

Minsk Automobile Plant

MAZ VEHICLES

**533702, 533742, 533603,
630308, 551605**

Operations manual

Republic of Belarus

Minsk, 2010

DEAR DRIVER!

The MAZ vehicle you are going to operate is a highly reliable automobile equipped with modern assemblies and instrumentation, which provides for an easier trailer train driving, easing down on some of the driver's fatigue and enhancing road safety, and makes it possible to considerably increase working efficiency and reduce transportation self-costs.

Before operation of the vehicle, carefully study the manual.

Introduction

MAZ-533702, 533742 are 4×2 two-axle vehicles (chassis) (Figure 1) designed to be used as part of specialized truck mountings at road traffic routes with axial weight limits as defined in the respective technical specification.

MAZ-533602 is a 4×2 two-axle vehicle (chassis) (Figure 2) designed to be used as part of specialized truck mountings at road traffic routes with axial weight limits as defined in the respective technical specification. The vehicle can be used with a trailer.

MAZ-630308 is a three-axle automobile chassis with 6×4 wheel arrangement (Figure 3) used as a mounting base for various technological equipment and designed to run at road traffic routes of various coating types with axial weight limits as defined in the respective technical specification.

MAZ-551605 is a three-axle automobile chassis with 6×4 wheel arrangement (Figure 4) used as a mounting base for various technological equipment and designed to run at road traffic routes of various coating types with axial weight limits as defined in the respective technical specification.

For details of engine, clutch and gear box operation and maintenance see respective manuals provided for the vehicle.

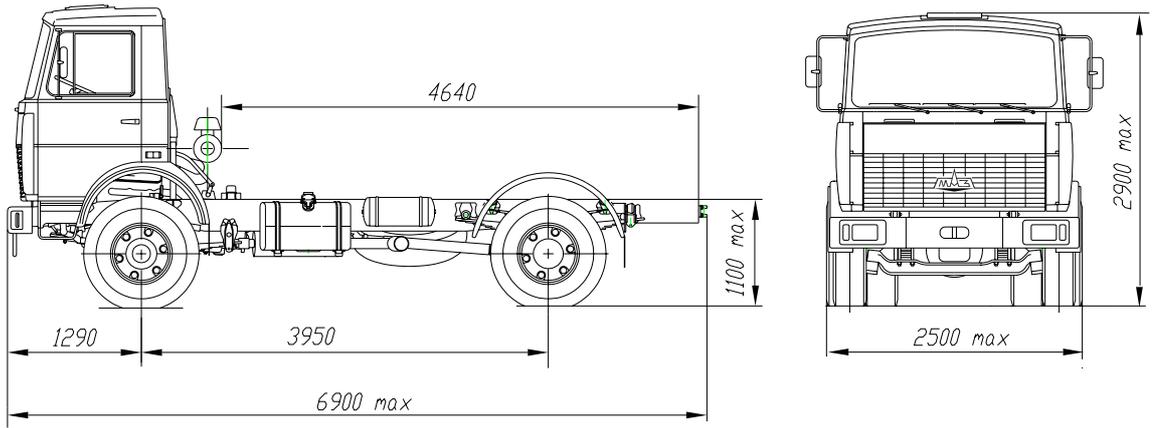


Figure 1 – Automobile chassis MAZ-5337

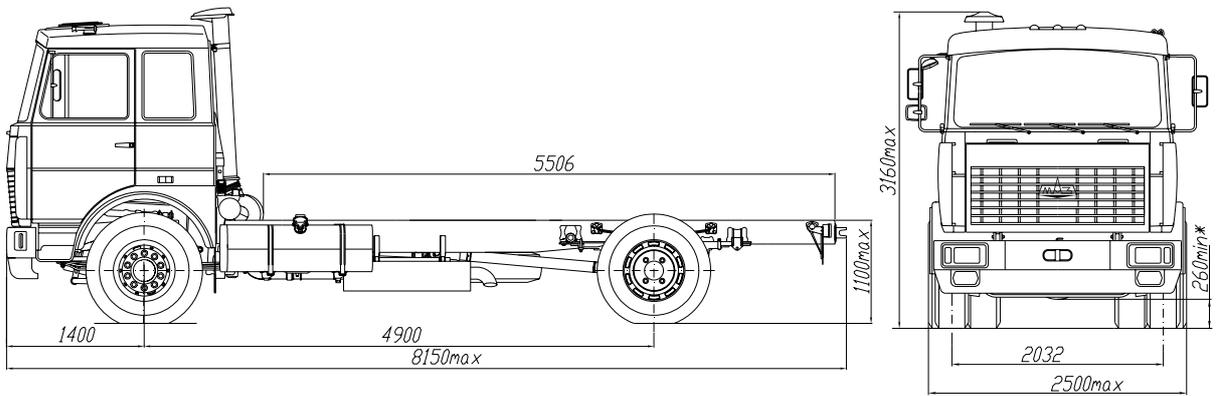


Figure 2 – Automobile chassis MAZ-533602

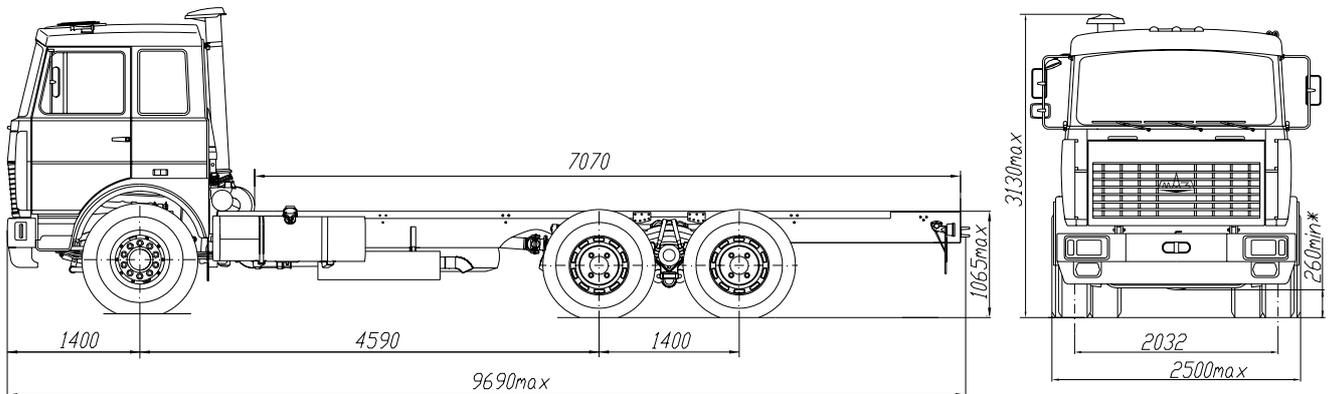


Figure 3 – Automobile chassis MAZ-630308

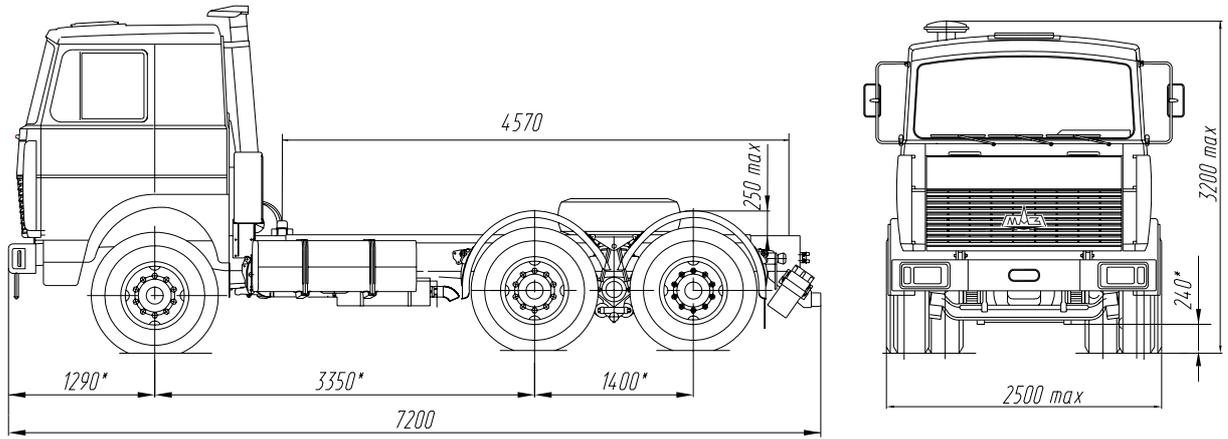


Figure 4 – Automobile chassis MAZ-551605

SAFETY REQUIREMENTS AND WARNINGS

To ensure reliable and effective performance of a vehicle one needs to know how its assemblies and units function, provide for strict compliance with operation, maintenance and servicing instructions and eliminate any deviations from whatever requirements are set out in this operations manual.

Before starting operation of a vehicle, it is necessary to thoroughly examine its construction, study operation, maintenance and servicing instructions provided within this manual, paying special attention to “Particular issues associated with vehicle operation” section.

1 Tightening torques for basic threaded joints are as defined in Annex 2.

2 During a break-in period (for the first 200 km) it is essential to provide for strict compliance with terms as set out in “Vehicle break-in period” section because further performance of vehicle components largely depends on how well separate parts bed in at the early operation stage.

3 Vehicle assemblies and units shall be lubricated in accordance with instructions set out in “Chimatology list” included into this manual. Application of any oils and lubricants containing contaminants or different from those recommended in this manual **is forbidden**.

4 It is prohibited to drive a vehicle if brake pneumatic drive circuit pressure is lower than 490 kPa, i.e. until indicating lamps for respective circuits go out.

5 If a vehicle is started on a slippery road section, it is required to enable interaxial and interwheel differential locks. After the road section is behind, the differentials are to be unlocked. A vehicle with locked differentials is not allowed to enter into a turn.

6 While a vehicle is moving, the driver should monitor its instrumentation and indicating lamps.

7 With engine out of operation and gear box cut-off, a vehicle is not allowed to run at a neutral speed so as to avoid power steering trip-out and air entering brake pneumatic drive receivers.

8 For downward slopes, it is necessary to make sure that vehicle rpm speed is within acceptable range, i.e. rev counter should never go as far as the red section on the instrument dial.

9 It is prohibited to operate vehicles which have defective or failing power steering. While a vehicle is moving, it is recommended not to remove the key from the lock starter and instrumentation switch to avoid steering post interlock and engine shutdown.

10 To prevent steering power pump failures steering wheel should not be held in extreme positions (extreme right and left steered wheel turns) for more than 5 seconds.

11 When parked, a vehicle battery should be disabled by pressing a cut-off push. If a vehicle idle period is rather long (lasts for more than 3 days), it is necessary to take the connector off the battery. It is forbidden to connect 12V electrical appliances (such as radio-recorders, receivers, and etc.) to the battery.

12 Maintenance scopes and frequency requirements as set out in this manual are to be strictly complied with.

13 Power pack servicing scopes are detailed in a separate manual.

14 Power pack servicing is to be carried out on a horizontal flat surface with cabin uplifted **to the maximum extent**.

It is strictly prohibited to perform any works under the cabin unless it is uplifted to the maximum extent.

15 The cabin should be lifted with vehicle stationed on a horizontal even surface. The vehicle must be put on the parking brake. Before uplifting the cabin, the gear-change lever is to be switched into neutral, the doors must be closed and the front cab liner group opened. While uplifting the cabin, keep a safe distance from the roll over area.

16 It is prohibited both to uplift or lower the cabin while the vehicle engine is still running and start the engine while the cabin is in the uplifted position, which is necessary to prevent gear box self-start and, accordingly, the resulting unwanted vehicle movement.

When an engine needs to be started with the cabin in the uplifted position to provide for adjustment or repair works, it is necessary to ensure that the gear box is in the neutral position. The starting shall be as required by “Safety instructions.”

17 After the cabin is lowered, it is required to ensure that the lock mechanism is in the lock position and the back safety wire rope is fixed into place as appropriate.

18 When washing a vehicle, it is essential to ensure that the stream is not pointed directly at electrical accessories and electric wiring joints.

19 System and electrical accessories circuits state should not be tested with a megohm meter or a lamp supplied from a source with voltage higher than 24V.

20 While the engine is running, it is not recommended to disconnect wiring from generator and battery outputs.

21 It is forbidden to use reverse polarity while connecting the battery to the vehicle-mounted electrical accessories system.

22 When welding a vehicle, the battery must be cut off and the wiring and the brake pneumatic drive piping must be protected from exposure to high temperatures (above 90°C) and welding splashes.

23 If a vehicle (a trailer train) is on a public road or is moving through city or settlement streets, transportation operators are to be careful to observe regulatory documentation effective within the respective country in terms of weight and dimensional requirements and transit regulations when those are exceeded.

