

Ulyanovsky Avtomobilny Zavod LLC



Motor Vehicles
PROFI

Operation Manual
236020-3902002-17
Second Edition

2017

ATTENTION!

The Operation Manual details the necessary rules of motor vehicle operation and maintenance.

Before operating a motor vehicle, please read carefully the Operation Manual and the vehicle log book.

In particular, please read the sections "Safety requirements and warnings," "New motor vehicle running-in" and "Engine start-up and stop" carefully.

Improper operation can lead to injuries, malfunction in the motor vehicle and its assemblies, and termination of the manufacturing plant's warranty liabilities.

For safety and fault-free motor vehicle operation, please observe the operation and maintenance instructions specified in the Manual.

Motor vehicle maintenance can be performed by one of the service stations recommended by the company that sold the motor vehicle. The service stations are equipped with the necessary spare parts, sets of special tools and equipment. All motor vehicle maintenance works are carried out by experienced specialists.

Due to continuous work on the improvement of the motor vehicle, the construction may include modifications that are not described in the present edition.

Have a safe trip!

CHAPTER 1. GENERAL DATA

The two-axial lorry UAZ-236021 of 4x2 type has a two-door cab and a cargo platform.

The cross-country two-axial lorry UAZ-236022 of 4x4 type has a two-door cab and a cargo platform.

These motor vehicles are designed to carry passengers and cargo on all types of roads and terrain.

The motor vehicles being manufactured in version "U" as per Category 1 of GOST 15150 are intended for operation at ambient temperatures from minus 40 up to plus 40 °C, air relative humidity of up to 100 % at plus 25 °C, air dust content of up to 1.0 g/m³ and wind speed of up to 20 m/s. You can operate them in regions located at altitudes of up to 3,000 m above the sea level with a corresponding reduction of traction-dynamic characteristics and fuel efficiency.

The "plus" sign near the part (assembly) description means that this part (assembly) shall be installed into the motor vehicles depending on the configuration.

MOTOR VEHICLE MARKING

The manufacturer's plate (Fig. 1.1) is installed on the rear pillar of the right-hand cab side wall of the vehicle.

Vehicle **identification number** is marked on the nameplate (Fig. 1.1) and on the motor vehicle cab, at the bottom windshield panel (Fig. 1.2).

Identification number (Fig. 1.2) consists of three parts:

Part I — manufacturer's international identification number, which means:

X — geographical area, where the manufacturer is located;

T — country code;

T — manufacturing plant code.

Descriptive part II — vehicle index.

Indicating part III — year of vehicle manufacture and its order number.

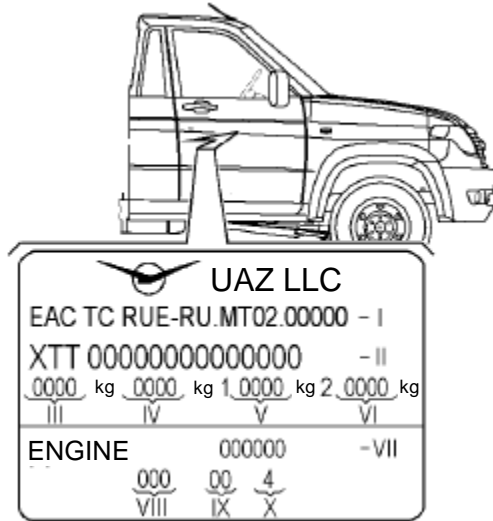


Fig. 1.1. Manufacturer's plate

- I — Full Transport Vehicle Type Approval number (TVTA);
- II — Vehicle identification number (VIN code);
- III — Transport Vehicle maximum permissible weight;
- IV — Maximum permissible weight of a transport vehicle with a trailer;
- V — Maximum permissible load on the front axle;
- VI — Maximum permissible load on the front back axle;
- VII — Engine model identification;
- VIII — Package code;
- IX — Variant execution code;

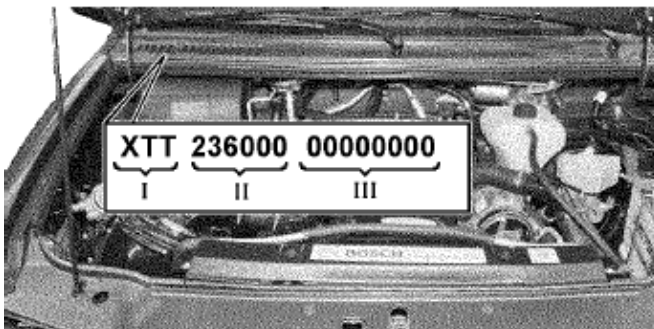


Fig. 1.2. Location of Vehicle Identification Number

Chassis identification number is stamped on the right-hand frame side member, at the rear (Fig. 1.3).

Engine identification number is stamped on the area located to the left of the engine block, above the fastening lug bosses of the engine front support (Fig. 1.4).

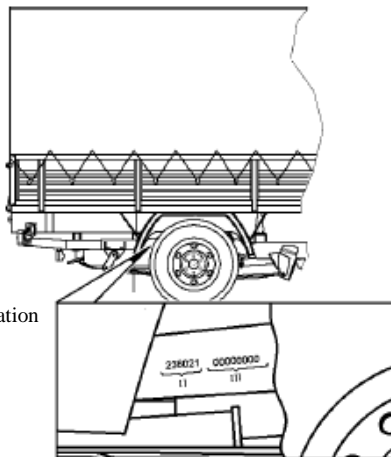


Fig. 1.3. Chassis Identification Number Location

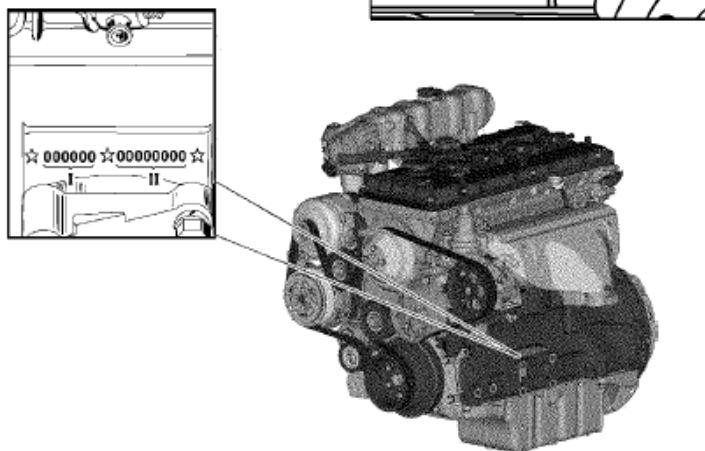


Fig. 1.4. Location of the identification number on the engine. I — the Vehicle Description Section (VDS) consists of six symbols (digits) specifying the engine model code. II — the Vehicle Indicator Section (VIS) consists of eight characters. The first character (letter or digit) denotes the conditional code of the year of the engine manufacture; the second character (digit) represents the conditional code of the engine manufacturer division; the remaining characters (digits) are the engine serial number counted from the beginning of the engine manufacturing year.

TECHNICAL SPECIFICATIONS

Description	Vehicles PROFI	
	UAZ-236022	UAZ-236021
1	2	3
General Information		
Vehicle dimensions *	See Fig. 1.5–1.6	
Vehicle type	All-terrain, two-axle, axle configuration 4x4	Two-axle, with axle configuration 4x2
Maximum bearing capacity (including driver and passengers), kg	1,435	1,510
Seating capacity (including driver's seat)	2	3
Maximum permissible gross vehicle weight, kg	3,500	3,500
6 Gross weight distribution by axles, kg:		
on the front axle	1,230	1,230
on the rear axle	2,270	2,270
Vehicle weight in running order (including driver), kg	2,065	1,990
Curb weight distribution by axles, kg:		
on the front axle	1,135	1,062
on the rear axle	930	928

* Dimensions are averaged, provided for reference, and can vary depending on operation conditions, installed tires, their state and inner pressure, motor vehicle load, suspension condition, etc.

Fig. 1.5. Main Dimensions of UAZ-236022 Motor Vehicle with Full Weight
(dimensions are shown for reference)

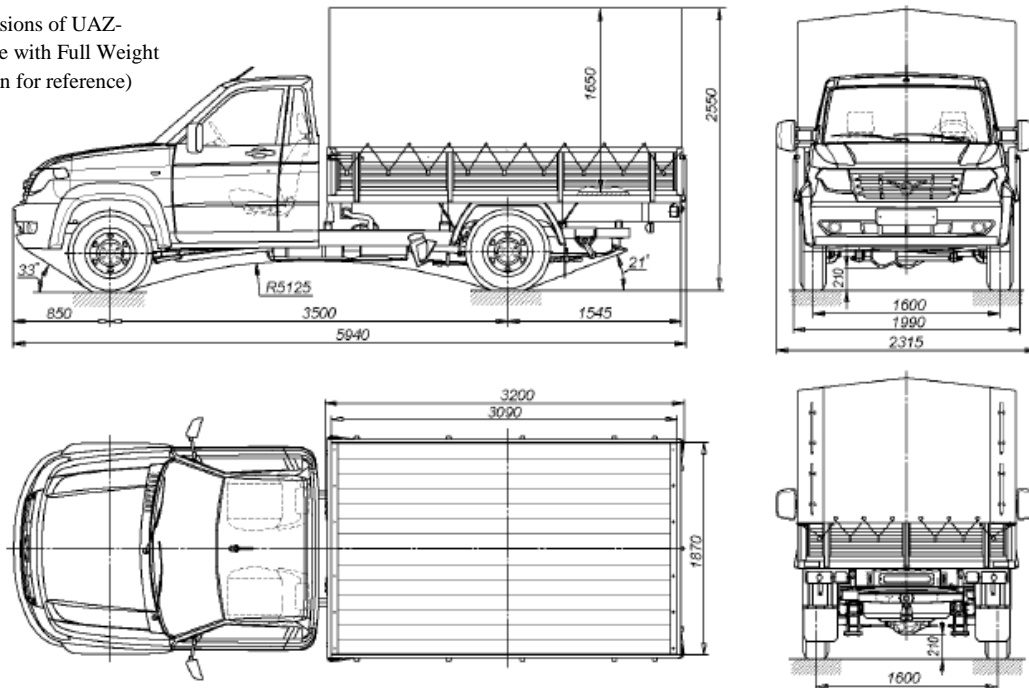
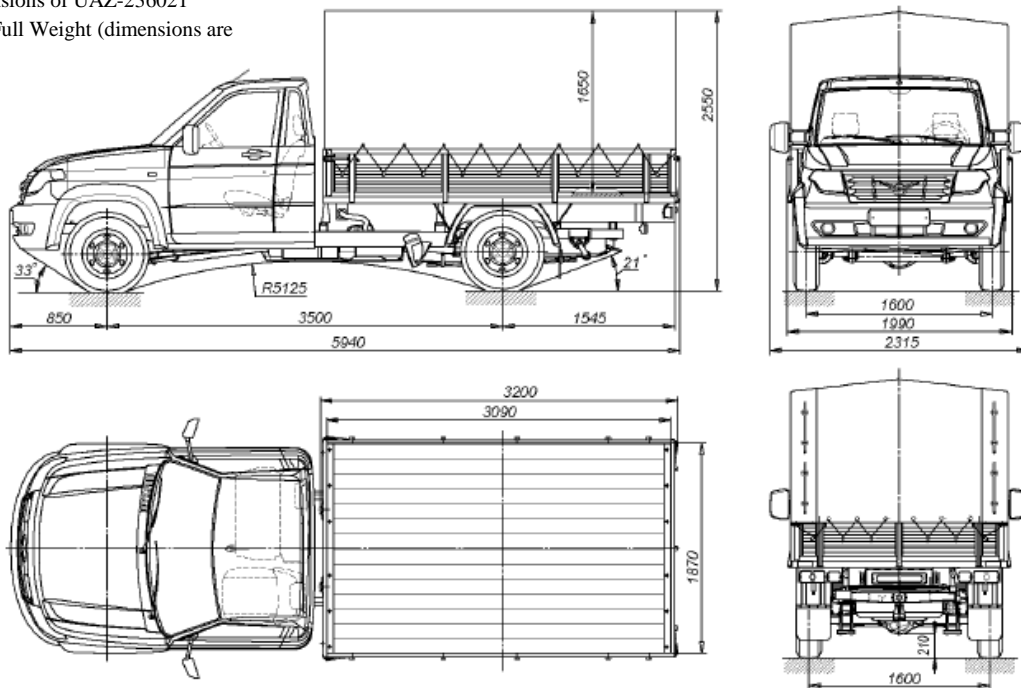


Fig. 1.6. Main Dimensions of UAZ-236021
Motor Vehicle with Full Weight (dimensions are
shown for reference)



1	2	3
Maximum speed, km/h		130
Fuel consumption at driving with constant speed 80 km/h, l/100 km		12.3

Note. Fuel consumption value is used to assess the motor vehicle technical condition and shall not be considered as the operation standard. Fuel consumption measuring accuracy is only ensured in special testing in strict compliance with requirements of GOST 20306-90, when the motor vehicle total mileage reaches 9,000–10,000 km.

Minimum turning radius on the centerline of the front outer wheel trace (as to the turning center), m, not more than	7.015	6.185
9 Minimum outer turning circle radius as to the front bumper point, the farthest from the turning center, m, not more than	7.335	6.535
Maximum climb for a motor vehicle with gross weight, degree (%)		31 (60)
Maximum fording depth, m		0.5
Engine		
Model		ZMZ-409051
Type		four-stroke with spark-plug ignition
No. of cylinders		Four

1	2	3
Cylinders arrangement	In-line, vertical	
Cylinders operation sequence	1-3-4-2	
Bore, mm	95.5	
Stroke, mm	94	
Displacement, cm ³	2,693	
Compression ratio	9.8	
Minimum crankshaft rpm at idle, min ⁻¹	800–900	
Maximum torque, N•m (kgf•m) according to Regulations 85 of UN EEC (GOST R41.85)	235.4 (24.0) at 2,650 min ⁻¹	
10 Maximum power, kW: according to Regulations 85 of UN EEC (GOST R41.85)	110 at 5,000 min ⁻¹	
Lubrication system	Combined: pressurized and by splashing	
Housing ventilation	Closed	
Fuel system	Distributed fuel injection with electronic control Unleaded gasoline AI-95-K5 as per GOST 32513, Premium Euro-95 type III (AI-95-5) as per GOST R 51866 Allowed: AI-92-K5 and AI-98-K5 as per GOST 32513, Regulator-92 (AI-92-5) as per GOST R 51105, Super Euro-98 type III (AI-98-5) as per GOST R 51866	
Fuel:	Liquid, closed circuit, with forced circulation	
Cooling system		

1	2	3
<p>Transmission</p> <p>Clutch:</p> <p>clutch type</p> <p>actuator type</p> <p>Gearbox:</p> <p>gearbox type</p> <p>control type</p> <p>Transfer case:</p> <p>gearbox type</p> <p>control type</p> <p>power takeoff*</p> <p>11 Front axle drive shaft</p> <p>Rear universal-joint drive</p> <p>Front drive axle:</p> <p>axle type</p> <p>gear ratio of final drive</p> <p>steering knuckles joints</p>	<p>Dry type, single-disk</p> <p>Hydraulic</p> <p>Manual, 5-speed</p> <p>Mechanical</p> <p>With switchable front axle drive</p> <p>UAZ, LLC</p> <p>Mechanical</p> <p>Open type, with two universal joints and a movable spline connection.</p> <p>Open type, with two universal joints, movable spline connection, and intermediate strut</p> <p>Single-stage with steering knuckles of open type</p> <p>4.625</p> <p>Ball-type constant velocity joints</p>	

*Possible for actuation (while driving or parked) of special devices installed in the body, with power takeoff mechanism mounted by a customer. Permissible power takeoff is 40 % The power takeoff mechanism installation shall be agreed upon with UAZ, LLC

1	2	3
Rear drive axle axle type gear ratio of final Drive		Single-stage 4.625
Running gear		
Suspension:		
suspension type shock absorbers	Dependent; the front one is of spiral spring type, with two longitudinal and one lateral arm, as well as with an anti-roll bar; rear one has two longitudinal single leaf springs with helpers and an anti-roll bar.	
Wheels and tires	Four, hydro-pneumatic, telescopic, of bilateral action	
	Disk type with solid rim, steel 6 1/2 Jx16H2 with a radial, tubeless tire 225/75R16C and hubcaps. Wheel fastening — by six nuts. Spare steel wheel with a tire of 16".	
12 Control Systems		
Steering System		
steering mechanism type	Steering column with tilt and length (reach) adjustment	
Brakes	"Screw-ball nut-rack-sector" with a hydraulic amplifier	
working brake type	With disk brakes on front wheels and drum	
	brakes on rear wheels	
working brake actuator type	Hydraulic with diagonally split dual circuits and Anti-Lock Braking System (ABS)	
	Circuit splitting is diagonal (primary circuit: right hand front and left hand back wheels, secondary one, left hand front and right hand back wheels).	

1	2	3
parking brake type	Drum and transmission type	
parking brake actuator type	Mechanical	
Electric equipment		
Wiring system	Single-wire, negative pole is connected to vehicle chassis	
System voltage (nominal), V	12	
Alternator	AAK 5572. (Pramo-Iskra) 14 V, 80 A; 5122.3771 (Pramo-Electro) 14 V, 80 A for	
	motor vehicles with A/C — 5122.3771-30 (Pramo-Electro) 14 V, 120 A; 32112.3771	
	Borisov, BATE 14 V, 110 A	
Accumulator battery	6ST-66A3 (6ST75 (77) A•h)*	
Spark plugs	AU14DVRM GOST P53842, DR17YC-F f. BRISK	
Starter	AZE 2203 12 V 1.9 kW (Pramo-Iskra); 5112.3708 12 V, 1.2 kW (BATE)	
Engine control module	NPP ITELMA, LLC, 236021-3763015	
¹³ Ignition switch	With an anti-theft device and starter re-engagement lock, with a coupling coil for the	
	immobilizer system	
Audio electric signal	Two ones of a tone horn type	
Windshield wiper	Electrically driven, with two brushes, triple mode, with pause adjustment in the	
	intermittent operation mode	
Washer	Electrical for a windshield	
Power windows	Remote	
Electrical interlocking system	Designed for simultaneous interlocking of all motor vehicle's door locks	

* For winter package

1	2	3
Adjusting values		
Deflection of driving belt of fan and power steering pump under 4 kgf force, mm		5-8
Deflection of belt of alternator and cooling system pump under 8 kgf force, mm		14-15
Spark plug electrodes gap, mm		0.7 ^{+0.15}
Brake pedal free play, mm		5-8
Front wheels toe-in		0°4'-0°10'
Inner front wheel maximum turning angle, degree	38	45
14 Steering system total play (steering-wheel angle from the position corresponding to steerable wheel wedge in one direction to the steering wheel position corresponding to steerable wheels wedge in the opposite direction), deg., not more than		20
Wheel and tire in assembly unbalance, g • cm, max.		1,000

1	2	3
Tire pressure, MPa (kgf/cm ²):		
front tires:		0.22 (2.2)
225/75R16C		
rear wheels:		
225/75R16C		0.43 (4.4)
Refilling data (in liters)		
Fuel tank		68±1
Engine cooling system		14.0
Engine lubrication system		6.5
Hydraulic brake actuator		0.6
Gearbox housing		2.5
Transfer case housing*		0.8
15 Final drive housing: front axle*		1.5
rear axle		1.4
Hydraulic power steering system		1.365
Hydraulic clutch actuator		0.18
Windshield washer reservoir		5

* For UAZ-236022 motor vehicles

CHAPTER 2. SAFETY REQUIREMENTS AND WARNINGS

SAFETY REQUIREMENTS

1. *When operating a motor vehicle, it is necessary to observe road traffic regulations and safety requirements and keep a motor vehicle in good repair, timely carrying out its maintenance and correcting possible malfunctions in order not to injure yourself and others.*

2. *A driver is responsible for the passengers. Therefore, a driver must ensure the observance of safety rules by the passengers. Be especially careful when children are in the motor vehicle. Do not leave children unattended in the motor vehicle.*

3. *It is prohibited to switch off IGN and remove the key from the ignition starter switch when driving a motor vehicle.*

4. *When leaving the motor vehicle, do not leave door keys and ignition keys inside.*

5. *Before opening a door, ensure that it will not be a hindrance for other road users.*

Before closing a door, make sure it will not pinch someone or something.

It is prohibited to drive the motor vehicle with any door opened.

6. *Do not adjust the steering column when driving the motor vehicle.*

7. *Do not adjust the driver seat when driving the motor vehicle.*

8. *Observe the requirements of safe power window use. Do not allow children to use power windows.*

9. *It is prohibited to use lamps that are not required by design.*

10. *Seat belts are an efficient means of driver and passenger protection against drastic consequences of traffic accidents.*

Use of seat belts is mandatory!

11. *Worn, damaged, underinflated or overinflated tires, warped wheels or wheel unfastening can cause a car crash.*

12. *Note that while the engine is off, the force required for steering input and motor vehicle braking increases significantly.*

13. *If the steering or brake systems do not work properly, further motor vehicle driving or towing with a tow-rope are forbidden. In this case you should use two wheel vehicle towing or a tow truck service.*

14. *It is prohibited to drive with engine switched off due to the loss of s brake efficiency.*

15. *It is strictly prohibited to disassemble shock absorbers.*

16. *Do not start and warm up the engine in an enclosed compartment without a good ventilation.*

17. *Do not heat up the vehicle major components with open flame.*

18. *Keep the engine clean (engine fouling can cause fire).*

19. *Make sure that the fuel tank plug is closed tightly and that there are no leaks from the fuel lines.*

20. *Catalyst operational temperature is 400–800 °C. It is prohibited to operate a motor vehicle without catalyst protection screens. When driving a motor vehicle and while parked, make sure that the exhaust system is not in contact with flammable materials (e.g., dried grass).*

21. *The following rules should be observed when working with low freezing point coolant, fuel, and brake fluid:*

- *avoid any operations that may result in these fluids or their vapors ingress into your mouth;*

- *do not let liquid dry out on the skin, immediately wash it off with soap and warm water;*

- *flush spilled liquid with water, ventilate the room;*

- *remove clothes contaminated with liquid, dry them outside the room, and wash;*

- *moisten carbon deposit with kerosene when scraping it to prevent ingress of toxic carbon substances into the respiratory system;*

- *when handling fuel, observe fire safety rules.*

22. *When a motor vehicle stops, it should be braked with the parking brake.*

23. *Use extreme caution when handling electrolyte. Follow these rules to prevent poisoning and chemical burns:*

- strictly observe the safety requirements specified in the accumulator battery manual;

- keep electrolytic solution or fumes from entering the mouth cavity, respiratory system, or eyes as it is very dangerous;

- avoid any operations that can result in electrolyte getting onto your skin. If electrolyte gets onto the skin, carefully wipe it off with cotton wool and immediately rinse remained traces off your skin with 5 % solution of ammonia or sodium carbonate;

- spilled electrolytic solution must be collected with a special rubber bulb or a densimeter and flushed with water, and the room must be ventilated;

- to charge the battery, remove it from the motor vehicle and unscrew filler plugs;

- the battery must be charged in a well-ventilated room. Electrolyte fume accumulation is dangerous to health and explosive.

24. Do not wash a motor vehicle while the engine is running. When washing a motor vehicle, avoid spraying water directly onto electrical equipment articles, electronic devices, sensors and detachable connections in the engine compartment. Monitor condition of the protective cases of electronic modules and sensors, as well as detachable connections. In case of moisture penetration, detachable connections must be blown off with compressed air and processed with water repellent vehicular preparation to protect terminals against oxidation.

25. A jacking apparatus installed improperly can cause serious injury or motor vehicle damage. It is strictly prohibited to carry out works under the motor vehicle supported only by a jacking apparatus.

26. It is prohibited to drive downhill with a gear thrown out in the gear box or the transfer case or with the clutch thrown out.

27. The cargo at the cargo bed should be distributed uniformly and as close as possible to the cab.

28. When carrying out maintenance and operating repair of a motor vehicle, the following requirements shall be met:

- before starting the works, check the tools and accessories for good condition and arrange work clothes: do cuff up, tuck clothes in so that there are no loose parts, tuck hair under closed-body hair cover;

- when carrying out any works, the motor vehicle must be securely braked;
 - do not carry out maintenance operation and repair of the motor vehicle while the engine is running, except for specific works that require the engine start according to the procedure — in such case, take particular care;
 - avoid bringing hands, parts of clothing, and tools dangerously close to operating drive belts, pulleys, etc.;
 - the fuel supply system is under pressure with the engine running after the fuel pump; therefore, it is prohibited to carry out maintenance (e.g., tightening joints) or repair of subsystems with the engine running or immediately after its shutdown;
 - take care when opening the engine cooler plug to avoid scalding;
 - before arc welding operations, the fuel tank should be removed, and the battery "-" terminal should be disconnected;
 - observe fire safety rules.
29. Waste oils and specialty liquids shall be collected and sent for recycling or disposal.
30. Several safety requirements are detailed in the respective chapters of the Manual.

WARNINGS

1. During the initial operating period, all recommendations specified in chapter "New motor vehicle running-in" shall be strictly observed.
2. The engine malfunction lamp switching on does not mean that the engine should be stopped immediately. However, in case of a malfunction caused by ignition failures (engine wobble and jerking when driving the motor vehicle), the motor vehicle shall be immediately (max. in 0.5 min.) stopped, and the engine shall be shut off in order to prevent catalytic converter failure.
3. Do not drive the motor vehicle with cold engine. Avoid high crankshaft rpm after a cold start..
In order to prevent any difficulties when starting engine, follow the instructions in chapter "Engine start."
4. In case of abnormal noises and knocks in a running engine, find out the cause of their occurrence. The motor vehicle should not be operated until the malfunction is corrected.

4.1. After the cold engine start, the hydraulic pushers may knock. This knocking should stop in the course of engine warm-up to the coolant temperature of 80–90 °C, but not more than in 30 minutes after reaching of the above mentioned temperature. If the knocking continues, it is necessary to check oil feed to the hydraulic pushers or to replace faulty hydraulic pushers.

5. Recommendations for fail-safe operation and to prevent accelerator pedal breakdown:

- do not apply excessive loads on the pedal lever after operating stroke ending;

- avoid impact, lateral and other loads that do not correspond to the pedal operating stroke.

6. Engage the back run in the gear box and the underdrive in the transfer case only after the motor vehicle complete stop.

7. When refueling, always turn off the engine.

8. Before fuelling of the motor vehicle, the heater-temperature booster (if available) should be switched off.

9. Do not overfill the fuel tank.

10. Disengage front axle drive when driving on dry paved roads.

Avoid front axle engagement when driving the motor vehicle with small turning radii.

11. In case of any brake circuit malfunction, the brake pedal travel increases, and brake efficiency decreases.

12. Be careful when carrying out any operation with the motor vehicle hood opened, as the electric fan can switch on (irrespective of whether the engine is running or not) on command of the Engine Control Unit.

13. Avoid any contact of a painted body, wheels, or rubber parts surface with acids, soda solutions, brake fluid, coolant, fuel.

14. In order to prevent turbidity of the headlamp assembly lenses and scratches on them:

- dry foreign materials on the external surface of the lens must be cleaned off only by pre-moistening them with plenty of water;

- do not apply aggressive chemical substances (petrol, acetone, solvents, etc.), aggressive detergents, and sharp objects to clean headlamp assembly lens;

- to prevent overheating of the headlamp assembly lens, do not switch on heavily polluted headlamp assemblies. Do not switch on headlamp assemblies covered with any object.

15. Before washing the motor vehicle in an automatic washer and entering low-ceilinged rooms, always remove the antenna, otherwise it can be damaged. To remove the antenna, unscrew it counter-clockwise. To install, screw it in clockwise.

16. Using the heater fan at above average to maximum operation modes under pouring rain conditions can result in soaking of the filter for air entering the interior and dripping ingress of moisture at the feet of the front passenger.

17. Avoid impact loads on the vehicle chassis. In cases of heavy impacts of the front wheels, carefully inspect the wheels, as well as all details of the front axle, steering rods, steering gear, engine oil sump and eliminate any defects.

18. The differential lock (depending on the configuration) establishes a rigid connection between the left and right wheels, preventing their separate slippage, which in some cases improves the vehicle off-road capability, but worsens its handling and stability; it also creates additional loads on the transmission parts. For safety reasons, the possibility of operation of the differential in a locked condition is limited by the speed of 30 km/h, and the ability to turn on the lock, by a speed of less than 5 km/h. To use the lock effectively and at the same time safely for you and others, it is necessary to consider and perform the following:

- do not use the differential lock on roads with a dry hard surface, as this leads to increased loads on the transmission, accelerated tire wear, and deterioration of the vehicle's maneuverability;

- when driving on roads with a low coefficient of adhesion (clear ice), the applied lock provokes loss of adhesion of the wheels to the road and skidding of the rear axle with deterioration of the road-holding ability. **Special care should be taken while applying the lock on vehicles equipped with an anti-lock braking system. The ABS cannot work correctly when the lock is turned on, and, therefore, it is forcibly disabled. When the ABS is switched off, the vehicle tendency to skid when braking on a slippery surface increases dramatically.**

After the lock switching off, the ABS turns on automatically;

- when driving with cornering, and the lock being applied, the vehicle has inadequate turnability and a tendency to travel to the outer turning radius, especially on roads with a low coefficient of adhesion;

- switch on the lock only while the engine is running, after the vehicle stop.

Do not try to engage the lock during wheel slippage, as this will result in shock loads and damage to parts;

- in vehicles with a front drive axle, engage the lock only when the front axle switching on does not allow to overcome the obstacle and only after its switching on;

- do not turn off the lock while cornering.

After reception of the signal to turn off the lock, the locking clutch for some time can remain in the switched-on state. Disengagement of the clutch will occur simultaneously with chop deceleration, for example, during a gearshift. After the obstacle overcoming and switching off (manual or automatic) of the differential lock, make sure that the clutch has unlocked the differential (there is no slippage of wheels and knocking in the transmission when cornering, and the vehicle's handling does not differ from usual).

Engagement of the lock not always improves the vehicle off-road capability. For example, when driving on soft (bogged) soils, the applied locking can lead to a breakdown of turf and "digging in" of the wheels. The lock engagement is especially effective when the wheels are hung out diagonally, or when there is a big difference in the wheels adhesion at the right and at the left.

19. To prevent excessive loads acting on the axle differential, avoid long-term slipping of one of the wheels.

20. When operating the motor vehicle in a cold season (ambient temperature is 0 °C and below), it is recommended to install a warm-keeping jacket on the radiator hood.

To prevent freezing through of the junction pipe of the engine positive crankcase ventilation system at ambient temperature below minus 15 °C, it is necessary to disconnect the resonator-type

hose from the air filter, to turn the filter counter-clockwise until hard stop (the air filter inlet spigot will be directed to the back and downward).

At the ambient air temperature below minus 30 °C, it is recommended to operate the motor vehicle with the front axle engaged at all times (if available).

21. It is recommended to store the battery in a heated room in case of the vehicle standstill for more than 12 hours at ambient temperature below minus 30 °C.

22. To prevent oil overheating and power steering pump malfunction, it is not recommended to hold the steering wheel in an extreme position for more than 5 sec.

23. Use only recommended lubricants and special fluids.

24. Knocks in the transfer case are possible at the moment of front axle engagement.

25. When the air conditioner is turned on, and the gearbox lever is in the neutral position, light knocks of the rings of the gearbox synchronizers are possible. Intensity of these knocks can increase with high gear actuation and with the front wheels turned to the limit.

26. When your vehicle's tailgate is open, it prevents other road users from seeing rear lighting devices. Before the tailgate opening, place the emergency stop sign on the road as per GOST R41.27-99.

27. Tightening torques of the main threaded couplings are shown in Appendix 2 hereof.

28. Long-term, fault-free, and safe operation of the motor vehicle depends on accurate compliance with the requirements of the Manual and the vehicle log book.

29. The plant continuously improves design of its motor vehicles, for which reason the last engineering changes, not affecting operation, may not be reflected in this edition.

CHAPTER 3. CONTROL ELEMENTS, MOTOR VEHICLE INTERIOR AND BODY EQUIPMENT

For driver seat equipment and location of controls see Figs. 3.1 and 3.2:

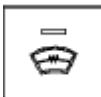
1 - steering column with a steering wheel, an ignition starter switch, multi-function switches and an adjustment lever of the steering column tilt angle and length (reach).

2 - instrument cluster (Fig. 3.5).

