

Minsk Automobile Plant

**VEHICLE
MAZ-651705**

Operating manual

Republic of Belarus

Minsk, 2010

DRIVER!

You are commencing to operate vehicle MAZ, which is distinguished by high reliability, equipped with up-to-date assemblies and devices that facilitate trailer train driving, reduce a driver's fatigue, enhance traffic safety, ensure considerable growth of working efficiency and decrease of hauling operations self-cost.

Study this manual carefully before starting vehicle operation.

Introduction

MAZ-651705 is a six-wheel dumptruck with 6×6 wheel arrangement (Figure 1) with back platform dumping meant for hauling simple construction bulk goods (sand, substratum, sand-gravel aggregates, etc.) along highways and temporary or designated road sections that allow axial weights indicated in the specification.

Operation and maintenance data for the engine, clutch and gear box are given in separate supplementary manuals to the vehicle.

SAFETY REQUIREMENTS AND CAUTIONS

The basic conditions for reliable operation and effective exploitation of the vehicle are knowledge of its assemblies and aggregates, strict observance of operational and maintenance regulations as well as elimination of the discovered deviations from the requirements set in this manual.

Before starting vehicle operation study carefully its assembly, operational and maintenance regulations described in this manual, pay particular attention to section “Particular issues associated with vehicle operation”.

1 Tightening torques for main thread connections are given in Annex 2.

2 During vehicle break-in period (first 2000 km of the distance run) strict observance of “Vehicle break-in period” section requirements is necessary, so as the further efficiency of its components mostly depends on satisfactory parts bed-in in the initial operating period.

3 Lubrication of the vehicle assemblies and aggregates must be performed in conformity with the instructions given in “Chimmotology list” of this manual. Using the oils and lubricants that were not recommended by this manual is **not allowed**.

4 Vehicle running at air pressure in the brake pneumatic drive circuits lower than 600 kPa, i.e. until the indicating lamps of the corresponding circuits are extinguished, is not allowed.

5 If a vehicle is started on a slippery road section, it is required to enable interaxle 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 the vehicle is moving, the driver should monitor its instrumentation and indicating lamps.

7 With engine out of operation and gear box cut-off, the vehicle is not allowed to run at a neutral speed so as to avoid power steering trip-out and air entering into the 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 the vehicles which have defective or failing power steering. While the 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, the 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.

24 Upon loading the dumptruck with bulk materials the shovel bucket volume must not exceed 2.5 m³, and the dropping height above the platform floor level must not exceed 1.5 m.

The load must be evenly distributed along the platform. To avoid platform damaging and load hovering load during dumping single monolithic lumps or frozen pieces of bulk materials must not exceed the maximum size of 0.4 m and 300 kg.

25 Lifting of the dumptruck loaded platform with a faulty stabilizer bar in the rear suspension is not allowed.

26 Activation of the platform hydraulic lifting system at air pressure in the pneumatic system lower than 500 kPa and with activated clutch is not allowed.

27 Unloading of the dumptruck is to be carried out on a hardcoated horizontal flat surface. Upon buckling failure signs occurrence the unloading procedure is to be stopped immediately.

28 The dumptruck take-off with the platform lifted is not allowed.

29 Any operations under the loaded platform are prohibited.

30 During operations performed under the lifted unloaded platform of the dumptruck or dump trailer the platform **must** be fixed using the corresponding holding devices (safety limit stop) in order to avoid its spontaneous down movement.

31 If the load is not dumped during platform lifting for, approximately, 20°, the platform lifting operation must be stopped and the reasons clarified.

32 When the dumptruck is run fully loaded along public roads or in-house autoroad that allow the axleload up to 26 t (on the second and third axles), the operating speeds must be lowered to the values ensuring safe operation (stability, handleability) of the vehicle.

TECHNICAL SPECIFICATION

Table 1 – Technical specification

Parameters	Parameter values
Technically acceptable load-carrying capacity, kg	19000
Equipped vehicle gross weight, kg	136250
Technically acceptable vehicle gross weight, kg	33000
On-road weight distribution for a vehicle of gross weight, kg: – on the first axle – on the second axle – on the third axle	7000 13000 13000
Engine	YMZ–238DE2
Rated engine power, kW	243.0
Gear box	YMZ–239
Maximum speed for a vehicle of gross weight, km/h	75.0
Reference fuel consumption, l/100 km, for a vehicle of gross weight moving at the constant speed of not more than 60 km/h	42.0
Tires, ply rating (PR), tread pattern	12.00R20; ID-304, ID-304M, NS 18, fig. – multipurpose
Rated wheel tire pressure, kPa: – on the first axle – on the second axle – on the third axle	795±20 840±20 840±20
Vehicle minimum turning radius along the outside front wheel track (with reference to turning center line) axis, m, not more than	10.5

Note:

* – with an installed overspeed limiter.

1 Permissible gross weight deviation of the equipped vehicle plus 3 %. The lower weight limit is not restricted.

2 Equipped vehicle gross weight (standard completeness) is the weight of the 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.

Table 2 – Basic adjusting values

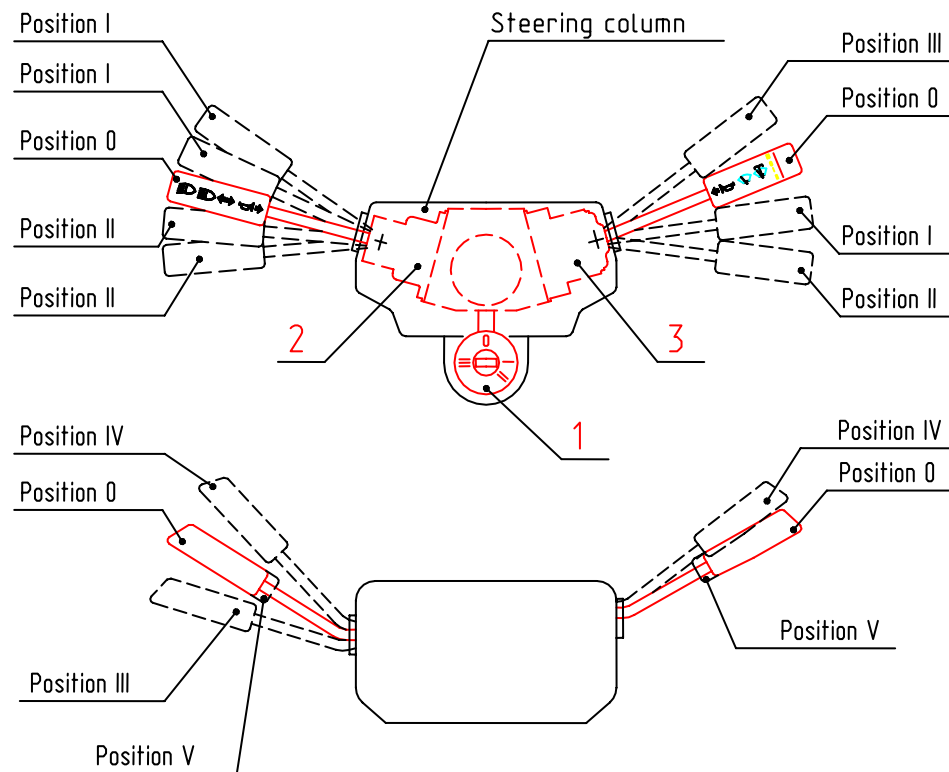
Misalignment of wheels	(0.5–3.5) mm
Left wheel left steering angle	(40±1)°
Right wheel right steering angle	(36±1)°
Clutch pedal free travel	(5–7) mm
Brake pedal free travel	(17–27) mm
Brake chamber rod stroke	(25–40) mm
Brake chamber rod stroke upon installment of an adjusting lever with automatic gap control	(38–44) mm

Table 3 – Refill capacities, l

Fuel tank;	
total capacity	343; 515
active capacity	327; 495
Cooling system	47
Gearbox crankcase housing	9.0
Crankcase housing of the front axle main gear	4.5
Crankcase housing of the rear and intermediate axle main gear	13 each
Crankcase housing of the rear and intermediate axle wheel gear	2 each
Power steering system	6.5
Dumptruck platform lifting system	65.0
Windscreen washer tank	10.0
Rear suspension balancer crankcase housing	0.4 each

CONTROL ELEMENTS AND MEASURING INSTRUMENTATION

Control elements and measuring instrumentation arrangement as shown in Figures 2, 3, 4 and 5.



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

Figure 2 – Switches below the steering wheel and the starter and instrumentation switch

Starter and instrumentation lock switch 1 (Figure 2) with an antitheft 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 4).

