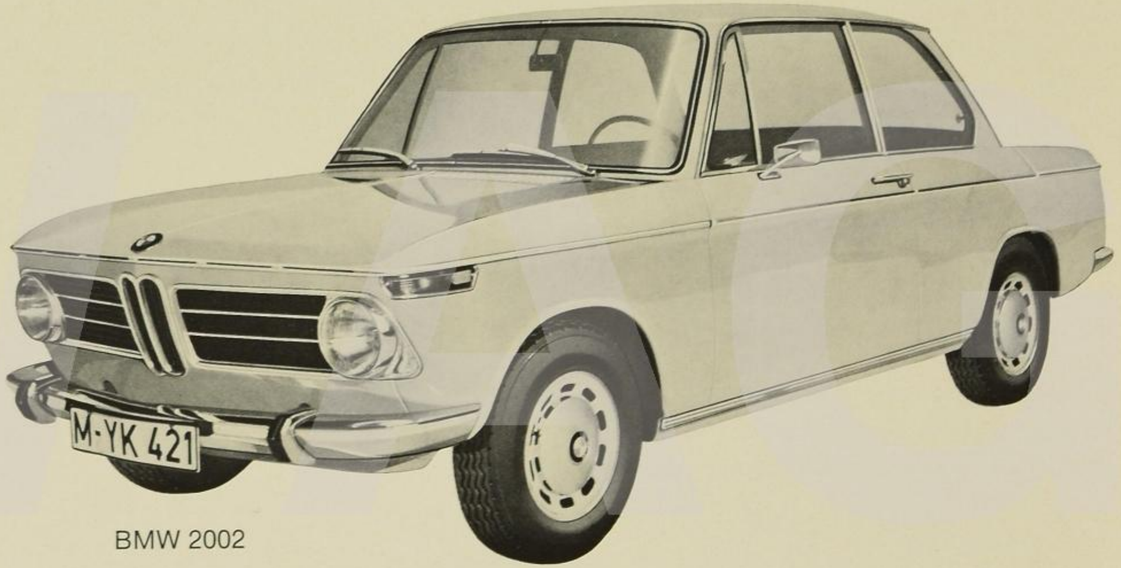
Owner's handbook

1600
2002
2002
2002
AUTOMATIC



BMW 2002

Dear BMW enthusiast,

The engineers who develop BMW cars are enthusiasts too. Now you have taken delivery of a BMW, and with it go our congratulations and good wishes.

Our Owner's Handbook contains all you need to know for lasting driving pleasure, and also full details of the service work necessary to keep your car in as-new condition. After reading through the handbook, you will soon feel entirely at home with every aspect of your car.

And now it's time for you to start enjoying pure driving pleasure – on crowded city roads, through the tight corners of steep mountain passes, or over the endless concrete strip of the inter-city highway.

Sincerely yours
BAYERISCHE MOTOREN WERKE AG

Contents

Before you start –
Where is everything?

"Daddy says
I'm too young to understand –
grown ups!"

The **maker's plate, chassis and engine numbers** are the means of identifying your car. The entries in the logbook should always agree exactly with the markings on the car. The workshop will need these numbers if it becomes necessary to order spare parts, but you should also know where to locate them in case licensing or customs authorities require to see them.

Manufacturer's plate: in the engine compartment, at the back on the right (looking forward). **Fig. 1**

Chassis No.: in the engine compartment on the right of the bulkhead (looking forward) next to the lock. **Fig. 1**

Engine No.: on the rear left-hand side of the crankcase (looking forward) above the starter. **Fig. 2**

You will have received two pairs of keys for your new BMW. It is a good idea to put the second pair in a safe place straight away so that you can get at them immediately if you should lose the first pair. Of course any BMW dealer will gladly help you out in case of difficulty.

If you should need to buy new keys, always quote the numbers on the keys when ordering. This speeds up the whole process considerably. Check that the key numbers are correctly recorded in the service booklet. **Fig. 3**

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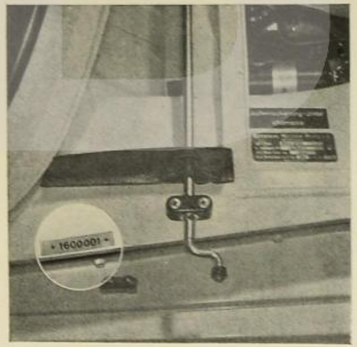

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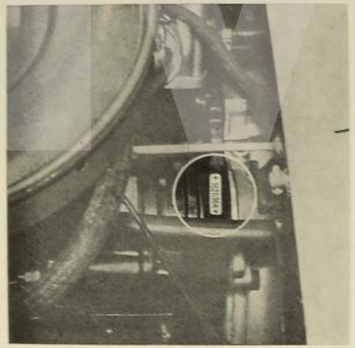

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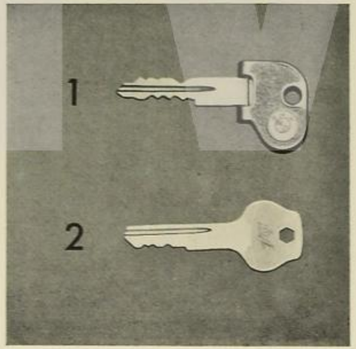

To unlock the doors, insert key 1 (swivel head) and turn towards the front of the car. To lock, turn towards rear. The doors are opened by pressing in the knob below the door handle. **Fig. 4**

To lock the doors from the inside, press down the safety knobs; to unlock from the inside pull up the handle beneath the arm rest. **Fig. 5**

The safety knob cannot be pressed down if the door is open; this prevents being accidentally locked out of the car.

The **luggage compartment** is locked and released by key 2. **Fig. 6**

Do not forget to lock the lid after closing.

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Instruments and controls

Note: Numbers in square brackets [ ] indicate page on which description is to be found

1. Rotary knob for hinged quarterlight (left) [16]
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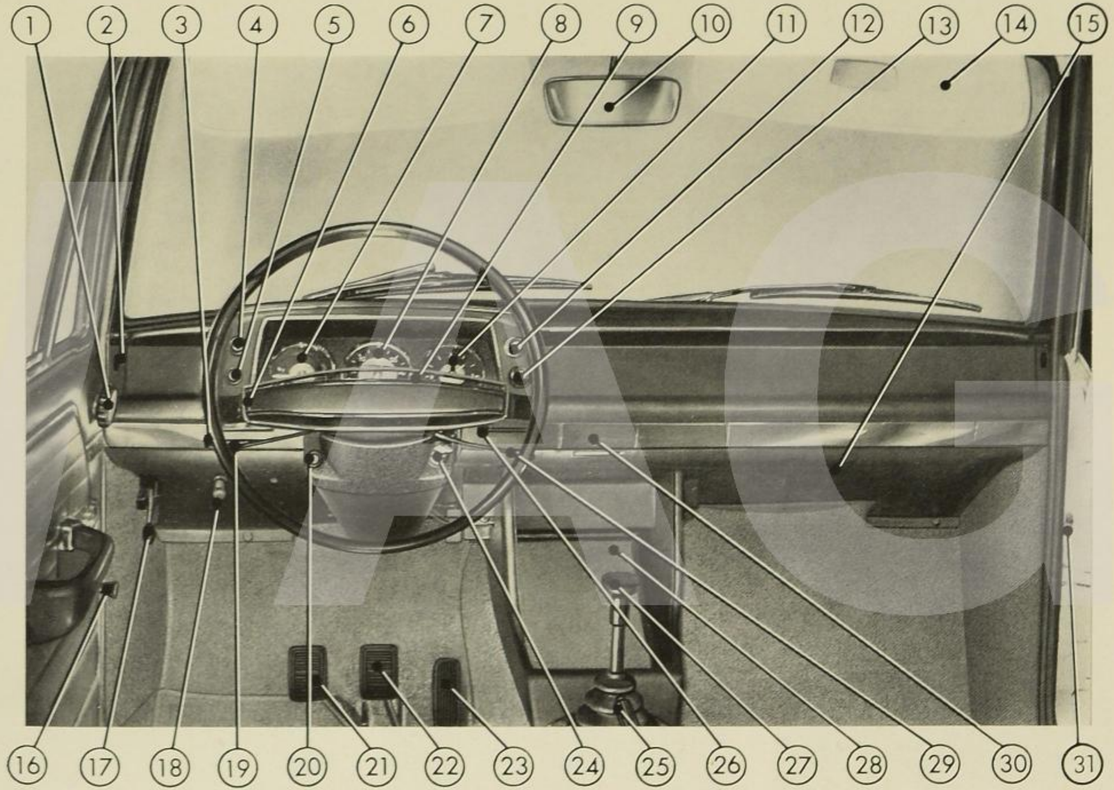

The **ignition and starter switch** is combined with the steering lock, and mounted on the right-hand side of the steering column enclosure. Insert key 1 (swivel head) in the "Halt" position and turn to the right as far as "Garage" position; you will hear the steering lock being withdrawn from the steering column, but if necessary the steering wheel should be moved slightly to assist. The steering is now unlocked, the key may now be withdrawn and the radio (available to special order) will operate. **Fig. 7**

Turn the key further to the right until the "Fahrt" ("Drive") position is reached; this switches on the ignition, so that the battery charge warning lamp (red) and oil pressure warning lamp (orange) should be illuminated. The fuel gauge will show the correct amount of fuel in the tank. In this position the key cannot be withdrawn.

To lock the steering, turn the key back to "Halt" and pull out. The steering wheel should be moved slightly if the lock does not engage.

2-position **headlamp and light switch (Fig. 8):**

Position 1 – parking lights
Position 2 – headlights

The intensity of the **instrument panel lighting** can be continuously adjusted by turning the light switch knob in its pulled-out position.

The **dip lever** to the left of the steering column can be finger-tip operated while both hands are holding the steering wheel **(Fig. 9).** When the lever is set to main beam (upper position) a blue warning lamp in the combination instrument is illuminated. To **flash the headlights,** pull the lever towards the steering wheel.

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The **turn indicator lever** beneath the steering wheel on the right hand side of the steering column operates the appropriate flashing indicators when moved to correspond with the movement of the steering wheel. **Fig. 10**

A regular ticking sound and illumination of the green warning light in the combination instrument tells you that the flasher unit is operating correctly. **Fig. 11**

When the steering wheel is returned to the straight-ahead position the turn indicator is automatically cancelled, but if the turn was only slight it may be necessary to cancel the lever by hand.

When the steering lock is engaged, the turn indicator lever is used instead to switch on the **parking lights** on the appropriate side of the car.

Lever up – left front and rear
Lever down – right front and rear

The **wiper knob** can be pulled out to select either of 2 operating speeds. **Fig. 12**

Use the faster speed only in heavy rain.

Pulling the tip of the turn indicator lever to the right of the steering column towards the wheel will operate the **automatic washer unit.** The electric pump and the wipers are both set in motion simultaneously. When the lever is released, a relay prevents the wipers from switching off immediately.

Warning: The automatic washer unit should not be operated when the fluid container is empty.

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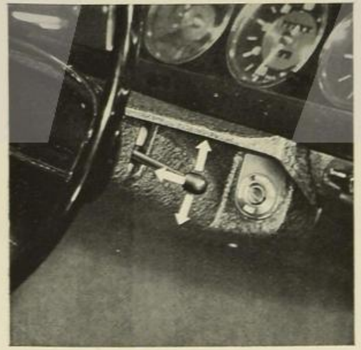

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The two **washer jets** are located under the rear edge of the lid in a position where they are not likely to be damaged. If either water jet fails to strike the glass correctly, the jet nozzle can easily be bent by hand to the correct position. **Fig. 13**

The **fluid container** (approx. 1.5 litres / 2.6 Imp. pints / 3.2 US pints) is located on the right-hand side of the engine compartment. **Fig. 14**

The forward-opening **engine compartment lid** is released from inside the car by pushing forward the lever close to the left side panel beneath the instrument panel. A built-in spring mechanism then assists in raising the lid. **Fig. 15**

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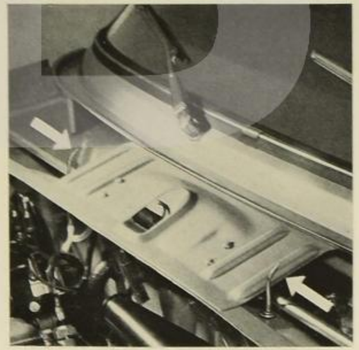

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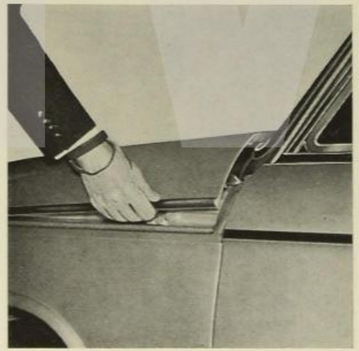

Warning: Close the engine compartment only when the interior lever is in the forward position. After closure, lock by pulling the lever back. **Fig. 16**

A knurled knob in the centre of the electric **clock** should be pushed in and turned to adjust the hands **(Fig. 17, 1).** On the back of the clock you will find an adhesive strip covering the regulating screw. The markings are: + (faster) and – (slower).

A reset knob is provided to return the **trip mileage recorder** in the speedometer to zero. The knob should be turned to the right. **(Fig. 17, 2)**

The **hazard warning flashers** can be operated with the ignition switched on or off by pulling the **red knob** beneath the dashboard close to the steering column. The knob is illuminated periodically to show that the hazard warning flashers are operating correctly. **Fig. 18**

The twin **horns** (BMW 2002) or single horn (BMW 1600) are operated by a horn ring or button on the steering wheel.

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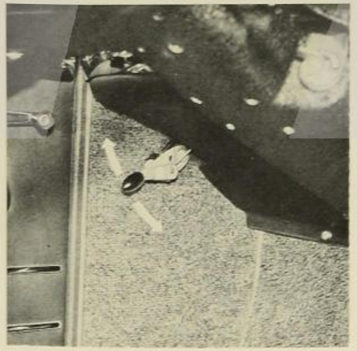

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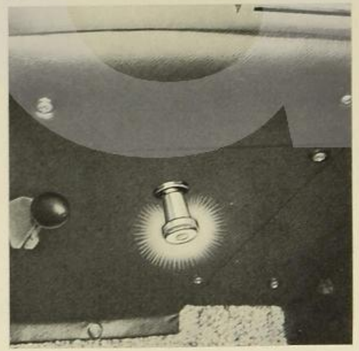

The **interior light switch** has 3 positions:

Position 1: permanently on

Position 2: permanently off

Position 3: Light is switched on when door is open (door contact switch)

Fig. 19

Adjust the positions of both the **interior and exterior rear view mirrors** to suit your driving position.

The BMW 2002 interior mirror can be **dipped** by pressing the small lever at its base. Fig. 20

Either **sun visor** may be swung sideways to cover the side window if the sun is dazzling from that direction. **Fig. 20**

The **combined instrument** contains coolant temperature gauge, fuel gauge and warning lights for:
oil pressure (O) – orange
battery charge (L) – red
turn indicators (B) – green
headlight main beam (F) – blue
Fig. 21

The **coolant thermometer** is divided into 3 colour zones:

Blue: engine is running too cold. If the thermometer needle is in this region the car's speed and engine revolutions must be kept low.

White: normal operating temperature range.

Red: engine is too hot. No anxiety need be felt if the needle reaches the red zone or enters it for a short period if the engine is working very hard or the outside temperature is extremely high. However, if the needle tends to remain in the red zone for longer periods, then the engine is definitely in need of attention (see procedure described on page 32).

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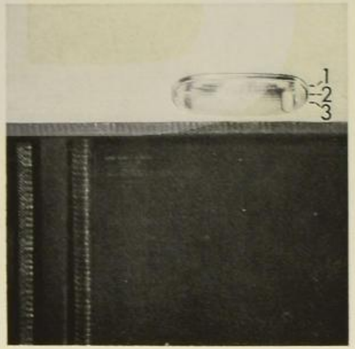

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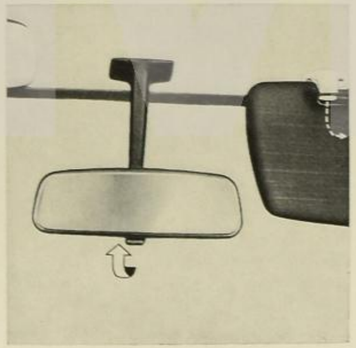

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When the ignition is switched on, the **fuel level** can be seen from the gauge. If the needle is indicating "R" **(reserve),** fill up as soon as possible, although the tank still contains enough fuel for about another 30 miles, depending on how you drive.

The **fuel filler cap** is located on the right side of the car at the rear.

Fig. 22 shows the layout of the **rearlight cluster:**
1. Turn indicator light (yellow)
2. Rear light and reflector (red)
3. Brake light (red)
4. Reversing light (white)

Whenever the lights are in use, in other words when the light switch (page 10, **Fig. 8)** is operated, the **luggage compartment** will be automatically illuminated.

For **fore-and-aft adjustment of the front seats,** pull up lever **(Fig. 23, 1)** at the front outside edge of the seat base and slide the seat to the desired position. Release the lever and move the seat very slightly to ensure that the locking catch has engaged.

The **front seat backs** are adjustable for angle by means of a cam operated by turning a knob **(Fig. 23, 2)** at the base of the seat back.

The seat backs also have a locking mechanism to prevent accidental tipping forward. To release, pull up the knob **(Fig. 23, 3)** on the outer edge of the seat back.

Fittings for reclining seats
(special equipment)

The front seat backrests are adjustable for rake by lifting the lever on the outside seat hinge fitting **(Fig. 24, 1)** and leaning back against slight spring pressure until the desired angle is reached or allowing the backrest to spring forward automatically. On releasing the lever the seat engages at that point.

The seat backs also have a locking mechanism to prevent accidental tipping forward. To release, pull up the knob **(Fig. 24, 2)** on the outer edge of the seat back.

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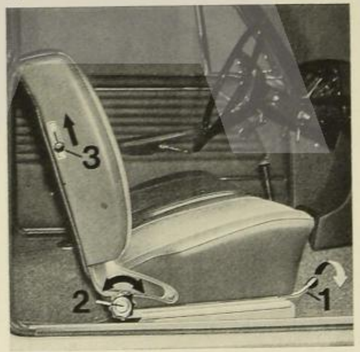

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Safety belt mountings for both front and rear seats are rigidly attached to the bodywork. Your BMW dealer knows the correct mounting points and will gladly fit a set of safety belts to your car.

The **handbrake** works on the rear wheels. To brake or secure the car, pull the lever upwards. To release the lever, first pull upwards slightly, then press the knob on the end of the lever and push downwards. **Fig. 25**

A useful hint: to avoid the noise of the handbrake being pulled on, first depress the knob.

The position of the gear lever for each speed can be seen from the **gate layout** shown below. All forward speeds are synchronised. **Fig. 26**

To engage reverse the car must be standing still; the lever should be pressed over to the left until a slight resistance is felt and overcome.

With the ignition on and reverse gear engaged, both **reversing lamps** will be illuminated.

The **hinged quarter lights** are opened and closed by turning the rotary knob immediately beneath. Before leaving the car unattended remember to guard against break-in by turning both knobs until the quarter lights are completely shut.