3 - steering wheel cover with the audio signal switch and built-in driver airbag module.

4 - head unit of the multimedia system or a plug.

5 - instrument switches. Set of switches depends on the vehicle package:



ignition ON.

Windscreen electrical heating switch (if available). A signal to the heating time relay, which actuates the heating element of the windscreen, is sent by brief pressing of the switch key with



Mirror heating switch (for motor vehicles without rear screen de-mist).



Emergency alarm switch. For triple alarm activation, briefly press the switch button twice.

ATTENTION! *In the circuits controlling electric windscreen heating, there is a time relay rated for 12 ± 2 min. If during the specified period the defrosting of glasses did not occur (for example, in case of severe icing), it is necessary to press again the heating button of the corresponding glass.*

6 - lid of the glove box (upper).

7 - lid of the glove box (lower). To open the lid, pull the handle from below. The glove box is equipped with a puddle lamp (depending on the configuration) that switches on automatically when the lid is opened.

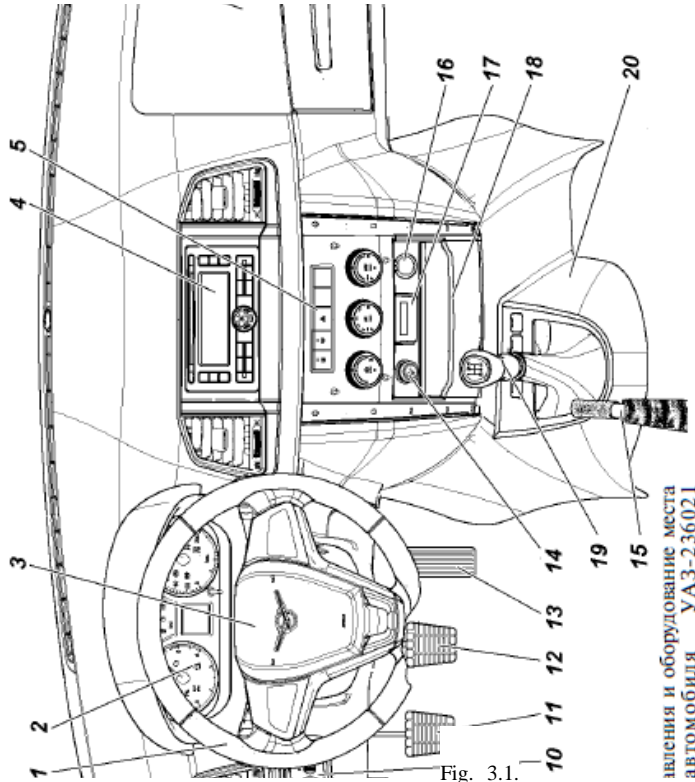
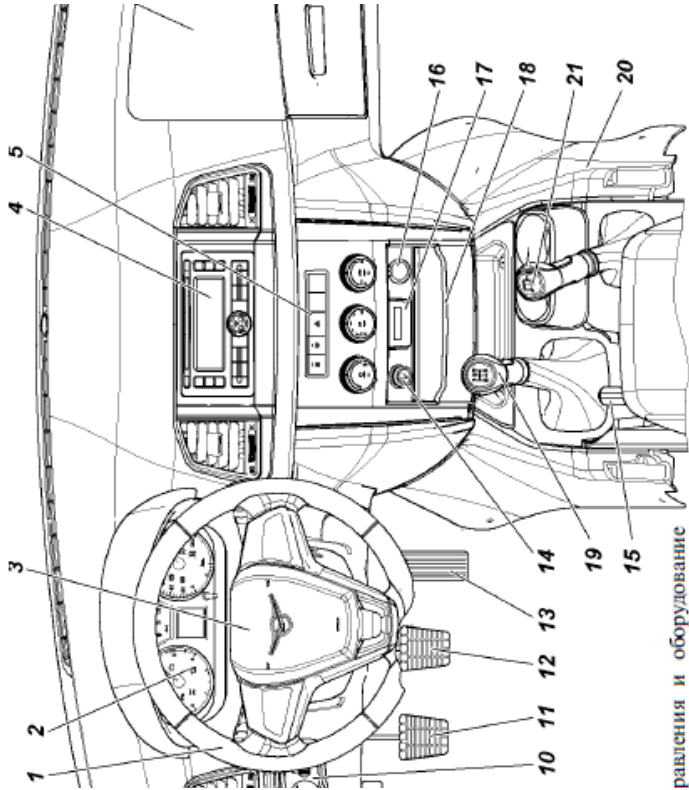


Fig. 3.1.
Control
Element
s and
Driver's
Seat
Equipme
nt of
Motor
Vehicle
UAZ-
236021
(item
descripti
on see in
the text)

зв'язки і обладнання місця
автомобіля УАЗ-236021
вий см. в тексті)



равления и оборудование
 автомобиля УАЗ-236022

Fig. 3.2.
 Control
 Elements
 and
 Driver's
 Seat
 Equipment
 of Motor
 Vehicle
 UAZ-
 236022
 (item
 description
 see in the
 text)

8 - bonnet latch opening lever.

9 - cover of the relay and fuses unit. (For access to the unit see Fig. 9.26).

10 - lighting means control module (Fig. 3.4).

11 - clutch engagement pedal.

12 - brake pedal.

13 - accelerator pedal.

14 - cigar lighter or its cap.

15 - parking brake lever. To engage the parking brake, move the lever up, to disengage, press the button on the lever face and move the lever down until it stops.

16 - 12V socket.

17 - starting preheater timer. (Operation and maintenance information is specified in the manufacturer instruction [manual] attached to the motor vehicle).

18 - box for small pieces.

19 - shift lever. (See lever positions on the shift lever handle and Fig. 3.3).

20 - floor tunnel with units and keys (Figs. 3.11 and 3.12)

21 - front axle and reduction gearing engagement lever.

(See lever positions in Fig. 3.3).

The cab (depending on the configuration) has the places for optional equipment.

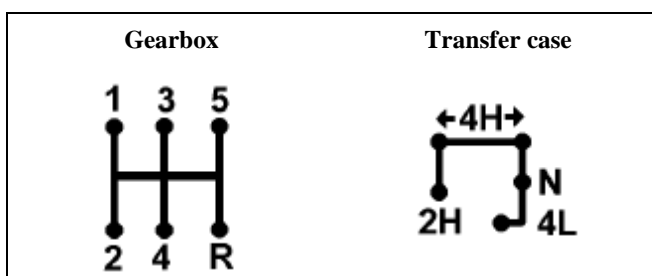


Fig. 3.3. Positions of Gearbox and Transfer Case Levers:

1-5 — gears; R — reverse gear; 2H — direct gear, the front axle is disengaged; 4H — direct gear, the front axle is engaged (the main position — left); N — neutral position; 4L — the front axle and underdrive are engaged.

LIGHT CONTROL MODULE

Lighting means control module (LMCM) is shown in Fig. 3.4.

1 - external lights switch. Has three positions (in clockwise sequence): "0"-lighting is OFF (daytime running lights are ON); "☛" - tail lamps, license plate light, and instrument cluster illumination are ON; "☛☛" - tail lamps, license plate light, instrument cluster illumination, and headlights are ON.

The fog lights (if available) are switched on by pulling out of the handle of the outdoor lighting switch to the first fixed position (the handle in this situation should be placed in position "☛" or "☛☛"). The green signal indicator ☛☛ switches on at the instrument cluster.

The rear fog lights are turned on by pulling out of the handle of the outdoor lighting switch to the second fixed position. If the vehicle is not equipped with fog lights, the rear fog lights are activated when the outdoor lighting switch is pulled out to the fixed position only in location "☛☛" (headlights are on). The yellow signal indicator ☛☛ switches on at the instrument cluster.

2 - headlamp corrector regulator. By turning the regulator, the headlamp light beam inclination angle is corrected depending on the motor vehicle loading: "0" — only a driver sitting on the front seat;

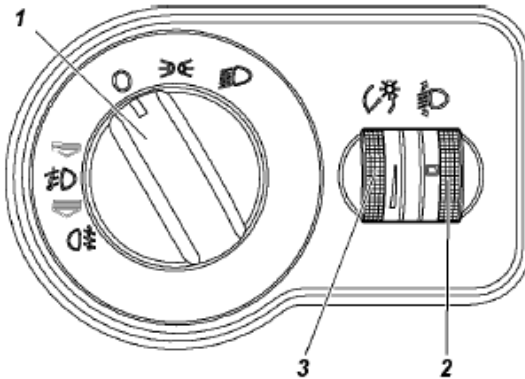


Fig. 3.4. Light Control Module (see item description in the text)

"3" — the driver plus load uniformly distributed on the cargo bed. For other loading options (when gross weight is not exceeded), select the position in the way that the road illumination by low beams is within the set standards, without blinding oncoming transport drivers.

3 - instrument cluster dimmer. Intensity of the controls lighting is changed by turning the dimmer.

INSTRUMENT CLUSTER

Cluster is shown in Fig. 3.5.

Green and blue signaling indicators inform the driver of the normal operation of the system being switched on. Orange signaling indicators warn the driver of need to take measures ensuring the motor vehicle's further normal operation. Red signaling indicators warn the driver of an emergency packs operation.

Motor vehicle operation with continuously lighted (at least one) red signal device is not allowed.

1 — tachometer with signaling indicators. The scale red range indicates exceeding of the permissible rpm and engine operation in an emergency mode.

Signal indicators on the tachometer.



- **signal indicator of rear inter-wheel differential lock** (yellow).



- **battery discharge signal indicator**

(red). Lighting, while the engine is running, indicates that the battery is not charging.



- **oil pressure warning signal indicator of the motor vehicle's engine lubrication system** (red). Signal indicator lights up after ignition switching on, and goes out after the engine start and increase of the crankshaft rpm.



- **complex microprocessor engine control system malfunction signal device** of the engine control system elements, which affects the exhaust gas toxicity (yellow). It lights up when ignition is switched on and goes out after the engine start. **When the signal device switches on, it indicates a malfunction of the engine components or the exhaust system that affect the exhaust gas toxicity level.**

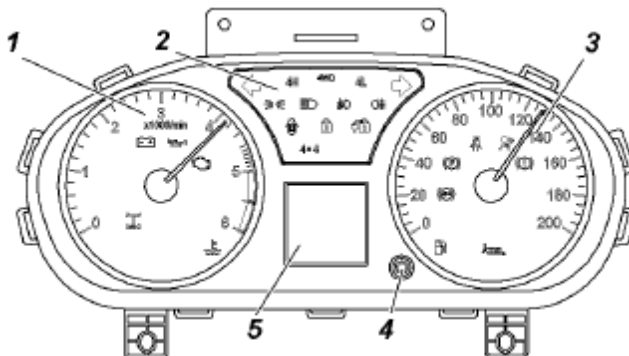



Fig. 3.5. Instrument Cluster (see item description in the text):

When the signal device switches on, if it is not accompanied by significant deterioration of riding qualities, driving is permitted at a low speed to the nearest authorized service station of UAZ, LLC, to carry out diagnostic works.


Prolonged operation with the malfunction signal device switched on can lead to malfunction of the engine control system elements.

When ignition is switched on, the signal device starts blinking with frequency of 5 Hz in case of engine control unit malfunction.

 - signal device of abnormal coolant overheating (red).

2 — signal device box:

 - left direction signal indicator and hazard light (green).

 - right direction signal indicator and hazard light (green).

 - tail lamps ON signal device (green).

 - distance lights ON signal device (blue).


 - front fog lights ON signal device (green).

 - rear fog light ON signal device (yellow).

 - door ajar signal device (red).

 - **security alarm system signal device** (yellow).

 - **immobilizer ON signal device** (yellow).


 - **4-wheel drive ON** (green).


3 — speedometer with signal indicators.

Indicators on the speedometer:


 - **brake ABS malfunction signal device** (ABS) (yellow).

 - **park brake ON signal device** (red).

 - **unbuckled seat belt signal device** (red).

 - **air bag control system failure alarm** (yellow).

 - **service brake system and EBD malfunction signal device** (red).

 - **low fuel level signal device** (yellow). It lights up when less than 9 l of fuel is left in the tank.

4 — trip computer switch. Switching over is performed by pressing and turning of the switch clockwise / counter-clockwise.

5 — LCD-display (depending on the configuration) displays the following functions of the trip computer:

- engine coolant temperature;
- level in the fuel tank;
- motor vehicle total and daily mileage. Daily mileage counter reset is performed by durable (over 2 s) pressing on the instrument cluster switch;
- time of day (in 24-h format). To set the clocks, the "Clocks setting" mode should be switched on in the trip computer. Activate the setting mode by durable pressing (over 2 s) of the instrument cluster switch or "OK/RESET" button located on the understeering switch. Hours / minutes values can be set by turning the switch clockwise / counter-clockwise. Switching over between hours / minutes settings is performed by short (less than 1 s) pressing of the instrument cluster switch;

- ambient temperature (depending on the configuration);
- date (in format "XX month"). To set the date, the "Date Setting" mode should be switched on in the trip computer. Activate the setting mode by durable pressing (over 2 s) of the instrument cluster switch or "OK/RESET" button located on the understeering switch. Day / month / year are set by turning the switch clockwise / counter-clockwise. Switching over between day / month / year settings is performed by a short (less than 1 s) pressing of the instrument cluster switch;
- fuel distance (in km);
- current motor vehicle speed;
- average motor vehicle speed.

LIGHT INDICATION SWITCH

Direction indicator and beam switch have the following positions (Fig. 3.6)

I — neutral position. Direction indicators are OFF, dimmers are ON, if forward lighting is switched off by the vehicle light switch.

II — right direction indicators are ON (three flashes). Unfixed position.

III — right direction indicators are ON. Fixed position.

IV — left direction indicators are ON (three flashes). Unfixed position.

V — left direction indicators are ON. Fixed position.

VI — pull, headlamp high beam flash. Short-time activation of the high beam headlights regardless of a position of the outdoor light switch. Unfixed position.

VII — push, headlamp high beam is ON, if forward lighting is switched on by the vehicle light switch. Fixed position.

To control the trip computer, use control button 1 and ring 2 (non-fixed position when turning) of the left understeering switch (Fig. 3.7).

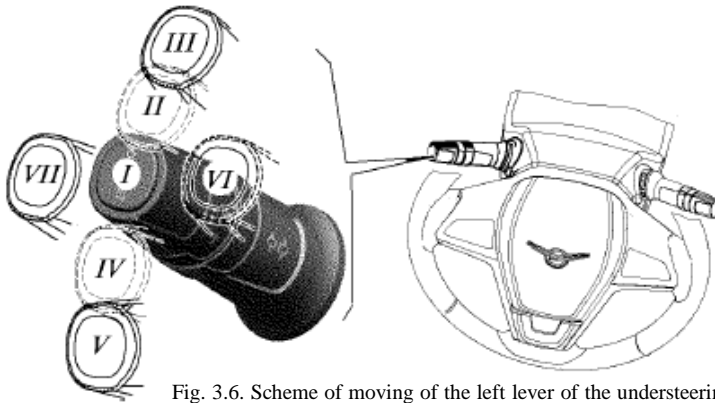


Fig. 3.6. Scheme of moving of the left lever of the understeering switch when controlling the direction indicators and headlights (see item description in the text)



Fig. 3.7. Controls of the trip computer on the left lever of the understeering switch:
1 — button; 2 — switch ring

Changing of the trip computer functions is performed similarly to operation of the trip computer switch 4 (Fig. 3.5).

WINDOW WIPER AND WASHER SWITCH

Window wipers and washers are ready only when ignition is on. The lever of the window wiper and washer switch has the following positions (Fig. 3.8).

I — neutral position. The window wiper and washer are switched off.

II — an intermittent operating mode of the windshield wiper is ON. Position is fixed.

Duration of pauses in the intermittent operation mode of the windshield wiper depends on the position of the pause time control 1 (Fig. 3.9).

III — the windshield wiper constant operation mode (with low speed) is ON. Position is fixed.

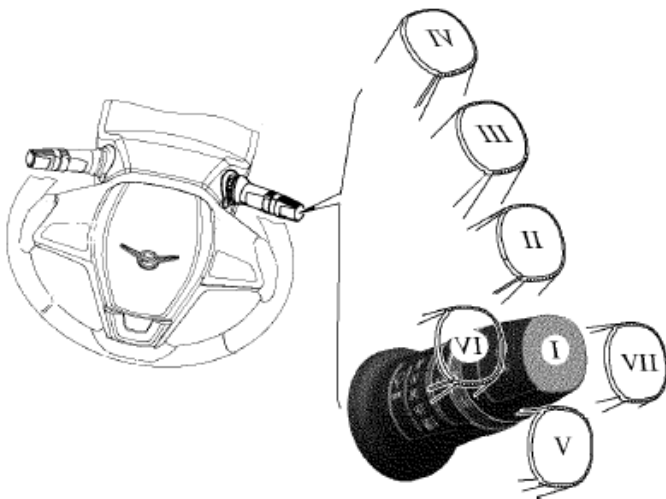
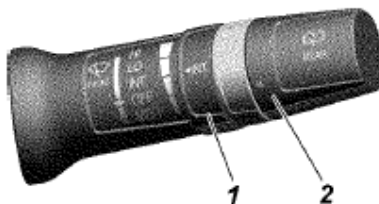


Fig. 3.8. Scheme of moving of the right lever of the understeering switch when controlling the window wiper and washer (see item description in the text)

Fig. 3.9. Right Lever of Understeering Switch:
1 — rotary pause time control; 2 — rotary switch of rear washer (not used)



IV — the windshield wiper constant operation mode (with high speed) is ON. Position is fixed.

V — short-term operation of the electric windshield wipers (one cycle of the brush movement). The switch position is unfixed.

VI — pull; windshield wiper and washer are ON.

VII — is not used.

STEERING COLUMN WITH STEERING WHEEL AND IGNITION SWITCH

A steering column with a steering wheel, an ignition switch, and an adjustment lever of the steering column tilt angle and length (reach) are shown in Fig 3.10.

1 — audio signal switch.

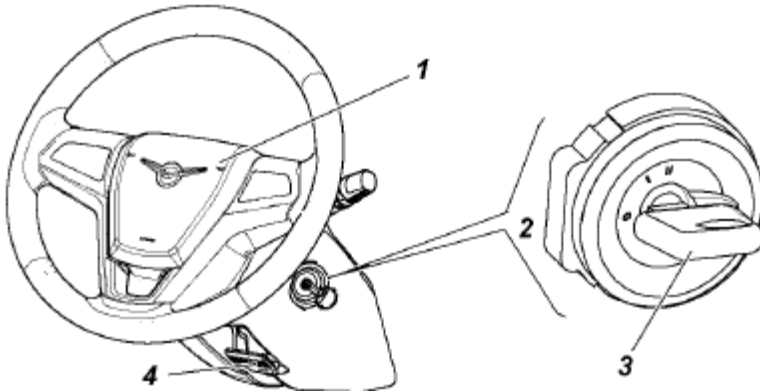


Fig. 3.10. Steering Column with Steering Wheel and Adjustment Lever of Steering Column Tilt Angle and Length (Reach), as well as Ignition Lock (item description see in the text)

Audio signal switch is integrated into the steering wheel cover, so press it without significant effort, as the audio signal switch is integrated with the driver airbag module.

2 — the ignition switch has three positions:

0 - parking (stable position);

I - ignition ON (stable position);

II - starter ON (unstable position).

ATTENTION! *It is prohibited to switch off the ignition and remove the key from the ignition switch when the motor vehicle is running. Engine shut down leads to brakes efficiency reduction, and when the ignition key is removed, the steering system shaft is blocked by an anti-hijack device, and the vehicle becomes uncontrolled.*

3 — ignition and door key.

Two keys are attached to the motor vehicle, each key is designed to unlock door locks and to start up the ignition.

The transponder, an electronic chip that saves the unique identification number, is embedded in the motor vehicle key bow. The immobilizer blocks the engine start without code pre-reading from the transponder thus ensuring additional protection against unauthorized use.

The key is removed from the lock only in position 0, in which the locking device mechanism actuates and locks the steering system shaft.

To lock the steering system when parked, set the key to position 0, remove it, and turn the steering wheel in any direction until it clicks, which indicates that locking device catch has matched with the groove of the steering wheel shaft stop sleeve.

When unlocking the steering system, insert the key to the ignition switch and, swaying the steering wheel to the right and left, turn the key clockwise to position I.

In order to avoid accidentally switching on the starter with engine on (key position II), the lock mechanism includes locking, that enables engine re-start only after key is set to position 0 again.

4 — adjustment lever of steering column tilt angle and length (reach).


To set the steering wheel to the optimum position, adjust the steering column position. To do this, lower lever 4 down, tilt and (or) extend (lower) the steering column, and then, lock the steering column by lifting the lever to its highest position.

In case of increased force when raising the adjustment lever (engagement of teeth in the adjustment mechanism), lower the lever, move the steering wheel by 1...3 mm tilting it in any direction, and fix the steering column by lifting the lever.

ATTENTION! *Do not adjust the steering column when driving the motor vehicle. After the adjustment, make sure that the steering column is securely locked in the new position.*

FLOOR TUNNEL WITH CONTROL KEYS

Covering of Power Base on Dashboard for Vehicles UAZ-236021 (Fig. 3.11)

1+ — **driver seat heating switches** . Heating of the corresponding seat is turned on by a short press on the switch. After that, the warning lamp comes on. Heating of the seat and the warning lamp turn off when the switch is pressed again, or when the ignition is turned off.

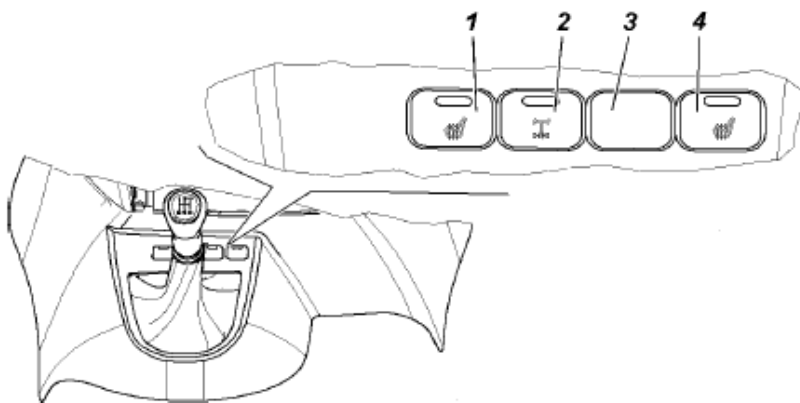



Fig. 3.11. Covering of Power Base on Dashboard with Control Keys (item description see in the text)




2+ — switch of the rear axle differential lock .



3 — cover plug.


4+ — passenger seat heating switches.  In case of doubled seat, the heating is performed only for the outermost passenger. When the heating is ON, the signaling indicator is ON, too.

Covering of Floor Tunnel of Vehicle UAZ-236022 (Fig. 3.12)

1+ — switch of the rear axle differential lock.

To enable the lock, press and hold buttons 1 (Fig. 3.12) or 2 (Fig. 3.11) until the instrument cluster signaling indicator  of the rear axle differential lock is activated. On lorries UAZ-236022 (with a transfer case), preliminary switch the transfer case to the 4x4 mode. When the lock is activated, the ABS automatically turns off. As a result, the ABS fault indicator  (Fig. 3.5) switches on, and the text message "Antilock Brake System is OFF" is displayed on the instrument cluster LCD. Manual deactivation of the lock is possible at any time by repeated pressing on and holding of buttons 1 (Fig. 3.12) or 2 (Fig. 3.11) until the rear axle differential lock signaling indicator  turns off.

In addition, the switching off occurs automatically when ignition the is turned off, or when speed exceeds 30 km/h. After the locking is switched off, signaling indicators  and  in the instrument cluster (Fig. 3.5) go out.

Diagnostics of the locking control system is carried out by the engine control unit after the lock is switched on. In the event of malfunctions, the engine fault indicator  in the instrument cluster is activated (Fig. 3.5). The fault codes are read out using a diagnostic scanner-tester intended for diagnostics of UAZ vehicles.

2+ — front seat heater switches.

3 — glove box.

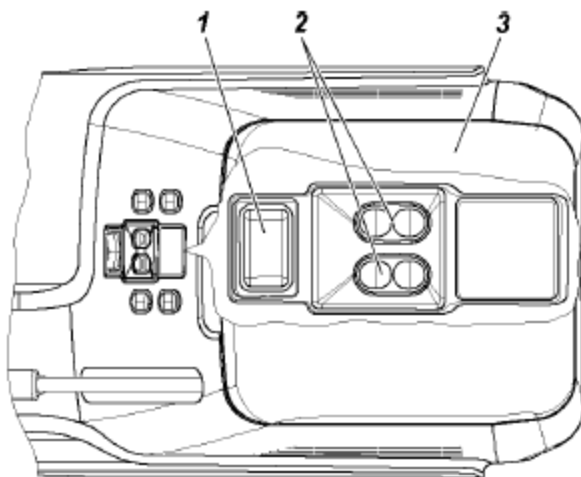


Fig. 3.12. Floor Standing Box with Control Keys (see item description in the text)

MOTOR VEHICLE ELECTRONIC ANTI-THEFT SYSTEM WITH ENGINE CONTROL UNIT M 86

Operation of Immobilization System

The vehicles are supplied with one master key with a transponder and one or more work code keys (with a remote control or with built-in transponders). For operation of the remote control and the transponder of the code key (CK) in the vehicle, they should be activated ("taught") using the master key. In one teaching procedure, it is possible to teach simultaneously up to eight CKs, including one master key and seven work ones. Master key status acquires the first key with the transponder, from which the teaching procedure was started and successfully completed.

Each time when the ignition is started up, the immobilizer reads via the antenna in the ignition switch the CK code using the transponder channel, decrypts the request issued by the control system controller of the internal combustion engine (ECSC), which is received via the CAN bus, and transmits the key reading result in an encrypted form to the ECSC via the CAN bus (whether the engine start is enabled or disabled).

The components of the immobilization system can be in the following states:

- initial;
- taught.

"Initial" state is the status at the moment of shipment from the factory of the immobilizer, ECSC, and CK.

In the "initial" state of the immobilization system, the so-called "free start" of the ICE (Internal Combustion Engine) is available.

The "taught" state comes into force after the successful completion of the teaching procedure.

In the taught state, after the ignition switch turning on, the immobilization system can be in the following states:

- locked;
- unlocked.

"Locked" state is the status, when the immobilization system is taught, and the ICE start is inhibited. The immobilization system switches over to this state in the following cases:

- after ignition is turned off;

- after the ignition start up, the immobilizer could not identify the CK (the immobilizer will store the fault code, which can be read out using a diagnostic tester);

- after the ignition start up, the immobilizer identified the "foreign" CK (the immobilizer will store the fault code, which can be read out using a diagnostic tester);


- after the ignition start up, the immobilizer did not receive a request from the ECSC (the immobilizer will store the fault code, which can be read out using a diagnostic tester);


- after the ignition start up, the immobilizer could not decipher the ECSC request (the immobilizer will store the fault code, which can be read out using a diagnostic tester);

- after a power failure.


"Unlocked" state is the status, when the immobilization system is taught and the ICE start is enabled. The immobilization system comes to this state after the ignition start up by a code key taught in this immobilization system.


The immobilizer diagnostic system during its operation registers, stores in memory, and transmits detected faults after a request of the diagnostic tester. Fault codes of the immobilizer are as follows:

Current states of the immobilizer are indicated by the immobilizer's signaling indicator  at the vehicle's instrument cluster and by the immobilizer's sound signal. After the ignition is started up (position "I" of the ignition switch), there is always a test turning on of this signaling indicator by the immobilizer for about 1.5 seconds.


If the immobilization system is not taught (it is in the initial state), then after the ignition switch is turned on for 1.5 seconds, the immobilizer activation signaling indicator  switches on, remains ON for 15 seconds, and then goes out.

If the immobilization system is taught:

- if the ignition switch is turned on by a key taught in this immobilization system, then after the turning on of the ignition switch, the immobilizer activation signaling indicator  turns on for 1.5 seconds and then goes out. Engine start is enabled;

- if the ignition switch is turned on by a key not taught in this immobilization system, then after turning on of the ignition switch, the immobilizer activation signaling indicator  is turned on for 1.5 seconds and remains permanently ON. At the same time, twice during 20 seconds, with periodicity of 10 seconds, either a single sound signal (CK is not read) or a triple audio signal (CK is read, but it is not in the list of the taught keys) are generated. The engine start is not allowed (the fault code is stored in the immobilizer memory and can be read using the diagnostic tester);

- if, after the ignition switch is turned on, a request from the ECSC is absent, then the signaling indicator lights up for 1.5 seconds and remains permanently ON; and twice during 20 seconds, with periodicity of 10 seconds, a double sound is generated. The engine start is not allowed (the fault code is stored in the immobilizer memory, and can be read using the diagnostic tester);

- if after turning on of the ignition switch, the immobilizer could not decrypt the request from the ECSC, then the immobilizer activation signaling indicator  switches on for 1.5 seconds and remains permanently ON; and twice during 20 seconds, with periodicity of 10 seconds, a four-time audio signal is generated. The engine start is not allowed (the fault code is stored in the immobilizer memory and can be read using the diagnostic tester).

If in a taught immobilization system, the immobilizer and/or ECSC and/or work CKs are replaced with new ones in the "initial" state, it is necessary to conduct a teaching procedure of the immobilization system.

In case of the ignition switch replacement, it is necessary to change the transponders in the set of keys of the new ignition switch with transponders from the key set of the old ignition switch.


If it is needed to add one work CK to the taught immobilization system, it is necessary to carry out an additional teaching procedure. For this purpose, it is necessary to use CK in the "initial" state.


"Teaching" of Immobilization and Remote Control System

ATTENTION! *Before the start of "teaching," the keys should not be in one bundle.*

1. Sit on the driver's seat and close all the doors of the vehicle.

2. Switch on the ignition with a master key (with a red insert at the end).
3. Switch off the ignition and remove the master key from the ignition switch.

4. Turn the ignition on with a work key, the immobilizer signal lamp  should start to flash rapidly.

ATTENTION! *Maximum duration of the interval between the ignition switching off and on should be 6 seconds. If this time was exceeded, the teaching procedure will be stopped, and in this case, the procedure should be repeated from step 2 without changing the system components: ECSC — immobilizer — CK. If this time was not exceeded, but the signaling indicator  of the immobilizer switching on did not start flashing, the work key is either defective or has been previously taught in another vehicle.*

If the teaching process is successfully continued, three beeps should sound, and in about 6 seconds, two additional beeps should be repeated.

5. Switch off the ignition and remove the work key from the ignition switch.


If "teaching" of additional work keys is not required, go to step 6. If there is a need in "teaching" of additional keys, then for all taught ones go to step 4, after which move to step 6.

ATTENTION! *In each teaching procedure, all work keys intended for use in the given vehicle should participate, as after completion of the succeeding teaching procedure, information on keys taught in the previous teaching procedure is erased from the immobilizer's memory.*

It is possible to teach maximum 7 work keys (4 keys with a remote control).

6. Turn the ignition on with the master key.


ATTENTION! *Maximum duration of the interval between the ignition turning off and on should be 6 seconds. If this time was exceeded, flashing of the signaling indicator will be stopped, and in this case, the procedure should be repeated from step 2 without changing the system components: ECSC — immobilizer — CK.*

Three beeps should sound, and in about 6 seconds, two additional beeps should be repeated, signaling indicator  of the immobilizer switching on should flash rapidly.

7. Turn the ignition off. Do not remove the master key from the lock after ignition turning off. A single beep should sound.

8. Turn the ignition on with the master key.


ATTENTION! *Maximum duration of the interval between the single beep and ignition switching on by the master key should be 10 seconds. If this time was exceeded, the teaching procedure will be stopped, and in this case, the procedure should be repeated from step 5.2 without changing the system components: ECSC — immobilizer — CK.*

Three beeps of the immobilizer should sound, signaling indicator  of the immobilizer switching on should stop flashing.

ATTENTION! *When step 8 is being executed, after the ignition is switched on, there starts the process of memorizing of codes in the ECSC, immobilizer, and power pack control unit (if CKs with a remote control participated in the teaching procedure); therefore, it is absolutely impossible to switch off the ignition without three confirming sounds of the immobilizer. To ensure completion of the codes memorizing process, the holding time with the ignition on should be at least 5 seconds.*


9. Switch off the ignition and remove the master key, wait with ignition off for at least 5 seconds.


10. For work keys with a remote control check the control operation.

11. Check the immobilization system operation. Turn the ignition on with a "taught" work key, the signaling indicator  of the immobilizer switching on will turn on for 1.5 seconds and then go out. Perform a test start of the engine, the engine should start. At this moment, the teaching and inspection procedure is finished, the system is in good order and functions normally.

