Operating manual

TRECOL 39041

Rev. 2

Moscow, 2017

1. Introduction

This manual contains technical information, operating and maintenance guides for four-wheeled all-terrain vehicle (ATV) on pneumatic ultra-low pressure tires TRECOL-39041 of pilot batch intended for year-round transportation in various road conditions, mainly along dirt roads, on soils with a weak bearing surface, including virgin snow, sand, soil cover of thawed tundra and marshes, with the possibility of overcoming small water obstacles. The floatability of ATV is ensured only by the displacement of the wheels.

This manual contains basic information necessary for the technically correct operation of the specified ATVs and keeping them in constant readiness. Before operating the ATV please carefully read this manual and service book.

Your wrong actions can lead to injuries, failure of ATV and its units, as well as to termination of the manufacturer's warranty obligations. For safe and trouble-free operation of the ATV please follow all operating and maintenance instructions described in this manual and service book.

This manual consists of the following sections: technical description, operating instructions and instructions for maintenance of all-terrain vehicle TRECOL -39041.

In the technical description main technical data of ATV, main features, principles of operation and methods for adjusting units and assemblies are given. Operating manual contains the information necessary for the correct operation of ATV in various conditions. Maintenance instructions set out the maintenance procedure and rules, the implementation of which ensures that ATV is always ready for operation.

2. Please not

1. Only drivers having the certificate of tractor driver (category "AII") can be admitted to administration of all-terrain vehicles.

2. Remember that at the initial period of operation of the new ATV a running mileage of 1000 km is set out, during which the requirements specified in the section "Break-in of ATV" should be complied with.

3. Applicable fuels and lubricants and special fluids should only be of the grades specified in the manual.

4. Limit permissible temperature of reliable start-up of the engine is minus 40 °C (provided that starter booster is used) when the vehicle is immobilized for more than 24 hours. The movement of ATV should be started after the engine has been preheated.

5. Changing the polarity when connecting wire ends to the battery leading out terminals leads to the failure of generator.

6. The duration of continuous operation of the starter is not more than 10 s. The engine can be restarted after a one-or-two-minute break. If after three or four attempts the engine does would not start up, find the fault and eliminate it.

7. If there is noise and knocking in the running engine, it is necessary to find out the cause and not to use ATV before the elimination of malfunction.

8. Before starting to move check the position of transfer gearbox shift levers, locking of interaxle differential.

9. Air pressure in the tires should comply with the road conditions according to Section "General movement of ATV".

10. When towing an ATV with an engine that is not running, transfer gearbox and transmission and gearbox shift levers should be in neutral, and interaxle differential should be unlocked. Towing speed should not exceed 20 km/h.

11. Reverse gear may be switched and gears may be changed in the transmission only after the ATV is completely stopped.

12. It is not allowed to operate ATV with the inoperative power steering system, as this leads to a breakdown of hydraulic pump. To avoid overheating of oil and failure of power steering pump, it is not recommended to hold the steering wheel in the extreme position for more than 5 seconds.

13. To avoid excessive loads on the steering parts, overheating of oil and failure of power steering system, it is not allowed to turn

the steering wheels on a stationary ATV. Turn the wheels only when ATV is moving.

14. During maneuvering and controlling ATV on sharp turns the return of the front wheels to the position corresponding to the motion along a straight line is carried out by forcing the steering wheel. Therefore, all the maneuvers associated with the turn should be performed at a speed that ensures traffic safety.

15. Due to the installation of large-diameter tires on ATV, the front driving axle, steering and other units require careful maintenance and strict compliance with the terms and scope of scheduled maintenance work. As a rule, non-compliance with these requirements leads to the appearance of gaps in articulated joints, the weakening of fasteners and the violation of adjustments.

16. Impact loads on the chassis are not allowed. If the front wheels were struck, carefully inspect all the details of the front axle, steering rods, steering gear and eliminate any defects found.

17. To avoid excessive loads on the differentials of the driving axles, long wheel slippage is not permitted. It is forbidden to block the center differential in the transfer box during the slipping of wheels.

18. If one of the circuits of the brake system failed, the brake pedal travel is increased and the braking efficiency is reduced.

19. It is necessary to monitor the uniform distribution of passengers and cargo in the cabin, preventing overloading on the sides or along the axes.

20. In the event of problems in road conditions due to the leakage of coolant, short-term use of water in the cooling system is allowed, but only for the duration of the journey to the place where the faults can be corrected. After ATV operation in the cold season water must be drained.

21. In case of below zero ambient temperature it is recommended to use radiator cover to ensure a normal thermal condition of the engine.

22. During ATV parking for more than 12 hours at an ambient temperature below -30 °C the battery should be stored in a warm room.

23. Do not allow acids, brake fluid, antifreeze and fuel to get onto the painted surface of the body and rubber parts. Clean the interior with a damp cloth, preventing water from entering the electrical equipment and thermal insulation.

24. Installation of various equipment and mechanisms on ATV is allowed only after coordination with the research and production company TRECOL (RPC "TRECOL"). Otherwise, the consumer loses the right for warranty service.

25. When starting the car at an air temperature below minus 20 °C, do not rotate the steering wheel until the engine has warmed to operating temperature, as this may damage the power steering oil seals.

26. RPC "TRECOL" constantly improves the design of ATV, and therefore the latest design changes that do not affect operation may not be reflected in this edition of the manual.

27. To obtain operational skills (management and maintenance) the Buyer is advised to pass training with the Supplier.

28. ATTENTION! For safety reasons it is absolutely forbidden to install wheels and tires on ATV that were not manufactured in RPC "TRECOL". If this prohibition is violated, the consumer loses the right for warranty service.

3. Safety requirements

In the process of operating the ATV strictly follow safety rules and fire safety requirements.

1. Do not work on a defective ATV. Before starting the movement, carefully inspect ATV and make sure it is in good working condition.

2. When transferring ATV to another driver it is necessary to warn him of any detected malfunctions.

3. Before starting the engine the shift lever must be in the neutral position. Do not warm up the engine in an enclosed area with poor ventilation.

4. It is prohibited to operate ATV if its tires have: unrepaired local injuries (breakdowns, cuts), nails, glass fragments, etc. stuck in the tread and side walls. It is forbidden to reduce the tire pressure below 8 kPa (0.08 kg/cm^2).

5. To avoid burns care must be taken when draining the hot coolant from the cooling system and hot oil from the all-terrain vehicle assemblies, as well as when removing the coolant plug of the engine cooling system.

6. Special care must be taken when handling ethylene glycol coolants, leaded gasoline and brake fluid to avoid poisoning when ingested. After contact with skin wash immediately with warm water and soap.

7. It is necessary to keep the engine (radiator and heater, if installed on ATV) clean and in good condition. Motor case oiling and leakage of fuel can cause fire.

8. When working with a towline heavy tarpaulin gloves should be worn.

9. It is prohibited to operate ATV with a faulty exhaust system. It is necessary to check the attachment of the intake and exhaust pipes. Do not allow sparks to escape from the exhaust pipe due to engine malfunction.

10. It is forbidden to warm up ATV units with an open flame.

11. Do not use an open flame, build a fire or smoke near the place fueling ATV, when determining fuel level in the tank or when inspecting the fuel tank.

12. It is forbidden to leave an unstopped ATV without a driver.

13. It is prohibited to be under the ATV, if it is raised by a hi-jack, without using additional safety devices.

4. ATV marking

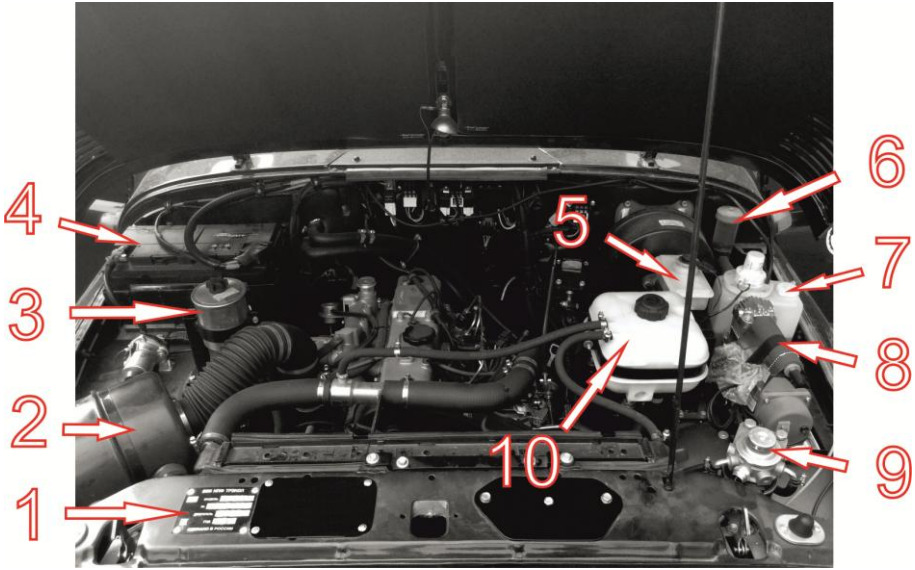


Fig. 4.1 Underhood space:

1 - ATV nameplate; 2 – engine air filter; 3 - power steering fluid tank (if a petrol engine is provided the tank is located on the right); 4 - rechargeable battery; 5 - brake fluid tank; 6 - clutch power fluid tank; 7 - windshield washer fluid tank; 8 - compressor (if available); 9 - fine fuel filter with hand pump for fuel pumping (diesel); 10 - windshield washer fluid tank.

ATV nameplate (Fig.4.2) is mounted on the top panel of the radiator (see Fig.4.1).

Fig. 4.2 ATV nameplate:

1 - trademark of manufacturer;
2 - model of ATV;
3 - serial number of ATV;
4 - engine model and its design;
5 - year of manufacture.

The index part of ATV serial number is duplicated by punch marking on the wall of the right girder in its front part (Fig.4.3). For example: "00000587".

Fig. 4.3 The place of identification of ATV serial number

Diesel engines **number** (HYUNDAI D4BF) is stamped on the right side of the cylinder block between the thermostat and the protective cover of the exhaust manifold (it is recommended to use a mirror) in two lines. (Fig. 4.4).
For example: "D4BF B078569".

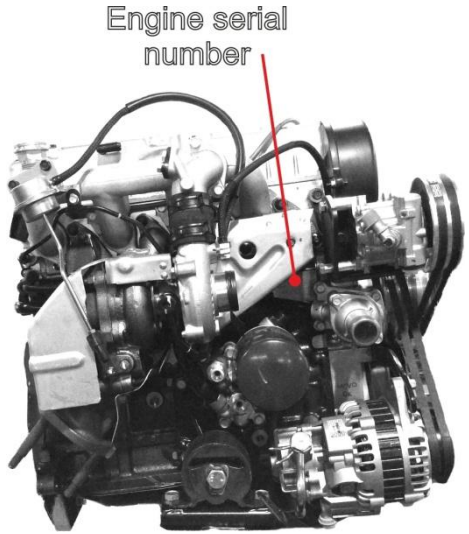


Fig. 4.4 Number of Diesel engines HYUNDAI D4BF

Gasoline engines **model and number** (ZMZ 4062.10 and ZMZ 40905.10) is stamped from the left side on the casting of the cylinder block near lateral engine support (Fig. 4.5).
For example: * 40905F * C3070959 *.

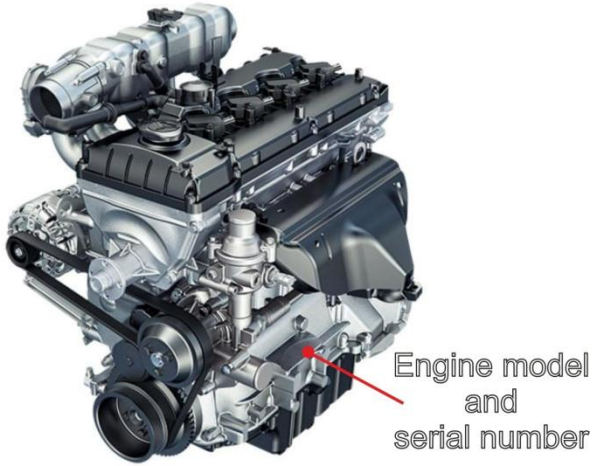


Fig 4.5 Model and number of gasoline engine ZMZ 40905.10

5. Technical description

5.1. Overall dimensions of ATV TRECOL-39041

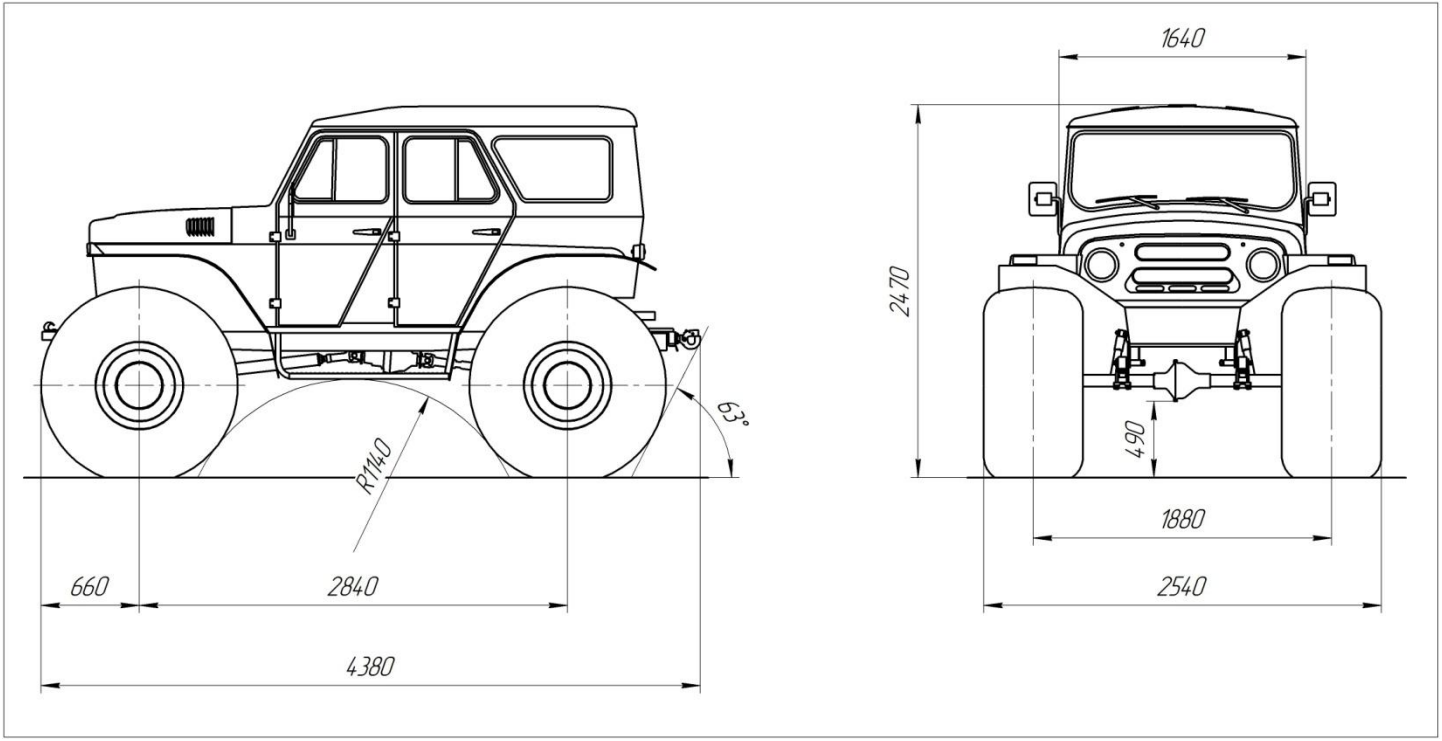


Fig. 5.1 Main dimensions of ATV TRECOL-39041 (for reference)

5.2. Technical characteristics of ATV TRECOL-39041

Table 5.1

Wheel arrangement	4x4
Capacity (number of seats, including driver's seat)	5
Nominal load-carrying capacity, including the mass of additional equipment, driver, passengers and cargo, kg: - on paved roads and dense soils - on weak soils and afloat	 450 350
Curb weight (without additional equipment), kg	1900
Permissible gross mass of ATV, kg: - on paved roads and dense soils - on weak soils and afloat	 2350 2250
Distribution of the load on the road from the ATV full mass, kg: - on the front axle - on the rear axle	Close to uniform
Maximum speed at full weight of ATV, km/h	70
Minimum steady speed at lower gear in the gearbox and lower gear in the transfer box, km/h	5

Table 5.1. (continued)

Maximum driving gradient of ATV at full weight,% (degrees), not less than	58 (30)
Maximum side slope of ATV in the area of dry and hard ground,% (degrees), not less than	36 (20)
Control fuel consumption while driving at a constant speed of 40 km / h, l/100 km	14
Fuel tank capacity, l	70+39+39=148
Fuel distance based on control fuel consumption, km	1050

Note. The control fuel consumption is used to determine the technical status of ATV and is not an operating standard.

Reliability of fuel consumption measurement is ensured only when carrying out special tests in strict accordance with the requirements of GOST 20306-90.

5.3. Controls and instrumentation

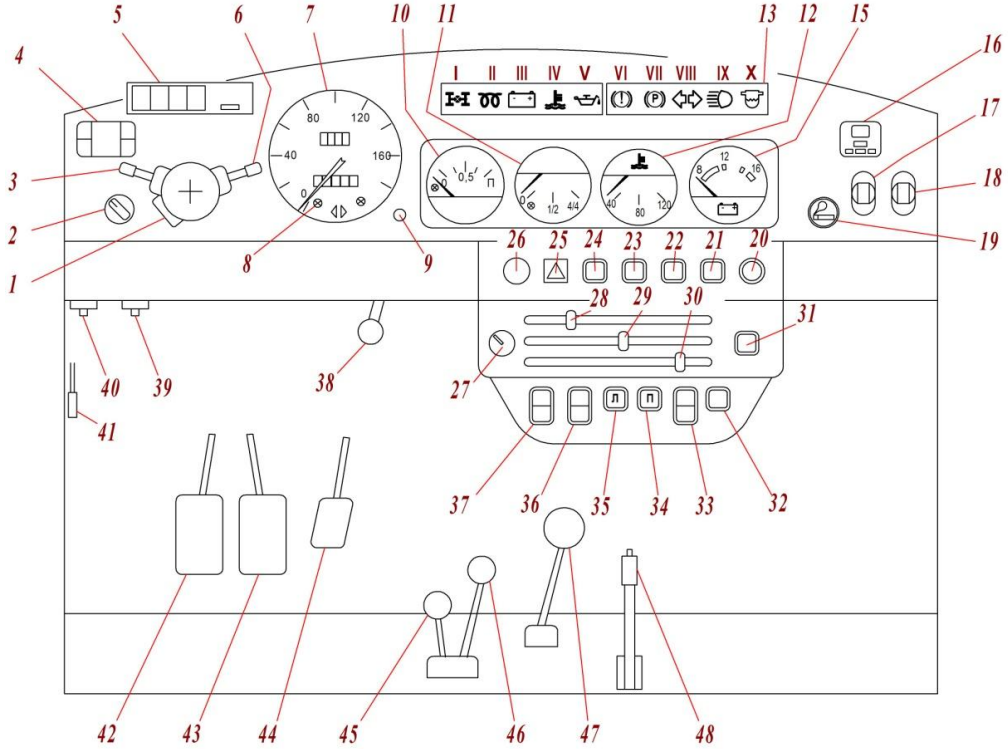


Fig 5.1
Layout of controls and instruments on ATV with HYUNDAI D4BF engine
(steering wheel and the button for the sound signal located on it are not shown conditionally)

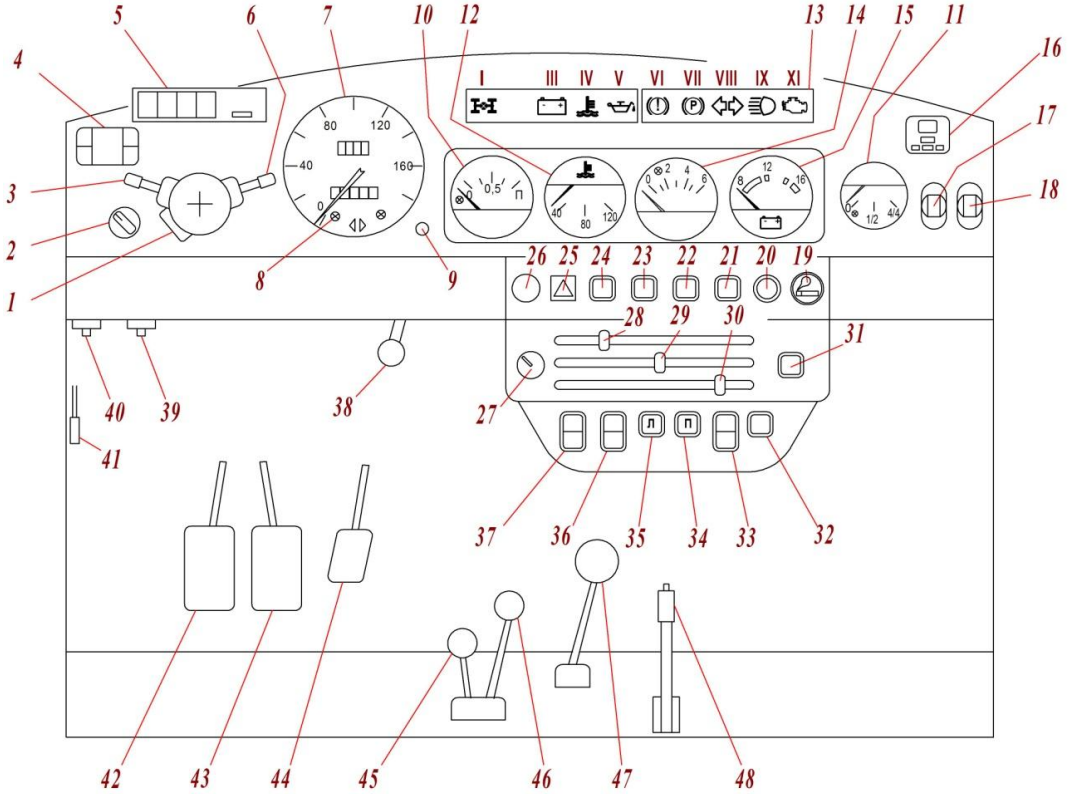


Fig 5.3
Layout of controls and instruments on ATV with ZMZ 4062.10 and ZMZ 40905.10 engines
(steering wheel and the button for the sound signal located on it are not shown conditionally)

1 – ignition and starter switch.

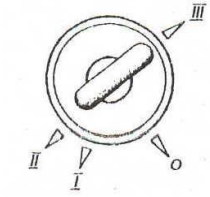


Fig. 5.4 Positions of ignition switch:

0 - all the devices are off (key position is fixed);

I - the ignition is switched on (key position is fixed);

II - the starter is switched on (key position is non-fixed);

III - parking (key position is fixed).

The key from the ignition switch is taken out only in position III, at this, the mechanism of the locking device, blocking a steering gear shaft, is triggerred. To lock the steering gear at parking, put the key in position III, remove it and turn the steering wheel to either side until clicking - it means that the locking tongue is aligned with the groove of the steering wheel hub. When unlocking the steering gear, insert the key into the ignition switch and, swinging the steering wheel to the right and left, turn the key clockwise to position 0.

In order to avoid the erroneous activation of the starter with the engine running (II position of the key), the design of the ignition switch mechanism assumes locking that allows the engine to be restarted only after the key is returned to position 0.

Do not turn off the ignition and do not remove the key from the ignition switch when moving the ATV. Stopping the engine will result in a loss of brake efficiency, and when the ignition key is removed, the steering shaft is blocked by the anti-theft device and the ATV becomes uncontrolled.

2 – vertical beam adjuster in vertical plane;

3 – lever to switch turn indicators and headlights.
Lever to switch turn indicators and headlights has some positions (Fig. 5.5 (a)):

I - turn indicators are switched off, dimmed headlights are turned on if headlights are turned on by means of center light switch;

II - left turn indicators (non-fixed position) are turned on);

III - left turn indicators (fixed position) are turned on);

IV - right turn indicators (non-fixed position) are turned on);

V - right turn indicators (fixed position) are turned on;

VI - (towards oneself) - main upperbeam is switched on regardless of the position of the central light switch (non-fixed position);

VII - (away from oneself) - main upperbeam is switched on if headlights are turned on by means of center light switch (fixed position);

4 – timer of engine preheater (if available);

5 – digital tachometer Multitronics DD5;

6 – wiper and windshield washer lever;

Fig. 5.5 Positions of wiper and windshield washer lever

(Fig. 5.5 (b):

I - wiper and washer are switched off;

II - intermittent operation of the wiper is activated (non-fixed position);

III - intermittent operation of the wiper is activated (fixed position);

IV - wiper speed is slow (fixed position);

V - wiper speed is high (fixed position);

VI - (towards oneself) – wiper and washer are switched on (non-fixed position);

VII - rear window wiper is switched on (fixed position);

VIII - pressing on the lever activates the motor of the tailgate washer (non-fixed position); water supply is stopped when the lever is released;

7 – speed recorder with a total mileage meter and a daily run meter;

8– external illumination switch indicator lights green is external illumination is switched on;

9 – daily run reset handle (for reset - turn the handle counter-clockwise until resetting the run counter);

10 – fuel level indicator in the side fuel tanks. The arrow of the instrument and the built-in indicator lamp for the fuel reserve are activated after 15 ... 50 seconds as well as after tanks switching tanks;

11 – fuel level gauge in the rear fuel tank with an integrated fuel reserve indicator that lights up orange when approximately 10 liters of fuel remains in the rear tank and refueling is required;

12 – coolant temperature indicator in engine cylinder block;

13 – indicator light unit. The green and blue indicator lights inform the driver of the normal operation of the system to be switched on. Orange lights warn the driver about the need to

take measures to ensure the further normal operation of military transport vhicle. Red lights warn the driver on the need to take measures to prevent the emergency operation of units that ensure the safety of military transport vehicles. Attention ! Operation of military transport vehicle with a constantly switched on (at least one) red light is not allowed.

Indicator lights unit is comprised of the following:

I – Control lamp (orange) - blocking activation of the center differential of the transfer box;

II – Control lamp (orange) – activation on (for the diesel engine);

III – Control lamp (red): no battery charge. If it is activated with the engine running it indicates that the battery is not charging.

Signaling indicator can light at idling speed immediately after starting the engine. In order for the generator to start producing current, it is required to increase the engine speed once, while the indicator should be switched off.

Its activation at idle can be caused by excessive load on the on-board network. In this case power consumption should be limited;

IV – Control lamp (red) for emergency coolant overheating;

V – Control lamp (red) oil pressure in the engine lubrication system. Lights up after the ignition is switched on and goes out after starting the engine when the crankshaft rpm is increased;

VI – warning light (red) of the brake system malfunction. Lighted lamp indicates a lowering of the fluid level in the brake fluid reservoir below the mark "MIN";

VII – parking brake warning light (red). Switched on when the parking brake is activated;

VIII – warning light on activation of turn indicators and alarm system (green). Operates in flashing simultaneously with turn indicator lights in MTS lanterns when the turn indicator or emergency alarm is switched on. The absence of lamp control signal when turning on the turn signal or an alarm signal indicates the failure of the direction indicators in the lamps;

IX – Control lamp of activation of distance light (blue). Switched on when the distance light is activated;

X – indicator light for the presence of water in the fuel filter (orange) (for ATV with the engine HYUNDAI D4BF);

XI – indicator light (orange) of the engine control system malfunction (for ATV with engines ZMZ 4062.10 and ZMZ 40905.10) is switched on for 1 sec. when the ignition is switched on and switched off if there are no faults. If the lamp continues to light after starting or lights up while the engine is running, this indicates a malfunction in the engine control

system. In this case, there is no need to immediately stop the engine, since the controller can switch to backup (bypass) operation modes. After eliminating the malfunction, the light must be turned off after starting the engine;

14 – oil pressure indicator in the engine lubrication system with an integrated oil pressure warning light which is lighting in red at an emergency pressure (for ATV with engines ZMZ 4062.10 and ZMZ 40905.10);

15 – voltmeter showing the voltage in the on-board ATV network;

16 – mini-regulator of independent air heater of salon (if available);

17 – start button for heating the driver's seat (if available);

18 – start button for heating the passenger seat (if available);

19 – cigarette lighter. To heat the cigarette lighter coil, press the insertion handle, insert it into the housing until it locks and release the handle. While coil is heating, the insert automatically returns to its original position. Do not force the insertion in the recessed position;

20 – button of forced cooling fans activation. Fans are switched on while the button is pressed;

21 – switch of the right spotlight (if available);

22 – switch of the left spotlight (if available);

23 – button for activation of front additional illumination on a roof (if available);

24 – button for activation of rear additional illumination on a roof (if available);

25 – alarm system switch;

26 – indicator light (red) for activation of winches (if available);

27 – heater electric fan speed switch;

28 – lever of heater crane control (left - closed, right - open);

29 – lever of heater air intake (to the left - intake from a cabin, to the right - intake from outside);

30 – lever for air supply distribution after the heater (to the left - to the windscreen, to the right - to the foot zone of the driver and the passenger);

31 – compressor button for centralized tire pressure control (if available);

32 – interior light switch;

33 – switch of sensors for fuel level indicator in lateral tanks (downwards against the stop - the left tank is connected, upwards up to the stop - the right tank);

34 – button to turn on fuel pumping from the right tank to the rear one. To pump fuel, press and hold the button;

35 – button to turn on fuel pumping from the left tank to the rear one. To pump fuel, press and hold the button;

36 – auxiliary heater pump switch;

37 – outdoor light switch;

38 – handle for heater air intake hatch cover actuator;

39 – winch remote control button (if available);

40 – battery switch;

41 – hood lock panel. Pull the handle in order to open the hood;

42 – clutch pedal;

43 – service brake pedal;

44 – accelerator pedal;

45 – starting lever of blocking of an interaxle differential of a transfer gear. Activation of locking by moving the lever forward until the lamp I lights up in block 13;

46 – lever for switching transmissions in gearbox. Switching network is provided in the subsection "Transmission";

47 – lever for switching transmissions in distributing box. Switching network is provided in the subsection "Transmission";

48 – parking brake lever.

6. Characteristics of the main assemblies and aggregates

6.1. Engine

Characteristics of the engine

Table 6.1

Model	ZMZ -4062.10	ZMZ-40905.10	HYUNDAI D4BF
Engine type	Four-stroke		
	Gasoline, injection type	Gasoline, injection type	Supercharged diesel
Grade of used fuel	Gasoline AI-92 as per GOST 2084	Gasoline AI-92 as per GOST 2084	Diesel as per GOST 305
Number and arrangement of cylinders	four in a row (P4), vertical		
Direction of rotation of the crankshaft in accordance with GOST 22836	Right		
Operation of cylinders	1-3-4-2	1-3-4-2	1-3-4-2
Diameter of a cylinder, mm	92	95,5	91,1
Piston stroke, mm	86	94	95
Engine capacity, l	2,285	2,693	2,476
Compression ratio	9,5	9,1	21

Table 6.1. (continued)

Rated power, kW (hp)	95,7 (130)	94,1 (128)	61,0 (83,0)
Crankshaft speed at rated power, min-1	5200	4600	4200
Maximum torque, Nm (kgs*m)	200,9 (20,5)	209,7 (21,4)	196 (20,0)
Crankshaft speed at maximum torque, min-1	4000-4500	2500	2000
Minimum speed of crankshaft, min-1	800-900	800-900	750
Lubrication system	Combined under pressure and spraying		
Powel supply system	Distributed injection	Distributed injection	Fuel pump of distribution type
Viscosity grade of the engine oil refilled at the factory *	SAE 10W-40	SAE 10W-40	SAE 10W-40
Temperature range of application of engine oil	-20^0C...$+35^0$C	-25^0C...$+40^0$C	-25^0C...$+40^0$C

Table 6.1. (continued)

Oil consumption for burnout in % of fuel consumption	0,3	0,3	0,35
Weight of lubricant-free engine with clutch, kg	192	190	208
Engine lubrication system capacity, l	6 (without the volume of the oil cooler)	6 (without the volume of the oil cooler)	7 (without the volume of the oil cooler)

* If a new ATV is operated outside this temperature range, it is necessary to change the oil by the oil grade recommended in the lubrication chart, without waiting for the oil change period in accordance with the service book.

The power system consists of three tanks. The main tank with a capacity of 70 liters is installed in the rear of the body between the frame side rails., The fuel is taken for power from the abovementioned tank. The fuel is discharged into this tank along the return line as well. Additional tanks with a capacity of 39 liters each are installed on the left and right on the body. It is possible to pump fuel from the side tanks to the rear ones by pumps. Pumping time for full lateral tank is 12 min.

ATTENTION! Do not overflow the rear fuel tank when transferring fuel from the lateral tanks.

Exhaust system - one intake tube with compensator, the main and additional silencers UAZ-31512, and outlet pipe at the rear right

Cooling system - liquid, closed, with forced circulation of cooling liquid. The system consists of a water jacket of the cylinder block, water pump, thermostat, radiator, expansion tank, fans, safety valves in the expansion tank cap, drain cock, coolant temperature sensor.

The system also includes: radiator of the cabin heater, coolant overheat warning indicator, sensor for switching on the electric fans located on the radiator outlet and on the radiator.

The capacity of the cooling and heating system is 12.5 liters.

In order to facilitate the start-up of a cold engine, ATV can be equipped with a pre-heater.

6.2. Transmission

Transmission units are filled at the manufacturing plant with oil of viscosity grade SAE 75W-90, designed for use in ambient conditions from minus 40 °C to plus 45 °C.

Clutch – dry, single-disk, permanently closed type clutch with diaphragm spring. Clutch release actuator is hydraulic. The charge volume of clutch release is 0.2 liters.

Transmission:

- For the ZMZ-40905.10 and ZMZ- 40905.10 engines the UAZ-3160 gearbox is used (mechanical, four-speed with synchronizers on all forward gears).

  Gearbox ratios:
  I - 3,78; II - 2,6; III - 1,55; IV - 1,0; R - 4,12.

  Transmission control - mechanical, with lever.

- For the HYUNDAI D4BF engine the HYUNDAI DYMOS M5ZR1 gearbox is used (mechanical, five-speed gearbox with synchronizers for all forward gears).

  Gearbox ratios:
  I - 4,31; II - 2,33; III - 1,52; IV - 1,0; V - 0,88;
  R - 4,124.

  Transmission control - mechanical, crank arm with cables.

The scheme of transmission shift control UAZ-3160 and M5ZR1 is shown in Fig. 6.1

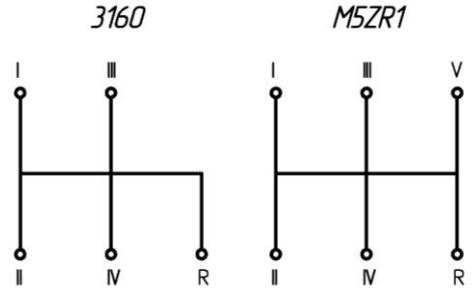


Fig. 6.1. The scheme of transmission shift control

Transfer box - GAZ-33027, two-stage, with an interaxle differential which has a mandatory lock.