Open the **glove box** by pulling down the recessed grip; close by moving the lid firmly upwards. **Fig. 27**

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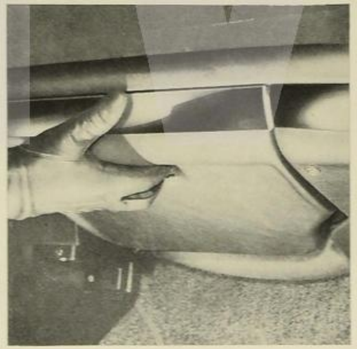

To use the **cigar lighter,** press the knob inwards. When the coil filament glows red-hot the knob will automatically spring back to the original position. **Fig. 28**

The cigar lighter **socket** is also designed to accept plugs attached to handlamps, electric razors or similar apparatus. The maximum rating must not exceed 200 watts for a 12 volt supply. Make sure that the socket is not damaged by attempting to insert a plug of the wrong shape.

To empty the **ashtray on the instrument panel:**

Pull out ashtray as far as possible, press down on the leaf spring as shown and withdraw the ashtray completely. **Fig. 29**

To empty the **ashtray in the rear passenger compartment:**

Hinge out, press firmly down and remove. **Fig. 30**

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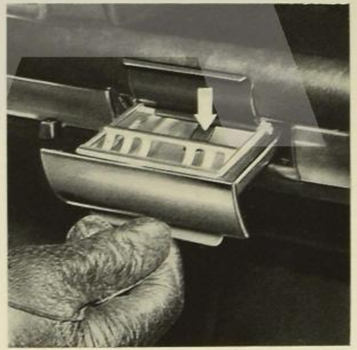

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The **heater and ventilator** of the BMW 2002 und BMW 1600 allows particularly accurate temperature control. The single slide lever varies output between full heat (lever to right, red symbol) and cool air only (lever to left, blue symbol).

Apart from the extreme limit positions, slightly less air is automatically passed to the demister slots than to the footwells. This provides stratified heating throughout the vehicle, with adequate warmth for the feet yet a pleasantly cool atmosphere at head height. **Fig. 31**

Lever to right: warm
Lever to left: cool

The supply of heated or fresh air to the interior of the car can be easily adjusted to within fine limits by means of the twin levers. The top lever controls the slots which direct air on to the screen and side windows, and the lower lever controls independently the supply to the footwells. In damp conditions or when the screen mists over the lower lever can be moved to the right to cut off the supply to the footwells, so that the full output can reach the front and side windows. **Fig. 32**

Lever to left: air supply open
Lever to right: air supply shut off

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When extra warm or cool air output is needed, always switch on the blower (pull out knob, **Fig. 33,** to first stage). If the windows are misted over or the car's interior is exceptionally cold, use the second blower speed, provided that the coolant temperature is sufficiently high (pointer of temperature gauge in white zone).

Air extraction: while the car is on the move stale air is extracted from the interior through slots above the rear window and ducted to openings below the rear roof pillars (only on vehicles without steel panel sliding roof). **Fig. 34**

Extra ventilation or air extraction can be obtained by opening the front door vent windows and the front-hinged rear side windows. **Fig. 35**

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Automatic transmission (BMW 2002): the following **selector lever positions (Fig. 36)** are available to suit various traffic conditions:

P–R–0–A–2–1

P = Park
Select only when the car is standing still. The drive train is locked as an additional precaution against running away on a slope. The engine can still be started.

R = Reverse
Select only when the car is standing still. To select, push in the left-hand safety knob.

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0 = Neutral
The engine is completely disconnected from the drive train, and can be started. Select this position also when stopped for **lengthy periods** (for instance in severe traffic jams).

A = Automatic (normal driving position)
This position should be selected for all normal road conditions. The car moves off in 1st gear and changes up to 2nd and 3rd gears as soon as the most favourable and economical point is reached.

2 = Hill-climbing and engine braking
This position can be selected on mountain roads or other lengthy rising or falling gradients. Better use is made of available engine power and engine braking effect.
Position 2 can be selected at any road speed. If the speed is initially too high for 2nd gear to engage, it will come into operation only after road speed has fallen to about 100 kph (62 mph). If the road speed then rises again, the transmission will not re-engage 3rd gear, and so excessive engine speeds can result.

1 = Hill-climbing and engine braking
This position is normally reserved for road and traffic conditions in which it is desirable to hold 1st gear in engagement, for instance on very steep uphill or downhill gradients.
Position 1 can also be selected at any road speed. At about 100 kph (62 mph), 2nd gear will then engage, and after speed has fallen to about 60 kph (37 mph) 1st gear will be engaged in turn. However, even if road speed then rises the transmission will not change up again into 2nd or 3rd gear, and so excessive engine speeds can result.
If road speed falls to about 70 kph (43 mph), 1st gear will be engaged and held; the transmission will not change up to 2nd gear even if road speed subsequently rises.

Kick-down
The accelerator pedal can be depressed beyond the normal full-throttle position (increased resistance will be felt).
In special circumstances, for example when overtaking, more rapid acceleration can be thus obtained; the transmission will select, up to a certain engine speed level, the correct gear.
When the kick-down has been used the subsequent upward changes will occur at a considerably higher road speed than normal, close to the maximum permitted engine speeds in each gear. This ensures that the full available engine power can be made use of when needed.

Towing away
If the car has to be towed away, place the selector lever in the "0" **(Neutral) position.**
Speeds reached when the car is being towed must not exceed 31 mph (50 kph), and the distance covered should be limited to 25–30 miles (40–50 km). For longer distances, the propeller shaft should be removed from the vehicle.

Tow starts
The design of the automatic transmission does **not permit** the engine to be started by towing the car.

Starting off – **a few hints**

"You think I don't know what I'm doing, don't you!"

Before operating the starter, check that the gear lever is in neutral.

On automatic transmission vehicles the engine can only be started with the selector lever in the "0" or "P" position.

Depending on engine and outside temperature, it may be necessary before operating the starter to pull out the **choke knob** to the left of the steering column housing. **Fig. 37**

a) pull out fully if outside temperature is below −10° C (14° F).

b) if the outside temperature is very low indeed, depress the accelerator once or twice briefly to inject a little fuel into the inlet manifold, at the same time operating the starter to turn the engine over.

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The half-way stop position permits choke control in two steps:

First step:
increase of idling speed

Second step:
operation of the choke valve in the carburettor.

After the engine has fired, allow it to run for 3–5 seconds, then push the choke knob in to the half-way stop position so that the engine idles smoothly. Leave the choke in this position after moving off until the needle of the water temperature gauge begins to move away from its stop. The choke knob may then be pushed back completely.

If the engine is warm (within the normal operating temperature range) the choke and accelerator need not be touched.

If the engine is hot, the accelerator only should be depressed while operating the starter.

The **starter** is operated by turning the ignition key fully to the right ("Start" position) until the engine begins to fire. However, do not allow the starter to turn the engine for longer than about 10 seconds. When released, the ignition key will spring back of its own accord to the "Fahrt" ("Drive") position. While operating the starter the radio (to special order) will automatically be switched off.

To make starting easier, especially during extremely cold weather, it is a good idea to switch off all other items which draw their electric supply from the battery, and to press down the clutch pedal. If the starter has to be operated a second time before the engine will run, the ignition key must first be returned from the "Fahrt" ("Drive") to the "Garage" position. This intentional delay is introduced in order to prevent as far as possible the starter from being re-engaged while the engine is still turning. You should always try to avoid using the starter unless the engine has come to a complete standstill. This will avoid damage to the starter and flywheel.

In very cold weather protect the battery by operating the starter for not more than about 10 seconds. If the engine does not fire, wait about 20–30 seconds before making a second attempt, which should be no longer than the first.

Your **BMW 2002 A** is equipped with an automatic choke carburettor. Please observe the following operating instructions:

If the engine is cold, depress the accelerator pedal briefly once before operating the starter. This will trip the automatic choke mechanism and bring it to the cold-start position.

Switch on the ignition and turn the key to operate the starter without depressing the accelerator again. When the engine starts its speed will immediately rise to the relatively high figure of 2500 to 3000 rpm.

Next, depress the accelerator again – without delay if outside temperature is high, after a few seconds have elapsed if outside temperature is low. The engine speed will fall to a fast tickover.

The automatic choke mechanism will control the engine speed until the coolant thermometer needle has reached more or less the centre of the blue zone, whereupon the engine speed will drop to a normal tickover.

If the engine will not start or fires only intermittently after several attempts, try again **with the accelerator fully depressed.** This will force open the throttle butterfly and weaken the mixture. Never depress the accelerator repeatedly or suddenly, as this will only inject still more fuel into the intake manifold.

If the engine is warm (normal operating temperature) do not touch the accelerator pedal at all when starting.

If the engine is very hot, depress the accelerator pedal fully when starting.

When the engine is running, the oil pressure (orange) and battery charge (red) warning lights should go out as soon as engine speed reaches a fast tickover.

If the oil pressure warning light is illuminated while driving, you must depress the clutch pedal immediately and switch off the ignition. Check the engine oil level; if there is sufficient, the fault must lie elsewhere and your BMW dealer should be summoned to assist. No danger is implied if the warning light glows briefly on the overrun, provided that it is extinguished immediately the accelerator is pressed down.

If the battery charge warning light is illuminated while on the road, you should take the car to your BMW dealer as soon as possible, or else the battery will become completely discharged.

It is not recommended that the engine be allowed to warm up while idling; it is better to move off immediately after starting the engine, using **moderate engine speeds.** If the choke was used for starting, push it in as soon as the thermometer begins to indicate that the water temperature is approaching the normal operating range. If the outside temperature is exceptionally low, however, it is better to run a cold engine for about half a minute at a fast idling speed, mainly to ensure that all parts receive an adequate supply of lubricant.

In all cases avoid running a cold engine at high speeds, as this will seriously shorten its working life.

If you start the car inside a garage, remember that the exhaust fumes contain an odourless and invisible but highly toxic gas (carbon monoxide). Always open a door first.

When disengaging the clutch, always depress the pedal fully; while driving never rest the left foot on the clutch pedal.

When driving an automatic transmission car, operate both brake pedal and accelerator with **the right foot only.**

Driving away an automatic transmission car:
At engine idling speed, move the selector lever from "0" or "P" to A, 2, 1 or R, **keeping the brake applied** until ready to move.

Stopping an automatic transmission car:
If stopped with the selector lever not in neutral, the car will tend to creep forwards even at idling speeds. To prevent this, keep the foot brake applied lightly.

To **stop the engine,** turn the key to the "Garage" position.

The first few miles –
take it easy!

"OK oldtimer, not so fast!"

The engine of your BMW 2002 or 1600 is not governed, in other words we have imposed no artificial limitation on its performance. As a result it is up to you to achieve maximum life expectancy and economic results from your car by observing the following simple **rules for running in.**

Maximum permitted speeds for the first 1000 km (600 miles):

	BMW 2002	BMW 1600
1st gear	30 kph (20 mph)	30 kph (20 mph)
2nd gear	60 kph (40 mph)	55 kph (35 mph)
3rd gear	90 kph (55 mph)	85 kph (55 mph)
4th gear	120 kph (75 mph)	115 kph (70 mph)

Fig. 38

Automatic transmission: BMW 2002

Selector lever position 1	45 kph (28 mph)
Selector lever position 2	80 kph (50 mph)
Selector lever position A	120 kph (75 mph)

Maximum permitted speeds for the second 1000 km (from 600 to 1200 miles):

	BMW 2002	BMW 1600
1st gear	30 kph (20 mph)	30 kph (20 mph)
2nd gear	65 kph (40 mph)	60 kph (40 mph)
3rd gear	100 kph (65 mph)	95 kph (60 mph)
4th gear	135 kph (85 mph)	125 kph (80 mph)

Fig. 39

Automatic transmission: BMW 2002

Selector lever position 1	55 kph (35 mph)
Selector lever position 2	90 kph (55 mph)
Selector lever position A	145 kph (90 mph)

The maximum permitted speeds in each gear should only be maintained for short periods while running in. Make frequent speed changes and alter engine speed as much as possible during a journey. Change down in good time, especially when climbing gradients.

After you have reached 2000 km (1200 miles) you may **gradually** increase your speed to the maximum permitted continuous road speed in 4th gear of **170 kph (106 mph), 165 kph (103 mph)** in selector position A for the BMW 2002 Automatic, or **160 kph (100 mph)** for the BMW 1600, provided that traffic conditions permit.

Maximum speeds after running in is complete:

	BMW 2002	BMW 1600
1st gear	44 kph (28 mph)	41 kph (26 mph)
2nd gear	82 kph (51 mph)	77 kph (48 mph)
3rd gear	125 kph (79 mph)	118 kph (74 mph)
4th gear	170 kph (106 mph)	160 kph (100 mph)

Automatic transmission: BMW 2002

Selector lever position 1	65 kph (41 mph)
Selector lever position 2	110 kph (68 mph)
Selector lever position A	165 kph (103 mph)

38

39

Running-in brakes:
Until 500 km (320 miles) have been covered, try to avoid heavy brake applications especially from high speeds, and do not subject the brakes to extended tests, or the brake linings will subsequently fail to achieve their normal low wear rates and high stopping power.

During running-in the gear lever, steering and other controls may be **stiff to move.** As the running-in process continues this stiffness will soon disappear.

At last –
full speed ahead!

"This is daddy's helmet –
and this is my BMW racer!"

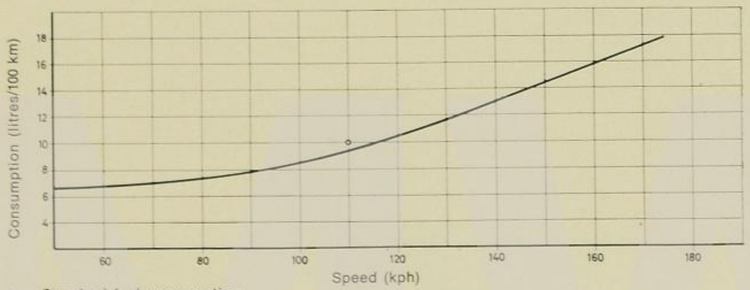
For its correct functioning the engine requires normally available **branded Super petrol** (without additives, for instance upper cylinder lubricants) with a minimum octane rating of 95 (Research Method).

If you find yourself compelled to buy petrol with a lower octane rating, in other words with less anti-knock resistance, the following procedure should largely avoid "knocking" or "pinking" in the engine: keep the engine turning at 2500 rpm or above, change down in good time and accelerate only gently.
A graph of road speed/engine speed is shown on page 74.

Your car's **fuel economy** depends mainly on your own style of driving. Just as travel by the fastest trains involves payment of a supplementary fee, so high speeds, acceleration to the limits of the gears, violent cornering and braking all take their toll, not only in terms of increased petrol and oil consumption but also through rapid tyre wear, early brake lining renewal and a more severe load on the transmission.

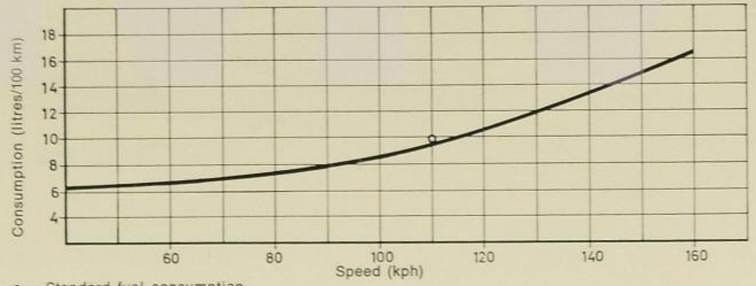
Figs. 40 and 41 show **fuel consumption** throughout the speed range for standard models with 2 passengers.

40 **Fuel consumption at steady speeds (BMW 2002)**



o = Standard fuel consumption

41 **Fuel consumption at steady speeds (BMW 1600)**

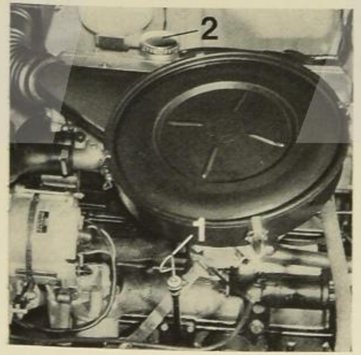


o = Standard fuel consumption

The **standard fuel consumption** graph was arrived at in accordance with the standardised test procedures. It is in no way identical with the average fuel consumption, which may be affected by a large number of different factors: driving methods, load carried, road conditions, traffic density and flow, weather conditions, tyre pressures, etc.

If you have been in a traffic jam or slow-moving column of cars for a long time, we suggest that you take the first opportunity of letting your car's engine **"take a deep breath"**, as it were, by travelling for a mile or two using fairly high engine speeds. If any build-up of carbon has occurred, this routine will disperse it.

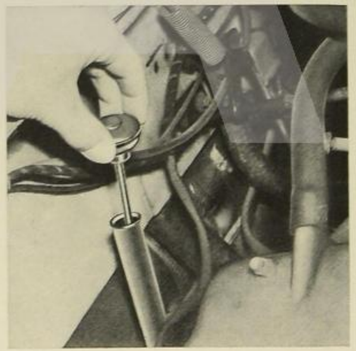
42



Engine oil consumption, like fuel consumption, depends on a variety of factors.

We recommend checking the oil level before the start of a journey (**Fig. 42,** 1). If necessary add fresh oil of the same brand as that already present in the engine. The filler cap can be seen in **Fig. 42,** 2. Fill until the oil level reaches the upper mark on the dipstick. It is useless to overfill the engine and can even cause harm in certain circumstances. The quantity of oil represented by the distance between the upper and lower marks on the dipstick is 1.5 l (3.2 US pints / 2.6 Imp. pints). The oil level must never fall below the lower mark. Do not take off the filler cap when the engine is running.

43



However, you should not change to a different make of oil unless a complete oil change, including the oil filter, is undertaken.

Our engines are designed in such a way as to take full advantage of the highly developed oils supplied by firms of repute nowadays. Neither the engine itself nor the gearbox and final drive oils should require the employment of **any additive.**

Check **automatic transmission oil level** whenever engine oil level is checked (see page 51). **Fig. 43**

A well-tried rule: After a long spell of **pass climbing** or **motorway running** at wide throttle openings, do not switch off the engine at once but allow it to idle or run under light load for a short while longer; this will disperse pockets of heat in the cooling system and prevent loss of the cooling water.

Warning: to remove the radiator cap when the engine is warm, use a glove or cloth, and turn the cap a quarter-turn to the left until it reaches the first stop; let the pressure escape, then turn further and remove. When replacing the cap, tighten all the way to the second stop.

Downhill stretches can be better negotiated if the engine's braking effect is increased by changing down to a lower gear. Never drive downhill with the clutch released, the gear lever in neutral or the ignition switched off.

After a long run on wet roads, through driving rain or snow, the first subsequent brake application may call for rather more pedal pressure than usual.

If one circuit of the **duplex twin-circuit hydraulic brake system** should fail, **brake pedal travel** will immediately increase. Higher **pedal pressure** will also be needed for the same braking effect. Although the vehicle can still be braked effectively with only one circuit in action, it is wise to consult a BMW service station without delay.

44

A spreader spring in each brake caliper causes **increased pedal pressure** when the **minimum brake pad thickness** is reached. To protect the brake discs, the pads should be renewed without delay by a BMW service station.

Whenever you make a long **journey abroad,** we recommend that you pack certain spare parts in case of emergency; bulbs, fuses, V-belts, spark plugs, gaskets, etc., are useful, and your BMW dealer will gladly help you in the selection of these parts.

In general, you are required to display an international registration plate at the rear of your car when driving abroad, but the regulations differ in various countries. You can obtain information from motor clubs, consulates, etc.

When crossing the border into a country which drives on the opposite side of the road, you must stick a piece of paper over the wedge-shaped area on the headlamp lenses, so that the asymmetric dipped beam of your car does not dazzle on-coming traffic. **Fig. 44** shows how to attach the strip when using a left-hand drive car in a country where they drive on the left-hand side of the road.

