6. TROUBLESHOOTING

Trouble, symptoms	Remedy
ENGINE	
The engine fails to start:	
Air in the fuel supply system.	Bleed air from the system using the hand-operated lift pump. Eliminate the air inleakage into the fuel supply system (see Section "Description and Operation").
The fuel pump is faulty.	Remove the fuel pump from the engine and sent it to the workshop for repair.
The fuel filters are clogged.	Wash the fuel coarse filter and replace filter elements of the fuel fine filter
The engine has too low temperature.	During the cold weather, preheat the engine using the available starting-facilitating means.
Engine fails to develop the full power:	
The fuel pump control lever would not rest at the stop.	Adjust the fuel pump control rods.
The fuel fine filter element is clogged.	Replace the fuel fine filter element.
The injectors are faulty.	Locate faulty injectors; wash and adjust them.
The injection advance angle is misadjusted.	Set the recommended fuel injection advance angle.
The supercharging pressure has decreased.	Remove the turbocharger from the engine and send the same to the workshop for repair.
Air in leakage into the fuel supply system.	Bleed air from the system using the hand-operated lift pump.
Engine smoky exhaust under all operation conditions **Black smoke from the exhaust pipe:**	
Engine air cleaner is clogged.	Service the air-cleaner.
Injector atomizer needle is stuck.	Locate a faulty injector, flush or replace the atomizer, adjust the injector.
Fuel pump is faulty.	Remove the fuel pump from the engine and send it to the workshop for repair.
Engine overloading	Reduce the engine loading by shifting-down.
The injection advance angle is misadjusted	Set the required fuel injection advance angle (see Section «Appendices»).
White smoke from the exhaust pipe:	
Engine is running overcooled.	Warm up the engine; during the work, maintain the coolant temperature within 70…95°C.

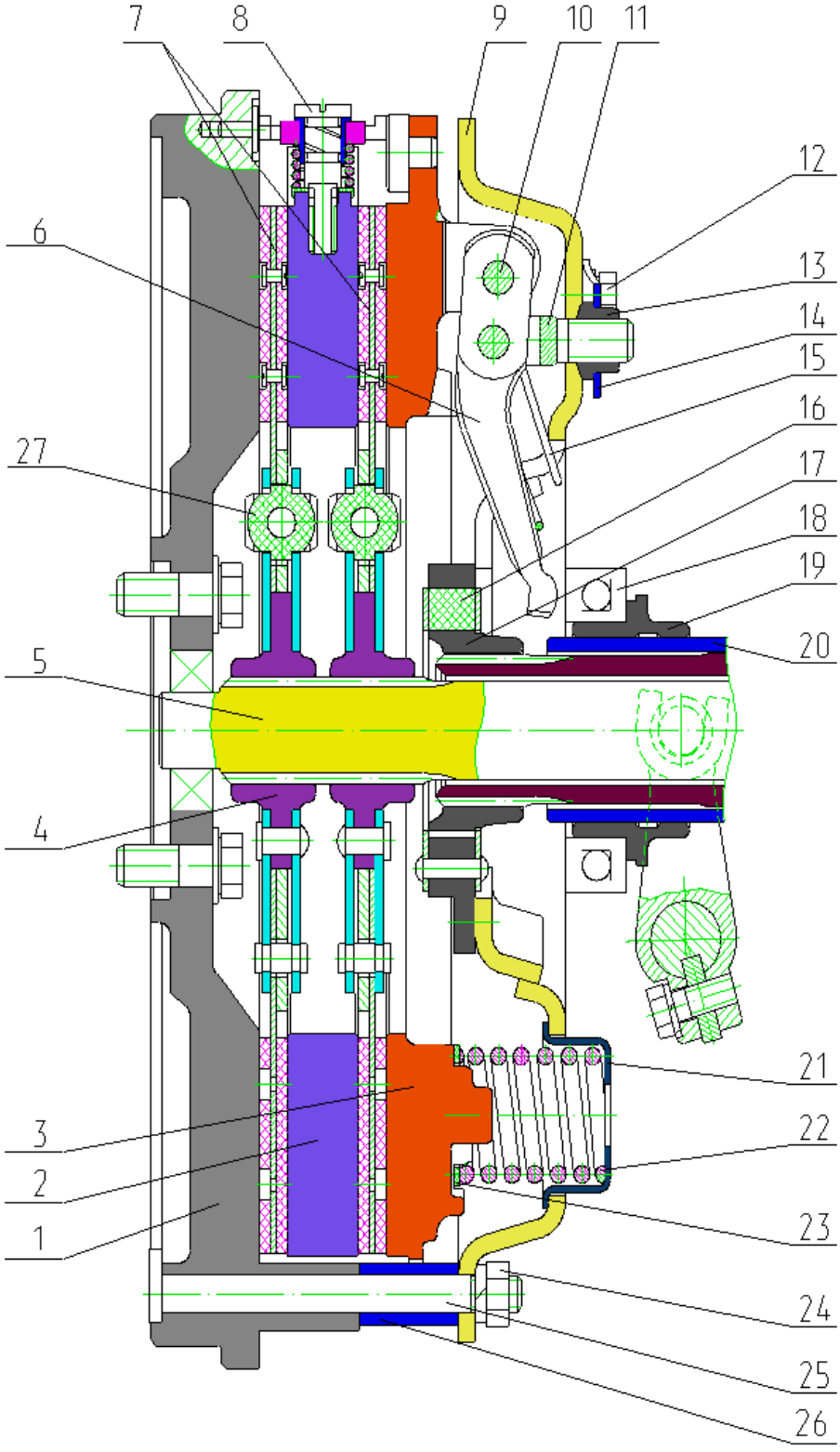
Trouble, symptoms	Remedy
Ingress of water into fuel.	Change the fuel.
No valve-to-rock arm clearance.	Adjust the valve-to-rock arm clearances.
The injection advance angle is misadjusted.	Set the required fuel injection advance angle.
Blue smoke from the exhaust pipe:	
Oil in the combustion chamber due to worn-out parts in the sleeve-piston assembly.	Replace worn-out parts of the sleeve-piston assembly.
Excess of oil in the engine crankcase.	Drain excessive oil and bring the oil level to top mark on the dip-stick.
The engine stops suddenly:	
The fuel is not fed.	Check the presence of the fuel in the fuel tank and working condition of the fuel pipelines, filters and lift pump.
The engine overheats:	
Lack of coolant in the cooling system.	Add the coolant up to normal level.
The radiator is dirty on the outside.	Clean the radiator.
Dirt and scale in the cooling system.	Clean the cooling system from impurities and/or scale and flush it.
The thermostat valve fails to open fully.	Replace the thermostat.
Insufficient tension of the fan belt:	
The tensioning device spring is broken;	Replace the spring. If it is impossible to replace the spring, it is admissible to interlock the fan clutch by clamping the alternator plate and the jockey pulley arm with nut and bolt.
Jamming of jockey-pulley on the lever axle.	Dismantle the tensioning device and remove the trouble.
The fan driving belt and pulleys are oily.	Remove the driving belt and clean the belt surface and pulleys from the traces of oil.
The oil pressure in a warmed-up engine is below the allowable value:	
The pressure gauge indicator is faulty.	Replace the pressure gauge indicator after checking the oil pressure against a reference manometer.
Leaks in the connections of oil pipelines.	Locate the leak and restore the leak-tightness.
Oil pump is faulty.	Locate and remedy the fault.
Oil level in the engine crankcase is lower than	Top up oil to the upper mark on the dip-stick.

Trouble, symptoms	Remedy
the allowable one.	
The safety valve is jammed in the oil filter body.	Flush the valve through and adjust the pressure in the lubrication system.
Extreme wear-out of the crankshaft neck-to-bearing mating interface.	Send the engine to the workshop for repair.
Turbocharger	
Turbocharger rotor fails to rotate (a distinctive high-pitch tone is missing):	
Presence of foreign items, which impede the rotor rotation;	Remove inlet and outlet branch-pipes and remove the foreign items.
The rotor is seized in the bearing.	Replace the turbocharger.
Higher ejection of oil from the side of the compressor or turbine, the leak-tightness of the turbocharger oil packing seals is dis-turbed.	Dismantle the turbocharger from the engine and send it to the workshop for repair.
Units of the automatic fan control system	
The cooling system fan fails to get ON at the water temperature at the engine outlet exceeding 97°C or fails to get OFF at the temperature of below 70°C:	
The thermopower transducer or the fan clutch is faulty.	Dismantle the fan clutch. Push the rod into the water pump as far as it will go and measure the length of its projecting part. Start the engine and warm it up until the water temperature at the outlet reaches 80-85°C. Then stop the engine and measure the rod part projecting from the water pump: 1. If the rod projection does not increase as compared with the initial position, replace the thermopower transducer; 2. If the rod projection end length has increased by 6…8 mm, replace the fan clutch and send the faulty clutch to the workshop for repair. If the replacement of the fan clutch is impossible, block the same by the above method.
The units of the automatic clutch control fan	
When the water temperature at the outlet of the engine above 97 ° C, the cooling fan does not turn on, or when the water temperature is below 70 ° C, fan cooling system does not turn off:	
The fault of thermopower sensor or fan clutch.	Remove the fan clutch. Press the stem to the water pump to the stop and measure its protrusion. Start the engine and warm it up until the water temperature at the outlet 80-85 ° C., stop the engine and measure the protrusion of the shaft of the water

Trouble, symptoms	Remedy
	pump: If the protrusion of the rod has not increased compared to the initial, replace the thermal power sensor; If the protrusion of the rod increased by 6.8 mm, replace the fan clutch, clutch faulty send in for repair. If you can not replace coupling, it must be locked it by the above method.

Trouble, symptoms	Remedy

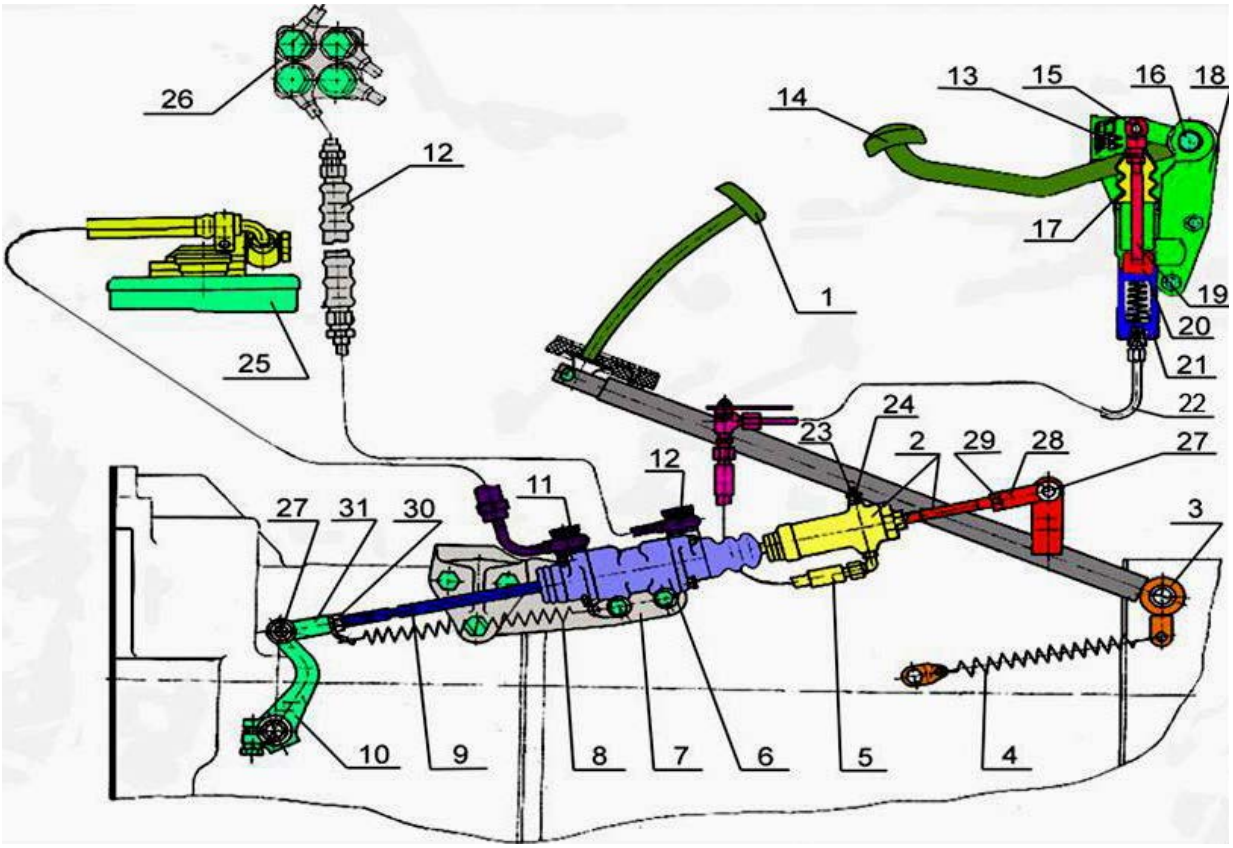
Clutch



Picture 6.1 Clutch

1- flywheel; 2- intermediate plate; 3- Pressure plate; 4- hub; 5-transmission shaft; 6-clutch release lever;7- driving plates; 8- leverage mechanism; 9- bearing plate or clutch cover; 10- lever axle; 11- fork; 12- bolt; 13- nut; 14 –washer; 15- lever spring; 16- damper; 17- clutch release shifter;18- bearing; 19- clutch release shifter support; 20- bracket slips; 21- shell cup; 22-pressure springs; 23-separating washer; 24- гайка; 25- pin; 26-bush; 27-vibration damper

Trouble, symptoms	Remedy



Picture 6.2

1- clutch pedal; 2- drive cylinder with traction; 3- axle; 4,8- snatch springs; 5- hosepipe; 6-hydraulic booster; 7- bracket; 9- rod; 10- lever; 11- oil pipeline; 12- oil pipeline; 13- spring; 14- pedal hanging; 15- pin; 16- axle; 17- cover; 18- bracket; 19- rod; 20- piston; 21- master cylinder; 22- oil pipe; 23- cap; 24- overflow valve; 25- oil tank of hydraulic steering control; 26- pump of hydraulic steering control ; 27-pin; 28-fork; 29,30- locknuts; 31- fork.

