BMW Automobiles:
An investment for your safety

BMW Service:
Safety for your investment

Fals economy - or how to buy experience the hard way

The advanced automotive engineering that goes into your BMW, and the high performance and efficiency that result, are not just unnecessary effort on the part of our designers, but essential requirements for the reliability and unrestricted ability to travel that is a feature of modern transporation, and indeed of our civilization itself. Within this concept, BMW Service is an extension of the same maximum-efficiency principle from which the original purchaser of a BMW benefits. And a sensible precaution, too since BMW Service continues the advanced technological approach and attention to detail designed into every new BMW vehicle.

The decision to purchase a high-grade automobile is an investment in your own safety. Protect this investment reliably by regular and careful Service checks. And entrust the work to those who know your BMW best: the carefully trained, skilled BMW Service team. Routine checks of this kind not only keep your BMW safe on the roads, but above all prolong its already exceptionally long operating life and, in addition, increase its trade-in value.

No chain is stronger than its weakest link

BMW carries out an uninterrupted series of complex, lavishly organized actual road tests and behavior simulation experiments to assess the value of every improvement or modification made to its models. The objective is not just to test the efficacy of the BMW safety systems as technical improvements are developed, but above all to establish how many hundreds of apparently insignificant details behave or react as the step-by-step BMW safety system takes effect.

Genuine BMW parts for your car are not in themselves good just because they bear the BMW badge. Their true value lies in an unsurpassed systematic testing routine capable of determining, for example, how each part will behave and interact with many other details of the car's design in an emergency. Every single part in your BMW, viewed in this way may be called upon to make an important contribution to the vehicle's overall performance. This expalins why price alone is never a sufficient reason to depart from the firm rule: use only genuine BMW parts, and let the BMW Service organization install them.

To sum up: bargain prices can look tempting. But hard-won experience may later convince you that putting your trust in BMW Parts and Service pays off in the end.

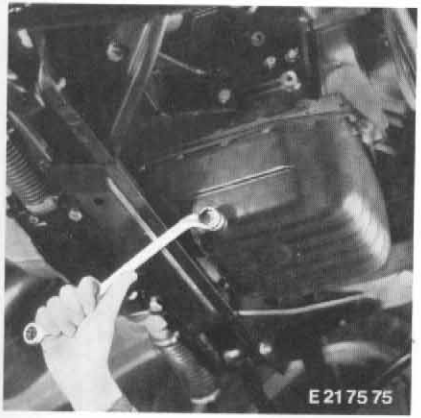
BMW: supreme automobile engineering for drivers whose common sense attitudes are the same as those of our design team.

Description of maintenance routines

Engine oil

Use only oils with API classification : SE

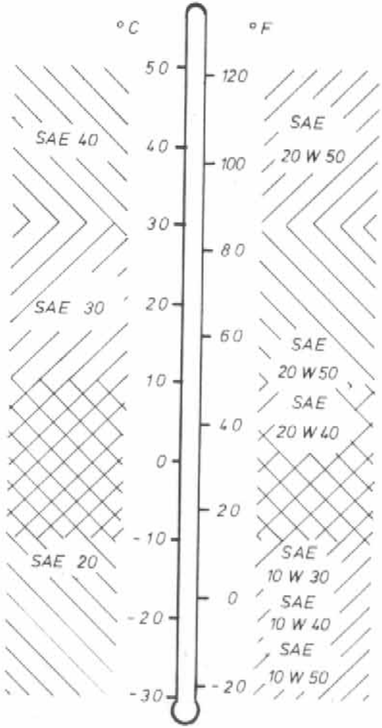
Frequency of oil changes	Outside temperatures	Oil grades	
		Branded 4-stroke HD oil	
		Multigrade oil	Single grade oil
Every 6,500 miles or 10,000 km or at least every 6 months	Usually above 86°F (30°C)	SAE 20 W 50	SAE 40
	The whole year above 14°F (–10°C)	SAE 20 W 40 SAE 20 W 50	SAE 30
	Usually below 50°F (10°C)	SAE 10 W 30 SAE 10 W 40 SAE 10 W 50	SAE 20



Engine oil change:
Unscrew drain plug (19 mm wrench) on the bottom right of the sump. Clean and screw up firmly after the old oil has drained away fully. **Fig.**

Total oil content 3.75 litres (US quarts; 6.65 Imp. pints)
+0.25 litre (0.44 Imp. pint, 0.26 US quart) when renewing filter.