Before carrying out any **technical modifications** on your vehicle, you are asked to consult a BMW service station. They will gladly inform you about the value, the legal requirements and the factory recommendations.

The right thing to do — **troublefree winter driving**

"Next winter I'll borrow daddy's spiked tyres!"

When using the car in the winter months, please take note of the following recommendations:

A long-term **antifreeze and corrosion inhibitor** is added to the cooling water.

The total capacity of the cooling system including heater is 7 litres (14.7 US pints/ 12.3 Imp. pints).

The factory recommended antifreeze compounds are known to your BMW service-station. To ensure the required frost resistance, it will be necessary to renew the coolant **every 2 years.** (Draining and filling the coolant, see pages 54 and 55).

Before and during the cold season of the year the antifreeze properties of the coolant should be checked. At the same time, examine the cooling system for leaks and renew porous or brittle hoses.

Engine temperature is controlled by thermostat, taking into account engine load and ambient temperature. For this reason the **radiator and air inlet grill should not be blanked off.**

The **screenwasher** unit can be maintained in working order during cold weather by adding a little branded antifreeze to the water (total reservoir capacity approx. 1.5 litres / 2.6 Imp. pints / 3.2 US pints).

If the normal outside temperature is less than 0° C (32° F) a **branded HD engine oil** of SAE 20 or SAE 10 W 30 grade for spark-ignition engines should be used.

If the weather becomes suddenly much colder, change to this grade of oil even if a routine service is not yet due.

Do not forget to move the **flap** for automatic intake air preheat to the "winter" position during cold weather (see page 59). One essential for quick starting is a well-charged **battery.** In cold conditions the battery's efficiency falls, but the loads imposed on it are much greater than in summer.

Warning: if the battery is recharged without removing it from the car, both battery cables must be disconnected. Do this only with the car's engine switched off.

In the interests of directional stability and accurate steering winter tyres should be of the same make and type, and should be fitted to **all four wheels** (and to the spare if possible).

This is particularly important in the case of spiked tyres. Do not exceed 130 kph (80 mph). In the same way, a car should always be fitted with cross-ply or radial-ply tyres, **never** with a mixture of both types.

Always inflate the tyres to the correct pressures, and have the wheel rebalanced whenever the tyre or the wheel itself is changed.

When driving with **chains** in place, never exceed 70 kph (44 mph).

If parking the car in freezing conditions, engage 1st or reverse gear or P on automatic transmission cars to hold the car firm, but do not pull on the handbrake. This is to ensure that the brake pads and linings do not freeze solid to the discs or drums.

To lubricate the **locks,** use only factory-approved products (your BMW dealer can advise you). These will help to prevent freezing in cold weather. If a lock freezes despite this precauation, it can be thawed by heating the key before insertion.

To prevent the **rubber seals** on the doors and lids from freezing, we recommend coating them with a little glycerin.

Chromium-plated and polished components should be protected in winter with a transparent preservative lacquer.

The **underside** of the car is undersealed at the factory. Before the cold season of the year it is a good idea to inspect the underseal and renew if necessary.

Spraying with oil-based products provides no lasting protection against rust, damages rubber components beneath the car and may loosen the existing underseal. Your BMW service-stations knows the brand-name products recommended by the factory. When applying underseal, carefully protect the disc brakes.

No preservative must reach the piston seals or the discs themselves.

After a heavy fall of snow, **clear the slots in front of the windscreen,** so that the heater can operate at maximum efficiency.

In winter it is wise to carry with you in the luggage compartment:

- sand, to assist starting on icy uphill roads;
- a shovel, in case the car has to be dug out of a drift;
- a flat board or plank to put under the jack;
- a brush and scraper for the removal of snow and ice from the body and windows.

It can happen to anyone:
What to do in an emergency

"Won't you spare a minute
to help a guy out of trouble?"

A flat tyre is fortunately a rare event these days. If you should be unlucky, pull to the side of the road as soon as possible and put the handbrake on. Unless you are well clear of the road you should then run back and display a warning triangle or flashing signal lamp at an adequate distance to the rear.

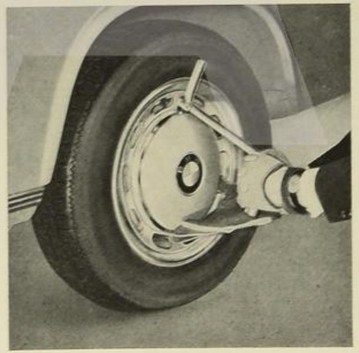
The **spare wheel, jack and tools** are housed in the luggage compartment under the left-hand floor panel. This is retained under light spring pressure and should be lifted up to remove.

Loosen the hexagon nut holding the spare wheel by turning it with the wheel brace. The nut also acts as a spare wheel nut in case you should lose one of the nuts during wheel-changing.
Fig. 45

45

Carefully prise off the hub cap, using the hook provided on one end of the wheel brace. With the other hand, support the hub cap as it becomes loose **(Fig. 46).** Loosen the wheel nuts slightly.

46



Set up the jack (please attach only to one of the **4 points on the body specially designed to accept it)** and raise the car by turning the jack pivot nut with the wheel brace until the wheel concerned is sufficiently clear of the ground.
Fig. 47

Screw off the wheel nuts and exchange the wheels. Replace the wheel nuts and screw up evenly all round the wheel. Lower the car with the jack, then **firmly tighten** the wheel nuts, working crosswise.
Push the hub cap over the 2 protrusions on the wheel, then strike the edge of the hub cap gently to drive it home over the third protrusion. Do not forget to have the flat tyre attended to and balanced at the earliest opportunity.

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Starter will not turn when ignition key is in "Start" position:

Test battery condition by switching on headlights and then trying starter.

1. If the lights go out slowly, the battery is insufficiently charged or has a fault. Recharge the battery or exchange it. To start the car it may be necessary to push it or have it towed. The front axle support beam is fitted with **towing eyes** at left and right. **Fig. 48**

   To tow-start, engage third gear, switch on the ignition and depress the clutch pedal. (Automatic cars cannot be tow-started.)
   When the car is moving steadily forward, engage the clutch.
2. If the headlights go out instantly, check that the cable terminals at the battery and starter are making good contact, and tighten if necessary.
3. If the brightness of the lights does not diminish, consult your BMW dealer (a fault in the starter is indicated.

Engine will not start although starter functions correctly:

Assuming that the starting routine on pages 22 and 23 was followed, and that there is enough fuel in the tank, failure to start could be due to a fault in the ignition system or the fuel supply line.

1. Check that the spark plug cables are properly in place on the spark plugs and that all cables on the coil, distributor and plug leads are making good contact. Examine for traces of water left over from when the car was washed, in case these are causing a short-circuit.
2. Remove spark plugs and check gaps and general appearance (see p. 57).
3. Each plug can be checked by attaching the appropriate lead and laying the metal body of the plug on an unpainted part of the engine block. When the starter is operated, sparks should be seen jumping the electrode gap. If no spark is visible, attach a different plug to the same lead and repeat the test. If no spark occurs this time, the ignition distributor must be examined (see page 57).
4. To check that fuel is reaching the engine, separate the fuel supply line from the carburettor and operate the starter. If no fuel emerges from the supply line, the fuel filter (see page 56), the various fuel lines and the fuel pump must all be examined. On the other hand, if fuel is pumped through to the carburettor, unscrew the carburettor jets (see pages 61 and 62) one after the other and clean them by blowing. If this fails, use a single bristle from a clothes brush, dusting brush or similar, but never clean the jets with a needle, wire or other sharp object.

Coolant temperature too high:

1. Carefully remove the filler cap on the radiator and inspect the coolant level. If a great deal of water has been lost, and the engine is hot, **do not top up the radiator straight away;** wait until the engine has cooled to the extent that a hand can be placed upon it.
2. If the coolant water escapes, check the filler gap, all hose connections and the radiator block itself for leaks.
3. Make sure that any material used to blank off part of the radiator at any time has been removed when no longer required.
4. Check fan belt, and adjust tension or replace as necessary (see page 59).
5. Check ignition timing (see page 58).
6. If necessary, instruct your BMW dealer to flush out the cooling system.

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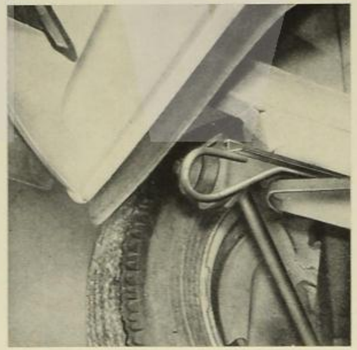

Faulty brakes

At the first sign that a fault may have occurred in the brake system, we strongly recommend that you contact your BMW dealer immediately.

Car **brought to a standstill** with the wheels spinning (deep snow, sand, soft ground, etc.):

Do not press down too far on the accelerator; before the next attempt to extricate the car is made, place some form of firm support beneath the rear wheels (in a real emergency the car's own mats can be used). Obtain help in pushing the car out of the ruts it has made before they become too deep.

Apply the handbrake to the extent necessary to prevent a single rear wheel from spinning. Do not forget to release the handbrake as soon as it has had the desired effect.

Towing another car:

If you wish to assist another motorist by towing his car with your BMW, first ensure that the other car is not larger and heavier than your own. A **towing eye** is provided beneath the spare wheel well. **Fig. 49**

To remove a **wiper blade,** hinge the wiper arm and blade forward away from the windscreen. Press the blade out of its attachment on the arm, and withdraw upwards. **Fig. 50**

The complete **wiper arm** can be removed if its spring retainer is lifted away from the pivot shaft slightly. **Fig. 51**

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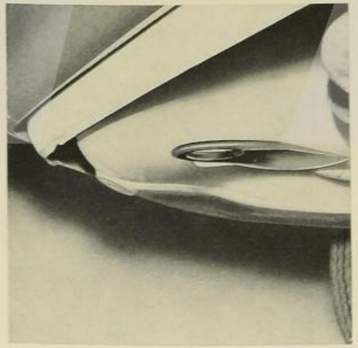

50

51

See and be seen –
lights and bulbs

"My goodness, what a bright light!"

If any power-consuming electrical component fails on your car, you should first check the fuses. The **fuse-box** is located under the bonnet at the rear top. **Fig. 52**

The melted metal band indicating a blown fuse can be clearly seen through the clear plastic cover of the fuse-box. Snap the blown fuse out of its spring clip fastenings and press in a replacement fuse.

Never try to replace a blown fuse with a piece of wire (this entails a fire risk). If the fuse blows repeatedly, the fault should be investigated by a specialist workshop.

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Fuse coding:

No.	Fuse insert to DIN 72581	Item
1	8 A	Rear, side and parking lights (left)
2	8 A	Number plate lights, instrument panel lights
3	8 A	Rear, side and parking lights (right)
4	8 A	Interior light, clock, cigar lighter
5	8 A	Brake and turn lights, reversing lights
6	16 A	Heater blower, horn, wiper motor, washer unit, fuel and temperature gauges, oil pressure telltale

When **changing bulbs** or carrying out any other work on the electrical system always switch off the item concerned in order to avoid short circuits. The earth cable can also be removed from the negative pole of the battery.

Try to avoid touching the glass of new bulbs, but handle them with a clean cloth or paper handkerchief. When removing headlight bulbs, do not disturb the setting of the beam adjustment screws.

Front flashing indicators:

Unscrew the 2 Phillips screws and remove the plastic lens and seal. Press in the round-headed bulb slightly and turn until it can be removed. Bulb rating 21 W spherical, Part No. 63 21 8 780 135. **Fig. 53**

Instrument panel lights:

Before the bulbs can be changed, the padded cover below the instrument panel must be removed. The affected bulb in its holder can then be withdrawn from the rear face of the instrument concerned. The bulb is released from its holder by pressing in slightly and turning.

Speedometer illumination:

2 indicator type bulbs, 3 W (V)

Clock illumination:

1 indicator type bulb, 3 W (I)

Combination instrument:

Lighting:
2 indicator type bulbs, 3 W (V)

Main beam warning:
1 indicator type bulb, 3 W (V)

Battery charge warning:
1 indicator type bulb, 3 W (V)

Oil pressure warning:
1 indicator type bulb, 3 W (V)

Turn indicating lamp:
1 indicator type bulb, 3 W (V)

Main and dipped headlight beams:

To gain access to headlights, open the bonnet and remove the plastic cover protecting the rear of the lamp. Withdraw the plug, turn the bayonet joint to the left and remove. Take out the bulb. When inserting the twin-filament 45/40 W (A) bulb, note the recess formed in the reflector to simplify fitting. **Fig. 54**

The **side and parking bulbs** (4 W indicator type, H) are held in the reflector by a small spring and can be withdrawn by pulling rearwards without difficulty.

Rear lights:

Open the lid of the luggage compartment, unscrew the 2 knurled nuts holding each light pressing and remove the complete assembly. **Fig. 55**

Remove the defective bulb from its holder and renew as follows:

1. Flashing indicator, round-headed bulb, 21 W, Part. No. 63 21 8 780 135.
2. Reversing light, round-headed (F), 15 W.
3. Rear, side or parking light bulb, round headed (G), 5 W.
4. Brake light, round-headed, 21 W, Part Nr. 63 21 8 780 135.

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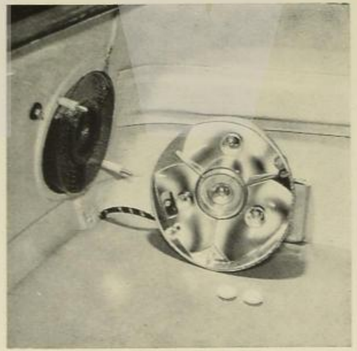

Number plate light:

Remove 2 Phillips screws and withdraw frame complete with glass and seal. **Fig. 56**

The contact clamps for the 5 W (L) festoon type bulbs must have adequate spring tension and make good metal-to-metal contact with the bulb end caps. If necessary squeeze the contact clamps together slightly and clean the contact surfaces.

Interior light:

The lamp housing contains 1 10 W (L) festoon type bulb. Using a screwdriver or similar tool, the housing can easily be removed and the bulb changed if required. **Fig. 57**

Because **correct headlight adjustment** is of such vital importance in terms of road safety it is best for the job to be done by a specialist workshop equipped with the proper equipment. If this is not possible, open the bonnet and turn the knurled plastic knobs until the correct setting is obtained. **Fig. 58**

1 Vertical adjustment
2 Horizontal adjustment

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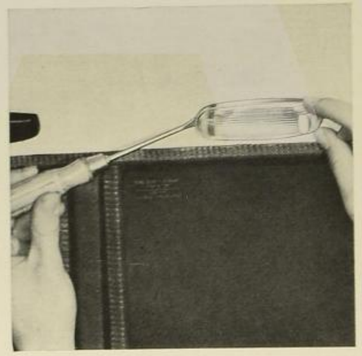
57



58

Follow the routine described below to adjust the headlamps if the proper equipment is not available:

Position the vehicle on a flat level surface at approx. 5 meters (16') from a light-coloured wall. Mark a point on this wall which coincides with the car's longitudinal centre-line.

Extend the centre-line vertically up the wall to give line v-v. **Fig. 59**

Get someone to sit in the centre of the rear seat. Measure the actual height of the headlamp centres above the ground, and transfer this height to the wall, marking out horizontal line h-h.

Mark line a parallel to h-h and 5 cm (2") below it.

Measure the distance separating the headlamps horizontally (e); divide this amount symmetrically and mark lines b and c on the wall at the corresponding distances from vertical centre-line v-v.

Headlamp adjustment with dipped beam only:

Cover up one headlamp. Set the other headlamp to the correct height by turning knurled knob 1 (Fig. 58). The height is correct when the left hand side of the horizontal light/dark border coincides with line a. Next move knurled horizontal adjustment knob 2 (Fig. 58) until the junction between the horizontal part of the border and the part angled upwards at 15° coincides exactly with vertical line b (or c).

Repeat the procedure for the second headlamp.

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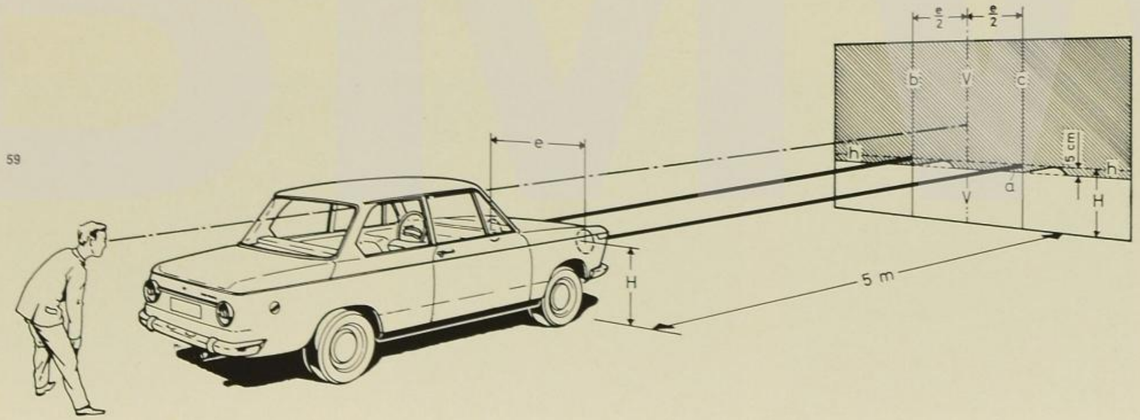

If Sealed-Beam headlights of the American pattern are fitted, adjust as follows:

Use an optical or photo-electric beam-setting device and follow the manufacturer's instructions. If no suitable device is available, park the car on a flat level surface at 7.6 meters (25 feet) from a light-coloured wall. Inflate the tyres to the correct pressures and get someone to sit in the center of the front seat. Extend the car's center-line forward to the wall and mark vertical line V on the wall.

Next mark horizontal line h-h at the height of the headlight center-line, with distance H approx. 66 cm (26½"). Mark lines a and b 5 cm (2") and 10 cm (4") below and parallel to line h-h. Transfer the distance between the headlight centers (approx. 110 cm/44") on to the wall, and mark lines c and d symmetrically on either side of centre line V. Distances e/2 to right and left must be exactly the same.

Mark additional vertical lines to right and left of lines c and d, and 15 cm (6") from them. This will form rectangles, the center-lines of which can be used to align the headlight beams. **Fig. 60**

Adjust only on full beam

For vertical adjustment, turn the upper knurled plastic knob; for sideways adjustment the knob at the side (see Fig. 58). The headlight is correctly adjusted as soon as the centre of the brightest circular section of the beam strikes the intersecting lines in the shaded areas or falls somewhere within these areas. The second headlight is then adjusted similarly.

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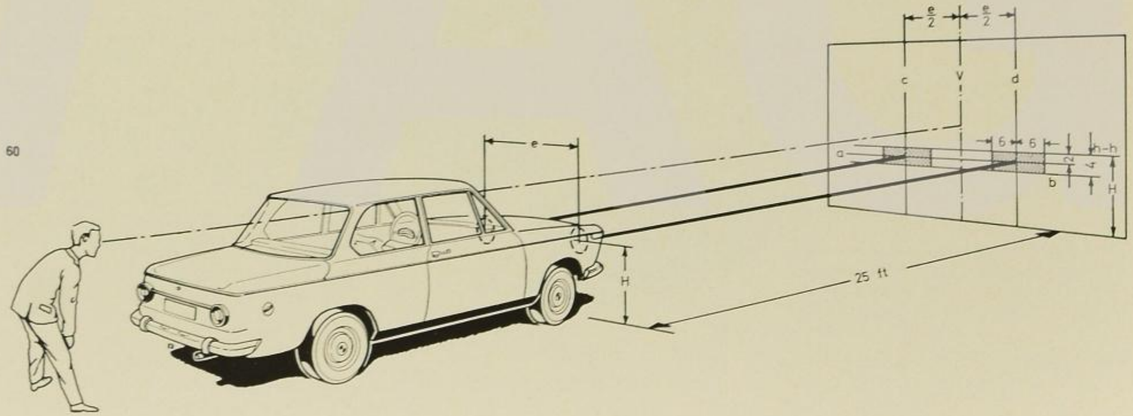


What must be, must be:
Care and maintenance

"Let me tell you, Mister BMW,
my rear wheel squeaks horribly!"
"Not surprising, young man,
if you forget the regular inspections!"