TECHNICAL SPECIFICATION

Table 1 – Technical specification

Parameter	533702	533742	533603	630308	551605
1	2	3	4	5	6
Technically acceptable load-carrying capacity, kg	11650	10250* 11750*	11000	14800	20000
Equipped vehicle gross weight, kg	6350	6250	7000	9700	12850
Technically acceptable vehicle gross weight, kg	18000	16500 18000*	18000	24500	33000
Technically acceptable trailer train weight, kg	32000	32000	36000	52000	–
On-road weight distribution for a vehicle of gross weight, kg:					
– on the first axle	6500	6500	6500	6500	7000
– on the second axle	11500	11500	11500	9000	13000
– on the third axle	–	–	–	9000	13000
Engine	YMZ–236NE2	MMZ D260.5E2	YMZ–236BE2	YMZ–7511.10	YMZ–238DE2
Rated engine power, kW	169.0	169.0	184.0	287.0	243.0
Gear box	YMZ–2361	YMZ–2381	YMZ–2381	YMZ–239	YMZ–2381
Maximum speed, km/h	85.0	85.0	100.0	100.0	85.0

1	2	3	4	5	6
Reference fuel consumption, l/100 km, for a vehicle (a trailer train) of gross weight moving at the speed of 60 km/h:	21.6 (25.5)	24.0	20.3	23.8	36.0
Tires, ply rating (PR), tread pattern	12.00R20; PR 16 or PR 18; generic pattern		11.00R20; PR 16; generic pattern		12.00R20; ID-304, ID-304M, PR 18, generic pattern
Rated wheel tire pressure, kPa**: – on the first axle – on the second axle – on the third axle	See table 2		See table 3		790 850 850
Vehicle minimum turning radius along the outside front wheel track (with reference to turning center line) axis, m, not more than	9.1		9.5	11.0	10.5

Примечание:

* – included into supply package for a reinforced rear suspension chassis;

** – permissible pressure variations are to be as follows: ± 20 kPa ($\pm 0,2$ kg-force/cm²).

1 Gross weight tolerance for an equipped vehicle is plus 3 %. There are no restrictions for the lower weight threshold.

2 Equipped vehicle gross weight (standard completeness) is the weight of a vehicle together with cooling fluid, clutch drive fluid, lubricants, windshield washer fluid, fuel (with tank filled up to not less than 90% of its rated capacity), a fire extinguisher, wheel chocks, a standard spare parts and tools package, a spare tire and any other accessories, such as a radio recorder, a radio receiver, and an aerodynamic panel.

3 Reference fuel consumption is used to determine technical state of a vehicle and is not intended for operating practice.

4 With a speed limit device installed in the vehicle, the maximum speed is 85 ± 4 km/h.

Table 2 – Tire pressure ratings for MAZ–533702, 533742

Weight on, kg	Vehicle tire pressure ratings, kPa	
	PR 16	PR 18
the first axle		
6350	730	730
6500	740	740
6600	740	750
6700	750	760
the second axle		
10000	630	630
11500	730	730
Note: Permissible pressure variation is ± 20 kPa		

Table 3 – Tire pressure ratings for MAZ–533603, 630308

Weight on, kg	Vehicle tire pressure ratings, kPa
the first axle	
6500	800
6700	820
the second and the third axle	
9000	560
9500	590
10000	650
11500	790
Note: Permissible pressure variation is ± 20 kPa	

Table 4 – Basic adjusting values

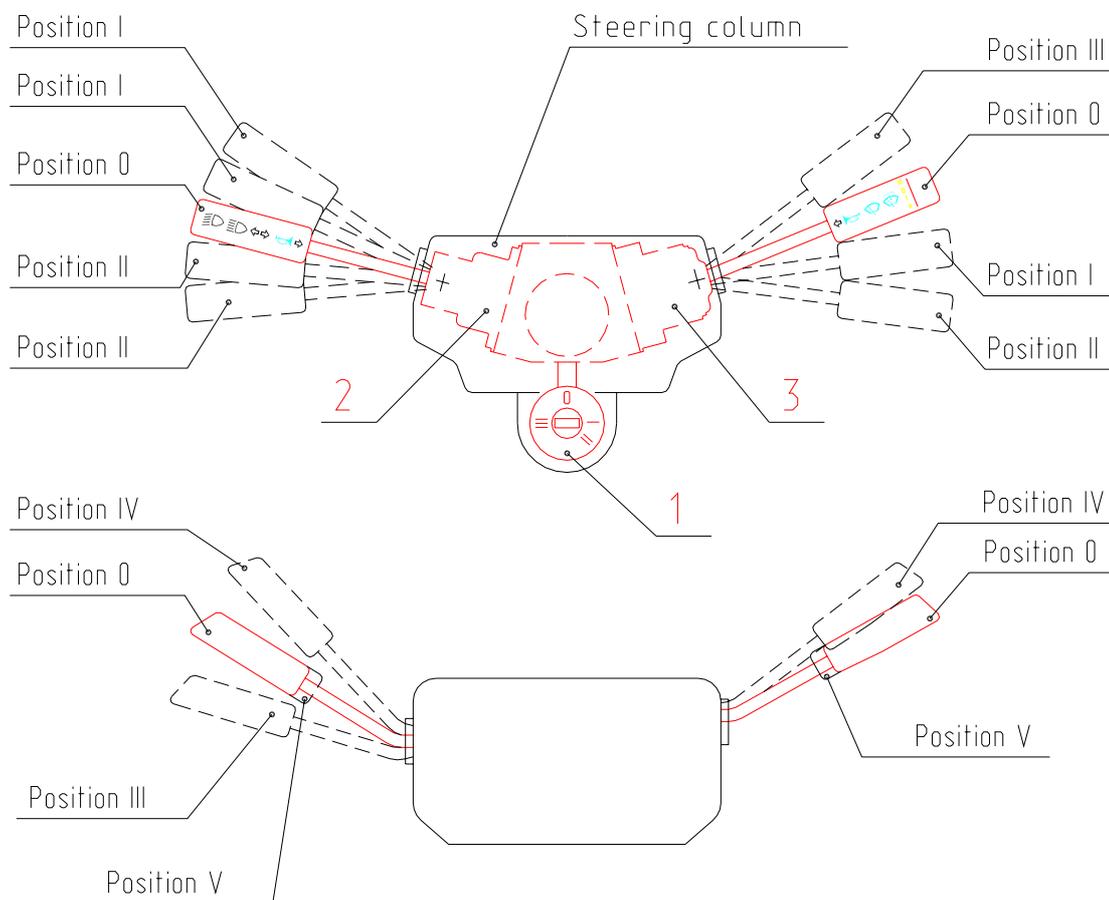
Misalignment of wheels	1–2 mm
Left wheel left steering angle	$(40 \pm 1)^0$
Right wheel right steering angle	$(36 \pm 1)^0$
Clutch pedal free travel	(5–7) mm
Brake pedal free travel	(17–27) mm
Brake chamber rod stroke	(38–44) mm

Table 5 – Refill capacities, l

Fuel tank;	
total capacity	343; 515
active capacity	327; 495
Rear and intermediate axle main gear crankcase housing	13 each
Rear and intermediate axle wheel gearing crankcase housing	2 each
Power steering system	6.5
Windscreen washer tank	10
Rear suspension balancer crankcase housing	0.4 each

CONTROL ELEMENTS AND MEASURING INSTRUMENTATION

Control elements and measuring instrumentation arrangement is as shown at Figures 5, 6, 7 and 8.



- 1 – starter and instrumentation lock switch with an anti-theft device;
- 2 – turn indicator switch, dipped and distance headlights switch;
- 3 – windscreen wiper and windscreen washer switch

Figure 5 – Switches below the steering wheel and the starter and instrumentation switch

Starter and instrumentation lock switch 1 (Figure 5) with an anti-theft device. Position III is for key insertion and removal from the lock switch.

To unlock the steering post shaft it is necessary to insert the key into the lock switch and, to avoid damage to the key, to slightly turn the steering wheel to the left and then to the right. After that, the key is to be turned clockwise into “O” position.

As soon as the key is removed from the lock switch (i.e. from position III), fuel supply stops and the lock mechanism for the switch is enabled. To lock the steering post shaft it is necessary to turn the steering wheel to the left and then to the right.

Other in-switch key positions:

- 0** – neutral (fixed) position. Starter and instrumentation circuits are cut off;
- I** – supply and instrumentation circuits are on (fixed position);
- II** – supply, starter and instrumentation circuits are on (the position is not fixed).

Switching handle 2 for the turn indicator and dipped and distance lights

Its positions are as follows:

Horizontal:

0 – neutral;

I – (fixed) – right turn indicators on; the indicators switch off automatically;

II – (not fixed) – right turn indicators are intermittently on;

III – (not fixed) – left turn indicators are intermittently on;

IV – (fixed) – left turn indicators on; the indicators switch off automatically.

Vertical:

V – (not fixed) – distance headlights are intermittently on (irrespective of the main light switch position);

0₁ – (fixed) – dipped lights are on with headlights enabled at the main light switch 12 (Figure 5).

VI – fixed, distance lights are on with headlights enabled at the main light switch.

When the handle is pressed from the end face plane, an electrical audible beep sounds.

Switching handle 3 for windscreen wiper and washer

Its positions are as follows:

Horizontal:

0 – neutral;

I – (fixed) – the windscreen wiper is on – low speed;

II – (fixed) – the windscreen wiper is on – high speed;

III – (fixed) – the windscreen wiper is on and is operated in an intermittent mode.

Vertical:

IV – (not fixed) – the windscreen washer is on and is run simultaneously with the windscreen wiper in a low speed mode.

When the handle is pressed from the end face plane, an electrical audible beep sounds (if it's available).

Parking and emergency brake control valve handle. The handle can be fixed in either of the two extreme positions. As soon as the handle is switched into the rear fixed position, the parking brake is enabled. And when it's in the fixed front position, the parking brake is off. If the handle is held down in any of the intermittent positions (not fixed), the emergency brake is enabled.

Secondary brake control valve handle. When the handle is pushed, the throttle gate blocks the discharge gas line flow passage, which causes backpressure within the gas discharge system with simultaneous fuel supply cut-off.

Battery switch remote control button 12 (Figure 6). In case of remote control system failure, the switch can be enabled or disabled by pressing the on-case button. The switch is located on the battery mounting bracket. When the switch is enabled, the voltage meter pointer starts to shift.

Cabin heater fan switch 10. The fans can be operated in two modes: maximum rotational velocity (the first fixed switch position) and minimum rotational velocity (the second fixed switch position).

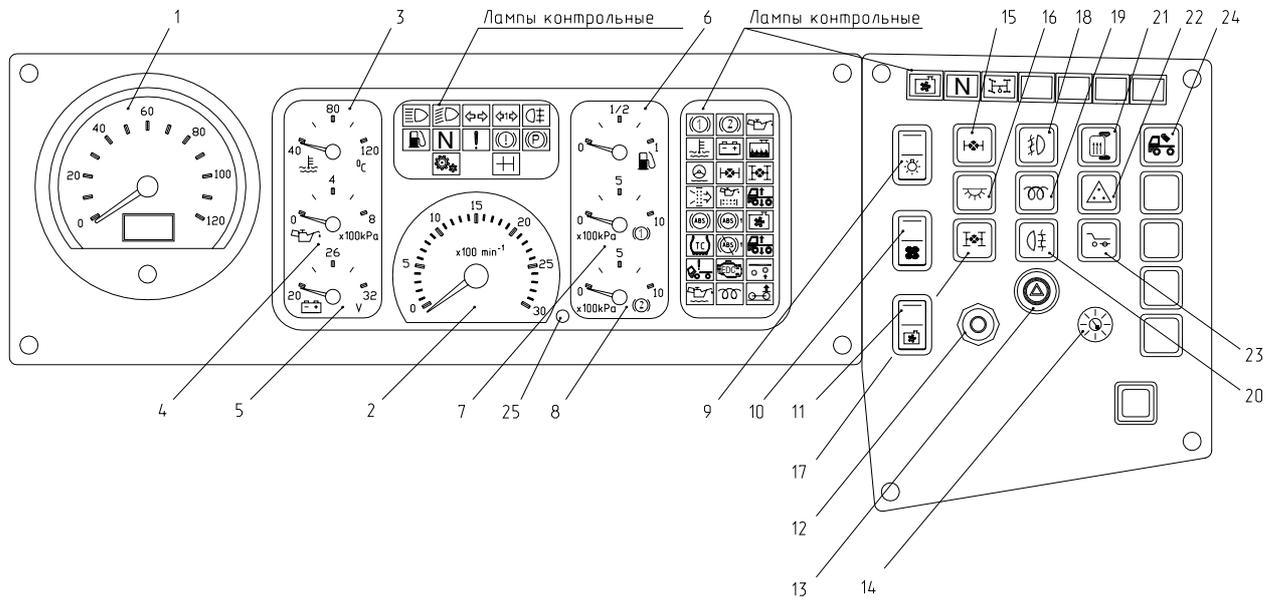
Rev counter 2 (Figure 6). This is a device indicating engine shaft rpm speed (connected to the generator phase and 8A fused).

The rev counter dial is divided into three sections of different colour:

– the green section is to indicate that the engine shaft rpm speed is within the engine economy mode range;

- the yellow section is to indicate that the engine shaft rpm speed range where intermittent engine work mode is possible;
- the red section is to indicate the engine shaft rpm speed range where engine operation is not possible.

Those dial sections which do not have colour designation are to indicate engine shaft rpm speed ranges which are not recommended because of high fuel consumption rates.

