

DATA

Bore (4.236 and 4.212 engines)	98,43 mm (3.875 in) *
Stroke (4.248 and 4.236 engines)	127 mm (5 in)
No. of Cylinders	Four
Cubic Capacity (4.236 engine)	3,86 litres (236 in ³)
Compression Ratio (4.248 and 4.236 engines)	16 : 1
Maximum Power	61 kW (82 bhp) at 2800 rev/min
Maximum Torque	256 Nm (194 lbf ft) at 1400 rev/min
Firing Order	1, 3, 4, 2
Cycle	Four-Stroke
Combustion System	Direct Injection
Lubricating Oil Pressure	2,1/4,2 kgf/cm ² (30/60 lbf/in ²) or 207/414 kN/m ² at max engine speed and normal working temperature

* Nominal — for actual bore size, see pages B.3 and B.4.

DE-RATING FOR ALTITUDE

Where engines operate at high altitudes they should be de-rated. The following table is given as a general guide to be applied on a percentage basis, where specific figures for a particular engine rating are not available.

Altitude	Maximum fuel delivery de-rating *
0 — 2,000 feet (600 metre)	No change
2,000 — 4,000 feet (1200 metre)	6%
4,000 — 6,000 feet (1800 metre)	12%
6,000 — 8,000 feet (2400 metre)	18%
8,000 — 10,000 feet (3000 metre)	24%
10,000 — 12,000 feet (3600 metre)	30%

* Measured at setting speed given on Pump Setting Code.

Any necessary adjustments in this respect to the fuel pump should be carried out by the C.A.V. dealer for the territory concerned.

For any further information apply to Service Department, Perkins Engines Ltd., Peterborough, or to Overseas Companies listed on Page 2.

SERVICE WEAR LIMITS

The following "wear limits" indicate the condition when it is recommended that the respective items should be serviced or replaced.

Cylinder Head Bow	Transverse	0,08 mm (0.003 in)
	Longitudinal	0,15 mm (0.006 in)
Maximum Bore Wear (when reboring or new liners are necessary		0,2 mm (0.008 in)
Crankshaft Main and Big Eng Journal Wear ..	Ovality	0,04 mm (0.0015 in)
Maximum Crankshaft End Float		0,35 mm (0.014 in)
Valve Stem to Bore/Guide Clearance	Inlet	0,13 mm (0.005 in)
	Exhaust	0,15 mm (0.006 in)
Valve Head Thickness between run-out of valve seat and face of valve		0,79 mm (1/32 in)
Rocker Clearance on Rocker Shaft		0,13 mm (0.0005 in)
Camshaft Journals	Ovality and Wear	0,05 mm (0.002 in)
Camshaft End Float		0,51 mm (0.020 in)
Idle Gear End Float		0,25 mm (0.010 in)
* Valve Head Depth below Cylinder Head Face		
	Exhaust	1,40 mm (0.055 in) maximum
	Inlet	1,55 mm (0.061 in) maximum

*Where is it necessary to conform with the smoke density regulation B.S.AU 141a: 1971, then the valve depths must not exceed production limits as given on Page B.8.

TIGHTENING TORQUES

The following figures will apply with the components lightly oiled before assembly.

Cylinder Head Nuts/Setscrews (½ in)	13,8 kgf m (100 lbf ft) — 136 Nm
Connecting Rod Nuts *	9,7 kgf m (70 lbf ft) — 94 Nm (non painted cap)
Connecting Rod Nuts †	10,4 kgf m (75 lbf ft) — 102 Nm (cap painted with green paint)
Main Bearing Setscrews **	20,7 kgf m (150 lbf ft) — 203 Nm
Main Bearing Setscrews ††	24,9 kgf m (180 lbf ft) — 244 Nm
Idler Gear Hub Setscrews	4,1 kgf m (30 lbf ft) — 41 Nm
Flywheel Setscrews	11 kgf m (80 lbf ft) — 108 Nm
Camshaft Gear Retaining Setscrews	6,9 kgf m (50 lbf ft) — 68 Nm
Crankshaft Pulley Retaining Setscrew	
42,4 mm (1.67 in) A/F	42 kgf m (300 lbf ft) — 406 Nm
Crankshaft Pulley Retaining Setscrew	
38,1 mm (1.5 in) A/F	33 kgf m (240 lbf ft) — 325 Nm
Lubricating Oil Filter Setscrews	4,2 kgf m (30 lbf ft) — 41 Nm
Atomiser Securing Nuts	1,7 kgf m (23 lbf ft) — 16 Nm
High Pressure Fuel Pipe Nuts	2,1 kgf m (15 lbf ft) — 20 Nm
Dynamo Pulley Retaining Nut	2,8 kgf m (20 lbf ft) — 27 Nm
Alternator Pulley Retaining Nut (7/16 in)	4,1 kgf m (30 lbf ft) — 41 Nm
Alternator Pulley Retaining Nut (9/16 in)	4,1 kgf m (30 lbf ft) — 41 Nm
Alternator Pulley Retaining Nut (5/8 in)	5,8 kgf m (42 lbf ft) — 57 Nm
Balancer Retaining Setscrews	5 kgf m (36 lbf ft) — 49 Nm
Thermostart with Adaptor	1,4 kgf m (10 lbf ft) — 13 Nm

* For engines preceding the following Engine Nos:

** For engines preceding the following Engine Nos:

† For engines commencing at the following Engine Nos:

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212U901
212UA140419
212UA4393A
236U96087
236UA59562
236UA1660A
236UC22005
236UE5408
236UH262
236US16138
248U9045
248UA78127

212U582
212UA119095
236U82408
236UA50507
236UC19949
236UE4404
236US12129
248U6330
248UA58746

MANUFACTURING DIMENSIONS

All threads used, except perhaps on proprietary equipment are Unified Series and American Pipe Series. The crankshaft and pulley retaining setscrew threaded 7/8 in U.N.F. of 14 T.P.I.

