



# OPERATING INSTRUCTIONS

BORGWARD »HANSA 2400«

CARL F.W. BORGWARD G.M.B.H., BREMEN II





# Operating Instructions

for the

# BORGWARD

passenger car

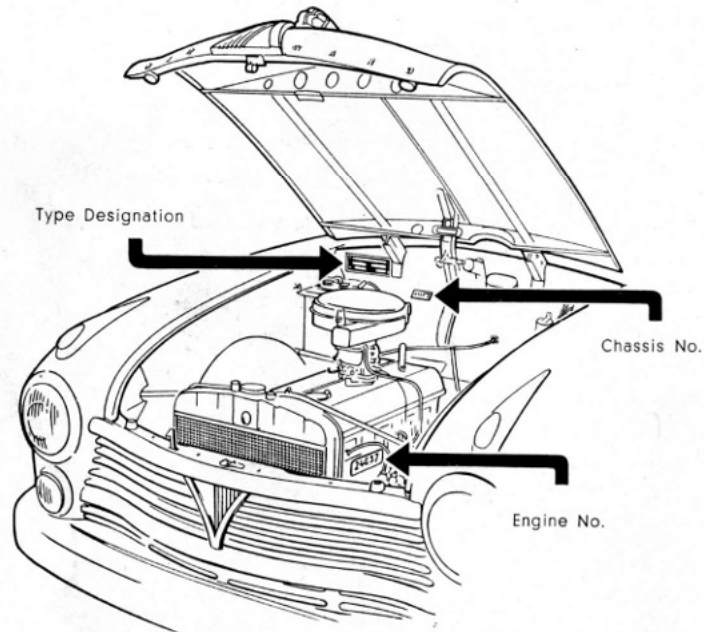
## Hansa 2400

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Carl F. W. Borgward G.m. b.H.  
Automobil- und Motoren-Werke / Bremen  
Germany

— Edition of August 1954 —

## Chassis and Engine-Number on the Borgward „Hansa 2400“



When inquiring or ordering replacement parts state number of chassis and engine of your car. Only in that case we are able to attend to your orders promptly and carefully.

## C O N T E N T S

	Page	Page
Foreword . . . . .	4	
Original "Borgward replacement parts" . . . . .	5	
<b>Operating Instructions</b>		
Control Instruments . . . . .	7	
Lighting system . . . . .	8	
Signal and auxiliary equipment . . . . .	9	
Winking indicators . . . . .	10	
Windscreen wipers . . . . .	10	
Gearshift lever, Brake lever and Pedal . . . . .	11	
Air conditioning system . . . . .	11/12	
De-Frosting . . . . .	13	
Bonnet . . . . .	13	
Closing of the bonnet . . . . .	13	
Boot . . . . .	14	
Filling of fuel . . . . .	15	
Preparations for a longer journey . . . . .	16	
Starting of the engine . . . . .	17	
Driving with automatic drive . . . . .	18-20	
Driving with normal gearbox . . . . .	21	
Running in instructions . . . . .	22	
<b>Description</b>		
Fuel system . . . . .	24	
Carburettor . . . . .	24	
Engine . . . . .	25	
Lubrication . . . . .	25/26	
Cooling system . . . . .	26	
Automatic drive . . . . .	27	
Clutch . . . . .	28	
		Gearbox with steering wheel gearchange . . . . . 29
		Suspension . . . . . 29
		Rear axle . . . . . 29
		Front axle . . . . . 30
		Steering . . . . . 30
		Brakes . . . . . 30/31
		Electrical equipment . . . . . 32
		Dynamo . . . . . 32
		Battery . . . . . 32
		Starter . . . . . 32
		Ignition system . . . . . 33
<b>Service and maintenance</b>		
		Fuel system . . . . . 34
		Engine . . . . . 35-39
		Automatic drive . . . . . 40
		Clutch . . . . . 41
		Gearbox . . . . . 41
		Rear axle . . . . . 41
		Springs . . . . . 41
		Steering . . . . . 41
		Brakes . . . . . 41
		Bleeding . . . . . 41
		Electrical equipment . . . . . 42
		Battery . . . . . 43
		Bulbs in HANSA 2400 . . . . . 44
		Care of the body . . . . . 45/46
		Wheelchange . . . . . 47
		Tyres . . . . . 48
		Windscreen wipers . . . . . 49
		Winter journey . . . . . 49
		Storage of your HANSA 2400 . . . . . 50
		Technical data . . . . . 51/52
		HANSA 2400 - Pullmann . . . . . 53-55
		Lubricant table HANSA 2400 . . . . . 56

It is with pleasure that we place in our hands this booklet containing the instructions for the maintenance and operation of the Borgward "Hansa 2400".

We should like to advise you that adhering to the directions laid down on these pages means enjoying your car and avoiding unnecessary troubles and repair. Special care should be taken in thoroughly lubricating the vehicle in accordance with the instructions given in the lubrication table.

The customers service of both our agencies and our works will readily answer any questions at any time. Please, take into consideration that in the course of time changes and improvements will develop, which, of course, cannot be dealt with at the time when this booklet is in the press.

When writing for informations please address the department mentioned below and do not forget to state chassis and engine numbers of your car and, if possible, the date of license issue.

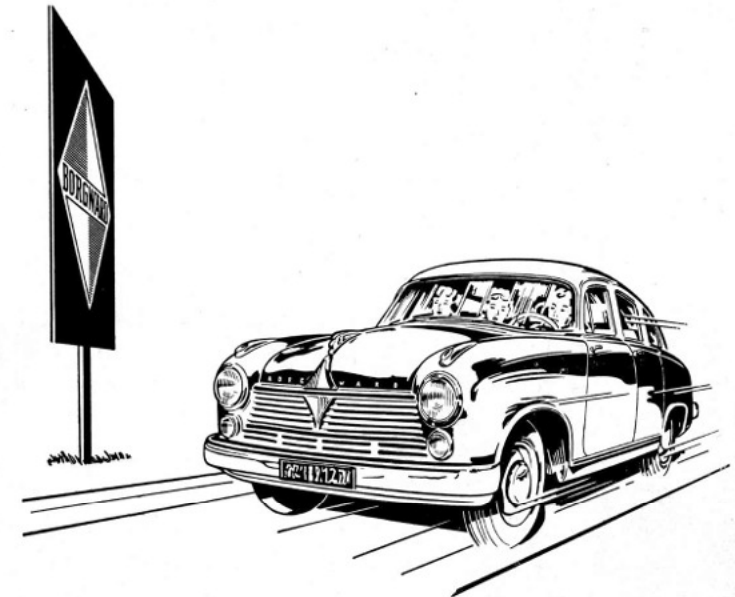
Yours truly,

**CARL F. W. BORGWARD G. M. B. H.**  
**AUTOMOBIL- UND MOTOREN-WERKE**

**Customers Service**

**Bremen, Osterdeich 222, Phone 441 51**

Business hours, except on Saturdays, from 8 a. m. to 17.30 p. m.



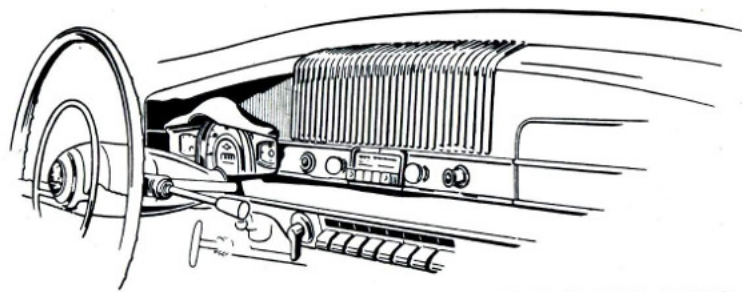
It is not only of importance that your Borgward "Hansa 2400" is taken good care of and thoroughly checked at reasonable intervals by our Inspection Service, but also that only the

### **ORIGINAL BORGWARD REPLACEMENT PARTS**

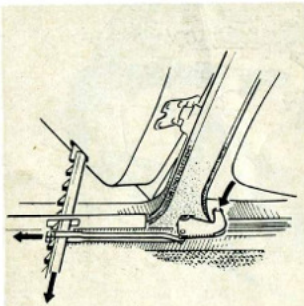
manufactured in our plant are used when repairs become necessary. These only give you the full guarantee that the quality of the individual members of your car is maintained at a constant high level.

We therefore recommend to make use of our repair shops marked by Borgward Service Signs the precise addresses of which are given in our Customers Service Lists. With their highly skilled staff of expert workers and their rich assortment of tools especially developed for servicing our cars, they have all the facilities to quickly and carefully remedy any trouble. In addition, these repair shops have the Original Borgward spare parts in stock.

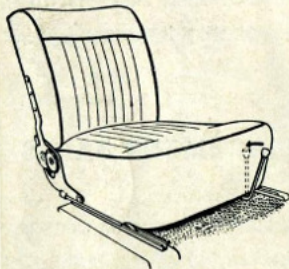




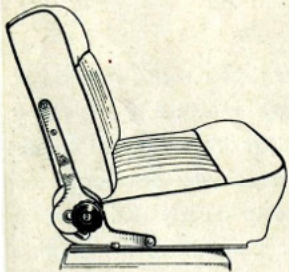
## OPERATING INSTRUCTIONS



A self-locking device is built in the front door of the Hansa 2400, which is only released if the rear doors are properly closed. Please ensure that under no circumstances should the front door be slammed with force. In case of resistance please check whether rear doors are properly locked.

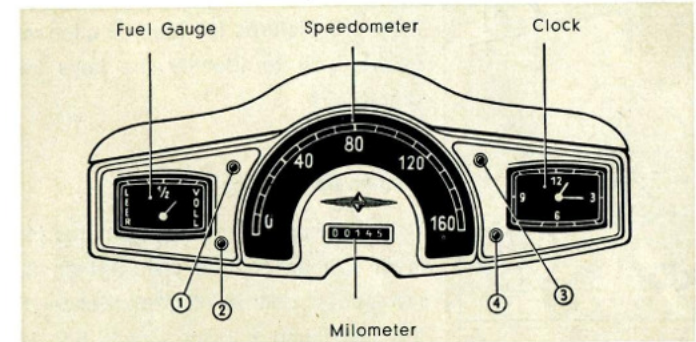


The front seats possess a most ingenious form of adjustment. After releasing seat, lock with the lever. The seats can be easily moved forwards or backwards. To alter the slope of the back of the seat use the knob fixed on the outside of the seats.



## CONTROL INSTRUMENTS

The following control instruments are placed in direct view besides the speedometer.

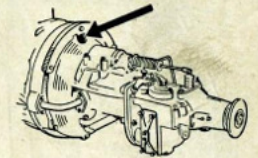


The visible control and warning lights have the following functions —

**Warning light no. 1** lights up **red** should the engine temperature rise above the normal working temperature of 80—85 degrees.



**Warning light no. 2** lights up **green** if the prescribed oil pressure in the "Hansamatic" drive is not reached.



**Warning light no. 3** lights up **blue** if the headlamps are switched on and goes off if the headlamps are dipped.



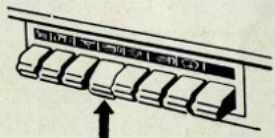
**Warning light no. 4** lights up **green** should the oil pressure in the engine not be sufficient.



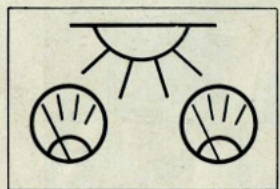
Attention! In case warning lights 1, 2, & 4 are flashing, the car is to be stopped and the engine switched off. Before continuing the journey the car is to be examined and the reason for the fault has to be found.



## L I G H T I N G   S Y S T E M

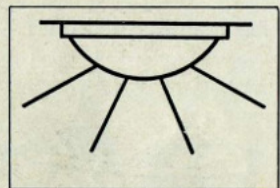


The lighting system is independent on the ignition lock, and can be switched on by means of the key switch. Above those keys are pictures for identification which enable you to identify the keys immediately.



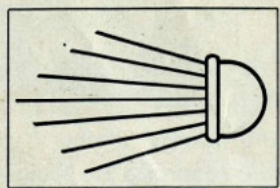
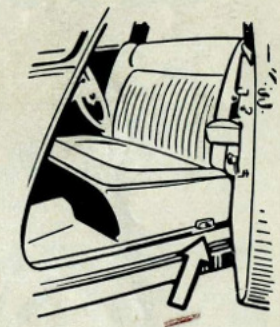
### Instrument Lighting

On switching on the headlights the instrument lighting can be switched on for a reflectless control. Independence from the headlamp current circuit has been chosen to avoid accidental switching on during the day, or when parking.



### Ceiling Lamp

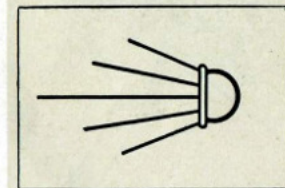
The interior is lit by means of a ceiling lamp which is switched on by the appropriate key or by a switch next to the lamp itself. Besides that the ceiling lamp switches on automatically when the doors are opened and switches off when the doors are closed. For that purpose each door contains a safe contact switch.



Headlamps of your car are switched on by pressing key with the appropriate picture. The dipping is by means of a foot switch.

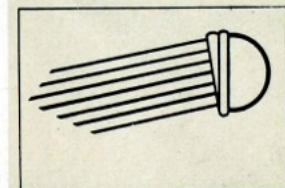
### Parking lights

When parking your car on public roads or squares parking lights have to be switched on.



### Fog Lamps

Bad visibility through fog is counteracted by means of fog lamps. The wide beam of the fog lamps supply ample vision.



## S I G N A L   A N D   A U X I L I A R Y   E Q U I P M E N T

The signalling equipment of your car consists of an electric horn, brake warning light and winking lights indicating direction.

The auxiliary equipment consists of an electric screen wiper.

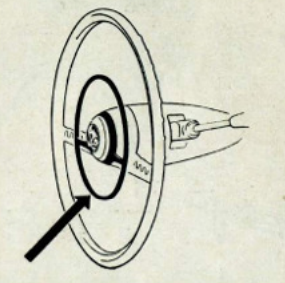
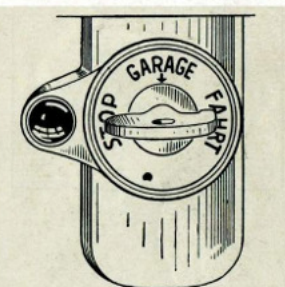
These instruments can only be put into operation if the ignition and steering lock is switched on, which is done by turning the key in the lock. No unauthorised person can put the vehicle into operation because the steering and ignition lock is a safety lock and it not only interrupts the current to the engine, but it also blocks the steering most efficiently at the stop position when the key is removed.