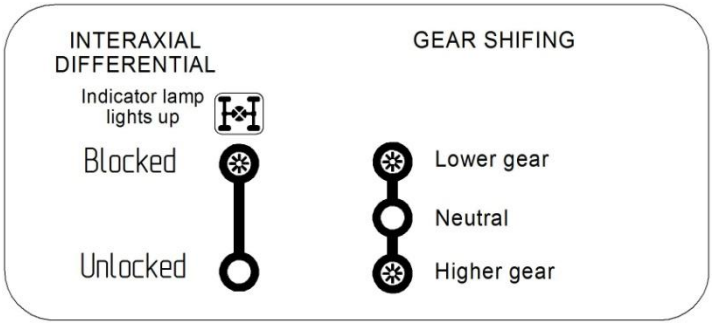


Fig. 6.2 Control scheme of transfer box

Gear ratios: the highest gear - 1.07; the lowest gear -1.86.
Control - mechanical, remote.

The control scheme of transfer box is shown in Fig. 6.2.

Open type **drive shaft** consisting of three shafts.

Each shaft has two cardan joints with a crosspiece on needle bearings.

Leading axles are U-shaped with a crankcase in the vertical plane and an on-board transmission. Semi-axels are of completely unloaded type..

The main transmission used in UAZ - 31512 consists of one pair of bevel gears with a spiral tooth.

The differential is conical with four planet pinions

On-board transmission in the basic configuration (used in UAZ-3151) consists of one pair of cylindrical spur gears of internal gearing. ATV can be custom-built with the original TRECOL-39041KR wheeled gearbox, which uses the same pair of internal gears, but the body, driven shaft and hub have an original reinforced structure.

Gear ratios:

- Main transmission – 4,625;
- On-board transmission – 1,94;
- Total gear ratio of the axle is – 8,97.

Filling volume of the crankcase of each axle is 0.85 liters, of each crankcase of the hub drive - 0.3 liters.

Front axle with axle swivels with joints of equal angular speeds from UAZ-3151.

Parameters of setting of controlled wheels for fully loaded ATV:

- wheel alignment (at the rim edges) 1,5 - 3 mm;
- camber angle 1º30' ± 0º15';
- caster angle 3º ± 30';
- kingpin inclination 8º ± 30'.

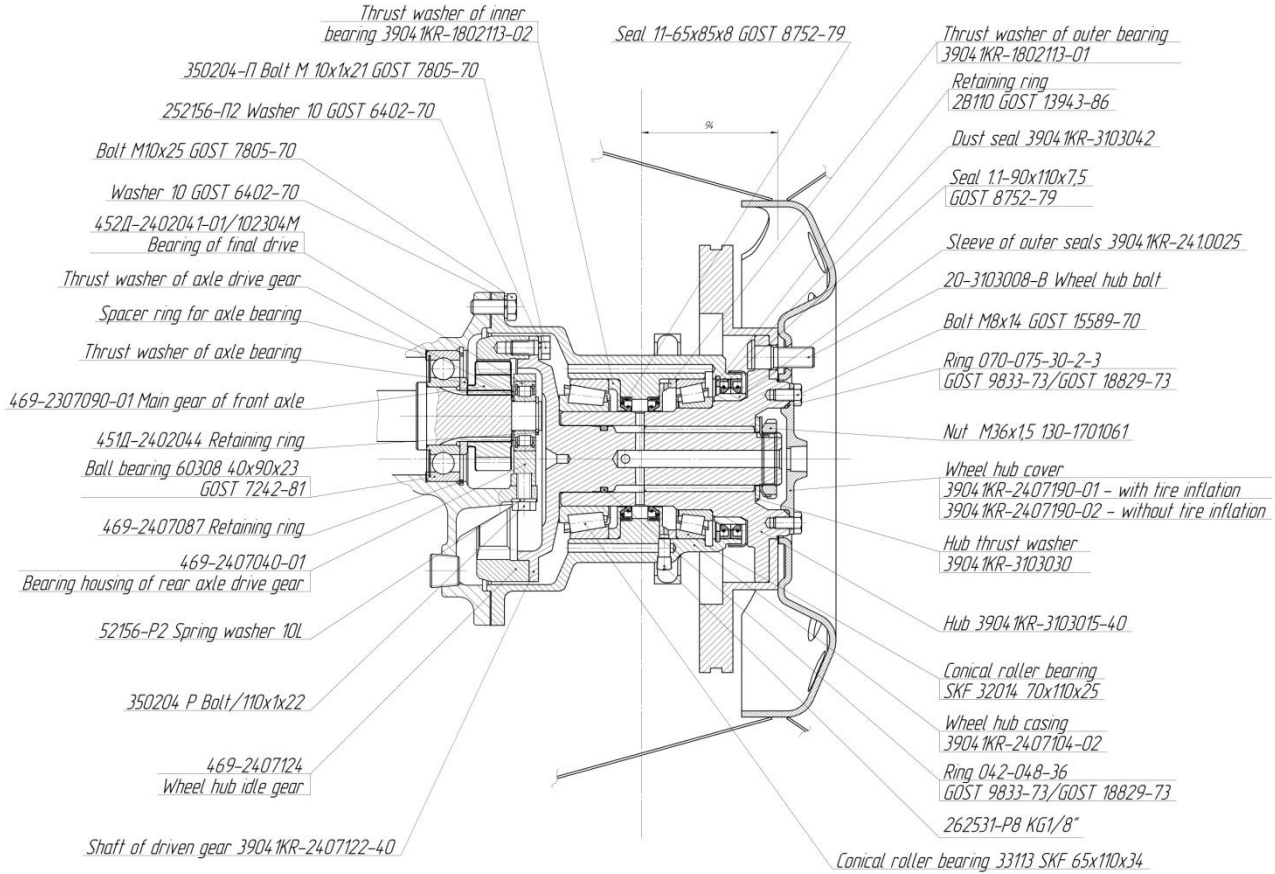


Fig. 6.11 Gear system TRECOL39041 KR

Adjustment of wheel bearings tightening shall be careful. If the bearings are too weakly tightened, they will be im-pacted during the movement, destroying the bearings. If the tightening is too tight, the bearings are heated up strongly, which causes the lubricant to leak out and the bearings are failed.

Wheel hub bearings tightening (wheeled gearbox UAZ - 3151)

Wheel hubs tightening is adjusted in the following order:

- Lift the adjustable wheel with the help of a jack thus it rotates freely;
- Remove the hub cover;
- Unscrew the lock washer and the lock nut, remove the lock washer;
- Loosen the bearing adjustment nut by 1/6 ... 1/3 turns (1 ... 2 faces);
- Turn the wheel by hand, check its ease of rotation and if any grazing is noticeable or audible, remove the cause of braking and only then start adjusting the bearings;
- Rotating the wheel to correctly place the rollers in the bearing, smoothly tighten the hub bearing adjustment nut without jerking, the tightening torque shall be 20 N • m (2 kgf • m)
- Place the lock washer, put and tighten the lock nut with a torque of 20-25 N • m (2-2.5 kgf • m). If there are even minor cracks on the lockwasher, replace it. Otherwise, washer tabs breakage and nut self-unscrewing (or self-loosening) is possible which will damage the bearings.
- Put the washer with an internal tab in the groove of the pin. Fold one tab of the lock washer on the side of the nut, and the second - on the face of the lock nut until it fits perfectly to the faces.

Check for correct bearing adjustment by heating the hub while driving. If the hub heats up strongly, then release the nut for one more side by unscrewing the lock nut and removing the lock washer.

Wheel hub bearings tightening (wheeled gearbox TRECOL39041 KR)

Wheel hubs tightening is adjusted in the following order:

- Lift the adjustable wheel with the help of a jack thus it rotates freely;
- Remove the hub cover;

- Loosen the bearing adjustment nut by 1/6 ... 1/3 turns (1 ... 2 faces);
- Turn the wheel by hand, check its ease of rotation and if any grazing is noticeable or audible, remove the cause of braking and only then start adjusting the bearings;
- Simultaneously turning the hub in both directions two or three times for self-alignment of the bearing rollers, tighten the M36 nut with the torque 50 ... 70 N • m (5-7 kgf • m);

- Tighten the rim of the nut in the groove of the driven gear shaft;
- Install the hub cover for wheel gear with the O-ring onto the hub flange. Fix with bolts M8x14 with the torque 36…40 N • m (3,6-4 kgf • m).

6.3. Chassis

Frame - welded, equipped with two tow hooks in the front part. To operate an ATV with a trailer, at the rear of the frame a two-way closed-type towing device with a rubber elastic element that softens impact loads can be installed. In the front part of the frame ATV can be equipped with a 12 V electric drive winch.

Suspension - on longitudinal semielliptical leaf springs with hydraulic double-acting telescopic shock absorbers of all bridges.
Wheels - made of steel, with hermetic rim and split side beads. The wheels are fastened by five nuts.

Tires - 1280x530-533; 1300x600-533; 1350x700-533 "TRECOL" ultra-low pressure, tubeless.

Recommendations for the choice of tire pressure and speed in relation to road conditions are given in Section «General movement of ATV».

6.4. Steering

6.4.1. General Provisions

The turn of an all-terrain special vehicle is carried out due to the steering wheels of the front axle. Steering wheel is located on the left. Steering gear ZF 8090.955.302 with the integrated hydraulic booster is made using an integrated circuit, i.e. in one body with the steering mechanism there is a hydraulic distributor and a power cylinder. The working pair of the steering mechanism is a screw with a nut on the circulating balls and a rack that engages with the toothed sector of the bipod shaft.

Steering mechanism has a variable gear ratio. This means that when driving in a straight line, a smaller steering angle correction is required, and with greater turns of the steering wheel a higher hydraulic torque is applied to the sector shaft. In addition, the steering mechanism has a hydraulic restriction system that works when the wheels are turned to the stop, thereby protecting the pump and steering rods, and also preventing the oil temperature from rising. In the event of a power failure, there is always a mechanical link between the steering wheel and the wheels, which provides steering with increased effort on the steering wheel.

Hydraulic booster pump is plate-type with integrated flow and maximum pressure valves (3408018 -11- L8,8 – for the ZMZ - 4062.10 engine, 2171-L8,8 – for the ZMZ-40905.10 and HYUNDAI D4BF engine). Pump has a belt drive.

Tank SHNKF 453473.300 of power steering pump is intended for storage and filtration of the working liquid of the system. Inside the shell of the tank there is a paper filter element that provides filtration of the flow of liquid returned to the tank from the power steering system.

Due to the fact that the steering booster is a heavily loaded unit, it undergoes heating during operation. To reduce the oil temperature an oil cooler is used, which is installed to the left of the radiator of the engine cooling system.

The general scheme of the hydraulic steering system is shown in Figure 6.4.

When operating the ATV with the hydraulic steering booster, it is necessary to closely monitor its operation in order to detect in time even minor deviations from its normal functioning and to take prompt measures to eliminate the identified malfunctions.

Particular attention should be paid to fastening the ball joints of the steering rods, drop arms, right drop arms pull rod and steering gear to the frame bracket. Observe the oil level in the hydraulic reservoir. It is strictly forbidden to use working oils that are not recommended by the lubrication chart. The operation of the pump in the event of oil leakage from the hydraulic system is prohibited as it leads to the failure of the pump.

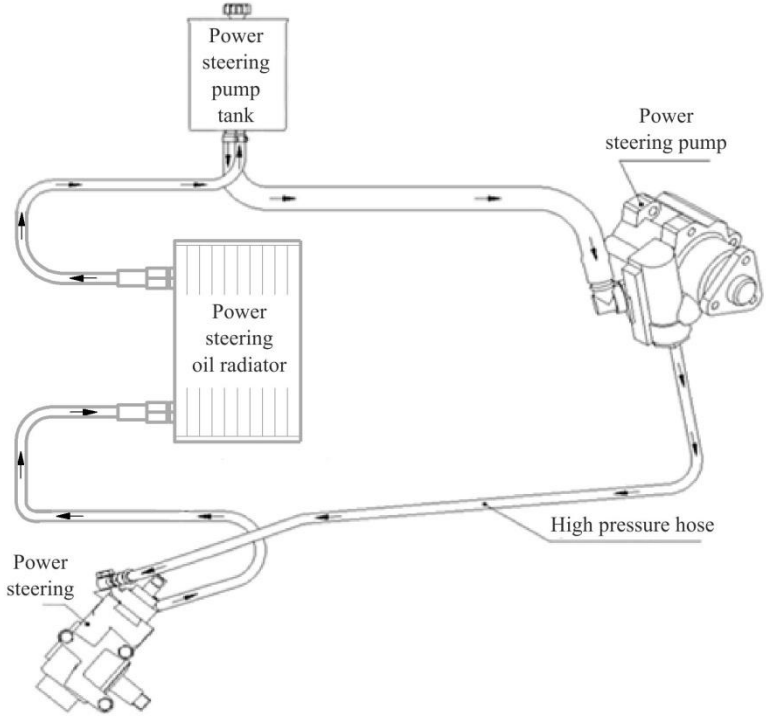


Fig. 6.4 General scheme of hydraulic steering system

Steering ratio in the middle position - 17,3.

Filling volume – 1,5 liters.

Pump ZF of power steering has belt drive. The brands of belts used in the ATV (depending on the engine brand) are given in Table 6.2.

Table 6.2

Engine	Belt brand
ZMZ 4062.10	6RK1368
ZMZ 40905.10 – 30 (without air conditioning compressor)	6RK1190
ZMZ 40905.10 – 40 (with air conditioning compressor)	6RK2050
HYUNDAI D4BF	10AVX875 (2 pcs.)

6.4.2. Brief description of the design of the power steering pump tank

Power steering pump tank (Figure 6.5) is designed to store and filter the hydraulic fluid of the power steering system. Inside the shell of the tank there is a paper filter element that provides filtration of the flow of liquid returned to the tank from the power steering system. Technical specifications of the power steering pump tank:

- the tank must be sealed;

- capacity of the tank is 0.6 liters;

- fineness of filtration of the filter element should not be more coarse than 45 microns;

- oil level in the reservoir must not be lower than the level of the oil filler strainer.

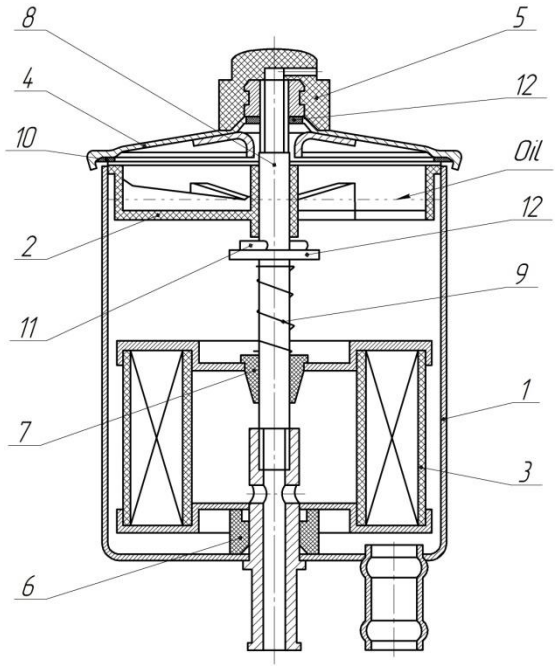


Fig. 6.5 SHNKF 453473.300 tank of the power steering:

1 – housing; 2 - filling strainer; 3 - filtering element; 4 - cover; 5 - plug; 6 - insert; 7 – filter washer; 8 - stud; 9 – valve spring; 10 - sealing gasket; 11 - cotter pin; 12 - washer.

6.4.3. Recommendations for the operation and maintenance of the power steering mechanism

These recommendations should be used every time when installing and dismantling and replacing the steering mechanism.

Mounting of the steering and hydraulic systems should be carried out by qualified personnel. During installation dirt and foreign objects should not enter the hydraulic system. When laying the hoses, they should be fixed in such a way as to prevent their friction against other parts when the vehicle is moving.

Filling and pumping of the oil in the power steering system should be as follows:

- remove the cover of the power steering pump tank and fill the clean oil slightly above the level of the filling strainer mesh. 3 ... 5 minutes after filling check the oil level in the tank and top up to the mesh level if necessary;

- start the engine and let it run without rotating the steering wheel for 10 ... 15 s. At the same time, it is necessary to top up the oil in the tank to the mesh level;

- then at idle smoothly turn the previously hung steering wheels from side to side and back. At the same time, add oil to the level of the strainer filter;

- smoothly turn the steerable wheels from side to side and make sure that the oil level in the tank remains unchanged. At the same time, air should leave the hydraulic system, which will be seen by the small bubbles in the tank, but at the same time the oil should not foam. Excessive foaming indicates that the connections of the hydraulic system are leaking..

In the fully charged hydraulic system the oil in the power steering pump reservoir should be at the level of the filling strainer mesh. Reducing the oil level in the reservoir below the level of the filling strainer mesh is not permissible.

Replacing of the paper filter element 4310-3407359-10 should be carried out simultaneously with the replacement of oil in the reservoir.

The normal deflection of the drive belt of the power steering pump should be 13 ... 15 mm at an effort of 8 kgf.

ATTENTION! Do not allow continuous operation (longer than 15 seconds) of the power steering when its safety valve is triggered (in case of high resistance of the steering wheels to the steering or at the extreme positions of the steering wheel) in order to avoid premature failure of the pump.

In the event of oil leaks or other faults in the power steering system and the impossibility of eliminating the malfunction on the way, it is necessary to remove the drive belt of the power steering pump (except for engines ZMZ 4062.10 and

ZMZ 40905.10 - 40), and driving at low speed, reach the nearest maintenance center to restore the efficiency of the power steering system.

ATTENTION! Long operation of the ATV with the non-working steering booster leads to premature wear and breakage of the steering mechanism.

The operation of the power steering system is accompanied by noise from the flow of working fluid through the steering gear distributor, which can be heard in the ATV cabin when the steering wheel is turned. When turning in severe conditions (rotation at low speeds, low pressure in the tires, on weak soils), a whistling sound can occur in the vicinity of the steering gear. This indicates the operation of the relief valve and is not a malfunction.

6.4.4. Adjustment of tightening of steering arm pivots

When operating the vehicle, pay special attention to the tightening condition of the steering arm pivots. At the factory the pivots are tightened with a preload. Adjusting shims with the same thickness are set from below and from above. When the friction surfaces wear out, the pre-tension disappears and an axial clearance is created between the ends of the pivots and the support rings. This clearance should be removed by removing the same number of adjusting shims from above and below. The difference between the total thicknesses of the upper shims should exceed 0.1 mm.

For adjustment it is necessary to:

1. Raise the front axle with a jack.
2. Release nuts and remove the wheel.
3. Remove the oil seal bolts from the ball joint and remove the oil seal.
4. While moving the body of the pivot up and down, check for axial movement of the pivots.
5. Unfasten the nuts of the steering arm (on the left) or the bolts securing the upper shim (on the right) and remove the lever or upper pivot shim.
6. Remove the thin (0.1 mm) adjusting shim and install the lever or pivot shim into place.
7. Remove the bolts and remove the lower shim of the pivot taking out a thin (0.1 mm) shim, and install the pivot shim into place. Check the results of assembly. If the gap is not removed, re-adjust, removing thicker shims (0.15 mm).

The removed shims should be retained, since after a few adjustments only thick 0.4 mm thick shims can remain under the lever and the gasket, which will need to be replaced by several thin ones.

6.5. Brake system

6.5.1. General Provisions

After a long stand (more than 8 hours), start movement no earlier than 20 ... 30 seconds after starting the engine, thus the vacuum pump creates a vacuum sufficient for reliable braking in the vacuum brake amplifier.

When the engine is running with a minimum engine speed at idle speed below 800 rpm, the efficiency of the vacuum brake booster is reduced, thus, regularly check the engine speed at idling.

In case of frequent brake pedal pressing (if repeated press-ing immediately follows the pedal release), keep in mind that the vacuum pump may not be able to create the required vacuum, which reduces the efficiency of the brakes and requires an increased brake pedal force.

Remember that when the engine is not running or vacuum amplifier is failed, the force is significantly increased which must be applied to the brake pedal to brake the ATV.

If one of the circuits of the brake system failed, the brake pedal travel is increased and the braking efficiency is reduced. In this case, do not make short-term repeated pressing of the pedal, and press the pedal until maximum possible effect.

If the braking system does not function, ATV further movement or its towing on a flexible hitch is prohibited.

Working brake system - hydraulic, two-circuit:

- I circuit – brake mechanisms of front axle wheels;
- II circuit – brake mechanisms of the rear axle wheels.

In the basic configuration the ATV is provided with drum brake. The material of brake linings is asbestos-free. The diameter of the brake drum is 280 mm, and the width of the brake linings is 50 mm.

Under the order the ATV can be provided with disc working brakes (version with wheel gears TRECOL 39041KR).

When the brake pedal is pressed (ATV is stopped, the engine is idling), a slight noise from the air intake to the vacuum amplifier is possible.

The level of the brake fluid in the reservoir of the main brake cylinder is checked according to the marks on the tank casing made of translucent plastic. In case of removed tank cover and new brake pads, the fluid level should be on the "MAX" mark.

If the hydraulic drive of the brakes is properly functioning, the lowering of the liquid level in the tank is related to the wear of the brake gear shoe lining. Lowering the liquid level to the "MIN" mark indirectly indicates their extreme wear.

The indicator light of the emergency liquid level in the reser-voir lights up when the liquid level falls below the "MIN" mark, which, with partially worn out or new brake pads, indicates a system leakage. Refill the fluid only after restoring the integrity of the system.

Simultaneously with checking the liquid level in the reservoir, check the functioning of the emergency level sensor by pressing on top of the central part of the protective cover cap (if the ignition is on, the indicator light should light up on the instrument panel).

Check the condition of the brake hoses. When cracks appear on the outer surface, the hoses must be replaced.

Periodically remove the brake drums and clean the brake parts from dust and dirt, check the reliability of mounting the wheel cylinders to the shields. Pay attention to the condition of the wheel cylinders, protective caps, the degree of wear of the friction linings as well as the condition of the brake drum.

Protective caps must be tightly installed in the piston and cyl-inder sockets and must not be damaged.

If there are deep notches on the working surface of the drum, tears or uneven wear, then drill the drum, based on the central hole of the drum. The maximum permissible diameter of a bored drum is 281 mm.

It is not recommended to relocate the brake drums from one hub to the other as this leads to an increase in the runout of the drum working surfaces.

Wear of the liners shall be checked through the holes in the shields. For this purpose, remove the plugs out of the holes, in-spect the linings (thickness of the linings should not be less than 2.5 mm), close the holes. In the case of great lining wear (coun-tersunk rivets less than 0.5 mm), they must be replaced. When replacing worn pads or linings, the piston with the thrust ring must be moved deep into the cylinder to freely put the drum on the pads. After assembly, press the brake pedal 2 ... 3 times to set the pistons in the working position.

ATTENTION! Do not press the pedal when the brake drum is removed, because under pressure in the hydraulic drive the pistons will be squeezed out of the wheel cylinders and the liquid will flow out.

To facilitate subsequent removal, each time the drum is removed, peel the bead on the edge of the working surface, formed when the drum is worn.

At the removed hubs, tighten bolts fastening the brake boards.

6.5.2. Adjustment of the brake pedal free play

If required, select the clearance in the connection: plug of the vacuum booster - pin - brake actuator lever by turning the adjusting screw to the right of the brake light switch.

Brake pedal free play must be 5 ... 14 mm. After adjustment, tighten the screw nut to 14 ... 18 N × m (1.4 ... 1.8 kgf × m).

The free travel of the pedal should be checked when the engine is not running.

6.5.3. Filling of hydraulic drive with brake fluid system (pumping)

The brake system is pumped at fluid replacement, if the air entered the hydraulic air system, replacement of the worn out part or the unit causing the system to be sealed. Hydraulic brake system has two independent circuits, which are procured separately. Pumping should be carried out when the engine is not working and there is no vacuum in the vacuum amplifier. During the pumping it is required to monitor the minimum level of the brake fluid in the main cylinder reservoir, not allowing the brake fluid level to fall below the "MIN" mark.

Brake system shall be filled in the following sequence:

1. Check all hydraulic brake connections for leaks as well as the condition of flexible rubber hoses.

2. Clean bypass valves and protective caps of the wheel cylinders from the dust and dirt.

3. Clean the surface of the main cylinder reservoir from the dust around the cover from and remove the cover. Fill the reservoir with brake fluid to the mark "MAX".

4. Press the brake pedal several times to avoid the effect of the vacuum present in the brake servo.

5. Pump the brake system.

Pumping shall be in the following sequence:

1. Pump the right and left wheel cylinders of the rear brakes alternately.

2. Pump the left and right wheel cylinders of the front brakes alternately.

If ATV is equipped with drum brakes, then first the lower and then the upper cylinder of the corresponding brake shall be pumped.

3. Remove the cap from the bypass valve of the wheel cylinder and fit a special rubber hose with a length of about 400 mm on the valve. The other end of this hose is lowered to the bottom

in a transparent vessel with a capacity of at least 0.5 liters, half filled with brake fluid.

4. Shortly press the brake pedal 3 ... 5 times and, keeping the pedal pressed until stop, screw off the bypass valve by 1 / 2-3 / 4 turns, releasing a portion of the liquid from the system into the vessel. After the pedal has moved forward until stop, turn the valve back on. Repeat this operation until the air bubbles are released from the hose that is lowered into the brake fluid reservoir.

5. Upon completion of pumping, hold the pedal pressed until stop, turn the valve and remove the hose. Wipe the valve head dry and put on the protective cap.

6. Add the brake fluid to the MAX mark in the brake main cylin-der reservoir. Screw the tank cover with a force to exclude its breakage.

In the process of pumping, in timely top up the liquid in the main cylinder reservoir not allowing the liquid level in the tank to drop by more than 2/3 of its volume. Always keep the hose end immersed in liquid.

ATTENTION! It is forbidden to top up the main cylinder with the brake fluid collected in the vessel during pumping.

6.5.4. Possible malfunctions of a working brake system and methods of their elimination

Table 6.3

Cause	Troubleshooting
High brake pedal travel (150-200 mm)	
Increased clearance between pads and drums	Adjust the gap
Presence of air in the hydraulic drive system	Pump the system
Incorrect installation of the pads after they have been replaced	Carry out full adjustment of brake mechanisms
When braking, the pedal gradually "falls through" approaching the floor of the cabin	
Fluid leakage in the connections of pipe-lines, wheel cylinders, power units, regulator, easily detectable by reducing the level in the main cylinder tank	Tighten the connections, replace the cuffs or repair the damage
Wear of the seal or head ring of the main cylinder piston in the absence of fluid	Replace the damaged cuff and main cylinder ring

Table 6.3 (continued)

Low efficiency of braking	
Losses in the connec-tions of the vacuum pipeline	Find the leaks in the pipeline con-nections and eliminate them
Destruction of the dia-phragm of the power unit chamber or the diaphragm of the con-trol valve	Disassemble the power unit, replace the damaged diaphragm
The brakes are not released	
Absence of clearance between the follower and the piston in the main brake cylinder	Adjust the brake pedal free travel
Swelling of rubber cuffs due to ingress of mineral oil into the system	Drain brake fluid, disassemble all cylinders, brake power unit and rinse the parts in the brake fluid. Rinse braking system. Replace brake cuffs. Before assembly of the details of cylinders and power unit should be grease with castor oil

Table 6.3 (continued)

One brake is not released	
Coupling spring of brake pads (drum brakes) is loose or bro-ken	Replace spring
Piston seizure in the wheel cylinder due to corrosion or blockage	Disassemble the cylinder and rinse the parts with brake fluid. If neces-sary, clean the surface of the cylin-der with 100 grit sandpaper. Before assembling the part, lubricate with a thin layer of castor oil
The plug tightly rotates in the support pin (drum brakes)	Determine the cause of seizure. Lubricate the surfaces of the bush-ing and pad bearing pin so that grease does not get onto the work-ing surface of the brake pads
Seizure of support guide pins in the holes (disc brakes)	Clean or replace the guide pins, clean the surface of the support holes. If protective covers are dam-aged - replace them. Guide pins should be lubricated with Grease LEP2 (Gazprom-neft)

Table 6.3 (continued)

When braking the ATV is led to the side	
Oiling of friction lining of brake mechanisms;	Rinse the lining with gasoline and clean with sandpaper. Adjust the brakes.
Uneven air pressure in the tires.	Bring the tire pressure to the re-quired level.

6.5.5. Parking brake

Parking brake system (Figure 6.6) - disk transmission brake is installed on the primary shaft of the main drive of the intermediate axle.

Parking brake caliper bracket (item 7) is installed in place of the standard cover of the shank of the main gear drive shaft and is fixed with 6 bolts (item 16).

It is attached to the brake mechanism of VAZ 2110, modified by removing the service brake cylinder and installing a mechanical drive consisting of a lever (item 1), a bracket (item 2), a brake pad support (item 3) and axes.

Brake disc is installed between the propshaft and the input flange of the main drive, and is secured with 4 bolts (item 12).

The parking brake is actuated by a cable (item. 34).

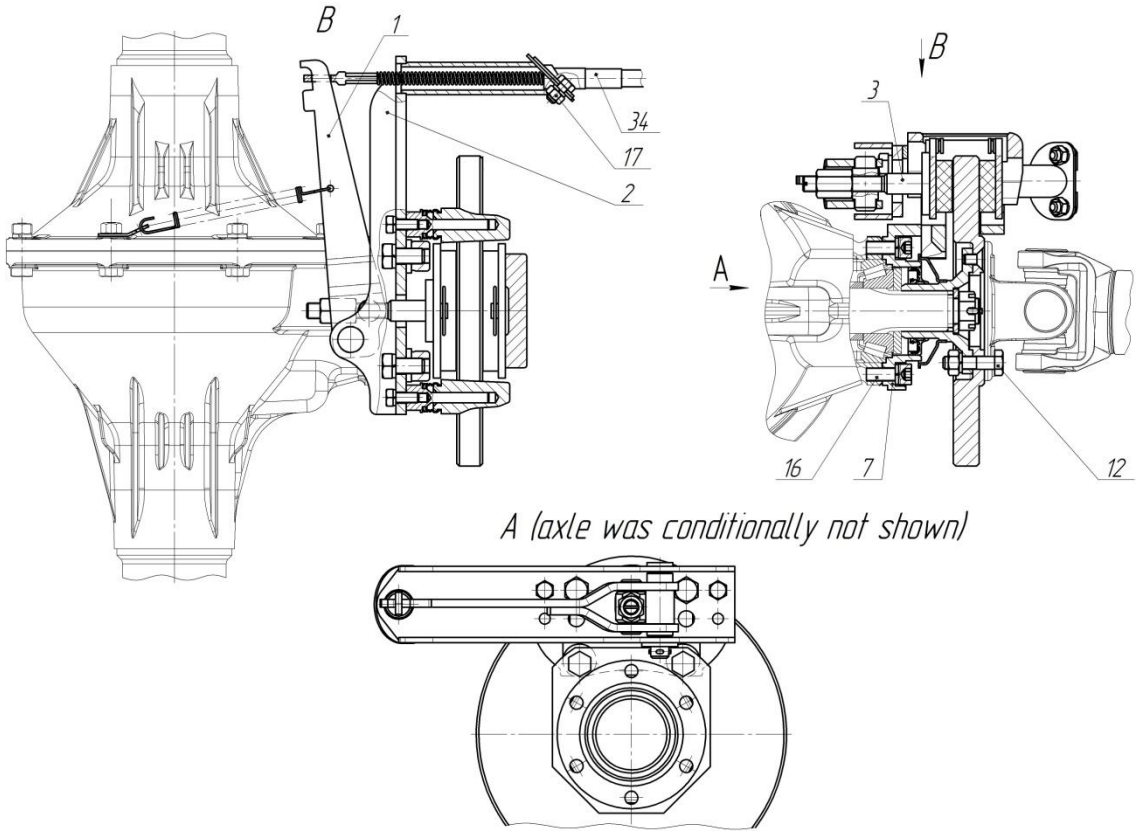


Fig. 6.6 Parking brake design

6.5.6. Parking brake maintenance

Maintenance of the parking brake involves periodic check of the condition of the brake and its drive, the reliability of the fastenings, the adjustment and cleaning of dirt, the lubrication of the guide pins, and elimination of the resulting faults.

In case of "gumming" of linings surfaces, clean them with sandpaper. Oily pads should be changed or after the treatment for 20-30 minutes in gasoline should be thoroughly cleaned with sandpaper or metal brush.

If the linings are worn out they must be replaced.

Adjust the brake when the brake lever travels more than half of its maximum stroke and the braking performance becomes insufficient.

Adjustment is carried out by unscrewing the threaded part of the brake pad stop (item 3), which should be screwed with a nut (item 17) after adjustment. The second place of adjustment is with the nuts on the threaded part of the cable sheath in its front part.

ATTENTION! It is forbidden to check the operation of the parking brake when starting or moving.

The work of the parking brake should be checked only on a slope.

6.5.7. List of possible parking brake malfunctions

Table 6.4

Malfunction	Possible cause	Troubleshooting
Increased brake lever stroke	Increased clearance between pads and disc or extension of the parking brake drive cable	Adjust the clearance If the friction linings are badly worn, replace the pads Adjust the length of the cable
Brake would not operate	Seizure or corrosion of the parts of the expansion mechanism Worn or oiled pad linings Improper djustment of the clearance or length of the cable	Disassemble the release mechanism, rinse and lubricate its parts Eliminate the cause of oiling of the linings. Replace pads or remove oil stains on the linings by rinsing them in gaso-line. Adjust the clearance or length of the cable
Brake is not released (heating of the brake disc)	Seizure of release mechanism Improper adjust-ment of the clear-ance or length of the cable	Disassemble the release mechanism, rinse and lubricate its parts Adjust the length of the cable

6.6. Electrical equipment

Electric equipment of ATV direct current, rated voltage 12 V, single-wire, negative pole connected to ATV.

In order to avoid damage to ATV it is forbidden to make any changes in the electrical equipment, for example, connect additional devices that consume electricity, or interfere with the operation of electronic control devices.

Regardless of the position of the key in the ignition lock, the power circuits of the audio signal, the stop light, the interior lighting, the motors of the cooling fans of the engine and the alarm are always switched on.

Do not disconnect the battery on the running engine. When checking the serviceability of ATV electrical equipment, it is not allowed to short-circuit the battery wire. It is recommended to always have a set of spare fuses.

Replace the fuses only after the cause of the fault has been eliminated and apply fuses only of the specified amperage.

The battery installed on the ATV does not need maintenance. Standing of all-terrain vehicle over 4 weeks can lead to discharge of battery, which may shorten its service life.

When parking with a non-working engine, it is necessary to limit the consumption of electricity by powerful consumers (seat heating, glass and mirrors, air conditioning, tire inflation compressor, electric winch, etc.). Otherwise, due to the discharge of the battery, starting of the engine will not be possible.

Activation of the battery discharge signal when the engine is idling can be caused by an excessively long load on the onboard network of the all-terrain vehicle.

In cases of parking of all-terrain vehicle with a running engine, slow traffic, when driving in a city, frequent trips for a short distance, it is necessary to partially limit the consumption of electricity by powerful consumers. Otherwise, due to undercharging of the battery, the subsequent start of the engine will not be possible.

When starting the engine, it is always necessary to depress the clutch pedal so as not to load the starter and the battery.

Charging the battery with the charger is done with the wire terminals disconnected from the battery terminals. First disconnect the battery negative terminal, then the positive terminal. When connecting first connect the positive, and then the negative terminal. Charge the battery according to the manufacturer's instructions.

It is possible to start the engine from an additional battery - connect the positive battery cable of the additional battery with the plus of the car battery. Connect the negative battery cable of the secondary battery strictly with the general part of all-terrain vehicle, as far as possible from the batteries. Start the engine, wait for stable engine operation at idling speed, then disconnect the connecting wires.

Always avoid sparkles and open flames near the battery, monitor the condition of the terminals. The discharged battery can freeze at 0 °C.

