

Ulyanovsk Automobile Plant, PJSC



**Motor Vehicles
UAZ PATRIOT,
UAZ PICKUP,
UAZ CARGO**

Operation Manual
OM 05808600.132-2011
Sixth Edition

2016

WARNING!

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

Prior to motor vehicle operation, please read the Operation Manual and the vehicle log book carefully.

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 may be handled by one of the service stations recommended by the company that sold the motor vehicle. The service stations are provided with the necessary spare parts, special tools sets and instruments. All motor vehicle maintenance works are carried out by experienced specialists.

Due to continuous work on motor vehicle enhancement, the design may be subject to modifications not described in the present publication.

Have a great trip!

Chapter 1. GENERAL INFORMATION

Motor vehicle UAZ Patriot (UAZ-3163, UAZ-31638) — light, two-axle, off-road, 4x4 type, with an all-metal five-door bodyshell.

Motor vehicle UAZ Pickup (UAZ-23632, UAZ-23638) — cargo-carrying (pickup), two-axle, off-road, 4x4 type, with a four-door cabin and a cargo compartment.

Motor vehicle UAZ Cargo (UAZ-23602, UAZ-23602-01, UAZ-23602-02, UAZ-23608, UAZ-23608-01, UAZ-23608-02) — cargo-carrying, two-axle, off-road, 4x4 type, with a two-door cabin and a cargo bed, grocery and general purpose van.

The motor vehicles are designed for public conveyance and freighting over all types of roads and terrain.

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

The motor vehicles manufactured in "T" are meant for operation under ambient operating temperatures of -10 up to +50°C, air relative humidity of up to 100 % at 35°C under conditions specified above for the "U"-design motor vehicles.

The plus ("+") by the side of the part name (assembly) description means that this part (assembly) shall be installed into the motor vehicle in accordance with the package.

MOTOR VEHICLE MARKING

The motor vehicle's name plate (Fig. 1.1) is installed on the B-pillar of the bodyshell side on the right-hand side of the motor vehicle.

Vehicle identification number is marked on the name plate (Fig. 1.1) and on the motor vehicle body, on the bottom windsheild panel (Fig. 1.2).

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

Part I – manufacturer international identification number, means:

X – geographical zone, where manufacturing plant is located;

T – country code;

T – manufacturing plant code.

Descriptive part II – vehicle index.

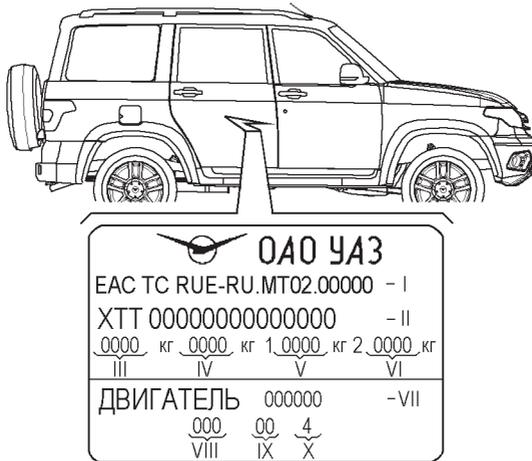


Fig. 1.1. Motor vehicle name plate:

- I – Full Transport Vehicle Type Approval number (TVTA);
- II – Transport 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;
- X – Emission standard

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

Bodyshell identification number is stamped on the upper radiator cowl frame connector (Fig. 1.2).

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

Engines ZMZ-40906 and ZMZ-51432's identification number is stamped on the area located to the left of the crankcase, above engine front support fastening lug bosses (Fig. 1.4).

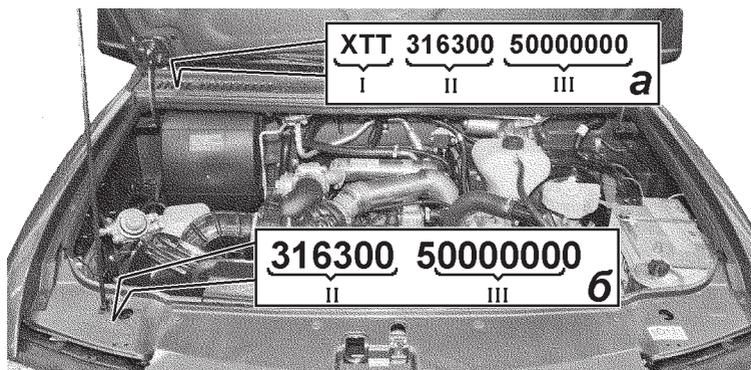


Fig. 1.2. Location of transport vehicle identification number and a bodyshell number:

- a — location of transport vehicle identification number;
- б — location of bodyshell identification number

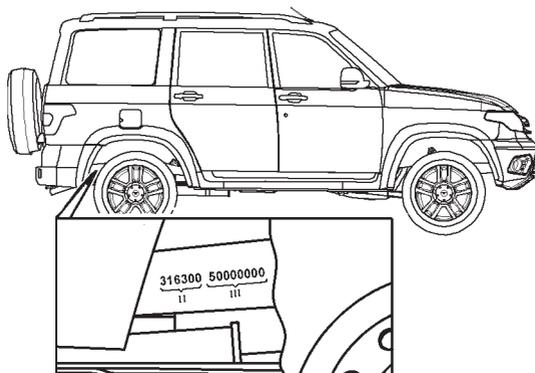


Fig. 1.3. Location of chassis identification number

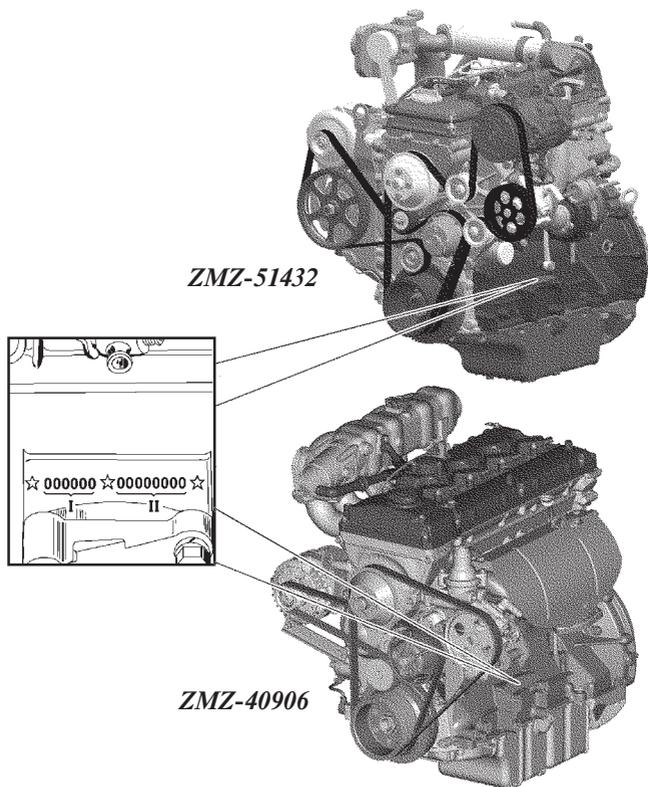


Fig. 1.4. Location of ZMZ-40906 and ZMZ-51432 engines' identification number:

I — descriptive part (VDS) consists of six characters. The first five characters (digits) represent the engine model code. If a model code contains fewer than five characters, a zero shall be entered in the free space at the end of the identification. A zero shall be entered in place of the sixth character. II — indicating part (VIS) consists of six characters. The first character (a letter or a digit) represents the conditional code of the year of vehicle manufacture, the second character (digit) is the conditional code of the engine manufacturing plant's division, and the remaining characters (digits) are the order number of the engine since the start of the year of engine manufacture.

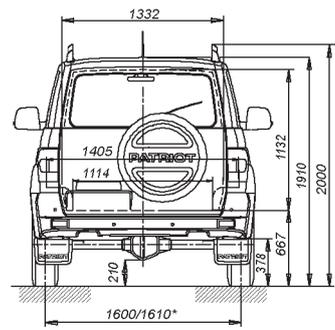
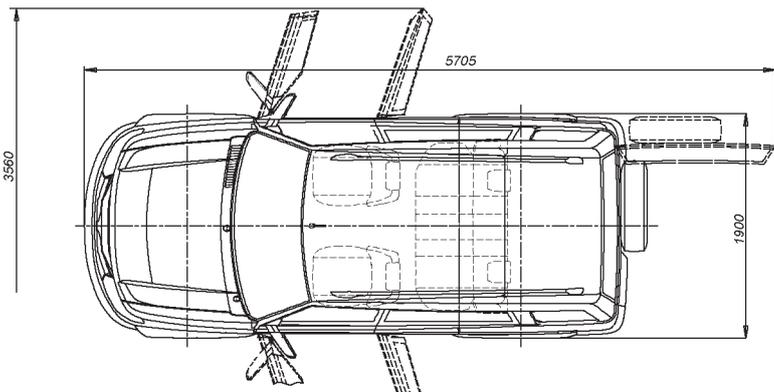
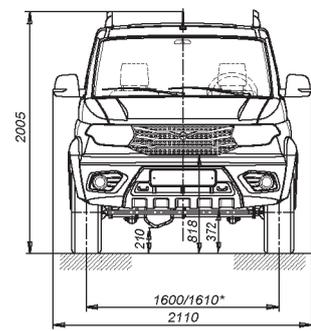
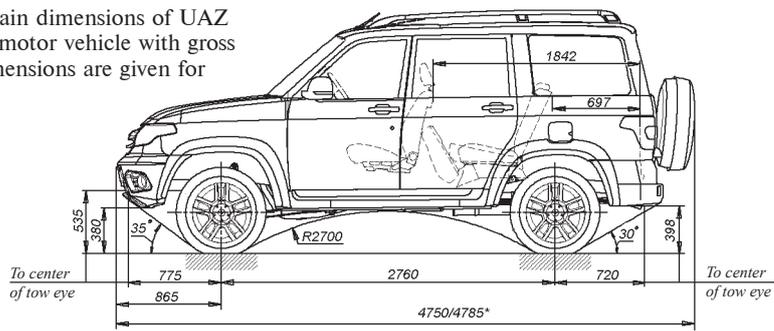
SPECIFICATION

	UAZ Patriot		UAZ Pickup		UAZ Cargo	
Designation	UAZ-3163	UAZ-31638	UAZ-23632	UAZ-23638	UAZ-23602 (01/02)	UAZ-23608 (01/02)
1	2	3	4	5	6	7
General data						
Vehicle dimensions*	Shown in Fig. 1.5-1.11					
Maximum bearing capacity (including driver and passengers), kg	600		800		800 (665/575)	
Seating capacity (including driver's seat)	5		5		2	
Maximum gross vehicle weight, kg	2,650	2,690	2,860	2,940	2,775	2,825
Gross weight distribution over axles, kg:						
on the front axle	1,217	1,260	1,230	1,285	1,090 (1,145/1,132)	1,130 (1,195/1,182)
on the back axle	1,433	1,430	1,630	1,655	1,685 (1,630/1,643)	1,695 (1,630/1,643)
Vehicle weight in running order (including driver), kg	2,125	2,165	2,135	2,215	2,050 (2,185/2275)	2100 (2,235/2,325)

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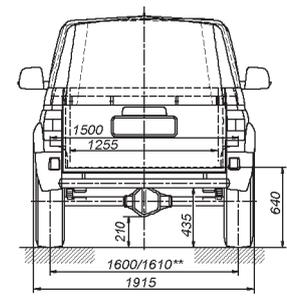
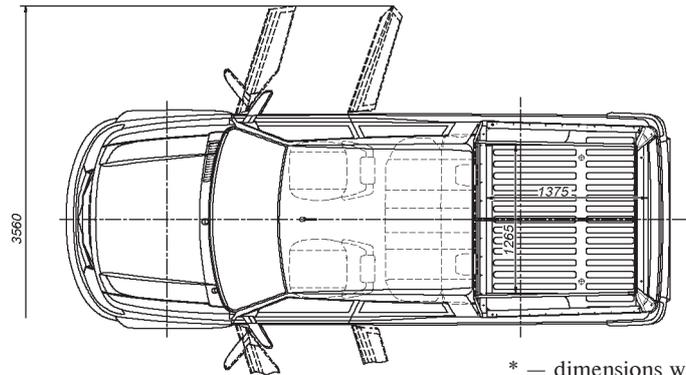
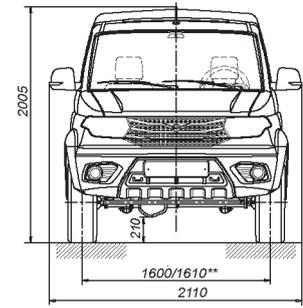
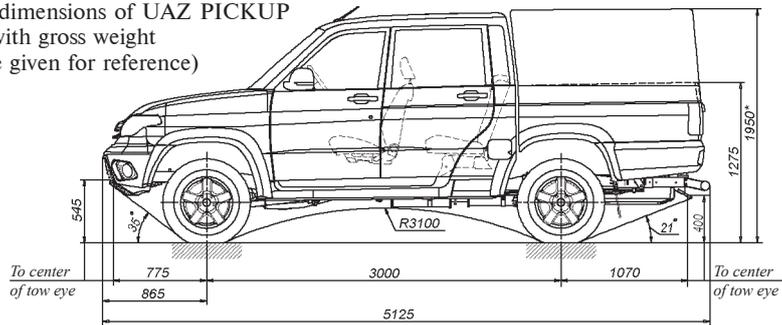
* Dimensions are averaged, given for reference and can vary depending on operation conditions, installed tires, their condition and tire pressure, motor vehicle load, suspension condition, etc.

Fig. 1.5. Main dimensions of UAZ PATRIOT motor vehicle with gross weight (dimensions are given for reference)



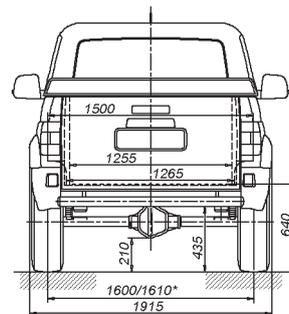
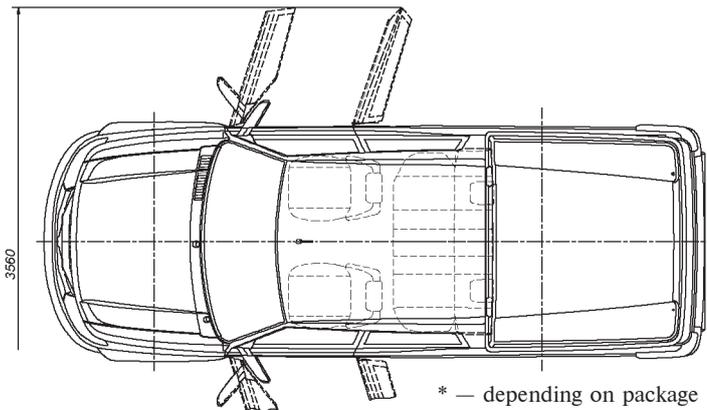
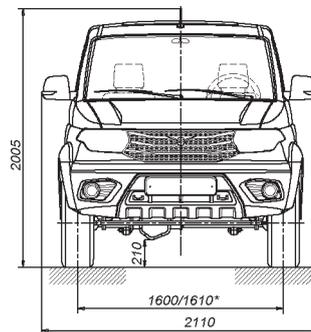
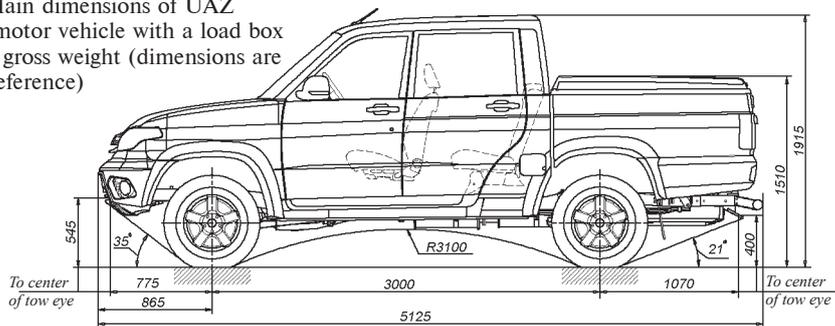
* — depending on package

Fig. 1.6. Main dimensions of UAZ PICKUP motor vehicle with gross weight (dimensions are given for reference)



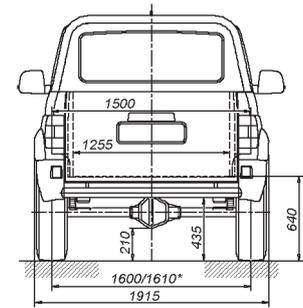
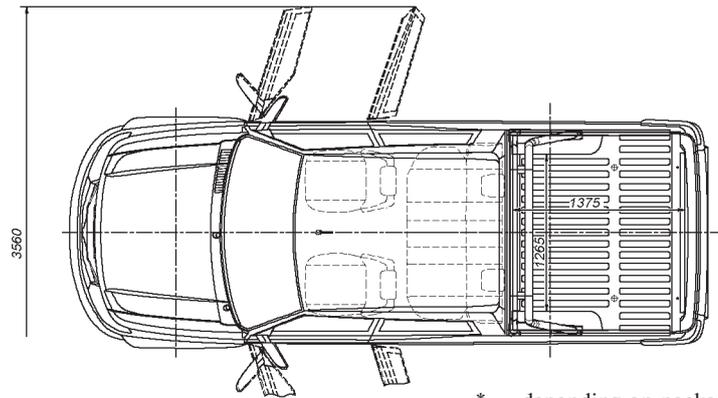
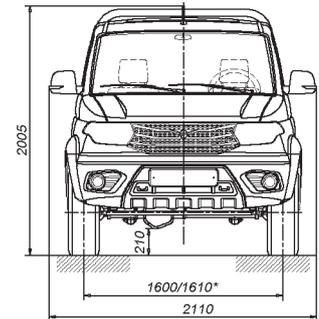
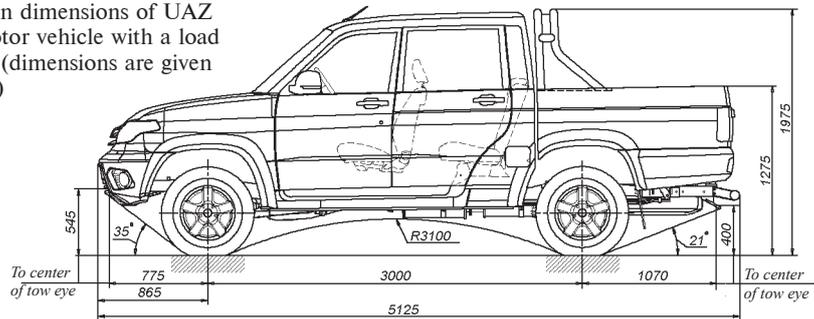
* — dimensions with tonneau cover
 ** — depending on package

Fig. 1.7. Main dimensions of UAZ PICKUP motor vehicle with a load box cover with gross weight (dimensions are given for reference)



* — depending on package

Fig. 1.8. Main dimensions of UAZ PICKUP motor vehicle with a load box top bow (dimensions are given for reference)



* — depending on package

Fig. 1.9. Main dimensions of UAZ PICKUP motor vehicle with a load box shelter with gross weight (dimensions are given for reference)

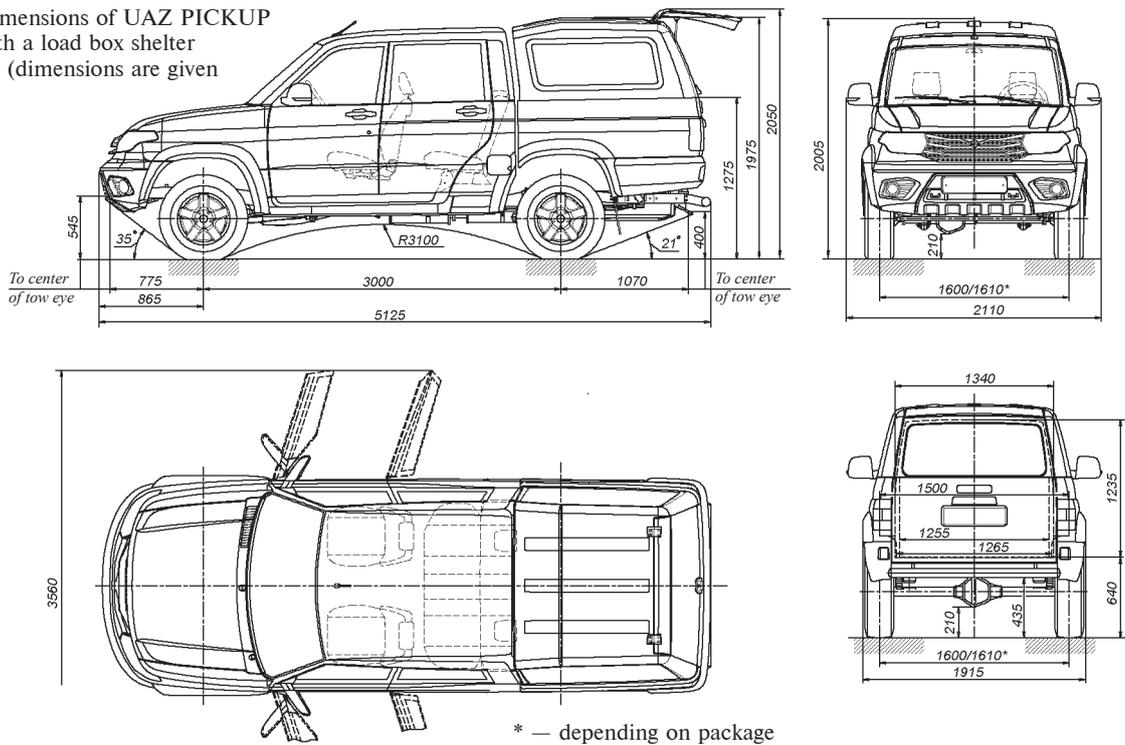


Fig. 1.10. Main dimensions of UAZ
CARGO motor vehicle with gross weight
(dimensions are given for reference)

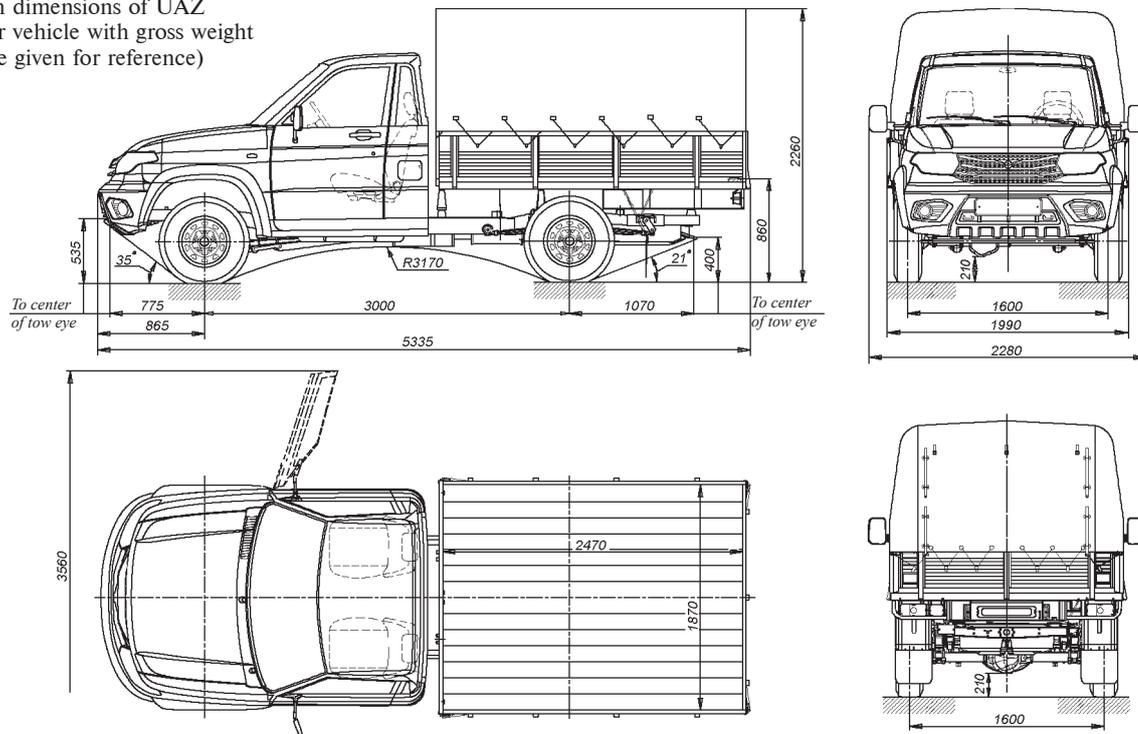
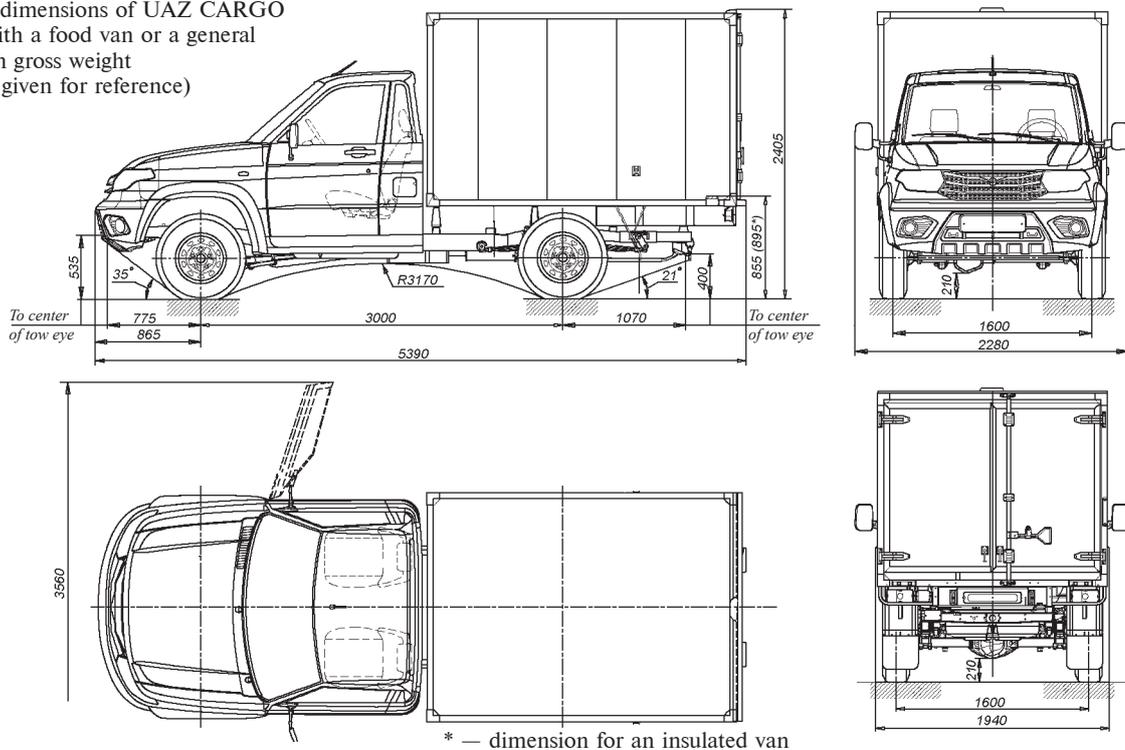


Fig. 1.11. Main dimensions of UAZ CARGO motor vehicle with a food van or a general purpose van with gross weight (dimensions are given for reference)



1	2	3	4	5	6	7
Unladen weight distribution over axle, kg:						
on the front axle	1,150	1,190	1,150	1,205	1,120 (1,096/1,097)	1,160 (1,147/1,149)
on the back axle	975	975	985	1,010	930 (1,089/1,178)	940 (1,088/1,176)
Maximum speed, km/h	150	135	140	135	135 (125*)	135 (125*)
Fuel consumption rate moving at uniform velocity 90 km/h, l/100 km	11.5	9.5	12	10	12 (13.5*)	10 (11.5*)
Fuel consumption rate moving at uniform velocity 120 km/h, l/100 km	15.5	12.5	15.6	12.6	—	—
Note: Fuel consumption rate is used to determine the motor vehicle's technical condition and shall not be the operation standard. Fuel consumption measuring accuracy is only provided when conducting special testing in strict adherence with the requirements of GOST 20306-90 when the motor vehicle total haul has reached 9000-10000 km.						
Gross weight of a towed trailer, kg, max.:						
equipped with brakes	1500**					
without brakes	750**					

* With tonneau cover and vans

** In case of a ball-type tow-hitch

1	2	3	4	5	6	7
Minimum turning circle along the axle, external (relative to the turning center) wheel, m, max.	6.55				7.08	
Minimum turning circle, external, by the front bumper point, the most distant from the turning center, m. max.	6.8				7.35	
Maximum climb covered by a motor vehicle of gross weight, degree (%)				31 (60)		
Inmost wading depth, m				0.5		
Engine						
Model	ZMZ-40906			ZMZ-51432		
Designation	UAZ-3163, UAZ-23632, UAZ-23602			UAZ-31638, UAZ-23638, UAZ-23608		
1	2			3		
Type	four-stroke, with spark-plug ignition			diesel turbo-charged		
Cylinder number				Four		
Cylinder arrangement				In-line, vertical		
Firing order				1-3-4-2		
Cylinder diameter, mm	95.5			87		
Piston stroke, mm	94			94		

1	2	3
Actual displacement, cm ³	2,693	2,235
Compression ratio	9.1	19.0
Minimum rotation frequency for crankshaft in idle, min. ⁻¹	800-900	850-900
Maximum torque, N·m (kgf·m) as per Rules 85 UNECE GOST R 41.85)	217.0 (22.1) at 3,900 min. ⁻¹	270 (27.5) at 1,300-2,800 min. ⁻¹
Maximum capacity, kW (h.p.): as per Rules 85 UNECE (GOST R 41.85)	99.0 (134.6) at 4,600 min. ⁻¹	83.5 (113.5) at 3,500 min. ⁻¹
Lubricating system	Combined: force-feed and splash	
Crankcase ventilation	Closed	
Fuel feed system	Distributed fuel injection with electronic control	
Fuel	Lead-free petrol "Regular-92" (AI-92-4) GOST R 51105,* AI-92-K4 GOST 32513, it is permitted: Premium Euro-95" type II (AI-95-4) and Super Euro-98 type II (AI-98-4) GOST R 51866, AI-95-K4, AI-98-K4 GOST 32513.*	Diesel fuel "EURO", type II and III as per GOST R 52368-2005 (EN 590:2009), grade or class depending on of climatic conditions
Cooling system	Liquid, closed with forced-circulation	

* For motor vehicle packages of emission standard 5 apply similar fuel of class 5, type III and K5

Transmission						
Designation	UAZ-3163	UAZ-31638	UAZ-23632	UAZ-23638	UAZ-23602	UAZ-23608
1	2	3	4	5	6	7
Clutch: clutch type drive type	Dry single-plate Hydraulic					
Gear box: gear box type control type	Mechanical, five-speed Mechanical					
Transfer case: type of transfer case control type	With front axle drive decoupling Two-stage by "Dymos" UAZ PJSC With electric control. Mechanic power take-off.* Possible for the drive (at vehicle driving and parking) of special packs, installed in the bodyshell, the power take-off box is installed					
The front and back universal-joint shafts	Open type, with two universal joints and a movable spline connection. The back universal-joint drive can have an intermediate bearing with a hinged joint					
Front and back drive axles: axle type steering pivots of the front axle	Single-reduction Ball equal angular speeds					
Running gear						
Suspension: suspension type	Dependent , front suspension — springing, on two longitudinal and one lateral arm, with an anti-roll bar, rear suspension — on two longitudinal semi-elliptic leaf-less springs with an anti-roll bar					

* For motor vehicles with a transfer case by UAZ PJSC

1	2	3	4	5	6	7
Shock absorbers	Four, hydro-pneumatic, telescopic, bilateral					
Wheels and tires: wheels	Disc, with a whole rim, steel 6 1/2 Jx16H2 with a radial, tubeless tire 225/75R16 or of light-metal alloy 7Jx16H2, 7Jx18H2 with radial tubeless tires 235/70R16, 245/70R16, 245/60R18 with hubcaps. Wheel mounting — by five nuts. A spare wheel with tires 16"- with a steel wheel, with a tire 245/60R18 — with a light-alloy wheel.					
Control systems						
Steering system steering mechanism type	Steering post with height adjustment of a steering wheel "Screw-ball nut-rack-quadrant" with electrically powered hydraulic steering					
Brakes						
pedal brake type	With front disc brakes and back drum brakes.					
type of drive pedal brake	Hydraulic, dual-circuit, diagonal-split, with ABS or with circuit splitting by axes with a pressure regulator valve without ABS, with a vacuum booster.					
	According to the package, motor vehicles can be equipped with an anti-locking braking system (in this case there is no mechanical pressure controller). Circuit splitting is diagonal (primary — right hand front and left hand back wheel, secondary — left hand front and right hand back wheel).					
parking brake type	Wheeled, combined with rear brakes or drum and transmission					
parking brake actuator type	Mechanical					

Electric equipment		
Designation	UAZ-3163, UAZ-23632, UAZ-23602	UAZ-31638, UAZ-23638, UAZ-23608
1	2	3
Wiring system	Single wire, the negative pole is connected with motor vehicle earth	
Line voltage (rated), V	12	
Generator	11.203.640 by Pramo-Iskra) 14V, 80A, 5122.3771 (Pramo-Electro) 14V, 80A for motor vehicles with A/C — 5122.3771-30 (Pramo-Electro) 14V, 120A, 32112.3771, Borisov, BATE 14V, 110A	AAK 5730 ("Iskra") 14V, 80A , 5122.3771 (Pramo-Electro), 14V, 80A or 3212.3771, Borisov, BATE 14V, 90A for motor vehicles with A/C — AAK 5727 ("Iskra") 14V, 120A or 5122.3771-30 (Pramo-Electro) 14V, 120A
20 Accumulator battery	6ST-66A3 (6ST75A)*	6ST90A
Spark plugs	AU14DVVM GOST P53842, DR17YC-F f. BRISK	—
Heating plugs	—	0250 202 029 ("BOSCH")
Starter	11.131.568 12V 1.9 kW (Pramo-Iskra) 5112.3708 12V, 1.2 kW (BATE)	AZE 2203 (Pramo-Iskra) 12V — 1.9 kW, AZE 2154 ("Iskra") 12V — 1.9 kW 6012 (ZIT OJSC), Samara, 12V — 1.7 kW
Engine control unit	BOSCH 0261 S07 321	BOSCH 0 281 018 675
Ignition starter switch	With an anti-theft device and a starter re-engagement lock	
Audio electric signal	One signal — membrane	Two signals — tone, horn

* For winter package

1	2			3		
Windshield wiper	Electrically driven, with two brushes, three-mode, with pause adjustment in intermittent operation mode					
*Tail gate window wiper	Electrically driven, with one brush					
Washer	Electrically driven, for windshield and rear window+					
Power windows	Remote controlled					
Electrical interlocking system	Designed for simultaneous interlocking of all motor vehicle's door locks					
*Safe parking system+	Designed to warn a driver of obstructions, located out of driver's sight, when motor vehicle moving in reverse with max. speed of 5 km/h					
Adjusting values						
Designation	UAZ-3163	UAZ-31638	UAZ-23632	UAZ-23638	UAZ-23602	UAZ-23608
1	2	3	4	5	6	7
Deflection of fan belt and power steering pump at force of 4 kgf, mm	5-8	6-8	5-8	6-8	5-8	6-8
Deflection of generator belt and cooling system pump at force of 8 kgf, mm	14-15	—	14-15	—	14-15	—
Belt deflection of a fan drive, a steering booster pump, A/C compressor (option) at force of 4 kgf, mm	—	6-8	—	6-8	—	6-8

*For UAZ Patriot motor vehicles

1	2	3	4	5	6	7
A gap between spark plug electrodes, mm	0.7 ^{+0.15}	—	0.7 ^{+0.15}	—	0.7 ^{+0.15}	—
Brake pedal free play, mm			5-8			
Front wheels toe-in			0°4'-0°10'			
Largest turning angle front inner wheel, deg.			31-32			
Steering control total backlash (steering wheel angle from the position corresponding to the beginning of steerable wheels turning in one direction to the steering wheel position corresponding to the beginning of steerable wheels turning in the opposite direction), deg., max.			20			
Wheel and tire in assembly unbalance, g·cm, max.			1000			
Tire pressure, MPa (kgf/cm ²): front wheels:						
225/75R16	0.20 (2.0)	0.21 (2.1)	0.20 (2.0)	0.21 (2.1)	0.19 (1.9)	0.19 (1.9)
235/70R16	0.19 (1.9)	0.20 (2.0)	0.19 (1.9)	0.20 (2.0)	—	—
245/70R16	0.17 (1.7)	0.18 (1.8)	0.17 (1.7)	0.18 (1.8)	—	—
245/60R18	0.18 (1.8)	0.18 (1.8)	—	—	—	—

1	2	3	4	5	6	7
Tire pressure, MPa (kgf/cm ²):						
back wheels:						
225/75R16	0.24 (2.4)	0.24 (2.4)	0.27 (2.7)	0.27 (2.7)	0.28 (2.8)	0.28 (2.8)
235/70R16	0.22 (2.2)	0.22 (2.2)	0.25 (2.5)	0.25 (2.5)	—	—
245/70R16	0.21 (2.1)	0.21 (2.1)	0.24 (2.4)	0.25 (2.5)	—	—
245/60R18	0.20 (2.0)	0.20 (2.0)	—	—	—	—
Fuelling data (litres)						
Fuel tanks: right/left				36/36		
Engine cooling system				14.0		
Engine lubrication system				6.5		
Brake hydraulic drive system				0.6		
Gearbox housing				2,5		
Transfer housing:						
"Dymos"				1.8		
UAZ PJSC				0.8		
Bevel gear housing:						
front axle				1.5		
back axle				1.4		
Power hydraulic steering system				1.25		
Clutch hydraulic drive system				0.18		
Windshield washer reservoir				5		

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, keep the motor vehicle in good repair and carrying out timely maintenance and correct possible malfunctions in order to avoid injury to yourself and others.*

2. *The driver is responsible for the passengers. Therefore the driver must ensure that his or her passengers observe safety rules. Be specially 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 the door, ensure that it will not be a hindrance for other road users.*

Before closing the door, make sure it will not catch someone or something.

