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Technical specifications

MINI Mini
W10B16BA/1.6 (R50/52/53) (01-09)

Vehicle identification

No. of cylinders	Type	4/OHC
Capacity (Fiscal)	cc	1598
Compression ratio	:1	10,5
Suitable for unleaded petrol		Yes
Minimum octane rating	RON	91
Ignition system	Make	Siemens
Ignition system	Type	EMS2
Ignition system	Description	Map-DIS
Trigger location		Cam/Crankshaft
Fuel system	Make	Siemens
Fuel system	Type	EMS2
Fuel system	Description	MFI-s
Air metering	Type	MAP
Combined ignition and fuel ECM		Yes
Diagnostic socket		Yes

Tuning and emissions

Tuning and emissions

Ignition timing - basic BTDC	°Engine/rpm	Not adjustable
Ignition advance checks	°Engine/rpm	ECM Controlled
Idle speed	rpm	800±100 Not adjustable
Oil temperature for CO test	°C	80
CO level at idle speed - tailpipe	Vol. % CO	0,2 Max Not adjustable
HC level at idle speed	ppm	100
CO2 level at idle speed	Vol. % CO2	14,5-16
O2 level at idle speed	Vol. % O2	0,1-0,5
Increased idle speed for CO test	rpm	2500-2800
CO content at increased idle speed	Vol. %	0,3
Lambda at increased idle	λ	0,97-1,03

Spark plugs

Spark plugs

Spark plugs	Original equipment	NGK
Spark plug	Type	BKR6EQUP
Spark plugs	Make	NGK
Spark plug	Type	BKR6EQUP

Fuel system

Fuel system

System pressure	bar	3,0

Service checks and adjustments

Service checks and adjustments

Valve clearance -INLET	mm	Hydraulic
Valve clearance -EXHAUST	mm	Hydraulic
Compression pressure	bar	11,5-17,0
Oil pressure	bar/rpm	1,7-5,5/3000

Lubricants and capacities

Preferred engine oil

Ambient temperature range		All temperatures
Engine oil grade	SAE	0W-30, 0W-40, 5W-30, 5W-40 Synthetic
Engine oil classification	OEM	BMW LL01

Engine oil options

Ambient temperature range		All temperatures
Engine oil grade	SAE	0W-30, 0W-40 Synthetic
Engine oil classification	OEM	BMW LL04

Engine oil classification

- BMW LL04 is only approved for European Union (EU), Switzerland, Norway and Liechtenstein.

Ambient temperature range		All temperatures
Engine oil grade	SAE	5W-30, 5W-40 Synthetic
Engine oil classification	OEM	BMW LL04

Engine oil classification

- BMW LL04 is only approved for European Union (EU), Switzerland, Norway and Liechtenstein.

Engine with filter(s)	litres	4,5

Other lubricants and capacities

Manual transmission oil grade	SAE

Manual transmission oil grade

- In case of repair only fill with lifetime oil.

  Oil types must not be mixed.

- Blue label = Texaco MTF-LT-3, BMW part No. 83-22-7-533-818

  MTF-LT-3 has been superseded by MTF-LT-4, BMW part No. 83-22-0-421-925. Fully drain transmission and attach MTF-LT-4 label.

  - If installing new transmission, use Texaco MTF-LT-4, BMW part No. 83-22-0-421-925. Attach MTF-LT-4 label.
- Yellow label = Texaco MTF-LT-4, BMW part No. 83-22-0-421-925
- 5 speed: GS-52 BG = Texaco MTF-LT-4, BMW part No. 83-22-0-421-925
- 5 speed: GS-65 BH (Midland) = Texaco MTF 94, BMW part No. 83-22-0-403-247
- 6 speed: GS6-85 BG/DG = Texaco MTF 94, BMW part No. 83-22-0-403-247

Manual transmission	litres

Gearbox oil capacity

- →07.04: GD565BH/SH = 2,0 litres
- 07.04→: GS552BG = 1,7 litres
- Dry fill capacity: GS685 BG/DG = 1,7 litres.