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 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 1 (Figure 4). 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 2 (Figure 4). 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 6 (Figure 3). This is a device indicating engine shaft rpm speed (connected to the generator phase and 8A fused).

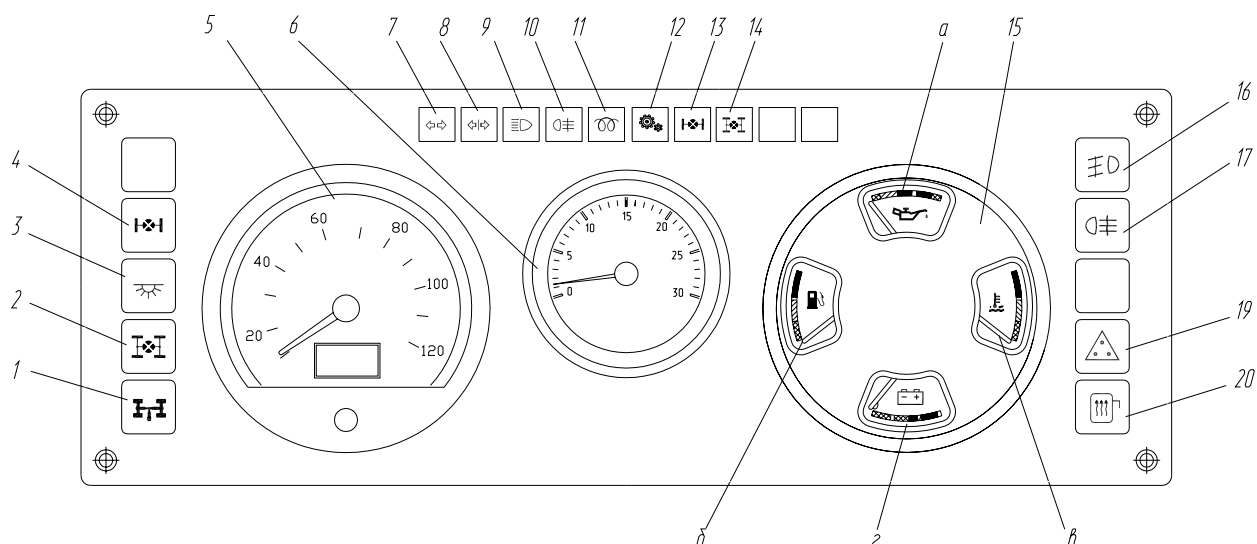
The rev counter dial is divided into three sections of different colors:

– 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 color designation are to indicate engine shaft rpm speed ranges, which are not recommended because of high fuel consumption rates.



2 – interaxle differential lock switch; 3 – engine switch; 4 – interwheel differential lock switch; 5* – speedometer; 6 – rev counter; 7 – vehicle turn indicating lamp; 9 – distance headlight indicating lamp; 10 – rear fog light indicating lamp; 11 – engine electric torch heater indicating lamp; 12 – downshifting indicating lamp; 13 – interwheel differential lock activation indicating lamp; 14 – interaxle differential lock indicating lamp; 15 – instrument board: a) – engine oil-pressure indicator in engine; б) – fuel indicator; в) – coolant temperature indicator; г) – voltage meter; 16 – fog lamp switch; 17 – rear fog light switch; 19 – trailer train sign switch; 20 – rear-view mirror heating switch (if rear-view mirrors are installed)

Figure 3 – Control panel**

* Rev counter installation is possible

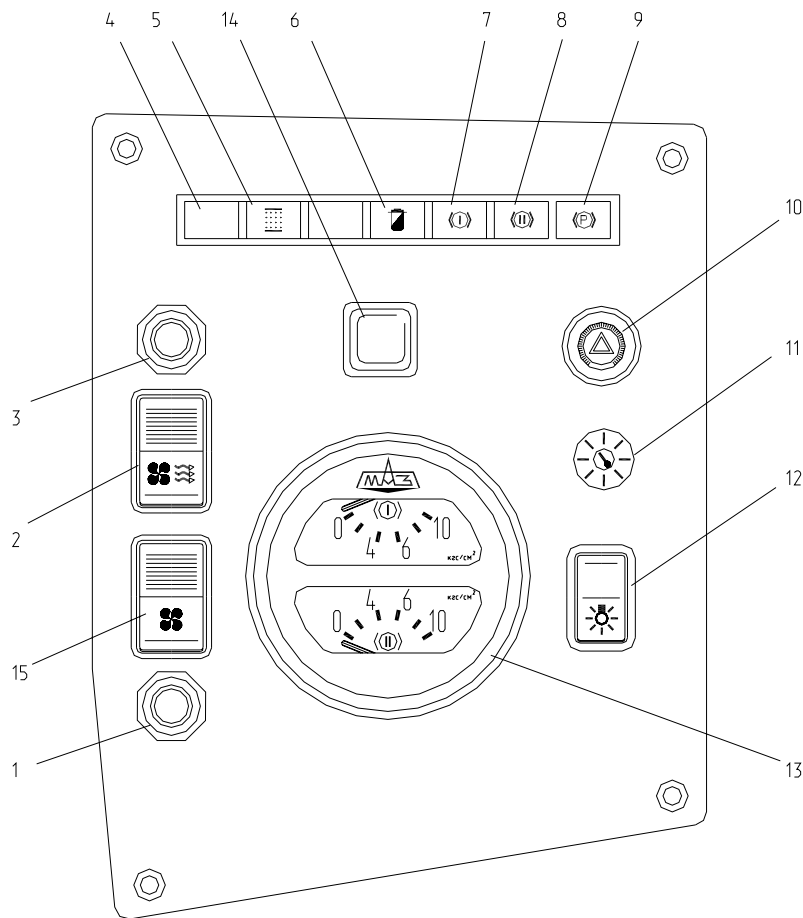
** If a vehicle is equipped with the antilock system, supplementary antilock brake system indicating lamps are installed on the control panel.

Air pressure indicator 13 (Figure 4) in brake circuits:
 upper dial – in the front circuit, lower – in the rear circuit.

Alarm system switch 10 (Figure 4). When on, vehicle and trailer left and right turn signals are lit simultaneously.

Main lights switch 12 (Figure 4). Its fixed positions are as follows: neutral, tail and gauge dial backlights on, headlights on (distance and dipped lights depending on handle 2 position 2 (Figure 6) 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).



- 1 – battery switch; 2 – cabin heater fan switch; 3 – electric torch switch; 4 – indicating lamps serviceability check button; 5 – air filter blocking indicating lamp; 6 – oil filter blocking indicating lamp; 7 – indicating lamp for insufficient air pressure in the brake system front circuit; 8 – indicating lamp for insufficient air pressure in the brake system rear circuit; 9 – parking brake indicating lamp; 10 – alarm system switch; 11 – instrument scale lighting resistor; 12 – main light switch; 13 – two-pointer indicator for air pressure in the front and rear brake system circuits; 14 – dumptruck gate shutdown control switch; 15 – fan clutch control switch

Figure 4 – Auxiliary panel

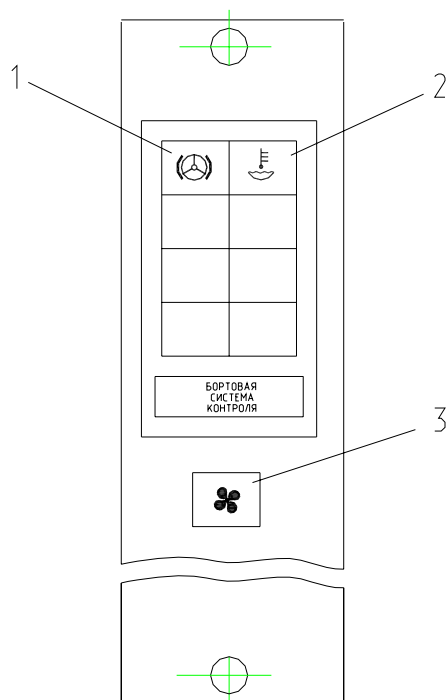
Dumptruck gate shutdown control switch 14 (Figure 5). Enable switch 14 before lifting the dumptruck platform. Deactivate the switch after descending the platform.

The following indicating lamps and warning devices are located on the panel (Figure 5):

Warning device 1 for oil level decrease in the power steering tank;

Warning device 2 for coolant fluid level decrease;

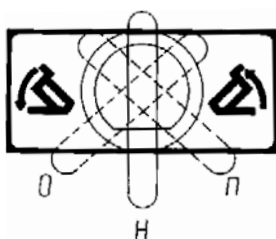
Indicating lamp 3 of the fan clutch.