It is advisable to note the number of the key, because in case of replacement it is necessary to let us have this number.

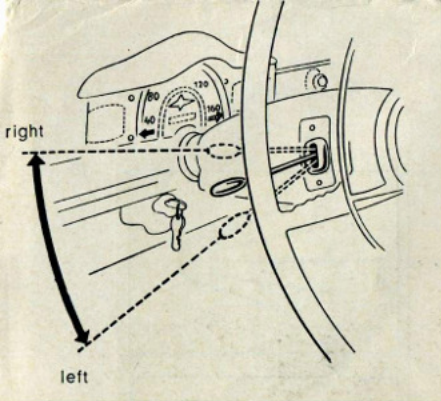
The horn is sounded by means of a light pressure on the contact ring, which is in the middle of the steering wheel.

Brake lights flash automatically if the footbrake is applied.

DO NOT RUN CAR ON FREEWHEEL WITH SWITCH OFF.



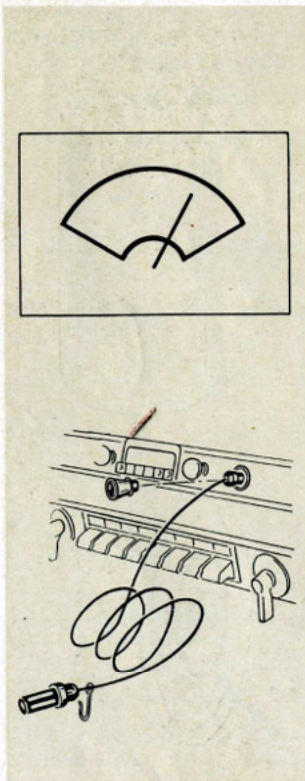




### Winking Indicators

The winking indicators are operated by means of a switch which is visible on the picture and is placed on the steering column opposite to the gear-change lever. On turning left pull the switch down. On turning right press the switch up. This switch is automatically released after turning.

The winking indicators are equipped with two control lamps in the form of a red arrow placed on either side of the speedometer. They flash on and off if the indicators are switched on.



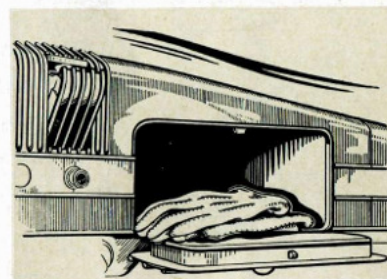
### Windscreen Wipers

The windscreen wipers are put into operation by pressing the appropriate key. Both wiping arms are driven by one motor by means of various levers and kept in constant movement. After switching off, both wiping arms return automatically to their starting position.

A part of the auxiliary electrical equipment is the cigarette lighter. This is switched on by a slight pressure on the mounting and when glow appears remove pressure. It can then be taken out and used. The plug for the cigarette lighter is also used as connection for the repair lamp delivered with the car.

### EQUIPMENT OF THE INSTRUMENT PANEL

On the instrument panel are two recessed ash trays, placed next to the wireless, and there is also a roomy glove compartment.

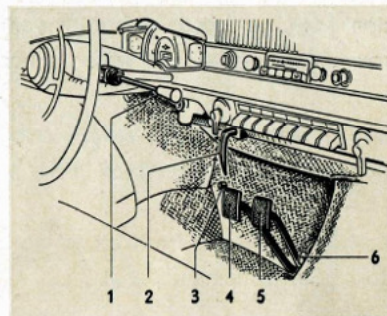


### GEARSHIFT LEVER, BRAKE LEVER, AND PEDAL

On the picture you will see the following items from left to right

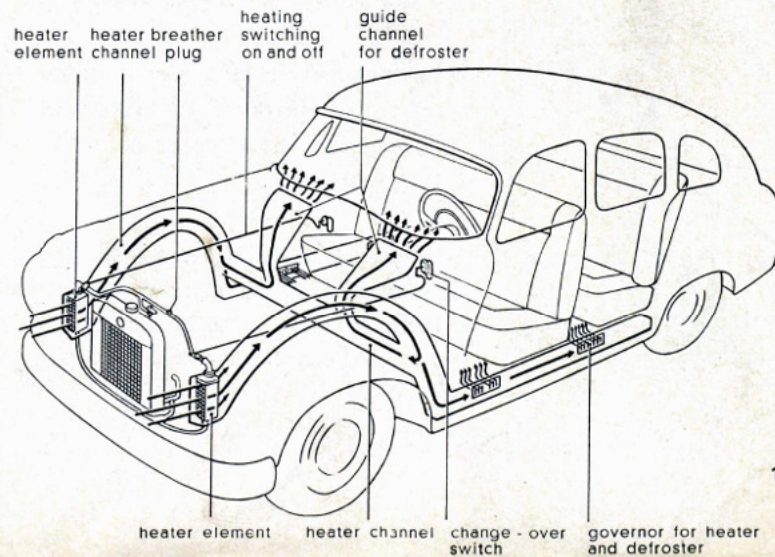
- (1) Gear Lever (2) hand brake
- (3) foot brake switch (4) clutch pedal
- (5) brake pedal (6) accelerator pedal.

Cars equipped with the automatic gearbox have no clutch pedal.



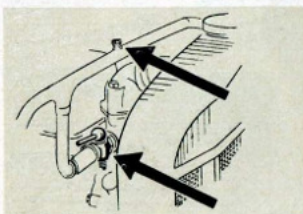
### AIR CONDITIONING SYSTEM

The air conditioning system conveys fresh air and warm air respectively into the interior of the car. Switching over from fresh to warm air can be done from the driver's seat.





At the beginning of the cold season, before taking the air conditioning system into service, ventilate the heating system as follows —

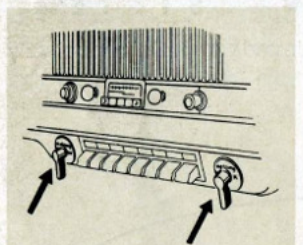


(1) open water tap on thermostat and switch on heating system. This done, warm water flows from the engine to two heating elements located on front.

(2) Remove ventilation screw on pipe connection the heating element, thus enabling the air left in the heating element to escape. As soon as cooling water flows out of the ventilation hole, re-tighten securely ventilation screw and re-fill water through filler mouth until water is near to overflow tube.

These direction must be strictly adhered to when re-filling water, or otherwise functional troubles in the heating system might occur.

To switch over from fresh air to warm air use switches placed either side of the instrument panel.



(a) the lever placed on position K switches the heating off, and automatically cold air is conducted through a channel into the interior of the car.

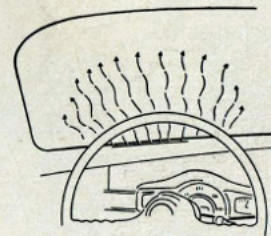


(b) by opening ventilators placed at the bottom of the doors the amount of fresh air can be adjusted according to requirements.

(c) by placing lever on W the heating system is switched on, now warm air is conducted into the interior of the car and can be regulated as per point (b).

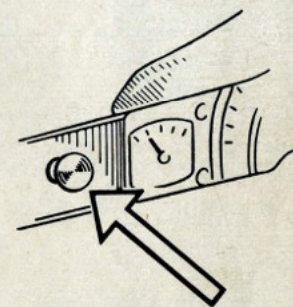
## D E - F R O S T I N G

Hot air produced by the air conditioning system is also used for warming the windscreen. When heating is switched off, hot air is driven automatically to the field of vision. This prevents very effectively formation of ice crystals, settling down of snow, or condensation on the windscreen.

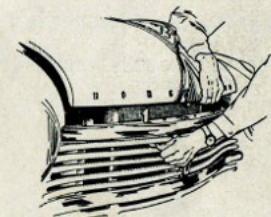


## B O N N E T

The bonnet is burglar proof, and it is only possible to open it by pulling a lever placed on the right hand side of the instrument panel. After the lever has been pulled, the bonnet jumps up slightly and is kept in position by a second safety hook on the front part of the radiator. To open the bonnet completely this hook has to be released as seen on the picture nearby, by moving it to the left side. Now the bonnet can be opened completely and in this position the bonnet is secured against falling down.

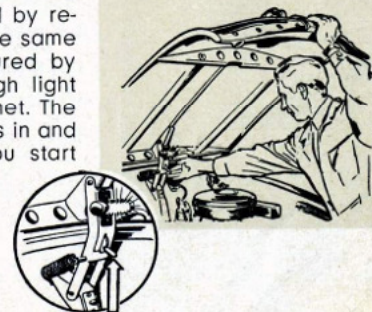


On opening the bonnet a lamp is automatically switched on which illuminates the whole engine compartment.



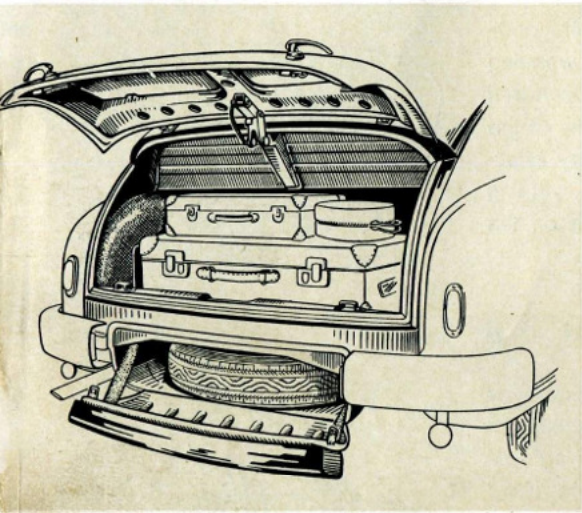
## C L O S I N G O F T H E B O N N E T

Closing of the bonnet is effected by releasing the safety catch and at the same time the bonnet has to be secured by hand against falling down through light pressure on the edge of the bonnet. The locking device automatically clicks in and the bonnet is closed. Before you start off be sure that the pull-button for manipulation of the engine bonnet is back in the original position.





## B O O T

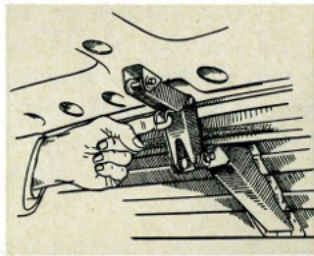


Great attention has been given to the equipment of the luggage boot.

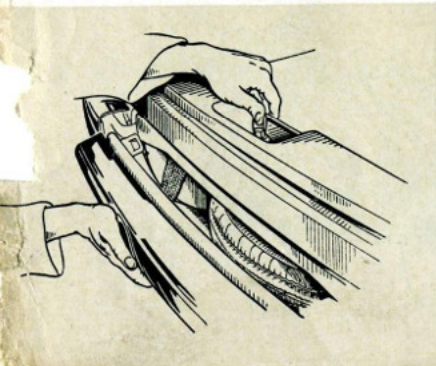
For tools and jack there is a special compartment on the left side of the luggage boot.

To open the boot turn the two chrome handles on the outside of it, one of which is fitted with a lock.

To lock the open boot lid, pull the supporting arm in with the keys. The lid opens very easily and is on a spring action.

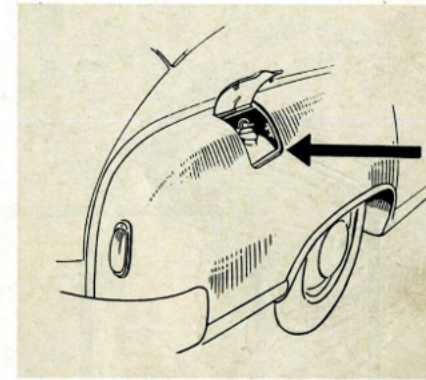


The spare wheel compartment is very easily accessible when the luggage boot is open. It is placed in the middle part of the rear bumper and is opened by letting down the appropriate part, which is secured by a lock which is released by means of a lever. After closing the compartment, please make sure that the locking device lever has jumped back into its proper place.



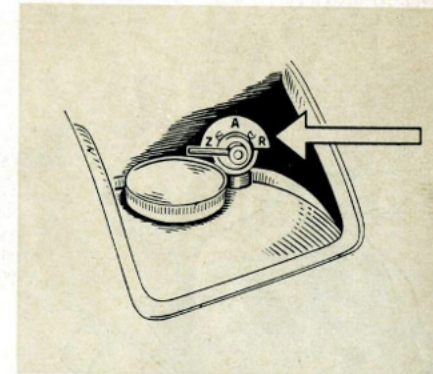
## F I L L I N G W I T H F U E L

The tank is placed in the rear part of the right rear wing. The cap is accessible by opening a lid. Besides the cap you find a switch with the positions — reserve, closed, open, marked.



Under normal driving conditions this lever should point to the position "A" 'open' (auf).

When the petrol has been used up the switch can be switched on to reserve "R". By doing so a further amount of reserve fuel is available to drive approximately 30—35 kilometres.



We recommend that you refill in good time, and not to use this safety device too often, which is only meant for an emergency.

### Executing Repairs on the Fuel System or Petrol Pump

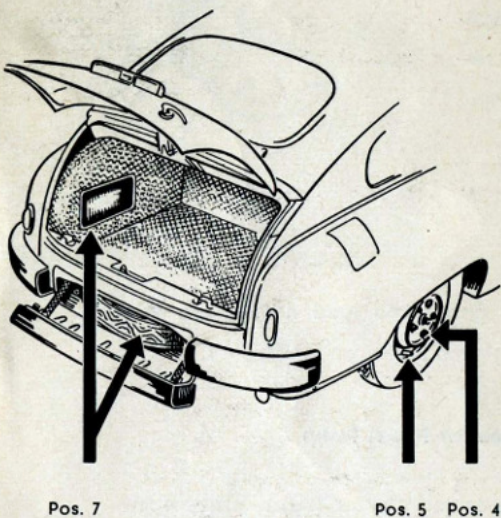
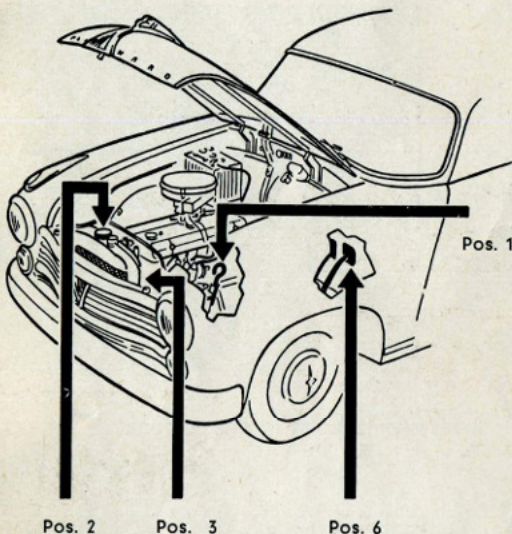
The lever has to be switched on to position 'closed' (ZU) to prevent the flow of petrol through.



