
Data and dimensions

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Introduction

This information is given as a guide for personnel engaged on engine overhauls. The dimensions which are shown are those which are mainly used in the factory. The information applies to all engines, unless an engine type code is shown.

Cylinder head assembly

Cylinder head

Angle of valve seat	...	46° (88° included angle)
Diameter of parent bore for valve guide	...	15,87/15,89 mm (0.6247/0.6257 in)
Leak test pressure	...	200 kPa (29 lbf/in ²) 2,04 kgf/cm ²
Head thickness	...	102,79/103,59 mm (4.047/4.078 in)
Minimum permissible thickness after head face has been machined in service	...	102,48 mm (4.035 in)

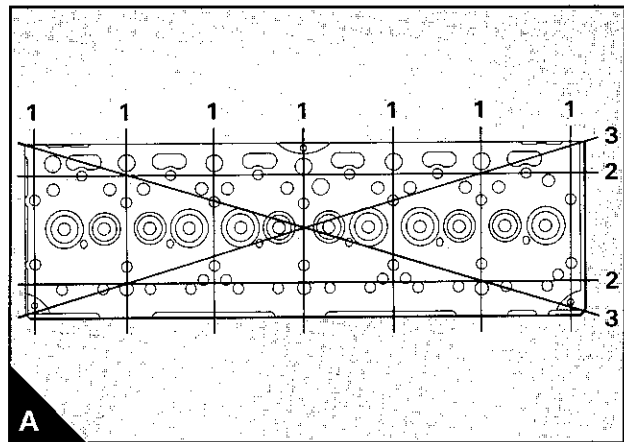
Maximum permissible distortion of cylinder head (A):

- AA,AB,AC,AD:

A1	0,08 mm (0.003 in)
A2	0,15 mm (0.006 in)
A3	0,15 mm (0.006 in)

- YA,YB,YC,YD:

A1	0,13 mm (0.005 in)
A2	0,25 mm (0.010 in)
A3	0,25 mm (0.010 in)



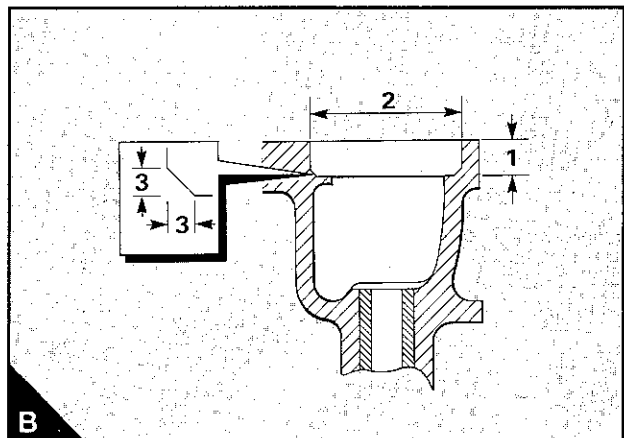
Dimensions of recesses for valve seat inserts (B):

- Inlet:

B1	7,19/7,32 mm (0.283/0.288 in)
B2	51,22/51,24 mm (2.0165/2.0175 in)
B3	Radius 0,38 mm (0.015 in) maximum

- Exhaust:

B1	9,52/9,65 mm (0.375/0.380 in)
B2	42,62/42,65 mm (1.6780/1.6790 in)
B3	Radius 0,38 mm (0.015 in) Maximum



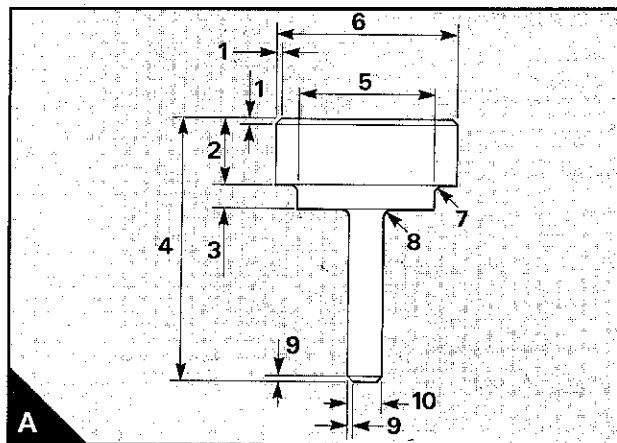
Valve seat insert tool (A):

- Inlet:

- A1 1,59 mm (0.063 in)
- A2 19,05 mm (0.750 in)
- A3 6,35 mm (0.250 in)
- A4 76,20 mm (3.00 in)
- A5 37,26/37,28 mm (1.467/1.468 in)
- A6 51,00/51,23 mm (2,008/2.017 in)
- A7 0,79 mm (0.031 in)
- A8 1,59 mm (0.063 in)
- A9 1,59 mm (0.063 in)
- A10 9,45/9,47 mm (0.372/0.373 in)

- Exhaust:

- A1 1,59 mm (0.063 in)
- A2 19,05 mm (0.750 in)
- A3 7,92 mm (0.312 in)
- A4 76,20 mm (3.00 in)
- A5 32,58/32,84 mm (1.283/1.293 in)
- A6 42,39/42,62 mm (1,669/1.678 in)
- A7 0,79 mm (0.031 in)
- A8 1,59 mm (0.063 in)
- A9 1,59 mm (0.063 in)
- A10 9,45/9,47 mm (0.372/0.373 in)



Valve guides

Inside diameter	...	9,51/9,56 mm (0.3744/0.3764 in)
Outside diameter	...	15,90/15,91 mm (0.6260/0.6265 in)
Interference fit of valve guide in cylinder head	...	0,03/0,07 mm (0.0012/0.0027 in)
Overall length:		
- Inlet	...	57,94 mm (2.281 in)
- Exhaust	...	61,10 mm (2.406 in)
Protrusion from bottom of recess for valve spring	...	15,10 mm (0.594 in)