The clutch fails to transmit the full torque (slips):	
Absence of clearance between the release shifter bearing and the release levers – “the clutch is disengaged incompletely” (insufficient free travel of the clutch pedal).	Adjust the clearance (see Section “Construction and Operation of Tractor Components”, item “Clutch Control Adjustment”).
Incomplete engagement of the clutch (the clutch lever (45) (see Section “Construction and Operation of Tractor Components”, figure in the item “Clutch drive”) fails to return to the initial position) on releasing the clutch pedal due to disturbance of the clutch control operation.	Locate and eliminate the cause.
The liners of the driven plates are worn out.	Remove the liners or driving plate assemblies.
Extra lubrication of the pads of driving plates because of oil entering into dry space.	Locate and eliminate the cause of oil entering into dry space.
Insufficient force of the pressure springs (shrinkage of the springs in case of prolonged slipping and overheating of the clutch).	Replace the pressure plates.
Absence of clearance between bearing and releasing levers- «the clutch is half-turned-off» (insufficient run of the clutch).	Fix the clearance.

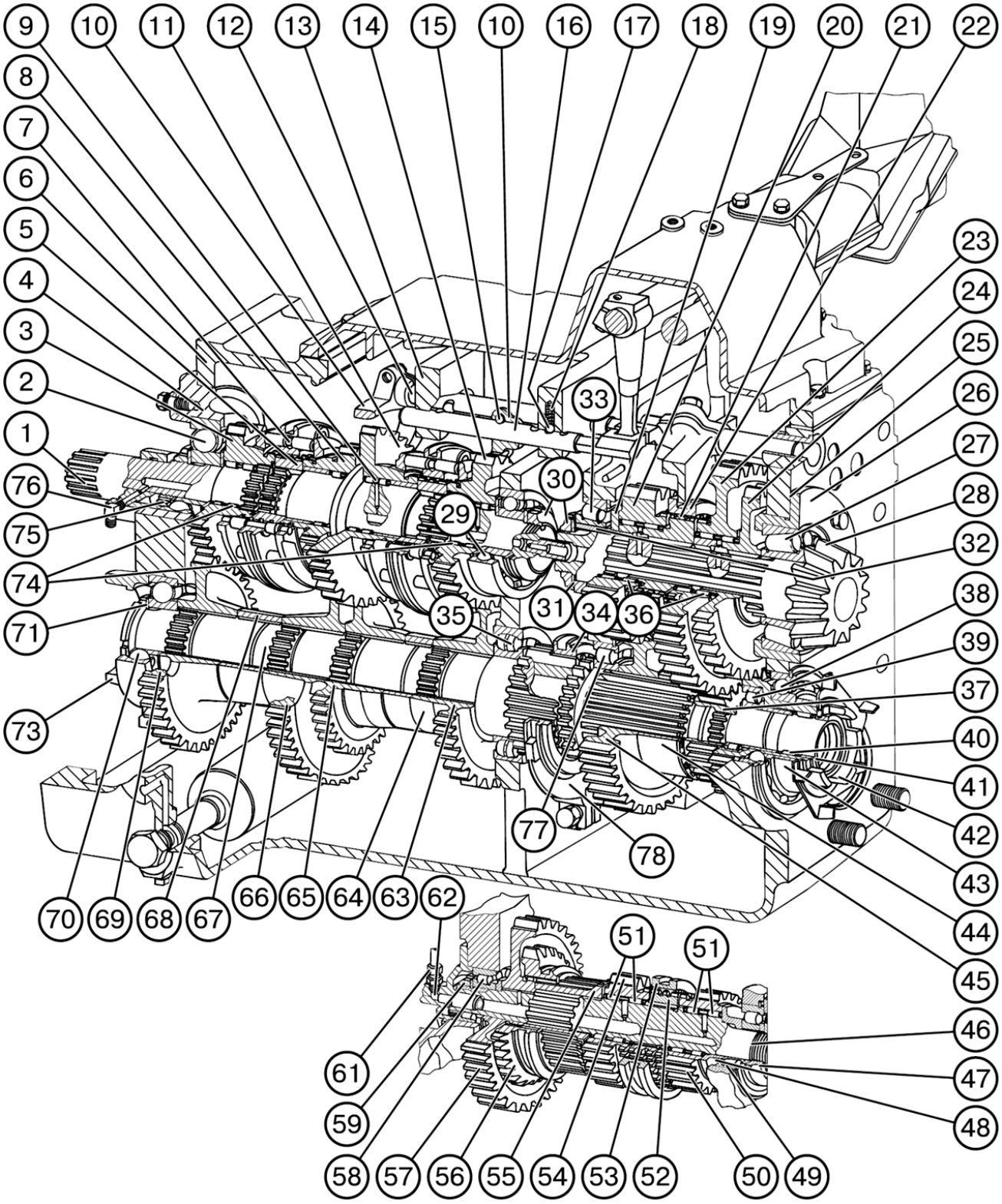
Trouble, symptoms	Remedy
The clutch is not disengaged completely (“drags”):	
The clearance between the release shifter bearing and the release levers is too large (large free travel of the clutch pedal).	Adjust the clearance (see Section “Construction and Operation of Tractor Components”, item “Clutch Control Adjustment”).
Insufficiently full travel of the clutch lever when the clutch pedal is stepped on completely.	Ensure that the free travel of the clutch lever and, respectively, hydraulic booster stroke when stepping completely on of the clutch pedal would be at least 24 mm
Maladjustment of the release levers.	Adjust the position of the release levers.
Increased warpage of the driven disks.	Check the end wobbling of the driven plate liners relatively to the outer diameter of the hub splines which shall be not more than 0.8 mm on the radius 165 mm.
If the plates cannot be repaired, they shall be replaced.	
Jamming of the driven plate boss on the transmission shaft splines.	Clean the splines to ensure the free travel of the plates on the transmission shaft.
The clutch lever fails to return to the initial position on releasing the clutch pedal: (see pic. 6.2)**:**	
Absence of clearance between the master cylinder piston and its lifter during the for-ward and reverse motion.	Perform the adjustment
Absence of clearance between the piston lifter of the master cylinder	Perform the adjustment
Jamming of the master cylinder piston (which fails to return to the initial position) for the forward motion (10) (see Section “Construction and Operation of Tractor Components”, figure in item «Clutch drive») and for the reverse (19) due to swelling of cups and O-rings that leads to blocking the compensation holes “A”	Using the brake fluid of improper mark or presence of mineral oil, petrol, kerosene or diesel fuel in the brake fluid.
Jamming of the master cylinder piston due to swelling of the collar.	
Jamming of the tap piston due to swelling of the O-ring.	
Impeded motion of the hydraulic booster piston.	Replace the hydraulic booster.
Lack of coaxiality of the hydraulic booster, master cylinder and lever	Ensure the coaxiality of the hydraulic booster, master cylinder and lever by shifting the bolts of the bracket, hydraulic booster and bracket before

Trouble, symptoms	Remedy
	tightening.
Clogging the compensation hole in the master cylinder for the forward or reverse movement.	Clean the compensation hole of the master cylinder for the forward or reverse movement and bleed air from the system.
Loss of elasticity of the release spring	Replace the spring.
The free travel of the clutch lever is not provided when stepping on the clutch pedal (see pic. 6.2):	
Absence of clearance between the piston and the piston lifter of the master cylinder for the forward and reverse motion.	Perform the adjustment
Absence of clearance between the piston lifter of the master cylinder and piston lifter of the hydraulic booster (28).	Perform the adjustment
Presence of air in the hydraulic clutch control system for the forward and reverse motion.	Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion
Insufficient level of the fluid brake in the hydraulic system reservoirs for the forward and reverse motion.	Add the brake fluid to the normal level in the reservoirs of the master cylinders for the forward and reverse movement. Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion.
Lack of the leak-tightness of the working chambers of the master and service cylinders and tap due to damage or wearing-out of the cups or O-rings.	Replace the cups or O-rings in the master and service cylinders and in the tap, if they are worn out. Check if the mirrors of the master and service cylinders and tap free of burrs, irregularities or cissing. Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion.
Leakage of brake fluid in the connections or pipelines in the hydraulic drive system. Air inflow into the hydraulic system.	Tighten the connections, replace the damages parts. Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion.
Clogging of the hole in the union of the reservoir (for the forward motion) or in the piston (for the reverse) causing the vacuum in the master cylinder due to which air is sucked through the seals into the cylinder.	Clean the hole. Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion.
Blocking of the hydraulic drive pipeline due to a dent or clogging.	Replace the pipelines. Pump the brake fluid through the hydraulic system to bleed air in the forward and reverse motion.
Oil leakage through the O-rings of the hydrau-	Replace the O-rings in the hydraulic booster.

Trouble, symptoms	Remedy
lic booster.	
Insufficient free travel of the clutch pedal (the pedal rests against the cab wall).	Increase the free travel of the clutch pedals for the forward and reverse motion by turning the fork (4) and bolt (30).
No force on the clutch pedal.	Presence of air in the hydraulic system. The cups and O-rings in the master and service cylinders and tap are worn-out.
The hydraulic booster, service cylinder and рычаг (21) are not set coaxially.	Ensure the coaxiality of the hydraulic booster, service cylinder and lever (21) by shifting the bolts of the bracket (30), hydraulic booster and bracket before tightening.
The flexible hose (18) dilates, swells, lengthens.	Replace the flexible hose (18).

Trouble, symptoms	Remedy

Gearbox (see pic. 6.3)

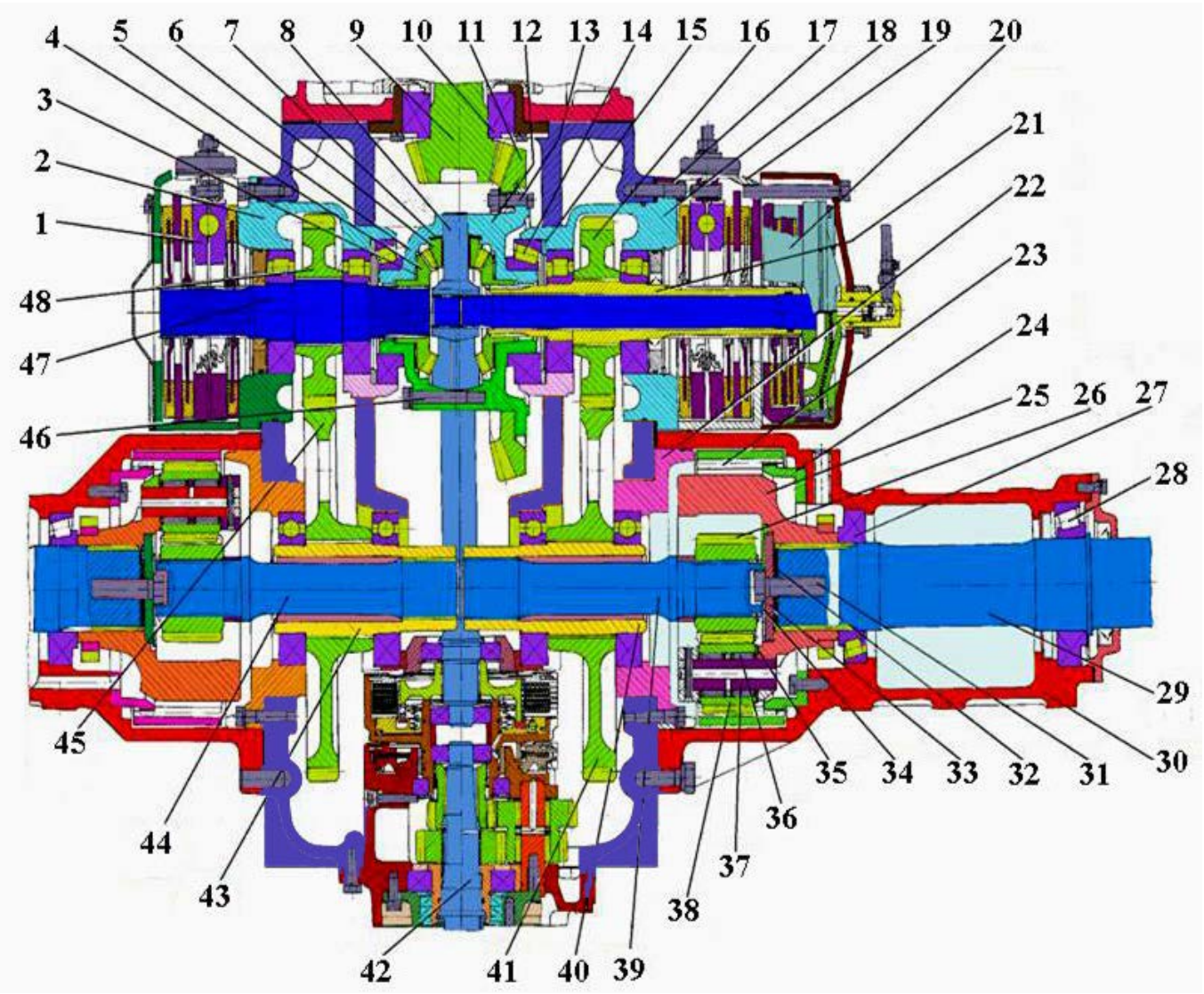


Picture 6.3

1 – primary shaft; 2, 29, 33, 27, 38, 39, 40, 49, 58, 35, 70, 77 – bearings; 3, 8, 11, 14, 20, 23, 24, 37, 45, 50, 54, 56, 57, 63, 65, 66, 69 – pinions; 4, 26, 62, 73 – sleeves; 5, 44, 48, 55, 64, 68, 19, 32, 52 – bushings; 6 – housing; 7 – synchronizer; 9, 36, 51, 74 – needle bearings; 10 – fork; 12, 16 – dogs; 13 – fork body; 15 – bolt; 17 – ball; 18 – spring; 21 – semi-coupling; 22, 53, 34 – toothed couplings; 25, 31 – adjusting shims; 28 – secondary shaft; 30, 47, 59, 71, 75 – nuts; 41 – gear-cluster shaft; 42 – synchronous PTO pinion; 43 – check ring; 46 – reduced gear shaft; 61 – pipeline; 67 – intermediate shaft; 76 – lubricant feed bush; 78 – fork.