## PREPARATIONS FOR A LONGER JOURNEY

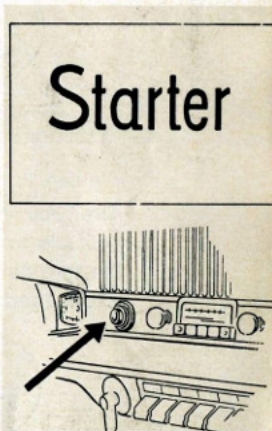
Before starting on a longer journey, please check over your car. It is recommended that your car does need any attention this should be done through an approved Borgward Distributor. In any case, please take care that the following items are done.

- (1) Check oil lever in engine. Refill always with the same brand of oil.
- (2) Check water lever in radiator.
- (3) Check ventilator belt for correct adjustment (it should not slip).
- (4) Check wheel nuts, especially after wheel change.
- (5) Check tyre pressure. Tyre dimensions 640X15.
  - 25 LBS Front
  - 27 LBS Back
- (6) Check clutch pedal for play.
- (7) Take spare wheel, tools, bulbs and fuses with you.
- (8) Prepare car documents and list of approved workshops besides. Do not forget to check your brakes for efficient action. Have brakes adjusted if required, or refilled with brake fluid.



## STARTING OF THE ENGINE

- (1) Gearchange should be put into neutral, on the manual box. The selector lever of the automatic gearbox should be put in the direction of movement.
- (2) Ignition should be switched on by means of the ignition key. At this the red control light will come on, and will automatically switch off when the engine starts.
- (3) Press the starter (choke) key in cold weather, right in. Should the engine not be quite cool or the weather should be warm, it is sufficient to push accelerator pedal twice.
- (4) The starter is put into operation by pressing the starter knob. To save the battery please take care that the starter is not running longer than five to ten seconds without interruption. After having tried to start a few times in vain, do not try again, but look for the fault.
- (5) After the engine starts, press choke back. Under no circumstances drive for a long time with the choke pressed in as not only a high fuel consumption may result, but also an extremely great amount of wear may be caused on the cylinder walls. Too much fuel causes the lubricating oil being washed off the cylinder walls and pistons, and besides that, the oil gets considerably thinned down. There is also a danger that the sparking plugs get wet and stop firing.

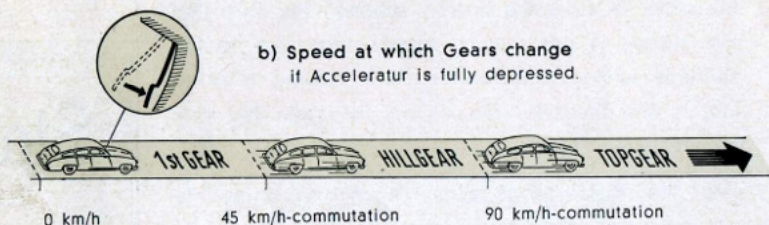
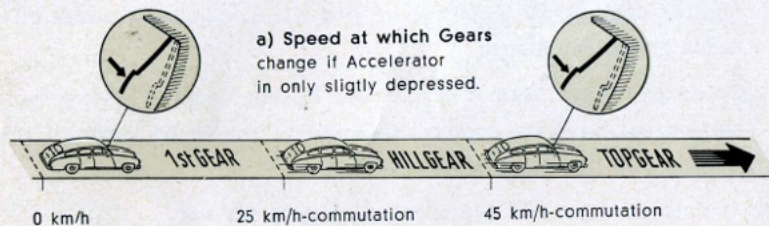


Too much use of the starter key and accelerator pedal during starting may cause flooding of the carburettor. In that case the engine has to be started with a completely depressed accelerator. The starter key has to be put in neutral position and the engine has to be turned by means of the starter. Thus, the accumulated petrol gets sufficient fresh air and is mixed into an ignitable mixture. After starting, please do not rev engine to maximum revs. Do not let the engine get warm when standing. It is better to let the engine warm up during driving.

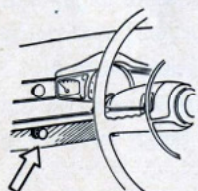
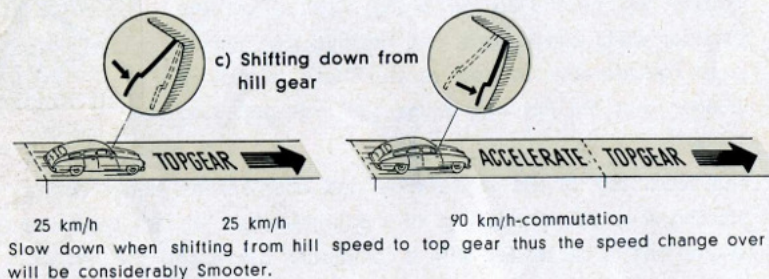


## DRIVING WITH AUTOMATIC DRIVE

During driving there is no gearchange. The gearbox change is completely automatic and is dependent on the speed from starting. Speed, through the hill speed and then into top speed. It depends on the position of the accelerator pedal whether the start is slow or fast.



After the retarding speed until about 25 kilometres per hour it is possible to induce the switching over into the hill speed by depressing the throttle pedal. After reaching a speed of 90 k. p. h. the Top Gear is engaged automatically.



Besides gearchange with the accelerator pedal, it can also be done by means of a button which is placed on the right hand side of the steering column beneath the instruments. This lever should only be used on hills or in special circumstances.

The automatic gearchange from direct speed into the hill speed is done either by taking the throttle completely away under 25 k. p. h. or by full throttle between 25—90 k. p. h. The starting speed switches on without using the throttle at a speed of approximately 10 k. p. h. and at full throttle beneath 30—35 k. p. h.

## RULES OF DRIVING

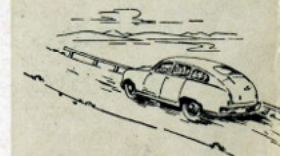
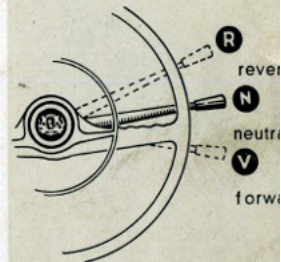
- (1) For beginning of journey put selector lever into the required direction.
- (2) Start engine, at the same time use foot brake.
- (3) Release brake, accelerate, the car will move immediately.

Do not let the engine get warm standing, it is better to drive the car to warm the engine.

In winter when the car has been left for a while outside, it is advisable to use the low aux gear for the first few minutes of driving so that the normal speed can be maintained in main gear. (speed under 40 k. p. h.)

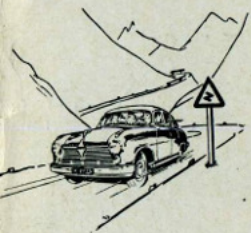
## SITUATIONS DURING DRIVING

- (a) **Acceleration** — The car has to be extremely fast whilst overtaking, and has to accelerate from its normal driving speed as quickly as possible to overtaking speed. Whilst using the normal gearbox one has to change back the gear. With the automatic gearbox you simply press the accelerator pedal right in, thus engage the hill speed and get the necessary acceleration without any effort.
- (b) **Driving in a hilly country** — During driving up-hill the speed adjusts itself automatically to the climbing possibilities.





On narrow twisty roads it is advisable to accelerate only very slightly, simultaneously pulling the aux gear to prevent a too early automatic change into the direct speed.



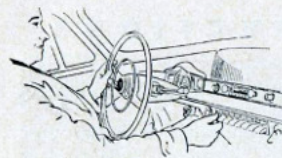
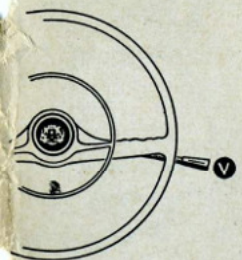
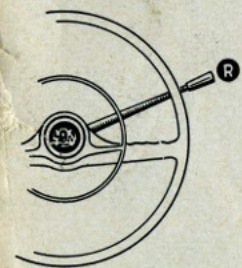
Whilst driving downhill, use again the aux gear to get the full benefit of the braking power of the engine.

- (c) **Stopping at Crossroads** — No clutch or gear-change has to be operated, simply remove your foot from the accelerator pedal, and if necessary use foot brakes. At a slight upwards road play with the accelerator pedal till the car stops.



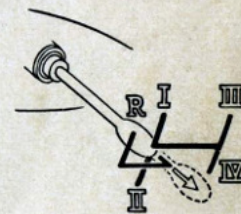
## PARKING OF THE CAR

- (1) **On flat surfaces** — The selection lever remains switched on to the direction of movement. Withdraw ignition key and pull handbrake.
- (2) **On an upward slope** — put selection lever into reverse, withdraw ignition key and pull handbrake.
- (3) **On a downhill slope** — put the selection lever to forward position, remove ignition key and pull handbrake.



## DRIVING WITH NORMAL GEARBOX

- (1) Gearchange lever into neutral, switch on ignition and if necessary press down the starting key. Start engine by pressing the starter knob. Pay attention to the oil pressure.
- (2) De-clutch and engage gear in the first speed. Start always on the first speed.
- (3) Release handbrake.
- (4) Slowly release the clutch and slightly accelerate, you get a soft start and you preserve your car.
- (5) Change through the gears in the correct order till you reach the required speed.
- (6) Whilst driving never leave your foot on the clutch pedal.
- (7) Brake sharply only in case of danger. Normally release accelerator pedal and let the car roll out.



When driving downhill engage low speed. Do not accelerate and use engine as brake, leave ignition switched on.

- (8) Change gear in good time. Never let the engine revs drop too far. Only a bad driver leaves the clutch slipping at crossroads, corners etc. instead of gearchanging.
- (9) When finishing your journey switch off ignition, and it is advisable when parking in public parking places or in streets to engage the low gear, lock steering to the steering ignition lock, to lock the car and the luggage boot.



## R U N N I N G - I N I N S T R U C T I O N S

The treatment you are giving to your new Hansa 2400 during the first 2,000 kilometres, whilst the load on the engine is diminished, is most important with regard to the life and reliability of your car. We are asking you, therefore, in your own interests to limit the speed of your 2400 equipped with a normal gearbox according to the chart below.

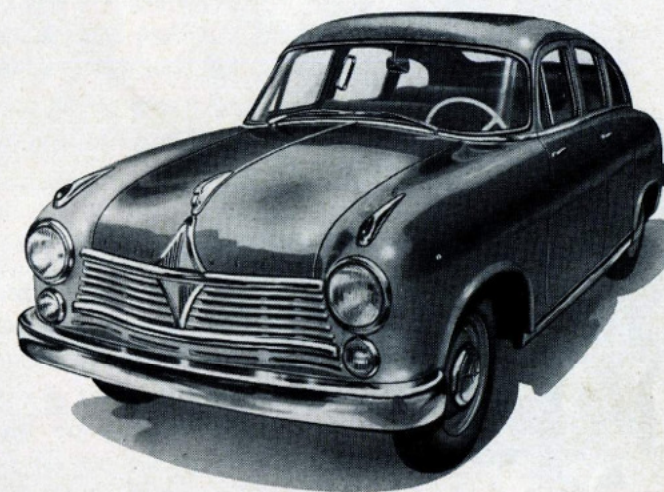
	1st gear	2nd gear	3rd gear	4th gear
1000 Kilometres	20 k.p.h.	35 k.p.h.	50-60 k.p.h.	60-80 k.p.h.
up to 2000 Kilometres	25 k.p.h.	40 k.p.h.	60-70 k.p.h.	80-100 k.p.h.

The given top speeds have not to be understood that they have to be kept regardless of the load of the engine.

Driving by the hour in a low speed, or driving without attention to the engine is just as bad for a new engine even if speeds for instance are kept up on slopes by pushing down the throttle. In such cases it pays one to change gear. The engine will later thank you for the little trouble you have taken.

The existing running-in rules can be neglected if your car is fitted with an automatic gearbox. The engine adjusts the revs and performance automatically to the driven speed.

The first oil put into your car by the works is thin running-in oil which should be exchanged after the first 500 kilometres. With which dirt and the first rubbing-off are eliminated. The running-in oil can be exchanged without special preparation by normal motor or premium oil. Please use only branded oils. All other oils. All other particulars are given on the Borgward customers service leaflet.



Of special significance is the self-supporting all steel body. The stable underpart consists of box sections with ribs and a central tube which give to the whole structure the necessary stiffness. The body is fixed to the front auxiliary frame and to the rear frame cross member by means of soft rubber cushions which ensure a jerking and vibration free ride.

The front wheels are fitted separately by means of a triangular swinging arm. The rear axle is built as a hinge axle. Coil springs in connection with telescopic shock absorbers make sure of exemplary springing and good road holding.



## F U E L S Y S T E M

All normally supplied commercial branded fuel can be used for the engine. Please avoid the use of unknown, very often falsified, or dissolvent diluted fuel. When putting fuel through the filler cap into the

tink please take care that no dirt gets into the fuel. The fuel is sucked from the tank by means of fuel pump type "Solex diaphragm pump" and fed to the carburettor.

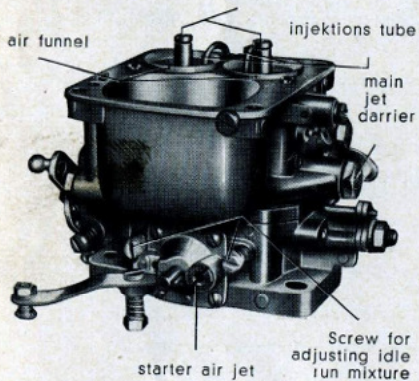
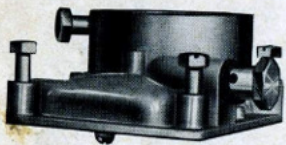
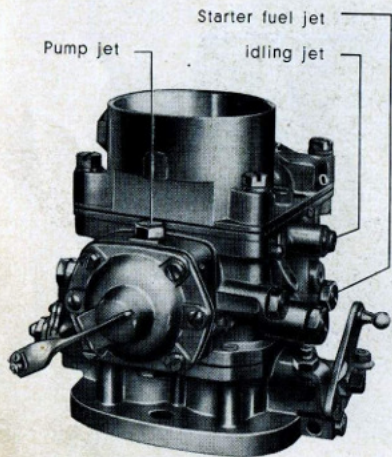
### Carburettor

Through the carburettor the right mixture consisting of fuel and air is fed into the engine. The centrally located air intake to the carburettor in connection with the attached air filter practically keeps all the dirt off the carburettor system. The fuel-air mixture therefore, remains constant. Through the stage starting carburettor a quick starting of the engine in cold weather is ensured, before the engine gets its prescribed speed two different stages can be set.

