piston crown depth (H.C.)	—	0.25 — .035in (0,63 — 0,88mm)	As '1500'
Piston crown depth (L.C.)	—	.080 — .085in (2,03 — 2,15mm)	—
Max. permissible weight variation per set	5 drams (8,8 grams)	As '1250'	As '1250'
Diameter — Grade 'A'	not available for service use. Service Piston — standard size	3.0926 — 3.0930in (78,550 — 78,560mm)	3.3887 — 3.3891in (86,073 — 86,083mm)
— Grade 'B'		3.0930 — 3.0934in (78,560 — 78,570mm)	3.3891 — 3.3895in (86,083 — 86,093mm)
— Grade 'C'		3.0934 — 3.0938in (78,570 — 78,580mm)	3.3895 — 3.3899in (86,093 — 86,103mm)
— Grade 'D'		3.0938 — 3.0942in (78,580 — 78,590mm)	3.3899 — 3.3903in (86,103 — 86,113mm)
— Grade 'E'		3.0942 — 3.0946in (78,590 — 78,600mm)	3.3903 — 3.3907in (86,113 — 86,123mm)
— Oversize available	+ .030in (0,762mm)	As '1250'	As '1250'
Piston skirt clearance measured at right angle to gudgeon pin hole 5/8in (16mm) above bottom of piston	.0015 — .0023in (0,038 — 0,058mm)	As '1250'	.0025 — .0033in (0,063 — 0,083mm)
Rings — compression	Two	As '1250'	As '1250'
— scraper	One	As '1250'	As '1250'
Ring gap (fitted) in Grade 'A' bore			
— top ring	.014 — .018in (0,35 — 0,45mm)	As '1250'	As '1250'
— second and scraper	.010 — .014in (0,25 — 0,35mm)	As '1250'	As '1250'
LUBRICATION SYSTEM			
Pump	Eccentric lobe type	As '1250'	As '1250'
Pump drive	Skew gear on camshaft	As '1250'	As '1250'
Normal pressure (hot) 50 m.p.h. (80 k.p.h.)	50 — 60lb/in ² (3,51 — 4,21kg/cm ²)	As '1250'	As '1250'
Filter — type	Full flow — disposable	As '1250'	As '1250'

DATA – ENGINES FITTED WITH TWIN 40 DCOE WEBER CARBURETTORS

Type 70 – Front Type 71 – Rear

General

Compression ratio	9.4:1
Compression pressure	165/180lb/in ²
Fuel octane requirement	99 min.
Max. b.h.p. (DIN)	92.5 at 6,100 r.p.m.
Max. torque (DIN)	89.6 lb.ft. at 4,500 r.p.m.

Cylinder head

Identification	'S' cast on top face and serial no. stamped on side, just below no. 1 plug: "EDP 1" upwards
Combustion chamber volume	12.3/12.9 c.c.
Max. variation on one engine	0.3 c.c.

Valves

Inlet std.	71265000
+.015	CTS 3011A
+.030	CTS 3011B
Exhaust std.	71265002
+.015	CTS 3012A
+.030	CTS 3012B
Head dia. – inlet	1.552/1.548 in.
– exhaust	1.340/1.336 in.

Valve seat inserts not yet available.
Valve stems .003in. oversize are not used on this model.

