

OPEL ASTRA H



SERVICE MANUAL

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1 IDENTIFICATION DATA

1.1 Typical plate

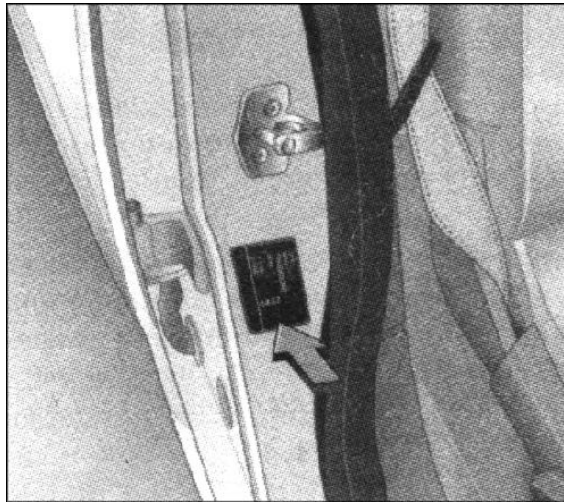
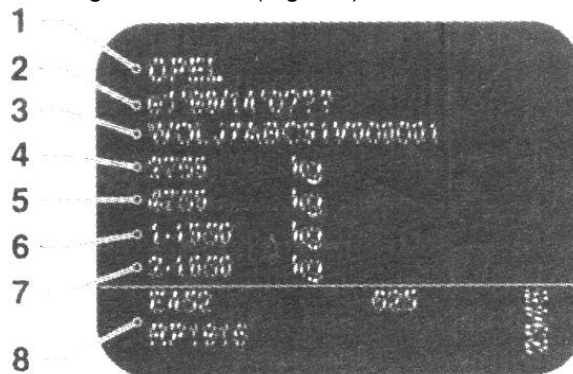


Fig. 1.1. Location Model tab-Licki

Typical plaque installed on the frame, right front door (Fig. 1.1).



Data on Model plate:

- 1 - country of manufacture; 2 - permit number;
- 3 - Vehicle Identification Number, 4 - permissible total weight;
- 5 - permissible total weight of the trailer;
- 6 - the maximum permissible load on the front axle;
- 7 - the maximum permissible load on the rear axle;
- 8 - Individual vehicle data or data specific to the country

Specifications Engine

Options engines Designation engine (Trade mark)	1.4Z14XEL	1.4 Z 14 XEP	1.6 Z 16 XEP	1.8Z18XE	2.0 Turbo Z20LEL	2.0 Turbo Z20 LER	OPCZ20LEH
Cylinders	4	4	4	4	4	4	4
Diameter, mm	73.4	73.4	79.0	80.5	86.0	86.0	86.0
Stroke, mm	80.6	80.6	81.5	88.2	86.0	86.0	86.0
Displacement, cm ³	1364	1364	1598	1796	1998	1998	1998
Net power, kW (in min ⁻¹) ₁₎	55 (5200)	66 (5600)	77 (6000)	92 (5600)	125 (5200)	147 (5400)	177 (5600)
Torque Nm (in min ⁻¹)	120 (3800)	125 (4000)	150 (3900)	170 (3800)	250 (1950)	262 (4200)	320 (2400- 5000)
Compression	10.5	10.5	10.5	10.5	8.8	8.8	8.8
The octane number (RON) ¹ unleaded or unleaded or unleaded	95 (S) ² 98 (SP) ² 91 (N) ₂₃	95 (S) ² 98 (SP) ² 91 (Nf) ³	95 (S) ² 98 (SP) ² 91 (N) ²³	95 (S) ² 98 (SP) ² 91 (N) ^{*3}	95 (S) ² 98 (SP) ² 91 (N) ^{2,4}	95 (S) ² 98 (SP) ² 91 (N) ^{2,4}	95 (S) ^{2,5} 98 (SP) ² 91 (N) [*] ₄
Allowable maximum speed, continuous operation, min ⁻¹ approx.	6200	6200	6400	6400	6400	6400	6400
Oil consumption, l/1000 km	0.6	0.6	0.6	0.6	0.6	0.6	0.6

¹ Standardized quality grade of fuel, such as unleaded fuel DIN EN 228; N - normal, S - Super, SP - super plus, in bold:

recommended grade of fuel.

² Regulator detonation, depending on the type of fuel filled (the octane number) automatically adjusts the ignition system.

³ When using fuel with 91 RON reduces power and torque.

⁴ In the absence of super unleaded fuel grades can use fuel with 91 RON, while avoiding the high engine load and full load car as well as driving in the mountains with a trailer or a high load.

⁵ If you use fuel with 95 RON reduces power and torque. Slightly increases fuel consumption.

1.2 Engine number

Designation and number of motor vehicle Opel Astra stamped on the left side of the engine, the crankcase (Fig. 1.5-1.8).

Gas tank components and systems. Recommended maintenance materials.

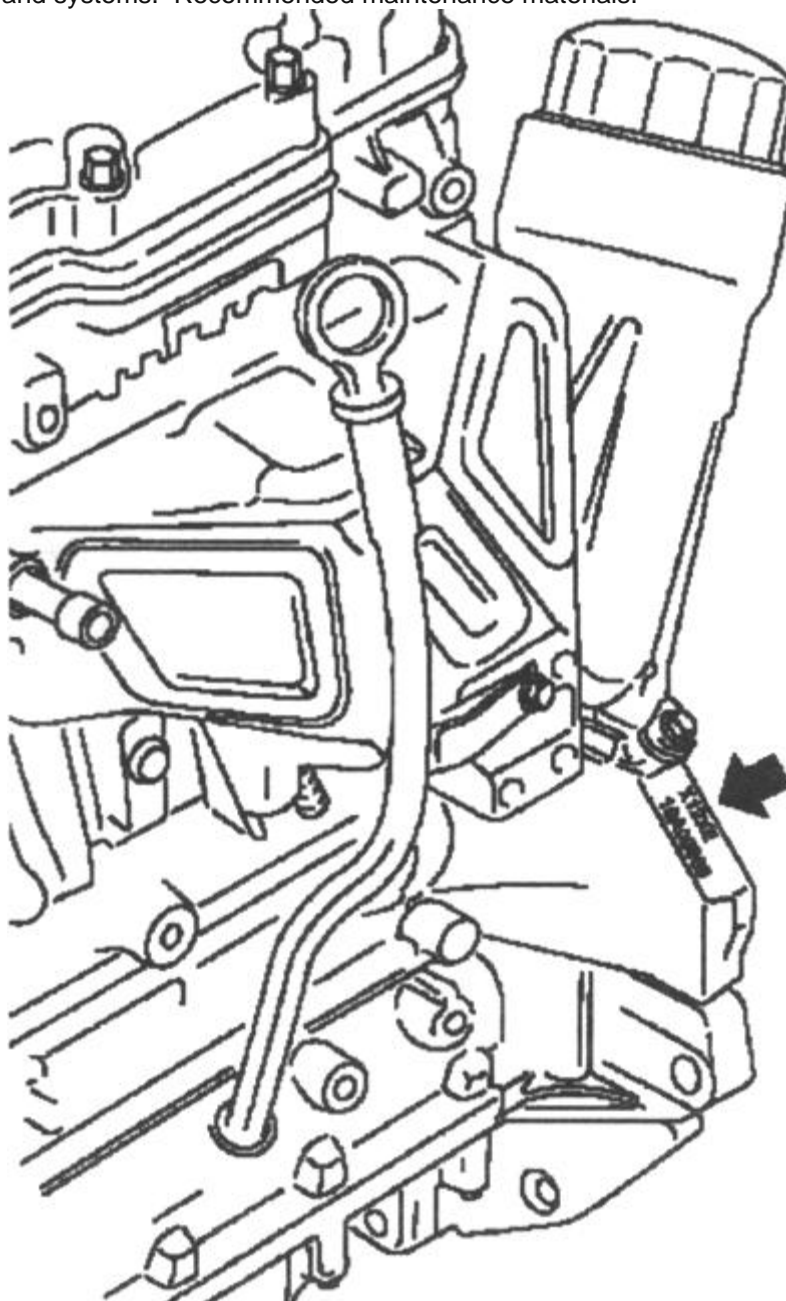


Fig. 1.5. Number engine (volume 1,4 I)

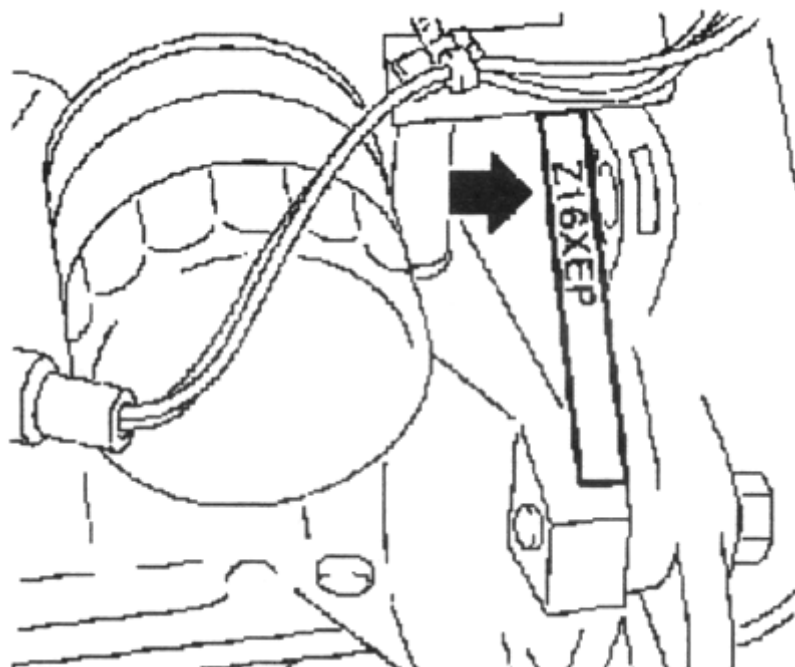


Fig. 1.6. Number engine (volume 1,6 l)

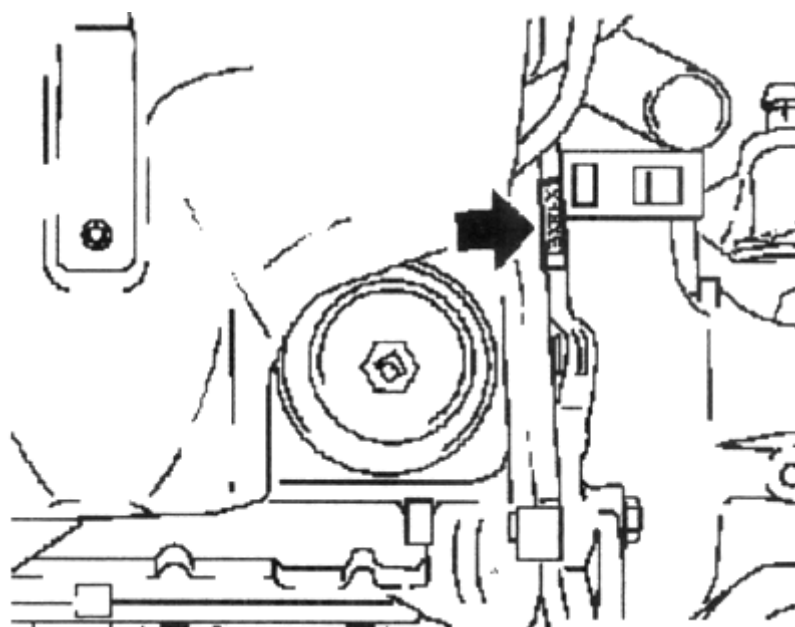


Fig. 1.7. Number engine (volume 1,8 l)

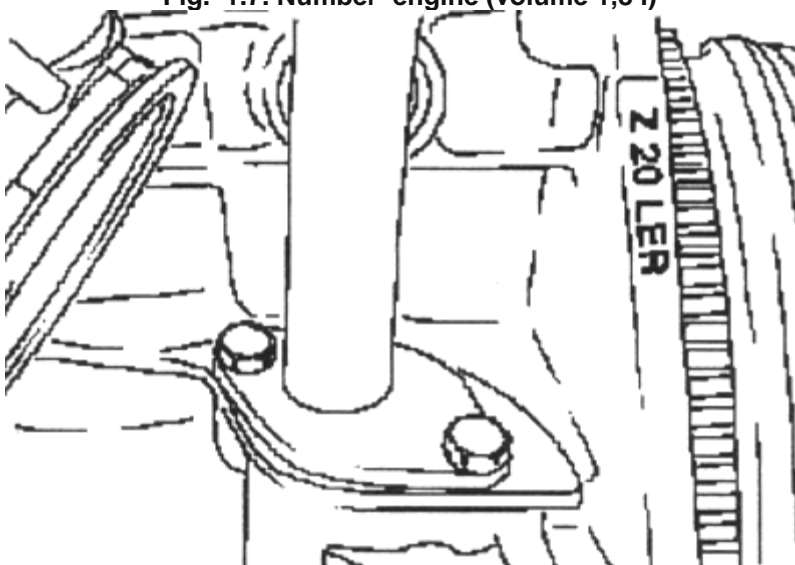


Fig. 1.8. Number engine (volume 2,0 l)

1.3 Type, properties and volumes of working fluids

The use of leaded gasoline and the abuse of additives to the fuel can lead to failure of the catalytic converter exhaust gases to meet the requirements exhaust emissions and engine failure. On diesel models in any case, do not use additives for winter operation, increase the fluidity of the fuel. When non-compliance with these requirements in the event of engine failure warranty of the manufacturer of this vehicle do not apply.

Filling volumes and used Maintenance Materials

Filling volume (approx. liters)							
Engine	Z14XEL	Z 14 XEP	Z 16 XEP	Z18XE	Z20LEL	Z20LER	Z20LEH
The cooling system on cars with manual transmission or Easytronic without air conditioning or climate control	5.6	5.6	5.9	5.9	--	--	--
with air conditioning or climate control	5.6	5.6	5.9	5.9	7.1	7.1	7.1
The cooling system on cars with automatic transmission without air conditioning or climate control	--	--	--	5.9	--	--	--
with air conditioning or climate control	--	--	--	5.9	--	--	--
Fuel tank (nominal capacity)	52	52	52	52	52	52	52
Replacing the engine oil filter	3.5	3.5	4.0	4.25	4.25	4.25	5.0
the gauge oil level gauge MIN and MAX	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pail device washing glasses	2.4	2.4	2.4	2.4	2.4	2.4	2.4
with the washing lights	4.0	4.0	4.0	4.0	4.0	4.0	4.0

1.4 Recommended fuel

Petrol Engines

Gas volumes and applied operational materials

Use unleaded gasoline with an octane number not less than 95 (on the research method).

Diesel engine

Use diesel fuel with a cetane number of not less than 50.

Depending on the ambient temperature operate the car on diesel fuel summer or winter varieties.

- At temperatures above -7 °C - summer grade fuel.

- At temperatures below -7 °C - winter grade of fuel

NOTICE

Prohibited fill automo-bil liquid fuel prednazna-inmates receive health care for home boilers heating-nance, gasoline and any Petrol, MI liquids, except diesel fuel. When use nepod-walking Fuel engine semi-cheat Serious damage. Not should fill car diesel Fuel summer sor-ta, if temperature ambient below -7 C. If cooling SRI in summer fuel intensity falls crystals paraffin, or if different assumptions clog fuel filter. When This engine may remainder curl or work with disruptions.

In the absence of unleaded fuel grade "super", you can use fuel with octane number 91, to avoid high loads on the engine and full vehicle load and driving in the mountains with a trailer or a high load - while decreasing power and torque of the engine. Regulator detonation, depending on the type of fuel filled (the octane number) automatically adjusts the ignition system.

NOTE

Engines adjusted on over-water - manufacturer for work gasoline with octane number AI -95 may without restrictions exploit-vatsya and on gasoline AI -98, but this not lead to increase eco-michnosti or Advancement exploitation-traditional properties car.

1.5 Recommendations for the choice of the viscosity of motor oil (petrol engines)

Recommended to use motor oil with a viscosity of 5W-30, in the absence of the oil run out the scheme with the prevailing environmental temperature.

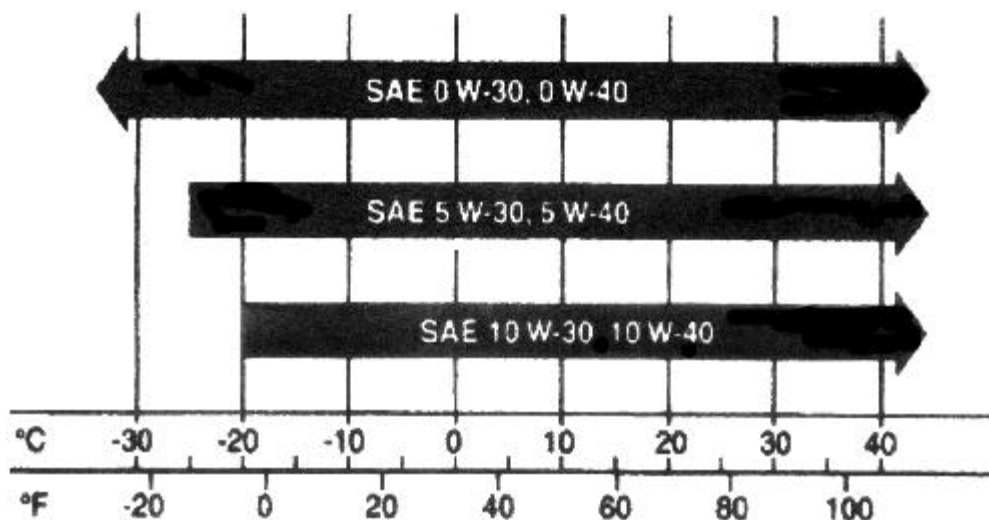


Table prevailing ambient
air until the next replacement of engine oil

1.6 The air conditioning system refrigerant

Air-conditioning system in a car Opel Astra directly charge the refrigerant HFC-134a (R-134a) or a similar material operational, fully equivalent to the specified properties. The use of another refrigerant will result in serious damage to the air conditioning system and the need for complete replacement of the system.

Is not recommended to release the refrigerant into the atmosphere. The refrigerant HFC-134a (R-134a), used in cars, no adverse effects on the ozone layer of the atmosphere. However, entering the atmosphere of the refrigerant can be a small contribution to global warming.

1.7 Type of coolant

Must use only the red (dark orange), not containing silicate antifreeze recommended for use by Opel, with the number 19 40 650 / 09 194 431 on the label. With prolonged use of anti-freeze can change the color to yellow. This does not affect the properties of the coolant, so it can be used until the next scheduled MOT.

NOTICE

Prohibited use in system-me Cooling antifreeze / antifreeze green - blue color, con-tion silicate. Not recommended addition What - or Additives to antifreeze (in Volume including for Leak-tion system and remove mel-cal leakage).

1.8 Keys, locks, sunroof, anti-theft system

Switches

Opel Astra car can be equipped with remote control door locks. In this case, the one key for all locks (Figure 1.10).

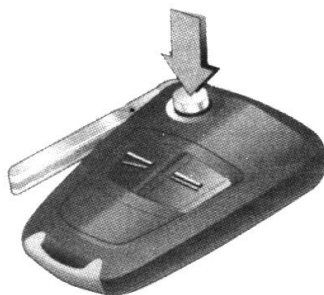


Fig. 1.10. Folding key with remote nym
management

The key is an integral part of the electronic locking system start-up of the engine. Included with the master key is supplied spare.

It is recommended to keep a spare key in a safe place, such as at home.

Key with folding beard

To expand the key, press the button. In order to lay down a key, press the same button and fix his beard till a key clicks (see Fig. 1.10).

Lock the doors from opening children

Use of blocking children from opening in all cases when they are in the car. Failure to do so can lead to injuries or accidents. Adequately inform their passengers.

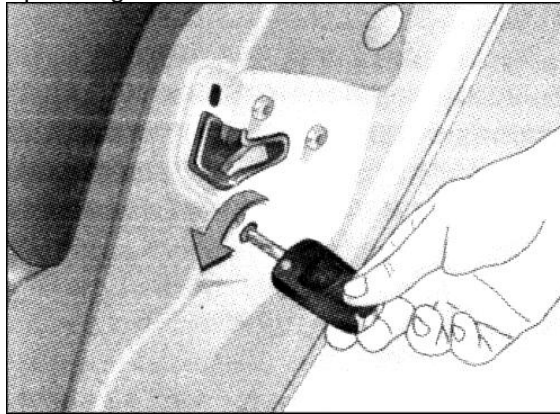


Fig. 1.11. Locking castle back Doors

In order to lock the door, turn the lever to lock the back door key or a screwdriver from a vertical position to horizontal position (Figure 1.11).

Device Remote

Remote control device built into the key (Figure 1.12).

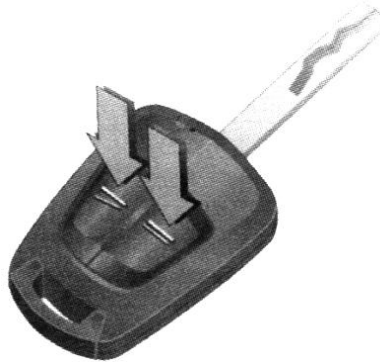


Fig. 1.12. Buttons Distance governance locks Doors

Remote system car Opel Astra manages central locking device, mechanical anti-theft devices and anti-theft alarm. In addition, in vehicles with electronic control system controls the windows on all doors.

Device remote control has a range of about 3 m. In order to use them, send a remote control device on the car.

NOTE

On range action remote-term system may influence environ-ing terms.

Contact with device of distance Management carefully. Do not expose his Effects moisture and high temperature, avoid using without necessary.

Indication of operation of the device running power for emergency light signal.

Record and challenge individual Vehicle installations with help remote device Management

When locking the car through the remote control device remembers the current settings climate control and lighting dashboard. The settings are stored by different remote control devices, are restored by using the appropriate remote control device.

Faulty remote device

If the control of central locking device using remote control devices is not possible, the cause of failure may be as follows:

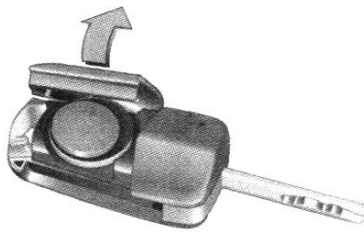
- Exceeded the operating range of the remote control device;
- Battery voltage of the remote control is too low;
- Multiple, following one after another attempt to use the remote control device outside the range of a vehicle (eg, distance to the vehicle is too high, in consequence of that remote control device ceases to be recognized);
- An overload of the central locking device as a result of frequent, repeated exposure (power supply device, briefly suspended);
- Imposition of radio waves due to the presence of external high-power radio.

Replacement element power devices Remote

If the operating range of the remote control decreases, replace the battery.

Open the remote control device (Figure 1.13).

Replace the battery, while adhering to the sequence of assembling parts.



**Fig. 1.13. Replacement element Food mouth-total employment
Distance Management**

Synchronization remote device Management

After replacing the battery door to unlock the car the usual way. Insert the key in the ignition, with automatic synchronization occurs remote control device.

Locking Door Remote device

Click on the button of the remote control, as shown in Figure 1.14, with the door locks automatically closed.

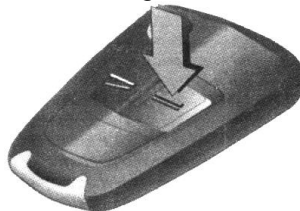


Fig. 1.14. Key lock Doors AB-tomobilya

Blocking with a mechanical protective device

All doors must be closed. Not later than 15 seconds after the re-lock, press the remote control device, as shown in Figure 1.15.

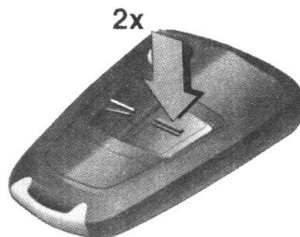


Fig. 1.15. Locking Locks Doors

Locks all doors locked from the opening.

If the ignition is switched on, you must open and close the driver's door, so the car could again block.

NOTICE

Not block locks if in auto-mobile are people. Debloki-ning inside impossible.

Unlock Door Remote device

Press the remote control device, as shown in Figure 1.16.

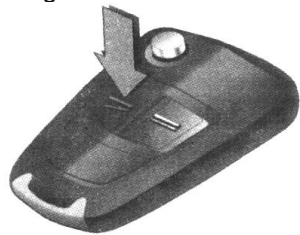
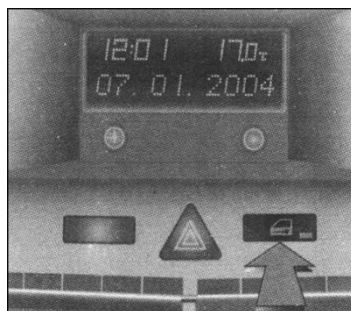


Fig. 1.16. Key to unlock car doors

Unlock and locking doors inside

In order to lock or unlock the doors from the inside, press the central locking device. located on the middle console of the dashboard (Figure 1.17).



**Fig. 1.17. Key unlocking and locking
Inside Vehicle**

When the key is inserted in the ignition, lock the car can be used only if all doors are closed.

NOTICE

When enabled Mechanical anti - device otre-ret Doors This key not possible.

NOTE

When Closure Doors Driver Central closing device is work.

For locking the door from the inside (for example, to prevent undesirable penetration of the self vulvas strangers), press the central locking device on the middle console. After unlocking the driver's door in the usual way (using the key) unlocked all the doors.

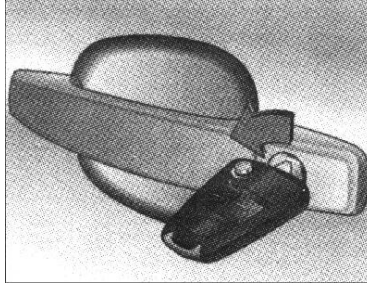
Locked central door locking device can be opened from the inside by pulling the handle on the inside of the door. Simultaneously unlocked and the central locking device.

Locked doors are automatically unlocked when the accident (in cases of damage to the car, to assist the outside), in addition, the hazard lights. The key in this should be in the ignition.

LED in the key central locking device burns approximately 2 minutes after locking.

Faulty devices or unlock the door lock

To resolve this issue devices to unlock doors, turn the key in the lock driver's door all the way forward. Then turn it back into the upright position and remove (Figure 1.18).



**Fig. 1.18. Actions in malfunction
unlock doors**

When you open the driver's door unlocked all the doors. To deactivate the device anti-theft alarm turn on the ignition.

To resolve this issue device locking, front passenger door open, then close the driver's door and press the central locking device on the middle console. Central locking device will be locked all the doors. Close the door front passenger.

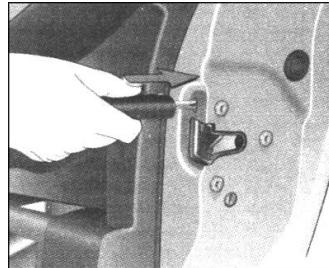
Malfunction central locking device

Unlock.

Turn the key in the lock driver's door forward until it stops. Turn the key back and remove it. Other doors can be unlocked from the inside by pulling the handles on the inside of the door (it is not possible with earlier engagement of the device). Luggage rack and cover the fuel tank thus remain locked to turn off the device anti-theft alarm, turn on the ignition.

Locking.

Insert the key into the hole on the inside of the door, above the lock, and cock the lock push up tangible click, then close the door (Fig. 1.19).



**Fig. 1.19. Removal of the central fault
closure**

Repeat for all other doors. Driver's door can be locked also on the outside with a key. Unlocked the lid of the fuel tank lock is impossible.

Closing and opening windows help remote Management

In cars with electronically controlled window box, you can open or close all the doors from the outside.

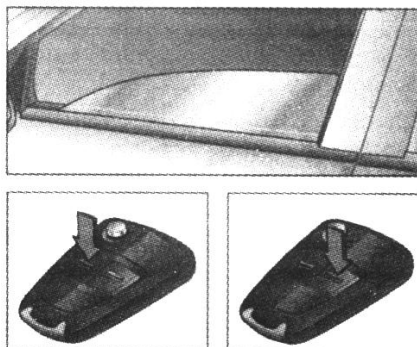


Fig. 1.20. Opening and closing windows outside

To do this, press the corresponding button on the remote control, until all the windows would not open or be closed completely (Figure 1.20).

Overloading power

For too often, repeatedly turned on and off the remote control system power windows central locking device can be briefly interrupted. However, after a while its functions are restored.

Unlock and lock luggage

In order to unlock the trunk lock, press the appropriate button on the remote control device (Figure 1.21).

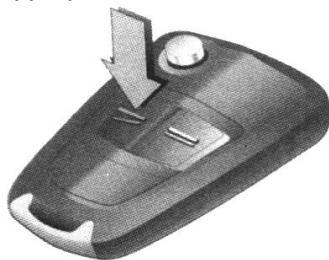


Fig. 1.21. Unlock castle luggage

Trunk unlocked with the central lock and can be opened by pressing a button under the bar for the capture (Figure 1.22).



Fig. 1.22. Opening luggage

In order to secure the lock luggage, press the appropriate button on the remote control device (Figure 1.23). To close the trunk, use the handle on the inside of the back of the door (Fig. 1.24).

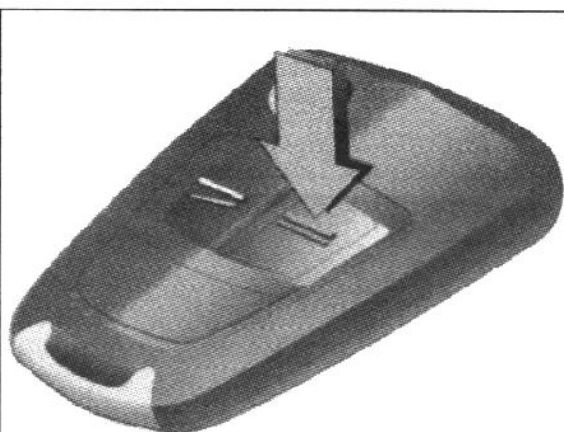


Рис. 1.23. Запирание замка багажника



Рис. 1.24. Закрывание багажника

NOTICE

Not should go with completely or partially open back door, for example, Transport krupnoga-barite goods, so as in Salon can fall toxic exhaust-WIDE gases.

Installation more paraphernalia on back Doors increases its mass. In result at over-Noy mass back door not the retention-etsya in open position.

Anti alarm

The unit antitheft alarm controls:

- Doors, trunk, hood;
- Lounge car;
- The slope of the vehicle, such as when lifting;
- The ignition.

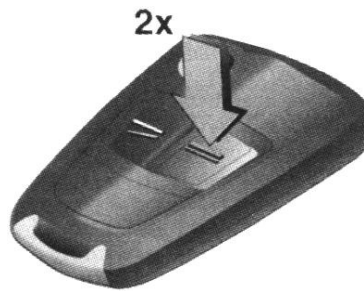


Fig. 1.25. The inclusion of anti-theft alarm

In order for anti-theft system has joined, should be closed all doors, windows, sunroof and hood. Not later than 15 seconds after locking the re-press the corresponding key remote control device (Figure 1.25).

If the ignition is switched on, you must open and close the driver's door to be able to activate the device anti-theft alarm.

Inclusion without function control cabin and tilt Vehicle

Close the trunk and hood. Click on the button in the console on the roof (Figure 1.26).

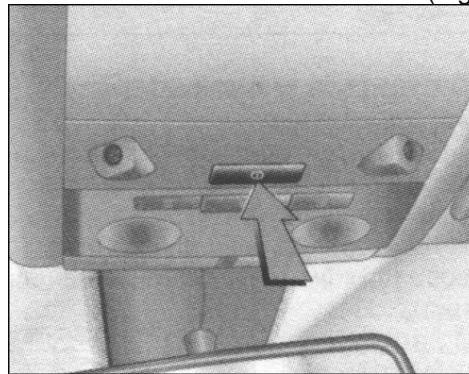


Fig. 1.26. Key partial off-tion functions antitheft system

Close the door.

The device anti-theft alarm. After about 10 with the device (without the control cabin and the inclination of the car) is activated. LED on the center console will flash to turn off the device.

To disable the partial deactivation of anti-theft system, click the corresponding button on the remote control or turn on the ignition (Figure 1.27).

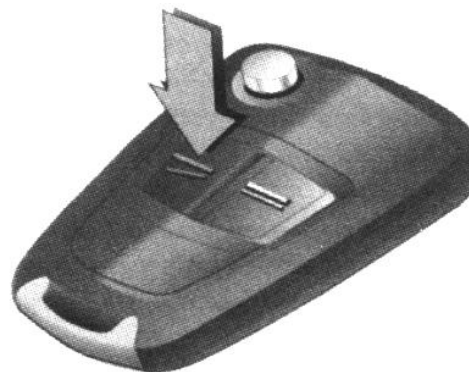


Fig. 1.27. Disable function partially th off antitheft system

When a failure of the remote control, open the car key. Turn the key in the lock all the way forward, return it to vertical position and remove.

If you open the driver's door of alarm, disable the device anti-theft alarm, switched on the ignition.

NOTE

When enabled device Seafight Jackpot-vougonnoy Signaling may work sound (beep) signals ation or light (emergency light alarm).

Opening and closing the hood

To open the hood, pull the handle to unlock the hood from the driver's side under the dashboard (Figure 1.28).

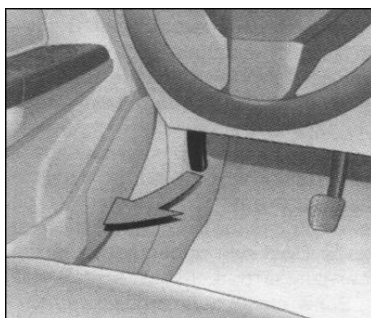


Fig. 1.28. Handle opening bonnet

Castle is unlocked, and the hood will open slightly. Return the handle to its original position. At the bottom of the hood latch handle is - then it up and open the hood (Figure 1.29).

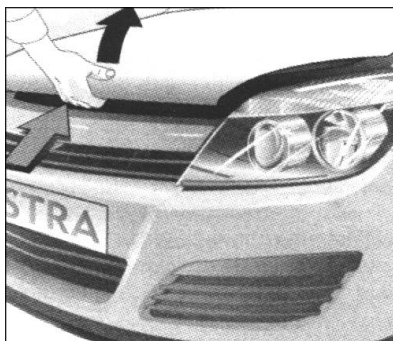


Fig. 1.29. Opening bonnet

NOTE

Be careful: dirt or snow are on hood when open-vanii may fall on Frontal stack lo and clog intake. Hood is automatically kept in the open position. To close the hood, pull it down and give it slammed shut. Check the fixation of the hood, pulling it over the front edge. If the hood is not, repeat the previous operation.

1.9 Power Windows - Windowlifter

Electronic control window

Electronic control window work when the ignition key.

In addition, the functions of windows continue to work within 5 minutes after the ignition is turned off and within 5 minutes when you turn the ignition key to position 1.

When you open the driver's door using the function becomes impossible.

Central Control Panel window

Central Control Panel window is located on the driver's door (Fig. 1.30).

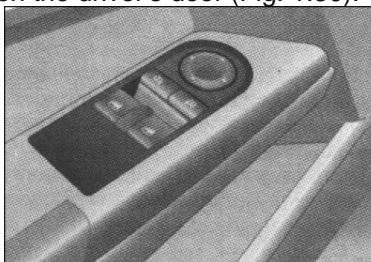


Fig. 1.30. Opening bonnet

The front keys are designed to control the glass on the doors of the driver and front passenger. Rear keys open and close the glass rear door. Additional control buttons are located on the front passenger door and rear door panels.

For the gradual movement of the glass, briefly press the forward or backward. To automatically open or close hold the keys pressed so far as is necessary.

Safety function

In the case of resistance during the automatic closing of glass above the middle of the window movement immediately stopped and the window re-opens.

If tugogo progress, for example due to the presence of frost, repeatedly press the key corresponding to the window until it closes.

Lock opening rear windows.

To lock, press the switch between the two rear buttons on the handle of the driver's door (Fig. 1.31).

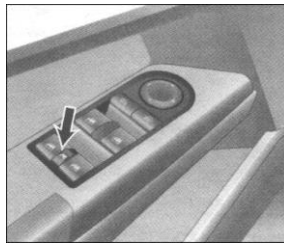


Fig. 1.31. Key lock rear windows

If you press the switch forward (see red box) - glass rear doors are blocked.

If you press the switch back (see green box) - glass rear door unlocked.

Faulty windows

If the automatic opening and closing windows is not possible, an electronic management system windows must be activated. To do this, close the doors, turn on the ignition and open the windows. Then close the window and hold not less than 5 seconds.

NOTE

Procedure must repeat for each windows in separately.

Panoramic glass

To open the panoramic windows, turn the knob to the right and slide back into the right position lining the ceiling (Figure 1.32).

To open the panoramic glass roof sheeting move forward from any position behind. In its most forward position lining locks (Figure 1.33).



Рис. 1.32. Открывание панорамного стекла



Рис. 1.33. Закрывание панорамного стекла

NOTE

When move plating ceiling fold sun ace-ki up.

Sunroof

Luc control keys on the console on the roof (Figure 1.34).

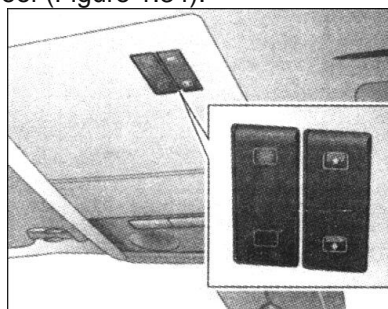


Fig. 1.34. Keys Management hatch roof

For the gradual movement of the hatch, press the button briefly. To automatically open or close hold them pressed.

Lifting the hatch.

When closed, press the hatch, hatch rear its rear.

Opening the hatch.

In the raised position to re-press, the hatch is fully open.

Closing hatch.

Press. Because of the open hatch closed, for security reasons do not reach 20 cm to the end, to completely close it, hold down pressed.

Sun blinds

Sun blinds designed to ensure that the sun's rays do not penetrate into the salon with a closed sliding hatch.

When you open the hatch opens and sun blinds.

Opening curtains.

Press, shutter fully opens.

Closing the curtain.

Press, shutter is fully closed.

From the open position shutter is closed for security reasons, do not reach 20 cm to the end. For a complete closing of the shutter, press and hold.

NOTE

When use luggage on the roof, in avoid damaged,-tion, make sure in presence tion sufficient Space for Moved-tion sliding hatch.

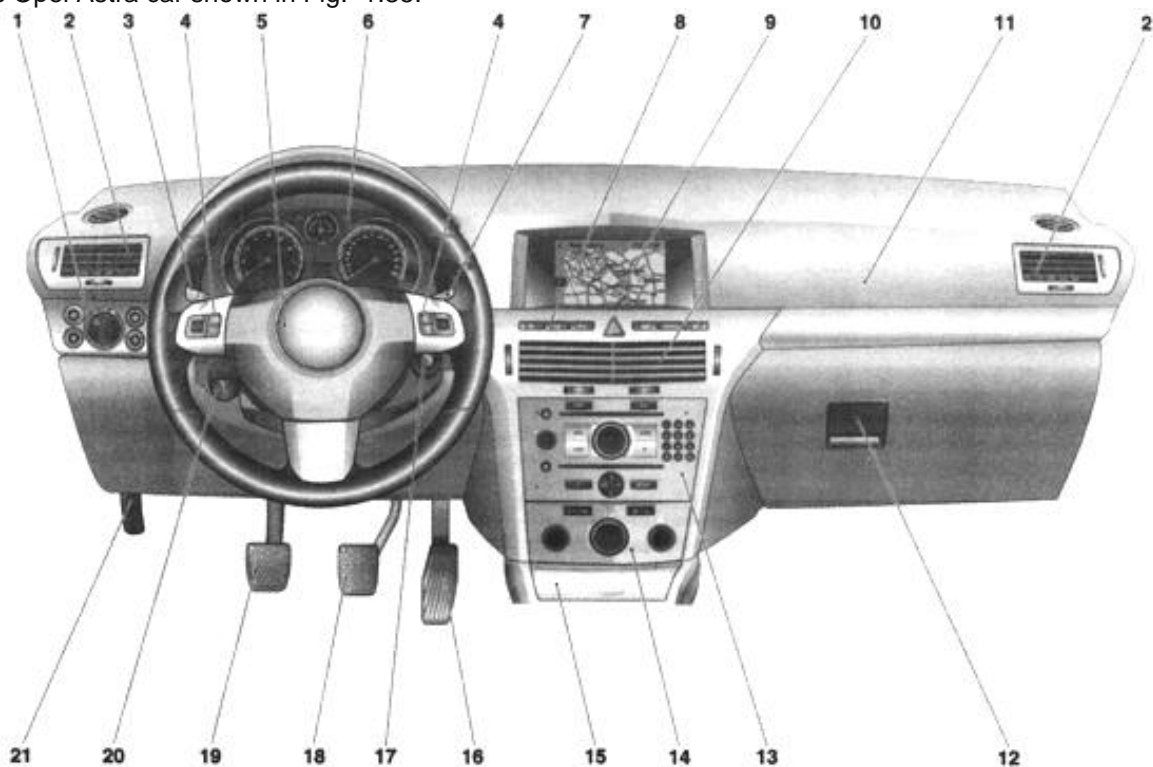
If a sliding sunroof and sun blinds do not work, you must activate the electronic system.

To do this, turn on the ignition, close the sliding hatch and hold not less than 10 seconds.

Close the sun blinds and hold not less than 10 seconds.

1.10 The combination of instruments and controls a car Opel Astra

Controls Opel Astra car shown in Fig. 1.35.



Organs Management Vehicle Opel Astra:

- 1 - control panel exterior lighting, 2 - side nozzle blowing;
- 3 - shift paddles, 4 - remote control device;
- 5 - beep, 6 - a combination of instruments; 7 - gearshift paddles;
- 8 - control keys heated seats, control system fall tire pressure;
- 9 - central information display, 10 - the average nozzle blowing;
- 11 - Air bag front passenger;
- 12 - front compartment;
- 13 - Control Panel infotainment system;
- 14 - panel microclimate; 15 - ashtray and cigarette lighter;
- 16 - throttle; 17 - ignition lock the steering wheel;
- 18 - brake pedal; 19 - clutch pedal;
- 20 - adjustment lever of the steering wheel;
- 21 - handle unlock the hood

Combination devices and light detectors

The structure of the instrument cluster includes: speedometer, tachometer, odometer, push button switches, light detectors and indicators (see Figure 1. 36).

Failure tell-tale oil level

Failure tell-tale oil pressure in the engine. This alarm warns the driver of low pressure in the lubricating system of engine.

Indicator lights up when you turn the ignition switch in position «ON» («Ignition included») and goes out after starting the engine.

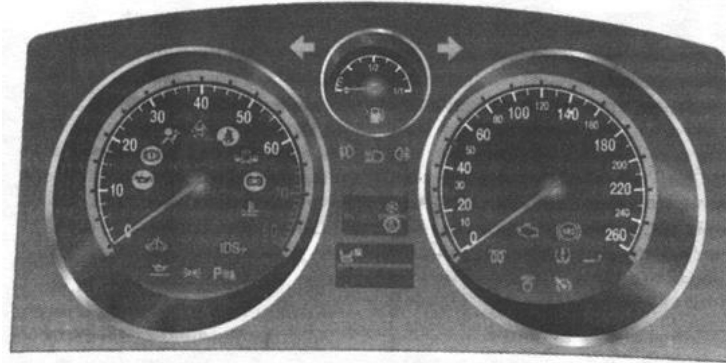


Fig. 1.36. Combination devices Vehicle Opel Astra

NOTICE

Prohibited work Engine when the detectors pressure drop oil. This may gain-ti to exit Engine of system.

Need to check serviceability of sensors, pressure drop of oil in the engine every time you turn the ignition. In case of sensors fail, you will not receive a timely message about the fall of oil pressure and engine may be damaged. If the indicator does not light up when you turn the ignition, do not run the engine. Refer to the service station official Opel dealer for inspection and repair signaling.

If the indicator light up on the run the car, follow these steps.

1. Observing precautions immediately turn over to the side or to the edge of the roadway and stop on a horizontal platform.
2. Stop the engine and wait 5 minutes, to glass in motor oil sump.
3. Check the oil level in the engine. If the oil level is below normal, top up the oil and bring its level back to normal.

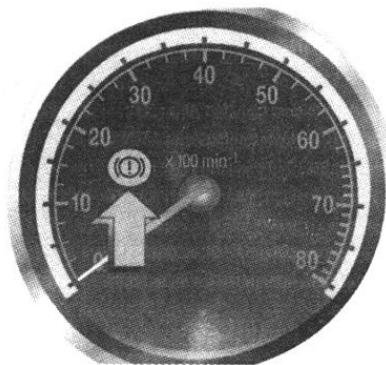


Fig. 1.37. Verification lamp signaliza-General
failure Brake system-we / indicator
inclusion handbrake

Control lamp sensors malfunction of the braking system / indicator applying the parking brake

Indicator lights up when the parking brake, if the ignition switch is in position «START» («starter) or« ON »(« Ignition inclusive). Indicator goes out with complete exclusion of the parking brake.

Failure tell-tale levels of brake fluid

If the alarm continues to burn after a full off the parking brake, a possible cause of a malfunction of the braking system.

Observing precautions immediately turn over to the side or to the edge of the roadway and stop.

You may notice that the brake pedal or turn increased (pedal dropped to the floor). In both cases, the vehicle braking distance increases.

Check the brake fluid. If necessary, top up the brake fluid and bringing its level to normal. After topping up the brake fluid, check whether the burn continues to alarm.

If the alarm continues to burn or there are signs of malfunction of the braking system, further movement of the car is prohibited.

NOTE

The need for topping up the brake fluid can sometimes be a consequence of its leakage. Therefore, immediately refer to the service station official Opel dealer to check the functioning of the braking system, even if the indicator is not lit.

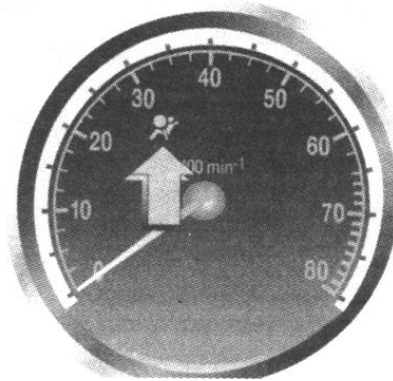
NOTICE

It is dangerous to operate the vehicle, if the fire alarm malfunction of the braking system. This indicates that the braking system of your car can not work or refuse at any time. If the alarm continues to burn, then after checking off the parking brake should immediately check the status of the braking system.

NOTE

At Opel Astra cars with Easytronic transmission in nezatyanutom parking brake indicator light flashes for a few seconds after the ignition is turned off.

Alarm stoppers locks belts / alarm system, airbags



**Fig. 1.38. Alarm stoppers locks belts / alarm
airbag systems**

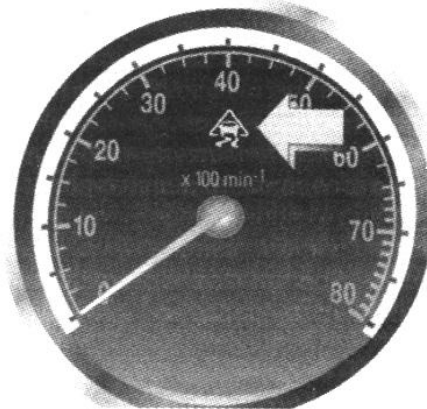
Stoppers locks of safety belts, along with systems airbags are controlled by electronic system, and indication of their operation is carried out by an indicator on the dashboard. When you turn the ignition indicator lights up for about 4 seconds. If it does not burn, does not go out at 4 with lights or in traffic, so there was fault in the system of locks stoppers belts or airbags systems. Stoppers locks belts or air-bags may fail during an accident.

Airbag systems, together with a system of identification of employment and lockable seat belt locks are controlled by electronic system, which is an indicator of the alarm on the dashboard. When you turn the ignition indicator light is about 4 seconds. If he does not light up or do not go out after 4 s, or burns on the road, so there was fault in the systems of airbags, seat recognition system of employment or pinning system locks of safety belts. The systems can fail in a traffic accident.

NOTICE

Categorically prohibited the autonomy interfere in const-ruktsiyu system pillows safety or retractors seat belts. All work on TE hobsluzhivaniyu and Repair set-tion systems must hold on service Station officially th Dealer Opel. Self-Repair and Maintenance maintenance or intervention in design system represent danger. Pillow Security or Predn - tyazhitel belt Security mo-gut accidentally trigger or exit system. This may lead to cha-zhelym Injuries people.

Detector e system dynamic stabilization



**Fig. 1.39. Indication e si-tem
dynamic stabilization**

ESP system when necessary improves stability of the vehicle and prevents stalling of the driving wheels regardless of the condition of pavement and tire in any road conditions. If you notice the danger of skidding vehicle (insufficient or too dramatic impact on the government) engine power is reduced (changing the engine noise) and individual wheels purposefully disinhibited. Thus significantly improving the stability of the car, especially in the snow and ice, as well as on wet or slippery road.

Indicator is lit after ignition for a few seconds. After that the system is ready to work. Blinking during movement indicates actuation system. Engine power is somewhat reduced (changing the engine noise), and the car automatically slows down.

If the indicator is lit during motion - means the system is off or malfunctioning. You can continue to travel, but the sustainability of progress may deteriorate depending on the condition of the road. Turn the ESP system or fix the problem.

Interactive dynamic system Driving (IDS + - Interactive Driving System)

IDS + system combines sensors and control devices of electronic stabilization program (ESP), Antilock braking system (ABS) and electronic dynamic control shock absorbers (CDC). This achieves a pronounced dynamics of the movement while improving safety.

E Dynamic Control shock absorbers (CDC - Continuous Damping Control)

CDC coordinates the system stiffness of the suspension of the car with traffic conditions and characteristics of road surface.

The system continuously monitors the movement of the wheels and the car and immediately change the rigidity of each shock absorber. This ensures optimum alignment of the chassis with traffic conditions and the properties of road surface.

When the sport mode suspension control system adjusts for a more sporty driving style (more "stiff" suspension).

Light and sound detectors-belt safety

Safety belt reminder alarm fire if ignition switch is turned to position «ON» («Ignition inclusive») and the driver's belt is not fastened.

Alarm car door closure

Indicator lights up when one of the doors (including rear luggage compartment door) is open or not closed tightly.

Battery discharge indicator

Indicator lights up when you turn the ignition switch in position «ON» («Ignition included») and goes out after starting the engine.

If the indicator light up on the run the car - this is a malfunction of the electric generator or the power system. Observing precautions immediately turn over to the side or to the edge of the roadway and stop.

NOTICE

If burns detector battery discharge battery, then fur-there movement on vehicle is prohibited, because in This case, engine may suddenly conk out.

Failure tell-tale levels of coolant

If the indicator light up when the engine is running, stop and turn off the engine. Too high temperature of the coolant is hazardous and can cause damage to the powertrain. Check the coolant and top up if necessary.

Detector electronics of the vehicle (engine and gearbox)

Indicator lights for a few seconds after ignition.

Illuminated sensors with the engine running indicates a malfunction in the electronic system of the engine or gearbox. Electronic switches to emergency mode. This can increase fuel consumption and can deteriorate driving characteristics. In some cases the problem can be eliminated by turning off and restart the engine.



Fig. 1.40. Indication e of equipment car (engine and box-ka transmission)

If the indicator lights when the engine is running, you should seek help at the service station.

Short-term single lamp ignition signaling does not matter.

Illuminated sensors can also indicate the presence of water in diesel fuel filter, while at the service of information indicating the display the corresponding text message. In this case, check the fuel filter on the presence of residual water.

Flashing signaling device when the ignition is a malfunction in the system start the engine block. In this case, start the engine is impossible.

Under these conditions, the system checks whether you can crank the engine used by the key. Start the engine is possible, if the key is recognized by the system as "permitted". Verification is carried out using the built-in key transponder.

Electronic lock engine start automatically after extracting the key from the ignition.

Try again to turn off and turn on the ignition.

If the indicator continues to flash, try to start the engine, spare keys, or ask for help at service stations.

NOTE

Detector can also be illuminated in case of failure of transmission Easytronic. For serious faults on the transmission indicator extra icon appears. Continue the movement is possible, if only the indicator lights. This is not to switch to manual mode.

If the indicator gear icon appears in addition, continue driving impossible.

Eliminate the problem or ask for help at service stations.

Interruption of power

Alarm will also burn if there are problems with power supply.

NOTICE

When a discharged battery and included the transfer clutch is not dropped. Driving a car is impossible. In the case of discharge of the battery, follow the procedure support the launch.

If the cause of eating disorders is not in a discharged battery, you should ask for help at service stations. In case if you want to move the car from the flow of a moving vehicle, the clutch can be turned off in the manner described below.

1. Tighten the parking brake and turn off the ignition.
2. Open the hood.
3. Clear Easytronic transmission in the cover (see Figure 1.41) that after removing the cover in the hole did not hit the dirt.
4. To release the lid, turning it, and pull up (Figure 1.41).

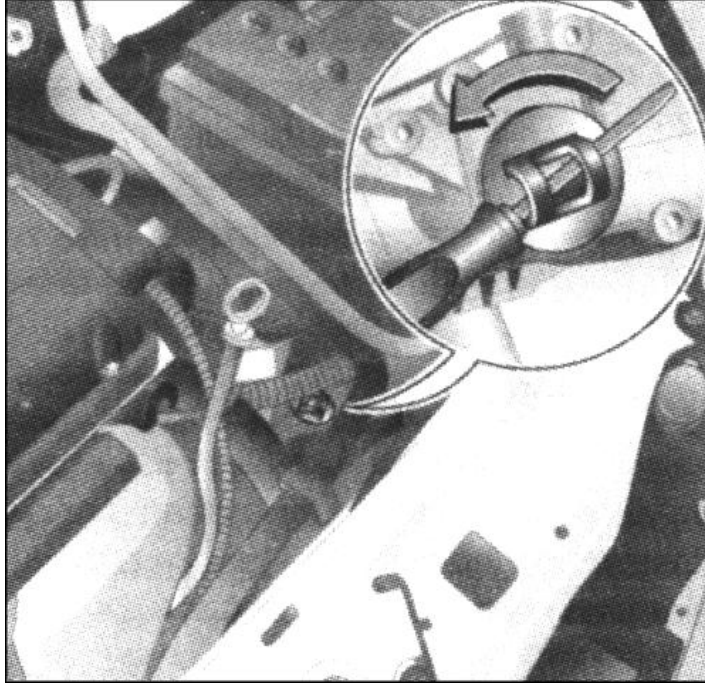


Fig. 1.41. Withdrawal cover automatic transmission Transmission Easytronic

5. Use a screwdriver to turn located under the cover mounting screw to the right to tangible resistance. Now the clutch disconnected.

Do not rotate further, overcoming resistance not to damage the transmission Easytronic.

6. Replace the lid clean. The lid should be fully fit to the body.

NOTICE

Towing the car and crank the engine with the clutch disconnected in this manner is forbidden, but may move the car for short distances. Immediately call for help at service stations.

Signaling an interactive dynamic system driving

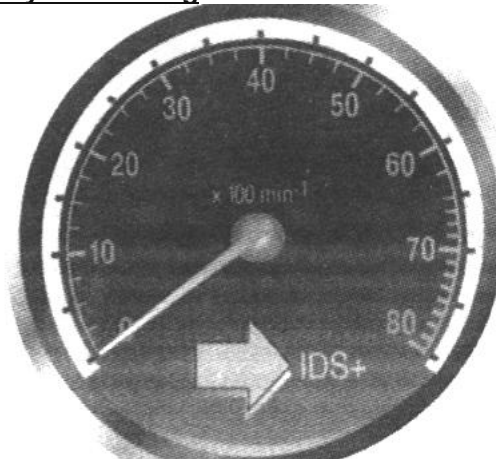


Fig. 1.42. Detector interactive dynamic driving system

IDS + electronic alarm system, dynamic control dampers burns about 10 seconds after opening the driver's door. Burning it in motion indicates a system malfunction. For safety switches on a more rigid chassis tuning. Eliminate the problem.

Mode «SPORT»

To activate this mode, press the corresponding button, located on the center console (Figure 1.43).

In sports mode while moving the parameters of the suspension, steering, engine intake, as well as the switching point automatic gearbox and Easytronic.

Suspension and steering are becoming more stringent and provide improved contact with the road. The engine responds rapidly to movements of the accelerator pedal.



Fig. 1.43. Key activate «SPORT»

The box and Easytronic automatic transmission reduces switching time and switching itself occurs at a higher speed (if not included speed controller).

When enabled on cars with Easytronic gearbox or automatic transmission indicator lights.

When the winter mode (on vehicles with Easytronic gearbox or automatic transmission) mode «SPORT» inclusion impossible.

To stop the regime again, briefly press or turn off the ignition. LED in the button goes off.

Long press to disconnect the ESR mode «SPORT» will remain engaged.

Detector IDS + for mode «SPORT»

This indicator is lit after opening the driver's door about 10 seconds. Illuminated during movement indicates a fault in the system. Eliminate the problem.

Detector inclusion violation zhного Lighting

Indicator lights when the exterior lighting.

Detector inclusion of the distance it light corrector

Indicator lights when the beam and emit a light signal.

Inclusion outdoor Lighting

To activate outdoor lighting, turn the switch to the appropriate position.

The off position, the position of "parking light" position "beam, the light".

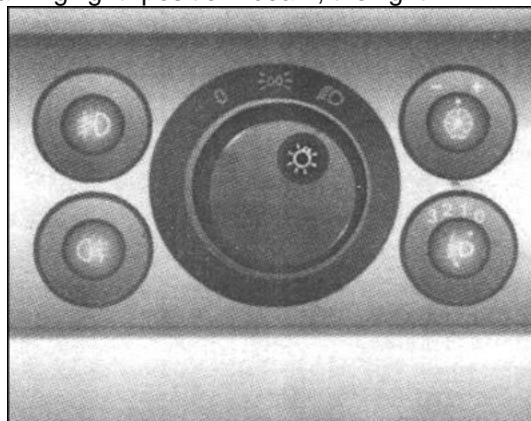


Fig. 1.44. Control panel exterior lighting

The regulations include the rear lights and license plate lights.

If the car installed fluorescent lights, then when you turn the ignition switch and position light or «AUTO» included the parking light. With the engine switched-beam headlamps.

Headlights daylight turned off when you turn off the ignition.

Automatic dip light corrector

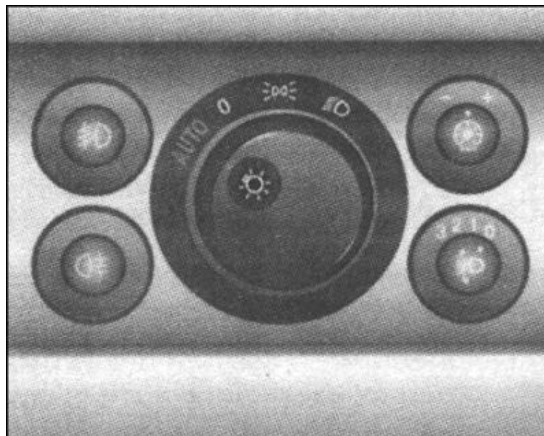


Fig. 1.45. Position switch in the mode dip headlamp

Install light switch in position «AUTO». When the engine is running short-range light will be activated automatically depending on the outdoor light.

Outdoor lighting is turned off when you turn off the ignition.

NOTICE

In to Security light switch should ever keep in situation «AUTO».

Inclusion fog corrector

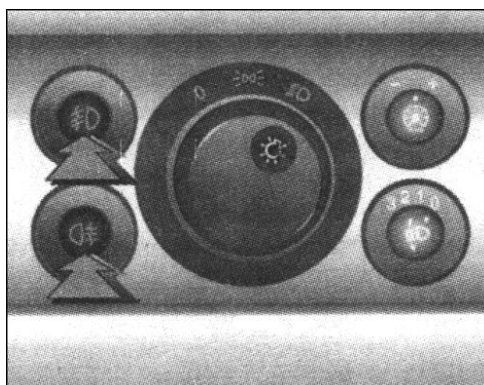


Fig. 1.46. Keys inclusion protivotu-mannyh corrector

Fog lights are included only when the ignition and lighting.

Rear fog lights

Rear fog lights are included only when the ignition and near or parking light.

Rear fog lights on the car while driving with the trailer disconnected.

Headlamps rear progress

They burn when the ignition key and switch on the reverse.

Detector "Parking pilot "



Fig. 1.47. Indication of "parking"

If the indicator is lit - this indicates a system failure. Eliminate the problem or refer to the service station.

Flashing sensors indicate contamination sensors, or the presence of these ice or snow. Sensors must be undamaged and free from dirt, snow and ice.

In addition, there may be interference in the system due to external sources of ultrasound (eg, jack hammers, garbage trucks). After the interference of the system again works properly.

System "Parking pilot "

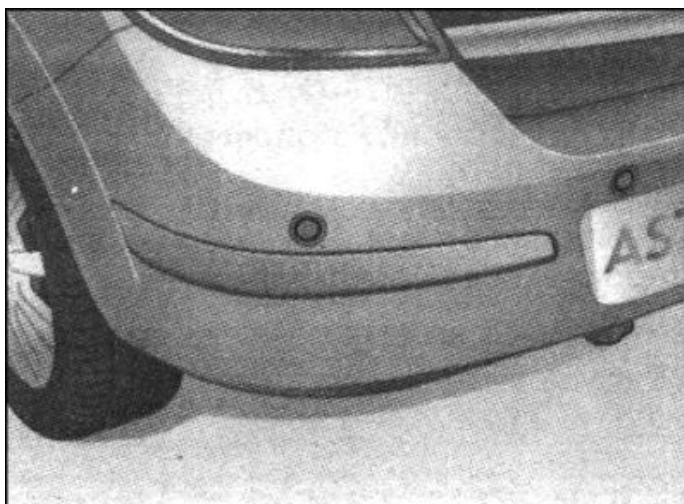


Fig. 1.48. Sensors "Parking Pilot "

"Parking Pilot" makes parking so that it measures the distance from the vehicle to an obstacle behind him and beeps in the car. The system determines the distance from the four sensors in the rear bumper.

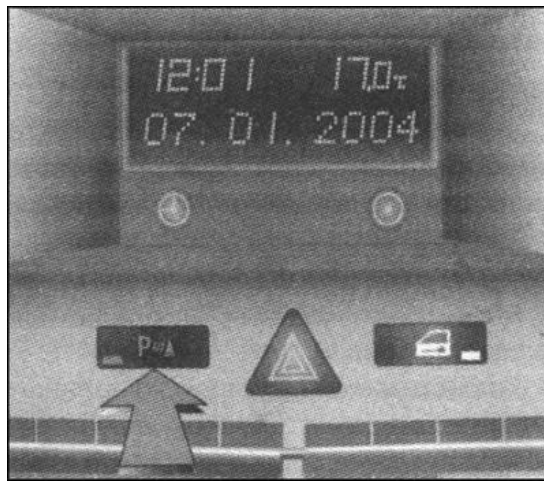


Fig. 1.49. Key inclusion and off-tion system

When the ignition system of parking pilot turned on automatically when going backwards.

On the operational readiness signal LED on the ignition key.

If the car approaches the obstacle behind you in the cabin is distributed periodic beep. With a decrease in the distance interval between the signals becomes shorter. At a distance of less than 30 cm signal becomes continuous.

Under special circumstances (various reflecting surfaces of objects or clothing, as well as extraneous sound sources), the system does not react to obstacles. For this reason, availability of parking pilot does not relieve the driver from the duty of care, for example when reversing.

Shutting system

After turning off the rear of the system is automatically disabled. If the system must be turned off when the back of the course, should press the LED

in the key turns off. To activate the system to re-press.

Index level Fuel in tank

Index fuel level shows the approximate amount of available fuel in the tank (Figure 1.50). Timely directly charge the fuel tank. Make sure that the amount of fuel in the tank is at least a quarter of total capacity. If you turn on the alarm minimum level of fuel in the tank or the arrow pointer stands at about 0, immediately tuck the fuel tank.

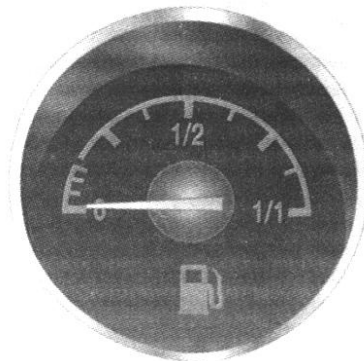


Fig. 1.50. Index level Fuel in tank

Detector inclusion gave nego light corrector

Indicator is lit when the beam and emit a light signal.

Mode switching between neighbors and distant light

To switch to high beam, move the lever forward. To switch to low beam lever back to its original position (Figure 1.51).

When the high beam indicator light is blue.

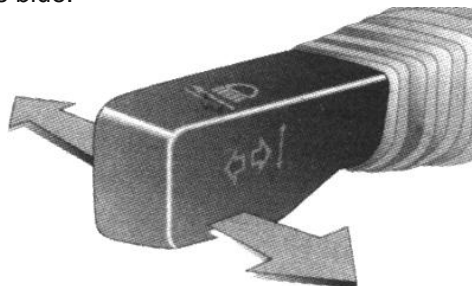


Fig. 1.51. Inclusion regime "Long-range / Middle" light corrector

To file a brief movement of the light signal, move the lever to the steering wheel (Figure 1.52).

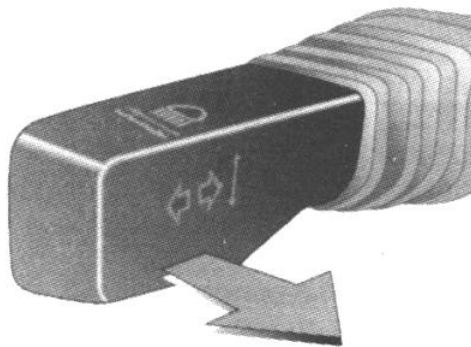


Fig. 1.52. Submission light signal

Railroad switch LED indicator rotation

The corresponding indicator (arrow) blinks when the direction indicator. Blinking indicates the failure of the lamp one of the flashing lights or the appropriate fuse. When the emergency signal light flashing both sensors.

Profiles switch pointers rotation

When turning right, move the lever up, with the left - down (Figure 1.53).

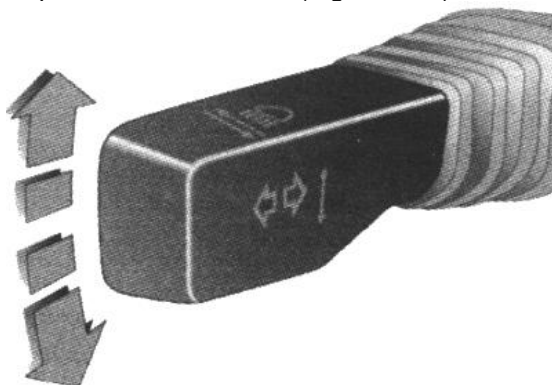


Fig. 1.53. Profiles switching Decree-ers rotation

Lever indicators always returns to its original position. After turning the steering wheel back indicator lamp is automatically switched off.

Detector inclusion winter regime Automatic Transmission or boxes Easytronic

Indicator is lit when the winter mode of operation.

Winter mode Driving (box Easytronic)

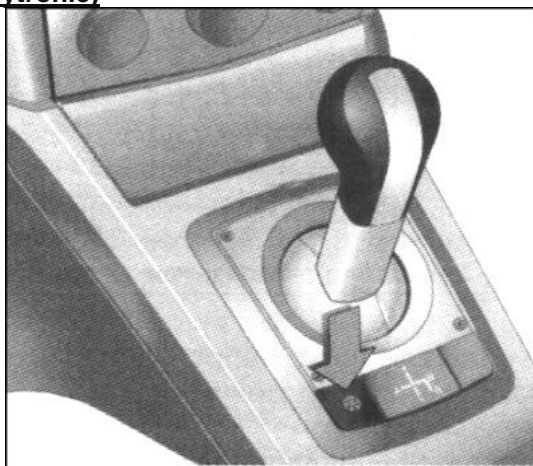


Fig. 1.54. Key inclusion winter regime Driving

In case of difficulty in moving from place to slippery roads, press the corresponding key (on the indicator gear icons will appear "A", and included the transfer. Easytronic transmission switches to automatic mode and the car touches the 2 nd gear.

Winter mode operation stops when the following conditions:

- Re-uses key activate;
- Turn off the ignition.

To protect against damage Easytronic transmission at too high a temperature coupling winter driving mode is automatically switched off.

NOTE

When inclusion winter regime re-Bench «SPORT» off (if it was included).

If at enabled winter Regis-me was satisfied switching in Manual regime winter mode on-nectcd.

When return in AB-tomaticchesky mode again including-etsya winter mode.

Winter mode driving (automatic box transmission)

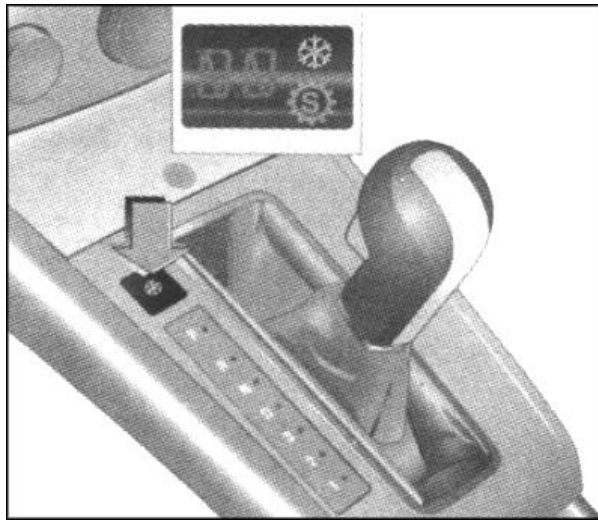


Fig. 1.55. Key inclusion winter regime Driving

In case of difficulty in moving from place on a slippery road, press the regime. This can be done only in the positions P, R, N, D, 3 (on the indicator icon will light transmission car will touch on the 3rd gear. Winter operating mode turns off when the following conditions:

- Re-activating the power key mode;
- Switched manually at 2 nd or 1 st transmission;
- Turn off the ignition.

To protect against damage to winter driving mode is automatically switched off at too high a temperature of transmission oil.

Alarm mode «SPORT» automatic transmission or Easytronic boxes

Indicator is lit when the mode «SPORT».

Profiles Driving car with boxes transmission with e management

If you switch «SPORT» switching occurs at a higher speed (if not included speed controller). The display gear indicator light is appropriate.

Mode automatically switches to the neutral position to reduce fuel consumption automatically sets the gearbox in position N, for example when stopping at a traffic light.

Automatic switching to the neutral position activates the following conditions:

- The gear lever is in position D, 3, 2 or 1;
- Brake pedal is pressed;
- The car stands still;
- The accelerator pedal is pressed.

When you release the brake and throttle the car from rest as usual.

The program of temperature control after a cold start automatically, due to delay in switching to higher gears (higher speed), quickly brings the catalyst to a temperature required for optimum reduction of emissions of harmful substances in the exhaust.

Adaptive mode automatically coordinate the process of switching to other programs in terms of driving, for example, when riding with a big boot or on the rise.

Alarm system, identification of employment Seats

Recognition System employment system disables the front seat side airbags and front seat passenger, if the front passenger seat is occupied or not at the front passenger seat mounted system for ensuring the safety of children «Opel» with transponders. Head airbag system is activated at the same time.

Alarm system, identification of employment seat is located on the dashboard. If the ignition is switched on indicator lights up for about 4 s, therefore, a car equipped with a system of identification of employment seat.

Security system of children «Opel» with transponders

Indication of the availability of child safety company «Opel» with transponders after ignition is carried out by continuously burning signaling in dashboard as soon as the identification system employment register the seat availability of the system to ensure the safety of children (Figure 1.56).



Fig. 1.56. Indication system ensure the Security Children

If the indicator is not lit during the motion - which means that the system of front and side airbags for front passengers are not disabled, which is dangerous for a child's life. In this case, a system for ensuring the safety of children should be set on the back seat. Eliminate the problem or refer to the service station.

Case of incorrect installation of child safety or transponder malfunction indicator light flashes. Verify that the installation of child safety. Instructions for installation of child safety with transponders, see enclosed guide.

NOTE

If detector flashes at of correct mounted system security Security children transponders means malfunction, it dangerous for re-Behnke. Set system ensure the Security Children on ass-it seat.

If system ensure safety Children Opel with transponde-holders not set, the alarm is not must burn or flashing, otherwise the system air pillows safety for anterior passenger not will work.

When correctly mounted si-tem ensure child safety Company «Opel» with transponde-holders after inclusion Ignition lights detector system OJEC-baking Security Children Fir-we «Opel» with transponders, races posited in shield devices. If detector not burns in VRE-name movement - it means si-tem air pillows safety for anterior passenger not off that dangerous for their lives. In This case system ensure the Security Children should establish on back seat.

When installed system to ensure the safety of children «Opel» with transponders after ignition indicator lights continuously when the system detects a seat. Only under this condition is allowed to use the system to ensure the safety of children with transponders on the front passenger seat.

In addition, in vehicles with a system of identification of employment at the bottom of the seat front passenger seat is the appropriate label (see Figure 1.57).



Fig. 1.57. Sticker indicating that on car set identification system Employment Seat

Availability of child safety «Opel» with transponders automatically registered with the proper mounting system for the front passenger seat. When using these systems the safety of children on the front passenger front and side airbags with his side are disabled. Head airbag system, however, remains activated. Be sure to supervise the work of signaling recognition system employment seat.

Alarm systems, engine failure

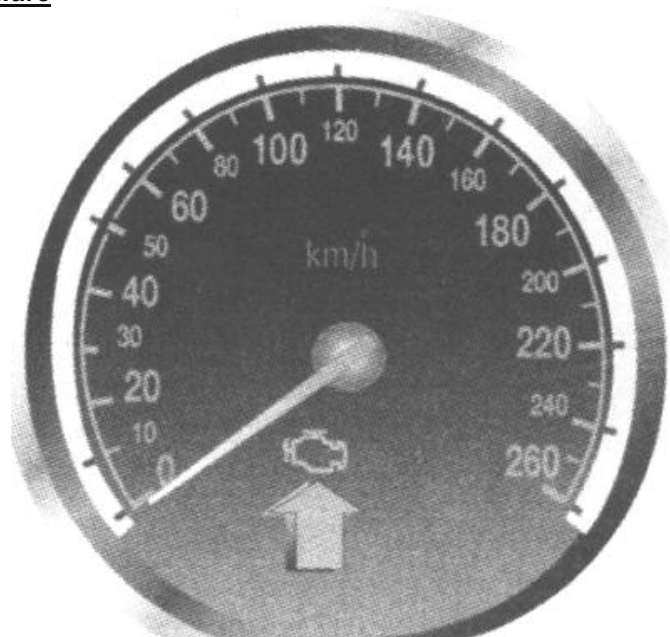


Fig. 1.58. Indication fault systems Engine

Indicator lights up after turning on the ignition and goes out shortly after starting the engine.

Illuminated with the engine running indicates a malfunction in the device exhaust. Perhaps the excess of allowable parameters of the exhaust. Seek the help of the station maintenance.

Blinking with the engine running indicates a failure, which can cause damage to the catalyst.

In this case, you can continue to move without risk of damage if the throttle to a point to stop flashing and the alarm was burning continuously.

Alarm Immobilizer system inhibition

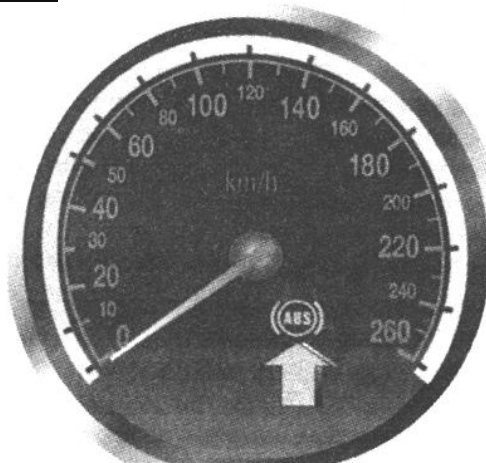


Fig. 1.59. Indication protivoblokirovochnogo device system inhibition

System ABS (protivoblokirovoch-Naya braking system) continually monitors the braking system and, regardless of the state of the road and tire, prevents wheel lock.

At the risk blocking one of the wheels of the device ABS regulates brake pressure of the wheel. The car is still manageable even with full braking in a corner or a side maneuvering. When emergency braking ABS allows you to bypass the obstacles, without releasing the brake.

Job ABS system is accompanied by pulsation of the brake pedal and the characteristic noise.

To achieve optimum braking effect is to squeeze brake pedal fully through the process of braking, without paying attention to the pulsation of the pedal and not reduce stress.

NOTICE

This Safety sys-ma not gives driver right on Fig Cova Style driving. safety Traffic provided only at Responsible management Institute car.

Alarm system, lights for a few seconds after ignition. At this time, is self-diagnostic system, possibly accompanied by a specific noise. The system is ready to work after the alarm goes off.

If the alarm does not go off after a few seconds or burning during the ride - this indicates a malfunction in the system of ABS. The braking system continues to operate, but without regulation of ABS.

In the case of malfunction of the ABS when excessive braking wheel can lock-Xia. A car loses control and can get into the skid.

In this situation, you can continue to travel, driving a car with caution.

For troubleshooting, visit the service station.

Detector system control fall pressure and current pressure in Tires

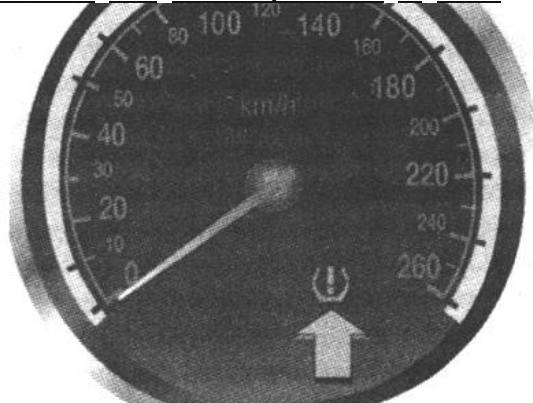


Fig. 1.60. Indication system Rear To fall pressure and current pressure-tion in Tires

Red light sensors shows a pressure drop in the bus, a yellow light - a malfunction in the system. To fix the problem ask for help at service stations.

Monitoring system tire failure (DDS - Deflation Detection System)

The monitoring system tire failure while driving continuously monitors the rotational speed of the wheels. When a pressure drop in one of the tires decreases the diameter of the wheel and it rotates faster than the other wheels. When the system detects a difference between speed, alarm light glows red.

In this case, stop immediately and check the tire pressure. If necessary, install the spare wheel.

System functions after ignition and detects a pressure drop, starting with a speed of about 30 km / h.

NOTE

The triple Strobe signalizato-ra indicates on initialization si-tem.

System control fall pressure-tion in Tires not replaces manual control with help Attorney manometer.

Pressure in Tires Check in cold Tires not less than every 14 days and before each duration-term trip.

Initialization system



Fig. 1.61. Key Initialization system-we DDS

After adjusting tire pressure, and after replacing the tire or wheel system must be initialized. To do this, with the ignition, hold DDS for approximately 4 s, alarm will flash 3 times. After a certain path towards the system will be ready to work.

The system can be initialized only if all the tires installed the prescribed air pressure.

Alarm indicators trailer

Indicator light flashes while driving with a trailer with a frequency indicators. Do not blink at a failure of one of the indicator lamps on the trailer or towing truck.

Alarm system, adaptive headlamps (AFL - Adaptive Forward Lighting)



Fig. 1.62. Indication system adaptive-tive light corrector

If the indicator lights continuously - this indicates a system failure.

When failure of the rotary device for lighting turns off the light passing the appropriate lights. For security automatically corresponding fog lamp.

To fix the problem ask for help at service stations.

Flashing signaling device for about 4 seconds after ignition recalled that the lights reconfigured in a symmetrical passing beam.

Adaptive headlights (AFL - Adaptive Forward Lighting)

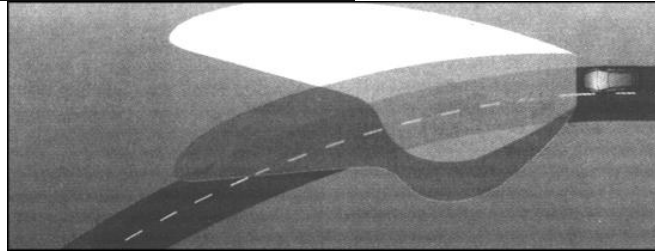


Fig. 1.63. Scheme of adaptive headlamps

Vehicles with a system of double xenon headlights have special lighting to improve visibility when cornering. Xenon light beam is deflected depending on the position of the steering wheel and speed (from about 10 km / h). Lamps emit light at an angle of 15 ° to the right or left of the axis of the vehicle.

Light for motorway.

When the vehicle is moving at a constant high speed of the passing light is automatically set somewhat higher, and thus increases the range of illumination.

Signaling speed regulator

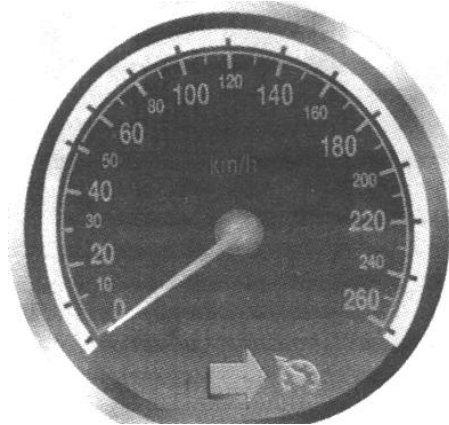


Fig. 1.64. Indication regulator rate

During the drive indicator lights up when you turn on the system.

Regulator rate

Speed regulator can remember and always maintain the value of the speed of about 30 to 200 km / h. For safety reasons, speed controller is switched on only after tapping the brake pedal. Speed regulator is controlled by buttons on the lever indicators (Figure 1.65).

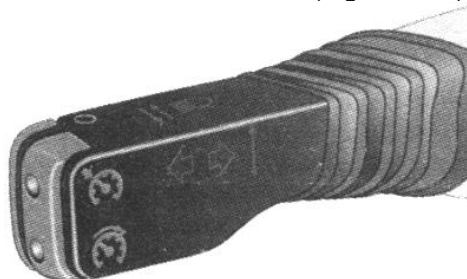


Fig. 1.65. Lever Management speed control

Regulation is not included, if constant speed is not recommended (eg, in dangerous situations for their own car and other vehicles, as well as in heavy traffic, on winding, smooth or slippery roads).

When driving with an automatic transmission include a speed regulator only in the mode of D, while driving with the transmission Easytronic - only in automatic mode.

When the speed regulator response time may increase, due to the change of feet.

NOTICE

Failure recommendations Driving with using regu-accumulators rate may cause Injuries or danger for life.

Inclusion regulator rate

Press, instantaneous velocity can be written in memory and will be maintained constant. The leg can be removed from the accelerator pedal.

To speed necessary to press the accelerator pedal. Once the accelerator pedal is released, the newly restored minded speed.

Acceleration

When the speed regulator for a long time or a few times, briefly *press, then* will include a permanent or a stepwise increase in the speed in increments of 2 km / h without uses the accelerator pedal.

When you release the key current speed is stored in memory and saved.

Slowing

When the speed regulator for a long time or a few times, briefly *press, then* will include a smooth or stepwise decrease in the rate of 2 km / h.

When you release the key current speed is stored in memory and saved.

Shutting

Press, speed turns off the appropriate alarm goes off, the car gradually slows down. To continue, press trips, as usual, the accelerator pedal.

Under certain conditions, speed controller is automatically disabled for security.

This occurs in the following cases:

- Vehicle speed below 30 km / h;
- The main brake pedal is engaged;
- Engaged the clutch pedal;
- Gear lever on the automatic transmission or Easytronic box is in position N.

Return to recorded in Memory rate

Press at speeds above 30 km / h, in this case will be restored speed, before shutting down.

Memorized in the speed you erased after turning off the ignition.

Detector Emergency stop

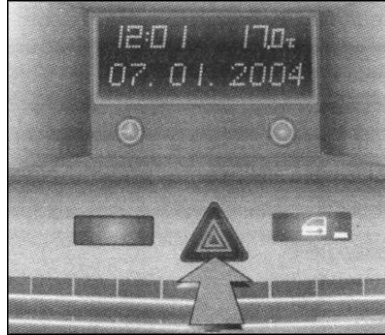


Fig. 1.66. Indication Emergency remain the adjustment elements

To simplify the search for a switch, with the ignition box, lighted red. When the indicator lights that flash with the same frequency as the indicator.

When you stop the car on the carriageway or near it, as well as in all cases under the rules of the road, turn on hazard warning lights.

Included is an emergency alarm system warns other road users that a defective car is a potential danger, and they should take extra precautions.

Audible signal

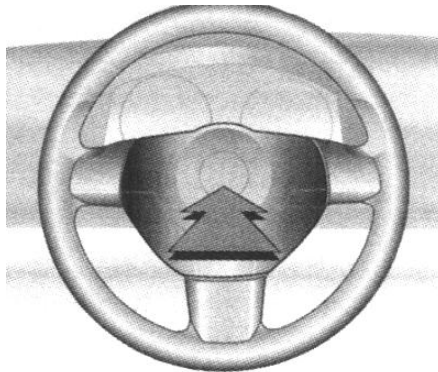


Fig. 1.67. Audible signal

To file a beep, press the switch located on the steering wheel.

Tachometer

Tachometer shows the frequency of rotation of the crankshaft of the engine in units of 1000 min^{-1} (Figure 1.68).

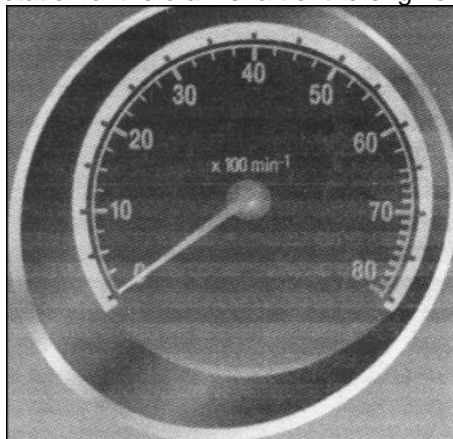


Fig. 1.68. Tachometer

NOTICE

Do not exceed the permissible speed of the crankshaft of the engine: The needle on the tachometer nor shall enter into the red zone of the scale. This can lead to engine failure.

Speedometer

Speedometer shows the magnitude of the current vehicle speed (Figure 1.69).

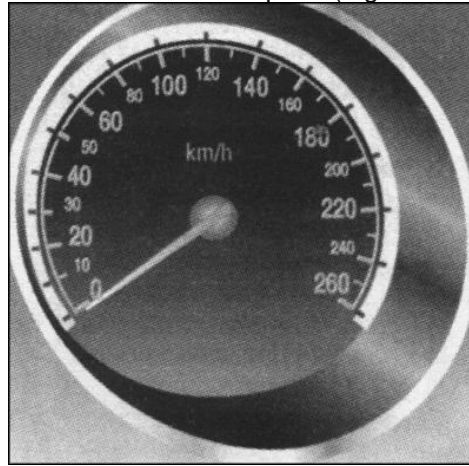


Fig. 1.69. Speedometer

Counter mileage (odometer)

Odometer shows the total mileage of the vehicle (Figure 1.70).

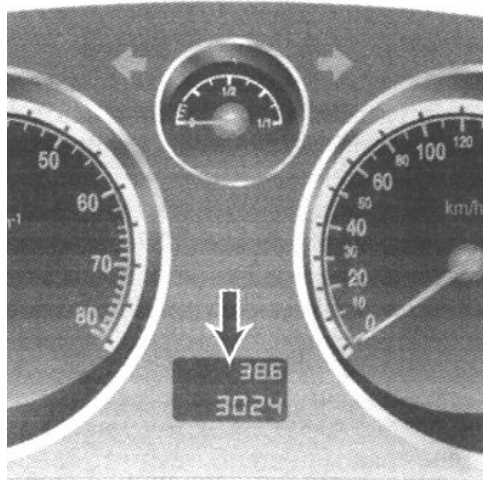


Fig. 1.70. Odometer

Counter daily mileage

To set to zero, press installation with the ignition button (Figure 1.70).

Zeroing in cars with indication of time in odometer

If you include a display of time, switch to the display counter daily run. To do this, briefly press the installation button (Figure 1.71).

Indication time counter mileage

To switch to display daily run on time indication briefly hire installation button (see Fig. 1.71).

Time

When time displays make the most of installation button on the device and hold it down for about 2 seconds.

When the indicator readings time is flashing, briefly press the button and set the clock.

In the same way, set readings minutes.

Customer display on the odometer

InSP - Indication of service intervals. Indication of the race, remaining until the next maintenance.

InSP 2 - the failure of the lamp.

InSP 3 - discharged battery remote control device.

InSP 4 - Water in diesel fuel filter.

NOTE

On cars with system Rear To instead inscriptions InSP 2 and InSP 3 on Information display Issued-etsya corresponding message.

ESPOff - Electronic stabilization program is disabled.

ESP on - Electronic stabilization program included.

1.11 Information display

Information screen displays the following information:

- Outdoor temperature readings;
- Data of the radio;
- Date and time;
- Testimony navigation system;

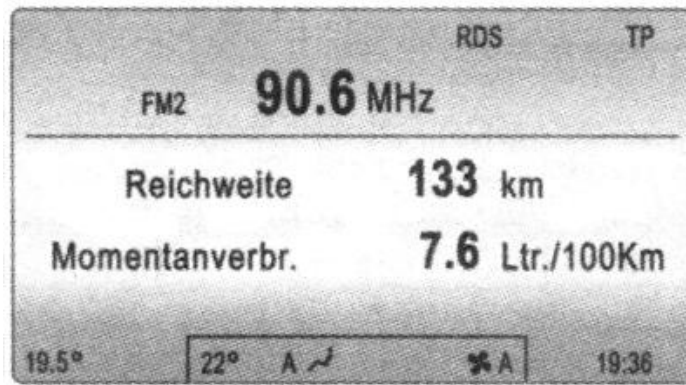


Fig. 1.72. Information display

- Data of the phone;
- Data monitoring system;
- Data of on-board computer;
- Data of climate control.

Triple information display

Triple information display shows time, outside temperature and the date or an infotainment system, when it is enabled.



Fig. 1.73. Triple Information Display

Time, date and outside temperature can be displayed when ignition is turned off for 15 seconds by briefly pressing one of two buttons below the display.

Indication of F on the display indicates a malfunction.

On-board information display

On-board information display shows time, outside temperature and the date or an infotainment system, when it is enabled.



Fig. 1.74. Flatbed Information Display

Indication of F on the display indicates a malfunction.

Graphical or color information displays

Graphical or color information display shows time, outside temperature and the date or an infotainment system, when it is included, as well as details of climate control.

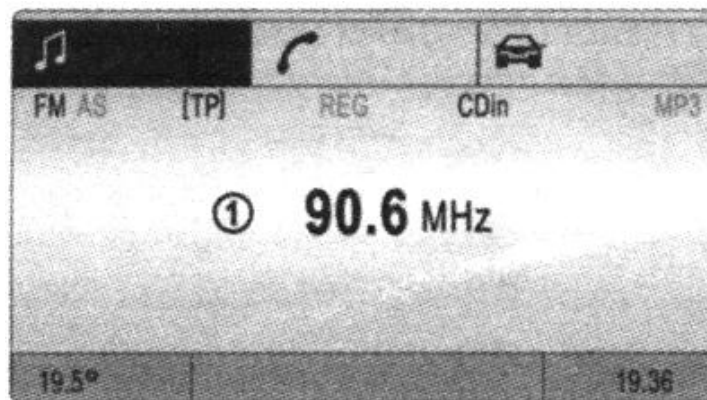


Fig. 1.75. Graphic Information Display

On the graphical information display information is displayed in monochrome. On color information display, data mapping - color.

Some indication on the display in an abbreviated form.

Indication of F on the display indicates a malfunction.

Outside temperature

Thermometer responds to lowering the air temperature immediately, but to improve - with time delay.



Fig. 1.76. Outdoor temperature

To prevent icing of the road when the outside temperature is lowered to 3 ° C in the treble or the on-board information display icon S. With increasing temperature the icon disappears. On cars with a graphic or a color information display for the prevention of icing of the road there is a warning message. At temperatures below -5 C the message is not displayed (Figure 1.77).

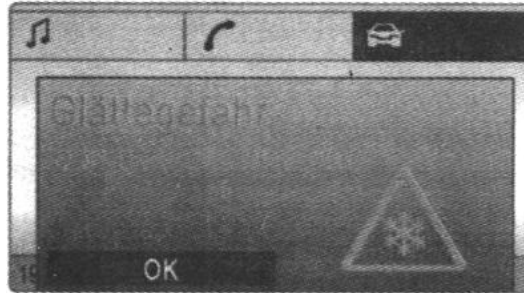


Fig. 1.77. Indications graphic Diploma

Setting time and date on triple Information Display



Fig. 178. Buttons for setting the date and time

Turn off the infotainment system, click the button under the display as follows:

- Press for 2 seconds, blinks, the date;
- Set the testimony of the day;
- Flashing indication of the month;
- set indication of the month - flashing indication of the year;
- Set the testimony of the year;
- Flashes the clock;
- Set the clock;
- Flashes reading minutes;
- Set the reading minutes;
- Hours run.

Correction time

Some radio stations broadcast RDS wrong time. If in connection with these watches often display the wrong time, you should disable the automatic synchronization clock and set the time manually.

Automatic installation is displayed on the display icon

Shutting and automatic inclusion time synchronization

Turn off the infotainment system.

hold the approximately 2 s, the time display switches to install;

- Click twice and flashes the testimony of the year;
- Press and hold for about 3 to until until the display starts flashing and appears «RDS TIME»;
- Press, the indication on the display - RDS TIME 0 - disabled;
- Press, the indication on the display - RDSTIME 1 - enabled;

Selection functions Onboard Display

With on-board information display manages the functions and settings of some equipment.



Fig. 1.79. Choice functions on-board information display

These functions are selected using the keys or the four-switch on the infotainment system (Figure 1.80), as well as the left control wheel (Figure 1.81) on the steering wheel.

In this case the corresponding menu items are displayed alternately.



Рис. 1.80. Четырехпозиционный переключатель



Рис. 1.81. Управляющее колесико на рулевом колесе

When a warning message display control system does not show any other information. Warning messages should be acknowledged by pressing the right or the left button of the cross-switch or the left switch on the steering wheel. If you receive several warning messages to confirm receipt of their rotation.

Customize system Onboard Display

Press the «Settings» to the infotainment system, with the displayed menu item «Audio» or «System».

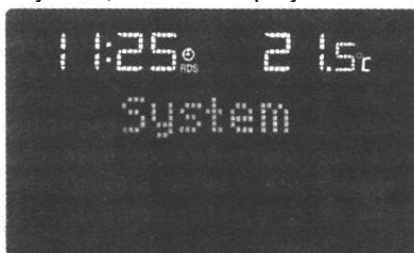


Fig. 1.82. Menu item «System»

Press the lower key four-rehpozitsionnogo switch to go to the menu item «System». After pressing the right button will display the four-switch is the first function menu «System».

Functions are displayed in the following order (some abbreviated):

- Time synchronization;
- The time clock setting;
- Time setting minutes;
- Date, setting the day;
- Date, setting month;
- The date of installation;
- The logic of ignition;
- Choice of language;
- Choice of units.

Correction time

Some radio station RDS reported wrong time. If in connection with these watches often display the wrong time, you should disable the automatic synchronization of time and set the clock manually.



Fig. 1.83. Menu item «Clock Sync. On »

Automatic installation is displayed on the display icon.

To correct the system with RDS choose to «Settings» point of time synchronization.

Set the desired values.

Set time and date

In the menu «Settings» select the items to set the time and date.

Set the desired values.

Set after the menu is written in the memory.

Language



Fig. 1.84. Indication Selection Language

Language of text messages, some functions can be changed.

This menu «Settings» Locate the language and set a suitable value.

Selecting units

Units can be chosen.



Fig. 1.85. Indication Selection One unit the measurement

This menu «Settings» locate the item selection system of units and set a suitable value.

These on-board computer on the parameters of motion

On-board computer gives data on the parameters of motion, which is continuously collected and processed them in electronic form.

To display the on-board computer operating data press the Sun on an infotainment system or the left switch on the steering wheel.

After selecting the audio function of the bottom line of the selected function onboard computer continues to display.

Functions are displayed in the following order (some abbreviated):

- Instantaneous fuel consumption;
- Average fuel consumption;
- The absolute fuel consumption;
- Average velocity;
- Mileage;
- Cruising;
- Timer.

Cruising



Fig. 1.86. Indication of the range

Cruising range is calculated based on the current balance of fuel in the tank and instantaneous fuel consumption.

The display shows the average value. After a

time after filling the car indication of the range is automatically updated.

If the contents of the tank missing less than 50 km, displayed «Range».

Instantaneous fuel

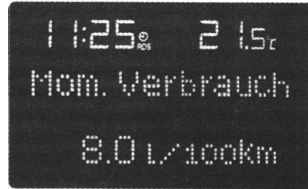


Fig. 1.87. Indication Instant Supplies da Fuel

Display varies depending on the speed:

- Indication of l / h - below 13 km / h;
- Indication in l/100 km - above 13 km / h.

Average fuel

Shows the average fuel economy display. Calculation at any time to start anew.

Absolute fuel

Displays indication of spent fuel. Measurement at any time to start anew.

Average speed

Displays the average speed indication. Calculation at any time to start anew.

It stops along the way, when ignition is turned off is not taken into account.

Mileage

Displays indication of the traversed path in kilometers. Measurement at any time to start anew.

Timer

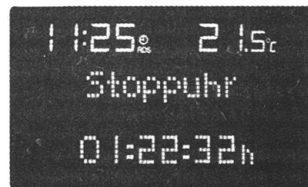


Fig. 1.88. Indication timer

Manage timer by using chetyrehpozitsi-tional switch.

By pressing the right button is included - start / stop.

By pressing the left key longer than 2 from discharging.

Resetting data on-board computer (reinstall)

The following data on-board computer can be cleared (re-launch measurements or calculations):

- Average fuel consumption;
- The absolute fuel consumption;
- Average velocity;
- Run.

Please select the required data on-board computer.

Zeroing is performed by pressing the left switch on the steering wheel or the right / left button of the cross-switch:

- Pressing than 2 to lead to zero current value;
- Keystroke longer than 4 to lead to zero for all values.

Interruption of power

After the interruption of power or when there is insufficient battery voltage values recorded in the memory of the onboard computer, erased.

The choice of functions or color graphic information displays

With the help of a graphic or a color information display functions are executed and implemented by setting a certain onboard equipment.

These features are highlighted on the display, and performed with the help of Th-tyrehpozitsionnogo switch, multifunction knobs on an infotainment system or the left control wheel on the handlebar.

Selection using the four-switch

Select items using the menu buttons or the four-switch on the infotainment system.

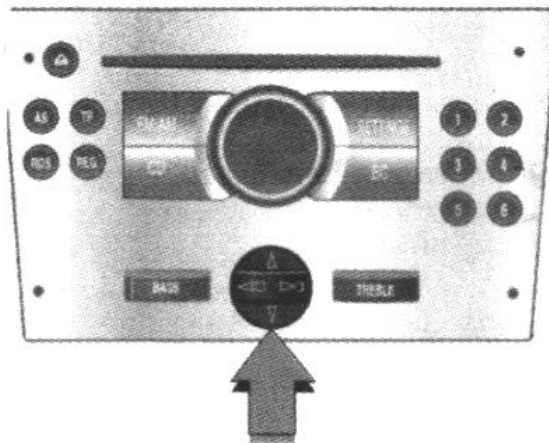


Fig. 1.89. The four-switch

When a warning message display control system does not show any other information. Warning messages should be confirmed by pressing the right or the left button of the cross-switch. If you receive several warning messages to confirm receipt of their rotation.

Management with multifunctional pen

Turn handles carries the designation function menu or command to choose the appropriate function.

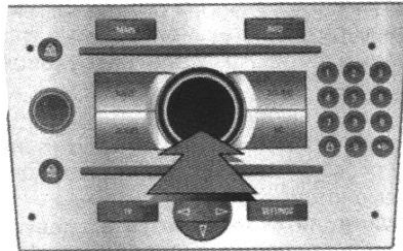


Fig. 1.90. Multifunctional pen

Pressing the knob selects the highlighted item and confirmation of the team.

To exit the menu, you should turn the multifunction button to the left or right on the item «Return» or «Main», and select it.

When a warning message display control system does not show any other information. Warning messages should confirm with multifunction buttons. If you receive several warning messages to confirm receipt of their rotation.

Manage with the left control wheel on the steering wheel

Wheel up making the transition to the previous punyu menu.

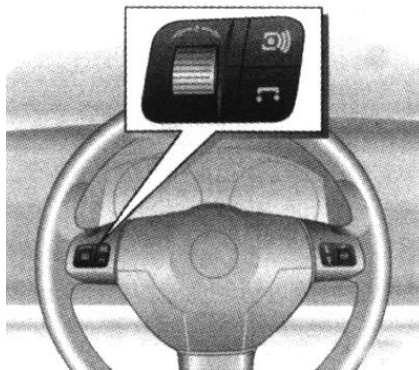


Fig. 1.91. The control wheel on py-left wheel

Rotating wheel down makes a transition to the next menu item.

Pressing the wheel selects a highlighted item and confirmation of the team.

During the display of warning message display control system does not show any other information. Warning messages should be confirmed by pressing the left switch. If you receive several warning messages to confirm receipt of their rotation.

For each area there is a function of home («Main»), you can select it in the top of the display (except for the infotainment system of CD 30 (Figure 1.90).

System Configuration

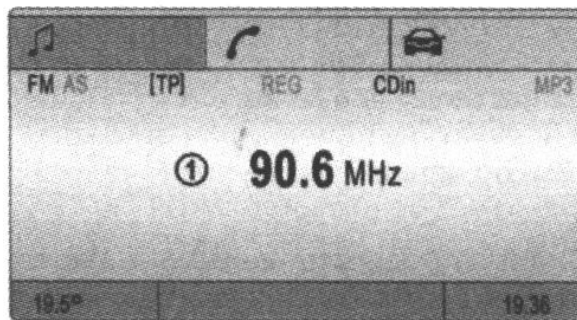


Fig. 1.92. Home Home Menu

Setting is carried out in the menu «Settings».

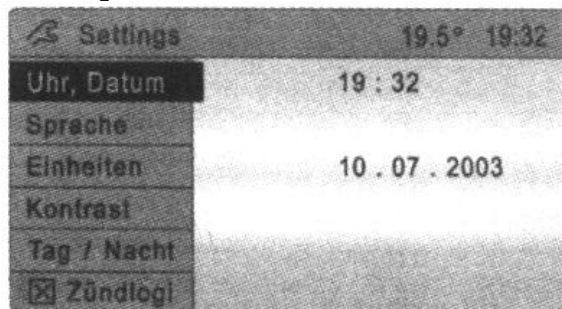


Fig. 1.93. Menu «Settings»

Press the Home key «Main» (not available in all systems) for information and entertainment system (the main menu).

Press the «Settings» to the infotainment system.

NOTE

If infotainment CD 30 can not select the menu.

You'll see a menu «Settings».

Set time and date

In the menu «Settings» choose the option «Time, Date».

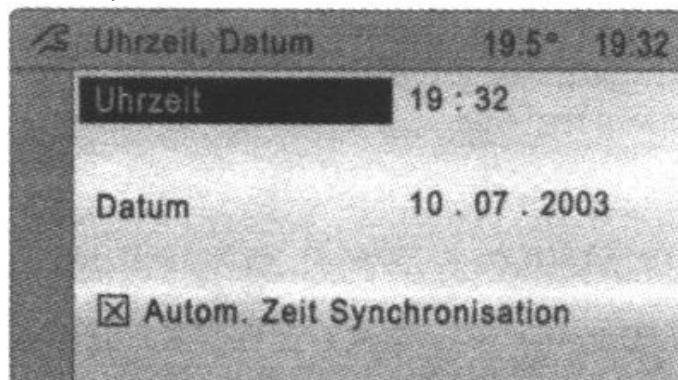


Fig. 1.94. Menu «Time, Date»

A menu «Time, Date». Select the desired menu items and set the correct values.

Correction time

On systems with a GPS receiver with the GPS satellite signal reception time and date are set automatically. If the displayed time does not correspond to local, perform a manual installation or automatic adjustment by signal reception time of RDS.

Some radio station RDS reported wrong time. If in connection with this clock shows the wrong time, turn off the automatic synchronization of time and set the clock manually.

To correct the time with the help of RDS choose to «Time, Date» menu «Synchron. clock automatical ».

Field in front of «Synchron. clock automatical »denotes a cross (see Figure 1.94).

Language selection

Language of text messages, some functions may be chosen.

This menu «Settings» choose the option «Language», and then displays a list of available languages.

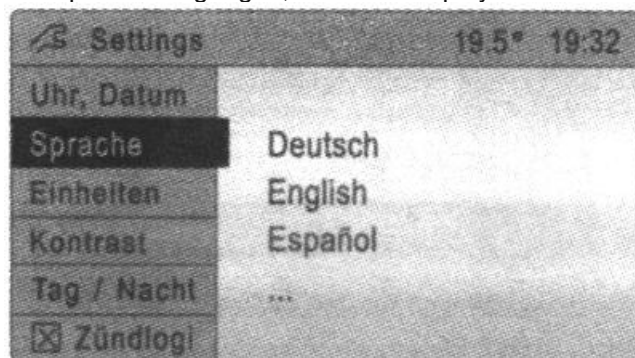


Fig. 1.95. My choice of language

Select the desired language

The selected before starting the menu notes symbol.

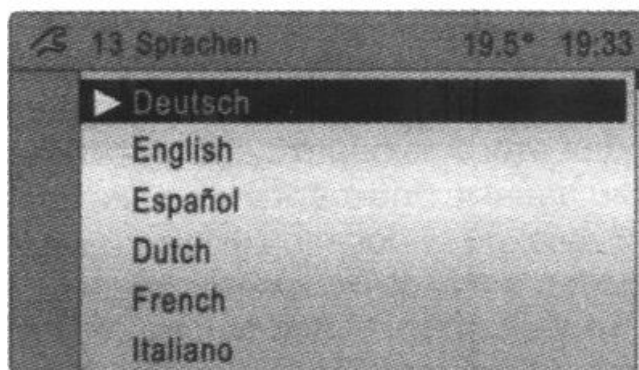


Fig. 1.96. Language

On systems with voice informant after changing the display language are asked whether you want to change the language and voice informer.

Selecting units

To select the units in the menu «Settings» choose the option «Units».

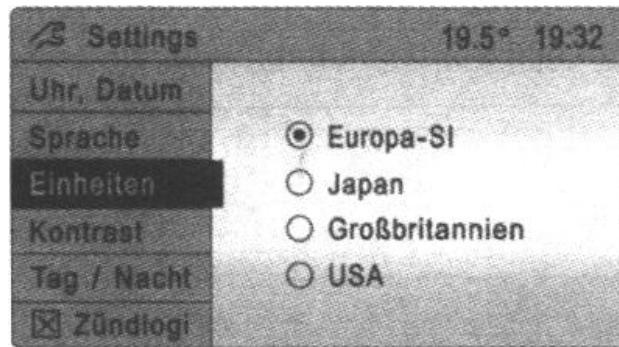


Fig. 1.97. Menu Selection units Measurement

In this case the system displays a list of available units.

Select the desired system of units.

The selected before the menu item marked symbol

Adjust the contrast (graphic information display)

To select this setting in the menu «Settings» choose the option «Contrast».

In this case, the menu is displayed «Contrast». Adjust the contrast and confirm your choice.

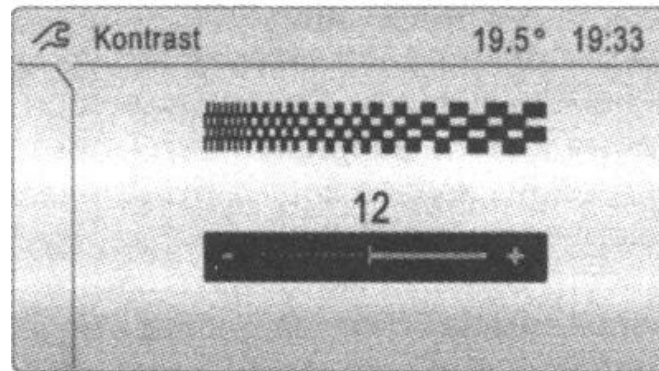


Fig. 1.98. Menu selection kontrasnosti

Setting the display mode

The image on the display can be customized depending on the illumination, ie choose monochrome or, respectively, colored text on a light background, either white or colored text on a dark background.

This menu «Settings» choose the option «Day / Night», then you will see the possible values.

«**Automatic**»: automatic adjustment depending on the lighting conditions in the car.

«**Always day design**»: black or colored text on a light background.

«**Always night design**»: a white or colored text on a dark background.

The selected before the menu item marked symbol

Choice of data on stock status and instantaneous fuel consumption graphic information display

Onboard computers provide performance data that is continuously collected and analyzed electronically.

Home on-board computer («Main») informs you of the range and instantaneous fuel consumption.

To display other operational data on-board computer, press the Sun on an infotainment system, select the display menu on-board computer, or press the left switch on the steering wheel.

Cruising

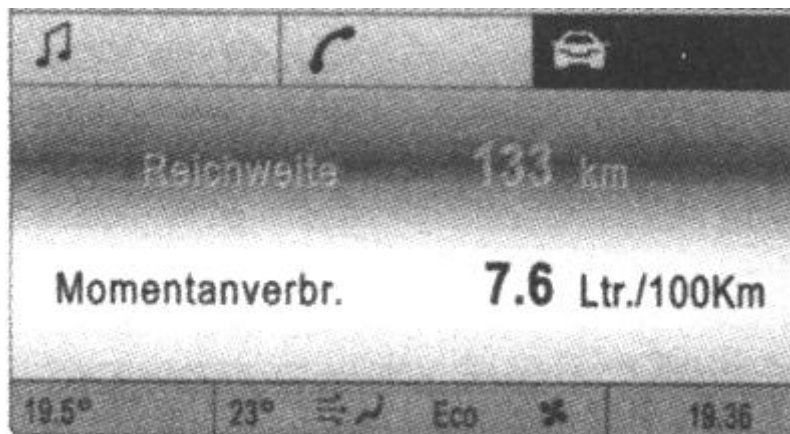


Fig. 1.99. Menu stock progress

Cruising range is calculated based on the current balance of fuel in the tank and instantaneous fuel consumption. The display shows the average value. Shortly after refueling the car indication of the range is automatically updated.

If the contents of the tank missing less than 50 km, displayed «Range».

Confirm the warning message.

Instant waste Fuel

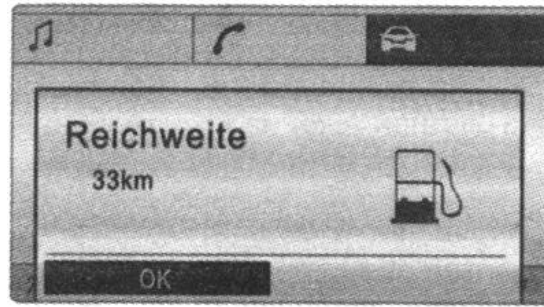


Fig. 1.100. Indication Instant race-course Fuel

Display varies depending on the speed:

- Indication of l / h - below 13 km / h;
- Indication in l/100 km - above 13 km / h.

Mileage

Indicator of the traversed path is given in kilometers. Measurement at any time to start anew.

Average speed

We give a calculation of average speed. Measurement at any time to start anew.

It stopover when ignition is turned off is not taken into account.

Absolute waste Fuel

We give a indication of the amount of fuel consumed. Measurement at any time to start anew.

Medium waste Fuel

We give a calculation of the average fuel consumption. Measurement at any time to start anew.

Reset Data board computer (reinstall)

The following testimony onboard computer can be reset (re-run measurement):

- Mileage;
- Average velocity;
- The absolute fuel consumption;
- The average fuel consumption.

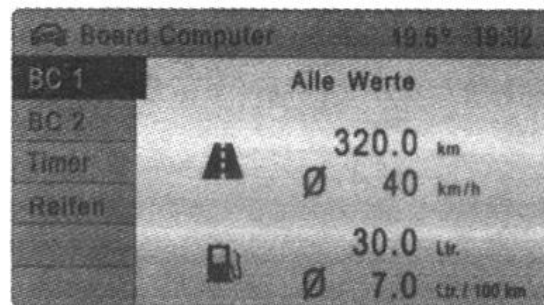


Fig. 1.101. Menu sborsa Data

Select the menu item on-board computer or Sun 1 Sun 2.

Testimony of two on-board computers can be disposed of separately, so the opportunity to assess data for varying lengths of time.

Please select the relevant data on-board computer.

The value of the selected function is reset and is re-calculated.

To reset all data on-board computer, select the menu item "AN values».

After the reset the display instead of selected readings on-board com puter displayed string. After some time, will re-defined values.

Interruption power

After the interruption of power or when there is insufficient battery voltage values recorded in the memory of the onboard computer, erased.

Timer

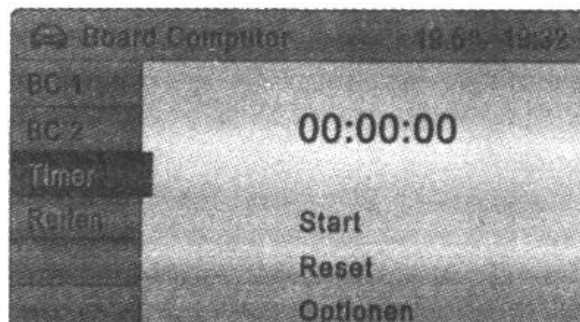


Fig. 1.102. Setup Menu Timer

To select this option in the menu «Board Computer» choose the option «Timer», then displays the appropriate menu.

To start the timer, select the menu item «Start».

To reset the timer, select the menu item «Reset».

Menu «Options»

Menu «Options» is used to set parameters for the timer and has a submenu, listed below.

«Driving Time excl. Stops ».

In this case, measured by the time that the vehicle is in motion. Time stops are not counted.

«Driving Time incl. Stops ».

In this case, measured by the time that the vehicle is in motion. In addition, take into account stops with the key in the ignition.

«Travel Time ».

In this case, the measured time between the start and stop the timer manually using the menu items, respectively - «Start» and the «Reset».

Indication current pressure in Tires

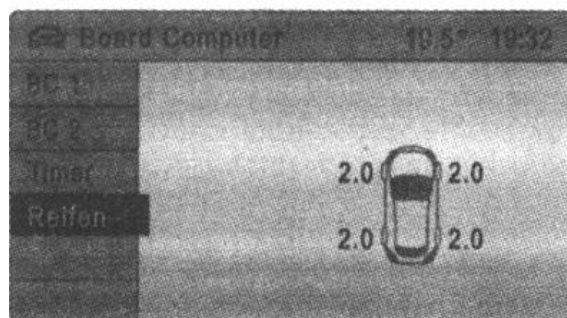


Fig. 1.103. Menu Indicating current pressure in Tires

To select this option in the menu «Board Computer» choose the option «Tyres», then will show the current value of pressure in each tire.

System control



Fig. 1.104. Example Indicating Menu system threads control

This system monitors the fluid levels, tire pressure, battery remote control device, the device anti-theft alarm, as well as the serviceability of the most important lamp outdoor lighting, including wiring and fuses. When operating the vehicle with a trailer is controlled by the lighting of the trailer. Warning messages are displayed. If there are several warning messages are displayed alternately.

Some warning messages are displayed in abbreviated form. Warning messages appear, for example, graphical information display and a color information display. On-board information display some messages displayed in abbreviated form. Confirm the warning message. Unconfirmed warning messages may be after some time reappear on the display.

Warning messages «Remote Control Battery check ».

Informs that the battery voltage remote control device is too low.

«Brakelight switch check ».

Informs that during braking the brake lights do not burn.

«Safeguard check ».

Informs a fault an alarm.

In case of failure of the lighting system corresponding source text indicates a failure, for example: **«Brakelight check right ».**

In the Opel Astra car with a system of monitoring pressure in the tires at too low a tire pressure message will appear indicating the tire, you want to check, for example: **«Tyre pressure check rear rightturn »** (value in bar).

At the first opportunity, check tire pressures with calibrated pressure gauge.

In the Opel Astra car with a system of monitoring tire pressure with a significant pressure drop, a message will appear indicating the tire, for example: **«Attention! Rear left tyre pressure loss »** (value in bar).

Immediately stop and check the tires.

«Washer Fluid Level check».

The level of drilling fluid cleaning device of glasses is too low.

NOTE

When too low level liquid-sti device washing rear window and corrector disabled.

«Coolant level check».

Too little fluid in the engine cooling system.

NOTE

In case of interruption of power supply stored in the memory warning messages are displayed alternately, after the power is restored.

1.12 Wipers and washer

NOTICE

Since clear review necessary for Security movement regularly check efficiency Wiper and mouth-total employment washing headlights. it is recommended replace Brushes stekloochisti-ers not less than times in year. When Pollution glasses before turning wipers or device Automatic Control wipers with sensor rain first vospol-syama device washing degree of count to prevent brushes wear wipers. Not switch wipers or device Automatic governance wipers with sensor-com rain at icy Stack-crystals, so as may damaged schet-ki or system management. Recommended separate primerz-Chiyah wipers with through defrosting spray. Contaminated Brushes empty soft-Coy cloth with application Detergent th and antifreeze funds.

Care wipers

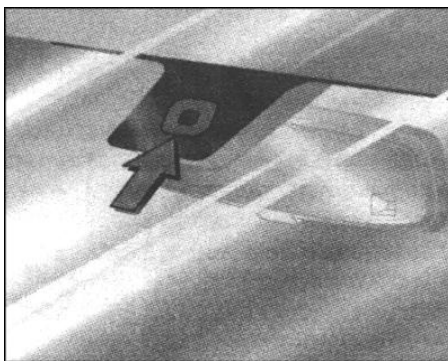


Fig. 1.105. Window Sensor rain

In order to ensure trouble-free operation of rain sensor, window sensor must be clean from dust, dirt and ice, so periodically switch the device washing windows or remove ice from the window of the sensor. Vehicles with rain sensor has a window above the sensor on the windshield (Figure 1.105).

Job wipers

To activate the wipers move the lever up slightly (Fig. 1.106).

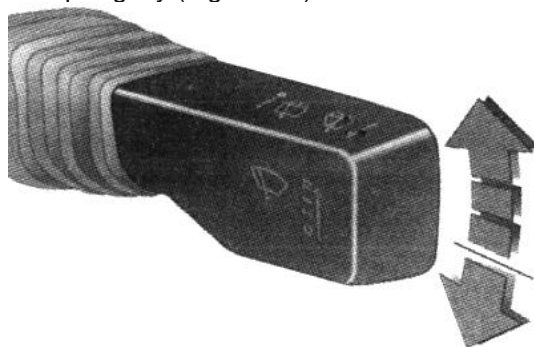


Fig. 1.106. Mode include wipers

The lever always returns to its original position to switch the lever to the next higher or lower stage, slightly move it up or down.

To enable a single lever, slide down from the position

Adjustable range of wiper

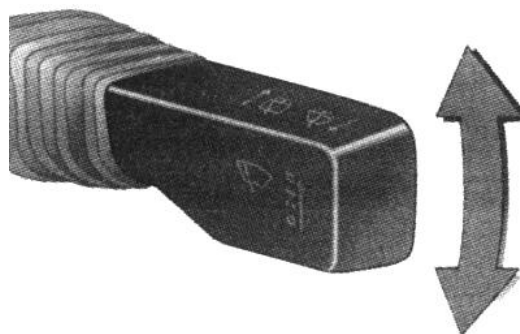


Fig. 1.107. Adjustable interval work-you Wiper

To adjust the cleanup interval in the range from 2 to 15 with a turn on the ignition, move the lever out of the situation down, wait a while and move the lever in the position of the periodic inclusion.

The installed length of the interval treatment remain stored in memory until the next change or until the ignition is turned off. After turning on the ignition and the installation of the lever, the interval inclusion is set for 4 with.

Device Automatic Control wipers with sensor rain

To activate this mode, slide the lever up slightly, then enable automatic management of cleaning with rain sensor. In this mode, rain sensor determines the amount of water on the glass and automatically adjusts the speed of the wipers.

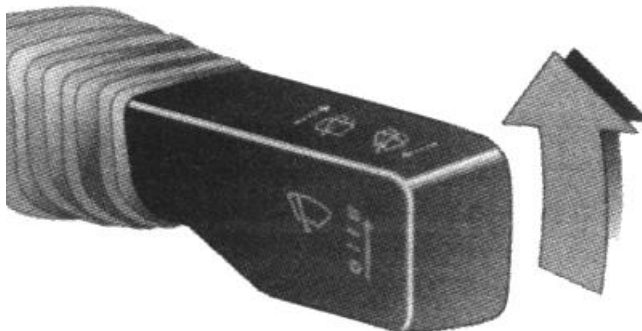


Fig. 1.108. Mode inclusion automatic-agency Management wipers with sensor rain

To turn off the regime pull the lever down.

Inclusion flushing device glasses and corrector

To activate this mode, pull the lever for him. Wipers included several cycles of treatment. At low speed One-time cleaning.

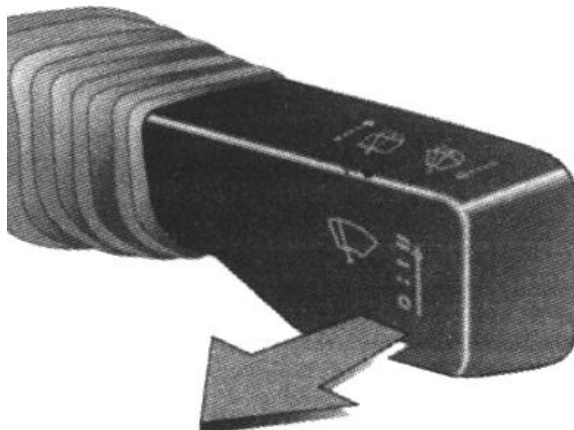


Fig. 1.109. Mode inclusion flushing device glasses and corrector

Cleaning device works when the headlights illuminated. The washing liquid is sprayed on the lights, after which the device is flush headlights off at 2 min.

NOTE

On cars with sensor rain should monitor for clean windows sensor.

Inclusion wiper and washers rear glass

To activate the wipers push the lever forward (Fig. 1.110).

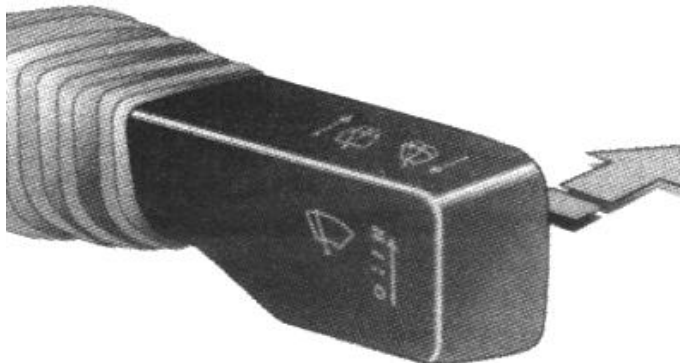


Fig. 1.110. Inclusion work stekloochi-stitelya rear glass

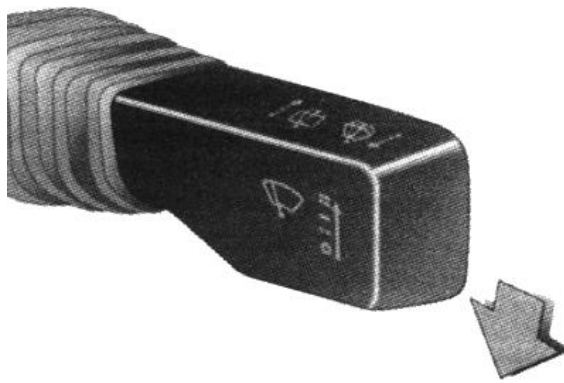
Rear window wiper works in periodic mode.

Rear window wiper is automatically enabled when working wipers and going backwards.

To activate the windshield of the slide lever forward and hold.

Care for front wipers

Before you replace or clean the brushes front windshield, within 4 seconds after the ignition is turned off, without removing the key, slide down the windshield wiper lever. Release the lever when the windshield wipers will take a vertical position (Fig. 1.111).



**Fig. 1.111. Setup Wiper
in vertical position**

To remove the brushes lift the wiper arm, rotate the brush at 90° to the lever and remove it.

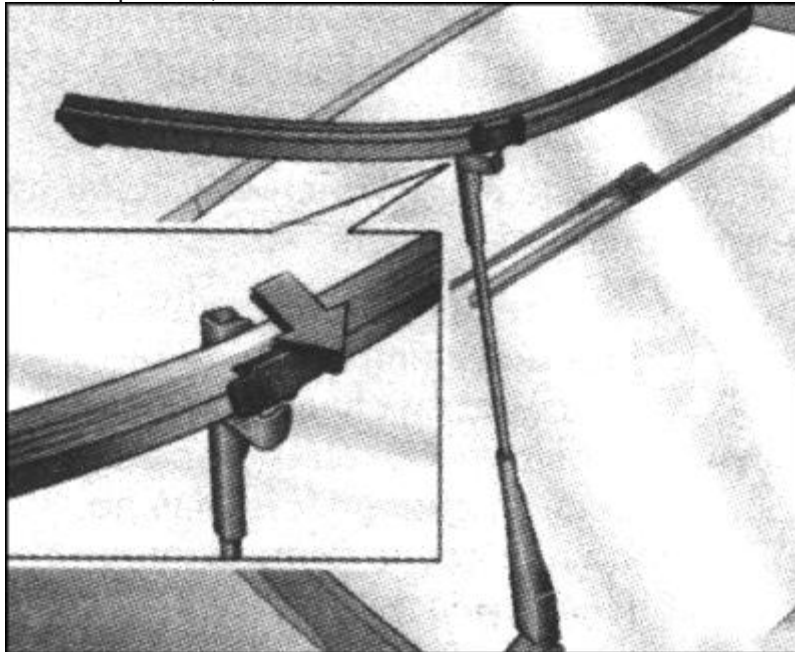


Fig. 1.112. Withdrawal Brushes anterior stack loochistitelya

To remove the brush, lift the rear wiper arm wiper.
Disconnect and remove the brush, as shown in Figure 1.113.

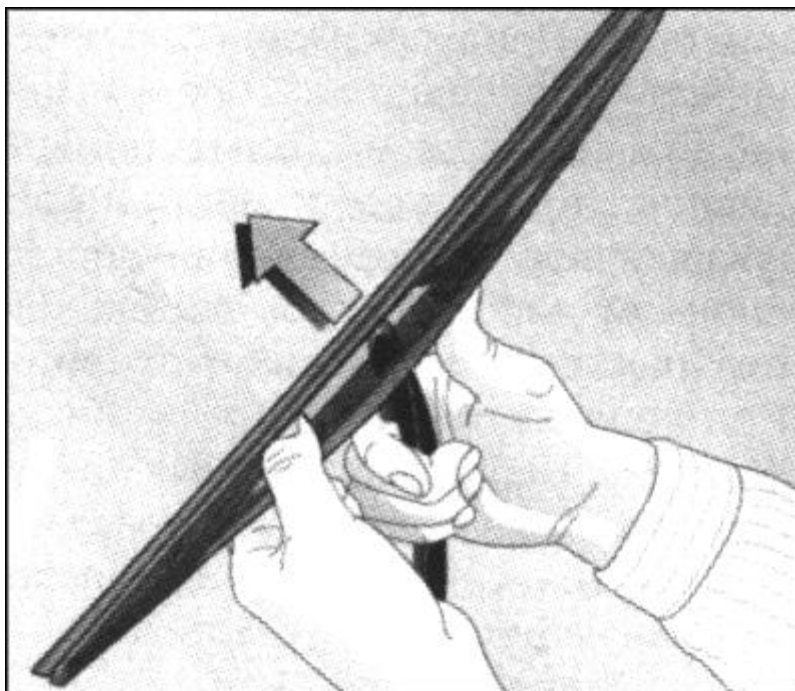


Fig. 1.113. Removing the rear wiper brushes

Cover fuel filler

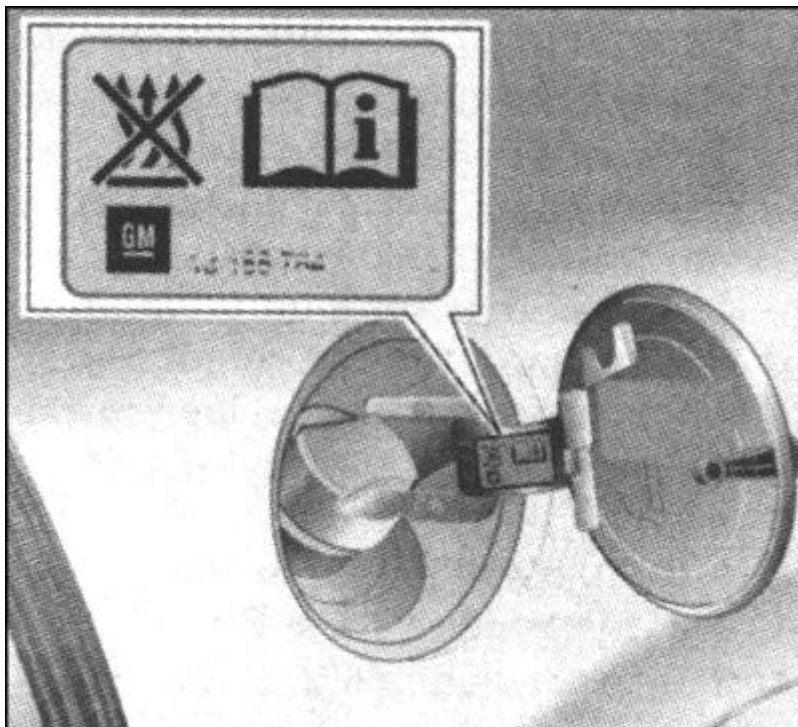


Fig. 1.114. Hatch and cover filler Gore-than half
Fuel tank

When replacing only install brand cap, which was released by Opel for the model of the car. Motor vehicles with diesel engines installed a special cover of the fuel tank.

Filling Vehicle Fuel

Before dressing sure to turn off the engine and, if necessary, additional heaters with combustion chambers (indicated on the sticker on the cover fuel filler).

NOTICE

In dealing with fuel is not permitted near open flame or spark formation. Do not smoke. This applies also to the places where fuel availability is noticeable only by its characteristic odor. If you smell fuel in the cabin should immediately remove the cause of its appearance.

Filling hole is situated to the right side of the car behind.

Filling hatch simultaneously with the doors unlocked.

Open the filling hatch by turning the filler cap of the fuel tank, remove it and hang it on the filling hatch.

NOTE

The fuel tank has a fill limiter which prevents overfilling of the tank.

To implement the correct filling must be able to handle the nozzle.

Insert the nozzle to stop and turn it on.

After the automatic shutdown is performed to re-dosed refueling prior to the nominal capacity of the fuel tank.

Nozzle, however, remains stuck until it stops.

To close the fuel filler lid, set it in place and rotate, overcoming resistance to tangible clicking striker.

Close the filling hatch.

Parking Brake

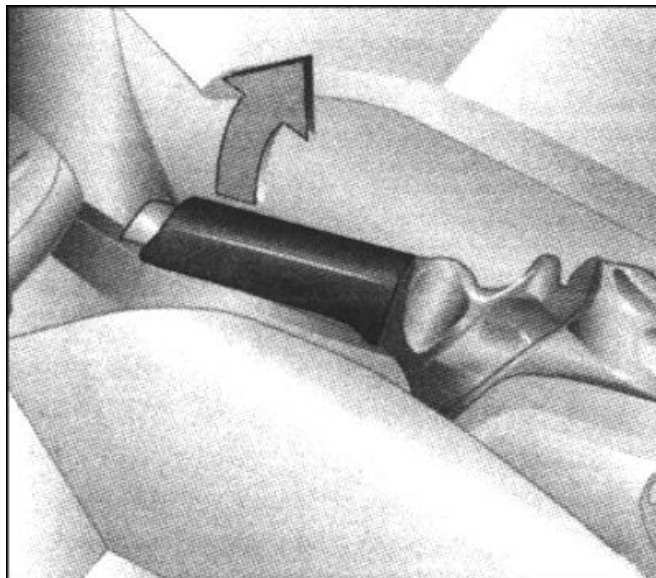


Fig. 1.115. Delays handbrake

On a slope or on the rise always tighten the parking brake is the most dense (Fig. 1.115). Mechanical parking brake acts on the brakes the rear wheels. When tightening, he recorded independently. To release the parking brake a little, lift the lever, press the button latch and fully lower the lever (Fig. 1.116).

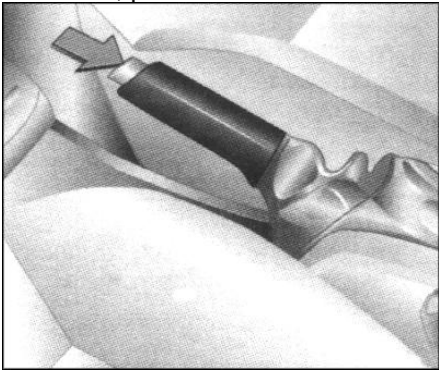


Fig. 1.116. Lowering parking brakes

1.13 Heating and ventilation system with air conditioning

Ventilation, heating and cooling car Opel Astra constitute a single functional unit, which is designed to create comfortable conditions in any weather and at any outdoor temperature.

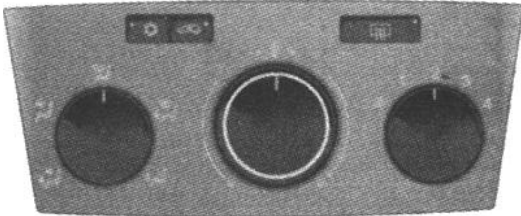


Fig. 1.117. Control panel for a heating and ventilation with air conditioning

When the cooling air is cooled and dried. A heating device in all modes warms the air as needed depending on the position of the temperature switch. Air supply can be adjusted by means of airflow. Keys and cooling system of air circulation only on vehicles equipped with optional air conditioning.

1.14 Electronic climate control system

This system provides maximum comfort for all weather, all outdoor temperature and at any time of year. To ensure a constant and comfortable climate in the car, we automatically adjust the temperature of incoming air, as well as flow and its distribution depending on the outdoor weather conditions.

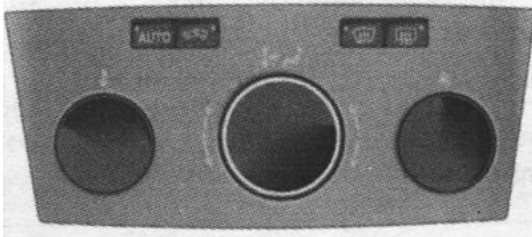


Fig. 1.118. Panel e climate-control system

Indication of the system is an information display.

The system of heating and ventilation

The left rotary switch is responsible for the distribution of flows of air supplied to the cabin.

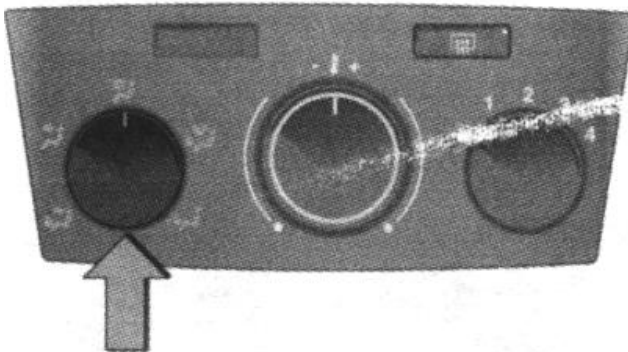


Fig. 1.119. Control air flow distribution

Mode blowing upper and lower interior space through the adjustable nozzle blowing.
 The regime of airflow through the interior space of the upper adjustable nozzle blowing.
 Regime of airflow through the windshield adjustable nozzle blowing.
 Regime of the wind blowing and the side windows and lower cabin of the space through the adjustable nozzle blowing.
 The regime of airflow through the interior space of the lower adjustable nozzle blowing.

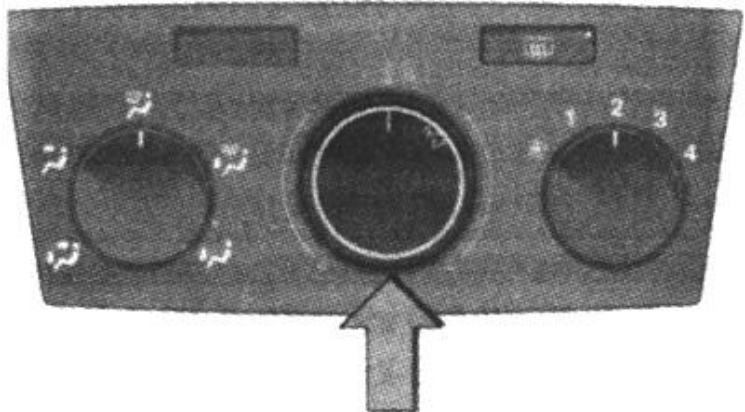


Fig. 1.120. Temperature air supplied

Average rotary responsible for regulating the temperature of air supplied to the salon.
 Turning the knob to the right is served warm air to the left - cold.

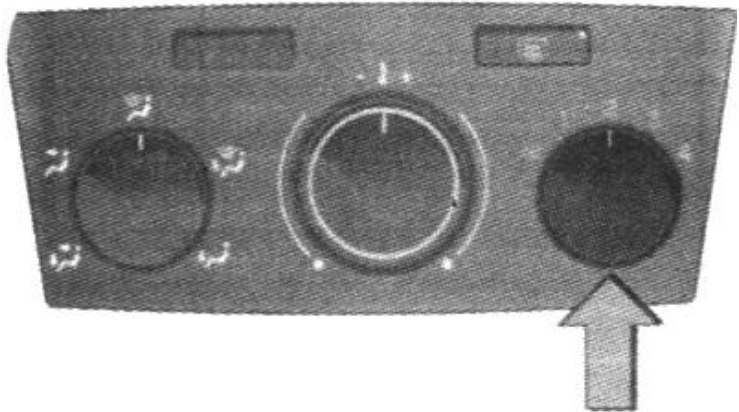


Fig. 1.121. Control air flow

Right rotary control is responsible for the air flow.
 The regulator has four speed blower. In the situation of the air supply is terminated.

NOTE

Waste air determined obdu-tion, so must include blowing and in time movement.
Heating rear glass, heated outdoor Mirrors rear type

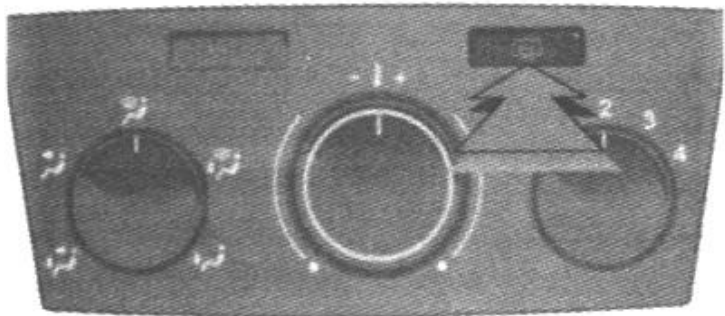


Fig. 1.122. Power key heating rear windows and outside mirrors

Heating is carried out with the engine running and automatically turns off after about 15 minutes. Alarm control is included in the switch.

NOTE

On cars with Diesel moving-graphy in time purification soot filter heating rear glass AB-tomaticheski off.

Mode Cooling conditioning

This mode is valid only when the engine is running and enabled blowing.
 Alarm control is included in the switch.

When the cooling (air conditioning compressors), air is cooled and dried. If this is not necessary, turn off the cooling for the fuel economy.

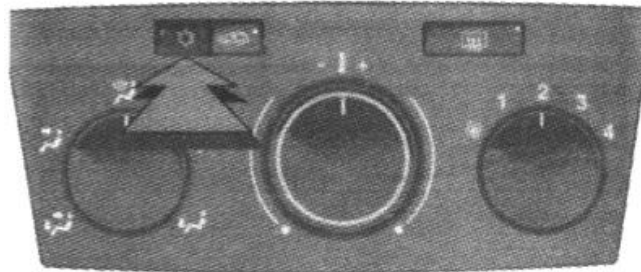


Fig. 1.123. Key activate cooling air conditioner

At low ambient temperatures cooling off automatically.

System Circulation air

With key switch circulating ventilation system switches to a mode of air circulation (detector included).

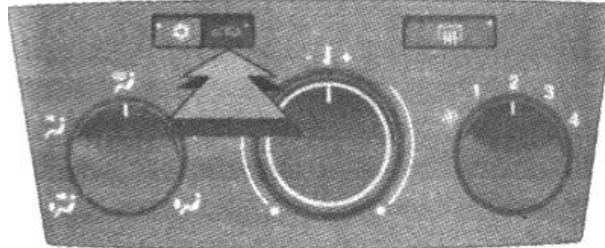


Fig. 1.124. Key off circulation

With the penetration of smoke or smell from the outside for a short time, turn on the system of air circulation.

Turn on the system of air circulation reduces breathability. Humidity increases, with the possible fogging glasses.

Air quality inside the cabin eventually deteriorates.

If the air valve switching to blowing the windscreen, air circulation system will automatically shut down for the accelerated removal of moisture from the glass.

Medium and side nozzle blowing

By changing the position of temperature is achieved comfortable ventilation of the upper cabin space.

To open the nozzle, turn the knob down the vertical ring. Turning the horizontal rings of the regulator changes the direction of airflow.

To close the nozzle, turn the vertical ring controller to lock up. An icon appears 0. Deflector plates remain open, but the air supply is terminated.



Fig. 1.125. Average nozzle blowing

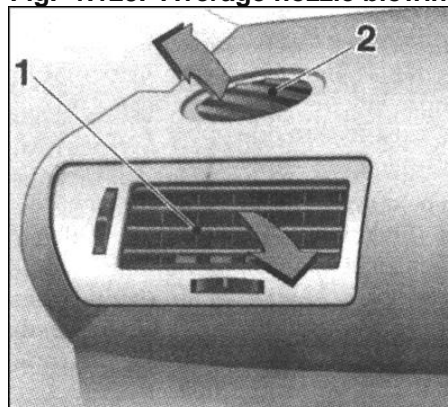


Fig. 1.126. Side nozzle blowing

Additional nozzles are located under the windshield and side windows, as well as the front in the lower area near the floor.

Heated front seats

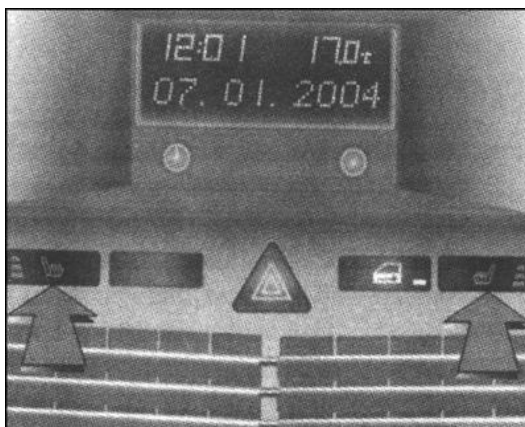


Fig. 1.127. Keys include heating front seats

Depending on the desired degree of heating press for the inclusion of the seat once or several times. Indication of the inclusion of one of the three steps is carried out an alarm indicating a key.

NOTE

People with high sensitivity skin not recommended -expendable use heating at most high stage.

In order to turn off the heating, press. If the alarm goes off in the key, then heating is turned off.

NOTE

Heated Seats performed only at running engine.

1.15 Automatic mode electronic climate control

This mode performs automatic compensation of temperature changes due to external influences such as sunlight. The indication is realized on the information display. Changes in individual parameters briefly displayed on the information display. Thus the currently displayed menu overlaps indication parameter.

Depending on the model of the display image may be different.

When locking the car using the remote control device settings climate control system are stored in memory for the corresponding remote control device.

It is possible to set the phone manually via the menu on the display.

When the cooling (air conditioning compressor) is cooling and drying.

Micro-filter cleans the air entering the outside air from dust and soot, as well as pollen and spores.

Automatic circulation system air

Automatic air circulation system with air quality sensor registers the presence of harmful gases surrounding and automatically switches to a mode of circulation.

In automatic mode, climate control maintains optimal parameters in almost any conditions. If necessary, climate-control settings can be configured manually.

Features climate control fully available only when the engine is running.

At low ambient temperatures cooling (air conditioning compressor) switches off automatically.

Automatic mode

To enable automatic climate-control mode, press «AUTO», open all the blowing nozzle, turn the air conditioner compressor, and then left the set temperature control at 22 ° C (Fig. 1.128).

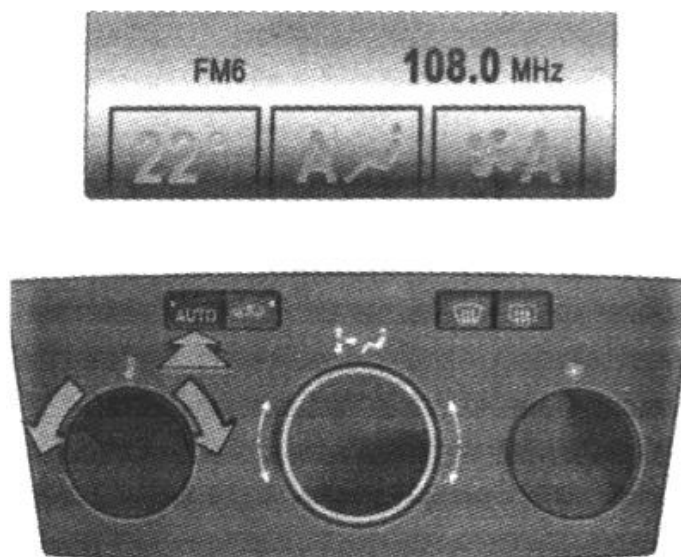


Fig. 1.128. Enable automatic mode

If necessary, you can set the temperature above or below.

If you turn off air conditioning compressor (the display shows the ECO) may reduce the level of comfort and security.

All nozzles blowing in the automatic mode, adjust automatically, so they must be kept open.

Automatic mode of air circulation

The ventilation system switches to circulation vozduhapri which the air in the cabin is mixed.

Automatic air circulation system with air quality sensor registers the presence of harmful gases surrounding and automatically switches to a mode of circulation.

At low outdoor temperature and off cooling (air conditioning compressors) the possibility of the automatic mode, the air circulation is limited. Thus avoid fogging of glasses. If necessary, activate the circulation of air manually.

Temperature

The temperature value is set left-regulator within 16-28'S.

To ensure comfortable conditions for the temperature should be changed gradually.

In the Opel Astra car with a system of rapid heating compartment «Quickheat» is an additional electric heater.

When you install the temperature below 16 ° C, the display shows Lo. In this case, climate control is working continuously with maximum cooling without temperature control.

When setting the temperature above 28 * C on the display shows Hi. In this case, climate control is working continuously with maximum power heating with no temperature control.

Installations temperature after ignition is turned off are recorded in the memory.

Installations manually

In special circumstances (such as icing or sweating glasses) climate-control settings can be configured manually.



Fig. 1.129. Menu Display at Installation
"Manual" control mode

Climate-control settings can be changed through secondary rotary knob, buttons and menus displayed on the display.

To access the menu, press the middle knob. The display shows the menu for manual settings climate control. Some menu items are indicated by turning the middle knob and select it by pressing. When you choose some other menu items appear, if the menu was selected by pressing.

To close the menu, turn the middle knob to the left or right to position «Return» or «Main» and confirm the selection.



Fig. 1.130. Disabling "Manual" Regis-ma Management

Performed manually install after the ignition is turned off are recorded in the memory.

Delete Moisture and frost with glasses

NOTICE

Failure these rules can lead to sweat degree-count and Accidents in result worsening-tion visibility.

Press activate the removal of moisture and frost from the glass. The display shows the appropriate symbol and the key will light signaling (Fig. 1.131).



Fig. 1.131. Off regime dehumidification and frost with glasses

Temperature and air distribution are installed automatically, airflow is over-capacity, and the glass quickly freed from frost and moisture.

Air flow rate can increase or decrease the rotation of the right of the regulator.

To return to automatic mode again, press mode or press «AUTO».

Inclusion and off the compressor conditioning

If the cooling or dehumidification is not necessary, turn off air conditioning compressor (the greatest fuel economy). To do this, click Manual Setup settings, scroll to the AU and press select it. The display ECO.



Fig. 1.132. Mode inclusion and OFF-tion Compressor conditioning

This cooling and removing moisture from the incoming air is not produced, thus limited comfort provided by electronic climate control system. This could lead, for example, sweat glasses.

To enable cooling mode, the manual settings menu, select the item and pressing a switch on AC cooling.

Mode distribution air

Turn middle knob, the display will cycle to show the settings of air distribution. The distribution of air can also be controlled using the menu «Air distribut».

Top: the distribution of air to the windshield and front side window

In the middle: the distribution of air to the passengers through the adjustable nozzle blowing in the front.



Fig. 1.133. Inclusion regime distribu-tion air

Down: distribution of air into the lower space of the passenger compartment.
To return to the automatic shut-down the air distribution settings, or press «AUTO».

Waste air

Turn the right knob left or right. Chosen level of airflow is shown on the display after the number of the icon (see Figure 1.134).



Fig. 1.134. Selecting the air flow

At stage 0 ventilation and cooling (air conditioning compressor) are switched off.
To return to automatic mode, press «AUTO».

Adjusting airflow characteristics in automatic mode

Parameters adjustment of airflow in the automatic mode can be changed manually.

In the manual settings menu choose the option «Autom blower» and then adjusting the desired characteristic (Fig. 1.135).



Fig. 1.135. Setup adjusting Ha-tics

In accordance with the established value increases maximalnyi air flow - and with it the noise level.

Inclusion and automatic shutdown circulation regime air

Automatic air circulation system with air quality sensor registers the presence of harmful gases surrounding and automatically switches to a mode of circulation.

In the manual settings menu choose the option «Auto, recirc» and pressing the knob turn on or off mode (Fig. 1.136).



**Fig. 1.136. Choice regime is auto-Coy
Circulation air**

If necessary, turn the manual mode of air circulation.

Manual mode of circulation air

Air circulation system prevents the infiltration of outside air in the cabin, while the internal air is pumped salon. Press, then on it will light detector. When the air circulation of air exchange is limited. Air quality inside the cabin eventually deteriorates. In the operating mode without cooling air humidity increases, so may fogging glasses. Manual air circulation includes only a short time. To turn off the manual mode of air circulation to re-press, a key indicator turns off.

Conditioning air at Nonoperating engine

When parked the car and the ignition is turned off, you can use more available in the heat or, respectively, cold air conditioning in the cabin, for example at a stop in front of the railway crossing.



**Fig. 1.137. Mode air conditioning
at Nonoperating engine**

To do this, press «AUTO» when ignition is turned off, the phone briefly displays the inscription «Residual air conditioning on».

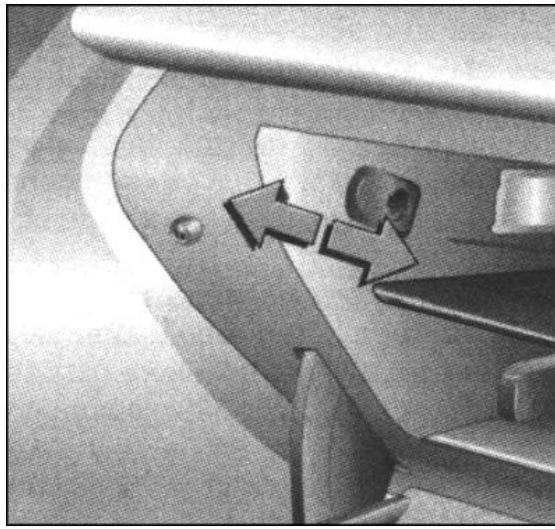
NOTE

Length air conditioning at Nonoperating moving-body limited.

To turn off the mode again press «AUTO».

Cooling anterior clothing box

The cooled air flows through the nozzle in the front kit box.



**Fig. 1.138. Inclusion and off ob Duva
anterior clothing box**

If the need for cooling the front glove compartment is not, move the nozzle forward (Fig. 1.138).

Intake

Air intakes are located in the engine compartment from the outside in front of the windshield (see Figure 1.139).

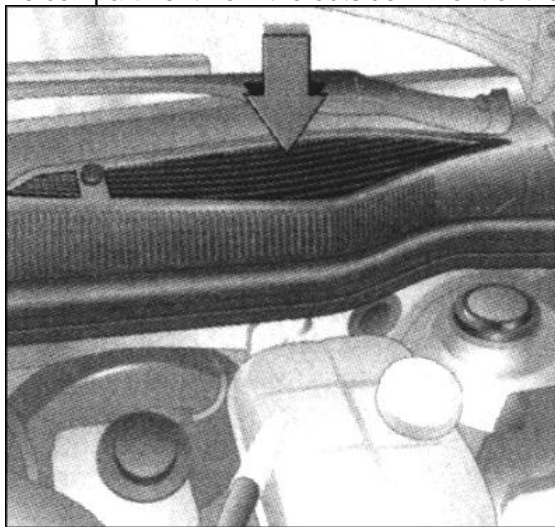


Fig. 1.139. Intake

They should be free for the flow of air, if necessary, remove the leaves from the air intake grilles, mud or snow.

Issue air

When placing items in the trunk does not block any openings for air outlet located on the right and left on the back wall.

Air microfilter

Micro-filter cleans the air entering the outside air from dust and soot, as well as pollen and spores. A layer of activated carbon to remove the air from extraneous odors and harmful gases. Air microfilter should be replaced at intervals specified in the service book.

Instructions for maintenance of air conditioning and heating

If wet weather mist over the windshield, you should briefly turn the system airflow to the windshield.

The most efficient air conditioner works when the windows and sliding sunroof are closed. A strong heating of the passenger compartment after prolonged exposure to sunlight for a short time, open the windows and sliding sunroof to ensure the rapid removal of heated air.

NOTICE

When enabled air conditioning (oh-lazhdayuschem compressor) image-etsya condensation water, flow-schaya on bottom car. When inclusion conditioner (oh lazhdayushego compressor) should be Open although would one Hole-stie for release air, something would Evaporator not covered INE-em from - for insufficient airflow.

Maintenance System

To ensure stable operation, the compressor air conditioner should be regardless of the weather and time of year once a month to include a few minutes. If in-vehicle climate control is done automatically during the ride.

NOTICE

Mode work system air-conditioned nirovaniya with included compressor-litter conditioning not possible with low outdoor temperatures. When occurrence system failure contact for help to station maintenance.

1.16 Incandescent interior lighting

Navigational light

NOTE

After close Doors car off Internal illumination-tion is with some for the delay.

To activate the navigator's lamp click on the appropriate key. To turn off the light, press the same button again (Fig. 1.140)

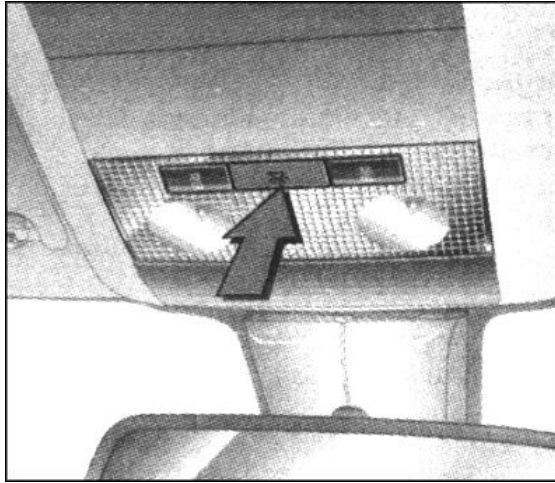


Fig. 1.140. Key inclusion navigator-sky lantern

Adjusting lighting middle console automatically, depending on lighting conditions, with the ignition.

Auxiliary front reading lights

Reading lights right and left are included separately in the ignition.

To activate the auxiliary lamps click on the appropriate button. To turn off the light, press the same button again (Fig. 1.141)

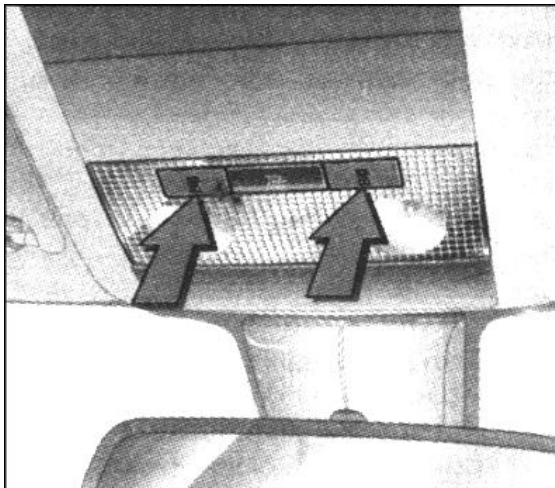


Fig. 1.141. Keys inclusion Subsidiary Lamps

Interior lighting and reading lamps rear

NOTE

Rear Lamps Salon burn in open doorway together with ne-rednimi at Installation switching-Chairpersons in average position.

Lamps for reading includes a separate rear left and right with the ignition.

To activate the rear lights click on the appropriate button. To turn off the light, press the same button again (Fig. 1.142)

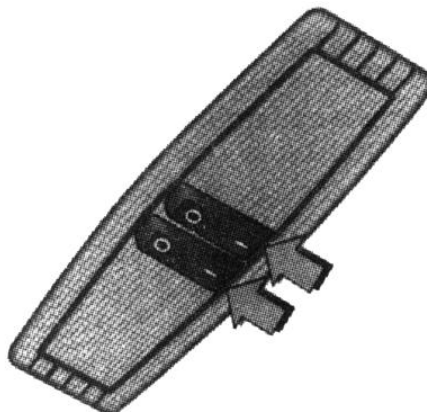


Fig. 1.142. Keys include the rear lights

Coverage of the front glove compartment

Lamp illumination lights up when you open the lid.

Illuminated mirrors in the sun visor

Backlight turns on when lowering the mirror.

Lighting entrance

After unlocking the door for a few seconds lights dashboard lights and switches.

Highlighting the space behind the car

After unlocking the car for a few seconds of lights illuminating the plate.

Lights doorknobs

Internal handle for opening the front doors are illuminated when the exterior lighting.

Lighting a cigarette lighter and ashtray

Lamps lights burning when the ignition key.

Lighting luggage

Lamp lights up when you open the trunk.

Privacy from discharge of the battery

Interior lighting, reading lamps, lighting, trunk and glove compartment in the front ignition is turned off automatically turns off after 20 minutes to protect the battery from discharging.

Caps fixtures

Under adverse conditions, in cold and damp weather, with heavy rain or after washing the car can be briefly sweat inner surfaces of fixtures. Fogging disappears quickly by itself, to accelerate the process can include lighting.

1.17 Rear-view mirrors

Internal

Tilt internal mirror by turning his body. Turn the lever on the underside of the shell mirror reduces glare at night (Fig. 1.143).

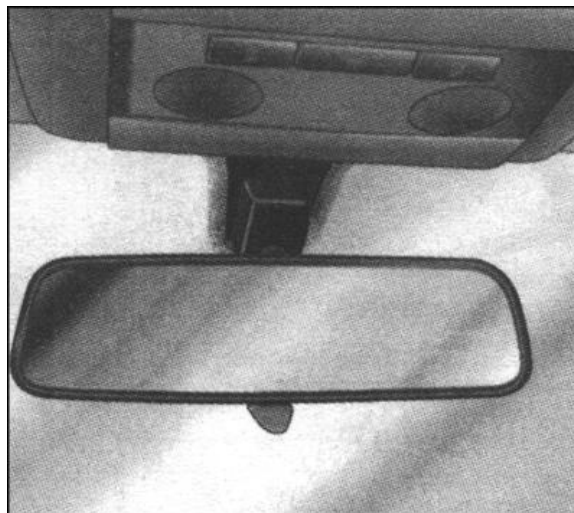


Fig. 1.143. Internal mirror rearview

Automatic anti-dazzle interior mirror

Automatically reduce the effect of glare at night to avoid discomfort while driving in the dark (Fig. 1.144).

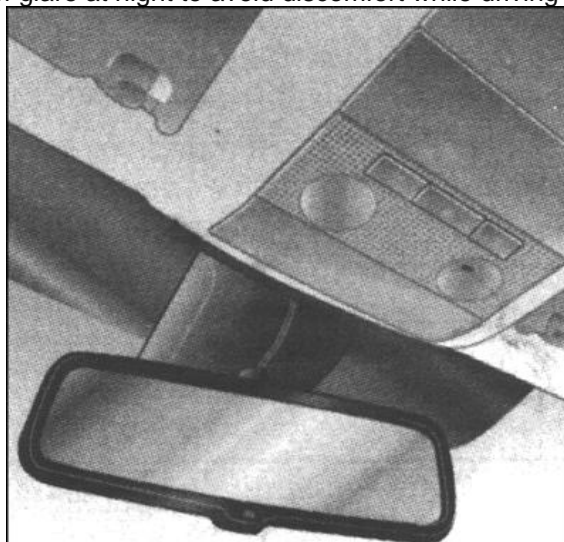


Fig. 1.144. Automatically blackout-Hsia internal mirror

NOTE

When off ignition Zerka-lo not obscured.

Outdoor

For the safety of pedestrians in a collision outside mirrors are made up of its state. Lock them in position can easily push (Fig. 1.145).

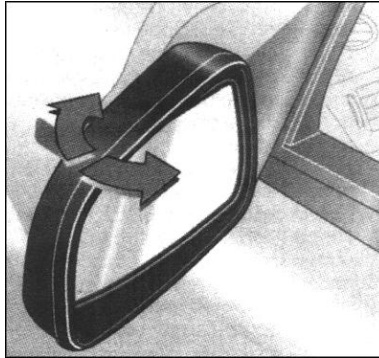


Fig. 1.145. The emerging outside mirror

Aspheric convex outside mirror

The rear field of vision is increased to reduce to a minimum so-called "dead zones" in the rear corners of the vehicle (Fig. 1.146).

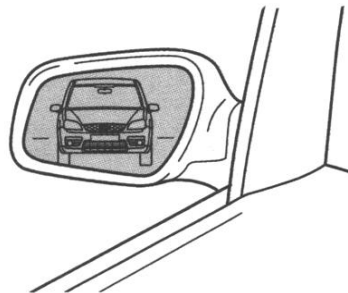


Fig. 1.146. Aspherical convex in the District mirror

NOTE

Because - for small distortion is possible only rough estimate distance to following behind vehicles.

Adjusting exterior mirrors

By car Opel Astra, mechanical installation is carried out lever by which the mirror can be rotated in the appropriate direction (Fig. 1.147).

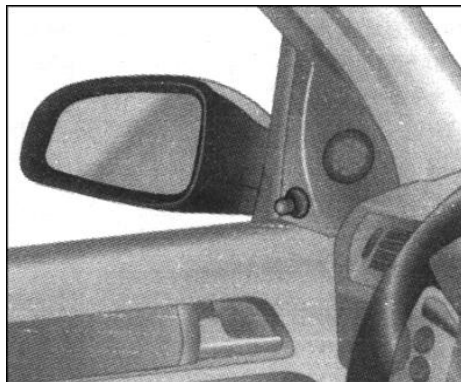


Fig. 1.147. Mechanical external regulation mirrors rear type

Power adjustable exterior mirrors the situation by using the four-switch on the driver's door (Fig. 1.148).

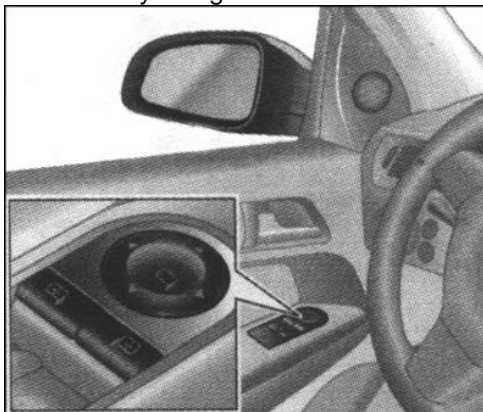


Fig. 1.148. The switch of the automatic mirrors

To adjust the click of a button left or right mirror. In this case the four-switch controls the corresponding mirror.
To fold exterior mirrors

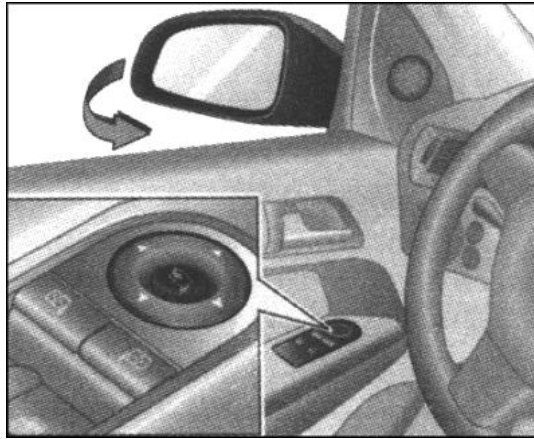


Fig. 1.149. To fold the automatic rear-view mirror

If you want to add the mirror manually, simply hold him to the body of the car body.
When adjusting the electrically press the corresponding key on the switch, both outside mirrors will arise.
Once again press the same key and both exterior mirrors return to their original position (Fig. 1.149).

1.18 Steering wheel

Unlock the steering wheel

To unload the stopper lightly turn the steering wheel, with a turn-key in the first fixed position of the ignition switch, as shown in Figure 1.150.

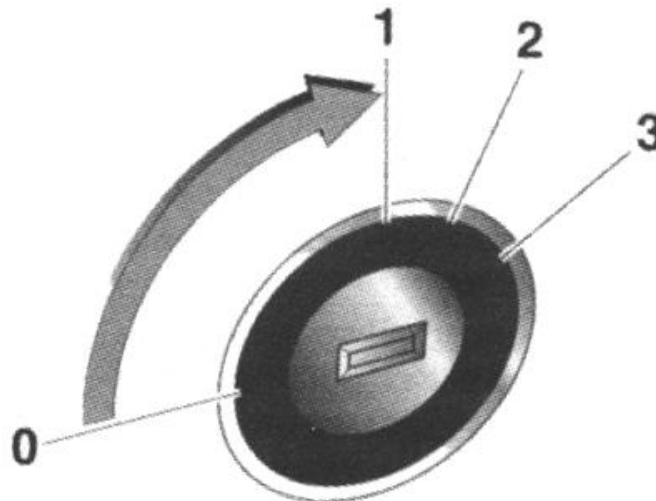


Fig. 1.150. Withdrawal lock steering

Tilt steering wheel

Turn the lever down and adjust the height and distance from the steering wheel, turn the lever up and fix it. It will emit a characteristic click (Fig. 1.151).

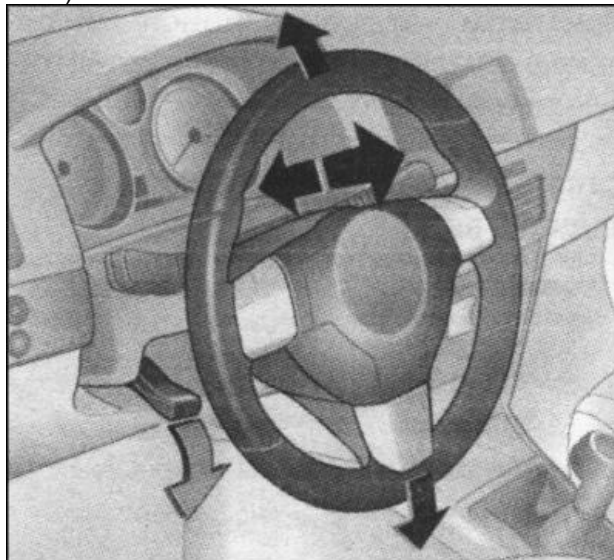


Fig. 1.151. Adjustment of handlebar-Vågå wheels

NOTICE

Regulation of the steering wheel produce only a hundred yaschem car and at removed blocks of markings.

