OJSC "BELAZ" – Management Company of Holding "BELAZ-HOLDING"

MINING DUMP TRUCK BELAZ-75180

DIRECTIONS ON ASSEMBLY, START-UP AND ADJUSTMENT 75180-3902016 DA

Republic of Belarus

This Manual contains the description and recommendations for mounting individual units, mechanisms and systems dismantled from the dump truck prior to loading and carrying by railway transport. The methods of testing the dump truck prior to commissioning the same are also described. The basic safety and electric safety requirements are stated.

The Manual is intended for the drivers, technicians and all persons involved in the operation and maintenance of BELAZ mining dump trucks.

The manufacturing plant works continually for improving the design of the dump trucks and reserves the right of making modifications to improve the quality and to prolong the service life of them.

The most comprehensive information on all the modifications can be found at the site of OJSC “BELAZ” – Management Company of Holding “BELAZ-HOLDING” www.belaz.minsk.by.

Please, send any comments regarding the design and operation of the dump trucks as well as requests and proposals regarding the contents of this Manual to the address:

Belarusian Autoworks Open Joint-Stock Company, Design Manager’s Office, 4, 40 Let Oktyabrya St., town of Zhodino, Minsk Region 222161, Republic of Belarus

OJSC “BELAZ” – Management Company of Holding “BELAZ-HOLDING”, 04.17

TABLE OF CONTENTS

When performing the mounting works, checking the operation of the dump truck systems and commissioning of the same, it is also necessary to refer to the following documents:

– Operation Manual 75180-3902015 OM;
– Documentation for the Engine;
– Documentation for the Traction Electric Drive;
– Manuals and Directions on Operation of Additional Units and Systems installed on the Dump Truck.

All the above documents are included in the complete set of operational documents delivered when shipping the dump truck.

1 SAFETY REQUIREMENTS AND WARNINGS

1.1 Safety Requirements

Prior to mounting, operation, maintenance and repair of the dump truck, the drivers and service personnel shall be given the obligatory instruction in safety engineering, electrical and fire safety, safe methods and ways of performing the works as well as observance of the general safety requirements for the automobile vehicles.

Here it is also necessary to follow the Unified Safety Regulations for Open-Cast Mining of Minerals, Operating Regulations for Consumers' Electrical The installations, Safety Regulations for Operating the Consumers' Electrical The installations, Regulations for Design and Safe Operation of Pressure Vessels and Operating Manual for Tubeless Giant and Supergiant Tires for Oversized and Outsized Dump Trucks.

The drivers and servicing personnel shall be provided with protective clothes, safe footwear, protective helmets, goggles and other personal protection equipment.

The enterprises operating the dump trucks shall ensure the safe labour conditions and develop the instructions for performing the maintenance and repair works as well as the operations related to servicing the fire-extinguishing system.

Besides, it is necessary to observe the below stated requirements conditioned by the dump truck design:

1.1.1 The dump truck is equipped with ladders, footsteps, handrails and bodys to ensure the safety of the works for mounting, adjustment and maintenance.

When performing the works without enclosures and/or handrails, the safety belt as well as portable ladders and stands shall be used. When doing this, the safety requirements shall be observed.

1.1.2 1.1.2 When moving on the ladders and top bodys (fenders, hoods), it is necessary to hold the handrails fitted on the ladders, fenders, bonnets and cab so that there would be three supporting points at any time (either two hands and one foot or two feet and one hand). It is prohibited to jump down from the truck. The ladders and bodys shall be cleaned from dirt, snow and ice.

It is recommended to walk up and down the truck ladders while facing the truck.

1.1.3 It is prohibited to stay and move on the ladders, footsteps, top bodys (fenders, hoods) and on the bodys designed for service dump truck.

1.1.4 It is prohibited to walk up or down the truck on the ladders or footsteps while holding tools or other things in the hands. To lift or lower the tools (other things) use the lifting equipment ensuring the safety of the mentioned operations.

While working on the ladders or footsteps it is not allowed staying of service personnel under the ladders or footsteps.

1.1.5 When testing the body lifting mechanism, never stand closely to the dump truck or perform any works under the lifted body.

When servicing and/or repairing the dump truck, the body shall be locked by means of a special locking rope, both ends of which shall be drawn into the ears on the axle carter and fasten them by means of towing pins. When doing this, there shall be no load in the body. It is not allowed working under the lifted body if the presence of stuck load in the quantity exceeding more 3% of the truck payload capacity or the tail wind with the velocity exceeding 6.5 m/s.

THE LOCKING ROPE IS ONLY DESIGNED FOR LOCKING THE EMPTY BODY.

It is not allowed leaving the cab when the body is being lowered or lifted.

1.1.6 Before charging the suspension cylinders and hydropneumatic accumulators with gas, make sure that the charging device is faultless and the cylinder with compressed gas is marked properly. The cylinder shall be marked with the word "NITROGEN" and brown circular stripe.

IT IS STRICTLY PROHIBITED TO CHARGE THE SUSPENSION CYLINDERS AND HYDROPNEUMATIC ACCUMULATORS WITH OXYGEN, BECAUSE IT WOULD LEAD IMMINENTLY TO EXPLOSION.

1.1.7 Before fitting the wheel check the tire pressure. If the tire pressure drops below 0.08 MPa inflate the tire to the pressure of 0.25 – 0.3 and make sure that the lock ring is fitted properly, then reduce pressure up to 0.1. MPa.

It is only allowed to inflate the tire to the required pressure after fastening the wheel on the hub only. There shall be nobody near the tire being inflated.

Before unfastening the wheel on the truck deflate the tire completely. If it is needed to unfasten the rear wheel deflate the both tires.

IT IS PROHIBITED TO FIT OR UNFASTEN THE WHEELS WITH THE TIRE OVERPRESSURE

1.1.8 It is prohibited to dismantle and/or disassemble the components of the brake systems and steering control being under the working fluid pressure. The pressure in the front and rear circuits of the service brake system shall be released by turning out the obturating needles on the brake valve.

The working fluid pressure in the hydraulic system of the steering control and parking brake is released automatically within 80 seconds after scheduled stopping of the engine. The hydropneumatic accumulators shall be only installed and dismantled with the gas chamber depressurized.

1.1.9 It is prohibited to eliminate the faults, disassemble the fittings and/or perform the welding works in the pressurized pneumatic starting system and pneumatic system of the dump truck under pressure. The pressure relief is carried out by means of the condensate drain valves and at the same time the stopcocks on air cylinders must be open.

1.1.10 It is prohibited to adjustment and operate the pneumatic starting system with faults of pressure gages and broken seals on the safety valves.

1.1.11 When servicing and repairing the storage batteries, keep in mind that contact of the electrolyte with the skin can cause severe burns.

1.1.12 When checking the working fluid level in the oil retainer of the suspension cylinder, the check hole plug shall be screwed out slowly to release the excessive gas pressure in the chamber. When performing this operation, do not stand in front of the plug.

1.1.13 The electrical safety regulations to be observed when adjusting the traction electric drive are stated in the instruction for the traction electric drive.

THE TRACTION ELECTRIC DRIVE OPERATES UNDER THE VOLTAGE WHICH IS DANGEROUS FOR LIFE. FAILURE TO COMPLY WITH THE REQIREMENTS OF THE SAFETY REGULATIONS MAY LEADS TO SHOCK OR DEATH.

1.2 Regulations of Fire Safety

To avoid the fire on the truck, it is necessary to observe the general Regulations of Fire Safety for handling the flammable substances and follow the recommendations stated below:

1.2.1 One should continually check the leak-tightness of fuel and oil pipelines of the engine systems, steering control, dumping and braking systems.

1.2.2 The dump truck should continually be cleaned from flammable materials, such as fuel and lubricant leaks, coal dust, etc.

1.2.3 It is prohibited to leave the dump truck while the system of pre-starting heating of engine is operating.

1.2.4 The dump truck is equipped with a fire suppression system. To extinguish the fire use the combined fire extinguishing system having stopped previously the engine.

IT IS PROHIBITED TO USE THE SOLUTION FIRE-EXTINGUISHING LINE FOR EXTINGUISHING THE ENERGIZED ELECTRIC EQUIPMENT AND SPILLAGE OF FUEL AND OIL.

IT IS PROHIBITED TO USE THE POWDER FIRE-EXTINGUISHING LINE, IF THERE IS ANYBODY WITHIN THE ZONE PROTECTED BY THE ABOVE SYSTEM.

1.2.5 IT IS PROHIBITED TO OPERATE THE DUMP TRUCK WITH FAULTY FIRE SUPPRESSION SYSTEM. THE MAINTENANCE OF THE FIRE SUPPRESION SYSTEM SHALL BECONDUCTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF OPERATION MANUAL OF DUMP TRUCK.

1.2.6 To avoid the ignition of gases, it is prohibited to use bare flame when checking the cooling fluid level in the expansion tank of the engine cooling system.

1.2.7 It is prohibited to use bare flame when checking accumulator batteries.

1.3 Warnings

1.3.1 During dismantling the assemblies and units of the dump truck for carrying it in the partially disassembled state, the marking labels shall befitted at the ends of the hoses, hydraulic system pipelines, centralized lubrication system and bundles of the electric equipment wires.

During the mounting of dump truck at the customer place the connection of hoses, hydraulic system pipelines shall be carried out in accordance with the marking labels and hydraulic circuit schematic (appendix B). The connection of bundles of the electric equipment wires shall be carried out in accordance with the marking and electric circuit diagrams.

It is prohibited the contact of pipelines and high-pressure hoses with elements of chassis, with each other besides the places of its fastening, the backlash between fastening elements is not allowed. It is not allowed a twisting of the high-pressure hoses during its mounting. Remedy defects by turning triangles, moving pipelines and high-pressure hoses, at the same time the bend of pipes is allowed.

1.3.2 The tightening torques of screwed connection are not indicated look at proper normative documentation (standards).

1.3.3 Loading/unloading and tires (wheels) transportation:

– Loading/unloading and tires (wheels) transportation shall be operated in such a manner that to eliminate a damage of tires;

– Lifting and tire (wheel) transportation by loader with flat captures shall be operated for external perimeter in vertical position with slight grade towards the loader not allowing a damage of integumentary tires.

– When performing loading/unloading with crane the fastening of tires (wheels) shall be operated with flat belt sling with width not less 140 mm and length not less 6 m or using special loading/unloading devices which are intended for these purposes and are recommended by manufacturing plant.

IT IS PROHIBITED LOADING/UNLOADING OF TIRES (WHEELS) BY MEANS OF STEEL WIRE ROPE AND CHAIN SLING, AS WELL AS IT IS PROHIBITED TO HOOK OVERBOARD, OVER WIRE TYING WHICH IS USED DURING TRANSPORTATION ON RAILWAY!

1.4 Safety Rules and Warnings for Performing the Welding Works

1.4.1 Prior to beginning the welding works directly on the assembled truck, it is necessary to disconnect both the “plus” and “minus” terminals of power supply of the trucks from the respective terminals of the storage batteries.

1.4.2 To avoid fire when performing the welding works, make sure that there are no flammable engineering maintenance materials (fuel, oils) in the immediate vicinity of the welding place (on the chassis elements or ground) and protect the fire-hazardous parts (hoses, wires, etc.) against the molten metal spatter.

1.4.3 The “ground” wire of the welding unit shall be connected to the part or unit to be welded at the distance of not more than 0.6 metres from the welding place so that no current would pass through the wires and cables of the traction electric drive control, cylinders of the hydraulic system and suspension, jointed bearings SHSL (jointed bearings with openings and gutters for lubrication in inner race and with cut in outer race in longitudinal direction) of the central levers and rods, bearings of the wheel hubs, bearings and toothings of the wheel gearings of the power-wheel reduction gear.

Special attention shall be paid to prevention of passing the current through the bearings in the traction alternator or power-wheel motors, because it would cause their damage and premature failure.

1.4.4 It is prohibited to fasten the “ground” wire of welding set:

– to the hydraulic system components (pumps, hydraulic cylinders, distributors, pipelines, oil tank, etc.);

– to the electronic modules and elements of the monitoring system of loading and fuel, the system of video observation.

The connection place shall be cleaned from paint and rust.

One shall be provided a reliable contact of the ‘ground’ wire with welded surface.

1.4.5 When performing the welding works near the electronic modules of the monitoring system of loading and fuel, the system of video observation these units shall be demounted.

1.4.6 When performing the welding works on the dump truck, the circuit breakers of the control and auxiliary circuits in the control cabinet shall be disconnected.

When performing the welding works near the electric wires and cables, the measures shall betaken to prevent them from being damaged.

Do not remove any control boards or disconnect the plug-and-socket units of the traction electric drive control system; otherwise the contact could be broken that would cause the failure of the system.

The welding works related to the power cabinet shall be performed under supervision of the expert in the field of electric drives and in such way that penetration of the molten metal spatter into the cabinet would be excluded.

1.4.7 When performing the welding works on the dump truck equipped with an electronic control system, observe the following rules to protect the electronic components against damages:

– prior to beginning the welding works disconnect all the plug-and-socket units connecting the circuits of the control, power supply, alarm and data transmission of the engine with the respective circuits of the truck;

– never fasten the “ground” wire to the bracket of the electronic module of the engine (ECM) or ECM module itself;

– should it be necessary to perform the welding works on the attached units of the engine or assemblies mounted immediately in the engine, these units shall be removed from the engine.

If such removal is impossible all the ECM plug-and-socket units shall be disconnected prior to beginning the welding works. Should the engine be equipped with several ECM's, the plug-and-socket units shall from all the modules.

1.4.8 When reconnecting the engine circuits to the truck circuitry (both after performing the welding works and when assembling the truck), the following rules shall be observed:

– all the plug-and-socket units connecting the circuits of the control, power supply, alarm and data transmission of the engine with the respective circuits of the truck shall be connected prior to connecting the storage batteries;

– when connecting the storage batteries the "minus" cable shall be connected first and then the «plus» one;

– it is prohibited to set the key in the ignition switch to the working position before connecting the cables to both terminals of the storage batteries;

– it is only allowed to disconnect the plug-and-socket units connecting the circuits of the engine with those of the truck (for example, for tracing the faults) provided the key is removed from the ignition switch and the storage batteries of the truck are disconnected.

1.4.9 It is prohibited to perform the welding works near the fuel and oil tanks, charged hydropneumatic accumulators and pipelines connected with them, gas cylinders of the fire extinguishing system and/or near the suspension cylinders charged with gas and filled with oil.

1.4.10 It is prohibited to perform the welding works in the pressurized pneumatic starting system and pneumatic system of the truck. The pressure shall be released through the condensate drain cock; the shutoff cocks on the air cylinders shall be opened.

1.4.11 Prior to performing the welding works make sure that the hydraulic system pipelines are not pressurized. The pressure in the front and rear circuits of the service brake system shall be released by turning out the obturating needles on the brake valve. The working fluid pressure in the hydraulic system of the steering control and parking brake is released automatically within 80 seconds after scheduled stopping of the engine.

1.4.12 When performing the welding works, protect the chromium-plated surfaces of the dump truck assemblies (cylinders of the suspension, hydraulic system, etc.) against the molten metal spatter.

1.4.13 It is prohibited to perform the repair works involving the welding on the wheel rim assembled fitted the tyre.

1.4.14 When performing the welding works for repairing the cab equipment, it is necessary to take measures for preventing the inflammation of the parts of upholstery and noise insulation of the cab interior.

1.4.15 Prior to performing the welding works near the boxes of storage batteries, special attention shall be paid to observance of the fire safety rules and necessary safety precautions.

2 PREPARING FOR ASSEMBLING

Prior to unloading the component parts of the dump truck, the customer shall check the presence and condition of the seals as well as completeness of the received cargo according to the accompanying sheets. The packing and preservation materials shall be removed immediately prior to mounting the unit onto the dump truck.

The accompanying sheets contain the quantity and places of location of seals, list of units and assemblies dismantled from the dump truck and places of their packing. One sheet is attached to the left side glass inside the cab and the other ones – on the box with the parts for fastening the units.

When shipping the dump truck, some fastening and mounting parts are fastened to their places, other ones are used for fastening the pads under the cab and under the front part of the chassis and the remaining ones are put into the box with parts in the cab and into the tool box.

The lighting devices dismantled from the dump truck prior to shipment with their fasteners are put into the box with spare parts and tools.

The assembling, adjustment and checkout works shall be performed in the sequence described in this Manual. It is allowed to modify the proposed sequence unless it would affect the safety of the works.

The assembling ground shall be level and have smooth pavement with good bearing capacity and its dimensions shall be sufficient for arrangement of the dump truck parts. The assembling ground shall not be crossed by the power and/or communication lines.

In winter, it is recommended to perform the assembling works in a heated room. The component parts shall be arranged on the ground in the order of the assembling process sequence so that the free access to them would be ensured.

WARNING! THE LOADING/UNLOADING WORKS AND TRANSPORTATION OF UNITS AND PARTS WHICH ARE PART OF THE SUPPLY PACKAGE OF THE DUMP TRUCK AND/OR ASSEMBLED DUMP TRUCK SHALL BEDONE IN SUCH WAY AS TO PREVENT THEIR DAMAGE.

The gantry or bridge crane with the lifting capacity shall be available as the basic hoisting equipment for assembling the dump truck. The technical state of hoisting equipment and their payload capacity rates shall be corresponded to the weight of assemblies and units. The lifting capacity of the jib crane shall be selected depending on the load weight and necessary boom reach.

The weights of the main parts to be transported are given in Appendix A, the diagrams of slinging of the parts to be lifted refer to Appendix B. The places of the lifting of units during unloading from rail gantry are marked with dark enamel in close proximity from the point of tying-up.

The list of recommended appliances providing unload of chassis, units, body components and their assembly is given in the Appendix C.

In addition to the main hoisting facilities, the assembling ground shall be provided with a tyre-fitting manipulator, two jacks, complete set of tying-up facilities and steel slinging ropes various pneumatic and hand-operated tools for metalworkers. Always use only faultless tools.

The electric equipment shall be mounted and adjusted in accordance with the electric diagrams and directions delivered in the complete set of the operating documentation.

For assembling and welding the body, the DC welding apparatus, gas welding and cutting apparatus, pneumatic grinding machine for cleaning the edges for welding and metalworker's tools.

Prior to mounting of the parts and units the rust-preventing grease shall be deleted from the parts and check their status.

3 ASSEMBLING

3.1 The installation of the Front Axle and Suspension

Prior to The installation of the front axle tighten the following:

– the nuts of spherical cylinder bearings of front suspension. The tightening torque is 2700 – 3150 N.m.;

– the bolts on the frame and front axle fastening the pins of the transverse rod of the front suspension with the tightening torque 620-780 N.m. Up to the required moment tighten the bolts in several steps. The tightening of the bolts shall be done evenly in the circle at the same time hitting on the end face of the pin at the side of bearing and installing the lengthening piece of nonferrous metal on the end face of the pin;

– the bolts fastening pivot pin central bearing covers of front suspension. The tightening torque is 245 – 300 N.m;

– the bolts fastening the brake frame of front wheels towards the steering knuckle. The tightening torque is 2500 – 3000 N.m;

– the nuts fastening the lever of steering linkage towards the steering knuckle. The tightening torque is 800 – 1200 N.m;

– the nuts of terminal connection of the steering link. The tightening torque is 125 – 150 N.m;

– the bolts fastening pins of the steering link and angle cylinders. The tightening torque is 600 – 740 N.m;

– the bolts fastening eyes to the lever of front axle beam. The tightening torque is 1633 – 2018 N.m.

Put the front axle with the hubs onto the props at the place of its connecting to the chassis.

Put the dump truck chassis onto the auxiliary props so that it would be possible to connect the front axle with small its displacements.

Detach the transportation props from the dump truck chassis.

Move the longitudinal lever of the front axle beam (eye 22 towards inside part of the frame bracket) (Figure 1) until the holes in the bearing of the eye are aligned with those on the bracket on the central joint of the frame crossbeam.

Orient the pin 30 so that it would be possible to fit the locking plate 26 with minimum turn of the pin because more force is required for turning the pin to the additional angle.

Press the pin 30 and fix it with the locking plate 26. The height or length clearance in the joints between the locking plate and the mating surfaces is not allowed take up the clearance by turning the pin 30. Fasten the plate by means of the bolts 27 (M20-6gx55) with flat and spring washers. The tightening torque of the bolts shall be 450 – 560 N.m.

Fit the nut 29 (M110x3) on the pin and tighten it applying the tightening torque 1800 – 2000 N.m. at that the axial clearance on both sides of the inner ring of the bearing is not allowed after that turning the nut at the angle of 60^0 (on the one side). Fix the nut with the lock bolts 40 (M12-6gx25) with tightening 44 – 62 N.m. and splint the bolts with split wire 39.

Connect the transverse rod 4 with the pin of the front axle beam. Fit the distance bushing 17, cover 13 and fasten it by means of the bolts 14 (M14x1,5-6gx50) with the spring washers applying the tightening torque of the bolts 161 – 199 N.m.

Mount and fasten left and right mounting brackets 1 to the legs of the second frame cross member by means of the bolts 3 (M30x2-6gx90). The tightening torque of the bolts shall be 1633 – 2018 N.m. Weld the brackets on the contour to the legs of the second frame cross member with weld N1 State Standard 14771-76-N1, leg of weld 16 ± 2.

By turns mount the left- and right-hand cylinders 2 of the front suspension assembled with the brackets 32 to the brackets 1 fastening to the frame by means of the bolts 33 (M30x2-6gx90) with spring washers. The tightening torque of the bolts shall be 1192 – 1472 N.m.

Position the mating surfaces of the steering knuckles and lower brackets 37 of the suspension cylinders by lifting the front axle or extending the front suspension cylinders with compressed nitrogen and put the auxiliary props under the pivot rods along the axis of the pivots of the steering knuckles. Align the holes and connect the lower brackets 37 of the cylinders with the steering knuckles by means of the bolts 36 (M24x2-6gx100) with spring washers. The tightening torque of the bolts shall be 830 – 1020 N.m.

Connect the hoses of the hydraulic system to the front brake gears and to the hydraulic steering cylinders of the steering control according to the marking of the hoses ends and hydraulic diagram.

Connect the bundle of wires to the speedometer transmitter mounted into the journal of the left-hand steering knuckle by means of a plug connector. Charge the front suspension cylinders with nitrogen after complete assembling and charging the dump truck.

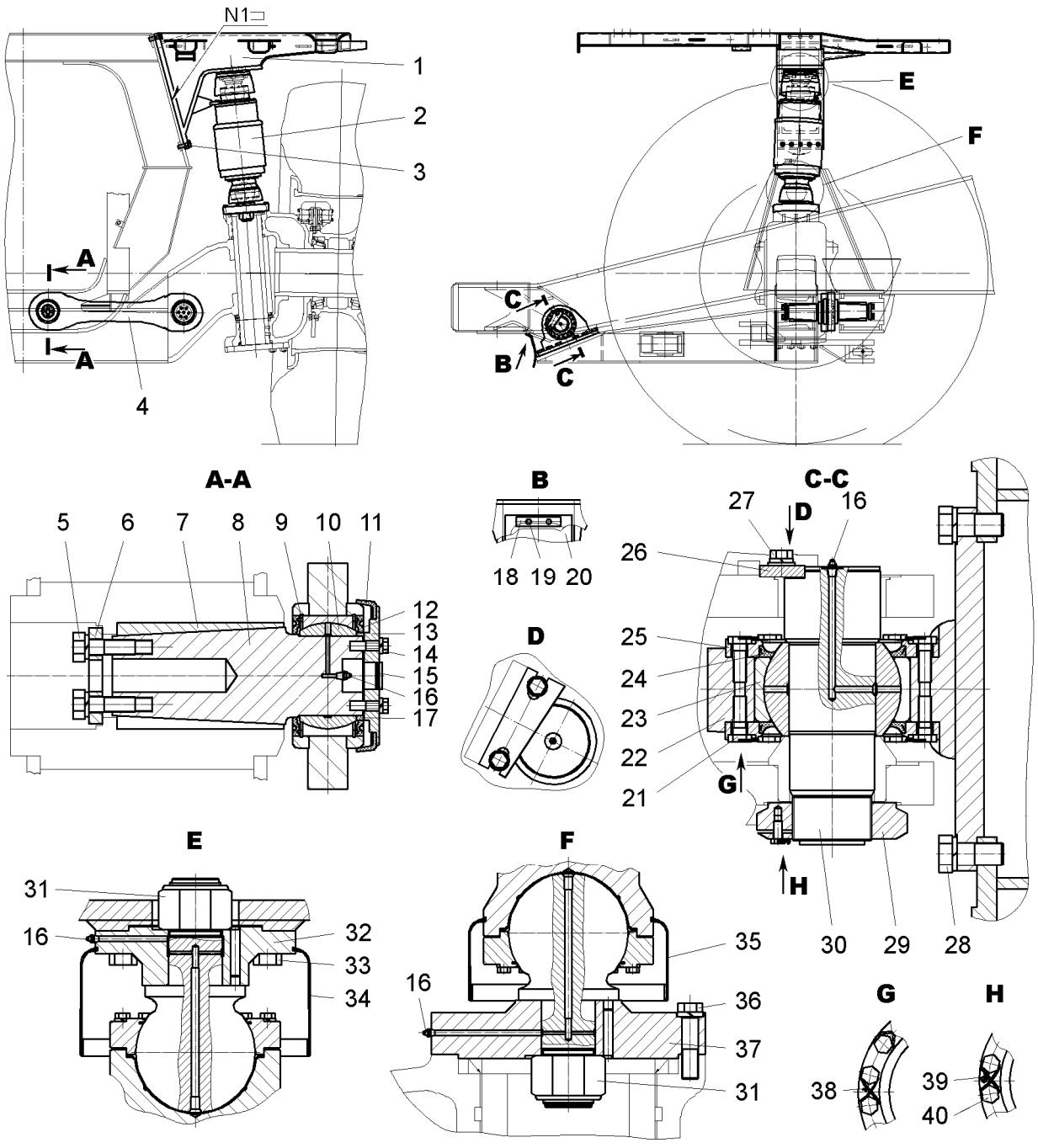

Figure 1 – The installation of the front suspension:

1 – bracket fastening the leg; 2 – suspension cylinder; 3, 5, 14, 19, 21, 27, 28, 33, 36, 40 – bolts; 4 – suspension rod; 6 – prop; 7 – bushing; 8, 30 – pins; 9 – locking ring; 10, 23 – joint-type bearings; 11 – sealing ring; 12 – gland; 13 – cover; 15 – plug; 16 – lubricator; 17 – distance bushing; 18 – clamping strap; 20 – splashguards; 22 – eye with base; 24 – gland; 25 – cover; 26 – locking plate; 29 – nut; 31 – self-locking nut; 32 – upper bracket of the suspension cylinder; 34, 35 – boots; 37 – lower bracket of the suspension cylinder; 38, 39 – splint wire.

3.2 The installation of the Power-Wheels

Prior to The installation of the Power-Wheels fasten the following:

– the bolts fastening the traction electric motor to the reduction drive of the power-wheels, the tightening torque is 800 – 1000 N.m;

– the nuts of the ball joint fastening the rear suspension cylinders, the tightening moment is 2700 – 3150 N.m;

– the nuts fastening the eye of the central joint of the rear suspension to the central lever, the tightening torque is 1300 – 1500 N.m;

– the bolt fastening the central joint pin of the rear suspension, the tightening torque is 1600 – 2000 N.m. (the axial clearance on both sides of inner bearing ring is not allowed);

– the bolts fastening the clamping plates to the transverse rod pin of the rear suspension, the tightening torque is 450 – 560 N.m;

– the bolts fastening the bearing cover of the central joint of the rear suspension, the tightening torque is 450 – 560 N.m;

– the nuts fastening side walls of brake gears of the rear wheels, the tightening torque is 370 – 450 N.m.

Remove the protective gaskets from the brushes and unseal the ventilation windows of the traction electric motors.

Sling the power-wheel 1 (figure 2), flange it with the rear axle housing 3 and fasten it by means of the bolts 2 (M48x3-6gx132) with spring washers. . Tighten the bolts with applying the torque of 2950 – 3150 N.m.

In the rear axle housing, connect the hoses of the hydraulic system to the service and parking brake gears according to the the marking of the hoses ends and hydraulic diagram.

Fasten the terminals of the power cables of the traction electric motors in the upper portion of the internal cavity of the rear axle housing on the connecting panels by means of the nuts with washers according to the connection diagram.

Connect the power wires to the rear axle housing by means of the fastening cramps and nuts.

Connect the plug connectors of the low-voltage bundles according to the connection diagram and fasten them by means of cleats and bolts M6 in the upper portion of the internal cavity of the rear axle housing.

Connect the cooling hoses of the electric motors of the power-wheels to the fittings in the rear axle housing and fasten them by means of yokes.

Connect the hose to the breather 4 and fasten it by means of yoke.

Connect the second power-wheels by analogy.

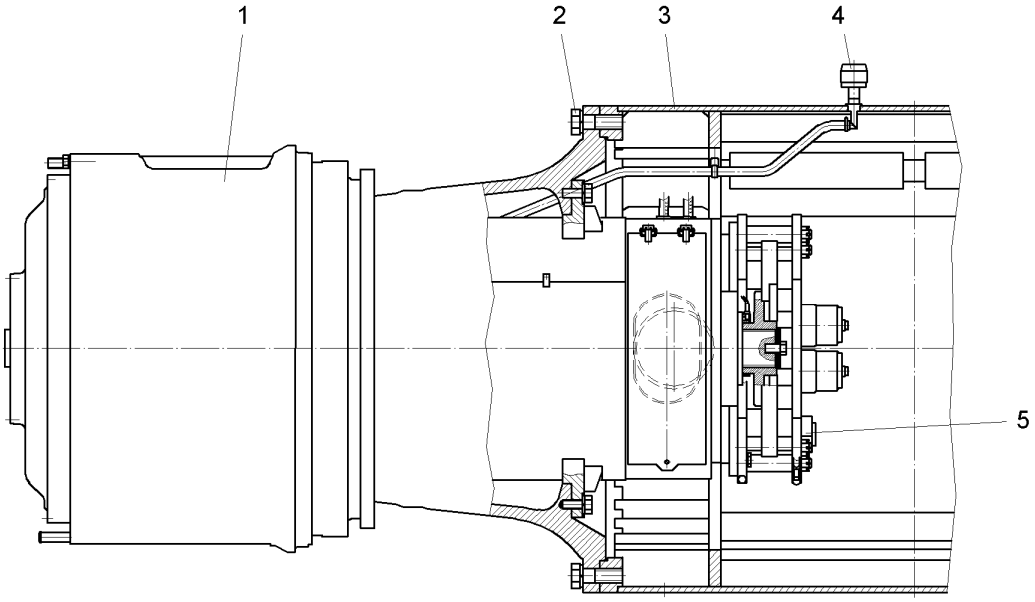

Figure 2 – The installation of the power-wheel:

1 – power-wheels; 2 – bolt; 3 – rear axle housing; 4 – breather; 5 – brake gears

3.3 The installation of the Fuel Tank

Sling the fuel tank 2 (Figure 3), place it by means of the brad 5 and fasten by means of the nut 7 (M36x2) with spring washer, preliminarily place the prop 6 into the ear of the fuel bracket.

Fix the brackets 1, 17 fastening the fuel on the brads 8 on the frame side member and fasten by means of the nuts 10 (M24x2) with spring washers, preliminarily installing the set of the gaskets 9.

Fit alternately the vibration isolators 15 with protective shrouds 5 and eliminate the clearance between the protective shrouds and mating faces of the tank brackets by selecting the adjusting shims 13.

Fit the bolts 12 (M24x2-6gx110) with the locking plates 11. Turn in the bolts into the threaded holes of the plates 14 and fix them by means of the locking plates 11. The tightening torque is 200 – 250 N.m. Tighten the nut 7 finally. The tightening torque is 1165 – 1883 N.m.

Install the fuel pump on the bracket of the rear side of the fuel tank by means of the clamps and M6 nuts with spring washers. Connect the fuel pipelines to the fuel tank cock and the fuel pump. Connect the drain pipeline to the angle piece on the fuel tank.