1 – warning device for oil level decrease in the power steering tank; 2 – warning device for coolant fluid level decrease; 3 – indicating lamp of the fan clutch

Figure 5 – Panel

The dumptruck platform lifting control switch has three fixed positions (see Figure 6).



“H” – neutral position;

“П” – platform lifting;

“O” – platform lowering

Figure 6 – Position of the platform lifting control switch

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 2), located on the right side of the steering post.

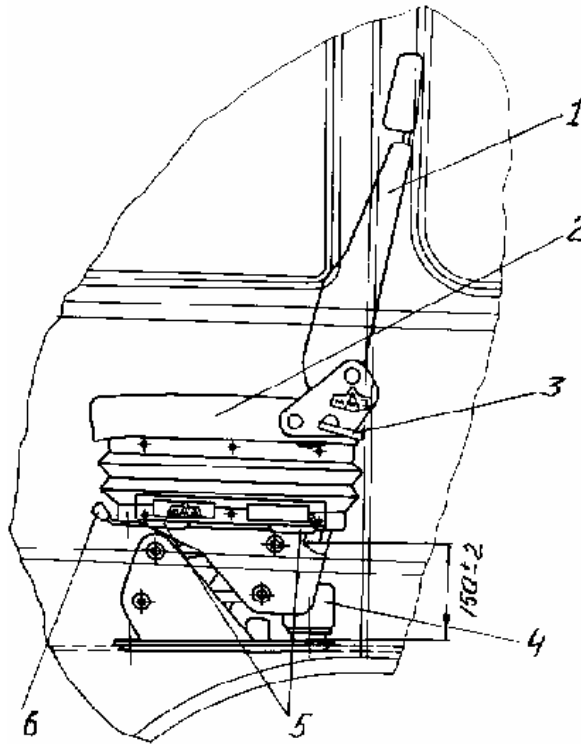
Windscreen washer with electric actuator. The washer pump is enabled with the same switch as the wiper. Water jet from the tank is directed to the windscreen via two spray diffusers. The switch released, the pump stops. The water jet direction is adjusted by turning the head spray diffusers.

Driver's and passenger's seats with air bellows 4 (Figure 7) 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 7 – 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 doors

The cabin doors are 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. The 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 springs.

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 exceed $\frac{3}{4}$ 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, the vehicle can be operated as usual.

PARTICULAR ISSUES ASSOCIATED WITH VEHICLE OPERATION

Pre-operation procedures for the vehicle

Prior to operation, it is recommended to carry out some preliminary works, which presuppose checks and filling-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 8) and lowered down to the maximum.

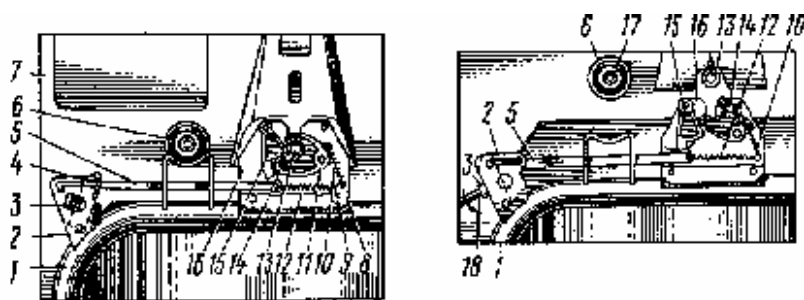
Cabin uplift. For cabin uplift, turn the pump distribution block handle into “Lift up” position and, using the handle inserted into the pump drive shaft hole activate the pump, until the cabin is uplifted to its maximum.

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 must 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 8 – Cabin lock mechanism:
a) lock mechanism open; b) lock mechanism closed

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 differential 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, the vehicle must be put on the parking brake and the gear box must be switched 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; fulfill rigid towing.

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 brakes. Driving with lit indicating lamps 7, 8, 9 (Figure 4), 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.

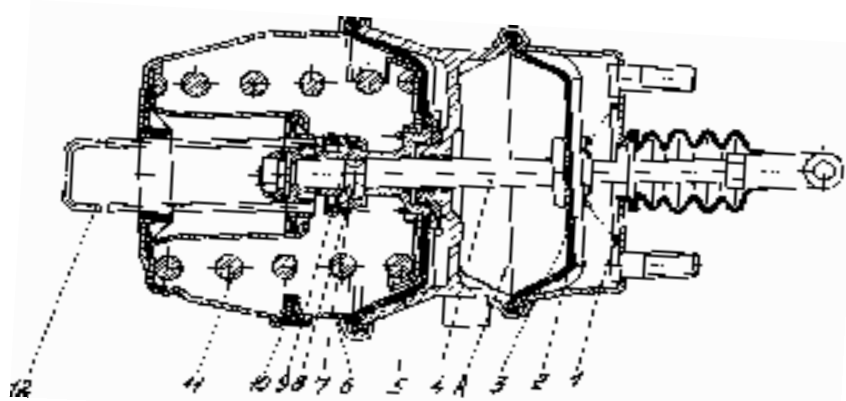
To slow down trailer train motion at down slopes use the auxiliary brake and, if needed, snub using the service brake. At this point, note that auxiliary brake is most efficient when the supplementary box is in the slow range.

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 9) or press pusher 12 while installing the spring accumulator (Figure 10).



Figure 9 – Unscrewing the pusher accumulator fixing bolt



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

Figure 10 – 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 chassis 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 a 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 a 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 a 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

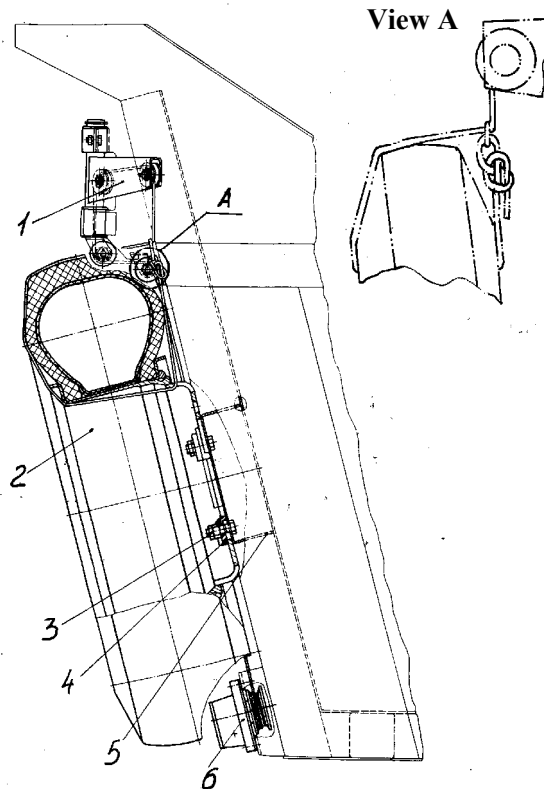
Spare wheels fitting for the dumptruck is shown in Figure 11. The spare wheel is mounted on the front side of the platform.

To lower the wheel:

- unscrew nuts 3 of clamp 4 tension bolts towards holder 5 and remove the clamps;
- remove wheel 2 from the holder and take it out of the holder zone outside the right side of the platform;
- using worm reduction gear box 6, lower the wheel to the ground and unfasten the wire rope cable.

A spare wheel must be lifted in the reverse order as compared to the lowering procedure.

Prior to a wheel uplift the wire rope cable must be loaded in order to be on the cap edge (Figure 11, view A).



1 – cross beam, 2 – wheel 3 – nut, 4 – clamp,
5 – holder, 6 – worm reduction gear box

Figure 11 – Spare wheel fitting

To the driver's attention!

Staying in the area of wheel lowering and lifting operations is strictly prohibited.

Dumptruck lifting mechanism

The lifting mechanism (dumping mechanism) is hydraulic, one-cylinder with c electropneumatic remote control and direct action on the platform.

The mechanism ensures self-supporting individual control of the dumptruck platform uplift at angle (47–50)°, lowering, intermediate stalling, automatic ascending angle restriction, jogging of the loaded platform at the uppermost lifting point for full load discharge. Besides, automatic gate opening and closing is ensured. The dumptruck platform lifting schematic is shown in Figure 12.

To the driver's attention!

The power take-off assembly must be activated at the pneumatic system air pressure not less than 500 kPa.