1.19 The cigarette lighter plug and power outlet

Cigarette lighter is located under the ashtray lid (Fig. 1.152).

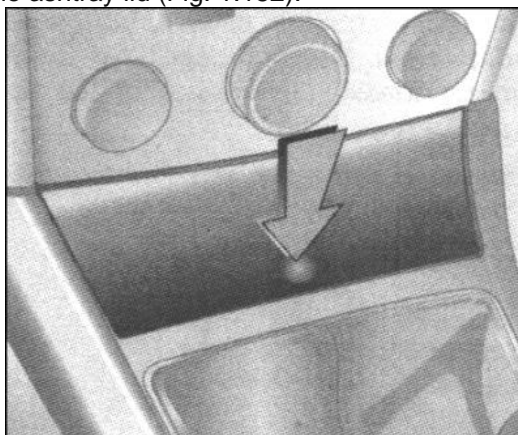


Fig. 1.152. Cigarette lighter

The lid is opened by pressing in the marked spot.

To use the cigarette lighter, press it. When spiral burn, cigarette lighter will automatically return to its original position.

Jack for optional accessories

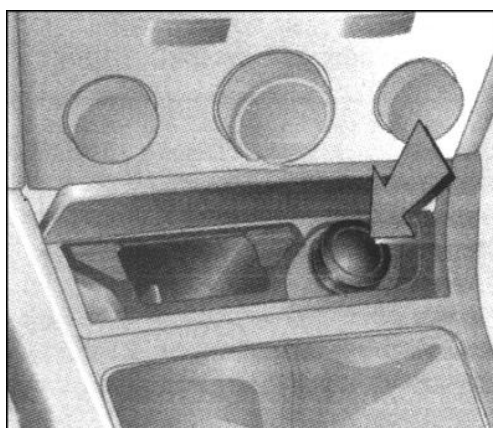


Fig. 1.153. Location sockets for additional accessories

Socket Cigarette Lighter can be used to activate electrical equipment.

NOTICE

When off engine this leads to detente battery.

NOTE

In the model «Caravan» HYDRATED additional plug for the equipment of is in trunk (Fig. 1.154).

Not Avoid damage sockets inappropriate plugs. Maximum consumption Motor input more elektropromyshlennosti burs not should exceed 120 watts. Do not connect appliances, feed Coffee current, for example Chargers device or batteries.

Mapped appliances must on Indicators electromagnetic Compatibility accordingly stvovat DIN VDE 40 839. In against Mr. case possible problems in work car.

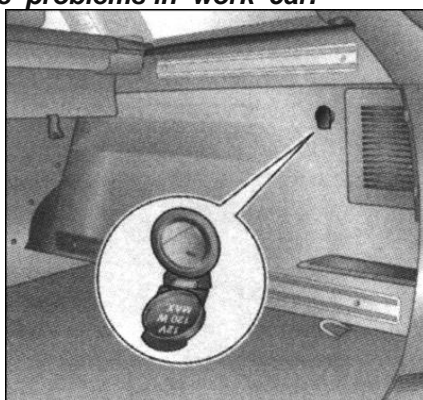


Fig. 1.154. Location Supplemen-tary plug connector in model «Caravan»

1.20 Ashtrays

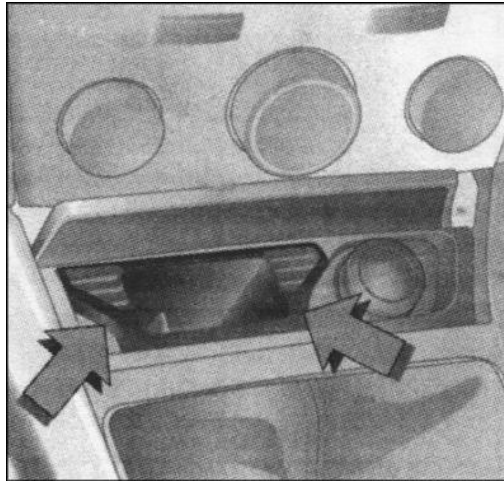


Fig. 1.155. Removing the front ashtray

NOTICE

Use Ashtrays only ash and not for igniting waste.

Front ashtray

Ashtray lid is opened by pressing a marked spot. To empty the liner, you should take it from two sides, as shown in Figure 1.155, and pull up.

Rear Ashtray

Rear ashtray is located in the middle console rear.

To pull the ashtray, click on one of its sides, and turn (Fig. 1.156).

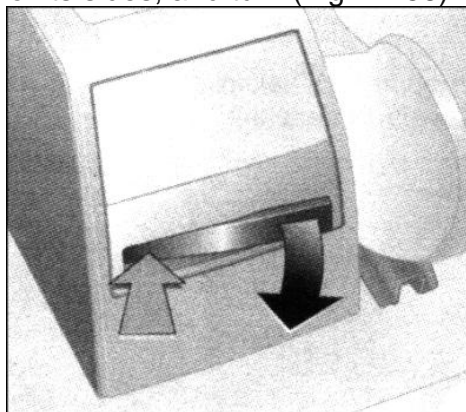


Fig. 1.156. Opening back Ashtrays

For emptying the ashtray open, click on the spring (arrow) and pull the ashtray back (Fig. 1.157).

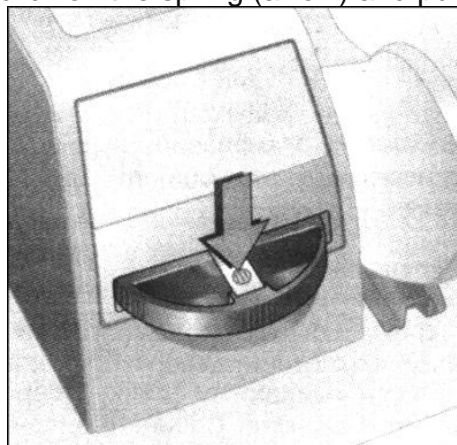


Fig. 1.157. Extract back Ashtrays

Folding tables

Folding tables are located on the back of the front seats. To pull the tilt table top until it clicks. To return to the starting position with little effort to push the table and pull it down.

NOTICE

Not put on folding tables cha-zhelye subjects

1.21 Front box kit

Front clothing box located on the dashboard, in front of the front passenger seat (see Figure 1.158).

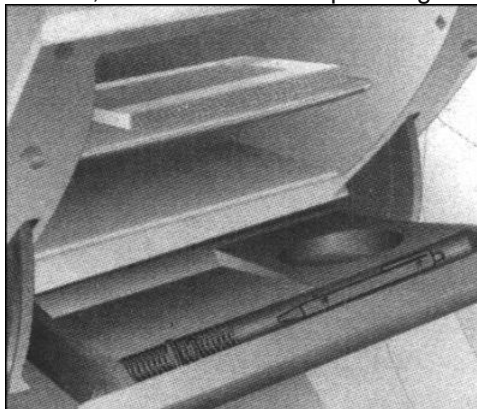


Fig. 1.158. Front clothing box

To open a clothing box, pull the handle latch up. Rack front glove compartment is removed to free her from the latch, you need to pull the front edge.

To insert the shelf into place, insert it into the side rails and secure it, hugging the back wall.

In front of the open cover has a holder for a pencil and compartment for storage of coins (in case of parking).

Clothes box in front armrest

To open the box, click the button and lift the upper arm (Fig. 1.159).

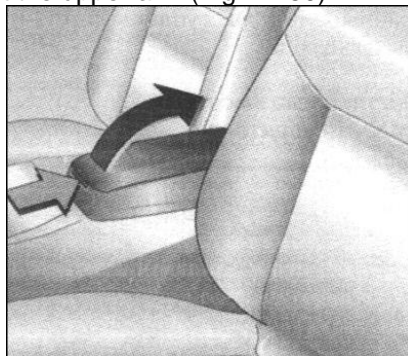


Fig. 1.159. Clothes box in front armrest

1.22 Compartment for glasses

Compartment for points located at the top of the car from the driver (Fig. 1.160). To open it, pull the compartment down.

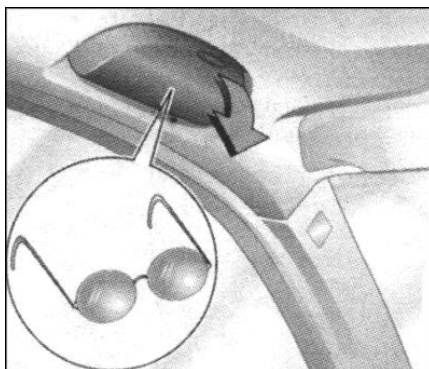


Fig. 1.160. Compart for points

NOTE

Not put in compartment heavy pre-meta.

1.23 Roofs - Sun visors

Sun visors are designed to protect from bright light. Roofs can be omitted and rotated to the side.

NOTE

On cars with panoramic set glass before displacements plating ceiling, Sunglasses-tsezaschitnye visors should from throw - up.

1.24 Seats

The seats, headrests, seat belts and airbags protect people in the car.

When planting in the car to adjust the head restraint so that the tip of the head restraint is at the top of the head.

Do not install the front seats too close to the control panel. The driver must hold the steering wheel, so that his hands were in the points corresponding to 10 and 2 h on the dial clock, and elbows were slightly bent. The legs should also be slightly bent, the driver had the opportunity to press the pedal until it stops.

Seat belt must pass through the center of the shoulder. Belt should tightly enfold hips, not stomach.

Slide the front passenger seat back as far as possible.

Seat backs should not be too rejected. Recommend installing seat-back angle of about 25 °.

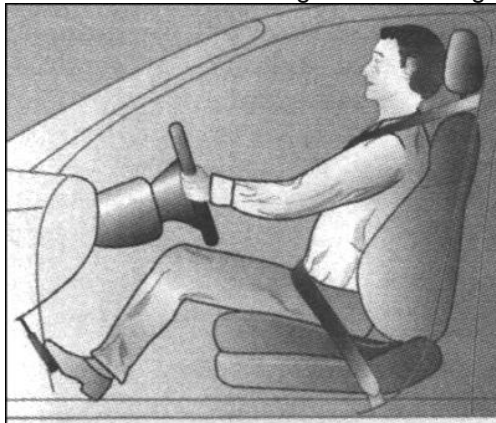


Fig. 1.161. Proper Planting on vodi telsom seat

Shift Seats forward, backward and up

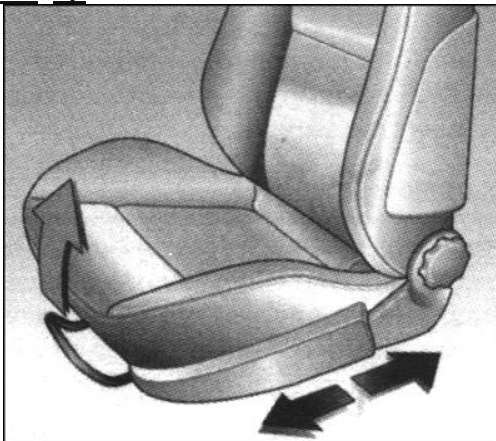


Fig. 1.162. Moving Seats For-ward, backward and up

To adjust the seat pull up the lever located on the outer front edge of the base seat. Letting go of the lever, push the seat to ensure the reliability of fixing the latch.

Adjust the height of the seat with a lever located on the outer side of the seat cushion.

NOTICE

Prohibited move seats in time drive. When elongated ry-chage they may suddenly shear o.s.

Adjustment angle torso Seat

Turn the knob located on the outer side of the seat cushion. If the seats are shifted all the way forward, the seat backs can be thrown back in full.

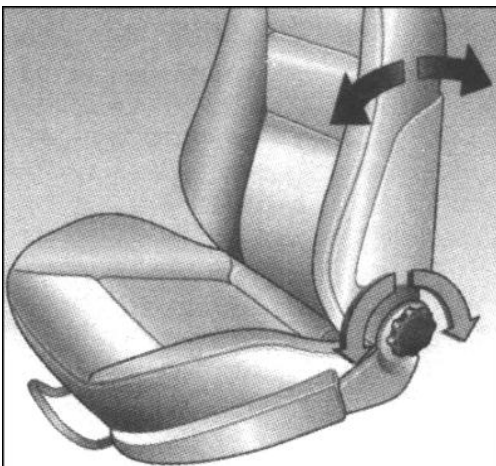


Fig. 1.163. Adjustment angle torso Seat

Lumbar support

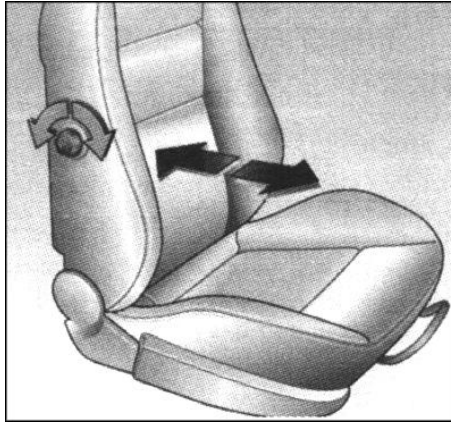


Fig. 1.164. Adjustment lumbar support

To increase the protrusion lumbar support seat forward pull lever on the side of the seat back. To reduce the protrusion pull the lever back.

Adjustment Seat height driver

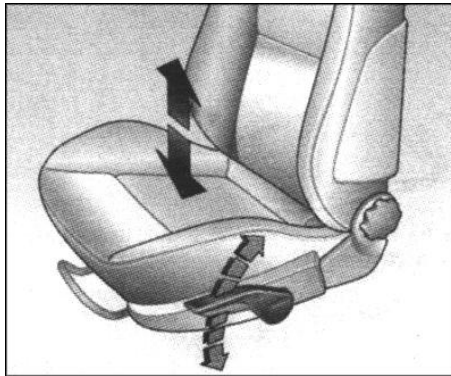


Fig. 1.165. Adjustment height driver's seat

Adjust the height of the seat with a lever located on the outer side of the seat cushion. To lift the seat a few times pull the lever up until it reaches the desired height. For lowering the seat a few times to push the lever until it reaches the desired height. Each lever seat rises or falls at low altitude.

Adjustment slope front Seats

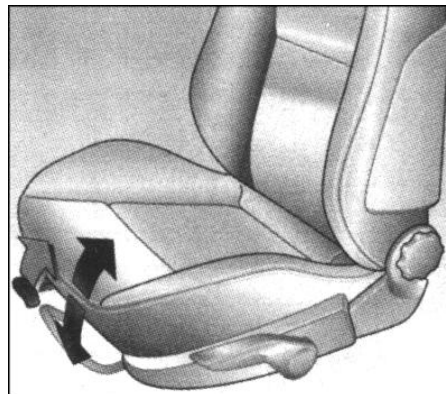


Fig. 1.166. Adjustment tilt before-them Seats

To adjust the internal pull the lever in the front seat, adjust the desired tilt and release the lever. Secure the seat until it clicks. Changes in the tilt of gravity achieved by the movement of the body.

To fold backs of the front Seats

In order to fold the seat back, pull up release lever, tilt the back forward and secure. Slide the seat forward.

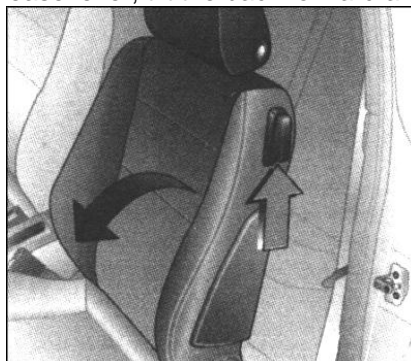


Fig. 1.167. Folding back antero th Seat

To raise the back, move the seat all the way back, pull the release lever up and lift the back.
 You move back the front seats with memory function of the electron of the seat is fixed in the previous situation.
 Front seat without this feature when you move back to lock in the desired position.

NOTE

On Opel Astra cars with panoramic set glass before скла-дывaniem Seat lower down headrests and fold sun up visors.

Front seat head restraints

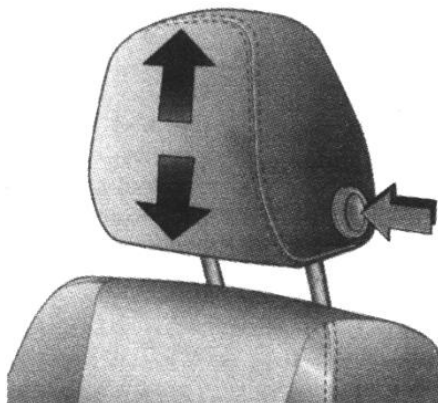


Fig. 1.168. Adjustment HR ne-rednego Seat

Adjust the head restraint so that the tip of the head restraint is at the top of the head.
 To adjust the height pull the headrest up or click on the lock and push the head restraint down.
 Make sure that the headrest is fixed.
 To remove the head restraint, press the lock and pull the headrest up (Fig. 1.169).
 For head restraints in place, click on the button and push the head restraint down.

Headrests rear seat

To raise the head restraint, pull it up to install the required position.
 For lowering, click the lock and push the head restraint down.

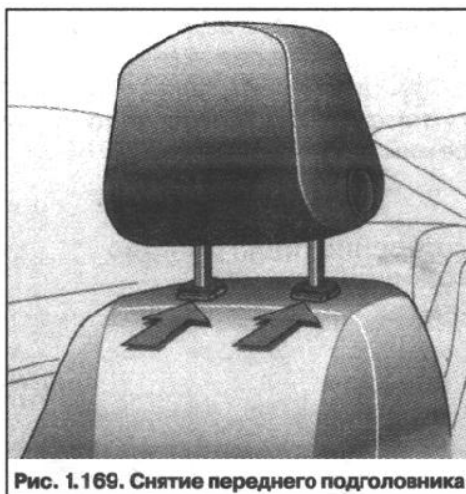


Рис. 1.169. Снятие переднего подголовника

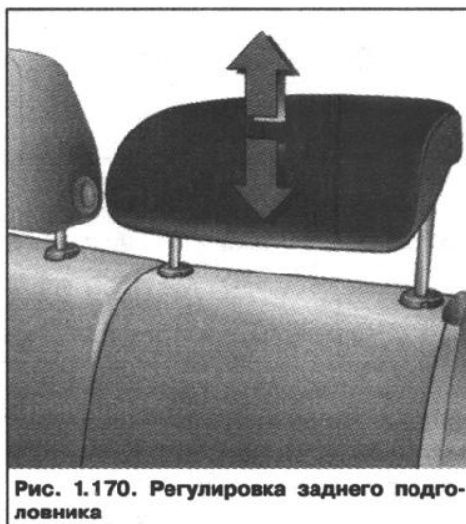


Рис. 1.170. Регулировка заднего подголовника

Be sure to lift the rear seat headrest, if it sits a passenger or installed restraint device for children.

NOTE

To lay back rear SEA-tions should completely Op-vented or dismantle rear headrests.

Armrest on the driver's seat

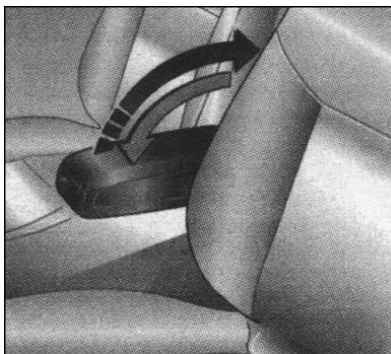


Fig. 1.171. Adjustment anterior mean-kotnika driving Seat

Press the raised armrest down, overcoming resistance, and lower it. By raising the armrest, it can be gradually set in one of several fixed positions (Fig. 1.171).

Adjusting the rear row of seats

Lift the handle under the pillow and slide number of seats in the desired position. Lower the handle and fix a number of seats until it clicks (Figure 1.172).

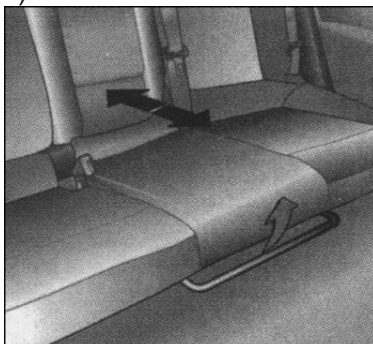


Fig. 1.172. Adjustment rear number of seats

Armrest on the rear seat back

Raise the front armrest, pull the loop down diagonally (at an angle of 45 °) (Fig. 1.173). When using the rear middle seat or a folding rear seat back, set up armrest.

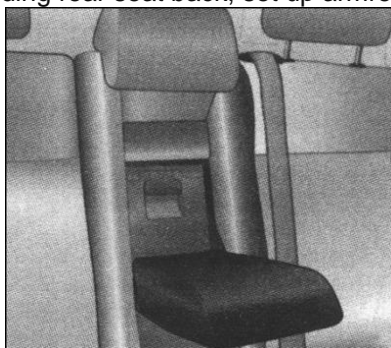


Fig. 1.173. Armrest on back postero th Seat

NOTE

For armrests is per-slonka aperture luggage department-tion for transportation long narrow subjects.

Increase Trunk space («Limousine»)

Fold the rear seat back. Rear headrests completely omit or dismantled. Move slightly forward front seats. Rear seat back, whole or split, and unlock button and fold on the seat cushion. Slide the front seats back in the desired position (Fig. 1.174).

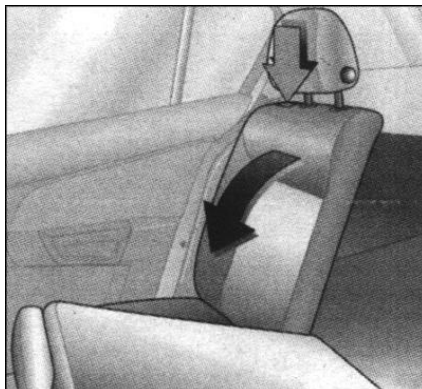


Fig. 1.174. Increase Space ba-gazhnika («Limousine»)

To fold average back back Seat

Fully lower the head restraint down. Loosen the back, pulling the handle and put it on the seat cushion. Folded average folding back seat allows you to load long items. The ends of the seat can be applied to passengers (see Figure 1.175).

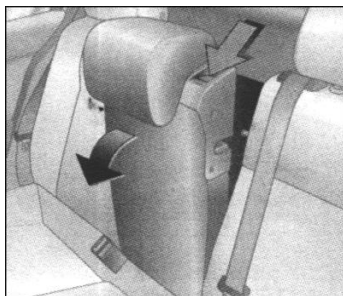


Fig. 1.175. Folding average back back Seat

NOTE

Cargo not must interfere parking management brake and lever switch transmission.

Installing the rear seat back in upright position

To protect against damage to miss the safety belt through the side of the holder (Fig. 1.176).

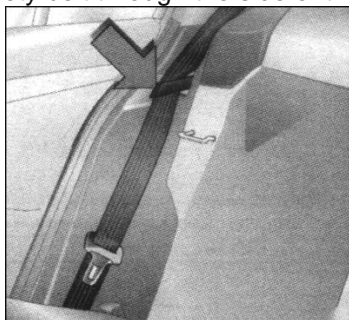


Fig. 1.176. Side holder belt Be-zopasnosti

To install the back of the rear seats in the upright position, you should fix the blockade until it clicks. Three-point safety belt in the middle and rear seats can be withdrawn from the traction device only if the fixed rear seat back.

Increase Trunk space model «Caravan» without moving number of rear Seats

Put the rear seat back on the pillow (Fig. 1.177).

Fully lower down, or disassemble the rear headrests. Remove the hooks of the luggage enclosure with head restraints. Move slightly forward front seats. Rear seat back, whole or split, and unlock button and put it on the seat cushion.

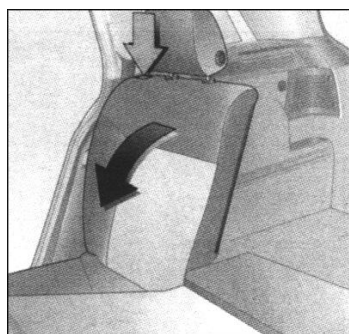


Fig. 1.177. Moving back rear seat

Move the front seat back to the desired position.

Pull the loop on the seat cushion and lift the rear seat cushion (whole or split) (Fig. 1.178).

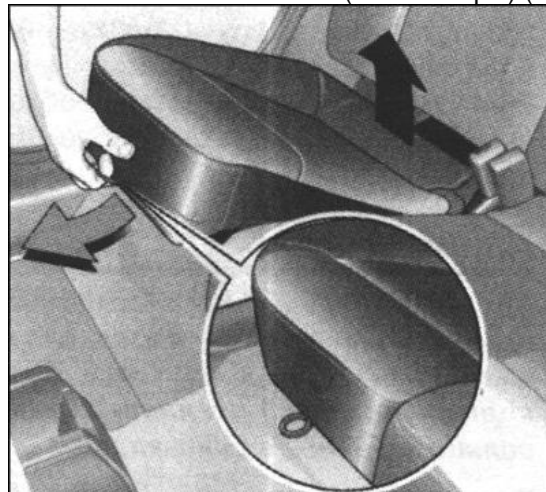


Fig. 1.178. Raising pillows rear seat

Remove the hooks of the luggage enclosure with head restraints.
Remove the outer rear head restraints, and the average HR is lower all the way down.
Dismantled headrests put in compartments, trays under the raised seat cushion (Fig. 1.179).



Fig. 1.179. Bays - pallets for Storage restraints

Release the back seat (whole or split) by pressing the button latches, fold it and secure it (Fig. 1.180).

To fold average back back Seat model «Caravan»

Fully lower the head restraint down.

Unlock the back, pulling the handle and put it on the seat cushion, or, if raised rear seat cushion, put it forward until it clicks (Figure 1.181).



Рис. 1.180. Складывание спинки заднего сиденья



Рис. 1.181. Складывание средней спинки заднего сиденья

Folded forward average folding back seat allows you to load long items. The ends of the seat can be applied to passengers.

NOTE

Cargo not must interfere parking management brake and lever switch transmission.

Installing the rear seat back in upright position or lowering the rear seat cushion

To protect against damage to miss the safety belt through the side of the holder (Fig. 1.182).

To install the seat back in upright position, should raise them up to do this, click the button on the backside. Backs in the upright position fix with a noticeable click.



Рис. 1.182. Боковой держатель ремня безопасности



Рис. 1.183. Установка подушки сиденья в вертикальное положение

Lift the seat cushion (Fig. 1.183).

Insert the headrests in the rear seat, and adjust their position. Lower the seat cushion, with a note on the correct position locks of safety belts. Fasten the hooks on the headrest shell luggage.

NOTE

Three-point Strap ааçîàñîñ-ti on average and back Opel Astra car seat can pull of tensioner mouth-total employment only at fixed-term back rear seat.

Increased luggage space model «Caravan» with moving near the rear seats

Fully lower down or disassemble the rear head restraints (Fig. 1.184).

Remove the hooks of the luggage enclosure with head restraints. Move slightly forward front seats. Back seat, whole or split, razblokiruyte with flaps and fold on the seat cushion. Move the front seat back to the desired position.

Lift the rear seat cushion and fold the seat backs (Fig. 1.185).

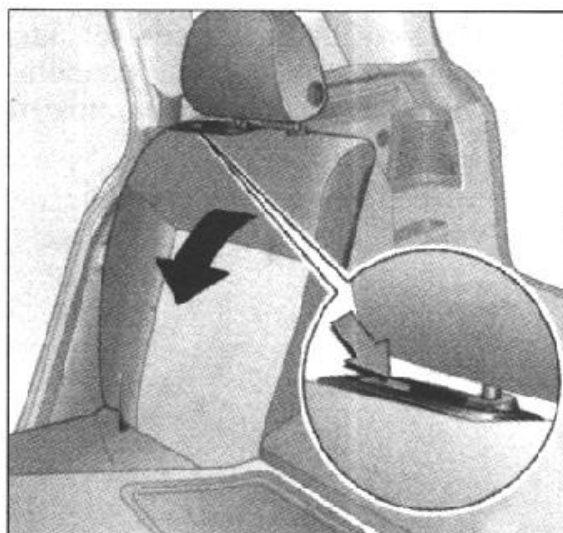


Рис. 1.184. Фиксаторы задних подголовников

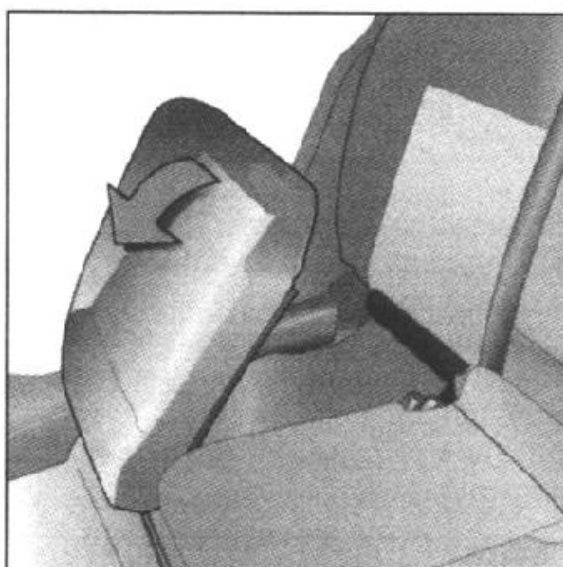


Рис. 1.185. Складывание подушки заднего сиденья

Lift the rear seat cushion (whole or split). Remove the hooks of the luggage enclosure with head restraints. Remove the outer rear head restraints, and the average HR is lower all the way down. Dismantled headrests put in compartments, trays under the raised seat cushion (Fig. 1.186).

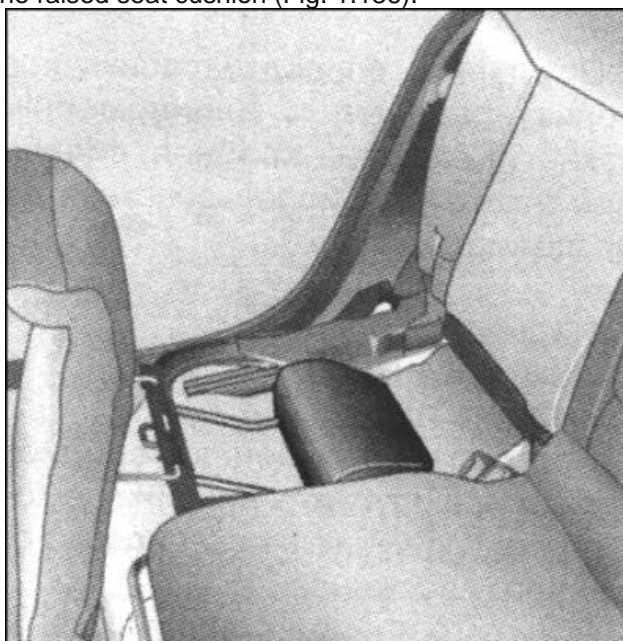


Fig. 1.186. Bays - pallets for Storage restraints

Release the latch rear seat back (whole or split), fold it and secure it (Fig. 1.187).

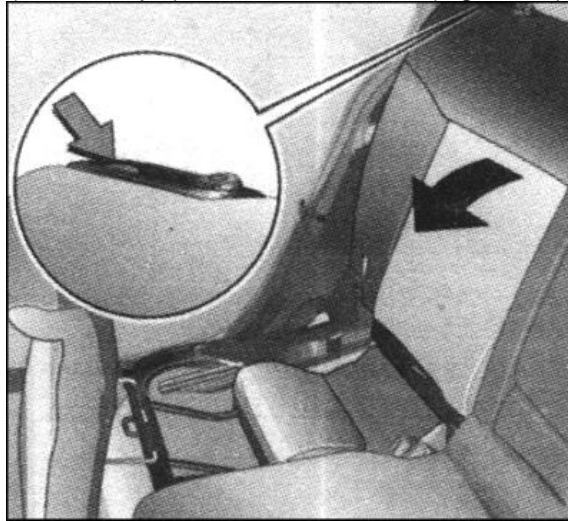


Fig. 1.187. Folding back rear seat

Ability Downloads for armrests on back back Seat

Raise the front armrest, pull the loop down diagonally (at an angle of 45 °). Pull the handle and lower the front flap (Fig. 1.188).

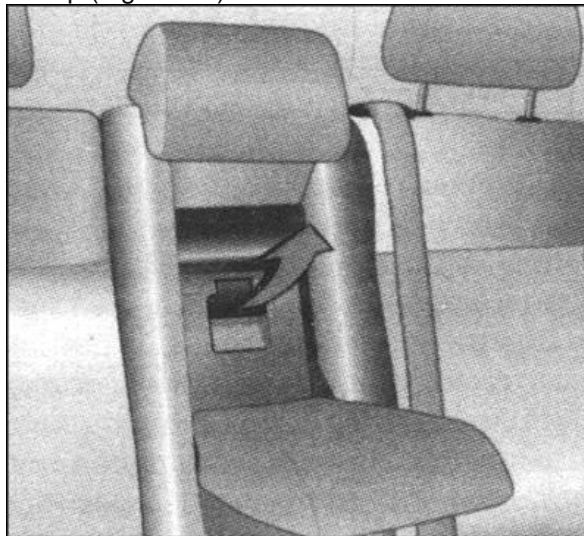


Fig. 1.188. Handle flap rear Sub-stays

Either forward flap allows you to carry lengthy narrow objects. The ends of the seat can be applied to passengers.

To fold back front passenger

Headrest front passenger seat lower down or dismantled. Slide back the front passenger seat. Lower the front seat back, raising unlock lever (Fig. 1.189).

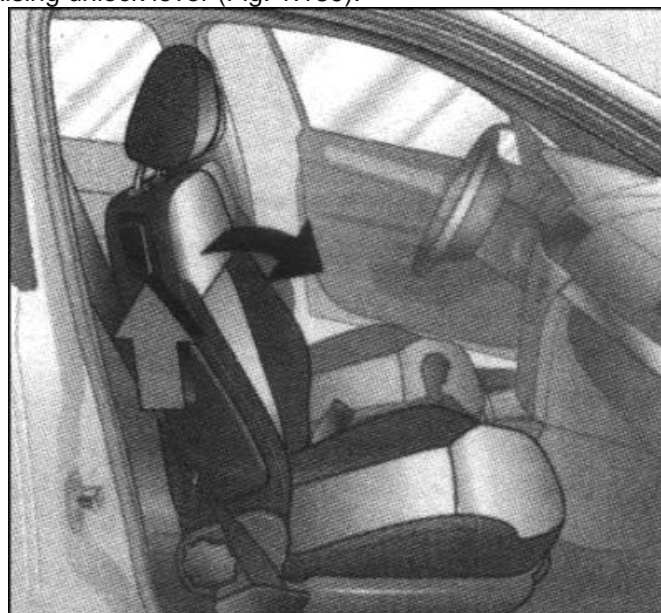


Fig. 1.189. Folding back front passenger

To set back in upright position, press the release lever forward, set the front passenger seat back in upright position and secure it with a noticeable click.

Casing luggage («Limousine»)

To dismantle the housing fastening straps to remove the rear door. Lift the cover and pull it out of the side rails (Fig. 1.190).

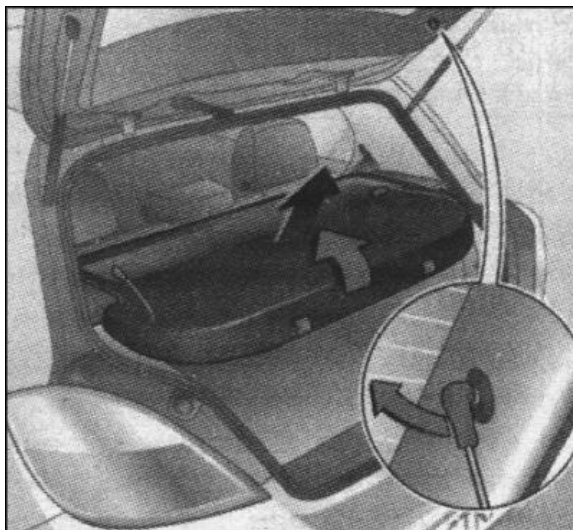


Fig. 1.190. Withdrawal housing luggage

Installing the place is in the reverse order of removal.

Casing luggage («Caravan»)

Click the handle housing luggage down jacket folds automatically (Figure 1.191). Pull the shell luggage back, it locks itself in position.

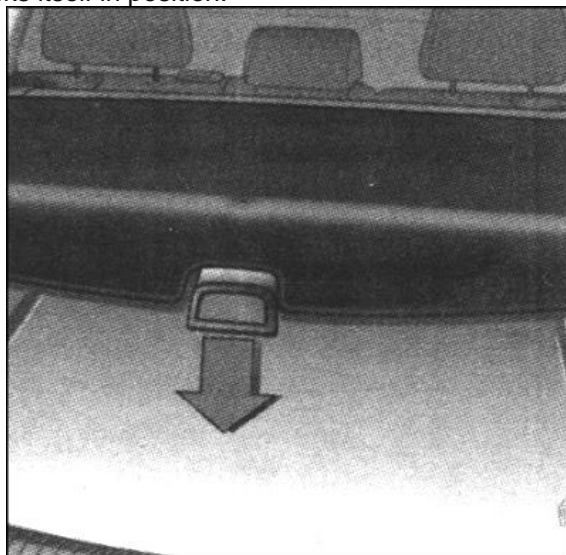


Fig. 1.191. Removing the shell luggage

NOTE

Not put on housing items with OS-trymi edges and large weight.

To close the gap between the hood and trunk back of the rear seat of the tape set Regiment. Both the hook to attach the shelves in guiding head restraints installed in the barrier grid hooks pass through its cell lattice (Fig. 1.192).

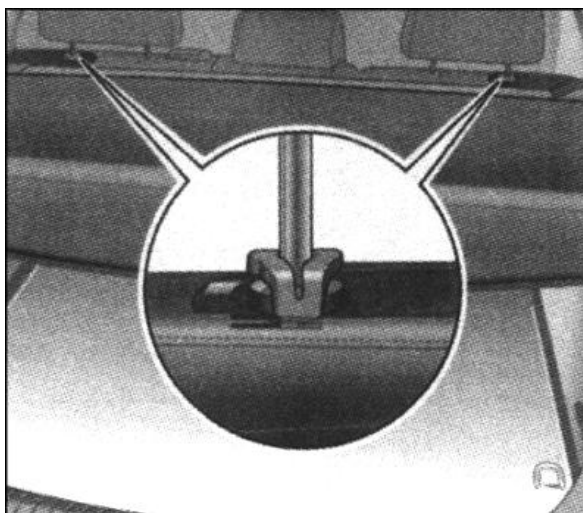


Fig. 1.192. Closure gap between skin-hum luggage and backs rear Seats

Dismantling housing

To dismantle, open the trunk and remove the cover hooks to the head restraints. Turn the release lever on the right side of the trunk lining up (Fig. 1.193). Lift sheeting on the right and pull it out of seizures.

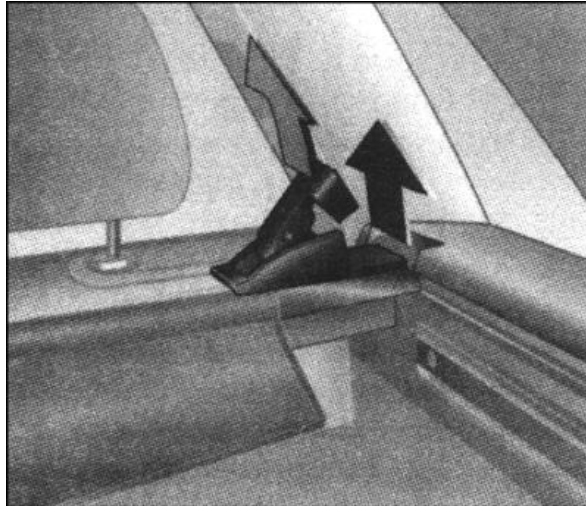


Fig. 1.193. Lever release housing ba-gazhnika

In order to mount the luggage cover, insert it into the left mounting, turn the release lever on the right side up, set the luggage cover in the right mount, secure, and lower the lever down. Then fasten the hooks on the headrest.

Ofaditelnaya lattice («Caravan»)

Fencing bars can be installed behind the rear seats or, with folded and raised the rear seat cushions for them. Expand the fence bars. In the frame of the roof are two mounting holes. Supports lattice hang in the mounting holes, first with one, and then the other side and lock forward movement (Fig. 1.194).

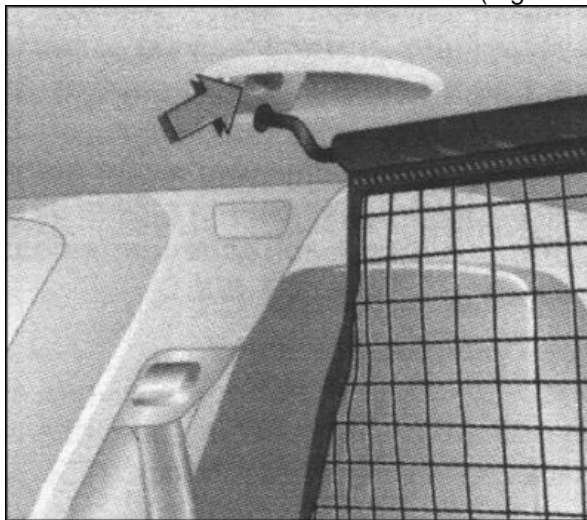


Fig. 1.194. Setup barrier lattice

If a car Opel Astra is equipped with not moving near the rear seats to fit the length of the belt barrier bars, should pass a top hooks and eyelets straps to keep them in the lug on the floor left and right (Fig. 1.195).

If installed in a car moving a number of rear seats to fit the length of the belt barrier bars, should pass a top hooks and eyelets straps to keep them in the lug on the back of the rear seat backs left and right.

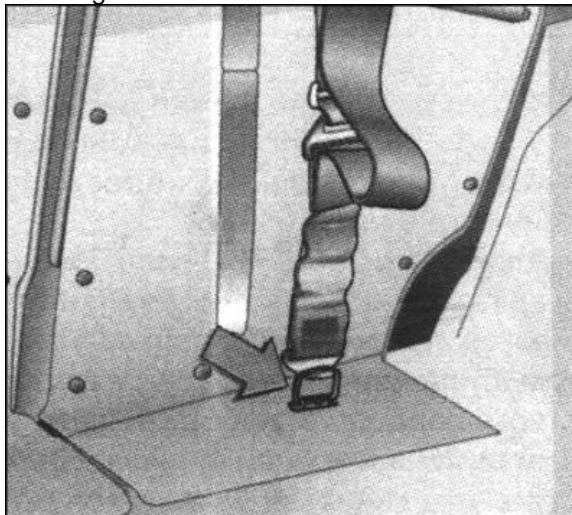


Fig. 1.195. Fastening belts fence-tion lattice

Installation barrier lattice for front seats

Lift the rear seat cushion. Expand the fence bars. In the frame of the roof over the front seats are two mounting holes. Supports lattice hang in the mounting holes, first with one, then the other side and secure it to move forward.

If the number is not moving the rear seats to fit the length of the belt barrier grilles, should be removed from the upper hooks and eyelets straps to keep them in the lug on the floor left and right (Fig. 1.196).

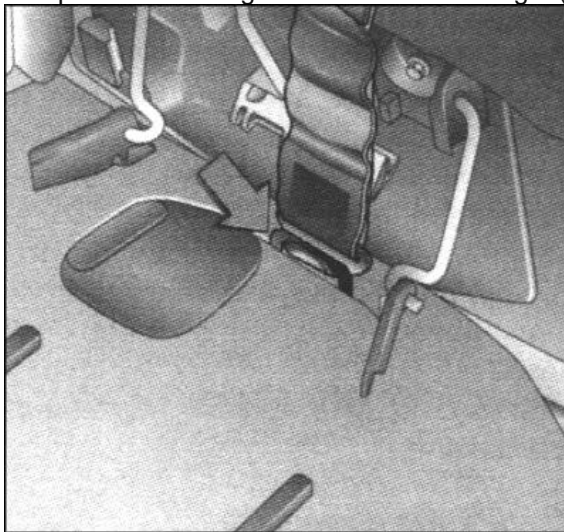


Fig. 1.196. Fastening belts fence-tion lattice

If the number of moving the rear seats to fit the length of the belt barrier grilles, should be removed from the upper hooks and eyelets straps to keep them in the right and left of the bracket under the seat cushions raised (Fig. 1.197).

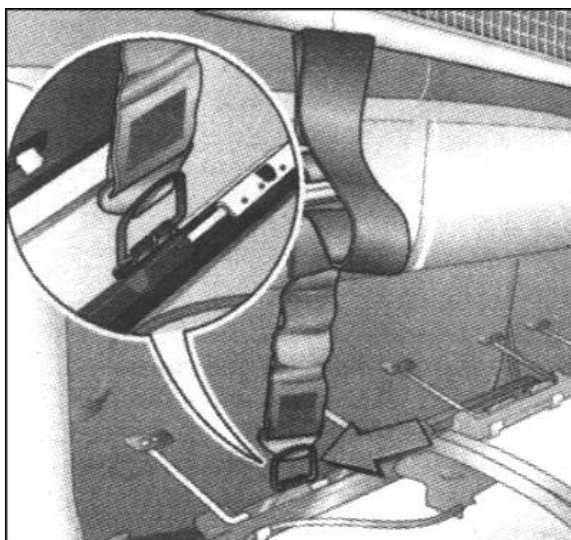


Fig. 1.197. Fastening belts fence-tion lattice

Then unmount the outer rear seat head restraints and seat backs folded forward.

Dismantling barrier lattice

Remove the hinge stretch belt barrier lattice, lifting knob length (Fig. 1.198).

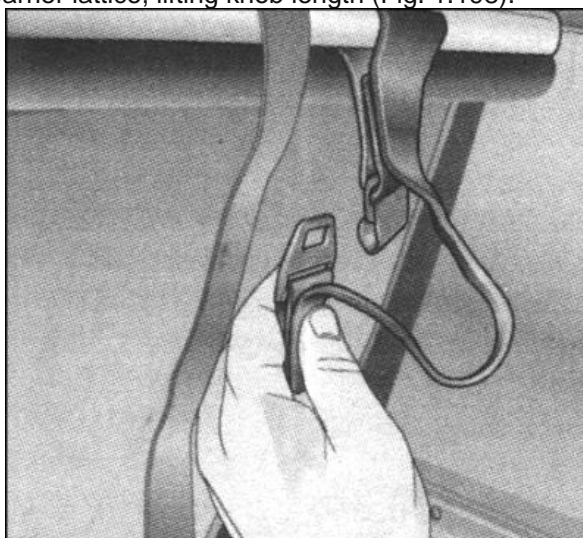


Fig. 1.198. Withdrawal loop stretch belts

Support barrier grid remove from mounting in the frame of the roof, roll up grille and styan belt-strap.

Guides and hooks trunk («Caravan»)

At the sidewalls of the boot is on the two guides. Insert the hook in the guide in the desired position to do so, set the hook in the top notch guide and slide into the lower groove (Fig. 1.199).

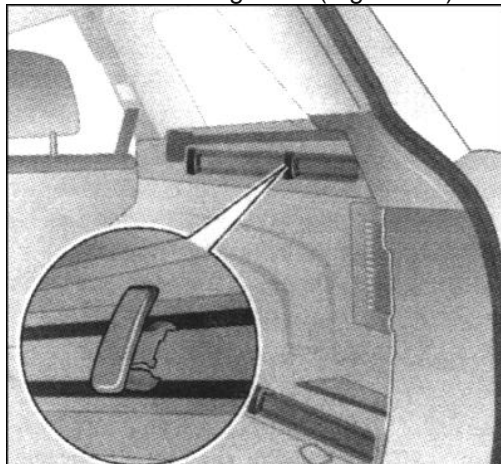


Fig. 1.199. Installation guide hooks in trunk

Pull the hooks to be removed.

The system of organization of space luggage «Rex Organizer» model «Caravan»

Universal mounting system for the separation of luggage space and stowage in the performance «Caravan» consists of the following elements:

- Adapters
- Adjustable net;
- Mesh bags on the side walls;
- Hooks in the trunk.

The components are mounted in two guides on each side wall of the trunk with the help of an adapter or hooks (Fig. 1.200).

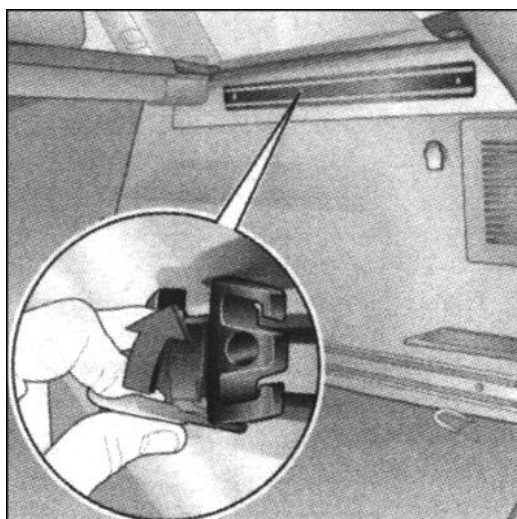


Fig. 1.200. Mounting Adapters system-we «Flex Organizer »

Adjustable net

Select one adapter for each guide, lift the latch, insert the adapter into the upper or lower guide groove and move the guide in position (Fig. 1.201).

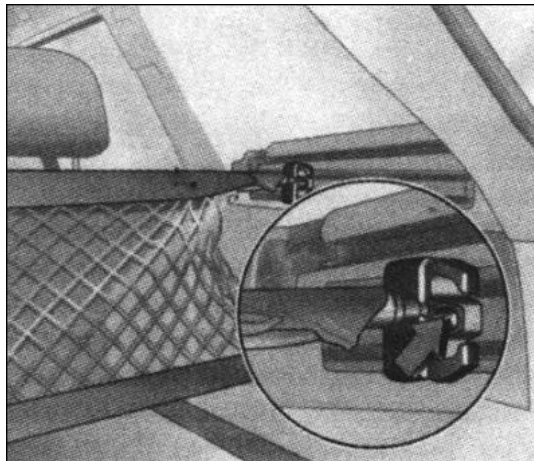


Fig. 1.201. Setup Bindings governed by separation grid

To lock the adapter, lift up the tongue. Lightly squeeze the support of the separation grid and insert into the holes adapters. A leg length should be inserted into the upper adapter.

Hooks and mesh bags

Insert the hook in the desired position on the guide. To do this, set the hook into the upper groove guide and slide into the lower groove. On the hook you can hang a mesh bag (Fig. 1.202).

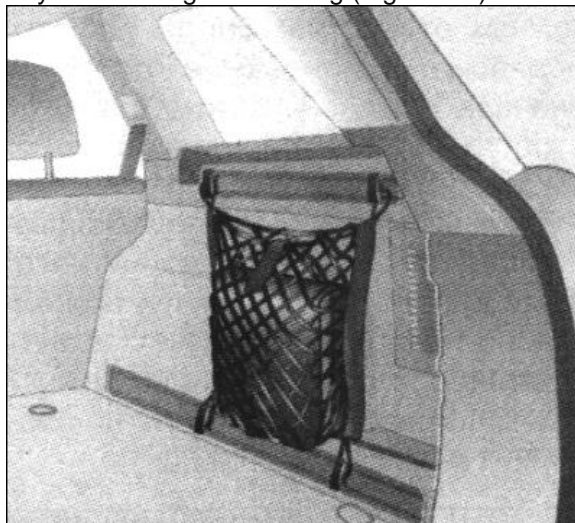


Fig. 1.202. Setup net Bags

To remove the hooks, squeeze the bearing walls and remove them from the adapter.

To remove the adapter, lift the flap, and unlock the adapter into the bottom groove and pull it from the top groove. Unlock the hooks on the rails.

Fixing lugs

The lugs are designed for secure mounting in the boot straps and nets for luggage.

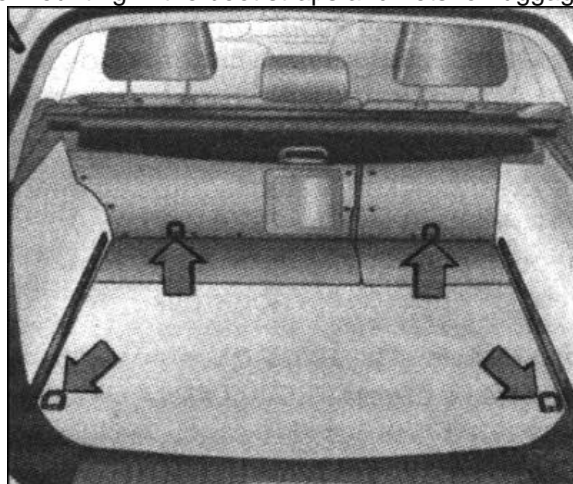


Fig. 1.203. Fastening eyelets

Staples for fastening system to ensure children's safety ISO-FIX

Staples, located between the backrest and seat cushion, used to mount the system to ensure children's safety ISO-FIX (Fig. 1.204).

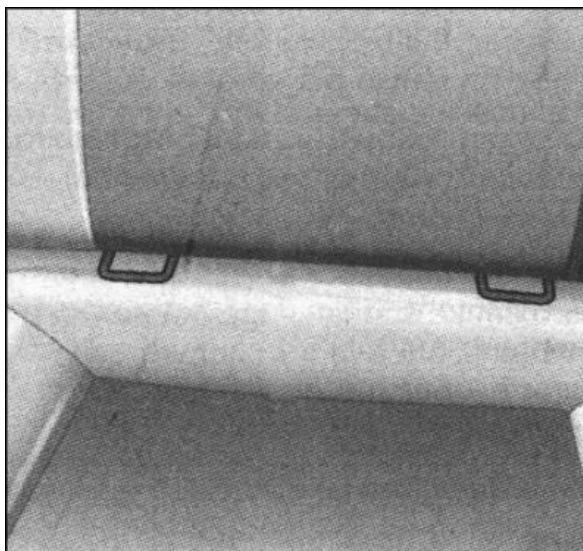


Fig. 1.204. Staples for fastening systems for child safety ISO-FIX

NOTE

It Required comply with the instructions supplied to system-me ensure Security de Tei ISO - FIX. Allowed use only allowed for this type auto mobil system ensure safety Children ISO - FIX.

Cargo Box

Folding box located under the hood floor and serves to separate the luggage compartment (Fig. 1.205).

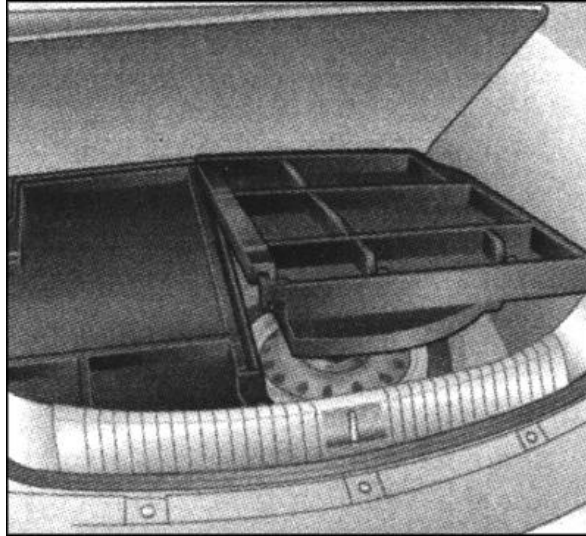


Fig. 1.205. Cargo box

In the cargo box, you can download something only when fixed in an upright position back rest.

Removal cargo box remove cover sex, first right and then left him half. On cars with trailer coupling should release fastening strap ball bearing and pass it through the eyelet. Assembling the box is carried out in reverse order of removal.

1.25 Passive safety system

Belts Security

Seat belts help reduce the likelihood of severe injuries in an accident and emergency braking of the car. All seats are equipped with bias-seat belts. These belts are equipped with an inertia reel, which retracts the unused seat belt. Inertia reels provide convenience for the driver and passenger in a normal driving conditions. In the case of collision inertia reel block the issuance of the belt and keep the driver and passenger of dangerous movements. In the back seat installed diagonally-seat belts with inertia reels.

Always WEAR YOUR SAFETY BELT, and see to it that all the passengers were also wearing or using appropriate restraints.

Nepristegivanie belt is extremely dangerous. In the case of an accident, the driver and passengers not wearing seat belts, can hit each other or the elements of the body, and can be thrown from the car. And they can get seriously injured or even killed.

Do not operate the vehicle with faulty seat belts.

In the collision of a car seat belt strap is used may be damaged. Damaged belt does not provide effective protection in a collision a car. When an accident front airbags and pyrotechnic seat belt retractors triggered simultaneously. Irrespective of whether the front passenger seat or not worked or not any airbags or belt tensioners need to check whether your seat belt installed on the front, and serviceability of all bags.

If necessary, replace the defective air bags and seat belts. Do not use twisted belt.

Twisting strap dangerous. In the collision of the vehicle inertia load of body weight will be perceived not the whole width of the strap, but only part of it. This increases the load on the bones of the chest, located under the strap, which can lead to serious injuries or death.

Do not buckle a seat belt, two (or more) people simultaneously.

In this case, a safety belt does not ensure the proper distribution of the dynamic loads from the impact of car, and the passengers fastened a belt, will cause each other serious injury, or may die.

Always follow the rule: for each passenger - his belt.

Instructions for use of seat belts

Seat belts must be based on those parts of the body, which are strong bones of the skeleton. The belt must pass over the pelvic bone, chest and shoulder, rather than lying on his stomach.

Need to adjust the belt so that it is maximally close to the body, while maintaining the convenience of landing.

Only in this case, the belt is able to effectively carry out its protective function, for which it is installed on the car.

Sagging seat belt greatly reduces the efficiency of passive protection of the passenger.

Make sure to strap on the seat belt did not get wax, oil and other chemicals, especially the electrolyte used in the battery. To clean the seat belt use a neutral soap and water. You should replace a safety belt, if the strap is worn, dirty or has traces of damage.

Make sure to replace the seat belt assembly, if it was used by the driver or passenger in a strong collision of a car, even if there are no visible signs of damage to the belt.

Never use a seat belt if the strap is twisted.

Each safety belt must be used only one passenger at a time. It is dangerous to buckle a seat belt and child passenger, sitting on his lap.

Prohibited any changes in design of safety belts, which violate the normal operation of devices for automatic selection of slacks strap or belt with the difficult adjustment to eliminate its sagging.

Retraction of the belt inertial reel can be difficult if the strap and the intermediate guide bracket contaminated. So check to see that portion of the belt and the guide bracket were clean (Fig. 1.206).

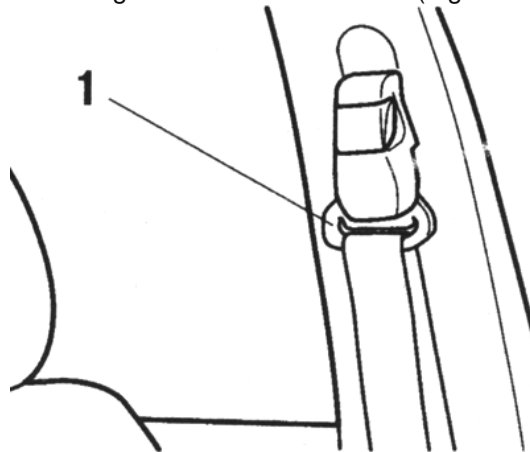


Fig. 1.206. Mounting belt

1 - slide clamp

If the seat belt drawn on the coil, it will work in emergency mode locking. In this mode, a safety belt does not violate the convenience of passengers. In the case of collision inertia reel blocks the issuance of safety-belt that holds the passenger in place. If fully stretch belt with a coil, then it switches to auto-lock belt. If there is a strong belt tension, or it impedes the movement of the passenger on a stationary car or while driving, the possible reason for switching is an inertia reel in the auto lock mode, after the belt was too long from the coil. In order to return the inertial reel in a more convenient mode of interlocking safety, stop the car in a safe place on a horizontal platform and fully Pass the belt inertial reel. This coil switches to emergency locking belt. Then, pull the seat belt to the required length, in order to buckle up.

Three-way security system

The structure of this system include:

- Three-point belts;
- Stoppers seatbelt in the front seat;
- Airbag system for driver, front passenger and rear outer seats.

Depending on the severity of the accident components of the three-tiered security system included in turn.

Auto lock safety belt prevents the extraction of belt that allows you to keep the passengers in the seats. Castles in the front seat belts drawn back. Due to this safety belt immediately adjacent to the body, which reduces the load on the body. Systems airbags triggered further in severe accidents and form a protective cushion for passengers. Actuation of the front airbags are depending on the severity of the accident in two phases.

Seat belts

Evenly pull the belt reel, and not perekruchivaya, drag it over the body.



Fig. 1.207. Installing belt

Snap the tongue of the buckle, lock (Fig. 1.208).

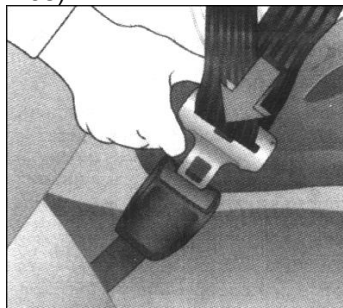


Fig. 1.208. Fixation belt Security

The back of the front seat should not be tilted too far back, as it adversely affects the performance of safety belts. The recommended angle is about 25°. Lap belt should fit snugly to the body without twisting. During the visit it from time to time should be tightened, pulling the shoulder strap.

Belt (especially when seat-pregnant women) should take place as far as possible down the thighs to avoid pressure on the lower abdomen.

A thick layer of outer clothing violates close fitting belt. Belt not impose on the firm or fragile items in the pockets of clothing (eg, keys, pens or glasses), as this can lead to injury. Between the belt and the body should not be any items such as handbags or mobile phones.

Adjusting the height of the upper guide element of the front and rear belts.

Lightly pull the belt.

Press the down button on the sliding regulator.

Move the slide knob up or down.

Lock the sliding knob until it clicks tangible.

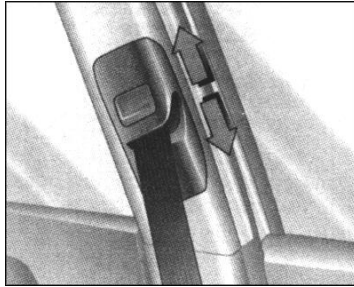


Fig. 1.209. Adjustment height upper guide element anterior and rear belts

NOTICE

Not adjust height belt during movement.

Adjust the height of the belt so that it passed through the shoulder and tight to him. Never belt should not pass on the neck or upper arm.

Removing the belt

To remove the belt, press the red button on the lock, the belt is automatically wound on the roller (Fig. 1.210).

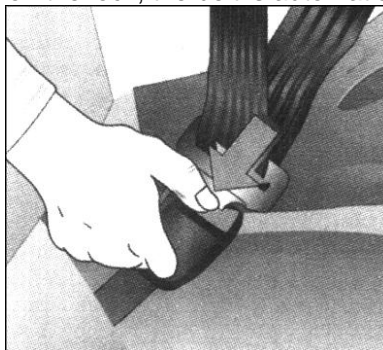


Fig. 1.210. Withdrawal belt

Three-point safety belt middle rear seat space

Belt is pulled from the pulling device only if the back of the rear seat is fixed in an upright position in their holders.

Test belts

All parts of seat belts should be from time to time to check for damage and serviceability. Damaged parts, stretched belts in the accident and worked stoppers locks must be replaced.

NOTICE

Nothing not change in belts safety, their fixtures, automatic ethical mechanisms winding and in Vice-tuples belts.

Not Avoid damage rem-It Security acute of the objects-ter or clamping belts.

System bags «Opel Full Size »

System of airbags «Opel Full Size» consists of several separate systems (Fig. 1.211).

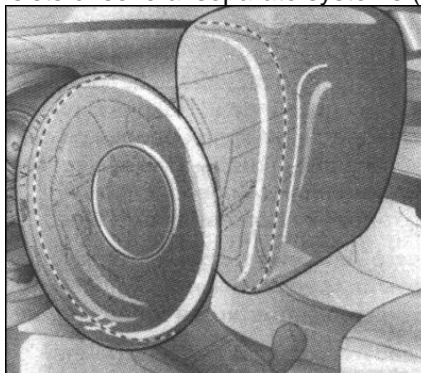


Fig. 1.211. The front airbag system «Opel Full Size»

System front airbags

System front airbags triggered by severe frontal collisions and form a safety bumper for driver and front passenger. Progress seated forward dramatically slowed down and, thus, significantly decreasing the risk of injury to the upper body and head.

System of side airbags

Side airbag system fires in side collisions and form a safety bumper for the driver or front passenger in the zone corresponding to the front door. Thus a side collision is significantly reduced risk of injury to the upper and pelvic parts of the body (Fig. 1.212).

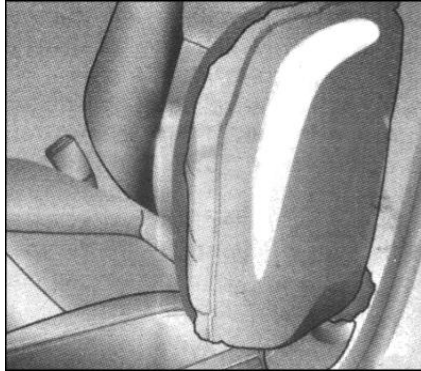


Fig. 1.212. Side airbag system «Opel Full Size»

Inflatable curtains security

Inflatable curtains security system triggered in side collisions and forms a safety zone in the shock of the head on the corresponding side of the car. Thus a side collision is significantly reduced risk of injury to the head (Fig. 2.213).

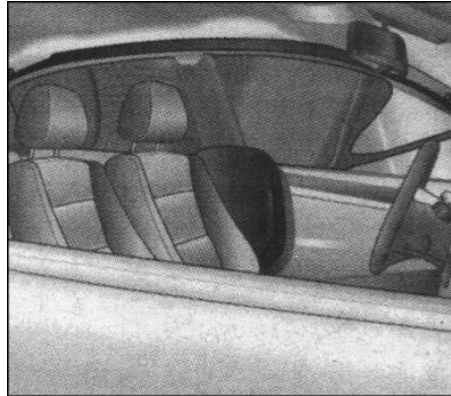


Fig. 1.213. Inflatable curtains security «Opel Full Size»

Front airbag

The presence of front airbags marked with the inscription «AIRBAG» on the steering wheel and above the anterior compartment (Fig. 2.214).

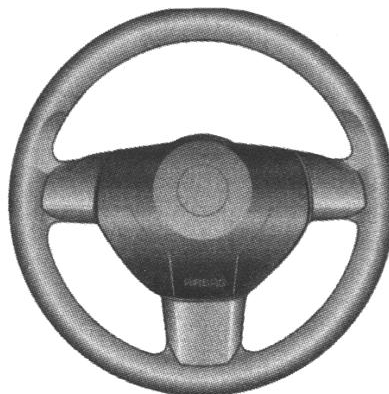


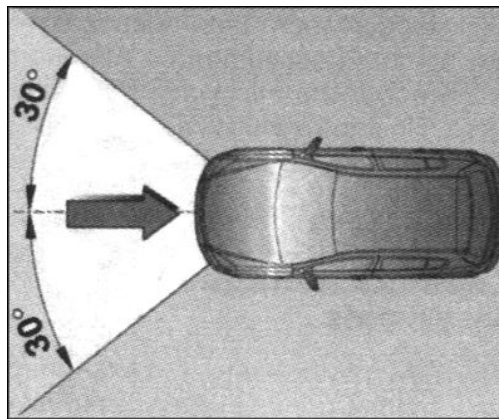
Fig. 1.214. The airbag module driver

System front airbags include:

- Air cushion with a gas generator placed in the steering wheel, and in the dashboard;
- Control electronics with sensors collision;
- Alarm systems, airbags on dashboard;
- System of identification of employment seat;
- Alarm systems, ensuring the safety of children with transponders in the dashboard.

System front airbag is triggered in the following cases:

- An accident of some gravity;
- Depending on the type of collision;
- In the zone of action, as shown in Figure 1.215;
- Irrespective of the side airbags and inflatable curtains.



**Fig. 1.215. Impact zone, in which fires
System front airbags**

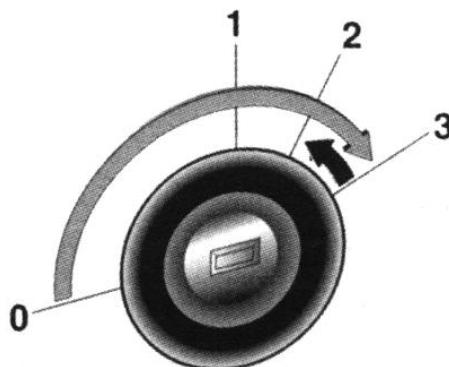
The front passenger seat with seat recognition system of employment

System of identification of employment off the front seat side airbags and front passenger when the seat is occupied or not it is installed to ensure the safety of children Opel with transponders.

1.26 Start the engine

Before you start the engine, install the shift lever manual transmission in neutral position. Squeeze the clutch, press the brake pedal and turn the starter.

In the Opel Astra car with transmission Easytronic, set the selector lever to position N, and on cars with automatic transmission - in position P or N. Do not press the accelerator pedal. Turn the ignition key to position 3 (Fig. 2.216).



**Fig. 1.216. Situation key in Castle per-bandits
at start Engine**

As the temperature increased at first engine speed is automatically reduced. Turn the key in the ignition back to position 0 and repeat the launch.

1.27 Easytronic transmission

Automated Easytronic manual gearbox enables manual (manual mode) or automatically (automatic mode) switching gears, while in both modes, the automatic clutch control.

Indicator gearbox

Indication regime and enabled the transfer is displayed (Figure 1.217).



Fig. 1.217. Indicator boxes Easytronic transmission

Start Engine

Start the engine is possible only when pressed the brake pedal. The display shows the icon gearbox N. When depressed the brake pedal N icon blinks.

Switching to the neutral position before the start of the engine is not required. Even when the gear box before the start of the engine automatically switches to the neutral position. Because of this may be a slight delay in starting the engine.

Office Easytronic transmission gear knob

Gearshift lever must always move in each direction until it stops. After each step, it automatically returns to the middle position, so you must follow the indication of transfer / mode indicator on the gearbox (Figure 1.218).

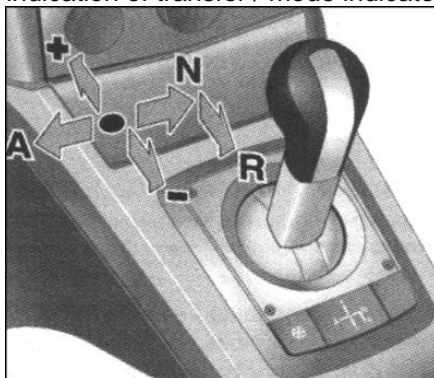


Fig. 1.218. Scheme switching Regis-mov work boxes Transmission Easytronic

Route Vehicle

Press the brake pedal, release the parking brake, move the gearshift lever to position A. Easytronic system will switch to automatic mode and use the first transfer (when the winter mode, the second transfer). The display will display the symbol gearbox A1 (when the winter mode - A2).

This is also the case when, after starting the engine while holding down the brake pedal gear lever for the first time translated into position + or -.

When you release the brake the car begins to move (Fig. 2.219).

You can also move, do not hit the brake, if immediately after moving the gear lever to press the accelerator pedal. If it does not click, transfer not included (the symbol A will be blinking). Move the gearshift lever in N position and begin the movement by pressing the brake, and then move the gearshift lever in position A.

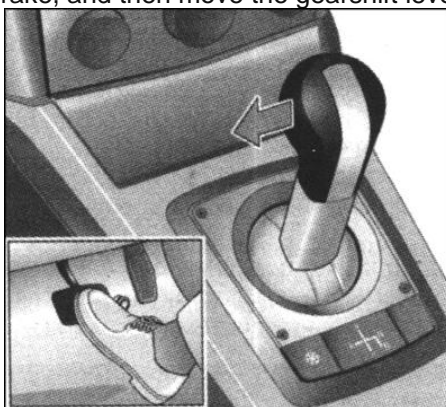


Fig. 1.219. Starting up the car

In automatic mode, gear changes automatically depending on road conditions.

Switching between automatic and manual

In manual mode, the transfer switch manually. The display shows the transmission letter M and included the transfer.

At too low an engine speed Easytronic transmission is switched to a lower gear automatic even in manual mode. This prevents jamming of the engine.

Mode switching speeds

If you choose a higher transfer rate when there is insufficient or lower channel at too high speed, switching is not performed. This keeps too low or too high speed.

By repeatedly moving the gear lever with a short interval may miss the transfer.

If enabled the automatic mode, when you move the gear lever in the position of + or - Easytronic transmission will switch to manual mode and increase or, respectively, will lower the transmission. The display will display the symbol of the transmission M, and included in the current transfer.

Moving the gear lever in position R

Reverse mode can be enabled only on the parked car.

Press the brake pedal, release the parking brake, move the gearshift lever in position R. Login reverse. The display will display the symbol of the gearbox R.

When you release the brake the car starts moving.

You can also start off in reverse, not pressing the brake, if immediately after moving the gear lever to press the accelerator pedal. If it is not pressing, the transfer not included (R symbol flashing). Move the gearshift lever in N position and start the movement, first by pressing the brake, and then move the gearshift lever in position R.

Driving modes with electronic control

In automatic mode, the program temperature control after a cold start by switching delay (at high speeds) automatically quickly bring the catalyst to a temperature required for optimum reduction of harmful emissions in the exhaust.

Adaptive mode automatically coordinate the process of switching to other programs in terms of driving, such as when driving with a trailer with a big boot and on the rise.

If you switch «SPORT» switching time is reduced, and switching occurs at a higher speed (if not included speed controller).

Forced downshifts

Pressing the accelerator below the point of resistance leads to the fact that the speed is below a certain value gearbox switch to a lower gear. To speed up the need to use the full power of the engine (Fig. 1.220).

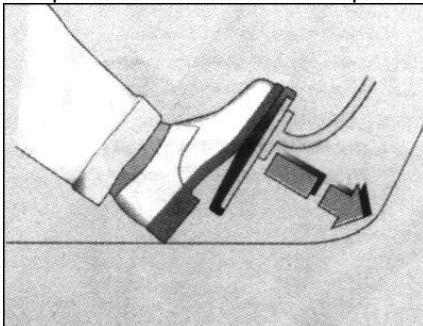


Fig. 1.220. Clicking pedal accelerator

NOTE

When squeezing pedal akselera-General switching Transmission I will hand-ing impossible.

In the range of engine speeds, close to the upper limit, the gearbox when squeezing the accelerator is switched to a higher gear, even in manual mode.

Without squeezing the accelerator pedal this automatic switching to manual mode is not performed.

When moving from place in the mode «SPORT» Forced downshifts driving wheels a bit stuck. This ensures maximum acceleration of the car.

Auxiliary engine braking

Automatic mode.

During the descent Easytronic transmission switches to higher gears only at higher revs. During braking Easytronic transmission is switched to a lower gear in a timely manner.

Manual.

To use the engine brake capacity during the descent in time to switch to a lower gear.

Stop

Both the automatic and manual modes when you stop the car automatically switches gears (when the winter mode - the second channel) and off the clutch. In R remains on reverse.

If the engine is running the driver's door opens, and the brake pedal is pressed, issued a warning beep: you should move the gearshift lever in position N and tighten the parking brake.

When you stop on the rise should be sure to tighten the parking brake pedal or press the main brake. Do not hold the car when the transfer by increasing the engine speed to prevent overheating of the gearbox.

When excess heat traction automatically.

For longer stops, such as in a traffic jam or on the move, turn off the engine.

Installation of car parking

Before leaving the car tighten the parking brake, then remove the key from the ignition.

Inclusion of the last channel (the display on the indicator gear box) is enabled. In position N transfer is not included.

After turning off the ignition Easytronic transmission ceases to respond to the movement of the gear lever.

If you do not remove the ignition key, then long-time parking your car can happen discharging.

If not tightened the parking brake, within a few seconds after the ignition is turned off alarm flashing parking brake system.

If the engine is off and parking brake nezatyanutom opened the driver's door, issued a warning beep and flashes the same detector. In this case, turn on the ignition, including transfer, then turn off the ignition and tighten the parking brake.

Pulling the car when slips

To pull a car stuck in sand, mud, snow or a ditch, with a little throttle translating the gear lever back and forth between the provisions of the R and A (or + and -). If possible, hold the engine at low speeds and avoid falls when you press the accelerator pedal.

NOTE

Described above way applied by those only in these exclusive-tion cases.

Exact maneuvering

For precise maneuvering, such as the installation of parking, check-in garage, etc. You can use the property of "sliding" enabled transfer when you release the main brake pedal.

Do not squeeze the accelerator and brake simultaneously.

To protect against damage Easytronic transmission overheating clutch function of "sliding" switch off automatically.

1.28 Driving with automatic transmission

After starting the engine before turning on the transfer, press the brake pedal. When the transmission and the brake released, the car starts moving. Do not press both the accelerator and brake pedals.

While D can ride in almost any conditions.

With a soft uniform squeezing the accelerator pedal is timely gear changes, providing fuel economy. Manual switching is necessary only in exceptional cases. Third, second or first choose a transfer only if switching to higher transfer undesirable, or when engine braking.

How to only allow traffic situation, switch back to mode D.

Indicator gearbox

Indication regime and enabled the transfer is displayed (Figure 1.221).

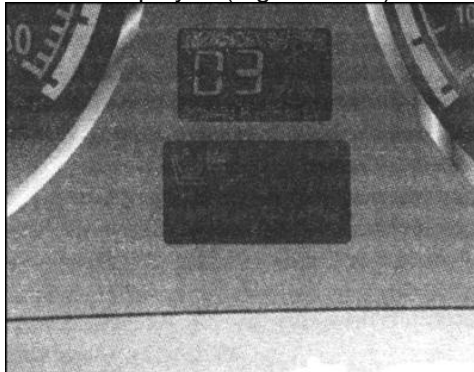


Fig. 1.221. Indicator Automatic co-shy Transmission

Gearshift lever (modes P, R and N)

P - parking regime. In this mode, the vehicle's wheels are blocked.

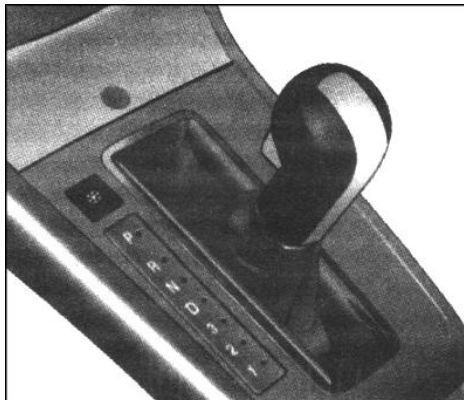


Fig. 1.222. Lever switching modes Automatic boxes Transmission

Include it only in the stationary vehicle and tightened parking brake. The display shows the transmission symbol R.

R - reverse mode. Include it only in the stationary vehicle. The display shows the transmission symbol R.

N - neutral position or idling. The display shows the transmission symbol N.

Gearshift lever can be switched from the position P only when the ignition key and pressing the brake pedal (to lock the gear lever).

To activate the P or R, press the button on the selector lever.

Start the engine is possible only in position P or N. When starting the engine in position N in addition make the most of the main brake pedal or turn on the parking brake.

During the gear shift does not squeeze the accelerator pedal.

Profiles movement (D, 1, 2, 3 and 4)

Permanent position for normal driving conditions - on transfers from the 1 st to 4 th.

Transmission will not switch above the established level.

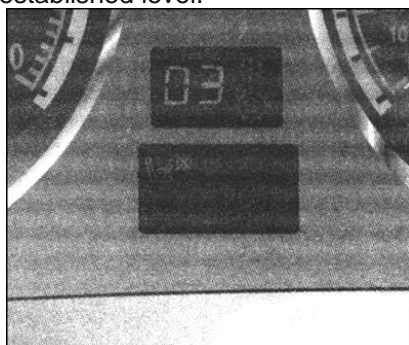


Fig. 1.223. Indication regime D Auto-matic boxes Transmission on Decision-making display

To activate the 3rd or 1-th transmission, press the button on the selector lever.

The display shows the position gearbox shift lever. In mode D, in addition, shows included in the current transfer (Fig. 1.223).

Driving modes with electronic control

If you switch «SPORT» switching occurs at a higher speed (if not included speed controller). The display is lit corresponding to the transmission detector (see Figure 1.224).



Fig. 1.224. Key inclusion mode «SPORT»

Mode automatically switches to the neutral position to reduce fuel consumption automatically sets the gearbox in position N, for example when stopping at a traffic light.

Automatic switching to the neutral position is activated in the following cases:

- The gear lever is in position D, 3, 2 or 1;
- Brake pedal is pressed;
- The car stands still;
- The accelerator pedal is pressed.

When you release the brake and throttle the car moving from the place as usual.

The program of temperature control after a cold start automatically, due to delay in switching to higher gears (higher speed) quickly brings the catalyst to the temperature required for optimum reduction of emissions of harmful substances in the exhaust.

Adaptive mode automatically coordinate the process of switching to other programs in terms of driving, such as when driving a large load or on the rise.

Winter driving modes

In case of difficulty in moving from place to slippery roads, press the regime (Fig. 1.225), which can be done only in the positions P, R, N, D, 3 (in the display lights up the appropriate gear icon).



Fig. 1.225. Power key winter driving mode

The car will touch on the 3rd gear.

Winter mode operation stops when the following conditions:

- Re-uses the keys;
- Switched manually at 2 nd or 1 st transmission;
- Turn off the ignition.

To protect against damage to winter driving mode is automatically switched off at too high a temperature of transmission oil.

Forced downshifts

Pressing the accelerator below the point of resistance at a speed below a certain value gearbox switch to a lower gear. In order to accelerate use the full power of the engine.

Auxiliary engine braking

To use an engine brake function during descent include timely step 3, 2, or, if the situation so requires, 1.

Particularly high inhibitory effect on the level 1. If step 1 is included at too high a speed, the gearbox will continue to work on the 2 nd transfer to the point until it reaches the point of transition to the 1-th transmission, for example by braking.

Siphon "

To "pull" machine, stuck in the sand, mud, snow or a ditch, with a little throttle alternately translating lever back and forth between the provisions of D and R. The engine speed hold as low as possible, avoid falls by pressing the accelerator pedal.

The above method is used only in those exceptional cases.

Precise maneuvering

For precise maneuvering, such as the installation of parking, check-in garage, etc. You can use the property "sliding" when you release the brake pedal.

Do not squeeze the accelerator and brake simultaneously.

Stop

Included is level when you stop with the engine can be maintained.

When stopped on an uphill gradient must necessarily tighten the parking brake or press the brake pedal. Do not hold the car when the transfer by increasing the engine speed to avoid overheating of the gearbox.

For longer stops, such as in a traffic jam or on the move, turn off the engine.

Before leaving the car at first turn on the parking brake, then - P mode and remove the ignition key.

If you do not remove the ignition key, then long-time parking your car can happen discharging.

Take out the key can be only when the gearshift lever is in position R.

Interruption of power

When a discharged battery gear lever does not switch from the position R.

In the case of discharge of the battery, follow the procedure support the launch.

If the reason was not the battery, unlock the gearshift lever.

1. Tighten the parking brake.
2. Release the latches on the cover behind the gear lever from the middle console and wrap it up (Fig. 1.226).

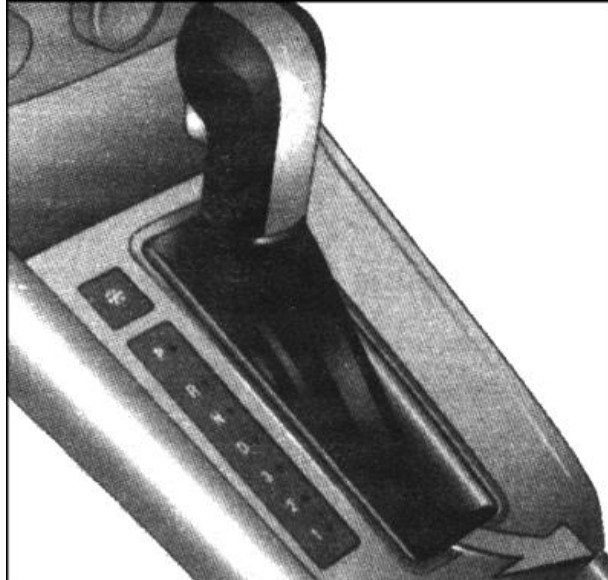


Fig. 1.226. Lifting the hood selector lever

3. Use a screwdriver to push the stopper forward and bring the gear lever from position P (Fig. 1.227).

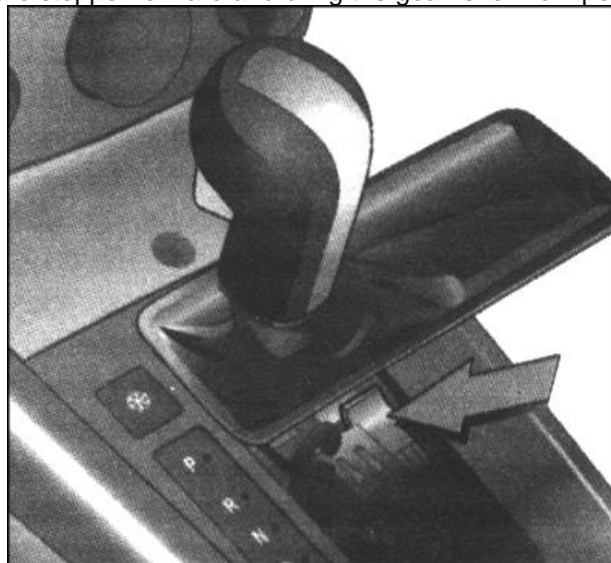


Fig. 1.227. Detent selector lever

4. Put the gear lever cover in the middle console and secure it.
- When you switched on again, R is the lock. Eliminate the cause of interruption of power supply.

1.29 Driving with a trailer

If the trailer coupling is installed on the car manufacturer, it is taken into account automatically.

When riding with the trailer parking pilot is automatically disabled when installing the trailer plug the cable into the slot.

NOTE

When Installation rear boots, such for bike, remember, those they mounted sensors near "Parking pilot and may break functioning tion system.

Installation the size of golf - the coupling devices with removable ball drawing «Limousine»

All these dimensions correspond to the trailer coupling trailer, mounted by the manufacturer.

Size	Value, mm
A	342.9
In	83
With	513.4
D	488.6
E	211.4
F	94.3
G	160

NOTE

Use only admitted to this Vehicle tyago in - coupling device. At cars with engined Z 20 LEH assembly Pull - the coupling not allowed.

Mounting dimensions trailer coupling with removable ball of «Caravan»

All these dimensions correspond to the trailer coupling trailer, mounted by the manufacturer.

NOTE

Use only admitted to this Vehicle tyago in - coupling device. At Opel Astra cars with engined Z 20 LEH assembly Pull - the coupling not allowed.

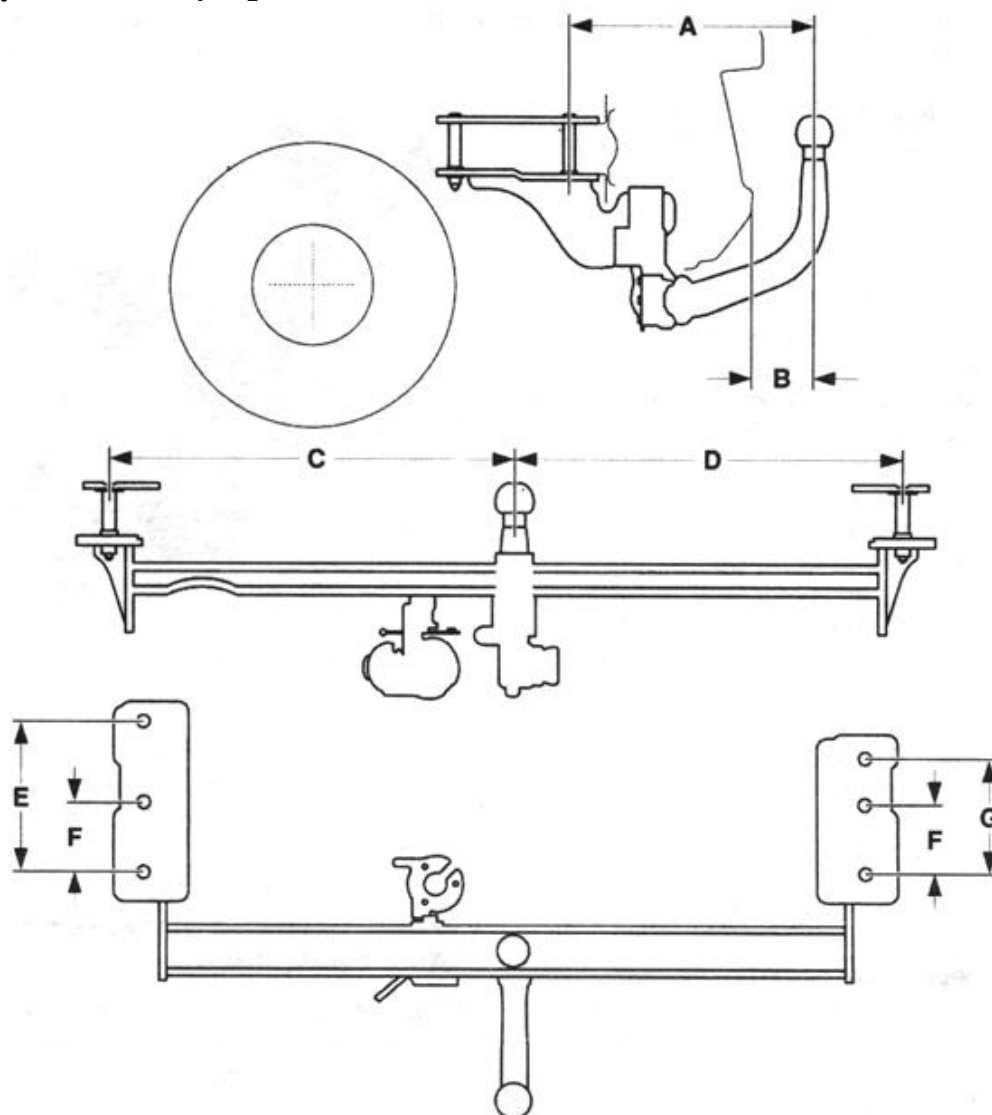


Fig. 1.228. Installation size Pull - coupling device with removable ball support «Limousine»

Size	Meaning, MM
A	84.0
In	570.0
With	515.0
D	93.5
E	173.0
F	307.6
G	158.0
H	292.6

Placing ball bearing trailer coupling

In the model of "Limousine" spherical bearing in the cover secured in the cargo box luggage fastening straps.
In the model «Caravan» spherical bearing fixed fastening straps to the luggage compartment in the recess for the spare wheel.

Installation of ball bearing

To release the connector and slide it down. Remove the cap from the opening for ball bearing and place them in the trunk (Fig. 1.231).

Check the position of a ball bearing.

Red markings on the swivel bracket should be directed towards the white markings on the ball anvil.

Between the swivel bracket and ball support should be a gap width of about 6 mm (Fig. 1.232).

Stopper is inserted into the lock and is in position 1 (Fig. 1.232).

Otherwise, you must hold down ball-bearing before installing casing couplings.

Unlock the ball as transferring detent in position 1 (Fig. 1.232).

Pull the swivel bracket and turn it into the elongated position all the way to the right (Fig. 2.233).

Install ball bearing

Insert ball-bearing sandwiched into the body and sleeves with force fed up to its fixation (Fig. 2.234).

Swivel arm themselves back in position and again adjacent to the ball support.

NOTICE

When installing the ball bearing does not touch the swivel bracket, because at the time of fixation he can injure his hand.

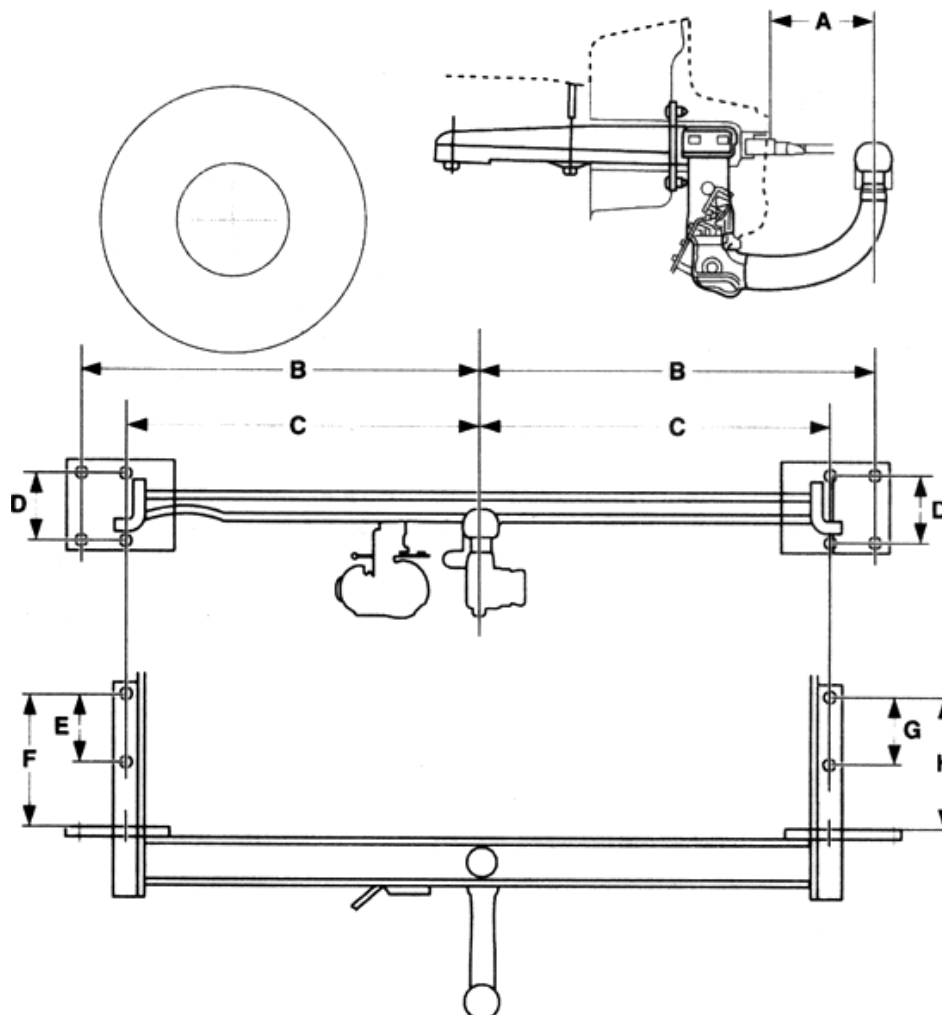


Fig. 1.229. Installation size Pull - coupling device with removable ball support «Caravan»

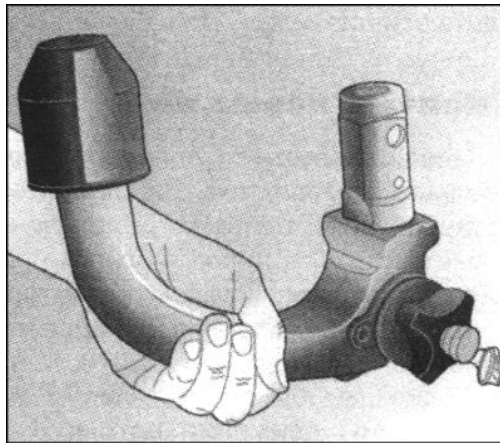


Fig. 1.230. Ball reliance Pull - clasped-tion device

Closed ball as setting the stopper in position 2 (Fig. 1.232). Remove the stopper and press the security tab (Figure 2.235).

After the closure of a ball bearing swivel bracket is no longer stretched.

Test after Installation

Check the correctness of mounting a ball bearing.

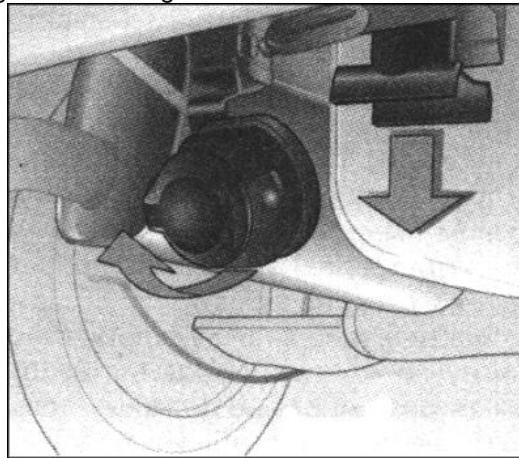


Fig. 1.231. Exemption connector tyago of - coupling device

The green markings on the swivel bracket should be directed towards the white markings on the ball anvil.

Between the swivel bracket and ball support should not be any backlash.

Ball bearing tightly fixed in the clutch housing.

Ball bearing must be locked.

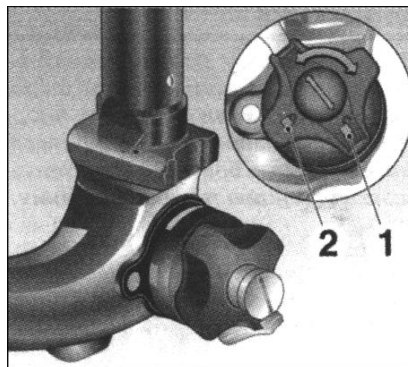


Fig. 1.232. Markings on the swivel bracket and the ball of

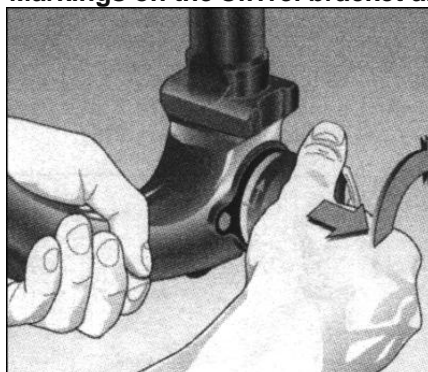


Fig. 1.233. Turning the lock bracket

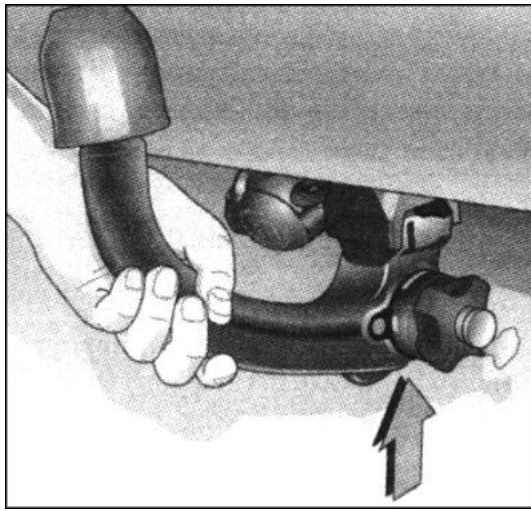


Fig. 1.234. Install ball bearing

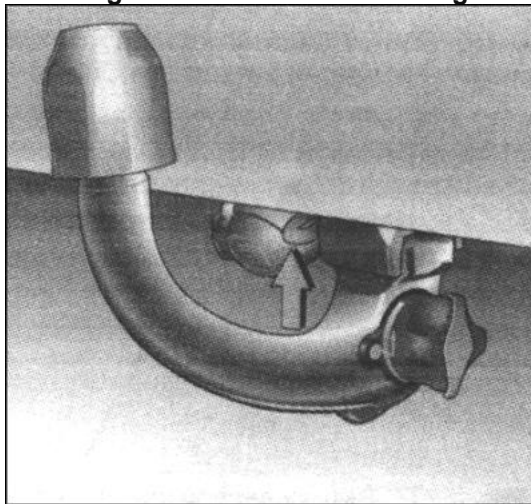


Fig. 1.235. Security tab

NOTICE

Horseback with trailer allowed Toll-to with correctly clamped Sharo-ing support. If ball support right consolidate not not necessary contact for Pomo-schyu on station maintenance.

Eyelet for traction cable

For trailers with a brake hook tether for the eyelet (arrow in Figure 1.235).

Dismantling ball support

Unlock the ball as turning the stopper in position 1 (see Fig. 1.232).

Pull the swivel bracket and turn it all the way to the right. Pull the ball bearing housing clutch down and put it in a duffel compartment in the trunk (Fig. 1.236).

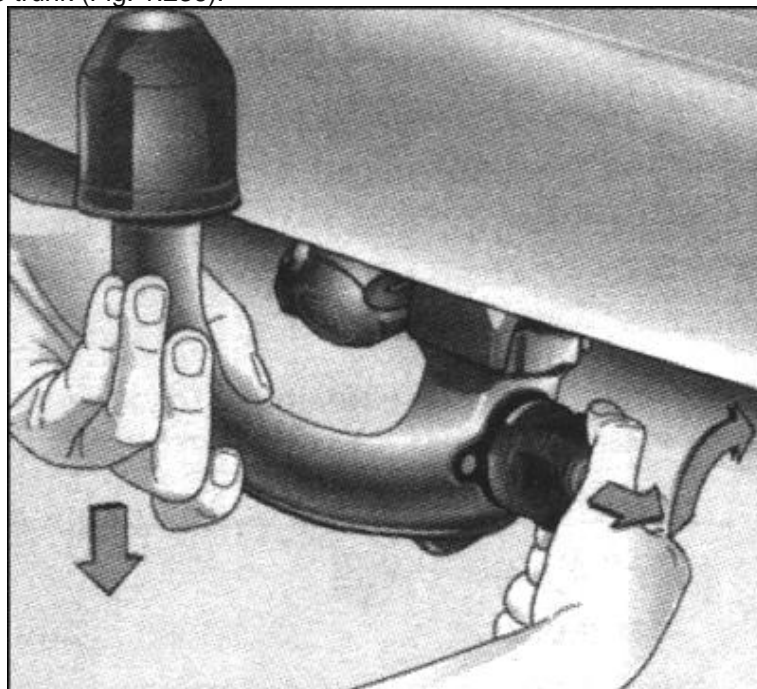
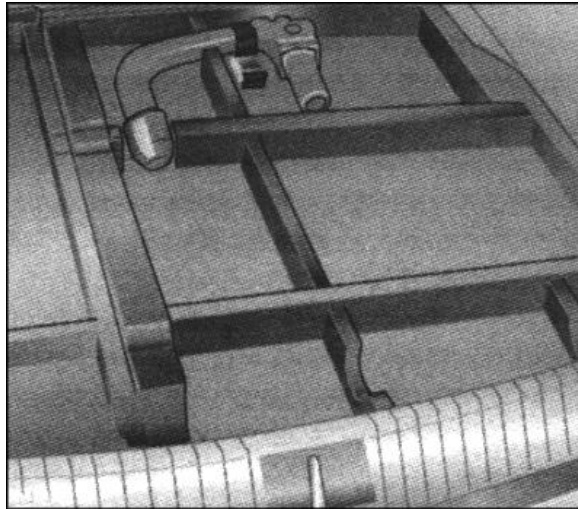


Fig. 1.236. Withdrawal ball support

Install plugs in the hole for a ball bearing. Close the socket (see Fig. 1.231).
Do not empty spherical bearing by blowing hot steam or using high pressure.
Placement ball bearing «Limousine» and «Caravan»



**Fig. 1.237. Accommodation ball support in luggage
Department Vehicle**

1. Ball joints in a case put the luggage in the cargo box and fasten the mounting strap.
2. Ball joints put in the luggage compartment in the recess for the spare wheel. Fasten it in the compartment fastening straps.

Trailed load

Permitted trailer load values depend on the type of car and engine, and the excess is prohibited. Trailed load - is the difference between the actual total weight of the trailer and the actual bearing load suspended on a condition. Therefore, to test the trailer load on the scales set only wheels of the trailer, not the nose wheel.

The values of permissible trailer load recorded in the documents of the car. In the absence of a special account value permissible trailer load applied to the gradient less than 12%.

Run the car with a full trailer load should be permissible only to drivers who have sufficient experience in the towing of large or heavy trailers.

Permitted trailer load values are valid only for these rises at an altitude of 1000 meters above sea level. Because of the thinness of air at higher altitude decreases the engine power and reduced gradeability, permissible trailer load decreases by 10% for each additional 1000 m ascent. When traveling on roads with a slight slope (less than 8%, for example on motorways) to reduce the trailing load is not necessary.

The actual trailer loads and total mass of the towing vehicle together must not exceed the permissible total weight of the train. If a permissible total weight is used in full trailer load can only be used to achieve the permissible total train weight. Permissible total train weight is specified on the type plate (see Fig. 1.1).

Supporting load

Bearing load is a load of pressure on the trailer coupling support. This force can be controlled through weight distribution when loading the trailer.

The maximum allowable bearing load (75 kg) car towing listed on the label with trailer coupling and the documentation of the car. Not be supporting the load of less than 25 kg.

The measurements of the reference load set pole trailer loaded to the altitude where it will be after the accession to the trailer loaded car. This is especially important for trailers with a double axle.

The load on the rear axle while driving with a trailer

When the associated trailer and fully loaded car, truck, including the weight of all passengers, rear axle load must not exceed the permissible load (see the relevant data on the type plate or in the documentation of the car) for a model of «Limousine» of 65 kg and the permissible total mass - 45 kg. For the model «Caravan» can not exceed the permissible rear axle load of 60 kg, and the permissible total weight - 30 kg. If the permissible rear axle load is exceeded, then the maximum speed should not exceed 100 km / h. If a country has set a lower speed when operating with a trailer, you should observe these rules.

1.30 Installation of new tires

Tires are in pairs, more complete set. At one bridge put tires of equal size, design, one manufacturer and with the same tread pattern.

Tires with a prescribed direction of rotation mount such a way that they were rolling in the direction of the car. The direction of rotation is shown with an asterisk (eg, arrow) on the sidewall of the tire.

Mounted rearward tires (for example, by changing the wheels) as soon as possible remount. Only in this way ensures optimal use of performance tires.

Some tires have a surrounding rim of thickening, designed to protect alloy rims from damage. Using caps wheels on steel wheels with tires having a protective thickening should observe the following conditions:

- Use the shields of the wheels and tires, admitted to the use by Opel and meet all the requirements of the relevant combinations of wheels and tires.

- In the case of caps of the wheels and tires, not admitted by Opel, the tires should not be protective thickenings.

NOTE

Application inappropriate tires or Caps wheels may cause sudden fall pressure due so to accident.
Pressure in Tires

Check pressure at least once in 14 days and before every long trip on cold tires. Do not forget to check the spare tire.

To facilitate untwisting valve covers use a special puller. It is located on the inner side of the filling hatches (Fig. 1.238).

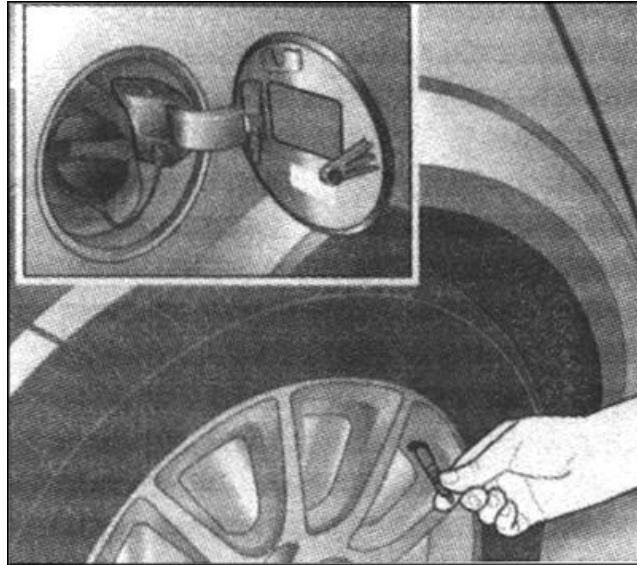


Fig. 1.238. Location puller for lids valves

In the Opel Astra car with a system of monitoring tire pressure in the lifter to valve caps have an adapter. Before installing the pressure gauge to check pressure wound adapter to valve (Fig. 2.239).

The pressure increased due to heating of tires, can not be reset, or cooling, it could fall below the minimum value. After checking tightly screw the lid valve special key (Figure 1.240).

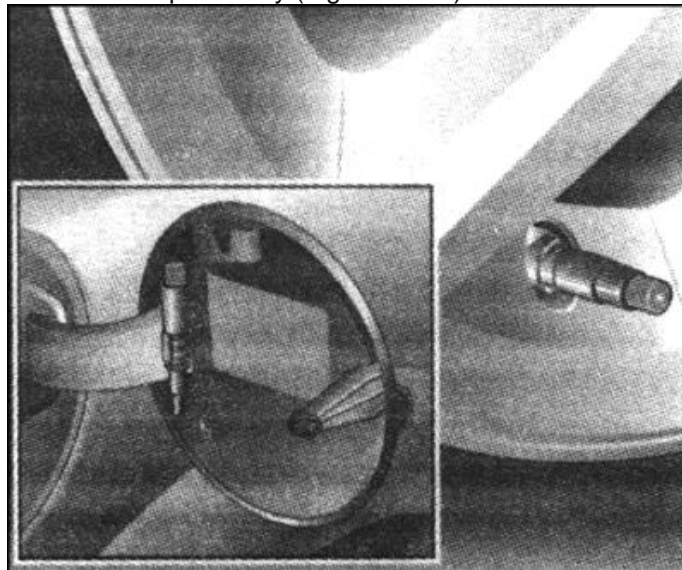


Fig. 1.239. Location puller with adapters for Installation manometer

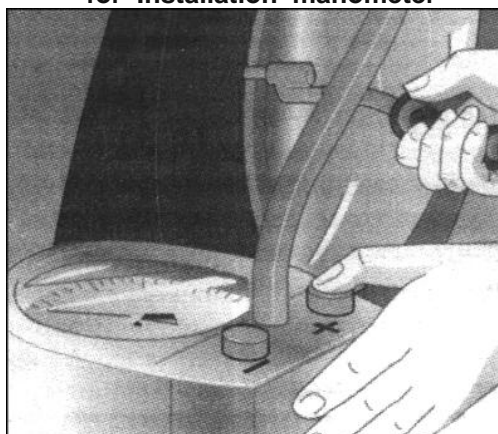


Fig. 1.240. Screwdriving cover piano fall board-on

Special key

When the pressure is above or below the specified values decreased security deteriorating driving performance, comfort and fuel consumption, as well as increased tire wear.

Excessively low blood pressure can lead to heat tires, internal injuries and due to this at high speeds - to the running surface of the peeling tires and even to their rupture.

Hidden damage to the tires can not be eliminated subsequent adjustment of air pressure.

1.31 Condition of tires, rims

Curbs moving at low speed and if possible a right angle. Hit a sharp curbs can lead to hidden damage to tires and rims, which manifest themselves later in the form of leaks, which lead to the fall of the set pressure (Fig. 2.241).

Regularly check the tires for damage (punctures, cuts, cracks and dents on the sides). Verify that no damage to the wheels. If any damage or excessive wear should apply to service stations.

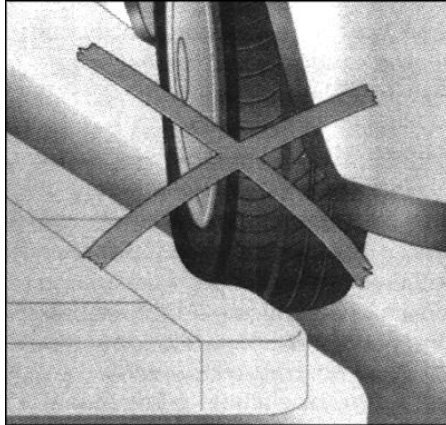


Fig. 1.241. Example irregular Park-ing Vehicle

NOTICE

Damage may lead to time-ryvu tires.

Height tread

Regularly check the height of the tread pattern. If the wear in the front than the rear, swap the rear and front wheels. Wheels with the best protector should be installed in the front (Fig. 1.242).

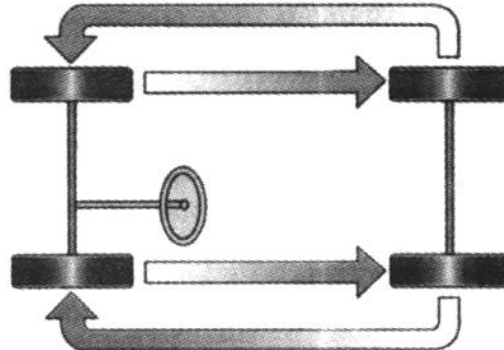


Fig. 1.242. Scheme reset wheels

Adjust tire pressure.

To ensure safety, tires should be replaced at a height of 2-3 mm Tread (winter tires - 4 mm).

Minimum permissible height of the tread pattern (1.6 mm) is achieved when the tread wears out before the wear indicator (TWI). Several signs of wear are shown at the same distance from each other in the pits running surface. Their situation was also pointers to the side of the tire (Figure 1.243).

General recommendations on tire

At low altitude tread greatly increases the risk of aquaplaning.

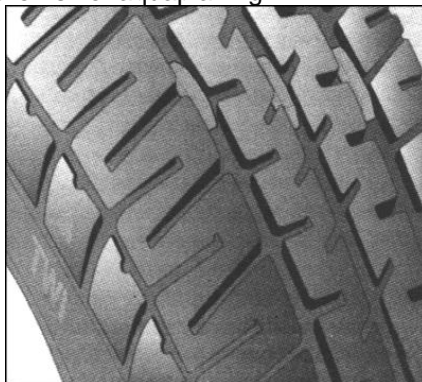


Fig. 1.243. Pointers wear Tires

Tires get old, even if the car does not drive or drives low. Unused spare wheel after 6 months to apply only in extreme cases and only at a slow ride.

Never place used tires, whose origin is unknown.

In order not to impair brake cooling, use only shields the wheels, admitted for this car.

Winter tires

Winter tires at a temperature below 7 °C provide improved safety, so they should be installed on all wheels.

Summer tires in its construction have limited features for winter operation.

If the maximum allowable speed for winter tires less than the car, attach the index plate with a permissible maximum speed of winter tires in a conspicuous place of the driver.

NOTICE

When use Reserve oscilla-sa with summer bus perhaps modification is running qualities car.

Urgently replace damaged tire, otbalansiruyte wheel and US-establish, his on car.

Caps wheels

In the case of application is not approved by Opel caps wheels and tires need to pay attention to the fact that the tires had no protective thickening.

Chains protivoskolzheniya

The use of chains is allowed only on the leading wheels (front) of the bridge.



Fig. 1.244. Chains protivoskolzheniya

Use melkozvennyye chain, the height of which, together with a connecting link in the chain of running surface and the inside of the tire is a maximum of 15 mm.

NOTE

Caps steel wheels may Co-touch with links chains and damage-Xia. Before installation chains kolpa-ki wheels should removed.

Snow chains are allowed to use only up to 50 km / h and at snowless areas only for a short time, since the solid surface, they quickly wear out and can burst.

Emergency Wheel

Use of snow chains on the emergency wheel is not allowed. If you puncture to the front wheel drive with snow chains, emergency wheel should be installed on the rear axle and rear wheel - on the front.

1.32 Start the engine by using an auxiliary start cable

If the battery is discharged Opel Astra car, the engine can be run using the auxiliary start cable and battery of another car (Figure 1.245).

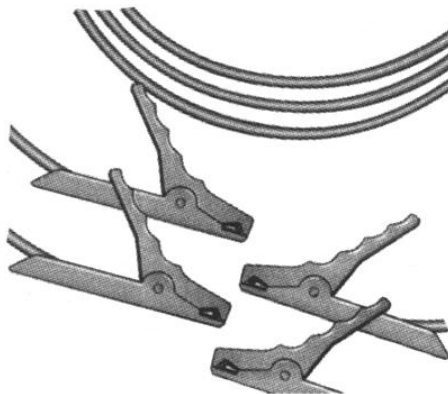


Fig. 1.245. Auxiliary starter cables

It should exercise extreme caution. Any deviation from the instructions given may result in injury or damage in the explosion of battery

battery and damage to electrical devices of both cars.

Avoid sparks and open flame near the battery.

The discharged battery can freeze at a temperature 0 °C. Before you connect the auxiliary starter cable, you need to defrost frozen battery in a warm room.

Do not expose the battery fluid in eyes, on skin, fabric and lacquered surfaces. The fluid contains sulfuric acid, which is in direct contact injuries.

When working with battery wear protective glasses and clothing.

Use the auxiliary battery constant voltage (12 V). Its capacity (Ah) must not be substantially less than the capacity discharged battery. The values of voltage and capacitance are listed on batteries.

Should use an auxiliary starter cable with insulated pole clamps, a section not less than 16 mm² for diesel engines - 25 mm².

The discharged battery will disconnect from the onboard network.

Disable unnecessary consumers of current.

During the whole procedure did not lean over the battery.

Pole clamps a cable must not touch the terminals of another.

During the start-up support vehicles must be fixed.

Tighten the parking brake. Manual gearbox and a box Easytronic switch to the neutral position, the automatic transmission - in the position of R.

Connecting auxiliary battery

Connect the cables to the one shown in Figure 1.246 sequence.

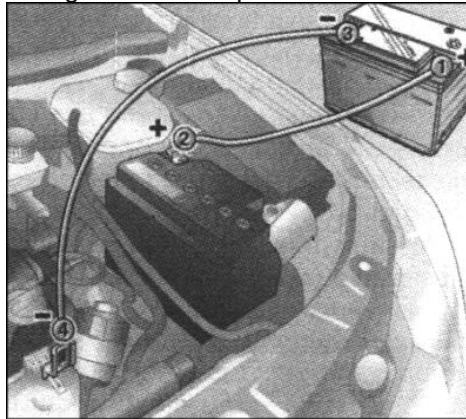


Fig. 1.246. Sequence Connect-cheniya Supplementary Battery

1. Connect the cable to the positive pole 1 auxiliary battery (the plus sign on the battery case or terminal).
2. The other end of the cable to the positive pole of 2 discharged battery (plus sign).
3. Connect the cable to the negative pole 3 auxiliary battery (minus sign).
4. The other end of the second cable 4 connect with a mass of another car - for example, connect to the engine block or a threaded connection suspension engine (Fig. 1.246).

NOTICE

Not connect cable to a negative pole discharged Ak kumulyatora.

Connection point should be located as far from the discharged battery.

Cables installed so that they do not touch rotating parts, engine compartment.

Start the car engine, which is fed with current.

After 5 minutes, start the engine of another car. Attempts to start should not last more than 15 seconds with an interval of 1 min.

After starting both engines give them something to work about 3 minutes at idle, without disconnecting cables.

To avoid excessive stress on the electrical system before disconnecting the cables from the terminals should include any consumer of electricity (eg, light, rear window) on the consumption current car.

Removing the cables are manufactured in the reverse order of installation.

Badge Emergency stop "Limousine"

Sign of the emergency stop is placed on the back of the trunk (Fig. 1.247).

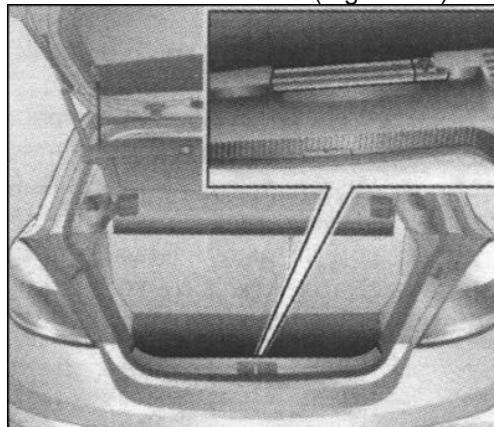


Fig. 1.247. Mark Emergency stop "Limousine"

To install the sign in place, slide it into the hole on the left, then insert in the guide on the right.

To remove the warning triangle, lift it from the right side and pull motion to the right.

In cars with the cargo compartment to lift the warning triangle on the right half of the cargo box. Remove the warning triangle motion to the right.

Badge Emergency stop "Caravan"

To install the sign in place, attach it to the fastening straps on the inside padding of the back door (Fig. 2.248).

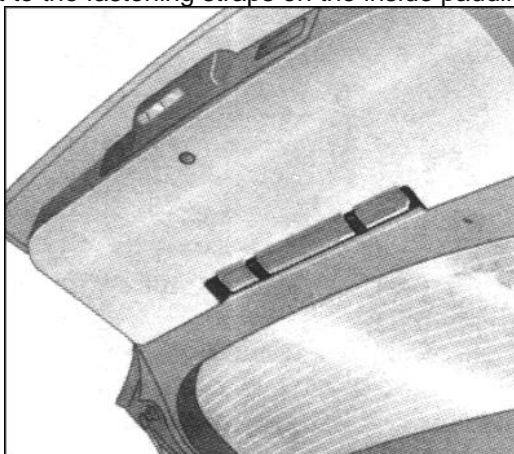


Fig. 1.248. Mark Emergency stop "Caravan"

Road kit "Limousine"

Road kit is fastened with a belt on the right side of the trunk (Fig. 1.249).

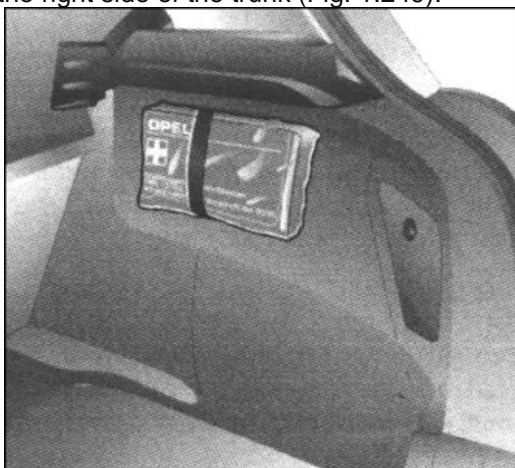


Fig. 1.249. Road kit "Limousine"

Dressings package "Caravan"

Dressing with a belt fastened on the left side of the trunk (Fig. 1.250).

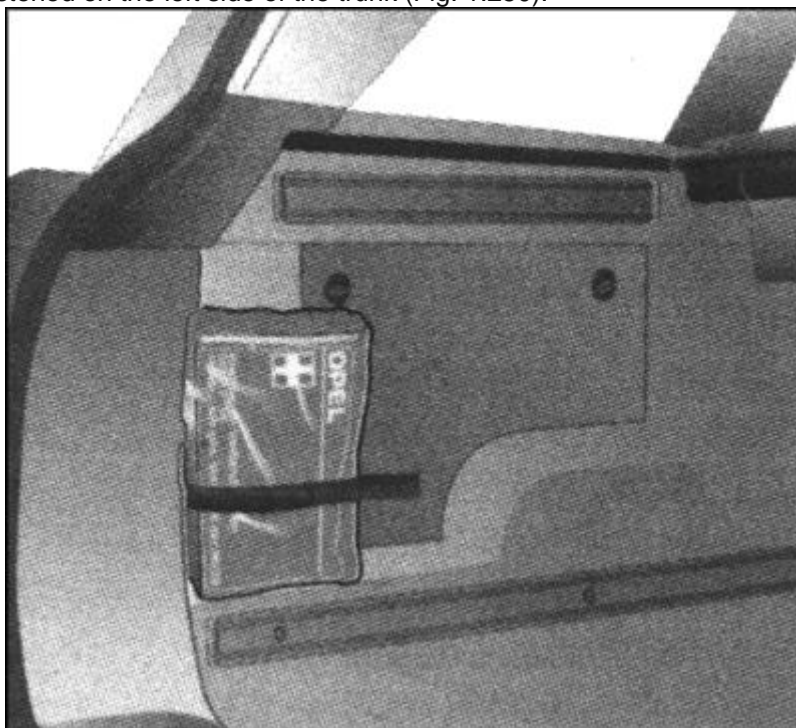


Fig. 1.250. Dressings package «Caravan»

1.33 Spare wheel

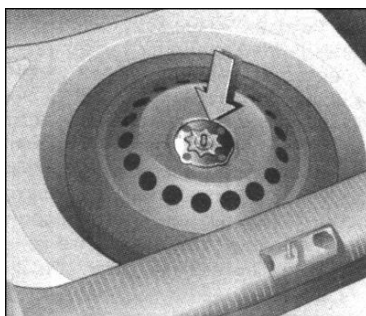


Fig. 1.251. Spare wheel

The spare wheel is located in the trunk under the hood floor. It is enshrined nut. In the model «Caravan» over the mounting nut is laying.

In order to get the spare tire on the car models «Caravan», unplug the adapters and hooks from the guides in the walls of the luggage. Rear mounting lugs, set up and lift the hood floor to a vertical position so that he stood in the internal padding of the roof (Fig. 1.252).

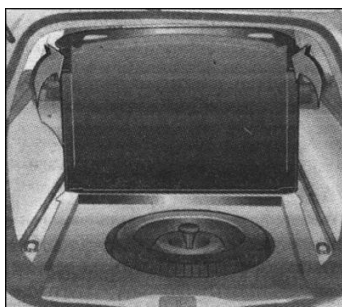


Fig. 1.252. Extract Reserve wheels

With the addition of mounting lugs attach to the housing of sex through the slot.

General recommendations on the exploitation of the spare wheel

Spare wheel, depending on the version, can be accomplished as accidental.

When preparing the car alloy rims spare tire may have a steel rim.

When using the spare wheel with summer tires on a car with winter tires can change their driving performance.

Urgent pomenyate faulty tire, otbalansiruyte wheel and install it on the car.

Spare tire may have a rim and tire smaller than the vehicle-mounted wheel. In this case, using the spare wheel can also change the driving characteristics. Urgent replace the damaged tire, otbalansiruyte wheel and set it on the car.

Instructions for using the emergency wheel

Mount only one emergency wheel.

Do not exceed the speed of 80 km / h.

Turns Keep moving slowly.

Do not use the emergency wheel for a long time.

How quickly replace the emergency wheel normal wheel.

Do not install the emergency wheel chains. If you puncture the front wheel to move with the use of chains, set the emergency wheel on the rear axle and rear wheel Relocate to the front. Check and if necessary, adjust tire pressure.

Jack and car tools

Jack and tools are designed specifically for this car. Use the jack only to replace the wheels.

Jack and tools are in the car trunk, in a compartment under the spare wheel (Fig. 1.253).

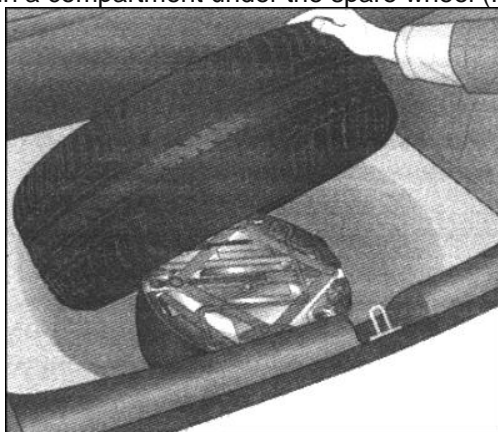


Fig. 1.253. Jack and car tools

On vehicles with the tire repair kit car is a tool with this kit in the luggage compartment, in the recess for the spare wheel.

After use, place the car jack and tools in the bay, as shown in Figure 1.254.

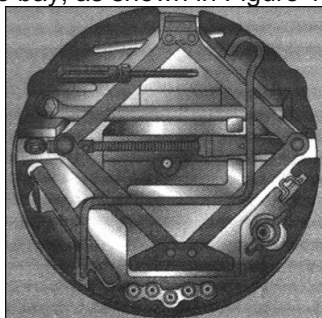


Fig. 1.254. Procedure advertisement domkra-ta and Road Instrument

1.34 Replacement of the wheel

Instead of the spare wheel vehicle can be equipped with a tire repair kit.

During the replacement wheels for your own safety Perform preparatory work described below.

Set the car on a flat, firm and skid pad.

Turn on hazard warning lights, tighten the parking brake, the automatic transmission, set the gear lever in park position P, on the manual transmission or Easytronic box including 1-S transmission or reverse.

Exhibitions, in accordance with the requirements of the law, warning triangle.

Remove the spare tire from the trunk.

Before the rise of the car give front-wheel drive in a direct position.

NOTICE

Categorically prohibited same time as change some wheels.

Block the wheel, located diagonally to the changing, resting in front of and behind the wheel of wedges or similar items.

Please only use the jack for changing wheels.

In soft ground put a jack under sustained maximum thickness of the lining of 1 cm Use thicker pads can cause damage to the jack and the car.

In the lifted car should not be people or animals.

Do not crawl under the raised car jack.

Do not start the engine when the car upright.

Replacement procedure

Remove the wheel cap with a hook (Fig. 1.255).

On alloy wheels with a screwdriver, release the cap bolts and remove their wheels (Fig. 1.256).

Loosen the wheel bolts with a special Socket wrenches inserting it until it stops (Figure 1.257).



Рис. 1.255. Снятие колесного колпака



Рис. 1.256. Снятие заглушек колесных болтов

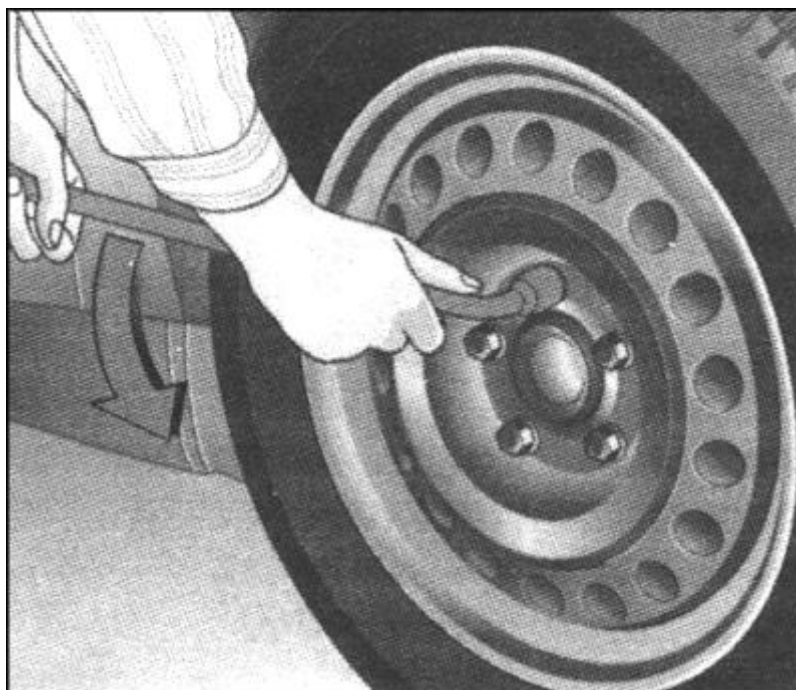


Fig. 1.257. Untwisting Wheeled Bolts

NOTE

Places for Installation jack bottom Vehicle given from-tag on lower edge body (Fig. 1.258).

Before installing the ram manually adjust the height by turning the lugs. Jack-mouth novlivayte so that it covered the seizure of the vertical edge and was a slot in it (Fig. 1.259).

Check the reliability of the installation.

Toe jack mount on the ground vertically podtochkoy installation.



Рис. 1.258. Места установки возимого домкрата

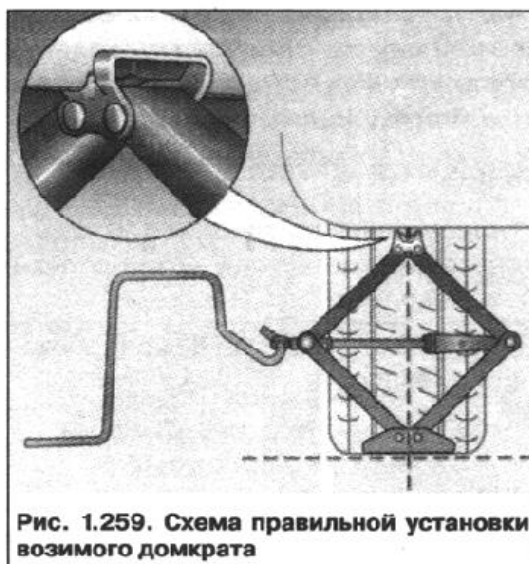


Рис. 1.259. Схема правильной установки возимого домкрата

Insert the handle into the eyelet threaded rod and the rotation of the handle lift the car (Fig. 1.260).

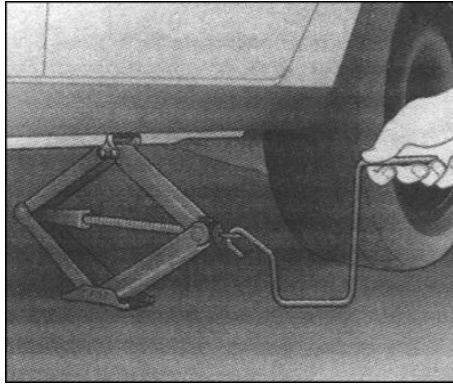


Fig. 1.260. Raising Vehicle

NOTE

If in process Recovery subsequent nickname was not strictly under point of installation, immediately Gently car and repeat the Installation jack.

Remove the screws and put them wheels so that the thread is not contaminated.

Replace the wheel.

Screw the wheel bolts and lightly tighten them, and the insert face wrench until it stops (Figure 1.261).

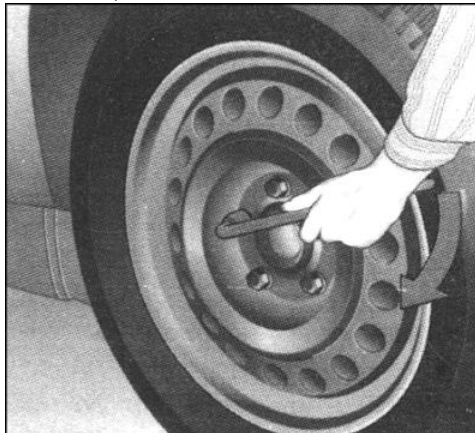


Fig. 1.261. Tightening Wheeled Bolts

Lower the car.

Tighten the wheel bolts crosswise, with the insert face wrench until it stops.

Before installing the wheel cover to clear the wheel at the site of clamping holders. The symbol of the valve with the back of the wheel cover is for the valve wheel.

Install and tighten the cap and wheels, respectively, caps wheel bolts.

Replaced wheel, instrument and warning triangle place in the trunk.

Check the tire pressure set the wheels when necessary, correct it.

Using a torque wrench, check the time of bolting the wheels on the fixed wheel, when necessary, correct it.

Replace the defective tire.

At the first opportunity to completely replace the wrecked wheel to normal.

Initialize the control system tire failure or a system to monitor tire pressure.

1.35 Towing Opel Astra

Open the aperture for towing eyelets in the front right side (Fig. 1.262).

To release the latches from the bottom cover and remove it.

Towing lug is in the clothing compartment for the jack and motor instrument or in the clothing compartment for the tire repair kit in the trunk, in the recess for the spare wheel.

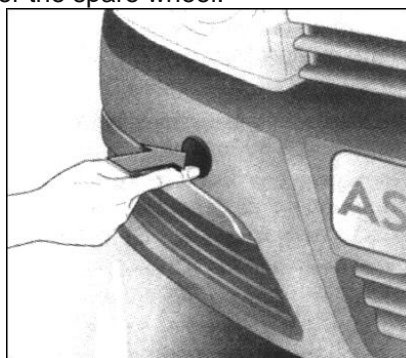


Fig. 1.262. Withdrawal cover aperture for towing loop

Tighten the left towing eyelet and tighten until it stops in a horizontal position (Fig. 1.263).

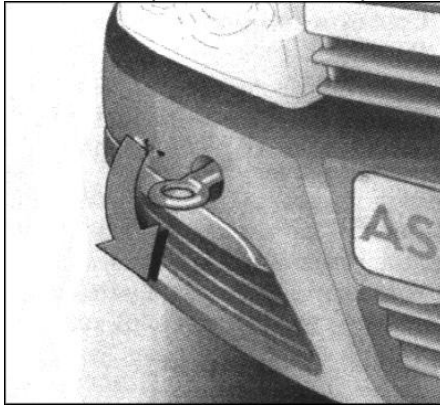


Fig. 1.263. Fastening tow loop

Attach a tow rope or tow bar to the eyelet.

Turn on the ignition to unlock the steering wheel and to ensure that the brake lights, sound signals and wipers.

Manual transmission or gearbox EasytronJc must be set in idle mode, automatic transmission - is included in the position of N.

Slowly touch the place with. Do not let jerks. Excessive traction may cause damage to cars.

For inhibition requires much more effort, since the braking power is valid only when the engine is running.

The rotation of the steering wheel will also require greater effort, since the power steering mechanism works only when the engine.

Turn on the system of air circulation and close the window to the salon did not get towed vehicle exhaust gases.

Rules tow

Vehicles with automatic transmission can tow only forward at a speed not exceeding 80 km / h and at a distance of no more than 100 km. When the faulty transmission, higher speeds or longer distances need to raise the tow vehicle for the front axle.

NOTE

If on cars with box ne-redach Easytronic at power fails automatic clutch was off I will hand-ing, towing not allowed. In This case should immediately contact for help on service stations.

Towing another vehicle

Open the aperture for towing lug back to the right (Fig. 1.264).

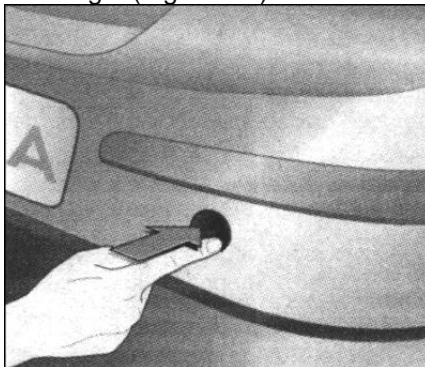


Fig. 1.264. Location back Beech-Sirny loop

Click the cover down to release the latches, and remove it.

Towing lug is in the clothing compartment for the jack and the car instrument or in the case for the tire repair kit in the trunk, in the recess for the spare wheel.

Tighten the left towing eyelet and tighten until it stops in a horizontal position (Fig. 1.265).

Attach a tow rope or tow bar to the eyelet.

Slowly touch the place with. Do not let jerks. Excessive traction may cause damage to cars.

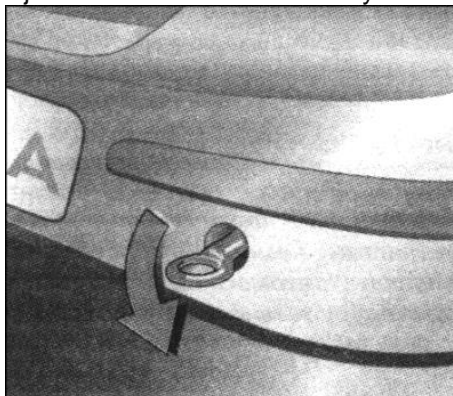


Fig. 1.265. Fastening back tug-Term loop

1.36 Kit repair tire

Minor damage to the running surface and the tire sidewalls, such as punctures extraneous objects, can be eliminated with a set of tires for repair.

Damage to tires larger than 4 mm, as well as damage to the rim with tire repair kit can not be repaired.

Driving with too low pressure in the tire or run flat tire leads to hidden damage that can not be corrected with a set of tires for repair. Park your car and ask for help at service stations.

Tire repair kit is located in the luggage compartment, in the recess for the spare wheel (Fig. 1.266).

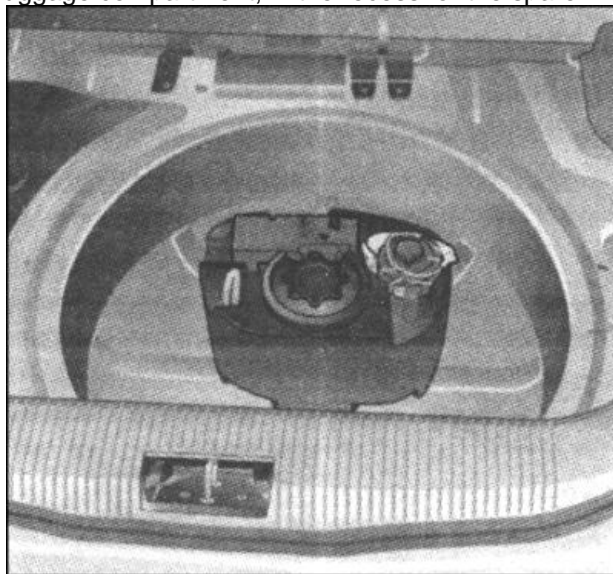


Fig. 1.266. Location kit repair Tires

Using the kit for tire repair

Remove the bag with a tire repair kit from the bay. Carefully remove the parts kit from the bag.

Remove the compressor.

Remove elektrosnur and air hose from offices on the lower side of the compressor (Fig. 1.267).

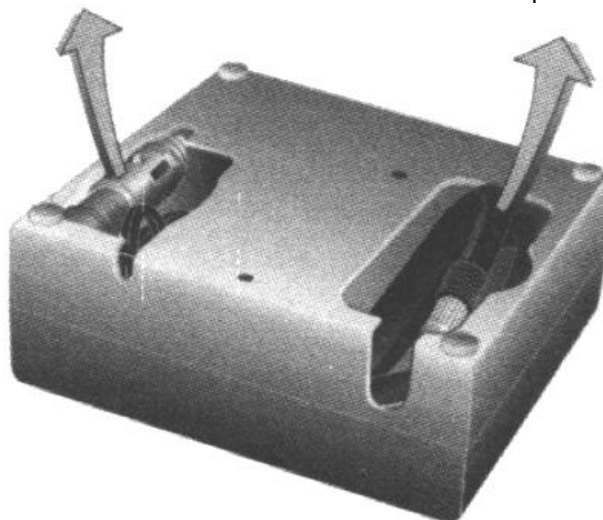


Fig. 1.267. Removing elektrosnura

Screw the air hose to the compressor fitting the flask with a sealant (Fig. 1.268).

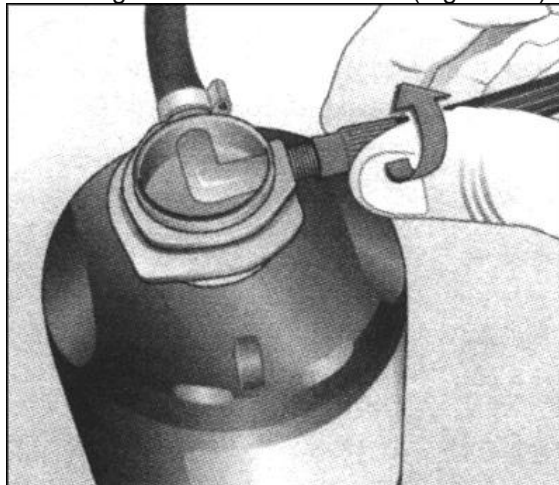


Fig. 1.268. Setup air compressor hose

Insert the flask sealed with a holder on the compressor.
 Install the compressor closer to the wheel to the flask was sealed with the vertical.
 Unscrew the valve cap of the damaged tire.
 Screw the hose to inflate a tire valve (Figure 1.269).

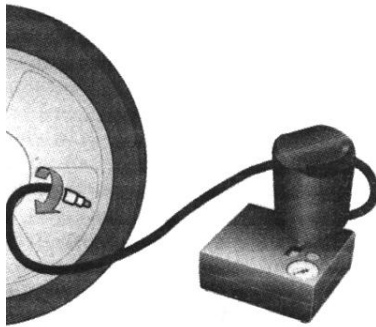


Fig. 1.269. Binding Hose to inflate to valve Tires

Switch the compressor shall be switched position.
 Insert the plug the cord into the outlet of the compressor for supplies or cigarette lighter socket.
 Turn on the ignition.
 Set toggle switch on the compressor in the position I, a tire will be filled with sealant (Fig. 1.270).

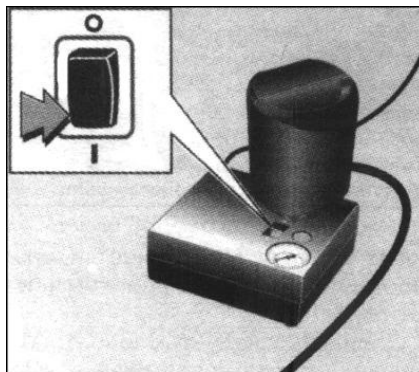


Fig. 1.270. Button inclusion and OFF-tion Compressor

NOTE

In time devastation Flasks with ger-metikom (about 30 s) at gauge compressor briefly Bu child show pressure up to 6 bar. After this pressure again lowered.

Sealant will be fully pumped into the tire. After the tire is inflated with air.

The target tire pressure should be achieved within 10 min. Turn off the compressor reaches the specified pressure.

If the prescribed tire pressure is not reached within 10 minutes, remove tire repair kit. Push the car a distance of about 2 meters (one turn of tires) in the direction of motion or back. Reinstall the tire repair kit, and then continue pumping for another 10 min. If during this time will not achieve the prescribed pressure in the tires, so tire is damaged too much. Park your car and ask for help at service stations.

NOTE

Excessive pressure reset to help Buttons over manometer (Fig. 1.271).

NOTICE

Do not switch the compressor for longer than 10 minutes.



Fig. 1.271. Button reset pressure

Remove the tire repair kit. Screw the hose to inflate tires to a free socket flasks with sealant. This prevents leakage of sealant. Remove the tire repair kit in the trunk.

Remove speaking sealant with a rag.

Fold the warning triangle and remove the trunk.

Appended to the kit label the maximum available speed, which allowed to go after the repair tires. Attach the sticker in the driver's field of vision.

Immediately proceed with a trip to the sealant evenly distributed within the tire. About 10 kilometers (not later than 10 minutes) stop and check the tire pressure. To do this, screw air compressor hose directly to the tire valve (see Fig. 1.272).

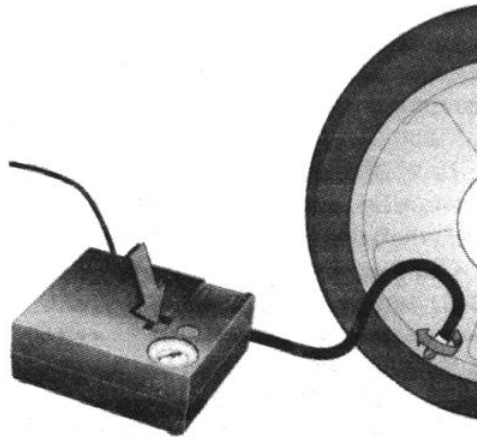


Fig. 1.272. Setup Compressor

NOTE

If pressure in bus than 1,3 bar, turn down his to setpoint. Repeat the process until such time as there is no fixed pressure loss.

If the tire pressure has fallen below 1,3 bar, go on a car can not. Ask for help at service stations.

1.37 Motor Oil

Level and flow of motor oil

Rate oil consumption is possible only after a sufficiently long run, while in the initial period (during running) the level of expenditure may exceed the value specified in the documentation. Frequent driving at high engine speeds also leads to increased oil consumption.

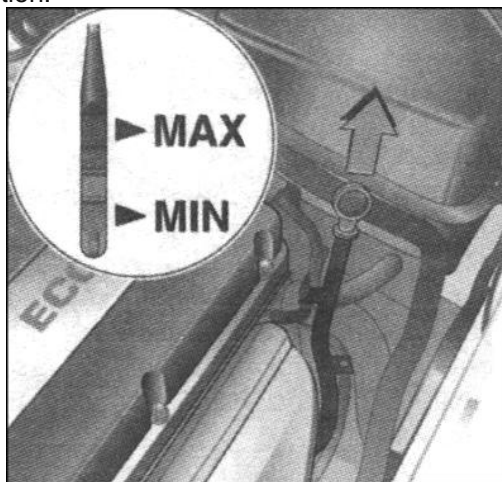


Fig. 1.273. Masloizmeritelny probe Astra motor car

Controlling the level of engine oil is carried out automatically. Before long trip is recommended to monitor the level of motor oil.

Control level and refilling the engine oil

Monitoring is performed only on the flat car and set off a hot engine. Before you check wait at least 5 minutes to oil, located in the lubricating circuit has had time to drain the oil pan.

To check the oil level plug grated masloizmeritelny probe to the hard surface on the handle. Top up the oil, if its level dropped in the region mark refueling MIN (Fig. 1.274).

The oil level should not exceed the upper mark MAX oil level gauge. Transfused oil drain or pump out. If the oil level exceeds the MAX mark, there is a risk of engine damage or a catalyst.

Oil should be topped up with the same brand that was used in the previous oil change, observing the instructions in the service book.

Position the plug and tighten it until it stops.

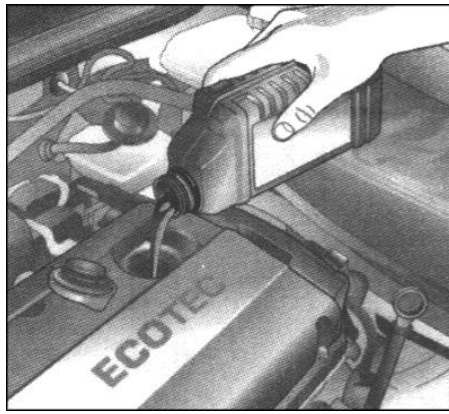


Fig. 1.274. Topped engine oil

1.38 Coolant

During operation the system is under increased pressure, so the temperature may briefly rise above 100 ° C. Coolant through glycol provides corrosion protection for cooling and heating, as well as from freezing to about -28 ° C. She remains in the cooling system all year round and does not need to be replaced.

The use of some anti-freeze can cause damage to the engine, to avoid this, use antifreeze, admitted by Opel. Antifreeze is harmful to health, so keep it only in the original packaging and take care of the children.

Protect from freezing and corrosion protection

Before the winter period, check the concentration of the coolant. Contents of antifreeze in the radiator should provide protection from freezing to about -28 ° C. Too low concentration of antifreeze affects the protection against freezing and corrosion. If necessary, add antifreeze.

In the case of loss of coolant top up the water, check the concentration of antifreeze and if necessary, add antifreeze (Fig. 1.275).

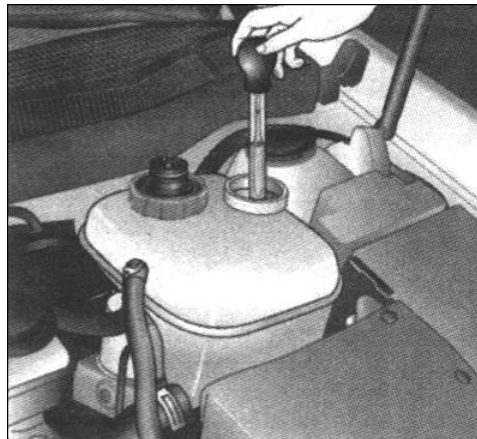


Fig. 1.275. Check the concentration of antifreeze

The level of coolant

In a closed system, cooling losses are practically absent, so refilling the coolant is needed very rarely.

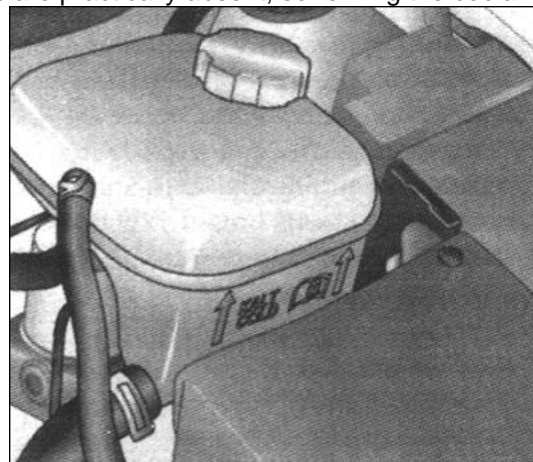


Fig. 1.276. Mess with the coolant

The level of coolant in the compensating tank with cold cooling system should be slightly above the mark KALT / COLD. When warmed up to operating temperature the engine level rises, and when cooling is reduced again. If he falls below the mark, top up coolant should be a little above it.

Before opening plugs allow the engine to cool down. Carefully open the tube to excessive pressure slowly fell, because otherwise there is a risk of burns.

Top up the antifreeze. In the absence of antifreeze tuck system clean drinking water or distilled water as a substitute.

After refueling drinking or distilled water, check the concentration of antifreeze and if necessary, add it. Eliminate the cause of loss of coolant.

Position the plug and tighten it until it stops.

Temperature coolant

Illuminated the appropriate sensors on the instrument cluster shows the excess coolant temperature. Immediately check the coolant level.

1.39 Brake Fluid

The level of brake fluid

NOTICE

Brakes liquid toxic. Do not hit her in eyes, skin, tissue and lacquered surface. Direct contact Brake liquid may cause injuries and damage.

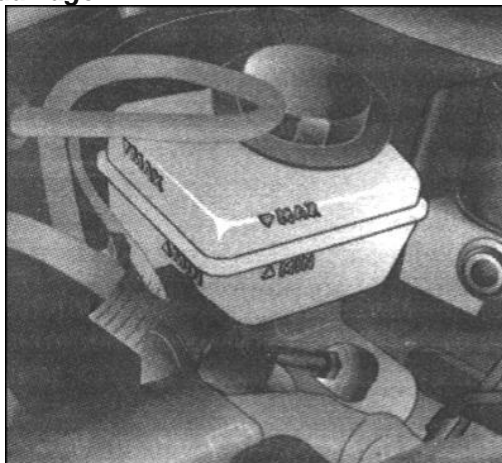


Fig. 1.277. Pail with brake liquid

The level of brake fluid in the tank must be above MAX mark and below the MIN.

There are brake fluid, use of which could result in damage or deterioration in braking performance, so use only high-quality brake fluid.

If refueling is necessary to ensure the highest degree of purity, as well as contamination of brake fluid can lead to abnormal functioning of the braking system.

After dol willow brake fluid eliminate the cause of its losses.

Replacing brake fluid

Brake fluid is hygroscopic, ie it absorbs moisture. Due to excessive heat build up during braking, for example on the long descent, can be formed vapor bubbles, which significantly (depending on water content) impair the effectiveness of inhibition.

You should exercise the brake fluid change intervals specified in the service book.

1.40 Electrical Equipment

Fuses

The car has two fuse boxes: in the trunk lid and left for the front left in the engine compartment.

Recommend that you always have with you a complete set of fuses. Spare fuses put in a special box in the trunk.

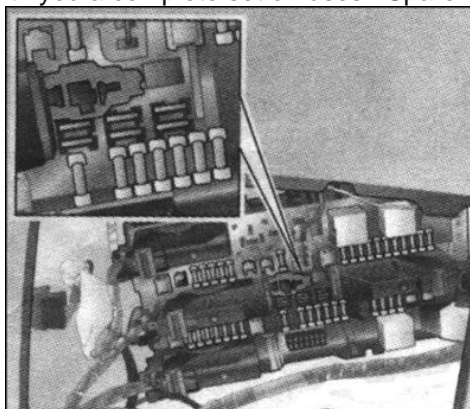


Fig. 1.313. Block Fuse in fat-no Vehicle

Before replacing the fuse or disconnect the appropriate radio button turn the ignition off.

Defective fuse (Fig. 3.14), can be identified by burned-fusible thread. Replacement fuse only after the damage repaired.

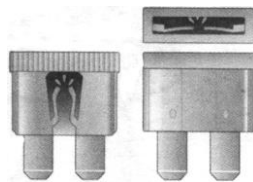


Fig. 1.314. Example serviceable and negotia-revshego Fuse

In the box located in the trunk, there is a device for extracting fuses.

Use only fuses specified amperage. She indicated on each fuse and additionally marked with color.

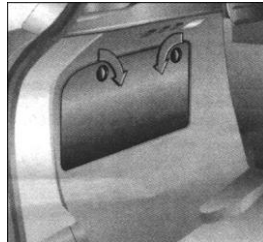


Fig. 1.316. Lid block fuses-ers Tsvetovayaya labeling and power current Fuse

Marker color	Power Current, A
fulva	5
brown	7.5
red	10
blue	15
yellow	20
Transparent	25
green	30
blue	20
Transparent	25
pink	30
green	40

Fuse box in the trunk

Fuse box located on the left in the trunk, under the lid. To get access to it, unscrew the two retainer coin, as shown in Figure 1.315, and flip the lid down.

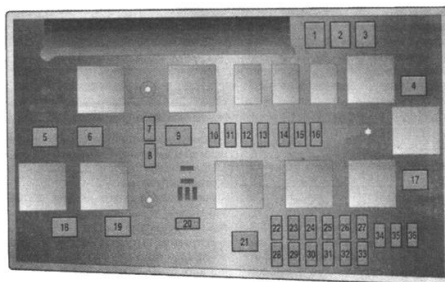


Fig. 1.317. Fuse block, located in the engine compartment of the car

Do not put foreign objects under the cover.

NOTE

Some chain may is protected-HN more fuses.

Fuse box in engine compartment

Fuse box located in the front left in the engine compartment.

Before you open a box of fuses in the engine compartment, turn off the engine.

To open the lid, release the latches by inserting a screwdriver until it stops in the holes and turning away. Lift the lid and remove it (Figure 1.318).

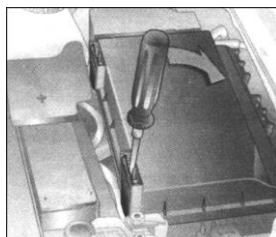


Fig. 1.318. Withdrawal cover block pre-keepers

2 TRANSMISION. STRENGTH

2.1 General information

By car Opel Astra with a manual gearbox set odnodi Skov-dry clutch with overlays do not contain asbestos, and the two-mass flywheel. Management is carried out through a hydraulic clutch. Vehicles equipped with automatic hydraulic multi-plate clutch.

During the operation does not require maintenance of cohesion, as well as in his work, worn out parts of the linings themselves aligned. The replacement slave clutch disc to hold approximately 100 000 km, but this largely depends on the load condition of the car.

Depending on engine model and type of gear coupling design may vary slightly (see Figure 3.1).

Flywheel

Flywheel rigidly connected to the crankshaft of the engine. Dvuhmassovy flywheel with a spring-damper system provides maximum damping of torsional vibrations.

Led and push Drives

Led by the disc is placed on the primary shaft of the gearbox. On both sides of him riveted lining.

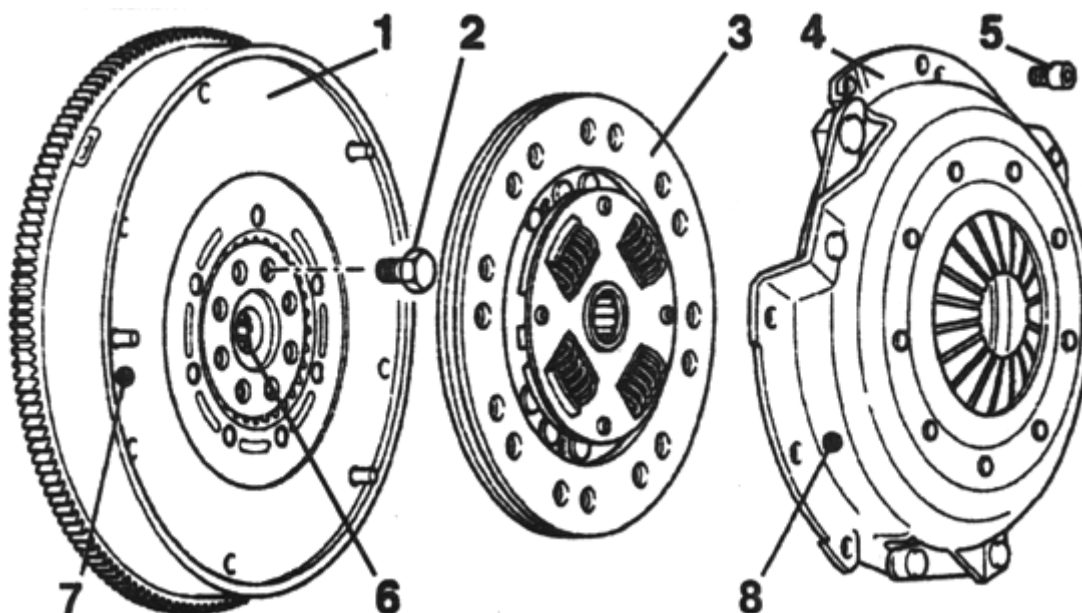
Push the disc through the diaphragm spring and clutch housing rigidly connected to the flywheel. Push the disc is pressed for the slave drive to the flywheel. The surface of the screw drive suitable corrosion compound. When cleaning the pressure plate must handle only its surface - so you extend the life of clutch.

Bearing off Clutch

Bearing clutch slave drive provides an exemption from the lead in pressing the clutch pedal.

Table 3.1. Possible failure coupling their causes and solutions

Possible causes failure	Method remove
Incomplete Off adhesion (adhesion "Leads")	
Lack of full clutch pedal	Adjust clutch
Warping slave drive (frontal beating more than 0,5 mm)	Vypravte or replace the disk
Seized hub slave drive slots on the primary shaft	Empty slots, rinse with white spirit. In the wear grooves, replace the primary shaft or slave drive
Warping or buckling pressure plate	Replace the clutch cover complete with pressure plate and spring
The weakening or breakdown of rivets friction linings slave drive	Replace pads, check the frontal beat drive
Violation performance rope clutch	Replace cable
Incomplete inclusion adhesion (adhesion "Stalled")	
Increased wear or sticking friction linings slave drive	Replace friction pads or slave drive assembly
Lubrication friction linings slave disk surfaces of the flywheel and pressure plate	Rinse thoroughly with white spirit greasy surface, replace worn or damaged gaskets gearbox and engine. Verify that no leakage of oil through the bolts fastening the flywheel, with a leak, install the screws on the sealant, as described in chapter
Damage or grabbing clutch	Eliminate the causes of jamming. Replace damaged parts
Jerks at work Clutch	
Lubrication friction linings slave disk surfaces of the flywheel and pressure plate	Rinse thoroughly with white spirit greasy surface, replace worn or damaged gaskets gearbox and engine. Verify that no leakage of oil through the bolts fastening the flywheel, with a leak, install the screws on the sealant
Seized in the clutch	Eliminate the causes of jamming. Replace damaged parts
Damage to the surface or warping the pressure plate	Replace the clutch cover complete with pressure plate
Increased noise at inclusion Clutch	
Breakage damping springs slave drive	Replace the slave drive assembly
Increased noise at off Clutch	
Wear, damage, leakage of lubricant from the bearing clutch	Replace bearing



Components with tsepleniya:

- 1 - Handwheel, 2 - attachment bolt flywheel, 3 - slave drive;
- 4 - pressure plate, 5 - bolt fastening screw drive;
- 6 - bearing clutch;
- 7 - marking combining flywheel;
- 8 - marking combination of pressure plate

2.2 Transmission. Clutch - The flow of the hydraulic clutch (gearbox - F13 / F17 + / F23 / M20 / M32)

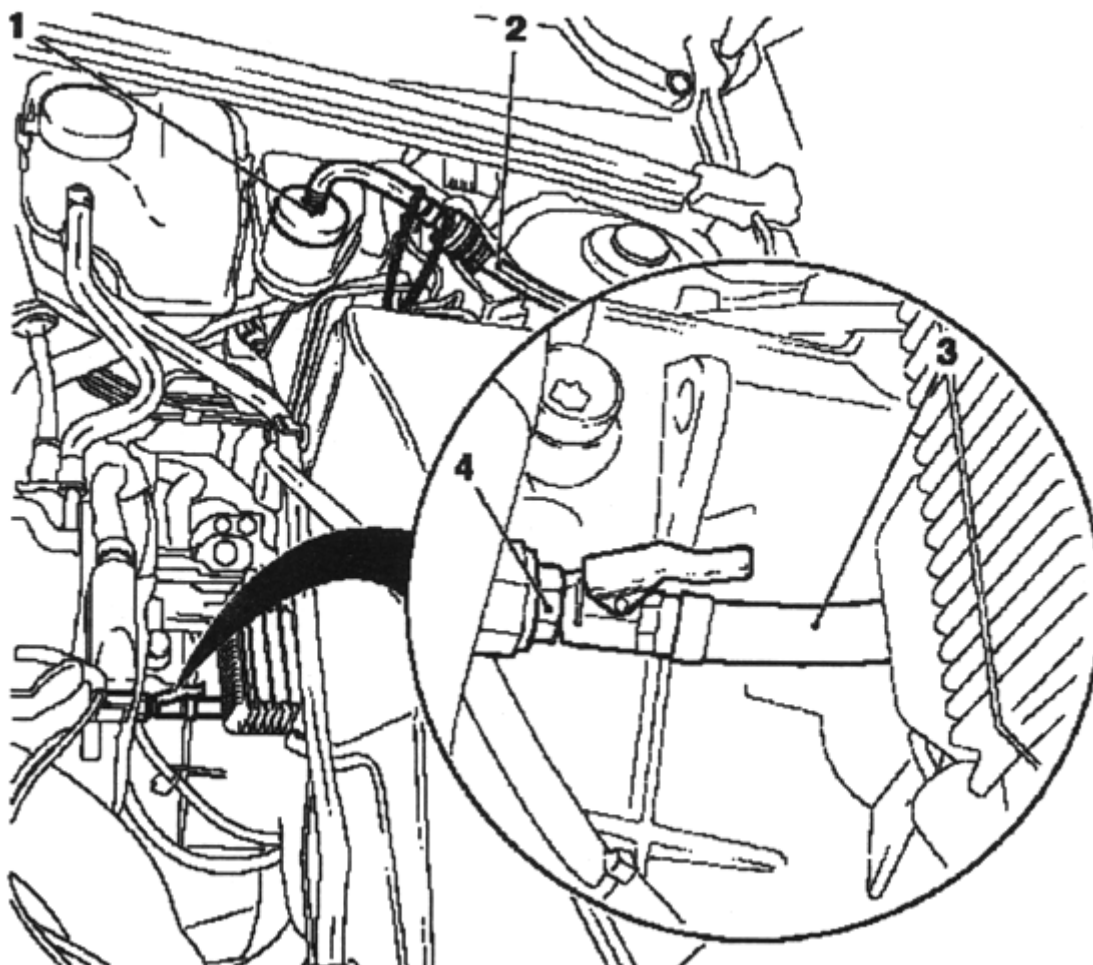


Fig. 3.2. Leveling hydraulic Clutch:

- 1 - Adapter 2 - a special tool IMC-6174-2;
- 3 - special tool IMC-6174-1, 4 - valve pumping

NOTICE

Use only brake fluid DOT 4.

The hydraulic clutch is pumped only "bottom", that is pumped through the valve. For this purpose the device is used to remove air from the hydraulic brakes.

NOTICE

Manual pumping not allowed. Follow production Ying-tion at use aspirations STVA for delete air of Tormo-call. Device for delete air to ha of Brakes should ensure pressure approximately 2 bar.

Hardware Installation

Connect the device to remove air from the hydraulic drive. To do so, attach the adapter device for removing air from the brakes to Backa hydraulic brake system. Install special tool IMC-6174-2 on the adapter.

Lower the end of the hose into a suitable container.

Remove the valve cap from the valve pumping and attach a special tool IMC-6174-1 to the valve pumping (Fig. 3.2).

Remove air from the clutch.

Turn on the device for removing air from the hydraulic drive.

Open the valve pumping (2-3 overleaf).

Pump to release the brake fluid without bubbles.

Close (by hand) valve pumping.

Removing device

Unplug the device for removing air from the hydraulic drive.

Disconnect the adapter device for removing air from the hydraulic drive.

NOTICE

Must follow following operations for fill gall-ment pipeline Carter co-shy Transmission Desktop cylinder clutch. When pumping certifying believe that tank hydraulic brake system filled.

Remove air from the discharge line of the working cylinder clutch.

Install special tool IMC-6174-2 on MCM-6174-1 on the valve pumping, lower the free end in a suitable container

Press and hold the clutch pedal.

Open the valve pumping.

Open the valve before pumping air and / or a mixture of air / brake fluid.

