OPERATING INSTRUCTION
744P-0000010

MTZ-KIROVETS tractors K-744R1, K-744R2 K-744R3, K-744R4

Head Office: 3-1136 Centre St. Ste 124, Thornhill, ON, L4J 3M8, Canada
Warehouse: 2682 Highway 34, Hawkesbury, Ontario. K6A 2R2 Canada
Tel: 1-855-2GO-4MTZ (1-855-246-4689) Fax: 1-647 933-9066 E-mail: info@mtzequipment.com Web: www.mtzequipment.com

Due to continuous activities on the improvement of tractors enhancing their reliability and improving their operating conditions, insignificant changes can be introduced into the design, which are not reflected herein.

ABBREVIATIONS

GB – gearbox
PW – paintwork (paint-and-lacquer coating)
PTO – power take-off
ET – electric torch
PDR – pump drive reducer
SPTA – spare parts, tools and accessories
ShM – shift maintenance
M-1 – first maintenance
M-2 – second maintenance
M-3 – third maintenance
M-SS – spring-summer maintenance
M-AW – autumn-winter maintenance
TSS – tractor service station
St – standard
Pr – premium

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NOTICE TO OPERATOR!

Before proceeding to work on your tractor please thoroughly read this instruction and operating manual for the engine installed on your tractor. Strictly follow the operation and maintenance guidelines.

IT IS PROHIBITED to work on the tractor without fire-extinguishing means. The tractor shall be equipped with fight-fighting inventory including a fire-extinguisher and a shovel.

IT IS PROHIBITED to work on the tractor with faulty devices.

IT IS PROHIBITED to use parking brake during motion.

IT IS PROHIBITED to tow the tractor by the mounted equipment.

IT IS PROHIBITED to fill the engine cooling system and heating system with water.

IT IS ABSOLUTELY PROHIBITED to switch on the heater without cooling fluid.

IT IS PROHIBITED to openplugs of the tank filler and expansion tank or unscrew the steam-air valve at the cooling fluid temperature over 70°C.

IT IS PROHIBITED to work on the tractor with faulty steering control, brake system, electrical lighting and alarm signaling.

IT IS PROHIBITED to use fuses, which are not conformant by the nominal value to the electrical diagram value.

IT IS PROHIBITED to use coasting during motion down the slope.

IT IS PROHIBITED to be under the tractor when the engine is operating.

IT IS PROHIBITED to work on the tractor at the voltage being above the voltage regulator level set in accordance with the ambient temperature in order to avoid an explosion of storage batteries.

IT IS PROHIBITED to operate the engine with unpressurised air feed channels from the air cleaner to the engine and dust suction from the air cleaner.

IT IS ABSOLUTELY PROHIBITED to work with clogged or ice-covered net of the air intake pipe cover and without free discharge of gases from the exhaust pipe.

REMINDER FOR OPERATOR

Before proceeding to work on the tractor please thoroughly read the operating instruction for the tractor paying special attention to the “Safety requirements” section.

To ensure safe work on the tractor, at first get familiarized with the requirements set forth in this section and further strictly fulfil them, especially the following:

- During turns select the speed providing safe traffic. ***IT IS PROHIBITED*** to make a sharp turn at the gear being higher than the first gear of the fourth mode.

- When working on slopes exercise caution, carefulness in tractor driving and meet the following conditions:

– do not shut off the engine and do not change gears modes on steep ascents and descents;

– when overcoming an ascent requiring actuation of both axles, perform actuation of the rear axle beforehand;

– during motion down the slope ***IT IS PROHIBITED*** to use coasting;

– it is allowed to work across the slope (the slope angle shall not exceed 5°) only with the “slow” position of the mode change lever and avoid sharp turns and passing obstacles.

- In crossing dams, dikes and bridges, make sure of the possibility of driving and use only low gears.

- Crossing trenches, hillocks and other obstacles with mounted implements should be performed at the right angle at a low gear avoiding sharp jogs and large rolls of the tractor.

- The motion of tractor train at maximum speed (27 km/h) is allowed only on roads with dry hard pavement.

- When using the tractor for hauling operations on snowy, overmoistened and other roads with a low adhesion coefficient as well as on slopes, turns, hillsides, during glaze ice, etc., perform motion at low gears, do not admit sharp braking and turns.

- When moving on slipperyroads it is recommended to drive the tractor train “stretched out” – to this end, brake the hooked-up vehicle first by means of a hand brake valve and then use the tractor brakes.

- During motion ***IT IS PROHIBITED*** to use the parking brake and during hauling operations use the hand fuel feed lever.

- The travelling speed of the tractor with mounted implementsshall not exceed 15 km/h in motion over an even road and 10 km/h in motion over a bumpy road or off-road.

- In tractor motion with the pressure in tyres below 1.7 kgf/cm^2, the speed shall not exceed 20 km/h.

SYMBOLS

The symbols being used on the tractor (instrument panel, fuse block, throw-in lever of lighting and signaling devices) are given below.

	fuel		low beam
	oil pressure in engine		fog light
	engine cooling fluid temperature		marker lights
	air filter		rear window washer
	engine oil temperature		frontwindow washer
	oil pressure in transmission		transmission deactivation
	storage battery		front axle is engaged
	deactivated		front and rear axles are engaged
	activated		sound signal
	fan		smooth regulation by rotation
	front wiper/washer		smooth regulation by movement
	rear window washer		service lighting
	Attention! “Emergency parameter”	N	neutral gear
	engine oil filter		turn signal
	air pressure in the primary circuit		scale illumination
	air pressure in the secondary circuit		heater
	gearbox oil filter		air conditioner
	high beam		cab dome light
	direction indicator switching on		“Road-train” sign
	alarm signaling		battery master switch
	air pressure in trailer system		heating boiler activation
	parking brake		stop signal

air pressure in front brake circuit

air pressure in rear brake circuit

abnormal operation of any system

lifting of mounted implement

lowering of mounted implement

floating position of mounted implement

service operations of hydraulic implements

rotating beacon

floating position of hydraulic paths for connection of hydraulic implements

power take-off shaft engaged

power take-off shaft disengaged

slower

faster

electric torch ET

pressure filter of mounted implements

pressure filter of steering control

1 INTRODUCTION

The Operating Instruction for Kirovets K-744R1, K-744R2, K-744R3, K-744R4 tractors is designed for drivers, mechanics and other persons related to operation of such tractors. The instruction contains a brief description of the design of tractors and their technical data, main rules of operation and maintenance. The data on engines of models ЯМЗ-238НД5, 8481.10, OM457LA (Mercedes), Cummins are set forth in the operating instructions, which are attached to the tractors and are an integral part of this book.

Before proceeding to tractor operation, it is necessary to study its construction and layout and operating rules. Long-term and reliable operation of Kirovets tractors is ensured provided proper operation and timely execution of maintenance.

2 GENERAL DESCRIPTION AND TECHNICAL FEATURES

2.1 Purpose and scope

K-744R1, K-744R2, K-744R3, K-744R4 tractors for general purposes serve for the execution of various agricultural operations with mounted, semi-mounted and trailing machines and implements, in combination with which it is possible to perform ploughing, reclamation, harrowing, sowing, scuffing, disk harrowing, deep ploughing, tilting the soil without or before ploughing, snow capture and other kinds of work. In addition, the tractors can effectively be used in transport operations performed on field and ground roads as well as on roads with hard pavement. The tractors are designed for broad use in most climatic areas.

The description of construction, installation and rules of operation of the above-mentioned equipment are set forth in the instructions to be attached to each type of equipment.

Tractor hooking-up with agricultural machines or implements and vehicles, their operation shall be performed according to the instructions issued by the manufacturers of such machines.

List of implements approved for use with K-744 tractors, series "R"

Table 1

Make	Description	Quantity of machines in the hookup	Method of connection
ПВР-3,5	Attachment to 7–9-furrow ploughs for soil compaction	1	---
ОП-12	Implement for pre-sowing preparation of soil	1	Hitch iron
ПТК-9-35 (40)	Plough 9-furrow	1	Hitch iron
ПНЛ-8-40	Plough 8-furrow	1	Implement mechanism
ПРК-8-4	Plough 8-furrow	1	The same
ПГП-7-40	Plough 7-furrow	1	-- " --
ПН-8-35	Plough 8-furrow mounted	1	-- " --
ПУН-8-40	Plough 8-furrow, multifunctional, mounted	1	-- " --
ПРУН-8-45	Plough-ripper 8-furrow, multifunctional, mounted	1	Implement mechanism
ПРК-8-40	Plough-ripper 8-furrow, combined	1	The same
ПЧ-4,5	Plough chisel type	1	-- " --

Make	Description	Quantity of machines in the hookup	Method of connection
ПД-4-35	Plough tier-type	1	-- “ --
ППН-4-40	Plough, deep ploughing type	1	-- “ --
ПТН-3-40/40А	Plough tier-type	1	-- “ --
ПНИ-8-40	Plough with adjustable width of catch	1	-- “ --
ОПТ-3-5	Implement for tilting the soil without or before ploughing	1	-- “ --
---	Plough of Paraplough type	1	-- “ --
ПБН-6-50	Plough for reclaiming cultivated bogs	1	-- “ --
РВК-7,2	Combined broad-catching hookup for pre-sowing soil preparation	1	-- “ --
АКП-5	Combined hookup for main preparation of soil for winter crops	1	-- “ --
МСП-2	Machine for mixing carbonate and solonetz horizons	1	-- “ --
АЛС-2,5	Meadow hookup for solonetz soils	1	-- “ --
ФП-4,2	Mill for pastures	1	-- “ --
РС-2,9	Ripper	1	-- “ --
ПГ-3-5	Subsurface plough	1	-- “ --
ГУН-4	Subsurface plough – fertiliser distributor	1	-- “ --
МИК-1.4	Stone extracting machine	1	-- “ --
ДЭ-227	Snow-breaker of mill type	1	-- “ --
ВНК-11	Pushing drag harrow	1	-- “ --
ПК-10	Grain-harvesting engineless combine	1	-- “ --
КПШ-11	Subsurface cultivator	1	-- “ --
КТС-10-02	Heavy sectioned cultivator	1	-- “ --
КЛШ-10/15	Rod-type cultivator	1	-- “ --
СВШ-10	Snow ridger	1	-- “ --
СВУ-2,6А	Snow ridger	3	Coupler СП - 16/16А
КПС-4	Cultivator	4–5	The same
КПЭ-3,8А	Heavy-duty cultivator	3	-- “ --
КШУ-18	Broad-catching cultivator	1	Hitch iron
ЛДГ-15	Scuffer of disc type	1	The same
ЛДГ-20	Scuffer of disc type	1	-- “ --
ЛДС-6	Scuffer-Sower (with attachment for connecting two ЛДС-6 units)	2	-- “ --
СП-16/16А	Coupler	1	-- “ --
2КПГ-2.2	Tractive connection	1	-- “ --
СГ-21	Coupler of harrow type	1	-- “ --
БДТ-720	Heavy-duty disc-type harrow	1	-- “ --
БДТ-7	Disc-type harrow	1	-- “ --
БДТ-10	Heavy-duty disc-type double-gang harrow	1	-- “ --
БД-10А	Disc-type harrow	1	-- “ --
БМШ-20	Grub-hoe harrow	1	-- “ --

Make	Description	Quantity of machines in the hookup	Method of connection
---	Heavy-duty three-link blade-type harrow	1	-- “ --
БЗТС-1,0	Harrow	42	Coupler СГ-21
БЗСС-1,0	The same	42	Coupler СГ-21
ЗБНТУ-1,0	Heavy-duty harrow	7	The same
БИГ-3А	Needle-type harrow	5–6	Coupling СП-16/16А
ВИП-5,6	Leveller-disperser	3	The same
ЗКВГ-1,4	Roller	4	-- “ --
СЗ-3,6	Sower	5	-- “ --
СЗУ-3,6	The same	5	-- “ --
СЗА-3,6	-- “ --	5	-- “ --
СЗО-3,6	-- “ --	5	-- “ --
СЗП-3,6	-- “ --	5	-- “ --
СЗТ-3,6	-- “ --	5	-- “ --
СЛТ-3,6	-- “ --	5	-- “ --
СЗС-2,1	Sower-cultivator	7	-- “ --
СЗШР-3,6	Seed-fertiliser row drill (instead of СЗ-3,6)	1	-- “ --
СТС-2,1	Seed-fertiliser tiller planter	5	-- “ --
---	Seed-fertiliser close-row planter (instead of СЗУ-3,6)	1	-- “ --
---	Seed-fertiliser press non-coupling planter (instead of СЗП-3,6)	1	-- “ --
---	Seed-fertiliser row-drill tusk-type planter (instead of СЗА-3,6)	1	-- “ --
—	Seed-fertiliser broad-catching planter	1	Hitch iron
---	Seed-fertiliser non-coupling planter with attachment for soil compaction (instead of СЗТ-3,6 and СЛТ-3,6)	1	The same
---	Cultivator tiller planter for broad-band sowing	1	-- “ --
СЗС-12	Cultivator sower	1	-- “ --
СЗС-14	The same	1	-- “ --
ЗПТС-12Б	Self-emptying trailer (ММЗ-768Б)	1	Hydraulic pick-up hitch
ОЗТП-8572	The same	1	The same
1ПТС-9Б	Semi-trailer (ММЗ-771Б)	1	-- “ --
ОЗТП-8573	The same	1	-- “ --
ЦТА-10	-- “ --	1	-- “ --
ПСЕ-45	Trailer tank	1	-- “ --
ПЖУ	Machine for distribution of liquid fertilisers and pesticides	1	-- “ --
РУМ-14	Machine for fertiliser distribution	1	-- “ --
РУМ-16	The same	1	-- “ --
РУМ-20	-- “ --	1	-- “ --
ПРТ-24	Machine for distribution of solid organic fertilisers	1	-- “ --
ПРТ16	The same	1	-- “ --

Make	Description	Quantity of machines in the hookup	Method of connection
МЖТ-24	Machine for distribution of liquid organic fertilisers	1	-- “ --
МЖТ-16	The same	1	-- “ --
МВБ-12	Machine for intrasoil distribution of mineral fertilisers	1	-- “ --
ЦТА-30	Tank	1	Hydraulic pick-up hitch
АВА-1	Hookup for fertiliser distribution	1	-- “ --
---	Hookup for fertiliser distribution on meadows and pastures	1	-- “ --

ATTENTION! Agricultural machines and implements designed for hooking up with K-744R1, K-744R2, K-744R3, K-744R4 tractors and not mentioned in this list must obligatorily be agreed upon with Peterburgsky traktorny zavod, JSC.