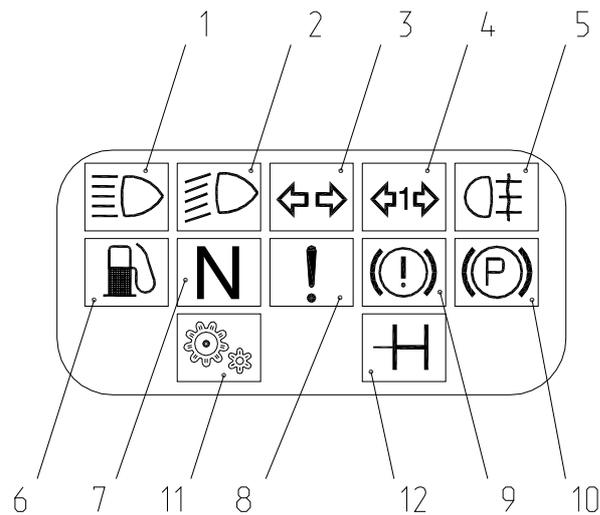


Лампы контрольные	Indicating lamps
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1 – speedometer; 2 – rev counter; 3 – cooling fluid temperature indicator; 4 – engine oil pressure indicator; 5–voltage meter; 6 – fuel-level indicator; 7 – brake system pressure indicator (the first circuit); 8 – brake system pressure indicator (the second circuit); 9 – main light switch; 10 – heater electric engines mode select switch; 11 – fan clutch mode select switch; 12 – battery cut-off switch; 13 – alarm signaling switch; 14– backlight adjustable resistor; 15 – interwheel differential lock switch; 16–engine flood-lamp switch; 17– interaxle differential lock switch (logging truck); 18 – fog light switch; 19 – electric torch switch (ET); 20– rear fog lights switch; 21 – mirror heater switch; 22– “trailer train” sign backlight switch; 23 – semitrailer pivoted axle lock switch/ dump truck back gate lock switch / trailer (vehicle) platform lift control switch; 24– coupling hitch light switch; 25– indicating lamps serviceability check switch

Note: some of the above switches and indicating lamps may not be included, and their arrangement can be changed, depending on the instrumentation panel used, vehicle type and completeness.

Figure 6 – Control panel indicators and control elements arrangement



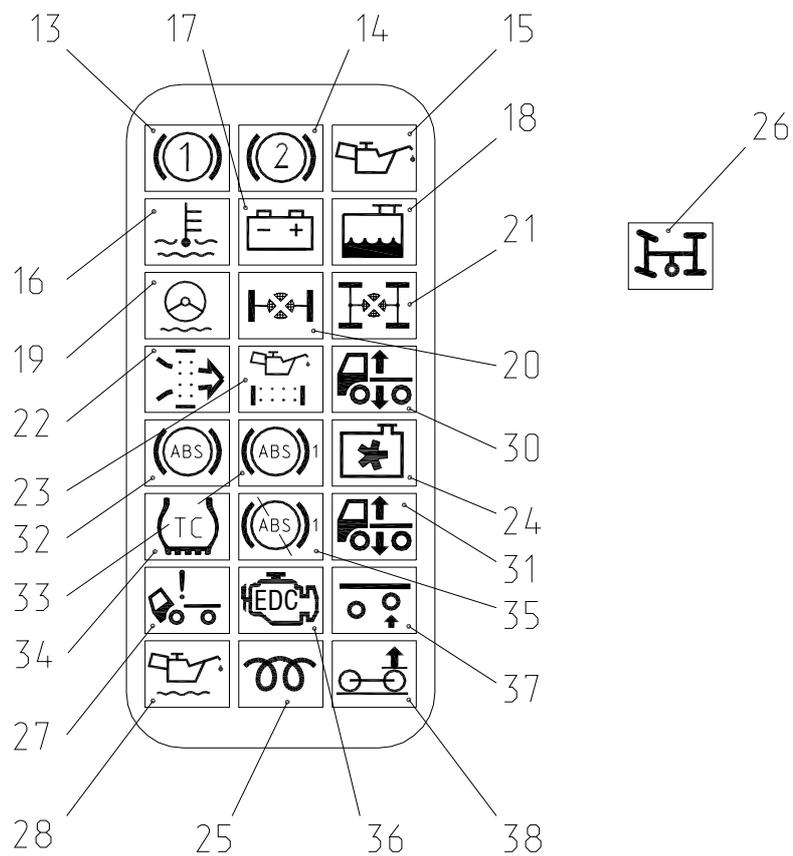
1–distance light switch (blue light); 2–dipped light switch (green light); 3–vehicle turn signal switch (green light); 4–trailer turn signal switch (green light); 5– rear fog light switch (yellow light); 6– fuel content below the reserve (yellow light); 7– ‘neutral’ switch (green light); 8– engine system failure (red light); 9– brake system failure (red light); 10– parking brake on (red light – flashing); 11– change gearbox splitter switch (green light); 12– change gearbox demultiplier switch (green light).

Figure 7 – Indicating lamps

Alarm system switch 13 (Figure 6). When on, vehicle and trailer left and right turn signals are lit simultaneously.

Main lights switch 9. Its fixed positions are as follows: neutral, tail and gauge dial backlights on, headlights on (distance and dipped lights depending on handle 2 position (Figure 2) of the turn signal switch, distance and dipped lights switch).

Rev counter (if installed) – device indicating driving speed, current time and mileage, and making a record on the inserted CD (coded as driving speed, current time, mileage, fuel consumption and driving mode).



13– pressure drop in the front brake circuit (red light); 14 – pressure drop in the rear brake circuit (red light); 15- oil pressure drop in the engine (red light); 16-emergency temperature in the engine cooling system (red light); 17- battery charge low (red light); 18-lowering of the engine cooling fluid level (yellow light); 19-lowering of the power steering fluid level (yellow light); 20 - interaxle differential lock switched on (yellow light); 21- interaxle differential lock switched on (yellow light); 22- air filter clogged (red light); 23- oil filter clogged (red light); 24- engine fan clutch switched on (green light); 25- engine starting preheater switched on (yellow light); 26- power take switched on (green light); 27- unlocked cabin position (red light); 28- oil level drop in the engine (yellow light); 30- air suspension system failure (red light); 31- air suspension system on (yellow light); 32- antiskid vehicle system (ASS) failure (yellow light); 33- antiskid trailer system (ASS) failure (yellow light); pulling force control system on (green light); 35-no antiskid trailer system (ASS) (yellow light); 36 - EDC system failure (red light); 37-axle elevation (yellow light); 38- aid at starting (yellow light)

Figure 8 – Indicating lights

CABIN ACCESSORIES

Rear-vision mirrors are installed outside of the either side of the cabin. Mirrors position is adjustable.

Windscreen wiper with electric actuator, two-speed, third-brush intended for windscreen wiping, actuated with handle 3 (see Figure 5), located on the right side of the steering post.

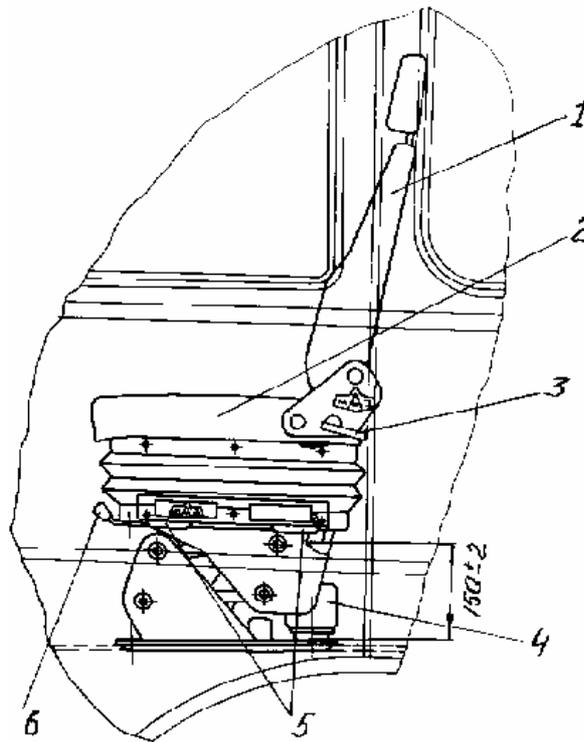
Windscreen washer with electric actuator. The washer pump is enabled with the same switch as the wiper. Water jet from the tank is directed to the windscreen via two spray diffusers. The switch released, the pump stops. The water jet direction is adjusted by turning the head spray diffusers.

Driver's and passenger's seats with air bellows 4 (Figure 10) furnished with vertical and horizontal adjustment mechanism and seat back angle adjustment mechanism.

The air bellows controlled by the distribution block positions the seat in the set height position regardless of the driver's weight. Driver's seat position is adjusted by rotating the distribution block linkage until the size is (150 ± 2) mm on spring unit 4.

The lever type vertical adjustment mechanism with graded latching allows for cushion angle adjustment 2.

The horizontal adjustment mechanism is of skid type and with graded latching.



1 – seat back; 2- seat cushion; 3 –seat back angle adjustment mechanism; 4 – air bellows; 5 –vertical seat adjustment mechanism handle; 6 –horizontal seat adjustment mechanism handle;

Figure 9 – Driver's seat

The passenger seat may be both unadjustable and adjustable as ordered by the purchaser. Fixing points for safety belts are provided.

To the attention of driver's!
Seat adjustment during driving is forbidden.

Cabin door

The cabin door is double paneled, pressed form plate steel, welded and canted along the perimeter. In the middle of the inside door panel, there are slots for windows mounting and dismounting, a window regulator, a door lock and a lock actuator component.

The doors are equipped with rotary type locks. In order to block the door lock in the closed position from inside of the cabin, press down the lock actuator element handle against the stop and then, without releasing the handle, slowly return it into the original position.

Bunks. The large cabin is equipped with two bunks located behind seat backs. The upper bunk with safety screen is hinged to the cabin rear wall. In transportation position, the bunk may be lowered or raised at 45° and fastened with belts. The lower bunk, with niches for driver's stuff underneath, is composed of two mattresses. During the team's rest time, the cabin is blanked out by blinds.

Glare shields. Two glare shields are installed inside the cabin in front of the driver's and passenger's seats. Shields are lifted and lowered manually.

Radio receiver or radio recorder is installed on the knapsack shelf of the cabin if additionally requested by the purchaser.

The cabin is lit by two main dome lamps and two lamps for bunks, with internal switches.

The main dome lamps may be switched on when the battery is on as the dome lamps are connected with the use of a two-wire arrangement (plus and minus to the lamps are supplied from the battery terminals).

To reduce vibration load on the driver's workplace, the large cabin is spring-mounted: front springing is achieved by two hinged supports resting on coil springs, two shock absorbers and an antisway bar, back springing is achieved by installation of cabin support beam on two coil springs and two telescopic shock absorbers located inside the spring.

Knapsack shelf intended for team's small belongings is located above the windscreen.

Against additional payment, a refrigerator intended for food storage may be installed in the cabin under the lower bunk behind the driver's seat.

LIST OF PRE-SALE PREPARATION OPERATIONS

- 1 Depreservation (antirust compound removal).
- 2 Visual inspection for transportation damages. Check accessories, tools, manuals according to the packing list.
- 3 Position the items, devices temporarily dismantled for transportation.
- 4 Check oils availability, their level in assemblies and units; top up, if needed.
- 5 Top up cooling fluid (if needed).
- 6 Check batteries condition, their fixings (top up electrolytic solution, recharge, fix, if needed).
- 7 Check the pneumatic brakes, the clutch linkage, electrical equipment, alarms, the cabin roll-over system, tire pressure, wheel attachments, and other joints and, if required, eliminate any failures.
- 8 Check assemblies and systems in all modes and, if needed, eliminate any failures.
- 9 Check steering mechanisms operation with engine running (steering wheel rotation) and, if needed, eliminate any failures.
- 10 Check the vehicle from below (ensure no cooling fluid, oil, fuel leakage, joints reliability) and, if needed, eliminate any failures.
- 11 Wash the vehicle, touch-up, if needed.
- 12 Instruct the owner, driver.

VEHICLE BREAK-IN PERIOD

Service life and reliability of assemblies and mechanisms, vehicle operational cost-effectiveness in many instances depends on how well its parts bed in at the early operation stage.

During break-in period, it is required to monitor fixtures state, tightening up loose bolt and other connections, as well as assemblies heating and, if the latter is excessive, determine the cause and eliminate any defects.

For new vehicles and in cases of wheel replacement, wheel nuts are to be tightened after about 50 km of mileage. Afterwards, wheel nuts must be tightened on daily basis, using the same torque, until firm adherence is achieved.

For new vehicles, break-in periods correspond to 2000 km mileage.

The break-in period has restrictions as follows:

- the break-in mode for the vehicle should be sparing;
- weight of load transported by the vehicle (trailer train) must not exceed 60% of the nominal weight;
- driving speed at each gear should not exceeding $\frac{3}{4}$ of the maximum allowable speed or allowable engine rpm;
- loaded trailer towage is prohibited.

After 2000 km mileage, speed can be gradually increased to its maximum or, accordingly, to the maximum allowable engine rpm.

Recommendations regarding servicing of the engine, clutch and gearbox during and after the break-in period must be observed in strict compliance with the manufacturing plant instruction guidelines.

At the early operating stage, after 2000 km mileage, it is necessary to carry out maintenance as follows:

- 1 Change oil in vehicle units and assemblies as specified in the chimmotology lists.
 - 2 Perform the entire scope of works as stipulated for maintenance (A) and carry out supplementary fixing operations as stipulated for maintenance (C) (see section “Maintenance”).
- After the above requirements are complied with, a vehicle can be operated as usual.

PARTICULAR ISSUES ASSOCIATED WITH VEHICLE OPERATION

Pre-operation procedures for a vehicle

Prior to operation, it is recommended to carry out some preliminary works, which presuppose checks and fill-in with operational fluids.

Depending on vehicle transportation conditions, batteries can be installed with or without electrolytic solution.

Batteries, if they are empty of electrolytic solution, must be put into the working trim, and the ones with electrolytic solution, if necessary, must be adjusted in terms of electrolytic solution density.

Besides, the following checks should be carried out:

- check availability of cooling fluid and its level in the expansion drum and, if necessary, top it up;
- check oil level in the engine pan, gearbox, drive axles, power steering system and, if necessary, top oil up to the required level;
- check drive belt tension of the water pump, the generator, the compressor and the power steering pump;
- check in-tire air pressure and, if necessary, adjust it as appropriate.

RULES FOR CABIN UPLIFT

Free access to the engine and its systems, the steering arrangement and other assemblies located in the front part of a chassis is ensured by cabin roll-over against front hinged supports.