Operating the platform lifting mechanism of a back-pumping dumptruck

Operating the dumptruck platform lifting mechanism is performed on a flat surface from the driver's cabin using the switch (Figure 6). Prior to lifting the platform with an operating engine ensure that the pneumatic system air pressure is not lower that 500 kPa (if the manometer indicates less than 500 kPa, preliminary air pumping is required). The platform must be lifted in the following order:

- throw in the clutch;
- enable the switch 14 (see Figure 4), herewith, the gate lockings must be released;

- turn the switch arm (Figure 6) to the extreme right position “**П**”;
- slowly release the clutch pedal increasing engine rpm speed simultaneously. Using the rev counter keep engine rpm speed within 1500–1800 rpm⁻¹.
- observing the rearview mirror or rear window adjust the platform uplift speed gradually changing engine rpm speed.

Upon moving-out of the cylinder actuator tube for about 2/3 of its length throw in the clutch and turn the platform control switch into the neutral position “**Н**”. At this time the platform must stop moving. The platform jogging is possible at the uppermost lifting point.

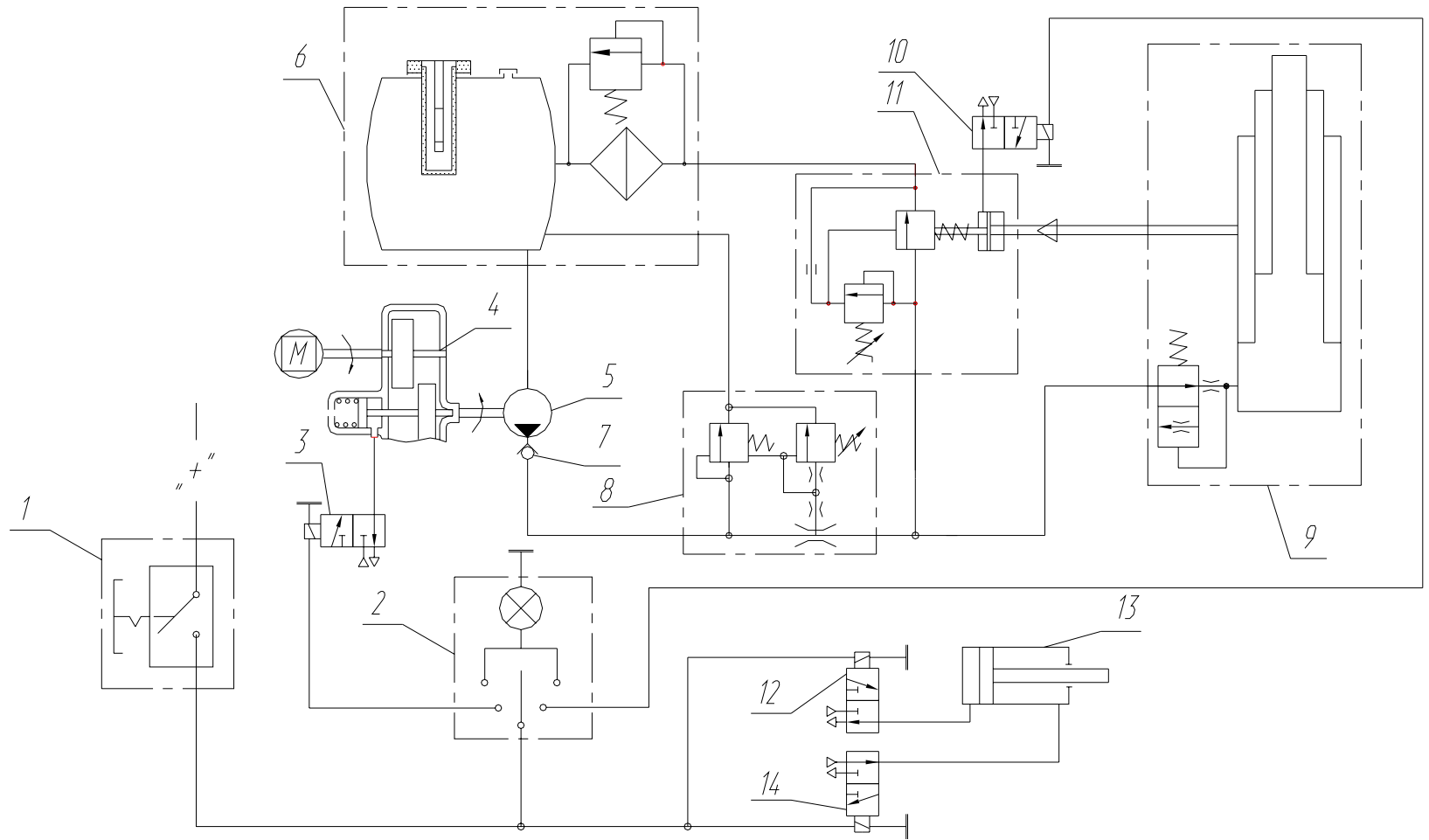
In order to lower the empty platform:

- turn the switch arm (Figure 6) to the extreme left position – “**О**”;
- after the platform lowering transfer the switch arm to “**Н**” position.
- deactivate the switch 14 (see Figure 4), herewith, the gate lockings must close down.

In case the platform must be stopped in the intermediate position while descending or ascending, just press the clutch pedal down and transfer the switch arm to “**Н**” position.

In order to avoid the platform brackets and damaging the cylinder actuator tube working surfaces running the vehicle with lifted platform is prohibited.

Lowering the loaded platform is prohibited.



1 – platform and side locking control button; 2 – platform control switch; 3, 10, 12 – electropneumatic valve; 4 – power take-off assembly; 5 – pump; 6 – oil tank; 7 – back-pressure valve; 8 – flow and pressure valve; 9 – cylinder actuator; 11 – platform uplift control valve; 13 – gate locking cylinder; 14 – gate locking electropneumatic valve

Figure 12 – Dumptruck platform lifting schematic

Dumptruck platform and platform lifting mechanism maintenance

While operating the platform lifting mechanism the following rules must be observed:

1 To avoid injuries while performing works under the dumptruck platform stall the platform using a safety outrigger (the platform **must** be unloaded).

2 Do not overload the dumptruck and trailer train over the prescribed allowance and ensure even load distribution along the platform, avoid the front part overload.

3 Grease all the couplings and units on the regular base according to the chimmotology list.

4 Monitor and promptly tighten the oil piping, air duct and hose joints in order to prevent oil and air leakages.

5 Observe the oil level in the tank. If the oil level drops below the second mark on the depth gauge, refill the oil up to the upper mark. The oil for refilling must be properly filtered.

6 Replace the oil in the hydraulic system after first 500 platform lifts. Further oil replacement must be fulfilled each season.

During each oil replacement operation wash the filtering elements of the tank oil filter in diesel fuel and purge them with compressed air.

In order to replace oil turn off the tank plug and the oil tank filler cap. After the waste oil drains, the tank drain plug must be screwed in and fresh filtered oil must be poured into the tank.

For fast oil drainage from the oil tank release the suction hose from the pump tube and drain the oil into the reservoir.

Note that contaminated oil is the main cause of early wear and lifting mechanism, especially the pump, failures.

High pressure gear-driven pumps are sensitive to overloads and applied oil cleanliness. During topping-up and replacing operations oil must be carefully filtered preventing foreign substances and water from getting into the tank.

If the pump needs to be dismantled, be careful not to interchange the gear bushings.

To prevent early pump breakdown using the oil grades that are not indicated in the chimmotology list is strictly prohibited for application in the hydraulic system.

During cylinder actuator operation its dismantling may be required in order to replace the sealing cups (O-rings) or guiding semirings and liners. For this purpose, remove the cylinder actuator off the vehicle, unscrew the lower cap and steadily retrieve the pull-out tubes from the body. In order to remove the worn-out liner take out its locking ring, after that the liner can be easily removed from the tube. While replacing the sealing cups (O-rings) pay attention to the guiding semirings condition. If their through-the-thickness wear exceeds 0.3–0.5 mm, they must be replaced.

During cylinder actuator assembly make sure that the locking rings are cautiously primed in their grooves to avoid the liner tear-out case in the course of the platform uplift.

After long-term operation minor oil leaks can appear on surfaces of the pull-out cylinder actuator links, this is the result of the oil film wiping by the O-rings. They must be removed with a clean cloth. Major oil leaks indicate the sealing cups (O-rings) wear. In this case, the sealing cups (O-rings) and chip shields must be replaced, as oils on the cylinder actuator tube surfaces leads to their pollution, and, consequently, to accelerated part wear.

If the cylinder actuator is mounted on the semi-trailer, ensure that the upper support retaining nut is locked using a designated spring ring located in its groove.