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

6. *Do not adjust tilt angle of steering column when driving a motor vehicle.*

7. *Do not adjust the driver seat when driving a 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 overpressured 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 steering system or brake system does not work properly, further motor vehicle driving or towing with a tow-rope is not allowed. In this case you should use two wheel vehicle towing or a tow truck service.*

14. *After long parking (over 1 hour) in a motor vehicle with a diesel engine, only begin driving at least 20 to 30 seconds after*

starting the engine so that the vacuum pump creates a depression in the vacuum brake booster sufficient for comfortable braking.

15. It is prohibited to drive with engine switched off as brake efficiency is lost.

16. It is strictly prohibited to disassemble shock absorbers.

17. It is prohibited to start and warm-up the engine in a confined space that does not have proper ventilation.

18. Do not subject motor vehicle's packs to open flame.

19. Keep the engine clean (engine fouling can cause fire).

20. Make sure that the fuel tank's plugs are closed tightly and there are no leaks from fuel lines.

21. Catalyst operational temperature is 400-800°C (UAZ-3163, UAZ-23632, UAZ-23602) and 400-600°C (UAZ-31638, UAZ-23638, UAZ-23608). 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).

22. When handling low-freezing liquid or fuel or brake fluid please observe the following rules:

- avoid any operations as a result of which these liquids or fumes can enter a mouth cavity;*
- 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 petrol deposit with kerosene when scraping in order to prevent poisonous particles from entering the respiratory system;*
- when handling fuel, observe fire safety rules.*

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

24. When handling electrolytic solution, take special precaution. In order to prevent poisoning and chemical burns please observe the following rules:

- 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 operation as a result of which the electrolytic solution can get onto the skin. If the solution comes in contact with the*

skin, carefully wipe off electrolytic solution with cotton wool and immediately rinse remaining traces on the skin with a 5 % solution of ammonia and 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, it must be removed from the motor vehicle and filler plugs must be unscrewed;

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

25. Do not wash a motor vehicle with a running engine. When washing a motor vehicle, avoid spraying water directly onto electric equipment articles, electronic devices, sensors and detachable connections in the engine compartment. Monitor the condition of the protective cases of electronic modules and sensors and 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.

26. A jacking apparatus installed improperly 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.

27. 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.

28. For UAZ Pickup motor vehicles, the weight of cargo hauling in a load box shall not exceed 425 kg.

29. For UAZ Pickup and UAZ Cargo motor vehicles, it is recommended to trim the cargo or to place the cargo closer to the cab.

30. Maximum permitted weight of the cargo hauling in the trunk compartment (including trunk compartment weight), when installing it on the UAZ Patriot motor vehicle's bows, shall not exceed 50 kg. In case of a motor vehicle without bows, cargo hauling on the roofing is not provided.

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

- before starting work, check tools and accessories for normal operation, arrange work clothes: do cuff up, tuck clothes in so that there are no hanging ends, tuck hair under closed-body hair cover;

- when carrying out any works, a motor vehicle must be securely braked;

- do not carry out maintenance operation and repair of a motor vehicle with engine on, except for specific works that require engine start according to the procedure, with that take special 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) repair of subsystems with engine on or immediately after its shutdown;
 - take due care when opening the radiator cap of the engine cooling system to avoid scalding;
 - before arc welding operations, execution tanks shall be removed and battery "-" terminal shall be disconnected;
 - observe fire safety rules.
32. Waste oils and speciality liquids shall be collected and sent for recycling or disposal.
33. 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. Switching engine malfunction lamp on does not mean that the engine must be shutdown immediately. However, in case of a malfunction caused by ignition failures (engine wobble and jerking when driving a motor vehicle), a motor vehicle shall be immediately (max. in 0.5 min.) stopped, and the engine shall be shut off in order to prevent exhaust gas catalyst breakdown.
3. Do not start motor vehicle driving with a cold engine. Avoid high crankshaft speed after starting a cold engine.
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, a motor vehicle must not be operated until the malfunction is corrected.
 - 4.1. After starting a cold engine the hydraulic valve may knock, that should disappear in the course of engine warm-up to the coolant temperature of 80-90°C, but not more than in 30 minutes after reaching the specified temperature. If knock persists, it is

necessary to check oil feed to the hydraulic pushers or to replace faulty hydraulic pushers.

5. For fail-safe operation and to prevent accelerator pedal breakdown it is recommended:

- 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 back run in the gear box and underdrive in the transfer case only when a motor vehicle completely stops.

7. Before fuelling motor vehicle, the heater-temperature booster (if available) shall be switched off.

8. When driving over dry hard roads the front axle shall be disengaged.

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

9. In case of malfunction of any brake circuit brake pedal stroke increases and brake efficiency decreases.

10. It is not recommended to operate diesel engine for more than 10 minutes with minimum idle speed in order to prevent oil penetration to the intake system from the turbocharge bearing assembly.

11. In case of frequent brake pedal depressing in a diesel engine motor vehicle (after releasing the pedal it is depressed again, e.g. on downhill) the vacuum pump is not able to create the required depression, wherefore braking capacity decreases and it will be necessary to apply increased force to the brake pedal.

To ensure efficient braking, keep engine idle speed from going below 850 min⁻¹.

12. Be careful when carrying out any operation with the motor vehicle hood opened, as the electric fan can switch on (irrespective of whether engine is on or off) on command of the Engine Control Unit.

13. Safe parking system is optional equipment that facilitates motor vehicle driving but does not drive a motor vehicle itself, therefore the manufacturing plant is not responsible for any possible damages when driving in reverse.

14. It is prohibited to remove metal segments with engine on and to check sparking charge "to ground".

15. *Avoid spilling acids, soda solutions, brake fluid, antifreeze and fuel on the painted surface of the bodyshell, wheels and rubber parts.*

16. *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.*

17. *Before washing 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.*

18. *When folding the two-passenger section of the back triple seat make sure that the middle seat belt is not fastened. Monitor the condition of the plastic limiting clip of the middle seat belt.*

19. *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.*

20. *Avoid impact loads on the motor vehicle chassis. In case of strong blows to the front wheels, carefully inspect the wheels, all parts of the front axle, steering links, steering gear and engine oil pan and correct detected defects.*

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

22. *When operating a motor vehicle in cold season (ambient temperature is max. 0°C) it is recommended to apply a cold weather radiator cowl cover.*

To prevent freezing through of the engine positive crankcase ventilation control system junction pipe, at ambient temperature below (-15°C) it is necessary to disconnect the resonator-type hose from the air filter, turn the filter tightly counter-clockwise (the air filter inlet spigot will be backward and downward directed).

At ambient temperature below -30°C it is recommended to operate the motor vehicle with the front axle continuously engaged.

23. *If duration of motor vehicle parking exceeds 12 hours at ambient temperature below -30°C, it is recommended to store the accumulator battery in a warm room.*

24. *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.*

25. *Use **only recommended lubricants and specialty liquids.***

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

27. *When switching on the A/C and with the transmission control lever in the neutral position, pings in the gear box synchronizer rings are possible. These pings can increase with high gear actuation and with the front wheels turned to the limit.*

28. *The opened lift gate or the back header can block visibility of the back lighting means of your motor vehicle for other road users. Before opening the lift gate of UAZ Patriot or the back header of UAZ Cargo motor vehicle, install breakdown triangle on the road as per GOST R 41.27-99.*

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

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

31. *The plant continuously improves the design of its motor vehicles, hence the latest engineering changes that do not affect operation may not be reflected in this Manual edition.*

Chapter 3. CONTROL ELEMENTS, MOTOR VEHICLE INTERIOR AND BODYSHELL EQUIPMENT

Layout of the control elements and the driver seat equipment is shown in Figs. 3.1, 3.2 :

1 — cowling (see section "Interior heating and ventilation").

2 — side window blower nozzle.

3 — lighting mean control module (Fig. 3.4).

4 — steering column with a steering wheel, an ignition starter switch, multi-function switches and a steering column tilt angle control lever (Fig. 3.5).

5 — instrument cluster (Fig. 3.6).

6 — control panel of heating and ventilation and climate control systems (see section "Interior heating and ventilation").

7 — hazard switch.

8+ — multimedia system head unit.

9 — device switches. Set of switches depends on the motor vehicle package:

AUTO — climate control system automatic operation switch;

 — rear screen de-mist and mirror heating switch;

 — mirror heating switch (for motor vehicles without rear screen de-mist);

 — recirculation switch;

 - intensive windscreen heating switch;

 — tank fuel sender switch.

 — A/C switch;

 — **windscreen electrical heating switch.** Briefly pressing the switch key with ignition ON sends a signal to the heating time relay, which actuates the heating element of the windscreen. Windscreen electrical heating will be switched off in 12 ± 2 min. automatically or when the switch key is pressed again or when key is off.

 — preheater starting switch.

10 — 12V socket.

11 — glove compartment cover. To open the cover pull the handle from below. The glove compartment is equipped

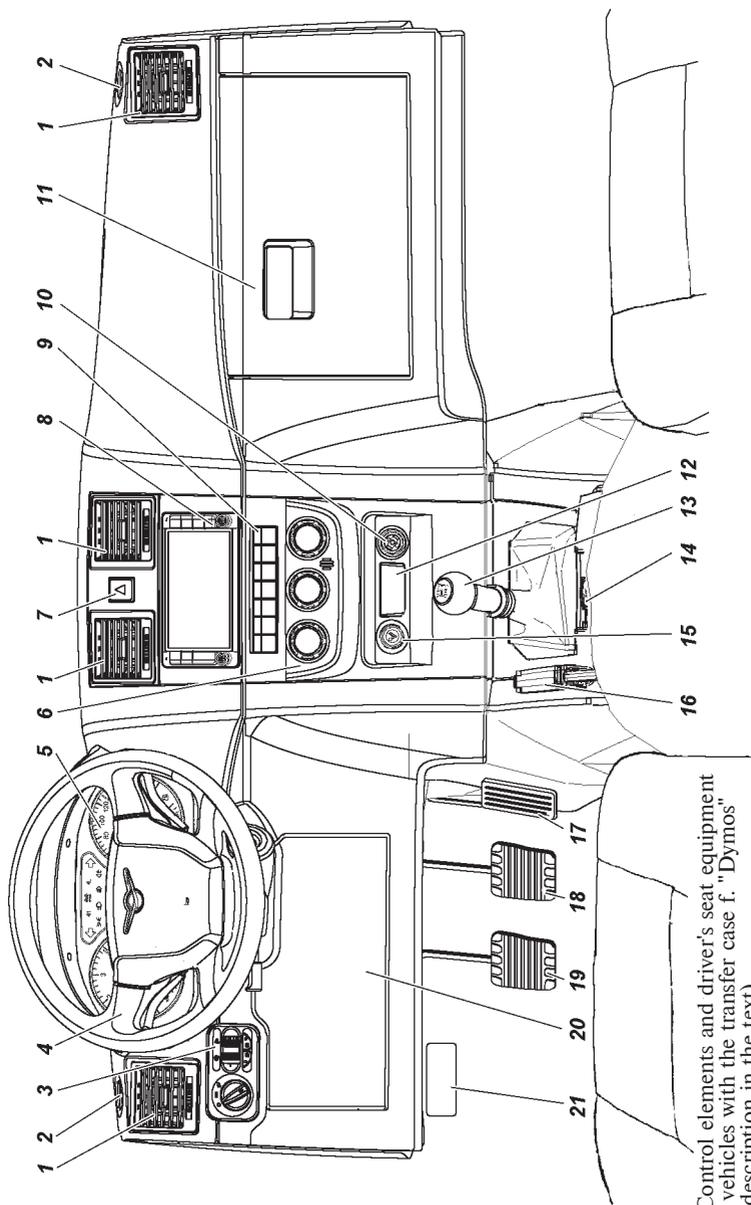


Fig. 3.1. Control elements and driver's seat equipment for motor vehicles with the transfer case f. "Dymos" (see item description in the text)

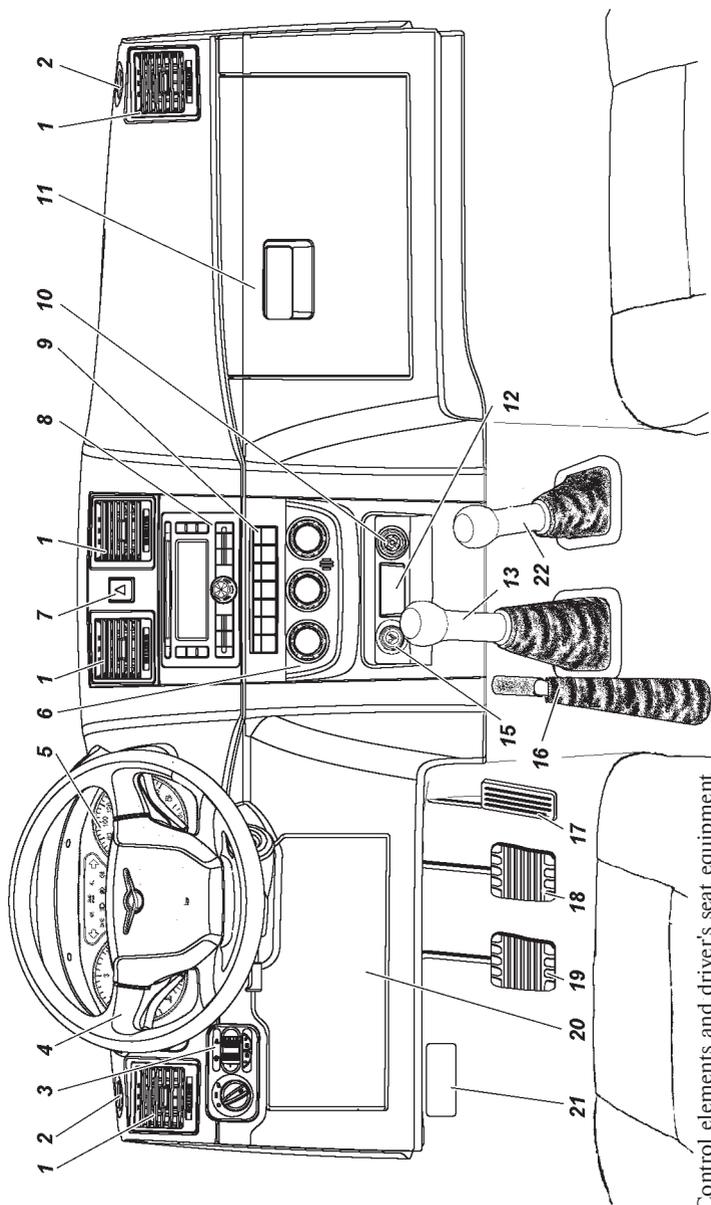


Fig. 3.2. Control elements and driver's seat equipment for motor vehicles with the transfer case of UAZ, PJSC (see item description in the text)

with a puddle lamp (depending on package) that switches on automatically when the cover is opened.

12+ — starting preheater timer. (Operation and maintenance information is specified in the manufacturing plant instruction (manual) attached to the motor vehicle).

13 — shift lever. (See lever positions on the shift lever handle and Fig. 3.3).

14 — floor standing box with units and keys (Fig. 3.7).

15 — cigar lighter. To heat up the cigar lighter coil, press the insert handle until it is fixed and then release the handle. When the required coil heating temperature is reached the insert automatically resets.

It is not recommended to use the cigar lighter for electric device connection.

16 — parking brake lever. To engage the parking brake, position the lever up, to disengage press the button on the lever face and position the lever down against stop.

17 — accelerator pedal.

18 — brake pedal.

19 — clutch engagement pedal.

20 — relay and fuses unit cover. For access to the unit, push up the top cover part, surpassing spring lock forces, and pull it out of the hooks in the lower part.

21 — bonnet latch opening lever.

22 — front axle and low gearing engagement lever (See lever positions in Fig. 3.3).

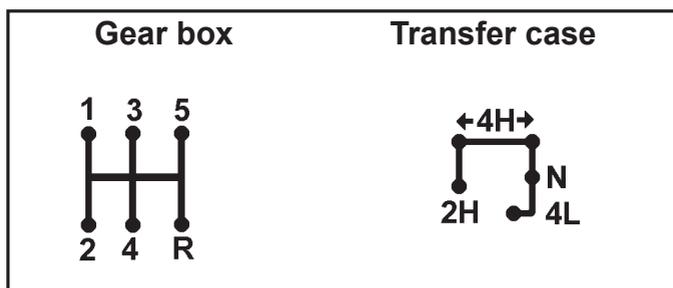


Fig. 3.3. Positions of the gearbox and transfer case levers:

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

LIGHTING MEANS CONTROL MODULE

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

1 — external lights switch. Has three positions (clockwise): "O" — lighting is OFF (daytime running lights are ON if available); "☰" — tail lamps, license plate light and cluster illuminating are ON; "☷" — tail lamps, license plate light and cluster illuminating, headlamps are ON.

2 — cluster dimmer. Light intensity is changed by turning the regulator.

3 — headlamp corrector regulator. By turning the regulator, the headlamp light beam inclination tilt angle is corrected depending on motor vehicle loading: "0" — one driver or a driver with a passenger on the front seat; the point between "0" and "1" — all seats in the interior are occupied (5 persons); "1" — all seats in the interior are occupied plus cargo in the luggage compartment up to the permissible load on the rear axle; the point between "1" and "2" — a driver plus cargo, well-distributed in the interior and the luggage compartment up to the permissible load on the rear axle. In case of other load options (not exceeding gross weight) the position is selected so that road illumination with dimmed beam is within normal limits and opposing motor vehicle drivers are not blinded by light.

4 — rear fog lights switch .

5 — fog light switch.

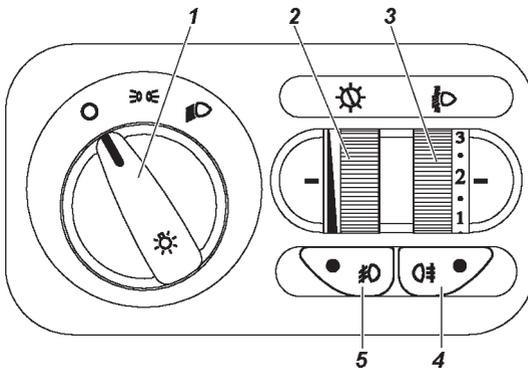


Fig. 3.4. Lighting indicates control module (see item description in the text)

STEERING COLUMN WITH STEERING WHEEL, MULTI-FUNCTION UNDERSTEERING SWITCH AND IGNITION STARTER SWITCH

The steering column with the steering wheel, the multi-function understeering switch, the ignition starter switch and the steering column toward angle control lever are shown in Fig. 3.5.

1 — direction indicator and beam switch lever have the following positions:

I — direction indicators are OFF, dimmers are ON, if forward lighting is switched off by the vehicle light switch;

II — left direction indicators are ON (unstable position);

III — left direction indicators are ON (stable position);

IV — right direction indicators are ON (unstable position);

V — right direction indicators are ON (stable position);

VI — (pull) headlamp high beam flash, regardless of vehicle light switch position (unstable position);

VII — (push) distance light is ON, if forward lighting is switched on by the vehicle light switch (stable position);

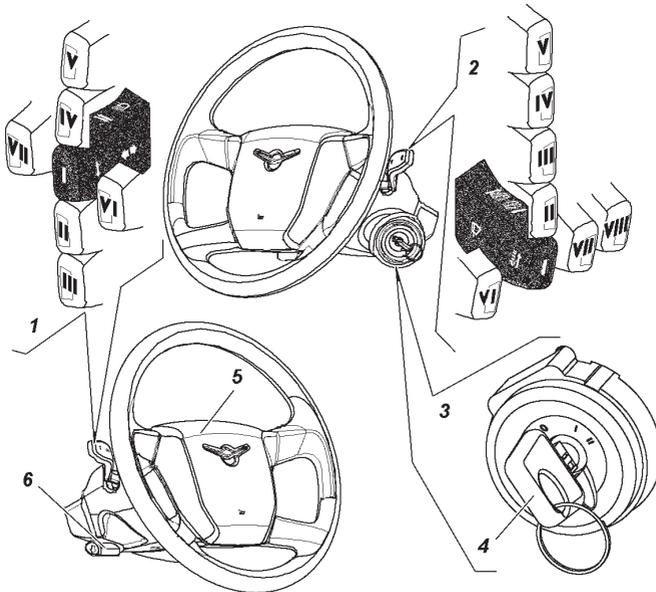


Fig. 3.5 Steering column with the steering wheel, the steering column multi-function switches, the ignition starter switch and the steering column canting angle control lever (see item description in the text)

2 — wiper and washer lever, have the following positions:

I — wiper and washer are OFF;

II — windshield intermittent wiper is ON (unstable position);

III — windshield intermittent wiper is ON (stable position).

Intermittent wiper and adjustment of delay between brush strokes is provided by the intermittent wiper, located in the relay and fuse units:

- when switching the wiper understeering switch to the intermittent mode, min. delay of (1.5...2.5) s is set;

- if it is necessary to set delay within the range between 1.5 s and (60 ± 12) s, the switch lever shall be set to the "OFF" position (pos. I), then wait for (set) the required delay, and then the lever should be set again to the "intermittent wiper" (pos. III);

- if wiper operation should be adjusted, the above specified operation should be carried out again;

- after switching off the ignition lock or interruption in intermittent wiper operation of over (75 ± 15) s the set delay values are not saved;

IV — windshield wiper constant mode (low speed) is ON (stable position);

V — windshield wiper constant mode (high speed) is ON (stable position);

VI — (pull) windshield wiper and washer are ON (unstable position);

VII — rear screen wiper is ON (stable position);

VIII — (unstable position) when pushing the lever, the lift gate window washer electric motor operates, when releasing the lever, water supply is shut off.

3 — ignition starter switch has three positions:

0 — parking (stable position);

I — ignition ON (stable position);

II — starter ON (unstable position).

WARNING! *It is prohibited to cut off IGN and remove the key from the ignition starter switch while driving a motor vehicle. Engine stoppage will lead to braking capacity reduction, and upon removing the key the steering system shaft becomes blocked by an anti-hijack device and the motor vehicle can no longer be controlled.*

4 — ignition and door key.

Three 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 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.

5 — horn button.

6 — steering column tilt angle control lever. To change steering column tilt angle, pull the lever down, move the column and release the lever.

WARNING! *Do not adjust steering column tilt angle when driving a motor vehicle. After adjustment make sure that the steering column is securely fixed in a new position.*

CLUSTER

Cluster is shown in Fig. 3.6.

Green and blue signal devices inform the driver of the normal operation of the switched on system. Orange signal devices warn a driver of the need to take measures to ensure the motor vehicle's continued normal operation. Red signal devices warn the driver of an emergency packs operation.

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

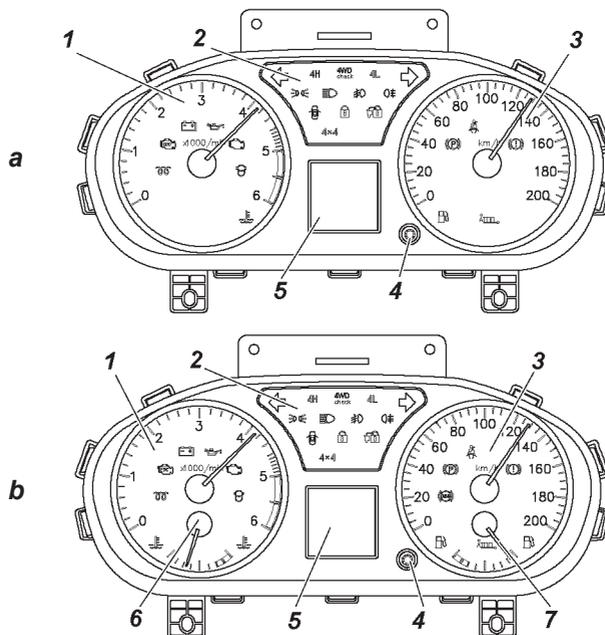


Fig. 3.6. Cluster (see item description in the text):

- a — dual-needle;
- b — four-needle

1 — tachometer with signal devices. The scale red range indicates exceeding permissible rpm and engine operation in emergency mode.

Indicators on the tachometer.

 — diesel engine glow plugs ON signal device (yellow).

 — “EDC” malfunction signal device of the diesel engine control system (yellow). It lights up for 2-3 s for testing when starting up the ignition and goes out. **Signal device switching on (continuously lit lamp or blinking lamp) indicates a malfunction of the engine control system. In case of continuously lit lamp, if it is not accompanied by significant deterioration of riding qualities, a motor vehicle can be driven to the nearest authorized service station of UAZ, PJSC to carry out diagnostic works. If the lamp blinks, engine operation is not permitted, the motor vehicle must be stopped and the engine must be shut off.**

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

 — **accumulator battery discharge signal device** (red). If it is lit with engine on, it indicates a lack of accumulator battery charge.

 — **oil pressure warning signal device of the motor vehicle's engine lubrication system** (red). Signal device lights up after starting up the ignition and goes out after starting the engine at increased 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 starting up the ignition and goes out after starting the engine. **When the signal device switches on, it indicates a malfunction of the engine components or the exhaust system, which affect the exhaust gas toxicity level. When the signal device switches on, if it is not accompanied by significant deterioration of riding qualities, driving is permitted at low speed to the nearest authorized service station of UAZ, PJSC, 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 switching on, the signal device starts blinking with frequency of 5 Hz in case of engine control unit malfunction, and also in case of immobilizer malfunction and using of an unregistered code key (see section "Electronic anti-theft device").

 — **signal device of water in the fuel filter of a diesel engine motor vehicle** (yellow).

 — **signal device of abnormal coolant overheating** (red).

2 — **signal device box:**

 — **left direction indicator and hazard light ON signal device** (green).

 — **right direction indicator and hazard light ON signal device** (green).

4H — **axle front engagement signal device** (green). It lights up after starting up the ignition and should go out if this mode is not ON. It lights up when engaging the front axle at any gear of the transfer case. For a motor vehicle with the transfer case of UAZ, PJSC, the signal device is not used.

4L — front axle and underdrive "4L" engagement signal device (green). It lights up after starting up the ignition and should go out if this mode is not ON. For a motor vehicle with the transfer case of UAZ, PJSC, the signal device is not used.

4WD check — transfer case malfunction signal device (yellow). It lights up after starting up the ignition and should go out if the system is in normal condition. If the indicator is still ON, the all-wheel control system should be checked at the nearest authorized service station. For a motor vehicle with the transfer case of UAZ, PJSC, the signal device is not used.

 — 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 (orange).

 — door ajar signal device (red).

 — security alarm system signal device (yellow).

 — immobilizer ON signal device (yellow).

4x4 — 4-wheel drive ON (for the transfer case by UAZ, PJSC).

3 — speedometer with signal devices.

Signal devices on the speedometer:

 — brake ABS malfunction signal device (ABS) (yellow).

 — park brake ON signal device (red).

 — unbuckled seat belt signal device (red).

 — 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 right tank.

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

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

- coolant temperature in the engine (for dual needle cluster);
- fuel level in the fuel tank (for dual needle cluster);
- motor vehicle power supply voltage;
- motor vehicle total and daily mileage. Daily mileage counter reset is performed by long (over 2 s) pressing the 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. By long pressing the cluster switch (over 2 s), the setting mode is activated. 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 the cluster switch;
- ambient temperature (depending on the package);
- date (in "XX month" format). To set the date, the "Date setting" mode should be switched on in the trip computer. By long pressing the cluster switch (over 2 s), the setting mode is activated. Day, month and year can be set by turning the switch clockwise/counter-clockwise. Switching over between day/month/year/minutes settings is performed by short (less than 1 s) pressing the cluster switch;
- instantaneous fuel economy (l/100 km);
- average fuel consumption (l/100 km);
- fuel distance (in km);
- current motor vehicle speed;
- average motor vehicle speed

6 — coolant temperature indicator. Engine operation with the indicator pointer in the red range is not allowed. Range of values from 50°C to 130°C. Division value 10°C.

7 - fuel level indicator.

FLOOR STANDING BOX WITH BLOCKS AND CONTROL KEYS

Floor standing box with unit and keys control for motor vehicles with the "Dymos" transfer case is shown in Fig. 3.7.

1 — transfer case mode switch.

Modes:

2H — only back axle drive. This mode is used to drive over dry hard-surface roads;

4H — all-wheel drive. This mode is used to drive over wet or slippery hard-surfaced road, off-road or terrain;

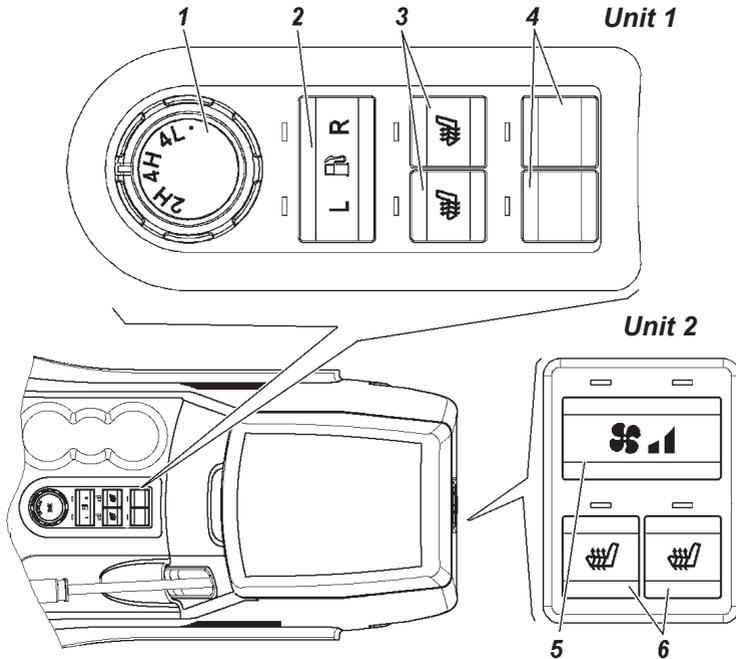


Fig. 3.7. Floor standing box with unit and keys control
(see item description in the text)

4L — all-wheel drive with underdrive. This mode is used to overcome difficult choke points, for hill climbing (overcoming downwards slopes) with high gradient, driving at low speed, to increase drawbar pull, etc.

WARNING!

Switch manual gearbox modes only with engine on.

All-wheel drive "4H" mode switching ON/OFF shall be performed both in a stationary motor vehicle and when driving in cruise modes "along the straight line", without wheel slip.

Engage all-wheel drive in due time before entering a difficult road section!

Switching the mode of all-wheel drive with underdrive "4L" ON/OFF shall be performed only in a stationary motor vehicle!

There is no manual gearbox mode indication in the cluster in the initial position "2H", only the back axle is driven.

Driving mode change 2H=> 4H:

To switch on all-wheel drive "4H" mode:

- release accelerator pedal;
- press and hold the clutch pedal;
- set the handle from the "2H" position to the "4H" position.

If switching is successful, the symbol $4H$ is switched in the cluster;

- release the clutch pedal.

If:

- efforts are made to switch all-wheel drive mode ON at the moment of significant back wheel slip against the front wheel;

- a motor vehicle is driven with a pressure difference in the front and back wheels exceeding the pressure difference specified in the Manual;

- immediately before switching on turning with minimum possible radius has been performed, or an effort to switch on is made immediately when turning;

- in other exceptional cases, when front wheel and back wheel drives will have different rpms at the moment of engagement all-wheel drive; system switching over to the emergency mode is possible, of which the simultaneous switching on of signal devices is an indicator, $4WD$ check, $4H$ and $4L$ in the cluster. With that only the back wheel drive remains active.

In this case, to switch the "4H" mode, it is necessary to set the switch to the "2H" position and the "4H" mode should be switched on again.

Driving mode change 4H=> 2H

To switch all-wheel drive mode OFF (engagement of back axle drive "2H") it is necessary to:

- release accelerator pedal;
- press and hold the clutch pedal;
- set the handle from the "4H" position to the "2H" position.

If switching over is successful, the symbol $4H$ is switched off in the cluster;

- release the clutch pedal.

Driving mode change 4H=> 4L

To switch on the mode of all-wheel drive with underdrive 4L (beforehand the all-wheel drive "4H" mode must be switched on), it is necessary to:

- stop the motor vehicle;
- press and hold the clutch pedal;
- set the switch handle from the "4H" position through the "4L" position to the unstable position "·" and hold it until the signal device 4L in the cluster switches on;
- when the signal device 4L switches on in the cluster, release the switch handle (the switch handle self-resets to the "4L" position);
- start driving, smoothly releasing the clutch pedal.

Driving mode change 4L=> 4H

To switch on the mode of all-wheel drive with underdrive it is necessary to:

- stop the motor vehicle;
- press and hold the clutch pedal;
- set the switch handle from the "4L" position to the "4H" position;
- when the signal device 4H switches on in the cluster, start driving, having smoothly released the clutch pedal.