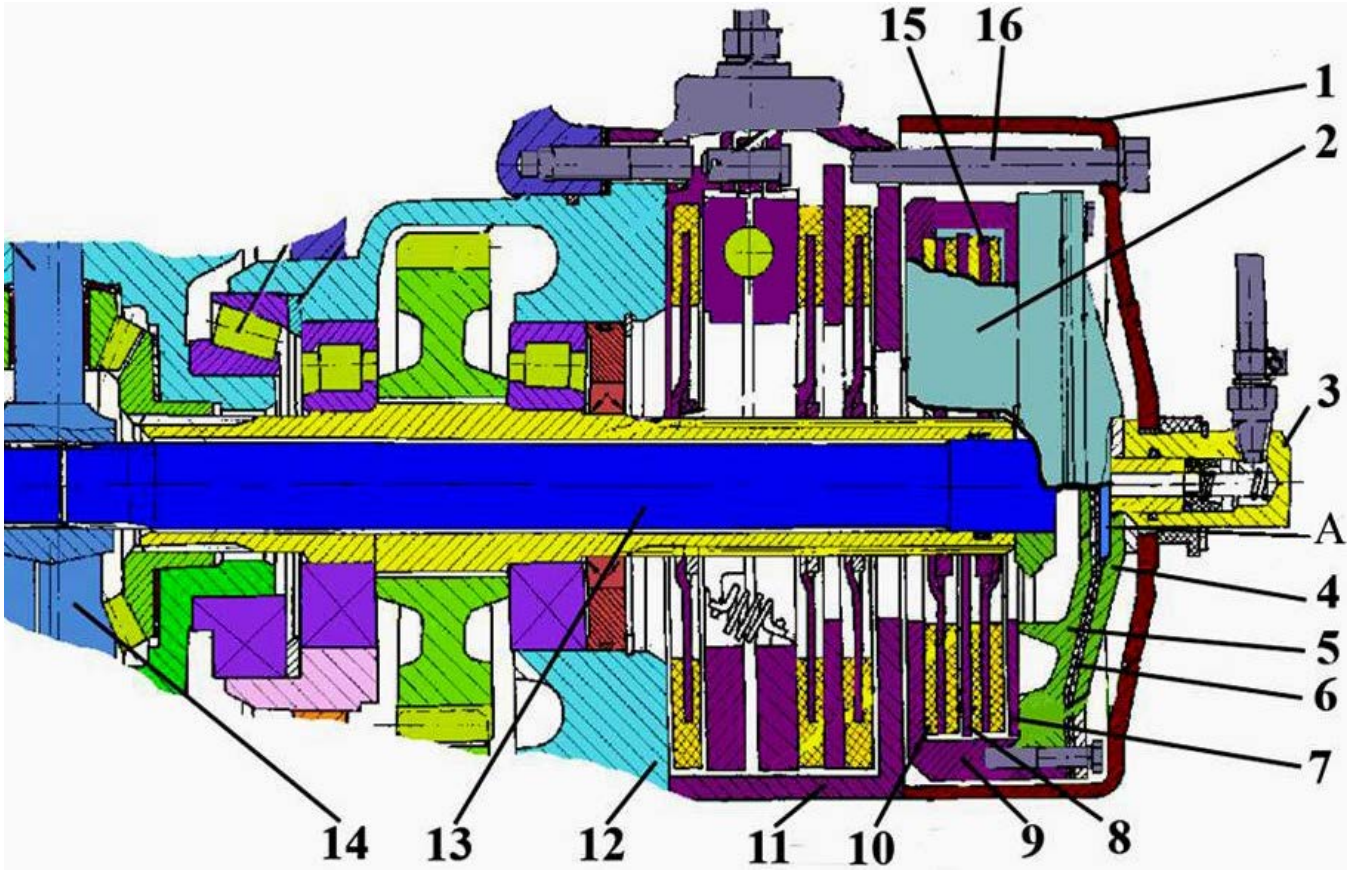
Trouble, symptoms	Remedy
Low pressure in the hydraulic system:	
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark ±5 mm against the oil gauge glass.
Clogging of the hydraulic system screen.	Wash the screen.
Seizure of the overflow valve in the distributing filter.	Flush the distributing filter valve.
High pressure in the hydraulic system:	
Seizure of the overflow valve in the distributing filter.	Flush the distributing filter valve.
The oil draining channels in the transmission are blocked.	Flush the oil draining channels.
No pressure in the hydraulic system:	
The drive of the hydraulic system pump is OFF.	Turn the pump ON.
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark.
Excessive noise when shifting gears:	
The clutch fails to disengage fully (the clutch “drags”).	Adjust the clutch.
The cone surfaces of the synchronizers and gear surfaces are worn-out.	Replace the worn-out parts.
Excessive noise:	
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark.
Bearings and/or other parts of the transmission are worn-out or broken.	Replace the bearings and/or other parts as necessary.

Rear axle (see. pic. 6.4, 6.5)



Picture 6.4

1 – left-hand brake; 2, 18 – bearing shells; 3 – bearing washer; 4 – axle-shaft pinion; 5 – differential cover; 6 – satellite; 7 – spherical washer; 8 – differential spider; 9 – rear-axle drive pinion; 10 – tapered roller bearing; 11 – driven gear; 12 – differential housing; 13 – bolt; 14, 27, 28 – tapered roller bearing; 15 – thrust ring; 16, 48 – hub drive driving pinion; 17, 32 – adjusting shims; 19 – right-hand brake; 20 – differential lockup clutch; 21 – right-hand driving pinion shaft; 22 – bearing shell; 23 – crown gear; 24 – crown gear boss; 25 – pinion carrier; 26 – sun gear; 29 – axle-shaft; 30 – axle-shaft housing; 31 – bolt; 33 - washer; 34 – check plate; 35 – washer; 36 – roller; 37 – satellite shaft; 38 – satellite; 39, 44 – torsion shaft; 40, 43 – driven gear bush; 41, 45 – driven gear; 42 – rear PTO; 46 – bolt; 47 – left-hand drive gear shaft.



Picture 6.5

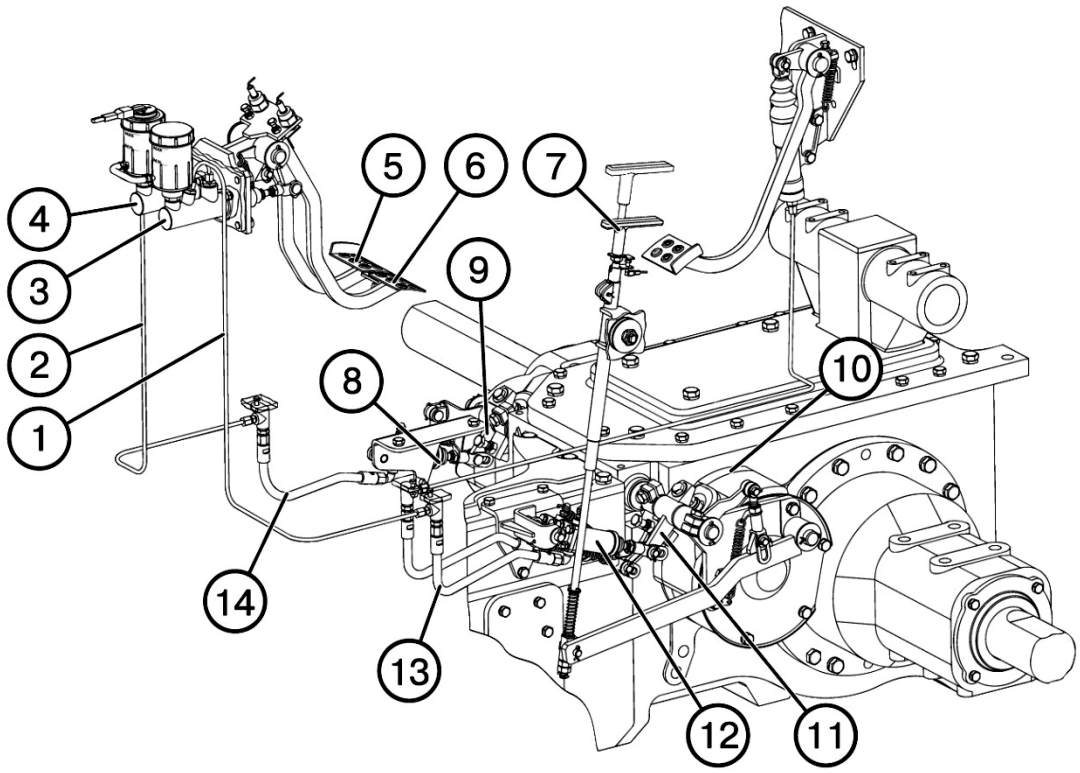
1 – casing; 2 – lock clutch; 3 – adapter; 4 – diaphragm cover; 5 – pressure plate; 6 – diaphragm; 7 – release plate; 8 – intermediate disk; 9 – clutch housing; 10, 15 – brake disks; 11 – right-hand brake case; 12 – bearing shell; 13 – lockup shaft; 14 – differential spider; 16 – bolt

Trouble, symptoms	**Remedy**
The main drive gear meshing is misadjusted in both spot pattern and lateral clearance.	
Tapered bearings of the main drive are misadjusted.	Adjust the bearing preload.
Low oil level in the transmission housing.	Check the oil level in the transmission housing; add the oil, if necessary.
The gear teeth are damaged.	Check the condition of the rear rings. No presence of chips or damages (pitting) is allowed. The gears with the damaged teeth shall be replaced as a pair.
The main drive gear meshing is misadjusted in both spot pattern and lateral clearance.	Adjust the main drive meshing in accordance with the spot pattern. Adjust the lateral clearance in the main pair meshing (0.25...0.55 mm).
The differential lockup does not function:	
The lockup clutch plate friction surfaces are worn out.	Change the plates.

The lockup clutch diaphragm is damaged.	Change the diaphragm.
Low pressure of oil fed into the lockup actuator.	Check the oil pressure applied to the lockup clutch. It shall be 9-10 kgf/cm2 at the oil viscosity within 18...26 mm2/s).
Lockup control electrohydraulic valve is inoperative.	Check safety fuses, relays and other circuit components for operability and the slide valve for easy and smooth travel; eliminate the fault.
Low pressure in the hydraulic system of the transmission	
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark.
Clogging of the hydraulic system screen.	Wash the screen.
Seizure of the overflow valve in the distributing filter.	Flush the distributing filter valve.
High pressure in the hydraulic system of the transmission	
Seizure of the overflow valve in the distributing filter.	Flush the distributing filter valve.
No pressure in the hydraulic system of the transmission	
The drive of the hydraulic system pump is OFF.	Turn the pump ON.
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark.
Excessive noise when shifting gears	
The clutch fails to disengage fully (the clutch “drags”).	Adjust the clutch.
The cone surfaces of the synchronizers and gear surfaces are worn-out.	Replace the worn-out parts.
Excessive noise:	
Lack of oil in the transmission housing.	Add oil to the “П” (Full) mark.
Bearings and/or other parts of the transmission are worn-out or broken.	Replace the bearings and/or other parts as necessary.

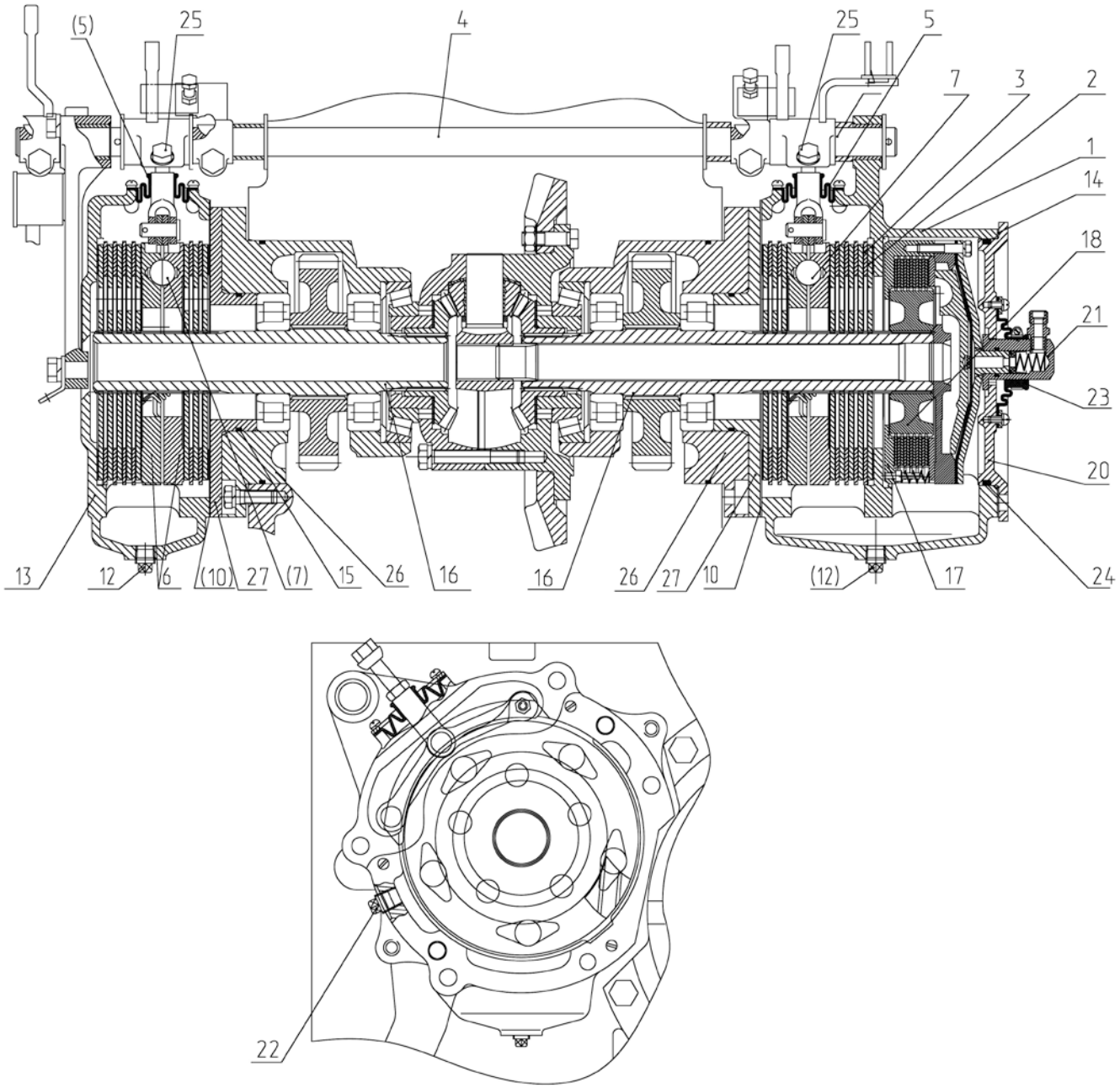
Trouble, symptoms	Remedy

Brakes (see pics 6.6, 6.7, 6.8, 6.9,)