Additional Teaching of One Work Key in Immobilization and Remote Control Systems (if taught key has remote control)


ATTENTION! *Before the start of "teaching," the keys should not be in one bundle. The immobilization system should be taught.*


1. Sit on the driver's seat and close all doors of the vehicle.
2. Switch on the ignition with a master key (with a red insert at the end).
3. Turn the ignition on.
4. Turn the ignition on with a master key, the immobilizer signal lamp  should start to flash rapidly.

ATTENTION! *Maximum duration of the interval between the ignition off and on should be 6 seconds. Flashing of the signaling indicator  of the immobilizer ON indicates a successful continuation of the additional teaching procedure. Absence of flashing means that the procedure for additional teaching is not available (the work key is just used, the master key is faulty, or the master key is from another vehicle, the immobilizer is defective, there is no communication with ECSC, the immobilization system is not taught).*

5. Turn the ignition off with a master key and remove the master key from the ignition switch.


6. Turn the ignition on with the work key.

ATTENTION! *Maximum duration of the interval between the ignition off and on should be 6 seconds. If this time was exceeded, flashing of signaling indicator  of the immobilizer ON will be stopped, and in this case, the procedure should be repeated from step 6.2 without changing the system components: ECSC — immobilizer — CK. If this time was not exceeded, but the signaling indicator stopped flashing, the work key is either defective or has been previously taught in another vehicle.*

If the teaching process is successfully continued, three beeps should sound, and in about 6 seconds, two additional beeps should be repeated, signaling indicator  of the immobilizer switching on should continue flashing.

7. Switch the ignition off and remove the work key from the ignition switch.


8. Turn the ignition on with the master key.


ATTENTION! *Maximum duration of the interval between the ignition off and on should be 6 seconds. If this time was exceeded, flashing of signaling indicator  of the immobilizer ON will be stopped, and in this case, the procedure should be repeated from step 6.2 without changing the system components: ECSC — immobilizer — CK.*

Three beeps should sound, and in about 6 seconds, two additional beeps should be repeated, the signaling indicator should continue flashing.

9. Turn the ignition off. Do not remove the master key from the lock after the ignition turning off. A single beep should sound.

10. Turn the ignition on with the master key.


ATTENTION! *Maximum duration of the interval between the single beep and ignition switching on by the master key should be 10 seconds. If this time was exceeded, flashing of signaling indicator  of the immobilizer ON will be stopped, and in this case, the procedure should be repeated from step 2 without changing the system components: ECSC — immobilizer — CK.*

Three beeps of the immobilizer should sound, signaling indicator  of the immobilizer switching on should stop flashing.


ATTENTION! *When step 10 is being executed, after the ignition is switched on, there starts the process of memorizing of codes in the ECSC, immobilizer, and CU (power pack control unit) (if a CK with a remote control participated in the additional teaching procedure); therefore, it is absolutely impossible to switch the ignition off without three confirming sounds of the immobilizer. To ensure completion of the codes memorizing process, the holding time with ignition on should be at least 5 seconds.*

11. Switch the ignition off and remove the master key, wait with ignition off for at least 5 seconds.


12. For the work key with a remote control, check the control operation.

13. Check the immobilizer operation. Turn the ignition on with a "taught" work key, signaling indicator  of the immobilizer switching on will turn on for 1.5 seconds and then go out. Perform a test start of the engine, the engine should start. At this moment the teaching and inspection procedure is finished, the system is in good order and functions normally.


Checking of Number of Work Code Keys Taught in Immobilization System

1. Turn the ignition on by anyone taught in this system key (master key or any work one). Wait until signaling indicator  of the immobilizer switching on goes out.


2. Turn the ignition off within 5 seconds after its switching on.

3. Turn the ignition on within 5 seconds after its switching off by the same key. Wait until signaling indicator  of the immobilizer switching on goes out.


4. Turn the ignition off within 5 seconds after its switching on.



5. Turn the ignition on within 5 seconds after its switching off by the same key. Wait until signaling indicator  of the immobilizer switching on goes out.

6. Turn the ignition off within 5 seconds after its switching on.

7. Turn the ignition on within 5 seconds after its switching off by the same key. Wait until signaling indicator  of the immobilizer switching on goes out.

8. Turn the ignition off within 5 seconds after its switching on.

9. Turn the ignition on within 5 seconds after its switching off by the same key. Wait until signaling indicator  of the immobilizer switching on goes out.

The number of flashes counted from 1 second after the moment, when signaling indicator  of the immobilizer switching on has gone over, will correspond to the number of work keys taught in this system. Signaling indicator  of the immobilizer switching on turns on for 1 second per each taught work key. Each turning on of the signaling indicator is accompanied by an audible signal.

ATTENTION! *In case of turning on of the starter or failure to observe specified duration of operations or power dump, the immobilizer will stop the procedure of verification of the number of taught keys.*

POWER PACK CONTROL SYSTEM+

The system includes the power pack control unit (CU), the driver side door module (DSDM), and two keys: one with a remote control (RC) and another with a transponder.

Description of the electronic anti-theft system, key registration, and system operation is shown above in the chapter "Motor vehicle electronic anti-theft system..."

Attention! *Using the RCP in the absence of obstruction, it is possible to control the electrical interlocking system in the front, from the left and right side of the motor vehicle at a distance of 10 m, at rear, at distance of about 6 m.*

To prevent theft, use remote control in close proximity to the motor vehicle.

The control unit records, saves, and displays the detected malfunctions of the electrical interlocking system upon request of the diagnostic tester that has the respective software.

Do not subject the RCP to the action of increased electromagnetic emission.

To prevent malfunction, protect the RCP against detergents, fuels, oils and lubricants, water.

The electric interlocking system allows to "teach" up to four remote controls. Remote controls, while working with the electric interlocking system, are equivalent as per functional possibilities.

The teaching and educable control panel shall be separated from the shared bunch of taught and non-taught RCP and ignition keys with transponders when teaching the RCP.

Take measures to prevent RCPs loss.

It is prohibited to operate the system if there is a possibility of ingress of corrosive liquids, acids, water, oil, and petrol in the CU, DSDM, and remote control.


System functions:

- central locking and unlocking with the key;
- central door locking and unlocking from the inside of interior;
- door locking and unlocking from the RCP depending on the motor vehicle configuration;
- side door window lifting and lowering control;
- outside rear view mirror position adjustment control;

- interior lighting control (polite lighting) depending on the motor vehicle package;
- intrusion alarm system;
- motor vehicle search in an unlighted parking place;
- "Panic" signaling and prompt alarm;
- system trouble diagnostics via the motor vehicle diagnostic connector.

Operation procedure with the control system

Door locks locking and armed mode switching on using a remote control

To lock the door locks and activate the armed mode, shortly press button 3 (Fig. 3.13) on the remote control. In this case, the locks of all side doors will be locked, and the system will go into the armed mode, which is confirmed by a single blinking of direction indicators and slow flashing of the system signaling indicator  in the instrument cluster.

If any door or the hood are opened, when the armed mode is activated, the direction indicators are flashing three times, and a single beep is emitted. In order to include open zones in the security area, you should close them.

Door locks unlocking and armed mode switching off using the RCP

To unlock all door locks and to switch armed mode off, it is necessary to shortly press button 2 on the remote control. Switching the armed mode off is accompanied by a double blink of the turn indicators and interior lighting switching ON. If during the safeguarding period a violation of the security zone (with alarm actuation) was detected, a single audible signal will be sounded in addition to the turn indicator blinking

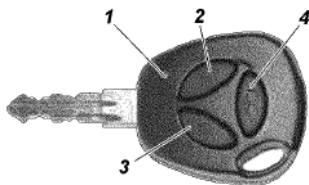



Fig. 3.13. Key with Remote Control:

- 1 — emission confirmation and control panel battery discharge indicator;
- 2 — lock unlocking and alarm switching off button;
- 3 — lock locking and alarm switching on button;
- 4 — horn button

If after door unlocking and switching the armed mode off none of the side doors are opened, and the ignition is not turned on, then in 30 seconds all doors will be automatically locked again, and the system will automatically switch over to the armed mode. Possibility of automatic switching over to the armed mode with door locking is indicated by frequent blinking of the system's signal indicator in the instrument cluster 

Unlocking the door locks from the RCP with side door window lowering

Unlocking of all side door locks with automatic opening of the side door glasses is carried out by pressing and holding until start of the glass movement of the corresponding button on the remote control (it may take approximately 2–3 seconds). The system carries out operations specified in the above mentioned items to unlock door locks and then performs automatic movement of the glasses of the side door windows thus opening them.

Every window movement is stopped automatically when reaching the limit stop in the extreme position or all window movement is stopped simultaneously by pressing any RCP button.

Movement of side door windows toward closing when locking the door locks through the system is not to be carried out in order to comply with the requirements of the international safety rules.

Locking / unlocking locks from outside the motor vehicle without switching on the armed mode

To lock the door locks without switching to the armed mode, it is necessary to lock by turning clockwise the key in the driver side door key hole. The locks of all side doors will be locked without the armed mode switching on. This type of locking is not accompanied by the turn indicator blinking.

Door locks are unlocked in the same way, the only difference is turning the key counter-clockwise.

Fast driver side door lock unlocking

The system can be switched over to the fast driver side door unlocking mode when, by single pressing button 2 of the RCP or turning the key in the driver side door key hole, only the driver side door is unlocked and, when pressing button 2 on the RCP or button 1 (Fig. 3.14) of the DSDM again, all other side doors and the T/gate are unlocked.

To switch on/off the fast unlocking mode, it is necessary to press button 1 of the DSDM within 1 second after the ignition turning on and hold it pressed (for at least 3 seconds) until the characteristic sound of the door locks triggered while opening. If later, the system should be switched over to the standard unlocking mode, it is necessary to repeat the above mentioned procedure.

Searching for the motor vehicle in an unlighted parking place

By single pressing and holding button 4 of the RCP (Fig. 3.13) the system blinks with T/signals two times, gives one horn, and switches interior lighting on for about 25 s.

Remote switching the alarm system on ("Panic")

To switch the alarm system on remotely, it is necessary to press button 4 of the RCP twice or hold it pressed for at least 2 seconds. The alarm system switches on for 5 s. To switch it off, press any button of the RCP.

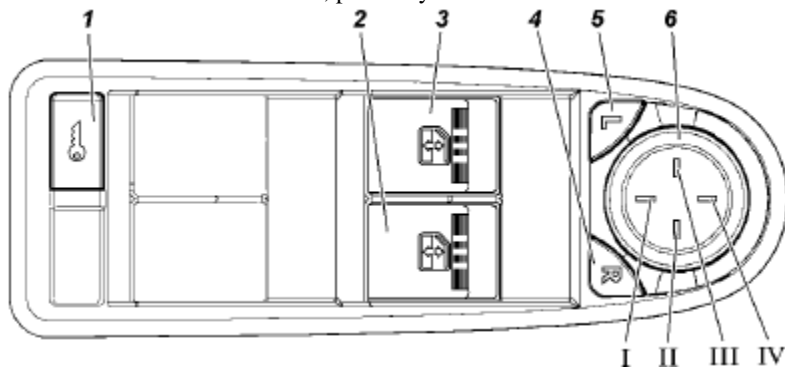


Fig. 3.14. Driver Side Door Switch Module with Multiplex Control:

1 — central door locking switch; 2 — window control switch of the passenger's door; 3 — window control switch of the driver's door; 4* — right mirror selection switch; 5* — left mirror selection switch; 6 — outside rear view mirror position control switch: I — mirror down; II — mirror right; III — mirror left; IV — mirror up

* - For vehicles equipped with electrically-driven mirrors, to disconnect it, press any button on the remote control.

Switching prompt alarm on

Switching the prompt alarm on is possible only when the ignition is ON. The switching on is performed by pressing button 4 of the remote control and holding it for at least 2 s. To switch the prompt alarm off, press any button of the remote control.

Locking and unlocking central door locks from interior

Locking of the locks of all doors from the vehicle interior is possible in 2 ways:

- sink the interlocking switch in the driver side door to lock, and pull the interlocking switch in the driver side door to unlock;
- press switch 1 (Fig. 3.14) of the DSDM. Every press either locks or unlocks the locks.

The central locking has door lock overheating protection. If locking or unlocking are performed many times over a short period of time, the system stops responding to switch pressing. If it has happened, the switch should not be pressed for some time (depends on overheating degree), after that, the system availability will be fully recovered. To ensure safety, the last command is always the unlock command.

In the fast unlocking mode, when opening the driver side door with the key, only the driver side door is unlocked; to unlock passenger doors and the T/gate, press button 2 of the RCP or switch 1 of the DSDM.

Side door window position control

Position of all side door windows is controlled in the same way.

Window glass position is controlled by the switches located on the armrests of the respective motor vehicle doors. Side door window positions are controlled by switches 2 and 3 (Fig. 3.14) located on the driver's seat armrest.

If a driver and a passenger simultaneously control any door window position, the command from the DSDM switches has priority.

The side door window position control subsystem has the overheating protection. If window movement commands are issued many times, after a while the subsystem stops responding to switch pressing. If it has happened, the respective window control switch should not be pressed for some time (depends on overheating degree), and after that, the system availability will be fully recovered.

Side door window position is controlled only with the ignition started up and 30 seconds after ignition is shut if no motor vehicle side doors were opened.

Window position control from the switches in the doors is not possible when the armed mode is switched on.

Operation of exterior mirror adjustment electric drive

Control of the electric drives of the left and right exterior mirrors is performed by a single switch 6 (Fig 3.14) located on the DSDM. Choice of the mirror to be adjusted by commands from the mirror switch is performed by one of the switches 6 or 7 of the DSDM — the mirror selection buttons. Simultaneous adjustment of the left and right mirror positions is not possible.

Indication of readiness for adjustment of the selected mirror is yellow backlighting of the corresponding selection button. Mirror adjustment is disabled automatically (yellow illumination of the mirror selection button goes out), if switch 9 is not pressed for over 10 seconds, and the mirror selection switches have not been pressed.

Exterior mirror position adjustment is possible only with the ignition started up or 30 seconds after shutting the ignition down, if neither of the side doors of the motor vehicle was opened.

Mirror control is not possible when the armed mode is switched on.

System operation in armed mode

When the armed mode is switched on, the system monitors the states of the following security zones:

- side doors;
- hood;
- ignition switch;
- driver side door lock;
- accumulator battery voltage.

If any of the following actions take place in the armed mode:

- opening of any side door;
- hood opening;
- ignition switching on;
- driver side door unlocking;

- in case of accumulator battery connection after its disconnection, the alarm system switches on generating a light alarm by turn indicators and an audible alarm by standard horn of the motor vehicle with duration of about 30 s.

Single pressing of any button on the remote control when the system is in the alarm mode leads to interruption of the alarm signal sending, while the system remains in the armed mode. The armed mode is switched off after button 2 on the remote control is pressed.

Remote Control Battery Replacement

A lithium battery of CR2032 type is installed in the remote control. Its initial voltage is 3 V. If the remote control supply voltage is within normal range, indicator 1 blinks with every pressing of any button on the control panel. If the indicator lights up with two short blinks or does not light up at all when pressing any button, the battery should be replaced.

For this purpose, unscrew screw 1 (Fig. 3.15) from the housing side, opposite to the control buttons; using a flat screwdriver, separate the housing halves; pull the board out of the housing; replace battery 2 observing connection polarity; insert the board into the housing; clip the housing's halves and tighten the screw.

RCP code re-synchronization

When the control panel's buttons are pressed out of the radio channel range, the floating code counter in the control panel falls out of synchronization with respect to the counter in the system control unit. If the number of control panel button pressings outside the system reception signal range has exceeded 1,000, the system stops responding to control panel commands. In this case the full system teaching procedure should be carried out. If the number of control panel

button pressings performed outside the system reception signal range exceeds 1,000, the system stops responding to the control panel commands.

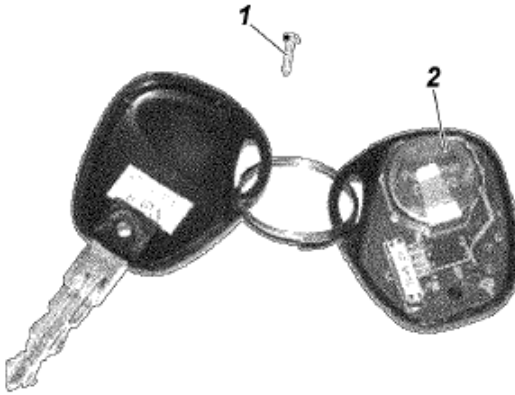


Fig. 3.15. Remote control panel:
1 — screw; 2 — power supply
element

In this case, the full system teaching procedure should be carried out.

Full system teaching

In case of full system teaching, all previously recorded control panel codes will be deleted, and new ones will be recorded instead. Full teaching is performed when one of the control panels is lost, and it is necessary to delete it from the system. To log on in the teaching mode, use any remote control which was taught in the system and has the synchronization counter agreed with the control unit. The remote control with which the teaching has been initiated becomes educative in this teaching session. When the teaching procedure is violated, the system logs out of the teaching mode without any results saved, and the system status indicator in the instrument cluster goes out.

Full teaching is performed in the following order:

1. Deactivate system security system.
2. Leave one of the doors open.
3. Start up the ignition.
4. Max. 1.5 s after starting up the ignition, press button 4 on the control panel to be taught and hold it pressed.
5. Wait until the system status signal device in the cluster starts blinking fast, indicating that the teaching process has started (about 3 s after pressing button 4).
6. Not later than 3 seconds after the indicator starts blinking, press button 2 once, while holding button 4. The system status signaling indicator stops blinking and is continuously lit. Release button 4.

7. Within max. 3 s, cycle the ignition.
8. Within max. 3 s after starting up the ignition, press button 4 on the control panel to be taught and hold it pressed.
9. Wait until the system status signal device in the cluster starts blinking fast (about 3 s after pressing button 4).
10. Within max. 3 seconds after the indicator starts blinking, press button 2 once, while holding button 4. The system status signaling indicator stops blinking and is continuously lit. Release button 4.
11. Within max. 3 s, cycle the ignition.
12. Repeat items 8–11 to teach other RCPs, the number of which can be from 0 to 3. The same control panel in the teaching mode is registered in the system only once; therefore, if the system detects that this RCP has already been registered in the current teaching mode, the teaching mode is logged out without data saving.
13. When the required number of RCPs are registered in the system, it is necessary to finish teaching using the teaching key. To do so, within 3 s after switching the ignition on, press button 4 on the teaching control panel and hold it pressed. Successful completion of teaching is accompanied by triple T/signal blinking, a short horn, and system status signal device blinking in the cluster, the number of flashes of which is equal to the number of RCPs to be taught in the current teaching mode.

Fast system teaching

The difference between fast system teaching and full teaching is that the already taught RCPs are not deleted. New RCP codes are written in free memory cells, the total number of the taught keys shall not exceed four. For fast teaching, it is necessary to deactivate the security system and close all doors, and then perform items 3–13 described in section "*Full system teaching.*"

VEHICLE INTERIOR AND BODY EQUIPMENT

Interior heating, ventilation, and conditioning

Interior ventilation and heating are regulated depending on the outside air temperature with mixing of cold and heated air. These processes are maintained practically at a constant level at all speeds of the vehicle.

In Fig. 3.16, the controls of ventilation and heating system of the vehicle interior are presented.

- 1 - dashboard side deflector.**
- 2 - blowing (heating) nozzle of the windshield.**
- 3 - dashboard central deflector.**
- 4 - control unit for heating and ventilation.**
- 5 - control knob of (horizontal) flaps.**
- 6 - control lever of the central flap.**

Interior heating, ventilation, and conditioning are operated with the help of controls (Figs. 3.17 a, b) that are the main control devices.

Controls diagnose errors and inform the driver about them.

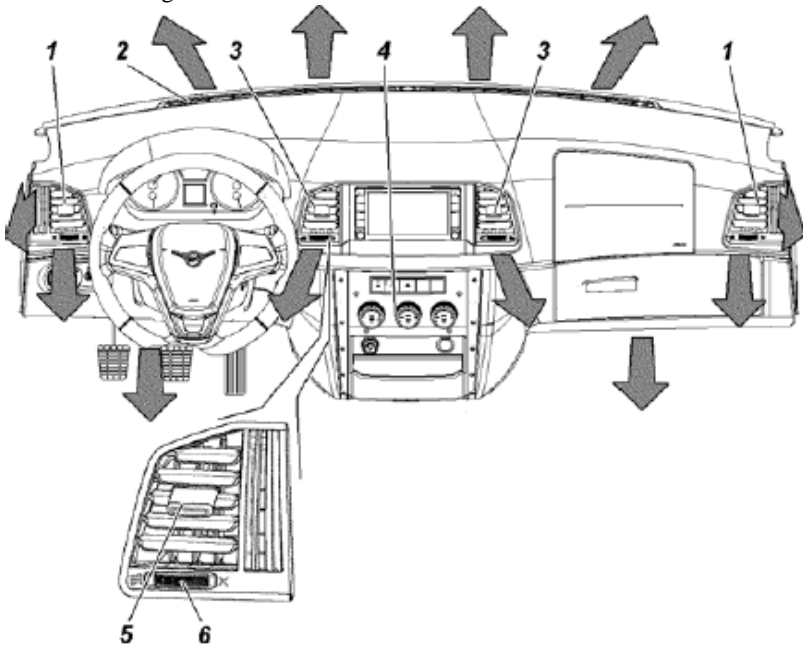


Fig. 3.16 Controls of Interior Ventilation and Heating System (item description see in the text)


Control Panel (Fig. 3.17)


1 — rotary switch controlling temperature of supply air.


Warm air from the right, cool air from the left.


2 — rotary switch for air flow distribution (Figs. 3.21 a, b).


The switch has five fixed positions. Each position corresponds to a specific distribution of air currents in the motor vehicle interior:

 — interior and feet air cooling via deflectors, if flaps are open.

 — interior air cooling via deflectors, if flaps are open;

 — windscreen air cooling;

 — windscreen and feet air cooling;

 — feet air cooling.

Direction of the air current can be changed via small levers 6 (Fig. 3.16) on the deflectors.

3 — rotary switch for fan control.

Position 0 (the fan is OFF).

Other positions: steps 1 ~ 7.

4 — pushbutton switch of modes "fresh air — recirculation" (Fig. 3.17) with a light indicator.

The pushbutton in the fan control knob allows to switch the mode between air intake and recirculation.

5 — pushbutton switch of intensity of the windscreen heating. Transfers the airflow to the windscreen.

The pushbutton in the mode knob can direct the fan directly to the windscreen.

6 — rotary switch marker.

7 — air conditioning pushbutton switch (Fig. 3.17 b) with a light indicator.

The air conditioner pushbutton in the temperature control knob can turn the air conditioning compressor on or off.

The heating and ventilation system is equipped with a filter for outside air cleaning.

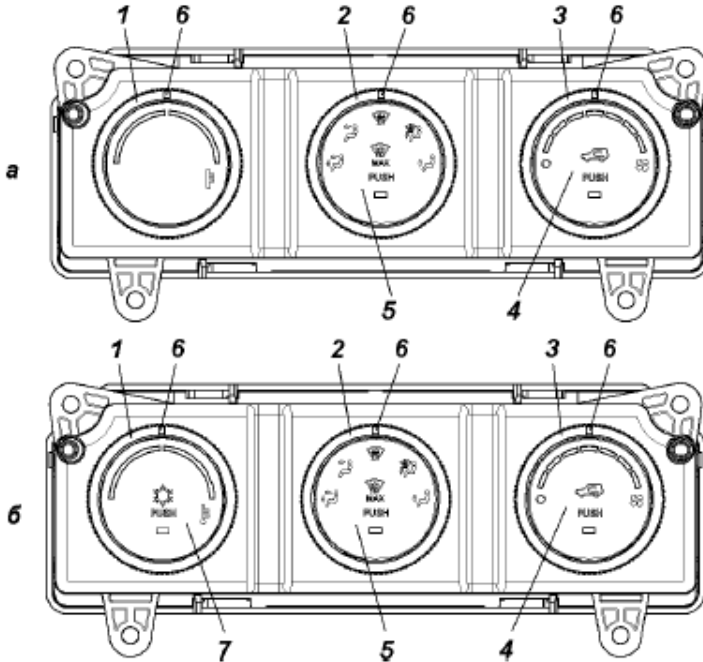


Fig. 3.17. Heater control panel:

- a — control unit of the ventilation and heating system;
 - b — control unit of the ventilation and heating system with interior air conditioning.
- (See item description in the text)

Access to the filtering element is provided below the dashboard, at the feet of the front passenger.

Changing of filtering element 5 (Fig. 3.18) should be performed as follows:

- force latches 3 away from cover 4 and remove the cover;
- replace filtering element 5;
- lock filter cover 4.

ATTENTION! Using the operation modes of the heater fan from above average to maximum output rate in pouring rain conditions can result in soaking of the air-intake filter and ingress of moisture at the feet of the front passenger.

Interior ventilation

Blowing ventilation of the interior is performed via the same channels, when handle 1 of the switch is placed in the leftmost position (Fig. 3.17).

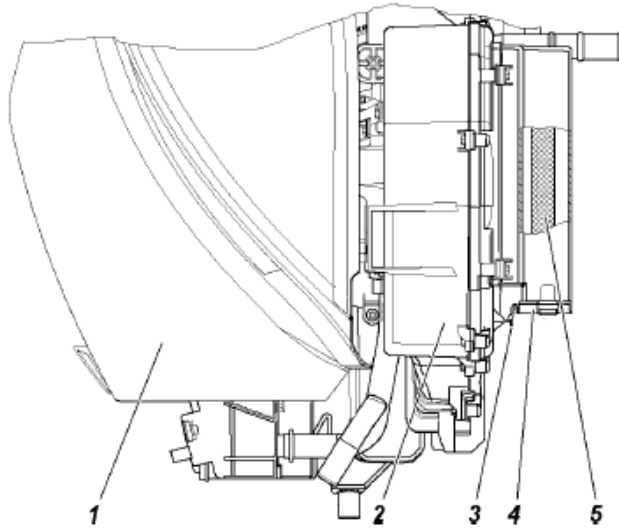


Fig. 3.18. Fan:

1 — dashboard; 2 — fan; 3 — cover latches; 4 — filter cover; 5 — filtering element

Drawing ventilation is performed via air holes in the upholstery at the rear surface, via ventilation grille with valves at the cab sides, as well as through the rolled down door windows.

Fan Drive Control

There is manual adjustment of the direction of distribution of air flows, as well as possibility of turning on/off of the air conditioner and recirculation mode.

Control panel operation modes (Fig. 3.17)

"Manual" operation mode is the main one for the control panel.

When fan switch 3 (Fig. 3.17) is rotated within divisions 1 and 8, the system switches over to manual adjustment, and the fan speed is increased by one division up or down within the scale.

When this mode is switched on, the control panel scans state of the control elements (rotary switches 1, 2, and 3) and, depending on their positions, works in accordance with the prescribed operation algorithm, determines condition of the recirculation flap switch 4, air conditioner switch 7, as well as of the rotary switches.

"Intensive windscreen heating" mode is turned on by switch 5 (Fig. 3.17), transmitting a signal to the control panel, which generates and transmits the control signals to the actuators that are necessary for the control panel switching to this mode.

In this mode, the control panel transfers the air distribution flap to position "To the window," and the choke flap to the position, which corresponds to the 8th position of switch 1 (Fig. 3.17). In this case, the fan rotation speed corresponds to the 7th position of switch 3. In this mode, the control panel does not react to changes in positions of the rotary switches.

If the control panel operating in "Intensive windscreen heating" mode receives a signal to switch on a conditioner, then the conditioner will be turned on, and the system will perform air drying.

"Interior preheating" + mode.

The control panel goes to "Interior preheating" mode if the source of power is the liquid heater.

While operating in this mode with ignition switched off, the control panel performs indication of this mode. Indication is carried out by turning on of the orange blinking backlight on pushbutton switch 4 with periodicity of 4.5 s (1.5 s on / 3 s off).

If the position of rotary switch 3 exceeds position 4 of the switch, then the control panel limits the maximum rotation speed of the fan and rotary switch 3 goes to the 4th position in order to prevent forced accumulator battery discharge.

If rotary switch 3 is turned to "OFF" position, then the rotary speed of the fan corresponds to position 2 of rotary switch 3 (i.e. the fan is rotating at minimum speed).

When the "Preheating interior" mode is turning on, the heater flaps go to the following positions:

- air current distribution flaps to "At the feet" position;
- recirculation flap to "Opened" position (air induction from the motor vehicle interior);
- choke flap to "Maximum opened" position (maximum air temperature).

After 5 minutes of operation with the above described positions of the flaps, the control panel transfers the air distribution flaps to position "To the window and at the feet." The control panel remains in this operation mode with current flap positions until the liquid pre-start heater is turned off or ignition is switched on.

If the ignition is turned on before the liquid pre-start heater is switched off, the control panel automatically goes to "Manual" operation mode, and states of the actuating elements are adjusted in accordance with positions of the control elements of the control panels.

Air conditioner

The air conditioner is installed in dependence on the vehicle configuration.

The air conditioner is switched on by button 7 (Fig. 3.17 b).

The control panel switches on the air conditioner if the air temperature at the evaporator output is above or equal to 7 °C. If the air conditioner is operating, and the air temperature decreases to 4 °C or lower, it turns off regardless of the A/C switch position.

When the control panel receives the signal from the A/C switch to turn off the air conditioner, the control panel turns it off.

Recirculation mode can be activated with a button for more effective cooling (air induction from the motor vehicle interior).

WARNING! Prolonged usage of the recirculation mode can cause window fogging and stuffy air in the interior.

ATTENTION! *Turn the air conditioner on even during cold seasons at least one to two times per month for 5–10 minutes. It will provide the required compressor lubrication and extend the service life of the system.*

ATTENTION! *In order to prevent the engine from overheating when the air conditioner continuously works while the engine runs at idle, and when moving in severe conditions with the engine load near to full, there is the automatic switching off of the air conditioner compressor with loss of the interior cooling efficiency.*

In order to improve the air conditioner efficiency in the given operating conditions, it is recommended to increase the rotation speed of the climate control fan by turning switch 3 (Fig. 3.17), as well as to switch the "Air recirculation" mode on for a short period of time (5–10 minutes).

One of the features of the system (for vehicles with A/C) is the availability of the cooling function of the glove box. To cool the box, you need to set the rotary toggle switch 4 (Fig 3.19) to "Open" position.

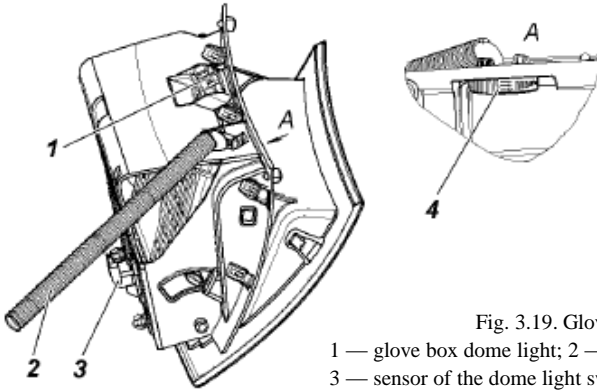


Fig. 3.19. Glove Box:


1 — glove box dome light; 2 — chilled air supply tube;
3 — sensor of the dome light switching off; 4 — toggle switch of cooling of the glove box

Lighting lamps

Cab lighting is performed by unit of pilot lamps 3 (Fig. 3.20).

The pilot lamps unit includes sections of individual lighting for the driver and front passenger. Left and right sections of individual lighting can be turned on by pressing of switches 1 or 3 respectively (Fig. 3.21).

Operation mode of the cab general lighting depends on switch 2 position:

 — the ceiling lamp turns on and off automatically when you open or close the doors. The interior ceiling lamp is on if any of the motor vehicle doors are open. After the closure of all the doors, the interior ceiling lamp lights for 25 seconds (depending on the configuration) and then smoothly goes out during 2 seconds.