2 — fuel level sender switch in the tanks. Senders are switched over by short pressing the central key zone. The signal device lights up according to the connected sender: "L" — left tank, "R" — right tank.

3+ — front seat heater switches.

4 — redundancy switches.

5+ — auxiliary heater speed control switch.

Low speed of the auxiliary heater electric motor is switched on by short pressing the switch, at which point the left signal device above the switch lights up. When the switch is short pressed again, the high speed auxiliary electric heater motor is switched on, additionally the right signal device lights up. By short pressing the switch or when the key is removed, the auxiliary heater and signal devices are switched off.

6+ — back seat heater switches. By short pressing the switch, the heating of the respective seat switches on and the signal device lights up. Seat heating and the signal device are switched off when the switch is pressed again or when the key is removed.

Motor vehicle's electronic anti-theft system with the engine control unit ME 17.9.71 (Engine ZMZ-40906)

The anti-theft system set includes three ignition keys, in whose bows the transponders are embedded. The keys are equal in terms of their functional capabilities. The system allows eight ignition keys to be registered. The prerequisite for system operation is the registration of three ignition keys.

The system can be in the "neutral", "taught" and "key upgrading" states with respect to ignition key registration.

"Neutral" state — after replacing the engine control unit at a service station, the system carries out automatic registration of the ignition keys, for this purpose the ignition should be started up by each key one by one.

Motor vehicle engine start is not possible until three keys are registered automatically and the system state changes to "taught".

"Taught" state — three keys are registered successfully.

"Key upgrading" state — after the procedure of switching over to this state, the system registers (re-registers) the required number of the ignition keys.

When starting up the ignition without successful key registration and successful key code recognition the engine start is not possible.

With regard to prevention of unauthorized motor vehicle use the system can be in the "ON" and "OFF" states.

"ON" state — the immobilizer locks engine start. The immobilizer turning-on signal device  is continuously switched ON.

The system switches over to this state in the following cases:

- if the engine is not started for 25 s after starting up the ignition and successful key code recognition;
- if after starting up the ignition the key code is not recognized (the system will store the trouble code, which can be read out using a diagnostic tester);
- if the system is in the "neutral" state and key registration is not carried out;
- if the system is in the "taught" state and an unregistered key is used;
- if the system is in the "key upgrading" state and key registration (re-registration) is not carried out;
- in 25 s after starting up the ignition;

- in 25 s in case of engine stop and there are no efforts to re-start the engine;
- after power failure.

"OFF" state — the immobilizer does not prevent engine start. The immobilizer ON signal device  is OFF.

The system switches over to this state (disarming) after starting up the ignition provided that the key code is recognized successfully.

The ignition key (transponder) can be in the "initial", "registered" and "faulty" states.

"Initial" state — the ignition key, handed over by the manufacturer, which is not registered in the system.

"Registered" state — the ignition key, registered in the specific system. After successful recognition of the key, engine start is possible.

"Faulty" state — the ignition key, whose code was not recognized by the system at starting up the ignition. Motor vehicle engine start is not possible.

WARNING! *To register (re-register) the keys, any two keys that were previously registered during the last session should be used. Take all necessary measures to prevent key loss.*

It is not recommended to start the engine using a key registered in this system that is in the same bunch with other keys, both registered and unregistered.

After starting up the ignition (Fig. 3.5), the immobilizer turning-on signal device  lights up for 1.5 s in the test mode. Then the signal device initiates the following state of the anti-theft system until engine starts:

- the system is in the "ON" state or the key registration procedure is not completed — the signal device  is continuously ON;
- the system is in "OFF" state or the key registration procedure is completed — the signal device  is OFF;
- when performing the key registration procedure, the signal device  switches on 5 times for a period of 1 s (0.5 s — OFF/0.5 s — ON);
- the system is in the "neutral" state — the signal device  switches on 3 times for a period of 3 s (1.5 s — OFF / 1.5 s — ON).

- the system is in the "key teaching" state — the signal device  switches on 4 times for a period of 3 s (1.5 s — OFF/1.5 s — ON).

Keys registration. Only ignition keys that are in "initial" and "registered" states (previously registered in the system) are subject to the registration. Keys registered in other systems cannot be re-registered in this system. The registration is only possible using any two keys that are registered in the previous key registration session.

Key registration with the system in the "taught" state is used to ensure that the motor vehicle owner have additional available ignition keys (without deleting codes registered in the previous ignition key registration session).

In order to register a key it is necessary to carry out the following operations:

- start up the ignition using one of the registered keys, turning it into position I (Fig. 3.10) of the ignition starter switch;
- make sure that ignition is started up, key code is recognized (the immobilizer turning-on signal device  is OFF);
- 10 seconds after starting up, shut ignition, turning the key into the 0 position (Fig. 3.10);
- For 10 s start up the ignition using another registered key, make sure that the ignition is started up, the key is recognized;
- 10 s after starting up, shut ignition. The immobilizer turning-on signal device  starts blinking, the system is ON;
- For 20 s (signal device blinking time) start up the ignition using the key to be registered. Registration is completed if in 5 seconds the signal device goes out. If the signal device is lit continuously (without blinking), the key registration is considered incompletd.

If a larger number of keys should be taught, repeat the key registration procedure.

WARNING! *Switching on the starter or violation of the specified time intervals or switching OFF the power supply system prevent logging on the key registration procedure, and if the system is already in the procedure, interrupt all further key registration operations.*

Key re-registration is used if at least one key is lost, and to register additional keys (by deleting codes of the previously registered keys).

For this purpose it is necessary to switch the system over to the "key upgrading" state and re-register keys:

- start up the ignition using one of the registered keys, turning it into position I (Fig. 3.10) of the ignition starter switch;
- make sure that ignition is started up, key code is recognized (the immobilizer turning-on signal device  is OFF);
- 10 seconds after starting up, shut ignition, turning the key into the 0 position (Fig. 3.10);
- For 10 s start up the ignition using another registered key, make sure that the ignition is started up, the key is recognized;
- 10 s after starting up, shut ignition. The immobilizer turning-on signal device  starts blinking, the system is ON;
- For 20 s (signal device blinking time) press the accelerator pedal. When the system recognizes full pressing of the accelerator pedal, the The immobilizer turning-on signal device  is OFF;
- keep the accelerator pedal pressed for 60 s. After that the immobilizer turning-on signal device starts blinking;
- For 20 s (signal device blinking time) start up the ignition using the key to be registered (not the first and not the second registered key). The immobilizer turning-on signal device is continuously lit. Release the accelerator pedal. Key registration is completed if in 2 s the signal device goes out. If the signal device starts blinking, the key registration is considered incomplete and the registration process is interrupted;
- 10 s after starting up the ignition, shut ignition and remove the key from the ignition starter switch. The immobilizer turning-on signal device will blink for 20 s. To register additional keys, proceed with the previous operation;
- to finish the key registration, start ignition using the second (from the start of the procedure) registered key. The immobilizer turning-on signal device continues blinking for 2 s and then switches OFF;
- 10 s after starting up the ignition, shut ignition and remove the key from the ignition starter switch. The immobilizer turning-on signal device starts blinking;
- For 20 s (signal device blinking time), start up the ignition using the first (from the start of the procedure) registered key. The signal device switches OFF. After that, the system deletes all key codes registered during the previous teaching session and registers all keys used in the current registration procedure

(the first, the second registered keys and additional keys). Key registration is completed if the signal device switches ON and goes out in 2 s.

If key registration is unsuccessful, the immobilizer turning-on signal device will continue blinking and the system will be locked until the ignition is started up using any of the registered keys.

WARNING! *Switching on the starter or violation of the specified time intervals or switching OFF the power supply system prevent logging on the key re-registration procedure, and if the system is already in the procedure, interrupt all further key registration operations.*

POWER PACK CONTROL SYSTEM+

The system includes the control unit (CU), the driver side door module (DSDM) and two keys with a remote control panel (RCP).

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

Warning. *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 electrical interlocking system allows up to four RCPs to be taught. When working with the electrical interlocking system the RCPs are equal in terms of functional capabilities.

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 the ingress of corrosive liquids, acids, water, oil and petrol in the CU, DSDM and RCP.

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 package;
- 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" signalling and prompt alarm;
- system trouble diagnosis through the motor vehicle data link connector.

Control System Operation Procedure

Door locks locking and armed mode switching on using the RCP

To lock door locks and switch armed mode ON it is necessary to short press button 3 (Fig. 3.13) on the RCP. All side door locks and the lock of the T/gate are locked, the system switches over to the armed mode that is indicated by a single blink of the T/signals and a slow blinking of the signal device system in the cluster .

If any door, the cowl or the T/gate are opened when switching armed mode on, the T/signals blink three times and a single horn is given. In order to include the opened areas into the security zone they must be closed.

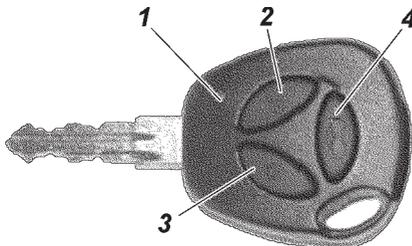


Fig. 3.13. Key with remote control panel:

- 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

Door locks unlocking and armed mode switching off using the RCP

To unlock all door locks and the T/gate lock and switch armed mode OFF it is necessary to short press button 2 on the RCP. Switching armed mode OFF is accompanied by a double blink of the T/signals and interior lighting switching ON. If violations of the security zone for the whole security period were detected (Alarm actuated), a single horn will be given in addition to T/signal blinking.

If after door unlocking and switching armed mode OFF none of side doors or the T/gate are opened and the ignition is not started up, in 30 seconds all doors will be automatically locked again and the system will automatically switch over to the armed mode. The possibility of automatically switching over to the armed mode with door locking is indicated by frequent blinking of the system's signal device in the cluster .

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

Unlocking of all side doors locks and the T/gate lock with automatic side door window opening is carried out by pressing the respective RCP button and holding it pressed till the window starts moving (about 2-3 seconds). The system carries out operations specified in the above mentioned items to unlock door locks and then carries out automatic moving of side door window to open — firstly front windows, then back windows.

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 armed mode

To lock the door locks without switching to armed mode, it is necessary to lock by turning the key in the driver side door key hole clockwise. The locks of all side doors and the T/gate lock are locked without armed mode switching on.

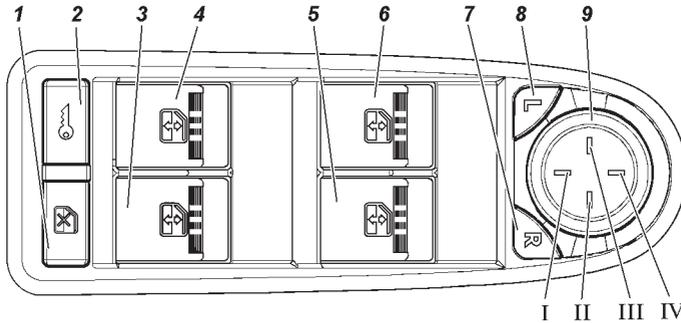


Fig. 3.14. Driver side door switch module with multiplex control: 1 -passenger door descending window glass guide interlocking switch; 2 – central door locking switch (except for UAZ CARGO); 3 – right T/gate descending window glass guide control switch; 4 – left T/gate descending window glass guide control switch; 5 – right front door descending window glass guide control switch; 6 – driver side door descending window glass guide control switch; 7 – right mirror selection switch; 8 – left mirror selection switch; 9 – outside rear view mirror position control switch (except for UAZ CARGO): I – mirror down; II – mirror right; III – mirror left; IV – mirror up

This type of locking is not accompanied by T/signal blinking.

Door locks are unlocked 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 2 (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 2 of the DSDM max. 1 second after starting up the ignition and hold it pressed (for at least 3 seconds) until the characteristic sound of the door locks triggered to open. If subsequently the system should be switched over to the standard unlocking mode it is necessary to repeat the above mentioned procedure.

Searching for a motor vehicle in an unlighted parking place

By single pressing and holding button 4 of the RCP (Fig. 3.8) the system blinks with T/signals two times, gives one horn and switches interior lighting ON for about 25 s.

Remotely switching alarm system ("Panic") ON

To switch 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.

Switching prompt alarm ON

Switch prompt alarm ON is only possible with started up ignition. Switching ON is performed by pressing button 4 of the RCP and holding it for at least 2 s. To switch prompt alarm OFF, press any button of the RCP.

Locking and unlocking central door locks from the interior

Locking all door locks (including the T/gate) from the motor vehicle interior is possible using 2 methods:

- 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 2 (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 is 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, 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 2 of the DSDM

Side door window position control

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

Window position is controlled by the switches located on the armrests of the respective motor vehicle doors. Side door window positions are controlled by moving switches 3, 4, 5, 6 (Fig. 3.14) on the driver's door armrest.

Button 1 of the DSDM allows control of passenger door window positions (all three passengers doors) from the switches installed on the passenger door armrests to be disabled. If

disabling mode is activated, the symbol on button 1 has yellow illumination. Pressing the button again cancels disabling, etc.

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

If passengers simultaneously control front and back windows of the right side doors, a window control command from the right front door switch has priority.

The side door window position control subsystem has 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, 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

Left and right exterior mirror electric drive is controlled by single switch 9 (Fig. 3.14), located in the DSDM. Selecting the mirror to be adjusted according to the commands from the switch is made by one of the switches 7 or 8 of the DSDM — mirror selection buttons. Simultaneous left and right mirror adjustment is not possible.

Indication of readiness to adjust of the selected mirror is yellow illumination of the respective selection button. Mirror adjustment is disabled automatically (the mirror selection button yellow illumination 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 ignition if no side doors motor vehicle were opened.

Mirror control is not possible when armed mode is switched ON.

System operation in armed mode

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

- side doors;
- cowl;
- T/gate;
- ignition starter 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;
 - cowl opening;
 - T/gate opening;
 - ignition start up;
 - driver side door unlocking;
 - accumulator battery connection after its disconnection,
- the alarm system switches ON as T/signals light alarm and an audible standard motor vehicle horn alarm for about 30 s.

Single pressing any button on the RCP when the system is in alarm mode leads to interruption of alarm signal sending but the system remains in armed mode. Armed mode is switched OFF after button 2 on the RCP is pressed.

RCP battery replacement

A lithium battery, CR2032 type, is installed in the RCP, its initial voltage is 3V. If the RCP's supply voltage is within normal range, indicator 1 flickers with every pressing of any button on the control panel. If the indicator lights up with two short flickers 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

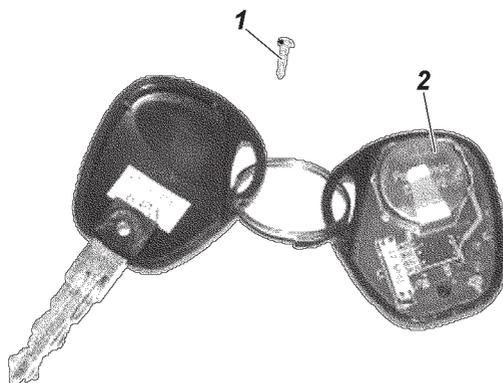


Fig. 3.15. Remote control panel:
1 — screw; 2 — replace battery

outside the system reception signal range has exceeded 1000, the system stops responding to control panel commands. 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 codes will be recorded in their place. 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 the teaching mode, any RCP that was taught in the system and the synchronization counter which is synchronized with the control unit are needed. The RCP with which 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 indication  in the 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 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 the teaching process has started (about 3 s after pressing button 4);
6. Max. 3 s after the indicator starts blinking, holding button 4 pressed, press button 2 one time. The system status signal device stops blinking and is continuously lit. Release button 4;

7. In max. 3 s cycle the ignition;
8. 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. Max. in 3 s after the indicator starts blinking, holding button 4 pressed, press button 2 one time. The system status signal device stops blinking and is continuously lit (without blinking). Release button 4;
11. In 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. Do do so, in max. 3 s after starting up the ignition, 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".

DEFENSIVE PARKING SYSTEM+

Defensive parking system (DPS) is designed to warn a driver of obstructions (objects), located out of driver's sight with a horn when motor vehicle is driving in reverse with max. speed of 5 km/h.

DPS significantly facilitates driving motor vehicle in reverse and parking in confined spaces, obscured conditions, during hours of darkness and with dirty windows and mirrors.

Warning! *Defensive parking system is optional equipment that facilitates motor vehicle driving but does not drive a motor vehicle itself, therefore the manufacturing plant is not responsible for any possible damages when driving in reverse.*

Operation procedure

1. Putting the system into operation.

When starting up the ignition and with reverse gear engaged the system should be set into operation automatically, and a short high-tone horn is given with a duration of 0.2-0.3 s. If a hindrance is within the detection area, the system informs the driver of it with an intermittent or continuous signal depending on a distance to the hindrance. The motor vehicle may be driving in reverse or be stationary.

2. System diagnosis.

When the system is switched on (see item 1), a short high-tone horn is given, then the control unit performs an integrated check in order to detect faulty sensors or other system malfunctions.

If a faulty sensor or other system malfunction is detected after the switching on signal, a continuous low-tone horn is given for 3 s, then:

- if sensor A (left, as viewed in the direction of motor vehicle motion, Fig. 3.11) or its circuit is faulty, the system indicates a faulty sensor with one low-tone horn with a duration of 0.5 s;
- if sensor B or its circuit is faulty, the system indicates a faulty sensor with two short low-tone horns with a duration of 0.5 s and interval of 0.3 s;
- if sensor C or its circuit is faulty, the system indicates a faulty sensor with three short low-tone horns with a duration of 0.5 s and interval of 0.3 s;
- if sensor D (right, as viewed in the direction of motor vehicle motion) or its circuit is faulty, the system indicates a faulty sensor with four short low-tone horns with a duration of 0.5 s and interval of 0.3 s;
- if the control unit is faulty, a low-tone horn is given with a duration of 2s.
- if several sensors or circuits are faulty, the system indicates it by sequentially listing faulty sensor numbers.

After malfunction alarm, the system switches off.

3. Audible hindrance alarm.

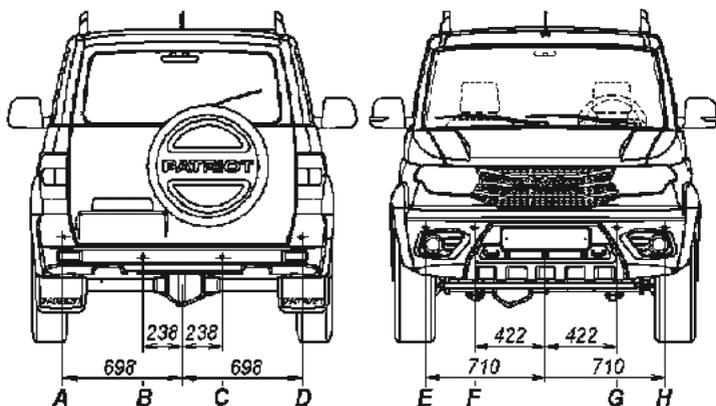


Fig. 3.16. DPS sensor layout:
 A, B, C, D — rear sensors;
 E, F, G, H — front sensors

When a motor vehicle approaches a hindrance, an intermittent acoustic tone signal is given with tone frequency of 1-3 kHz.

The interval time between tone "sendings" reduces as the distance to the hindrance reduces, up to continuous horn at a distance of 60 + 5 cm and less.

WARNING! *Unauthorized modifications to the DPS circuit diagram and design are strictly prohibited.*

When operating, keep the parking system sensors (PSS) clean, do not subject them to mechanical impacts. PSS surface should be cleaned of contaminations using a soft cloth moistened with a mild soap solution. When removing contaminations from the PSS surface avoid applying pressure to its central part in order to prevent damages.

DPS may not give a horn for a hindrance from behind in the following cases:

- hindrance is located at a distance of less than 0.1 m;
- hindrance is a sharp or thin object (ropes, chains), posts with diameter of max. 10 cm;
- hindrance surface of absorbent material ultrasound (snow, clothes or other porous materials);
- hindrance has smooth round shape or is smooth inclined surface (heavy inclination);
- the system's sensors are covered with snow, ice or dirt;

- the motor vehicle moves in reverse with speed of over 5 km/h;
- system's elements or electric circuits are faulty.

DPS may give a faulty horn of hindrance from behind in the following cases:

- when installing optional equipment or changing motor vehicle bumper installation height;
- with increased noise sources within the DPS range of action;
- chattering drive (unmetalled road, irregularities, sloped roads, tall grass);
- under conditions of heavy rain and plenty of spatters;
- when hauling a trailer;
- contaminated system sensors (snow, ice or dirt);
- when the rear bodywork is overloaded
- malfunctions of system's elements or electrical circuits.

Defensive parking system's elements belong to non-repairable items.

"AUTOCRUISE" AND "OVERSPEED LIMITER" SYSTEM

"Autocruise" (AC) and "Overspeed limiter" (OSL) system OSL is designed to maintain the set vehicle speed automatically without

the driver pressing the accelerator pedal and for automatic limitation of the permissible vehicle speed, set by the driver.

The AC and OSL system includes the following devices:

- electronic engine control unit (ECU). Includes AC and OSL function algorithm to control engine torque;
- cluster (CL). Displays the current state of AC and OSL functions;
- network gateway. Receives sending through the LIN bus and transmits message on the steering system keys unit to the controller area network;
- current collector. Transmits signals from the steering system keys unit to the network gateway through the LIN bus;
- steering system keys unit, Fig. 3.17. Serves to control AC and OSL functions;
- hydromodulator ESP9. Transmits motor vehicle speed and longitudinal acceleration signals to the controller area network.

VEHICLE INTERIOR AND BODY EQUIPMENT

Interior heating, ventilation and conditioning

The vehicle is equipped with heating-and-ventilating unit and climate control unit produced by Sanden. The units are controlled by control board 5 (Fig. 3.1, 3.2).

Control panel (Fig. 3.12) is meant for maintaining of temperature in the interior set by the driver and performs the following functions:

- Motoreducer control of the heatr flaps;
- Ensuring the ability to operate the unit in "Manual" mode;
- Ensuring the ability to operate the unit in "AUTO" mode;
- Ensuring the ability to operate the unit in "Intensive windscreen heating" mode;
- Ensuring the ability to operate the unit in "Interior preheating" mode;
- Unit fan control capacity;
- Motoreducer control of the recirculation flap.

When actuating the tail lamps, all markings on the switches of the control panel are illuminated with green light. The same happens when the ignition is turned on or off.

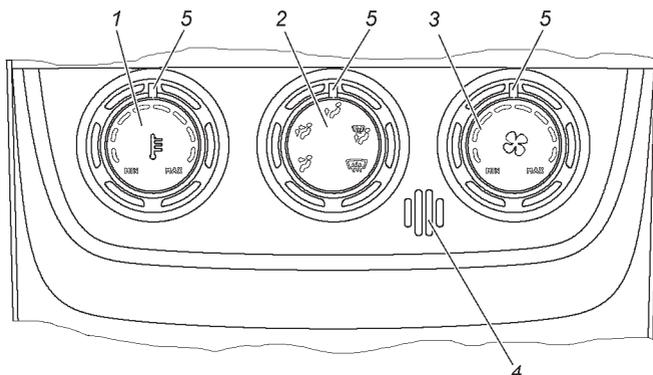


Fig. 3.12. Heater control panel:

1 — rotary switch for adjusting the temperature of the air incoming to the interior (in "Manual" mode) / setting of the interior air temperature (in "AUTO" mode) with a built-in indication system; 2- rotary switch for distribution of air currents (controls the motoreducer of the front and rear heater flaps) with a built-in indication system; 3 — rotary switch for controlling the fan speed of the climate control unit with a built-in indication system; 4 — interior temperature sensor; 5 — rotary switch marker

In addition, rotary switch 2 has yellow illumination, which indicates malfunctions in heating-and-ventilating unit and climate control unit control system (this function is activated only when the control panel is scanned with certifier via diagnostic K-Line channel) detected by the control panel. It also indicates "Interior preheating" mode.

"Interior preheating" operation mode is indicated with blinking yellow illumination on rotary switch 2. The blinking period of the illumination is 4.5 seconds:

- turned on 1.5 sec / turned off for 3 sec, when the tail lamps are turned off;

- yellow illumination turned on 1.5 sec / green illumination turned on 3 sec, when the tail lamps are turned on.

If the control panel has malfunctions, they are indicated with switching on/off yellow illumination on rotary switch 2. Malfunctions are indicated only when the control panel is scanned with certifier via diagnostic K-Line channel.

The control panel is turned on automatically when the motor vehicle ignition is started or via signal of the pre-start liquid heater control unit. Pre-start liquid heater control unit transmits a signal (power) for turning-on of the control panel when the heater is switched on and the temperature of the cooling fluid in the heat exchanger reaches a point when a ventilator of the heating-and-ventilating unit is turned on. When the control panel is turned on, it automatically determines the generator of the signal (ignition starter switch or pre-start liquid heater control unit) and scans control elements of the climate control unit.

If the source of power is an on-board network of the motor vehicle (when the ignition starter switch is switched on), then the control panel switches into the main operation mode ("Manual", "Auto" or "Intensive windscreen heating", depending on the condition of the corresponding switches), in which it generates and transmits control signals to all actuating elements. These signals correspond to control elements of the climate control unit.

If the source of power is the pre-start liquid heater, then the control panel switches into the "Interior preheating" operation mode.

Control elements

Handle 1 (Fig. 3.12) controls the motoreducer of the choke flap which helps to control air temperature at the climate control unit output ("Manual" mode / controls the interior air temperature ("AUTO" mode)). The current position of the switch is shown by marker 5 on the moving part of the handle.

When the "Manual" operation mode is switched on, turning right (clockwise) increases the air temperature at the climate control unit output. When turning left (counter-clockwise), the temperature at the climate control unit output decreases.

The switch has nine fixed positions: temperature minimum value, temperature maximum value and seven intermediate values between them.

In positions from 5 to 9, an additional electric pump of the heater is switched on if there is no signal from the A/C switch to turn on the A/C.

In "AUTO" mode, the switch controls the air temperature, which is automatically maintained in the motor vehicle interior.

Handle 2 (Fig. 3.12) controls the distribution of air currents (controls the motoreducer of the front and rear heater flaps). Current position of the switch is shown by marker 5 on the moving part of the handle.

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



— windscreen air cooling;



— windscreen and feet air cooling;



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



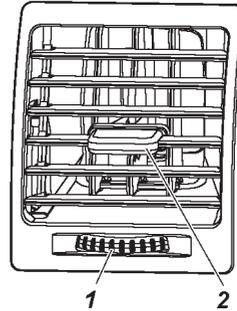
— feet air cooling;



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

Direction of the air current can be changed via small levers 2 (Fig. 3.13) on the deflectors.

Fig. 3.13. Deflector:
 1 — flap control lever; 2 — air currents control lever



WARNING! *Low air cooling of the windscreen is allowed when the interior or foot air cooling mode is switched on.*

When the interior heater is switched to any air cooling mode, the presence of small air currents is allowed in directions different from the selected mode, pictured on handle pictograph 2 (Fig. 3.13.).

Handle 3 (Fig. 3.13) controls the fan speed of the climate control unit. Current position of the switch is shown by marker 5 on the moving part of the handle.

The switch has nine fixed positions: "Fan is turned off" (leftmost position), maximum fan rotation speed (rightmost position) and seven intermediate fixed positions between them.

For accelerating of stationary motor vehicle interior heating, recirculation mode can be turned on . When in motion, recirculation mode should be turned off to avoid window fogging.

On motor vehicles with additional interior heater, heating rate of the rear triple passenger seat can be increased. In order to do this, turn on the electric motor fan, additional heater valve with electric drive 13 (Fig. 3.14) using the switch 5 (Fig. 3.7) positioned at the rear panel of the floor container.

Direction of air currents is adjusted by two deflectors.

Heating and ventilation system is equipped with an air-intake filter. The filter should be changed after 15000 km mileage or once per year, depending on what comes first.

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

Changing of filtering element 5 (Fig. 3.15) should be performed as follows:

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

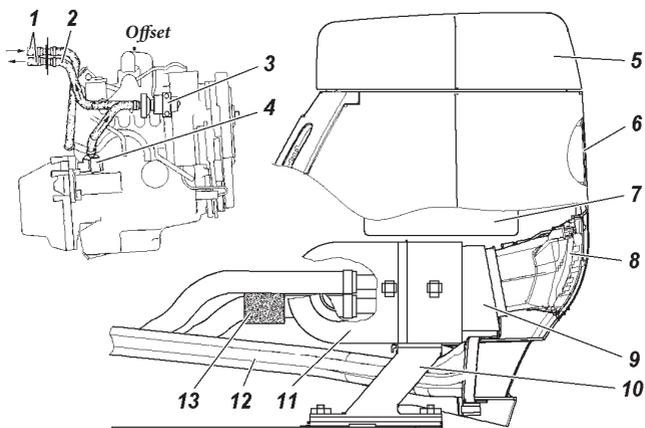


Fig. 3.14. Additional heater:

1 — heater tubes; 2 — a hose for supplying the cooling fluid to the heater; 3 — electric motor with a pump (for ZMZ-40905 engine); 4 — fitting; 5 — lid of the compartment in the floor tunnel lining; 6 — switch unit (Fig. 3.7); 7 — case of the tunnel lining glove compartment; 8 — deflector (control elements on Fig. 3.13); 9 — deflector sealing; 10 — support; 11 — enclosed radiator and electric fan of the additional heater; 12+ — air conduit for heating the rear passenger feet space; 13 — valve with electric drive.

WARNING! *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.*

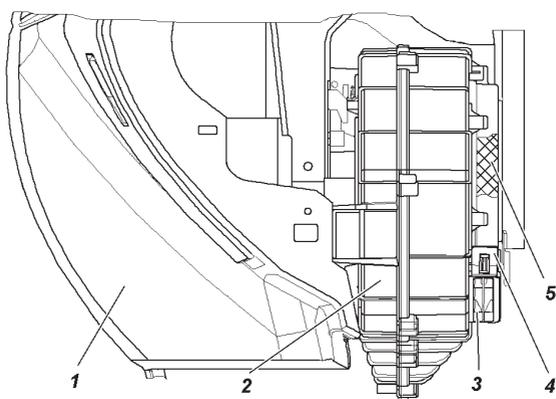


Fig. 3.15. Fan:

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

Interior ventilation

Blowing ventilation of the interior is performed via the same channels, when the handle 1 (Fig. 3.12) is arranged at maximum counter clockwise position. Drawing ventilation is performed via air holes in the rear roof liner and inner panel of the tail gate apertures, via ventilation grille with valves and rolled down door window.

Control panel operation mode (Fig. 3.12)

"Manual" operation mode is the main mode of the control panel.

When this mode is switched on, the control panel scans the condition of the control elements (rotary switches 1, 2 and 3) and, depending on their positions, works in accordance with the prescribed operation algorithm, determines the condition of the recirculation flap, A/C switch, position of the rotary switches. In accordance with this data, the control panel generates and transmits control signals for:

- speed control unit of the heater fan;
- switching the air conditioner on/off;
- motoreducer of the recirculation flap;
- motoreducer of the air current distribution flap and choke flap;

Besides its own control elements, the control panel interacts with a number of external switches, namely: "AUTO" mode switch, "Intensive windscreen heating" mode switch, recirculation flap control switch, A/C switch.

"Intensive windscreen heating" mode is turned on by a switch , transmitting a signal to the control panel. The control panel generates and transmits the control signals necessary for switching the heating-and-ventilating unit and climate control unit into this mode to the actuating elements.

In this mode, the control panel changes the position of the air distribution flap to "To the window" position, air damper to position, which corresponds to the 8th switch position 1 (Fig. 3.12). However, rotation speed of the climate control unit fan corresponds with 8th positions of the switch 3. In this mode, the control panel does not react to changes in positions of the rotary switches.

If the control panel in "Intensive windscreen heating" mode receives a signal to switch on a conditioner, then the conditioner will be switched on and the system will perform the drying of the climate control unit.

"AUTO" mode is turned on by switch "AUTO"

In this mode, the control panel controls the air damper so that it is set by the rotary switch 1 (Fig. 3.12), temperature is automatically maintained if the fan rotation speed of the climate control unit is manually set (by rotary switch 3) and the distribution of the air currents is manually operated (rotary switch 2).

The air temperature automatically maintained in the motor vehicle interior can vary from +16 to +28°C. Moreover, the values indicated in the table 3.1 are also available.

If "AUTO" mode is switched on and the position of rotary switch 1 is changed, then the interior air temperature is set in accordance with the new value.

Switching off "AUTO" mode occurs after pressing the "AUTO" switch a second time or after switching on the "Intensive windscreen heating" mode.

Table 3.1.

Position of switch 1	1	2	3	4	5	6	7	8	9
Temperature, °C(±2°C)	16	18	20	21	22	23	24	26	28

"Interior preheating"+ mode.

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

When this mode is turned on (the ignition is turned off), the control board indicates this mode with orange blinking illumination on rotary switch 2 with a 4.5 second blinking period (1.5 seconds turned on/ 3 seconds turned 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. 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 in the above described positions, the control panel changes the positions of the flaps to "Ventilation of the interior and at the feet" position. The control panel remains in the current operation mode with current flap positions until the liquid pre-start heater is turned off or ignition is turned on.

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

Air conditioner

Depending on the configuration, the motor vehicle can be equipped with "Sanden" air conditioner.

The air conditioner is switched on by a button .

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, then it turns off regardless of the A/C switch position.

If an additional electric pump of the heater is turn on and the control panel receives a signal to switch on the air conditioner, then the control panel should simultaneously turn on the air conditioner and turn off the additional electric pump of the heater.

If the A/C switch transmits a signal to turn off the air conditioner, then the control panel turns on electric pump of the additional heater, if switch handle 1 is in "ON" 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.

WARNING! *Turn on the air conditioner even during cold seasons at least one to two times per month for 5-10 minutes. It provides the required compressor lubrication and extends the service life of the system.*

WARNING! *In order to prevent the engine from overheating, when the air conditioner continuously works at idle engine run and when moving in severe conditions with the engine load near to full, the air conditioner compressor can often be shut off together with a loss of cooling efficiency. In order to improve the air conditioner efficiency in the given conditions, it is recommended that the rotation speed of the climate control unit fan be raised at the flick of switch 3 (Fig. 3.12) and a minimum air temperature be set at the flick of switch 1.*

Lighting lamps

Interior lighting is performed by pilot lamps 3 (Fig. 3.16) and rear interior light 4.

The **pilot lamps unit** includes sections of individual interior lighting. Left and right sections of individual lighting switches on by pressing the corresponding left 1 (Fig. 3.17) or right 3 switch.

Operation mode of the interior ambient lighting depends on switch 2 position:

 — the lamp switches on and off automatically, when opening or closing the door. The interior lamp is on if any of the motor vehicle doors are open. After closing all the doors, the lamp lights for 25 seconds (depending on the configuration), and then smoothly goes off for 2 seconds.

 — the lamp is on until it is switched off.

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

Lamp of the luggage compartment turns on (Fig. 9.53) when opening the tail gate.

The control of the interior lighting units ("polite" light) with a smooth change of brightness for 2 seconds when turning on and off the interior lighting lamps is enabled:

- when opening any of the side 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 turning on the ignition, after all the doors are closed while the lamp is still in "on" position;
- 25 seconds after all the side doors are closed, if during this period the ignition wasn't turned on, any of the side doors were not open, the "Security" mode was not switched on via a radio channel of the remote control panel;
- in 10 minutes when one or more side doors are constantly open (if during this period all the side doors were not closed, the tail gate was not opened or closed, the ignition was not turned 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 turned on, the interior lighting is on only if at least one side door is open.

Interior rearview mirror (Fig. 3.16)

Interior mirror is adjusted by pivoting around its joint.