Automatic transmission fluid	Type

Automatic transmission fluid type

- CVT = Esso EZL-799

Automatic transmission (drain & refill)	litres

Automatic transmission fluid - drain and refill

- Automatic transmission (Aisin F21):
- Fill transmission with specified amount.
- Start engine. Remove level plug. Allow excess fluid to drain off.
- Select each gear twice for 2-3 seconds, then return selector lever to 'P'.
- Ensure ATF temperature is 35-45°C.
- Top up until ATF runs from level hole.
- CVT (ZF ECVT):
- Fill transmission with specified amount.
- Ensure dynamic stability control (DSC) system switched OFF, if fitted.
- Ensure selector lever in 'P'.
- Start engine and allow to idle for 10 seconds.
- Press brake pedal, select each gear for more than 5 seconds.
- Move selector to 'M' and release brake pedal.
- Press accelerator pedal slightly, (keep engine speed below 2500 rpm).
- Manually select 1st to 5th gear. Manually select 6th gear and then 1st gear for 3 seconds each, repeat twice.
- Press brake pedal, move selector to 'R' and wait 2 seconds.
- Release brake pedal, slowly raise engine speed to 2500 rpm and hold, wait 10 seconds.
- Press brake pedal, move selector to 'P', release brake pedal, wait 15 seconds.
- Press brake pedal, wait 2 seconds, move selector to 'N'.
- Ensure ATF temperature is 30-50°C.
- Ensure at least 0,3 litres drains from level hole, if not top up with at least 1,0 litre and allow excess fluid to drain off.

Automatic transmission (dry fill)	litres

Automatic transmission fluid - dry fill capacity

- Automatic transmission (Aisin F21):
- Fill transmission with specified amount.
- Start engine. Remove level plug. Allow excess fluid to drain off.
- Select each gear twice for 2-3 seconds, then return selector lever to 'P'.
- Ensure ATF temperature is 35-45°C.
- Top up until ATF runs from level hole.
- CVT (ZF ECVT):
- Dry fill capacity = 5,0 litres
- Fill transmission with specified amount.
- Ensure dynamic stability control (DSC) system switched OFF, if fitted.
- Ensure selector lever in 'P'.
- Start engine and allow to idle for 10 seconds.
- Press brake pedal, select each gear for more than 5 seconds.
- Move selector to 'M' and release brake pedal.
- Press accelerator pedal slightly (keep engine speed below 2500 rpm).
- Manually select 1st to 5th gear. Manually select 6th gear and then 1st gear for 3 seconds each, repeat twice.
- Press brake pedal, move selector to 'R' and wait 2 seconds.
- Release brake pedal, slowly raise engine speed to 2500 rpm and hold, wait 10 seconds.
- Press brake pedal, move selector to 'P', release brake pedal, wait 15 seconds.
- Press brake pedal, wait 2 seconds, move selector to 'N'.
- Ensure ATF temperature is 30-50°C.
- Ensure at least 0,3 litres drains from level hole, if not top up with at least 1,0 litre and allow excess fluid to drain off.

Cooling system - total capacity	litres	5,3
Brake fluid	Type	DOT 4 LV
Clutch fluid	Type	DOT 4 LV
Power steering fluid	Type	Pentosin CHF 11S
Power steering fluid	litres	0,6-0,7

Tightening torques

Tightening torques

Cylinder head instructions

- Do not remove bolt coating.

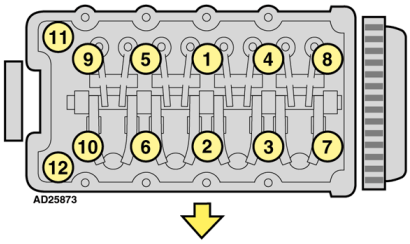


Fig25873

Cylinder head

	Renew bolts	Yes
	Tighten	20 Nm

	Tighten	40 Nm
	Tighten	90°
	Tighten	M8=28 Nm

Other engine tightening torques

Main bearings	Renew bolts/nuts	Yes
Main bearings	Stage 1	

Main bearings

Do not remove bolt coating.

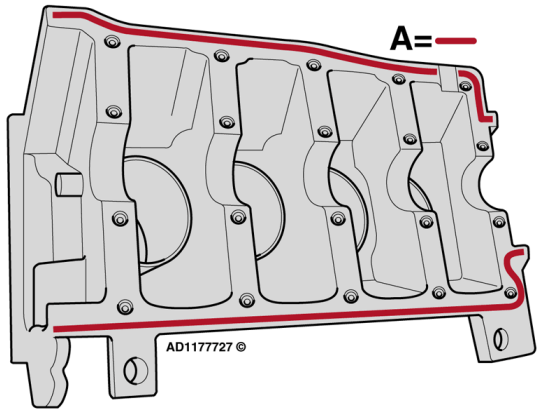
Lubricate bolt threads.

Apply a bead of Loctite 518 or equivalent to mating surface of cylinder block fig1177727.A.