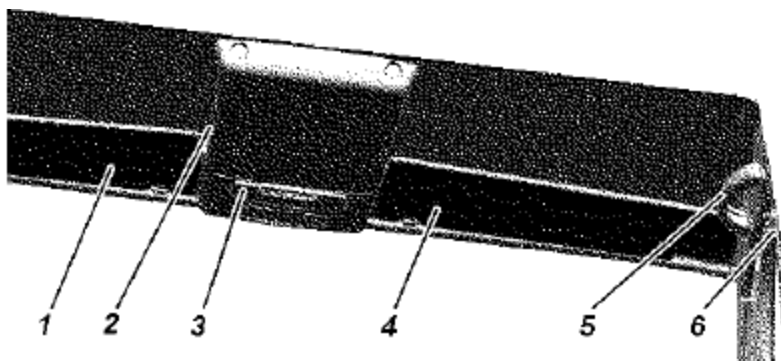


Fig. 3.20. Ceiling lamp, sun visors, and handrail:

1 and 4 — sun visors; 2 — document shelf; 3 — unit of pilot lamps; 5 — handrail; 6 — seat belt height adjuster

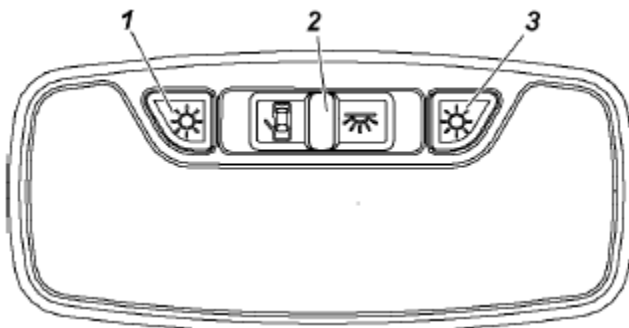


Fig. 3.21. Interior space lighting unit:

1 — left section switch; 2 — general lighting mode switch; 3 — right section switch



— the lamp is on until it is switched off.

When switch 2 is in mid-position, the lamp switches off.

Lighting control ("polite" light) with smooth change of brightness during 2 seconds when turning on and off of the interior lighting lamps is carried out:

- while opening of any of the doors;
- when turning on and off the "Security" mode via a radio channel of the remote control panel;
- when receiving "Find motor vehicle in unlighted parking area" command via remote control panel;
- when starting up the ignition, after all the doors have been closed, while the lamp is still in "on" position;


- within 25 seconds after the closure of all the doors if during this period the ignition is not switched on, all the doors remain closed, and the "Security" mode is not switched on via a radio channel of the remote control panel;

- in 10 minutes when one or two doors are constantly open (unless during this period all the doors get closed, and the ignition is switched on).

The lighting turns on when the ignition is turned off and the doors are open, and also for not more than 25 seconds after all the doors are closed.

When the ignition is switched on, the cab lighting is on only if at least one door is open.

Exterior rearview mirrors

Selection of the optimal position of the exterior mirror is performed with switch 6 (Fig. 3.14) or with the help of manual adjustment (depending on the configuration). Rearview mirror heating is activated by switch  positioned on the dashboard.

In order to reduce the motor vehicle size when parking in tight space, it is necessary to fold in the exterior rearview mirrors to the side doors of the motor vehicle.

The mirror is folded by applying force to the furthest edge from the base of the cover or body, parallel to the mating line of the body with the cover (Fig. 3.22).

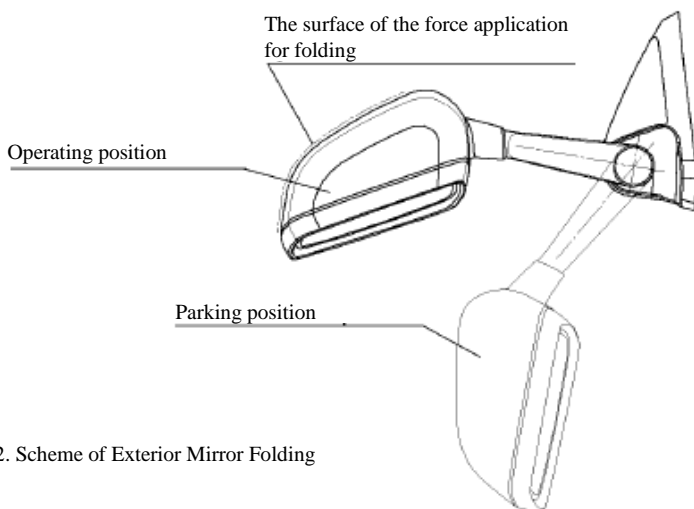


Fig. 3.22. Scheme of Exterior Mirror Folding

Sun visors (Fig. 3.20)

In case of necessity, we recommend to position the sun visors in either of the two positions: flip the sun visor into its downward position or flip it down and turn toward the side door.

Doors

ATTENTION! *Before opening a door, ensure that it will not be a hindrance for other road users.*

Before closing a door, make sure it will not pinch someone or something.

Driver's door is locked / unlocked with a key from the outside. To do this, insert the key into the lock switch 1 (Fig. 3.23). In this case, turning of the key clockwise locks the lock, and turning of the key counter-clockwise unlocks the lock. To open the door, when it is not locked, pull movable part 2 (Fig. 3.23) of the door handle. To make door opening more convenient, it is recommended, while pulling out movable part 2 of the outer handle of the door, to rely with the hand thumb on the body of the door handle 3 (Fig. 3.23).

The door opens from the inside when turning handle 2 (Fig. 3.24) toward yourself.

To lock / unlock the doors press / raise button 1 (Fig. 3.24).

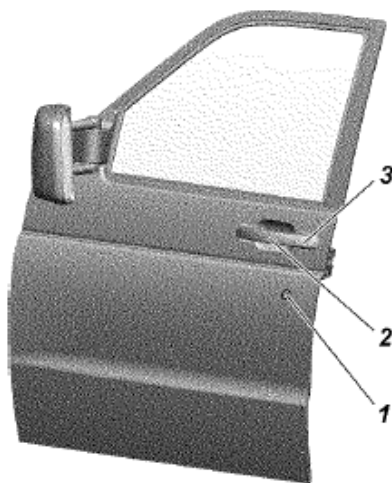


Fig. 3.23. Front door (view from outside):
1 — door lock switch; 2 — movable part of the door handle; 3 — door handle body

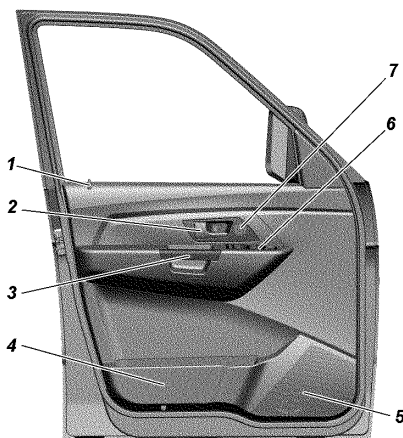


Fig. 3.24. Front door (view from interior):
 1 — locking button; 2 — door handle; 3 —
 armrest handle; 4 — pocket; 5 — place for
 loud-speaker mounting; 6 — switch unit
 (Figs. 3.9, 3.23); 7+ — place for twitter
 mounting

The motor vehicle is equipped with an electric blocking system of the door locks. When locking / unlocking the front left door with a key, all the door locks are locked / unlocked simultaneously. Every door (except the left one) can be locked or unlocked individually from inside the cab with use of the corresponding door locking button.

ATTENTION! *When leaving the motor vehicle, do not leave the door key or ignition key inside it. Passengers inside the motor vehicle, especially children, can accidentally lock all the doors.*

The locks of the doors can be blocked only when the door is locked (to prevent accidental leaving the key inside the interior).

The windows of the side doors go up and down with the help of the power window switches 2 and 3 (Fig. 3.14).

ATTENTION! *When closing the power windows, fingers or other body parts may be caught, which can lead to a serious injury. Therefore, pay attention when using the power windows, especially if there are children in the motor vehicle. If there is a child in the motor vehicle, make sure there are no body parts of the child in the window aperture when opening / closing the window. If a body part is caught, it is necessary to stop closing the window immediately and start to open it.*

The driver bears full responsibility for inappropriate usage of the power windows. The driver should inform the passengers about the directions of use and dangers when the power windows are used inappropriately.

Do not allow children to use power window switches! Do not hang hands or other body parts out of the open window, keep children from doing this.

When leaving the motor vehicle, it is necessary to take out the ignition key in order to turn off the power windows and prevent the passengers left in the motor vehicle from getting injured accidentally. If the key was left inside the motor vehicle, the system warns the driver about it by making the immobilizer buzzer to produce beeping sounds when the driver's door is open. Never close the motor vehicle from the outside if there are passengers inside it — it will not be possible to open the windows from inside the motor vehicle.

When closing / opening the windows, keep in mind the safety requirements.

Successful performance of the power windows depends on the cleanliness of the windows.

Seats

ATTENTION! *Do not adjust the driver seat when driving the motor vehicle.*

While driving the vehicle, the seatbacks of all passengers should be in an upright position, convenient for passengers, and the passengers themselves should sit comfortably, leaning back, and be properly fastened with seat belts.

The driver's seat and the position of the steering column should be adjusted so as to ensure a correct seating: the driver should tightly rely on the back rest of the seat; elbow joints of both arms should be slightly bent when holding the upper part of the steering wheel; the legs should not be extended at full length when pressing the pedal as far as it can go.

Do not let the vehicle driving if any of passengers is sitting improperly. Persons sitting and held by the seat belts inappropriately can be seriously injured in the event of emergency braking or collision.

The seat headrests should be adjusted so that the back of the head touches the midpoint of the headrest when the head rests upon it. If it is not possible, the headrest should be raised to the uppermost position for very tall persons and lowered to the lowermost position for very small persons.

After adjusting the positions of the front seats, it is necessary to adjust the position of the upper mounting points of the seat belts.

It is forbidden to sit on the knees and load the individual points of the seat in different ways so as not to damage the heating elements.

Do not use the heating mode, if the seats are not occupied by passengers or there are any items such as a special baby seat, bag, etc. This may cause a malfunction of the heating elements of the seat heating system. It is recommended to switch the seat heating system on only when the engine is started. It significantly saves the accumulator battery capacity.

Do not use additional pillows between the seat and the passenger or the driver.

It is forbidden to place foreign objects under the driver's seat and in the area of his feet.

A set of seats installed in the cab includes the following: a driver's seat, a single or two-seater passenger seat (depending on the configuration).

The headrests of the driver's and passenger's seats (the right passenger in the double seat) are removable and adjustable by height. The headrests have tubular members inserted into the backrest frame guides. The height is adjusted by the locking mechanism stopper being inserted into the tubular member notches. The shape of operational notches allows moving the headrest upwards without using the locking mechanism. The last notch differs by the profile from work notches in order to reliably lock the headrest in the uppermost position.

Movement of the headrest of the driver and passenger of a single seat is performed as follows:

- up — by arm force (to the uppermost position);
- down — when the button of the headrest lock is switched on.

Movement of the headrest of the right passenger of a double seat is performed as follows:

- up — by arm force (to the uppermost position);
- down — by arm force (to the lowest position).

Removal of the headrest of the driver seat and passenger single seat is performed by moving upward from the uppermost position with the button of the headrest lock being pressed.

Removal of the headrest of the right passenger of the double seat is carried out by moving from the uppermost position to the top with application of a greater force than one developed while moving.

Driver's and passenger's single seats have the following adjustment mechanisms:

- lengthwise adjustment mechanism with two-sided locking;
- Keiper-type backrest angle adjustment mechanism.

Lengthwise position adjustment of the driver's and passenger's seats (single seat) is performed via slide rails by moving a slider fastened on the seat frame against a fixed guide of the slide rails rigidly fastened to a box-shaped support. The slide rails are blocked by two-sided locking mechanisms located on the sliding bars, using their teeth to enter slots on the seat railing comb. Actuation is performed by a spring-loaded lever 1 (Fig. 3.25) located in front of the seat cushion. The lever activates both slide locking mechanisms simultaneously.

Backrest angle is adjusted steplessly by turning handle 3 at the backrest base. For this purpose it is necessary to:

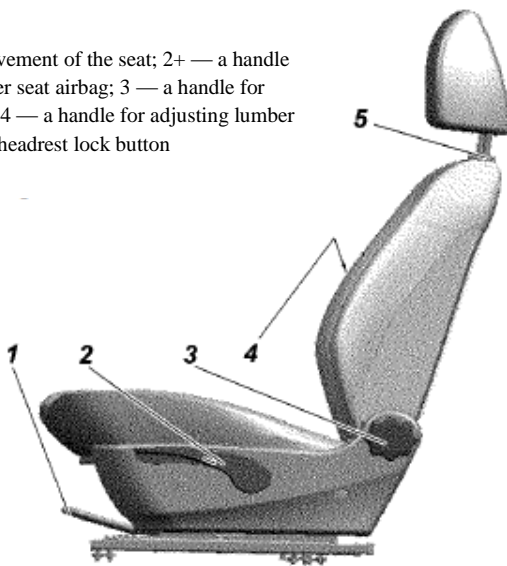
- push the seat forward until it stops with your feet in the dashboard;
- adjust the angle of the seat by handle 3 rotation;
- return the seat to its original position.

For your convenience, make the adjustments with the door open.

For the two-seat passenger seat, the longitudinal adjustment and adjustment of the angle of inclination of the backrest are not provided.

Fig. 3.25. Front seat:

1 — a catch for locking lateral movement of the seat; 2+ — a handle for adjusting the height of the driver seat airbag; 3 — a handle for adjusting the tilt of the seat squab; 4 — a handle for adjusting lumbar support of driver seat airbag; 5 — headrest lock button



Under the double seat of passengers, there is an organizer (depending on the configuration). Access is provided via the seat cushion lifting up.

The driver's seat in some motor vehicle configurations is equipped with a lumbar support mechanism and seat height adjustment.

Handle 4 for adjustment of the lumbar support is located on the inner side surface of the backrest. Turning the handle forward or backward results in a corresponding change of the convex camber in the lower part of the seat backrest, providing comfortable support for the lumbar part of the spine.

In order to raise the driver's seat, pull up handle 2 several times until it is set to the desired height. To lower the driver's seat, pull down handle 2 several times until it is set to the desired height.

For your convenience, make the adjustments with the door open.

Seat belts

REMEMBER! *Seat belts are efficient means to protect the driver and passengers against drastic consequences of traffic accidents. Use of seat belts is mandatory!*

ATTENTION! *Fasten the seat belt without its twisting. After fastening, check the belt and, if necessary, adjust it.*

ATTENTION! *The seat belts must be replaced if they have been worn or damaged and after a critical load as a result of a traffic accident.*

Replacement of the seat belts should be performed only in the service shops of UAZ, LLC (addresses of the authorized service shops are listed in the service book).

Seat belts are designed for individual use by drivers and adults taller than 144 cm and weighing at least 36 kg.

The vehicle is equipped with seat belts (Fig. 3.26) for all seats. These are diagonal seat lap belts with retractor. To fasten the belt, pull the seat belt buckle 4 and, without twisting the straps, insert it into the lock 3 till it clicks. To unfasten the belt, press the red lock button.

The passenger dual seat belt is a static lap belt.

The seat belt height adjuster has four fixed positions.

The top position of the seat belt anchor is adjusted up or down by moving the slider group of the adjuster 1 (Fig. 3.27). To do this, pull the adjuster button 2 and move it up or down. And to increase the height, just pull up the height adjuster.

ATTENTION! *Make sure that the shoulder belt passes through the center of your shoulder. Failure to follow these recommendations reduces the degree of security in the event of an accident and enhances the likelihood of getting injured at car crash.*

Keep the belt straps and buckles clean. If they are soiled, clean them with alkali-free soap solution.

Protect the straps from touching sharp edges.

Protection from direct sunlight is recommended.

In order to clean the straps from dust, blow with compressed air not less than once per year.

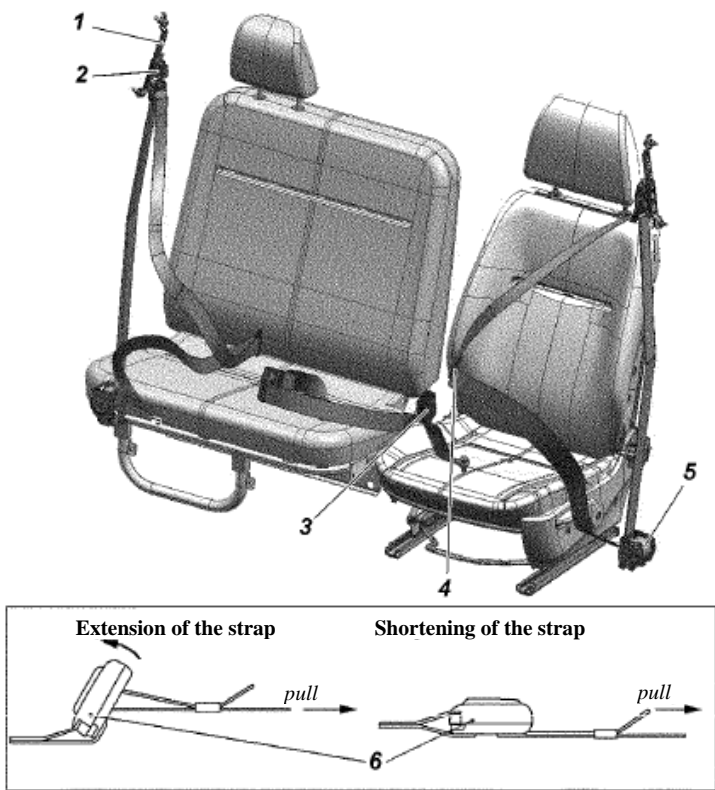


Fig. 3.26. Seat belts:

1 — seat belt height adjuster; 2 — seat belt guide bracket; 3 — lock; 4 — lock catch; 5 — inertia reel; 6 — adjuster for static middle belt

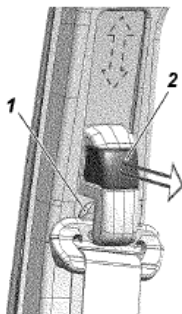


Fig. 3.27. Height adjuster:


1 — slider group of the adjuster; 2 — adjuster button

It is forbidden to:

- remove the seat belts by yourself, as well as disassemble, repair, ignite them, and connect them to voltage sources;
- replace the seat belts by yourself;
- make alterations in the design of the elements of the security system (seat belts and their fasteners);
- expose the seat belts to high temperature (for example: ironing, burning with a lighter or a smoldering cigarette, etc.);
- allow twisting of belt straps when fastening. To untwist the strap of the seat belt, straighten it in the direction of the lower anchor point of the seat belt;
- use any objects to loosen the belt contact with the body (for example, clothes pegs, clamps, etc.). A loose seat belt may cause injuries in an accident;
- pass the diagonal strap of the belt under the arm or behind your back, waist strap of the belt under your thighs;
- use one seat belt for fastening several people;
- fasten a person with a child sitting on his lap with one seat belt;
- use the seat belt if it shows signs of wear or damage (scuff marks, tears, cracks, and other damages);
- use seat belts after an accident without preliminary check (and/or replacement) at the dealer's service station.
- fasten the seat belt to the lock meant for the other belt.
- allow entering of foreign objects into the belt anchor and belt passing areas.
- fasten the seatbelt with violation of the requirements of these instructions.

ATTENTION! *While driving, the backrest angle of the seat should be minimal, but comfortable enough for the driver and passengers. The seat belt actuates most effectively if the driver and passengers sit up straight on the back rest. If the backrest is reclined too much, the seat belt may slip off, which may result in increasing the risk of getting injured in an accident.*

Unfastened seat belt signal device.


If driver's seatbelt is not fastened when starting up the ignition, the seatbelt warning lamp  on the instrument cluster turns red. Warning lamp turns off when the seatbelt buckle is inserted into inertia lock or the ignition is turned off.

If the motor vehicle moves for more than 60 seconds or passes more than 500 meters, or reaches a speed of 25 km/h, and the seat belt of the driver is not fastened, an additional horn turns on.

When the motor vehicle moves and the seat belt of the driver isn't fastened within 30 seconds, the warning horn turns off.

After the motor vehicle stops and then starts again, the audio alarm algorithm will repeat if the driver's seat belt is not fastened.

Diagnostics of defective unfastened seat belt indicator.

Seat belt signal device  is ON when the driver's seat belt is fastened. Disconnect the receptacle of the retractable seat belt buckle:

- the signal device goes off if the retractable seat belt buckle is defective;
- the signal device remains illuminated if the wiring harness or the instrument cluster are defective.

Air Bag

The car is equipped with a frontal system of airbag (SA) of the driver. When the airbag is activated, it is inflated with gas for a very short period of time, which, unfolding before the driver, reduces the risk of injury of the upper body and the head. The airbag system is activated in the event of frontal crash, when it is necessary to contribute towards the safety of the driver. The availability of the airbag system is marked with the inscription "AIRBAG" on the steering wheel cap.

The air bag system includes:

- driver's air bag module mounted in the steering wheel;
- driver's seat belt alarm sensor (fastened / not fastened);

- a rotating device mounted on the under-steering switch connector (for connection of the audio signal switch and the air bag module with the vehicle circuit);
- the airbag control unit mounted between the driver's and passenger's seats (configuration with a two-seater cabin) or under the seat cushion of the middle passenger (configuration with a three-seater cabin);
- the malfunction indicator of the airbag control system in the instrument cluster;
- driver's seat belt reminder in the instrument cluster.

The airbag is an additional means of protection for the driver with the seat belt fastened; it is activated in the event of a severe frontal crash, starting with a certain degree of crash severity.

The airbag must be activated in the event of a severe frontal crash. However, the airbag can also be activated in emergencies when the vehicle experiences the effects similar to those as in a severe frontal crash.

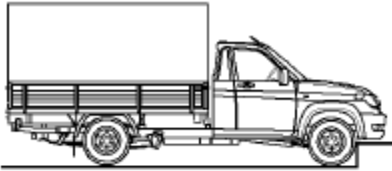
Examples of situations with the activation of airbags:

- a crash against an immovable non-deformable obstacle: the airbag is activated at low speed;
- crash against a movable deformable obstacle (for example, another vehicle): the airbag is activated only at a high speed of the vehicle;
- in the event of sufficient force of impact on the vehicle from the front, some examples are shown in Fig. 3.28.

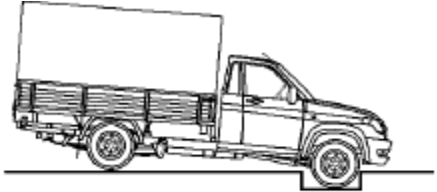
The airbag is not activated:

- if the ignition is switched off;
- in the event of minor frontal crashes;
- in the event of vehicle roll-over;
- in the event of lateral or rear crashes; i.e. in cases where it can not contribute towards the safety of the driver.

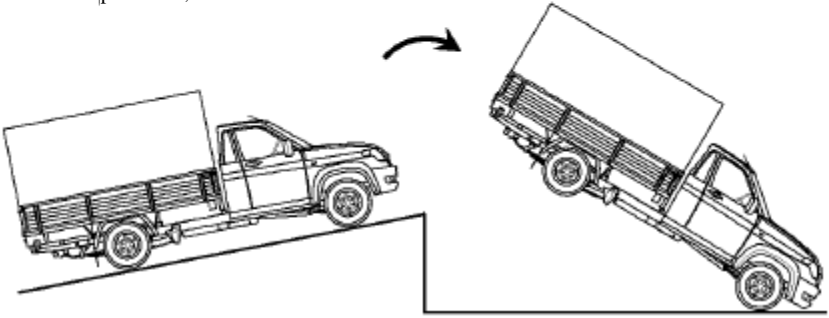
The extent of the vehicle body damage at crash (or the absence of major damage) is not always indicative of normal or abnormal operation of the front airbags.



Hitting the curb, the edge of pavement, or a hard material



Dropping or shaking at deep potholes X



Hard landing or dropping of the vehicle from the brow

Fig. 3.28. Examples of situations with the activation of the passive safety system of the driver and front passenger


There is practically no danger of visibility restriction for the driver due to deployment of the airbag, as it is filled and emptied in a short period of time. The airbag provides optimum protection when the seat, backrest, and headrest are correctly positioned. The entire back should be in resting contact upon the seat back, and the seat should be set back so far as is reasonably possible for the driver to hold the steering wheel in the upright sitting position with his arms slightly bent in the elbows. Push the front passenger seat as far back as possible and bring the backrest to a vertical position so that it does not cause discomfort. Incorrect seat position may result in serious injury or death in the event of the airbag deployment. The airbag requires space when it is filled with gas. The airbag is a self-contained unit for a single use and does not require maintenance while the vehicle is in operation. After the deployment of the airbag the control unit and the airbag module must be replaced by authorized dealers.

WARNING!

1. The air bag does not replace the seat belt, it only implements the effect of the seat belt, so always fasten your seat belts. Those who do not use seat belts risk getting injured way more seriously in the event of accident or even being thrown out of the car, where the possibility of a fatal outcome is not excluded. The belt contributes to the fact that in the event of an accident, you will take the safest sitting position, in which the airbag can provide the most effective protection.

2. Do not fasten foreign objects on the steering wheel, as they may cause injuries when the air bag is deployed. The same danger exists also in those cases when the driver smokes a pipe or uses a mobile phone while driving.

3. When driving, do not put your forearms / hands in the area where the airbag is mounted.

4. The malfunction indicator of the airbag control system  should turn on for 6 seconds after the ignition has been switched on, and then it should turn off. When the ignition is switched off and on again within 15 seconds, the indicator will not turn on. The following turning-on of the diagnostic indicator during the operation of the vehicle means that a malfunction has been detected in the airbag system and its deployment in the event of a frontal crash is not guaranteed.

5. Unauthorized interference with the airbag system is prohibited. The overall work on it must be carried out only by specially trained personnel of the authorized dealers.

6. Immediately after the deployment of the airbags, some of the system components may have a high temperature. To avoid burn wounds, do not touch hot parts.

7. If the skin surface shows signs of irritation it should be thoroughly rinsed with soap solution.

8. In case of eye irritation, rinse them with clean water. If you have long-term worries, you should consult your doctor. In case of scrapping of the vehicle, the airbag system components must be dismantled at authorized dealers.

Installation of child restraints.

ATTENTION! *The installation of child restraint systems of "universal" category according to Table 3.1. is carried out using seat belts of the vehicle. Children under 1.5 years old are transported in the child restraint device (CRD) heading only backward.*

Table 3.1.

Weight category	Seats		
	Single passenger seat	Dual passenger side seat	Dual passenger middle seat
0 to 10 kg (0–9 months)	X*	X	X
0+ to 13 kg (0–2 years)	X	X	X
I — 9 to 18 kg (9 months–4 years)	U*	U	X
II and III — 15 to 36 kg (4–12 years)	U	U	X

* Child seat category

U — universal category of a child seat suitable for settling a child both into a front-facing seat and a rear-facing seat.

X — child seats mounting is not permitted.

Fuel tank plug

The fuel tank plug is located under the platform at the front on the right on open access.

Bonnet

To open the hood, pull lever 10 (see Figs. 3.1, 3.2), through the formed slot in between the hood and radiator grill, push the hook clamp 1 (Fig. 3.28) and lift the hood. Remove the bonnet stay 3 from the holder 2 by moving it "away from yourself" and put it into a special hole above the right headlight. Depending on the configuration, the vehicle may be equipped with an air spring, which makes easier to lift the hood and keep it in the open position.

Free closing of the hood should be carried out at a height of not more than 200 mm above the radiator grill. In the configurations with an air spring, the hood should close by inertia after overcoming the force of the air springs.

ATTENTION! Before closing the hood, make sure that it does not pinch anything and the bonnet stay is securely fixed in the holder. When closing the bonnet, check the security of the lock.

Avoid free falling of the hood from a large opening angle.

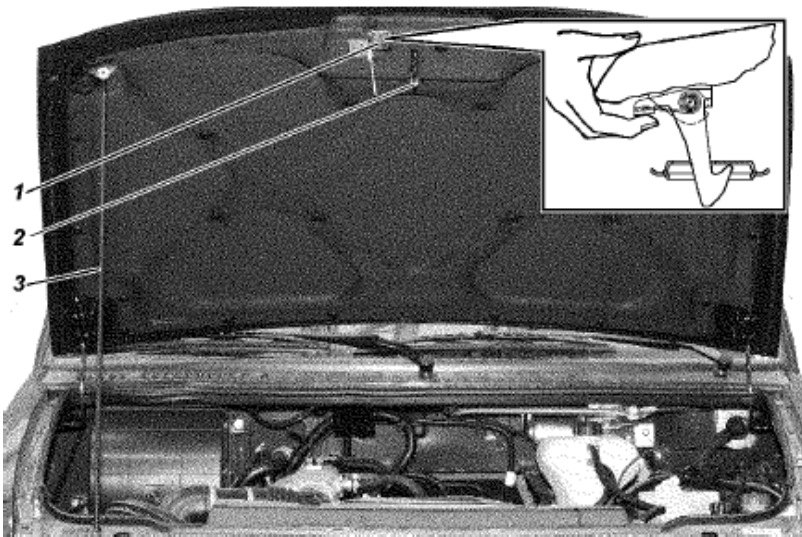


Fig. 3.28. Hood: 1 — supporting hook; 2 — holder; 3 — bonnet stay

Wind-screen wipers, water pumps for the washer

To ease washing the windshield manually, wiper blades must be placed in fixed position away from the windshield.

In cold seasons, before switching on the windshield wipers, make sure the wiper blades are not frozen to the windshield.

Windshield wipers should not be turned on when the windshield is dry. Keep the wiper blade rubber out of contact with fuel and oil.

While operating, make sure that windshield and lamp wipers work properly and their parts are securely fixed. Periodically clean glass elements and rubber edges from dirt and oil.

During seasonal service, keep the windshield wipers on for 15–20 minutes. Wiper blades must be placed in fixed position away from the windshield. The wiper blade arm of the rear window must be detached.

After 18–24 months of operation, replace wiper blades or their rubber edges if necessary.

Replacement of wiper blades of windshield wipers

To replace wiper blades of the windshield wipers:

- lift the arm of the windshield wiper from the windshield or the rear window;
- rotate the wiper blade about its axis of rotation and place it nearly perpendicularly to the lever; prior to this step release the wiper blade lock by pressing the tab on the adapter between the wiper blade and the lever; dismount the wiper blade from the lever.

A new wiper blade is installed in the reverse order.

Note. Installation of frameless wiper blades is possible.

Washer reservoir 2 (Fig. 3.30) is filled with clean water (in summer) or a special nonfreezing fluid (in winter).

To drain water from the washer reservoir pull out the washer reservoir and disconnect electric wiring and tubes from the washer.

Adjust the direction of water stream by changing the position of spraying nozzle balls with a needle inserted into the ball channel (feed hole).

When the spraying nozzle is clogged, disconnect the tube and air blow the spraying nozzle.

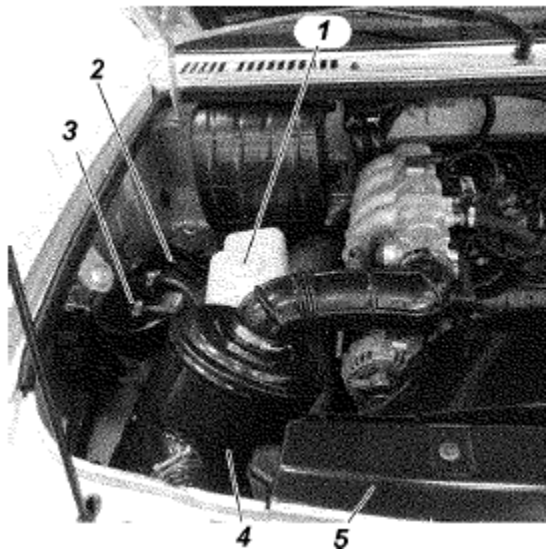


Fig. 3.30. Underbonnet space (section):

1 — washer reservoir ; 2 — additional electric pump of the heater; 3 — adsorber; 4 — the air filter; 5 — radiator of engine cooling system

To avoid failure of the washer pumps, check the water level in the reservoir; 20 mm from the bottom is the lowest level permitted.

Do not keep washer reservoirs turned on for more than 10 sec.

PLATFORM

Cargo platform — with four metal boards; the sideboards and the tailgate can be folded, the front-board is removable.

The platform is equipped with a tool box for packing the tools and accessories, a removable canvas cover with a tilting rear canopy, and a cover frame with removable bows. The base of the platform has a wood covering.

The floor of the platform has clamps for securing the load.

CHAPTER 4. MOTOR VEHICLE PREPARATION UPON RECEIPT FROM THE MANUFACTURER

The trading organization is obliged to list the vehicle for sale only after performing of works on pre-sale preparation.