FR

WSM 150

DATA—PLYMOUTH CRICKET ENGINES

GENERAL	1500 Single carburettor G, H and 3 Series	1500 Twin carburettor H Series	1500 Twin carburettor 3 Series
Number of Cylinders	4	4	As H Series
Capacity — standard bore (actual)	1498cc	1498cc	"
" " " "	76.16 cu in	76.16 cu in	"
Stroke	2.53in (64,3mm)	2.53in (64,3mm)	"
Bore — 'A' Grade	3.3906 — 3.3910in (86,121 — 86,131mm)	3.3906 — 3.3910in (86,121 — 86,131mm)	"
— 'B' Grade	3.3910 — 3.3914in (86,131 — 86,141mm)	3.3910 — 3.3914in (86,131 — 86,141mm)	"
— 'C' Grade	3.3914 — 3.3918in (86,141 — 86,151mm)	3.3914 — 3.3918in (86,141 — 86,151mm)	"
— 'D' Grade	3.3918 — 3.3922in (86,151 — 86,161mm)	3.3918 — 3.3922in (86,151 — 86,161mm)	"
Compression ratio	8.0:1	8.0:1	"
Compression pressure (lb/in ²)	150 — 160	140 — 150	"
(kg/cm ²)	10,55 — 11,25	9,84 — 10,55	"
Fuel Octane Requirement (Research Method)	91 min (BS rating 2 star)	91 min (BS rating 2 star)	"
Performance (DIN Standard 70.020)			
*Max. BHP @ rpm	57 @ 5000	71 @ 5400	63.5 @ 5000
*Max. Torque (lb ft)	74 @ 3000	75 @ 3750	76 @ 3000
<i>*As obtained on engine test bed</i>			
CYLINDER BLOCK			
Material	Cast Iron	Cast Iron	As H Series
Max. oversize (with or without liners)	.030in (0,76mm)	.030in (0,76mm)	"
Cylinder liner (outside diameter)	3.241 — 3.242in (82,32 — 82,34mm)	3.241 — 3.242in (82,32 — 82,34mm)	"
(Interference fit)	.002 — .004in (0,050 — 0,101mm)	.002 — .004in (0,050 — 0,101mm)	"
CYLINDER HEAD			
Material	Cast Iron	Cast Iron	As Single Carb
Identification	None	"S" cast on top face	"
Gasket identification	Marked LB	Marked LB	"
Combustion chamber volume	13.7 — 16.2cc	13.7 — 16.2cc	"
Variation between cylinders	±.60cc	±.60cc	"
VALVES			
Valve position and Operation	OHV — push rod	OHV — push rod	"
Valve clearance hot or cold			
Inlet	.008in (0,20mm)	.010in (0,25mm)	.008in (0,20mm)
Exhaust	.016in (0,40mm)	.016in (0,40mm)	.016in (0,40mm)

ENGINE

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Valve timing —	1500 Single carburettor		1500 Twin carburettor		
	G & H Series	3 Series	H Series	3 Series	
Inlet opens B.T.D.C.	} At normal operating clearances	35°	32°	44°	32°
Inlet closes A.B.D.C.		69°	74°	78°	74°
Exhaust opens B.B.D.C.		69°	44°	69°	44°
Exhaust closes A.T.D.C.		23°	18°	23°	18°
Valve overlap		58°	50°	67°	50°
Exhaust valve clearance and closing position for checking timing chain replacement — if suspect					
	.100in (2,54mm)	.100in (2,54mm)	.100in (2,54mm)	.100in (2,54mm)	
	22° BTDC	17° BTDC	12° BTDC	17° BTDC	

Valve identification on stem	
Inlet	standard
and	+ .003in
Exhaust	+ .015in
	+ .030in

See Parts List and check that Part Number of valve specified is stamped on cotter end of valve stem.

Valve head diameter	1500 Single carburettor	1500 Twin carburettor	1500 Twin carburettor
	G, H and 3 Series	H Series	3 Series
Inlet	1.448in (36,78mm)	1.498in (38,05mm)	As single carb
Exhaust	1.228in (31,19mm)	1.228in (31,19mm)	As H Series
Valve length	4.310in	4.324in	"
Angle of valve seats and faces	45°	45°	"
Valve stem clearance in guide			
Inlet	.001 — .0025in (0,025 — 0,063mm)	.001 — .0025in (0,025 — 0,063mm)	"
Exhaust	.0025 — .0040in (.063 — 1,14mm)	.0025 — .0040in (.063 — 1,14mm)	"
Valve guide bores			
Standard	.3125 — .3135in (7,937 — 7,962mm)	.3125 — .3135in (7,937 — 7,962mm)	"
Some new engines	+ .003in (+0,076mm)	+ .003in (+0,076mm)	"
Service oversize	+ .015 and .030in (+0,38 and 0,76mm)	+ .015 and .030in (+0,38 and 0,76mm)	"
Valve stem diameter			
Inlet valve — standard	.3110 — .3115in (7,899 — 7,912mm)	.3110 — .3115in (7,899 — 7,912mm)	"
+ .003in	.3140 — .3145in (7,975 — 7,988mm)	.3140 — .3145in (7,975 — 7,988mm)	"
+ .015in	.3260 — .3265in (8,280 — 8,293mm)	.3260 — .3265in (8,280 — 8,293mm)	"
+ .030in	.3410 — .3415in (8,661 — 8,765mm)	.3410 — .3415in (8,661 — 8,765mm)	"
Exhaust valve — standard	.3095 — .3100in (7,861 — 7,874mm)	.3095 — .3100in (7,861 — 7,874mm)	"
+ .003in	.3125 — .3130in (7,937 — 7,950mm)	.3125 — .3130in (7,937 — 7,950mm)	"
+ .015in	.3245 — .3250in (8,242 — 8,255mm)	.3245 — .3250in (8,242 — 8,255mm)	"
+ .030in	.3395 — .3400in (8,623 — 8,636mm)	.3395 — .3400in (8,623 — 8,636mm)	"