Close (by hand) valve pumping.

Slowly release the clutch pedal and wait approximately 5 seconds.

Repeat the procedure four times.

Tighten the valve point pumping 5 N-m.

Remove the special tools IMC-6174-1 and IMC-6174-2.

Remove the cap from the valve pumping.

Fill the tank hydraulic clutch brake fluid to the mark "MAX".

Close the tank hydraulic brake system.

Check the opening pressure of the clutch pedal.

Check to include all gear with the engine running and clutch depressed.

NOTE

Make trial trip, something would ensure clear work si-tem Clutch and inhibition. Travel spend with different velocities and frequent switch-em transfers to reach work-chih temperatures.

2.3 Clutch - Removal, inspection and installation of hard plates and the driven clutch plate (without SAC)

NOTE

To prevent damage to the petals spring thrust plate use a special device KM-6263 after removal and installation.

NOTE

Note the different length brackets for joining the CM 6263 at lowering engine block.

Withdrawal

Remove the gearbox

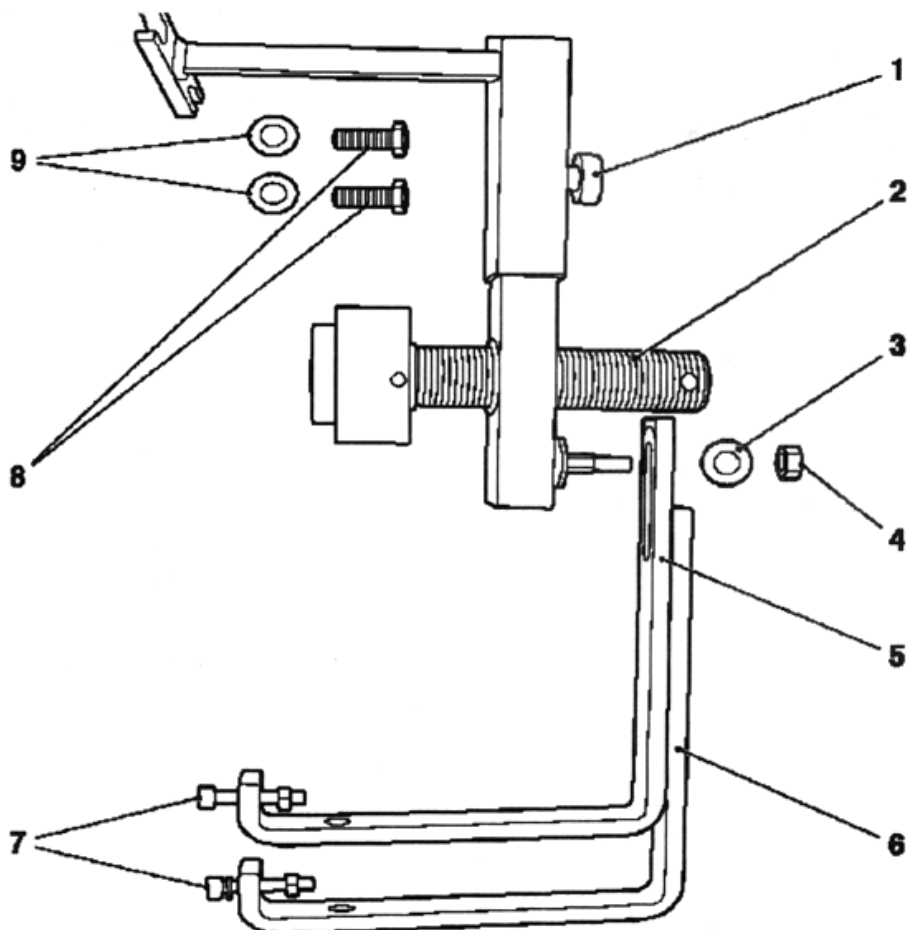


Fig. 3.3. Gadgets for withdrawal and Installation stubborn Plates and slave disc clutch:

- 1 - pin 2 - retractors, 3 - Disc 4 - nut;
 5 - KM-6263-4 (short arm), 6 - KM-6263-5 (long arm);
 7 - lower bolt engine block;
 8 - upper bolt engine block; 9 - Puck

NOTE

Special KM-6263 device can is attached only to block engine and not to oily pallet.

Attach a special device KM-6263 to the engine block and tighten the 4 bolts (arrows in Figure 3.4).

NOTE

Not tighten bolts.

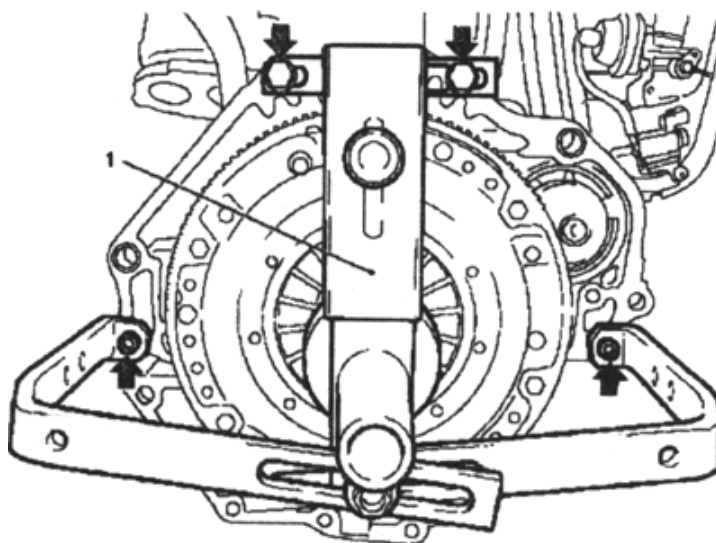


Fig. 3.4. Accession -adapted-tion:

- 1 - adaptation

Attach a special device KM-6263-30 (4) to the alignment fixture (Figure 3.5).

Transmission	Aligning arbor
F13	CM-6263-21
F17 +	CM-6263-21
F23	CM-6263-22

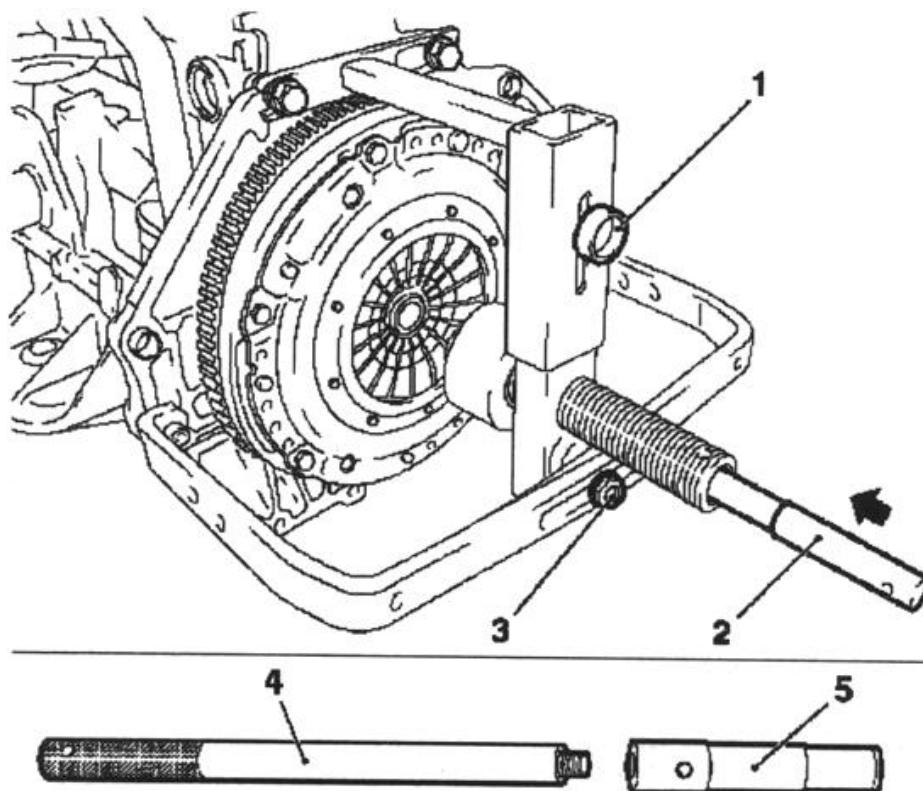


Fig. 3.5. Setting special accessories and alignment mandrel:

1 - pin 2, 4 - a special device KM-6263-30;
3 - nut, 4 - aligning arbor

Attach a special device KM 6263.

Align special device KM-6263 with the center.

Set alignment mandrel with a special device KM-6263 KM-30 through 6263 in the drive clutch and the crankshaft (center).

Tighten the bolt and nut.

Tighten the 4 bolts special device KM-6263 to the engine block (Fig. 3.5).

Free slave clutch disc.

Set a special device KM-6263 so that it was situated opposite the petals spring thrust plate (Fig. 3.6).

Turn special device KM-6263 clockwise to the limiter.

Remove the thrust plate to the flywheel.

6 Loosen the mounting bolts (arrows in Figure 3.7).

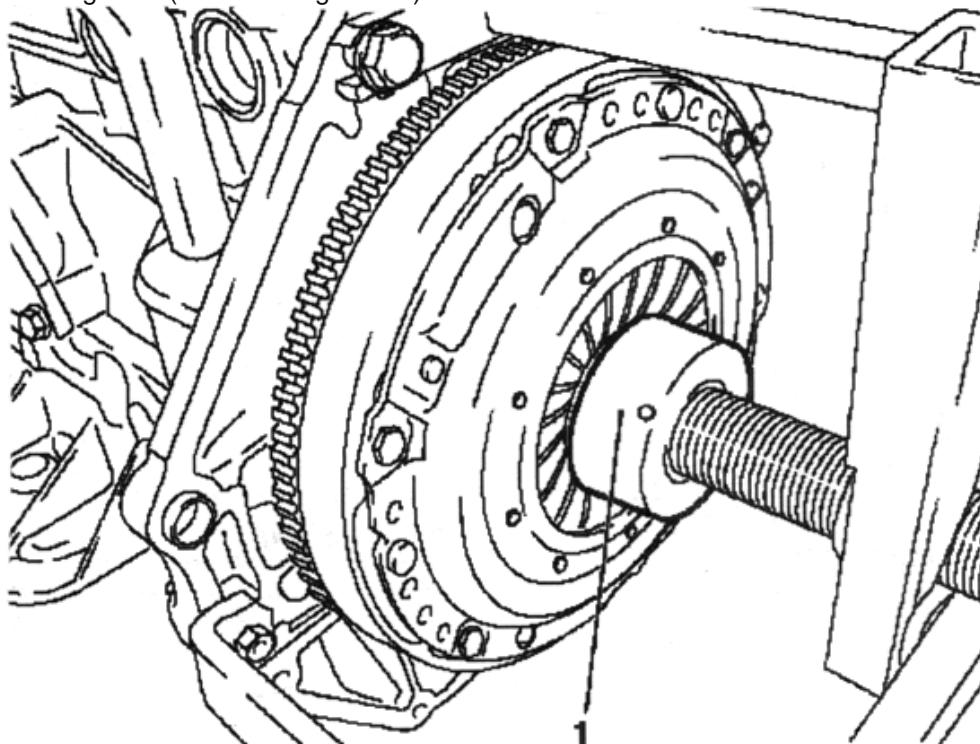


Fig. 3.6. Installation of special devices:

1 - adaptation

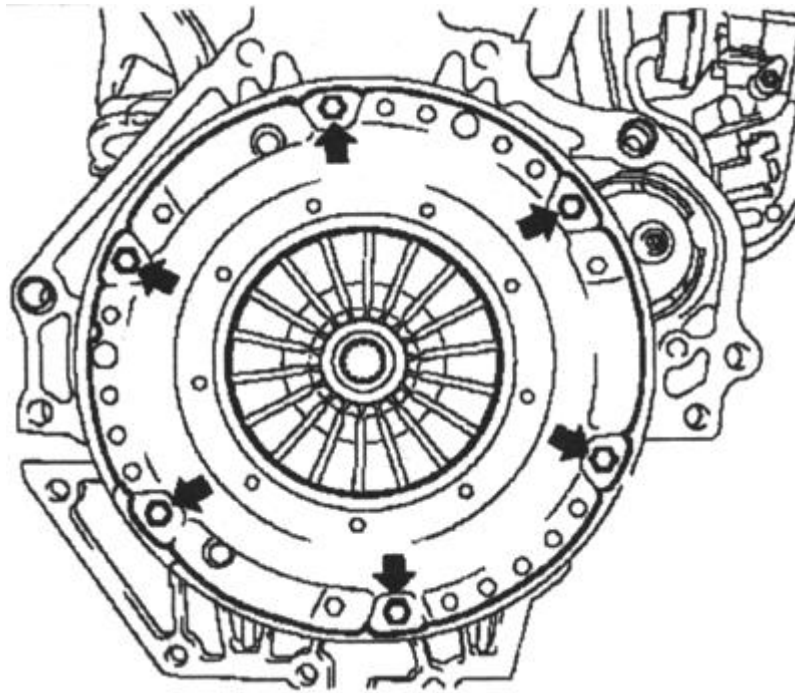


Fig. 3.7. Bolts mounting the flywheel

NOTE

On Figure 3.7 shows traction without special KM-6263 and accessories alignment mandrel.

Remove the thrust plate and clutch disc.

Turn special device KM-6263 counter-clockwise until the limiter and pull the mandrel alignment with a special device KM-6263-30.

Test

Check thrust plate and driven clutch disc wear.

Replace if necessary.

NOTE

The clutch labor-contaminated products (oil, detergent, etc.) should be replaced. Check the slave clutch disc for damage and wear products on the hub and replace if necessary. Do not empty the thrust plate and driven clutch disc high-pressure cleaners or washing machine.

Check the friction surface of the flywheel on the absence of cracks, burnt and the wear surface.

Check the condition of the friction linings and clutch slave drive if they have traces of oil or mechanical damage, replace the slave drive.

Check the thickness of the lining driven clutch plate, with the help of vernier calipers. Overlays should speak over the heads of rivets not less than 0.3 mm (Fig. 3.8).

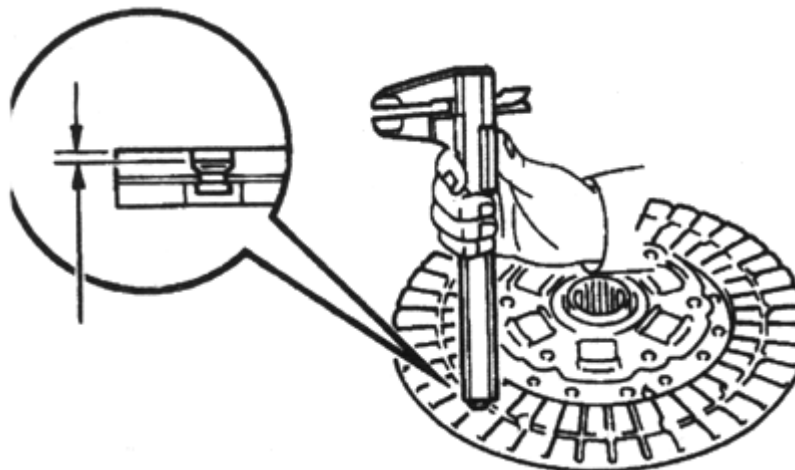


Fig. 3.8. Measurement of friction linings slave clutch plate

If the thickness of the lining is less than the permissible or rivet heads are close to the working surface, replace them or slave drive clutch. Check that the springs were not broken and they are no cracks. Check on the lack of wear slots in the hub clutch discs.

Replace clutch disc to the shaft of the gearbox (Figure 3.9).

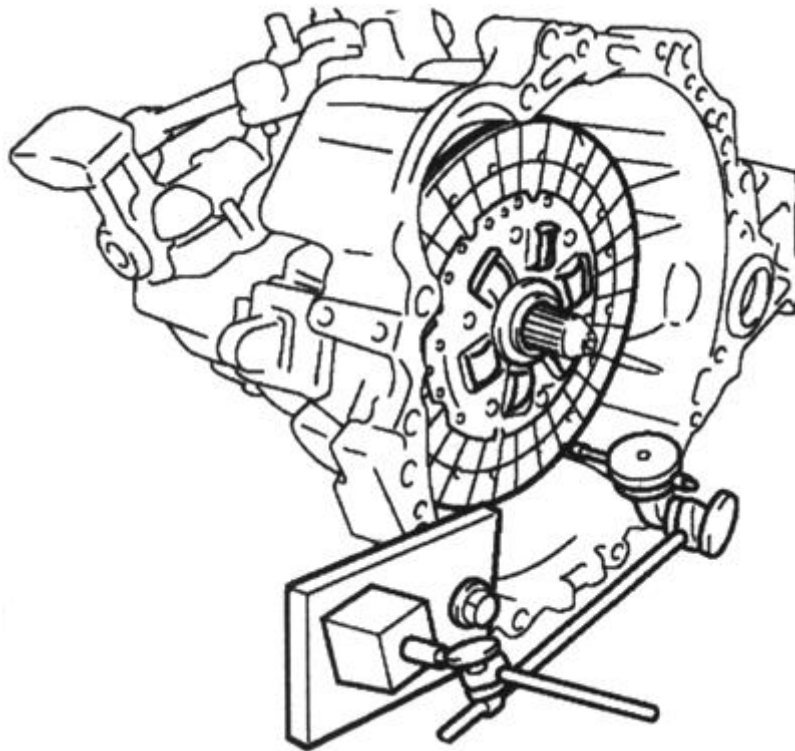


Fig. 3.9. Installing slave drive clutch to the shaft of the gearbox

Slave clutch disc should be easily and smoothly slide in the slots of the primary shaft of the gearbox.

NOTICE

If conducted replacement slave drive adhesion to per-ndo and bearing clutch.

Using a clock-type indicator, check the pulse of the disc clutch.

Minimal beat: 0,8 mm.

Using vernier calipers to check the depth and width of wear petals diaphragm spring (3.10).

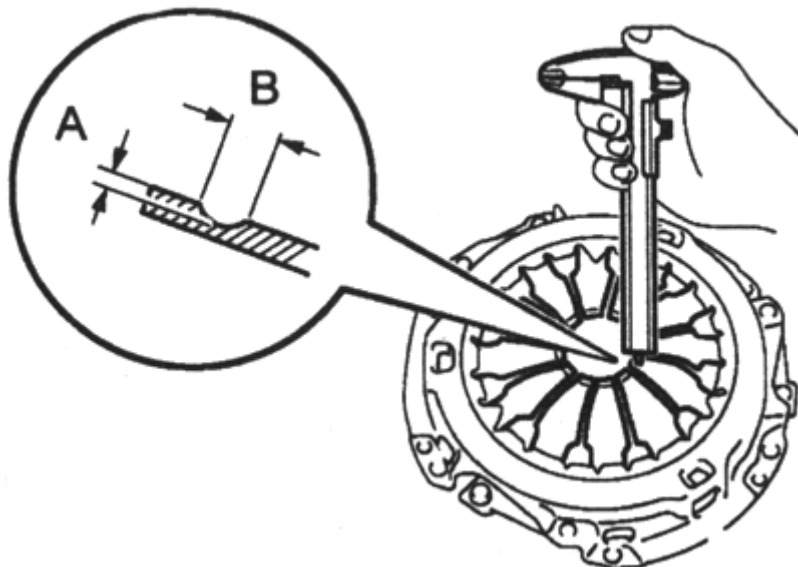


Fig. 3.10. Measuring the depth and width of wear Petal diaphragm spring

Maximum:

A (Depth): 0,5 mm

B (Width): 6,0 mm

NOTE

Minor damage to the friction surface can remove the fine-grained sand boom goy, but in case of any doubt about the condition of the pressure plate must be replaced by new.

Using a clock-type indicator, check the pulse of the flywheel (Fig. 3.11).

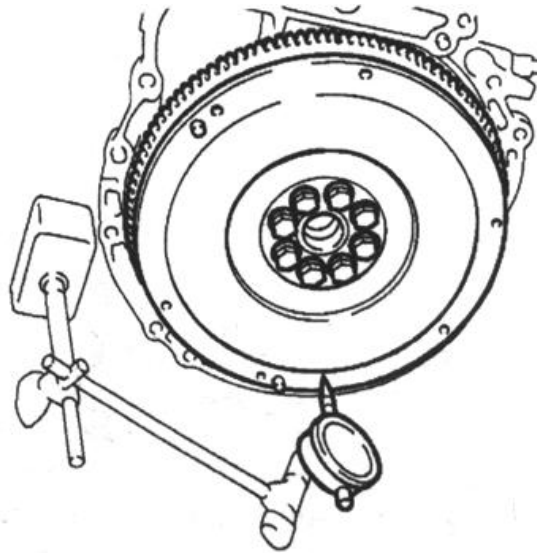


Fig. 3.11. Measurement beats Flywheel

Maximum beat: 0,1 mm Rotate bearing clutch hand, applying force in the axial direction, check the clutch bearing (Fig. 3.12).



Fig. 3.12. Check bearing turned off-cheniya Clutch

NOTE

In bearing laid lubrication calculated on all term exploitation, such , the addi-cen Grease not required. In case necessary, replace bearing off adhesion.

If you install new parts, be sure to find out what pressure plate and slave drive is required for the designation of the engine and its number, to avoid error. If you set the former in the clutch components, they must first check.

Before installing the new pressure plate corrosion protective grease must be removed only at the working surface. In other places, to remove grease in any case is not recommended, because it can significantly reduce the lifetime of adhesion.

Make sure the installation of centering pins on the flywheel.

Clean the rust on the splines slave drive. Lubricate the teeth of the drive shaft gear box with a thin layer of lubricant MoS₂. At stations used for this purpose grease G000100. Then move the slave on the primary drive shaft so that the hub is easily moved about the shaft. Sure to remove excess grease.

Apply grease on the contact surface couplings and clutch fork, fork and push rod and fulcrum fork (Figure 3.13).

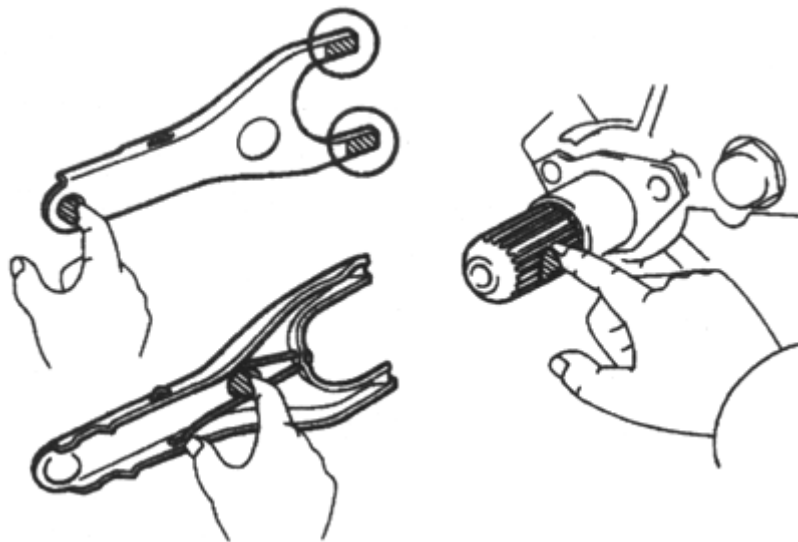


Fig. 3.13. Places Application grease on forks off clutch forks and pusher and point support forks

Apply grease to the splines on the clutch and drive shaft splines.
Install clutch fork with bearing clutch in the gearbox.

NOTE

After installation, move Fork-ku forward and back for check smoothness movement Clutch release th bearing.

Setting

NOTE

Literal designation «Transmis - sion side » should is drawn to box transmission.

Attach the slave drive clutch and thrust plate to the flywheel.

Ottsentiruyte thrust plate and clutch disc alignment mandrel and a special device KM-6263-30 (Fig. 3.14).

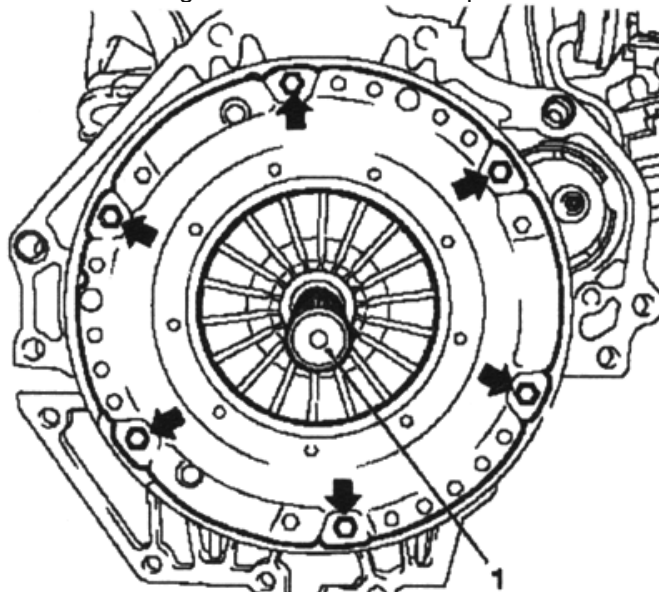


Fig. 3.14. Spigot stubborn plas-slime and CD Clutch:

1 - adaptation of the CM-6263-30

NOTE

For visibility Figure 3.13 There-is called clutch without adapted-PRINCIPLES FOR GOOD GOVERNANCE KM 6263.

Tighten the 6 new bolts (arrows in Figure 3.13).

NOTE

Not tighten bolts.

Attach the thrust plate to the flywheel.

Turn special device KM-6263 clockwise to the limiter.

Tighten the 6 bolts fastening point 15 N-m.

NOTE

Tighten Bolts crosswise.

Remove special device KM-6263 from the engine block. Turn counterclockwise to remove the limiter and alignment mandrel and KM-6263-30 (Fig. 3.15).

Loosen the 4 bolts special device KM-6263 to the engine block.

Set the gearbox.

2.4 Transmission. Clutch - Removal and installation of piping and discharge hose coupling (gear - F13 / F17 / F17 + / F23 / M20 / M32)

Remove

Close the tank and disconnect the brake hydraulic supply line from the clutch master cylinder (Figure 3.16).
Assemble arising brake fluid.

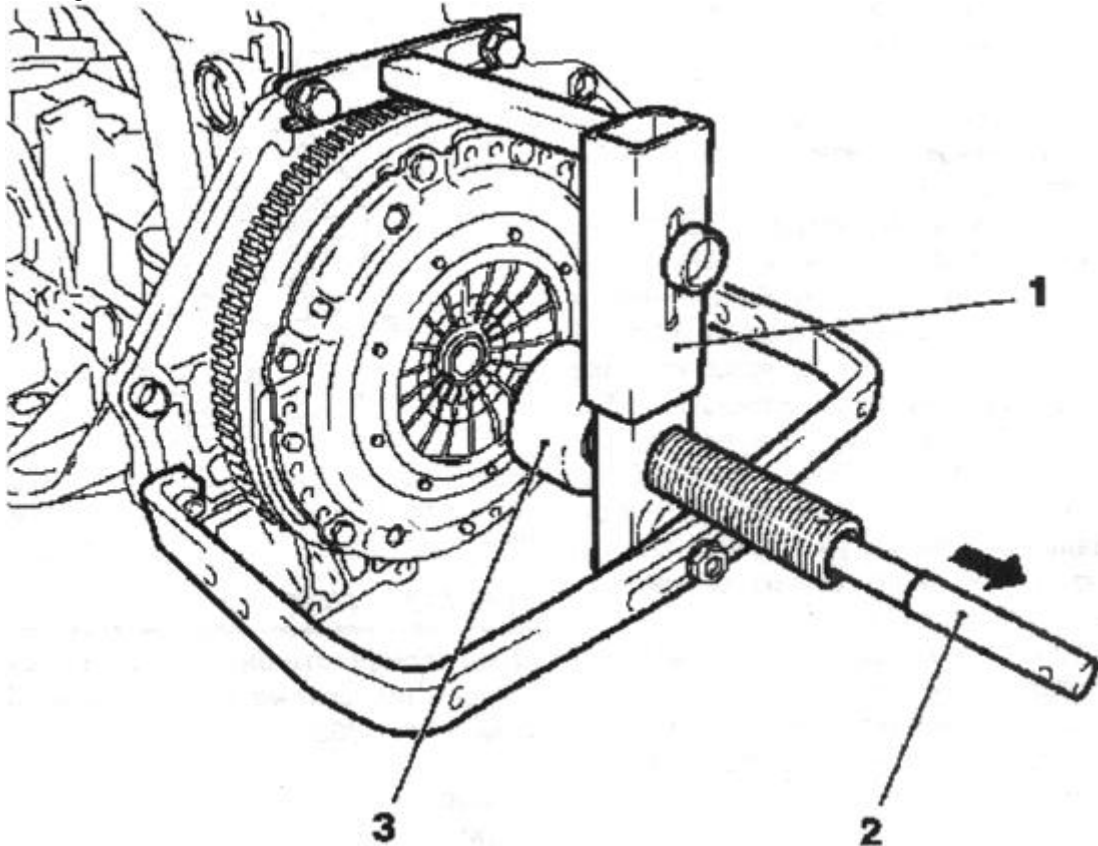


Fig. 3.15. Setting slave CD and stubborn plate:
1,3 - a special device KM-6263-30, 2 - mandrel

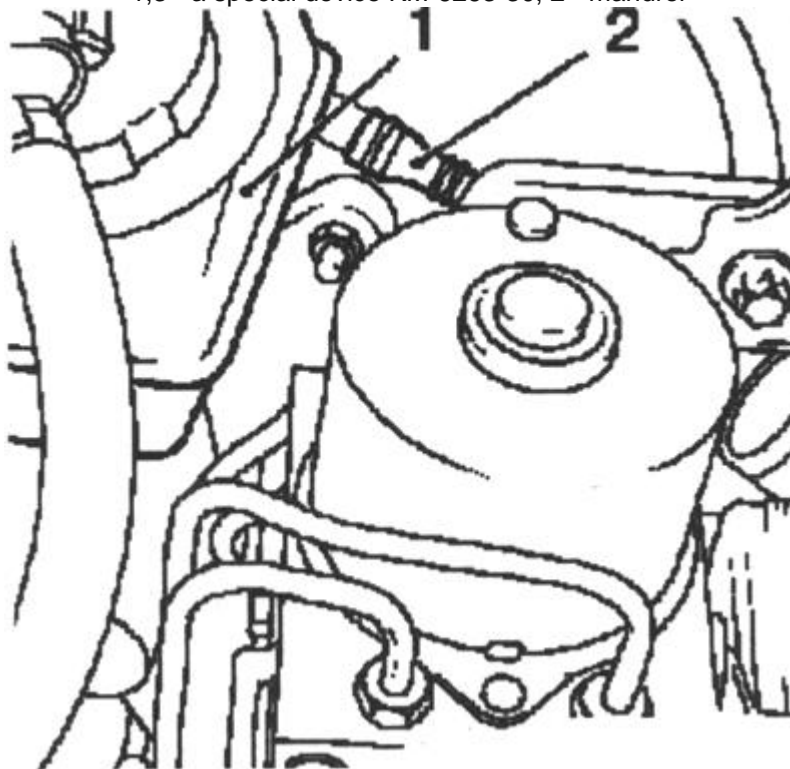


Fig. 3.16. Feeding pipeline and tank stopping hydraulic system:
1 - tank brake hydraulic system 2 - the supply line

Close the tank hydraulic brake system of protective cap.
Fill the tank hydraulic brake system up to the mark "MAX".
Disconnect the mass wire from the battery, disconnect the positive wire from the battery.
Remove the strap, loosen the bolt and remove the battery (Figure 3.17).

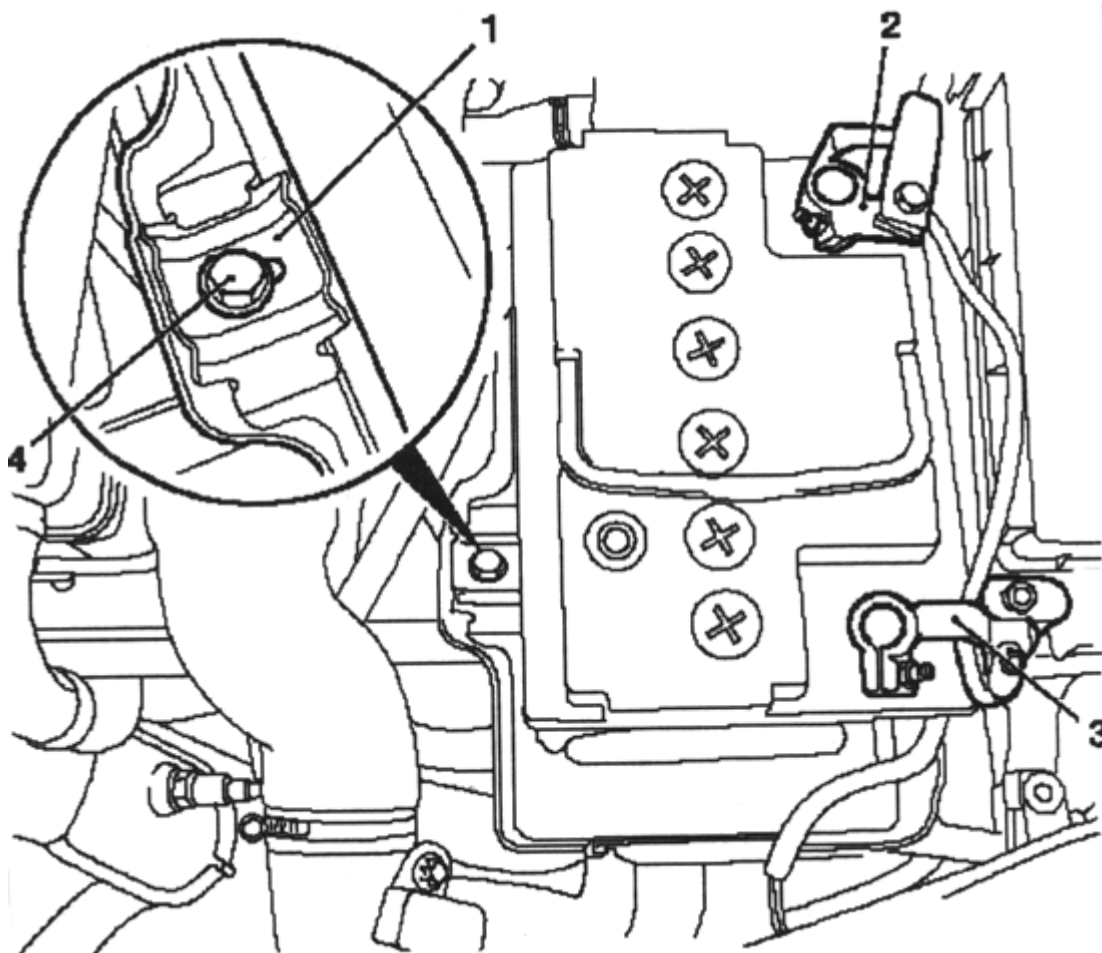


Fig. 3.17. Removing the battery:

- 1 - spud, 2 - a massive wire;
- 3 - the positive wire, 4 - bolt

Remove the battery support. To do this, remove the cable ties and loosen the 3 bolts fastening (Figure 3.18). Take the expansion tank cooling system places the side.

Remove the expansion tank with the support.

Disconnect the module anti-lock braking system

Disconnect the module anti-lock braking system from the top by unscrewing 2 screws fastening (Figure 3.19).

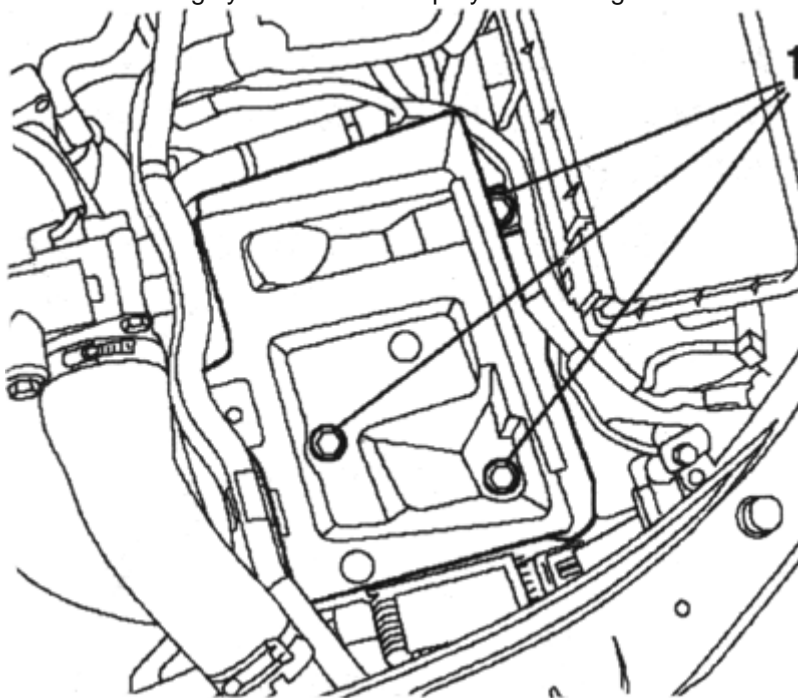


Fig. 3.18. Withdrawal support Battery:

- 1 - mounting screws

Unleash the conclusion of the bracket.

Disconnect the module anti-lock braking system from the bottom.

Remove the retaining clamp on the clutch master cylinder.

Carefully slide the module anti-lock braking system to the side.

Remove the retaining clamp with a screwdriver (Figure 3.20).

Disconnect the flow line of the actuator with the damper on the clutch master cylinder clutch.

Disconnect the discharge pipe from the clutch actuator arm on the bracket supports the battery (Figure 3.21).

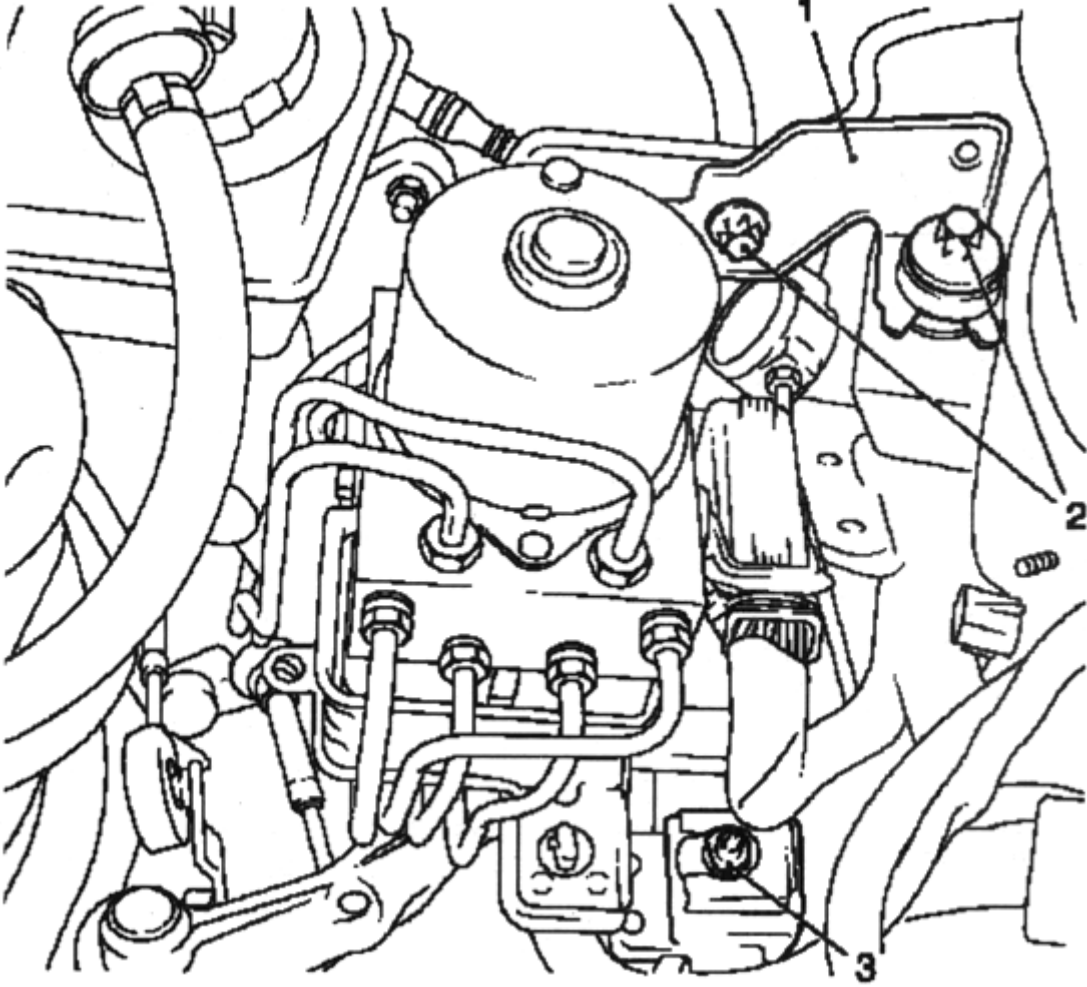


Fig. 3.19. Withdrawal Module antilock system Brakes:
1 - upper bracket, 2 - mounting screws, 3 - bottom bracket

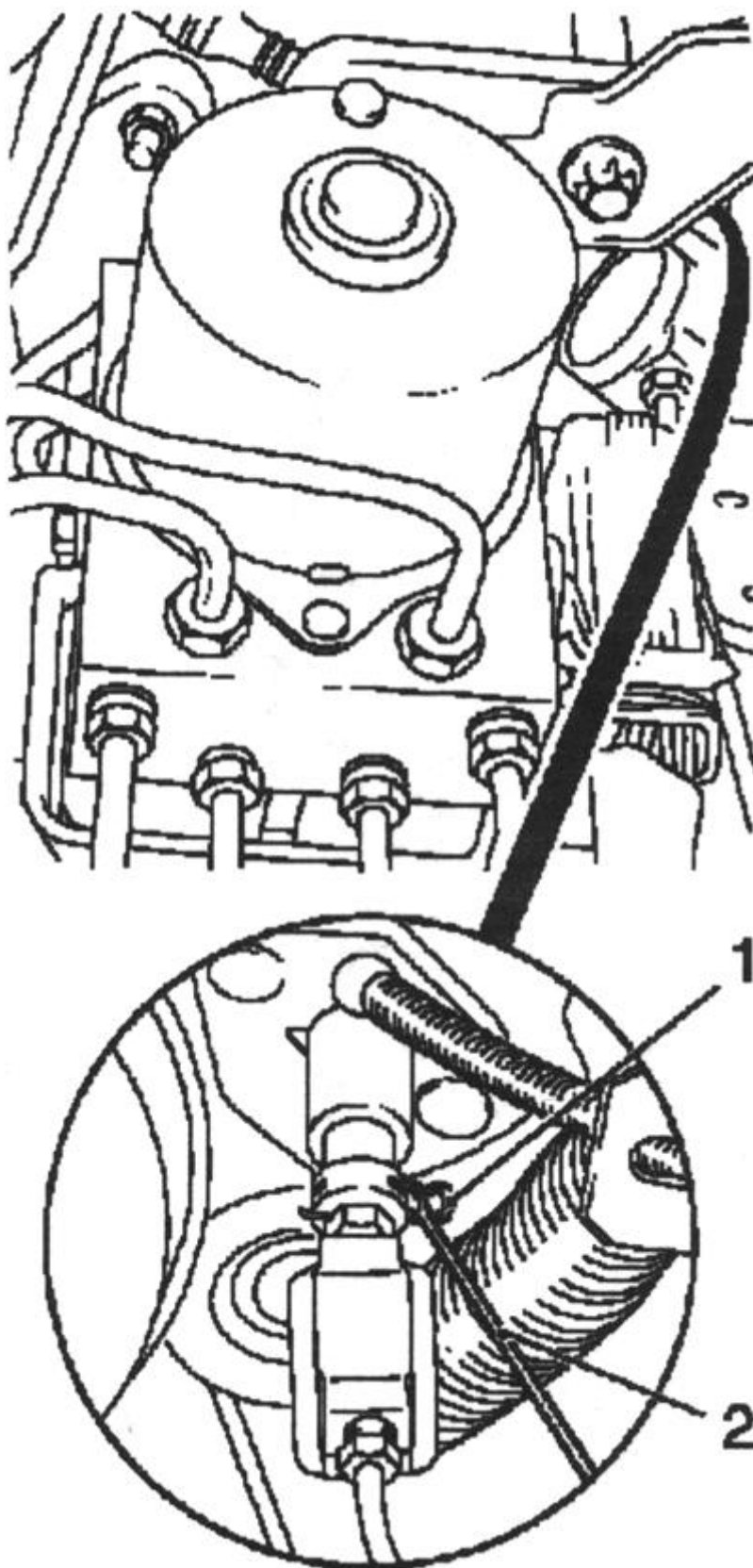
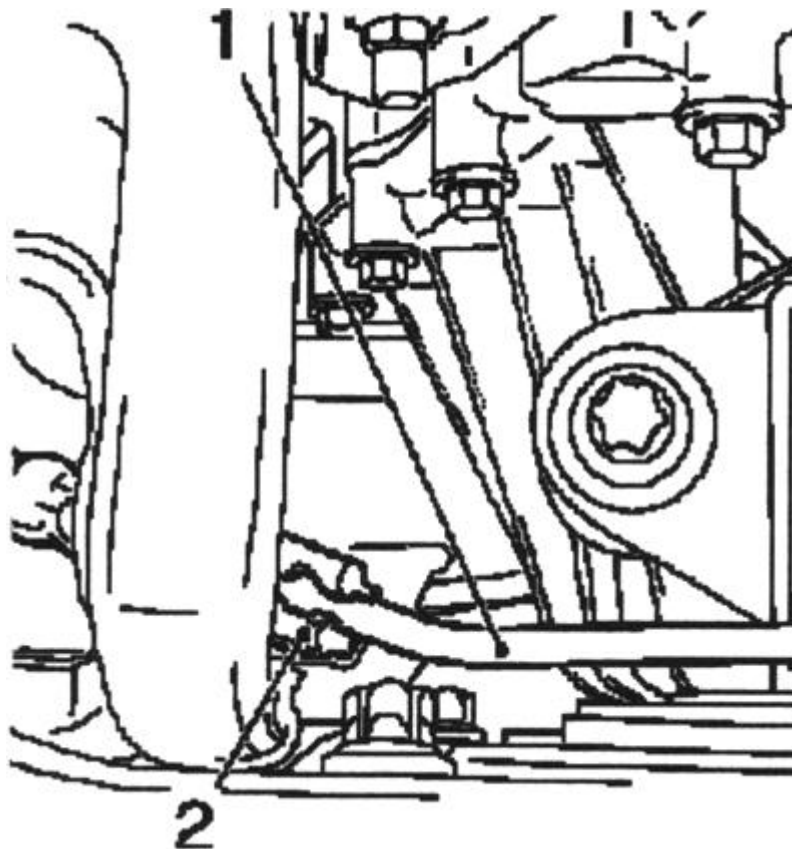


Fig. 3.20. Withdrawal restraint Homa-ta:
1 - holding the collar 2 - Screwdriver



**Fig. 3.21. Disconnecting discharge line
Executive mecha-ma Clutch:**

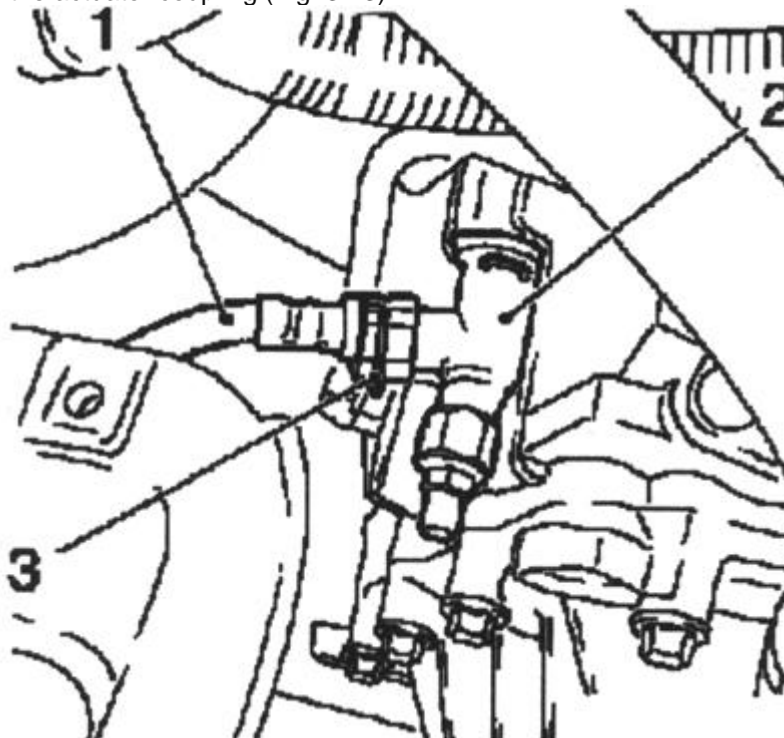
1 - flow line executive
clutch, 2 - Bracket

Remove the discharge pipe from the working cylinder clutch.

Unlock the retaining collar on the connector working cylinder holding a screwdriver and remove the retaining clamp (Figure 3.22).

Disconnect the discharge pipe connections from the working cylinder clutch

Remove the flow line of the actuator coupling (Fig. 3.23).



**Fig. 3.22. Withdrawal discharge Oil throughput with Desktop
cylinder Clutch:**

1 - flow line;
2 - jack working cylinder coupling;
3 - retention clamp

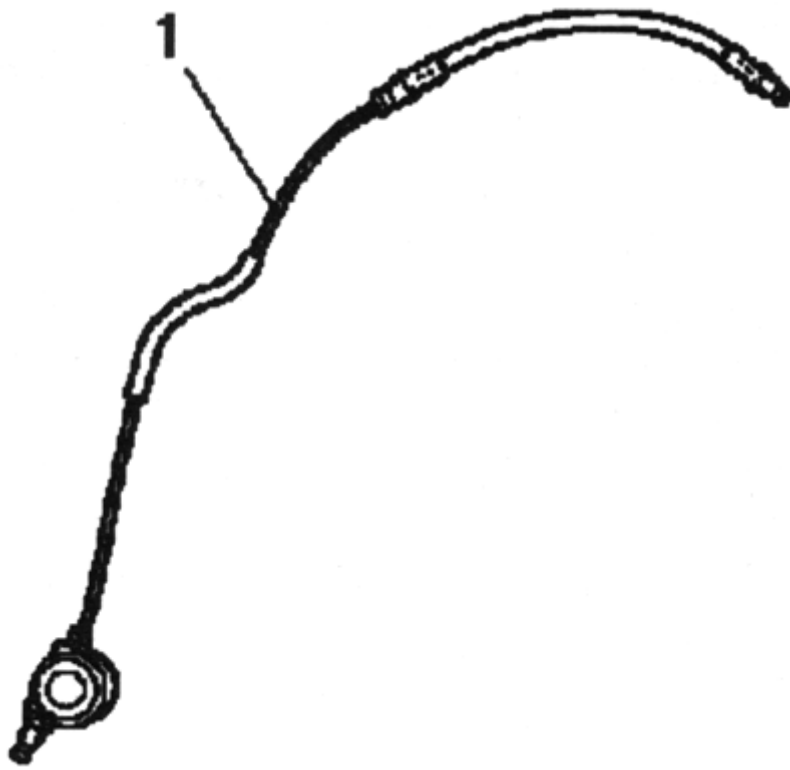


Fig. 3.23. Discharge Pipeline:

1 - Pipeline

Check the O-ring on the discharge line (Figure 3.24).

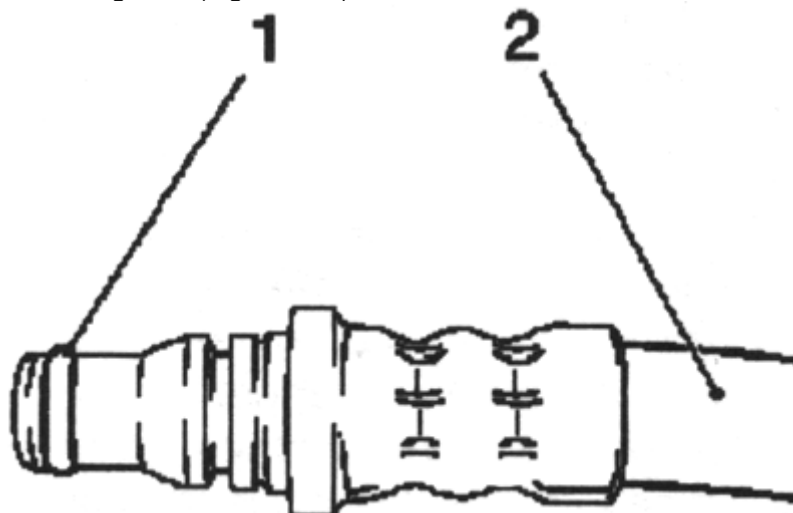


Fig. 3.24. Seal ring Discharge-tatelnogo pipeline:

1-O-ring, 2 - flow line

NOTE

Seal ring not may remain in socket Desktop Qi-lindra adhesion.

Setting

Install flow line of the actuator coupling to the engine compartment.

Install retaining collar.

Slightly bend the clamp and set to choke working cylinder clutch.

Connect the discharge pipe to the socket of the working cylinder to the crankcase clutch clutch.

NOTE

Discharge pipeline long-wives publish click

Attach the flow line in a bracket on the battery.

Set delivery pipeline to the executive cylinder clutch.

Some bend the clamp and gently insert the module anti-lock braking system with one hand.

Attach a clamp holding the master cylinder to the clutch.

Insert unagnetatelnny pipeline in the clutch master cylinder.

Attach the module anti-lock braking system, and tighten the attachment bolt moment 20 Nm.

Attach the bracket module anti-lock braking system, and tighten the 2 screws fastening moment 20 Nm.

Attach the output to the bracket.

Connect the expansion tank cooling system.

Install the expansion tank in the bracket.

Install the battery support, secure the cable ties and tighten the 3 bolts fastening point 10 N-m.
 Replace the battery pack.
 Connect the positive terminal of the battery.
 Connect the negative cable to the battery.
 Attach the supply line clutch master cylinder Backa hydraulic brake system.
 Program volatile memory.
 Remove air from the hydraulic drive.

2.5 Clutch - Replacement of the clutch pedal

Withdrawal

Remove the lining of the steering column.
 Remove the light switch.
 Click on the light switch on the left, turn clockwise and remove it.
 Remove the bottom pad of the instrument panel by unscrewing 4 bolts fastening (Figure 3.25).

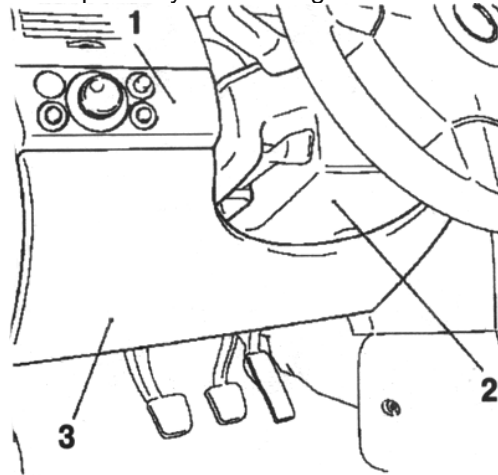


Fig. 3.25. Withdrawal finishing front pa-nonlinearity:

1 - light switch, 2 - facing the steering column;
 3 - Lower lining dashboard

Remove the clutch control switch (Figure 3.26).
 Disconnect the return spring from clutch pedal
 Disconnect the clutch pedal from the clutch master cylinder (Figure 3.26).
 Bend up a screwdriver and remove the strap.

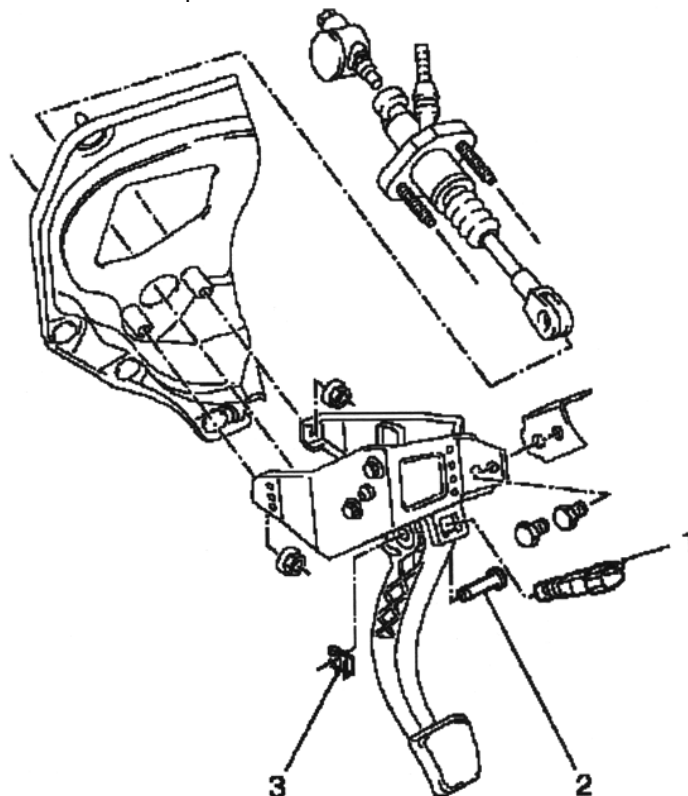


Fig. 3.26. Withdrawal pedal Clutch:

1 - control switch coupling;
 2 - attachment bolt pedal, 3 - spud

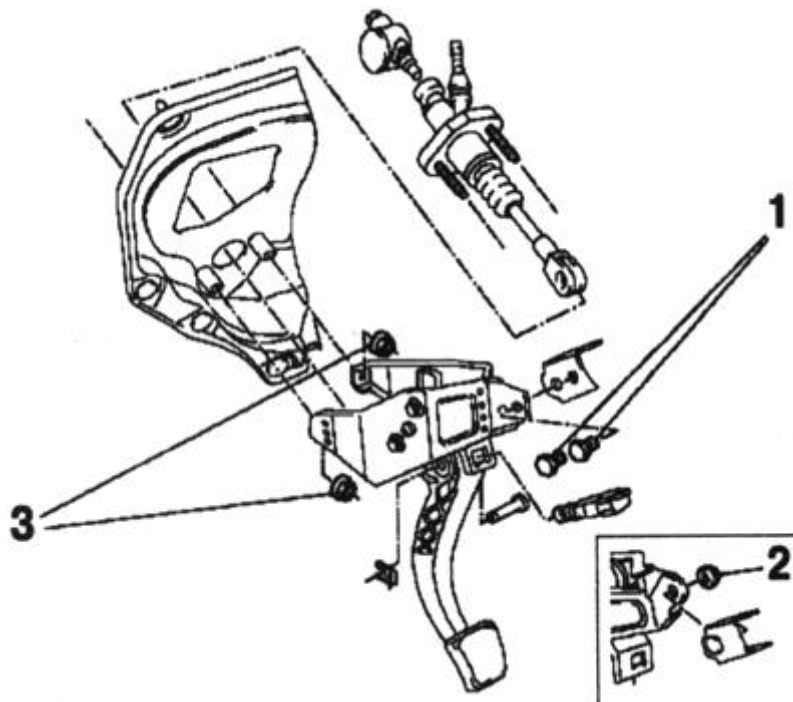


Fig. 3.27. Disconnecting Oprah Pedals:
1 - bolts, 2 - nut, 3 - nuts pedal

Loosen the bolt pedal (Figure 3.26)

Remove the pedal from the cross-pillar (Figure 3.27).

On vehicles with left-hand steering unscrew the 2 screws fastening.

On cars with right-hand-steering unscrew the nut fastening.

Remove the support from the pedal clutch master cylinder by unscrewing 2 nuts (Figure 3.27).

Slide back to the master cylinder clutch.

NOTE

Not damage the harnesses wires and attached elements.

Remove the prop pedal carefully assembled with the clutch pedal.

Setting

Install prop pedal with clutch pedal.

NOTE

When Installation use new bolts.

Attach the pedal to the crossbar support by tightening the 2 nuts mounting point 20 Nm.

NOTE

Use new nuts.

Attach the clutch pedal to the clutch master cylinder.

Attach the strap.

NOTE

Use new spud.

Attach the return spring to the clutch pedal.

Attach the control switch gears.

Install the lower instrument panel pad.

Install light switch and turn counterclockwise.

Install the steering column shroud.

2.6 Clutch - Manual Transmission

General

Cars Opel Astra / Zafira equip 5 and 6-speed manual gearboxes for all types of engines. All forward gears are equipped with synchronizers, gear ratios vary in each version of the engine. Corps gearboxes are made of aluminum or magnesium alloy.

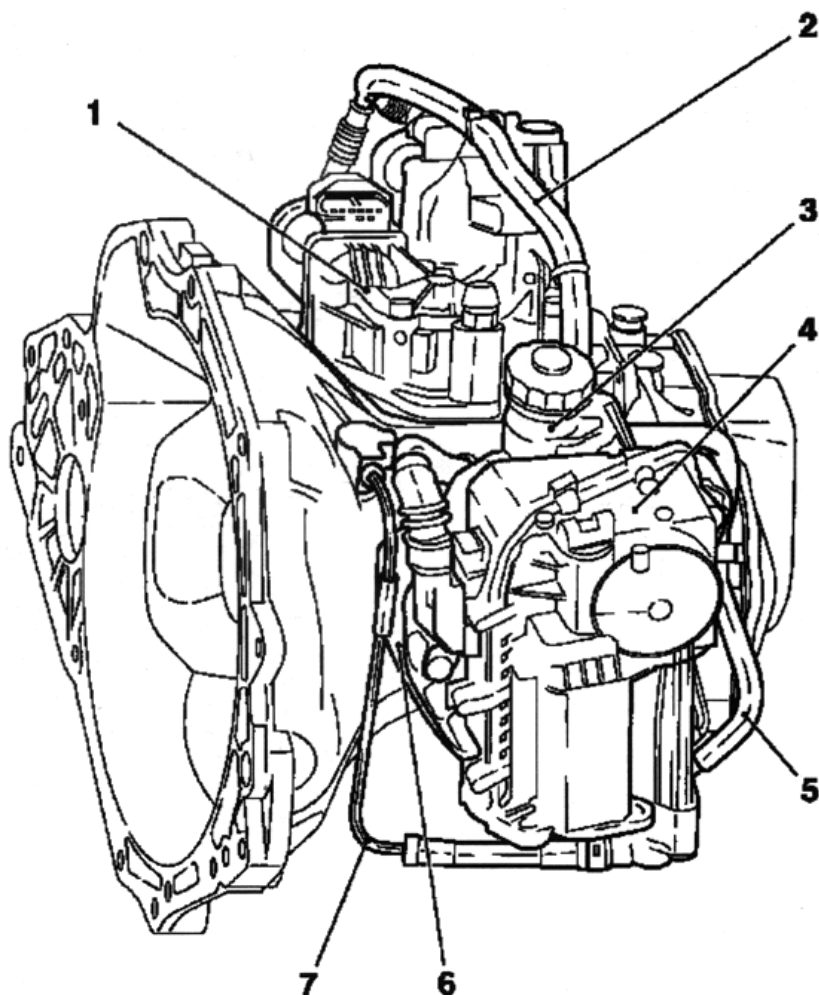


Fig. 3.28. Box Transmission Easytronic:

- 1 - module gear, 2 - TV;
 3 - tank with brake fluid; 4 - block clutch control;
 5 - hose, hydraulic circuit coupling;
 6 - bracket block clutch control;
 7 - relapsing hydraulic circuit

Table 3.2 Possible malfunctions of the INC, their causes and solutions

Possible causes failure	Method remove
Vibration, noise in box Transmission	
Possible cause malfunction	Remedy fault
Looseness or damage to the suspension support the engine and gearbox	Tighten or replace mounting support
Shaft axial clearance does not meet the norm	Adjust the axial clearance
Worn or damaged gears	Replace gears
Are flooded oil inappropriate brand	Pour oil required stamps
Insufficient oil level	Add the butter to the rules
Violation adjustment of idling engines	Adjust Idling
Leakage oil	
Destruction of or damage to oil seals or o-rings	Replace gaskets or O-rings
Shortness switching Transmission	
Faulty cable drive gear	Replace the cable drive gear
Gapping or wear rings and cones blocking synchronizers	Eliminate or replace defective parts
Reducing springs synchronizers	Replace springs synchronizers
Are flooded oil inappropriate brand	Pour oil required stamps
Spontaneous Off Transmission	
Worn gearshift forks or broken springs, retainers	Replace the plug or lock Replace the hub and clutch
Increased clearance synchronizer clutch on the hub	synchronizer

2.7 Clutch - gears and gear lever

In the primary shaft of a manual gearbox written 5 or 6 gears forward gears (5 - or 6-speed manual) and one reverse gear. All the leading front of the gears are constantly meshed with the respective slave gears. Some gear is made for one with trees, others mounted on needle bearings, which provide noise-free rotation of the gears. In neutral gear shift torque from the leading to the driven shaft is not transmitted.

The gears rotate freely until the shift lever is in neutral position. The inclusion of transmission by moving the sliding clutch synchronizer, resulting in gear rigidly connected to the shaft of the gearbox. To accomplish this, each shaft for the respective gear set their synchronizers.

To the gears are engaged with each other, the number of revolutions should be equalized. This is achieved by means of synchronizers that before gearing gears in contact with each other and by comparing the friction speed shafts.

The speed of the first three transmission is less than the engine speed, fourth speed transmission (direct) is the same as that of the motor shaft. In the fifth and sixth gear speed increases compared with engine speed. For the reverse is more gear, which changes the direction of rotation of the shaft. To prevent accidental inclusion of reverse gear when moving forward on the car Opel Astra is set switching mechanism, in which the rear channel has traditionally included with the preliminary pressing the lever down.

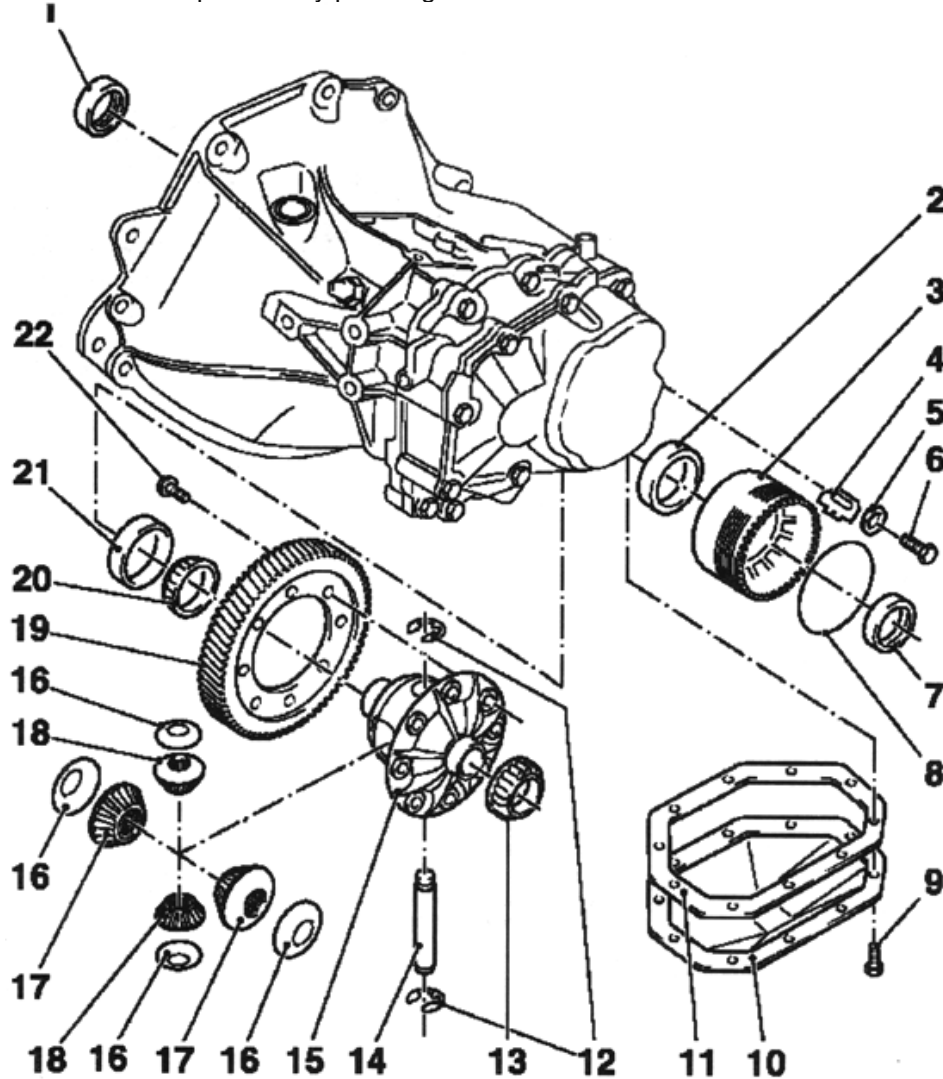


Fig. 3.29. Differential boxes Transmission F 13:

- 1 - O-ring shaft of the wheel;
- 2 - outer ring of a conical roller bearing;
- 3 - cage, 4 - tongue blocking, 5 - spring washer;
- 6 - bolt; 7 - O-ring shaft wheel 8 - O-ring;
- 9 - Bolt, 10 - cap differential, 11 - Gasket 12 - retaining rings;
- 13 - inner ring of the taper roller bearing;
- 14 - axle differential mechanism; 15 - differential housing;
- 16 - annular friction pads;
- 17 - bevel gears shaft wheel;
- 18 - Differential bevel gears;
- 19 - toothing;
- 20 - inner ring of the taper roller bearing;
- 21 - outer ring of a conical roller bearing;
- 22 - Bolt

With the handle switch, select the desired transmission. Handle switch is connected to the gearbox through the cross, fork pushers and levers.

Differential and transmission oil

The differential is connected to the gearbox. It is mounted on two tapered bearings between the buildings clutch and gearbox. Two different diameters gland seal output shaft places outside. The leading differential gear is fixed in the casing and connected to the gear shaft drive wheels.

For the lubrication of parts of mechanical gear boxes provided long-term synthetic oil. Unlike the engine oil in the gearbox almost spent. If the outside of the gearbox no traces of water stains of oil, which means that its level is not decreased. Nevertheless, the oil level from time to time to check. An automatic transmission hydraulic fluid level can be checked only in the main transmission, the level in the gearbox must be checked for STOA with special diagnostic equipment.

Inspection and maintenance

Oil can flow out because of the leaky gaskets. Check the connections at the following locations:

- Between the gearbox and engine;
- Place output shaft of the gearbox;
- Cork filler;
- Plug the drain holes.

All gear transmission nodes have very long service life. If the box fails, it must be repaired in TechCentre, as the repair should be performed by qualified professionals with a special tool.

If you decide to undertake the repairs yourself, remember that the quality of repair gear needed orderly and very clean job. In addition to repair would require a special tool.

2.8 Clutch - Check transmission oil level

Check transmission oil level (gearbox M2O/M32)

NOTICE

Cork control holes in front part boxes Transmission not should turn away.

NOTE

Transmission oil, blended for verification can be reused. New transmission oil should be relied upon to service. Before discharging gear oil should be warmed up to operating temperature.

Withdrawal

Remove the bottom cover of the engine compartment, if it is installed.

Check the bottom of the pan.

Loosen the oil drain bolt (Figure 3.30).

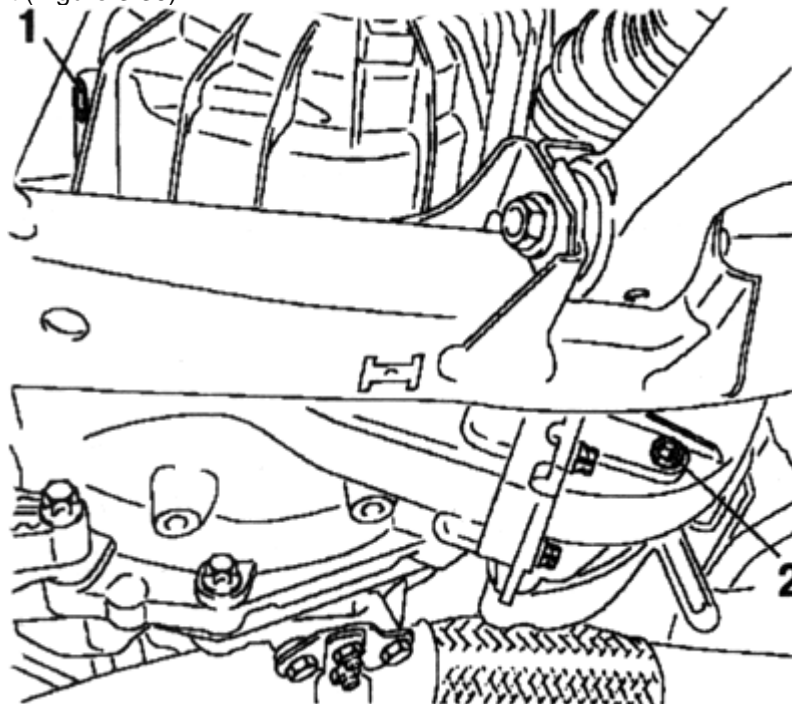


Fig. 3.30. Drain powerpack oils:
1 - control bolt; 2 - bolt to drain

NOTE

Advance screw (Fig. 3.30) WMS-but not peel off.

Let the transmission oil drain for about 10 minutes.

Setting

Top up gear oil until it will flow from the control holes (Figure 3.31).

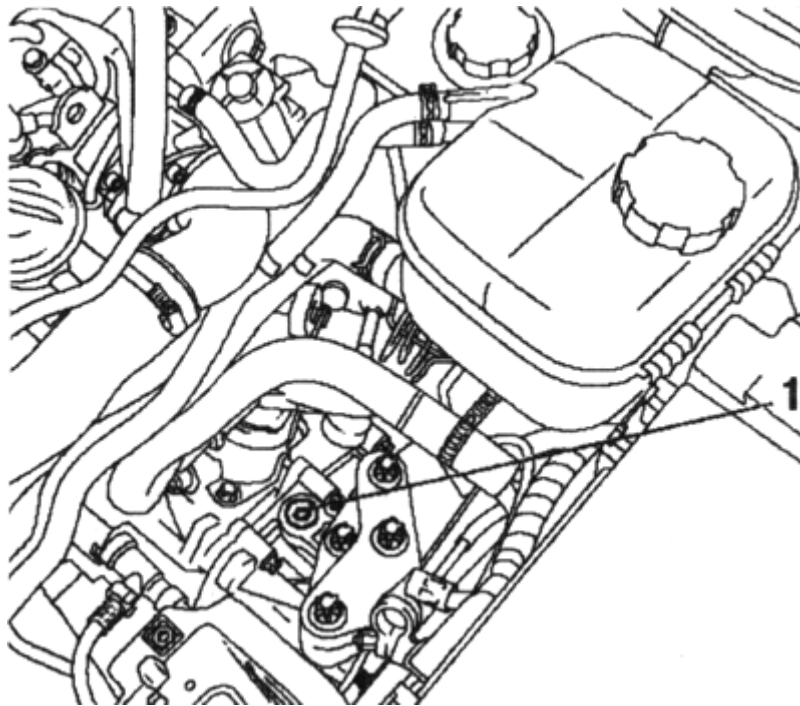


Fig. 3.31. Cork control Hole-stiya:
1 - cork

The level of transmission oil

All gear, except for M20 / M32, after repair should be filled to the bottom of the control holes.

Since gear oil is poured on the plant, by weight, the liquid level - always below the reference holes, during the interval of maintenance of correction is not needed if there is no leak.

NOTE

Not Although on that Transmission-Nye liquid merged completely, box all well remains approximately 0.2 liters. In case filling volume Transmission M 20 / M 32 - 2,2 liter. If installed new box-ka, then need pour liquids 1,8 l-ti, so as on plant in new boxes filled approximately 0.68 liters. butter.

Table 3.3. The volume of transmission oil

Box Transmission	Refill volume
F13	Approximately 1.6 liters
F17 + F17 + MTA	Approximately 1.6 liters
F23	Approximately 1,75 l
M20	Approximately 2.4 liters
M32	Approximately 2.4 liters

Tighten control congestion point of 30 N-m.

NOTE

Use new cork.

Replace the battery pack.

Install support battery.

Attach the bottom cover of the engine compartment, if it is installed

Program volatile memory.

Test level transmission oil (box Transmission F 13)

NOTE

Level powerpack oil should is ever below control-tion holes (up to 16 mm). check level transmission oil only after repair operator radios on box Transmission and correc-tiruyte in case necessary.

Withdrawal

Remove the bottom cover of the engine compartment, if it is installed.

Loosen the stopper control holes on the gearbox housing (Fig. 3.32).

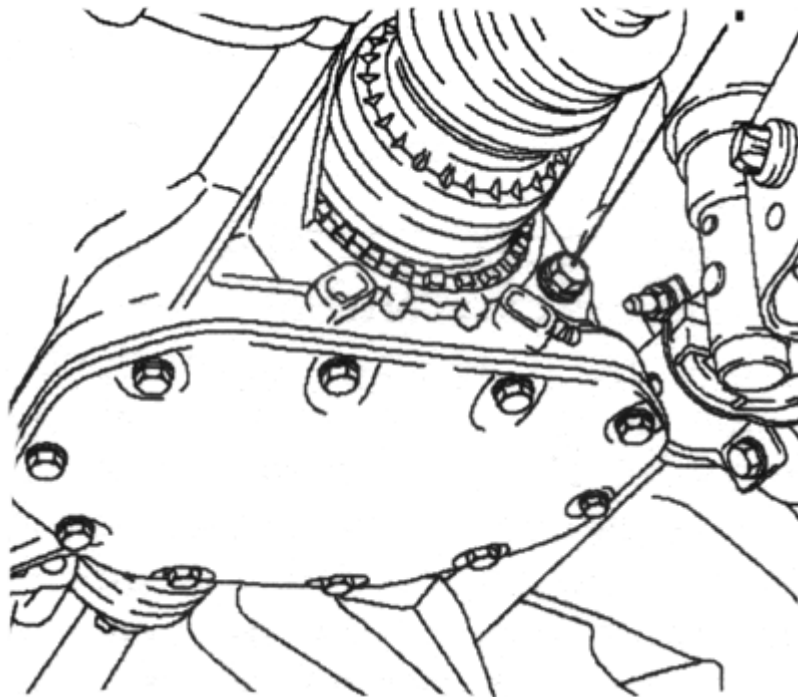


Fig. 3.32. Cork control Hole-stiya:
1 - cork

Disconnect the wiring harness connector switch reversing lamps (Figure 3.33).

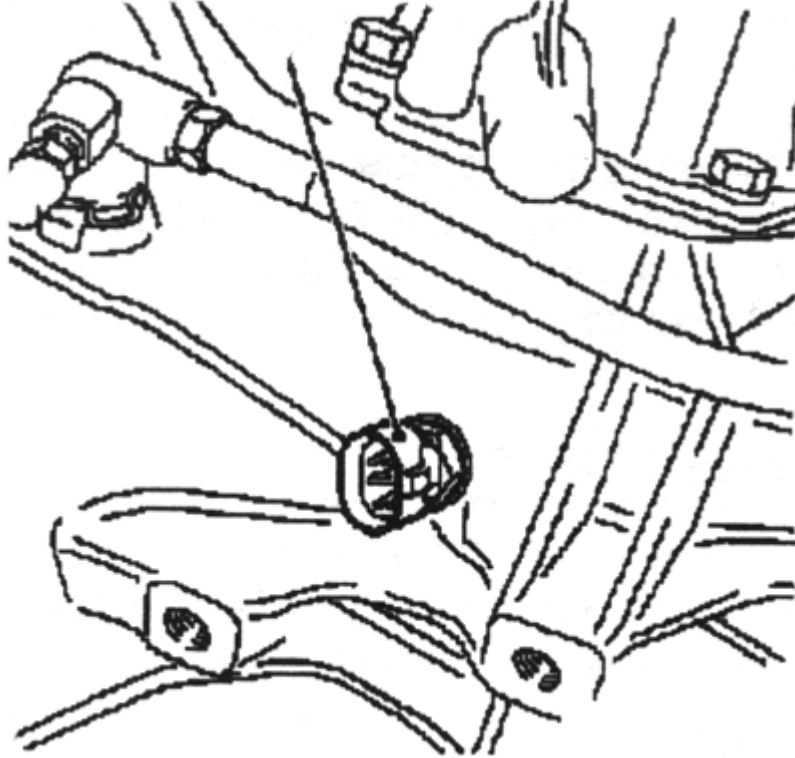


Fig. 3.33. Connector tourniquet wires turned off the consignee lamps rear Stroke:
1 - Connector

Setting

Refill transmission oil level.

Top up gear oil until it will flow from the control holes.

Tighten the plug hole control point 4 H, m, Dauvergne on + (45-135) ^{on}.

Tighten the switch reversing lamps moment 20 Nm.

Use new O-ring.

Connect the wiring harness connector switch reversing lamps.

Attach the bottom cover of the engine compartment, if it is installed.

2.9 Clutch - Removal and installation of the transmission (F 13)

NOTE

If the transmission is replaced, should be replaced by the elements listed below.

Socket clutch.

Bracket damping engine block.

Bracket cable switch.

Rear bracket gearbox.

Withdrawal

Remove the bottom cover of the engine compartment, if it is installed.

Remove the central silencer and a front exhaust pipe.

Attach KM 6001-A to the body of the front axle.

Loosen the 2 bolts (arrows) guides on the CM-6001-A (Figure 3.34).

Set KM-6001-A as shown in Figure 3.34.

NOTE

2 Neck must is in holes to Corps the front axle.

Tighten 2 screws to adjust the tire.

Turn the front supporting bearing to the contact with the guide pin front damping engine block.

NOTE

Guides pins be are in reference Sub-shipnikah without gap.

Turn back to the journal-bearing contact with the guide pin rear bracket damping engine block.

NOTE

Guides pins be are in reference Sub-shipnikah without gap.

Remove the casing front axle.

Remove the air filter housing with the hose inlet.

Disconnect the wiring harness connector (4), switch reversing lamps (Figure 3.35).

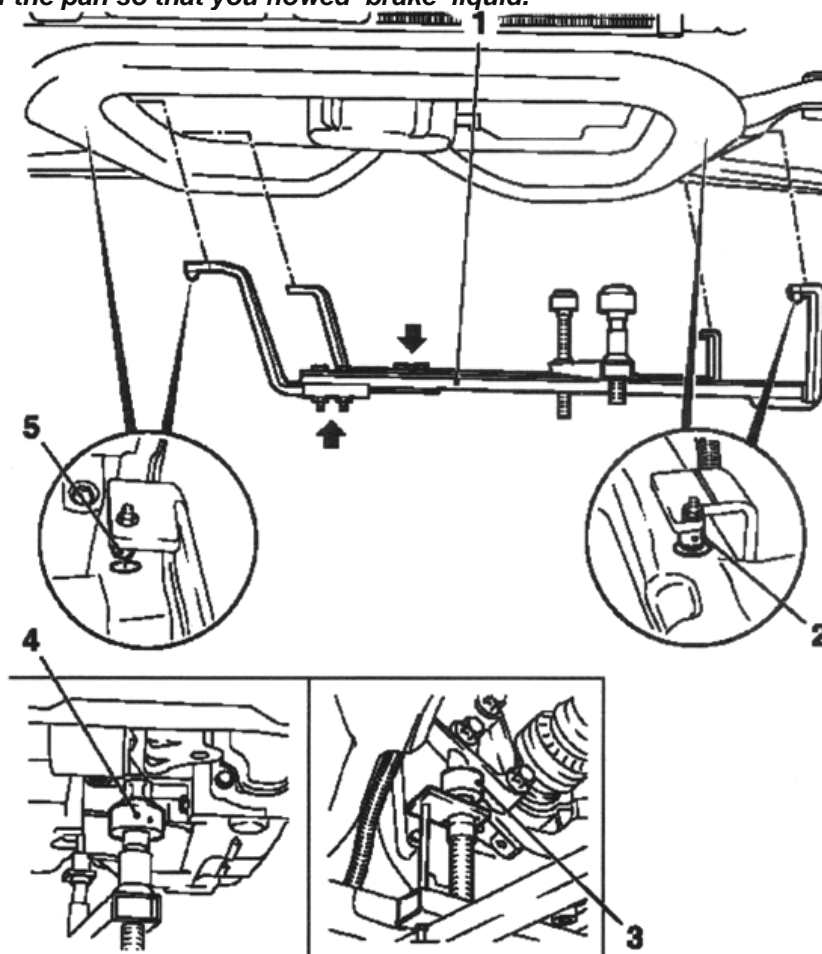
Close the tank hydraulic brake system.

Fill the tank hydraulic brake system up to the mark "MAX".

Disconnect the discharge pipe from the nipple (Figure 3.35).

Note

Check the bottom of the pan so that you flowed brake liquid.



**Fig. 3.34. Special adaptation KM-6001 - A
for withdrawal boxes Transmission:**

1 - a special device KM-6001-A, 2 - neck;
3 - rear supporting bearing, 4 - front supporting bearing;
5 - neck

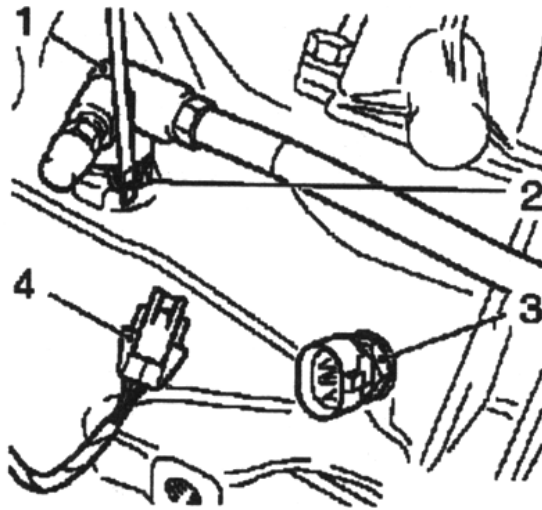


Fig. 3.35. Disconnecting elements element ktropitaniya and discharge water pipelines:

1 - flow line from the nipple 2 - retaining collar;

3 - switch reversing lamps, 4 - the wiring harness connector

Unlock the retaining clamp with a screwdriver and remove the discharge line.

Bend the retaining collar a bit and then reinstall it on the socket.

Disconnect the left engine damping block.

Disconnect from the left arm damping engine block.

Loosen the 3 mounting screws (Figure 3.36).

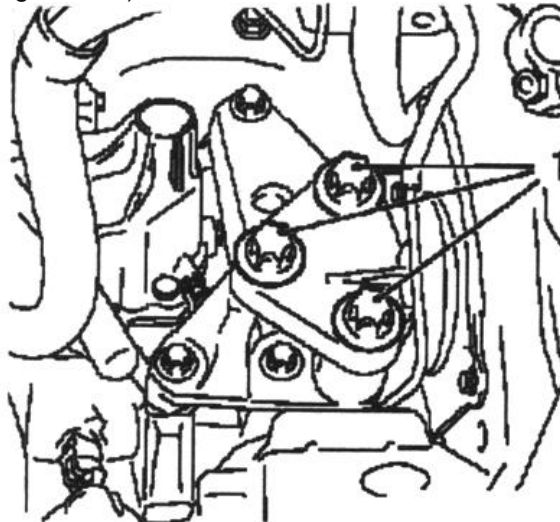


Fig. 3.36. Mounting left bracket damping block Engine:

1 - Bolts

Remove the top of the gearbox from the engine by unscrewing 4 bolts fastening (arrows in Figure 3.37).

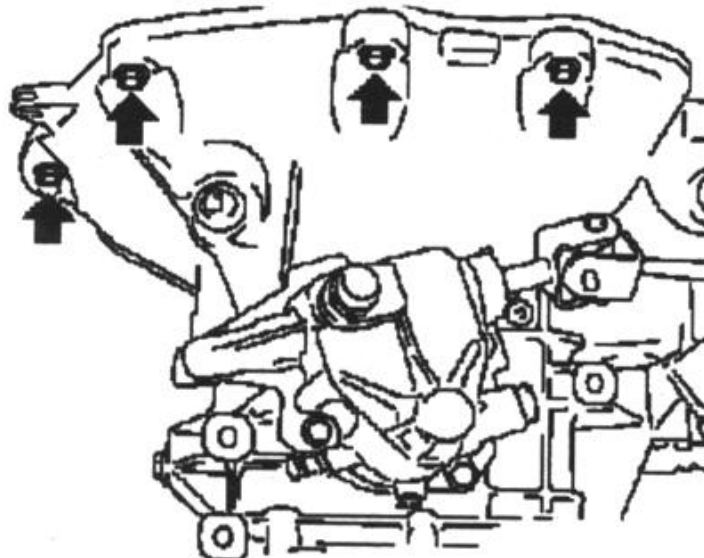


Fig. 3.37. Mounting boxes Transmission

NOTE

In case need pull pipeline system cooling up and secure cable ties.

NOTICE

Not damage the harnesses wires and elements attachment.

Lower the engine and transmission of approximately 5 cm with a special tool MKM-883-1.

Remove the shafts of the wheels of the gearbox.

Check the bottom of the pan to leaked transmission oil.

NOTE

Shafts wheels remain in wheel hubs.

Attach the shafts of the wheels to the bottom of the car.

Close the wheel shaft hole plugs.

Disconnect the front damping motor unit from the gearbox by unscrewing 2 screws fastening (Figure 3.38).

Remove the gearbox from the tray by unscrewing the bolt fastening 3 (Figure 3.38).

Remove the front and rear of the gearbox from the engine by unscrewing 2 screws fastening (Figure 3.39).

NOTICE

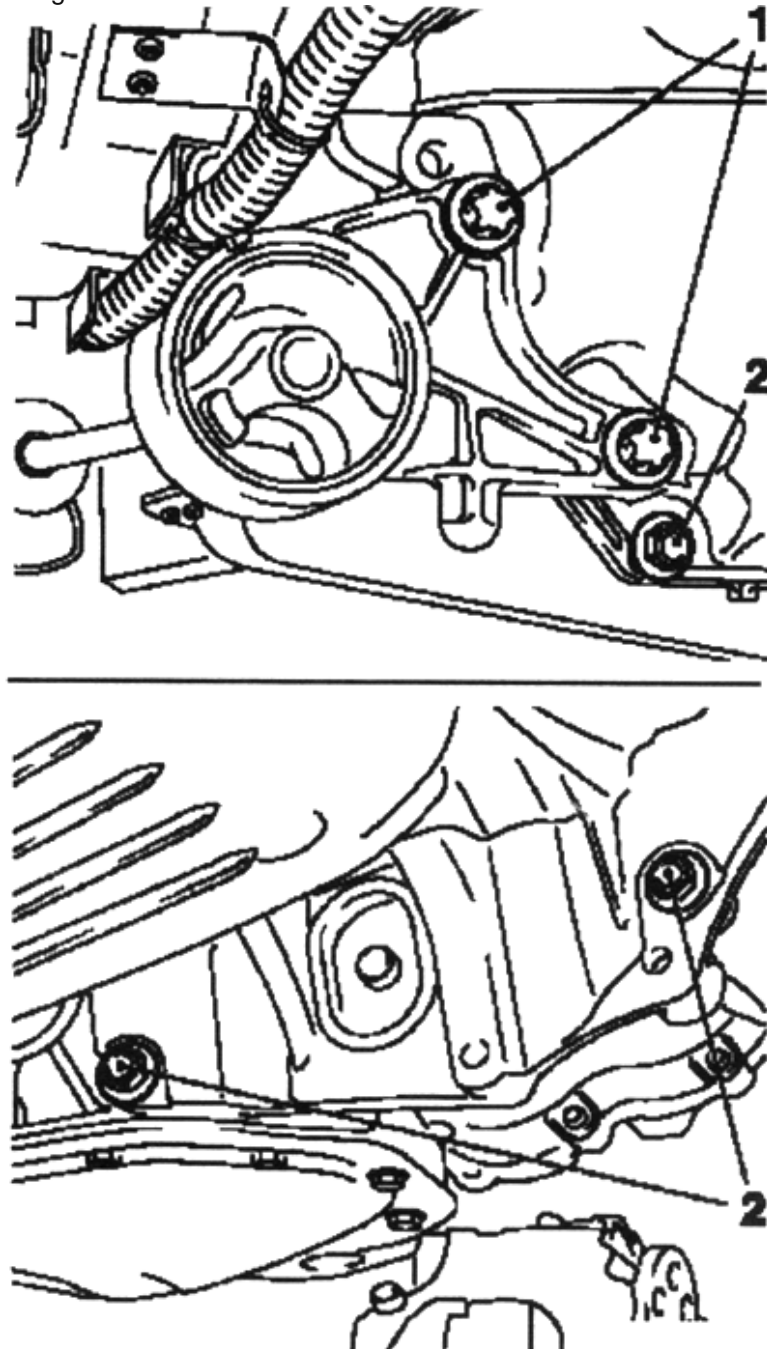
Not damage the harnesses and elements attachment.

Remove the gearbox.

Put the gearbox from the engine block and gently pull down.

Setting

Attach the gearbox to the engine.



**Fig. 3.38. Mounting anterior dampfi pol -
block Engine:**

1 - bolts fastening the block, 2 - bolts fastening the box

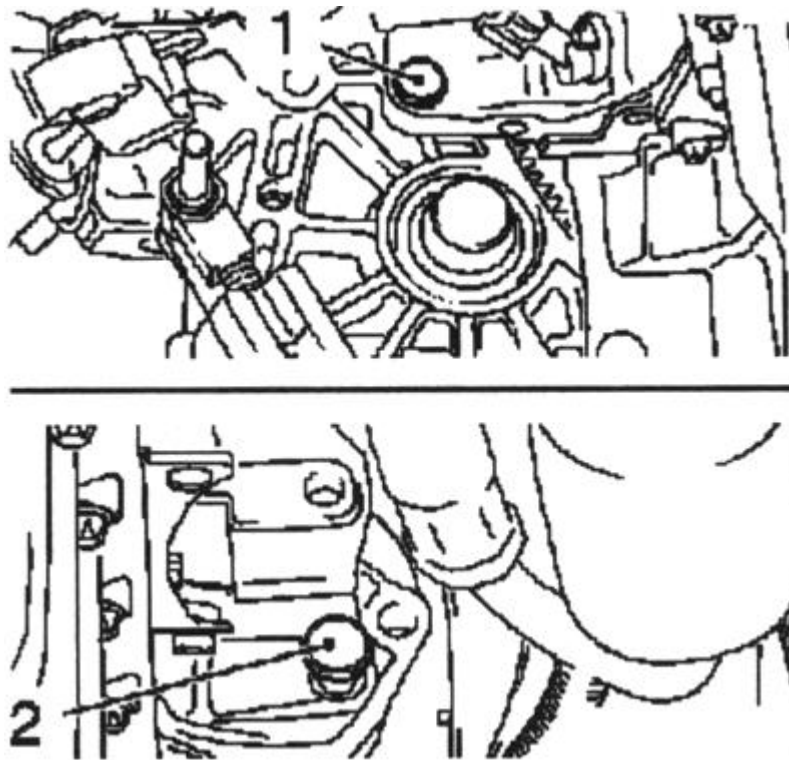


Fig. 3.39. Mounting front and rear boxes Transmission:
1,2 - bolts fixing

Be sure to install.

Lift and ottsentriruyte gearbox.

Attach the front and rear of the gearbox to the engine and tighten the 2 screws fastening torque 60 Nm.

Set pan gearbox and tighten the 3 bolts fastening the moment 40 Nm.

Attach the front damping motor unit to the gearbox and tighten the 2 screws fastening the moment 80 Nm.

Set shafts of the wheels.

Lift the engine and transmission with a special device MKM-883-1.

NOTE

When assembly Corps Front axle, make sure that journal-bearing KM -6001 - A properly location in sending-schem pin anterior damping-yuschego block Engine and rear brackets damping engine block. In case ty deems desirable to adjust Installation of the provisions Engine and boxes re-cottages, using special in-sposoblenie MKM -883-1.

Install the front axle housing.

NOTE

Not set central silencer, front exhaust pipe, battery battery and support Accumulator battery.

Replace the air filter housing and air intake hose.

Install left damping engine block.

Attach to the left relying damping engine block and tighten the 3 bolts fastening point 55N-M.

Attach the gearbox to the top and tighten the 4 mounting bolt torque 60 Nm.

Connect the discharge pipe from the socket.

NOTE

Cyanoacrylate clamp must per-click.

Connect the wiring harness connector switch reversing lamps.

Remove the special device KM-6001-A from the body of the front axle.

Install central silencer and a front exhaust pipe.

Check the fluid level in the gearbox.

Attach the bottom cover of the engine compartment.

NOTE

In case need The adjustments Ruyt traction switching gearbox.

Install support battery.

Replace the battery pack.

Program volatile memory.

Remove air from the hydraulic clutch.

2.10 Transmission, removing and setting of the engine (dismantled)

Withdrawal

Remove the coolant hose (1) with the thermostat housing (Fig. 3.40).

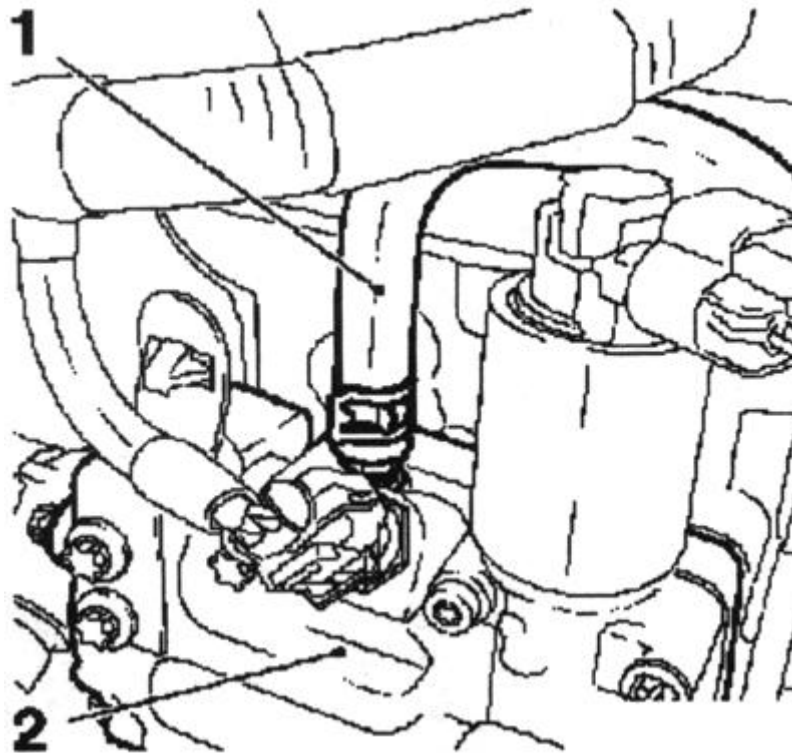


Fig. 3.40. Withdrawal Hose coolant with Corps Thermostat:

1 - coolant hose, 2 - housing thermostat

Remove the clamp.

Remove the hose from the coolant pump coolant.

Disconnect the coolant hose from the body of the thermostat and turn off the module heat sink, pulling it from the lower radiator brackets (Figure 3.41).

Remove the body axis of the differential mechanism with the help of a special device KM-460-B (Figure 3.42).

Hole in the differential close flap.

Remove the left body axis of the differential mechanism with the help of special devices KM 313 and KM-6003-1 (Figure 3.43).

Hole in the differential close cap

Remove the front and rear damping block engine by unscrewing the bolts fastening (Figure 3.44).

Remove the engine from the body of the front axle.

Attach the cables to the motor vehicle footboards.

Tighten up the engine hoist.

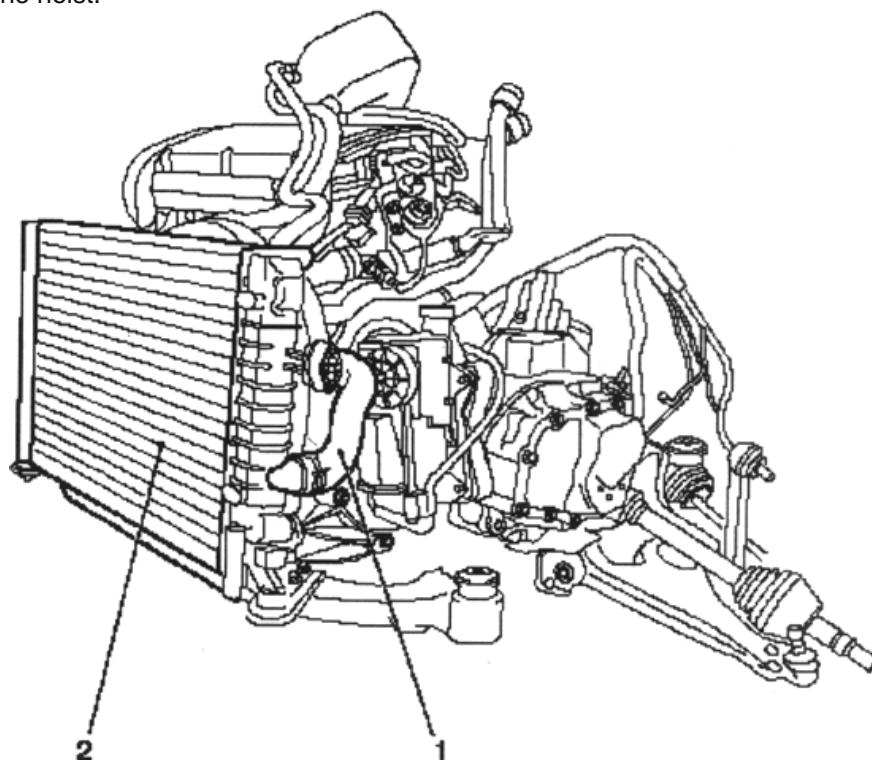


Fig. 3.41. Disable Module Radiator:

1 - coolant hose, 2 - module heatsink

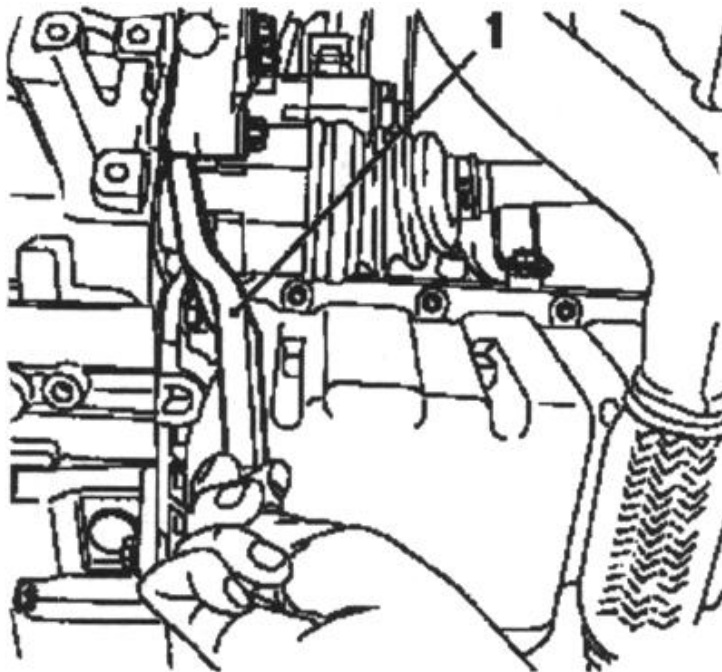


Fig. 3.42. Extract Corps axis from differential mechanism:

1 - a special device

Lift the engine.

Remove prop intake manifold, disconnect the vacuum hose and unscrewing 2 screws fastening (Figure 3.45).

Install special device KM-412-31 and tighten the 3 mounting bolts (Figure 3.46).

Remove the catalytic converter bracket by unscrewing 2 screws fastening (Figure 3.47).

Unscrew the 2 screws fastening of the cylinder.

Insert a special device KM-412-31 and tighten the 3 mounting bolts (Figure 3.48).

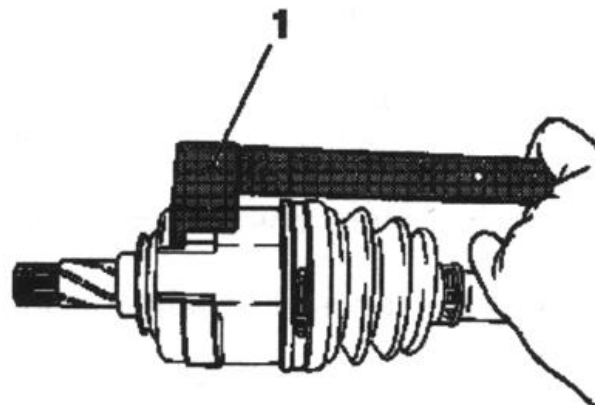
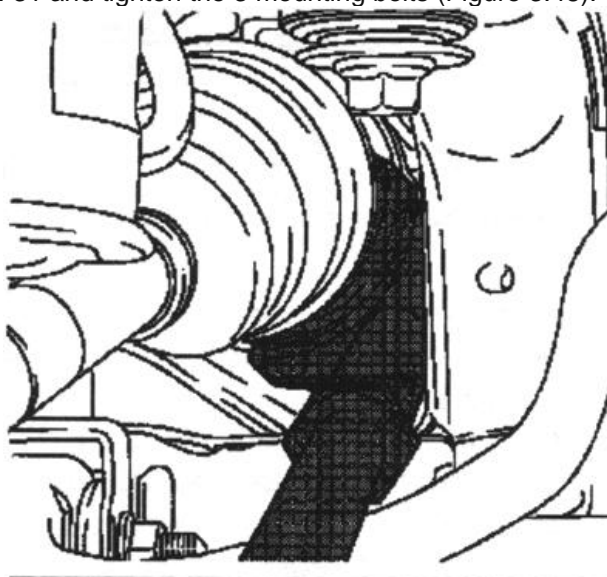


Fig. 3.43. Extract left Corps axis of differential mechanism:

1-special device

Install the engine on the stand KM-412 and secure his 8 bolts.
 Disconnect the wires from the transport brackets.
 Remove the gearbox, remove the 6 mounting bolts.

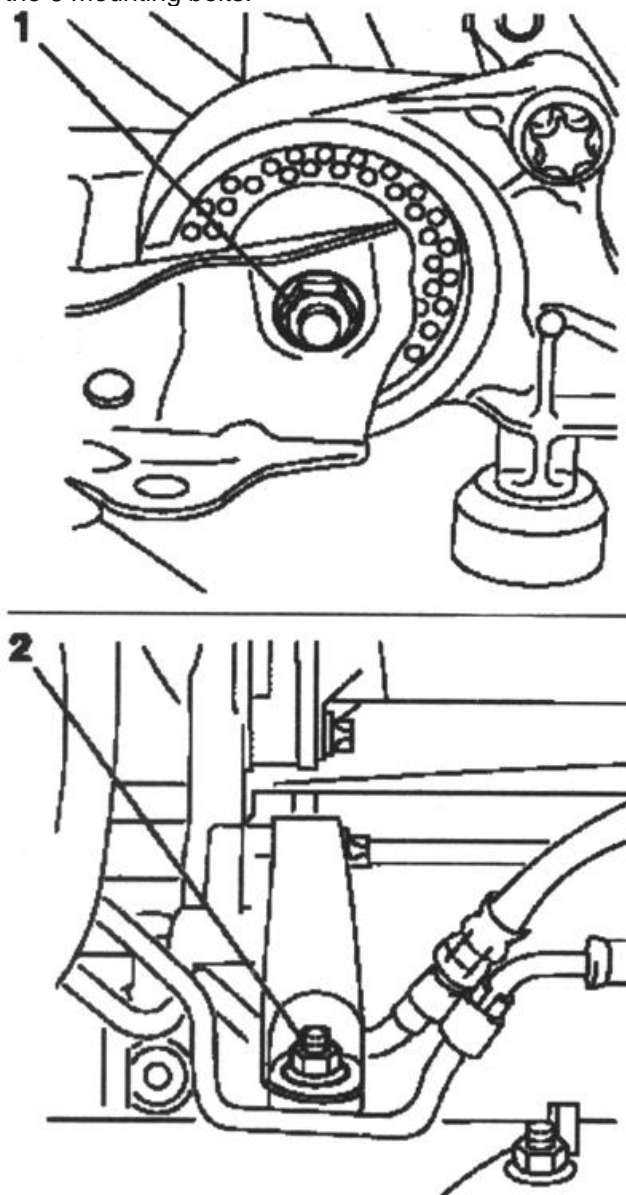


Fig. 3.44. Withdrawal anterior and rear damping blocks Engine:
 1,2 - bolts fixing

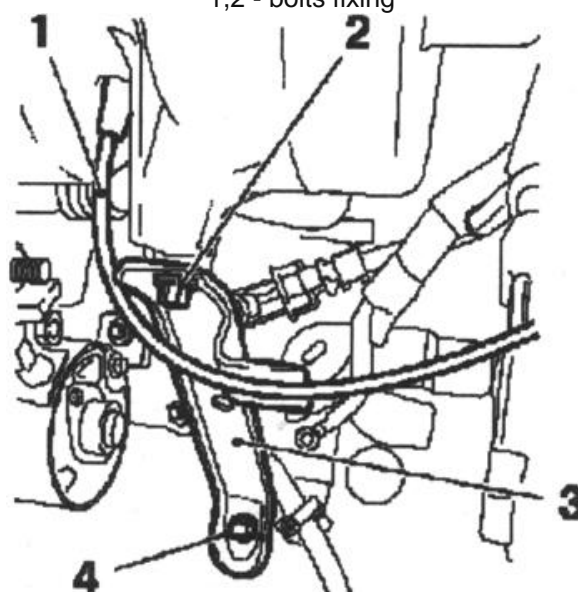


Fig. 3.45. Withdrawal support Intake collectors:
 1 - vacuum hose, 2, 4 - mounting screws, 3 - support

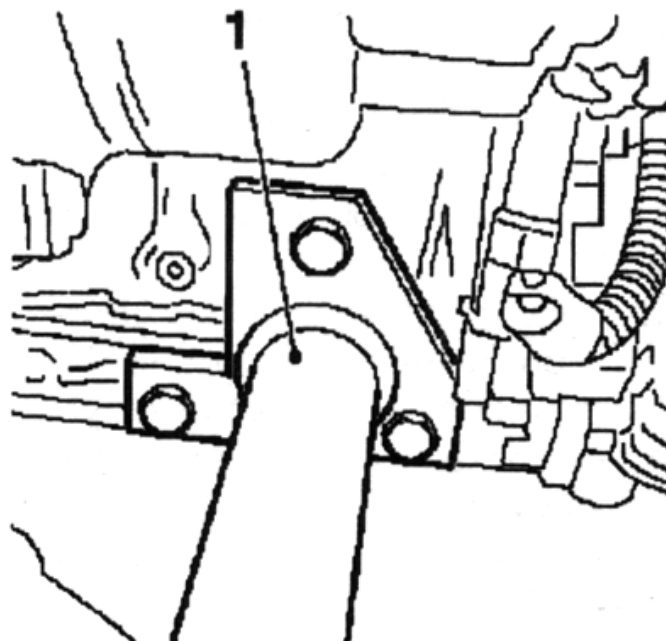


Fig. 3.46. Setting special at sposobleniya:
1 - adaptation

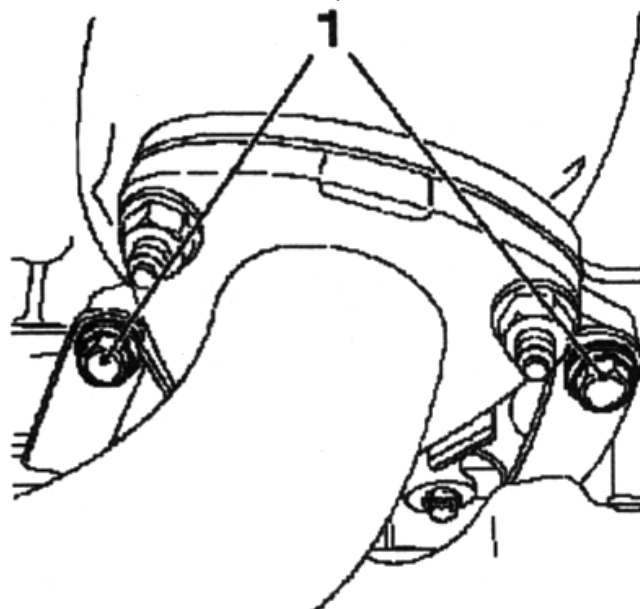


Fig. 3.47. Mounting bracket Catalytic
converter:
1 - Bolts

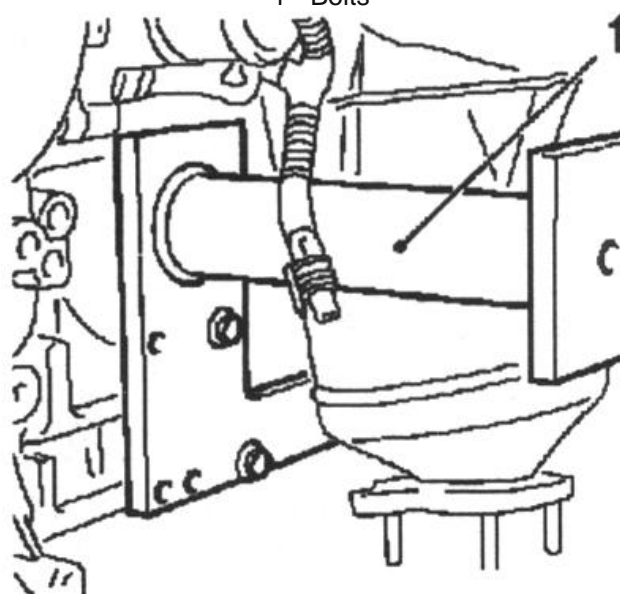


Fig. 3.48. Setting special in-sposobleniya:
1 - adaptation

NOTE

One screw remains set for fixation.

Attach the cables.

Lift the gear box, loosen the bolt and remove the gearbox from the flange of the engine (Figure 3.49).

NOTE

Make in that location-WIDE near elements and harnesses conduction-ing not will damaged.

Setting

Lift the gearbox.

Attach the gearbox to the flange of the engine.

Tighten the attachment bolt.

Remove the cables.

Secure the gearbox bolts.

Transmission of the cylinder block - 4 bolt torque 60 Nm.

Transmission to the oil sump - Zboltami moment 40 Nm.

Lift the engine crane.

Attach cables to transport footboards.

Remove the engine from the stand of the CM-412, unscrewing 8 mounting bolts.

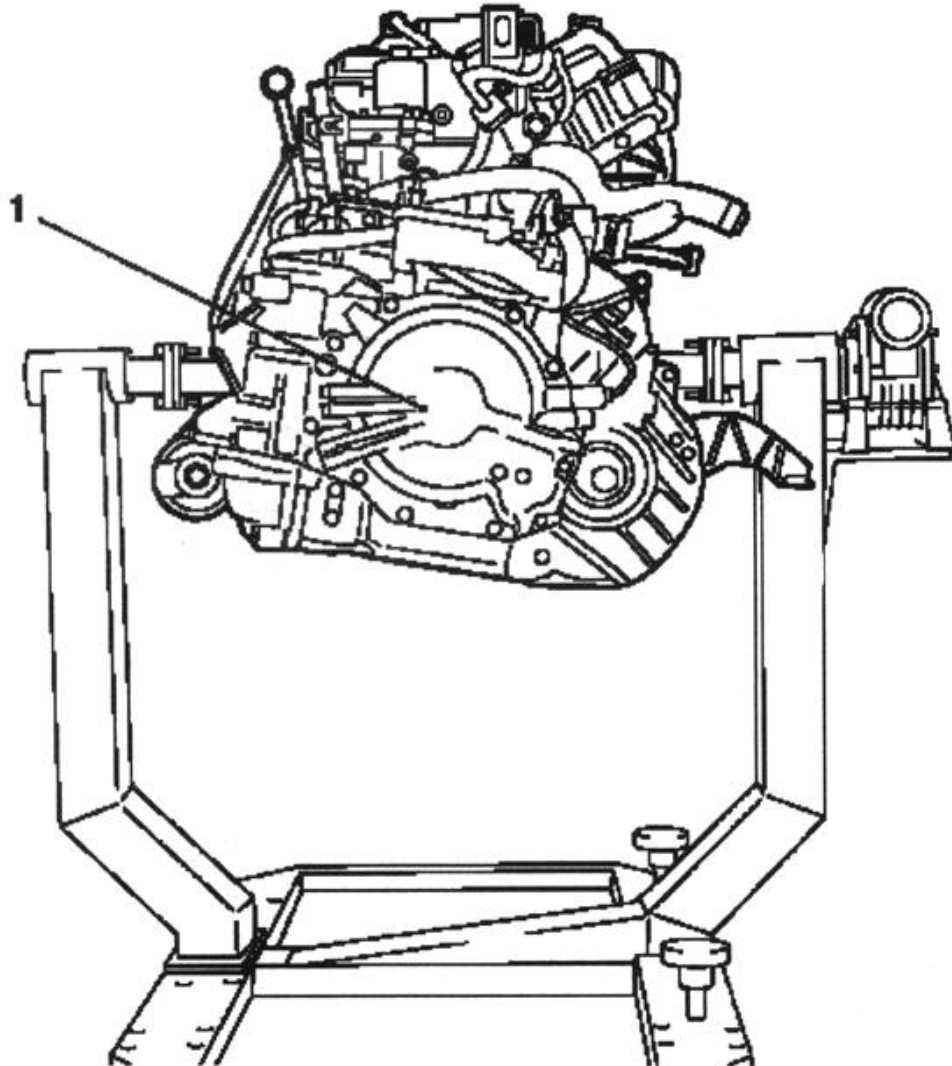


Fig. 3.49. Withdrawal boxes Transmission:

1 - Transmission

Attach the intake manifold support vehicle Opel Astra, tightening the 2 screws fastening point 8 N-m.

Replace catalytic converter bracket by tightening the mounting bolts - on the catalytic converter element 15 N-m, on the engine block moment 20 Nm.

Lift the engine.

Gently pull down on the housing front axle.

Unhook the motor from a crane.

Remove the cables from the transport brackets.

Install rear damping block engine.

Use new bolts, tightening them are 55 Nm.

Install the front damping engine block.

Use new bolts, tightening them are 55 Nm.

Install the left body axis.

Install a new circlip on the body axis (Fig. 3.50).

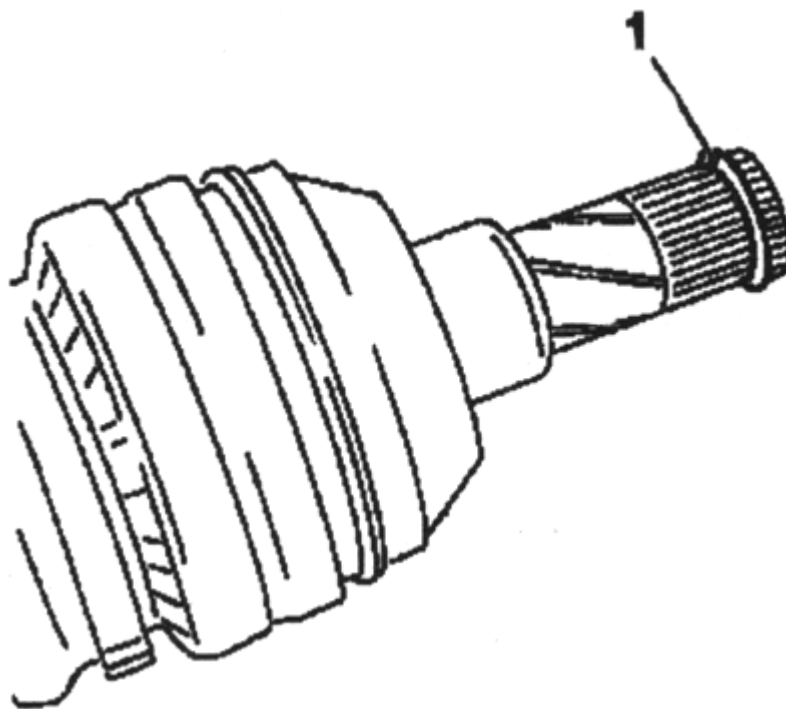


Fig. 3.50. Setting new circlip:
1 - Ring

Brush teeth and supports motor oil.

Insert the body axis in the gearbox until it snaps into the locking ring.

Set the right body axis.

Install a new circlip on the body axis.

Brush teeth and supports motor oil.

Insert the body axis in the gearbox until it snaps into the locking ring.

Install the module heat sink.

Attach the coolant hoses to the body of the thermostat and the coolant pump and set the 2 clamp.

Replace Poly-V belt.

2.11 Clutch – Replacing the crankcase-Replacement of the transmission housing (gearbox F13)

Withdrawal

Remove the gearbox car Opel Astra.

Attach the gearbox to the special adaptations KM 6115 and KM-113-2 (Figure 3.51).

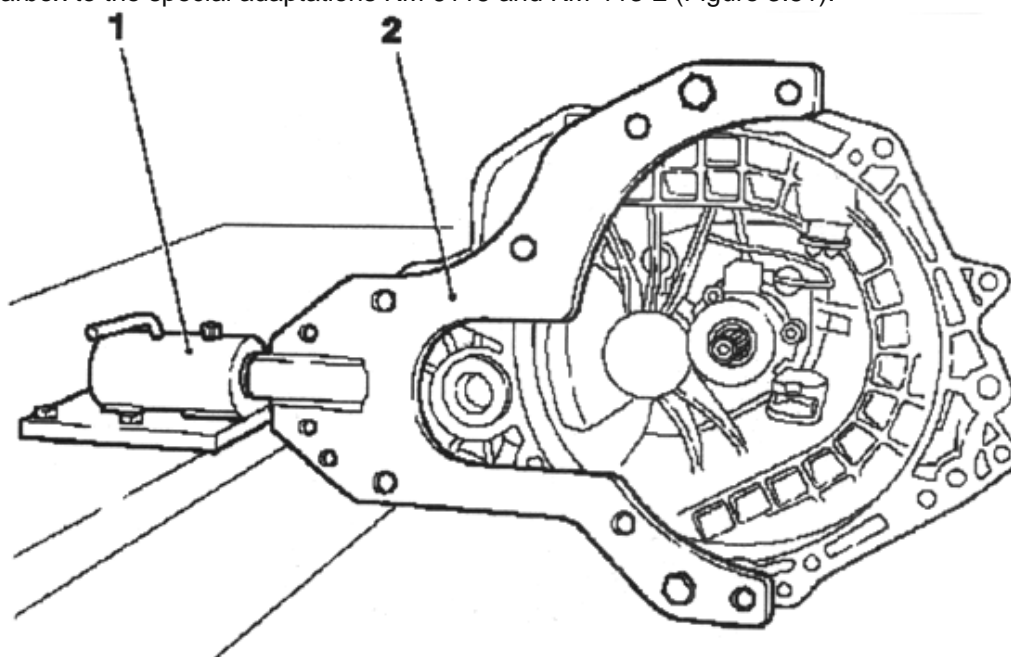


Fig. 3.51. Accession Carter to Special
aids:
1,2 - special arrangements

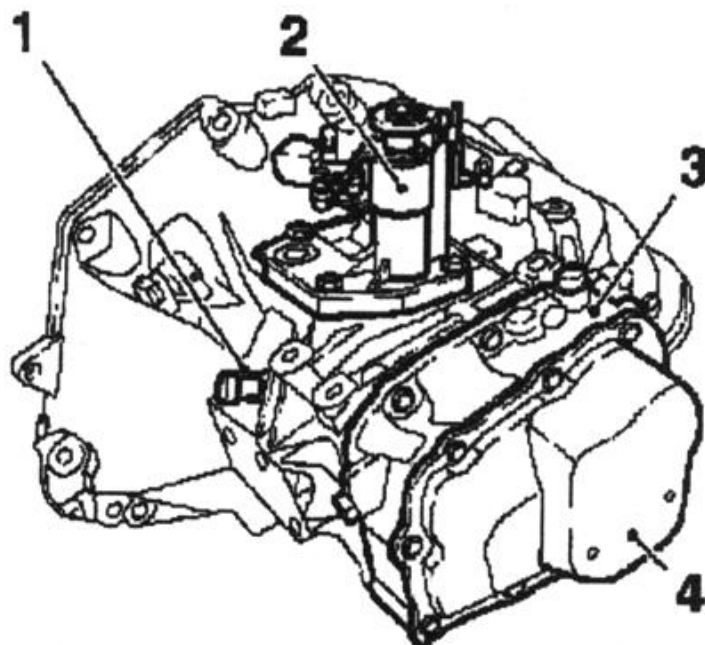


Fig. 3.52. Withdrawal lids with boxes re-cottages:

1 - Reversing light switch, 2, 3, 4 - Lid

Remove the left arm damping engine block car Opel Astra, 3 unscrewing bolts.

Set the gearbox in neutral position.

Remove the gearbox.

Remove light switch reverse.

Remove the back cover (Figure 3.53).

Remove the cover gasket.

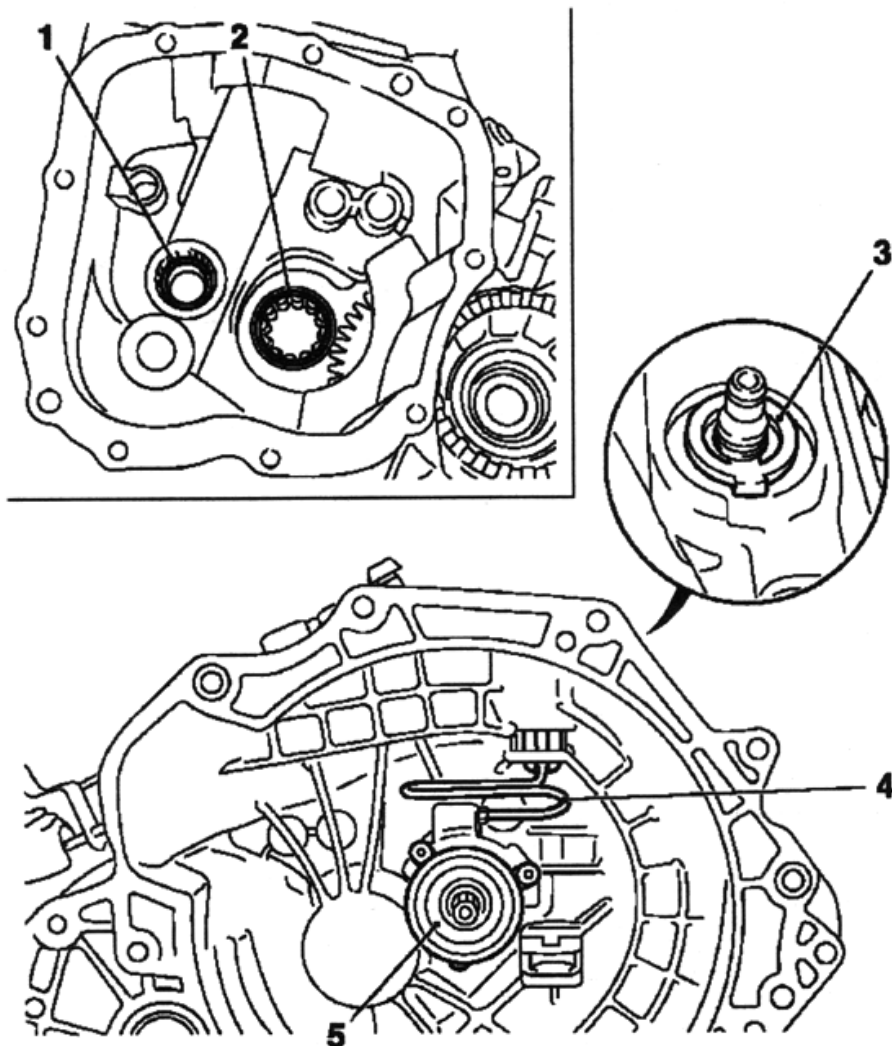


Fig. 3.53. Removing the gearbox components:

1 - bearing shaft, 2 - bearing main shaft;

3 - bush mounting discharge line;

4 - flow line, 5 - a working cylinder clutch

NOTE

If necessary, loosen the fastening lid light strikes a rubber hammer.

NOTE

Drain the gear oil.

Disconnect the special device KM 6155.

Remove the differential.

Remove the working cylinder clutch.

Remove the discharge pipe and discharge pipe mounting sleeve.

Remove the main bearing and the shaft of the transmission housing.

Remove the 2 sealing rings of the shaft wheel.

Remove the transmission housing through a special device KM 6115.

Setting

Attach the new transmission housing to the special adaptation of the CM 6115.

Install the main bearings and shaft.

Install differential.

Install discharge pipe and discharge pipe mounting sleeve.

Install working cylinder clutch.

Attach a special device KM-6155 to the gearbox.

Replace the back cover.

NOTE

Please attention on magnet.

NOTE

Please attention on similarity bolts.

Attach the rear cover.

Replace it with a new gasket on the transmission housing.

Tighten the 4 bolts M7 moment 15 Nm.

Tighten the 5-bolt M8 moment 20 Nm.

Replace the cover gearbox.

Set switch reversing lamps.

Tighten the switch reversing lamps moment 20 Nm.

NOTE

Use new O-ring.

Install 2-wheel shaft sealing ring.

Install the left engine damping block

Tighten the 3 bolts fastening the moment 55 Nm.

2.12 Clutch - Removal and installation of rear cover gear (F 13)

NOTE

Portfolio held on set-Term box transmission.

Withdrawal

Remove the gearbox and switch reversing lamps (Figure 3.54).

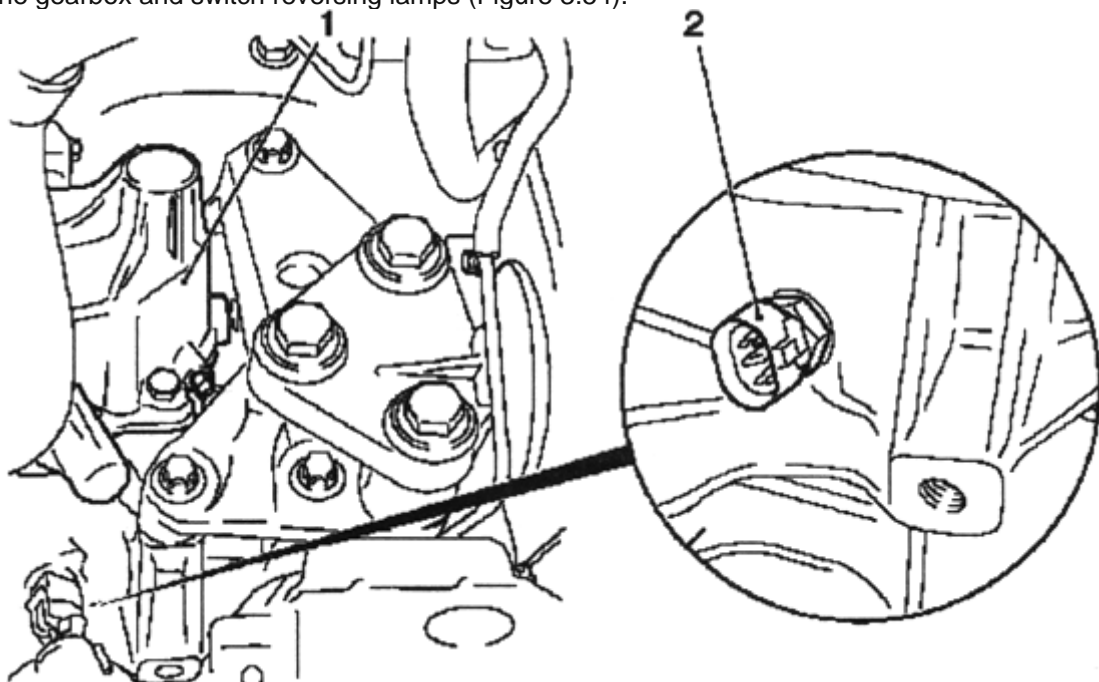


Fig. 3.54. Withdrawal cover boxes Transmission:

1 - cap 2 - Switch Rear

Disconnect the wiring harness connector, switch reversing lamps.
 Unscrew the switch reversing lamps
 Remove the casing front axle.
 Remove the back cover by unscrewing the mounting bolts 9 (see Figure 3.55).

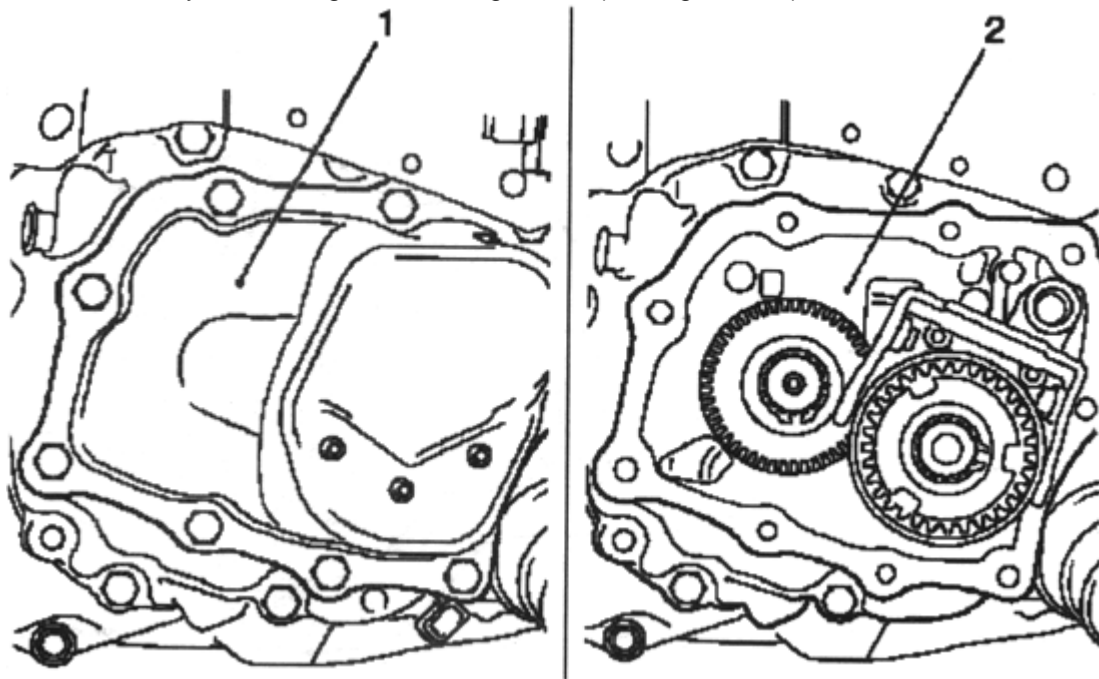


Fig. 3.55. Removing the back cover of gearbox:
 1,2 - cover

NOTE

In case necessary, loosen the mounting cover Light blow-mi rubber hammer.
 Remove the rear cover gasket.
 Attach the back cover of a special adaptation of KM 552 (Fig. 3.56).

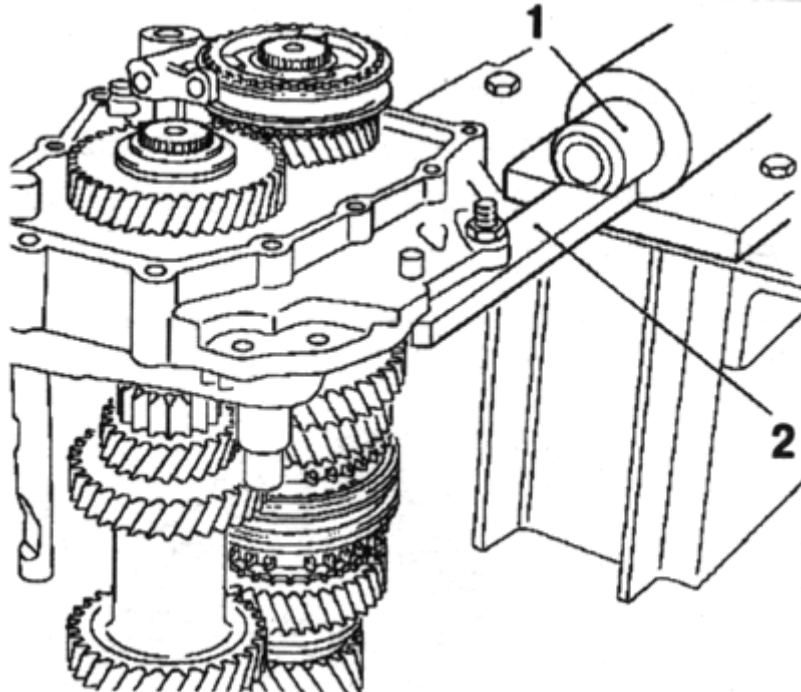


Fig. 3.56. Setting special in-sposobleny:
 1,2 - devices

Attach the back cover of a special adaptation of the CM-113-2 using a special device KM-552.
 Remove the support bearing with the yoke with the back cover (Figure 3.57).

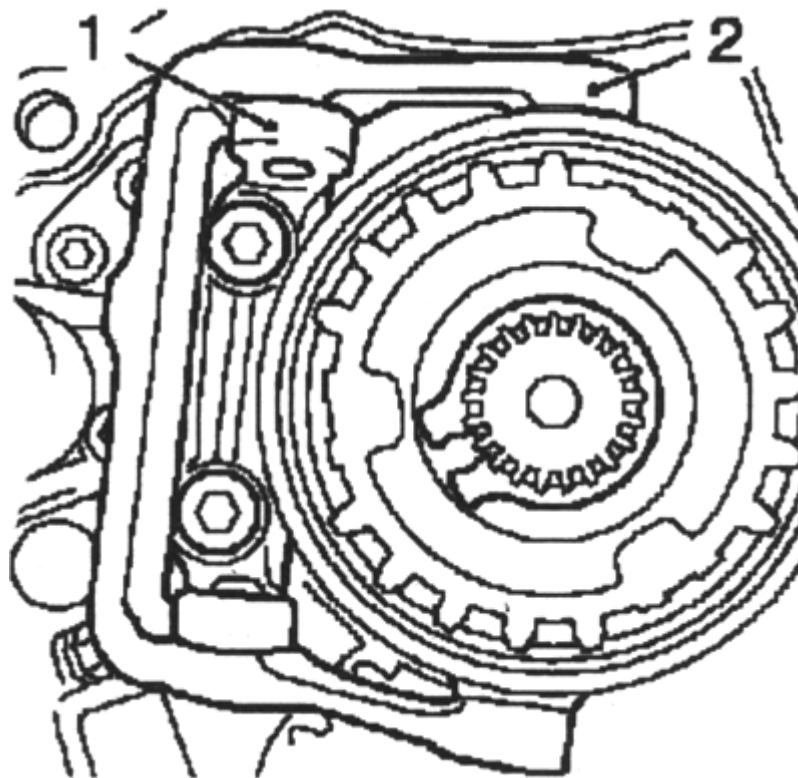


Fig. 3.57. Withdrawal support bearing with Rocker with back cover:

1 - bearing bearing 2 - rocker

NOTE

If Bolts fixing not otvorachi-ing, heat back cover hairdryer to temperature closer-tion 80 "C.

Unscrew the 2 screws fastening.

Remove the fifth gear transmission (slave).

Remove the retaining ring from the body synchronizer.

Remove the cog wheel, gear fifth gear and fifth gear synchronizer body with the main shaft with a special device KM-161-B (Figure 3.58).

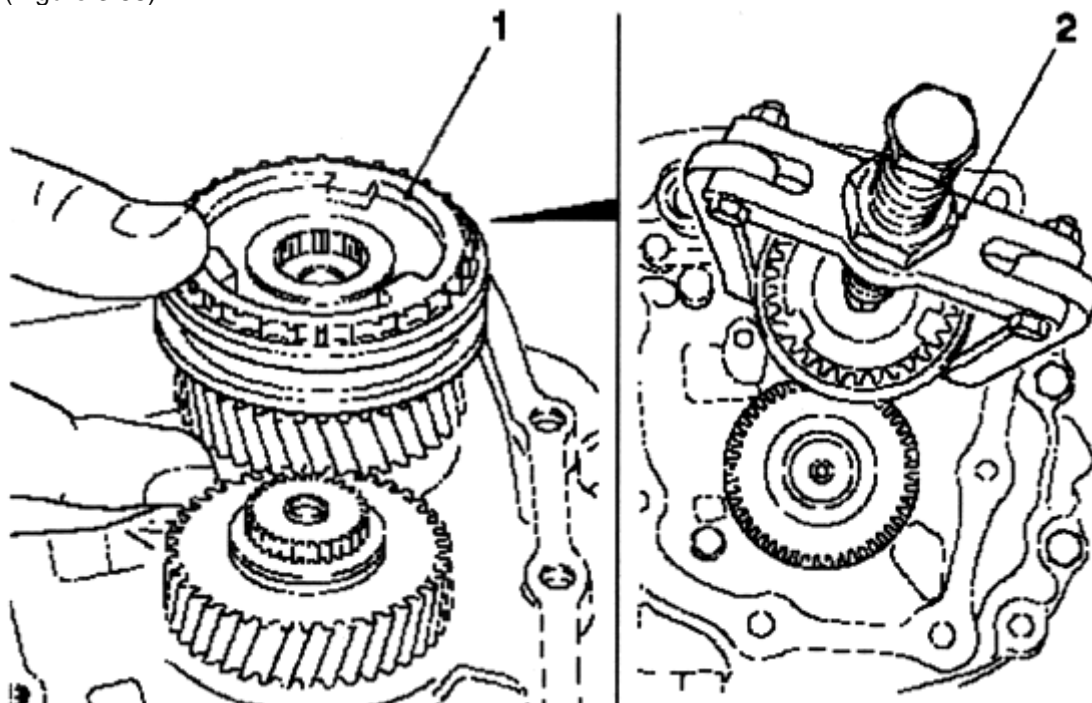


Fig. 3.58. Withdrawal dentate wheels, gears fifth transfer and Corps sinhronizato-ra fifth transfer with Chief Shaft:

1 - body synchronizer 2 - adaptation

2 Remove the needle bearing gear fifth gear.

Remove gear fifth gear (lead) (2) of the shaft and remove the holder (Figure 3.59).

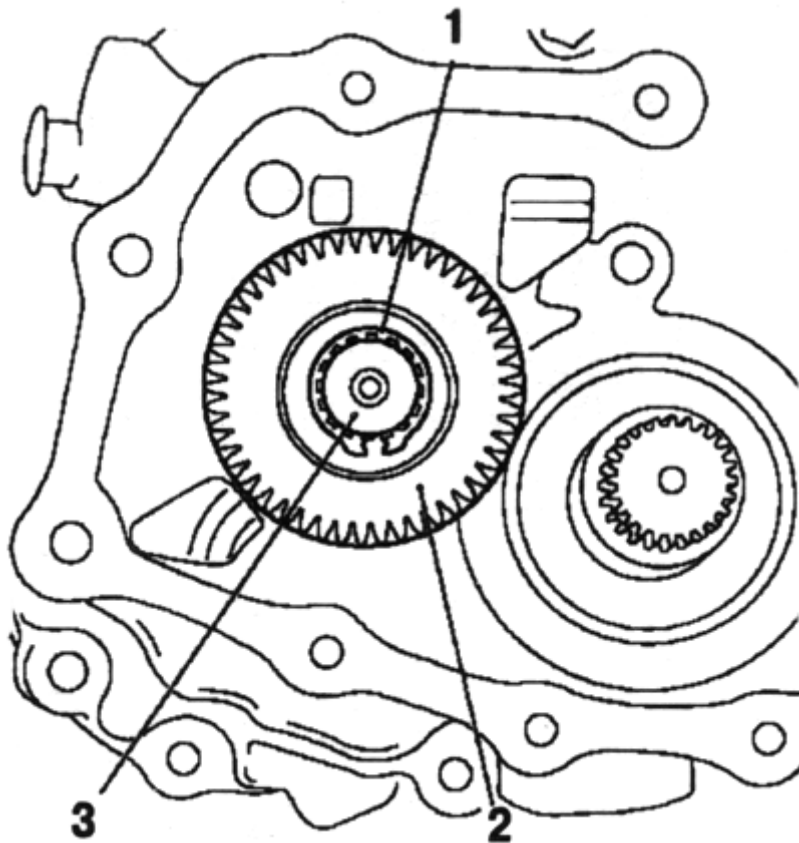


Fig. 3.59. Withdrawal dentate wheels with in-water Shaft:

1 - Holder, 2 - fifth gear transmission, 3 - drive shaft

Remove the fifth gear wheel transmission, (lead) from the shaft using a special device KM-553-A (Figure 3.60).

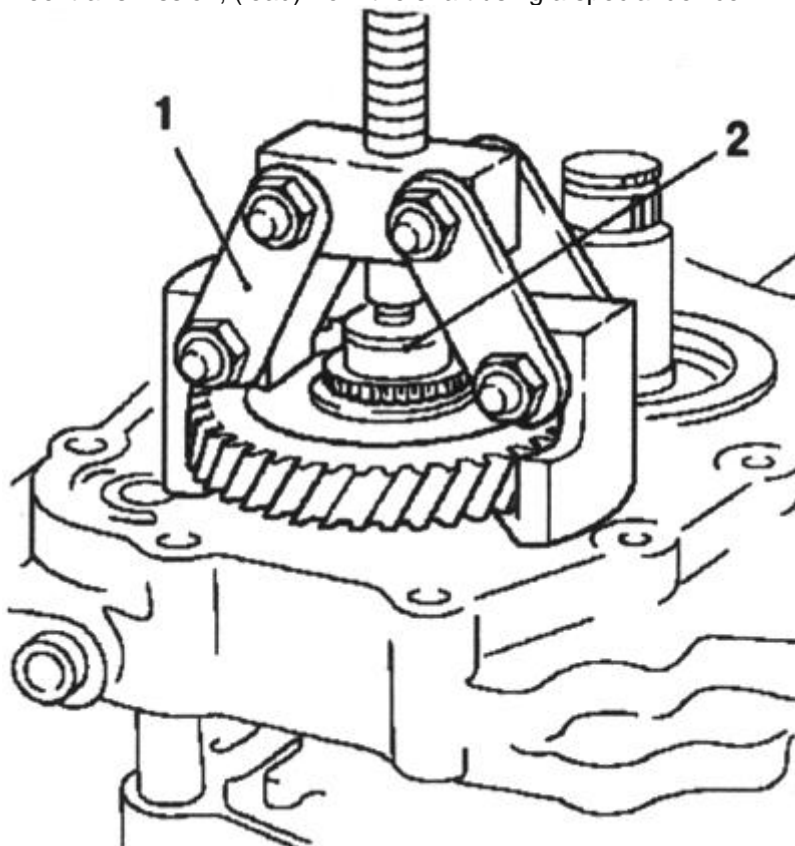


Fig. 3.60. Withdrawal dentate wheels with in power special devices:

1 - a special device, 2 - thrust bush

NOTE

Monitor the proper installation of special devices KM-553-A at the toothed wheel 5-th channel (lead).
Set stubborn bush from the CM-553-A on the driving shaft.
Disconnect the support bearing with a clip on the back cover (Figure 3.61).
Unscrew the 2 screws (arrow in Figure 3.61).

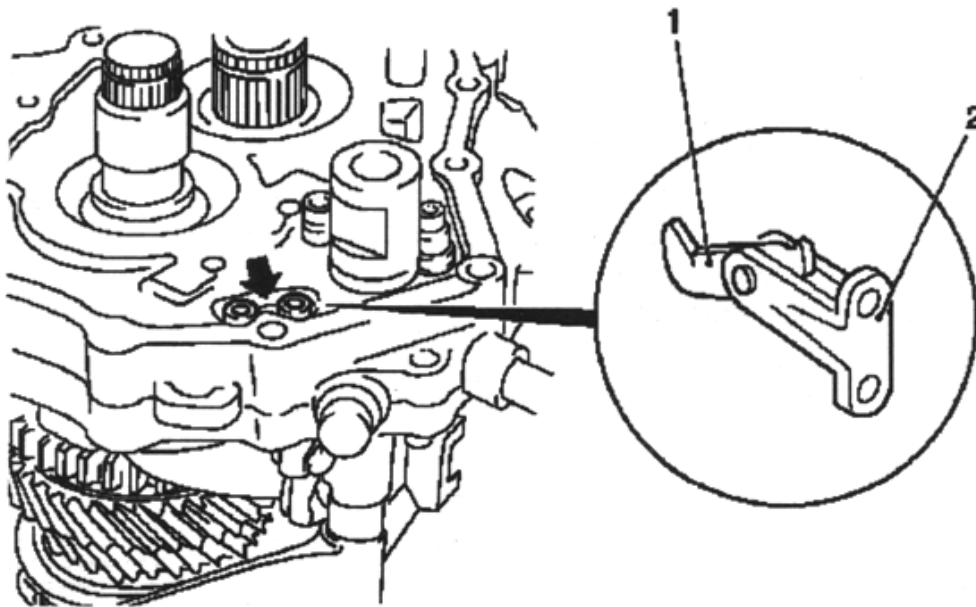


Fig. 3.61. Disconnecting support bearing:
1 - Latch, 2 - bearing bearing

NOTE

If Bolts fixing not otvorachi-ing, heat back cover hairdryer to temperature closer-tion of 80° C.

Remove the plugs (arrows in Figure 3.62) from the back cover.

Remove the cap using a special tool for KM 727 and KM-328-B (Figure 3.62).

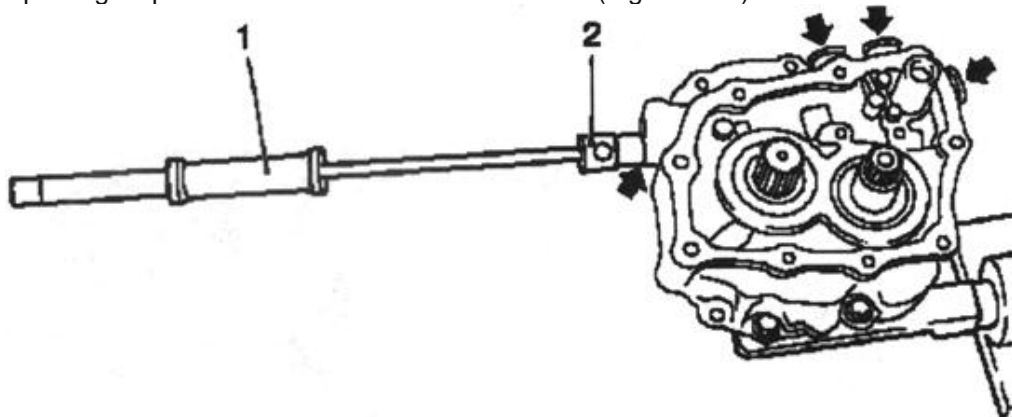


Fig. .3.62. Removing plugs:
1,2 - Special tools

Disconnect the bridge clamping bolt rear cover by unscrewing 2 screws fastening (Figure 3.63).

NOTE

Bridge can withdraw if Included will be the 3rd transfer.

Turn 2-S transmission and 5-S transmission.

Turn 2 transfers with the holder of the switch (arrows in Figure 3.63).

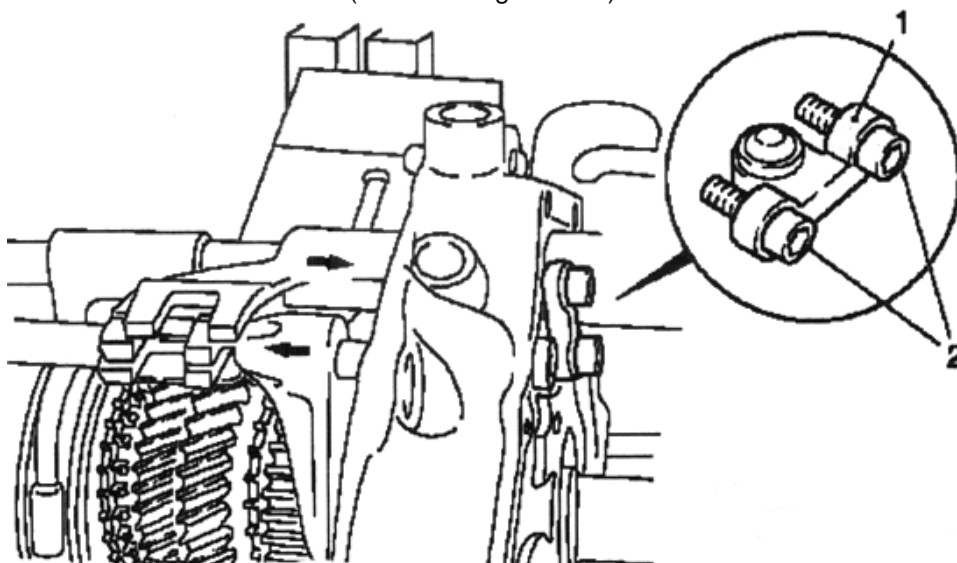


Fig. 3.63. Disconnecting ISO-ta clamping bolt
back cover:

1 - Bridge 2 - bolts fixing

NOTE

*Reduce pressure on direction yuschie rod switching re-giving - For this, support rods switching
Transfer top wooden block.*

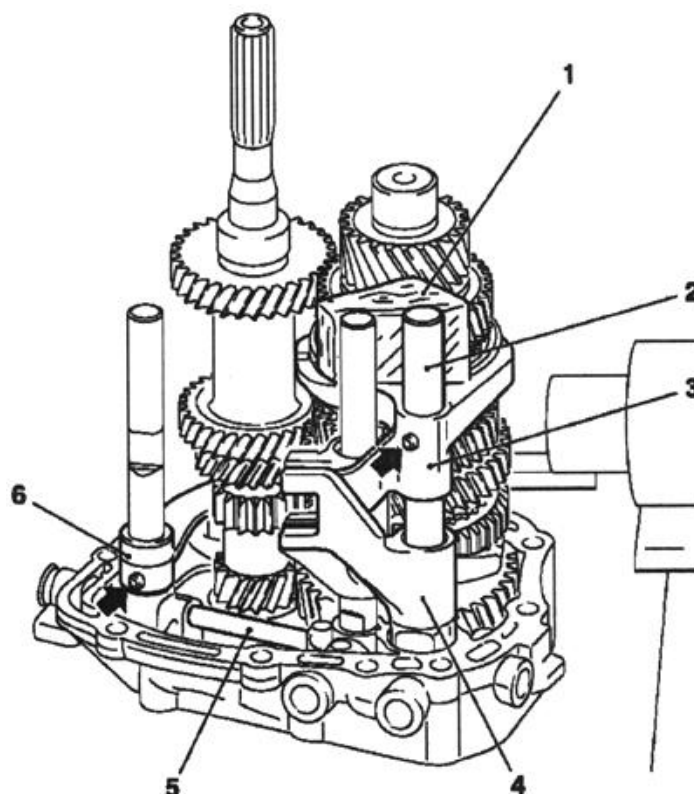


Fig. 3.64. Withdrawal components mechanism switching

5 - First transmission:

- 1 - Wood block, 2 - rod change gear;
- 3 - plug switch 3 / 4 gear;
- 4 - switching mechanism 5-th transmission;
- 5 - splint, 6 - fork inclusion reverse gears

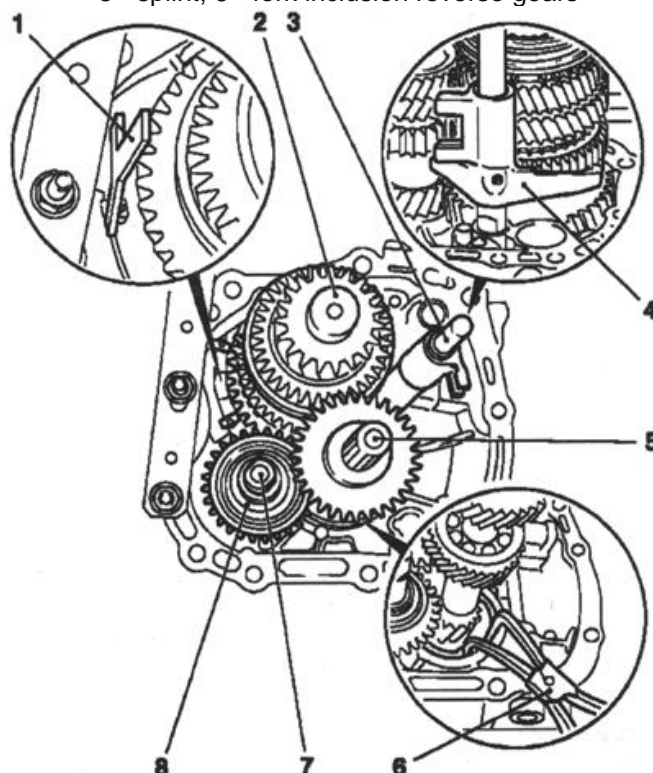


Fig. 3.65. Removing the components of the switching mechanism reverse gears:

- 1 - plate 2 - retaining rings of the main shaft;
- 3 - gear shift fork rod 1-J / 2-j;
- 4 - Fork gearshift 5 - drive shaft;
- 6 - a special tool; 7 - axle gears reverse;
- 8 - idler reverse

Remove the fork gear, 3rd / 4 th gear and reverse gear.

Vybeyte cylindrical pins of the shift fork 3rd / 4 th gear and forks include reverse gears using a special tool, the CM 308.

Remove the core of the gear rod include reverse gears and fork gear.

Remove the shifter 5-th transmission with the rear cover (Fig. 3.6ft).

Remove the cotter pin and remove the cylinder latch the back cover.

Remove the 2 retaining rings of the main shaft and drive shaft with a special tool KM-443-B (Figure 3.65).

NOTE

When lifting, keep retainer ring tso Chief shaft under tension of the relevant plate (Fig. 3.65).

Remove the main shaft from the rear cover.

Remove the drive shaft from the rear cover.

Remove the idler reverse of the back cover.

Remove the fork gear shift and gear shift fork rod 1 st / 2 nd transmission of the back cover.

Remove the axle gears reverse from the back cover.

Clamp the rear axle pinion in a vise with copper sponges.

Gently Destroy the back cover of a copper rod.

NOTE

Please note that the retention worded the ball utaplivaetsya.

Clear all items and sealing surfaces.

Check all items for damage.

NOTE

Replace damaged nodes.

Setting

Lubricate the rotating elements and contact surface of the liquid from the gearbox.

NOTE

Please attention on ustanovoch-ing position.

Zapressuyte axle gears in the rear of the rear cover.

Set fixing ball (arrow) (Figure 3.66).

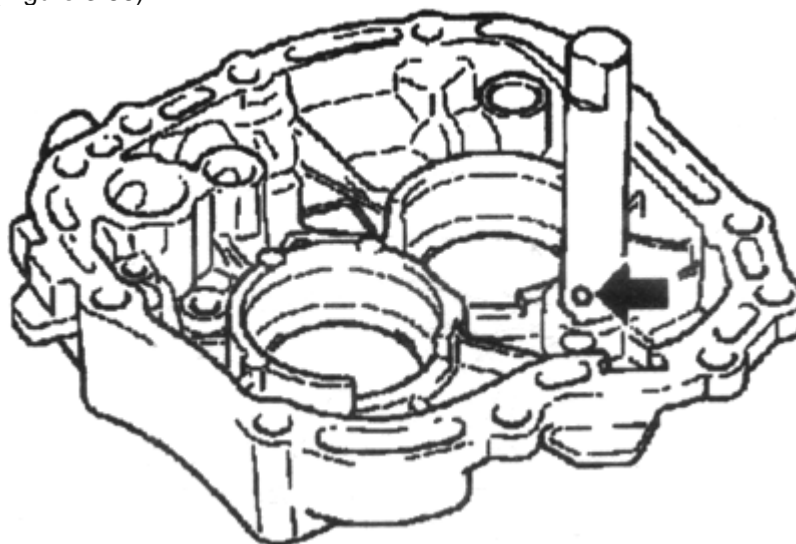


Fig. 3.66. Fixing ball

Zapressuyte axle gear reversing all the way

NOTE

Cover bearing and hole rear progress transmission oil.

Install the main shaft in the bearing.

Install drive shaft into the rear cover.

Install reverse gear in the rear cover.

Paz forks gear (arrow in Figure 3.67) reverse gear facing upwards.

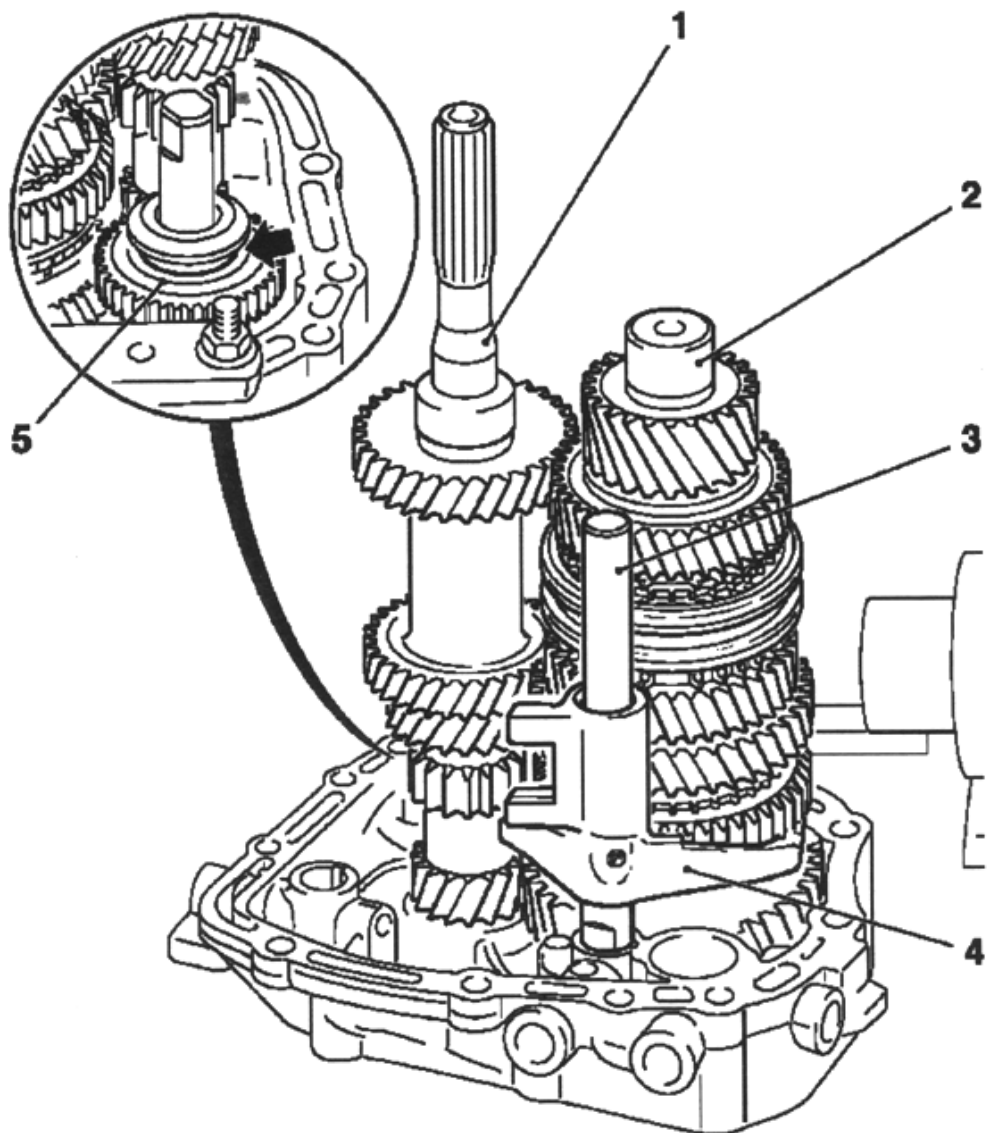


Fig. 3.67. Setting components mechanism switching Transmission:

- 1 - drive shaft, 2 - the main shaft;
- 3 - gear shift fork rod 1 st / 2 nd;
- 4 - Fork gearshift 5 - reverse gear

Insert fork gear shift rod with a 1 st / 2 nd gear in the rear cover.

Install new retaining rings.

Install snap rings with a special tool KM-443-B.

Install tightening bolts, gears, reverse and 3-rd / 4 th transmission.

Reduce the load on the guide rod gear in the back.

When installing the pins podoprite rod gear wooden wedge.

Install the plug shifting gears and reverse gear-changing stock.

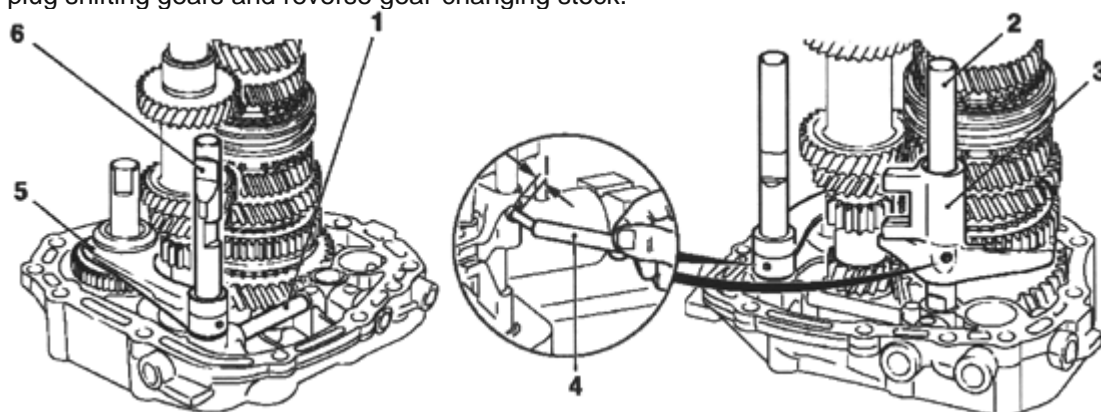


Fig. 3.68. Setting components mechanism switching

1 - d / 2 - d transfer:

- 1 - clamping bolts 2 - rod change gear;
- 3 - plug switch 1 st / 2 nd transmission, 4 - a special tool;
- 5 - fork gear reverse gears;
- 6 - rod change gear

Install a cylindrical pin with a special tool KM 308.

NOTE

Protrusion new pin shall draw up approximately 2 mm / 0,08 (Size I).

Install the plug switch 1 st / 2 nd transfer and stock transfer switch. Install a cylindrical pin with the KM 308.

NOTE

Protrusion new pin shall draw up approximately 2 mm / 0,08 (Size I).

Insert holder 5-th transmission.

Install the gearshift fork and stem forks gear, 3rd / 4 th transmission.

Install a cylindrical pin with the KM 308.

Set 4 Blank.

Drive in stoppers to stop nylon with a hammer or a soft metal rod.

Slide the fork gear shift in neutral position.