If the motor vehicle was delivered to the sales point and traveled more than 100 kilometers (OST 37.001.082-82), all the preliminary preparations for ferrying must be carried out as a part of the pre-purchase preparations.

CHAPTER 5. RUNNING-IN OF A NEW VEHICLE

The vehicle long-term and fail-safe service life depends greatly on the run-in of its parts during the initial service period.

The running-in time is 2,500 km.

During the run-in period, observe the following instructions:

1. Crankshaft rpm of engine must not exceed the $\frac{3}{4}$ of the nominal rotational speed.
2. Do not exceed the motor vehicle nominal load.
3. Do not drive along the tough roads (deep mud, sand, steep inclines, etc.).
4. Do not haul a trailer.
5. Do not change the oils in the engine and idler aggregates, filled by the Manufacturer.
6. Check the temperature of brake drums and discs and in case of strong heating, adjust the parking brake actuator or brake pedal free play.
7. Check the temperature of the wheel hubs; in case of strong heating, loosen the bearings.
8. Check condition of all attachments and piping connections; eliminate leakages of oils, fuel, coolant and hydraulic fluid, if any.

CHAPTER 6. STARTING AND STOPPING THE ENGINE

GENERAL PROVISIONS

ATTENTION! *Do not start and warm up the engine in an enclosed compartment without a good ventilation to avoid carbon monoxide poisoning.*

For reliable start of the engine, viscosity grade of the engine oil should correspond to the operating temperature range of the motor vehicle

Before starting the engine, check for the coolant in the engine cooling system, fuel, oil level in the engine crankcase and power steering tank.

Place the shift lever in Neutral position.

Remember that (in order to prevent the starter from accidentally switching on when the engine starts) the ignition switch is equipped with the interlock, which allows the engine to be restarted only when the key returns to "0" position (see Fig. 3.10).

Switch on the starter for not more than 10 seconds. As soon as the engine starts to work, release the ignition switch key immediately, and it will automatically return to position "I." Warm up the engine.

Warming up the engine at high crankshaft rpm for faster heat-up is forbidden.

Do not drive with a cold engine.

The warmed up engine coolant temperature shall be at least 60 °C.

ENGINE START

Starting a cold engine at -20 °C and above

1. Turn on the ignition. This should activate the electric fuel pump, which can be heard when the engine is not running.
2. If the engine is to be started after a long stop, it is recommended to wait until the electric fuel pump switches off (for about 5 seconds).
3. In a non-faulty control system, the malfunction indicator lamp (in the instrument cluster) must turn on and off. If the malfunction indicator lamp does not turn off, the fault must be detected and eliminated (see section "Diagnostics").

ATTENTION! *If the motor vehicle has malfunctioning systems (the malfunction indicator lamp continuously glows), it can cause the failure of the engine converter and oxygen sensor in exhaust gases.*

4. Press the clutch pedal as far as it can go.

5. Switch on the starter.

6. Release the key after starting the engine (turn off the starter).

Try to start the engine not earlier than 60 seconds after the first attempt.

It is not recommended to press the throttle pedal when starting the engine.

After starting the engine, its system will automatically set the fast idle speed to warm up the engine, and will gradually reduce it to the minimum as the engine warms up.

If the engine does not start after the third attempt, stop the starting, detect and correct the malfunction.

Cold start at temperature below -20 °C.

In order to ease the starting of cold engine at low temperature, the engine must be preheated (by steam, hot air, etc.).

The following sequence of operations is the same as for the cold start at the temperature of -20 °C and above.

Starting a hot engine

The sequence of operations is the same as for the cold start at the temperature of -20 °C and above.

If the engine does not start at the third attempt, press the accelerator pedal as far as it will go and turn on the starter for 2–3 seconds. In this case, the control unit will fulfill the function of "Engine cylinder blow-down mode," and then try to start again.

Engine stop

In order to stop the engine, turn the ignition key to position "0." Before stopping the engine, operation at low crankshaft speed for 1–2 minutes is recommended.

CHAPTER 7. FEATURES OF DRIVING UNDER DIFFERENT ROAD, METEOROLOGICAL AND CLIMATIC CONDITIONS

The vehicle operation and the service life depend largely on the features of its driving. Proper driving enables the vehicle to move with high average speed and low fuel rate when overcoming heavy road sections. **The getaway on horizontal hard-surface road sections or down the slope is acceptable from the second gear. In all other cases, drive from the first gear off. Shift the gears and switch the front axle on when the clutch is disengaged:**

- disengage the clutch fast by pressing the clutch pedal as far as it can go;
- engage the clutch smoothly, avoiding a quick release of the clutch pedal, which results in jerking motion of the motor vehicle, and a slow engagement of the clutch with prolonged slipping;
- do not hold the clutch pedal pressed when the gear is engaged and the vehicle is standing with the engine on (at a crossing, at a traffic light, etc.). Use the neutral in transmission and the fully engaged clutch in such cases;
- do not press the clutch pedal when the motor vehicle is in motion;
- do not use the clutch slipping as a means of keeping the motor vehicle on steep inclines.

Shift the gears engaging the lever smoothly and gradually. If you cannot shift the required gear before taking off, release the clutch pedal slightly and then disengage the clutch and shift the gear again.

Shift the reverse gear only after bringing the motor vehicle to a complete stop.

On slippery roads, drive the vehicle evenly at low speed.

Release the gas pedal completely when braking with the engine.

Brake the vehicle smoothly, gradually increasing the pressure on the brake pedal. Any kind of braking increases tire wear and fuel consumption. When braking, do not bring the wheels to slippage, since in this case the braking path and tire wear increase.

Besides that, strong and hard braking on a slippery road can cause skidding.

When driving off-road (sand, dirt, snow, etc.), on slippery roads, steep climbs (over 15°), and on other heavy road sections, engine overload is not acceptable. In these conditions, switch on the front axle in advance, and before driving in particularly difficult conditions, switch on also the low gearing in the transfer case and the differential blocking of the rear axle. The front axle may be switched on and off when driving, whereas the low gearing in the transfer case and the differential blocking of the rear axle shall be switched only after complete stop.

Making steep ascents and descents. Driving the vehicle on the roads with steep ascents and descents requires increased attention and quick action of the driver. Try to define the steepness of the climb in advance and shift the gear in the transmission, which will provide the necessary drive force on the wheels, so that not to shift them on the climb. Steep climbs should be overcome in low gearing in the transfer case and in the first gear in the transmission. If there is a risk of slipping, switch on the differential blocking of the rear axle before making ascent. Do it without stops and turning, if possible. Depending on the uphill gradient, short ascents with an easy road approach and a relatively even surface should be made at speed in the second or third gear in the transmission without shifting the low gearing in the transfer case. If, for any reason, the ascent is impossible to make, take all safety measures and drive down slowly, having shifted the reverse gear. Drive down gradually without disengaging the clutch to prevent the vehicle from accelerating. When making steep descents, take measures to ensure safety while descending. When making a long descent (more than 50 m), try to estimate its steepness first and shift the gears in the transmission and transfer case which would enable the vehicle to overcome an ascent of similar steepness. Use engine braking when making such descents.

ATTENTION! *It is prohibited to make an ascent with a gear thrown out in the transmission or the transfer case or with the clutch disengaged.*

The rotational speed of the crankshaft should not be fast when making a descent, reduce the motor vehicle speed by gradually braking it.

Cross ditches, roadside ditches and trenches at low speed with the front axle switched on in a direction perpendicular to the slope. Take into account the dimensions of the vehicle, which determine its off-road capability. Do not cross over the obstructions without a pause, if there is the possibility of a blow in the wheels.

When overcoming the ditches and trenches, consider the possibility of getting stuck due to the wheel slip and vehicle cross-axling. In such cases, switch the inter-wheel differential lock of the rear axle in advance on.

Driving along muddy, clay, graded earth and black-earth cross-country roads. When driving along clay and black-earth roads after heavy rain, the vehicle can get sideways skidding. For this reason take great care when choosing driving direction. Choose relatively horizontal sections of the road while driving and use the traced wheel track as much as possible. This will prevent the vehicle from side skidding. Driving along wet graded roads with steep cross-sections and deep ditches can be difficult in particular. On such roads you should drive along the ridge carefully and at low speed.

Driving along snowy or icy roads.

Switch on the minimum gear and drive slowly.

As the braking path of the vehicle on the slippery road is increased, it is required to increase the distance from the vehicle moving ahead.

In case of abrupt acceleration or hard braking, the wheels of the vehicle may lose traction, which can lead to skidding and cause an accident. Use engine braking to speed down; press the brake pedal only after the vehicle has significantly slowed down.

When driving down a slope, use the engine braking. Avoid the acceleration of the motor vehicle.

ATTENTION! *In order to ensure the safety of traffic, use the snow tires when driving along snowy or icy roads.*

Swampy areas should be overcome in a straight line, without making sharp turns and stops. Take off smoothly, without snatching. Drive with the front axle and the low gearing in the transfer case on, shift the gear in the transmission that would provide the necessary traction of drive wheels to avoid slipping. Turn smoothly, with a long radius, without reducing the speed of the vehicle. This will exclude the possibility of breaking away and wheel slip. Avoid moving along the trail laid by the vehicle ahead.

When overcoming sandy areas, move smoothly, avoiding snatching and stops. Turn smoothly and with a long radius. When driving with the front axle on, use as high gears as possible to overcome snowdrift sites and short sandy ascents without a pause. Avoid wheel slipping. Estimate the traffic situation in advance and shift the gear in the transmission, which would provide the necessary traction on the wheels.

Overcome fords with great care. The vehicle is able to overcome 500 mm deep fords with firm ground at low speed. Before overcoming the ford, check the condition of the bed carefully, make sure that there are no deep potholes, large stones, swampy spots, as also choose and check an area for entering into the water and getting out of it, turn off the fog lights.

Overcome the ford carefully, without creating waves in front of the vehicle, in the first or second gear in the transmission with the front axle and the lower gear in the transfer case on.

Avoid maneuvering and sharp turns.

Check the oil in all the units after overcoming the ford as soon as possible, the same day by latest. If water is found in oil, change oil in such unit. The presence of water in the oil is defined by the change in its color. All chassis lubrication nipples shall be lubricated until fresh grease squeezes out.

Each time after getting out of the ford, conduct several short declutching and braking to dry the clutch facings and brake shoe facings.

If the engine stops during the ford crossing, you can make two or three attempts to start the engine with a starter. If the engine does not start, the vehicle must be evacuated immediately by any means. In case of water penetration into the units of the vehicle, it should not move in self-propelled mode after it has been removed from the water. Tow the vehicle to a place where maintenance operation can be carried out.

The vehicle can move on up to 350 mm deep virgin snow soil. Turn the vehicle in the same way as when driving on boggy areas. When driving on sand snow, apply the same rules of driving as when driving on sand.

CHAPTER 8. TOWING THE VEHICLE

Towing the vehicle with a **towrope** is provided with towing eyes in the front and rear parts of the frame (Fig. 8.1). Before towing, start up the ignition (position I, Fig. 3.10) and the light alarm. When towing, make sure that the towrope is stretched. The motor vehicle must be towed smoothly without jerks.

ATTENTION! *Note that while the engine is off, the force required for steering input and motor vehicle braking increases significantly.*

Strictly follow requirements listed in the Traffic Rules when towing.

If the steering or brake system does not work properly, further motor vehicle driving or towing with a towrope are forbidden. In this case you should use two wheel vehicle towing or a tow truck service.

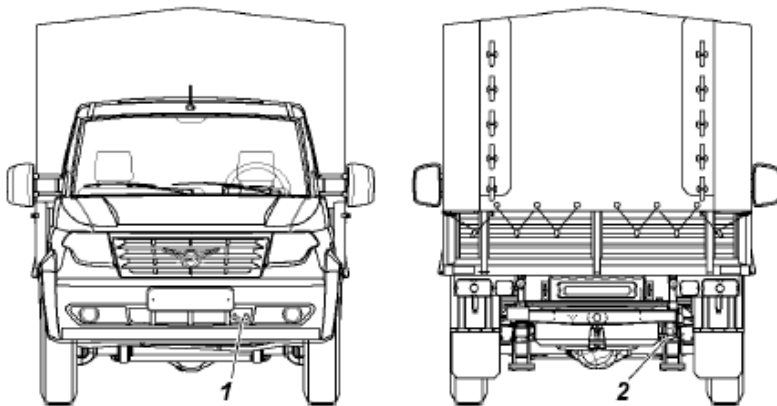


Fig. 8.1. Towing eyes:
1 — front towing eye; 2 — rear towing eye

CHAPTER 9. CAR SERVICE

The vehicle maintenance volume and frequency are given in the warranty and service book.

The present manual contains the methods of the motor vehicle maintenance and adjustment of its units, and also the operations which should be carried out in the intervals between the maintenance actions in accordance with the warranty card of the service book.

Tightening torques of the main threaded joints are shown in Annex 2 of the present Manual.

DAILY MAINTENANCE

1. Check visually the vehicle completeness, the body, windows, mirrors, trim package, number plates, painting, door locks, wheels and tire condition. Take measures to eliminate discrepancies.

Inspect visually the parking space and make sure no leaks of fuel, oil, coolant, and brake fluids are present. Take measures to eliminate the cause of leakage if any.

Check and refill the amount of coolant, oil in the crankcase, brake fluid, and fuel.

2. Verify the operation of steering system, braking system, lights, light and sound alarm, and windshield wipers.

Take measures to eliminate discrepancies.

3. Refill the windshield washer reservoir. Use of water is allowed during the warm season.

4. If the vehicle was operated in extremely dusty conditions or forded, or waded country road sections covered with mud, check the condition of the filter element of the engine air filter, and replace it, if necessary.

5. Wash the vehicle if it was operated on muddy or dusty roads.

VEHICLE MAINTENANCE EVERY 500 KM

1. Check and adjust the tire air pressure as required.

2. Check and tighten the wheel bolts after the first 300–500 km (if necessary).

SEASONAL MAINTENANCE

Seasonal maintenance is performed twice a year (in spring and autumn) and, if possible, combines with the next maintenance in accordance to the warranty card of the service book.

Prior to the summer season

1. Remove the oil pump cover and check the condition of the oil pump drive gears.

2. Check the operation of the window wiper and washer. Eliminate failures.

3. Replace oils in the units with summer (all-season) grade oils specified in the lubrication schedule.

Prior to the winter season

1. Check density of fluid in the engine cooling system and bring to the required value ($1.075\text{--}1.085\text{ g/cm}^3$ at $20\text{ }^\circ\text{C}$), if necessary.

2. When filling the washer reservoir with the water, pour off the water.

3. Check the body heating and ventilation system operation. Eliminate failures.

4. Replace oils in the aggregates with winter grade oils specified in the lubrication schedule.

ZMZ-409051 ENGINE

Engine suspension

During operation, check tightening of threaded joints of the front and the rear engine suspensions (see Appendix 2) and condition of the mounts. Delamination and breakage of the engine mounts is not permitted.

Engine Cylinder Head

It is not required to tighten the cylinder block head bolts in the course of the engine operation. If tightening is required, it should be done with the cold engine only. To ensure the even and tight bottoming of the cylinder block to the gasket, tighten the bolts following the sequence shown in Fig. 9.1 in two steps. Tighten the bolts evenly using a torque-measuring wrench (see appendix 2).

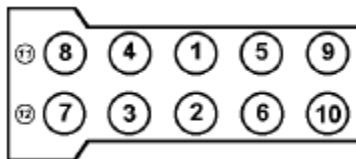


Fig. 9.1. Sequence of tightening cylinder head fastening bolts:

Engine gas distribution mechanism

Two-speed chain camshaft drive. The chains are tensioned by hydraulic tensioners.

ATTENTION! Do not take the hydraulic tensioner out of the chain cover to prevent disengagement of the piston with the casing caused by the wrap spring.

The valve train are driven from the camshafts directly via the hydraulic pushers. Using the hydraulic pushers eliminates the need for clearances adjustment.

Engine lubrication system

If there is a fault in the lubrication system, the operation of the engine must be stopped immediately.

Check the engine crankcase oil level regularly and refill if necessary. Check the oil level before starting the engine. Wait at least 15 minutes for the oil to drain into the crankcase, if you want to check it after the engine has been just stopped.

The vehicle should stand on a flat and horizontal platform. The oil level should be between the "MIN" and "MAX" marks of the oil level indicator 10 (Fig. 9.2). When traveling across country frequently, keep the oil level near the "MAX" mark, without exceeding it. The oil quantity required for refilling from the mark "MIN" to the mark "MAX" is 1 liter.

It is forbidden to mix engine oils of different brands and manufacturers! If you fill another brand or manufacturer engine oil, flushing of the lubrication system with flushing oil is mandatory. Select the flushing oil upon the manufacturer's recommendations for the new oil to be filled.

Replace the oil filter when changing oil. Drain used oil from the crankcase immediately after the road trip, while it is still hot.

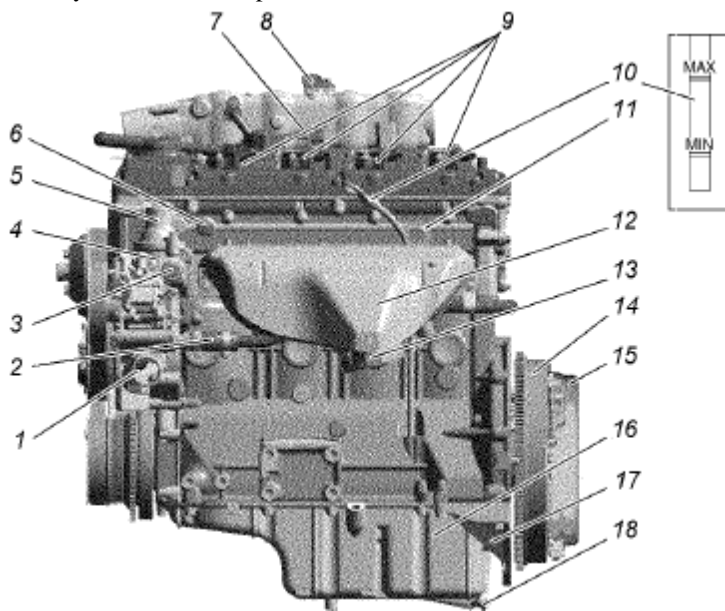


Fig. 9.2. ZMZ-409051 Engine (left side view):

1 — Coolant from radiator to water pump supply pipe; 2 — connection hoses; 3 — control unit coolant temperature sensor; 4 — thermostat housing; 5 — coolant branch pipe from thermostat to radiator; 6 — critically low oil pressure sensor; 7 — crankshaft position sensor connector; 8 — absolute pressure and temperature sensor; 9 — ignition coils; 10 — oil level indicator; 11 — engine elevation rear bracket; 12 — exhaust manifold screen; 13 — exhaust manifold ; 14 — flywheel; 15 — clutch; 16 — oil charger; 17 — clutch housing booster; 18 — oil purge plug.

In this case it can be drained quickly and completely.

Dismantle the oil filter 10 (Fig. 9.3) by unscrewing it counter-clockwise. When installing a new filter, make sure the rubber O-ring is in the good condition, and lubricate it with engine oil, screw the filter until the O-ring contacts the cylinder block surface, then make the filter further for 3/4 rotation. Make sure there are no oil leaks.

With the engine warm and the lubrication system intact, the emergency oil pressure warning lamp may be on at idle, but it shall go out immediately after increasing the crankshaft rpm.

It is recommended to flush the engine lubrication system after two oil changes. For that purpose, drain the used oil, fill in special flushing oil (VNIINP-FD) 3–5 mm over the "MIN" mark on the oil level indicator and let the engine run for 10 minutes.

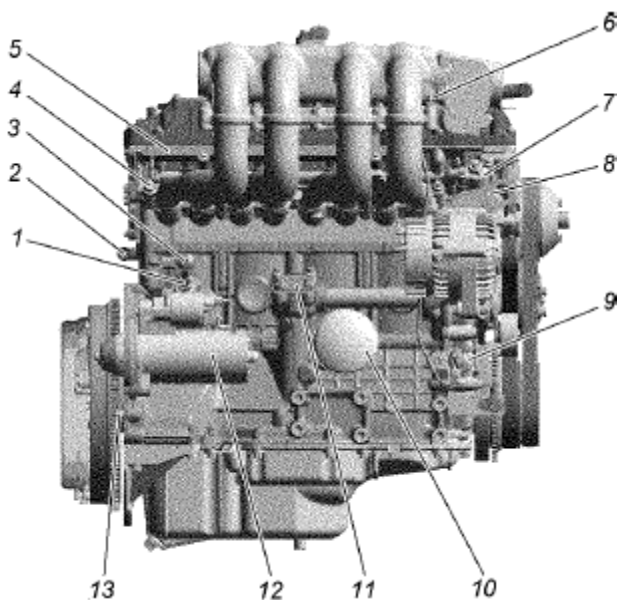


Fig. 9.3. ZMZ-409051 Engine (right side view):

1 — Coolant to heater branch pipe; 2 — heater coolant discharge tube; 3 — knock sensor; 4 — fuel pipeline flanged socket / union nipple; 5 — common rail with injectors; 6 — “-“ KMCUD wire connection pin; 7 - upper hydraulic tensioner cap; 8- engine elevation front bracket; 9 — lower hydraulic tensioner cap; 10 — oil filter; 11 — oil pump drive cap; 12 — start motor; 13 — gear installation pin

Then drain the flushing oil, replace the oil filter and pour in clean engine oil. If the flushing oil is not available, the flushing can be carried out using clean engine oil.

Engine crankcase ventilation system

During the ventilation system servicing, remove the valve cover 4 (Fig. 9.4), the ventilation hoses and pipes, the vacuum valve cover 3, the valve diaphragm and the spring and clean the removed parts. Clean the ventilation nipple openings of the valve cover, the drain holes 7 of the trapped oil, the calibration orifice 8 in the vacuum valve housing and the openings in the atmospheric valve cover. Flush the oil slinger 5 without removing it from the valve cover. Check the diaphragm for damage and rupture. Joint tightness is to be ensured during the reassembly.

ATTENTION! Do not operate the engine with a non-tight ventilation system and an open oil filler pipe. This causes increased oil carryover with crankcase blow-by gas, and environmental pollution. To prevent depressurization of the ventilation system, it is necessary to close the cover of the oil filler pipe tightly and set the oil level indicator up to the stop.

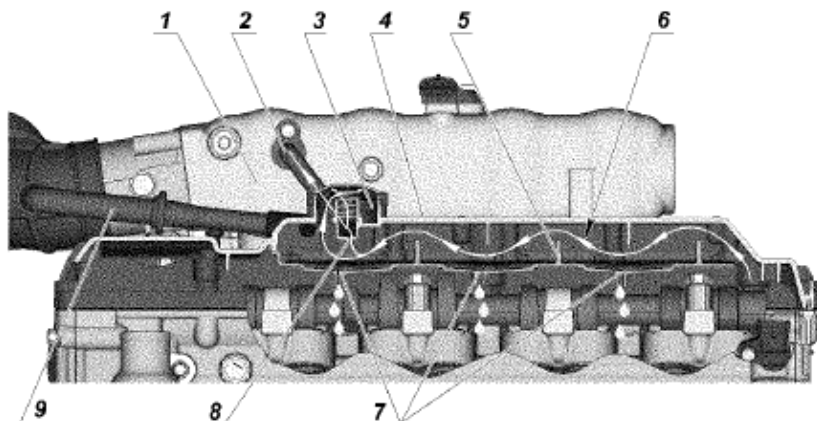


Fig. 9.4. Engine crankcase ventilation:

1 — receiver; 2 — ventilation tube connects depression valve to receiver; 3 — depression valve; 4 — valve cap; 5 — oil reflector; 6 — Blow-By Gas flow; 7 — Blow-By Gas separated oil drain orifice; 8 — depression valve orifice; 9 — Engine injection system air supply tube with reverse valve.

Engine cooling system (Fig. 9.5)

ATTENTION! The coolant is poisonous. Keep the coolant in a tightly closed container. Observe the following rules when working with the coolant:

- avoid any mouth contact with the fluid;
- in case of skin contact, do not let the fluid dry on the skin, and immediately wash it away with warm water and soap;
- flush the spilled fluid with water, air the room;
- remove clothing contaminated with the fluid, dry it outside the room, and wash it.

Take care when opening the expansion chamber plug of the engine cooling system to avoid scalding.

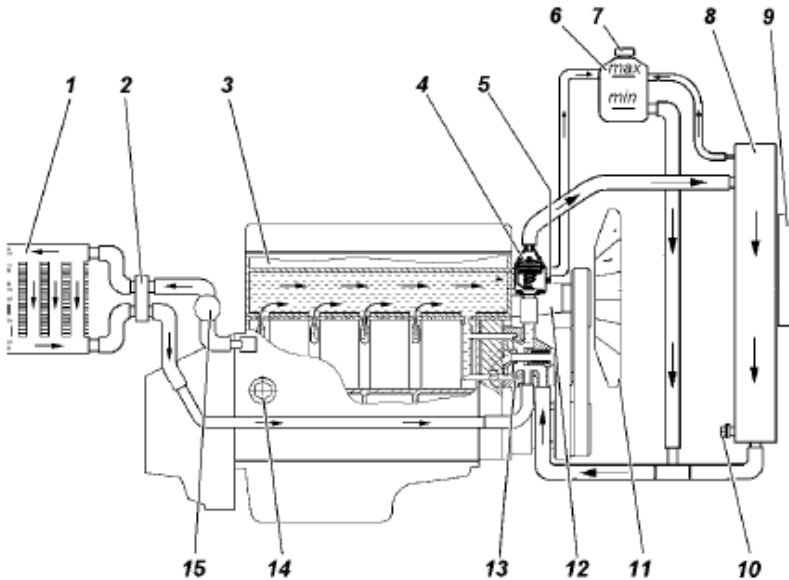


Fig. 9.5. Engine cooling and heating system pattern:

- 1 — cabin heater radiator; 2 — heater radiator connection hoses; 3 — engine; 4 — thermostat; 5 — control unit coolant temperature sensor; 6 — expansion tank; 7 — expansion tank plug; 8 — Radiator assembly; 9 — motor fan; 10 — discharge plug; 11 — fan; 12 — fan drive; 13 — pump; 14 — crankcase discharge plug; 15 — additional heater motor pump

When the ambient air temperature is below minus 40 °C, use the low freezing point fluid TOSOL-A65M, OZh-65 "Lena," THERMOSOL-A65M, or OZh-65 "TOSOL-TS."

The cooling fluid operating temperature shall be within 80—110 °C. Short-time (maximum of 5 minutes) engine run is allowed at cooling fluid temperature up to 120 °C.

When the cooling fluid overheat warning lamp turns on, the cause of overheating should be immediately identified and eliminated.

Check the coolant level in the expansion tank 6 regularly (Fig. 9.5), particularly if there is an auxiliary heater. The coolant level must be between the "min" and "max" marks. As the coolant has the high thermal expansion coefficient, and its level in the expansion tank may vary substantially depending on the temperature, its level should be checked at the system temperature of plus 15–20 °C.

When the cooling fluid in the expansion tank decreases within a short period of time or after a moderate travel (up to 500 km), check the cooling system tightness, and upon elimination of leaks, add coolant into the radiator or the expansion tank.

Flush the cooling system during the coolant replacement.

The cooling system flushing procedure is as follows:

- fill the system with pure water, start the engine, let it work until warmed up, shut the engine down and drain the water;
- repeat the operation mentioned above.

Due to presence of air in the interior heater and connection hoses, the cooling system cannot be completely filled without starting the engine. Fill the system by the following steps:

- fill the coolant into the system through the neck-tube of the expansion tank to the level between the marks "min" and "max;"
- start the engine, add the cooling fluid into expansion tank when its level decreases;
- stop the engine, let it cool down, raise the cooling fluid level in the expansion chamber to the standard and close the expansion chamber plug;

- run 2–3 cycles of the engine warm-up and cool-down, and raise the coolant level in the expansion tank to the standard again.

To drain the engine cooling system, open the expansion tank cap, unscrew the radiator drain plug 10 (Fig. 9.5) and the plug on the cylinder block 14.

Belt tension 3 (Fig. 9.6) of the coolant pump drive and the generator is provided by an automatic tension mechanism 2. The automatic tensioning mechanism does not require maintenance and adjustment while in operation.

The fan and the pump drive belt tension of the power steering system 15 (Fig. 9.6) shall be adjusted by displacing the power steering system pump 12; the following actions are required: loosen bolts 13, adjust the drive belt tension with adjustment bolt 14 by moving the pump along the rails. Tighten bolts 13.

In vehicles equipped with air conditioning, the drive of the units is carried out by one belt. Its tension is adjusted automatically (Fig. 9.7). It is necessary to check the condition of the belt while the vehicle is in use. If high tension is detected, it is possible to adjust the position of the power steering pump by bolt 9 in order to ensure the further operation of the outstretched belt. Fixing of the power steering pump bolts 8.

Fan drive clutch. If the clutch stops switching on or does not switch on completely, the engine may get overheated. Clutch fault check must be carried out in UAZ service station on special-purpose equipment.

Keep the external surface of the clutch clean.

The electric fan is mounted on the cooling system radiator at the front. The clutch is enabled and disabled automatically.

Gas exhaust system

ATTENTION! *The operating temperature of the neutralizer and components of the gas exhaust system is 400–800 °C. Do not operate the vehicle without protective shields of the neutralizer. When driving a motor vehicle and while parked, make sure that the exhaust system is not in contact with flammable materials (e.g., dried grass).*

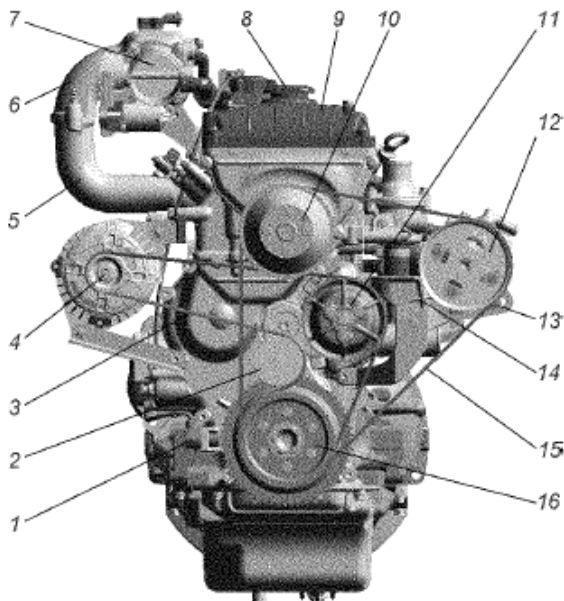


Fig. 9.6. Unit drive belts tension:

1 — synchronization sensor; 2 — automatic tension mechanism; 3 — alternator and water pump drive belt; 4 — alternator pulley; 5 — inlet pipe; 6 — receiver; 7 — throttle assembly with throttle position sensor; 8 — oil filler cap; 9 — valve cap; 10 — fan pulley; 11 — water pump pulley; 12 — steering system pump pulley; 13 — steering system pump attachment bolt; 14 — adjusting bolt; 15 — fan and steering system pump drive belt; 16 — crankshaft pulley damper

Gas leak through the joints with gaskets is not permitted and is to be eliminated immediately. Fasten the rusted-on nuts (see Appendix 2) having previously moistened the threaded joints with special fluids.

When the fuel system or the ignition system are faulty, a lot of unburnt hydrocarbons ingress into the catalytic converter, due to this its temperature can rise above the admissible limit (750–800 °C), and the catalytic converter will fail. Therefore, special attention shall be paid to the operation of the fuel system and the ignition system. Three-cylinder operation of the engine is prohibited even for a short period of time.