Oil level: up to upper mark on dipstick, not higher.



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Oil filter
Renew throw-away cartridge filter every 6 500 miles or 10 000 km, when the engine oil is changed:

Unscrew filter.
Lightly oil the seal of the new filter element. Then screw in the element until the seal rests in position and tighten by hand by turning the element round once.

Check the filter for leaks with the engine running. **Fig.**

Change the oil in the manual gearbox
only while at normal operating temperature every 25 000 miles or 40 000 km. Remove oil drain plug (17 mm spanner), then oil filler plug (17 mm Allen key) on the left of the gearbox housing. This will help the oil to drain more rapidly.
Fig.

When fully drained, replace the drain plug (screw on firmly). Both plugs have conical threads and must not be replaced with plugs having metric threads.

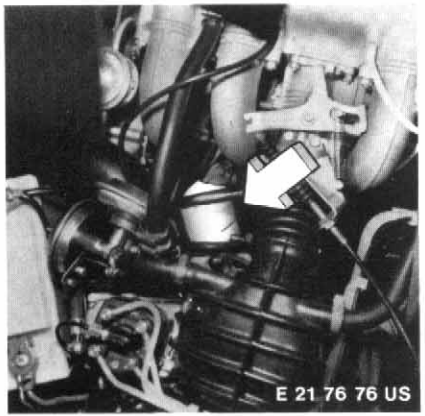
Total oil capacity:
4-speed box: 1.1 US quarts/1 litre
1.8 Imp. pints

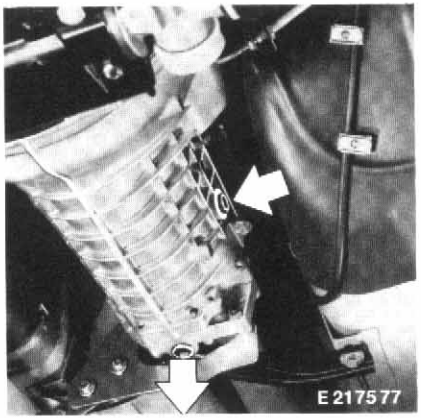
Oil level: up to underside of filler orifice.
Oil grade: Branded SAE 80 gearbox oil (not hypoid gear oil); in an emergency, HD engine oil.

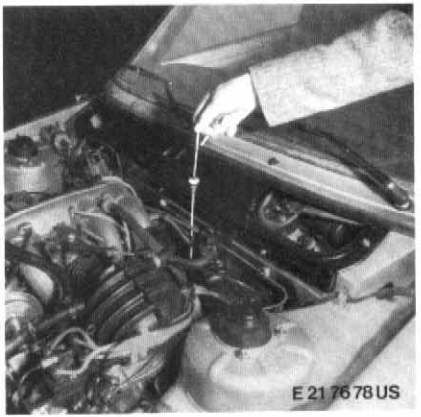
To check oil level in the automatic transmission (check at regular intervals):
Park the car on a flat level surface, apply the handbrake and run the engine at normal operating temperature with the selector lever in the "P" position at idling speed.

Remove the transmission oil dipstick wipe with a **non-fluffy** cloth, re-insert and measure oil level. This must lie between the two marks on the dipstick.

The quantity of oil represented by the space between the two dipstick marks is 0.25 litre/0.25 US quart/0.44 Imp. pint.
Fig.







Change the oil in the automatic transmission only when at normal operating temperature, every 25.000 miles or 40.000 km.

Place the car on a flat, level surface and apply the handbrake. Engage selector lever position "P" and stop the engine. Unscrew the oil drain plug (17 mm spanner) on the oil sump of the automatic transmission, allow the oil to drain, and tighten plug firmly. **Fig**

Add only 1.1 US quarts/1 litre/1.8 Imp. pints at first, then run the engine at idling speed and continue to add oil until the level reaches the upper third of the space between the two marks on the dipstick.