Inlet valves

Diameter of valve stem	...	9,46/9,49 mm (0.3725/0.3735 in)
Clearance in valve guide	...	0,02/0,10 mm (0.0008/0.00039 in)
Maximum clearance in valve guide	...	0,13 mm (0.005 in)
Diameter of valve head	...	44,86/45,11 mm (1.766/1.776 in)
Angle of valve face	...	45°
Depth of valve head below face of cylinder head:		
- Production limit	...	1,27/1,60 mm (0.050/0.063 in)
- Service limit	...	1,85 mm (0.073 in)
Overall length	...	122,66/123,07 mm (4.829/4.845 in)
Seal arrangement	...	Rubber seal fitted to valve guide

Exhaust valves

Diameter of valve stem	...	9,43/9,46 mm (0.371/0.372 in)
Clearance in valve guide	...	0,05/0,13 mm (0.002/0.005 in)
Maximum clearance in valve guide	...	0,15 mm (0.006 in)
Diameter of valve head	...	37,26/37,52 mm (1.467/1.477 in)
Angle of valve face	...	45°
Depth of valve head below face of cylinder head:		
- Production limit	...	1,28/1,83 mm (0.050/0.072 in)
- Service limit	...	2,08 mm (0.082 in)
Overall length	...	123,07/123,57 mm (4.845/4.865 in)
Seal arrangement	...	Rubber seal fitted to valve guide

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Double valve springs - outer

Fitted length	35,8 mm (1.41 in)
Load at fitted length	176/195N (39.5/43.7 lbf) 18/20 kgf
Number of active coils	3.6
Number of damper coils	1
Direction of coils	Left hand - damper coil to cylinder head

Double valve springs - inner

Fitted length	35,8 mm (1.41 in)
Load at fitted length	89/104N (20/23 lbf) 9/11 kgf
Number of active coils	4.9
Number of damper coils	1
Direction of coils	Right hand - damper coil to cylinder head

Single valve springs

Fitted length	40,0 mm (1.57 in)
Load at fitted length	312/344N (70.1/77.3 lbf) 31,8/35,1 lbf
Number of active coils	4.5
Number of damper coils	0
Direction of coils	Left hand

Tappets

Diameter of tappet stem	18,99/19,01 mm (0.7475/0.7485 in)
Diameter of tappet bore in cylinder block	19,05/19,08 mm (0.7500/0.7512 in)
Clearance of tappet in cylinder block	0,04/0,09 mm (0.0015/0.0037 in)

Rocker shaft

Outside diameter	19,01/19,04 mm (0.7485/0.7495 in)
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Rocker levers and bushes

Diameter of parent bore for bush	22,23/22,26 mm (0.8750/0.8762 in)
Outside diameter of bush	22,28/22,31 mm (0.8770/0.8785 in)
Interference fit of bush in rocker lever	0,020/0,089 mm (0.0008/0.0035 in)
Internal diameter of fitted bush when reamed	19,06/19,10 mm (0.7505/0.7520 in)
Clearance between rocker lever bush and rocker shaft	0,03/0,09 mm (0.001/0.0035 in)
Maximum clearance between rocker lever and rocker shaft	0,13 mm (0.005 in)

Pistons and connecting rods

I Pistons - AA, YA, YC

Type	"Quadram" combustion bowl, controlled expansion, inserted top ring groove
Diameter of bore for gudgeon pin	34,928/34,934 mm (1.3751/1.3754 in)
Height of piston above top face of cylinder block	0,14/0,36 mm (0.005/0.014 in)
Width of groove for top ring	2,57/2,59 mm (0.101/0.102 in)
Width of groove for second ring	2,55/2,57 mm (0.100/0.101 in)
Width of groove for third ring	4,03/4,06 mm (0.1587/0.1598 in)

I Pistons - AB, AC, AD, YB, YD

Type	"Quadram" combustion bowl, controlled expansion, inserted top ring groove, reduced diameter top land.
Diameter of bore for gudgeon pin	38,103/38,109 mm (1.500/1.5004 in)
Height of piston above top face of cylinder block	0,14/0,36 mm (0.005/0.014 in)
Width of groove for top ring	Tapered
Width of groove for second ring	2,56/2,58 mm (0.1008/0.1016 in)
Width of groove for third ring	4,04/4,06 mm (0.1591/0.1598 in)

I Piston rings - AA, YA, YC

Top compression ring	Barrel face, molybdenum insert, with a chamfer at the top of the inner face
Second compression ring	Taper face, cast iron
Oil scraper ring	Coil spring loaded, chromium faced
Width of top ring	2,48/2,49 mm (0.097/0.098 in)
Width of second ring	2,48/2,49 mm (0.097/0.098 in)
Width of third ring	3,98/3,99 mm (0.1566/0.1571 in)
Clearance of top ring in groove	0,08/0,11 mm (0.003/0.004 in)
Clearance of second ring in groove	0,06/0,09 mm (0.002/0.003 in)
Clearance of third ring in groove	0,04/0,08 mm (0.002/0.003 in)
Gap of top ring	0,40/0,85 mm (0.016/0.033 in)
Gap of second ring	0,30/0,76 mm (0.012/0.030 in)
Gap of third ring	0,38/0,84 mm (0.015/0.033 in)