During each oil replacement procedure it is recommended to unscrew the plug in the cylinder actuator bottom to allow condensate drainage. As shown by operating experience, the water that gets into the hydraulic system agglomerates in the cylinder actuator, freezes in winter and the resulting ice inside the cylinder actuator impedes full platform lowering that may cause serious damaging of the cylinder actuator.

On an intermittent basis check the valve 11 operation (see Figure 12). Seat wear usually indicated by impaired platform uplift, and in case of orifice breakage in the chamber working area input the compressed air will go outside with behavioral hissing noise.

Oil dripping through the valve body drainage outlet indicates the valve O-ring wear or damaging. Air venting through the outlet testifies of another ring wear or damaging.

During valve disassembling disturbing the safety guard adjustment is strictly prohibited.

CHECKING AND ADJUSTMENT

Clutch linkage

The clutch linkage is shown in Figure 13. 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.

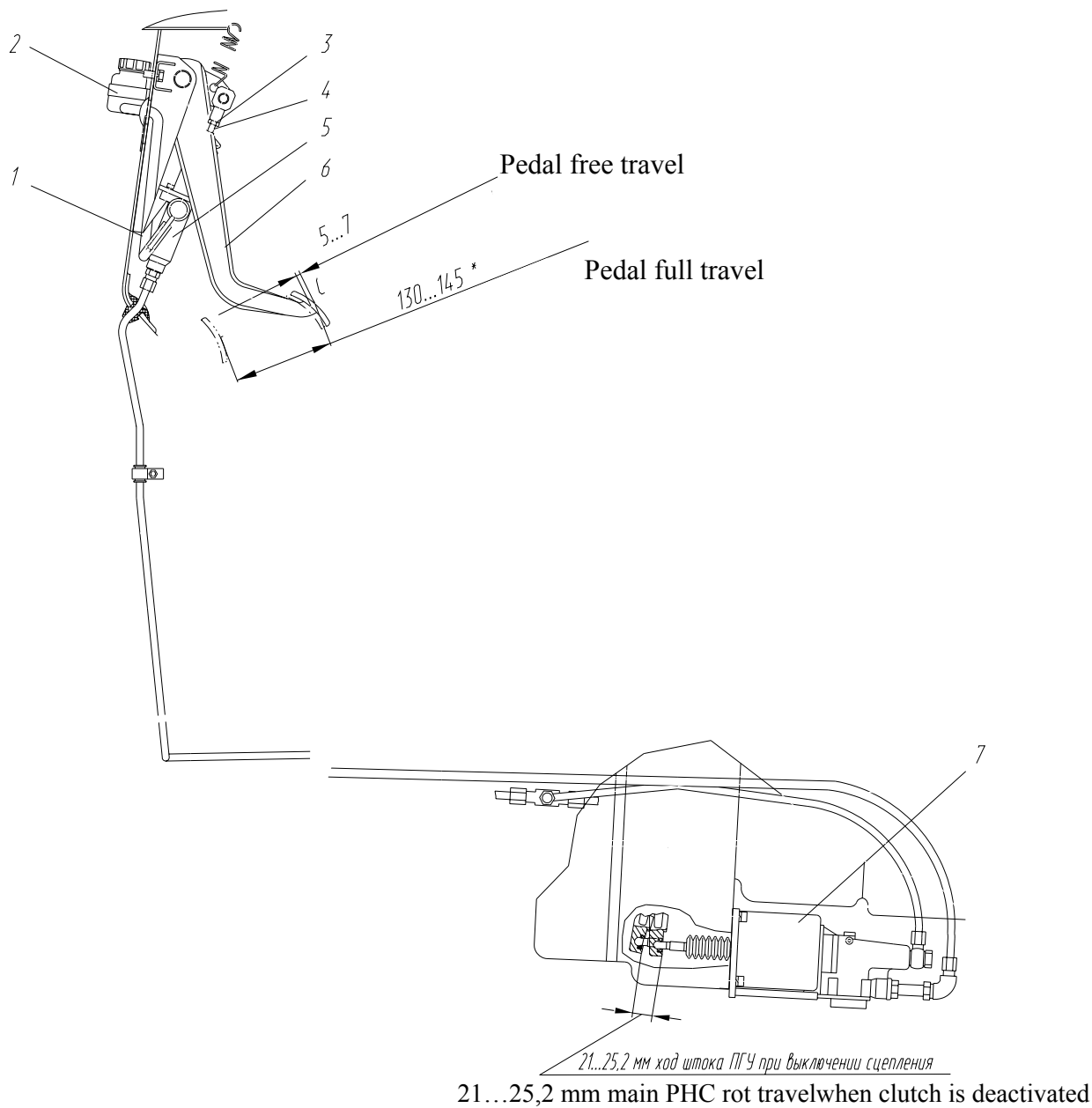


Figure 13 – Clutch linkage

9-speed gearbox control drive

The main gear box is controlled with remote control lever 2 of the remote control gear (Figure 14). The auxiliary gearbox is controlled by range switch 1 mounted on the gear-changing lever. The gear shifting diagram for the 9-speed gear box is shown in Figure 15.

The gear changing diagram is stucked 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.

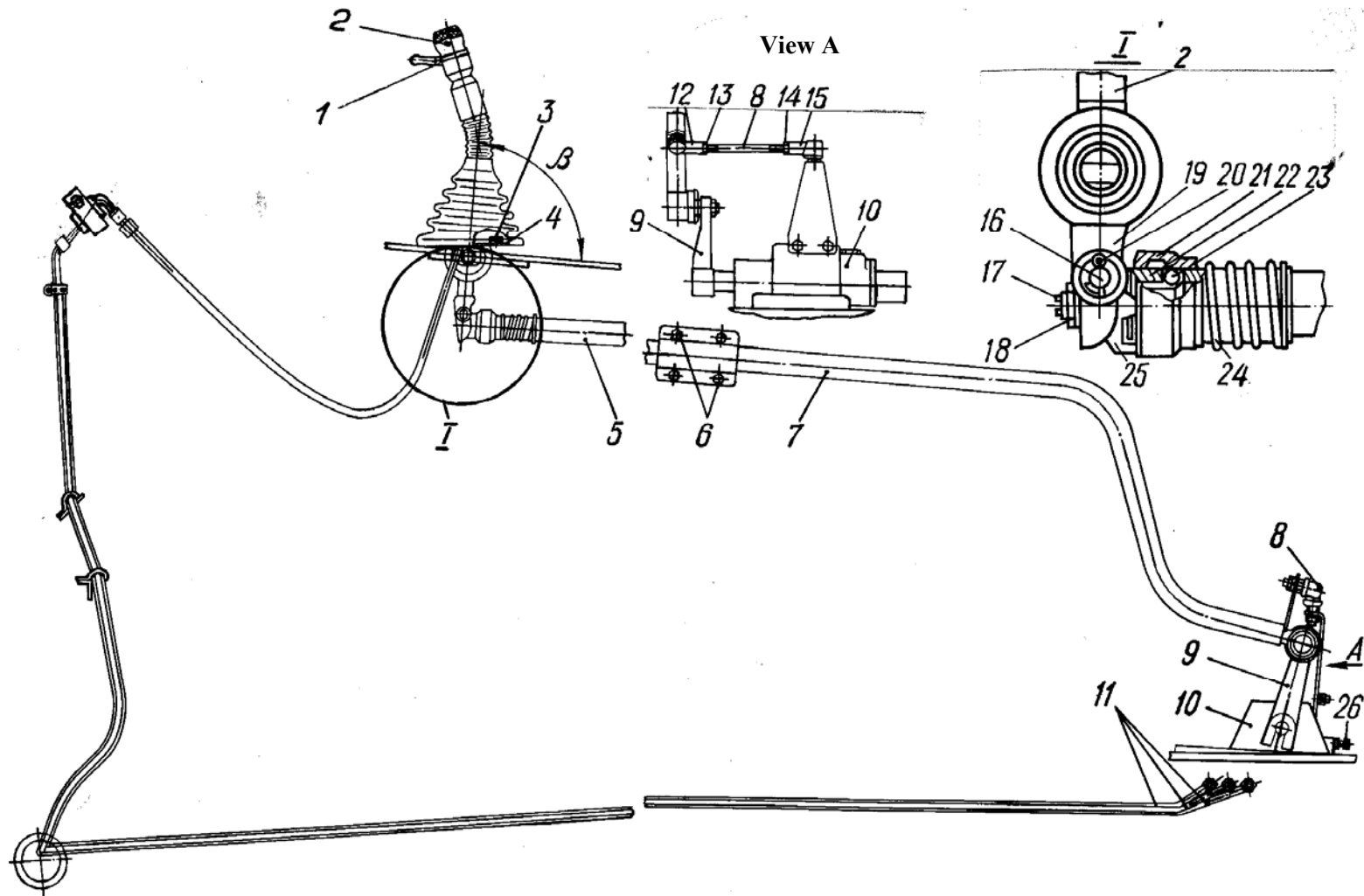
After the adjustment is finished, the neutral position latch must be repositioned as appropriate.