Capacity approx. 2.1 US quarts/2.0 litres/3.5 Imp. pints total capacity of a new or exchange transmission when initially filled is 6.4 US quarts/6.05 litres/10.7 Imp. pints.

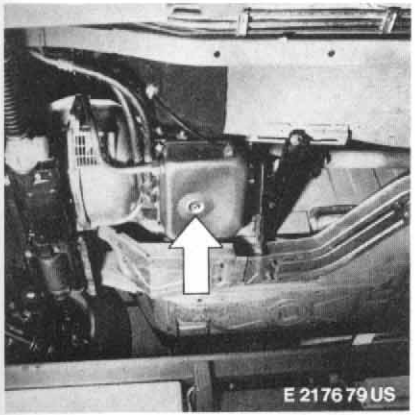
Oil grades
see page 96
The rack and pinion steering gear is permanently packed with grease and requires no routine maintenance. Check that the flexible bellows ar not leaking.
Fig.

Change oil in the final drive at 600 miles (1 000 km) while the housing is warm. Unscrew the oil drain plug (int. hex. 10 mm) and then the oil filler plug (int. hex. 10 mm) on the cover of the final drive housing, so that the oil can drain away more quickly. Clean the drain plug and tighten firmly. **Fig.**

Capacity: 1.0 US quart/0.95 litre/1.7 Imp. pints. Total capacity of new of exchange final drive when initially filled: 1.2 US quarts/1.1 litres/1.9 Imp. pints.

Oil level: to lower edge of filler aperture. Check every 12.500 miles or 20.000 km.

Oil grade: branded running-in and regular grade hypoid gear oil, SAE 90. (Your BMW Service Station knows the factory-approved oil grades.)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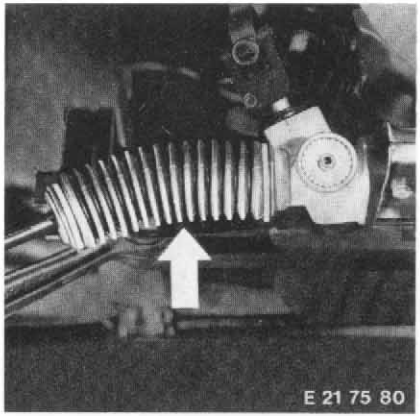
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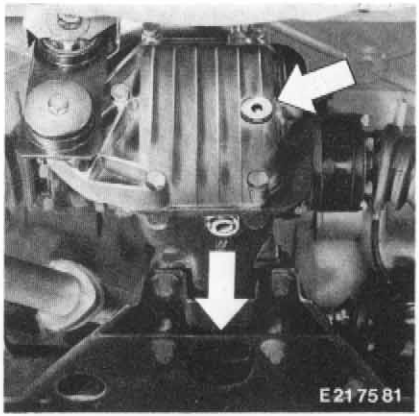
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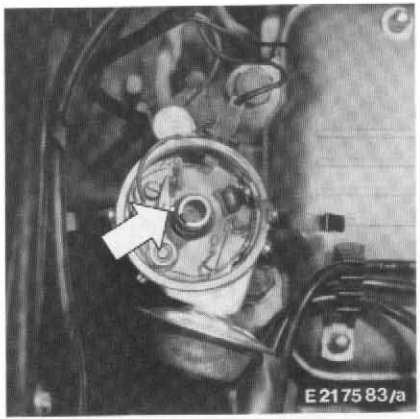
Greasing hinges, pivots etc.

Every 12.500 miles or 20.000 km apply a few drops of an oil containing graphite to the pivot and support points of the throttle linkage, engine and luggage compartment lids and catches, door strikers and hinges.

Check ignition distributor every 12 500 miles or 20 000 km during a BMW inspection:

Apply a narrow layer of Bosch Ft 1 v 4 grease to the **fibre heel** of the contact breaker arm. **Fig.**



The transparent **reservoir for brake and clutch fluid** is in the engine compartment on the left hand side, and enables the level to be inspected at a glance.