ATTENTION! Reclamation on tractor failures in case of its hooking-up with agricultural machines and implements, which are not agreed upon with Peterburgskytraktorny zavod, JSC will not be accepted for review. The tractor warranty will be cancelled.

Serial numbers of tractor components

The tractor nameplate with indication of the tractor make and model, name of manufacturer, country, manufacturer’s trademark as well as year of manufacture is installed in the cabin on the instrument panel support on the left.

The tractor serial number is stamped on the front of the bumper at the right angle (in the direction of tractor travel). The number includes the tractor model, i.e. K744R1, K744R2, K744R3 or K744R4, the letter denoting the year of manufacture and subsequent four digits corresponding to the ordinal number of manufacture within the year.

The serial number of the transmission gearbox is stamped on the upper part of the gearbox, in the area of compressor drive pulley, vertically under the lifting eye nut.

The serial number of the pump drive reducer is stamped on the casing at the side, on the lateral lid.

The serial number of the axle is stamped on the case in the area of inlet flange on the left.

2.2 Brief data on construction and layout

K744R1, K744R2, K744R3 or K744R4 tractors are differentiated by design of the engine unit, by a radiator unit.

K744R3 and K744R4 tractors have an increased weight due to installation of ballast.

Electrical equipment of tractors is fitted out with preparation for installation of the Glonass data acquisition and storage system, which is located under the instrument panel.

When ordering tractors with the ***"Installation of Glonass system" option***, the manufacturer shall, in the regular mode, install this system, activate it, perform a test checkup of the controlled parameters.

On the tractors, the possibility of installation of a rotation beacon is provided. The rotation beacon is installed in the rear part of the cabin, on the left in the direction of tractor travel.For installation, it is necessary to unscrew the plug, fix the beacon on the regular bracket, take off the power cord and connect the rotation beacon. The beacon activation switch is located on the ceiling panel of the cabin.

On the tractors, a four-stroke eight-cylinder V-shaped engine is installed:

ЯМЗ-238НД5 –on K-744R1St tractor;

8481.10 –on K-744R2St tractor;

8481.10-02 and 8481.10-04 –on K-744R3St, K-744R4St tractors.

Cummins engines are installed on K-744R1Pr tractors andOM457LA (Mercedes) engines are installed on K-744R2Pr, K-744R3Pr and K-744R3Pr tractors.

The engine start-up is performed by an electrical starter. In order to facilitate start-up at low temperatures, the tractors are equipped with a pre-starting heating system.

The **air cleaning system** isdry, double-stage, combined, with dust suction into the exhaust pipe. The air cleaner manufactured by Donaldson is used on the tractors.

The engine **cooling system** is closed, with compensating circuit, with forced circulation of the cooling fluid. In order to maintain the optimum heat conditions, the engines are provided with an automatic fan control system.

ATTENTION! In order to avoid radiator destruction, ***IT IS PROHIBITED*** to increase the engine speed over 1,200 RPM at the oil temperature in the hydraulic system below 30°C.

The system warm-up shall be performed by making tractor turns from one extreme position to the other, with holding at the stop during 3...5 seconds each time or by forced lowering of the mounted implement.

ATTENTION! ***IT IS PROHIBITED*** to fill the engine cooling system and heating system with water.

The **fuel system** consists of a fuel tank, hand fuel boost pump (located under the cabin in the direction of tractor travel in the vertical hinge pivot area), fuel coarse and fine mesh filters, high-pressure fuel pump with variable speed regulator, automatic coupling of fuel injection advance, low-pressure and high-pressure fuel pipelines and nozzles.

The **gas discharge system** is with one silencer and connecting branch pipes.

The tractor **transmission** includes a semi-rigid coupling and a pump drive reducer, a gearbox, a cardan drive, an intermediate support and driving axles.

The***semi-rigid coupling and the pump drive reducer*** serve for transmission of torque from the engine to the gearbox. The reducer also performs driving to the pumps of hydraulic systems for control of turns and mounted implement as well as provides engine deactivation from transmission in case of idle start-up. Two lifting eye-bolts are installed in the casing of the pump drive reducer for the purpose of its installation and dismantling.

The ***gearbox*** is mechanical, multi-stage, four-regime, with constant-mesh gears, with a mechanical regime change drive and hydraulic gear change without break of the power flux within any of regimes. It allows to change the tractor motion speed, implement motion by back running, engage the rear driving axle, transmit torque to the power take-off (PTO) as well as ensure driving of the steering control pump from the wheels during tractor towing with faulty engine. Four lifting eye-nuts are installed in the upper lid of the gearbox for installation and dismantling of the latter. A lifting eye-bolt is installed on the PTO coupling housing for the execution of similar operations.

The ***cardan drive*** consists of a cardan shaft of the gearbox, cardan shaft of the front axle, intermediate shaft of the rear axle, intermediate support and cardan shaft of the rear axle.

The ***intermediate support*** connects the cardan shafts transmitting the torque from the transfer shaft of the gearbox to the rear axle.

Both tractor axles are driving and serve for increase of the torque to be driven to them from the gearbox and for its transfer to the wheels. On the tractors, the front driving axles are suspended to the frame on two semi-elliptic carriage springs with telescopic hydraulic shock absorbers.The rear axles of all tractors are fastened rigidly to the frame.

The **service brakes** are dry, of block type, with a separate pneumatic drive to the front and rear wheels, are installed in the rear-axle drives of the leading axles.

The **parking brake** is with spring energy accumulators combined with the service pneumatic chambers of the front and rear axles.

On both leading axles, wheels with low-pressure tyres are installed.Tyres 28,1R-26 of model ФД-12 are installed on K-744R1 tractors; tyres30,5R-32 of model Ф-81 are installed on K-744R2, K-744R3, K-744R4 tractors.

The **tractor turn control system** is with a power drive.

The tractor turn is performed by means of two hydraulic cylinders due to swinging the tractor semi-frames in respect of each other around the vertical hinge pivot. On new tractors, the total free play in the connections of “hydraulic cylinder – semi-frame lifting eyes” (over the hydraulic cylinder axis) can be no more than 0.9 mm.The permissible total free play in the course of operation shall not exceed 1.8 mm. The feed of working fluid to the hydraulic cylinders, which is proportional to the angle of turn and the rotational speed of the steering wheel, is performed by the steering mechanism PM 2000 installed on the steering column.

A pump with adjustable flow-rate is installed in the hydraulic system of the operating equipment.

Two pressure filters provide cleaning of the working fluid to be fed from the pumps to the hydraulic system units.

The diagram of the hydraulic system of steering control and mounted implements is given in Appendix 2.

The **frame** consists of two semi-frames, e.g. the front and rear ones connected by a hinge pivot device. The semi-frames can rotate in respect of each other around the horizontal and vertical hinge pivots.

The **cabin** is with a built-in protection framework, all-metal, two-man, hermetic, with heating, ventilation and air conditioner, with heat absorbing tinted windows. The cabin is fitted with one entry door on the left side.

Two seats fitted with safety belts **are installed in the cabin**. The driver's seat is spring-supported, adjustable over height, angle of back inclination in the longitudinal direction and depending upon the driver's weight.

The **steering column** has five fixed positions, e.g. nominal position at the angle of 25° to the horizon, three positions at every 5° from the nominal position with pulling inclination and one position with pushing inclination.

The change of the angle of inclination is performed with the pedal located in the steering column base being pressed.

The adjustment of the steering wheel over height at the flywheel located in the steering wheel centre being turned at 2–3 revolutions.

The **pneumatic system** isthree-circuit ensuring braking of the tractor front and rear axle wheels as well as trailer wheels.

The system provides simultaneous operation of the brake drives of the front and rear wheels of the tractor, the energy accumulator drive, the parking brake, air extraction for tyre pumping and at tractor towing, blowing of air cleaner cassettes and the entire tractor.In addition, the equipment for trailer brake control is installed on the tractor, which serves both for reducing the trailer movement speed as a part of the road-train and for its automatic brake in case of break of the coupler with the hauler.

In the brake pneumatic drive system, there are three mutually independent circuits, e.g. in case of failure of one circuit, the remaining ones will continue functioning. The circuit independence is provided by installation of a triple protection valve 3 into the mainline downstream of the pressure regulator 1, which ensures the "cut-off" of the failed circuit from serviceable ones. In doing so, the serviceable circuits will continue functioning providing tractor braking.

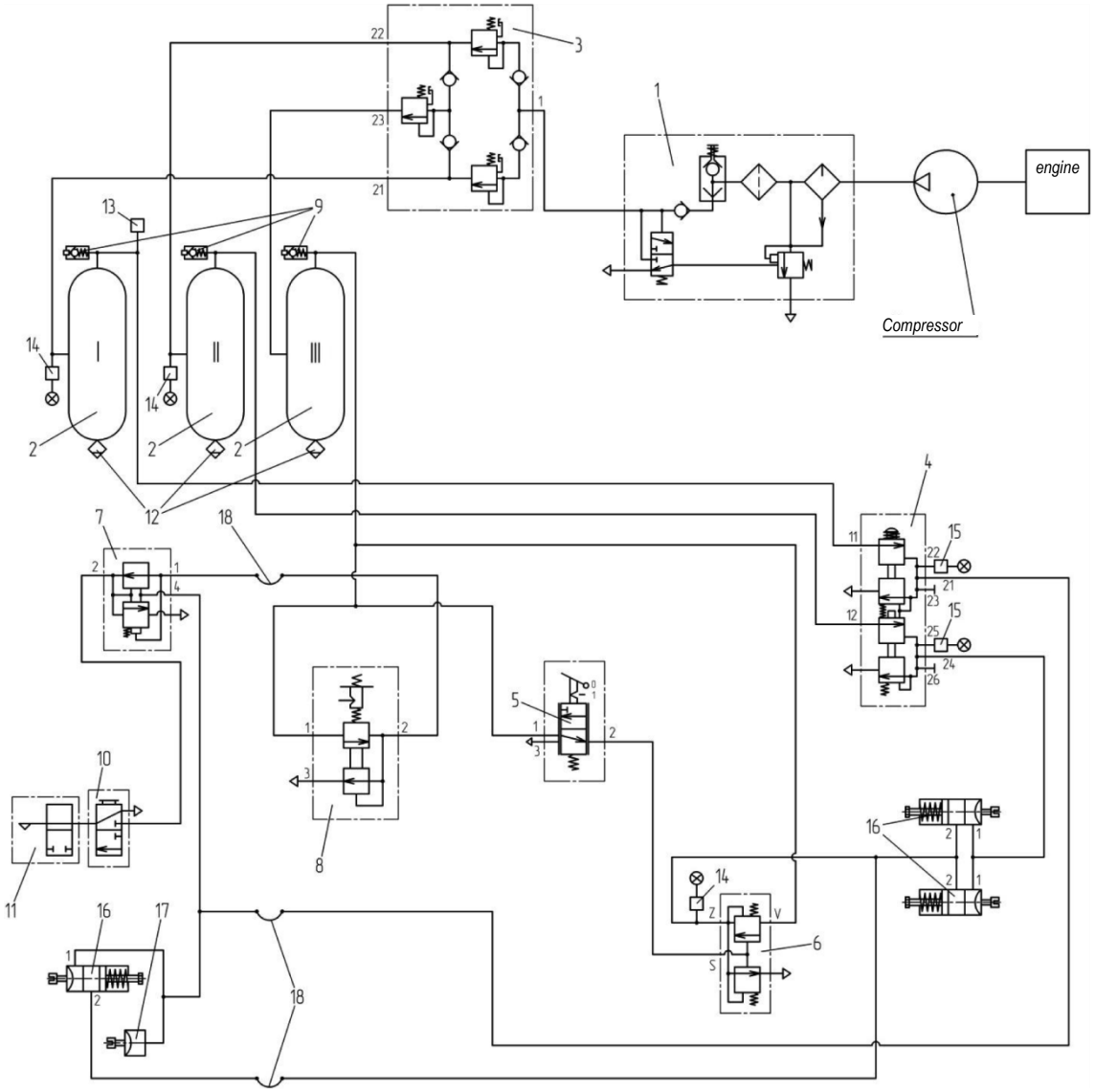
The first circuit performing the function of rear wheel braking consists of receiver 2 (I) connected with brake valve 4, service braking chambers 16 and 17 of the rear axle and hose 18. The connection is carried out by plastic tubes and fittings. The second circuit providing front wheel braking consists ofreceiver 2 (II) and service braking chambers 16 of the front axle.The third circuit serving for control over energy accumulators of the parking brake and control over trailer brakes consists of receiver 2 (III), hand brake valve 5, acceleration valve 6, three energy accumulators of braking chambers 16, control valve for trailer brakes with single-wire drive 7, separation valve 10, connecting head 11 and two hoses 18.

During start-up of the engine, air is supplied, over the feeding mainline pipes, from the compressor to pressure regulator 1, which deactivates the feed of compressed air into the system in case when the pressure is exceeded, connecting the compressor discharge mainline with the atmosphere. The regulator automatically maintains the working air pressure in the pneumatic system within specified limits as well as serves for protection against overload and contamination.

When the brake pedal is pressed, air will get, through the brake valve, into the service brake chambers, which, via the stem, activate the actuators pressing the blocks to the brake drums, and the tractor wheels will get braked.When the pedal is retuned into the initial position, the brake release of the braking chambers will take place by their connection with the atmosphere and filling of air cylinders from the compressor.

The system is equipped with acceleration valve 6 designed for reduction of the pickup time of the energy accumulator drive due to shortening of the mainline of compressed air admission from the receiver to the actuator and air discharge through the acceleration valve into the atmosphere. With valve 5 being open, air, through valves 6 and 7, is supplied to the energy accumulators of the tractor brake chambers and brake head 11. The wheels are not braked. When the valve is closed (or engine is stopped), the air pressure becomes less than the pressure energy accumulator spring, which moves the stem acting on the actuators. The wheels get braked; in doing so the pressure in the brake head decreases to the zero.

The diagram of the tractor pneumatic system is given in Appendixes 1, 1A.