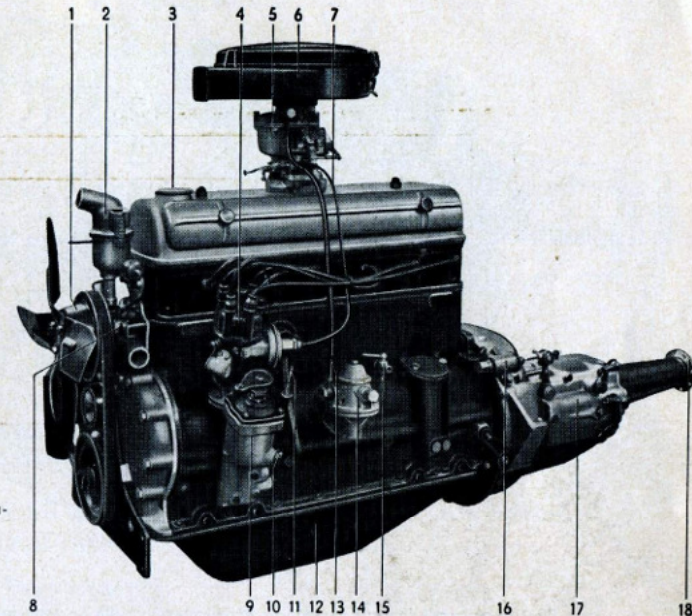
(1) Completely open when starting from cold the mixture is rich on fuel.

(2) Half open the mixture gets weaker in fuel.

The middle position is recommended when the engine is running slowly towards getting warm or after having speed before the engine is quite cold.



- (1) fan
- (2) thermostat
- (3) oil filler cap
- (4) distributor
- (5) carburettor
- (6) air cleaner
- (7) depression line
- (8) water pump
- (9) lube oil filter
- (10) drain plug
- (11) oil dip stick
- (12) sump
- (13) fuel feed line
- (14) fuel lift pump
- (15) water drain cock
- (16) oil pressure type cylinder clutch operation
- (17) gearbox
- (18) driver flange



## E N G I N E

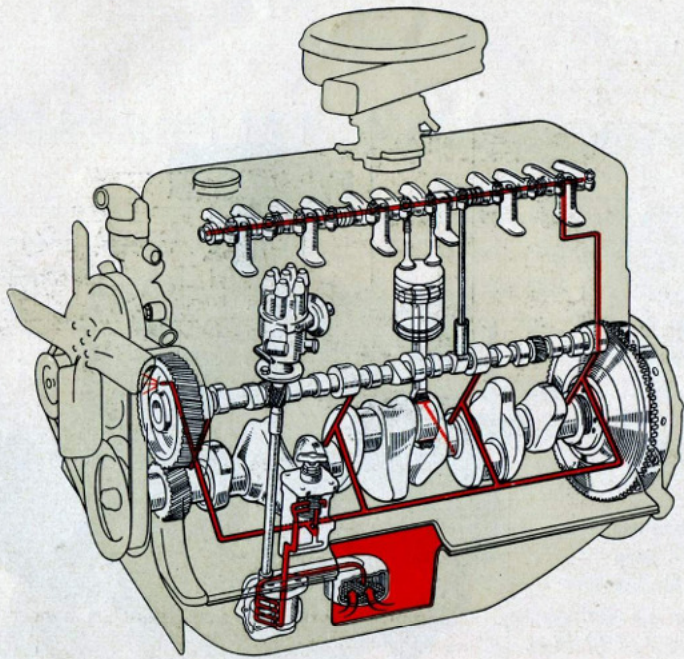
The engine works on the 4 stroke principal. The valves are placed hanging into the cylinder head, and are governed by valve lifters and camshaft followers from a camshaft placed in the crankshaft housing. The crankshaft is of the 4 steel bearing type. The crankshaft placed in the crankshaft housing is running the cylinder head, is one unit and detachable. To achieve better heat deduction a light metal alloy is used. Oil fumes of the engine are eliminated by an efficient breathing system. The engine is mounted on 4 rubber mountings, thus no vibration whatsoever is transferred to the car.

### Lubrication

The system used for lubrication is a combination of pressure and splash. The oil filling cap is placed in the front part of the cylinder head, the oil is fed through this into the oil sump.

A gear oil pump sucks the oil from the old oil sump and cleans it by means of channels over an edge filter to the respective lubrication points. The lubricating of the gudgeoni pins and cylinder walls is by oil splashing.



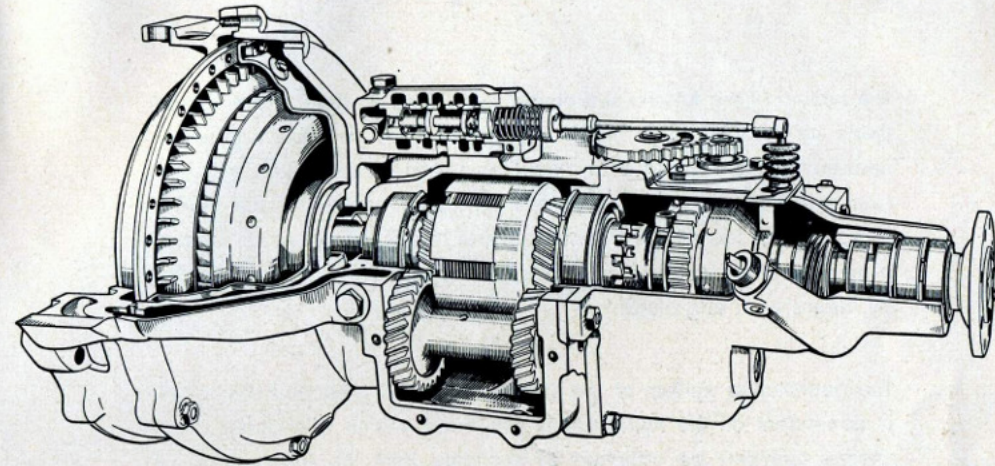
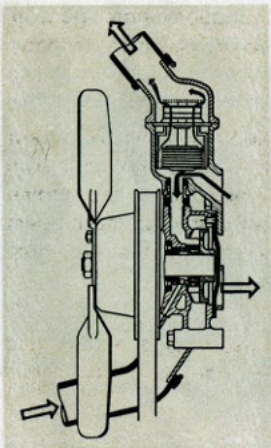


Dirt in the oil is immediately eliminated. This is achieved through sieves placed on the suction at the lowest part of the oil sump, and through the edge filter built in the main oil stream. There is sufficient oil pressure if the warning light no. 2 extinguishes after starting.

#### Cooling System

The cooling water is fed in continuous circulation by the water pump from the radiator into the engine. The thermostat is built in between the engine and the radiator, which operates at a temperature of approximately 80 degrees C., the circulation of the cooling water over the radiator. The thermostat therefore, remains closed till this temperature is reached.

The cooling water is so long circulating through an auxiliary lead again directly into the engine block and cylinder head, a quicker warming up of the engine and a saving of all movable parts of the engine is thus achieved. Over stepping of the permissible cooling water temperature is, as already mentioned, signalled through a warning lamp.



### A U T O M A T I C G E A R B O X

In size and weight the automatic gearbox is equivalent to a normal cog wheel gearbox. It consists of —

- (a) A hydraulic torque converter.
- (b) A post engaged reduction gear as hill speed.
- (c) A hydraulically engaged multiple disc clutch for direct speed.
- (d) A set of cog wheels with a dog clutch for reverse.

Changing over from the gears is dependent on the speed of the vehicle and the torque of the engine, and is completely automatic in such a way that for the particular speed the appropriate gear is engaged. For the driver, therefore, there is no de-clutching or gear-changing whilst driving.

The torque converter is filled with oil which is kept by means of a gear oil pump driven by the engine under pressure of 4 atu. The oil is thrown by the blades of the pumping wheel, driven directly on to the turbine wheel where it is diverted to the leading blades placed in the biggest diameter of the housing. The leading blades give to the oil again the re-flow direction to the pump wheel.

The oil circulation in this system is through the leading blades and thus enables the driving turbine wheel to engage in a continuous torque increase.



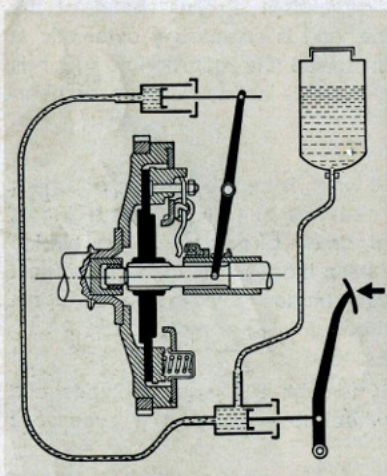
The turning of the turbine wheel, and with it the starting of the vehicle, starts as follows: the turbine torque reaches its maximum height needed by the rear axle to move the vehicle. The power let to the rear axle goes for the starting and hill speed over the clutch gear in direct speed. The power from the engine to the rear wheel is let over a multiple clutch and the rear speed is engaged over a reverse axle by means of a dog clutch.

The gearchange system of the starting gear, hill gear and direct gear is dependent on the hydraulically governed engine revolutions. Gearchange can only be achieved by changing from the direct gear into the hill gear. The gearchange can be achieved either by means of the auxiliary pedal or the pulling button shown.

## T R A N S M I S S I O N

### Clutch (with normal gearbox)

The engine and gearbox are connected to each other by means of a single foot clutch. The connection is interrupted when the clutch pedal is pressed down. The pressure from the pedal is let by means of an oil hydraulic system over the thrust bearing to the clutch. It is therefore quite unnecessary to engage the clutch with „feeling“ but one should avoid a sudden release of the clutch pedal because the whole engine power would at once be transmitted to the gearbox and rear axle, and can cause damage to the engine and transmission.



### Gearbox with steering wheel gearchange

The 4 speed gearbox is used with a rear speed, and all the speeds are fully synchronised, but synchronisation means that all the parts which have to be connected together have to be brought to the same speed. Thus a slight gearchange is possible and the changing back from higher speed to the next speed can be done without using the throttle. The gearchange of the gearbox is effectuated by means of gearshift bars connected to the gearchanging lever on the steering column, and to the changing mechanism of the gearbox.

### Suspension

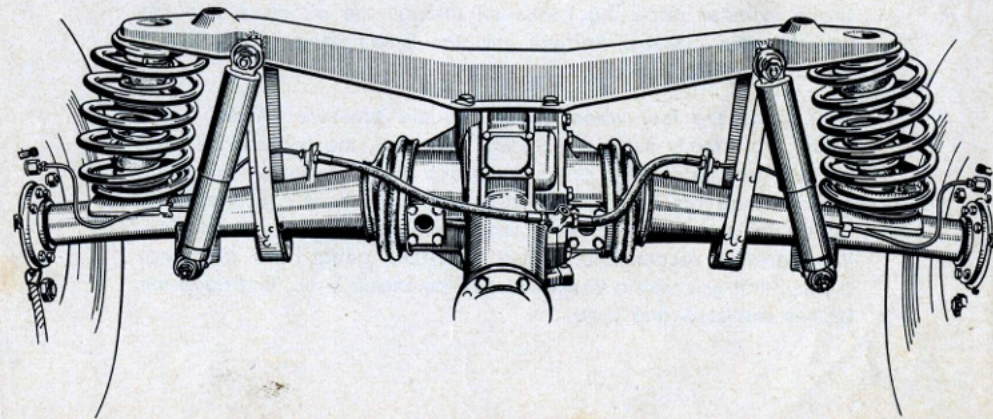
Bumps caused by the road are already partly eliminated by the tyres, but the springs are those that guarantee a vibration free ride under difficult driving conditions and load of the vehicle.

This has been achieved on the front and rear wheels by a combination of coil springs and hydraulic telescopic shock absorbers, always fixed in pairs.

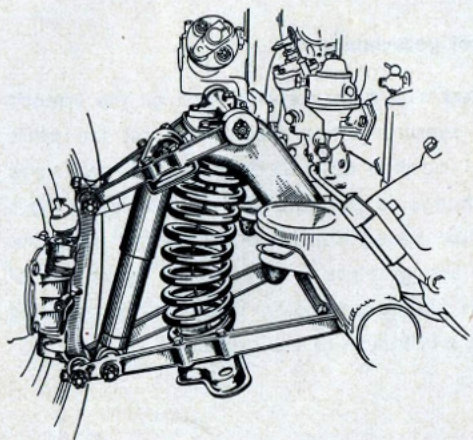
### Rear Axle

The rear axle is an oscillating hinge axle. The suspension consists of 2 coil springs fixed on either side. The telescopic shock absorbers successfully limit the oscillating movement caused during driving.

The drive to the wheels is over a differential gear to the half shafts.







### Front Axle

The front wheels are independently suspended on either side of the suspension by means of coil springs and telescopic shock absorbers fixed two on either side. The stub axles are held by 2 wishbones on each side.

## S T E E R I N G

The steering is worm and bevel Type ZF-ROSS. It works easily and is vibration-free. The steering transmission to the front wheels is by drop arm and tie rod.