The following data of clearances and tolerances are given as a guide for personnel engaged upon major overhauls and the figures are those used in the factory for production purposes.

CYLINDER BLOCK

Total Height of Cylinder Block between Top and Bottom Faces	441,12/441,33 mm (17.367/17.375 in)
Parent Bore Dia. for Cylinder Liner (Chrome Thin Wall)	100,65/100,67 mm (3.9625/3.9635 in)
Parent Bore Dia. for Cylinder Liner (Chrome Thick Wall)	103,19/103,22 mm (4.0625/4.0635 in)
Parent Bore Dia. for Flangeless Cylinder Liner (Cast Iron)	103,16/103,19 mm (4.0615/4.0625 in)
Parent Bore Dia. for Flanged Cylinder Liner (Cast Iron)	103,16/103,19 mm (4.0615/4.0625 in)
Depth of Recess for Liner Flange (Cast Iron)	3,81/3,91 mm (0.150/0.154 in)
Depth of Recess for Liner Flange (Chrome Thin Wall) early type	1,17/1,25 mm (0.046/0.049 in)
Depth of Recess for Liner Flange (Chrome Thin Wall) later type	1,25/1,30 mm (0.049/0.051 in)
Depth of Recess for Liner Flange (Chrome Thick Wall)	3,81/3,86 mm (0.150/0.152 in)
Main Bearing Parent Bore Dia.	80,42/80,44 mm (3.166/3.167 in)
Camshaft Bore Dia. No. 1 for Bush (where fitted)	55,56/55,59 mm (2.1875/2.1887 in)
Camshaft Bearing Bush Internal Dia. fitted	50,8/50,84 mm (2.000/2.0017 in)
Camshaft Bore Dia. No. 1	50,80/50,83 mm (2.000/2.001 in)
Camshaft Bore Dia. No. 2	50,55/50,59 mm (1.990/1.9918 in)
Camshaft Bore Dia. No. 3	50,04/50,08 mm (1.970/1.9718 in)

CYLINDER LINERS CAST IRON

Types	Dry—Interference Fit (Production) Dry—Transition Fit (Pre-finished Service)
Outside Dia. of Production Liner	
Flangeless	103,26/103,29 mm (4.0655/4.0665 in)
Flanged	103,24/103,26 mm (4.0645/4.0655 in)
Outside Dia. of Flanged Pre-Finished Service Liner	103,19/103,21 mm (4.0625/4.0635 in)
Interference Fit of Production Liner in Cylinder Block	
Flangeless	0,08/0,13 mm (0.0003/0.0005 in)
Flanged	0,05/0,10 mm (0.002/0.004 in)

Data

Transition Fit of Pre-Finished Service Liner Block ..	$\pm 0,03$ mm (± 0.001 in)
Finished Bore Dia. of Production Liners	94,48/98,50 mm (3.877/3.878 in)
Bore Dia. of Pre-Finished Service Liner in Block ...	98,50/98,52 mm (3.878/3.879 in)
Height of Top of Liners above Cylinder Block Face	0,71/0,89 mm (0.028/0.035 in)
Flange Thickness of Liner	
Earlier engines	3,66/3,71 mm (0.144/0.146 in)
Current engines	3,81/3,86 mm (0.150/0.152 in)
Relationship of Liner Flange to Cylinder Block Face	
Earlier engines	0,10/0,25 mm (0.004/0.010 in) Below
Current engines	0,5 mm (0.002 in) Above to 0,10 mm (0.004 in) Below
Maximum Oversize (Rebore) Flangeless Liner	+0,76 mm (+0.030 in)
Overall Length of Liner (Flangeless)	228,7/229 mm (9.005/9.015 in)
Overall Length of Liner (Flanged)	227,10/227,43 mm (8.941/8.954 in)

CYLINDER LINERS CHROME – THIN WALL

Type	Dry—Transition Fit
Outside Dia. of Liner	100,65/100,67 mm (3.9625/3.9635 in)
Depth of Liner below Cylinder Block Top Face	
Early Type	0,025/0,23 mm (0.001/0.009 in)
Depth of Liner below Cylinder Block Top Face	
Later Type	0,102/0,203 mm (0.004/0.008 in)
Flange Thickness (Early Type)	1,016/1,143 mm (0.040/0.045 in)
Flange Thickness (Later Type)	1,092/1,143 mm (0.043/0.045 in)
Inside Dia. of Liner after fitting	98,47/98,53 mm (3.8765/3.879 in)
Overall Length of Liner	226,6/225,8 mm (8.9212/8.8912 in)