ATTENTION! When servicing and repairing the engine control system, always turn off the ignition (in some cases, disconnect the bat-tery terminal from the negative battery terminal). When weld-ing on MTS, disconnect the engine control harness from the controller. When the engine is running, do not disconnect or correct the engine management wiring harness pads or the battery cable terminals.

Do not start the engine if the wire terminals on the battery outputs and the tips of the "mass" wires on the engine are not fixed or contaminated.

The controller is installed in front on the right side of the body.

The engine compartment (in the middle on the rear wall) contains a diagnostic link of the engine control system and the petrol pump relay nelow it as well as the main relay of the engine control system.

Connector for three fuses for the engine control system is installed next to the battery:

- 15A fuse "+ 12V from the battery" (near the battery);
- 10A fuse "+ 12V from ignition terminal 15" (middle);
- 15A fuse of "electric rear-end pump" (far from the battery).

The power fuse block is located on the engine cover of the front end, under the hood and consists of two fuses:

- right fuse (along the ATV way) - protects the circuit of outdoor lighting at 40A;
- left fuse (along the ATV way) - protects the circuit of "30" ignition switch terminal at 90A.

The fuse box (26 pcs.) is installed in the body of ATV under the instrument panel to the left of the steering post.

Table 6.5

Designation	Current force, A	Protected circuits
UPPER UNIT (numbering of fuses from left to right)		
F1	25	Reserve
F2	5	Parking lights (starboard)
F3	7,5	Low beam headlight (starboard)
F4	10	High beam (starboard)
F5	7,5	Reserve (fog lamp - starboard)
F6	5	Fog lamp lighting fuse box, portable lamp socket
F7	7,5	Brake signals
F8	10	Direction indicators in alarm mode

Table 6.5 (continued)

F9	20	Sound signal
F10	7,5	License plate illumination lights, illumination of instruments, switches
F11	15	Cigarette lighter
F12	5	Reserve (rear fog lamp)
F13	10	Reserve (radio equipment)
LOWER UNIT (numbering of fuses from left to right)		
F14	25	Reserve
F15	5	Parking lights (port side)
F16	7,5	Low beam headlight (port side)
F17	10	Headlight - high beam (port side), high beam headlight warning light
F18	7,5	Reserve (fog lamp - port side)

Table 6.5 (continued)

F19	5	Reversing light
F20	7,5	Turn indicators in maneuver mode
F21	10	Heater
F22	20	Windscreen wiper motor, windshield washer
F23	7,5	Interior lighting, under hood lights
F24	15	Reserve
F25	5	Instruments, alarms
F26	10	Additional heater pump

Lamps used on the ATV Table 6.6

Item No.	Lights location	Type of lights	Power, W	Number of lights per ATV
1	Headlight: high beam and low beam	A12-45×40 АКГ12-60+55-1 (H4)	45×40 60×55	2
2	Front Lights: - side light - turn signal indicator	 A12-5 A12-21-3	 5 21	 2 2
3	Rear Lights: - side light - turn signal indicator - brake signals	 A12-5 A12-21-3 A12-21-3	 5 21 21	 2 2 2
4	Side blinkers	A12-5	5	2
5	Reversing light	A12-21-3	21	1
6	License plate illumination light	A12-5	5	2
7	Under hood light	A12-21-3	21	1
8	Cab dome light	A12-10	10	1

Table 6.6 (continued)

9	Instruments lighting devices	AMH12-3-1	3	6
10	Control of alarm activation	A12-1,1	1	1
11	Emergency liquid overheat control	AMH12-3-1	3	1
12	Fuel reserve indicator	AMH12-3-1	3	1
13	Control of emergency oil pressure	AMH12-3-1	3	1
14	In the speed recorder: control of parking lights switching on, high-beam headlights	A12-3-1	3	2
15	Emergency fluid level indicator	A12-1	1	1
16	Parking brake switching on sound alarm	A12-1	1	1
17	Turns switching on signal indicator	A12-1	1	1
18	Interaxle differential lock signal indicator in the transfer case	A12-1	1	1

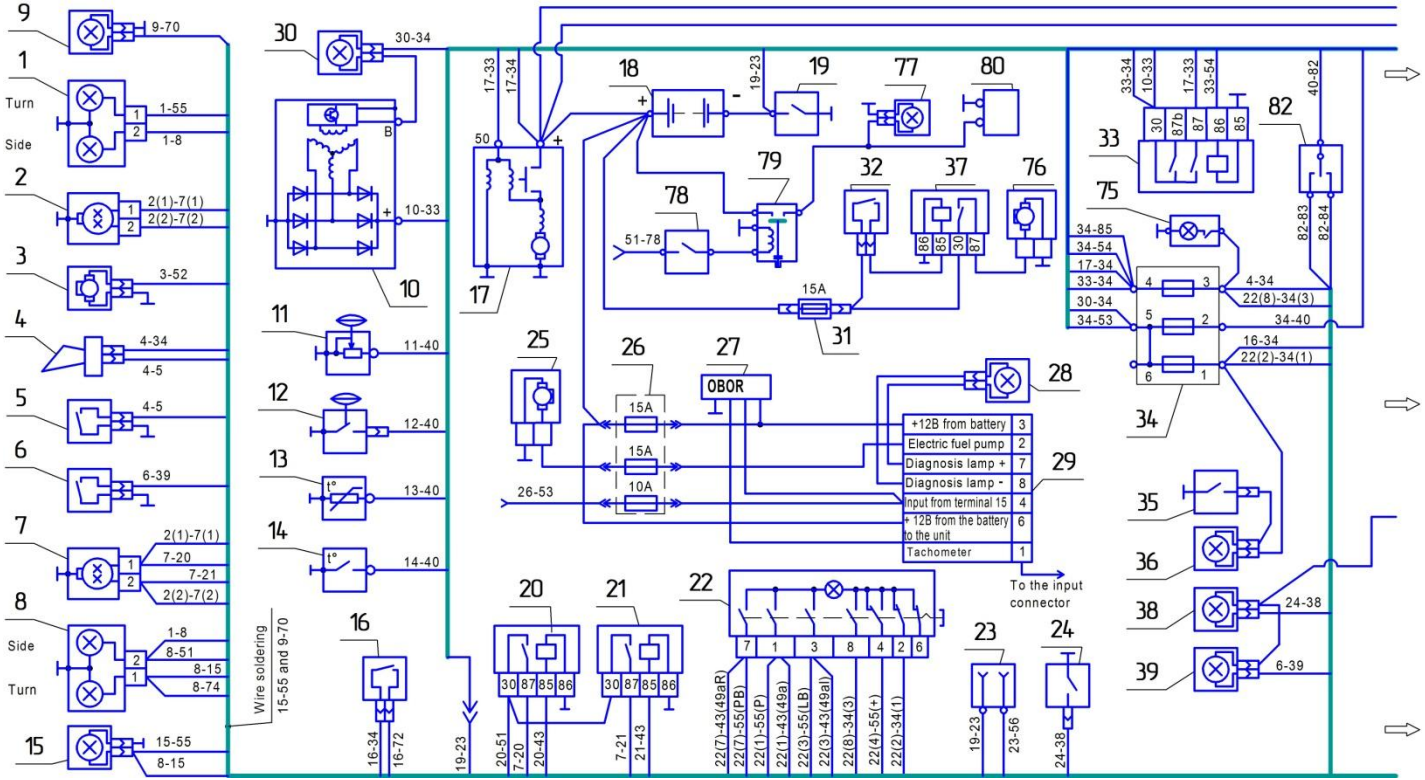


Fig. 6.7 (Part 1) TRECOL 39041 power supply circuit

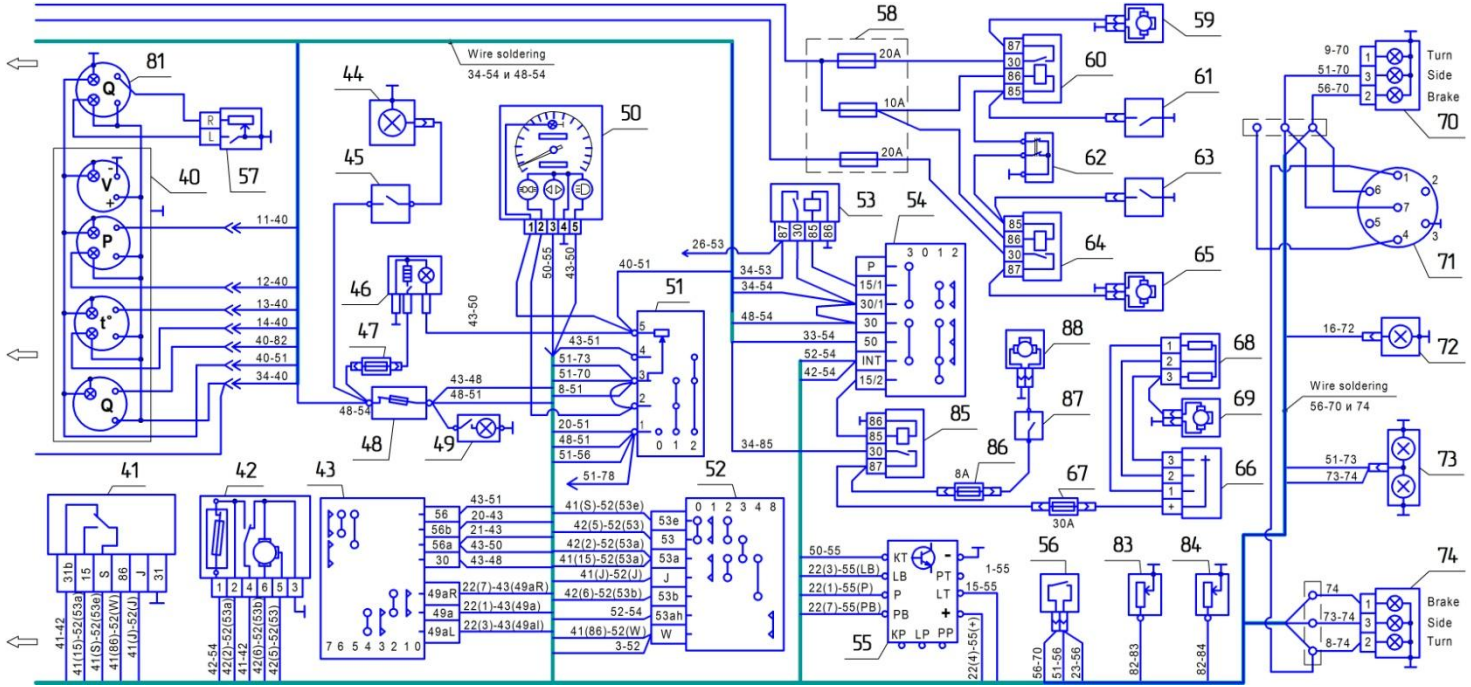


Fig. 6.7 (Part 2) TRECOL 39041 power supply circuit

№	Name
1	Front right lantern
2	Right headlight
3	Electric washer
4	Sound signal
5	Sound button
6	Brake Fluid
	Level Sensor
7	Left headlight
8	Front left lantern
9	Right side follower
10	Generator
11	Oil pressure indicator
12	Emergency pressure sensor
13	Cooling liquid
	temperature sensor
14	Cooling liquid emergency
	temperature sensor
15	Right side follower
16	Reversing light switch
17	Starter
18	Battery
19	Battery disconnect switch
20	Dimmed headlights
	switch relay
21	Distance light
	switch relay
22	Hazard light switch
23	Socket outlet

№	Name
24	Parking Brake
	Light Switch
25	Rear tank fuel priming pump
26	Motor drive circuitry
	fuse block
27	Electronic tachometer
28	CHECK ENGINE indicator
29	Control circuit connector
30	Battery charge indicator
31	Fuel pump fuse
32	Fuel pump button
33	Staretr relay
34	Fuse box
35	Locking pump switch for
	distributing box differential
36	Lockout control
	indicator for distributing
	box differentia
37	Fuel pump relay
38	Parking brake
	switch indicator
39	Brake fluid level
	warning indicator
40	Instrument panel
41	Wiper breaker
42	Wiper
43	Light signal switch
44	Rotating headlamp

№	Name
45	Rotating headlamp switch
46	Cigarette lighter
47	Cigarette lighter fuse
48	Thermal fuse
49	Interior Car Lights
50	Speed recorder
51	Central switch
52	Wiper switch
53	Ignition switch relay
54	Ignition switch
55	Turn indicator and
	alarm indicators relay
56	Stop-signal switch
57	Fuel level sensor of rear tank
58	Fuse box
59	Right fan
	motor
60	Right fan switch relay
61	Right fan
	switch sensor
62	Forced power button
	for cooling system fans
63	Left fan switch sensor
64	Left fan switch relay
65	Left fan motor
66	Heater switch
67	Heater fuse
68	Heater resistance

№	Name
69	Heater electric engine
70	Right rear lantern
71	Backsight plug
72	Reversing light
73	License plate illumination lantern
74	Left rear lantern
75	Under hood lantern
76	Fuel priming pump топлива
77	Wrench power
	pilot light
78	Wrench power switch
	remote button
79	Wrench power switch
80	Wrench
81	Rear tank fuel level meter
82	Fuel level sensor
	switch of lateral tanks
83	Left tank fuel
	level sensor
84	Right tank fuel
	level sensor
85	Additional ignition
	switch relay
86	Electric motor
	pump fuse
87	Electric pump switch
	of the heating system
88	Electric heating pump

Fig. 6.7 (Part 3) TRECOL 39041 power supply circuit

7. Adjusting values

Table 7.1

Clearances between rockers and valves on the cold engine HYUNDAI D4BF (15...20 ^{0}C), mm : (80...90 ^{0}C), mm :	 0,15 0,25
Minimum engine speed of the crankshaft of the engine ZMZ-4062.10 и ZMZ-40905.10, мин-1	800...900
Minimum engine speed of the crankshaft of the engine HYUNDAI D4BF, min -1	750
Deflection of the hydraulic booster pump belt at 4 kgs, mm	8…14
Free travel of the clutch pedal, mm	35...55
Free travel of the brake pedal, mm	5...14
Free travel of the steering wheel, degrees, not more than	10
Coolant level in expansion tank	Based on marks
Maximum permissible diameter of the bore of the service brake, mm	281
Minimum permissible brake disc thickness, mm	20,4
Minimum permissible parking brake disc thickness, mm	10,8
Front wheel toe-in, mm (at the rim edges)	1,5...3,0

8. Operating manual

8.1. Preparing ATV for operation

Before starting the operation of ATV, it is necessary to:

- check the correspondence of the numbers of the shipping documents with the ATV passport data;

- check the completeness of ATV according to the attached packing list (availability of operational documentation, tools, components and accessories);

- carefully inspect ATV, check and, if necessary, tighten the threaded connections, while paying attention to the presence and correctness of the installation of washers, cotter pins and nuts;

- check and, if necessary, bring the air pressure in the tires to normal;

- check the fastening of the wheels;

- check and, if necessary, fill the ATV with coolant, oil and fuel according to the lubrication chart of combustible and special liquids;

- start the engine, warm it up and with the engine running check the operation of electrical equipment and all ATV systems.

During test travel check the operation of systems, mechanisms and instruments.

In all cases of preparation of the ATV for the movement it is necessary to carry out a control inspection of ATV and check the following:

- availability and fuel level in the tank (refuel if necessary);
- coolant level in the expansion tank of the cooling system (if necessary, top up);
- presence of brake liquid in the tank of the main brake cylinder and the cylinder of the clutch hydraulic drive (add if necessary);
- presence of liquid in the windscreen washer tank (add if necessary);
- condition of wheels and tires;
- state of power steering (without the use of special tools);
- operation of heating and ventilation system;
- operation of lighting and alarm devices;
- check the completeness according to item «Complete set»;
- state of windows of the cabin, headlights, rear lights, rear-view mirrors, etc.

8.2. ATV breaking-in

Reliability, durability and efficiency of ATV depend on the running-in of parts in units and assemblies in the initial period of operation (breaking-in). The duration of the break-in period for a new ATV is 1500 km, of which 250 km are factory tests, run on roads with an improved coating and on a slightly cross-country terrain with a solid surface. Avoid traffic in heavy traffic conditions (deep mud, marshy swamps, steep slopes, etc.).

For the break-in period the maximum speed should be limited to 50 km/h. The payload must not exceed 50% of the rated payload. For the break-in period the tire pressure should be within the range of 20...55 kPa (0,2...0,55 kg /cm ^{2}).

In the process of testing the ATV it is necessary to closely monitor and verify the following:

1. The degree of heating of the wheel hubs, brake drums, front axle ball joints and the main gears of the leading axles. When the heating is high, it is necessary to find out the cause and repair the malfunction.

When the wheel hub is heated, it is necessary to remove the wheel, remove the caliper and try to rotate the hub by hand. The permissible value is 1.1-1.6 Nm (you can rotate it with your hand). If the value is within the permissible range, the cause of the heating is in the brake pads. If the value is higher than the allowable value, loosen the bearings.

2. The oil level in the units (top up if necessary).

3. The condition of all fixtures. Loosen nuts, screws and bolts should be tightened in time. Particular attention should be paid to the fastening of the steering arm, steering crankcase, ball joints of the steering rods, levers of the front axle camshafts, wheel nuts, axle flanges, flanges of the cardan shafts, spring nut nuts and the like.

4. During the movement carefully monitor the instrument readings and take timely measures to eliminate the identified malfunctions leading to abnormal operation of the ATV units and assemblies.

5. In case of failure or malfunction contact TRECOL Service. Phone: +7-910-000-33-01.

After the end of the ATV break-in period perform the work foreseen in the Routine maintenance -0.

In the future maintenance of ATV is carried out in accordance with the list of works performed during technical maintenance of ATV.

8.3. Starting and stopping the engine

ATTENTION! It is strictly forbidden to start and warm up the engine in a room that does not have good ventilation in order to avoid carbon monoxide poisoning.

For reliable engine start-up the viscosity grade of the engine oil should correspond to the temperature range of ATV operation.

In the design of the ignition switch mechanism a lock is applied, which makes it possible to restart the engine only after the key is returned to the "0" position. As soon as the engine starts, immediately release the ignition switch key - it will automatically return to the "I" position.

ATTENTION! Do not start driving on an ATV with a cold engine. It is strictly forbidden to drive with a high frequency of rotation of the crankshaft in order to accelerate the heating.

Start the cold engine at a low temperature after preheating it (steam, hot air or using the preheater).

The temperature of the coolant of the heated gasoline engine should be not less than 60 °C.

In very cold weather and in case of a cold engine, depress the clutch pedal before starting the engine. After starting the engine gradually release the clutch pedal.

ATTENTION! Emergency starting of the engine by towing is prohibited.

Turn off unnecessary lights and accessories, as the battery charge may decrease and it will be difficult to start the engine.

8.3.1. Start of engines ZMZ-4062.10 and ZMZ-40905.10

1. Depress the clutch pedal to the stop and set the gearshift lever to neutral.

2. Turn the ignition key to the "I" position. If starting is carried out after a prolonged stop, it is recommended to wait until the electric fuel pump switches off (approximately 5 seconds). With a faultless engine control system the fault warning lamp on the instrument panel should turn on and go out. If the test lamp does not go off, the fault should be identified and corrected.

3. Without pressing the accelerator pedal turn the ignition key to position "II" and turn the crankshaft of the engine by the starter motor before starting the engine. Release the ignition key as soon as the engine has started.

4. Warm up the engine. After starting the engine its control system will automatically set the idle speed for warming up the engine and gradually reduce it to minimum as the engine warms up.

5. Try to start the engine again not earlier than in 15-20 seconds. If the engine does not start with three attempts, press the accelerator pedal to the stop and turn on the starter for 3-5 seconds. In this case the control unit will fulfill the function "Engine cylinders blowdown mode", then try to start the engine again. If the engine does not start, stop starting, find out and correct the fault.

8.3.2. Start of engines Hyundai D4BF

1. If the ATV was not used for a long time, then before starting the engine pump up the fuel with a manual pump.

2. Depress the clutch pedal to the stop and set the shift lever to neutral.

3. Turn the ignition key to the "I" position. If the engine is cold then check that the glow plug indicator light comes on. When the control lamp of the glow plugs goes out, the preheating is complete.

Note: if the engine is warmed up, the glow plug indicator lamp may not light up even after turning the key to the "I" position. If the engine is cold, the glow plug indicator lamp can illuminate for a long time (15 seconds or more) at a low ambient temperature. If the engine has not been started for about 10 seconds after the glow plug indicator light is turned off, turn the ignition key to the "0" position. Then again turn the ignition key to the "I" position to prepare for start-up.

4. Without pressing the accelerator pedal, turn the ignition key to position "II" and turn the crankshaft of the engine with the starter motor before starting the engine. Release the ignition key as soon as the engine has started. Do not crank the engine for more than 10 seconds at a time. Before the next attempt to start the engine, take a break for at least one minute.

After starting warm up the engine until the pointer of the coolant temperature gauge starts to move.

ATTENTION! The engine is equipped with a turbo-charger, so immediately after starting the engine do not increase the crankshaft speed to high values and do not drive at high speed.

8.3.3. Engine stop

To stop the engine turn the key in the ignition switch to the "0" position. For gradual and uniform cooling of the engine, before turning off the ignition, allow it to run for 1.5-2 minutes at idle.

8.4. General movement of ATV

Proper driving of ATV is one of the most important conditions for increasing its service life and trouble-free operation. ATV can be started away from rest only after the engine has warmed up and the control devices have been checked. During the movement it is necessary to constantly monitor the readings of the instruments.

When operating ATV it is especially important to choose the right internal tire pressure.

The specific value of internal pressure when driving off-road is selected by the driver depending on the type of bearing capacity and the condition of the ground, snow, wetlands. At the same time, the tire pressure must ensure that the ATV is passable under the given conditions without destroying the surface layer and the vegetation cover.

Recommended tire pressures for the most characteristic driving conditions and driving speeds, depending on the tire pressure, are given in Table 8.1.

Recommended tire pressure parameters

Table 8.1

Conditions of driving	Recommended air pressure in tires, kPa (kg/cm2)	Speed, km/h
Hard roads	50...55 (0,5... 0,55)	70
Ground roads	30...45 (0,3...0,45)	40…60
Sand, plowing	20...30 (0,2...0,3)	20…40
Wet meadow	10...20 (0,1...0,2)	10…20
Virgin snow	10...25 (0,1...0,25)	10…30

The specified values of pressure should be maintained in the tires regardless of the ambient temperature with an accuracy of ±0,01 kgf/ cm^2.

Before starting the movement it is necessary to set the correct internal air pressure in the tires according to Table 8.1 and turn on the necessary gear in the transfer box.

In severe road conditions the lowest gear in the transfer box should be activated. In particularly heavy areas the interaxle differential in the transfer box should be blocked.

ATTENTION! Movement on hard roads with a locked interaxle differential is strictly prohibited as this can lead to the failure of transmission.

Switching of transfer box transmissions and locking of differential is activated when the ATV stops completely (a slight forward or backward movement is allowed).

To avoid an excessive increase of the engine speed do not drive in the lower gear in the transfer box at a speed of more than 35 km/h.

The initial transmission in the gearbox when starting away from rest is selected depending on the loading of ATV and road conditions.

Switch gears with the clutch switched off by gently pressing the shift lever.

After a long stay at a very low ambient temperature it is recommended to drive at least 1 km in the first speed and the lowest gear in the transfer box. At the same time, the engine should operate at an average engine speed of the crankshaft, so that the oil in the gearbox, transfer box and drive axles is heated and becomes less viscous, which is necessary for normal lubrication of the gears.

ATV should be braked smoothly in all cases, avoiding sudden braking. When braking do not allow the wheels to slip as this significantly reduces the braking effect and increases tire wear. On a slippery road a strong and severe braking can cause a crash.

While ATV parking, in addition to the parking brake, it is required to switch a lower gear or a reverse gear in the gearbox and one of the gears in the distributing box.

8.5. Overcoming water barriers

ATV is able to overcome water obstacles afloat. The floatability is provided by the displacement of the wheels. Movement afloat is provided by the rotation of wheels and maneuvering by turning the steerable wheels.

Before entering the water estimate the size of the reservoir, the state of the soil and the slope of the shoreline, determine the location of the entrance and exit. Choose a place with the densest soil on the flat section of the shore. The presence of wind, wave or current significantly complicates the movement afloat and can lead to loss of controllability and uncontrolled driftage of ATV.

ATTENTION!

Overcome small water obstacles only if they cannot be passed-by.

It is forbidden to overcome small water obstacles in the event of damage or absence of one of the ATV wheels.

Do not overload the ATV. Nominal load capacity, including the mass of additional equipment, driver, passengers and cargo afloat, is 350 kg.

Cargo should not be mounted on the trunk installed on the roof of ATV. Before entering the water move the load from the roof to the passenger compartment of the ATV to reduce the possibility of overturning.

The displacement of tires 1280x530x533 is not enough to maintain the ATV afloat. Therefore, water obstacles with depths up to 1.1 m should be forded.

Passengers and cargo in the cabin should be distributed evenly, without overloading on the sides or axes of the ATV and, if possible, as low as possible to ensure the stability of ATV on water. It is forbidden to move around the passenger compartment of the ATV being afloat.

The tire pressure should be maintained between 0.2 and 0.55 kgf/cm².

Enter the water at low speed. Before entering the water lock the center differential, engage the lower gear in the front transfer box and connect the rear axle. Movement afloat should be carried out with the third or fourth gear in gearbox and engine speed of 1200-1700 rpm.

ATTENTION! Control the temperature of the engine. If the temperature rises, immediately lower the engine speed.

The speed of motion afloat (in the absence of wind or current) is 1-1.5 km/h.

After overcoming the water obstacle several smooth braking operations should be performed while the ATV is moving to dry the braking mechanisms. At the earliest opportunity check the condition of the oil in all units. If water is found in the oil - replace it, find the cause of water ingress and eliminate it.

8.6. Movement of ATV with a trailer

The movement and driving of ATV with a trailer is more difficult than driving without it. In this case the driver needs special attention:

- place the load on the trailer in such a way that the center of its gravity is located as low as possible and closer to the longitudinal axis of the trailer. The vertical load from the trailer towing eye to ATV towing hook should not exceed 50 kgf. If the cargo is placed incorrectly (shifted backwards), when the trailer is uncoupled from ATV, it is possible to tilt the trailer back around the axis of the wheels;

- it is strictly forbidden to transport people in the trailer and operate the trailer without connecting it to ATV with safety chains;

- length of the safety chains must be such that the drawbar hangs freely on them. Otherwise, if the emergency disengagement of a moving vehicle with a trailer is disconnected, the drawbar will rest on the road and the trailer will fall over;

- air pressure in the tires of the trailer must correspond to the pressure in the tires of the military transport vehicle and differ from the left and the right by not more than 0.01 kg /cm ^{2}. It should be kept in mind that when the air pressure in the trailer tires is less than 0.3 kg /cm ^{2} or if there is a large pressure difference between the right and left sides, the horizontal (course) fluctuations of the trailer are sharply increased due to a sharp maneuver, sideways gust, movement of unevenness, etc.;

- maximum permissible speed of ATV with a trailer of not more than 50 km / h, the controllability and stability are reduced if the speed is exceeded;

- actions of ATV driver with the trailer must be predictable and understandable to other drivers (especially the oncoming and overtaken vehicles) who often see the trailer at the last moment;

- large mass of ATV with a trailer reduces both the acceleration and braking dynamics. Start the movement, accelerate, rebuild and slow down very gently, smoothly, without jerking. Otherwise, the trailer will strongly pull or push ATV.

- braking should be smoothly, regardless of whether the trailer is empty or loaded. Jerks when braking, especially when cornering, can cause a skid of a trailer or military transport unit and their "folding". Therefore, before the turn, it is better to reduce the speed in advance and the turn itself shall be at low rpm;

- it is easier to drive ATV with the trailer when ATV is loaded more than trailer; in the worst case (when the ATV is empty), it is better to shift part of the cargo;

- increased dimensions of the military transport vehicle with the trailer complicate the restructuring in the stream and while maneuvering. When driving while turning, the trailer wheels move along a smaller radius than the wheels of ATV and this should be taken into account when passing through sharp turns;

- reversing is difficult as the visibility is limited and the trailer is prone to a dramatic change in trajectory when one wheel hits a bump;

- controllability and stability of ATV with a trailer is worse. In the abrupt manner of driving, the trailer can swing and go beyond the lane, tip over, provoke a warfare or its overturn;

- look more frequently in the rear-view mirrors to control the trailer motion even on a straight road. Then, it is possible to notice the dangerous oscillations of the trailer before they can be felt based on the ATV movement and stop the swing by reducing the speed of movement;

- when driving on rough terrain and overcoming ruts of track, etc., do not allow the trailer to fall through with one wheel as this may cause the trailer to tip over. To leave the rut, slow down and drive out in the area where there is freedom to maneuver;

- if the vertical, longitudinal or lateral oscillations while driving of ATV with the trailer have become more intense or longer than they were at the beginning, it is required to check the serviceability of ATV and trailer suspension.

8.7. Towing of ATV

Before towing the ATV it is necessary to set the gearbox and transfer box levers to the neutral position.

ATV towing can be carried out with a soft or rigid coupler, as well as in a semi-submerged condition.

When towing with a soft coupler the towed ATV should be in good working order with serviceable brakes, lighting and sound signal. A rope or a steel cable can be used as a coupler. The cable should be firmly fixed to both vehicles. When moving the cable should always be pulled. If it weakens the towed ATV should be slightly braked. The towing speed with the soft coupler should not exceed 20 km/h.

ATV towed with a rigid coupler should have a faultless steering control, and in the dark - an operating back light. The towing speed in this case depends on the conditions and general traffic rules.

Towing in a semi-submerged condition occurs when the ATV has a faulty steering, a front axle and in case there is no driver.

9. Maintenance instructions

9.1. Scheduled maintenance

Table 9.1

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
		1500	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
		RM -0	RM -1	RM -2	RM -3	RM -4	RM -5	RM -6	RM -7	RM -8	RM -9	RM -10	RM -11	RM -12
			65000	70000	75000	80000	85000	90000	95000	100000	105000	110000	115000	120000
			RM -13	RM -14	RM -15	RM -16	RM -17	RM -18	RM -19	RM -20	RM -21	RM -22	RM -23	RM -24
			125000	130000	135000	140000	145000							
			RM -25	RM -26	RM -27	RM -28	RM -29							
1	**Engine:**													
1.1	Tightness of seals and connections of engine units and systems	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
1.2	Coolant	CHK	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG
		Should be replaced every 20.000 km or every two years, depending on what comes earlier												
1.3	Tightness of cooling and heating system, serviceability and fixing of cooling system pump, condition of electric fans	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
1.4	Radiator mounting			CHK		CHK		CHK		CHK		CHK		CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1.5	Oil and oil filter in the engine	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG	CHNG
		Should be replaced every 5.000 km or every year, depending on what comes earlier												
1.6	Air filter		CHK	CHNG	CHK	CHNG	CHK	CHNG	CHK	CHNG	CHK	CHNG	CHK	CHNG
1.7	Fuel filter (for gasoline engines ZMZ 4062.10 and 40905.10)					CHNG				CHNG				CHNG
1.8	Fuel filter (for diesel engine HYUNDAI D4BF)			CHNG		CHNG		CHNG		CHNG		CHNG		CHNG
1.9	Gaps in the timing mechanism (should be adjusted for diesel engine HYUNDAI D4BF)	CHK				CHK				CHK				CHK
1.10	Mounting the intake and exhaust manifolds (for gasoline engines ZMZ 4062.10 and 40905.10)	CHK				CHK				CHK				CHK
1.11	Spark plugs (for gasoline engines ZMZ 4062.10 и 40905.10)			CHNG		CHNG		CHNG		CHNG		CHNG		CHNG
1.12	Glow plugs (including contacts, for diesel engine HYUNDAI D4BF)				CHK				CHK				CHK	

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1.13	Timing belt and its rollers (for diesel engine HYUNDAI D4BF)					CHK		CHK		CHNG				CHK
		SHOULD BE REPLACED AT LEAST ONCE EVERY 5 YEARS												
1.14	Drive belts	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
1.15	Engine speed at idle (adjusted and control exhaust gases)	CHK				CHK				CHK				CHK
1.16	Exhaust system status and mounting	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
1.17	Fastening of power unit, clutch crankcase, transmission	CHK		CHK		CHK		CHK		CHK		CHK		CHK
1.18	Fuel tank and fuel intake (rinse). Fastening of fuel tank. Ventilation system (purge).					CHK				CHK				CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
2	**Transmission:**													
2.1	Mounting of transfer box control drive		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
2.2	Fastening and tightness of seals of crankcases – transfer box, leading axles, gearboxes	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
2.3	Fastening of bearing caps of driving gears of driving bridges			CHK		CHK		CHK		CHK		CHK		CHK
2.4	Pipes for ventilation of transmission units (clean)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
2.5	Oil in gearbox, transfer box, crankcases of leading axles and onboard reducers (bring to normal)	Should be replaced every 20.000 km or every two years, depending on what comes earlier												
2.6	Extraneous noise in the clutch operation (check for a hear and evaluate the operability of the unit by test run)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
2.7	Fluid in clutch hydraulic drive		CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG
		Should be replaced every 20.000 km or every two years, depending on what comes earlier												
3	**Chassis:**													
3.1	Springs, spring bushings, rebound bumpers, rubber bushings of shock absorbers		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.2	Fastening of units, assemblies, chassis components (tighten)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.3	Backlash, the condition of lubricant in joint pivots (if necessary, adjustment and replacement of lubricant)	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.4	Clearances in hub bearings (adjustment if necessary), wheel-hub assembly (tightness control) (for ATV with UAZ wheel reduction)	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
3.5	Lubrication in hub assemblies and broaching of brake panels (for ATV with UAZ wheel reduction)	CHK	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG
3.6	Clearances in the bearings of the hubs (check and, if necessary, adjust (for ATV with TRECOL wheel reduction)	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.7	Fastening of flanges of cardan shafts to flanges of transfer box, leading axles, gearbox	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.8	Condition of crankshafts of cardan shafts and spline joints (lubricate according to lubrication chart)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.9	Tightness and serviceability of shock absorbers		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
3.10	Efficiency of tire inflation compressor, tightness of pumping system (if installed)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
3.11	Condition of wheels and tires, tire wear		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
4	**Steering:**													
4.1	Wheel toe-in (adjust if necessary)			CHK		CHK		CHK		CHK		CHK		CHK
4.2	Hydraulic power steering oil, paper filter in the HPS		CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG
		SHOULD BE REPLACED EVERY 20.000 KM OR EVERY TWO YEARS, DEPENDING ON WHAT COMES EARLIER												
4.3	Splinting of ball joint nuts, fastening of steering knuckle lever, drop arm	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
4.4	Steering rods, dust caps and backlashes in the steering joints		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
4.5	Steering wheel play	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
4.6	Fastening of crank case to frame girder	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
5	**Brake system:**													
5.1	Value of free and working stroke of brake pedal and its drive		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
5.2	Condition and tightness of pipe-lines of brake systems and brake cylinders, condition of hoses, tubes, connections	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
5.3	Brake fluid in the tank	CHK	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG	CHK	CHK	CHK	CHNG
		SHOULD BE REPLACED EVERY 20.000 KM OR EVERY TWO YEARS, DEPENDING ON WHAT COMES EARLIER												
5.4	Operation of brake fluid level indicator		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
5.5	Condition of brake cylinders, brake drums, brake pads. Adjust the clearances between the drums and pads (for ATV with drum brakes)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
5.6	Condition of brake cylinders, brake pads and brake discs, condition of protective covers of guide pins of caliper bracket, mobility of guide pins (for ATV with disc brakes)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
5.7	Condition and adjustment of parking brake, condition of parking brake pads		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
6	**Electrical equipment:**													
6.1	Condition of battery. Fastening and reliability of contact of wire tips on battery terminals, condition of battery housing and its fastenings. Lubricate the terminals		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
6.2	Generator operation, lighting, light and sound signaling, control instruments operation (dimensions, dimmed/driving lights, spot lights, reverse motion lights, saloon lighting, emergency stop signals, turn signals, etc.)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
6.3	Serviceability of windshield wiper and washer. Bring to normal the level of liquid for washing the windshield	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
6.4	Check adjustment of headlights lighting	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
6.5	Operation of starter (if necessary, check condition of collector and brushes of starter)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
6.6	Working capacity of additional equipment (if needed perform maintenance in accordance with the requirements for the operation of the equipment concerned)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
7	**Body:**													
7.1	Condition of the body, frame (cracks, corrosion spots, etc.)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
7.2	Operation of doors locks, bonnet		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
7.3	Lubricate door hinges, bonnet lock actuator, he friction areas of the door check, keyholes			CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
7.4	Fastening of body to frame		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
7.5	Fastening of seats, rear-view mirrors		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK

Table 9.1 (continued)

Ser.	Description of works	Kilometers travelled												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
8	**Ventilation and heating system:**													
8.1	Operation of ventilation and heating system		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
8.2	Cabin filter (for TREKOL-AGRO) (replace if necessary)		CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK	CHK
CHNG - replacement, CHK – check														

The total specified service life is 150000 km, taking into account the periodic maintenance and repairs based on the technical state in accordance with the instruction manual.