EE

WSM 150

ENGINE

	1500 Single carburettor G, H and 3 Series	1500 Twin carburettor H Series	1500 Twin carburettor 3 Series
Valve springs – type	Single	Twin	As single carb
–	1.745in (42,32mm)	Outer 1.51in (38,35mm) Inner 1.20in (30,48mm)	–
– length fitted	1.505in (38,23mm)	Outer 1.34in (34,04mm) Inner 1.005in (25,52mm)	–
– load fitted	70lb (31,75kg)	Outer 53lb (24,04mm) Inner 17lb (7,71mm)	–
CAMSHAFT			
Drive	Chain	Chain	As H Series
Bearings	Aluminium – Tin	Aluminium – Tin	“
Number	3	3	“
Journal diameter front	1.9345 – 1.9352in (49,136 – 49,154mm)	1.9345 – 1.9352in (49,136 – 49,154mm)	“
centre	1.7470 – 1.7477in (45,373 – 45,391mm)	1.7470 – 1.7477in (45,373 – 45,391mm)	“
rear	1.5595 – 1.5602in (39,611 – 39,629mm)	1.5595 – 1.5602in (39,611 – 39,629mm)	“
Bearing internal diameter front	1.9365 – 1.9375in (49,187 – 49,212mm)	1.9365 – 1.9375in (49,187 – 49,212mm)	“
Centre	1.7490 – 1.7500in (44,424 – 44,450mm)	1.7490 – 1.7500in (44,424 – 44,450mm)	“
rear	1.5615 – 1.5625in (39,662 – 39,687mm)	1.5615 – 1.5625in (39,662 – 39,687mm)	“
Bearing running clearance	.0013 – .0030in (0,033 – 0,076mm)	.0013 – .0030in (0,033 – 0,076mm)	“
End play	.004 – .009in (0,101 – 0,228mm)	.004 – .009in (0,101 – 0,228mm)	“
CRANKSHAFT			
Throw	1.264 – 1.266in (32,10 – 32,15mm)	1.264 – 1.266in (31,10 – 32,15mm)	“
Bearings	Aluminium tin steel backed	Aluminium tin steel backed	“
Number	5	5	“
Diameter of main journal “A”	2.1245 – 2.1252in (53,962 – 53,980mm)	2.1245 – 2.1252in (53,962 – 53,980mm)	“
Maximum undersize regrinding	.040in (1,01mm)	.040in (1,01mm)	“
Diameter of crankpin “A”	1.9995 – 2.0000in (50,787 – 50,800mm)	1.9995 – 2.0000in (50,787 – 50,800mm)	“
End float thrust washers	Two steel semi-circular copper lead faced	Two steel semi-circular copper lead faced	“
End float	.002 – .008in (0,05 – 0,20mm)	.002 – .008in (0,05 – 0,20mm)	“
Main bearing running clearance	.0005 – .0025in (0,012 – 0,063mm)	.0005 – .0025in (0,012 – 0,063mm)	“
CONNECTING ROD			
Material	Alloy Steel	Alloy Steel	“
Type	“H” Section	“H” Section	“
Distance between centres	4.964 – 4.966in (126,08 – 126,13mm)	4.964 – 4.966in (126,08 – 126,13mm)	“
Big end bearings	Aluminium tin steel backed	Aluminium tin steel backed	“
Big end bore (without bearings)	2.1460 – 2.1465in (54,508 – 54,521mm)	2.1460 – 2.1465in (54,508 – 54,521mm)	“
Big end running clearance	.0009 – .0024in (0,022 – 0,060mm)	.0009 – .0024in (0,022 – 0,060mm)	“
Big end side clearance	.007 – .012in (0,177 – 0,304mm)	.007 – .012in (0,177 – 0,304mm)	“