Fasten the low-voltage bundle of wires by means of cleats with M6 bolts of the side wall of the fuel tank and put the bundle under the protective shrouds then fasten them by means of the M6 bolts on the side of the fuel tank. Connect the lantern for indication of the top fuel level and fuel level sensors (2 pcs).

Connect the low-voltage bundle of wires to the fuel pump having turned in the M10 bolts and fastened two cleats with the M6 bolts.

Open the fuel tank cock.

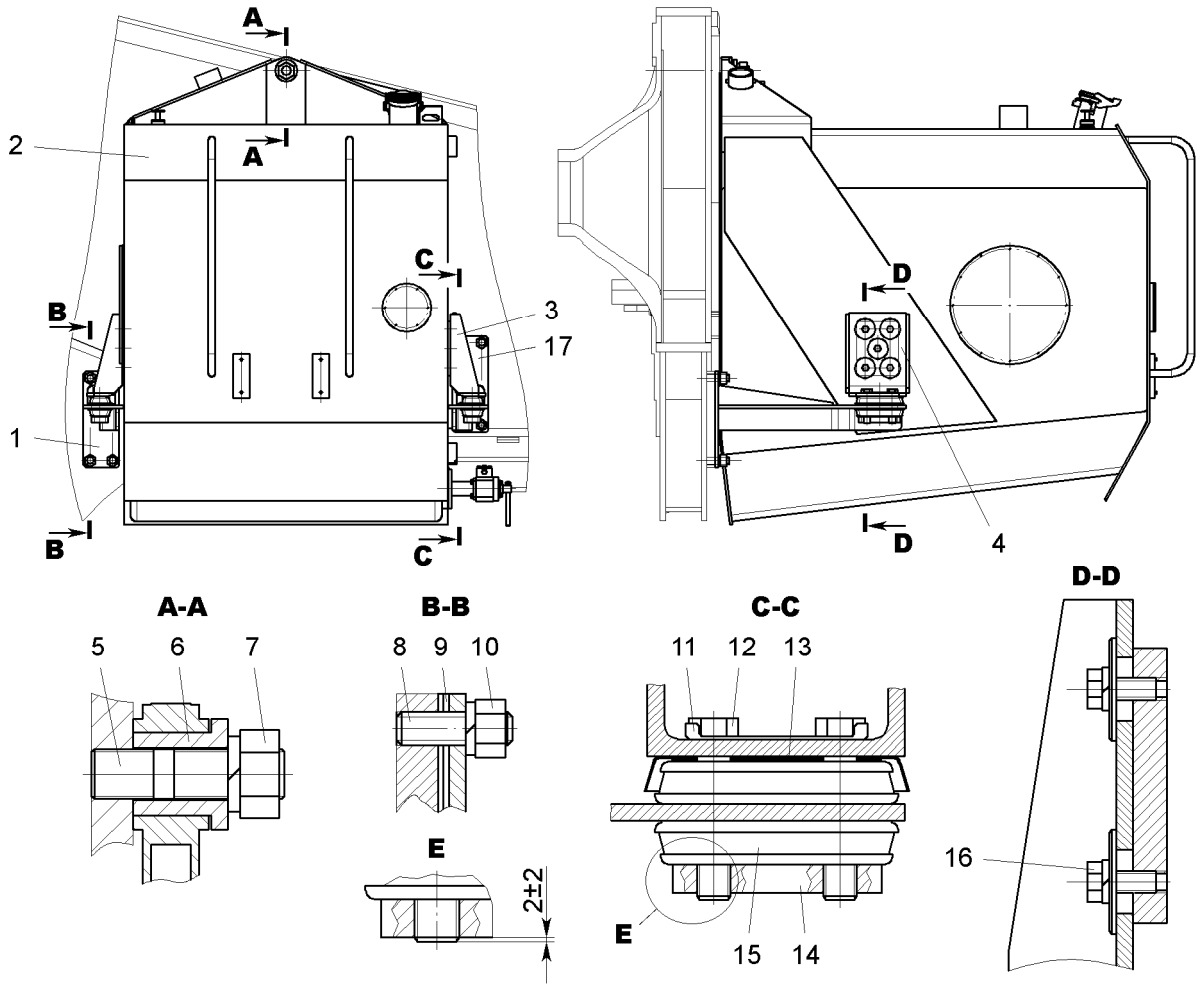

Figure 3 – The installation of the Fuel Tank:

1, 3, 4, 17 – brackets; 2 – fuel tank; 5, 8 –brads; 6 – prop; 7, 10 – nuts; 9 – gasket; 11, 14 – plates; 12, 16 – bolts; 13 – adjusting shims; 15 – vibration isolator

3.4 The installation of the Front Wheels

Prior to mounting the wheel check the air pressure in the tire. Under the dropping of pressure below 0,08 MPa inflate the tire with the pressure 0,25 – 0,3 MPa and take care that the locking ring is installed correctly, then reduce pressure up to 0.1 MPa. Prior to the mounting the wheel check the air-tightness of the connection of the valve 10 (Figure 4) with the extender 8 using soapy emulsion.

Turn the hub with the slot faced downward and mount the wheel with the extender of the valve onto the hub having aligned the rim stopper with the hub slot. When doing this, protect the valve and the extender against damage.

Fit the upper and lower clamps and then the left and right ones 3 and fasten them preliminarily by tightening the nuts 4 uniformly and alternately in the diametrically opposite directions (places) to the torque of 200 – 300 N.m. taking care that the wheel would not be skew on the hub.

Fit the other clamps and tighten the nuts. The nuts shall be tightened evenly and alternately, in diametrically opposite directions in three-four operations, with applying the torque of 1265 – 1565 N.m. Fasten the extender 8 to the hub by means of the plate 13 and of the bolts 12 with spring washers.

The allowable wobble over the side wall of the tire casing shall not exceed 10 mm.

Inflate the tire to the required pressure.

THE AIR PRESSURE IN THE TIRE SHALL BE ONLY BROUGHT TO THE NORMAL VALUE AFTER FASTENING THE WHEEL ON THE HUB. NOBODY SHALL BE PRESENT NEAR THE TIRE BEING INFLATED.

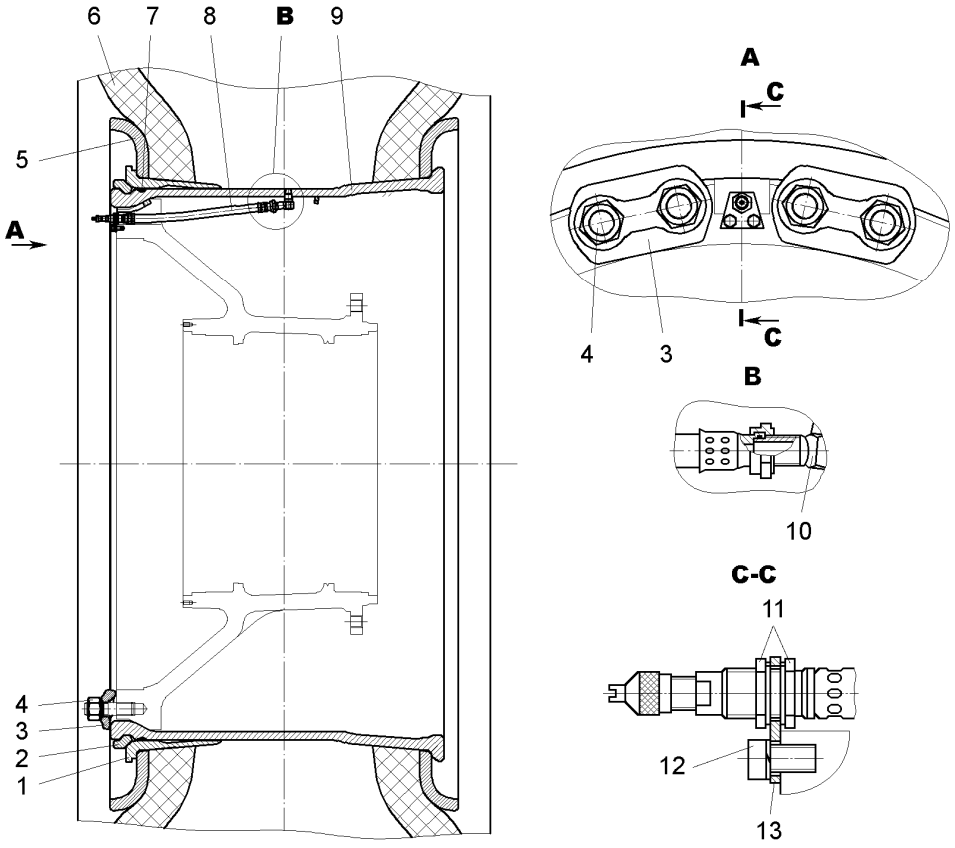

Figure 4 – The installation of the front wheels:

1 – landing ring; 2 – locking ring; 3 – clamp of front wheel; 4 –wheel fastening nut; 5 – bead ring; 6 – tire; 7 – sealing ring; 8 – extender; 9 – rim; 10 – valve; 11 – nuts; 12 – bolt; 13 – plate

3.5 The installation of the Rear Wheels

Prior to mounting the wheel check the air pressure in the tire. Under the dropping of pressure below 0,08 MPa inflate the tire with the pressure 0,25 – 0,3 MPa and take care that the locking ring is installed correctly, then reduce pressure up to 0.1 MPa. Prior to the mounting the wheel check the air-tightness of the connection of the valve 12 (Figure 5) with the extender 1 using soapy emulsion.

Mount the inner wheel with the extender 1 of the valve onto the hub with the slot faced downward, distance ring 10 and assembled external wheel.

Mount the upper and lower clamps and then the left and right ones 6 and fasten them preliminarily by tightening the nuts 5 uniformly and alternately in the diametrically opposite directions (places) to the torque of 200-300 N.m. taking care that the wheel would not be skew on the hub.

Mount the other clamps and tighten nuts. The nuts shall be tightened evenly and alternately, in diametrically opposite directions in three-four operations, with applying the torque of 1265 – 1565 N.m.

The allowable wobble over the side wall of the tyre casing shall not exceed 10 mm.

Fasten the plate 11 to the valve 12 and to the extender 1 by means of the nuts 13. Inflate the tires to the required pressure.

THE AIR PRESSURE IN THE TYRE SHALL BE ONLY BROUGHT TO THE NORMAL VALUE AFTER FASTENING THE WHEEL ON THE HUB. NOBODY SHALL BE PRESENT NEAR THE TYRE BEING INFLATED.

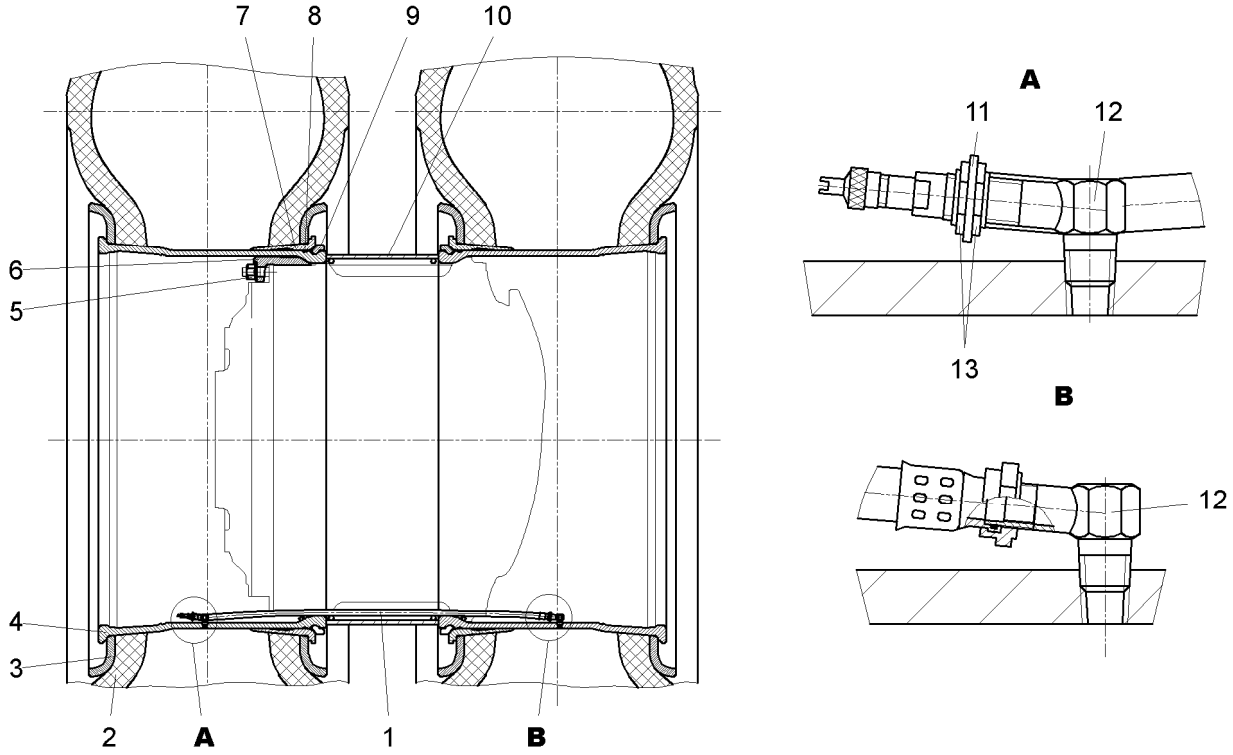

Figure 5 – The installation of the Rear Wheels:

1 – extender; 2 – tire; 3 – side wall ring; 4 – rim; 5 – wheel fastening ring; 6 – clamp of the rear wheel; 7 – landing ring; 8 – sealing ring; 9 – locking ring; 10 – distance ring; 11 – plate; 12 – valve; 13 – nuts

3.6 The installation of the Empennage

When installing the empennage the clearance of 10±5 mm is allowed in the joints by means of the oblong holes between:

– the front bonnet 3 (Figure 6) and the rear one 39;

– the rear bonnet and the fenders 37, 42.

The step between the planes of the mated assemblies such as the rear bonnet, the left-hand fender 37, the right-hand fender 42, the additional right-hand fender 45 and the additional left-hand fender 47 shall be up to 0 – 15 mm.

When installing the fenders it is allowed to use washers 5 (not more than 3 pcs) for adjusting the step between the planes of the empennage (section D1 – D1).

When installing the spare parts and assemblies of the empennage by means of the bolts and nuts fit with the flat and spring washers, eliminate the clearances by means of adjusting plates as indicated in the Figure 6.

Fit the right- 19 and left-hand 24 brackets for fastening the fenders and fasten them by means of the bolts 10 (M24x2-6gx60, 20 pcs) according to section C-C to the frame legs.

Connect and fit two mounting bracket supports 49 to the left-hand bracket fastening the fender 24 by means of the bolts 60 (M24x2-6gx70, 8 pcs) with the nuts according to section L1 – L1, to the bracket fastening the fender by means of the bolts 59 (M24x2-6gx100, 8 pcs) with the nuts according to section K1 – K2 if necessary fit the plates 58.

Fit and fasten the buffers 2, 28 by means of the bolts 16 (M16-6gx50, 8 pcs) according to section R1 – R2 and fastening the buffers by weld according to section G1 – G1 и H1 – H1.

Fit and fasten the stairs 26 assembled with the stages 69 by means of the bolts 35 (M12-6gx30, 8 pcs) according to section W – W.

Fix and fasten the stairs 27 according to section U – U by means of the bolts 13 (M10-6gx30, 8 pcs).

Fit and fasten the left-hand fender 37 assembled with the additional left-hand fender 47 and the handrails 23,4,6 and the bolts 63 (M14-6gx45, 4 pcs) according to section N1 – N2, the bolt 56 (M24x2-6gx75, 1 piece) and the nut according to section D1 – D2 fitting if it necessary the adjusting washers 55 (not more than 3 pcs) by means of the bolts 56 (M24x2-6gx75, 6 pcs) and the nuts according to section E1 – E1.

Fit and fasten the plate 48 to the left-hand fender by means of the bolts 12 (M8-6gx25, 4 pcs) and the nuts according to section H – H, to the handrails 4, 6 and the handrail 5 fastening the handrail 5 by means of the bolts 13 (M10-6gx30, 2 pcs) with the nuts according to section G – G.

Fit and fasten the right-hand fender 42 assembled with the additional right-hand fender 45 and the handrails 20, 43, 44 by means of the bolts 56 (M24x2-6gx75, 13 pcs) and the nuts according to section E1 – E1, the bolt 56 (M24x2-6gx75, 1 piece) and the nut according section D1 – D1 fitting if it necessary the adjusting washers 55 (not more than 3 pcs).

Fit and fasten two traps 22 by means of the bolts 33 (M10-6gx38, 6 pcs) with the nuts according to section R – R and S – S by means of the bolts 13 (M10-6gx30, 2 pcs) according to section V – V, by means of the bolts 70 (M12-6gx38, 2 pcs) according to section Y-Y and the bolts 71 (M12-6gx45, 2 pcs) according to section Z – Z.

Fit and fasten the handrails 21, 38, 41 to the front bonnet 3 by means of the bolts 32 (M12-6gx25, 7 pcs) according to section Q – Q, connect them by means the bolts 12 (M8-6gx25, 2 pcs) with the nuts according to section E – E using from the top 6 bolts and from the bottom 4 ones. Fasten the handrails by means of the braces 40 and the bolts 13 (M10-6gx30, 4 pcs) according to section B1 – B1 with the nuts. Fit and fasten the landing 46 by means of the bolts 64 (M10-6gx25, 4 pcs) according to section O1 – O1.

Fit and fasten the brackets fastening the mud guards to the fenders 37, 42 and to the additional fenders 47, 45 by means of the bolts 16 (M16-6gx50, 20 pcs) with the nuts according to section L – L, fasten the covers 7 by means of the bolts 17 (M8-6gx20, 20 pcs) according to section M – M.

Fit and fasten the mud guards 67 to the brackets of the fenders 24, 15 by means of the bolts 12 (M8-6gx25, 12 pcs) according to section T – T installing the plate 34 under the washer.

Fit and fasten the mud guards 68 to the stiffener 61 by means of the bolts 14 (M8-6gx30, 14 pcs) with the nuts according to section M1 – M1 installing the plates 29 under the washers.

Connect the air cylinders which have been fastened on the fender with the pneumatic engine starting system. Fasten the tubes by means the clamps (for dump trucks with pneumatic start-up).

Fasten the ladder on the oil tank by means of the bolts (M12x253 4 pcs) with the washers.

For dump trucks **BELAZ-75180-02** for more convenient access to the dump truck deck instead of the standard gangway (from the left side), a diagonal ladder is installed in accordance with figure 6a.

Installation procedure:

– install and fasten the ladder rest 9 to the frame stand with bolts 12 (M18x1,5-6gx60, 2 pcs.) using nuts according to section Д – Д;

– install and fasten the bracket 10 to the bumper using bolts 18 (2M18x1.5-6gx40, 4 pcs.) according to the cross section K – K;

– install and fasten the ladder 4: to the frame stand using bolts 11 (M14-6gx45, 4 pcs.) according to the cross section C - C, to the rest 9 using bolts 12 (M18x1.5-6gx60, 2 pcs.) according to section L – L, having installed if necessary plates 19 (4 pcs max);

– install and fasten ladder 3: to ladder 4 using bolts 20 (M16-6gx45, 4 pcs.) with nuts according to the section M-M, to bracket 10 using bolts 17 (M16-6gx60, 3 pcs.) with nuts according to the cross section H – H;

– install and fix the guide of step 2 in assembly with footboard 1 to the ladder 3 using bolts 16 (M12-6gx30, 4 pcs.) with nuts according to section G – G;

– install and fix handrails 5, 6, 7, 8 to the ladders 3 and 4 using bolts 15 (M10-6gx30, 52 pcs.) according to the section F – F;

– interconnect handrails 6 and 7, 7 and 8 using brackets 14 with bolts 13 (M10-6gx35, 4 pcs.) with nuts according to section E-E, having connected holders 21, 22 on the handrails using screws 23 (M8-6gx20, 8 pcs.) with nuts according to section N – N.

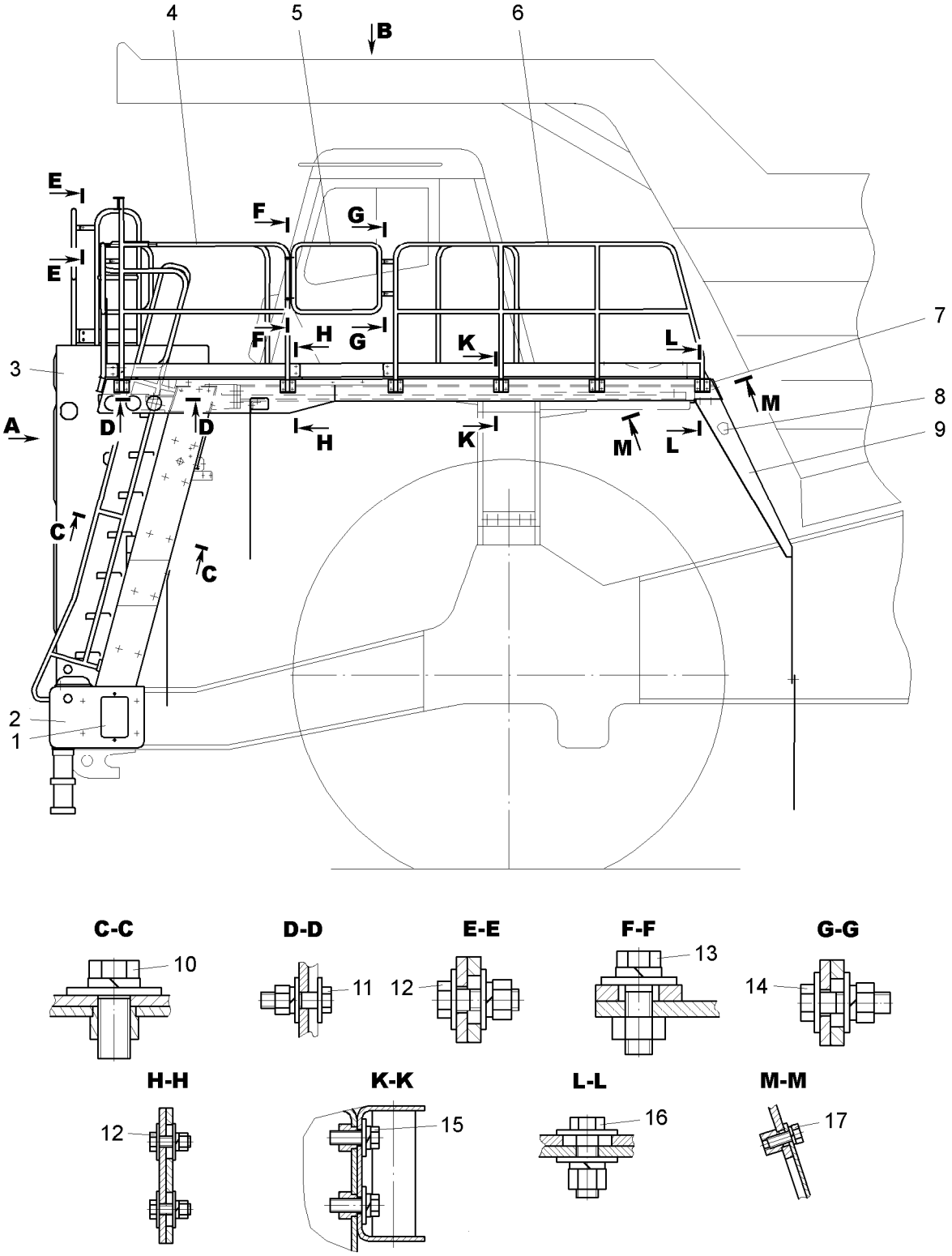

Figure 6 – The installation of the Empennage:

1, 7 – covers; 2 – left-hand buffer; 3 – front bonnet; 4, 5, 6, 20, 21, 23, 38, 41, 43, 44 – handrails; 8, 9 – brackets fastening mud guards; 10, 11, 12, 13, 14, 15, 16, 17, 32, 33, 35, 36, 53, 56, 59, 60, 62, 63, 64, 65, 70, 71 – bolts; 18, 25, 30, 67, 68 – mud guards; 19, 24 – fender brackets; 22 – trap; 26 – stairs; 27 – stair; 28 – right-hand buffer; 29, 34, 58 – plates; 37 – left-hand fender; 39 – rear bonnet; 40 – brace; 42 – right-hand fender; 45 – additional right-hand fender; 46 – landing; 47 – additional left-hand fender; 48 – plate; 49 – mounting bracket support; 50, 51 – bracket holders; 52 – screw; 54, 55 – washers; 57, 61, 66 – stiffeners; 69 – stage

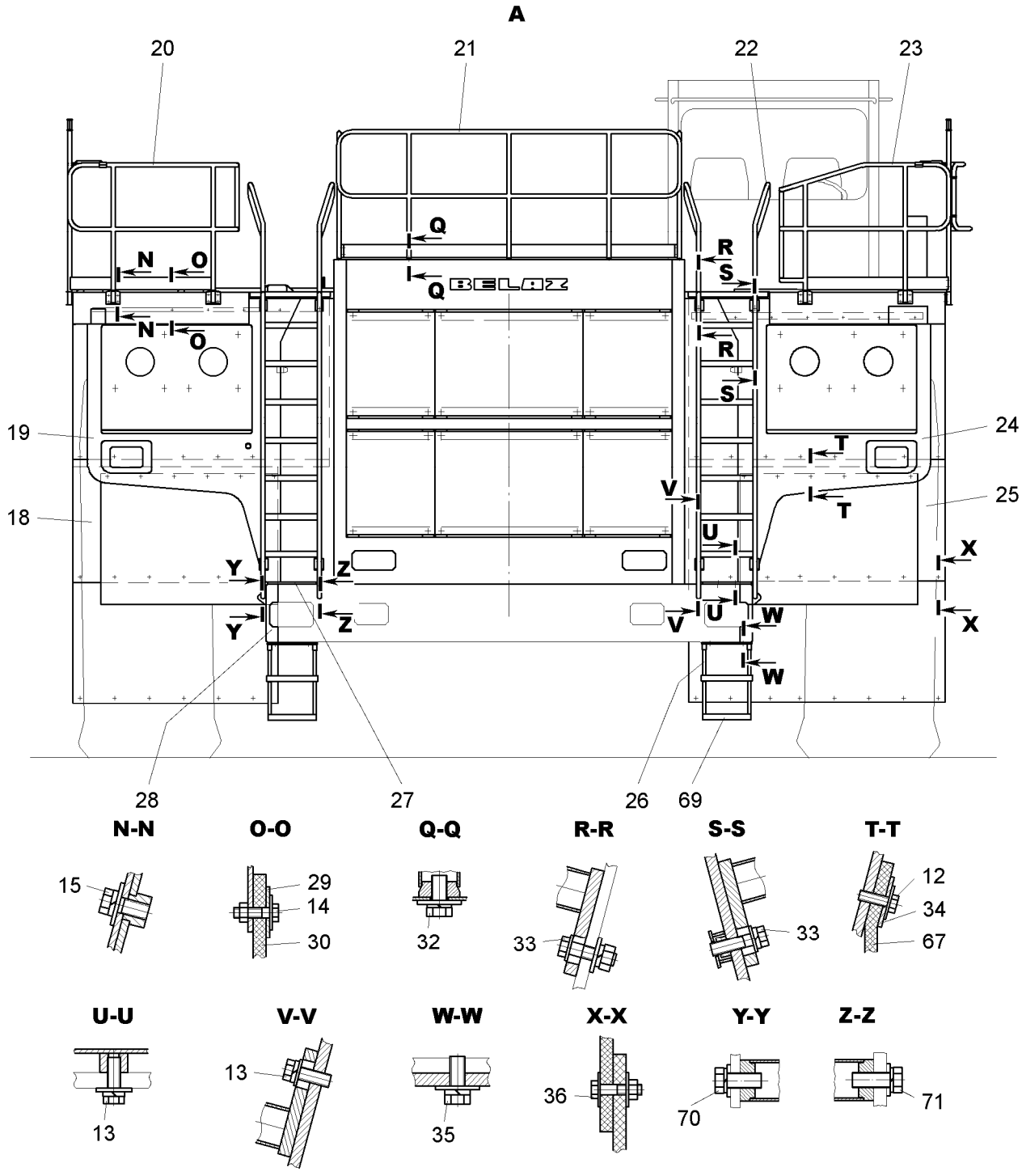

Figure 6 – The installation of the Empennage (continued)

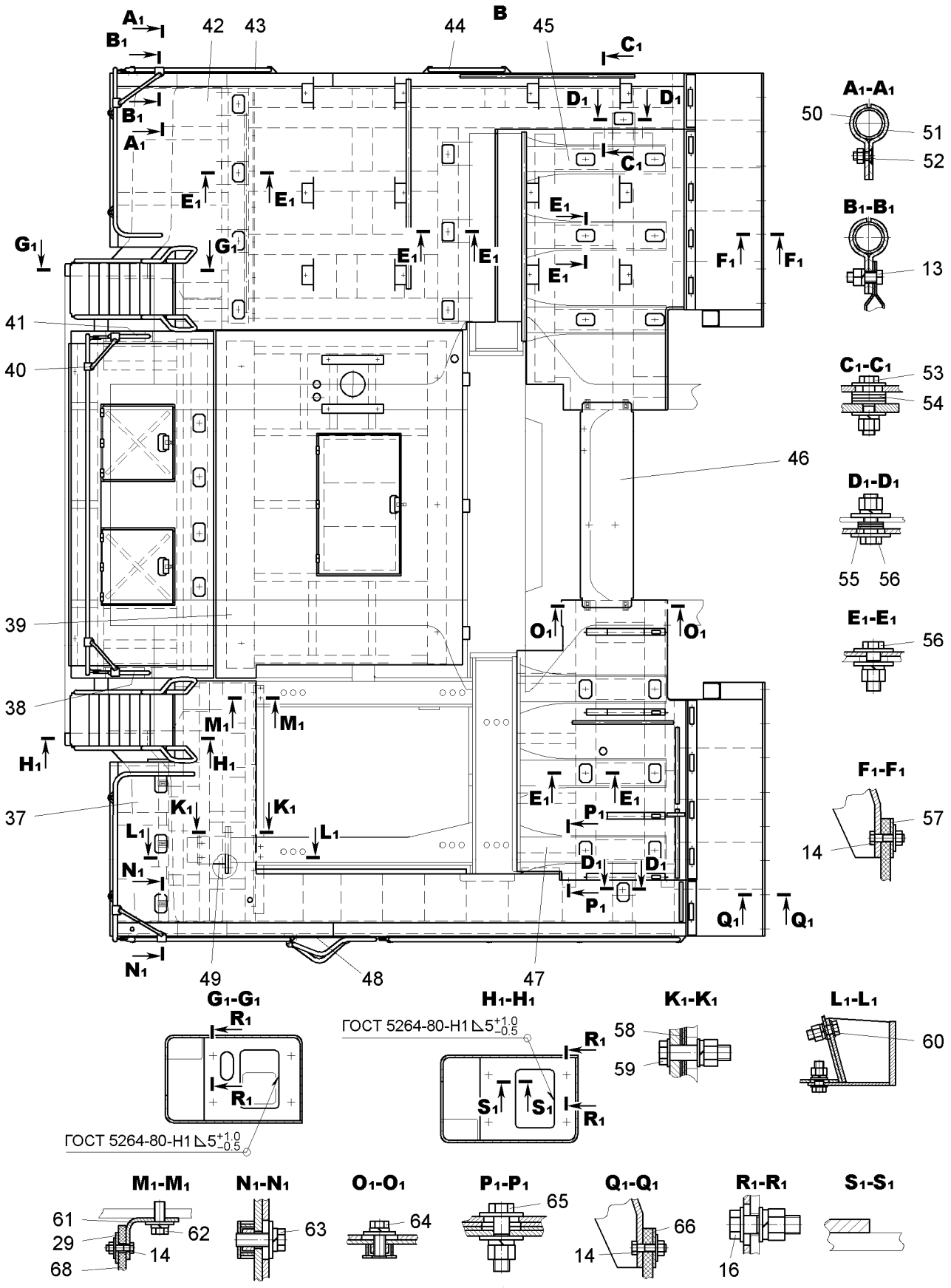

Figure 6 – The installation of the Empennage (continued)

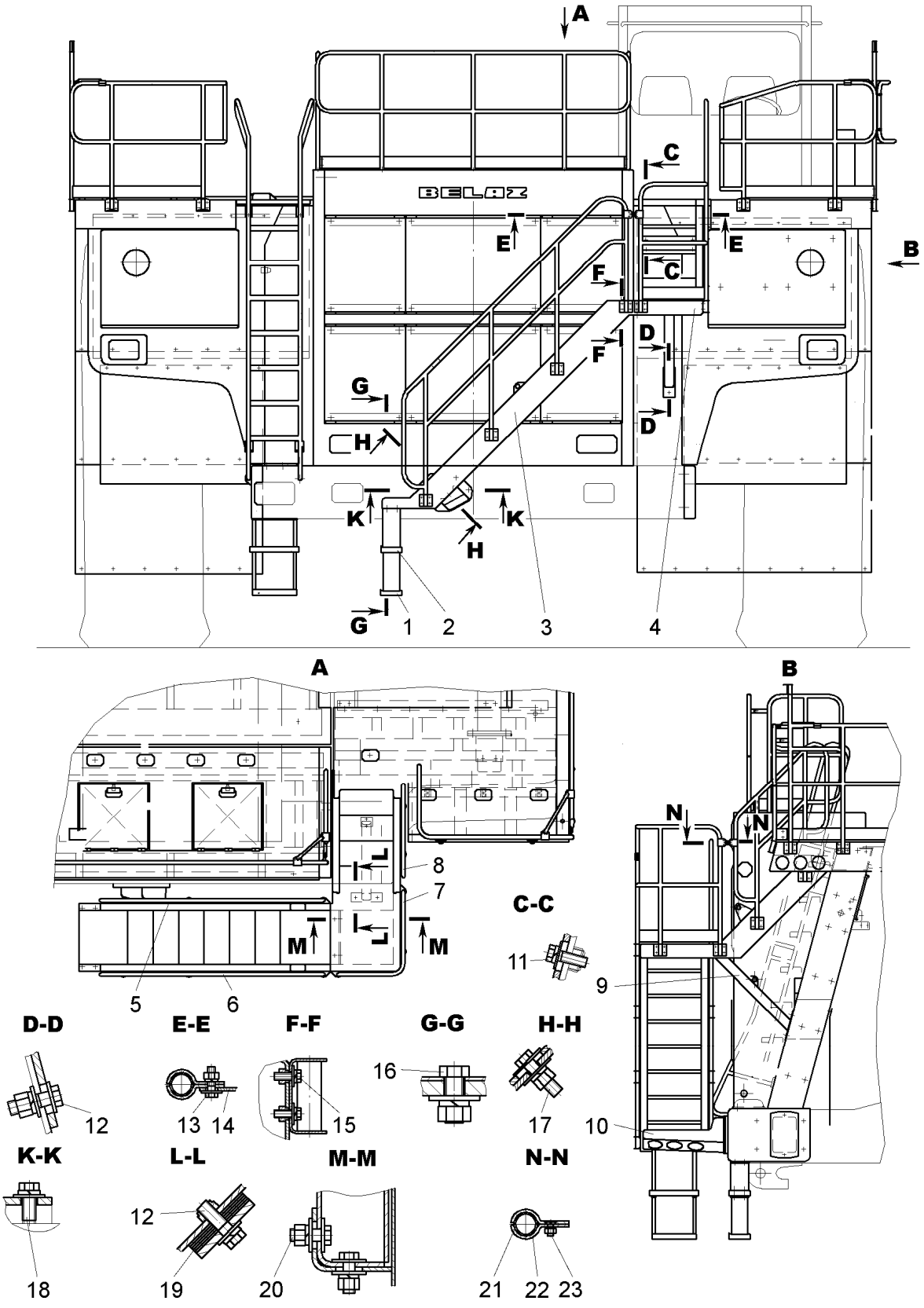

Figure 6a – Installation of fenders with diagonal ladder:

1 – footboard; 2 – guide of footstep; 3, 4 – ladders; 5, 6, 7, 8 – handrails; 9 – ladder rest; 10, 14 – brackets; 11, 12, 13, 15, 16, 17, 18, 20 – bolts; 19 –plate; 21, 22 – holders; 23 – screw

3.7 The installation of the Cab and the protective shroud of the cab floor

Turn off the temporary bolts, fasten the cab and dismantle it from the prop which being used during the transportation. Install the cab 1 (Figure 7) with the cushion 4 on the bracket fastening the left-hand fender and fasten the cab by means of the bolts 3 (12 pcs) with the nuts and the lock nuts 5, installing the upper plates 2 and the bottom plates 6. The tighten torque of the nuts is 400 – 500 N.m.

