

2006 MINI Cooper

2002-08 ENGINE Engine - Technical Data - Cooper (W10) & Cooper S (W11)

2002-08 ENGINE

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ENGINE, GENERAL

11 00 ENGINE IN GENERAL

ENGINE IN GENERAL

Cylinder		4
Bore	mm	77 (3.03)
Stroke	mm	85.8 (3.377)
Effective displacement	cm ³	1598
Compression ratio (W10)	:1	10.5
Compression ratio (W11)	:1	8.3
Maximum permissible speed (fuel shutoff)	rpm	7000
Permissible continuous speed (red area)	rpm	6750
Compression pressure (approximately equal for all Cylinders) (W10)	bar	11.5-17.0
Compression pressure (approximately equal for all Cylinders) (W11)	bar	9.0-13.5

ENGINE BLOCK

11 00 ENGINE IN GENERAL

Information is identical to 11 00 ENGINE IN GENERAL.

11 31 CAMSHAFT

Information is identical to 11 31 CAMSHAFT.

11 24 CONNECTING RODS AND BEARINGS

Information is identical to 11 24 CONNECTING RODS AND BEARINGS.

11 21 CRANKSHAFT AND BEARINGS

Information is identical to 11 21 CRANKSHAFT AND BEARINGS.

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11 21 CRANKSHAFT AND BEARINGS

Information is identical to 11 21 CRANKSHAFT AND BEARINGS.

11 12 CYLINDER HEAD WITH COVER

Information is identical to 11 12 CYLINDER HEAD WITH COVER.

11 12 CYLINDER HEAD WITH VALVE SEAT COVER

Information is identical to 11 12 CYLINDER HEAD WITH VALVE SEAT COVER.

11 11 ENGINE BLOCK (CRANKCASE)

ENGINE BLOCK (CRANKCASE) SPECIFICATIONS

Bore dia. a)	mm	76.992-77.008
Permitted out-of-round of cylinder bore a)	mm	0.0076
Permitted conicity of cylinder bore a)	mm	0.051
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.10

11 25 PISTONS WITH RINGS AND PINS

Information is identical to 11 25 PISTONS WITH RINGS AND PINS.

11 25 PISTONS WITH RINGS AND PINS

Information is identical to 11 25 PISTONS WITH RINGS AND PINS.

11 34 VALVES WITH SPRINGS

Information is identical to 11 34 VALVES WITH SPRINGS.

CYLINDER HEAD WITH COVER

11 31 CAMSHAFT

Information is identical to 11 31 CAMSHAFT.

11 24 CONNECTING RODS AND BEARINGS

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11 21 CRANKSHAFT AND BEARINGS

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11 12 CYLINDER HEAD WITH COVER0

CYLINDER HEAD WITH COVER SPECIFICATIONS

Inside diameter of installed valve guide	mm	5.975-6.000
Running clearance between valve and valve guide		
Inlet	mm	0.048-0.066
Exhaust	mm	0.074...0.094
Maximum running clearance between valve and valve guide (inlet)	mm	0.076
Maximum running clearance between valve and valve guide (exhaust)	mm	0.101
Wear limit (inlet)	mm	0.25
Wear limit (exhaust)	mm	0.25

11 12 CYLINDER HEAD WITH VALVE SEAT COVER

CYLINDER HEAD WITH VALVE SEAT COVER W10 SPECIFICATIONS

Valve seat angle	°	45
Correction angle: outer	°	15
Correction angle: inner	°	75
Valve seat width: Inlet	mm	1.15-1.48
Valve seat width: outer	mm	1.47-1.80
Valve seat bore diameter		
Valve seat surface: Outside dia. inlet	mm	31.9 +0.1
Valve seat surface: Outside dia. exhaust	mm	25.2 +0.1

CYLINDER HEAD WITH VALVE SEAT COVER W11 SPECIFICATIONS

Valve seat angle	°	45
Correction angle: outer	°	15
Correction angle: inner	°	65.25

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Valve seat width: Inlet	mm	.90-1.30
Valve seat width: outer	mm	.90-1.30
Valve seat bore diameter		
Valve seat surface: Outside dia. inlet	mm	30.000
Valve seat surface: Outside dia. exhaust	mm	23.000

11 25 PISTONS WITH RINGS AND PINS

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11 34 VALVES WITH SPRINGS

Information is identical to 11 34 VALVES WITH SPRINGS.

CRANKSHAFT WITH BEARING

11 31 CAMSHAFT

Information is identical to 11 31 CAMSHAFT.

11 24 CONNECTING RODS AND BEARINGS

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11 21 CRANKSHAFT AND BEARINGS

CRANKSHAFT AND BEARINGS SPECIFICATIONS (MAIN)

Diameters of main journals	mm	47.922-48.008
Radial play of main bearings	mm	0.022-0.062
Radial play of main bearings (wear limit)	mm	0.70
Axial play of crankshaft	mm	0.090-0.240
Axial play of crankshaft (wear limit)	mm	0.30

11 21 CRANKSHAFT AND BEARINGS

CRANKSHAFT AND BEARINGS SPECIFICATIONS (CONROD)

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Diameters of conrod bearing journals (W10)	mm	43.992-44.008
Diameters of conrod bearing journals (W11)	mm	45.992-46.008
Radial play of conrod bearings	mm	0.023-0.067
Radial play of conrod bearings (wear limit)	mm	0.070

11 25 PISTONS WITH RINGS AND PINS R50

Information is identical to 11 25 PISTONS WITH RINGS AND PINS R50.