WARNING! *In order to avoid blinding by headlights of vehicles traveling behind during night driving conditions, it is necessary to change the tilt angle of the mirror with a lever positioned below the mirror.*

Exterior rearview mirrors

Selection of the best position for the exterior mirror is performed with switch 9 (Fig. 3.9). Rearview mirror heating is activated by switch  or , 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 by pressing them toward the rear part of the motor vehicle.

Sun visors (Fig. 3.16)

In case of necessity it is recommended that the sun visors be positioned in either of the two positions: flip the sun visor into its downward position or flip it down and turn toward the side door.

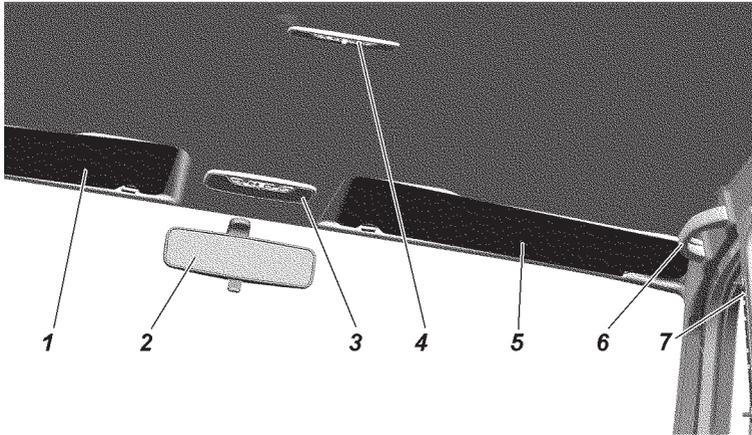


Fig. 3.16. Lighting lamps, interior rearview mirror, sun visors and hand grip:
 1,5 — sun visors; 2 — interior rearview mirror; 3 — a unit of pilot lamps;
 4 — rear interior lighting lamp; 6 — hand grip; 7 — seat belt height adjuster

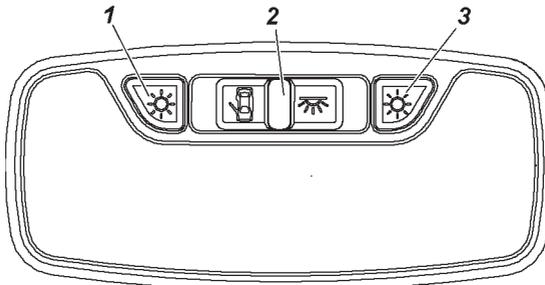


Fig. 3.17 Interior space lighting unit:
 1 — left section switch; 2 — general lighting mode switch; 3 — right section switch

Doors

WARNING! *Before opening a door, make sure it will not be a hindrance for other road users.*

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

Driver's door is locked with a key from outside. If it isn't locked, the door opens when pulling moving part 2 (Fig. 3.18, 3.19) of the door handle.

The door opens from inside when turning handle 2 (Fig. 3.20,3.21) toward you.

The doors are locked by pressing button 1 (Fig. 3.20, 3.21).

The tail gate is not equipped with an inside handle which opens it or a button which blocks the lock.

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

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

The locks in the rear doors and the tail gate have interior handle blocking levers ("child lock") which prevent the doors from opening from inside the motor vehicle. The handle is locked by turning lever 1 downward (Fig. 3.19), 6 (Fig. 3.21).

The windows of the side doors go up and down by turning the switches of the power windows 3, 4, 5, 6 (Fig. 3.9 for UAZ Patriot, UAZ Pickup) or 1, 2 (Fig. 3.22 for UAZ Cargo).

WARNING! *When closing the power windows, fingers or other body parts may be caught, which could lead to 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*

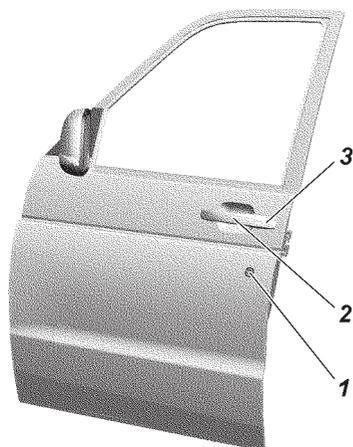


Fig. 3.18. Front door (view from outside):

1 — door lock switch; 2 — movable part of the door handle; 3 — door handle body

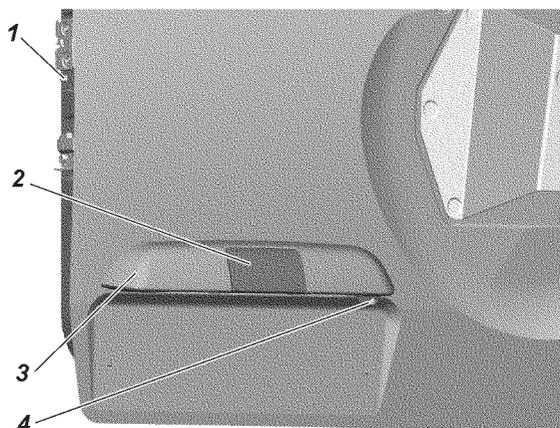


Fig. 3.19 Tail gate (view from outside):
 1 — lever for blocking a door interior handle; 2 — door handle; 3 — pad housing of license plate lamp 4 + — rear view camera

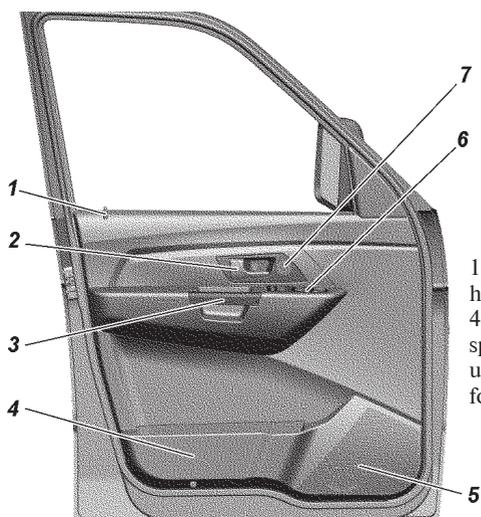
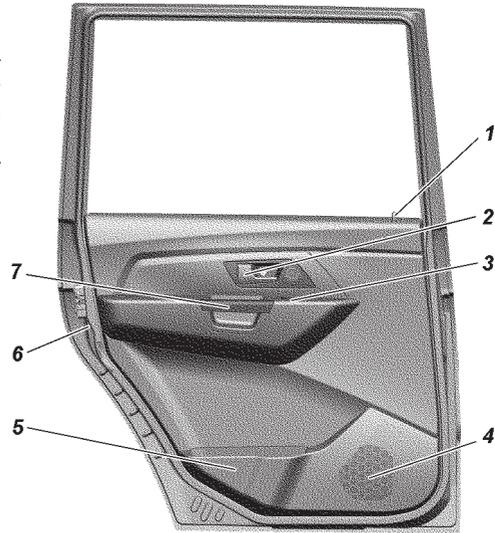


Fig. 3.20. Front door (view from the interior):
 1 — locking button; 2 — door handle; 3 — armrest handle; 4 — pocket; 5 — place for loud-speaker mounting; 6 — switch unit (Fig. 3.9, 3.23); 7 + — place for twitter mounting

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. When there are children in the motor vehicle, it is recommended that the power windows be turned off using switch 1 (Fig. 3.9).

Fig. 3.21. Rear door (view from the interior):
 1 — locking button; 2 — door handle
 3 — power window control switch; 4 — place for loud-speaker mounting;
 5 — pocket; 6 — lever for locking door interior handle;
 7 — armrest handle



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.

Keep children away from the switches of the power windows! 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

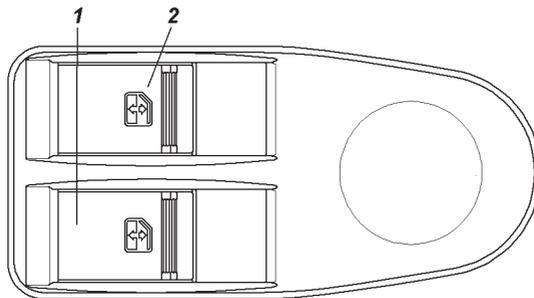


Fig. 3.22. Driver switch pack:

1 — window control switch of the right front door; 2 — window control switch of the driver's door

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 produce beeping sounds when the driver's door is open. Never close the motor vehicle from 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

WARNING! *Do not adjust the driver's seat when the motor vehicle is moving.*

The driver's seat and tilt angle of the steering column should be adjusted so as to provide the necessary position of the driver: the driver should tightly bear against 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.

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, then 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 that the switches of the heating system be turned on only when the engine is started. It significantly saves the accumulator battery capacity.

If the voltage drops in the electrical on-board system of the motor vehicle, the seat heating is automatically switched off to provide sufficient power for the engine control system.

If you or a passenger suffer from low pain or temperature threshold, e.g. as a result of drug treatment, paralysis or chronic

disease, it is recommended that you do not use the heater. It may result in burns on the back, buttocks and legs. If you still want to use the seat heating, it is recommend that you turn on the heating for short periods of time.

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.

Changing of the headrest height or its removal is performed by moving the headrest in a vertical direction:

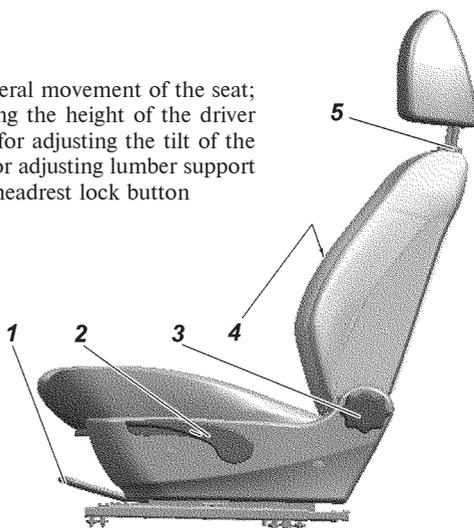
- up — by arm force (to the uppermost position);
- down — when the button of the headrest lock is switched on.

Removal is performed by moving the headrest upward from the uppermost position while pressing the button of the headrest lock.

Adjustment of the front seats in the longitudinal direction is performed by lever 1 (Fig. 3.23): Pull the lever located under the seat cushion which blocks the longitudinal movement of the seat and move the seat to the desired position. When the adjustment is finished, release the lever and make sure that the seat is securely fixed by moving it back and forth when the lever is released. Backrest angle is controlled (step-less adjustment) by turning handle 3 at the base of the backrest.

Fig. 3.23. 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



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

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

Lever 4 for adjustment of the lumbar support is located on the inner side surface of the backrest. Turning the lever forward or backward results in a corresponding change of the convex section 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.

Rear triple seat (Fig. 3.24) consists of pillows and backrests for one and two passengers.

In order to increase the space of the luggage compartment, the rear seat can be folded down and every part of the seat can be unfolded separately. Unfolding of the rear seat is performed as follows:

- pull the loop 1 (Fig. 3.24) and set the pillow to the upright positions;

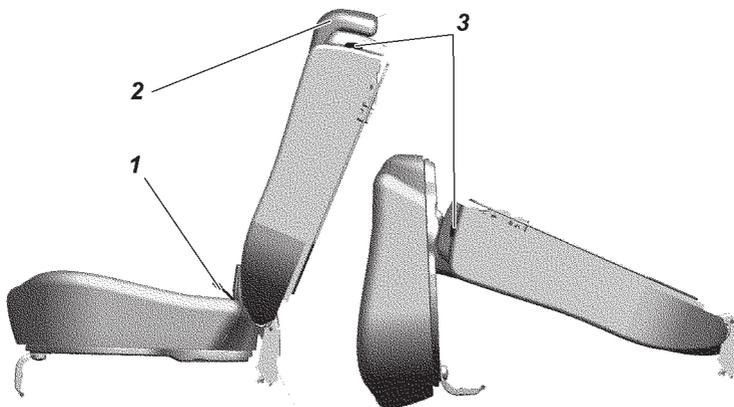


Fig. 3.24. Rear three-seater seat:
1 — releasing and raising loop of the rear seat cushion; 2 — seat squab headrest 3 — rear seat squab release lever

- remove headrest 2;
- pull lever 3 in the direction of movement of the motor vehicle, release and fold the backrest as shown in the diagram, Fig. 3.24;
- to return the backrest to its initial position, raise the backrest until the headrest lock is activated;
- to return the pillow to its initial position, turn it back to the horizontal position (for UAZ Pickup until the lock is activated);
- mount the headrests.

Change the position of the rear seat with the rear doors open.

WARNING! *When returning the seat to its initial position, make sure that it is securely fixed to avoid the folding of the seat during the movement of the motor vehicle.*

WARNING! *When folding the two-seat section of the rear triple seat, make sure the center seat belt is not fastened.*

WARNING! *Mounting of the "universal" child restraint system, according with the Table 3.2, is performed with the seat belts of the vehicle. Children under 1.5 years of age should sit in the child restraint device only facing backwards.*

WARNING! *Installation of the ISOFIX child restraint system should be carried out in accordance with the table 3.3 — "Mounting points for the ISOFIX child restraint system on the motor vehicle".*

Table 3.2.

Weight group	Seats		
	Front seat passenger's	Rear side seat	Rear middle seat
0–10 kg (0–9 months)	X*	U*	X
0+ — 13 kg (0–2 years)	X	U	X
I — 9–18 kg (9 months–4 years)	U	U	X
II and III — 15–36 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.

Table 3.3

Weight category	Dimension class	Clamping device	Position of ISOFIX in vehicle	
			Second row	
			left	right
	F (Transverse cradle)	ISO/L1	IL	X
0 — up to 10 kg	G (Transverse cradle)	ISO/L2	X	IL
	E (Rear-facing seat)	ISO/R1	IL	IL
	E (Rear-facing seat)	ISO/R1	IL	IL
0+ — up to 13 kg	D (Rear-facing seat)	ISO/R2	IL	IL
	C (Rear-facing seat)	ISO/R3	IL	IL
	D (Rear-facing seat)	ISO/R2	IL	IL
	C (Rear-facing seat)	ISO/R3	IL	IL
I — 9–18 kg	B (Front-facing seat)	ISO/F2	IUF	IUF
	B1 (Front-facing seat)	ISO/F2X	IUF	IUF
	A (Front-facing seat)	ISO/F3	IUF	IUF

IUF — a place suitable for setting a front facing child seat which is "universal" for the given category of child seats with ISOFIX fasteners;

IL — a place suitable for setting a "universal" child seat with ISOFIX fasteners;

X — position SOFIX not suitable for child seat systems ISOFIX.

Seat belts

REMEMBER! *Seat belts are an efficient means of protection of the driver and the passengers against the drastic consequences of road traffic accidents. **The use of seat belts is required!***

WARNING! *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 must be performed only in the authorized service shops of UAZ PJSC (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.

All motor vehicle seats are equipped with three-point seat belts (Fig. 3.25) with retraction mechanisms. To fasten the seat belt, pull belt tongue 3 without twisting the straps and insert it into lock 4 until it clicks. Press the red button of the lock to unfasten the belt.

The center seat belt of the UAZ Pickup is a static lap belt.

The seat belt height adjuster has three fixed positions.

The position of the upper mounting point of the seat belt is adjusted by moving belt guide support 2 up or down. To do it, pull on the support when pressing the decorative screw cap with your thumb and then move the guide support. Also, in order to increase the height, pulling up the guide support is enough.

Keep the belt straps and buckles clean. If they become dirty, clean them with an 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.

It is forbidden to:

- twist the straps, fold them lengthwise and allow excessive slack;
- iron the straps;
- strap in a child sitting on the lap of a passenger;
- make changes in the belt design.

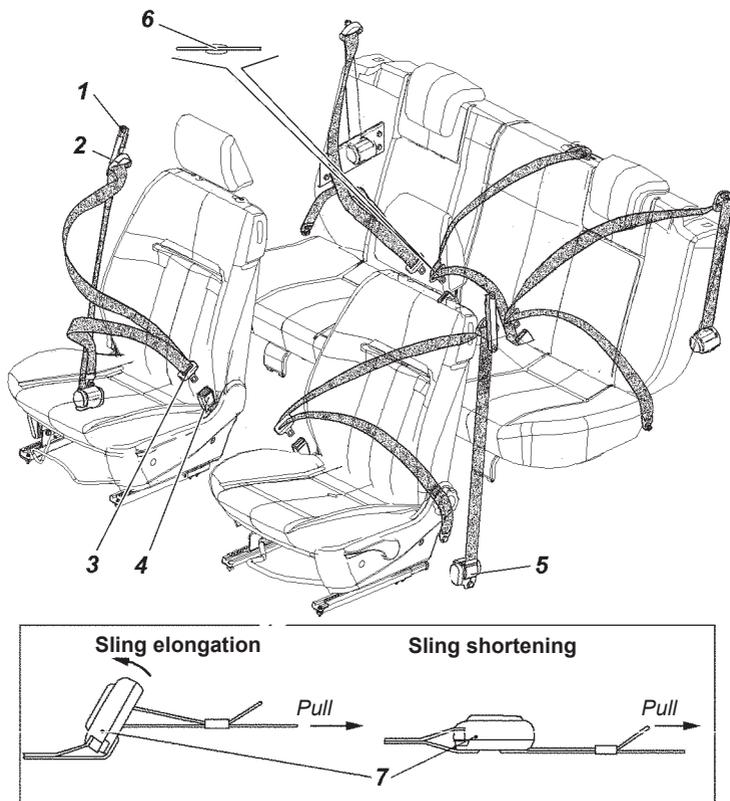


Fig. 3.25. Seat belts:

1 — seat belt height adjuster; 2 — seat belt guide bracket; 3 — lock catch; 4 — lock; 5 — inertia reel; 6 — clip; 7 — adjuster for static middle belt (UAZ Pickup)

WARNING! *When the motor vehicle moves, the seat backrest angle should be minimal, but sufficient for the convenience of the driver and passengers. The seat belts are more effective when the driver and passengers sit up straight, resting on the backrest. If the seat backrest is inclined too much, the seat belt may slip, increasing the risk of getting injured in an accident.*

WARNING! *Control the condition of plastic restriction clip 6 (Fig. 3.25) of the center seat belt.*

Unfastened seat belt signal device.

If the seat belt of the driver is not fastened when the ignition is turned on, the seat belt signal device  on the instrument cluster turns on. The signal device turns off when the ignition is turned off or the strap is inserted to the retractable seat belt.

If the motor vehicle moves more than 60 seconds or 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:

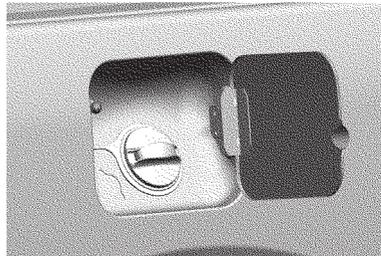
- the signal device goes off if the retractable seat belt buckle is defective;
- the signal device remains illuminated if the wiring harness or the instrument cluster is defective.

Fuel tank plug

Open the fuel filler door (Fig. 3.26) to access the fuel tank plug.

WARNING! *Fuel tank hatch cover has an opening angle restriction of 70°. Opening the cover to a larger angle will cause a deformation of the hinge movable link and when closing the cover of the fuel filler door the hinge will not butt up against the door bumper.*

Fig. 3.26. Fuel filler flap and choke plug



Hood

In order to open the hood, pull lever 21 (see Fig. 3.1, 3.2) between the hood and the radiator lining, push the clamp of hook 1 (Fig. 3.27) and lift the hood. Take out bonnet stay 3 from holder 2 by pushing it and insert it into a special opening above the right head light. Depending on the configuration, the motor vehicle may be equipped with air springs for the hood which facilitate lifting of the hood and keep it open.

The hood closing must be performed from a height not more than 200 mm above the radiator lining. If the motor vehicle is equipped with air springs for the hood, the latter should close by inertia after overcoming the force of the air springs.

WARNING! *Before closing the hood, make sure it will not entrap anything and the bonnet stay is securely fixed in the holder. When closing the hood, check that the lock works properly.*

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

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.

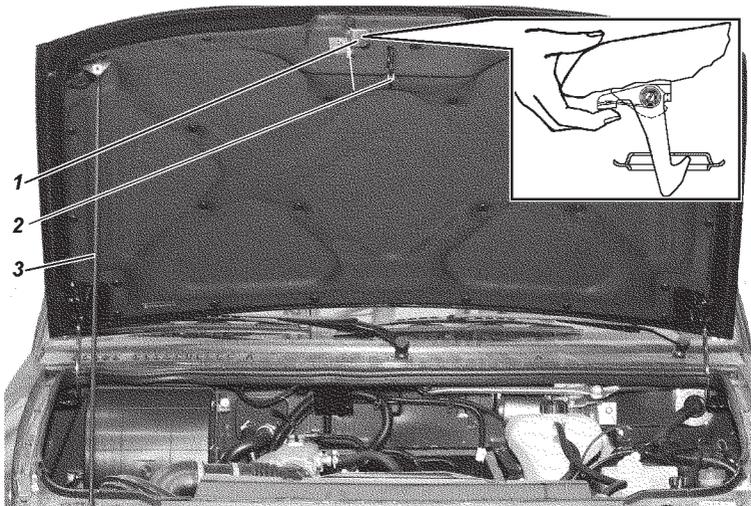


Fig. 3.27. Hood: 1 — locking hook; 2 — support; 3 — rest

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 the windshield wipers work properly and their parts are securely fixed. Periodically clean the windshield and rubber edges of the wiper blades 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 windshield wipers perform the following steps:

- 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. 3.28) 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.

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.

WARNING! *When switching on the washer of the tail gate door, there may be water feed delay up to 2,5 sec.*

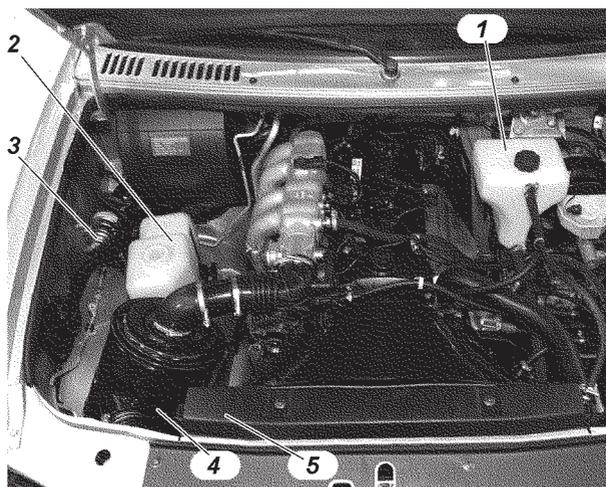


Fig. 3.28. Underhood space (fragment):

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

Luggage compartment

Luggage compartment has a pullout cover to protect the luggage.

WARNING! *Avoid placing objects on the cover.*

WARNING! *No passengers are allowed in the luggage compartment during driving.*

WARNING! *Tail gate door only opens from the outside.*

Chapter 4. MOTOR VEHICLE PREPARATION UPON RECEIPT FROM THE MANUFACTURER

Dealers must sell the motor vehicle only after pre-purchase preparations, specified in the service book.

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. MOTOR VEHICLE RUNNING-IN

Long-term and fail-safe service life of the motor vehicle depends to a greater extent on the run-in of the parts during the initial service period.

The running-in kilometrage equals to 2500 km.

During the running-in period, observe the following rules:

1. Crankshaft rpm of engine must not exceed the 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 the trailer.
5. Do not change the oils filled in the engine and units at the manufacturing plant.
6. Check and adjust the tension of the auxiliary unit drive belts if necessary, as they reach the maximum stretch during the running-in period.
7. Check the temperature of brake drums and discs and in case of raising the temperature, adjust the parking brake actuator or brake pedal free play.
8. Check the temperature of wheel hubs and in case of raising the temperature, loosen the tightness of bearing.
9. Check condition of all attachments and connections of pipes; eliminate leakages of oils, fuel, coolant and hydraulic fluid, if you find it.
10. The scope and period of the motor vehicle maintenance are specified in the service book.

Chapter 6. STARTING AND SHUTTING DOWN THE ENGINE

GENERAL REQUIREMENTS

WARNING! *It is strictly forbidden to start and warm up the engine indoors without good ventilation in order to avoid carbon monoxide poisoning.*

It is forbidden to start the gasoline engine with improperly installed high-voltage wires from the ignition coils to the spark plugs or low-voltage wires to the ignition coils. It can cause failure of the flywheel ring gear teeth and destruction of the starter.

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.

Shift the gearshift 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 (Fig. 3.4).

Switch on the starter for a maximum of 5 seconds. As soon as the engine starts, immediately release the ignition key, it will automatically return to "I" position. Warm up the engine.

It is forbidden to increase a crankshaft speed for acceleration of the engine warming-up process.

Do not drive a motor vehicle with a cold engine.

The temperature of coolant must be not less than 60°C for the warmed up engine of ZMZ-40906 family.

ZMZ-40906 ENGINE STARTING

Starting a cold engine at -20°C and above*

1. Turn on the ignition. It should activate the electric fuel pump, which can be heard when the engine turned off.
2. If the engine turns on after prolonged stop, it is recommended to wait until the electric fuel pump is switched off (about 5 seconds).

3. The system functions correctly if a malfunction indicator lamp (on the instrument cluster) switches on and off. If the malfunction indicator lamp continues to glow, it is required to detect and remove the malfunction (refer to "Diagnostics").

WARNING! *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 15 — 20 seconds after the first attempt.

When starting the engine, it is not recommended to press the throttle pedal.

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

If the engine does not start after the third attempt, stop the ignition, detect and remove the malfunction.

Starting a cold engine at temperature below -20°C.*

In order to ease the starting of cold engine at low temperature, preliminary warm up is required (by steam, hot air, etc.).

The following sequence of operations is the same as in case of starting from cold at -20°C and above.

Starting a hot engine

The sequence of operations is the same as in case of starting from cold at -20°C and above.

If the engine does not start after the third attempt, press the throttle pedal as far as it can go and turn on the starter for 2-3 seconds. The control unit will perform "Scavenging of the engine cylinders mode" function and then retry to start the engine.

Shutting down the engine

In order to shut down the engine, turn the ignition key to the "0" position. Before shutting down the engine, let it run for 1-2 minutes at low crankshaft speed.

*If the motor vehicle is equipped with the starting pre-heater, it is recommended to use it at -10°C and below

ZMZ-51432 ENGINE STARTING

Fuel and oil should correspond to the season.

If necessary, release the air from the feed system, as suggested in the "Engine" section.

Warning! Do not press the throttle pedal during the starting of the engine!

Do not drive the motor vehicle right after the starting of a cold engine. After starting the engine, it should operate at minimum idle speed for 1-2 minutes in order to put the turbocharger and engine systems into working order. After this procedure, the engine is ready for service.

Do not overload the engine when starting it cold. The optimal service conditions of the engine are when the temperature of the coolant is +60–95°C.

Starting a cold engine

1. Turn on the ignition.
2. If one of the temperature sensors (coolant, air or fuel sensors) detects a temperature below +10°C, then the heating plugs indicator starts to glow when turning on the ignition . The duration of pre-start warming up process with heating plugs depends on the temperature conditions and state of the battery charge.
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).

After starting the engine, heating plugs signal device stops to glow, and the plugs continue to warm up the engine for some time.

Try to start the engine not earlier than 15 — 20 seconds after the first attempt.

If the engine does not start after the third attempt, stop the ignition, detect and remove the malfunction.

Starting a hot engine

If all the temperature sensors detect a temperature above +10°C, then the heating plugs signal device starts to glow for about 2 seconds and switches off when turning on the ignition. The engine is ready for starting .

Shutting down the engine

In order to shut down the engine, turn the ignition key to the "0" position.

Before shutting down the engine, operation at low crankshaft speed for 3-5 minutes is required.

Chapter 7. VEHICLE DRIVING IN DIFFERENT ROAD, WEATHER AND CLIMATIC CONDITIONS

The operation and service life of the motor vehicle depends to a great extent on the features of its driving. When driven correctly, the motor vehicle may run at a high middle speed and consume not much fuel when overcoming difficult road sections. **It is recommended to put in the second gear when driving away from rest on a level section of a hard-surface road. In all the other cases, put in the first gear when driving away from rest. Disengage the clutch when putting in the gears and engaging the front axle:**

- 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 keep the clutch disengaged on a stationary motor vehicle (waiting at a highway crossing, traffic light, etc.) when the gear is put in and the engine starts. It is recommended to use the neutral gear of the gearbox and the fully engaged clutch;
- 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.

Put in the gears smoothly and without jerks. If it is impossible to put in the right gear when driving away from rest, then slightly release the clutch pedal and try to disengage the clutch and put in a gear again.

Use 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 throttle pedal completely when braking with the engine.

Brake the motor vehicle smoothly by gradually pressing the braking pedal. Any braking increases the wear of the tires and the fuel consumption. Avoid slipping of the wheels when braking, as it increases the braking path and wear of the tyres. In addition, sharp and hard braking could result in skidding of the motor vehicle.

When driving the motor vehicle on off-road surfaces (sand, mud, snow etc.), slippery roads, steep inclines (more than 15°) and on other heavy road sections, do not overload the engine. In these conditions, engage the front axle in advance and use the reduction gear of the transfer case when driving through particularly difficult road sections. Engage and disengage the front axle in motion, and use the reduction gear of the transfer case only after bringing the motor vehicle to a complete stop.

Overcoming steep inclines and descents. When driving on roads with steep inclines and descents, the driver should be very careful and have quick reflexes. Determine in advance the uphill gradient and shift to the required gear, which would provide a required rim pull without shifting the gear. In order to overcome a steep incline, use the reduction gear of the transfer case and the first gear of the gearbox. Overcome steep inclines without stops and turns to the extent possible. Overcome short steep inclines with convenient access and even road surface by speeding up without using the reduction gear of the transfer case and by shifting the gearbox to the second or third gear depending on the uphill gradient. If for some reason it is impossible to overcome the incline, take all precautions and slowly descend by shifting to the reverse gear. Descend gradually, do not speed up the motor vehicle and do not disengage the clutch. When overcoming steep descents, take measures to ensure a safe descent. Before overcoming a long descent (more than 50 m), determine its steepness, shift the gearbox and transfer case into the required gears to overcome it. Overcoming of such descents is performed by engine braking.

WARNING! *It is forbidden to overcome steep descents if the gears of the gearbox and transfer case are switched off or the clutch is disengaged.*

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

Overcome ditches, side ditches and trenches at low speed with the front axle engaged in the direction perpendicular to the decline with regard to the motor vehicle dimensions defining its cross-country capability. Do not overcome an obstacle in a rush, if an impact against the wheels is possible.

When overcoming ditches and trenches, consider the possibility of getting stuck due to wheel slips and vehicle cross-axling.

Driving along muddy country roads and graded clay and gumbo roads. When driving along clay and gumbo after heavy rain, the motor vehicle could slip off the road. Be careful when choosing the direction of motion. In order to prevent sideways skidding, choose relatively level ground while trying to move along the side-rut of the road if possible. It is very difficult to steer a motor vehicle on very wet graded roads with the steep grades and deep trenches. On these roads, drive carefully on the crest of the corrugation 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.

When the motor vehicle sharply accelerates or brakes, the wheels could lose the traction to the road which may result in a road accident. In order to reduce the speed, use the engine braking; press the brake pedal only when the speed is sufficiently reduced.

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

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

Overcome marsh-ridden sections by driving along a straight line without sharp turns and stops. Drive smoothly and without jerks. Move with engaged front axle and reduction gear of the transfer case, using the gear of the gearbox which would provide a required rim pull without slipping. In order to prevent the wheels from slipping and losing adhesion with the turf, turn smoothly with a great radius, do not reduce the speed. Do not drive along the track made by the motor vehicle moving ahead.

When overcoming sandy soils, drive smoothly without jerks and stops. Turn smoothly and with a great radius. Switch on the highest possible gear and engage the front axle, in order to overcome the sand drifts and short sand upgrades in a rush. Avoid the slipping of the wheels. Determine the road conditions preliminarily and switch on a required gear which would provide a required rim pull.

Overcome a ford with great care. The motor vehicle can overcome a ford of a 500 mm depth with a hard bottom at low speed. Before overcoming a ford, check its bottom. Make sure that there are no deep pits, big stones, swampy grounds, choose and check the ground where the motor vehicle will enter the water and go out of the water, switch off the fog lamps.

Overcome a ford slowly, without making waves in front of the motor vehicle, in the first or second gear of the gearbox, engaging the front axle and the reduction gear of the transfer case.

Avoid maneuvering and sharp turns.

After fording, as soon as possible but not later than on the same day, check oil in all units. Change oil in units where water is detected. There is some water in the oil if its color is changed. Lubricate all grease fittings of the chassis until the fresh grease appears. After every fording, partly engage the clutch and partly apply the brakes several times in order to dry the clutch facings and brake shoe linings.

If the engine stops when fording, try to restart the engine by means of the starter two to three times. If the engine does not start, the motor vehicle should be immediately removed from the water by all means. If some water is penetrated to the units of the vehicle after the removal, it is not recommended to drive the motor vehicle. Tow the motor vehicle to a service station.

The motor vehicle can move along **snowy surfaces** of a 350 mm depth. Steer the motor vehicle in the same manner as when moving on swampy grounds. When driving on friable snow, apply the same rules, as when driving on sand surfaces.

Chapter 8. VEHICLE TOWING

The front and rear parts of the frame (Fig. 8.1) are equipped with towing eyes for flexible towing. Before towing, turn on the ignition (position I, Fig. 3.4) and light alarm. When towing, check the tension of the rope. Tow the motor vehicle smoothly, without jerks.

The towing of a trailer is possible only if the vehicle is equipped with a ball-type tow hitch.

WARNING! Remember that when the engine turns off, the forces required for steering input and motor vehicle braking increase significantly.

Strictly follow the requirements listed in "The Highway Code" when towing.

If the brake or steering system is broken, it is forbidden to drive or tow the motor vehicle with a tow rope. In this case use the two wheel towing or tow truck service.

It is strictly forbidden to tow the motor vehicle using the ball-type tow hitch!

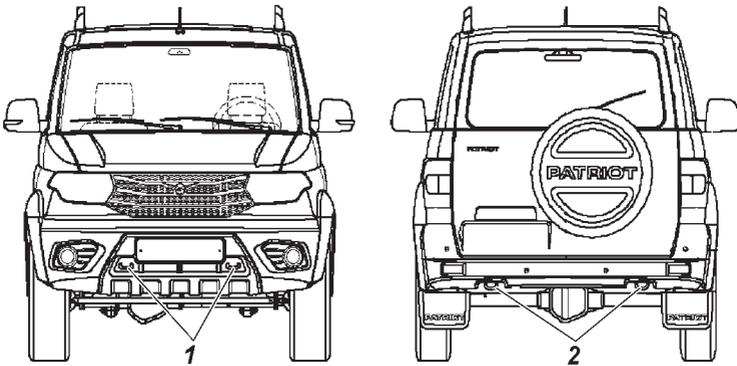


Fig. 8.1. Towing eyes:
1 — front eyes; 2 — rear eyes

Chapter 9. VEHICLE MAINTENANCE

The scope and period of the motor vehicle maintenance are specified in the service book.

The present manual contains the methods of 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. Visually check the motor vehicle configuration, the condition of the body, glasses, rear view mirrors, trim packages, license plates, painting, door locks, wheels and tires. Eliminate the detected defects.

Inspect the parking lot of the motor vehicle to make sure there are no fuel, oil, coolant or brake fluid leakages. Eliminate the detected leakages.

Check and replenish the coolant, oil in the crankcase, braking fluid and fuel to the required amount.