CYLINDER LINERS CHROME – THICK WALL

Type	Dry—Transition Fit
Outside Dia. of Liner	103,19/103,21 mm (4.0625/4.0635 in)
Depth of Liner Flange below Cylinder Block Top Face	0,102/0,203 mm (0.004/0.008 in)
Height of Liner above Cylinder Block Top Face	0,71/0,89 mm (0.028/0.035 in)
Flange Thickness	3,66/3,71 mm (0.144/0.146 in)
Inside Dia. of Liner after fitting	98,48/98,54 mm (3.877/3.8795 in)
Overall Length of Liner	227,05/227,43 mm (8.939/8.954 in)

PISTONS

Type	Cavity in Crown
Piston Height in relation to Cylinder Block (standard)	0,08/0,25 mm (0.003/0.010 in) above
Piston Height in relation to Cylinder Block	
(B.S. Au 141a:1971)	0,41/0,61 mm (0.016/0.024 in)
Bore Dia. for Gudgeon Pin	34,92/34,93 mm (1.37485/1.37505 in)
Compression Ring Groove Width—Numbers 1, 2, 3 ..	2,43/2,46 mm (0.0957/0.0967 in)
Scraper Ring Groove Width—Numbers 4 and 5	6,41/6,44 mm (0.2525/0.2535 in)
Weight of Piston	1,165 kg (2 lb 9 oz)

PISTON RINGS

* Top Compression	Chromium Plated — Parallel Face
Second and Third — Compression	Internally Stepped
†Fourth — Scraper	Spring Loaded Conformable
Fifth — Scraper	Maxigroove

* A cast iron compression ring is fitted when a chrome liner is used or on certain agricultural applications.

† With earlier engines, the fourth ring was a maxigroove and where combine harvester engines used a four ring kit in a five groove piston, maxigroove has been added to the fifth groove.

Compression Ring Width Numbers 1, 2 and 3	2,36/2,38 mm (0.0928/0.9838 in)
Ring Clearance in Groove	0,05/0,10 mm (0.0019/0.0039 in)
Scraper Ring Width—Fourth and Fifth	6,33/6,35 mm (0.249/0.250 in)
Ring Clearance in Groove	0,06/0,11 mm (0.0025/0.0045 in)
Ring Gap—Chrome Compression	0,41/0,86 mm (0.016/0.034 in)
Ring Gap—Internally Stepped Compression	0,30/0,76 mm (0.012/0.030 in)
Ring Gap—Maxigroove Scraper	0,30/0,76 mm (0.012/0.030 in)

Gudgeon Pin

Type	Fully Floating
Outside Dia. of Gudgeon Pin	34,92/34,93 mm (1.3748/1.375 in)
Length of Gudgeon Pin	83,74/84,12 mm (3.297/3.312 in)
Fit in Piston Boss	Transition

Small End Bush

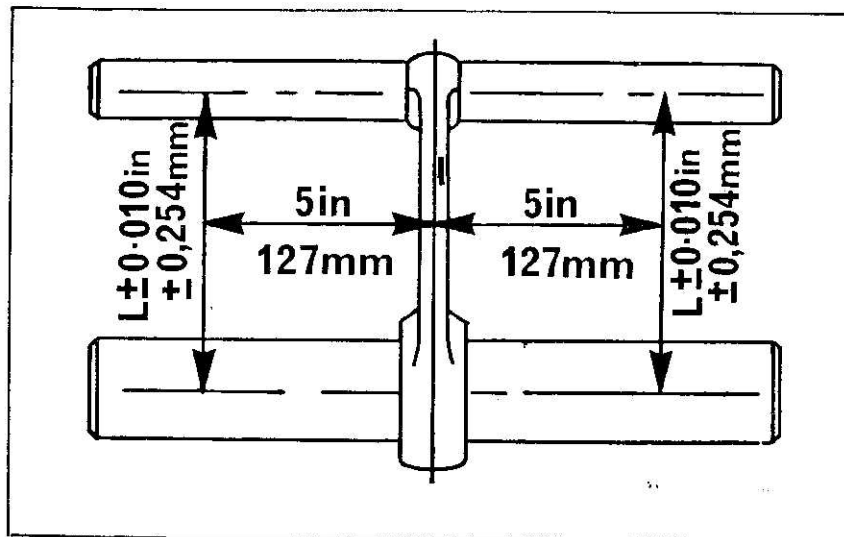
Type	Steel Backed, Lead Bronze Lined
Outside Dia. of Gudgeon Pin	38,99/39,03 mm (1.535/1.5365 in)
Length of Small End Bush	33,68/33,93 mm (1.326/1.336 in)
Inside Dia. before Reaming	34,53/34,63 mm (1.359/1.363 in)
Inside Dia. after Reaming	34,94/34,96 mm (1.37575/1.3765 in)
Clearance between Small End Bush and Gudgeon Pin	0,02/0,04 mm (0.000075/0.0017 in)

Connecting Rod

Type	"H" Section
Cap Location to Connecting Rod	Serrations
Big End Parent Bore Dia.	67,21/67,22 mm (2.6460/2.6465 in)
Small End Parent Bore Dia.	38,90/38,92 mm (1.53125/1.53225 in)
Length from Centre Line of Big End to Centre Line of Small End	219,05/219,10 mm (8.624/8.626 in)
Big End, Width	40,06/40,13 mm (1.557/1.580 in)
Connecting Rod End Float on Crankpin	0,21/0,37 mm (0.0085/0.0145 in)
Big End Bolt Dia.	12,7 mm (0.500 in)
Thread of Bolt	U.N.F.