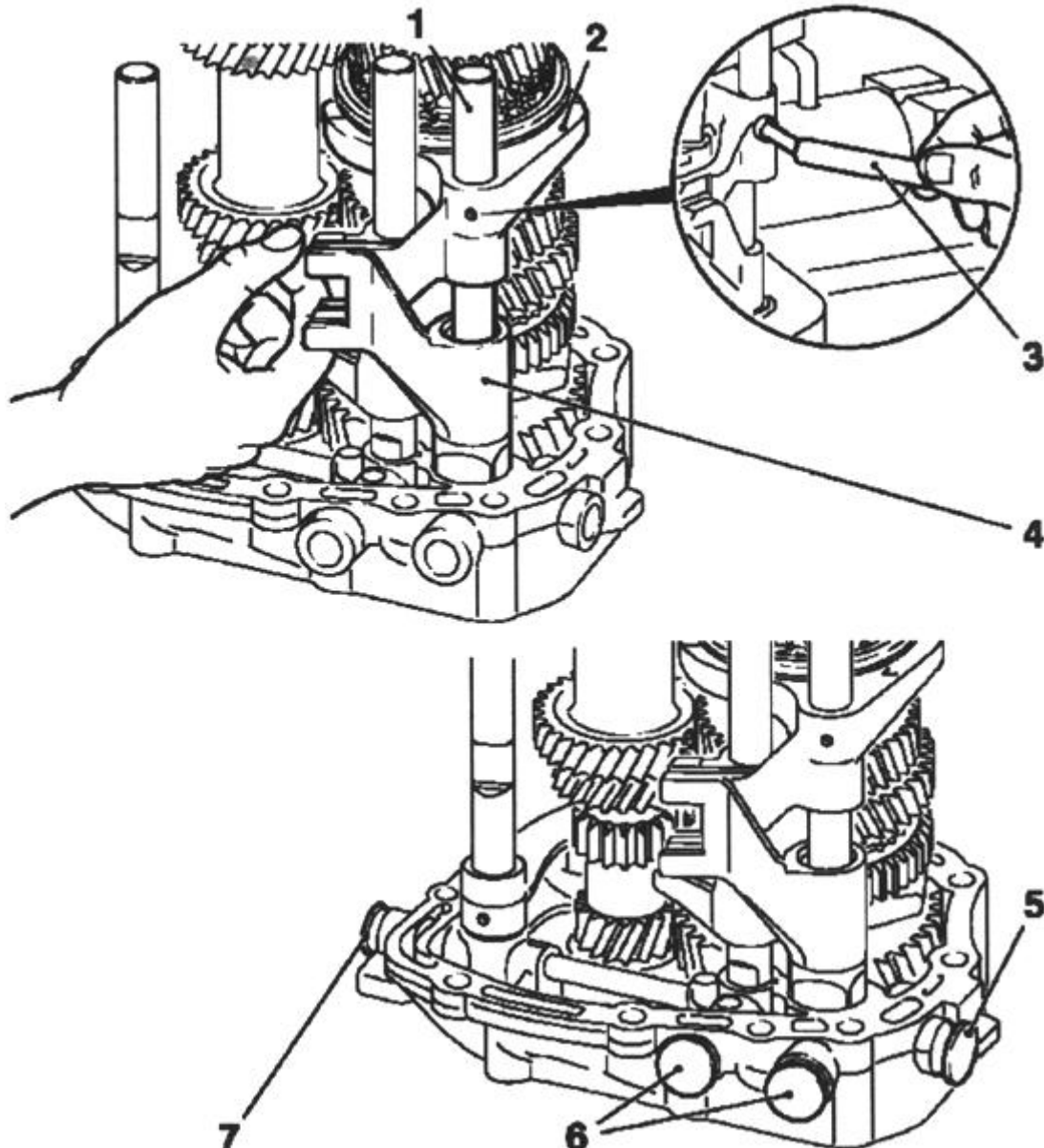
Turn 3 assists.

Turn 2-S transmission.

Turn on the 3rd gear.

Including 5-S transmission.

Attach a bridge clamping bolt rear cover.



**Fig. 3.69. Withdrawal components mechanism switching
5 - th transfer:**

- 1 - gear shift fork rod 1 st / 2 nd;
- 2 - gear shifting fork, 3 - a special tool;
- 4 - holder of 5-th transmission; 5,6,7 - Stoppers

NOTE

Cover Bolts fixing of compositions.

Tighten the 2 new bolt.

Slide the fork switch 1 st / 2 nd gear in neutral position.

Secure the 2 screws of the bridge point 7 Nm.

Slide the fork gear shift in neutral position.

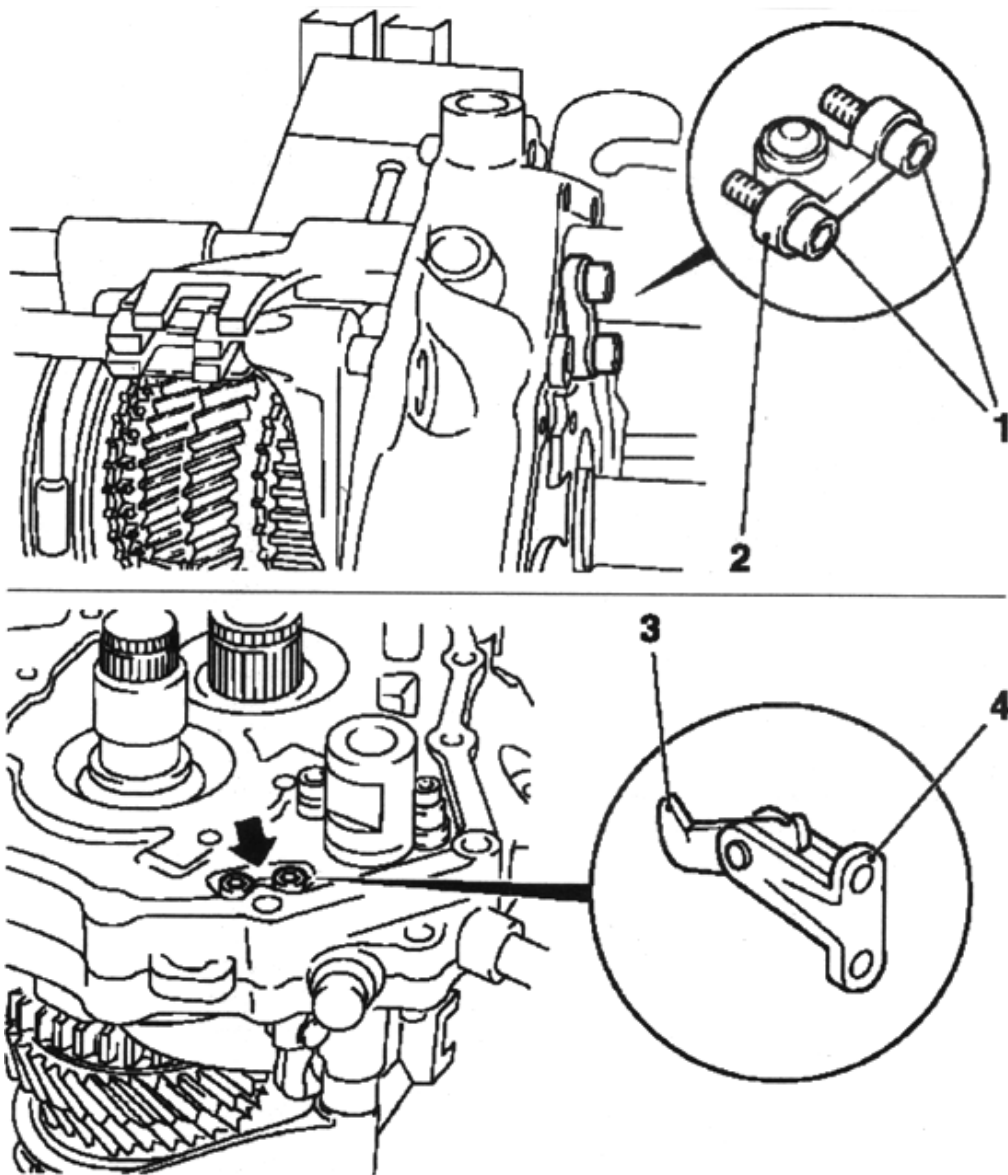


Fig. 3.70. Setting Bridge:

1 - clamping bolts 2 - bridge;
3 - Latch, 4 - bearing bearing

Secure the support bearing in the rear cover latch.

Tighten the 2 bolts moment 9 Nm.

Remove the back cover with the help of special devices KM 552 KM-113-2.

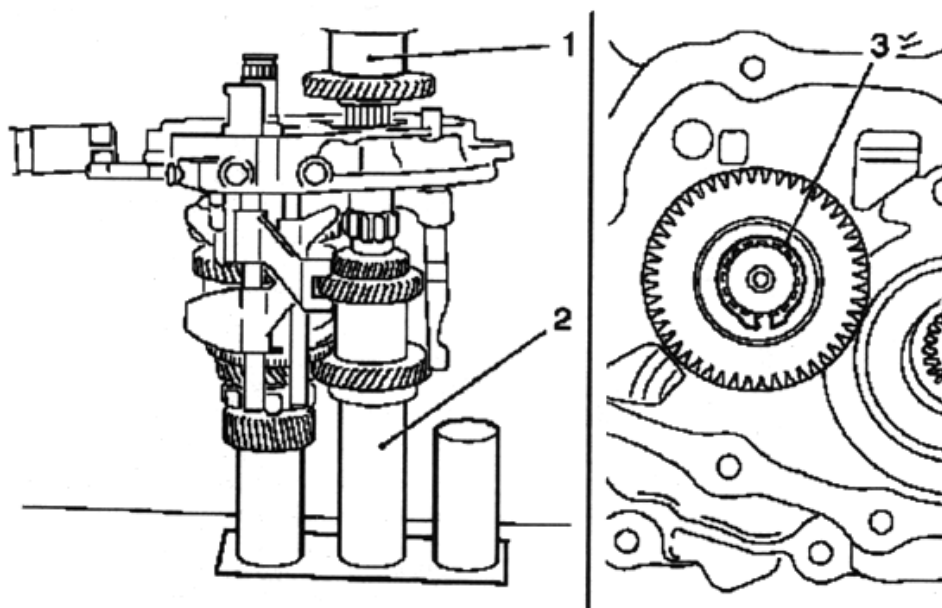


Fig. 3.71. Press-fit dentate wheel 5 - th transfer:

1 - a special tool, 2 - a special tool;

NOTE

Long hub dentate wheels turned in side back cover.

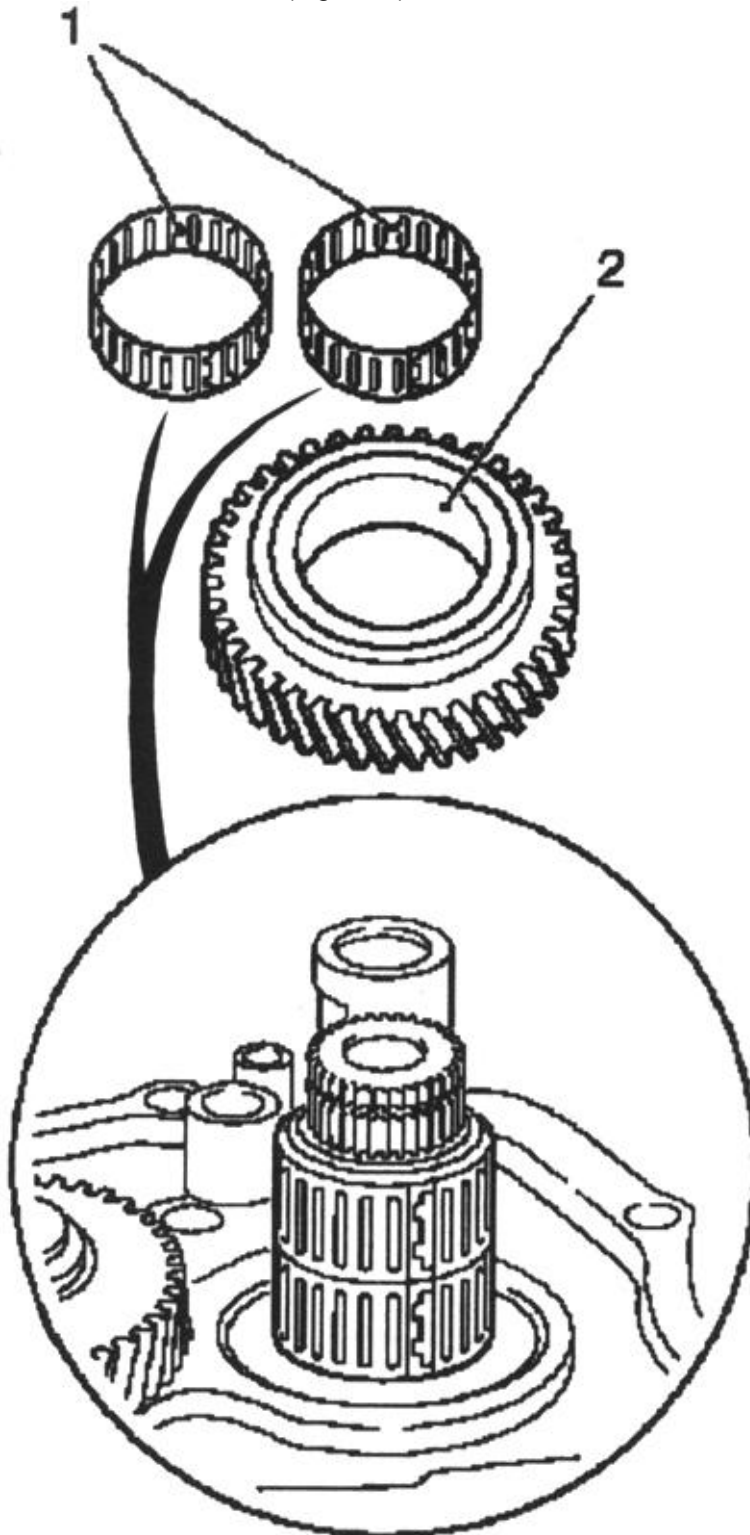
Press the pinion 5-th transmission (lead) on the driving shaft by means of KM 514 (Fig. 3.71).

Replace the back cover from the main shaft and drive shaft in a special adaptation of the CM 554.

Install a new circlip.

Attach the rear cover to the CM-113-2 with a special tool KM-552.

Install pinion 5-second transfer to the main shaft (Fig. 3.72).



**Fig. 3.72. Installing the gear 5-th transmission
the main shaft:**

1 - Gear 2 - Needle Bearings

Cover 2 needle bearing transmission oil.

Install 2 needle bearings on the main shaft.

NOTE

Make in correctness landing needle bearing.

Install gear, fifth gear transmission, and building on the main synchronizer shaft (Figure 3.73).

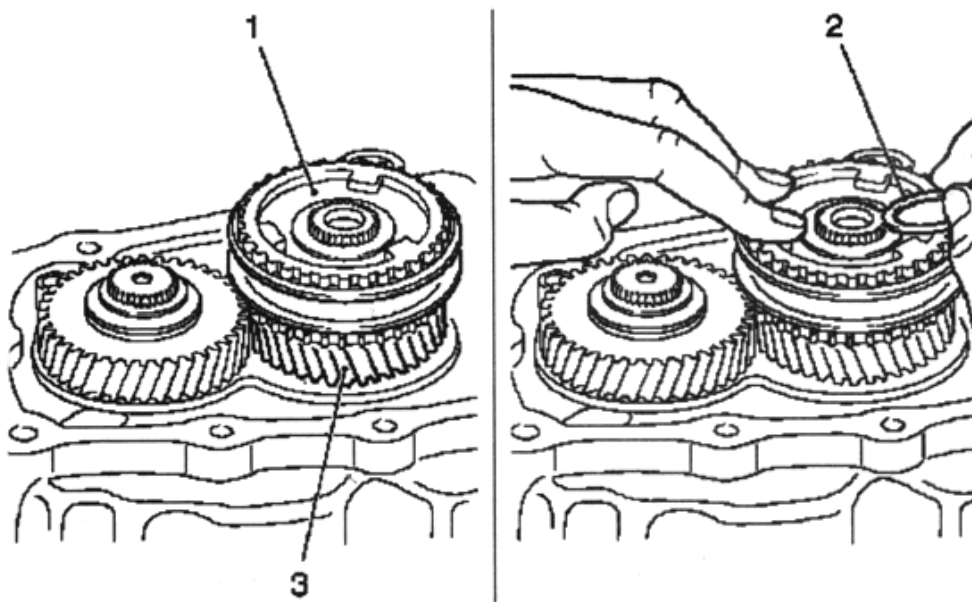


Fig. 3.73. Setting dentate wheels, gears fifth transfer and Corps synchronous mash fifth transfer with Chief Shaft:

1 - body synchronizer, 2 - retainer ring;
3 - fifth gear transmission

Coat the bearing surface of the main shaft and housing synchronizer transmission oil.

Install a new circlip.

Replace shoe (arrows) on the inclusion of plug fifth gear (Fig. 3.74).

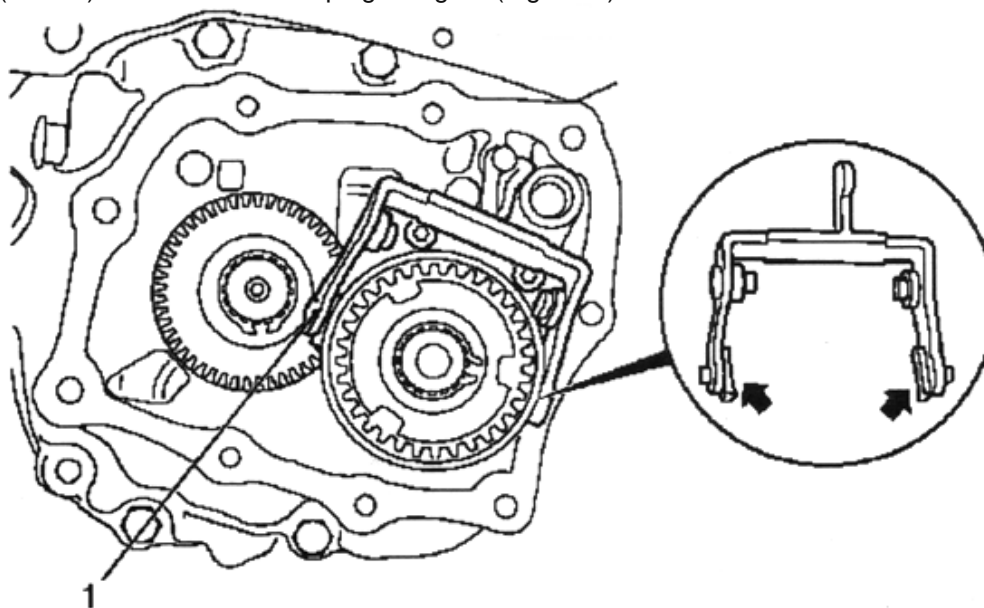


Fig. 3.74. Setting shoe on fork inclusion fifth transfer:

1 - body synchronizer

Attach the support bearing with a yoke to the back cover.

Tighten the 2 new bolts moment 22 Nm.

NOTE

Set Bolts with fixing composition.

Set friction washer axle gears reverse.

NOTE

Friction washer fix grease grease.

Check the position and placement of components listed below.

Stock switch 3rd / 4 th gear.

Fork shift 3rd / 4 th gear.

The control for 5-th transmission.

Stock switch 1 st / 2 nd gear.

Fork switch 1 st / 2 nd gear.

Pin restrictor inclusion transmission.

Fork include reverse gears.

Stock activate reverse gears.

Replace the back cover.

NOTE

Please attention on similarity bolts.

Attach the back cover with new gasket to the transmission housing.

Tighten the 4 bolts M7 moment 15N-m.

Tighten the 5-bolt M8 moment 20 Nm.

Install the front axle housing.

Tighten the switch reversing lamps moment 20 Nm.

NOTE

Use new O-ring.

Replace the cover gearbox.

Check the fluid level in the gearbox.

2.13 Clutch - Removal and installation of the differential (gearbox F13)

NOTE

Box Transmission remains Install the universe.

Withdrawal

Disconnect the shafts of the wheels of the gearbox.

NOTE

Shafts wheels remain in wheel hubs.

Remove the back cover by unscrewing the mounting bolts 9.

Remove the back cover.

Remove the differential (Figure 3.75).

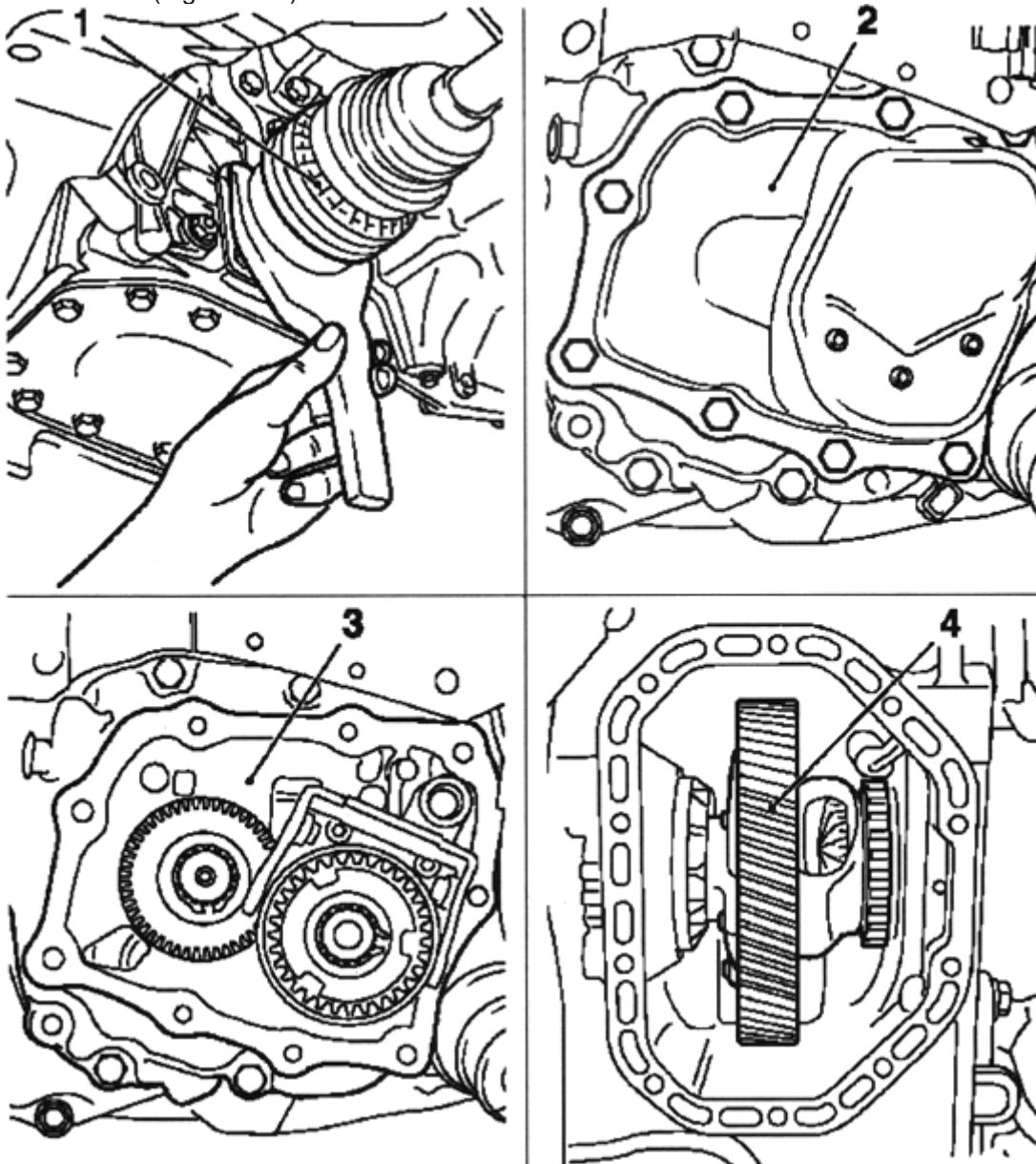


Fig. 3.75. Withdrawal Differential:

1 - shafts of the wheels 2, 3 - back cover, 4 - differential

Remove the 2 sealing rings of the shaft of the wheel cage and gearbox.

Remove the O-ring shaft wheels with special instruments KM-454-2 and KM-454-4 (Fig. 3.76).

Remove the outer ring of taper roller bearing of the cage.

NOTE

Must only in case replaced HN bearing.

Install the outer ring taper roller bearing seats in the 303 IM.

Remove the outer ring of a taper roller bearing with special instruments KM 304 and KM 451 (Fig. 3.76).

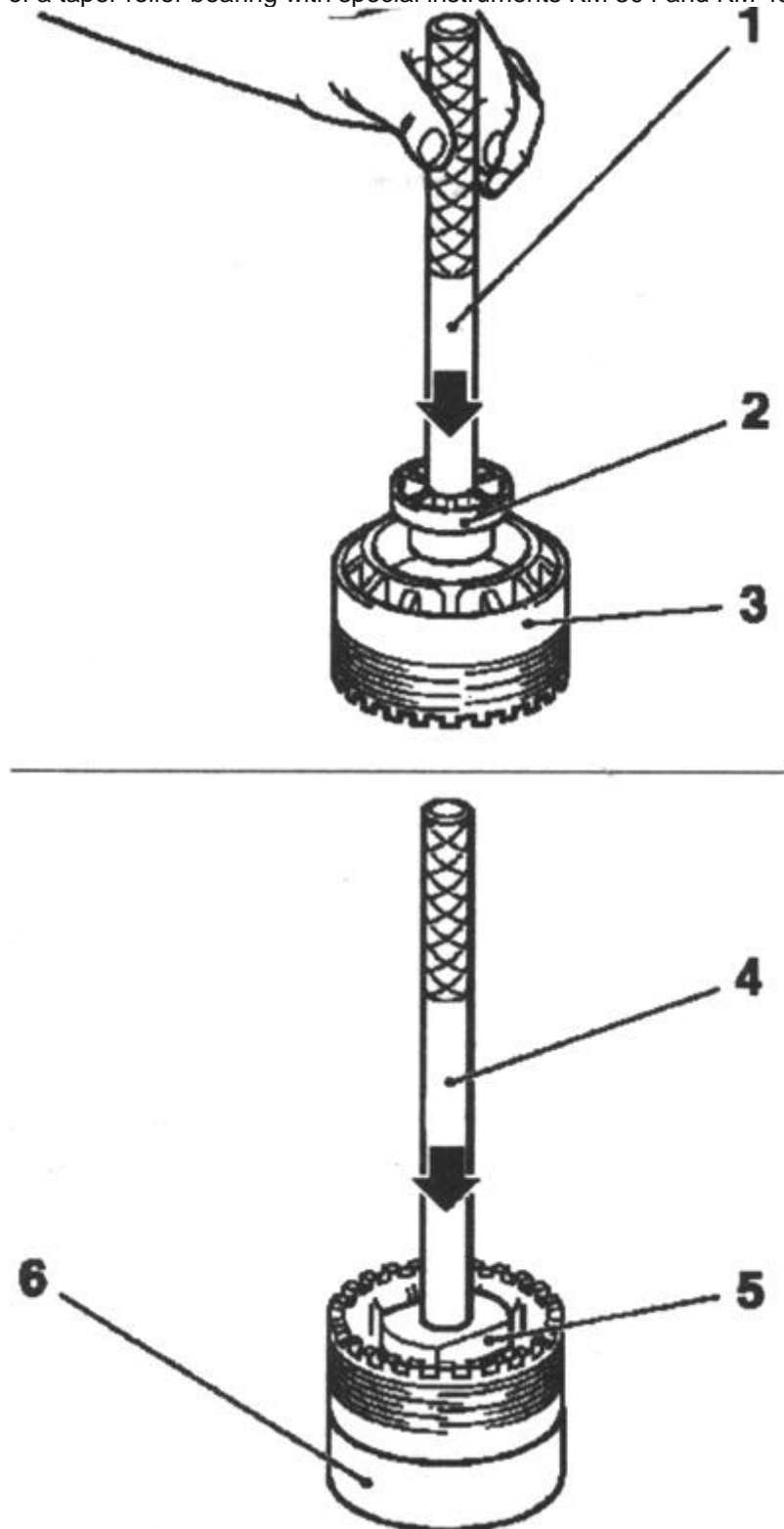


Fig. 3.76. Withdrawal sealing and Coney ethical Rings roller bearing:

1,2 - special tools; 3 - cage;

4,5,6 - special tools

Remove the outer ring of a taper roller bearing of the gearbox

NOTE

It is only necessary when replacing the bearing in the gearbox.

Remove 2 internal rings of tapered roller bearings from the differential.

Do not change the place of external and internal ring when reusing bearings.

When repairing the speedometer gear (drive) must be destroyed. During the assembly is not installed again.

Remove the inner ring of the taper roller bearing with pomoschyuspetsialnyh instruments KM-161-B, KM-161-3 and KM-161-4 (Fig. 3.77).

Remove the gear ring with the differential housing.

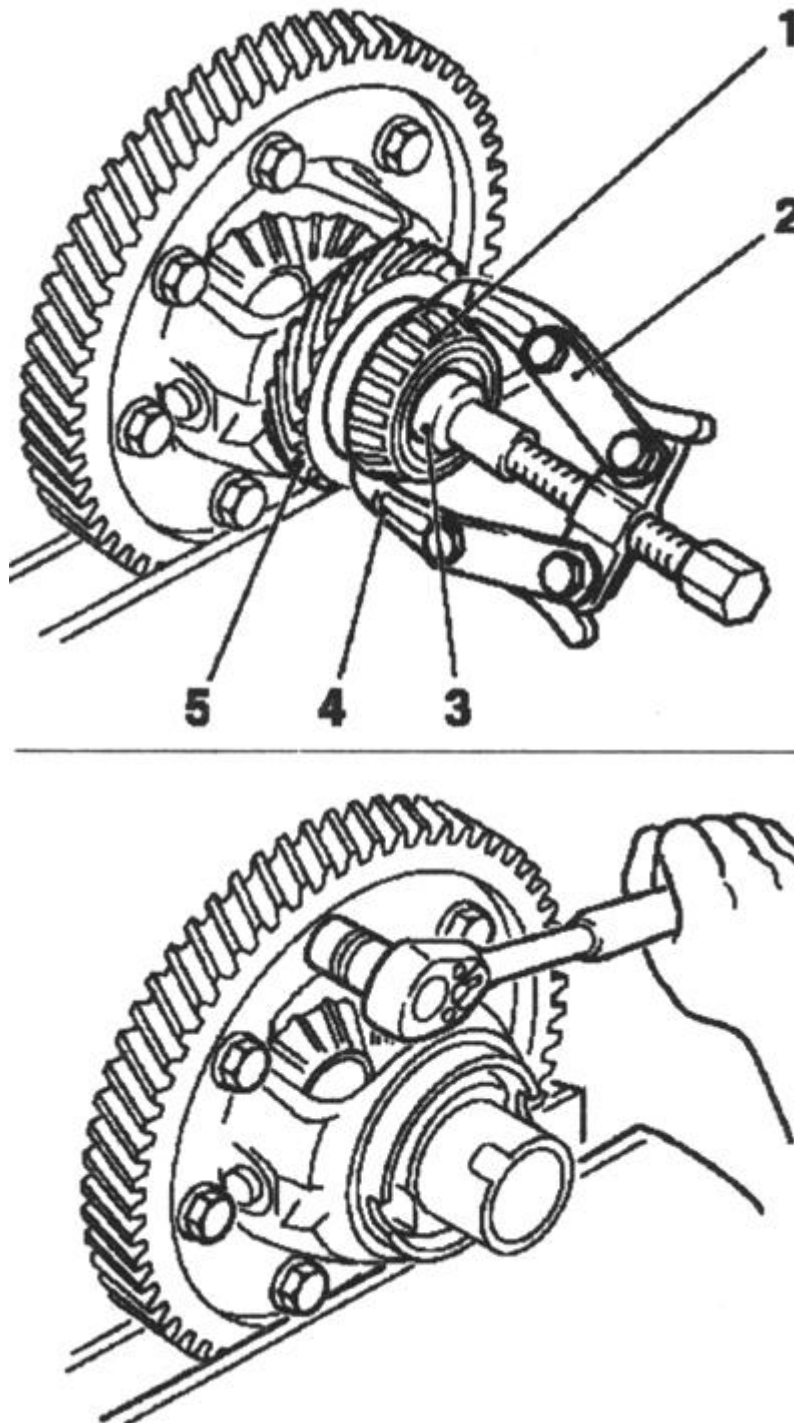


Fig. 3.77. Withdrawal Interior Rings the role of postglacial bearings:

1 - inner ring of tapered roller bearings;

2, 3, 4 - special tools;

5 - speedometer gear (lead)

NOTE

Use protective vices.

Remove the differential housing.

Remove the 2 retaining rings with a conical axis.

Remove the cone axis.

Remove the wheels and shafts poluosevye gears with a special tool KM-458-A.

Remove the plastic clip.

Clear all the elements and the transmission housing. Check all items for damage.

Setting

NOTE

Grease rotating elements, bearings and surface contacts ta Transmission oil.

Insert the plastic clip in the differential.

NOTE

Should is perhaps set ring (1) plastic probes of guide leading six-ren in housing

Assemble the differential housing.

Replace gears and satellite differential in housing differential.

Hold the differential housing in a vise using a special device KM-458-A (Figure 3.79).

NOTE

Use protective vices.

Install central satellite differential with special prispobleniyaKM 456.

Install the conical axis.

Install 2 new retaining rings (Fig. 3.79).

Attach the gear ring (1)

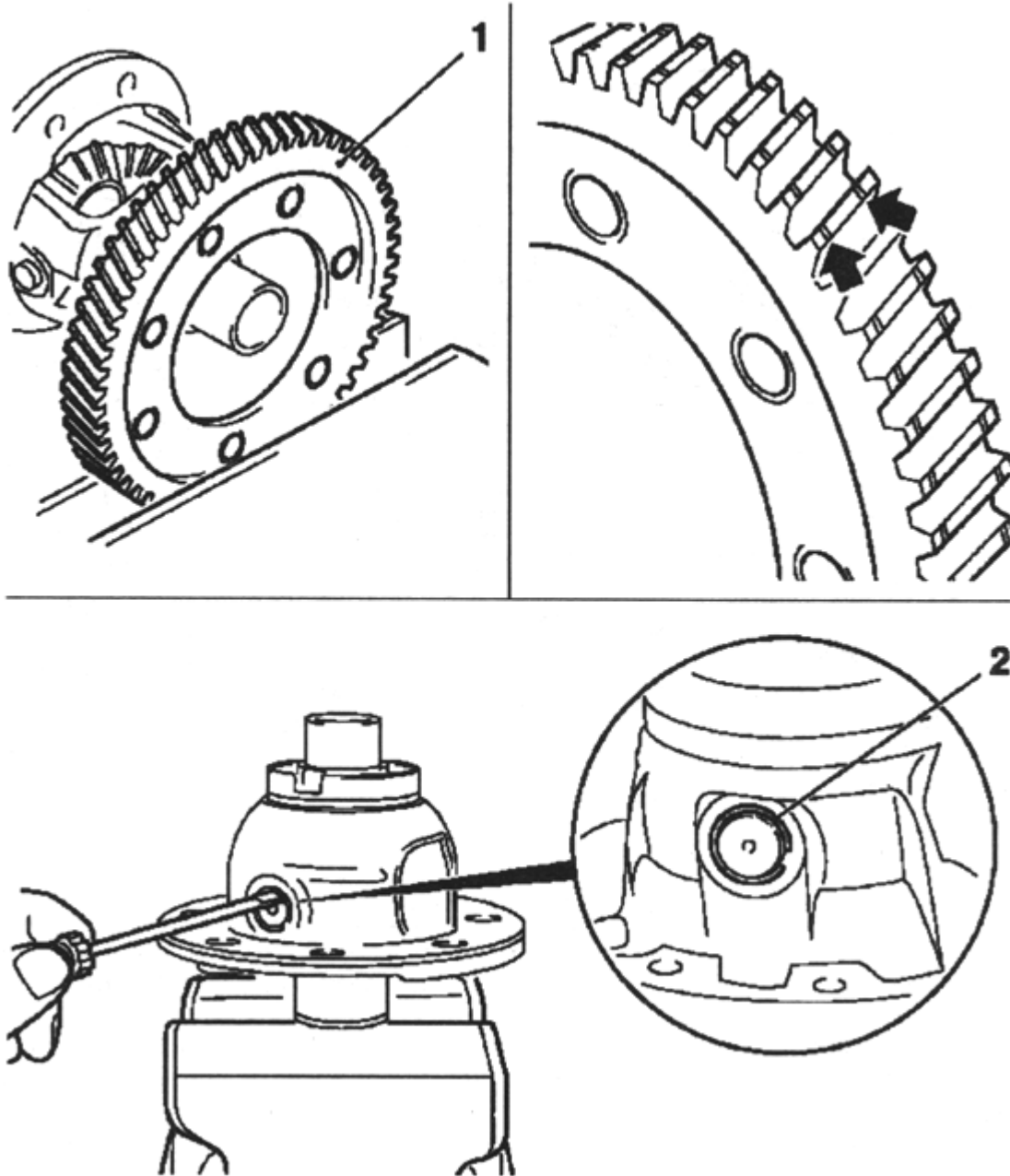


Fig. 3.78. Removing the locking rings:
1 - toothing differential 2 - retaining rings

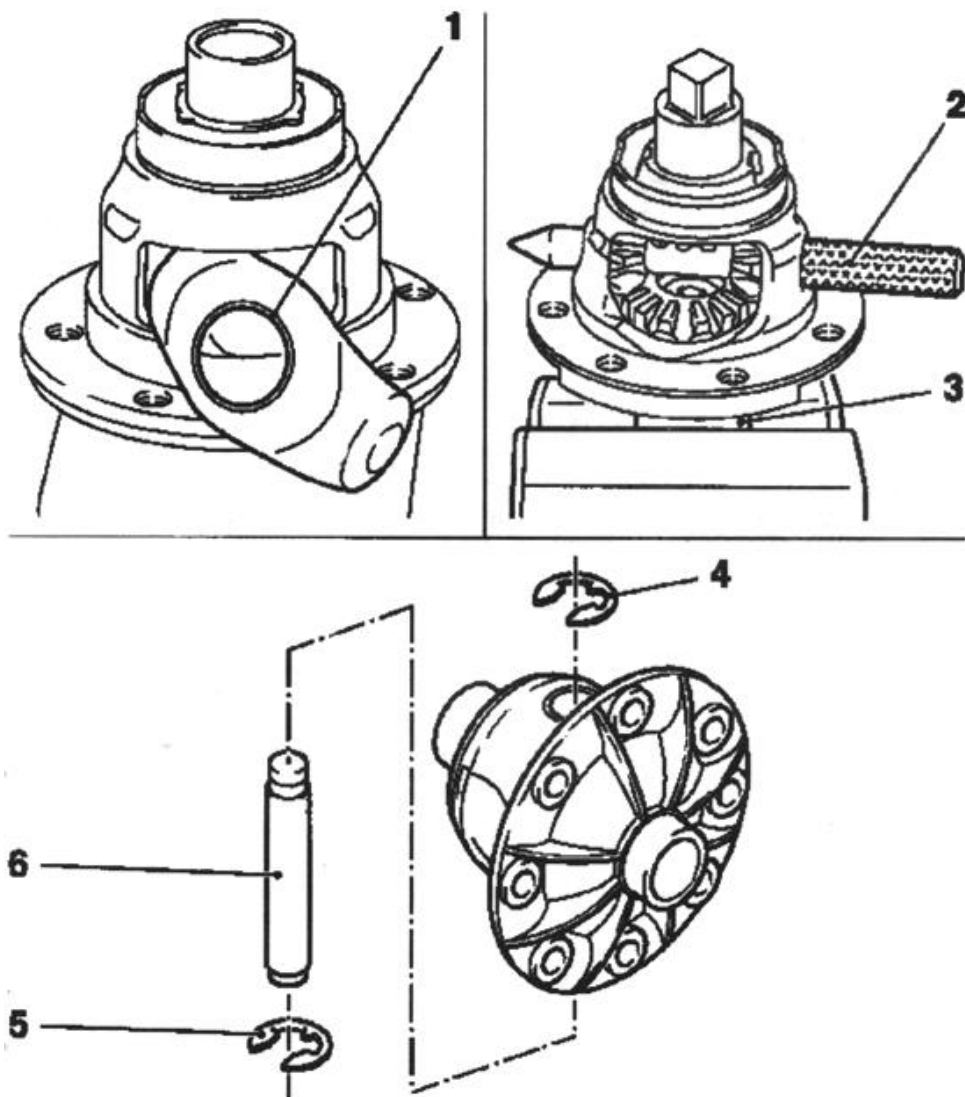


Fig. 3.79. Assembling Corps Differential:

1 - Ring 2, 3 - a special tool;
4, 5 - retaining rings, 6 - cone axis

NOTE

Replace top gear only in pairs. Pay attention to the identification groove (arrows in Figure 3.80) in the upper part of the tooth.

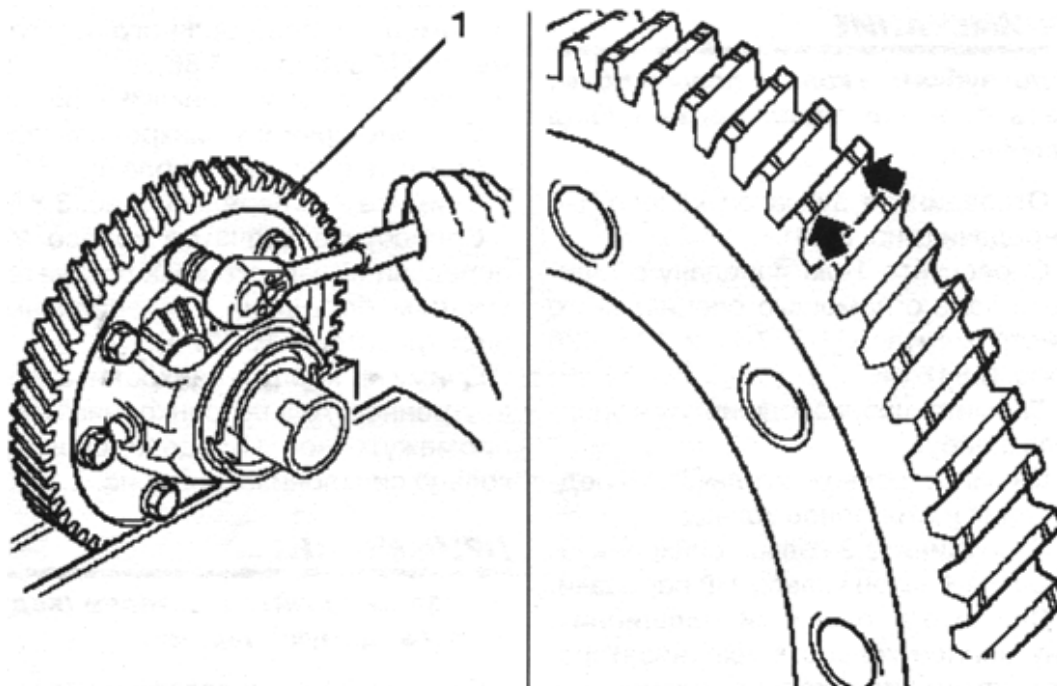


Fig. 3.80. Accession dentate crown:

1 - tothing

Set 2 internal rings of tapered roller bearings (Figure 3.81).

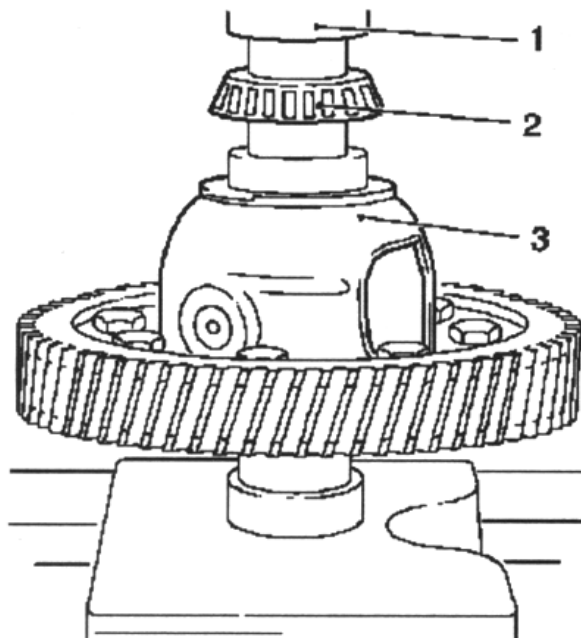


Fig. 3.81. Setting Interior Rings:
 1 - a special tool, 2 - inner ring;
 3 - differential housing

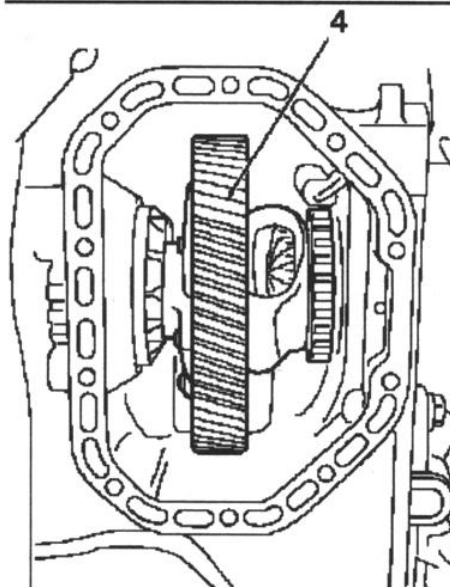
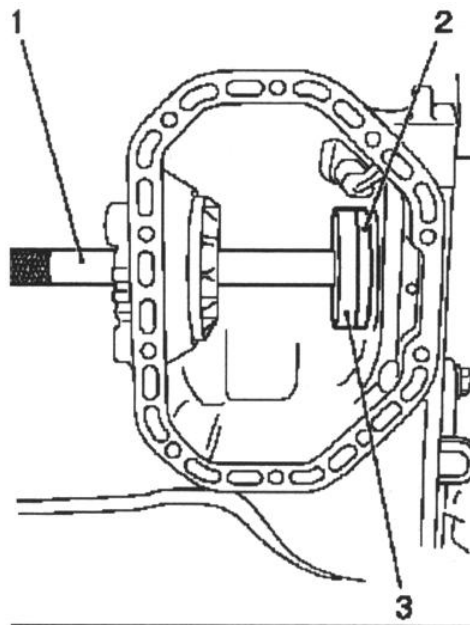


Fig. 3.82. Setting outdoor Rings Ro-faces bearing:
 1,3 - a special tool, 2 - roller bearing;
 4 - differential

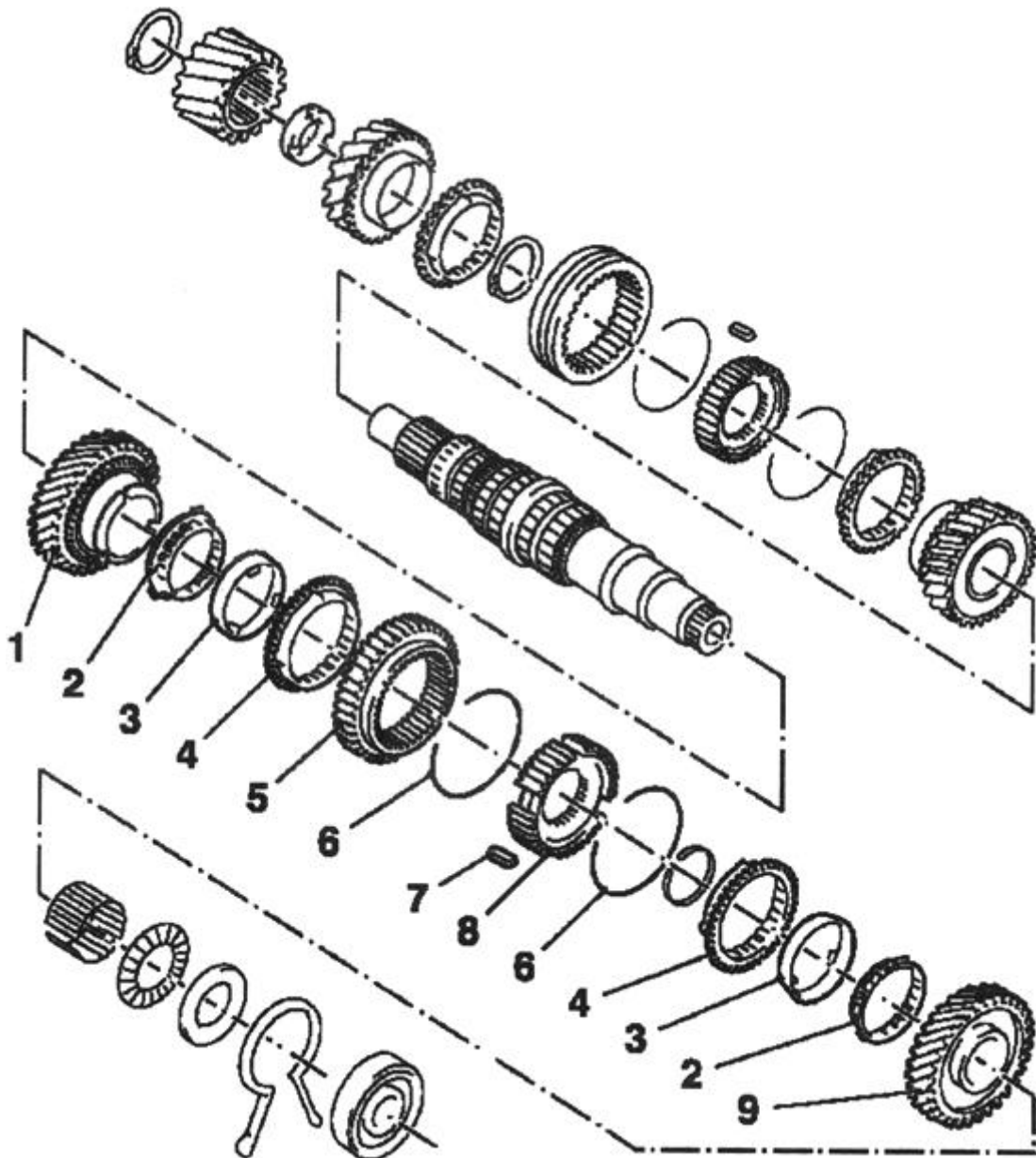
Install the inner ring of taper roller bearing with a special tool KM-453 in the case of the differential (Figure 3.81).
 Insert the 2 outer rings of tapered roller bearings.
 Install exterior ring taper roller bearing with the help of special instruments KM 304 and KM 451 in the gearbox and cage.
 Install O-rings, shafts of the wheels.
 Install O-rings, shaft wheel with a special tool KM-446 in the cage and the transmission housing.
 Install differential (Figure 3.82).
 Replace the back cover.

NOTE

Please attention on similarity bolts.

Attach the rear cover.
 Replace it with a new gasket on the transmission housing.
 Tighten the 4 bolts M7 moment 15N-m.
 Tighten the 5-bolt M8 moment 20N-m.
 Set shafts of the wheels.
 Check the fluid level in the gearbox.

2.14 Clutch - Removal and installation of the main shaft (gearbox F13)



Total kind Chief shaft and mechanism Synchronization:

- 1 - Leading 2-nd gear transmission, 2 - inner ring synchronizer;
- 3 - intermediate ring, 4 - outer ring synchronizer;
- 5 - hub switch 6 - Spring synchronizer;
- 7 - sliding blocks, 8 - housing synchronizer;
- 9 - Leading pinion 1-th transmission

NOTE

Box Transmission remains Install the universe.

Withdrawal

Remove the gearbox.

Remove the switch reversing lamps.

Disconnect the wiring harness connector, switch reversing lamps.

Remove the casing front axle.

Remove the back cover by unscrewing the mounting bolts 9.

NOTE

In case necessary, loosen the mounting cover Light blow-mi rubber hammer.

Remove the rear cover gasket.

Remove the back cover. Remove the main shaft.

NOTE

If dentate wheels damaged, the entire block Gear must be replaced.

Remove the pinion 1-th transmission (Fig. 3.84).

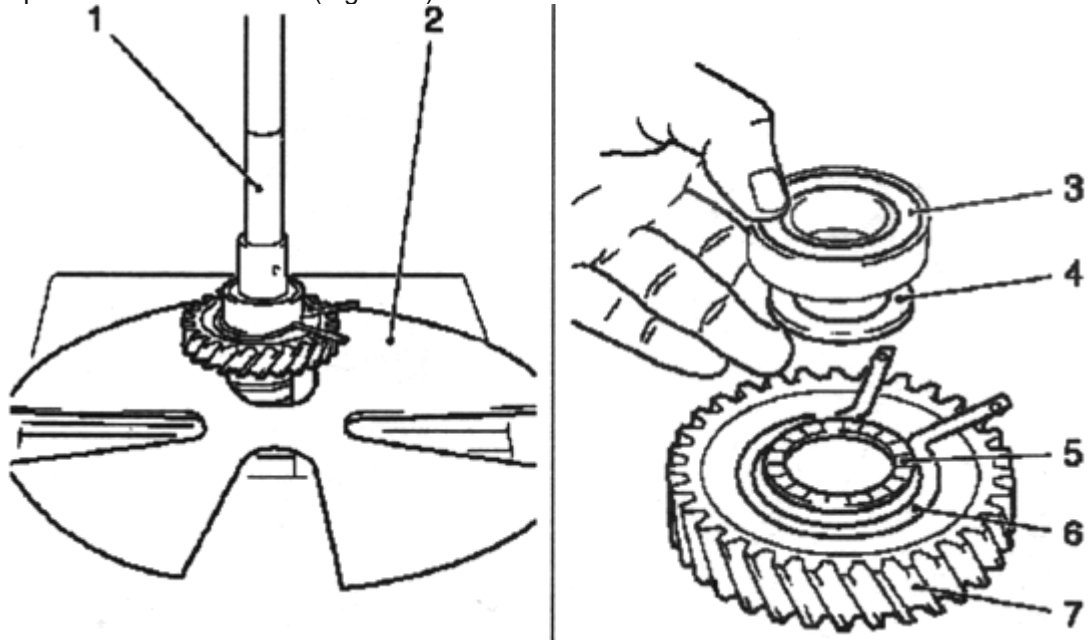


Fig. 3.84. Withdrawal Component 1 - th transfer:

- 1,2 - a special tool, and 3 - ball bearing;
- 4 - thrust washer, 5 - Axial needle bearing;
- 6 - circlip; 7 - gear 1-th transmission

Compressed 1st transfer from the main shaft with a special tool KM-307-V and KM-736 (Fig. 3.84).

Remove the ball bearing and thrust washer.

Remove the axial needle bearing and retaining ring.

Disconnect the 3 ring synchronizer and gear 1-th transmission.

Remove the needle bearing, inner ring synchronizer, an intermediate ring and outer ring synchronizer car Opel Astra (Figure 3.85).

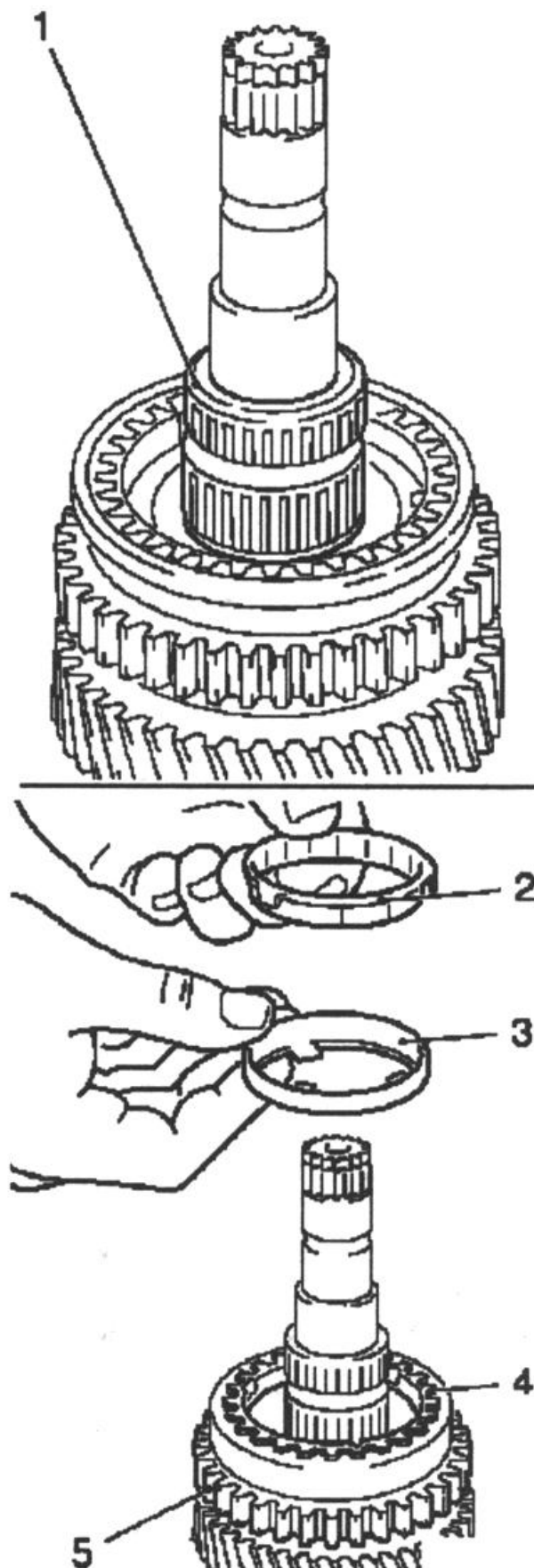


Fig. 3.85. Withdrawal components synchronous congestion:

- 1 - needle bearing, 2 - inner ring synchronizer;
- 3 - intermediate ring, 4 - outer ring synchronizer;
- 5 - gear transmission 1 st

Remove casing synchronizer.

Remove circlip Corps synchronizer 1 st / 2 nd gear with a special tool KM-396 (Fig. 3.86).

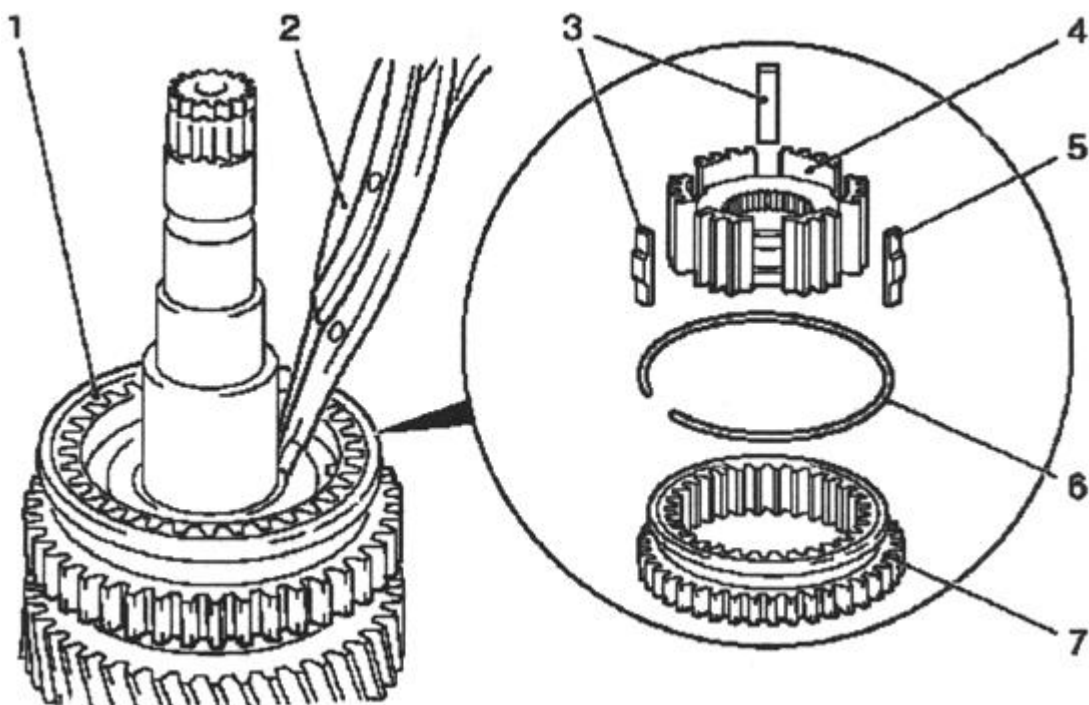


Fig. 3.86. Removing the hull synchronizer:

- 1 - snap ring, 2 - a special tool;
3, 5 - sliding blocks, 4 - body synchronizer;
6 - Spring synchronizer; 7 - sleeve switch

Remove the sleeve switch.

Remove the spring synchronizer.

Remove the sliding blocks.

Remove the 2-S transmission (Fig. 3.87).

Compressed gearwheel 2 nd transmission main shaft of the relevant beard and a special tool KM-307-B.

Remove casing synchronizer, the inner synchronizer ring, intermediate ring and outer ring synchronizer (Figure 3.87).

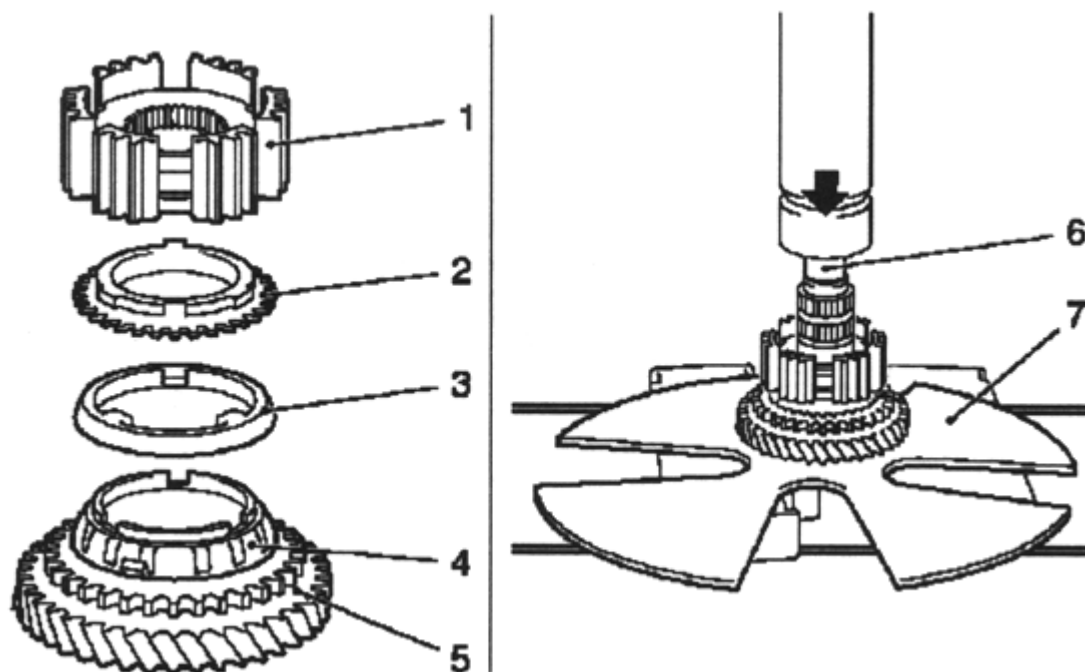


Fig. 3.87. Removing 2 - J transfer:

- 1 - body synchronizer, 2 - inner ring synchronizer;
3 - intermediate ring, 4 - outer ring synchronizer;
5-2-I transmission, 6 - piercer; 7 - a special tool

NOTE

Ever replace gears (leading schuyu and slave) pairs.

Otsoedenite gear (lead)

Remove the holder.

Compressed drive gears from the main shaft of a car Opel Astra relevant beard and a special tool KM-307-B (Figure 3.88).

Remove the 4-th transmission (Fig. 3.89).

Place a special device KM-307-B in the groove gear 4-th transmission.

Compressed gearwheel 4-th transmission and spacing ring with the main shaft of the relevant beard and a special tool KM-307-B.

Remove the needle bearing from the main shaft.

Remove the synchronizer ring, cog-wheel 4-th transmission.

Remove the hub switch from the main shaft.

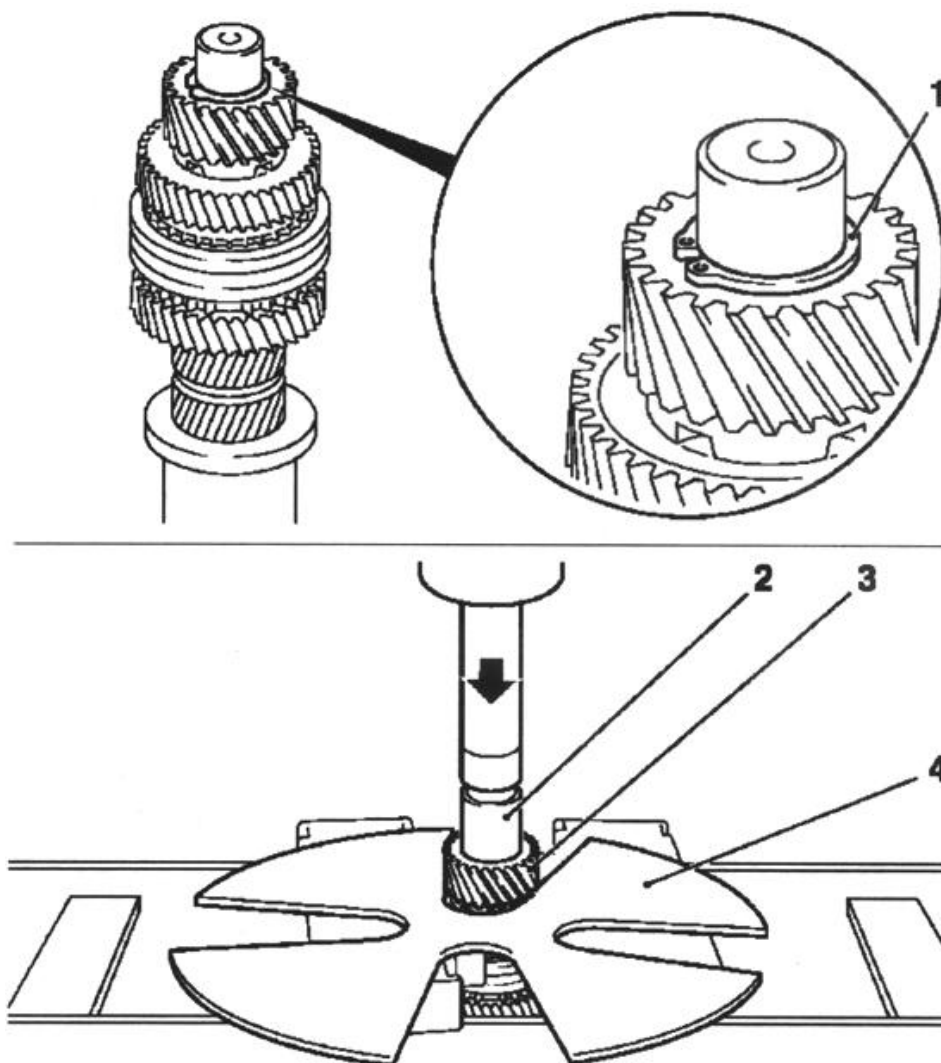


Fig. 3.88. Disconnecting leading gears:

1 - Holder, 2 - piercer 3 - gear (drive);
4 - special tool

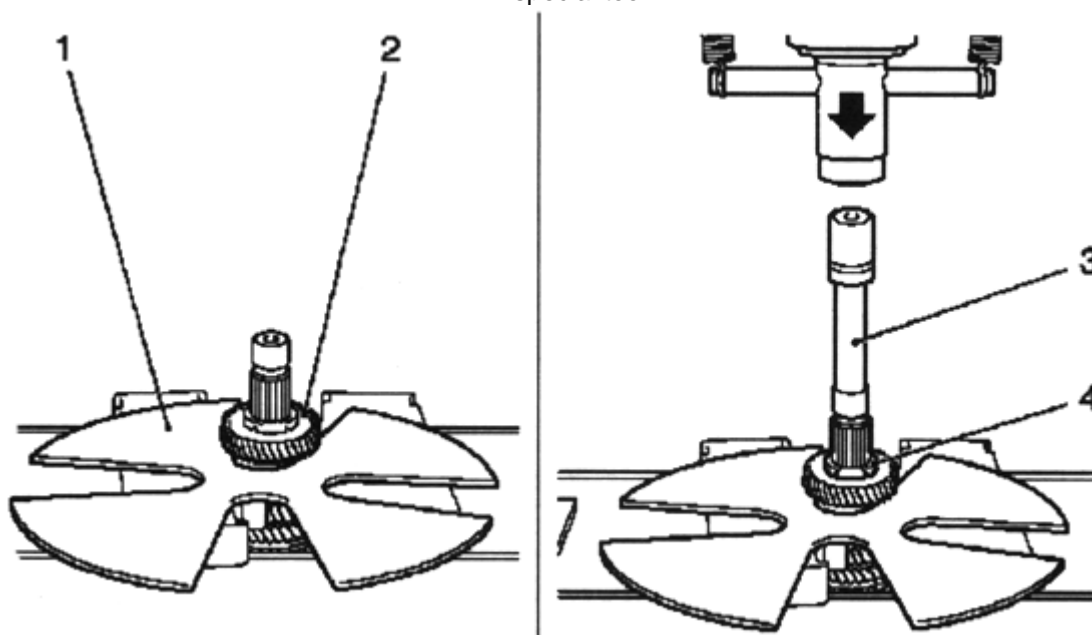


Fig. 3.89. Removing the 4 - th transfer:

1 - a special tool, 2-4-gear;
3 - piercer 4 - spacing washer

Remove the synchronizer spring and sliding blocks.
Remove the gear 3rd gear (Fig. 3.90).

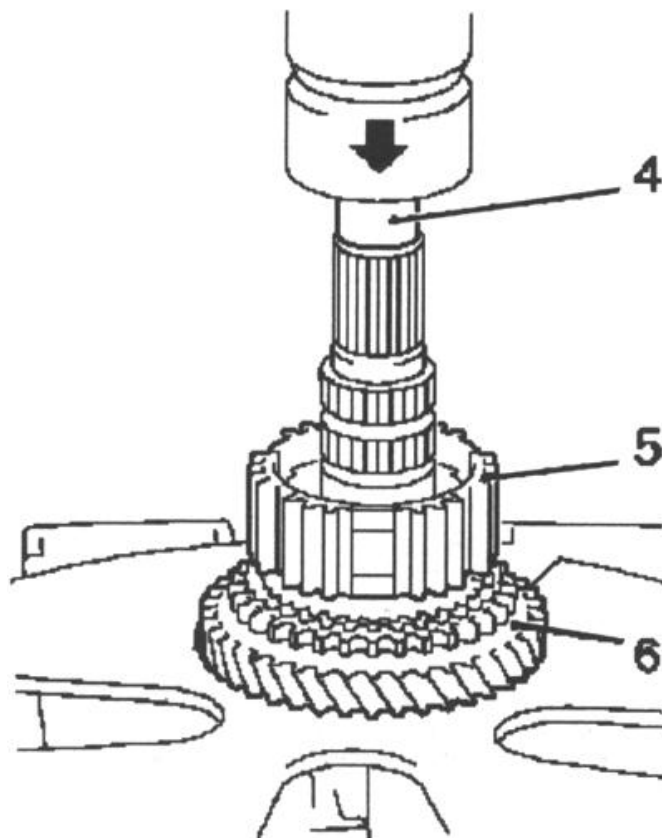
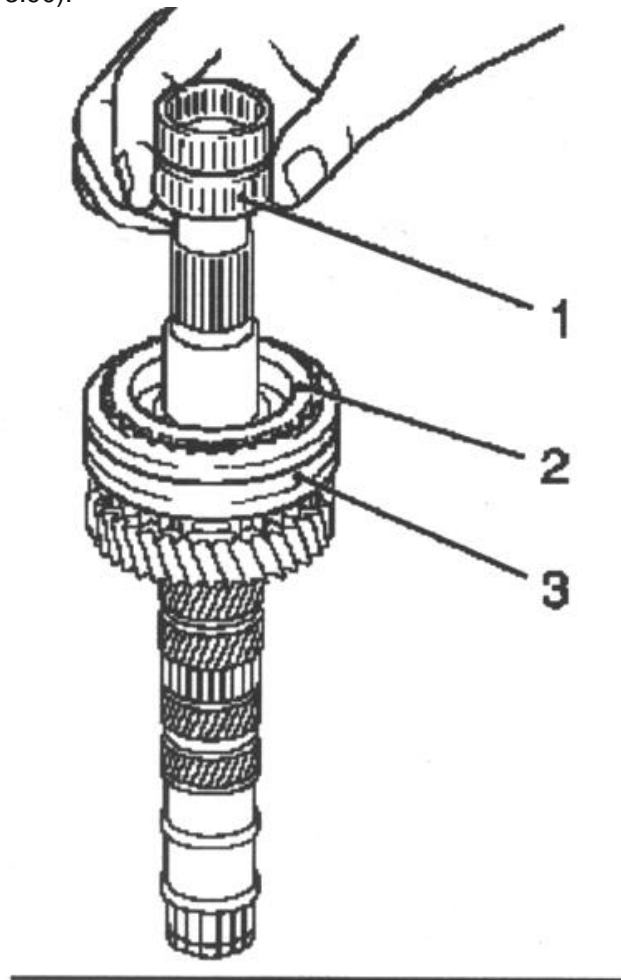


Fig. 3.90. Withdrawal dentate ring 3rd ne-redachi:
1 - needle bearing 2 - gear 4-th transmission;
3 - plug switch, 4 - piercer;
5 - housing synchronizer 3rd / 4 th transmission;
6 - gear 3rd transfer

Compressed body synchronizer 3-y/4-y transmission, synchronizer ring and pinion 3rd transmission main shaft of the relevant beard and a special tool KM-307-B.

Clear all items.

Check all items for damage.

NOTE

Replace damaged nodes.

Setting

Immerse all the elements in the gear oil before installing.

Lubricate all the bearings before installing and supporting surface transmission oil.

Gather Corps synchronizer 1 -y/2-y transmission and 3-y/4-y transmission.

NOTE

Block Corps synchronizer 1 - d / 2 - d transfer and the 3rd / 4 - th transfer mo-Jette is pressed on main Shaft only in assembled state

Set in the housing synchronizer sliding sleeve (Figure 3.91).

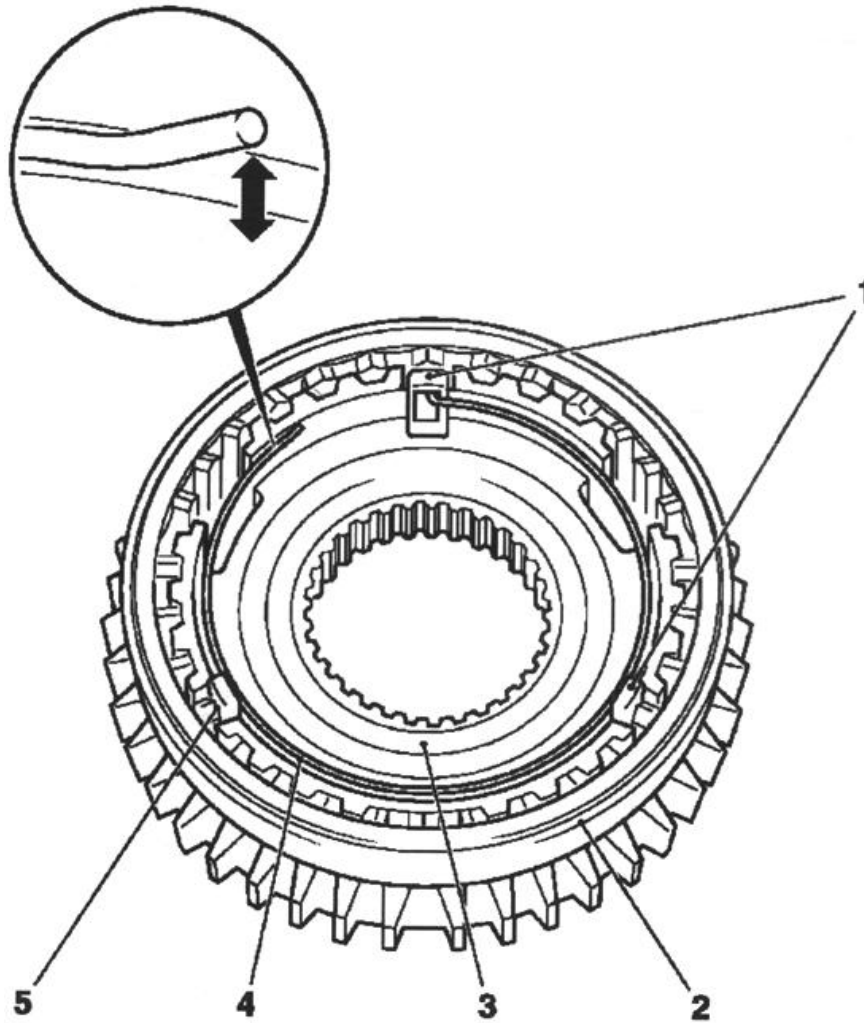


Fig. 3.91. Block Synchronization:

1 - a sliding block, 2 - sliding sleeve;
3 - housing synchronizer, 4 - spring synchronizer;
5 - sliding block

Install 3 sliding block.

NOTE

Set open party to cor-pusu synchronizer.

Install spring synchronizer.

NOTE

Make in that at installation in right position, free end rises with Corps synchro-nizatora (arrow on Figure 3.91). If it not so, turn synchronizer spring 180 ° and re US-establish,. Removed end synchro-nizatora falls in rolling block.

Install gear 3rd transfer to the main shaft.

Install needle bearing gear, 3rd transfer to the main shaft (Fig. 3.92).

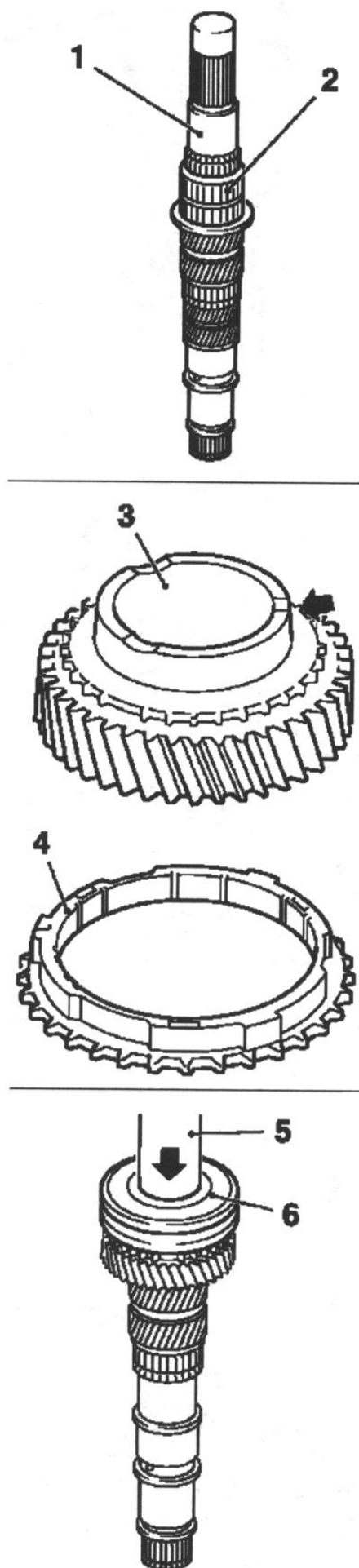


Fig. 3.92. Setting components main Shaft:
 1 - the main shaft, 2 - needle bearing;
 3 - gear 3rd transmission, 4 - Ring sinhranizatora;
 5 - a special tool, 6 - Ring

Install gear 3rd transfer to the main shaft of the drive wheel.

NOTE

Cone (arrow) points in the direction of the driving wheel.

Zapressuyte bloc synchronizer body 3-y/4-y transmission with a special tool KM-277 on the main shaft.
Set synchronizer ring on the cone 3rd transmission.

NOTE

Always replace top gear pairs.

Install gear 4-th transmission to the main shaft (Fig. 3.93).

Install needle bearing, gear 4-th transmission to the main shaft.

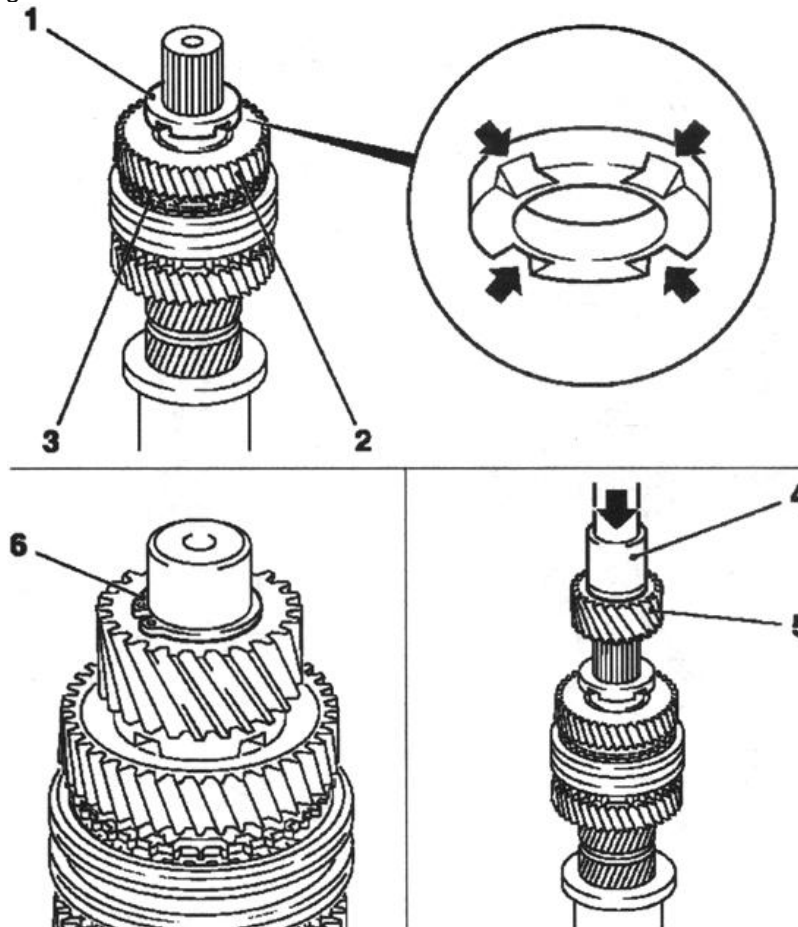


Fig. 3.93. Setting dentate wheels 4 - th transfer on main shaft with hand Leading On wheels:

- 1 - spacing ring 2 - gear 4-th transmission;
3 - synchronizer ring, 4 - a special tool;
5 - a driving wheel, 6 - circlip

Set synchronizer ring on the main shaft.

Set spacing washer on the main shaft.

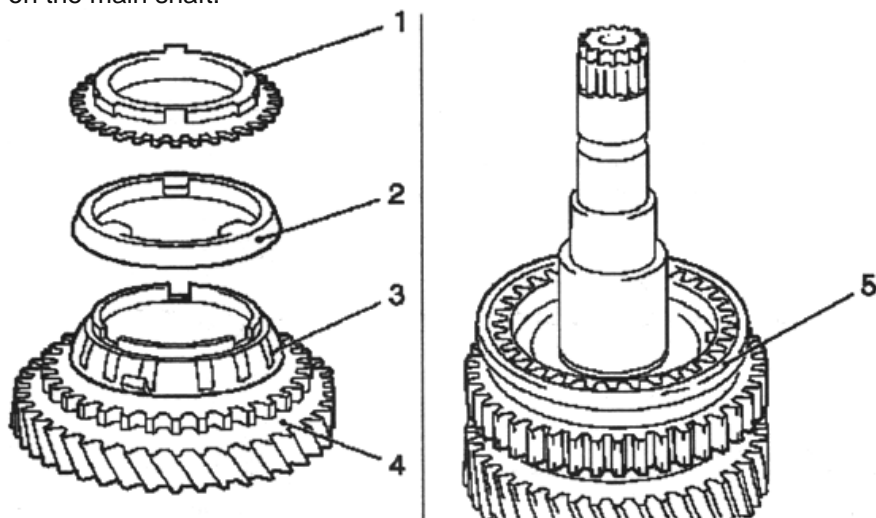


Fig. 3.94. Setting dentate Wheel 2 - j transfer on main Shaft:

- 1 - outer ring synchronizer, 2 - intermediate ring;
3 - inner ring synchronizer, 4 - gearwheel 2 nd transmission;
5 - block housing synchronizer

NOTE

4 groove (arrows on Figure 3.93) turned to toothed wheel 4 - th transmission.

Install drive wheel to the main shaft.

NOTE

Ring drawn to spacer rings.

Zapressuyte drive wheel on the main shaft with a special tool KM-311 -2.

Install retaining ring.

NOTE

Use new retainer ring.

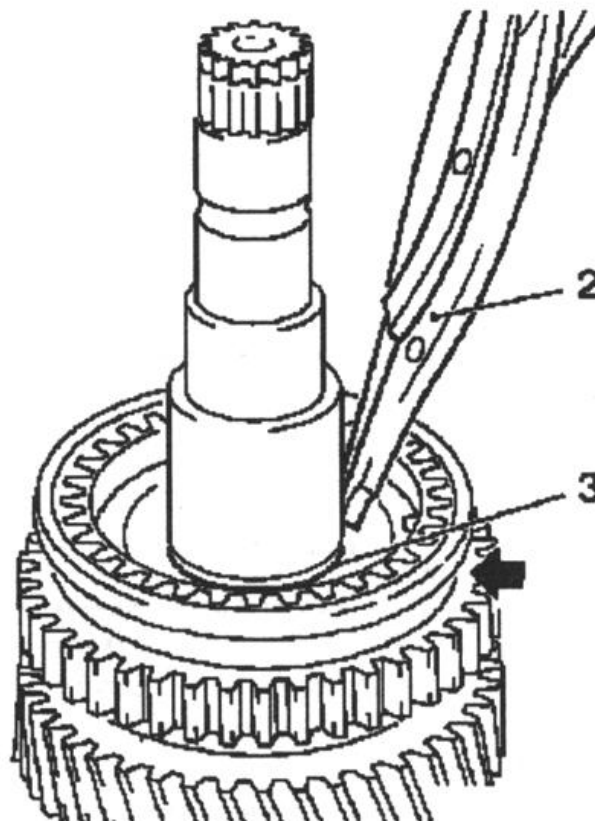
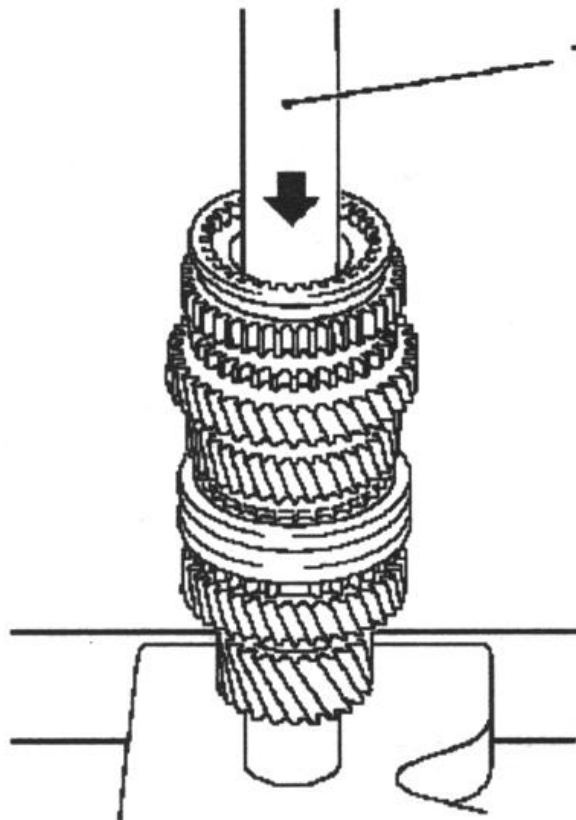


Fig. 3.95. Setting block Corps syn-hronizatora on main Shaft:

1 - a special tool, 2 - tongs for locking rings;

3 - circlip

Install gear 2 nd transfer to the main shaft (Fig. 3.94).
Install the inner ring synchronizer.

NOTE

Projections must be in pas Zech dentate wheel.

Install intermediate ring. Install the outer ring synchronizer.

NOTE

Notches must sit on wards internal ring synchronizer.

Replace the shell on the main shaft synchronizer.

Zapressuyte bloc synchronizer body to the main shaft with a special tool KM-277 (Fig. 3.95).

NOTE

Projections on external ring syn-hronizatora must aligned with grooves in housing synchronizer.

Paz forks gear (arrow in Figure 3.95) facing the ball bearings.

Install snap ring pliers for the locking rings.

NOTE

Use new retainer ring.

Install outer ring synchronizer (Figure 3.96).

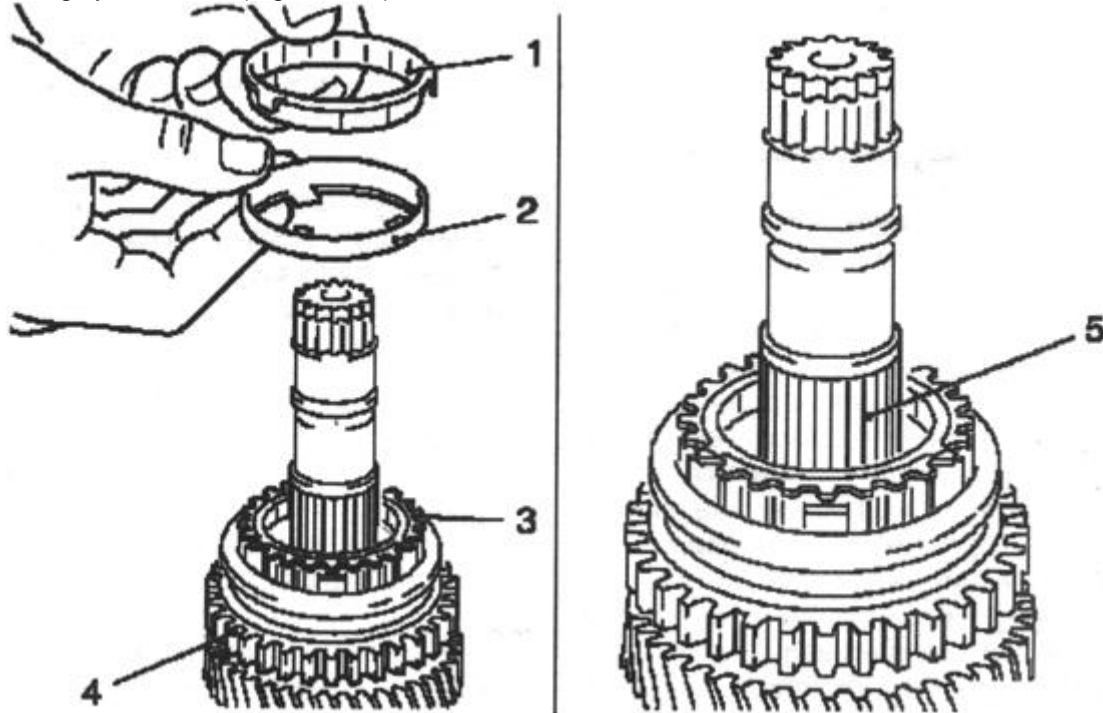


Fig. 3.96. Setting Rings synchronizer:

- 1 - inner ring synchronizer, 2 - intermediate ring;
3 - outer ring synchronizer, 4 - body synchronizer;
5 - needle bearing 1-th transmission

NOTE

Projections must be in pas Zech Corps synchronizer.

Install intermediate ring.

Install the inner ring synchronizer.

NOTE

Projections must be in pas Zech external ring synchronous deadlock.

Install needle bearing 1-th transmission to the main shaft (Fig. 3.96).

Install 1-S transmission (Fig. 3.97).

NOTE

Notches must sit on overhangs intermediate ring.

Install axial needle bearing.

Set spacing washer.

Install a new circlip.

Zapressuyte ball bearing on the main shaft with a special tool KM-334 (Fig. 3.97).

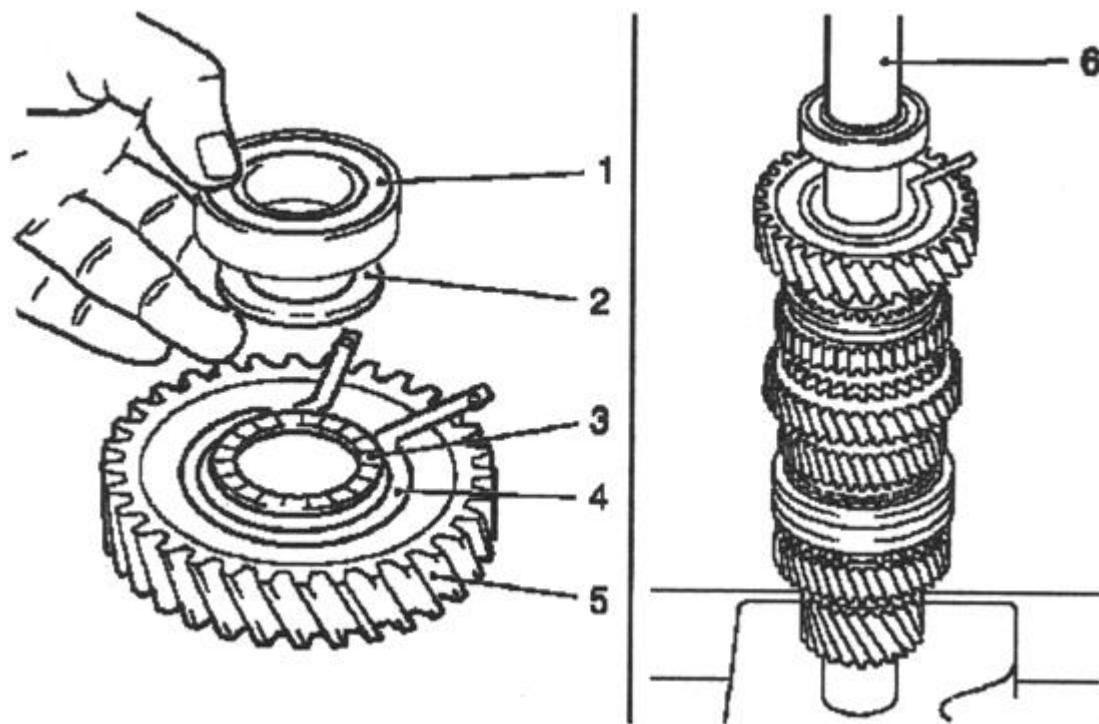


Fig. 3.97. Installation 1 - th transfer:

1 - ball bearing 2 - spacing ring;
3 - Axial needle bearing, 4 - a new retaining ring;
5-1-I transmission, 6 - special tool

Replace the back cover with new gasket on the transmission housing, a car Opel Astra.

Tighten the 4 bolts M7 moment 15 Nm.

Tighten the 5-bolt M8 moment 20 Nm.

Install the front axle housing.

Tighten the switch reversing lamps moment 20 Nm.

NOTE

Use new uplotnitelyyue ring.

Replace the cover gearbox.

Check the fluid level in the gearbox.

2.15 Automatic Transmission

General information

Automatic transmission serves as a seamless integration with the clutch when starting place and the best gear when driving a car Opel Astra.

Automatic box equipped with four driven gears to move forward. The third and fourth gears when locked coupling can be switched mechanically bypassing the torque converter.

The main units of the automatic transmission are as follows:

- Hidrotrasformator that transfers torque from the engine to the gearbox. Blocking allows you to bypass the torque converter clutch and mechanically switch the third and fourth gears;
- Planetary gearbox.

Is a mechanical unit of automatic transmission, with which by the continuous engagement of gears and brakes and the interaction of the satellites can change gear almost without breaking the flow of power;

- Controlled oil pressure multi-disk clutches and brakes, as well as band-brake can without breaking the flow of power to establish the necessary gear ratios and stop the rotating parts. In contrast to the clutches, brakes attached to the gearbox housing;

- Oil pump and the radiator;

- Freewheel to optimize load transfer;

- The main channel;

- Electronic control system with a hydraulic control unit for automatic transmissions. The control unit performs the gear shift. Element

mi affecting the work of the control unit are the sensor throttle position and engine speed sensors, speed of the output shaft gear, oil temperature in the gearbox, etc.

Table 3.4. Troubleshooting the drive wheels, their causes and solutions

<i>Possible causes of malfunction STI</i>	<i>Method remove</i>
Disposed in the side car	
Seized ball joint shaft drive wheel	Replace hinge
Depreciation, beating or seizing of a bearing hub	Replace bearing
Violation of the angles of adjustment of the wheels, defective front suspension and steering	Adjust or replace worn or damaged parts
Vibration	
Wear, damage or deformity of the shaft wheel drive	Replace shaft
Beating shaft drive wheel and scratches in the HUB	Replace
Depreciation, beat or bully in the bearing hub	Replace
Front wheel shimmy	
Imbalance wheels	Balance the wheel or replace
Violation of the angles of adjustment of the wheels, defective front suspension and steering	Adjust or replace worn or damaged parts
Noise, noise from the front wheel when driving a car	
Wear, damage or deformity of the shaft wheel drive	Replace shaft
Beating shaft drive wheel and scratches in the HUB	Replace
Beating shaft drive wheel and scratches on poluosevoy gear differential	Replace
Depreciation, beating or seizing of a bearing hub	Replace
Loosening nuts hub	Tighten or replace the nut
Violation of the angles of adjustment of the wheels, defective front suspension and steering	Adjust or replace worn or damaged parts

2.16 Clutch - Torque

The vehicles Opel Astra establish different torque converters. They are marked on the butt end, which indicates the compatibility of the transformer with a gearbox is the same markings.

Torque is located between the engine and gearbox, for transferring torque from the engine to the box through the hydrodynamic flow motion of the working fluid.

The engine drives a torque converter oil pump. Impeller, which is also housing the transformer, converts the energy of the engine to kinetic energy of the working fluid, which acts on the turbine wheel.

Pump and turbine wheels rotate at different speeds. So, for example, when moving from place transformation ratio is very high, and then with increasing speed of the turbine wheel, he goes down. However, even at high speeds there is a certain "slip" of the liquid. Even at high speed the engine crankshaft to the shaft frame is transmitted only 85% of torque. Therefore, engines, equipped with automatic transmission, spend a bit more fuel than engines with a manual. This drawback is eliminated with the help of the locking clutch.

2.17 Clutch – Gear Main channel

Transmission converts engine torque, which is a small and large gears main gear is transmitted further. Most gear is fixed to the housing main gear. Drive shafts connecting the transmission with semi wheels. The main gear with the gearbox mounted in one housing.

There also are four related to each other bevel gear (differential), two of which are connected to the diversion (cardan) shaft, which in turn transmit torque to the drive wheel of the car. Installed on the shafts of constant velocity joints (such as "tripod") provide the necessary transfer of torque at varying angles of inclination shafts.

During straight-line motion on a perfectly smooth surface, both wheels have the same rotational speed equal to the speed main transmission. Differential rotates with the same speed, and conical gears are in a state of rest. When turning or hitting on the uneven one wheel is greater distance than the other. In this case, comes into force differential that distributes torque between the wheels and allows the driven shafts to rotate with different angular velocities.

2.18 Clutch - Adjust the cable selector switch automatic transmission

Lift and set the car on stands or on the observation pit.

Selector set to position "P".

Squeeze the top ball-bearing rope from the axis of the selector switch.

Switch the selector from the position "P" in position "1". This drive should be easy to navigate. Otherwise, replace the cable.

Switch the selector to position "P". This should be enabled parking lock, front wheel should not rotate. In this position the cable selector should be no effort to press on the lever axis switching. Otherwise Perform adjustment of the cable.

Switch the selector to position "P".

Click on the axis of the switch in the gearbox in the rearmost position. Blocking parking should be fixed.

Few loosen the bolt 3 supports a gear. Pull the prop so that the cable can be free to push on the lever axis switching. In this position, tighten the bolt the moment 25 Nm.

Go through to the car and check the action selector. The engine can be started only in the position of the selector "P" and «N».

Turn on the ignition. At stationary car selector should be evacuated from the provisions of "P" or «N» only when simultaneously pressed the brake pedal.

2.19 Propulsion mechanism. Clutch - Drive Mechanism

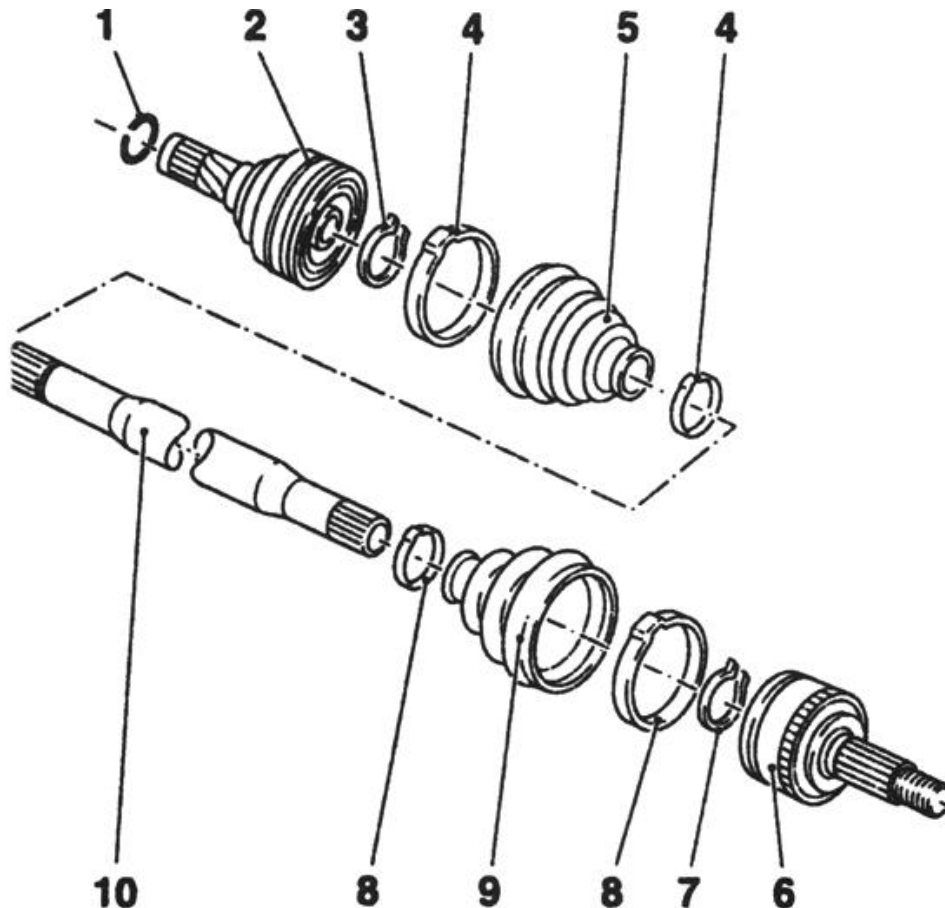


Fig. 3.98. Drive shaft with CV Joints double Compensation:

- 1 - snap ring, 2 - inner constant velocity joints;
- 3 - internal circlip hinge; 4 - Mounting clamp;
- 5 - anthers, 6 - outer constant velocity joints; 7 - internal locking ring joint;
- 8 - Mounting clamp; 9 - anthers; 10 - drive shaft

General information

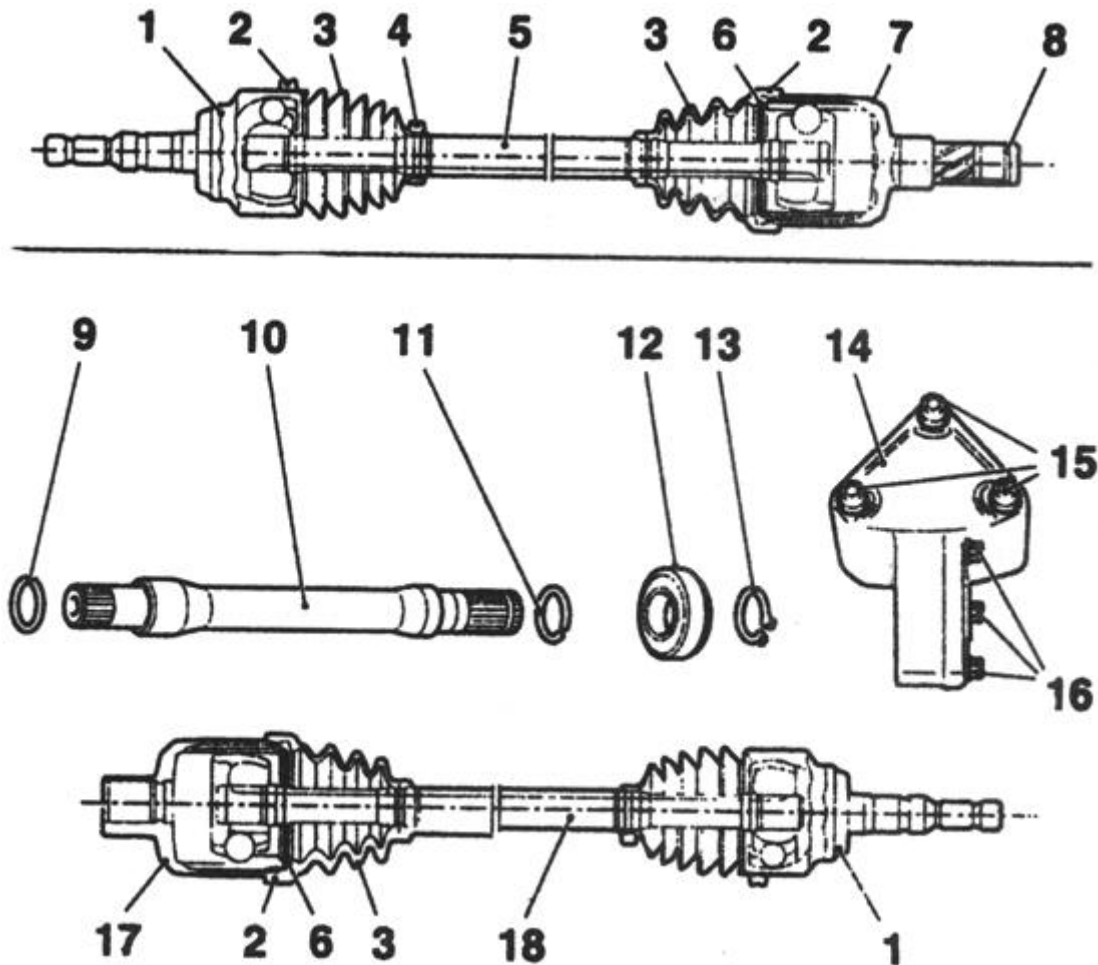
Drive shafts transmit torque from the engine, gearbox and differential on the front wheels. In the transmission housing, drive shafts are mounted splines with poluosevymi gear differential. Spline Fixing the tip of the internal hinge shaft in poluosevoy gear is carried by a spring circlip. When installing the retainer ring is compressed, entering into the groove of the shaft. After, that as the shaft will be completely installed in poluosevuyu gear differential, locking ring decompressed and fixes splined tip of the axial displacement. Outside hinges are attached to the drive shafts of front wheel hubs mounted on the bearings. A shaft is fastened to the hub nut.

On the drive shaft from the differential set universal joint-velocity (CV Joints) tripodnogo type, providing a low level of vibration.

Constant-velocity joint (CV Joints) are protected by rubber covers, which are fastened with clamps and protect from water and dirt.

Carry case must periodically inspect for the presence of traces of damage, leakage of the lubricant or cuts. Damaged covers CV Joints must be immediately replaced by new ones, otherwise the constant velocity joints can be damaged. Replacing the cover includes the operation of removing drive shafts. The signs of wear or damage to the constant velocity joints, in addition to leakage of the lubricant, are snapping when moving and turning, the roar when accelerating after a motion by inertia or vibration at high speeds on the highway.

2.20 Strength - Measurement of radial and lateral runout of the bearing wheels



Drive shaft with Internal CV Joints tripodnogo type and intermediate va-scrap:

- 1 - outer constant velocity joints (double compensation); 2 - Mounting clamp;
- 3 - anthers 4 - Mounting clamp, 5 - left drive shaft;
- 6 - circlip hinge; 7 - inner tripodnogo type constant velocity joints;
- 8 - snap ring, 9 - O-ring;
- 10 - intermediate shaft; 11 - locking ring;
- 12 - supporting bearing intermediate shaft; 13 - locking ring;
- 14 - intermediate support 15 - fixing bolts intermediate support;
- 16 - fixing bolts flange intermediate shaft;
- 17 - inner CV Joints tripodnogo type (with slots for intermediate shaft);
- 18 - The right drive shaft

Withdrawal

Remove the rear wheel of a car Opel Astra.

Remove the brake disc or brake drum.

Attach special tool MKM-571-B with the bracket clock type indicator and a magnetic holder to the brake shield or cover (Fig. 3.100).

Install sensor type indicator hour in front of the outer edge of the bearing wheels.

Set an indicator on the "O".

Slowly turn the wheel bearing.

Measure the radial run.

Allowable lateral beating is: 0,04 mm.

NOTE

If value different from raised-tion, replace bearing wheel.

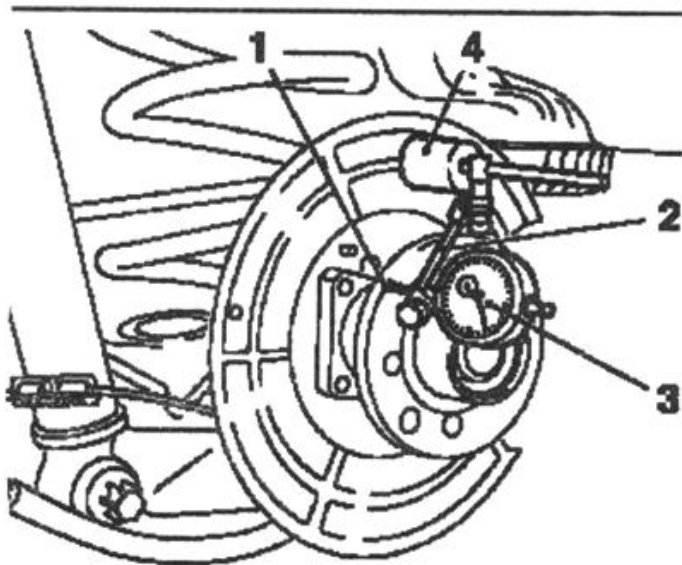
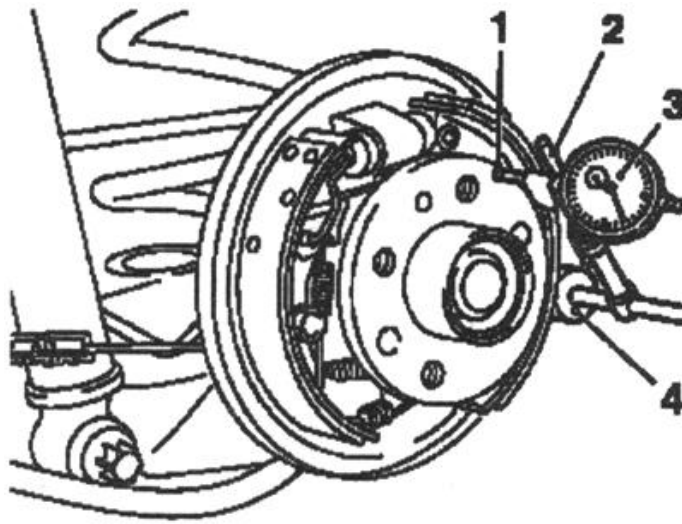


Fig. 3.100. Measurement radial Bie-tion:

1 - The clock display type sensor 2 - LED clock type;

3 - a special tool, 4 - magnetic holder

Install special tool MKM-571-B (3) The clock display type, the bracket (1) and a magnetic holder (2) on the brake shield.

Install sensor type indicator hour front wheel bearing (as shown in Figure 3.101).

Set an indicator on the "O".

Slowly turn the wheel bearing.

Measure the lateral separation.

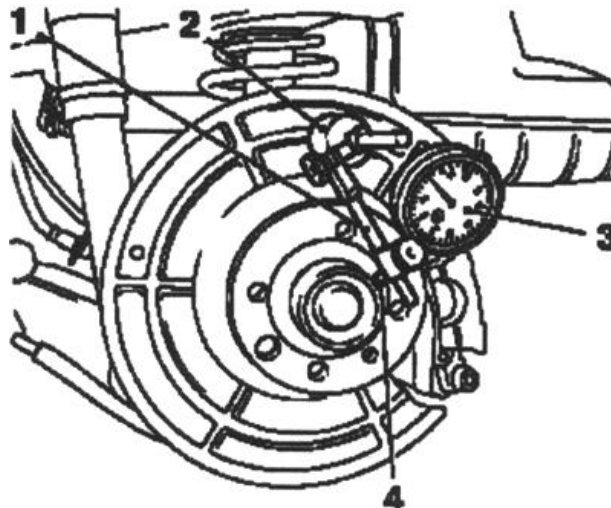


Fig. 3.101. Measurement lateral beats:

1 - Bracket 2 - magnetic holder;

3 - a special tool, 4 - sensor type indicator time

Allowable lateral beating: not more than 0,05 mm.

NOTE

If value different from raised-tion, replace bearing wheel.

Setting

Remove the special tool MKM-571-B with bracket clock type indicator and a magnetic holder.

Install the brake disc or brake drum.

Install the rear wheel and tighten the bolts fastening point 110N-M.

2.21 Strength inclined gap block - Measurement of oblique gap block bearing

NOTE

If on Installed wheel is appreciable gap measure as specified below.

Withdrawal

Remove the appropriate rear wheel.

For Opel Astra car with drum brake mechanisms: remove the brake drum.

Attach special tool KM-468-B of the wheel hub (see Figure 3.102).

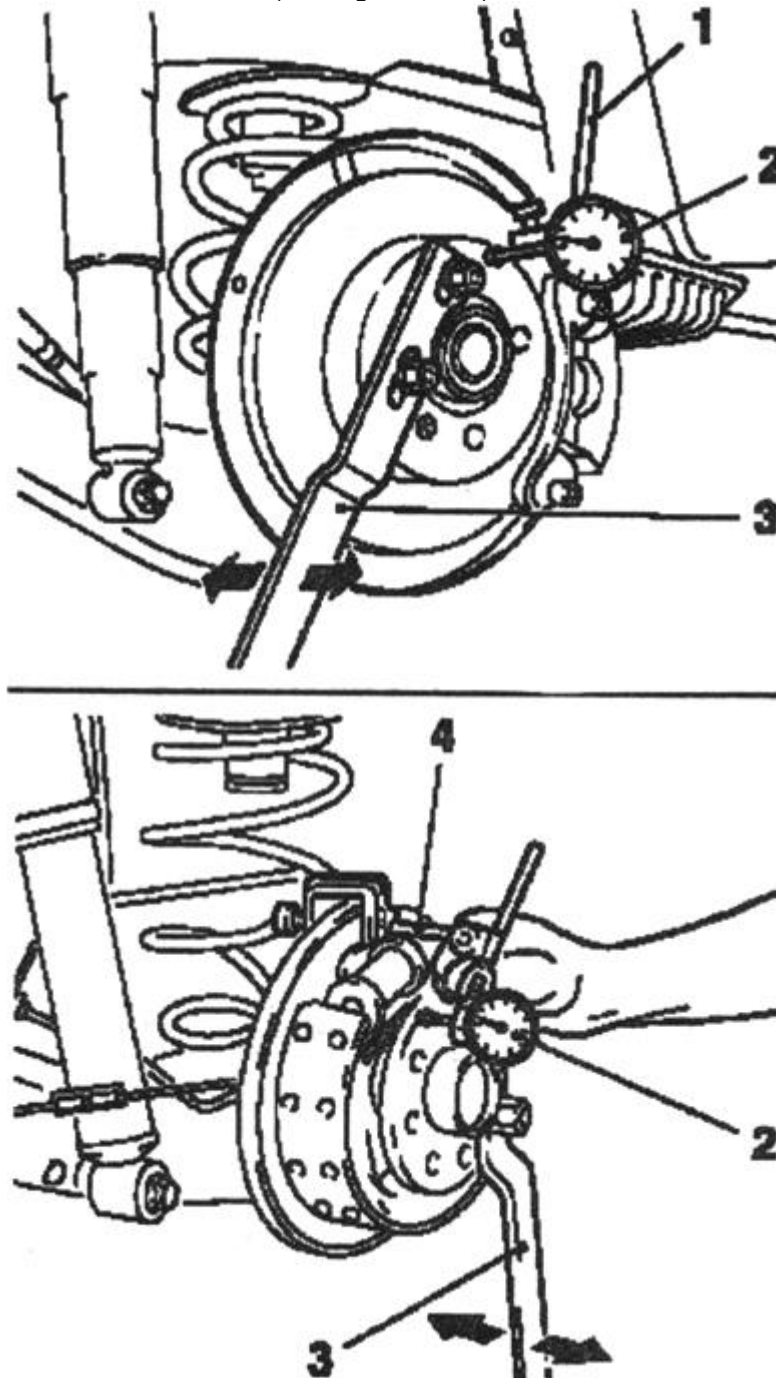


Fig. 3.102. Measurement oblique zazo-ra block bearing:

1 - magnetic holder, 2 - a special tool;

3 - Bracket 4 - special tool

Attach special tool MKM-571-B, to the brake calipers or backplate brake mechanism with a magnetic holder, or bracket.

Replace the sensor if a special tool MKM-571-B on the outer edge of the brake disc or wheel bearing.
Check the clearance of raising a little bit special tool KM-468-B.
The maximum permissible slope of the gap: 0,1 mm.

NOTE

If it value exceeded, replace bearing wheel.

Setting

Remove the special tool MKM-571-B with duplex or magnetic holder.

Remove the special tool KM-468-B.

For cars with drum brake mechanisms: Set the brake drum

Install the rear wheel, tighten the bolts fastening the moment 110 Nm.

2.22 Installing shaft wheel. Clutch - Removal and installation of roller wheel

Withdrawal

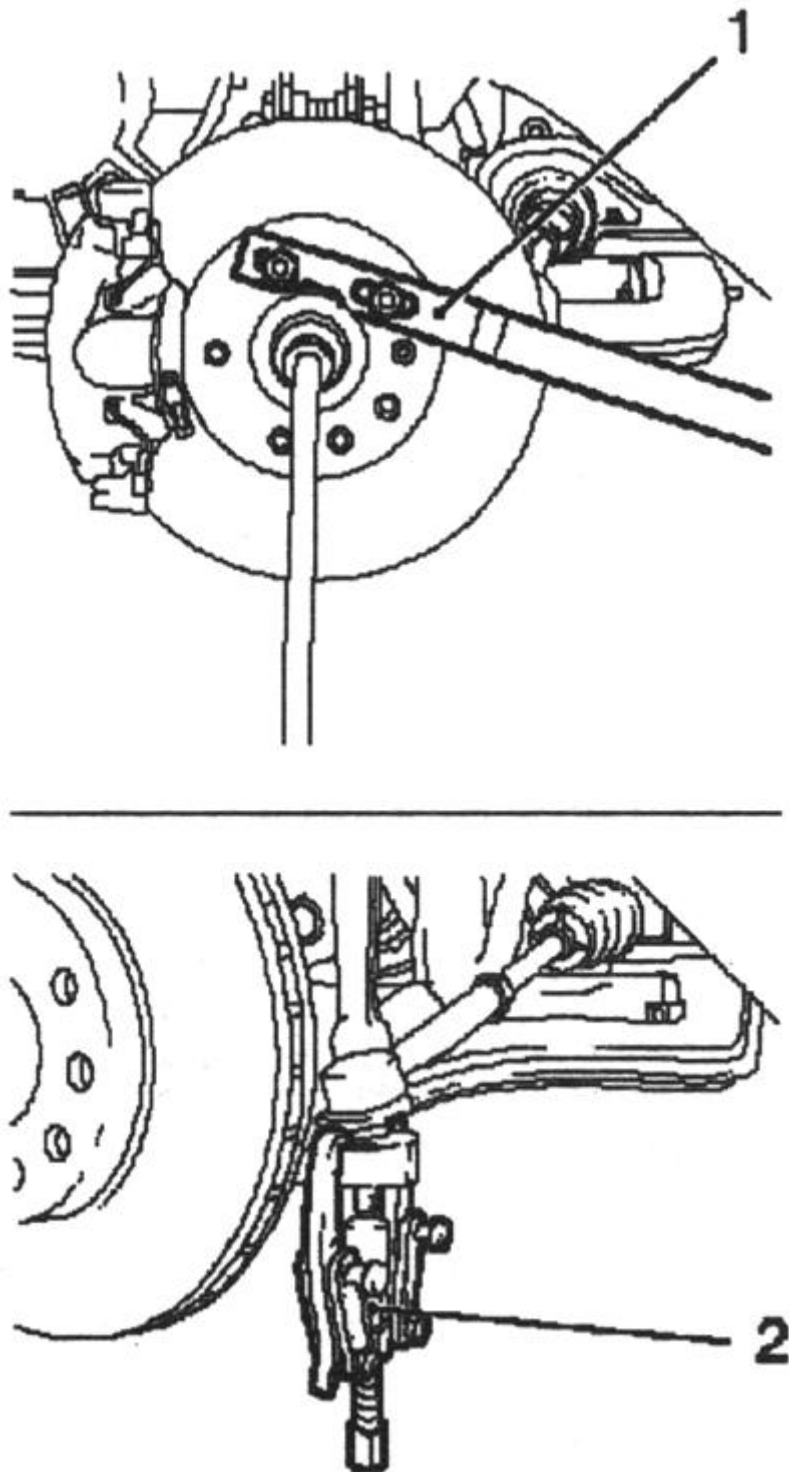


Fig. 3.103. Extrusion steering traction of Rotation fist:

1,2 - special tool

Remove the corresponding front wheel.
Disconnect the wheel shaft of the wheel hub.

Unscrew the nut on the shaft of the wheel.

Hold with a special tool KM-468-B on the front wheel hub (see Figure 3.103).

Remove the steering pull to the steering knuckle, remove the nuts.

Vypressuyte steering thrust of the steering knuckle, using a special tool KM-161-In conjunction with a device KM-161-2 (Fig. 3.103).

Disconnect the brake hose from the pipe supporting spring rack.

Remove the strap.

Disconnect the brake hose from the bracket.

Disconnect the swivel lever (1) of the supporting spring tube rack (Fig. 3.104).

Hold for Lyskov open wrench.

Remove the hinge from the steering knuckle, unscrewing bolts.

Take the steering knuckle using special tool KM 915 (Fig. 3.104).

Remove the joint from the steering knuckle.

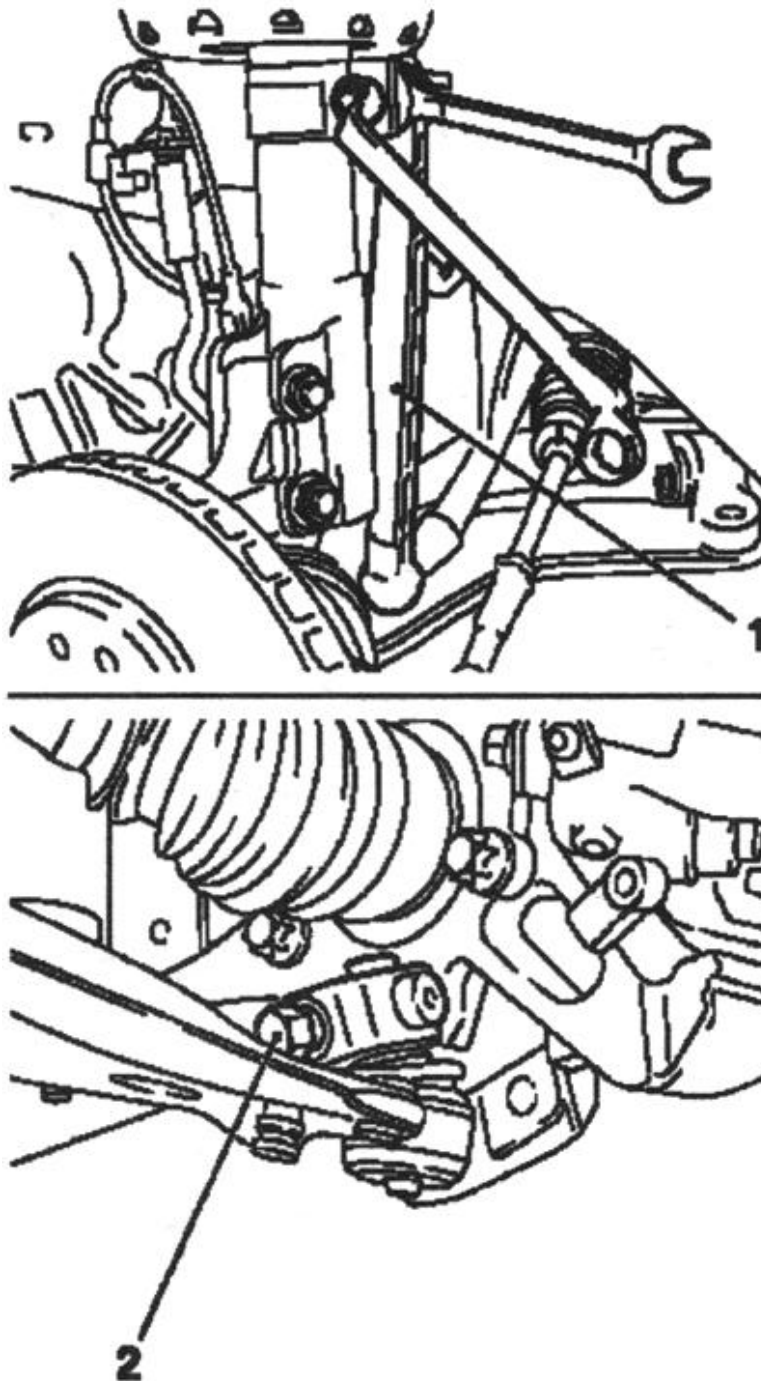


Fig. 3.104. Disconnecting rotary lever from supporting pipe pru-zhinnoy Rack:

1,2 - special tool

Squeeze the shaft of the wheel hub of the wheel.

NOTE

When This Take turning ku-lak outside use in necessary puller wheel hub.

Remove the bottom cover of the engine compartment

Remove the wheel drive shaft of the gearbox and surmount it with an intermediate shaft (Fig. 3.105).

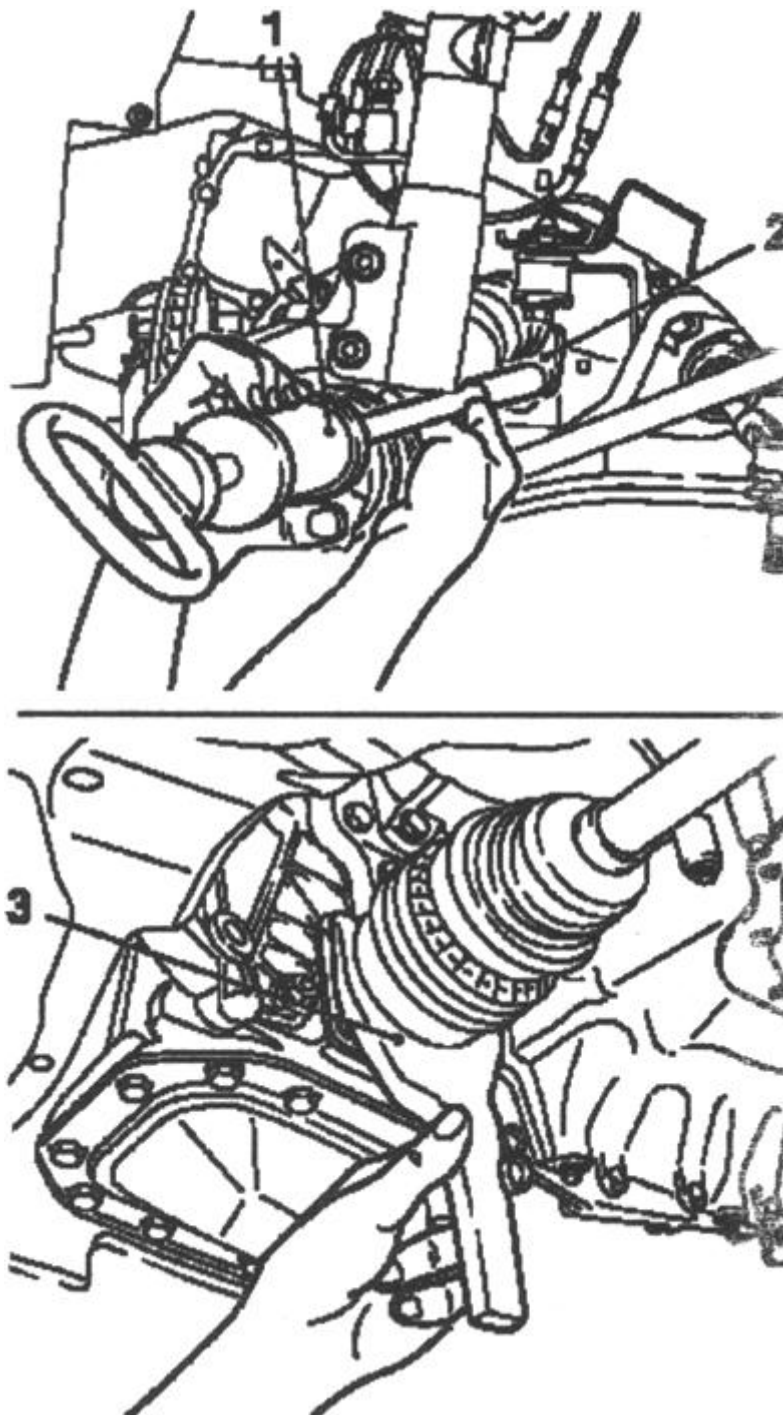


Fig. 3.105. Extract shaft wheels:
1, 2, 3 - special tool

NOTE

Collect the oil in a pan and close the hole plugs.

Observe the orderly handling of the shaft wheel.

Setting

Install wheel shaft in the gearbox.

Install a new circlip on the shaft wheel.

Cover the slots and supports oil for gearboxes

Install wheel shaft in the gearbox, Drive in a gear box with a rubber hammer and *potskodyaaschd* soft metal beard (Fig. 3.106) until it snaps into the locking ring.

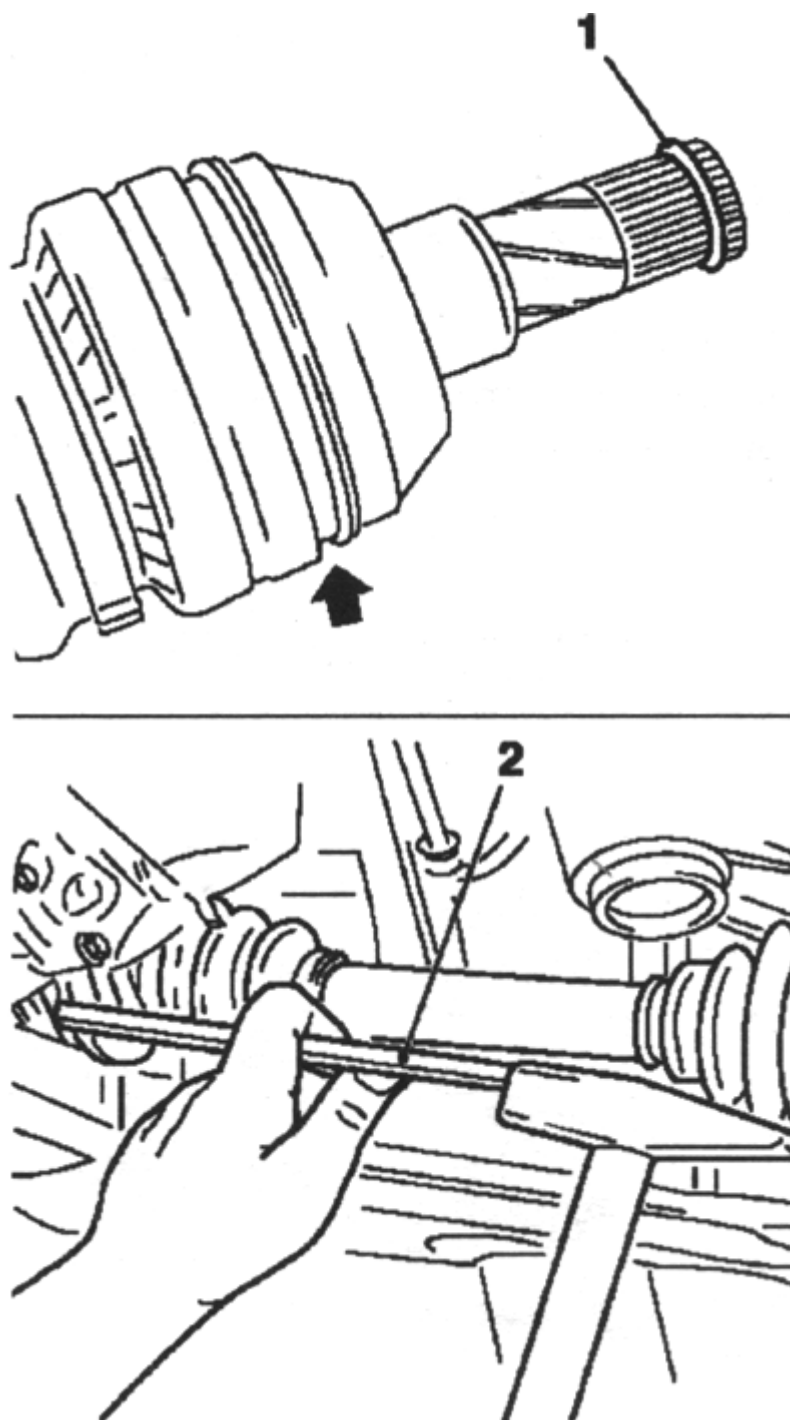


Fig. 3.106. Setup stopping ring:

1 - snap ring, 2 - piercer

In the Opel Astra car with an intermediate shaft - set the wheel shaft to the intermediate shaft.

Replace the retaining ring on the intermediate shaft.

Secure the right wheel drive shaft on the intermediate shaft.

NOTICE

Watch for so that not damage slots, zapressuyte intermediate-tion shaft using suitable soft metal beard before lock stopping the ring (Fig. 3.106).

Install shaft wheel in the wheel hub.

Attach the hinge to the steering knuckle and tighten the moment 50 Nm.

Use new nut.

Attach a swivel arm for supporting the pipe rack and tighten the spring point 55 nm.

Use new nut.

Hold for Lyskov open wrench.

Attach the steering pull to the steering knuckle and tighten the moment $30\text{nm} + 90^{\text{to} +15}$

Use new nut.

Attach the brake hose to the pipe supporting spring rack.

Install the brake hose bracket to the supporting tube spring rack.

Secure the strap.

Install shaft wheel in the wheel hub and tighten the moment of 150 Nm, loosen at 45° , and then tighten the moment of 250 Nm.

Use new nut.
Hold with spetsal-tion tool KM-468-B for the wheel hub.
Install the front wheel and tighten the bolts fastening point 110N-m.
Check the fluid level in the gearbox.

2.23 Internal hinge. Clutch - Replacement of internal velocity joints

NOTE

Internal hinge equal angular velocity not be repair and in case Released his of system, over-lay replace hinge in assembly.

Attach the drive shaft in a vise with soft sponges (Fig. 3.107).

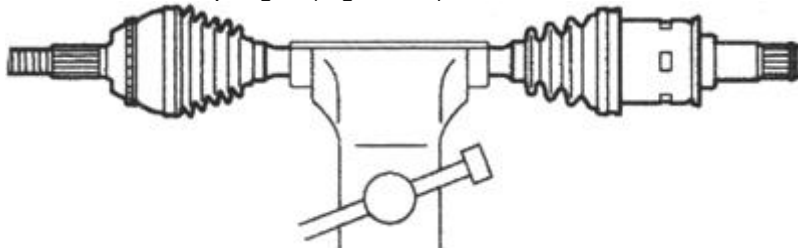


Fig. 3.107. Mounting drive shaft vices

Using special pliers for removing spring locking ring, remove the circlip from the end of the internal velocity joints (Fig. 3.108).

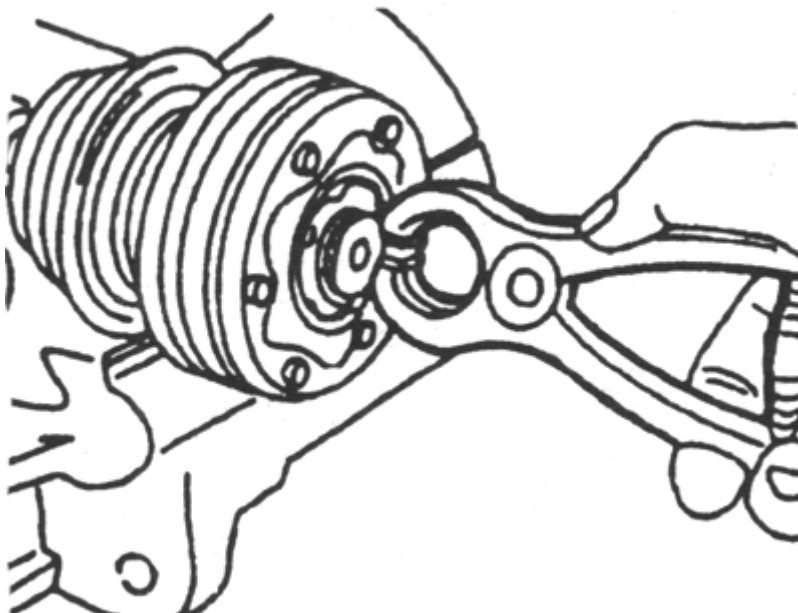


Fig. 3.108. Withdrawal stopping ring

Using the mandrel, surmount the protective cover from the hinge (Fig. 3.109).

Mandrel must in turn be installed in various points around the perimeter of the shell to his uniform withdrawal. Slide the protective cover of mid-shaft.

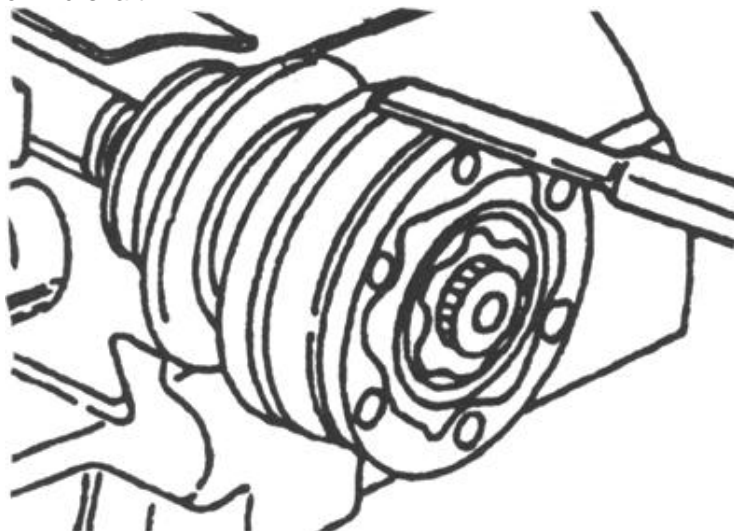


Fig. 3.109. Withdrawal protective cover

Mount the hinge in a vise, then remove from the drive shaft. If the drive shaft can not be extract from the joint, the joint is set into a press and using the device, squeeze from the drive shaft (Fig. 3.110).

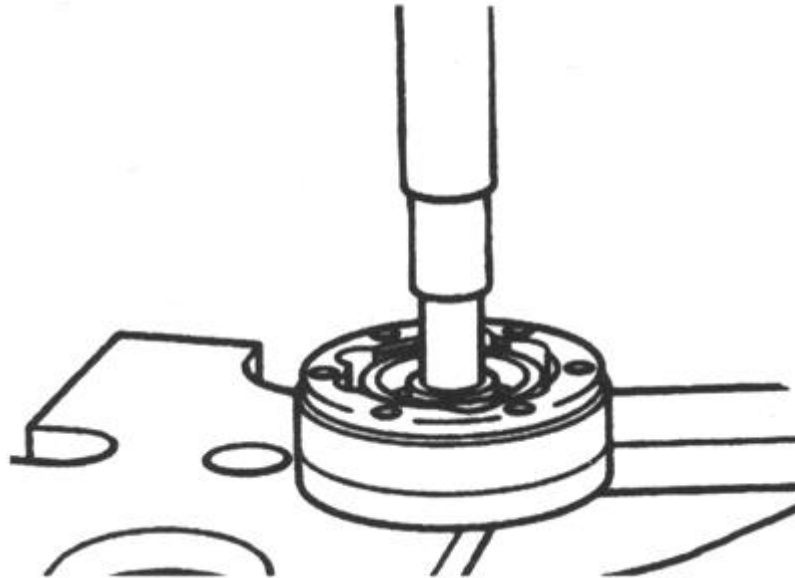


Fig. 3.110. Extract drive shaft of Hinge

Remove the drive shaft disc springs washer, pre-noting its position. Washer has slots, and the convex side of the washer is on the part of the hinge.

Before installing the new hinge thoroughly clean the drive shaft.

Install a spring plate washer on the shaft so that the convex side of the puck was at the hinge, and the internal splines compatible with the puck shaft splines.

Mount the joints of equal angular velocity in a vise with soft lips and insert the drive shaft. If the shaft is not included in the hinge, zapressuyte hinge on the shaft on the press, with the shaft bottom must rely on the support (Fig. 3.111).

Set the groove shaft new spring-loaded locking ring.

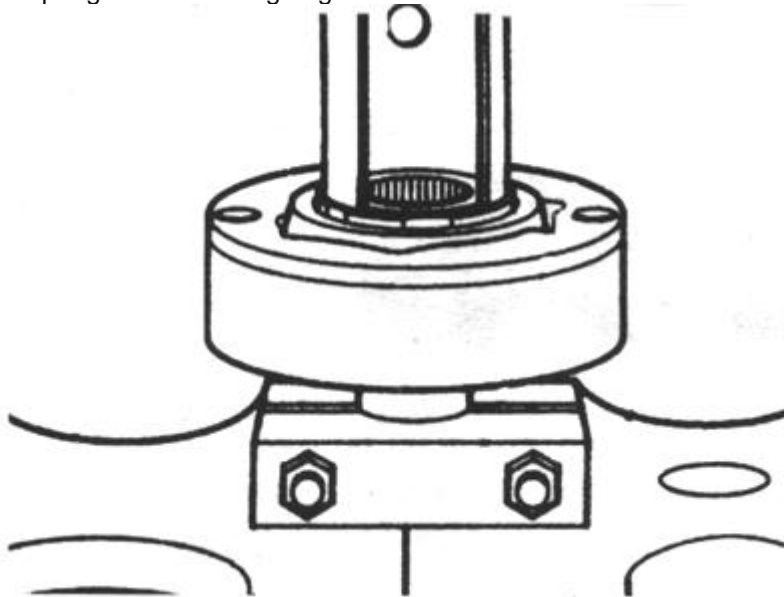


Fig. 3.111. Mounting shaft in hinge

Fill the inner hinge 120 grams of lubricant, with one half of lubrication in the joint mortgage on the one hand, and the second half - the other side.

Replace the protective cover. Before mounting a protective cover with clamps, screwdriver, lift the inner edge of the cover, to equalize the air pressure under the cover.

2.24 External hinge. Clutch - Replacement of external velocity joints

Remove the clamps mount a protective cover and slide the cover to hinge on the driving shaft.

Thoroughly clean the inside of the hinge and remove the spring-loaded locking ring on the inside hinge.

Attach the drive shaft in a vise with soft sponges and aluminum or copper with a hammer Destroy hinge shaft (Fig. 3.112).

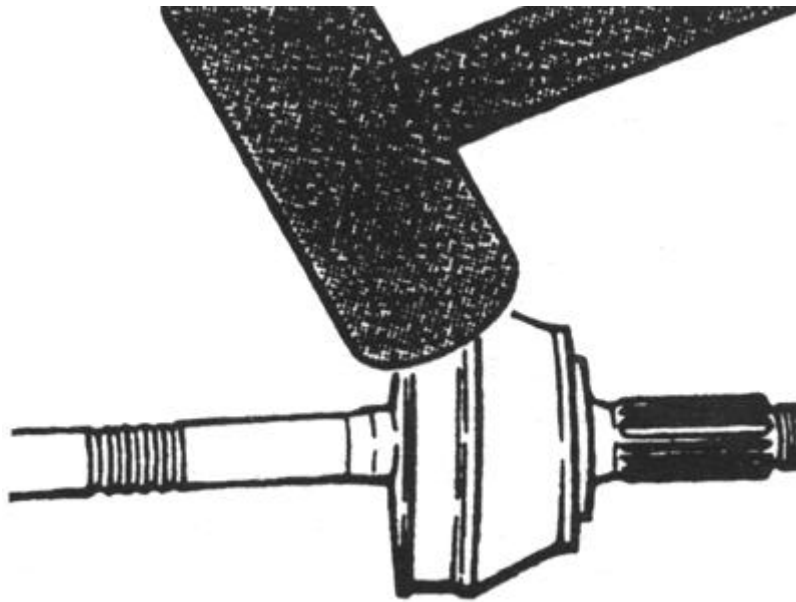


Fig. 3.112. Withdrawal Hinge with shaft

Remove the spring-loaded locking ring, gasket and plate washer from the end of the shaft car Opel Astra.

Fill the inner hinge 90 grams of lubricant.

Install the drive shaft plate washer, convex side to the hinge.

Install the new drive shaft, spring-loaded locking ring, secure the shaft in a vise with soft lips, and an aluminum or copper hammer nabeyte hinge on the drive shaft, and the retaining ring must clearly fall into the groove on the inner side of the hinge.

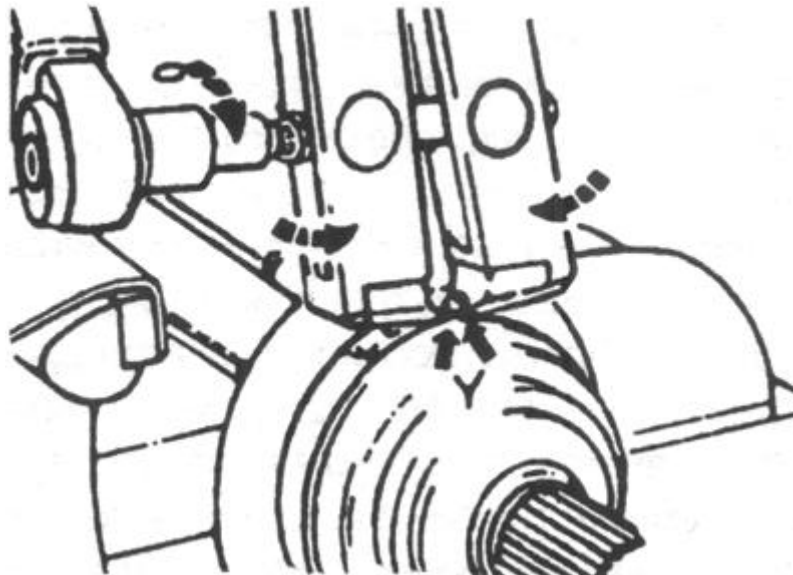


Fig. 3.113. Mounting clamps

Replace the hinge protective cover and secure it with clamps, screwdriver, lift the inner edge of the cover, to equalize the air pressure under the cover. For mounting clamps must use a special tool (see Figure 3.113).

Sponge tool set at the corners of clamp time, and in this position tighten the screw sponges.

2.25 Clutch - Dismantling the outer constant velocity joints

Mark the position of clips and body joint. Turn the hub joint in the body and pull each ball. Tie balloons in the order of removal, for subsequent re-installation in the original position.

Turn the cage pivot, so that two rectangular slits were combined with the shell, then remove the separator and the clip (Fig. 3.114).

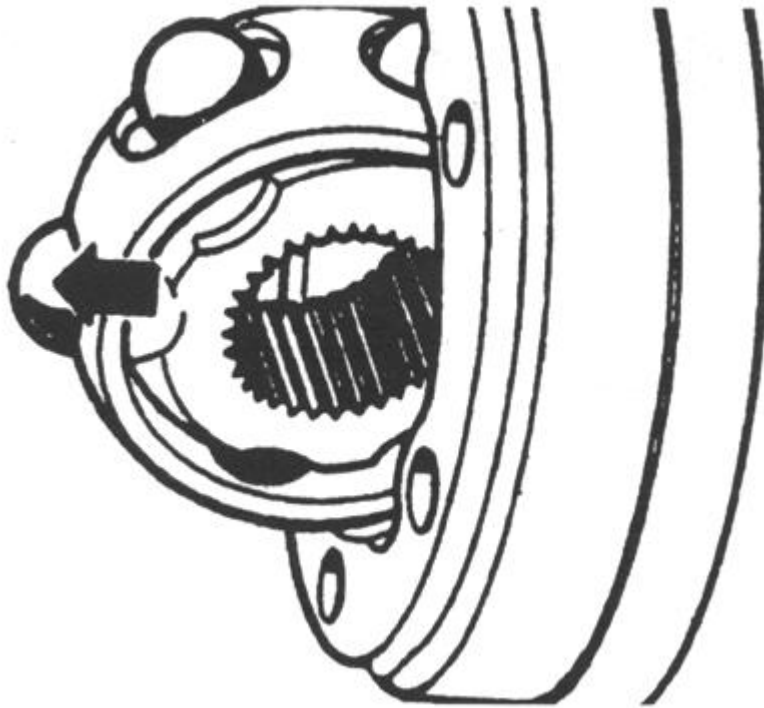


Fig. 3.114. Extract balls

Rotate the clip in the cage so that one part of the clips came in one of the rectangular slit in the cage, turn the clip and remove it (Figure 3.115).

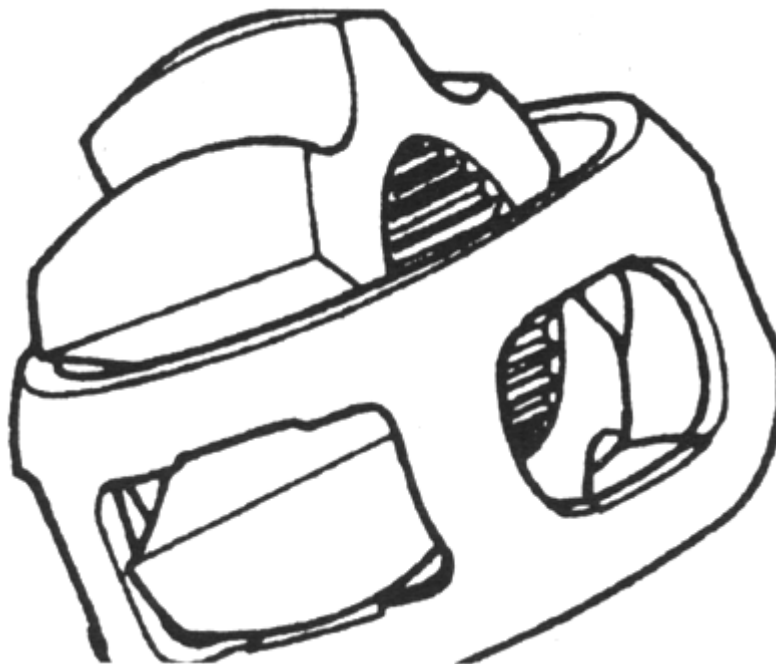


Fig. 3.115. Removing the separator and clips

Clear all the details of joint and check their status. If there are signs of wear or corrosion, replace the hinge.

Apply 45 grams of body joint, then set the separator with an internal clamp into the body joint. Successively insert the balls into the clip, and check that the clip in the cage and the body established in the initial position (as previously made mark). Install a new circlip, then push in the remaining half of the joint lubrication (45 grams).

3 CHASSIS

General

Suspension - a link between body and wheels. Through her body sent forces acting on the wheel. The suspension is to reduce the dynamic loads, reducing the volatility of the body, soften the blows of the wheels on uneven roads, provides stability and smoothness of the car Opel Astra.

Front suspension consists of a steering knuckle, racks, springs and levers.

The lever swings on the body. In the lower lever used rubber bushing. The upper end of the rack is fixed on the body and consists of a bearing, allowing the wheel turns.

The lower part of the swivel pin mounted on a ball joint which is connected to a lever with bolt. When servicing mounting arm to the body and the insulator of the stabilizer of the body, make sure that the mounting bolts

loosened so that the lever in rolling to get to the upper limit of the amplitude of the rolling, which is also a normal position, which moves the lever when the vehicle is on earth.

Table 4.1. Potential problems, their causes isposoby address

Possible reason failure	Method remove
Preliminary test	
Check the tire pressure and tire wear uniform	Bring to a desired tire pressure
Check on the weakening or deterioration of the hinges of the steering shaft to the intermediate shaft	Tighten the banjo bolt connecting flange
Check on the weakening or deterioration of the hinges of the intermediate shaft to steering gear	If you want to lure intermediate shaft
Check on the weakening of or damage to parts front and rear suspension, steering mechanism and the hinges'	Tighten bolts and nuts fastening the front and rear suspensions. Tighten the bolts fastening the bracket steering mechanism. If necessary, replace the front and rear suspension. If necessary, replace the steering mechanism. If necessary, replace the connective tion flange
Check tire roundness	Please check with the free rotation of the wheel. If necessary, replace the tires
Check the tires for the presence of imbalance, the deformation of the wheels and wear and tear or weakening of the wheel bearing	Otbalansiruyte wheel. Replace the wheel. Replace wheel bearings
Check the drive belt power steering pump	Tighten the belt drive pump power steering
Check the system and power steering fluid level in the cistern of steering control	Eliminate leaks Check power steering add fluid in hydraulic power steering system
Disposed / shakes Vehicle	
Incorrect selection of tires or tires of different types	Replace tires
Breakage or sag spring suspension	Replace spring
Been violated angle of the front wheels	Adjust the angle of convergence of the front wheels
Mixing of the steering mechanism	Reinstall the steering gear assembly Replace steering gear assembly
Front brakes seized	Adjust the front brakes
Uneven or h rezmerny wear Tires	
Excessive toe	Adjust the angle of convergence
Breakage or decrease the suspension spring stiffness	Replace spring
Broken balancing tires	Otbalansiruyte tires
Worn out damper struts	Replace damper struts
Improper tire rotation	Change the direction of rotation of tires if necessary, replace the tires
Vehicle overloaded	Do not overload your vehicle
Low tire pressure	Bring to a desired tire pressure
Worn Tires	
Incorrect toe	Adjust the angle of convergence
Curvature or deformation of the suspension arms	Replace the lever suspension
The angular (transverse) oscillation wheels	
An unbalanced tire or wheel	Otbalansiruyte tire or wheel
Disrupted suspension struts	Replace damper struts
Angle oscillation, vibration or Vibration	
Imbalance tires or wheels	Otbalansiruyte tire or wheel

Excessive beating wheel hub	Measure the backlash of the flange hub. If necessary, replace the hub
Excessive imbalance brake drum or disc	Adjust brakes. If necessary, replace the brake disc or brake drum
Worn tie-rod ends	Replace the tie-rod ends
Imbalance wheels	Otbalansiruyte wheel
Worn ball joint	Replace the lever and the ball joint assembly
Excessive beating wheels	Measure the beat of the wheels. If necessary, replace the wheel
Possible reason failure	Method remove
Excessive radial run tire and wheel assembly	Install correctly matched the tire and wheel assembly
Tight steering control (without a silitelya Steering Management)	
Lack of lubrication in ball joints, steering rods and steering mechanism	Lubricate ball joints, tie rod ends and steering mechanism. If necessary, replace the lever and the ball joint assembly, tie rod ends and steering mechanism
Disrupted alignment of the apron of the wheels	Adjust the angle of convergence of the front wheels
Razregulirovka steering	Adjust the steering mechanism
Tight steering Administration (with amplifier Steering Management)	
Razregulirovka preload steering	Adjust the preload bearing rack car
Leakage of hydraulic	Check the fluid pressure in the system of steering control. If necessary, replace the gaskets and hoses
Looseness of gear	Tighten the bolts fastening the bracket steering mechanism
Too great backlash in steering management	
Worn or weakening of a wheel bearing	Tighten the nut of the shaft drive. If necessary, replace the wheel bearing
Looseness of gear	Tighten the bolts fastening the bracket steering mechanism
Razregulirovka preload steering	Adjust the preload bearing rack car
The weakening of the joints or wear of the hinge of the steering shaft to the intermediate shaft	Tighten the clamp bolts connecting
The weakening of the joints or wear of the hinge of the intermediate shaft to the steering mechanism	If necessary, replace the intermediate shaft
Poor recurrence Steering wheels in average position	
Seized in ball joints	Replace the lever and the ball joint assembly
Seized in the steering column	Lubricate the steering column. If necessary, replace the steering column
Disrupted alignment of the front wheels	Adjust the angle of convergence of the front wheels
Razregulirovka preload steering	Adjust the preload bearing rack car
Seized shaft	Lubricate the steering gear assembly. If necessary, replace the steering gear assembly
Outsider noise in front suspension	
Seized in the hinge intermediate shaft	Replace the interim hall
Damaged suspension components	Replace damaged suspension components
Wear sleeves arm or tie-rod ends	Replace the hub lever or tie-rod ends

The weakening of Stabilizer	Attach stabilizer
Reducing the wheel fixing nuts	Tighten the wheel nuts
Loose bolts or nuts fastening viper	Tighten the bolts or nuts suspension
Reducing caps wheels	Fasten caps wheels
Worn suspension struts or shock absorber mounting	Replace damper struts. Tighten the nuts damper
Improper location of damper spring	Place the spring damper properly
Deviation or bad controllability	
Incorrect selection of tires or different tires on one axle	Replace tires
Worn suspension struts	Replace damper struts
Looseness stabilizer	Attach stabilizer
Breakage or sag spring suspension	Replace spring suspension
Razregulirovka preload steering	Adjust the preload bearing rack car
Possible reason failure	Method remove
Disrupted alignment of front and rear wheels	Adjust the installation angle of the front and rear wheels
Unsustainable steering Administration under inhibition	
Worn wheel bearings or weakening	Replace wheel bearings
Breakage or sag spring suspension	Replace spring
Drain brake fluid from the caliper	Replace caliper
Warp drive	Replace wheels
Wrong angle rack	If the angle of inclination of the front desk is bigger than the size, check box, if necessary, repaired
Low or uneven clearance Vehicle	
Breakage or sag spring suspension	Replace spring
Vehicle overloaded	Do not overload your vehicle
Loss of elasticity of the spring suspension (draft springs)	Replace spring
Horseback too soft	
Worn suspension struts	Replace damper struts
Breakage or sagging springs	Replace spring
Horseback too Rigid	
Defective damper struts	Replace damper struts
Defective spring	Replace spring
Transverse roll or transverse fluctuations Body	
Looseness stabilizer lateral stability	Attach stabilizer
Worn suspension struts or shock absorber mounting	Replace damper struts. Tighten the nuts damper
Vehicle overloaded	Do not overload your vehicle
Breakage or sag spring suspension	Replace spring
Draft Suspension	
Worn suspension struts	Replace damper struts
Vehicle overloaded	Do not overload your vehicle
Breakage or sag spring suspension	Replace spring
Possible reason failure	Method remove
Impact Steering wheels (with amplifier Steering Management)	
The presence of air in the system of steering control	Remove air from the hydraulic power steering
Looseness of gear	Tighten the bolts fastening the bracket steering mechanism

The weakening of the joints or wear of the hinge of the steering shaft to the intermediate shaft	
The weakening of the joints or wear of the hinge of the intermediate shaft to steering gear	Tighten the connecting stud If necessary, replace the intermediate shaft
Reducing the tie-rod ends	Tighten the tie-rod ends if necessary, replace the tie-rod ends
Weakening or deterioration of wheel bearing	Tighten the nut drive shaft if necessary, replace the wheel bearings
Swinging or tremors on steering wheel (with amplifier Steering Management)	
Low pressure in the hydraulic power steering	If necessary, replace the gaskets and hoses
Slow steering valve actuation mechanism (lack of efficiency of steering control)	Clean the steering gear assembly when necessary, replace the steering gear assembly
Reducing belt power steering	Adjust the tension of the belt power steering
Warped Tires	
Disrupted alignment of front and rear wheels	Adjust the installation angle of the front and rear wheels
Worn suspension struts	Replace damper struts
Weakening or deterioration of wheel bearing	Tighten the nut fastening the drive shaft if necessary, replace the wheel bearings
Excessive beating tires or wheels	Set well-matched tires. If necessary, replace the tire. If necessary, replace the wheel
Worn ball joints	Replace the lever with the ball joint assembly
Razregulirovka preload steering	Adjust the preload bearing rack car

3.1 The body of the front axle

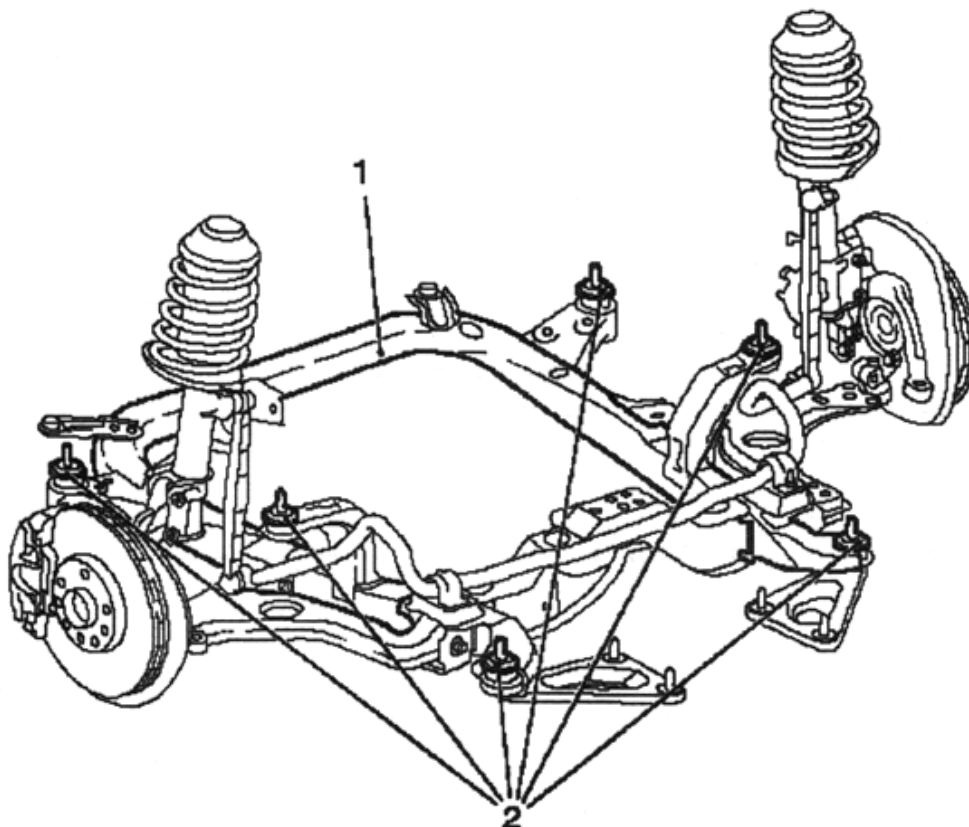


Fig. 4.1. Building front axle:
1 - the front suspension subframe, 2 - rubber sleeve

Install the front suspension subframe to the body through resinometal-metallic bushings will significantly reduce the transmission of vibrations and noise from the drive to the body and, ultimately, to the car. In the event of an impact in the area of the front suspension subframe, the forces transmitted to the body through the damping bushes in the six mounting points. Subframe front suspension has front and rear bearings for jet engines and transmissions. The static load on the engine and gearbox spars absorbed by the body.

Service

Removing and installing the front suspension subframe are described in the Instructions for maintenance Astra-H, Group "E" and implemented with the help of a hydraulic jack, and a frame 904 KM and the new device for the alignment of KM 6390. It is essential that these special instruments are used in order to properly remove and install the front suspension subframe, as well as the correct target sub-frame of the front suspension on the bottom of the car. In contrast to the Astra-G, the direction of the CM 6390 - are now in the front mounting points. Therefore, when lifting the car, pay special attention to the fact that the holes for the alignment of the CM 6390 has not been closed.

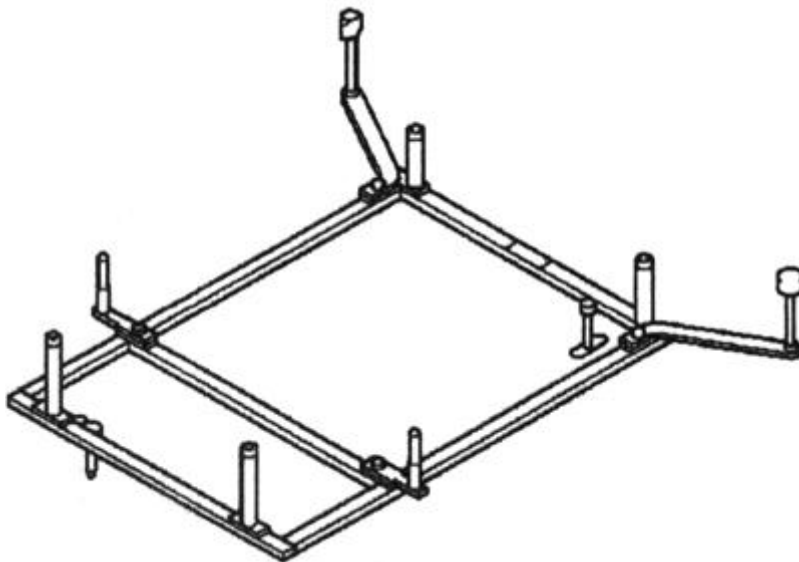


Fig. 4.2. Gadgets for lifting stretcher front Suspension

Recommended tightening torques - front suspension, wheels and tires

Component	Moment torque, N - m
Shaft of the hub wheel	Tighten to 150 Nm, let go at 45 ^{on} , tighten to 250 Nm 5)
Reliance battery spar	15
Triangular plate body of the front axle to the chassis	90N-m = 45 * 15 ^{of 1:2:5}
Spring rack to steering knuckle	85N-m + 75 ^{to +15}
Spring rack to niche wheels	55
Swivel to the steering knuckle	50
Pivot to the lever	35
Radiator bracket to the chassis of the front axle	15
Bracket rear bracket damping engine block to gearbox	80 ³
Bracket rear bracket to the engine block damping damping engine block	55
Bracket directing switching to the body of the front axle	20
Stabilizer bracket to the chassis of the front axle	20
Arm control unit to the CDC lateral septum	2.2
Intermediate shaft bracket to the cylinder	55
bracket intermediate shaft bearing cap	18
Rear sensor body to the wall CDC	2
Front CDC sensor body to the dome spring rack	2
Piston rod for pillow blocks	80
Castle nut to the tip of the tie rod	60
Air Vent boost to the bracket (Z 17 DTL)	3
Front and rear of the lever to the body of the front axle	90N-m + 75 ^{to +15 4.5}

The cover of the engine to the engine	8
Rear damping engine block to the body of the front axle (M10)	55
Front damping engine block to the hull of the front axle	55
Bottom of the engine compartment to the bottom of the body	5
Turning the lever to spring rack and stabilizer	55
Wheel to wheel hub	110
Module bearing wheels for steering knuckle	90 N-m + 30 ^{to} + 15 ^{v5}
Sensor spring rack CDC to spring rack	6
Tire pressure sensor to the rim	9
Connection of tie rod to steering knuckle	30Hm + 90 ^o 15 ^{o5}
The body of the front axle to the body	90 nm + 45 ^{to} + 15 ^{o1, 2,5}
Intermediate shaft to the steering mechanism	24 ³

¹ otvorachivanie Fastening and mounting bolts or a pulsed power-driven not allowed.