Care and maintenance

Your brand new BMW is a fine sight. How it will look after years of willing services is quite another matter, and depends on the trouble you take to look after it.

Please **do not wash the car** in direct sunlight, nor when the bonnet top is still warm, as patches may develop in the paintwork.

Road dirt and dust contain many chemicals which can damage the paintwork if allowed to remain in place for too long. For this reason any car – particularly a new one – should be washed as often as is practicable.

Traces of tar, dead insects or marks caused by thrown up stones should be removed without delay or touched up where necessary. This will prevent the discolouration of the paintwork or the formation of rust at the affected spots.

Clean out the interior of the car with a brush or vacuum cleaner.

The paintwork should be cleaned down with a fine spray of water, and all traces of dirt hosed away.

Do not direct the hose into the heater intake slots in front of the windscreen. After hosing down, wash the car with abundant warm water using a sponge or wash-leather glove, and starting with the roof. Rinse the sponge at frequent intervals.

Wash the lower part of the body and the wheels last of all and if possible keep a separate sponge for these areas.

After washing, spray the car down most thoroughly a second time and dry off with a clean leather, so that no marks are left by residual water.

If the car cannot be cleaned by washing with water alone, it should be treated with a reputable make of car cleaner or shampoo, mixed with the water in the proportions specified by the maker of the product. The car should then be washed or hosed down with an abundant supply of water. Too frequent use of shampoos and cleaners removes oil from the paintwork, which then tends to become brittle, necessitating the application of a good-quality paintwork preservative.

It is easy to tell when your car's paintwork needs the application of a polish or preservative: the water no longer forms round globules when it comes into contact with the paint surface.

Whatever branded product you apply to your car's bodywork should always be used in strict accordance with the maker's instructions.

Minor paintwork damage may be touched up with the aid of a BMW paint spray aerosol. You will find the respective colour code on a reference label located near the maker's plate.

Chromium plated and polished parts should be cleaned with water or with soapy water if very dirty. A branded chrome protector can then be applied.

Patches of tar should never be removed with a hard object such as a knife. Use instead a proprietary tar remover.

Rubber parts may be washed down with water, but no other substance should be allowed to contact them except pure glycerin.

Clean the **wiper blades** with soapy water. The blades will normally require replacement at least once a year.

White-wall tyres are delivered with a protective coating, and after the tyres have been fitted the coating may be removed by brushing in warm soapy water. If the white walls become exceptionally dirty a proprietary brand of special cleaner will normally restore them without difficulty.

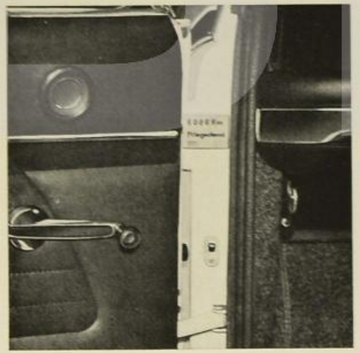
Stains on the cloth upholstery can be removed with stain remover, but the product should not be allowed to come into contact with any real or artificial leather.

Artificial leather can be wiped down with a damp cloth and immediately dried using a separate drying cloth.

When you take delivery of your car you will also receive a **Service Booklet**, in which your name and details of the car will have been entered. After carrying out the **free pre-delivery inspection**, your BMW dealer will remove the appropriate section in the booklet and will make an entry to confirm that the work has been done. The same procedure will be followed when it is time for your 1st inspection at 1500 km (1000 miles).

Your BMW dealer will also put an adhesive label on the driver's door post **(Fig. 61)** to remind you when the next service is due. You will receive confirmation that this and all other specified services have been carried out when you look in the appropriate area of the service booklet. Always ensure that the confirming entries are correctly made; if it is ever necessary to make a claim under the warranty this evidence may be required, and you will in any case be glad later on to have this clear proof that your car has been well looked after.

61



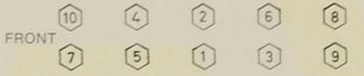
We strongly recommend you to have the prescribed services and inspections carried out **at the correct intervals** by your BMW dealer. This is the only safe way of ensuring that all the work has been done in accordance with the latest works' standards. A list giving details of the widespread BMW dealer network is supplied to you on delivery, so that your car can receive proper attention even if you have travelled a long way from your normal garage.

To ensure the reliability and long life of your car we advise a **minimum of twice-yearly inspections**, even if the mileage laid down between services has not yet reached the correct figure.

1st Inspection

after 1500 km (1000 miles)

1. Change oil in engine together with filter element, while engine is warm.
2. Change oil in gearbox while engine is warm.
3. Change oil in final drive while warm.
4. Check oil content and oiltightness of rear half-shaft joints and gaiters, and top up as necessary (no-maintenance half-shafts will not require topping up).
5. Check steering box oiltightness and top up if necessary.
6. Check level of coolant in radiator and top up if necessary. In winter check anti-freeze. Retighten hose fastening clips if necessary.
7. Examine brake lines and connections for leaks, damage or distortion. Check level of brake fluid in reservoir and top up if necessary.
8. Clean out fine mesh sieve and filter bowl in fuel pump. Tighten screws on fuel pump.
9. Tighten screws and nuts on carburettor.
10. Check automatic intake air pre-heat valve for freedom of movement, and operating lever setting for summer/winter adjustment.
11. Check V-belt tension (5–10 mm / 0.2–0.4″ movement in response to finger pressure) and re-tension if necessary.
12. Take up any slack on all engine bolts and nuts to the required torque levels (see Specification). Check nuts on engine mountings (right and left), inlet manifold and exhaust pipe, exhaust pipe flange and oil sump. With the engine cold or the water temperature not in excess of 35° C (95° F), tighten the cylinder head bolts (for order of tightening, see sketch).



13. Check valve clearances (inlet and exhaust 0.15 – 0.20 mm / 0.006″ to 0.008″); contact breaker gap (0.4 mm/0.016″), dwell angle (BMW 2002 59° to 65°; BMW 1600 61°–66°) and ignition point (adjust dynamically in accordance with instructions).
14. Tighten all bolts and nuts on front axle, steering, gearbox, drive shafts, rear axle and brakes to the torque levels stated in the Specifikation for these parts.
15. Tighten all bolts and nuts throughout the bodywork and exhaust system.
16. Check steering in straight-ahead position for absence of play, and adjust if necessary.
17. Test foot brake and adjust (rear only) as necessary. Bleed the brake system. Check handbrake and adjust as necessary.
18. Check clutch operating clearance (3.0 mm / 0.12″ at thrust rod) and adjust if required (BMW 1600 only).
19. Check front wheel bearing radial play and adjust if required.
20. Check tyre pressures and correct if required.
21. Rebalance all four road wheels if necessary (to be invoiced separately).
22. Check headlamp settings and correct if necessary.
23. Carry out final check on items offecting road safety (brakes, steering, clutch or automatic gearbox, instrument readings, control knobs and horn). Check carburettor idling settings and adjust if required.

Service

every 12 000 km (8000 miles)
beginning at 6000 km (4000 miles)

1. Change engine oil while engine is warm. Renew oil filter element.
2. Grease half-shaft universal joints (no-maintenance half-shafts do not require greasing).
3. Check coolant level (in winter also check anti-freeze) and top up if required.
4. Check acid level in battery and top up if necessary with distilled water. Clean exterior of battery and grease terminal posts with special grease.
5. Inlet air silencer: carefully knock out all dust from air filter element and blow through with air from the inside. If the element is very dirty, renew.
6. Examine brake lines and connections for leaks, damage and distortion. Check level of brake fluid in reservoir and top up if necessary. Check overall brake pad thickness and renew if less than 7 mm (0.28″).
7. Carry out final chek on items affecting road safety and operation (brakes, steering, clutch or automatic transmission, instrument readings, control knobs, rear view mirror, lights, headlight beam settings, horn). Check carburettor idling settings and adjust if required.

Inspection

every 12 000 km (8000 miles)
beginning at 12 000 km (8000 miles)

1. Change oil in engine and oil filter while engine is warm. Renew filter element.
2. Check gearbox oil level and top up if necessary every 24 000 km (16 000 miles) while warm. Automatic transmission every 36 000 km (24 000 miles).
3. Check final drive oil level and top up if necessary.
4. Half-shaft joints: check oil level and oiltightness of sleeves (every 24 000 km/16 000 miles change the oil). No oil change is required on no-maintenance half-shafts.
5. Steering box: check oil level and top up if required.
6. Check level of coolant in radiator, and top up if necessary. In winter also check anti-freeze.
7. Check battery acid level, and top up with distilled water if required. Clean exterior of battery and grease terminal posts with special grease.
8. Check level of brake fluid in reservoir and top up if required.
9. Clean out sieve and bowl of fuel pump, and tighten screws on fuel pump.
10. Check automatic air intake pre-heat valve for freedom of movement and correct setting of lever for summer and winter operation.
11. Check V-belt tension (5–10 mm/0.2 to 0.4″ movement in response to finger pressure) and re-tension if necessary.

12. Oil joints and bearing of the carburettor linkage.
13. Renew spark plugs. Spark plugs with normal electrodes every 12 000 km (8000 miles), spark plugs with platinum electrodes according to maker's instructions.
14. Take off the distributor rotor and let a few drops of engine oil soak into the lubricating pad in the distributor shaft.

    Warning: no oil must overflow or come into contact with the contact breaker points. Rub a little Bosch Ft 1 v 26 grease lightly on to the base plate guide ball track. Apply a small quantity of Bosch Ft 1 v 4 grease to the heel of the contact breaker rocker arm.
15. Tighten all bolts and nuts on the engine (see Specification for torque levels to be observed); tighten cylinder head bolts as prescribed above while the engine is cold or the water temperature not exceeding 35° C (95° F). Tighten right- and left-hand engine mounting bolts, bolts and nuts on inlet and exhaust manifolds, exhaust pipe flange, carburettor and fuel pump mountings and oil sump.
16. Check valve clearances (inlet and exhaust 0.15–0.20 mm/0.0056–0.0078″) contact breaker gap (0.4 mm/0.016″) dwell angle (BMW 2002 59°–65°; BMW 1600 61°–66°) and ignition point (adjust dynamically in accordance with instructions).
17. Renew intake air silencer filter element.
18. Check steering for absence of play in straight-ahead position, and adjust accordingly. Check condition of track rod joints.
19. Final drive and half-shafts: check condition of rubber couplings; examine rubber coupling, examine and grease universal joints (no-maintenance half-shaft and propeller shaft joints do not require greasing).
20. Tighten the following bolts and nuts (keep to correct torque values shown in Specification): front axle, steering, gearbox, half-shafts, rear axle and brakes.
21. Disc brakes: check overall thickness of pads: not to fall below 7 mm (0.28″); examine surface of discs, if necessary replace pads.
22. Front wheel bearings: check play and adjust if necessary.
23. Change round running wheels in the prescribed number. Check tyre pressures and correct if necessary. Check condition of tyres. If uneven wear is evident, check toe-in. Optional complete check and correction of wheel alignment (cost to be shown separately).
24. Balance all four running wheels (cost to be shown separately).
25. BMW 2002: Check clutch driving plate for wear.

    BMW 1600: Check clutch play (3.0 mm/0.12″ at thrust rod) and adjust if necessary.
26. Check brake lines and connections for leaks, damage or distortion. Clean out brake drums and linings and examine for wear. Check that handbrake cables move easily. Adjust brakes.
27. Tighten all bolts and nuts on bodywork and exhaust system.
28. Oil door, bonnet and luggage compartment hinges. Lightly grease bonnet and luggage compartment lid catches as well as door strikers and latches. Test for correct operation.
29. Apply a light coating of glycerine to the outer faces of the door sealing rubbers, swivelling window rubbers and other rubber mating surfaces.
30. Check headlight beam settings and adjust if required.
31. Carry out final check on all items affecting road safety (brakes, steering, clutch or automatic transmission instrument readings, control knobs, rear view mirror, light and horn). Check carburettor idling settings and adjust if necessary.

Details of maintenance routines

The **engine oil** should be changed only when it has become warm by running the engine for a period. Oil changes are necessary: during the summer months every 6000 km (4000 miles), during the remainder of the year (below 50° F [10° C]), every 3000 km (2000 miles) or at least after three months.

Unscrew the oil drain plug (19 mm) on the right-hand lower part of the sump, allow the old oil to run out and retighten the plug firmly. **Fig. 62**

62

Total oil capacity: 4 litres (8.5 US pints/ 7 Imp. pints) +0.25 litre (0.53 US pints/ 0.44 Imp. pints) if the oil filter is changed.

Fill to the upper mark on the dipstick, never higher.

Oil grades: for outside temperatures above 50° F (10° C), a branded HD 4-stroke engine oil, grade SAE 30, SAE 20 W 40 or SAE 20 W 50; for outside temperatures below 50° F (10° C), grade SAE 20 or SAE 10 W 30.

Change **oil filter element** every 6000 km (4000 miles) when engine oil is changed.

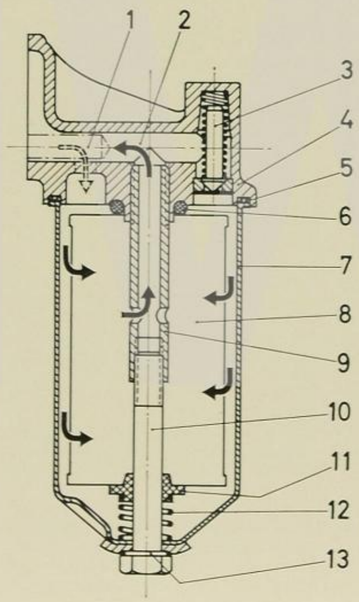
Unscrew holding bolt (17 mm) and remove it, together with the sealing ring and the filter casing, leaving the upper part of the filter in place.

Clean the casing, renew the element, inspect the sealing ring for damage and re-assemble. **Fig. 63**

Full-flow oil filter (Fig. 63)

1. Oil input from pump
2. Filtered oil to lubrication points
3. Pressure relief valve
4. Upper part of body
5. Sealing ring
6. Rubber sealing ring
7. Filter casing
8. Filter element
9. Outlet tube
10. Holding bolt
11. Rubber seal
12. Spring
13. Sealing ring

63



Change the oil in the gearbox only when it has become warm. The change should be made every 24 000 km (16 000 miles). Unscrew first the oil drain plug (17 mm), then the oil filter plug (14 mm) on the left-hand side of the gearbox. This will assist the oil in draining more rapidly. When fully drained, screw back the drain plug firmly into place. Both drain and filler plugs have conical threads, and should therefore not be replaced by plugs having metric threads. **Fig. 64**

Total oil capacity:
4 speed box: 1 litre (2.1 US pints/ 1.8 Imp. pints)
5 speed box: 1.4 litres (3.0 US pints/ 2.5 Imp. pints)

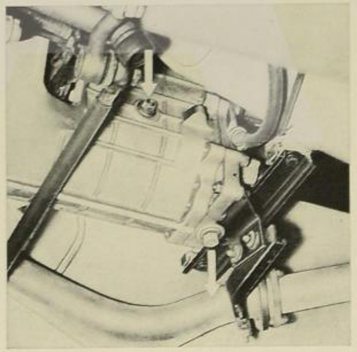
Correct oil level: to underside of filler aperture.

Oil grade: any branded SAE 80 gearbox oil (not hypoid gear oil), or, if not available, HD engine oil SAE 30.

Checking oil level in automatic transmission:
Place the car on a flat level surface and apply the handbrake. With the selector lever in position "P", run the engine at idling speed. The engine should be at its normal operating temperature. Take out the oil dipstick (see page 29, **Fig. 43**), wipe with a **non-fluffy** cloth and measure the oil level. It should be between the two marks on the dipstick. The quantity of oil represented by the space between the two marks is approx. 0.6 litre (1.3 US pints / 1.1 Imp. pints).

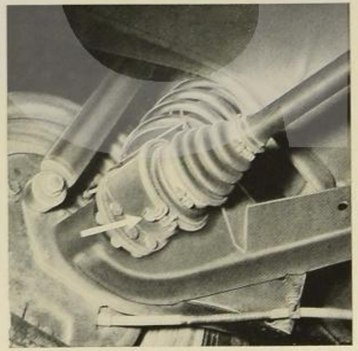
Change the oil in the automatic transmission only when the engine is at normal operating temperature, every 36 000 km (24 000 miles):
Place the car on a flat level surface and apply the handbrake. Engage selector lever in position "P" and stop the engine. Unscrew the oil drain plug (17 mm spanner) on the oil sump of the automatic transmission, allow the oil to drain, replace the drain plug and tighten firmly.
Add only 1 litre (2.1 US pints / 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. 1.5 litres (3.2 US pints/ 2.6 Imp. pints); the total capacity of a new or exchange transmission when initially filled is 4.75 litres (10 US pints / 8.4 Imp. pints).
Oil grades: see page 90.

64



Change oil in the **half-shaft sliding joints** every 24 000 km (16 000 miles). No oil change is required on no-maintenance half-shafts. Turn the rear wheel until the combined filler/drain plug (11 mm) is pointing downwards. Unscrew the plug and let the oil drain away. **Fig. 65**
To refill the joint with oil, the wheel must again be turned until the orifice is pointing upwards at 45°.
Total capacity of each joint:
180 cc (6.3 fl. oz.).
Oil level: to lower edge of filler orifice. Checking is assisted by the transparent gaiter covering the joint.
Oil grade: branded hypoid gear oil, SAE 90.

65



Change the oil in the **final drive** at 1500 km (1000 miles), when it has become warm.
Unscrew oil drain plug (10 mm intl. hex.) and then oil filler plug (10 mm intl. hex.) on the left-hand side of the final drive casing. This will help the oil to escape more quickly. Clean the drain plug and replace, screwing home firmly. **Fig. 66**

Total oil capacity: 0.8 litre (1,7 US pints/ 1.4 Imp. pints).

Oil level: to lower edge of filler orifice. Check every 12000 km (8000 miles).

Oil grade: branded hypoid gear oil, SAE 90 (running-in grade). Your BMW service station knows the approved brands.

66

The 2 half-shaft universal joints should be greased every 6000 km (4000 miles); not necessary on maintenance-free half-shafts.

Grease: branded multi-purpose grease, drip point 180° C (355° F).

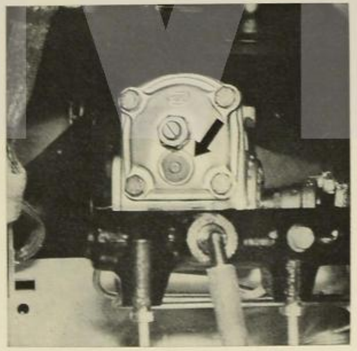
The **steering box** is permanently oil-filled, and thus no drain plug is fitted. The oil level should be checked every 12000 km (8000 miles). **Fig. 67**

Total oil capacity: 300 cc (10.5 fl. oz.).