This manual describes works that should be done regularly in the intervals between the maintenance operations provided in the service book.

During the operation of ATV wear of friction surfaces of parts, violation of adjusting parameters, aging of rubber products and other phenomena occur. In order to prevent malfunctions and increase the service life of ATV, mandatory preventative maintenance is required, which includes lubrication, checking, adjustment and replacement of parts over a certain mileage.

Scheduled maintenance is designed to maintain the ATV in good condition and is a preventive measure, conducted in a planned manner. Full compliance with periodicity and high-quality performance of maintenance is the main condition for ensuring technical readiness, reliability and long service life of ATV. The lack of the necessary equipment and complex stationary or mobile maintenance facilities is not a basis for changing the volume, periodicity and conditions of ATV servicing. If there is a malfunction in the operation of machinery, extraneous noise, knocking or vibration, as well as violations of adjustments and other malfunctions, the driver must immediately take measures to eliminate them, regardless of the period of the next maintenance.

The operation of a faulty ATV or ATV that has not been properly serviced is prohibited.

The oil level in the crankcase should be checked with a cold engine that is not running. The level should be between the "MIN" and "MAX" marks (or P and O) of the indicator. Oil change should be carried out with the engine warmed up to working temperature. In order to drain the used oil, unscrew the plug of the oil pan. With each oil change in the engine, the oil filter should be changes.

The level of oil in the gearbox, transfer boxes, main gears of the leading axles and side gears should be at the bottom of the oil hole. When replacing the oil, drain it immediately after stopping the ATV, when the machine is warmed up.

The level of the brake fluid when the cover is installed and the brake pads have been replaced should reach the MAX mark. At the same time, the serviceability of the emergency level indicator should be checked. To do this, press on top of the central part of the protective cap - in this case the control lamp should light up if the ignition is switched on.

The emergency brake warning lamp illuminates when the liquid level in the tank falls below the "MIN" mark, which means that if the brake pads are partially worn out or new, it indicates a leakage of the system. In this case the liquid is topped up only after the system has been re-sealed.

If the hydraulic drive of the brakes is working, the lowering of the liquid level in the tank is due to the wear of the brake linings. Lowering the liquid level to the "MIN" mark indirectly indicates

their extreme wear. In this case it is necessary to maintain direct control over the condition of the pads.

During the check of the technical condition of the brakes, the front and rear brakes should be pre-cleaned from dirt, rinsed with water and dried with compressed air. Do not use any mineral solvents, as they can damage the protective caps and seals of hydraulic cylinders.

Contaminated pad liners, discs and drums should be cleaned with a metal brush and washed with detergents. If traces of a brake liquid are found out on overlays, it is necessary to find and eliminate the reasons of its occurrence. During maintenance protect the brake pads, discs and drums from oil or grease.

The coolant level in the surge tank should always be 3-4 cm higher than the "MIN" risks. Check the level and opening of the cap of the tank and refill the fluid only on with a cold engine. After replenishing the fluid, the plug of the tank should be tightened, since the expansion tank is under pressure when the engine is warmed up. In extreme cases clean water can be added to the cooling system. However, the freezing temperature of the mixture is increased and the corrosion resistance of the cooling system components is decreased.

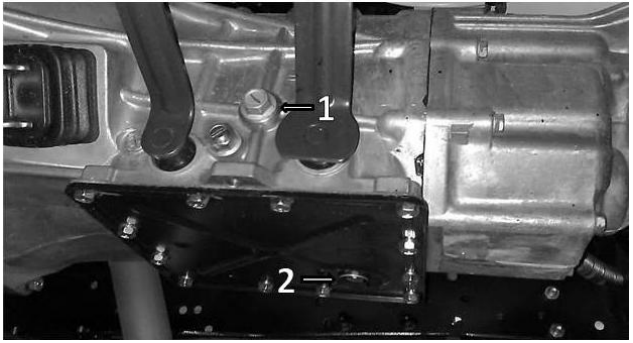


Fig. 9.1 Transmission HYUNDAI:

1 - oil hole plug, 2 - oil drain plug.

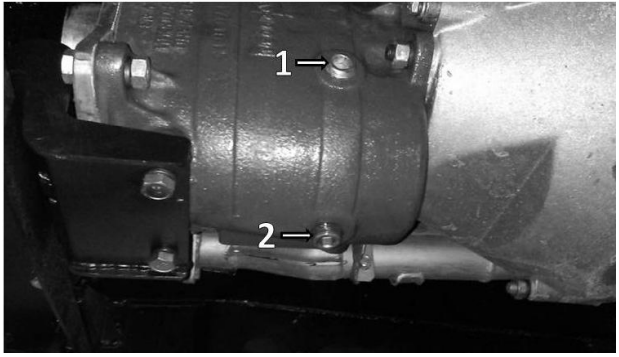


Fig. 9.2 Transmission UAZ:

1 - oil hole plug, 2 - oil drain plug.

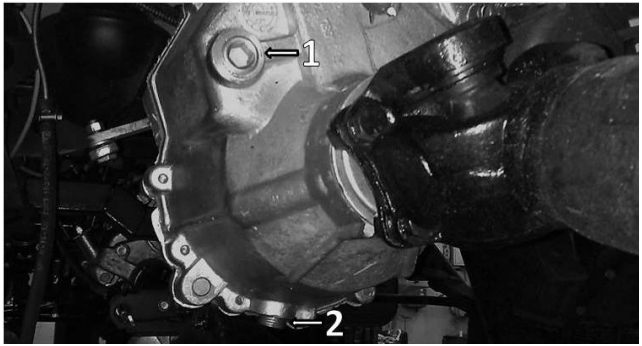


Fig. 9.3 Transfer box:

1 - oil hole plug, 2 - oil drain plug.

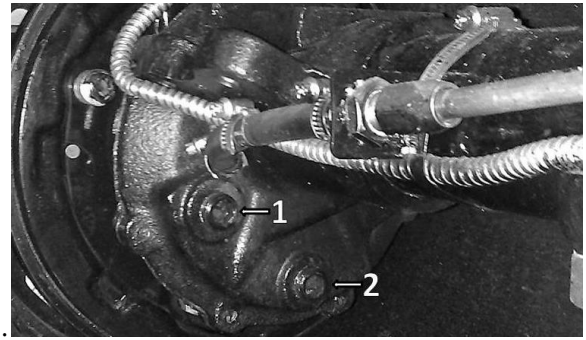


Fig. 9.5 oil drain plug:

1 - oil hole plug, 2 - oil drain plug.

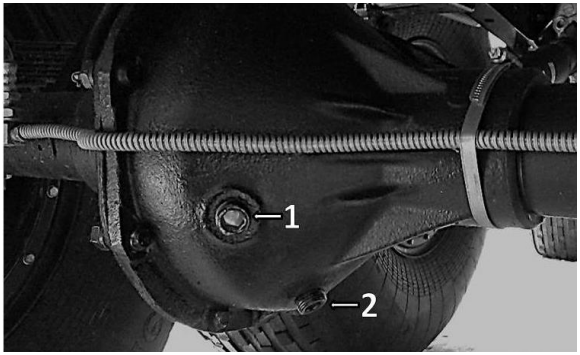


Fig. 9.4 Final drive casing of leading axle:

1 - oil hole plug, 2 - oil drain plug.

9.2. Daily maintenance

- Visually check the completeness of ATV, the state of the body, doors and mechanisms of doors, glasses, rear-view mirrors, trim package, number plates, frame, springs, towing device, paint, etc. by external inspection. Take measures to eliminate inconsistencies. Clean the ATV from dust and dirt or wash and dry. Clean the interior. Do not allow water to enter the electrical equipment;
- Check the tightness of the power supply, lubrication and cooling of license plates, paying attention to the condition of the fuel supply hoses. Leaking fuel, oil and coolant is not allowed. Cracks are not allowed on the outer surface of the hoses. Eliminate the causes of leakage, wipe dry the traces of streaks;
- Check the level of fuel, oil in the crankcase, fluid in the expansion tank of the cooling system, fluid in the reservoir of the master cylinder of the brake system and the master cylinder of the clutch release actuator, oil in the reservoir, fluid in the reservoir of the windscreen washer. If necessary, bring it to the norm in accordance with the instructions of lubrication chart;
- Inspect tires and wheels. Check air pressure in the tires, if necessary, bring it to normal. Remove foreign objects stuck in them (stones, nails, etc.);
- Warm up the engine and check for abnormal noise when the engine is running at different speeds. Check the operation and indications of instruments;
- Check the operability of the windscreen wiper and windshield washer, light and sound alarms, heating and ventilation systems;
- Check the operation of service braking system. When the engine is running, the brake pedal should not reach the floor of the cabin. The brake fluid warning light should be inactive. Check the tightness of the hydraulic drive of the service braking system;
- Check that the parking brake system is functioning properly. The parking brake lever should move to 3-4 teeth when applying a force of 60 kgf;
- Check the operation of pedals and control levers on the move.

9.3. Seasonal maintenance

Seasonal maintenance should be carried out twice a year - in spring and autumn and, if possible, should be combined with the next maintenance. When moving to winter and summer season of operation it is necessary to perform the following works:

- Remove the battery for recharging and adjust the density of electrolyte (if provided by the design of the battery);
- Check the condition and density of the fluid in the engine cooling system;
- Rinse the fuel tank, replace the fuel filters (if necessary) and blow out fuel lines;
- Check the operation of the body ventilation and heating system, the operation of the windshield wiper;
- Carry out a seasonal oil change in accordance with the lubrication chart.

9.4. Tightening torques for the main threaded connections

Table 9.2

Fasteners	Thread	Tightening torque, kgsc×m
Bolts of gearbox fastening to the engine	M10	4,0…5,6
Nuts of propshaft tension bolts	M10×1	3,2…4,0
Nut of fixing the axle inlet flange	M20×1,5	17…21
Tension bolts fastening idle gear of the main transmission to differential box	M12×1,25	10…11
Tension bolts of axles flanges	M10×1,5	6,0…7,0
Tension bolts of spherical joints	M10×1	3,6…5,0
Bearing nuts of tire hubs	M45×1,5	5,0…7,0
Nuts of mounting studs of brake supports	M10×1	3,6…4,4
Bolts of removable bearing housing of driving gear of wheel hub drive	M10×1	6,5…8,0
Bolts of driving gear of wheel hub drive	M10×1	6,5…8,0
Tension bolts of wheel hub drive cover	M10×1	3,6…4,0
Tension bolts of steering mechanism	M14×35 кл. пр. 10.9	16…20
Bearing nut fastening steering arm to shaft	M30×1,5	30…33
Steering wheel bearing nut	M16×1,5	6,6…8,1
Nuts of ball pins (UAZ) of steering linkage	M14×1,5	6,0…8,0
Nuts of ball pins (GAS) of steering linkage	M16×1,5	7,0…10,0
Tie rod locknuts	M18×1,5	10,5…13,0
Bearing nut of the bottom pin of shock-absorber	M14×1,5	6,5…8,0
U-bolt nut	M14×1,5	9…10
Wheel mounting nut	M14×1,5	16…18

Other threaded connections: M6 – (0.45…1.0 kgf×m); M8 – (1.4…1.8 kgf×m); M10 – (3.0…3.5 kgf×m)

10. Rules for the operation of ultra-low pressure tires 1,300 x 600-533, 1,280 x 530-533, 1,350 x 700-533 "TRECOL "

10.1. Introduction

Ultra-low pressure TRECOL tires **1300x600-533, 1280x530-533, 1350x700-533** are designed for use on all-terrain vehicles (ATV), working mainly in off-road conditions.

Long-term observations of the operation of ATV with TRECOL tires 1300x600-533, 1280x530-533, 1350x700-533 indicate the presence of systematic violations of the rules of tire operation. Most of these violations are related to the discrepancy between the actual loads on the tires, the internal air pressures in them and the mileage in various road conditions to the values established by the regulatory and technical documentation for the tires. All this significantly reduces the service life of tires, leading to loss of controllability and passing ability of ATV.

These Rules are the main document regulating the maintenance and operation of TRECOL 1300x600-533 tires, 1280x530-533 tires, 1350x700-533, and their implementation is mandatory.

10.2. Features of the tire structure

TRECOL tubeless tire with wheel assembly consists of a thin-walled shell with a rubber-cord casing, sealing layer, beads and protector mounted on a special 500-533 rim with a disk and a valve (see Fig. 10.1). By securely pressing the tire bead against the rim, the tire is sealed and at the same time the turn of the tire on the rim under the action of the torque is prevented. Due to this it is possible to achieve very low working pressure in the tire, which varies from 0.6 kPa to 0.08 kPa.

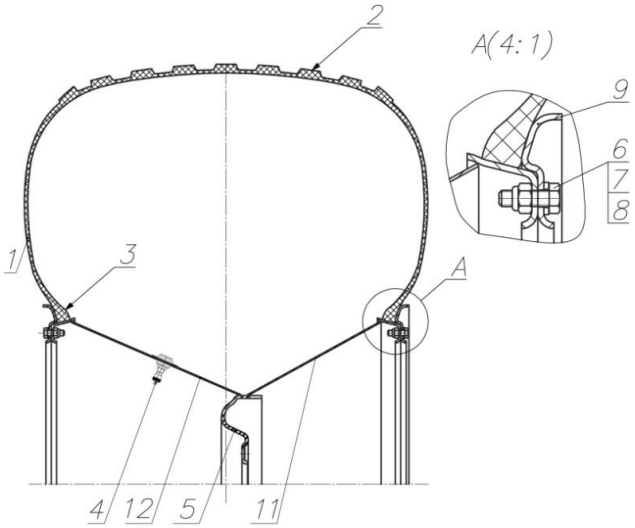


Fig. 10.1 1300x600-533 Tire with wheel assembly

1 - tire; 2 - tire protector; 3 – tire bead; 4 - valve; 5 – wheel disk; 6 - bolt; 7 - washer; 8 - nut; 9 - rim bead ring; 10 – rim landing ring with a flange; 11 - inner cone; 12 - outer cone.

Technical characteristics of "TRECOL" tires

Table 10.1

Parameter	**1300x600-533**	**1350x700-533**	**1280x530-533**
Outside diameter, mm	1350±30	1350±30	1285±25
Tire section, not more than, mm	650	650	560
Landing diameter, mm	533	533	533
Tire weight, kg	40 ± 2	51 ± 2,55	70 ± 3,5
Tread depth, mm	12	14	24
Maximum speed on hard roads, km/h	80	80	70
Maximum load on the tire, kgf	600	700	600

10.3. Rules of mounting and dismantling of tires

10.3.1. General provisions

Mounting the tire onto the rim of the wheel can be carried out by one qualified installer in compliance with the generally accepted safety rules for tire fitting, set out in the "Rules for the operation of automobile tires". Only to serviceable, clean and dry tires and rims should be mounted.

Tires stored at temperatures below 0 °C should be kept at a temperature above 0 °C for 4-5 hours before mounting.

Tires should be inspected externally and internally before mounting. Foreign inclusions and objects inside the tire and on the outer surface are not allowed.

The following tires should not be mounted:

- with the ultimate wear of the tread (if the height of protrusions in the middle of the tread is less than 1 mm);
- with elongated (deformed) sides, with fracture or de-struction of the metal bead ring;
- with the bundle in the frame;
- with delamination of the tread;
- with damage of the carcass plies;
- with annular fracture or fracture of carcass;
- in case of prolonged exposure of tires to petroleum products (oil, gasoline, kerosene) or other substances that cause swelling of rubber;
- with through damage greater than 10 mm.

Through damage detected by inspection of up to 10 mm in size should be repaired by means of a repair kit for tubeless tires (RKTW) in accordance with the instructions.

Wheels should not be mounted that have deformation, cracks, burrs and rust of the rim parts contacting the tire, as well as weld cracks in the cones of the rim base and in the joints of the landing rings and the disc with the cones of the rim base, curvature of the discs and the development of the mounting holes of the disc more than the sizes provided in GOST 10409.

The surfaces of the rims in contact with the tire should be cleaned of rust and covered with metal lacquer.

Before beginning mounting rim and bead seats should be lubricated with silicone grease or a soapy emulsion.

10.3.2. Tools used to mount the tire on the rim

Table 10.2

Tool	Quantity
Mounting blades	2
Wrenches S=13	2
Torque wrench S=13	1
Temporary bolts M8x40	4

10.3.3. Mounting procedure (Fig.10.2):

1. Remove bead rings from the wheel (if fitted on the wheel) (Fig.10.2). Install UB or LB valve (GOST 8107) or the imported valve TR 413 in the hole on the outer cone of the rim base. When using the UB valve its seals should fit tightly into the rim hole, and tightness of the connection should be ensured by tightening the nut.
2. Put the tire on side wall on a clean surface. Raise the base of the rim with the disc and landing rings and insert it from the top entirely into the tire (with the tilt of the rim) first with one and then the other bead seat, helping with the mounting blades if necessary. (1)
3. Push the upper bead of the tire onto the upper bead seat of the rim. (2)
4. Place the bead ring on top, aligning its holes with bolts with holes in the flange of the landing ring. Insert the temporary bolts with nuts into the diametrically opposite holes of the bead ring. (3) Sequentially tighten the nuts on the temporary bolts, make a preliminary tightening of the bead ring and the flange of the landing ring. As the bead ring approaches the seat ring flange, insert standard shortened bolts with washers and nuts into the openings and gradually tighten the nuts. After installing the standard bolts with washers and nuts in all twelve free holes, replace the four temporary bolts with standard ones. (4) The final tightening of the standard bolts with nuts in the sequence "crosswise" with a torque wrench torque of 1.4 ... 1.7 kgf-m should be carried out. After the final tightening of the nuts the clearance between the flange of the landing ring and the bead ring is not allowed.

Fig. 10.2. Procedure for mounting the TRECOL tire

5. Turn the wheel and repeat the operation as per 2 to 4 for the other side of the tire.
6. Pump the tire with air to a pressure of 0.5 kgf/cm^2 and verify with a soapy emulsion that there is no air leakage at the points where the tire meets the rim and in the weld seams of the rim. Allowable air pressure drop for 24 hours – 0.02 kgf / cm^2.
7. The assembled wheel with the tire should be installed on the hub of the ATV axle; all wheel nuts should be tightened with a torque of 11 ... 12 kgf-m. For a uniform tightening tighten the nuts next but one.

Attention! After installing the wheel on the ATV be sure to check the tightening torque of the wheel nuts through 50 km and 100 km of run.

Remove the tire from the rim in the reverse order, making sure that there is no excess air pressure in it.

10.4. Monitoring of tires during operation

The durability and reliability of tires are determined by compliance with the established operating conditions during operation and proper tire servicing.

10.4.1. Recommendations for choosing tire pressure depending on road conditions

The operating range of tire pressures is specified in the section «General movement of ATV».

The norm of tires life on hard roads and dirt roads should not exceed 15% of their total mileage. In this case the serviceability of the tire up to the extreme wear of the tread pattern (if the residual height of the projections along the middle of the tread is not less than 1 mm) is not less than 40 thousand km. The norm of tires life at internal air pressures of 0.2 and 0.1 kgf/cm2 is not more than 1500 km and 300 km, respectively, within the warranty period of ATV. In this case the appearance of a fold along the sidewall of the tire is normal.

Violation of these standards leads to failure of tires.

10.4.2. Maintenance of tires

Before you start using ATV do the following:

a) check the internal pressure in the tires and, if necessary, bring it to normal. Internal pressure should be measured using a manometer with scale interval of not more than 0.02 kgf/cm^2. After checking the pressure, the valves on all tires should be covered with caps;

When parking ATV in winter time in a warmed garage, before checking the internal pressure in the tires, it is necessary to set the ATV from the garage into the street for half an hour before the measurement. This is due to the fact that internal pressure in the ultra-low pressure tires essentially depends on the ambient temperature.

b) carefully inspect tires and wheels and remove foreign objects stuck in them (stones, nails, etc.);

c) if small through-damages of the tires were identified, repair them using the RKWT. Depending on the size and type of damage, repairs can be made without dismantling or with the dismantling of the tire in accordance with the instructions attached to the RKWT;

d) check the tightness and the presence of all the bolts securing the rim bead rings. If necessary tighten the bolt nuts. In case individual bolts were lost, replace them with new ones;

e) check the tightness of the wheel discs to the hubs and, if necessary, tighten fastening nuts;

f) if tires with extreme wear of the tread pattern were detected (the height of the protrusions in the middle of the treadmill is less than 1 mm), they must be replaced;

g) when detecting tires with uneven wear of the tread, it is necessary to establish the causes of the wear (violation of the angles of installation of the steered wheels, skewing of the axles, loose fixing of the wheel to the hub, violation of load norms and internal pressures, etc.), take measures to eliminate them and to carry out rearrangement of the wheels, keeping the direction of the tread pattern and choosing the wheels with the length of the outer circles of the same size.

In the process of using ATV it is necessary to:

a) monitor the condition of the road and maintain the internal pressure in the tires and the speed of ATV movement in accordance with current road conditions;

b) avoid overloading of ATV;

c) avoid prolonged slippage of wheels when ATV is stuck;

d) prevent sudden braking and take-off of ATV, especially on hard roads;

e) prevent bloking of interaxle differential on hard roads;

f) inspect the tires at parking sites in order to determine possible damages and reliability of fixing the wheels to the hubs. If any damage of the tires was detected, repair them using the RKWT. If it is impossible to repair the tire, replace it;

g) after a long stay of the ATV in the frost, for the first 20-30 minutes move at a speed of 10-15 km/h, and then gradually increase the speed.

10.4.3. Instructions for use of repair kit for tubeless tires (RKTW)

Intended purpose: repair of tubeless tires.

Repair of damage of the tread section:

- up to 5 mm in size – using a rubber patch.
- from 5-10 mm is size - by a cord or caps.

Repairs of damages on the sidewall are carried out using a rubber patch.

10.4.3.1. Repairs using a cord (without dismantling)

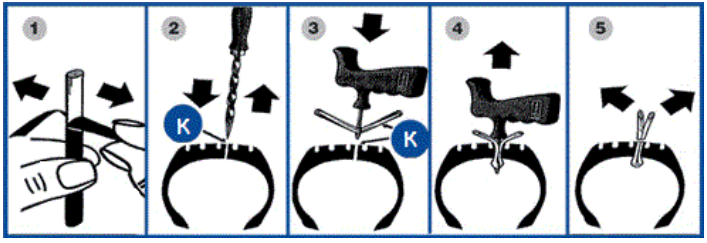


Fig.10.3 Repair of TRECOL tire using a cord (without disman-tling)

Clean the puncture site with a puncture cleaning device (2). Insert the cord insertion device (without cord) into the puncture to check the treatment of the tire. Lubricate the puncture walls with glue (2). Remove protective film from one end (1) and insert the cord with this part forward into the cord insertion slot (3). Remove the film from the entire cord, grease the cord and the slot of the device with adhesive (3), insert the device with the cord into the puncture and push the cord, leaving the end of the cord at least 5 mm long on the tire surface.

Remove the tool from the tire, cut the protruding end of the cord at the level of the tread.

10.4.3.2. Repair using a rubber patch (with dismantling)

Scuff the area around the damage larger than the selected patch (1). The scuffed area should be degreased with BX3 buffer cleaner, or should be applied a uniform layer of glue, which should be immediately scraped off together with the scuffed dust. Double glaze with glue and dry thoroughly after each coating (2). Remove the protective film from the patch and apply this side of the patch to the damage (3). Tightly roll with roller from the center to the edges (4).

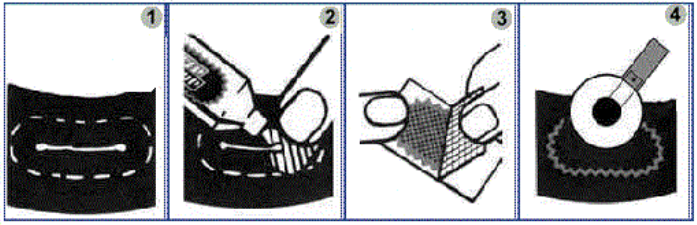


Fig.10.4 Repair of TRECOL tire using a rubber patch (with dismantling)

10.4.3.3. Repair using a cap (with dismantling)

Determine the angle of puncture by rotating the rubbing fixture clockwise. The hole should be 2-3 mm less than the diameter of the foot of the cap. If the damage is more than 25 degrees to the plane of the tread, this puncture cannot be repaired using a cap.

Treat the surface to be repaired mechanically using a scratcher larger than the cap head. Treat the puncture with puncture cleanser at least 3 times from the outer and inner sides (1). Apply a uniform layer of glue and immediately scrap it off together with the scuffed dust. Apply glue to the rubbing fixture and while rotating it glue the puncture through the entire depth. Then, turning the fixture counter-clockwise, remove it from the tire. Repeat the procedure three times. Leave the device at rest (2).

Apply twice a thin layer of glue on the damaged surface, carefully dry after every coating for 3-5 minutes. Remove the protective film from the cap. Remove the rubbing fixture from the tire. Lubricate the foot of the cap with glue. Fix the end of the cap foot in the relative device (loop) and insert the cap into the tire damage (4). Do not remove the foot of the cap from the loop, pull up to the full fit of the cap to the tire surface from the inside. Tightly roll the cap head with the roller from the center to the edges (5). Cut the protruding part of the foot of the cap 3 mm above the level of the tire tread.

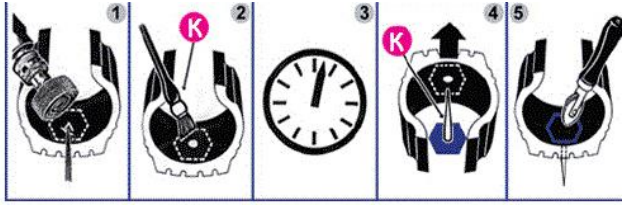


Fig.10.5 Repair of TRECOL tire using a cap (with dismantling)

11. Lubrication chart

Table 11.1

Ser. No	Assembly	Name	Refilling, l	Note
1	Fuel tank	Automobile Gasoline AI-92 GOST 2084-77	70 – rear tank, 39 – left tank, 39 – right tank	for gasoline engines ZMZ 4062.10 and ZMZ 40905.10
	Fuel tank	Diesel fuel according to GOST 305-82 In summer: grade L-0.2-40 (at t above 0ºC) In winter: grades Z-0.2 minus 35 (at t up to -20ºC) grades Z-0.2 minus 45 (at t up to -30ºC) grades A-0.2 (at t up to -50ºC)		for diesel engine HYUNDAI D4BF
2	Lubrication system of gasoline engines ZMZ 4062.10 and ZMZ 40905.10	Engine oil of SAE viscosity grade: 0W30 from minus 30 to plus 20 ºC 0W40 from minus 30 to plus 25 ºC 5W30 from minus 25 to plus 20 ºC 5W40 from minus 25 to plus 35 ºC 10W30 from minus 20 to plus 30 ºC 10W40 from minus 20 to plus 35 ºC 15W40 from minus 15 to plus 45 ºC 20W50 from minus 10 to plus 45 ºC According to operational properties of API classification: group SG or higher	6 (without oil cooler volume)	Check the level with a warmed up engine 10 minutes after the engine has stopped. Remove the pointer, wipe the rod dry, re-insert it until it stops, and then remove it. The oil level should be between the marks "P" and "O" on the indicator

Table 11.1 (continued)

Ser. No	Assembly	Name		Refilling, l	Note
3	Lubrication system of diesel engine HYUNDAI D4BF	Engine oil of SAE viscosity grade: 5W30 from minus 30 to plus 10 ºC 5W40 from minus 30 to plus 20 ºC 10W30 from minus 25 to plus 40 ºC 10W40 from minus 25 to plus 40 ºC 10W50 from minus 25 to plus 40 ºC 15W40 from minus 15 to plus 40 ºC 15W50 from minus 15 to plus 40 ºC 20W40 from minus 10 to plus 40 ºC 20W50 from minus 10 to plus 40 ºC According to operational properties of API classification: group CD or higher		7 (without oil cooler volume)	Check the level with a warmed up engine 10 minutes after the engine has stopped. Remove the pointer, wipe the rod dry, re-insert it until it stops, and then remove it. The oil level should be between the marks "MIN" and "MAX" on the indicator
4	Housing of gearbox UAZ-3160	According to operational properties of API classification: group GL-4	All-season transmission oil of viscosity grade according to SAE 75W-90	1,5	The check should be performed on a cooled transfer box. The level should be along the bottom edge of the threaded hole of the control plug
	Housing of gearbox HYUNDAI DYMOS M5ZR1			2,4	
5	Housings of transfer box	All-season transmission oil of viscosity grade according to SAE 75W-90 According to operational properties of API classification: group GL-5		1,65	The check should be performed on a cooled transfer box. The level should be along the bottom edge of the threaded hole of the control plug

Table 11.1 (continued)

Ser. No	Assembly	Name	Refilling, l	Note
6	Housings of rear drive axles	All-season transmission oil of viscosity grade according to SAE 75W-90 According to operational properties of API classification: group GL-5	0,85 x 2	The check should be performed on a cooled transfer box. The level should be along the bottom edge of the threaded hole of the control plug
7	Housings of final drive axles	All-season transmission oil of viscosity grade according to SAE 75W-90 According to operational properties of API classification: group GL-5	0,3 x 4	The check should be performed on a cooled transfer box. The level should be along the bottom edge of the threaded hole of the control plug
8	Hub bearings (axles with standard wheel hub drives)	Grease LEP2 (Gazpromneft)		Grease film between the bearings should be 10-15 mm. The space between the rollers should be completely filled in
9	Universal-joint bearings	Grease LEP2 (Gazpromneft) Grease 158 TU 38-101-320-77 FIOL-2U TU 38 USSR 201-266-79		Lubricate using lubrication pumps
10	Propeller shaft slip joints	Grease LEP2 (Gazpromneft) FIOL-2U TU 38 USSR 201-266-79		Lubricate using lubrication pumps (if available)

Table 11.1 (continued)

Ser. No	Assembly	Name	Refilling, l	Note
11	Locks of doors, doors locking bars, bonnet lock	TSIATIM-201 GOST 6267-74		
12	Battery terminals and clamps	Grease LEP2 (Gazpromneft)		
13	Steering joints	Grease LEP2 (Gazpromneft)		Lubricate using lubrication pumps to provide the grease release through upper sealing washers
14	Constant-velocity joints of the front axle	Grease LEP2 (Gazpromneft)		Rinse the hinges and put 500 grams of grease
15	Steering knuckle pivots	Grease LEP2 (Gazpromneft)		Lubricate using lubrication pumps of the upper pivot
16	Springs	Graphite grease USSA GOST 3333-80 or a mixture of solidol with 10% graphite GS-4		
17	Engine cooling and heating system	Antifreeze G11, G12 (up to -40 ºC) If the air temperature is below -40 ºC, use antifreeze concentrate G11, G12 diluted with distilled water in a concentration of 1.5: 1 (60% antifreeze) or in accordance with the dilution table on the package	13,5	Level between the top and bottom marks on the expansion tank

Table 11.1 (continued)

Ser. No	Assembly	Name	Refilling, l	Note
18	Clutch hydraulic drive system	Brake fluid DOT-4 SAEJ 1701L SO 4925	0,18	The fluid level with the new brake pads should be on the "MAX" mark
19	Brake hydraulic drive system		0,62	
20	Power steering system	ATF Dexron III	1,5	The oil in the reservoir of power steering pump must be at the level of the strainer filter mesh
21	Windscreen washer reservoir	Windshield washer fluid	2	
22	Rear door window washer reservoir		2	

12. Tools and accessories

12.1. General provisions

Each ATV is equipped with a set of tools (see table further), a jack, a compressor, as well as accessories according to the delivery set
(is specified in the section «Complete set»).

12.2. Set of tools

A set of tools "Motorist"2 TS9.chr.bvts
TU3926-023-05797687-2006

Table 12.1

Ser. No.	Complete set	Quantity
Replaceable heads as per GOST 25604-83*		
1	7812-0483 (10)	1
2	7812-0484 (11)	1
3	7812-0485 (12)	1
4	7812-0486 (13)	1
5	7812-0487 (14)	1
6	7812-0488 (15)	1
7	7812-0491 (17)	1
8	7812-0493 (19)	1
9	7812-0496 (22)	1

Table 12.1 (continued)

10	7812-0498 (24)	1
11	7812-0502 (27)	1
12	7812-0504 (30)	1
13	7812-0502 (32)	1
Double-head wrenches as per GOST 2839-80		
14	7811-0003 (8X10)	1
15	7811-0004 (10X12)	1
16	7811-0021 (12X14)	1
17	7811-0463 (13X15)	1
18	7811-0022 (14X17)	1
19	7811-0023 (17X19)	1
20	Key with connecting square 6910-0324 GOST 25601-83	1
21	Ratchet wrench 6910-0296 GOST 22402-77	1
22	Extension 6910-0229 (125) GOST 25600-83	1
23	Joint 6910-0361 GOST 25603-83	1
24	End wrench for glow plugs “21” TU2.035.1079-87 or drive socket “21” with magnet TU3926-001-05797687-2006	1

Table 12.1 (continued)

25	Combination pliers 150 mm TU2.035.0221532.016-98	1
26	Combined screwdriver 1.0x6.0/N2 TU3926-024-05797687-2005	1
27	Case (according to factory drawings)	1
28	Complete set list	1

* At the request of the consumer it is allowed to make changeable heads with a double hexagon.

12.3. Jack

Jack (Fig. 12.1) is designed for hanging out the wheels of ATV during its maintenance or during repair.

Fig. 12.1 Jack:

1 – ratchet gear, 2 - external screw, 3 - internal screw, 4 – stop block, 5 - transfer pin, 6 - lever, 7 - body.

12.3.1. Procedure for hanging out the wheel:

1. Brake the ATV using a parking brake and engage the first gear in the gearbox. In this case one of the gears should be engaged in the transfer boxes.

2. Place the jack on a flat horizontal platform with stop block 4 being under the axle housing.

ATTENTION! An improperly installed jack can cause injuries or damage to ATV.

3. Check parking brake only on a slope.

4. Unscrew outer screw 2 of jack to maximum. If there is a gap between stop bracket 4 and axle housing, place the right-shaped bar under the jack. In this case the position of the jack should remain stable.