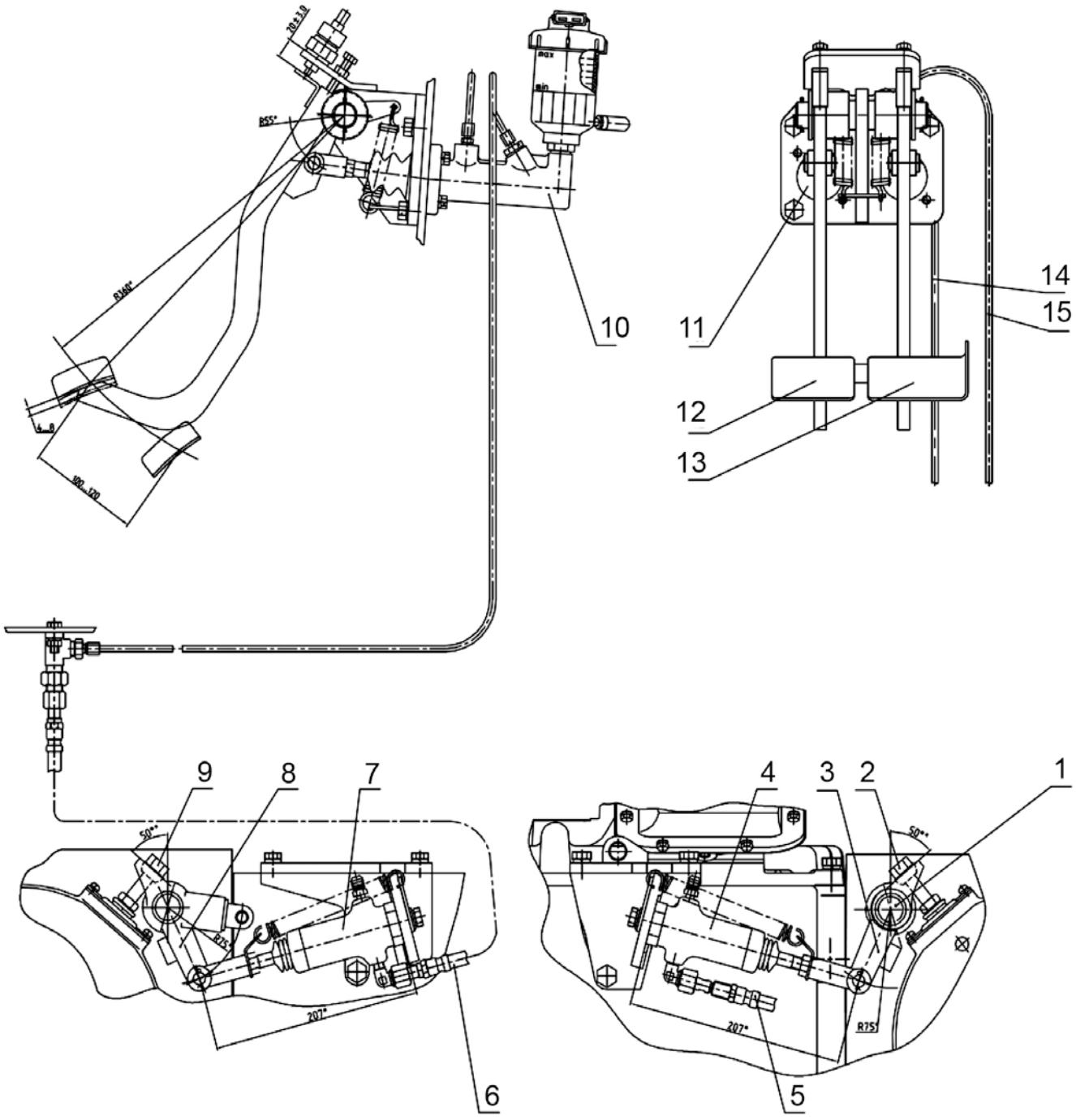
Picture 6.6

1, 2 – pipeline; 3, 4 – left- and right-hand master cylinder; 5, 6 – right- and left-hand brake pedal; 7 – parking brake handle; 8 – service brake of the right-hand brake; 9 – lever of the right-hand brake; 10 – carriage; 11 – lever of the left-hand brake; 12 – working cylinder of the left-hand brake; 13, 14 – connecting hose.



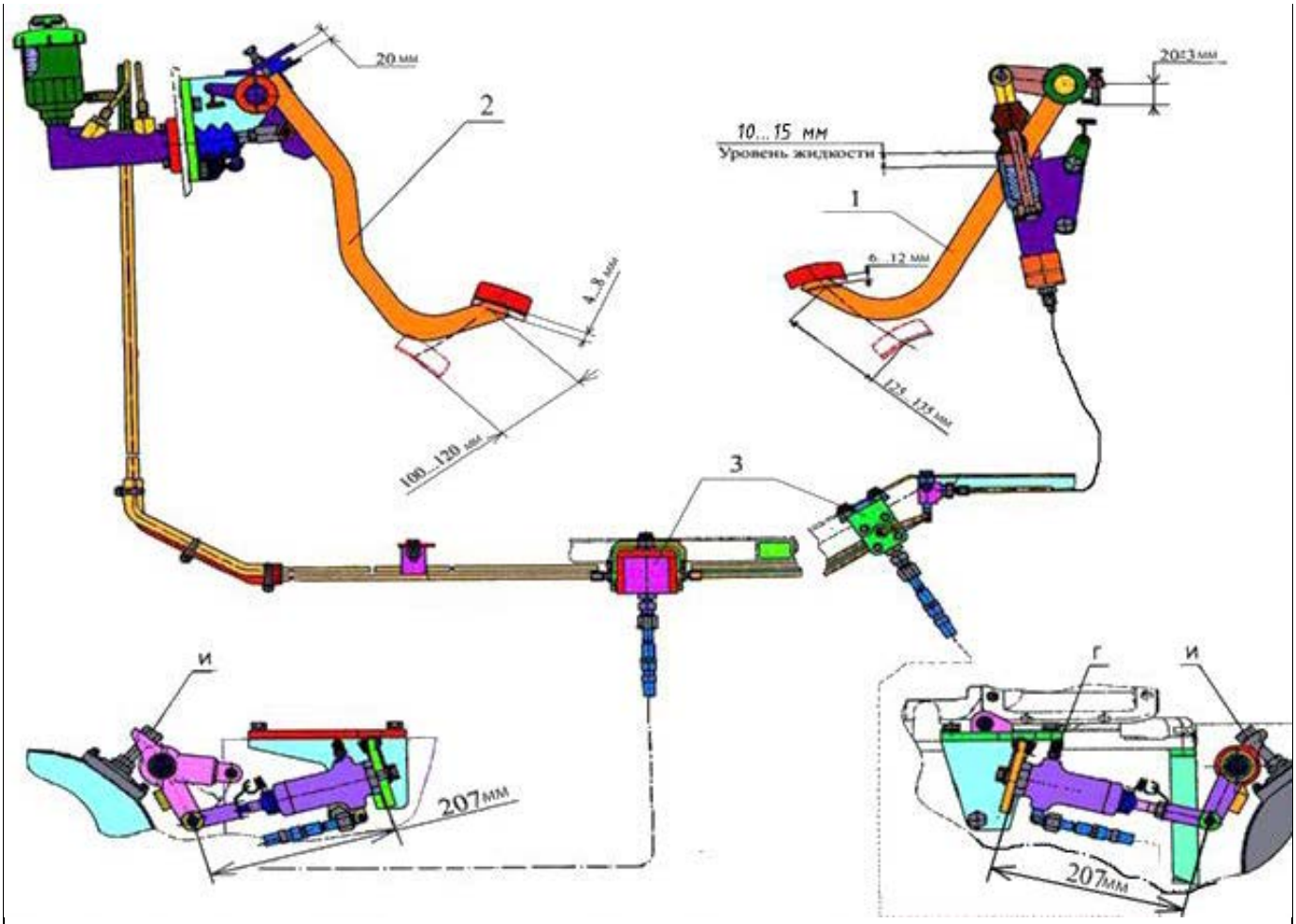
Picture 6.7

1 – brake casing; 2 – friction disk; 3 – intermediate disk; 4 – roller; 5 – sealing boot; 6 – pressure disk; 7 – ball; 10 – gasket; 12 – draining plug; 13 – brake casing; 14 – gasket; 15 – O-ring; 16 – final drive pinion; 17 – lock clutch; 18 – boss; 20 – cover; 21 – oil feeding adaptor; 22 – inspection and filler plug; 23 – sealing boot; 24 – O-ring; 25 – brake rod (adjusting bolt); 26 – carrier; 27 – carrier cover.



Picture 6.8

1 – brake roller; 2, 9 – link bolt; 3, 8 – levers of the left- and right-hand brake, respectively; 4, 7 – left- and right-hand service cylinder; 5, 6 – flexible hose of the brakes; 10, 11 – right- and left-hand master cylinders; 12, 13 – left- and right-hand brake pedals; 14, 15 – pipelines.



Picture 6.9

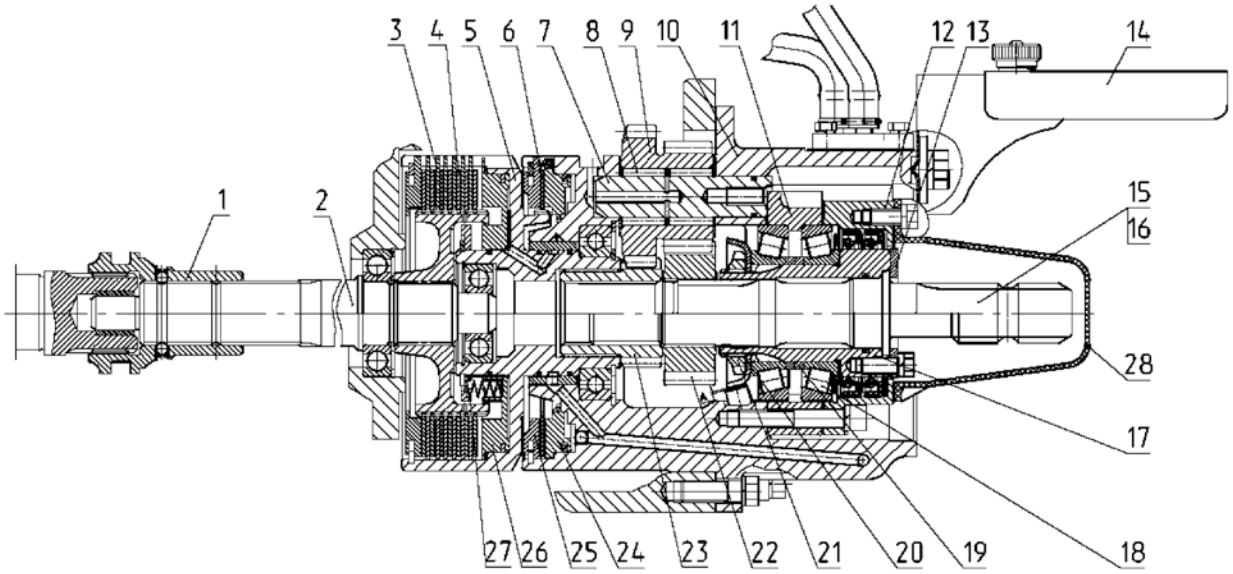
1- ;2- ; 3- taps;

Inefficient braking:	
Increased pedal travel.	Perform the adjustment as describes in Section “Construction and Operation of Tractor Components”, item “Adjusting the Brakes”.
Air inleakaging into the hydraulic actuator system due to drop in brake fluid level in the master cylinder reservoirs below the mark “Min”.	Add the brake fluid to the “Max” mark. Bleed air from the hydraulic actuator system.
Loss of leak-tightness of the master and service cylinders due to damage of the collars.	Replace the collars. Bleed air from the system.
Leakage of brake fluid through the joints of pipelines and hoses at the places of damage.	Tighten the captive nuts and clamps, replace the damaged parts. Add the fluid to the required level. If necessary, bleed the system.
The brake disks are worn out.	Replace the disks.
Incomplete release of all the brakes:	
No free travel of the pedal	Perform the adjustment (see Section “Construction and Operation of Tractor Components”, item “Adjusting the Brakes”).
Jamming the collars of the master and service cylinders because of:	

• soiling and corrosion of working surfaces;	Replace the protective boots. Clean and wash the cylinders, remove the corrosion. Replace the collars.
• swelling of the sealing collars due to ingress of mineral oil.	Flush the system through. Replace the collars.
Incomplete return of the pedals to their initial position after braking:	
• Breakage of the release springs of the pedals, service cylinders and pressure disks.	Replace the springs
Incomplete release of one of the service brakes:	
Loosening or breakage of the release springs of the pressure disks.	Replace the springs
Jamming of the master cylinder piston due to:	
• soiling or corrosion;	Disassemble the working cylinder, clean the parts from dirt and corrosion and bleed air from the system.
• swelling of the sealing collars due to ingress of mineral oil.	Replace the collar, flush the system and bleed air from there.
Non-uniform braking of the right- and left-hand wheels:	
War-out of the friction surfaces of one of the disks.	Replace the disks.
Maladjustment of the length of the link bolts of the service brakes.	Perform the adjustment (see Section “Construction and Operation of Tractor Components”, item “Adjusting the Brakes”).
Poor operation of the leveling valves of the hydraulic actuator.	Remove the tube connecting the two master brake cylinders; remove the unions and leveling valves from the master brake cylinders; check the quality of the collars and the presence of the balls. Replace the worn-out parts.
Clogging or crushing of the pipelines of brake control or leveling valves of the mas-ter brake cylinders.	Clean or replace the pipelines.
Spontaneous locking of the brake levers on axles.	Remove the brake levers from the axle, clean mounting seats on the axle for the levers, lubricate them with grease and refit them on the axle.
ATTENTION! The failure of the tractor brakes is often caused by using the trailed and semi-trailed brakeless machines blocked with the tractor brakes. Never use the trailed and semi-trailed brakeless machines blocked with the tractor brakes, if their mass exceed half of the tractor mass.	

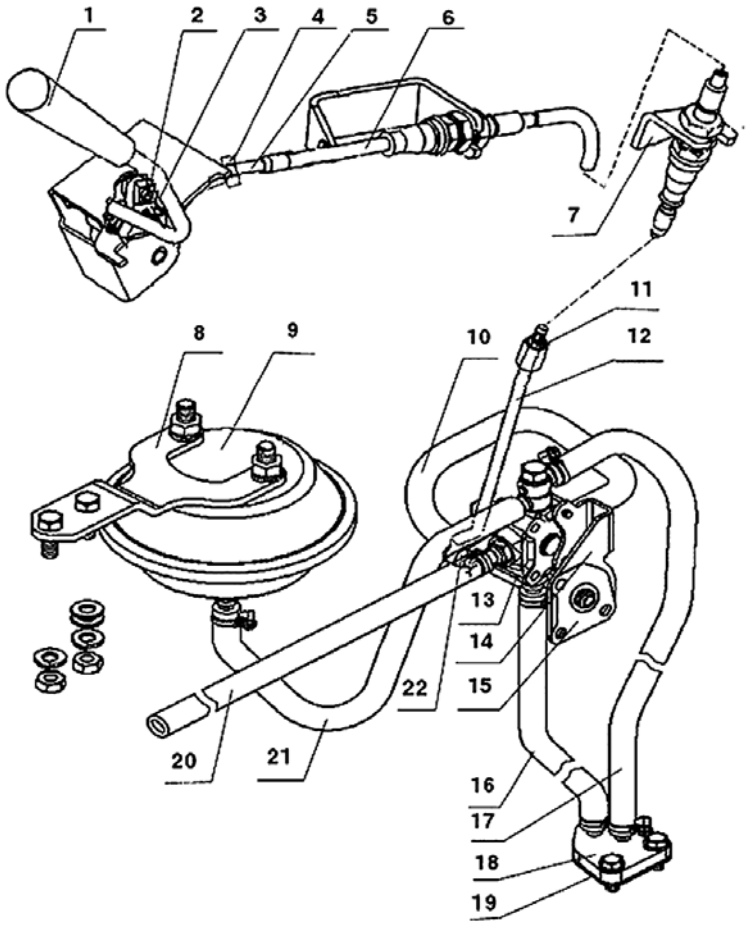
Trouble, symptoms	Remedy

PTO (pic. 6.10, 6.11)



Picture 6.10

1 – changeover clutch; 2 – driving shaft; 3 – friction disk; 4 – intermediate disk; 5 – drum; 6 – brake plate; 7 – intermediate shaft; 8 – roller; 9 – gear; 10 – housing; 11 – sleeve; 12 – cap; 13 – thrust washer; 14 – cover; 15, 16 – interchangeable tail-pieces; 17 – bushing; 18 – taper roller bearing; 19 – ring; 20 – washer; 21 – nut; 22, 23 – pinion; 24 – brake piston; 25 – thrust plate; 26 – friction piston; 27 – spring; 28 – cap.