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	1500 Single carburettor G, H and 3 Series	1500 Twin carburettor H Series	1500 Twin carburettor 3 Series As H Series	
Small end bore — bushing in connecting rod and piston bore —				
High Grade	.9378 — .9379in (23,820 — 23,823mm)	.9378 — .9379in (23,820 — 23,823mm)	“	
Medium Grade	.9377 — .9378in (23,818 — 23,820mm)	.9377 — .9378in (23,818 — 23,820mm)	“	
Low Grade	.9376 — .9377in (23,815 — 23,818mm)	.9376 — .9377in (23,815 — 23,818mm)	“	
GUDGEON PIN				
Type	Floating	Floating	“	
Location	Circlips	Circlips	“	
Diameter — service grade — blue inside pin	.9377 — .9378in (23,818 — 23,820mm)	.9377 — .9378in (23,818 — 23,820mm)	“	
high grade — white inside pin	.9376 — .9377in (23,815 — 23,818mm)	.9376 — .9377in (23,815 — 23,818mm)	“	
medium grade — green inside pin	.9375 — .9376in (23,812 — 23,815mm)	.9375 — .9376in (23,812 — 23,815mm)	“	
low grade — yellow inside pin	.9374 — .9375in (23,810 — 23,812mm)	.9374 — .9375in (23,810 — 23,812mm)	“	
Class of fit	Thumb push @ 68°F (20°C)	Thumb push @ 68°F (20°C)	“	
Length	2.621 — 2.625in (66,57 — 66,67mm)	2.621 — 2.625in (66,57 — 66,67mm)	“	
PISTON				
Type	Slotted Upper Skirt	Slotted Upper Skirt	“	
Material	Aluminium alloy tin plated	Aluminium alloy tin plated	“	
Height	2.98in (75,7mm)	2.98in (75,7mm)	“	
Compression identification	Recessed crown	Recessed crown	“	
Piston crown depth	.080 — .085in (2,03 — 2,15mm)	.075 — .085in (1,90 — 2,15mm)	“	
Max. permissible weight per set	5 drams (8,8 grams)	5 drams (8,8 grams)	“	
Diameter — “A” Grade	} <i>Not available for service use</i>	3.3887 — 3.3891in (86,073 — 86,083mm)	3.3877 — 3.3881in (86,048 — 86,058mm)	
“B” Grade		3.3891 — 3.3895in (86,0383 — 86,093mm)	3.3881 — 3.3885in (86,058 — 86,068mm)	
“C” Grade		3.3895 — 3.3899in (86,093 — 86,103mm)	3.3885 — 3.3889in (86,068 — 86,078mm)	
“D” Grade		} <i>Service piston standard size</i>	3.3899 — 3.3903in (86,103 — 86,113mm)	3.3889 — 3.3893in (86,078 — 86,088mm)
“E” Grade			3.3903 — 3.3907in (86,113 — 86,123mm)	3.3893 — 3.3897in (86,088 — 86,098mm)
Oversize available	+0.030in	+0.030in	“	
Piston skirt clearance measured at right angle to piston pin hole 5/8in (16mm) above bottom of piston	.0015 — .0023in (0,038 — 0,058mm)	.0025 — .0033in (0,063 — 0,083mm)	“	
Rings — compression scraper	Two One	Two One	“	
Ring gap (fitted) in Grade “A” bore				
Top ring	.014 — .018in (0,35 — 0,45mm)	.014 — .018in (0,35 — 0,45mm)	“	
Second and scraper	.010 — .014in (0,25 — 0,35mm)	.010 — .014in (0,25 — 0,35mm)	“	