I Piston rings - AB, AC, AD, YB, YD

Top compression ring	Barrel face, molybdenum insert, wedge
Second compression ring	Taper face, cast iron
Oil scraper ring	Coil spring loaded, chromium face
Width of top ring	Wedge
Width of second ring	2,48/2,49 mm (0.097/0.098 in)
Width of third ring	3,98/3,99 mm (0.156/0.157 in)
Clearance of top ring in groove	Wedge
Clearance of second ring in groove	0,07/0,11 mm (0.003/0.004 in)
Clearance of third ring in groove	0,05/0,08 mm (0.002/0.003 in)
Gap of top ring	0,35/0,75 mm (0.014/0.030 in)
Gap of second ring	0,30/0,76 mm (0.012/0.030 in)
Gap of third ring	0,38/0,84 mm (0.015/0.033 in)

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Connecting rods - AA, YA, YC

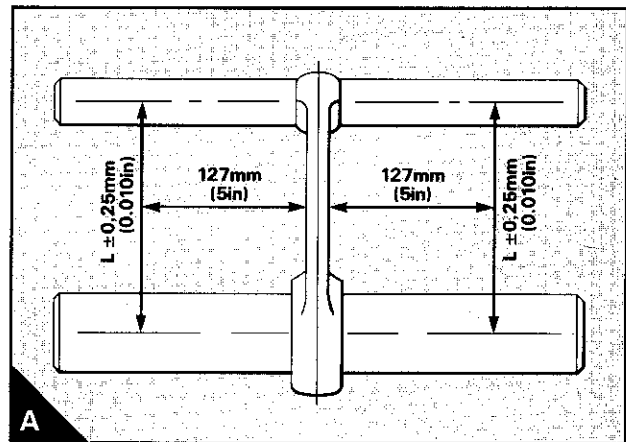
Type	"H" section, square shape small end
Location of cap to connecting rod	Serrations
Diameter of parent bore for big end	67,21/67,22 mm (2.6460/2.6465 in)
Diameter of parent bore for small end	38,89/38,92 mm (1.531/1.532 in)
Length between centres	219,05/219,10 mm (8.624/8.626 in)

Connecting rods - AB, AC, AD, YB, YD

Type	"H" section, wedge shape small end
Location of cap to connecting rod:	
- Vehicle applications	Flat joint face with dowels
- Non-vehicle applications	Serrations
Diameter of parent bore for big end	67,21/67,22 mm (2.6460/2.6465 in)
Diameter of parent bore for small end	42,07/42,09 mm (1.656/1.657 in)
Length between centres	219,05/219,10 mm (8.624/8.626 in)

Connecting rod alignment (A)

The large and small end bores must be square and parallel with each other within the limits of +/- 0,25 mm (0.010 in) measured 127 mm (5.0 in) each side of the connecting rod axis on a test mandrel. With the small end bush fitted, the limits are reduced to +/- 0,06 mm (0.0025 in).



Gudgeon pins - AA, YA, YC

Type	Fully floating
Outside diameter	34,920/34,925 mm (1.3748/1.3750 in)
Clearance fit in piston boss	0,003/0,014 mm (0.0001/0.0006 in)

Gudgeon pins - AB, AC, AD, YB, YD

Type	Fully floating
Outside diameter	38,095/38,100 mm (1.4998/1.5000 in)
Clearance fit in piston boss	0,003/0,014 mm (0.0001/0.0006 in)

Small end bushes - AA, YA, YC

Type	Steel back, lead bronze bearing material
Outside diameter	38,94/39,03 mm (1.535/1.536 in)
Inside diameter (reamed)	34,94/34,96 mm (1.3758/1.3765 in)
Clearance between bush in small end and gudgeon pin	0,020/0,043 mm (0.0008/0.0017 in)

Small end bushes - AB, AC, AD, YB, YD

Type	Steel back, lead bronze bearing material
Outside diameter	42,16/42,19 mm (1.6600/1.6613 in)
Inside diameter (reamed)	38,12/38,14 mm (1.5008/1.5015 in)
Clearance between bush in small end and gudgeon pin	0,020/0,043 mm (0.0008/0.0017 in)

Connecting rod bearings

Type:	
| - AA, YA, YC	Steel back, aluminium-tin bearing material
| - AB, AC, AD, YB, YD	Steel back, lead bronze bearing material with lead finish
Width:	
| - AA, YA, YC	31,62/31,88 mm (1.245/1.255 in)
| - AB, AC, AD, YB, YD	31,55/31,88 mm (1.240/1.255 in)
Thickness	1,835/1,842 mm (0.0723/0.0725 in)
Inside diameter	63,525/63,548 mm (2.5010/2.5019 in)
Bearing clearance	0,025/0,076 mm (0.001/0.003 in)
Available undersize bearings	-0,25 mm (-0.010 in); -0,51 mm (-0.020 in); -0,76 mm (-0.030 in)
| Piston cooling jets - AB, AC*, AD, YB, YD:	
Valve open pressure	178/250 kPa (26/36 lbf/in ²) 1,8/2,6 kgf/cm ²
| * Certain AC lists	

Crankshaft assembly

Crankshaft

Diameter of main journals	76,16/76,18 mm (2.998/2.999 in)
Maximum wear and ovality on journals and crank pins	0,04 mm (0.0016 in)
Width of front journal	36,93/37,69 mm (1.454/1.464 in)
Width of centre journal	44,15/44,22 mm (1.738/1.741 in)
Width of all other journals	39,24/39,35 mm (1.545/1.549 in)
Diameter of crank pins	63,47/63,49 mm (2.499/2.500 in)
Width of crank pins	40,35/40,42 mm (1.589/1.591 in)
Diameter of flange	133,27/133,37 mm (5.247/5.251 in)
Depth of recess for spigot bearing:	
- AA, AB, AC, AD	20,22/20,98 mm (0.796/0.826 in)
- YA, YB, YC, YD	14,72/15,48 mm (0.579/0.609 in)
Bore of recess for spigot bearing:	
- AA, AB, AC, AD	46,96/46,99 mm (1.849/1.850 in)
- YA, YB, YC, YD	51,97/51,99 mm (2.046/2.047 in)
Crankshaft end-float	0,05/0,38 mm (0.002/0.015 in)
Maximum permissible end-float	0,51 mm (0.020 in)
Fillet radii of journals and crank pins	3,68/3,96 mm (0.145/0.156 in)
Undersize journals and crank pins	-0,25 mm (-0.010 in); -0,51 mm (-0.020 in); -0,76 mm (-0.030 in)
Crankshaft heat treatment:	
- Induction hardened	Part numbers 31315662, 31315992 and 3131H024
- Nitrocarburised	Part numbers 31315661, 31315991 and 3131H022

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Crankshaft overhaul

Induction hardened crankshafts need not be hardened after they have been machined undersize.