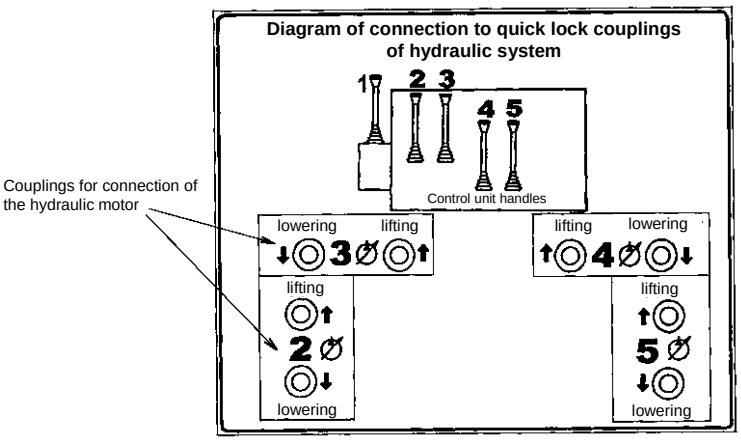


Schematic pneumatic diagram of the braking system

1 – pressure regulator; 2 – receiver; 3 – triple protection valve; 4 – double-section braking valve with pedal; 5, 8 – reverse action braking valve with manual control; 6 – acceleration valve; 7 – trailer brake control valve with single-wire drive; 9 – reference output valve; 10 – disconnecting valve; 11 – connecting head of“A” type; 12 – condensate drain valve; 13, 14 – pressure sensor;15 – pneumatic switch; 16 – braking chamber with spring energy accumulator; 17 – braking chamber of type 30; 18 – hose

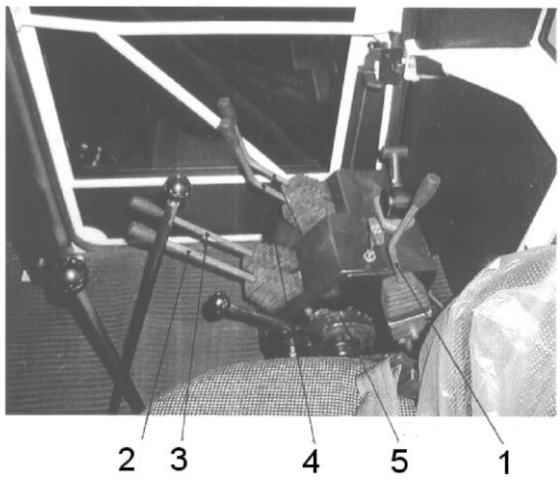
Electrical equipment system has the voltage of 24 V and is single-wire, the minus terminals are connected with the tractor “frame”. Two storage batteries and an alternating current generator with integral voltage regulator serve as power supplies. Power users’ electrical circuits are protected against short-circuits by fuse blocks. On the tractors, there is the possibility of connection to power supply with the voltage of 12 V. The plug socket is located under the cover in the right bottom part of the instrument panel support, near the “12V” label. The diagram of electrical equipment is given in Appendixes 10, 10A, 10B, 10C.

The tractor is provided with a hydraulic system and a three-point mounted implement, which serves for connection of mounted and semi-mounted agricultural machines and implements to the tractor, for their regulation in the working position and their transfer into the transportation position. A 5-section hydraulic distributor with remote cable-operated control is installed on the tractors in the hydraulic system of working equipment, out of them four sections (levers 2, 3, 4, 5) are designed for connection to external hydraulic lines. All 5 sections of the hydraulic distributor have flow-rate regulators, the handles of four flow-rate regulators are brought into the cabin through openings in the floor; when the handle is rotated in the clockwise/anticlockwise direction the flow-rate through the section decreases/increases respectively.



In order to increase pressure at the outlet from the 2nd and 3rd pairs of hydraulic system outlets from two gate valves of the hydraulic distributor (control handles 2 and 3), the automatic return switch is excluded.

The installation of handles into the “NEUTRAL” position from the service positions shall be carried out manually.



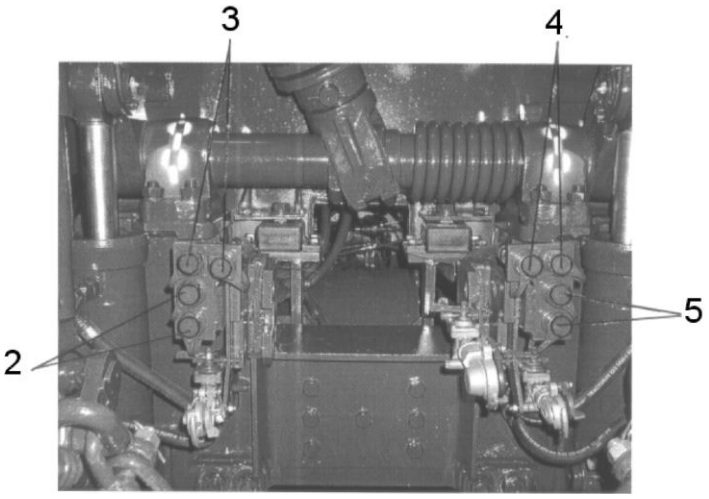
Layout of control levers of the tractor hydraulic distributor

1 – control of the hydraulic system of the tractor mounted implement;

2, 3, 4, 5 – control of external hydraulic lines

Gate valves of the 4th and 5th service sections have no fixation in the service positions and, accordingly, the automatic switch of return to neutral.

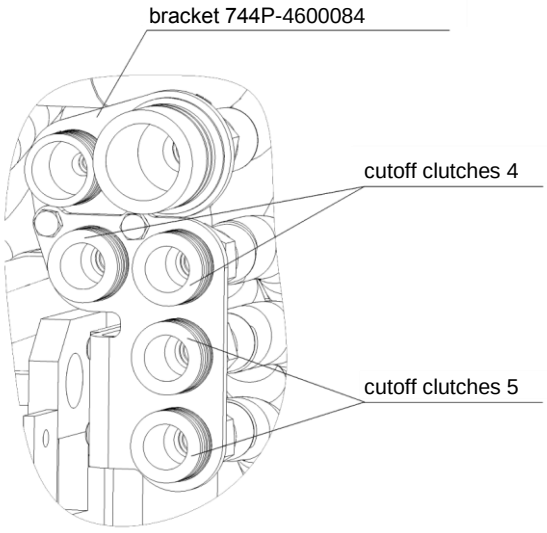
The gate valves of all sections from the “Floating” position are released from the fixing stop manually and returned to neutral under the action of spring.



Layout of outputs on the tractor for connecting external hydraulic lines

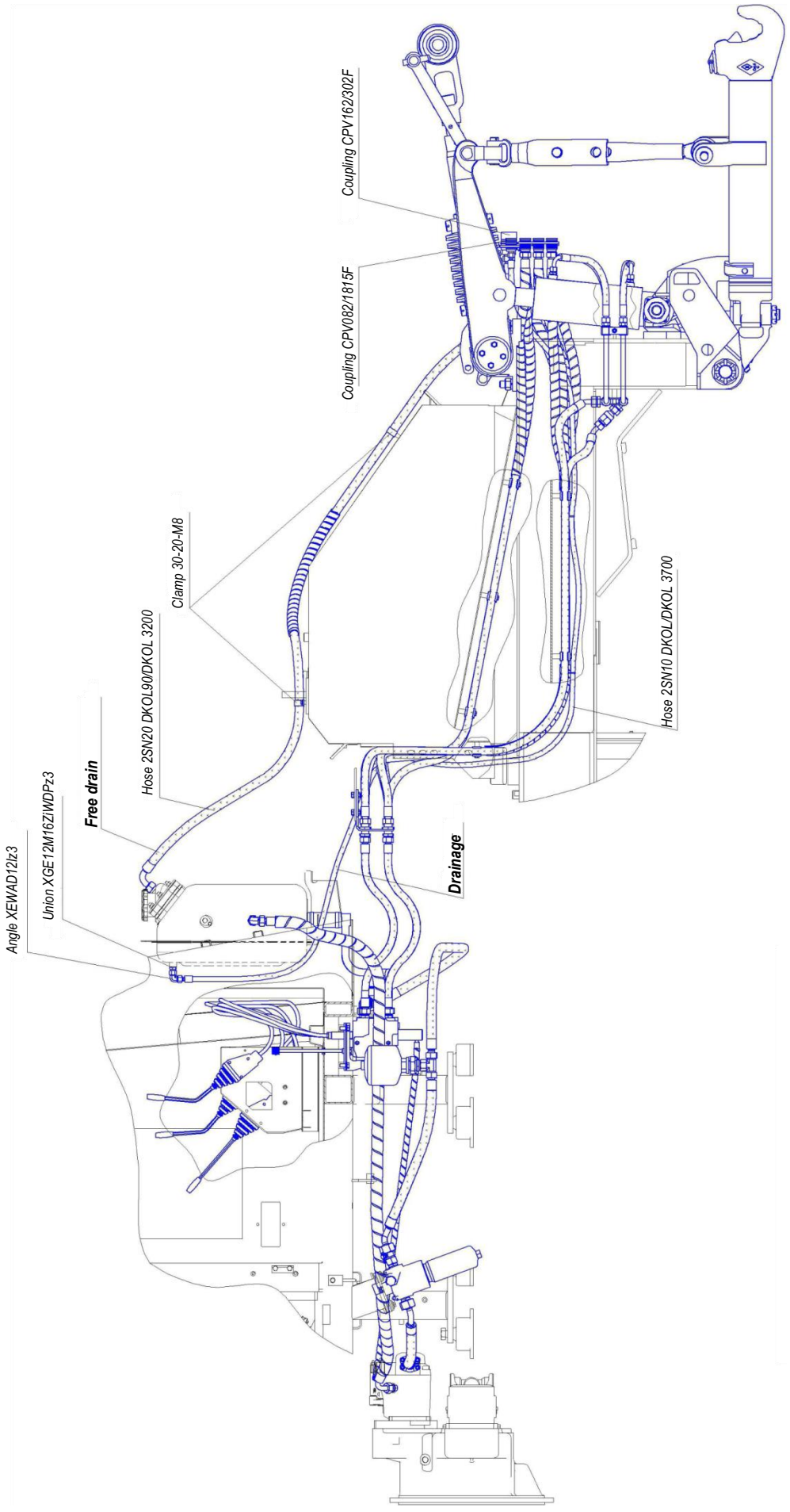
2, 3, 4, 5 – outputs for connecting external hydraulic lines from handles 2, 3, 4, 5 with the same name

In order to reduce losses in the hydraulic system and avoid its overheating during operations with planters equipped by a hydraulic motor of the fan drive; the tractor SPTA kit contains a set for providing “free” drain (bypassing the hydraulic distributor) into the hydraulic tank and a set for hydraulic motor drainage.



In order to connect “free” drain and drainage paths, it is necessary to install bracket 744P-4600084 under cutoff clutches 4 and 5.

The free drain set consists of a hose 2SN 20 DKOL 90/DKOL, L=3,200, cutoff clutch CPV162/302F and two clamps 30-20-M8.



Installation of free drain and drainage paths

The installation of the free drain set shall be performed as follows:

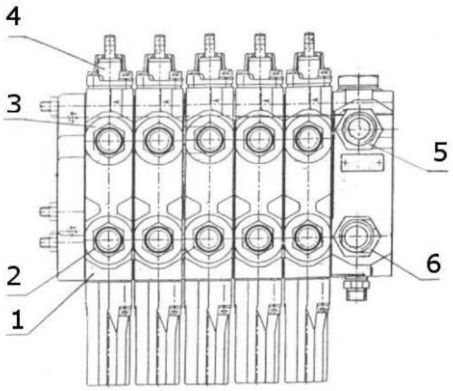
- dismantle the plug from the union on the hydraulic tank filter cover (the right-hand one in the direction of tractor travel);
- install hose 2SN 20 DKOL 90/DKOL, L=3,200, fitting with attachment 90°, connect to the union on the hydraulic tank filter cover;
- fix the hose on the fuel tank bosses using clamps of 30-20-M8 type, fasten the clamps to the bosses with regular bolts; provide hose “sagging” (about 1,000...1,200 mm from the union of the hydraulic tank cover to the fuel bank boss) in order to avoid damage of the hose in case of tractor jack-knifing around the hinge pivot;
- connect the hose fitting with the cutoff coupling CPV162/302F.

The drainage set consists of angle XEWAD12Lz3, union XGE12M16ZLWDPz3, hose 2SN 10 DKOL/DKOL, L=3,700, and coupling CPV082/1815F.

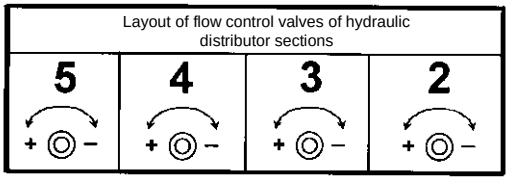
The installation of the drainage set shall be performed as follows:

- dismantle the plug M16 on the hydraulic tank wall on the cabin side;
- install angle XEWAD12Lz3 on the tank boss;
- connect hose 2SN10 DKOL/DKOL, L=3,700to the angle and lay it over the route having fastened by plastic clamps to the hoses (under the fuel tank);
- connect the coupling to the free end of the hose. Connect the drainage (hydraulic motor housing leaks) route valve of the agricultural implement to the coupling.

ATTENTION! It is necessary to connect only the hydraulic motor drainage link (if any) to this route. ***IT IS PROHIBITED*** to connect the drain line to it.



Hydraulic distributor
1 – distributor block;
2, 3 – unions of service hydraulic lines;
4 – gate valve; 5 – pressure line union;
6 – drain line union



Layout of flow control valves of hydraulic distributor sections

In order to connect corresponding hydraulic lines of the hydraulic system of the agricultural machine or implement to be hooked up with tractors to the tractors, prevent oil leaks from high-pressure hydraulic hoses during their disconnection or in case of emergency rupture, four pairs of quick lock rupture members are provided (Fig.26).

In order to reduce peak loads arising during changeover of gate valves of the hydraulic distributor of tractor service equipment (in the “pipe – hydraulic distributor” route), a hydraulic accumulator is installed (Appendix 2).

ATTENTION! TGE ACCUMULATOR IS A PRESSURE VESSEL. IT IS ABSOLUTELY PROHIBITED TO PERFORM WELDING OF THE HOUSING OF HYDRAULIC ACCUMULATOROR ITS DISMANTLING.