Brake fluid is a hygroscopic substance and over a period absorbs moisture from the atmosphere. To ensure that the brakes remain absolutely safe we strongly recommend that the **brake fluid should be drained and renewed once a year** by a BMW service station.

Capacity: fill to upper "MAX" mark on reservoir. **Fig.**

Grade: ATE – DOT 3 brake fluid SL.

The **clutch requires no maintenance** and is automatically adjusted at the clutch slave cylinder.

In the course of a BMW inspection every 37.500 miles or 60.000 km, wear of the clutch driving plate should be measured. **Fig.**

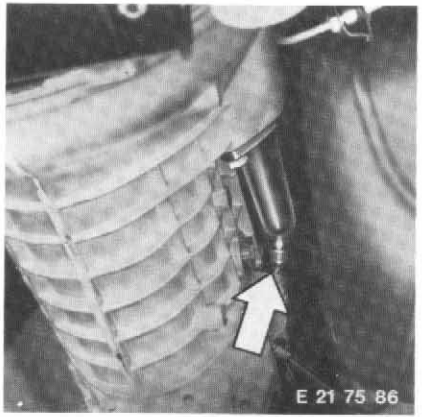
As the driving plate wears, the gauge gap "a" will become smaller. When the limit of wear is reached, the indicator will be touching the slave cylinder, and the clutch driving plate should then be renewed by a BMW Service Station.

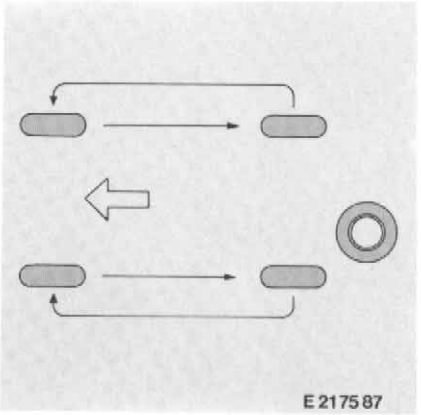
Loss of fluid from the hydraulic clutch mechanism, or the presence of air in the system, can lead to incomplete clutch release and damage to the transmission.

Bleed the system in good time, using the bleed screw provided. **Fig.**

In the interests of even tire wear, ask for the **road wheels** to be interchanged every 12.500 miles or 20.000 km during a BMW Inspection. The front and rear wheels on either side of the car should be changed round – never move a wheel from one side of the car to the other. If need be, the spare wheel can be included in the interchangeable pattern. **Fig.**

All four road wheels should be **rebalanced** statically and dynamically, if possible on the car after interchanging (on request) during a BMW Inspection every 12.500 miles or 20.000 km. If routine inspection of the tires reveals wear, damage, penetration of similar bodies, etc., or a seriously uneven wear pattern, we recommend that the wheel alignment should be checked by a specialist workshop as soon as possible, the car being loaded with the prescribed weight at the time.





Every 6.500 miles or 10.000 km or at least once a month, the **battery acid level** should be checked. Remove the battery cover and unscrew the six plugs on top of the casing. The acid level should be approx. 0.2 inch (5 mm) above the surface of the plates in each cell, or up to the level mark visible in the plug orifice.

If the acid level is too low, top up with distilled water (not acid). **Fig.**

The top of the battery should be kept clean and dry.

Warning: Do not allow acid or lead oxide from the terminals to come in contact with clothing. Do not bring a naked light near the battery – there is a risk of explosion.

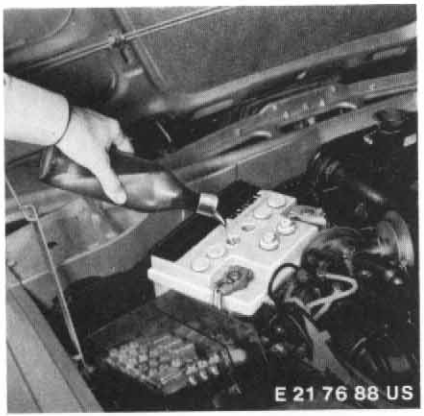
To remove and replace the battery, unscrew or screw up the toggle screw with holding rail. **Fig.**