Prior to cabin uplift, switch the gear-change lever into the neutral position, remove the wire rope from the pin, open the cab liner group and, using the respective handle, open the cabin lock mechanism. For this purpose, the handle must be installed into bushing 2 (Figure 10) and lowered down to the maximum.

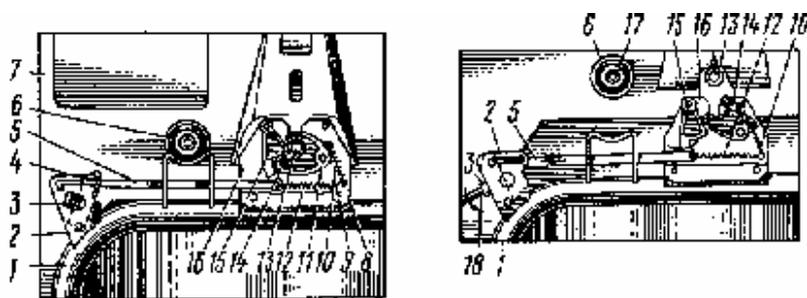
Cabin uplift. For cabin uplift, turn the pump distribution block handle into “Lift up” position and, using the handle, inserted into the oil pump drive shaft hole activate the pump until the cabin is uplifted to its maximum.

As soon as the instable equilibrium position is reached, further cabin roll-over is inadvertent.

Cabin lowering. For cabin lowering turn the distribution block handle into “Lowering” position and lower the cabin, carrying out operations identical to the above.

When the cabin is in the downmost position, the automatic locking mechanism is enabled, after which safety wire rope should be put onto the cabin axis pin.

The power unit should be serviced with cabin uplifted to its uppermost position.



- 1 – truss; 2 – bushing with a lever; 3 – bracket; 4 – linkage; 5 – support;
6 – washer; 7 – knuckle; 8 – cheek; 9 – pin; 10 – grabber; 11, 12 – springs

Figure 10 – Cabin lock mechanism:

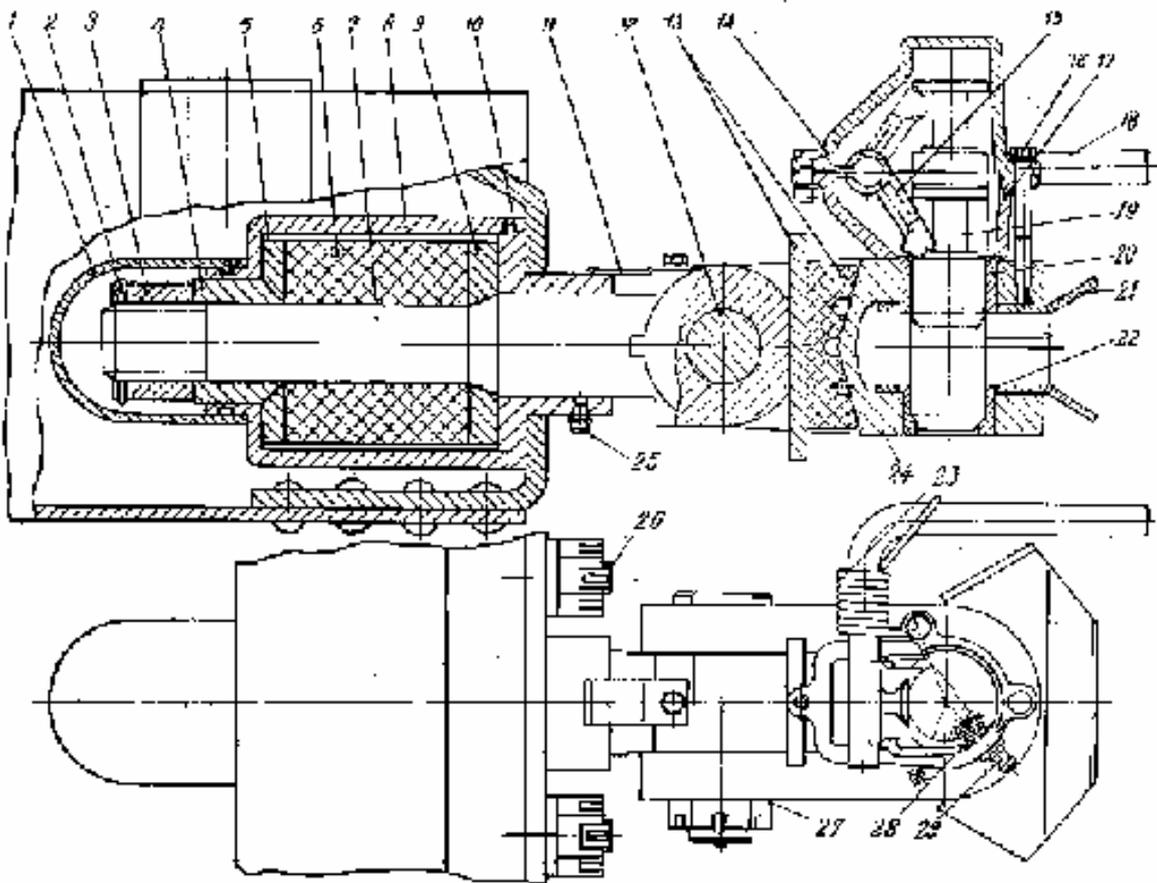
a) lock mechanism open; b) lock mechanism closed

Coupling and uncoupling a vehicle with a trailer

To couple a trailer with a vehicle carry out operations as follows:

- put the trailer on the parking brake;
- back run the vehicle to the trailer, making sure that handle 18 (Figure 11) of the towing device is turned up and couple as appropriate. After coupling, ensure that the handle is in horizontal position and the safety cut-off 29 is “buried”;
- connect trailer pneumatic and electric systems to the vehicle system;
- open disconnecting valves on the vehicle and the trailer to ensure air intake from the vehicle pneumatic system to the trailer air cylinders;
- check trailer brakes and alarm system operation.

To uncouple a trailer, pull out the safety stop to the full and, holding it down, lift the handle as far as it will go with the other hand (the handle must be fixed in this position).



- 1 – nut casing; 2 splint; 3 – nut; 4 – guide bushing; 5, 9 – buffer flanges; 6 – buffer; 7 – stub; 8 – casing; 10 – casing cover; 11 – spring; 12 – stub axis; 13 – buffer; 14 – cover; 15 – lever; 16 – bolt; 17 – cover seat; 18 – handle; 19 – pin; 20 – upper bushing; 21 – hinge strain runner; 22 – bottom bushing; 23, 28 – springs; 24 – fork; 25 – oil pot; 26 – bolt; 27 – nut; 29 – safety stop

Figure 11 – Towing device

DRIVING AND CONTROLLING THE VEHICLE

When breaking away or moving along slippery road sections, interwheel and interaxle differential lock is recommended to be enabled for a short-term (for a distance not exceeding 1 km). The lock must be enabled immediately before entering a slippery road section. In this case, it is required to throw in the clutch and enable the lock mechanism after the vehicle stopped moving.

It is forbidden to enable the lock mechanism at wheel slippage.

During transportation of loads and high gravity centre containers on-turn driving speed must be chosen such as necessary to provide for transverse stability.

Use fog-lights to improve observability while driving in the rain, fog, snowfall.

Remove the leg from the clutch pedal while driving to avoid clutch slippage and failure.

When parked, a vehicle must be put on the parking brake and the gearbox must be switch into the neutral position.

To tow a vehicle:

1 Detach the propeller shaft from the intermediate axle flange and fix it securely onto the vehicle frame.

2 Disengage the vehicle from spring brake accumulators; use a tow bar for towage.

3 Unlock the steering post or detach the drag link from the tie-rod arm.

Trailer train brake control

MAZ vehicles have separate pneumatic drive circuits for front and back wheel brake devices, auxiliary, parking and emergency brake. Driving with lit indicating lamps 7, 8, 9 (Figure 7), signaling insufficient brakes pneumatic drive circuits pressure, is prohibited.

At first signs of stowage or sideslip of a trailer train, release the service brake pedal and change for auxiliary brake, avoiding drift by turning the steering wheel towards where the drift is directed.

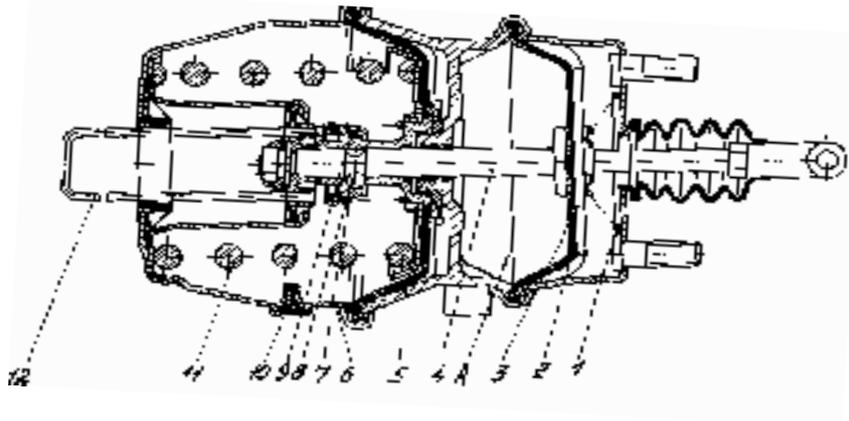
To slow down trailer train motion at down slopes use the auxiliary brake and, if needed, snub using the service brake. At this point, note that auxiliary brake is most efficient when the supplementary box is in the slow range.

While driving along the slippery roads, a trailer train is recommended to be driven “at full length”. For this purpose, in the first place, put the vehicle on the auxiliary brake. Auxiliary rate intensity depends on control valve handle steering angle. The parking brake is enabled when this handle is turned into the back fixed position.

When parking drive circuit pressure is low, spring accumulators are enabled and the vehicle is put on the brake. To brake off the vehicle unscrew pusher fixing bolts from spring accumulator cylinders (see Figure 12) or press pusher 12 while installing the spring accumulator (Figure 13).



Figure 12 – Unscrewing the pusher accumulator fixing bolt



1, 7, 11 – spring; 2, 5 – diaphragm; 3 – disk; 4 – guide bar; 6 – cylinder;
8 – balls; 9 – fixing bushing; 10 – breather hole; 12 – pusher

Figure 13 – Spring accumulator

Vehicle control

While driving, monitor instrumentation indications and indicating lamp signals. Air pressure in the brake pneumatic drive circuits must be 637–784 kPa.

Besides instrumentation, assembly systems state is controlled by lamps indicating:

- when engine lube system pressure drops below 68–98 kPa (lamp for the oil pressure indicator);
- when cooling fluid temperature goes up (lamp for the fluid temperature indicator);
- and when fuel left in the tank is sufficient only for another 20 km (lamp for the fuel level indicator).

When enabling the parking brake, the interwheel and interaxle differential locks, turn lights, when brake mechanism pneumatic drive circuits pressure drops below 441–539 kPa, lamps on the instrumentation panel start to flash, and when ASS is on – those on the speedometer.

Tire mounting and demounting

Remember that gaps in hub bearings and steering tie-rod hinges; improper wheel toe-in adjustment; endfloat in “pivot axle–front axle beam” connection increase tire wear rates.

For tires, it is required to observe the following rules:

1 Provide for daily tire pressure checks carried out before departure and, if needed, adjust the pressure as appropriate. If in-tire pressure is 25% lower as compared to the reference norm, it reduces its service life by about 25...40%.

2 Do not overload the tires. Avoid loading a vehicle in excess of its rated load-carrying capacity. Overloading tires by 25% declines their service life by approximately 40%.

3 Brake the vehicle steadily, avoid wheel slips as they lead to increased tire tread wear.

4 Tire chains must be put only if necessary and removed as soon as no longer needed.

5 Keep tires free of fuel, oil and other oil-products, since they lead to rapid tire damage.

6 Avoid using diagonal and diagonal-radial tires and tires of different tread patterns for one and the same axle, twin wheels and axels.

Differences in twin tires tread patterns must not exceed 5 mm (with tread pattern groove measured on the track centre). Any greater differences can cause differential gears to operate continuously resulting in excessive wear and friction loss.

Tires must be changed as frequently as required from the technical point of view (tire damage, changing twin tires for better selected, ensuring more reliable tires for the vehicle front axle, uneven heavy wear of tire tread patterns, etc.).

7 At regular intervals and before rimless wheel removal, check the restraints condition by rotating wheels. In case when any of the restraints is damaged, before removing the ring from the hub, bleed the tires (for safety reasons).

To take the wheels off, unscrew all its restraining nuts at six rotations, then, using a jack, raise the wheel (wheels) off the ground and, using the tire tool, release the blankholders (for back wheels).

When fitting a tire it is strictly prohibited:

- to take a wheel off the hub without bleeding the tire entirely; and to start demounting the tire from the rim without ensuring that the air is bled as appropriate;
- to use stone hammers, iron bars and other heavy objects that can deform wheel parts;
- to mount the tire on a rim that does not match the tire dimensions;
- to use edge and lock wheel rings from other vehicle models;
- to mount supplementary bead rings to decrease the rim width;
- to use rims, edge and lock wheel rings with surface damages: out-of-roundness, local dimples, cracks, outside rim gutter butt end ware as well as dirt, corrosion and paint fade-over;
- to use tires with scratches and damages which hinder mounting;
- to start inflating tires without ensuring that its lock ring is in the proper position in the rim base matching the inflated wheel as appropriate;
- to inflate tires without removing those from the vehicle when in-tire pressure drop is more than 40% of the rated pressure;
- to inflate the tire outside the designated enclosure without removing it from the vehicle or without protective devices (chains and ropes) when in road conditions;
- change edge and lock ring position during tire inflating or bleeding.