Connecting Rod Alignment

Large and small end bores must be square and parallel with each other within the limits of $\pm 0,25$ mm (0.010 in) measured 127 mm (5 in) each side of the axis of the rod on test mandrel as shown in Fig. B.1. With the small end bush fitted, the limit of $\pm 0,25$ mm (0.010 in) is reduced to $\pm 0,06$ mm (0.0025 in).



Crankshaft

Overall Length	609,85/610,62 mm (24.01/24.04 in)
Main Journal Dia.	76,16/76,18 mm (2.9984/2.9992 in)
Main Journal Length—No. 1	36,91/37,41 mm (1.453/1.473 in)
Main Journal Length Nos. 2, 4 and 5	39,24/39,34 mm (1.545/1.549 in)
* Main Journal Length—No. 3	44,15/44,22 mm (1.738/1.741 in)
* Main Journal Fillet Radii	3,68/3,96 mm (0.145/0.156 in)
Crankpin Dia.	63,47/63,49 mm (2.4988/2.4996 in)
Crankpin Length	40,35/40,42 mm (1.5885/1.5915 in)
* Crankpin Fillet Radii	3,68/3,96 mm (0.145/0.156 in)
* Surface Finish—All Journals	0,4 microns (16 micro inches)
Main Journal and Crankpin Regrind Undersizes	-0,25, 0,51 and 0,76 mm) (-0.010, 0.020 and 0.030 in)
Oil Seal Helix Dia. (rope seals only)	79,35/79,38 mm (3.124/3.125 in)
Oil Seal Helix Width	1,27/2,03 mm (0.050/0.080 in)
Oil Seal Helix Depth	0,10/0,20 mm (0.004/0.008 in)
Flange Dia.	133,30/133,35 mm (5.248/5.250 in)
Spigot Bearing Recess Depth	19,84 mm (0.781 in)
Spigot Bearing Recess Bore	46,98/47,00 mm (1.8497/1.8502 in)
Crankshaft End Float	0,10/0,38 mm (0.004/0.0015 in)

* Fillet radii and surface finish must be maintained during crankshaft regrinding. Length of No. 3 main journal not to exceed 44,68 mm (1.759 in) after regrinding. Width of crankpins must not exceed 40,55 mm (1.5965 in) after regrinding. Where necessary use oversize thrust washers to suit.

Crankshafts Part No. 31315584, 31315872, 31315542, 31316224, 31316235 and 31316204 are tufftrided and must be re-tufftrided after any regrinding has taken place (see Page H.2.). Where facilities for re-tufftriding are not available, then a factory replacement crankshaft should be obtained.

CRANKSHAFT THRUST WASHERS

Type	Steel Backed, Aluminium Tin or Lead Bronze Faced
Position in Engine	Centre Main Bearing
Thrust Washer Thickness (STD)	2,26/2,34 mm (0.089/0.092 in)
Thrust Washer Thickness (O/S)	2,44/2,51 mm (0.096/0.099 in)
Thrust Washer Outside Dia.	103,84/104,90 mm (4.088/4.098 in)
Thrust Washer Inside Dia.	86,87/87,12 mm (3.420/3.430 in)

MAIN BEARINGS

Type	Pre-Finished, Steel Backed, Aluminium Tin Faced
Shell Width—Nos. 1, 2 44 and 5	31,62/31,88 mm (1.245/1.255 in)
Shell Width—No. 3	36,45/36,70 mm (1.435/1.445 in)
Outside Dia. of Main Bearing	80,41 mm (3.167 in)
Inside Dia. of Main Bearing	76,24/76,28 mm 3.0015/3.003 in)
Main Bearing Running Clearance	0,06/0,12 mm (0.0023/0.0046 in)
Shell Thickness	2,08/2,09 mm (0.082/0.08225 in)

CONNECTING ROD BEARINGS

Type	Pre-Finished, Steel Backed, Aluminium Tin Faced
Shell Width	31,62/31,88 mm (1.245/1.255 in)
Outside Dia. of Con. Rod Bearing	67,22 mm (2.6465 in)
Inside Dia. of Con. Rod Bearing	63,53/63,55 mm (2.501/2.502 in)
Con. Rod Bearing Running Clearance	0,04/0,08 mm (0.0015/0.003 in)
Shell Thickness	1,835/1.842 mm (0.07225/0.0725 in)