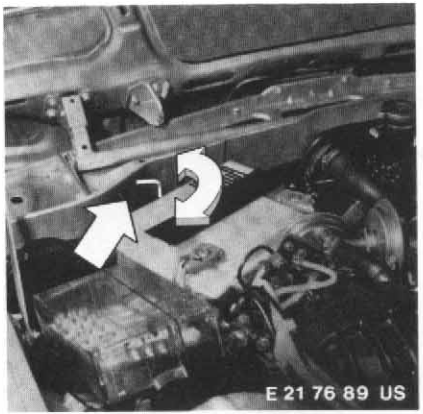
In addition to regular checks on water level in the radiator, the antifreeze strength and corrosion resistance (concentration at least 35 % all the year round), the hoses and hose connections we also recommend that the **water in the cooling system** should be renewed **every 2 years.** While doing this, check the filler cap for good sealing and correct functioning of the pressure and vacuum relief valves.

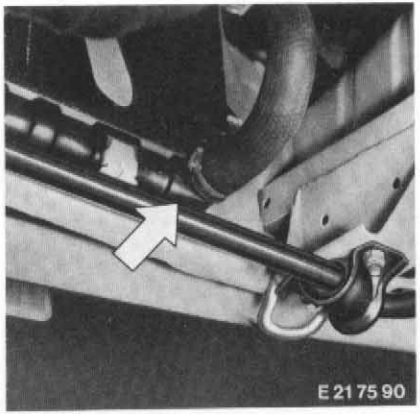
The complete **cooling system,** including heater, has **a capacity** of 7.4 US quarts/7 litres/12.3 Imp. pints.

To **drain the system,** loosen the lower radiator hose clip and pull off the hose. **Fig.**

Warning: Danger of scalding if engine is warm.







Unscrew and remove the hex. bolt (19 mm wrench) at the rear right side of the engine block. **Fig.**

First set the left heater control slide on the facia to "WARM".

Refilling the cooling system

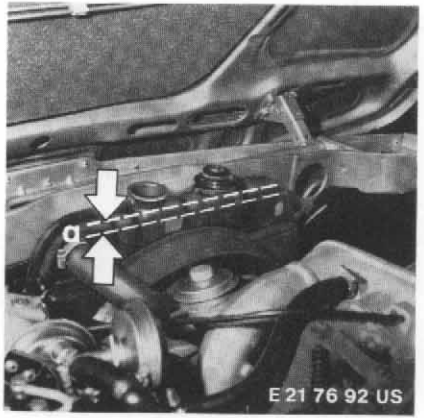
Set the heater temperature control lever to "WARM", and fill the radiator slowly, adding a long-term antifreeze and corrosion inhibitor at 35 % concentration, for frost protection down to -25°C or -13°F. Replace the filler cap, turning is far as the second stop. Allow the engine to run at 2.000–2.500 rev/min until normal operating temperature is reached, then stop the engine.

Restart after about 1 minute and run at not less than 4.000 rev/min for another 30 seconds. Then check at idle speed that heater is blowing warm. Allow engine to cool until the thermometer needle is in the center of the white zone. Top up radiator to a point "a" no higher than 3/4" (2 cm) below the base of the filler aperture. Replace cap and tighten. **Fig.**

Overfilling or repeated topping up will dilute the coolant since some will escape through the overflow tube. This will reduce the antifreeze strength and corrosion inhibiting action.

The air ckeaner element in the intake air silencer should be renewed every 12.500 miles or 20.000 km during a BMW inspection, or earlier in very dusty conditions. Loosen the over-centre catches, take off the cover and lift out the element.

A clogged air filter element increases fuel consumption and prevents full engine power from being developed.



Renewing main fuel filter every 25.000 miles or 40.000 km (located with the electrical fuel pump)

1. Loosen the two hollow screws on fuel hoses and the collar band screws.

2. Renew filter, reconnect fuel hoses and collar band. Check for tightness. **Fig.**

Important: note the direction of flow shown on the filter label when fitting a new filter.