5. Move transfer pin 5 of the jack to the lifting position (on the left side of lever 6).

6. Swing lever 6 to raise the ATV to the required height.

7. To lower the wheel slide the transfer pin 5 into the lowering position (on the right side of lever 6).

8. Lower ATV with the swinging movements of lever 6 until the gap between stop block 4 under the axle housing appears.

9. Pull out the jack from under the hanging wheel, screw in outer screw 2 and inner screw 3 until it stops into the jack body and release ATV.

12.4. Compressor

ATV (without the system of centralized regulation of air pressure in the tires) is equipped with a piston automobile compressor BERKUT R20 (Fig. 12.2). The compressor is statically installed under the hood on the right (рис. 4.1), is connected to the on-board network and is intended for inflating the ATV tires.

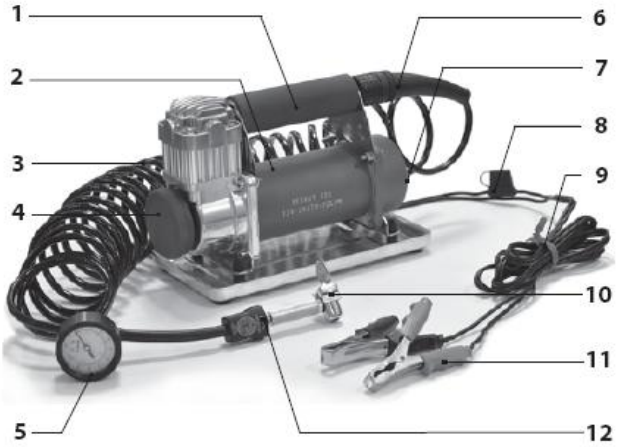


Fig. 12.2 Compressor:

1 - carrying handle, 2 - motor housing, 3 - universal twisted hose,
4 - air filter, 5 - manometer, 6 - quick-release coupling,
7 - ON/OFF button, 8 - built-in fuse , 9 - power drive,
10 quick-release tip, 11 - clamp contacts,
12 - trigger valve "deflector".

12.4.1. Operation of compressor

1. Connect the quick-release tip to the nipple of the tire. Make sure that the drain valve "deflector" is not fixed.
2. Set the compressor switch to ON position to start pumping.
3. Turn off the compressor by turning the switch to the OFF position when the required tire pressure level is reached.

ATTENTION! A more detailed operating manual is attached to the compressor. Read this manual before use.

13. Complete set

ATV must be delivered fully equipped in accordance with the approved documentation and the supply contract. The mandatory delivery kit includes the tools, accessories and maintenance documentation listed in Table 13.1.

Complete set

Table 13.1

Ser. No.	Item	Q-ty, pcs.
1	Tools set *	1
2	Special wrench key 19 for wheel nuts	1
3	Special end wrench for hub nuts	1
4	Tire pressure gauge with a tip	1
5	Jack with stand	1
6	First aid kit	1
7	Warning triangle	1
8	Portable lamp	1
9	Repair kit for tubeless tires	2
10	Technical specification for ATV	1
11	Operating manual for ATV	1

* See section «Tools and accessories».

14. List of main used accessories

14.1. Rolling bearings

Table 14.1

Ser. No.	Bearing installation location	Bearing code	Q-ty
Clutch			
1	Clutch release bearing with clutch assembly (for gasoline engine 40905.10)	39294-1601180	1
Gear box (3160)			
2	Rear bearing of gear box input shaft	39041-20-1701032	1
3	Front bearing of gear box intermediate shaft	39041-452-1701066	1
4	Rear bearing of gear box intermediate shaft	39041-20-1701190	1
5	Front bearing roller of output gear box shaft	39041-20-1701182	14
6	Rear output gear box shaft bearing	39041-452-1701190	1
7	Bearing of reverse gearbox	39041- 451D-1701085-01	1
8	Gears of transmission shafts	39041-263014	4
Transfer box			
9	Front bearing of transfer box input shaft	39294-6306N/KY	1

Table 14.1 (continued)

Ser. No.	Bearing installation location	Bearing code	Q-ty
10	Rear bearing of transfer box input shaft	39294-6-42306 KMSH	1
11	Front bearing of transfer box intermediate shaft	39294-50307A1	1
12	Rear bearing of transfer box intermediate shaft	39294-307A	1
13	Transfer box differential bearing	39294-6-215	2
14	Transfer box output shaft bearing	39294-306-K5	4
15	Locking ball of transfer box gearshift	39294-263014-P	2
Cardan shafts			
16	Universal-joint bearing	39294-704702K2	32
Axles			
17	Front bearing of final drive gear	39294-2402041-01	3
18	Rear bearing of final drive gear	39294-2402025	3
19	Axle differential bearing	39294-2403036	6
20	Wheel hub drive internal pinion bearing (UAZ)	39294-2407086	6
21	Wheel hub drive idle gear bearing	39294-2407126	6

14.2. Seals and glands

Table 14.2

Ser. No.	Bearing installation location	Bearing code	Q-ty
1	Seal of propshaft universal joint with spring assembly	39294-2201028	32
2	Seal of leading gear with front and rear axle spring	39294-1701210	2
3	Transfer case seal	39294-2402052	3

14.3. Parts and components

Table 14.3

Code	Item	Quantity	Note
1000000 Engine and its systems			
39041-1013010-02	Oil heater	1	ZMZ-4062.10
39294-1013010 (TH248-13-102)	Oil heater	1	HYUNDAI D4BF
39041-1013100-10	High pressure hose	2	ZMZ-4062.10
39041-1008020	Upper high pressure hose	1	HYUNDAI D4BF
39041-1008020-10	Lower high pressure hose	1	
39294-1001020	Front engine mount	2	
39294-1001027	Bolt M16 × 1.5 × 90 of side support fixing	2	
39294-1001044	Rear engine mount	1	
39294-1001052	Bolt M14 × 1,5 × 105 of rear engine support fixing	1	
1100000 Power supply system			
39041-1101010	Fuel tank	1	HYUNDAI D4BF
39041-1101010	Fuel tank	1	ZMZ-4062.10, ZMZ-40905.10
39294-1109010	Air filter assembly	1	
39294-1104022	Gasket of fuel tank (and fuel inlet) gauge	2	HYUNDAI D4BF
39041-1101022	Fuel pump seal	1	ZMZ-4062.10, ZMZ-40905.10
39294-1104012	Fuel inlet	1	HYUNDAI D4BF
39041-582.3827	Fuel gauge sending unit	1	

Table 14.3 (continued)

Code	Item	Quantity	Note
39041-1139020	Submersible fuel pump with fuel gauge sending unit	1	ZMZ-40905.10
39041-50.1139-01	Fuel pump	1	ZMZ-4062.10
1200000 Exhaust system			
39041-31512-1201010	Muffler	1	
39041-3151-1202008	Resonator	1	
39041-28710-43152	Muffler inlet pipe	1	HYUNDAI D4BF
39294-1203240	Inlet pipe flange gasket	1	ZMZ-4062.10; ZMZ-40905.10
39041-1203030	Muffler clamp assembly	2	
39294-1203073	Muffler pad	5	
39294-1203088	Resonator flange gasket	3	
1300000 Cooling system			
39041-1301010-32	Radiator	1	
39294-25411-4B000	Radiator cooling system upper branch	2	HYUNDAI D4BF
39294-1303010-01	Radiator cooling system branch	4	
39294-1303010-01	Radiator cooling system branch	3	ZMZ-4062.10
39294-1303025	Radiator cooling system branch	1	
39294-1303010-01	Radiator cooling system branch	4	ZMZ-40905.10
39294-1303025	Radiator cooling system branch	1	

Table 14.3 (continued)

Code	Item	Quantity	Note
1600000 Clutch			
39294-1601200	Coupling fork	1	ZMZ-4062.10; ZMZ-40905.10
39294-1602510	Declutching drive cylinder assembly	1	ZMZ-4062.10; ZMZ-40905.10
39294-41700-43150	Declutching drive cylinder assembly	1	HYUNDAI D4BF
1700000 Transmission			
39041-1700010-01 (UAZ)	Gearbox assembly (4-speed)	1	ZMZ-4062.10; ZMZ-40905.10
39294-M5ZR1	Gearbox assembly (5-speed)	1	HYUNDAI D4BF
39294-1702140	Gear shift lever	1	ZMZ-4062.10; ZMZ-40905.10
39294-43700-4B070	Gear shift lever (gate)	1	HYUNDAI D4BF
39294-43770-4B360	Gearbox control cable	1	
1800000 Transfer box			
39041-1800013-01	Transfer box	1	
39294-1801030	Transfer box bracket pad	8	
39294-SHS-8	Tie-rod end bearing of transfer box control drive	4	
2200000 Cardan drive			
3929-2201010	Transfer box drive shaft	1	ZMZ-4062.10; ZMZ-40905.10

Table 14.3 (continued)

Code	Item	Quantity	Note
39041H-2202010-10	Transfer box drive shaft	1	HYUNDAI D4BF
39041-2203010-60	Front axle drive shaft	1	Double hinge
3904-2201010	Rear axle drive shaft	1	L=616
2300000 Axles 23,24,25			
39041-2303050	Front axle shaft gear	2	
39294-2304002	Right steering knuckle assembly	1	
39294-2304003	Left steering knuckle assembly	1	
3929-2304100-01	Steering knuckle lever to bipod rod	1	
39294-2400520	Rear axle gear assembly	2	
39041-2403070	Right rear axle	1	
39041-2403071	Left rear axle	1	
39294-2407002	Right wheel hub drive (basic configuration)	2	
39294-2407003	Left wheel hub drive (basic configuration)	2	
39294-2407048	Axle seal gasket (basic configuration)	4	
39041KR-2307010-01	Right wheel hub drive assembly (on request)	2	
39041KR-2307011-01	Left wheel hub drive assembly (on request)	2	
39294-2401024-00	Axle housing pad	4	
39294-2307122	Right shaft of the wheel hub driven gear (basic configuration, reinforced)	2	

Table 14.3 (continued)

Code	Item	Quantity	Note
39294-2307123	Left shaft of the wheel hub driven gear (basic configuration, reinforced)	2	
2800000 Frame			
39041-2800010	Frame assembly	1	Depends on modification
39041-2805010	Towing device	1	
2900000 Suspension			
39041-2902012-95	Front spring assembly (8 leaves)	2	
39041-2912012-01	Rear spring assembly (7 leaves)	2	
39294-2902028	Spring bushing	24	
3929-2902120-10	Front axle spring liner	6	
39294-2912408	Clamp (h = 170 mm)	4	Rear axle
39294-2902408	Clamp (h = 190 mm)	4	Front axle
39294-2902444-92	Shackle bracket	4	
39294-2912622-01	Spring buffer	4	
39294-2905006	Shock absorber assembly	4	
39294-2905420	Internal bushing of the shock absorber hinge	2	
39294-2905432-01	External bushing of the shock absorber bracket	2	
39294-2905432	Shock absorber bushing	12	
39294-2912418-92	Clamps lining	2	
39294-2912480	Spring eye axle	4	
39294-2902418-02	Front right clamps lining	1	

Table 14.3 (continued)

Code	Item	Quantity	Note
39294-2902419-02	Front left clamps lining	1	
39294-2902458-01	Clevis cheek assembly	4	
39294-2902466-01	External clevis cheek	4	
39294-2905544-01	Washer 12,5 of the shock absorber pin	6	
39294-2905545-01	Washer 17,5 of the shock absorber pin	6	
39294-2912412-02	Spring pad	4	
39294-2915418-10	Shock absorber pin	2	
3100000 Wheels			
39294-TR416	Tubeless tire valve (LB 15.2)	4	
	Compressor "Berkut R20"	1	Without a system for central regulation of air pressure in tires
	Compressor "Berkut R24"	1	With a system for central regulation of air pressure in tires
39293-3101015-30	Wheel (rim) 500-533	4	With UAZ wheel gearbox
39295-3101015-30	Wheel (rim) 500-533	4	With TRECOL wheel gearbox, with tires 1280 and 1300
39041-3101015-30	Wheel (rim) 450-533	4	With UAZ wheel gearbox, with tire 1350

Table 14.3 (continued)

Code	Item	Quantity	Note
39041-3101015-50	Wheel (rim) 450-533	4	With TRECOL wheel gearbox, with tire 1350
39294-3101040-B	Wheel nut M14 × 1.5 × 30 cone, closed, key 19 mm with bonnet. D32 (MB027)	20	
	Tire 1300 × 600-533 TRECOL	4	
	Tire 1350 × 700-533 TRECOL	4	
	Tire 1280 × 530 × 533 TRECOL	4	
39294-4224120-G	Wheeled crane	4	
3400000 Steering			
39041-3402015	Steering wheel	1	
39041-3401040	Steering cardan shaft	1	
39294-3401090	Drop arm	1	
39294-8090.955.302	Power steering mechanism	1	
39294-4534 73.300	Power steering reservoir	1	
39292Д-3407040	Power steering pump pulley	1	ZMZ-4062.10
39041-3407011	Power steering pump pulley	1	ZMZ-40905.10
39294-3407040	Power steering pump pulley	1	HYUNDAI D4BF
3904-3408020-20	High pressure hose (L=680 mm)	1	ZMZ-4062.10
39294-3408020	High pressure hose (L=900 mm)	1	HYUNDAI D4BF, ZMZ-40905.10

Table 14.3 (continued)

Code	Item	Quantity	Note
39294-3408214	Rotary adapter Ø16/M16x1.5 (pump - discharge)	2	
39294-3408220-30	Drain rotary adapter	1	
3929-3408232-02	Cap connection M16x1,5x36	1	
39294-3408232	Cap connection M18x1,5x36	1	
39041-3414013-40	Power steering drop arm	1	
39041-3414052-01	Steering linkage pull-rod with tips	1	
39041-3408018-11-L8,8	Power steering pump	1	ZMZ-4062.10
39294-2171-L8,8	Power steering pump	1	HYUNDAI D4BF, ZMZ-40905.10
3500000 Brakes			
39294-P10x12	Brake tube adapter 10x12	2	axles with drum brakes
39294-3506033	Tee of pipelines to rear hydraulic brakes	2	
39294-3506060	Flexible hose of front hydraulic brakes	6	
39294-3506085	Flexible hose of rear brakes	1	
39294-1602590	Cylinder clutch hose	2	axles with disc brakes
39294-3501076	Brake disc	4	Disc brakes

Table 14.3 (continued)

Code	Item	Quantity	Note
39294-3507052	Drum	4	Drum brakes
39041-3507003-10	Parking brake disc	1	
39294-3508180-02 (-03, -04)	Brake cable	1	
39294-3501136	Right caliper	2	Disc brakes
39294-3501137	Left caliper	2	Disc brakes
39294-296496-P29	Brake tube nut	14	M12x1
39294-3505009	Rear brake cylinder	2	axles with drum brakes
3700000 Electrical equipment			
39294-6ST-100	AKB 6ST-100	1	HYUNDAI D4BF
39041-6ST-62	AKB 6ST-62		ZMZ-4062.10; ZMZ-40905.10
39294-23.3704	Ignition lock	1	
39294-0392020034	Additional electric pump of heater	1	
39041-GV 300K-01	Flexible speed recorder shaft	1	ZMZ-4062.10; HYUNDAI D4BF
39294-56.3843	Speedometer sensor	1	ZMZ-40905.10
LP-BV	Portable lamp 12V, clamp – “crocodile”	1	
39294-PD308Б3715300V	Under hood lamp	1	
39294-372PM-450	Ground wire 450 mm	1	
39294-BK-409	Parking brake control lamp switch	1	

Table 14.3 (continued)

Code	Item	Quantity	Note
39294-17224	Fan activation sensor (99-94 deg.)	1	ZMZ-4062.10
39294-TM108	Fan activation sensor (88-83 deg.)	1	
39294-TM111	Temperature sensor	1	
39041-233.3828	Temperature sensor	1	HYUNDAI D4BF
39294-1332.3768	Rear axle and differential axle switch	1	
39294-BPR-3	Fuse block	3	
39294-75.3777-10	4-pin relay	7	
39041-PT10-01	Cigarette lighter	1	
39294-BK 169 1300 3737	Remote battery switch	1	
Engine control units			
39041-241.3763-000-31	Engine control units	1	ZMZ-4062.10
39294-3763014-20	Engine control units	1	ZMZ-40905.10
39294-3763013-00	Engine control units	1	HYUNDAI D4BF
5000000 Body			
39294-5001018/28-10	Frame pad (with bolt 90 mm)	10	
8100000 Heating and ventilation system			
	Interior heater NAMI (for UAZ Hunter)	1	

15. Transportation of ATV

ATV can be transported by rail, water or air.

When transporting on railway platforms ATV should be secured with tension wires, and wooden beams should be placed under the beams of the axles and wheels, tightly fitting them to the tires. Annealed wire of steel St.0 or St.2 with a diameter of 5-6 mm should be used. Each extension should be made of 2-3 threads (4-6 threads at the twisting points) and is stretched by twisting the threads with a mounting crowbar until a reliable fastening of ATV is ensured. Tension wires should not be weakened. Tension wires should not touch the ATV tires. The tire pressure should be 45 kPa (0.45 kg/cm^2).

When transporting ATV by water or air transport the fastening should be carried out according to the ship's scheme or according to the scheme of transportation by air transport.

Loading and unloading of ATV should be carried out with a crane using special grippers.

On all modes of transport ATV should be located in such a way that the distance between ATV and adjacent objects is not less than 100 mm. In the transport position the ATV should be braked by parking brake, the engine should be shut off, the gearbox should be moved in the first gear position, the transfer boxes should be moved to the downshift position, the battery should be disconnected.

When preparing the ATV for transportation the tanks can be filled with no more than 75% of their capacity.

ATV should be driven on the plane using the first gear in the gearbox with reduced gear in transfer boxes or reverse gear.

16. Storage of ATV

The storage of ATV means the maintenance of a technically serviceable, fully stocked and specially prepared ATV in a state that ensures its safety and readiness in a timely manner.

ATV the operation of which is not planned for more than two months should be placed into storage.

The volume, materials for preservation, the sequence and organization of work performed in the preparation and maintenance of ATV storage is determined by the Manual for storage of automotive equipment, as well as GOST 9.014-78 and OST 37.002.001-70. Storage conditions: group "8" according to GOST 15150-69. Temporary wheels from UAZ-31512 should be mounted on ATV. TRECOL wheels should be stored at a pressure of 0.01 kPa.

Before operation of ATV after storage it is necessary to de-preserve, remove protective lubricant from the outer surfaces using a soft cloth soaked in kerosene. Check the tension of the drive belts of the generator and the power steering pump. Fill AVT with working fluid, oils and fuel and pump the power system. Start the engine and carry out a test run, during which check the operation of units, mechanisms and instrumentation. Detected faults should be eliminated.

17. Disposal of ATV

ATV is disposed of in accordance with the legislation in force in the territory of the Russian Federation or at the place of operation.

18. Manufacturer's warranty and complaint procedure

1. Supplier agrees to hand over the Machine to the Buyer with the quality corresponding to the requirements of the Technical conditions described in the Specification, confirmed by the certificate of conformity.

2. Warranty period and conditions for the observance of the warranty are established by the warranty conditions of the manufacturer specified in the vehicle operation manual.

3. Supplier shall guarantee the proper operation of the Machine in the basic configuration within 6 months from the date of its handover to the Buyer or at a mileage not exceeding 5000 (Five thousand) km, provided that:

- the Buyer's Operating Manual is complied with when using the Machine;
- ATV is given timely maintenance.

4. Warranty period of operation and mileage are calculated from the moment of handover of the Machine by the Supplier to the Buyer.

5. During the above warranty period the Supplier undertakes to perform a free replacement of all components (except for the cases listed in clauses 7 and 8 of the Operation Manual) prematurely disrupted due to the fault of the Supplier, provided that the consumer observes all the rules of transportation, storage, operation and maintenance of the equipment described in the operating manual.

6. The warranty period applies to the whole Machine, including its components and elements.

7. The buyer loses the right for warranty in the following cases:

a) In case of improper storage of the Machine;

b) If the requirements of the operating manual for the Machine are not fulfilled in terms of the application of the recommended fuels and lubricants and operational materials;

c) In case of non-observance of periodicity and scope of maintenance work;

d) If the Machine was damaged, including as a result of an accident, not as the result of a technical malfunction caused by the manufacturer;

e) When the consumer makes changes in the design of the Machine, as well as when installing additional equipment without the consent of LLC NPF "TRECOL;

f) In the absence or violation of the speedometer cable ties;

g) If the consumer fails to take timely measures to prevent the development of a malfunction;

h) If the parts and assemblies were mechanically damaged (for example: there are faces, dents, etc.);

i) In cases where the Machine does not have original tires installed by LLC NPF "TRECOL".

8. The terms of the warranty also do not apply to the effects of external factors, such as: storage of Machines in conditions not recommended by the manufacturer (operation manual), stone impacts, industrial emissions, tarry deposits of trees, salt, hail, storm, lightning, earthquakes, floods and other natural phenomena. Elimination of damages (defects) that have arisen for the above reasons is carried out on a reimbursable basis.

9. In the event of defects in aggregates or parts were found during the warranty period, the Buyer shall without dismantling the units send a copy of the complaint notice to the Supplier by e-mail, telegraph or fax within three days (for example of complaint notice see in the section « Notice on complaint », and the original by mail.

10. The complaint notice for the Machine should indicate the following:

- the time and place of the complaint, the name of the consumer, his exact and full postal address, contact telephone numbers of persons participating in the inspection of the technical condition of ATV;
- date of receipt of ATV by the consumer, mileage in kilometers;
- operating conditions of ATV: payload, running time and road characteristics, depending on the carrying capacity of the ground;
- detailed description of the deficiencies or malfunctions for each unit separately, indicating (if possible) the causes of the damage and the circumstances under which they were detected;
- serial number of ATV or unit, number and full name of the defective parts;
- presence of oil in the unit, its brand, quantity and quality.

11. Photographs of defective parts, which allow unambiguous establishing of its authenticity (serial number) and the nature of the damage, should be attached to the notice.

12. The supplier has the right to request video materials of the failed units or parts, and if necessary also their originals, as well as other items that in the Buyer's opinion were the cause of the damage. In this case the Buyer is obliged to send the requested materials and/or aggregates and details to the postal address of the Supplier.

13. Within four days from the date of receipt of the notice the Supplier shall inform the Buyer by telephone, telegraph, facsimile, postal and electronic communication about the travel of his representative or agrees to inspect the Machine by the Buyer (Consignee).

14. Materials and/or aggregates and parts to be sent should be clean, without corrosion. The Supplier should be informed about the completeness of the units being sent.

15. Notices on complaints and defective parts should be sent by mail to the following postal address: 140009 Moscow region, Lyubertsy, 3/1 Initsiativnaya str., LLC NPF "TRECOL". Tel/Fax +7 (495) 745-93-65.

Cargoes should be sent to the following postal address: 140009 Moscow region, Lyubertsy, 3/1 Initsiativnaya str.

16. The requirements of the Buyer (Consignee) are not subject to satisfaction in the following cases:

- presentation of claims made in violation of the conditions and requirements of this provision or not containing full information on all the issues listed above, or after the expiration of the warranty period;
- repair of parts submitted for reclamation without the consent of the Supplier;
- not sending at the request of the Supplier of damaged and other parts requested for investigation.

17. If any disputes arise between the Parties on the nature of the malfunction, the Parties agree on the expert (expert institution) and the range of issues to be investigated. Buyer (Consignee) should be notified on the time and place of the examination. Preliminary payment for the examination is made by the Party initiating the expertise.

18. In cases when additional examination is needed to determine the cause of the failure of aggregates or parts, the period for consideration of the notice on complaint may be increased for the duration of the examination.

19. The place and conditions of storage of the Machine prior to the expert examination shall be determined by agreement of the Parties.

20. Details submitted in the complaint are subject to a comprehensive investigation and, if replaced, are not returned to the Buyer (Consignee).

21. In case the detected defect in aggregates or details of the Machine has occurred due to the fault of the Buyer (Consignee), the costs of complaint handling related to transportation, diagnostics, additional examination and repair are borne by the Buyer (Consignee).

22. The acceptance and transfer of the Machine for warranty or maintenance shall be performed by authorized service centers under the Acts of Acceptance, describing the nature of the malfunction, external and technical condition of the Machine.

23. The deadline for the elimination of technical defects shall not exceed 20 (twenty) working days from the date of recognition by the Supplier as declared by the Buyer (Consignee) in the notice on claim.

24. In case of defects elimination during the warranty period in the specialized Technical Center, the Supplier shall reimburse the Buyer (Consignee) the repair costs within 10 banking days from the receipt of the confirming documents on the costs incurred by the Buyer (Consignee).

25. In the event that according to the expert opinion the malfunctioning of the Machine is caused by improper operation and use, the Supplier shall at the request of the Buyer compile and agree with the Buyer or the Consignee the estimate of the cost of spare parts and components, replacement and cost of work, and the Buyer or the Consignee shall approve them not later than in 3 (three) business days, accept the work performed under the Statement of Acceptance of Works and pay them in the manner and within the time set in the Supplier's invoice.

26. Upon termination of the warranty period specified in clause 3 of this Agreement, the Parties may conclude an agreement on technical maintenance of the Machine.

19. Notice on complaint

_____ _____

date place

I, _____

(name of the consumer, the surname and initials of the owner of the ATV, his exact and full postal address, telephone, fax)

_____

hereby inform you that that ATV TRECOL _____,

(model)

factory No _____ engine No._____,

received _____ and travelled _____ km while driving on

(date of receipt)

_____,

(road characteristic)

at the speed of _____ km/hour with load _____

_____

(load characteristic and weight)

experienced the fault _____

(detailed description of the nature of the failure and failed the units and parts)

_____

_____

Annex:_____

(photo- (video) materials attached to this notice)

Please send a representative of your company for the preparation of certificate of complaint, to give an instruction on sending the units for detailed investigation by the manufacturer or to take a decision on drawing up a certificate of complaint by the manufacturer.

_____ _____

(full name) (signature, seal)

Repair survey report

APPROVED
Deputy Director General in charge of Manufacturing
“ _____ “ _____20__.

Repair survey report for ATV (components) manufactured by LLC NPF "TREKOL"

WARRANTY / NON-WARRANTY (underline)

Date: _____ ; By representative: _____ , on Customer's demand **_____ ,**
position, full name (organization)

or **a representative of the customer (with the permission of NPF "TRECOL" LLC): _____**
position, full name

Carried out inspection and repair of ATV (components): _____ Type (brand) _____

Factory No _____ Engine No._____ Travelled km _____

Fault occurred _____ while driving with ATV on_____
(date) (road characteristic)

And with load _____ as the speed of _____ km/h
(load characteristic and weight)

Visual inspection of ATV (components) showed that:

1. Violation of operating rules: _____

_____

2. Presence of external damage: _____

Continued on the next page

_____

Malfunctions were found *:_____

_____

_____

* Name of faulty units and parts, presence of oil in the units, its name, quantity and quality, detailed description of the nature of the failure.

with the purpose of their elimination, the following types of work (replacement of components) were performed :

_____

Cause of malfunction: _____

_____

Complaints should be ACCEPTED/REJECTED/COMPONENTS SHOULD BE SENT TO DIAGNOSTICS

(underline)

CONCLUSIONS: as a result of the performed inspection and repair of ATV (components) it was recognized as suitable (not suitable) for further operation (underline).

Attention! In case of revealing the fault of the Consumer in the failure of the product, the warranty does not apply to it.

Representative of LLC NPF
«TRECOL» _____ _____

Position, full name. Signature

20. Additional equipment and accessories

20.1. Trailer TRECOL 8901

20.1.1. Introduction

In order to increase the weight of the cargo transported by ATV, as well as for the transportation of bulky cargo it is recommended to use a trailer for ATV.

This manual contains technical characteristics, description and recommendations for operation and maintenance of trailer TRECOL 8901 on ultra-low pressure tires.

In the technical description the main technical data of the trailer, the features of the device, and the methods for adjusting the assemblies are given. Operating instructions contain the information necessary for the proper operation of the trailer in various conditions. Maintenance instructions set out the maintenance procedure and rules, the implementation of which ensures that the trailer is kept ready.

20.1.2. Warnings

ATTENTION! For safety reasons it is strictly forbidden to install wheels and tires on the trailer, that were not manufactured by LLC NPF "TRECOL". If this prohibition is violated, the consumer loses the right for warranty service and is liable for the consequences arising from the operation.

Correct operation and long life of the trailer can be ensured when all the requirements and recommendations set forth in the manual are fulfilled. Before operating the trailer carefully study and comply with the requirements, recommendations and operating procedures outlined in this manual.

- Placement of cargo on the platform should be carried out evenly, so that the vertical force from the trailer towing ring to towing hook of the tractor does not exceed 490 N (50 kgf).

If the load is placed incorrectly (shifted backwards), when the trailer is uncoupled from the tractor, the trailer can tilt back around the axis of the wheels.

- Admissible wear of the towing ring in the area of contact with the tow hook should not exceed 10%.

- Operation of the trailer without connecting it to the tractor with safety chains is strictly prohibited.

- Transportation of people on a trailer is strictly prohibited.

20.1.3. Safety requirements

In the process of operating the trailer strictly follow the safety rules and fire safety requirements.

1. It is forbidden to operate the trailer when it is faulty. Before the start of movement carefully inspect the trailer and make sure it is working properly.

2. When coupling and uncoupling the trailer with a tractor, heavy tarpaulin gloves should be worn.

3. It is prohibited to be under the trailer if it is lifted by a jack without using additional safety devices.

4. When stopping on the ascent and descent, it is necessary to lock the trailer wheels with anti-skid stops.

5. When performing fastening operations, the tool should be used in accordance with its intended purpose. It is prohibited to expand the keys, install the gaskets between the yawn of the key and the edges of the nuts or bolts, hit the key with a hammer when screwing or unscrewing. Dimensions of the key should match the dimensions of the nuts or bolts heads.

20.1.4. Marking of the trailer

The trailer nameplate (Fig.20.1) is mounted on a forward wall of a body from the right side (Fig.20.2).

Serial production number of the trailer is duplicated by the shock method on the front wall of the body on the right side above the nameplate of the trailer (Fig.20.2).

Fig. 20.1 Nameplate of the trailer:

1 - trademark of manufacturer; 2 - trailer model; 3 – trailer serial number; 4 - year of manufacture.

Fig. 20.2 The place of designation of the trailer serial number and location of nameplate:

1 – serial production number of the trailer;
2 – location of nameplate.

20.1.5. Technical description

20.1.5.1. Purpose of the trailer

Single-axle trailer TRECOL-8901 on ultra-low pressure tires is intended for transportation of various economic cargoes in various road conditions, mainly along dirt roads and terrain, on soils with a weak bearing surface, including virgin snow, sand, soil cover of the thawed tundra and marshes, with the possibility of overcoming small water obstacles. The floatability of the trailer is provided only by the displacement of the wheels.

The trailer is designed for operation in the operating range of ambient air temperatures from plus 40°C to minus 45°C and relative air humidity of 80% at a temperature of 20°C.

20.1.5.2. Characteristics of the trailer

Table 20.1

Trailer type	Trailer is uniaxial, all-metal, made in the form of welded construction
Carrying capacity, kg	300
Curb weight of the trailer, kg	440
Permissible gross weight of the trailer, kg	740
Load on the road through the tires of trailer wheels, kgf: - total mass - loaded	 700 420
Load from the towing ring to the towing hook, N (kgf): - total mass - loaded	 490 (50) 294 (30)
Maximum permissible speed, km/h, not more than	50
Angle of transverse static stability of fully loaded trailer, %(degrees), not less than	35

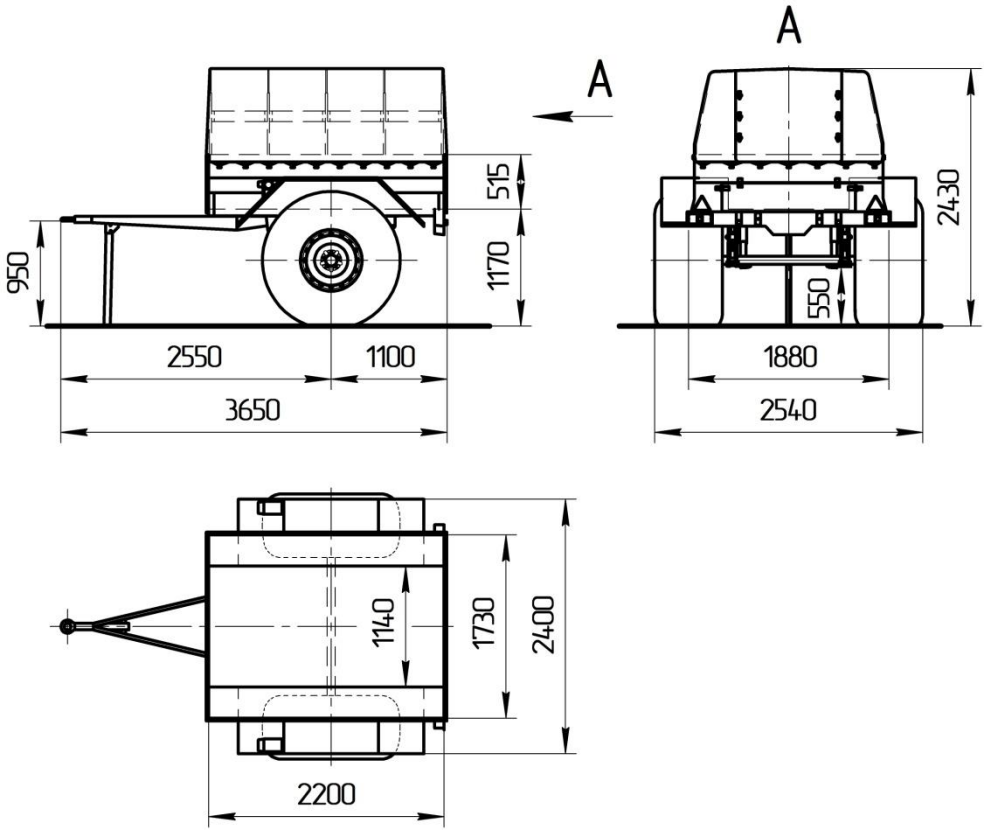


Fig. 20.3 Main dimensions of trailer TRECOL-8901 (given for reference). The canopy is not shown in the top view conditionally

20.1.5.3. Characteristics of the main assemblies

Table 20.2

Frame	Welded structure, consisting of two girders and four crossbars
Drawbar	Welded construction, removable, bolted to the frame. In front of the drawbar a non-detachable loop and safety chains are located. The drawbar is held In the horizontal position by means of a folding support post
Towing ring	Non-removable according to GOST 2349-75. Allowable wear - 10%
Suspension	On two longitudinal semielliptical leaf springs with hydraulic double-acting telescopic shock absorbers
Wheels	Disk, steel, with a hermetic rim and removable bead edges. Wheel fastening is carried out by five nuts
Tires	"TRECOL" tires are similar to the ATV standard tires
Electrical system	Single-wire, with a nominal voltage of 12 V, negative pole of the current source is connected to the frame of the trailer. The connection to the on-board network of the ATV (tractor) is carried out by plug PS300A-150
Lighting and signaling devices	Rear lights - FP-132, license plate lamp - FP-131, front parking light - FP-161

20.1.5.4. Structure and operation of assemblies

20.1.5.4.1. Suspension

It consists of two longitudinal semielliptical springs, working together with two telescopic hydraulic shock absorbers. The ends of the springs are fixed with pins with rubber bushings.

20.1.5.4.2. Spring

It consists of six sheets. The length of the spring is 1100 mm, the width of the sheet is 55 mm.