Oil level: to lower edge of filler orifice.

Oil grade: branded hypoid gear oil, SAE 90.

67



The **wheel bearings** should be serviced only by a BMW dealer; every 60000 km (40000 miles) the grease content should be checked and grease added if required. **Fig. 68**

Grease: branded multi-purpose grease, drip point 180° C (355° F).

Greasing hinges, pivots etc.:
From time to time, apply a few drops of an oil containing graphite to the pivot and support points of the carburettor linkage, bonnet and luggage compartment lids and catches, door stays and hinges.

68

Lubrication of ignition distributor:
Every 12000 km (8000 miles):

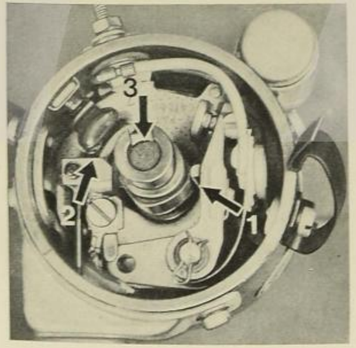
Apply a narrow layer of Bosch Ft 1 v 4 grease to the **fibre heel** of the contact breaker rocker arm. **Fig. 69, 1**

Coat the baseplate guide **ball track** lightly with Bosch Ft 1 v 26 grease. **Fig. 69, 2**

Take out the distributor rotor and let a couple of drops of engine oil soak into the **felt pad** in the distributor shaft. **Fig. 69, 3**

The transparent **reservoir for brake and clutch** (brake fluid only on BMW 1600) is in the engine compartment on the left hand side, and enables the level to be inspected at a glance.

69



If the level should fall below the minimum mark, the result will be faulty clutch disengagement which will become apparent well before there is a risk of brake failure. **Fig. 70**

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

Capacity: fill to upper "MAX" mark on reservoir. **Fig. 70**

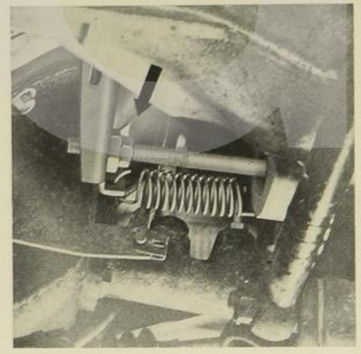
Grade: ATE blue brake fluid.

70

Check **clutch operating clearance** (BMW 1600 only) every 12000 km (8000 miles) at the thrust rod on the lower left of the clutch housing. Adjust to the prescribed clearance of 3.0 mm (0.12") by loosening the locknut (13 mm) and turning the adjusting nut (19 mm). Finally, retighten the locknut firmly. **Fig. 71**

The **clutch** on the BMW 2002 **requires no maintenance** and is automatically adjusted at the clutch slave cylinder. In the course of an Inspection every 12000 km (8000 miles) wear of the clutch driving plate should be measured in situ.

71



Push the withdrawal lever by hand in the direction of travel until it contacts the stop on the clutch slave cylinder.

When new, travel at the thrust rod (A) is 17–19 mm (0.67–0.75").

As the clutch plate wears distance A becomes smaller, and when the lower limit A = 5 mm 0.2") is reached the clutch driving plate must be renewed by a BMW service station. **Fig. 72**

Loss of fluid from the hydraulic clutch actuating system, or air in the hydraulic system, can lead to incomplete clutch disengagement and thus to gearbox damage.

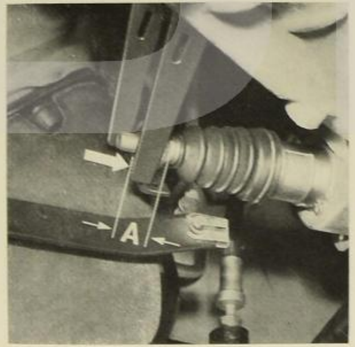
Bleed the hydraulic system in good time by means of the bleed screw provided.

With a view to achieving even tyre wear, the **wheels** should be changed round ever 12 000 km (8000 miles). On each side of the car the front and rear wheels should be exchanged. Never change the wheels crosswise from one side of the car to the other. The spare wheel can be included in the wheel changing pattern if so desired. **Fig. 73**

Have the wheels statically and dynamically **balanced** every 12 000 km (8000 miles) if possible while in place on the car and as soon as they have been changed round. If signs of uneven wear are detected in the course of a regular tyre inspection for wear, damage, foreign bodies, etc. we recommend that an expert check on wheel positioning at normal loading be carried out as soon as possible.

Besides regularly checking the coolant level, the hoses and their connections we recommend to renew the coolant of the cooling system every 2 years (see page 32). While doing this, check the filler cap for good sealing and correct functioning of the pressure and vacuum relief valves.

72



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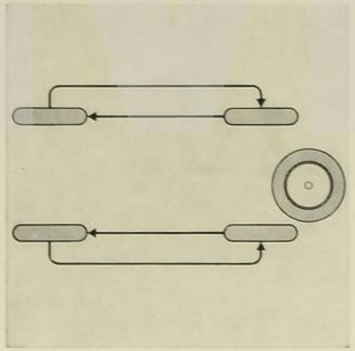

74

The complete cooling system, including heater, has a **capacity** of 7 litres (14.8 US pints/12.3 Imp. pints), To **drain** the system, open:

1. drain plug at the bottom left of the radiator (13 mm hex. nut).
2. plug at the rear right-hand side of the engine block (19 mm hex. nut).

Figs. 74 and 75

While draining the cooling system the heater temperature control on the instrument panel must be set to "warm" (see page 18, **Fig. 31**).

Refilling an empty cooling system:

Set the heater temperature control lever to "warm", and fill the radiator. Replace the filler cap, turning as far as the second stop. Drive the car, or allow the engine to run, until the normal operating temperature is reached. Unscrew filler cap as far as the first stop, thereby allowing air to escape from the cooling system, then remove completely. Top up radiator to a point no higher than 2 cm (3/4") below the base of the filler orifice. Replace cap and tighten. **Fig. 76**

Every 6000 km (4000 miles), or at least once a month, the **battery acid level** should be checked. To do this, unscrew and remove the 6 plugs along the centre of the battery. The acid level should be approx. 5 mm (0.2") above the upper surface of the plates in each cell, or level with the bar which can be seen through the plug orifice.

If the level is too low, top up to the correct marking with distilled water. Do not use acid for this purpose. **Fig. 77**

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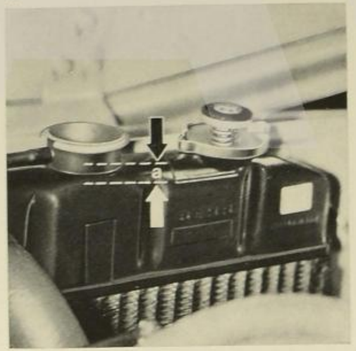

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The top part of the battery should always be kept clean and dry. The **terminal clamps and posts** can be protected against corrosion by an application of Bosch Ft 1 v 40 anti-acid grease.
Fig. 79

Warning: make sure that no acid or lead oxide from the terminals reaches your clothing. Do not bring a naked light near the battery, as there is a risk of explosion.

Every 6000 km (4000 miles) the **air intake silencer filter element** should be removed, by undoing the over-centre catches, and examined to see how much dirt it contains. Dirt adhering to the element can be carefully knocked off and blown out from the inside; if the element is severely contaminated, however, and in any case after every 12 000 km (8000 miles), the element should be renewed.
Fig. 79

Continuing use of a choked air filter element will increase fuel consumption and lower the car's performance.

Clean the **fine mesh filter** and bowl in the fuel pump by taking off the fuel pump cover plate (8 mm bolt and sealing ring), and extracting the nylon fine mesh sieve and cleaning out the bowl. Do not fit the same sealing ring when replacing unless it is in good condition.
Fig. 80

The 6 cheese-headed screws on the fuel pump should be tightened evenly with a screwdriver.

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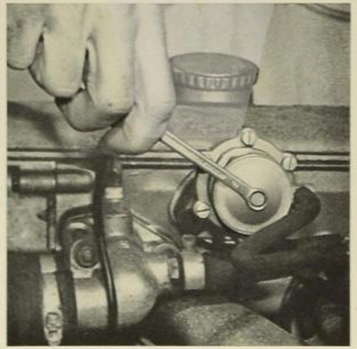


Check **spark plug electrode gaps** every 12 000 km (8000 miles); in addition, check the gaps of new plugs before fitting. Use a feeler gauge and set the correct gap "a" of 0.6 + 0.1 mm (0.024" + 0.004") by bending the earth electrode – platinum electrode 0.35 mm (0.014").
Fig. 81

Clean spark plugs with a brush (not a metal brush) dipped in fuel, and apply a little graphite grease to the threads before replacing in the cylinder head.

In all cases, **renew the spark plugs** every 12 000 km (8000 miles), and spark plugs with platinum electrodes in accordance with the manufacturer's instructions.

Details of the correct types of spark plug are given on the inside back cover.

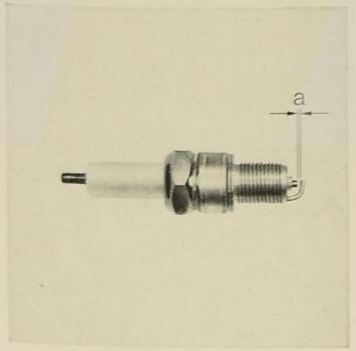
Check **contact breaker gap** every 12 000 km (8 000 miles).

If no instrument for the measurement of dwell angle is available, remove distributor cap, take out spark plugs and turn the engine slowly using a spanner on the V-belt pulley securing nut (30 mm). Never turn the engine over by means of the fan blades. Continue to turn the engine clockwise, looking from front to back of the vehicle, until the contact breaker arm is fully raised (fibre heel is resting on the highest point of the distributor shaft cam). If the contact breaker points are dirty or slightly eroded they can be rubbed smooth. If they are severely eroded they should be renewed. Check that the gap is 0.4 mm (0.016"), by using a feeler gauge. **Fig. 82**

Resetting contact breaker gap:

Slightly loosen locking 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 0.4 mm (0.016") can be measured between the points. Re-tighten locking screw a and check that the setting has not altered. **Fig. 83**

81



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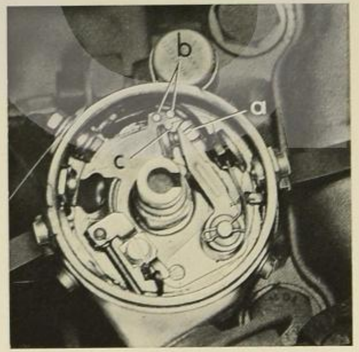
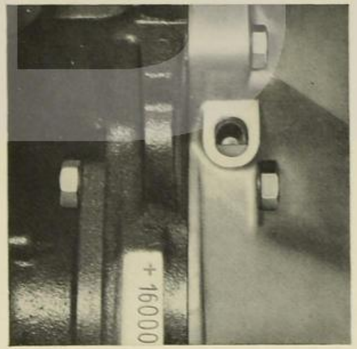


Checking the ignition timing: this should always be done after the contact breaker gap has been reset, and in any case every 12 000 km (8000 miles) dynamically without vacuum adjustment with a timing (strobe) light and a tachometer at 1400 rpm. The timing mark Z (pressed-in steel ball) for the first cylinder will be found on the flywheel and is visible through the inspection hole in the clutch bell housing – above the starter motor. **Fig. 84**

The ignition timing adjustment should be left to a BMW service station.

84

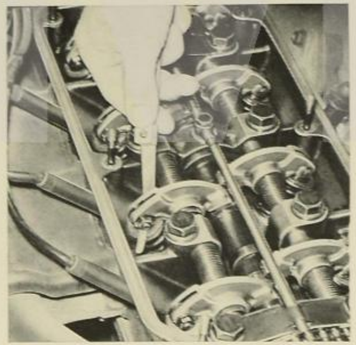


Check valve clearances and adjust if necessary every 12 000 km (8000 miles). The engine should be at rest and cold, or the water temperature not higher than 35° C (95° F). Remove the breather connecting hose.

Take off the valve cover (6 nuts and 1 bolt, 10 mm, with washers). Make sure the ignition lead clip is freed before removing cover.

The correct valve clearance for both inlet and exhaust valves is 0.15–0.20 mm (0.006–0.008"). To measure, a feeler gauge 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. **Fig. 85**

85



The compression stroke TDC is reached when the valves of the cylinder next but one in the firing order are on the overlap:

TDC position Cylinder No.	Valve overlap Cylinder No.
1	4
3	2
4	1
2	3

To adjust valve clearance, loosen the hexagon nut (10 mm) on the rocker. **Fig. 86**

86

Using a piece of 2.5 mm (0.1") steel wire bent in a slight angle, turn the eccentric adjuster until the correct clearance can be measured. **Fig. 87**

Re-tighten the hexagon nut and check that the clearance has not altered.

Check V-belt tension
every 12 000 km (8000 miles).

The V-belt is correctly tensioned if it can be pushed down by 5–10 mm (0.2 to 0.4") with the finger in the centre of the top run, between the alternator and the fan pulley. **Fig. 88**

Resetting V-belt tension:
Loosen the upper and lower alternator securing bolts (13 mm) and move the alternator bodily to one side on the tensioning strap.

Renewing V-belt:
Loosen upper and lower alternator securing bolts (13 mm) and move the alternator as close as possible to the engine. Pass the new V-belt over the fan and the crankshaft, fan and alternator pulleys, seat in pulley grooves and set correct tension as above.

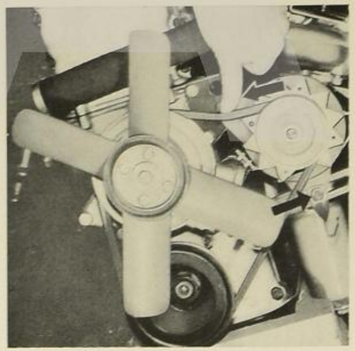
The **automatic induction air pre-heat valve** is located in a housing to the right of the radiator. Every 12 000 km (8000 miles) the lever should be placed in the winter (W) setting and the valve's freedom of movement checked. If necessary, oil the valve.

In the "W" position air drawn in at the front of the car is mixed with air pre-heated round the exhaust manifold in proportions dependent on outside and engine temperatures, until it reaches approx. 30° C (86° F). At approx. 30° C (86° F) outside temperature the pre-heat supply hose is completely closed and the car obtains all its induction air supply from the fresh air hose.

In summer, the external lever should be used to set the valve to position "S" (see also transfer on valve housing cover plate). The cover plate can be removed for inspection purposes by unfastening one slotted screw. **Fig. 89**

87

88



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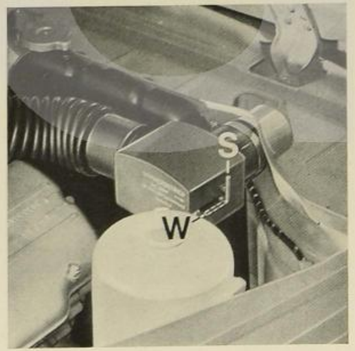


The brakes should be adjusted every 12 000 km (8000 miles). The front disc brakes have automatic adjustment.

Each **rear wheel brake plate** carries 2 eccentric adjusters (17 mm spanner), providing separate adjustment of each brake shoe.

Turn the left eccentric hexagon nut anti-clockwise and the right nut clockwise to adjust, at the same time turning the wheel forcibly forwards until the shoes contact the brake drum and prevent further movement. Then turn each adjuster back approx. 1/8 turn until the wheel just begins to turn without binding. **Fig. 90**

90

Warning: when adjusting the brake shoes, make sure that the handbrake is released.

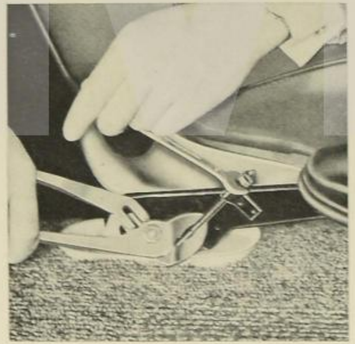
If the brake pedal is springy and has excessive travel, the brake system must be bled.

Handbrake adjustment

(brake shoes should first be adjusted as described above):

Push back the rubber sleeve protecting the handbrake lever, loosen the locknut (10 mm) on each adjusting screw, pull the handbrake on for about 4 notches, tighten the adjusting nut (10 mm), while holding the adjusting screw with pliers to prevent it from turning, and check that the wheel cannot turn. **Fig. 91**

91



Re-tighten locknut. **Fig. 92**

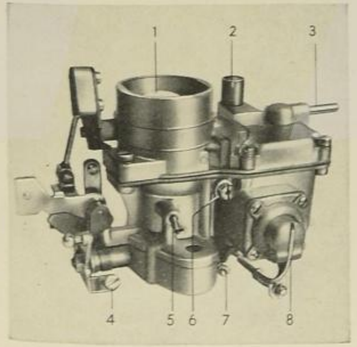
Following this, check that the rear wheels can turn without binding when the handbrake is released. You can confirm that both cables from the handbrake lever to the rear wheels are set to give equal braking effort by pulling the handbrake lever on gently and turning both wheels round by hand.

92

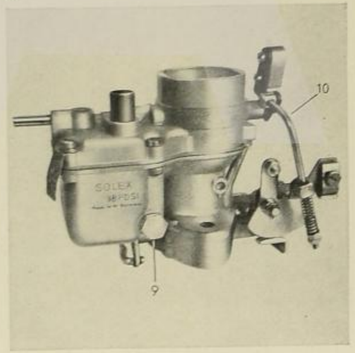
Solex downdraught carburettor
40 PDSI (BMW 2002)
38 PDSI (BMW 1600) Figs. 93 and 94

1. Cold start butterfly
2. Float chamber breather
3. Fuel inlet
4. Idling adjustment screw
5. Vacuum regulator connection
6. Idling jet
7. Idling mixture control screw
8. Accelerator pump
9. Main jet closure plug
10. Cold start connecting link

93



94



The carburettor should if possible be **cleaned** only by your BMW dealer. In an emergency the float chamber can be emptied by removing the plug (Fig. 94, 9: 13 mm spanner) and any water or dirt trapped therein thus removed. In addition, the following jets can be unscrewed and cleaned by blowing through:

Main jet (accessible after removal of plug, 13 mm, Fig. 94, 9).

Idling jet (8 mm, Fig. 93, 6).

The jet sizes and basic carburettor adjustment adopted by the manufacturers should not be tampered with. See Specification for details.

Adjust **idling settings** only when the engine is at its normal operating temperature.

Screw the idling mixture control screw carefully in as far as it will go, then unscrew it by about 2 1/2 turns; this will give the basic idling setting.

Using the idling adjustment screw, set the idling speed of the engine to approx. 700–800 rpm.

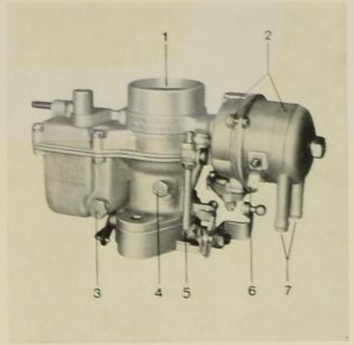
If the idling mixture control screw is now slightly screwed in (weaker mixture), the best fuel-air mixture setting will be discernible as a slight rise in engine speed. Following this, the idling speed of the engine must again be reduced by unscrewing the idling adjustment screw, making sure that the engine continues to run smoothly and without hesitation. If this is not so, make further slight adjustment of the idling mixture control screw.