The hydraulic accumulator requires periodic inspection for the sufficiency of nitrogen filling pressure. The pressure of charging the hydraulic accumulator shall be equal to 83...85 bar.

It is necessary to perform the first inspection after the first 10 hours of tractor operation, the subsequent inspections shall be carried out once in every 6 months or upon tractor commissioning after long-term storage.

ATTENTION! THE INSPECTION SHALL BE PERFORMED BY TRAINED PERSONNEL USING A SPECIAL INSTRUMENT.

Perform the inspection as follows:

1. Shut off the engine, set all hydraulic distributor handles into the “floating” position.

2. Loosen locking nut 1 and take off the hydraulic accumulator from bracket 2. **DO NOT UNDO THE HOSE NUTS!**

3. Remove cap 3 and check the filling pressure by means of a special instrument, the pressure should be 80...85 bar. In case when the pressure is lower, perform refill with nitrogen.

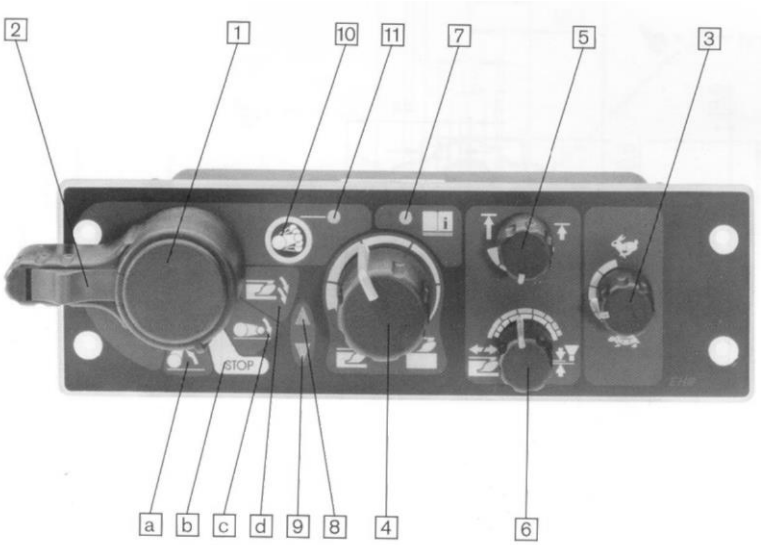
Mechanical impacts on the housing can lead to its damage and loss of serviceability of the hydraulic accumulator. Pay increased attention to the necessity of execution of erection-dismantling operations in the hydraulic system only when there is no pressure therein.

For outer illumination and signalingfour transport headlights are installed on the tractor with high and low beams as well as eight lights for service illumination, for direction indicators, four fender lamps, “Road-train sign”, two lateral repeaters of direction indicators, two “Stop signal” lights.

The hydrostatic power steering for tractor turns, steering column being adjustable by angle and height, instrument panel with automatic control of the operation of tractor systems significantly facilitate the driver's labour.

ATTENTION! In order to provide operation of the hydraulic system in cold weather, it is necessary to warm up the working fluid to the temperature of not less than 20...25°C. It is allowed to perform warming up by operation of the hydraulic system on the safety valve. To this end, it is necessary to turn the tractor to the stop at the engine rotational speed of 1,000...1,200 RPM with holding in the extreme position during several seconds.

In case of tractor configuration including EHR system (position regulation of the suspension axis)



EHR control unit

1 – "lifting–lowering" handle
2 – switch for blocking the system in the transportation position of the mounted implement
3 – lowering speed regulator
4 – handle for setting the soil treatment depth
5 – handle for limitation of the mounted implement lifting height
6 – mixed regulation handle(not connected)
7 – "Diagnostics" lamp
8 –"Lifting" lamp
9 – "Lowering" lamp
10 – vibration damping switch – not activated
11 – vibration damping switch-on indicator – not connected

Composition of the system:

1. Control unit is located to the right of the operator's seat.

2. Electronics unit is located on the bracket in the rear part of the main control unit.

3. Positioning sensor is installed on the bracket under the nut fastening the support of implement lever shaft.

4. Excentric is installed on the implement lever shaft.

5. Two pairs of button switches are located on the rear light housings and are designed for remote control of the mounted implement.

Please note that in the given system there is no forced lowering of the mounted implement, this operation is executed in the floating mode, at which the piston and stem cavities of the lifting hydraulic cylinders are interconnected via a hydraulic cylinder.

Plastic boot opening mechanism

To open the plastic boot it is necessary to do the following:

Holding the boot with one hand, shift the latch to the right up to the click with the other hand without any special effort. The lock will get unblocked and the boot will begin opening under the action of gas springs.

In the course of opening, it is necessary to hold the boot by the belt in order to avoid jerks in case of wind gusts.

The inertial mechanism of the belt design allows fixing the boot in the open position at any angle. It is sufficient in the process of opening to give acceleration to the belt in the upward direction, and it will be blocked, thus holding the coot at the required height. In order to release interlocking, it is necessary to slightly pull the belt downwards and the boot will continue opening.

In order to close the plastic boot, it is necessary to do the following:

Smoothly, without jerks, pull the boot by the belt downwards. At the initial moment of movement an additional resistance can arise, which is causes by the design of gas shock absorber (built-in damper). During lowering the belt will automatically be rewinding to the very closing.

Having lowered the boot to the chest level, it is necessary to re-catch the knob and perform closing of the boot until the lock operates.

Safety measures

In order to observe safety measures with regard to prevention of spontaneous closing of the boot, a stop is provided in the boot construction located parallel to the left gas spring in the direction of tractor travel.

In order to bring the stop into the fixed position, it is necessary to open the boot, take off the spring splint locking pin from the lower part of the stop and install the splint pin into a special hole in the upper part of the stop. Release the blocking in the reverse sequence.

2.3 Main technical data

Parameters	K-744R1	K-744R2	K-744R2	K-744R4
	Standard Premium	Standard Premium	Standard Premium	Standard Premium
Tractor make	Kirovets			
Engine	ЯМЗ-238НД5 Cummins 6LTAA8,9-C300	8481.10 OM457LA/E2/4	8481.10-02 OM457LA/E2/3	8481.10-04 OM457LA/E2/2
Type	wheeled, agricultural general purpose			
Hauling class according to GOST 27021	5	5	6...8	6...8
Nominal tractive force, kN, (tf)	50 (5)	50 (5)	75 (8)	75 (8)
Wheel formula	4x4			
Engine capacity, kW (h.p.), not less than:				
– rated engine capacity	220 (300) 225 (306)	257 (350) 260 (354)	287 (390) 295(401)	309 (420) 315 (428)
– operating engine capacity	205 (279)	235 (320) 250 (340)	265 (360) 284 (386)	287 (390) 298 (405)
Rotational speed of the engine crankshaft at the rated capacity, RPM	$\frac{1900^{+50}_{-20}}{2000^{+50}}$	$\frac{1900^{+50}_{-20}}{1800^{+50}_{-20}}$	$\frac{1900^{+50}_{-20}}{1800^{+50}_{-20}}$	$\frac{1900^{+50}_{-20}}{1800^{+50}_{-20}}$
Specific fuel consumption, g/(kW·h) (g/(h.p.·h)):				
– at the rated capacity, no more than *	220 (167) 213 (157)	220 (162) 205 (151)	213 (157) 205 (151)	213 (157) 205 (151)
– at the operating capacity, no more than	237 (174)	240 (177) 213 (157)	230 (170) 213 (157)	230 (170) 213 (157)
– at the maximum capacity on the PTO shaft, no more than	257 (189)	265 (193) 225 (166)	250 (185) 225 (166)	250 (185) 225 (166)
The maximum capacity on the PTO shaft at the nominal rotational speed of the engine crankshaft, kW (h.p.), not less than	189 (257)	216 (294) 235 (319)	243(331) 267 (363)	262 (363) 279 (380)
Relative oil consumption of the engine, %, no more than:				
to fuel burning	0.5	0.3 0.25	0.3 0.25	0.3 0.25
general, during operation with allowance for change of lubricant	1.0	0.7 0.5	0.7 0.5	0.7 0.5
Efficiency factor of the transfer from the outlet shaft of the engine to the power take-off (PTOP) shaft end, not less than	0.92			
Tractor motion speed without allowance for slippage, km/h				
forward drive				
the least, decreasing speed	4.49 4.72	4.72		
the highest operating speed	17.0 17.9	17.84		
the highest travelling speed	28.84	29.26		
backward drive				
the least speed	5.5 5.86	5.86		

* The parameters are determined at the engine manufacturer's plant

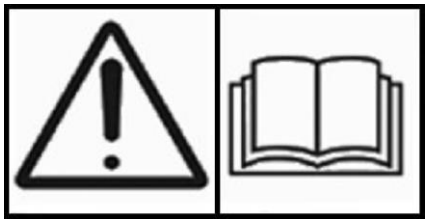
Parameters	K-744R1	K-744R2	K-744R2	K-744R4
	Standard Premium	Standard Premium	Standard Premium	Standard Premium
the highest	20.97 22	22.4 22	22.4 22	22.4
Number of gears				
forward drive	16			
backward drive	8			
Tractor weight, kg, no more than:				
structural weight (in basic configuration)	13,820 13,290	14,600 14,140	16,400 16,000	16,400 16,000
operating weight (in basic configuration)	14,900 14,370	15,680 15,220	17,500 17,000	17,500 17,000
– operating weight with the wheel doubling set	16,670 16,140	17,780 17,620	19,600 19,200	19,600 19,200
Weight distribution over axles in the basic configuration, kg:				
front axle	7,516 8,046	8,470 8,010	9,450 8,800	9,450 8,800
rear axle	6,854	7,210	8,050 8,200	8,050 8,200
Weight distribution over axles with the wheel doubling set, kg:				
front axle	7,516 8,046	8,470 8,010	10,500 9,900	10,500 9,900
rear axle	6,854	7,210	9,100 9,300	9,100 9,300
The largest pressure from mean conventional pressure values for driving machines, kPa (kgf/cm^2), no more than				
on ordinary wheels	110 (1,1)			
on doubled wheels	80 (0,8)			
Road clearance (at the static radius of tyres 790 mm for K-744R1 andstatic radius of tyres 830 mm for K-744R2, K-744R3, K-744R4), mm, not less than:				
under the main gear of the driving axle	520	560		
under the axle of the vertical hinge of frame	460	500		
Tractor wheel spacing, mm	2,115	2,100		
on ordinary wheels	2,115	2,100		
on doubled wheels	2,115	3,090		
The least radius of turn (by the trace of the outer wheel with disengaged the rear axle), m	7.98			
Tractor base, mm	3,750			
Fordable depth, m, no more than	0.96	1.0		
Carrying capacity of the mounted implement (at the distance of 610 mm from the suspension axis according to GOST 19677), kgf, not less than	5,500			
Implement equipment capacity depending upon the operating weight of the tractor according to GOST 19677, %, not less than	20			

Parameters	K-744R1	K-744R2	K-744R2	K-744R4
	Standard Premium	Standard Premium	Standard Premium	Standard Premium
Pressure of fluid in the hydraulic system for control over the mounted implement and hydraulic mechanisms of agricultural machines, MPa (kgf/cn^2):				
maximum pressure (valve opening finish)	18...20 (180...200)			
at the hydraulic system outlet, not less than	15 (150)			
Duration of continuous operation without fuel refill at the engine load by 70% of the rated operating capacity, engine hours, not less than	13	12 14	12 13	12 13
Overall dimensions, mm:				
length (with the mounted implement being lifted)	7,350			
width on ordinary wheels (at the wheel level)	2,865	2,875		
width on doubled wheels (at the wheel level)	2,865	3,865		
height	3,846	3,876		
Tractor braking distance at the motion speed of 8.3 m/s (30 km/h), m, no more than	13			
Static lateral stability angle, degrees, not less than	35			
Ascent and descent angle, degrees, no more than	18	20		
Angle of tractor holding by parking brake, degrees, not less than	20			
Tractor semi-frame turn angle, degrees, not less than				
around the horizontal hinge pivot	±16			
around the vertical hinge pivot	±32			
First overhaul period at T=80, engine hours, not less than:				
for tractor	8,000			
for engine	8,000			
for transmission	8,000			
for load-bearing system	full period for tractor			
for tyres	2,000	5,000		
Lifetime	10 years			
Power take-off	option			
Wheel doubling set	option			
Power take-off	option			
Floating drawbar	option	option	basic configuration	basic configuration
Mounted implement	basic configuration			

3 SAFETY REQUIREMENTS

3.1 General

The tractor design ensuressafety of tractor operations.



In order to avoid accidents, strictly observe the “Road traffic rules” and safety measures set forth in this section.

A failure to observe the safety regulations can leas to an accident or injuries.

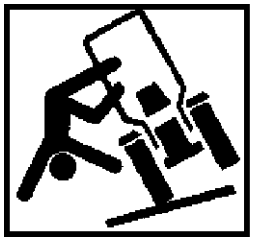
Only properly trained personnel should be admitted to work on the tractor.

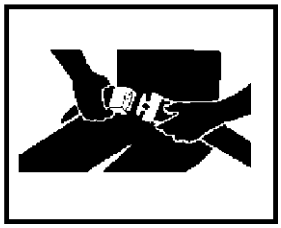
The tractor shall be completed and serviceable.

A first aid kit stocked in accordance with applicable regulatory documents shall be installed and fixed in the tractor cabin.

If it is required to use cabin windows as an escape exit, break the glasses by the hammer attached in the cabin.

Keep the cabin clean; no presence of foreign items is allowed in the cabin.





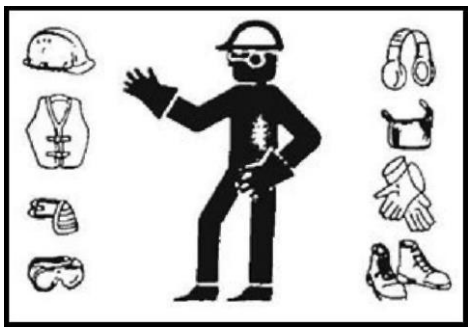
IT IS PROHIBITEDto place more than two persons including the driver in the tractor cabin.

The seats shall be in good working condition.