Nitrocarburised crankshafts must be hardened again each time they are machined. These crankshafts must be nitrocarburised or, if this process is not available, they can be nitrided for 20 hours. If neither process is available a new crankshaft, or Power Exchange crankshaft, must be fitted.

Check the crankshaft for cracks before and after it is ground. Demagnetise the crankshaft after it has been checked for cracks.

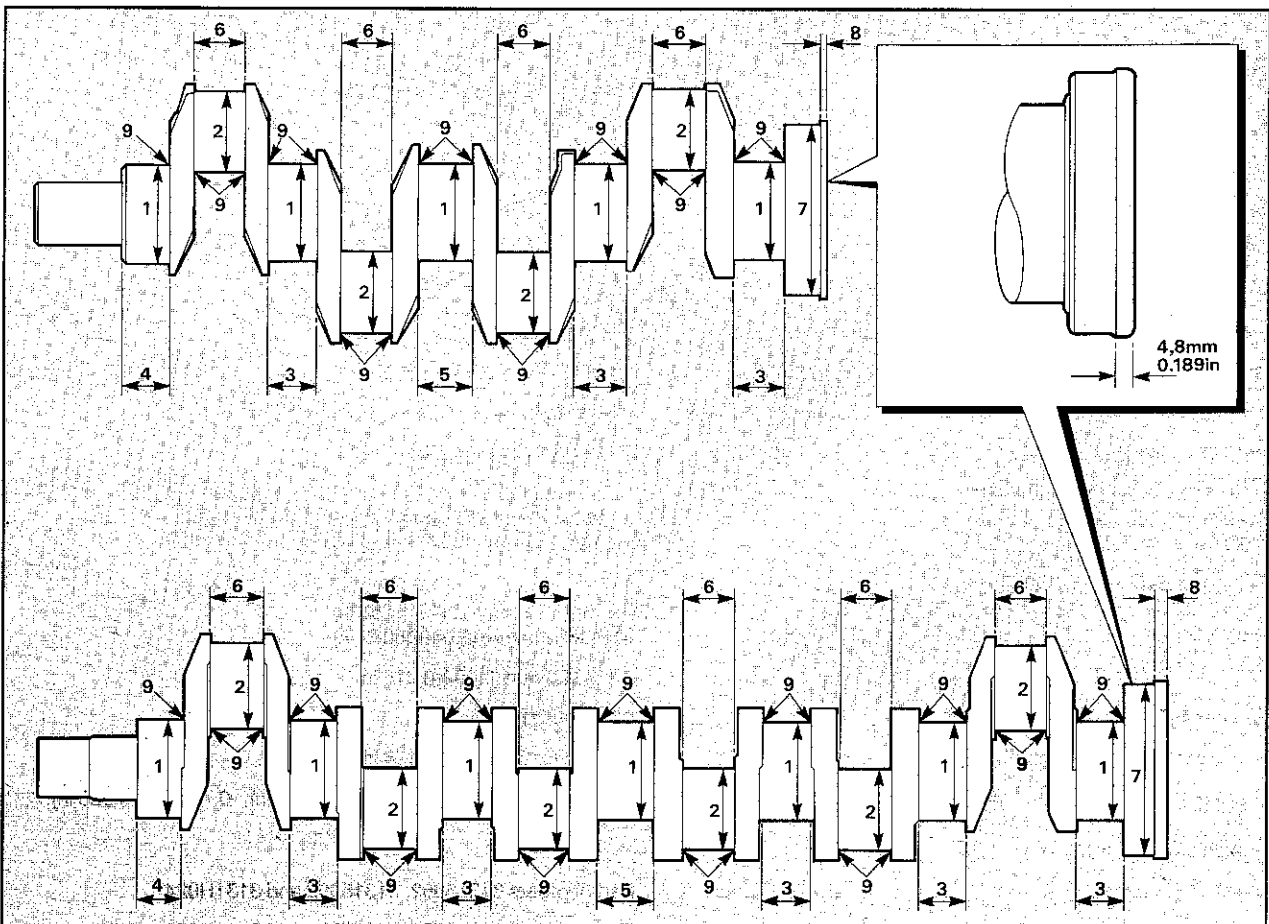
After the crankshaft has been machined remove any sharp corners from the lubricating oil holes.

Surface finish and fillet radii must be maintained.

The finished sizes for crankshafts which have been ground undersize are given below.

Item	Undersize		
	0,25 mm (0.010 in)	0,51 mm (0.020 in)	0,76 mm (0.030 in)
1	75,905/75,926 mm (2.9884/2.9892 in)	75,651/75,672 mm (2.9784/2.9792 in)	75,397/75,418 mm (2.9684/2.9692 in)
2	63,216/63,236 mm (2.4888/2.4896 in)	62,962/62,982 mm (2.4788/2.4796 in)	62,708/62,728 mm (2.4688/2.4696 in)
3		39,47 mm (1.554 in) maximum	
4		37,82 mm (1.489 in) maximum	
5		44,68 mm (1.759 in) maximum	
6		40,55 mm (1.759 in) maximum	
7		133,17 mm (5.243 in) minimum	
8		Do not machine this diameter	
9		3,68/3,96 mm (0.145/0.156 in)	

Surface finish for journals, crank pins and fillet radii must be 0,4 microns (16 micro inches).