11 25 PISTONS WITH RINGS AND PINS R50

Information is identical to 11 25 PISTONS WITH RINGS AND PINS R50.

11 34 VALVES WITH SPRINGS R50

Information is identical to 11 34 VALVES WITH SPRINGS R50.

CONNECTING ROD WITH BEARING

11 31 CAMSHAFT R50

Information is identical to 11 31 CAMSHAFT R50.

11 24 CONNECTING RODS AND BEARINGS

CONNECTING RODS AND BEARINGS SPECIFICATIONS

Conrod bushing: Inside diameter (W10)	mm	18.96-18.98
Conrod bushing: Inside diameter (W11)	mm	21.009-21.019
Running clearance between small-end bushing and piston pin	mm	0.023-0.067
	Wear	limit mm 0.07

11 25 PISTONS WITH RINGS AND PINS R50

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11 34 VALVES WITH SPRINGS R50

Information is identical to 11 34 VALVES WITH SPRINGS R50.

PISTON WITH RINGS AND PIN

11 31 CAMSHAFT R50

Information is identical to 11 31 CAMSHAFT R50.

11 25 PISTONS WITH RINGS AND PINS R50

PISTONS WITH RINGS AND PINS R50 SPECIFICATIONS

Pistons and pins are matched - only replace together in pairs		
Measuring point "A" (position)	mm	
Piston diameter at measuring point "A"		
Original (new dimension)	mm	76.956-76.974
Piston running clearance	mm	0.018-0.52
Permissible total play between piston and cylinder (engine operated)	mm	0.15

11 25 PISTONS WITH RINGS AND PINS

PISTONS WITH RINGS AND PINS SPECIFICATIONS

1st groove		
End clearance	mm	0.20-0.36
Contact clearance (wear limit)	mm	0.8
Axial play	mm	0.025-0.065
2nd groove		
End clearance	mm	0.25-0.46
Contact clearance (wear limit)	mm	1.0
Axial play	mm	0.025-0.065
3rd groove		
End clearance	mm	0.20-0.58
Contact clearance (wear limit)	mm	1.0
Axial play	mm	0.004-0.178

11 34 VALVES WITH SPRINGS R50

Information is identical to 11 34 VALVES WITH SPRINGS R50.

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CAMSHAFT

11 00 ENGINE IN GENERAL R50 / W10 / COOPER

Information is identical to 11 00 ENGINE IN GENERAL R50 / W10 / COOPER.

11 31 CAMSHAFT

CAMSHAFT SPECIFICATIONS

Diameters of bearings	mm	25.290-25.309
Radial runout	mm	0.053-0.093
Wear limit: Radial runout	mm	0.12
Axial play	mm	0.05-0.095
Wear limit: Axial play	mm	0.40

VALVES WITH SPRINGS

11 34 VALVES WITH SPRINGS

VALVES WITH SPRINGS W10 SPECIFICATIONS

Stem bore diameter		
Inlet	mm	5.934-5.952
Exhaust	mm	5.934-5.952
Valve (length)		
Inlet	mm	108.72-109.22
Exhaust	mm	117.57-118.07

VALVES WITH SPRINGS W11 SPECIFICATIONS

Stem bore diameter		
Inlet	mm	5.934-5.952
Exhaust	mm	5.906-5.924
Exhaust	mm	5.934-5.952
Valve (length)		
Inlet	mm	109.53
Exhaust	mm	118.33

OIL SUPPLY

11 40 OIL SUPPLY R50 / W10

OIL SUPPLY SPECIFICATIONS

Oil grades and consumption: refer		
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to appropriate OPERATING FLUIDS article in GENERAL INFORMATION.		
Oil change volume with oil filter (W10)	Liters	4.5
Oil change volume with oil filter (W11)	Liters	4.8

OIL PUMP WITH FILTER AND DRIVE

11 31 CAMSHAFT R50

Information is identical to 11 31 CAMSHAFT R50.

11 24 CONNECTING RODS AND BEARINGS R50

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11 21 CRANKSHAFT AND BEARINGS R50

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11 12 CYLINDER HEAD WITH COVER R50

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11 12 CYLINDER HEAD WITH VALVE SEAT COVER R50

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11 11 ENGINE BLOCK (CRANKCASE) R50

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11 25 PISTONS WITH RINGS AND PINS R50

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11 34 VALVES WITH SPRINGS R50

Information is identical to 11 34 VALVES WITH SPRINGS R50.

11 41 OIL PUMP WITH SUCTION ELEMENT AND DRIVE

OIL PUMP WITH SUCTION ELEMENT AND DRIVE SPECIFICATIONS

Oil pressure at idle speed and engine at operating temperature	bar	0.25
Oil pressure at 3000 rpm	bar	1.7 - 5.5