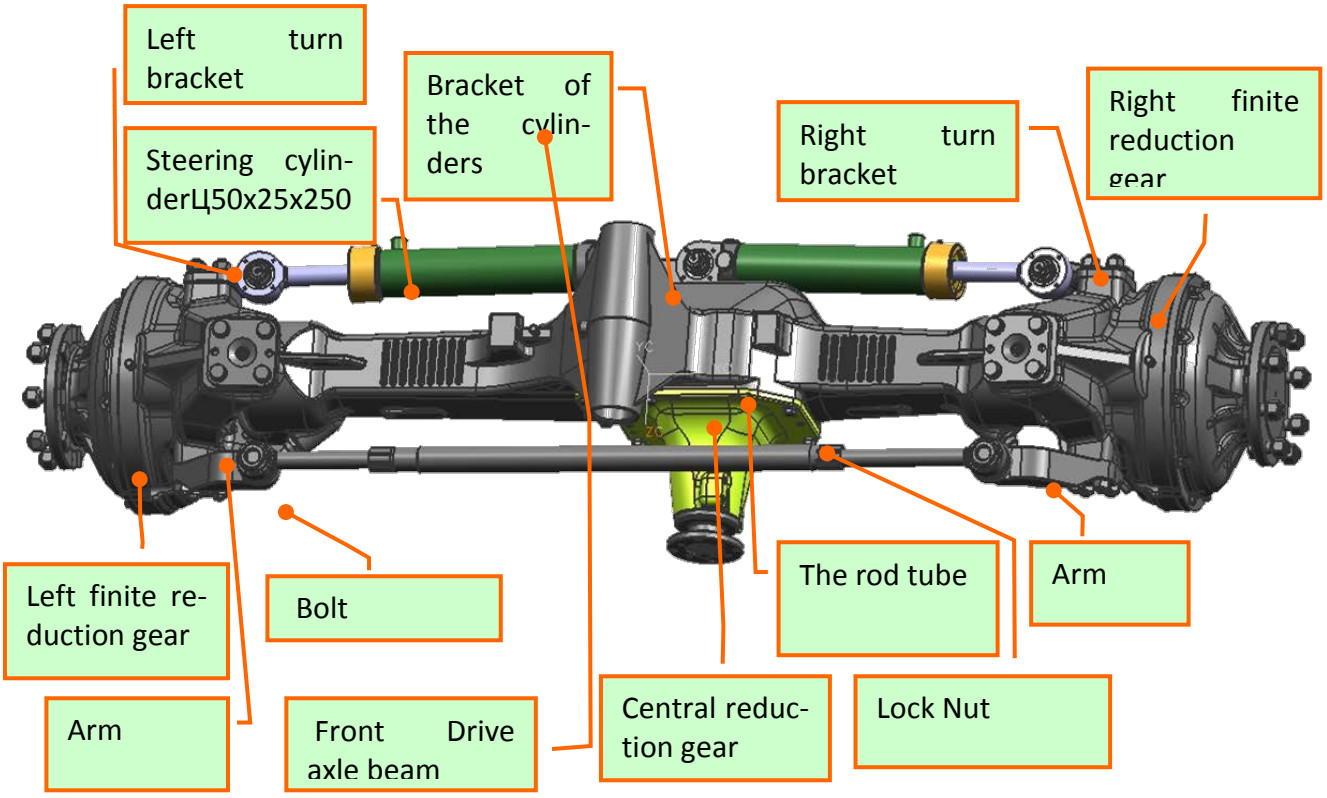
1 – control handle; 2 – pin; 3 – fork; 4 – locknut; 5 – cable link; 6 – cable; 7, 8, 14 – bracket; 9 – dumper; 10 – drain hose; 11 – coupling; 12 – rod; 13 – rear PTO control tap; 15, 19 – gasket; 16 – brake hose; 17 – friction hose; 18 – flange; 20 – oil supply hose; 21 – dumper hose; 22 – PTO control tap lever; 23 – switch.

Picture 6.11

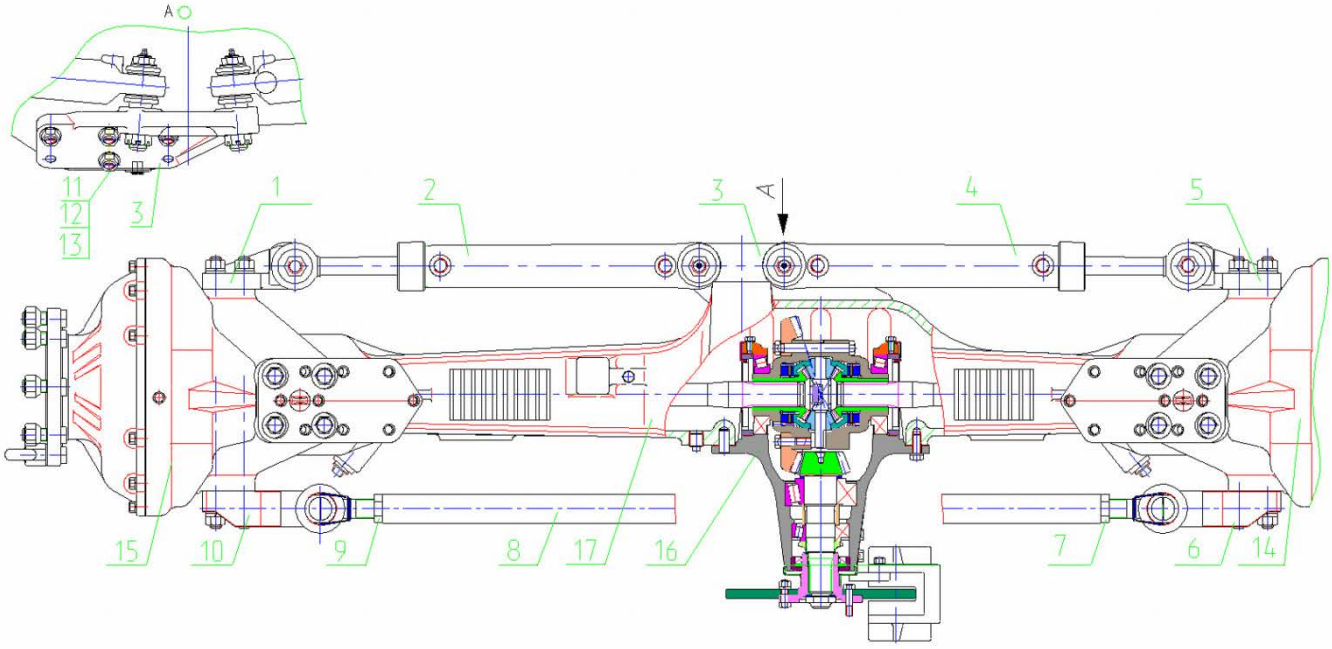
Rear PTO fails to transmit full torque or continues to rotate on applying the brake:	
Maladjustment of the control.	Adjust the distributor control.
Low oil pressure in the transmission hydraulic system.	Adjust the pressure-relief valve on the transmission hydraulic system.
Low oil pressure at the outlet to the PTO friction clutch and brake due to excessive leak in the PTO friction clutch and brake.	Check the pressure applied to the PTO friction clutch and brake. If necessary, replace the O-rings of the PTO friction clutch and reduction gear brake or distributor.
Low oil pressure at the outlet to the PTO friction clutch and brake due to jamming of the distributor sliding valve.	Dismantle the distributor, clean and wash its parts; eliminate the cause of jamming. Replace the damaged parts, if any.
The operation of the friction clutch or brake is disturbed due to hanging-up of the pistons or wearing-out of the friction disks.	Wash all the friction clutch and brake parts in clean diesel fuel; change the friction disks, if necessary.

Trouble, symptom	Remedy

Front Driving Axle (see pic. 6.12, 6.13, 6.14, 6.15)

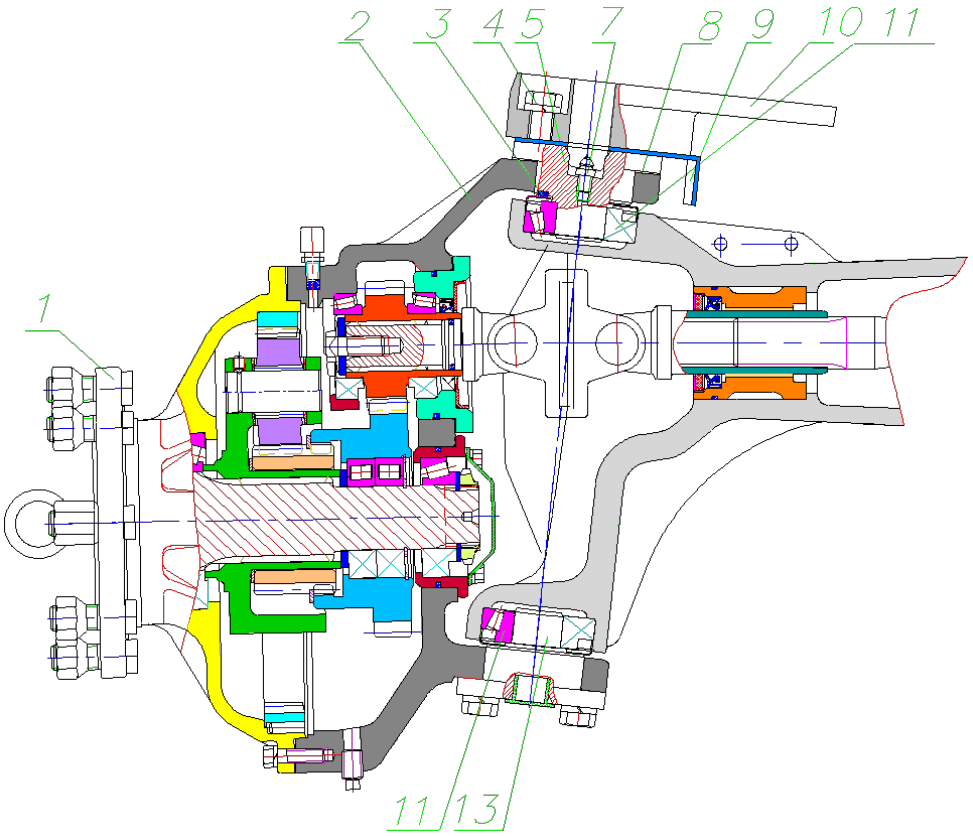


Picture 6.12



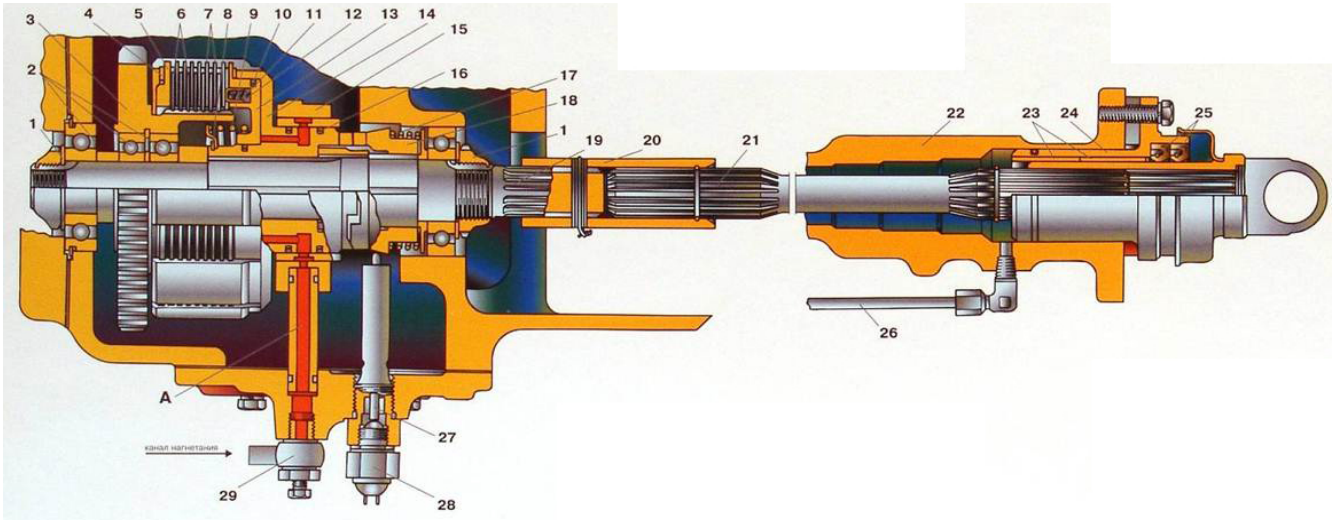
Picture 6.13

1,5-bracket of the cylinder; 2,4-cylinder Ц50x25x250; 3-bracket; 6,10-Arm; 7,9-lock nut; 8-the rod tube; 11-sleeve; 12-pin; 13-nut M16; 14-right finite redactor gear; 15- left finite redactor gear; 17-front drive axle beam.



Picture 6.14

1-flange; 2-final drive reductor; 3-ring; 4-bolt M16x60 (8 шт.); 5-upper axle of king pin; 7-oil cup; 8-spacer; 9-bracket; 10-base; 11-coned roller bearing; 13-lower axle of king pin.