Clean the mesh strainer from the immersed fuel level indicator every 37,500 miles or 60,000 km

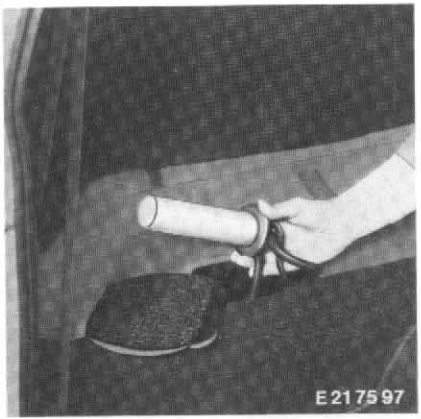
1. Remove rear seat.
   Take off cover.

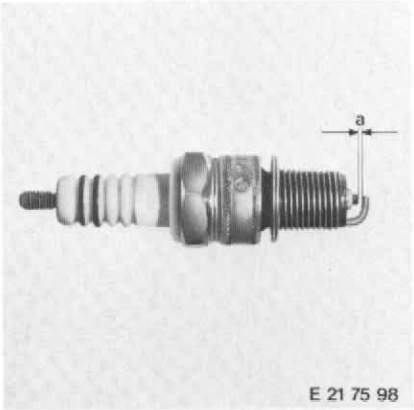
2. Remove bolts holding indicator and detach hoses.

3. Clean the mesh strainer.
Fig.

Check **spark plug electrode gaps:**
Before new spark plugs are fitted, their gaps should always be checked with a feeler gage, and the earth electrode bent if necessary to achieve the prescribed gap "a" of 0.24 + 0.004 in (0.6 + 0.1 mm). **Fig.**

Renew spark plugs every 12.500 miles or 20.000 km during a BMW Inspection. Details of the correct spark plugs are given on page 104.





Renew contact breaker points every 12.500 miles or 20.000 km during a BMW inspection:

Adjust dwell angle (see page 104) using a BMW Program Tester (instrument for measuring dwell angle).

If no instrument for the measurement of dwell angle is available, regulate the contact breaker points gap in the following way. **Fig.**

Turn the engine until the contact breaker arm is fully raised (fibre heel is resting on the highest point of the distributor shaft cam).

Resetting contact breaker gap:

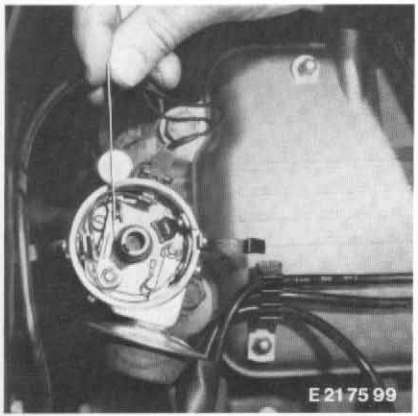
Slightly loosen lock screw "a", insert a screwdriver blade between the 2 small studs "b" so that it engages with slot "c" on the contact breaker mounting, then turn the blade gently until a gap of 0.016" (0.4 mm) can be measured between the points. Re-tighten locking screw "a" and check that the setting has not altered by using a feeler gauge.
Fig.

Checking ignition timing: This must always be done after the points gap has been reset, or every 12.500 miles or 20.000 km during a BMW inspection. Adjust dynamically without vacuum retard using a stroboscopic light gun and revolution counter.

Adjusting speed:

2,200 rpm - 49-State version
2,400 rpm - California version

The timing mark "Z" (a pressed-in steel ball) for No. 1 cylinder is located on the flywheel, and is visible through an aperture in the transmission housing on the left-hand side, behind the starter motor. **Fig.**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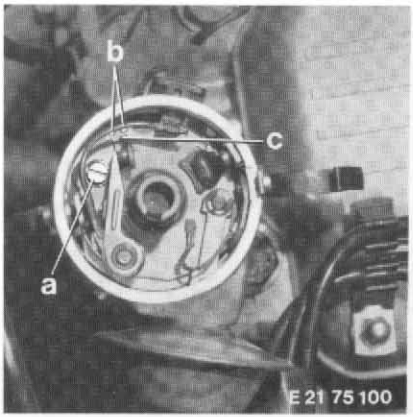