Perform adjustment of doors 7 in open position to reach the maximal open state avoiding contact of doors with fenders elements and other elements (see view B). Perform adjustment by means of position of stoppers 10. With unavailability of elements preventing maximal possible opening state of door 7 at extreme position of the stopper 10 the gap value is not regulated.

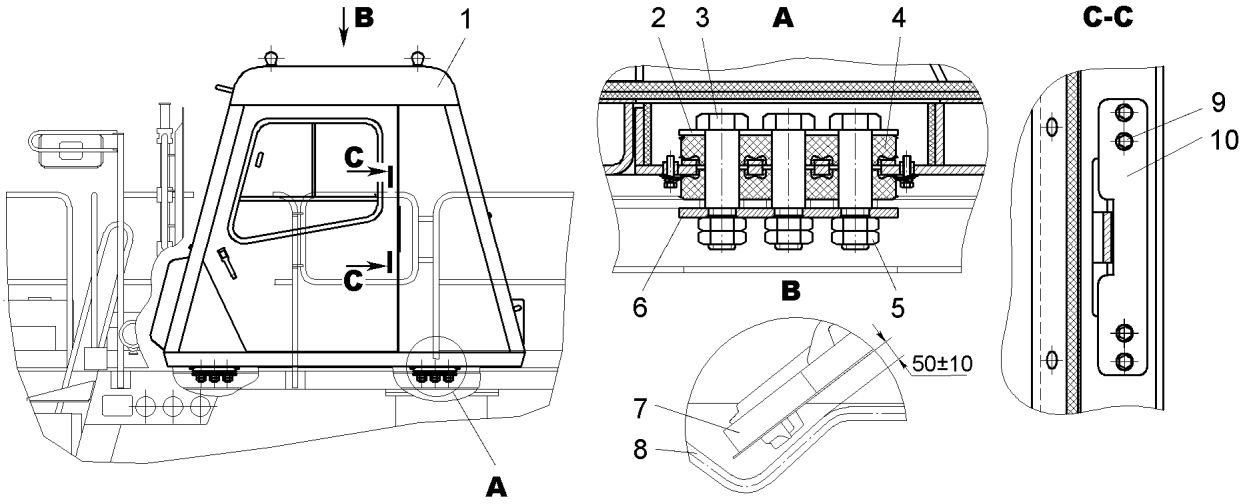

Figure 7 – Installation of cabin:

1 – cabin; 2, 6 – plates; 3, 9 – bolts; 4 – pad of the cabin support; 5 – nut; 7 – cabin door; 8 – handrail; 10 –stopper

After fastening the pipelines under the cab fit the protective shroud 3 of the cab floor which gets opened over the hinges 2 and protects units mounted under the cabin from dirt through the bracket 1 (Figure 8) and fasten it to the cab floor stiffeners by means of the bolts 9 (M10x30, 3 pcs,).

When repairing or servicing to provide access to the units under the cab turn off the thumb nuts 5 and take down the protective shroud 3.

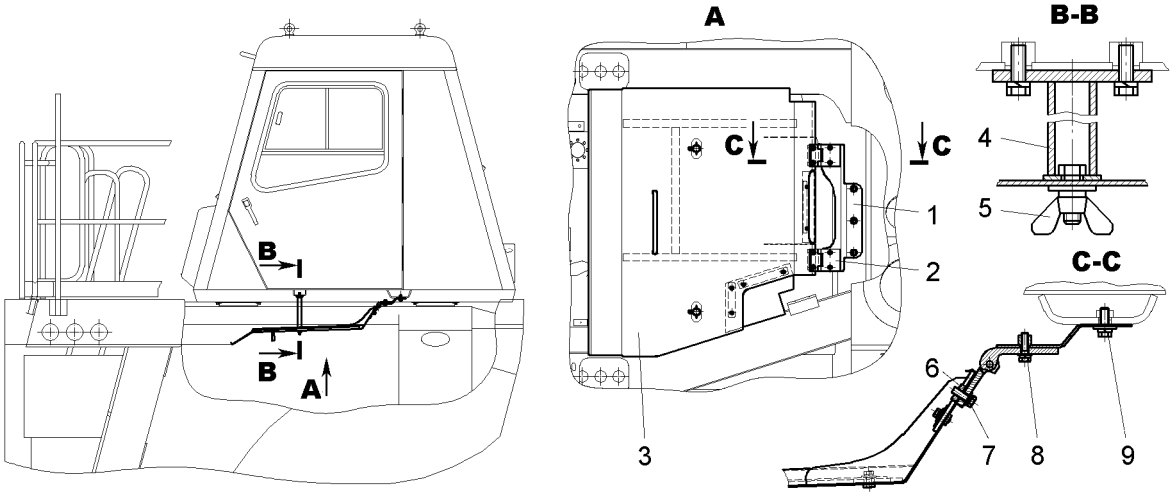

Figure 8 – The installation of the protective shroud of the cab floor:

1 – bracket; 2 – hinge; 3 – protective shroud; 4 – front bracket; 5 – thumb nut; 6 – plate; 7, 8, 9 – bolts

3.8 The installation of the Air Feed System of the Engine

Install the air filters 1 (Figure 9) to the bracket pockets of the front wing supports and fasten it by means of the bolts 25 (M16-6gx40, 16 pcs).

Connect the pipelines 20 with the air filters 1 and with the pipelines 4 by means of the hoses 2 and the nozzles 17, fasten by means of the clamps 3, 18. Fasten the pipelines 20 to the brackets 21 by means of the clamps 23 with the nuts 22 and the washers. Install the supports 16 and fasten it by means of the clamps 18.

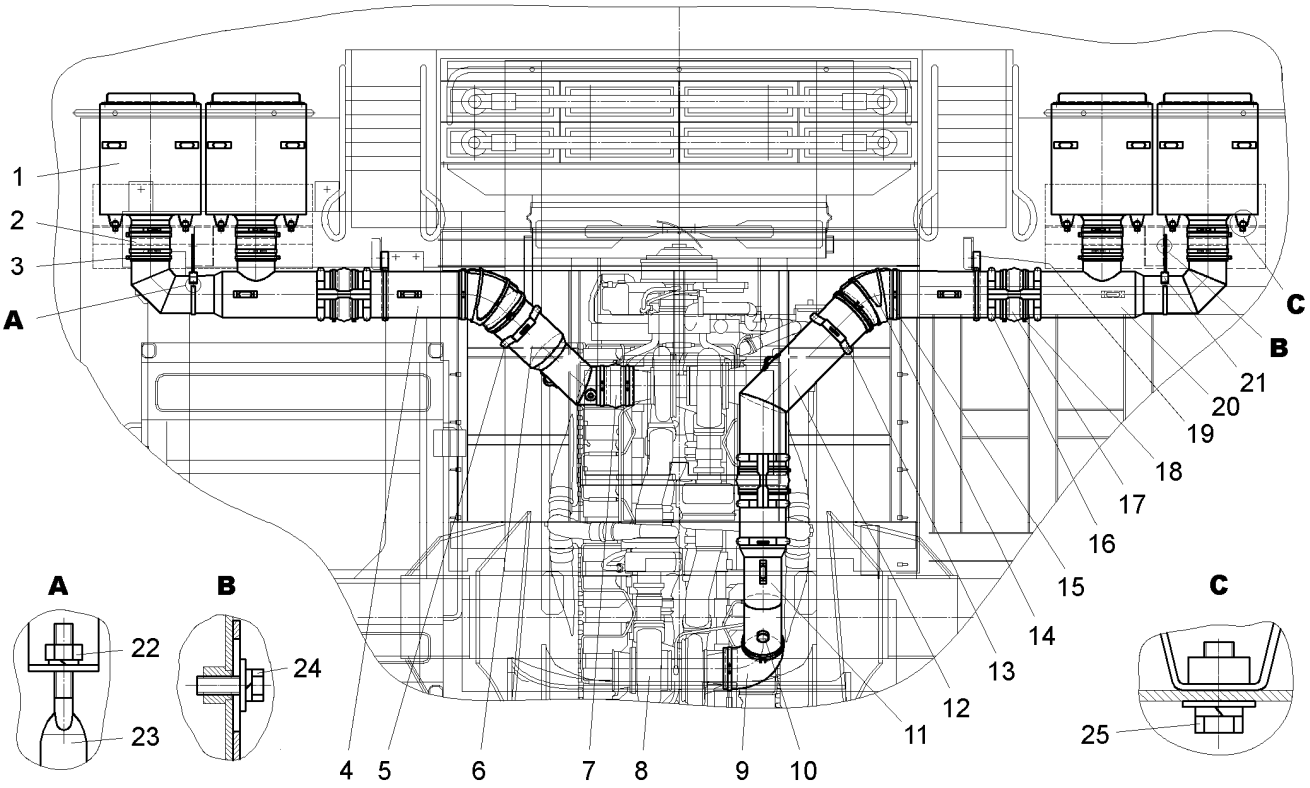

Figure 9 – The installation of the Air Feed System of the Engine:

1 – air filter; 2 – hose; 3, 15, 18, 23 – clamps; 4, 6, 11, 12, 20 – pipelines; 5, 13, 19, 21 – brackets; 7, 14, 17 – nozzles; 8 – engine; 9 – hose; 10 – signaling sensor of air filter dirtiness; 16 – support; 22 – nut; 24, 25 – bolts

3.9 Connection the Cab Equipment

When dismantling the cab of the dump truck for transporting it in partially disassembled state, the marking labels are fitted to the ends of the hoses and pipelines of the hydraulic system and bundles of the electric equipment wires with marking the numbers of the connectors on the label.

After installing the cab when assembling the dump truck connect the high-pressure hoses of the dozing pump 1 (Figure 10), the hoses of the control valve of the parking brakes 4, the hoses of the control valve of the brakes 6 to the nipples 13 in the chute 3. Fasten the hoses under the cab bottom by means of the clamps with the bolts.

Connect and fasten the air duct from the pneumatic system receiver to the pneumatic springing of the driver seat by means of the cleats.

Pull the hoses of the cab heater through the holes in the cab bottom and fasten them on the nozzles of the heater radiator by means of the clamp. The hoses shall have the slope towards the engine over the whole length.

Connect the plug connectors of the electric equipment wires over the chassis to the plug connectors on the rear panel of the cab according to the marking and electric connection diagram.

When connect the wires to the power leads of the circuit connector and the connector of the pump injecting the oil (switch PR60 in the battery box) with the tighten torque of the cleats 12 – 13 N.m.

Set the arms of the brush holders assembled with the brushes of the wind and rear screen so that the brushes would be in the bottom position when the windscreen wiper is off.

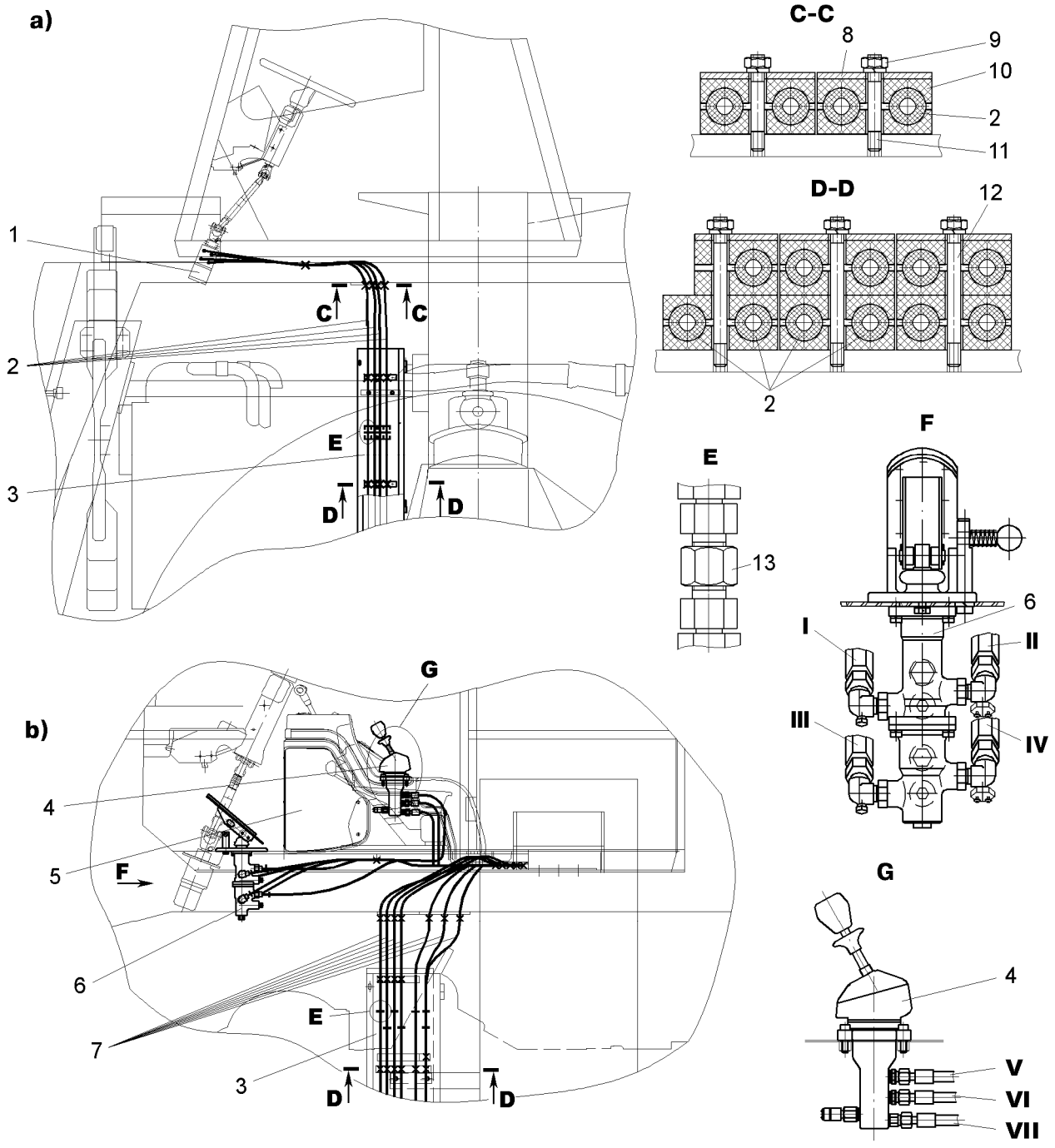

Figure 10 – Connection the hydraulic system hoses

a) steering control; b) brake systems:

1 – dosing pump; 2 – high-pressure hoses of the steering control; 3 – chute; 4 – control valve of the parking brake; 5 – control member console ; 6 – control valve of the brakes; 7 – high-pressure hoses of the brake system; 8 – plate; 9 – nut; 10 – insert; 11, 12 – pins; 13 – nipple;

I – to the hydropneumatic accumulator of the rear brakes; II – to the wheel cylinders of the rear brakes; III – to the hydropneumatic accumulator of the front brakes; IV – to the wheel cylinders of the front brakes; V – drainage into the oil tank (through the control valve of the brakes); VI – to the hydropneumatic accumulators of the parking brake and of the steering control; VII – to the parking brake cylinders

Install the conditioner hoses in the dump truck chassis (on the inner side of the left-hand leg of the second crossbeam) from the cab to the compressor, preliminary connecting them to each other by means of the quick-disconnected couplings 1, 2 (Figure 10a).

ATTENTION: PRIOR TO THE ENGINE START AFTER INSTALLING THE DUMP TRUCK MAKE SURE THAT THE HOSES OF THE AIR CONDITIONER HAVE BEEN CONNECTED RIGHT BY MEANS OF THE QUICK-DISCONNECTED COUPLINGS.

EVEN TRANSFERING OF THE ENGINE TORQUE TO THE CONDITIONER COMPRESSOR WITHIN A SHORT PERIOD WHEN THE HOSES ARE INSTALLED INCORRECTLY OR DISCONNECTED WILL LEAD TO THE BREAKAGE OF THE AIR CONDITIONER AND THE DEPRESSURISATION OF THE CONDITIONING SYSTEM.

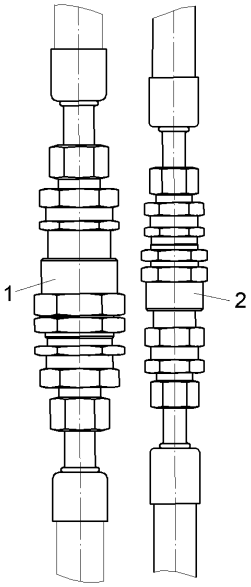

Figure 10a – Connection of the conditioner hoses:
1, 2 – quick-disconnected couplings

Install and fasten the rear view mirrors (Figure 11).

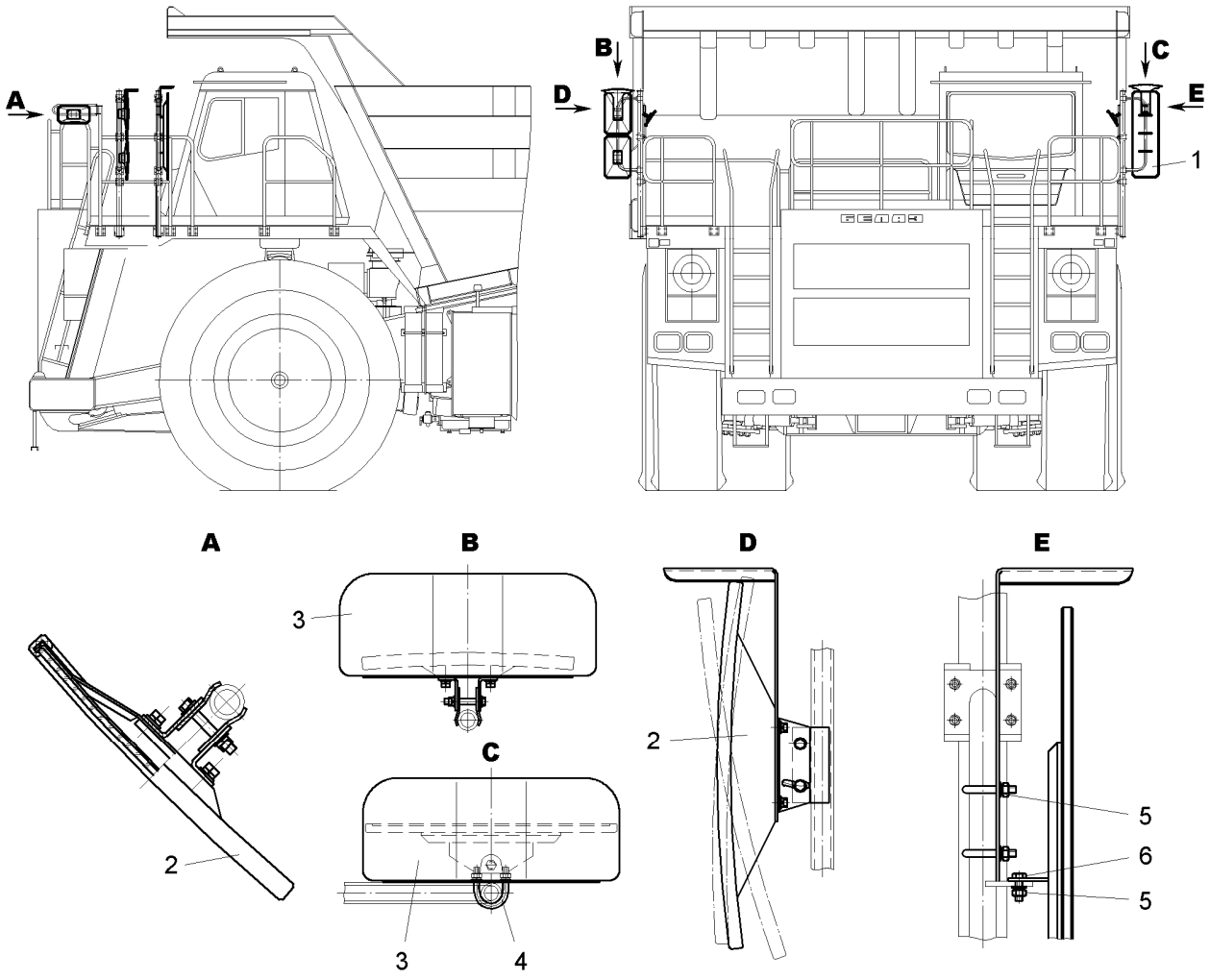

Figure 11 – The installation of the rear view mirrors:
1, 2 – external mirrors; 3 – protective bracket; 4 – latch; 5 – nut; 6 – bolt

3.10 The installation of the Control Cabinet

Fasten the bracket 3 on the frame crossbeam by means of the bolts 11 (M24x2x52, 6 pcs) (Figure 12).

Sling the control cabinet 2 and mount it on the brackets of the frame crossbeam. Use the washers 13 for adjusting the cabinet position.

Fasten the cabinet on the brackets by means of the bolts 12 (M16x60, 8 pcs) with the nuts 14, flat and spring washers. Connect the suction air duct 5 with pipeline 6 by means of the hose 8 and fasten it by means of the clamps 19.

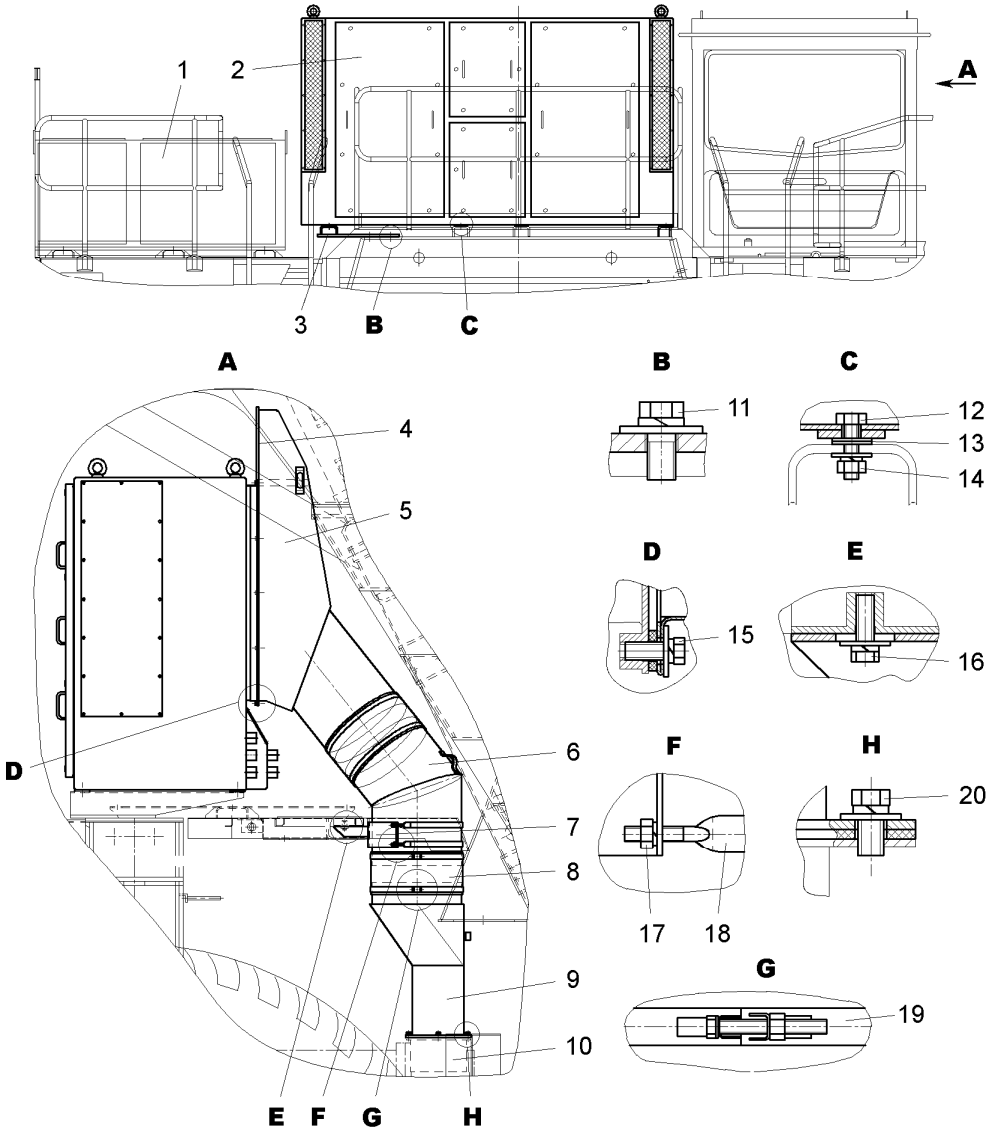

Figure 12 – The installation of the Control Cabinet:

1 – ventilated brake device; 2 – control cabinet; 3, 7 – brackets; 4 – cross-hatch; 5 – suction air duct; 6 – pipeline; 8 – hose; 9 – nozzle; 10 – traction alternator; 11, 12, 15, 16, 20 – bolts; 13 – washer; 14, 17 – nuts; 18 – belt; 19 – clamp

3.11 Connection of the Bundles and Wires of the Traction Electric Drive

The connection of the wires shall be performed according to connection diagrams, the connection of the wires to the electric devices and mechanisms shall be performed according to the electric schemes applying with the operating documentation. Each model of the dump truck is completed with the corresponding diagrams and electric schemes.

General requirements:

– The sharp bends, breaks, stripped places and/or other damages of the wires and bundles are not allowed;

– The wires shall not be in contact with hot parts of the dump truck and/or sharp edges of the insertion holes on the frame and empennage, brackets and other parts of the dump truck;

– The radii of the mounting bends of the wires shall be at least five-time diameter of the wire;

– Should the ambient temperature be below minus 40°C, the wires with the outer diameter of more than 20 mm shall be preheated to the temperature of up to 20°C to improve their flexibility;

– After being installed in the places provided, the wires and bundles shall be fastened by means of cleats with rubber gaskets as well as cleats and cramps;

– Additionally fasten the power wires of the ventilated brake device to the links UVTR frame by means of the plastic clamps with width not less than 8 mm and at a pitch of 100 mm.

3.12 The installation of the External Lighting Armature and Light Signalling Devices

Connecting the wires shall be performed after The installation of the headlights, the lanterns, audio signals according to the electric schemes applying with the package of the operating documentation.

Mount and fasten the dipped headlights 26 (4 pcs) to the brackets of the empennage units (Figure 13, section O-O и P-P) and the distance headlights 28 (2 pcs) (section R-R) making the dimensions indicated in the sections.

Mount and fasten the fog headlights 1 (2 pcs) onto the bumper (view B).

Mount and fasten the lantern 6 (section D-D) lighting the ladder.

Mount and fasten the front lanterns 15 (2 pcs) 15 (section J-J) and the side repeater lights 9 (2 pcs) (section E-E).

Mount and fasten the light 16 (view K) on the cab lighting the bottom.

Mount and fasten the lights 12 (2 pcs) (view L) on the front side handholds of the empennage lighting the side space.

Mount and fasten the lights 12 (3 pcs) (view F и G) on the rear side handholds and the bracket of the empennage lighting the working space.

Mount and fasten the swiveling headlights 16 (2 pcs) (view N) in the engine section lighting the motor area.

Mount and fasten the lantern 13 (view H) on the fuel tank for controlling the fuel overflow.

Mount and fasten the electric horns 21, 24 (view M).

For the the dump trucks **BELAZ-75180-02**, a diagonal ladder is installed on the left side for access from the ground to the dump truck deck. Installation of outdoor lighting and alarm devices is shown in figure 13a.