CAMSHAFT

No. 1 Journal Length	30,75 mm (1.2105 in)
No. 1 Journal Dia.	50,71/50,74 mm (1.9965/1.9975 in)
No. 1 Cylinder Block Camshaft Bore Dia.	50,8/50,83 mm (2.000/2.001 in)
No. 1 Journal Running Clearance	0,06/0,11 mm (0.0026/0.0045 in)
No. 2 Journal Length	41,27 mm (1.625 in)
No. 2 Journal Dia.	50,46/50,48 mm (1.9865/1.9875 in)
No. 2 Cylinder Block Camshaft Bore Dia.	50,55/50,60 mm (1.990/1.992 in)
No. 2 Journal Running Clearance	0,06/0,14 mm (0.0025/0.0053 in)
No. 3 Journal Length	29,4 mm (1.156 in)
No. 3 Journal Dia.	49,95/49,98 mm (1.9665/1.9675 in)
No. 3 Cylinder Block Camshaft Bore Dia.	50,04/50,09 mm (1.970/1.972 in)
No. 3 Journal Running Clearance	0,06/0,14 mm (0.0025/0.0053 in)
Cam Lift	7,62/7,70 mm (0.300/0.303 in)
Oilways for Rocker Shaft Lubrication	No. 2 Journal

CAMSHAFT THRUST WASHER

Type	360°
Thrust Washer Outside Dia.	72,95/73,00 mm (2.872/2.874 in)
Cylinder Block Recess Dia. for Thrust Washer	73,03/73,28 mm (2.875/2.885 in)
Clearance Fit of Washer in Recess	0,03/0,33 mm (0.001/0.013 in)
Thrust Washer Inside Dia.	44,45 mm (1.75 in)
Thrust Washer Thickness	5,47/5,54 mm (0.216/0.218 in)
Cylinder Block Recess Depth for Thrust Washer (Earlier Type)	3,86/3,91 mm (0.152/0.154 in)
Thrust Washer Protrusion beyond Cylinder Block Front Face (Earlier Type)	1,53/1,68 mm (0.062/0.066 in)
Cylinder Block Recess Depth for Thrust Washer (Later Type)	4,75/4,83 mm (0.187/0.190 in)
Thrust Washer Protrusion beyond Cylinder Block Front Face (Later Type)	0,66/0,79 mm (0.026/0.031 in)
Camshaft End Float	0,10/0,14 mm (0.004/0.016 in)

CYLINDER HEAD

Cylinder Head Length	454,02 mm (19.875 in)
Cylinder Head Depth	103,20±0,38 mm (4.0625 ±0.015 in)
Skimming Allowance on Cylinder Head Face	0,30 mm (0.012 in)
Min. Cylinder Head Depth after Skimming	102,51 mm (4.0355 in) *
Max. Nozzle Protrusion after Skimming	4,44 mm (0.175 in)
Leak Test Pressure	2,11 kgf/cm ² (30 lbf/in ²) — 404 kN/m ²
Valve Seat Angle	45°
Valve Bore in Cylinder Head	9,51/9,53 mm (0.37425/0.37525 in)

VALVE GUIDES (If fitted)

Inside Dia. — Inlet and Exhaust	9,53/9,55 mm (0.375/0.376 in)
Outside Dia.	15,90/15,91 mm (0.620/0.6265 in)
Bore in Cylinder Head for Guide	15,87/15,91 mm (0.625/0.6255 in)
Interference Fit of Guide in Cylinder Head Bore ...	0,02/0,04 mm (0.0005/0.0015 in)
Depth of Counterbore—Exhaust Guide	10,32 mm (0.4062 in)
Overall Length of Guide	61,92 mm (2.4375 in)
Guide Protrusion above Cylinder Head Top Face ...	15,87 mm (0.625 in)

EXHAUST VALVES

Valve Stem Dia.	9,45/9,47 mm (0.372/0.376 in)
Clearance Fit of Valve in Guide (if fitted)	0,06/0,10 mm (0.00225/0.004 in)
Clearance Fit of Valve in Head	0,04/0,08 mm (0.00145/0.00325 in)
Valve Head Dia.	36,45/36,70 mm (1.435/1.445 in)
Valve Face Angle	45°
Valve Head Depth below Cylinder Head Face (earlier)	0,74/0,99 mm (0.029/0.039 in)
Valve Head Depth below Cylinder Head Face (current)	1,07/1.32 mm (0.042/0.052 in)
Overall Length of Valve	123,11/123,52 mm (4.847/4.863 in)
Service Valve Stem Oversizes	0,08, 0,038 and 0,76 mm (0.003, 0.015 and 0.030 in)
Sealing Arrangement	Rubber Deflectors (Low Rated Engines only)

INLET VALVES

Valve Stem Dia.	9,46/9,48 mm (0.3725/0.3735 in)
Clearance Fit of Valve in Guide (if fitted)	0,04/0,09 mm (0.0015/0.0035 in)
Clearance Fit of Valve in Head	0,02/0,07 mm (0.00075/0.00275 in)
Valve Head Dia.	44,09/44,36 mm (1.736/1.746 in)
Valve Face Angle	45°
Valve Head Depth below Cylinder Head Face	0,89/0,14 mm (0.035/0.045 in)
Overall Length of Valve	122,71/123,11 mm (0.035/0.045 in)
Service Valve Stem Oversizes	0,08, 0,38 and 0,76 mm (0.003, 0.015 and 0.030 in)
Sealing Arrangement	Rubber Deflectors (High Rated Engines only)

INNER VALVE SPRINGS

Fitted Length	39,7 mm (1.5625 in)
Load at Fitted Length	7 kg ±0,45 kg (15.4 lb ±1 lb)
Fitted Position	Damper Coils to Cylinder Head