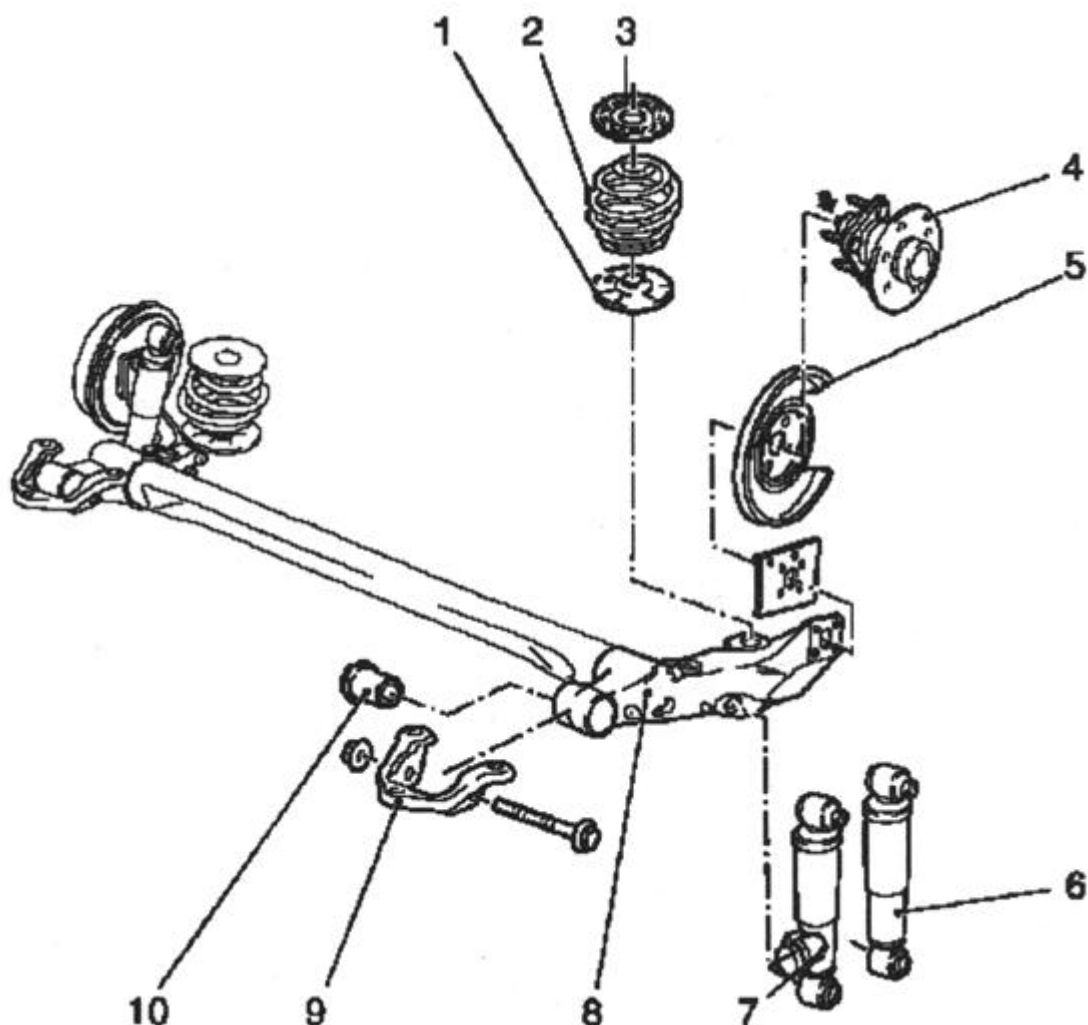
² cm Operation Corps front axle, removing and installing.

³ Clean the threads and install the bolts with a fixing composition.

⁴ Covering joints must be carried out under the load on each front seats must be load of 70 kg.

⁵ Bolt (s) attachment, use the new nuts.

3.2 Rear axle



Components back axis:

- 1 - bottom cushion ring;
- 2 - Rear spring, 3 - upper cushion ring;
- 4 - wheel bearing module with a sensor installed on the wheel of the vehicle (arrow);
- 5 - cap 6 - shock absorbers, 7 - shock absorber system, CDC;
- 8 - rear axle; 9 - arm rear axle, 10 - damping bush

The modified rear axle from Astra-G is used in Astra-H.

The levers are welded to the body of the rear axle. Mounts damping bushings increased to install a larger diameter bushings, mounting the rear axle changed. Thanks to optimized design of the rear axle, the Astra-H was possible to do without the stabilizer.

For optimal settings chassis, there are a total of six different versions of the rear axle. The following table gives an overview of the different structures of the rear axle.

Service

Rear axle must be removed and installed using a hydraulic jack and special adaptations KM 904 and KM-6002, to ensure proper installation of the rear axle.

Damping sleeve

The diameter of the damping of the rear axle bushings on Astra-H for 10 mm more than the Astra-G and Zafira. Changing the damping sleeve has helped reduce the transmission of vibrations from the rear axle of the car body, thus improving ride comfort and stability control. Controllability and longitudinal stability was also improved by changing the damping sleeves and an increase in rut.

Service

In order to aftermarket rear axle comes complete with sealing sleeves. Special device KM-6006, which was used for Astra-G and Zafira is not suitable for damping sleeves Astra-H. New device for removing and installing the damping of the rear axle bushings scheduled for delivery in 2004

Options for design of the rear axle

Option	1	2	3	4	5	6
Engine	Z14XEP; Z16XEP	Z14XEP; Z16XEP	Z17DTL	Z14XEP; Z16XEP; Z17DTL	Z18XE; Z20L £ L; Z17DTH	Z18HE; Z20LEL; Z17DTH
Construction	Only export	No sports chassis	No sports chassis	For sports gear	No sports chassis	For sports gear

Brakes	Brake Drum 20.64	Brake Disc 36	Brake Disc 38	Brake Disc 38	Brake Disc 38	Brake Disc 38
Mounting wheels	4 holes	4 holes	5 holes	5 holes	5 holes	5 holes
Section profile of the torsion	13171 150	13171 150	13171 150	13156 030	13 171 149	13156 031
Rear axle assembly	13 171 148	13171 148	13 171 148	13156027	13 171 147	13156029

Featured values moments tightening - Rear axle, rear suspension

Parameter

Specifications

Brake hose to brake pipe	16
Holder tube of the braking system on the rear axle	8
Arm of the parking brake cable to the rear axle	8
Bracket rear axle to the damping sleeve	90N-m + 60 ° +15 ° * **
The holder of the rear axle to the bottom of the car	90 nm + 30 ° +15 ° * ***
Wheel to wheel hub	110
Module bearing wheels to the rear axle	50 nm + 30 ° +15 ° **
Shock absorber to the bottom of the car	90
Shock absorbers to the rear axle	110

* Use new bolts

** Use new nuts

*** Fastening and mounting bolts otvorachivanie pulse
or power tool is unacceptable.

Note: The bolts that are tightened at the moment and the corner (beyond the elastic limit)
can not be reused, as to turn away.

3.3 Shock Absorbers - rear axle

Rear shock absorbers for Astra-H are available in different versions. As spring front rack, rear bumpers of cars with the chassis CDC are proportional valve that is installed on the outside and works as a bypass valve.

Service

For the operation of the service, shock absorbers and their corresponding numbers in the catalog can be found in the electronic catalog of parts for each version of the equipment of the car. Rear shock absorbers are removed and installed using a hydraulic jack, special adaptations KM 904 and KM 6002.

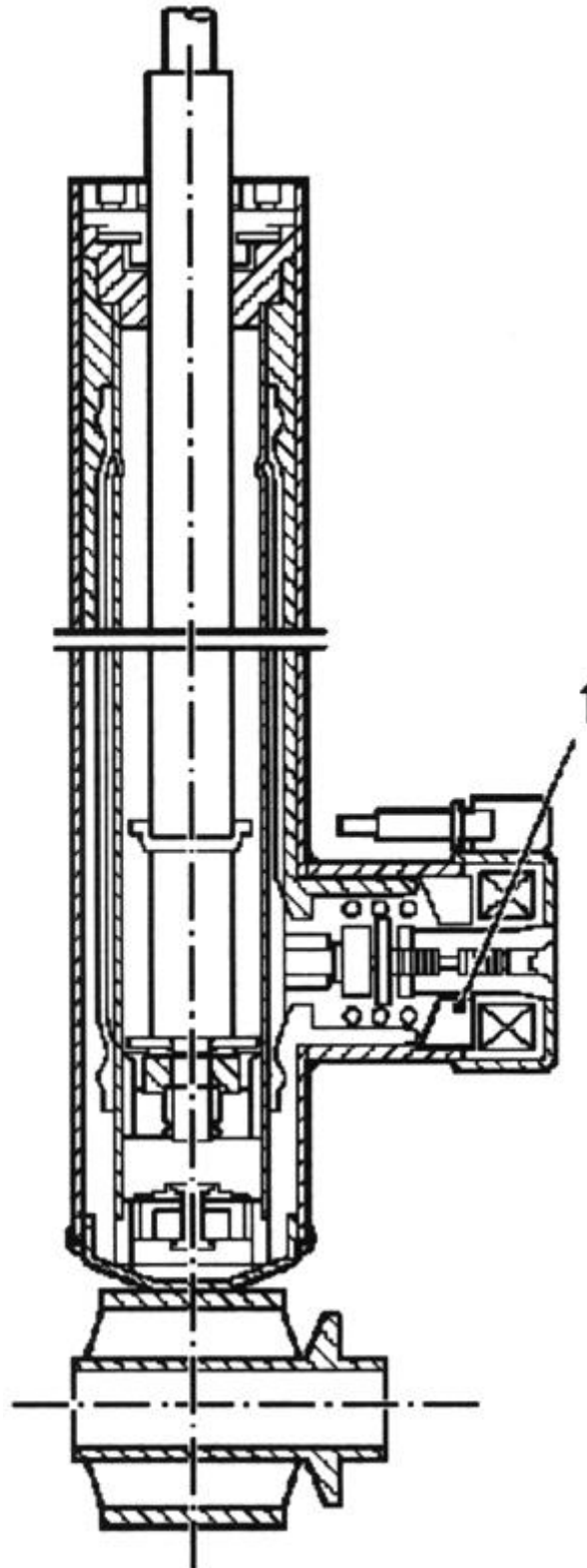


Fig. 4.4. Construction absorber rear axle counters:
1 - Proportional Valve

3.4 Spring rack with springs of the all-clear

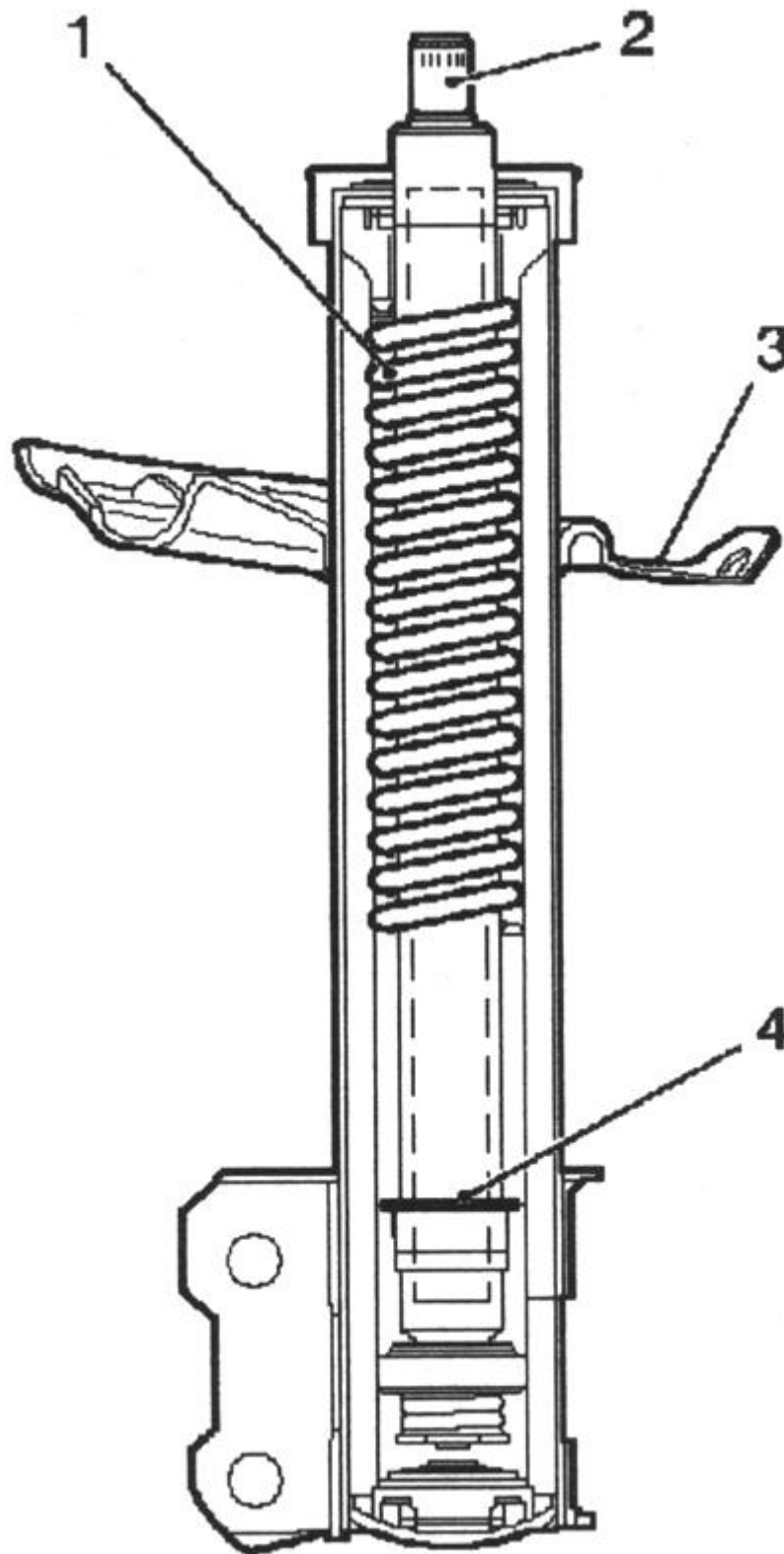


Fig. 4.5. Spring stand with springs of the taps:

- 1 - spring of the all-clear, 2 - piston;
- 3 - spring plate on the shock absorber;
- 4 - limiter on the piston rod

Spring of the taps, which, depending on the version of the equipment installed in the shock absorber, provides greater lateral stability and to counter the trend buildup, especially on cars with high center of gravity. Spring rack with a spring of the taps used in the models Opel A, with a panoramic roof (additional equipment), since the use of safety glass in the roof leads to higher center of gravity of the car. Exceptions are models with petrol engines Z18XER and Z 16 XEP. These options do not have the springs of the taps, even in the complete set with a panoramic roof. All models, with "sports chassis" have a system of springs of the all-clear. The surface of the shock absorber with spring-clear can be distinguished from conventional shock absorber only when it is not installed on the car. In the normal shock absorber, piston, under the influence of gas pressure in the cartridge

damper, is brought out. In the spring of the shock absorber piston-clear to put forward as long as the force produced by spring of the taps does not exceed the gas pressure, so the rod will not pull out completely.

3.5 Spring rack

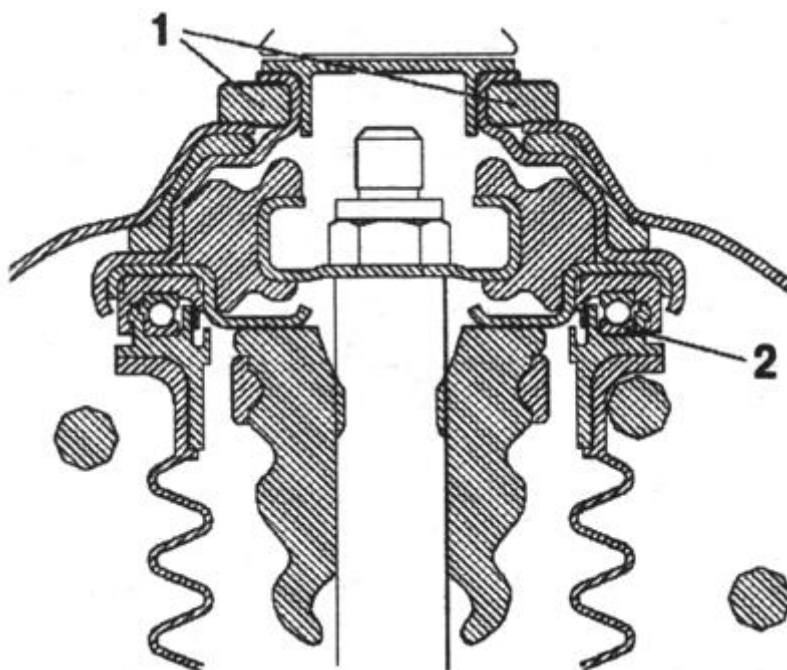


Fig. 4.6. Design spring Rack:

- 1 - plastic retaining ring;
- 2 - supporting bearing

New spring and a new rack mount system spring rack to the dome spring racks are specially designed for Astra-H. Spring-loaded rack with gas-filled shock absorbers have a lightweight design. The new valve system improves the properties of a car shock absorber and the work of the steering.

Newly developed separate supporting bearing also provides better noise isolation and damping. Two halves of the plastic retaining ring used to connect the spring stand with body (dome spring rack).

Springs, which have been specially selected for the spring poles, provide a linear displacement of the piston rod in the spring rack, thus minimizing the friction between the piston and seal spring rack. The result is reduced wear and tear. This, in turn, has a positive influence on ride comfort.

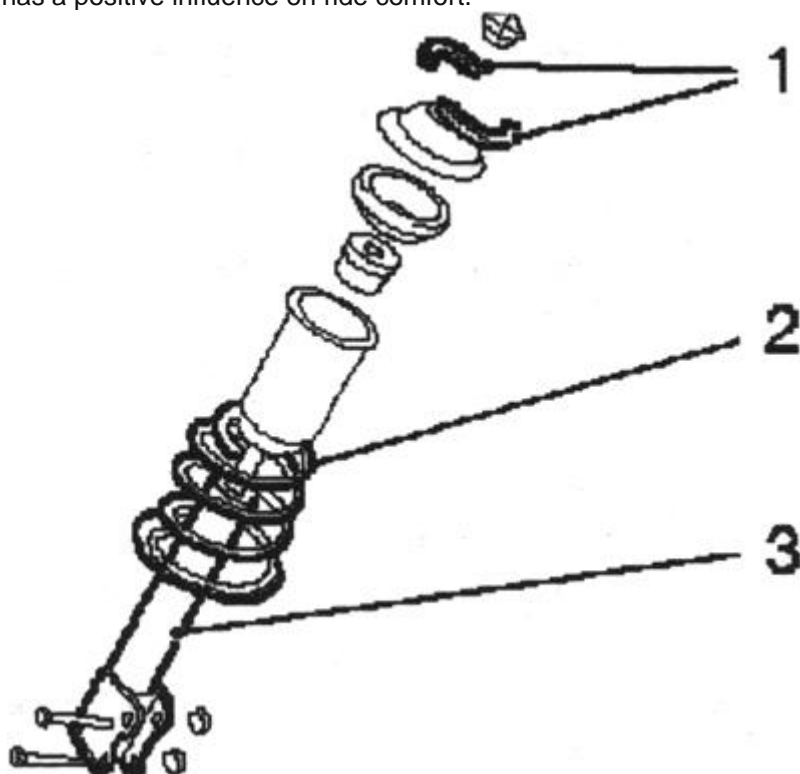


Fig. 4.7. Components spring Rack:

- 1 - halves of the locking ring, 2 - spring;
- 3 - spring rack

Electronically controlled shock absorber damping is used in conjunction with the damping system CDC, which is new for this class of cars.

Service

To dismantle a spring rack should be used a new special tool KM 6399, along with the usual holder of the IMC-6066 and KM-6068 puller springs. The new tool is required to reduce and tighten the nuts pillow block.

It is possible to remove and install a spring rack without the need to dismantle the suspension arms and wheel shafts. When mounting the spring rack, always use a new retaining rings for attaching spring rack to the body. Retainer rings (1) shall be established using a new special tool KM 6384 (2).

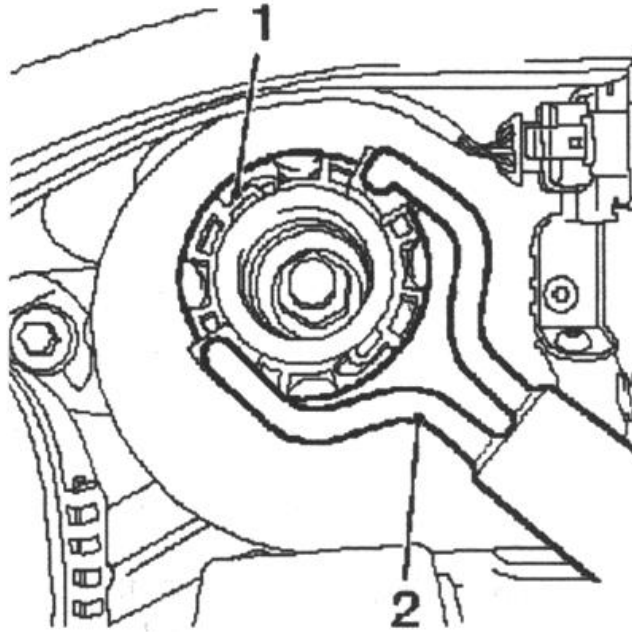


Fig. 4.8. Puller for locking Rings:
1 - retaining rings, 2 - smnik

3.6 Stabilizer / Lever / swivel arm

The stabilizer is attached to the front suspension subframe by means of two rubber bearings and brackets. The stabilizer is attached to a spring reception at both ends by turning a lever made of plastic or steel. For cars with chassis CDC steel rotary instruments in a certain area have a bend, it is connected with the need to provide space for the valve control spring rack.

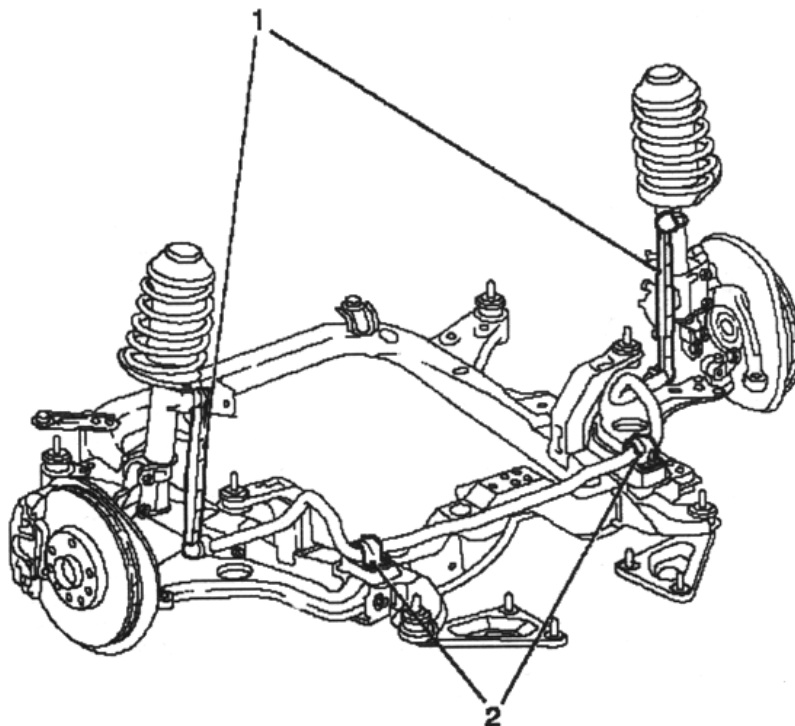


Fig. 4.9. Stabilizer / swivel Lever:
1 - turning the lever, 2 - Brackets

3.7 Continuous Damping Control System(CDC)

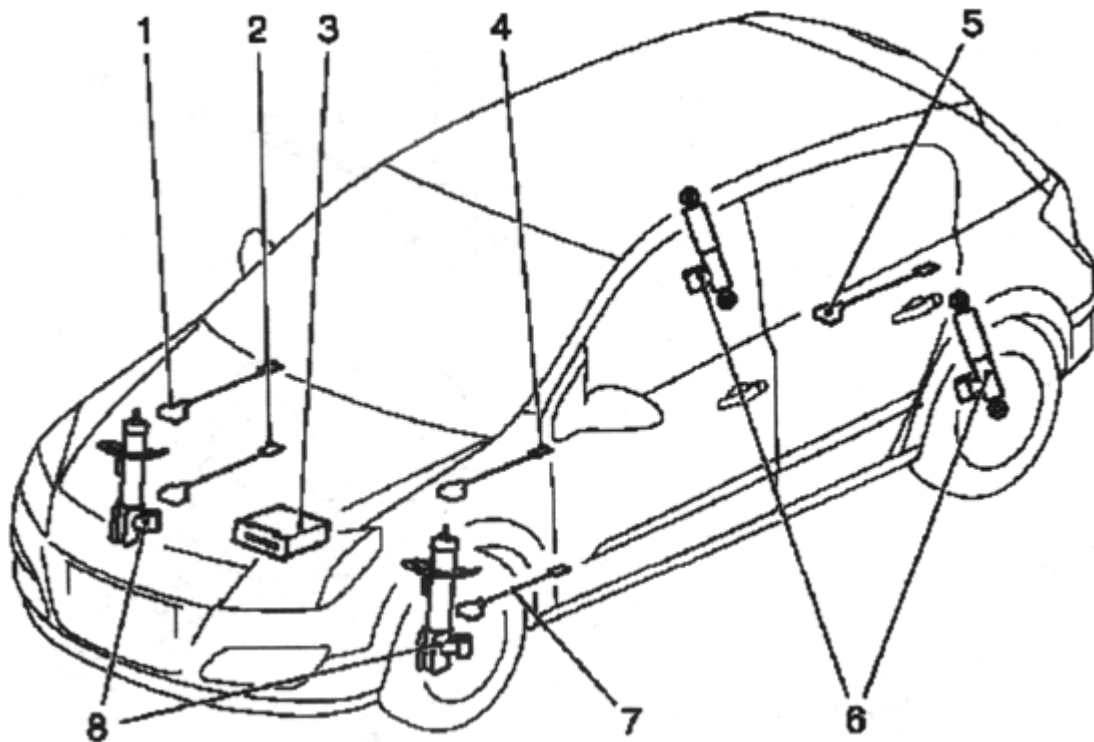


Fig. 4.10. Components system (CDC):

- 1 - front right sensor on a body (acceleration body);
- 2 - right sensor spring rack (wheel speed);
- 3 - control unit CDC;
- 4 - front left sensor on a body (acceleration body);
- 5 - rear sensor on a body (acceleration body)
- 6 - rear shock absorber CDC;
- 7 - Left sensor spring rack (wheel speed);
- 8 - Spring front desk CDC

Continuous Damping Control (CDC) is a management system damping and is a new system for cars in this class. CDC regulates the damping characteristics of shock absorbers car in accordance with traffic conditions and quality of road surface. System uses the principle of CDC «Skyhook». Principle «Skyhook» is to keep the body as possible in a stable state at the expense of variable damping, regardless of traffic conditions. For this, the system uses as a reference point "so to speak" imaginary virtual plane (eg the sky above the car), which is stored as a computational model in the control unit of CDC. The aim is to keep the body of the car as far as possible horizontally, on this plane. All vertical movements are compensated to the fullest extent possible, actuated shock absorbers. These actions are carried out within milliseconds.

Dampers

Shock absorbers can be smoothly adjusted electronically. CDC system continuously monitors the movement of the wheels and the car and immediately changes the damping of each shock absorber. Chassis thus configured optimally under conditions of motion. As a result, Astra-H offers excellent ride comfort without compromising safety. Brake performance on uneven roads is also optimized, as well as to a certain extent offset by the depreciation shock absorbers.

Adjustable shock absorber control unit and is calculated based on the following information:

- Road conditions;
- Speed of the vehicle;
- Braking force;
- Acceleration of the wheel;
- Move the steering wheel;
- Angle of the vehicle in the longitudinal and lateral direction (lift, tilt, swinging);
- Lateral acceleration (the angular velocity of yaw);
- Position switch - normal or sport driving style;
- ESP signal for correction of attenuation.

The flow of oil in the damper, and thus the damping force is regulated for each wheel depending on driving conditions and load. This is done within milliseconds by continuously adjustable proportional valve (1) located outside the damper. The valve operates as a bypass and replace check valves that are not used in shock absorbers CDC.

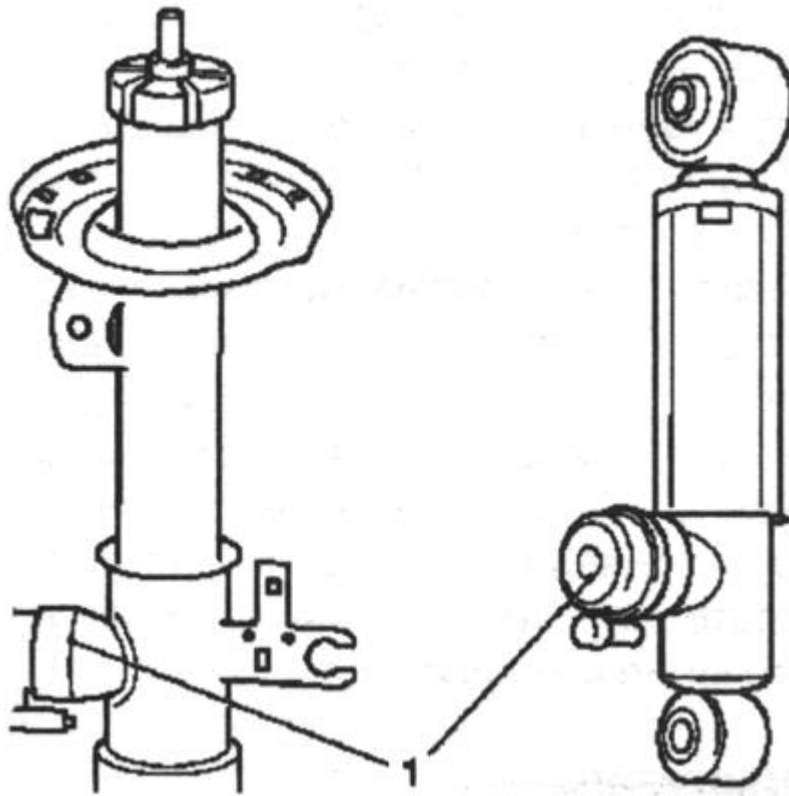


Fig. 4.11. Proportional Valves:
1 - Valves

Sensors

CDC system for Astra-H also has 5 sensors on the body, needed to calculate the acceleration of the body and wheels. Two are located on two racks near the front springs steering knuckle, two spring mounts on the top rack about partitions, while the fifth is located behind the right rear rack, under the steering wheel above the castle door.

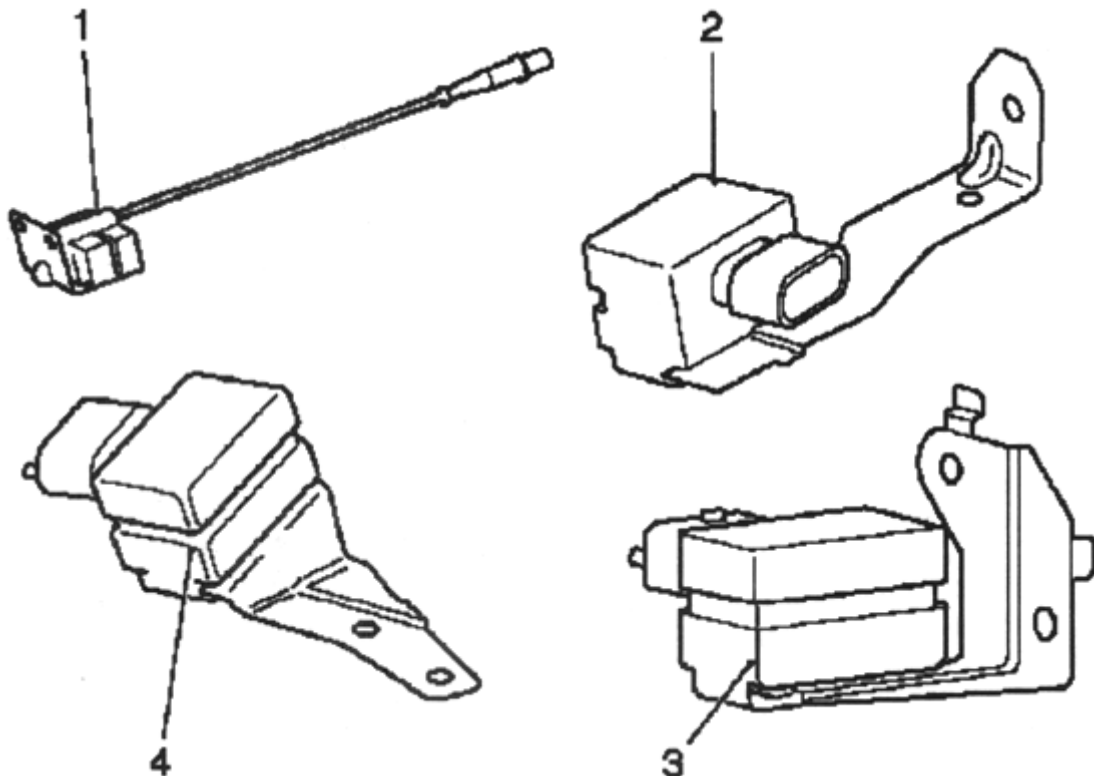


Fig. 4.12. Sensors system CDC:

- 1-sensor left and right spring rack (wheel speed);
- 2 - front left sensor on a body (acceleration body);
- 3 - front right sensor on a body (acceleration body);
- 4 - rear sensor on a body (acceleration body)

Indicator Control

Indicator control in the instrument cluster is lit if the system is a failure, and does not distinguish the category of failure.

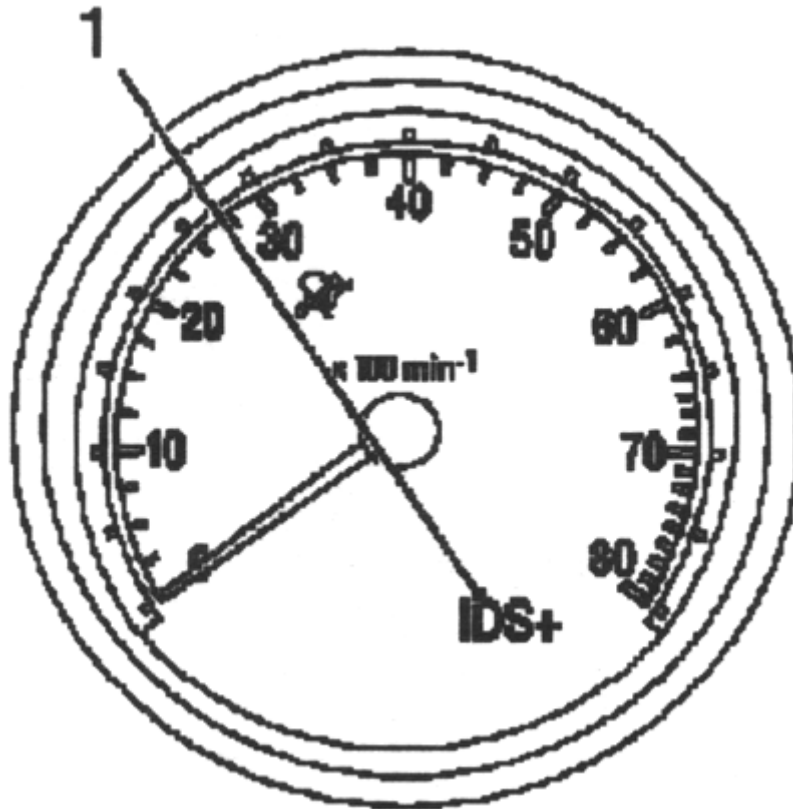


Fig. 4.13. Indication system CDC:
1 - LED

3.8 Wheels and Tires

General information

Alignment wheels

The design of cars is the most important development of safe systems, steering and suspension. Each component must be strong enough to withstand and absorb the load limiting steering control, and front and rear suspension should operate geometrically with the body of the car. Steering system and suspension requires that the front wheels were self-returning, and to grip the rotating wheel and the road surface guarantees low driving force with the least effort and the greatest comfort.

Full check of installation angles of the wheels should include measurement of convergence and collapse of the rear wheels.

Adjustable mounting angles of the four wheels ensures that all wheels will roll strictly in one direction. When adjusted adjusting the angles of the wheels, saving fuel consumption and resource path reaches its maximum value, improves handling.

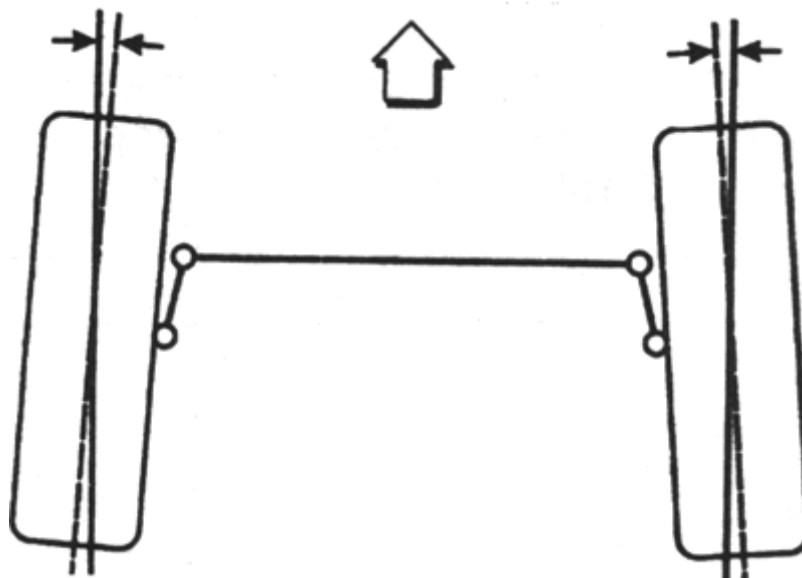


Fig. 4.14. Scheme convergence (wheels -stalled forward inside)

Convergence

Convergence is turning the wheels inside, opposite toe-wheels - wheels that turn outward from the center line. Convergence of the wheels provides parallel planes of rotation of the wheels.

Convergence is used to neutralize the small deviations of the wheel, taking place when the vehicle is moving forward. Installed the angle of convergence - the ability to install that angle at which the 0° between the planes of rotation of the front wheels and the center line of a moving car (no convergence).

Incorrect toe or toe back wheel leads to premature tire wear and increase fuel consumption. Individual components of steering and suspension wear, depending on the mileage, an additional toe necessary to equalize wear. Always adjust the angle of convergence in the least.

Angle tilt axis kingpin

Angle of inclination of the axis of the hinge pivot is the highest point of the axis of the kingpin forward or backward from the vertical at the sight of the car on the side.

Tilt back and forth is a positive - negative. The angle of inclination of the axis of kingpin affect the control of the direction of steering control, but does not affect tire wear. Weak (with a draft of) a spring or an overloaded vehicle affect the angle of inclination of the axis of kingpin. One wheel with a large positive slope of the axis of kingpin pulled to the center of the car. This causes a movement or tilt the vehicle towards the wheel with a smaller positive angle of inclination of the axis of kingpin. Angle is measured in degrees, but not regulated.

Collapse

The collapse of the wheels is the angle between the longitudinal axis of the wheels and the vertical to the plane of the road.

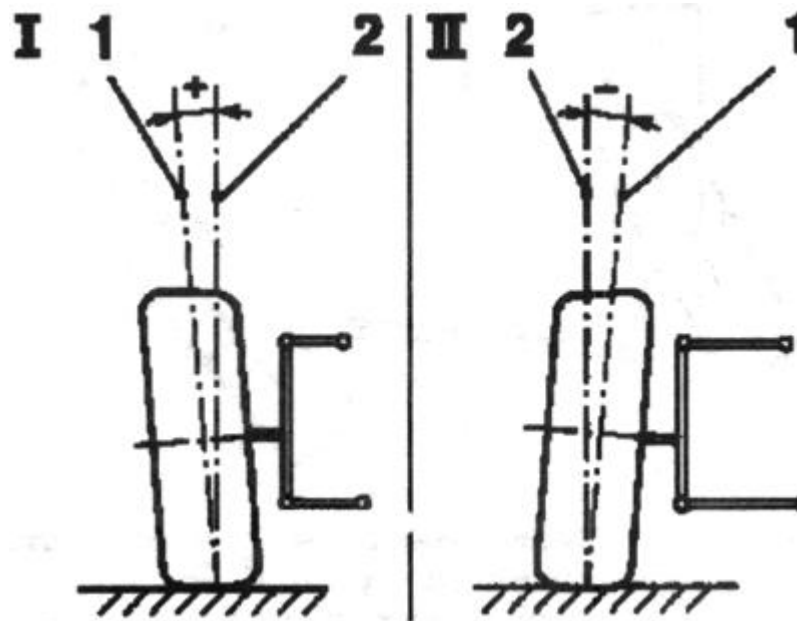


Fig. 4.15. The breakdown:

1 - the angle between the longitudinal axis of the wheel;
2 - vertical

The collapse of the wheels - positive (I), if the center line wheel is tilted outward from the vertical line. The collapse of the wheels - a negative (II), if the center line wheel is tilted inward relative to the vertical line.

To achieve high lateral forces and, consequently, better handling when driving in turn, modern cars are usually designed with a negative camber.

Effect improper angles Installation wheels

The collapse of the wheels, too big (negative value):

- An improved lateral control when driving in the turn;
- At high speed and high axle load, invalid shoulder heating zones tires;
- Damage to the tire overheating;
- Premature wear on the internal bus.

The collapse of the wheels are too small (positive value):

- Deterioration of transverse controllability of the motion in the rotation;
- Increased wear on the outside of the tires (only if the simultaneous convergence of the improper adjustment of the wheels).

Angle tilt longitudinal axis rotation wheels

Angle to the longitudinal axis of rotation of the wheels is the angle between the line passing through the axis of the kingpin in the direction of the axis of symmetry, and the vertical to the road, passing through the center of the wheel.

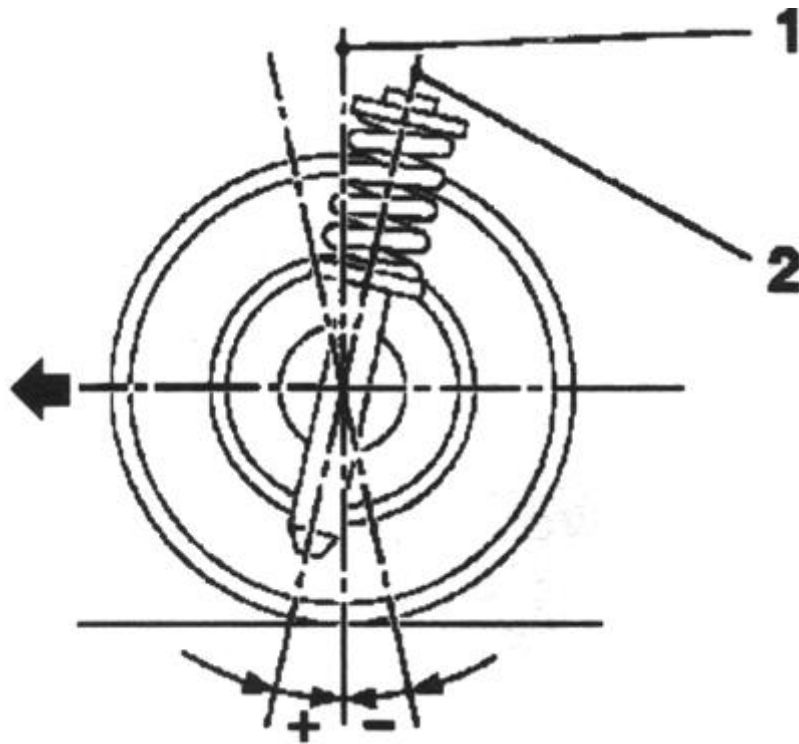


Fig. 4.16. Angle tilt longitudinal pivot wheels:

1 - the angle between the line passing through the axis of the kingpin;

2 - direction of the axis of symmetry

Angle of the longitudinal axis of rotation of the wheels is negative if the point of intersection of this imaginary line to the plane of the road - the rear wheel contact point. Angle of the longitudinal axis of rotation of the wheels - yes, if - before the point of contact with the plane of the road wheels.

A positive angle to the longitudinal axis of rotation of the wheels creates a force on the wheels, which helps to bring the wheels in position rectilinear motion after passing the bend.

Effect improper angles Installation wheels

Angle of the longitudinal axis of rotation of the wheels are too negative:

- Incomplete return of the steering in the initial position;
- Susceptibility to defects in the tires (taper, corner effect);
- May cause distortion;
- Beat wheel;
- Sensitivity to lateral wind.

Angle of the longitudinal axis of rotation of the wheels too positive:

- Increased effort on the steering wheel and the effort to keep the car.

Angle of inclination of the longitudinal axis of rotation of the wheels on the left differs from the angle of inclination of the longitudinal axis of rotation of the wheels on the right:

- Susceptibility to distortion.

Slope Rotation kingpin

Caster is the angle between the center line of the kingpin and the vertical to the road crossing the axis of symmetry.

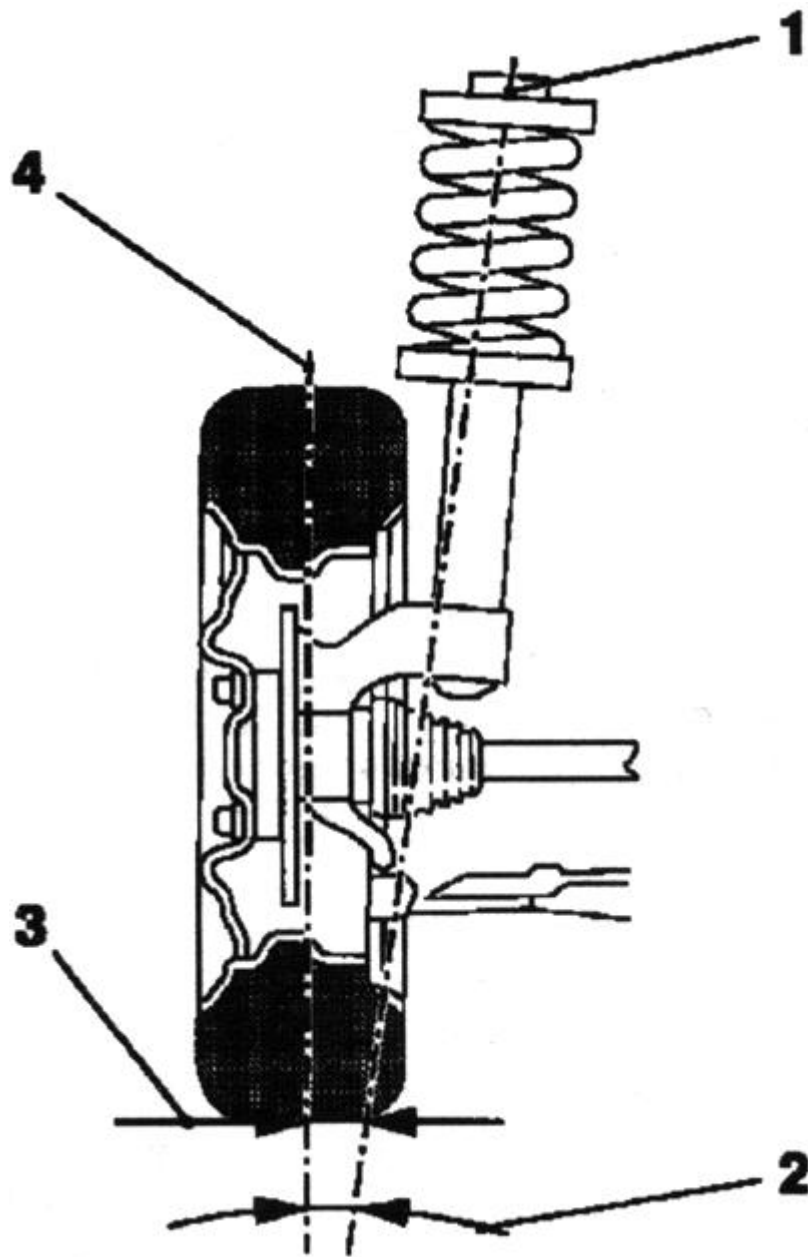


Fig. 4.17. Slope Rotation kingpin:

- 1 - center line of the kingpin;
 2 - angle; 3 - horizontal displacement;
 4 - vertical road

Caster - positive (the normal situation), if the center line of the kingpin is directed inwards to the top of the vertical line.

Positive caster wheels provide a return to the position of the rectilinear motion after cornering and prevents "self-oscillation" wheels.

Effect improper angles Installation wheels

Caster is too small:

- Incomplete return of the steering in the initial position;
- Susceptibility to defects in the tires (taper, corner effect);
- May cause distortion.

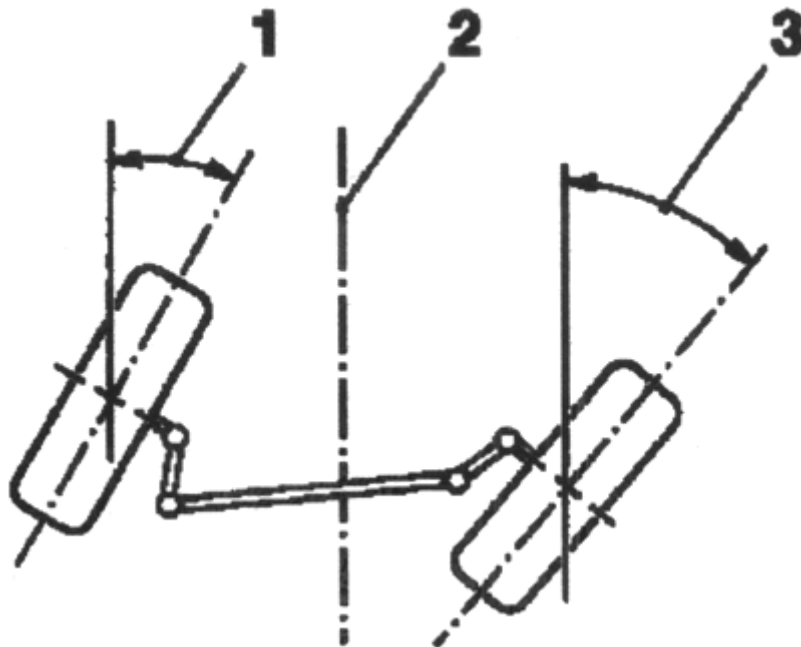
Too much caster:

- Increased effort on the steering wheel and the effort to keep the car.

Caster on the left differs from the caster on the right.

- Susceptibility to distortion.

Maximum angle Turning from stop to stop (corner rotation)



**Fig. 4.18. Maximum angle Turning from stop to stop
(Angle rotation):**

1,3 - angle of the front wheels, 2 - axis of symmetry

The maximum angle of the front wheels is the angle through which the wheels are turning (left and right) about the axis of symmetry. It defines the circle of rotation of the car.

Maximum angle of the front wheels is manifested as distinct angles of convergence on the left and right, and also gives information about the state of the steering linkage and steering mechanism.

Because the regulation of the maximum angle the front wheels are usually available only in vehicles off-road, it should be checked only on the cars of this type.

Maximum angle of the front wheels is measured at full lock when turning the inner wheel. Depending on the steering linkage, external rotation with the wheel should have the same negative difference, within a specified tolerance.

Sample

Maximum angle of the front wheels on the right: 34° . Angle lock, left: $32^\circ \pm 1^\circ$.

Difference: 2°

Tolerance: $\pm 1^\circ$.

Effect improper angles Installation wheels

Difference of the circle of rotation of the vehicle (with the right and left turn).

Identification of the wheel and tire

Wheels

Code may be present in full or in abbreviated form. For example: 6 J 16.

Tires

Each bus can be identified by code. Narimer: 195 / 70 R 13 108 L

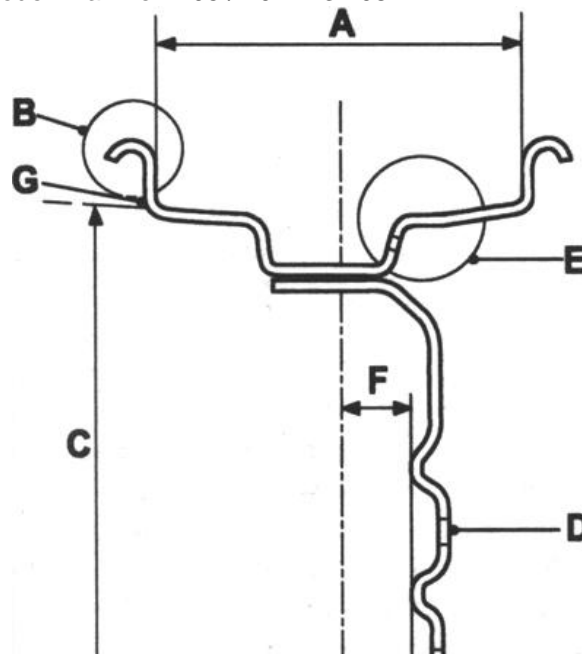


Fig. 4.19. Identification marking discs

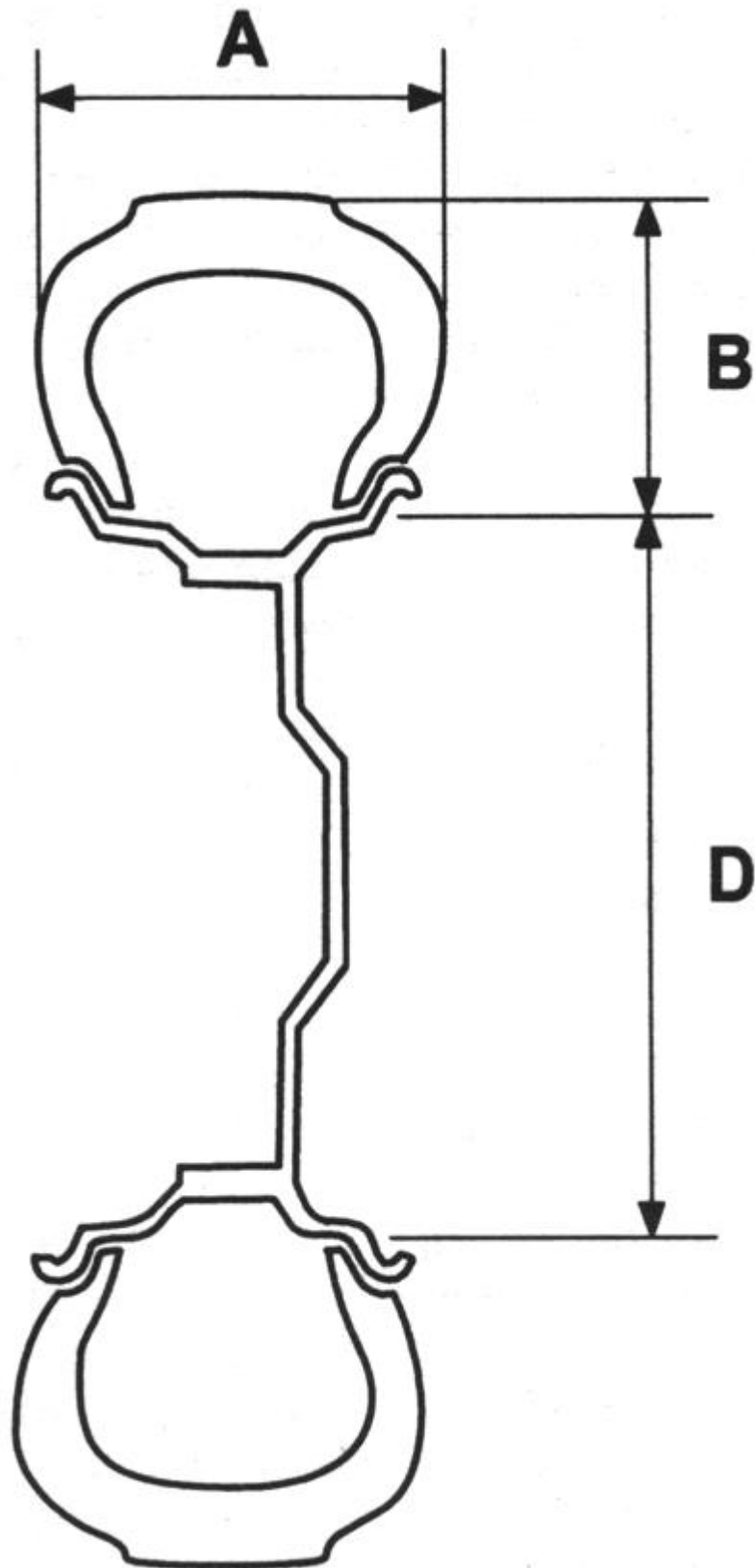


Fig. 4.20. Identification SYMBOL cheniya Tires

NOTE

An explanation IDs cm. in Consolidated Table 4.6.

Dates

Width rim: the distance between the bead board.

Table 4.5 Angles adjustment wheels, Opel Astra-H 2006

Adjustable front wheels	Sedan	Sedan with "sports" equipment (lowering)	Sedan for the "bad roads"	The difference right / left maximum
The collapse of the wheels	-0-30 '± 45'	-0 * 30 '± 45'	-0 * 30 '± 45'	1 *
Angle of the longitudinal axis of rotation of the wheels	4 * 00 '± 1'	4 * 00 "± 1'	4 * 00 '± 1'	1 *
Convergence wheels *	+0 W ± 10 "	0 * 00 '± 10'	+0 W ± 10 '	--
Changing the convergence of the wheels with an internal deflection wheel 20 '	1 * 20 '± 45'	1 * 20 '± 45 "	1 * 20 '± 45'	--
Outside deviation wheels 20 * internal deflection wheel	18 * 40 '± 45'	18'40 '± 45'	18 * 40 '± 45'	--
Adjusting the rear wheels	--	--	--	--
The collapse of the wheels **	-G15 '± 30'	-1 '15 '± 30'	-1 * 15 »± 30 '	35 '
Convergence wheels * **	-KP0 '%	0 * 14 '	0 * 07 '	25 '
Adjustable front wheels	Universal	Wagon with "sports" equipment (lowering)	Wagon for "bad roads"	The difference right / left maximum
The collapse of the wheels	-O 'AOR "± 45'	-0 * 30 '± 45 "	-0 * 30 '± 45'	1 *
Angle of the longitudinal axis of rotation of the wheels	3 * 30 "± T	3 * 30 '± 1 *	3 * 30 '± 1 *	1 *
Convergence wheels *	0 * 00 '± 10'	0 * 00 '± 10'	0W ± 10 '	--
Changing the convergence of the wheels with an internal deflection wheel 20 '	1 * 20 '± 45'	1 * 20 '± 45'	1 * 20 '± 45 "	--
The outer wheel deflection for the 20 'inner wheel deflection	18 * 40 '± 45 "	18 * 40 '± 45'	18 * 40 '± 45'	--
Adjusting the rear wheels	--	--	--	--
The collapse of the wheels **	-1 '20 '± 30'	-1 '20 '± 30'	-G20 "± 30 '	35 '
Convergence wheels * **	+0'02 "	0 * 07 '	0 * 02 '	25 '

* Positive values = toe-wheels, negative values = variance

** These values are set in manufacturing. Adjusting for servicing is not possible.

Note: The values refer to vehicles with a load of 70 kg on each front seat and filled up to half of the fuel tank.

Table 4.6 Value of the wheels for the Zafira - in 2006

Adjustable front wheels	Lowering	For the "bad roads"	The difference right / left
The collapse of the wheels	-0 * 30 '± 45'	-0 * 30 "± 45"	1 *
Angle of the longitudinal axis of rotation of the wheels	3 * 15 "± 1 *	3 * 15 "± 1 *	1 *
Convergence wheels *	0 * 00 '± 10'	(TOO '± 10'	--
Changing the convergence of the wheels with an internal deflection wheel 20 '	1 * 20 "± 45 '	1 * 20 '± 45 "	--
The outer wheel deflection for the 20 'inner wheel deflection	18 * 40 »± 45 '	18 * 40 '± 45'	--
Adjusting the rear wheels	--	--	--
The collapse of the wheels **	-1 * 20 '± 30'	-1 * 20 '± 30'.	35 '
Convergence wheels ***	0 * 08 '	0 * 03 '	25 '

* Positive values = toe-wheels, negative values = variance

** These values are set in manufacturing.
Adjusting for servicing is not possible.

Note: The values refer to vehicles with a load of 70 kg each
front seat and filled up to half of the fuel tank.

Height Profile: half the difference between the outer diameter and the nominal rim diameter.

Nominal width: width set for the size of an inflated tire, which is installed on the geometrically correct rim.

Width Profile: the distance between the outer sides of side walls of an inflated tire, excluding the area with distinguishing mark, decorative edges and wear strips.

Overall width: the distance between the outside of the side walls beefiest tire, including higher field due to distinguishing mark, decorative edges and strips of abrasion.

Outer diameter: the diameter of an inflated tire in the most remote point of a race surface.

Nominal attitude profile: multiplied by one hundred ratio of the height to width of a tire on its rim, presumably established.

Payload Bus: The maximum load capacity of a tire which is valid for the specified conditions of use.

Tire pressure: The tire pressure refers to the tire pressure at ambient temperature, and does not include an increase in air pressure caused by the tires.

Speed index: the index indicates the speed limit the speed at which the tire has a load capacity corresponding to the code of duty for specified conditions.

3.9 Front Suspension

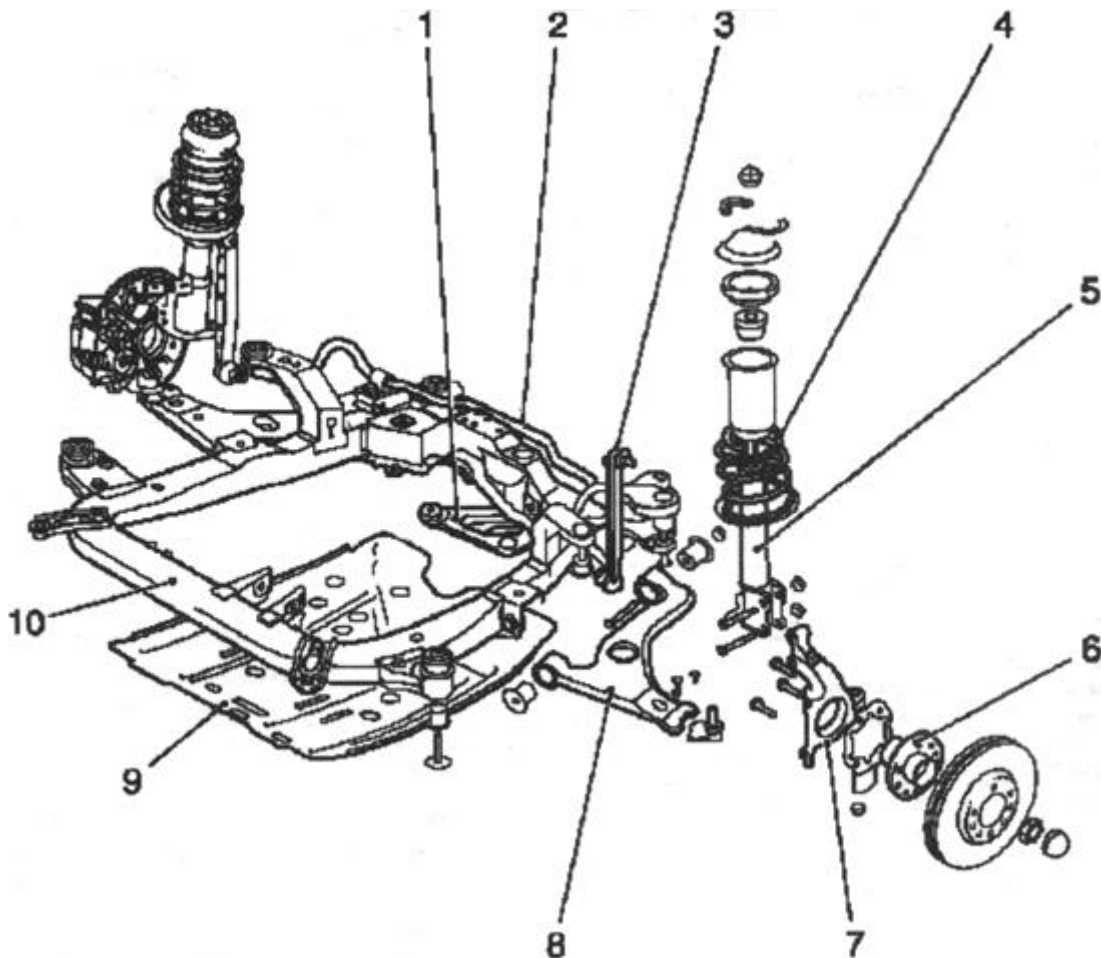


Fig. 4.21. Components front Suspension:

- 1 - Triangular plate; 2 - stabilizer;
- 3 - pendulum (depending on the design of plastic or steel);
- 4 - front springs, 5 - damper, 6 - a wheel bearing unit;
- 7 - turning a fist, 8 - Lever;
- 9 - lower engine compartment lid (only with additional
equipment "for bad roads" or "protection of the engine compartment");
- 10 - front suspension subframe

Regulation of rectilinear motion

Regulation rectilinear motion is a key position of the front axle, where the convergence (1.2) the front wheels - the same (positive or negative).

The rear axle is aligned to the provisions of the rectilinear motion.

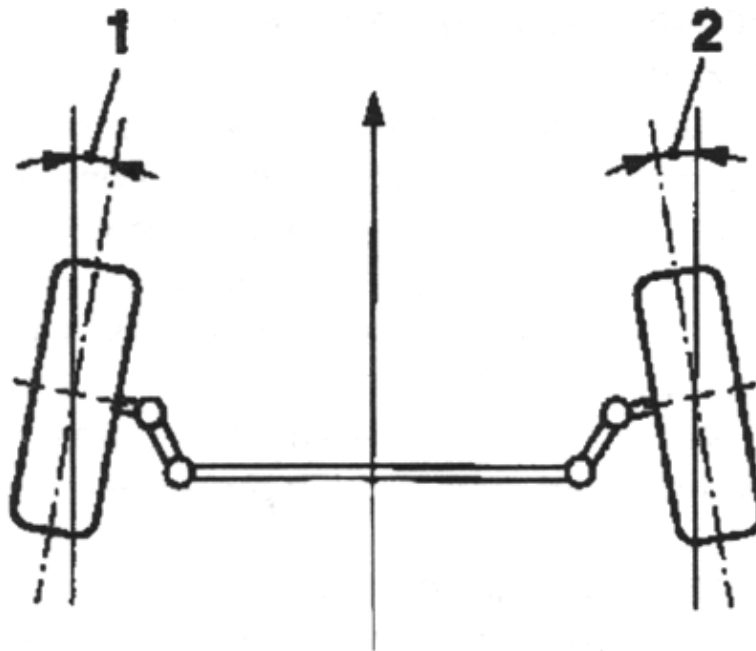


Fig. 4.22. Situation rectilinear motion:
1,2 - toe

Composite wheel

In the Opel Astra car with composite wheels, wheel caps kept bolted wheels additional restraining disks. When removing or replacing caps wheels, new restraint shall be used discs.

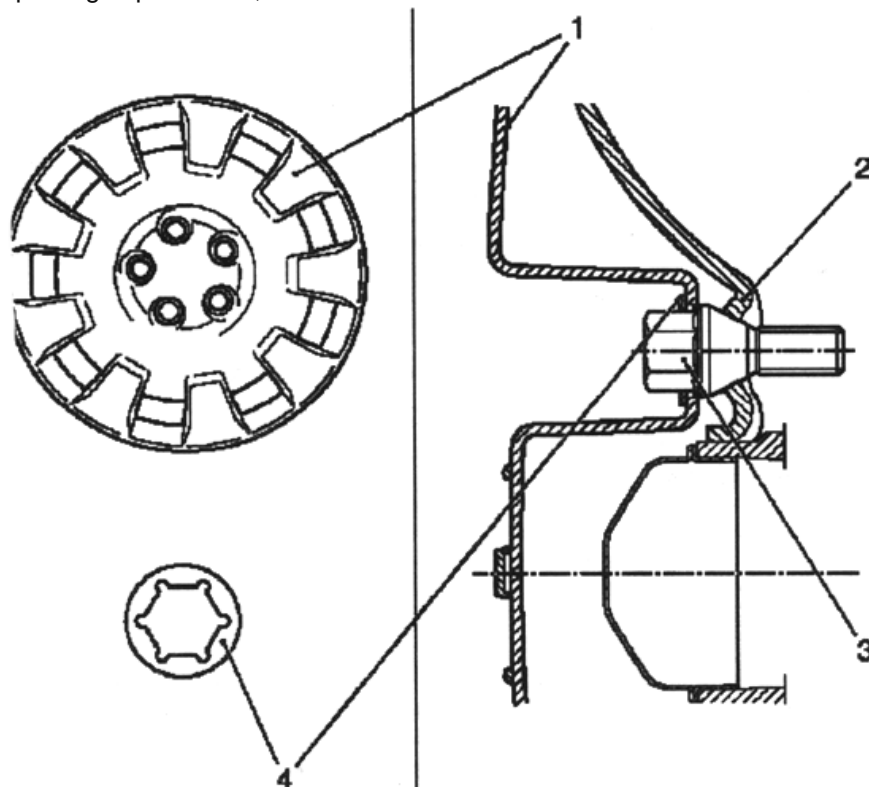


Fig. 4.23. Components wheels:
1 - wheel cover 2 - rim;
3 - bolt wheels, 4 - keeps the drive

The difference of convergence

Variance of convergence - the angle at which to stop the internal rotation of the wheels in motion to turn over a turn until it stops outside wheels during cornering. This difference provides the steering linkage.

Difference of convergence of the outer wheel is measured when the inner wheel is turned at an angle 20° , relative to the axis of symmetry.

Difference similarities front wheels should be identical to within a specified tolerance for a car Opel / Vauxhall.

Measurement of this angle gives information about the condition of the steering linkage (rod and turning the lever).

Effect improper angles Installation wheels

Increased tire wear.

The car "go" when driving in turn.

Incomplete return of the steering wheel at high angles of steering.

3.10 Adjust the front suspension

Preparation Vehicle

Before adjusting the chassis, must satisfy the following conditions:

- Should use regular wheels and tires;
- Check the profile tires - wear and tear should be uniform;
- Make sure the tire pressure corresponds to full load.

The pressure in the left and right tires of each axle must be the same;

- All the wheels and wheel bearings must be in excellent condition;
 - Chassis must be undamaged, and the gaps in the ball joints (steering) or nodes of suspension are not allowed.
- Check the collapse of the wheels, the angle of the longitudinal axis of rotation of the wheels and toe.

The following operations must be performed before the adjustment of the chassis:

- Fuel tank is refueled by half;
- The car must be unloaded;
- Set the car in position for adjustment. In all operations the car must be on a horizontal surface;
- Check and adjust the equipment to adjust the chassis of a car in accordance with the manufacturer's instructions;
- Set the steering wheel in position rectilinear motion.

Camber

NOTE

Operations described below be used only to renounced-gulirovat collapse wheels in limited not too much range.

Raise the front of the car. The corresponding front wheel must be posted. Unscrew the two bolts supporting the pipe spring stands at a turning fist. Install new bolts and nuts - set threaded screw connection freely (Figure 4.24).

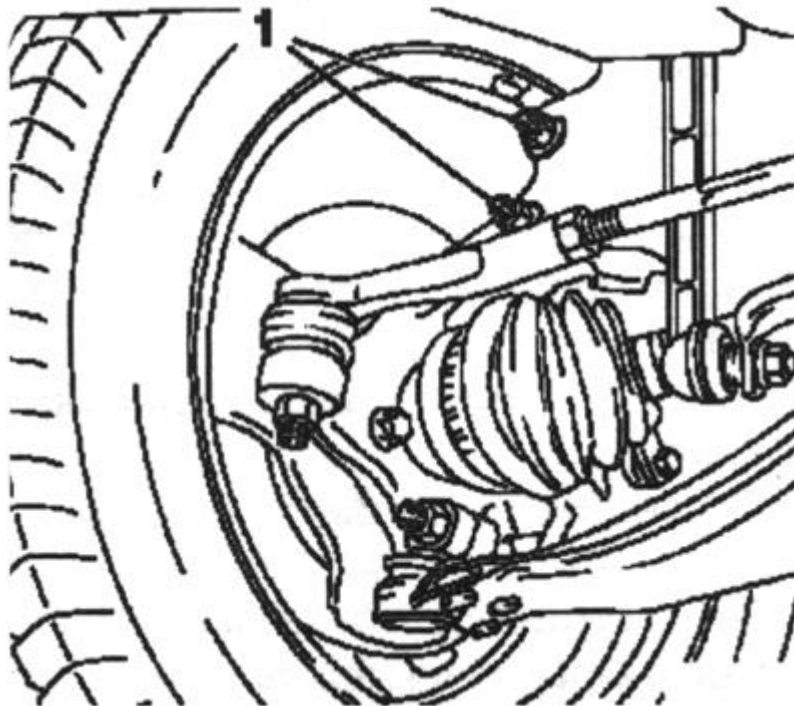


Fig. 4.24. Bolts supporting pipe spring stands at a turning fist:

1 - Bolts

Pull the front wheel on top and set the maximum positive disintegration. Tighten the two bolts supporting the pipe spring stands at a turning point fist 10 N-m, to hold down a spring rack in the steering knuckle.

Slowly lower the car on wheels. The collapse of the change in "negative" side - if necessary, turn the front wheel with his hands. When the "nominal value" collapse, tighten the bolt, a spring connecting the rack with swivel - torque 80 Nm +60 ° +15 °.

Test / inspection

Swing the car several times and then check the camber of the wheels.

Adjusting the convergence of the front wheels

NOTE

Adjustment should ever Revisions occur previ - on both rods. After regu-wording, draft may have difference in length not more than 5 mm.

Set the steering in the position of the rectilinear motion. Loosen the lock nut on the left and right rods - hold the draft open wrench. Adjust the toe-rotation rods - to "nominal value" (Figure 4.25).

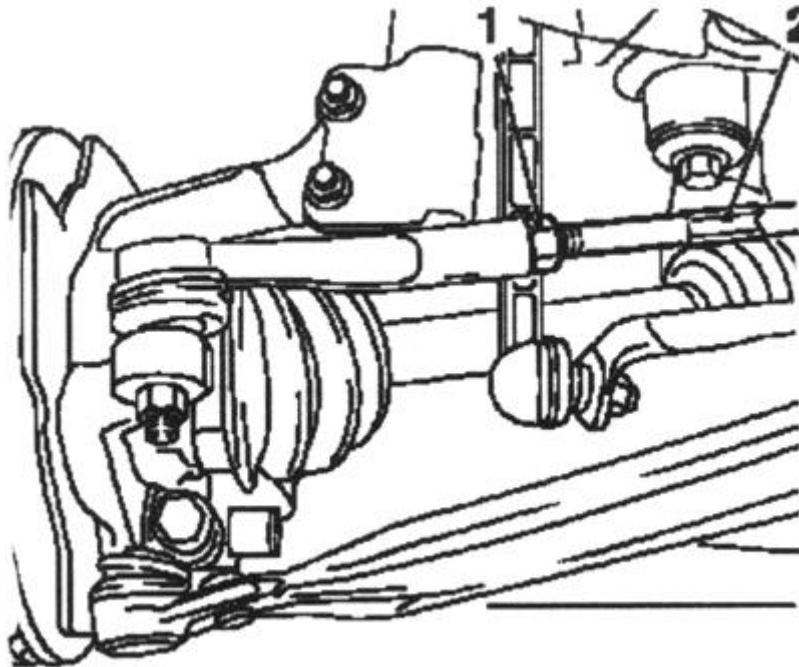


Fig. 4.25. Adjusting the convergence of the front wheels:
1 - nuts, 2 - draft

NOTE

Due Nominee value-based institutions, is allowed both type shozhde-tion wheels (+ toe) and discrepancy iour (- toe). Tyagi be adjusted so that both front wheels had one-kovoe positive or a negative convergence.

Tighten the nuts on both rods - tightening torque of 60 N-m. Hold open rod wrench - with protective covers on the steering mechanism will not be knotted. If necessary, loosen the clamp cover, eliminate twisting and re-install the clamp.

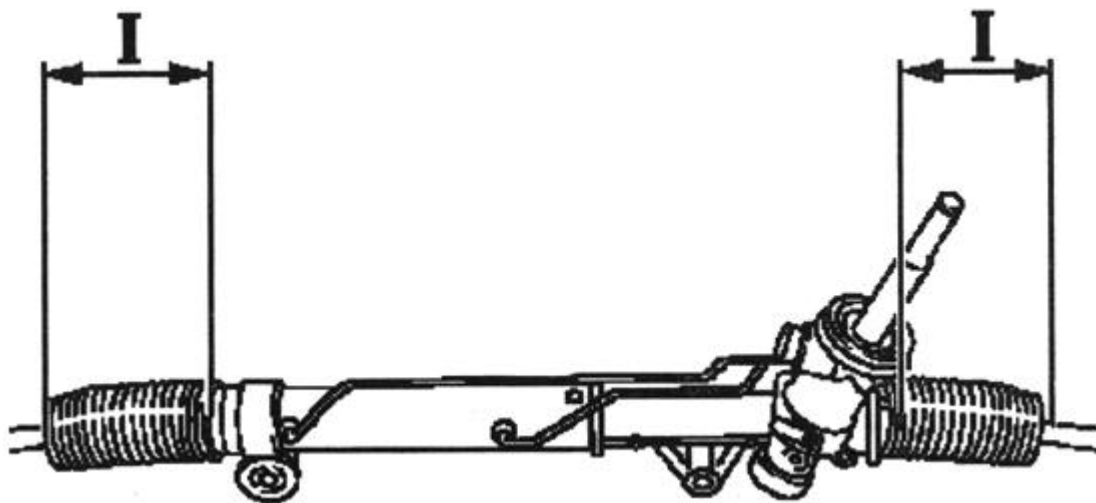


Fig. 4.26. Domestic covers steering rods

Test / inspection

Adjusting convergence - re-inspection. The steering wheel must be in the position of the rectilinear motion - is determined by results of a trial trip. Check / set the position of the rectilinear motion.

NOTICE

After exposure to the steering mechanism, in any case, check the position of the rectilinear motion of the steering. Situation rectilinear motion is achieved when the protective covers do not have the internal stress along the length of \ between the grooves on traction and steering body and the wheels are in the position of the rectilinear motion.

Test / inspection

Shaft of the steering mechanism can be installed in the intermediate shaft rotation through 360 °. This is obvious if protective covers are stretched or compressed when you install the steering wheel in the position of rectilinear motion, and the wheels while not in the position of rectilinear motion.

Adjustment

Turn the steering wheel in position rectilinear motion, remove the key from the ignition and let the trigger lock the steering column.

Remove the intermediate shaft with the axis of the steering mechanism. Turn the steering shaft so that the protective covers from both sides of the same length, and the wheels were in the position of the rectilinear motion. Install intermediate shaft on the steering.

The small difference between the position of the rectilinear motion of the steering wheel and the wheels can be eliminated by adjusting the convergence (change in length of rod).

3.11 The difference base chassis

The difference is the base of the chassis produced by shifting the angle of the wheels (front and / or rear) between the lines of contact points of contact of the wheels front and rear axles.

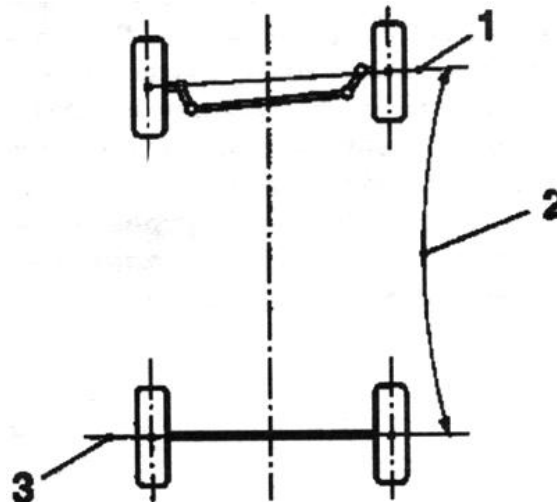


Fig. 4.27. The difference base Chassis:

1, 3 - lines of contact, 2 - offset angle wheel

Angle - positive, if the base of the right wheel, more than the base of the left wheel drive chassis and negative, if the base of the left wheels more than the right.

Difference base wheels generally measured in degrees. If the nominal value of the base is known, these data can also be expressed in units of length.

Center line wheel

Diametral plane of the wheel is the longitudinal axis of the vertical bus to the axis of rotation of the wheels.

3.12 Offset Wheel

Offset wheel represents the angular deviation between the line connecting the points of contact of the wheels on one axis and perpendicular to the axis of symmetry, passing through one point of contact of the wheels.

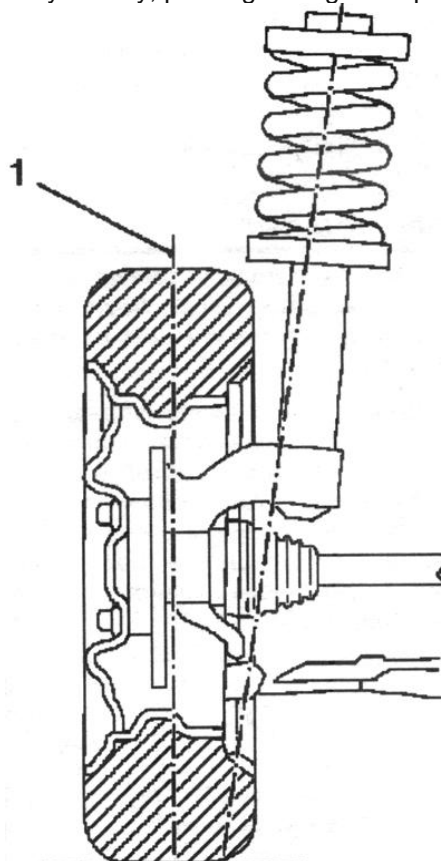


Fig. 4.28. Diametric plane to-forest:

1 - a plane wheel

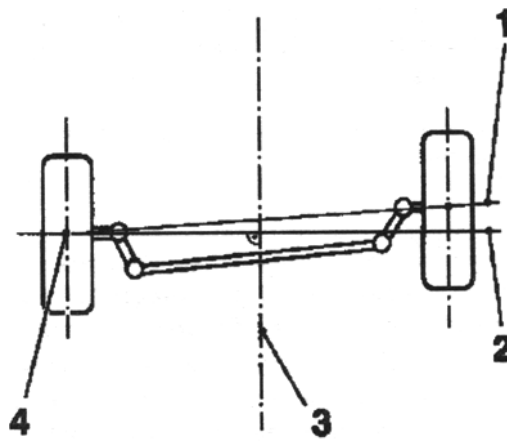


Fig. 4.29. Offset wheels:

1 - line angular deviation, 2 - axis perpendicular;
3 - axis of symmetry, 4 - wheel contact point

The angle is negative if the right wheel is shifted to the front left wheel and positive if the left wheel is shifted to the front right wheel.

Offset wheel measured in degrees. If you know your gauge, then these data can also be expressed in units of length.

3.13 Removing and installation arm suspension

Withdrawal

Remove the front wheel.

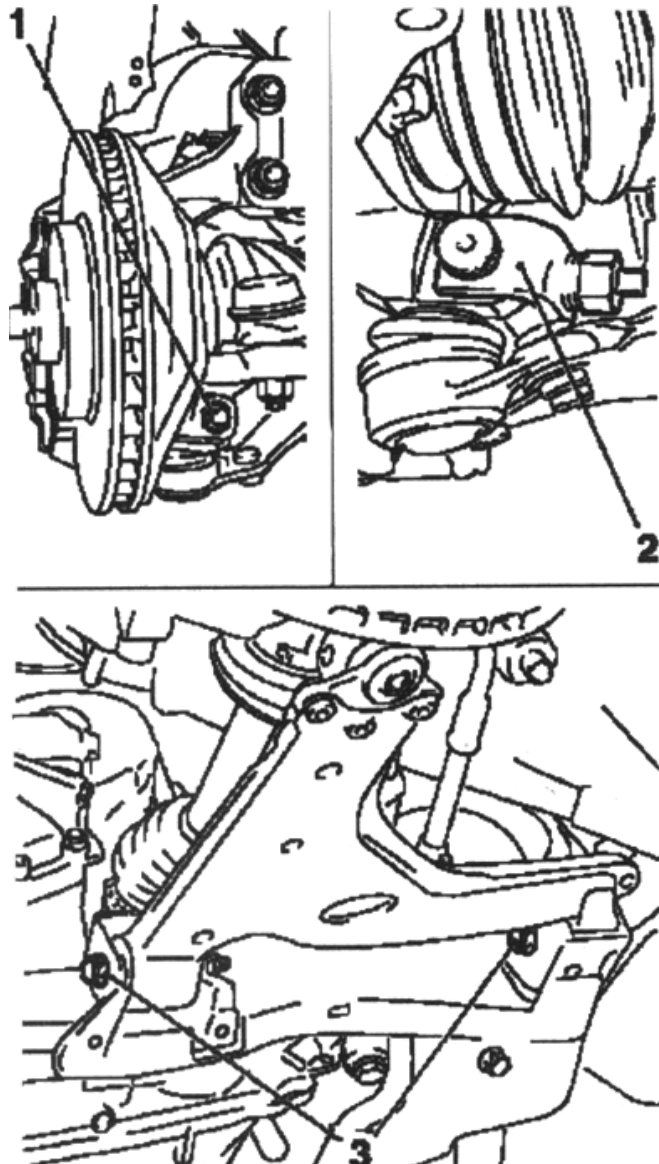


Fig. 4.30. Withdrawal lever under ever:

1 - bolted connection, 2 - a special device;
3 - bolted connection

Disconnect steering knuckle from the lever.
 Remove the bolt connection.
 Take the steering knuckle using a special device KM-915 (Fig. 4.30).
 Remove the joint from the steering knuckle.
 Remove the lever from the module front.
 Loosen the 2 bolts.
 Remove the lever from the holders in the front suspension subframe.

Setting

Set the lever in the front suspension subframe.

NOTE

Tighten bolted connection freely. Bolts fixing lever to stretcher front suspension tightened under Load (auto-mobile must stand on four wheels), with This both front si-ing weighted load 70 kg.
 Use 2 new bolt.

Tighten the 2 new nuts.

Attach the lever to the steering knuckle and tighten the moment 50 Nm.

Set joint to steering knuckle.

Assemble bolted connection, use a new nut.

Install the front wheel and tighten the bolts fastening point 110N-M.

Tighten the 2 screws fastening the lever to the front suspension subframe.

Load both front seats in the 70 kg weight.

Install 2 new threaded connection of the lever to the front suspension subframe and tighten the moment 90 Nm +75 ° +15 °.

NOTE

Cars must stand on oscilla-sah (check stand or yama).

3.14 Removing and installing racks CDC spring with shock absorbers

Withdrawal

Remove the front wheel.

Disconnect the wiring harness from the spring bar.

Move the locking mechanism down.

Turn the secondary locking mechanism in the direction of the arrow (Fig. 4.31).

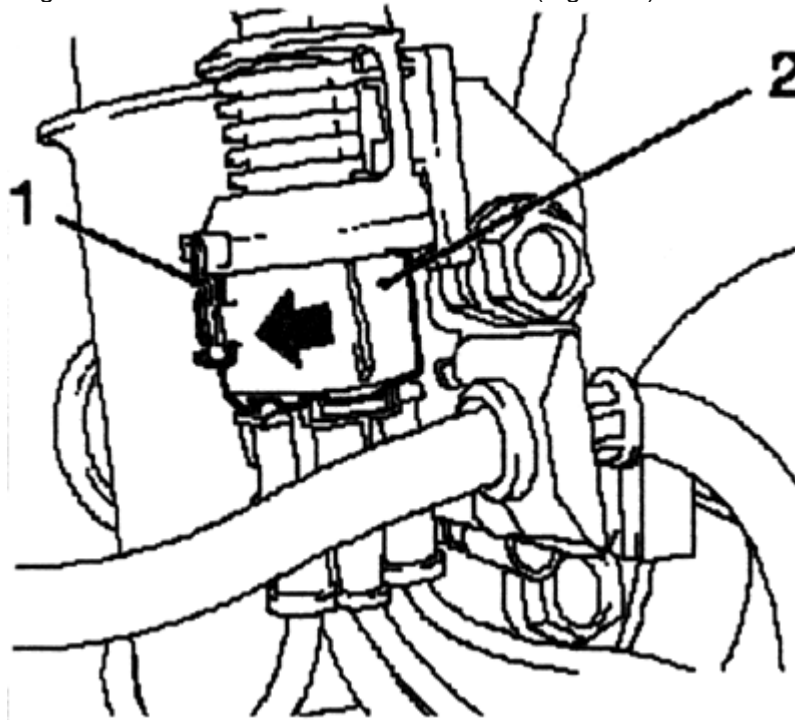


Fig. 4.31. Mechanism block:

1 - lock mechanism, 2 - a secondary locking mechanism

4 Disconnect the wiring harness connector from the wiring harness.

Disconnect the wiring harness from the spring bar.

Remove the sensor spring rack CDC from spring rack.

Loosen the screw.

Remove the sensor spring CDC from rack mount the sensor on the spring supports (Fig. 4.32).

Disconnect the brake hose from the pipe supporting spring rack.

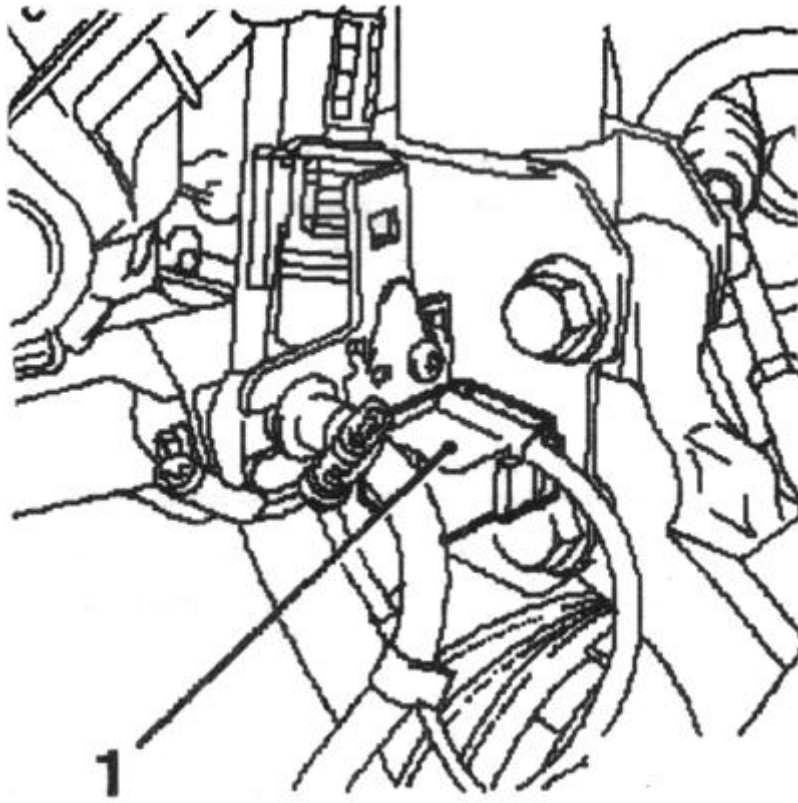


Fig. 4.32. Sensor spring Rack CDC:
1 sensor

Remove the clamp and pull the brake hose from the bracket (Figure 4.33).

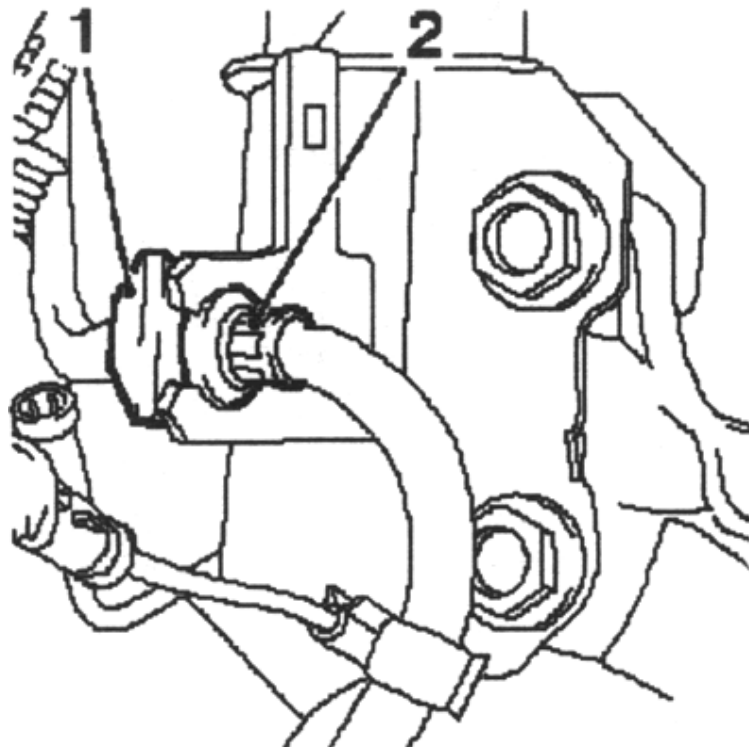


Fig. 4.33. Withdrawal inhibitory Hose:
1 - clip 2 - brake hose

Disconnect the swivel arm from the supporting tube spring racks car Opel Astra (Figure 4.34).
Hold for Lyskov open wrench.
Disconnect steering knuckle from the spring rack, unscrewing 2 bolts.
Tilt steering knuckle outwards.

NOTE

Before Disposal stopping the ring secure spring - rack.

Remove the retaining ring (Figure 4.35).

Remove the spring-rack.

Setting

Set a rack in a spring wheel arch.

Replace the spring-rack in the wheel arch.

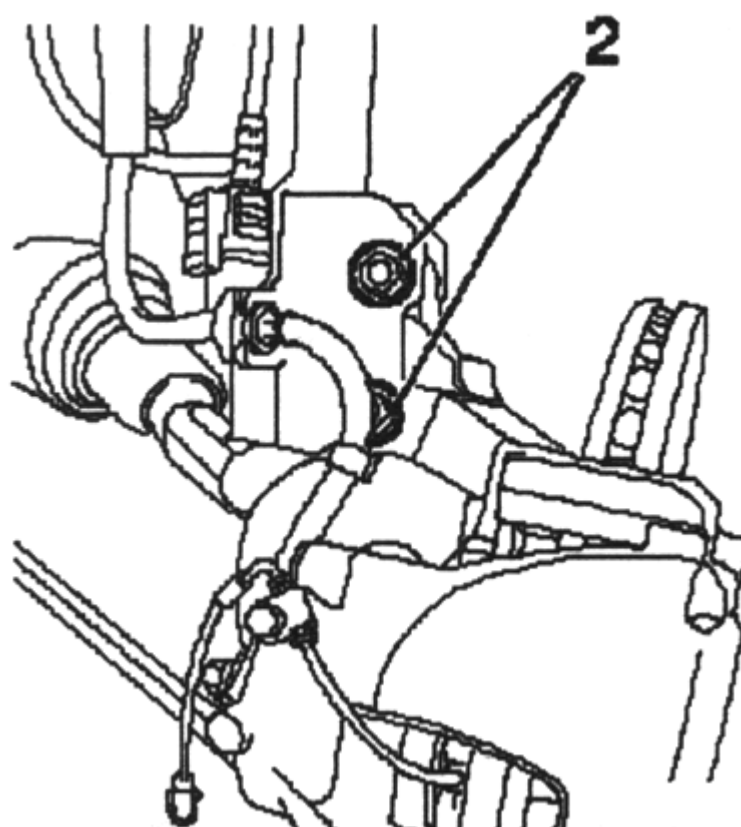
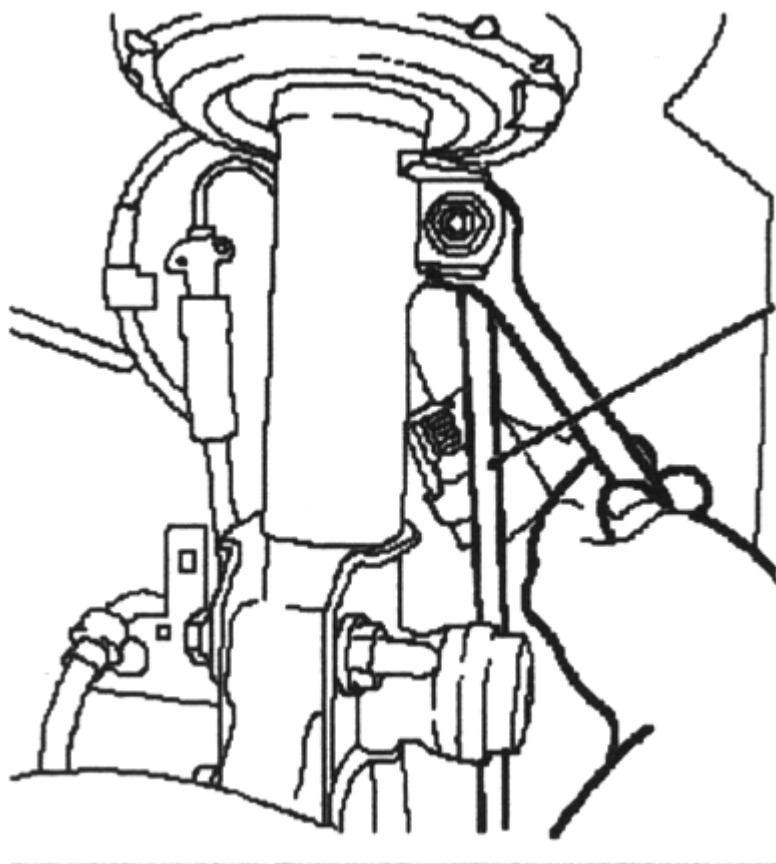


Fig. 4.34. Withdrawal Rotation arm:
1 - turning the lever, 2 - Bolting

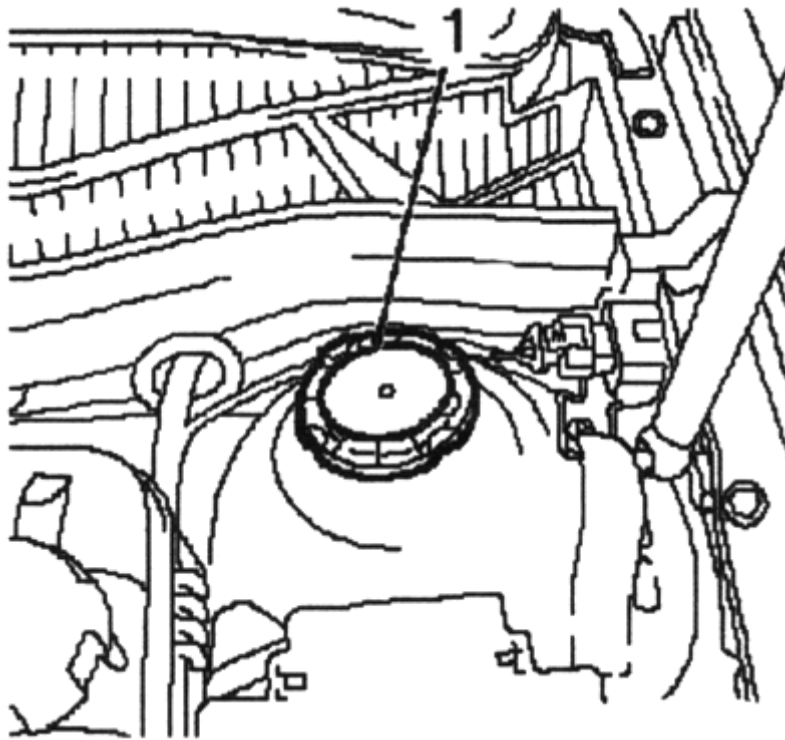


Fig. 4.35. Snap Ring:
1 - Ring

Attach the new circlip using appliances KM 6384 (Fig. 4.36).
Set a rack in a spring swivel fist.
Install 2 bolts.

NOTE

Set Bolts front. Not per-tyagivayte to adjustment the collapse of the wheels.
Use 2 new bolt.

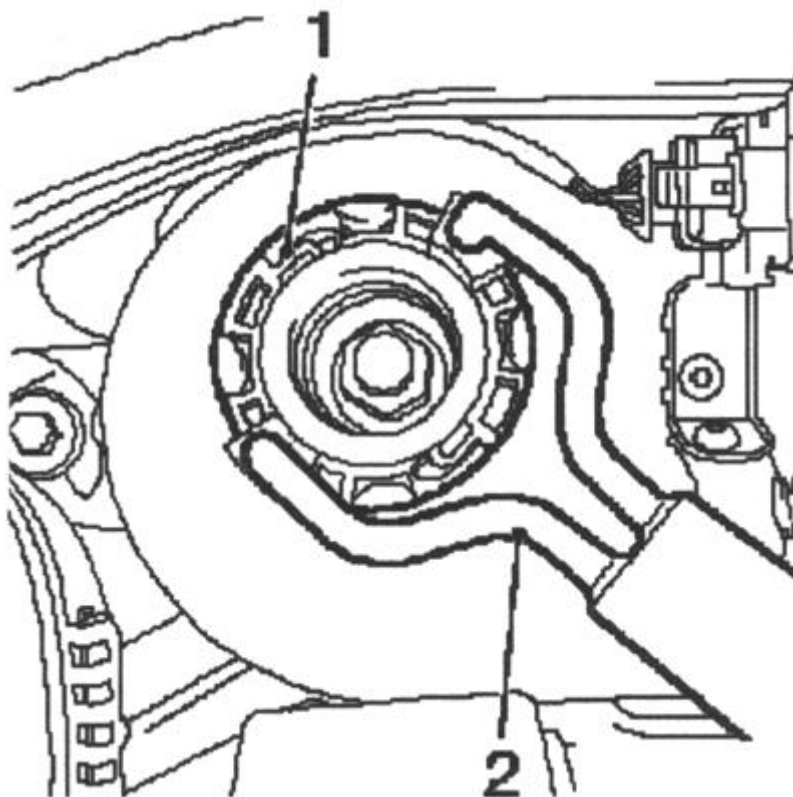


Fig. 4.36. Setting new ring:
1 - snap ring, 2 - adaptation

Use 2 new nuts.

Attach a swivel arm for supporting the pipe rack and tighten the spring element 65 Nm.
Use new nut.
Hold for Lyskov open wrench.
Attach the brake hose to the bracket supporting the tube spring rack.

NOTE

Correctly Route hose.

Install the brake hose bracket.

Attach the brake hose using a clamp.

Install the sensor spring rack CDC to mount the sensor on a spring rack.

Tighten the attachment bolt.

Install the wiring harness on a spring rack.

Attach the wiring harness in the clamp spring rack.

Connect 4 x wiring harness to the wiring harness.

Turn the secondary locking mechanism.

Slide the locking mechanism up.

Install the front wheel and tighten the bolts fastening point 110N-M.

Check and adjust the collapse of the wheels.

Check and adjust the collapse of the wheels.

2 Tighten the hinge that supports the spring the pipe rack to the steering knuckle, in 3 hours.

I. Tighten the 2 bolts moment 50 Nm.

II. Tighten the 2 new pivot point of 85 Nm.

III. Dauvergne 2 new joint by 75 ° and +15 °.

3.15 Replacement of the front damping arm bushings

NOTE

In general case both damp-ing Bushings must is replaced.

Withdrawal

Remove the lever.

Vypressuyte front damping sleeve with spetsal-tion tool KM-508-A-1 and KM-508-A-3 (Figure 4.37).

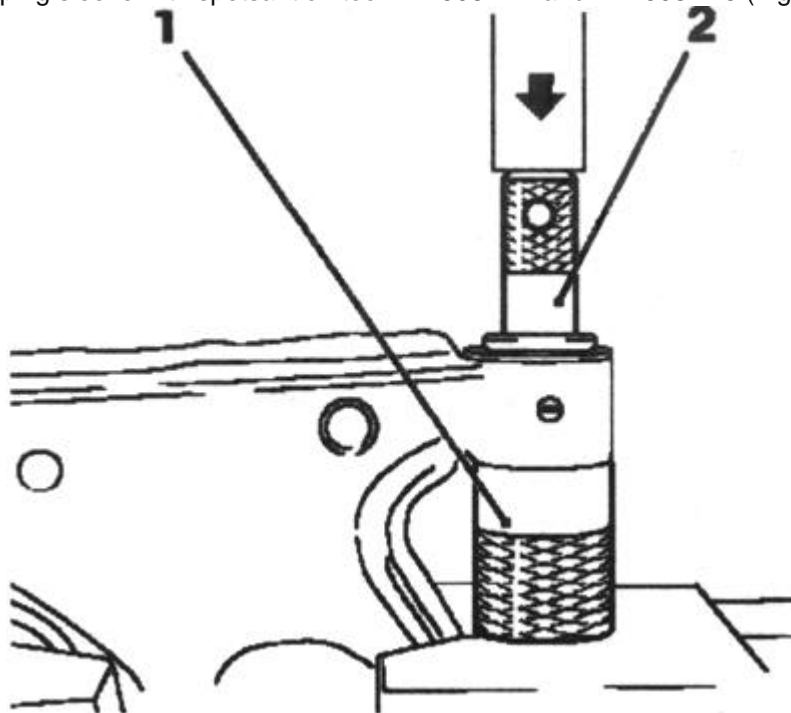


Fig. 4.37. Extrusion front dem-pfiruyuschey Bushings:
1,2 - special tool

Setting

Cover the front damping sleeve (1), adaptation of the CM-508-A-2 and the lever soapy water before mounting.

Zapressuyte front damping sleeve with special devices KM-508-A-3, KM-508-A-2 "KM-508-A-1 (Figure 4.38).

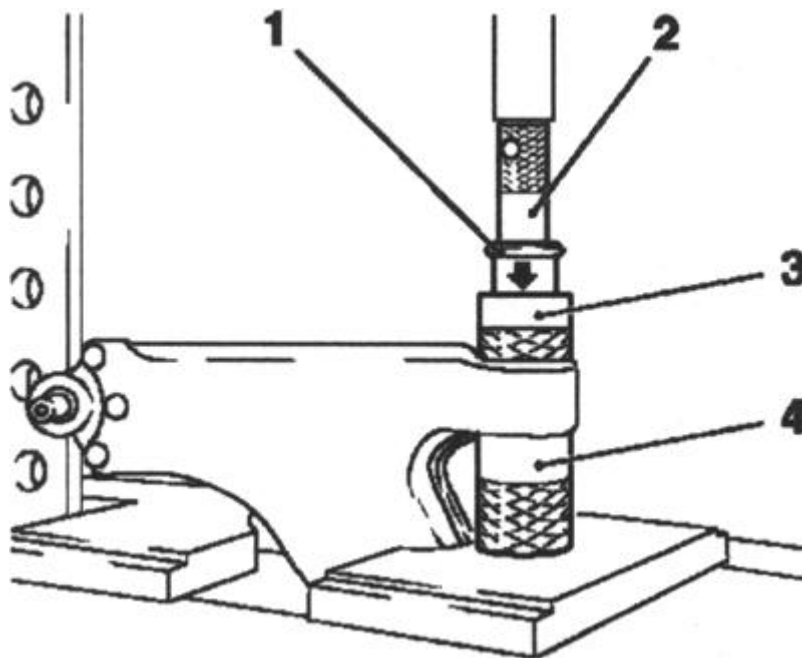


Fig. 4.38. Mounting front dem-pfiruyuschey Bushings:
1 - damping sleeve, 2, 3, 4 - a special tool

Install lever.

Replacing the rear damping arm bushings

NOTE

In general case, both damp-ing Bushings must is replaced.

Withdrawal

Remove the lever.

Attach special tool IMC-6615-10 to the lever.

Attach the IMC-6615-12 KMKM-6615-11.

Attach special tool KM-6005-2 to the special adaptation of the IMC-6615-11 and MCM-6615-12 from the ring.

Insert a special device through the hole damping sleeve. Attach special tool KM-6005-1-A from the inside to the IMC-6615-11. Screw the special tool IMC-6615-13 (Fig. 4.39).

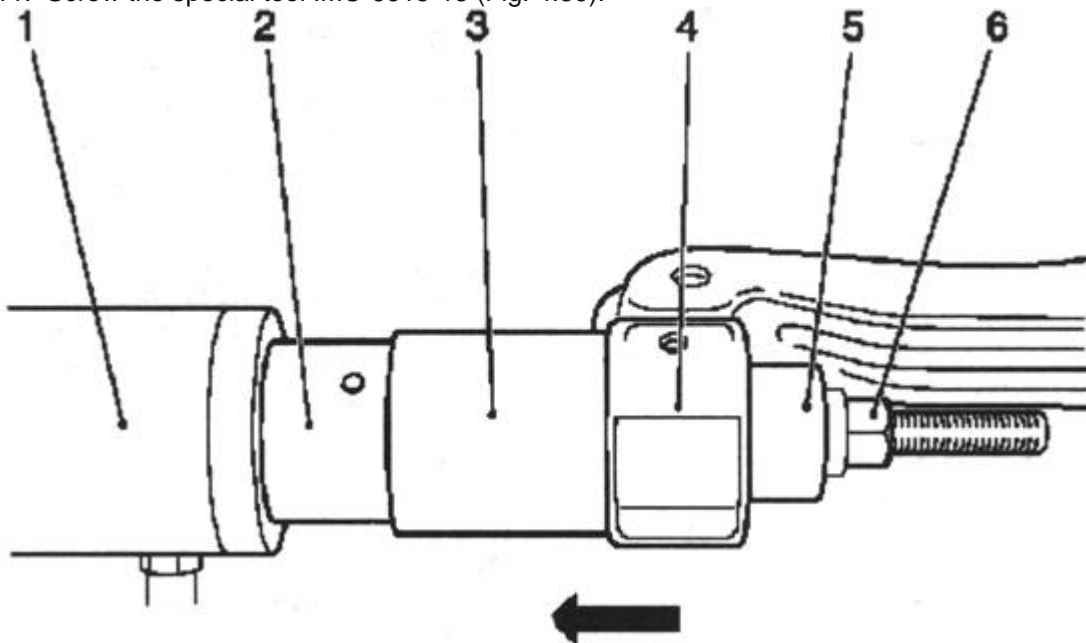


Fig. 4.39. Extrusion back damping Bushings:
1,2,3,5,6 - a special tool, 4 - damping bush

NOTE

Make in right located-zhenii tool. Arrow on ri-sunke 4.39 points Extrusion direction.

Connect the hand pump IMC-6616 with the adaptation to the IMC-6615-11.

NOTE

Watch for growth pressure on mano-meter MKM -6616. Check weary vochnoe position special at sposobleniya. Maximum load-ca hydraulic 6615-10 Stock of 70 kN or 260 bar.

Vypressuyte Remove the sleeve from the sleeve device KM-6005-2.

Setting

Install the new hub, using a special tool.

Connect the CM-6005-3 to the IMC-6615-11 together with the IMC-6615-12. Toothing KM-6005-3 should be aligned with a toothed crown damping sleeve. Set KM-6005-4-A for IMC-6615-11 and MCM-6615-12 (Figure 4.40).

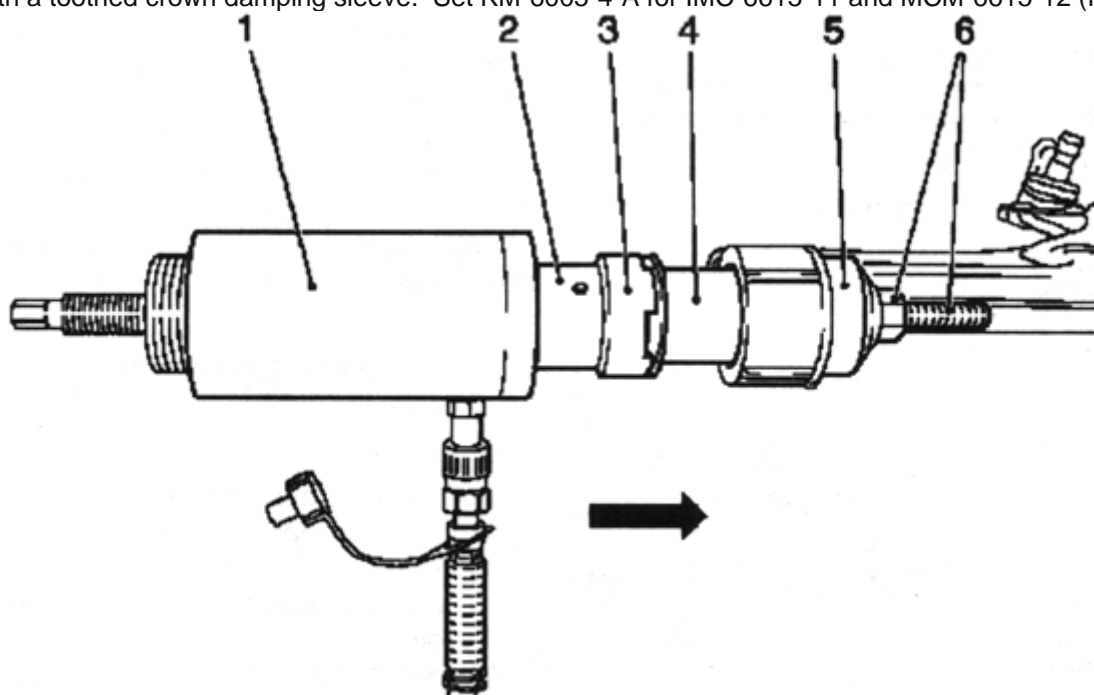


Fig. 4.40. Mounting back damping Bushings:
1,2,3,5,6 - a special tool, 4 - damping bush

NOTE

Make in correctness Set-ki nuts MKM -5515-13. Arrow of Figure 4.40 shows direction-ing pressing.
Tighten with fitnesses niyaKM-6615-13.

NOTE

Watch for growth pressure on ma-nometru MKM -6616. Check US-tanovochnoe position especially th tool. Maximum on-Transshipment hydraulic Stock 6615-10 70 kN or 260 bar.
Zapressuyte sleeve.

NOTE

Cover bush Silicone SmAZ-Coy.

Remove the special tool.

Install lever.

3.16 Pipe rack spring - Replacement of the spring supporting tube rack

NOTE

Replace spring pairs. Zama-nyayte absorbers only pairs. When replacement springs or dampers use elements, Koto-rye correspond version check book and level bundle.

Withdrawal

Remove the spring-rack.

Set a rack in a spring device.

NOTE

Make sure regulator pressure supporting tube spring-term Rack not has damage (cars with CDC).

Install special tool KM 6066 on a spring rack, attach a spring rack with a special tool KM 6066 to KM-113-2 (Figure 4.41).

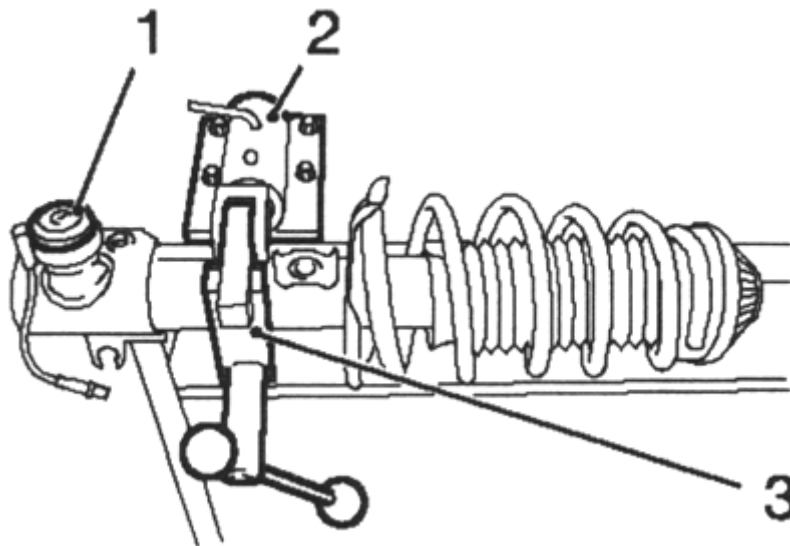


Fig. 4.41. Setting special instruments on tube spring Rack:

1 - a pressure regulator, 2, 3 - special tool

Mark the layout and installation of

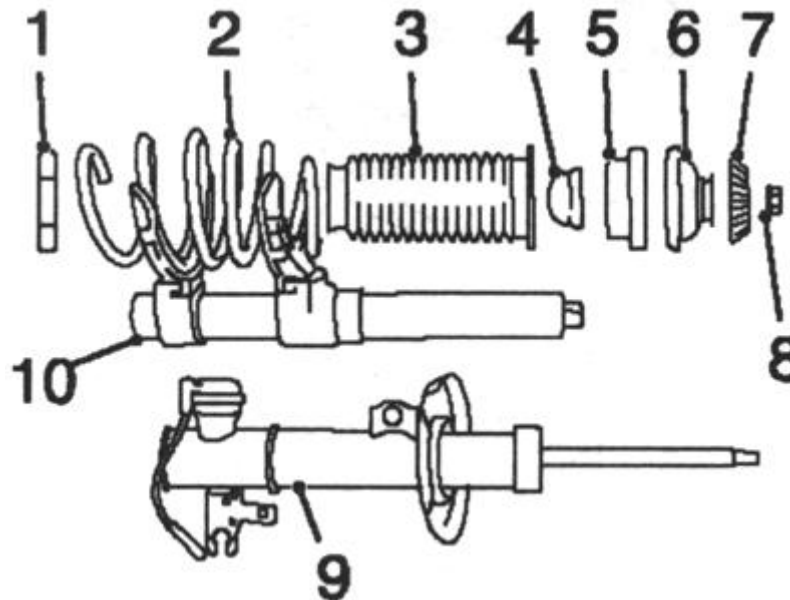


Fig. 4.42. Components spring stand-k:

1 - lower bracket, 2 - spring, 3 - support springs;
 4 - limiter, 5 - supporting bearing;
 6 - plate springs; 7 - damper ring;
 8 - supporting bearing; 9 - front desk;
 10 - special tool

Remove the spring-rack.

Attach special tool IMC-6068 to the spring.

Squeeze the spring before discharge pillow block.

Unscrew the nut bearing-with a special tool KM 6399.

Remove the main damping ring and a plate spring.

Remove the supporting bearing and restraint.

Remove the upper support springs and spring with lower support.

Setting

Assemble a spring rack.

NOTE

Please attention on tentative labeled ustanovoch-WIDE of and layout.

Install the spring in the spring supporting the pipe rack.

Install the upper support spring to spring.

Set buffer limiter.

Install supporting bearing with the upper plate of the spring and damper ring.

Install new bolts pillow block with a special tool KM 6399 for piston shock absorber and tighten the moment 80 Nm (Figure 4.43).

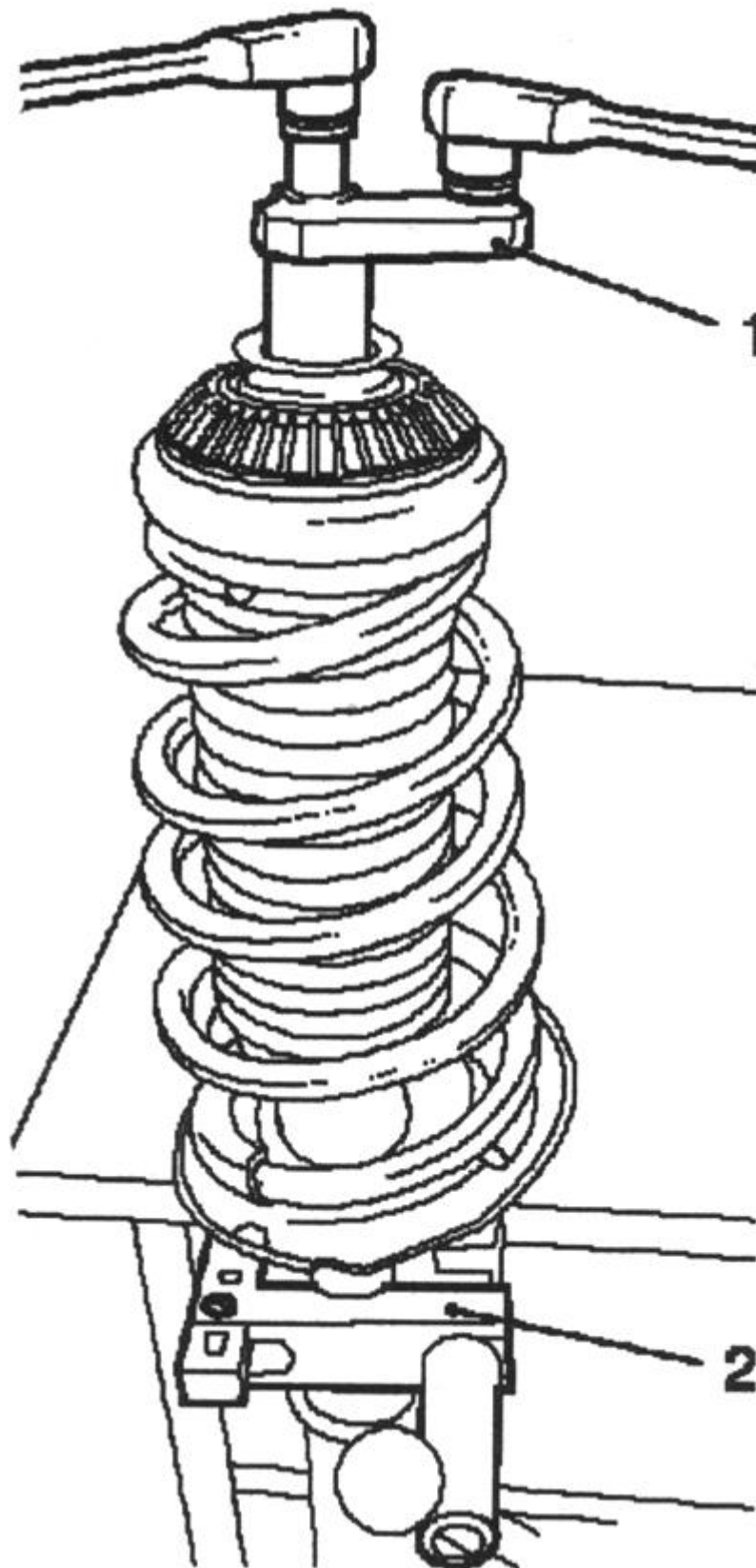


Fig. 4.43. Assembling spring Rack:

1 - a special tool KM 6399;

2 - a special tool KM 6066

Unload a special tool IMC-6068 and remove the spring.

NOTE

Make in that spring -stalled correctly.

Remove the rack from a spring KM 6066 (Fig. 4.43).

Install a spring rack.

Check the collapse of the wheels and adjust if necessary.

Adjust the chassis.

2 Tighten the hinge that supports the spring the pipe rack to the steering knuckle, in three stages.

I. Tighten the 2 bolts moment of 50 N-m.

II. Tighten the 2 new joint torque 85 Nm.

III. Dauvergne 2 new hinge further 75 ° and + 15 °.

3.17 Replacement Stabilizer

Withdrawal

Remove the front suspension subframe

Disconnect the swivel arm of the stabilizer on both sides.

Hold for Lyskov open wrench.

Disconnect the right and left holding the brackets with rubber mountings on the front suspension subframe.

NOTE

Mark Installation position rubber supports.

Remove the stabilizer (Fig. 4.44).

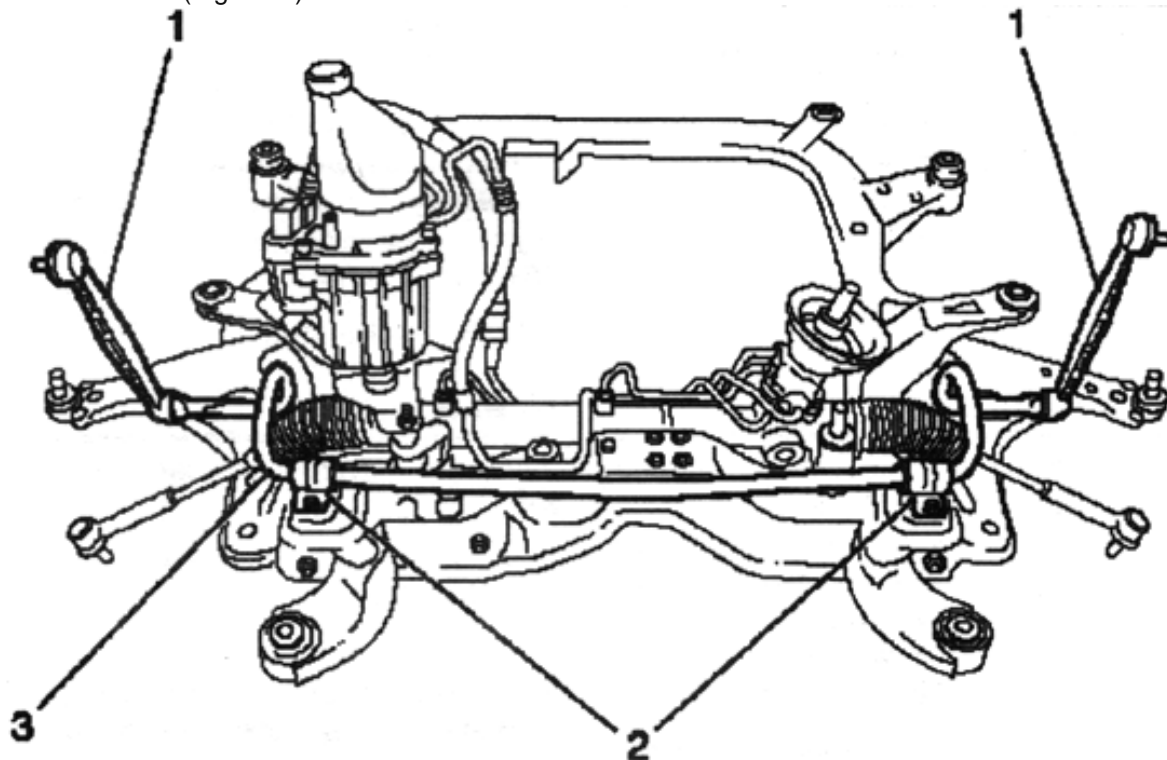


Fig. 4.44. Stabilizer front Suspension in collection with subframe:

1 - turning the lever, 2 - retaining brackets;

3 - stabilizer

Setting

Attach the stabilizer to the front suspension subframe.

Install stabilizer on the front suspension subframe.

Install rubber support stabilizer.

NOTE

Mark Installation position rubber support - Notch (arrow Figure 4.45) should is facing forward (in direction movement).

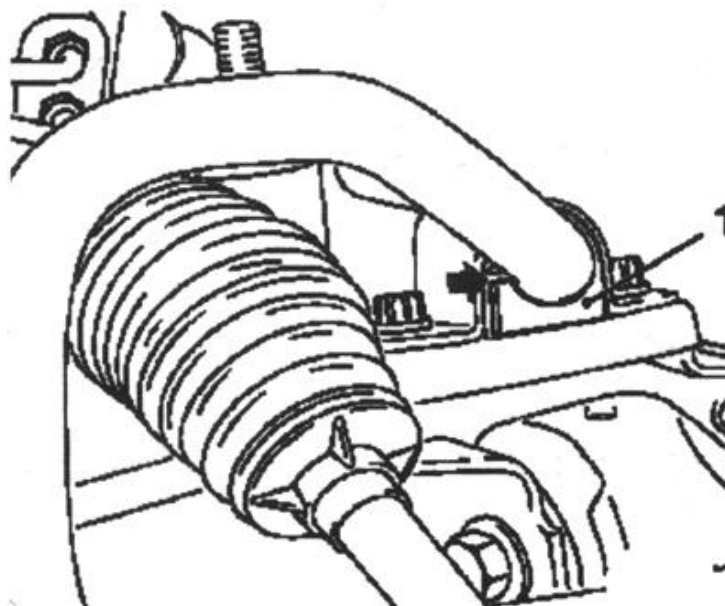


Fig. 4.45. Support Stabilizer:

1 - bracket

Install retaining bracket.

Attach the retention bracket to the front suspension subframe and tighten the moment 20 Nm.

Attach the swivel arm to the stabilizer on both sides and tighten the moment 55 Nm.

Use 2 new nuts.

During installation, hold for Lyskov open wrench.

Install the front suspension subframe.

3.18 Replacement of rotary lever

Withdrawal

Remove the front wheel.

Remove the rotary levers.

Disconnect the swivel arm from the supporting tube spring rack.

Hold for Lyskov bolt steering knuckle open wrench.

Disconnect the swivel arm of the stabilizer car Opel Astra (Figure 4.46).

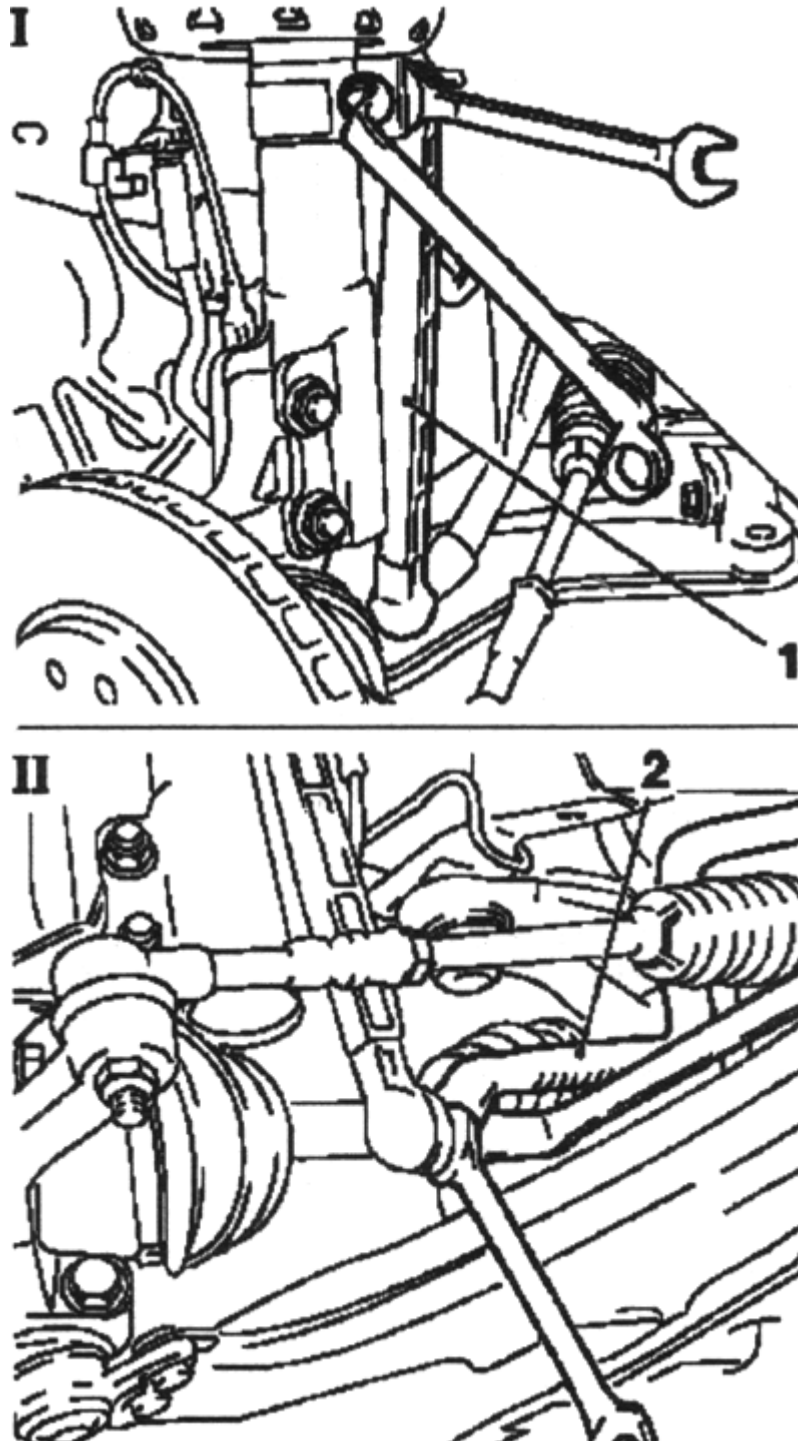


Fig. 4.46. Disconnecting Rotation ry-Chaga:

1 - turning the lever, 2 - Stabilizer

During the hold lever for Lyskov bolt swivel pin wrench.

Setting

Attach the swivel arm to the stabilizer, and tighten the mounting bolts are 55 Nm

Use 2 new nuts.

Hold for Lyskov bolt steering knuckle open wrench.

Attach a swivel arm for supporting the pipe rack and tighten the spring mounting bolts are 55 Nm.

Install the front wheel and tighten the bolts fastening point 110N-M.

3.19 Elastic beam rear suspension, Astra-G, Astra-H, Zafira - rear axle

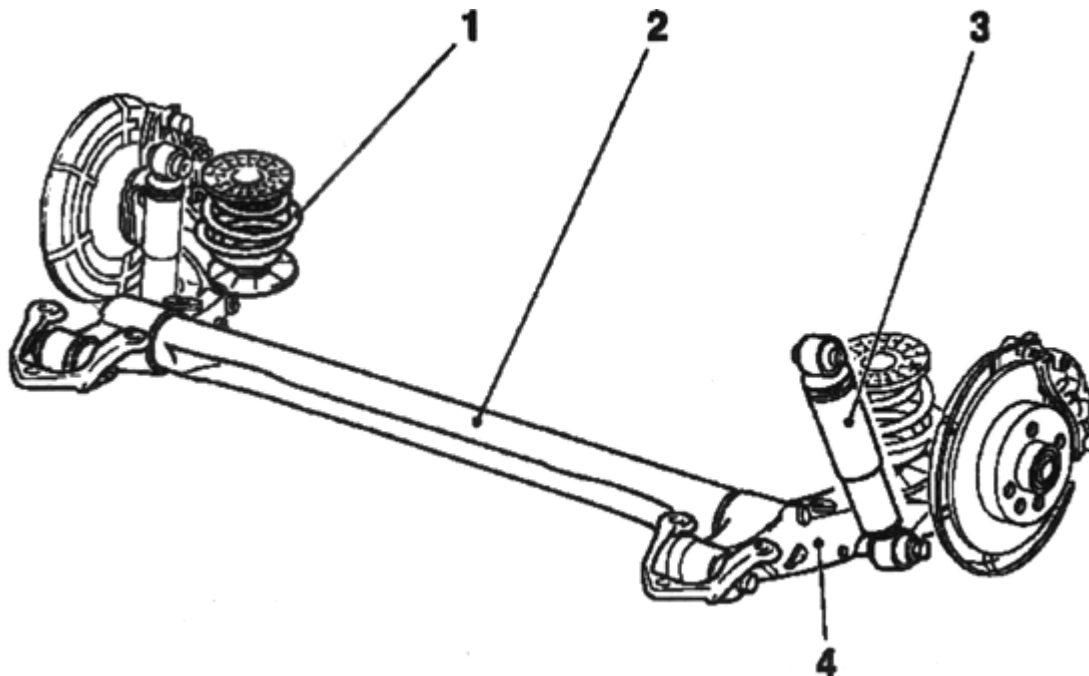


Fig. 4.47. Rear suspension:

1 - Rear spring, 2 - elastic profile (crossbar);

3 - shock absorbers, 4 - lever with a longitudinal mounting of the rear axle

Table 4.7 Potential problems, their causes and solutions

Possible causes failure	Method remove
Depreciation central part Tread Tires	
Low tire pressure	Bring to a normal tire pressure
Incorrect transposition tires	Relocate bus
Depreciation side Parts Tread Tires	
High tire pressure	Bring to a normal tire pressure
Incorrect transposition tires	Relocate bus
Wide wear side Parts Tread Tires	
Incorrect angle of convergence of the front wheels	Adjust the angle of convergence of the front wheels
Narrow wear side Parts Tread Tires	
Wrong angles slay or inclination of the axis of kingpin	Check the steering knuckle, levers, drive and suspension
Defective suspension	Perform repairs and, if necessary, replace the parts
Broken wheel balance	Otbalansiruyte wheel
Incorrect transposition tires	Relocate bus

The rear suspension on these models is a continuous bridge, working on torsion.

Profile of torsion is welded to two longitudinal levers. Depending on the model profile is used in different thicknesses, torsional profile itself is welded to the levers at different angles. This allows you to adjust the rear suspension to the weight and design (eg sports suspension) car Opel Astra.

3.20 Removing and installing wheel bearing

Withdrawal

Turn off the parking brake systems.

Release the handbrake lever (1) and disconnect the hand brake lever cover (Figure 4.48).

Loosen the parking brake cable adjusting nut return.

Remove the rear wheel.

In cars with drum brake mechanisms: remove the brake drum.

NOTE

For prevent fall torus OIML Shield and damage brake line, tie brake Highway to back pru-zhine at inhibitory cylinder to-forest use Cable ties.

In the Opel Astra cars with disc brakes: unplug the cable from the parking brake caliper brake.

Take control lever caliper brake mechanism with a screwdriver.

Remove the parking brake cable system.

Remove the clamp.

Pull the parking brake cable from the bracket.

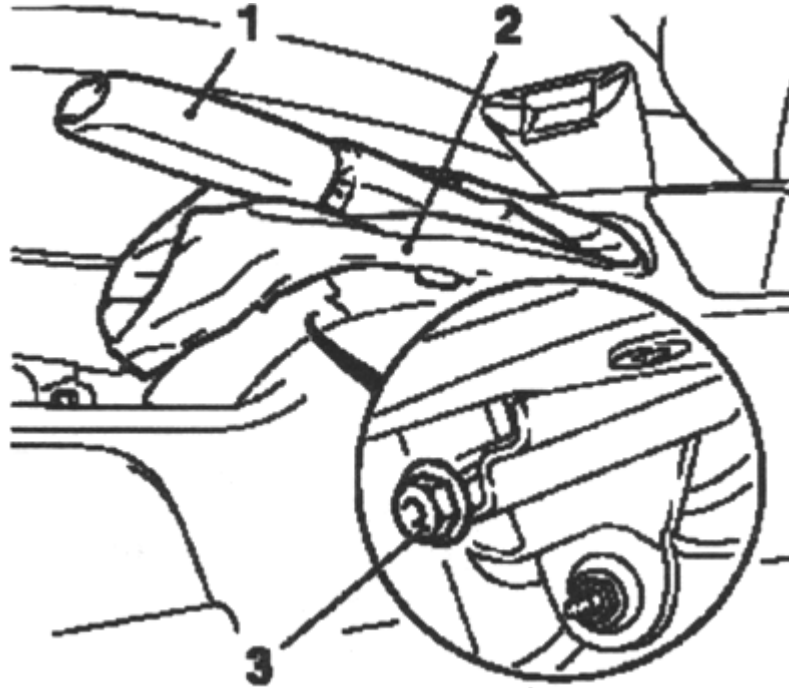


Fig. 4.48. Attenuation Rope parking brake:

1 - hand brake lever, 2 - cover handbrake lever;

3 - adjusting nut

Remove the brake caliper with brake suspension of the base plate.

NOTE

If not perhaps withdraw caliper brake mechanism with direction yuschey and brake shoes of inhibitory disk, for example, from - for wear inhibitory CD: remove the brake shoes inhibitory IU-nism rear wheel.

Unscrew the 2 screws fastening the suspension of the brake mounting plate.

Take the caliper brake with a guide from the brake disc.

Hang the caliper brakes and rear spring guide to using a suitable wire.

Remove the brake disc rear wheel.

Attach the mounting plate to the rear spring, using the cable styazhkie

Disconnect the wiring harness connector from the sensor installed on the wheel of the car.

Disconnect the module from a wheel bearing rear axle.

Loosen the 4 nuts (arrows) from the module bearing wheels (Figure 4.49).

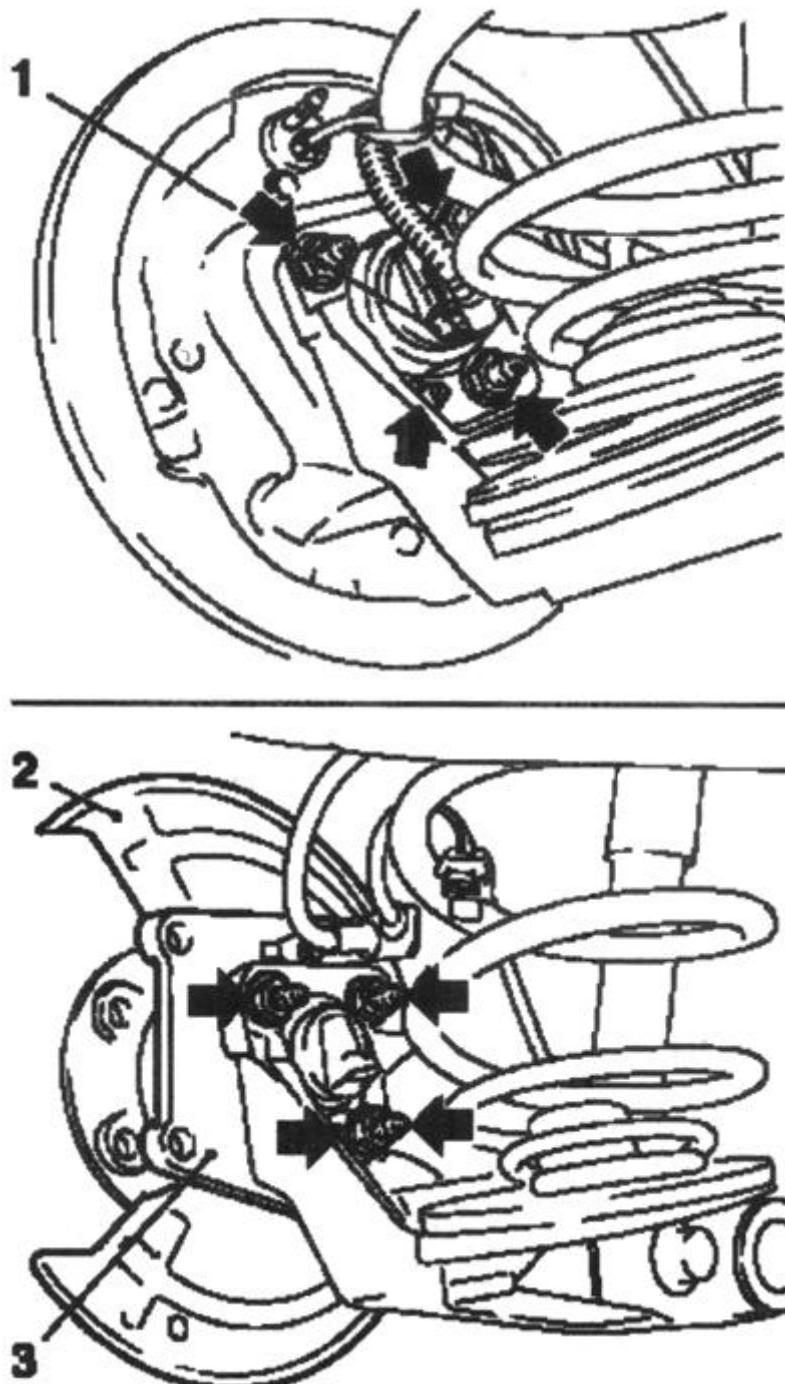


Fig. 4.49. Mounting Module podshipni-ka wheels:

1 - the wiring harness connector, 2-guard;
3 - mounting plate

Remove the wheel bearing module with a lid (2 - in cars with disc brakes).

Setting

In cars with disc brakes: attach the wheel bearing unit, the housing and mounting plate to the rear axle and tighten the bolts fastening point 50 nm, Dauvergne at +30 ° and +15 ° (see Fig. 4.49).

Tighten the 4 new nuts.

In cars with drum brake mechanisms: Set the module bearing wheels and a brake plate to the rear axle and tighten the moment of 50 N-m, Dauvergne at +30 ° and +15 °.

Tighten the 4 new nuts.

Connect the wiring harness sensor mounted on the wheels of the car.

In cars with disc brakes, install the brake disc brake rear wheel.

Attach the brake caliper with a guide to the anchor plate and tighten the mounting point of 100 Nm.

Slide the caliper brake mechanism to the brake disc.

Tighten the 2 screws fastening.

NOTE

Clear thread and set bolt fixing composition.

If you have been removed, install the brake pads rear wheel brake mechanism.

Attach the parking brake cable to the caliper brake.

Set the parking brake cable system in the bracket on the caliper brake.

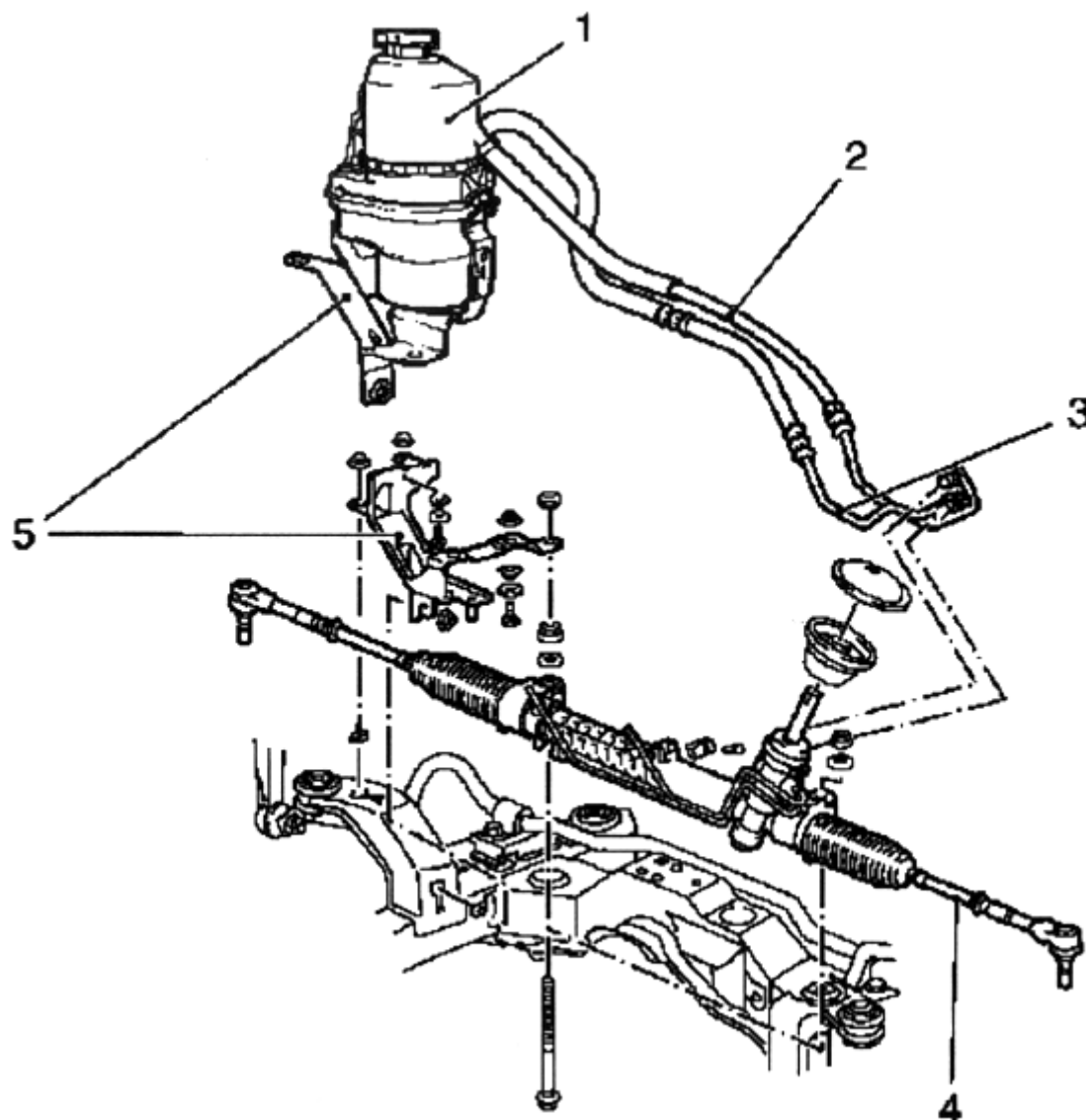
Attach the clip to the cable of the parking brake system.

Take control lever caliper brake mechanism with a screwdriver.
Set the parking brake cable system.
In cars with drum brake mechanisms, set the brake drum.
Install the rear wheel and tighten the bolts fastening point 110N-M.
Adjust the hand brake.

4 STEERING GEAR

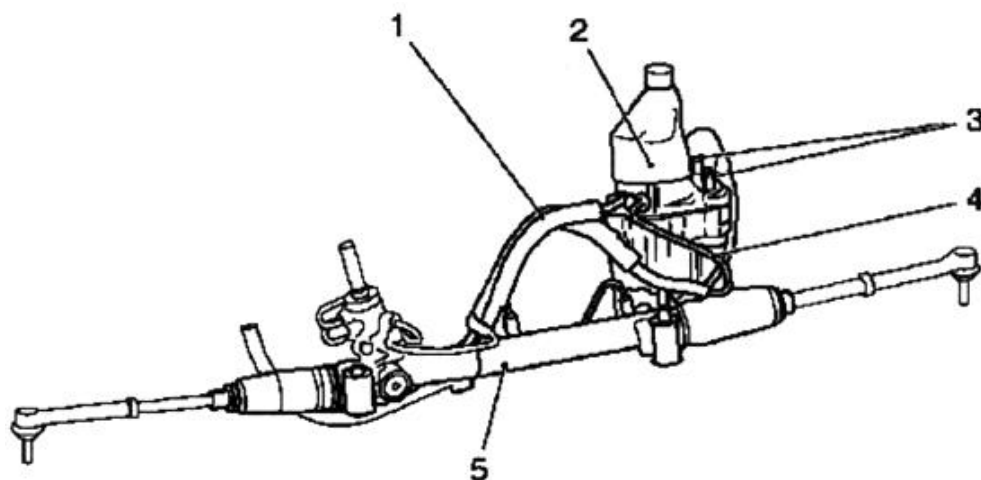
Opel Astra car has power steering with steering (EHPS), which provides optimum performance in all conditions.

4.1 EHPS - How it works



Helmsman mechanism Astra's H (TRW):

- 1 - electro-hydraulic unit (TRW);
- 2 - return pipeline 3 - flow line;
- 4 - steering mechanism;
- 5 - Bracket, electrohydraulic module



Helmsman mechanism Vehicle Astra H (ZF EHPS):

- 1 - return pipeline; 2 - electro-hydraulic module;
3 - the wiring harness connector, 4 - pressure pipeline;
5 - steering mechanism

Electro-hydraulic power steering reduces the force on the steering mechanism. The hydraulic system also acts as the steering system with power used on other models, but it comprises a hydraulic pump with electric drive, independent of the motor vehicle. The control unit and hydraulic pump form a single unit and can be replaced only in the collection.

The force of EHPS regulated by a control unit as a function of engine speed and in accordance with the three-dimensional characteristics of the adjusting motor.

In the car Opel Astra-H uses two different systems EHPS.

EHPS production TRW used on versions with petrol engines of small power and Z 17 DTL and not included in the system bus CAN. This system EHPS is the same as EHPS II used in the Astra G. For diagnostic purposes, this system has its own line of diagnosis (diagnostic output 7). EHPS production TRW offers two-stage, depending on the load, the regulation speed of the pump (2 speed). Value is determined by the load current that the motor consumes electrical system of the car.

EHPS ZF is used in the production of gasoline engines and heavy-duty Z 17 DTH and is connected with bus HS CAN Astra-H. EHPS production ZF operates depending on the speed and load, and uses two different adjustment card. Appropriate traffic conditions are determined by the speed of the car as a function of displacement of the steering wheel and steering servosilie decreases with increasing speed. On cars with sports chassis, adjusting the second card can be activated power button sport mode.

Recommended values moments

Component	Moment torque, N - m
Tube feeding and return to the electrohydraulic module ZF	16
The supply pipeline to the electrohydraulic module (TRW)	30
Tube feeding and return to the steering mechanism ZF	16
The supply pipeline steering mechanism (TRW)	30
Damping bushing bracket and electrohydraulic module (TRW)	7
Bracket electrohydraulic module to the steering mechanism	22
Bracket electrohydraulic module to the front suspension subframe	22
Bracket damping engine block to the rear of the gearbox	80
Bracket damping engine block to the rear of the damping engine block	55
Bracket directing switch to the front suspension subframe	20
Heat shield to the steering mechanism	4
Clamping bolt block steering column	22
Steering rod to tie rod nut	60
The steering mechanism to the front suspension subframe	45 N-m + 45 ^{to} +15 ^{**}
Steering wheel to the steering shaft	30 ***
Power steering column to the crossbar	22
Returnable tube to the steering mechanism (TRW)	30
Steering arm to the rail steering mechanism	90 **
Tie rod to steering knuckle	30 N-m + 90 ^{to +15}
Intermediate shaft to the shaft of the steering mechanism	24 ***
Intermediate shaft to the steering shaft	24 ***

* Use new nuts and bolts.

** Clean the threads on the rail and cover with a fixing composition.

*** Clear the threads and install the bolt with a fixing composition.

Note: The bolts that are tightened at the moment and the corner (beyond the elastic limit) can not ispolzovatsyapovtorno, having to turn away.

Technical data hydraulic Steering Management

Engines	TRW	ZF
Versions	Vehicles with right-hand-steering and cars with left-hand steering	
Gear ratio	15:1	15:1, 14:1 *
The working fluid as the working fluid number from a catalog. (1 l) № spare parts. (1 liter) volume filling	Special oil Pentos 1940 9054 675 ml	sinCHF202/11S 0766 4116 600 ml ** 700 ml ***

Elements of a EHPS

Element	Construction	Element	Description
Control unit	--	Element mapping	--
A1A75	Control unit - electro-hydraulic power steering	RH	Combination of devices
A65	The control unit - control Headlights (Xenon headlights)	P6	Information display
A84	Engine control module	P9	Triple information display
A105	Column Module	Connectors	
		H110	Diagnostic connector

Possible failure of causes and ways remove

(Steering management with booster)

Possible causes of failure	Remedy
Increased free lift steering	
Loosening the adjustment screw lock slats	Tighten
Loosening the bolts fastening the steering mechanism	Tighten
Looseness or wear of ball joints steering rods	Tighten the fixing or replacing the hinges
Tight rotation of the steering wheel (the lack of gain)	
Slipping belt drive hydraulic pump	Adjust belt tension
Damage belt drive pump	Replace belt
Insufficient level of working fluid	Restore the liquid level to normal
Contact with air in the hydraulic system --	Remove air
Twisted or damaged hoses	Eliminate twisting or replace hoses
Insufficient pump pressure booster	Eliminate or replace a malfunctioning pump
Seized Distributor	Replace
Higher internal leak in the pump	Replace defective pump parts
Increased leakage of fluid from the steering mechanism	Replace defective parts
Warping or damaged seal steering gear or valve	Replace seals
Fuzzy return the steering wheel in the middle position	
Increased time of turning the ball joints tie-rod ends	Replace
Excessive tightening of the adjustment screw lock slats	Properly tighten the screw
Shortness of cranking the internal hinges and / or joints of tie-rod ends	Replace
Loosening the mounting bolts to the steering stretcher	Tighten bolts
Worn universal joint steering shaft and / or sealant	Eliminate or replace defective
Deformation steering rack	Replace
Damage bearing drive gear	Replace
Twisted or damaged hoses	Eliminate twisting or replace hoses
Damage pressure control valves	Replace
Damage to the bearing shaft of the rotor pump	Replace bearing

Noise (noise) in the steering control	
Touching hoses on the body	Right to lay pipes
Looseness arm steering	Tighten mounting
Looseness steering rods and / or ball joints traction lugs	Tighten mounting
Worn steering rods and / or ball joints	Replace
Increased noise hydraulic pump	
Insufficient level of working fluid	Restore the liquid level to normal
Contact with air in the hydraulic system	Remove air
Loosening the mounting bolts pump	Tighten bolts

4.2 The visual differences between the systems, TRW and ZF

TRW System

Pail hydraulic round.

Wiring harness associated with electro-hydraulic module can not be separated.

Pipelines hydraulic system, laid individually to the electrohydraulic module and are fastened through the coupling nut or clamp.

System ZF

Pail hydraulic circular shape, with two flat areas.

Wiring harness, connected with electro-module via two connectors.

Pipelines hydraulic system attached to an electrohydraulic module and the steering mechanism through the central bolt.

4.3 The steering mechanism - How it works EHPS ZF

The control unit controls the system EHPS on the map, depending on the angular velocity of rotation of the pump hydraulic system. A car's speed is transmitted to the control unit via the bus EHPS CAN.

Sensor angle

EHPS production TRW, which is not associated with the bus CAN, does not have a sensor angle. Instead, the information is used to increase the pressure in the steering mechanism, which occurs when you turn the steering wheel.

Vehicles with antilock brake system ESP MK60 have a rotation angle sensor in the CIM. The vehicles Opel Astra with EHPS ZF, information from the sensor angle CIM is transmitted through HS CAN bus control unit EHPS. Because of the large power consumption of hydraulic pump is not activated until the engine is not working. If during the trip is the refusal of an alternator, hydraulic pump is switched off to protect the battery from the discharge.

4.4 The wiring harness connector electrohydraulic module

Connector wiring harness car Opel Astra is located under the coolant expansion tank, close to the control unit anti-lock braking / hydraulic modulator.

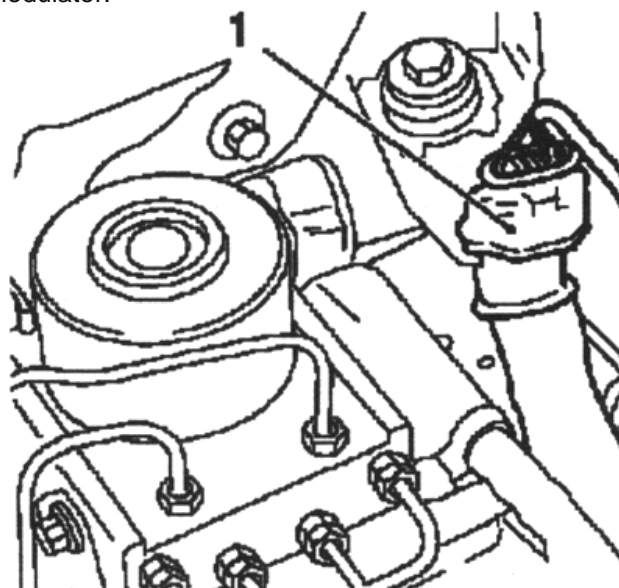


Fig. 5.3. Connector tourniquet wires electro-hydraulic module:

1 - Connector

Pin - wiring harness connector 2-pin (x2) (ZF)
Connector tourniquet wires for individuals are located on electrohydraulic module.
 Pin - wiring harness connector 3-pin (ZF)
Connector tourniquet wires located around a etsya on electro mo-barrel ZF.

Pin - connector tourniquet wires with a 5-pin (X 1) (TRW)

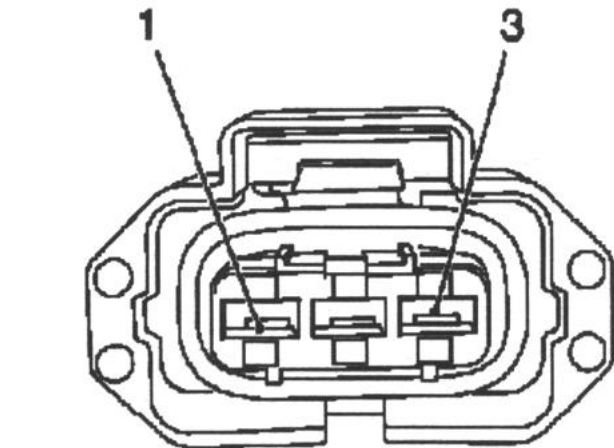
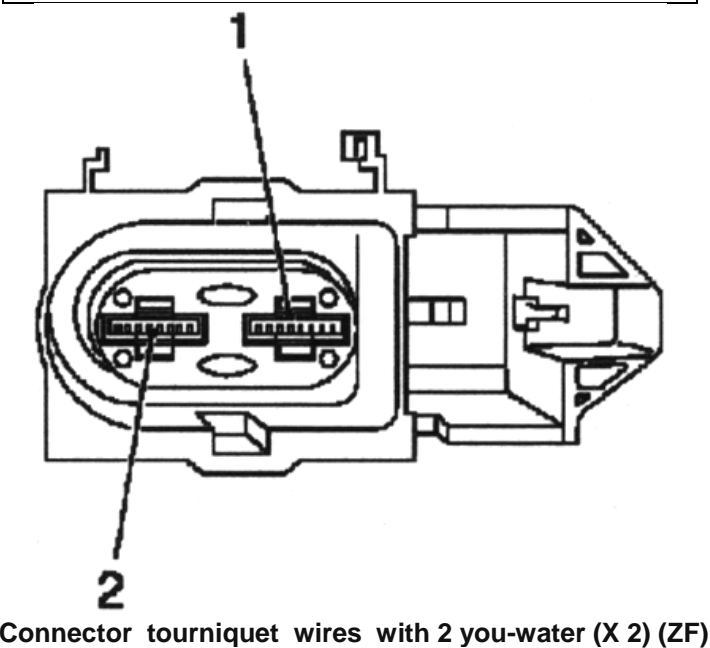
Conclusion	Appointment	Signal Type
1	Ignition is on (output 15)	I
2	HS CAN high (only ZF)	I / O
3	HS CAN low (only ZF)	I / O
4	K-line (only TRW)	I / O
5	Signal speed of the engine (only TRW)	I

The wiring Contact - connector tourniquet wires with 2-pin (X 2) (ZF)

Conclusion	Appointment	Signal Type
1	Battery + (pin 30)	I
2	Massa (pin 31)	I / O

The wiring Contacts -- connector tourniquet wire 3-pin (ZF)

Conclusion	Appointment	Signal Type
1	Ignition is on (output 15)	I
2	HS CAN high (only ZF)	I / O
3	HS CAN low (only ZF)	I / O



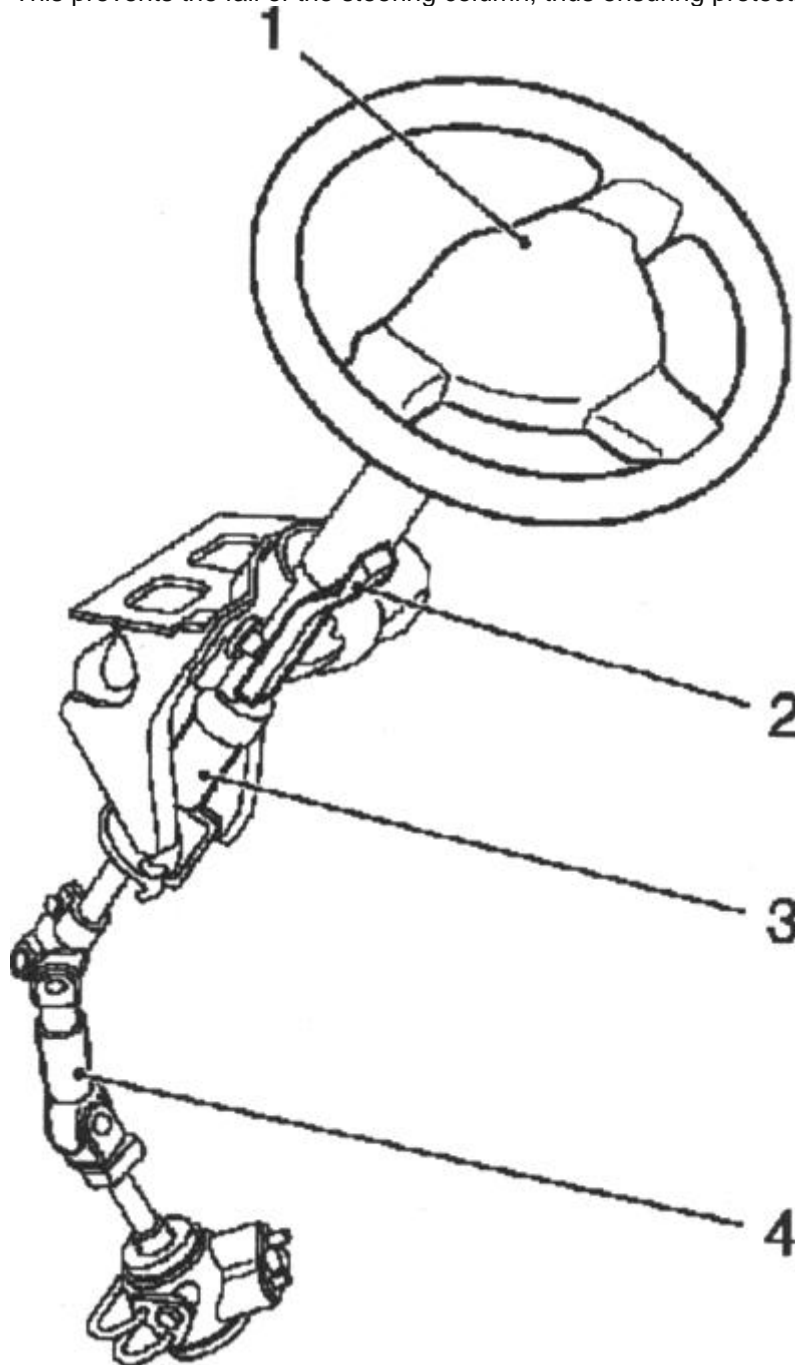
Connector tourniquet wires 3 you-waters (ZF)
Measurement of the slats is achieved by use of different axial joints

Manufacturer	Attitude	Proceedings Reiki	Application
TRW	15:1	68,3 mm	Basic chassis
ZF	15:1	72,5 mm	Basic chassis
ZF	14:1	68,3 mm	Sport chassis
ZF	14:1	66,8 mm	The sports chassis with 18 "wheels

4.5 Casing steering

New steering column cover for a car Opel Astra-H is adjustable in length and slope. The steering wheel can be adjusted in length by 50 mm, the slope of - 40 mm.

Working steering column in a collision has also been improved. Steering column is equipped with a safety device that prevents a drop in the steering column in case of collision. The protective device consists of a pin, which in a collision is in a groove. This prevents the fall of the steering column, thus ensuring protection of the driver.



Steering column:

- 1 - steering wheel, 2 - steering wheel;
- 3 - adjustment lever on the length and angle;
- 4 - intermediate shaft

In the locked position of the adjusting lever is fixed in a secure position in facing the steering wheel.

4.6 Steering gear - Steering Gear / tie rods

The steering mechanism of a car Opel Astra-H rack, as in the Astra-G. The steering mechanism is connected with the front suspension subframe by damping sleeves. There are two different gear ratio. The main version has a gear ratio of 15:1, and the sport version - 14:1. As with the Astra-G, the change gear ratio is achieved by various designs of axial joints tie rod.

Steering Gear

Changing of the slats is achieved through the use of different axial joints.

There are three different designs of axial joints tie rod.

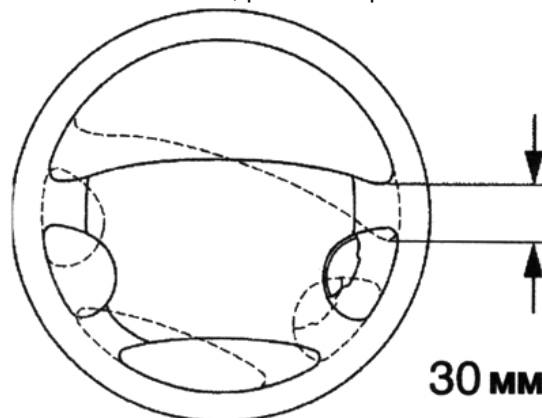
Reinforced axial joints tie rod

Construction:

	Size
Basic	7,2 mm
Sports	3,0 mm
Sporting with 18 "wheels	--

4.7 Steering Gear - Checking wheel play

At the stationary vehicle, setting the wheels in motion in a straight position, rock the steering wheel from side to side with little effort. If the gap exceeds the allowable, perform repairs.