20.1.5.4.3. Амортизатор

Shock absorber from UAZ-31512 is used. It does not require special adjustments and it should not be disassembled without special need.

Disassemble the shock absorber only if there is a fatal liquid leak, loss of effort when stretching or compressing and replacing the fluid. Disassembly and subsequent assembly operations should be carried out in conditions that ensure complete cleanliness.

20.1.5.4.4. Wheel hubs

Wheel hubs are maximally unified with the hubs of UAZ-31512. Adjustment of the tightening of the wheel bearings is specified in the section «Transmission».

20.1.5.4.5. Electrical equipment

Electrical equipment is connected to the on-board network of the tractor with a plug. Wiring - single-wire with the connection of the negative terminal of the current source to the grounding. The electrical diagram is shown in Fig. 20.4.

Rear light signaling of the trailer is carried out by two three-section lanterns. The outer sections of the rear lights of the orange color serve as turn indicators, the middle and inner sections of the red color are respectively the headlights and braking signal.

In sections of turn indicators and braking signal lamps A12-21-3 (power 21 W) are used. In the section of tail lights, in the lamps of the front parking lamps and in the license plate lamp A12-5 lamps (power 5 W) are used.

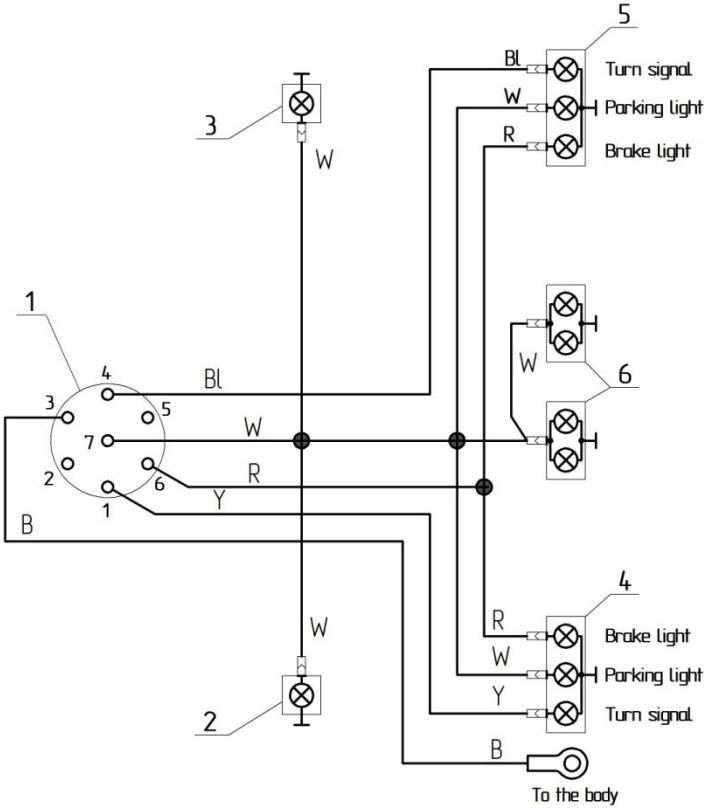


Fig. 20.4 Scheme of the electrical equipment of the trailer

1 - plug;
2 - left lamp of front parking light;
3 - right lamp of front parking light;
4 - left tail lamp;
5 - right tail lamp;
6 - license plate light.

Wire color:
B - black;
W - white;
Bl -blue;
R - red;
Y - yellow.

20.1.6. Operating manual

20.1.6.1. Preparing the trailer for operation

Before operating a new trailer do the following:

- check the conformity of the numbers of the accompanying documents with the passport data of the trailer;
- check the completeness of the trailer according to the attached packing list (availability of operational documentation, tools, components and accessories);
- carefully inspect the trailer, check and, if necessary, tighten the threaded connections, paying attention to the presence and correctness of the installation of washers, cotter pins and nuts;
- check and, if necessary, bring the tire pressure to normal.

In all cases of preparing the trailer for traffic it is necessary to carry out a control inspection of the trailer and check the following:

- Reliability of closing the hook throat of the tractor towing device with the upper latch, which in the closed position should be blocked by the transfer pin. To prevent spontaneous disengagement of the trailer drawbar with the hook, the transfer pin in the latch should be blocked by a cotter pin.
- Connection of the trailer with the tractor using safety chains;
- Condition of wheels and tires;
- Operation of lighting and alarm devices.

20.1.6.2. Choosing air pressure in tires

The correct choice of the internal air pressure in the tires is one of the most important conditions for increasing their service life.

The specific value of internal pressure when driving off-road is defined by the driver depending on the type of bearing capacity and the condition of the ground, snow, wetlands. At the same time, the tire pressure must ensure that the tractor is passable with the trailer in these conditions without destroying the surface layer and the vegetation cover of the soil and marsh.

The procedure for choosing the tire pressure is described in Section «General movement of ATV».

20.1.7. Maintenance instructions

Maintenance is designed to maintain the trailer in good condition and is a preventive measure conducted in a planned manner. Compliance with periodicity and high-quality performance of maintenance in full is the main condition for ensuring technical readiness, reliability and long service life of the trailer. The lack of the necessary equipment is not a basis for changing the volume, periodicity and conditions of the service. If any foreign noise, knocking or vibration, discrepancy in the adjustment of wheel bearings and other faults were detected, the driver must immediately take measures to eliminate them, regardless of the period of the next maintenance. The operation of a faulty trailer or trailer that has not been properly serviced is prohibited.

20.1.7.1. Types and frequency of maintenance

The scope of maintenance includes control and diagnostic, fastening, lubricating, adjusting and other works. By periodicity, list of works performed and labor input, maintenance is divided into the following types:

- daily maintenance (DTM);
- first maintenance (TM-1) is carried out every 2000 km;
- second maintenance (TM-2) is carried out every 10,000 km;
- seasonal maintenance (STM) is carried out twice a year when preparing a trailer for operation in winter and summer periods.

At monthly mean runs less than the above values TM-1 should be carried out once a month, and TM-2 – twice a year during the transition to the winter and summer operation season.

20.1.7.2. Daily maintenance (DTM) (ETO)

Daily maintenance includes monitoring to ensure traffic safety, as well as work to maintain a proper appearance. DTM is performed before departure and after work on the line, as well as when changing drivers. DTM is carried out by the driver at the expense of machine-setup time and includes the following:

1. Visual examination to reveal external malfunctions. Check the condition of the suspension, license plate and platform.

2. Inspect tires and wheels. Remove foreign objects stuck in them (stones, nails, etc.). Check the air pressure in the tires and, if necessary, bring it to normal.

3. Visually check the condition of the coupling device and the reliability of the coupling with the tractor.

4. Check the serviceability and operation of the lighting and light-signaling devices.

5. Check at a stop the heating of wheel hubs if they were subjected to adjustment. Heating of the wheel hubs with properly adjusted bearings is considered normal if the hand tolerates the heat.

6. Clean the trailer of dust and dirt, if necessary wash and dry. Wipe off the lights, license plate and corner reflectors.

20.1.7.3. First maintenance (TM-1)

1. Perform all the work provided in the DTM.

2. Tighten the wheel mount to the hub.

3. Check the reliability of fastening of shock-absorbers and absence of a working liquid leak. If fluid leakage was detected through the rod seal and O-rings, tighten the tank nut. If leakage does not stop, remove the shock absorber, disassemble and replace the worn parts. After troubleshooting assemble the shock absorber and replace the fluid. Check the operation of the assembled shock absorber and install it on the trailer.

20.1.7.4. Second maintenance (TM-2)

1. Carry out all the works provided in TM-1.

2. Replace the grease in the wheel hubs (every second TM-2). When changing grease flush the hubs and bearings. Lubricate the bearings with Litol 24 grease by placing the grease in the separators with the rollers and the hub cavity between the thrust bearing rings. The lubrication layer between the bearings should be 10 ... 15 mm. The space between the rollers should be completely filled. Re-install wheel hubs and adjust their bearings.

3. Check the condition of the springs, lubricate if necessary (when a squeak appears).

4. Check the wear of the towing ring and replace if necessary. Admissible wear of the towing ring in the area of contact with the towing hook should not exceed 10%.

5. Check the condition of the bottom of the platform and the inner surface of the wings, if necessary clean, prime and paint the surfaces damaged by corrosion.

20.1.7.5. Seasonal maintenance

Seasonal maintenance is carried out twice a year during the tran-sition to the winter and summer operating season and, if possible, is combined with the next TM-2. It is necessary to perform a list of works listed in TM-2.

20.1.8. Lubrication chart of trailer TRECOL 8901

Table 20.3

Ser. No.	Assembly	Number of service points	Name	Refilling volume (total), l	Periodicity of refilling	Note
Greases						
1.	Wheel hub bearings	2	Grease LEP2 (Gazpromneft)		At each second TM-2	Lubrication layer between the bearings must be 10-15mm. The space between the rollers should be filled completely.
2.	Springs	2	Graphite grease USSA GOST 3333 80 or mixture of solidol with 10% graphite GS-4		Lubricate as needed when a squeak appears	
Operating fluids						
3.	Hydraulic shock absorbers	2	Shock absorber liquid AZH-12T GOST 23008-78	2x0,32 (0,64)	Replace when disassembling	

20.1.9. List of spare parts used in the design of trailer TRECOL 8901

Table 20.4

Ser. No.	Item	Code	Location	Q-ty per trailer	Dimensions, mm/note		
					d	D	H
1.	Roller conical single-row bearing	127509KA	Wheel hub	4	45	85	25
2.	Wheel hub seal	UAZ 3741-3103038	Wheel hub	2	60	85	10
3.	Turn signal indicator of the rear light	A12-21-3	Back lamp FP-132 *	2	* Q-ty: 2 lamps per trailer		
4.	Brake signal of the rear light	A12-21-3	Back lamp FP-132 *	2	* Q-ty: 2 lamps per trailer		
5.	Tail light of the rear light	A12-5	Back lamp FP-132 *	2	* Q-ty: 2 lamps per trailer		
6.	Parking lamp of the front parking light	A12-5	Front parking lamp FP-161 *	2	* Q-ty: 2 lamps per trailer		
7.	License plate lamp	A12-5	License plate lamp FP-131 *	2	* Q-ty: 2 lamps per trailer		

20.1.10. Tightening torques for threaded connections

Table 20.5

Mounting part	Thread	Tightening torque, kgm·m
U-bolt nut	M14x1.5	10...12
Wheel mounting nut	M14x1.5	16...18

For other threaded connections: M6 - (0.45 ... 1.0 kgf · m); M8 - (1.4 ... 1.8 kgf · m); M10 - (3.0 ... 3.5 kgf · m).

20.1.11. Комплектность

The trailer should be delivered fully stocked in accordance with the approved documentation and supply contract. The mandatory delivery kit includes accessories and operating documentation listed in Table 20.6

Complete set

Table 20.6

Ser. No.	Item	Q-ty, pcs.
1	Wheel chock	2
2	Technical data of ATV	1
3	Manual	1

20.1.12. Manufacturer's warranty and complaint procedure

1 The manufacturer guarantees that the trailer meets the requirements of the technical specifications for the product within six months, provided that the mileage for this period does not exceed 5000 km.

2 The warranty period of operation and mileage is calculated from the moment of transfer of the trailer to the consumer at the manufacturing facility.

3 During the above warranty period the manufacturer agrees to replace free of charge all components prematurely disrupted due to the fault of the manufacturer provided that the user complies with all the rules for the transportation, storage, operation and maintenance of the trailer described in the operating manual.

4 The consumer loses the right for warranty in the following cases:

4.1 If the trailer is not correctly stored.

4.2 When installing wheels and (or) tires on ATV, that were not manufactured by LLC NPF "TRECOL";

4.3 If the requirements of the operating manual were not fulfilled with regard to the use of recommended lubrication and maintenance materials.

4.4 If the periodicity and the scope of maintenance work for the trailer were not met.

4.5 If the trailer was damaged, including as a result of an accident, not as the result of a technical malfunction caused by the manufacturer.

4.6 When the consumer makes changes in the construction of the trailer, as well as when installing additional equipment without agreement with LLC NPF "TRECOL".

4.7 If the consumer fails to take timely measures to prevent the development of a malfunction.

4.8 In the event that parts and assemblies were mechanically damaged.

5 The procedure for making complaints Порядок предъявления рекламаций:

5.1 In the event of defects in aggregates or parts were found during the warranty period, the Buyer shall without disman-tling the units send a copy of the complaint notice to the Sup-plier by e-mail, telegraph or fax within three days (a sample of the notice is attached).

5.2 Within four days from the date of receipt of the notice the manufacturer shall inform the Buyer by telegraph or fax about its decision on the travel of the representative or au-thorize the preparation of a unilateral certificate of complaint (the sample is attached). The total time for the preparation of the complaint must not exceed 30 days from the date the

defect was discovered.

5.3 Certificate of complaint on defects of the trailer should contain the following:

- time and place of drawing up the act, name of the consumer, his exact and full postal address, number of the document authorizing the preparation of a unilateral certificate of complaint, the persons participating in checking the technical condition of the trailer;
- date of receipt of the trailer by the consumer, mileage in kilometers;
- operating conditions of the trailer: payload, running time and road characteristics, depending on the bear-ing capacity of the ground;
- detailed description of the deficiencies or malfunc-tions for each unit separately, indicating (if possible) the causes of the damage and the circumstances under which they were detected;
- number of the trailer, number and full name of the re-jected parts.

Certificates issued in accordance with the above conditions and requirements, with a cover letter and details that, in the opinion of the consumer, served as the cause of the damage, should be sent to the manufacturer's address.

The consumer should take measures to protect the parts being sent from corrosion and inform the manufacturer of the completeness of the units being sent..

5.4 The details presented in the complaint certificate are subjected to comprehensive investigation and shall not be returned to the consumer.

5.5 Complaints shall be satisfied in the following cases:

- presentation of claims made in violation of the condi-tions and requirements of this provision or not con-taining full information on all the issues listed above, or after the expiration of the warranty period;
- repair of parts submitted for reclamation without the consent of the manufacturer;
- not sending at the request of the Supplier of damaged and other parts requested for investigation.

6 Certificates of complaints and defective parts should be sent by to the following address:

140009 Moscow region, Lyubertsy, 3/1 Initsiativnaya str., LLC NPF "TRECOL". Phone/fax (095) 745-93-64.

Cargoes should be sent by rail to the following address:

St. Lyubertsy-1, Moscow railway, railway code: 194206, consignee: LLC NPF "TRECOL", consignee code: 7402.

Correct execution of complaints accelerates their consideration and the response of the manufacturer to the consumer.

The manufacturer reserves the right to make certain changes to the construction of the trailer without prior notice.

Notice on complaint

_____ _____

date place

I, _____

(name of the consumer, the surname and initials of the owner of the ATV, his exact and full postal address, telephone, fax)

_____

hereby inform you that trailer TRECOL 8901, factory No _____

received _____ and travelled _____ km while driving on

(дата получения)

_____,

(road characteristic)

at the speed of _____ km/hour with load _____

_____

(load characteristic and weight)

experienced the fault _____

(detailed description of the nature of the failure and failed the units and parts)

_____

_____

_____

Annex:_____

(photo- (video) materials attached to this notice)

Please send a representative of your company for the preparation of certificate of complaint, to give an instruction on sending the units for detailed investigation by the manufacturer or to take a decision on drawing up a certificate of complaint by the manufacturer.

_____ _____

(full name) (signature, seal)

20.2. Centralized tire pressure regulation system

20.2.1. Introduction

This system is not included in the basic configuration of all-terrain vehicle and is installed by order.

20.2.2. Description and principle of operation

Pressure regulation system is designed for centralized control of air pressure in the tires from the passenger compartment of the ATV.

Portable compressor "Berkut R-24" with a capacity of 96 l/min is installed in the rear of the body. Compressed air from the compressor through non-return valve enters receiver. The receiver is located under the floor of the body under the compressor. At the lower point of the receiver there is a safety valve opening at a pressure of 1 kgf/cm^2. When the tire inflation control valve is closed, the pressure in the receiver rapidly increases and when the valve is operated, the receiver is purged in case condensation accumulates in it.

Tire pressure is controlled by control valve 11.3122110 located under the driver's seat. On the left of the driver's seat there is a lever for driving the control valve to three positions:

- average - neutral;
- front - exhaust air from the tires;
- back - pumping tires.

It is allowed to use control valve 11.3122009-02 modified in accordance with Fig. 20.5. When the valve is modified, safety valve is removed from the valve.

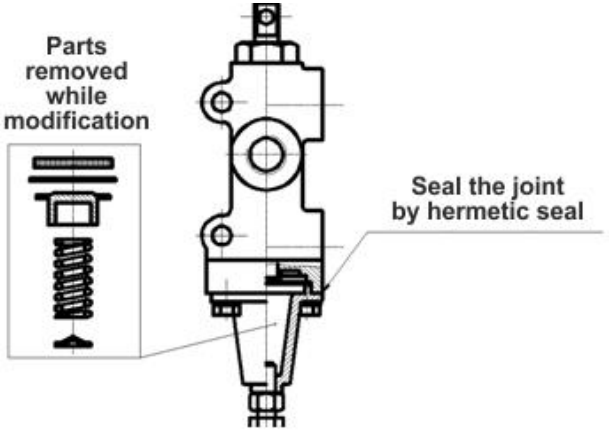


Fig. 20.5. Modification of control valve 11.3122009-02.

The receiver is connected to the lower branch pipe of the control valve. From the upper branch pipe of the control valve an air discharge tube goes into the atmosphere. From the middle branch pipe goes out a choke connecting the valve to the tee, where the system branches into two lines. One line leads to a pressure gauge installed on the control panel, the other leads to the flange tee through a flexible hose and to the front and rear axles along the tubes. Tubes end with flange corners, which are connected to axles by flexible hoses. Air supply to the rotating wheels is made inside the wheel gears. Couplings are connected by drilling in the

driven shafts of the reducers with the wheels adapters, and then through flexible hos-es - with wheeled cranes.

20.2.3. Operating manual

The compressor is switched on from the passenger compartment using a button on the instrument panel. Since the compressor is a powerful consumer of energy, in order to avoid the discharge of the battery it is not recommended to activate it when the engine is not running. At neutral position of the control valve (middle position of the lever) air enters the receiver, but does not enter the tire. When the valve is opened for pumping the wheels (rear position of the lever), compressed air from the receiver rushes to the wheels. Wheeled cranes should be open (they are opened with a special key counter-clockwise, and are closed clockwise). When the valve is opened to release air from the wheels (front position of the lever), the air is released into the atmosphere.

Air pressure in the tires is determined by the manometer with the neutral position of the pressure control valve and opened wheeled cranes. The pressure in all tires is the same.

It is recommended to close wheeled cranes for long parking. When using the system of centralized air pressure regulation in tires, open wheel cranes for 3 ... 4 full turns.

It is recommended to periodically remove condensate from the receiver. To do this it is necessary to allow the compressor to run for 20 ... 30 seconds with the control valve closed (middle position of the lever).

To check the correctness of the readings of the pressure gauge installed in the system, it is recommended to compare its readings periodically with the indications of a regular manometer for checking the tire pressure.

In the event of failure of the pressure control system, the pumping of the wheels can be carried out through a rubber hose. The second end of the hose is alternately connected to the wheeled gate valves. In this case the wheeled cranes should be closed.

For repair and maintenance the control valve and wheel valves should be greased with CIATIM-201 grease.

When repairing and maintaining the system it is necessary to check the tightness of the connections of pipelines and flexible hoses using a soapy emulsion. Also, periodically check the correctness of the manometer reading.

20.3. Electric winch

20.3.1. General provisions

Failure to follow the operating instructions can result in serious injury or damage. Before using the winch carefully study the safety rules and instructions for use, and then carry them out.

Winch is not included in the basic configuration of the ATV and is installed by order.

20.3.2. Safety rules

1. The winch is not designed to lift people.

2. Never touch the cable or hook when they are under load. Winch cable can be tensioned even when the winch is not working.

3. Never touch the cable during the operation of the winch or when someone is holding a remote control.

4. During the operation of the winch remember that in the event of a wire break it can cause serious injury to people who stand in the immediate vicinity.

5. Before turning on the winch carefully inspect the remote control wire for cracks, punctures, bare wires or contacts. Due to the damaged wire the winch can start working immediately as soon as a remote control is connected to it. From inside the car always transfer it through the window or the hatch to exclude the possibility of pinching it by the doors. Always store the remote control in a dry and clean place where it cannot be damaged.

6. Make sure that the anchor that you are about to use is able to withstand the load. Always use a chain or a wood rope on the anchor. Never wind the object with the winch cable - this leads to damage of the cable.

7. Never use the winch when less than five turns of cable are wound on the drum. Otherwise, the cable may fall off the drum under heavy load.

8. The cable should always be unwound from the drum in the direction indicated on the drum rotation scale. Some winches are equipped with an automatic brake, and this **brake will NOT work**, if the cable unwinds in the opposite direction. The reverse direction of unwinding the cable can happen by accident if you wind the cable to full length and then wind it with the switch in the "OUT" position.

9. In no case should the winch be loaded higher than the nominal load. In order to reduce the load almost twice, use the block.

10. To avoid tearing the cable, choose the weak spot, alternately turning the winch on and off.

11. Always unwind the cable as far as possible. Fold the cable in half using a block. This will help to avoid damage to the cable. Remember that the greatest pulling force is obtained on the first layer of the cable winding, decreasing with each subsequent layer.

12. Always try to pull the cable in a straight line to avoid interference from one side of the drum. If the cable is damaged, it must be replaced immediately.

13. Lifespan of the cable directly depends on its servicing. The cable of the new winch, as well as any new cable, must be unwound and rewound under load before using it for the first time. Failure to do so may result in damage to the cable.

14. From time to time after using the winch the cable should be rewound for a short time without load. This should be done as follows: keep remote control in one hand and the cable in the other hand. Move away from the car for the length of the remote control cord, turn on the remote control, lay a few meters of the cable, and turn off the remote control. Repeat the procedure the required number of times. **ALWAYS** turn off the remote control when your hand with the cable is at least **1.5 meters** from the winch hole, through which the cable passes.

Before you take the cable in your hands, be sure to wear thick leather gloves. It is inadmissible that the cable slides in the palms of your hands.

15. **ALWAYS** turn off the remote control when the hook is located not closer than 1.5 meters from the winch hole through which the cable passes. For your own safety and to avoid damage to the cable, follow these safety measures:

– if the winch is equipped with a device for free disengagement of the cable, disconnect the remote control, turn off the device and, by rotating the drum manually, wind the cable to the end. Turn on the device;

– if the winch is not equipped with a device for free disengagement of the cable, secure the hook by fitting kit. Then, without touching the hook, the cable, or the hole in the winch through which the cable passes, select the weak point of the cable by short switching on of the remote control. Remember that the excess tension can cause damage to the cable.

16. If you hooked the winch to another machine that performs the function of the tractor, pull up the handbrake and lock the wheels. Move the gearbox in neutral.

17. Winding the cable lay it on the drum with even turns and in a tight manner. Otherwise, the upper turns may fall under the lower ones, and a "beard" can be formed, which can lead to damage to both the cable and the winch. When the "beard" is formed, the cable should be slightly unwound in the front and then wound in the opposite direction, even if the remote control is in the "OUT" position. If a "beard" was formed, attach the hook to the fixed object. After a series of short turns of the winch for pulling and retracting, the cable usually untangles. In any case, **NEVER try to manually untangle the cable!**

20.3.3. Operating instructions

20.3.3.1. Remote control

Remote control switch has three positions: middle fixed position - (off), and extreme unfixed positions - "IN" winding the cable; "OUT" unwinding the cable.

20.3.3.2. Automatic brake (available not on all winches)

Every time the remote control switch is in the middle position, the brake automatically turns on.

20.3.3.3. Перегрузка-перегрев

The winch is not designed for continuous operation. When the winch motor starts to work in the heavy load (falling speed) mode, it overheats quickly, which can lead to the final engine failure. To avoid this it is necessary to turn off the winch from time to time and determine by hand whether the motor has overheated. If the engine burns the hand, it should be cooled down. At the same time, you can use this time to recharge the battery. When using the unit, the energy consumption is reduced, and the time of the continuous operation of the winch is accordingly increased.

20.3.3.4. Recommendations for handling the battery

To get the most effective operation of the winch, it is recommended to use a fully charged standard car battery. Make sure that all contacts were cleaned and fit tightly.

20.3.3.5. Service

The winch does not require regular lubrication. The winch should not be immersed in water. If the winch got into the water, in at least 3 days it should be turned on and operated before the motor is warmed. This will remove all moisture from the motor.

Attention! The winch works only when the engine is running at medium speed.

20.3.4. Ways of using the winch

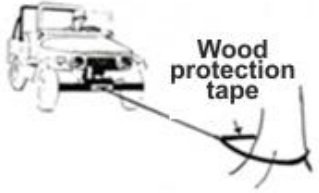


Fig. 20.6 The most common method. Note that when a tree trunk is used as an anchor, a wood protection tape should be used. To avoid damage to wildlife, do not use a rope or chain. In addition, the cable should not be looped around the anchor, because it significantly reduces the break strength of the cable

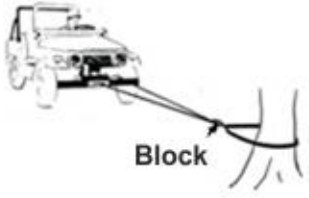


Fig. 20.7 Using a block gives a mechanical force of 2: 1. In addition, the load on the rope and the winch is halved. Accordingly, the motor will spin faster and with less energy consumption. It is possible to work with a long cable and not be afraid of engine overheating

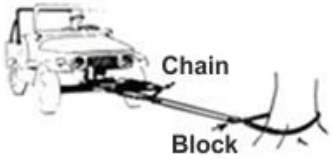


Fig. 20.8 Basically the same as in Fig. 20.7. A chain with a distributor helps to evenly distribute the load over the components of the car.

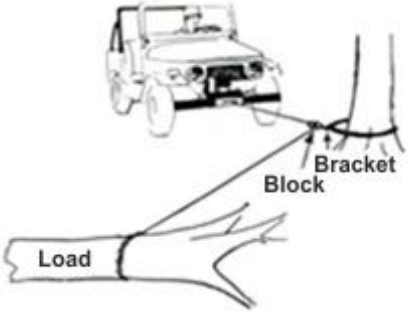


Fig. 20.9 An example of how the direction of thrust can be changed using a block. The block is connected to the wood protection tape with the help of a connecting bracket

Fig. 20.10 An example of how to properly limit a car when transporting heavy loads, if wheel blocks are not enough. Safety cable or chain is attached to the anchor as low as possible, passes under the car and is securely attached to the other parts of the winch fitting kit. The way of attachment to the rear frame or beam of the axle has a certain risk. The power of the winch is sufficient to break or bend the axle frame or beam

20.3.5. Loops

The loop should be as long as possible (see Figure 20.11), especially when the winch is used for pulling the car. Table 20.7 below shows how the strength of the cable decreases with a design load of 3.6 tons due to an incorrect angle.

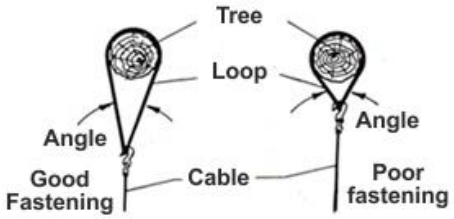


Fig. 20.11 Loop.

Recommended loop parameters depending on load

Table 20.7

Load on cable, t	Angle, degrees
3,6	≤5
3	60
2,5	90
1,8	120

Loops with a sliding hook should be used with caution, since they can form corners of more than 120 degrees. Recommended minimum diameter of the sliding loop is 22 mm.

20.3.6. Winding the cable on the drum

The cable should be wound on the drum under the load of at least 250 kg, otherwise the external winding loops can fall under the internal loops, which can cause damage to the cable.

Attention! The cable must be wound on the drum in the direction indicated on the winch; otherwise the brake will not work.

20.3.7. Anchors

It is recommended to use natural objects as an anchor, for example trees, stumps or stones. Always carefully choose the anchor and make sure that it is able to withstand the load. In order not to dump/break the anchor, attach a cable to it as close as possible to the surface of the earth. If you have several anchors, but each of them is not sufficiently strong, it is advisable to fix the cable to several objects. If there is no natural object suitable for use as an anchor, you will have to use materials on hand.

Fig. 20.12 Shows an example of the correct use of stakes. It can be a very effective anchor if the soil is suitable for their use. They should be staked in the ground at an angle

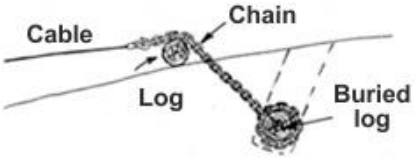


Fig. 20.13 A log buried in the ground is an excellent anchor. If necessary, instead of a log you can use a variety of objects, for example, a metal beam, a pipe or even a large canister.

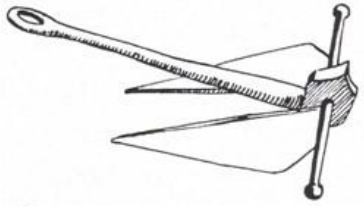


Fig. 20.14 Special anchor. Boat anchor is the best option. A ten-kilogram anchor is sufficient in virtually any soil and as it can easily be pulled out - it's enough to drive over it. For greater efficiency it is recommended to move the anchors twice closer to the rod

20.4. Engine preheater and air heater

20.4.1. Engine preheater HYDRONIC

20.4.1.1. General provisions

The system is designed to facilitate starting of the engine at low temperatures by heating the coolant when the engine is not running.

Pre-heater can be equipped with various control devices in various combinations. Preheater is not included in the basic configuration of all-terrain vehicle.

20.4.1.2. Safety requirements

1. Do not use the preheater in enclosed spaces such as garages or workshops that do not have an exhaust system, due to the danger of asphyxiation or carbon monoxide poisoning.

2. Do not use the heater at gas stations or in places where combustible fumes and dust can form, for example, if fuel, coal, wood storage or grain storage facilities are located nearby.

3. In case of strong smoke, unusual noises or smell of fuel, the heater should be blocked and checked in the service station.

4. The level of the cooling liquid in the system should correspond to the level prescribed by the ATV manual. The coolant should contain a minimum of 10% antifreeze to protect the heater from corrosion.

5. In order to comply with fire safety rules, it is necessary to drain fuel from the fuel tank in the summer when the heater is not in use.

6. The temperature around the heater should not exceed 125 °C.

7. When conducting electric welding on the ATV to ensure the protection of the control unit, the positive pole should be disconnected from the battery and connected to the grounding.

8. When refueling the car it is necessary to switch off the heater.

9. It is forbidden to stop the heater's coastdown by using a battery isolator (disconnecting the "earth"), except for an emergency shutdown..

10. Damaged fuses should only be replaced by fuses with a similar current rating.

11. It is always necessary to comply with the generally accepted rules for the prevention of accidents and comply with the relevant regulations on labor protection.

20.4.1.3. Technical data for heaters

Technical data for diesel fuel heaters

Table 20.8

Heater model	D 4 W SC		D 5 W SC	
Heat-transfer liquid	Water, coolant			
Heat flow adjustment	High	Low	High	Low
Heat flow (W)	4300	2400	5000	2400
Fuel consumption (l/h)	0,53	0,27	0,62	0,27
Power consumption (Watts): during startup	48 120	23 120	50 120	23 120
Rated voltage (V)	12			
Operating voltage (V)	10,2…16			
Permissible working pressure	Excessive pressure up to 2.5 bar			
Efficiency of water pump at 0.1 bar	900 l/h			
Minimum heater output	250 l/h			
Fuel	Diesel			
Permissible ambient temperature: operation storage	-40ºC…+80ºC -40ºC…+125ºC			

Technical data for gasoline heaters

Table 20.9

Heater model	B 4 W SC		B 5 W SC	
Heat-transfer liquid	Water, coolant			
Heat flow adjustment	High	Low	High	Low
Heat flow (W)	4300	1500	5000	1500
Fuel consumption (l/h)	0,6	0,2	0,69	0,2
Power consumption (Watts): during startup	48 120	22 120	50 120	22 120
Rated voltage (V)	12			
Operating voltage (V)	10,2…16			
Permissible working pressure	Excessive pressure up to 2.5 bar			
Efficiency of water pump at 0.1 bar	800 l/h			
Minimum heater output	250 l/h			
Fuel	Gasoline with octane rating min 80			
Permissible ambient temperature: operation storage	-40ºC…+80ºC -40ºC…+125ºC			

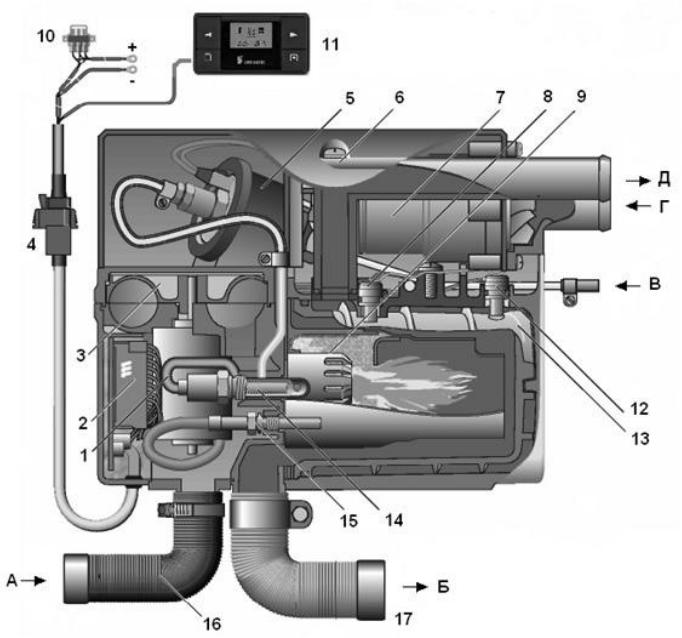


Fig. 20.15 HYDRONIC D 4 W SC and D5 W SC in section (diesel)

1 - Electric motor of air intake fan;
2 - Controller;
3 - Fan for air supply to combustion chamber;
4 - 8-pin connector;
5 - Dosing pump;
6 - Combustion vent screw;
7 - Water pump;
8 - Temperature sensor;
9 - Combustion chamber;
10 - Fuse holder;
11 - EasyStart timer;
12 - Overheating sensor;
13 - Heat exchanger;
14 - Glow plug;
15 - Flame sensor;
16 - Air supply pipe to combustion chamber;
17 - Exhaust gas pipe;

А – Air supply to combustion chamber;
Б – Discharge of exhaust gases;
В – Supply of fuel from the tank;
Г – Coolant inlet;
Д – Coolant outlet.