## B R A K E S

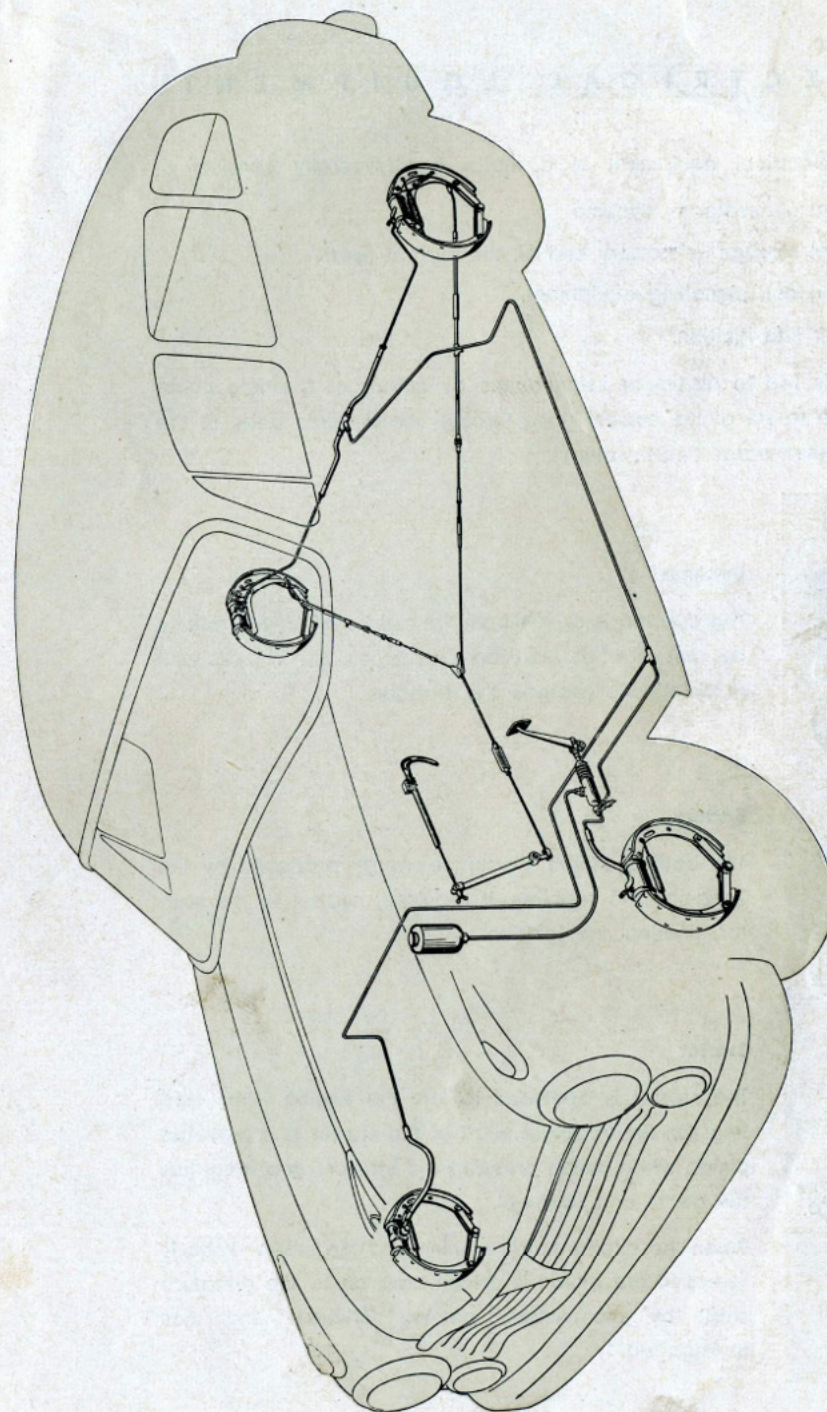
The cars are equipped with two independently leading shoe brakes.

(a) **Handbrake.** This is used only as a stationary brake. The brake works by manual lever over steel cables to the rear wheels.

To secure the car pull the handbrake. To disengage the handbrake turn right and push back.

(b) 4 wheel oil-pressure inside brake works on all 4 wheels by means of a brake pedal which is connected to the piston of the main oil brake cylinder. When applying the brake pedal, the piston and main brake cylinder force the brake oil through the oil ducts into the wheel brake cylinder. Through this the brake shoes are pressed against the brake drum.

To engage the four wheel brake a slight pressure on the brake pedal is normally sufficient. Should, however, the brake shoes not be sufficiently adjusted, press the brake pedal down several times at short intervals. Through this sufficient brake fluid is pumped into the oil ducts. However, a brake working like that is not entirely safe. We therefore recommend, should the brake pedal have too great a play, that you visit a Borgward service repair shop, and have the brakes adjusted and bled.



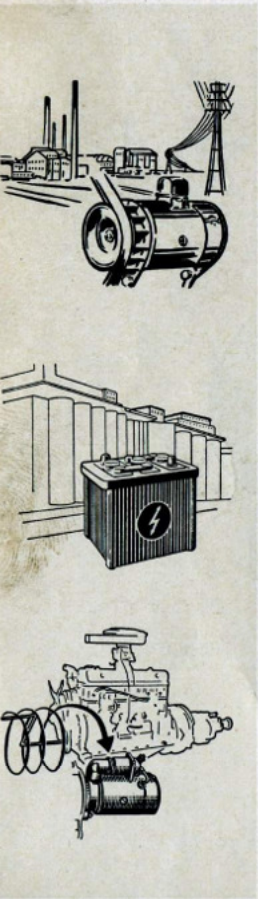


## ELECTRICAL EQUIPMENT

The electrical equipment in a motor car generally consists of

- (a) current generator = dynamo
- (b) current storage = battery and all the current users.
- (c) lighting and signalling equipment.
- (d) starter and ignition.

Current is fed to particular using points by means of a single cable wire. The return of the current goes through the metallic parts of the car, in other words "earth return".



### Dynamo

The dynamo is driven from the crankshaft of the engine by means of a belt and produces the current and automatically charges the battery.

### Battery

The battery stores electrical energy produced by the dynamo, and supplies, if required, current to the starter, lighting, and ignition.

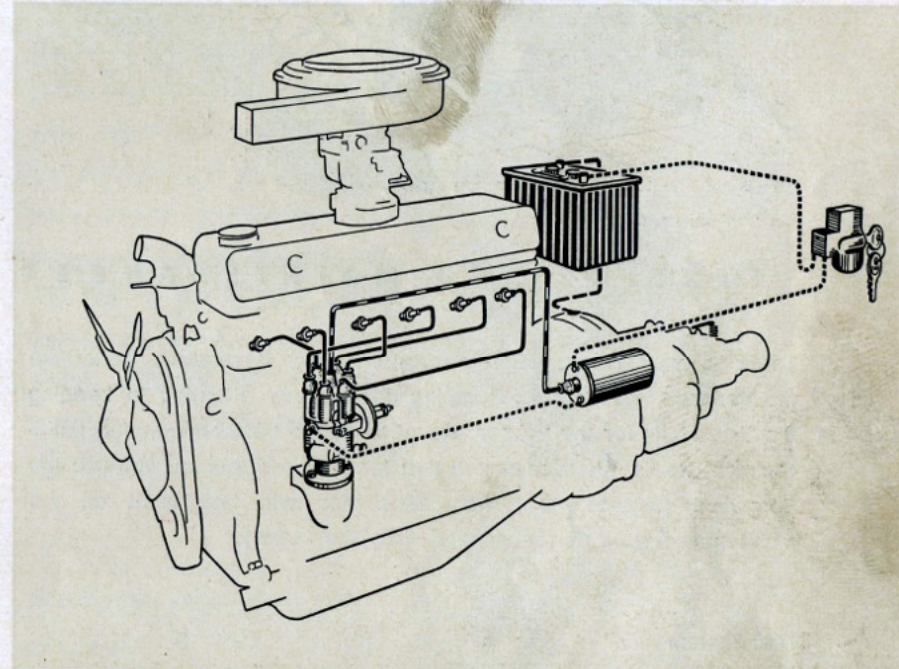
### Starter

The starter is operated to turn the engine when starting. On the armature shaft of the starter is a movable pinion which, when pressing the starter knob, engages the gears and flywheel.

When the engine starts running and the starter knob is released the pinion is driven back on to the armature shaft by the quickly running flywheel and thus disengaged.

## Ignition System

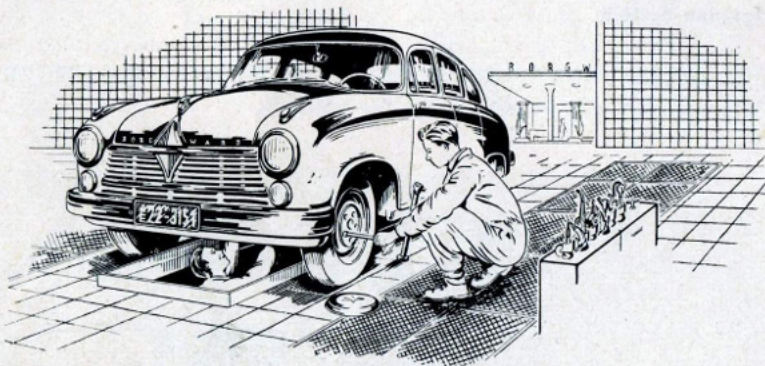
The ignition system consists of the coil, the distributor, and sparking plugs. Current is supplied through the battery.



To use the power of the engine to the best advantage, especially when accelerating, the distributor is linked with a vacuumatic ignition timing device.

The timing sequence of the cylinders is 1 — 5 — 3 — 6 — 2 — 4. Counting from the first cylinder on the gear box side of the engine.



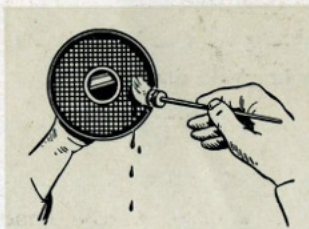


## SERVICE AND MAINTENANCE

To keep your Hansa 2400 in proper order, it requires periodical maintenance, also careful handling. Please pay attention to keeping the time limits for the proper execution of the below-mentioned maintenance checks. We recommend that for your own benefit you use the Borgward customers service leaflet. You will find in it all the maintenance work as recommended by the factory.

### Fuel System

Dirt in the fuel system including the tank can cause engine failure. It is therefore, necessary to clean the engine fuel system after approximately 20,000 kilometres. Filter element of the air filter should be washed in petrol after every 2,000 kilometres, dried and slightly moistened with engine oil. The superfluous should be jerked out. The carburettor is set for all commercially used fuels. Please therefore do not alter the setting.



The repair of faults, and the maintenance of your carburettor should only be done by the Borgward customers service. Oil the controls of your carburettor at the joints.

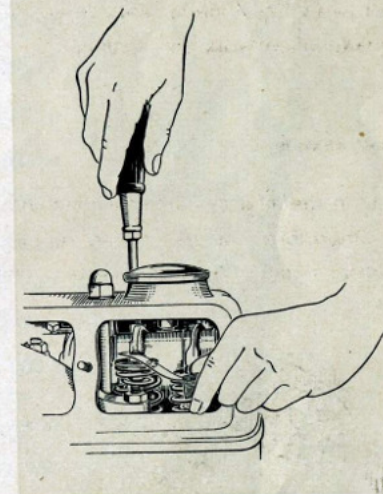
### Engine

After the first 500 and 1000 kilometres reset the valve setting as advised by the Borgward customers service leaflet.

The play between the valve rocker gliding surface and the valve rod should be for the in and exhaust valve 0.2 mm when the engine is warm. Remove the valve covers which are fixed to the side of the cylinder head cover, set valve play whilst engine is running and warm by means of a ring spanner and screwdriver.

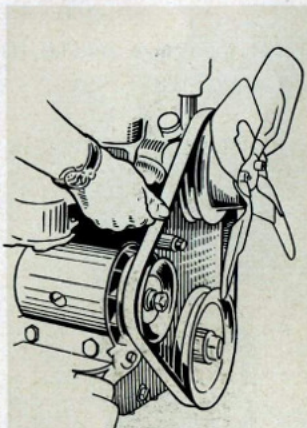


Check valve play with a gauge (0.2 mm) for the first three and last three valve rockers the gauge ought to be engaged from the right side of the engine. Six valve rockers placed in the middle can only be reached from the left hand side.

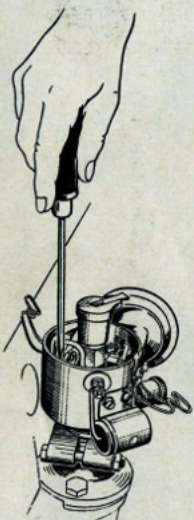


Fixing bolts of engine suspension have to be regularly checked. Check rubber parts of engine suspension. Check also fixing of radiator and the connections of the battery ground straps.





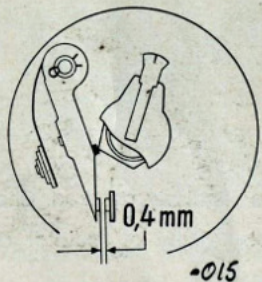
The proper working of the water pump and dynamo driven from the crankshaft depends on the correct tension of the fan belt, and also the efficiency of the electrical installation, cooling system and life of the belt itself. The correct tension of the belt is if it is possible to press down the belt with your thumb to a depth of approximately 15 mm. KEEP GREASE AND OIL OFF THE BELT.



The breaker contact points of the ignition distributor are checked for the correct opening distance. This should be 4 millimetres clearance. In case of burning out of the contacts it is advised to see the next Bosch Service Station.

The contacts of the distributor and the breaker should be kept scrupulously clean. Oil and grease on the contacts cause early wear and irregular ignition. The lid of the grease nipple on the distributor should be greased to every 8,000 kilometres.

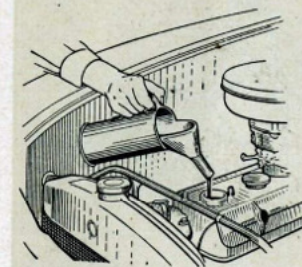
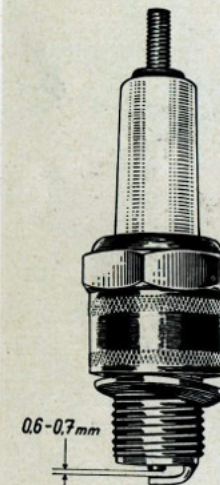
After removing distributor cap put a few drops of motor oil on the felt in the cam bore. Distributor cams should be slightly greased. The grease wedge on the sliding piece of the breaker should be checked also.



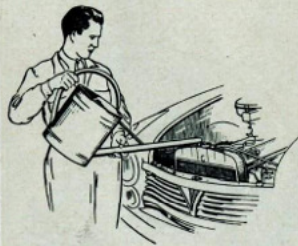
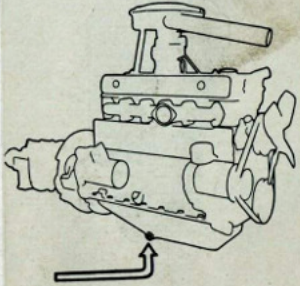
The sparking plug electrode should, after prolonged use, be a light brown colour. Light grey or dark colours point to too rich a mixture. Oiled up sparking plugs are a sure sign of worn piston rings. The contacts of the sparking plugs should be cleaned with a fine wire brush. Oiled up sparking plugs should be washed in petrol. The electrode clearance should be 6 to 7 millimetres. The sparking plugs should be exchanged after 15,000 kilometres. The engine needs 5,5 litres of oil, which should not be exceeded.

Check preferably daily the oil lever in the oil sump. Check only when the engine is switched off. Remove the oil dipstick wipe over and put it in again and then you will be able to read the oil level on the removed dipstick. As soon as the oil level is below the minimum mark it is necessary to top up the oil to that mark. When topping up this oil, please use always the same brand. The engine oil should be changed after the first 500 and 1000 kilometres, and then at times according to Borgward instructions.