To the attention of purchaser's!

Tire fitting operations must be performed in a facility or on the premises specially designated for these operations using special equipment, devices and tools.

Tire inflating

For vehicle tire inflating use the checkpoint valve located at the receivers or the towing valve located at the frame front cross-member. For this purpose:

- unscrew the checkpoint valve protective cup;
- rotate the tire valve core 2–3 times and twist hose nut onto the checkpoint valve output.

Prior to tire inflating, raise the air brake system pressure up till the kPa pressure-sensitive detector is enabled 800 for compressor unloading. If the vehicle is equipped with a pressure-sensitive detector with an air bleed valve for tire inflating, air bleeding can be carried out after lowering the pneumatic brake system pressure to the pressure-sensitive detector closure pressure of 650 kPa. When inflating the tire, pressure must be controlled with a tire gauge.

Spare wheel fitting

Spare wheels fitting for MAZ–5337, MAZ–533603 and MAZ–630308 vehicles is illustrated in Figure 14.

The spare wheel is mounted to the frame using bracket 1, holder 6 and nuts 4.

To lower the wheel:

- unscrew holder 6 fixing nuts 4 towards bracket 1;
- rotate shaft 5 anticlockwise;
- disengage the holder off the wheel disk.

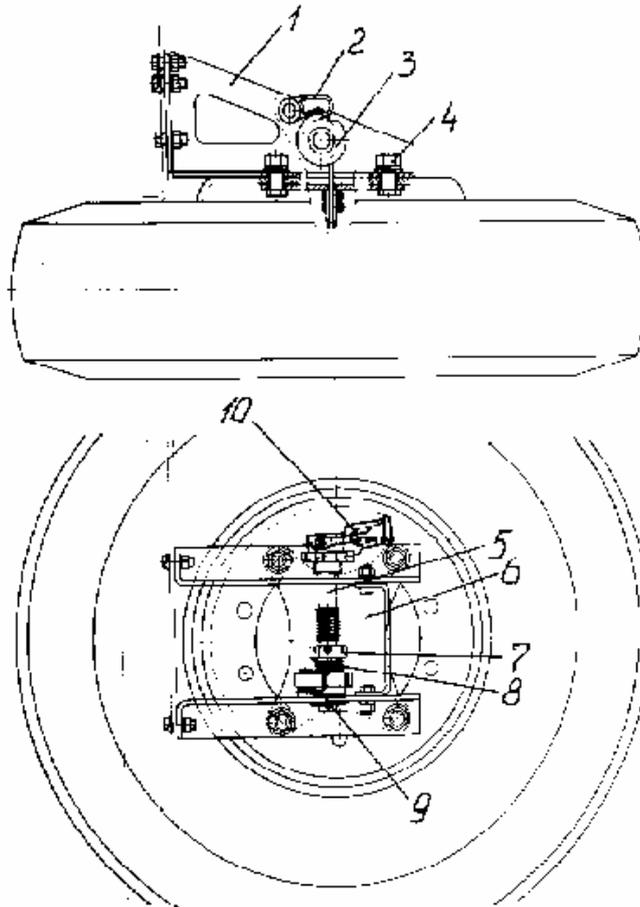
Lift the wheel up and fix it following the reverse sequence.

If, when lifting the wheel up, no shaft rotating resistance is observed or it is too insignificant, tighten nut 7 that regulates diaphragm spring 8 taking effort.

To the driver's attention!

When lowering or lifting up the vehicle observe safety regulations.

Prior to wheel uplift and lowering ensure that ratch 2 forced by spring 9 is engaged with notched wheel 3. When uplifting a spare wheel ensure the wire rope is properly is coiled round the roller as appropriate, especially in its first coils. The wire line must be evenly coiled from the very attachment point.



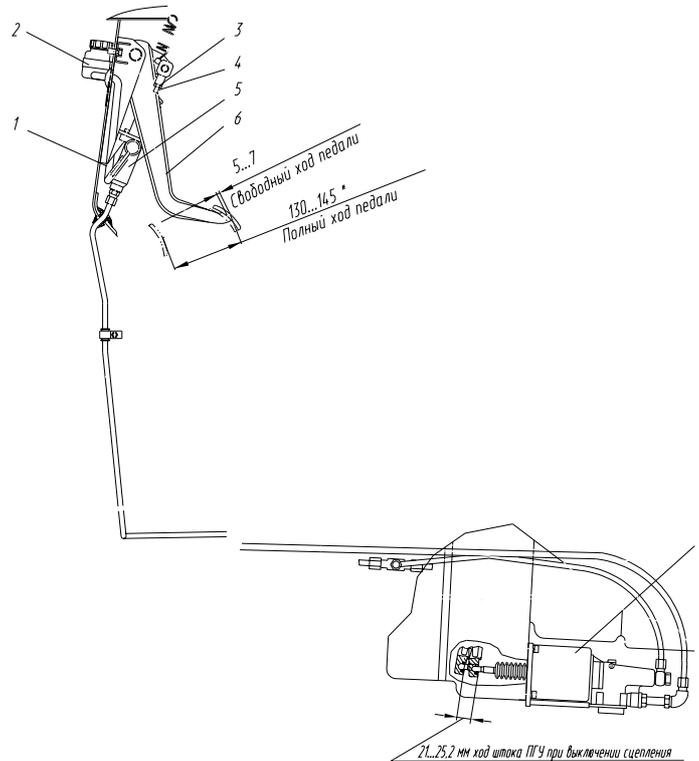
1 – bracket, 2 – ratch, 3 – notched wheel, 4 – nut, 5 – shaft,
6 – holder, 7 – nut, 8 – diaphragm spring, 9 – spring

Figure 14 – Spare wheel fitting

CHECKING AND ADJUSTMENT

Clutch linkage

A clutch linkage is as shown in Figure 15. To prevent partial declutching at upper pedal position (at upper stop) it is required to adjust rod 4 length with nut 3 released so as pedal 6 free travel, until main hydraulic cylinder 5 piston begins to move, is within 5–7 mm.



1 – hose; 2 – bowl; 3 – nut; 4 – rod, 5 – main cylinder;
6 – pedal; 7 – pneumatic hydraulic cylinder (PHC)

Figure 15 – Clutch linkage

Свободный ход педали	pedal free travel
Полный ход педали	pedal full travel
21..25,2 мм ход штока ПГУ при выключении сцепления	21..25,2 mm main PHC rod travel when clutch is enabled

8- and 9-speed gearbox control drive

The main gearbox is controlled with remote control lever 2 (Figure 16). The auxiliary gearbox is controlled by range switch 1 mounted on the gear-changing lever. The gear changing diagram for the 8-speed gearbox is shown in Figure 22, the gear shifting diagram for the 9-speed gearbox is shown in Figure 23.

The gear changing diagram is stuck to the instrumentation panel.

The main gearbox cannot be used for gear changing until the selected range is enabled at the auxiliary gearbox.

The first speed and the backward motion cannot be used if at the auxiliary gearbox the fast range is enabled.

The slow range cannot be enabled at the auxiliary gearbox unless vehicle speed is lower than 25 km/h.

The fast range is enabled at the auxiliary gearbox with range switch is in the low position, while the slow range is enabled with range switcher is in the upper position.

When operating a vehicle, the following gearbox control drive adjustments are carried out:

- longitudinal grade angle adjustment lever 2;
- transverse grade angle adjustment lever 2;
- drive telescopic components lock mechanism adjustment.

Longitudinal grade angle lever 2 adjustment is to be carried out as below:

- tighten neutral position latch at switching mechanism 10.

To check if the gearbox is in the neutral position move lever shaft 9 axially by pressing it with a hand. At that, the lever travel distance should be (30-35) mm;

- release bolt 3 and ensure angle $\beta=85^\circ$ by moving plate 4 in longitudinal direction;
- if plate 4 travel is insufficient, release bolts 6, shift pull rod 5 relative to shank 7, tighten bolts 6 and check angle “ β ” adjustment by moving plate 4.

Transverse grade angle lever 2 adjustment is carried out by regulating steering tie rod 8 length, which is achieved by disconnecting one of the rod ends, with respective fixing nut unscrewed, followed by length adjustments as appropriate to ensure lever 2 vertical positioning relative to the cabin tunnel mounting surface.

After the adjustment is finished, the neutral position latch must be repositioned as appropriate.

Telescopic device lock mechanism should be adjusted as follows:

- splint out pin 16, back out the nut, dismount the pin and release linkage rod 5 from fork 19 of the gear-change lever;
- release lock nut 18 and screw out shank 17 up to the tread end;
- push drag-link 5 down to where the pendant projects into end grooves 22;
- keeping the device compressed, turn shank 17 until the device is blocked with bushing 21 forced by spring 24;
- tighten lock nut 18, check lock mechanism accuracy.

When the mechanism is locked, axial and angle endfloats must be minimal. When unlocked (bushing 21 shifted rightwards), the inner linkage rod must be pushed off 35-50 mm forward by the return spring. Further extension bar travel must be smooth, without sticking, and the lock mechanism is to ensure fixing the extension bar in the initial position as appropriate.

Bends and bows of the drive drag-link and the telescopic components are not allowed. Adjustment can only be carried out with engine switched off.

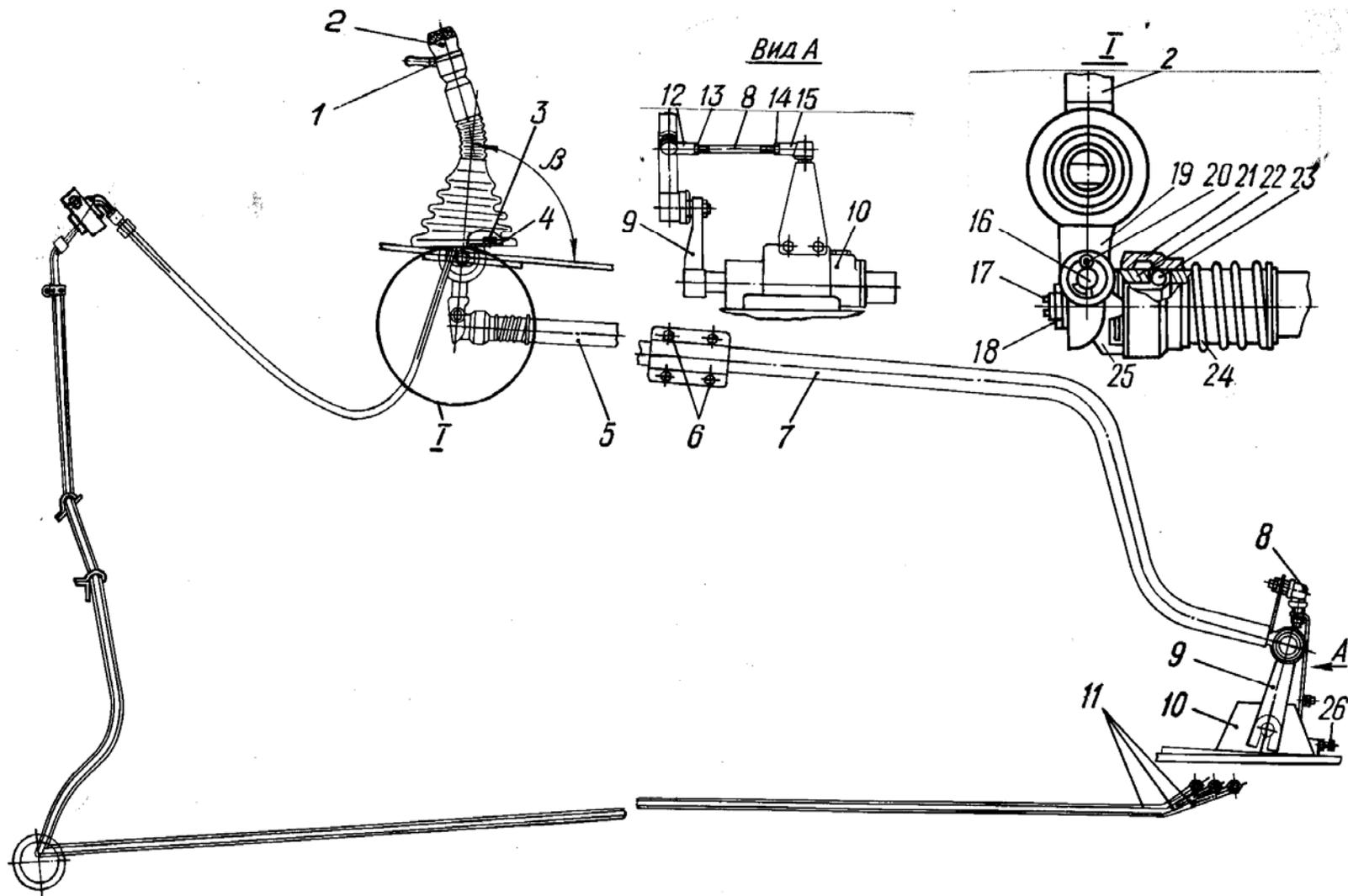
Gearbox control drive YMZ-2361

Gearbox YMZ-2361 is a five-speed three-way gearbox with synchronizers provided for the 2nd-3rd and the 4th-5th gears.

Gears are changed by a lever with a remote control mechanism (Figure 17).

Gear change diagram is as shown in Figure 24.

Drive adjustment is similar to that as described above.