Pass the wiring harness 1 along the fenders units and fix it using clamps 34, bolts 20 (M6x16, view V) with gaskets and washers. Install and secure switch 30 with bracket 29 and secure it using bolts 31 (M6x25, view R). The lower beam headlights 23 are installed in two in brackets 35 (sections M-M and N-N), the upper headlights 25 are installed together with the front lamps 21 in brackets 26 and 22 (sections P-P and L-L). There are two lanterns 3 of the ladder illumination (section BB and type O).

Installation of other outdoor lighting and signaling devices should be carried out in a manner similar to that described above for the basic version.

3.13 The installation of the Rear Lanterns and Rear Lights

Connecting the wires shall be performed after mounting lights, lights, audio signals according to the electric schemes applying with the package of the operating documents.

Mount and fasten the turn indicators 16 and the rear lanterns 1 on the brackets of the rear lanterns 19 (Figure 14, view H) by means of the nuts 15 (M6) (view G) with the flat and spring washers.

Fasten the brackets of the rear lanterns 19 with the shock absorbers 12 and pressure plates 11 (view G) by means of the bolts 13 (M6x25) with nuts to the body brackets.

Pull the wire bundles 9 through the protective tubes on the body to the brackets of rear lanterns 19 installing the bushings 20 onto the ends of the protective tubes. If it necessary dismount the electric plug connectors of the wire bundles in order to pull the bundles through the protective tubes. After pulling the bundles collect the plug connectors according to the electric scheme.

Connect the plug connectors of the bundles 9 with the lanterns. Fasten the wire bundles on the body by means of the cleats 7 with gaskets and the bolts 8 (M6x16) with washers.

Mount and fasten the mudguard 10 of the rear lanterns by means of the bolts 5 (M8x22) (view F) with the nuts and washers.

Mount and fasten the rear lanterns 1 (3 pcs) to the frame brackets, the rear fog lantern 2 by means of the nuts (M6) with the washers, the working lamp 4 (section B-B) by means of the nut with the washers, the audio signal of the reverse 6 (view C) by means of the bolts 5 (M8x22) with the nuts and washers.

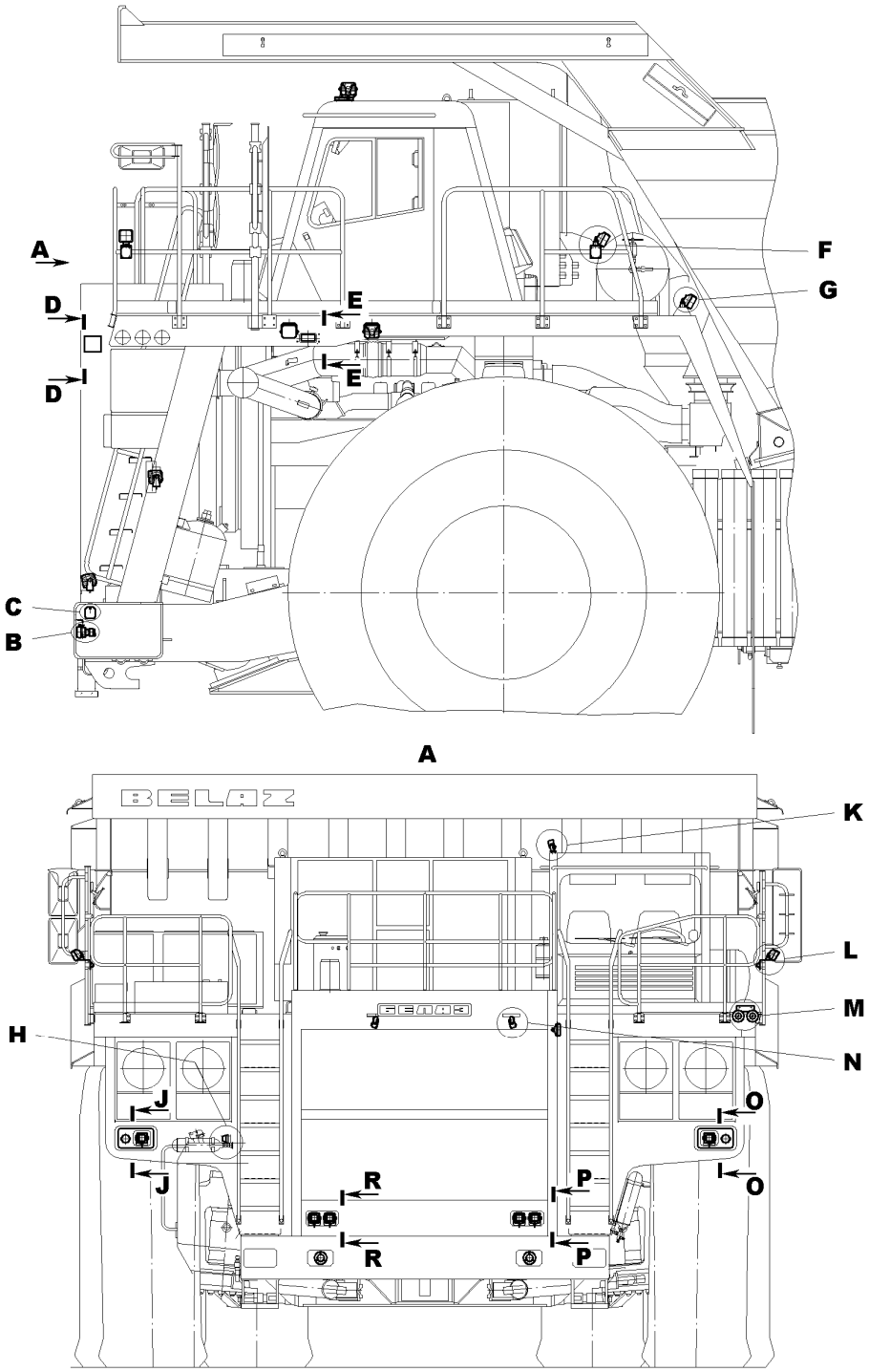

Figure 13 – The installation of the headlights and side lights:

1 – fog headlights; 2, 7, 10 – screws; 3, 8, 20, 27, 29 – bolts; 4 – buffer; 5 – cover; 6 – rear lantern; 9 – side repeater light; 11 – housing; 12, 16 – working lamps; 13 – lantern for controlling of fuel overflow; 14 – fuel tank; 15 – front lantern; 17, 25, 31 – brackets; 18 – fitting piece; 19 – clamp; 21, 24 – audio signals; 22 – handhold; 23 – bracket of audio signal; 26 – dipped headlight; 28 – distance headlight; 30 – switch

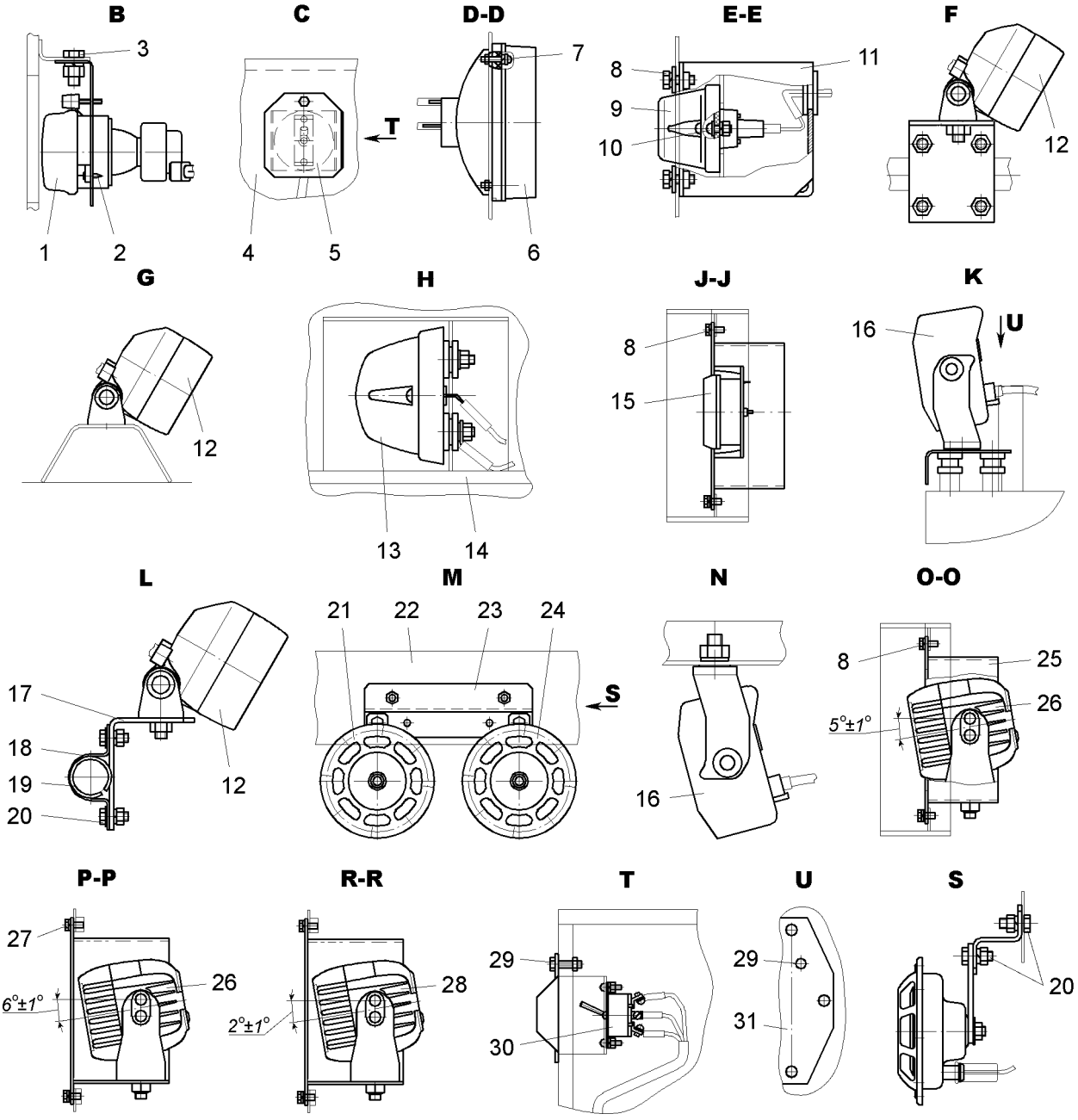

Figure 13 – The installation of the headlights and side lights (continued)

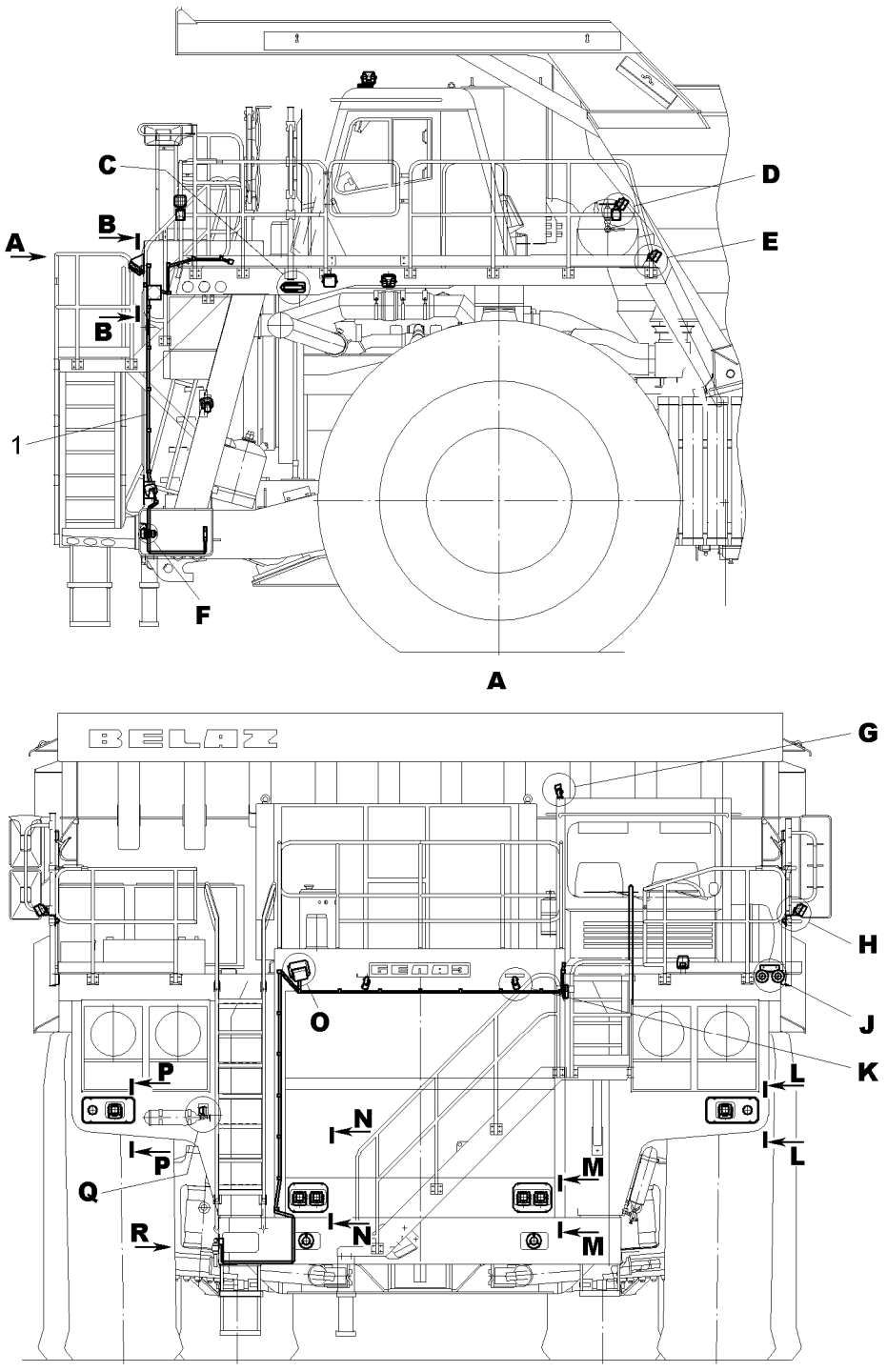

Figure 13a – Installation of headlights and lanterns (dump truck BELAZ-75180-02):

1 – wiring harness; 2 – screw B.M4x14; 3 – taillight 38.3716; 4 – side turn indicator 2BM 011 788-001; 5, 10, 17, 22, 24, 26, 29, 33, 35 – brackets; 6, 15, 16 – handrails; 7 – lower beam headlight 1GA 995 606-501; 8 – foglight 1NL 007 186-047; 9 – bolt M12x30; 11 – operation light PB 1000 1GA 996188-011; 12 – bolt M8x22; 13 – clamp; 14 – gasket; 18 – horn 3AF 003399-061; 19 – horn 3AF 003399-071; 20 – bolt M6x16; 21 – front lantern; 23 – lower beam headlight 1GA 996 192-031; 25 – upper beam headlight 1GA 996 192-091; 27 – lantern for fuel overflow check; 28 – fuel tank; 30 – switch; 31 – bolt M6x25; 32 – screw B.M4x10; 34 – cleat

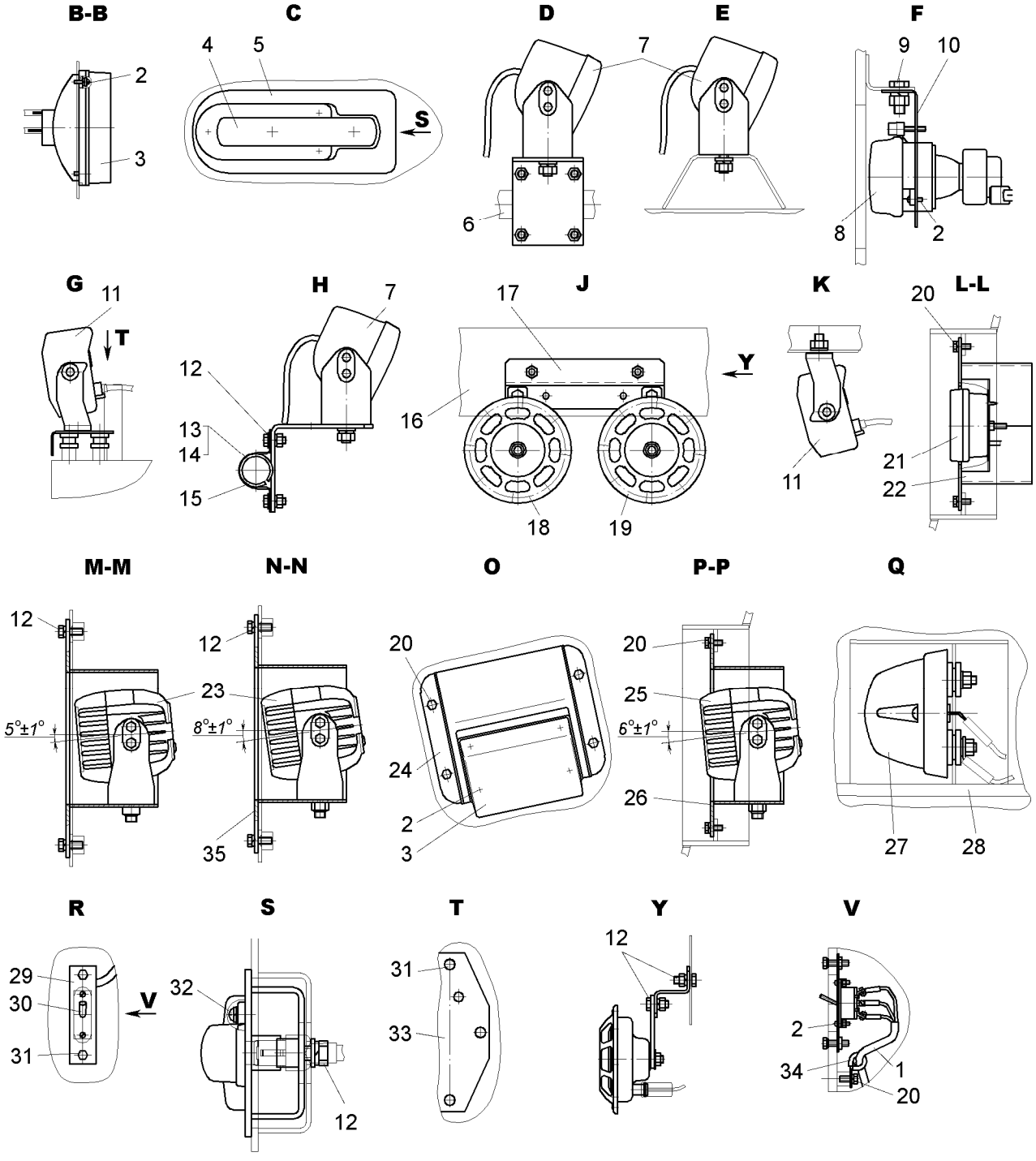

Figure 13a – Installation of headlights and lanterns (dump truck BELAZ-75180-02 continued):

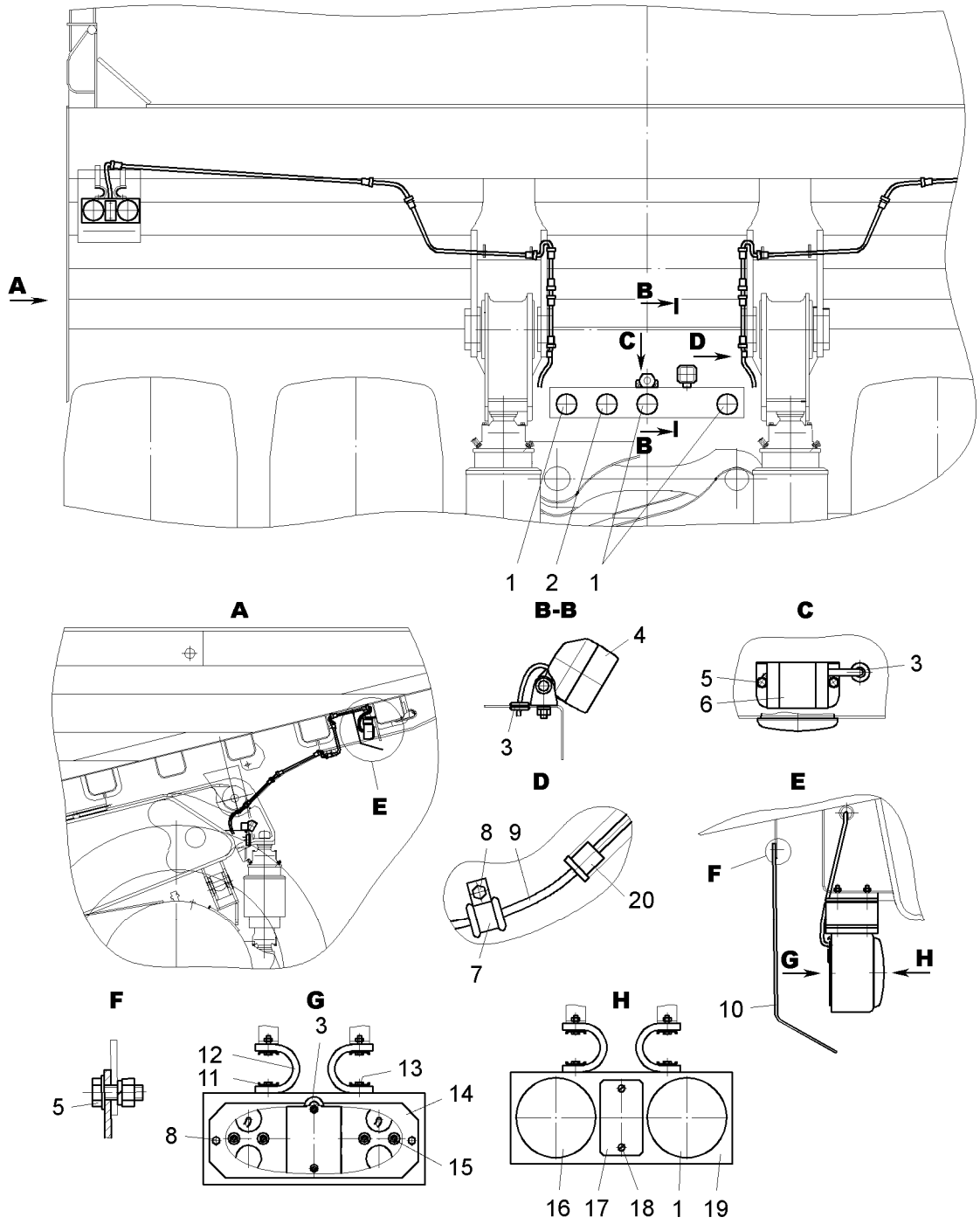

Figure 14 – The installation of the rear lanterns and rear light:

1 – rear lantern; 2 – rear fog lantern; 3 – bushing; 4 – working lamp; 5, 8, 13 – bolts; 6 – audio signal of the reverse; 7 – cleat; 9 – wire bundle; 10 – mudguard; 11 – pressure plate; 12 – bracket shock absorber; 14 – cover; 15 – nut; 16 – turn indicator; 17 – corner reflector; 18 – screw; 19 – bracket of the rear lanterns; 20 – bushing of the flexible hose

3.14 Assembling and Welding the Body

The body made of high-strength steel shall be welded at the temperature of above 0°C and provided the welding place is protected against atmospheric precipitations and draughts.

The electrodes to be used for the body welding are placed in the SPTA box.

With this purpose apply:

– electrodes such as Э70 of АНП-2 type (international qualification E7015/AWS A 5.5 E10015), electrodes Э60 of УОНИ 13/65 type (international qualification E7015/AWS A 5.1 E51 3 B20 / ISO 2560) for welding the face layers of the body weld seams;.

– electrodes such as Э50А of УОНИ 13/65 type (international qualification E7015/AWS A 5.1 E42 3 B 2 2 H10 / EN 499), for welding the “soft” layers of the body weld seams, for the body counteforts, for welding and repairing the frame elements;

It is allowed to weld the body and frame elements using semi-automatic welding mashine with wire of 1.2 mm diameter of 08Г2С type (international qualification ER 70S-6 / AWS A5.18 G3Si1 / EN ISO 14341-A).

Electrodes are to be stored in a dry heated premise with temperature not below plus 16 ^{o}C and relative humidity of air not exceeding 60 %. Directly before use electrodes should be baked according to regime recommended by manufacturers: Prior to baking, check electrodes cores whether there is no rust, destroying coats of one – two electrodes of each brand. Rust is not admitted.

Prior to calcining, check the stems of the electrodes for absence of rust by destruction of coating on 1-2 electrodes of each mark. No rust is allowed to be present.

The calcined electrodes shall be transported to the working site and stored in the closed container protecting them against moistening and dirtying.

For welding the body, the DC welding equipment provided with ammeters shall be used. The welding shall be performed using the reverse-polarity current.

The welding works shall be performed by the welders of at least 4th category having studied the requirements of this manual for welding the body.

Prior to assembling, the places of making the welds and surfaces of the body parts to be joined shall be cleaned from dirt in the welding zone, degrease the places with oil stains, clean them using a grinding wheel of shot blasting until any rust, scale, paint and/or other contaminants are completely removed. The cleaning shall be performed on the area equal to the weld width pus 20 mm to each side.

Prior to making all the welds, the edged to be welded and near-weld zone shall be dried by heating to 60 – 80°C at the distance of 150 – 200 mm to both sides from the welded edges.

In case of increased humidity of ambient air, the welding shall be performed with preheating the edges to be welded to the temperature of 100 – 150°C.

The weld shall be performed without interruption, until the grooving or full weld section is completely. In case of arc extinction during the welding, clean thoroughly the crater from slag and only then re-excite the arc. The electrode shall be changed and the bead shall be completed after filling the crater with metal only. After putting each bead and making the weld as a whole, both the weld metal and the weld adjacent zone shall be cleaned thoroughly from slag and metal spatter.

When performing the welding, ensure the leakproofness of the welds. The check shall be performed visually by the absence of incomplete fusion, lack of penetration and passage of gases when the engine is running.

It is prohibited to perform the adjustment and correction of the details using the local heating.

For assembling each body use the central and cross components, the eyebrows with the same serial number.

The scheme of mounting of the frame components for welding is shown in Figure 15.

It is prohibited to delete the welded assembling jigs, the mounting brackets and the fastening brackets during transporting by the railway body by stroke (breaking off). It shall be cutted by gas-flame method, the welds shall be deleted by means of the grinder at the one level with the main metal, the places with the flay marks have been cleaned, welded using electrodes АНП-2 of Э70 type or УОНИ 13/65 of Э60 type and cleaned by the grinder at the one level with the detail surface.

The parameters of the welds shown in figure 16 shall be corresponded to the values specified in Table 1. The quality level of the welds according to the state standard ISO 5817-2009 – B.

The welding with the electrodes shall be performed by a short arc in beads with the width not exceeding three diameters of the electrode, in the modes specified in Table 2.

Table 1 – Parameters of the welds

Weld No.	Weld designation	Weld leg, mm	Weld No.	Weld designation	Weld leg, mm
1	ГОСТ (State Standard) 14771-76-Т1	6^{+2}_{-1}	12	ГОСТ (State Standard) 14771-76-Т1	$12^{+2,5}_{-1,5}$
2	ГОСТ (State Standard) 14771-76-Т1	8^{+2}_{-1}	13	See section A - A	—
3	ГОСТ (State Standard) 14771-76-Т1	$10^{+2,5}_{-1,5}$	14	ГОСТ (State Standard) 23518-79-Т1	—
4	ГОСТ (State Standard) 14771-76-Т1	14^{+3}_{-2}	15	ГОСТ (State Standard) 23518-79-Т2	—
5	See detail drawing L	—	16	See section C – C	—
6	ГОСТ (State Standard) 14771-76-Н1	8^{+2}_{-1}	17	ГОСТ (State Standard) 14771-76-Т6	—
7	ГОСТ (State Standard) 14771-76-Н1	$10^{+2,5}_{-1,5}$	18	ГОСТ (State Standard) 14771-76-С10	—
8	ГОСТ (State Standard) 14771-76-Т1	16^{+3}_{-2}	19	ГОСТ (State Standard) 14771-76-У4	—
9	ГОСТ (State Standard) 14771-76-С21	—	22	See detail drawing К	—
10	ГОСТ (State Standard) 14771-76-С19	—	23	ГОСТ (State Standard) 14771-76-С8	—
11	ГОСТ (State Standard) 14771-76-С17	—			

Notes:

Т1 – single-sided T-shaped weld without scarves;
Т2 – double-sided T-shaped weld without scarves;
Н1 – single-sided lap weld without scarves;
С10 – single-sided flat-butt weld on permanent backing with one scarf;
С17 – single-sided flat-butt weld with scarves;
С19 – single-sided flat-butt weld on permanent backing with scarves;
С21 – two-sided flat-butt weld with two scarves

Table 2 – Welding modes

Weld position in the space	Current, A, for the electrode diameter, mm		
	4,0	5,0	6,0
Bottom, vertical	150 – 200	200 – 250	Only bottom position 220-280
Horizontal, ceiling	120 – 160	160 – 200	—

Assembling and Welding Procedure:

Put the right- 5 and left-hand 4 (Figure 15) components of the body with the floor oriented upwards onto the process prop 1 and pads 2. Prior to installing the middle component under the crossbeams, tack the pads for the weld by the tack weld N1 (Figure 16) and pads 21 by the tack welds №1 and №5.

Place the middle component and fasten it with the right- and left-hand components over the mounting brackets by means of the bolts 15 (section D-D) with the nuts having mounted preliminarily the plates 16.

Place the front panel 13 and fasten it with the side components over the mounting brackets 2, do with floor panel over the mounting brackets 5.

Weld the body floor crossbeams with the connecting plates of the crossbeams of the counterforces of the side components over the upper shelves (section C-C) and over the side shelves.

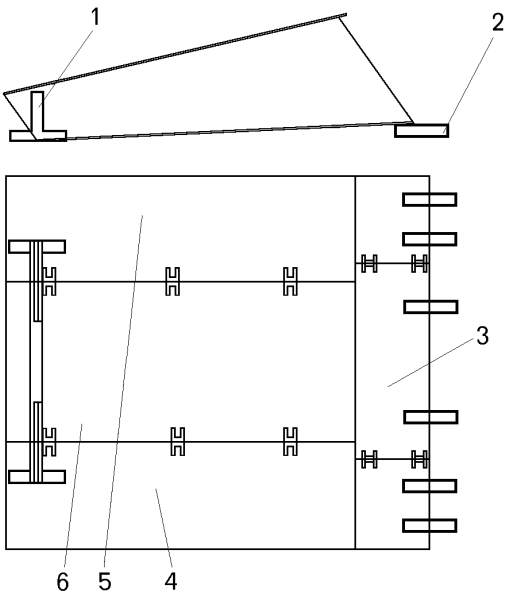

Figure 15 – Scheme of arrangement of the component parts when assembling the body:

1 – prop; 2 – pad; 3 – front panel; 4 – left-hand component of the frame; 5 – right-hand component of the frame; 6 – middle component of the frame

ATTENTION: THE WELDS BETWEEN THE CROSSBEAMS AND THE FLOOR AND THE OTHER WELDS OF THE CORNER, LAPPED AND T-SHAPED CONNECTIONS IN THE ZONE OF FLAT BUTT MOUNTING WELDS SHALL BE ONLY MADE AFTER MAKING THE FLAT BUTT WELD.

Weld the front border stiffeners 3 along the mounting joint.

Loosen the fastening of the mounting brackets of the body floor having turned out the nuts by one revolution. Turn over the body so that the floor would be oriented downwards and loosed the fastening of the mounting brackets of the front panel having turned out the nuts by 1/2 revolutions.

Weld the body floor along the mounting joints. The floor joint shall be welded with breaking the weld length into 6-7 blocks each having the length of 1000-1200 mm with the preheating of fusion edges up to temperature of 100 – 150 ^{0}C as well as the heating of the welds and the near weld area up to temperature of 150 – 200 ^{0}C during 30 – 40 minutes. The temperature of the weld and the near weld area shall be no less than 200 ^{0}C. Use the sheet asbestos in order to reduction of the cooling intensity.