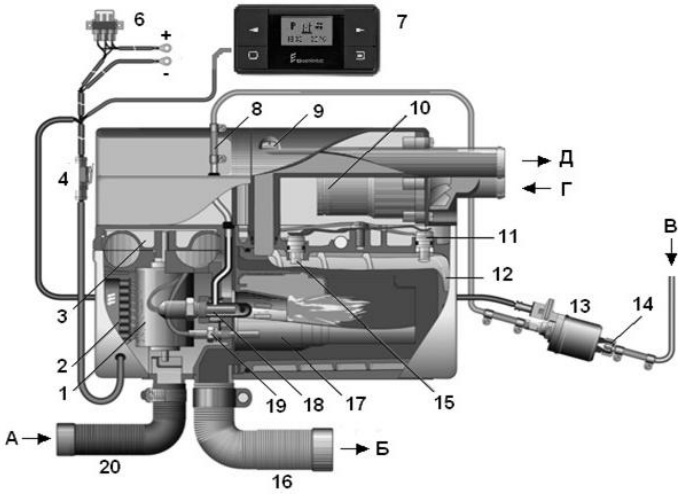


Fig. 20.16 HYDRONIC B 4 W SC and B 5 W SC in section (gasoline):

1 - Electric motor of air intake fan;
2 - Controller;
3 - Air intake fan;
4 - Heater harness connector (8-pin);
6 - Fuse holder;
7 - EasyStart timer;
8 - Fuel connection;
9 - Air vent screw;
10 - Water pump;
11 - Overheating sensor;
12 - Heat exchanger;
13 - Dosing pump;
14 - Filter in the dosing pump;
15 - Temperature sensor;
16 - Exhaust pipe;
17 - Combustion chamber;
18 - Glow plug;
19 - Flame sensor;
20 - Air supply pipe for combustion chamber;

А – Air supply to combustion chamber;

Б – Discharge of exhaust gases;

В – Supply of fuel from the tank;

Г – Coolant inlet;

Д – Coolant outlet.

20.4.1.4. Stages of heater operation

20.4.1.4.1. Turning on

When the heater is turned on, water pump, air supply fan to combustion chamber, spark plug and fuel metering pump start to operate. Combustion process starts according to a certain program. When a stable flame has formed, the timer turns off the plug.

20.4.1.4.2. Heating mode

Depending on the need for heat, the following modes of work are possible: HIGH; LOW; OFF (pause).

The temperature limits are programmed in the electronic controller. If during the "LOW" mode the heat demand is so small that the cooling water temperature reaches 86 °C, the device goes to the OFF stage. Coastdown occurs for about 120 seconds, and then the heater switches off (control pause). The operating display is still on, and the water pump is still running.

20.4.1.4.3. Shutdown

When the heater is turned off, the dosing pump switches off, stopping the fuel supply and stopping the combustion. After the heater was turned off, the purge cycle (purging the combustion chamber) takes place. Therefore, **it is not allowed to disconnect the "ground" of ATV until the end of the cleaning cycle.**

20.4.1.5. Safety devices

The flame is monitored by the flame sensor, and the maximum permissible temperature is detected by the overheating sensor. Both act on the controller, which turns off the heater when malfunctions occur.

1. If no ignition occurs within 90 seconds after starting the fuel supply in the preheater, the start-up process is repeated. If the ignition stops again 90 seconds after the start of the fuel supply, an emergency shutdown is carried out.

2. If the flame goes out during the heater operation, a new start is carried out. If there is no ignition within 90 seconds after the start of the fuel supply or it occurs and the flame goes out again, an emergency shutdown is performed. By turning the heater off and on again, you can stop the emergency shutdown.

3. In case of overheating (lack of cooling liquid, poor exhaust of air from the cooling system), the overheating sensor is triggered, the fuel supply stops, and emergency shutdown * takes place. After eliminating the cause of overheating, the heater can be restarted by turning it off and then on again (condition: the heater is sufficiently cooled, the coolant temperature is below 70 °C). After a certain number of trips due to overheating, the control unit is blocked*.

4. If the voltage drops below 10.2 V or rises above 16 V, an emergency shutdown takes place.

5. The heater does not start when the spark plug is faulty or if the electrical wire leading to the dosing pump is interrupted.

6. If the electric motor of the air blower does not start or if it started but was blocked during operation, an emergency shutdown of the heater takes place.

* You can unlock the system or read error messages using the following devices: EASYSTART timer, EASYSTART REMOTE +; connection of the diagnostic tool.

Attention! It is prohibited to switch on the engine heater when the interior heater valve is closed! In order to avoid its failure the electric pump should be switched on only when the heater valve is open.

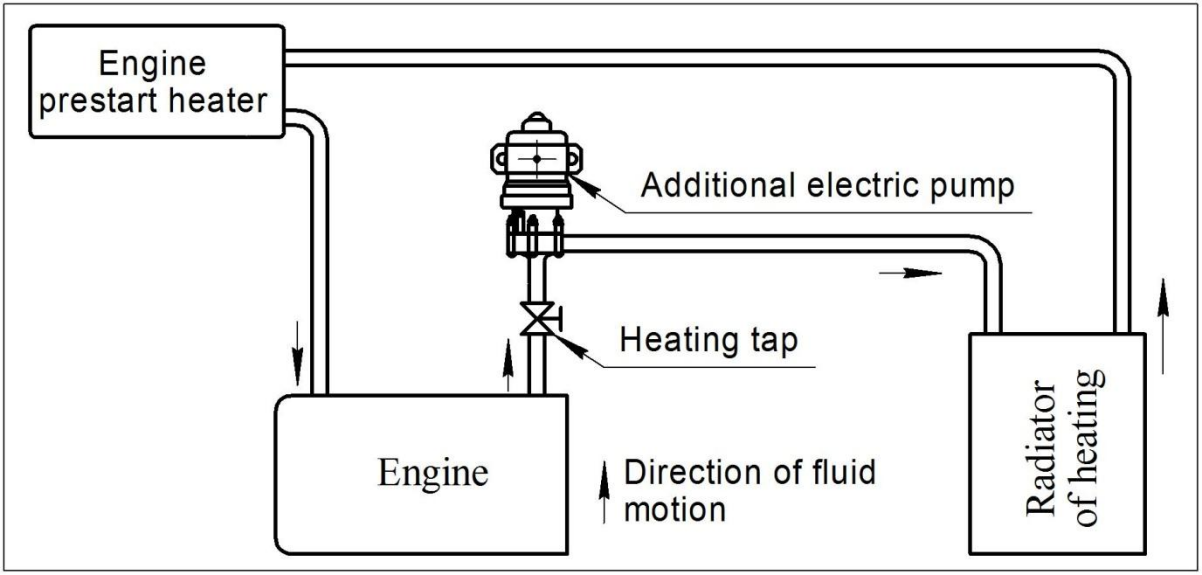


Fig. 20.17 Heating system

20.4.1.6. Recommendations for the use of fuel

The quality of the fuel for the heaters should meet the requirements for the fuel that is poured into the tank of your car.

If the supply of diesel fuel to the heating system is carried out from a separate fuel tank, at temperatures below 0 °C it is necessary to add kerosene or gasoline according to Table. 20.10.

Recommendations for the use of fuel

Table 20.10

Ambient temperature	Recommended fuel
From 0°C to -25°C	100% winter diesel fuel
From -25°C to -40°C	100% **arctic** winter fuel or 50% of winter diesel fuel and 50% of kerosene or gasoline

As a rule, additives do not adversely affect the operation of the heater.

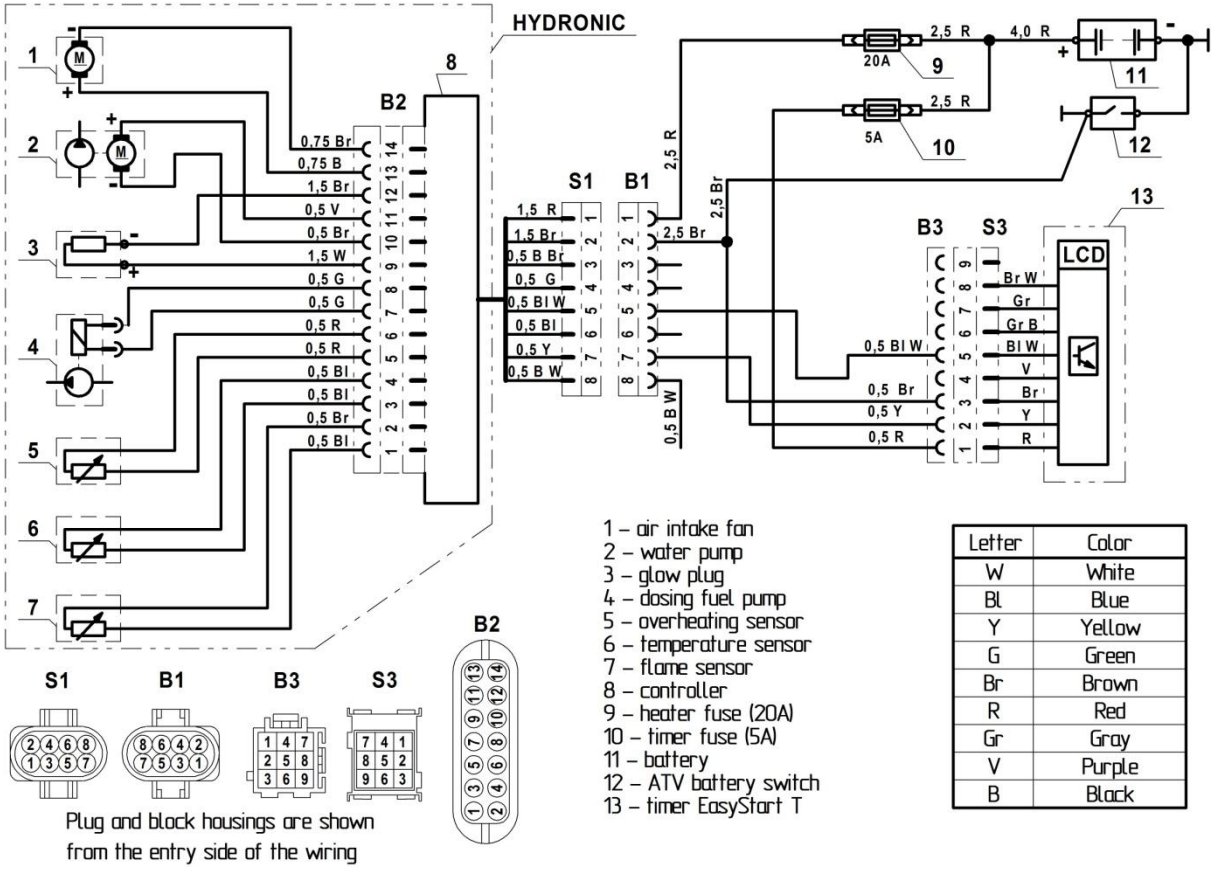
When switching to frost resistant fuel, the heater should be switched on for 15 minutes to fill the fuel system with the new fuel.

20.4.1.7. Maintenance of heater

In the event of a malfunction of the heater or with visible emission of soot in the exhaust, clean the openings of the air supply lines to the combustion chamber and the exhaust gas line.

Beyond the heating season it is recommended to turn the heater monthly for about 10 minutes when the engine is cold. This prevents the difficulties of starting the heater in the beginning of winter.

When changing the coolant, after removing the air from the engine cooling system, remove the air from the heater. For this purpose turn on the heater for 1-2 minutes, so that the circulating pump works during the coastdown. If necessary, restart the heater. Top up the missing coolant.



Letter	Color
W	White
Bl	Blue
Y	Yellow
G	Green
Br	Brown
R	Red
Gr	Gray
V	Purple
B	Black

Fig. 20.18 Wiring diagram of the heater connection

20.4.1.8. In case of malfunction

If the heater does not start, it is necessary to switch the heater off and on again, **but not more than twice in a row.**

If the heater does not start, check the following:

- whether there is fuel in the fuel tank of the heater;
- whether fuses are blown, whether the electrical lines and connections are OK;
- whether pipes for air intake and removal of exhaust gases got clogged.

If the heater still does not start, it is necessary to inspect the heater using the EasyStart timer or the Eberspaecher diagnostic equipment.

20.4.1.9. Malfunction codes for HYDRONIC preheaters

Table 20.11

Error code	Error description
00	No errors
04	Attention! Short circuit in the control unit, terminal of the additional device
05	Attention! Short circuit in the control unit, terminal of the alarm system
09	Disabling ADR
010	Increased voltage - heater shutdown
011	Low voltage - heater shutdown
012	Overheating on the overheating sensor
014	Differential overheating
015	Blocking - Heater overheated more than 10 times
017	Overheating detected. Emergency shutdown
020	Breakage of pin electrode circuit
021	Short circuit of pin electrode circuit
030	Air blower speed is outside permissible limits
031	Air blower circuit opening
032	Short circuit of the air blower circuit
038	Fan control circuit opening
039	Short circuit of the fan control circuit
041	Fluid pump control circuit opening

Table 20.11 (continued)

042	Short circuit of the fluid pump control circuit
047	Short circuit of the dosing pump control circuit
048	Dosing pump control circuit opening
050	Blocking. Exceeding of allowed number of starts
051	Exceeding of cold blowing time
052	Exceeding of safe time limit
053	Burnout of flame in the "high" mode
056	Burnout of flame in the "low" mode
060	Temperature sensor circuit opening
061	Short circuit of the temperature sensor circuit
64	Combustion sensor circuit opening
065	Short circuit of the combustion sensor circuit
071	Overheating sensor circuit opening
072	Short circuit of the overheating sensor circuit
090, 092-103	Defective heater control unit
091	External electrical interferences

20.4.2. Air heater AIRTRONIC D4 (diesel). Air heater AIRTRONIC B4 (gasoline)

20.4.2.1. General provisions

The system is designed to heat and maintain heat in the ATV interior at low temperatures and when the engine is idle.

The air heater can be completed with various control panels in various combinations. The air heater is not included in the basic configuration of all-terrain vehicle.

20.4.2.2. Safety requirements

1. Do not use the preheater in enclosed spaces such as garages or workshops that do not have an exhaust system, due to the danger of asphyxiation or carbon monoxide poisoning.

2. Do not use the heater at gas stations or in places where combustible fumes and dust can form, for example, if the following facilities are located nearby:

- fuel storage;
- coal storage;
- wood storage;
- grain storage, etc.

3. In case of strong smoke, unusual noises or smell of fuel, the heater should be blocked and checked in the service station.

4. The heating air inlet and outlet should be kept free of dirt and foreign objects. Dirty and clogged air ducts for heating air can lead to overheating and thus to the activation of the heating limiter.

5. In order to comply with fire safety rules, it is necessary to drain fuel from the fuel tank in summer when the heater is not in use.

6. When conducting electric welding on the ATV to ensure the protection of the control unit, the positive pole should be disconnected from the battery and connected to the grounding.

7. Turn off the heater when refueling the car.

8. It is forbidden to stop the heater's coastdown by using a battery isolator (disconnecting the "earth"), except for an emergency shutdown.

9. It is always necessary to comply with the generally accepted rules for the prevention of accidents and comply with the relevant regulations on labor protection.

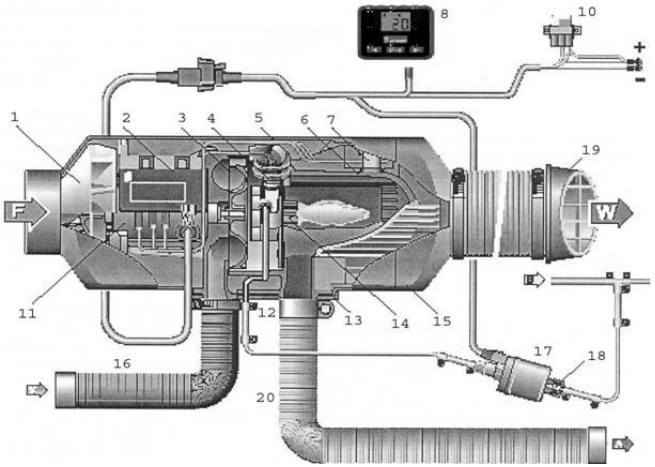


Fig. 20.19 AIRTRONIC D4 in section (diesel):

1 - Air heater impeller;
2 - Control unit;
3 - Impeller of combustion chamber;
4 - Glow plug;
5 - Cover;
6 - Heat exchanger;
7 - Flame/overheating sensor;
8 - Element of EasyStart Select control system;
10 - Fuses;
11 - Electric motor;
12 - Fuel supply;
13 - Flange seal;
14 - Combustion chamber;
15 - Exhaust gases cowl;
16 - Combustion air pipe;
17 - Dosing pump;
18 - Fuel filter integrated in the metering pump;
19 - Air outlet;
20 - Flexible exhaust manifold;

A – Release of exhaust gases;
B – Fuel (Diesel);
V – Supply of air to combustion chamber;
F – Input air;
W – Heated air.

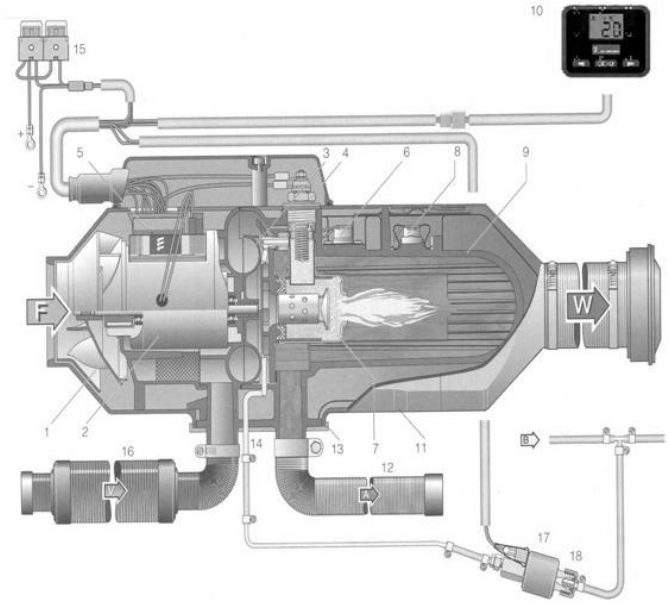


Fig. 20.20 AIRTRONIC B4 in section (gasoline)

1 - Air heater impeller;
2 - Air blower impeller motor;
3 - Impeller of combustion chamber;
4 - Glow plug;
5 - Control unit;
6 - Combustion chamber overheating sensor;
7 - Flame/overheating sensor;
8 - Overheating sensor;
9 - Heat exchanger;
10 - Element of EasyStart Select control system;
11 - Outer casing;
12 - Flexible exhaust manifold;
13 - Flange seal;
14 - Fuel supply;
15 - Fuses;
16 - Combustion air pipe;
17 - Dosing pump;
18 - Fuel filter integrated in the dosing pump.

A – Release of exhaust gases;
B – Fuel (gasoline);
V – Supply of air to combustion chamber;
F – Input air;
W – Heated air.

20.4.2.3. Technical data for heaters

Technical data for diesel fuel heaters

Table 20.12

Heater model	AIRTRONIC D4			
Heat-transfer fluid	Air			
Heat flow adjustment	Mode			
	Full	Ave.	Low	Off
Heat flow (W)	4000	3000	2000	1000
Air consumption (kg/h)	185	150	110	65
Fuel consumption (l/h)	0,51	0,38	0,25	0,13
Power consumption (W): during startup	40 <100	24 <100	13 <100	7 <100
Rated voltage (V)	12			
Operating voltage (V)	10,5…16			
Fuel	Diesel			
Permissible ambient temperature: operation, storage	-40ºC…+70ºC -40ºC…+85ºC			
Level of protection against radio interference	3 for FM, 4 for SW, 5 for LW and MW			

Technical data for gasoline heaters

Table 20.13

Heater model	AIRTRONIC B3LC/B3LP			
Heat-transfer fluid	Air			
Heat flow adjustment	Mode			
	Full	Ave.	Low	Off
Hea flow (W)	3500/3000	3200/2500	1500/1500	1000/900
Air consumption (kg/h)	160/140	160/130	80/85	65/60
Fuel consumption (l/h)	0,47/0,4	0,42/0,34	0,2/0,2	0,13/0,12
Power consumption (W): during startup	36/26 270/260	36/22 270/260	12/12 270/260	8/8 270/260
Rated voltage (V)	12			
Operating voltage (V)	10,5…16			
Fuel	Gasoline with octane rating of at least 80			
Permissible ambient temperature: operation, storage	-40ºC…+70ºC -40ºC…+85ºC			
Permissible ambient temperature: operation,	3			

20.4.2.4. Stages of heater operation

20.4.2.4.1. Switching on the heater

When the heater is switched on, the glow plug begins to heat up, and the air blower starts to work at a low speed.

The heater will start only after the residual heat has been removed (only air blower works before that).

20.4.2.4.2. Start-up process

The supply of fuel begins in 60 seconds. The fuel-air mixture ignites in the combustion chamber. In 90 seconds, once the combined sensor (flame sensor) detects the flame, the glow plug is turned off. The heater goes into normal operation. In 120 seconds the heater reaches the "POWER" stage (maximum fuel flow and maximum fan speed).

20.4.2.4.3. Selecting temperature using the control

The desired temperature in the ATV cabin is set by means of the digital control device EasyStart Select. Depending on the outside temperature, the size of the heated cabin, this figure can vary from + 10ºC to + 30ºC.

20.4.2.5. Regulation in heating mode

In heating mode the temperature in the passenger compartment or the temperature of the intake air is constantly measured. If the temperature exceeds the set value on the device, the adjustment is started. The heater has 4 stages of adjustment that allow precise adjustment of the warm air to the specified heating requirements. Each stage of regulation has its own speed of rotation of the air blower and a certain amount of fuel consumed. If the set temperature is exceeded in the low control stage, the heater switches to the "OFF" stage and the air blower continues to rotate for about 4 minutes to cool the heater. Then the air blower will continue to rotate at a minimum speed until the heater starts up again.

20.4.2.6. Switching off the heater

When the heater is switched off, the fuel supply stops. The air blower continues to run for about 4 minutes (cleaning cycle) for the purpose of cooling and blowing the heater. Glow plug remains on for 40 seconds in order to remove residual combustion products.

Therefore **it is not allowed to disconnect the "ground" of ATV until the end of the cleaning cycle**.

Special case: If there is no fuel supply at start-up or the heater is in the "OFF" control stage, the heater switches off immediately without purging.

20.4.2.7. Operation of the heater in mountainous conditions

At an altitude up to 1500 m the heater can be operated without restrictions.

At an altitude over 1500 m the short-term operation of the heater is possible in principle (travel through the mountain pass, rest).

In case ATV is operated for a long time in mountainous conditions (for example, winter camping) the fuel consumption should be adapted to these conditions. In this case it is necessary to contact the service department of the manufacturer's facility.

20.4.2.8. Safety devices

1. If no ignition occurs within 90 seconds after starting of the fuel supply in the heater, the start-up process will be repeated. If 90 seconds after the start of the fuel supply no ignition occurs again, an emergency shutdown will take place, i.e. the fuel pump will shut off and the fan will continue to rotate for approximately 4 minutes.

2. If the flame goes out during the heater operation, a new start of the heater will be carried out. If no ignition occurs within 90 seconds after the start of the fuel supply or if it occurs but within 15 minutes goes out again, the emergency shutdown will take place, i.e. the fuel pump will shut off and the fan will continue to rotate for approximately 4 minutes.

By turning the heater off and then on again you can stop the emergency shutdown. **But do not do this twice in a row!**

1. When the heater overheats, the overheating sensor trips, the fuel supply stops and the emergency shutdown takes place. After eliminating the causes of overheating, the heater can be restarted by turning it off and then on again.

2. When the lower or upper limit of the supply voltage is reached within 20 seconds, the emergency shutdown of the heater takes place.

3. The heater does not start with a defective glow plug, burner motor or interrupted power supply of the dosing pump.

4. If the heater starts with a faulty overheating sensor or damaged electric cable, the emergency shutdown takes place during the start-up phase.

5. The speed of air blower motor is constantly monitored. If the air blower motor does not start or the speed deviation exceeds more than 10%, then in 30 sec the emergency shutdown of the heater takes place.

20.4.2.9. Recommendations for the use of fuel

The quality of the fuel for the heaters should meet the requirements for fuel that is poured into the tank of your car.

At temperatures from 0 °C to -20 °C - use winter diesel fuel.

At temperatures from -20 °C to -40 °C - use arctic winter fuel.

As a rule, additives do not adversely affect the operation of the heater.

When switching to frost resistant fuel, the heater should be switched on for 15 minutes to fill the fuel system with the new fuel.

20.4.2.10. In case of malfunction

In the event of a malfunction of the heater or with visible emission of soot in the exhaust, clean the openings of the air supply lines to the combustion chamber and the exhaust gas line.

Beyond the heating season it is recommended to turn the heater monthly for about 10 minutes when the engine is cold. This prevents the difficulties of starting the heater in the beginning of winter.

20.4.2.11. In case of malfunction

If the heater does not start, it is necessary to switch the heater off and on again, **but not more than twice in a row.**

If the heater does not start, check the following:

- whether there is fuel in the fuel tank of the heater;
- whether fuses are blown;
- whether the electrical lines and connections are OK;
- whether pipes for air intake and removal of exhaust gases got clogged.

If the heater still does not start, it is necessary to inspect the heater using the EasyStart timer or the Eberspaecher diagnostic equipment.

20.4.2.12. Malfunction codes for Airtronic heaters

Table 20.14

Error code	Error description
00	No errors
04	Attention! Short circuit in the control unit, terminal of the additional device
05	Attention! Short circuit in the control unit, terminal of the alarm system
09	Disabling ADR
010	Increased voltage - heater shutdown
011	Low voltage - heater shutdown
012	Overheating on the overheating sensor
014	Exceeding the permissible temperature difference between the temperature and combustion sensors
015	Functional blocking
017	Overheating
019	Insufficient energy for ignition
020	Breakage of pin electrode circuit
021	Short circuit of pin electrode circuit
022	Pin electrode circuit is closed to (+)
025	Diagnostic cable short-circuited
031	Air blower circuit opening
032	Short circuit of the air blower circuit
033	Air blower does not rotate or short circuit of the air blower circuit
034	Short circuit of the air blower circuit to (+)
047	Short circuit of the control circuit of the dosing pump
048	Dosing pump control circuit opening

Table 20.14 (continued)

049	Short circuit of the fuel pump circuit to (+)
050	Blocking. Exceeding of allowed number of starts
051	Flame detected
052	Exceeding the safe time limit
053-056	Burnout of flame in the "high", "average", "low" mode
057	Burnout of flame in starting phase
060	Opening of external temperature sensor circuit
061	Short circuit of external temperature sensor circuit
062	Opening of control circuit
063	Short circuit of control circuit
064	Opening of combustion sensor circuit
065	Short circuit of combustion sensor circuit
072	Opening of overheating sensor circuit
072	Short circuit of overheating sensor circuit
074	Defective control unit
090	Defective control unit (internal fault)
091	External electrical interference
092	Defective control unit (faulty ROM)
093	Defective control unit
094	Defective control unit (EEPROM faulty)
095	Defective control unit
096	Defective internal temperature sensor
097	Defective control unit
098	Defective control unit
099	Defective control unit

20.4.3. Preheater and heater controls

20.4.3.1. General Provisions

Control devices can be used in various combinations. The configuration of the equipment is determined when ordering an all-terrain vehicle.

EasyStart Select is the simplest remote control. By using only three control buttons you can configure and, if necessary, change all functions. It is recommended for air heaters. PN: 22 1000 34 1300

EasyStart Timer is a 7-day programmable timer with 3 memory cells. It is recommended for use with programmable preheaters. PN: 22 1000 34 1500

EasyStart Remote is the simplest remote control with feedback. By using only 2 buttons you can configure and, if necessary, change all functions. The switching signal in the open area (line of sight) is transmitted for a distance of up to 1,000 meters. External sources of interference, local conditions and restrained urban conditions shorten the range. PN: 22 1000 34 2300

EasyStart Remote plus - remote control with feedback. Using this remote control you can enter settings and perform programming. The switching signal in the open area (line of sight) is transmitted for a distance of up to 1000 meters.

External sources of interference, local conditions and restrained urban conditions shorten the range. PN: 22 1000 34 1700

If you have any technical problems or problems with control panels, please contact the Technical Consulting Department of LLC NPF "TRECOL" or to the regional service department of CJSC "Eberspächer Climatic Systems».
General Representative of J.Eberspächer GmbH. & Co.KG CJSC "berspächer Climatic Systems"
107140, Moscow, 2 Verkhnyaya Krasnoselskaya str.
www.eberspaecher.ru

20.4.3.2. Remote controls installed in the cabin of all-terrain vehicle

20.4.3.2.1. EasyStart Select. PN: 22 1000 34 1300

Fig. 20.21 EasyStart Select

EasyStart Select – is the simplest remote control. By using only three control buttons you can configure and, if necessary, change all functions. It is recommended for air heaters.

When the power is connected, an InI symbol will be displayed on the EasyStart Select display, and the heating equipment will be identified. If the identification was successful, the start window will indicate a flashing temperature value in the car's cabin.

EasyStart Select remote control buttons

Table 20.15

Button	Function
OK / ⏻	ON, OFF.,confirm action
◄ ►	perform menu items and settings

20.4.3.2.1.1. 20.4.3.2.1.1. Activation of EasyStart Select remote control

LONGPRESS – direct way. Press and hold the button OK / ⏻ for more than 2 seconds - heating mode will immediately start.

SHORTPRESS – if the display is not on, shortly press any of the three buttons for less than two seconds. The start page is displayed on the display, and you can then perform control and configuration operations.

The symbol for the menu item being activated flashes on the display. Activation of a flashing symbol is performed by pressing the key OK / ⏻.

Selecting the menu items HEATING or VENTILATION should always be confirmed with the button OK / ⏻. The VENTILATION mode is not present in all heater configurations

20.4.3.2.1.2. Start window

20.4.3.2.1.2.1. For water heaters

Menu bar

Status bar

20.4.3.2.1.2.2. For air-heaters

Menu bar

Status bar

20.4.3.2.1.3. Menu items

Table 20.16

Symbol	Function
	Heating ON/OFF
	Ventilation ON/OFF
°C or °F	Temperature in the cabin
°C or °F	Specified temperature

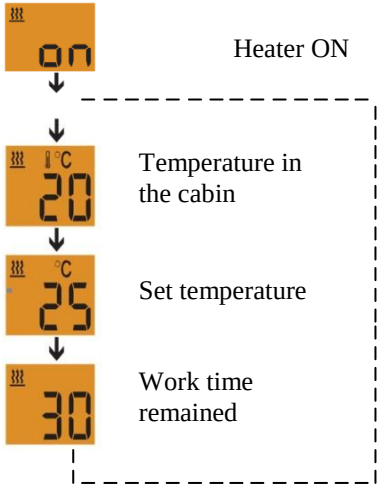
20.4.3.2.1.4. Status bar

If no menu item is activated, the temperature in the cabin is displayed in the status bar.

20.4.3.2.1.5. Turning on the heating

LONGPRESS - immediate activation. Press and hold the OK button OK/⏻ for more than 2 seconds;

SHORTPRESS - activate EasyStart Select with any button. Symbol . will flash on the panel. Short press the OK button OK/⏻.



20.4.3.2.1.6. Control and settings

The heating temperature set point can be set by pressing the ◄ or ► button. The temperature set point adjustment range is 8°C - 36°C.

20.4.3.2.1.7. Turning on the heating by SHORTPRESS

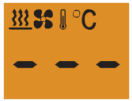
The "heating" menu item is displayed.

Press short and hold OK/⏻ button.

Heater OFF.

20.4.3.2.1.8. Possible messages on the screen in the event of a malfunction

Table 20.17

Symbol	Troubleshooting
	System malfunction. Turn off the control panel using the OK/⏻ button. Contact the workshop.
	Heater OFF. Low battery voltage. Charge the battery, contact the workshop.
	No connection. Check the fuses. If necessary, contact the workshop.
	Temperature sensor interruption. Contact the workshop

20.4.3.2.1.9. Menu of EasyStart Select factory settings

Using the factory settings menu, you can open, read, and/or modify the following service functions.

20.4.3.2.1.9.1. Call up the factory settings menu

Display is on, start window is displayed

Start window of water heater

Start window of air heater

Press and hold ◄ and ► simultaneously for more than 5 seconds. Factory settings menu is displayed.

Use buttons ◄ or ► to select the desired item, for example, "item 2: Select the temperature unit, °C or °F" and confirm by pressing the EY button OK/⏻.

Select the unit of temperature °C or °F by pressing the button ◄ and ►.

Confirm by pressing the OK button OK/⏻.

Leave the factory settings menu after the time limit has elapsed.

20.4.3.2.1.9.2. Overview of service functions

Table 20.18

Menu item	Service function	Note
1.1	current fault indication	heater should be connected. AF symbol (current fault) and the current fault number are displayed in turn. The current fault is always written to fault recorder F1. The text "ndi" is displayed if the diagnostic cable is not connected.
1.2	reading data from fault recorder F1 – F5	heater should be connected. F1 and the error number are displayed in turn. select the display of the F2-F5 error log data using buttons ◄ or ►. The text "ndi" is displayed if the diagnostic cable is not connected.
1.3	resetting of error log F1 - F5	heater should be connected. confirm "DEL" (delete) with by pressing the OK button OK/⏻. The text "ndi" is displayed if the diagnostic cable is not connected.
2	selection of temperature unit, °C or °F	default: °C
3.1	setting voltage lower limit	default: 8 V Setting range: 8 – 28 V in 0.1 V increments (indication, for example, 271 for 27,1 V).
3.2	setting voltage lower limit "Offset" (correction)	default: 0 V Adjustment range: 0 – 6 V in 0.1 V steps (indication, for example, 55 for 5.5 V).
3.3	setting of contact bounce clearing time "fault finding»	default: 20 seconds adjustment range: 5 – 255 seconds in 1 second increments.

Table 20.18 (continued)

Menu item	Service function	Note
4.1	setting the duration of work	default: 60 min. for water heaters/continuously for air heaters adjustment range: 10 - 120 min in increments of 1 min, after the 120th minute -720 min in increments of 5 min. for air-heating appliances, continuous heating operation is possible (select OFF). **Attention! In combination with other controls this function is disabled.**
5	reset to the state at the time of delivery	confirm → press the OK button OK/⏻
6.1	read information about the hardware configuration of the control	function is provided solely for internal purposes.
6.2	read information about the hardware configuration of the control	function is provided solely for internal purposes.
6.3	read information about the configuration of the program part of the control	function is provided solely for internal purposes.
6.4	read information about the configuration of the program part of the control	function is provided solely for internal purposes.
14	display all symbols (display)	reset with the OK button OK/⏻

20.4.3.2.2. EasyStart Timer. PN: 22 1000 34 1500

Fig.20.22 EasyStart Timer

EasyStart Timer is a 7-day programmable timer with 3 memory cells. It is recommended for use with programmable pre-start heaters. It is installed in the all-terrain vehicle. When the power is connected, the InI symbol will be displayed on the EasyStart Timer display, and heating equipment will be identified. If the identification is successful, the clock on the start window will flash. It is necessary to set the time and days of week. Maintenance of the EasyStart Timer is similar to the EasyStart Remote Plus timer, except for the remote control function.

20.4.3.2.2.1. Functions of the EasyStart Timer and EasyStart Timer plus control buttons

Table 20.19

Button	Pressing *	Function
	LONGPRESS	- if the display is On or Off, the heater is switched on immediately (except when programming or setting is carried out).
	SHORTPRESS	- if the display is off, the timer will start, and start window will open; - button pressing, confirmation of the selected function, confirmation of data entry.
	LONGPRESS	- completion of all functions; - If the display is OFF, timer will be ON and the start window will open.
	SHORTPRESS	the displayed, active function is off, the rest of the functions will continue to work. With each SHORTPRESS the display changes to the next higher level without saving the entered values until the timer is OFF.

Table 20.19 (continued)

	Press and hold the button	the timer is in the main menu, the start window is open, the next right symbol in the center of the menu bar is flashing; the timer is in the submenu, the displayed value increases or the next selected value is displayed; - if the timer is OFF, the timer is ON, the start window will open.
	Press and hold the button	- the timer is in the main menu, the start menu is open, the next left symbol in the center of the menu bar is flashing; the timer is in the submenu, the displayed value is decreased or the next selected value is displayed; - if the timer is OFF, the timer is ON, the start window will open.

* LONGPRESS - long press. Keep the button pressed for more than two seconds;

SHORTPRESS - short press. Keep the button pressed for less than two seconds.