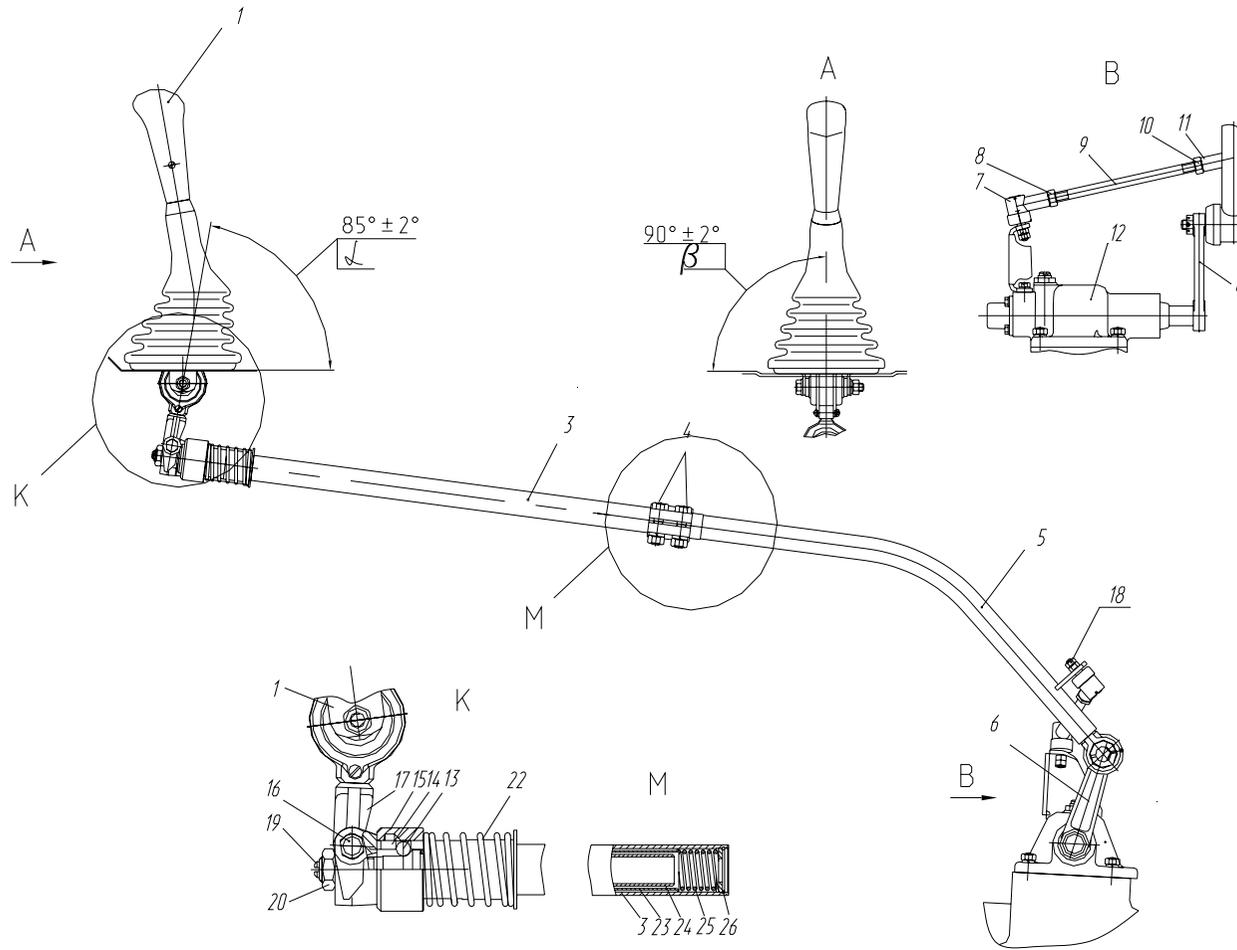


Вид

View

1 – switch; 2 – lever; 3, 6 – bolt; 4 – plate; 5, 7, 8 – linkage rod; 9 – lever; 10 – gear change mechanism; 11 – piping; 12, 15, 22 – linkage rod end; 13, 14, 18 – nut; 16 – pin; 17 – shank; 19 – fork; 20 – splint; 21 – bushing; 23 – ball; 24 – spring; 25 – pendant; 26 – screw

Figure 16 – Gearbox control drive for MAZ-551605, 630305 vehicles



1 – lever; 3, 5, 9 – linkage rod; 4 – bolt; 6 – lever; 7, 11 – linkage rod end; 8, 10 – nut; 12 – gear change mechanism; 13 – ball; 15 – locking bushing; 17 – fork; 18 – pin; 19 – shank; 21 – pendant; 22, 25 – spring; 23 – intermediate extension bar; 24 – inner extension bar; 26 – locking ring.

Figure 17 – Gearbox control drive

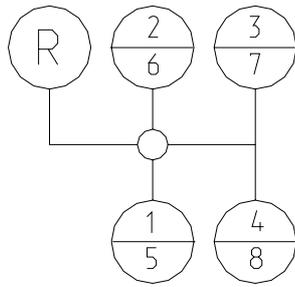


Figure 18 – Gear change diagram KP YMZ–2381

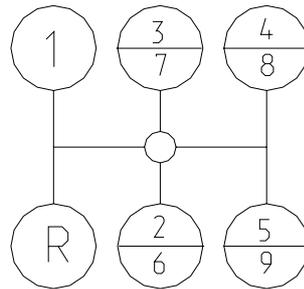


Figure 19 – Gear change diagram (9-speed gearbox)

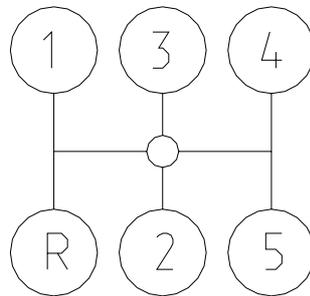
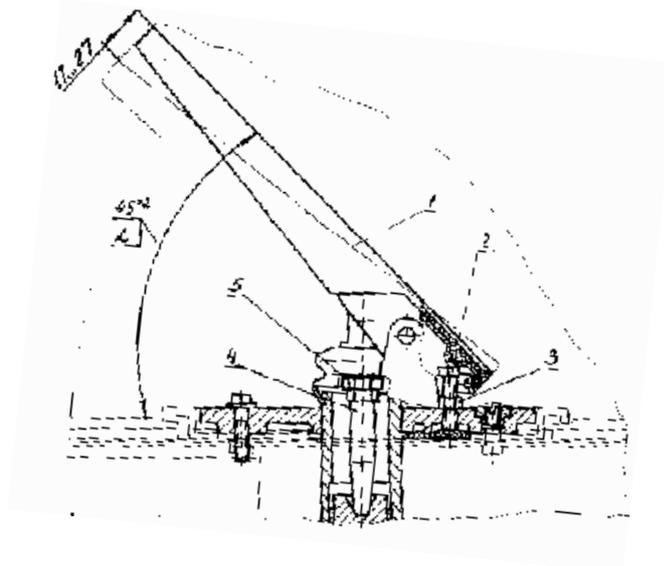


Figure 20 – Gear change diagram KP YMZ –2361

Brake valve actuator

Brake valve angle $\alpha=(45+2)^0$ (Figure 21) can be adjusted, using bolt 2. After the adjustment, nut 3 must be tightened to the torque of 11.8-15.7 Nm. Pedal free travel is to be 17-27 mm. It is determined by pressure build-up in brake chambers. Adjustments are carried out by regulating rod 4 length. After the adjustment, nut is to be tightened to the torque of 23.5–35.3 Nm.



1 – lever; 2 – bolt; 3, 5 – nut; 4 – stem

Figure 21 – Brake valve actuator

Distant and dipped lights adjustment

Lights are adjusted with special equipment.

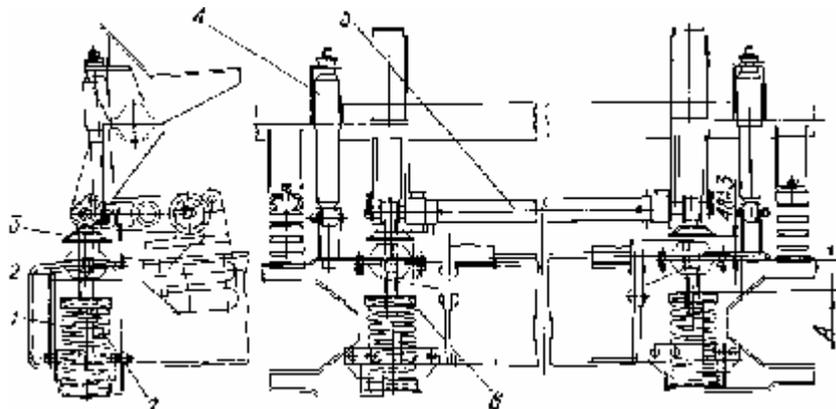
Front cabin springing adjustment

Front cabin springing is adjusted as follows:

- measure the existing gap between support cup 3 and bumper bracket 2 (see Figure 22);
- throw off lock nut 4;
- rotate upper cup 3 with the wrench, adjust to 48 ± 3 mm length.

In a similar way, adjust the other support and ensure that the gap between cup 3 and bracket 2 on the first support is still equal to 48 ± 3 mm. At that, A dimension difference should not exceed 8 mm.

Screw in lock nuts for both supports.



1– hinged support; 2 – bumper bracket; 3 – cup (with welded nut);
4 – lock nut; 5 – spring; 6 – wrench; 7 - reamer holder

Figure 22 – Front cabin springing adjustment

VEHICLE MAINTENANCE

Careful vehicle maintenance is the best way to reduce operational costs for the vehicle and to ensure its trouble-free and long-term operation.

During MAZ vehicles operation the following maintenance is recommended:

- weekly maintenance;
- maintenance after every (A) of mileage for I operation category:
 - 8000 km – for trucks;
 - 5000 km – for vehicles MAZ–551605;
- maintenance after every (C) of mileage for I operation category.
 - 24000 km – for trucks;
 - 20000 km – for vehicles MAZ –551605.

Maintenance must be carried out in conditions excluding contaminants or dust ingress into vehicle assemblies and equipment.

Engine power system devices, electrical equipment, batteries and hydraulic system assemblies can be adjusted and services only at special maintenance stations or in special workshops where such experienced specialists, having all necessary tools, devices and stands at their disposal, could ensure quality and fast execution of works as above.

After dismounting of pneumatic, electrical and hydraulic systems elements, it is necessary to check for dangerous contacts of such systems with vehicle parts and eliminate them if any.

Power unit maintenance (engine, clutch, and gearbox) is carried out in accordance with manufacturer specification.

Daily maintenance

If needed, washing and cleaning can be carried out. While washing with hose, water streams must be kept away from the electrical equipment.

Before engine start, the following parameters are to be checked:

- fuel level in the tank;
- cabin locking mechanism closure;
- backlights, turn and brake signals;
- clutch;
- oil level in the engine;
- tire state.

After engine start, the following parameters are to be checked:

- oil pressure;
- pneumatic system air pressure;
- clutch operation, including parking brake.

The following parameters must be checked daily:

- in-tire air pressure;
- cooling fluid level;
- windscreen washer fluid level;
- check wheel nuts and tighten them, if needed (including spare wheel nuts, nuts retaining spare wheel bracket to the frame, the disks (rims)).

Biweekly maintenance (after-trip inspection):

- power steering oil level;
- air filter clogging;
- condensate in pneumatic system receivers;
- pneumatic system leakages;
- fluid level in clutch control drive tank;
- in-battery electrolyte level;

- leakages in the engine, the power train, the suspension bumpers, the driving axle, the steering system, the ventilation and heating systems, the cabin uplifting.
- check the battery charge rate in terms of electrolyte density and recharge if needed;
- check steering wheel free travel and for steering rods hinges endfloats.

The first maintenance (A)

During the first maintenance it is required to carry out the entire scope as prescribed for annual maintenance, plus:

- 1 Check all driving belts and adjust if needed.
- 2 Check clutch pedal free travel and adjust if needed.
- 3 Check frame bolt connections and tighten if needed.
- 4 Check brake chamber rods and adjust if needed.
- 5 Check steering linkage rod nut splints, bolts fixing levers to steering knuckles, brake chambers rod fork pins and brake valve actuator parts and eliminate troubles if any.
- 6 Check the battery charge in terms of electrolyte density and remove batteries for recharging if needed.
Check power electric circuits threaded connections (bolts, screws) and tighten if needed; check battery wire connections on the engine support side bracket as well as terminal and battery cut-off switch, starter and generator connections.
- 7 Check gearbox drive and adjust if needed.
- 8 Check cabin uplift mechanism and safety wire ropes condition and that of the respective fixtures.
- 9 Check the propeller shaft flange retaining nut and tighten if needed.
- 10 To eliminate door deflection, remove door lining, release hinge strap bolts, adjust the door upper hinge and tighten bolts to 32–36 Nm torque.
- 11 Ensure that distance between hinged support cup and the cabin front springing bracket (Figure 22) is (48 ± 3) mm and adjust the distance if needed.
- 12 Check steering linkage rod end terminal nuts and adjust if needed.
- 13 Carry out lubricating operations for the vehicle as specified the chimmotology list.

The next nearest maintenance after A mileage:

It is necessary to carry out the entire scope of maintenance A works, plus:

- 15 Check brake chamber nuts and bolts and tighten if needed.
- 16 Check fixing nuts of muffler inlet pipes with intake manifolds, muffler support brackets and tighten those if need, check leakproof hose condition and its connection tightness.
- 17 Check air intake pipe and filter casing bolts and tighten if needed.

After-maintenance vehicle check: the engine, the instrumentation, the steering, the brake and other systems are checked as the vehicle is moving and at a diagnostics station.