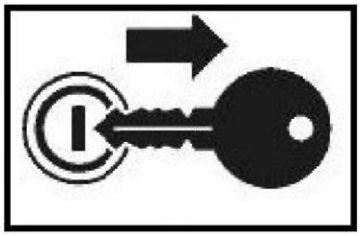
The driver and the passenger shall be fastened by safety belts.

In case when any fault occurs, the tractor shall immediately be stopped in order to eliminate them.

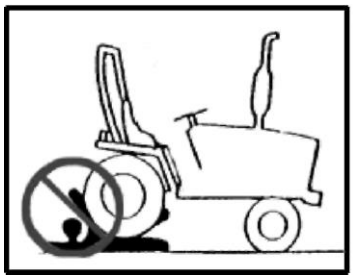
3.2 Safety measures during depreservation, installation, test operation and running-in

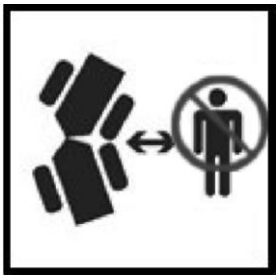


During washing of the tractor, application and removal of lubricants, paintwork coatings, the workers shall be provided with aprons, gantlets and protective goggles.



Perform preparation of the tractor for operation only with the engine being shut off and the parking brake being pulled up; the mounted implements shall be lowered.





IT IS PROHIBITED to be under the tractor as well as in the area under the hinge pivot device of the frame with the engine being in operation.

During depreservation, installation, assembly, test operation and running-in follow the guidelines set forth in the corresponding sections.

Perform depreservation and preservation of the tractor in a specially equipped room with observance of all occupational and industrial safety regulations and fire safety regulations.

3.3 Safety measures during tractor operation

Before starting the engine, the change-gear lever and thechange-mode level shall be in the “Neutral N” position (Fig.5); the levers of hydraulic distributor of the mounted implement shall be in the “Neutral” position; the parking brake shall be pulled up.

Before taking off make sure that the road is free, that there are no people between the tractor and the agricultural implements as well as in the area of frame hinge pivot device. Issue a warning sound signal at the beginning of movement.

Before exiting from the tractor set the change-gear lever and thechange-mode level into the “Neutral N” position; the levers of hydraulic distributor of the mounted implement – into the “Neutral” position; pull up the parking brake and shut off the engine.

In order to avoid overheating of the hydraulic system, do not leave the tractor in the position of full swing (up to the stop) of the semi-frames to the right or to the left.

When working with cables on towing hooks ***IT IS PROHIBITED*** to be in the cable radius area.

IT IS PROHIBITED to use the parking brake during motion.

IT IS PROHIBITED to tow the tractor by the mounted implement mechanism.

During tractor operation the folding ladders shall be removed.

During tractor movement with the mounted implement beinglifted incompletely it is necessary to adjust the horizontal brace struts for a length preventing from touching the elements of the mounted implement of the rear wings.

See for the readings of monitoring devices and their operability. ***IT IS PROHIBITED*** to work on the tractor with faulty devices.

IT IS PROHIBITED to openplugs of the tank filler and expansion tank or unscrew the steam-air valve at the cooling fluid temperature over 70°C.

In case of accident or excessive increase of the rotational speed of the engine crankshaft, immediately deactivate the fuel feed by the shutdown handle.

IT IS ABSOLUTELY PROHIBITED to work on the tractor with faulty steering control, brake system, electrical lighting and alarm signaling.

All tractor control levers shall admit fixing in the corresponding positions.

The tractor brakes shall be in good working condition. During braking of the tractor travelling over dry and hard ground using the service brake, the braking distance shall not be more than 13 m at the speed of 8.33 m/s (30 km/h) and no more than 6.5 mat the speed of 5.6 m/s (20.2 km/h). The brake pedal being fully depressed shall not bump up against the cabin floor.

The air pressure in the pneumatic system of brakes in the process of operation shall be equal to 0.65–0.8 MPa (6.5–8.0 kgf/cm^2).

The storage batteries shall be reliably fastened, closed with a lid and shall have no electrolyte leaks.

Before switching on the “frame” switch after a long-term outage of the tractor (more than one day – 24h), especially in summer season, open the lid of the storage battery container for a period of not less than 5 min in order to remove the explosive hydrogen-air mixture, which is generated in the self-discharge process.

See for the condition of electrical equipment. Sparking, break of wires and terminals, especially near heated parts and at places of possible ingress of oil and fuel thereon are not allowed.

The permissible tractor speed at access driveways and passageways shall not be more than 10 km/h.

During turns select the speed providing safe traffic. ***IT IS PROHIBITED*** to make a sharp turn at the gear being higher than the first gear of the fourth mode.

In crossing dams, dikes and bridges, make sure of the possibility of driving and use only low gears.

Before passing the route sections requiring motion on both driving axles (ascent, heavy places), perform activation of the rear axle beforehand.

When working on slopes exercise caution, carefulness in tractor driving and meet the following conditions:

do not shut off the engine and do not change gears modes on steep ascents and descents;

during motion down the slope ***IT IS PROHIBITED***to use coasting;

it is allowed to work across the slope (the slope angle shall not exceed 5°) only in modes I...II and avoid sharp turns and passing obstacles.

Perform stream wading only after thorough preparation and inspection of the route of travel. It is allowed to perform wading with the depth of no more than 0.8 m for K-744R1 tractors and 1.0 m – for K-744R2, K-744R3, K-744R4 tractors.

Coupling to the tractor and mounting of agricultural machines and implements on the tractor shall be carried out by persons operating such machines. The coupling worker who performs mounting implements shall stay aside until full stop of the tractor and begin coupling (mounting) only after driver's signal.

During operation of the tractor with agricultural machines and implements observe the safety rules set forth in the operating instruction for such machines or implements.

Approach the agricultural machines, implements or trailers on the tractor at the minimum gear with the drain gate drive pedal being depressed incompletely having preliminarily issued a sound signal.

After connection to the trailing implements and pumping of the hydraulic system, check the level of oil in the hydraulic tank and, if necessary, refill it.

It is strictlyPROHIBITED to stay under the agricultural implement being lifted**.**

In case of long-term outage, do not leave the mounted agricultural implement in the lifted position. ***IT IS ABSOLUTELY PROHIBITED*** to stay under the implement being lifted**.**

During work with hydraulic agricultural machines and implements it is necessary to remember that the maximum working pressure at the outlet of quick lock rupture devices is equal to no more than 15.0 MPa (150 kgf/cm^2).

Crossing trenches, hillocks and other obstacles with mounted implements should be performed at the right angle at a low gear avoiding sharp jogs and large rolls of the tractor.

IT IS PROHIBITED to travel on trailing implements, mounted machines and outside the tractor cabin.

Trailing implements and trailers shall have rigid couplers preventing from their infall on the tractor.

In case of tractor disconnection from trailing implements or trailers, first disconnect the pneumatic systems and electrical equipment.

Only those persons that are aware of the rules of work with trailers, semi-trailers and other vehicles should be admitted to work with them.

In hooking up trailers and semi-trailers, connect their safety chains to the connecting links located on the lifting nuts of braces of the mounted device.

In using the tractor in transport operations, it is necessary to take the following precautions:

execute works with the “Road-train” sign being switched on;

check reliability of the pneumatic system operation;

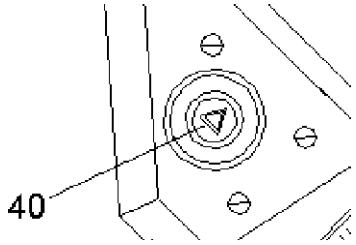
pay special attention to the choice of motion speed with the account of road conditions, radiuses of turn, visibility, features and condition of vehicles and the load being conveyed;

when operating the tractor on snowy, overmoistened and other roads with a low adhesion coefficient as well as on slopes, turns, hillsides, during glaze ice, etc., perform motion at low gears, do not admit sharp braking and turns;

when moving on roads with a low adhesion coefficient it is recommended to drive the tractor train “stretched out” – to this end, brake the hooked-up vehicle first by means of a hand brake valve 10, Fig.6, and then use the tractor service brakes;

in case of occurrence of a danger for movement, take measures for decreasing the speed and stopping the road-train;

in case of a sudden stop of the tractor on the surfaced portion of roadway, switch on the alarm signaling. Such switching on is performed by pressing the button, pos. 40, on the instrument panel (Fig. 1, 2, 3,4). In doing so, a reference lamp built into the switch button will get alight;



trailer brakes shall be adjusted in accordance with the requirements set forth in the operating instructions for trailers;

motion of the tractor train at maximum speed (up to 8.39 km/h) is allowed only on roads with dry hard pavement;

in case of first signs of jack-knifing or skid of the road-train, release the brake pedal and brake by means of the control handle for trailer brakes until jack-knifing or skid are eliminated;

at the road-train parking, during loading (unloading) of trailers set the handle of manual brake valve into the “pulled” position. Before the beginning of motion set the brake valve handle into the “pushed” position;

in hooking up the tractor with vehicles having 12V equipment, it is necessary to replace electrical lamps on the vehicles;

In driving with the vehicle:

periodically check the operability of trailer brakes braking it by the trailer brake control handle;

IT IS PROHIBITED to use the lever of manual fuel feed set the fuel feed lever into the position of minimum fuel feed;

transportation of people on trailers is prohibited.

IT IS PROHIBITED to work with the power take off without installation of protective enclosures. In case of short-term stops for inspection of the implement, which is operated with the power take off shaft, it is necessary to disengage the power take off shaft.

The connection and disconnection of the PTO reducer shaft to the slotted bushing of the agricultural implement drive shall be performed with the engine being stopped.

do not leave the operating pre-starting heating system unattended;

When working on the tractor:

see for the readings of instruments and signal devices. The readings of instruments and signaling of indicator lamps shall correspond to the directives set forth in the “Controls” section;

do not permit the engine operation on load at the cooling fluid temperature below 70°C;

IT IS ABSOLUTELY PROHIBITED to connect uncleaned pipelines and hydraulic fittings of agricultural machines and implements to the hydraulic system of the tractor;

check the oil level in the GB after engagement of the PTO shaft, if necessary, refill it.

Fulfil the following rules of operation for pneumatic tyres:

a) do not permit tractor operation with significant wheel slip;

b) do not permit tractor operation and parking on damaged and blown-out tyres;

c) do not permit travelling on tyres with decreased internal pressure even for small distances as it leads to tyre failures;

d) in order to avoid increased wear if tyres, operate the tractor on roads with hard pavement during no more than 30% of the total period of operation;

e) protect tyres from the ingress of fuel, oil and other oil products thereon;

ATTENTION! In order to prevent untimely failure of the rear axle cardan gear and reduce the wear of tyres, it is necessary to engage the rear axle only in case of tractor operation with agricultural implements and during movement in heavy road conditions.

During movement in good road conditions (on roads with compact ground or with pavement) the rear axle shall be disengaged.

3.4 Safety measures during maintenance, troubleshooting and placement for storage

Before proceeding to operations relating to maintenance and troubleshooting it is recommended to clean the tractor from dust and dirt.

Execute the operations on maintenance, troubleshooting and cleaning from dirt only with the engine being shut off, parking brake being pulled up and the mounted implements being lowered. ***IT IS PROHIBITED*** to be under the tractor as well as in the area under the hinge pivot device of the frame with the engine being in operation.

During jacking the tractor use reliable jacks with the carrying capacity of not less than 120,000 N (12,000 kgf); perform hacking according to the jacking diagram using “DK” marks on the tractor. In order to avoid jack-knifing of tractor semi-frames during tractor jacking, install split bushings on the hydraulic cylinder stems preventing the movement of stems.

When using lifting and transporting equipment it is necessary to strictly comply with the corresponding safety requirements.

The tools and attachments shall be operable, conform to their designated purpose and ensure safe execution of work.

During washing of the tractor, application and removal of lubricants, the workers shall be provided with aprons, gantlets and protective goggles.

During installation and dismantling of wheels strictly observe the rules set forth in the corresponding subsection. On each type of wheels install a tyre of the proper size only, which is determined by the technical specification for such wheel.

All repair operations related to the use of electrical welding directly on the tractor should be executed with the battery master switch being switched off.

During execution of maintenance operations for storage batteries it is necessary to fulfil the following rules:

avoid the ingress of electrolyte on the hands;

when cleaning the battery wear gauntlets and use a wiping cloth soaked in ammonia solution (ammonia spirit);

IT IS PROHIBITEDto check the degree of battery charging by short-circuiting the terminals;

IT IS PROHIBITED to use open fire during checking the electrolyte level;

never pour water into acid in order to avoid acidic splashes;

upon completion of work related to maintenance of storage batteries, the disappearing stair shall be installed on the tractor and fixed.

In case of tractor placement for storage, inspection and maintenance during the storage period and in case of withdrawal from storage, it is necessary to obey the corresponding guidelines set forth in the “Storage regulations” section.

During storage it is necessary to take measures preventing turnover and spontaneous displacement of the tractor. The tractor shall be installed on strong, specially prepared stands or saw buck.

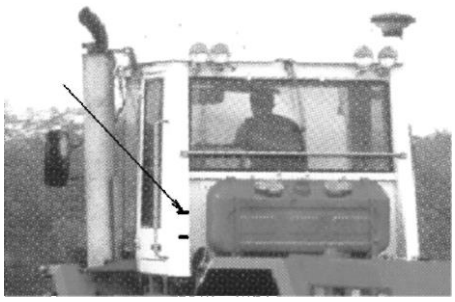
Remember that cooling automotive fluids and antifreeze agents are poisonous and the ingress of even small amount of them into human organism can cause a heavy intoxication.

ATTENTION! If it is required to dismantle the starter, cut out the protective bracket welded to the side member on the end side of the starter.

3.5 Fire safety requirements

Every driver shall be obliged to be aware of fire safety regulations, fire-extinguishing methods and observe fire prevention measures.

The tractor shall be equipped with fight-fighting inventory including a fire-extinguisher and a shovel. The place for fire-extinguisher attachment is provided in the rear part of the side wall of the cabin, on the left.



The spaces for tractor parking, storage fuels and lubricants shall be ploughed by a strip with the width of not less than 3 m and provided with fire-extinguishing means.

In tractor storage areas ***IT IS PROHIBITED*** to smoke, make fires and execute works related to the use of open fire.

Fill fuels and lubricants by a mechanised method. In filling oil and checking the oil level, do not use open fire and do not smoke.