2. Check the functioning of the steering system, brake systems, lighting devices, light and sound alarms, windscreen wiper. Eliminate the detected defects.

3. Charge the windshield washer tank. Water is allowed for use in warm seasons.

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

5. Wash the motor vehicle after a trip if it was operated in dirty or dusty road conditions.

VEHICLE MAINTENANCE AFTER 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 operation

1. Remove the oil pump cover and check the condition of the oil pump drive gears.
2. Check the operation of the screen wiper and washer. Eliminate the defects.
3. Replace oils in the units with summer (all-season) grade oils specified in the lubrication schedule.

Prior to the winter season of operation

1. Check the density of fluid in the engine cooling system and set the required density (1.075 — 1.085 g/cm³ at 20°C), if necessary.
2. When filling the washer reservoir with the water, pour off the water.
3. Check the operation of the body heating and ventilation systems. Eliminate the defects.
4. Wash the fuel tanks prior to the winter season of operation (or after 30000 km).
5. Replace oils in the units with winter grade oils specified in the lubrication schedule.

ZMZ-40906 ENGINE

Engine suspension

During the use of the motor vehicle, check the tightening of threaded joints of the front and the rear engine suspensions (refer to Appendix 2) and condition of the supports. Delamination and breakage of the engine supports is not permitted.

Engine cylinder head

During the use of the engine, the cylinder head bolt tightening is not required. Perform the tightening only when the engine is cold, if necessary. In order to provide the tight and even contact of the cylinder head bolt with the gasket, perform the tightening in a sequence shown in Fig. 9.1, in two steps. Tighten the bolts evenly using the torque wrench (refer to Appendix 2).

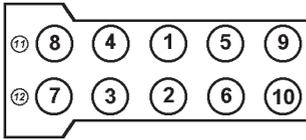


Fig. 9.1. Sequence of the cylinder head bolt tightening

Engine gas distribution mechanism

Camshaft drive is a two-stage chain. Chain tension is provided for by hydraulic tensioners.

WARNING! *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 valves are driven from the camshafts directly via the hydraulic pushers. Using the hydraulic pushers eliminates the need for clearances adjustment.

Engine lubrication system

The engine should be stopped immediately when a lubrication system malfunction is registered.

WARNING! *The manufacturing facility set-in reduced size engine oil filter is to be replaced at the first maintenance service (after 2500 km, total kilometres logged) on one of the filters: 2101C-1012005-HK-2, 2105C-1012005-HK-2 manufactured by 'KOLAN' company or 409.1012005, 406.1012005-02 manufactured by LLC 'BIG-Filter' company.*

Regularly check up oil in the crankcase and fill it up as required. Make the check before starting the engine. When checking the oil level after the engine stops, it is necessary to wait for at least 15 minutes to allow the oil to drain into the crankcase. The motor has been placed on a horizontal site. The oil level shall be between MIN and MAX oil level gauge marks 10 (Fig. 9.2). In case of frequent cross-country road trips, keep the oil level near the «MAX» mark, not exceeding it. The volume of oil to be added to the engine between MIN and MAX is 1 liter.

Engine oils of different grades and different manufacturers may **not be** mixed! If the engine oil of another grade or manufacturer is to be poured, you must flush the lubrication system with washing oil. The washing oil shall be selected in accordance with the recommendations of the manufacturer of the newly poured oil.

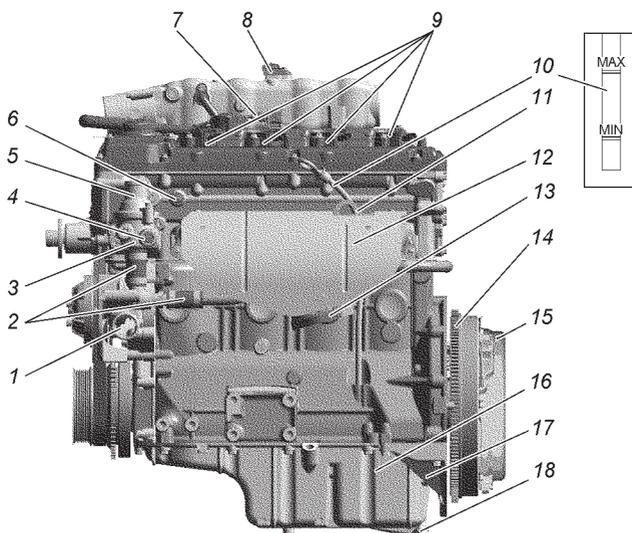


Fig. 9.2. Engine ZMZ-40906 (left side view):

1 — Coolant from radiator to water pump supply pipe; 2 — connection hoses; 3 — thermostat housing; 4 — control unit coolant temperature sensor; 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 charger booster; 18 — oil purge plug.

When changing the engine oil, replace the oil filter. Drain the used oil from the engine crankcase immediately after a journey while it is still hot. In this case, the oil pours out quickly and completely.

Remove the oil filter 10 (see Fig. 9.3) by turning it counter-clockwise. When installing a new filter, make sure that the rubber O-ring is in proper condition and lubricate it with engine oil, turn the filter until the O-ring touches the plane on the engine block and then tighten the filter with a 3/4 turn. Make sure no oil leak exists.

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 each two oil changes. For that purpose, drain the used oil, fill in special flushing oil (VNIINP-FD) 3-5 mm over the "MIN"

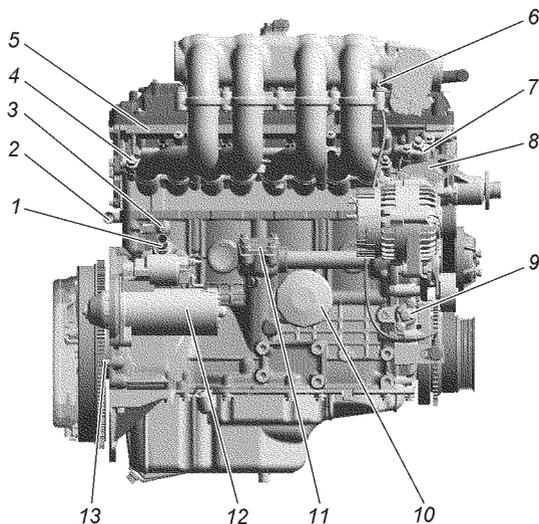


Fig. 9.3. Engine ZMZ-40906 (right side view):

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 — Starter; 13 — gear installation pin

mark on the oil level indicator and let the engine run for 10 minutes. Then drain the flushing oil, replace the oil filter and pour in clean engine oil. If the flushing oil is absent, the flushing can be carried out using pure engine oil.

Engine crankcase ventilation system

During engine breather system maintenance remove valve cap 4 (Fig. 9.4), ventilation hoses and tubes, vacuum valve cap 3, the valve membrane and spring and clean the removed parts. Clean the holes of valve cap ventilation necks, holes 7 of separated oil drain, sensing hole 8 in the vacuum valve case and venting holes in the vacuum valve cap. The oil baffle 5 shall be flushed mounted on the valve cap. Check the membrane for damage and breakage. When re-assembling, ensure tightness of connections.

WARNING! *DO NOT operate the Engine with a non pressure-tight ventilation system and open oil socket. It may cause higher oil consumption via crankcase blow-by gas evacuation and environmental pollution. To prevent the ventilation system, tight close the oil socket cap and set the oil level indicator to the fix.*

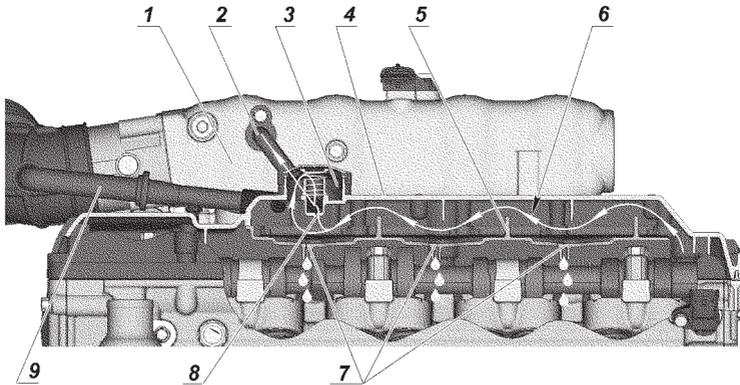


Fig. 9.4. Engine crankcase of ventilation:

- 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)

WARNING! *Coolant is poisonous. Keep it in a tightly closed container. While using it, obey the following rules:*

- *avoid any operations as a result of which the liquid can enter into the mouth cavity;*
- *do not let the fluid dry out on the skin; wash it off with soap and warm water;*
- *flush the spilled fluid with water, air the room;*
- *remove clothing contaminated with the fluid, dry it outside the room, and wash it.*

Take due care when opening the cap of the expansion tank of the engine cooling system to avoid a scald.

For cooling liquid, use a low temperature freeze fluid TOSOL-A40M, OG-40 Lena or OG-40 TOSOL-TC.

At the ambient air temperature -40°C use the low freeze point fluid TOSOL-A40M, OG-40 Lena or OG-40 TOSOL-TC.

The cooling fluid operating temperature shall be within 80°C - 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, you must immediately identify and eliminate the cause of overheating.

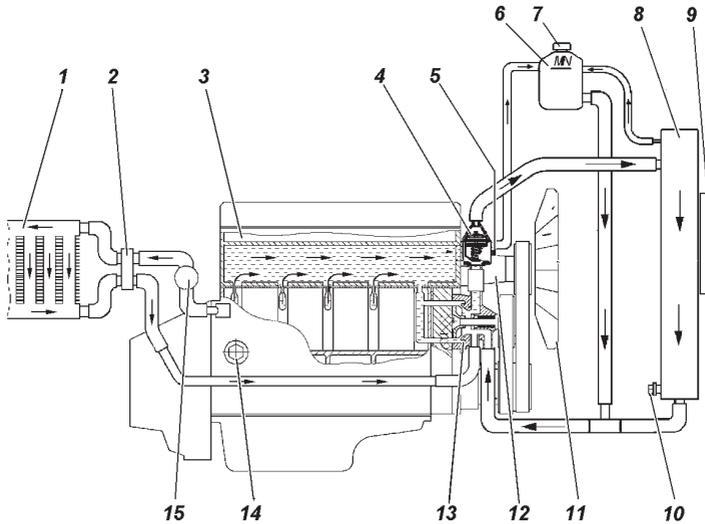


Fig. 9.5. Engine cooling and heating system scheme:

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

As required, check the coolant level in expansion tank 1 (Fig. 3.28), especially if an additional heater is installed. The fluid level should be 3-4 cm above the MIN mark. Since a cooling fluid has a high thermal expansion coefficient and its level in the expansion tank varies significantly depending on the temperature, check the level at the system temperature of +15-20°C.

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

Every three years or after every 60,000 km (depending on which happens first) purge the cooling system and refill the coolant.

Purge the cooling system as follows:

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

It is impossible to fill the system completely with the necessary coolant volume without engine launch due to the existence of air in the interior heaters and connecting hoses. Fill the system as follows:

- set the additional heater (if installed) switcher 5 (Fig. 3.7) in ON position;
- fill the cooling system with a coolant via an expansion tank inlet 3-4 cm beyond the MIN mark;
- start the engine, add the cooling fluid to the cooler upper 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 — cool-down and raise the cooling fluid level again in the expansion chamber to the standard.

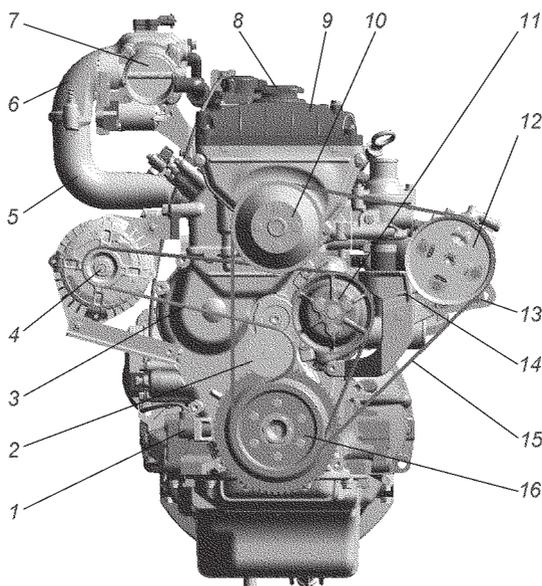


Fig. 9.6. Aggregates drive belt tension

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

To drain the fluid from the engine cooling system open the expansion tank plug, unscrew heat exchanger outlet plug 10 (Fig. 9.5) and unscrew cylinder head cap 14. When draining, set the additional heater (if installed) switch 5 (Fig. 3.7) in ON position.

The generator and cooling system pump drive belt tension (Fig. 9.6.) is provided by automatic tension mechanism 2. In the operation process, the automatic tension mechanism does not require servicing or adjustment.

Fan and steering system hydraulic pump drive belt tension 15 (Fig. 9.6) is performed by displacing pump 12, for which it is necessary: to loosen bolts 13, adjust the drive belt tension by adjustment bolt 14 and move the pump along the rails. Tighten bolts 13.

In motor vehicles equipped with an air conditioner the aggregates drive is performed by the same belt. Its tension is adjusted automatically (Fig. 9.7). It is necessary to check belt condition during the operation process. Upon detection of its substantial looseness, the GUR pump placement adjustment is

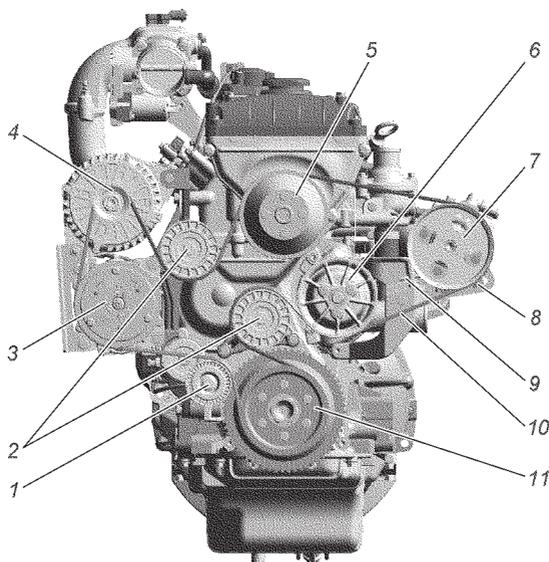


Fig. 9.7. Accessory drive belt:

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.

possible by bolt 9 to continue using the stretched belt. The GUR pump is fixed by bolts 8.

Fan drive clutch. In case the clutch does not switch on and off properly, the engine can overheat. Check up is to be done at a specially equipped UAZ workshop.

Keep the clutch surface clean.

Electric fan is installed on the cooling system radiator assembly at the front. It turns on and off automatically.

Gas exhaust system

WARNING! *Working temperature of neutralizer and gas exhaust system parts is 400-800°C. The motor vehicle may not be operated without neutralizer protecting screens. While driving the motor vehicle and while parked, ensure the exhaust system does not contact any inflammable materials (e.g. dry grass).*

Exhaust gas leaks from the exhaust system connections fitted with gaskets are not allowed and shall be eliminated on the first occasion. Tighten heat attached nuts (see Annex 2) after rinsing threaded connections with specific fluids.

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

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

Precautions

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. While being charged from an external source, the rechargeable battery must be disconnected from the in-vehicle network.

5. The control unit may not be exposed to temperatures above 80°C, e.g. in an oven dryer.

Before arc welding operations, disconnect the battery wire and control unit connection.

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

8. The control systems' 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 kg/cm².

WARNING! *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 right fuel tank is empty.

Feed System

WARNING! *The motor gasoline and its vapours are toxic and flammable. Observe the following rules:*

- observe fire safety rules;
- avoid any operations as a result of which the liquid can enter into the mouth cavity;
- do not let the fluid dry out on the skin; immediately wash it off with soap and warm water;
- 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.

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

Electric petrol pump with fuel level gauge (feed module) is installed in the right tank. With fuel consumption the right tank is automatically refilled from the left tank.

Fuel tank inlet pipes ducts plugs are sealed and provide hermetic sealing.

The following is recommended due to the specified features of the fuel system design:

- when closing the tank filler necks, make sure the plugs are in good condition, the sealing gasket is present and undamaged, and ensure tight closing of the plugs by applying adequate force;
- for partial fuelling of the motor vehicle, start from the right-side tank;
- check fuel consumption in both fuel tanks.

Fuel tanks 18, 22 (Fig. 9.8). Fuel tanks maintenance includes fuel module (right tank) filter regular purge, fuel level indicator inlet pipe filter (left tank) and tanks purge.

Regularly check tanks attachment for security and tighten fastening bolts when required.

Fuel tanks must be dismantled from the motor vehicle in order to flush them.

Prior to dismantling the tanks from the motor vehicle, do the following:

- disconnect accumulation battery;
- open cap in bodysshell floor over fuel module 3;
- disconnect motor fuel pump (fuel module) and fuel level indicator sender wires and insulate them;
- disconnect fuel pipe line tubes and hoses;
- loosen filling pipe collar and pull off connection hose.

Then unscrew coupling band pins, turn collars down so as not to impede tank lowering and remove tank.

Install tank in reverse order.

Submersible fuel module 3 (Fig. 9.8) contains motor pump, gauze filter, jet pump, proportioning valve and fuel sender. Install fuel pipes until quick removal connector locking spring clicks.

From time to time, check and clean the pins of the fuel pump connection to the in-vehicle network.

Pay special attention to the reliability of the ground connection.

It is not recommended to operate the motor vehicle if there is less than 5 liters of fuel in the right-side fuel tank.

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

The fuel module filter shall be flushed when the tank is not removed from the motor vehicle, and, furthermore, the fuel module must be withdrawn from the fuel tank through the hatch in the body's floor.

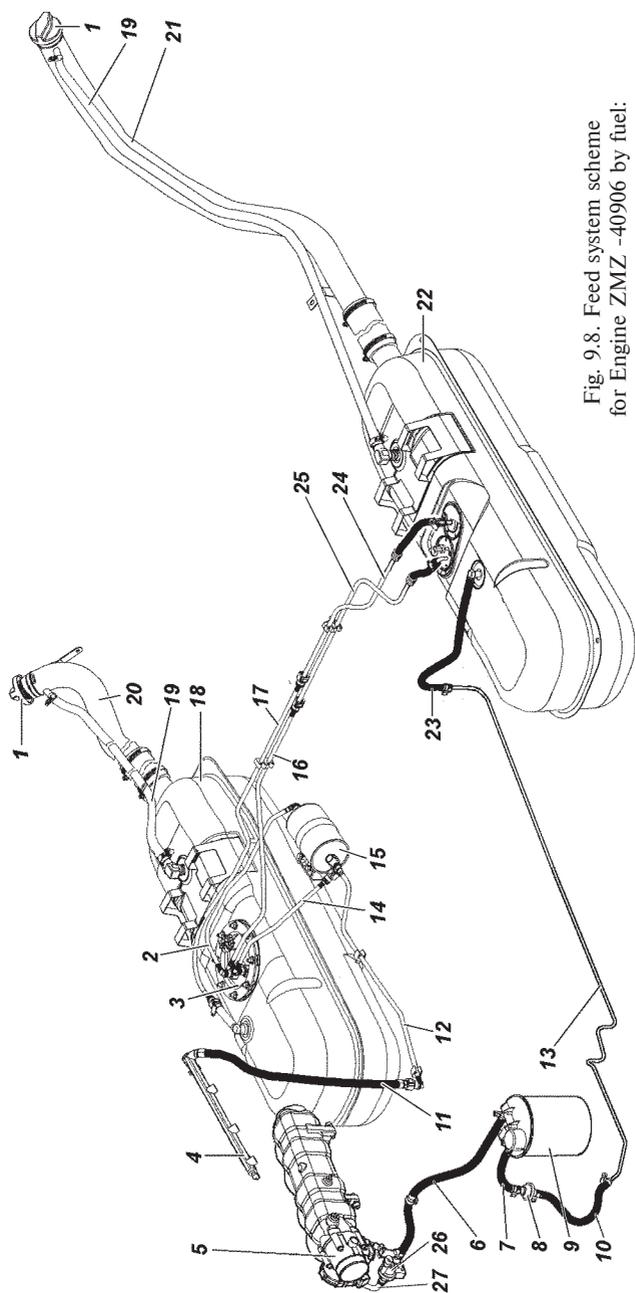


Fig. 9.8. Feed system scheme for Engine ZMZ -40906 by fuel:

1 — fuel tank plug; 2 — fuel pump to fine fuel filter tube; 3 — fuel module; 4 — common rail; 5 — throttle; 6, 7, 10, 19, 23 — vapor diversion hoses; 8 — fuel tank valve; 9 — absorber; 11 — fuel supply hose; 12- fuel supply tube; 13 — vapor diversion tube; 14 — fine fuel filter to fuel module discharge tube; 15- fine fuel filter; 16 — right fuel tank fuel supply tube; 17 — right fuel tank vapor diversion tube; 18 — right fuel tank; 20 — right fuel tank fill pipe; 21 — left fuel tank fill pipe; 22 — left fuel tank; 24 — left fuel tank vapor diversion tube; 25 — left fuel tank fuel supply tube; 26 — absorber blowing valve; 27 — vapor diversion tube

Clogging of the strainer fuel module, final fuel filter, presence of dirt and mechanical admixtures in the fuel tank manifest first of all in deterioration of the pumping of the fuel from the left-side tank into the right-side one, unstable engine operation at high loads and degradation of the motor vehicle performance. If such signs arise, seek help from a service station in order to prevent the fuel priming pump failure.

Notes. At atmosphere temperature below 0°C clogging symptoms can be caused by water freezing in fuel system. When detecting water in fuel purge fuel and rinse fuel tanks with pure fuel and fine fuel filters are to be replaced.

Couplings leak is to be rectified by coupling tightening (see Annex 2) or defected element replacement.

Upon completion of any maintenance of fuel system operations related to tightening of connections, removal or replacement of parts and assemblies, the system tightness must be checked:

- make sure the filler ports plugs are securely tightened;
 - tighten collars and screw couplings to sealed condition;
 - fuel tubes shall be installed until "click" of the quick coupler's locking spring;
 - start the engine running idle and check the system visually.
- Fuel leaks and wetting of fuel system components are not permitted.

In the course of the motor vehicle operation, 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);
- operability of the evaporative emission control system (the absorber and the fuel tank valve). Any failure of these elements leads to fuel supply system failures. Damaged components shall be replaced.

Accelerator pedal drive. The motor vehicle is equipped with an accelerator pedal electronic module. Accelerator pedal is made of plastic. Full pedal stroke equals 48,7 mm and is provided with stable design and is not regulated.

Air filter. After every 30000 km of total kilometres logged and after engine capacity reduction, replace filter element.

The filter element shall be replaced as follows:

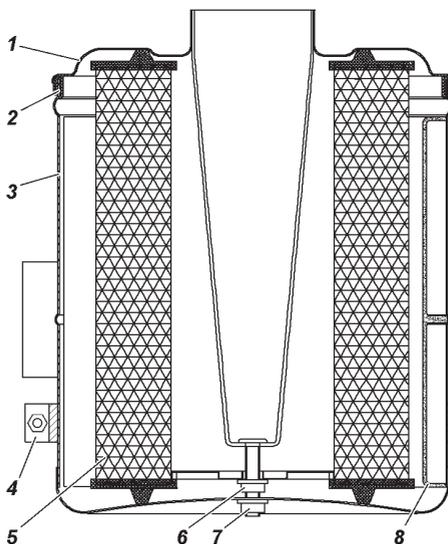


Fig. 9.9. Air filter:

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

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

Diagnostics

Serviceability of the engine control system and the injection system depends on the mechanical and hydromechanical systems. Several deviations leading to faults can be mistaken for the control system electronic part malfunctions, such as:

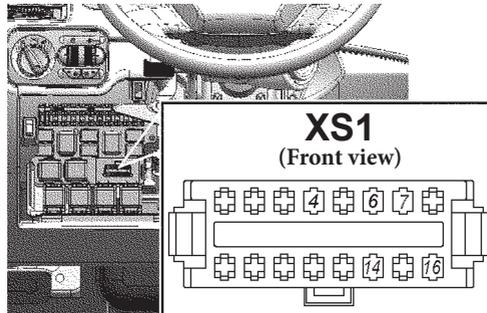


Fig. 9.10. Data link connector (XS1):
4- ground; 6, 14- Sup-line; 7- K-line; 16-+12V

- low compression;
- deviation of gas distribution phases caused by incorrect assembly of the 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 switches on the diagnostic lamp of faults on the motor vehicle instrument panel, and the code designating the fault is recorded into its memory.

The engine fault lamp switching on does not mean shutting the engine immediately, as the control unit has reserve modes that allow the engine to go on in close to normal conditions. Nonetheless, when the fault is caused by ignition malfunctioning (engine fault lamp starts to blink) to avoid exhaust gas neutralizer failure the engine speed should be reduced to 2500 rpm (motor vehicle speed below 50 km/h) and you should head for a workshop.

WARNING! *Signal device switches on persistently when the neutralizer temperature rises above the allowed temperature. In this case one or two engine injectors will turn off.*

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

Diagnostic lamp operation

In operating mode with ignition started and engine inoperative the diagnostic lamp turns on and goes out after the engine start

up. If the diagnostic lamp is on with the engine operating, the system and engine require maintenance as soon as possible.

When ignition faults are present while engine is operating, 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 in the motor vehicle.

WARNING! *When using a starter heater, the minimum fuel volume in the right fuel tank must be at least 5 liters.*

ENGINE ZMZ-51432 (Fig. 9.11, 9.12)

Engine suspension

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

Engine gas distribution mechanism

The camshafts' drive is chain-type double-stage. The first stage is from the crankshaft to the intermediate shaft, the second stage is from the intermediate shaft to the camshafts.

Each chain tensioning is done by hydraulic tensioners automatically.

Engine lubrication system

The engine should be stopped immediately when a lubrication system malfunction is registered.

The liquid-oil heat exchanger is provided for oil cooling in the lubrication system.

The lubrication system is filled through the oil filler placed on the cylinder head valving cover.

Regularly monitor the oil level in the crankcase and refill when necessary. Check prior to the engine starting. If the oil level is to be checked after the engine stop, wait for at least 15 minutes to let the oil drain to the crankcase. The motor vehicle shall rest on an even horizontal surface. The oil level shall be between marks "O" and "P" of oil level indicator 6 (Fig. 9.11). For frequent cross-country journeys, maintain the oil level near the mark "P" without exceeding it.

When changing oil, replace the oil filter. Used oil shall be drained from the crankcase while hot, right after the trip. Prior to draining, open the oil filler cap 4, then unscrew oil drain plug. The oil drains for at least 10 minutes.

When replacing the drain hole plug, check sealing gasket condition. Replace the damaged gasket.

Pour the fresh oil in up to the upper mark on the oil level indicator, start the engine.

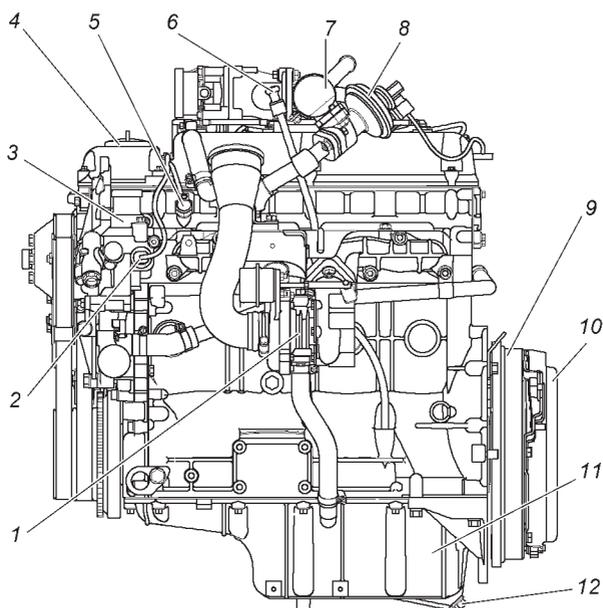


Fig. 9.11. ZMZ-51432 engine (left-side elevation):
1 — turbocharger; 2 — control system cooling fluid temperature sensor;
3 — temperature control valve housing; 4 — oil filler cap; 5 — oil critical pressure sensor; 6 — oil level indicator; 7 — recirculating gases cooler; 8 — exhaust gases recirculation valve; 9 — flywheel; 10 — clutch; 11 — oil casing; 12 — oil drain plug

When oil critical pressure signal device turns off, stop the engine and check oil level in 5 minutes. Add oil as required.

Please remember, the engine contains trapped oil at all times. Pour the oil in portions bringing oil level to the indicator to the upper mark 'P'. The volume between 'O' and 'P' marks holds about 1 liter of oil. Oil level above 'P' mark is not permitted.

Use recommended oil brands.

Different brands of engine oils and from different manufacturers may **not be mixed**.

When oil of one grade is replaced with oil of another grade, we recommend you flush the engine lubrication system. When petroleum oil is replaced with a synthetic oil and vice versa, the engine must be flushed.

To flush the engine lubrication system:

- drain used engine oil from the crankcase while hot;

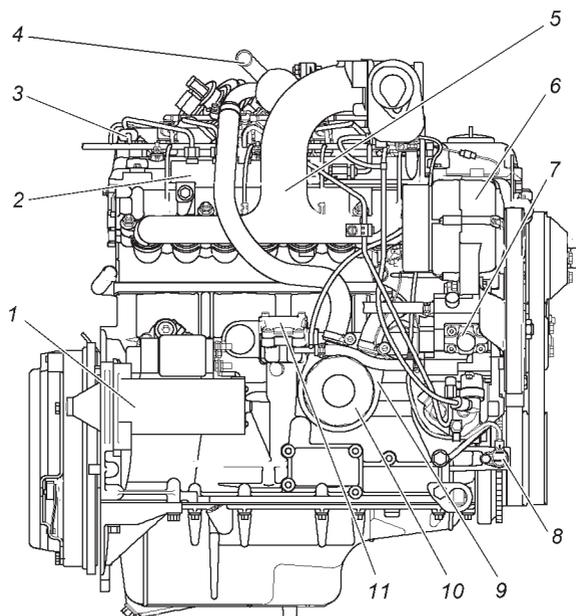


Fig. 9.12. ZMZ-51432 engine (right-side elevation):

1 — starter; 2 — fuel rail; 3 — phase sensor; 4 — cooling fluid removal to the heater pipe; 5 — inlet pipe; 6 — alternator; 7 — high-pressure fuel pump (HPFP); 8 — timing sensor; 9 — fluid & oil heat exchanger; 10 — oil filter; 11 — oil pump drive cover

- fill replacement or special cleansing oil to the level indicator upper mark;
- start the engine and let it run at minimum crankshaft rpm for at least 10 minutes;
- drain cleansing oil;
- replace oil filter 10 (see Fig. 9.12);
- pour the fresh oil as indicated above.

Remove oil filter, turning it counter-clockwise. Use oil filter with bypass valve filtering element 2101C-1012005-NK-2 produced by 'Kolan' PSTE

When replacing **oil filter**, check tightening of the heat exchanger fastening neck nut and tighten it as required.

When installing the filter onto the engine, make sure the sealing gasket is in proper condition, lubricate it with oil, and turn the filter until the gasket touches the plane on the heat exchanger and then tighten a 3/4 turn. Make sure no oil leak in the sealed joints exists.

Engine crankcase ventilation system

The system maintenance includes periodic check of the joints tightness and cleaning the system components of gum residue.

In case of increased oil consumption for burn-out loss and occurrence of black smoke out of the motor vehicle exhaust pipe, check the crankcase ventilation system for proper condition (clogging of channels).

The crankcase ventilation system proper condition is checked using the water piezometer connected to the crankcase via the oil level indicator tube.

In the crankcase of idle running engine (with crankshaft rpm minimum to maximum), there shall be negative pressure of 1-14 mbar (10-140 mm WG).

If oil traces appear on the joints between the turbocharger and the inlet pipe, check the crankcase blow-by gases pressure.

If the crankcase pressure exceeds 15 mbar (150 mm WG), check tightness of the motor vehicle vacuum system (the system of vacuum booster and exhaust gas recirculation). In case of leak, the vacuum pump forms gauge pressure in the crankcase resulting in increased gases flow rate through the oil separator and oil entrainment with gases.

Increased pressure of crankcase gases can also be due to malfunctions of the cylinder-piston group and clogging of the

crankcase ventilation system components. In this case, clean the components.

During operation, do not break tightness of the ventilation system and do not allow the engine to run with the oil filler opened. This can result in failure of the turbocharger, contamination of the engine oil chambers, causes increased oil entrainment with crankcase gases and environment pollution.

To clean the crankcase ventilation system, remove the valve cap, the oil separator cap, ventilation hose and the turbocharger inlet pipe. Flush the removed parts with kerosene and dry out. The oil baffle shall be flushed without disassembling.

Cooling system (Fig. 9.13)

WARNING! *Coolant is poisonous. Keep it in a tightly closed container. While using it, obey the following rules:*

- *avoid any operations as a result of which the liquid can enter into the mouth cavity;*
- *do not let the fluid dry out on the skin; wash it off with soap and warm water;*
- *flush the spilled fluid with water, air the room;*
- *remove clothing contaminated with the fluid, dry it outside the room, and wash it.*

Take due care when opening the cap of the expansion tank of the engine cooling system to avoid a scald.

For coolant, use a low temperature freeze fluid TOSOL-A40M, OG-40 Lena or OG-40 TOSOL-TC.

At the ambient air temperature -40°C use the low freeze point fluid TOSOL-A40M, OG-40 Lena or OG-40 TOSOL-TC.

The cooling fluid operating temperature shall be within $60^{\circ}\text{--}110^{\circ}\text{C}$. Short-time (maximum of 5 minutes) engine run is allowed at cooling fluid temperature up to 115°C .

In case the cooling fluid overheat warning lamp turns on, you must immediately identify and eliminate the cause of overheating.

Check the coolant level periodically in expansion tank 1 (Fig. 3.28), especially if an additional heater is installed. The fluid level should be 3-4 cm above the MIN mark. Since the cooling fluid has high thermal expansion coefficient and the cooling fluid level in the expansion tank varies significantly depending on the temperature, check the level at the system temperature of $+15\text{--}20^{\circ}\text{C}$.

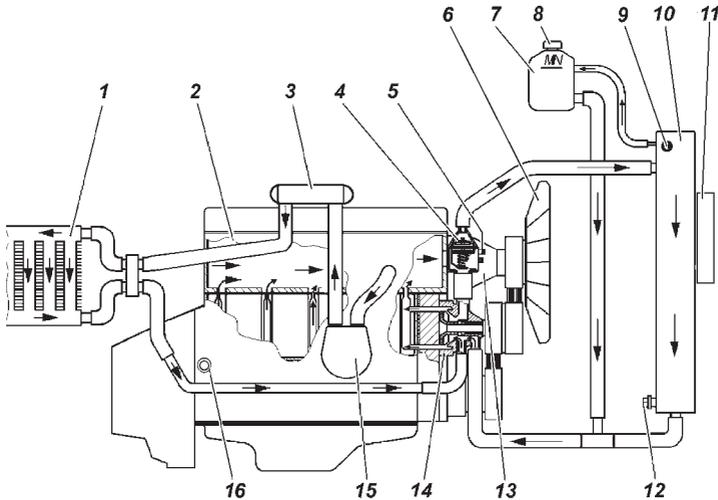


Fig. 9.13. Engine cooling and heating system pattern:

1 — cabin heater radiator; 2 — engine; 3 — recirculating gases cooler (RGC); 4 — thermostat; 5 — control unit coolant temperature sensor; 6 — fan; 7 — expansion tank; 8 — expansion tank plug; 9 — engine overheat sensor; 10 — Cooling System radiator; 11 — air breather; 12 — drain plug; 13 — fan drive; 14 — pump; 15 — fluid & oil exchanger; 16 — crankcase drain plug

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

Every two years, purge cooling system and refill coolant.