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	1500 Single carburettor G, H and 3 Series	1500 Twin carburettor H series	1500 Twin carburettor 3 Series
LUBRICATION SYSTEM			
Pump	Eccentric Lobe type	Eccentric Lobe type	As H Series
Pump drive	Skew gear on camshaft	Skew gear on camshaft	"
Normal pressures (hot) 50 mph	50 – 60 lb/in ²	50 – 60 lb/in ²	"
80 kph	3,51 – 4,21 kg/cm ²	3,51 – 4,21 kg/cm ²	"
Filter type	Full flow – disposable	Full flow – disposable	"



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**DATA-1300 & 1600 ENGINES
VARIATIONS**

(For items not included below see 1250/1500 Data on pages vii-xii)

	1300 Single Carb. (1.50)	1300 Twin Carbs. (1.50) or Single carb. (1.75)	1600 Single Carb. (1.50)	1600 Twin Carbs. (1.50) or Single carb. (1.75)
GENERAL				
Capacity standard bore (actual)	1295 c.c.	1295 c.c.	1598 c.c.	1598 c.c.
Capacity standard bore (actual)	79.0 cu. in.	79.0 cu. in.	97.5 cu. in.	97.5 cu. in.
Stroke	2.62 in (66.7 mm)	2.62 in (66.7 mm)	2.62 in (66.7 mm)	2.62 in (66.7 mm)
Bore A grade	3.0945 - 3.0949 in. (78,600 - 78,610 mm)	3.0945 - 3.0949 in. (78,600 - 78,610mm)	3.4384 - 3.4388 in. (87,335 - 87,346mm)	3.4384 - 3.4388 in. (87,335 - 87,346mm)
Bore B grade	3.0949 - 3.0953 in. (78,610 - 78,621 mm)	3.0949 - 3.0953 in. (78,610 - 78,621 mm)	3.4388 - 3.4392 in. (87,346 - 87,356 mm)	3.4388 - 3.4392 in. (87,346 - 87,356 mm)
Bore C grade	3.0953 - 3.0957 in. (78,621 - 78,631 mm)	3.0953 - 3.0957 in. (78,621 - 78,631 mm)	3.4392 - 3.4396 in. (87,356 - 87,366 mm)	3.4392 - 3.4396 in. (87,356 - 87,366 mm)
Bore D grade	3.0957 - 3.096 in. (78,631 - 78,641 mm)	3.0957 - 3.096 in. (78,631 - 78,641 mm)	3.4396 - 3.4400 in. (87,366 - 87,376 mm)	3.4396 - 3.4400 in. (87,366 - 87,376 mm)
Compression Ratio Up to 7 Series Commencing 7 Series	h.c. 8.6:1 8.8:1	h.c. 8.6:1 8.8:1	h.c. 8.6:1 8.8:1	h.c. 8.6:1 8.8:1
Compression pressure (lb/in ²)	h.c. 160/180	h.c. 150/160	h.c. 160/180	h.c. 150/170
Compression pressure (lb/cm ²)	h.c. 11,0/12,4	h.c. 10,5/11,2	h.c. 11,0/12,4	h.c. 10,3/11,7
Performance (to DIN 70 020) Max. B.H.P. at r.p.m. Up to 7 Series Commencing 7 Series	h.c. 57 at 5000 59 at 5000	h.c. 54 at 5000	h.c. 69 at 5000 69 at 4800	h.c. 81 at 5500 80 at 5400
Max. Torque at r.p.m. Up to 7 Series (lb/ft) Commencing 7 Series (lb/ft)	h.c. 69 at 2600	h.c. 66 at 2500	h.c. 87 at 2900 91 at 2900	h.c. 86 at 3400 86 at 4400