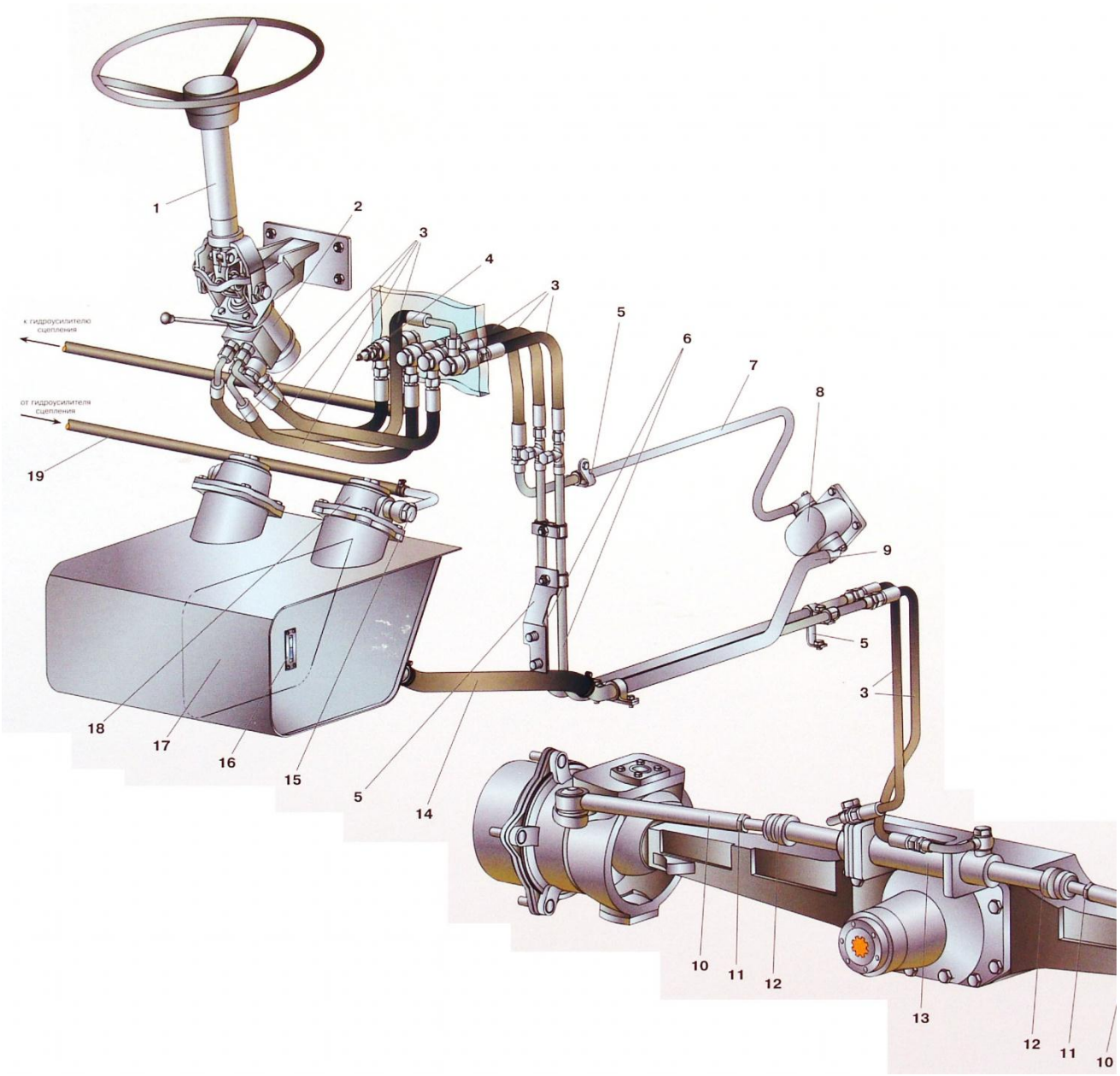
Picture 6.15

1-nut; 2-bearing; 3-pinion; 4-ring; 5-disk; 6-drive disk; 7-driven disk; 8-cup; 9-spring; 10-ring; 11-spring; 12-rod; 13-piston; 14-drum; 15-holder; 16-ring; 17-spring; 18-jaw half-clutch; 19-shaft; 20-spline bushing; 21-torsion bar; 22-housing; 23-sleeves; 24-holder; 25-collar; 26-oil pipelines; 27-pusher; 28-switch; 29-oil pipeline; A-canal for supplying oil into hydrocontrolled clutch.

Insufficient traction of the front driving axle	
The drive clutch fails to transmit the torque: (see pic. 6.15)	
Lack of pressure in the clutch booster.	Dismantle the distributor and wash its parts.
Slipping of the drive clutch.	Check and adjust the pressure in the hydraulic system of the transmission (11...12 kgf/cm^2). Replace the worn-put plates.
Electrical circuit of the FDA control system is faulty.	Locate and eliminate the fault.
Insufficient value of the torque transmitted by the clutch due to oil leakage in the hydraulic system: (see pic 6.15)	
Wear-out of the rubber sealing rings.	Replace the rings.
Wear-out of the piston rings and clutch drum.	Replace the rings.
Wear-out of the mating surfaces between the casing and the drum hub" and between the drum and the piston.	Replace the worn-out parts.
Drive fails to operate in the automatic mode: (see pic. 6.15)	
Maladjustment or failure of the switch of the automatic engagement sensor.	Adjust the position of the switch or replace the latter.
Excessive noise and heating in the main drive zone: (see pic. 6.13)	
Excessive play in the main drive gear bearings.	Adjust the gear bearings.
Incorrect mesh of the main drive gears.	Check and, if necessary, adjust the mesh against the contact spot.
Noise at the maximum angle of turning of the angle: (see pic 6.14)	
Incorrect operation mode of the FDA. The FDA operates all the way in the forced engagement mode.	Check the mode of engagement of the FDA drive and set the switch to the OFF or AUTO position.
Incorrect limit angle of turn of the wheels.	Check and adjust the angle.
Knocking in the pivot during the motion	
Maladjustment of the pivot bearings.	Check and adjust the bearings.
Knocking in the FDA in case of sudden turning of the wheels: (see pic. 6.12)	
Excessive play in the pins of the steering link and hydraulic cylinders of turning.	Check and adjust the pins.
Oil leakage through the collar of the main drive flange:	
Wear-out or damage of the flange collar.	Replace the worn-out parts.
Oil leakage through the breathers of the wheel reduction gears:	
Too high oil level.	Check the level and adjust the same as required.
Oil leakage through the collar of the driving gear of the wheel reduction gear	

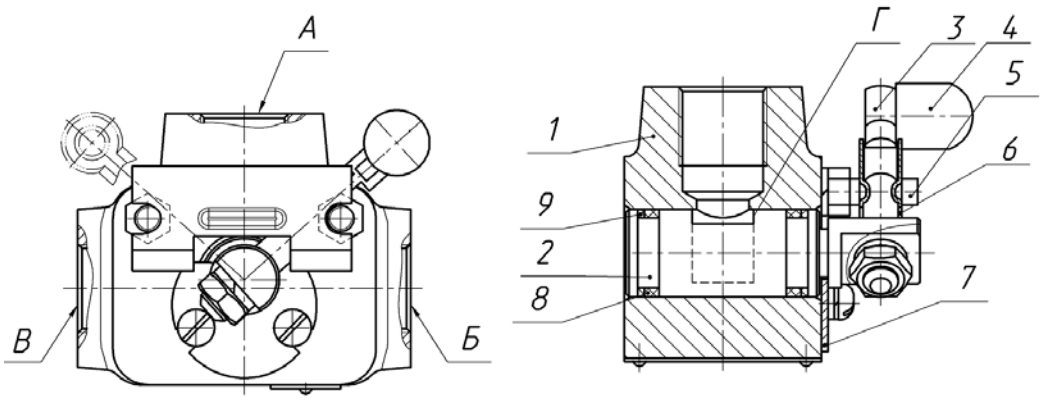
Excessive clearance in the gear bearings.	Check and adjust the bearings.
Wear-out or damage of the collar.	Replace the collar
Angular oscillations of the wheels: (see pic. 6.12)	
Axial clearance in the bearings of the wheel reduction gear pivots.	Check and adjust.
Excessive clearance in the bearings of the front wheels.	Check and adjust the clearance in the flange bearings.
Excessive clearance in the bearings of the HPS hydraulic cylinders.	Replace the worn-out parts.
Excessive wear and ply separation of front tyres: (see pic 6.12)	
Toe-in is misadjusted or disturbed.	Adjust the toe-in as described in Section “Adjustments”.
Tyre inflation pressure does not correspond to that recommended.	Keep the pressure in the tyres according to the recommendations (see Section “Aggregating the Tractor with Agricultural Machines and Implements”).
The FDA is all the way operated in the forced engagement mode.	Check the FDA engagement and disengagement. If any faults will be detected, eliminate them.

Trouble, symptoms	Remedy
Steering control (see pic 6.16;6.17)	



Picture 6.16

1-Steering column; 2-metering pump; 3-high-pressure hoses; 4-sensor; 5-bracket; 6-pipelines; 7-forced oil conduit; 8-feeding pump; 9-draw-in oil conduit; 10- transverse arm; 11-nut; 12-spherical joint; 13-hydraulic cylinder; 14-hose; 15-valve; 16-oil gauge; 17-oil tank; 18-draining filter; 19-pipeline.

Trouble, symptoms	Remedy
 Picture 6.17 1- body, 2- main valve, 3- lever, 4-handle, 5- stop-plate, 6- lock, 7- plate, 8- ring, 9- ring	
Excessive force to be applied for turning the steering wheel:	
1. No or insufficient oil pressure in the hydraulic system of the steering wheel due to:	1. The oil pressure in the hydraulic system of the steering wheel shall be 140...155 bar (at the stop):
● the relief valve of the metering pump has hung up in the open position or adjusted to low pressure.	*● Wash the relieve valve and adjust it to the pressure of 140...145 bar.
● the feeding pump is faulty or designed for counter-clockwise rotation.	● repair or replace the pump.
2. Excessive friction or jamming in the mechanical components of the steering column.	2. Eliminate the friction in the steering column: ● reduce the tightening of the upper nut; ● lubricate the rubbing surfaces of the plastic bushings; ● eliminate the contact of the universal joint with the walls of the steering column bracket.
3. Excessive torque of turning of the FDA reduction gears.	3. Repair the FDA.
The steering wheel rotates without turning the steerable wheels:	
1. No oil in the tank.	1. Fill in the tank with oil up to the required level and bleed air from the hydraulic system.
2. The relief valve is set to the pressure exceeding the set point of the anti-hammer valves.	*2. Adjust the setting of the relief and anti-hammer valves.
3. When disassembling and reassembling the non-return valve, the ball was not refitted.	*3. Refit the ball of the non-return valve.

The seals of the hydraulic cylinder piston are worn-out.	4. Repair or replace the hydraulic cylinder.
When rotating the steering wheel, the steerable wheels turn in opposite direction:	
The high-pressure hoses are connected to the steering hydraulic cylinder or metering pump incorrectly.	Refit the high-pressure houses.
The steering is too slow or too difficult when rotating the steering wheel rapidly:	
1. The feeding pump is faulty.	1. Repair or replace the pump.
2. The feeding pump of too low capacity is installed.	2. Install the feeding pump of the standard size specified in the Operating Manual.
3. The relief valve of the metering pump is set to low pressure or has hung up in the open position due to dirt.	**3. Wash the relieve valve and adjust it to the pressure of 140…145 bar.
The steering wheel fails to return to the neutral position, tendency to "motoring" of the metering pump:	
1. Excessive friction or jamming in the mechanical components of the steering column.	1. Eliminate the friction in the steering column. To do this: ● loosen the tightening of the upper nut; ● lubricate the rubbing surfaces of the plastic bushings; ● eliminate the contact of the universal joint with the walls of the steering column bracket.
2. The splined tail-end of the steering column and the metering pump shaft are not aligned coaxially (due to excessive thrust of the universal-joint shaft).	2. Release the universal joint; to do this, cut the end face of the upper fork of the universal or reduce the height of the lower rubber bushing to get the clearance between the end face of the upper fork of the universal joint and the cage.
3. The clearance between between the splined tail-end of the steering column and slide valve of the metering pump is absent or too small.	3. Shorten the splined tail-end, if its end projects over the mating face of the steering column bracket by more than 7.1 mm, or set additional washers with the thickness of not more than 1.5 mm between the metering pump and the bracket.
"Motoring" of the metering pump (the steering wheel continues to rotate after the turn):	
1. Seizure of the sleeve with the slide valve, possibly, due to dirt.	*1. Wash the parts of the metering pump and reassembly them in accordance with the manufacturer's instructions.
2. The return springs of the slide valve have	*2. Replace the springs

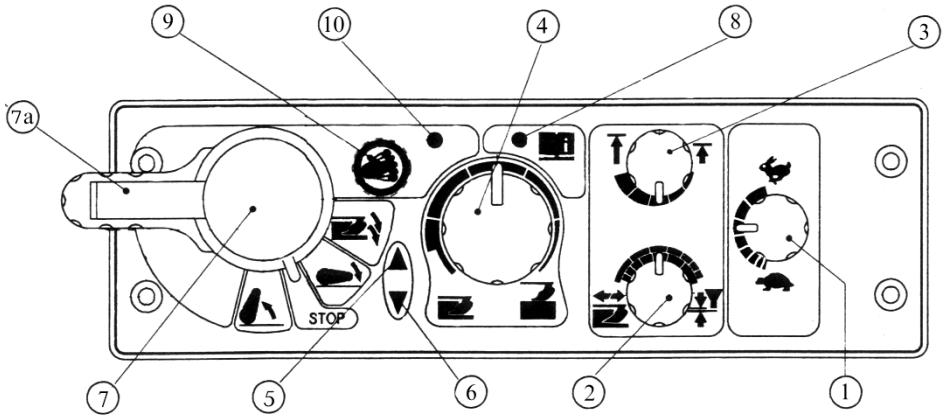
lost the elasticity or been broken.	
The continual correction of the steering wheel is required (the steering wheel does not hold the road):	
1. The return springs of the slide valve have lost the elasticity or are broken.	*1. Replace the springs
2. The spring of the anti-hammer valves is broken.	*2. Replace the spring and adjust the pressure of the anti-hammer valves.
3. The gerotor pair is worn out.	*3. Replace the gerotor pair.
4. The cylinder piston seals are worn-out.	*4. Replace the defective parts of the cylinders.
Strong blows on the steering wheel in both directions:	
Incorrect setting of the universal joint in the metering pump.	*Re-assemble the metering pump in accordance with the manufacturer's instructions.
Excessive play of the steering wheel:	
1. The tapered fingers of the hydraulic cylinder or steering tie-rods are not tightened.	1. Tighten the nuts of the fingers with the torque of 180…200 Nm and fix them with cotter pins.
2. The splines of the steering column tail piece are worn out.	2. Replace the lower fork of the universal joint.
3. The universal-joint shaft of the steering column is worn out.	3. Replace the universal-joint shaft.
4. The return springs of the slide valve have lost the elasticity or are broken.	*4. Replace the springs
Oscillation of the steerable wheels (wobbling) during the motion:	
1. Excessive play of the fingers of the universal joints of the steering tie-rods and hydraulic cylinder.	1. Tighten the nuts of the fingers and universal joints of the steering tie-rods.
2. Wear-out of the mechanical connections or bearings.	2. Replace the worn-out parts.
3. Presence of air in the hydraulic system.	3. Bleed air from the hydraulic system.
Oil leaks over the tail-piece of the slide valve of the metering pump, cover or body of the gerotor pair:	
1. Wear-off of the slide valve seal.	*1. Replace the slide valve seal by means of a special fixture.
2. The bolts of the metering pump cover are loosened.	2. Tighten the bolts with the torque of 3...3.5 kgf•m.