Scheme verification wheel play

Maximum backlash: 30 mm.

4.8 Steering Gear - Testing the efforts of the steering wheel

NOTE

Before holding verification, pro-Believe pressure in tire type tires and surface contact.

Install the steering wheel in a central position.

Remove the steering wheel pad.

Start the engine and check idle.

Using a torque wrench, measure the force on the steering wheel in both directions (Fig. 5.8).

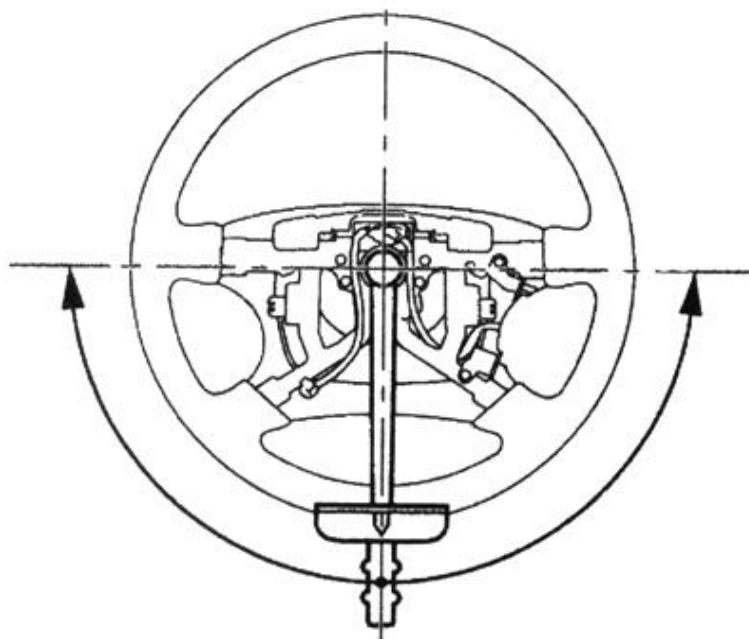


Fig. 5.8. Measurement efforts on steering wheel in both directions

Maximum allowable force: 6N-m.

If the force on the steering wheel more tolerance, repair power steering.

Tighten the nut fixing steering wheel.

Tightening torque: 35 Nm.

Install the steering wheel pad.

4.9 Steering mechanism - Pumping system hydraulic power steering

Check the working fluid in the tank.

Raise the front of the car and set it on the stand.

When the engine is off, turn the steering wheel from lock to lock several times.

Lower the car.

Start the engine and check idle.

Turn the steering wheel from stop to stop holding it in the extreme position 2-3 with. Repeat this procedure three - four times.

Turn off the engine.

Verify that no foaming or emulsification of the liquid. If foaming or emulsification verify the absence of leaks in the system.

Check the working fluid.

4.10 Steering Gear - Check tie-rod ends and seals

Raise the car so that the front wheels were displayed. Tie rods are mounted in clusters levers left and right body axis. From moisture and dust protected by rubber gaskets tips (covers). Check the tips and the seal on the absence of cracks and damage and ensure the reliability of their landing.

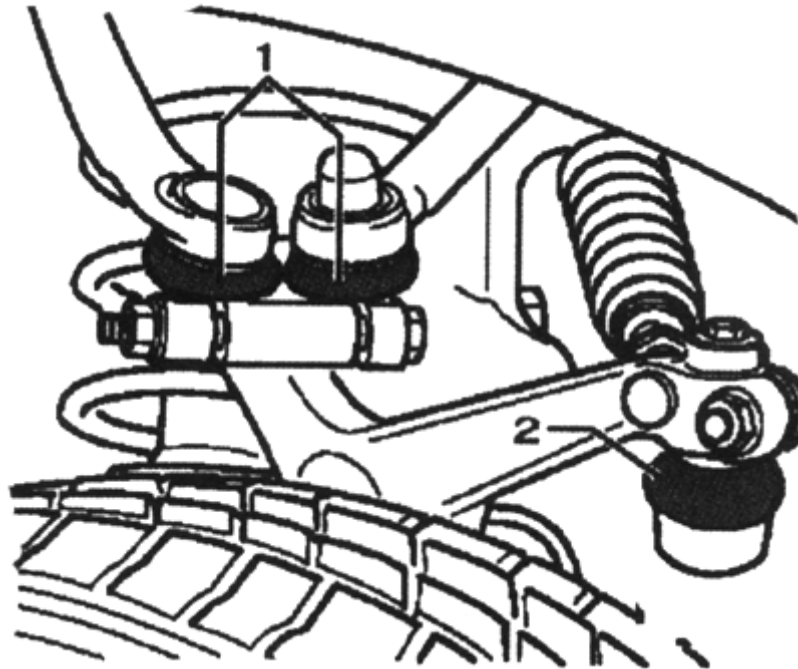


Fig. 5.9. Cleaning blankets on roaring-gah and tip steering draft:

1 - lugs, 2 - Seal

Rock the wheel and make sure not to play in the tip rods. Check that the tips were secured into the receiving slots levers.

Salvage Dirt bag and tip, having a gap, you need to be replaced.

4.11 Steering Gear - Check constant velocity joints

Turn the steering wheel in any direction until it stops. Joints are sitting firmly in the long-term grease-filled plastic liners rotary instruments. From moisture and dirt are protected by plastic covers (Figure 5.10).

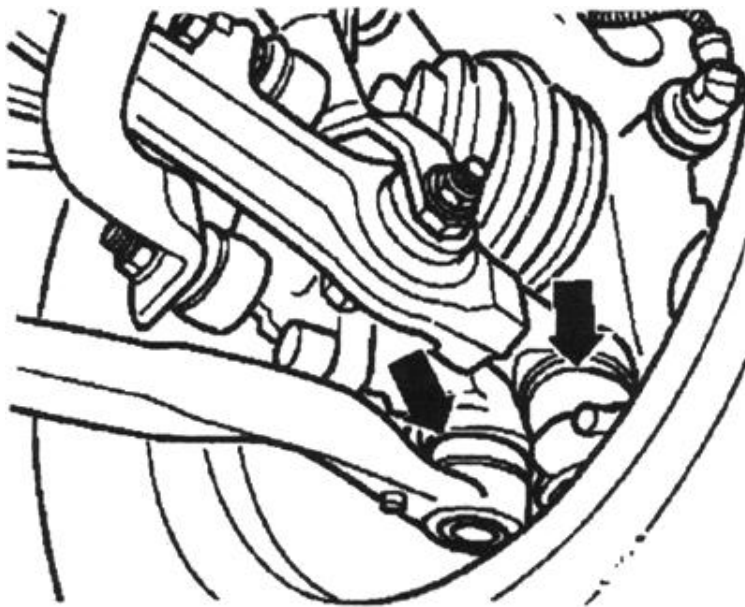


Fig. 5.10. Seals Hinge

Penetrate inside the metal chips, sand and moisture can lead to corrosion and destruction of the joint. Check the covers on hinges. In case of detection of cracks and damage, replace them. Check end-play in the joints (Figure 5.11).

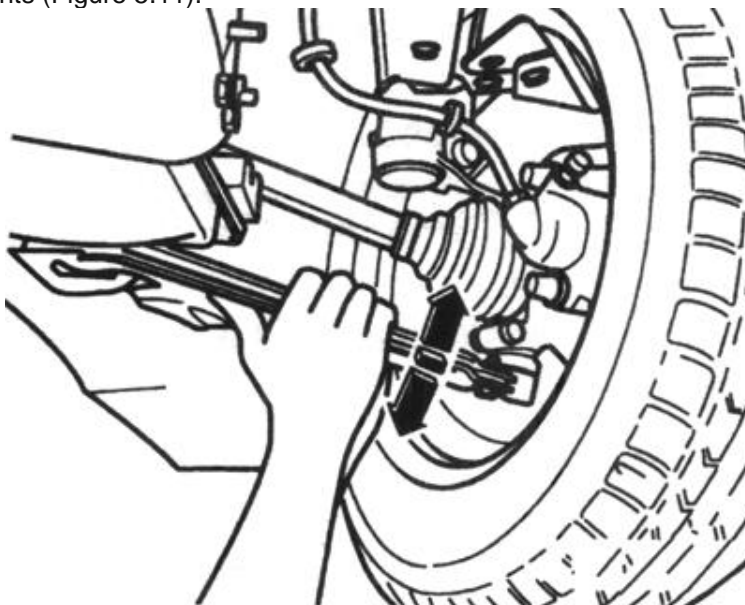


Fig. 5.11. Check axial backlash a ball nirah

Check the transverse gap (Fig. 5.12).

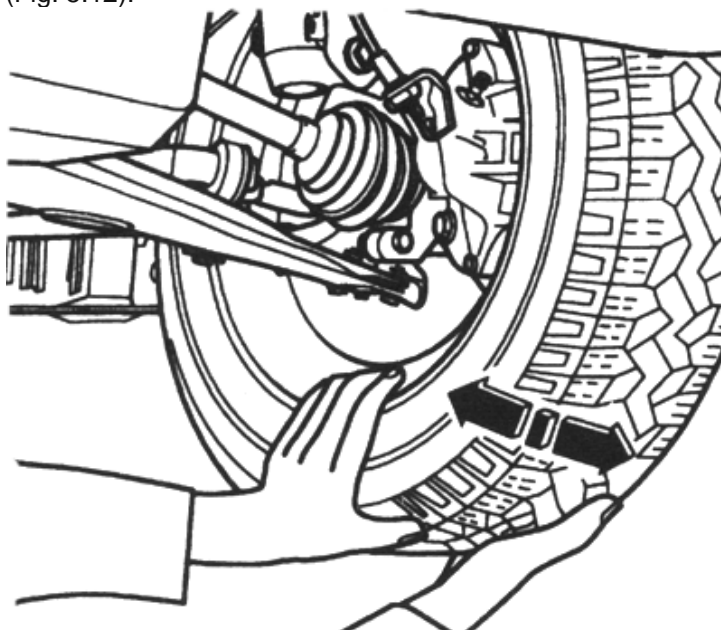


Fig. 5.12. Check cross backlash vsharnirah

4.12 Steering mechanism - Checking power steering leak

Open the clamps on the shell casings and move in the direction of the steering mechanism.

Run the motor.

NOTE

Spend this test not longer than 5 s, Otherwise case may be damaged pump hydraulic system.

Turn the steering wheel to lock and hold it for a while in this position. When the pressure rises to the highest possible value.

Check for tightness of the following elements:

- O-ring on the valve body gear steering mechanism;
- All joining hoses;
- O-rings rack.

Turn the steering wheel all the way to the other side, hold for a while in this position and repeat the test.

Replace the guards and secure them with clamps.

NOTE

If there oil in housing handlebar-Vågå mechanism and/or in protective covers, replace steering mechanism.

4.13 Steering Gear - Check the level of the working fluid hydraulic

Check the vehicle's wheels in the position directly. If the working fluid in the hydraulic system is cool, let the engine do not. You can conduct an audit and cold butter.

Pail hydraulic steering system is located behind the engine compartment. Check the level with the pointer on the lid.

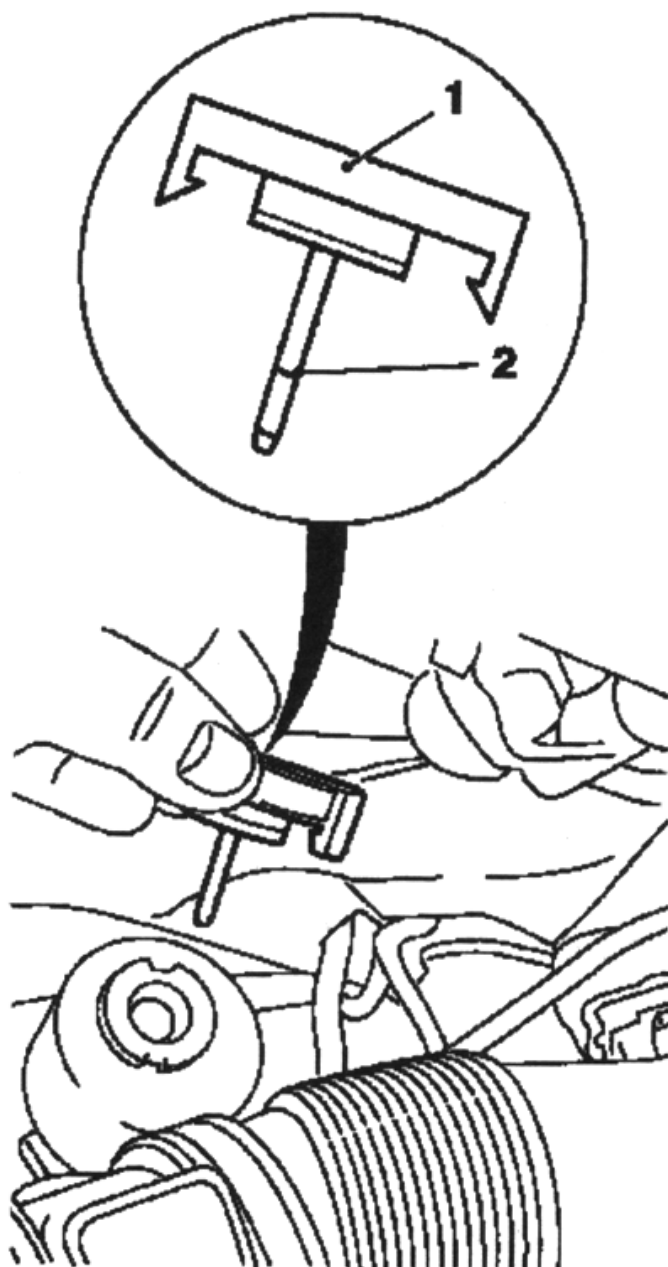


Fig. 5.13. Check level fluid tank hydraulic system:

1 - tank lid, 2 - probe for measuring

Unscrew the lid, wipe clean with a cloth rod pointer and tightly screw in place. Again, loosen the lid: the level should be 2 mm below or above the tag «MIN» (Figure 5.13).

If the working fluid temperature is 50 °C, measure the level in the same way. The level should be between the marks «MIN» and "MAX".

If the level is higher than normal, it is necessary to select the liquid. If it is below normal, check the system to leak or top up the hydraulic fluid.

4.14 Steering mechanism - Filling and removal of air from the hydraulic system

NOTE

Not Avoid work elektrogidravlicheskogo Module without SmAZ-ki. Sleet liquid not be used again. Hydro-System filled special liquid.

Use a funnel with a flexible tube to fill the hydraulic system.

Pail combined with electro-hydraulic module and located on the right side of the engine compartment between the engine and bulkhead (cars with left-hand steering) or the left side of the engine compartment between the gearbox and bulkhead (cars with right-hand-steering).

Filling and removing air from the hydraulic system should be carried out at room temperature.

To remove air from the hydraulic system, start the engine and turn the steering wheel from left to right limiter three times with the engine running.

Turn off the engine and check the fluid level, if necessary top up to the top mark on schupe for level measurement.

Test the Power assisted steering, turning the steering wheel from left to right the limiter a few times with the engine running.

Check all connection points Power assisted steering visually for leakage

4.15 Steering Gear - Replacement of the modulus of the steering column (CIM)

Disconnect the battery.

Remove the steering.

Remove the bottom facing the steering column by unscrewing 5 mounting bolts (arrows in Figure 5.14).

Remove the ignition switch (Figure 5.14).

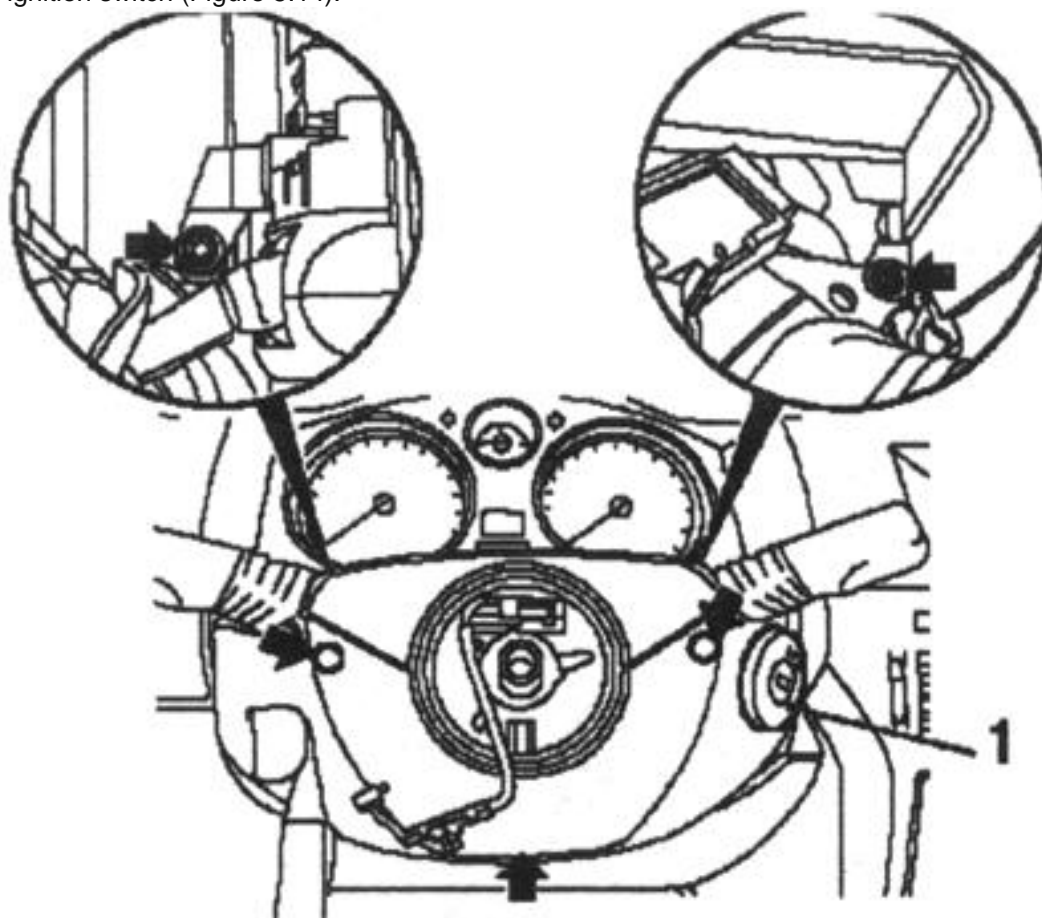


Fig. 5.14. Withdrawal panel castle lighting-tion:

1 - panel lock

Remove the column module (CIM), unscrewing 3 bolts.

Remove the holder of the wiring harness (arrow) and disconnect the wiring harness connector (Fig. 5.15).

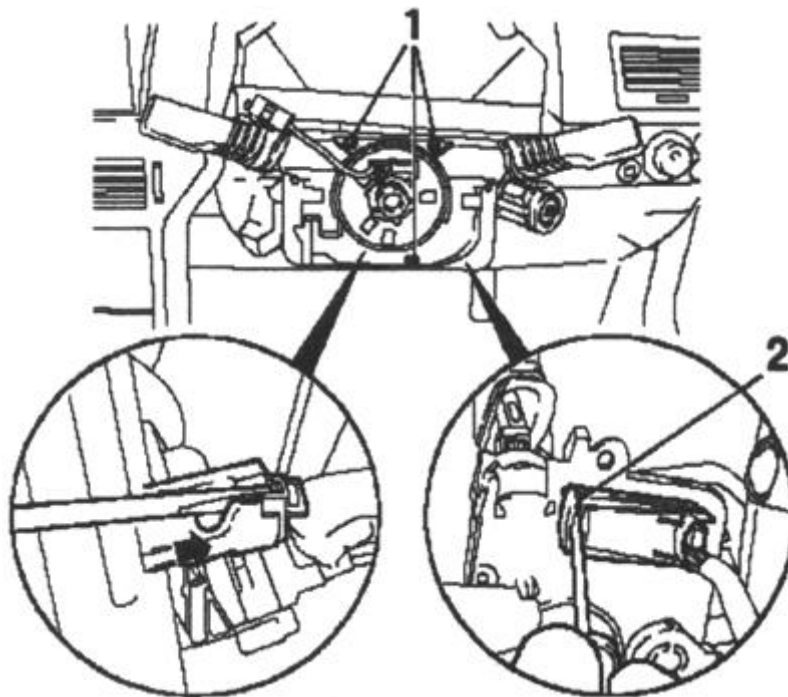


Fig. 5.15. Withdrawal module:

1 - bolts fastening, 2 - wiring harness connector

NOTE

Contact module can not overlap Chiva after removal. With the withdrawal and installation, make sure that the label (arrows) are opposite another as shown on ri-sunke 5.16.

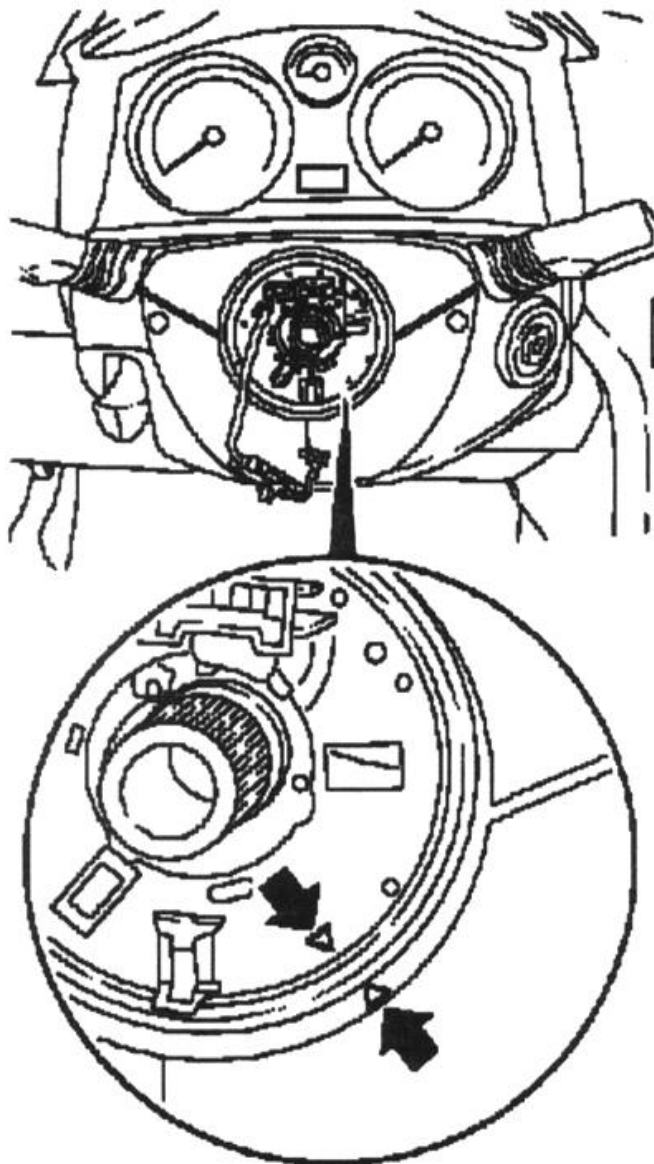


Fig. 5.16. Tags combining for Set the adjustment Module

Setting

Install the module column (CIM).

Connect and lock the wiring harness connector and attach the wiring harness in the holder.

Tighten the 3 bolts.

Attach the bottom facing the steering column.

Install outlet ignition lock and tighten the 5 screws fastening.

Install the steering.

Connect the battery pack.

NOTE

When replacing the control unit, after connecting the control unit, do programming with the device CLOSE 2.

Program volatile memory.

4.16 Steering mechanism - Replacing the steering column

NOTE

Before installing the system, acting upon the air by Dumping safety, observe the security measures for pyrotechnic systems.

Withdrawal

Lock the steering

Set the steering in the position of the rectilinear motion.

Remove the ignition key.

Give the trigger lock the steering column.

Remove the pad upholstery of the driver.

2 Loosen the clamp bolt (Figure 5.17).

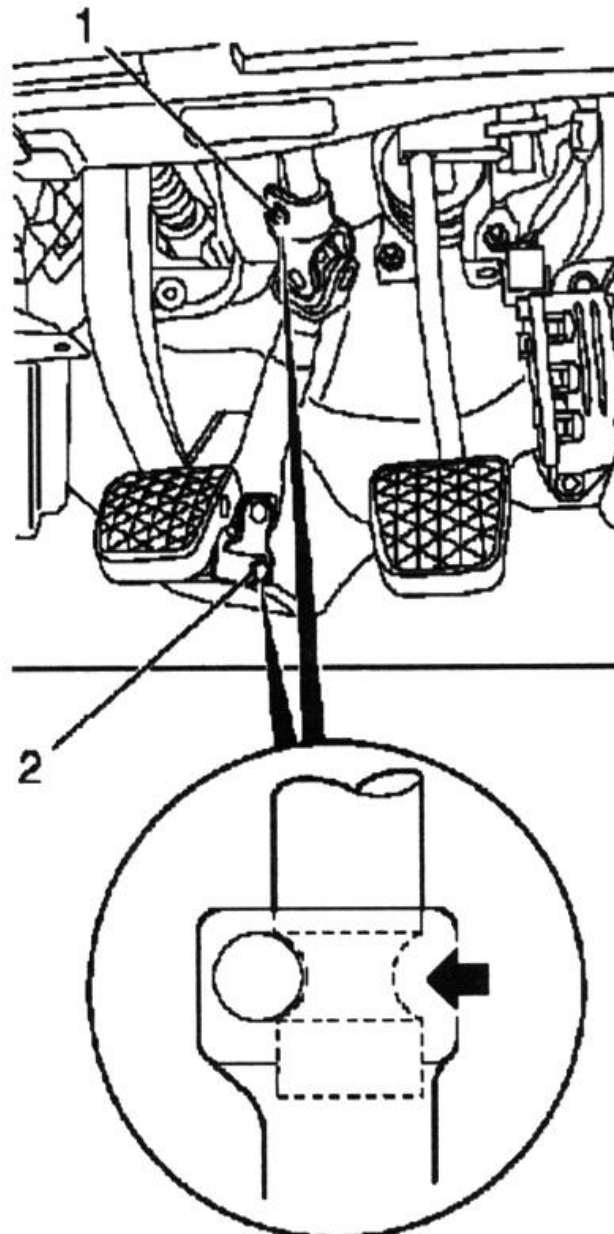


Fig. 5.17. Withdrawal clamping Bolts:

1,2 - Bolts

NOTE

Mark Installation clamping position bolts.

Remove the intermediate shaft slightly squeezing it.

Disconnect the mass wire from the battery.

NOTE

Wait 1 minute to discharge the capacitor.

Remove the air bag module.

NOTE

Module Inflatable pillows safety not must subjected from over loads and must always packed front side up.

Separate wiring harness connector audio signal.

Remove the steering wheel with power steering, turning away attachment bolt (Figure 5.18).

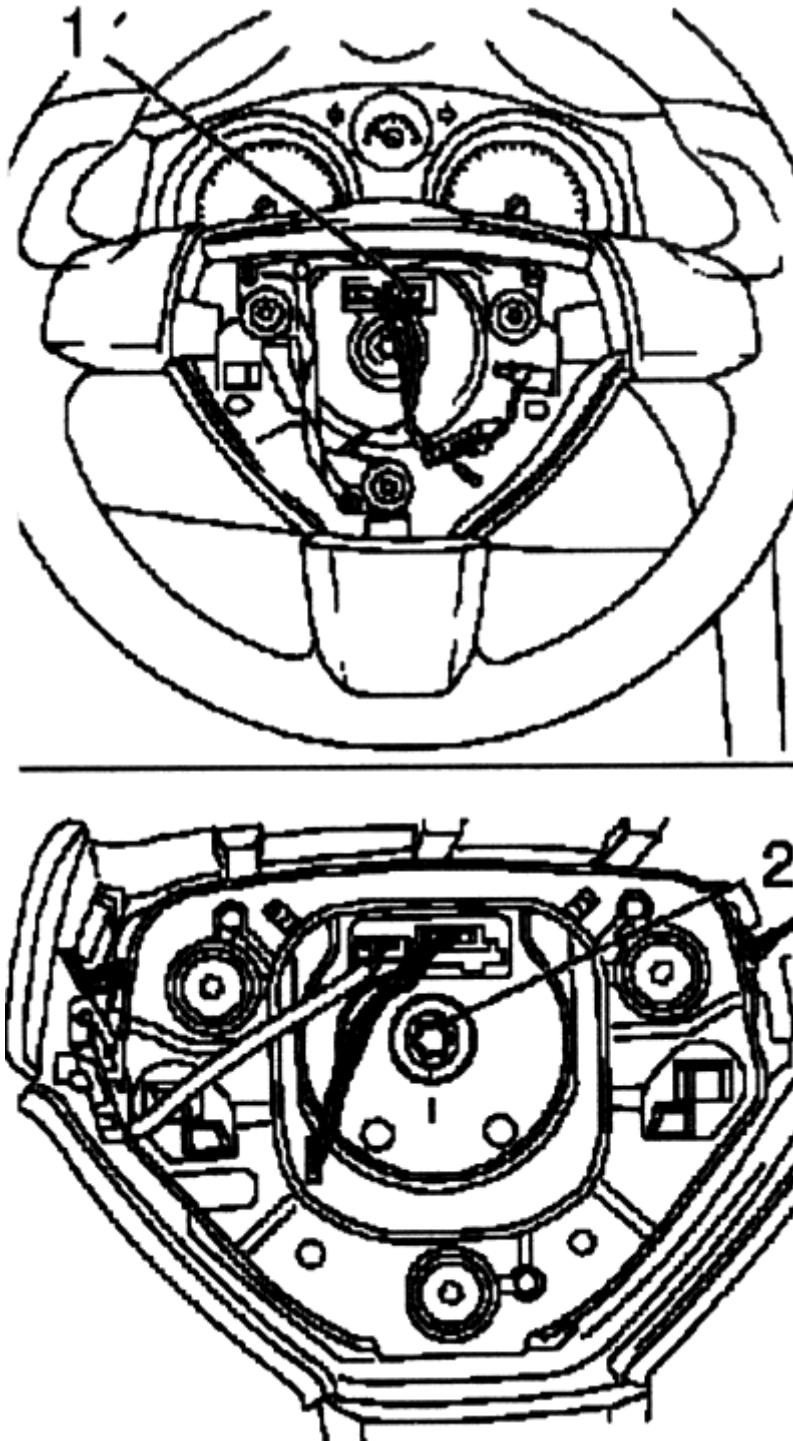


Fig. 5.18. Withdrawal Steering wheels:
1 - the wiring harness connector audio signal;
2 - bolt mount

Remove the steering wheel from the steering shaft.

Remove the top upholstery of the steering column by unscrewing 2 screws fastening.

Remove the lining of the lower steering column, 3 unscrewing bolts.

Remove the module CIM, separating the wiring harness connector and unscrewing 3 bolts.

Remove the light switch module.

NOTE

For withdrawal Module light switch, to down knob (1) positive zhenii "On", move pen in central position and INS-Mite Module switch light (Fig. 5.19).

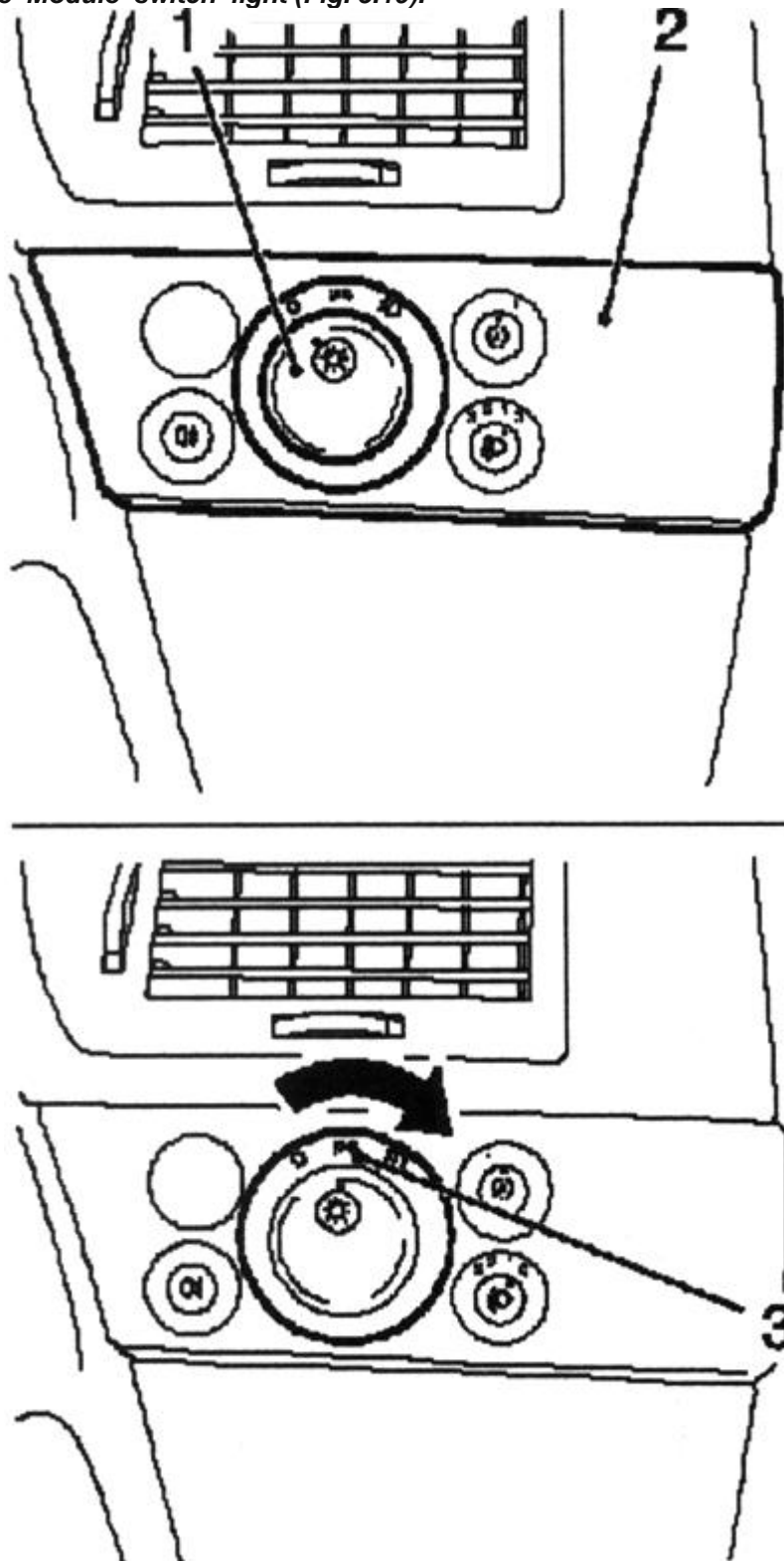


Fig. 5.19. Withdrawal Module light switch:

- 1 - Grip 2 - central position;
- 3 - light switch module

Remove the light switch module.

Separate wiring harness connector module light switch. To do this, push the secondary fuse and unlock the fuse (Figure 5.20).

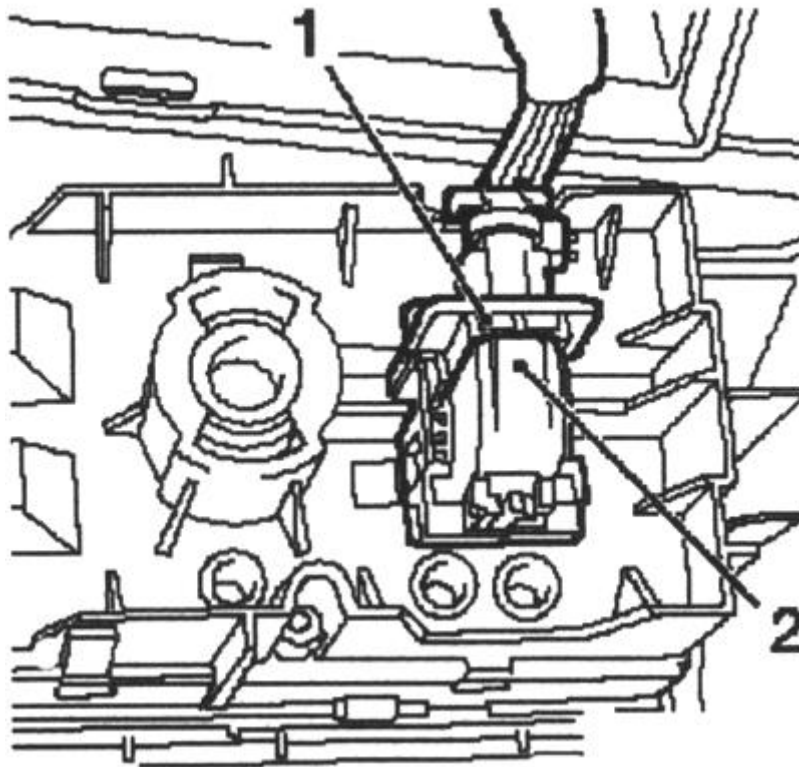


Fig. 5.20. Withdrawal connector tourniquet conduction-ing Module switch light:

- 1 - Secondary fuse;
2 - fuse

Remove the bottom pad of the instrument panel by unscrewing 4 bolts fastening.
Remove the wiring harness power steering column, unscrewing bolts.
Remove the steering column with the cross, turning away West bolts.

NOTE

Mark Installation position of the cotter on top steering column.

Remove the steering / ignition unit with the steering column.
Turn the ignition switch to the starting position.

Setting

Attach the steering / ignition switch to the block of the steering column.
Install and tighten the clamp bolts.

Attach the power steering column to the crossbar and then block the steering column, tighten the 3 bolts.

NOTE

Cotter pin must is correctly US-tanovlen in crossbar.

Attach the wiring harness to the block of the steering column.
Attach the wiring harness in the holder.
Lock the steering.

Install the steering column in the position of the rectilinear motion. Check on the steering column should be turned down.

Remove the key from the ignition.

Give the trigger lock the steering column.

Install the lower instrument panel pad.

Connect the wiring harness connector module light switch.

Install light switch module.

Free module switch light. To do this, turn the rotary switch to position "O", fix the light switch (Figure 5.21).

Install module CIM.

Connect the wiring harness connector.

Install the bottom facing the steering column.

Install the upper facing of the steering column.

Insert the wiring harness air bag through the hole in the steering wheel hub.

Attach the steering wheel to the steering shaft.

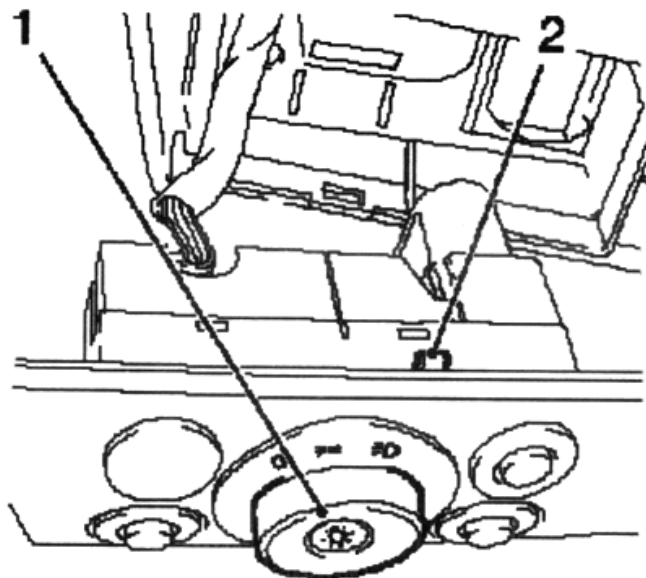


Fig. 5.21. Setting Module light switch:

1 - Rotary Switch, 2 - retainer

Install the steering wheel on the block steering column.

NOTE

Align tags on steering oscillation and steering interval (Fig. 5.22).

Tighten the attachment bolt moment 30 Nm.

NOTE

Clear thread and set new bolt with fixing composition.

Connect the wiring harness connector audio

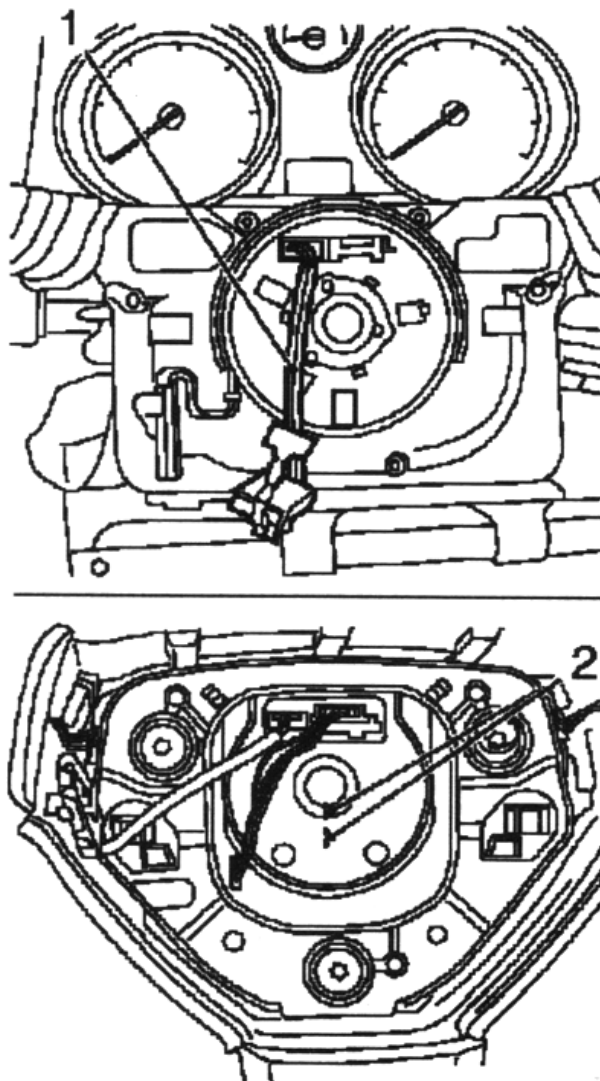


Fig. 5.22. Combination tags on steering wheel and steering shaft:

1 - wiring harness inflatable airbags;

2 - Label

Install air bag module security.

Attach the intermediate shaft to the steering shaft and tighten the moment 24 Nm.

Insert the intermediate shaft on the steering shaft.

Attach the clamping bolt.

NOTE

Before installation clamping bolt to ensure groove steering shaft (arrow on Figure 5.17) combined with hole in suspension shaft. Clear threads and set screw with fixing composition. Tighten loading position clamping bolt.

Install intermediate shaft on the steering mechanism and attach the clamping bolt.

NOTE

Make in that wheels have traditionally in situation rectilinear motion

Install the lower trim.

Check the position of the rectilinear movement, adjust if necessary.

Connect a massive wire to the battery.

4.17 Steering Gear - Replacement of steering ZF

NOTE

To remove steering mechanism should be withdrawn stretch ne-redney suspension.

Withdrawal

Remove the front suspension subframe.

At Opel Astra cars with left-hand steering clear bracket damping engine block rear damping block engine.

Remove the holder and disconnect the supply pipeline and return pipe from the steering mechanism (Figure 5.23).

NOTE

For collection implication oil IP-profit tray.

Remove the electrohydraulic module with the front suspension subframe.

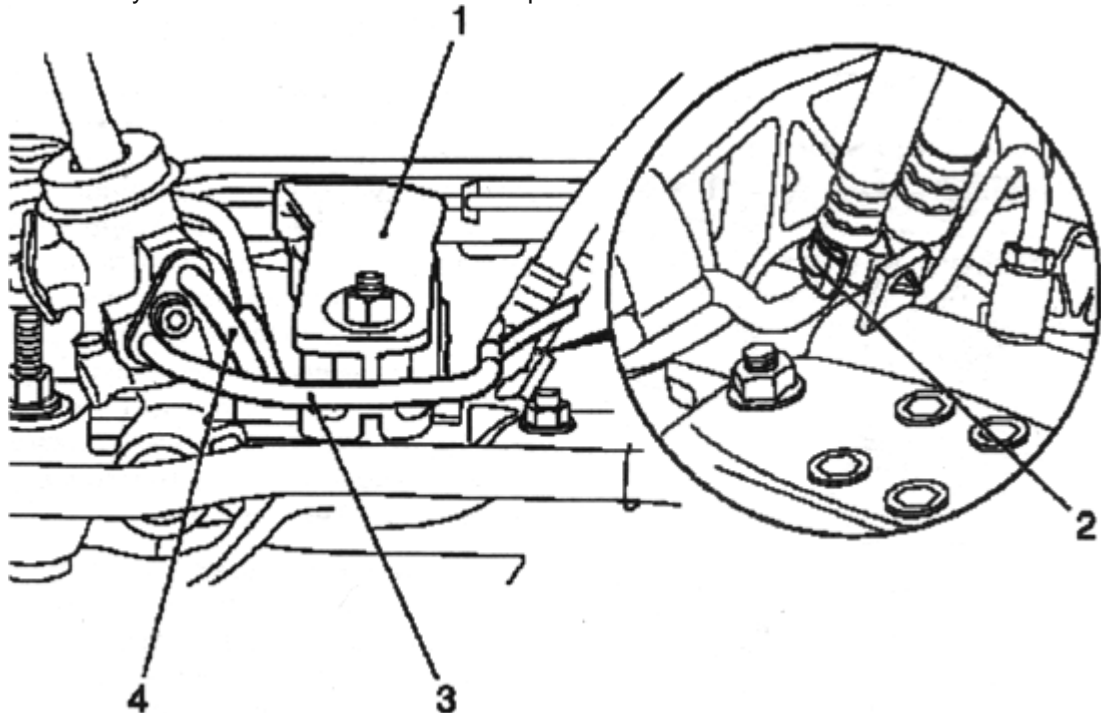


Fig. 5.23. Withdrawal stretch front Suspension:

1 - Bracket damping engine block, 2 - holder;

3 - supply pipeline 4 - reusable tube

Disconnect the 2 connectors wiring harness and remove them from the electrohydraulic module (Figure 5.24).

Loosen the 3 screws from the steering mechanism and the front suspension subframe.

Remove the electrohydraulic module with return pipe from the steering mechanism and the front suspension subframe.

Remove the tie rod ends on both sides of the steering mechanism.

Remove the 2 fixing brackets.

2 Remove the cover of the steering mechanism.

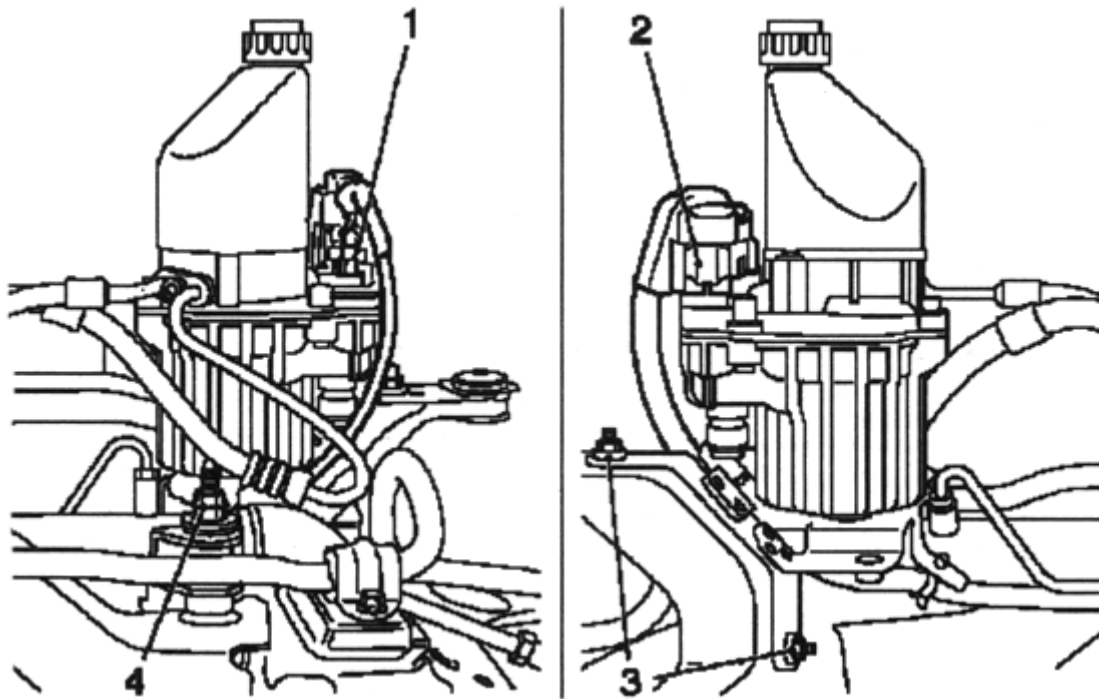


Fig. 5.24. Withdrawal electrohydraulic module:

1,2 - connectors wiring harnesses, 3, 4 - nuts

Disconnect the 2 tie rod ends from the steering mechanism by means of devices KM-6004-2 (Figure 5.25).

Hold open rod wrench for Lyskov rack from the steering shaft.

Remove the steering mechanism with the front suspension subframe.

Loosen the 2 nuts from the front suspension subframe.

Unscrew the 2 screws and remove the steering mechanism with the front suspension subframe.

Setting

Attach the steering mechanism to the front suspension subframe and tighten the moment of 45 N-m, Dauvergne at + 45 ° and + 15 °.

Install 2 new bolt.

Tighten the 2 new nuts.

Attach 2 tie rod ends to the steering mechanism by means of devices KM-6004-2 point of 90 N-m.

NOTE

Clear thread on rail and cut-cho fixing composition.

Hold open rod wrench for Lyskov rack from the steering shaft.

2 Attach the cover to the steering mechanism, and set them on the steering mechanism.

NOTE

Make in that cover printed it invited in slots steering traction and py-left mechanism.

Attach 2 new retaining clamp to the steering mechanism by means of devices KM-J-22610.

Install 2 cover on the steering traction, using a new fixing bracket.

NOTE

Make in that cover printed it invited in slots steering traction.

Attach the electrohydraulic module with bracket to the front suspension subframe and tighten the moment 22 Nm.

Place electrohydraulic module with a holder on the steering mechanism and front suspension subframe.

NOTE

Pay attention to the wiring harness of steering control.

Connect the wiring harness 2 x electrohydraulic module.

Attach the tube to the steering mechanism and tighten the moment 16 Nm.

Use 2 new sealant-tion of the ring.

Attach the holder of the tubes to the steering mechanism.

At Opel Astra cars with left-hand steering: attach the rear bracket, damper block damper motor to the engine block and tighten the moment 55 Nm.

Install the front suspension subframe.

Fill the hydraulic system and remove the air from the hydraulic system.

Check the position of the rectilinear movement, adjust if necessary.

Check the convergence of the wheels, adjust if necessary.

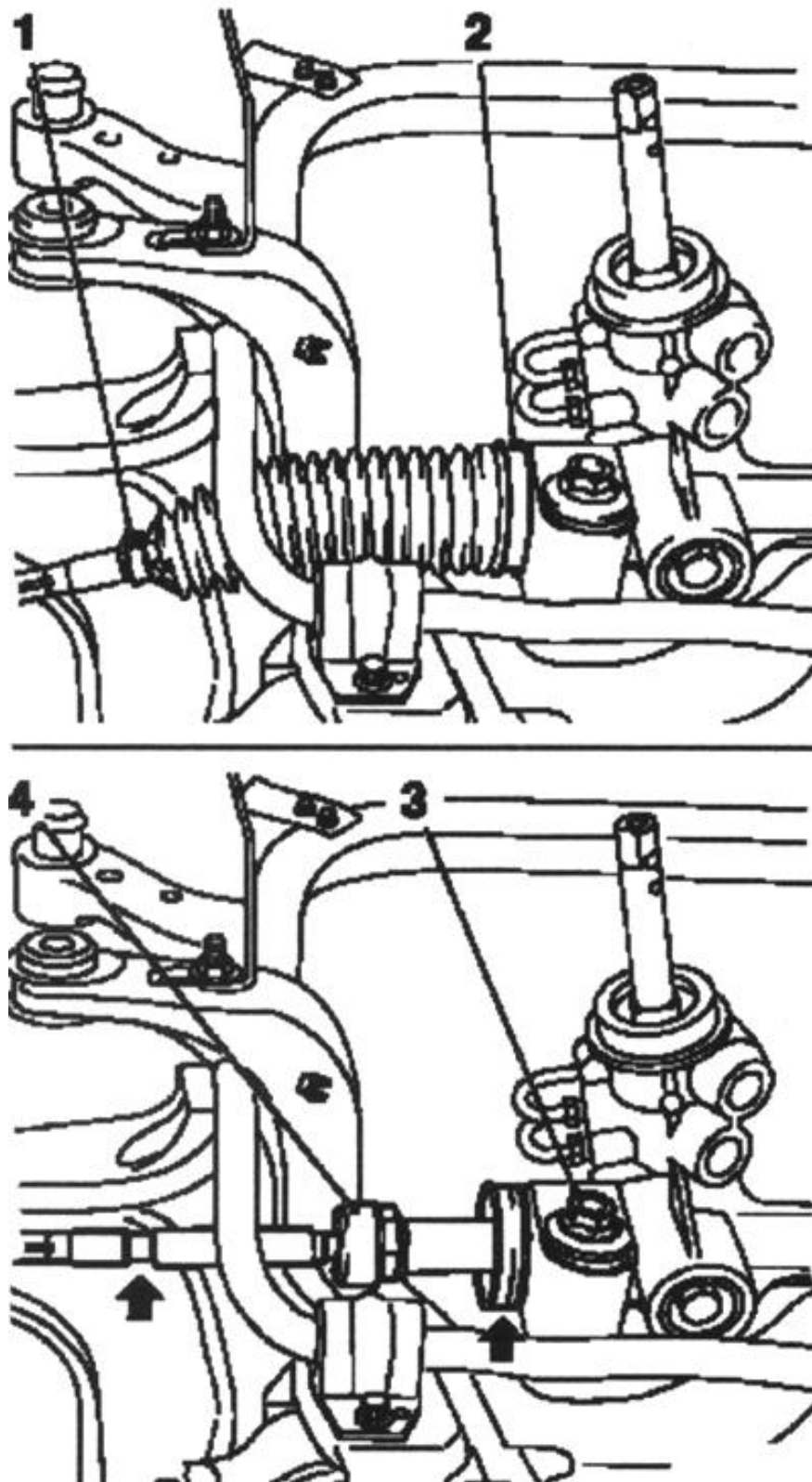


Fig. 5.25. Withdrawal steering rods:
1,2 - Fixing brackets, 3 - nut, 4 - tie rod ends

4.18 Steering Gear - Replacement of tie rod

Withdrawal

Remove the front wheel.

Measure the length of thread from a lock nut to the threaded end of tie-rod (Fig. 5.26).

Loosen the locknut and hold open wrench for the steering rod tip.

Disconnect the tie rod tip from steering knuckle.

Remove the nut.

Vypressuyte Tie rod from steering knuckle using a special tool KM-161-In conjunction with the CM-161-2 (Figure 5.26).

Remove the tip from the tie rod tie rod.

Setting

Attach the tip to the steering tie rod and tighten the thrust torque 60 Nm.

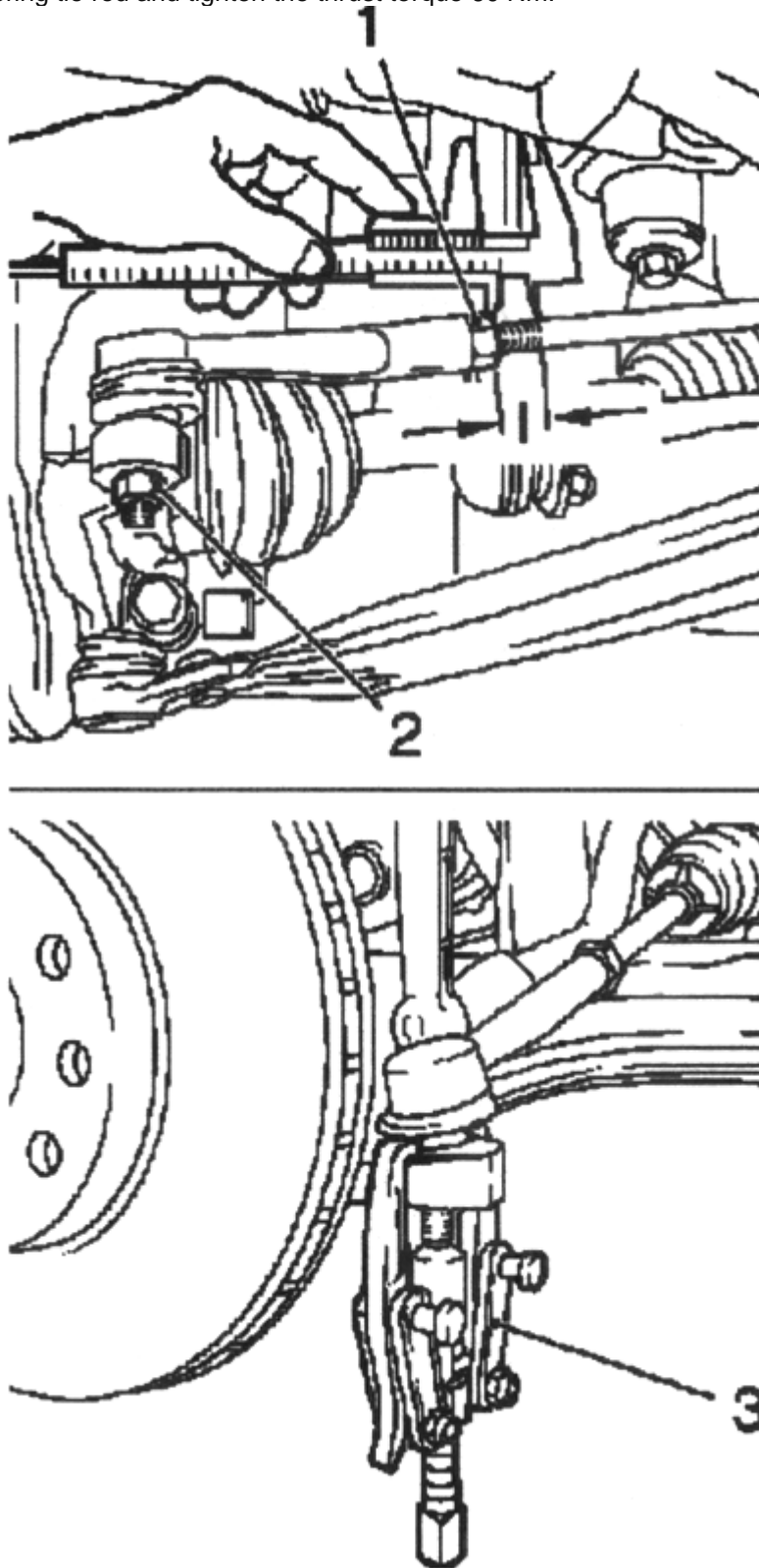


Fig. 5.26. Measurement length thread of nuts to threaded end NACO-nechnika steering traction and spew
NACO-nechnika steering draft:

- 1 - locknut 2 - nuts;
3 - special tool

NOTE

First check length thread.

Secure the tip of the steering rod and hold open the lock nut wrench for the steering rod tip.

Attach the tie rod tip to the new steering knuckle nut, tighten the moment of 30 N-m, Dauvergne at +90 ° and +15 °.

Fasten the front wheel moment of 110 Nm.

Check the convergence of the wheels, adjust if necessary.

4.19 Steering Gear - Replacement of tie rod

NOTE

Steering management ZF has 3 times the various steering traction in Depending model. When replacement steering cha-gi record Number necessary details to avoid errors.

Withdrawal

Remove the tip of the corresponding tie rod with tie rod.

Remove the appropriate case.

NOTE

On car Opel Astra with right located-zheniem Steering management, something would remove and set left handlebar-vuyu traction also must is otsoe-Association has from Steering mechanism PRA-headed case. At cars with left-hand Steering governance, to remove and set PRA vuyu steering traction also be unplugged from Steering a mechanism left case.

Disconnect the steering traction with a special tool KM-6004-2 from the steering rack and hold an open wrench for Lysko on rack (see Figure 5.27).

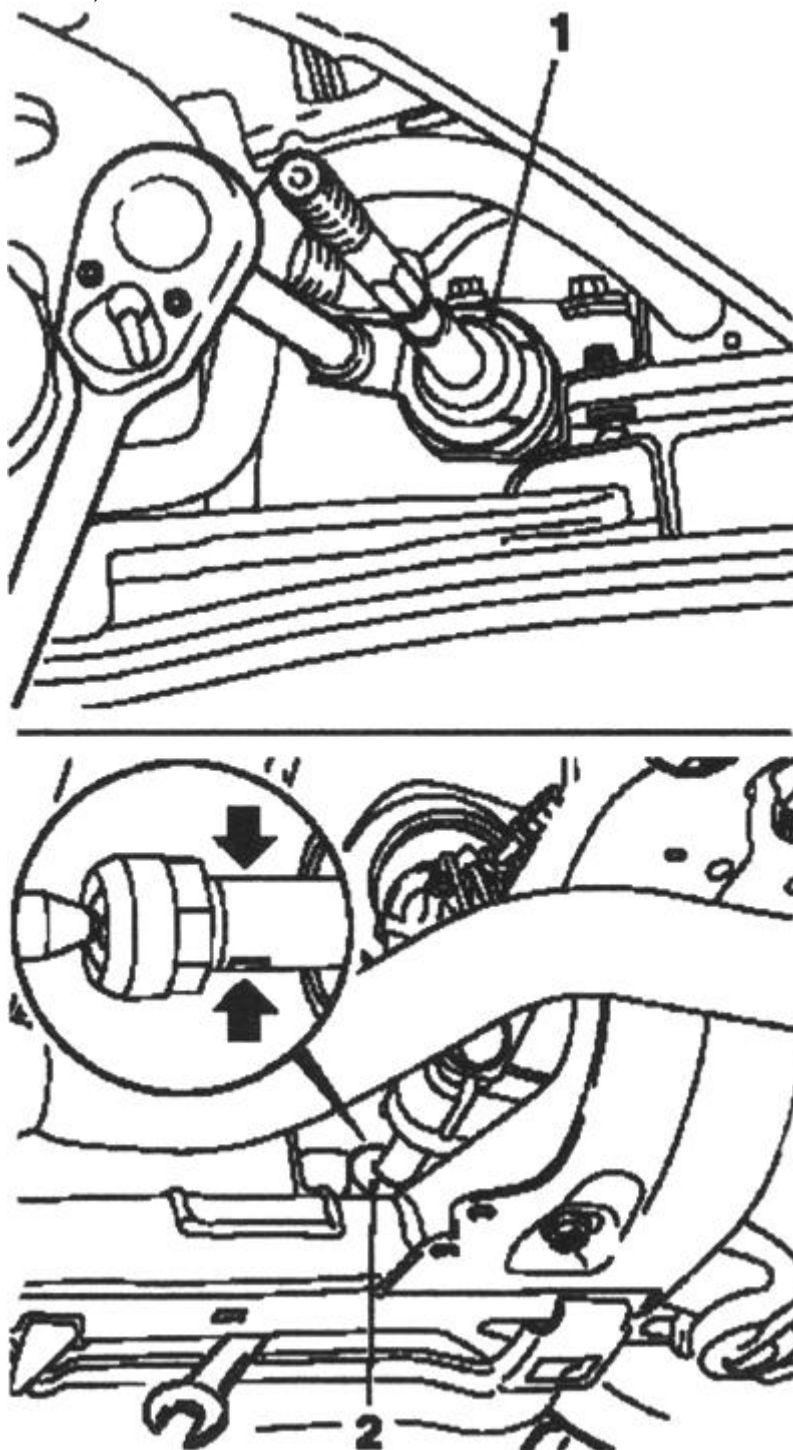


Fig. 5.27. Disconnected steering draft:

1 - a special tool, 2 - Wrench

Setting

Attach the steering pull to the steering mechanism and tighten the moment of 90 N-m.

Clean the threads on the rail and cover with a fixing composition.

Attach the steering pull to the rail with a special tool KM-6004-2 and hold an open wrench for Lysko on rack (arrow in Figure 5.27).

Replace cover or covers.

Install the appropriate tip steering traction.

Check the position of the rectilinear movement, adjust if necessary.

Check the convergence of the wheels, adjust if necessary.

4.20 Steering Gear - Replacement of the steering mechanism TRW

NOTE

To remove steering mechanism should is withdrawn stretcher ne-redney suspension.

Withdrawal

Remove the front suspension subframe.

On vehicles with left-hand steering clear bracket damping engine block rear damping block engine.

Remove the holder.

Remove the supply pipeline and the return pipeline to the steering mechanism (Figure 5.28).

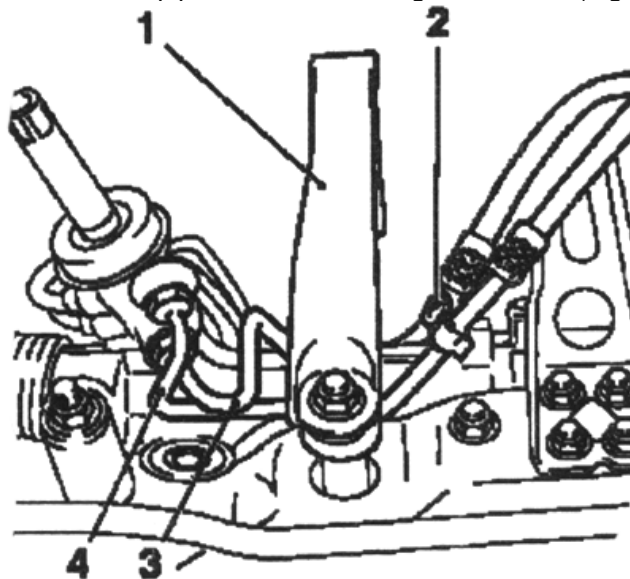


Fig. 5.28. Withdrawal pipeline with steering th mechanism:

1 - Bracket damping engine block;

2 - Holder, 3 - supply pipeline;

4 - return pipeline

NOTE

For implication oil use-syama tray.

Wiring harness and unleash the power steering of the front suspension subframe.

NOTE

Please attention on gasket tourniquet.

Remove the electrohydraulic module with the front suspension subframe.

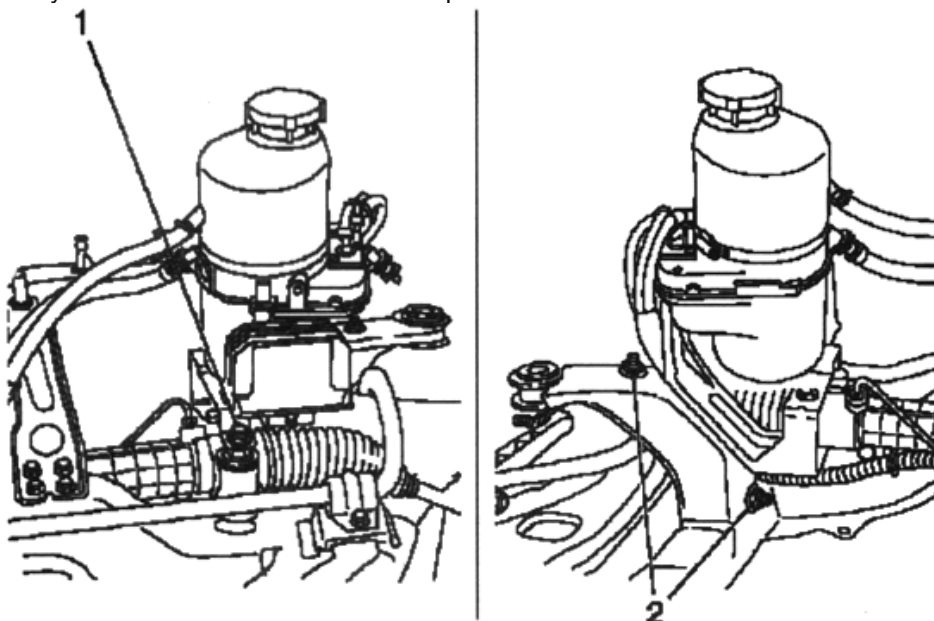


Fig. 5.29. Mounting electrohydraulic module:

1,2 - Nuts

Loosen the 3 nuts from the steering and front suspension subframe (Figure 5.29).
 Remove the electrohydraulic module with feed and return pipeline to the steering and front suspension subframe.
 Disconnect the 2 tie rod ends from the steering mechanism by means of devices KM-6004-2 (Figure 5.30).

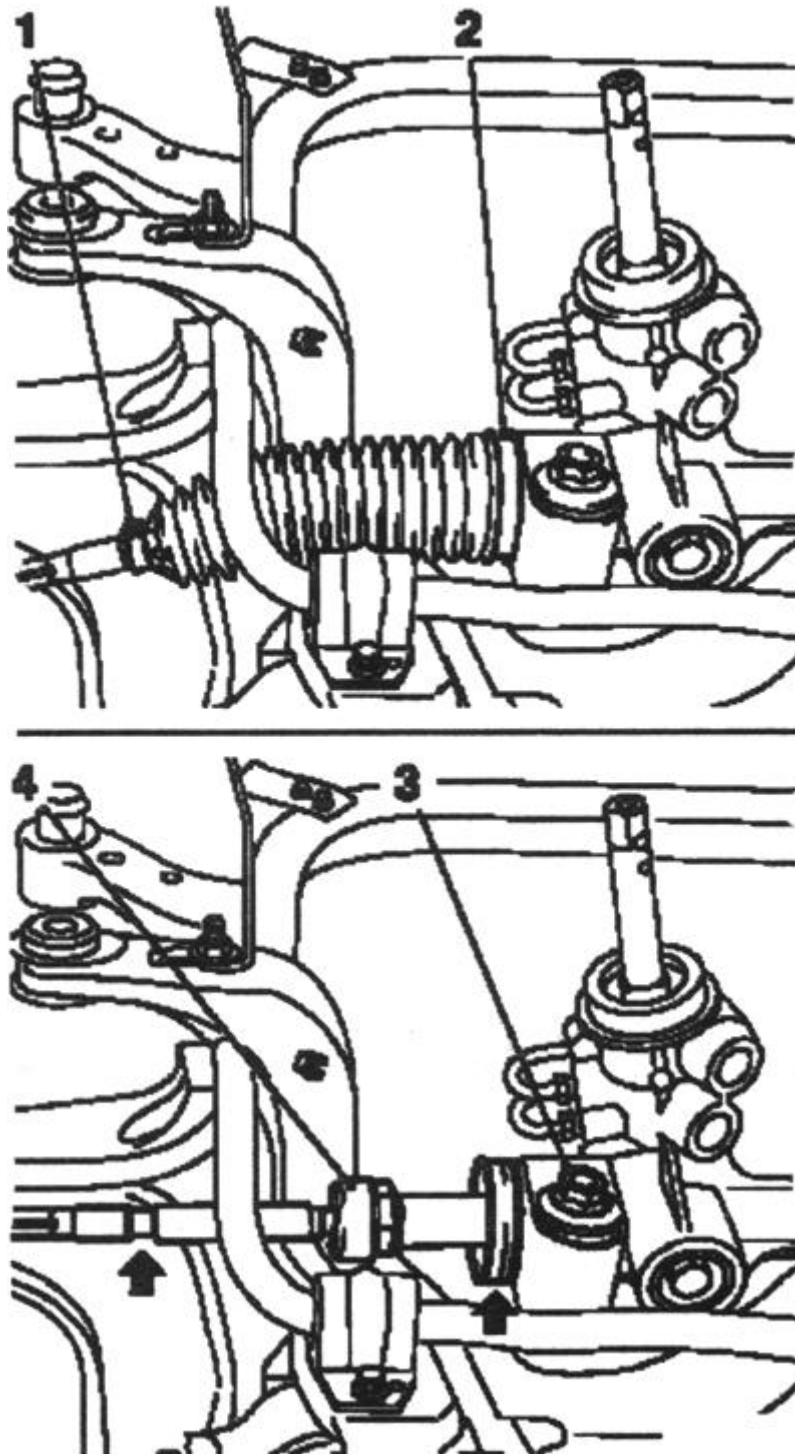


Fig. 5.30. Withdrawal steering rods:
 1,2 - Fixing brackets, 3 - nut, 4 - tie rod ends

Hold open rod wrench for Lyskov rack from the steering shaft.
 Remove the steering mechanism with the front suspension subframe.

Setting

Attach the steering mechanism to the front suspension subframe, install 2 new bolts and 2 noyh nuts and tighten the moment $45 \text{ Nm} +45^{\circ} +15^{\circ}$.
 Attach 2 tie rod ends to the steering mechanism by means of devices KM-6004-2, and tighten the moment 90 Nm.

NOTE

Clear thread on rail and cut-cho fixing composition.

Install 2 cover of the steering mechanism.

Place 2 cover on the steering mechanism.

NOTE

Make in that cover printed it invited in slots steering traction and py-left mechanism.

Attach 2 new retaining clamp to the steering mechanism by means of devices KM-J-22610.

Install 2 mantle on the tie rod ends, using a new fixing bracket.

NOTE

Make in that cover printed it invited in slots steering traction.

Attach the electrohydraulic module with bracket to the front suspension subframe and tighten the nuts the moment 22N-m.

Place electrohydraulic module with a holder on the steering mechanism and front suspension subframe.

NOTE

Please attention on tourniquet conduction-ing Steering management.

Attach the wiring harness of steering control to the front suspension subframe.

NOTE

Make in that electrical-vodka stacked due manner.

Attach the feed and return pipe to the steering mechanism and tighten the moment 30 Nm.

Use 2 new sealant-tion of the ring.

Attach the holder submitting and return piping to the steering mechanism.

On vehicles with left-hand steering: connect rear bracket, damper block damper motor to the engine block and tighten the moment 55 Nm.

Install the front suspension subframe.

Fill the hydraulic system and remove the air from the hydraulic system.

Check the convergence of the wheels, adjust if necessary.

4.21 Steering Gear - Replacement covers on the steering mechanism

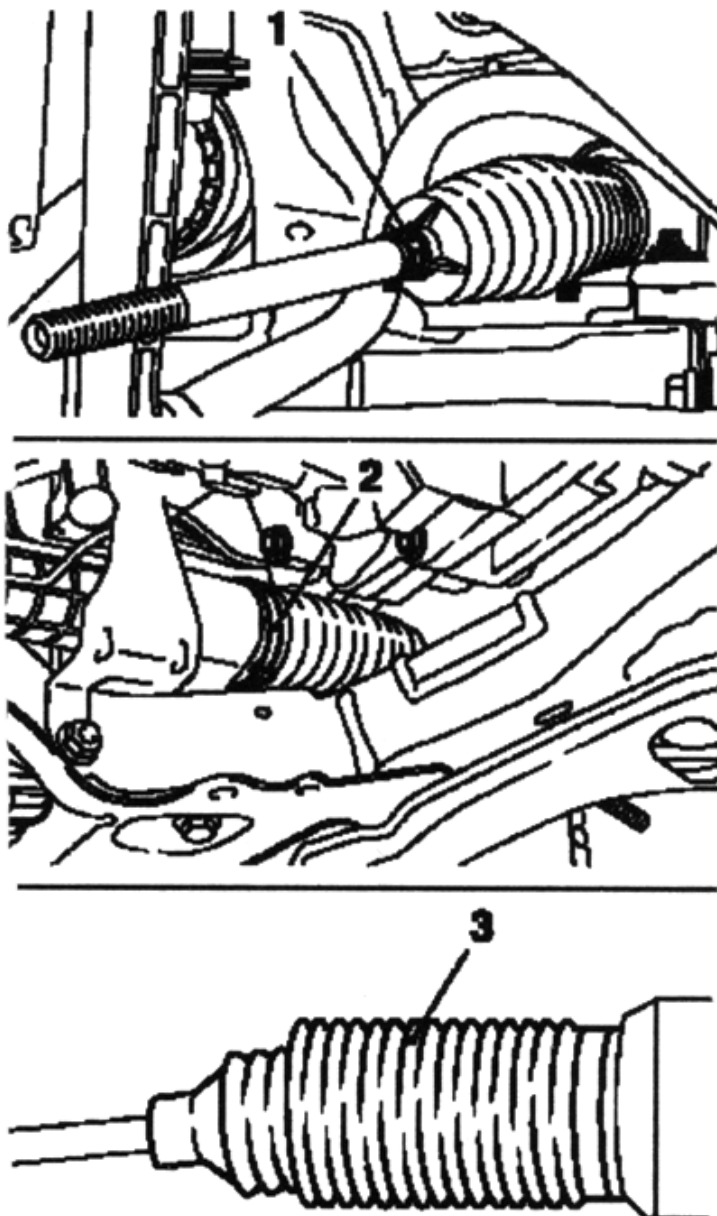


Fig. 5.31. Withdrawal cover steering draft:
1,2 - Fixing brackets, 3 - cover

Withdrawal

Remove the front wheel.
Remove the engine compartment.
Remove the tip of the steering rod.
Remove the retaining collar / locking brackets.
Remove the cover tie rod (Figure 5.31).

Setting

Tighten cover on the steering traction and steering mechanism.
Lubricate grease groove.

NOTE

Make in that cover sits in slots steering traction and Steering IU-nism.

Attach the cover to the steering mechanism with a new restraint with a collar device KM-J-22610 (Figure 5.32).

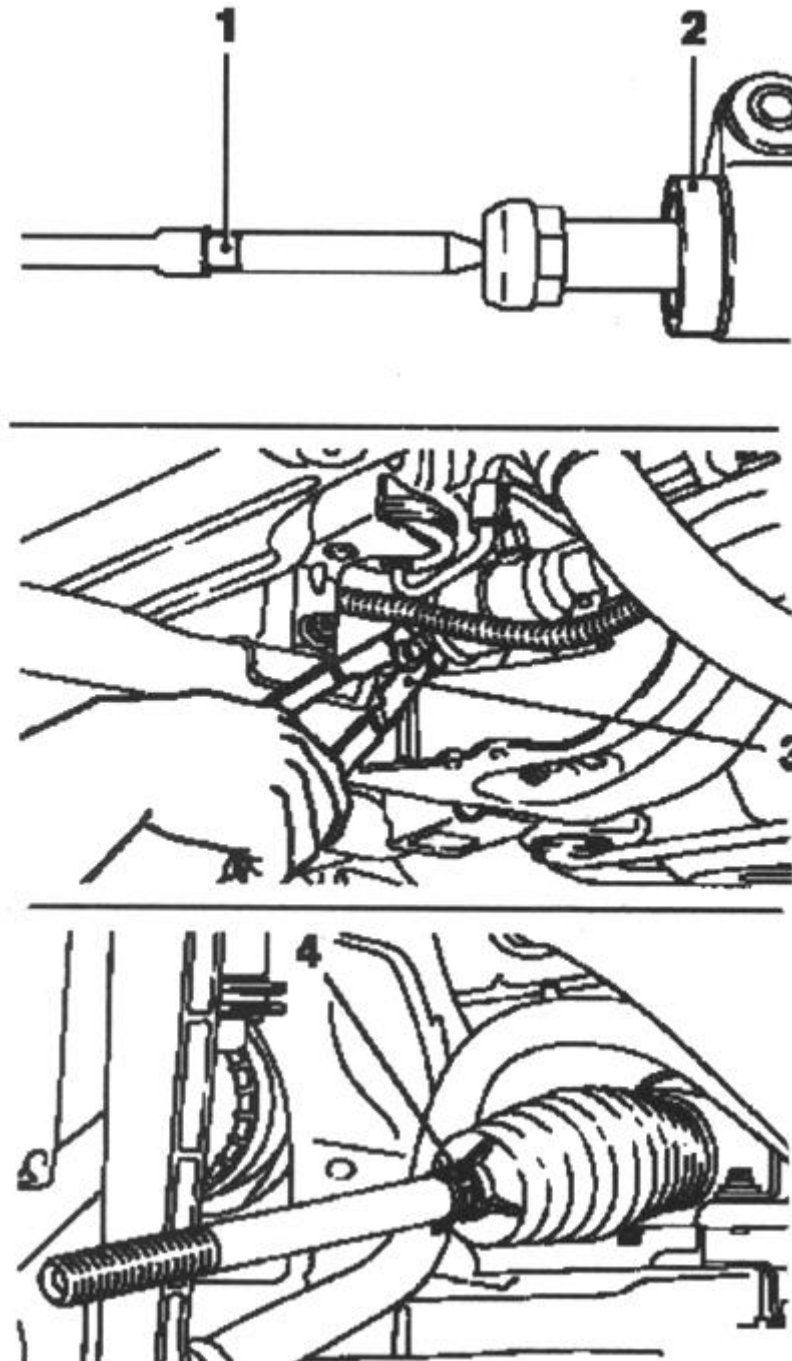


Fig. 5.32. Setting cover on steering cha-gu:

1,2 - slots, 3 - adaptation, 4 - fixing bracket

Fasten the cover of the new retention bracket to the steering traction.

NOTE

Make in that cover sits in slots steering traction.

Insert the tip of the steering rod.
Install the bottom cover of the engine compartment.
Fasten the front wheel bolts with torque 110 Nm.

4.22 Steering Gear - Replacement of pipelines hydraulic steering system with amplifier (ZF)

Withdrawal

Remove the front suspension subframe.

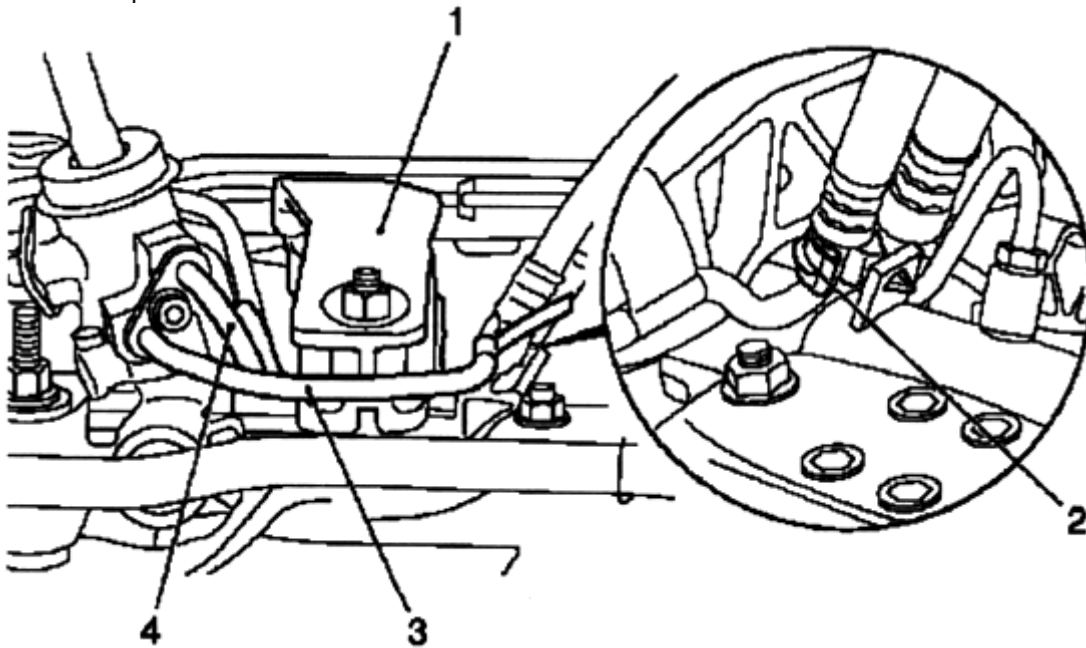


Fig. 5.33. Removing the front suspension subframe:

- 1 - Bracket damping engine block, 2 - holder;
3 - supply pipeline 4 - reusable tube

On vehicles with left-hand steering clear bracket damping engine block rear damping block engine. Remove the holder and disconnect the supply pipeline and return pipe from the steering mechanism (Figure 5.23).

NOTE

For collection implication oil IP-n Use a tray.

Remove the feed and return pipe electrohydraulic module, remove the attachment bolt (Figure 5.34).

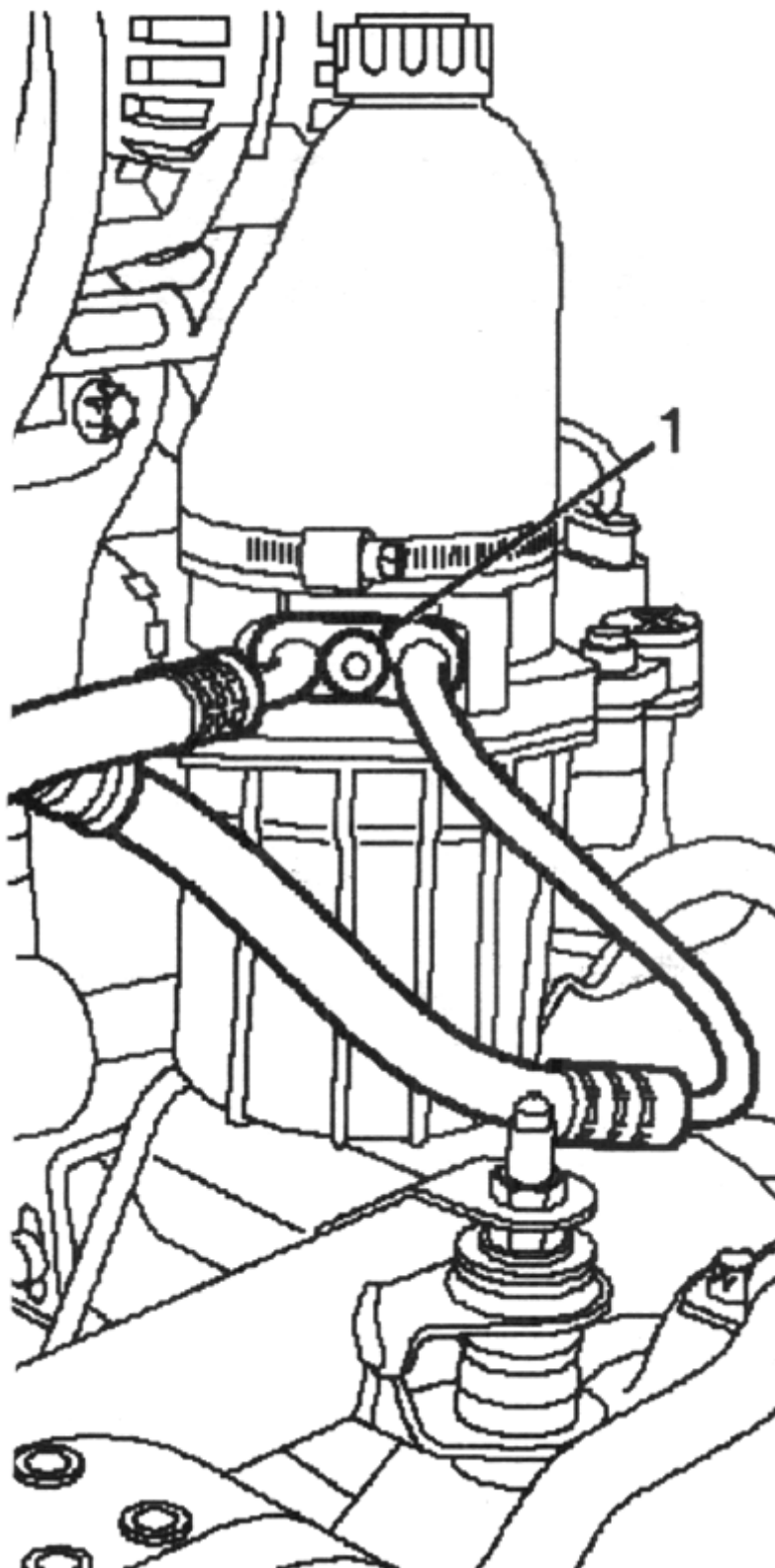


Fig. 5.34. Bolt fixing toplivoprovo da:
1 - bolt

Setting

Attach the feed and return pipe to the steering mechanism, with new O-rings and tighten the attachment bolt moment 16 Nm.

Attach the feed and return pipeline to the electrohydraulic module with new O-rings and tighten the attachment bolt moment 16 Nm.

Attach the feed and return pipe in the holder the steering mechanism.

Install the front suspension subframe.

Fill the hydraulic liquid and remove it from the air.

5 BRAKES

5.1 General

Automobile Opel Astra-H in the standard version is equipped with antilock brake system. Depending on the model of the engine, it can be either only anti-lock brakes, or ABS system with ESR.

Astra-H equipped with a brake booster with a membrane diameter of 255 mm and a built-in amplifier emergency braking.

Master cylinder diameter 23,81 mm has a compact design with two central valves. Master cylinder beyond repair.

Recommended tightening torques values of threaded connections

Component	Moment torque, N - m
The control unit is an anti-lock braking system to the hydraulic modulator (MK70)	2.0
The control unit is an anti-lock braking system to the hydraulic modulator (ESP MK60)	5,5 *
Power Brakes to the support pedal (brake pedal) and the partition	20 **
Tube brake to the brake cylinder	16
Carriage rear brake mechanism for fixing element rear brake mechanism for	25
Carriage front brake mechanism for fixing brake the front wheel (steering knuckle without integrated support slide)	28
Rear disc brake mechanism to the rear wheel hub	4
Front disc brake mechanism to the front wheel hub (M10h1.25)	7
Brake hose to the rear caliper brake mechanism	40
Guide to the steering knuckle pads (M12x1.5)	100 ***
Fixing an element of the rear brake mechanism for fixing element rear brake mechanism for	100 ***
Brake drum to the wheel hub	4
Socket for removing air to the rear brake mechanism	10
Screw connections for the removal of air to the brake caliper, front	10
Screw connections for the removal of air to the brake cylinder	6
Bracket hydraulic modulator to the body	20
Lever of the parking brake system to the bottom of the car	8
The main brake cylinder to brake booster (except for Z 19 DTH)	15
The main brake cylinder to brake booster (Z19 DTH)	21
Central muffler heat shield to the bottom of the car	2
bracket hydraulic modulator / relay holder to the bracket hydraulic modulator	8
Bracket to the pedal crossbar steering (bolts and nuts)	20 **
Reliance pedal (brake pedal) to the partition	20 **
Wheel to wheel hub	110
Brake wheel cylinder to the anchor plate	9
Connecting nuts tubes braking system (M10x1, M12x1)	14
Vacuum line to vacuum pump (Z17 DTL, Z17 DTH)	18

* Use new bolts.

** Use new nut.

*** Clear the threads and install the bolts with a fixing composition.

Potential problems, their causes and solutions

Possible causes failure	Method remove
Verification lamp brakes Included	
Leakage of brake fluid	Eliminate leaks or top up the fluid
The switch is closed the parking brake on "mass"	Repair closure of the "masses"
Faulty brake fluid level sensor	Replace sensor
Signal inhibition included	
Faulty brake light switch lamp Stem length vacuum amplifier is less than the required length The chain brake signal lamp switch is closed to the positive terminal of the battery	Replace the lamp switch signal inhibition Adjust the length of the rod with vacuum booster Repair or replace wiring

Inefficient inhibition	
Leakage or lack of brake fluid	Eliminate leaks or top up the fluid
Contamination of brake fluid	Replace brake fluid
The presence of air in the brake fluid	Remove air from the brake system
Damaged brake hose	Replace brake hoses
Damaged or defective vacuum hose check valve	Replace vacuum hose and check valve
Sticking bath (grabbing) brakes	
No backlash brake pedal	Adjust backlash
The weakening of the brake pedal return spring	Replace return spring
Malfunction of the master brake cylinder	Replace the master cylinder
The presence of air in the brake system	Remove air from the brake system
Great course pedal brakes	
Leakage or lack of brake fluid	Eliminate leaks or top up the fluid
Improper adjustment of backlash brake pedal	Adjust the length of the rod of the vacuum brake booster
Uneven inhibition front wheels	
Defective caliper	Replace caliper
Wedging of the piston in the caliper	Make repairs or, if necessary, replace the caliper assembly
Seized (tacking) brakes front wheels	
Wedging of the piston in the caliper	Make repairs or, if necessary, replace the caliper assembly
Noise and Vibration front wheels at inhibition	
Excessive beating brake disc	Replace the disc
Possible causes failure	Method remove
Interfering effects of the dust jacket	Repaired dust jacket
Reducing the caliper mounting bolts	Tighten mounting bolts
Insufficient brake power rear wheels	
Strong wear linings brake pads	Replace brake pads
Contact with oil or brake fluid on the pad brake pad	Check on the absence of leakage from the working brake cylinder and, if necessary, replace the working cylinder or brake pads
Failure of the brake cylinder	Replace working brake cylinder
Malfunction limp	Repair self-adaptive
Uneven inhibition rear wheels	
Contact with oil or brake fluid on the pad brake pad	Verify no leakage from the working brake cylinder, if necessary, replace the working cylinder or brake pads
Failure of the brake cylinder	Replace working brake cylinder
Malfunction limp	Repair self-adaptive
Tacking Brakes after release pedal brakes	
The weakening of the spring return of brake pads	Replace the spring return brake pads
Failure of the brake cylinder	Replace working brake cylinder
Excessive course pedal brakes	
Excessive wear in the linings of brake shoes	Replace brake pads
Malfunction limp	Repair self-adaptive
Noise or Vibration rear wheels at inhibition	
Ingress of foreign matter in the brake drum	Clean the brake drum
The weakening of the supporting bolt brake disc	Tighten the bolt for the supporting brake disc

Damage to the brake drum	Replace the brake drum
Poor brake power parking brakes	
Contact with oil or brake fluid on the pad brake pad	Verify no leakage from the working brake cylinder, if necessary, replace the working cylinder or brake pads
Malfunction limp	Repair self-adaptive
Poor regulation of the parking brake cable	Adjust the length of the parking brake cable

5.2 Front brakes

Depending on the model of the engine and auxiliary equipment, Astra-H can be equipped with brakes of various sizes. The brake caliper is bolted to the steering knuckle. The following table gives information about the brake calipers and brake discs for various models of engines and options configuration.

Depending on the version of equipment, brake pad wear indicator may be a mechanical / acoustic, and can be displayed visually on the dashboard, through the use of front electrical contact pads.

Specifications Front brakes

Engine	Z14XEL; Z14XEP; Z16XEP	Z 18 XE; Z 13 DTH; Z 17 DTL; Z 17 DTL; Z 19 DTH	Z20LEL; Z20LER	Z20LEH
	Carriage			
Piston diameter, mm	52,0 57,0		57.0	57.0
	Disk			
Outside diameter, mm	256.0	280.0	308.0	321.0
Thickness (new), mm	24.0	25.0	25.0	28.0
Permissible residual thickness *, mm	22.0	23.0	23.0	26.0
Minimum thickness, mm	21.0	22.0	22.0	25.0
Allowable beating, mm	0.11	0.11	0.11	0.11
Allowable scratch depth, mm	0.4	0.4	0.4	0.4
Uneven thickness (tolerance), mm	0.01	0.01	0.01	0.01
Overhead ki				
Thickness without the support plate (new), mm	12.0	14.0	14.0	14.0
Permissible residual thickness without the support plate mm	2.0	2.0	2.0	2.0

5.3 Rear brakes

Technical Specifications rear inhibitory mechanism drum type

Brake wheel cylinder	--
Nominal diameter, mm	19.05
Brake Drum	--
Inner diameter (new), mm	230.0
Width mm	40.0
The highest allowable internal diameter, mm	231.0
Allowable roundness, mm	0.05
Brake pads	--
The thickness of the plate without the support of the pad (new), mm	5.0
Permissible residual thickness of the plate without the support of the pad, mm	1.0

Specifications rear brake mechanism

<i>Engine</i>	<i>Z14XEL; Z14XEP; Z16XEP</i>	<i>Z 18 XE; Z 13 DTH; Z 17 DTL; Z 17 DTL; Z 19 DTH</i>	<i>Z20LEL; Z20UER</i>	<i>Z20LEH</i>
Carriage				
Piston diameter, mm	36	38	38	38

Piston Material	--	--	--	--
Type	Floating piston		--	--
Disk				
Outside diameter, mm	240	264	264	278
Thickness, mm	10	10	10	10
Internally ventilated, yes / no	no	no	no	no
Escutcheons				
Diameter, mm	230	--	--	--
Thickness, mm	40	--	--	--
Type	Solid cast		--	--
--				
Diameter, mm	20.64	--	--	--
Overhead ki				
Thickness without the support plate (new), mm	10.5	10.5	10.5	10.5
Permissible residual thickness without the support plate mm	2.0	2.0	2.0	2.0

In addition to models for Germany, Austria and Switzerland versions with engines Z 14 XEP, Z 14 and Z 16 XEL XEP equipped with drum brakes. For all other models of engines and the aforementioned countries are used disc rear brakes. Mechanical or electronic brake pad wear indicators for the rear brakes are not provided. The following table gives information about the different versions of the rear brakes.

5.4 Power Brakes

Automobile Opel Astra is equipped with a two-step brake booster with the emergency braking function, which in situations of emergency braking sverhproportsionalno increases the braking pressure, thus reducing the braking distance.

5.5 Brake line

By car Opel Astra for the first time used a new brake line. The brake line has a larger outer diameter of 5.14 mm and replaces the familiar to Astra-G brake lines, which had a diameter of 4.75 mm. Both the brake lines have the same internal diameter.

New brake lines offer better protection against corrosion and have a coating without chromium content (and heavy metals).

Service

Brake lines are delivered in parts with unprepared for the installation ends.

When you use these brake lines for maintenance, observe the following guidelines for preparing the ends (beading). Can be used two types of compounds with beading:

- Beading type E (SAE) and the flaring-type F (ISO).

To connect the two brake lines can be used beading type E and type F. To connect with the individual nodes (eg, hydraulic modulator, brake caliper) is used beading type F. The ends of the tubes with beading should be lightly coated with oil.

Procedure expanding

1. Using a steel brush, remove the pipe cover the length of 6,5 mm from the end, which will be laminated.
2. Clamp the brake lines to adjust for the 5 mm brake lines.
3. Use a tool for expanding (E or F) for the brake lines with a diameter 4,75 mm.

Expanding the type F-1.

Capture (Workholding, 5 mm).

Brake line with expanding type F.

Tool for expanding the type F (4,75 mm).

Expanding the type E - II.

Capture (Workholding, 5 mm).

Tool for expanding the type E (4.75 mm).

Brake lines with expanding the type E.

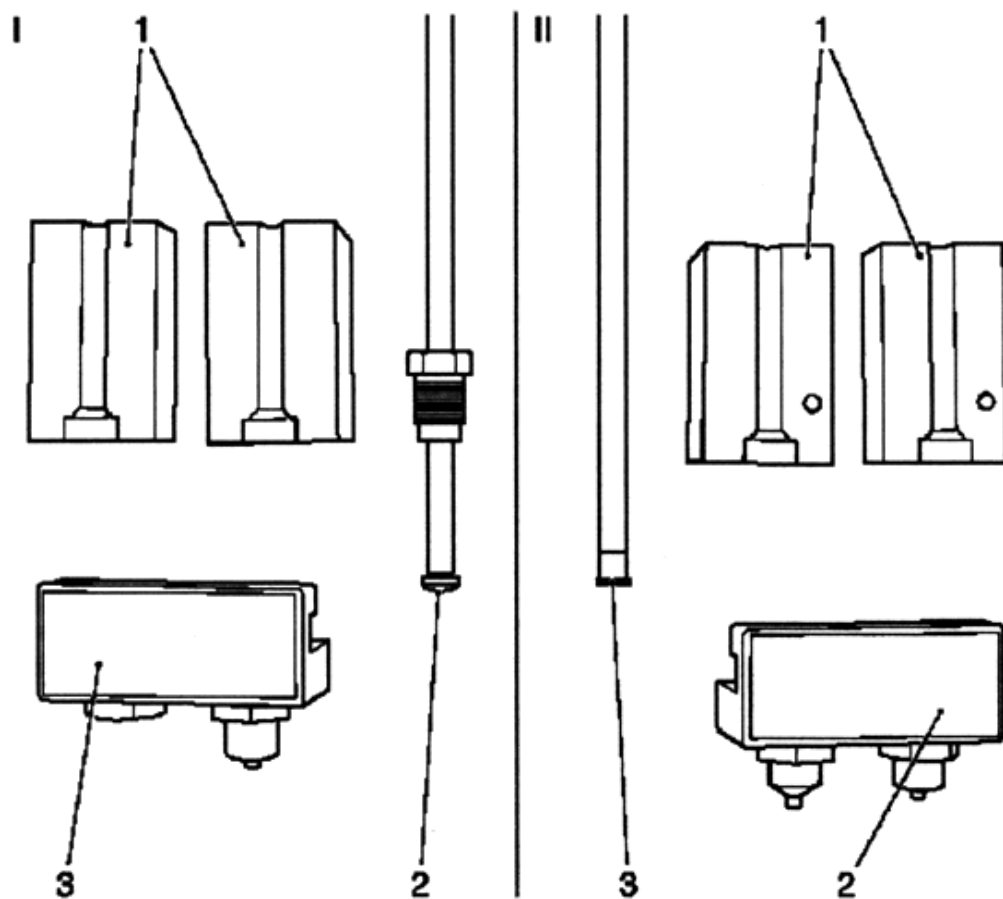


Fig. 6.1. Flared grips types F and E

5.6 Master Cylinder, brakes

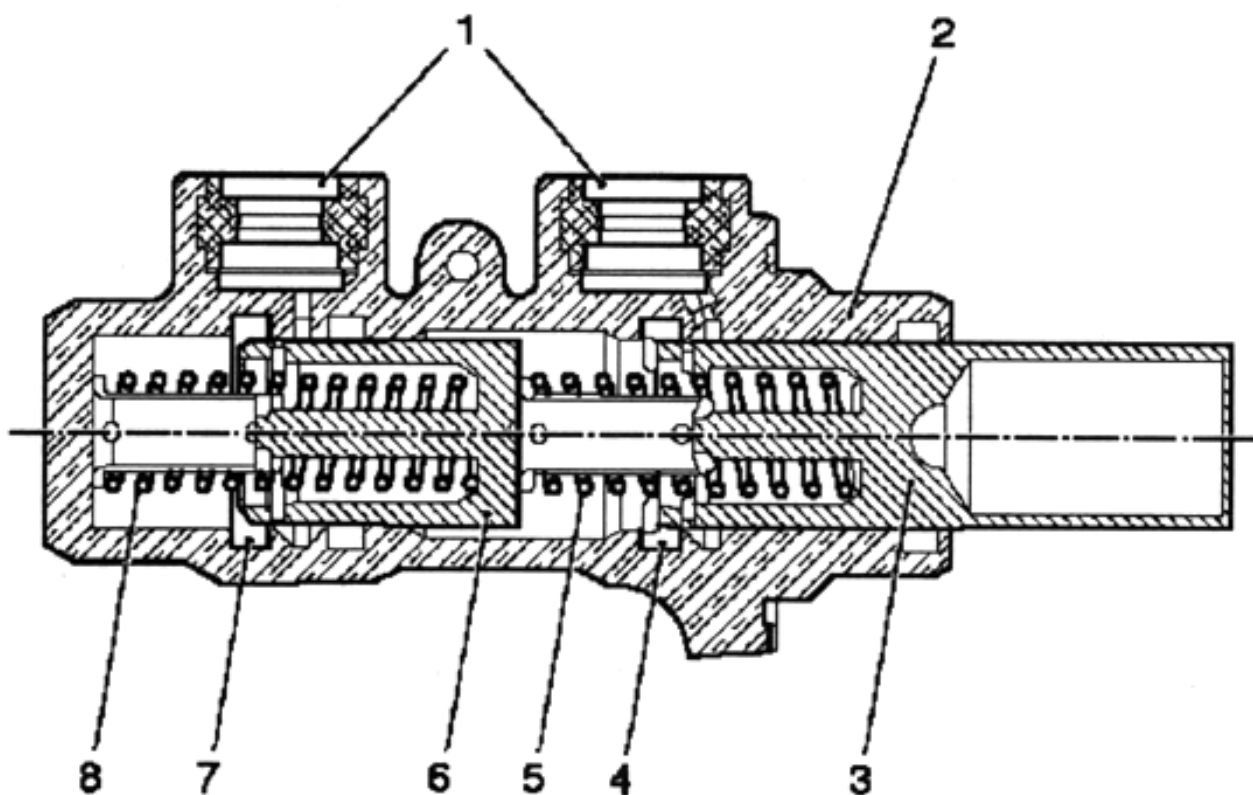


Fig. 6.2. Total kind tandem master brake cylinder:

- 1 - socket compensating reservoir;
- 2 - building a tandem master brake cylinder type;
- 3 - primary piston (piston pusher);
- 4 - sealing sleeve of the primary circuit;
- 5 - compression springs, 6 - secondary piston (floating piston);
- 7 - uplotnyayuschayavtulka secondary circuit;
- 8 - return spring

Brakes new master cylinder and new brake booster

Restrictions on the size marker in all models of Astra-H engine Z19DTH and Zafira to the left-hand steering led to the need to design new, more compact master brake cylinder. Effect of this tandem cylinder based on the principle of "plunger".

Unlike conventional master brake cylinder, sealing plugs are embedded in the body instead of being installed on the piston, as before. The hole in the hull, thus directly sends pistons. This design reduces the length of the tandem master brake cylinder by 25%. In addition, the number of nodes is reduced to 15, thus significantly lowered weight, reduced size and length of service.

"Plunger" tandem master cylinder like the 2nd generation, like almost all the brake cylinders, provides the dual-circuit brake system. Contours of pressure are consistent. Force the driver is passed as usual, from the stock brake booster to the primary pistons. Creates a preliminary pressure of compression springs mounted on the end of the primary piston, and it provides a virtually simultaneous transfer efforts to the secondary piston (floating piston). Joint action of two pistons in one spring would reduce the free running and causes the secondary braking circuit to react more readily than it does in conventional tandem master cylinder.

In the system used to date the secondary piston is driven by the pressure in the primary circuit brake system. This leads to an increase in free running, because at first the pressure should increase up to a specified level. Second compression spring is located behind the secondary piston is returnable. It must be tough enough to ensure that the overcoming of friction sealing sleeves, but at the same time soft enough to protect the ability to compress under the action of the spring the first circuit when the brakes are activated.

Initially there is depressurized the connection between the master brake cylinder, a tandem type and Countervailing reservoir. This provides pressure compensation and productivity in the brake system. When the brake is actuated cylinder piston includes a sealing sleeve, after a short free running. Connect with encapsulated compensation reservoir ceases. Once the rubber sealing elements provided, the amount of brake fluid begins to move and brake system is under pressure. Once the brake is released, return spring attaches pistons back to recovery to seal the connection between the tandem brake master cylinder reservoir and compensation.

In cars equipped with an ESP and Traction Control performance brake system in case of intervention by the system should be provided with additional supply. Since the time for the working mode of the pump ABS depends on the resistance in the suction system, the cross section of holes and channels should be as much as possible.

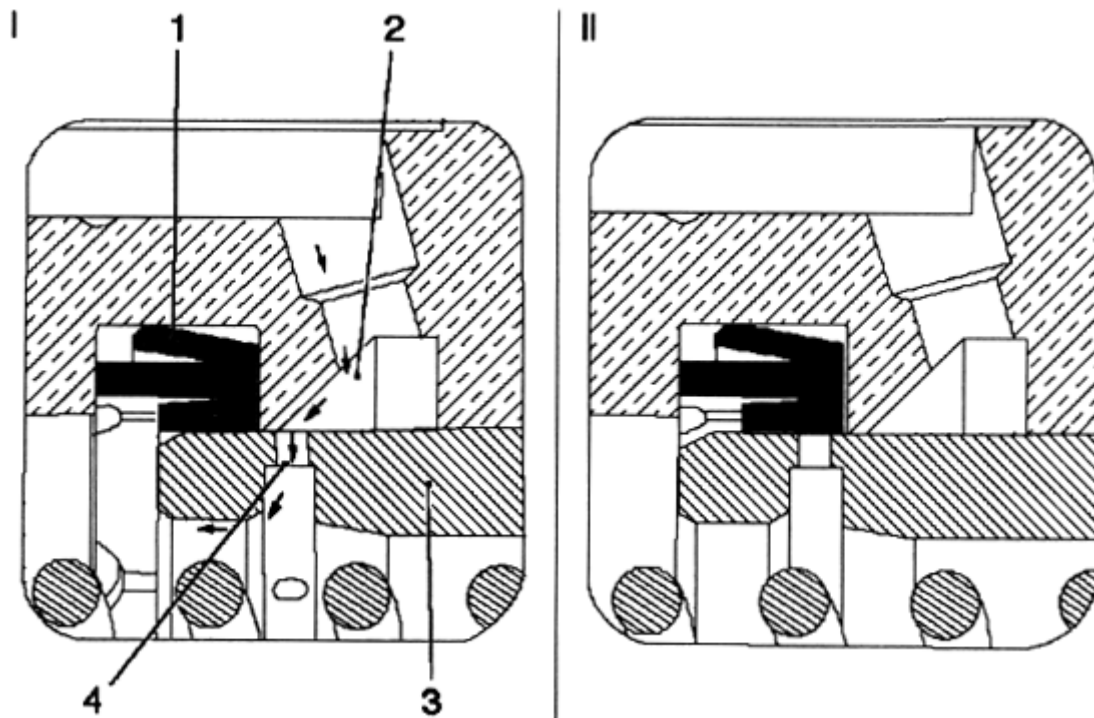


Fig. 6.3. Scheme work Chief inhibitory cylinder in free state and after free Stroke:

- I - tandem master cylinder in a free state;
- II - Tandem master cylinder after free running;
- 1 - sleeve sealing 2 - ring groove;
- 3 - primary or secondary piston, 4 - hole in the piston

In the case of intervention traction control system proivzoditelnost braking system is provided by an annular groove, which is located opposite the holes in the piston, when the master cylinder is in a free state. When the brakes are included in the work in the regulatory process, the additional brake fluid, which was filed with the brakes traction control system, comes back to the relief tank pressure. The degree of pressure increase on the return is determined by the instantaneous performance braking system and the pressure in the brake system, which was established traction control system.

If, when you use the brakes, the control system moves from traction control to harness the anti-lock braking system, compensating the hole can open up the pressure in the main brake cylinder as a result of the need to

return the brake fluid in the master cylinder during the phase of pressure decrease in the anti-lock braking system. Pressure relief tank in the outflow depends on the pressure in the main cylinder, which is operated by the driver. The quantity of liquid that flows back into the reservoir at this time, depends essentially on the performance of the braking system and the current control settings.

The combination of stress, overflow and output during operation of the brakes is possible, as the state of the system.

Primary bush master brake cylinder tandem type remains under pressure created by excess capacity in the brake circuit, until not reached final position.

Inner projection of the primary hub is under pressure and on the outside and from the piston to compensate for the total pressure on the sleeve. This prevents damage to the sleeve edges (sealing edge) at the exit of the piston to limit, as happens in the main brake cylinder tandem type with Vent hole where there is a drop in pressure in the bush.

In principle, the change due to reverse filling (decrease in productivity at constant pressure) is the same as the change when you release the pedal (pressure decrease with a decrease in performance) because edge sleeve is in contact with the piston with a decrease in productivity.

In the case of the ESR system, however, brake fluid should also be made whenever the master cylinder is activated. In this case the pump antilock braking system applies additional brake fluid from the compensation tank. Then the brake fluid passes through the primary hub, causing folding sealing protrusion, while between the piston and the hole created by the annular gap. Brake fluid can now get the pitcher to the corresponding socket.

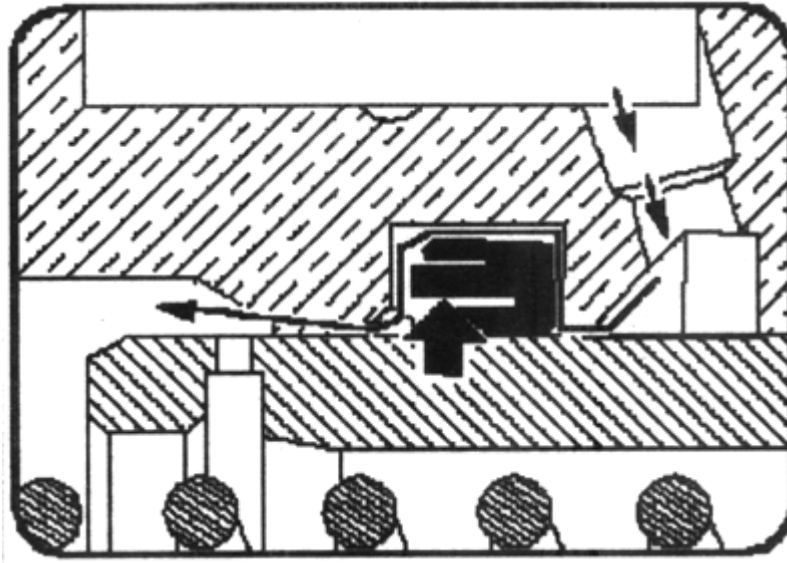


Fig. 6.4. Primary hub of the main brake tandem type cylinder

Arrows - current direction of brake fluid.

Arrow provisions - outer edge of the sealing sleeve is bent inwards.

Faulty circuit

In case of cancellation circuit brake system free lift increases. In case of failure of the primary circuit, the primary piston is based on the secondary piston and rod brake booster brings the latest in motion by a mechanical connection (I).

Upon cancellation of the secondary circuit, the secondary piston rests on the limiter at the end of the opening of the cylinder, then the pressure rises in the primary circuit (II) (Fig. 6.5).

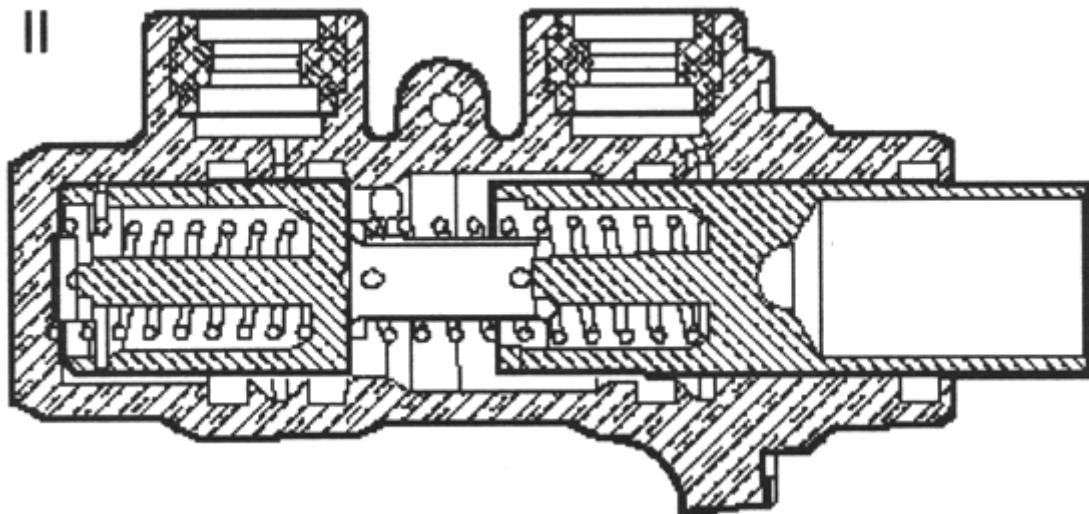
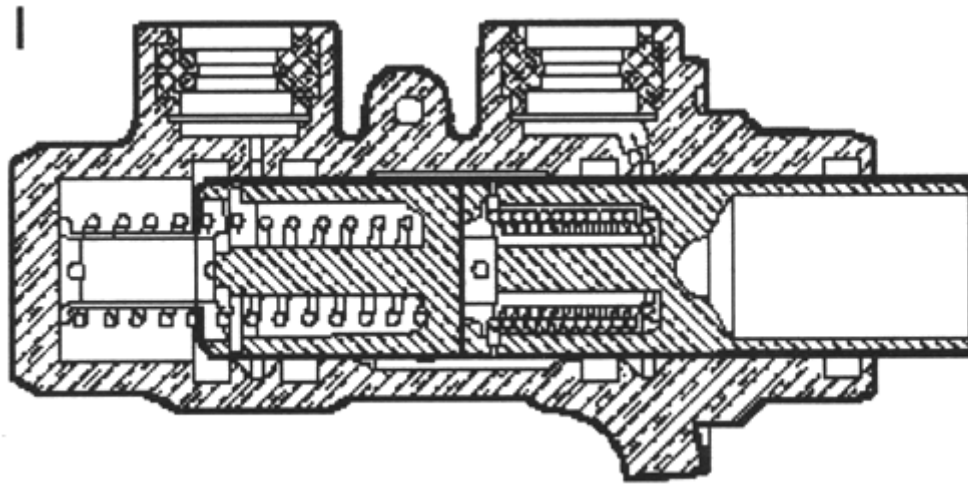


Fig. 6.5. Work Chief inhibitory cylinder at failure
primary and secondary contours Brake system

5.7 Anti-lock braking system ESP MK60

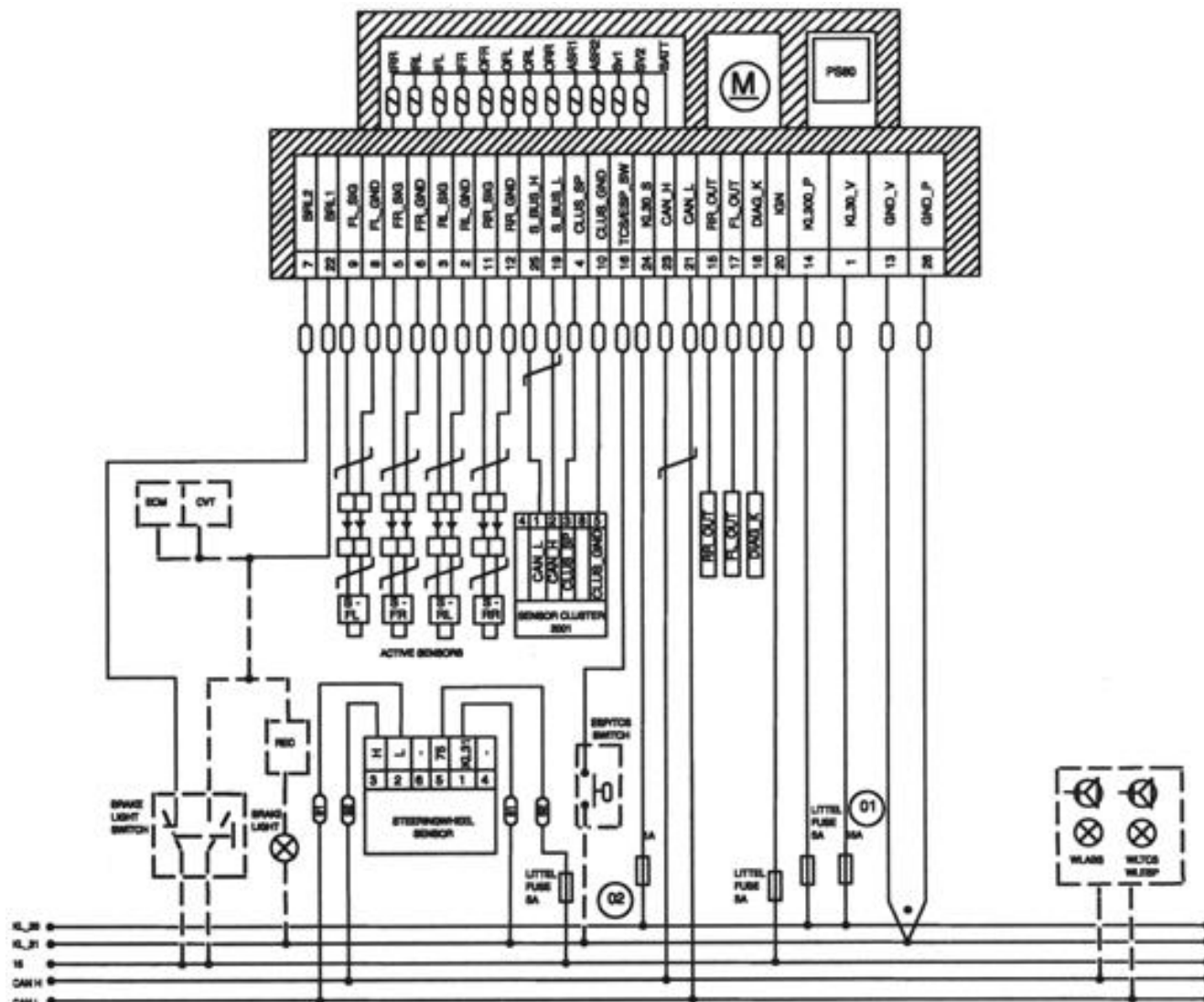


Fig. 6.6. Schematic scheme antilock system Brakes MK 60

ESP is currently the most modern active control system and prevents the emergence of critical situations in the movement at the beginning. Anti-lock braking system ESP MK60 Astra-H includes the following systems:

- Anti-lock braking system (ABS system);
 - Traction Control (TCS);
 - Program electronic stability control (ESP).
- and has the following main functions:
- Logical control scheme understeer (UCL);
 - Control braking force when the motion in the rotation (SHS);
 - Trailer stability control program (TSP);
 - Integral control body (ICC).

Versions systems set on car Opel Astra

Engine	Z14XEP; Z16XEP; Z17DTL	Z18XE; Z20LEL; Z17DTH
Standard	ABSMK70	ABSMK60ESP
More	ABSMK60ESP	--
Extensible	TPMS / DDS	TPMS / DDS
	NVA	NVA
	HSA	HSA

Depending on the version of equipment, anti-lock braking system ESP MK60 may also have the following additional features:

- Detection system pressure drops (DDS) controls the loss of tire pressure through the wheel speed sensors in the event of failure of the system for monitoring tire pressure (TPMS / DDS).
- Hydraulic power Brake Assist (HBA);
- Assistance when starting on a slope (HSA) to prevent slipping back into the car for two seconds, thus facilitating moving off on a slope.

The following table contains general information about using different versions of systems installed in vehicles Astra-H.

Service

The anti-lock braking system ESP MK60 / HSA, a control unit can not be separated from the hydraulic modulator. The control unit anti-lock braking / hydraulic modulator should always be replaced as a single unit.

Description of connectors, anti-lock braking system ESP MK60

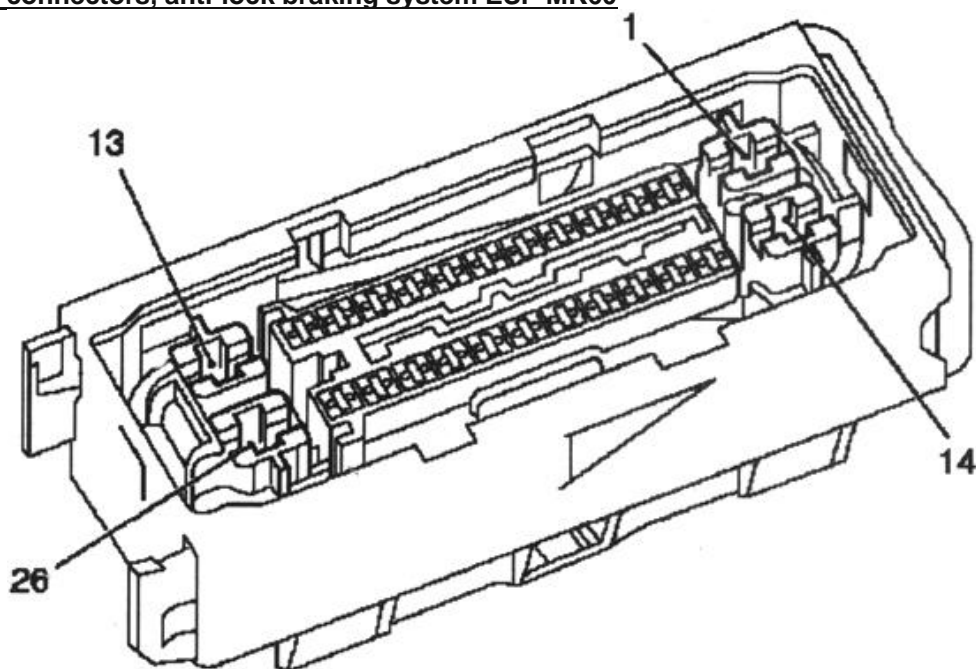


Fig. 6.7. Connector block Management ABS

The control unit is an anti-lock braking system is connected to a power source through a wiring harness connector with 26 contacts, which Pin below.

Pin connector ABS control unit

<i>Conclusion</i>	<i>Description</i>	<i>Type signal</i>
1	Solenoid valves - battery + (pin 30)	1
2	The rear left wheel speed sensor - mass	0
3	The rear left wheel speed sensor - signal	1
4	Power supply yaw angular velocity sensor	0
5	The front right wheel speed sensor - signal	1
6	The front right wheel speed sensor - mass	0
7	Switch signal inhibition	1
8	Left front wheel speed sensor - mass	0
9	Left front wheel speed sensor - signal	1
10	Weight yaw angular velocity sensor	0
11	The rear right wheel speed sensor - signal	1
12	The rear right wheel speed sensor - mass	0
13	Solenoid valves and flow control anti-lock brakes - weight (output 31)	1
14	Relapsing pump - positive battery voltage (pin 30)	1
15	Output - rear right wheel speed sensor	0
16	Not assigned	--
17	Output signal - front left wheel speed sensor	0
18	Diagnosis	1 / 0
19	Private CAN high	1 / 0
20	Ignition (pin 15)	1
21	HS CAN low	1 / 0
22	Switch signal inhibition	1
23	HS CAN high	1 / 0
24	Not assigned	--
25	Private CAN low	1 / 0
26	Return pump - weight (output 31)	1

Sensor / group yaw angular velocity

Yaw angular velocity sensor is installed on the Astra-H, together with the control system ABS ESP MK60. This sensor calculates the instantaneous speed of the vehicle yaw rate (angular velocity) and lateral acceleration. These data require a power control anti-lock braking system for calculating the beginning of the critical traffic situations.

Data exchange between the sensor and the yaw angular velocity control unit anti-lock brake system via a special bus CAN (private bus CAN) in order to reduce the load on the tire HS. Private HS CAN bus works the same way as "normal» HS CAN.

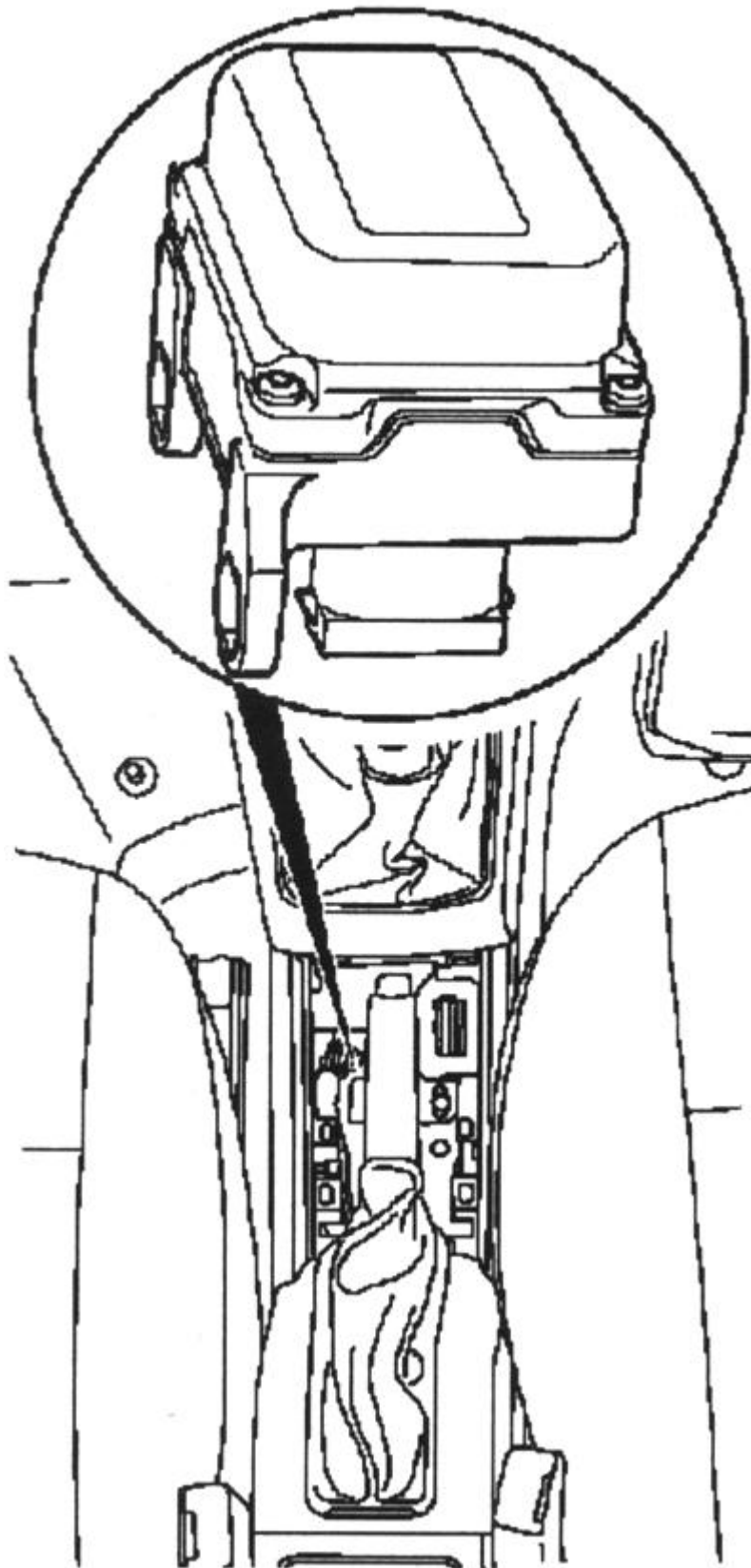


Fig. 6.8. Location connector dates Chica
angular rate yaw

Diagnostics Sensor angular velocity yaw

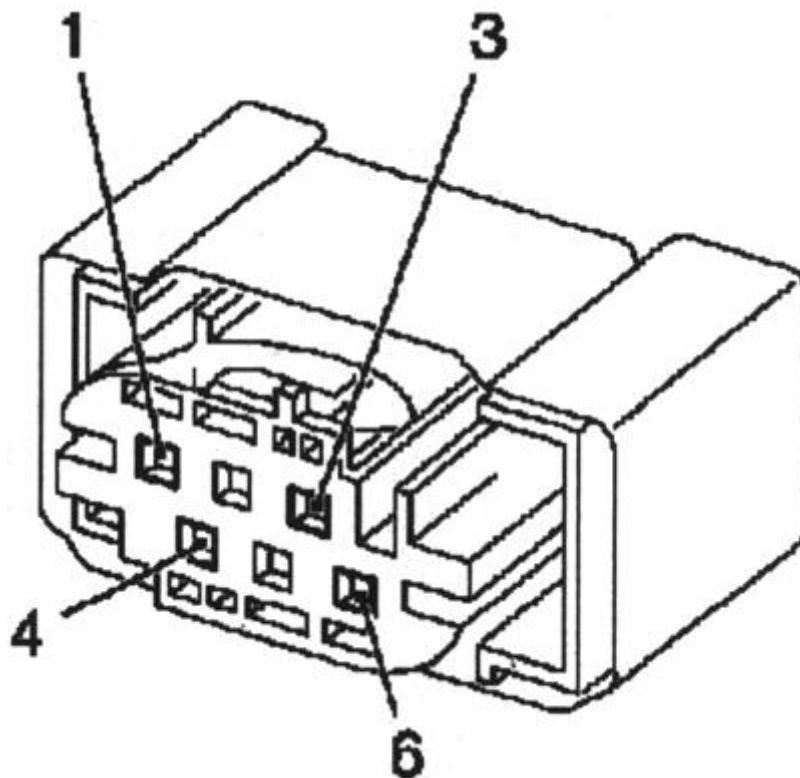


Fig. 6.9. Connector Sensor angular soon-sti yaw
Appointment findings
connector Encoders rate yaw

Conclusion	Description
1	CAN bus low
2	CAN bus high
3	Power supply sensor (+)
4	Not assigned
5	Weight Sensor (-)
6	Not assigned

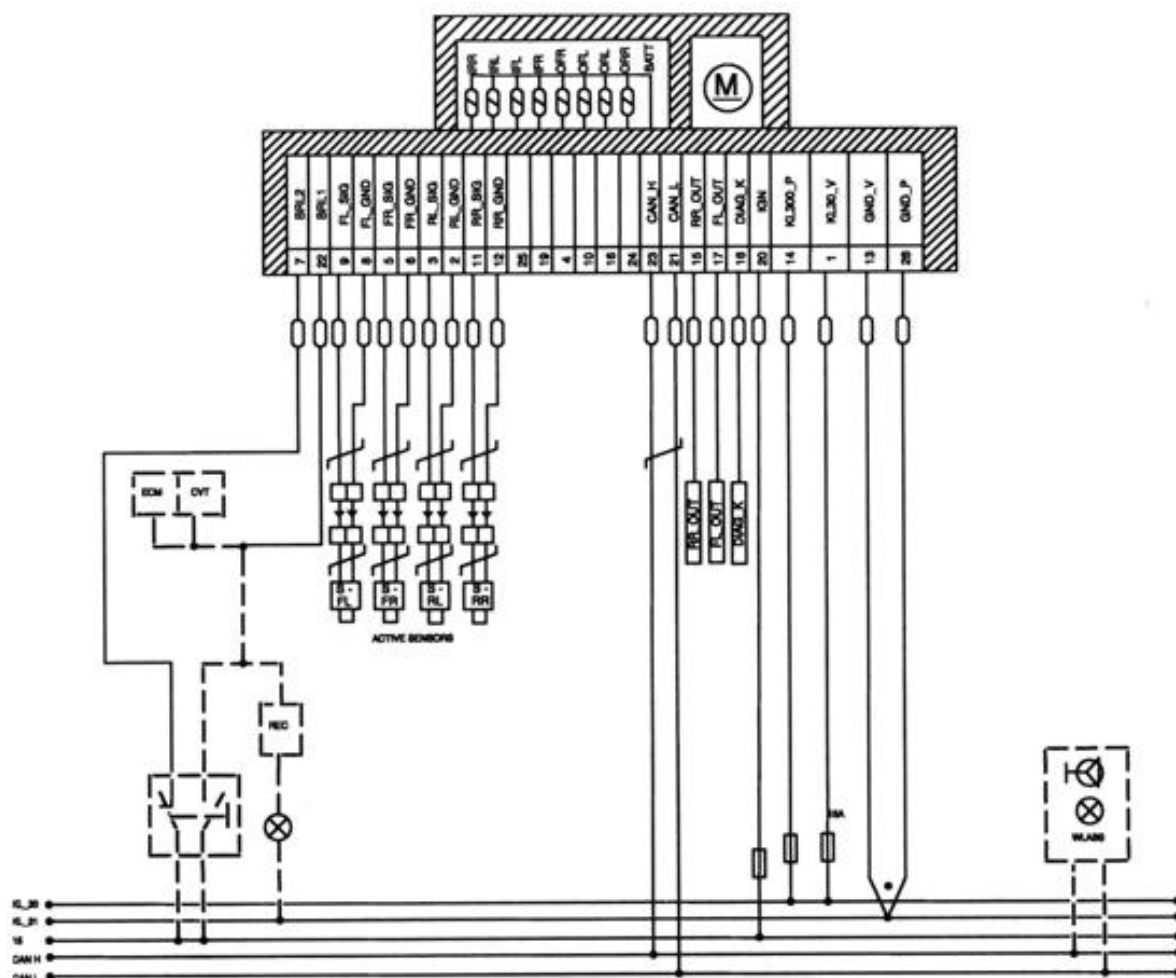
Yaw angular velocity sensor has its own diagnostic tool. It is controlled by a control unit antilock braking system, ie, the control unit antilock braking system receives information on all faults yaw angular velocity sensor via a private bus HS CAN. The corresponding fault codes stored in the control unit anti-lock braking system, with activated warning lights.

-Lock braking system ESP MK70

Anti-lock brake system MK70 is a simple anti-lock brake system with diagonal contours. This is a further development of anti-lock braking system MK60. The control unit is an anti-lock braking system / power hydraulic modulator has been optimized for weight, its dimensions were reduced. The four active sensors, mounted on wheels car supply control unit of anti-lock brakes with necessary information about the speed of rotation. If set, the control unit anti-lock braking system communicates with the hydraulic modulator and can not be disconnected from the modulator, it requires lift hydraulic modulator assembly with the control unit.

NOTICE

Motor pump not long-wives disconnected from gidravliches-who modulator.



Schematic scheme antilock system Brakes MK 70

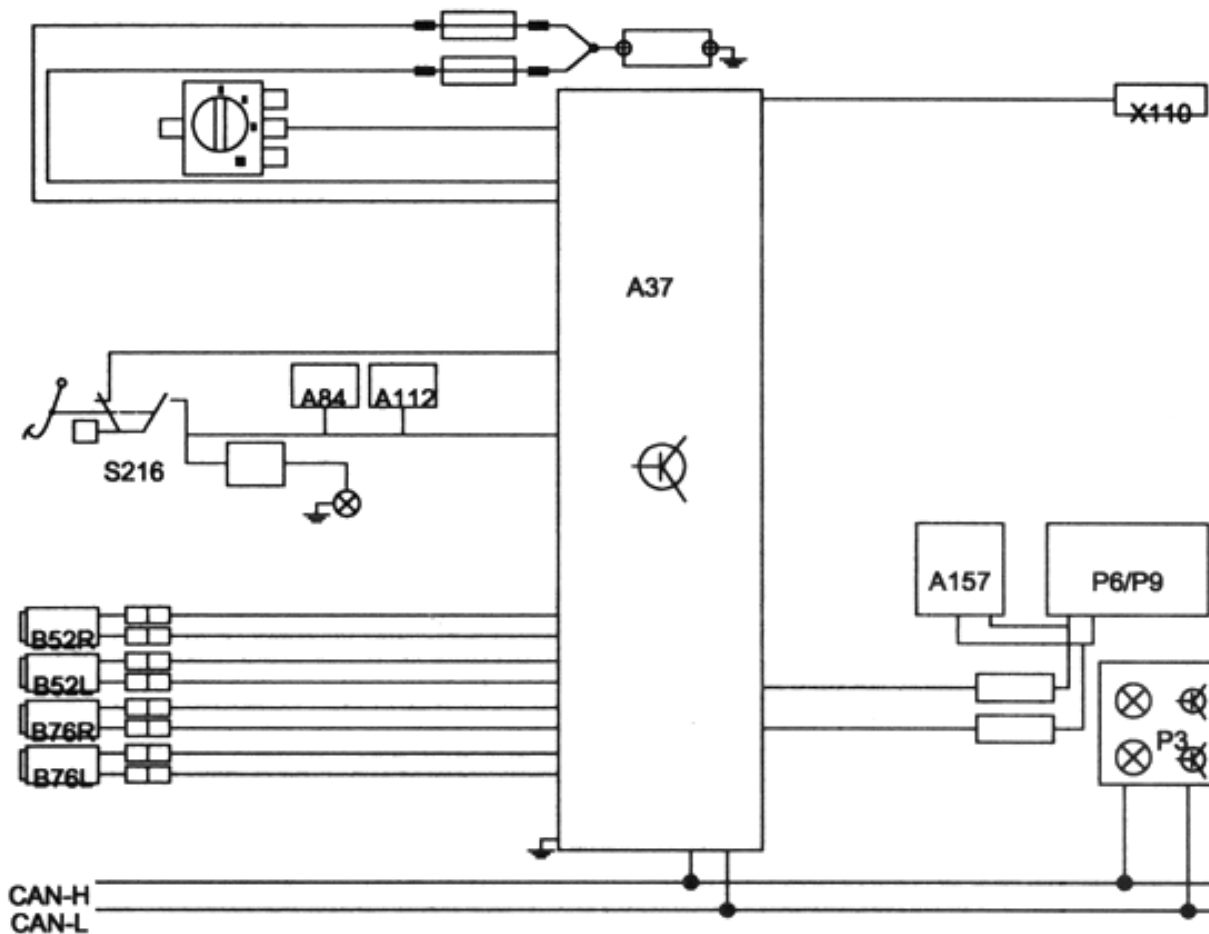


Fig. 6.11. Block diagram of an anti-lock braking system MK70

5.8 Check and adjust the brake system

Check brakes on a dry, clean, relatively smooth and level road. The results of brake testing will be unreliable if the road is wet, slippery or covered with mud. Because of this, adhesion of all tires are different. At the test results will also influence the road, which were biased, because the tires will roll somewhat misleading.

Check your brakes at various speeds the car with light and slam on your brakes to avoid locking the brakes and skidding tires. Lock the wheels when braking does not provide complete information on the effectiveness of the brakes as compared to inhibition when the wheels can rotate and the braking distance is less than the. This is because a locked wheel sliding traction coefficient less than when it was rolling.

In the process of braking affect three main factors:

- On different wheels will vary in terms of tire adhesion, resulting in uneven braking forces. Air pressure and retreading must be the same;
- Brake force on the front and rear axles should be proportional to the force at which the vertical loads;
- Violation of the angles of the wheels may cause that the car is under braking to pull to the side.

To check the leakage of brake fluid, press the brake pedal when the engine speed at idle and the gear lever in neutral position. If the pedal gradually falls at constant pressure, then there is a leak in the system. Visually check for leaks and brake fluid level in the tank master brake cylinder. Slight drop in brake fluid level is due to normal wear pads. Abnormally low levels of interpretation of a leak in the system. In the hydraulic system is possible both internal and external leakage. If the brake fluid level is normal, check the length of the rod of the vacuum brake booster. If found inadequate length of the rod, adjust the length or replace the rod. Check the master cylinder in the following order:

- Check for damage master cylinder or the lack of leakage of brake fluid around the master brake cylinder.

Lowering the level of brake fluid can only talk about leaking. Abnormal conditions is also moisturizing the surface of the master brake cylinder;

- Check your connection to pull the pedal and the length of the rod. If they are normal, disassemble the master cylinder and check for stretching or swelling of the glands of the cylinder, then there is no wear rubber parts, If you have swollen glands, possibly using non-standard or contaminated brake fluid. If found contaminated brake fluid, all components should be dismantled and cleaned, and all rubber parts replaced. All piping should also be washed.

Unsuitable brake fluid, or mineral oil or water in the fluid can cause boiling brake fluid, or damage to rubber components. If the main oil seals of the piston in the master cylinder swelled, it means that the rubber components are corrupted. This malfunction can be confirmed by the swollen glands cylinder piston brake drum on wheels. If you wear rubber is confirmed, sort out all the details of the hydraulic system, rinse them with alcohol. Before building dry details of the flow of compressed air. Replace all rubber parts in the system, including hoses. When using the brake mechanism to verify the absence of fluid seals. If liquid is detected, replace the gaskets. If the condition of oil seals piston in the master brake cylinder is normal, check for leaks or overheating. If these conditions are not detected, drain the brake fluid, fill the master cylinder and re-drain the fluid from the system.

5.9 Check brake fluid level in the cistern hydraulic braking

Tank for the brake fluid is located in the engine compartment.

Pail has a transparent casing, so the level of brake fluid can be controlled from the outside.

The level of brake fluid should always be closer to the mark "MAX" (Figure 6.12).

If the brake fluid level is too low, before removing the cork from the compensation tank clean cloth wipe the cork and place near the cork from contamination, to prevent their falling into the hydraulic circuit brakes.

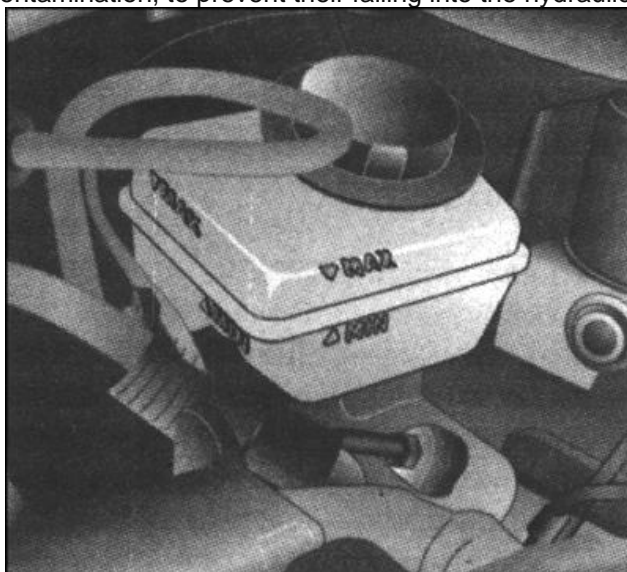


Fig. 6.12. Pail for Brake fluid

Top up the recommended brake fluid into the tank. Mixing different types of brake fluid can damage the hydraulic system.

5.10 Removal of air from the hydraulic braking system

Use only fresh brake fluid DOT 3 or DOT 4.

Remove air (pumping) of the hydraulic braking system is needed to remove the air, significantly reducing the effectiveness of inhibition. The air can get into the hydraulic drive system due to leakage in the repair, replacement of individual units or brake fluid. The presence of air in the drive indicated by an increase brake pedal and its "softness". Before removing the air leak, check all sites in the drive brakes and their compounds.

In the process of pumping the brake system, brake fluid level should not drop below the middle of a tank of hydraulic braking system.

Pumping is performed with an assistant.

Ride the brakes in the following order:

- 1 - rear right brake cylinder working;
- 2 - rear left brake cylinder working;
- 3 - Right front caliper brakes;
- 4 - front left brake caliper.

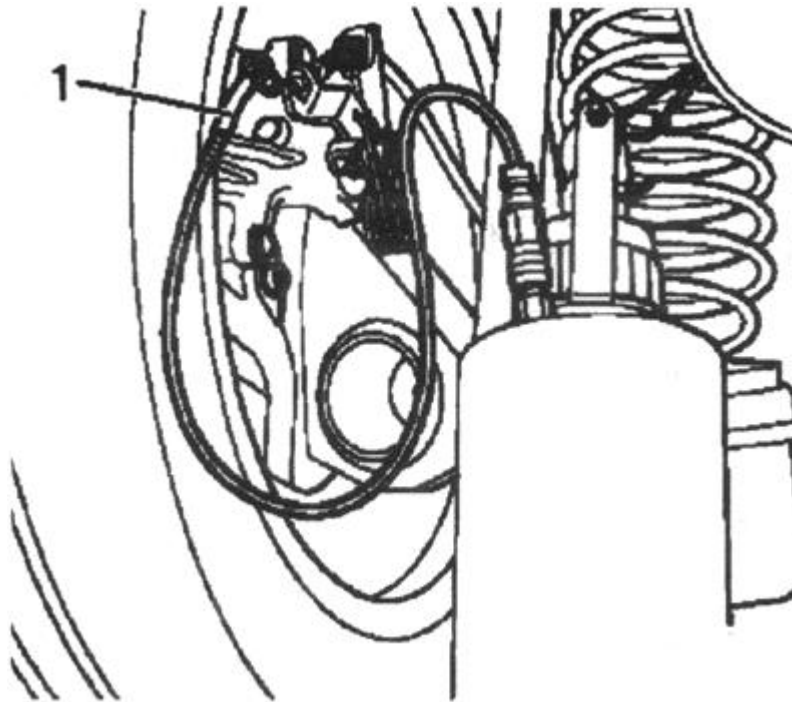


Fig. 6.13. Removal of air from the brake system:

1 - hose to remove air

Raise the car.

Remove the dust cap with pumping connections, clean it, put it on one end of the clean, clear hose, pull down the other end into a container partially filled with brake fluid.

Sharply press the brake pedal 3-5 times at intervals of 2-3 sec, and while holding down the brake pedal to loosen the choke half traffic throughput. Continuing to press the pedal, and to remove the fluid in the system with air through a hose into a container. When the pedal reaches its most forward position and the outflow of liquid through the hose end, screw the fitting volume to failure. Repeat the procedure until the end of the exit of air hose.

Hold the pedal is pressed, screw socket volume to stop and remove the hose from the choke pumping.

Clean the socket and then pumping the protective cap.

Repeat these steps for other wheels.

5.11 Brake hoses

Brake hoses car Opel Astra carry mobile communications between mobile and immobile parts of the car.

Hoses brake system should be checked at least twice a year.

To prevent a sudden failure of the braking system thoroughly check the condition of all piping and connections, paying particular attention to the following:

Metal pipes should not have nicks, scratches, scoring, active corrosion centers and should be located away from the sharp edges that could damage them.

The brake hose must be elastic, not to have tears and cracks.

The hose must be securely enclosed in the tip. Thread handpiece hose shall not be damaged. If the brake pedal tube is inflated, it means that the threads are severed cord. If you notice any of these defects, the hose must be replaced. At the hoses should not be exposed to mineral oils and lubricants, solubilizing rubber.

All bracket pipelines must be safe and well secured. Looseness or destruction of the brackets leads to vibration of pipelines, which causes them to breakdown.

Or leaking brake fluid from the joints of the master cylinder with the pipes and the tank.

If you find faults, replace damaged parts with new ones. Flexible hoses, regardless of their condition, are replaced with new after 120 thousand kilometers, or after five years of operation of the vehicle to prevent sudden discontinuities of the aging of rubber. The brake hose rubbing on the suspension parts, wear out and eventually fails.

To check, use a mirror and light.

5.12 Adjust the parking brake system

For the Opel Astra car with drum brake mechanisms: Adjust drum brake.

Remove the diagnostic connection.

Separate lever parking brake system on the center console and lift it up.

Loosen the adjustment nut completely.

Set the parking brake lever system in the position "0" (off) (Figure 6.14)

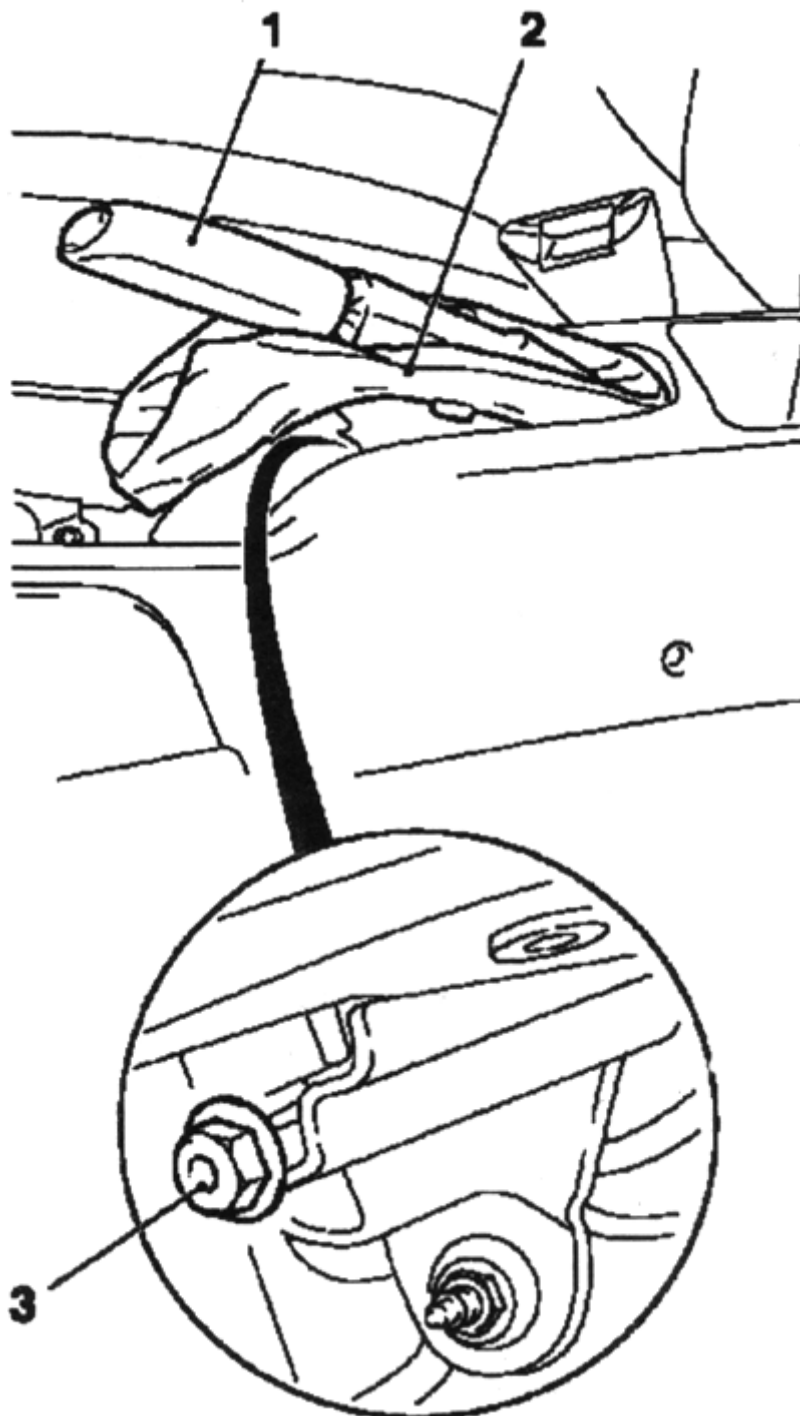


Fig. 6.14. Adjustment parking torus OIML system:

- 1 - lever parking brake system;
- 2 - center console, 3 - adjusting nut

Click on the brake pedal completely for at least 5 times.

NOTE

To adjust the status of the parking brake in the brake caliper or brake drum - make sure that every time when you turn on the parking brake, the brake pedal is returned to its original position (fully unloaded). In cars with drum brake adjuster lever mechanisms of the work can not hear.

Lift the lever of the parking brake system 5 times until it stops and then pull down.

Lift the lever of the parking brake for 2 clicks.

Turn the adjusting nut on the parking brake lever system before any appreciable resistance to rotation of the rear wheels.

NOTE

Inhibitory force must be equal on both wheels.

Lift the lever of the parking brake system on the 3 steps.

NOTE

The wheels should be blocked by 3 clicks.

Attach the corrugated cuttings of the parking brake lever on the center console.

Attach the lid of the diagnostic compounds.

5.13 Replacement of the brake pedal

Withdrawal

Remove the casing pipe supporting the steering column from the top by unscrewing 2 screws fastening.

Remove the casing pipe supporting the steering column from the bottom, unscrewing 3 bolts.

To remove the light switch module, to down the knob in position "O", move the knob to the center position and remove the light switch module (Figure 6.15).

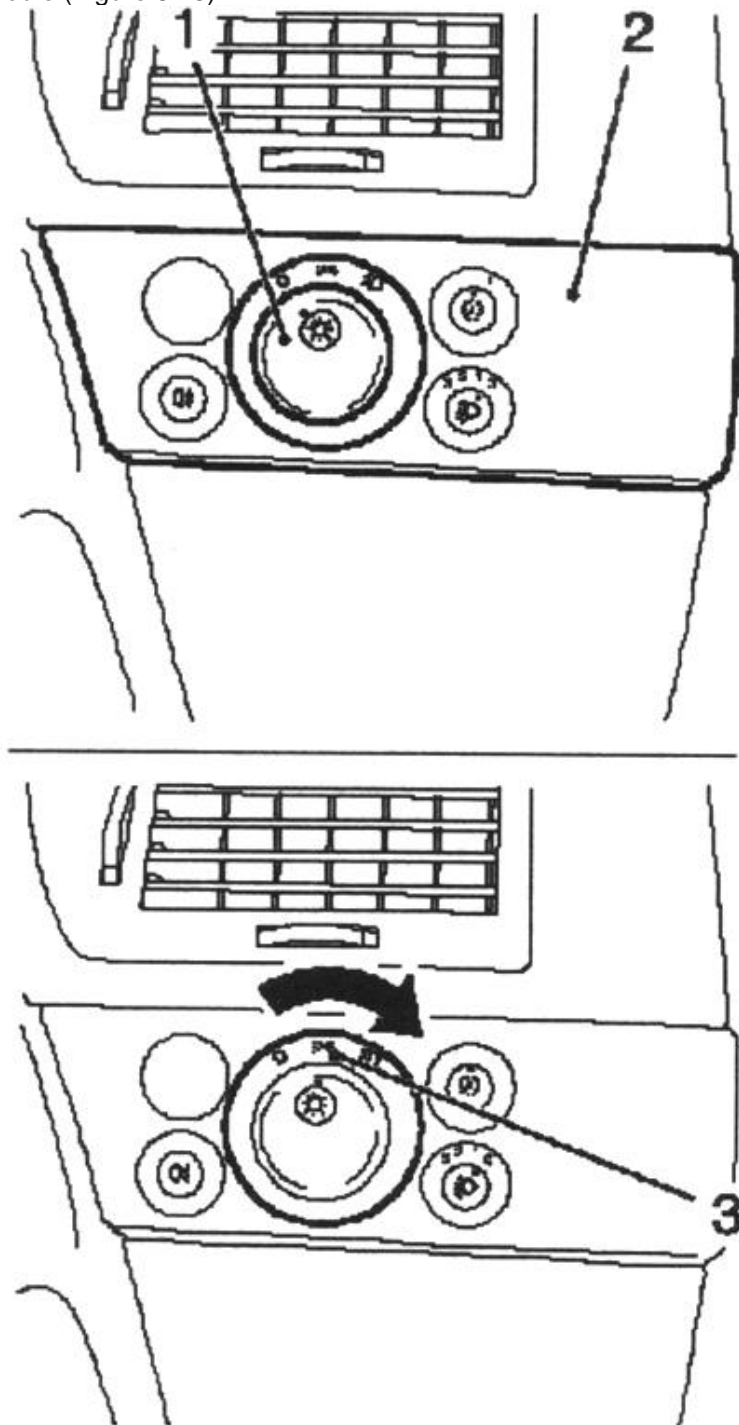


Fig. 6.15. Withdrawal Module light switch:

1 - Grip 2 - central position, 3 - light switch module

Remove the light switch module.

Separate wiring harness connector module light switch. To do this, push the secondary fuse and unlock the fuse (Figure 6.16).

Remove the lining of the bottom lining of the instrument panel by unscrewing the 4 screws fastening.

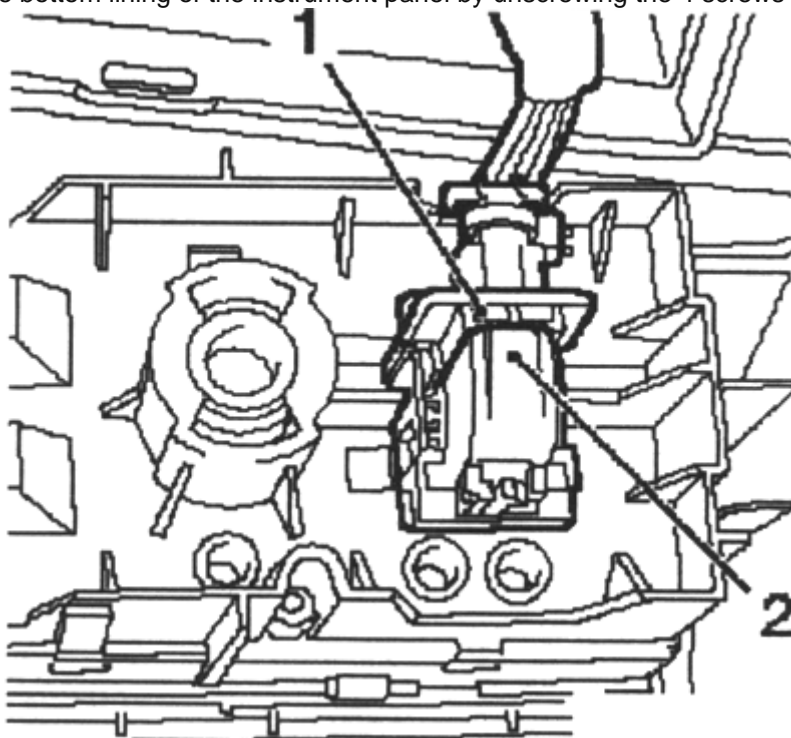


Fig. 6.16. Withdrawal connector tourniquet conduction-ing Module switch light:

1 - Secondary fuse, 2 - fuse

Remove the lining of the driver, removing the 2 time.

Remove the duct from the driver.

Remove the rivet.

Lock the steering wheel in the position of the rectilinear motion.

Turn the steering wheel in position rectilinear motion.

Remove the key from the ignition.

Block locking steering column.

2 Loosen the clamp bolt (Figure 6.17).

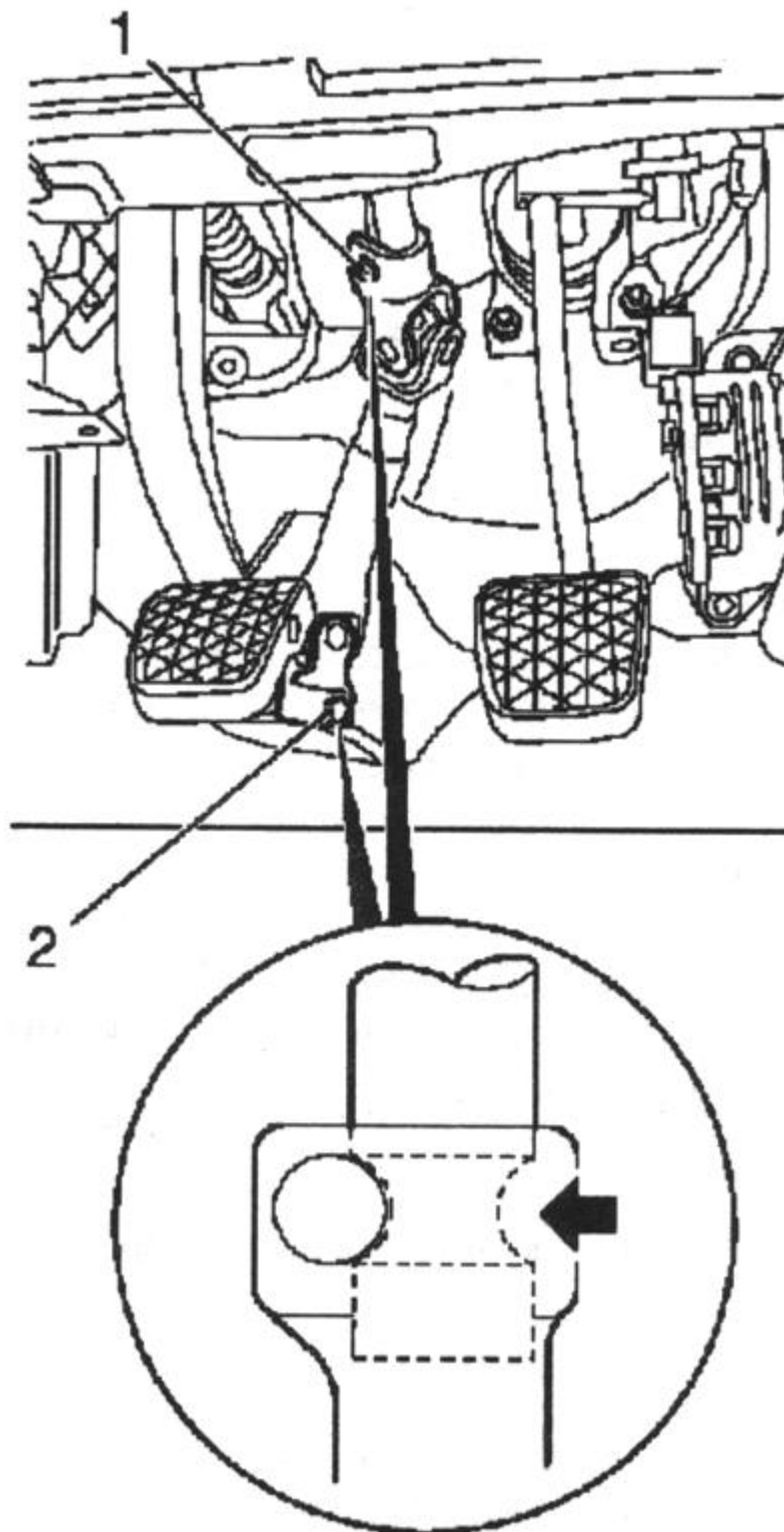


Fig. 6.17. Clamping Bolts steering co-Lonkila:
1,2 - clamping bolts

NOTE

Mark Installation clamping position bolts.

Remove the intermediate shaft.
 Disconnect the wiring harness.
 Disconnect the wiring harness connector switch signal inhibition.
 Unleash the bracket.
 Disconnect the wiring harness connector, the sensor pedal.
 Remove piston brake booster from the brake pedal.
 Loosen the screw fastening the brake pedal.
 Remove the fixing spring.
 Remove the bolt on brake pedal.
 Remove the damping unit.
 Remove the brake pedal with the support of the bearing by unscrewing 2 screws and 4 nuts.
 Disconnect the brake switch signal from the holder (Figure 6.18).

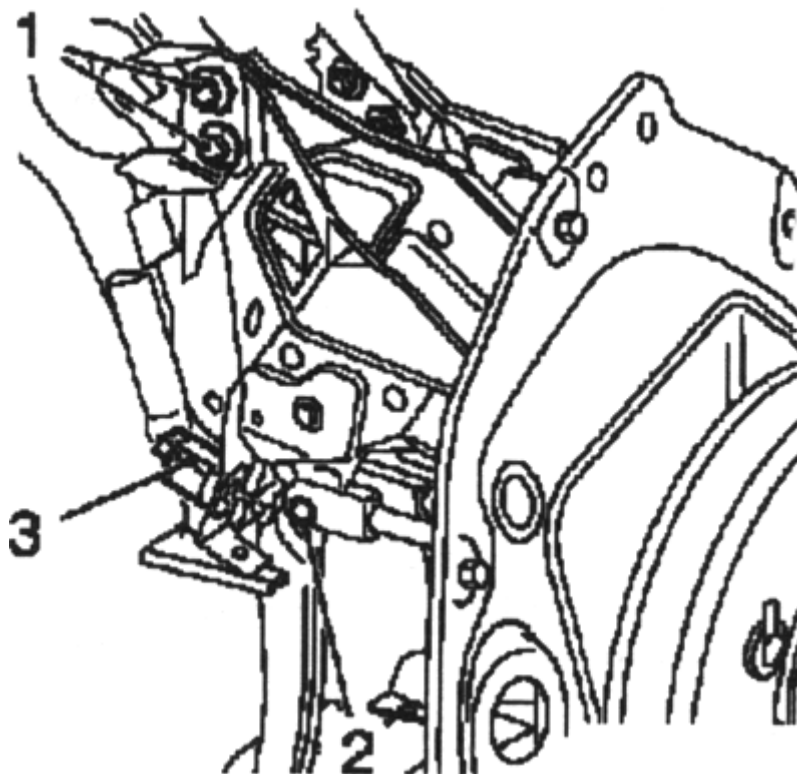


Fig. 6.18. Withdrawal pedal Brakes:
 1 - bolts, 2 - attachment bolt brake pedal;
 3 - switch braking signal

Setting

Install signal inhibition.

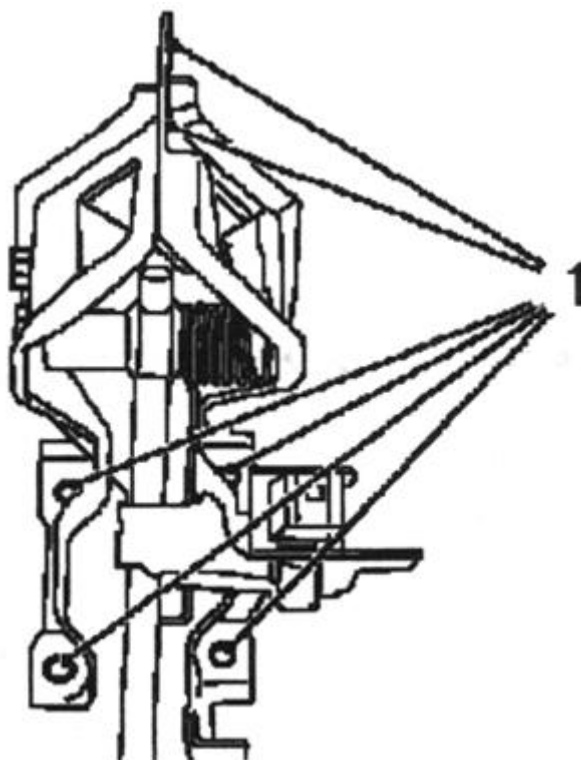


Fig. 6.19. Bolt fixing pedal Tormo for:
 1 - bolts;

Install the brake pedal with the support bearing tighten the mounting point of 20 Nm.