Cooling system drain is performed via radiator drain orifices (shut with plug 12 Fig. 9.13) and crankcase (shut with plug 16). To drain the coolant from heater 15, blow heater chamber with compressed air by heater coolant drain hose preliminarily disconnected from ORG 3. When draining, set additional heater (when installed) switcher 5 (Fig. 3.7) to ON position.

In cases of emergency, e.g. coolant level drastic reduction, fill cooling system with distilled water for a short use period. Do not use salt water or alkali for softening of water as it corrodes aluminum parts. Filter water before filling.

At first opportunity fully drain and purge cooling system.

Purge the cooling system as follows:

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

- repeat the above operation.

It is impossible to fill the system completely with the necessary coolant volume without engine launch due to the existence of air in the interior heaters and connecting hoses. Fill the system as follows:

- set the additional heater (if installed) switcher 5 (Fig. 3.7) to ON position;
- fill the cooling system with a coolant via an expansion tank inlet 3-4cm beyond the MIN mark;
- start the engine, add the cooling fluid to the cooler upper tank when its level decreases, and close the cooler plug;
- 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 — cool-down and raise the cooling fluid level again in the expansion chamber to the standard.

WARNING! *The manufacturer bears NO responsibility for cooling system elements break down caused by water freeze.*

Replacement and tensioning of mounted units drive belts

Regularly check the belts tension and condition. Replace the belts when damaged or overstretched.

Determine the tension of fan drive belt, power steering pump and air conditioner compressor as follows:

- loosen bolt 4 (Fig. 9.14);
- by turning one of the tension rollers 3, bring the belt tension to the necessary value (for standard values, see Table "Specifications");
- tighten bolt 4.

Use the second roller if you can not achieve the specified tension using one roller.

The belt shall be replaced as per the following order:

- loosen bolts 4;
- by turning rollers 3, release the belt tension;
- replace the belt and set its tension as specified above.

The belt stretcher 3 (Fig. 9.15), the generator drive, cooling system pump and the HPFP are ensured by the automatic belt tensioner 2. During operation, automatic tensioner does not require maintenance and adjustment.

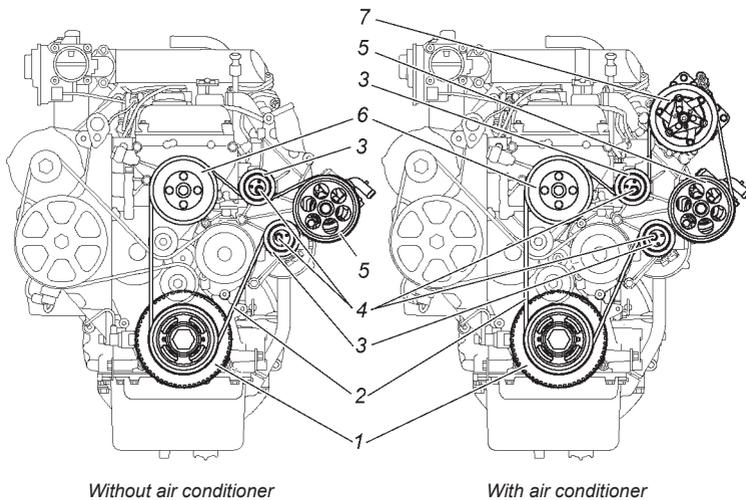


Fig. 9.14. Fan drive belt, steering pump and air conditioner compressor:
 1 — crankshaft damper pulley; 2 — fan, GUR pump and air breather compressor drive belt; 3 — tension roll; 4 — bolt; 5 — steering power booster pulley; 6 — air breather pulley; 7 — air breather booster pulley.

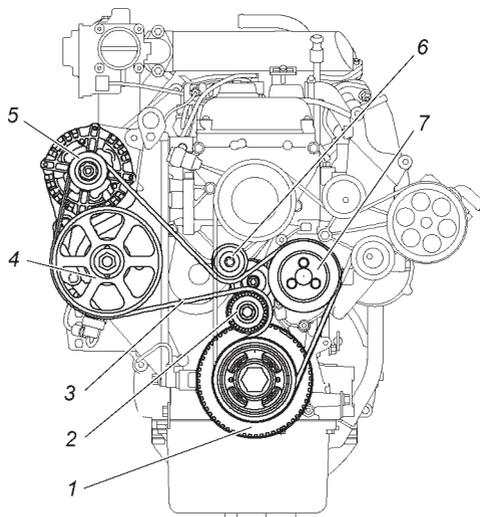


Fig. 9.15. Alternator & system pump belt drive:
 cooling and HPFP:
 1 — Crankshaft damper pulley; 2 — automatic tension mechanism; 3 — HPFP & water pump drive belt; 4 — HPFP pulley; 5 — alternator pulley; 6 — bypassing roll; 7 — water pump pulley.

Gas exhaust system

WARNING! *Working temperature of neutralizer and gas exhaust system parts is 400-600°C. Do not use the motor vehicle without neutralizer protecting screens. While driving and when parked, ensure the exhaust system does not contact any flammable materials (e.g. dry grass).*

Exhaust gases leak in couplings is forbidden and should be rectified at first notice. Tighten heat attached nuts (see Annex 2) after rinsing threaded connections with specific fluids.

The motor vehicle operation modes, in which ingress of unburnt fuel into the exhaust system is possible, are not permitted.

Pay special attention to the operation of the feed system, the valve control system, the inlet system.

Microprocessor controlled fuel injection system

WARNING! *Use only the diesel fuel complying with the requirements of GOST R 52368. Various additives for fuel (including gasoline, kerosene etc.) may not be used. If the above requirements are not met, UAZ, PC shall bear no warranty responsibility in case of the fuel equipment failure.*

Precautions.

1. Prior to dismantling and installation of any components or wires of the control system, disconnect the rechargeable battery ground wire.

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. If being charged from an external source, the rechargeable battery must be disconnected from the in-vehicle network.

5. Do not expose control unit to temperatures above 80°C, e.g. in a desiccator.

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

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

WARNING! *Do not loosen or tighten fuel line connections while engine is running or immediately after its stop.*

Feed system (Fig. 9.16)

Fuel runs to high pressure fuel pump 11 from the right side tank 7 through fine filter 10.

Final fuel filter with hand pumping and water detection sensor (BOSCH, 0 450 126 273) is shown on Fig. 9.17.

Fuel heater turns on at IGN, when fuel temperature is below 4°C.

Heating is controlled automatically by fuel temperature sensor.

After every 5000 km total kilometres, remove settling from the filter (unscrew plug 5, drain the settling until pure fuel current appears, and screw the plug).

Every 15000 km replace the filter cartridge.

For replacement use filter cartridge 1 457 434 310 by BOSCH.

Prior to replacement, remove dirt from the filter outer surface.

When replacing the filter cartridge, prevent ingress of dirt into the filter body cavity.

For fuel fine filter cartridge replacement proceed as follows::

1. Unscrew housing with cartridge 4 (Fig. 9.17).
2. Lubricate gasket 3 on the housing of the new filter cartridge with pure diesel fuel oil;
3. Replace with a new housing with a filter element, turning until spacer 3 contacts with heater 2. Carry out filter material tightening with FDM 20-25 N·m.

Air release from the fuel feed system.

Air must be released from the system in the following cases:

- the first time the engine is started;
- following long engine idle time;
- upon dismantling of pipelines, filters and pumps;
- upon replacement of the fuel filter cartridge;
- upon complete fuel burn out of the system.

To release air and fill the system with fuel, carrying out of the following operations is required:

1. Make sure the fuel tanks plugs 1(Fig. 9.16) are tightened securely. The fuel tank filler plugs are blind and ensure tight sealing;

2. Loosen the air release plug 7 (Fig. 9.17) on the final fuel filter (FFF). Using the manual priming pump 1 on the FFF, fill the main line until air bubbles disappear from the fuel going from under the air release plug;

3. Tighten air release plug 7;

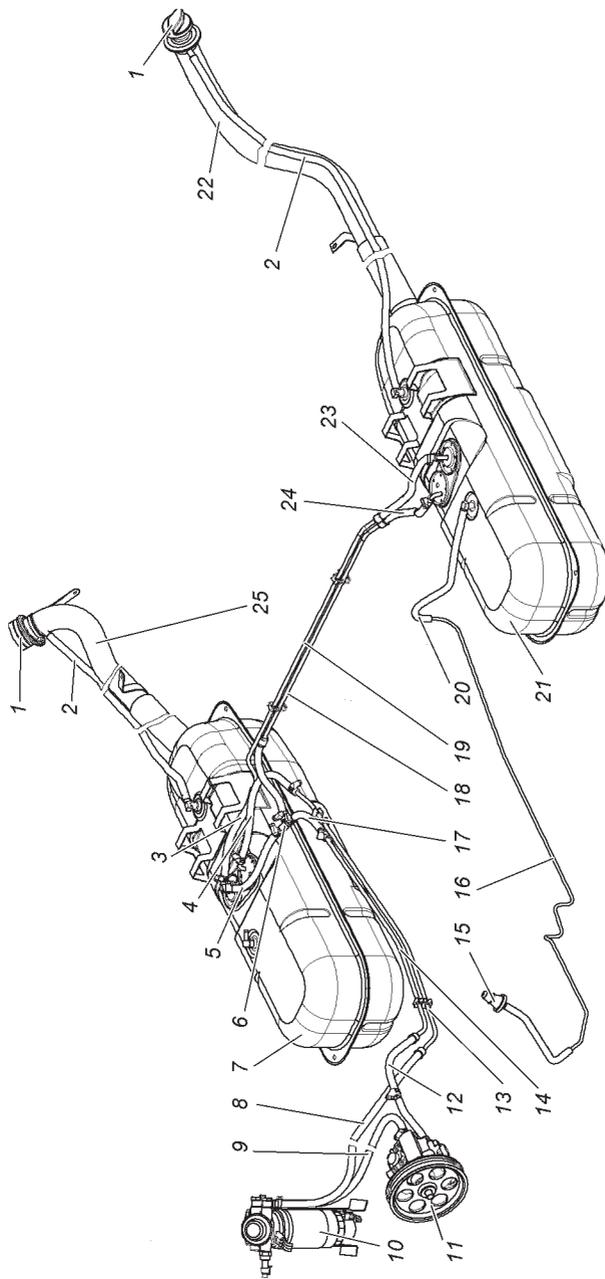


Fig. 9.16. Engine feed system:

1 — fuel tank plug; 2,3,20,23 — air-vapor hoses; 4,8,9 — fuel feed hoses; 5,17,12 — fuel drain hoses; 6 — jet pump; 7 — right side fuel tank; 11 — high pressure fuel pump HPFP; 13 — fuel feed tube; 14 — fuel feed tube; 15 — fuel tank valve; 16,19 — vapor emission tubes; 18 — left side fuel tank; 21 — left side fuel tank; 22 — left tank inlet tube; 24 — left tank hose to jet pump; 25 — right tank inlet tube

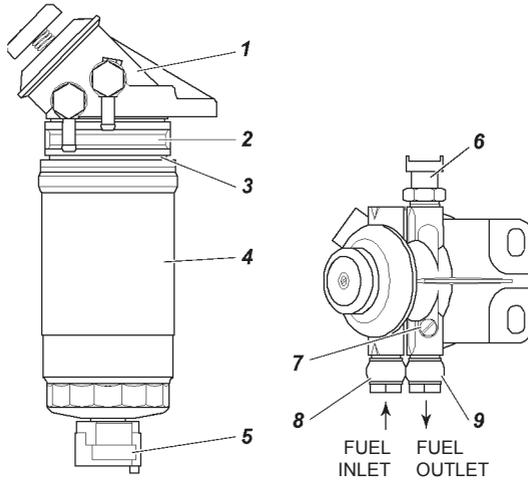


Fig. 9.17. Fine fuel filter with priming pump:

1 — manual priming pump; 2 — heater; 3 — spacer; 4 — replaceable filter cartridge; 5 — settling drain plug with water presence indicator; 6 — fuel temperature sensor; 7 — heater pin connector; 8 — air release screw; 9 — fuel supply nozzle; 10 — fuel removal nozzle

4. Start the engine with starter until engine operates steadily;
5. If the engine did not start due to the high-pressure tubes not being filled with fuel, you must do the following:
 - loosen the tubes fastening nuts on the injectors;
 - fill tubes with fuel by turning the crankshaft with the starter.
 Continuous starter operation is not to exceed 15 seconds. When turning the starter engine, provide full fuel supply by stepping firmly on accelerator pedal until bumping;
 - if fuel leaks from under the high-pressure tubes nuts turn off the starter;
 - tighten nuts at FDM 21,6-24,5 N · m (2,2-2,5 kg s · m).;
 - start the engine.

It is recommended to install onto the engine the high-pressure fuel lines from HPPFP to injectors only once. Repeated installation will not ensure the joints' secure sealing and long-term fuel line operation.

Jet pump 6 (Fig. 9.16). Regularly check pump and connections tightness. If fuel does not go from the left-side tank into the right-side one, disassemble the pump (unscrew the injector), purge it and blow with air.

The jet pump is fixed on the fuel hoses near the frame right side member.

High pressure fuel pump (HPFP) 11 (Fig. 9.16).

Maintenance, adjustment, inspection and repair of HPFP and injectors are recommended to be carried out at BOSCH service centres. Independent adjustment, partial or complete disassembling of the HPFP is not permitted.

WARNING! *HPFP lubricant contacting parts is carried out by fuel, so do not fully work out from the fuel supply system as it will result in HPFP damage.*

Accelerator pedal drive. ECO 4 motor vehicles are equipped with electronic module of Accelerator pedal. Accelerator pedal is made of plastic. Full pedal stroke equals 48,7 mm and is ensured with stable design and is not regulated.

Air filter. For filter maintenance see engine ZMZ-40905 section.

Exhaust gas recirculation system

Exhaust gas recirculation system (Fig. 9.18) reduces toxic nitrogen oxides exhaust gases emission by partially feeding exhaust gases from exhaust manifold to engine cylinders.

The System operation is controlled by microprocessor based control unit relying on coolant temperature sensors, mass air consumption, crankshaft rpm indications and memory recorded data.

WARNING! *Do not operate engine at disconnected and non-tight exhaust gas recirculation valve and brakes booster vacuum hoses. Failure to comply will lead to crankcase pressure rise and increased burnt oil consumption.*

Turbocharger

Engine operation without air cleaner at turbocharger (TCR) inlet is not permitted.

To avoid engine failure, it is strictly prohibited to adjust the TCR bleed valve.

Turbocharger system maintenance consists of regular air supply system couplings hermeticity check.

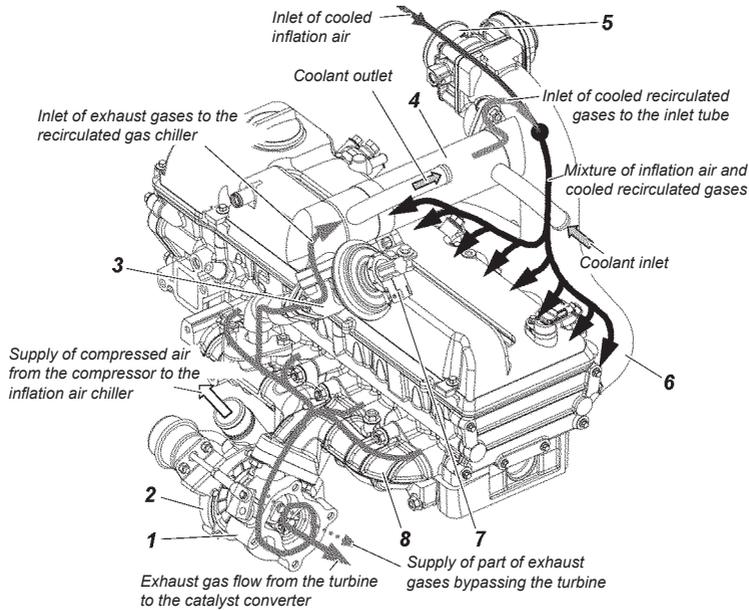


Fig. 9.18. Recirculation system scheme:

1 — turbine; 2 — compressor; 3 — recirculation valve; 4 — recirculating gases cooler; 5 — air supply pipe with throttle gate; 6 — inlet pipe; 7 — valve stem position sensor; 8 — exhaust manifold

Engine control system

This is designed for starting the engine and control while the motor vehicle is in motion and stopped.

The main functions of this system are:

- fuel feed control;
- heating plugs operation control — to ensure engine start and warming;
- control of exhaust gases recirculation — to reduce the nitrogen oxides content in exhaust gas emissions;
- control of the heating plugs switching-on indication lamp on the motor vehicle dashboard;
- control of the engine control system faults indication lamp on the motor vehicle dashboard;
- diagnostics of the engine control system.

Engine control system and diagnostics thereof

The main component of the system carrying out the control process is the microprocessor based control unit. The control unit issues the control signals based upon the data acquired from the sensors of the system monitoring the state of the engine, the motor vehicle and environment. The control unit is installed in the motor vehicle cab to the right on the front bodywork panel.

To connect the engine control system automated external diagnostics and programming engine control devices, a diagnostic data link connector is installed under assembly block cap on the assembly block bodywork panel (Fig. 9.19).

Control unit performs a certain amount of engine control system components diagnostics. When a malfunction is detected, the control unit switches on malfunction signalling lamps  and  on the vehicle dashboard. Malfunction is recorded in its memory.

ATTENTION! *When the "EDC" fault signalling lamp is on flashing, the engine may not be operated. Stop the motor vehicle as soon as possible and shut of the engine. The motor vehicle may only be operated after the fault is eliminated.*

When the "OBD" engine fault signalling lamp is constantly on, the engine components or the exhaust system components affecting the exhaust gas toxicity are faulty. If the signalling lamp is on and no significant deterioration of ride performance is observed, you can continue motion at low speed to the nearest UAZ authorized service station to seek diagnostics.

Long-term operation with the signalling lamp constantly on can lead to failure of the engine control system components.

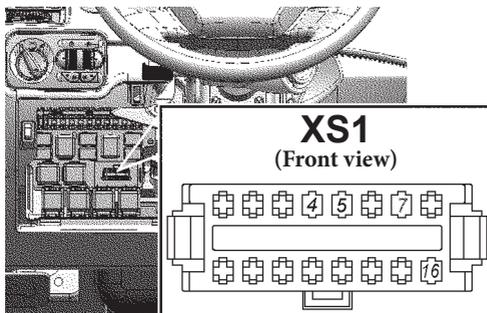


Fig. 9.19. Data link connector (XS1):
4, 5 — weight;
7 — K-line;
16 — +12V

TRANSMISSION

At slow speed, in gears 1 and 2, in acceleration-deceleration regime, an audible knock 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 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 knock may occur during selection of air gaps in spline coupling of the driving system.

Upon engine braking a slight knock 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

WARNING! *Brake fluid is poisonous. Keep it in a tightly closed container. While working with it follow these rules:*

- *avoid any operations as a result of which the liquid can enter into the mouth cavity;*
- *do not let the fluid dry out on the skin; wash it off with soap and warm water;*
- *wash away the spilled fluid with water, vent the room;*
- *remove contaminated clothing, dry it outside the room and launder.*

The level of fluid must be 15-20 mm lower than the upper edge of the reservoir 2 (Fig. 9.20).

The clutch pedal position is adjusted by clutch master cylinder push rod 5 length change. Clutch pedal full travel should be 130 ± 10 mm. Free travel (5-30 mm) is clutch design feature and is not adjusted.

Incomplete clutch release and pedal softness indicate air presence in the hydraulic system. Perform system bleeding via clutch release cylinder valve 2 (Fig. 9.21, 9.22) following the hydraulic brake system bleeding instruction.

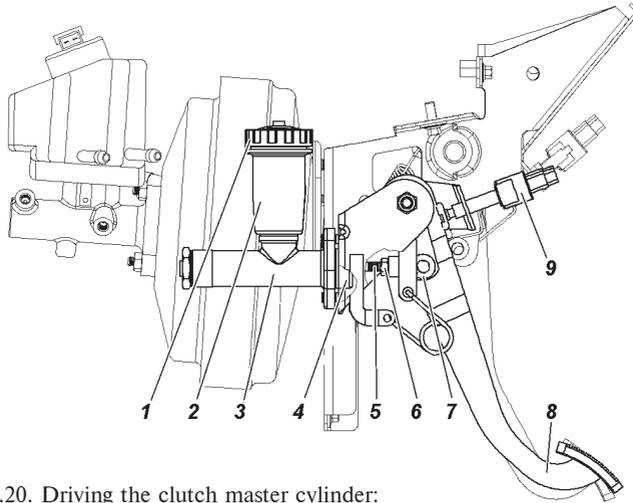


Fig. 9.20. Driving the clutch master cylinder:
 1 — tank cap; 2 — tank housing; 3 — master cylinder housing; 4 — safety cover; 5 — push rod; 6- nut; 7 — push rod sleeve; 8 — clutch release pedal; 9 — clutch switch off pedal

Gearbox

Regularly check threaded couplings (see Annex 2).

When leak is detected find out the reason and replace defective parts (spacers, cups).

To check oil level, screw out plug 5 (see Fig. 9.21, 9.22). The oil level should reach the filler orifice lower edge.

Upon oil replacement, drain oil immediately following the motor vehicle shut-down while the aggregate is hot. Do not forget to unscrew plug 5. Following plug 6 installation, replace spacer.

Transfer case

Regularly check threaded couplings (see Annex 2).

When leak is detected find out the reason and replace defective parts (spacers, cups).

To check oil level, screw out plug 9 (Fig. 9.21) or 8 (Fig. 9.22). The oil level should reach the filler orifice lower edge.

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

- wipe dry fill and drain plugs;

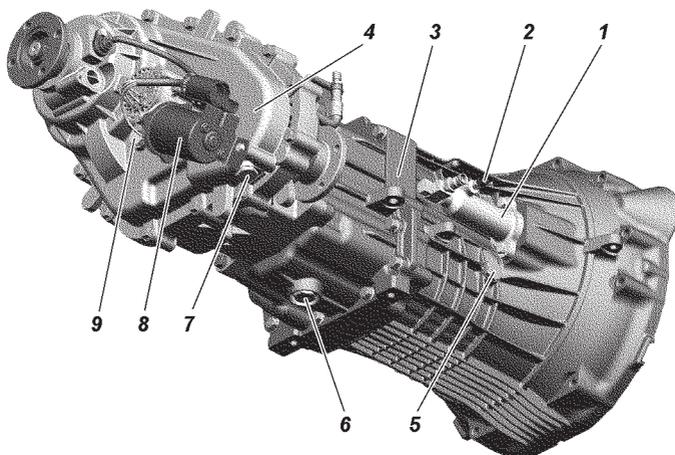


Fig. 9.21. Dymos 5-step gearbox,

Dymos 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 — motor drive; 9 — transfer case housing filler plug

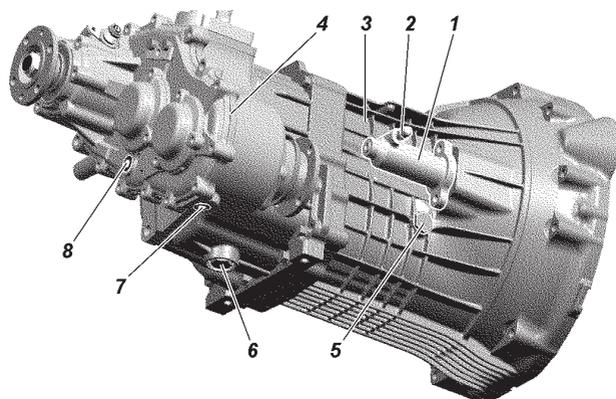


Fig. 9.22. Dymos 5-step gearbox,

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;
- replace and tighten drain plug at 6.0 — 6.5 kgs m momentum;
- refill oil until overflow via filler plug orifice;
- replace and tighten drain plug at 6.0 — 6.5 kgs m momentum;

WARNING! Use the same oil brand for Dymos gearbox and Dymos transfer case (see Annex 3). Do oil check and refill in gearbox and dispense box simultaneously.

WARNING! Different oils are used in the gearbox "Dymos" and in the transfer case PJSC UAZ (see Annex 3), blending is not permitted.

WARNING! Transfer case "Dymos" malfunction signal device ^{4WD} _{check} turns on after switch starting and turns off when the system is in normal condition. When signal device is turned on, go to the nearest authorized service center for four-wheel drive check up.

Propeller shafts

Regularly check threaded couplings (see Annex 2).

The spline coupling is lubricated through grease fitting 1 (Fig. 9.23), which is screwed into the slip yoke, and the needle bearings are lubricated through grease fitting 2 on the crosses.

Lubricate the needle bearings until the grease shows up from under the working edges of the cross oil seals.

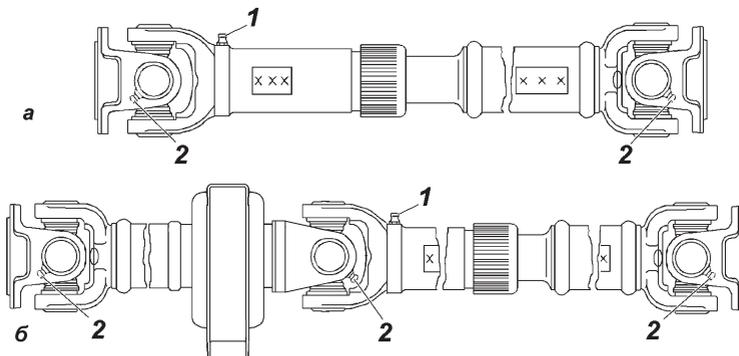


Fig. 9.23. Propeller shaft:

a — without intermediate strut;

b — with intermediate strut

1 — grease-pump for spline coupling lubrication; 2 — grease-pump for needle bearings lubrication of the joint

Applying solid oil or its mixtures for lubrication of the needle bearings can lead to their premature failure.

Do not apply too much grease to the splines as it will bleed through the spline coupling, resulting in premature failure of the oil seals and possible plug knocking out of the slip yoke.

Use a special tip on the grease gun to lubricate the knuckles.

The motor vehicle may be equipped with non serviceable propeller shafts (without grease fitting). If this is the case, regularly check shaft coupling pleated sleeve. Following pleated sleeve damage, apply to the service centre for replacement.

Driving axles

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

Drain the oil through orifice 2 (Fig. 9.24) at the bottom of the housing by screwing out filler plug 1.

Axial clearance over 0.05 mm in the bearings of the axle drive pinion is not permitted, as greater clearance would provoke premature gear teeth wear and that could result in an axle jam. Check the axial clearance in the bearings by swinging the drive pinion by universal-joint flange.

Axial clearance in the differential bearings of the final gear is not allowed. Check the clearance by swinging of the drive pinion when the housing cap is removed.

If an air gap is detected, the axle should be adjusted. The axle adjustment is a labour-intensive operation requiring specific skills and instruments, that is why we recommend to conduct the axle adjustment only at a service station.

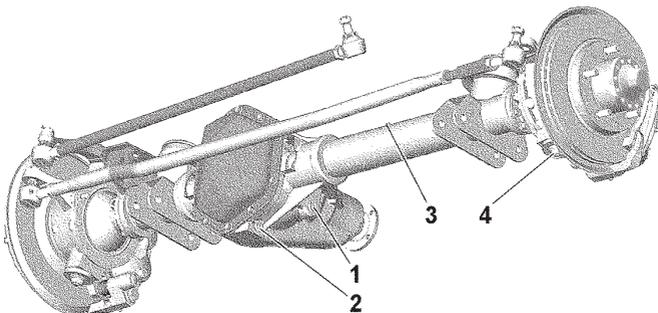


Fig. 9.24. The front axle:

1 — filler plug; 2 — drain plug; 3 — safety valve; 4 — lower pin nut

During inspection of the steering knuckles, check the serviceability of adjusting bolts 1 (Fig. 9.25) and steering stop bolts 3. The value of steering angle B of the right wheel to the right, and of the left wheel to the left should be within the limits of $31-32^\circ$. The increased steering angle of the wheels results in the contact of the wheel with the suspension parts.

It is not required to add the grease into the spherical pins and into the ball struts in-service. The grease in the units is replaced during maintenance.

Adjustment of steering knuckle pins 2 (Fig. 9.26) tightening at works is carried out at pre-load along the common axle shaft of the pins.

During operation of the vehicle, pay special attention to the condition of the tightening of the steering knuckle pins. At the wear of the interacting spherical surfaces of liners 3 or pins 2 the pre-load disappears and the air gap appears along the common axle shaft of the pins. To remove the air gap tighten clamping bush 10.

Front driving axle operation with air gaps in the pins units can lead to premature upper pin liner failure.

It is easier to tighten clamping bush 10 of the lower pin while in operation:

- unscrew nut 13;
- remove shield 12 with spacer 11;
- using the special wrench tighten clamping bush 10 to remove the air gap (hit the threaded end of the pin with a copper hammer beforehand);
- by turning the wrench by $10-20^\circ$ tighten this bush to obtain pre-load along the common axle shaft of the pins;
- install bracket with a spacer;
- tighten nut (see Annex 2).

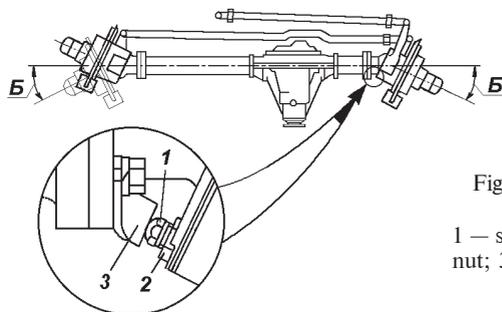


Fig. 9.25. Adjustment of the wheels steering angle:
1 — steering stop bolt; 2 — lock-nut; 3 — steering stop

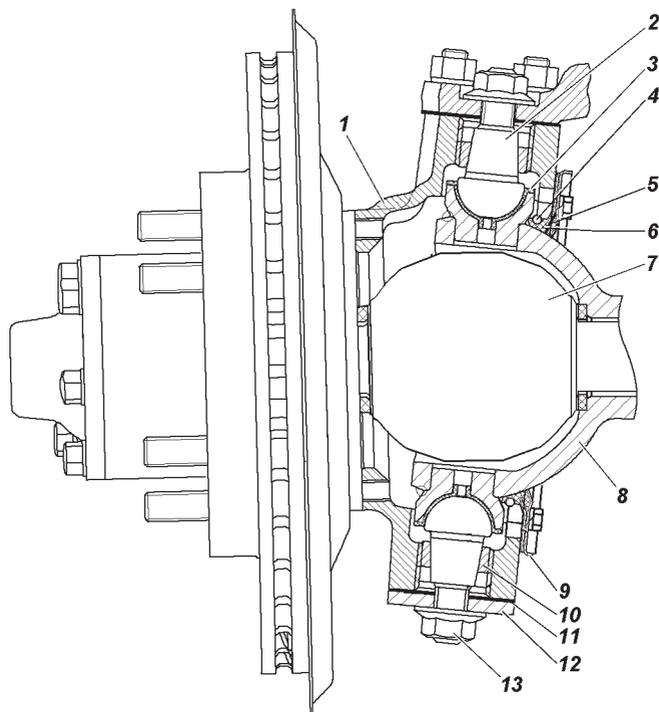


Fig. 9.26. Steering knuckle and wheel hub:

1 — steering knuckle housing; 2 — pin; 3 — pin liner; 4 — spring; 5 — outer O-ring; 6 — inner O-ring; 7 — joint; 8 — ball strut; 9 — outer oil seal housing; 10 — clamping bush; 11 — spacer; 12 — plate; 13 — nut

WARNING! *Tightening torque excess will cause lower pre-load and pin unit failure.*

The driving force of ball strut 8 (or housing 1 of the steering knuckle, if the ball struts were not disconnected from the housing of the axle shaft) in any direction relative to the common axle shaft of the pins should be within the limits of 10-25 N · m (1.0-2.5 kgs · m) considering the removed O-rings 5, 6 and joint 7 of the steering knuckle.

In case the control parameter is not reached, tighten the clamping bush once again by turning the wrench by 10-20° and tighten the nut 13 with the specified torque.

In case air gap persists following threaded bush tightening, contact UAZ service to replace pins units liners.

RUNNING GEAR

Suspension

WARNING! *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.

Hydraulic shock absorbers are not served and repaired. Upon shock absorbers replacement, replace axle assembly.

Replace suspension pin joints in case of knocks, squeaks and/or rubber bundle. Do not operate the vehicle with track control arm and/or tie rod deformation. Upon pin joints replacement the complete nuts tightening (see Annex 2) is to be performed on the wheeled motor vehicle.

Upon spring installation, the complete tightening (see Annex 2) of ladder nuts, front axle spring nut and spring shackle bolt nuts is performed at motor vehicle weight load.

Wheels and tyres

WARNING! *Worn out and damaged tyres, excessive or insufficient air pressure in them, deformed discs or weakening of fastening of wheels can cause an accident. Regularly check tyres condition and air pressure, discs condition and safe mounting.*

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

WARNING! *Using tyres 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 system (if any), which in turn can lead to a serious accident.*

Use only identical tyres of dimensionality and manufacturer for all wheels. Otherwise driving system components can be damaged.

For more uniform tightness, tighten the nuts while observing the rule — through one nut . Final tightening is carried out on the motor vehicle standing on wheel discs (see Annex 2).

Check inflation pressure in cold tyres.

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

Checking and wheels toe-in adjustment using on a process-specialized stand. Carry out wheels toe-in adjustment at a normal tyre air pressure. Adjust wheels toe-in adjusting steering trapezoid rod length by nozzle 2 rotation (Fig. 9.27) after prior loosening of left-handed thread counter nuts 1 and right-handed counter nuts 3. To complete adjustment, tighten counter nuts (see Annex 2).

After every 15,000 km of total kilometres, carry out a wheels swap for even tyre wear. Follow the same side rule: swap the front and rear wheels on the same side. Do not use a spare wheel. When swapping the wheels, ensure they are balanced.

UAZ Patriot **spare wheel** with a plastic container is attached to the back door bracket by three nuts, depending on the package.

UAZ Pickup and UAZ Cargo **spare wheel** are placed at the rear underbody part and should be securely fixed to the hold by a sector.

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

Wheel hubs

The presence of a gap in the bearings being checked by rocking the wheel in the vertical plane

To change grease, remove the hub from the stub axle, remove old grease, thoroughly wash the bearings and the cuff. Grease the bearings and the working edge of the cuff. Fill the space between the bearings rollers with the grease. Apply 10-15 mm of grease between the bearings. Do not apply too much grease into the hub to avoid its contact with brake mechanisms.

Thoroughly adjust the bearings. If their tightening is loose, the motor 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

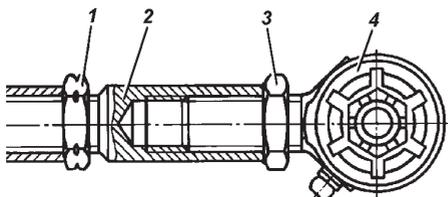


Fig. 9.27. Steering trapezoid tie rod:

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

down. Moreover, big air gaps 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 coverage. Take out axle shaft 9 (Fig. 9.28) of the rear axle or remove the driving flange of the front axle.

3. Unbend the tab of locking washer 6, turn off locknut 7 and remove the locking washer.

4. Loosen bearings adjustment nut 4 by $1/6$ - $1/3$ of a turn (1-2 sides).

5. Rotate the wheel by hand to check it for easy turning (the wheel should rotate freely without rubbing of the brake shoes against the brake plate or the drum).