If it is necessary to perform a repair and in field conditions with the use of electrical gas welding, the parts and assembly units should be preliminarily cleaned and washed until removal of fuel and lubricants.

In washing the parts and assembly units with kerosene or petrol, take measures to prevent inflammation of washing fluid vapours.

Do not admit accumulation of straw-containing products on the engine.

See for the serviceability and timely charging the fire-extinguisher.

In case of stopping the engine, switch off the battery master switch.

Periodically clean the exhaust pipe from sludge and carbon deposit.

IT IS PROHIBITED to use open fire for heating pipelines, oil in the engine tray and in filling fuel and oil.

In case of occurrence of a source of fire, it is necessary to do the following:

switch off the battery master switch (de-energise the system);

stop the feed of fuel;

extinguish the centre of fire with the use of the fire-extinguisher or any other by means turned out to be at hand.

Do not pour water onto burning fuel.

IT IS PROHIBITED to work on the tractor at the voltage being above the voltage regulator level set in accordance with the ambient temperature in order to avoid an explosion of storage batteries.

IT IS PROHIBITED to use fuses, which are not conformant by the nominal value to the electrical diagram value.

When working on the tractor it is prohibited to wear oily special clothes, which are impregnated with fuel.

Do not admit leaks of fuel and oil at pipeline connection joints. Spilt fuel and oil should be wiped.

Do not permit sparking from the exhaust pipe, which can be the cause of fire and serve as the evidence of abnormal operation of the fuel equipment.

4 CONTROLS

4.1 Instrument panel of K-744R1 tractor of Standard design version

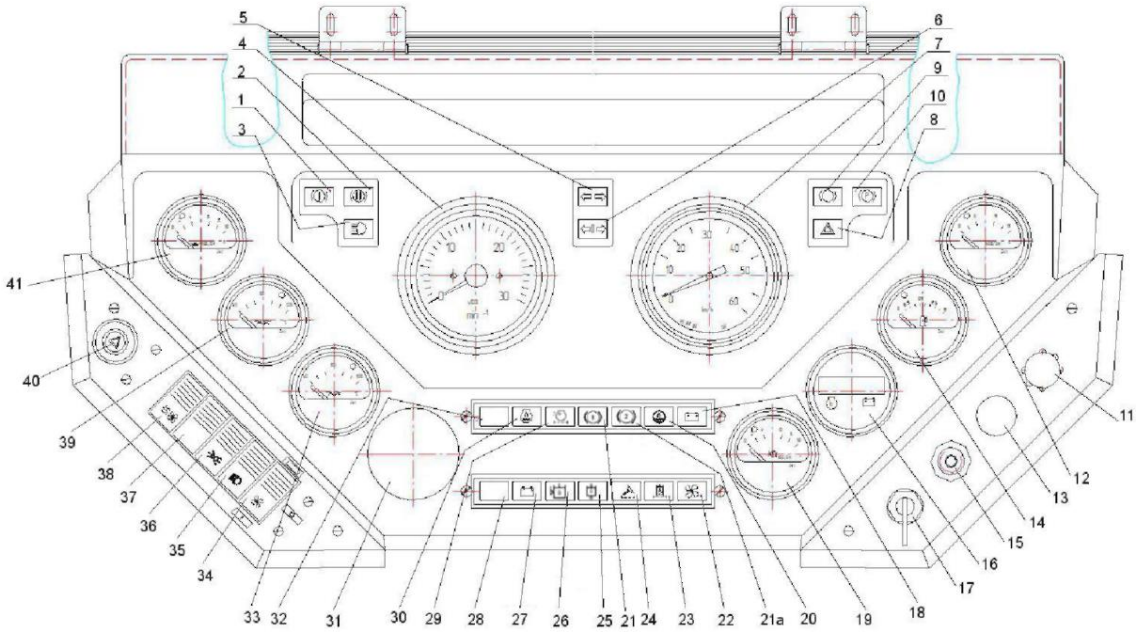


Fig. 1 Instrument panel of K-744R1 Standard tractor

1. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
2. Indicator lamp of the air pressure-fall in the second circuit of the pneumatic system of the tractor.
3. Indicator lamp of switching on the traffic headlight high beam.
4. Tachometer.
5. Indicator lamp of switching on the turn signal light of the tractor.
6. Indicator lamp of switching on the turn signal light of the trailer.
7. Speedometer.
8. Indicator lamp of the alarm parameter in one of the tractor systems.
9. Indicator lamp of the air pressure-fall in the trailer brakes.
10. Indicator lamp of parking brake pulling up.
11. Instrument panel illumination regulator.
12. Indicator of oil pressure in the gearbox hydraulic system.
13. Plug.
14. Indicator of fuel level in the tank.
15. Battery master switch.
16. Engine hour meter / voltmeter.
17. Keylock switch of the starter and instruments.
18. Indicator lamp of accumulator charge.
19. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
*20. Indicator lamp of clogging of the oil filter of the gearbox hydraulic system.
21. Indicator lamp of the air pressure in the front brake circuit.
21a. Indicator lamp of the air pressure in the rear brake circuit.

* It is allowed to switch on the lamp of clogging of the oil filter of the gearbox hydraulic system for a short period of time during the engine start-up.

22. Indicator lamp of engagement of the engine fan clutch.
23. Indicator lamp of clogging of the pressure filter of the hydraulic system of mounted equipment.
*24. Indicator lamp of clogging of the pressure filter of the hydraulic system of steering control.
25. Indicator lamp of oil overheating of the hydraulic system.
26. Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment.
27. Indicator lamp of switching on the battery master switch.
28, 32. Indicator lamp serviceability checkup buttons.
29. Indicator lamp of clogging of the engine air cleaner filter.
30. Indicator lamp of clogging of the engine oil filter.
31. Plug.
33. Engine oil temperature gauge.
34. Fan clutch switch (for K-744R1 with ЯМЗ-238НД5 engine).
35. Traffic headlight switch.
36. Switch of end out marker lamps on front and rear lights.
37. The key is not involved.
38. Turning-on of the heater fan.
39. Engine cooling fluid temperature gauge.
40. Alarm signaling switch.
41. Engine oil pressure gauge.

12 – Oil pressure gauge in GB

The oil pressure in the GB hydraulic system at the transmissions with the crankshaft rotation speed of 900–1,800 RPM shall be as follows:

1.0–1.2 MPa (10–12 kgf/cm^2) – for K-744R1, K-744R2 tractors;

1.1–1.3 MPa (11–13 kg/cm^2) – for K-744R3, K-744R4 tractors.

The oil pressure growth on each transmission shall be fast. The pressure on neutraland in engagement of synchronizer brake shall not be less than on transmission gears.

In case of pressure fall in GB below 10 kgf/cm^2 for K-744R1, K-744R2 tractor and below 11 kgf/cm^2 for K-744R3, K-744R4 tractors, a sound alarm will get operated in the intermittent mode 30 s later.

16 – Engine hour meter / voltmeter

The instrument shows the number of engine hours during the first 3...5 s after switching on the battery master switch.

In the course of operation the instrument reading range shall be 22.8÷30.0 V. The increase or decrease of readings indicate a fault of the generator or voltage regulator.

17 – Keylock switch of the starter and instruments

* It is allowed to switch on the indicator lamp of clogging of the pressure filter of the hydraulic system of steering control for a short period of time until the operating oil temperature of the hydraulic system reached ~40–50°C.

The lock has the following positions:

zero position (fixed) – the key is inserted vertically;

first position (fixed) – the key is turned in the clockwise direction. Power is supplied to the generator excitation winding;

second position (non-fixed) – with the key being turned further in the clockwise direction power is supplied to the generator excitation winding, voltage regulator and starter drive relay. In case of the key being lowered from this position, it will return to the first position;

third position (fixed) – the key is turned in anticlockwise direction from the zero position. This position is provided at the operation of the radio equipment on the tractor.

18 – Indicator lamp of accumulator charge

The lamps comes on when there is no charging current from the generator.

19 – The air pressure gauge in the first circuit of the pneumatic system with built-in alarm signaling of the minimum limit value of 0.45 MPa (4.5 kgf/cm^2)

The air pressure in the pneumatic system in the process of operation shall be equal to 0.65–0.8 MPa (6.5–8 kgf/cm^2).

25 – Indicator lamp of oil overheating of the hydraulic system

The lamp comes on when the oil temperature in the hydraulic system reaches the critical value.

26 – Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment

The lamp comes on when the oil level falls below the critical value. Short-term “flashing” of the indicator lamp is allowed in case of travelling over road irregularities causing fluctuations of the oil levelin the hydraulic tank.

33 – Oil temperature gauge in the engine with built-in alarm signaling of the maximum limit temperature value

for ЯМЗ-238НД5 engines – 100°C.

34 – Switch of the fan drive clutch

When the lower part of the key is pressed, the forced mode of clutch operation will get activated.

When the upper part of the key is pressed, the automatic mode of clutch operation will get activated.

The middle position of the key corresponds to the switched-off position of the fan clutch.

36 – Switching on the end marker lights

The key symbol in the upper position – the lights and illumination are switched off.

The key symbol in the lower position – the end marker lights switched on.

39 – Cooling fluid temperature gauge with built-in alarm signaling of the maximum limit temperature value:

for ЯМЗ-238НД5 engines – 100°C.

Within the temperature range of 90...99°C it is allowed to admit flashing of the temperature gauge indicator lamp.

Cooling fluid working temperature:

for ЯМЗ-238НД5 engines – 75...100°C.

Do not permit the engine operation on load at the cooling fluid temperature below 70°C.

40 – Alarm signaling switch

It is designed for simultaneous switching on the left and right turn signals in the flashing mode in case of sudden stop of the tractor on the surfaced portion of the road. Switching-on is performed by pressing the button. In doing so, the indicator lamp built into the switch button will come on.

41 – Oil pressure indicator in the engine with built-in alarm signaling of the minimum limit pressure value

The oil pressure in the mainline of the unit of heated ЯМЗ-238НД5 engine shall be within the range of 0.45–0.6 MPa, (4.5–6 kgf/cm^2) at the nominal rotational speed. The oil pressure at the minimum rotational speed with ЯМЗ-238НД5 engine shall not be less than 0.08 MPa (0.8 kgf/cm^2).

A short-term lighting of the built-in indicator lamp of the emergency oil pressure of the engine at minimum rotational speed with the engine being heated.

4.2 Instrument panel for K-744R2, K-744R3, K-744R4 tractors of Standard design version

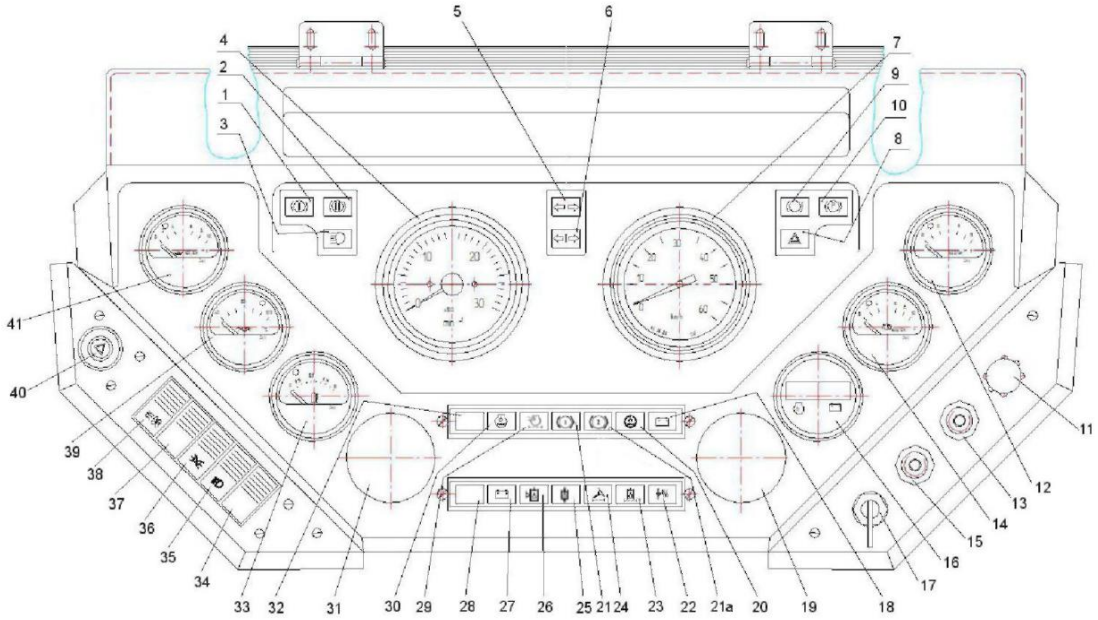


Fig.2 Instrument panel for K-744R2, K-744R3, K-744R4 Standard tractors

1. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
2. Indicator lamp of the air pressure-fall in the second circuit of the pneumatic system of the tractor.
3. Indicator lamp of switching on the traffic headlight high beam.
4. Tachometer.
5. Indicator lamp of switching on the turn signal light of the tractor.
6. Indicator lamp of switching on the turn signal light of the trailer.
7. Speedometer.
8. Indicator lamp of the alarm parameter in one of the tractor systems.
9. Indicator lamp of trailer brake pulling up.
10. Indicator lamp of parking brake pulling up.
11. Instrument panel illumination regulator.
12. Indicator of oil pressure in the gearbox hydraulic system.
13. ET (electric torch) switch.
14. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
15. Battery master switch.
16. Engine hour meter / voltmeter.
17. Keylock switch of the starter and instruments.
18. Indicator lamp of accumulator charge.
19. Plug.
*20. Indicator lamp of clogging of the oil filter of the gearbox hydraulic system.
21. Indicator lamp of the air pressure in the front brake circuit.

* Short-term switching-on of the lamp of clogging of the oil filter of the gearbox hydraulic system for a short period of time during the engine start-up.

21a. Indicator lamp of the air pressure in the rear brake circuit.
22. Indicator lamp of ET switching-on.
23. Indicator lamp of clogging of the pressure filter of the hydraulic system of mounted equipment.
*24. Indicator lamp of clogging of the pressure filter of the hydraulic system of steering control.
25. Indicator lamp of oil overheating of the hydraulic system.
26. Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment.
27. Indicator lamp of switching on the battery master switch.
28, 32. Indicator lamp serviceability checkup buttons.
29. Indicator lamp of clogging of the engine air cleaner filter.
30. Indicator lamp of clogging of the engine oil filter.
31. Plug.
33. Indicator of fuel level in the tank.
34. The key is not involved.
35. Traffic headlight switch.
36. Switch of end out marker lamps on front and rear lights.
37. The key is not involved.
38. Turning-on of the heater fan.
39. Engine cooling fluid temperature gauge.
40. Alarm signaling switch.
41. Engine oil pressure gauge.