With the crankshaft on mountings at the front and rear journals, the maximum run-out (total indicator reading) at the journals must not be more than shown below.

Journal	4 cylinder crankshafts	6 cylinder crankshafts engines
1	Mounting	Mounting
2	0,08 mm (0.003 in)	0,10 mm (0.004 in)
3	0,15 mm (0.006 in)	0,20 mm (0.008 in)
4	0,08 mm (0.003 in)	0,25 mm (0.010 in)
5	Mounting	0,20 mm (0.008 in)
6	-	0,10 mm (0.004 in)
7	-	Mounting

Run-out must not be opposite. The difference in run-out between one journal and the next must not be more than 0,10 mm (0.004 in). Run-out on the crankshaft pulley diameter, rear oil seal diameter and the rear flange diameter must not be more than 0,05 mm (0.002 in) total indicator reading.

Main bearings

Type:

- AA, AB, AC, AD:

All bearings Steel back, 20% tin-aluminium bearing material

- YA, YB, YC, YD:

Centre bearing Steel back, lead bronze bearing material with lead finish

All other bearings Steel back, 20% tin-aluminium bearing material

Bearing width:

- AA, AB, AC, AD:

Centre bearing 36,32/36,70 mm (1.430/1.445 in)

All other bearings 31,62/31,88 mm (1.245/1.255 in)

- YA, YB, YC, YD:

Centre bearing 36,32/36,70 mm (1.430/1.445 in)

All other bearings 30,86/31,12 mm (1.215/1.225 in)

Bearing thickness:

- AA, AB, AC, AD:

All bearings 2,083/2,089 mm (0.0820/0.0823 in)

- YA, YB, YC, YD:

Centre bearing 2,087/2,096 mm (0.0822/0.0825 in)

All other bearings 2,083/2,089 mm (0.0820/0.0823 in)

Inside diameter 76,23/76,27 mm (3.0010/3.0025 in)

Bearing clearance 0,046/0,107 mm (0.0018/0.0042 in)

Available undersize bearings -0,25 mm (-0.010 in); -0,51 mm (-0.020 in); -0,76 mm (-0.030 in).

Crankshaft thrust washers

Type Steel back, lead bronze bearing material

Position Each side of centre main bearing

Thickness:

- Standard 2,26/2,31 mm (0.089/0.091 in)

- Oversize 2,45/2,50 mm (0.096/0.098 in)

11C

Balancer unit

Diameter of drive shaft for front bearing	... ..	28,562/28,575 mm (1.1245/1.1250 in)
Diameter of drive shaft for rear bearing	... ..	23,787/23,800 mm (0.9365/0.9370 in)
Number of teeth on gear of drive shaft	... ..	21
Backlash from gear of drive shaft to idler gear	... ..	0,17/0,29 mm (0.007/0.011 in)
End-float of drive shaft	... ..	0,13/0,30 mm (0.005/0.012)
Diameter of bore for front bearing of drive shaft	... ..	34,912/34,937 mm (1.3745/1.3755 in)
Diameter of bore for rear bearing of drive shaft	... ..	29,972/29,993 mm (1.1800/1.1808 in)
Diameter of bore for idler gear	... ..	47,64/47,65 mm (1.8755/1.8760 in)
Diameter of hub of idler gear	... ..	38,09/38,10 mm (1.4996/1.5000 in)
End-float of idler gear	... ..	0,07/0,23 mm (0.003/0.009 in)
Thickness of thrust washer for idler gear	... ..	4,14/4,29 mm (0.163/0.169 in)
Number of teeth on idler gear	... ..	37
Inside diameter of bushes in balancer frame and end cover (fitted)	... ..	38,133/38,174 mm (1.5013/1.5029 in)
Diameter of spigots for balance weights	... ..	38,054/38,069 mm (1.4982/1.4988 in)
Fit of spigot in bush	... ..	0,064/0,120 mm (0.0025/0.0047 in)
End-float of balance weights	... ..	0,19/0,40 mm (0.007/0.016 in)
Backlash of gears on balance weights	... ..	0,10/0,27 mm (0.004/0.011 in)
Backlash of drive gear to spline on balance weight	... ..	0,05/0,20 mm (0.002/0.008 in)
Number of teeth on drive gear	... ..	24
Number of teeth on spline on balance weight	... ..	16

Timing case and drive assembly

Camshaft

Diameter of number 1 journal	50,71/50,74 mm (1.9965/1.9975 in)
Diameter of number 2 journal	50,46/50,48 mm (1.9865/1.9875 in)
Diameter of number 3 journal:	
- AA, AB, AC, AD	49,95/49,98 mm (1.9665/1.9675 in)
- YA, YB, YC, YD	50,20/50,23 mm (1.9765/1.9775 in)
Diameter of number 4 journal:	
- YA, YB, YC, YD	49,95/49,98 mm (1.9665/1.9675 in)
Clearance of all journals	0,06/0,14 mm (0.0025/0.0055 in)
Cam lift:	
- Inlet	7,62/7,69 mm (0.2999/0.3029 in)
- Exhaust	7,71/7,79 mm (0.3036/0.3066 in)
Maximum permissible ovality and wear on journals	0,05 mm (0.021 in)
End-float:	
- Production limit	0,10/0,41 mm (0.004/0.016 in)
- Service limit	0,53 mm (0.021 in)
Width of spigot for thrust washer	5,64/5,89 mm (0.222/0.232 in)