The welding shall be begun from the central block; after welding the central block, the other blocks shall be welded alternately in both directions from the centre. Should two welders are employed, two central blocks shall be welded simultaneously (each welder shell weld one block) and then the subsequent blocks shall be welded in pairs.

No joining the welds at the places of intersection with the other ones is allowed. The outmost block of the front panel of the floor shall be ended at the distance of 50-100 mm from the front panel of the body.

The beads within single block shall be made over the passage or from the centre to the ends. For the first two passages, the beginning and the end of each layer in the layer are displaced relatively to the preceding one by 20 – 30 mm (Figure 17). The subsequent blocks shall be welded with overlapping (binding) the welds of the preceding block by 20 – 30 mm.

The weld in a block shall be performed without interruption, until the grooving is completely filled.

The first fillet is to be made strengthened with the section height of 5 – 7 mm. Make first layer as well as separate next layers using electrodes УОНИ 13/55 of Э50А type (“soft layers”). Total quantity of “soft” layers should not exceed 25 – 30 % of total seam section. When welding with “soft” layers first runs are possible to be performed without overlapping. Other layers of weld seam are made using electrodes АНП-2 of Э70 type or УОНИ 13/65 of Э60 type.

Make the last layer using electrodes АНП-2 of Э70 type or УОНИ 13/65 of Э60 type.

The beads of the last layer shall have smooth conjugation both with one another and with the surface of base metal. The width of beads of the last layer shall not exceed 15 mm.

Weld the front panel of the body along the mounting joint (see Figure 16) with observing the recommendations for welding the body floor, but without preheating and post-welding heating. The side weld length shall be divided into 3 blocks each having the length of 1,000–1,100 mm, the beads within each block shall be put through feed.

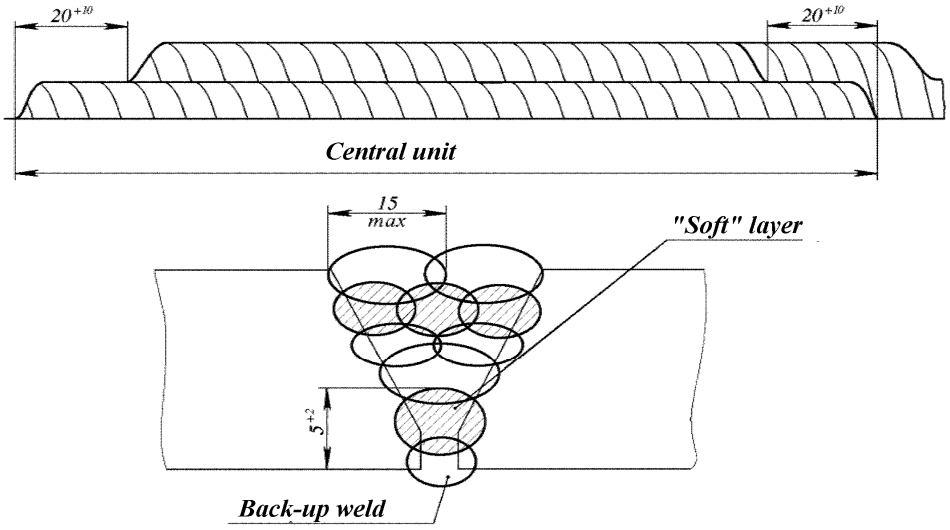

Figure 17 – Diagram of arrangement of the welding layers in the block and scheme of performing the multilayer welds

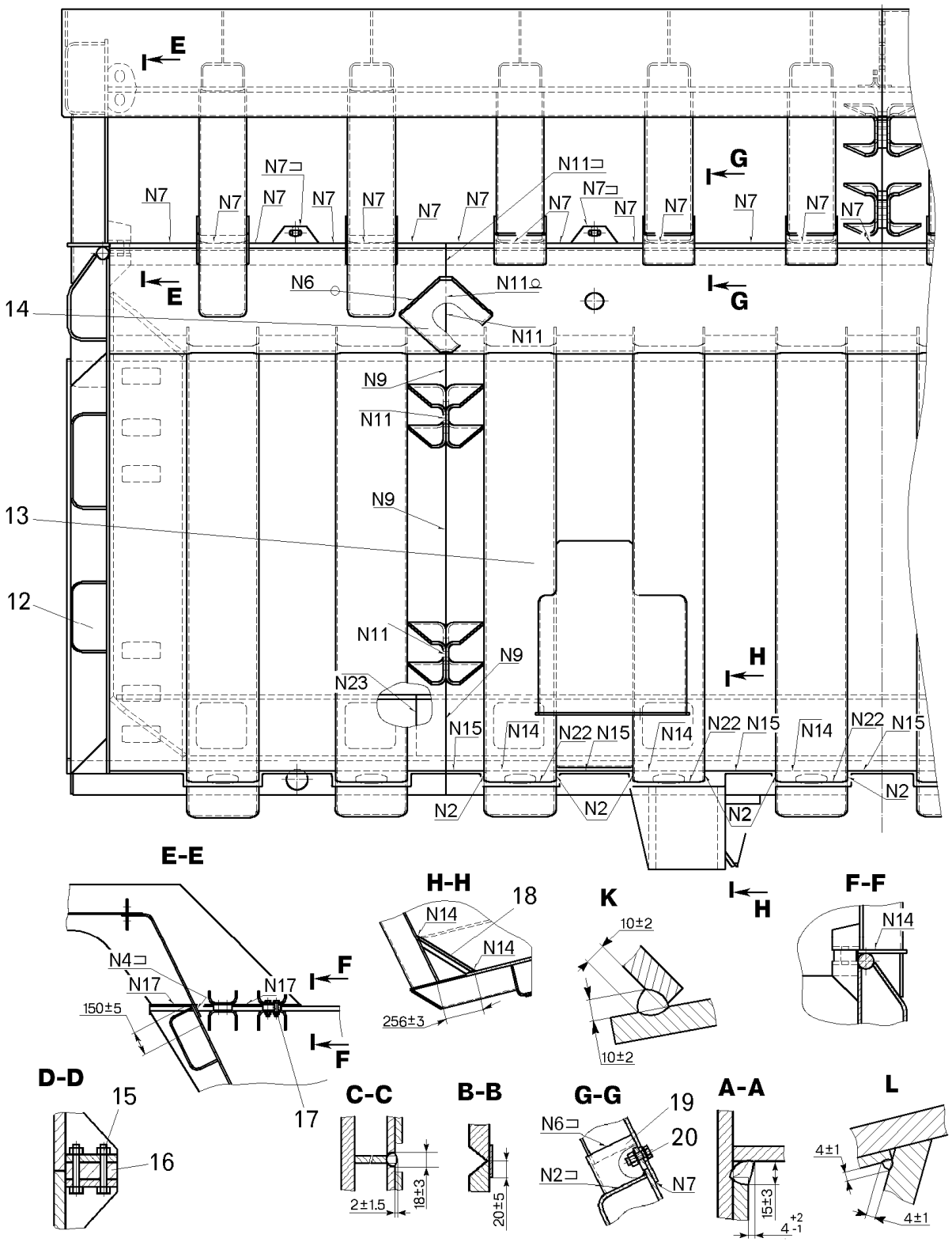

Figure 16 – Assembling and Welding the Body:

1 – overhead guard; 2, 5 – mounting brackets; 3 – stiffeners (4 pcs); 4 – end plate (2 pcs); 6 – front beam (2 pcs); 7 – bar (8 pcs); 8 – pad (12 pcs); 9 – bar (4 pcs); 10 – bar (4 pcs); 11 – bar (2 pcs); 12 – side panel; 13 – front panel; 14 – bar (2 pcs); 15, 17, 20 – bolt; 16 – plate; 18 – floor stiffener; 19 – stiffener; 20 – pad (4 pcs); 21 – pad (2 pcs)

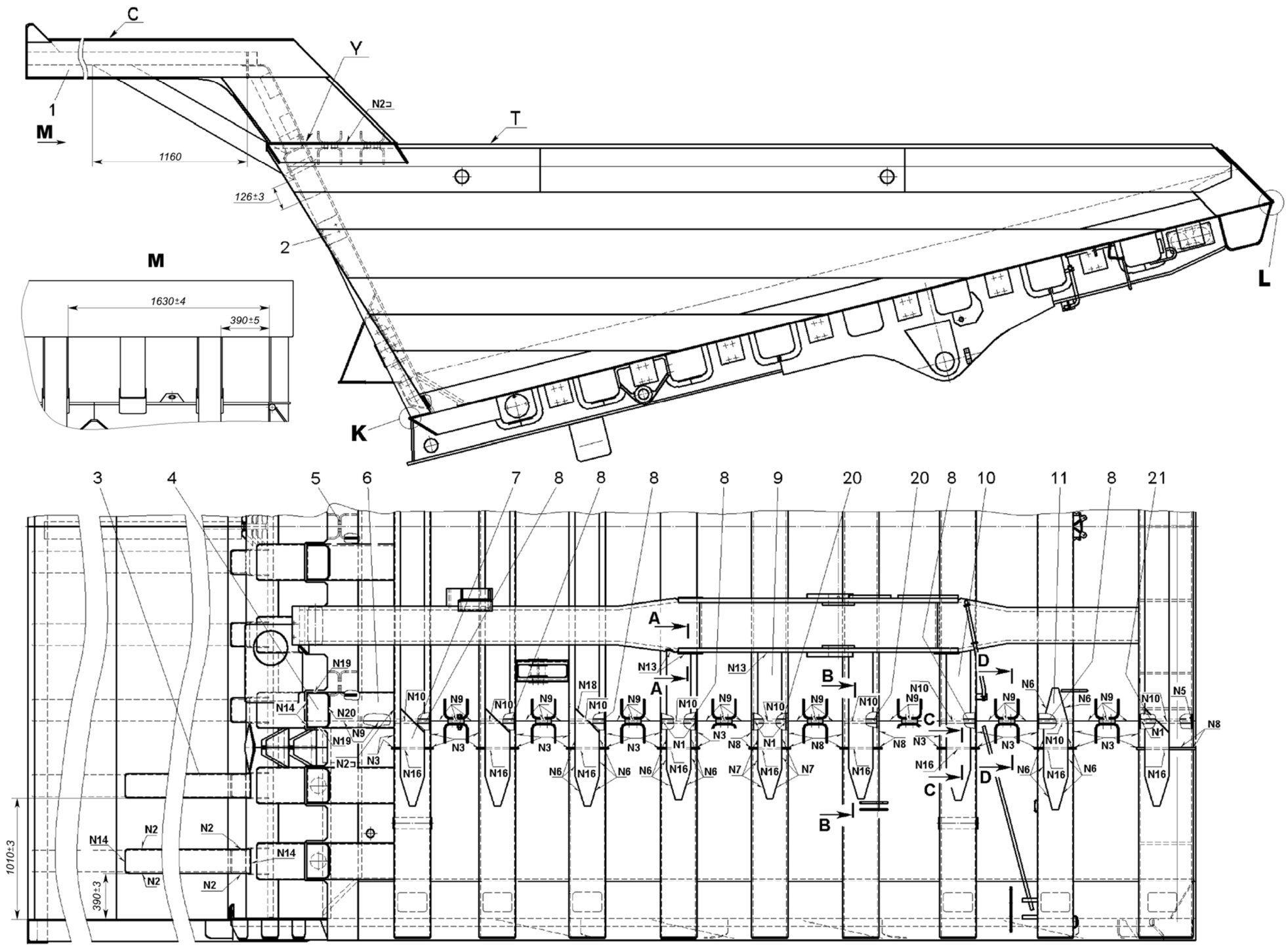

Figure 16 – Assembling and Welding the Body (continued)

It is recommended to start welding the bottom block from the incompletely welded section (50-100 mm) of the body floor. The first layer shall be made using the electrodes УОНИИ-13/55 of Э50А type.

Two welders should be invited to weld the joint between the floor and the board in order to complete the butt seam within one working shift, observing the required heating parameters within the weld area;

Prior to fitting the joint bars 14 and remove the weld reinforcement by means of a grinding wheel to the plane of the surfaces of the parts to be jointed.

Weld the front panel 13 with the frame floor.

Fit the front floor stiffener 18 (section H-H) and weld it.

Fit the overhead guard:

– connect the components of the overhead guard 1 and 2 (Figure 18) over the mounting brackets 4 by means of the bolts 3;

– weld the components (weld №8 – ГОСТ(state standard)14771-76-С5, weld №11 – (state standard) ГОСТ 14771-76-С21, weld №5 – (state standard) ГОСТ 14771-76-Т3 weld leg 12 mm);

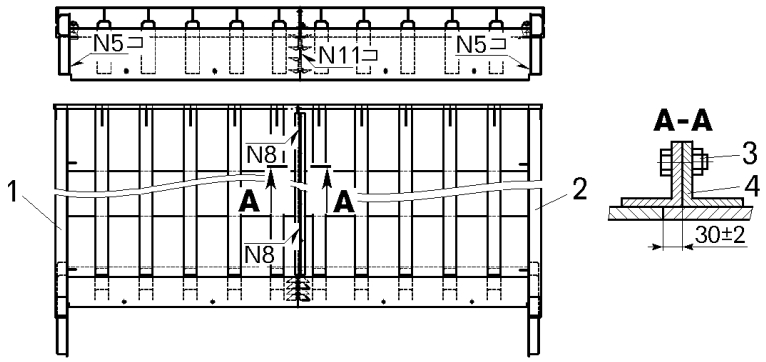

Figure 18 – Overhead guard:

1 – left-hand component; 2 – right-hand component; 3 – bolt; 4 – mounting bracket

When welding the overhead guard and rock fenders is allowed to perform the adjusting of the edges during mounting by means of the gas cutting or the welding deposition of the edges by means of the electrodes АНП-2 of Э70 type or УОНИ 13/65 of Э60 type.with further cleaning by means of the grinder up to the metallic luster, the clearance is allowed no more than 2 mm.

The length of the electric tack weld is 80 – 100 mm, the weld leg is 6 – 8 mm. It is not allowed to set up the tacks at the places of the weld crossing. The tacks shall be cleaned from the slag and the metal splashes.

– mount the overhead guard 1 (Figure 16) and fasten it with the side panel over mounting brackets by means of the bolts 17 with the nuts, preliminary installing the gaskets and weld it by means of the tacks. Fit the overhead guard 2 and fasten it by electric tacks. The tolerance for parallelism of the surface Z relatively to the surface X – shall not exceed 20 mm. The fitting over the surface Y is allowed;

– weld the overhead guard to the side and front panel (sections E – E and F – F) by means of the electrodes УОНИ 13/55 of Э50А type. Weld №7 (section G – G) on the bottom of the overhead guard panel which is welded after tipping of the body;

– turn over the body so that its bottom would be directed upwards, finish the welding of the overhead and stiffeners 3;

– weld the stiffeners 19 (welds №6 and №2 section G – G) to the stiffeners of the overhead guard and to the front panel;

– remove the bolts with nuts from the mounting brackets and delete the plates 16;

– perform the back run of the two-sided mounting weld of the floor and front panel with back-up weld (welds N10 and N15) using the УОНИ 13/55 of Э50А type electrodes. Prior to performing the back run, it is recommended to remove the bottom run by means of a grinding wheel to the depth of 2-3 mm.;

– weld the crossbeams with the floor panel in the zone of butt welds. Prior to mounting the pads 7, 9, 10 и 11 remove the weld reinforcement by means of the grinding stone up to the surface of the mating details;

– fit and weld the bars 7, 9, 10 и 11;

– fit the front beams 6 and end plates 4 and weld them;

– remove the parts welded to the internal surfaces of the body for fixing during the transportation by railway flush with the floor panels using the gas cutting equipment;

– after performing the mounting welds, the mounting brackets on the body bottom and inner surfaces shall be removed by means of the gas cutter flush with the floor panels and side border.

The following visible defects are not allowed in the welded joints:

– Cracks of whatsoever kinds and directions;
– Incomplete fusion and lack of penetration;
– Groups of pores and slag inclusions;
– Individual pores and inclusions with the diameter exceeding 1 mm in the quantity of more than 4 defects per weld section with the length of 400 mm and with the distance between the defects of below 50 mm;
– Craters not welded up;
– Flay marks on the basic metal;
– Undercutting of the basic metal to the depth exceeding 0.5 mm.

The weld sections with inadmissible defects in the form of cracks, incomplete fusion, lack of penetration as well as the sections with group porosity shall be removed completely by gas cutting; the grooves formed due to it shall be cleaned and welded up. The weld places with undercutting and incomplete section shall be also welded up.

When welding up the defective weld with removing with metal from the weld-adjacent zone, the preliminary and post-welding preheating shall be used.

Coat the welds and near-weld-adjacent zone with the paints delivered complete with the dump truck.

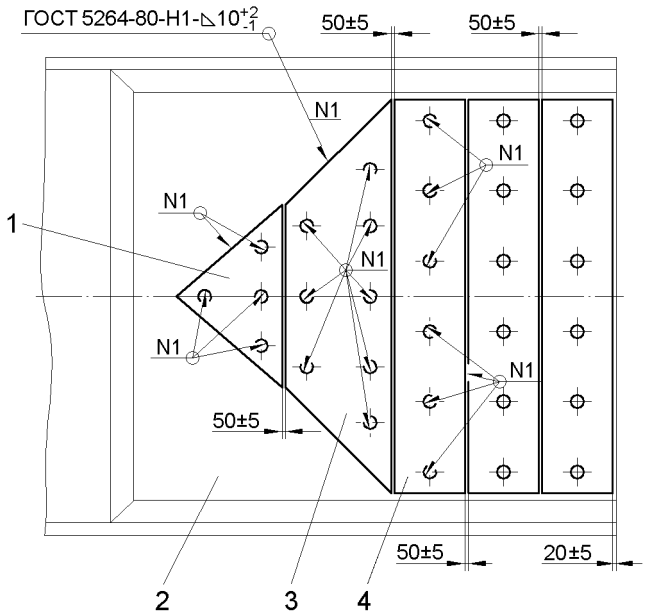

Figure 19 – Fitting the flooring sheets:
1, 3, 4 – flooring sheets; 2 – body

Fitting the flooring sheets.

On the customer's request can be fitted the floor covering (lining) for increasing the operating life of the body. The arrangement of the flooring sheets and characteristics of the welds are shown in the Figure 19.

The installation of the patched-on sides of the body.

The body is equipped with patched sideboards. The location of patched sideboards parts and the parameters of the weld seams to provide the volume of the body of 78.5 m3 / 108.5 m3 see in figure 20 and in Table 3, to provide the volume of the body of 83.3 m3 / 112.4 m3 - in figure 20a and in the table 4.

Weld seams, the structural elements of which are shown in the figures are of arc welded. Clearances for welding should not exceed 3 mm. To ensure clearances for welding, fitting in place is allowed. After completing all the welding works, the brackets must be removed aflush with the panels. When welding, ensure the first execution of weld seams No. 3, 4, 5, 6 (see figure 20), welds No. 1, 2, 7 (see figure 20a). Quality level of weld seams should meet requirements of STB ISO 5817-2009 - C.

Table 3 – Parameters of the welds

Weld No.	Weld designation	Weld No.	Weld designation
1	ГОСТ (State Standard) 5264-80-С8	5	See section A-A
2	ГОСТ 11534-75-Т1	6	ГОСТ 5264-80-Т3-Δ6
3	ГОСТ 5264-80-С12	7	See section D-D
4	ГОСТ 11534-75-Т2	8	ГОСТ 5264-80-У4-Δ12

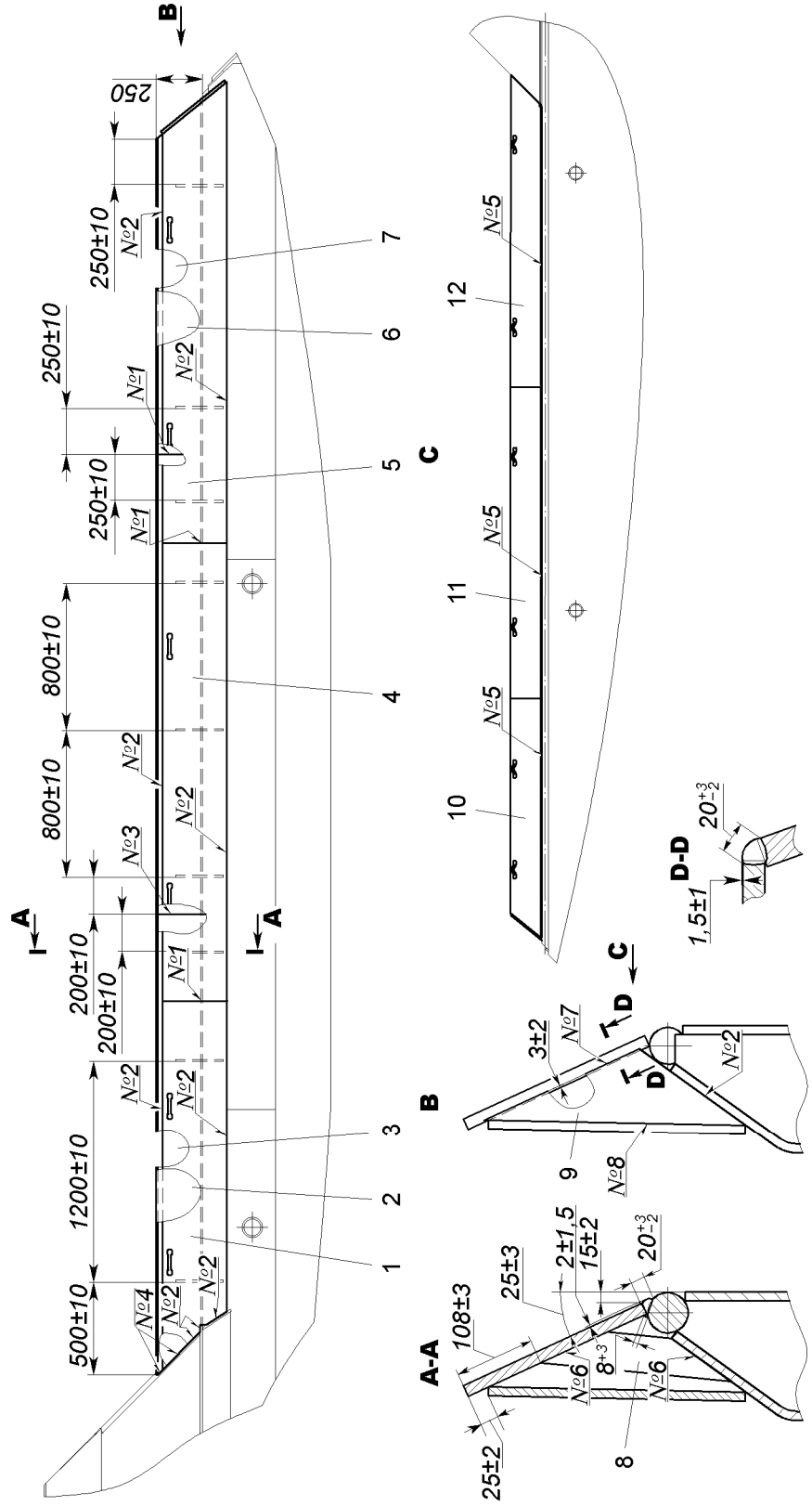

Figure 20 – The installation of the patched-on sides (body volume of 78,5 м^3 / 108,5 м^3):

1, 12 – front left-hand patched-on side; 2, 3 – front right-hand patched-on side; 4,11 – middle patched-on side; 5, 10 – rear left-hand patched-on side; 6, 7 – rear right-hand patched-on side; 8 – rib; 9 – plug

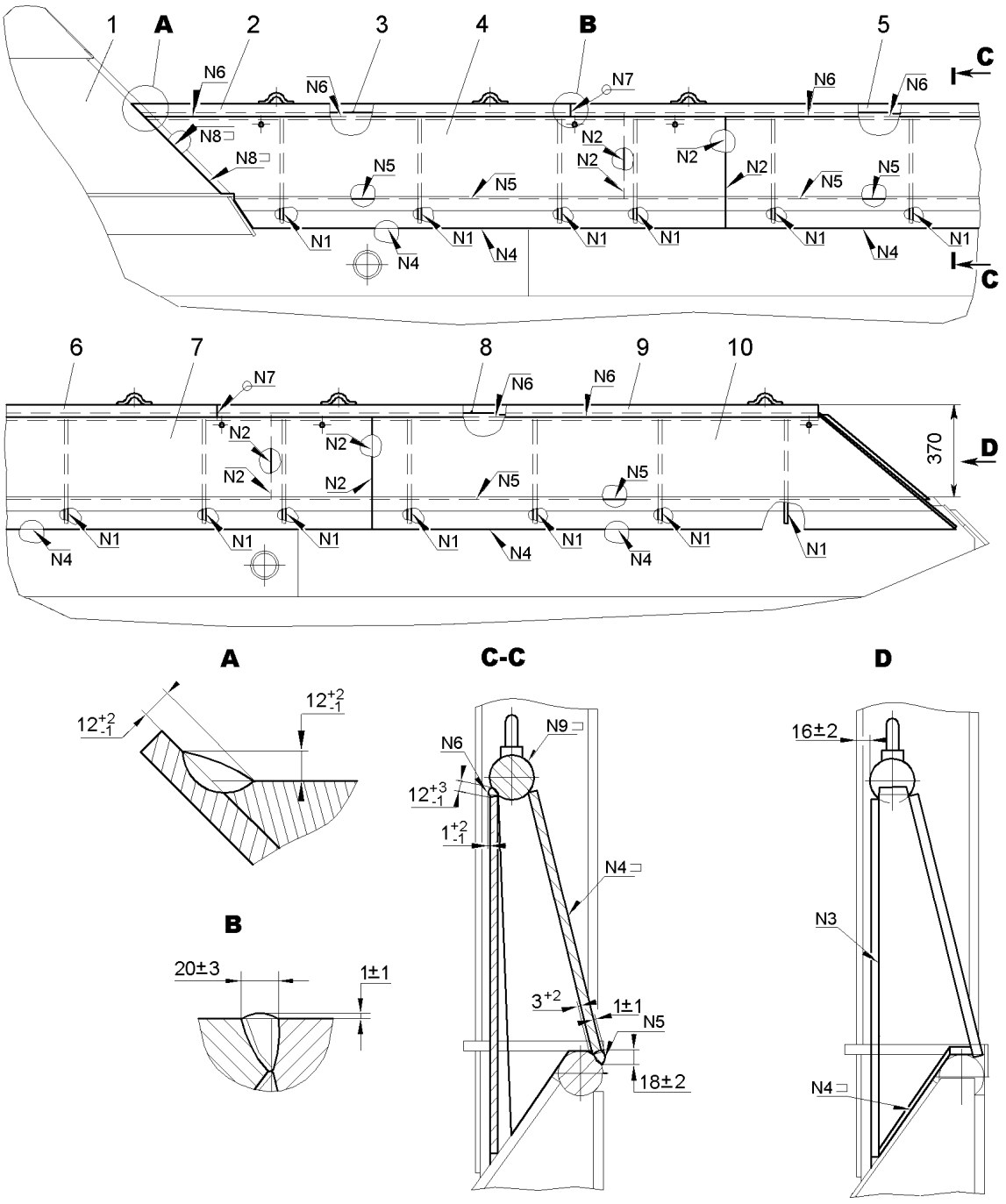

Figure 20a – The installation of the patched-on sides (body volume of 83,3 м^3 / 112,4 м^3):

1 – body; 2 – front left-hand patched-on side; 3 – front right-hand patched-on side; 4, 7, 10 – panels; 5 – борт надставной средний правый; 6 – left middle patched-on side; 8 – rear right-hand patched-on side; 9 – rear left-hand patched-on side

Table 4 – Parameters of the welds

Weld No.	Weld designation	Weld No.	Weld designation
1	ГОСТ 5264-80-Т3- Δ5	5, 6	See section C-C
2	ГОСТ 5264-80-С8	7	See view B
3	ГОСТ 5264-80-У4- Δ10	8	ГОСТ 5264-80-Т1- Δ10
4	ГОСТ 11534-75-Т1	9	See view A

Installing of the rock guards.

For supplementary protection from the dropping of rock bits during the loading of the dump truck are welded the rock guards to the body. The arrangement of the rock guards and the parameters of the welds of the rear wheels are shown in the Figure 21, of the front wheels – in the Figure 22. The quality standard of the welds according to the state standard СТБ ISO 5817-2009 – С.