The second maintenance (C)

The second maintenance requires the entire scope of works as required for maintenance (A) (item 1-17), plus:

- 1 Check the front and side engine supports on the frame and tighten if needed.
- 2 Check hinge and shaft drive spline connection condition.
- 3 Adjust gearbox support location.
- 4 Check nuts fixing the gearbox crankcase housing to the drive axle crankcase housing and tighten if needed.
- 5 Check front axle beam condition, toe-in value and turn angles for front wheels.

- 6 Check free travel and turn force while the engine is running.
- 7 Make a visual inspection of the frame, brackets, springs and supporting wedge fixtures.
- 8 Check nuts at the front and rear spring clamp, pins and springing eye clamps and rear suspension balancer brackets and tighten if needed.
- 9 Check nuts fixing receivers, fuel tank and batteries brackets, power steering pump, cabin lock system brackets and tighten if needed.
- 10 Check rubber boots and hoses condition at speedometer plug and terminal connections and ensure that the connections are leak-proof
- 11 Check thickness of brake shoe lining through holes in mechanism plates. Cover plate thickness cannot be less than 7 mm. If the clearance between the cover plate and the control collar or the cover plate rivet is 1 mm, such cover plates are to be replaced.
- 12 Check front and rear wheels journal bearing endfloat and adjust bearing preload if needed. To check the endfloat rock the wheel while raised off the ground with a jack.
- 13 Check the distance, dipped and fog lights and adjust if needed.
- 14 Check fixtures of the towing device with the frame cross-member, slotted nut tightening and splinting and eliminate troubles if any.
- 15 For a dump truck, check release valve wire rope condition and adjustment and adjust cabin uplift angle if needed.
- 16 Upon expiry of 4 maintenance-2 periods check taper bearings and drive axles gearbox main drive gears backlashes and adjust if needed.
- 17 Check kingpin bearings condition and adjustment and eliminate troubles if any.
- 18 Carry out lubrication operations as specified in the chimatology list.

After-maintenance vehicle check: the engine, the instrumentation, the steering, the brake and other systems are checked as the vehicle is moving and at a diagnostics station.

Seasonal maintenance (C)

Seasonal maintenance is carried out once in two years and simultaneous with regular maintenance (C). Besides works, stipulated for maintenance (C), seasonal maintenance includes the following:

1 Remove brake drums, check brake wheel mechanisms condition and friction pads condition and thickness, tighten nuts of the front brake calipers with swivel knuckles and lubricate the shoe axle and the shoe roller axle.

2 Check the front axle thrust bearings condition and eliminate troubles if any.

3 Check shock absorber bushing conditions.

4 Check cabin mounting brackets bushing.

5 In autumn and in winter, replace oil, fuel and cooling fluid with the suitable seasonal oil, fuel and coolant.

VEHICLE LUBRICATION

Vehicle lubrication is carried out as specified in the chimmotology list.

Engine assemblies and units (including clutch and gearbox) are lubricated in compliance with manufacturer specifications.

FUEL, OIL AND LUBRICANTS (FOL) CHIMMATOLOGY LIST

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Engine vehicles supply system: – YMZ-236NE2 – YMZ -238DE2 – YMZ -7511.10 –MMZ D-260.5E2	1	Summer, winter diesel fuel according to RD 37.319.036-06 (YMZ) “Diesel fuel. Regulatory documents” or to engine operations manual supplied with the vehicle.	Summer, winter diesel fuel according to standard EN 590:2004	Fuel tank – (196±3)l Fuel tank – (339±6)l Fuel tank –(515±15)l			
Engine cooling system – YMZ -236NE2 – YMZ -238DE2	1	Cooling liquids in compliance with engine operations manual instructions (included in the engine supply package)	Ethylene glycol based cooling fluids meeting the requirements of the following specifications: SAE J034 (USA) ASTM D3306, D6210, D4985 (US) NF R 15-601 (France)	40 l without heater 42 l with heater 47 l without heater 49 l with heater	40 l without heater 42 l with heater 47 l without heater 49 l with heater	In compliance with recommendations on maintenance provided in the correspondent section of the engine operations manual.	Check cooling fluid level, top up if and as required. Change cooling system fluid. Instructions on changing procedures are specified in the engine operations manual.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Filling norm		
– YMZ-7511.10				48 l without heater	48 l without heater		
–MMZ D-260.5E2				50 l with heater	50 l with heater		
				31 l	31 l		
Engine oil pan: – YMZ–236NE2 – YMZ–238DE2 – YMZ-7511.10 –MMZ D-260.5E2	1	List of “D” group engine oils “Engine oils for YMZ engines. Regulatory documents” as well the respective section of the engines operations manual supplied with the vehicle.	Engine oils with API performance characteristics of, at least CF-4 category, and SAE viscosity class as follows: In summer: SAE 30 (to plus 30°C) SAE 40 (over plus 40°C) In winter: 20W-20 (to minus 10°C) All-season: 5W-50 (to minus 30°C) 10W-30 (to minus 20°C) 10W-40 (to minus 20°C) 10W-60 (to minus 20°C) 15W-40 (to minus 15°C) 20W-40 (to minus 10°C) 20W-50 (to minus 10°C)	32.0 l	32.0 l	After each-2000 km of mileage In compliance with recommendations on maintenance provided in the engine operations manual supplied with the vehicle.	Change oil after the break-in period, wash oil filters. Check oil level, refill if necessary. Change oil in the lubricating system. Instructions on changing procedures are specified in the engine operations manual supplied with the vehicle.
				24.0 l	24.0 l		
				32.0 l	32.0 l		
				18.0 l	18.0 l		

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Filling norm		
Gearbox crankcase housing – YaMZ-2361 – YaMZ-2381 – YaMZ-239	1	List of transmission gear oils is specified in RD 37.319.035-03 (YMZ) “Transmission gear oils for YMZ gear boxes. Technical requirements” or in the engine operations manual supplied with the vehicle. Pursuant to RD 37.319.035-03 (YMZ) the following transmission oils grades may be used:	Transmission oils with API performance characteristics of, at least GL-4 category, and SAE viscosity class as follows:: In summer: SAE 90 (to plus 38°C) All-season: 75W-90 (from minus 40°C to plus 38°C) 80W-90 (from minus 26°C to plus 38°C) 80W-140 (from minus 26°C to plus 38°C and more) 85W-140 (from minus 12°C to plus 38°C and more) Pursuant to RD 37.319.035-03, the following transmission oils grades may be used : -Fuchs Titan 5 Speed SL SAE 75W-90; -Mobilube 1SHC SAE 75W-90 manufactured by ExxonMobil; -Esso Gear Oil GP SAE 80W-90 manufactured by ExxonMobil	5.5 l	5.5 l	After each-2000 km of mileage A	Change oil after the break-in period, clear the oil stainer and the magnet of bed-in products Check oil level and top up if necessary. Change oil in the gear box crankcase housing. Instructions on changing procedures are specified in the engine operations manual supplied with the motor vehicle.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Central main drive gear crankcase housing: - intermediate axle - with round banjo-type axle crankcase housing - with oval banjo-type axle crankcase housing - back axle - with round banjo-type axle crankcase housing - with oval banjo-type axle crankcase housing	1	All seasons: Transmission gear oil TAD17 (down to minus 30 ⁰ C) TM-5-18, API GL-5 Mixture: 85% TAD17 and +15% of diesel fuel "A", "3" (below minus 30 ⁰ C)	Transmission gear oils SAE viscosity class: In summer: SAE-90 (from minus 12 ⁰ C to plus 38 ⁰ C) In winter: SAE-80W (from minus 26 ⁰ C to plus 21 ⁰ C) All-season: 75W-80 (from minus 40 ⁰ C to plus 30 ⁰ C) 75W-90 (from minus 40 ⁰ C to plus 38 ⁰ C) 80W-90 (from minus 26 ⁰ C to plus 38 ⁰ C) 85W-90 (from minus 12 ⁰ C to plus 38 ⁰ C) 85W-140 for the tropics Pursuant to American classification API GL-3/4/5 MIL-L-2105 Pursuant to classification ZF TE-ML 02/05/07/12 Pursuant to norms MAN M3343 (API GL-4+5) M341 (API GL-4) M342 (API GL-5)			After each-2000 km of mileage A 2C 2C for the mixture	Change oil after the break-in period. Check the oil level and top up to the filling opening lower edge. Discharge waste oil, wash the crankcase housing, fill in with fresh oil to the filling opening lower edge.
				13.0 1	13.0 1		
				15.2 1	15.2 1		
				13.0 1	13.0 1		
				15.0 1	15.0 1		

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Wheel gearing crankcase housing - intermediate axle - back axle	2	All-season: Transmission oil TAD17 (up to minus 30 ⁰ C) TM-5-18, API GL-5 Mixture: 85% TAD17 и +15% of diesel fuel "A", "3" (below minus 30 ⁰ C)	Transmission gear oils SAE viscosity class: In summer: SAE-90 (from minus 12 ⁰ C to plus 38 ⁰ C) In winter: SAE-80W (from minus 26 ⁰ C to plus 21 ⁰ C) All-season: 75W-80 (from minus 40 ⁰ C to plus 30 ⁰ C) 75W-90 (from minus 40 ⁰ C to plus 38 ⁰ C) 80W-90 (from minus 26 ⁰ C to plus 38 ⁰ C) 85W-90 (from minus 12 ⁰ C to plus 38 ⁰ C)			After each-2000 km of mileage	Change oil after the break-in period.
				2.0 l	4.0 l	A	Check oil level and top up to the filling (control) opening lower edge.
				2.0 l	4.0 l	2C C for the mixture	Discharge waste oil, wash the crankcase housing, fill in with fresh oil to the filling (control) opening lower edge. As for wheel gearing, when oil level is checked and oil is changed, the opening shall be located at the lowermost position.
Rear suspension balancer crankcase housing for a 3-axle vehicle	2		85W-140 for the tropics Pursuant to American classification API GL-3/4/5 MIL-L-2105 Pursuant to classification ZF TE-ML 02/05/07/12 Pursuant to norms MAN M3343 (API GL-4+5) M341 (API GL-4) M342 (API GL-5)	0.4 l	0.8 l	2C C for the mixture	Change oil, for that purpose, remove the cover, wash and place it back, fill oil up to the filling opening lower edge.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Power steering system	1	Vehicle hydraulic system oil, grade R (MG-22-V)	MIL-H-5606D (USA) Pursuant to classification ZF TE-ML 09 Pursuant to "General Motors" classification: ATF Dexron II/III Pursuant to "Ford" classification: ATF Mercon	6.5	6.5	After each-2000 km of mileage C 3C	Change oil after the break-in period. Check the oil level and top up if necessary. Change oil.
Hydraulic jack DG 12	1	Hydraulic oil VMGZ or VMGZ-C (MG-15-V(c))	MIL-H-6083D (USA) DX-15 to DID-5540 (GB.) C-635, C-636 symbol (NATO) "Shell" company: Tellus 21 Aeroshell Fluid 7 "Esso Petroleum Co., Ltd" company: Esso Univis j 43, Tso Univis j 40 "Mobil Oil" company: Mobil Fluid 93	0.4 l	0.4 l		Change oil in the course of repairs, top up to the filling opening level.
Cabin uplift system	1			0.78 l	0.78 l	2C 4C	Check oil level and refill if necessary. Change oil.
Propeller shaft needle bearings:	5	Lubricant No. 158M	DIN 51502 (Germany) "Mobil" company: Mobilgrease Special (MoS ₂) "BP" company: Energrease L 21 M(MoS ₂) "Texaco" company: Molytex TP2 (MoS ₂) "Esso" company: Multi-purpose, Lithium	0.04 kg	0.20 kg	C	Apply the lubricant until it appears from under the bearing end seal.
Propeller shaft slip joint	2	Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB)	0.05 kg	0.10 kg	2A	Apply the lubricant until it is pressed out of the control opening.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Propeller shaft intermediate support bearing	1		"Shell" company: Retinax EP2; "Mobil" company: Mobilgrease MP Mobilux EP2/EP3 "BP" company: Energrease LS-EP2 "Texaco" company: Multifak EP2 "Esso" company: Beacon EP2	0.085 kg	0.085 kg	A	Fill the intermediate support inner cavity with lubricant using a grease fitting until the lubricant appears from the opening of the opposite grease fitting unscrewed beforehand.
Steering post U-joints needle bearings	2	Lubricant No. 158M	DIN 51502 (Germany) "Mobil" company: Mobilgrease Special (MoS ₂) "BP" company: Energrease L 21 M(MoS ₂) "Texaco" company: Molytex TP2 (MoS ₂) "Esso" company: Multi-purpose, Lithium	0.008 kg	0.016 kg		Apply the lubricant whenever U-joint is assembled or repaired.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Steering post bearings and splines	1	Lubricant Litol-24 TsIATIM-201	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) “Shell” company: Retinax EP2; “Mobil” company: Mobilgrease MP Mobilux EP2/EP3 “BP” company: Energrease LS-EP2 “Texaco” company: Multifak EP2 “Esso” company: Beacon EP2	0.02 kg	0.02 kg	2C	
Steering post propeller shaft splines	1	Lubricant Litol-24		0.02 kg	0.02 kg	A	When cabin is uplifted, lubricate the shaft splines after cleaning lubricating surfaces.
Power steering power cylinder: - rear support - hinge joint	1			0.02 kg	0.02 kg	C	Apply the lubricant using a grease fitting until fresh lubricant appears in the gaps.
	1			0.05 kg	0.06 kg	A	
Steering joints: - longitudinal - traverse	2			0.06 kg	0.12 kg	2A	
	2			0.06 kg	0.12 kg		