12 – Oil pressure gauge in GB

The oil pressure in the GB hydraulic system at the transmissions with the crankshaft rotation speed of 900–1,800 RPM shall be as follows:

1.0–1.2 MPa (10–12 kgf/cm^2) – for K-744R1, K-744R2 tractors;

1.1–1.3 MPa (11–13 kg/cm^2) – for K-744R3, K-744R4 tractors.

The oil pressure growth on each transmission shall be fast. The pressure on neutraland in engagement of synchroniser brake shall not be less than on transmission gears.

In case of pressure fall in GB below 10 kgf/cm^2 for K-744R1, K-744R2 tractor and below 11 kgf/cm^2 for K-744R3, K-744R4 tractors, a sound alarm will get operated in the intermittent mode 30 s later.

On K-744R4St tractor, it is allowed to admit movement of the GB oil pressure pointer to the beginning of the “red” zone on the right at the maximum rotational speed of the crankshaft and the GB lever set in the neutral position.

* It is allowed to switch on the indicator lamp of clogging of the pressure filter of the hydraulic system of steering control for a short period of time until the operating oil temperature of the hydraulic system reached ~40–50°C.

14 – The air pressure gauge in the first circuit of the pneumatic system with built-in alarm signaling of the minimum limit value of 0.45 MPa (4.5 kgf/cm^2)

The air pressure in the pneumatic system of brakes in the process of operation shall be equal to 0.65–0.8 MPa (6.5–8 kgf/cm^2).

16 – Engine hour meter / voltmeter

The instrument shows the number of engine hours during the first 3...5 s after switching on the battery master switch.

In the course of operation the instrument reading range shall be 22.8–30.0 V. The increase or decrease of readings indicate afault of the generator or voltage regulator.

17 – Keylock switch of the starter and instruments

The lock has the following positions:

zero position (fixed) – the key is inserted vertically;

first position (fixed) – the key is turned in the clockwise direction. Power is supplied to the generator excitation winding;

second position (non-fixed) – with the key being turned further in the clockwise direction power is supplied to the generator excitation winding, voltage regulator and starter drive relay. In case of the key being released from this position, it will return to the first position;

third position (fixed) – the key is turned in anticlockwise direction from the zero position. This position is provided at the operation of the radio equipment on the tractor.

18 – Indicator lamp of accumulator charge

The lamps comes on when there is no charging current from the generator.

25 – Indicator lamp of oil overheating of the hydraulic system

The lamp comes on when the oil temperature in the hydraulic system reaches the critical value.

26 – Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment

The lamp comes on when the oil level falls below the critical value. Short-term “flashing” of the indicator lamp is allowed in case of travelling over road irregularities causing fluctuations of the oil levelin the hydraulic tank.

36 – Switching-on of the end marker lights

The key symbol in the upper position – the lights and illumination are switched off.

The key symbol in the lower position – the end marker lights switched on.

39 – Cooling fluid temperature gauge with built-in alarm signaling of the maximum limit temperature value

for 8481.10 engine – 90°C (a short-term (up to 10 min) temperature rise to95°C is allowed).

Cooling fluid working temperature:

for 8481.10 engine – 90°C.

Do not permit the engine operation on load at the cooling fluid temperature below 70°C.

40 – Alarm signaling switch

It is designed for simultaneous switching on the left and right turn signals in the flashing mode in case of sudden stop of the tractor on the surfaced portion of the road. Switching-on is performed by pressing the button. In doing so, the indicator lamp built into the switch button will come on.

41 – Oil pressure indicator in the engine with built-in alarm signaling of the minimum limit pressure value

The oil pressure in the mainline of the unit of heated 8481.10 engine shall be within the range of 0.38–0.5 MPa (3.8–5.0 kgf/cm^2) at the nominal rotational speed and not less than 0.09 MPa (0.9 kgf/cm^2) at the minimum rotational speed.

4.3 Instrument panel for K-744R1 tractor of the Premium design version

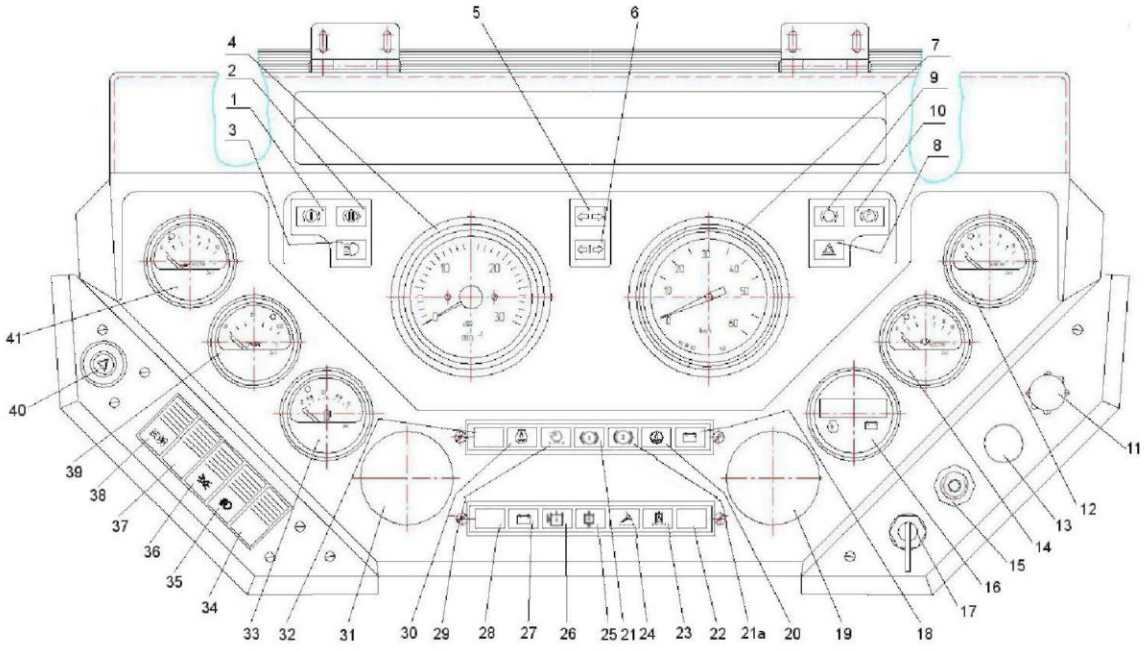


Fig. 3 Instrument panel of K-744R1 Premium tractor

1. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.

2. Indicator lamp of the air pressure-fall in the second circuit of the pneumatic system of the tractor.
3. Indicator lamp of switching on the traffic headlight high beam.
4. Tachometer.
5. Indicator lamp of switching on the turn signal light of the tractor.
6. Indicator lamp of switching on the turn signal light of the trailer.
7. Speedometer.
8. Indicator lamp of the alarm parameter in one of the tractor systems.
9. Indicator lamp of trailer brake pulling up.
10. Indicator lamp of parking brake pulling up.
11. Instrument panel illumination regulator.
12. Indicator of oil pressure in the gearbox hydraulic system.
13. Plug.
14. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
15. Battery master switch.
16. Engine hour meter / voltmeter.
17. Keylock switch of the starter and instruments.
18. Indicator lamp of accumulator charge.
19. Plug.
*20. Indicator lamp of clogging of the oil filter of the gearbox hydraulic system.
21. Indicator lamp of the air pressure in the front brake circuit.
21a. Indicator lamp of the air pressure in the rear brake circuit.
22. The indicator lamp is not involved.
23. The indicator lamp of clogging of the pressure filter of the hydraulic system of mounted equipment.
**24. Indicator lamp of clogging of the pressure filter of the hydraulic system of steering control.
25. Indicator lamp of oil overheating of the hydraulic system.
26. Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment.
27. Indicator lamp of switching on the battery master switch.
28, 32. Indicator lamp serviceability checkup buttons.
29. Indicator lamp of clogging of the engine air cleaner filter.
30. Indicator lamp of clogging of the engine oil filter.
31. Plug.
33. Indicator of fuel level in the tank.
34. The key is not involved.
35. Traffic headlight switch
36. Switch of end out marker lamps on front and rear lights.
37. The key is not involved.
38. Turning-on of the heater fan.
39. Engine cooling fluid temperature gauge.
40. Alarm signaling switch.
41. Engine oil pressure gauge.

12 – Oil pressure gauge in GB

* It is allowed to switch on the lamp of clogging of the oil filter of the gearbox hydraulic system for a short period of time during the engine start-up.

*** It is allowed to switch on the indicator lamp of clogging of the pressure filter of the hydraulic system of steering control for a short period of time until the operating oil temperature of the hydraulic system reached ~40–50°C.

The oil pressure in the GB hydraulic system at the transmissions with the crankshaft rotation speed of 900–1,800 RPM shall be as follows:

1.0–1.2 MPa (10–12 kgf/cm^2) – for K-744R1, K-744R2 tractors;

1.1–1.3 MPa (11–13 kgf/cm^2) – for K-744R3, K-744R4 tractors.

The oil pressure growth on each transmission shall be fast. The pressure on neutraland in engagement of synchroniser brake shall not be less than on transmission gears.

In case of pressure fall in GB below 10 kgf/cm^2 for K-744R1, K-744R2 tractor and below 11 kgf/cm^2 for K-744R3, K-744R4 tractors, a sound alarm will get operated in the intermittent mode 30 s later.

14 – The air pressure gauge in the first circuit of the pneumatic system with built-in alarm signaling of the minimum limit value of 0.45 MPa (4.5 kgf/cm^2)

The air pressure in the pneumatic system in the process of operation shall be equal to 0.65–0.8 MPa (6.5–8 kgf/cm^2).

16 – Engine hour meter / voltmeter

The instrument shows the number of engine hours during the first 3...5 s after switching on the battery master switch.

In the course of operation the instrument reading range shall be 22.8–30.0 V. The increase or decrease of readings indicate afault of the generator or voltage regulator.

17 – Keylock switch of the starter and instruments

The lock has the following positions:

zero position (fixed) – the key is inserted vertically;

first position (fixed) – the key is turned in the clockwise direction. Power is supplied to the generator excitation winding;

second position (non-fixed) – with the key being turned further in the clockwise direction power is supplied to the generator excitation winding, voltage regulator and starter drive relay. In case of the key being released from this position, it will return to the first position;

third position (fixed) – the key is turned in anticlockwise direction from the zero position. This position is provided at the operation of the radio equipment on the tractor.

18 – Indicator lamp of accumulator charge

The lamp comes on when there is no charging current from the generator.

25 – Indicator lamp of oil overheating of the hydraulic system

The lamp comes on when the oil temperature in the hydraulic system reaches the critical value.

26 – Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment

The lamp comes on when the oil level falls below the critical value. Short-term “flashing” of the indicator lamp is allowed in case of travelling over road irregularities causing fluctuations of the oil levelin the hydraulic tank.

36 – Switching-on of the end marker lights

The key symbol in the upper position – the lights and illumination are switched off. The key symbol in the lower position – the end marker lights switched on.

39 – Cooling fluid temperature gauge with built-in alarm signaling of the maximum limit temperature value:

for Cummins engine – 100°C (a short-term (up to 10 min) temperature rise to 113°C is allowed).

Cooling fluid working temperature:

for Cummins engine – 93...100°C.

Do not permit the engine operation on load at the cooling fluid temperature below 71°C.

40 – Alarm signaling switch

It is designed for simultaneous switching on the left and right turn signals in the flashing mode in case of sudden stop of the tractor on the surfaced portion of the road. Switching-on is performed by pressing the button. In doing so, the indicator lamp built into the switch button will come on.

41 – Oil pressure indicator in the engine with built-in alarm signaling of the minimum limit pressure value

The oil pressure in the mainline of the unit of heated Cummins engine shall be within the range of 0.4–0.6 MPa (4.0–6.0 kgf/cm^2) at the nominal rotational speed and not less than 0.07 MPa (0.7 kgf/cm^2) at the minimum rotational speed.

4.4 Instrument panel for K-744R2, K-744R3, K-744R4 tractors of the Premium design version

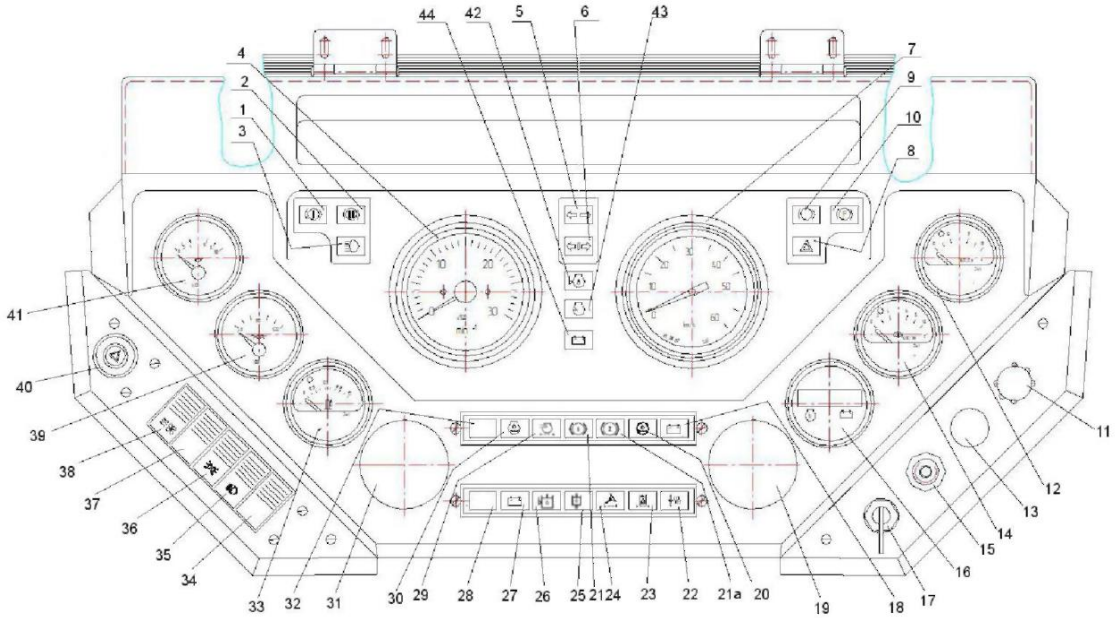


Fig.4 Instrument panel for K-744R2, K-744R3, K-744R4 Premium tractors

1. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
2. Indicator lamp of the air pressure-fall in the second circuit of the pneumatic system of the tractor.
3. Indicator lamp of switching on the traffic headlight high beam.
4. Tachometer.
5. Indicator lamp of switching on the turn signal light of the tractor.
6. Indicator lamp of switching on the turn signal light of the trailer.
7. Speedometer.
8. Indicator lamp of the alarm parameter in one of the tractor systems.
9. Indicator lamp of trailer brake pulling up.
10. Indicator lamp of parking brake pulling up.
11. Instrument panel illumination regulator.
12. Indicator of oil pressure in the gearbox hydraulic system.
13. Plug.
14. Indicator lamp of the air pressure-fall in the first circuit of the pneumatic system of the tractor.
15. Battery master switch.
16. Engine hour meter / voltmeter.
17. Keylock switch of the starter and instruments.
18. Indicator lamp of alarm signaling of the engine parameter (yellow).
19. Plug.
*20. Indicator lamp of clogging of the oil filter of the gearbox hydraulic system.
21. Indicator lamp of the air pressure in the front brake circuit.