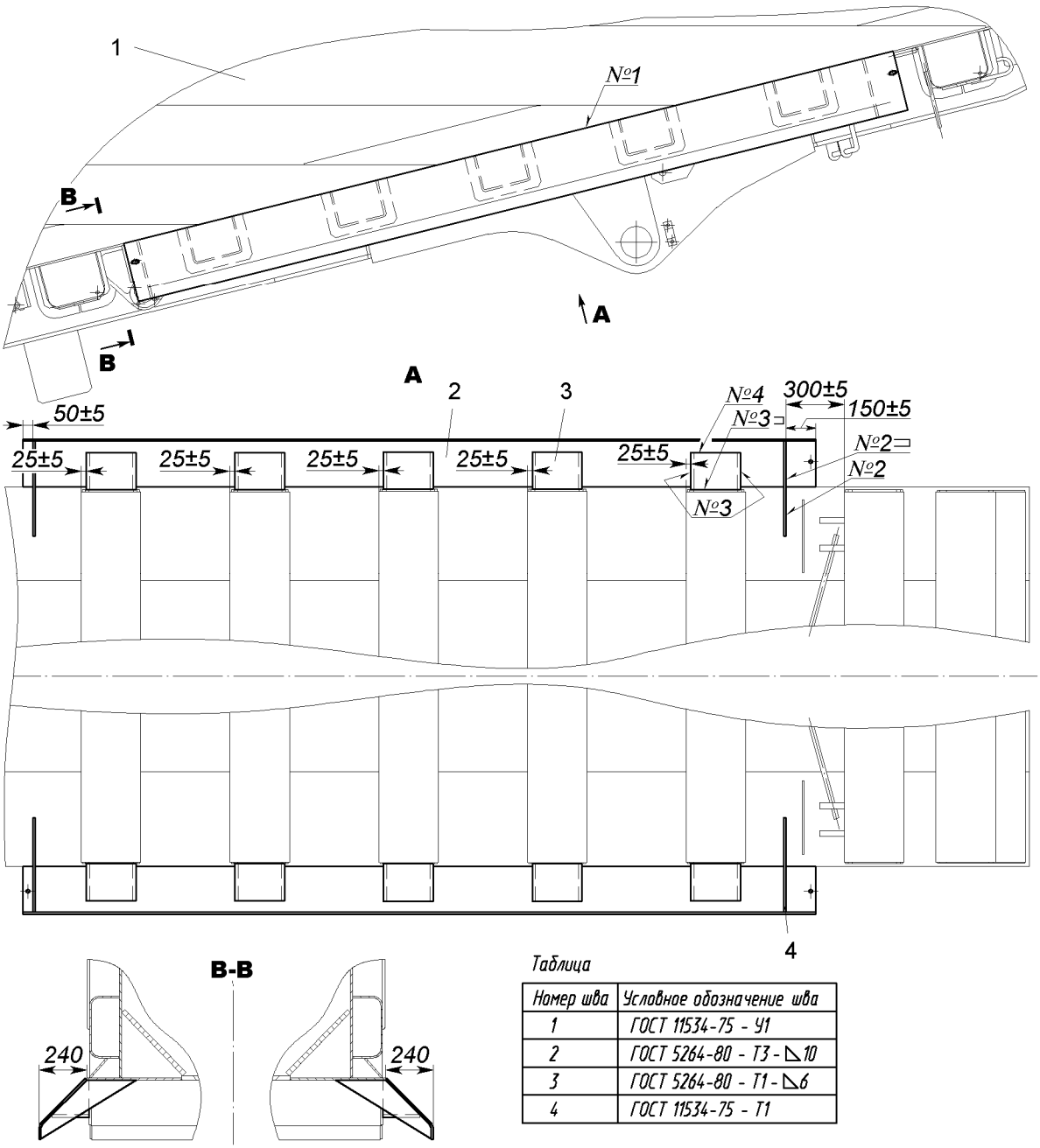

Figure 21 – The installation of the rock guards of the rear wheels:

1 – body; 2 – rock guard, 3, 4 – stiffeners

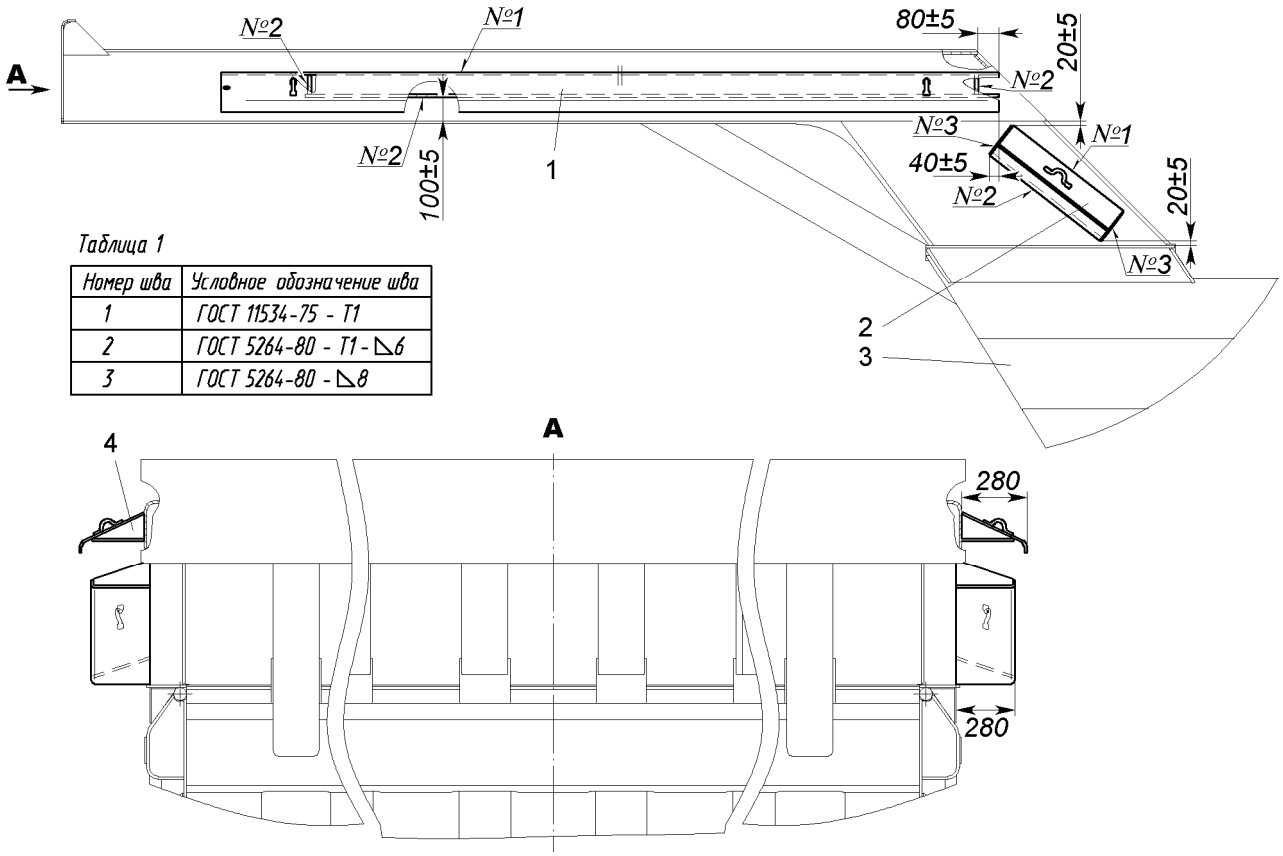

Figure 22 – The installation of the rock guard of the front wheels:

1, 2, 4 – rock guards; 3 – body

3.15 The installation of the Body

Prior to The installation of the body onto the dump truck, lubricate the pivots 17 (Figure 23) of the body supports with Lithol-24 grease.

Sling the body and align the holes of the frame brackets with hose of the frame brackets.

To lift and install the body, use special slinging fixture and two additional braces for manoeuvring when transporting and installing the body.

Fit the pivots 17 from the outside of the frame brackets. Fit preliminarily the two adjusting washers 16 between the supports and the bosses of the body brackets so that the axial clearance in the support joints would not exceed 2 mm. The clearance shall be determined in the zone of minimum distance between the planes. Align the locking plate of the finger with the slit of the latch and fasten it by means of the cover 18 and bolts 19 (M16-6gx40, 4 pcs) with spring washers.

Check and ensure as necessary the maximum possible coaxiality of the connections of the exhaust pipes with the holes in the lower sheet of the gas intakes of the body using the oval holes in the brackets for fastening the connections. The coaxiality tolerance of the exhaust pipe relatively with the hole I (view A) R5 mm, is no more.

Place the auxiliary pads between the frame side members and the body and then lower the body onto them.

Fill the cavities of the bearings of the upper heads of the dumping mechanism cylinders 2 with Lithol-24 grease and insert the distance bushings 12. Align the holes of the cylinder heads with those of ears of the brackets, fit the pins 9 of the top support of the cylinders and fasten them by means of the bolts 10 (M14-6gx42, 8 pcs) with spring washers. Place a protective ring 8 under the bolts.

Lift the body and remove the safety pads. Remove the slinging fixture and braces from the body.

Lift slightly the front part of the body and place the safety pads between the frame and the body.

Fit the shock-absorbers 14 and fasten them by means of the bolts 15 (M10-6gx35, 72 pcs) with spring washers. Ensure the uniform adjoining of the shock absorbers 14 to the bearing surface of the frame side members by inserting the adjusting shims 13. The clearance between the shock absorber and the frame shall not exceed 1 mm. Wedge-shaped clearances of up to 3 mm is allowed in individual places.

The minimum size of contraction of the shock absorber shall be 37 mm.

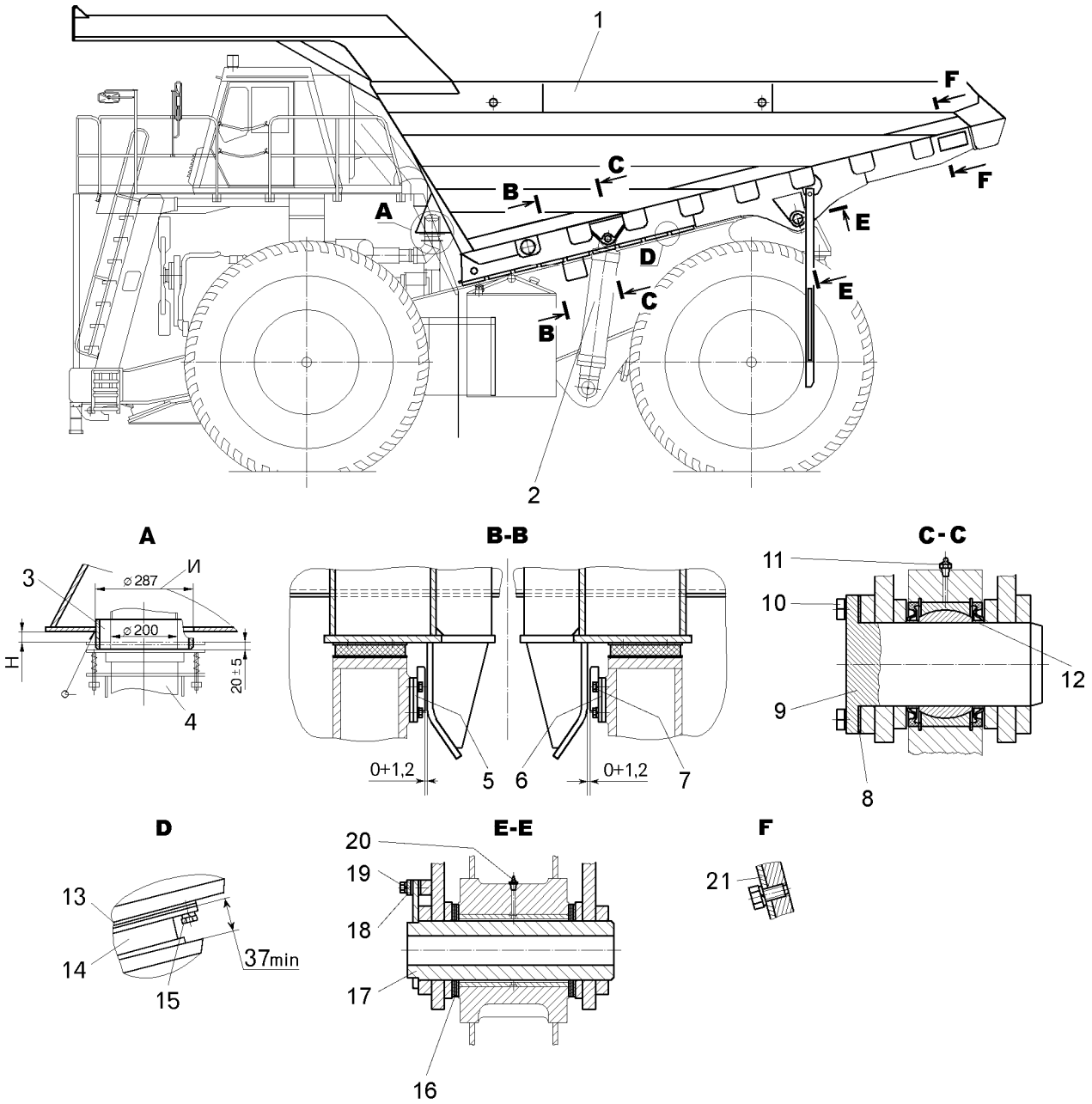

Figure 23 – The installation of the Body:

1 – body; 2 – dumping mechanism cylinder; 3 – thrust ring; 4 – exhaust pipe; 5 – adjusting plates; 6 – contact plate; 7, 10, 15, 19 – bolts; 8 – ring; 9 – pin; 11, 20 – grease boxes; 12 – distance bushings; 13 – shims; 14 – shock absorber; 16 – adjusting washer; 17 – pivot; 18 – cover; 21 – plug

Measure the dimensions “H” (view A) between the supporting flanges of the exhaust flanges of the exhaust pipes and lower sheets of the gas intakes at four points over the circumference of the flange. Mark the dimensions “H+20” mm from the end face of the ring at the respective points on the thrust rings of the gas intakes and draw a reference line over the marks for welding the thrust rings. Fit the thrust rings of the gas intake in the line of the indexing and weld it by weld according to the state standard ГОСТ 14771-76-Т1 weld leg 6 mm.

Paint the welds and weld-adjacent zone.

Check and adjust as necessary the clearance ($0^{+1,2}$) mm between the body guides and the contact plates 6 (section B – B) by mounting the adjusting plates 5.

Lubricate the joints of the rear supports of the body and upper supports of the dumping mechanism cylinders through the grease boxes 20, 11.

The outgoing direction of the exhaust gas shall be regulated by means of the plugs 21.

After The installation of the body fit and regulate the operation of the sensor switching the kickout mechanism of lifting body and the sensor of the body position. (see chapter of the operating manual “Dumping mechanism”).

Fit the stone pushers 2 (Figure 24) having connected them with the brackets by means of the pins 6 and fitted the thrust bushings 9, the washers 8 and the cotter pins 7. For the correct operation of the stone pushers it is necessary to delete the slinging clamps and clean the weld zone. (for elimination the damage of the stone pushers)

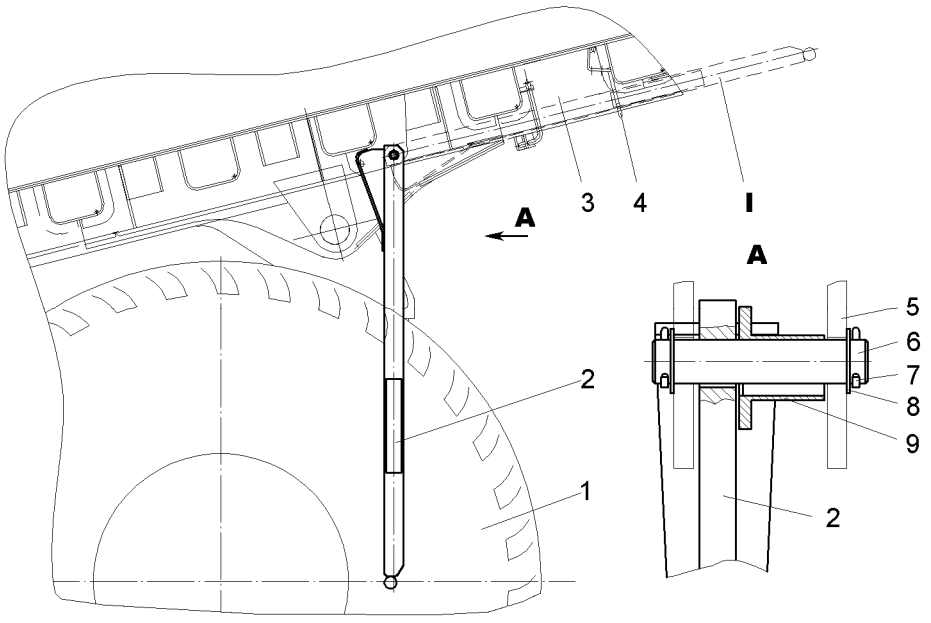

Figure 24 – The installation of the Stone pushers:

1 – rear axle; 2 – stone pusher; 3 – body; 4 – locking; 5 – jaw of the bracket; 6 – pin; 7 – cotter pin; 8 – washer; 9 – thrust bushing of the stone pusher

***I** – position the position of the stone pusher during mounting of the inner wheel*

3.16 The installation of the Mudguards

The mudguards of the motor box protect the engine against the dirt and provide insulation against loss of heat for maintaining the optimum temperature modes of engine operation at a low temperature of ambient air as well as protect the engine against the unauthorized access during the transportation and operation of the dump truck. The installation of the mudguards is shown in Figure 25.

The installation of the mudguards of the front wheels is shown in a chapter “The installation of Empennage”, The installation of the mudguards of the rear wheels is shown in Figure 26. Fit the mudguards of the front and rear wheels, fasten it to the brackets fastening the empennage, fenders and body by means of the bolts, nuts and spring washers.

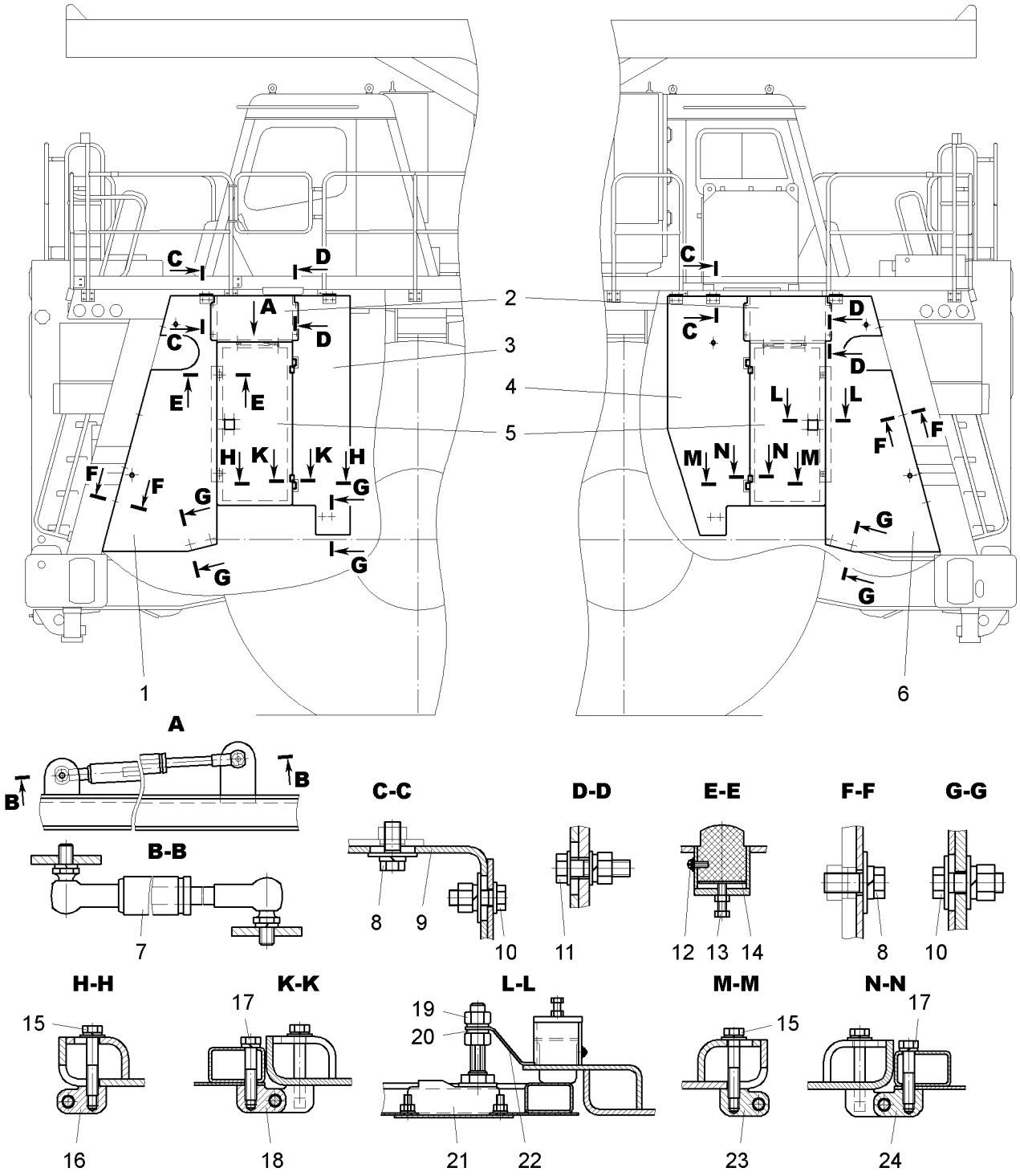

Figure 25 – The installation of the mudguards of the engine:

1 – left-hand panel; 2 – upper panel; 3, 4 – mudguards; 5 – cover of the mudguard; 6 – right-hand panel; 7 – gas spring; 8, 10, 11, 15 – bolts; 9 – brackets; 12, 13 – screws; 14 – buffer; 16, 18, 23, 24 – hinges; 19 – nut; 20 – washer; 21 – choke stone; 22 – tab

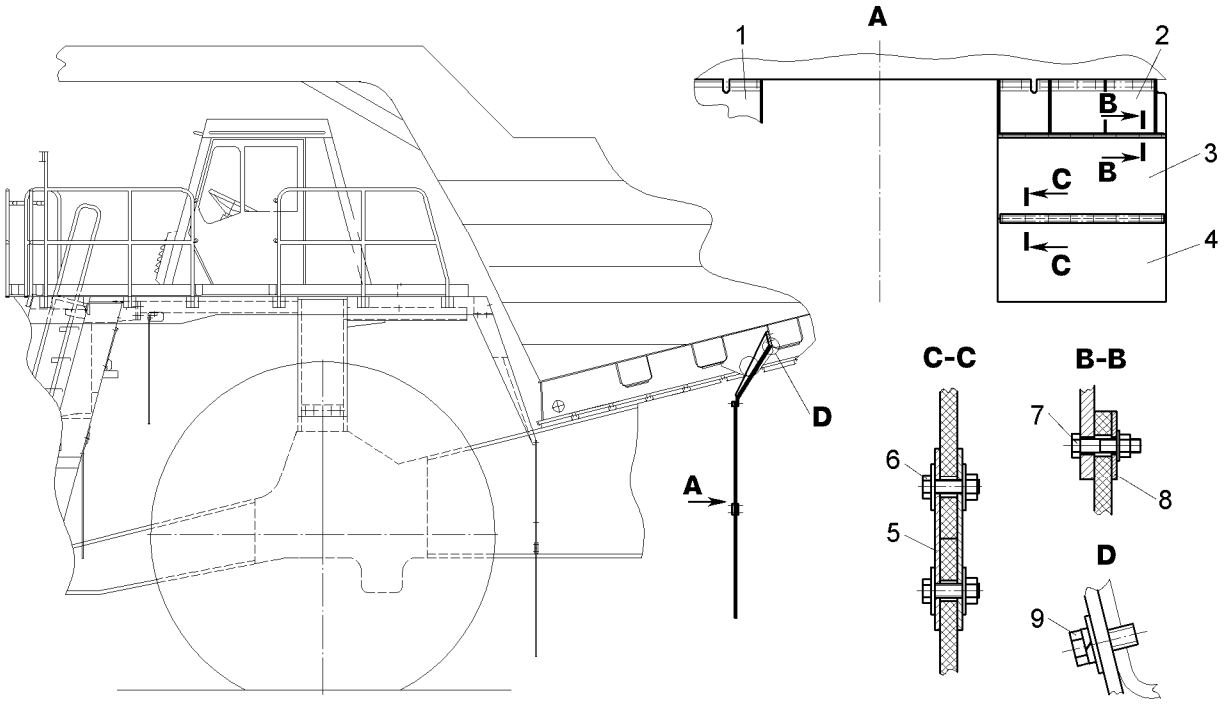

Figure 26 – The installation of the mudguards of the rear wheels:

1, 2 – brackets fastening the mudguards; 3, 4 – mudguards; 5, 8 – stiffeners; 7, 9 – bolts

3.17 The installation of the bonnet housings

For maintaining optimum temperature modes of engine operation at a low temperature of ambient air in combination with the mudguards of the engine are installed the warmth-keeping housings of the bonnet 2, 3 (Figure 27), which are fastened to the front side of the bonnet by means of the bolts 4 with the flat and spring washers. There are dampers (housing valves) in the warmth-keeping housings for regulation of working temperature range of the engine at temperature disturbance of chilling air

The warmth-keeping housings shall be removed in passing to the spring and summer period.

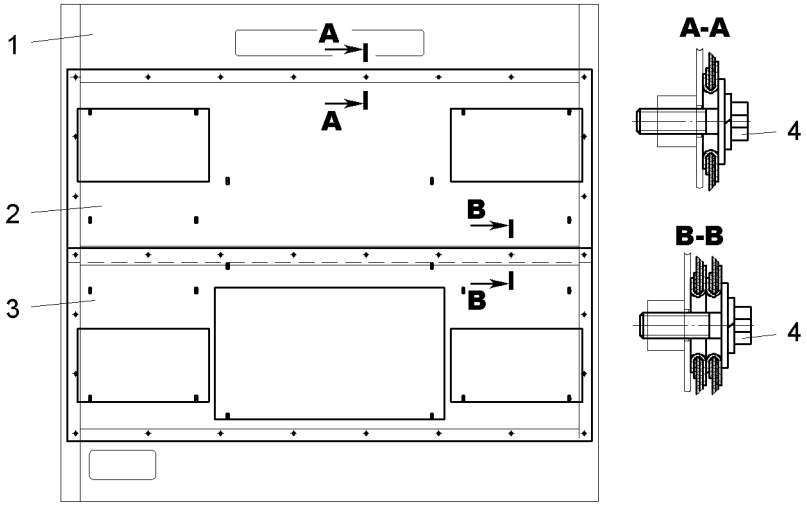

Figure 27 – The installation of the bonnet housings:

1 – bonnet; 2, 3 – bonnet housings; 4 – bolt

3.18 The installation of the Video Viewing System

The video viewing system has been installed on the dump truck consisting of 2 cameras located on the hand holder leg of the right-hand fender and final frame crossbeam, the monitor located in the cab, the set of additional equipment.

The installation of the video viewing system of the dump truck is shown in figures 28, 29.

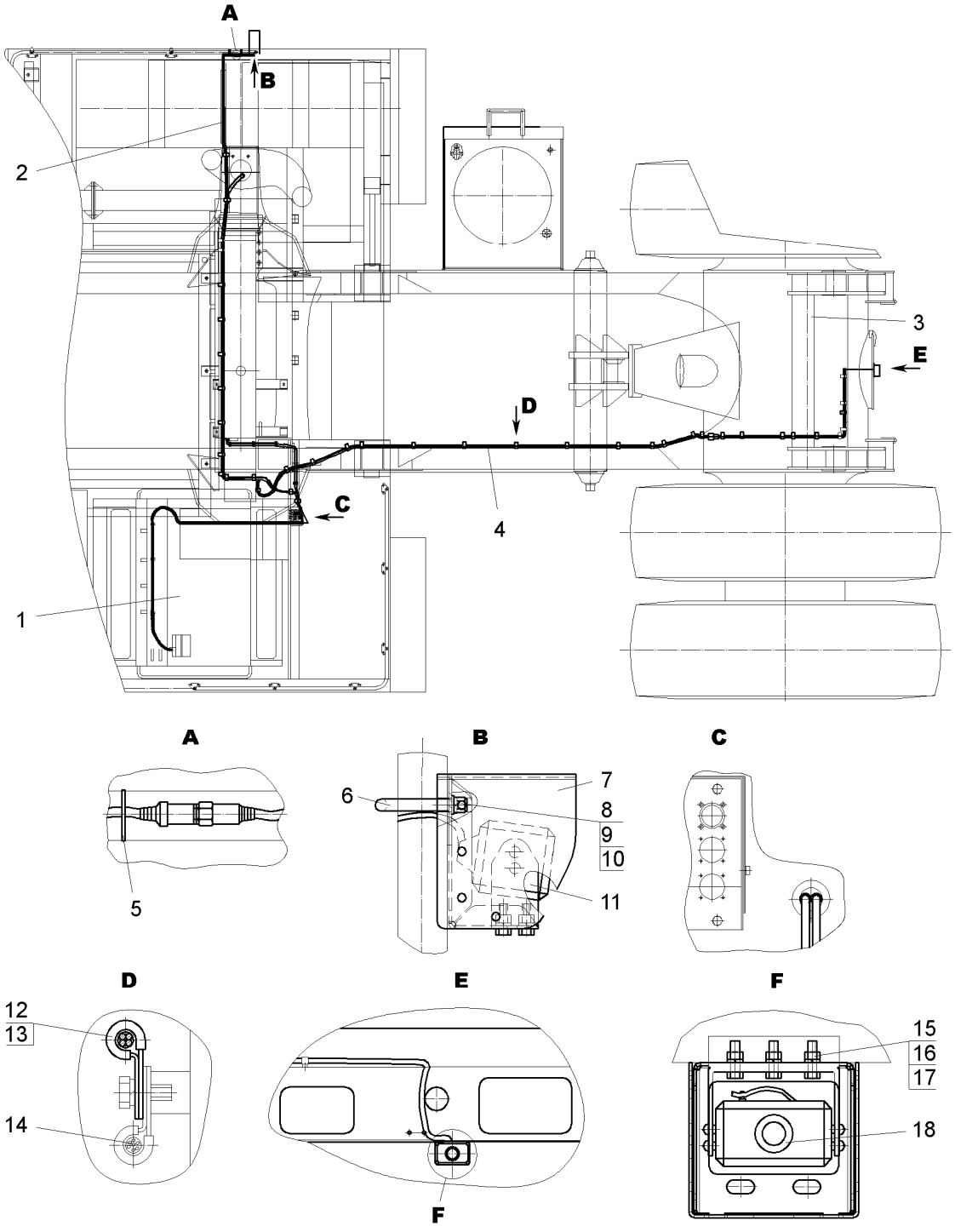

Figure 28 – The installation of the video viewing system on the chassis:

1 – cab; 2, 4 – video cables; 3 – rear frame crossbeam; 5 – electric-The installation clamp; 6 – rod; 7 – camera housing; 8, 16 – nuts; 9, 10, 17 – washers; 11, 18 – cameras; 12 – tack; 13 – pad; 14 – wire bundle over side member; 15 – bolt

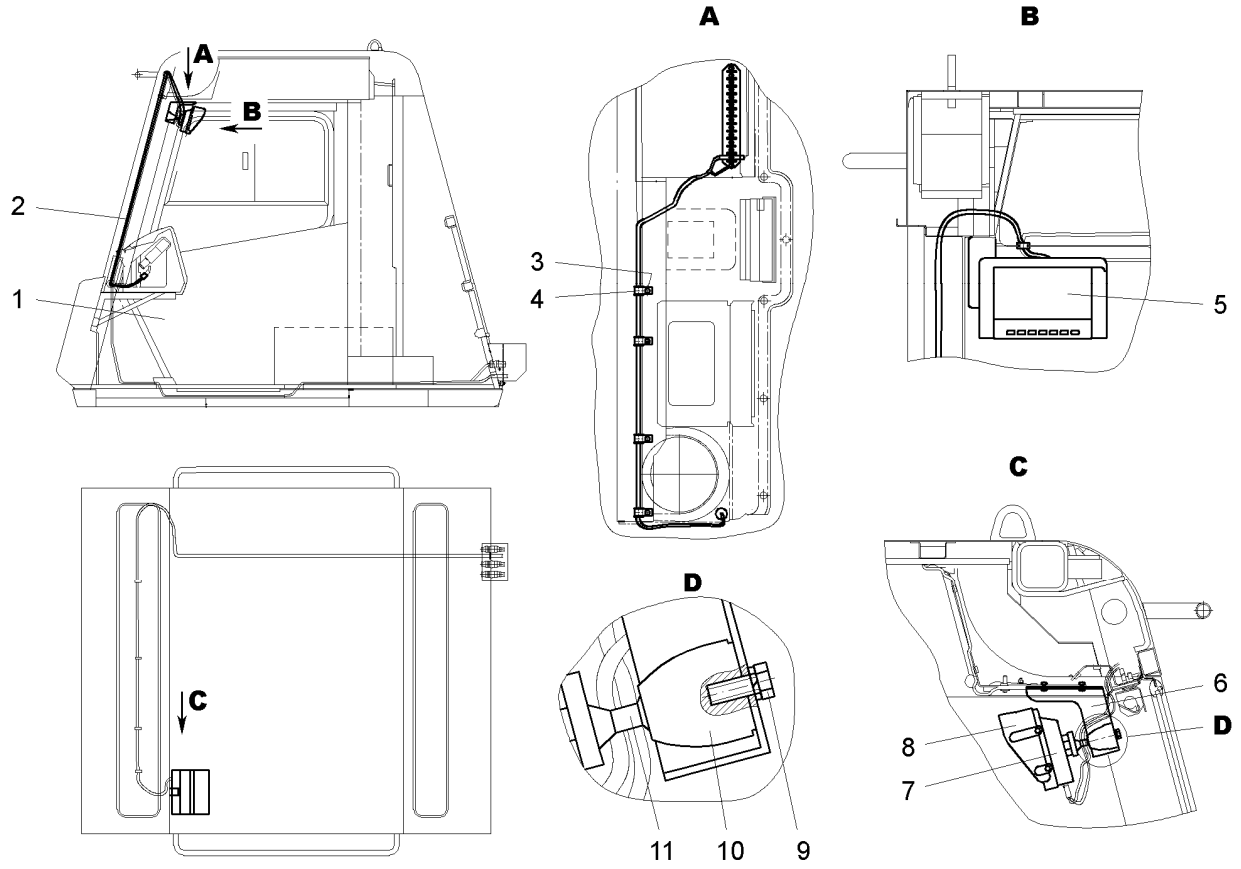

Figure 29 – The installation of the video viewing in the cab:

1 – cab; 2 – wire bundle; 3, 9 – bolts; 4 – tack; 5 – monitor; 6 – bracket; 7 – anti-vibration block; 8 – light-protective cap; 10 – basic block for mounting; 11 – hinge bracket

3.19 The installation of the Fire Extinguisher System

The installation of the fire extinguisher system, connection to the network of the electric equipment and checking of the technical condition shall be performed according to operating manual of dump truck and instruction of the operation system.

3.20 The installation of the Centralized Automatic Lubrication System

Connect the pipelines of the centralized automatic lubrication system according to the numeration of the ends of the disconnected pipelines, schematic diagram (see the Operating Manual) and Appendix D. Check the operation of the system according to the operating manual of the lubrication system.

3.21 The installation of the Warning Plates

The warning plates are installed for information about potential information during maintenance, repair or performing the works in danger area as well as the warning plates are installed on the dump truck assemblies.