The quality of the oil should be summer and winter SAE 20, and below minus 8 Co degrees SAE 10.







The oil pressure is not really the important part. Far more important is the amount of oil which within a certain given short time is pressed through the particular lubrication points. Only after the green warning lamp lights up is one approaching the danger point, then it is necessary to inquire the reason for it.

The oil should be changed whilst the engine is warm. After having released the old oil, wash engine thoroughly. Use about three litres of flushing or thin motor oil which should be poured into the crankshaft housing and let the engine run for about two minutes on this oil at medium revs.

After having switched off the engine remove flushing oil entirely and fix drain plug, fill with new oil and let engine run for about three minutes. Thus all lubrication points are reached by the new oil. Never use for flushing the engine, paraffin oil petrol or diesel oil.

The oil filter at the gear oil pump should be removed every 10,000 kilometres and thoroughly cleaned. At the same time remove also oil sump which should be also thoroughly cleaned. The disc oil filter belt in the main oil stream should be cleaned every 8,000 kilometres. Clean before washing engine. Remove the mud, drain plug and let out the oil residue. Take out the disc oil filter, wash in petrol and fit in again.

The wing nut on lube oil filter should be twisted two or three times at short intervals!

### Cooling System

The cooling system should only be filled up with clean water. At least once a year clean radiator thoroughly. Rust and mud in the radiator and in the water engine jacket should be removed with Henkel P 3 mixture 250 gramme and P 3 to 10 litres of water. The fur deposit should be removed with a soda solution of 5%. Drive several days with this solution and drain whilst warm and flush thoroughly through.

### Cooling Liquid, Filling and Draining

Before filling with cooling liquid please take care that

- (1) the tap of the thermostat is open
- (2) remove leading screw from the connection tube of the heating element
- (3) as soon as cooling water is running out of the bleeding hole fix screw immediately.

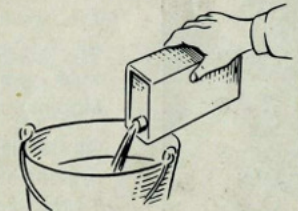
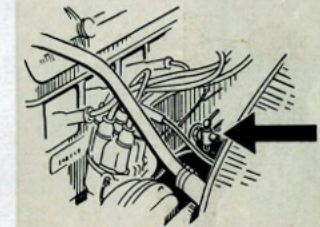
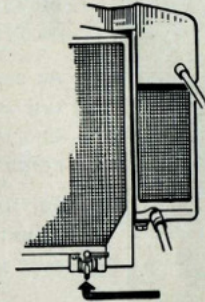
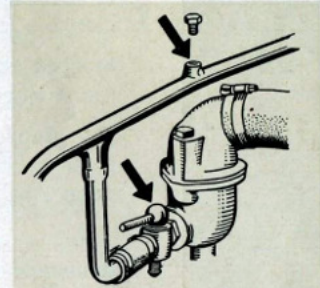
The rest of the cooling water can now be filled to the level of the overflow in the filler. When draining cooling water please note

- (1) that the tap on the thermostat is open
- (2) that the lid of the radiator should be removed
- (3) first drain the water from the radiator and then from the engine.

In case of frost danger remove bleeding screw from the connection tube of the heating elements so that the remaining water in the heating elements can be drained. Should the radiator boil, don't fill immediately with water, wait till the cool water control lamp switches off.

Remove carefully the radiator cap and fill up with cold water only whilst the engine is running as otherwise tensions may occur in the crankshaft housing which could easily lead to damage (cracks).

In winter, before filling up the cooling system with anti-freeze, clean the whole system thoroughly especially if fur-removing chemicals have been used. The cooling liquid should be mixed as follows — at a temperature minus 30 Co 4 litres anti-freeze to 5 litres water; at minus 20 Co — 3 litres of anti-freeze to 6 litres water. Cooling liquid with anti-freeze should not be just drained, it should be caught in a container and can be used again. Please note that anti-freeze very often contains chemicals which are dangerous to health, and therefore wash thoroughly all containers with hot water.



Temperature	Anti-freeze	Water
up to 10° C	2 ltr	7 ltr.
up to 20° C	3 ltr.	6 ltr.
up to 30° C	4 ltr.	5 ltr.





Whilst using anti-freeze do not use any radiator cleaners (anti-corrosive).

In case no anti-freeze is used drain water from radiator when temperature falls below zero.

The grease screw on the water pump has to be given a turning from time to time and also filled in good time with grease.

### Automatic Gearbox

Service for the automatic gearbox is to check the oil pressure, check the oil level in the oil cooler.

As soon as the oil pressure drops below 2.5 atu a red warning lamp lights up on the instrument panel. Check oil level immediately, replenish the oil to a normal level which is 3—5 cm below filler cap.

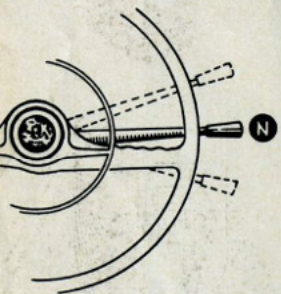
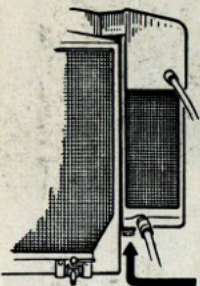
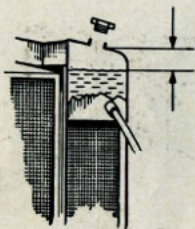
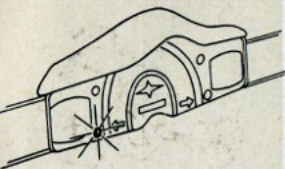
Greater losses of oil at short intervals indicate a disturbance and it is advisable to have it checked over immediately at the next Borgward repair shop.

The oil tank should only be topped up whilst the engine is idling. Leave engine running as long as there is a formation of bubbles on the oil mirror. This procedure has also to be observed when the whole system is refilled, thus making certain that there is no air left in the system. In the hydraulic part of the gearbox the oil should be exchanged every 16,000 kilometres. The quantity required is 6 to 7 litres.

The works recommend the following qualities of oil — Castrol TQ type A and Veedol transmission fluid type A, Esso-ATF 55, Shell-Donax T 6, Vacuum-Mobilfluid 200, B. V.-Öl S. G. F.

Oil leads and connections should be checked at regular intervals for leaks and should be tightened. To do this put lever at the steering wheel between forward and reverse on to neutral, and rev engine to maximum revs to get maximum oil pressure.

The oil in the mechanical part of the gearbox should be exchanged every 8,000 kilometres. The quantity necessary is 0.8 litre normal gearbox oil of a viscosity of SAE 90.



### Clutch

The clutch plate should only be adjusted by a Borgward Service. The clutch cross shaft be greased every 2,000 kilometres.

### Gearbox

The service of the manual gearbox is limited to a check of the oil level and the oil change after every 8,000 kilometres. The oil should be drained whilst warm. Noise in the gearbox should be immediately investigated. The steering column box does not need any special attention.

### Rear Axle

The service of the back axle is the same as the service of the manual gearbox.

### Springs

Clean at regular intervals the springs and grease them.

### Steering

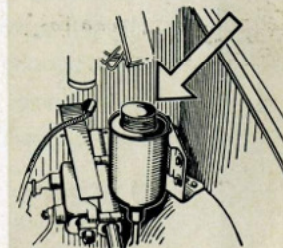
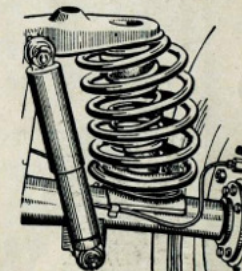
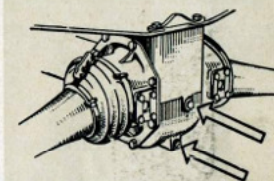
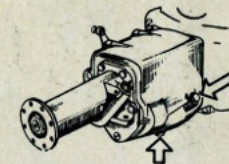
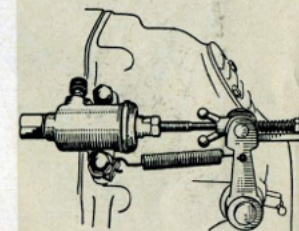
Refill oil in the steering box in good time. Grease steering gear every 2,000 kilometres and check the seat, all nuts and lock plates on the ball joints.

### Brakes

To increase the efficiency of the brakes bleed on all bleeding points after the first 500—1000 kilometres. Please pay attention that there is always sufficient braking fluid in the container. Only blue ATE braking fluid should be used as mineral oils in small quantities damage rubber parts of the braking system.

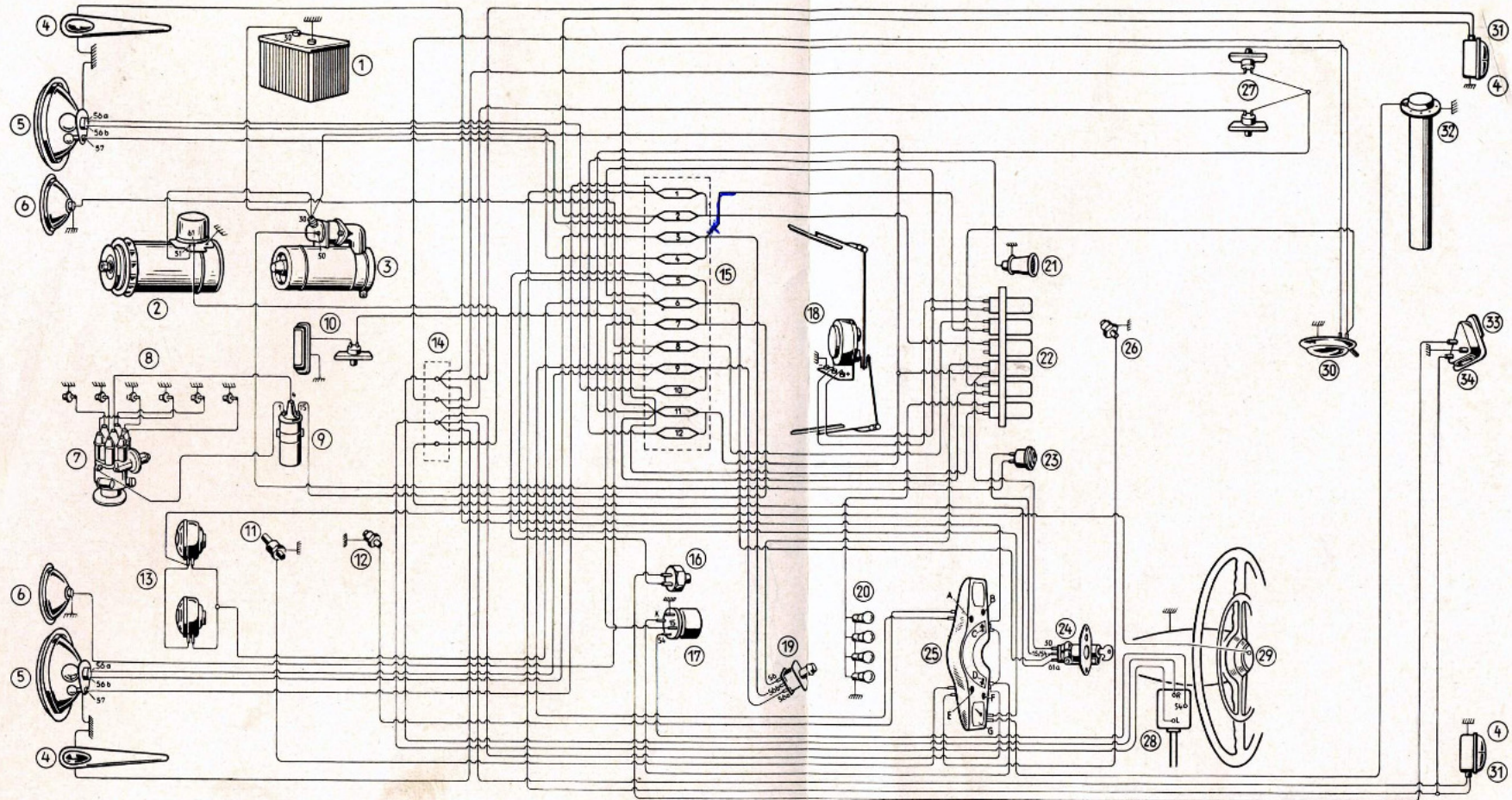
### Bleeding

First check if the spare container is sufficiently topped up with braking fluid.



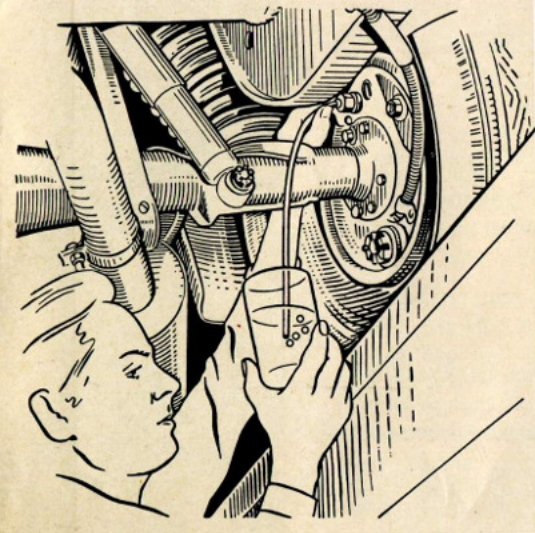


# SWITCH PLAN „HANSA 2400“



- |  |                                     |                          |                                    |  |   |   |
|--|-------------------------------------|--------------------------|------------------------------------|--|---|---|
| (1) battery                                | (12) oil pressure switch for engine | (15) fuse box            | (18) windscreen wiper              | (21) lighter   | (26) oil pressure switch for automatic transmission gear  | (1) parking light and tail light left, licence plate light        |
| (2) generator                              | (13) horn                           | (16) stop light switch   | (19) dimmer switch                 | (22) push-pull switch                                  | (27) door actuated switches left and right for dome light | (2) parking light and tail light right                            |
| (3) starter motor                          | (14) champ board                    | (17) blinker assy.       | (20) dash board lighting           | (23) starter push button                               | (28) directional light switch                             | (3) dimmer light left   |
| (4) directional lights                     | (15) fuse box                       | (18) windscreen wiper    | (21) lighter                       | (24) ignition switch                                   | (29) pressure button for horn                             | (4) dimmer light right  |
| (5) head lamps                             | (16) stop light switch              | (19) dimmer switch       | (22) push-pull switch              | (25) combined instrument                               | (30) dome light and switch                                | (5) oil pressure and cooling water control, stop light fuel gauge |
| (6) fog lamps                              | (17) blinker assy.                  | (20) dash board lighting | (23) starter push button           | A head light beam control                              | (31) tail lamps   | (6) horn and windscreen wipers                                    |
| (7) distributor                            | (18) windscreen wiper               | (21) lighter             | (24) ignition switch               | B engine oil pressure control                          | (32) fuel tank gauge                                      | (7) blinker light   |
| (8) spark plugs                            | (19) dimmer switch                  | (22) push-pull switch    | (25) combined instrument           | C blinker light control right side                     | (33) stop light   | (8) fog lamps left and right                                      |
| (9) ignition coil                          | (20) dash board lighting            | (23) starter push button | A head light beam control          | D blinker light control left side                      | (34) licence plate lamp                                   | (9) head light beam left and control lamp                         |
| (10) inspection lamp                       | (21) lighter                        | (24) ignition switch     | B engine oil pressure control      | E cooling water control                                |   | (10) head light beam right  |
| (11) switch for cooling water control-lamp | (22) push-pull switch               |                          | C blinker light control right side | F oil pressure control for automatic transmission gear |   | (11) dash board lights, inspection lamp and dome light            |
|  | (23) starter push button            |                          | D blinker light control left side  | G fuel gauge   |   | (12) lighter  |





It should fill  $\frac{3}{4}$  of the spare container. Then remove the hexagonal lock screw from the wheel brake cylinder. The bleeding tube which is a part of the regular equipment should be connected to the bleeding valve and let through the box spanner. The other end of the bleeding tube should be placed in a glass which is half-filled with braking fluid. Now turn a few times by means of the box spanner to

the bleeding screw but do not remove it entirely. Press several times quickly and jerkily on to the brake pedal, but release each time very slowly so that the air and liquid will come out through the bleeding tube into glass. This pumping should be repeated as long as air bubbles are showing in the glass.