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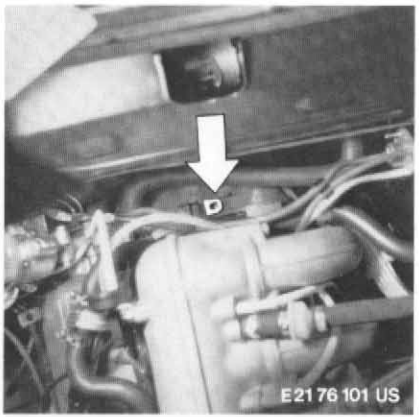

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BMW 320 i - adjusting idle speed
The necessary adjustments should always be entrusted to your BMW authorised repair shop, which possesses the necessary equipment and details of the correct idle speed settings.

In an emergency only, the following adjustment procedure may be carried out with the engine at its normal operating temperature:

Alter the setting of the idle air screw until engine speed is 950 ± 100 rev/min.

Check valve clearances and adjust if required every 12.500 miles or 20.000 km during a BMW inspection, **with the engine stopped and cold** (max. 95°F/35°C coolant temperature), or as directed by the BMW Service Station:

Take off the valve cover.

The correct valve clearance for both inlet and exhaust is 0.006 - 0.008 in (0.15 - 0.20 mm). To measure, a feeler gage should be inserted between the valve and the rocker; all measurements and adjustments should be carried out in a cylinder order corresponding to the **firing order 1-3-4-2** and at TDC for each cylinder on the compression stroke.

TDC position is reached for each respective cylinder when the valves of the next but one cylinder in the sequence overlap:

TDC cyl. No.		Valve overlap cyl. No.
1	=	4
3	=	2
4	=	1
2	=	3

To adjust valve clearance at the rocker, loosen the hexagon nut (10 mm wrench). Turn the eccentric adjuster with a slightly angled piece of 2.5 mm dia. wire until the prescribed clearance is obtained. **Fig.**

Tighten the hexagon nut and check that valve clearance has not altered.
Put-on valve cover.


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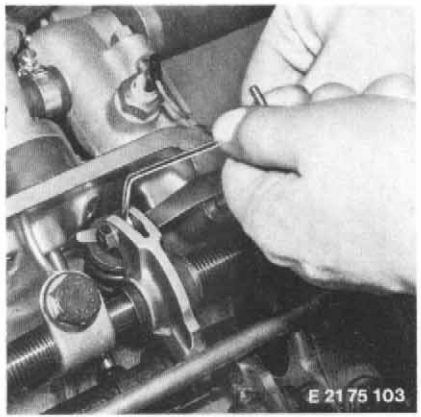
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Check V-belt tension at a BMW inspection every 12.500 miles or 20.000 km.

The V-belt is correctly tensioned if it can be pressed down 0.2 - 0.4 inch (5 - 10 mm) with the finger in the centre of the top run between the alternator and the fan pulley. **Fig.**

To retension V-belt:

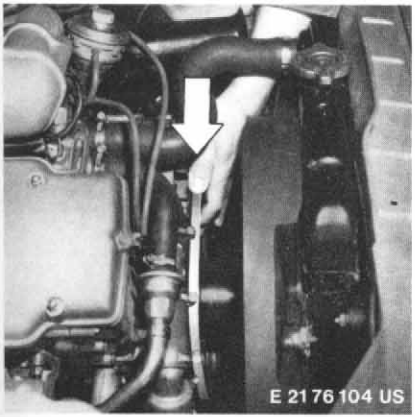
Slacken the upper and lower alternator securing bolts (13 mm) and move the alternator bodily along its retaining strap until the desired V-belt tension is obtained.

Retension V-belt for air pump.
Loosen the thru bolt and the clamping screw and move the air pump along the retaining strap until the V-belt is tensioned.

To renew V-belt:

Slacken the upper and lower alternator securing bolts (13 mm) and push the alternator as close to the engine as possible. Pass the new V-belt over the crankshaft, fan and alternator pulleys, then tension as described.