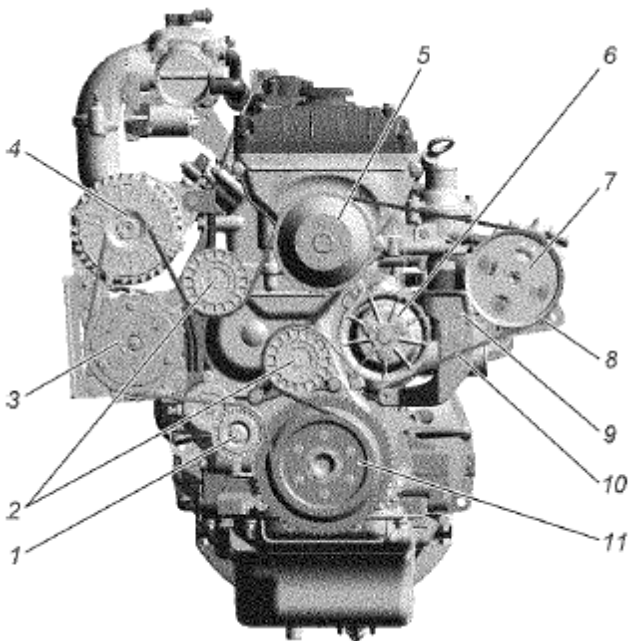


Fig. 9.7. Aggregates drive belt:

1 — automatic tensioning mechanism; 2 — auxiliary Idle pulleys / guide rollers; 3 — conditioner compressor pulley; 4 — alternator pulley; 5 — fan pulley; 6 — water pump pulley; 7 — steering system pump pulley; 8 — steering system pump attachment bolt; 9 — adjustment bolt; 10 — belt; 11 — crankshaft damper-pulley.

Injection system with microprocessor fuel supply control and ignition (Figs. 9.2, 9.3)

Safety measures

1. Before disassembling and assembling any parts or cables of steering system, disconnect the mass wire from the accumulator battery.
2. The engine may not be started if the rechargeable battery and the ground wire between the engine and the body are not connected reliably.
3. The rechargeable battery may not be disconnected from the motor vehicle in-vehicle network while the engine is running.
4. To charge the battery from an outer source disconnect the battery from the on-board power supply.
5. The control unit may not be exposed to temperatures above 80 °C, e.g., in an oven dryer.

6. Prior to arc welding operations, disconnect the battery wire and the control unit connector.

7. To prevent rusting of pins during vapor cleaning, do not direct the nozzle to the system components.

8. The control system electronic components are designed for very low voltage and are vulnerable to electrostatic discharges.

9. The fuel supply system from electric gas / fuel pump to fuel pressure regulator at running engine is under pressure at 4 kgf/cm².

ATTENTION! *The fuel line joints may not be loosened or tightened with the engine running or immediately after its stop.*

10. Fuel pump electric motor is cooled by the passing fuel current, thus to avoid its damage, do not turn on the electric fuel pump “on a dry,” when the fuel tank is empty.

Fuel system

ATTENTION! *Motor gasoline and its fumes are poisonous and fire dangerous. Observe the following rules:*

- *observe fire safety rules;*
- *avoid any operations resulting in the ingress of the gasoline into your mouth;*
- *in case of skin contact, do not let the gasoline dry on the skin and immediately wash it away with warm water and soap;*
- *cover the spilled gasoline with sand or chips, brush it off and dispose of it, ventilate the room;*
- *remove clothing contaminated with fuel, dry it outside the room, and launder.*

ATTENTION! *Use only recommended unleaded gasoline. Lead from leaded gasoline causes failure of the exhaust gas oxygen sensors and the catalyst.*

The electric fuel pump with the level indicator (submersible module) is installed in the tank.

Fuel tank inlet pipe duct plug is sealed and provides hermetic sealing.

Fuel tank 1 (Fig. 9.8) plastic (multi-layered) is equipped with a metal cover to protect the unit from damage when driving the vehicle over heavy soil road. Fuel tank maintenance consists in flushing the submersible module (clogging of the submersible module filter), flushing the tank itself (the presence of dirt and mechanical impurities in the fuel tank).

Check from time to time the reliability of the tank fastening and, if necessary, tighten the fastening bolts.

To be flushed, the fuel tank shall be dismantled from the vehicle.

Prior to dismantling of the tank from the vehicle, do the following:

- disconnect the rechargeable battery;
- remove the fuel tank protection;
- loosen the binding clamp bolts and lower the tank;
- disconnect the wire from the electric fuel pump (of submersible module)

and isolate it;

- disconnect the nylon tubing of the fuel-supply line;
- loosen the clamp of the filling pipe and pull it from the neck of the fuel tank, disconnect the steam-air sleeve from the fuel tank nozzle. Isolate the filling pipe, steam-air sleeve, and tank openings from dirt.

Then unscrew the bolts of the fuel tanks bands, remove them so they do not obstruct the tank lowering, and remove the tank.

Install the tank in reverse order.

Submersible module 5 (Fig. 9.8), which includes an electric fuel pump, a filter screen, an air intake chamber with a jet pump, a fuel inlet connector to the starting preheater, a pressure regulator valve and a fuel level indicator.

Check and clean fuel pump connections to the on-board power supply before installation.

Pay special attention to the reliability of the ground connection.

Try to avoid complete fuel exhaustion, as it can badly affect the units.

When overcoming the steep inclines, there must be at least 20 liters of fuel in the tank.

The submersible module strainer and fine fuel filter clogging, dirt, and debris in the fuel tank are indicative by the degradation of the vehicle dynamic performance, first of all under substantial load. In the event of such signs, immediately apply to service station to avoid the failure of the electric fuel pump.

Note. At the temperature below 0 °C the clogging symptoms may be indicative of water frozen in the fuel system.

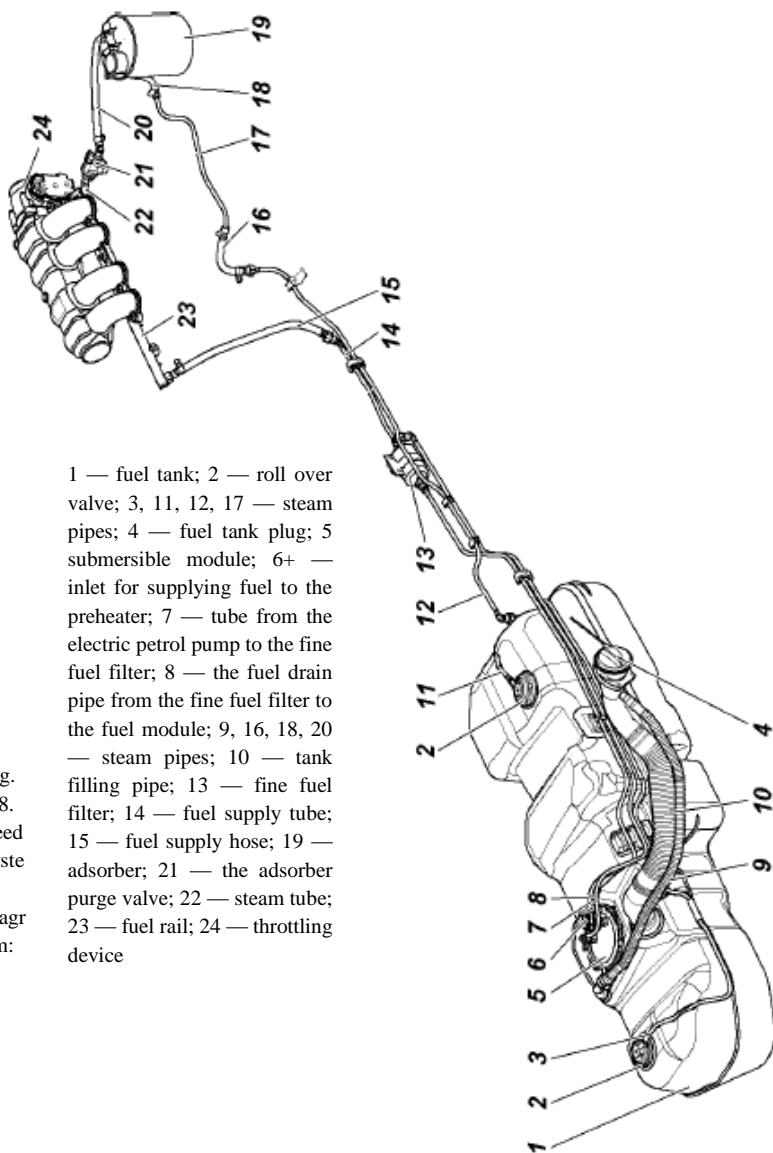


Fig. 9.8. Feed system diagram:

Should water be found in fuel, fuel shall be drained, fuel tank shall be flushed with clean gasoline, and the fine fuel filter shall be replaced.

Joints leakage shall be rectified by replacing faulty components.

Upon completion of any fuel system maintenance operations, related to removal or replacement of parts and assemblies, the system hermetic-tightness must be checked as follows:

- make sure that the filler neck plug is tightened securely;
- fuel tubes shall be installed until "click" of the quick coupler's locking spring;
- start the engine and inspect the entire system while it is idle running. Fuel leakage and fuel system elements moistening is not allowed.

In the course of the motor vehicle operation do pay attention to the following:

- if there is a strong smell of gasoline within the interior, engine room, locations of passage of fuel and steam lines and tubes, check tightness of joints, condition of the absorber (cracks and damage, serviceability of the absorber purge valve), the state of the tank (absence of cracks and damage);
- the efficiency of the fuel evaporation system elements (adsorbers). The malfunction of these elements leads to the fuel supply system breakdown. Replace defective elements.

Throttle pedal actuator. The vehicles are equipped with an electronic accelerator pedal module. The accelerator pedal is made of plastic. The full pedal travel is 48.7 mm. It is provided by the design and is not adjustable.

Air filter. Changing of filtering element of the air filter should be performed as follows:

- loosen collars and remove angle and resonator hoses from air filter;
- unscrew collar nut 4 (Fig. 9.9), remove collar and air filter;

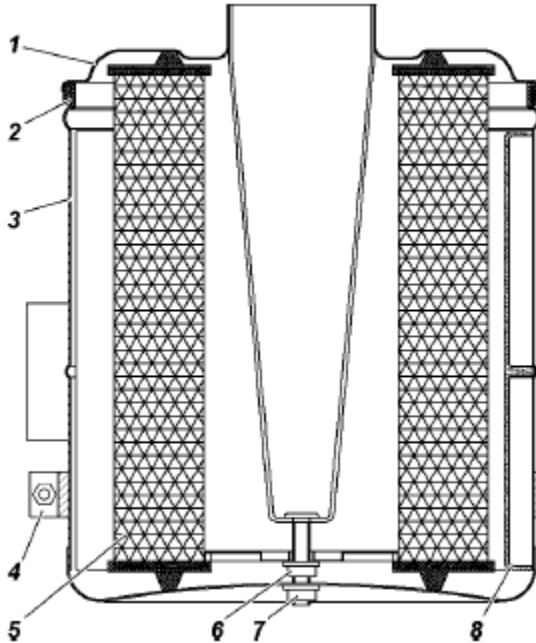


Fig. 9.9. Air filter:

1 — air filter cap; 2 — sealing spacer; 3 — filter housing; 4 — filter attachment collar; 5 — filtering element; 6 — nut; 7 — nut; 8 — air duct

- unscrew nut 7 and take cover 1 with the filter cartridge 5 out of the filter housing;
- unscrew nut 6 and remove filter element;
- install a new filtering element, compose and install air filter.

Fuel supply and ignition control system

To connect the engine control system automated external diagnostics and programming devices, the data link connector covered with protective lid is installed under the hood on the front bodywork panel (Fig. 9.10).

Control unit is installed under the motor vehicle house-coat hood on the right hand side wall.

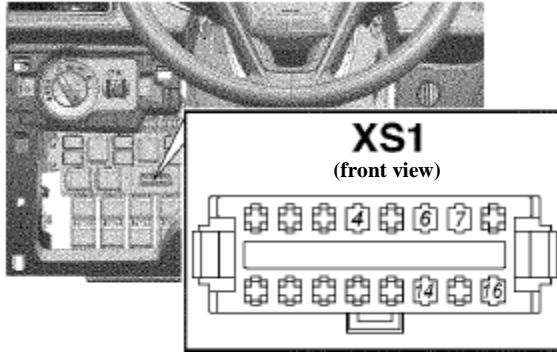


Fig. 9.10. Data link connector (XS1):
 4 — ground; 6, 14 — Sup-line; 7 — K-line; 16 — +12 V

Diagnostics


The operating capacity of the engine control system and injection system depends on the operable condition of mechanical and hydro-mechanical systems. A number of deviations causing malfunctions can be mistaken for malfunctions in the electronic part of the control system:

- low compression;
- deviation of gas distribution phases caused by incorrectly assembled engine components;
- air influx in the inlet pipe line;
- poor fuel quality;
- failure to meet the maintenance frequency.

The control unit is capable of diagnosing the engine control unit components to a certain extent.

If a fault is detected, the control unit turns on the diagnostic fault lamps on the vehicle dashboard, and the code designating the fault is recorded into its memory.

The engine malfunction lamp switching on shall not mean the engine must be stopped immediately, since the control unit has backup modes allowing the engine to work under conditions close to normal.

However, in the event of a malfunction due to ignition misfiring (the engine malfunction  indicator starts blinking), it is necessary to reduce the crankshaft speed to 2,500 rpm (vehicle speed not higher than 50 km/h) and drive to service station in order to avoid failure of the exhaust gas converter.

ATTENTION! *The alarm indicator lights up permanently if the permissible temperature of the neutralizer is exceeded. In such cases cut-out of one or two of the engine injectors is possible.*

The vehicle operation is only allowed after the fault is eliminated.

Diagnostic lamp operation

In the operating mode with the ignition on and the engine out, the lamp lights up and goes out after the engine has been started. If the diagnostic lamp remains on while the engine is running, that means that the engine or the system needs servicing as soon as possible.

When ignition faults are present while the engine is running, the diagnostic lamp starts to blink and glows on while neutralizer exceeds the allowed temperature.

Clearing fault codes.

The memory storing the fault codes can only be cleared using the scanning tester.

If the rechargeable battery switches off, the control unit self-learning parameters are not lost and can be cleared using a scan-tester.

Pre-starting heater+

All necessary information about heater operation and maintenance is in the manufacturer's manual enclosed to the motor vehicle.

TRANSMISSION

At slow speed, in gears 1 and 2, in acceleration-deceleration regime, an audible knocking in the form of short clicks may occur in the driving system.

When moving at higher gears of the gearbox and the transfer case at a speed higher than 60 km/h in engine braking regime, as well as during free running (neutral position of the gearbox), noise in the driving system in the form of a slight low-frequency hum may occur.

During brisk acceleration of the motor vehicle, a slight knocking may occur during selection of air gaps in spline coupling of the driving system.

Upon engine braking, a slight knocking may occur during selection of air gaps in spline couplings of the driving system.

During free running and subsequent brisk acceleration of the motor vehicle, a slight knocking of synchronizers rings of the gearbox may occur.

Clutch

ATTENTION! *The brake fluid is poisonous. Keep the coolant in a tightly closed container. Observe the following rules when working with the brake fluid:*

- *avoid any mouth contact with the fluid;*
- *in case of skin contact, do not let the fluid dry on the skin and immediately wash it away with warm water and soap;*
- *flush the spilled fluid with water, air the room;*
- *remove clothing contaminated with the fluid, dry it outside the room, and wash it.*

The level of the fluid must be 15–20 mm lower than the upper edge of the reservoir 2 (Fig. 9.11).

The position of the clutch pedal is adjusted by changing the length of the pusher bar 5 of the clutch master cylinder. The full clutch pedal travel should be (130 ± 10) mm. The free travel (5–30 mm) is provided by clutch structural design and is not adjustable.

The "flexibility" of the pedal and incomplete declutching indicates the presence of air in the hydraulic drive system. Bleeding of the system is carried out through the working cylinder valve 2 (Figs. 9.12, 9.13), similar to bleeding of the hydraulic brake actuator.

The tightening torque of the clutch cylinder bleed adapter with a plastic case should be 0.4–0.5 kgs • m.

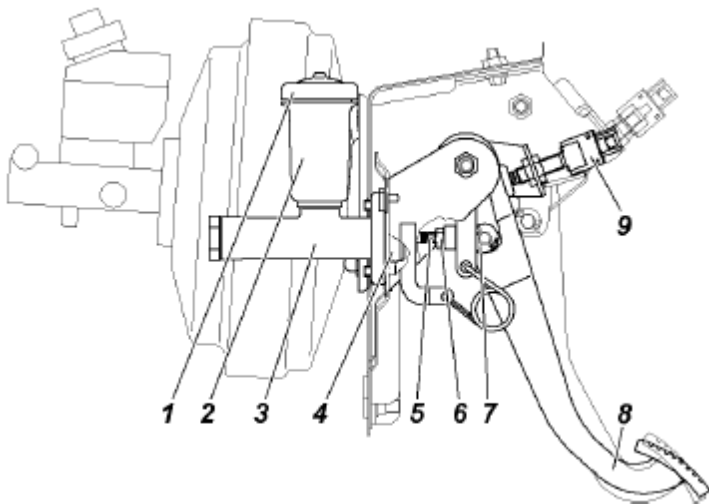


Fig. 9.11. Clutch master cylinder drive:

1 — tank cap; 2 — tank housing; 3 — master cylinder housing; 4 — safety cover; 5 — push rod; 6 — nut; 7 — push rod sleeve; 8 — clutch release pedal; 9 — clutch switch off pedal

Gearbox

Regularly check threaded couplings (see Annex 2).

If a leak is detected, find out the cause and replace the defective parts (gaskets, cuffs).

Unscrew plug 5 to check the oil level (Figs. 9.12, 9.13). The oil level should be on the bottom edge of the filler hole.

When replacing the oil, drain it (having removed plug 6) immediately after stopping the vehicle, while the unit is still hot, herewith plug 5 is to be unscrewed as well. Replace the gasket of plug 6 during its reinstallation.

Transfer case

Regularly check threaded couplings (see Annex 2).

If a leak is detected, find out the cause and replace the defective parts (gaskets, cuffs).

Unscrew plug 8 to check the oil level (Fig. 9.13). The oil level should be on the bottom edge of the filler hole.

Upon oil replacement, drain it immediately following the motor vehicle shut-down while the aggregate is hot. For this it is necessary to:

- wipe dry fill and drain plugs;

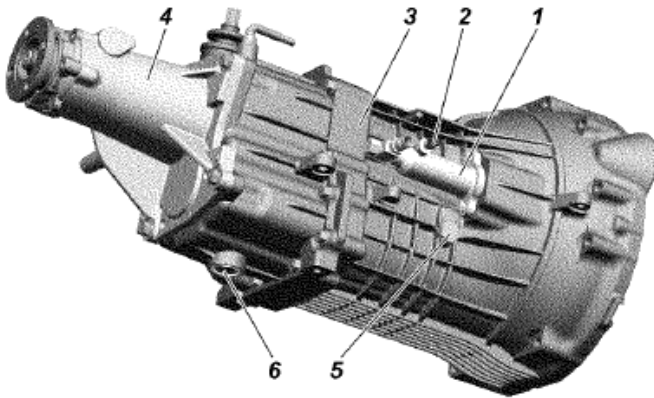


Fig. 9.12. Five-speed transmission "Dymos", adapter and declutching working cylinder:
 1 — clutch release cylinder; 2 — discharge valve; 3 — transmission; 4 — adapter; 5 — transmission crankcase filler plug; 6 — transmission crankcase drain plug

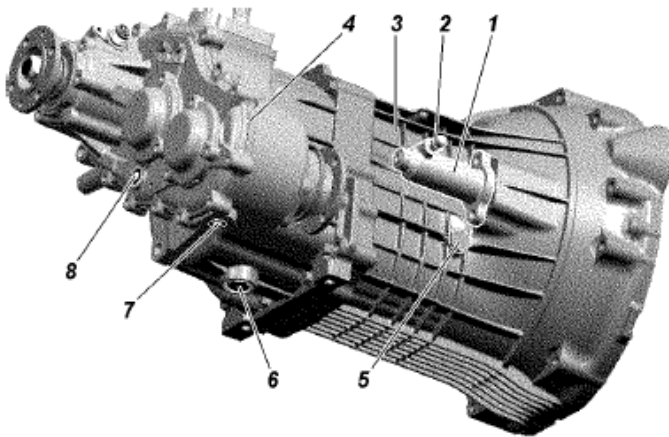


Fig. 9.13. Dymos 5-speed transmission, UAZ transfer case and clutch release cylinder:
 1 — clutch release cylinder; 2 — transfer valve; 3 — gearbox; 4 — transfer case; 5 — gearbox housing filler plug; 6 — gearbox housing drain plug; 7 — transfer case housing drain plug; 8 — transfer case housing filler plug

- place a vessel under transfer case;
- pull drain and fill plugs out;
- let oil drain;
- place and tighten drain plug at 6.0–6.5 kgf·m momentum;
- refill oil until overflow via filler plug orifice;
- place and tighten drain plug at 6.0–6.5 kgf·m momentum;

ATTENTION! *Different oils are used in the gearbox "Dymos" and in the transfer case UAZ, LLC (see Annex 3), mixing is not permitted.*

Propeller shafts

Propeller shafts are non-serviceable. While in operation, periodically check the safety gaiter 4 (Fig. 9.14) on the spline shaft joint. If the gaiter is damaged, it is required to contact the service center for replacement.

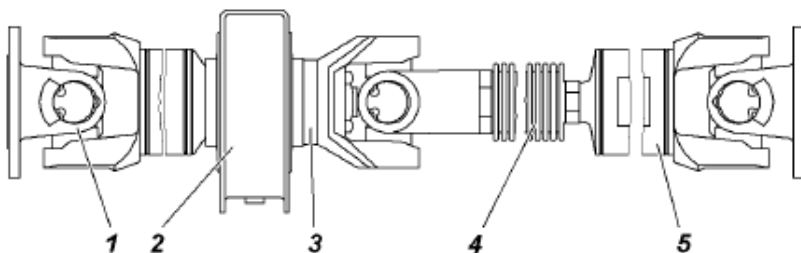


Fig. 9.14. Propeller shaft:

1— flange; 2 — intermediate shaft support; 3 — intermediate propeller shaft; 4 — safety gaiter; 5 — rear propeller shaft

Driving Axles

Check the oil level in the housing, it should reach the lower edge of the filler orifice.

Drain the oil through plug 1 (Fig. 9.15) in the bottom part of housing, herewith plug 2 should be screwed out of the filling hole as well.

Axial clearance in bearings of main gear driving pinion for more than 0.05 mm is not allowed, since it causes fast wear of pinion teeth and possible axle jamming.

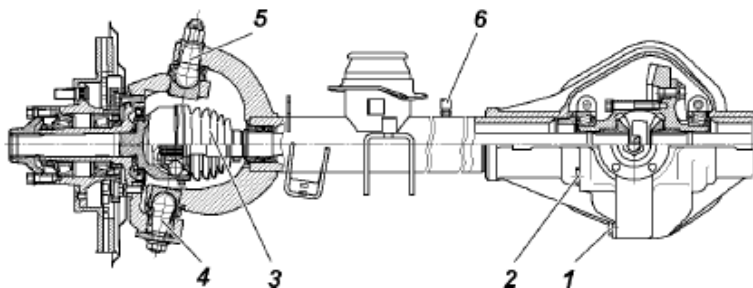


Fig. 9.15. Front axle:

1 — drain plug; 2 — filler plug; 3 — front wheel drive-gear knuckle; 4 — lower pivot axle
 5 — upper pivot axle; 6 — protection valve

Check axial clearance by swinging driving pinion at the flange of driving shaft fixation.

Axial clearance in main gear differential is also not allowed. To check for clearance swing the driven pinion slightly with housing cover removed.

If there is a clearance, the bridge must be adjusted. The axle adjustment is a labor-intensive operation requiring specific skills and a special tool, that is why we recommend to conduct axle adjustments only at authorized service stations.

Pay attention to the condition of the protecting covers of the front wheel drive knuckles and pivot joints. The operation of the axle with damaged covers may lead to a rapid failure of the joints.

Pivot joints 4, 5 (Fig. 9.15) do not require maintenance and must be replaced in case of excessive wear. To replace the pivot joints, special tools and custom tooling are required, that is why we recommend to do it only at authorized service stations.

When checking the steering knuckles, pay attention to the operable condition of the wheel turn adjusting bolts 1 (Fig. 9.16). The measure of wheel turning angle A to the right, and the left one to the left should be within $37\text{--}38^\circ$. The increased wheel turning angle may cause damage of steering pivot and result in contact of suspension and steering components.

During the operation, it is not required to add lubricant to spherical pivot studs.

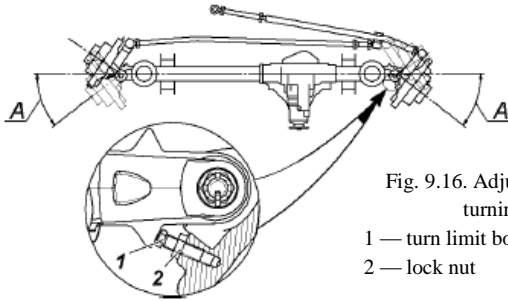


Fig. 9.16. Adjustment of wheels turning angle:

- 1 — turn limit bolt;
- 2 — lock nut

Front axle

The front axle does not require maintenance. The design of the steering knuckles is similar to that of the front axle (Fig. 9.15). In operation, monitor the state of the pivot stud covers 4,5 (Fig. 9.15) and the stud bolt plugs B (Fig. 9.17). The turning angle A (Fig. 9.16) of the front axle wheels should be 44–45°.

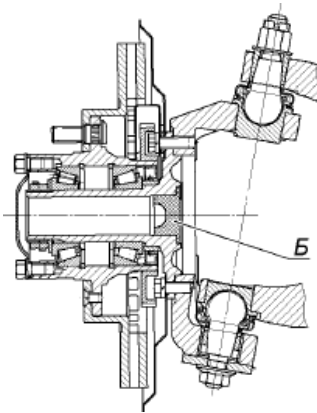


Fig. 9.17. Front Axle knuckle

RUNNING GEAR

Suspension

ATTENTION! Shock absorber disassembly is strictly forbidden to avoid accidents.

The motor vehicle operation at malfunctioning or missing shock absorbers and worn out suspension joints is strictly prohibited.

Front and rear shock absorbers are not interchangeable.

Hydropneumatic shock absorbers are not subject to maintenance and repair. In case of replacement of shock absorbers, it is recommended to replace them completely along the axle.

Knocks, squeals, and lamination of rubber in the joints indicate a wearing that require the joint replacement. In operation no deformation of the mount cross tie-rod and steering rod is allowed. When replacing the joints carry out a final tightening of the nuts (Annex 2) on the wheeled vehicle.

During installation of the absorber, do the final tightening (Annex 2) of the absorber front and rear end retaining nuts (of spring buckles) under the weight of the vehicle.

Pay special attention to the tightening of the absorber clamp nuts. Vehicle operation with loose torque of the absorber clamp nuts is not allowed. Do not overtighten the absorber clamp nuts with excess torque, as this can lead to deformation of the clamp plate.

Tighten the clamp nuts when the absorber is fully floating. To do this, lift the rear part of the vehicle at the frame.

Wheels and tires

ATTENTION! *Worn or damaged tires, under-inflated or over-inflated, warped wheels, or loosened wheel fasteners can cause an accident. Regularly check the condition and the air pressure of tires, as well as the condition of the wheels and their mounting.*

Since tires of different models (tread patterns) may have different sizes and stiffness performances, use identical tires for all wheel discs.

ATTENTION! *Using tires and wheels of deprecated dimensions can lead to uneven tire wear, deterioration in motor vehicle handling, increased fuel consumption and braking distance, the appearance of vibration on the steering wheel and cause malfunction of the ABS, which in turn can lead to a serious accident.*

Use only tires of the same size and manufacturer for all wheels. Otherwise, the transmission components may be damaged.

ATTENTION! *It is not recommended to use tires whose size differ from those installed by the manufacturer.*

When replacing tires with other than those specified, it is necessary to register the size of the new tire in the memory of the ABS electronic control unit, in order to ensure correct operation of the speedometer. To do this requires applying to UAZ, LLC Service Station (addresses of Service Stations are listed in the service book).

To provide uniform tightening of the nuts, tighten them alternatively (every second one). The final tightening of the nuts is performed on the vehicle standing on the wheels (see Annex 2).

Check inflation pressure in cold tires.

If intensive uneven wear of the front wheel tire is detected, check and adjust the toe-in of the front wheels and the gaps in the pins units.

Check and adjust the toe-in of the wheels on a special stand. Toe-in adjustment of the wheels should be performed at normal tire pressures. Adjust the toe-in of the right wheel by changing the length of the pull-rod arm (the steering wheel position herewith must match the position when the vehicle is moving straight). Then adjust the toe-in of the left wheel by changing the steering arm length. Change the steering arm length by rotating the union 2 (Fig. 9.18) having previously loosened the locknuts 1 and 3 with left and right-handed threads. Tighten the locknuts after adjustment (Annex2).

Rearrange the wheels for their even wear after every 15,000 km. Interchange them only on one side – the front instead of the rear one. Do not use the spare wheel for interchanging. Balance the wheels after rearrangement.

The spare wheel is located at the back of the body and must be securely fastened to the holder by the sector.

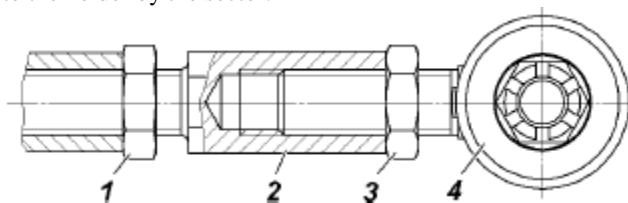


Fig. 9.18. Steering rod length adjustment:

1 — left thread nut; 2 — flanged socket; 3 — right thread nut; 4 — joint

Move the wheel away from exhaust manifold to a 40 mm air gap prior to wheel adjustment to avoid a tire burnout from exhaust manifold when using exhaust system with rear wheels exhaust pipe.

Wheel hubs

Swing the wheels to check the clearance in bearings.

In order to change lubricant, remove the hub from the journal, clean the debris-contaminated lubrication, wash thoroughly the bearings and the collar. Lubricate the bearings and the collar working edge. Fill in the cavity between the bearing rollers with lubricant. Fill in a lubricant layer of 10–15 mm thick between the bearings. Do not put an excess amount of lubricant to avoid its ingress into the wheel brakes.

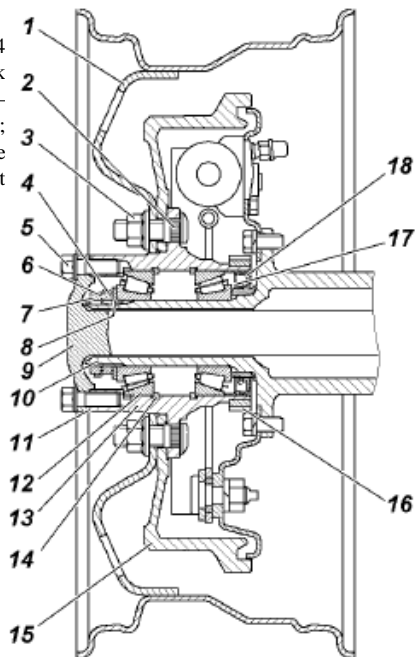
Thoroughly adjust the bearings. If their tightening is loose, the vehicle movement provokes shocks in them, and, as a result, damages the bearings. If the tightening is too tough, the bearings overheat, the grease leaks and the bearings break down. Moreover, large clearances in the front wheel hubs increase brake pedal travel.

Adjust the wheel hub bearings in the following sequence:

1. Hang the motor vehicle or lift the jack from the side of the wheel whose bearings are to be adjusted.
 2. Remove the wheel cover. Remove the rear axle half shaft 9 (Fig. 9.19) or the flange of the front axle hub or the front axle hub cap.
 3. Unbend the tab of locking washer 6, loosen lock-nut 7 and remove the locking washer.
 4. Loosen the adjusting nut 4 of the bearings by $1/6$ – $1/3$ turns (1–2 flats).
 5. Rotate the wheel by hand to check it for easy turning (the wheel should rotate freely without the brake shoes rubbing against the brake plate or the drum).
 6. Tighten bearing hub adjustment nut smoothly using a manual device at tightening torque to be 25–30 N•m (2.5–3.0 kgf•m).
- Rotate the wheel to position the rollers correctly in the bearing, while tightening the nut.

Fig. 9.19. Rear wheel hub:

1 — wheel; 2 — hub bolt; 3 — wheel nut; 4 — adjusting nut; 5 — axle bolt; 6 — lock washer; 7 — locknut; 8 — thrust washer; 9 — axle; 10 — journal; 11 — pad; 12 — bearing; 13 — hub; 14 — thrust ring; 15 — brake drum; 16 — trigger wheel; 17 — thrust washer; 18 — collar



7. Replace locking washer, replace and tighten counter nut at tightening torque to be 20–25 N•m (2.0–2.5 kgf•m).

Upon bearing replacement, nut tightening torque is to be 35–40 N•m (3.5–4.0 kgf•m), counter nut 25–30 N•m (2.5–3.0 kgf•m).