When no more air bubbles are showing keep brake pedal pressed down until the bleeding screw is again thoroughly tight then release brake pedal into its normal position. Screw the hexagonal lock screw cap on. This procedure should be repeated on all four wheel brake cylinders.

### Electrical Equipment

Before starting any work on the dynamo, the cable between the dynamo and the battery must be disconnected. The dynamo does not need any special care or attention. The pinion of the starter and the starter ring teeth should be cleaned by means of a brush after 16,000 kilometres, and slightly greased. Every 8,000 kilometres grease the drive bearing of the starter. Check clock and brushes of the starter and dynamo. When trying to locate faults use the electrical connections diagram.

Before doing any work on the electrical equipment remove connections on the plus pole of the battery (short circuit danger). We recommend to check cables now and then for wear or rubbed off isolation.

### Battery

Special care should be given to the battery to keep up performance.

- (1) Keep battery continuously clean and dry. The terminals should be greased with acid resisting grease.
- (2) Do not place any metallic pieces on the battery, which would cause a short circuit.
- (3) Check every fourteen days if the acid is 5 to 10 mm above the upper edge of the plates. Should that not be the case, fill up with distilled water.
- (4) Use only chemically pure battery acid to replenish lost acid. The denseness of the replenishment should be more or less the same as the acid in the battery in question. Evaporated liquid should only be replaced by distilled water.
- (5) After having filled up with water or acid, check density in the cells only after a full mixture. The best way would be a half an hour after charging. The battery is well charged at a specific weight of 1.286.
- (6) Whilst working on the electrical equipment disconnect positive cable from the battery.
- (7) Do not use an open light for inspecting the battery, always do it with an electric torch.
- (8) Do not leave battery standing around uncharged. When not in use charge every four weeks.
- (9) During the winter and during continuous driving in town connected also with frequent starting and use of electric current, charge battery now and then.



## B U L B S I N H A N S A 2 4 0 0

bilux bulb for head lamp . . . . .	6 Volt 35/35 Watt
parking light bulb for head lamp . . . . .	6 " 1,5 "
fog light bulbs . . . . .	6 " 35 "
blinker light bulb . . . . .	6 " 15 "
stop light bulb . . . . .	6 " 15 "
dome light bulb . . . . .	6 " 15 "
tail light bulb . . . . .	6 " 3 "
inspection lamp bulb . . . . .	6 " 5 "
licence plate lamp bulb . . . . .	6 " 10 "
control for oil pressure (automatic transmission gear)	6 " 0,6 "
control for oil pressure (engine) . . . . .	6 " 0,6 "
control for thermometer . . . . .	6 " 0,6 "
control for head light beam . . . . .	6 " 0,6 "
control for blinker light . . . . .	6 " 0,6 "
instrument panel light bulb . . . . .	6 " 0,6 "
keyboard light bulbs . . . . .	6 " 0,6 "
battery charging control bulb . . . . .	6 " 3 "



Used bulbs should be only replaced by bulbs of the same quality and the same strength, thus a full benefit of the lamps is ensured and, on the other hand, the over use of the battery is obviated.

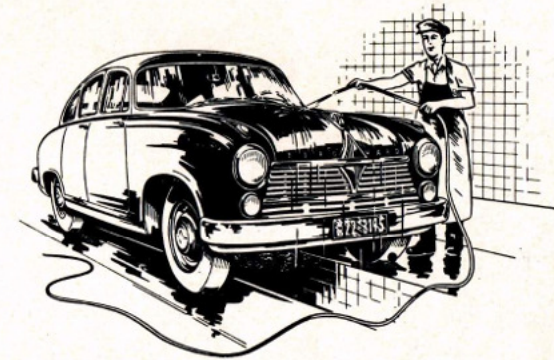
Do not touch bulbs for spotlights and fog lights whilst putting them in with greasy hands, as a matt surface can be formed on the lamp mirrors.

After having removed the headlight unit always adjust the headlights.

## U N D E R P A R T O F T H E B O D Y

The body has a smooth underpart and is therefore easy to clean. It is recommended that besides regularly washing all the dirt from the road, that all metal parts of the chassis are sprayed over with a rust preventative oil.

## C A R E O F T H E B O D Y



Efficient care of the body is made very easy through the smooth pontoon-shape of the body. In the normal way one should use running clear cold water and a clean sponge. To avoid getting scratches or marks on the lacquer, remove continually foreign bodies from the sponge. It is not advisable to direct the water spray on to the lacquering or the window or door corners.

After having washed over the car, rub over with a soft leather so that no water marks are left. Immediately afterwards polish over with a dry clean cloth, without using any polish.

As suggested in our customers service leaflets, please, in order to keep the shine and durability of the lacquering let a Borgward Service Station give your car a service treatment.

After normal intervals, which more or less depend on the use of the vehicle, a new treatment is necessary. For doing so, have as already mentioned, the body washed with clean clear water and dry. Immediately afterwards put on with cotton wool or polishing rag a wax polish on to the surface of the body in circular movements. Polish with a clean soft polishing rag until you get a high gloss.



Thus the lacquer surface is water proof — that is, water spilled over the lacquer is not kept or absorbed but curls into little circles, forming drops. This condition of the surface can be checked over from time to time by wetting with water.

All chrome parts of the body should only be washed with clear water without the use of any kind of metal polish.

After cleaning, clean off well with a soft rag. Bodies treated in that way will keep your coachwork as new.

Windows and door locks have to be greased from time to time. The door handles have to jump back by themselves into horizontal position.

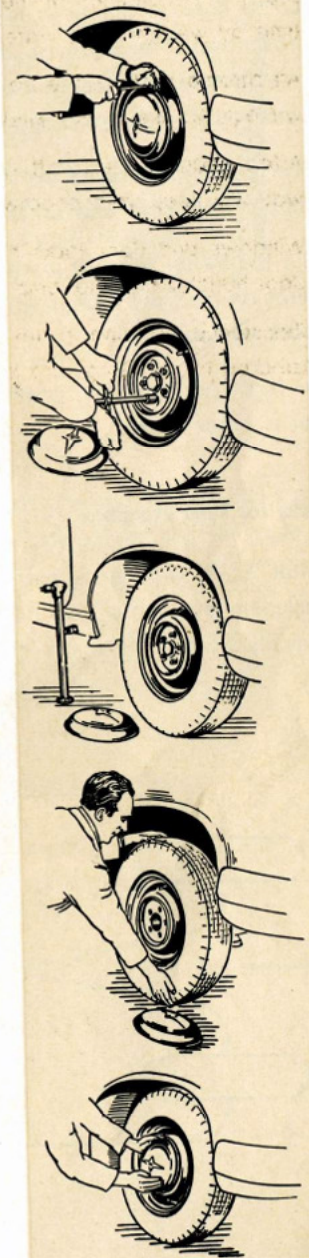
Resistance occurring in the window mechanism should be immediately checked by the Borgward Service Station.

## W H E E L C H A N G E

*B*efore changing wheel pull hand-brake to make certain that any kind of movement of the car is interrupted.

Remove first, by means of a screw driver, the hub cap, and then the wheel nuts. Only then wind the car high with a jack which we supply with our equipment. Fit the lifting part of the jack into the hole provided next to each wheel and then wind it so that it stands high. After the wheel has been changed, tighten the wheel nuts over the cross, release jack and tighten once more the wheel nuts.

The hub cap fastens by means of a spring lock which works by a light tap with your flat hand.





## T Y R E S

The care of the tyres is not only restricted to the keeping of the prescribed tyre pressure. It is very important that after a while the tyres should be checked against one-sided wear. A longer life can be achieved if tyres are changed over (look at our plan).

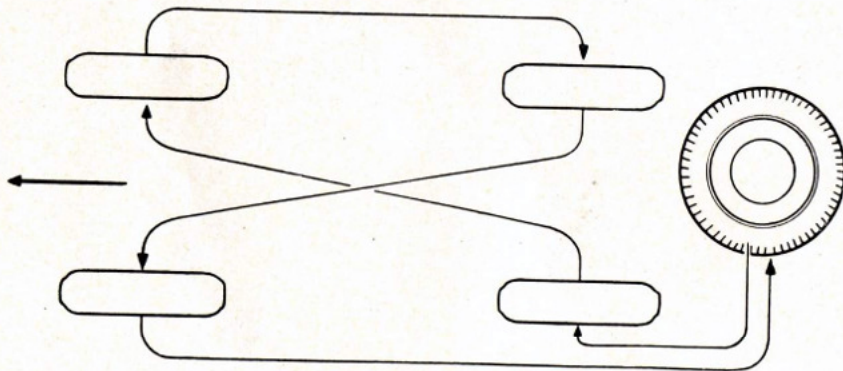
The tyres should never be left standing directly in the hot sun because rubber gets hard and brittle in the heat.

Put the better tyres, if possible, on to the front wheels because punctures on the front wheels whilst driving are more dangerous than on the back wheels.

At least once a year, possible when changing tyres, check over rims for damage or rust.

### Plan for Tyre Exchange

After 6,000 kilometres exchange tyres from one side to the other, including the spare tyre as below. Thus achieving that all tyres are equally worn.



## W I N D S C R E E N W I P E R

### Windscreen Wiper

Due to the curved windscreens the Hansa 2400 is equipped with special flexible wiper arms. The rubber part is more sensitive than those used on straight windscreens. If not treated properly the thin steel stiffeners on the wiping rubber bend or lock on the joints of the wiping rubber suspension. When washing the windscreen please do not bend back the wipers on the wiping rubber, only on the wiping arm.

Wiper-  
blade



Wiperarm

### Winter Journey

It is suggested that besides those tools which are part of the normal equipment of the car, the following extra equipment should be taken as well whilst driving in the winter

- (1) A spade in case the car has to be dug out.
- (2) A little sack of sand to enable starting on an icy road.
- (3) A piece of plank which may serve as a support for the jack.
- (4) Snow chains or tyres with special snow-gripping pattern.

On icy roads it is better to drive without snow chains. It is advisable to remove the chains immediately on reaching snow-free roads as otherwise the chains wear out very quickly.



## STORAGE OF YOUR HANSA 2400

In case of prolonged storage of your Hansa 2400 it is advisable to take the following precautions.

- (1) The car should be left in a dry and well ventilated garage.
- (2) Drain water from radiator and engine preferably when the engine is still warm.
- (3) Drain petrol tank, fuel pump and carburettor.
- (4) Clean disc oil filter.
- (5) Pour into the cylinder through the ignition plug holes a small quantity of anti-corrosion oil and turn engine with the starter so that the oil distributes evenly over the cylinder walls.
- (6) Take out and store in a frost proof room. Take care that the battery is regularly charged every four weeks.
- (7) Remove wheels. Tyres and tubes should be dusted over with talcum powder and kept in a dark room. If the tyres are not removed it is advisable to put the car on blocks to remove pressure on the tyres.
- (8) All greasing points should be greased.
- (9) Body and all mechanical parts should be cleaned.
- (10) All chromed parts should be covered with acid-free Vaseline.
- (11) If possible, cover the whole car with a dust sheet.

## T E C H N I C A L D A T A

Dimensions —	Hansa 2400	Hansa 2400 Pullmann
Overall length	approx. 4460 mm	4690 mm
Overall width	" 1780 mm	1775 mm
Height (unladen)	" 1490 mm	1545 mm
Wheelbase	2620 mm	2820 mm
Track front	1360 mm	1360 mm
Track rear	1420 mm	1420 mm
Ground clearance (laden)	" 180 mm	180 mm
Turning circle	" 11.5 m	12 m

### Filling Capacities —

Fuel tank	50 litres
Cooling system	9 "
Engine, oil-change	5.5 "
Gearbox, oil-change	0.7 "
Rear axle, oil-change	4.5 "

### Performances —

Engine continuous output	82 h. p.
Revs	4500 rev/min
Engine maximum torque	16 kgm
Normal fuel consumption	10.6 ltr/100 km
	<sup>2</sup> / <sub>3</sub> of max. speed
Maximum speeds of the gears	
	1st 33 km/h
	2nd 62 km/h
	3rd 94 km/h
	4th 150 km/h

### Engine layout

Suspension	In. line
manner of working	3 point (4 point)
no. of cylinders	4 stroke
stroke	6
bore	81.5 mm
engine capacity	78 mm
Compression ratio	2337 cm <sup>3</sup>
cooling system	6.9
valves	waterpump
point of ignition	overhead
	T. D. C.