The plate informs about the measures of precaution and/or necessary actions on prevention of danger in the area of The installation if the plate.

The plates being putted in the box of the operational documents before dispatching of the dump truck.

The installation of the warning plates on the dump truck assemblies is performed according to figures in the chapter 2 “The safety requirements and notifications” of the operational manual.

Before pasting the plates clean off the grease from the surface, remove the cover foil. The blisters, warps, cracks on the pasted plates are not allowed. In case of dirt of the plates it is necessary to clean the plates by cloth wet with soapy water. It is prohibited to clean the plates by the solvent, gasoline and other deleterious substances.

3.22 The installation of the System for Monitoring the Pressure in the Tires

The dump trucks can be equipped with the systems for monitoring the pressure in the tires of various manufacturers:

– telemetering monitoring system (TMS);
– system of remote control.

These systems are exchangeable.

The system design for automatic control of the pressure in the tires, emitting alarm signals in case of the emergency situations, the date and time registration of the accident initiation and the accident damage control.

Technical characteristics, description, maintenance and repair of the system see in the operational manual which is included in the set of the operational documents and added when dispatching the dump truck.

The installation of the housings of the telemetering monitoring system (TMS) and the transmitting modules of the front wheels is shown in Figure 30, the bodies of TMS and the transmitting modules of the rear wheels is shown in Figure 31, the mounting of TMS is shown in Figure 32.

The housings of the TMS and the transmitting modules of the front wheel shall be installed in the following order:

– After fitting and fasten the wheels, screw the adapter from the extender and screw it into the housing of the TMS 6 (see Figure 30);
– Connect the housing of the TMS with the extender by means of a sleeve nut;
– Fasten the mounting plate 4 of the transmitting module to the wheel hub by means of the bolts;
– Screw the transmitting module 8 into the housing of the TMS 6;
– Fasten the transmitting module to the plate 4 by means of the nut 7 having inserted the spring washer;
– Inflate the wheel to the rated pressure;
– Check the air-tightness of the threaded connections using soapy solution;
– Fasten the protective housing 3 by means of the bolts 5.

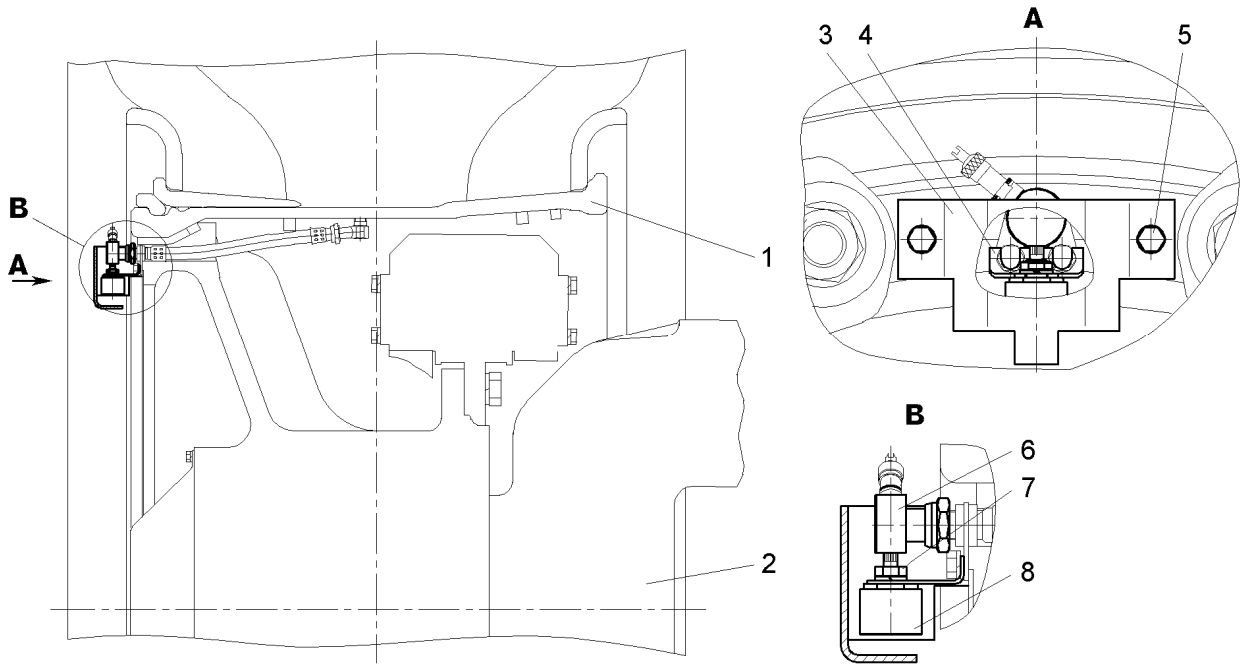

Figure 30 – Installation of the housings of the TMS of the front wheels:

1 – wheel; 2 – front axle; 3 – housing; 4 – mounting plate of transmitting module; 5 – bolt; 6 – housing of the TMS of the front wheels; 7 – nut; 8 – transmitting module

The housings of the TMS and the transmitting modules of the rear wheel shall be installed in the following order:

– After fitting and mounting the wheels, screw out the adapters 9 from the extender 9 and valve and screw them into the housings of the TMS 10;

– Connect the TMS housings with the extender and valve by means of sleeve nuts;

– Fasten the mounting plate 5 of the TMS housing to the wheel rim by means of the bolts 6 having placed the mounting plates 4 of the transmitting modules;

– Fasten the housings of the TMS to the plate 5 by means of the nuts;

– Screw the transmitting modules 3 into the housings of the TMS 10;

– Fasten the transmitting modules to the plates 4 by means of the nuts 11 having inserted the spring washer;

– Inflate the wheels to the rated pressure;

– Check the air-tightness of the threaded connections using soapy solution;

– Fasten the protective housing 7 by means of the bolts 8, 12.

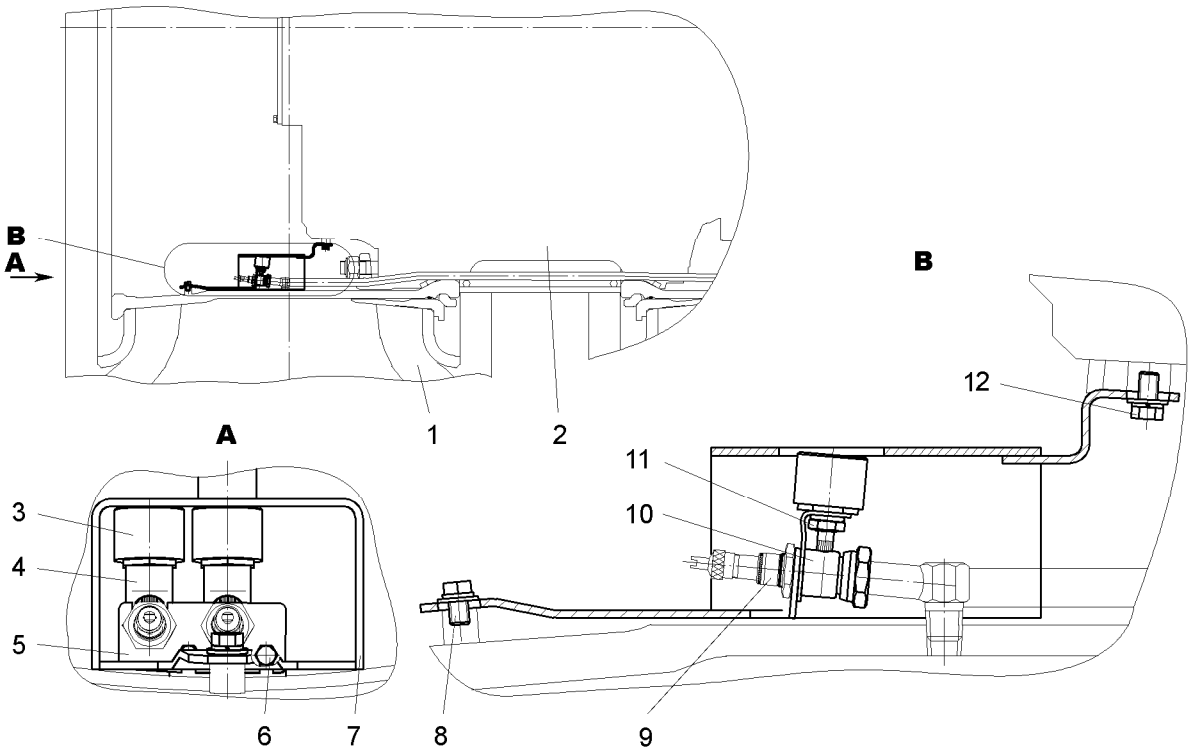

Figure 31 – Installation of the housings of the TMS of the rear wheels:

1 – wheel; 2 – rear axle; 3 – transmitting module; 4 – mounting plate of the transmitting module; 5 – mounting plate of the TMS housing; 6, 8, 12 – bolts; 7 – protective housing; 9 – extender; 10 – housing of the TMS; 11 – nut

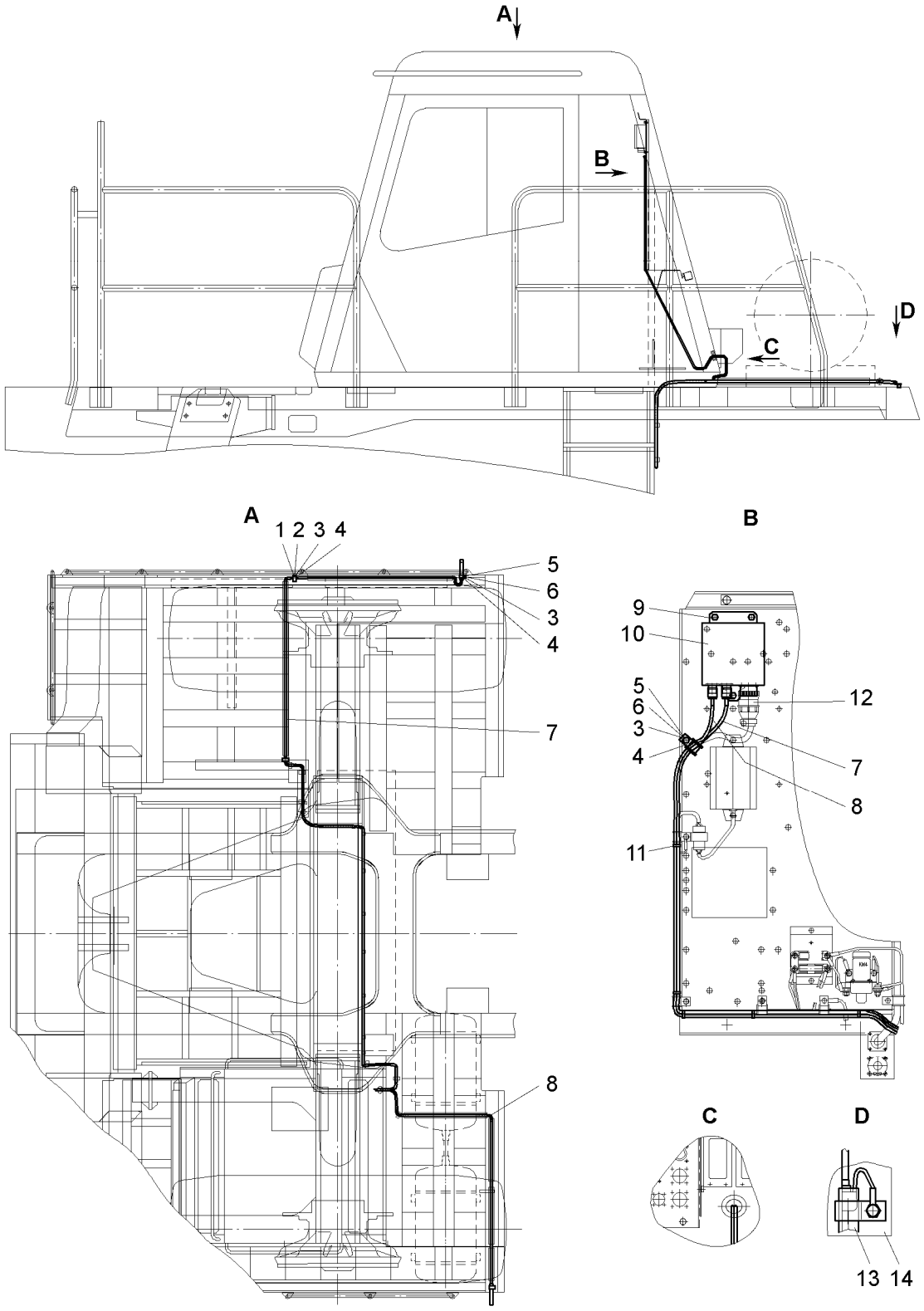

Figure 32 – Installation of the system for monitoring the pressure in the tires:

1, 5 – tacks; 2, 6 – pads; 3, 9 – bolts; 4 – washer; 7 – antenna of the right-hand panel; 8 – antenna of the left-hand panel; 10 – basic module; 11 – cable tie; 12 – wire bundle «CAN»; 13 – housing of the antenna; 14 – left-hand fender

3.23 Installation of the Antennas of the Signaling Device approaching the Overhead Electrical Line

From June 2015 the installation of the antennas of the signaling device approaching the overhead electrical line has been changed. The new installation of the antennas of the overhead electrical line is shown in the Figure 33.

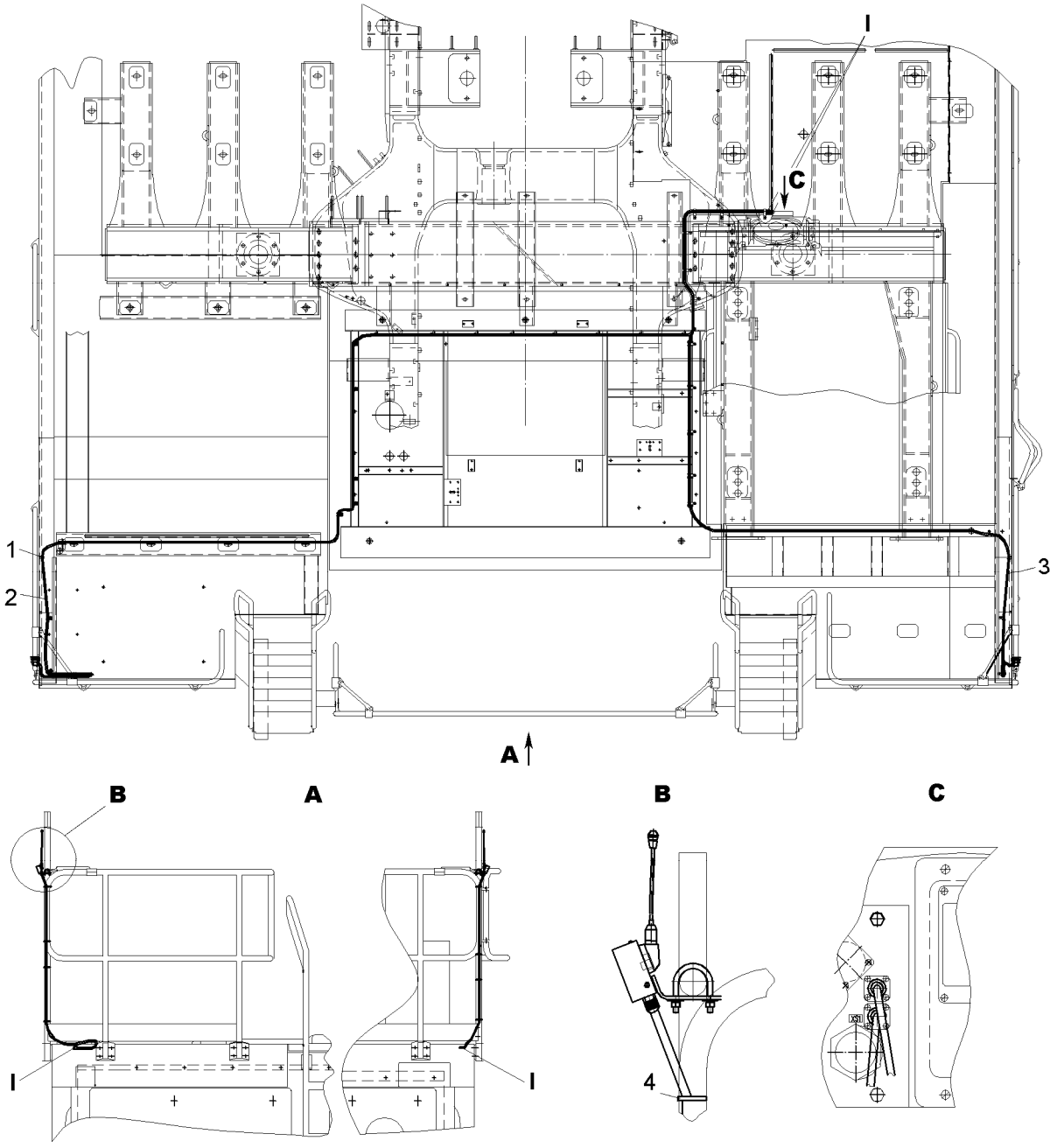

Figure 33 – Installation of the antennas of the signaling device approaching the overhead electrical device:

1 – tack; 2, 3 – antennas; 4 – cable tie;
I – to the cab

3.24 Installation of the batteries

Figure 34 shows the installation of batteries for dump trucks with the engine electric start-up system. For dump trucks with the engine electric start-up system, four batteries are installed, as for dump trucks with pneumatic start-up system there are two ones.

.Install the batteries 3 into the box 1, fixed to the right dump truck fender. Secure the batteries in the box with the help of links 4, frame 2, nuts 5 with washers 6. Lubricate the battery terminals with grease Litol-24 GOST21150 after installation. Connect the wires to the batteries after assembling all the electrical equipment according to the electrical diagrams. Close the box with the lid.

When connecting the batteries, the following rules must be observed:

– all the sockets connecting the electrical circuits must be connected before connecting the batteries;

– when connecting the batteries, the negative cable must be connected first, and then the positive cable must be connected;

– it is prohibited to set the key in the lock-switch to the operating position prior before connecting cables to both poles of batteries,.

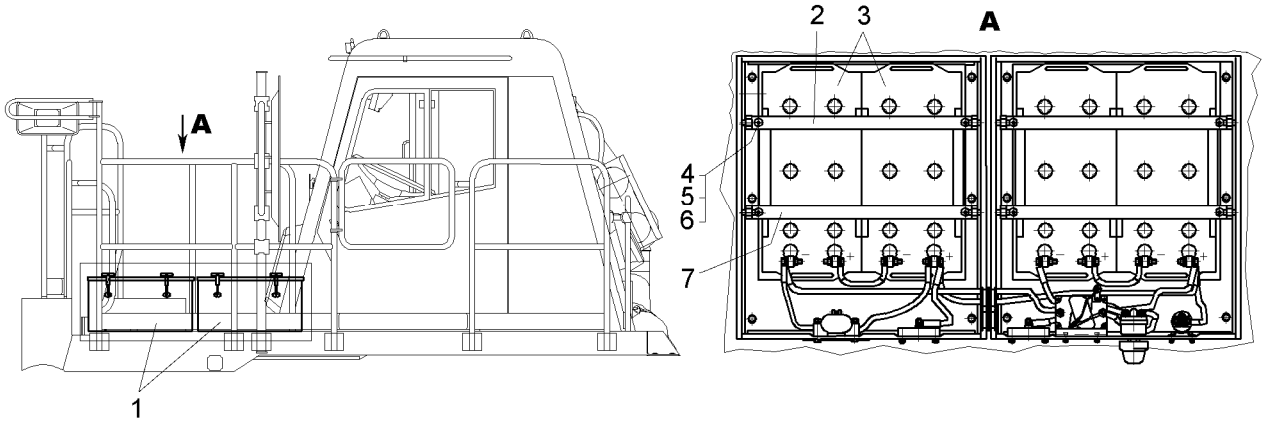

Figure 34 – Installation of the batteries:

1 – box; 2 – frame; 3 – storage batteries; 4 – link; 5 – nut; 6 – washer

3.25 Installation of drop-type sprags

Fasten the plates 4 (Figure 35) to the dump truck bumper using bolts 5, install the drop-type sprags 1, 2 on the plates and fix them with latches 6.

For dump trucks equipped with diagonal ladder, the drop-type sprag 1 is moved to the left end of the bumper.

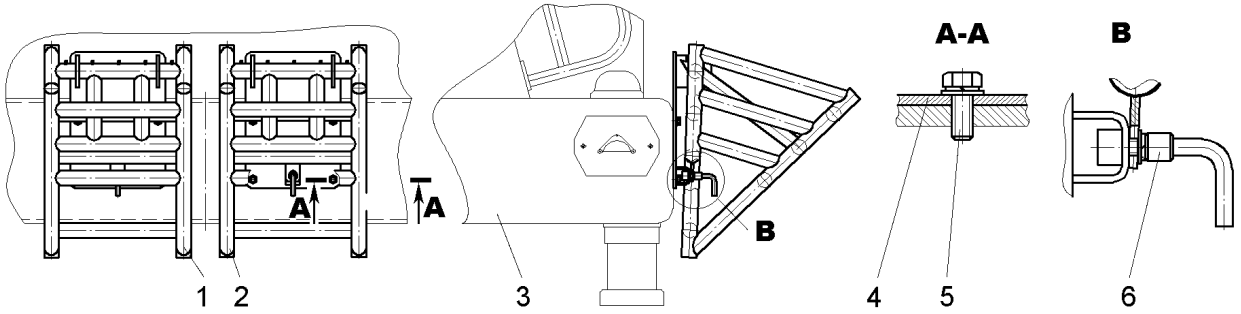

Figure 35 – Installation of drop-type sprags:

1,2 – drop-type sprags; 3 – bumper; 4 – plate; 5 – bolt; 6 – latch

4 COMPLEX TESTING OF THE DUMP TRUCK WHEN PUTTING IT INTO OPERATION

PRIOR TO BEGINNING THE COMPLEX TESTING RELATED WITH THE COMMISSIONING WORKS AND RUN OF THE DUMP TRUCK, STUDY THE SAFETY REQUIREMENTS, ATTENTIONS AND SPECIAL ASPECTS OF OPERATION EXPOUNDED IN OPERATIONAL MANUAL.

The schedule of actions being performed during the complex testing:

– Check the technical condition by external inspection while paying special attention to the tightening of the most critical external threaded connections (fastening of the diesel-generator set, wheels, parts and assemblies of the suspension, steering control, brake systems, cardan shaft and electric machines;

– Check the oil level in the engine, oil tank of the integrated hydraulic system, reduction gears of the power-wheels, presence of fuel in the tank and of the cooling fluid in the engine cooling system as well as check the presence of plastic grease in the friction units according to the list of lubricants to be used (see the Operating Manual);

– Check the serviceability and operation of the measuring instrumentation, pilot lamps, lighting armature as well as light and audible alarm systems. Check the operation of the cab heater and windscreen wiper with setting the switch to the first and second position. Check the forced switching-on of the engine fan and the engine stopping system;

– Check the adjustment of the fuel feed control actuator. The adjustment shall provide for the maximum and minimum rotational speed of the engine in the idling mode. The temperature conditions, oil pressure, crankshaft speed shall be corresponded to the sizes recommended by the operational manual;

– Check the serviceability of the power supply system of the low-voltage equipment. At the engine rotational speed of 800 rpm and more, the pointer of the voltage indicator shall be in the zone coloured green (26 – 28.5 B). The location of the pointer of the voltage indicator in the red or yellow zone when the engine is running is evidence of faulty operation of the power supply system;

– Perform the adjusting of the sensor of kickout mechanism of body lifting and the sensor of the body position (see operational manual);

– Perform the cleaning of the working liquid of the hydraulic system using the filter elements of hydraulic system by performing at least 10 lifting cycles of the body without load;

– In case of the failing of the hydraulic system such as blocking of the control valves, unstable work of the pump regulator and others repeat the procedure again;

– When driving the dump truck at the speed of up to 5 km/h, perform two turns from one extreme position to another and vice versa. The hydraulic system shall ensure the smooth and free of jerks and/or oscillations turn of the steerable wheels. The minimum radius of turn to the track of the front outer wheel shall correspond to the data of the technical specification. Check the operation of the pressure release system in the hydro-pneumatic accumulators of the steering control. Check the operation of the emergency drive of the steering control;

– Perform at least three stopping cycles using the electro-dynamic brake system and service one as well as reversing in the following order:

– when driving the dump truck at the speed of 35 – 40 km/h, reduce the speed down to 10 km/h using the hydrodynamic brake;

– Stop the dump truck completely using the working brake;

– Apply the reverse gear and drive in reverse at least 20 m;

– Stop completely the dump truck;

– After stopping, accelerate the dump truck to the speed of 35 – 40 km/h;

– check the operation of the service brake system by braking the unloaded dump truck from the initial speed of 20 – 25 km/h when driving it rectilinearly. The service brake system shall ensure the simultaneous braking of all the wheels without skid of the dump truck. The check of the steering control, service and electrodynamic brake system shall be performed on a flat level ground with hard dry pavement without potholes and/or slopes. The dimensions of the ground shall ensure the safety of performing the works;

– Check the efficiency of the parking brake system. The parking brake system shall ensure the motionless state of the dump truck on the slope of 16%;

– Perform the testing and diagnostics of the hydraulic system of the dump truck. Check the dumping mechanism by performing two-three complete lifting cycles of the body without load and one-time locking the body in the lifted position. The unloading mechanism shall provide for smooth and free of jerks and jamming lifting and lowering of the body and stopping it in any intermediate position. At the end of the body lifting, the pilot lamp indicating the emergency lowering of the oil level in the tank of the steering control shall light up. When performing the check the testing zone shall be free of overhead power transmission line and other communications. When the switch is set to the neutral position, the spontaneous lowering of the body at the speed not exceeding 0.01 m/min is allowed;

– Check the functioning of the device excluding the accidental lifting of the body.

Set the switch handle to the “Подъем” (Lifting) position; after lifting the body to the height of 200 – 400 mm set the switch to the neutral position. When the button disabling the device excluding the accidental lifting of the body, start the motion; the body shall not move down;

– Check the leak-proofness of all the hydraulic systems. No throwing and/or leakage of oil, grease, fuel, brake and/or cooling fluid from whatever unit and/or assembly or through the connections is not allowed;

– Check the air pressure in the tyres. The air pressure in the tyres shall be measured when the tyres have cooled down completely;

– Check the technical condition of the suspension cylinders by external inspection and according to the dimensions;

– The electric drive parameters shall be checked and monitored after assembling the dump truck in accordance with the adjustment manual;

– After checking the dump truck systems perform the checking of the additional systems according to the operational manuals: the centralized automatic lubrication system, the system of the combined fire extinguishing, the signaling device approaching the overhead electric line, the telemetering monitoring system, the video viewing system, the system of the service monitoring;

– Perform the final run of the dump truck at least 25 km.

For the period of running-in of a new truck, the following limitations are introduced:

– the dump truck shall be driven on the roads with hard pavement;

– the motion speed shall be chosen depending on road conditions and gradual rising of tensions on the aggregates and assemblies and shall not exceed km/h;

Within the period of running-in of the dump truck, it is necessary to:

– maintain the operation parameters of the systems, assemblies and units within the optimum limits, monitor them according to the readings of the measuring instrumentation on the instrumentation board;

– adhere strictly to the specified thermal conditions excluding overheating of the engine, of the reduction gears of the power-wheels, traction electric motors, hubs of the front wheels and brake disks.

All and any faults detected during the running in shall be eliminated and the dump truck shall be transferred to the operating enterprise with drawing up the Report on Putting into Operation.

APPENDIX A – Weights of the basic transportable parts of the dump truck

(obligatory)

The weights of the basic transportable parts of the dump truck are given in Table A.