Install the locking washer with its inner tab into the pin groove. Replace the locking washer if some cracks on the tabs of the locking washer are detected.

8. Check the alignment of the bearings after tightening the lock-nut. If adjusted correctly the wheel should rotate freely without sticking, visible axial clearance and wobbling.

9. Bend one tab of the lock washer around the flat of the nut, bend the second tab around the flat of the lock-nut until full fitting to the flats. Unbend those tabs of the lock washer that are the closest to the middle of the nut flats.

10. Install the rear axle shaft or the flange of the front axle hub or the front axle hub cap, clean the threaded part of the bolts from old sealant, degrease them, and apply fresh UG-6 sealant or "Anacrol-201," tighten the bolts. Install the wheel cap.

CONTROL SYSTEMS

Steering System

ATTENTION! *The disabled hydraulic power steering increases the effort, necessary for turning the steering wheel.*

It is prohibited to switch off ignition and remove the key from the ignition switch when the motor vehicle is running. When the ignition key is withdrawn, the steering gear shaft is locked up by the anti-theft device and the vehicle becomes unsteered.

If the steering is out of order, further vehicle movement or its towing with a towrope is prohibited. In this case you should use two wheel vehicle towing or a tow truck service.

If the power steering fails due to pump, hose, or pump drive belt damage, or due to engine stop when towing the vehicle, using of the steering mechanism is possible only for a short time. If there is no oil in the power steering system, remove the pump drive belt, otherwise the pump may be jammed and the belt may break. When the pump drive belt is removed, the temperature of the coolant must be carefully controlled, since the engine may overheat.

Long-term motor vehicle operation with disabled power steering can lead to the premature wear of the steering system.

The total play of the steering system is inspected while the engine is idling and the front wheels are positioned straight. The steering wheel should be swung to both sides until the front wheels turn. The total play cannot exceed 20°.

If the free play is more than allowed, it needs to be defined which joint causes the increased play. To find it out check: the tightening torque of the steering gear bolts, the propeller shaft mounting bolts (see Annex 2), the condition of steering rods, the clearance in the propeller shaft joints and in the countershaft joint of the steering wheel column, the clearance in the propeller shaft slip joint, and the clearances in the steering mechanism.

The steering joints do not require adjustment and lubrication while in operation.

In case of clearance in the unserviceable joints, they must be replaced.

In case of a radial clearance in the drive line universal joint of the steering and in the countershaft joint of the steering column, replace the propeller shaft and/or the steering column respectively.

Adjust the mechanism, if clearance in the steering gear is detected. Adjustment is to be carried out at UAZ Service Center.

Power steering pump belt tension see chapter "Engine cooling system."

Replace the belt if damages or excessive stretch are detected.

Oil level check and hydraulic booster oil change (to avoid cases of pump jamming due to incomplete filling of the required oil volume, the procedure is to be performed by two people).

When checking the oil level in the oil tank 4 (Fig. 9.20), the front wheels must be positioned straight.

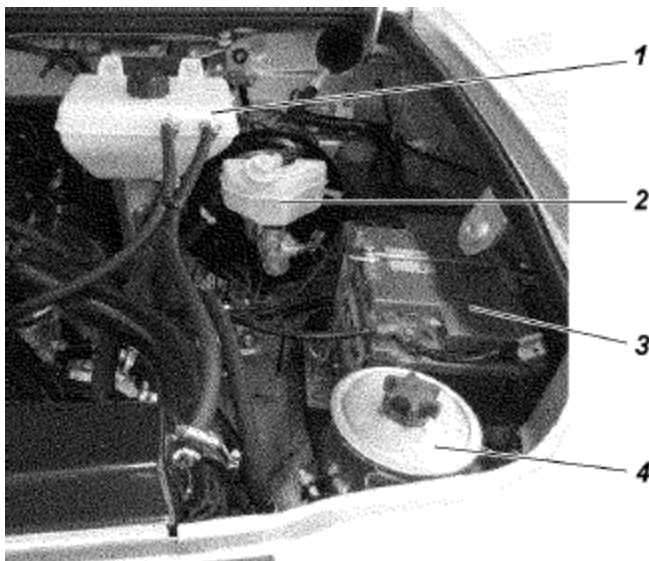


Fig. 9.20. Underbonnet space (section):

1 — the expansion tank of the engine cooling system; 2 — the master cylinder reservoir; 3 — battery; 4 — oil tank of the power steering system.

The oil level should align with the level of the strainer in the tank (at warm engine, the oil level above the strainer up to 7 mm is allowed). The oil must be pre-filtered through a filter with filtration fineness no more than 40 micrometers.

Hydraulic system filling procedure:

1. Disconnect the drag link from the drop arm and lift the front wheels with a jack.

2. Open the bleeding adapter located on the shaft cover of the drop arm (unscrew it one turn), put a piece of a hose on it and dip it into a bucket with oil (the hose end must be fully immersed in oil).

3. Remove the oil tank cap, fill the oil until it appears through the bleeding adapter, close the adapter and add oil to the level of the strainer.

4. Do not start the engine and turn the steering wheel or the input shaft lock-to-lock until air bubbles stop coming out of the oil tank (at least 5 times in both directions). Add oil to the tank to its previous level.

5. Start the engine and keep adding oil to the tank at the same time. Avoid its complete emptying.

Note. In case of excessive foaming of oil, which indicates of air getting into the system, stop the engine and let the oil settle for at least 20 minutes (before the air bubbles come out of the oil). Inspect the hose connection points to the power steering system units and, if necessary, remove leaks.

6. Bleed the air out of the hydraulic system while the engine is running by turning the steering wheel lock-to-lock, without stopping in the end positions, at least 3 times in each direction until the air bubbles come out of the oil. Before bleeding the air out of the hydraulic system, open the bleeding adapter (described in item 2) and close it as soon as the oil comes out of the adapter. Avoid oil contact upon the engine.

7. Check the oil level in the tank. Add oil if necessary.

8. Close the tank with the cap, screw it with hand force, connect the rod arm, secure (Annex 2) and pin the ball stud.

Brake systems

ATTENTION! Remember that the stopped engine and the disabled vacuum booster increase the effort necessary for pushing the brake pedal to stop the motor vehicle.

ATTENTION! In case of any brake circuit malfunction, the brake pedal travel increases and brake efficiency decreases. In this case, do not implement short and repeated pedaling. Press the pedal until the maximum possible braking effect is obtained.

If the brake system does not work properly, further motor vehicle driving or towing with a towrope are forbidden. In this case you should use two wheel vehicle towing or a tow truck service.

ATTENTION! The brake fluid is poisonous. Keep the coolant in a tightly closed container. Obey the following rules when working with the brake fluid:

- avoid any mouth contact with the fluid;
- in case of skin contact, do not let the fluid dry on the skin, and immediately wash it away with warm water and soap;
- flush the spilled fluid with water, air the room;
- remove clothing contaminated with the fluid, dry it outside the room, and wash it.

The level of brake fluid in reservoir 2 (Fig. 9.20) can be checked visually with the marks on the reservoir housing made of semitransparent plastic. When cap is off and the brake linings are new, the fluid level shall be on the MAX mark. If the hydraulic drive works properly, the reduced level of the fluid in the reservoir is associated with worn linings of the brakes shoes. The fluid level reduced to the MIN mark indirectly indicates their maximum wear. In this case, directly monitor the linings condition, and there is no need to add fluid into the reservoir because the installation of new brake pads heightens the fluid level up to the normal.

The brake fluid warning light comes on when the fluid level falls lower than the MIN mark, which indicates that, if the brake shoe linings are new or partially worn, the system is non-hermetic and the fluid leaks.

In this case add the fluid only after all leakages are eliminated.

Check the fluid level in the tank simultaneously with the alarm level sensor, which can be done by uncapping the tank (if the ignition is on, the warning light should appear on the dashboard).


ATTENTION! *If the motor vehicle is equipped with ABS and the brake fluid level is reduced lower than MIN mark or air enters the system, contact a service station, as this failure needs to be inspected with additional diagnostic equipment.*

Check the brake hoses. If cracks appear on the outer side of the hoses, replace them.

If brakes pipes have corrosion, replace them.

Anti-lock braking system. The vehicles are equipped with an anti-lock braking system (ABS). ABS prevents wheels from blocking when braking, thereby enabling to preserve the target motion path and minimum brake path. However, when braking on a road with a loose surface (gravel, sand, unpacked snow), braking path may increase compared to braking under the same conditions with locked wheels.

ABS braking starts from the speed of 10 km/h and is accompanied by slight pulsation of the brake pedal and typical noise of ABS actuators.

When ABS warning indicator  is on (except for the self-test mode when the ignition is switched on and ABS turn-off when the rear axle differential lock is engaged), it is indicative of malfunction in the system. Although in this case the operation of the hydraulic drive of the brakes is not interrupted, the malfunction must be eliminated in UAZ Service Station.

Illuminating of the red brake system (ⓘ) signal device of malfunction (except for self test mode when cycling the ignition) indicates critical malfunction (electronic brakeforce distribution [EBD] malfunction, system leakage, etc). It is not permitted to operate the motor vehicle with the (ⓘ) brake system warning light on.

Disc brakes of the front wheels. To inspect the brake pads 2 (Fig. 9.21), get the vehicle to a horizontal location, pull up the parking brake. Inspect the shoes through the window in caliper 4. If the linings are worn to a thickness of 1.5–2.0 mm, replace the shoes with new ones. Replace the shoes on both front wheels.

If brake shoes with audio signals of the wear are installed on the motor vehicle, change the shoes if clanking (tinkling) occurs, which indicates the shoes are worn down.

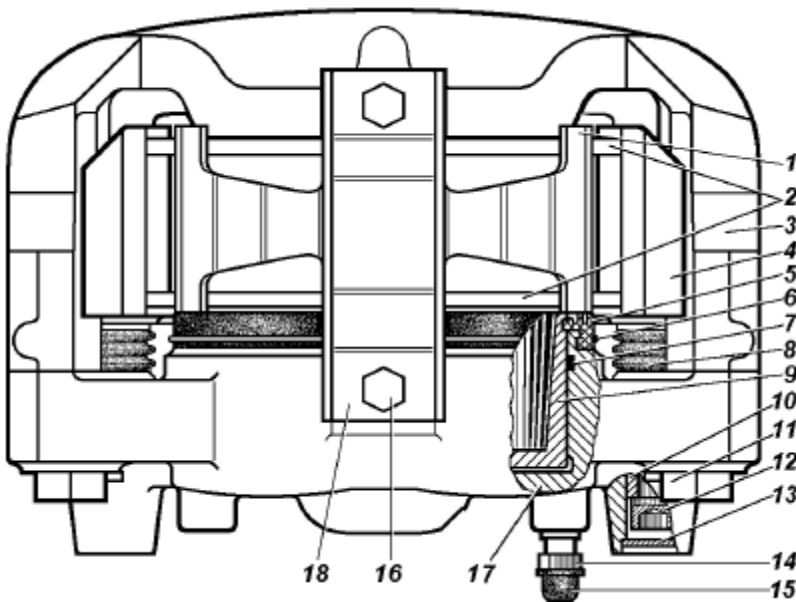


Fig. 9.21. Front disc brakes:

1 — spring; 2 — shoes; 3 — clip; 4 — caliper; 5 — protective cap; 6 — snap ring; 7 — O-ring; 8 — protective boot; 9 — piston; 10 — bushing; 11 — bolt; 12 — screw; 13 — plug; 14 — proportioning valve; 15 — cap; 16 — spring carrier bolts; 17 — crankcase; 18 — spring carrier

Make sure to replace such pads correctly. The pads equipped with an audible wear indicator are not interchangeable for the left and right brakes. These pads must be installed on the side of the brake pistons in such a way that the wear indicator is located at the top of the brake pads. Install the pads without wear indicators on the outside of both brakes.

To replace the brake shoes, unscrew bolts 16, remove carrier 18 and spring 1.

Check the brake disc. If there are deep notches and score marks on the surface of the brake disc, it must be removed from the vehicle, cleaned and filed. When the disc is worn to a thickness less than 20.4 mm, replace it with a new one.

Make sure that the cylinder block has no leakage.

Check safety caps 5 and boots 8 for damages and proper installation in seats, replace them if necessary.

Check the outer surface of bushes 10 in the area of boots 8 for grease and lubricate them with UNIOL 2M/1 TU 38.5901243-92 grease as required.

Move clip 3 until pistons 9 bear against the inner surface of cylinder block 17. Bypass valve 14 can be opened to facilitate fluid displacement from cylinder block 17. Close valve 14 as soon as pistons 9 completely sink into the cylinder block. Before moving clip 3, uncap the master cylinder reservoir and do not let the fluid overflow while moving the clip.

It is forbidden to recess the pistons with a tire iron as it can deform guide bush 10 and damage clip 3 and boot 8.

Replace the worn brake shoes with new ones. The shoes shall be replaced from both sides of the front axle. To bring the shoes to the disc, press the brake pedal 2–3 times.

Install spring 1, spring carrier 18 and screw bolts 16.

ATTENTION! Since the spring carrier 18 has an asymmetrical shape, make sure that it is installed correctly. Correctly mounted carrier provides pressure of spring 1 for both pads.

During further operation, the necessary gap between the brake shoes and the brake disc is maintained automatically.

ATTENTION! The disk brake fastener of parking drive details are fixed against loosening by adhesive sealant (without lockwashers). In the case of loosening these bolts and nuts, add sealant.

Drum brake mechanisms of the rear wheels (Fig. 9.22). Remove the brake drums and clean the parts from dust and dirt at times. The frequency of this operation depends on the operating conditions of the vehicle. In summer and when driving on muddy roads, increase the cleanup frequency, in winter, less often.

Replace the greasy rear brake pad linings or keep them in clean gasoline for 20–30 min and thoroughly grind them with a sand paper or a wire brush.

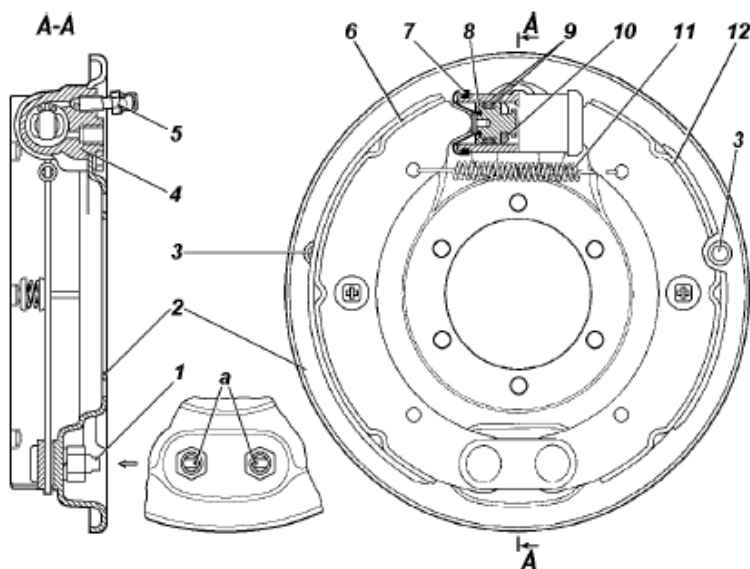


Fig. 9.22. Rear wheel brake:

a — anchor stud marks; 1 — anchor studs; 2 — shield; 3 — orifices for visual inspection of brake linings; 4 — wheel brake cylinder; 5 — bypass valve; 6,12 — brake shoes; 7 — safety cap; 8 — piston; 9 — O-rings; 10 — snap ring; 11 — release spring

After removing the drum, make sure that there is no leakage from the wheel cylinders, and that the wheel cylinders are securely fastened to the shields. Pay attention to the condition of the safety caps 7 (Fig. 9.22) of the wheel cylinders and their mounting, the degree of wear of the friction facings, and the condition of the brake drum.

Safety caps must be tightly installed in piston and cylinder seats and not be damaged.

If the drum working surface has deep notches and burrs or wears unevenly, rebores the drums from its central orifice. The maximum permissible diameter of the rebored brake drum is 281 mm.

It is not recommended to change the brake drums between the hubs as working surfaces of the drums will wobble more.

Air gap between the shoes and the drum is restored automatically as the linings wear.

Replace the linings in case of their excessive wear (the rivets are sunk less than 0.5 mm).

In the case of pasted linings, replace the pads when the lining is worn to a thickness of less than 1.5 mm.

Prior to installation of new pad or linings, it is necessary to move the pistons with the thrust rings deep into the cylinder to put the drum on the pads easily. After assembly, press the brake pedal 2–3 times to set the pistons in the working position.

Do not press the brake pedal when the brake drum or the leading pads are removed as the compressed fluid will press the pistons out of the wheel cylinders and the fluid will escape.

During every drum removal grind the lip on the edge of the friction surface which appears from the drum wear to ease the next removals of the drum.

Tighten the brake shields bolts when the hubs are removed.

Fill the brake system as follows:

ATTENTION! Fill the brake system of ABS-equipped vehicles at a service station, as it requires additional diagnostic equipment.

1. Check the tightness of all connections of the brake hydraulic drive and the condition of flexible rubber hoses and tubes.

2. Clean the bypass valves and the safety caps of wheel cylinders, crankses and proportioning valve from dust and dirt.

3. Clean the surface of the master cylinder reservoir from dust around the cap, and unscrew the cap. Fill the reservoir with brake fluid up to the MAX mark.

4. Press the brake pedal several times to eliminate effect of the vacuum formation in the brake booster.

5. Bleed the cavity of the right and left wheel cylinders of the rear brakes, the right and left blocks of the front brake cylinders in turn.

Bleed the system as follows:

ATTENTION! *While bleeding, add fluid to the master cylinder reservoir in time and do not let the fluid level decrease lower than 2/3 of the reservoir volume. Do not let air enter the system.*

If air enters the brake system of a vehicle equipped with ABS, contact the service center. It is prohibited to operate the vehicle until the malfunction is repaired.

1. Uncap the bypass valve of the wheel cylinder and put a special rubber hose (approximately 400 mm long) on the valve.

Drop the other end of the hose into a transparent vessel no less than 0.5 l in capacity, which is half-filled with the brake fluid.

2. Press the pedal 3–5 times abruptly, hold it in the extreme position and simultaneously unscrew the bypass valve by 1/2–3/4 turn to release the fluid portion from the system to the vessel. After the pedal goes forward until stop, screw the valve. Repeat this step until bubbles stop coming out from the hose dropped into the vessel with the brake fluid.

3. When the bleeding is over, press the pedal and, holding it in the extreme position, screw the bypass valve (Annex 2), and remove the hose.

Wipe the valve head dry and put on the protective cap.

4. Add the brake fluid up to the MAX mark into the master cylinder tank.

Tighten the reservoir cap. Do not apply excessive force to avoid cap breakage.

While bleeding, add fluid to the master cylinder reservoir in time and do not let the fluid level decrease lower than $2/3$ of the reservoir volume. Hold the hose end immersed into the fluid.

Check the brake system operation when driving the vehicle. If the adjustment of the service brakes, their drive and bleeding of the brake system are carried out correctly, full braking should happen within $1/2$ – $2/3$ of the pedal travel.

It is not recommended to refill the master cylinder reservoir with the fluid collected during bleeding.

If necessary, **adjust the brake pedal free play** by turning the adjustment screw 6 (Fig. 9.23). The brake pedal free play must be 5–8 mm. After adjustment, tighten the screw nut to the torque 14–18 N • m (1.4–1.8 kgf • m).

Adjust the switches 4 with the nuts 7, ensuring a clearance of no more than 0.5 mm, as shown in the figure. After adjustment, tighten the screw nut to the torque 4–6 N • m (0.4–0.6 kgf • m).

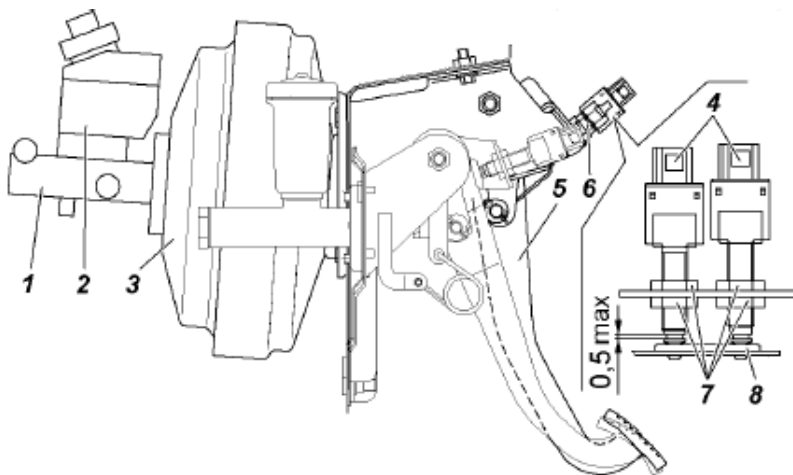


Fig. 9.23. Master cylinder drive:

1 — master brake cylinder housing; 2 — tank; 3 — vacuum booster; 4 — brake signal switches; 5 — brake pedal; 6 — adjusting screw; 7 — nuts; 8 — buffer

Parking brake system

Drive line parking brake affecting

the transmission (Fig. 9.24).

Clean the brake pads from dust and dirt, and, if the lining surfaces are "gummy," polish them with a sand paper. Replace the greasy linings or keep them in clean gasoline for 20–30 min and thoroughly grind them with a sand paper or a wire brush.

Replace the linings in case of their excessive wear (the rivets are sunk less than 0.5 mm). In the case of pasted linings, replace the pads when the lining is worn to a thickness of less than 1.5 mm. Grind the linings of new shoes to ensure that their diameter is by 0.2–0.4 mm less than the brake drum diameter.

Despite the labyrinth sealing of release and adjusting mechanisms, they gradually collect dirt; therefore, periodically dismantle and clean them (especially the release mechanism) and apply new grease ("Litol-24"). Avoid the grease contact with the friction linings.

The brake shall be adjusted when the brake lever travel gets more than the half of its maximum travel and when the braking effect becomes insufficient.

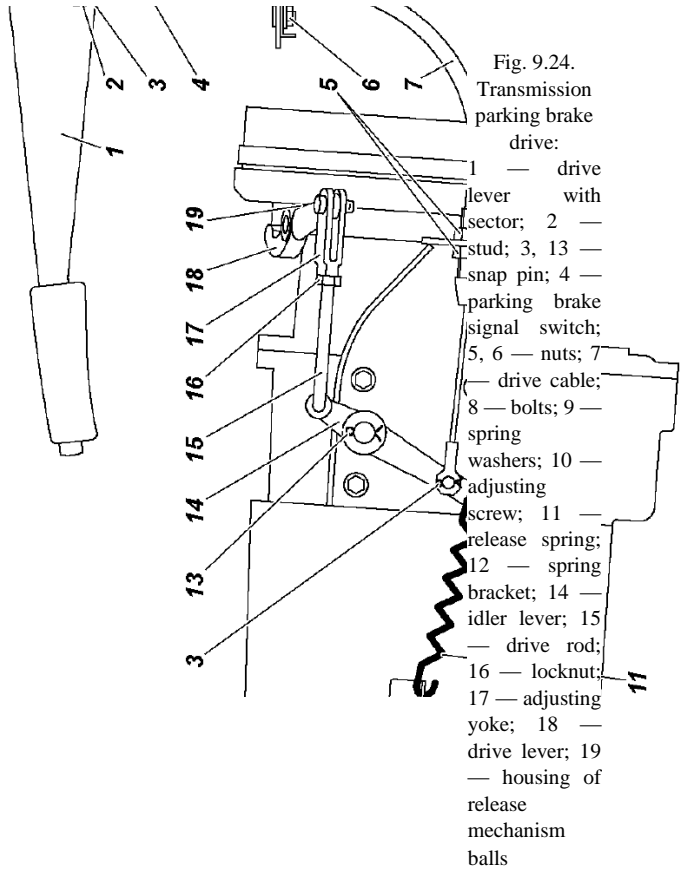
ATTENTION! Use a pit or a hoist for adjustment.

Adjust the gaps between the pads and the brake drum as follows:

1. Place the transfer case lever into the neutral position.
2. Set the parking brake lever 1 (Fig 9.24) in the lowest position.
3. Lift the motor vehicle with a hoist.

When inspecting the motor vehicle from a pit, do the following:

- put wedges under the front wheels;
 - lift the motor vehicle with a jack from any side of the rear wheels and put a special stand under the axle shaft housing.
4. Tighten adjusting screw 10 so that the brake drum cannot be turned by hand.
 5. If necessary, turn nuts 5 to adjust the slack in cable 7 and the clearances in the drive.



If necessary, adjust the tension of drive cable 7 by changing the length of rod 15 or by moving the drive cable end into the upper position on lever 1.

6. Loosen the adjusting screw 10 for 4–6 clicks, the drum must rotate freely by manual effort. If the adjustment is carried out correctly, the travel of the lever 1 should comply with 3–5 clicks of the lever pawl.

Adjust the length of the drive rod of transmission brake as follows:

1. Loosen adjusting screw 10 by 4–6 clicks ($1/3$ – $1/2$ of the torque), so that the drum revolves freely by manual effort.

2. Unscrew locknut 16 of adjusting yoke 17, unpin and remove the stud connecting the yoke and drive lever 18.

Match the orifices in the yoke and lever 17 by rotating yoke 18. Take up the clearances in the release mechanism and the drive by moving the end of lever 18 with an orifice and rod 15 toward each other.

4. Install the stud, cotter it, and tighten the locknut.

If the parking brake is properly adjusted, the vehicle must be braked when the lever pawl is inserted into the 4th–6th slot of the sector, counting from the bottom (4–6 clicks).

It is forbidden to check the operation of the parking braking system when starting or moving. This should be done only on a slope.

ELECTRIC EQUIPMENT

Relay and fuse boxes

All the discharge and control relays of the motor vehicle electric equipment, as well as the fuses, are installed in relay and fuse boxes in the cabin and engine compartment of the motor vehicle.

The relay and fuse box in the cabin is located under the cover on the dashboard to the left of the steering column (Fig. 9.25). The layout chart of the relays and fuses is located on the inside of the unit cover.

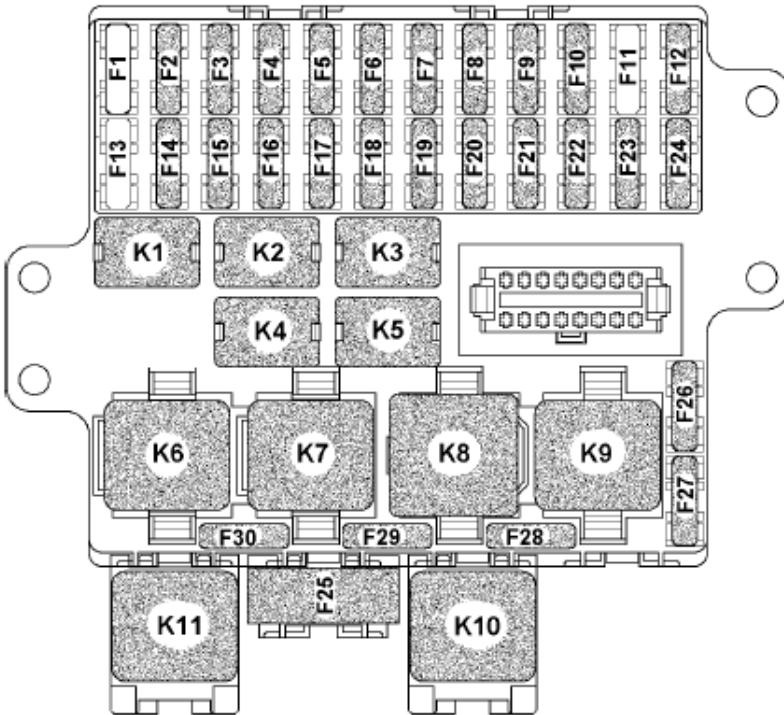


Fig. 9.25. Relay and fuse box are in the cabin:

K1 — fog-light turn-on relay; K2 — distance light turn-on relay; K3 — cabin auxiliary heater relay; K4 — dipped headlights turn-on relay; K5 — air conditioner compressor relay; K6 — mirror heater turn-on relay; K7 — the wiper breaker relay; K8 — additional (discharging) relay; K9 — windscreen heater relay; K10 — windscreen heater timed relay; K11 — rear axle differential block relay; F1-F25 — fuses (see table)

To access the relay and fuse unit:

- disengage two catch hooks 2 (Fig. 9.26) from the back of the unit cover located in the lower part;

- unfasten five clips 3 in turn located along the perimeter of the cover, applying force in the horizontal plane (in the opposite direction from the vehicle's movement);

- carefully remove the cover without applying undue force.

The relay and fuse box under the hood is located on the left extension of the vehicle mudguard (Fig. 9.27). The layout chart of the relays and fuses is located on the inside of the unit cover.

To access the relay and fuse box, remove its cap.

Before replacing a bad fuse, find out the reason for its blowing and eliminate it.

Do not use metallic objects while removing a relay or a fuse.

Do not use fuses not required by design (Table 9.1).

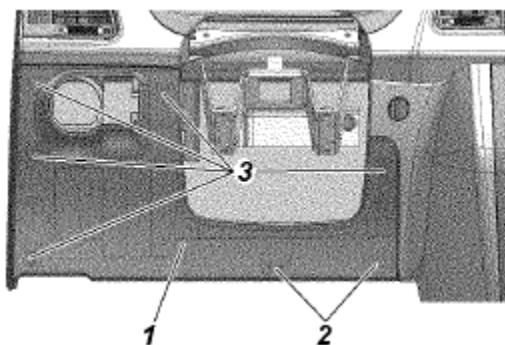


Fig. 9.26. The relay and fuse box cover installation:

1 — the cover of the relay and fuse box; 2 — cover latches; 3 — cover clips

Table 9.1. Circuits protected by fuses

Designation	Current, A	Protected Chains
Relay and fuse box in cabin		
F1	-	Not installed
F2	15	Cabin socket connection
F3	10	Air conditioner compressor
F4	30	Power options relay box 30 A
F5	7.5	Stop light switch, interior lighting, flood-lamp lighting, glove compartment lighting, baggage compartment lighting
F6	40	Heating and air conditioning system, switch of rear screen and mirror heating
F7	10	Left fog light
F8	10	Right fog light
F9	20	Windshield wiper switch, windshield wiper, driver's switch box, rear-seat passenger switch box, rear body-shell heater
F10	20	Heating of glass tailgate, mirrors, light control module
F11	-	Not installed
F12	20	Cigarette lighter
F13	-	Not installed
F14	10	Window lifters (driver door module)
F15	5	Cluster 34 A, reverse movement switch, alarm signal switch 2 A
F16	15	Air Bag
F17	10	Media system
F18	15	Differential blocking
F19	10	Left high beam
F20	10	Right high beam
F21	7.5	Left low beam
F22	7.5	Right low beam
F23	5	Right parking lamp
F24	5	Left parking lamp
F25	60	Windscreen heating
F26	10	Spare
F27	10	Spare
F28	30	Spare
F29	25	Spare
F30	20	Spare
Relay and fuse box under the hood		

F1	15	Audio alarm
F2	-	Not installed
F3	30	Electric fan 2
F4	25	ABS
F5	5	Instrument cluster
F6	20	Fuel pump
F7	20	Starter
F8	30	Electric fan
F9	10	Integrated Microprocessor Traffic Management System
F10	10	ABS
F11	-	Not installed
F12	-	Not installed
F13	-	Not installed
F14	-	Not installed
F15	-	Not installed
F16	-	Not installed
F17	60	Punch-down block
F18	40	ABS
F19	60	Punch-down block

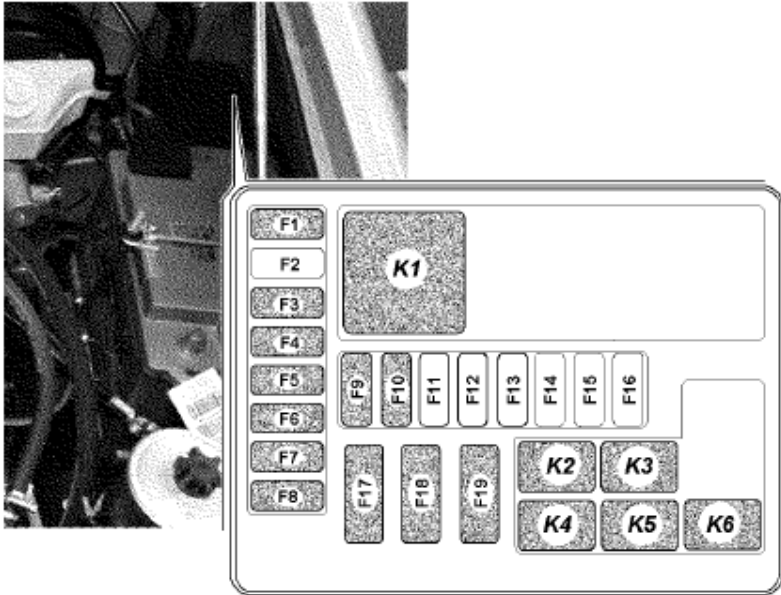


Fig. 9.27. The relay and fuse box under the hood of the vehicle (without cover):
 K1 — starter relay; K2 — horn relay; K3 — relay of Integrated Microprocessor Traffic Management System; K4 — electric fan relay; K5 — fuel pump relay; K6 — electric fan relay;
 F1-F19 — fuses (see table)

Alternator

WARNING! Even short-time engine operation with battery off can lead to alternator diodes damage.