**Timing** at 0.3 mm Tappet clearance, later adjust tappet clearing to 0.2 mm.

Intake opens	14° before U. D. C. = 33.7 mm
Intake closes	60° after L. D. C. = 144.6 mm
Exhaust opens	52° before L. D. C. = 125 mm
Exhaust closes	22° after U. D. C. = 53 mm
Flywheel diameter	276 $\phi$
1° measured on the flywheel =	2.41 mm



**Tappet clearance** (warm engine)

Intake 0.2 mm  
 Exhaust 0.2 mm

**Fuel Equipment** —

Carburettor Solex	30 PAAJ
Main jet	0107.5
pilot jet	g 50
pump nozzle	50
air-intake diameter	22
Fuel pump	PE 10209 a
Clutch	K 16 KZ single plate dry
Gearbox	Borgward fourspeed

**Transmission** —

1st gear	4.18
2nd gear	2.23
3rd gear	1.47
4th gear	1
Reverse gear	4.4

**Front axle** —

Cumber angle	2°
toe in	6 mm
castor action	3°
king pin inclination	5°

**Rear axle** —

Reduction	3.90
number of cogs on bevel-wheel	39
number of cogs on pinion	10

**Brakes** —

Type	Borgward-Teves, hydraulic
------	---------------------------

**Steering** —

Type	ZF Ross-steering
------	------------------

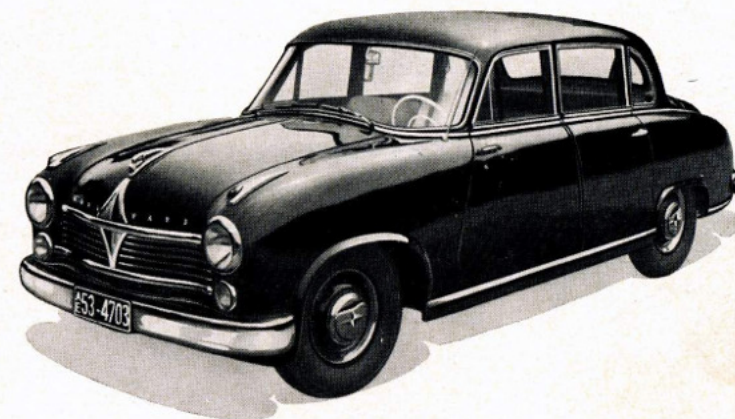
**Electrical Equipment** —

Battery	6 B 75 DIN 72 311
startermotor Bosch	EGD 0,6/6 AR 2
Dynamo Bosch	RJH 130/6 2200 R 2
Dynamo for radio installation	RJHK 130/6/2200 R 2
Distributor Bosch	VJU 6 AR 14
Ignition plugs	W 225 T 1

**Wheels and Tyres** —

	Hansa 2400	Hansa 2400-Pullmann
Tyres front	6.40 Special	6.70—15
Tyres rear	6.40 Special	6.70—15
Air pressure front	1.7 atmosphere	1.7 atmosphere
Air pressure rear	2 atmosphere	2 atmosphere

The difference of the air pressure between the 2 front tyres and between the 2 rear tyres should not be bigger than 0.1 atmosphere.



## HANSA 2400-*Pullmann*

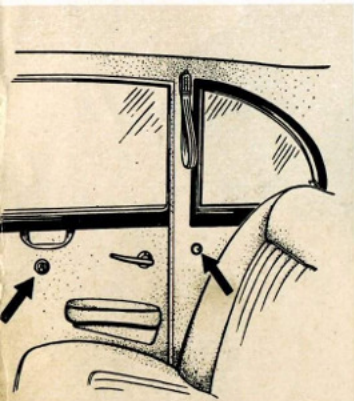
**Annex**

for

**Instruction Manuel "HANSA 2400"**



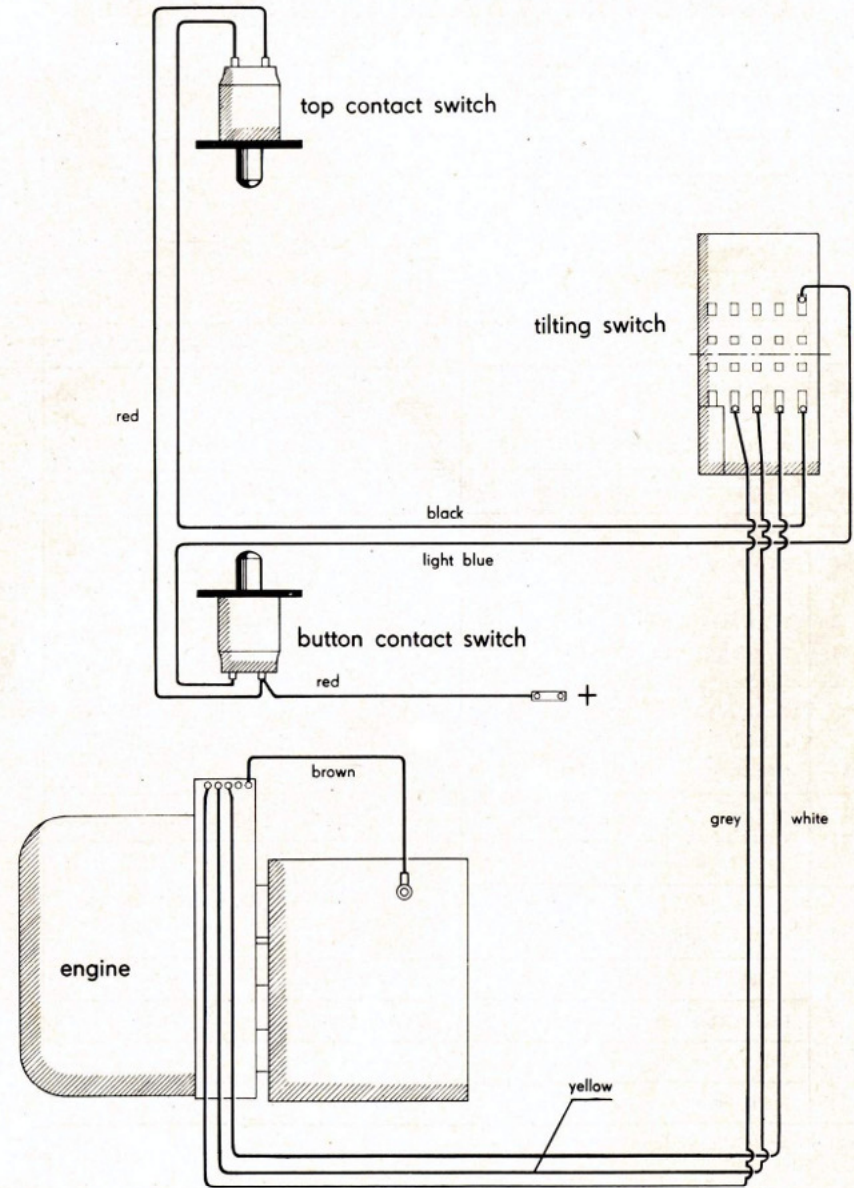
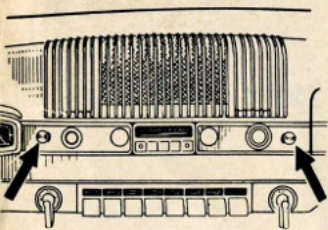
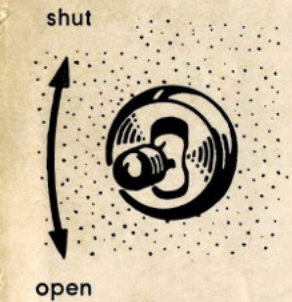
## OPERATION OF SIDE WINDOW GLASSES



All side windows of your H 2400-Pullmann can be automatically opened and shut. The door window glasses may be put into any desired position by switches on door panel.

In the extreme upper or lower position — fully opened or closed window — the motor is automatically switched off by contact switches located inside these doors.

The rear adjustable windows can be operated both from rear seats and driver's seat. For this purpose you will find pressure buttons below these windows and pull switches on the instrument panel.





## LUBRICANT TABLE HANSA 2400

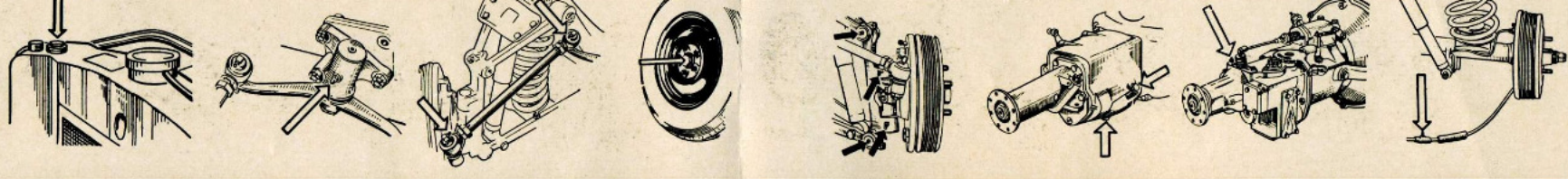
Any lubricants usual in trade may be applied for lubrication provided that they are up to the specifications as defined below.

lubrication points		lubricant and specification
1	1 Engine SAE 20 for summer and winter time SAE 10 in winter time below -8° C	Engine oil SAE 20
3	Rear Axle	High Pressure oil (Hypoid SAE 90)
2	Transmission Gear	Gear oil SAE 90
4	Steering	
5	Automatic Gear (mechanical part)	
6	Automatic Gear (hydraulic part)	see page 40
7	Power Transmission joints	Grease
8	Stub Axle Bolts	
9	Swing levers	
10	Track bars	
11	Steering tie rod	
12	Support for steering arm	
13	Cross shaft for clutch	
14	Hand brake cables	
15	Gearshift on Steering wheel	
16	Water pump <span style="margin-left: 20px;">drain bore</span>	Water pump grease
	<span style="margin-left: 20px;">grease cup</span>	Grease for racers
17	Distributor	
18	Front wheel bearings	
	Springs and Chassis	Sparkling Oil
	Engine cleaning	Scavenging Oil
	Battery	Pole grease
	Brake fluid	Blue genuine Ate Brake Fluid

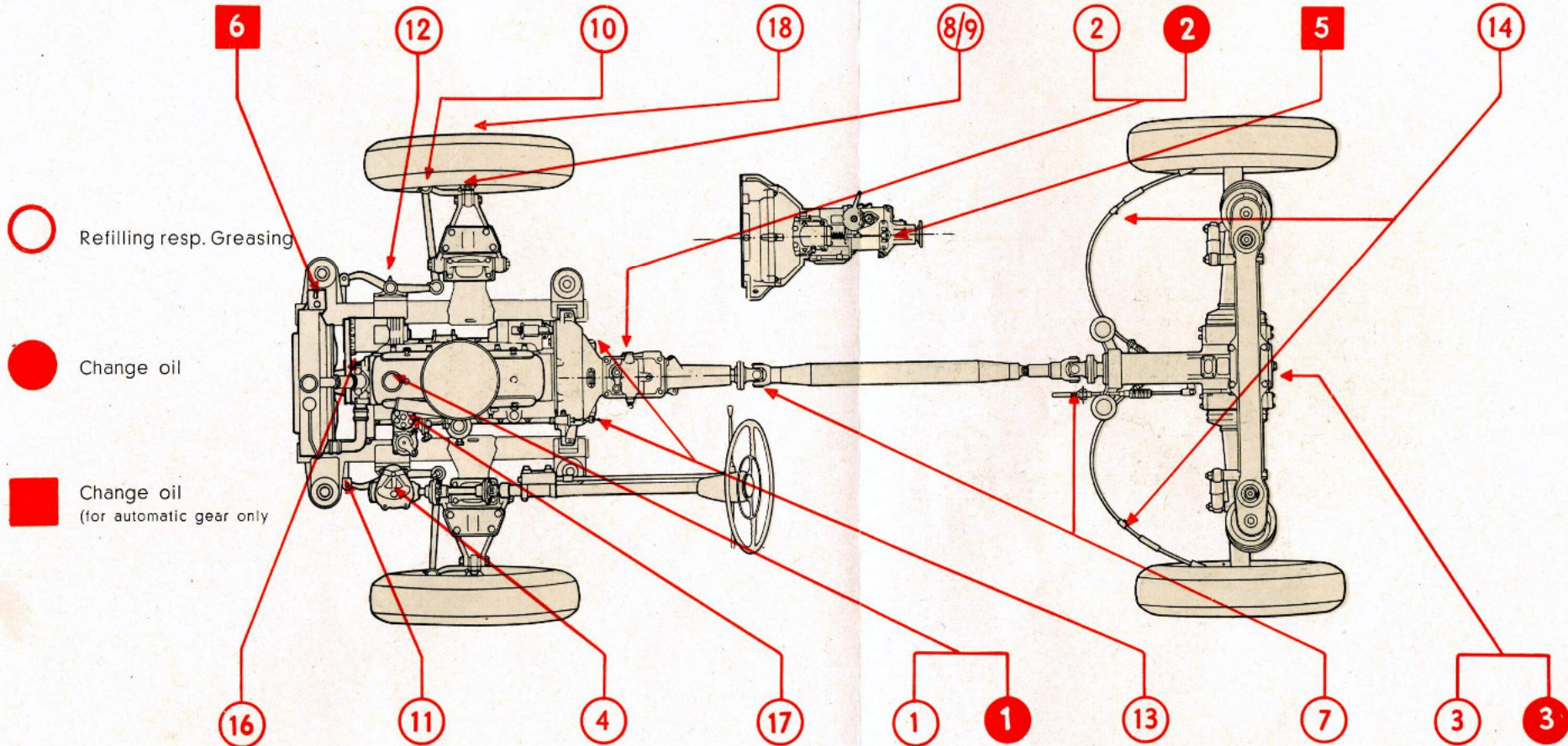
\* not shown in illustration

Be sure the oil nipples are free from dust and dirt when using lubrication press thus avoiding entrance to lubrication channels. When lubrication is completed the outer part of the oil nipples should be cleaned to avoid adherence of dust.





Lubrication point	Automatic Gear hydraulic part	Steering Arm Support	Track Bars	Front wheel Bearings	Stup Axle bolts Swing lever	Transmission Gear		Automatic Gear mech. part	Brake cable
Number of nipples	1	1	2 left, 2 right	1 left, 1 right	4 left, 4 right	1	8000	1	1 left, 1 right
Interval in kms	16000	2000	2000	3000	2000	2000	8000	8000	2000



Interval in kms	2000	2000	2000	8000	täglich	2000	2000	8000	2000	8000
Number of nipples	1	1 left, 1 right	1	1	1	1	1 left, 1 right	1 front, 1 rear	1	1
Lubrication point	Water Pump	Steering tie rod	Steering	Distributor	Engine	Engine	Clutch cross shaft	Power Transmission joints	Rear Axle	Rear Axle