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.



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 14 – Vehicle gearbox control drive

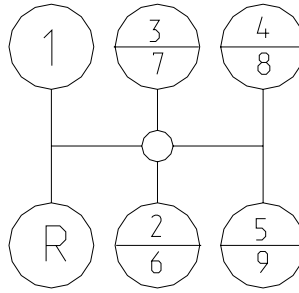


Figure 15 – Gear shifting diagram (9-speed gear box)

Adjustment of the platform lifting mechanism

During vehicle operation periodically check that the vehicle control valve cable adjustment is in proper condition and correctly fulfilled.

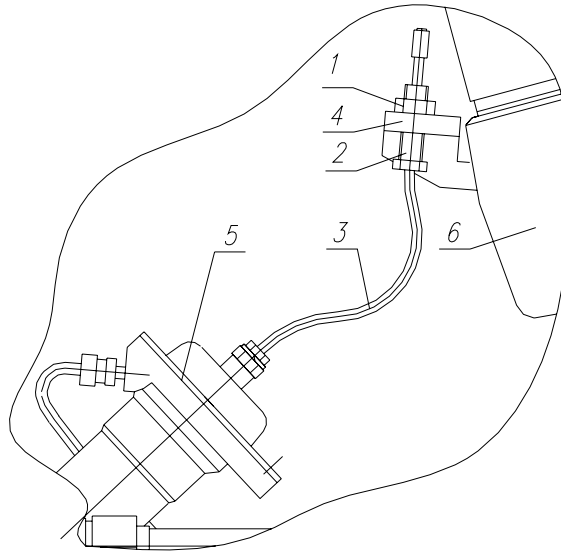
The cable must not have bends and must freely move in the adjustment bolt 2 hole during platform lifting and lowering operations (see Figure 16). If the platform lifting mechanism is adjusted correctly, the cable 3 free travel is chosen at the platform ascending angle $(47-50)^\circ$, after that the cable is stretched and reveals the air escape valve. If the platform is fully uplifted and the cable is stretched the platform ascending angle is not $(47-50)^\circ$, adjust the cable free travel as follows (see Figure 16):

- lift the platform at the angle sufficient to put a safety limit stop. Put a safety limit stop and lower the platform on it;
- unscrew the adjustment bolt safety nut of the control valve cable and π screw out the bolt out of the cylinder bracket up to the hilt;
- lift the platform at angle $(47-50)^\circ$, put the platform control switch into the neutral position and securely sustain the platform with a designated limit stop;
- screw the adjustment bolt in the bracket until full free cable droop remove the designated limit stop. Lower the platform.

During the second uplift check, if the ascending angle was adjusted correctly. Platform jogging is possible in the uppermost lifting point. Absence of jogging is not an objectionable sign.

Attention!

All the frame operations with the lifted platform must be performed only with a removed safety limit stop. Running the vehicle with the lifted platform is prohibited.

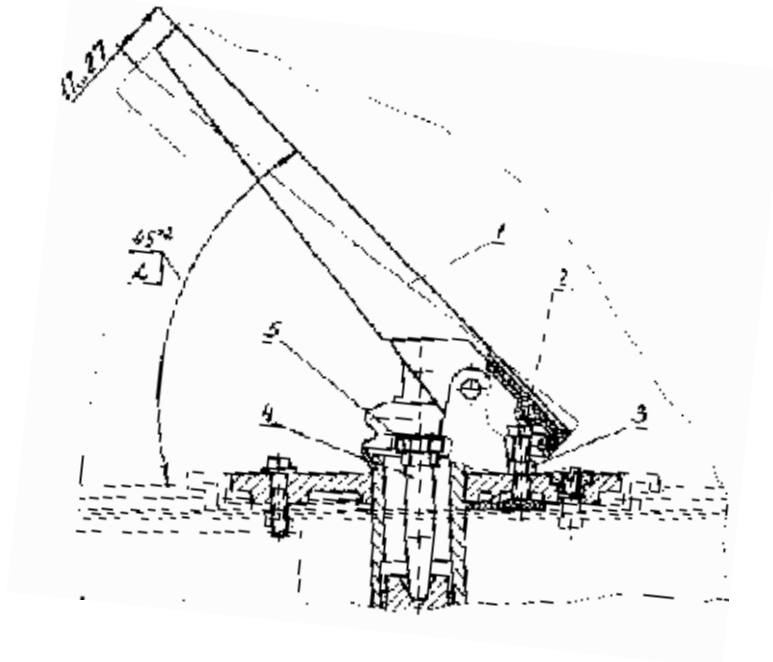


1 – safety nut; 2 – adjustment bolt; 3 – control valve cable;
4 – valve actuator bracket; 5 – control valve; 6 – cylinder actuator

Figure 16 – Platform lifting mechanism adjustment

Brake valve actuator

Brake valve angle $\alpha=(45+2)^\circ$ (Figure 17) can be adjusted using a 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 front brake chambers. Adjustments are carried out by regulating rod 4 length. After the adjustment, the nut is to be tightened to the torque of 23.5–35.3 Nm.



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

Figure 17 – Brake valve actuator

Distant and dipped lights adjustment

Lights are adjusted with special equipment.

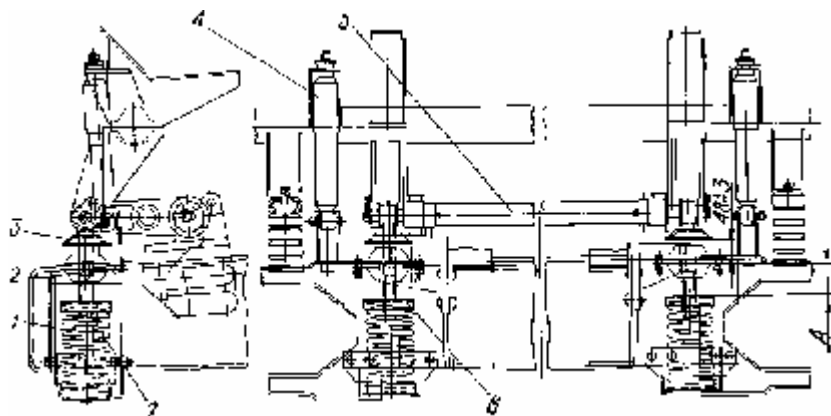
Front cabin springing adjustment

Front cabin springing is adjusted as follows:

- measure the existing gap between support cup 3 and bumper bracket 2 (see Figure 18);
- 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 18 – 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:
 - 5000 km – for dumptrucks;
- maintenance after every (C) of mileage for I operation category:
 - 20000 km – for dumptrucks.

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 serviced 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.

Post break-in maintenance: check hermiticity of the dumptruck platform lifting system.

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

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;
- in winter check the battery charge rate in terms of electrolyte density and recharge if needed;

- condition and operation of the dumptruck platform lifting mechanism;
- hermiticity of the dumptruck platform lifting system;
- 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 of daily maintenance operations, besides:

- 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 88) is (48 ± 3) mm and adjust the distance if needed.
- 12 Check steering linkage rod end terminal nuts and adjust if needed.
- 13 Check the lockings of the vehicle platform sides and rear side with the aid of the threaded joint ensuring firm adherence of the brackets to the levers and adjust if needed. Tighten the safety nuts to 55–80 Nm torque.
- 14 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 a 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 nuts of the front and side engine supports on the frame and tighten if needed.
- 2 Check hinge and shaft drive spline connection condition.
- 3 Adjust gear box support location.
- 4 Check nuts fixing the gear box 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 the nuts at the front and rear spring clamp, pins and springing eye clamps and rear suspension balancer brackets and tighten if needed.
- 9 Check the 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 Check the retaining nuts of the dumptruck platform and tighten if needed.
- 16 For dumptrucks check release valve wire rope condition and adjustment and adjust the platform uplift angle if needed;
- 17 Screw out the hydraulic cylinder bottom plug and drain the sludge;
- 18 Check the condition of the guiding semirings of the platform uplift hydraulic cylinder.
- 19 Upon expiry of 4 maintenance-2 periods check taper bearings and drive axles gearbox main drive gears backlashes and adjust if needed.
- 20 Check kingpin bearings condition and adjustment and eliminate troubles if any.
- 21 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 a vehicle is moving and at a diagnostics station.