Turn off battery while removing alternator for maintenance.

Keep the alternator clean. Blow the generator with compressed air to remove dust.

Accumulator battery

ATTENTION! *Use extreme caution when handling electrolyte. Follow these rules to prevent poisoning and chemical burns:*

- strictly observe the safety requirements specified in the accumulator battery manual;

- avoid electrolyte or its fumes entering the mouth cavity, respiratory system or eyes, it is very dangerous;

- avoid any operations that can result in electrolyte getting onto your skin. If electrolyte gets onto the skin, carefully wipe it off with cotton wool and immediately rinse remained traces off your skin with 5 % solution of ammonia or sodium carbonate;

- collect spilled electrolyte with a special filler bulb or an areometer, flush it with water and air the room;

- to charge the battery, remove it from the vehicle and unscrew filler plugs;

- the battery must be charged in a well-ventilated room. Electrolyte fume accumulation is dangerous to health and explosive.

Accumulator battery 3 (Fig. 9.20) is installed on a bracket under the hood of the motor vehicle.

If, during normal operation of the vehicle, the battery gradually discharges or excessively charges by the alternator and the electrolyte starts to "boil," it is necessary to check the operation of the alternator.

Keep the battery in a clean and charged condition, protect the battery clips and cable clamps from oxides.

Periodically clean the ventilation holes in the plugs, check the electrolyte level and, if necessary, add distilled water.

Before operation, correct electrolyte density corresponding to the climate area of the motor vehicle operation (see the Battery operating manual).

At the factory the motor vehicle is installed with the accumulator battery, the density of which is $1.28 \pm 0.01 \text{ g/cm}^3$.

Do not allow continuous battery discharge by a large current (when starting a cold engine in winter time).

Thoroughly prepare the engine for starting and turn on the start motor only for a short period of time – no more than 5 sec.

Operate the accumulator battery in correspondence with the Battery Operating Manual, enclosed in the vehicle.

Starter

Periodically do the following:

- check the bolts that mount the starter to the engine for tightening and clean them;

- check starter terminal ends for cleanliness and mounting security

Turn off the accumulator battery while removing the starter for maintenance.

Once the starter has been removed:

- check the relay switch outputs and the working surface of electric terminals;

- check the starter drive: a gear, a lever, and a spring;

- clean the rubbing details from dirt and lubricate them with Litol-24 grease as required.

The starter must move freely, without jamming, along the splines of the shaft and return to its original position under the action of a return spring. Anchor must not rotate when turning the drive gear in the direction of the working rotation. With reverse rotation, the gear must rotate with the shaft. Check the ease of rotation of the rotor in the bearings with raised brushes, rotating the shaft by hand.

Warnings:

1. The sleeve of starter travel can be broken if the starter is ON after the engine begins working.

2. Do not wash the starter caps and the drive with gasoline or kerosene to prevent the grease from being removed from the bronze graphite cellular plain bearings.

ATTENTION! Do not move the car with a starter. The duration of the continuous operation of the starter should not exceed 10 seconds. It is possible to switch on the starter again not earlier than in 1 minute, the permissible number of repeated switches is not more than three. If the engine does not start, the fault must be detected and rectified.

Lighting System, Light and Audio Alarm

Lamp maintenance consists in its adjustment and replacement of bad ones.

Headlight adjustment perform as follows:

1. Park the motor vehicle, which should have a full fuel tank, its curb weight, normal tires pressure and loaded driver's seat 750 N (75 kgf), on an even level ground 5 meters far from the screen with special markings (Fig. 9.28).

2. Move control 3 (Fig. 3.4) of headlamp adjuster to 0 position.

3. Switch on low beams and, covering each headlamp in turn, rotate adjusting screws 2 (Fig. 9.29) so that the cutoff line from E and E' points on the left coincides with line 1 and on the right coincides with lines 2 and 2' for the left and right headlamps respectively. Points of light edge fracture shall coincide with points E and E'.

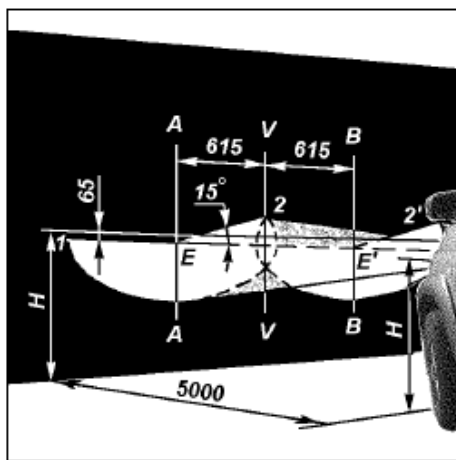


Fig. 9.28. Marks of a screen for adjustment of headlamps:

H — distance of the headlamps center from the ground level; V-V — projection of the longitudinal axis of a vehicle; A-A, B-B — axes of headlamps center

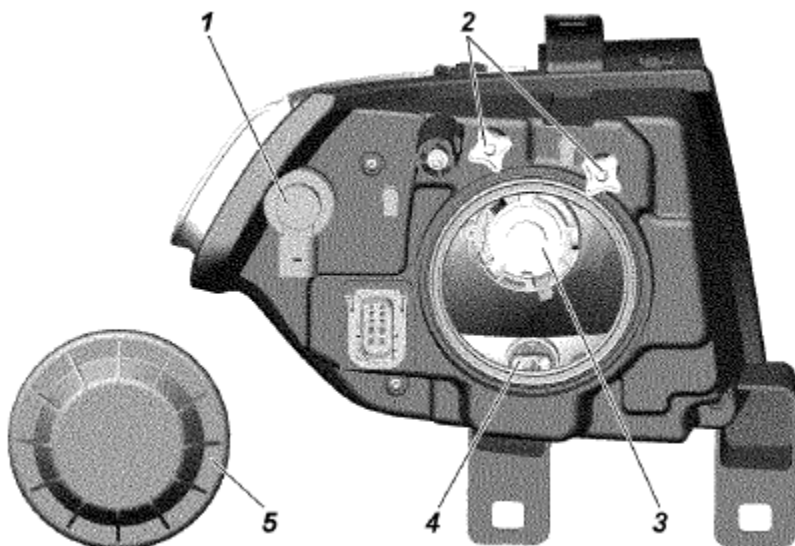


Fig. 9.29. Headlamp:

1 — turn indicator lamp holder; 2 — adjusting screws; 3 — a lamp of a distant and passing light; 4 — cartridge lamp DRL/HL; 5 — cover

Replacement of the headlight lamps. To change turn indicator lamps remove the connector from lamp holder 1 (Fig. 9.29), turn the holder clockwise (for the right headlamp) or counter-clockwise (for the left headlamp) and remove the holder with the lamp.

To replace the high beam and low beam headlamp 3 and DRL/HL 4, remove cover 5. Disconnect a terminal block with wires from lamp 3, remove whiskers of a spring latch of a lamp from grooves and take out the lamp. Replace the DRL/HL lamp by pulling the holder out of the seat.

Install halogen lamps in gloves, without touching the lamp bulb. If there are fat traces on the bulb, remove them with alcohol.

Fog lamps. Adjustment of fog lamps is carried out by screw 1 (Fig. 9.30) with the help of the key S = 5 or Torx T20. Set the headlamp to a position where the cut-off line coincides with line 1 (Fig. 9.31).

To replace front fog lights remove wiring harness connector 2 (Fig. 9.30) from the light, turn it counter-clockwise and remove it.

Install halogen lamps in gloves, without touching the lamp bulb. If there are fat traces on the bulb, remove them with alcohol.

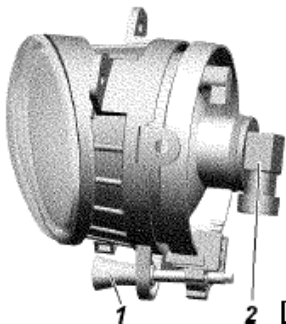


Fig. 9.30. Fog lamp:
1 – adjusting screw; 2 – wiring harness connector

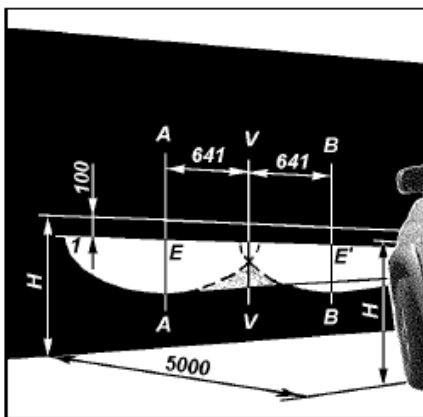


Fig. 9.31. Marks of a screen for adjustment of fog lamps:
H — distance of the headlamps center from the ground level; V-V — projection of the longitudinal axis of a vehicle; A-A, B-B — axles of headlamps center

The side turn indicators are installed on the side of the front fenders. To replace the turn indicator lamp, tighten the clamps 1 (Fig. 9.32) and remove the turn indicators from the vehicle, then remove the holder 2 with the lamp.

Replace turn indicator lamps only when lockers are removed.

Rear lights, reversing lights, fog taillight. In order to replace lamps, unscrew screws attaching the diffuser, and remove it.

Lamps of illumination of a license plate. In order to change lamps, loosen the screw that fastens the cover, remove the cover and lens.

A block of navigating lamps (Fig. 3.21) is installed on the shelf for the salon documents. If the light sources fail, they must be replaced.

A bowl shade of illumination of a glove compartment. To replace the lamp, remove the bowl shade (Fig. 9.33) from the glove compartment. Replace lamp 1 by pressing holder 2.

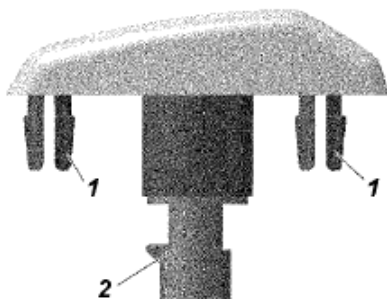
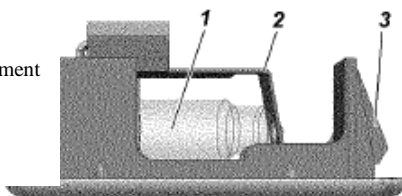


Fig. 9.32. Side turn indicator:
1 – catches; 2 – holder

Fig. 9.33. A bowl shade of a glove compartment illumination:
1 – lamp; 2 – lamp holder;
3 – catches



Instrumentation and warning alarms

When removing electrical sensors, the ends of the wires must be insulated to avoid a short circuit. In order not to damage the body of the temperature sensor and the temperature of the coolant, use a hexagonal or spanner key to remove them.

Check the fluid level in the cooling system of the radiator. If the fluid level is low, the sensor may fail.

Radio equipment+

Loudspeakers and tweeters are installed on the interior panels of the doors. The head unit of multimedia system is located on the instrument panel.

Turn the IGN key into position I (Fig. 3.10) to switch on radio or multimedia system.

You will find all necessary information about operation and maintenance in the manufacturer's manual enclosed to the motor vehicle.

BODY

To maintain a good outside appearance of the vehicle, protective service for the paint coating of body should be carried out permanently. In order to avoid scratches on the painted surface, do not remove dust and dirt with a dry cleaning cloth. Wash the vehicle body with small pressure water jet using car shampoo and soft rags. Do not use spongy material.

When washing the body using the equipment of type "Karcher" use the "blade," "fan" modes and the like. The "jet" mode is not recommended for use in places where doors and windows are opened, in order to avoid possible removal of the sealant and water entering the interior.

Wipe the washed body surfaces dry, so that after drying in summer no stains are formed on them, and in winter, when the water drops freeze, no cracks are formed on the painted surface. Do not use soda and alkaline solutions for washing. After their usage the paint coating dims.

ATTENTION! *Do not wash the motor vehicle while the engine is running.*

When possible do not park the motor vehicle under direct sunlight to avoid deteriorating wheel tires and weatherstrips.

In order to preserve the painted surface of the body, use preventive polishing compounds: auto-emulsion, polish (aerosol), wax of brand AB-70 (for cars), etc. To restore the gloss of the faded painted body surface, use a cleaning and polishing compound.

During the operation of the car, it is recommended to periodically treat the surfaces in order to protect the body against early fracture, especially the closed cavities, with anti-corrosive compounds such as "Movil," "Tektil," and others.

The treatment of closed body cavities is carried out through special holes in the panels and cross-pieces of the floor, which are closed with rubber stoppers.

As required, recover the bodyshell floor pan, coated with plastisol sealing compound, by spreading the mastic with a special spray or with a brush.

VEHICLE LUBRICATION

Long and failure-free vehicle work mainly depends on the timely change of oil and grease in units and assemblies

Exact implementation of all the instructions of this manual and the service book for lubricating the car is a must. The lubricant name is indicated in the "Lubricants and Fluids" table (Annex 3). It is not permitted to use oils and lubricants not indicated in the lubricants table and to break lubrication intervals.

Methods of units lubrication and grease change are described in the corresponding sections of the manual.

Check the condition of oil in all the units within 24 hours after fording. If water is found in oil, change oil in such unit. All chassis lubrication nipples shall be lubricated until fresh grease squeezes out.

Meet the following requirements during lubrication:

1. When changing oil, drain it from the engine and the transmission units immediately after the vehicle stops, while the units are warmed up.

2. Clean lubrication nipples and plugs thoroughly before lubrication in order to avoid dirt penetration into the vehicle mechanisms.

3. Thoroughly remove escaped grease from all the details after lubrication.

4. If housings of the engine and the transmission units contain excessively dirty oil or if oil contains metal particles, wash the housings before filling fresh oil.

5. It is not permitted to mix the engine oils of different brands or of different manufacturers.

When changing the oil brand or manufacturer, wash the engine lubrication system.

6. Mixing Litol-24 lubricant with its substitute Lita is allowed in any proportion. When using other substitutes, flush the unit with kerosene.

CHAPTER 10. TOOLS AND ACCESSORIES

Each new vehicle, delivered from the manufacturing plant, is equipped with a set of tools and appliances according to the list applicable to the vehicle.

The jack (Fig. 10.1 or 10.2) is designed for hanging the wheels of the car during its maintenance or repair. The lifting capacity of the jack shown in Fig. 10.1 is 2 t, in Fig. 10.2, 1t. The maximum lifting height of the jack shown in Fig. 10.1 is 410 mm, in Fig. 10.2, 380 mm.

ATTENTION! *An incorrectly installed or faulty jack can cause serious injury or motor vehicle damage. It is strictly prohibited to carry out works under a motor vehicle supported only by a jacking apparatus.*

For jacking up the wheel with jack shown on Fig. 10.1, proceed as follows:

1. Apply the parking brake, shift into the first or the reverse gear of the gearbox and make sure that the transfer case lever is not in the neutral position. If necessary, place the chocks under the wheel opposite the hanging one.

2. Install the jack on a level ground under the axle shaft sleeve.

3. Remove the inner screw 3 of the jack as far as the clearance between the semi-axle cover and the ground support surface permits.

4. Move jack pawl 5 to the left from handle 6, so that the pawl end enters the slot of ratchet wheel 7.

5. Lift the motor vehicle to required height by swinging the wheel nut wrench inserted into the handle orifice.

6. To lower the wheel, move the pawl of the jack to the right side and swing the jackscrews in the body 1 with the wrench for the wheel nuts. At the end of work, screw the outer 2 and inner 3 screws of the jack into the body until it stops.

To lift the wheels with the rhombus jack in fig. 10.2 do the following:

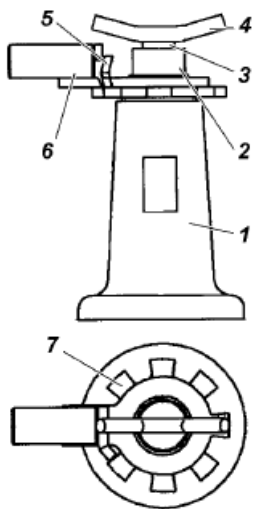


Fig. 10.1. Jack:
 1 – housing; 2 – external screw; 3 – internal screw; 4 – head; 5 – pawl; 6 – handle; 7 – ratchet

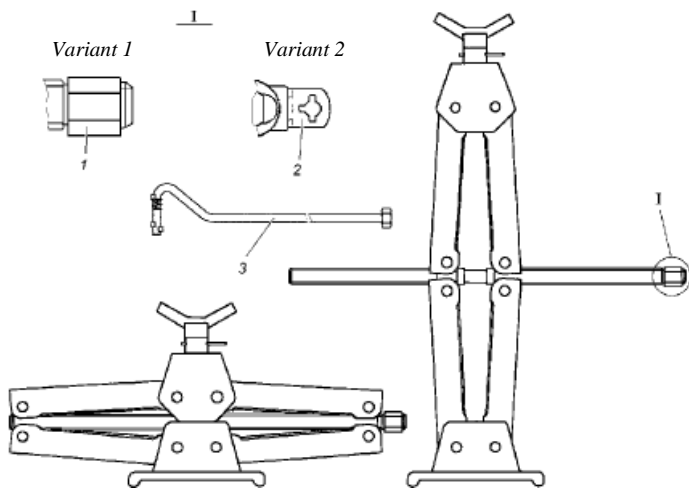


Fig. 10.2. Jack:
 1 – hexagon under 22 mm wrench; 2 – yoke; 3 – extension

1. Apply the parking brake, shift into the first or the reverse gear of the gearbox, and make sure that the transfer case lever is not in the neutral position. If necessary, place the chocks under the wheel opposite the hanging one.

2. Install the jack on a level ground under the axle shaft sleeve.

3. Lift the motor vehicle wheel to the necessary height by rotating hexagon 1 or yoke 2 clockwise with the "22" mm nut wrench or with extension 3.

4. To lower the wheel, rotate the hexagon 1 with the wheel wrench counter-clockwise. At the end of the work, fold up the jack completely, rotating the hexagon with the key.

Maintenance of jacks amounts to periodically cleaning it of mud and lubricating its threaded parts.

Watch for the condition of the jack riveted joints of its screws and levers. Deformation or damage to screws and levers, weakening riveted joints are not allowed. In this case, replace the jack.

CHAPTER 11. CONSERVATION

If the motor vehicle is not operated for a long time (over 3 months), preserve it as follows:

1. Carry out the next maintenance.

2. Wash the car and dry it. Remove corrosion and paint the paint damage spots.

3. Fill to protect the engine cylinders from corrosion in each cylinder of the engine for 30–50 g of hot dehydrated engine oil used for the engine. To distribute oil over the entire surface of the cylinders, rotate the crankshaft of the engine with the starter (3–5 seconds) (when the spark plugs are turned off and the power cables disconnected from the ignition coils).

4. Clean the electric wiring from dirt and dry it thoroughly.

5. Clean and lubricate all the unpainted exterior metal motor vehicle surfaces and unpainted parts of joint couplings (door hinges, door locks and other units, spark plugs), and grease them with PVK plastic lubricant (or petroleum jelly instead). Wash and wipe dry the painted surfaces.

6. Check, clean tool and accessories, wrap with oiled paper or cloth.
 7. Cover the body glass from the outside with light-proof paper (cloth) or cover with flaps.
 8. Remove, if necessary, the wheels from the vehicle and disassemble. Clean the wheels from a dirt, corrosion, and if necessary straighten and paint. Remove dirt from the tires, wash and dry them thoroughly. The tubes and inner surfaces of the tires should be wiped with talc. Assemble the wheels with tires, make the pressure normal and put in place.
 9. As required, flush out the fuel tank and fill it with fuel.
 10. Prepare the battery for long-term storage according to the instructions (see battery instruction manual).
 11. Cover the air filter inlet tube and the muffler tailpipe with solid-oiled paper.
 12. Loosen the tension of ventilator and alternator drive belts.
 13. Drain the fluid from the cooling system and from the reservoir of the washer.
 14. Seal the transfer, front, and rear axle housings by wrapping the safety valves of these units with an insulating tape.
 15. Cover the gap between the brake shields and the drums with solid-oiled paper.
 16. Protect tires and other rubber parts from direct sunlight.
 17. Put metal or wooden props under the axles so that the wheels are raised above the floor or the ground.
- Release the bow and front springs by putting wooden spacers between the frame and the axles.
- The preserved vehicle should be located in a clean ventilated room with a relative humidity of 40–70 % and temperature not less than +5 °C.
- It is forbidden** to keep the motor vehicle and poisonous substances (acids, alkali, etc.) together.

Maintenance of a stored vehicle

Vehicle maintenance is carried out once in two months. Do the following:

1. Carry out a thorough outside inspection of the car.
2. Turn out spark plugs and turn a crankshaft of the engine with a starter (3–5 sec) at the turned on first gear in a transmission and a downshift in a transfer case. Previously, disconnect power wires from the ignition coils. Once a year, before cranking the crankshaft in the engine cylinders, fill in 30–50 g of oil used for the engine.
3. Clean the damaged areas from corrosion and grease or paint them.
4. Turn the steering wheel in both directions 2–3 times.
5. Check the parking and service brakes, clutch, throttle actuator, light switches.
6. Check the fluid level in the brake master cylinder reservoir. Add oil if necessary.
7. Check the condition of all electrical equipment.
8. Check the tool and accessories, if necessary, wipe and relubricate.
9. Check the condition of tires and other rubber parts.
10. Eliminate any faults found during inspection.

De-preservation

1. Remove lubricant-impregnated paper and lubricant from the parts, and clean parts with kerosene or unleaded gasoline. Especially carefully remove the lubricant from parts that can be touched with rubber parts or painted surfaces. Wash the plugs thoroughly in unleaded gasoline.

2. Fill the engine cooling system.
3. Carry out everyday vehicle maintenance.
4. Check the oil level in the crankcase. Remove excess oil.
5. Before starting the engine fill each cylinder with 30–50 g of the engine oil and turn the crankshaft for 10–15 torques.

CHAPTER 12. TRANSPORTATION

Motor vehicles can be transported by railway, water or air transport.

When transporting vehicles by water or air transport, mount them using ship's scheme or the air transport scheme. Use tools that exclude damage to parts and paint of the vehicle.

Load and unload vehicles by crane using special grippers.

In all modes of transport, vehicles must be located in such a way that the distance between vehicles (extreme points) on the side of the engine cooling radiator is 50–100 mm and on all other sides, not less than 100 mm. In the transport position, the car must be braked by the parking brake, the engine must be switched off, the gear lever must be set to the first gear position, the battery must be disconnected.

Before transporting by air, the fuel tanks should be filled with fuel to not more than 75 % of their capacity.

Enter the aircraft in the first gear of the gearbox and in the reduction gear of the transfer case or in the reverse gear.

CHAPTER 13. DISPOSAL

The motor vehicle is utilized in accordance with the regulations, rules, and methods of the utilization location.

MOTOR VEHICLE LAMPS

Lamps	Lamp Type	Power, W
1	2	3
Of lamps:		
- of high beam and low beam	H4	60/55
- of front turn indicators	P21 W	21
- DRL and parking lights	W21/5 W	21/5
Of fog lamps	H11	55
Of rear lamps:		
- of turn indicator	P21 W	21
- of brake indicators	P21 W	21
- of reverse lights	P21 W	21
- of fog lights	P21 W	21
- of parking lights	R5 W	5
Turn indicators side repeaters of UAZ-23602	WY5W	5
Of license plate lamp	R5W	55
Of the unit of navigating lamps	LED	
Of the bowl shade of a glove compartment illumination:	AS12-5-1	5
Of cigarette lighter light	A12-3-1	3

TIGHTENING TORQUE OF MAIN THREADED COUPLINGS, kgf • m

Engine and its systems:

Bolts of crankcase cylinder head (ZMZ-409051 engine):	
Pretension	3.3–3.7
holding min. 1 minute	
final tightening - additional turn to angle 95°	
Valve cap bolts	0.5–0.7
Chain cap screws	2.0–2.5
Cylinder head front cap bolts	1.2–1.8
Crankshaft coupling bolt	17.0–20.0
Attachment of ventilator drive sleeve to hub	5.0–6.0
M16 bolt of engine front strut to engine bracket	9.0–11.0
Bolts between engine front strut brackets and crankcase	2.8–3.6
Nuts of engine front struts fastening to frame brackets	5.0–6.2
Engine rear support to bracket fixing bolt	8.0–10.0
Nuts of rear strut fastening to frame cross member	2.8–3.6
Inlet pipe nuts	2.9–3.6
Exhaust manifold nuts	2.0–2.5
Self-locking nuts for attaching the catalytic converter to the engine	4.6–5.1
Oil housing bolts	1.2–1.8
Spark plugs	2.1–3.1
Filling pipe clamp	0.25–0.35
Clamps of cooling system hoses	0.4–0.45
Cooling system radiator bolts	3.6–3.2
Upper cooling system radiator cushions	2.0–2.5
Fastening bolts of the fan casing	1.5–1.7
Oil radiator nuts and bolts	1.8–1.6
Starter bolts	4.4–5.6
Cooling system pump pulley bolts	1.4–1.8
Cooling system pump bolts	2.0–2.5
Inlet manifold nuts	2.0–2.5
Generator retaining nut	2.0–2.5
Thermostat housing screws	2.0–2.5

Annex 2 (continued)

Fastening bolts of a fuel tank and protection cover	2.0–2.8
Fastening bolts of a filling pipe	0.36–0.5
Sensor bolts (timing sensor, phase sensor, absolute pressure sensor and temperature sensor)	0.6–0.9
Cooling system temperature sensor	1.2–1.8
Oxygen sensor	3.5
Detonation sensor nut	1.5–2.0
Throttle mounting screws	0.6–0.9
Ignition coil bolts	0.6–0.9
Clutch pressure disk bolts	2.0–2.5
Bolts and nuts of gearbox and transfer case	4.0–5.6
Nuts and bolts of propeller shaft flanges	4.4–5.6
Upper pin nut	16–20
Lower pin nut	8–10
Bolts of fastening of a axle casing cover	1.1–2.5
Bolts of front axle hub flanges and rear axle shafts flanges	6.0–7.0
Hub cap bolts	2.2–3.2
Fastening bolts of the steering mechanism	5.5–8.0
Nuts of tie rod ball studs	5.0–7.0
Tie rods locknuts	10.5–13.0
M10 bolts of steering system propeller shaft	4.8–5.6
Tie-rod arm nut	20–28
Fastening bolts of forward wheels joint eye	3.6–4.4
Fastening bolts of rear brake backplates	4.4–5.6
Nuts of pipelines, tips, bypass valves, brake units	1.4–1.9
Override valves of the working cylinder of declutching	1.0–1.4
Switch working cylinder with plastic housing	0.4–0.5
Bolts of fastening of forward disk brakes	14–16
Nut of longitudinal levers and forward suspension control arm	14–16
Nuts of spring U-bolts	12–14
Nuts of the springs fastening to the frame	18–20
Wheels nuts	14–16
Adjusting nuts and locknuts of wheel hubs bearings	3.0–4.0

Annex 2 (continued)

Lamp-cluster retaining nut	0.25–0.45
Nuts of power steering hoses	2.0–3.5
Nut of the forward hinge of spring	16–18
Steering wheel nut	3.2–3.6
Screws of locks and door locks catches	3.0–4.0

Note – Use the following tightening torque for other threaded couplings:

M6 – (0.45–1.0) kgf • m;

M8 – (1.4–1.8) kgf • m;

M10 – (3.0–3.5) kgf • m;

M12 – (5.0–6.2) kgf • m.

LUBRICANTS AND SPECIAL FLUIDS

Place of Lubrication / Filling	Name of Lubricant or Fluid
Fuel tank	<p style="text-align: center;">Fuel type</p> unleaded petrol 95- RON-K5 GOST 32513, Premium Euro-95 type III (95-RON-K5) GOST R 51866 is allowed: 92-RON-K5 and 98-RON-K5 GOST 32513, Regulator-92 (92-RON-5) GOST R 51105, Super Euro-98 type III (98-RON-5) GOST R 51866,
Engine lubrication system	<p style="text-align: center;">Engine oil</p> Recommended: UAZ MOTOR OIL 0W-40, API SN/CF, S-Synt; UAZ MOTOR OIL 5W-40, API SN/CF, S-Synt; UAZ MOTOR PREMIUM 5W-4, API SN/CF, S-Synt;0; UAZ MOTOR OIL 10W-40, API SN/CF, S-Synt According to the classification: SAE 0W-30 — from minus 30 to plus 20 °C; SAE 0W-40 — from minus 30 to plus 25 °C; SAE 5W-30 – from minus 25 to plus 20 °C; SAE 5W-40 – from minus 25 to plus 35 °C; SAE 10W-30 – from minus 20 to plus 30 °C; SAE 10W-40 – from minus 20 to plus 35 °C; SAE 15W-30 – from minus 15 to plus 35 °C; SAE 15W-40 – from minus 15 to plus 45 °C; SAE 20W-40 – from minus 10 to plus 45 °C; SAE 20W-50 – from minus 10 to plus 45 °C; SAE 30 – from minus 5 to plus 45 °C;

Place of Lubrication / Filling	Name of Lubricant or Fluid
	SAE 40 – from 0 to plus 45 °C; SAE 50 – from plus 5 to plus 45 °C; classifications by operating properties: STO AAI-003-98 - B4/D2, B4 or B5; API - SG or higher groups SH, SJ, SL, SM
Gearbox housing	<p style="text-align: center;">Transmission oils</p> Recommended: UAZ SAE 75W85 According to the classification: SAE 75W-85 as per API GL-5
Transfer case housing	Recommended: UAZ SAE 75W90 API GL-4 According to the classification: SAE 75W/90 as per API GL-3, GL - 4
Final drive housings of front and rear axles	Recommended: UAZ SAE 75W90 API GL-5 According to the classification: SAE 75W/90 as per API GL-5
Oil tank of hydraulic power steering system	Recommended: UAZ ATF According to the classification: Mobil ATF 220, EZL 998; Shell Spirax S4 ATF HDX; THK ATF IID; Lukoil ATF; G- Box Expert ATF DX III; G-Box ATF DX II
Front and rear wheel hub bearings, expansion and adjusting gears of parking brake, parking brake cable, transmission clutch shaft bearing, declutching bearing coupling, battery terminals, bonnet hinges and lock, tailgate hinges	<p style="text-align: center;">Plastic lubricants</p> "Litol-24;" "Litol-24RK;" Lithium grease according to NLGJ N3

Annex 3 (continued)

Place of Lubrication / Filling	Name of Lubricant or Fluid
Steering knuckles joints	CVD-4; CVD-4M; Retinax HDX2
Hinges of side doors and tailgate, door stops, mechanisms for front seats adjustment, mechanism of rear seat folding and fixation, door locks, tailgate guide pin, hinge of fuel tank filler cap	TSIATIM-201; Centuri 1180
Guide bushes of front disk brakes	UNIOL 2M-1
Rubber washers	Graphite powder; Barbatia Grease 2
Slots and joints of unattended cardan shafts	Klüberplex BEM 41-141
Operating fluids	
Clutch and brake system hydraulic drives	Recommended: brake fluid UAZ "DOT 4" According to the classification: brake fluid "DOT 4"
Engine Cooling System	Recommended: Antifreeze UAZ G12 According to the classification: cooling liquids Termosol-A40; Termosol-A65; OZh-40 Lena; OZH-65 Lena; TOSOL A-40M; TOSOL A-65M; OZh-40 TOSOL-TS; OZh-65 TOSOL-TS
Windscreen and tailgate washer tank	"Obzor," Auto Cleaner

INFORMATION
on precious metals in vehicle electric equipment is not available

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For Notes

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