Camshaft thrust washer

Type	360°
Depth of recess in cylinder block for thrust washer	5,46/5,54 mm (0.215/0.218 in)
Thickness of thrust washer	5,49/5,54 mm (0.216/0.218 in)
Relationship of thrust washer to front face of cylinder block	-0,05/+0,08 mm (-0.002/+0.003 in)

Camshaft gear

Number of teeth	56
Diameter of bore	34,93/34,95 mm (1.3750/1.3760 in)
Outside diameter of hub of camshaft	34,90/34,92 mm (1.3741/1.3747 in)
Clearance fit of gear on hub	0,008/0,048 mm (0.0003/0.0019 in)

Fuel pump gear

Number of teeth	56
Bore	Tapered

Crankshaft gear

Number of teeth	28
Diameter of bore	47,625/47,650 mm (1.8750/1.8760 in)
Diameter of hub for gear on crankshaft	47,625/47,645 mm (1.8750/1.8758 in)
Transition fit of gear on crankshaft	-0,020/+0,048 mm (-0.0008/+0.0010 in)

Idler gear and hub

Number of teeth	63
Diameter of bore of gear	57,14/57,18 mm (2.2495/2.2512 in)
Width of gear and split bush assembly (fitted in position)	30,14/30,16 mm (1.186/1.187 in)
Inside diameter of flanged bushes (fitted in position)	50,80/50,82 mm (1.9998/2.0007 in)
Outside diameter of hub	50,70/50,74 mm (1.9960/1.9975 in)
Clearance of bushes on hub	0,058/0,119 mm (0.0023/0.0047 in)
End float of gear:	
- Production limit	0,10/0,20 mm (0.004/0.008 in)
- Service limit	0,38 mm (0.015 in)
Backlash for all gears	0,08 mm (0.003 in) minimum

Cylinder block assembly

Cylinder block

Height between top and bottom faces	... ..	441,12/441,33 mm (17.367/17.375 in)
Diameter of parent bore for cylinder liner	... ..	104,20/104,23 mm (4.103/4.104 in)
Depth of recess for flange of cylinder liner	... ..	3,81/3,91 mm (0.150/0.154 in)
Diameter of recess for flange of cylinder liner	... ..	107,82/107,95 mm (4.245/4.250 in)
Diameter of parent bore for main bearing	... ..	80,416/80,442 mm (3.1660/3.1670 in)
Camshaft bore diameter:		
- AA, AB, AC, AD:		
Number 1 (for bush)	... ..	55,56/55,59 mm (2.188/2.189 in)
Number 2	... ..	50,55/50,60 mm (1.990/1.992 in)
Number 3	... ..	50,04/50,09 mm (1.970/1.972 in)
- YA, YB, YC, YD:		
Number 1 (for bush)	... ..	55,56/55,59 mm (2.188/2.189 in)
Number 2	... ..	50,55/50,60 mm (1.990/1.992 in)
Number 3	... ..	50,29/50,34 mm (1.980.1.982 in)
Number 4	... ..	50,04/50,09 mm (1.970/1.972 in)
Bore of bush for number 1 camshaft journal	... ..	50,79/50,85 mm (2.000/2.002 in)

Cylinder liners

Type:		
- Production	... ..	Dry, interference fit, flanged
- Service	... ..	Dry, transition fit, flanged
Outside diameter of production liner	... ..	104,25/104,28 mm (4.105/4.106 in)
Interference fit of production liner	... ..	0,03/0,08 mm (0.001/0.003 in)
Inside diameter of production liner	... ..	100,00/100,03 mm (3.937/3.938 in)
Transition fit of service liner	... ..	+/- 0,03 mm (+/- 0.001 in)
Inside diameter of service liner (fitted)	... ..	100,04/100,06 mm (3.9385/3.9395 in)
Maximum permissible wear of liner bore	... ..	0,25 mm (0.010 in)
Thickness of flange	... ..	3,81/3,86 mm (0.150/0.152 in)
Relative position of top of liner flange to top face of cylinder block	... ..	0,10 mm (0.004 in) above 0,10 mm (0.004 in) below

Aspiration system

Turbocharger

Make and type of turbocharger fitted:

- AB	... ..	Airsearch T31 or Schwitzer S2A
- AC	... ..	Schwitzer S2A
- AD	... ..	Schwitzer S2A
- YB	... ..	Airsearch T04B
- YD	... ..	Schwitzer S76

Lubrication system

Lubricating oil pump - AA, AB, AC, AD

Type	Differential rotor, gear driven
Number of lobes	Inner rotor 6, outer rotor 7
Clearance of outer rotor to body:	
- Without balancer unit	0,15/0,34 mm (0.006/0.013 in)
- With balancer unit	0,31/0,45 mm (0.012/0.017 in)
Clearance of inner rotor to outer rotor	0,04/0,13 mm (0.0015/0.0050 in)
End-float of rotor assembly	0,03/0,10 mm (0.001/0.004 in)

Lubricating oil pump - YA, YB, YC, YD

Type	Differential rotor, gear driven
Number of lobes:	
- Inner rotor	4
- Outer rotor	5
Clearance of outer rotor to body	0,15/0,34 mm (0.006/0.013 in)
Clearance of inner rotor to outer rotor	0,04/0,13 mm (0.0015/0.0050 in)
End clearance YA, YC:	
- Inner rotor	0,05/0,12 mm (0.002/0.005 in)
- Outer rotor	0,04/0,11 mm (0.0015/0.0044 in)
End clearance YB, YD:	
- Inner rotor	0,043/0,118 mm (0.0017/0.0046 in)
- Outer rotor	0,031/0,106 mm (0.0012/0.0042 in)
Clearance of bush of idler gear on shaft	0,020/0,066 mm (0.0008/0.0026 in)

Oil pressure relief valve (standard)