6. Tighten bearing hub adjustment nut smoothly using a manual device at tightening torque to be $25-30 \text{ N} \cdot \text{m}$ ($2.5-3.0 \text{ kgs} \cdot \text{m}$).

When tightening the nut, turn the steering wheel to adjust the rollers in the bearing properly.

7. Replace locking washer, replace and tighten counter nut at tightening torque to be $20-25 \text{ N} \cdot \text{m}$ ($2.0-2.5 \text{ kgs} \cdot \text{m}$).

Upon bearing replacement, nut tightening torque is to be $35-40 \text{ N} \cdot \text{m}$ ($3.5-4.0 \text{ kgs} \cdot \text{m}$), counter nut $25-30 \text{ N} \cdot \text{m}$ ($2.5-3.0 \text{ kgs} \cdot \text{m}$).

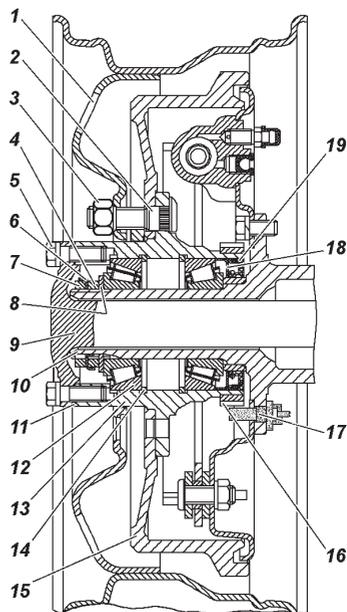
Install the lock washer with its inner tab into the stub axle slot. If the lock washer tabs have any cracks, replace the washer.

8. Check the adjustment of the bearings after tightening of the locknut. If the adjustment is correct the wheel should rotate freely without binding, noticeable axial play or wobbling.

9. Bend one tab of the lock washer round the nut flat and the other tab round the locknut flat until it fits fully to the flats. Unbend the tabs closest to the centers of the nut flats.

10. Install the rear axle shaft or the flange of the front axle hub, 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 hub.

Fig. 9.28. Rear wheel hub:
 1 — wheel; 2 — wheel hub bolt; 3 — wheel fastening nut; 4 — adjusting nut; 5 — axle fastening bolt; 6 — lock washer; 7 — locknut; 8 — thrust washer; 9 — axle; 10 — journal; 11 — spacer; 12 — bearing; 13 — wheel hub; 14 — thrust ring; 15 — brake drum; 16 — impulse disc; 17 — ABS sensor; 18 — thrust washer; 19 — cuff wheel nut



CONTROL SYSTEMS

Steering System

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

It is not permitted to turn off the ignition and remove the key from the ignition switch while the motor vehicle is moving. The steering system shaft is blocked by the anti-theft device when the key is removed, and the motor vehicle is not controlled.

If the steering system does not work properly, it is not permitted to drive the motor vehicle or to tow it with a tow-rope. In this case use two wheel towing or tow truck service.

The steering mechanism can be used only for a short time when the hydraulic power steering is broken as a result of the pump damage, the hose or the pump drive belt malfunction or when the motor vehicle is towed as a result of engine stop. If the power steering system lacks oil, the pump drive belt should be removed, otherwise a pump seizure or belt rip is possible. Pay special attention to coolant temperature when the pump drive belt is removed to avoid engine overheating.

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 backlash is higher than the permissible level, detect the unit which gives the increased play. Therefore the following should be checked: proper tightening (see Annex 2) of the steering box bolts, the tie rod joints, tightening of the propeller shaft joints, air gaps in the joints and spline coupling of the steering column propeller shaft, air gaps in the steering mechanism.

Tie rod joints do not require adjustment and lubrication during vehicle operation. If non-repairable joints have an air gap, replace them.

If a radial air gap in the joint of the steering shaft is detected (axial displacement of the crosspiece in bearings) punch the bearings in yoke eyes, so that the bearing sleeve is not deformed.

Replace the steering column propeller shaft if air gaps in the spline couplings are detected.

If air gaps in the steering mechanism are detected, adjust the mechanism at UAZ service station.

Tension of power steering pump drive belt see section "Engine cooling system".

Replace the belt if damages or excessive stretch are detected.

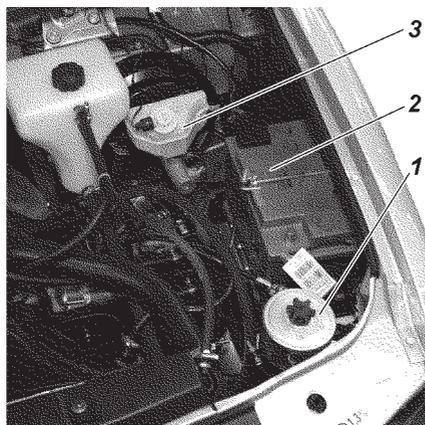


Fig. 9.29. Under hood
(fragment):
1 — oil tank of hydraulic
power steering system;
2 — accumulate battery;
3 — tank of master brake
cylinder

Hydraulic power steering oil: level check and change. To check the oil level in oil tank 1 (Fig. 9.29) position the front wheels straight. Pour the oil to the oil tank up to the level of the filling strainer screen or no higher than 5 mm. Run the oil through the filter with the maximum pour size of 40 mym in advance.

Fill the system as follows:

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

2. Uncap the oil tank, pour the oil until it can be seen over the filter screen (no higher than 5 mm).

3. 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. Add some more oil into the tank.

4. Start the engine and add the oil into the tank simultaneously.

Note. If the oil foams abundantly in the tank, which means that air has entered into the system, stop the engine and let the oil settle for no less than 20 min (until bubbles come out from the oil). Inspect the connections between the hoses and the power steering units and eliminate the leakage as required.

5. Let the engine run for 15-20 sec and bleed the power steering system to bleed residual air from the steering mechanism by turning the steering wheel lock-to-lock 3 times with no stops in the end positions.

6. Add the oil into the tank as required.

7. Cover the tank and tighten the cap with your hand.

8. Connect the drag link, tighten (see Annex 2) and cotter the ball stud nut.

Note. The motor vehicle can be equipped with the hydraulic power steering, having the union which simplifies filling of the system. The union is located on the cap of the drop arm shaft. Before filling the system, open the union, put the one tube end on the union and drop the other end into the vessel with oil (the tube end should be dipped into the oil). After step 4 (filling) is done, close the union.

Brake systems

WARNING! *Please, remember, that the stopped engine and the disabled vacuum booster increase the effort necessary for pushing the brake pedal to stop the motor vehicle.*

WARNING! *If one of the brake circuits is broken, pedal travel is increased and braking efficiency is decreased. In this case do not make short-time multiple pedal pushes, instead push the pedal until maximum efficiency braking.*

If the brake system is broken, it is not permitted to drive it or to tow it with a tow-rope. In this case use two wheel towing or a tow truck service.

WARNING! *Brake fluid is poisonous. Keep it in a tightly closed container. While working with it follow these rules:*

- avoid any operations as a result of which the liquid can enter into the mouth cavity;*
- do not let the fluid dry out on the skin; wash it off with soap and warm water;*
- flush the spilled fluid with water, air the room;*
- remove clothing contaminated with the fluid, dry it outside the room, and wash it.*

WARNING! *After a long parking (over 1 hour) in motor vehicles UAZ-23608, UAZ-23638, UAZ 31638, start going no earlier than 10-15 seconds after starting the engine, so that the vacuum pump can create the depression in the brake booster comfortable enough for braking.*

Please keep in mind that frequent pushing of the brake pedal (immediate pedal push after its release, for example, during downhill) can lower brake efficiency after the 3rd push in comparison with the 1st and the 2nd pushes.

To ensure efficient braking do not let engine idle speed reduce lower than 850 min⁻¹.

The level of brake fluid in tank 3 (see Fig. 9.29) can be checked visually with the marks on the tank housing made of semitransparent plastic. When the cap is off and the brake linings are new, fluid level should be on MAX mark. If the brake hydraulic drive is in good order, reduced level of the tank fluid is connected with the wear of the brakes shoes linings. Reducing of the fluid level to MIN mark indicates its maximum wear. In this case, control the linings condition as installation of new linings heightens the fluid level in the tank up to normal.

The brake fluid warning light comes on when the fluid level falls lower than MIN mark, which indicates that if the brake shoe linings are new or partially worn, the system is non-hermetic

or the fluid is leaking. 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).

WARNING! *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.*

Bleed the brake system if the motor vehicle is not equipped with ABS.

Check the brakes hoses. If cracks appear on the outer side of the hoses, replace them.

If brakes pipes have corrosion, replace them.

Anti-lock braking system. Depending on the configuration motor vehicles can be equipped with the anti-lock braking system (ABS). ABS prevents the wheels from locking up while braking, which keeps the initial motion trajectory and minimum braking distance. However the motor vehicle braking distance can be increased when breaking on roads with soft surface (gravel, sand, unrolled snow) compared to lock braking in the same conditions.

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.

Illuminating of  ABS signal of malfunction (except for self test mode when cycling the ignition) indicates a system malfunction. Despite the fact that it does not affect the work of the brake hydraulic drive, it is recommended to contact UAZ service station to eliminate the problem.

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.

Front disc brakes. To inspect brake shoes 2 (Fig. 9.30) place the motor vehicle on level ground and raise the parking brake. Inspect the shoes through the window in caliper 4. If the linings

wear to a thickness of 1.5–2.0 mm, replace the shoes on both front brakes.

To replace the brake shoes unscrew bolts 16, remove carrier 18 and spring 1.

Check the brake disc. If its surface has deep notches and burrs, remove it, clean and grind. When the disc wears to a thickness of 20.4 mm, replace it.

Make sure that the crankcase 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 rest the inner surface of crankcase 17. Bypass valve 14 can be opened to ease the fluid displacement from crankcase 17. Close valve 14 as soon as pistons 9 completely sink into the crankcase. Before moving clip 3 uncap the master

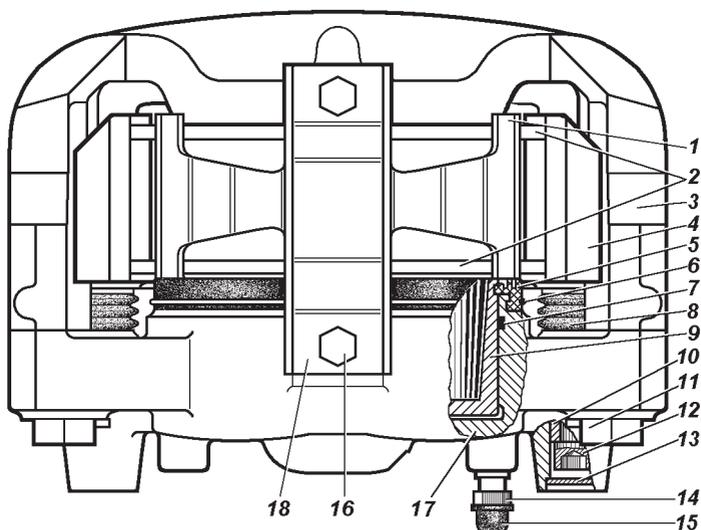


Fig. 9.30 Front disc brakes:

1 — spring; 2 — shoes; 3 — clip; 4 — support; 5 — safety cap; 6 — snap ring; 7 — O-ring; 8 — protective boot; 9 — piston; 10 — bush; 11 — bolt; 12 — screw; 13 — plug; 14 — proportioning valve; 15 — cap; 16 — spring carrier bolts; 17 — crankcase; 18 — spring carrier

cylinder tank 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 worn brake shoes 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.

WARNING! *As spring carrier 18 is asymmetric, make sure in its proper installation. It will ensure that spring 1 presses both shoes.*

The necessary air gap between the brake shoes and the brake disc is maintained automatically during vehicle operation.

In ABS-equipped motor vehicles the calipers have recesses.

WARNING! *The brake disc hardware, the tubing T-connector, the parking brake drive details, the governor drive and the governor itself are fixed with adhesive sealant (with no spring washer) to prevent unscrewing. Add adhesive sealant if unscrewing these bolts and nuts.*

Rear drum brakes (Fig. 9.31, Fig. 9.32 depending on the configuration). Remove brake drums periodically and clean

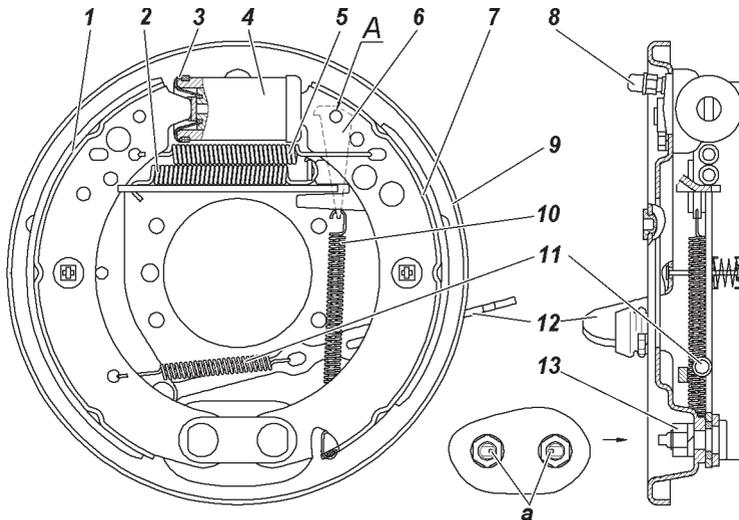


Fig. 9.31. Rear wheel brake for wheel parking brake (variation 1):
 a — anchor stud marks; 1, 7 — brakes shoes with linings; 2 — expander link spring; 3 — safety cap; 4 — wheel brake cylinder; 5 — brake release spring; 6 — adjusting lever; 8 — bypass valve; 9 — shield; 10 — adjusting lever spring; 11 — drive lever spring; 12 — idler lever unit; 13 — anchor studs

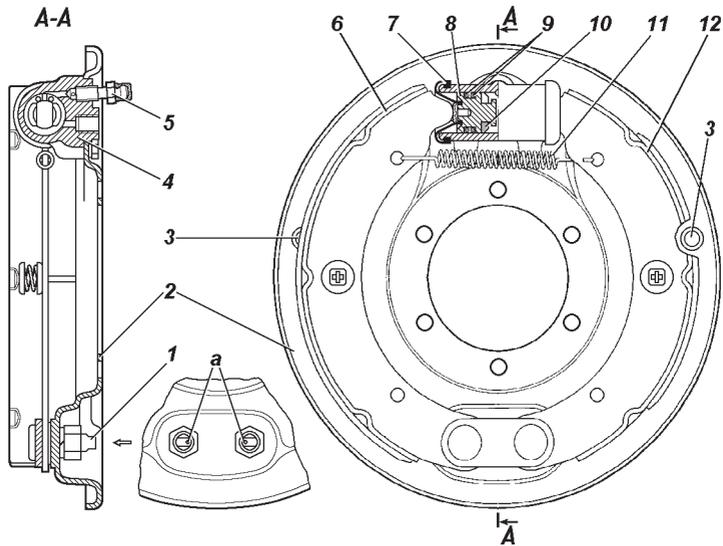


Fig. 9.32 Rear wheel brake (variation 2):

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

the brake details from dust and dirt. The frequency depends on vehicle operation conditions. Clean the drums more often in summer and when driving dirty roads and less often in winter.

Sand the rear brake shoes when they get greasy. Replace the greasy linings or keep them in clean gasoline for 20-30 min and grind them with sand paper or a wire brush.

After the drums are removed, make sure that wheel cylinders do not leak and are securely fixed to the shield. Pay attention to the condition and installation of wheel cylinders safety caps 3 to the wear of the linings and to the condition of the brake drum.

Safety caps must be tightly installed in piston and cylinder seats and not damaged.

If the drum working surface has deep notches and burrs or wear unevenly, rebore the drums from the central orifice. The maximum permissible diameter of the working 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).

Move the pistons with the snap rings deep into the cylinder to put the drum on the shoes easily when replacing the worn shoes or linings. When replacing the shoes and linings in brakes (Variation 1) raise adjusting lever 6 (Fig. 9.31). To make reassembly more convenient, fix the lever on the shoe: match the orifice in the upper part of the lever with orifice A (Fig. 9.31) in the shoe rib and insert a bar into these orifices with a diameter of 6-8 mm. When reassembly comes to an end, remove the bar. After the reassembly press the brake pedal 2-3 times to install the pistons to the working position.

Do not press the brake pedal when the brake drum or the leading shoes 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 shield bolts when the hubs are removed.

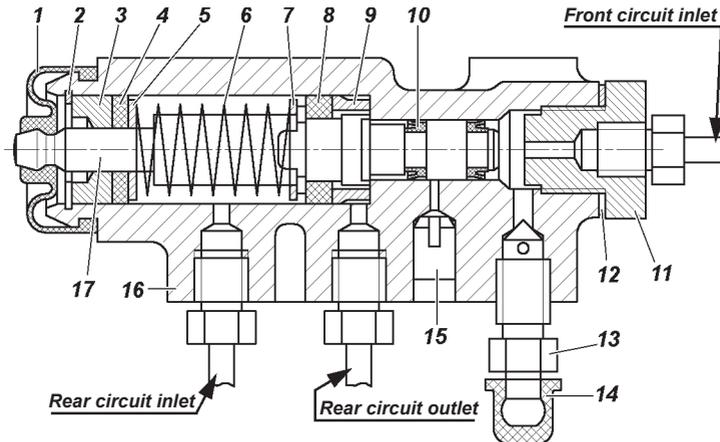


Fig. 9.33. Proportioning valve:

1 — protective boot; 2 — snap ring; 3 — bush; 4 — piston O-ring; 5, 7 — piston spring supporting washer; 6 — piston spring; 8 — weatherstrip; 9 — housing bush; 10 — cuff; 11 — lock; 12 — lock spacer; 13 — bypass valve; 14 — cup; 15 — plug; 16 — housing; 17 — piston

Proportioning valve. The motor vehicles without ABS are equipped with the proportioning valve (Fig. 9.33), which ensures the optimal distribution of braking forces between the axles of motor vehicle and prevent the rear wheels from blocking earlier than the front wheels. When servicing the motor vehicle check the proportioning valve and clean it from dirt and check its attachment. Make sure by visual inspection that the valve and its drive details are not damaged, the brake fluid does not leak and the coupling of the pillar with the flexible arm and the bracket on the rear axle has no play.

When pressing the brake pedal, proportioning valve piston 17 should move out from the housing for 1.7-2.3 mm. If the piston has no stroke, as well as poor or excessive stroke, the valve or its drive have malfunctions.

When inspecting the hydraulic drive pay attention to protective boot 1, to the position of gauge plug 15 and to brake fluid leaks from it. The plug should normally be sunk into the housing orifice of the valve up to the stop. If the plug comes out and the brake fluid leaks, the valve must be replaced.

The protective boot should be tightly installed in the seat of the piston and the housing should have no damages.

During the operation and during rear springs replacement, adjust the force of flexible arm 4 (Fig. 9.34) to the valve piston. For adjustment do the following:

1. Install the motor vehicle on even level ground.
2. Loosen the locknut of adjusting bolt 3 and unscrew the bolt for 2-3 turns.

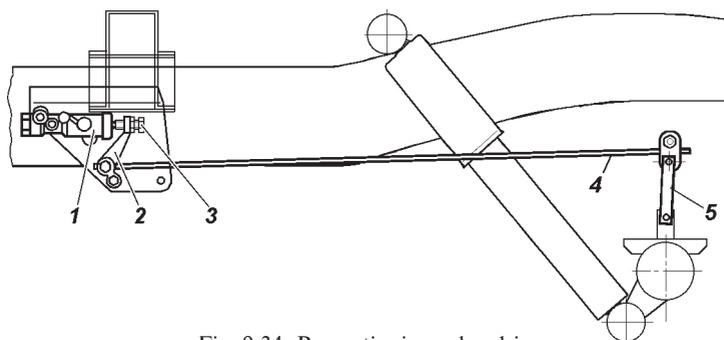


Fig. 9.34. Proportioning valve drive:

- 1 — proportioning valve; 2 — drive lever; 3 — adjusting bolt; 4 — flexible arm; 5 — arm pillar

3. Screw bolt 3 until it touches piston tail 17 (see Fig. 9.33) of the valve.

4. Tighten bolt 3 (see Fig. 9.34) for 2-3 turns (14 edges of the bolt head).

5. Tighten the locknut.

6. Check the stroke of the valve piston (see above).

7. Check adjustment correctness in motion of the motor vehicle. While going on a straight level road with dry surface, brake the motor vehicle until wheels block. If the valve is in order and drive adjustment is done correctly, the front wheels should be blocked slightly earlier than the rear ones. If the rear wheels are blocked earlier, unscrew bolt 3 for 1-2 edges of the bolt head and check the brakes in motion again.

Change the fluid regularly for proper work of the brakes: drain old fluid via the bypass valves of wheel cylinders and proportioning valve, and then replace it with a new one.

Fill the brake system as follows:

WARNING! *Filling the brake system of ABS-equipped motor vehicles is necessarily carried out at a service station as it requires additional diagnostic equipment.*

1. Check all couplings of the brakes hydraulic drive for leakages and the flexible rubber pipes and hoses.

2. Clean the bypass valves and the safety caps of wheel cylinders, crankcases and proportioning valve from dust and dirt.

3. Clean the tank of master cylinder from dust and dirt around the cap and uncover it. Fill the tank with brake fluid up to MAX mark.

4. Press the brake pedal several times to eliminate the effect of depression in the brake booster.

5. Bleed successively the chambers of the right and left rear brakes wheel cylinders, the front circuit of the proportioning valve (for non-ABS motor vehicles), and then the right and left crankcases of front brakes.

Bleed the system as follows:

WARNING! *While bleeding, add the fluid to the master cylinder tank in time and do not let the fluid level decrease lower than 2/3 of the tank volume. Do not let air come into the system.*

If air comes into the brake system of the ABS-equipped motor vehicle, contact a service station. It is forbidden to operate a motor vehicle until the malfunction is eliminated.

1. Remove the cap from the bypass valve of the wheel cylinder, from the crankcase or from the proportioning valve (for non-ABS motor vehicles) and put a special rubber hose (c. 400 mm long) on the valve.

Drop the other end of the hose into a transparent vessel, no less than 0.5 L, which is half-filled with brake fluid.

2. Press the brake pedal 3-5 times abruptly, hold it in the extreme position and simultaneously unscrew the bypass valve for 1/2-3/4 of a turn to release the fluid portion from the system to a vessel. After the pedal goes forward up to the stop, screw the valve. Repeat the operation until bubbles stop coming out from the hose dropped into the vessel with brake fluid.

3. Once bleeding is over, press the pedal and hold it in the extreme position, screw the bypass valve (see Annex 2) and remove the hose. Dry the valve head and put on the safety cap.

4. Add brake fluid up to MAX mark into the master cylinder tank.

Cover the tank cap. Screw the cap tightly with effort, carefully to avoid breaking it.

While bleeding add the fluid to the master cylinder tank in time and do not let the fluid level decrease lower than 2/3 of the tank volume. Hold the hose end dropped into the fluid.

Check the brake system when driving the motor vehicle. If the working brakes and their drives are adjusted correctly and the brake system is bled correctly, full braking occurs within 1/2-2/3 of the pedal travel.

It is not recommended to add the brake fluid collected after bleeding to the master cylinder tank.

Brake pedal travel can be adjusted by turning adjusting screw 6 as required (Fig. 9.35). Free pedal travel should be 5-8 mm. After adjusting tighten the screw nut with the torque of 14-18 N · m (1.4-1.8 kgf · m).

Adjust switches 4 with nuts 7, maintaining an air gap of no more than 0.5 mm, which is indicated in the figure. After adjusting, tighten the nuts with the torque of 4-6 N · m (0.4-0.6 kgf · m).

Parking brake system

Wheel parking brake, affecting the brake shoes of rear wheels (Fig. 9.36).

WARNING! After the motor vehicle stops, apply the parking brake.

When parking the motor vehicle during cold seasons do not apply the parking brake after driving on a wet road, thereby preventing the shoes from freezing to the drums. Instead, shift into the first or the reverse gear (any position of the transfer case lever, except for neutral position) and put wheel wedges as required.

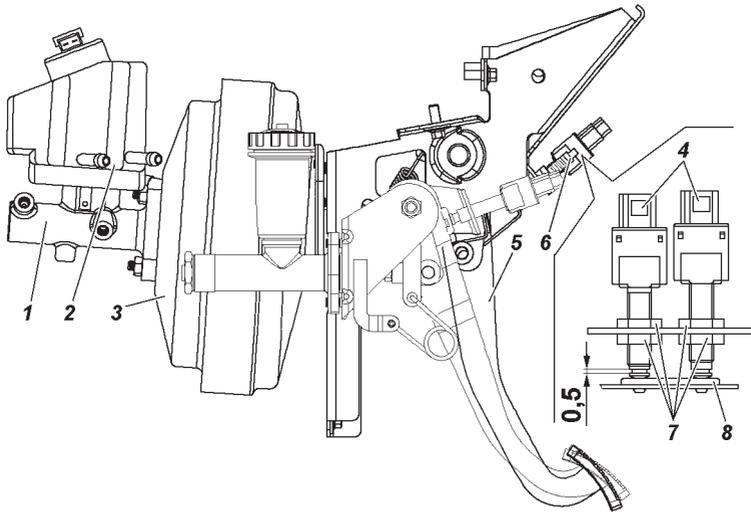


Fig. 9.35. Master brake cylinder drive:

1 — master brake cylinder housing; 2 — tank; 3 — vacuum booster; 4 — brake signal switches; 5 — brake pedal; 6 — adjusting screw; 7 — nuts; 8 — buffer

The wheel parking brake is equipped with the system, which compensates wear of the friction linings automatically, and should not be adjusted during the motor vehicle operation. However, to ensure normal operation of the brake, check the drive cables and adjust them to compensate their tightening and loosening during operation.

Adjust the parking brake drive, when the travel of the brake lever is more than 6 clicks of the lever pawl and braking effect is insufficient.

WARNING! Use a pit or a hoist for adjustment.

Adjust the parking brake drive as follows:

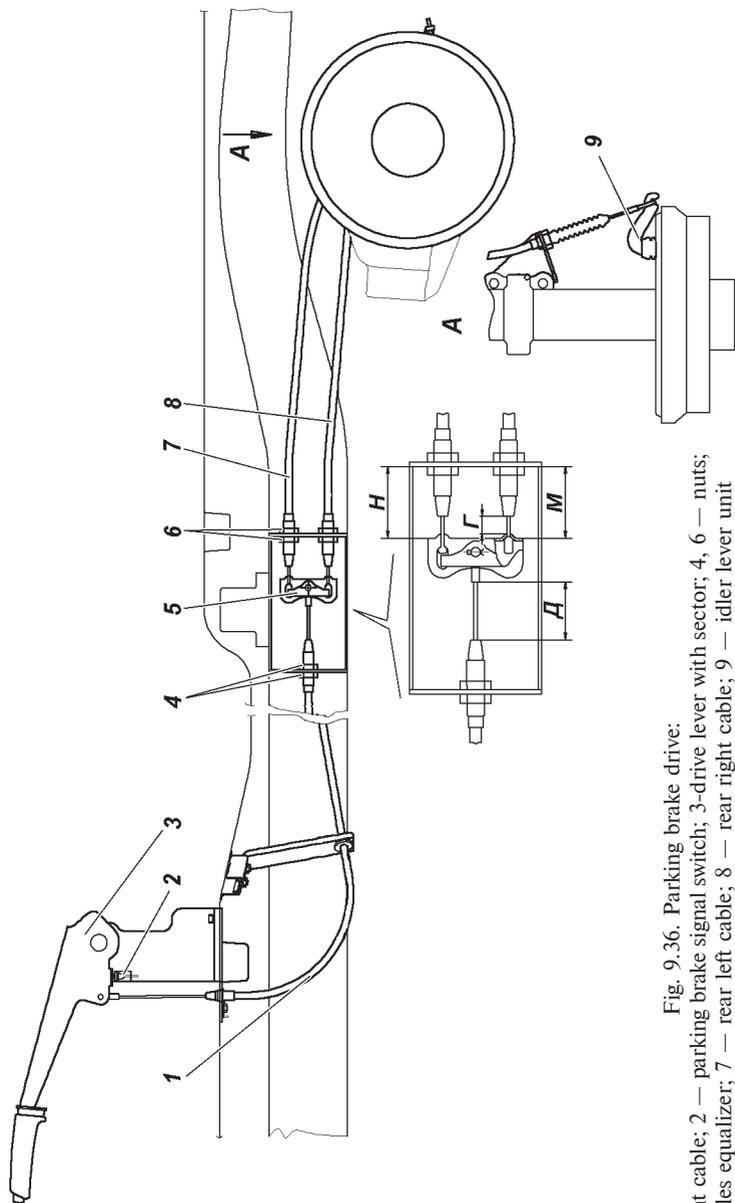


Fig. 9.36. Parking brake drive:
 1 — front cable; 2 — parking brake signal switch; 3 — drive lever with sector; 4, 6 — nuts;
 5 — cables equalizer; 7 — rear left cable; 8 — rear right cable; 9 — idler lever unit

1. Check the air gaps correctness between the brake shoes and the rear brakes drums: press hard the brake pedal several times while the parking brake drive lever is lowered to its extreme position.

2. Lift the rear part of the motor vehicle and put secure struts under it.

3. Set the parking brake lever 3 in the lower position (Fig. 9.36).

4. Compress the drive by tightening the lever with a force of min. 400 N (40 kgf) 2-3 times.

5. Turn nuts 4 and 6 and choose the slack of cables 1, 7, 8. Keep the following sizes: $G = 1$ mm (min), $D = 35$ mm (min), and keep the difference of sizes M and N max. 6 mm (fig, 9.36). While choosing the slack of cables do not move levers 9.

6. When adjusted correctly, the lever travel should correspond to 4-6 clicks of the pawl, and when controlling the travel the force to the lever must equal to $600 + 10N$ ($60 + 10\text{kgf}$). After adjusting lever 3 must be lowered and lifted rear wheels should be turned with hands.

It is forbidden to check the parking brake system while moving. It should be done only on a slope.

Drive-line parking brake, affecting the driving system (Fig. 9.37).

Clean the brake shoes from dust and dirt and sand them, if they get greasy. Replace greasy linings or keep them in clean gasoline for 20-30 min and grind them with sand paper or wire brush.

Replace the linings in case of their excessive wear (the rivets are sunk less than 0.5 mm). Grind the linings on new shoes, so that their diameter is 0.2-0.4 mm less than the brake drum diameter.

Despite labyrinth seal of the release and adjusting mechanisms, they gradually collect dirt, therefore dismantle and clean the mechanisms (especially the release mechanism), adding new grease (Litol-24). Do not let the grease contact the drum and the linings.

Adjust the brake when the brake lever travel gets more than half of its maximum travel and when braking effect is insufficient.

WARNING! *Use a pit or a hoist for adjustment.*

Adjust the air gaps between the shoes and the drums as follows:

1. Shift the transfer case lever into neutral position.
2. Lower parking brake lever 1 (Fig. 9.37) into its extreme 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 hands.

5. As required, choose the slack of cable 7 and drive air gaps by turning nuts 5. As required, 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 adjusting screw 10 by 4-6 clicks, so that the drum revolves freely by hands. If adjusted correctly, the travel of lever 1 should correspond to 3-5 clicks of the lever pawl.

Adjust the length of the drive-line brake drive rod 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 hands.

2. Unscrew locknut 16 of adjusting yoke 17, remove the snap pin and take out the stud, which connects the yoke with drive lever 18.

3. Match the orifices in the yoke and lever 18 by rotating yoke 17. Choose air gaps in the release mechanism and in the drive by moving lever end 18 with a orifice and rod 15 to each other.

4. Install the stud, cotter it and tighten the locknut.

If adjusted correctly, the motor vehicle should brake when the lever pawl is installed into the 4th-6th sector slot from the bottom (4-6 clicks).

It is forbidden to check the parking brake system while moving. It should be done only on a slope.

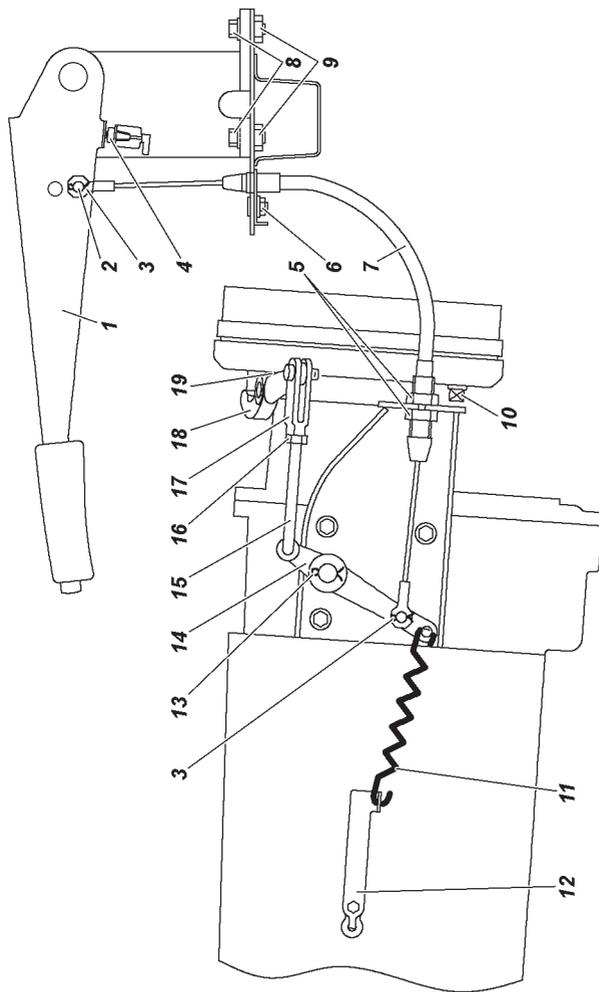


Fig. 9.37. Drive-line parking brake drive:

- 1 — drive lever with sector; 2 — stud; 3, 13 — snap pin; 4 — parking brake signal switch; 5, 6 — nuts; 7 — drive cable; 8 — bolts;
- 9 — spring washers; 10 — adjusting screw; 11 — release spring; 12 — release screw; 13 — spring bracket; 14 — locknut;
- 15 — adjusting yoke; 16 — drive lever; 17 — housing of release mechanism balls

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 cabin relay and fuse box is located under the cap on the instrument panel, left from the steering column (Fig. 9.38). The scheme of relays and fuses is located on the inner side of the box cap.

To access the relay and box, release the upper part of cap 20 (Fig. 3.1, 3.2), overcoming the springs, and remove it from the hooks in the bottom.

The relay and fuse box under the hood is located on the left, behind the battery (Fig. 9.39). The scheme of relays and fuses is shown on the inner side of the box cap.