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Brake toe fulcrum pin bushings and toe roller shafts	18	Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) “Shell” company: Retinax EP2; “Mobil” company: Mobilgrease MP Mobilux EP2/EP3 “BP” company: Energrease LS-EP2 “Texaco” company: Multifak EP2 “Esso” company: Beacon EP2	0.005 kg	0.09 kg	maintenance C	Lubricate when assembling, seasonal maintenance, brake shoe repairs replacing.
Front wheel bearings	2			0.005 kg	0.01 kg	2C	Fill spaces between the bearing rollers with lubricant. Apply a thin layer of lubricant to the internal hub cavity and cover.
Needle bearings of front axle steering knuckle pivots.	4			0.02 kg	0.08 kg	A	Lubricate using a pressure lubricator until fresh lubricant appears in the gaps.
Towing device of the high sided vehicle: - bar	1			0.01 kg	0.01 kg	A	For a trailer vehicle: Lubricate using a pressure lubricator.
- hoisting device space	1			0.075 kg	0.075 kg	4C	Clear the surface of old lubricant and dirt, apply fresh lubricant
- hood guard	1			0.1 kg	0.1 kg		
Pneumatic hydraulic cylinder pusher spherical surface and on-roller lever recess	2			Lubricant ShRUS-4	DIN 51502 (Germany) “Mobil Oil” company: Mobilgrease 24 “Shell” company: Aeroshell 15, Aeroshell 15A	0.005 kg	0.010 kg

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Clutch control drive	1	Brake liquid "RosDOT" "RosDOT4"	SAE J1703, ISO 4925, FMVSS 116 type DOT3 and DOT4 (USA) "Shell" company: Shell Dona B "BP" company: Petrosin Super Fluid J1703P "Mobil" company: Hydraulic Brake Fluid "Esso" company: Attas Brake Fluid CD	1.0 l	1.0 l	A	Check liquid level and top up if necessary. Change liquid once a year.
Fuel supply drive pedal –vehicles pedals inserts inner surface	1	Lubricant Litol-24	DIN 51502 (Germany) "Shell" company: Retinax EP2 "Mobil" company: Mobilgrease MP Mobilux EP2/ EP3 "BP" company: Energrease LS-EP2 "Texaco" company: Multifak EP2 "Esso" company: Beacon EP2	0.02 kg	0.02 kg	C	Disassemble and clean off old lubricant, apply fresh lubricant. Lubricate when assembling and repairing.
Gearbox control drive				0.0025 kg	0.005 kg		Lubricate friction surfaces when assembling and repairing.
– steering tie rod spherical joint	2			0.005 kg	0.005 kg		
– back end spherical joint	1			0.01 kg	0.01 kg		
– gear-change lever spherical joint	1			0.03 kg	0.03 kg		
For vehicles with a speedometer (rev counter) mechanical actuator			DIN 51502 (Germany) MIL-G-10924C (USA) "Shell" company: Retinax C "BP" company: Energrease C2, C3,				

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
- speedometer transmitter drive gear	1	Lubricant solid oil C, Press-solid oil C	GP2, GP3, PR2, PR3 “Mobil” company: Mobilux EP2	0.01 kg	0.01 kg	2C	Fill secondary shaft bearing cover change gear cavity with fresh lubricant.
- speedometer transmitter driven spindle	1			0.0005 kg	0.0005 kg		Apply a thin layer of lubricant while assembling and repairing.
Worm-and-worm pairs of wheel brakes adjusting levers with automatic regulation of clearance space.	6	Lubricant ShRUS -4	DIN 51502 (Germany) Фирма Mobil Oil: Mobilgrease 24 “Shell” company: Aeroshell 15, Aeroshell 15A	0.02 kg	0.12 kg	2C	Apply lubricant using a grease fitting until fresh lubricant appears at the relief valve without taking the lever off.
External surface and recess in brake valve actuator pusher	1	Lubricant ZhT-72		0.005 kg	0.005 kg	C	Apply a thin layer of lubricant to the surfaces with partial dismantling of the brake valve.
Expansion cam shaft bushings (front)		Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) “Shell” company: Retinax EP2; “Mobil” company: Mobilgrease MP Mobilux EP2/EP3 “BP” company: Energrease LS-EP2 “Texaco” company: Multifak EP2 “Esso” company: Beacon EP2	0.025 kg	0.005 kg	A	Apply lubricant using a grease fitting until fresh lubricant appears in the gaps.
Drive axles expansion cams shaft bearings (ShS-40K).	8			0.015 kg	0.12	2A	

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Gearbox control drive	7	Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) “Shell” company: Retinax EP2; “Mobil” company: Mobilgrease MP Mobilux EP2/EP3 “BP” company: Energrease LS-EP2 “Texaco” company: Multifak EP2 “Esso” company: Beacon EP2	0.03 kg	0.21 kg		When assembling apply lubricant onto friction surfaces
Spring bolts: - cushion suspension - pneumatic suspension	2			0.015 kg	0.03	A	Apply lubricant using grease fitting when vehicle is operating under normal conditions. If vehicle is used on dusty and dirty roads it is recommended to apply lubricant on a daily basis.
	2			0.015 kg	0.03 kg		
Front and rear laminations of laminated springs	4	Graphite grease USsA	DIN 51502 (Germany) VV-G-671d (USA) grade Grease 3C.S/3113 grade XG264 (GB) “Shell” company: Barbatia 2/3 “Mobil” company: Mobiltac 81 “BP” company: Energrease C36/C2G/GP2-G/GP3-G “Texaco” company: Clissando FMA-20 “Esso” company: VanEstan2	0.25 kg	1.00 kg		Apply a thin layer of lubricant to the points of contact when repairing.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Wind-screen wiper hinge joints	3	Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) "Shell" company: Retinax EP2; "Mobil" company: Mobilgrease MP Mobilux EP2/EP3 "BP" company: Energrease LS-EP2 "Texaco" company: Multifak EP2 "Esso" company: Beacon EP2	0.02 kg	0.06 kg		Lubricate axes and cavities when assembling.
Cabin front springing axes	2			0.02 kg	0.04 kg		When assembling and repairing apply lubricant using a grease fitting until the lubricant appears on the bushing end face.
Cabin door lock actuator friction surfaces	2	Lubricant TsIATIM-201	DIN 51502 (Germany) MIL-G-7711A(CIIIA) DEF STAN 91-12/1 grade XG-271 (GB) "Shell" company: Aeroshell "Mobil" company: Mobiltemp SHC 32 "Esso" company: Beacon 325	0.01 kg	0.02 kg		Lubricate when assembling.
Seat hinge joints	8	Graphite grease USsA	DIN 51502 (Germany) VV-G-671d (USA) grade Grease 3C.S/3113 grade XG264 (GB) "Shell" company: Barbatia 2/3 "Mobil" company: Mobiltac 81 "BP" company: Energrease C36/C2G/GP2-G/GP3-G "Texaco" company: Clissando FMA-20 "Esso" company: VanEstan2	0.005 kg	0.04 kg		In case of squeaking, disassemble hinge joints and lubricate outside and inside diameters of bushings.
Longitudinal control mechanism	4			0.005 kg	0.02		In case of squeaking, lubricate guides at insert and rollers motion locations.

Lubrication (filling) point	Lubrication (filling) quantity	Basic grades and application seasons	Foreign equivalents (grade, specification, company)	FOL quantity		FOL change (refilling) intervals. Basic grade	Lubrication (filling, oil change) recommendations. Waste oil discharge (collection) norm.
				Filling norm	Total for a vehicle		
Cylinders for vehicle driving axles differential lock switching	2	Lubricant Litol -24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) "Shell" company: Retinax EP2; "Mobil" company: Mobilgrease MP Mobilux EP2/EP3 "BP" company: Energrease LS-EP2 "Texaco" company: Multifak EP2 "Esso" company: Beacon EP2	0.015 kg	0.030 kg	2C	Disassemble, clean off dirt and apply a thin layer of lubricant.
Inside surface of bushing for back axle and front axle ASS transmitter for the vehicles equipped with antiskid system (ASS).	4	Graphite grease USsA	DIN 51502 (Germany) VV-G-671d (USA) grade Grease 3C.S/3113 grade XG264 (GB) "Shell" company: Barbatia 2/3 "Mobil" company: Mobiltac 81 "BP" company: Energrease C36/C2G/GP2-G/GP3-G "Texaco" company: Clissando FMA-20 "Esso" company: VanEstan2	0.00025 kg	0.001 kg		Apply a thin layer of lubricant when brake shoes are changed or if transmitter in-busing shift force is more than 120...140 N.
Windscreen washer tank	1	A mixture of wind-screen washing fluid "Obzor" and water in the following proportion: 1:9 (to minus 5 ⁰ C) 1:5 (to minus 10 ⁰ C) 1:2 (to minus 20 ⁰ C) 1:1 (to minus 30 ⁰ C) 2:1 (to minus 40 ⁰ C)		10.01	10.01		"Obzor" fluid mixtures to be used under the ambient temperature below plus 5 ⁰ C.

Scope of the guarantee provided, procedures for claims submission and drawing up of documents as required are stipulated in the vehicle sale and purchase contract.

In case of any damage please fill in the attached form and send it to the vendor.

DAMAGE STATEMENT No.

City _____

Date _____

Name and address of the commercial organization, company: _____	Product model: _____ Chassis: _____ Engine: _____
Service station, address: _____	Speedometer readings as of the date when the failure was discovered: _____ km
Supply date: _____	Commissioning date: _____
Implemented measures on scheduled maintenance:	
Date: _____	Date: _____
Mileage: _____	Mileage: _____
Description of damage, its causes and characteristic features: _____	

Replaced parts, assemblies

Designation	Catalogue No.	Quantity	Price per unit	Amount	Cost of work
1.					
2.					
3.					
4.					
5.					

Date of delivering the Product to the service repair station _____

Date of sending the Product out of the service repair station _____

Conclusion: _____

Purchaser representative responsible for repairs: _____

Vendor responsible representative in the country of the Purchaser: _____

Date
L.S.

Signature

Date

Signature
L.S.

Main threaded connections tightening torques, Nm

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
1 HOLD-DOWN BOLTS				
Journal to axle crankcase housing	320–360	+	+	
Carrier to carrier crankcase housing	420–440	+	+	Drive axles with disk wheels
Driving bevel gear bearing sleeve	90–120	+		Bolt connection variant
Gearbox crankcase housing band covers	200–280	+	+	
Brake chamber bracket	110–160	+		
Brake chamber bracket	320–360	+	+*	*upper location of energy accumulators
Brake chamber bracket	118–157		+	lower location of energy accumulators
Front axle brake chamber bracket	110–140			
Expansion cam supports	118–157	+	+*	*upper location of energy accumulators
Expansion cam sleeve	118–157	+	+	
Carrier to hub	80–100	+	+	Drive axles with rimless wheels
Interaxle differential cups	65–80		+	
Gear crankcase housing to intermediate crankcase housing.	50–62		+	
Covers to carrier crankcase housing	29–37		+	For 4- planet pinion wheel gearing
Collar covers to hub	24–36	+	+	
Collar covers of intermediate axle input shaft	50–62		+	
Collar covers of intermediate axle output shaft	44–56		+	
Collar covers of back axle bearing sleeve	50–62	+		

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
Differential nut stops	12–18	+	+	
Brake shoes fulcrum pins locking plates	24–36	+	+	
Front drive axle back plate	24–36			
Steering rod lever to steering knuckle	392–432			
Journals for the front drive axle and support, lever and steering knuckle bearing lower covers	275–314			
Bolts and studs for securing steering knuckle lever and upper cover	275–314			
Front axle covers and crankcase housings	157–196			
Pivot pin bearing covers	16–20			
Expansion cam tube shock absorber brackets to caliper	310–315			
Pivot stud device adjustment bolt	310–350			
2 RETAINING NUTS				
Gear unit to axle crankcase housings	120–160	+	+	
Driven spur wheel	450–600		+	
Flanges	450–600	+	+	
Driven gear and interwheel differential cups	210–260	+	+	
Wheel gearing covers	24–36	+	+	For 5-planet pinion wheel gearing
Wheel hubs	400–500	+	+	
Intermediate axle pinion gear carrier	130–180		+	
Back axle drive bevel gear bearings carrier	90–120	+		For stud fixings
Hubs mounting locknuts	400–500	+	+	
Reducers and back plates retaining nuts	24–36	+	+	
Interaxle differential cross piece mounting clamp	300–400		+	
Interaxle differential lock screw fixings	44–56	+	+	

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
Cages with steering knuckle hinge joints housings	110–140			
Intermediate axle crankcase housing	70–100		+	
Wheel disk 250–300	+	+		
Wheel disk	250–300	+	+	
Ball pin	275–317			
Locknuts of pivot assembly adjusting bolt	216–275			
Lever studs and steering knuckle bearings covers	275–314			
Steering tie rod ends	69–88			
Bolts for securing front brake supports with steering knuckles	160–200			
Nuts for securing wheels for vehicles with disk wheels	500–600			
Nuts for securing wheels for vehicles with rimless wheels	250–300			
Nuts for front spring U-bolts	450–600			
Nuts for rear spring U-bolts	600–650			
Nuts for front and rear spring eyes U-bolts	200–220			
Front and rear spring eyes bolts	250–320			
Shock absorber housings nuts	120–150			
Nuts for securing steering box to frame	250–320			
Nuts for securing steering linkage ball studs	160–200			
Nuts for securing plain arms on sector shafts	400–440			
Nuts for securing brake accumulators and bolts for securing accumulator bracket	180–200			
Nuts for securing compressor cylinder head	12–17			
Nuts for steering wheel securing	60–80			
Bolts for securing steering post universal-joint forks	27–35			
Bolts for securing propeller shaft flanges	160–200			

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
Nuts for securing cross members to frame	220–240			
Bolts for securing steering knuckle and steering geometry levers	400–500			
Nuts for securing ball pin to steering geometry levers	220–250			

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