OUTER VALVE SPRINGS

Fitted Length	45,22 mm (1.780 in)
Load at Fitted Length	18,1 kg ±0,91 kg (40 lb ±2 lb)
Fitted Position	Damper Coils to Cylinder Head

TAPPETS

Overall Length	75,41 mm (2.96875 in)
Outside Dia. Tappet Shank	18,99/19,01 mm (0.7475/0.7485 in)
Cylinder Block Tappet Bore Dia.	19,05/19,08 mm (0.750/0.7513 in)
Tappet Running Clearance in Bore	0,04/0,10 mm (0.0015/0.0038 in)
Outside Dia. of Tappet Foot	30,16 mm (1.1875 in)

ROCKER SHAFT

Overall Length of Shaft	426,62 mm (16.796 in)
Outside Dia. of Shaft	19,01/19,04 mm (0.7485/0.7495 in)

ROCKER LEVERS

Inside Dia. of Lever Bore	19,06/19,10 mm (0.7505/0.7520 in)
Lever Clearance on Rocker Shaft	0,03/0,09mm (0.001/0.0035 in)

* Minimum Cylinder Head Depth quoted is nominal and Skimming Allowance must be governed by the Maximum Nozzle Protrusion Permissible.

ROCKER LEVERS WITH REPLACEABLE BUSHES

Lever Parent Bore	22,23/22,26 mm (0.875/0.8762 in)
Outside Diameter of Bush	22,28/22,31 mm (0.877/0.8785 in)
Interference Fit of Bush in Bore	0,02/0,09 mm (0.0008/0.0035 in)
Finish Machine Bush Bore	19,06/19,10 mm (0.7505/0.752 in)
Clearance of Bush on Shaft	0,03/0,09 mm (0.001/0.0035 in)

VALVE CLEARANCES

Clearances between Valve Stem and Rocker Lever	0,30 mm (0.012 in) Cold
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CAMSHAFT GEAR

Number of Teeth	56
Inside Dia. of Gear Boss	34,93/34,96 mm (1.375/1.376 in)
Outside Dia. of Camshaft Hub	34,93/34,95 mm (1.3751/1.3757 in)
Fit of Gear on Camshaft Hub	0.017/0.022 mm (-0.0007/+0.0009 in)

FUEL PUMP GEAR**(Hydraulically Governed Pumps)**

Number of Teeth	56
Inside Dia. of Fuel Pump Gear Bore	41,28/41,30 mm (1.6250/1.6262 in)
Outside Dia. of Gear Carrier	41,19/41,24 mm (1.6225/1.6238 in)
Running Clearance of Gear on Carrier	0,03/0,09 mm (0.0012/0.0037 in)

FUEL PUMP GEAR**(Mechanically Governed Pumps)**

Number of Teeth	56
Inside Dia. of Gear Bore	44,45/44,47 mm (1.750/1.751 in)
Fuel Pump Hub Dia.	44,40/44,42 mm (1.748/1.7488 in)

IDLER GEAR AND HUB

Number of Teeth	63
Bore Dia. of Gear Bush (requires boring in situ)	50,79/50,82 mm (1.996/1.9975 in)
Outside Dia. of Gear Hub	50,70/50,74 mm (1.996/1.9975 in)
Running Clearance of Gear on Hub	0,06/0,12 mm (0.0023/0.0047 in)
Idler Gear Width including Bushes	30,14/30,16 mm (1.1865/1.1875 in)
Hub Width	30,26/30,33 mm)
Idler Gear End Float	0,10/0,20 mm (0.004/0.008 in)

IDLER GEAR AND HUB – Heavy Duty

No. of Teeth	63
Bore Dia. of Gear Bush (requires boring in situ)	50,79/50,82 mm (1.9998/2.0007 in)
Outside Dia. of Gear Hub	50,70/50,72 mm (1.996/1.997 in)
Running Clearance of Gear on Hub	0,07/0,12 mm (0.0028/0.0047 in)
Idler Gear Width	23,81/23,94 mm (0.9375/0.9425 in)
Idler Gear Thrust Washer Thickness	3,02/3,10 mm (0.119/0.122 in)
Hub Width	30,26/30,33 mm (1.1915/1.1945 in)
Idler Gear End Float	0,20/0,41 mm (0.008/0.016 in)

CRANKSHAFT GEAR

Number of Teeth	28
Gear Bore	47,63/47,65 mm (1.875/1.876 in)
Crankshaft Dia. for Gear	47,63/47,64 mm (1.8750/1.8755 in)

TIMING GEAR BACKLASH

All Gears	0,08 mm (0.003 in) minimum
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SUMP

Sump Capacity (Standard)	8 litres (14 pts)
Dipstick Position	Left or Right Hand Side
Strainer Location	On Suction Pipe of Lubricating Oil Pump

OIL PUMP

Type of Pump	Rotor Type
No. of Lobes—Inner Rotor Concentric	Three
No. of Lobes -Outer Rotor Concentric	Four
No. of Lobes—Inner Rotor Hobourn Eaton	Four
No. of Lobes—Outer Rotor Hobourn Eaton	Five
Drive Position on Engine	By Idler Gear from Crankshaft Gear