Set damping unit.

Attach piston brake booster to the brake pedal.

Install bolt brake pedal.

Attach the fixing spring.

Attach the wiring harness.

Connect the wiring harness connector to the sensor pedal.

Attach a bracket.

Connect the wiring harness connector switch signal inhibition.

Attach the intermediate shaft to the steering shaft, tighten the moment of 24N-m.

Slide the intermediate shaft on the steering shaft.
Attach the clamping bolt.

NOTE

Before installation clamping bolt, make sure that groove (arrow on ri-sunke 6.17) steering shaft combined with hole in intermediate shaft.

Clean the threads and install the bolt with a fixing composition.
Pay attention to the loading position, the clamping bolt.
Attach the intermediate shaft to steering gear and tighten the moment 24 Nm.
Insert the intermediate shaft in the steering mechanism.

NOTE

Make sure wheels are situation rectilinear motion.

Attach the clamping bolt.

NOTE

Before installing the clamping bolt, make sure that the groove (arrow) of the steering shaft is combined with a hole in the intermediate shaft.

Clean the threads and install the bolts with a fixing composition.
Check the position of the rectilinear movement, adjust if necessary.
Install ducting from the driver.
Insert rivet.
Set facing the driver's side.
Install 2 time.
Install the lower instrument panel pad.
Install central light switch.
Connect the wiring harness connector.
Install central light switch.
Install central light switch in the leftmost position.
Install casing pipe supports the steering column below.
Replace the cover ignition.
Install casing pipe supports the steering column top.

5.14 Removing and installing front brake hoses

Withdrawal

Fill the tank hydraulic brake system up to the mark "MAX" and close with a special tool MKM-558-10.
Remove the front wheel.
Loosen the screw type "Banjo" (3) of the brake caliper.

NOTE

Collect deriving brake fluid and close hole.

Remove the strap and choke tubes braking system (1) of the brake hose (Figure 6.20).

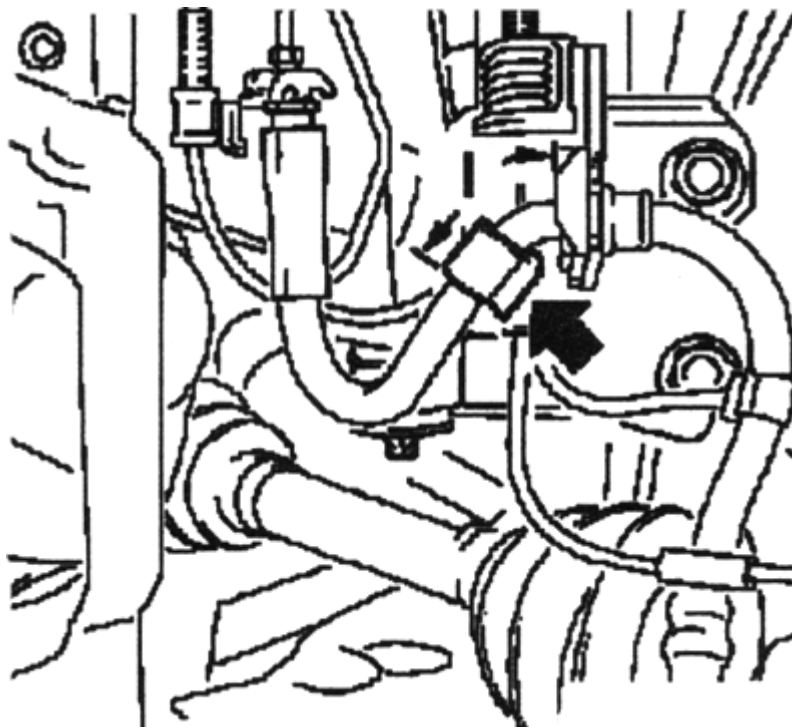


Fig. 6.22. Fastening tourniquet wire gauge:
1 - time

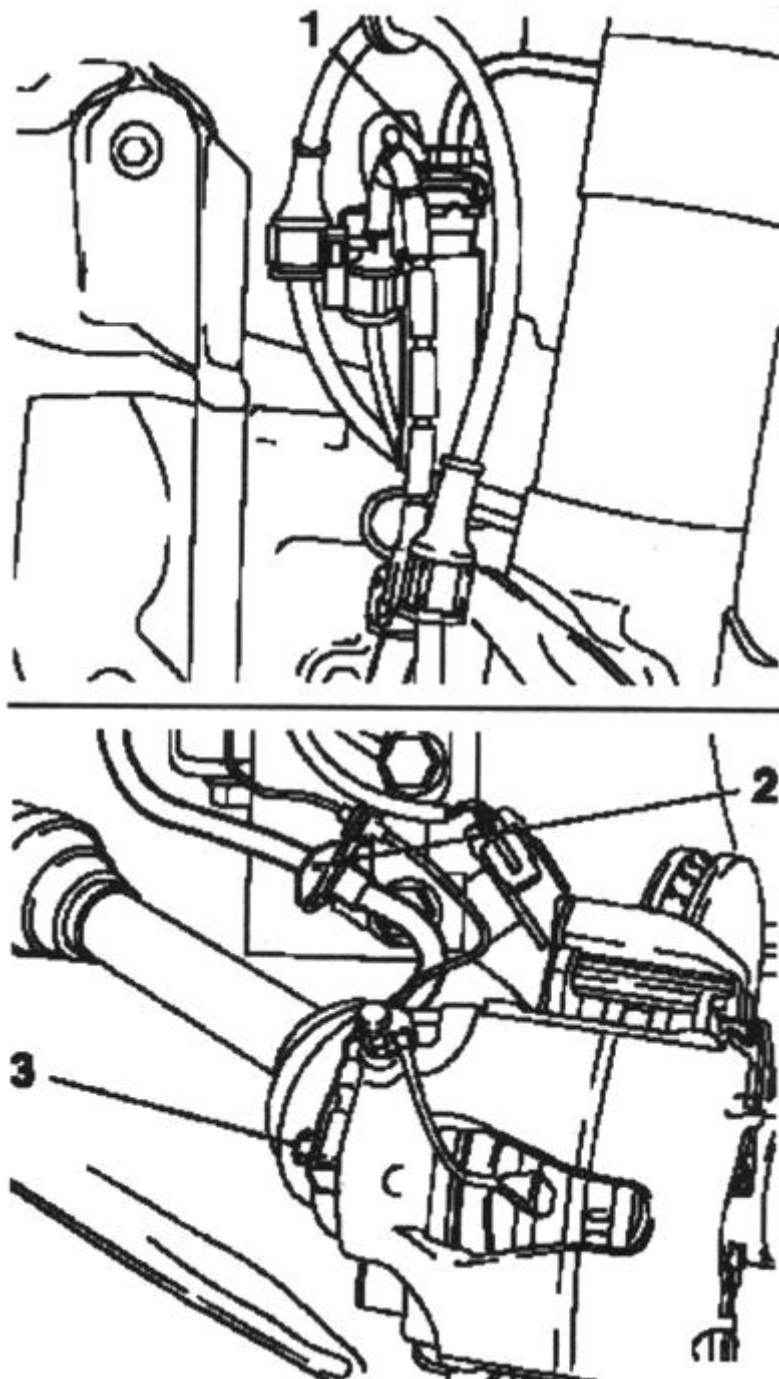


Fig. 6.20. Disconnecting brake hose:

- 1 - tube brake system;
2 - strap, 3 - screw type "banjo"

Remove the brake hose with attachment.

Setting

Attach the brake hose to caliper bolt type "banjo" with the new O-rings and tighten the moment of 40 Nm. Attach the brake pipe to the brake hose and tighten the moment 14 Nm.

NOTE

Set Brake hose for chassis IDS+. Record assembly size (l) of the tread (arrow Figure 6.21).

Mounting dimensions (l): 53 mm.

Install the front wheel and tighten the moment of 110 Nm.

Remove air from the brake system and check the tightness.

Adjust the level of brake fluid so that it was at the label "MAX".

5.15 Replacement of tubes of the braking system

Withdrawal

Fill the tank hydraulic brake system up to the mark "MAX" and close with a special tool MKM-558-10.

NOTE

Tubes Brake system in Founded by Mr. supplied without Match-ing Bolts and razvaltssovok. Ex-use connecting bolts of the diameter necessary Manufacturing labor side Brake system. Set-cho corresponding connector-tion screw on tube Brake system threads and razvaltsuyte end tube brake system. Pay attention on Type originally expanding.

Fold the new brake pipes, using pipe braking system, which will be replaced, as a model.

NOTE

Use tube expanders Institute a Tool in avoid changes section.

Additional protective shells for tubes of the braking system must be installed in the original location (Figure 6.23).

Setting

NOTICE

When replacement tubes Brake si-tem, watch for so that they were between electrically-mi lines. Abrasion will denial electrical system. Distance between tubes torus OIML system and electrically-mi lines should is not Me-it 25 mm.

The fixing bolts of the brake system of pipes tightened moment 14 Nm.

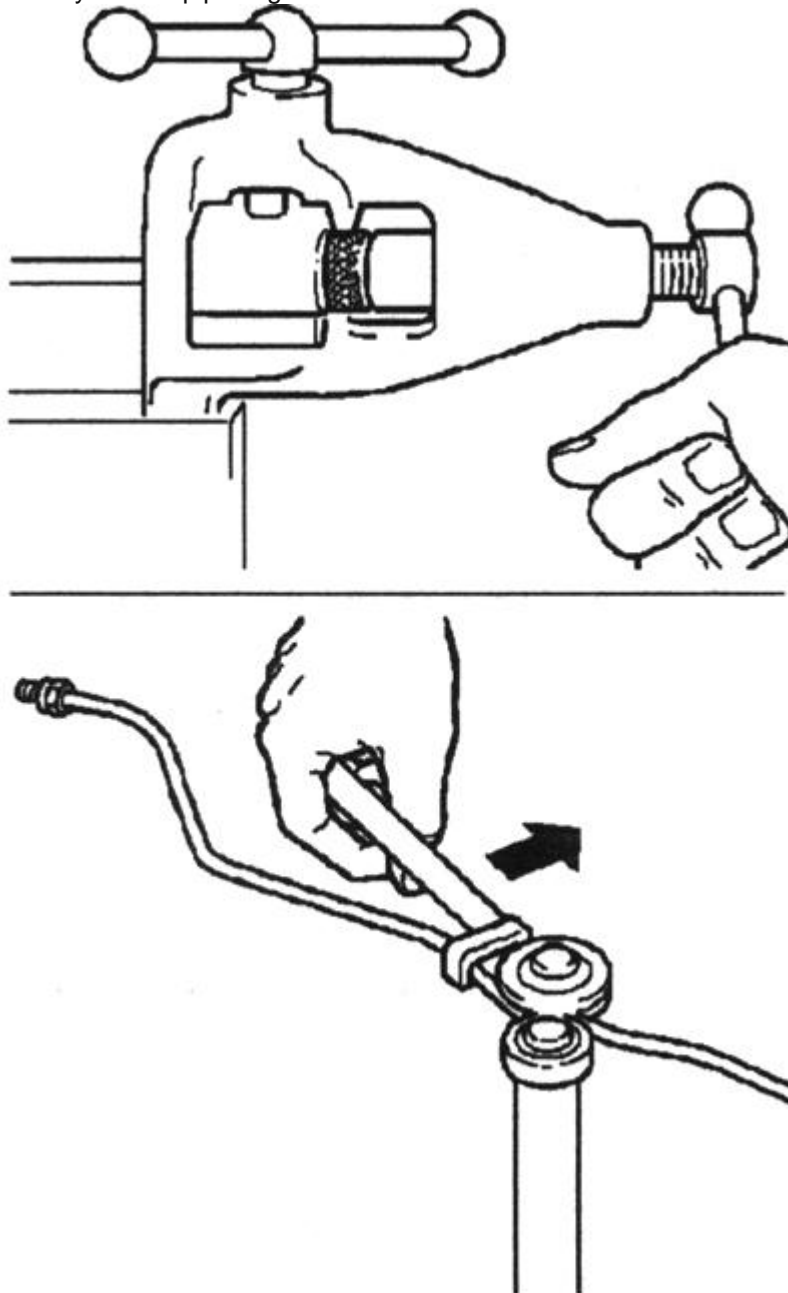


Fig. 6.23. Flaring Braking tubes

Remove the special tool MKM-558-10 tank with hydraulic brake system.

Remove air from the brake system and check the tightness.

Adjust the level of brake fluid so that it was at the label "MAX".

5.16 Replacement of cistern hydraulic braking system

Withdrawal

Remove the tank lid hydraulic brake system of a car Opel Astra.

Pump out as much brake fluid.

Disconnect the wiring harness from the reservoir.

Disconnect the wiring harness connector from the brake fluid level sensor (Figure 6.24).

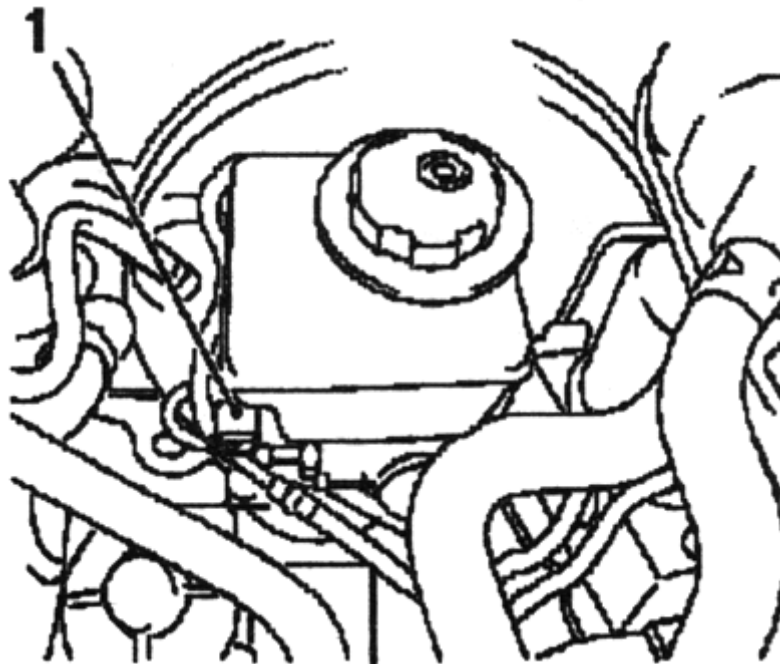


Fig. 6.24. Connector tourniquet wires sensor-ka level

Brake fluid:

1 - Connector

Disconnect the tank hydraulic brake system of the master brake cylinder.

Loosen the screw (Figure 6.25).

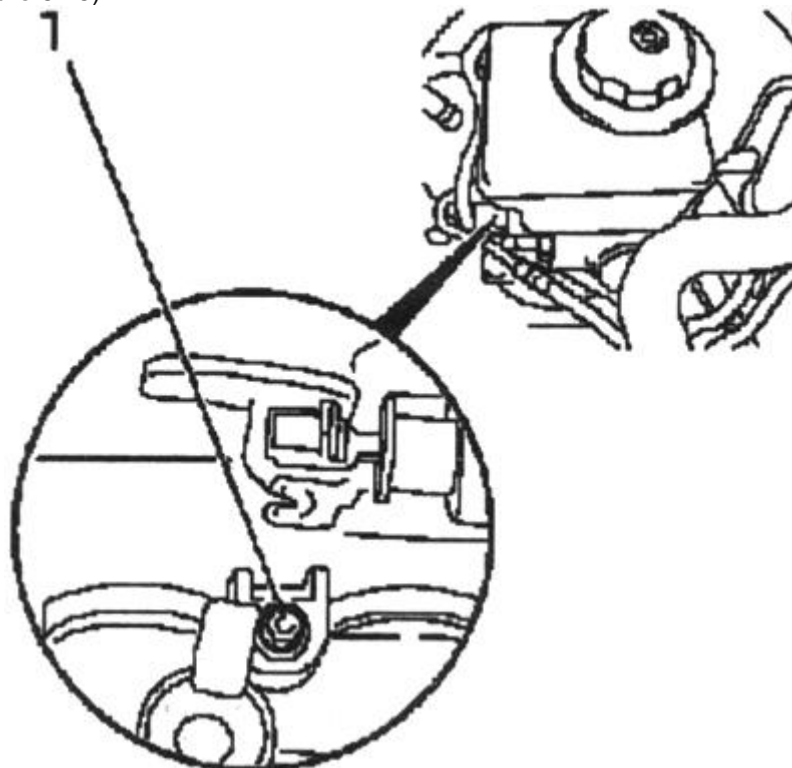


Fig. 6.25. Bolt fixing cistern hydro drive

Brake system:

1 - bolt

Carefully remove the tank hydraulic brake system with master brake cylinder.

NOTE

Collect brake liquid and close openings.

For cars with manual gearbox: disconnect the feed pipe from the clutch master cylinder reservoir hydraulic brake system (Figure 6.26).

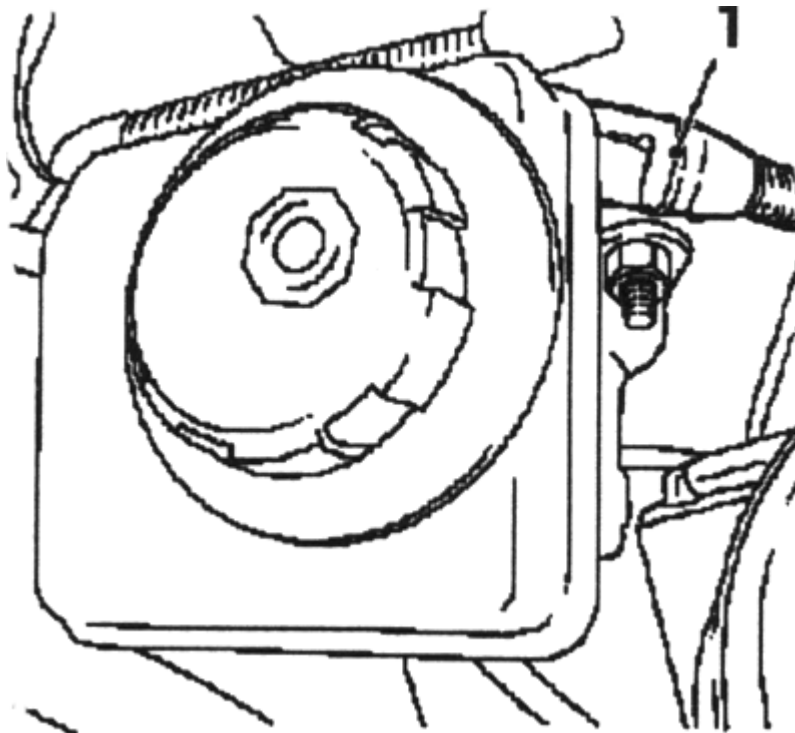


Fig. 6.26. Disconnecting submitting Labor boprovoda
Chief cylinder Clutch:
1 - supply pipeline

NOTE

Collect brake liquid and close openings.

Disconnect the brake fluid level sensor.

Setting

Replace the seals on the master brake cylinder (Figure 6.27).

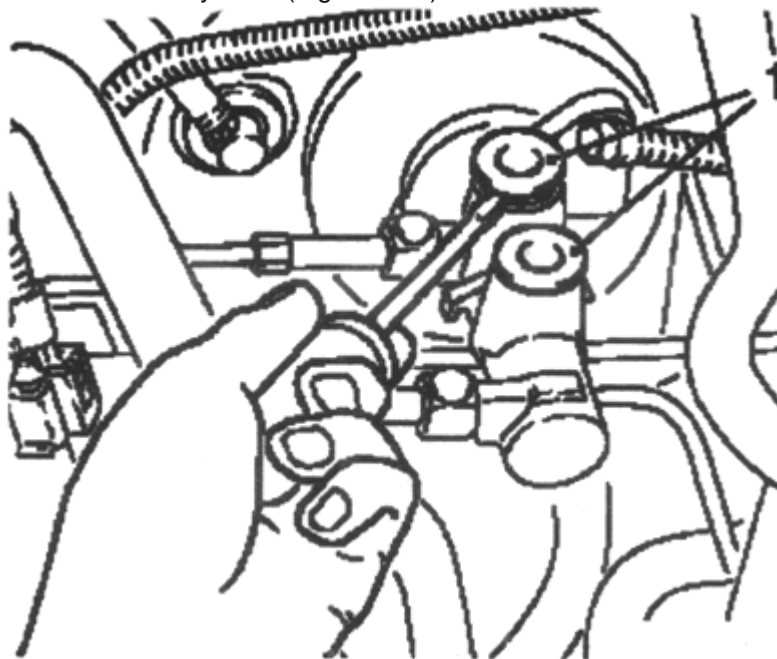


Fig. 6.27. Replacement Seal on main brake Cylinder:
1 - Seal

NOTE

Avoid Mineral Lubricating oil or lubrication with the installation of Seals or supply Labor boprovoda Chief cylinder clasp-PRINCIPLES FOR GOOD GOVERNANCE on choke cistern hydraulic brake system. In case wherever necessary, should used pa-hundred for brake cylinders.

Attach the brake fluid level sensor.

For cars with manual gearbox: Attach the feeder pipe to the clutch master cylinder Backa hydraulic brake system.

Attach the tank to the hydraulic brake system master cylinder.

NOTE

Make in that tank hydro drive Brake system of correct installed.

Attach the tank to the hydraulic brake system master cylinder.

Connect the wiring harness brake fluid level sensor.

Attach the wiring harness clamp on the tank hydraulic brake system.

Remove air from the brake system.
Fill the tank hydraulic brake system up to the mark "MAX".
Close the tank hydraulic brake system lid.

5.17 Removing and installing brake booster vacuum line

Withdrawal

Remove the vacuum line from the elbow to the brake booster.

Disconnect the latch mounting the vacuum line from the front intake manifold (for cars with gasoline engines) or from the vacuum pump (for diesel vehicles) (Figure 6.28).

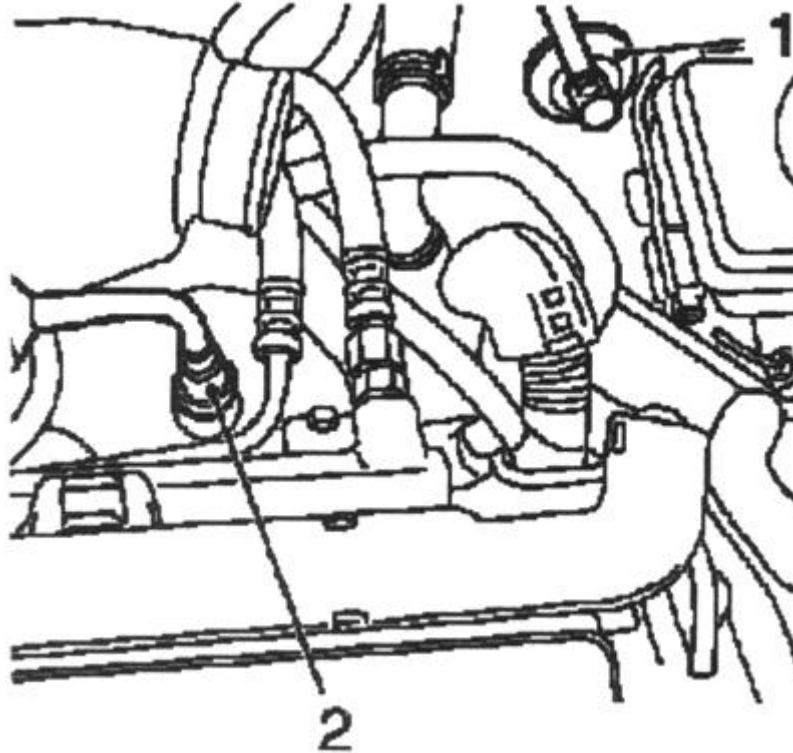


Fig. 6.28. Disconnecting vacuum Magicians strali:

1 - elbow pipe, 2 - latch mounting vacuum line

Disconnect the latch by pressing on the latch (arrow). Remove the vacuum line.

Setting

Cut open the vacuum line to the choke and remove from the nozzles (Figure 6.29).

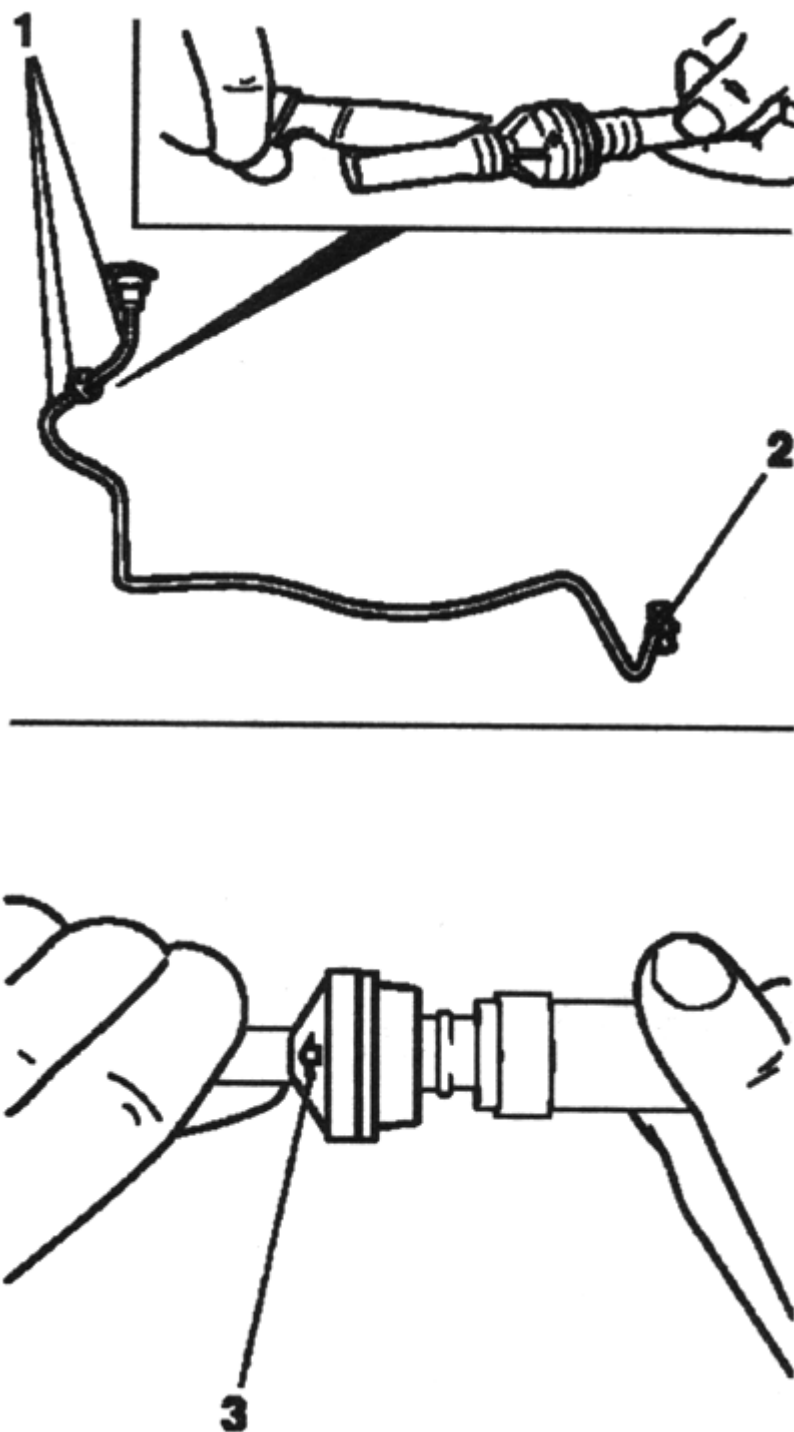


Fig. 6.29. Withdrawal vacuum magistrali with Fittings:

1, 2 - place paring 3 - pointer at the non-return valve

Cut a new vacuum line (rubber hose with textile base) the required length and attach the new clamps with a special tool KM-J-22610.

NOTE

Make sure arrow (Fig. 2.29) on reverse valve points in direction Intake collectivized-ra or vacuum pump.

Zapressuyte vacuum flow line with the elbow in the brake booster.

Attach the vacuum line socket on the intake manifold or vacuum pump.

NOTE

Make in that Reliable Connections sealed.

Test the brake booster.

5.18 Replacement of Control Unit ABS (ESP MK60)

NOTICE

Important observe How on ra-Bothe with hydraulic modulator rum and block Management antiblo-kirovochnoy system brakes.

Withdrawal

Remove the hydraulic modulator with a control unit antilock braking system.

Attach a draft attachment to the hydraulic modulator.
Loosen the 2 plugs from the hydraulic modulator.
Install thrust restraint (Figure 6.30).

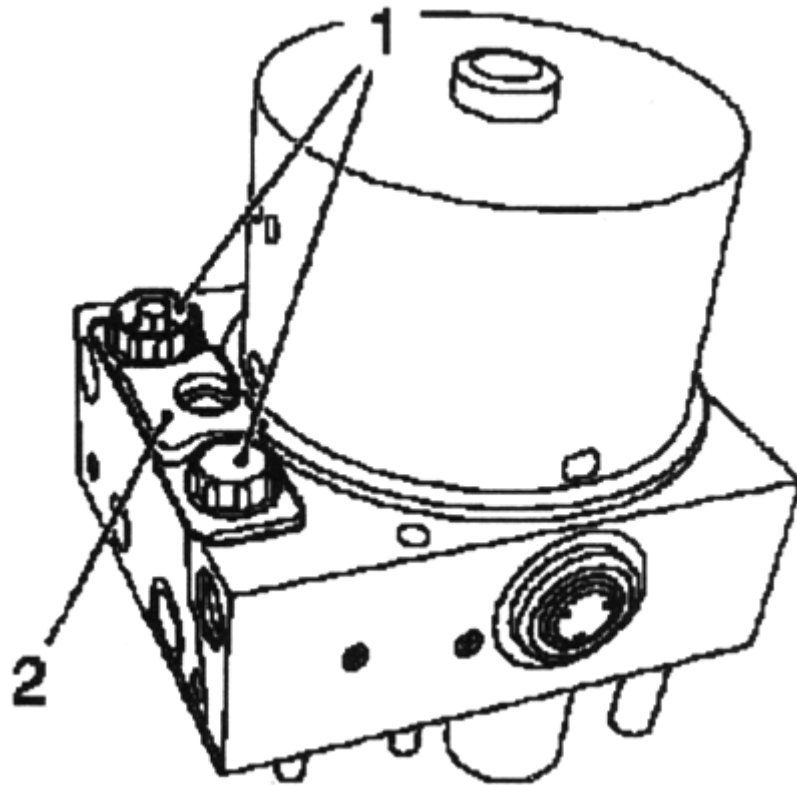


Fig. 6.30. Withdrawal hydraulic fashion-accumulators:
1 - cap 2 - thrust restraint

Tighten the 2 plugs in the hydraulic modulator.

Disconnect the control unit anti-lock braking system on the hydraulic modulator, unscrewing 2 screws fastening (Figure 6.31).

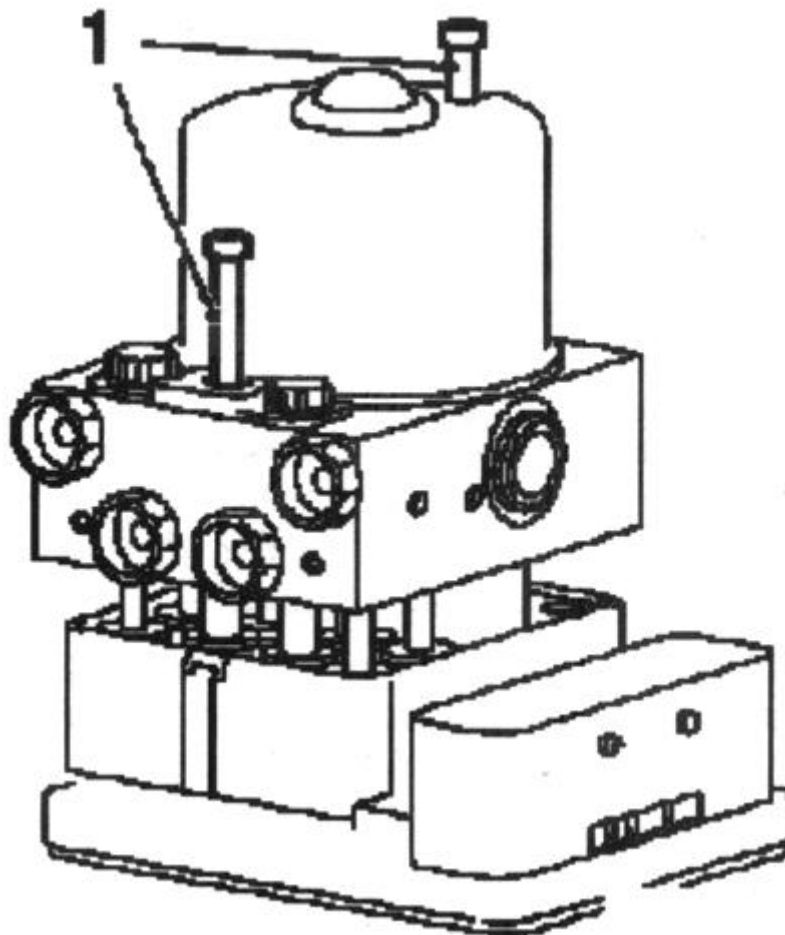


Fig. 6.31. Mounting block Management:
1 - Bolts

NOTICE

Remove block Management antiblo-kirovochnoy system Brakes with hyper-dravlicheskogo modulator not to clone his.

Disconnect the control unit anti-lock braking system on the hydraulic modulator.

Setting

Connect the adapter to the pump motor control unit anti-lock braking Install the adapter in the guide (Figure 6.32).

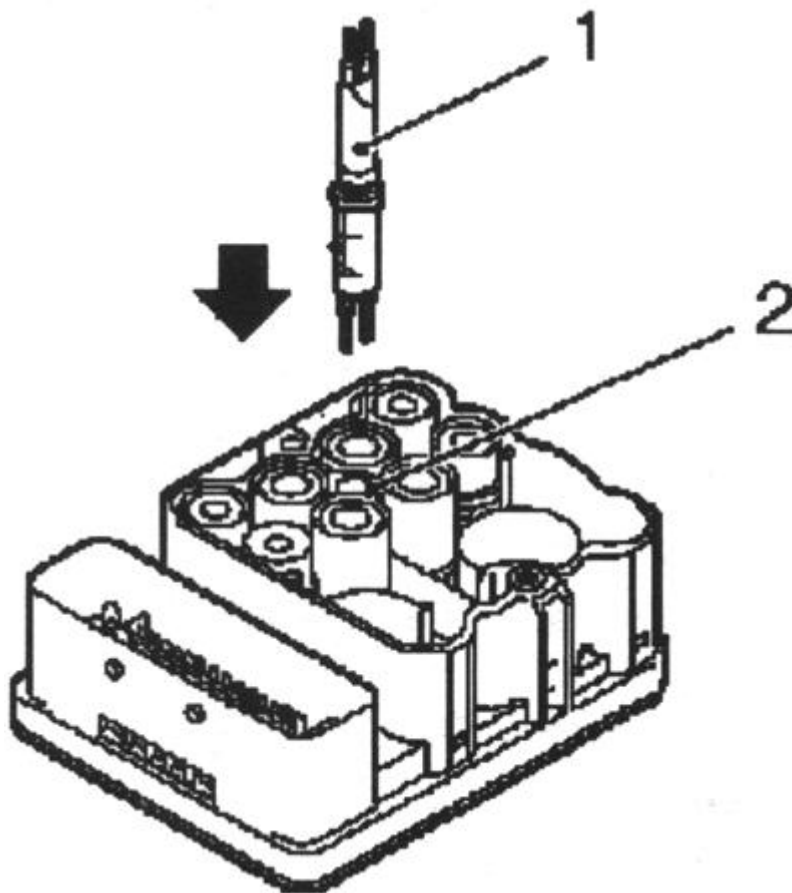


Fig. 6.32. Setting adapter:

1 - Adapter 2 - slide

NOTE

Effort assembly may up to 130 N.

Attach the new control unit anti-lock braking system to the hydraulic modulator and tighten the moment 5,5 Nm.

Install the control unit antilock braking system on the hydraulic modulator carefully, without tilting it.

Remove the restraining pull of the hydraulic modulator car Opel Astra.

Remove 2 plugs hydraulic modulator.

Remove the thrust restraint.

Tighten 2 Stoppers hydraulic modulator.

Install hydraulic modulator with a control unit antilock braking system.

When replacing the control unit anti-lock braking system, after the installation is complete, programming using TESN2.

5.19 Removing and installing brake caliper front wheel

Withdrawal

Remove the brake caliper.

Remove the piston from the brake caliper.

Tighten the brake caliper in a vise.

Insert wooden block in the brake caliper shaft.

Gently squeeze the piston with compressed air.

Gently squeeze out the protective cover from the brake caliper plastic wedge.

Gently squeeze a plastic wedge-shaped sealing ring from the groove in the housing slide and vypress-live even a sliding sleeve (Figure 6.33).

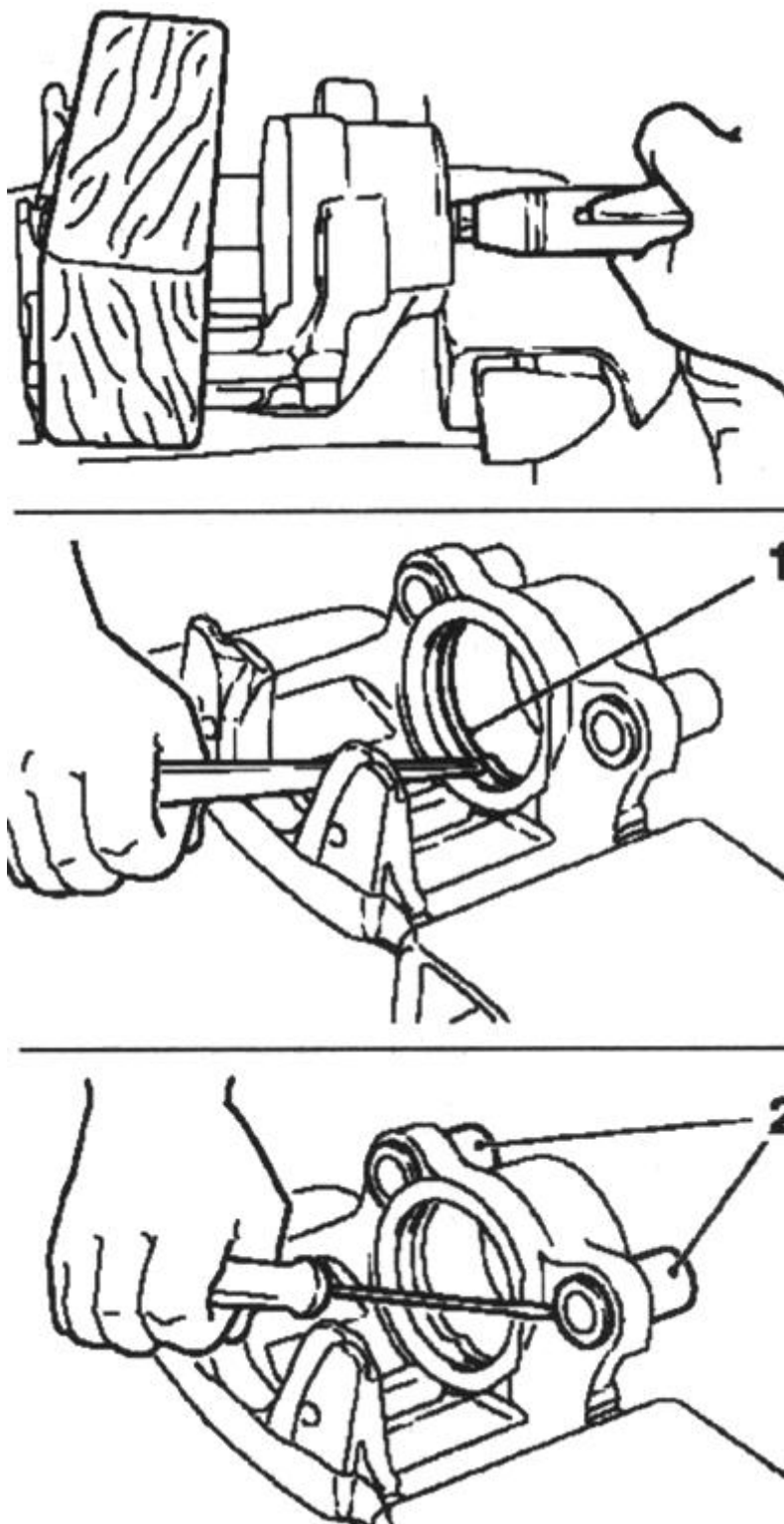


Fig. 6.33. Extract sealing ring
and Moving Bushings:
1 - O-ring, 2 - sliding sleeve

Clean the piston and cylinder walls.

NOTE

Only Brake liquid or alcohol, never not use other fluid.

Replace the O-ring and a protective cover.

Check the wear of the piston and cylinder wall.

NOTE

If the piston is defective or Zahwah chen with rust: replace all the brake caliper.

Setting

Install the piston in the brake caliper.

Cover the cylinder walls, piston and sealing ring for brake cylinder paste.

Zapressuyte new sliding sleeve.

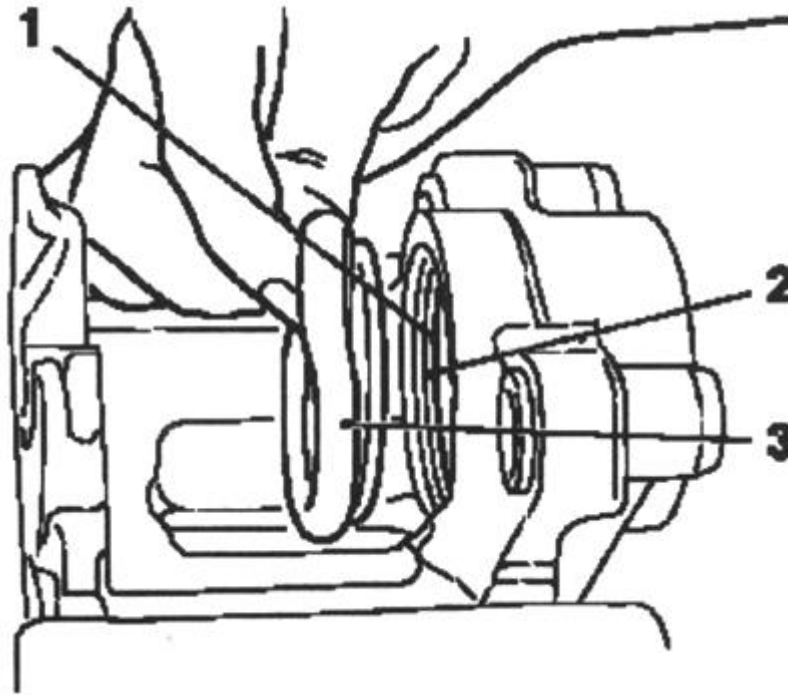


Fig. A .34. Installation new seal-tion ring:
1 - O-ring, 2 - edge, 3 - groove

Install new O-ring (Figure 6.34).

Install a protective cover to the brake caliper.

NOTE

Edge protective cover be located in groove calipers (Fig. 6.34).

Gently insert the plunger.

NOTE

While internal ledge protective cover not fall in groove on piston.

Make sure that the piston is not tilted. Install the brake caliper.

5.20 Removing and installing brake shoes lining the front wheel

NOTE

All lining Brake lasts one axis must is replaced.

Withdrawal

Remove the 2 front wheels.

Remove the sensor pads brake pad on the inside lining of the pad, if any.

Remove the fixing spring lever brake caliper with a screwdriver.

Remove the protective dust cap sleeves guide bolts (Figure 6.35).

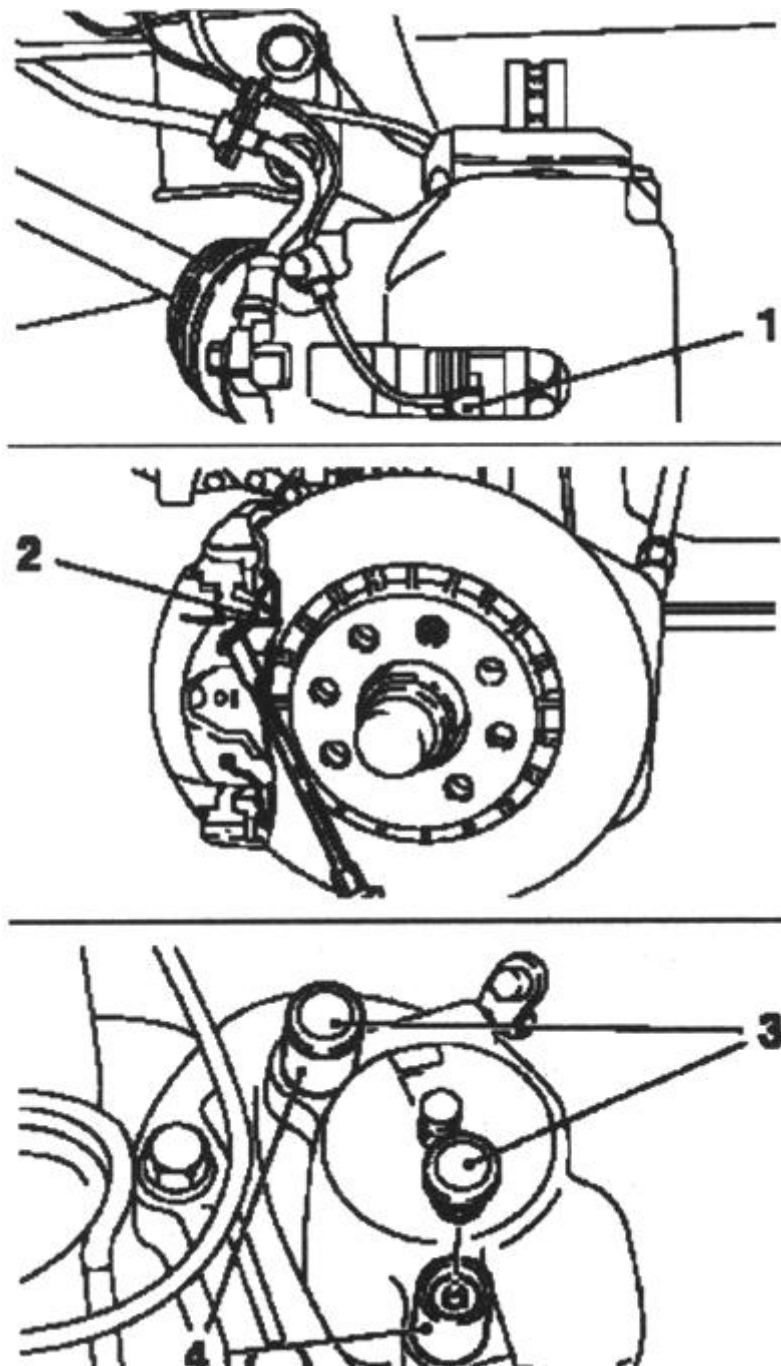


Fig. 6.35. Withdrawal components Front brakes:

1 - sensor pads brake pads, 2 - retainer spring lever;

3 - dust caps;

4 - protective sleeve guide bolts

Loosen the brake caliper guide bolts.

Remove the brake caliper with the guide blocks.

Remove the outer pad brake shoe brake caliper and the inner pad brake shoe hold down clamp with pistons (Figure 6.36).

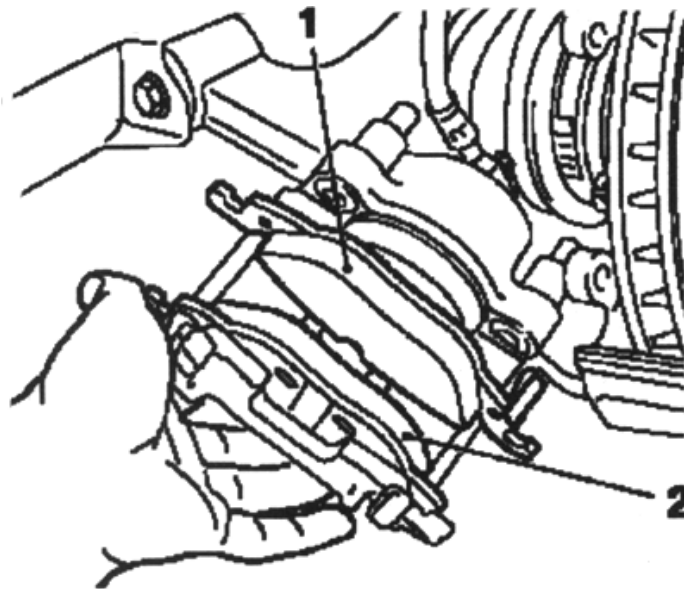


Fig. 6.36. Withdrawal linings Brake to-boat:

- 1 - the inner lining of the pad;
- 2 - outer lining brake shoe

Check brake pad linings and brake discs.

Clean the guides (arrows) in the guide shoe with a soft wire brush (Fig. 6.37).

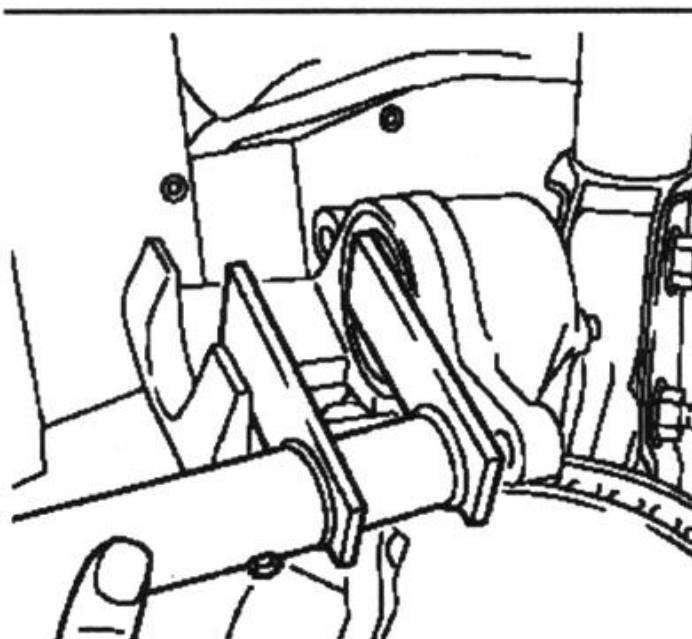
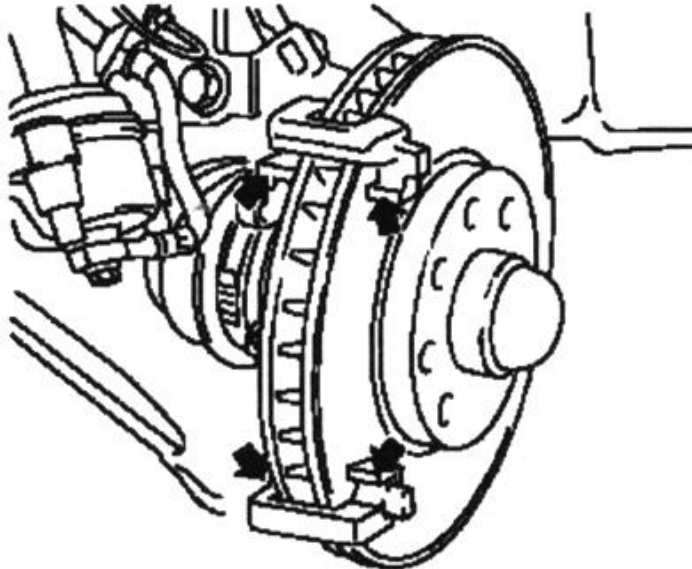


Fig. 6.37. Places purification guides

Cover directing anti-skrripnym composition.
Drown the piston inside.

NOTE

Level Brake fluid in hydraulic tank Brake system increases. In case necessary - ty, pumped brake fluid bag. If Brake caliper da-o leakage or damaged protective cover on brake caliper: from-repair Brake mechanism.

Setting

Install the inner pad brake pads in the piston and secure restraint clamp.

NOTE

When assembly linings brake pads, make sure for so that the arrows on back surface on-stack pointed in direction of rotation inhibitory CD the motion Vehicle forward (Fig. 6.38).

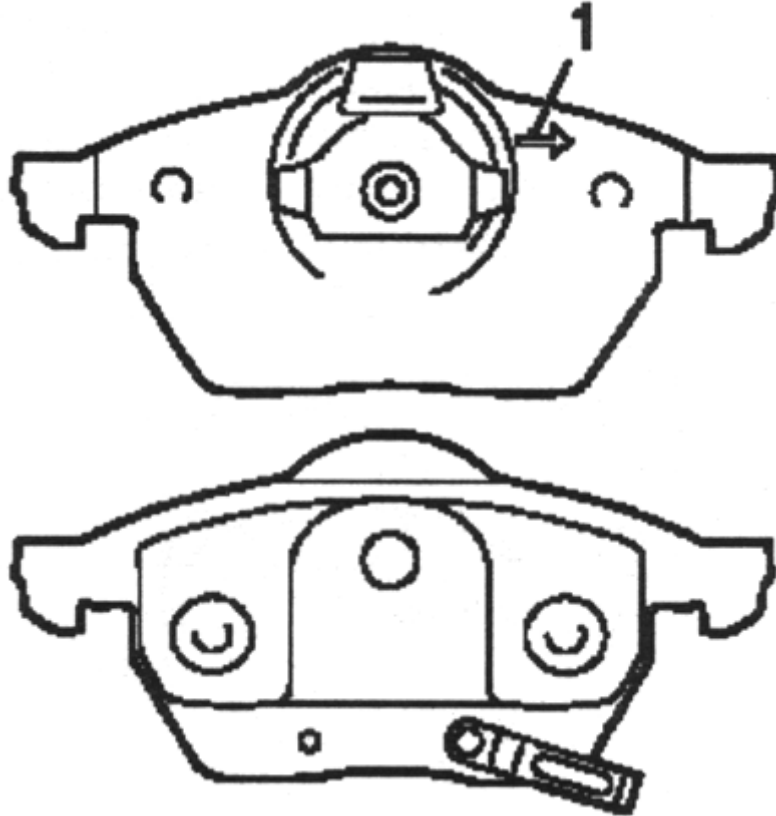


Fig. 6.38. Arrow directions rota-tion inhibitory disk:

1 - Arrow

Install the outer pad brake pad in the brake caliper.
Install the brake caliper on the guide shoes with pads.

NOTE

Make in that brake hose not kinked.

Attach the brake caliper to the guide blocks and tighten the moment of 28 Nm.

Install dust caps.

Install secures the spring to the slide.

Attach the brake lining wear sensor pads to the inner lining of the pad, if any.

Install the front wheel and tighten the moment of 110 Nm.

Several times, press on the brake pedal.

Replenish the brake fluid up to the mark "MAX".

5.21 Removal and installation of safety guard brakes the front wheel

Withdrawal

Remove the front wheel.

Remove the brake disc.

Loosen the screw shaft of the wheel.

Hold the wheel hub with the key KM-468-B (Figure 6.39).

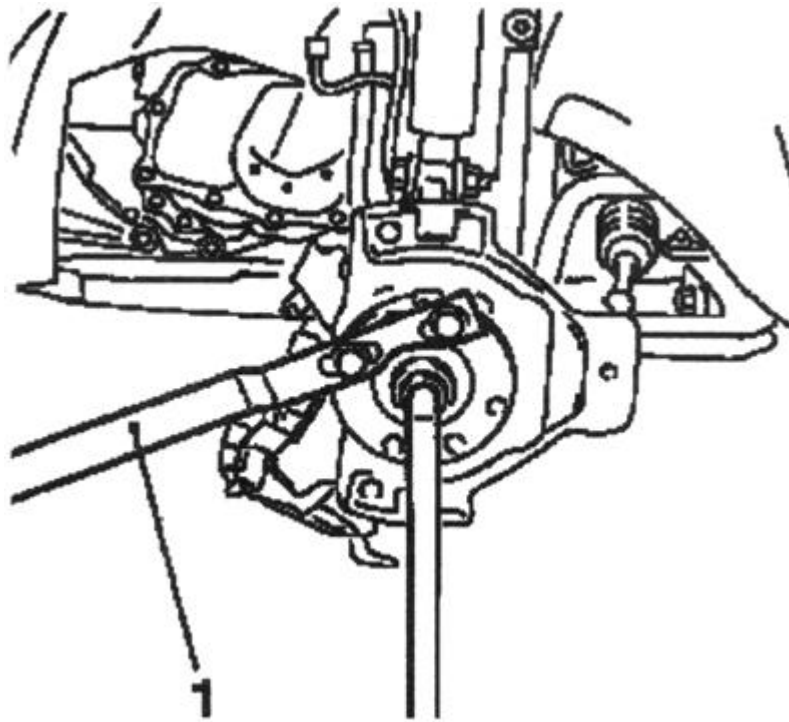


Fig. 6.39. Special Key:
1 - key

Disconnect the wiring harness connector sensor mounted on the wheels of the car.

Disconnect module bearing wheels, unscrewing 3 bolts.

Loosen the 3 bolts.

Disconnect the module bearing wheels with protective housing from the steering knuckle and the wheel shaft.

NOTE

Mark Installation position module bearing wheels and per-Szczytno jacket.

Remove the protective cover from the module bearing wheels.

Setting

Attach the module bearing wheels.

Install a protective cover on the module bearing wheels.

Set module bearing wheels with protective housing to the shaft of the wheels and steering knuckle.

NOTE

Mark Installation position.

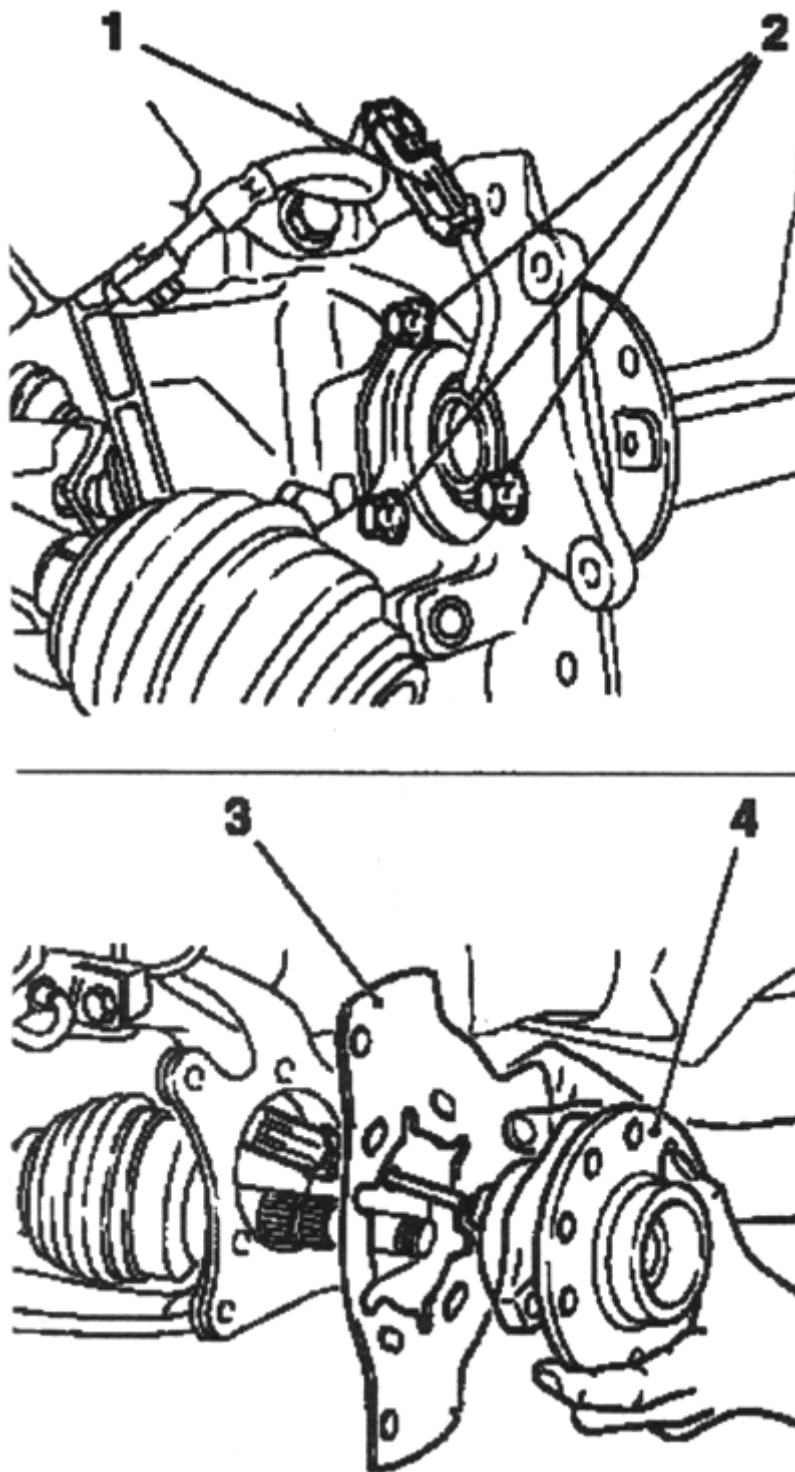


Fig. 6.40. Withdrawal protective housing:

- 1 - the wiring harness connector, 2 - mounting bolts;
3 - blade guard, 4 - wheel bearing module

Tighten the 3 new bolt and tighten the moment 90 N - m Dauvergne at +³⁰ ° and + 15^{on}

NOTE

Clear thread and set bol-you with fixing composition.

Connect the wiring harness connector sensor mounted on the wheels of the car.

Secure the shaft wheel hub wheel of a new nut, tighten the moment of 150 Nm, loosen at 45^{on}, then tighten the moment of 250 Nm.

Hold the wheel hub with a special tool KM-468-B.

Install the brake disc.

Install the front wheel and tighten the moment of 110 Nm.

5.22 Replacing the brake disc front wheel

NOTE

In general case, always replace both Braking CD on one axis.

Withdrawal

Remove the front wheel.

Release the brake hose from the spring-mounting rack.

Disconnect the strap brake hose.

Pull the brake hose from the mounting.

Remove the bolts fastening the guide shoes on the steering knuckle car Opel Astra (Figure 6.41).

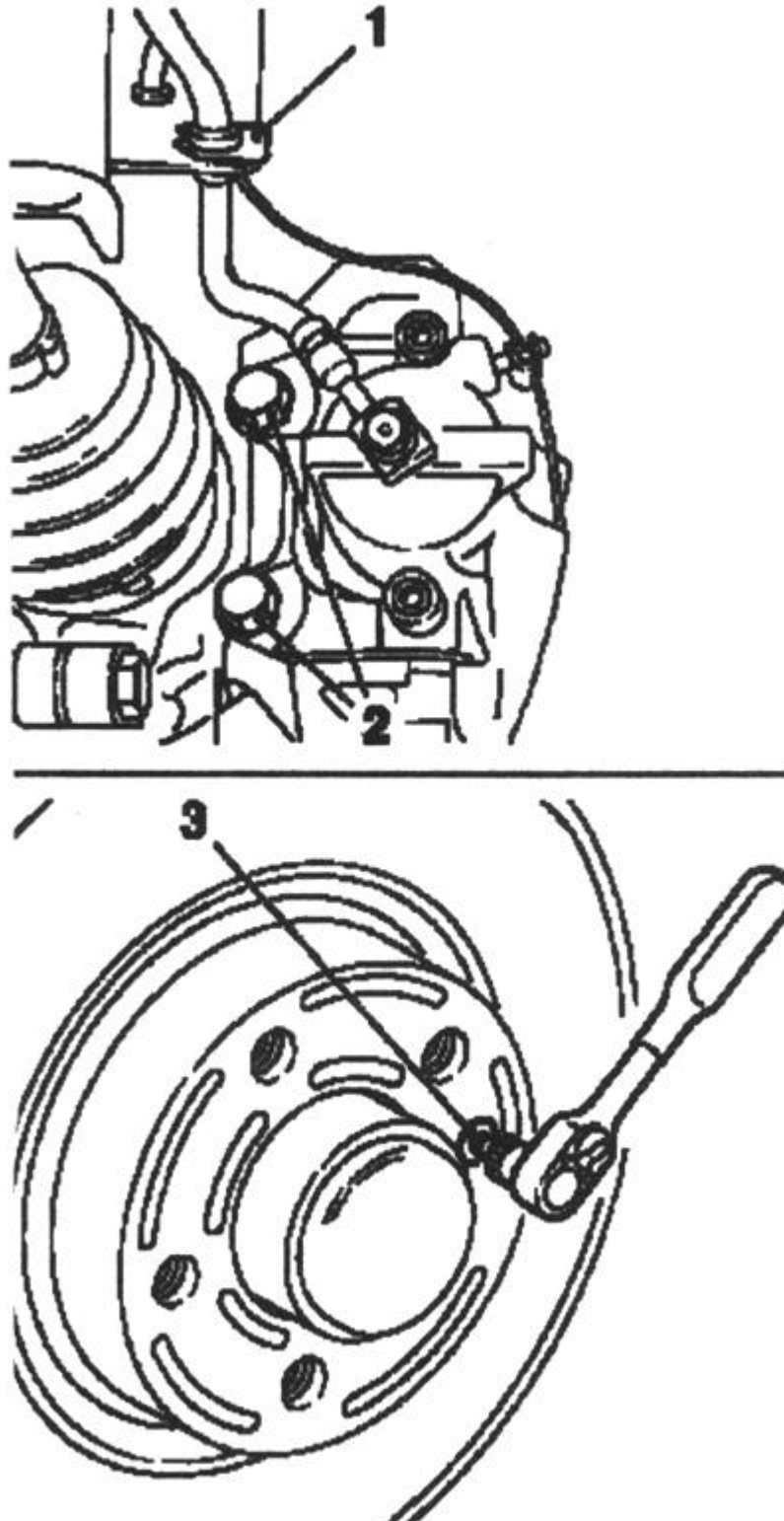


Fig. 6.41. Withdrawal inhibitory drive a car Opel Astra:

1 - spud;

2 - bolts fastening the guide pads 3 - Tightening bolt

Remove the brake caliper with pad and rail hang it on the spring rack.

Loosen the clamping bolt.

Remove the brake disc.

Setting

Clean the mating surfaces of brake disc and wheel hub.

NOTE

Make in that contact surface not deformed and have scoring.

Attach the brake disc to hub front wheel then tighten the screw element 7 Nm.

Attach guide shoes to steering knuckle with brake caliper and pads brake shoes tighten the moment 100 Nm.

NOTE

Clear thread and set bol-you with fixing composition.

Attach the brake hose to the spring reception.

Attach the brake hose to the anchorage.

Set spud.

Install 2 front wheels and tighten the moment of 110 Nm.

5.23 Removing and installing rear wheel brake shield

Withdrawal

Fill the tank hydraulic brake system up to the mark "MAX" and close with a special tool MKM-558-10.

Remove the rear wheel.

Remove the brake drum.

Remove the brake pads brake rear wheel.

Remove the brake cylinder wheel.

Remove the clamp and remove the cable of the parking brake system with brake shield the rear wheel car Opel Astra (Opel Astra) (Figure 6.42).

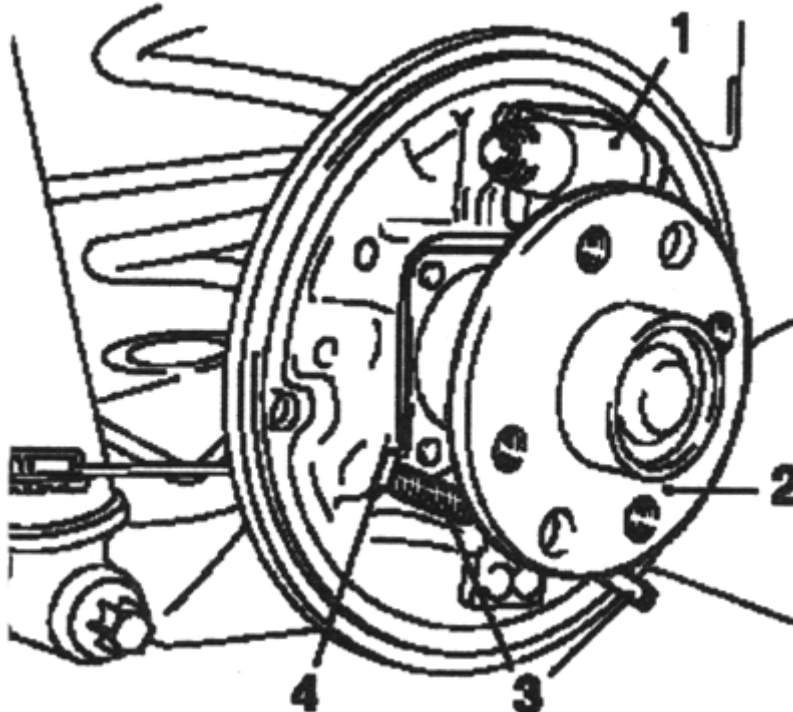


Fig. 6.42. Withdrawal inhibitory disk:

1 - wheel brake cylinder, 2 - wheel bearing module;

3 - wire the parking brake system, 4 - Clamp

Disconnect the module bearing wheels with brake shield from the rear axle.

Setting

Attach the brake shield module bearing wheels to the rear axle.

Set the parking brake cable system in the brake shield and attach the new clip.

Install the brake cylinder wheel.

Check brake pads rear wheel.

Install the brake drum.

Fasten the rear wheel moment of 110 Nm.

Remove air from the brake system and check the tightness.

Several times, press on the brake pedal.

Replenish the brake fluid up to the mark "MAX".

5.24 Removal and installation of caliper brake rear wheel

NOTE

Brake shoes must be removed to remove Brake Soup port rear wheel.

Withdrawal

To release the parking brake cable system.

Release the lever of the parking brake system.

Remove the corrugated tube of the parking brake system.

To release the parking brake cable unscrewing the adjusting nut.

Fill the tank hydraulic brake system up to the mark "MAX" and close with MKM-558-10.

Remove the appropriate rear wheel.

NOTE

Mark position relatively center wheel.

Remove the brake caliper.

Unhook the parking brake cable system.

Squeeze the lever caliper with a screwdriver and disconnect the cable of the parking brake system.

Remove the blank.

Pull the parking brake cable from the mounting on the brake caliper.

Loosen the 1 screw.

Hold for hexagon guide pin (Fig. 6.43).

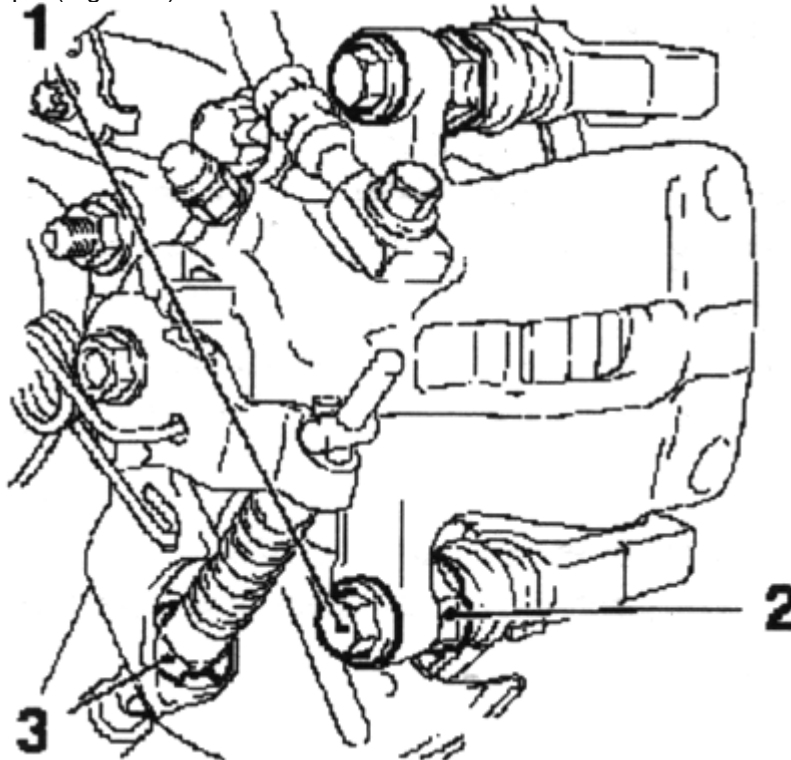


Fig. 6.43. Withdrawal inhibitory disk:

1 - rotor, 2 - guide pin, 3 - emphasis

Take the brake caliper up.

Loosen the brake piston.

NOTE

Level Brake fluid in re-zervuare rises in case If required, pump out with pears.

Replace the brake piston with the help of special instruments KM-6007-A i.KM-6007-30 (Figure 6.44).

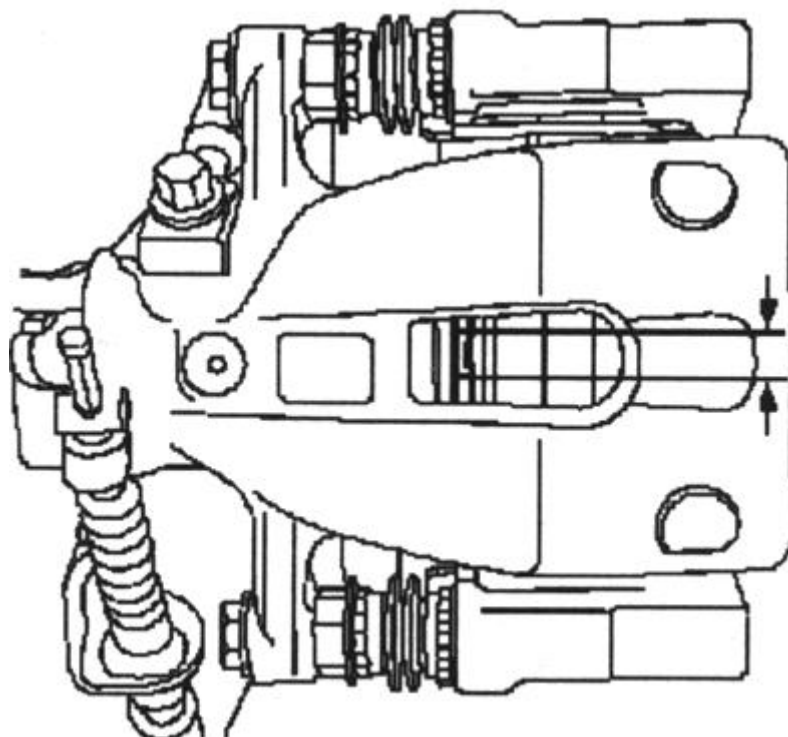
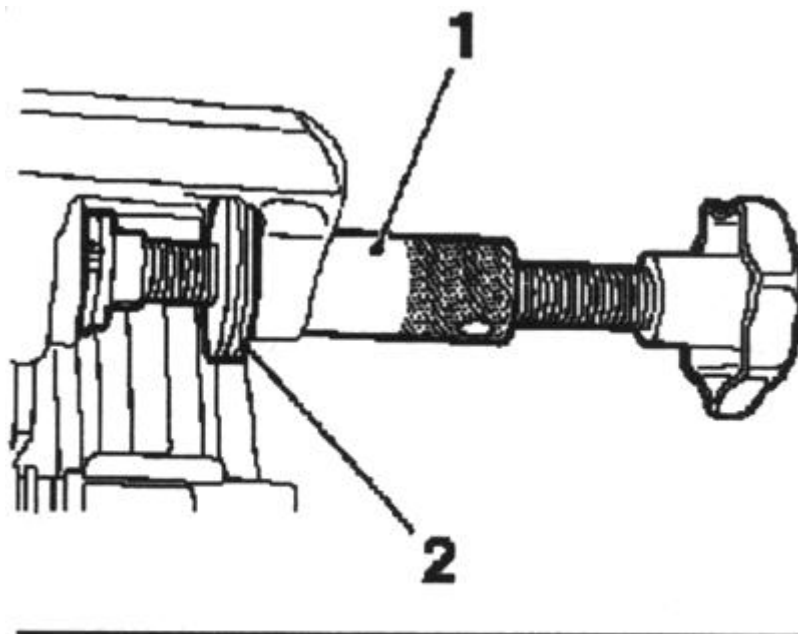


Fig. 6.44. Vvorachivanie inhibitory pore shnya:
1,2 - special tools

NOTE

Shoulder on KM -6007-30 should UCA-portrayal in direction handwheel or hexagonal part KM -6007 - A.

Replace the plunger to the limiter.

Remove the plunger again to reconcile the notch in the brake piston with a hole in the brake caliper (arrows in Figure 6.44).

Remove the brake caliper with a guide.

NOTE

The brake caliper must be completely removed from the guide pads before installing the brake pads.

Loosen the screw.

Hold for hexagon guide pin (Fig. 6.45).

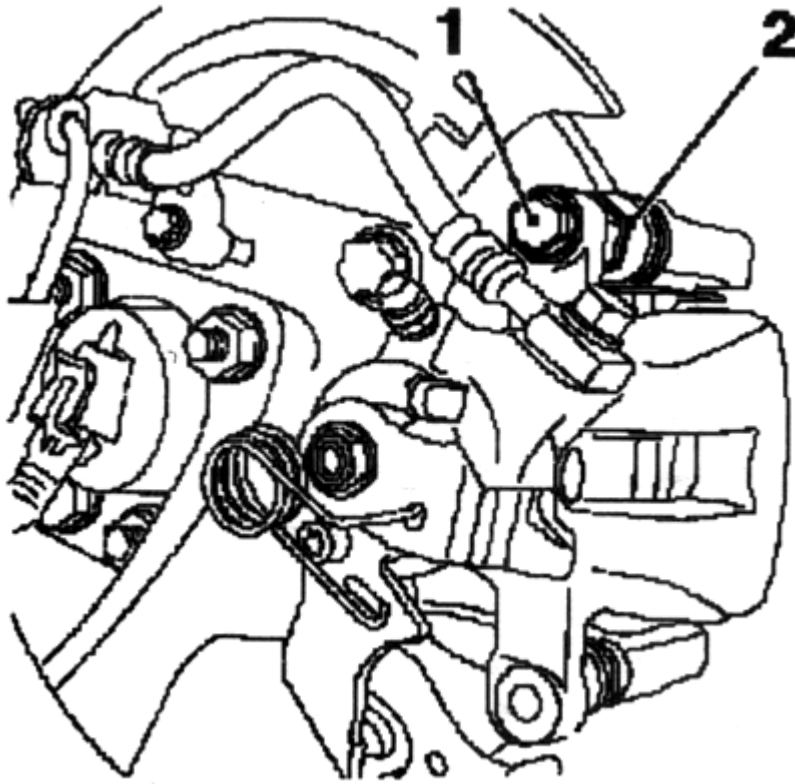


Fig. 6.45.'s Guide pin:
1 - pin 2 - pin

Remove the brake caliper from the guide pads.
Hang the brake caliper to the rear springs on a suitable wire.
Remove the brake pads and guide plates.
Disconnect the brake hose from the brake caliper

NOTE

Collect deriving brake fluid and close hole.

Loosen the bolts guide blocks from the base plate of the inhibitory mechanism and remove the guide blocks (Fig. 6.46).

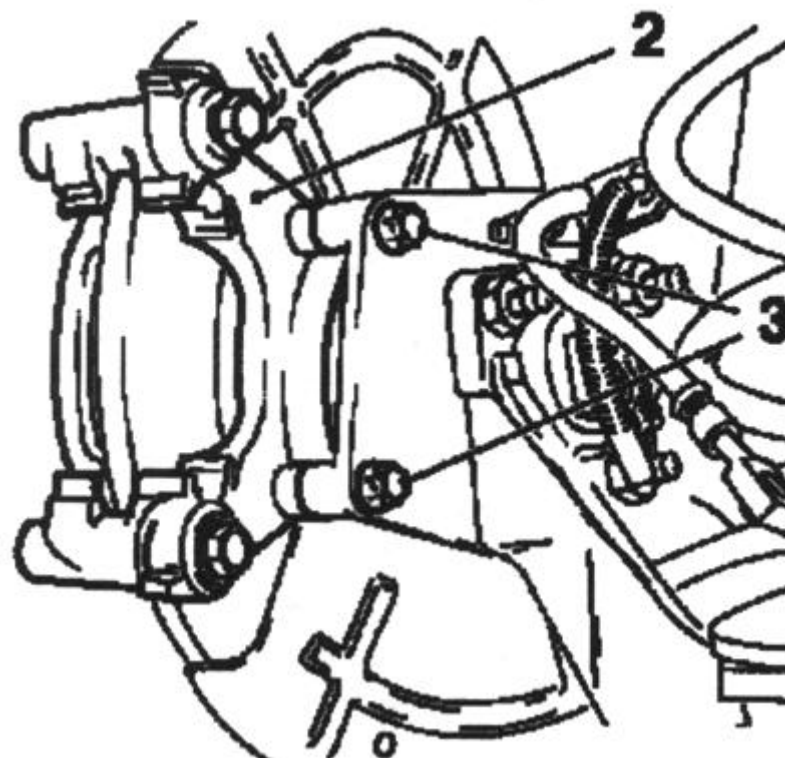
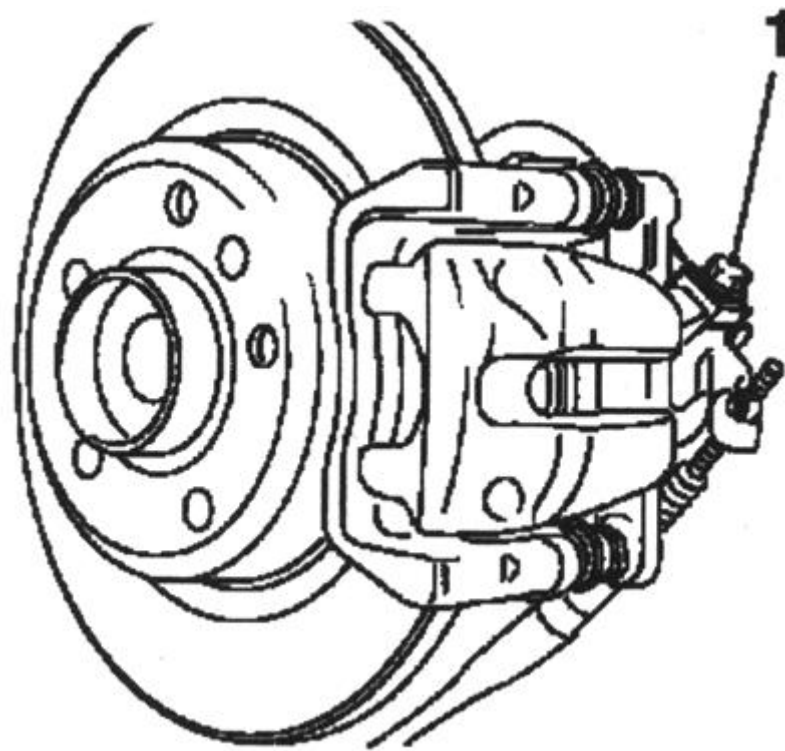


Fig. 6.46. Withdrawal guide colo-dock:
1 - brake hose, 2 - guide pads 3 - Bolts

Setting

If the brake caliper leaks, will be damaged by a protective cover on the brake caliper or sealing sleeve guide pads:
Replace the brake caliper / guide blocks.
Attach the brake caliper to the guide blocks and tighten the moment of 100 Nm.

NOTE

Clear thread and set bol-you with fixing composition.

Install the brake pads with new adhesive foil.

Attach the parking brake cable system to mount a new restraint clamp (Figure 6.47).

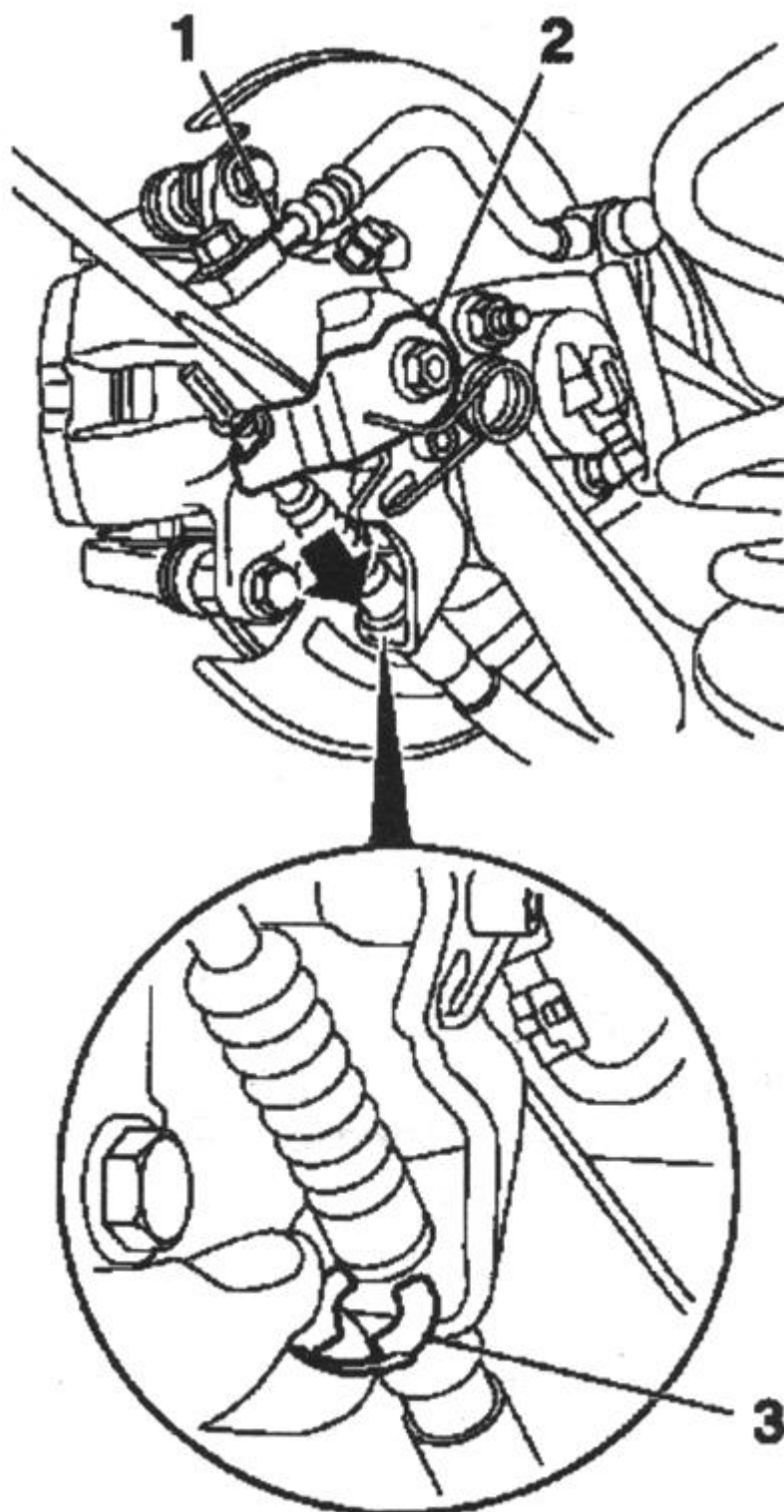


Fig. 6.47. Withdrawal guide colo-DOS:

1 - brake hose, 2 - lever;
3 - retention clamp

Squeeze the lever down with a screwdriver.

Pull the parking brake cable system.

Attach the brake hose with the new O-rings to the brake caliper and tighten the moment 40 Nm.

Install the rear wheel and tighten the moment of 110 Nm.

Remove air from the brake system and check the tightness.

Several times, press on the brake pedal.

Replenish the brake fluid up to the mark "MAX".

Adjust the parking brake.

5.25 Removing and installing brake pads rear wheel

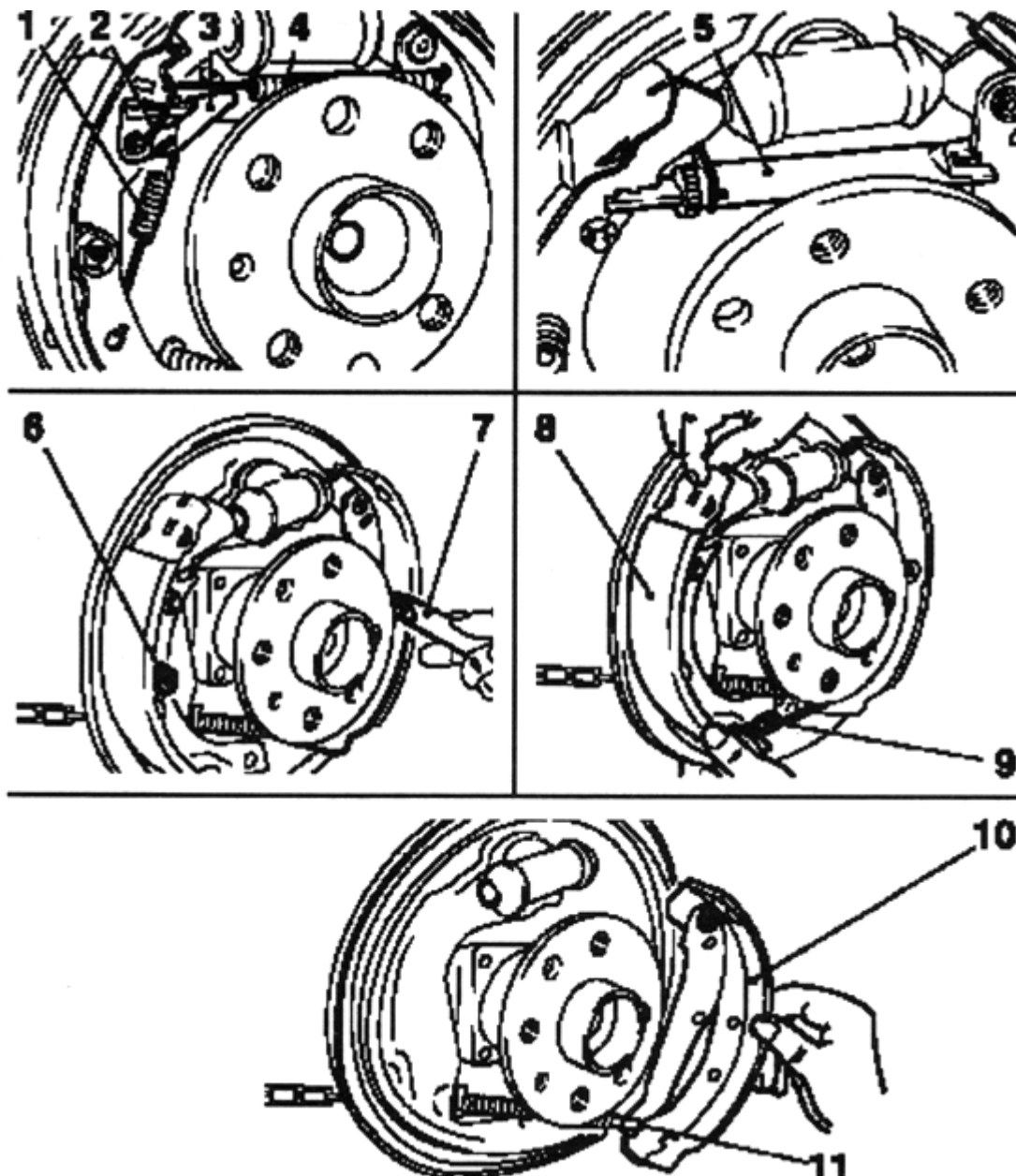


Fig. 6.48. Withdrawal Braking shoes rear wheels:

- 1 - Spring 2 - retaining clamp, 3 - adjusting lever;
- 4 - upper spring; 5 - adjusting module;
- 6 - cups of compression springs, 7 - a special tool;
- 8 - front brake pads, 9 - spring;
- 10 - Rear brake pads; 11 - the parking brake cable

Withdrawal

Remove the rear wheel.

Remove the brake drum.

Remove the upper spring pliers brake spring.

Remove the retaining collar.

Disconnect the adjuster lever spring.

Remove the adjusting module Heatshrink, dilute with a little brake pads.

Turn the cup compression springs on both sides with a special tool KM-346 to release the springs.

Remove the front brake pads and remove the spring.

Disconnect the rear brake shoe from the parking brake cable and remove.

Setting

Clean the brake shield and cover both sides protivoskripnoy grease all mating surfaces of brake pads in the hands (Figure 6.49).

Clean the brake drum.

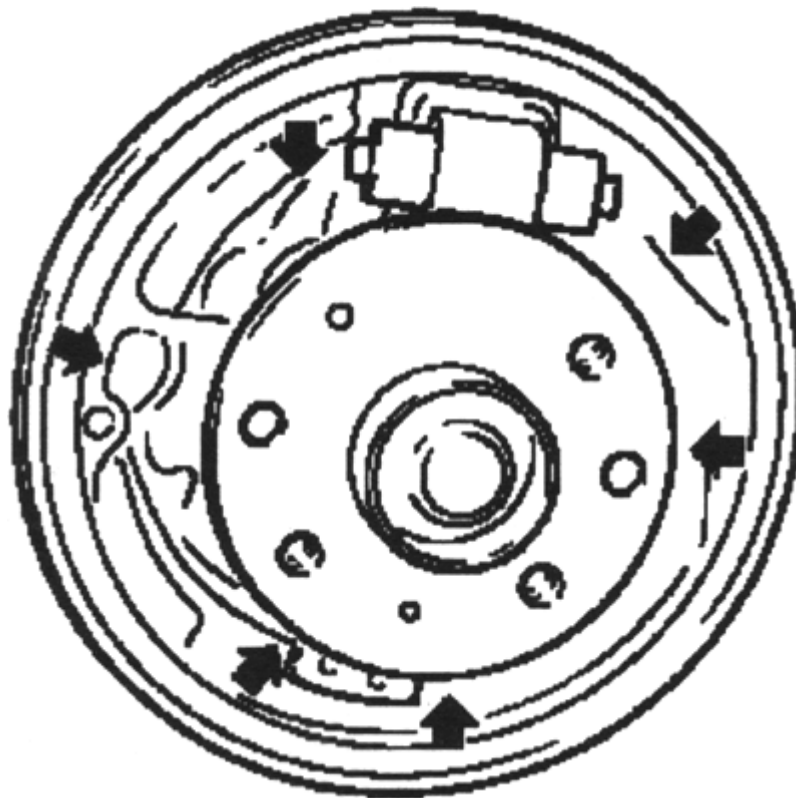


Fig. 6.49. Places -clean anti-skripnoy grease

Check the wheel brake cylinder for leaks, replace if necessary.

Check the lock springs and mounting for damage, replace if necessary.

Check brake pads for cracks, lubricating and wear, replace the brake pads if necessary.

Check brake drums for cracks and the surface of brake pads for the presence of ticks - if necessary: protochite brake drum or replace the brake drum.

Install the rear brake shoe in the parking brake cable system.

NOTE

Before assembly Braking colo-dock, make sure in that cable standing-night Brake system naho-ditsya in guide on Mr. Brake shield.

Install retainer, spring compression and the plate with a special tool KM-346.

Fasten the fixing spring and set the shoe front brake mechanism on the guide.

Install a catch in the spring compression plate and the front brake pads.

Install the adjusting module.

Coat the threads with silicone grease.

NOTE

Ratchet not must is blocked-van in end Module adjustment.

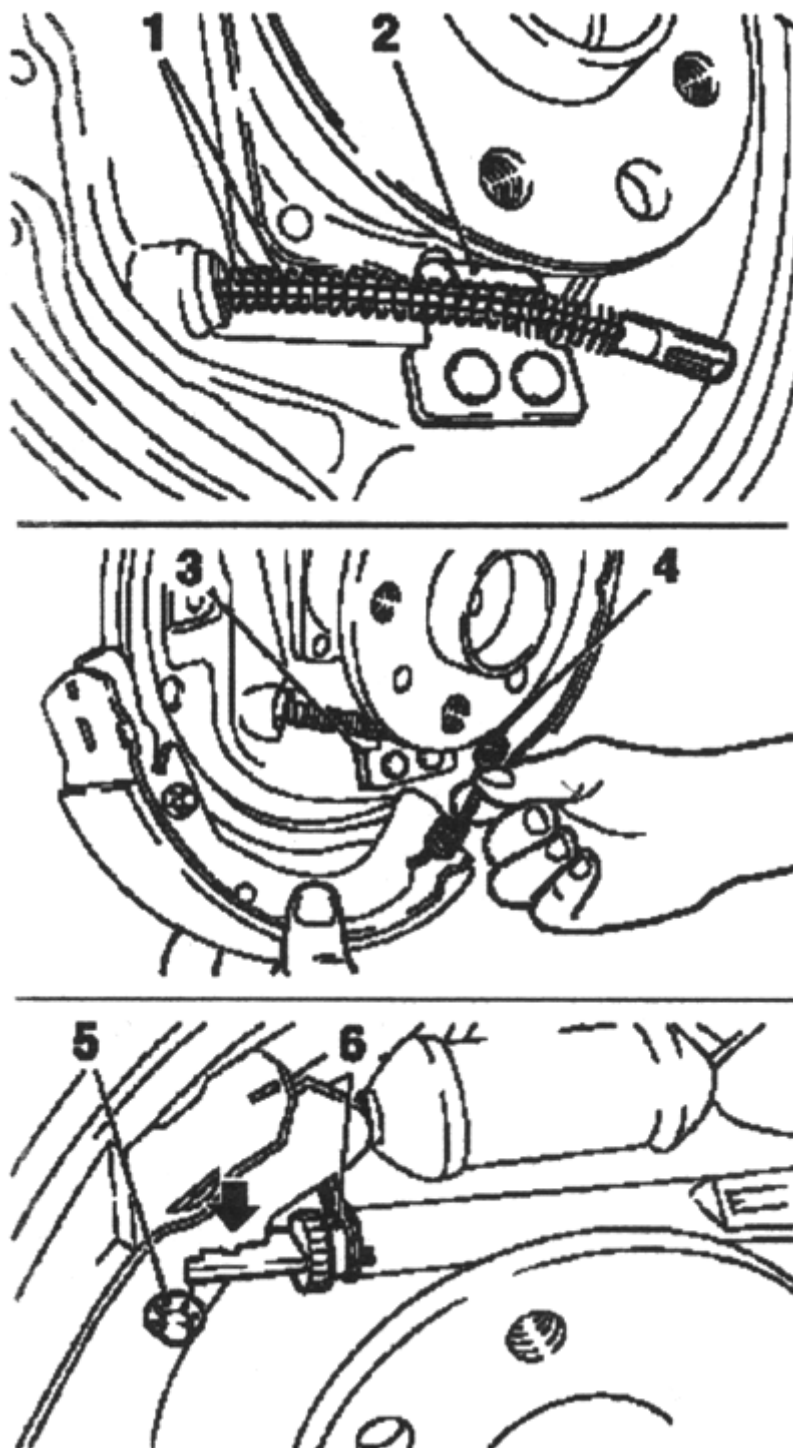


Fig. 6.50. Setting Braking Rear pads wheels:

1 - cable parking brake system, 2 - guide-rope;

3 - slide the front brake mechanism;

4 - fixing the spring, 5 - spring washer 6 - ratchet

Install module control Heatshrink - be sure to install (arrow).

Make sure that the spring washer was installed before the installation of the adjusting lever.

NOTE

Set new spring - Shai-bu, when assembly new brake pads.

Install the adjusting lever with a spring.

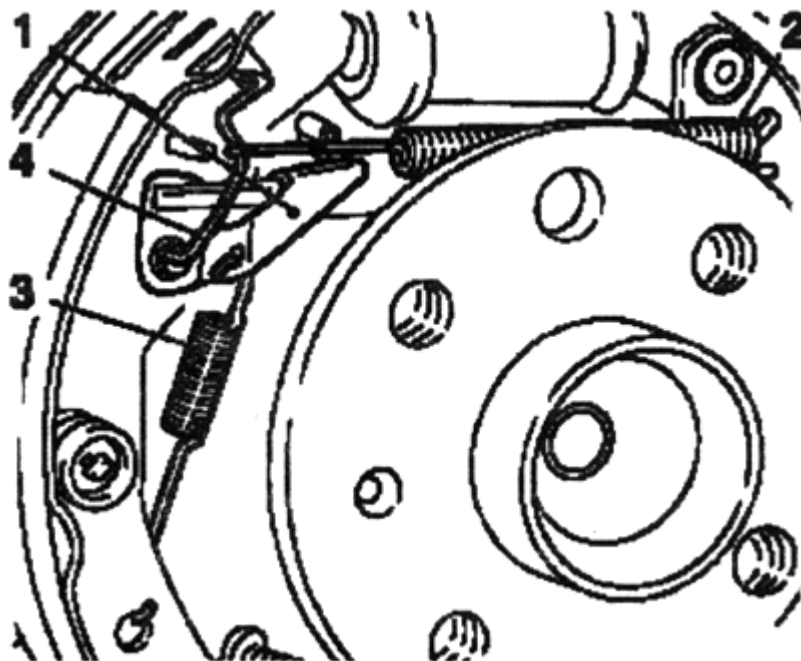


Fig. 6.51. Setting adjusting ry-Chaga and springs:

1 - adjusting lever, 2 - upper spring;
3 - spring, 4 - holding clamp

Install holding clamp and the upper spring pliers brake spring.

Install the brake drum.

Install the rear wheel and tighten the moment of 110 Nm.

Adjust drum brake and parking brake systems.

5.26 Adjust the drum brake mechanism

NOTE

Adjustment drum brake-tion mechanism necessary after only withdrawal brake replacement torus OIML drum or replacement torus OIML blocks, so as regulation-ka carried automatically. Verify in that lever the parking Brake system was released before adjustment. If has place inequality torus OIML efforts on wheels, brake parts drum must be verified and replaced in case required.

Remove the rear wheel.

Disconnect the brake drum car Opel Astra.

Regulator module (arrow) must be fully svinchen (Figure 6.52).

Gear should not be blocked at the end of the module control.

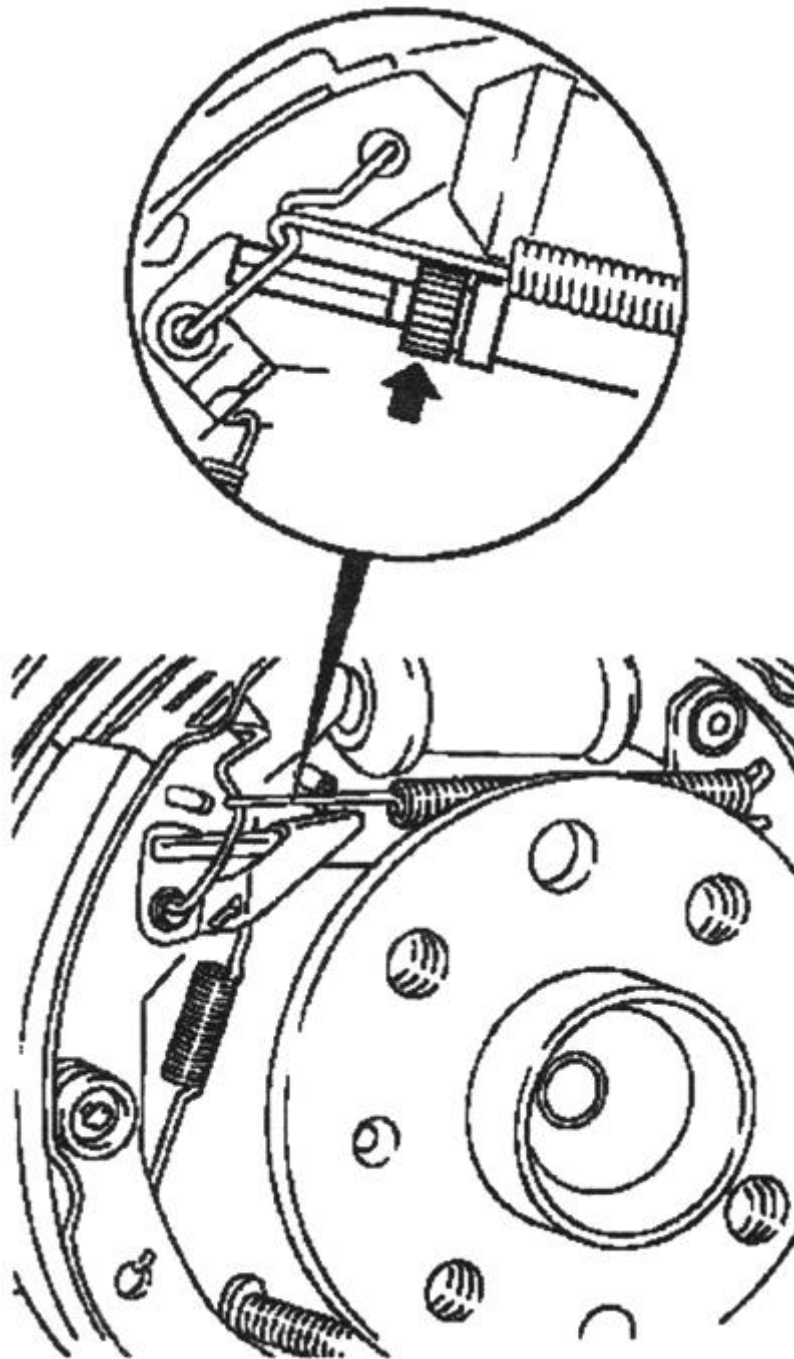


Fig. 6.52. Adjustment drum for Mozah
Car Opel Astra

Install the brake drum.

Install the rear wheel and tighten the moment of 110 Nm.

Click on the brake pedal for at least 20 times.

NOTE

Up those then while not will Heard shocks adjusting lever when This Brake shoes budut be in contact with brake drum.

After adjusting the brake drum to adjust the parking brake systems.

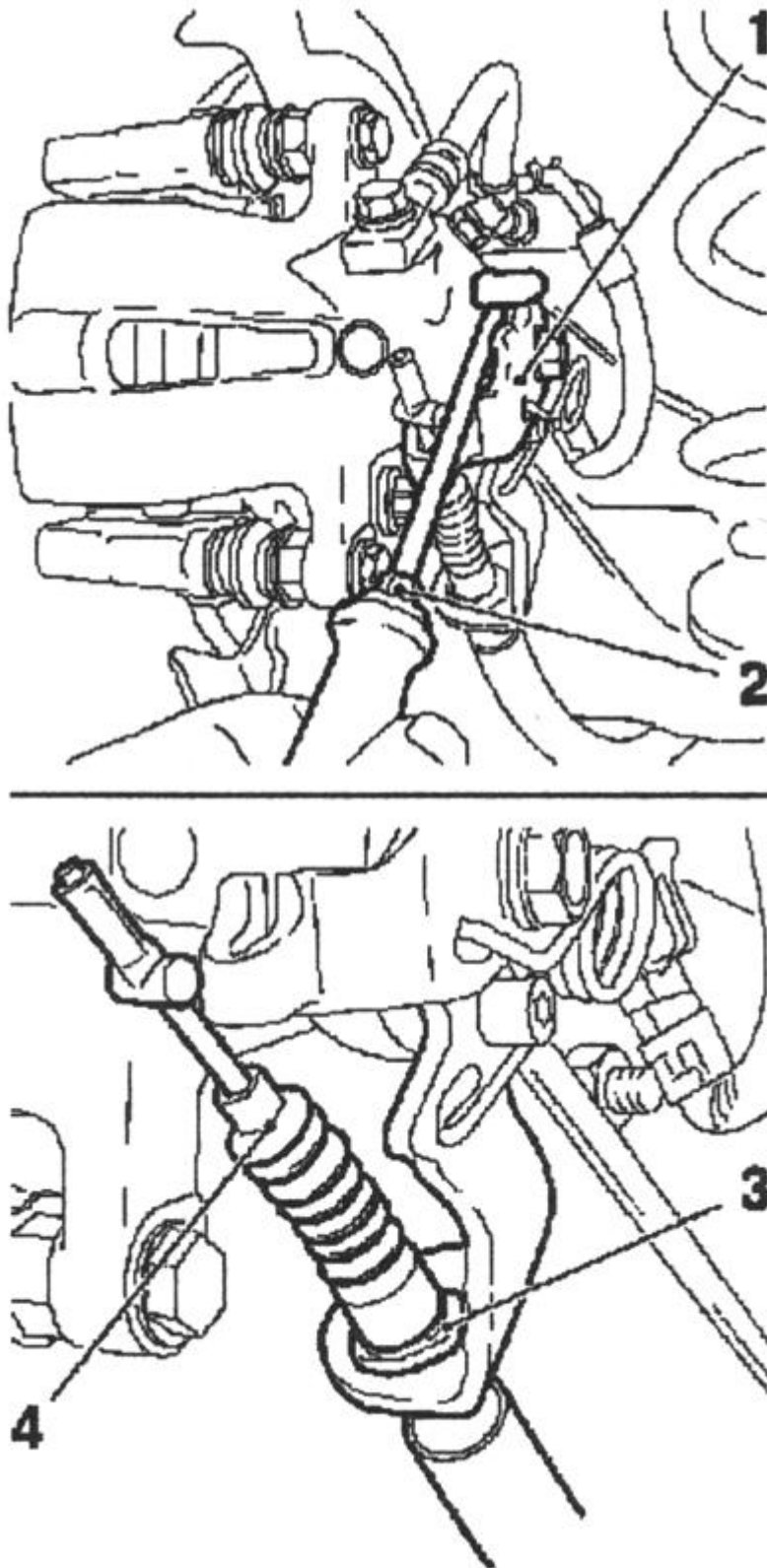
Take running for a short trip of about 300 m at low speed, the parking brake lever should be slightly raised.

5.27 Replacing brake pads disc brake rear wheel

NOTE

As rule all Brake lasts one axis must is replaced.

Withdrawal



**Fig. 6.53. Withdrawal Braking shoes
(Preliminary operations):**

1 - lever caliper, 2 - screwdriver 3 - time;
4 - wire the parking brake system

Loosen the parking brake cable system.

Release the lever of the parking brake system.

Remove the lid of the diagnostic compounds.

Remove the bellows of the parking brake system.

Loosen the parking brake cable adjusting nut screwing.

Remove the rear wheels.

Disconnect the parking brake cable from the brake caliper.

Squeeze the lever downward slide in the direction of the arrow, using a screwdriver, and disconnect the cable of the parking brake system.

Note: Make sure that the king pin bushing between the lever and the brake caliper is not damaged.

Remove the clamp and pull the parking brake cable from the bracket

Remove the brake pads from the brake caliper.
 Loosen the bolt from the brake caliper.
 Take the caliper up.
 Loosen the brake piston.

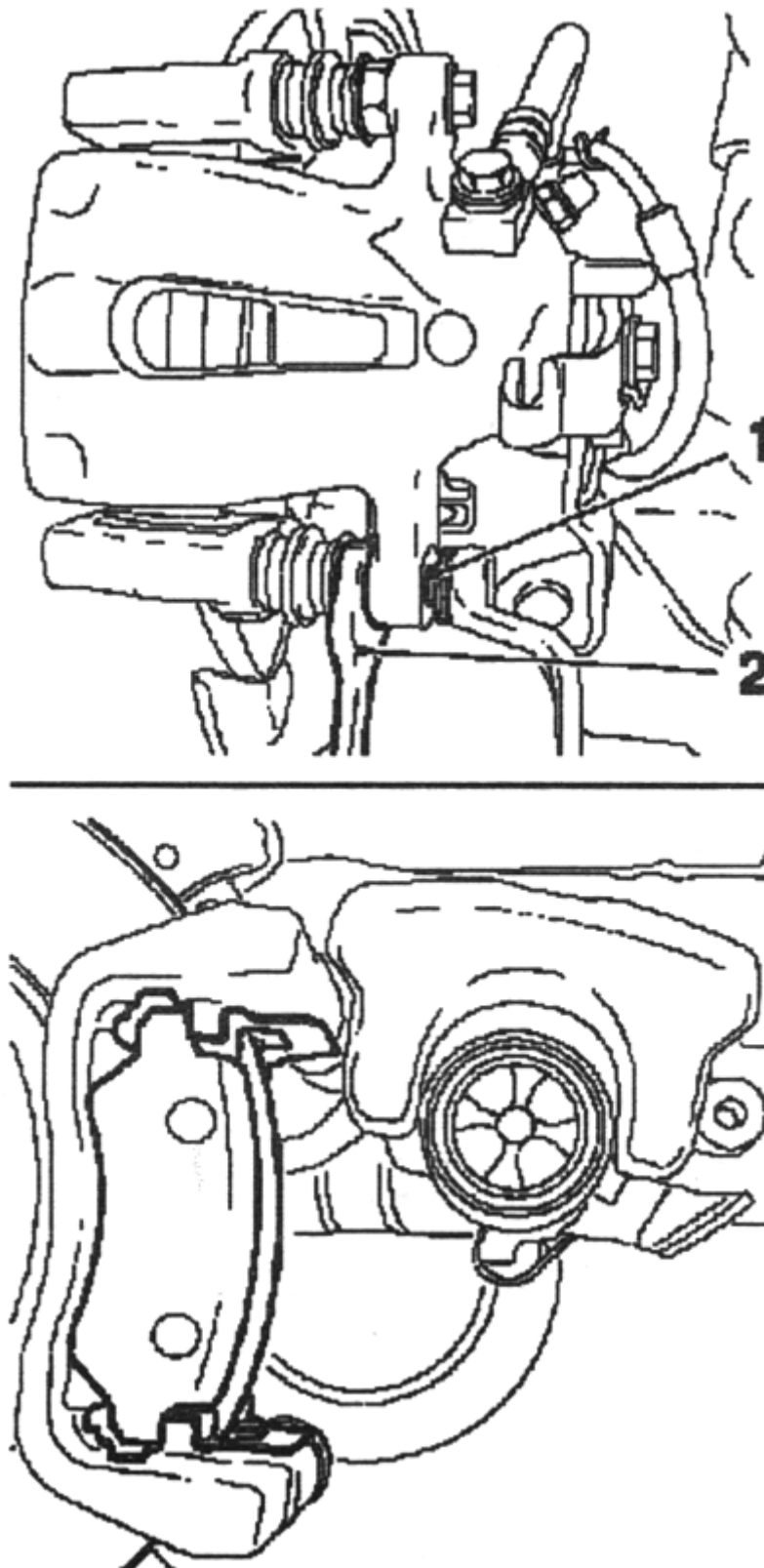


Fig. 6.54. Setting special instrument on Support:
 1 - caliper, 2 - adaptation

NOTE

Level Brake fluid in Bach-Ke hydraulic Brake system-we increases. pumped Brake-ing liquid Pear in case required.

Place the device KM-6007-A on the brake caliper with the KM-6007-30 (Figure 6.54).

Click device KM-6007 KM-30-6007-A.

NOTE

Make in that bead (arrows ca) KM -6007-30 points on Macho-vichok or hexagonal of KM -6007 - A.

Loosen the brake piston to the limiter, then remove it from the brake caliper to the combination of the groove in the brake piston with a hole in the brake caliper.

Remove the brake caliper from the support.

NOTE

Before installation Braking colo-dock Brake caliper be completely withdrawn with sending-ing shoes.

Remove the upper bolt from the brake caliper, holding it open wrench.

Remove the brake caliper from the guide pads.

Hang the brake caliper to the rear springs on a suitable wire.

Remove the brake pads and guide plates.

Clear guide brake pads on the top and bottom of the rail pads and the contact surface with the brake pads on the brake piston and the opposite surface (arrows) (Figure 6.55).

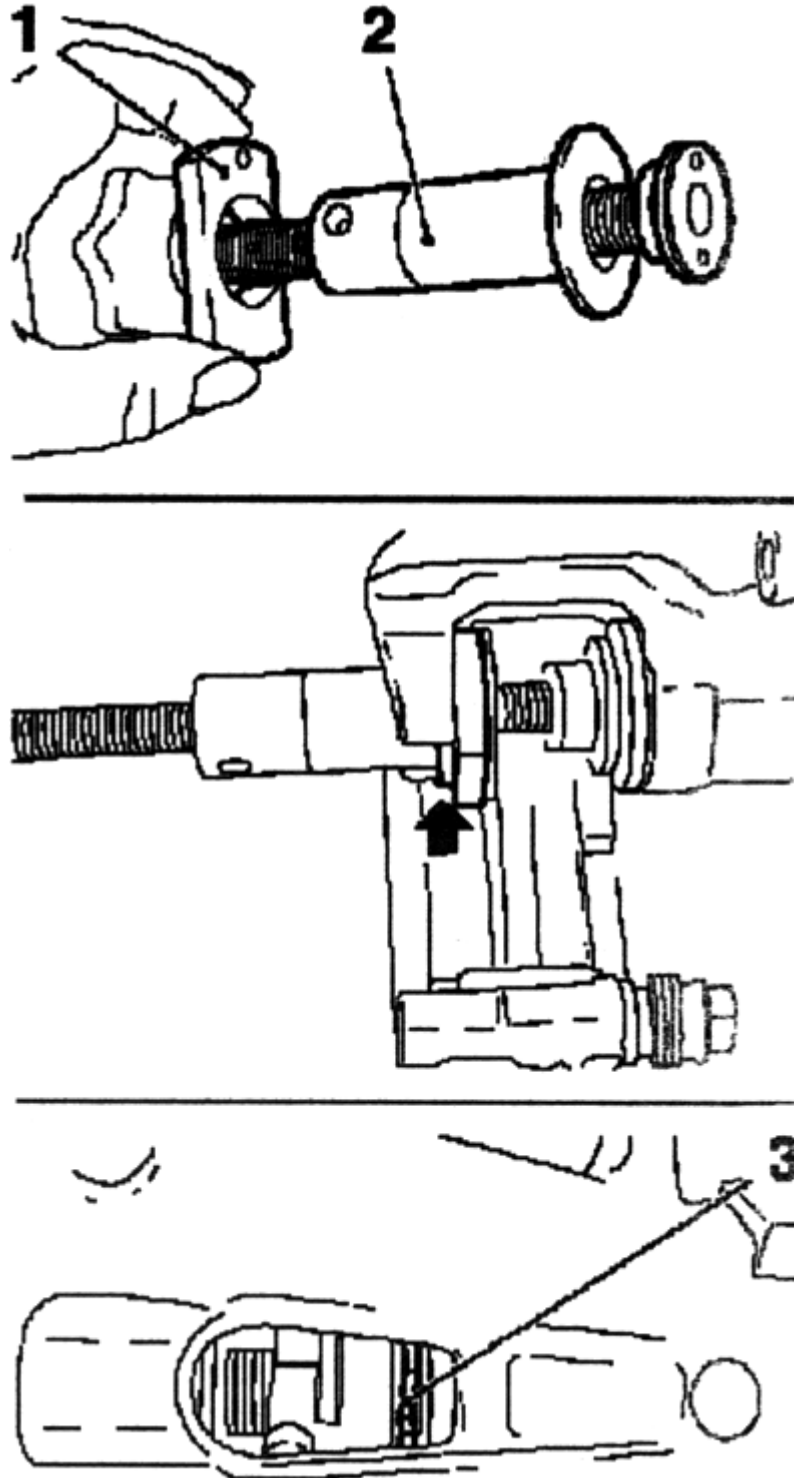


Fig. 6.55. Cleaning the brake pads at the top and bottom guide pads:

1 - brake piston, 2 - guides for brake pads

NOTE

Make sure remnants glue removed with surfaces brake pads.

Check the wear of brake discs.

Setting

NOTICE

If the brake caliper leaks, damaged the protective cover on the brake piston or sealing sleeve guide pads, replace the brake caliper and / or the guide blocks.

Install the new guides in the guide blocks.

Apply grease to the guide blocks below guides (labeled surface - a thickening of 1).

Install guides.

NOTICE

Protective film on the brake pads must be removed after installation of brake pads. Brake shoe with a mechanical wear indicator (if any) should be on the inside.

Install new brake pads in the guide blocks.

Attach the brake caliper to the guide shoes.

Install the brake caliper on the guide shoes.

NOTE

Make sure that the guides are not deformed, and sticky surface linings brake pads included in contact with torus OIML caliper only It should in how they were properly installed.

Slide the brake caliper in the direction of the arrow from the rear to the front of the guide blocks.

Attach the caliper brake mechanism bolts to the guide shoes.

Clean the threads and install new bolts with fixing the composition hold open wrench, torque 25 Hm.

Attach the parking brake cable to the brake calipers.

Attach the parking brake cable to the bracket clamp (Figure 6.56).

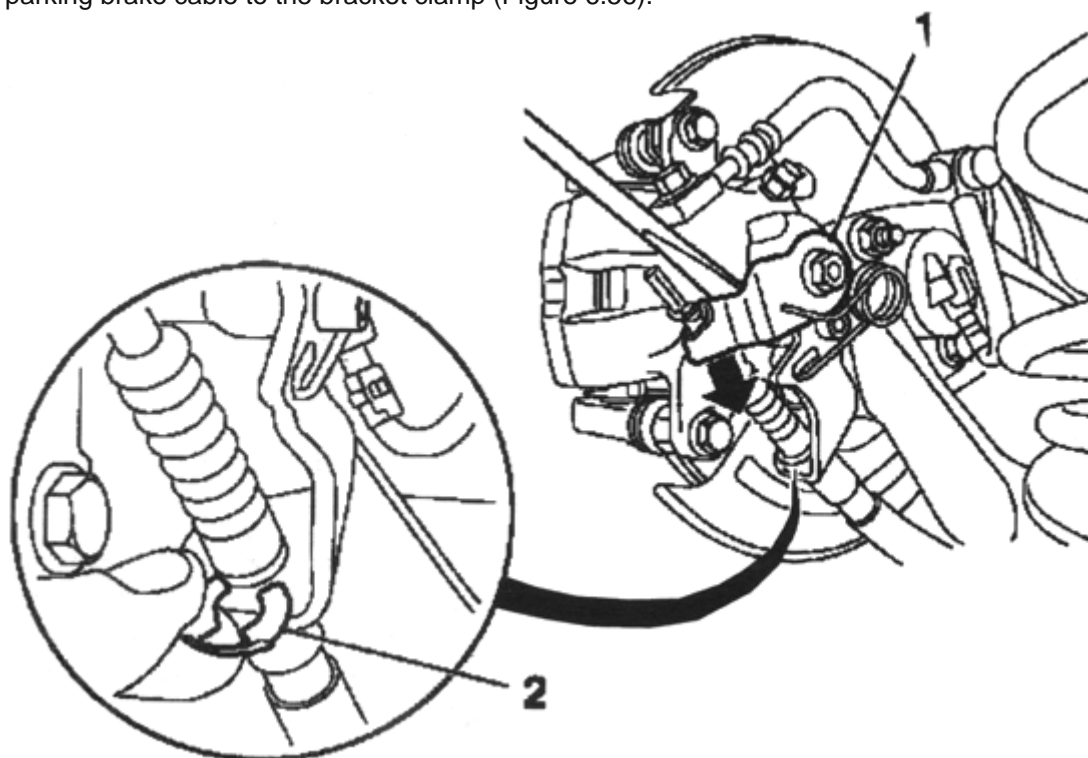


Fig. 6.56. Accession cable stoyanoch-Term Brake system:

1,2 - ropes of the parking brake

Squeeze the lever downward slide in the direction of the arrow, using a screwdriver, and attach the cable of the parking brake system.

Install rear wheel and tighten the moment Nm.

Several times, press on the brake pedal.

Run the motor.

Keep the pedal down for about 30 seconds with an average effort.

Top up the brake fluid up to the mark "MAX".

6 ON-BOARD ELECTRICAL

6.1 General

Opel Astra cars have electrical systems with a working voltage of 12 V. The electrical executed on a single-scheme - the negative findings of the sources and power consumers connected to the car body, which performs the function of the second wire. Catering for all lighting and electrical assemblies made from lead-acid battery type, rechargeable by the alternator.

This section describes procedures for maintenance and repair of certain elements of the onboard electrical equipment. In addition, reviewed the procedures fault diagnosis of electrical general.

At Opel Astra began installing a device Controller Area Network (CAN). It brings together the individual control devices in the general scheme (data bus), which has the following advantages: rapid transfer of data from one instrument to another, saving space by using smaller circuit boards and components, reducing the number of sensors due to their multifunctionality.

6.2 Principle of AMU

Instead of a separate wire for each signal uses only two common wire that allows you to simultaneously receive information on the status of the majority of devices and sensors, without using a separate toggle switches and switches.

Bus CAN, getting important information (for example, a fault), registers it in his memory.

6.3 Safety

For the repair of electrical power supply system of the engine and disconnect the wire from terminal "-" battery car Opel Astra.

When replacing fuses is prohibited to use a screwdriver and a metal tool as this could lead to a short circuit in the electrical circuits.

Do not disconnect the ignition switch and battery in the engine is running, as this will lead to failure of the voltage regulator and the elements of electronic equipment a car Opel Astra.

When checking the electrical circuits is forbidden to bring up the "mass" of wire (check the serviceability of chains "a spark"), as this may lead to failure of electrical components.

Do not even briefly join output "30" generator with "mass" (check the work of the generator "to spark"), as this will lead to failure of the diode rectifier unit generator. Check the generator on a car can only voltmeter and ammeter. To avoid failure of the diode rectifier unit is prohibited to check their megger or control the lamp voltage for more than 12 in and check the electrical circuit such devices in a vehicle without disconnecting the wires from the generator. Check the insulation resistance of generator stator winding high voltage necessary for the alternator, removed from the car, if you disconnect from the rectifier unit findings of the stator winding.

When conducting electrical welding work on the car to disconnect the wires from the battery terminals and the generator.

Do not touch the elements of the ignition system and high-voltage wires to the engine running.

Do not route the wires of low and high voltage in a tourniquet.

When recharging the battery in a car with charger disconnect the wires from the battery terminals.

6.4 Check for voltage

Check for voltage produced in the event of disruption of the electrical circuit car Opel Astra. Connect one wire from the tester electrical circuits or to the negative pole of the battery, or to the well-grounded point of the car body. Another tester, connect the wire to the terminal electrical connectors verifiable chain, preferably next to the battery or fuses. If the control lamp tester lights up, the supply voltage at a given interval of the chain is present, which confirms the serviceability of the chain between a given point of the chain and battery. Continuing to act in a similar manner, explore the rest of the chain. Detection of the lack of voltage indicates a failure between a given point of the chain and the last of the previously tested (where the voltage present). In most cases, the cause of failure is the weakening of electrical connectors and a violation of the quality of the contacts (oxidation).

6.5 Searches of the short circuit

One way to search for short-circuit is to pull the fuse and connection instead lamp or voltmeter probe. Tension in the chain must be absent. Pull wires, watching the lamp-probe. If the light starts to blink, somewhere in the wiring harness is the closure of the mass, possibly caused by wiping insulation of wires. A similar test can be performed for each of the components of the circuit by incorporating appropriate switches.

6.6 Check serviceability of earth

This check is performed to determine the reliability of grounding circuit element car Opel Astra. Disconnect the battery and connect one wire having a self-contained power source lamp probe to a known good ground point.

Another wire tubes connect verifiable burned wiring or terminal electrical connector. If the lamp lights up, grounding in the order (and vice versa).

6.7 Lack of checks on the precipice

Verification is performed in order to identify breaks the electrical circuit. After a power failure circuit, check it with the lamp-probe, equipped with autonomous power supply. Connect the probe wires to both ends of the chain, if the control lamp lights up, break in the chain missing. If the lamp is not lit, it indicates the presence of chain breakage. Similarly, the same way you can check and serviceability of a switch, plugging in the probe to its terminals. When transferring the power switch to "On" lamp shall be illuminated by the probe.

Localization place cliff

When diagnosing a suspect in the presence of breakage of the circuit area to visually locate the cause of failure is rather difficult, as inspection of terminals on the presence of corrosion or violation of the quality of their communication is difficult, in view of the limited access to them (usually terminal closed body electric socket). Sharp twitching body connector on the sensor or its wiring harness, in many cases leads to the restoration of the contact. Keep this in mind when trying to localization of the reasons were suspected for the presence of chain termination. Instability arises failures may be caused by oxidation of terminals or violation of the quality of contacts.

Troubleshooting electrical circuits, does not constitute an intractable problem, provided a clear idea of what an electric current goes to all consumers (lamps, electric, etc.) from the battery through the wires through the switches, relays, fuses, fuse, and then returned the battery through the mass of the vehicle body. Any problems associated with electrical failure may have caused his only cut off the flow of electric current to them from a battery or return it to her.

6.8 Wires, relays and fuses

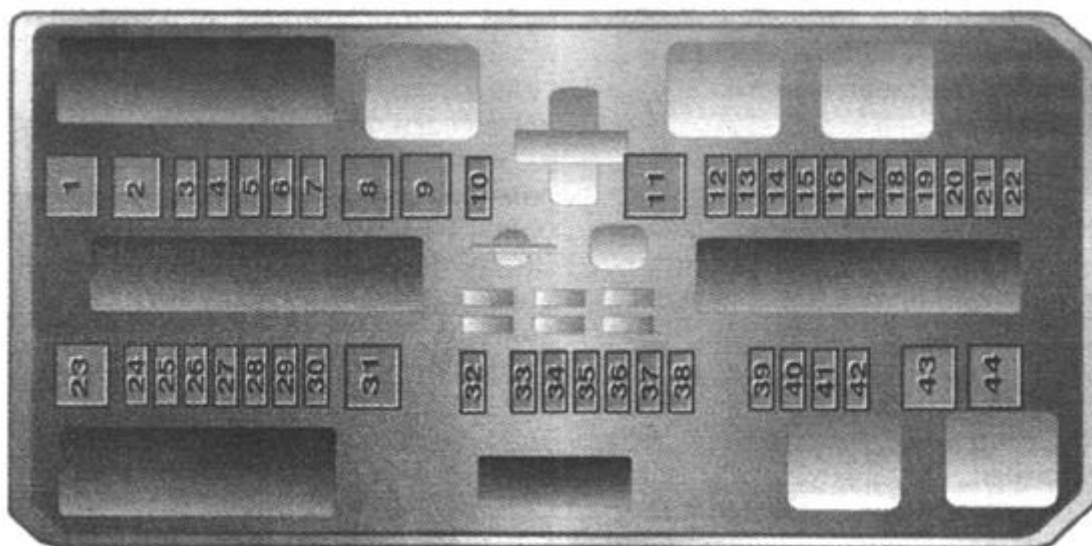
Protection of electrical circuits of the car from a short circuit is achieved by using combined fuses, circuit breakers and fuse. Burnt fuse easily distinguished from the healthy by examining its transparent plastic case. Carefully inspect the fuse to identify his burnout. If the fuse has the appearance of normal, but the suspicions of his problem persisted, the inspections conductivity between terminals knife protruding from his body.

When replacing the fuse, the conformity of the nominal face value of the new fuse old. Designed for a variety of amperage fuse may outwardly look the same, so special attention should be paid to the marking. Replacing burned-out fuse designed for a smaller - and more particularly, the current strength is undesirable. Every electrical circuit needs a different degree of protection. Make sure that the markings on the body of the fuse in line with current intensity, which is calculated corresponding to the chain. If a replacement fuse immediately fuse, not reasonable to continue his replacement. First of all, should identify and eliminate the cause of his burnout. In most cases, such is a short circuit in the electrical circuit caused by the breakage or damage to the insulation of the wire.

Fusible insertion

Protection of certain electrical circuits carried out by including fuse. Inserts are typically used to protect circuits not equipped with safety devices such as a chain ignition system.

Fuse like a fuse in the sense that the output of their failure (melting) is easily determined visually.



Fuse block in-car Opel Astra

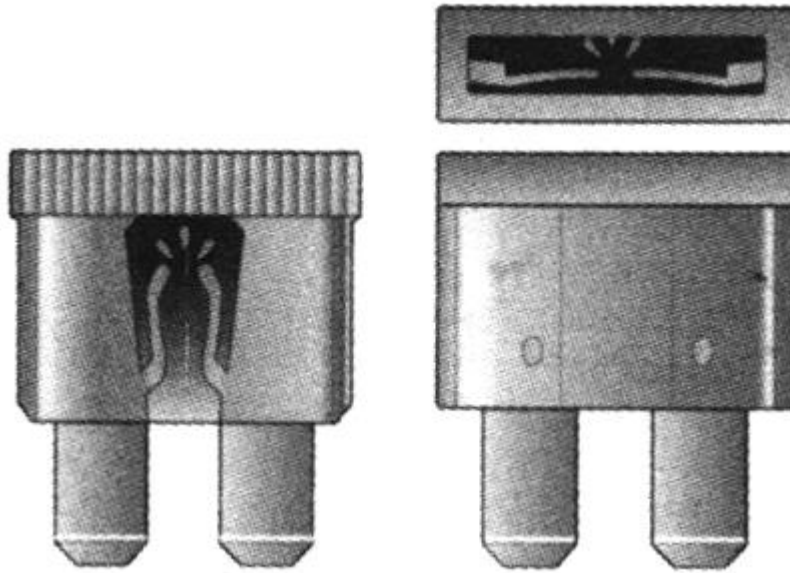


Fig. 7.2. No faults and burnt-out fuse Box

To replace the fuse, disconnect the negative wire from the battery. Remove the burnt-box and install in its place a new one. Before replacing the insert must try to determine the cause of the overload that caused the insert out of order.

Circuit breakers (thermal relay)

Overload Relays are used to protect components such as electric windows, door locks and adjust the headlight (elektrokorektory). Some of the chopper circuits installed in the mounting block. Return of the thermal relays in the initial state on some models is carried out automatically, ie in the event of thermal overload relay in the circuit immediately opened, and then, after cooling, returns to its original state. If the return path to the operating position does not occur, you should immediately make an inspection. Normal functioning of the thermal relay confirms the serviceability of the circuit. Some of the choppers are equipped with buttons for manual forced to return to its original state.

Replacing Fuse

To prevent short circuit and overload electricity consumers separate circuits protected by fuses. The vehicles used Opel fuses corresponding to the latest technological advances, these fuses have knife contacts.

Before replacing the fuse, first disconnect necessarily appropriate consumer.

Poddente unit cover fuses narrow screwdriver and remove it.

A blown fuse is identified by the molten metal strip. Location fuses shown on the inside of the lid unit fuses.

Remove the defective fuse plastic tweezers, located in the lid of fuse box (Fig. 7.3).

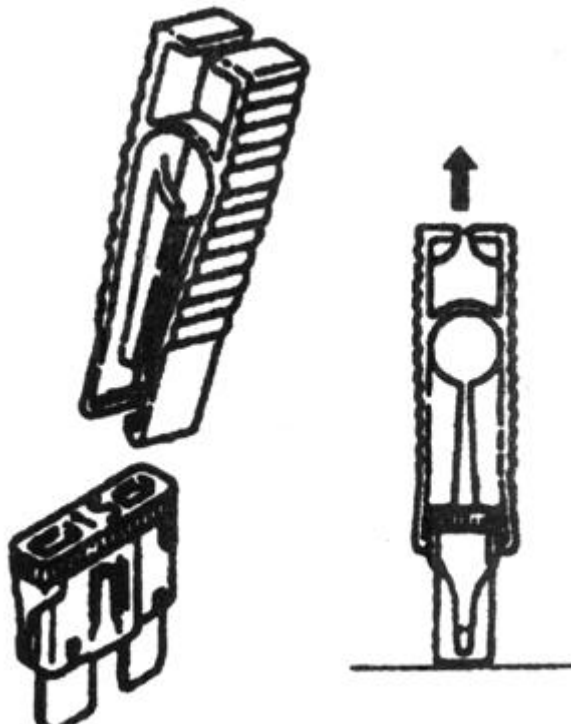


Fig. 7.3. Tweezer for replacement Fuse

Insert the new fuse of the same denomination (amperage).

If the newly inserted fuse fuse in a short time, you should check the relevant circuit.

Do not replace the fuse wire or similar aids, as well as because of the electrical system of the car can cause serious damage.

Recommended to always have a spare set of car fuses different denomination. To store them in the fuse block provided the appropriate place.

Par fuse is coated on the reverse side of the fuse body. In addition, the housing has a corresponding color, which can determine the nominal amperage.

For the supply of electricity to some elements of the electrical relays used car. Violation of the correct functioning of the relay leads to a refusal to serve his element. In the event of a suspected malfunction of any of the relay, it should be removed and tested at a service station or in a specialized vehicle workshop. Replacement of a failed relay is in the collection.

6.9 Battery

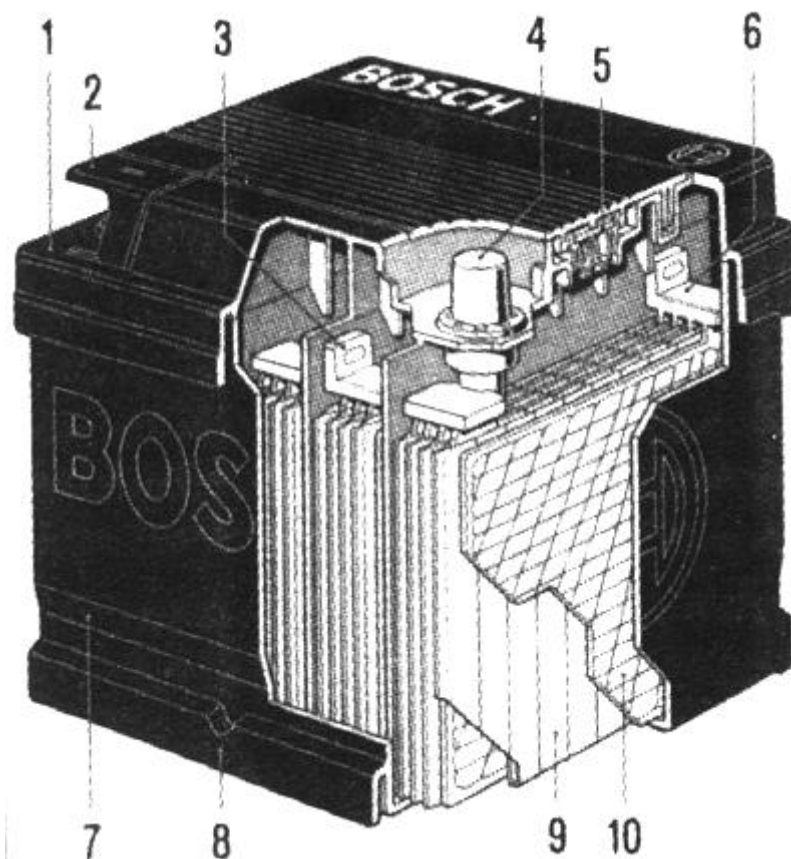


Fig. 7.4. Modern maintenance-free battery Battery:

- 1 - housing cover, 2 - protective cover terminals;
- 3 - interelement compound, 4 - the final terminal;
- 5 - cork elements (below the lid);
- 6 - plate holder, 7 - body, 8 - amplifier heads;
- 9 - positive plate, closed separator;
- 10 - negative plate

Viewed in this manual have the car electrical system, under a voltage of 12 V. The mass of the body is connected to the negative terminal of the battery. The battery pack is located in the engine compartment or under the rear seat (the model with air conditioning, as well as some diesel versions).

Battery performs three major functions in the electrical system of a vehicle:

- An electrical current to start the engine;
 - Stabilizes the voltage in an electrical system;
 - May in a short time to provide a current, when energy consumption exceeds the power output of the generator.
- Sealed batteries standard for all vehicles. They are on the case there is no flood jams. The battery pack is fully waterproof, not counting the two small side holes for ventilation. These vents allow evaporate formed gases.

Sealed batteries have the following advantages over conventional batteries:

- For the life of batteries do not need to top up the water;
- Battery is protected from the charge. If too much voltage is supplied to the battery, it will not take as much current as conventional battery. Increasing the voltage will continue to charge the normal battery, which leads to gassing and loss of electrolyte;
- Be self-charging battery like a normal battery. It is very important when the car is in one place for a long time;
- With smaller size and weight of voltage and current remained unchanged.

The battery pack has two indicators:

- Indicator of battery capacity is determined at 27 ° C, which when fully charged, provides in 10.5 and more;

- Battery indicator when starting a cold engine is determined by testing at -18°C , which shows the battery power when cranking a cold engine.

Backup battery power is defined as the maximum length of time for traffic at night with a minimum electrical load without the use of output of the generator. Expressed in minutes reserve capacity (or rate of E) is the necessary time to fully charged battery at 27°C and discharge current of 25 A to achieve at the terminals of voltage 10,5 V.

Testing sipy current during start cold engine is performed at -18°C . Minimum rate of current strength, which should be maintained battery at a given temperature, while there is a minimum voltage of 7.2 V.

This indicator is measured at starting a cold engine.

The service life of the battery is not limitless. Nevertheless, with proper care the battery will last for many years. If the battery been tested well, but detected malfunction for no apparent reason, malfunction or failure may be the following factors:

- Any device was left on all night;
- In short periods of a car moving at low speed;
- Vehicle electrical load exceeded the power output of the generator, often with the inclusion of non-standard equipment;
- Failure in the system of charging: slipping belt generator, malfunction or failure of the generator voltage regulator and so on;
- Improper use of batteries: failure to clean, for the attachment of terminals or weakening of times;
- Mechanical failure of the electrical system: Shorted or pinch wires.

Sealed batteries have a built-in hydrometer temperature compensated in its upper part, used for the following diagnosis:

- When looking at the hydrometer, make sure that the upper part of the battery clean;
- During normal operation must be received two indications:

The visible green dot-emergence of green, called "green dot" means that the battery is ready for testing;

Dark green invisible point-if there are complaints about the start of a cold engine requires testing battery. At the same time must be verified by the electrical system and charge. Sometimes it may be a third condition:

Clear or light yellow-fluid level below the tip of the hydrometer. This may cause excessive or prolonged charging excessive or normal wear of the battery. Therefore, charging and electrical systems may need to check if there are complaints about the cold start. If the battery - the reason for the complaint to the bad start a cold engine, replace it.

Test state of charge Battery

The density of the electrolyte in conjunction with measuring the voltage across the battery terminals can make an accurate conclusion about the charge level. To test serves hydrometer, which can be purchased at specialty shops. The greater the density of the electrolyte, the higher rise (pops) float hydrometer. On a scale hydrometer values are expressed in units of density (g / cm^3).

When measuring the density of electrolyte should be to ensure that the surface of the battery box and other parts of the pipette hydrometer is not falling droplet of electrolyte containing sulfuric acid, which causes corrosion and leakage current.

When measuring the density of the electrolyte temperature of the electrolyte must be between $20-30^{\circ}\text{C}$. The density of the electrolyte must be measured in each cell (the Bank) battery. After measuring the density of the electrolyte can set the level of discharge of the battery.

All the elements of the electrolyte should have the same density.

The density of the electrolyte in a fully charged battery is $1.28 \text{ g} / \text{cm}^3$.

Density of the electrolyte the battery discharged to 25%, is $1.24 \text{ g} / \text{cm}^3$.

The density of the electrolyte the battery discharged to 50%, is $1.20 \text{ g} / \text{cm}^3$.

The battery, discharged more than 25% in winter and more than 50% in the summer, remove from the car and charging.

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The battery, discharged more than 25% in winter and more than 50% in the summer, remove from the car and charging.

Charging Battery

Battery with a green dot indicates that the charge is not needed, the remaining battery power, such as when starting a cold engine.

When charging the battery with sealed terminals outside the car, install the adapter. Make sure that all connections charger are clean and reliable. For best results, the battery must be recharged when the electrolyte and plates are at room temperature. Extremely cold battery may not charge a few hours after the start of charging.

Charge the battery until you see the green dot. In the process of charging the battery should be checked every 30 minutes. Tilt or agitation may be necessary for the emergence of a green dot.

After charging the battery should be tested.

The time required for charging the battery depends on:

- Size batteries - for a fully discharged battery high capacity, designed for heavy-duty applications, you need time to 2 times greater than for a rows of the battery of a car;
- Temperature - for charging the battery at -18 ° C would require more time than at 27 ° C. When the charger is connected to a cold battery, first degree charge is very low, but as the temperature of the battery state of charge will rise;
- The ability charger - the charger with a current of 5 A charge will take longer to charge than the charger with charging current 30 A or more;
- The state of charge - for charging a fully discharged battery should be twice the charge, than to charge the two half-discharged batteries, because in a fully discharged battery, the electrolyte is approaching the composition of nearly pure water and is a poor conductor. Then, as the charging current leads increase the content of acid in the electrolyte, respectively, increases and the degree of charging.

Before charging the battery disconnect the positive cable and the masses, first cable mass.
 Before charging, check the electrolyte level, if necessary top up the distilled water.
 Frozen battery (battery, the electrolyte in which froze) before charging thaw. A fully charged battery freezes at a temperature of -65 ° C, half-charged battery - at a temperature of -30 ° C, discharged battery - at a temperature of -12 ° C.

Charge the battery only in well ventilated area. When charging the battery installed, leave the hood open.
 During normal charging the charging current value is approximately 10% of battery capacity (ie the battery capacity of 50 Ah to be charged current value of approximately 5.0 A). As the charging time can take a value of 10 h.

Connect the positive battery terminals with a wire-date transport, minus the withdrawal from the battery minus the charger.

During charging the electrolyte temperature should not exceed +55 ° C, if necessary, interrupt or reduce the charge current of charge.

Charge the battery for as long as all elements of the battery will not take copious evolution of gas and the following one after the other in an hour 3-dimensions, will not cease to increase the density of the electrolyte and voltage.
 After charging, check the electrolyte level, if necessary top up the distilled water.

Charging a fully discharged battery
 Use the following procedure to recharge a fully discharged battery:

- Measure the voltage at the battery terminals are accurate voltmeter. If the value of the measured value below 10 V, the charge current is very low, and it may take some time before the battery will take a few milliamperes excess;
- Put the charger on a high place. Some chargers have a protection scheme against reverse polarity, preventing charged with improper connection to the battery terminals. Fully charged battery has sufficient voltage to give effect to this scheme, even if the wires are connected correctly. This will cause the battery will not charge. Therefore, the following special instructions of the manufacturer of chargers for charging device is turned on and started to charge the battery with low voltage;
- In the chargers provide voltage regulators and current strength. The time required to charge the battery depending on the different voltage values are listed below.

<i>Initial voltage findings batteries,</i>	<i>Charging time, hours</i>
16.0 or	Up to 4
14,0-15,9	Up to 8
13.9 or less	Up to 16

Charging the battery depending on the source voltage of the battery
 If the resulting battery charge can be measured after a charging time, the battery should be replaced.
 If the resulting charge is measured in the process of charging, the battery correctly, is charging should be completed as usual.
 If the resulting battery charge is not measured after a charging time, calculated by the above method, the battery should be replaced.
 If the resulting charge is measured during the time of charging, the battery is charging properly and should be completed in the usual way.

Care battery

From time to time to perform the following work to serve longer battery and its power to maintaining the highest.
 You should always contain a battery and its surrounding parts clean. The surface of the battery should always be dry, as otherwise, between the individual banks may have the surface leakage currents, due to which the battery is discharged itself.

The electrolyte level should always be a ring, located on the underside of the filler cells. For USD willow should use distilled water.

In cold weather did not keep the battery in the uncharged state, as it is (more precisely, the electrolyte in it) freeze. Poor battery packs are frozen at a temperature of about -10 ° C.

Storage battery

Batteries are not used for a long time, discharged themselves and may be subject sulfatatsii plates. If these batteries charged charger, they do not accept charging current and because of the so-called surface charge.

Before you rubbish the battery, you should check it: '

Check the density of the electrolyte. If the density of all elements differ by no more than $0,02 \text{ g / cm}^3$, the battery should charge the battery charger.

Check the battery after charging under load. If the values do not meet the required, the battery is defective.

Check the density of the electrolyte. If the density of the electrolyte in one or more banks is significantly lower than in the others (for example, five banks, the density is 1.16 g / cm^3 , and one $1,08 \text{ g / cm}^3$). Battery has internal short circuit.

To avoid premature aging of the battery should charge the battery, located on the hra-nznii every 3 months.

Self-Discharge Battery

Depending on the modification of the car to the normal process of self-discharge the battery adds energy consumption permanent consumers of energy. Therefore, the battery is not operated on a car should be charged once a month and a half. If you suspect the presence of surface leakage currents, should check the on-board network of the car.

To check, use a fully charged battery.

Set the ammeter (with a limit of measurement of 0-5 mA and 0-5 A) the highest limit of measurement. Include an ammeter between the minus terminal of the battery and cable mass. The positive wire, connect the ammeter to the positive terminal of the battery, minus the wire ammeter - to the negative terminal of the battery.

Turn off all electricity consumers, close all doors and trunk, turn off the ceiling lights, engine compartment.

Change the limit of measurement ammeter downward until yet have any evidence (acceptable value is 1.3 mA).

You remove the fuses one by one from the fuse box, opens the series all electrical circuits. If disconnecting one of the chains of evidence fall to 0, then this circuit should look for the source of the problem. Potential problems: corroded or contaminated by contact electrical connectors, abraded wires, internal circuit in electrical components.

If a fuse-protected circuits fault is not detected, you should disconnect the wires from the fuse unprotected devices: the generator, starter, ignition system components.

If you disable one of the unprotected circuit testimony ammeter will drop to 0, will repair or replace the appropriate item. When leakage current in the starter or the ignition system always check (in accordance with the scheme), ignition switch and starter.

Removing and installing the battery

When disconnecting the battery from the memory of the central block of the engine management and transmission, antilock braking system, as well as from the memory of other electrical equipment such as radio, clock and erase data on the fault occurred. After connecting the appropriate devices re Program. Some commercially installed radios have the security code. Security code prevents unauthorized use of the radio, if its power is turned off. Feeding the radio and clock is turned off, if, for example, turns off the battery, removed the receiver or the appropriate fuse fuse.

Loosen nuts and remove the "negative" terminal and then "positive" terminal from the battery.

Loosen the nut fastening the bracket supporting the battery.

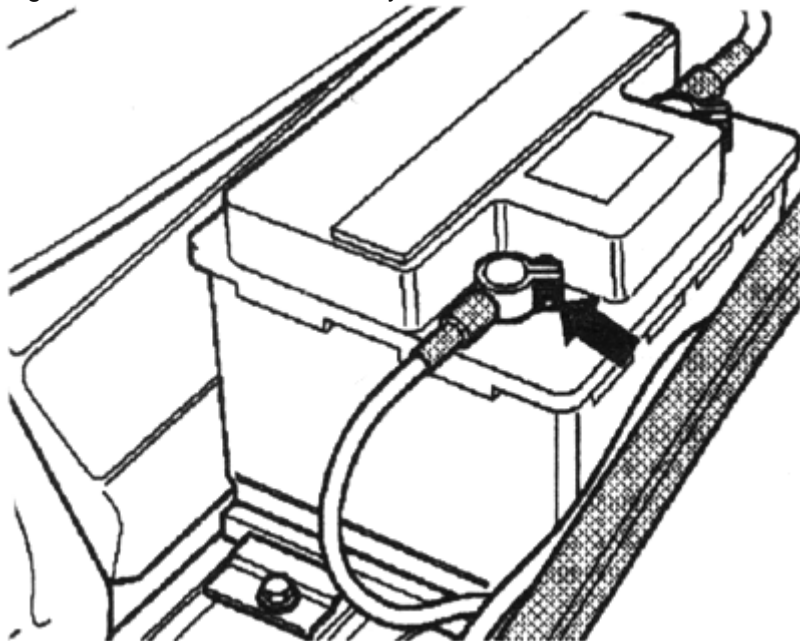
Remove the battery.

Before installing the battery connections clean the battery, this ideal brass wire brush. To prevent corrosion of the battery cover with the findings of the special grease.

Installation of the battery to be followed, feedback withdrawal.

Tighten the nut mounting bracket supporting the battery point of 6.8 Nm.

Tighten the nuts terminals battery moment 9.12 Nm



**Fig. 7.5. Delayed nuts mount terminals
Accumulator Battery**

6.10 Generator

The generator - a source of electricity car Opel Astra. When the engine is running, it provides power to all units and charges the battery. Powerful three-phase synchronous generator is the power power plant in your vehicle. Even at idle, it provides electricity to all consumers. In modern cars generator capable of producing power to 2 kW. The generator is powered by a V-belt.

Three-phase generator produces three-phase alternating current. Since the battery must be recharged by direct current, then with the help of powerful diode converts AC to DC.

Rectifiers also prevent battery discharge when parked. The generator requires virtually no maintenance. Self-brush generator can be replaced after run 100 000 km. In the case of serious malfunction Turn the generator for repair.

Removing and installing the generator

Remove the wire from the negative battery terminals.

Remove V-belt, to follow the correct installation please tick one of its sides to the direction of motion. Loosen the belt by turning natyazhite-la and remove it.

Remove contact from the generator "B +" (Fig. 7.6).

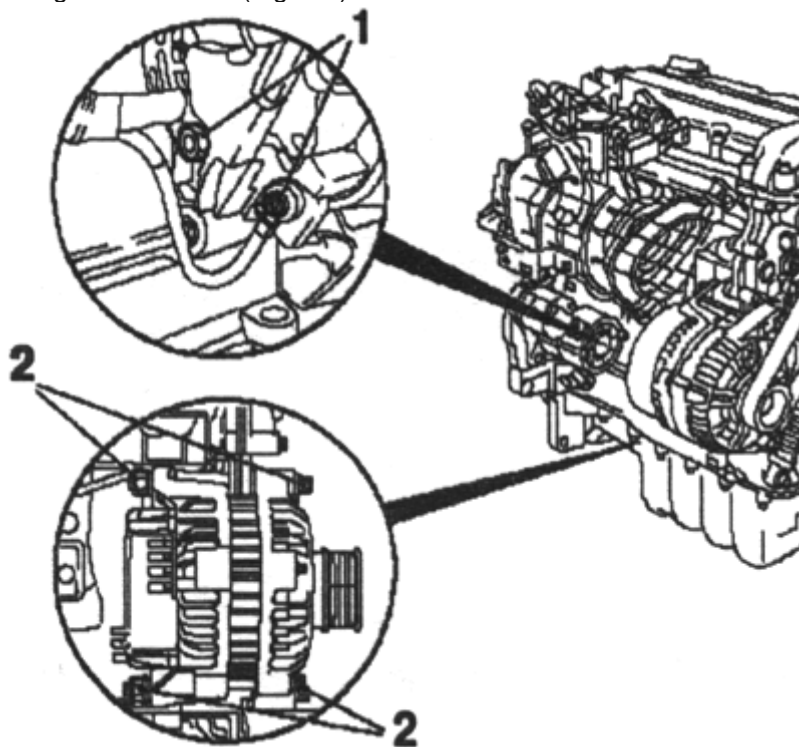


Fig. 7.6. Mounting generator:

1 - Nuts contacts generator, 2 - stud fastening

At the generator contact designated as "B1 +". New generators are equipped with a closed oval plug socket for the plug to double, while the old generator plugs rectangular shape.

Loosen generator mounting bolts and pull it up.

Installation of generators spend in the reverse order. VybeYTE threaded bushing mounting bolts on the back 1 mm. Tighten the nut contact "B +" ("B1 +"; contact * 30 ") point of 15 Nm. If the nut does not tighten the required point, then there is the following hazards:

- Rechargeable battery is not fully charged;
- Onboard electrical and electronics can not work;
- Sparking may cause a fire;
- Surges can knock out individual parts and assemblies.

Electrical and reactivate radiokodirovku.

Generator BOSCH

Parameter	Value
ID	0124225 024
Type	6CB214V70A
Catalog number Opel	9192 823
Rated voltage *, B	14
Maximum current, A	71.4
Current. A:	--
at 1500 min ⁻¹	29.1
at 6000 min ⁻¹	70

Slip Rings (new), mm	15.6
Minimum diameter, mm	14.9
Brushes (protrusion), mm	13.2
Excitation winding (resistance), Ohm	1,8-2,8
Stator winding (resistance), Ohm	max. 0,10-0,11
The voltage regulator ** In	14.5

6.11 Starter

Parameter	Value
ID	D6RA162
Type	24B91007FP
Catalog number Opel	09130838
Tests in mode circuit progress	
Current, A	<70
Speed, min ⁻¹	2500
Voltage, V	11.5
Tests in mode short circuit	
Voltage, V	5.6
Current, A	450-650
The moment, Hm	--
Speed, min ⁻¹	--
Electromagnetic rale	
Actuation voltage, V	<7,5
Current, A	<30
Clearance between lamellae switch	
The degree of wear, mm	0.3
Brushes	
Minimum length, mm	13

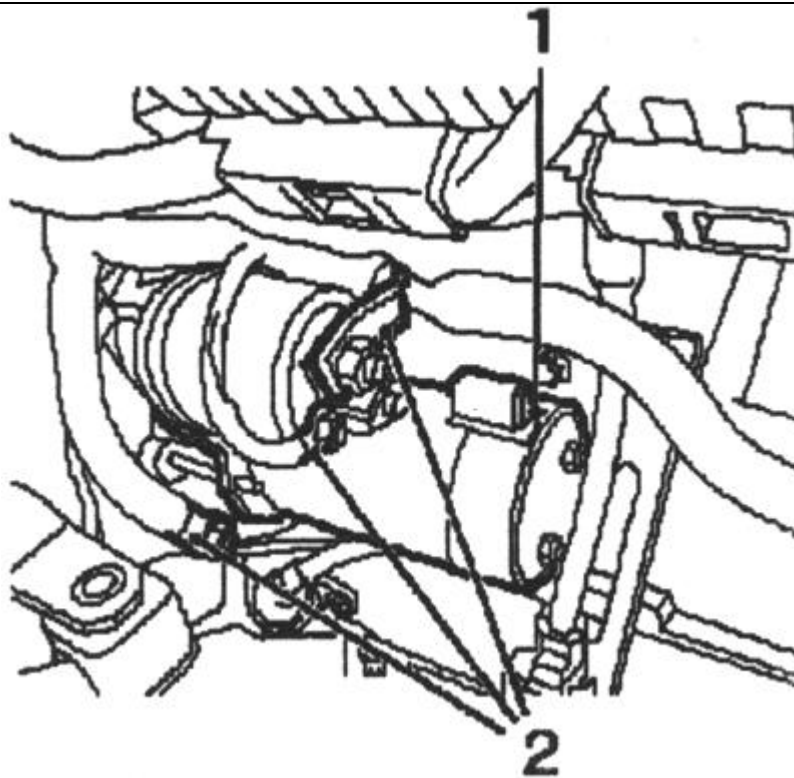


Fig. 7.7. Mounting the starter:

1 - Starter 2 - retention

Automobiles Opel, as well as on most other cars, install a starter, consisting of electric motor, gear drive and freewheel (freewheel). At such starters solenoid switch connected to a thick cable plus battery (pin "30") and a thin wire through the ignition switch (pin "50").

If you turn the ignition key to position "start" voltage is applied to the retractor relay contacts, which is mounted on top of the starter. Anchor relay through the lever pushes forward the starter gear, which engages with a toothed crown wheel.

When the starter gear engages with a toothed crown wheel, the motor starter contacts are closed and he begins to turn the crankshaft of the engine.

After starting the engine speed flywheel increases sharply. As a consequence, increases the speed of rotation of starter gears, as it is still engaged with the flywheel. In order to avoid transmission of high speed gears on the rotor of the starter pinion is connected to the roller freewheel. If you turn the ignition key to the starting position the chain opened, anchoring the retractor relay under the action of the return spring returns, and with a lever release from meshing gear starter.

6.12 Voltage regulator

Test voltage regulator

Connect the tester between the contact "+" generator, and "mass".

Set engine speed from 3000 to 4000 min⁻¹ leave it for 2 minutes to ensure that the generator has reached operating temperature (approximately 80 ° C). When starting the engine the voltage should drop to 8 V (at ambient temperature +20 ° C).

Turn the parking lights, radio or fan, which corresponds to the load current from 3 to 7 A. If the voltage regulator is in the range 13,5-14,8 V, hence the generator and voltage regulator operable. Voltage generator (and an onboard network) should be higher than the battery voltage, so that it can recharge while driving.

Turn on the beam and repeat the measurement with engine speed of 3000 min⁻¹. Voltage must not change compared with the previous more than 0.4 V.

If the voltage is greater, then the regulator is defective and should be replaced.

If the voltage is too low, then worn generator brushes. Length of new brushes is 12 mm, the allowable depreciation - 5 mm. The difference in the lengths of the two brushes should not exceed 1 mm. If not, remove the generator and give it for repair.

6.13 Removing and installing windshield washer nozzles and rear window

Windscreen

Remove the cowl grille.

Squeeze the latch on the back of the grid and remove the nozzle from the planting slot car Opel Astra. Disconnect the hose from the nozzle.

Installation is performed in reverse order of removal.

If necessary, adjust the direction of the jet supply washer fluid on the windshield, which enter in the appropriate nozzle needle and direct the nozzle to the desired point (Figure 7.8).



Fig. 7.8. Adjustment jet jets

Withdrawal and installing injectors washer rear glass

Remove the back of the door trim.

Remove the upper stop light.

On models "Hatchback" remove the nozzle assembly of the stop light at the Astra GTC, you must first overcome 2 release (Fig. 7.9).

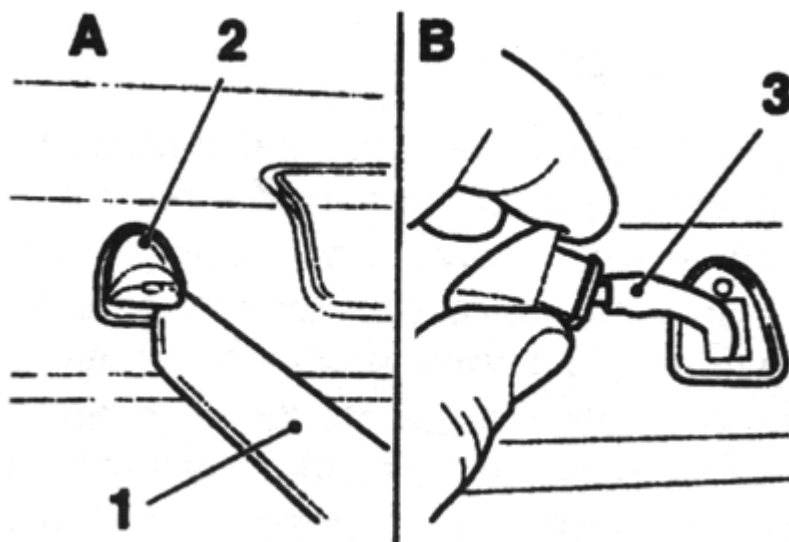
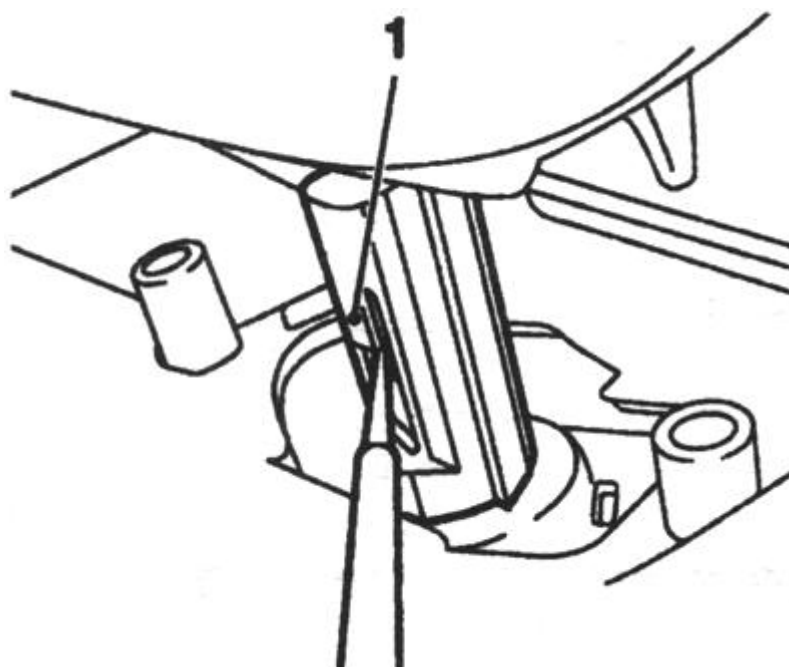


Fig. 7.9. Withdrawal nozzles:

1 - plastic wedge, 2 - burner, 3 - inlet hose

Installation is performed in reverse order of removal.

6.14 Removal and installation faroomyvateley



**Fig. 7.10. Latch Faro myvatelya
Car Opel Astra:**

1 - lock

Remove the pad front bumper.

Disconnect the hose washer lights on the back side lining.

Use a screwdriver to press the lid down faroomyvatelya lining of the front bumper (Figure 7.10).

Squeeze the latch and remove faroomyvatel of the lining.

Squeeze the latches and remove the cover faroomyvatelya.

6.15 Removal and installation of the reservoir / pump for washer fluid

Remove the decorative grille.

Remove the bolts fastening the tank to the washer fluid (Figure 7.11).

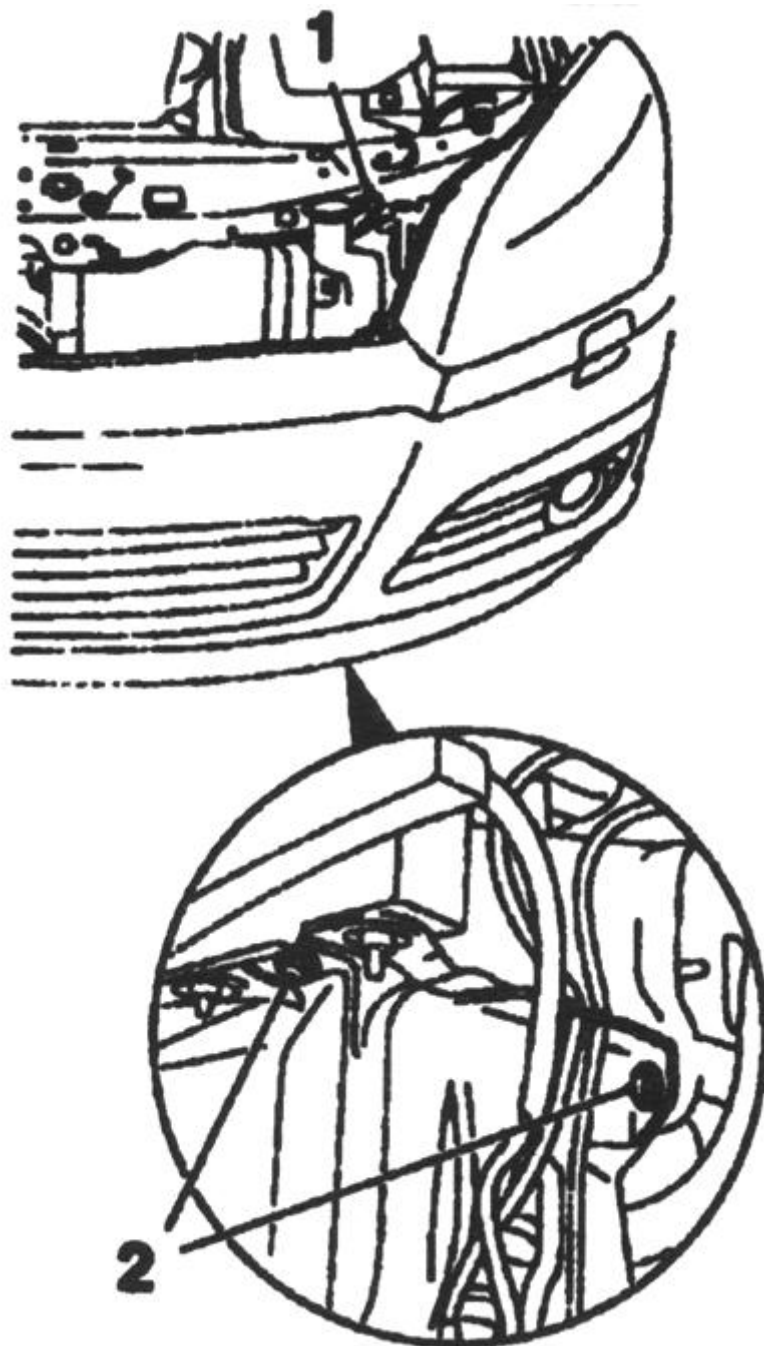


Fig. 7.11. Bolts fixing faroomyva-Chairpersons:

1,2 - Bolts

Disconnect the wiring (see conj. Illustration) from the pump stack loomyvatelya and washer fluid level sensor.
 Disconnect hoses from the pump windscreen, while try to prevent leaking washer fluid (Fig. 7.12).
 Disconnect electrical connector and hose from the pump faroomyvateley.
 Remove the washer fluid reservoir through the bottom and disconnect the hose from the tank.
 Release the pump from the holders of the tank.