Diameter of bore for plunger	18,24/18,27 mm (0.718/0.719 in)
Outside diameter of plunger	18,16/18,18 mm (0.715/0.716 in)
Clearance of plunger in bore	0,06/0,11 mm (0.002/0.004 in)
Length of spring (fitted):	
- AA, AB, AC, AD	59,8 mm (2.4 in)
- YA, YB, YC, YD	55,6 mm (2.2 in)
Load on spring (fitted):	
| - AA, AB, AC, AD	15,9/23,1 N (3.6/5.2 lbf) 1,6/2,4 kgf
| - YA, YB, YC, YD	12,9/18,6 N (2.9/4.2 lbf) 1,3/1,9 kgf
Pressure to open valve	
| - Four cylinder engines:	
| Without piston cooling jets	340/395 kPa (49/57 lbf/in ²) 3,5/4,0 kgf/cm ²
| With piston cooling jets	415/470 kPa (60/68 lbf/in ²) 4,2/4,8 kgf/cm ²
| - Six cylinder engines	345/414 kPa (50/60 lbf/in ²) 3,5/4,2 kgf/cm ²

Oil pressure relief valve (with balancer)

Diameter of bore for plunger	16,00/16,03 mm (0.630/0.631 in)
Outside diameter of plunger	15,95/15,98 mm (0.628/0.629 in)
Clearance of plunger in bore	0,02/0,08 mm (0.0008/0.003 in)
Length of spring (fitted)	42,7 mm (1.7 in)
Load on spring (fitted):	
| - Engines without piston cooling jets	24/30 N (5.4/6.7 lbf) 2,4/3,1 kgf
| - Engines with piston cooling jets	34/38 N (7.6/8.5 lbf) 3,5/3,9 kgf
Pressure to open valve:	
| - Engines without piston cooling jets	414 kPa (60 lbf/in ²) 4,2 kgf/cm ²
| - Engines with piston cooling jets	523 kPa (76 lbf/in ²) 5,3 kgf/cm ²

Oil filter

Type	Full flow, screw-on type canister
Pressure to open by-pass valve in filter	55/83 kPa (8/12 lbf/in ²) 0,6/0,8 kgf/cm ²
Pressure to open by-pass valve in oil cooler	172 kPa (25 lbf/in ²) 1,8 kgf/cm ²

Fuel system

Bosch fuel injection pump

Type EPVE
 Direction of rotation from drive end Clockwise
 Outlet for number 1 cylinder "C"

Static timing:

The engine check angle must be used with special tool MS.67B and with the engine set with number 1 piston at top dead centre (TDC) on compression stroke. The pump mark angle and the piston displacement are checked with the pump plunger set at 1,00 mm (0.039 in) plunger lift.

The code letters are included in the setting code stamped on the data plate which is fastened to the fuel injection pump. A typical setting code is 2643J603DK/1/3020; in this example the code letters are "DK".

Fuel pump code letters	Engine check angle degrees	Pump mark angle degrees	Static timing position degrees before TDC	Piston displacement	
				mm	in
BK	308	314	12	1,78	0.070
CK	308	314	12	1,78	0.070
DK	307	313	12	1,78	0.070
EK	308 1/2	315 1/2	14	2,42	0.095
EK*	306 1/2	315 1/2	18	3,99	0.157
EM	288 1/2	295 1/2	14	2,42	0.095
FM	288 3/4	295	12 1/2	1,93	0.076

* Engines to build list YA80433 with the data plate of the fuel injection pump stamped J609.

CAV fuel injection pump

Type DPA or DPS
 Direction of rotation from drive end Clockwise
 Outlet for number 1 cylinder:
 - AA, AB, AC, AD Letter "W"
 - YA, YB, YC, YD Letter "Y"

Static timing:

The engine check angle must be used with special tool MS67B and with the engine set with number 1 piston at top dead centre (TDC) on compression stroke. The pump is checked with the pump set at the start of injection for number 1 cylinder.

The code letters are included in the setting code stamped on the data plate of the fuel injection pump. A typical setting code is 2643C601BM/4/2860; in this example the code letters are "BM".

Fuel pump code letters	Engine check angle degrees	Pump mark angle degrees
AK	324 1/2	336
AM	282 1/4	292
BM	282 1/4	290 1/2
CM	282 1/4	290
DM	282 1/4	290 1/2
FK	325 1/2	336
GK	324	336
GM	282 1/4	292
HK	327	336
HM	282 1/4	291
JK	325 1/2	334

Atomisers

Code	Holder	Nozzle	Set and reset pressure		
			atm	(lbf/in ²)	MPa
HV	LRB67014	JB6801052	250	3675	25,3
HZ	LRB67014	JB6801029	220	3234	22,3
JA	LRB67014	JB6801057	250	3675	25,3
JB	LRB67014	JB6801058	250	3675	25,3
JE	LRB67014	JB6801058	220	3234	22,3
JF	LRB67032	JB6801052	250	3675	25,3
JG	LRB67032	JB6801058	230	3381	23,3
JH	LRB67014	JB6801084	250	3675	25,3
JJ	LRB67014	JB6801082	250	3675	25,3
JK	LRB67014	JB6801088	220	3234	22,3
JL	LRB67032	JB6801093	250	3675	25,3
JR	LRB67032	JB6801100	250	3675	25,3
JS	LRB67032	JB6801084	250	3675	25,3
RD	KBEL66S45	DLLA140S1039	250	3675	25,3
RE	KBEL66S47	DLLA150S1055	250	3675	25,3
RF	KBEL66S47	DLLA150S1072	250	3675	25,3
RH	KBEL66S47	DLLA150S1087	250	3675	25,3

The code letters are stamped on the side of the atomiser body just below the connection for the nut of the high pressure pipe.