Solex 40 PDSIT downdraught with automatic choke. Figs. 95 and 96

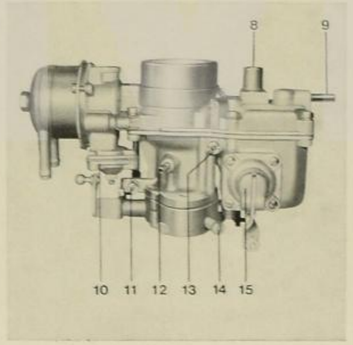
1. Cold start butterfly
2. Automatic choke mechanism
3. Main jet cover screw
4. Venturi retaining screw
5. Choke connecting linkage
6. Terminal for electric mixture heater
7. Hot water unions for mixture heating
8. Heat chamber vent
9. Fuel feed
10. Vacuum diaphragm housing
11. Idling speed adjusting screw
12. Connection for vacuum advance
13. Idling jet
14. Idling misture adjusting screw
15. Accelerator pump

The Solex PDSIT carburetor uses a combined automatic choke system with both electric and warm-water heating of the bimetallic spring. It needs no maintenance in service. For cleaning and adjustment, see 40 PDSI carburetor.

95



96



Last but not least:
Specifications

"Daddy and I will now discuss the whole matter again as man to man!"

Specification

ENGINE

Type

4 cylinder, 4-stroke inline, water-cooled, with overhead camshaft (OHC), inclined valves and swirl-action hemispherical combustion chambers.

Position

Over front axle, inclined at 30° from vertical, 3-point mounting: at front close to centre of gravity on two side-mounted rubber cushions attached directly to the front axle cross-member; at rear, bolted rigidly to gearbox, with single rubber mounting on gearbox cross-member.

Cylinder block

Special gray cast iron.

Cylinder head

Light alloy, with shrunk-in valve seats and guides.

Crankshaft

Hardened forged steel with 8 balance weights (BMW 2002), 4 balance weights (BMW 1600), 5 three-component main bearings.

Connecting rods and pistons

Forged steel connecting rods with replaceable four-layer big-end bearings. Pistons with raised flat top. Chromium plated top rings.

	BMW 2002	BMW 1600
Capacity fiscal effective	1977 cc (120.6 cu.in.) 1990 cc (121.4 cu.in.)	1563 cc (95.38 cu.in.) 1573 cc (95.99 cu.in.)
Max. output at	100 bhp (DIN) 5500 rpm 113 bhp (SAE) 5800 rpm	85 bhp (DIN) 5700 rpm 96 bhp (SAE) 5800 rpm
Output per litre	50.3 bhp	54.0 bhp
Max. permitted engine speed	6200 rpm	6200 rpm
Max. continuous engine speed	6000 rpm	5800 rpm
Max. torque at	16 mkp (115.7 ft/lb) 3000 rpm	12.6 mkp (91 ft/lb) 3000 rpm
Compression ratio	8.5 : 1	8.6 : 1
Stroke/bore ratio	80/89 mm	71/84 mm
Mean piston speed at	14.7 m/sec (2892 ft/min) 5500 rpm	13.5 m/sec (2657 ft/min) 5700 rpm
Torque/weight ratio (unladen)	17 mkp/1000 kg (125 ft/lb/ton)	13.7 mkp/1000 kg (99 ft/lb/ton)
Output/weight ratio	9.4 kg/bhp (20.7 lb/bhp) 13.4 kg/bhp (29.5 lb/bhp)	10.8 kg/bhp (23.8 lb/bhp) 15.5 kg/bhp (34.1 lb/bhp)

Valves

inclined in cylinder head at a narrow V angle. Armoured exhaust valve with hard chromium-plated shaft. Adjustment by eccentric-mounted rockers.

Valve operation

By light alloy rockers with case-hardened cam pads and a single overhead camshaft. Duplex roller chain drive to camshaft with automatic oil-damped chain tensioner and backlash reducer.

Breathing

Crankcase and valve chamber linked by a duct connected to the inlet tract.

Valve operating clearance

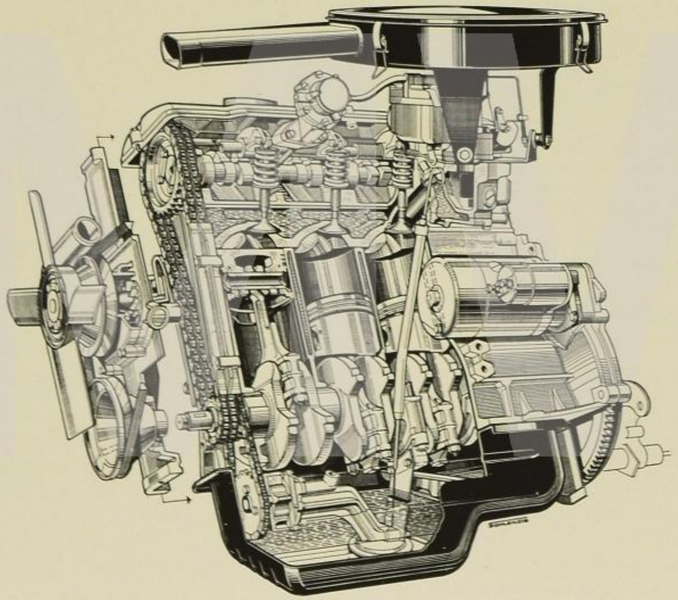
Inlet and exhaust: 0.15–0.20 (0.006 to 0.008") with engine stopped and cold (max. coolant temperature 35° C/95° F).

Valve timing

Inlet opens 4° bTDC
Inlet closes 52° aBDC
Exhaust opens 52° bBDC
Exhaust closes 4° aTDC
} (± 2.5°)

allowing 0.5 mm (0.02") adjustment play measured between rocker and cam base circle.

Engine – BMW 2002



Lubrication

Pressure circulating system with full-flow oil filter, gear-type pump chain-driven from crankshaft and pressed steel sump.

Oil filter

Full-flow filter with paper element and pressure relief valve opening at a pressure of 1.3 ± 0.2 atü (18.5 ± 2.8 psi).

Oil consumption

0.05–0.1 litre per 100 km (1650–1900 mpg).

Air filter

Filter element within induction air silencer.

Fuel supply

Mechanical fuel pump, operating pressure 0.21–0.25 kp/cm² (2.85–3.5 psi).

Fuel filter

Fine mesh filter within fuel pump and on fuel gauge plunger tube in tank.

Radiator type

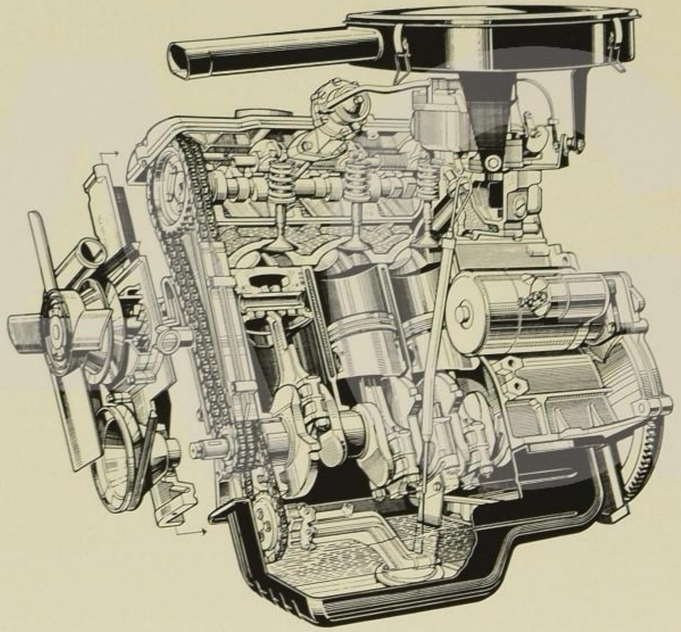
Gilled tube, with pressure relief and vacuum valves in filter cap.

Opening pressure

of radiator filler cap valves

Excess pressure	1,0 ± 0,15 kp/cm² (14,22 ± 2,14 psi)
Underpressure	0,04 ± 0,01 kp/cm² (0,47 ± 0,14 psi)

Engine – BMW 1600



Coolant thermostat

Thermostatic control of the engine coolant circulation in engine inlet, compensating the engine load and ambient temperature variations (BMW system).

Opening begins: 80° C (176° F). Mixed temperature corresponds to approx. 85° C (185° F) at engine outlet.

	BMW 2002	BMW 1600
Fuel consumption (DIN 70030 standard procedure)	10.0 litres/100 km (23.5 mpg [US] / 28.2 mpg [Imp])	9.9 litres/100 km (23.8 mpg [US] / 28.5 mpg [Imp])
Carburettor type	1 Solex 40 PDSI downdraught	1 Solex 38 PDSI downdraught
Carburettor settings		
Main jet	X 155	X 130
Corrector jet	130	110
Venturi	30	26
Idling jet	45	47,5
Rich mixture valve	100	90
Injection volume	2 ± 0.2 cc/stroke (0.122 ± 0.012 cu.in.)	1.4–1.7 cc/stroke (0.109–0.134 cu.in.)
Float needle valve	2.0	2.0
Float weight	8.5 g (0.3 oz.)	8.5 g (0.3 oz.)
Fuel level	17–19 mm below joint (0.67–0.75")	17–19 mm below joint (0.67–0.75")

CLUTCH

BMW 2002:

Hydraulically operated single dry plate diaphragm spring clutch with torsional vibration damper and automatic wear compensation (manual gearbox); fluid coupling with torque converter (automatic transmission).

BMW 1600:

Mechanically operated single dry plate with torsional vibration damper.

GEARBOX

a) Manual: 4 forward speeds (optional: 5-speed gearbox) and reverse, with Porsche synchromesh on all forward speeds.

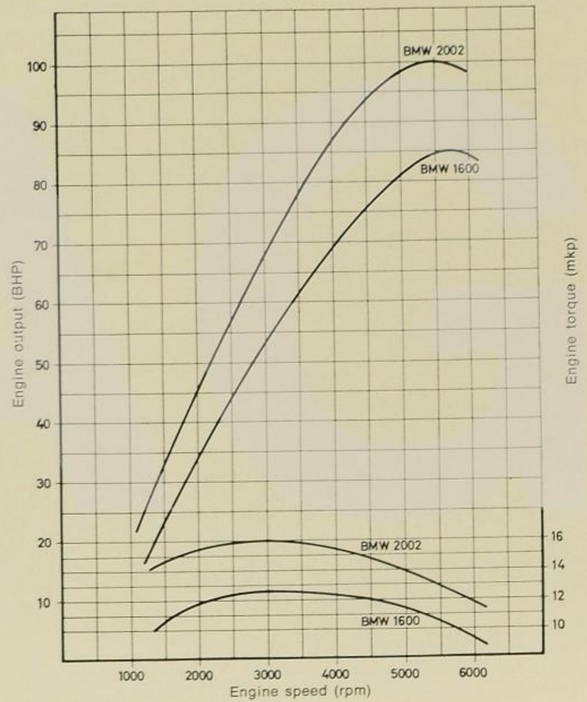
b) Automatic: ZF 3HP-12/B transmission.

Ratios

Manual	4-speed	5-speed	Automatic
1st gear	3.835:1	3.368:1	2.56:1
2nd gear	2.053:1	2.16:1	1.52:1
3rd gear	1.345:1	1.579:1	1.0:1
4th gear	1.0:1	1.241:1	–
5th gear	–	1.0:1	–
Reverse	4.18:1	4.0:1	2.0:1

Torque converter ratio:
1–2.1 : 1

Engine output



PROPELLER SHAFT

BMW 2002:

Divided shaft with flexible mounting for center bearing, rubber coupling at front, needle roller universal joint in the centre and at rear.

FINAL DRIVE

Hypoid bevel, running on taper roller bearings.

Ratio: BMW 2002

Pinion/ crown wheel	No. of teeth	Contact pattern
3.64 : 1	11 : 40	Klingelnberg

Ratio: BMW 1600

Pinion/ crown wheel	No. of teeth	Contact pattern
4.11 : 1 or 4.10 : 1	9 : 37 10 : 41	Klingelnberg Gleason

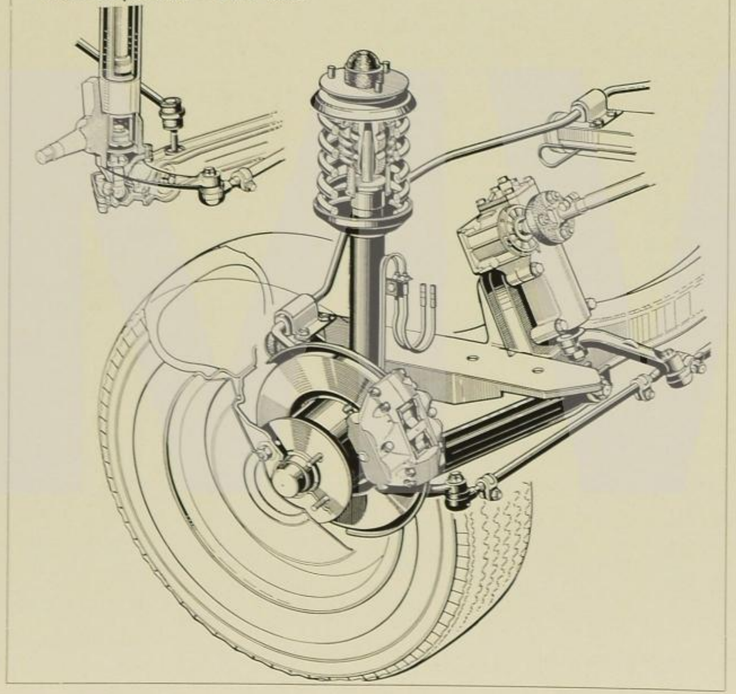
Rear axle drive

Left and right half-shafts with needle-roller universal joint at the final drive end and needle roller sliding joint at the wheel end, in oil bath.

or

left and right double universal joint half-shafts with no-maintenance homokinetic joints.

Front suspension – BMW 2002



WHEELS AND SUSPENSION

Front wheel mounting: BMW 2002

Independent suspension by lower wishbones and spring columns incorporating double acting hydraulic shock absorbers, coil springs and rubber auxiliary springs. Wheel travel 180 mm (7″).
Torsion bar stabiliser with no-maintenance rubber mountings.

Front wheel mounting: BMW 1600

As BMW 2002, but without torsion bar stabiliser.

Toe-in with vehicle normally loaded*: 1 ± 1 mm (0.04 ± 0.04″).

Camber angle, vehicle normally loaded*: 0° 30′ ± 30′

Castor angle: 4° + 30′

King pin angle: 8° 30′

Toe-out on turns for 20° deflection of inside wheel: 1°

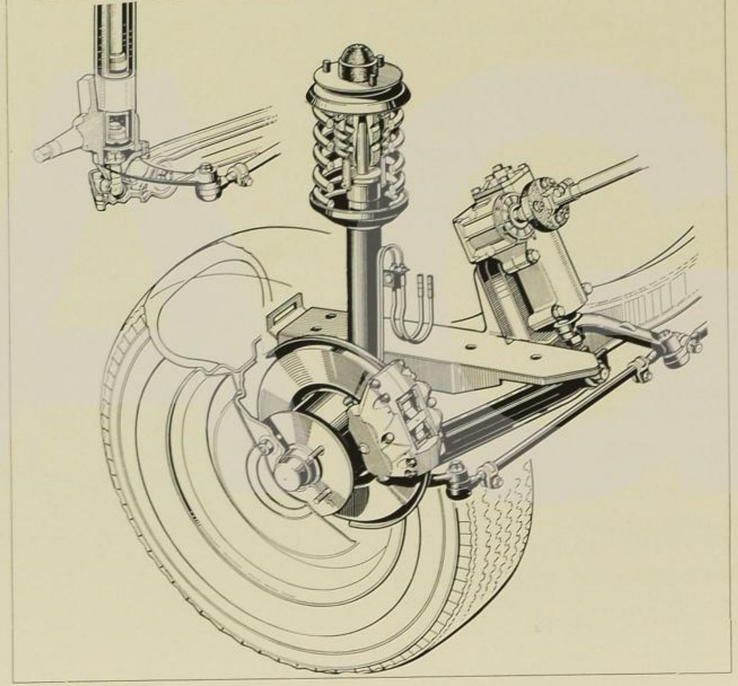
Max. wheel lock
Inside wheel 42°
Outside wheel 34°

Rear wheel mounting: BMW 2002

Independently sprung wheels with semi-trailing arms mounted on rubber bushes requiring no maintenance.
Delta-shaped box-section support beam for trailing arms and final drive, attached to bodywork at 4 points by rubber mountings.

* Normal load: 3 persons = 3 x 65 kg (430 lbs) + luggage 30 kg (66 lbs).

Front suspension – BMW 1600



Coil springs and auxiliary rubber springs, spring travel 190 mm (7.5"); double-acting hydraulic telescopic shock absorbers.
Torsion bar stabiliser with no-maintenance rubber mountings.

Rear wheel mounting: BMW 1600
As BMW 2002, but without torsion bar stabiliser.

Normal toe-in*: 1.5 ± 1.5 mm (0.06" ± 0.06").

Normal camber angle*: 2° ± 20' negative

Steering
ZF Gemmer hourglass worm and roller.

Gear ratio: 15.5:1

Overall steering ratio: 17.58:1

3-piece track rod

Steel disc wheels
4½ J x 13 well-base rims

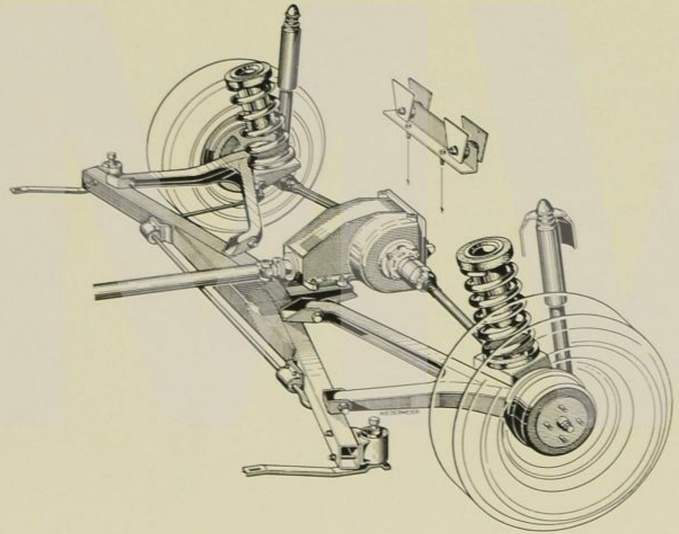
Tyres: BMW 2002
165 SR 13 radial-ply, with tube and metal screw valve 40 G DIN 7771

Tyres: BMW 1600
600 S 13 tubeless

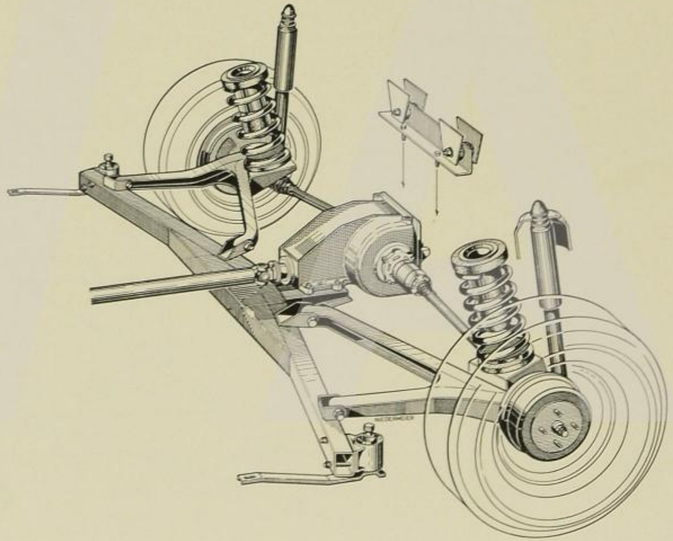
Special equipment: 165 SR 13 radial-ply tyres, with tube and metal screw valve 40 G DIN 7771

* Normal load: 3 persons = 3 x 65 kg (430 lbs) + luggage 30 kg (66 lbs).