3. The gaskets under the heads of the bolts of the metering pump cover are damaged.	3. Replace the gaskets.
Different minimum radii of turn of the tractor to the left and to the right:	
Not adjusted convergence of wheels.	Adjust the convergence
Неполный угол поворота управляемых колес:	
The toe-in of the wheels is not adjusted.	Adjust the wheel toe-in.
● the relief valve is set to low pressure.	*● set the valve to the pressure of 140…145 бар;
● the feeding pump is faulty	● repair or replace the pump.
2. Increased torque of turning of the FDA reduction gear.	2. Repair the FDA.
Failure of the feeding pump:	
High pressure in the hydraulic system of the steering control.	
● incorrect connection of the high-pressure hoses.	● the hoses shall be connected in strict compliance with the operating manual.
● jamming of the relief valve of the metering pump.	*● wash the relief valve and adjust it to the pressure of 140…145 bar.
Oil leakage over the slide of the reverse tap: (see pic 6.17)	
The rubber O-rings are damaged or worn-out.	Replace the rings (to prevent the rings from being cut off against sharp edges of the holes in the casing when being replaced, the slide of the tap shall be moved out of the casing in turn to the both sides by not more than 7 mm)
Taking into account the extreme complexity and responsibility of the metering pump from the standpoint of the steering control safety, its disassembling and reassembling shall be only performed by a specialist of the customer service department of the manufacturer (or other authorized service organization) having been trained appropriately, got familiar with the construction of the metering pump and documentation for servicing, disassembling and reassembling of the metering pump as well as subject to availability of all the required special fixtures, tools and special hydraulic stand ensuring the adjustment and checking of the parameters and operation of the metering pump after the repair performed. Otherwise, the full responsibility for inoperability of the metering pump shall be imposed on the person who performed the disassembling and reassembling of the metering pump, replacement of the parts or setting of the valves as well as on the tractor owner.	

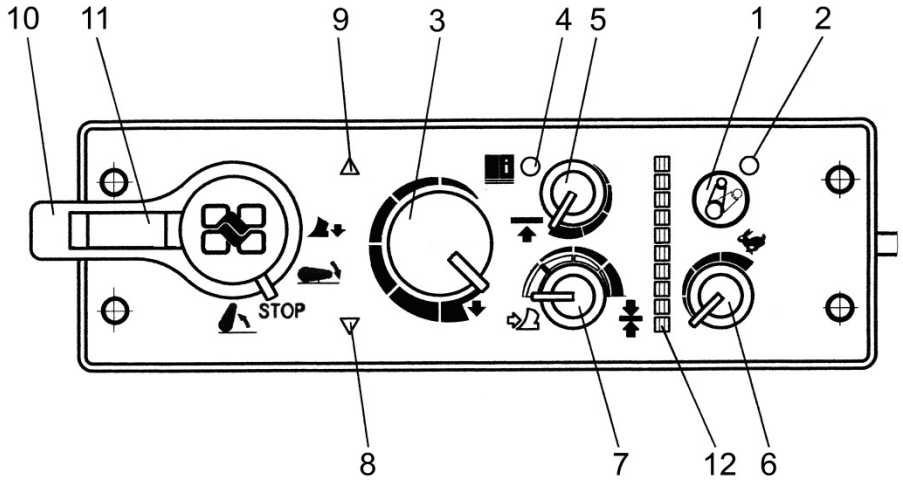
Trouble, symptoms	Remedy

Rear Hitch Linkage

RHL Control Panel Manufactured by the BOSCH Company



ПУ-03 RHL Control Panel Manufactured by the Izmeritel Plant



Picture 6.18

1 – damping knob; 2 – damping warning lamp; 3 – handle for adjusting the tillage depth (clockwise – shallower, counter-clockwise – deeper); 4 – red diagnostic alarm; 5 – handle for adjusting the limitation of lifting the hitch linkage (clockwise – maximum lifting, counter-clockwise – minimum lifting); 6 – handle for adjusting the drop rate (clockwise – quicker, counter-clockwise – slower); 7 – handle for selecting the adjustment method (clockwise – position one, counter-clockwise – draft one, in-between them – combined method); 8 – hitch linkage drop warning lamp (green); 9 – hitch linkage drop lifting lamp (red); 10 – hitch linkage control handle (upwards – lifting, downwards – drop, extra pressing down the handle in its bottom position – plough entry for ploughing, middle position – disengaged); 11 – interlocking switch (transportation) – locks mechanically the handle (10) in the top position by shifting the switch to the right; 12 – RHL position indicator (green, top mark of the scale: the RHL is in the top position, bottom mark of the scale: the RHL in the in the bottom position).

Diagnostics of Faults

The BOSCH electrohydraulic control system has the self-diagnostics feature and, in case of detection of a fault, it generates coded data for the operator by means of a diagnostics warning lamp on the control panel. When no faults are detected in the system after starting the engine, the warning lamp is in constant glow. After manipulations of the RHL control handle upwards or downwards, the warning lamp goes out. When the control handle is set downwards, a green warning lamp lights up to indicate the drop of the RHL; when the handle is set upwards, a red warning lamp to indicate the lifting of the RHL.

If any faults are detected in the system (after starting the engine), the diagnostics warning lamp begins to give the coded information on the fault and, if required, cause the system to block.
The fault code is generated in the form of a two-digit number, the first digit of which is equal to the number of flashes of the warning lamp after a long pause. The second digit is the number of flashes after a short pause. For example, a long pause – lamp flashes three times, a short pause – the lamp flashes six times. This means that the system has a fault with a "36" code. Should several faults be detected, the system indicates one fault code after another, one by one, separated with a prolonged pause.

The system subdivides all the faults into three groups: major, average, and minor faults.
If major faults are detected, the adjustment operations are stopped and the system is disabled. It can be controlled neither from the main control panel nor from the external button posts. The diagnostics warning lamp indicates the fault code. The operation of the system is only resumed when the fault is eliminated and the engine is restarted.
In case of average faults, the adjustment procedure is stopped and the system is blocked. It cannot be controlled from the main control panel, but can be controlled from the external button posts. The diagnostics warning lamp indicates the fault code. The operation of the system is only resumed when the fault is eliminated and the engine is restarted.
In case of minor faults, the diagnostics warning lamp shows its code. The sys-tem is still can controlled without blocking. When the fault is eliminated, the di-agnostics warning lamp goes out.
If any fault is detected by the system, proceed as follows:
1. Stop the engine.
2. Set the controls on the main control panel of the RHL as follows:
- The hitch linkage control handle – to the OFF position;
- The lift limit adjusting handle – to the "0" position;
- The soil working depth adjustment handle – to the "0" position;
- The drop rate adjustment handle – to the middle position;
- The "draft-position" mode adjustment handle – to the middle position.

3. Start up the engine and, if no faults are detected, proceed with field jobs. If the defects have not been eliminated in such a way, carry out malfunction diagnosis of the system and eliminate the troubles.

For a list of possible troubles, their diagnostics methods and remedies, see the section "Troubleshooting".

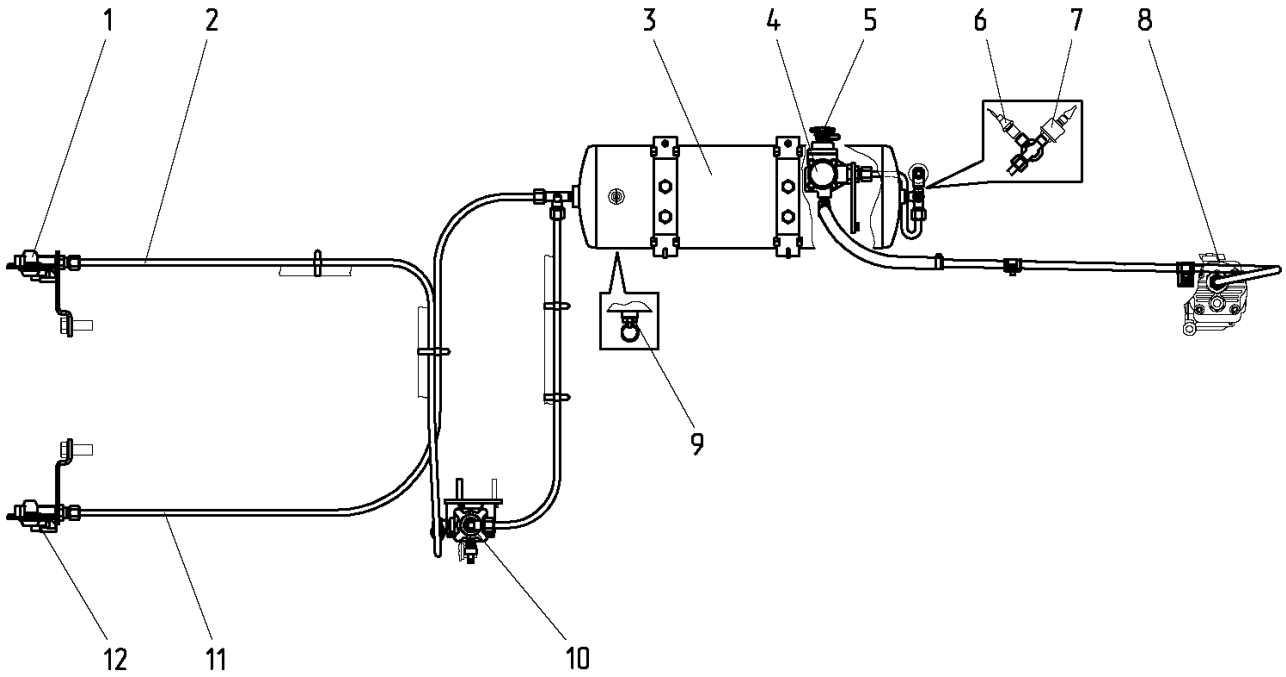
ATTENTION!

1. The electrical connectors of the hitch linkage control system shall be only disconnected with the engine stopped.
2. The specified voltage values shall be only measured on a running engine in compliance with safety regulations for handling the live electrical products.
3. The pin numbering in the bundle connectors is indicated on the base elements of the connectors.

Trouble, symptoms	Remedy
Electric equipment (see the attachments)	
Low degree of charging of the storage battery:	
The intermediate resistance between the terminals of the storage battery and wire lugs is increased due to loosening and oxidization.	Dress the connecting terminals, tighten the contact parts and lubricate them with technical petroleum jelly. Tighten the fastening of the battery disconnect switch and bridge.
The alternator is faulty (no voltage at the "+" and "Д" terminals).	Remove the alternator and send it to the workshop for repair.
The storage battery if faulty.	Replace the storage battery.
Slipping of the driving belt.	Adjust the tension of the alternator drive belt (see Section "Scheduled Maintenance").
The storage battery "boils" and requires frequent addition of distilled aqua:	
The storage battery if faulty.	Replace the storage battery.
When the starter is switched on, the engine crankshaft does not rotate or rotates very slowly:	
The storage battery terminals are loosely tightened or wire lugs are oxidized	Dress the lugs and tighten up the terminal clamps.
The storage battery has been exhausted below the allowable limit.	Charge or replace the storage battery.
The commutator and brushes have got fouled.	Dress the commutator and the brushes.
Poor contact between the brushes and the commutator.	Remove the starter from the engine, dress the commutator, eliminate the wedging of the brushes in their box-guides or replace them, if worn-out.
Maladjustment of the solenoid starter switch.	Adjust the switch.
The engine start interlock device has operated or its switch is faulty.	Set the GB levers to the neutral position and check the operability of the switch. If necessary, adjust the switch position by means of adjusting shims.
The engine is not prepared for starting at the temperature of below + 5°C.	Prepare the engine for starting at low temperatures.
After starting the engine the starter remains in the ON state	
The starter power disk is tacked to the starter relay contact bolts.	Stop the engine, disconnect the storage battery and dress the contacts of the solenoid starter switch.
The drive pinion does not get out of mesh with the flywheel rim due to breakdown of the release lever spring.	Replace the return spring of the release lever.

The solenoid valve of the engine start assisting facilities does not operate:	
Poor contact in the electromagnet coil circuit.	Check the circuit and tighten the wire fastening contacts.
Alternator noise:	
Slipping or excessive tension of the alternator drive belt.	Remove the alternator and send it to the workshop for repair. Adjust the tension of the alternator drive belt.
Electric tachospeedometer	
See the faults of tachospeedometer in the section «Drive controls and Instrumentation».	
System of heating and air cooling in the cab	
No warm air is fed to the cab	
No water circulation through the heating unit:	
The tap on the cylinder block head is closed.	Open the tap.
Ice plugs in the heater hoses.	Break ice and pass hot water through the hoses.
The heater fan does not operate.	Remove the fan fault and check the electric circuit for switching on the fan.
High humidity of the air passed to the cab:	
Water leakage in the heater radiator.	Eliminate the leakage or replace the radiator.
Water leakage in the connections of the heater system.	Tighten the buckles.