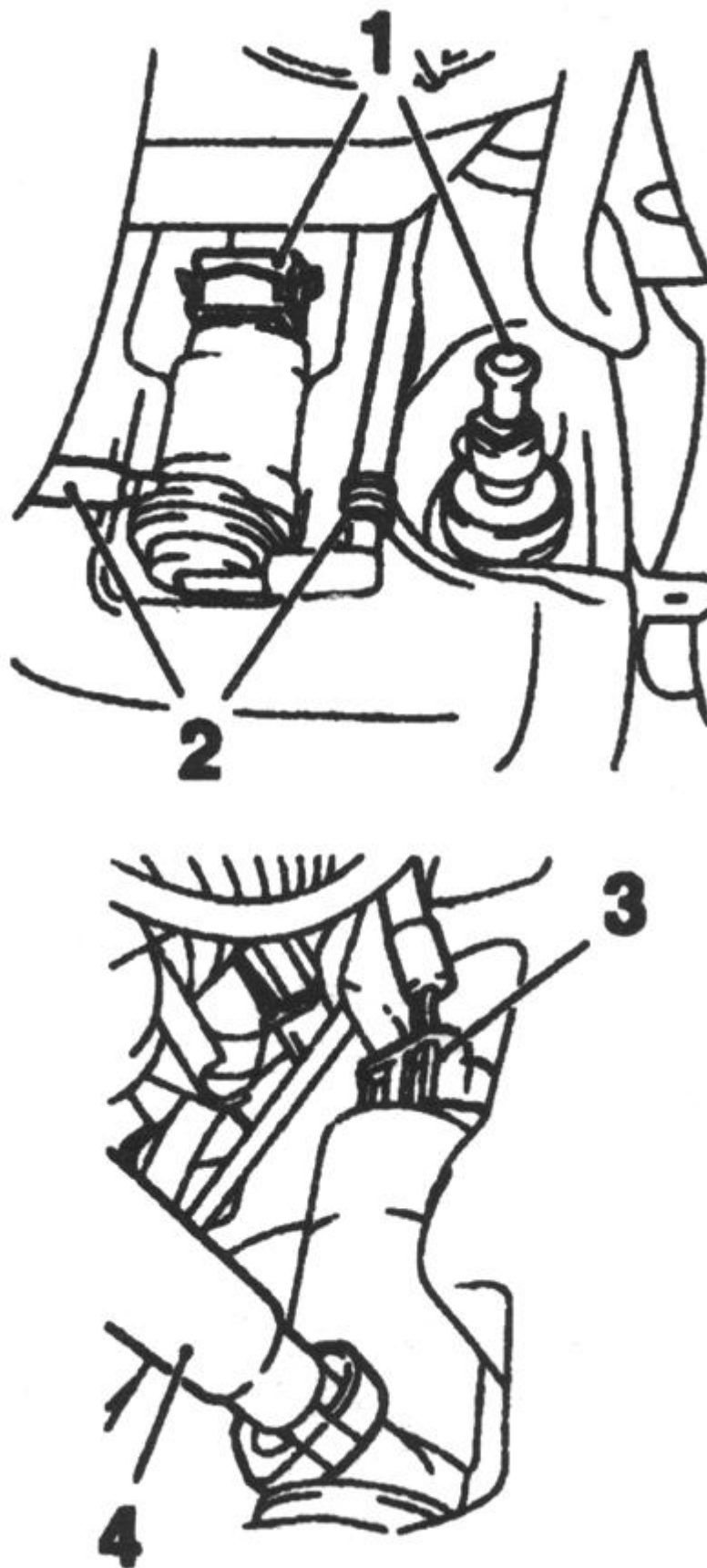


Fig. 7.12. Disconnecting Hose and electron troprovodki:
 1,2 - hoses, 3, 4 - electrical

If necessary, remove the liquid level sensor.
 Installation is performed in reverse order of removal.
 Upon completion of works fill the new reservoir with fluid.

6.16 Removal and installation of front wiper levers

Withdrawal

Wash the windshield, turn on and shut down the windshield wipers - they must be in its lowest position.

Mark the position of the rubber wiper blades, which affix to the windshield tape or adhesive tape along the brush. Open the hood.

Poddente protective cap with a screwdriver and remove it from the spindle axis of the lever (Fig. 7.13).

NOTE

Caps equipped threaded connection, pry manually to those long as not in come sufficient gap between caps and lever.

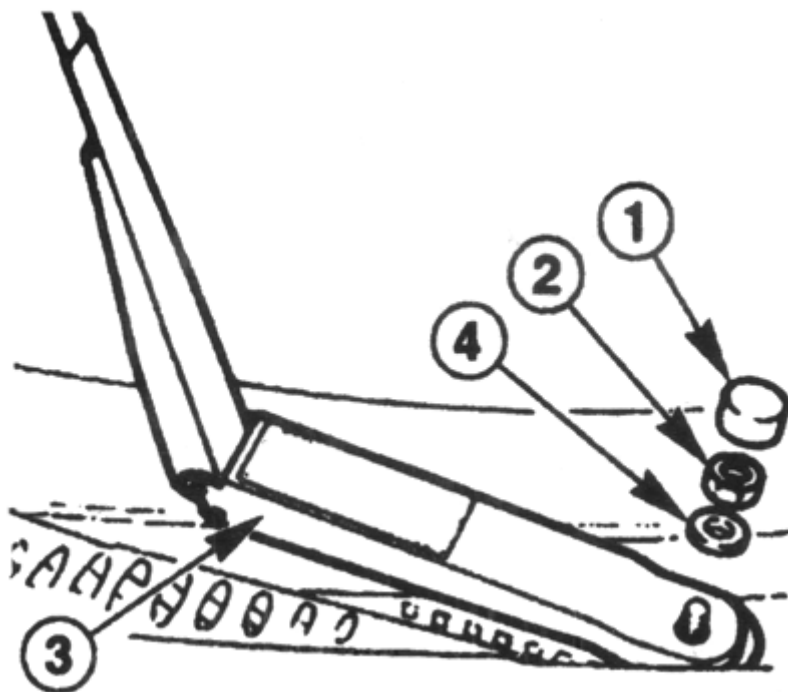


Fig. 7.13. Components lever stekloochi-stitelya:

1 - cap 2 - fastening nut, 3 - lever 4 - Puck

Loosen the nuts for about 2 turns. Slightly swinging arm wipers from side to side, download it from the landing bushing axis, if necessary, use the appropriate tool (Figure 7.14).

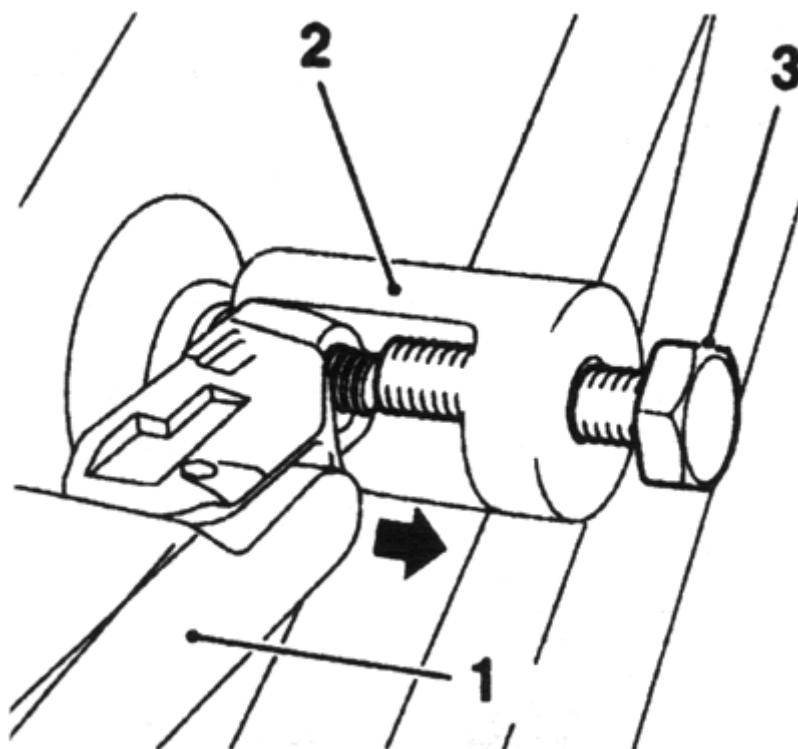


Fig. 7.14. Withdrawal lever stekloochisti-Chairpersons:

1 - lever, 2 - a special tool, 3 - bolt

Completely unscrew the nut and remove the wiper arm from the spindle.

Setting

Make sure that the position of the drive blades corresponds to an extreme situation, if necessary, turn the drive and install the desired position.

Set the lever on the landing bushing so that the brush wiper coincided with the previously affixed with adhesive tape (scotch).

Tighten the nuts by hand lever. Close the hood, wash the windshield and over time turn the windshield wiper blades at work should not go beyond the glass, but when you turn off the drive should return to the lowest position. Otherwise, release the nut and repeat the installation of the lever.

After adjustment tighten the nuts required time and reinstall the protective caps.

6.17 Removal and installation of electric motor cleaners windscreen

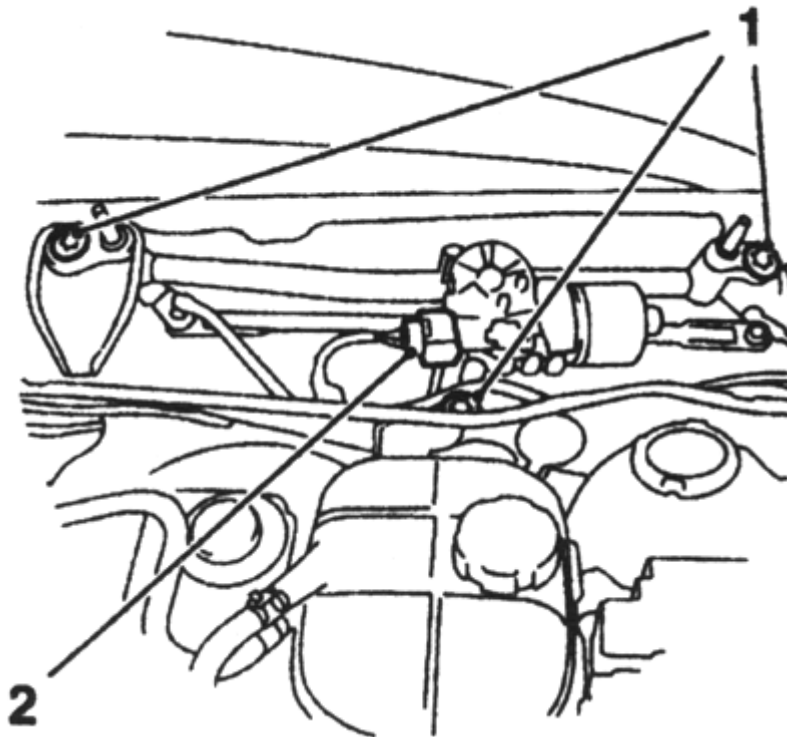
Remove the wiper levers.

Remove the cowl grille.

Disconnect the wire from the negative terminals of the battery.

Remove the 3 bolts.

Disconnected the wiring connector and remove the motor drive assembly of the cleaners hood space (Figure 7.15).



**Fig. 7.15. Mounting wiper motor
Car Opel Astra (Opel Astra):**

1 - bolts, 2 - electric

Poddente screwdriver and separate the driving thrust from the motor pivot.

Marker mark the loading position, the hinge electric panel assembly.

Loosen the nut and remove the hinge from an electric motor.

Remove the 3 mounting bolts and remove the motor from the panel assembly.

Installation is performed in reverse order of removal.

Make sure that the drive motor is in the proper position, if necessary, connect the motor to the connector (connect the battery) and set the desired position.

Check the levers of cleaning the windshield.

6.18 Removing and installation of rear window wiper motor

Disconnect the wire from the negative terminals of the battery car Opel Astra.

Remove the wiper arm.

Remove the door trim back of the cart.

Disconnected connector wiring motor 3 Remove the mounting bolt (Figure 7.16).

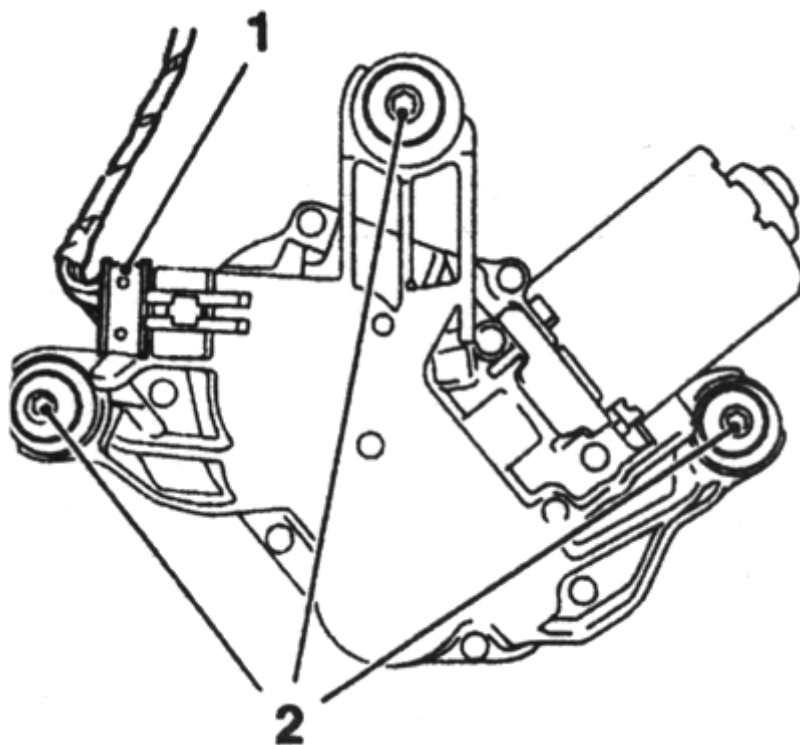


Fig. 7.16. Mounting wiper motor:

1 - slot 2 - bolts fixing

Remove the electric motor from the back of the door.

Installation is performed in reverse order of removal.

Make sure that the drive motor is in the proper position, if necessary, connect the motor to the connector (connect the battery) and set the desired position.

Check the lever cleaner.

6.19 Removal and installation of rain sensor

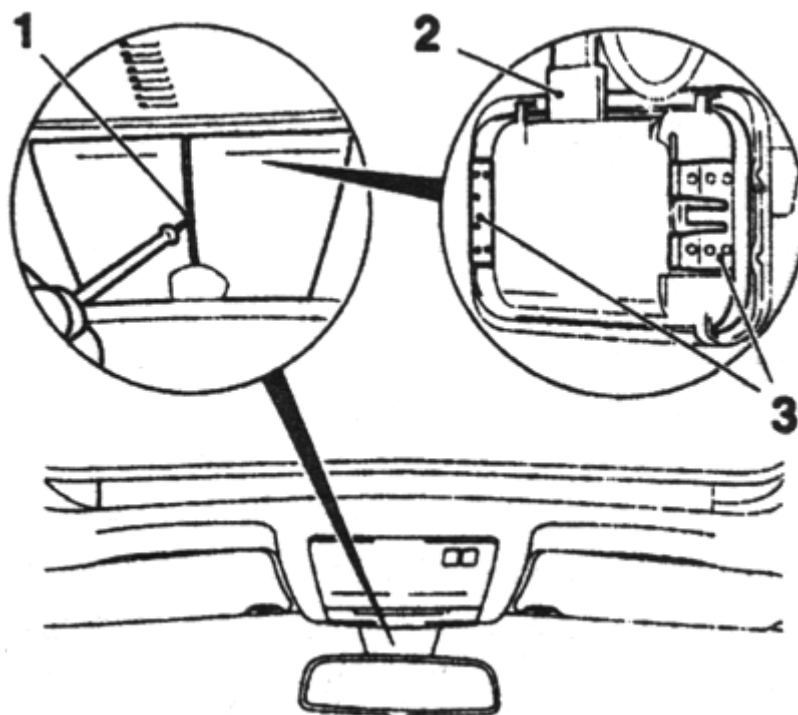


Fig. 7.17. Withdrawal cover salon grain-kala rear type:

1 - plastic wedge, 2 - connector wiring;

3 - latches

Separate with a plastic wedge cap rack salon mirrors (Fig. 7.17).

Disconnected connector wiring rain sensor.

2 Squeeze the release and remove the sensor.

Installation is performed in reverse order of removal.

6.20 Removal and installation of instrument cluster

NOTE

Condition all components must be checked with certain established in combination of checking-etsya at help special diagnostic device. At osno-vanii This test determined by the need replacement combination devices.

Disconnect the battery.

Remove the lower steering column shroud.

Remove the 2 screws fastening (Figure 7.18).

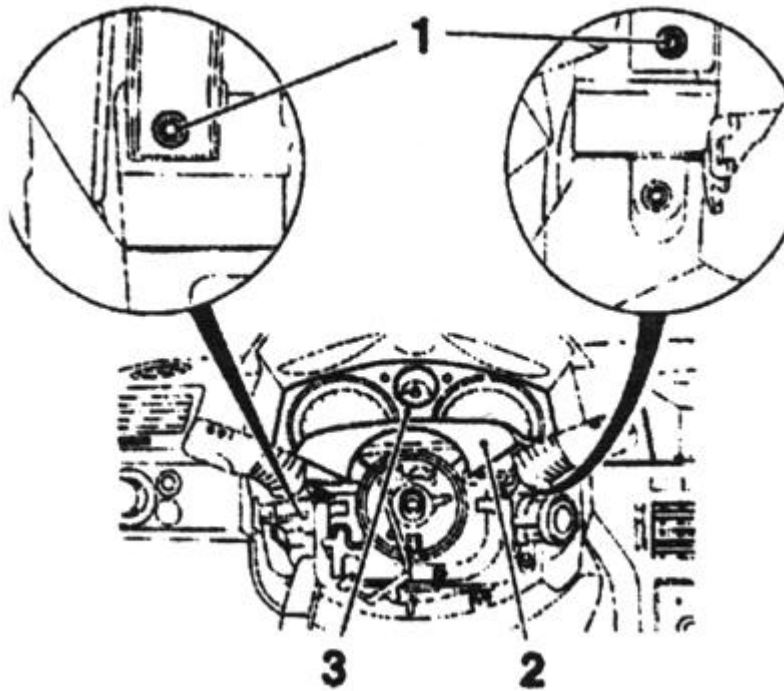


Fig. 7.18. Withdrawal combination devices

Car Opel Astra:

1 - bolts, 2 - the upper steering column housing;

3 - combination of devices

Remove the combination of instruments, together with the upper steering column jacket.

Disconnected the wiring harness connector from the back of the instrument cluster.

2 Squeeze the release and remove the upper shroud steering column with a combination of instruments.

Installation is performed in reverse order of removal.

Turn on the ignition and check the correct functioning of the warning lights and other components of the combination of instruments.

6.21 Removal and installation of information display

Remove the pad section of the dashboard console with air vents car Opel Astra.

Remove the 2 screws fastening.

Remove the information display together with the adjustment of the instrument panel (Figure 7.19).

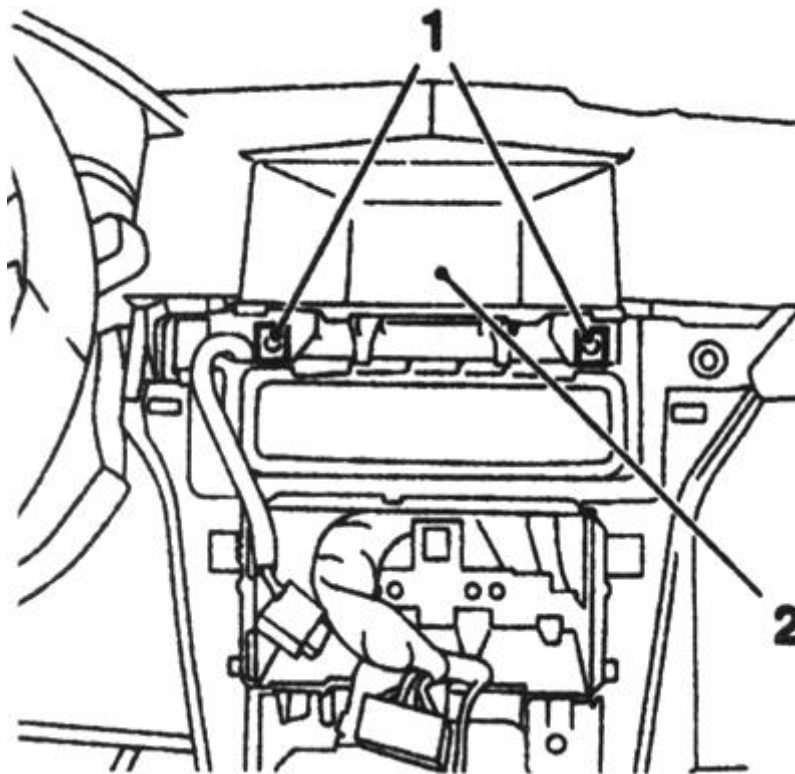


Fig. 7.19. Mounting Information Display

Car Opel Astra:

1 - bolts, 2 - Information Display

Disconnected the wiring harness connector from the back of the screen.

2 Squeeze the release and remove the top pad display.

Installation is performed in reverse order of removal.

Set time and date.

6.22 On-board electrical equipment - Removal and installation of outdoor lighting panel switches / lighting devices

Withdrawal

Disconnect the wire from the negative terminals of the battery.

Turn the rotary switch modes of operation of outdoor lighting the way (position "O" or «AUTO», depending on the configuration).

Click on the handle of a rotary switch and turn it into a central position (Figure 7.20).

Remove the panel switches of the dashboard.

Disconnected the wiring connector on the back side panel.

Setting

Connect the wiring to the panel switches.

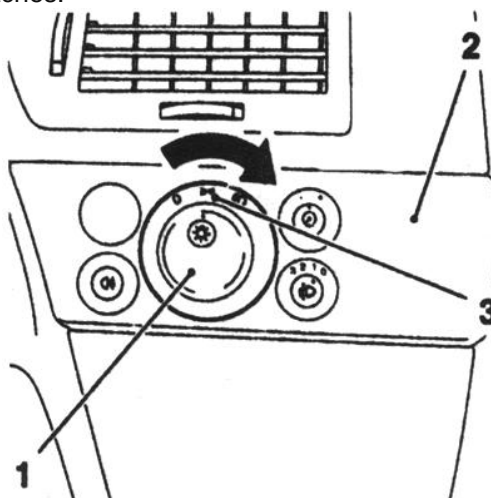


Fig. 7.20. Withdrawal panel switches outdoor lighting / lighting devices:

1 - handle rotary switch, 2 - panel switches;

3 - the central position switch

Click on the handle of a rotary switch and turn it right until the lock bar switch is not fully sink in deeper (Figure 7.21).

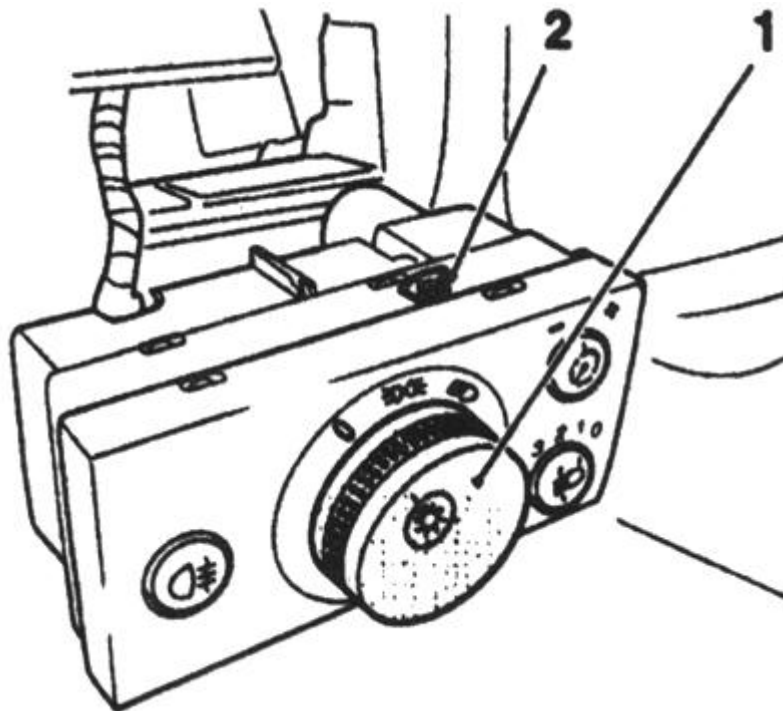


Fig. 7.21. Latch panel swi-lei moves up or down at in vorachivanii handle Rotation re-klyuchatelya:
1 - lever, 2 - retainer

Hold the handle in this position, insert the panel in the landing slot, and turn the knob to the left to lock the panel. Check the operation of the switch in all positions and is mounted panel

6.23 On-board electrical equipment - Removing and installing the module gearshift paddles

NOTE

Paddles Switches -stalled in Contact block on wheel-ing column. To withdrawal levers should pre remove contact block.

Slide the lever toward the anther edge grip, insert the punch diameter of 1.5 mm as shown in Figure 7.22.

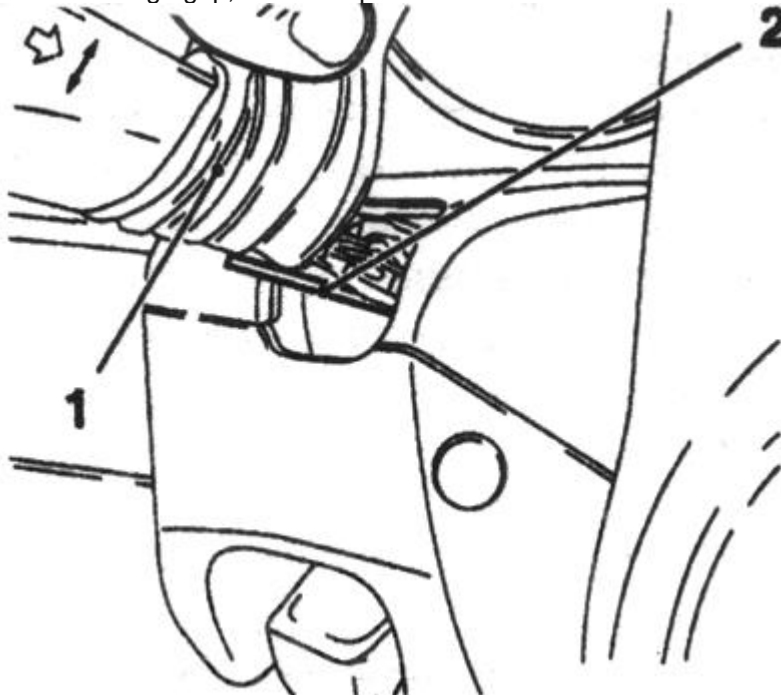


Fig. 7.22. Setting knockout:
1 - anther 2 - hammered

Squeeze punch retainer and separate from the lever assembly of the contact block. When installing, enter the lever assembly of the contact block and press it into place. Further installation is in reverse order of removal

6.24 On-board electrical equipment - Removal and installation of power switches console section of the dashboard

NOTE

In Depending from configuration in composition block may include the various switches.

Remove the pad section of the dashboard console with air vents.

Disconnected the wiring harness connector from the back side side switches (Fig. 7.23).

2 Turn the retainer and disconnect the power switch on the console cover plate section.

Installation is performed in reverse order of removal.

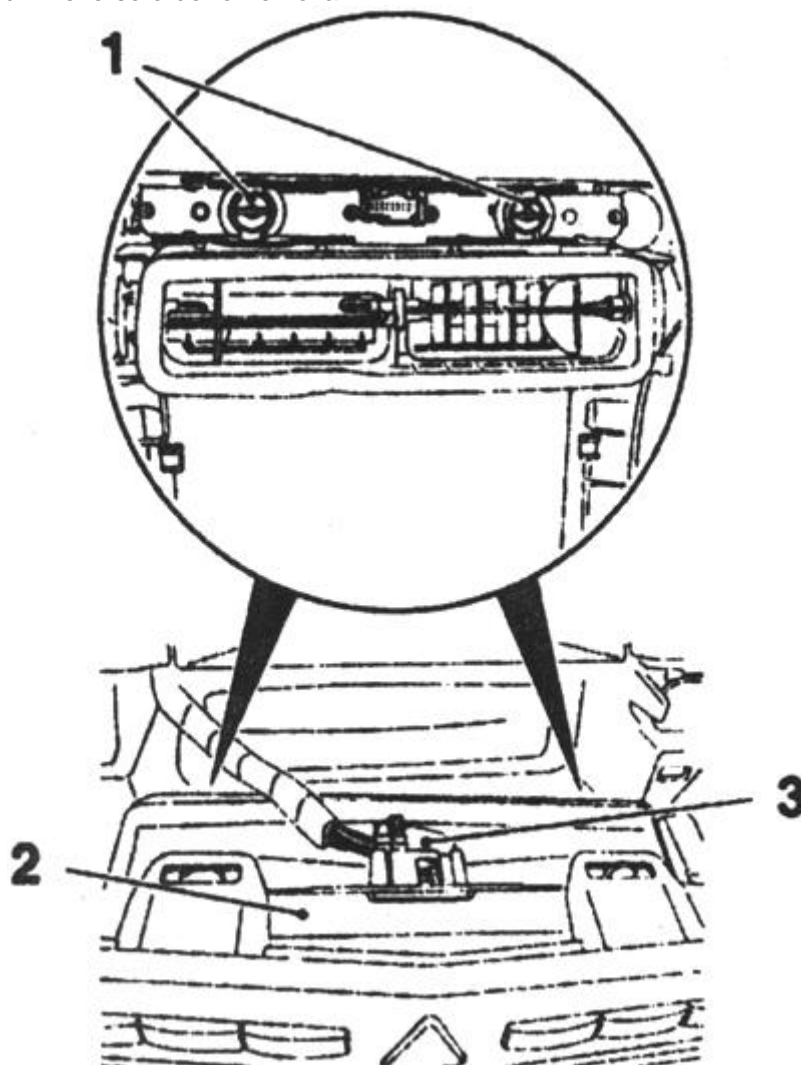


Fig. 7.23. Withdrawal block switch console with eksii panel devices car Opel Astra:

1 - rotary latches, 2 - block of switches;

3 - Connector wiring

6.25 On-board electrical equipment – Removal, installation, switch mode of winter driving

NOTE

Button switch activation / de-activation winter regime leader-tion (model with AT) is panel lever selector and SYMBOL Chen relevant symbol.

Disconnect the wire from the negative terminals of the battery.

Remove the base selector lever with a central console.

Squeeze the lock switch on the back side and remove it (Figure 7.24).

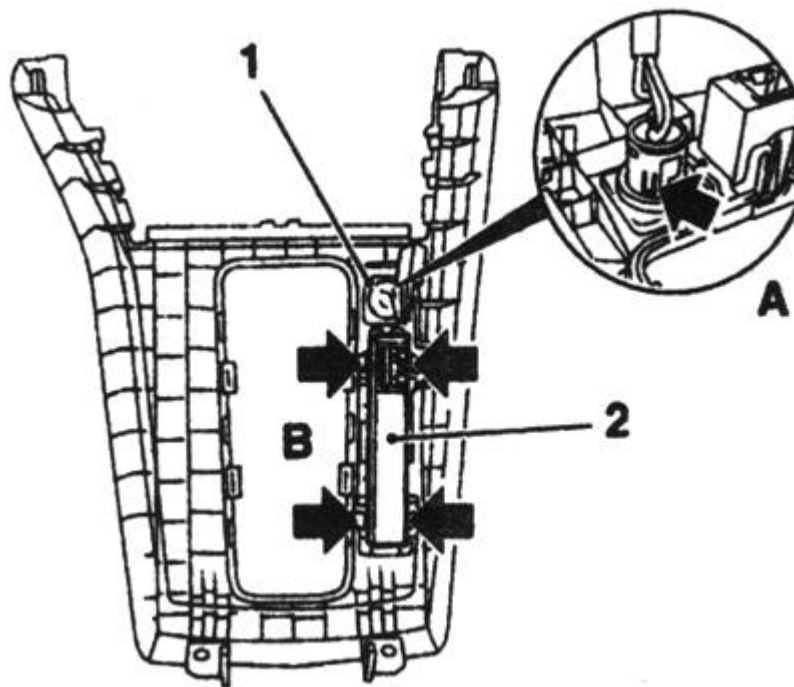


Fig. 7.24. Withdrawal release:

1 - Switch 2 - lining

4 Squeeze the latch and remove the pad light indicators.
Installation is performed in reverse order of removal.

6.26 On-board electrical equipment - Removal and installation of switches, electric windows front and rear doors

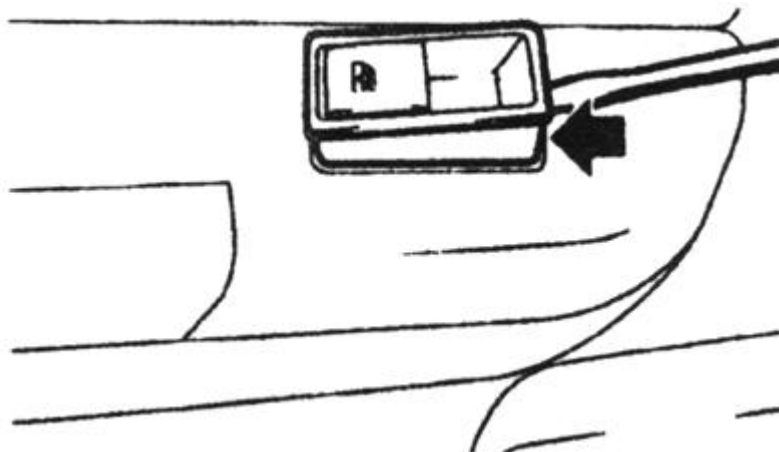
Withdrawal and install electric switches front windows Doors

Disconnect the wire from the negative terminals of the battery.

Remove the door trim.

Disconnected from the electrical connector assembly of the main panel of switches on the back side door upholstery.

Squeeze the latch and remove the assembly of the main panel switches from finishing arm (Figure 7.25).



**Fig. 7.26. Withdrawal individual re-klyuchatelya
drive window lifts**

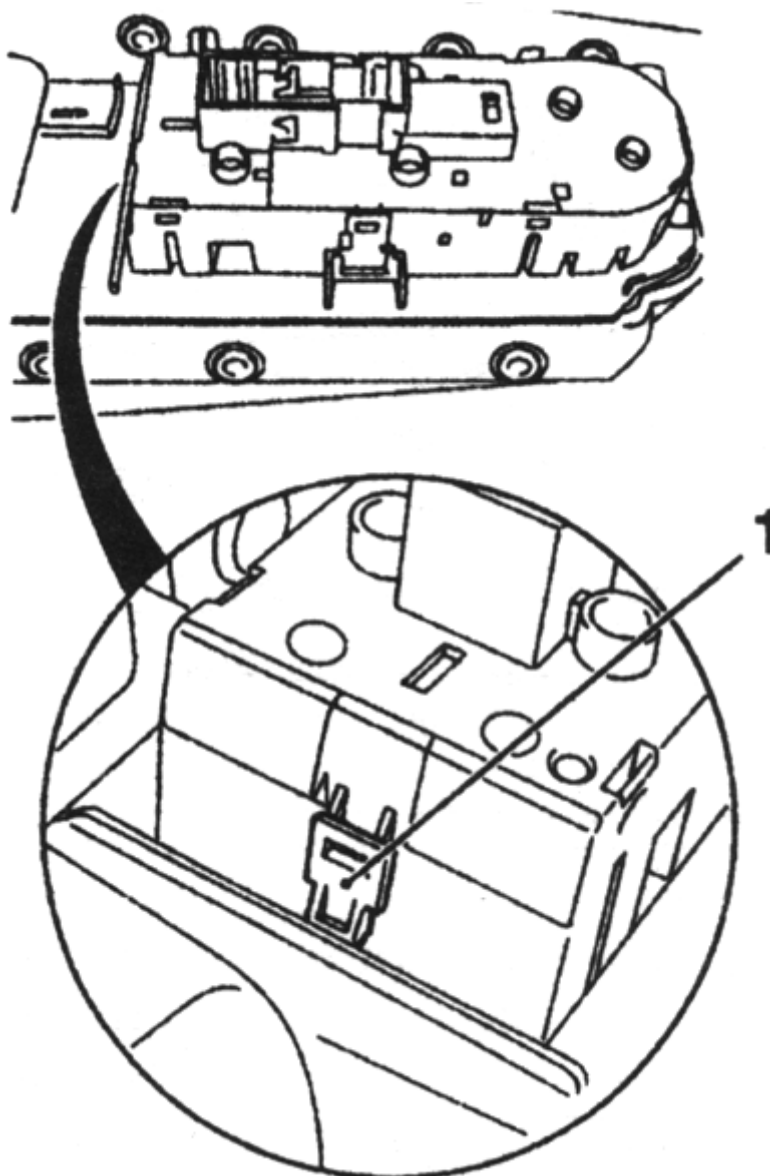


Fig. 7.25. Latch main panel ne-reklyuchateley Management elektroprivo house windows:

1 - lock

Installation is performed in reverse order of removal.

Withdrawal and install electric switches rear windows Doors

Disconnect the wire from the negative terminals of the battery.

Carefully poddente with a screwdriver in the switch arm of the door and wring it out (Figure 7.26).

Remove the switch and disconnected the wiring harness connector from the back of the switch.

Installation is performed in reverse order of removal.

6.27 On-board electrical equipment - Removal and installation of remote control panel switches on the steering wheel

NOTE

When appropriate level com-plektatsii in steering wheel be mounted bodies of distance Management informational Onno - entertainment system.

Disconnect the wire from the negative terminals of the battery.

Turn the steering wheel to the left by 90 ° and remove the fixing screw (Figure 7.27).

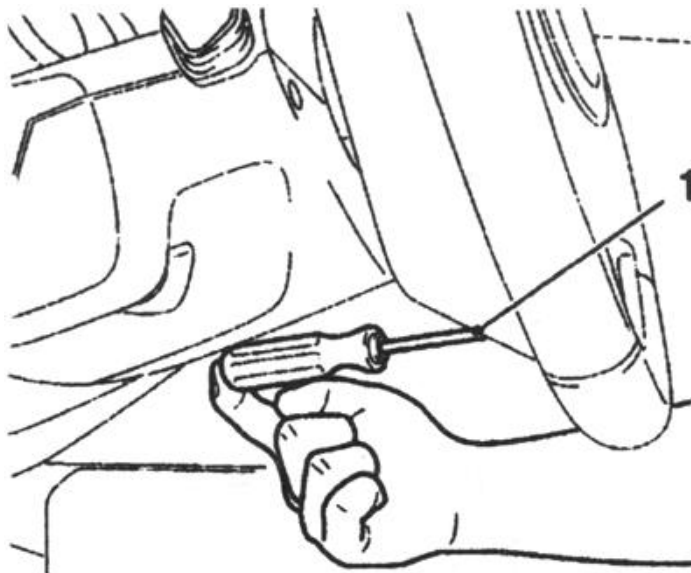


Fig. 7.27. Bolt fixing linings Pan-li switches
Distance swissagency:

1 - bolt

Bring back the steering wheel to its former position and carefully remove the pad panel, steering wheel switches. Separate panel switches on the steering wheel and disconnected the wiring harness connector from the back side panel (Figure 7.28).

Installation is performed in reverse order of removal.

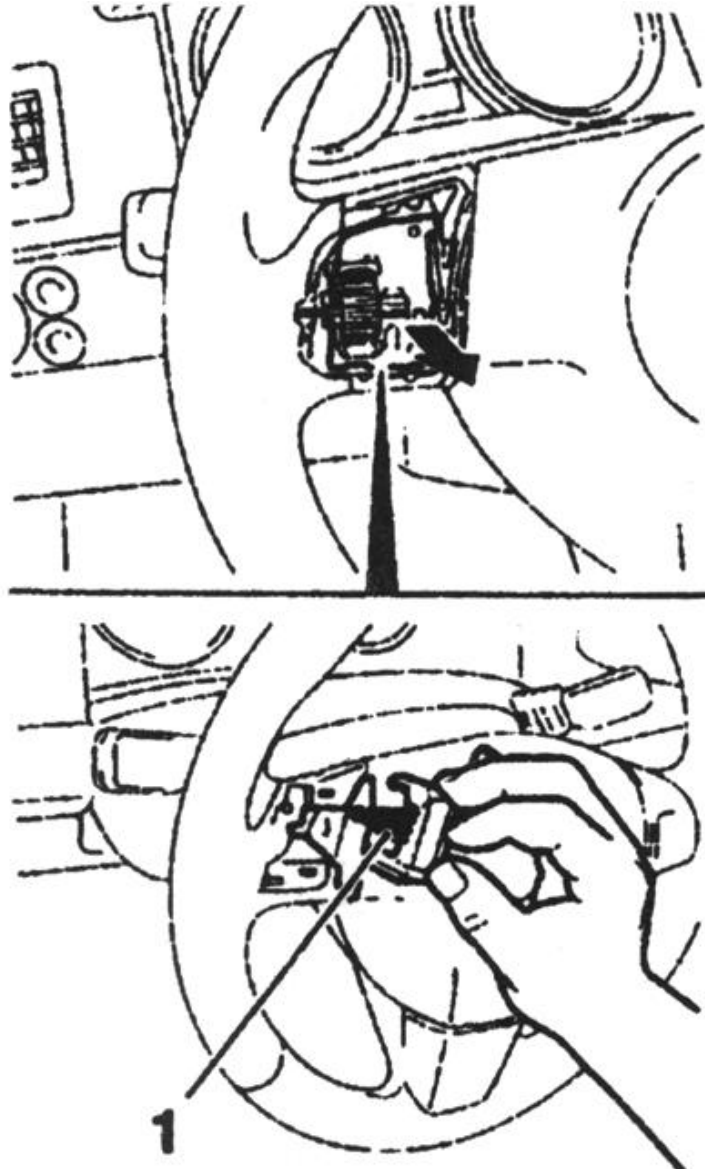


Fig. 7.28. Panel switches long-distance
driving Opel Astra:

1 - Connector wiring

6.28 On-board electrical equipment - Removal and installation of sensor-switch hood (model with anti-theft system)

Disconnect the wire from the negative terminals of the battery.

Open the hood.

Squeeze the latch and remove the sensor-switch from the holder (Figure 7.29).

Disconnected sensor wiring connector.

Installation is performed in reverse order of removal.

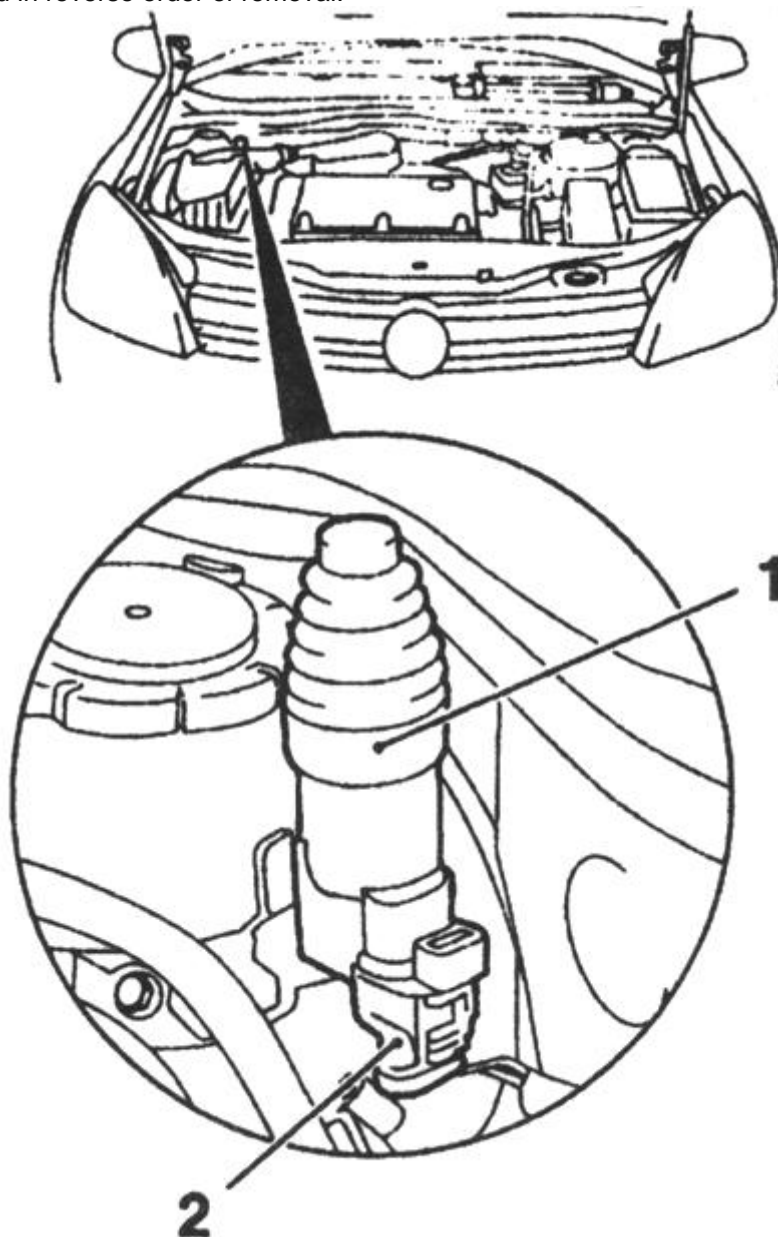


Fig. 7.29. Connector wiring dates Chica - switch bonnet

Car Opel Astra:

1 - connector wiring, 2 - sensor-switch hood

6.29 On-board electrical equipment - Removal and installation of sensor-switch door lock

Disconnect the wire from the negative terminals of the battery.

Remove the two backlight plate.

Remove the back of the door trim.

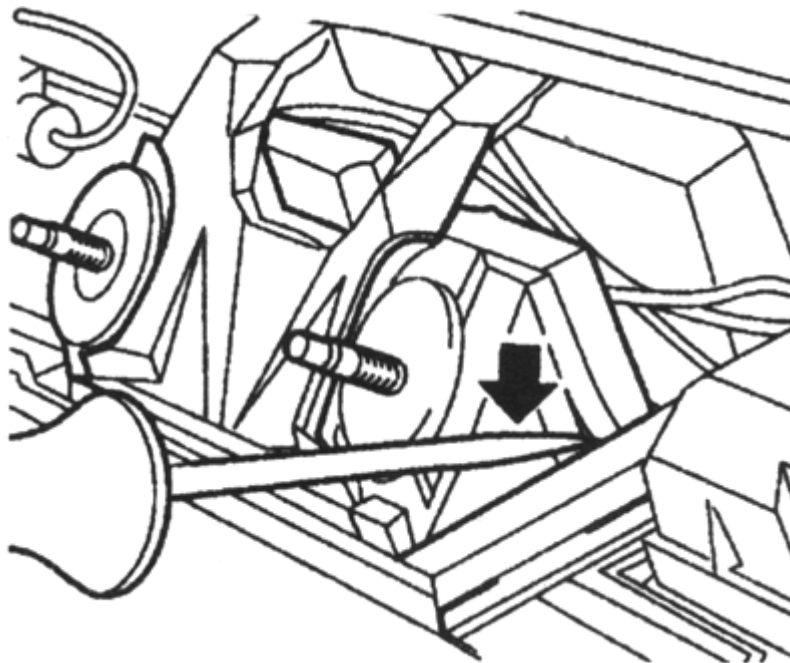
Remove the decorative overlay back of the door.

On the wagon models, and Astra GTC pull the fastening bolts on the sides of the holder of decorative lining.

Use a screwdriver to press the lock and disconnected the wiring harness connector.

Remove it from the holder of the laths together with cable.

2 Squeeze the release and remove the sensor-switch with the cable from the laths (Figure 7.30).



**Fig. 7.30. Withdrawal Sensor - Switch
castle Doors back of**

Installation is performed in reverse order of removal.
Pay attention to the cabling.

6.30 Removal and installation of the loudspeaker

Broadband speakers (front and rear)

NOTE

Loudspeakers enshrined in door assemblies. At models Astra GTC rear speakers fixed on sidewalls baggage th offices.

To access the loudspeaker clear trim / finish of the corresponding door / sidewall.

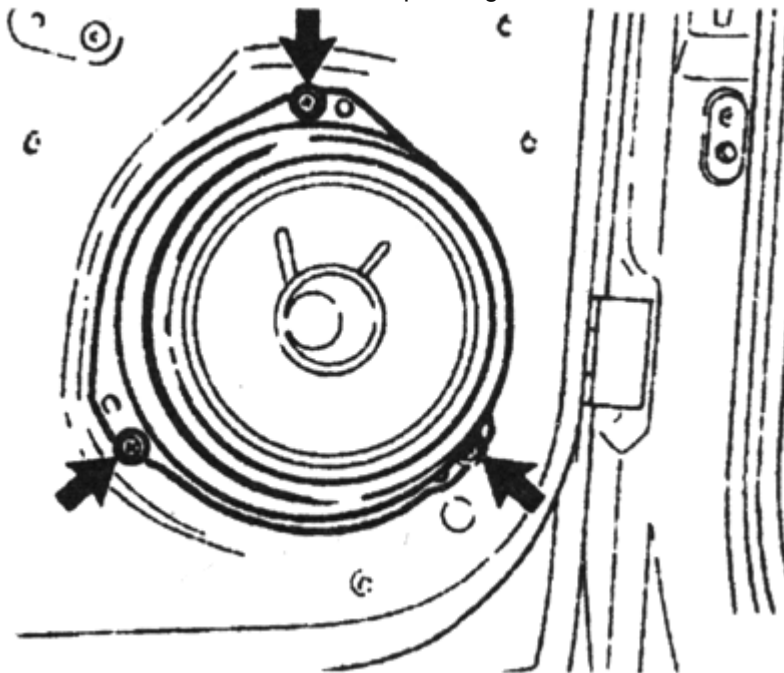


Fig. 7.31. Mounting loudspeaker

Remove the 3 mounting screws and remove the speaker, then disconnected the wiring harness connector (Figure 7.31).

Installation is performed in reverse order of removal.

Front tweeter

Using a plastic wedge separate triangular pad the front door, remove the foam insert.

Disconnected connector wiring Tweeter, press the latch and remove the speaker of the planting slot (Fig. 7.32).

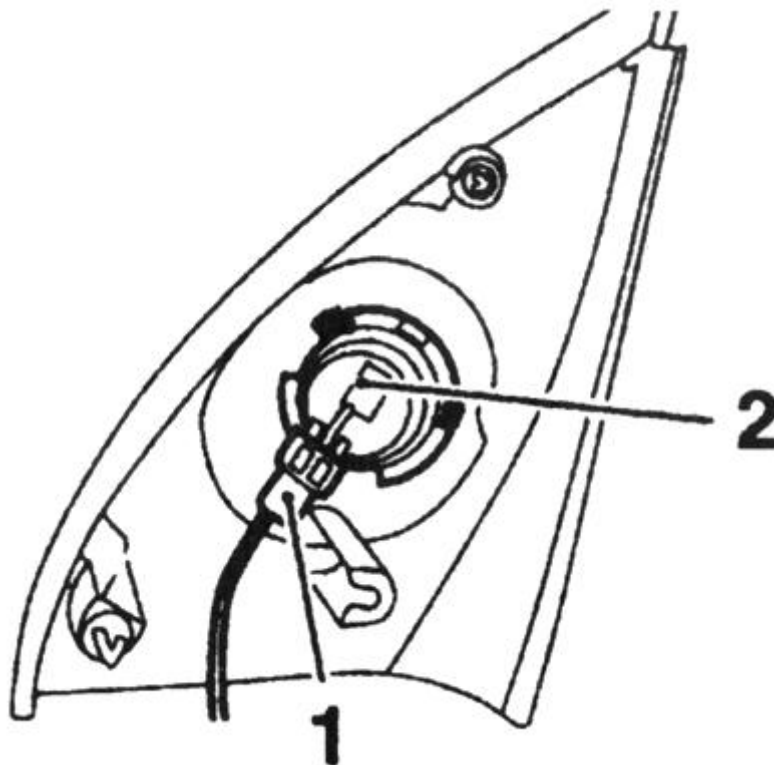


Fig. 7.32. Connector wiring high-frequency loudspeaker:

1 - connector wiring, 2 - speaker

Installation is performed in reverse order of removal.

Loudspeaker on dashboard

Using a plastic wedge poddente and separate the cover from the loudspeaker of the instrument panel (Figure 7.33).

With the appropriate configuration disconnected the wiring connector and remove the sensor of sunlight on the back side of the cover.

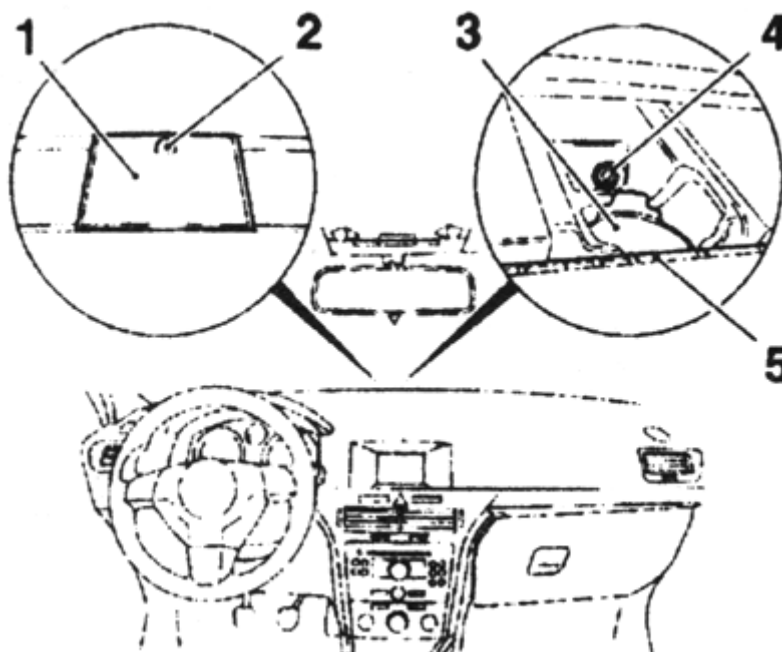


Fig. 7.33. Withdrawal loudspeaker with pa-nonlinear devices:

1 - cover the loudspeaker, 2 - sensor sunlight;

3 - speaker 4 - fixing screw;

5 - Deflection blowing the windscreen

NOTE

Not miss cable in hole pa-nonlinear devices.

Separate deflectors blowing the windscreen of the dashboard and remove the fixing screw located beneath them. Remove the mounting screw, remove the speaker and disconnected the wiring harness connector. Installation is performed in reverse order of removal.

6.31 On-board electrical equipment - Removal and installation of outdoor antenna

Open the back of the door.

Remove with a plastic wedge rear ceiling pad.

Remove the top trim rack C / D (back).

Gently pull down the ceiling panel upholstery.

NOTE

Rear ceiling upholstery attached to Roof with help Velcro.

Disconnected the wiring harness connector from the base of the antenna (Figure 7.34).

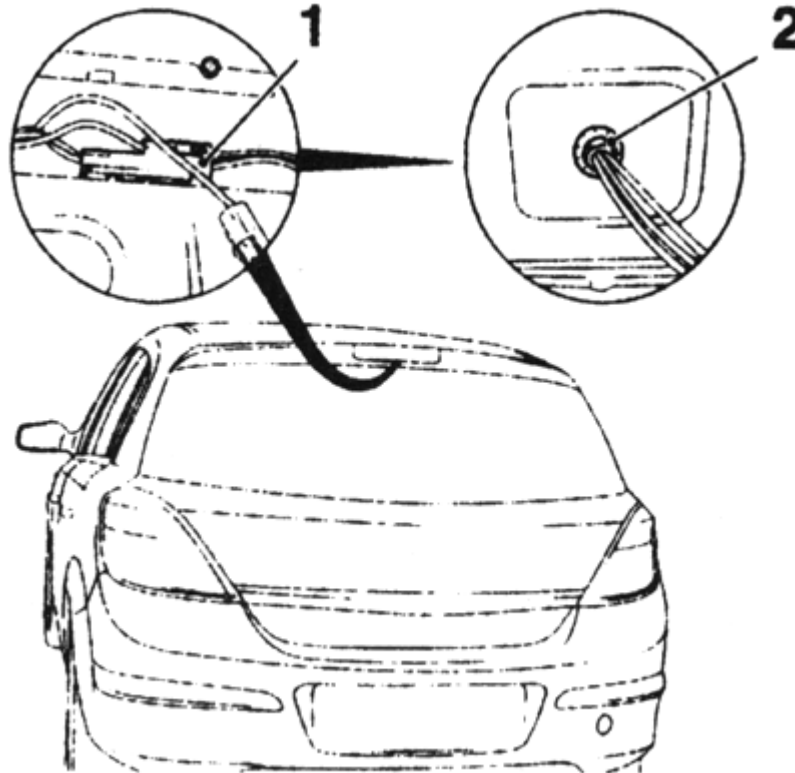


Fig. 7.34. Connector wiring and gai-ka fixing outdoor aerial vehicle Opel Astra:

1 - connector wiring, 2 - nuts

Loosen the lock nuts, disconnect the cable and pull the antenna out of the hole in the roof of the car.

Installation is performed in reverse order of removal.

Tighten the nut fastening the base antenna required moment 5H-m.

7 BODY

7.1 General

Body car carrying four-door Opel Astra, consists of a skeleton and external components. Body structure includes a base, sidewalls, roof and frame parts are connected with each other electric welding (spot, seam, and arc), and is a non-separable design with sufficient stiffness and can carry the car all the units, mounted units body parts and interior details.

The body consists of several parts linked together, forming the whole of the front and rear frame. Parts of the body contribute to achieving the ultimate strength of the body, so supervise welding in progress of repair works.

If during the repair destroyed or damaged factory seal or anti-corrosion coating on the lower parts of the body apply anti-corrosion coating and sealing. When applied to rust on the lower parts of the body apply corrosion-resistant chrome plating or something similar. The use of combined resources is not recommended.

Lower casing gearbox, single steel element that serves to protect the bottom of the gearbox. This coating protects against ingress of small stones, gravel or other objects in the gearbox in normal driving.

NOTICE

Large bodywork repair, as replacement glued wind and ass-it glasses should as usually performed in conditions Station Technical services, where for this there all necessary equipment and devices.

Hinged junctions are side doors, hood, back of the door, front fenders, bumpers and grille. Doors, hood and trunk lid are mounted on the body by hinges. The front wings are attached to the body bolts.

Front and rear bumper are fastened with bolts. Radiator mounted with plastic latches and screws.

Windshield three-layer type "Triplex". Glass doors, side and rear tempered glass. The windmill, rear and side windows are pasted in the window openings of the body.

The front seats are separate, with the backrest inclination adjustment mechanism and displacement in the longitudinal direction, with easily removable head restraints, height-adjustable. Rear seat with integral cushion and backrest, split folding armrests into two parts.

The front and rear outboard seat belts inertia, and the rear middle passenger's lap belt NON-INERTIAL.

In-car cigarette lighter installed, front and rear ashtrays, sun visors, heater, mirrors, handrails. Under the driver's seat provides attachment for a fire extinguisher.

The car is equipped with front and rear eyelets for towing.

Office ventilation and heating the interior is carried out in automatic mode controller. If the car is equipped with air conditioning system, the controller also controls the microclimate in the cabin in the automatic mode.

7.2 Central and door locks

Lock the doors and other units car Opel Astra done by the executive mechanisms operating on-board network. Central locking of doors includes separate locking modules mounted on a common bracket in the door.

The central module is installed at the bottom front of the driver's seat in the E-box. In order to dismantle it to take off his left pad to raise the floor and upholstery.

Handles all the doors are removed the same way. Ahead of the handle is mounted a cylinder lock. On vehicles with remote-controlled lock cylinder is installed only in the driver's door, the door of the passenger instead of the cylinder cap is.

In order to remove the lock cylinder to reduce the bracket with all the elements (lock-in speaker, a central locking mechanism and window openers).

7.3 Removal and installation of body linings (moldings)

Thresholds for bumpers

NOTE

Moldings anterior bumper you are as element total on-stack bumper and removed pair, those with it.

To remove the rear bumper molding, you must first remove foam insert pads from the rear bumper. Squeeze the latches from the back of the bumper cover and remove the pad (Fig. 8.1).

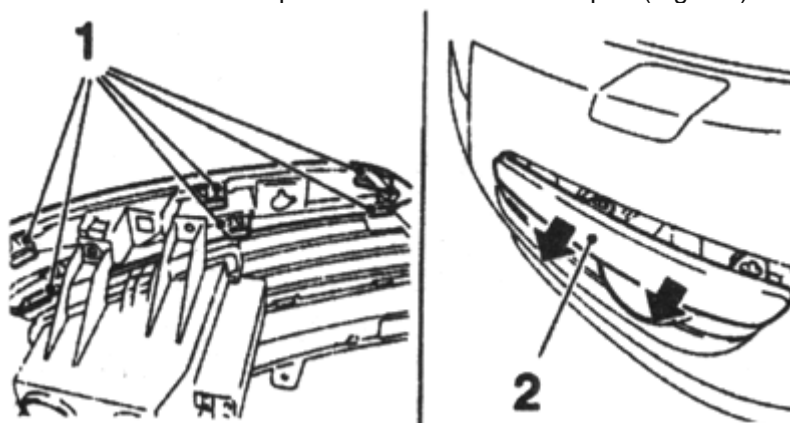


Fig. 8.1. For withdrawal lining efforts should be overcome latches on Feedback Stora not cover rear Bumper:

1 - latches, 2 - lining

Installation is performed in reverse order of removal.

7.4 Decorative overlay on the back of the door

Disconnect the wire from the negative terminals of the battery.

Remove the door trim back of

Disconnected electrical connector near the back of the door with a decorative cover plate.

Loosen nuts and remove the laths (Figure 8.2).

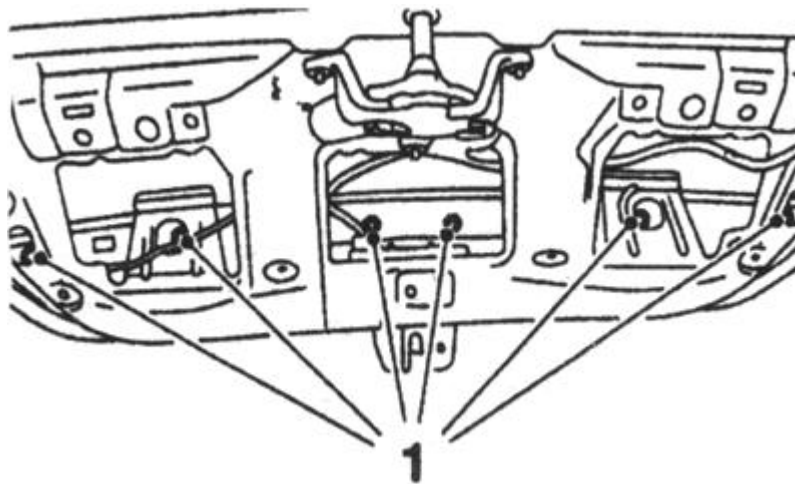


Fig. 8.2. Nuts decorative lining the back of the door:

1 - Nuts

Installation is performed in reverse order of removal.

NOTE

Central studs ornamental-Term strips at Installation additionally lubricated sealant.

7.5 Removing and installing fairing lattice

Remove the wiper levers.

Disconnect and remove the rear engine compartment bulkhead rubber seal.

Lift the grate of the fairing of the rear engine compartment bulkhead.

Inside wring 5 internal fixation devices (Fig. 8.3).

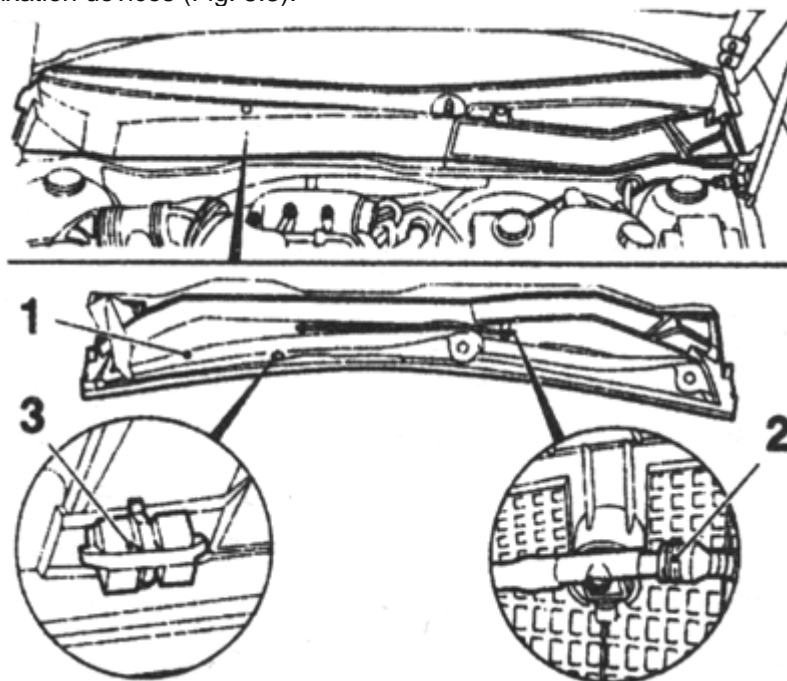


Fig. 8.3. Fixings fixing lattice fairing:

1 - fairing, 2 - clamps, 3 - hose washers

On the back of the grid disconnect the hose washers.

Installation is performed in reverse order of removal.

7.6 Removal and installation of protection wheel arches

Remove the appropriate wheel.

To remove the front wheel arch protection remove the 2 fixing screws, remove the spacers 8 rivets, and on the back of the arch - 2 fixing screws and 2 lock nuts and remove the protection (Fig. 8.4).

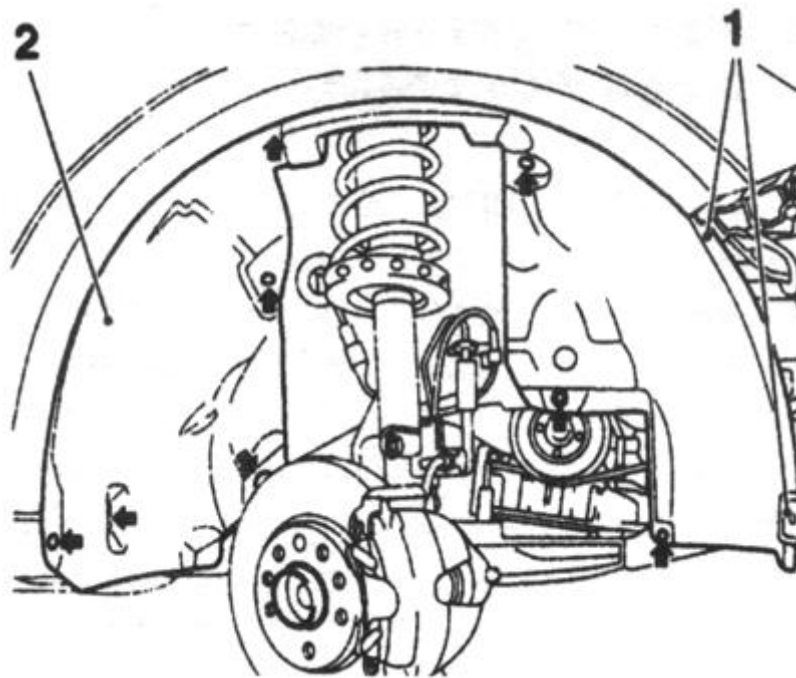


Fig. 8.4. Mounting protection arch before-it Wheels - Arrow given spacing-WIDE rivets arch:

1 - mounting screws and 2 - protection of the arch

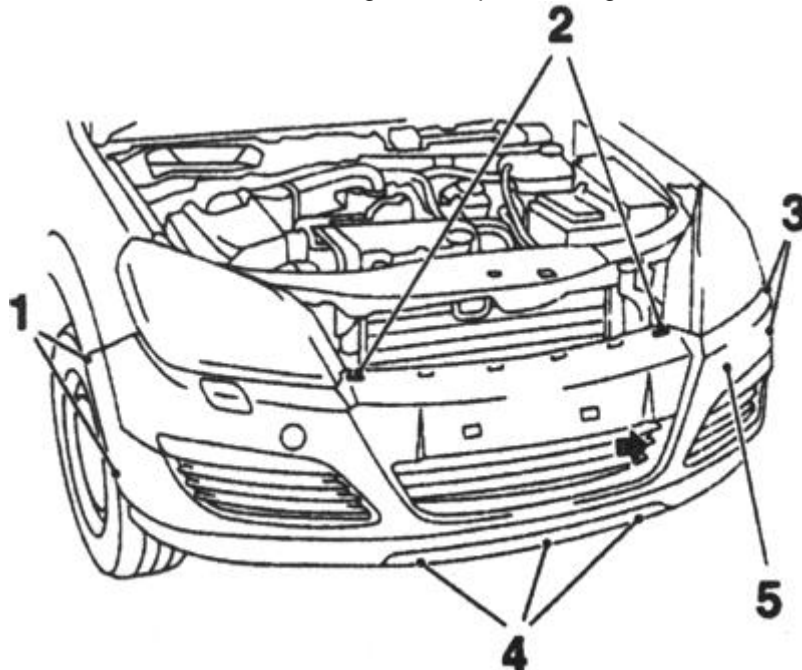
Installation is performed in reverse order of removal.

7.7 Removing and installing the front bumper / bumper moldings

Remove the decorative grille.

Remove the mounting pads front bumper (see Figure 8.5).

Release the temperature sensor of the holder on the grille bumper moldings.



**Fig. 8.5. Mounting pads front bumper
Car Opel Astra:**

1,3 - bolts fastening; 2,4 - locks, 5 - lining

With proper configuration, disconnect the wiring fog lamps, and headlamp washer hose from the tank with the liquid for washing of glass-Collect spilled liquid.

Click on the side fasten bumper pads in the direction of up and release the pad from the side rails (see Figure 8.6).

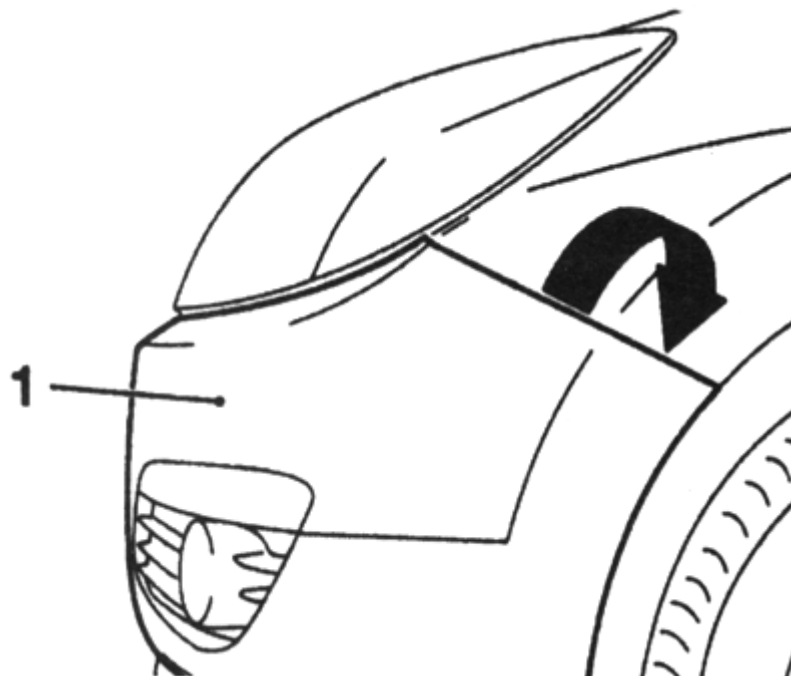


Fig. 8.6. Push on side fast on-stack anterior bumper and will free-te pad of side guides:

1 - lining

NOTE

Be careful - Not damage the mounting lining bumper.

Release the bumper pad of the front guide, located on the beam between the bumper lights, and with the help of an assistant remove the pad.

Remove the headlamp.

Remove the side support pads bumper (see Figure 8.7).

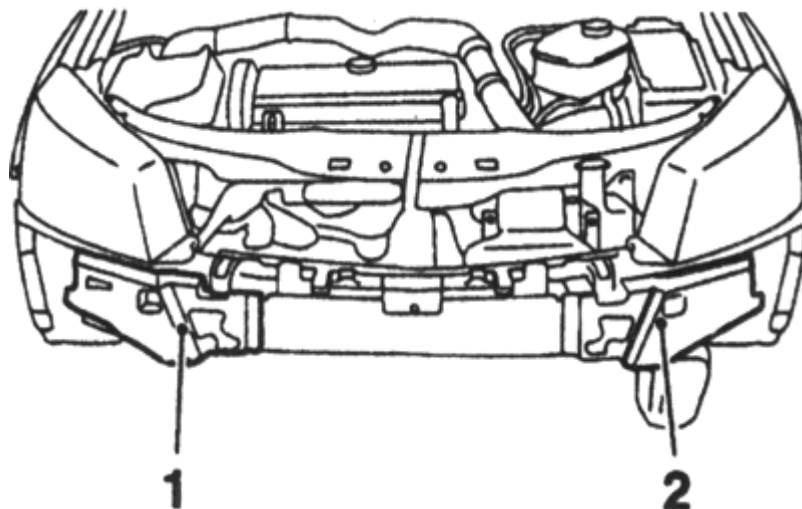


Fig. 8.7. Side support lining bumper

Remove the heads of the five hidden rivets, unbolt rivets and remove the front bumper beam to the guide (Fig. 8.8).

Cut the mounting wiring and remove the tourniquet from the bumper beam.

Remove the fixing screw and remove the bumper beam tank with liquid for washing of glass (Fig. 8.9).

Loosen the 4 nuts, remove the mounting bolts and remove the beam from the frame.

When you install a beam to use the new mounting bolts and nuts. Flange beams bumper after tightening the bolts for protection should be sealed with wax.

Further installation is in reverse order of removal. To mount the front rail using new rivets, and the slide should be displayed on the center hole.

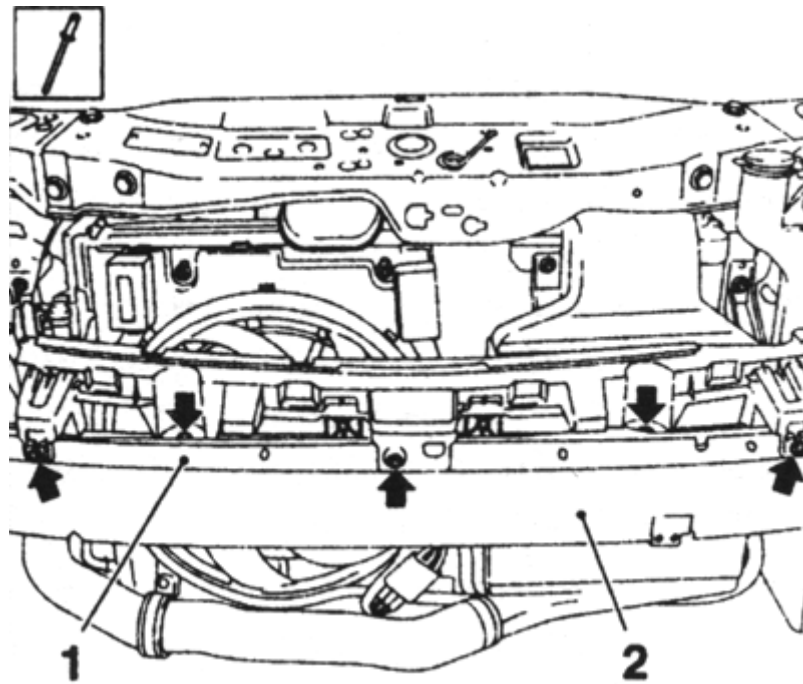


Fig. 8.8. Secret rivets (indicated by arrows) attachment front direction rectifying to beam anterior Bumper:

- 1 - mount the front rail;
- 2 - front bumper

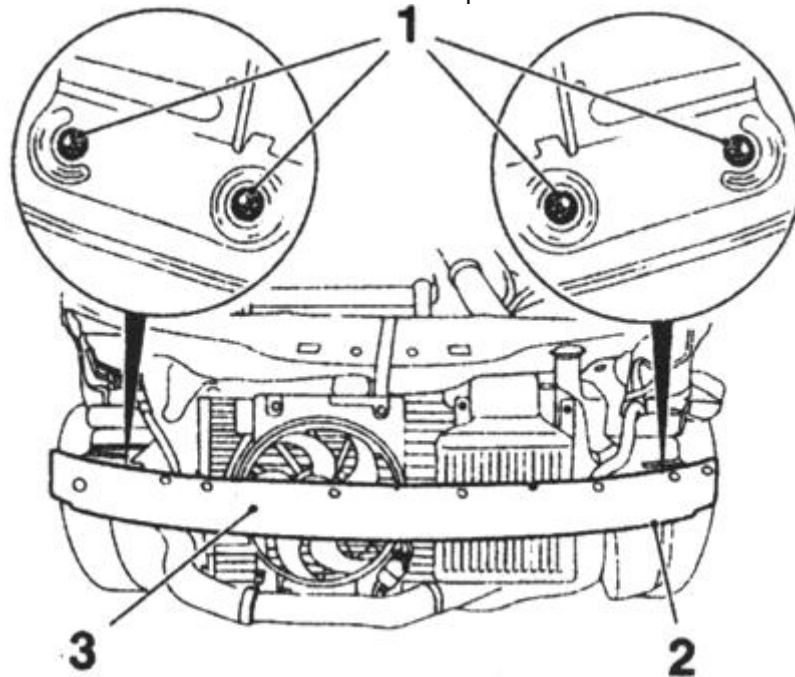


Fig. 8.9. Bolts fixing beam before-it Bumper:

- 1 - bolts, 2 - place the fluid retention reservoir for washing of glasses;
- 3 - the front bumper beam

7.8 Removal and installation of decorative radiator grille

Open the hood and remove the 4 spacers from the rivet plate holder lock the hood.
 B. Squeeze the retainers and remove the grille from the bumper pads (Figure 8.10).
 Installation is performed in reverse order of removal.

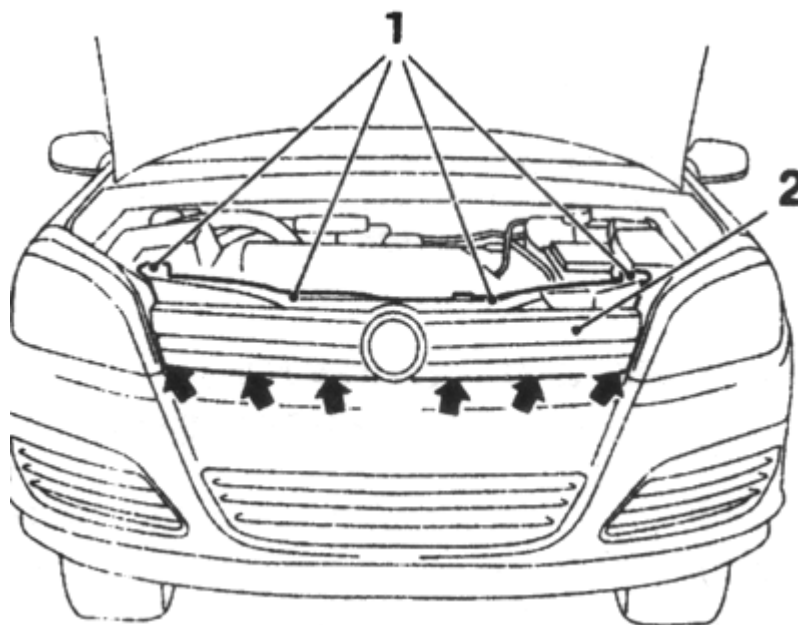


Fig. 8.10. Rivets fixing decorative tive lattice Radiator
(Arrows indicate place location fixative-ing):
 1 - rivet fastening, 2 - decorative grille

7.9 Removal and installation of front wings

Remove the lamp, side repeater flashers.

Remove the protection of wheel arches.

Remove the pad front bumper.

Upon removal of the right wing on gasoline models, release nuts, remove the carbon adsorber system EVAR take him to the side.

Remove the isolation of the wing (Figure 8.11).

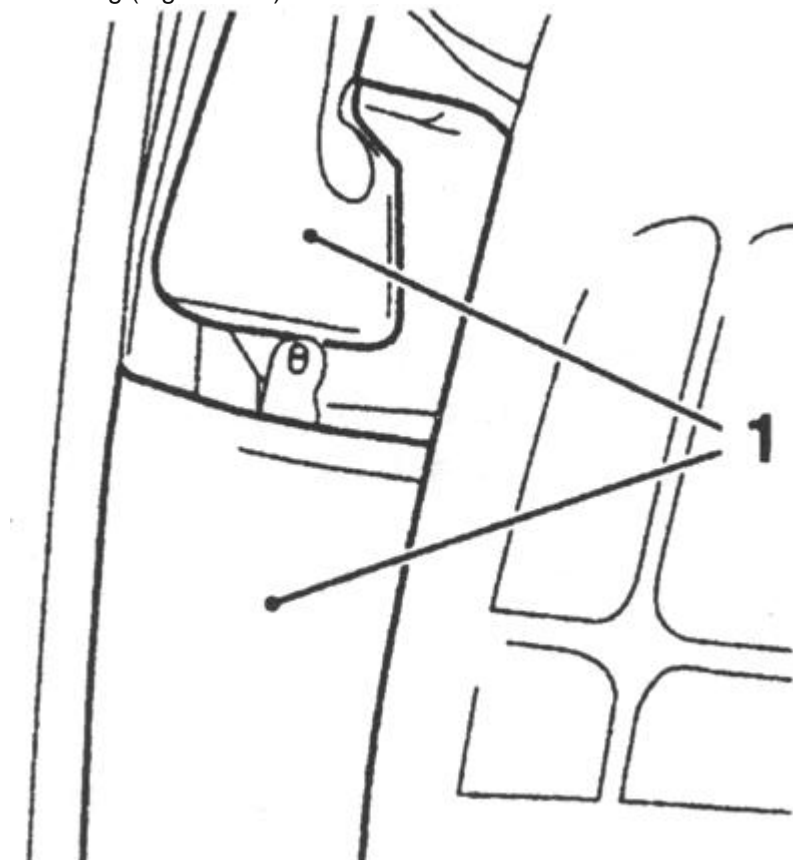


Fig. 8.11. Isolation wing:
 1 - isolation

If the removal of the wing is made with a view to its eventual replacement, must be removed from his side the guide (Figure 8.12).

Rassverlite heads of the three rivets and rivet vybeye of planting holes.

Remove with a plastic wedge pad wing of the windshield, then remove the tape from the frame (Figure 8.13).

Stick the edge of the wing tape.

Open the front door, remove the 8 fixing screws and remove the wing (Figure 8.14).

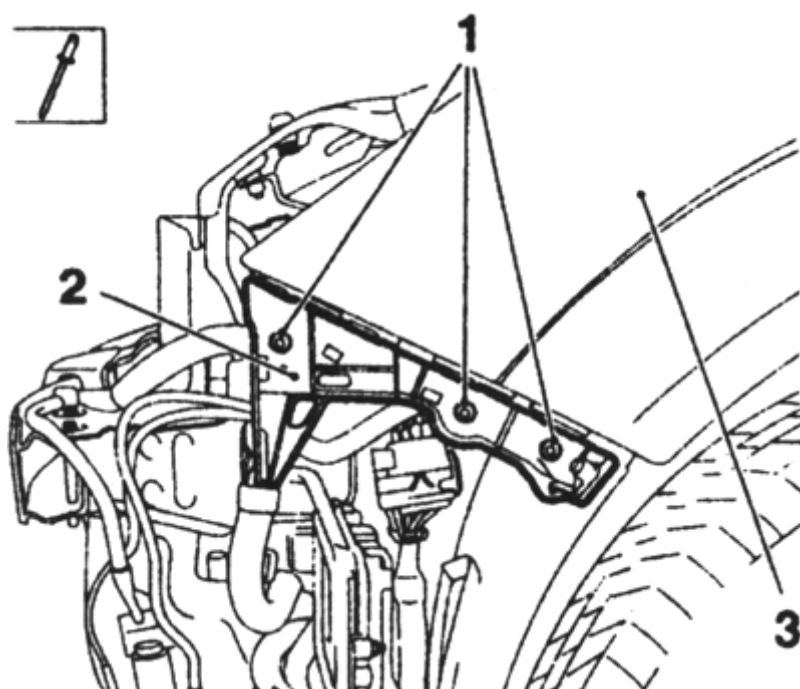


Fig. 8.12. Rivets side guide front wing:

1 - rivets, 2 - side slide 3 - wing

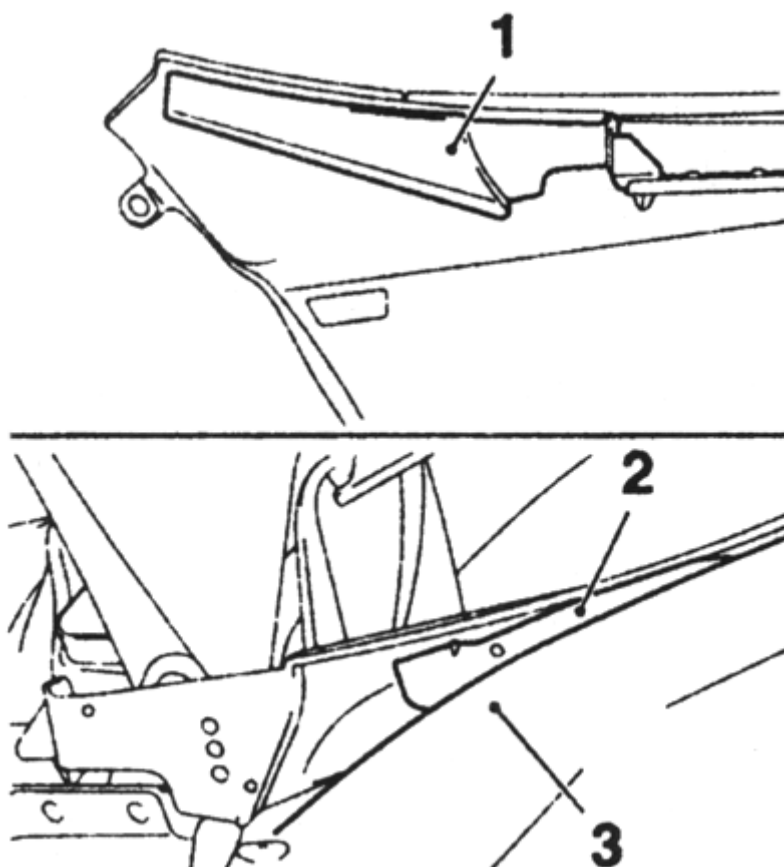


Fig. 8.13. Tape for installation lining front wing on the frame of the windscreen:

1 - tape 2 - lining, 3 - frame of the windscreen

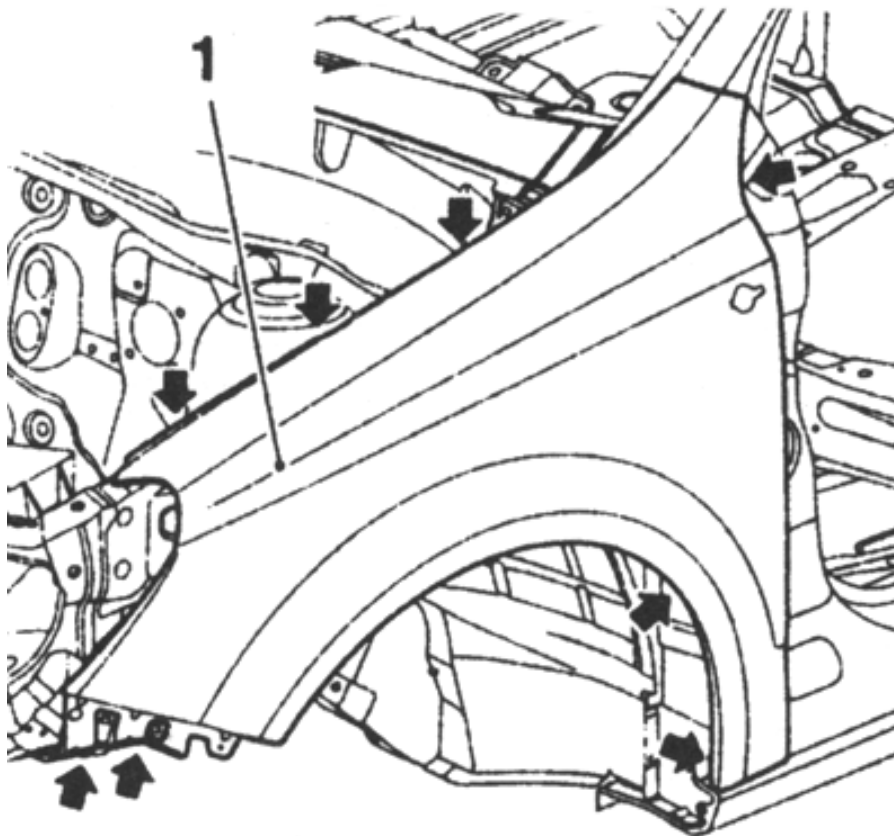


Fig. 8.14. Bolts (indicated arrows) fixing anterior wing

NOTE

When replacement wing un with hundred-cerned and set on new clamp-ing nut fixing lights, sealing nenie bonnet and pad wing.

When installing a new wing of the stick, a length of 5 cm, two-sided adhesive tape on the pad of the wing.

Keep a pad under the windscreen sealant and glue to the windscreen.

Cover the surface with a special varnish those new wing, which after installation will be inaccessible.

Clean the mating surface of the wing, where necessary to align them.

Install the wing and set a uniform gap between adjacent elements of the bodywork.

Fasten the wing onto the pad, replace the bolts.

Installation is performed in reverse order of removal.

7.10 Removal, installation and adjustment of the hood

Withdrawal

Open the hood and disconnected from the gas-filled telescope focus, for which little lift a screwdriver locking bracket and bring out a rack from the top of the spherical bearing.

To install circle marker position hinges on the bonnet.

Remove the 4 fixing screws (for 2 on each side), then with the help of an assistant remove the hood and set it aside.

Setting

With the help of an assistant, install the hood, align the hinge plates on the inflicted in the process of dismantling tags, then tighten the mounting bolts by hand.

Close the hood and align it in the Touring Car doorway.

At the end of adjustment tighten the bolts and secure the upper end of gas-filled lock on the bonnet.

7.11 Adjustable hood clearances

Loosen the bolts fastening the bonnet (if before it was carried out to remove it).

Close the hood and make sure that the gaps pair it with the right and left wings are the same, if necessary, make appropriate adjustments, then tighten the bolts fastening the bonnet with the required effort.

By rotation of the two damping stops, mounted on a bracket holder lock the hood, adjust the height of the front edge of the latter. The front edge of the hood must rise above the surface of the wings of no more than 2 mm.

Check and adjust the hood latch lock (see below), then remove the rubber emphasis on the 1 rotation. Deviation from the provisions of the closed hood "flush with the surface of the wings" should be not more than 1 mm thick.

7.12 Removing and installing the cable drive release latch lock hood

Open the hood, remove the screws and remove the cable holder (Figure 8.15).

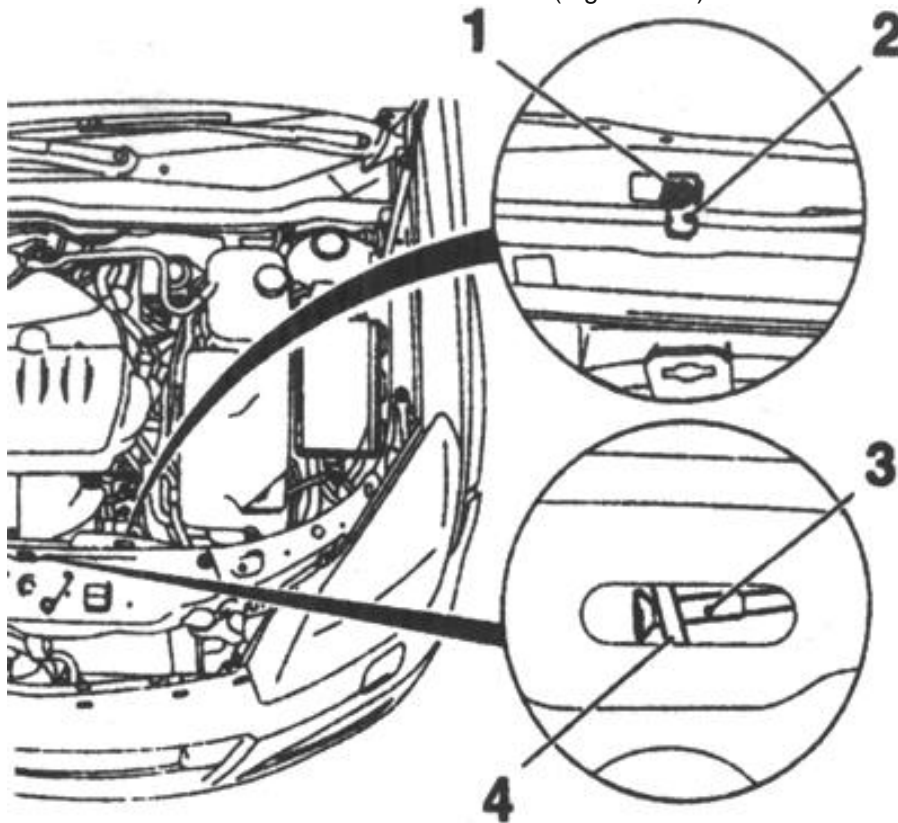


Fig. 8.15. Mounting drive cable to castle hood:

1 - attachment bolt, 2 - cable holder;
3 - drive cable, 4 - locking bonnet

Disconnect the drive cable from the lock hood.

Remove the cowl grille.

Remove from the back of the engine compartment rubber sleeve, through which the threaded cable drive.

Remove the left lower decorative cover the instrument panel.

Pull the handle of the lever releasing the hood latch lock on the left under the dashboard and release the cable from the holder, then Pull the cord through the salon and disconnect from the lever.

When you install it thread the rope through the hole in the back of the engine compartment, carefully not bend the cable, to lay him to lock the hood, connect and adjust - the tip should be installed at the site of attachment without backlash.

Installation is performed in reverse order of removal.

Before closing the hood test the cable.

7.13 Removal, installation and adjustment of the back of the door

Disconnect the wire from the negative terminals of the battery.

Open the door and remove the back of the shelf in trunk (with appropriate configuration).

Remove the door trim from the back of the window frame and seal the edge of the back of the door with tape.

Disconnected wiring connector back of the door and disconnect the hose washer rear window (see conj. Illustration).

Pull the wiring from the back of the door (Fig. 8.16).

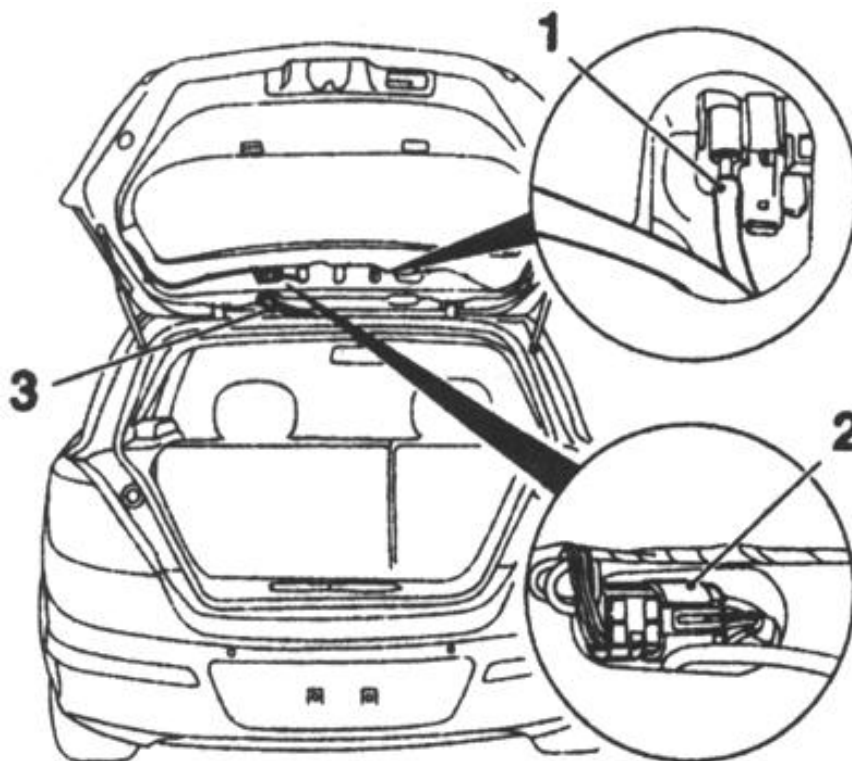


Fig. 8.16. Inlet line Doors ass-ka:

1 - hose washer rear window, 2 - connector wiring;
3 - rubber duster wiring

NOTE

For facilitate subsequent Mon-tazha secure on end wire cable, which after pull wires will in Doors back of the cart.

Few small screwdriver, lift the locking bracket and disconnect the gas-filled alternately rests on the upper spherical bearings back of the door.

Remove the clamps (see illustration 14.6) vybeyte axial finger loops and with the help of an assistant remove the back of the door (Fig. 8.17).

Installation is performed in reverse order of removal. After installing the axial fingers of the hinge pin to close the back of the door and make an adjustment.

Adjustment

Remove the lining of the back of the door threshold.

Remove the 2 screws mounting bracket lock on the bottom edge of the back of the door frame and remove the bracket.

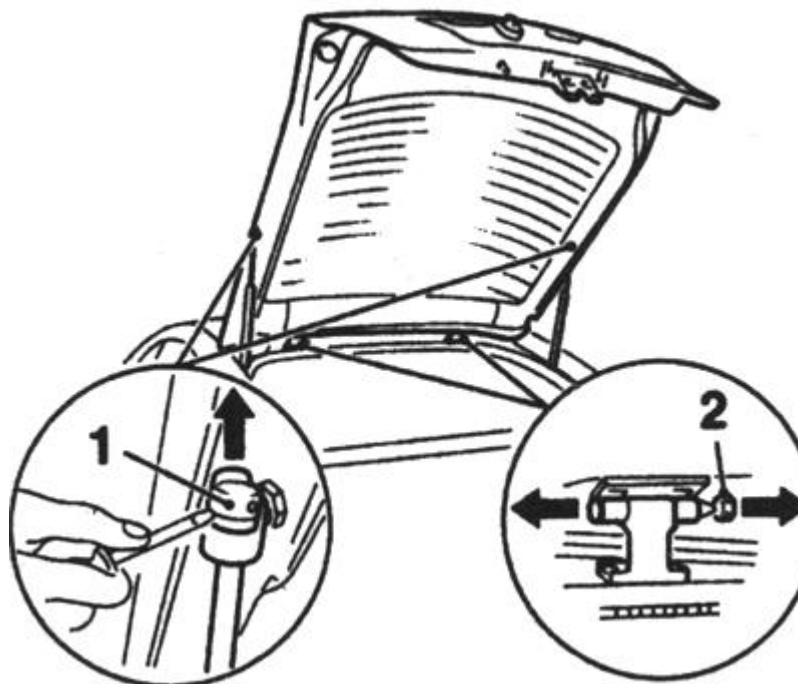


Fig. 8.17. Mounting Doors back of:

1 - Lock clamp a gas-filled counters;
2 - retainer axis of the hinge

If necessary, remove the trim at the top of the rear rack of the vehicle (C or D - depending on model). Gently pull down the ceiling panel upholstery and loosen the screws holding the hinge pin.

NOTE

Rear ceiling upholstery attached to Roof with help Velcro.

Close the door and check the back of the uniformity of the gap between adjacent elements of the bodywork.

The back of the door is adjusted correctly when in the closed position around the perimeter is a uniform gap, and the door is flush with the surrounding bodywork surfaces.

If necessary, adjust gap is shifting back of the door in the appropriate direction.

To adjust the depth of planting the back of the door in the doorway to release the rubber dampers.

Turning to the clips on the angle from 60 to 80 ° counterclockwise. Then install the dampers on both sides so that the back of the door in the closed position freely adjoined to them. Note: To facilitate the adjustment apply to the doughy mass dampers - for a spot on the mass determine if adjacent door.

After setting back the catch to its original position - Installation labels must coincide.

Tighten the bolts fastening the hinge pin with the required effort.

Replace the back of the bracket of the door and tighten its mounting screws by hand. Gently close the door to the back of: clamp will lock into position. Open the door and tighten the bolts fastening brackets with the required effort.

Several times, close and open the door and make sure the back of the correctness of its control and correct functioning of the lock, if necessary, repeat adjustment.

Check the back of the door trim.

7.14 Removal and installation of door lining the back of

Open the back of the door, remove the shelf in trunk and remove the retention cables shelves of upholstery window frame.

Enter under the upholstery of the frame window plastic wedge, press 4 release and separate the trim from the window frame first with one, and then on the other side (Figure 8.18).

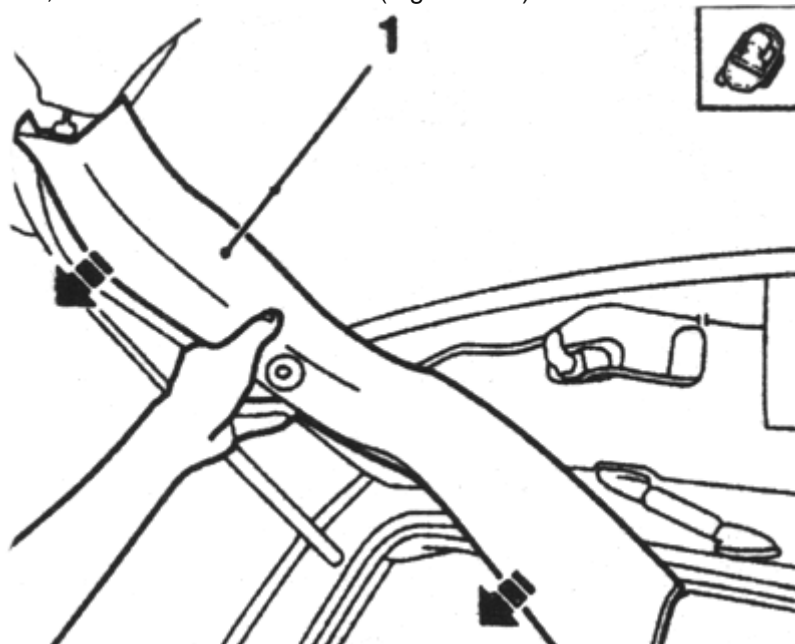


Fig. 8.18. Withdrawal Upholstery frame windows Two-ri back of:
1 - upholstery frame window

Remove the back of the pad lock the doors.

Remove the clamp and remove the fixing screw in the frame of a door handle (Figure 8.19).

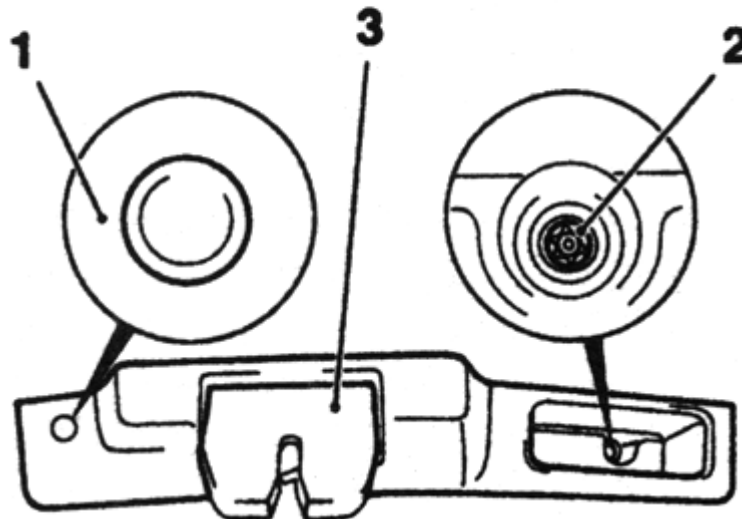


Fig. 8.19. Latch and screw fixing on-stack castle Doors back of:

1 - lock, 2 - pin 3 - lining the back of the door lock

Enter under the plastic trim wedge or a lever, in turn, release 8 retainers and remove the door trim. Installation is performed in reverse order of removal. Replace all damaged locks with new ones.

7.15 Removal and installation of the door back of

Disconnect the wire from the negative terminals of the battery.

Remove the lower door trim and the back of the pad lock the door.

Disconnected electrical connector back of the door lock.

Remove the 3 mounting bolts and remove the lock from the back of the door (Fig. 8.20).

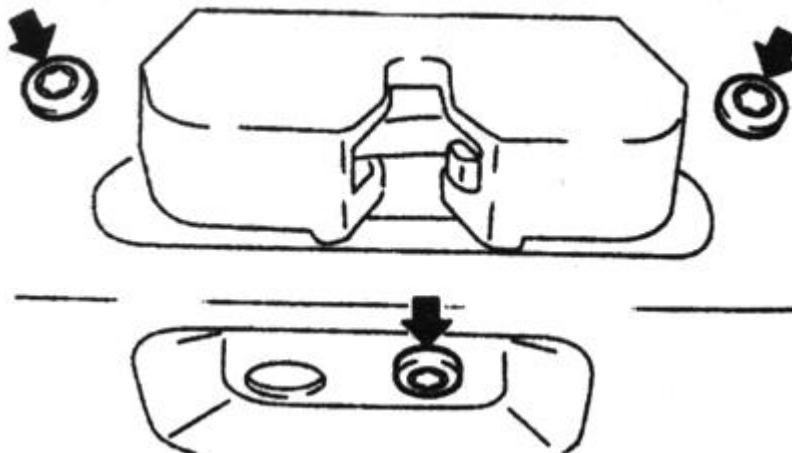


Fig. 8.20. Bolts (indicated arrows) attachment castle Doors back of

Installation is performed in reverse order of removal.

After installation, check the correct functioning of the locking mechanism at the back of the door is open.

7.16 Removal, installation and adjustment of the side doors

Disconnect the wire from the negative terminals of the battery.

Open the door and door seal edges with tape.

Remove the mounting bolt and disconnect the arrester from the door bodywork Stoics.

For disconnecting the wiring harness connector front door pull the locking bar of red, while turning the socket counter-clockwise, and on the connector back door push the locking bar is blue.

Remove the rubber caps on the door hinge, with the help of an assistant vybeyte axial fingers and remove the door hinges.

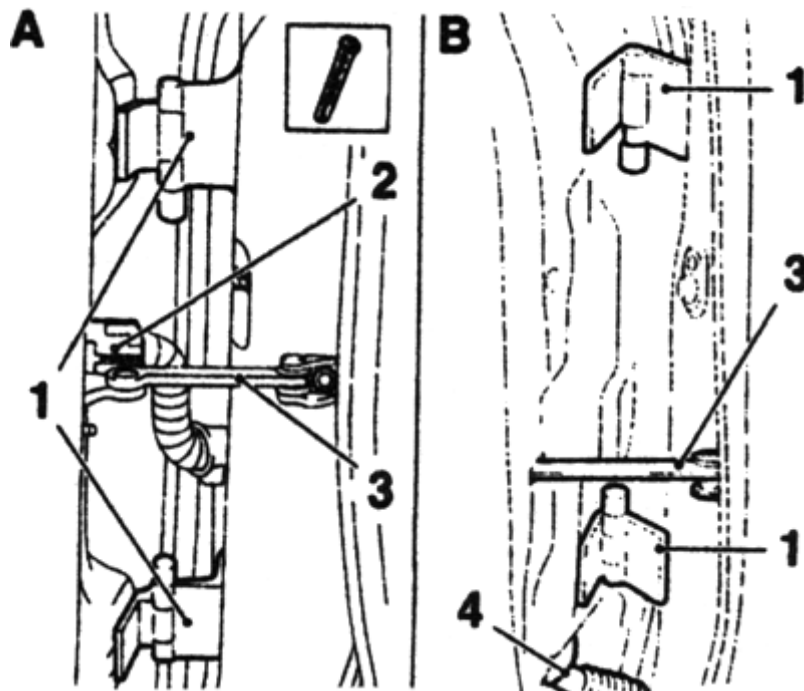


Fig. 8.21. Mounting side Doors:

A - Front side door; B - rear side door;

1 - hinges, 2, 4 - electrical connectors;

3 - constraints of the door

NOTE

Axial fingers door loops must stand out with end of co-tory was dressed cap.

Installation is performed in reverse order of removal.

Before installing grease axial fingers hinge waterproof grease. After installing the door hinges on the adjustment made accordingly (see below). Tighten the bolts fastening the hinge pin with the desired momentum.

Remove the bracket lock.

Align door Touring Car aperture is accomplished by podgibaniya door hinges. This operation requires a certain experience - if not sure of yourself, contact the service station.

Close the door and check the gap between adjacent elements of the bodywork. The back of the door is adjusted correctly when in the closed position around the perimeter is a uniform gap, and the door is flush with the surrounding bodywork surfaces

If necessary, adjust the door. The front edge of the rear door may be deeper than the trailing edge of the front door no more than 1 mm.

Replace the bracket lock side door and tighten its mounting screws by hand. Gently close the side door, and the clamp will lock into position. Open the door and tighten the bolts fastening the bracket.

Several times, close and open the door, check its position and the ease of opening / closing, if necessary, repeat adjustment, and repair damage to the coating, caused by podgibaniya loops.

7.17 Removing and installing lock side doors

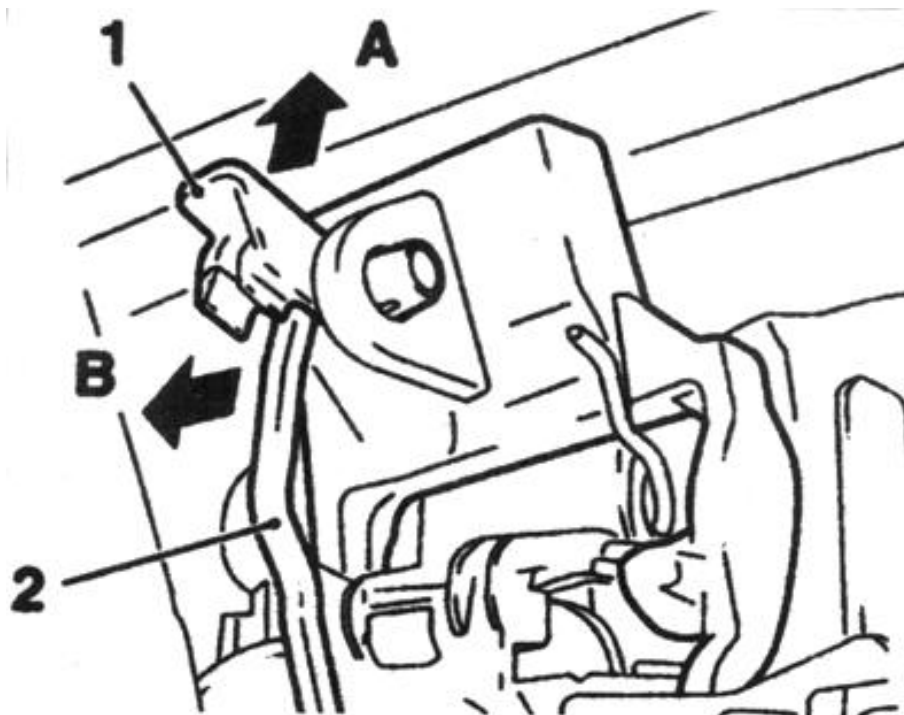
Disconnect the wire from the negative terminals of the battery.

Remove the door trim.

At the front door clear the 2 fastening at the back of the door frame.

Remove the back of the insulation film, disconnected the wiring connector lock.

Take up locking bracket and disconnect the door lock from the thrust bearing (Fig. 8.22).



**Fig. 8.22. Disconnecting traction door lock
(On example castle back side door):**

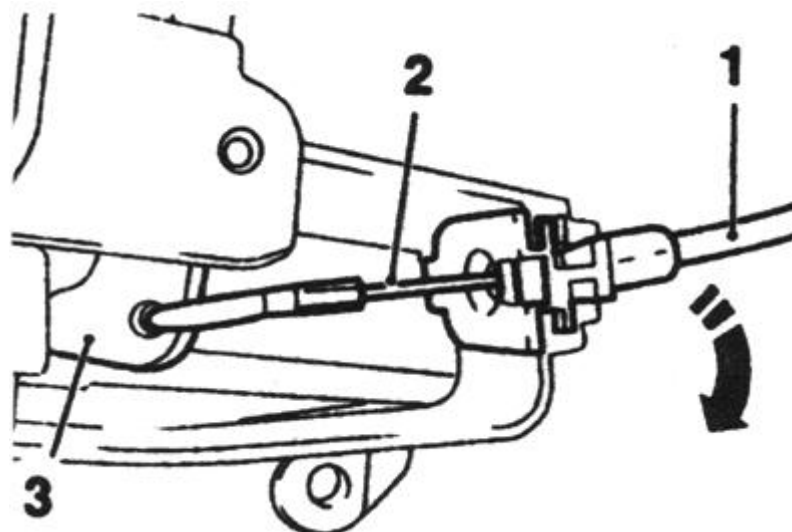
1 - Lock clamp, 2-pull door lock;
3 - lining the back of the door lock

Remove the 3 mounting bolts on the rear end wall and separate the door lock from the door frame.

At the front door, disconnect traction cylinder door locks.

Remove the lock from the frame.

Release the flexible pull the holder of the door lock and remove the core thrust of the rotary lever locking button (Figure 8.23).



**Fig. 8.23. The core flexible traction to a turning
lever HGS button:**

1 - a flexible rod, 2 - core, 3 - turning the lever

Installation is performed in reverse order of removal.

Do not forget to replace the liner. Do not shut the door, test the locking mechanism.

7.18 Removal and installation of exterior side door handles

Open the door.

On models equipped with the system Open & Start, remove the door trim and disconnected the wiring connector automatic recognition.

Using a plastic wedge remove the plug holes on the rear end wall of the door, pull the outside handle of the door and turn the locking screw counterclockwise until it stops - handle should fix dragged into position (Fig. 8.24).

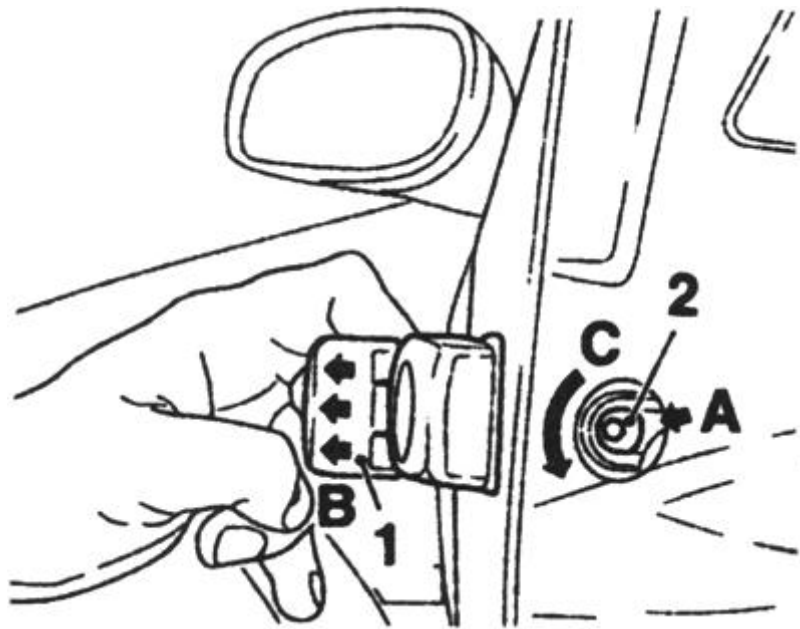


Fig. 8.24. Commit outer pen in dragged position (arrows B):

1 - outdoor pen, 2 - core, 3 - locking bolt

Remove the key cylinder with the body of the door.

NOTE

On front Passenger and posterior them side doorway cylinder lock it.

The order lifting the door handle is shown in Figure 8.25.

Installation is performed in reverse order of removal. The locking bolt to rotate in a clockwise direction, with the need to hold in the situation dragged outside door handle and door lock housing from being rotated.

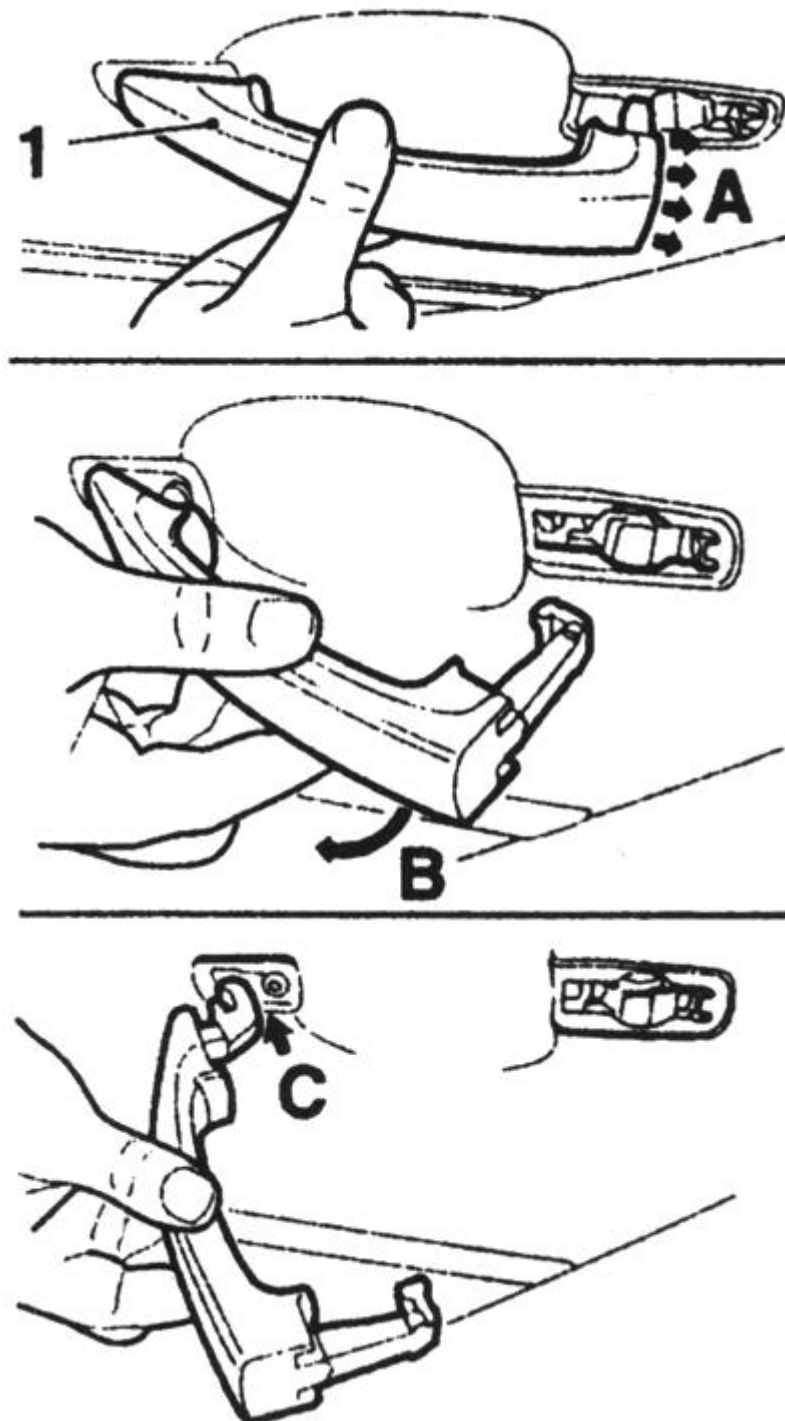


Fig. 8.25. Removing the outer door handle:
1 - outdoor pen

7.19 Removing and installation of the base outside door handles

Remove the outer door handle.

Remove the door trim.

At the front door clear the 2 attachment in the back of the door frame.

Remove the back of the insulating film.

Remove the 5-speed propeller, located outside the front door handle anvil.

Remove the thrust of the door from a support bracket and remove the bracket from the door assembly (Figure 8.26).

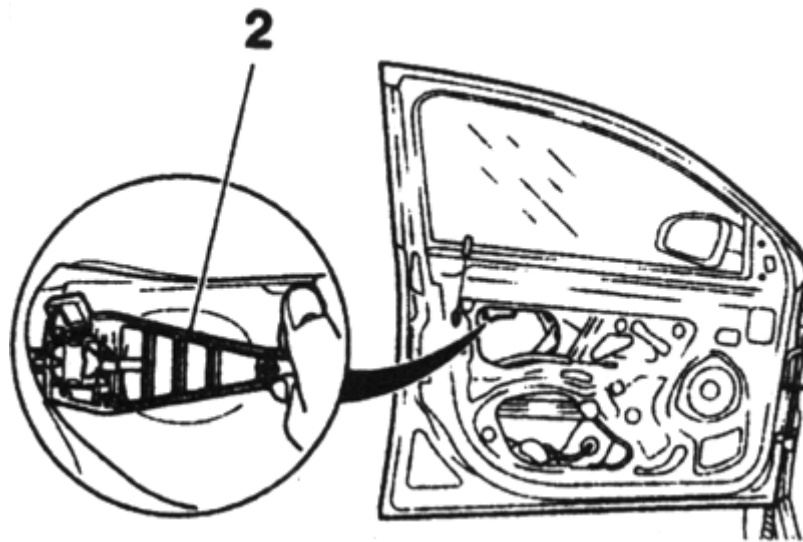


Fig. 8.26. Extract reference Staples in the District Pens of door assembly

Installation is performed in reverse order of removal.

7.20 Removing and installing upholstery, side door

Disconnect the wire from the negative terminals of the battery

Open the door.

Using a plastic wedge separate overlay front speaker pressed the 3 release (Figure 8.27).

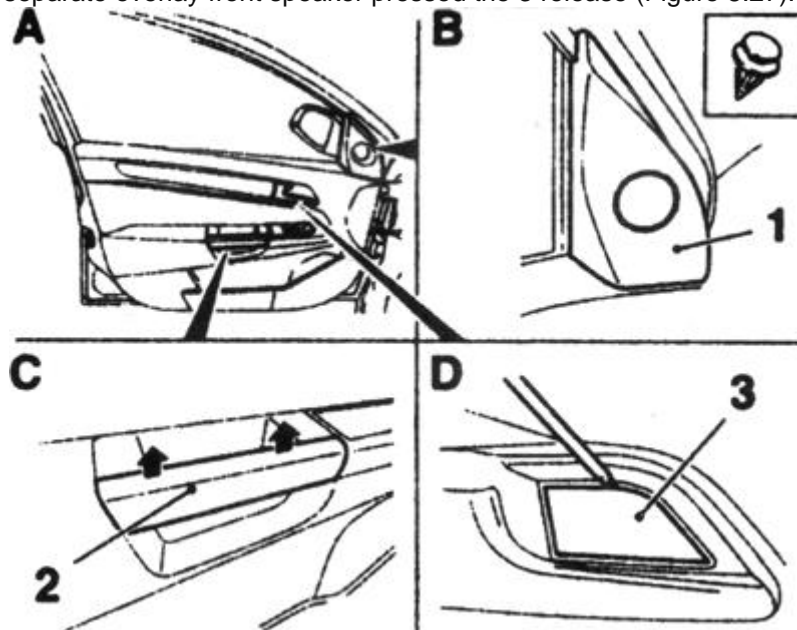


Fig. 8.27. Withdrawal linings front door:

- 1 - the outer lining front speaker;
- 2 - door armrest pad assembly;
- 3 - lining the interior door handle

Speaker wiring connector disconnected from the inside and remove the pad.

Similarly, taking the pad to remove the armrest pad and door interior door handle. Be careful not to damage the lining.

Remove the mounting bolts, using a plastic wedge, separate from the door trim assembly, squeeze clamps 5. Disconnected the wiring harness connector from the back of the upholstery (Figure 8.28).

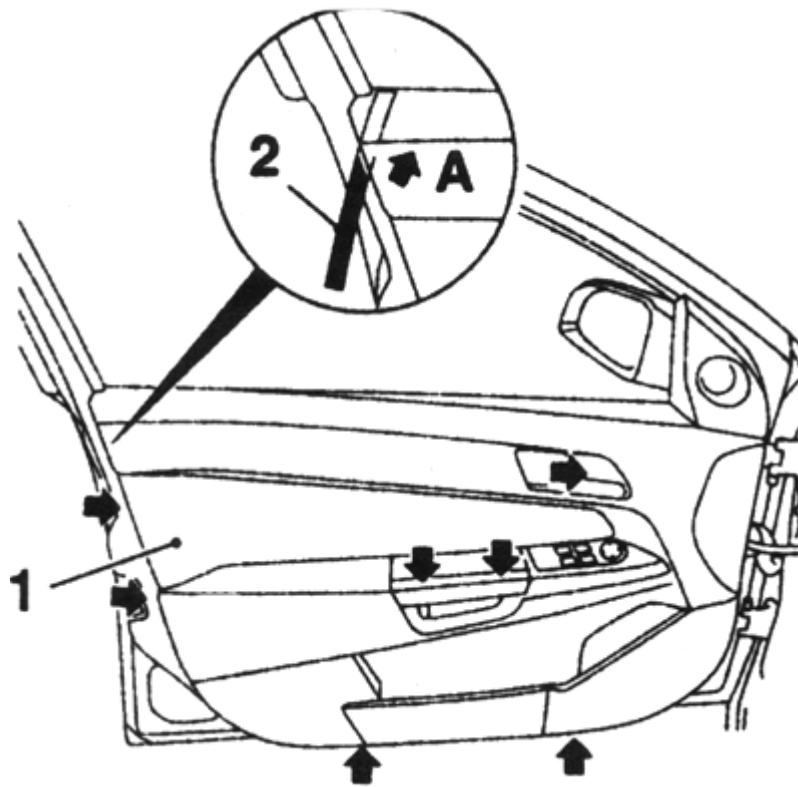


Fig. 8.28. Fastening bolts (indicated by arrows)

Upholstery Sidebar Doors:

1 - the outer lining front speaker;

2 - lining arm

Disconnect the draft door lock and remove the upholstery.

When removing the rear door upholstery, there are a few features - it is necessary to delete the rear glass door, window lifts off the handle (with appropriate configuration) and unscrew the 4 fixing screws: 2 screws at the door armrests, one bolt on the inside door handle and bottom upholstery.

Installation is performed in reverse order of removal. If necessary, replace damaged locks with new ones.

7.21 Care body car Opel Astra

Removing small scratches

If you scratch the surface and does not affect the metal body panels, its repair is extremely simple. To remove particles peeling paint and wax coating lightly rub scratched area fine grinding paste. Rinse the treated surface with clean water.

Little brush paint scratch paint used for exterior body panels meet. Continue to apply paint layer by layer until, until its surface scratches inside it reaches the level of the surrounding surface refinishing panel. Give the new paint polymerization to be treated for at least two weeks, then abrade the surface of the transition is flush with the surface covering the rest of the panel using very fine grinding paste. Then cover the treated surface with wax.

If the scratch has penetrated through the layer of paint, reaching a metal body and causing its corrosion, you should use a different technology repair. Knife scrape from scratch powdered rust, then treat the surface of the corrosion inhibitor, to avoid the development of pockets of corrosion in the future. Rubber or plastic spatula cover the damaged area inhibitor-treated fillers. If necessary, and this is especially useful when puttying narrow scratches, to form a fine paste putty can be diluted with a solvent. Before the putty hardens within the scratches, wrap the tip of the thumb of a smooth cotton cloth. Then, soak your finger in a solvent, quickly spend it along the putty surface scratches. This will make the surface slightly concave. Now, after setting filler treated with a scratch can be painted in accordance with the instructions given for cases where the scratch does not affect the metal.

Repair dents

When repairing dents priority is extension of the deformed surface in order to launch it to the initial level. Attempts to achieve one hundred percent of the original does not make sense, since it is still impossible because of violations of the internal structure of the metal body panels on impact. The best is to remove the concave surface to a level of approximately 3 mm below the surface of the surrounding undamaged area of the body panel. If the dent is not deep, its full extension has no meaning.

In the case where a concave portion can be reached from the back of the panel should try to dent the inside-peen hammer with the busiest of soft material (rubber, plastic). Tapping dent, tightly to her face of the mallet to absorb the shock pulse in order to avoid excessive bending outwards deformed metal panels.

If the crater formed on the two-layer section of panel, or access to it from the reverse side is not possible for any other reason, you should use a different method of extraction. Make a concave area panel several small holes, hoping that they were buried in most areas of bruising. Then screw the long screws into the holes, leaving their heads sticking out so that for them it was possible to grasp pliers. Now start pulling out dented forceps for screws.

At the next stage of processing dents should be removed from the damaged surface and the section width of approximately 3 cm around the remnants of paint coating. This work is best done with a wire stripping nozzles or disc in the chuck electric drills, but no less effective, and manual processing of sandpaper. The final phase of preparations for puttying is scratching paint peeled from the metal dents with a screwdriver or a fragment file or drilling small holes in it to ensure maximum adhesion of adhesives to the metal surface. Then you can begin to implement the procedures puttying and painting.

Repair of cross-cutting corrosion damage and leaks

With the grinding disc or wire attachments, caught in the chuck electric drill, remove all traces of paint from the damaged area and the section width of about 3 cm around it. In the absence of the possibility of using an electric drill can be accomplished as effectively by hand with sandpaper.

After removal of paint can estimate the extent of damage to metal corrosion and determine whether it makes sense to start would be wiser to repair or replace the entire panel (if it is in principle possible). The new panels can be purchased is not as expensive, as many motorists. Often, much faster and even more economical to install a new panel than to repair the extensive damage to the body.

Remove the damaged panel, all the elements of body decoration, except for those that can serve as a guide to recreate the original shape of the deformed areas (such as lining the block-corrector, etc.). Using scissors or Blades remove all dangling freely, weakly attached and hopelessly corroded metal parts. Then bend the hammer inside edge of the hole for the formation of depressions, which will be filled with putty material.

Use wire brush to remove the damaged metal powdered rust. If you have access to the back of the damaged area, process it, the corrosion inhibitor.

Before puttying hole must be plugged. This can be riveted or privernuv to the damaged section of the back of his hand a piece of tin or blocking the hole with wire mesh.

Once the hole is closed, the damaged section can be plastered and painted.

Puttying and color

Make many types of body fillers, however, it should be noted that for this type of work best suited attached to a set of body panels to repair putty paste with hardener. In order to achieve the smoothness and accuracy of the contour surface of the putty, paste should be applied flexible plastic or nylon spatula. Strictly following the manufacturer's instructions fillers (violation may lead to incorrect pour putty) implicated a small number of filler on a clean wooden or cardboard surface (carefully use the hardener).

Spatula apply putty on a pre-prepared surface of the damaged section of body panels. To achieve the desired contour surface and the level of filler, each swab spatula must pass through the entire repair area. Once the contour of the surface will be plastered close to the desired, stop cause plaster, as it hardened, will begin to Scallawags spatula, forming clumps and leaving Wry-you to the workpiece. Continue to apply layers of pasta with intervals of about 20 minutes to as long as the level of plastered surface becomes slightly protrude from the surrounding metal panels.

After freezing putty, remove excess files. Next phase begins zashkuriva-tion and grinding plastered surface. It is best suited for this purpose waterproof sandpaper. Starting with a coarse-grained paper number 180 and then successively reducing the grain, finish number 600. In order to achieve adequate flatness of the workpiece, the paper pre-wrap around the bar of solid rubber (wood or foam) or stick to it. Processing the paper regularly and frequently moistened with water. This technology allows to reach the absolute smoothness and evenness of the workpiece at the final stage.

As a result, the treated surface should be surrounded by a ring of pure metal. Rinse the treated surface with clean water, washing away from it all, formed during the grinding dust.

From the aerosol can with a thin layer of lotion to the treated surface a light coat, so-called Processing Layer. This will identify all violations committed during polishing defects, which can be eliminated by applying a new layer of putty. Repeat zashkurivanie and grinding. Repeat puttying, processing, and priming the surface to obtain a satisfactory (according to the quality of the surface) result. After rinse the treated surface water and dry it.

Now the surface is ready for painting. Apply the paint from an aerosol spray in a dry room. If circumstances compel to the body paint in the open air should take seriously the choice of suitable weather conditions. If one is painting a car body panels, cover the surrounding undamaged panel. This precaution will minimize the effect of slight differences in the colors of old and new colors. Elements such as chrome decorative trim strips, door handles, etc., should also cover (and better-off altogether). For the protection of non-paint surfaces, use a special adhesive tape (painter's "tape") and old newspapers stacked in several layers.

Before you begin to paint from an aerosol spray can, shake it thoroughly, then apply the paint on the surface of a test, practicing the technique of staining. Cover the prepared surface to paint primer in several stages. Do not spare the water, waterproof abrasive paper number 600, process primed surface, seeking its absolute smoothness. Before proceeding to the final paint, let the primer dry completely.

Apply a coat of paint, again achieving the required thickness by the multiple of its application. Streaking, start from the repaired area, making hand with spray circular motion. Increase the radius, spiraling up until not have covered all the damaged area and part of the old paint coating on the width of about five centimeters. After 10-15 minutes (not later, not to damage the edge of a start-freeze fresh paint) after applying the last layer of paint covering the separate body panels surrounding the newspaper and tape. The paint will cure completely in about two weeks, after which, to smooth the transition from fresh paint to spray before, treat the recovered very thin surface grinding paste. Finally, apply a protective layer on the panel means with wax.

Repair with considerable damage to the body

Repair of serious damage to the body has to take place in a specialized workshop, at the disposal of which has all the necessary equipment.

If there is extensive damage to the body, first and foremost, make sure it did not happen if the displacements of car body elements that could affect the controllability of the vehicle or cause increased wear of any of its nodes.

8 PLANS

This section provides wiring diagrams of different systems and devices, car Opel Astra, as well as their designation.

8.1 Legend - designations used on electrical circuits

Most Important terminal

Terminal 15 (position «ON» ignition)

Receives power from the ignition. Wires are served food only when the ignition key, and in most cases are green or black with a stripe of another color.

Terminal 30 ("+" battery) This terminal is powered up the battery is in most cases, red or red with a stripe of another color.

Terminal 31 ("-" battery) leads to the mass. Wires are usually brown in color.

General notation

15, 30, 31 numbers of the terminals

5 A, 7.5 A ... 80 A nominal current strength of the elements of the circuit

ABS anti-lock system

AC Air-conditioning

ASP Outside rearview mirror

AT Automatic Transmission

BRAIK switch stop lamps

CLS Contact switch

COMP Compressor

CTS coolant temperature sensor

DWA antitheft alarm device

EU Engine cooling system

ESS (NECC) climate control (without climate-control systems)

EMP Radio

FB5 / FB6 Protectors

FE3, FE4 .. FE33 Fuse, located in the mounting block in the engine compartment with the corresponding

FR1, FR4 ... FR37 Fuse, located in the mounting block in the luggage compartment, with the corresponding

FFD Dvuhrozhkovy horn

FH Door Window

FIL heated fuel filter (diesel models)

FNX Headlamps (except xenon)

HEAT Heater

HSCAN-H Hi-Speed CAN High (1)

HSCAN-L Hi-Speed CAN Low (0)

HSH heater rear window

HZG / AC heater / air conditioner

INS Instrument cluster

IRL interior lighting

KSP Fuel Pump

KSR relay fuel pump

LHD left-hand steering

LMD in Light door

LSL Directional individual lamps rear seats

LSW lighting switch

M1S Microphone

MIR-L / R External rear-view mirror (left / right)

IC Engine cooling system

AIT Robot Transmission

NAC Without air-conditioning

PPS gas pedal position sensor (general symbol)

PEDALSEN-D accelerator pedal position sensor - Diesel Models

PEDALSEN-P gas pedal position sensor - petrol models

PEPS Open & Start System

PP Help System with parking

PU Fuel Pump

RAIN rain sensor. RC Remote

RHD Right-hand steering

RSH heater rear window

SBUL switch reversing lamps
 SCC switch center console
 SD upper glass hatch
 SDD driver's door switch
 SLS brake switch signals
 SMP Build ashtrays
 STA System Start & Laden
 STT switch system Easytronic
 SW-HEAD Build outdoor lighting switches
 TEL Telephone
 TL Direction indicators
 TWA Twin Audio system
 XNL Xenon headlights
 WA wipers (front / rear - a generic term)
 WA-HL Headlamp washers
 WI-F front windshield
 WI-in rear window wiper
 ZV single lock

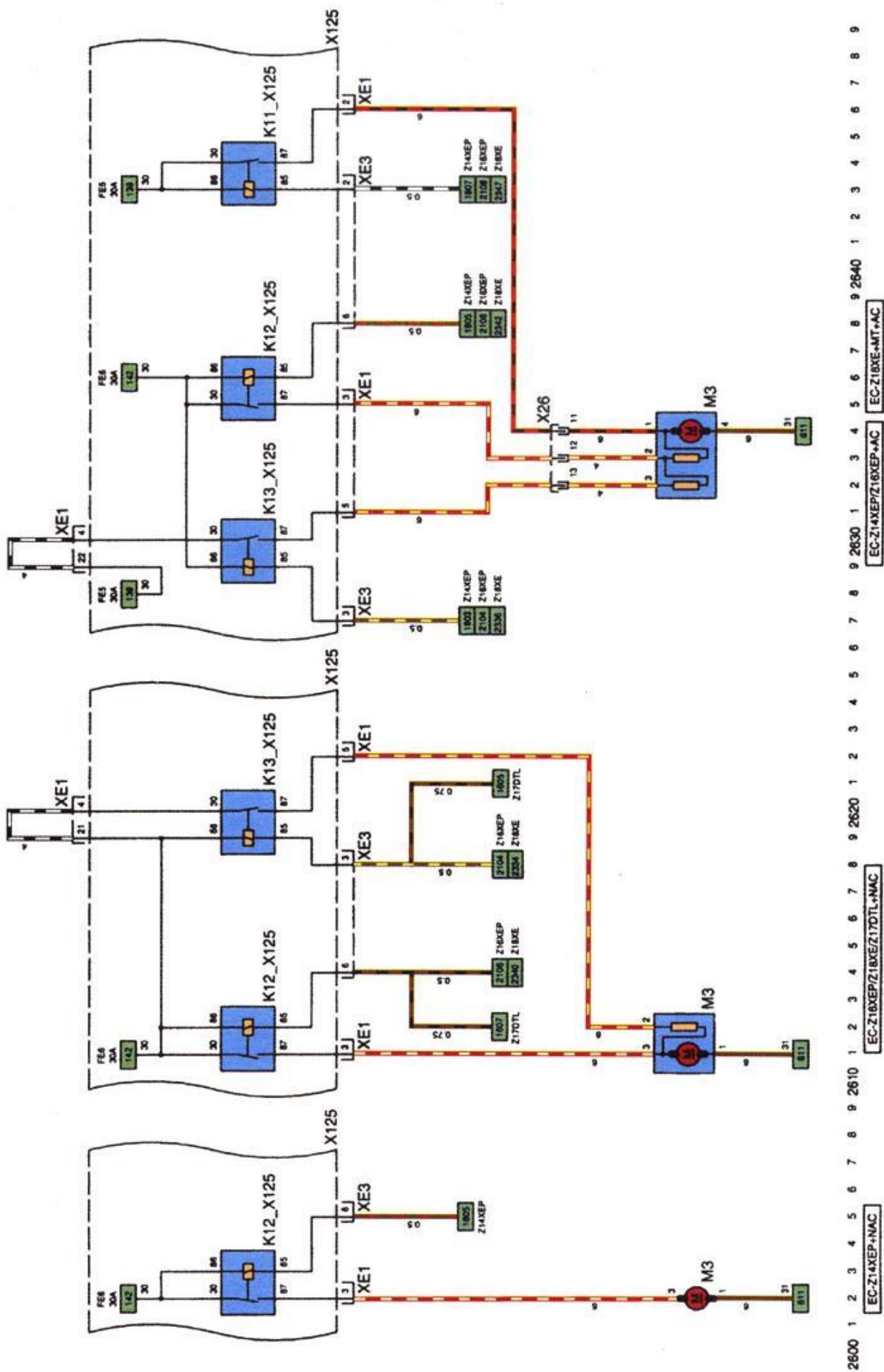
Elements of electrical chains

A1_A60 Distribution device heating and A / C
 A1_H125 Electronic module assembly hood fuse block
 A1_H131 Electronic module cabin mounting fuse block
 A2_H131 Electronic module trailer coupling
 A13 Building diffusers HVAC system
 A40 ignition module
 A60 Building diffusers HVAC system
 A84 engine control module
 A105 Built-in electronic module steering column
 A111 regulator throttle position
 V1_E68 Microphone
 V1_M8 fuel level sensor in the tank
 In B1_Y21 sensor system Twinport
 V2_E68 sensor anti-theft system
 B9, V9N horn with the alarm
 B18 Pressure Sensor A / C
 B22 pedal position sensor
 V28 camshaft sensor
 OPV pulse sensor crankshaft
 V39, V39A, V39V coolant temperature sensor
 V57 Postkatalitichesky lambda probe
 B64 temperature sensor incoming air stream
 B65 Sensor firing angle
 V67 absolute pressure sensor in the intake tract
 V86 Rain Sensor
 V135 Sensor Clean Air
 V166 Heated dokataliti-ment of the lambda probe
 E1_E68 front cabin lamp
 E1_E119 (L / R) Driving (left / right headlamp)
 E2_E119 (L / R) Main beam (left / right headlamp)
 EZ_E119 (L / R) Direction indicator lights (left / right headlamp)
 E4_E119 (L / R) Dimensional (park-vochny) lamp (L / R)
 E62 lamp trunk
 E67 front cabin lamp
 E69 (L / R) fog lamp (left / right)
 E72D lamp driver door
 Fixture E72R front passenger door
 E79 Brake light upper level
 E82 lamp chief glove compartment
 E94 Rear cabin lamp
 E98 (L / R) lamp lights, license plate (left / right)
 E106 (L / R) rear combination lamp assembly (left / right)
 E106 (L / R) .1 Rear Clearance (L / R)
 E106 (L / R) .3 reversing lamp (L / R)
 E106 (L / R) .4 indicators (L / R)
 E106 (L / R) .5 The rear fog lamp (L / R)
 E106 (L/RJ.6 Rear position lamps / stop lamps
 E119 (L / R) Building-block lights (left / right)

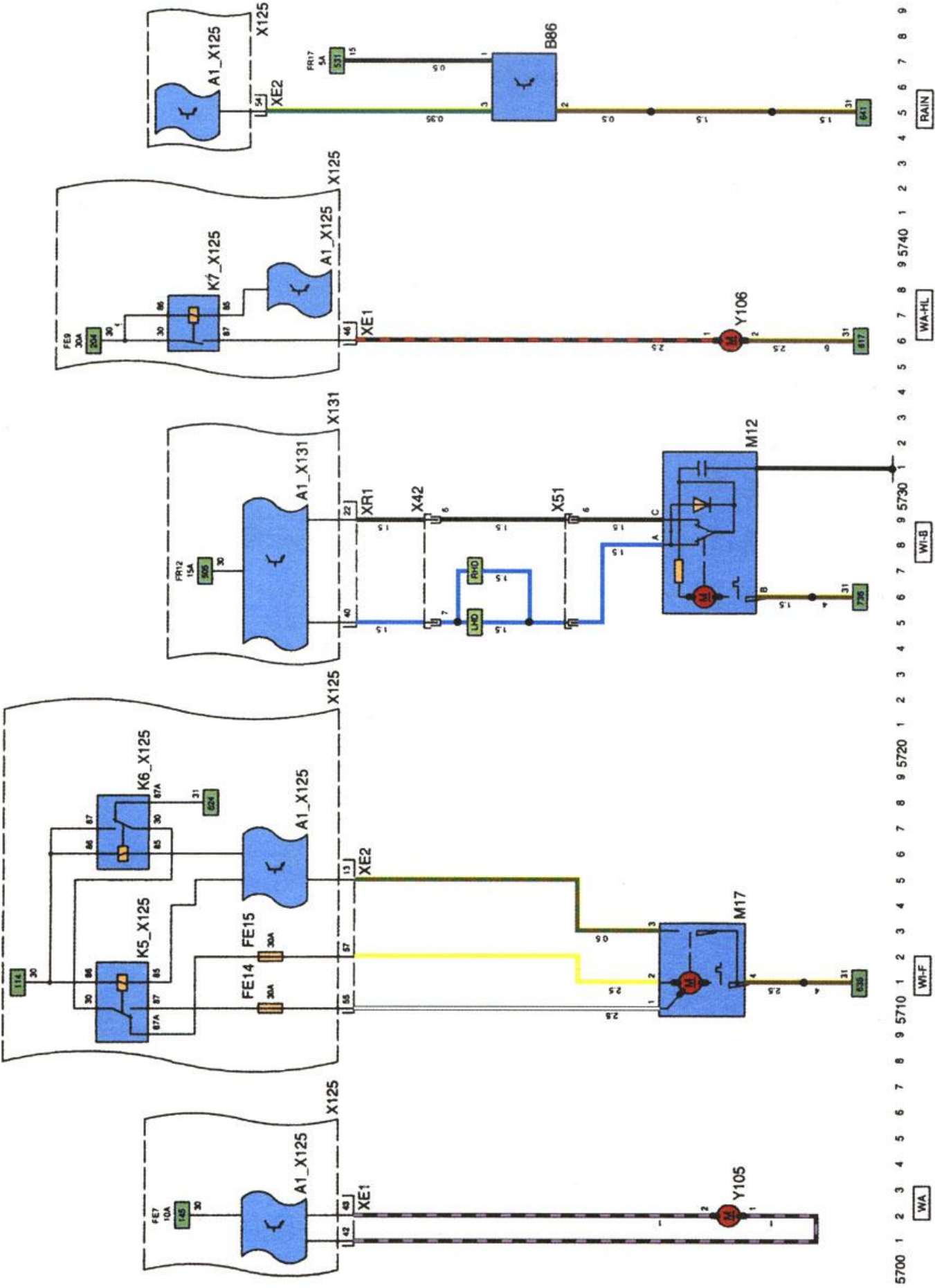
E120 (L / R) lighting vanity mirrors (left / right)
 L2A Injector first cylinder
 L2B'Inzhektor second cylinder
 L2C Injector third cylinder
 L2D Injector fourth cylinder
 L7 Compressor Clutch A / C
 M1_M8 Fuel Pump
 Electric drive M1_A13 suction valve
 M1_E119 (1_ / H) control the direction of optical axes of the headlights
 M2_A60 Electric air mixing valve
 MH, MZA, MZT Electric fan cooling system
 MZ_A60 Electric valve air distribution
 M4_A60 Electric damper system of air circulation
 Electric drive M5_A60 suction valve
 M8 Fuel Tank
 M10D Electric window lifts the driver's door
 M10R Electric passenger door window lifts
 M11D Assembling left outside mirror
 M11D. 1 Electric motor control of the left exterior mirror
 M11 D. 2 Electric folding exterior mirrors left and transfer it into position
 M11 D. 3 Heating of the left exterior mirror
 M11R Building right outside mirror
 M11R. 1 Electric motor control of right outside mirror
 M11R 2 Electric folding exterior mirrors and the right of translating it into position
 M11 P. 3 Heated right outside mirror
 M12 Electric rear window wiper
 M17 Electric windscreen wipers
 RE Combination Devices
 R1 cigarette lighter
 R1_A60 resistive electric fan assembly of HVAC
 R22 rear window heater
 R27 heater fuel filter (diesel models)
 S32 switch reversing lamps
 S122 Building exterior lighting switches
 5122.1 Rotary switch modes of operation of outdoor lighting
 5122.2 control backlight brightness of the instrument panel (potentiometer)
 5122.3 regulator directions of optical axes of the headlights
 S 122.5 switch fog lamps
 S122.6 switch back hazy lights
 S112P Compiling switch passenger door window lifts
 S218 Dual switch stop signals
 Y1A13 regulator air in the cabin
 Y1_Y21B Electromagnetic valve system Twinport
 Block system Y21V Twinport
 Y56 Electromagnetic valve exhaust gas recirculation
 Y105 pump windscreen and rear glass
 Y106 pump light washers
 Y123 Electromagnetic valve of the ventilation system of the fuel tank
 Y158 Thermostat
 Plug connectors
 E68 body - the front section of the ceiling console
 E68.1 front section of ceiling console - Sensor Alarm
 E68.2 front section of ceiling console - a microphone
 E68.3 front section of ceiling console - backlight
 X1 Body - dashboard
 HZ Body - the body (front)
 X4 body - the front passenger door
 X6 Body - driver's door
 X10 Body - Fuel Tank
 X16 Body-roof
 X24 Body (chuck) - engine cooling system
 X26 Body (chuck) - engine cooling system
 X38 trailer wiring connector
 Ō41 Body (Zadok) - back of panel
 X42 Body (Zadok) - the back of the door wiring harness connector
 X44 Body (Zadok) - trailer wiring connector
 X51 Connector wiring back of the door - the back of the door

X60 engine - the engine / gearbox
 X62 positive terminal of the battery - the motor gearbox
 X63 Engine - injector
 Front socket H112FR PTO
 H125 hood mounting fuse block
 H131 exporter mounting fuse block
 CS engine - engine control module
 HS10 Engine / transmission-engine control module
 HS40 dashboard - system control HVAC
 HS41 dashboard - system control HVAC
 HS47 steering wheel - built-in steering column
 HE1 Body (chuck) - TV engine compartment
 HE2 Body - TV engine compartment
 HEZ Engine / gearbox and electric power in the engine compartment
 XR1 Body (Zadok) - TV back of
 XR4 body - the back of TV
 XR5 body - the back of TV
 XR7 Body (Zadok) - Rear electric power
Additional symbols
 ASC Rosette PTO
 ACSSEN sensor system
 A / AZV Trailer coupling
 CIG cigarette lighter
 FOG-F9 Fog lights
 FL-NXNLOapbi (except xenon)
 GLOV-L Highlighting the main glove compartment
 HOR horn with the alarm
 Light, license plate KZL
 LAMP-D Door Lamp (backlight door)
 LIG-R rear light
 SHL Lights vanity mirrors (in sunshield)
 SL-M Stop-signal top-level
 TRUMPETDM switch the alarm
 TRUNK-L Lights trunk

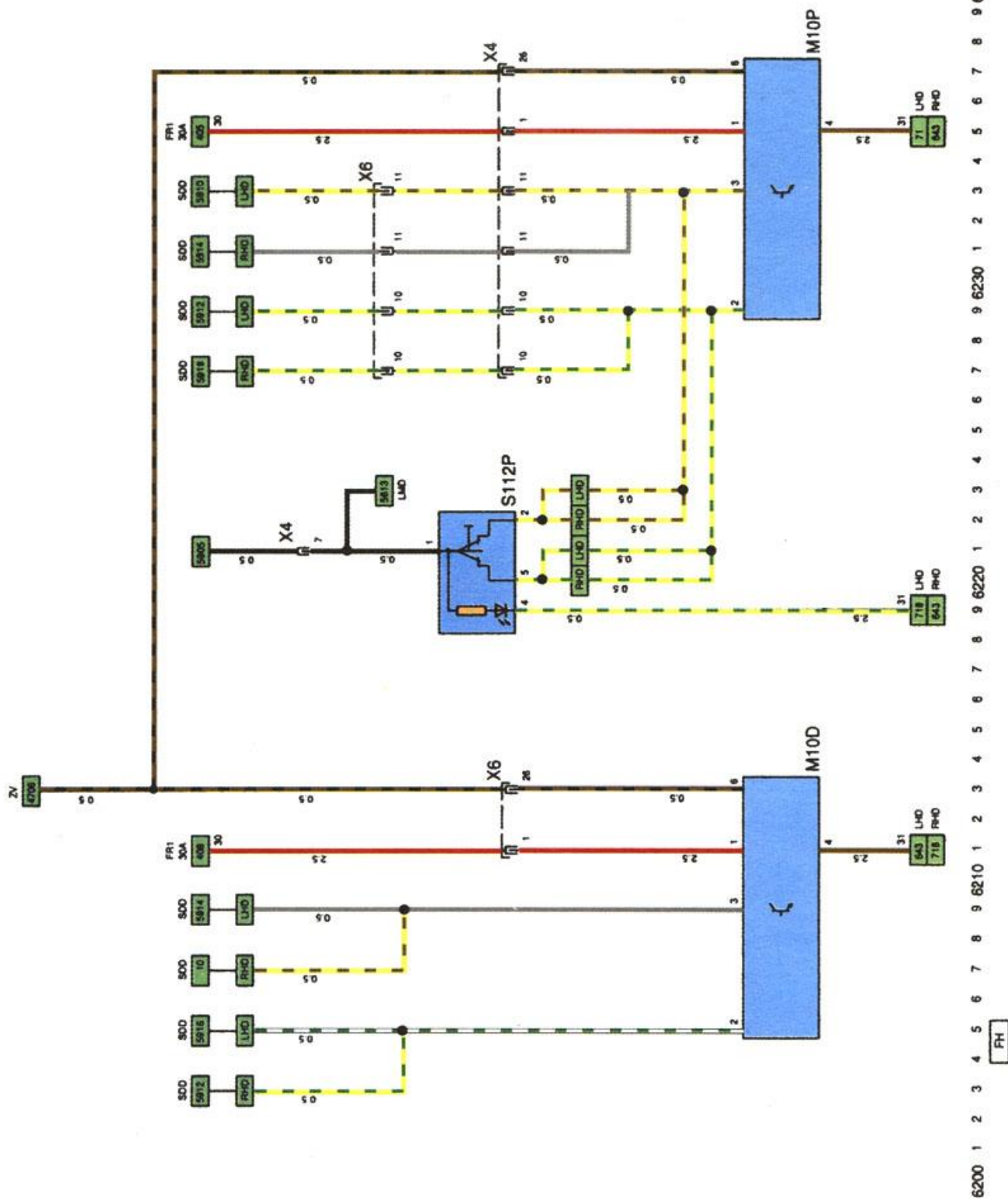
8.2 The cooling system of engine (engines Z14 XEP, Z16 XEP, Z18 XEP and Z17DTL)



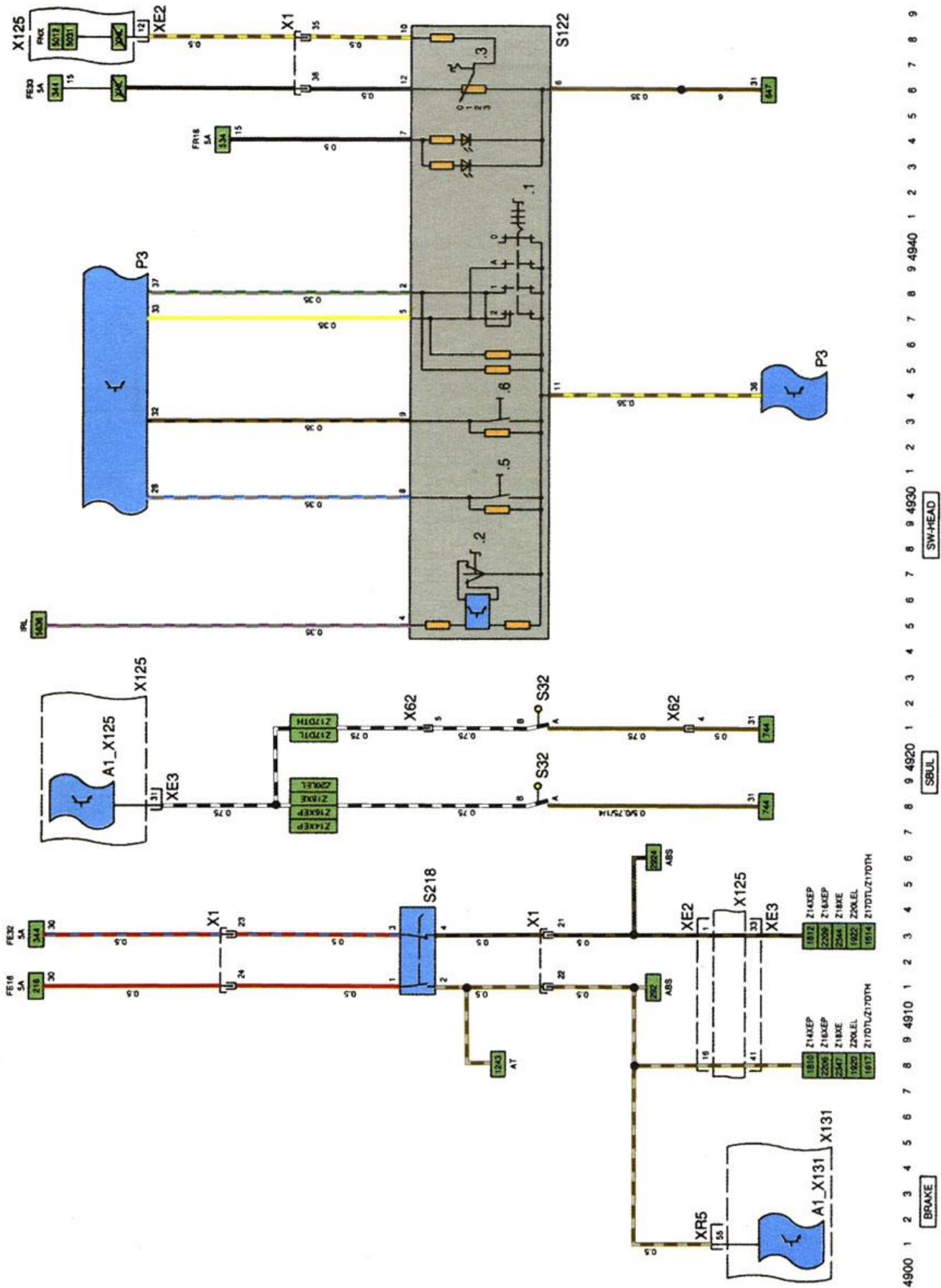
8.3 Front and rear wiper / rain sensor / headlamp washers



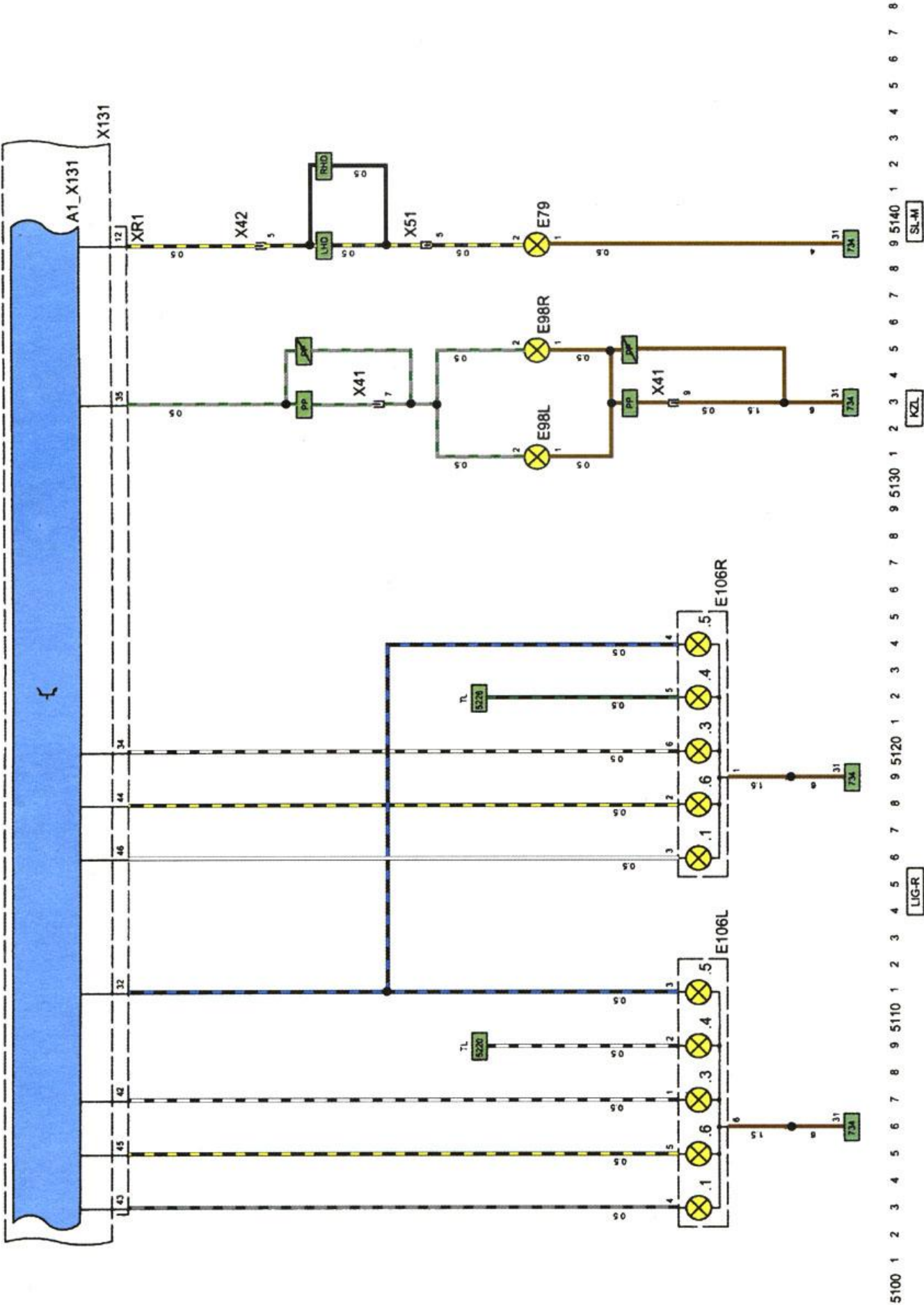
8.4 Power Windows



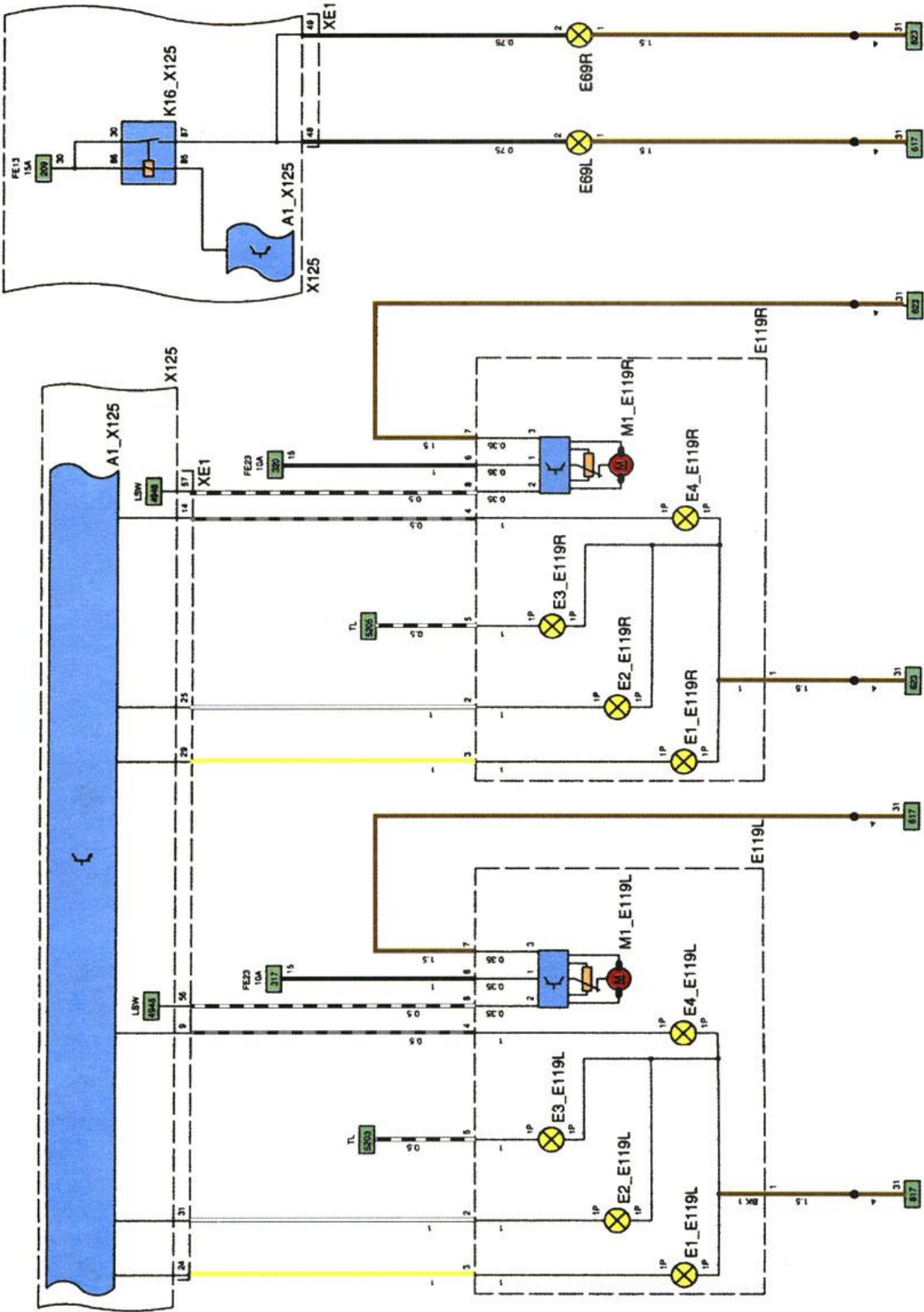
8.5 Switch stop-signalov/Vyklyuchatel reversing lamps / switches Control outdoor lighting / lighting devices



8.6 Rear combination lamps / Light, license plate / brake light upper level



8.7 Headlamps (except xenon) / Fog lights



5000 1 2 3 4 5 6 7 8 9 5010 1 2 3 4 5 6 7 8 9 5020 1 2 3 4 5 6 7 8 9 5030 1 2 3 4 5 6 7 8 9 5040 1 2 3 4 5 6 7 8 9

FL-NXNL

FOG-F

8.8 Cabin Interior lighting / power take-off socket / cigarette lighter / Lighting trunk