Note:
Take care that after retensioning of the V-belts the screws and bolts are well tightened.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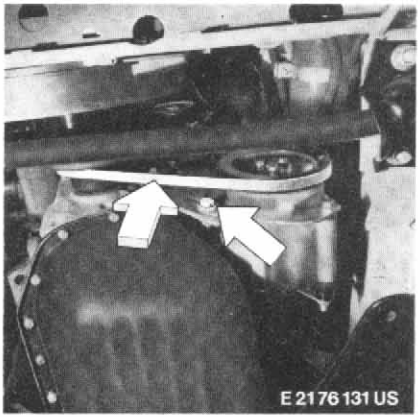
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Adjust the brakes during a BMW inspection every 12.500 miles or 20.000 km. The disc brakes on the front wheels have automatic compensation for wear.

Two eccentric adjusters (17 mm) are fitted on each brake shield of the **rear wheel brakes**, and must be turned to adjust each of the brake shoes as desired.

When viewed from above, the left-hand eccentric hexagon must be turned counter clockwise and the right-hand eccentric hexagon clockwise – while the wheel is being turned forcibly – until the brake shoe locks the brake drum. Then turn the hexagon back about 1/8th turn until the wheel just begins to turn without binding. **Fig.**

Note: when adjusting the brake shoes the handbrake must be released.
If the brake pedal becomes springy and has excessive travel, the brake system must be bled.

Adjusting handbrake:

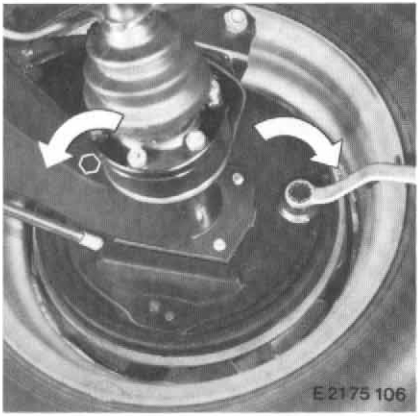
If the handbrake can be pulled up 5 notches without any braking effect being perceptible, the handbrake must be adjusted.

The handbrake should normally only be adjusted by a BMW Service Station. In exceptional cases however proceed as follows:

Adjusting handbrake (only after adjusting the brake shoes):

Push back rubber sleeve protecting the handbrake lever, slacken the locknut (10 mm) on each adjusting screw, pull the handbrake up 4 notches, tighten the adjusting nut (10 mm) while holding the adjusting screw with pliers to prevent it turning and check that the rear wheels can still be turned easily by hand. Retighten locknut. **Fig.**

Then check that the rear wheels rotate freely with the handbrake fully released.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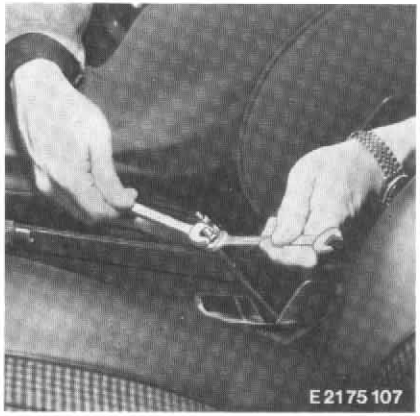
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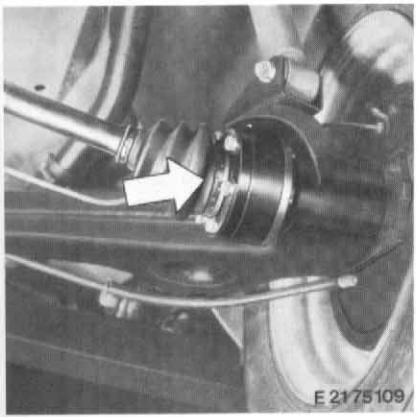
Check the flexible bellows on the half shafts for leaks and tightness of the retaining bolts during the BMW inspection, every 12,500 miles or 20,000 km. **Fig.**



Warning!
If you are using the jack for lifting the car, do not put any portions of your body unter the car, or start the engine while the vehicle is on the jack.

Note!
The running-in rules described under "OPERATING INSTRUCTIONS" refer not only to the engine, but also to the gear box and the rear axle.

If after a longer running time a aggregate should be renewed in that case attention must be paid again to the running-in recommendations.