Seasonal maintenance (C)

Seasonal maintenance is carried out twice a year and simultaneous with regular maintenance (C). Besides the 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 condition.

4 Check cabin mounting brackets bushing condition.

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 -238DE2	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: –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 (USA) NF R 15-601 (France)	47 l without a heater 49 l with a heater	47 l without a heater 49 l with a 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 the 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	Total for a vehicle		
Engine oil pan: –238DE2	1	List of “D” group transmission gear oils “Transmission gear oils for YMZ gear boxes. Technical requirements” or in the engine operations manual supplied with the vehicle.	Transmission oils with API performance characteristics of, at least GL-4 category, and SAE viscosity class as follows: In summer: SAE 30 (up to plus 30°C) SAE 40 (above plus 40°C) In winter: 20W-20(up to minus 10 C) All-season: 5W-50 (up to minus 30°C) 10W-30 (up to minus 20°C) 10W-40 (up to minus 20°C) 10W-60 (up to minus 20°C) 15W-40 (up to minus 15°C) 20W-40 (up to minus 10°C) 20W-50 (up to minus 10°C)	24.0 l	24.0 l	Maintenance-2000 In compliance with the engine operations manual supplied with the motor vehicle	Change oil after the break-in period with washing the oil filters. Check oil level and top up if necessary. Change oil in the lubrication system. Instructions on changing procedures are specified in the engine operations manual supplied with the motor vehicle.
Gearbox crankcase housing –YMZ-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 (up to plus 38°C) All-season: 75W-90 (from minus 40°C up to plus 38°C) 80W-90 (from minus 26°C up to plus 38°C) 80W-140 (from minus 26°C up to plus 38°C and higher) 85W-140 (from minus 12°C up to plus 38°C and higher) 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	11.5-2,5 l	11.5-2,5 l	Maintenance-2000 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.

					<p>In compliance with the engine operations manual supplied with the motor vehicle.</p>	<p>Change oil in the gear box crankcase housing. Instructions on changing procedures are specified in the engine operations manual supplied with the motor vehicle.</p>
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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: – front axle – intermediate axle – with round banjo-type axle crankcase housing - with oval banjo-type axle crankcase housing – rear axle – with round banjo-type axle crankcase housing – with oval banjo-type axle crankcase housing	1	All-season: Transmission gear oil TAD17 (up to minus 30 ⁰ C) TM-5-18, API GL-5	Transmission gear oils SAE viscosity class: In summer: SAE-90 (from minus 12 ⁰ C up to plus 38 ⁰ C)	4.5 l	4.5 l	Maintenance-2000 A	Change oil after the break-in period. Check the oil level and top up to the filling opening lower edge. Discharge the waste oil, fill in with fresh oil to the filling opening lower edge.
			In winter: SAE-80W (from minus 26 ⁰ C up to plus 21 ⁰ C)	13.0 l	13.0 l		
			All-season: 75W-80 (from minus 40 ⁰ C up to plus 30 ⁰ C) 75W-90 (from minus 40 ⁰ C up to plus 38 ⁰ C) 80W-90 (from minus 26 ⁰ C up to plus 38 ⁰ C)	15.2 l	15.2 l	2C	
			85W-90 (from minus 12 ⁰ C up to plus 38 ⁰ C)	13.0 l	13.0 l		
			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)				

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: – front axle – intermediate axle – rear axle	2	All-season: Transmission oil TAD17 (up to minus 30°C) TM-5-18, API GL-5	Transmission gear oils SAE viscosity class: In summer: SAE-90 (from minus 12 °C up to plus 38 °C) In winter: SAE-80W (from minus 26 °C up to plus 21 °C) All-season: 75W-80 (from minus 40 °C up to plus 30 °C) 75W-90 (from minus 40 °C up to plus 38 °C) 80W-90 (from minus 26 °C up to plus 38 °C) 85W-90 (from minus 12 °C up to plus 38 °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)	2.3 l	4.6 l	Maintenance-2000	Change oil after the break-in period. Check oil level and top up to the filling (control) opening lower edge. 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.
				2.0 l	4.0 l	A	
				2.0 l	4.0 l	2C	
				4.5 l	4.5 l		
Dispensing gearing crankcase housing	1						
Rear suspension balancer crankcase housing for a 3-axle vehicle	2			0.4 l	0.8 l	2C	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	Maintenance-2000 3C	Change oil after the break-in period. Change a filter with paper filtering element or wash a filter with wire cloth filtering element.
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	Check oil level and top-up if necessary. Change oil in the course of repairs.
Needle bearings of steering column propeller shaft	8	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	0.0025 kg	0.02 kg		Apply lubricant to each bearing during assembly or repair, lube cross tires.
Fuel feed drive stud	1	Lubricant Litol -24	DIN 51502 (Germany)	0,02 kg	0,02 kg	C	Dismantle, clean off old lubricant and apply new lubricant.

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 shutdown cable	1		“Shell” company: Retinax HDX2 (MoS ₂); “Mobil” company : Mobilgrease Special (MoS ₂)	0.025 kg	0.025 kg	2C	Dismantle, wash and fill the cladding with lubricant.
Fuel feed control cable	2		“BP” company: Energrease L 21 M(MoS ₂) “Texaco” company: Multifak EP2 (MoS ₂) “Esso” company: Multi-purpose, Lithium	0.02 kg	0.04 kg	2C	Dismantle, wash and grease the cable with a thin layer of lubricant.

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	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			0.02 kg	0.02 kg	2A	When cabin is uplifted, lubricate the shaft splines after cleaning lubricating surfaces.
Steering pump drive splines	1			0.05 kg	0.05 kg		Lubricate during assembly or repair.
Power steering power cylinder: - rear support - hinge joint	1			0.02 kg	0.02 kg	C	Grease the hinges until fresh lubricant shows up from under the seal or until first signs of the seal shape alteration.
	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	CO	Lubricate when assembling, seasonal maintenance, brake shoe repairs replacing.
Front wheel hub 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 vehicle spare wheels	1			0.45 kg	0.45 kg	4C	Lubricate using a pressure lubricator.

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 needle bearings:				0,04 kg	0,32 kg	C	Grease the hinges until fresh lubricant shows up from under end seal edge of the bearings
a. Nominal size VII according to RD 37.001.665-96. End slot flange, T-180 according to ISO 12667. Size between the cross butt ends 143 mm. Crosspin diameter 33.635 mm. Tube diameter 94int. x 4 mm.							
– for 6x6 vehicles	8	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				
b Nominal size VIII according to RD 37.001.665-96. End slot flange, T-180 according to ISO 12667. Size between the cross butt ends 161 mm. Crosspin diameter 45 mm. Tube diameter 105int. x 6 mm.							
– for 6x6 vehicles	8	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	0,048 kg	0,384 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		
Cardan drive (shaft) needle bearings							
<p>Nominal size III according to RD 37.001.665-96. Plain flange, type 3. Size between the cross butt ends 143 mm. Crosspin diameter 16.3 mm. Tube diameter 45int. x 2.5 mm.</p>							
Binary hinge of equal front axle rotational speeds	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	0.06 l	0.12 l	2A	Take out both plugs, put the oiler in one of the holes and fill the hinge with lubricant until it appears from the second hole. After lubrication remove the oiler, plug the hole, reposition the oiler in the opposite bearing body and extrude until the lubricant shows up from under end seal edge of the bearings. This operation must be performed for each cross bearings.

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 sline joint						2A	Lubricate using a pressure lubricator until fresh lubricant appears from the gaps blow-off valve (from the sleeve yoke plug hole).
a. Nominal size VII according to RD 37.001.665-96. End slot flange, T-180 according to ISO 12667. Size between the cross butt ends 143 mm. Crosspin diameter 33.635 mm. Tube diameter 94int. x 4 mm.							
-for 6x6 vehicles	4	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	0.05 kg	0.20 kg	A	If vehicle is used on dusty and dirty roads.
b Nominal size VIII according to RD 37.001.665-96. End slot flange, T-180 according to ISO 12667. Size between the cross butt ends 161 mm. Crosspin diameter 45 mm. Tube diameter 105int. x 6 mm.						2A	Lubricate using a pressure lubricator until fresh lubricant appears from under the seals edges.
-for 6x6 vehicles	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	0.07 kg	0.28 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		
Propeller shaft spline joint							
<p>Nominal size III according to RD 37.001.665-96. Plain flange, type 3. Size between the cross butt ends 143 mm. Crosspin diameter 16.3 mm. Tube diameter 45int. x 2.5 mm.</p>						2A	Lubricate using a pressure lubricator until fresh lubricant appears from the gaps blow-off valve (from the sleeve yoke plug hole).
Leading axle and torque divider drives		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			A	Repeat the above operations, if the vehicle is used on dusty and dirty roads.
Spherical surface of clutch PGU pusher and roller lever cavity	2	Lubricant ShRUS-4	DIN 51502 (Germany) “Mobil” company: Mobilgrease 24 “Shell” company: Aeroshell 15, Aeroshell 15A	0.005 kg	0.010 kg		When assembling and repairing apply the lubricant.