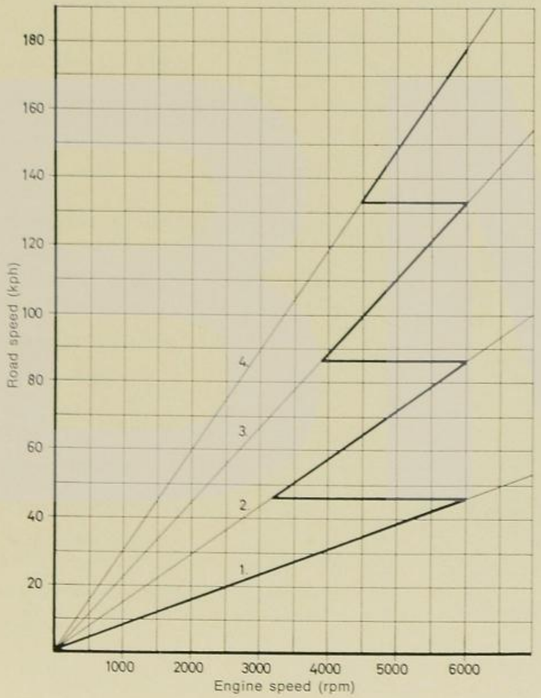
Rear suspension — BMW 2002



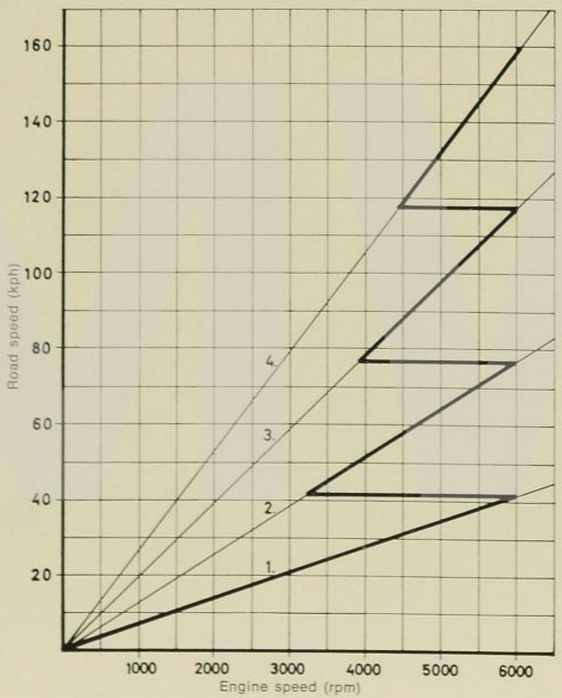
Rear suspension — BMW 1600



Road speed/engine speed — BMW 2002



Road speed/engine speed — BMW 1600



BRAKES

Foot brake (duplex twin-circuit system)
Hydraulic, acting on all four wheels, and fitted with servo assistance. Tandem master cylinder located in engine compartment, diameter 0.81″ (20.64 mm). Transparent brake fluid reservoir also located in engine compartment.

Front

4-piston fixed caliper disc brakes with automatic pad wear compensation.
Disc diameter 240 mm (2.45″)
Piston diameter 34 mm (1.34″)

Rear

Drum brakes with self-centering shoes.

Cylinder diameter
17.46 mm (0.68″)
15.87 mm (0.625″) (BMW 2002)

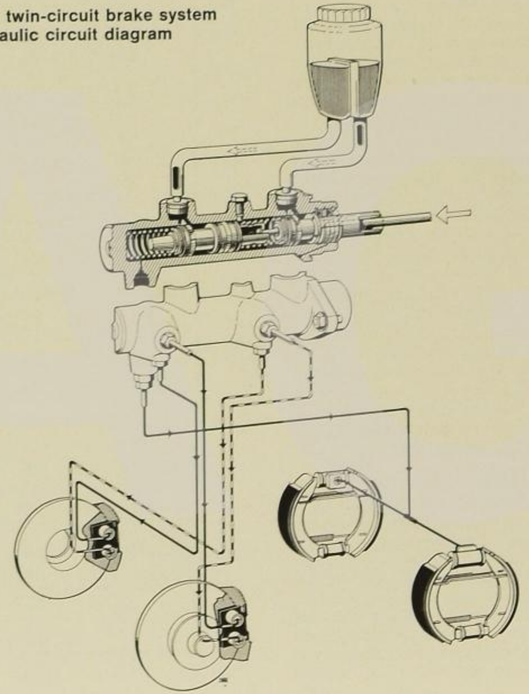
Brake drum diameter
200 mm (7.87″)
230 mm (9.05″) (BMW 2002)

Lining width 40 mm (1.57″)

Handbrake

Operates mechanically on rear wheels only. Adjust at handbrake lever after lifting rubber sleeve. Cable to each rear wheel adjustable separately.

Duplex twin-circuit brake system — hydraulic circuit diagram



Braking distance

The best possible brakes can only attain a road efficiency corresponding to the friction between tyre and road surface. As the graph shows, the maximum possible retardation of a vehicle travelling on an icy surface is only in the region of 1.5 m/sec² (4.9 ft per sec).

This implies that your car's speed in such circumstances is reduced in every second by only 1.5 metres per second (4.9 ft per sec). In other words, every second the speed drops by only 5.4 kph (3.375 mph). If you had, for example, been travelling at 54 kph (33.75 mph), it would take 10 seconds for you to stop. As the graph shows, you would cover almost 100 m (330') in that time.

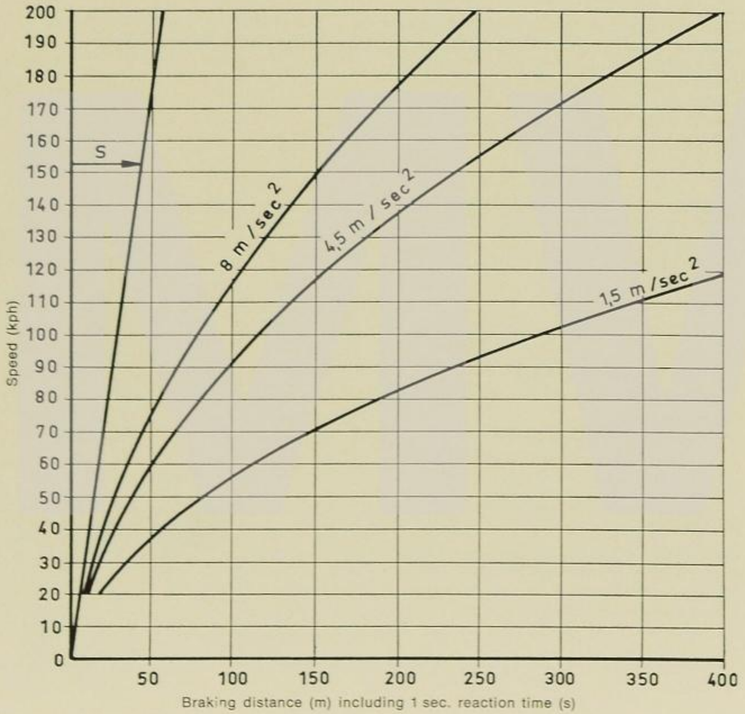
The lowest curve (1.5 m/sec²) shows you your braking distance related to travelling speed in the conditions just described.

In contrast the uppermost curve (8 m/sec²) refers to the shortest braking distances generally obtainable in ideal conditions.

The middle curve (4.5 m/sec²) applies to a damp road not entirely devoid of grip for the tyres, and thus represents an average set of values which could be used as a guide for normal strength braking during everyday driving on dry roads.

All the values plotted on the graph can vary for better or worse, depending on the state of the brakes, the condition of the tyre treads and the road surface itself.

Braking distance related to speed and retardation



The lengths quoted for braking distances include a proportion "S" covered during one second's reaction time on the part of the driver.

Most efficient braking takes place not with locked wheels, but when the wheels are still just turning.

Locking the wheels can be dangerous, as locked front wheels can no longer be steered, and locked rear wheels cause the car to slide sideways or spin.

BODYWORK

Load-carrying all-steel body welded to floor section, and giving a particularly torsion resistant complete unit. Two doors; engine compartment bonnet hinged at front.

Luggage compartment capacity: approx. 450 litres (15.9 cu. ft.)

Fuel tank capacity: 46 litres (12.1 US gal./10.1 Imp. gal.)

Heating and ventilation

Fresh-air heater with warm water heat exchanger and 2-speed axial blower. 6 outlet nozzles in all covering all parts of the front screen, side windows and foot area. Air extraction from the car's interior through slots above the rear window (only on vehicles without sliding roof), conveying stale air to outlets in the rear body pillars (concealed below the luggage compartment lid).

ELECTRICAL SYSTEM

Battery
12 V, 44 Amp/hr (BMW 2002)
12 V, 36 Amp/hr (BMW 1600)

Coil
Bosch K 12 V (BMW 2002)
Bosch TE 12 V (BMW 1600)

Distributor
Bosch JFUR 4

Ignition point: 25° bTDC at 1400 rpm. Checking adjustment: dynamically without vacuum adjustment with engine running at its normal operating temperature (1400 rpm) by pointing a strobe light at the ignition timing mark on the flywheel.

Firing order: 1–3–4–2

Contact breaker dwell angle 60°

Contact breaker gap 0.4 mm (0.016")

Ignition advance and retard
Centrifugal and vacuum

Centrifugal adjustment: BMW 2002
Begins: approx. 800 rpm
Ends: approx. 2700 rpm
Max. adjustment range: 40° CS

Centrifugal adjustment: BMW 1600
Begins: approx. 800 rpm
Ends: approx. 3800 rpm
Max. adjustment range: 44° CS

Vacuum adjustment
Begins: approx. 115 mm (5.12") Hg
Ends: approx. 210 mm (8.27") Hg
Max. adjustment range: 10° CS

Alternator
Bosch K 1 – 14 V 35 A 20

Voltage regulator
Bosch ADN 1/14 V (BMW 2002)
Bosch AD 1/14 V (BMW 1600)

Starter
Bosch GF (R) 12 V 1 hp (BMW 2002)
Bosch EF (R) 12 V 0.8 hp (BMW 1600)

Spark plugs

Beru 200/14/3 A Bosch W 200 T 30 Champion N 9 Y	Electrode gap 0.6 + 0.1 mm (0.024" + 0.004")

For mainly short-distance operation and when using heavily leaded fuel
Bosch W 215 P 21*
Electrode gap 0.35 mm (0.014")

* Spark plugs with platinum electrodes (also for motorway driving).

Headlights
with asymmetric dipped beam and side/parking lights included.
Lens diameter 170 mm (6.7")

12 V bulbs
see page 39–41 for details.

Fuse box
Under bonnet on left-hand side; contains 6 fuses. For circuits controlled by each fuse, see page 39.

Cigar lighter and plug socket on instrument panel
Can be used to plug in a handlamp, an electric razor with standard type plug or similar apparatus not exceeding 200 W rating at 12 V.

Automatic screen washer

Electric gear type pump with delaying relay; operated by finger-tip switch on turn indicator lever.

Horn

Well positioned for maximum audibility behind the radiator grille, with protection against dirt.

DIMENSIONS AND WEIGHTS

BMW 2002 and BMW 1600

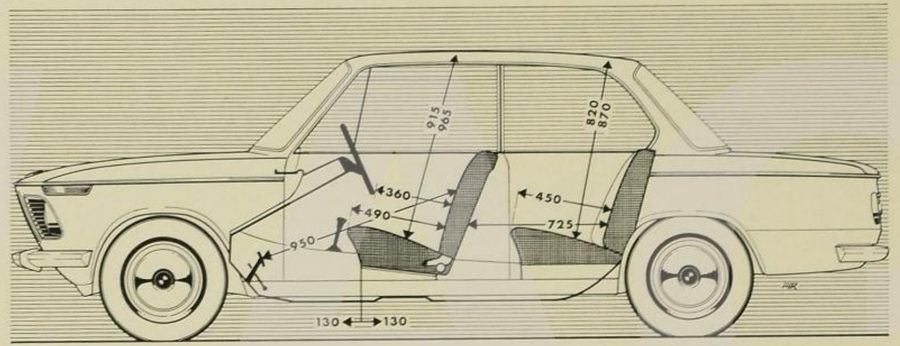
Overall length	4230 mm (13′ 10½″)
Overall width	1590 mm (5′ 2⁹/₁₆″)
Height (unladen)	1410 mm (4′ 7½″)
Wheelbase	2500 mm (8′ 2³/₈″)
Ground clearance (laden)	160 mm (6′ ⁵/₁₆″)
Front overhang	720 mm (2′ 4³/₈″)
Rear overhang	1010 mm (3′ 3³/₄″)
Front track	1330 mm (4′ 4³/₈″)
Rear track	1330 mm (4′ 4³/₈″)
Min. track circle dia.	9.60 m (31′ 6″)
Min. turning circle dia.	10.40 m (34′ 2″)

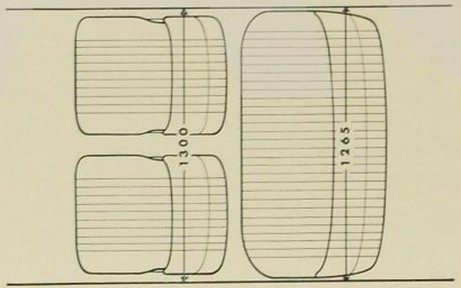
Vehicle weight, empty	940 kg	(2073 lb)
(ready for use with full tank)	930 kg	(2050 lb)*
Permitted total weight	1340 kg	(2954 lb)
	1320 kg	(2910 lb)*
Permitted front axle load	650 kg	(1433 lb)
Permitted rear axle load	720 kg	(1587 lb)
	700 kg	(1544 lb)*
Permitted trailer load		
without brakes	500 kg	(1103 lb)
with brakes	1200 kg	(2645 lb)
With automatic transmission		
(no oil cooling)	800 kg	(1764 lb)
(with oil cooling)	1200 kg	(2646 lb)
Permitted load on roof	75 kg	(165 lb)

(The vehicle's fully loaded condition must not exceed the permitted axle loads).

* BMW 1600

Internal dimensions (mm)





PERFORMANCE

	BMW 2002	BMW 1600
Maximum speed	170 kph (106 mph)	160 kph (100 mph)
Max. gradients		
1st gear	76 % (1 in 1.3)	65 % (1 in 1.5)
2nd gear	33 % (1 in 3.0)	30 % (1 in 3.3)
3rd gear	19 % (1 in 5.3)	18 % (1 in 5.5)
4th gear	13 % (1 in 7.9)	12 % (1 in 8.3)

Acceleration

BMW 2002

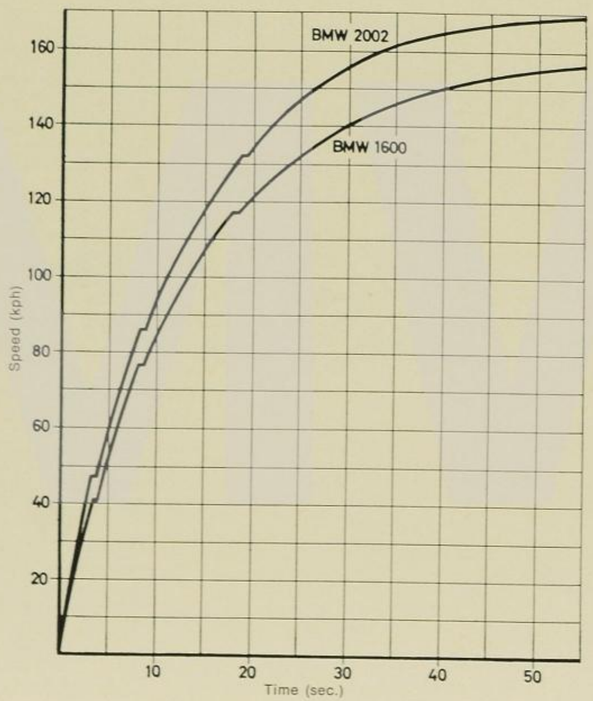
Gears	kph	(mph)	sec.
1–2	0– 50	(0–31)	3.8
1–2	0– 80	(0–50)	7.3
1–3	0–100	(0–62)	10.9
1–3	0–120	(0–75)	15.4
1–4	0–140	(0–87)	22.0

BMW 1600

Gears	kph	(mph)	sec.
1–2	0– 50	(0–31)	4.5
1–3	0– 80	(0–50)	9.0
1–3	0–100	(0–62)	13.3
1–4	0–120	(0–75)	19.4
1–4	0–140	(0–87)	29.7

	BMW 2002	BMW 1600
Standing start kilometer	32.4 sec.	35.0 sec.
Average speed over the distance:	111 kph (69 mph)	103 kph (64 mph)
Terminal speed:	159 kph (99 mph)	147 kph (92 mpph)

Acceleration through gears



TIGHTENING TORQUE VALUES FOR BOLTS AND NUTS

Engine	
Cylinder head bolts	7 ± 0.2 mkp (50.6 ± 1.4 ft/lb)
Crankshaft V-belt pulley	14 mkp (101.3 ft/lb)
Coolant pump V-belt pulley	4 mkp (28.9 ft/lb)
Engine mounting bracket	4.7 mkp (34.0 ft/lb)
Rubber mounting nuts	2.5 mkp (18.1 ft/lb)
Gearbox	
Engine attachment flange	2.5 mkp (18.1 ft/lb) M 8 4.7 mkp (34.0 ft/lb) M 10
Front axle	
Spring/shock absorber unit, top centre	8 mkp (57.8 ft/lb)
Spring/shock absorber unit, support bearing	2.5 mkp (18.1 ft/lb)
Tierod arm to kingpin	2.5 mkp (18.1 ft/lb)
Tierod arm guide joint	7 mkp (50.6 ft/lb)
Front axle carrier to engine carrier	4.7 mkp (34.0 ft/lb)
Wishbone to front axle carrier	15 mkp * (108.5 ft/lb)
Tension strut at wishbone and front axle carrier	6 mkp * (43.4 ft/lb)
Rear axle	
Cross member on underbody	4.5 mkp (32.5 ft/lb)
Casing to cross member	4.5 mkp (32.5 ft/lb)
Final drive to axle carrier	9 mkp (65.1 ft/lb)
Axle carrier to body floor	12 mkp (86.8 ft/lb)
Compression strut to body floor	4.5 mkp (32.5 ft/lb)
Trailing arms on axle carrier	7.5 mkp * (54.2 ft/lb)
Shock absorber, lower end	4.5 mkp * (32.5 ft/lb)
Half shaft pick-up flange	3 mkp (21.7 ft/lb)
Half shaft at rear axle shaft	3 mkp (21.7 ft/lb)
Universal joint shaft at gearbox take-off flange	4.5 mkp (32.5 ft/lb)
Rear axle carrier rubber mountings	4.5 mkp (32.5 ft/lb)
Rubber coupling	4.5 mkp (32.5 ft/lb)
Rear axle shaft castellated nuts	30 + 5 mkp (217.0 + 36.2 ft/lb)
Axle carrier support points	4.5 mkp (32.5 ft/lb)
Steering	
Steering wheel securing nut	5.5 + 0.5 mkp (39.7 + 3.6 ft/lb)
Plate mounted joint	1.9 mkp (13.7 ft/lb)
Flange mounted joint	2.5 mkp (18.1 ft/lb)
Drop arm to steering box	14 mkp (101.3 ft/lb)
Tierod castellated nuts	3.5 mkp (25.3 ft/lb)
Steering box to front axle carrier	4.7 mkp (34.0 ft/lb)
Track rod clamp bolts	2.5 mkp (18.1 ft/lb)
Brakes	
Brake disc to wheel hub	6 mkp (43.3 ft/lb)
Caliper to king pin	9.5 mkp (68.7 ft/lb)
Wheel nuts	9 mkp (65.1 ft/lb)