PUMP CLEARANCES

Pump Part No. 41314054 (Concentric)

Inner Rotor to Outer Rotor	0,025/0,76 mm (0.001/0.003 in)
Inner Rotor End Clearance	0,038/0,076 mm (0.0015/0.003 in)
Outer Rotor End Clearance	0,013/0,063 mm (0.0005/0.0025 in)
Outer Rotor to Pump Body	0,28/0,33 mm (0.011/0.013 in)

Pump Part No. 41314061 (Hobourn Eaton)

Inner Rotor to Outer Rotor	0,025/0,152 mm (0.001/0.006 in)
Inner and Outer Rotor End Clearance	0,025/0,0127 mm (0.001/0.005 in)
Outer Rotor to Pump Body	0,139/0,254 mm (0.0055/0.010 in)

OIL PUMP DRIVE GEAR

Number of Teeth	19
Inside Dia. of Gear Bore	12,62/12,64 mm (0.497/0.4978 in)
Outside Dia. of Oil Pump Shaft	12,67/12,69 mm (0.4990/0.4995 in)
Interference Fit of Gear on Shaft	0,03/0,06 mm (0.0012/0.0025 in)
Clearance between Drive and Pump Body	0,08/0,18 mm (0.003/0.007 in)

OIL PUMP IDLER GEAR

Number of Teeth	20
Inside Dia. of Gear Bore	25,40/25,43 mm (1.000/1.0012 in)
Outside Dia. of Gear Bush	25,40/25,42 mm (1.000/1.0008 in)
Inside Dia. of Gear Bush	22,23/22,26 mm (0.8750/0.8763 in)
Outside Dia. of Idler Gear Shaft	22,19/22,20 mm (0.8737/0.8742 in)
Running Clearance of Gear on Shaft	0,02/0,07 mm (0.0008/0.0026 in)
Idler Gear End Float	0,05/0,41 mm (0.002/0.016 in)

RELIEF VALVE

Type	Spring Loaded Plunger
Pressure Setting	3,52/4,22 kgf/cm ² (50/60 lbf/in ²) — 345/414 kN/m ²
Length of Plunger	23,81 mm (0.9375 in)
Outside Dia. of Plunger	14,19/14,21 mm (0.5585/0.5595 in)
Inside Dia. of Valve Housing Bore	14,23/14,30 mm (0.5605/0.5625 in)
Clearance of Plunger in Bore	0,03/0,10 mm (0.001/0.004 in)
Outside Dia. of Spring	9,35/9,58 mm (0.368/0.377 in)
Spring—Fitted Length	32,51 mm (1.28 in)
Spring—Load at Fitted Length	3,52/3,74 kgf (7.76/8.24 lbf) — 34,5/36,7 N

LUBRICATING OIL FILTER —**Element or Canister Type**

Type of Filter	Full Flow
By-Pass Valve Setting	Opens between 0,56/1,2 kgf/cm ² (8/17 lbf/in ²) — 55/117 kN/m ²
Type of Valve	Spring Loaded Ball
Torque Tension for Filter Bowl Retaining Screw (Element Type)	2,07 kgf m (15.0 lbf ft)

TYPE OF COOLING SYSTEM

Cylinder Head and Block	Thermo — Syphon — Impeller Assisted
Engine Water Capacity (less Radiator)	9,36 litres (16.5 pints)

THERMOSTAT

Type	Bellows or Wax
Opening Temperature	77–83°C (170–180°F)
Fully Open at	94°C (202°F)
Valve Lift	7,94/11,91 mm (0.312/0.469 in)

WATER PUMP

Type	Centrifugal
Outside Dia. of Shaft for Pulley	19,03/19,04 mm (0.7492/0.7497 in)
Inside Dia. of Pulley Bore	19,05/19,07 mm (0.7500/0.7508 in)
Clearance Fit of Pulley on Shaft	0,01/0,04 mm (0.0003/0.0016 in)
Outside Dia. of Shaft for Impeller	15,90/15,92 mm (0.6262/0.6267 in)
Inside Dia. of Impeller Bore	15,87/15,89 mm (0.6249/0.6257 in)
Interference Fit of Impeller on Shaft	0,01/0,05 mm (0.0005/0.0018 in)
Outside Dia. of Impeller	78,58/78,63 mm (3.094/3.096 in)
Impeller Blade to Body Clearance	0,30/0,81 mm (0.012/0.032 in)
Water Pump Seal Type	Synthetic Rubber, Carbon Faced

BALANCE UNIT

Note: Later units have needle roller bearings and all current balance units have reversed weights.