h.c. = high compression l.c. = low compression

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	1300 Single Carb. (1.50)	1300 Twin Carbs. (1.50) or Single Carb. (1.75)	1600 Single Carb. (1.50)	1600 Twin Carbs. (1.50) or Single carb. (1.75)
PISTON				
Compression identification				
Piston crown depth (H.C.)	Recessed crown .081 - .084 in. (2,057 - 2,134mm)	Recessed crown .081 - .084 in. (2,057 - 2,134mm)	Recessed crown 0.098 - 0.101 in. (2,489 - 2,565mm)	Recessed crown 0.098 - 0.101 in. (2,489 - 2,565mm)
(L.C.)	.182 - .185 in. (4,623 - 4,699mm)		0.188 - 0.191 in. (4,775 - 4,851mm)	
Diameter - Grade 'A'	3.0912 - 3.0916in. (78,517 - 78,527mm)	3.0912 - 3.0916in. (78,517 - 78,527mm)	3.4351 - 3.4355in. (87,252 - 87,262mm)	3.4351 - 3.4355in. (87,252 - 87,262mm)
Grade 'B'	3.0912 - 3.0920in. (78,527 - 78,537mm)	3.0916 - 3.0920in. (78,527 - 78,537mm)	3.4355 - 3.4359in. (87,262 - 87,272mm)	3.4355 - 3.4359in. (87,262 - 87,272mm)
Grade 'C'	3.0920 - 2.0924in. (78,537 - 78,547mm)	3.0920 - 3.0924in. (78,537 - 78,547mm)	3.4359 - 3.4363in. (87,272 - 87,282mm)	3.4359 - 3.4363in. (87,272 - 87,282mm)
Grade 'D'	3.0924 - 3.0928in. (78,547 - 78,557mm)	3.0924 - 3.0928in. (78,547 - 78,557mm)	3.4363 - 3.4367in. (87,282 - 87,292mm)	3.4363 - 3.4367in. (87,282 - 87,292mm)
Grade 'E'	3.0928 - 3.0932in. (78,557 - 78,567mm)	3.0928 - 3.0932in. (78,557 - 78,567mm)	3.4367 - 3.4371in. (87,292 - 87,302mm)	3.4367 - 3.4371in. (87,292 - 87,302mm)
Oversize available	+ .030in. (0,762mm)	+ .030in. (0,762mm)	As 1300	As 1300
Piston skirt clearance measured at right angle to gudgeon pin hole.	.0029 - .0037in. (0,074 - 0,094mm)	.0029 - .0037in. (0,074 - 0,094mm)	.0029 - .0037in. (0,074 - 0,094mm)	.0029 - .0037in. (0,074 - 0,094mm)
5/8" (16mm) above bottom of piston				
Ring gap (fitted) in Grade 'A' bore - top ring	.014 - .019in. (0,36 - 0,48mm)	.014 - .019in. (0,36 - 0,48mm)	As 1300	As 1300
- second and scraper	0.009 - 0.014in. (0,23 - 0,36mm)	0.009 - 0.014in. (0,23 - 0,36mm)	0.010 - 0.015in. (0,25 - 0,38mm)	As 1600 S.C.

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	1300 Single Carb. (1.50)	1300 Twin Carbs. (1.50) or Single Carb. (1.75)	1600 Single Carb. (1.50)	1600 Twin Carbs. (1.50) or Single Carb. (1.75)
VALVES				
Valve clearances (inlet)	.008in. (0,20mm)	.010in. (0,25mm)	.008in. (0,20mm)	.010in. (0,25mm)
(hot or cold) (exhaust)	.016in. (0,40mm)	.016in. (0,40mm)	.016in. (0,40mm)	.016in. (0,40mm)
Valve timing			Up to Commencing 7 Series 7 Series 8 Series	
Inlet opens at BTDC	38°	44°	38°	44°
Inlet closes ABDC normal	66°	78°	66°	78°
Exhaust opens BBDC operating	72°	69°	72°	69°
Exhaust closed ATDC clearances	20°	23°	20°	23°
Identification - Camshaft (Colour code)	Blue	Green	Orange	Green
Valve stem clearances Inlet in guide :-	.0010 - .0025 in. (0,03 - 0,66mm)	As 1300	As 1300	As 1300
Exhaust	.0025 - .004in. (0,66 - 0,10mm)	As 1300	As 1300	As 1300
Valve springs				
Free length	1.592in. (40,44mm)	Outer 1.592in. (40,44mm) Inner 1.26in. (32,00mm)	1.592in. (40,44mm)	Outer 1.592in. (40,44mm) Inner 1.26in. (32,00mm)
Length fitted	1.331in. (33,8mm)	1.373in. (34,9mm)	1.331in. (33,8mm)	1.373in. (34,9mm)
Load fitted	75lb. (34,02kg)	63lb. (28,6kg)	75lb. (34,02kg)	63lb. (28,6kg)
Exhaust valve clearance and closing position for checking timing chain replacement	.100in. (2,54mm) 25° B.T.D.C.	.100in. (2,54mm) 12° B.T.D.C.	.100in. (2,54mm) 19° 25° 19° B.T.D.C.B.T.D.C.B.T.D.C.	.100in. (2,54mm) 12° B.T.D.C.
CAMSHAFT - Endfloat	.002 - .008in. (0,05 - 0,20mm)	As 1300	As 1300	As 1300
CRANKSHAFT				
Main bearing running clearances	Up to 8 Series .0008 - .0028in. (0,02 - 0,07mm)	Commencing 8 Series .0013 - .003 in. (0,33 - 0,084mm)	As 1300	As 1300
CONNECTING ROD	.007 - .019in. (0,178 - 0,483mm)	As 1300	As 1300	As 1300