* Normal load position: vehicle with 3 persons (= 3 x 143 lb/65 kg) + luggage (65 lb/30 kg)

Key to Lubrication Chart

1.	Fuel filler	Branded super grade fuel
2.	Radiator filler (Coolant outlets are situated at the bottom left of the radiator and the bottom right of the engine block)	For details, see page 32. Check frost-resistance before and during the cold season.
3.	Engine oil filler	◆ Branded HD engine oil (for oil grades, see page 50) ◇ indicates oil change
4.	Fuel pump fine mesh filter	⌗ indicates filter cleaning
5.	Battery	I Distilled water
6.	Engine oil filter	⊜ indicates filter renewal
7.	Induction air filter	⌗ indicates filter cleaning ⊜ indicates filter renewal
8.	Engine oil level dipstick	Check oil level regularly
9.	Steering box (permanently filled)	✦ Branded hypoid gear oil SAE 90
10.	Hydraulic brake and clutch fluid reservoir	+ ATE brake fluid, blue Renew brake fluid once a year
11.	Wheel bearings (examine every 60 000 km / 40 000 miles)	▲ Branded multi-purpose grease with drip point 180° C (356° F)
12.	Distributor lubrication points (see page 53)	◆ Branded HD oil, as engine oil, and Bosch Ft 1 v 4 and Ft 1 v 26 greases
13.	Manual gearbox (change oil every 24 000 km / 18 000 miles) Automatic transmission (change oil every 36 000 km / 24 000 miles)	● Branded gearbox oil, SAE 80 (in an emergency, SAE 30 HD engine oil) See page 90 for oil grades
14.	Half shaft sliding joints (change oil every 24 000 km / 16 000 miles) (not used on no-maintenance half-shafts)	✦ Branded hypoid gear oil, SAE 90
15.	Final drive	✦ Branded hypoid gear oil, SAE 90 (Your BMW service station knows the approved brands)
16.	Half-shaft universal joint grease nipples (not used on no-maintenance half-shafts)	▲ Branded multi-purpose grease with drip point 180° C (356° F)

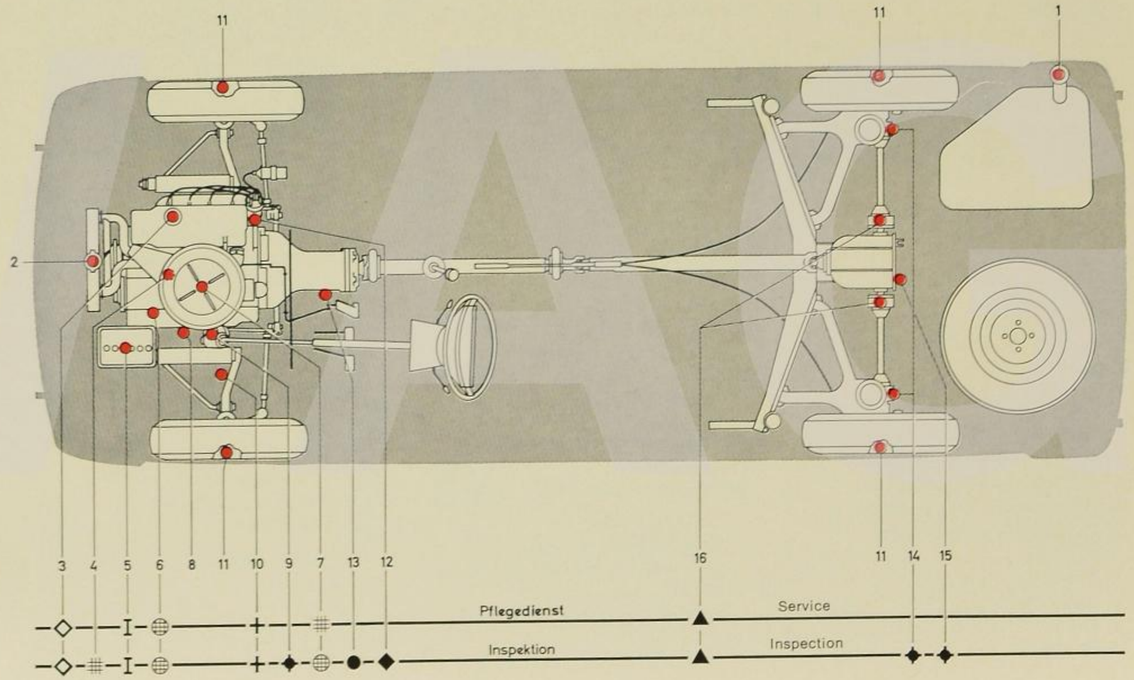
Important instruction to service stations

Strengthened points for single column car lifts with 4 lifting points:

Outer extremity of body under fold directly adjacent to the reinforced points for the car's own jack.

Warning: If the car is jacked up under the final drive housing, place a suitable piece of packing material between the final drive and the jack lifting pad to prevent damage to the housing.

Lubrication chart



Key to electrical wiring diagram (BMW 2002)

Cable colour coding

1.5 GN

Cross-section (sq. mm)	Colour	
WS = blue	GR = red	
BL = brown	RT = black	
BR = yellow	VI = violet	
GE = green	SW = white	
GN = grey		

1 Front r. h. flashing indicator
2 R. h. headlight with side light
4 L. h. headlight with side light
5 Front l. h. flashing indicator
6 Alternator
7 Regulator
8 Distributor
9 Starter
10 Battery
11 Brake light switch
12 Coil
13 Oil pressure switch
14 Water temperature gauge contact
15 Fusebox
16 Washer pump
17 Wiper motor
18 Delay relay
19 Heater blower motor
20 Ignition/starter switch

Positions:
I Stop
II Garage
III Drive
IV Start

21 Main light switch
22 Cigar lighter/socket
23 Screen wiper switch
24 Blower switch
25 Flashing indicator, parking light and washer switch
26 Dip switch and headlight flasher
27 Horn button
28 Instrument panel

a) Dial illumination
b) Charge warning (red)
c) Oil pressure warning (orange)
d) Main beam (blue)
e) Flashing indicator repeater (green)
f) Coolant temperature gauge
g) Fuel gauge
h) 12-pole plug-in connector
k) 3-pole plug-in connector (clock)
l) 3-pole plug-in connector (revolution counter)
m) Speedometer
n) Clock

29 Instrument panel connector plug
30 Reversing light switch
31 Flasher unit
32 Door-operated switch, r. h.
33 Interior light
34 Door-operated switch, l. h.
35 Fuel gauge tank contact
36 R. h. rear light cluster

A Reversing light
B Rear light
C Flashing indicator
D Stop light

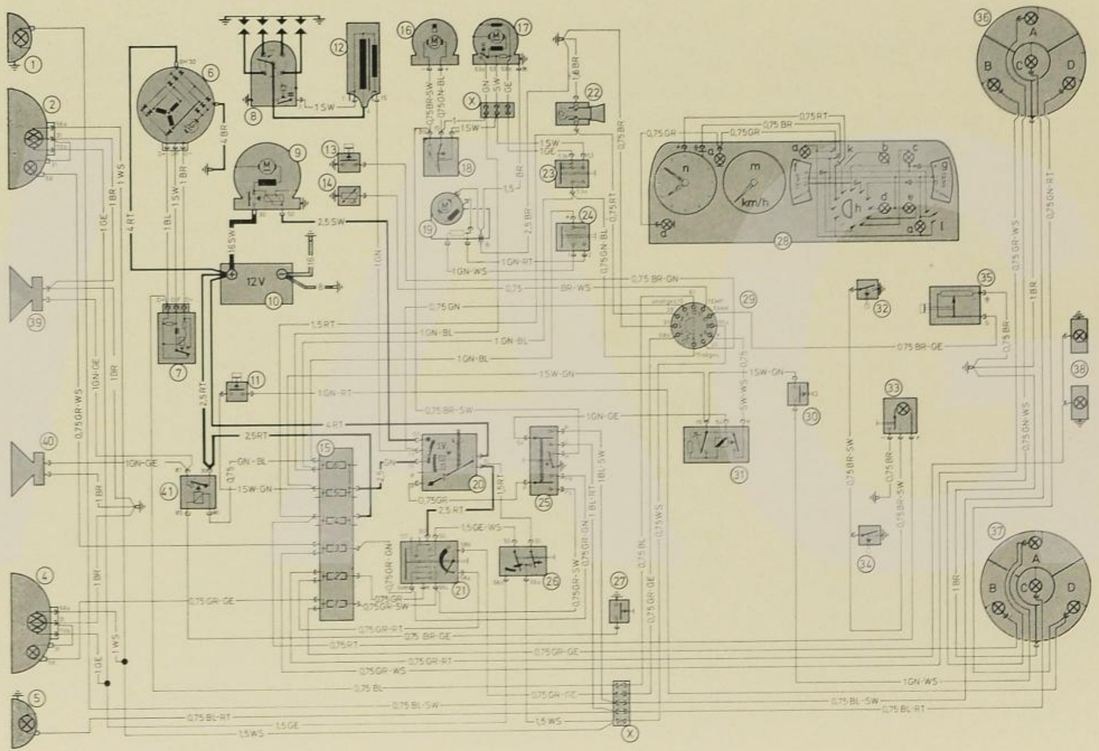
37 L. h. rear light cluster

A Reversing light
B Rear light
C Flashing indicator
D Stop light

38 Number plate light
39 R. h. horn
40 L. h. horn
41 Horn relay

X Flat plug connector

Electrical wiring diagram BMW 2002



Key to electrical wiring diagram (BMW 1600)

Cable colour coding

1.5 GN

Cross-section (sq. mm) | Colour

BL = blue	RT = red
BR = brown	SW = black
GE = yellow	VI = violet
GN = green	WS = white
GR = grey	

1 Front r. h. flashing indicator
2 R. h. headlight with side light
3 Horn
4 L. h. headlight withe side light
5 Front l. h. flashing indicator
6 Alternator
7 Regulator
8 Distributor
9 Starter
10 Battery
11 Brake light switch
12 Coil
13 Oil pressure switch
14 Water temperature gauge contact
15 Fusebox
16 Washer pump
17 Wiper motor
18 Delay relay
19 Heater blower motor
20 Ignition/starter switch

Positions:
I Stop
II Garage
III Drive
IV Start

21 Main light switch
22 Cigar lighter/socket
23 Screen wiper switch
24 Blower switch
25 Flashing indicator, parking light and washer switch
26 Dip switch and headlight flasher
27 Horn ring
28 Instrument panel

a) Dial illumination
b) Charge warning (red)
c) Oil pressure warning (orange)
d) Flashing indicator repeater (green)
f) Coolant temperature gauge
g) Fuel gauge
h) 12-pole plug-in connector
k) 3-pole plug-in connector (clock)
l) 3-pole plug-in connector (revolution counter)
m) Speedometer
n) Clock

29 Instrument panel connector plug
30 Reversing light switch
31 Flasher unit
32 Door-operated switch, r. h.
33 Interior light
34 Door-operated switch, l. h.
35 Fuel gauge tank contact
36 R. h. rear light cluster

A Reversing light
B Rear light
C Flashing indicator
D Stop light

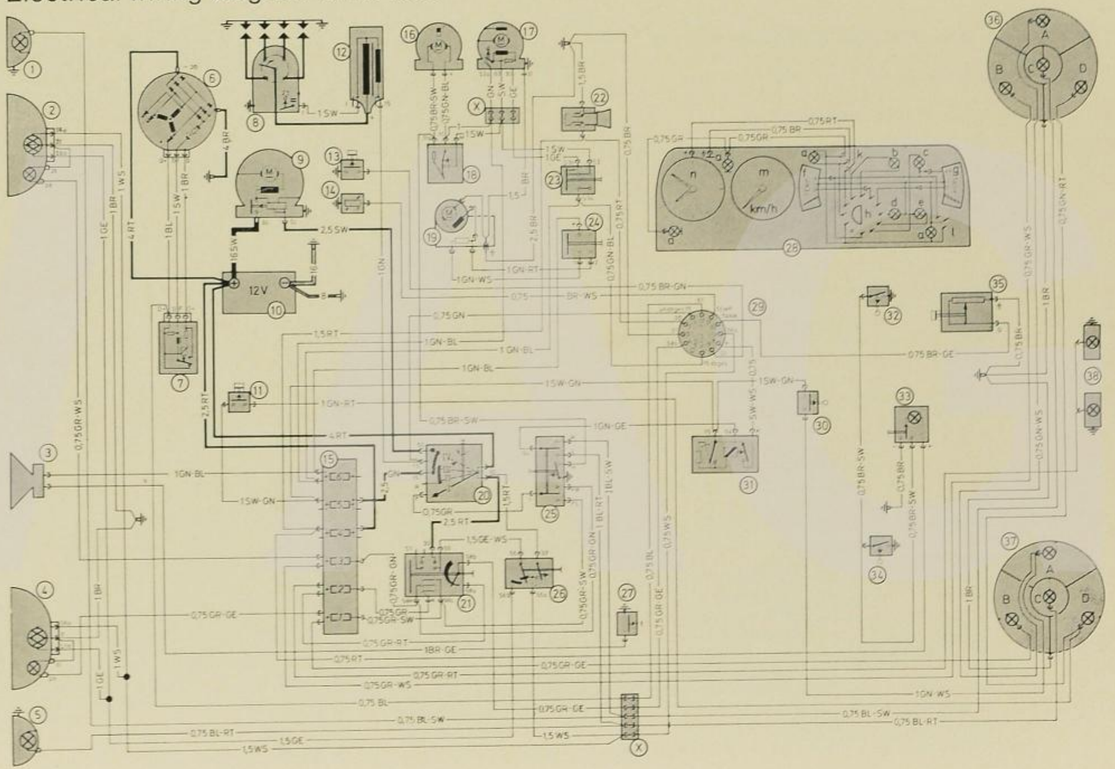
37 L. h. rear light cluster

A Reversing light
B Rear light
C Flashing indicator
D Stop light

38 Number plate light

X Flat plug connector

Electrical wiring diagram BMW 1600



Approved oil grades for automatic transmission

Initial or subsequent filling

BP	AUTRAN DX	B-10511
Chevron	Automatic Transmission Fluid DEXRON	B-10122
Esso	Automatic Transmission Fluid DEXRON	B-10103
Quaker State	DEXRON, Quadromatic ATF	B-10128
Valvoline	Valvomatic ATF, Type B	B-10312

For subsequent filling

Aral	ATF gear oil (DEXRON)	B-10373
Aral	ATF 546 gear oil (DEXRON)	B-10546
Aseol	Ascol DEXRON 16-712	B-10669
Castrol	TQ DEXRON	B-10658
Castrol	TQ DEXRON	B-10476
Castrol	TQ DEXRON	B-10578
Exactol	HFL B 492	B-10492
Fina	DEXRON-ATF	B-10572
Frisia	DEXRON-ATF	B-10492
Fuchs	Automatic TF 25 DEXRON	B-10653
Gasolin	DEXRON gear oil	B-10290
Gasolin	DEXRON gear oil	B-10547
Gulf	Automatic Transmission Fluid DEXRON	B-10486
Labomatic	DEXRON	B-10647
Mobil	ATF 220 DEXRON	B-10104
Mobil	ATF 220 DEXRON	B-10467
Orvematic	ATF-DEXRON Fluid	B-10588
Oest	ATF-DEXRON	B-10572
Rhein. Mineralöl	Amoco ATF DEXRON	B-10595
Shell	Automatic Transmission Fluid DEXRON	B-10492
Sunamatic	128 DEXRON Automatic Transmission Fluid	B-10107
Texaco	Texamatic Fluid 6673	B-10334
Total	DEXRON	B-10631
Veedol	ATF Special B 101 DEXRON	B-10579

Item reference

Notes

Notes

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Notes

Notes

Notes

At a glance

Tyre pressures in atm (psi) when **cold**; when tyres are hot, increase by 0.3 atm (4 psi).

Normal tyre dimensions 6.00 S 13

Load	front		rear	
	atm	lbs	atm	lbs
up to 4 persons	1.7	(24)	1.7	(24)
5 pers. and luggage	1.7	(24)	1.9	(27)

For motorway travel increase the pressures by 0.2 atm (3 lbs)

Radial tyre dimensions 165 SR 13

Load	front		rear	
	atm	lbs	atm	lbs
up to 4 persons	1.8	(26)	1.8	(26)
5 pers. and luggage	1.8	(26)	2.0	(29)

For competition use, special rules apply.

Winter or spiked tyres (cross ply):

Load	front		rear	
	atm	lbs	atm	lbs
up to 4 persons	1.9	(27)	1.9	(27)
5 pers. and luggage	1.9	(27)	2.1	(30)

Radial-ply tyres + 0.2 atm (3 lbs)

Spark plugs

Beru 200/14/3 A
Bosch W 200 T 30
Champion N 9 Y
} Electrode gap 0.6 + 0.1 mm (0.024″ + 0.004″)

For mainly short-distance operation and when using heavily leaded fuel:

Bosch W 215 P 21*
Electrode gap 0.35 mm (0.014″)

* Spark plugs with platinum electrodes (also for motorway driving).

Contact breaker gap 0.4 mm (0.016″).
Dwell angle BMW 2002: 59°–65°
BMW 1600: 61°–66°

Ignition timing
25° bTDC at 1400 rpm

Valve clearance (engine cold)
Inlet and exhaust: 0.15–0.20 mm (0.006–0.008″)

V-belt
alternatively:
9.1 x 870
9.5 x 875 LA DIN 7753

Capacities

Fuel tank		46 litres (12.1 US gal / 10.1 Imp. gal)	Branded super grade fuel
Cooling system incl. heater		7 litres	For details, see page 32
Engine		4 litres (8.5 US pints / 7 Imp. pints) plus 0.25 litre (0.53 US pint / 0.44 Imp. pint) if oil filter is changed	Branded HD engine oil (for oil grades, see page 50)
Manual gearbox	4-speed: 5-speed:	1 litre (2.1 US pints / 1.8 Imp. pints) 1.4 litre (3.0 US pints / 2.5 Imp. pints)	Branded gearbox oil, SAE 80 (or if not available, HD engine oil SAE 30)
Automatic transmission		approx. 1.5 litres (3.2 US pints / 2.6 Imp. pints) (Total capacity when filling new or exchange transmission 4.75 litres (10 US pints/8.4 Imp. pints)	See page 90 for oil grades
Final drive		0.8 litre (1.7 US pints/1.4 Imp. pints)	Branded running-in grade hypoid oil, SAE 90 (your BMW dealer knows the approved grades)
Half-shaft sliding joints (not fitted to no-maintenance half shafts)		180 cc (6.3 fl. oz.) per joint	Branded hypoid gear oil, SAE 90
Steering box		300 cc (10.5 fl. oz.) permanently filled	

BMW AG

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