1-10 (M10) = 60 Nm

11-20 (M8) = 35 Nm

fig1177784



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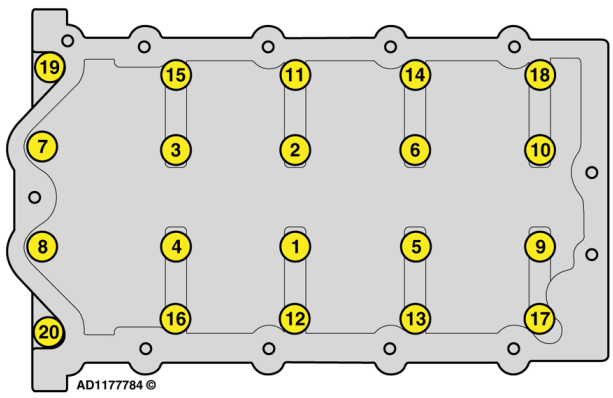

fig1177784

Big end bearings	Renew bolts/nuts	Yes

- Do not remove bolt coating.

Big end bearings	Stage 1	20 Nm
Big end bearings	Stage 2	90°
Sump bolts		31 Nm
Sump drain bolt		31 Nm

Flywheel/driveplate	80 Nm

Flywheel/driveplate

- Dual mass flywheel = 90 Nm.

Clutch pressure plate

Clutch pressure plate

- M7 = 20 Nm
- M8 = 23 Nm
- M9 = 28 Nm

Crankshaft pulley/damper centre bolt	115 Nm

- Use new nuts/bolts.

Camshaft sprocket/gear	102 Nm
Camshaft carrier/cap	30 Nm
Camshaft/rocker cover	12 Nm
Inlet manifold to cylinder head	26 Nm
Exhaust manifold to cylinder head	24 Nm
Exhaust downpipe to manifold	60 Nm

- Use new nuts/bolts.

Water pump	30 Nm
Spark plugs	27 Nm
Fuel rail	25 Nm
Crankshaft position (CKP) sensor/engine speed (RPM) sensor	9 Nm
Camshaft position (CMP) sensor	9 Nm
Engine coolant temperature (ECT) sensor	17 Nm
Lambda sensor (Oxygen)	39 Nm
Knock sensor (KS)	22 Nm
Engine oil pressure switch	20 Nm

Chassis tightening torques

Front hub	182 Nm

- Use new nuts/bolts.

Front hub - wheel bearing housing bolts	20 Nm+90°±15°

- Use new nuts/bolts.

Rear hub - wheel bearing housing bolts	56 Nm
Steering wheel	63 Nm
Steering rack/box mounting	56 Nm
Steering track rod end	52 Nm

- Use new nuts/bolts.

Brake disc to hub	Front	27 Nm

- Use new nuts/bolts.

Brake caliper to carrier	Front	28±2 Nm

- Use new nuts/bolts.

Brake caliper/carrier to hub	Front	110 Nm

- Use new nuts/bolts.

Brake disc to hub	Rear	27 Nm

- Use new nuts/bolts.

Brake caliper to carrier	Rear	28±2 Nm

- Use new nuts/bolts.

Brake caliper/carrier to hub	Rear	65 Nm

- Use new nuts/bolts.

ABS sensor	Front	8 Nm
ABS sensor	Rear	8 Nm
Road wheels		120±10 Nm

Road wheels

- Do NOT lubricate bolts.
- Lightly coat mating surfaces between wheel centre hole and hub (use grease).
- Used bolts:
  - Lightly oil threads and conical seat.
- M14 = 140±10 Nm

Starting and charging

Starting and charging

Battery	V/RC(Ah)	12 (46)

Brake disc and drum dimensions

Brake disc and drum dimensions

Minimum disc thickness for replacement - ventilated	Front	19,6 mm

Minimum disc thickness

- During brake pad replacement = 20,4 mm

Minimum disc thickness after refacing - ventilated	Front	20,4 mm
Minimum disc thickness for replacement	Rear	7,6 mm

Minimum disc thickness

- During brake pad replacement = 8,4 mm

Minimum disc thickness after refacing	Rear	8,4 mm
Minimum pad thickness	Front	3 mm
Minimum pad thickness	Rear	3 mm
Parking brake travel	No. of notches	7

Air conditioning

Air conditioning

No. of AC service connectors		2
Air conditioning restrictor type		Expansion valve
Compressor clutch/magnetic coupling		Yes
Compressor variable displacement solenoid		No
Air conditioning refrigerant	Type	R134a
Air conditioning refrigerant quantity	grams	415±10
Air conditioning oil group		PAG
Air conditioning oil	Type	81 229 407 724
Air conditioning oil quantity	cm^3	

Oil quantity

- Refer to label on compressor.

Air conditioning oil viscosity	ISO	46