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TIGHTENING TORQUE FIGURES

STUDS

	Nm	lb. ft.
Cylinder block to cylinder head	19	14
Cylinder head to inlet manifold	13,5	10

NUTS

Alternator to cyl. block and timing cover	21,5	16
Clutch housing to cylinder block	46	34
Connecting rod (12 point)	40	30
Cylinder head-loose washers	88	65
Cylinder head-integral washers	95	70
Exhaust manifold to cylinder head	21,5	16
Inlet manifold to cylinder head	21,5	16
Engine rear mounting to crossmember — automatic	11	8
Engine front mounting to crossmember	36,5	27

PLUGS AND ADAPTORS

Chain tensioner 1/8 - 27 NPTF	13,5	10
Drain tap	7	5
Oil gallery 3/8 - 18 PTF SAE	34	25
Oil pressure gauge adaptor	16,5	12
Oil pressure gauge sender unit	14	10
Oil pressure switch 1/8 - 28 NPTF	5,5	4
Servo adaptor	13,5	10
Sparking plug	16,5	12
Sump drain plug	50	37
Thermometer bulb	19	14

BOLTS AND SCREWS

Camshaft thrust plate to cylinder block	12	9
Chain tensioner to cylinder block	9,5	7
Clutch housing to cylinder block	46	34
Clutch to flywheel	21,5	16
Crankshaft pulley to crankshaft	68	50
Cylinder head to cylinder block — loose washer	88	65
Cylinder head to cylinder block — integral washer	95	70
Drive plate to crankshaft	56	42
Drive plate to torque convertor	46	34
Engine mounting bracket to cylinder block	23	17
Engine rear crossmember to body	16,5	12
Engine rear mounting to extension housing — manual	35	26
Engine rear mounting to extension housing — automatic	21	15
Exhaust manifold to cylinder head	21,5	16
Flywheel to crankshaft	54	40
Fuel pump to cylinder block	13,5	10
Inlet manifold to cylinder head	21,5	16
Main bearing cap to cylinder block	70,5	52
Oil pump to cylinder block	9,5	7
Rocker cover to cylinder head	9,5	7
Rocker pedestal to cylinder head	23	17
Starter motor to cylinder block	46	34
Timing cover to cylinder block	17,5	13
Timing wheel to camshaft	46	34
Water pump/timing cover to cylinder block	17,5	13
Sump to cylinder block	8	6

ENGINE



INTRODUCTION

1 Section B gives information on engines fitted with a single carburettor or twin carburettors where the engine parts are common.

Sub-section BA explains the differences on engines fitted with single 1,75 or twin carburettors.

Data

All clearances, dimensional data, torque spanner settings, compression ratios, compression pressures and engine power output are given in the Data pages at the beginning for all engines.

Ignition system

For fault diagnosis and servicing — See Section N.

Fuel system

For information on the fuel pump, carburettor and synchronising of twin carburettors — see Section C.

SPECIAL TOOLS

These are listed under Engine in Section S.

CAUTION

Models fitted with Electric Fan

Current supply to the fan is direct from the battery and may operate with the ignition switched 'ON' or 'OFF'.

Keep the hands and clothing clear of the fan at all times and always disconnect the battery before starting work on the engine unit.

Models fitted with Sealed Fuel Tanks

The valve vented fuel cap fitted to later models maintain a pressure balance within the tank.

Internal pressures should always be relieved at any time the fuel system is disturbed. Do not leave the tank sealed with any part of the fuel system disconnected. For further precautionary detail refer to Sub-section CJ on page 2.