Fuel lift pump - AA, AB, AC, AD

Type A.C.Delco, type XD
 Method of drive Eccentric on camshaft
 Static pressure (no delivery) 42/70 kPa (6/10 lbf/in²) 0,4/0,7 kgf/cm²

Fuel lift pump - YA, YB, YC, YD

Type A.C.Delco, type LU
 Method of drive Eccentric on camshaft
 Static pressure (no delivery) 34,5/55,2 kPa (5/8 lbf/in²) 0,35/0,56 kgf/cm²
 Test pressure (75% of minimum static pressure) 26 kPa (3.75 lbf/in²) 0,26 kgf/cm²

Fuel filter

Type Twin parallel flow or single element

Cooling system

Water pump

Type	Centrifugal, gear driven
Outside diameter of shaft	15,91/15,92 mm (0.6262/0.6257 in)
Diameter of bore of drive gear	15,88/15,89 mm (0.6253/0.6257 in)
Interference fit of drive gear on shaft	0,02/0,04 mm (0.0008/0.0014 in)
Diameter of bore of impeller	15,87/15,89 mm (0.6249/0.6257 in)
Diameter of bearing	29,99/30,00 mm (1.1807/1.1811 in)
Diameter of bore for bearing	29,96/29,98 mm (1.1795/1.1803 in)
Interference fit of bearing in pump body	0,01/0,04 mm (0.0004/0.0016 in)
Dimension of impeller boss to front face of pump body (fitted)	8,1/8,5 mm (0.319/0.335 in)
Dimension of gear from rear face of pump body (fitted)	0,6/2,6 mm (0.024/0.102 in)

Thermostat

Type:	
- AA, AB, AC, AD	Single, wax pellet, by-pass blanking
- YA, YB, YC, YD	Twin, wax pellet, by-pass blanking
"Start to open" temperature	77°/85°C (170°/185°F)
"Fully open" temperature	92°/98°C (198°/208°F)
Valve lift, fully open	9,1 mm (0.358 in)

Fan drive housing

Bore of housing for bearing	41,98/41,99 mm (1.6527/1.6531 in)
Outside diameter of bearing	41,99/42,00 mm (1.6531/1.6535 in)
Interference fit of bearing in housing	0,00/0,02 mm (0.0000/0.0008 in)
Bore of hub	21,946/21,958 mm (0.8640/0.8645 in)
Outside diameter of shaft	21,987/22,000 mm (0.8656/0.8661 in)
Interference fit of shaft in hub	0,029/0,054 mm (0.0011/0.0021 in)
Maximum permissible end-float of shaft	0,25 mm (0.010 in)

Flywheel and housing

Limits for flywheel housing run-out and alignment (total indicator reading)

Diameter of housing flange bore		Maximum limit (total indicator reading)	
mm	in	mm	in
Up to 362	Up to 14.25	0,15	0.006
362 to 511	14.25 to 20.125	0,20	0.008
511 to 648	20.125 to 25.50	0,25	0.010
Over 648	Over 25.50	0,30	0.012

Electrical equipment

The information which follows is general and can change with individual applications.

Alternators

Make and type	CAV AC5RA, CAV AC5RS or Lucas A127
Rating:	
- AC5RA and AC5RS	12V/60A or 24V/40A
- A127	12V/55A
Rotation	Clockwise from drive end

Starter motors

Make and Type	CAV M45G, CAV S115 or Lucas M127
Voltage:	
- M45G and S115	12V or 24V
- M127	12V
Number of teeth on pinion	10
Maximum starter cable resistance at 20°C (68°F):	
- 12V	0.0017 ohms
- 24V	0.0034 ohms

Starting aid

Type	Fuel fed, electrically operated heater
Voltage	12V (dropping resistor used on 24V system)
Flow rate of fuel through starting aid	3,5/5,9 ml/min

Auxiliary equipment

Compressor drive assembly

Number of teeth on idler gears	... ..	27
Number of teeth on compressor drive gear	... ..	26
Inside diameter of idler gear	... ..	22,23/22,25 mm (0.875/0.876 in)
Outside diameter of shaft for idler gears	... ..	22,23/22,24 mm (0.8750/0.8756 in)
Transition fit of gears on shaft	... ..	-0,01/+0,02 mm (-0.0004/+0.0008 in)
Inside diameter of front bearing	... ..	24,987/25,003 mm (0.9837/0.9844 in)
Outside diameter of shaft for front bearing	... ..	25,014/25,026 mm (0.9848/0.9853 in)
Interference fit of bearing on shaft	... ..	0,011/0,039 mm (0.0004/0.0015 in)
Housing bore for front bearing	... ..	61,948/61,966 (2.4389/2.4396 in)
Outside diameter of front bearing	... ..	61,983.62,004 mm (2.4403/2.4411 in)
Interference fit of front bearing	... ..	0,017/0,056 mm (0.0007/0.0022 in)
Inside diameter of rear bush	... ..	15,875/15,900 mm (0.625/0.626 in)
Outside diameter of shaft for rear bush	... ..	15,82/15,85 mm (0.6228/0.6240 in)
Clearance fit of shaft in bush	... ..	0,025/0,08 mm (0.001/0.003 in)
Inside diameter of drive gear	... ..	23,750/23,775 mm (0.9350/0.9360 in)
Outside diameter of compressor drive shaft	... ..	23,753/23,765 mm (0.9352/0.9356 in)
Transition fit of gear on shaft	... ..	-0,015/+0,022 mm (-0.0006/+0.0009 in)
Bore for bush	... ..	19,000/19,030 mm (0.7480/0.7492 in)
Outside diameter of bush	... ..	19,050/19,075 mm (0.75/0.7510 in)
Interference fit of bush in compressor casing	... ..	0,020/0,075 mm (0.0008/0.0030 in)