Front Dia. of Shafts (Driving and Driven)	31,71/31,73 mm (1.2484/1.2490 in)
Inside Dia. of Front Balance Frame Bushes	31,78/31,82 mm (1.2510/1.2526 in)
Running Clearance of Shafts in Bushes	0,05/0,11 mm (0.002/0.0042 in)

Rear Dia. of Shafts (Driving and Driven)	25,37/25,38 mm (0,9987/0.9992 in)
Inside Dia. of Rear Balance Frame Bushes	25,43/25,46 mm (1.001/1.0022 in)
Running Clearance of Shafts in Bushes	0,05/0,09 mm (0.0018/0.0035 in)
Shaft Dia. for Balance Weights	26,98/27,00 mm (1.0622/1.0630 in)
Bore Dia. of Balance Weights	26,99/27,02 mm (1.0625/1.0637 in)
Fit of Balance Weights on Shafts	-0,01/+0,04 mm (-0.0005/+0.0015 in)
Spigot Dia. of Earlier Balance Weights	63,47/63,50 mm (2.499/2.500 in)
Recess Dia. in Earlier Balance Weights	63,50/63,53 mm (2.500/2.501 in)
Spigot Dia. for Reversed Balance Weights	34,90/34,93 mm (1.374/1.375 in)
Recess Dia. in Reversed Balance Weight Gears	34,93/34,95 mm (1.375/1.376 in)
Fit of Gear on Balance Weight	-0,00/+0,05 mm (-0.000/+0.002 in)
Dia. of Earlier Shaft for Lub. Oil Pump Gear	10,71/10,76 mm (0.4215/0.4235 in)
Bore Dia. of Later Lub. Oil Pump Driver Gear	10,79/10,82 mm (0.425/0.426 in)
Clearance Fit of Earlier Gear on Shaft	0,04/0,11 mm (0.0015/0.0045 in)
Dia. of Shaft for Later Lub. Oil Pump Gear	16,51/16,53 mm (0.6500/0.6508 in)
Bore Dia. of Later Lub. Oil Pump Drive Gear	16,54/16,59 mm (0.6513/0.6533 in)
Clearance Fit of Later Gear on Shaft	0,01/0,08 mm (0.0005/0.0033 in)
Depth of Earlier Lub. Oil Pump Body	25,38/25,45 mm (0.999/1.002 in)
Depth of Later Lub. Oil Pump Body	25,45/25,53 mm (1.002/1.005 in)
Width of Lub. Oil Pump Drive Gears	25,35/25,40 mm (0.998/1.000 in)
End Float of Earlier Oil Pump Gears (with joint)	0,08/0,20 mm (0.003/0.008 in)
End Float of Later Oil Pump Gears	0,05/0,18 mm (0.002/0.007 in)
Shaft Dia. for Lub. Oil Pump Driven Gear	11,13/11,14 mm (0.4382/0.4386 in)
Bore Dia. of Lub. Oil Pump Driven Gear	11,16/11,19 mm (0.4394/0.4404 in)
Running Clearance of Oil Pump Driven Gear	0,02/0,06 mm (0.0008/0.0022 in)
Hub Dia. for Idler Gear	38,06/38,08 mm (1.4984/1.4990 in)
Bore Dia. of Idler Gear Bush	38,10/38,14 mm (1.500/1.5016 in)
Runing Clearance of Idler Gear on Hub	0,03/0,08 mm (0.001/0.0032 in)
Idler Gear End Float	0,20/0,36 mm (0.008/0.014 in)

APPROVED FUEL OIL SPECIFICATIONS

United Kingdom	BS.2869 : 1967 — Class A1 and A2
United States	A.S.T.M/D.975 — 66T — Nos. 1-D or 2-D VV — F — 800a : Grades DF-A, DF-1 or DF-2
Germany	DIN-51601 (1967)
France	(J.O. 14/9/57) Gas Oil or Fuel Domestique
Italy	CUNA — Gas Oil NC-530-01 (1957)
India	IS : 1460/1968 — Grade Special or Grade A
Sweden	SIS. 15 54 32 (1969)
Switzerland	Federal Military Specification 9140-335-1404 (1965)

Fuel oils available in territories other than those listed above which are to an equivalent specification may be used.

FUEL LIFT PUMP

Type of Pump	A.C. Delco V.P. Series
Method of Drive	Eccentric on Camshaft
Delivery Pressure	0,19/0,30 kgf/cm ² (2¾ to 4¼ lbf/in ²) – 29/29 kNm ²
Pump to Cylinder Block Gasket Thickness	0,64 mm (0.025 in)
Spring Colour Code	Green

FUEL FILTER (FINAL)

Element Type	Paper
Valve Type	Gravity Vent Valve

FUEL INJECTION PUMP

Make	C.A.V.
Type	D.P.A.
Pump Rotation	Clockwise
Plunger Dia.	8,5 mm
Timing Letter (Hydraulic)	"A"
Timing Letter (Mechanical)	"C"
No. 1 Cylinder Outlet	"W"

ATOMISERS

Body	Nozzle	Working Pressure		Setting Pressure		Identification Code
		atm	kgf/cm ²	atm	kgf/cm ²	
BKBL67S5299	BDLL150S6507	170	176	185	191	C.F.
BKBL67S5151	BDLL150S6225	170	176	175	181	U.A.
BKBL67S5151	BDLL150S6382	170	176	175	181	A.C.
BKBL67S5151	BDLL150S6561	170	176	175	181	D.M.
BKBL67S5151	BDLL150S6556	170	176	175	181	C.U.
BKBL67S5151	BDLL150S6435	170	176	175	181	A.B.
BKBL67S5299	BDLL150S6591	200	206	215	222	E.A.
BKBL67S5151	BDLL150S6705	170	176	175	181	F.Y.