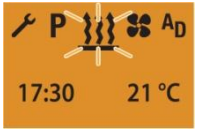
In the main menu you can activate the flashing symbol in the menu bar by pressing the button.

In the submenu you can activate the flashing value by pressing the or button, confirm the selection or complete by pressing.

You can reset the buttons.

Always confirm any settings and changes by pressing the button, otherwise they will not be saved.

20.4.3.2.2.2. Main menu



Menu bar

Status bar

20.4.3.2.2.3. Menu bar

Table 20.20

Symbol	Function
	- Heating ON/OFF
	- Ventilation ON/OFF
AD	- Additional heater
	- Settings
P	- Program

20.4.3.2.2.4. Status bar

If none of the menu items is activated, the current time will be displayed in the status bar, and if there is a temperature sensor (option) the temperature inside the car. When the menu item (heating, ventilation, additional device, settings, program) is activated, various information will be displayed in the corresponding sections of the status bar.

20.4.3.2.2.5. Submenu

Menu bar

Status bar

Display: for example, HEATING ON, running time 107 minutes.

The symbol for the menu item being activated is displayed in the center of the display. The assigned value will blink in the data entry field; set up with the ◄ or ► button and confirm with the ▭ button.

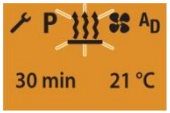
20.4.3.2.2.5.1. Starting window after activation

If none of the menu items is activated, the flashing symbol of heating will be displayed in the center of the menu bar, the clock with the current time and the actual temperature on the status bar will be displayed in the start window. Possible further actions:

- immediate activation of the heating with the LONGPRESS button.
- activation of the heating with SHORTPRESS, additional confirmation of the set temperature and operating time. Their parameters can be changed if necessary.

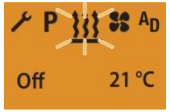
Selection of a new menu item.

20.4.3.2.2.5.2. Immediate activation of the heating with the LONGPRESS button (without settings)



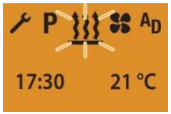
Press the button LONGPRESS and hold it for more than two seconds. Heater ON.

20.4.3.2.2.5.3. Turning off using LONGPRESS



Display ON, the HEAT menu item is displayed. Press and hold the LONGPRESS button for more than two seconds. Heater OFF.

20.4.3.2.2.5.4. Switching on the heating with SHORTPRESS with changes in the settings



Display ON, open the start menu.
Short press button SHORTPRESS, for less than two seconds - HEATING submenu will open.

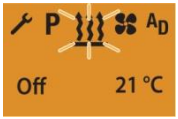
ATTENTION! Temperature value and operating time should be additionally specified

Display ON, start menu is open.

Short press the SHORTPRESS, button for less than two seconds - HEAT submenu will open.
The setting range of operation time is 10 - 120 minutes in 1 minute increments. The setting is done with the or button.
Confirm the duration of the operation by pressing the button.

Display mode for air-heating appliances with continuous operation in heating mode (factory setting).

20.4.3.2.2.5.5. Shutdown using SHORTPRESS



Display ON, the HEAT menu item is displayed.
Short press the SHORTPRESS button for less than two seconds. Heater OFF. Turn off the display backlight in ten seconds.

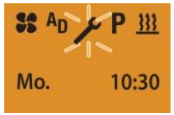
20.4.3.2.2.6. Settings

20.4.3.2.2.6.1. Time setting

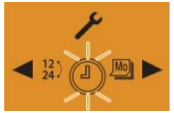
Attention! The button should not be pressed, as the display will again show TIME SETTINGS.

After the setting using the button return to the SETTINGS menu or wait until the device's backlight goes out.

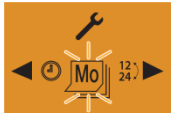
20.4.3.2.2.6.2. Setting the days of week



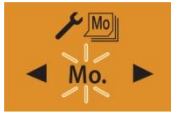
Display ON, start menu is open.
Press or to select . Confirm your choice with the button .



Press or to select the CLOCK symbol. Confirm your choice with the button .



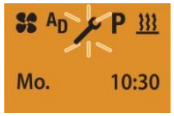
Press or to select the DAY OF THE WEEK. Confirm your choice with the button .



Select the day of week using button or .
Confirm your choice using the button .

Attention! The button should not be pressed, as the display will again show the DAY SETTING of the week.

After the setting using the button return to the SETTINGS menu or wait until the device's backlight goes out.



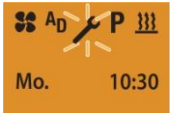
Display ON, start menu is open .
Press or to select .
Confirm your choice with the button .

Press or to select the CLOCK symbol. Confirm your choice with the button .

To adjust the clock press the or button. Confirm your choice using the button .

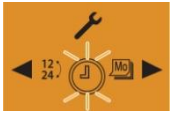
To adjust press the or .
Confirm your choice using the button .

20.4.3.2.2.6.3. Setting the clock display format



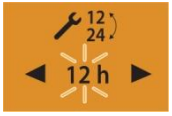
Display ON, start menu is open.

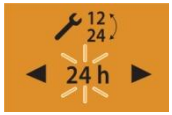
Press ◄ or ► to select 🔧. Confirm your choice with the button ▭.



Press ◄ or ► to select the CLOCK symbol. Confirm your choice with the button ▭.

Use ◄ or ► button to choose the 12/24 - symbol – clock display format. Confirm your choice with the button ▭.





Clock display format is set using buttons ◄ or ►. Confirm your choice with the button ▭.

Attention! The ▭ button should not be pressed, as the display will again show the CLOCK DISPLAY FORMAT.

After the setting using the ▬ button,return to the SETTINGS menu or wait until the device's backlight goes out.

20.4.3.2.2.7. General programming instructions

Display ON, start menu is open. Select the symbol P from the menu bar using the ◄ or ► buttons. The timer can be programmed for three time presets. Three time presetscan be assigned to one work day or distributed to different days of the week.

There are also three groups of days of week to choose from. They can be activated daily by the time value.

Groups of days of week:

Sat. – Sun.	2x Heating/Ventilation
Mon. – Fri.	5x Heating/Ventilation
Mon. – Sun.	7x Heating/Ventilation

If the activation is made at the programmed range of days of the week, all days of the week are processed sequentially, then the programming should be carried out again.

20.4.3.2.2.8. Automatic calculation of the work duration

Only for water heaters.

Heating system performs automatic calculation of the start of the HEAT mode depending on the measured temperature in the cabin and the selected heating mode:

ECO – economical mode

HIGH – high mode

The duration of the work can be from 10 to 60 minutes before the programmed departure time, with the operation always ending five minutes after the programmed time of the trip. Thus, the minimum working time is 15 minutes, and the maximum time is 65 minutes.

The duration of work specified in the menu (P - program) in this case is not valid. In all other configurations the start is carried out according to the preset duration of operation.

Attention! The heating stages ECO and HIGH are valid only in combination with the programmed time preset.

Times values are always the times of departure, even in case of a disabled work time calculation function.

It is not possible to program more than three time presets.

Maximum operating time is 65 minutes with automatic calculation is the factory setting. On request it can be lowered in the workshop where the installation was performed to a minimum of 15 minutes.

If the function of automatic calculation of the operating time was activated for water heaters, the duration of the work for calculating the time interval is 60 minutes.

20.4.3.2.2.9. Programming the presets

Display ON, start menu is open. Select the P symbol in the menu bar by pressing the ◄ or ► button.

It is displayed on the screen if the preset is not activated.

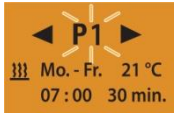
It is displayed on the screen if the preset is activated. Confirm the menu item P - program using the button ▭.

Attention! If the symbol P is marked with an ≀, sign, it means that one or more program memory devices have already been activated.

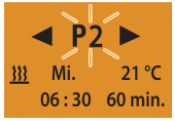
Activated program memory devices are indicated on the screen √.

20.4.3.2.2.10. Selecting program storage unit

When the program storage unit is displayed, select the next program memory P2, P3 or again P1 using the button ◄ or ►.

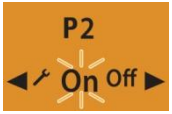


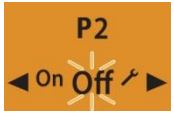
Factory setting window.



Window with pre-programmed presets.
The ▭ button confirms the choice.

20.4.3.2.2.11. Enabling/disabling of program storage unit





Set the function On or Off by pressing the ◄ or ► button. Use the ▭ button to confirm the choice, for example, is the P2 program is disabled.

Attention! After program editing with the ▭ button return to the menu item P-program or wait until the display light goes out. Do not press the ▭, button, otherwise the On or Off functions can switch positions.

20.4.3.2.2.12. Editing of program storage unit

Press the key to confirm the choice of the program memory, for example, program P2.
Press or to select . Confirm your choice with the button .

20.4.3.2.2.13. Selecting a group of days of week, day of week

Press the or button to select the group of days of week: Mon-Fri; Sat-Sun; Mon-Sun, or any of the days of the week: Mon, Tues, Wed, Thurs, Fri, Sat, Sun. Confirm your choice with the button .

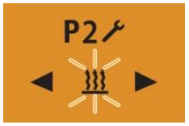
20.4.3.2.2.14. Setting travel time, start time

In order to adjust the clock, press the or button. Confirm your choice with the button .

Adjust the minutes by pressing the button or .
Confirm your choice with the button .

20.4.3.2.2.15. Selection of operating mode

Use the or button to choose , VENTILATION.
Confirm your choice with the button .
Function is available not for all ATV.



Using the or button choose , HEATING.
Confirm your choice with the button .

20.4.3.2.2.16. Setting the temperature set point (only for air heater)

Temperature set point can be set by pressing the or button.
Temperature adjustment range is 8°C - 36°C.
Confirm the temperature selection with the button.

20.4.3.2.2.17. Choosing the heating mode

Use the or button to select the heating stage ECO or HIGH.
Heating stage ECO - normal heating at around 10°C.
Confirm your choice with the button.

Use the ◄ or ► button to select the heating stage HIGH.

Heating stage HIGH comfortable heating at around 14°C.

Confirm with the ▭ button.

20.4.3.2.2.18. Setting the work duration

Press the ◄ or ► button to select the duration of work.

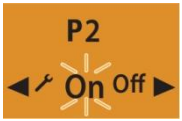
Setting range of operating time 10 min. - 120 min.

Confirm by pressing the ▭ button.

Attention! In water heaters with automatic calculation of the work duration, the maximum duration of operation is 65 minutes. There is no possibility to set the duration of work.

In air-heating appliances and when working in the pre-selection mode, the maximum duration of operation is 120 minutes. There is no possibility to use continuous heating mode.

20.4.3.2.2.19. Enabling of program storage unit



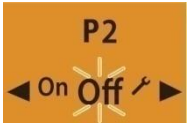
Using the ◄ or ► button, select the On function.

Confirm by pressing the ▭ button.

Attention! ! After editing the program using the ▭ button, return to the menu item P-program, presetting or wait until the display light goes out.

Do not press the ▭, button, otherwise the On or Off functions can switch positions.

20.4.3.2.2.20. Turning off the program memory



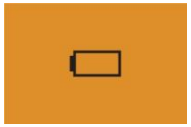
Using the ◄ or ► button, select the Off function.

Confirm by pressing the ▭ button.

Attention! After editing the program using the ▭ button, return to the menu item P-program, presetting, or wait until the display light goes out.

Do not press the ▭, button, otherwise the functions Off or On may switch positions.

20.4.3.2.2.21. Possible messages on the screen in the event of a malfunction



Remote control battery is discharged. It is necessary to replace the battery.

No connection; the device does not respond to commands. Check fuses and replace if necessary. In case of failure - contact the workshop.

Temperature sensor is defective.

Contact the workshop.

Low voltage of all-terrain vehicle battery.

Battery should be charged. Contact the workshop if necessary.

The distance for the radio connection between the remote control and the vehicle is too high. It is necessary to shorten the distance.

Attention! If you use several EasyStart Remote (plus) radio control systems at the same time, you should reactivate the remote control after a pause. If the LED flashes in the button, the stationary part is in the learning mode. It is necessary to wait thirty seconds before switching off. If the connection was not established, it is necessary to activate the learning mode of the mobile key fob.

If the error or fault cannot be remedied, please contact the workshop.

20.4.3.2.2.22. Factory settings menu of EasyStart Remote timer

By using the factory settings menu you can open, read, and/or modify the following service functions.

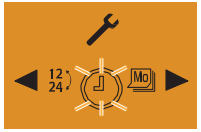
Attention!

- **in order to activate most functions the timer should be reset (remove fuse 5A). In this case it is necessary to follow the instructions in the "notes" to the "overview of service functions".**
- **refer to the heater repair manual for troubleshooting.**

20.4.3.2.2.22.1. Calling up of the factory settings menu

The display is on, the start window is displayed. Select in the menu bar symbol with the button ◄ or ►.

Confirm the menu item setting by pressing the button.



LONGPRESS the button for more than 5 seconds - factory settings menu will open.

Use the ◄ or ► button to select the desired function, for example "2: Select the temperature unit, °C or °F" and confirm with button.

Select the unit of temperature °C or °F with the ◄ or ► button.

Confirm your choice using the button.

Exit the factory settings menu by pressing the button.

20.4.3.2.2.22.2. Overview of service functions

Table 20.21

Menu item	Service function	Note
1.1.1	Heater 1 - displays current error	to recognize the current error, the heater should be switched on. The "no diag" text is displayed on the screen if the diagnostic cable is not connected.
1.1.2	Heater 2 - displays current error	to recognize the current error, the heater should be switched on. The "no diag" text is displayed on the screen if the diagnostic cable is not connected.
1.2.1	Heater 1 - reading data from fault recorder F1 - F5	displays the data of fault recorder F1 - F5 with error codes, e.g. F1: 12. The "no diag" text is displayed on the screen if the diagnostic cable is not connected.
1.2.2	Heater 2 - reading data from fault recorder F1 - F5	displays the data of fault recorder F1 - F5 with error codes, e.g. F1: 12. The "no diag" text is displayed on the screen if the diagnostic cable is not connected.
1.3.1	Heater 1 – resetting of fault recorder F1 – F5	Reset → select function with  , button, flashing text "DEL" (delete) will appear, confirm with the button  . The "no diag" text is displayed on the screen if the diagnostic cable is not connected.
1.3.2	Heater 2 - resetting of fault recorder F1 – F5	Reset → select function with  , button, flashing text "DEL" (delete) will appear, confirm with the button  . The "no diag" text is displayed on the screen if the diagnostic cable is not connected.

Table 20.21 (continued)

Menu item	Service function	Note
1.4.1	Heater 1 - reading data from service meter	The operating time is displayed in minutes. The text "no diag" is displayed on the screen if the diagnostic cable is not connected
1.4.2	Heater 2 - reading data from service meter	The operating time is displayed in minutes. The text "no diag" is displayed on the screen if the diagnostic cable is not connected
2	Selecting the temperature unit, °C or °F	default: °C
3.1	Set the lower voltage limit (only Easystart timer)	default: 8 B Adjustment range: 8 – 28 V in steps of 0.1 V
3.2	Set the lower voltage limit to "Offset" (only Easystart timer)	default: 0 V Adjustment range: 0 - 6 V in steps of 0.1 V.
3.3	Set the contact bounce clearing time "fault finding" (only Easystart timer)	default: 20 seconds Adjustment range: 5 - 255 seconds in 1 second increments.
4.1	Heater 1 - set max. duration of operation (only Easystart timer)	default: 120 min. adjustment range: 10 - 120 min in increments of 1 min, after the 120th minute - 720 min in increments of 5 min. for air heaters appliances a continuous heating mode is possible. These settings have no effect on the duration of the timer programming.

Table 20.21 (continued)

Menu item	Service function	Note
4.2	eater 2 - set the duration of operation (only Easystart timer)	default: 120 min. adjustment range: 10 - 120 min in increments of 1 min, after the 120th minute - 720 min in increments of 5 min. continuous heating mode is possible for air heaters. These settings have no effect on the duration of the timer programming.
5	reset to the state at the time of delivery	select the function with the , button, the "Default" text will flash, by default, confirm with the . button. all active timers will be deleted.
6.1	read information about the hardware configuration of the control	function is provided for internal purposes only
6.2	read information about the software configuration of the control	function is provided for internal purposes only
7	control range measurements (only Easystart Remote +)	performing a control measurement. with a mobile part to stand at a distance of 1 m in front of the vehicle and select in the factory settings menu using the button or pos. 7: if a value of 75 to 100 is displayed near R and s, the measurement is normal. Recommendations on the control measurement: for optimum installation, the radiated power can reach a maximum value of 100. If the maximum value is not reached, change the position of the antenna so that a value in the range from 75 to 100 is displayed near R and s.

Table 20.21 (continued)

Menu item	Service function	Note
8	Select language, DE (German) or En (English)	default: DE
9	setting the debug mode, On or Off	default: «Off» To activate the function, you must perform a reset (remove the fuse).
10	select the start time (On) or the start time of the trip (Off)	default: Off (start time) in the heating mode with automatic calculation of the duration of operation (pos.11.1 :), the time required to start the trip is required. in the heating mode without automatic calculation of the duration of operation (pos.11.1 :), a choice can be made between the start time (On) or the travel start time (Off). To activate the function, a reset must be performed (remove the fuse).
11.1	setting automatic calculation of the duration of the operation, On (on) or Off (off)	default: Off A temperature sensor must be connected to the control element or the base part. Additional settings are required, see pos. 11.2: and 11.3: To activate the function, you must perform a reset (remove the preserver). It is not possible to automatically calculate the duration of operation for air heaters.
11.2	Set the working volume	default: 1800 cm ³ adjustment range: 1000 cm³ - 4000 cm³ in increments of 100 cm³. The working volume can be set only when 11.1: is in the On position.
11.3	adjustment of max. duration of work	default: 60 min. adjustment range: 10 - 60 min. in increments of 1 min. Max. The duration of the work can be established only when 11.1: is in the On position.

Table 20.21 (continued)

Menu item	Service function	Note
12.1	installation of an additional AD device, On or Off	default: "Off" options: 1. by using the JE diagnostics →, the flame symbol and fan (if supported by the heater) in the AD menu. 2. by means of the switch-on signal s + 2 (deactivated 1.2.2 :, 1.3.2 :, 1.4.2 :, 9:) → S + 2 (only the flame symbol is displayed and in AD heating menu). 3. by means of a signal of turning on of the first heater s + 1 (deactivated 1) → S + 1 (only the heating menu is displayed). To activate the function, it is necessary to reset (remove the fuse).
12.2.1	Interior temperature control, On or Off	default: Off
12.2.2	Hysteresis (difference on/off): 0 - 7 °C	default: 2 °C
12.2.3	polling frequency: 0 - 15 seconds	default: 5 seconds
13.1	select mode KL58 or KL15	default: KL58. input KL58 = control the illumination of the control. To activate the function, you must perform a reset (remove the fuse).
13.2	if mode KL15 is enabled	default setting: 15 min. setting the time of inertial run-out of the heater before shutdown. adjustment range: 1 - 255 min. value 0 = the heater continuously operates continuously.

Table 20.21 (continued)

Menu item	Service function	Note
14.1	pixels on the indicator display	checking of individual pixels in test mode. If there are too many "broken" pixels, replace the control if necessary.
14.2	pixels on the indicator display	checking of individual pixels in test mode. If there are too many "broken" pixels, replace the control if necessary
14.3	pixels on the indicator display	checking of individual pixels in test mode. If there are too many "broken" pixels, replace the control if necessary
14.4	pixels on the indicator display	checking of individual pixels in test mode. If there are too many "broken" pixels, replace the control if necessary
14.5	pixels on the indicator display	checking of individual pixels in test mode. If there are too many "broken" pixels, replace the control if necessary
14.6	the contrast off the indicator display	Using this function you can adjust the contrast of the display **Attention! Also, you can reduce the contrast to such a level that no displayed information will be visible. Each time a reset is performed with the power turned off (remove the fuse), the contrast will return to the value at the time of delivery.**

20.4.3.3. Remote controls

20.4.3.3.1. EasyStart Remote.
PN: 22 1000 34 2300

Fig.20.24 EasyStart Remote

EasyStart Remote is the simplest remote control with feedback. By using only 2 buttons you can configure and, if necessary, change all functions. The switching signal in the open area (line of sight) is transmitted for a distance of up to 1,000 meters. External sources of interference, local conditions and restrained urban conditions shorten the range. Depending on the type of equipment, the type of LED indication may differ.

20.4.3.3.1.1. Button functions

- On button
  - Heater ON.
  - Apply settings.
- Off button
  - Heater OFF.
  - Apply settings.

20.4.3.3.1.2. LED indication

- Data transfer

Green LED

- The heater is ON, HEATING or VENTILATION

The LED flashes green 12 times.

- The heater is ON, HEATING or VENTILATION

The LED flashes red 12 times.

- The heater is activated

The LED flashes green 5 times.

Attention! Data entry is possible during status display, but is not possible during data transfer.

When transmitting data the LED indicator constantly flashes green.

During data transfer the setting is not possible.

20.4.3.3.1.3. Maintenance and configuration instructions

20.4.3.3.1.3.1. Using a mobile part (key fob)

Before each use or setting it is necessary to establish a connection between the remote control and all-terrain vehicle. To do this press and hold the button until the LED indicator turns green, then release the button and start using the key fob or make settings.

Each press of the button starts the execution of an action, which is indicated by the flashing of the LED indicator.

LED indicator will stop flashing on its own.

20.4.3.3.1.3.2. Switching on the heater

Press the button to establish the connection with the all-terrain vehicle.

Data is being transferred.

The LED is green.

The LED flashes green twelve times.

Heater is ON.

The heater is switched on. Running time is 30 minutes (factory setting).

Attention! During operation you can request the operating status of the heater.

20.4.3.3.1.3.3. Switching off the heater

Press the button to establish the connection with the all-terrain vehicle.

Data is being transferred.
The LED is green.

The LED flashes red twelve times.
Heater is OFF.

The heater is switched off.

Attention! After the heater is switched off it is possible to restart the heater.

20.4.3.3.1.3.4. Request for operating status of the heater

Press the button to establish the connection with the all-terrain vehicle. The following indications are possible:

- Data is being transferred.

The LED is green.

- With the heater ON

The LED flashes green five times.
Heater is ON.

- If the heater device is OFF it will turn on.

The LED flashes green twelve times.
Heater is ON.

Attention! If you don't need the heating or ventilation mode, press the button to turn off the heater.

20.4.3.3.1.3.5. Changing the duration of operating on an ongoing basis

Press and hold the button until the CURRENT OPERATION DURATION indicator flashes.

Attention! The switched on heater switches off when this operation is performed.

Data is being transferred.
The LED is green.

The LED flashes red for eight seconds.

Data is being transferred.
The LED is green.

The current duration of the operation is indicated by the flashing, for example, if the indicator flashes red three times it means thirty minutes.

Release the button - then other flashing signals will appear to select the duration of the operation.

- Running time 10 minutes - LED flashes red 1 time.
- Running time 20 minutes - LED flashes red 2 times.
- Running time 30 minutes - LED flashes red 3 times.
- Running time 40 minutes - LED flashes red 4 times..
- Running time 50 minutes - LED flashes red 5 times.
- Running time 60 minutes - LED flashes red 6 times.

Confirmation of the selected operating time is selected in the pauses of flashing signals by pressing the button.

The selected operation time is saved and displayed as a flashing signal again.

Attention! Flashing signals for selecting the duration of operation are displayed from the current duration to the sixtieth minute and then twice completely from the tenth to the sixtieth minute. Then the mobile key fob will turn OFF and go into standby mode. The setting can only be completed via TIMEOUT.

Do not press the button during setup, otherwise the operating mode will change.

20.4.3.3.1.3.6. Switching to heating or ventilation

Attention! VENTILATION function available only if the VENTILATION function is supported by the heater.

During the performing of this setting the enabled device is turned off.

Press and hold the button until the CURRENT OPERATION DURATION indicator appears.

Data is being transferred.
The LED is green.

The LED flashes red for eight seconds.

Data is being transferred.
The LED is green.

Attention! The operating mode remains unchanged until the next switch. The setting can only be completed via TIMEOUT .

The current running time is indicated by a flashing. Release the button after the flashing starts.

Attention! Perform the next setting within 30 seconds after releasing the . button. Press the - button again - the operating mode will change.

Carry out the next setting within 30 seconds after releasing the . button. Press the - button again.

- Switching from HEAT to VENTILATION.

The LED flashes green for about ten seconds.

- Switching from VENTILATION to HEATING.

The LED flashes red for about ten seconds.

20.4.3.3.1.3.7. Function of the "heater" button

The "HEATER" button the can be installed on the ATV. The button is has a LED indicator of the ON mode. You can perform the following actions using this button.

- Starting the HEATING mode - the last setting will be used as the duration of the operation.
- Turning off the HEATING mode.
- Training key fob.

20.4.3.3.1.3.8. Possible light signals in the event of a malfunction

When pressing the or button a slow five-time flashing means the following:

- Malfunction of the heater. It is necessary to contact the workshop.
- EasyStart Remote was disconnected from the power supply. Complete the training of the key fob (wait for the automatic completion of recognition).

After pressing the or button a quick red-green flashing 12 times. It is not possible to establish a connection between the mobile remote and the all-terrain vehicle.

- distance between the remote control and all-terrain vehicle. It is necessary to shorten the distance.
- Simultaneous use of several radio control systems. You need to activate the key fob again.
- The mobile key ring is not trained. It is necessary to activate the learning mode of the mobile key fob.

The LED indicator flashes green rapidly for six seconds.

- The equipment installed on the ATV is in training mode. You should complete the training of the key fob (wait for the automatic completion of recognition).

The LED indicator lights up red after activation for four seconds.

- Key fob battery voltage is too low. Data transmission is not possible. Replace the battery.

Key fob is not activated.

- The battery is low. Replace the empty battery.

The LED indicator in the "HEATER" button of the ATV flashes.

- The equipment installed on the ATV is in training mode. After thirty seconds the display will turn off automatically or perform the training of the key fob.

Attention! When the red-green light flashes, the use of the device is not possible. The heater can only be switched off using the "HEATER" button of the ATV.

If it is not possible to eliminate the error or malfunction, contact the workshop.

20.4.3.3.2. EasyStart Remote plus. PN: 22 1000 34 1700

Fig.20.24 EasyStart Remote plus

EasyStart Remote plus – is a timer made in the form of a mobile key fob. When activating or transmitting data the key fob should be pointed at the all-terrain vehicle. If the key fob is outside the range, you can still use the preset heating mode. When the power is connected, the button flashes for 30 seconds, the EasyStart Timer plus displays Add or AddE. Select the function by pressing the button. Then set the time and day of week.

AddE is the function of training only one mobile key fob. In the learning process all previously trained key fobs are removed.

Add is the function of training up to four mobile key fobs. At the same time, only one key fob can exchange data with the vehicle at any given time.

Maintenance of the EasyStart Remote Plus timer is similar to the maintenance of the EasyStart Timer timer, except for the remote control function.

Each time you use or configure the timer you need to establish a connection between the remote control and the all-terrain vehicle. To do this press the or button on the display, after which the signal transmission antenna will be displayed.

Indication during data transmission

Indication in case of a failed data transmission

If the data transmission was successful, the display shows the active mode of operation or opens the start window - continue working or making the settings.

If the data transmission was unsuccessful, the flashing crossed antenna will be displayed. Measures for an unsuccessful attempt to transfer data are listed in the faults section.

If the setting is not performed or the device is not used, the indication goes out after 10 seconds, i.e. the key fob goes into standby mode.

20.4.3.3.3. Replacement of battery in remote control

Fig.20.26 Replacement of batteries in remote controls

EasyStart Remote plus: The power level of the battery is displayed in the startup window of the SETTINGS menu item. At a low level it is necessary to replace the battery with a new one (type CR 2430).

EasyStart Remote: LED indicator lights up red, indicating a low battery charge. It is necessary to replace it with a new type CR 2032 battery.

Do the following to replace the battery:

- open battery compartment;
- remove the emptybattery; install a new one observing the polarity;
- the battery is installed correctly if the plus sign and marking are visible;
- replace the cover and slide it back until it locks into place; activate the remote control.

20.4.4. Dealers and service centers

General Representative Office in Russia: OTEM CJSC (Moscow). Tel. (495) 645-59-79 Fax. (495) 647-59-79 www.eberspaecher.ru, www.otem.ru

Regional representative offices and dealers in Russia

Table 20.22

Aksai	M4	(863)22-92-777
Blagoveshchensk	Company Cliffford	(4162) 35-20-30
Bryansk	PROF PLUS	(4832) 92-94-59
Vladivostok	AVA-Service	(4232) 31-89-64
Volgograd	Zubr	(8442) 54-43-22/55
Voronezh	Doka	(4732) 21-49-89
Ekaterinburg	Hydronik Center Ural	(343) 383-60-00
Izhevsk	Escort	(3412) 78-63-51
Irkutsk	SibAutoAlarm	(3952)22-65-08
Kazan	Bezopasnost	(843) 266-50-33
Kaliningrad	Termit	(4012) 520-012-13, 753-070
Kirov	Avtokomfort	(8332) 44-66-44
Komsomolsk-on-Amur	TES	(4217)27-32-22
Krasnodar	Monapol-Auto	(861) 237-28-08
Krasnoyarsk	OTEM-SIBERIA	(3912)59-56-53
Moscow	OTEM MOSCOW	(495) 423-80-33
Moscow	Klima-Service (cargo vehicles)	(495) 783-07-93
Moscow	Trinity-Cars (light vehicle)	(495) 221-08-10
Moscow	Company TDB-1	(499) 259-81-25
Moscow	Avtokomplekt-K	(495) 740-54-92

Table 20.22 (continued)

Moscow	Technoservis	(495) 580-51-99
Nizhniy Novgorod	OTEM-NN	(831)248-12-48/49
Novosibirsk	OTEM-SIBERIA	(383) 2000-757
Noyabrsk	Automotive Systems	(3496) 33-06-55
Omsk	OTEM-SIBERIA	(3812) 26-99-95
Orenburg	DiaSkan	(3532) 96-30-77
Perm	AVTOKLIMAT	(342) 299-55-88
Samara	PE Peshnin I.N.	(846) 958-66-87
Samara	OTEM-Samara	(846) 972-06-53
St. Petersburg	OTEM - St. Petersburg	(812)448-07-06
Saratov	SPE Balakit SC	(8452) 531-449/538
Surgut	Avtoklimat (cargo vehicles)	(3462) 72-44-22
Surgut	OTEM-JURGA (light vehicles)	(3462) 318-800
Tver	PE Nikolaev	(4822)76-90-34
Tula	VIKONA	(4872) 20-69-25
Tyumen	AVtoKom (dealer)	(3452) 44-78-95
Ufa	AVESTO-Bashkortostan (dealer)	(347) 279-88-56
Ukhta	Smart Thermo (dealer)	(82147) 69-285
Khabarovsk	DalLesTehService (dealer)	(4212) 40-07-83
Khabarovsk	DalUralServis (dealer)	(4212)54-41-40
Chelyabinsk	Triera (dealer)	8 (902) 89-98-577
Cherepovets	RassvetAvto(dealer)	(8202)26-95-09, 20-55-20
Yuzhnosakhalinsk	Hydronic (dealer)	8(914) 755-85-82
Yaroslavl	Avtodom	(4852) 73-98-80, 51-00-88

20.5. Air conditioning system

Air conditioning system is designed to create and maintain a comfortable microclimate for the driver and passengers by changing the temperature and humidity in the passenger compartment.

Installation of the system on the ATV TRECOL is optional.

Air conditioner unit (Fig. 20.27) is located between the front seats of the ATV.

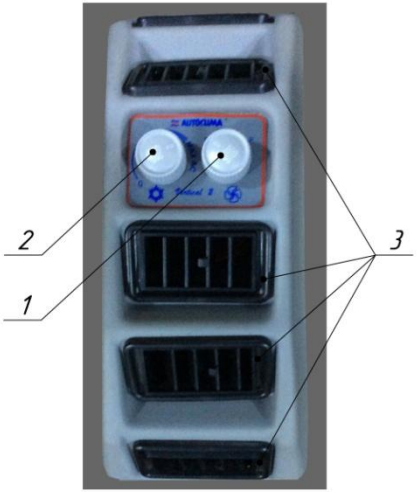


Fig.20.26

1– fan speed level selector;

2 – regulator of air conditioning and air cooling control;

3– deflectors regulating the direction of air flow.

20.6. Other accessories

In addition to the above-described equipment, the ATV can be equipped with the following accessories:

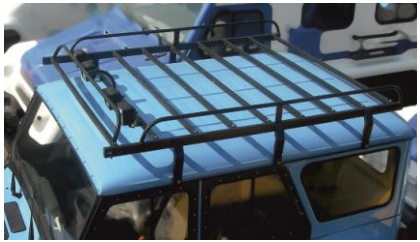


Fig. 20.27 Roofrack with ladder

Fig. 20.28 Halogen headlamps for the rack

Fig. 20.29 Search lamps with handles, controlledfrom ATV windows

Fig. 20.30 Winch anchor

Fig. 20.31 Tackle (reinforcement for winch up to 8 tons)

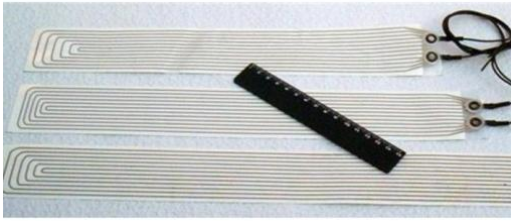


Fig. 20.32 Windshield heating

Fig. 20.33 Heating of side mirrors

Fig. 20.34 Turbo timer (for diesel engines)

Fig. 20.35 Engine hour meter

Fig. 20.36 Wheel chock

Fig. 20.37 Company logo stickers

Weight of accessories

Table 20.23

Additional equipment	Weight, kg	√
Electric winch	40	
Winch anchor	6,5	
Winch Tackle up to 8 t	1	
Wheel choke (2 pcs.)	4	
Centralized tyre inflation system	15	
Engine preheater	9	
Autonomous interior heater	12	
Automatic floor conditioner	22	
Protection of the front bumper	15	
Roof baggage rack with ladder	25	
Spot lamp (1 pcs.)	1,7	
halogen headlamps for the rack (4 pcs.)	2,5	

Table 20.23 (continued)

Additional equipment	Weight, kg	√
Exhaust gas flame arrester ISG-55	0,8	
Audio unit, speakers, radio antenna	5	
Towing device (towbar) with socket	16	
TRECOL tire 1280x530-533	70	
TRECOL tire 1300x600-533	40	
TRECOL tire 1350x700-533	51	
Rim	17	
Rim for the "Centralized tyre inflation system	18	
Reinforced rim	21	
Reinforced rim for the "Centralized tyre inflation system	22	
Total weight of installed accessories		

Attention! The presence of accessories by the weight of the ATV reduces its carrying capacity. Take into account the weight of accessories when operating the ATV.

Table 20.23 (continued)

Additional equipment	**Weight, kg**	√
Hinged agricultural equipment for TREKOL-AGRO		
Mineral fertilizer spreader "AMAZONE"	390	
Spraing device for working with liquid products (3 nozzles)	510	
Spraing device for working with liquid products (1 nozzle)	505	
Parallel driving device Trimble EZ-Guide 250 for TREKOL-Agro with original bracket	5	
Extra light kit Hella for working in the dark time	9	
Narrow wheel for driving on a technological track assembly with a tire and camera	79	
Installation kit for AMAZONE ZA-M900	82	
Total weight of installed Hinged agricultural accessories		