Table A – Weights of the basic transportable parts of the dump truck

Description of the parts	Weight, kg
Chassis in the transportation state	**36500**
Body assembly	**30000**
Middle component of the body with overhead guard in the transportation state	**14000**
Side components of the body in the transportation state	**19400**
Right- (left-) hand component of the body	**8000**
Middle component of the front panel in the transportation state	**1850**
Front axle assembled with the hubs and pivots	**10000**
Power-wheel	**10500**
Control cabinet of the traction electric drive Control cabinet of the traction electric drive in the wooden box	**1950** **2420**
Fuel tank	**1200**
Front suspension cylinder in the transportation state (two pcs)	**1350**
Wheel assembled with the tyre	**4790**
Cab Cab in the wooden box	**1600** **2150**
Left-hand fender in the transportation state	**650**
Right-hand fender in the transportation state	**2900**
Mounting bracket of the right- (left-) hand fender	**450**

APPENDIX B – Diagrams of slinging the assemblies (obligatory)

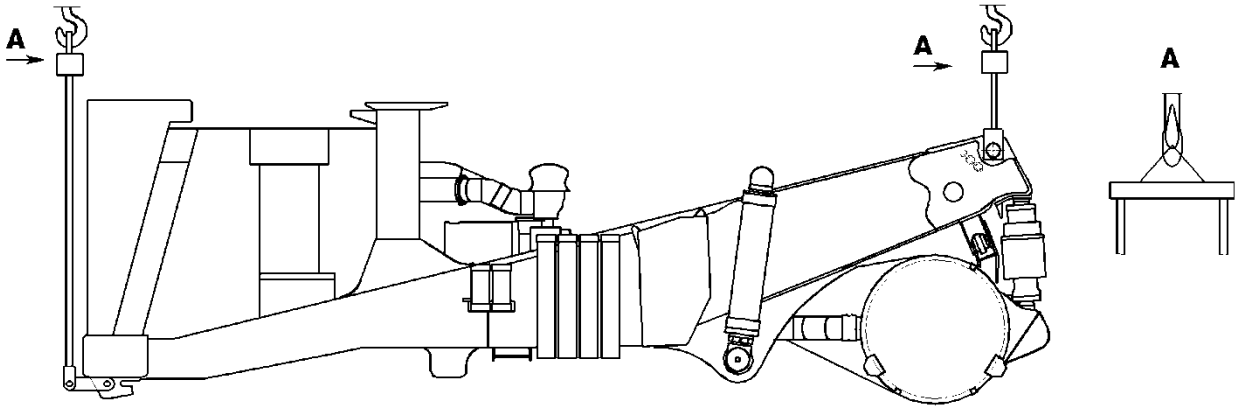

Figure B1 – Diagrams of slinging the chassis

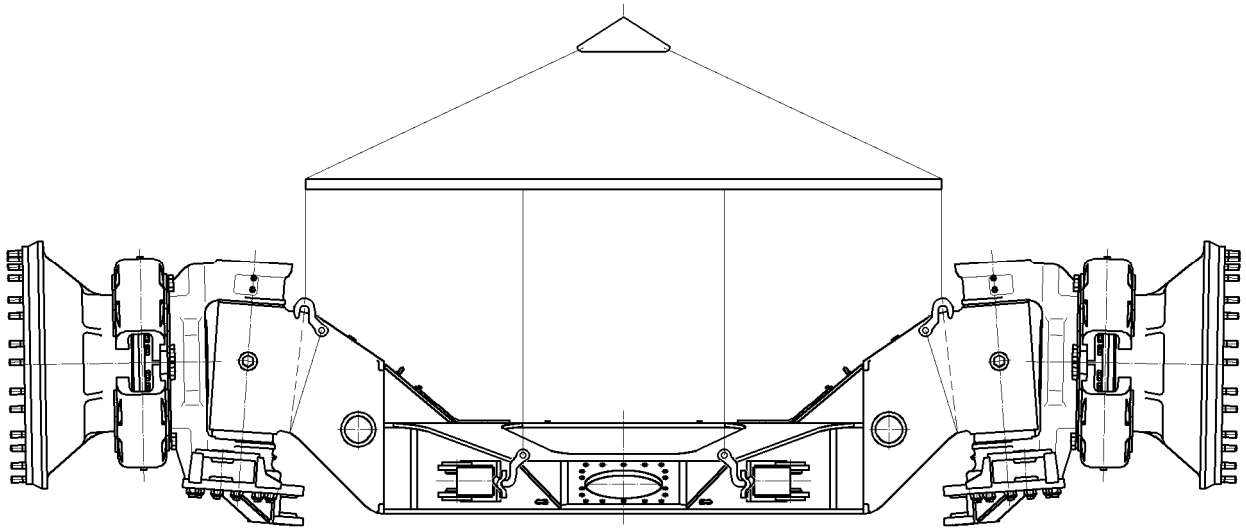

Figure B2 – Diagrams of slinging the front axle beam

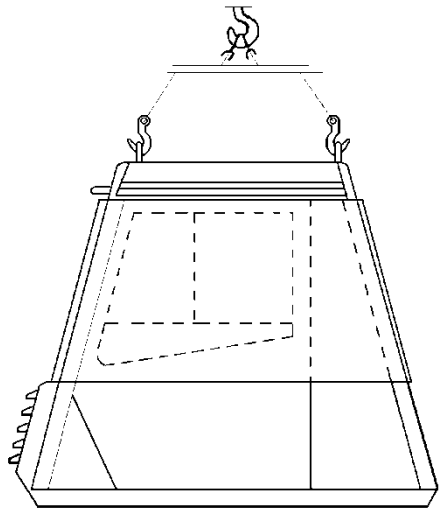

Figure B3 – Diagrams of slinging the cab

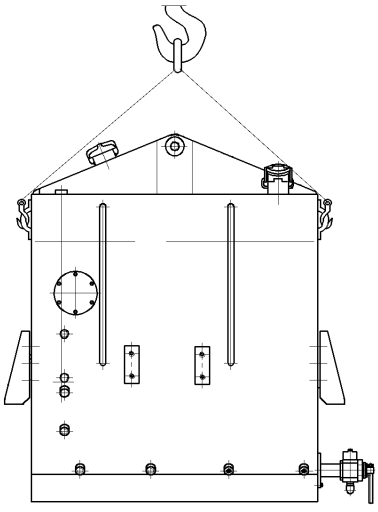

Figure B4 – Diagrams of slinging the fuel tank

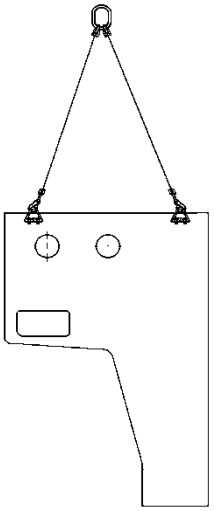

Figure B5 – Diagrams of slinging the fender bracket

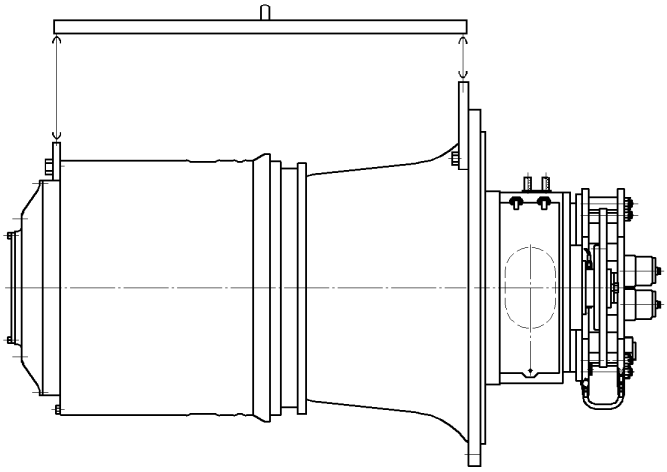

Figure B6 – Diagrams of slinging the power-wheel

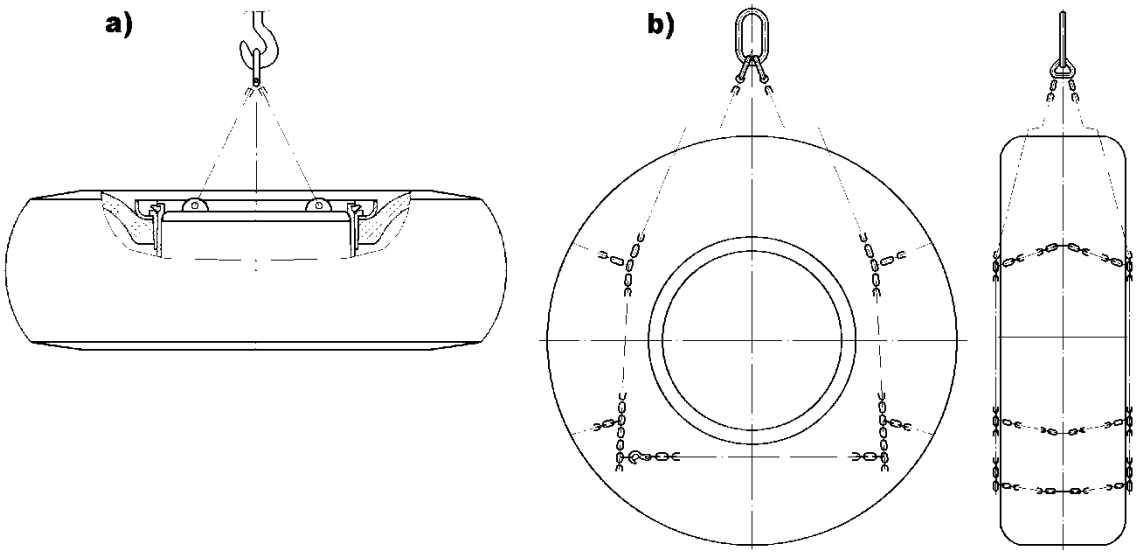

Figure B7 – Diagrams of slinging the wheels
a) for transportation in the horizontal; b) for installation on the dump truck

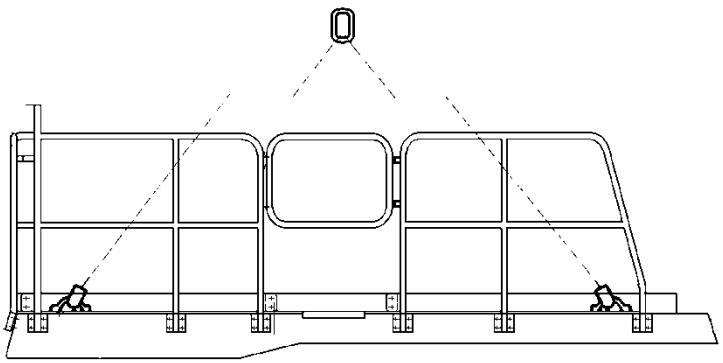

Figure B8 – Diagrams of slinging the left-hand fender, right-hand fender (using 4 hooks)

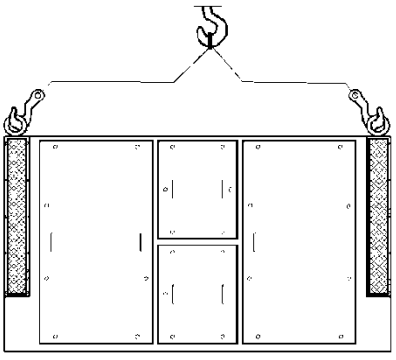

Figure B9 – Diagrams of slinging the cabinet of the traction electric drive (using 4 hooks)

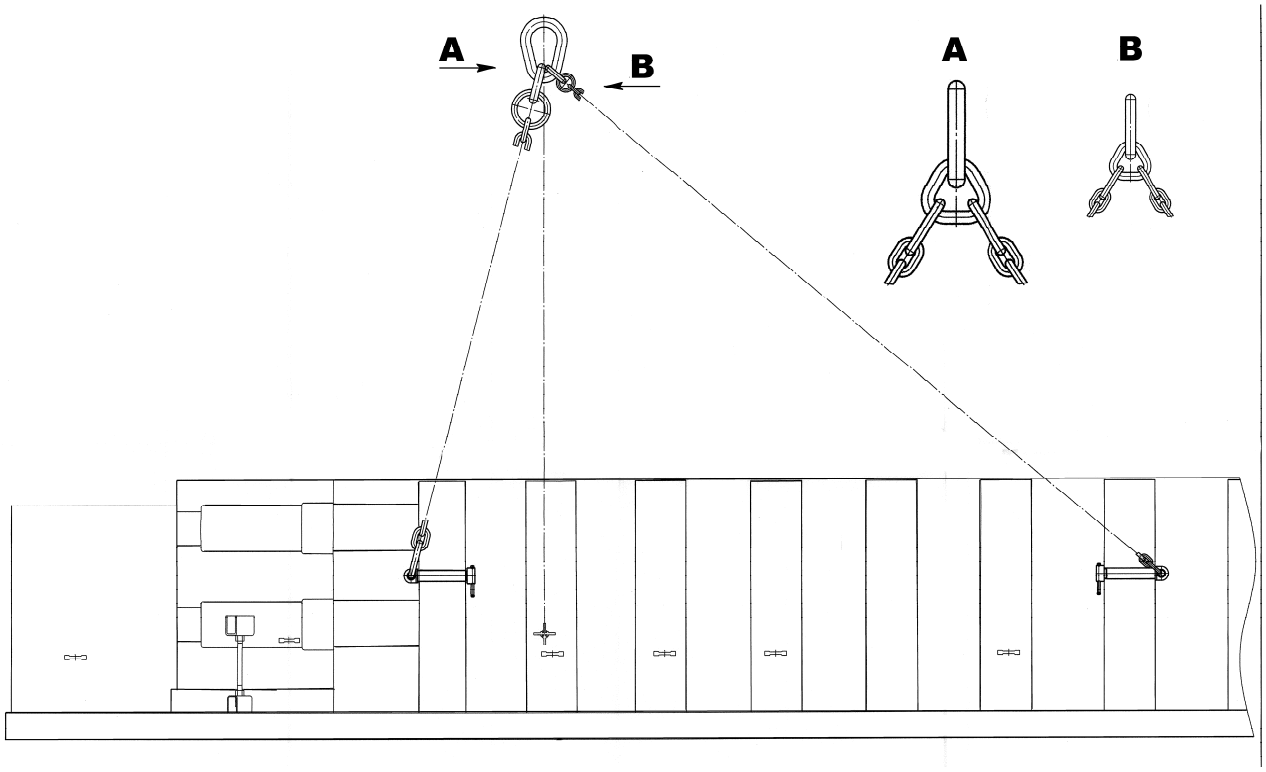

Figure B10 – Diagrams of slinging the left- (right-)hand components of the body for unloading from the railway body

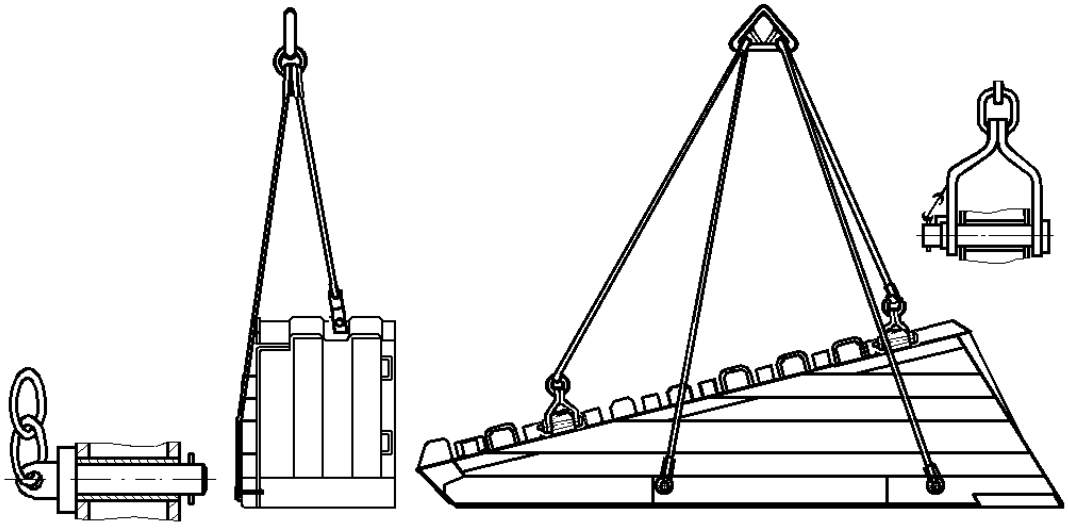

Figure B11 – Diagrams of slinging the side components of the body when assembling

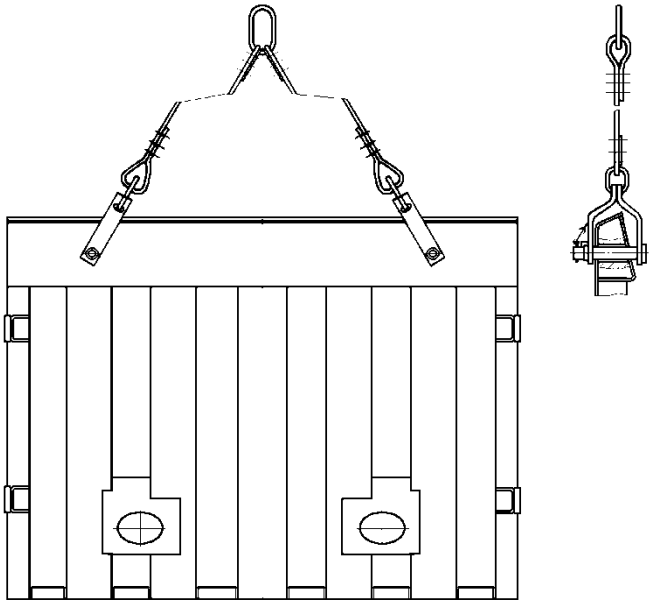

Figure B12 – Diagrams of slinging the front panel when assembling the body

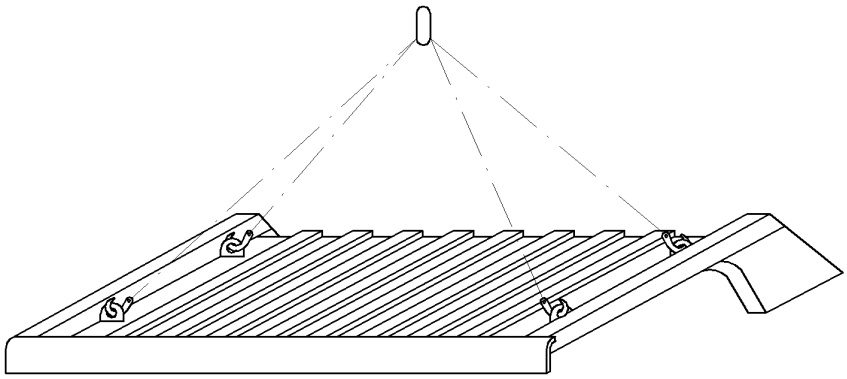

Figure B13 – Diagrams of slinging the overhead guard

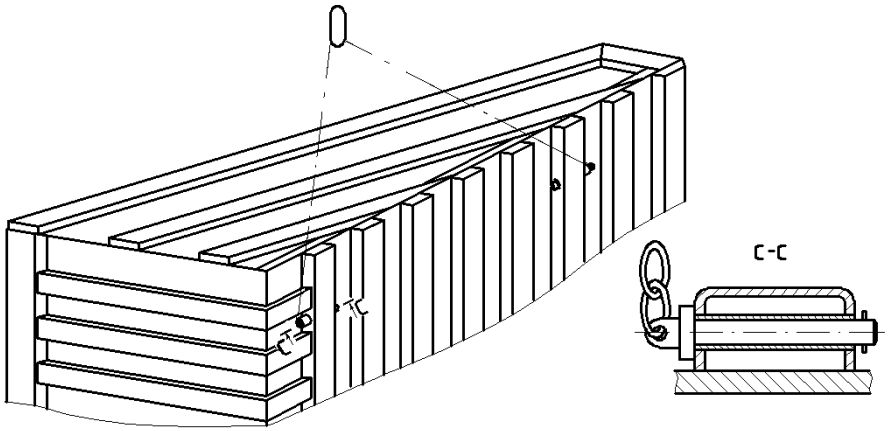

Figure B14 – Diagrams of slinging the body for turning when welding

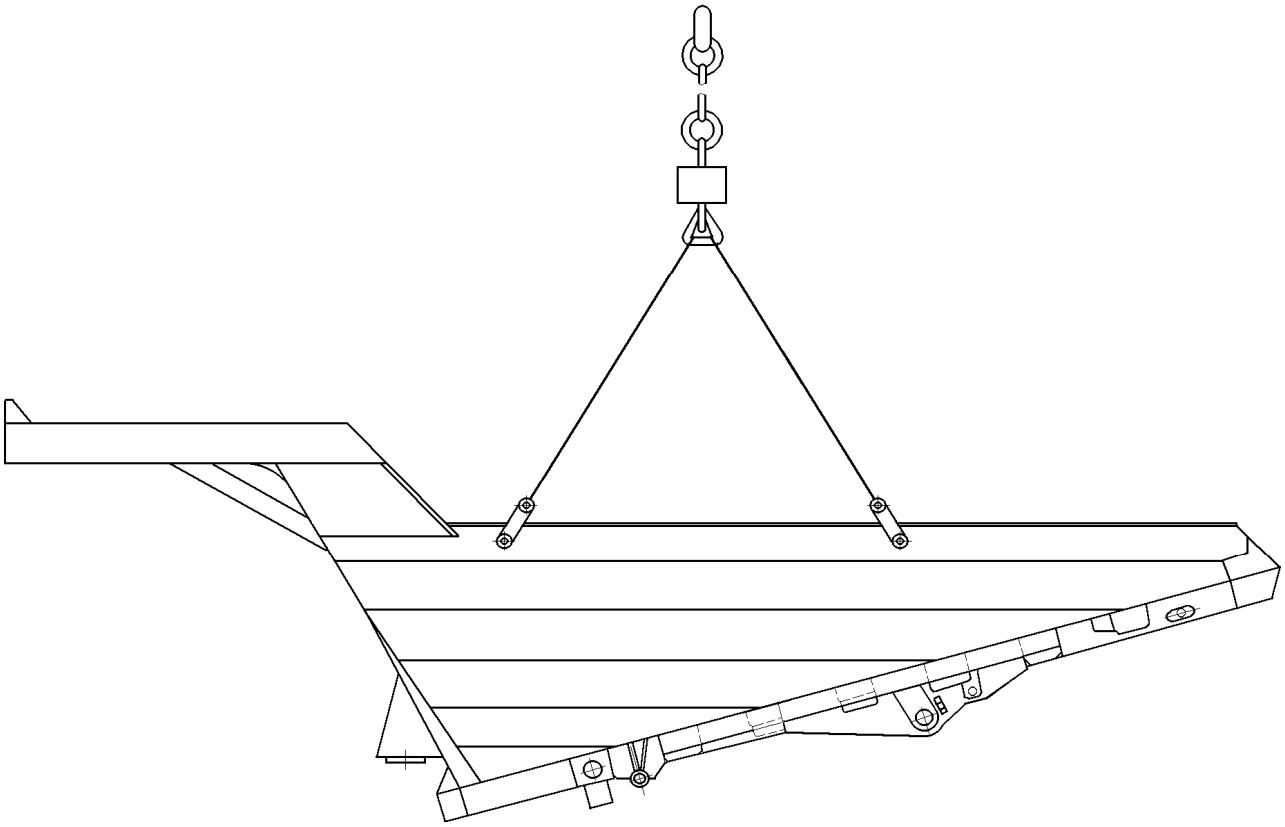

Figure B15 – Diagrams of slinging the body when mounting

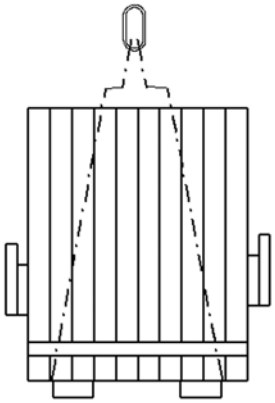

Figure B16 – Diagrams of slinging the box with cab, cabinet of traction electric drive, suspension cylinders

APPENDIX C – List of attachments for unloading the chassis, assemblies, components of the body and its mounting

(informative)

List of attachments for unloading the chassis, assemblies, components of the body and its mounting is given in Table C.

Table C – List of attachments for unloading the chassis, assemblies, components of the body and its mounting

N	Description of the garage equipment	Number of the garage equipment	Notation
1	Sling hanger (for lifting the dump truck under the front element)	7808-7171	
2	Sling hanger (for lifting the dump truck under the front element)	7808-8595	
3	Sling hanger (for slinging the power-wheel)	7808-9723	
4	Sling hanger (for slinging the front axle)	7808-9058	
5	Sling hanger (for slinging the cab, the front left- (right-) hand brackets, fuel tank, distance rings)	7808-6300	
6	Sling hanger for slinging the box with the cab, the cabinet of the traction electric drive, the suspension cylinders	7808-7990	
7	Sling hanger (for slinging the side components of the body)	7808-0153	
8	Sling hanger (for slinging the front panel, right-(left-)hand fenders	7808-6811	
9	Sling hanger (for the mounting the wheel)	7808-6770	
10	Sling hanger (for slinging the body assembly)	7808-9010	
11	Support (for rear axle housing)	145-534	2pcs
12	Support (for frame crossbeam)	145-531	
13	Support (for front axle beam оси, in front of the lever)	145-290	
14	Support (for front axle beam, behind on each side)	145-144	2 pcs

APPENDIX D – Schematic diagram of the hydraulic drive

(informative)

The designation and description of the hydraulic drive elements are given in Table D1. The schematic diagram of the hydraulic drive is shown in Figure D2.

Table D1 – Designation and description of the hydraulic drive elements

Designation	Description	Q-ty	Remarks
АК1, АК2	**Hydropneumatic accumulator 75450-3415010**	2	V= 6 dm^3, P_{gas}=8MPa
АК3-АК6	**Hydropneumatic accumulator 75170-3415010-01**	4	V= 25 dm^3, P_{gas}=8MPa
ВН3-ВН5	**Junction valve 75212-348430**	3	
ДР1		1	d=9 mm see item 2
К5, К6, К7	**Two-line valve 78221-4619074**	3	
Н1	**Pump A20VLO190DRS/10R-NZD**	1	q=192.7x2 cm^3, n_{max}=41,6 c^{-1}
РД1	**Pressure switch**	1	P=10 MPa
РД2, РД3	**Pressure switch**	2	P=0,5 MPa
РД4, РД5	**Pressure switch**	2	P=12 MPa
ДД	**Pressure sensor**	1	
Ф3	**Filter 75137-3442010**	1	10 μm
Ц7, Ц8	**Steering cylinder 75170-3429010-01**	2	D=140, d=70, l=480 mm
Ц9, Ц10	**Dumping mechanism cylinder 75180-8603010**	2	
А1, А2	**Parking brake gear**	4	
Ц1	Parking brake cylinder	8	
А3	**Brake valve with hand control**	1	
	LT 08MMA-2X/125/02M		
А4	**Dosing pump OSPBX 500 LS**	1	
КО1		1	
НМ1		1	q=500 cm^3
Р2		1	
А5	**Flow amplifier OSQB 8**	1	
К1		1	
КО2, КО3		2	
КО4		1	
КО5		1	
КП1, КП2		2	P=24MPa
КП3		1	P=17.5MPa
Р3		1	
Р4		1	K_{amp}=8
Р5		1	

1. *Marking on the Danfoss hydraulic apparatus.
2. Made in the plate 75306-8609344.

Continued table D1

Designation	Description	Q-ty	Remarks
A6	**Hydraulic distributor 75306-8606100-20**	1	
K2, K3		2	
КП4		1	P=8MPa
КП5		1	P=21MPa
КП6		1	P=21MPa
P7		1	
P8		1	
A7	**Control module 75132-8606410**	1	
КР1		1	P=4MPa
P9	Hydraulic distributor РГС5-6/3СЕ 34А Г24	1	
P10	Hydraulic distributor РГС5-6/3СЕ 44А Г24		
A8 – A11	**Rear parking brake gear**	4	
Ц2	Service brake cylinder	16	
A12	**Brake drive valve 7555A-3514010-01**	1	
ВН1, ВН2		2	
P11		1	
P12		1	
	Front brake gear	8	
A13-A18	Brake housing 75570-3501080-10	6	
Ц3		36	
A21	**Double protective valve 75125-3515110**	1	
КО8, КО9		2	
A23	**Manifold 75170-3408800**	1	
P14	Hydraulic distributor	1	
КО10	Check valve	1	
A23	**Automatic pump unloading device 75131-3428010**	1	P=16MPa
P15	Control module 75131-3428020	1	
P16		1	
A24	**Drain filter**	1	Built in tank
K4		1	P=0.3MPa
Ф1		1	10 μm
A25	**Distributor 75450-3537070**	1	

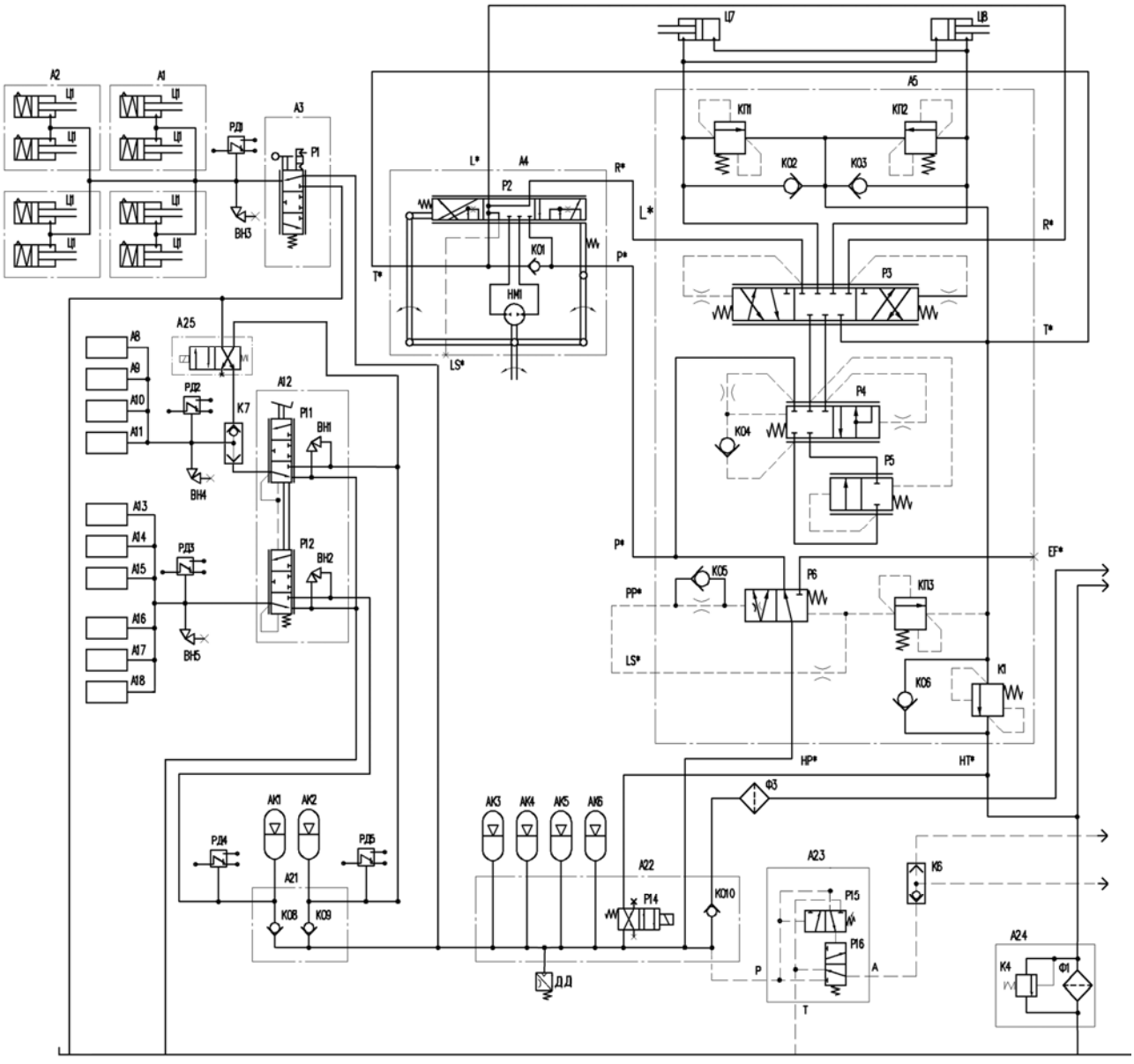

Figure D1 – Designation and description of the hydraulic drive elements (начало)

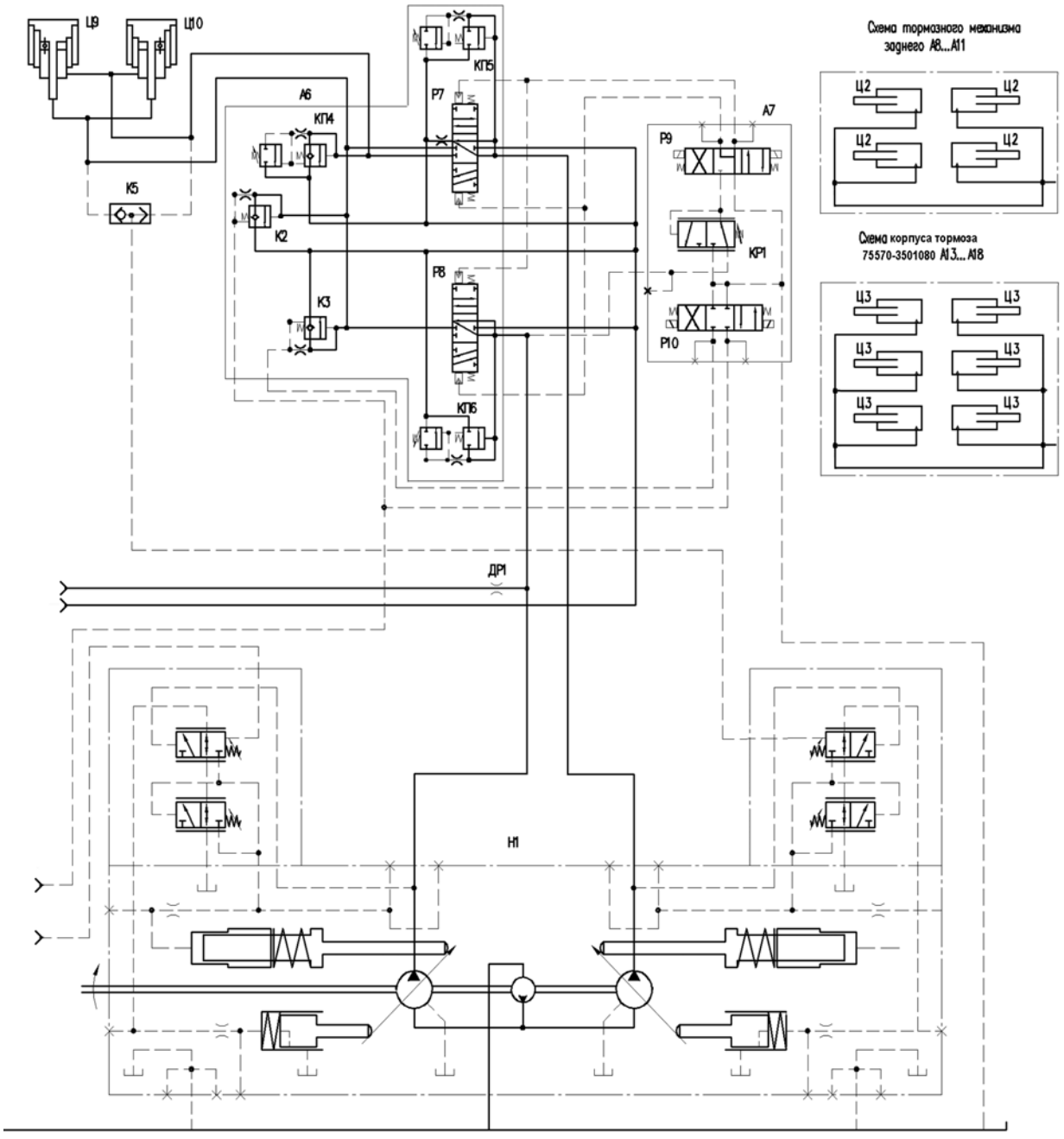

Figure D1 – Designation and description of the hydraulic drive elements (продолжение)