Trouble, symptoms	Remedy
PNUEMATIC SYSTEM (see pic. 6.19)	



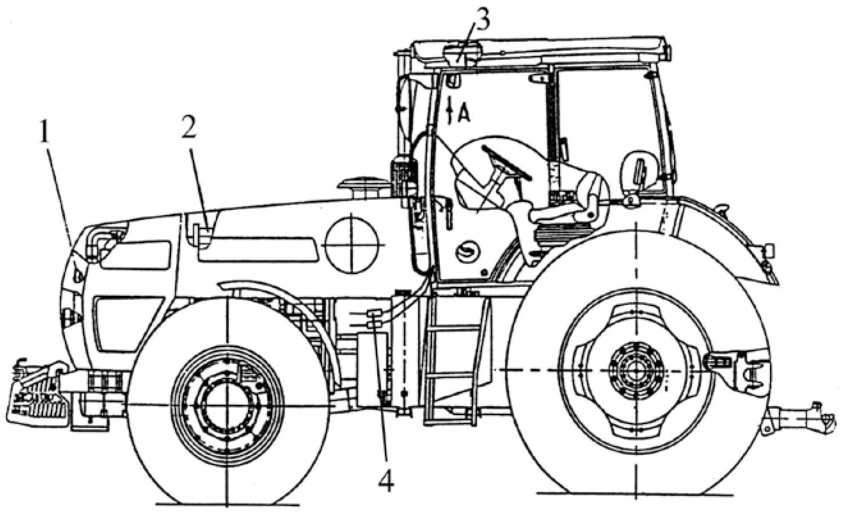
Picture 6.19

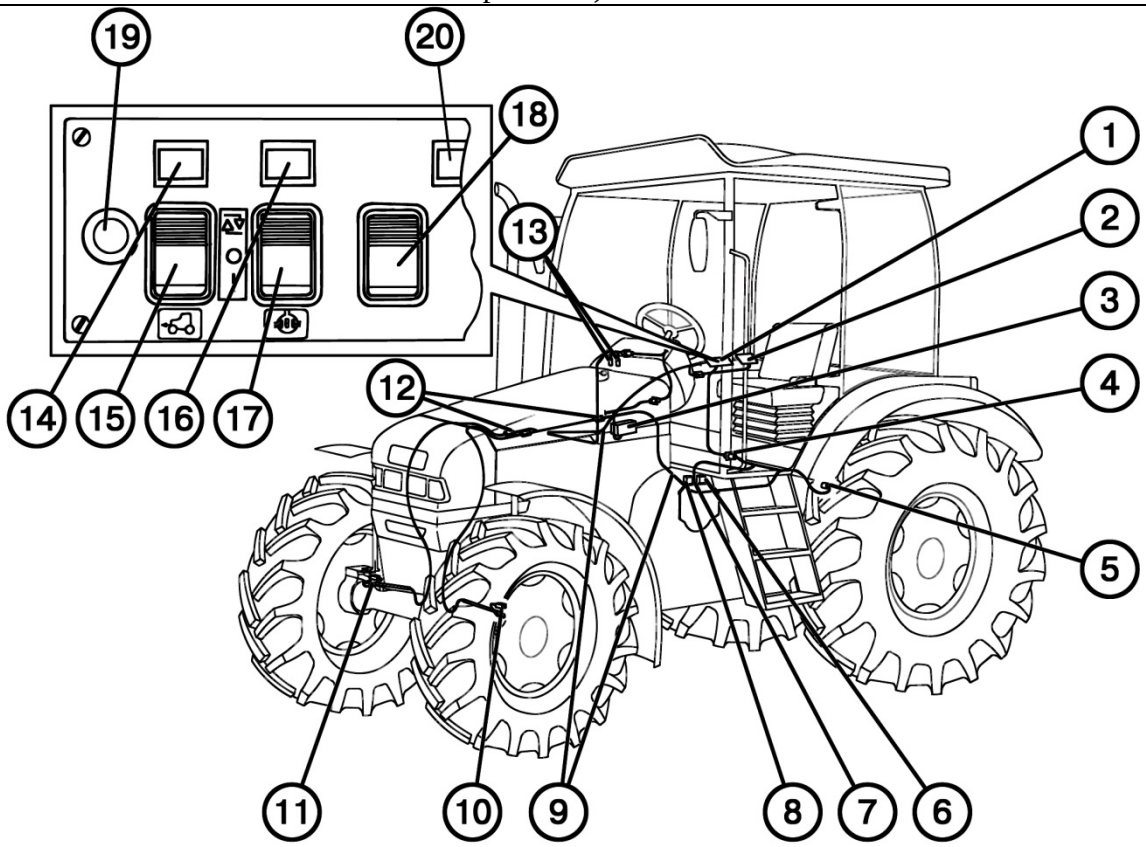
1, 12 – coupling heads; 2 – control manifold; 3 – bottle; 4 – pressure regulator; 5 – air intake valve; 6 – air emergency pressure sensor; 7 – air pressure sensor; 8 – compressor; 9 – condensate draining tap; 10 – brake valve (two-line); 11 –supply manifold.

Pressure in the receiver builds up slowly:	
Air leakage from the pneumatic system:	
• The nuts of the pipelines, fittings and binding screw clamps are loosened or damaged.	Detect the places of leakages and eliminate them by tightening the connections or replacement of the damaged parts.
• The rubber seal of the connecting head is damaged.	Replace the damaged seal.
• The nut of the O-ring of the connecting head has been loosened.	Tighten the nut.
• Penetration of dirt under the connecting head valve.	Clean the valve.
• Contact of the dirt-protection cover with the stem of the connecting head valve.	Eliminate the contact.
• Maladjustment of the valve actuator.	Perform the adjustment (see Section “Construction and Operation of Tractor Components”, item “Checking and Adjusting the Brake Valve of the Pneumatic System and Its Actuator”).
• The operation of the pressure regulator	Remove the pressure regulator and brake valve

and brake valve is disturbed.	and send them to the workshop for repair.
The pressure in the air bottle rises slowly:	
Air leakage through the compressor valves.	Remove the compressor head and clean the valves and their seats from coke deposits. Replace the damaged parts.
Sticking or run-out of compressor piston rings	Remove the head and cylinder of the compressor, clean the rings from coke deposits and replace them as necessary.
Pressure in the air bottle drops quickly when the engine is stopped:	
Air leakage through coupling elements of the pneumatic system.	Eliminate the leakage.
On stepping on the brake pedals, the air pressure in the bottle drops quickly:	
The inlet valve is warped, clogged or damaged.	Eliminate the warpage, clean or replace the valve.
The brake valve diaphragm is damaged.	Change the diaphragm.
Insufficient air pressure in the bottle:	
Air leakage.	Eliminate the air leakage.
The pressure regulator operation is disturbed.	Remove the pressure regulator and send it to the workshop for repair.
The suction or pressure valve of the compressor is faulty.	Clean the compressor valves from coke deposits or replace them, if they are excessively worn-out.
Excessive wear of the piston rings, jamming of the compressor rings.	Clean the compressor rings from coke deposits or replace them.
Excessive ejection of oil to the pneumatic system by the compressor:	
Jamming or wear-out of the compressor piston rings.	Clean the compressor rings from coke deposits or replace them.

Trouble, symptoms	Remedy
The pressure regulator switches the compressor on to idling at the pressure of less than 0.77...0.80 MPa (7.7...8.0 kgf/cm2) and into action – at less than 0.65 MPa (6.5 kgf/cm2) or at more than 0.70 MPa (7.0 kgf/cm2):	
Clogging of the chambers, pockets and channels of the pressure regulator.	Clean and wash the pressure regulator.
The adjusting cap is uncottered.	Adjust the pressure of switching the compressor ON/OFF.
Loss of elasticity, damage or rupture of rubber parts; irreparable slackening of springs.	Change the damaged parts.
Warpage or hanging-up of the pressure regulator operating members.	Check the valves for sliding ability; lubricate, if necessary.
The pressure regulator is frequently operates (turns the compressor ON) without taking air from the air bottle:	
Air leakage from the pneumatic system or pressure regulator, damage of the back-pressure valve of the regulator.	Remove the back-pressure valve and send it to the workshop for repair.
The pressure regulator functions as a relief valve:	
The adjusting cover is screw down too much.	Remove the adjusting cover and send it to the workshop for repair.
Seizure of the discharge piston in the diaphragm assembly.	Remove the diaphragm assembly and send it to the workshop for repair.
Absence of clearance between the discharge piston and the bottom cover; the outlet holes in the cover are clogged.	Screw off the cover, clean the outlet holes and check the clearance.
No air is supplied to the coupling hose through the air-intake valve:	
The stem of the air-intake valve in the pressure regulator is sunk insufficiently.	Screw the nut of the coupling hose fully down onto union.
The pressure regulator has switched the compressor to idling.	Reduce the pressure in the receiver to below 0.65 MPa (6.5 kgf/cm^2).
Displacement of the rubber ring on the air-intake valve.	Screw out the cover and check the position of the O-ring and its condition..
The trailer's brakes are ineffective:	
The brake valve fails to maintain the pressure in the control mainline at the level of 0.77...0.80 MPa (7.7...8.0 kgf/cm^2).	Adjust the brake valve and its actuator
The brake valve fails to drop the pressure in the coupling mainline to zero.	Adjust the brake valve and its actuator
The pressure in the coupling mainline drops to zero too slowly.	Check the condition of the mainline, atmospheric opening in the valve and the pedal travel.

The operation of the trailer's brake system is disturbed.	Perform the adjustment.
The trailer's brakes are released too slowly:	
Maladjustment of the brake valve and its actuator.	Perform the adjustment
The operation of the trailer's brake system is disturbed.	Perform the adjustment
Air-Conditioner (see pic. 6.20)	
 Picture 6.20 1 – condenser and drying filter; 2 – compressor; 3 – cooler-heater; 4 – quick-release connectors.	
The electromagnetic clutch of the compressor fails to operate (when turning the temperature regulator, no distinctive metallic click is heard):	
Electric equipment failure.	Check the operability of the block of pressure sensors by means of a tester or multimeter; the leads of the block of sensors (red and pink wires) shall be rung out between one another. Check the intactness of the connections of the electric circuits from the compressor coupling to the air conditioner control panel.
The coolant leakage took place.	Detect the coolant leakage place. The detection of the leakage places and replacement of the hoses and components of the air conditioner shall be performed by trained personnel using the special equipment.
The air conditioner fan motor fails to operate.	Electric equipment fault: Check the intactness of the respective fuse (25 A, see electric diagram) on the fuse block located in the dashboard. Replace the blown out fuses by new ones. Check the presence of supply voltage at the air conditioner motor M7 by means of a test lamp when the switch is set to the ON position and the battery is connected. If the electric circuits are intact, but no

	supply voltage is present at the motor M7, replace the switch.
When the air conditioner is switched on in the cooling mode, warm air is delivered to the cab.	Destruction of the sealing element of the tap ПО-11 (or ВС11). Replace the tap ПО-11 (or ВС11).
Coolant leakage from the ventilation compartment of the cab.	Burst of the heater tubes (“defrosting” of the heater due to incomplete drainage when operating in the cold season with water). Replace the climatic unit of the air conditioner.
Electronic control systems of the DL, FDA, GB reduction gear, front PTO and RHL (see pic. 6.21)	
 Picture 6.21 1 — control panel; 2 — safety fuse box; 3 — starting relay block; 4 — plug-in socket; 5 — reverse sensor; 6 — DB control electrohydraulic distributor, 7 — sensor of automatic engagement of the FDA Drive; 8 — FDA Drive control hydraulic distributor; 9 — connecting cables; 10, 11 — steering angle sensors; ±13 deg. and ± 25 deg., respectively; 12 — connector terminals; 13 — servive brake applied sensors; 14,16, 20 — warning lights; 15 — FDA Drive control selector switch; 17 — DL control selector switch; 18 — front PTO (FPTO) switch (if installed); 19 — horn switch (1523B)	
The FDA drive or rear axle differential lockup cannot be not engaged in the forced mode, the reduction gear cannot be switched to a higher stage, the front PTO drive cannot be engaged:	
No supply voltage is applied to the respective electromagnet of the electrohydraulic distributor.	Check the application of the supply voltage to the respective electromagnet against the electric connection diagram (see diagrams in Section “Appendices”)
Jamming of the slide of the respective electrohydraulic distributor.	Wash the electrohydraulic distributor
No pressure in the hydraulic system of the	Eliminate the fault in the hydraulic system.

transmission.	
When the front PTO drive is engaged (the pilot lamp is ON), the tail piece fails to rotate:	
Make sure that the cylinder rod moves when being engaged.	If the cylinder rod moves, the electric control of the front PTO is operable.
Check the adjustment of tightening o the brake band of the front PTO.	If necessary, perform the adjustment
The rear axle differential lockup or FDA drive cannot be engaged in the automatic mode in the straightforward position of the steerable wheels:	
Excessive clearance between the bracket and, respectively, end face of the left- and right-hand ЭВИТ-С3 sensors of turn angle of the steerable wheels.	Adjust the clearance within 3±0.2 mm by turning the nuts (6) and (7) as shown in Figure “Adjusting the ЭВИТ-С3 Sensors of the Angle of Turn of the Steerable Wheels” in Section “Construction and Operation of Tractor Components”.
Breakage in the “minus” circuit of the power supply or in the “signal” circuit of the left- (34) or right-hand (35), respectively, turn angle sensors (see “Electric Connection Diagram of the Control Systems of the LD, FDA and GB Reduction Gear” in Section “Appendices”).	Check the electric circuits against the electric connection diagram.
The right- or left-hand turn angle sensor, respectively, is faulty.	Replace the faulty sensor.
When braking the tractor (stepping on the both pedals at the same time) the FDA drive cannot be engaged or the rear axle DL cannot be disengaged (on stepping on any brake pedal):	
One or both ВК 12-21 sensors of application of the brakes (operation of the brake pedals) (see “Electric Connection Diagram of the Tractor” in Section “Appendices”).	Simulate in turn the operation of the sensors by closing the contacts in the terminal blocks of the bundle to the sensors.
The bundle is faulty	Check the bundle for intactness against the electric connection diagram (see “Electric Connection Diagram of the Control Systems of the LD, FDA and GB Reduction Gear” in Section “Appendices”).
The relays (10, 11, 12 and 13) (see «Electric Connection Diagram of the Control Systems of the LD, FDA and GB Reduction Gear» in Section «Appendices») in the circuit of engagement of the FDA drive and engagement of the rear axle DL during the brake are faulty.	Replace the relays.
The lamp of engagement of the lower reduction gear stage fails to light up on start-ing the engine, or the lamp of engagement of the higher reduction gear stage fails to light up after switching the reduction gear to a higher reduction gear stage:	
The oil pressure in the hydraulic control system is below 0.8 MPa.	Check the oil pressure against the transmission oil pressure gauge in the dashboard. Eliminate the fault in the hydraulic system or adjust the relief

	valve.
The ДСДМ-М pressure sensor of the higher or lower stage of the GB reduction gear (37) or (38), respectively, is faulty or the pilot lamp of engagement of the GB reduction gear (6) or (24) is blown out, or the LED of the GB reduction gear (40) or (39) is blown out (see “Electric Connection Diagram of the Control Systems of the LD, FDA and GB Reduction Gear” in Section “Appendices”).	Replace the faulty components (pressure sensor or pilot lamp, or LED).
Open circuit from the sensor to the pilot lamp or from the sensor to the LED.	Check the integrity of the “sensor – pilot lamp” or “sensor – LED” circuit and eliminate the breakage in the faulty circuit (see “Electric Connection Diagram of the Control Systems of the LD, FDA and GB Reduction Gear” in Section “Appendices”).