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 fluid “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 the oil level and top up if necessary. Change oil once a year.
Dumpruck lifting mechanism cylinder – lower support – upper support – cylinder trunnions	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	0.06 kg	0.12 kg	A	Grease until fresh lubricant comes out of the gaps. Apply lubricant using a pressure lubricator.
	1			0.06 kg	0.06 kg		
	2			0.01 kg	0.02 kg		
Dumpruck platform lifting mechanism	1	Loom oil AU (MG-22-A)	MIL-H-6083D(USA) OX-15 according to DID-5540 (GB) “Shell” company: Tellus 21 Aeroshell Fluid 7 “Esso” company: Esso Univis j 43, Esso Univis 40 “Mobil Oil” company; Mobil Fluid 93	(67±1) l	(67±1) l	A	Check the oil level between the plug probe marks and top up if necessary.
						4C	Change oil.

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		
For vehicles with mechanical drive speedometer (tachograph) mechanical drive speedometer: – speedometer sending unit gear wheel – speedometer sending unit gear roller	1	Lubricant solidoil C, press- solidoil C	DIN 51502 (Germany) MIL-G-10924C (USA) “Shell” company: Retinax C “BP” company: Energrease C2, C3, GP2, GP3, PR2, PR3 “Mobil” company: Mobilux EP2	0.01 kg	0.01 kg	2C	Apply fresh lubricant into the binder change gears of the main shaft.
	1			0.0005 kg	0.0005 kg		Apply a thin layer of lubricant during assembly and repair.
							2C
Worm-and-worm pairs of wheel brake adjusting levers: – without automatic gap adjustment – with automatic gap adjustment	6	Lubricant ShRUS -4	DIN 51502 (Germany) “Mobil Oil” company: Mobilgrease 24 “Shell” company: Aeroshell 15, Aeroshell 15A	0.02 kg	0.12 kg	C	Grease using a pressure lubricator until fresh lubricant comes at the output of the pressure-relief valve without removing the lever.
	6			0.02 kg	0.12 kg		
External face and cavity of the brake valve actuator push bar	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 space rollers (front)	2	Lubricant Litol-24	DIN 51502 (Germany) MIL-G-10924C (USA) CS3107B grade XG279 (GB) “Shell” company: Retinax EP2;	0.025 kg	0.005 kg	A	Grease using a pressure lubricator until fresh lubricant comes out of the gaps.

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		
Driving axle expansion cam shaft beatrings (IIIС-40K)	8		<p>“Mobil” company: Mobilgrease MP Mobilux EP2/EP3</p> <p>“BP” company: Energrease LS-EP2</p> <p>“Texaco” company: Multifak EP2</p> <p>“Esso” company: Beacon EP2</p>	0.015 kg	0.12 kg	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)	0.03 kg	0.21 kg		When assembling apply lubricant onto friction surfaces.
Leaf suspension shackle pins	2		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	0.03	A	Apply lubricant using grease fitting when the 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.
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.
Friction surfaces of the platform front guides	2	Lubricant solidoil C, press- solidoil C	DIN 51502 (Germany) MIL-G-10924C (USA) “Shell” company: Retinax C “BP” company: Energrease C2, C3, GP2, GP3, PR2, PR3 “Mobil” company: Mobilux EP2	0.01 kg	0.02 kg		Apply a thin layer of lubricant during assembly and repair.

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		Grease axles and cavities during assembly.
Cabin front springing axes	2			0.02 kg	0.04 kg		Grease during assembly or repair using a pressure lubricator until lubricant appears on the sleeve butt end.
Cabin door lock actuator friction surfaces	2	Lubricant TsIATIM-201	DIN 51502 (Germany) MIL-G-7711A(USA) 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		Grease during assembly.
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.
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:	0.015 kg	0.030 kg	2C	Disassemble, clean off dirt and apply a thin layer of lubricant.

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		
– torque divider differential lockings	1		Mobilgrease MP Mobilux EP2/EP3 “BP” company: Energrease LS-EP2 “Texaco” company: Multifak EP2 “Esso” company: Beacon EP2	0.015 kg	0.015 kg		
ABS detector of the back axle and front axle – produced by “Wabco”, Germany -produced by BPO “Ekran”, RB, Borisov	4	Viscous lubricants according to specification JED 564 f. Wabco: - Staburags NBU 30 PTM produced by “Kluber Lubrication”; - Urethyn-E2 produced by “Fuchs Lubritech”; - Mobilith SHC-220 produced by “Mobil Oil”; - Unirex N3 produced by “Esso”; - Eco-Li-Plus produced by Special type provided by BPW Company; - Molycote P40 produced by “Dow Corning”; - TEK-662 (former:EXP-135) produced by “Roy Dean Products Company”/USA; - Moly-Fortified Multi-Purpose Grease produced by “Valvoline/USA” Viscous lubricants series PENTA-200 TU 6-05-40245042-003-98		0.0025 kg	0.01 kg		Apply a thin layer of lubricant to the spring bushing surface and detector metal surface during assembly of repair.
Windscreen washer tank	1	A mixture of wind-screen washing fluid “Obzor” and water in the following proportion: 1:9 (up to minus 5 ⁰ C) 1:5 (up to minus 10 ⁰ C) 1:2 (up to minus 20 ⁰ C) 1:1 (up to minus 30 ⁰ C) 2:1 (up to minus 40 ⁰ C)		10.01	10.01		“Obzor” fluid mixtures to be used under the ambient temperature below plus 5 ⁰ C.

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		
Chassis wire fixture on a right side-member	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	0.0025 kg	0.005 kg	C	Apply a thin layer of lubricant to the contact surfaces.
Accumulator terminals with main lead lugs	4			0.005 kg	0.02 kg		
Accumulator switch terminals with main lead lugs and a control wire	3			0.003 kg	0.009 kg		
Chassis control wire terminal fixture on the right rear engine support	1			0.005 kg	0.005 kg		
Control wire and main lead fixture on the starter	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		
Two-wire connection to the generator – screw-holt joints	4	0.00125 kg	0.005 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		
—rebates and pegs	1	Lubricant VNII NP-510		0.001 kg	0.001 kg		
Harness contacts of the left side-member and back lamp harnesses in the junction box (of the left side-member)	24			0.0004 kg	0.01 kg		
Connection contacts of the headlights and front direction indicators	24	Lubricant VNII NP-510		0.0004 kg	0.01 kg		
Connection contacts of the side direction indicator on the mudguard and in the BUP binder link up point binder and binders of the side-members near the headlights	16			0.0005 kg	0.008 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		
Connection contacts of the windshield washer pump	4	Lubricant VNII NP-510		0.0005 kg	0.002 kg	C	Apply a thin layer of lubricant to the contact surfaces.
Connection contacts of the pneumatic signal electropneumatic valve	2			0.0005 kg	0.001 kg		
Connection contacts of the sound electric signals	2			0.0005 kg	0.001 kg		
Connection contacts of the front fog lamps						C	
– lug Ø12.5	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		

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		
– binder socket of the side-member and fog-lamps pintle	2	Lubricant VNII NP-510		0.0005 kg	0.001 kg		
Connection contacts of the fuel level detector	3			0.0003 kg	0.0009 kg		

* grease the contacts on a monthly basis, when the vehicle is operated in the increased humidity conditions.

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: _____	Date: _____	Date: _____
Mileage: _____	Mileage: _____	Mileage: _____	Mileage: _____
Description of damage, its causes and characteristic features:			

Replaced parts, assemblies

Designation	Catalogue No.	Quantity	Price per unit	Amount	Cost of works
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	+		
Differential nut stops	12–18	+	+	

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
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	+	+	
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			

Assembly	Tightening torque, Nm	Back axle	Intermediate axle	Note
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			
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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