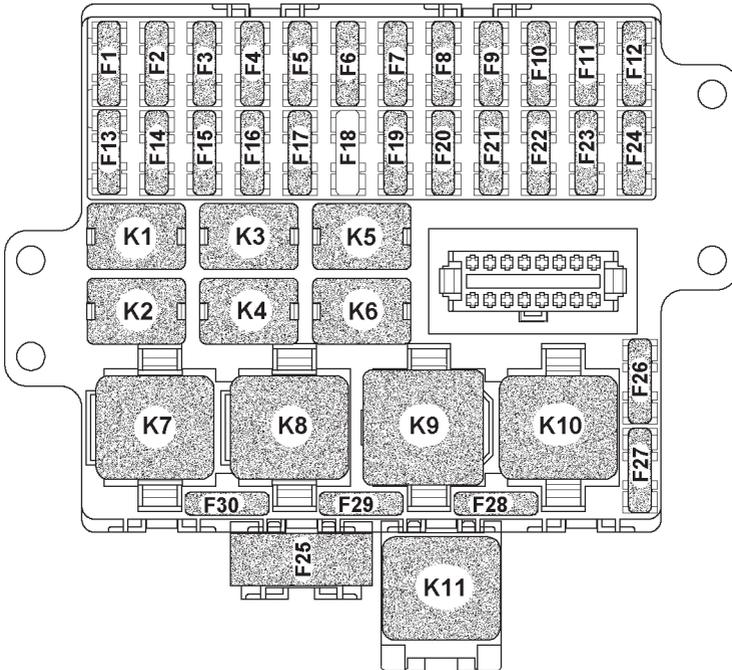


Fig. 9.38. Relay and fuse box in motor vehicle cabin:
K1-K11 — relays; F1-F25 — fuses (see the Table)

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 (see Table 9.1).

Table 9.1. Fuse protected chains

Designation	Current, A	Protected chains
		Relay and fuse box in cabin
F1	10	"Dymos" transfer case 15 A
F2	15	Cabin socket
F3	10	Air conditioner compressor
F4	30	Power options relay box 30 A
F5	7.5	Dome and reading lamps, glove compartment lamp, luggage compartment lamp, breaking alarm lamp switch
F6	25	Heating and air conditioning system, switch of rear screen and mirrors 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 bodyshell heater
F10	20	Heating of glass tailgate, mirrors, light control module
F11	20	Audio alarm (for the motor vehicles with ZMZ-51432 engine)
F12	20	Cigarette lighter, luggage compartment socket
F13	30	"Dymos" transfer case 30 A
F14	10	Window lifters (driver door module)
F15	10	Cluster 34 A, reverse movement switch, speed sensor 1 A, alarm signal switch 2 A
F16	10	Alarm signal
F17	10	Radio and multimedia
F18	-	Not installed
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	Windshield heating
F26	10	Reserve
F27	10	Reserve
F28	30	Reserve
F29	25	Reserve
F30	20	Reserve

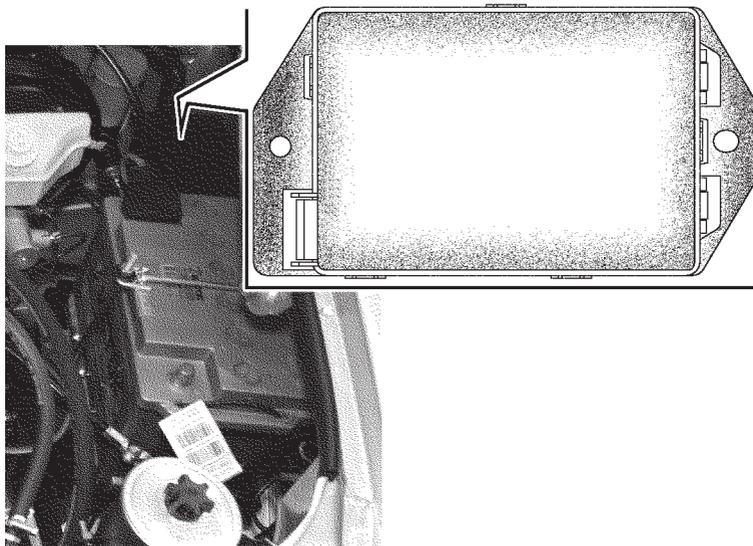


Fig. 9.39. Relay and fuse box under the hood

Alternator

WARNING! *Even short-time engine operation with the accumulator battery off can lead to alternator diodes damage.*

Turn off the accumulator battery while removing the alternator for maintenance.

Keep the alternator clean. Blow the alternator with compressed air to remove dust.

Accumulator battery

WARNING! *Use extreme caution when handling electrolyte. Follow these rules to prevent poisoning and chemical burn:*

- *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 operation that can result in electrolyte getting onto the skin. If this occurs, carefully wipe off electrolyte with cotton wool and immediately rinse remained traces on the 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 2 (Fig. 9.29) is installed on a bracket under the hood of the motor vehicle.

Check the alternator operation if the accumulator battery is discharged, overcharged by the alternator or electrolyte starts boiling.

Keep the accumulator battery clean and charged and protect the battery clips and the cable terminals from oxidation.

Periodically clean vent orifices in the plug, check electrolyte level and add distilled water as required.

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 ± 0.01 g/cm³.

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 starter 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.

Starter drive should move freely with no jamming at the shaft splines, and it should return to the source position by the return spring. The anchor should not revolve when the drive gear goes in the working rotation direction. In case of reverse rotation the gear should revolve with the shaft. Check the ease of rotor rotation in bearings with the brushes lifted by turning the shaft by hands .

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.

WARNING! *It is prohibited to move the motor vehicle with the starter. The starter should work no more than 10 seconds uninterruptedly. Turn on the starter again after min. 1 minute, no more than 3 times. If the engine cannot be started, detect and eliminate the malfunction.*

Lighting system, light and audio alarm

Lamp maintenance consists in its adjustment and replacement of bad ones.

Adjust the headlamps 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. 9.40).

2. Move control 3 (see Fig. 3.4) of headlamp adjuster to 0 position.

3. Switch on low beam and, closing each headlamp in turn, rotate adjusting screw 1 (Fig. 9.41) and adjusting gear 2, so that 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.

Headlamp replacement. To change T/signal lamps remove the connector from socket 6 (Fig. 9.41), turn the socket clockwise (for the right headlamp) or counter-clockwise (for the left headlamp) and remove the socket with the bulb.

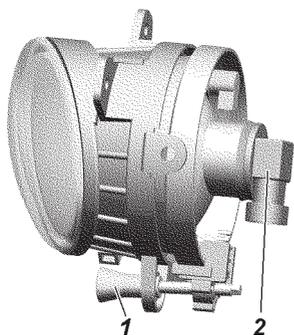


Fig. 9.42. Front fog light:
1 — adjusting screw; 2 — wiring harness connector

To change the bulbs of high 3 and low 4 beams, remove cap 5. Disconnect the wire from lamps 3 and 4, release the ends of the lamp spring pawl from slots and remove the lamp.

Install halogen lamps wearing gloves, do not touch the lamp bulb. If the bulb has fat stains, remove them with alcohol.

Front fog lamps. Adjust the front fog lights with screw 1 (Fig. 9.42), using S=5 or Torx T20 keys. Install the light into the position in which the cutoff line coincides with line 1 (Fig. 9.43).

To replace front fog lights remove wiring harness connector 2 (Fig. 9.42) from the light, turn it counter-clockwise and remove it.

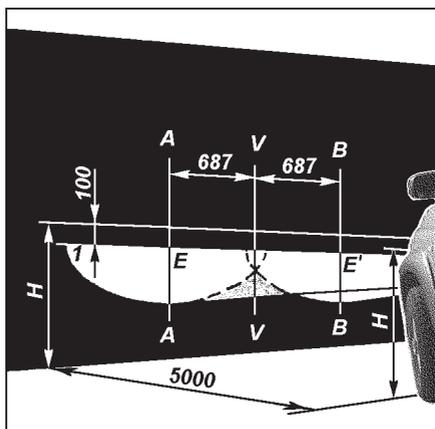


Fig. 9.43. Screen marking for front fog lights adjustment:
H — distance between the headlamps center and the ground level; V-V — motor vehicle longitudinal axis projection; A-A, B-B — axes of headlamps centers

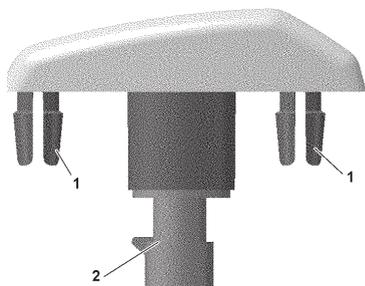


Fig. 9.44 Side T/Signal:
1 — catches; 2 — socket

Fig. 9.45. Rearview mirror
with side T/Signal



Install halogen lamps wearing gloves, do not touch the lamp bulb. If the bulb has fat stains, remove them with alcohol.

Side T/signals are located at UAZ Cargo on front fenders sideways. To change T/signal lamps press catches 1(Fig. 9.44) and remove T/signals, then take out socket 2 with the lamp.

Replace T/signal lamps only when lockers are removed.

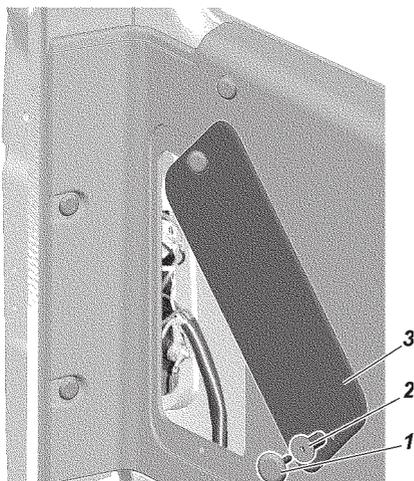


Fig. 9.46. Hatch of tail
lamp access:
1 — catch of holder cap; 2 —
holder cap; 3 — cap

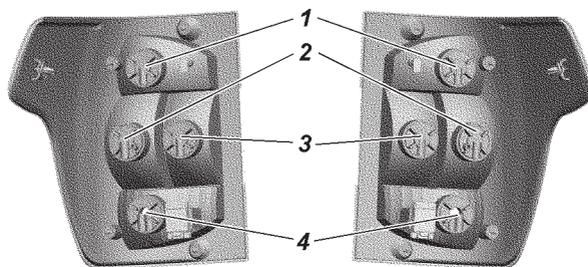


Fig. 9.47. Tail lamps:

1 — socket of brake signal lamp; 2 — socket of T/signals lamp; 3 — socket of reverse lamp; 4 — socket of fog lights and parking lamps

Side T/Signals are located at UAZ Patriot and UAZ Pickup in rearview mirrors (Fig. 9.45). If the lamps are broken, they are replaced with a new rearview mirror.

Tail lamps are located in the bodyshell back.

Replace tail lamps from the motor vehicle cabin. Remove catch 1 (Fig. 9.46) of lower cap holder 2, pull cap 3 and remove the holder from the upholstery orifice, then turn the cap. You can replace any lamp (Fig. 9.47) by taking out the sockets with

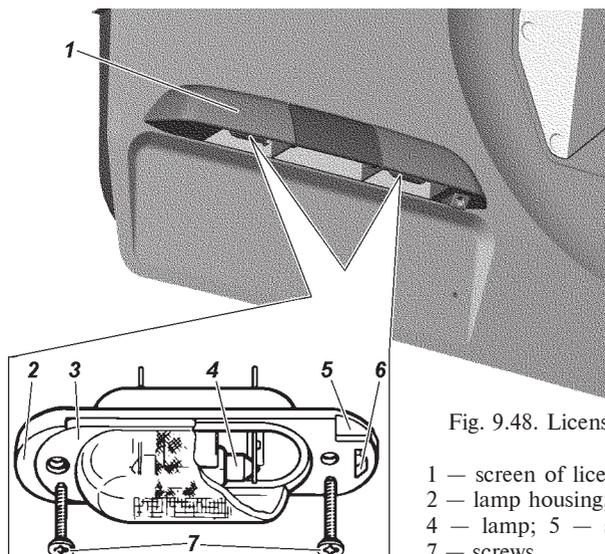


Fig. 9.48. License plate lamps:

1 — screen of license plate lamps;
 2 — lamp housing; 3 — lamp lens;
 4 — lamp; 5 — slot; 6 — pawl;
 7 — screws

Fig. 9.49. Center high mount stop lamp (UAZ Patriot)

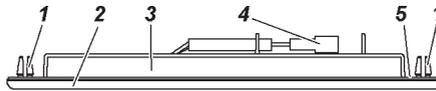
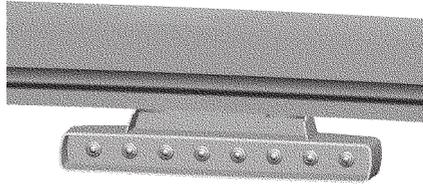


Fig. 9.50. Center high mount stop lamp (UAZ Pickup):
1 — catches; 2 — lens; 3 — lamp housing; 4 — connector; 5 — gasket

lamps by rotating counter-clockwise. Replace the holder and the catch if necessary.

License plate lamps are located in the tailgate handle. Untwist screws 7 (Fig. 9.48) and take out the lamp. Insert the screwdriver to slot 5, press pawl 6, and remove lens 3.

Center high mount stop lamp is located at UAZ Patriot on the inside panel of the tail gate (Fig. 9.49). The bad lamp should be replaced.

The center high mount stop lamp (Fig. 9.50) is located at UAZ Pickup on the tailgate, depending on configuration and is fixed by catches 1. The bad lamp should be replaced.

Reading lamps and dome lamp (Fig. 9.51) are located on the headliner. The bad lamps should be replaced.

Glove compartment lamp. To replace the lamp, remove the lamp shade (Fig. 9.52) from the glove compartment. Release holder 2 and replace lamp 1.

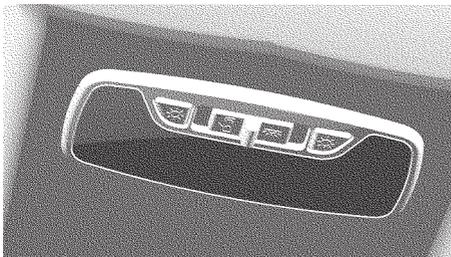


Fig. 9.51. Reading lamps

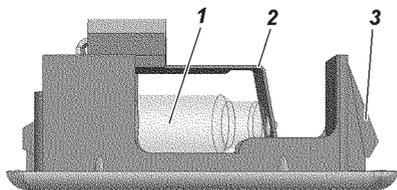


Fig. 9.52. Glove compartment lamp:
1 — lamp; 2 — lamp holder; 3 — catches

Luggage compartment lamp is located on the right side of the compartment (Fig. 9.53). To replace the lamp, remove the lamp shade by pushing it through the side hatch under cap 1. Release holder 3 and replace lamp 2.

Gages and alarms

When removing electric sensors, isolate the wires to avoid short circuiting. Use a hex socket wrench or a box wrench to remove the coolant temperature sensor and the coolant emergency temperature sensor without damaging their housings.

Do not let fluid level decrease in the cooling system radiator as it can lead to a sensor malfunction.

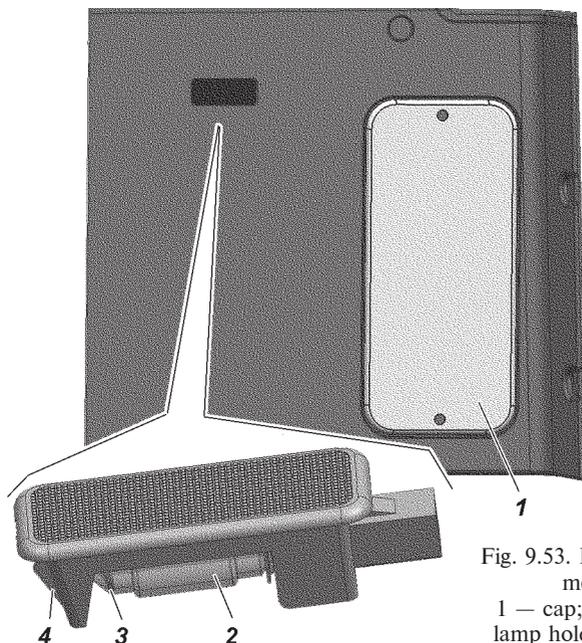


Fig. 9.53. Luggage compartment lamp:
1 — cap; 2 — lamp; 3 — lamp holder; 4 — catches

Radio equipment+

Loudspeakers are installed on door interior panels, and tweeters are installed on front door interior panels.

The head unit of multimedia system with a monitor is located on the instrument panel.

The monitor of multimedia system can show the picture from rear view camera 4 (Fig. 3.19).

Turn the IGN key into position I (Fig. 3.5) to switch on radio or multimedia system.

You will find all necessary information about operation and maintenance in the manufacturer's manual, enclosed in the motor vehicle.

BODYSHELL

Always take preventive care of the bodyshell paint to preserve the motor vehicle's appearance. Do not clean the surface from dust and dirt with dry cloth to avoid scratches. Wash the bodyshell with low-pressure water jet, using car shampoo and a soft cloth. Do not use sponges.

When washing the bodyshell with such systems as "Karcher", use 'blade' and 'fan' modes or other similar modes. Do not use 'jet' mode for washing door and window apertures to avoid weatherstrip release and water coming into the cabin.

Wipe dry the washed bodyshell surfaces to avoid stains appearing after drying-out in summer, and to avoid cracks appearing after water drops freezing. Do not use soda and alkaline solutions, as it leads to paint fading.

WARNING! *Do not wash the motor vehicle with the engine started.*

When possible do not park the motor vehicle under direct sunlight to avoid deteriorating wheel tires and weatherstrips.

Use preventive polishes, such as car emulsions, aerosol polishes, AB-70 wax (for motor vehicles) etc, to preserve the bodyshell paint. Use cleaning polishes to restore the shine of faded bodyshell paint.

During vehicle operation, periodically treat the surfaces (especially closed hollows) with anti-corrosion products, such as 'Movil', 'Tectil', 'Nova' etc, to preserve the bodyshell from premature deterioration. Treat the closed bodyshell hollows through the orifices in floor panels and cross members, which are closed by rubber plugs.

As required, recover the bodyshell floor pan, coated with bituminous mastic, by spreading the mastic with a special spray or with a brush.

VEHICLE LUBRICATION

Long and failure-free motor vehicle work mainly depends on the timely change of oil and grease in units and assemblies.

It is strongly recommended to follow the instructions of this manual and the lubrication service Manual. The grease names are indicated in the lubricants and fluids table (see Annex 3). It is not permitted to use oils and greases not indicated in the table, and to break greasing intervals.

Methods of assembly lubrication and grease change are described in the corresponding manual sections.

Within 24 hours after fording, check oil in all units. If water is detected in the oil, change the oil in this unit and grease all the lubrication nipples of the chassis until the fresh grease squeezes out.

While greasing, follow these rules:

1. Drain oil from the engine and the transmission units immediately after the motor vehicle stops while the units are warmed up.

2. Thoroughly remove dirt from the lubrication nipples and plugs before greasing to avoid dirt getting into the motor vehicle mechanisms.

3. Thoroughly remove escaped grease from all the details after lubrication.

4. If the housings of the engine and the transmission units contain excessively dirty oil or the 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" grease with "Lita" substituting grease is allowed in any proportions. When using other substitutes wash the unit with kerosene.

7. Mixing of the following brake fluids is allowed in any proportions: "Rosa", "Rosa-3", "RosDot", "Tom", "Rosa Dot-4".

Chapter 10. TOOL AND APPLIANCES

Each manufactured motor vehicle is equipped with the tools and appliances according to the list, enclosed in the motor vehicle.

A jack (Fig. 10.1 or 10.2) is applied for lifting vehicle wheels when servicing or repairing

. Carrying capacity of the jack in Fig. 10.1 is 2 tons, that of the jack in Fig. 10.2 is 1 ton. The highest lifting point of the jack in Fig. 10.1 is 410 mm, that of the jack in Fig. 10.2 is 380 mm.

WARNING! *If defective or installed improperly, the jack can cause injuries or motor vehicle damage. It is strictly forbidden to carry out any work with the motor vehicle if it stands only on the jack.*

To lift the wheels with the jack in Fig. 10.1 do the following:

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 neutral position. Put wheel wedges under the wheel opposite to the lifted one as required.
2. Install the jack on level ground under the axle shaft housing.
3. Untwist internal jack screw 3 as high as the clearance between the axle shaft housing and the ground allows.
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 wheels, move the jack "pawl" to the right and deepen the jack screws into housing 1 by swingings the wheel nut wrench. At the end of work, twist external screw 2 and internal screw 3 into the housing up to the stop.

To lift the wheels with the rhombus jack in Fig. 10.2 do the following:

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 neutral position. Put wheel wedges under the wheel opposite to the lifted one as required.
2. Install the jack on level ground under the axle shaft housing.
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.

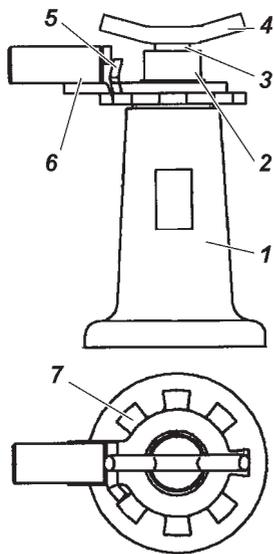


Fig. 10.1. Jack:
 1 — housing; 2 — external screw;
 3 — internal screw; 4 — head;
 5 — pawl; 6 — handle; 7 — ratchet

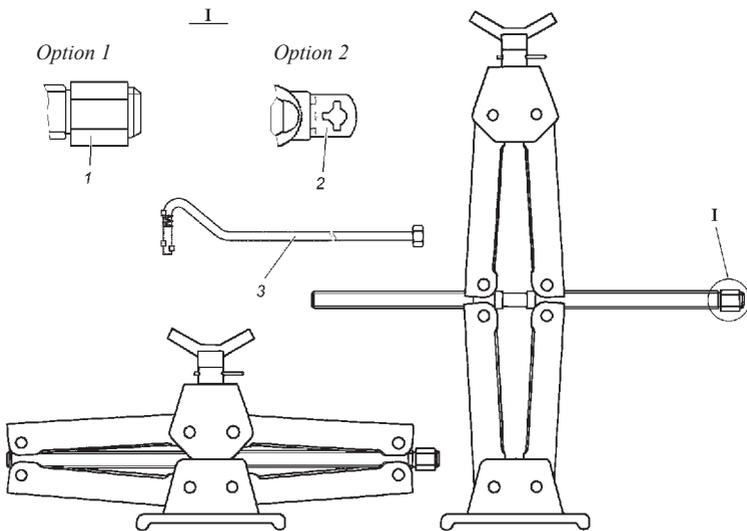


Fig. 10.2. Jack:
 1 — hexagon under 22 mm wrench; 2 — yoke; 3 — extension

4. To lower the wheel, rotate hexagon 1 counter-clockwise with the wheel wrench. At the end of work, fold the jack completely by rotating the hexagon with the wrench.

Jack Maintenance: periodically clean the thread details from dirt and grease them.

Inspect the riveted couplings, screws and levers of jacks. Screws and levers deformation or damage, as well as riveted couplings loosening are not allowed. If present, replace the jack.

CHAPTER 11. PRESERVATION

If the motor vehicle is not operated for a long time (over 3 months), preserve it as follows:

1. Carry out scheduled maintenance.
2. Wash the motor vehicle and dry it. Remove corrosion and paint the areas of damaged paint.
3. Fill each engine cylinder with 30-50 g of hot dehydrated motor oil to prevent them from corrosion. When spark plugs are screwed off and power wires are disconnected from the ignition coils, turn the engine crankshaft with the starter (for 3-5 sec) to spread oil over the whole surface of cylinders.
4. Clean the electric wiring from dirt and dry it thoroughly.
5. Clean 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 the painted parts and dry them.
6. Grease the springs with a graphite lubricant.
7. Check and clean the tools and the appliances, wrap them in oiled paper.
8. Cover the bodyshell glasses with lightproof paper (cloth) or with shields.
9. Remove the wheels and dismantle them as required. Clean the wheel disks from dirt and corrosion, straighten and paint them. Clean the tires from dirt, wash and dry them. Talc the tubes and the inner side of tires. Collect the wheels and tires, put the normal pressure in them and install on the motor vehicle.
10. As required, wash the fuel tanks and fuel them up to the max level.
11. Prepare the accumulator battery for long preservation, following the instructions (see accumulator battery operating Manual).

12. Cover the air filter inlet tube and the muffler tailpipe with solid-oiled paper.

13. Loosen the tension of ventilator and alternator drive belts.

14. Drain the fluid from the cooling system and from the windshield washer.

15. Seal the housings of the transfer case, front and rear axles by wrapping their safety valves in insulating tape.

16. Cover the gap between the brake shields and the drums with solid-oiled paper.

17. Keep the tires and other rubber details from direct sunlight.

18. Put metal or wooden stands under the axles, so that the wheels are lifted above the ground.

Release the bow and front springs by putting wooden spacers between the frame and the axles.

Keep the preserved motor vehicle in a clean and ventilated room with relative humidity of 40-70 % and with a temperature of min. +5°C.

It is forbidden to keep the motor vehicle and poisonous substances (acids, alkali, etc.) together.

Maintenance of preserved motor vehicle

Carry out the motor vehicle maintenance every two months. Do the following:

1. Thoroughly inspect the motor vehicle from the outside.

2. Screw off the spark plugs and turn the engine crankshaft with the starter (for 3-5 sec) after shifting into the first gear of the gearbox and into the reduction gear of the transfer case. Disconnect the power wires from the ignition coils in advance. Once a year, fill the engine cylinders with 30-50 g of the engine oil by turning the crankshaft.

3. Clean the damaged areas from corrosion and grease and paint them.

4. Turn the steering wheel to both sides 2-3 times.

5. Check the parking brake and the pedal brake, the clutch, the throttle drive and lighting switches.

6. Check the fluid level in the tanks of the brake master cylinder. Add fluid as required.

7. Check the electrical equipment instruments.

8. Check the tools and the appliances, wipe and grease them again as required.

9. Check the tires and other rubber details.
10. Eliminate detected malfunctions.

Depreservation

1. Remove greased paper from the details and preservation grease, wash the details with kerosene or unleaded gasoline. Thoroughly remove the grease from the details that can contact rubber details or painted surfaces. Thoroughly wash the spark plugs in unleaded gasoline.
2. Fill the engine cooling system.
3. Carry out everyday vehicle maintenance.
4. Check oil level in the engine housing. Drain excessive oil.
5. Before starting the engine fill each cylinder with 30-50 g of the motor 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 motor vehicles by water or air transport, fasten them in accordance with the water transport shipment scheme or air transport shipment scheme. Use appliances that will not damage the details and the paint of the motor vehicle.

Motor vehicles' loading and unloading should be carried out by a crane with special grips.

During all transport, motor vehicles should be arranged with the following distances between them: 50-100 mm from the side of the engine cooling radiator, 100 mm from all the other sides. The motor vehicle parking brake is on, the engine is off, the lever of the gearbox is shifted into the first gear, the accumulator battery is disconnected.

Before air transport, the fuel tanks should be fueled to max. 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. UTILIZATION

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
Lamps:		
- of high beam	AKG12-55 (N1)	55
- of low beam	N7	55
- front N/signals	P21W	21
Fog lamps	N11	55
Tail lamps:		
- of T/signals	PY21W	21
- of brake signal	A12-21-3	21
- of reverse light	A12-21-3	21
- of fog and parking lights	P21/5W (A12-21+5-2)	21+5
T/signal side repeaters of UAZ-23602	WY5W	5
Side T/signals of UAZ-3163 and of UAZ-23632	LED	
License plate lamps	AC12-5-1	5
Dome lamps and reading lamps	LED	
Glove compartment lamp	AC12-5-1	5
Cigarette lighter illumination	AC12-3-1	3
Center high mount stop lamp for UAZ-3163 and UAZ-23632	LED	
Luggage compartment lamp	AC12-5-1	5

TIGHTENING TORQUE OF MAIN THREADED COUPLINGS, kgf • m

Engine and its systems:	
Bolts of crankcase cylinder head (ZMZ-40906 engine):	
pretension	3,3-3,7
holding min. 1 minute	
final tension — turn to angle 95°	
Valve cap bolts	0,5-0,7
Chain cap screws	2,0-2,5
Bolts of front cylinder head cap	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 of engine front strut brackets to crankcase	2,8-3,6
Nuts of engine front struts to frame brackets	5,0-6,2
Bolt of engine rear strut to bracket	8,0-10,0
Nuts of rear strut 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 of neutralizer and engine	4,6-5,1
Oil housing bolts	1,2-1,8
Spark plugs	2,1-3,1
Clamps of power system rubber hoses	0,25-0,35
Clamps of cooling system hoses	0,4-0,45
Bolts of cooling system radiator	3,6-3,2
Upper pads of cooling system radiator	2,0-2,5
Bolts of electric ventilator housing	1,5-1,7
Oil radiator nuts and bolts	1,8-1,6
Starter bolts	4,4-5,6
Bolts of cooling system pump pulley	1,4-1,8
Cooling system pump bolts	2,0-2,5
Inlet manifold nuts	2,0-2,5
Alternator nuts	2,0-2,5
Thermostat housing screws	2,0-2,5
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 screws	0,6-0,9
Ignition coil bolts	0,6-0,9
Bolts of clutch pressure plate	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
Pin nut 8-10	
Bolts of axle housing caps	1,1-2,5
Bolts of front axle hub flanges and rear axle shafts flanges	6,0-7,0
Ball struts bolts	3,6-5,0
Steering mechanism bolts	5,5-8,0
Nuts of steering trapezium ball studs	6,0-8,0
Tie rods locknuts	10,5-13,0
Nuts of steering system universal joints	2,8-3,6
M8 bolt of steering system propeller shaft	2,8-3,6
M10 bolt of steering system propeller shaft	4,8-5,6
Nut of steering system drag link	20-28
Front wheels journal bolts	3,6-4,4
Bolts of rear brake shields	4,4-5,6
Nuts of manifolds and brake hoses:	
when screwing into aluminum, brass and cast iron details	1,5-2,0
when screwing into steel details	2,8-3,6
Bypass valves of rear brakes wheel cylinders, of front brakes crankcases, of proportioning valve and of switch working cylinder for clutch	1,0-1,4
Switch working cylinder with plastic housing	0,7-1,0
Bolts of front disc brakes	14-16
Bolts of brake system proportioning valve and coupling bolt nut of proportioning valve drive end	1,4-1,8
Bolt and locknut of drive flexible lever in brake system proportioning valve, nut of drive lever axle	2,8-3,6
Nut of drive lever (in brake system proportioning valve) to axle bracket and nut of end to pillar	0,65-0,8
Nut of longitudinal levers and suspension control arm	14-16
Spring U-bolts nuts	9-10
Nuts of spring axle	16-18
Nuts of spring studs	8,5-9,5
Wheel nuts	10-12
Adjusting nuts and locknuts of wheel hubs bearings	3,0-4,0
Lamp clusters nuts	0,15-0,25
Nuts of delphi power steering hoses	2,0-3,5
Nut of front spring joint	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;	M10 — (3,0-3,5) kgf · m;
M8 — (1,4-1,8) kgf · m;	M12 — (5,0-6,2) kgf · m.

LUBRICANTS AND SPECIAL FLUIDS

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Place of lubrication/filling	Name of lubricant or fluid	
	Basic	Foreign
UAZ-3163, UAZ-23602, UAZ-23632 Fuel Tank	<p align="center">Fuel</p> unleaded "Regular-92" gasoline (AI-92-4) GOST R 51105, AI-92-K4 GOST 32513*, Allowed: Premium Euro-95 type II (AI-95-4) and Super Euro-98 type II (AI-98-4) GOST R 51866, AI-95-K4, AI-98-K4 GOST 32513.* *For motor vehicle's configurations of ecological class 5 use the same fuel of class 5, type II and K5	
UAZ-31638, UAZ-23608, UAZ-23638 Fuel Tank	EURO diesel fuel GOST R 52368: of type II or type III; of grades A,B,C,D,E,F; of classes 0,1,2,3,4 according to operating conditions	
ZMZ-40906 engine lubrication system	<p align="center">Engine oils</p> SAE 0W-30 — from -30 to +20°C; SAE 0W-40 — from -30 to +25°C; SAE 5W-30 — from -25 to +20°C; SAE 5W-40 — from -25 to +35°C; SAE 10W-30 — from -20 to +30°C; SAE 10W-40 — from -20 to +35°C; SAE 15W-30 — from -15 to +30°C; SAE 15W-40 — from -15 to +45°C; SAE 20W-40 — from -10 to +45°C; SAE 20W-50 — from -10 to +45°C; SAE 30 — from -5 to +45°C;	

Place of lubrication/filling	Name of lubricant or fluid	
	Basic	Foreign
	SAE 40 — from 0 to +45°C; SAE 50 — from +5 to +45°C; classifications by operating properties: STO AAI-003-98 — B4/D2, B4 or B5; API — SG/CD, SG or higher groups SH, SJ, SL, SM	
ZMZ-51432 Engine lubrication system	SAE 5W-30 — from -25 to +20°C; SAE 5W-40 — from -25 to +35°C; SAE 10W-30 — from -20 to +30°C; SAE 10W-40 — from -20 to +35°C; SAE 15W-30 — from -15 to +35°C; SAE 15W-40 — from -15 to +45°C; SAE 20W-40 — from -10 to +45°C; SAE 20W-50 — from -10 to +45°C and higher; SAE 30 — from -5 to +45°C; SAE 40 — from 0 to +45°C; SAE 50 — from 0 to +45°C and higher classifications by operating properties: API -CF-4 and higher	
Housing of Dymos gearbox and transfer case	Transmission oils ZIC G-F Top75W-85, ZIC G-FF 75W-85, GT Transmission FF SAE 75W-85 — GL-4 of API classification	
Housing of PAO UAZ transfer case	For all seasons: SAE 75W/90 — GL-3 of API classification	

Place of lubrication/filling	Name of lubricant or fluid	
	Basic	Foreign
Final drive housings of front and rear axles GL-5 of API classification	For all seasons: SAE 75W/90 —	
Oil tank of YUBEI hydraulic power steering system:	Mobil ATF 220, EZL 998, Shell Spirax S4 ATF HDX, TNK ATF IID; Lukoil ATF; G-Box Exper ATF DX III	
Splines of front and rear propeller shafts with lubrication nipples, joints of front and rear propeller shafts with lubrication nipples, steering knuckle, steering knuckles pins, bearings of front and rear wheel hubs, bearings of steering column shaft, tie rod joints, splines of steering system propeller shaft, mechanism of steering wheel adjustment, release and adjusting mechanisms of parking brake, parking brake drive cable, front bearing of gearbox driving shaft, bearing sleeve of clutch shutoff, battery terminals, hinges and lock of hood, tailgate hinges	Plastic lubricants	
	For all seasons: "Litol-24"; "Litol-24RK"	For all seasons: Lithium grease — N3 of NLGJ classification
Steering knuckle joints	SHRUS-4; SHRUS-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	TZIATIM-201	Centuri 1180
Guide bushes of front disc brakes	UNIOL 2M-1	
Rubber weatherstrips	Graphite powder	Barbatia Grease 2

Place of lubrication/filling	Name of lubricant or fluid	
	Basic	Foreign
Splines and joints of non-repairable propeller shafts		Klubberplex BEM 41-141
Hydraulic drives of clutch and brake system	Fluids Brake fluid: "RosDot-4"; "Rosa"; "Rosa-3"; "Tom"; For ABS-equipped vehicles "Rosa DOT-4", "Rosa-3"	SAE 1703F; DOT-4
Engine cooling system	Cooling fluid: OZH-40 "Lena"; OZH-65 "Lena"; TOSOL A-40M; TOSOL A-65M; OZH-40 TOSOL-TS OZH-65 TOSOL-TS	Shell safe
Washer reservoir of windshield and rear screen	"Obzor", Avtoochistitel stekol-2	

INFORMATION
on precious metals in motor
vehicle electric equipment

Manufacturing Type	Name	Precious Metal	Mass, g
683.3709	Understeering switch	silver	0,3034
6212.3827	Fuel Level sensor	silver palladium ruthenium	0,013806 0,0048774 0,0008569
6002.3829	Oil emergency pressure sensor	silver	0,0310

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Memo

**UAZ PATRIOT,
UAZ PICKUP,
UAZ CARGO**

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