* It is allowed to switch on the lamp of clogging of the oil filter of the gearbox hydraulic system for a short period of time during the engine start-up.

21a. Indicator lamp of the air pressure in the rear brake circuit.
22. Indicator lamp of ET switching-on.
23. Indicator lamp of clogging of the pressure filter of the hydraulic system of mounted equipment.
*24. Indicator lamp of clogging of the pressure filter of the hydraulic system of steering control.
25. Indicator lamp of oil overheating of the hydraulic system.
26. Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment.
27. Indicator lamp of switching on the battery master switch.
28, 32. Indicator lamp serviceability checkup buttons.
29. Indicator lamp of clogging of the engine air cleaner filter.
30. Indicator lamp of clogging of the engine oil filter.
31. Plug.
33. Indicator of fuel level in the tank.
34. The key is not involved.
35. Traffic headlight switch.
36. Switch of end out marker lamps on front and rear lights.
37. The key is not involved.
38. Turning-on of the heater fan.
39. Engine cooling fluid temperature gauge.
40. Alarm signaling switch.
41. Engine oil pressure gauge.
42. Indicator lamp of the emergency oil level of the engine (red).
43. Indicator lamp of the engine stop demand (red).
44. Indicator lamp of accumulator charge.

12 – Oil pressure gauge in GB

The oil pressure in the GB hydraulic system at the transmissions with the crankshaft rotation speed of 900–1,800 RPM shall be as follows:

1.0–1.2 MPa (10–12 kgf/cm^2) – for K-744R1, K-744R2 tractors;

1.1–1.3 MPa (11–13 kgf/cm^2) – for K-744R3, K-744R4 tractors.

The oil pressure growth on each transmission shall be fast. The pressure on neutraland in engagement of synchroniser brake shall not be less than on transmission gears.

In case of pressure fall in GB below 10 kgf/cm^2 for K-744R1, K-744R2 tractor and below 11 kgf/cm^2 for K-744R3, K-744R4 tractors, a sound alarm will get operated in the intermittent mode 30 s later.

14 – The air pressure gauge in the first circuit of the pneumatic system with built-in alarm signaling of the minimum limit value of 0.45 MPa (4.5 kgf/cm^2)

The air pressure in the pneumatic system in the process of operation shall be equal to 0.65–0.8 MPa (6.5–8 kgf/cm^2).

* ** It is allowed to switch on the indicator lamp of clogging of the pressure filter of the hydraulic system of steering control for a short period of time until the operating oil temperature of the hydraulic system reached ~40–50°C.

16 – Engine hour meter / voltmeter

The instrument shows the number of engine hours during the first 3...5 s after switching on the battery master switch.

In the course of operation the instrument reading range shall be 22.8–30.0 V. The increase or decrease of readings indicate afault of the generator or voltage regulator.

17 – Keylock switch of the starter and instruments

The lock has the following positions:

zero position (fixed) – the key is inserted vertically;

first position (fixed) – the key is turned in the clockwise direction. Power is supplied to the generator excitation winding;

second position (non-fixed) – with the key being turned further in the clockwise direction power is supplied to the generator excitation winding, voltage regulator and starter drive relay. In case of the key being released from this position, it will return to the first position;

third position (fixed) – the key is turned in anticlockwise direction from the zero position. This position is provided at the operation of the radio equipment on the tractor.

18 – Indicator lamp of alarm signaling of the emergency engine parameter (yellow)

Yellow-colored indicator lampcomes on in the following cases:

the rotational speed of the engine shaft is 300 RPM;

the cooling fluid temperature has reached the limit permissible value;

the engine oil level is the limit permissible one;

the engine oil level is the limit permissible one;

abnormal operation (break) of the CAN electrical circuit;

abnormal operation (program error) of the ADMFR electronic unit.

In case when the yellow indicator lamp comes on, it is necessary to check the readings of gauges by temperature, pressure, oil level (by the indicator lamp) and perform the required maintenance of the engine.

In case when the yellow indicator lamp comes on at the normal readings of the above-mentioned gauges, it is necessary to check the operation of PLD and ADM units by the efforts of Mercedes Benz servicing specialists.

25 – Indicator lamp of oil overheating of the hydraulic system

The lamp comes on when the oil temperature in the hydraulic system reaches the critical value.

26 – Indicator lamp of oil level fall in the tank of hydraulic system for control over turns and service equipment

The lamp comes on when the oil level falls below the critical value. Short-term “flashing” of the indicator lamp is allowed in case of travelling over road irregularities causing fluctuations of the oil levelin the hydraulic tank.

36 – Switching-on of the end marker lights

The key symbol in the upper position – the lights and illumination are switched off. The key symbol in the lower position – the end marker lights switched on.

39 – Cooling fluid temperature gauge with built-in alarm signaling of the maximum limit temperature value

for OM457LA (Mercedes) engine – 95°C.

Cooling fluid working temperature:

for OM457LA (Mercedes) engine – 90...95°C.

Do not permit the engine operation on load at the cooling fluid temperature below 70°C.

40 – Alarm signaling switch

It is designed for simultaneous switching on the left and right turn signals in the flashing mode in case of sudden stop of the tractor on the surfaced portion of the road. Switching-on is performed by pressing the button. In doing so, the indicator lamp built into the switch button will come on.

41 – Oil pressure indicator in the engine with built-in alarm signaling of the minimum limit pressure value

The oil pressure in the mainline of the unit of heated OM457LA (Mercedes)engine shall be within the range of 0.25–0.5 MPa (2.5–5.0 kgf/cm^2) at the nominal rotational speed and not less than 0.05 MPa (0.5 kgf/cm^2) at the minimum rotational speed.

42 – Indicator lamp of the emergency oil level of the engine (red)

43 – Indicator lamp of the engine stop demand (red)

The red-colored indicator lamps come up at the emergency values of the following parameters:

engine shaft rotational speed;

engine oil level;

engine oil pressure;

cooling liquid temperature.

ATTENTION! In case when the red lamp comes on, it is necessary to immediately shut down the engine.

The engine starting sequence shall be performed in strict accordance with the operating instruction of the engine.

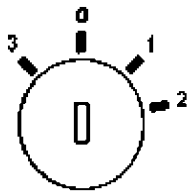


Fig.5 Keylock switch of the starter and instruments

The engine start-up shall be performed by turning the key into “2” position (Fig.5).

The engine shutdown is performed by returning the key into “0” position. “3” position is not involved.

If after the engine start-up the indicator lamp 43 (Fig.4) continues burning, it is necessary to shut down the engine and apply to the service station.

The tractor is equipped with the electric torch (ET) for engine start-up at the ambient temperature from minus20°C.

The choice of oil and cooling fluid for using in the engine at the temperature from minus 20°C is described in the operating instruction for the engine.

The choice of oil and cooling fluid shall be performed in accordance with the operating instruction for the engine and the appendix (“Specification for operating materials”).

The coarse mesh fuel filter (located on the right under the cabin) is equipped by a boosting pump and a tubular electric heating element (24 V). There is a valve with two positions (“Open”, “Closed”) on the filter.

ATTENTION!

1. In order to ensure long-term and reliable operation of the engine, use only available certificates of the diesel fuel grade. Try to avoid the ingress of water and foreign things into the fuel.

2. In case of execution of welding operations on the tractors with Mercedes engines, it is necessary to disconnect the power wires “+” and “–” from storage batteries (wires 9 and 7, see electrical schematic diagram). Connect the wire terminals between each other by means of an M4 bolt with nut. In connecting the accumulator to the electrical schematic diagram, first connect “+”, then “–“. Non-fulfilment of this requirement can lead to a failure of the engine electronic control system.

4.5 Tractor system control

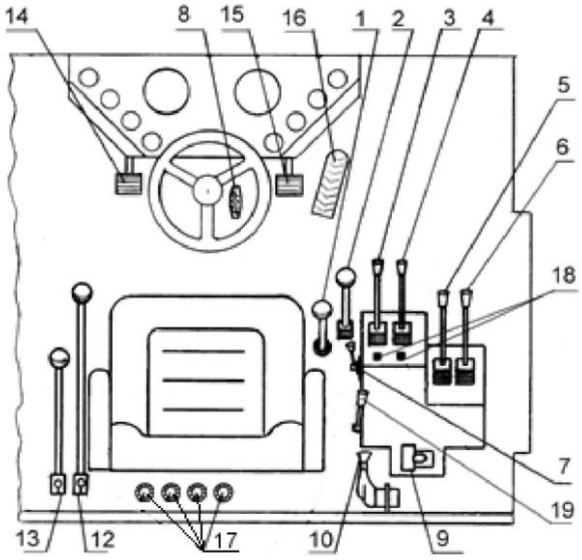


Fig. 6 Layout of control levers and handles in the cabin

1. GB change-mode lever.
2. Gear-shift lever.
3, 4, 5, 6. Handles for control of hydraulic drives of the machines to be hooked up.
7. Fuel feed control handle (except tractors with Mercedes engines).
8. Engine shutdown handle.
9. Parking brake handle (in the pulled up position – braking). For K-744R1, K-744R2 tractors it also performs the trailer partial braking function.
10. Trailer partial braking valve handle (“Down” position – releasing of brake, “Up” position – braking). On K-744R1, K-744R2 tractors, it is missing.
12. Rear driving axle engagement lever.
13. “Fast” and “Slow” mode engagement lever.
14. Drain gate valve control pedal (drain pedal).
15. Service brake control pedal.
16. Fuel feed pedal.
17. Handles for control of oil flow-rate to the actuator (agricultural implement).
18. Buttons of manual fuel feed on tractors with Mercedes engine.
19. Implement mechanism control handle.

Positions of handles 3, 4, 5, 6, 19: “Pulled up” from neutral – lifting; “Pushed up” from neutral – lowering (1st position) and floating (2nd position).

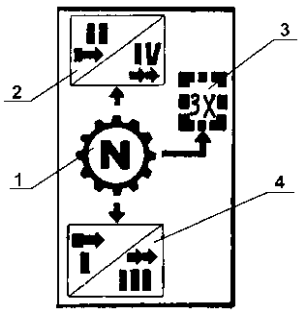


Fig. 7 Diagram of positions of the mode change lever

1. Neutral “N”.
2. Modes II and IV.
3. Rear travel.
4. Modes I and III.

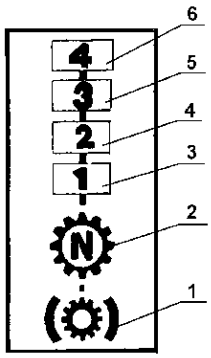


Fig. 8 Diagram of positions of the gear change lever

1. Engagement of synchroniser brakes.
2. Neutral “N”.
3. 1st gear.
4. 2nd gear.
5. 3rd gear.
6. 4th gear.

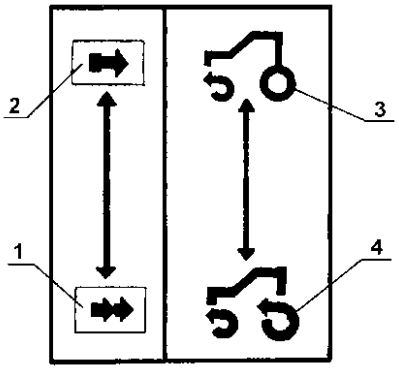


Fig. 9 Diagram of positions of the fast and slow mode lever and rear axle engagement lever

1. Fast mode.
2. Slow mode.
3. Rear axle is disengaged.
4. Rear axle is engaged.

The gear change lever has six fixed positions. Transfer the lever from the “N” position to the 1st gear with shifting the drain pedal. During tractor motion perform the change of gears within the mode selected by consecutive transfer of the lever forward from the 1st gear position to the position of 2nd, 3rd and 4th gears without shifting the drain pedal.In pressing the drain pedal on 2nd, 3rd or 4th gear, the pedal will “hang up”. In order to return the pedal into the initial position, press on the pedal, transfer level 2 (Fig.6) into position 1 or “N”, release the pedal. In the “engagement of synchroniser brakes” position, transfer the lever from “N” position backwards, slightly lifting it. Use this position only for changing modes with the tractor being shut down.

ATTENTION! In case of engine warming up and during parking with the engine being in operation, the gear change lever and the mode change lever 1 (Fig.6) shall be in the “Neutral N” position.

ATTENTION! The mode change lever as well as the levers of slow and fast mode engagement should be used only with the tractor being shut down. In doing so, the gear change lever shall be set in the position of “Engagement of synchroniser brakes”. In case of difficulties in the mode engagement, it is necessary to shift the drain pedal for a short-term period.

If necessary (for facilitation of mode change as well as for rear axle engagement with the tractor being stopped), it is allowed to turn (to the right/left) the steering wheel.

ATTENTION! In case of oil pressure jump or fall in GB, **immediately** stop operation of the tractor and check the pressure using a mechanical instrument (manometer).

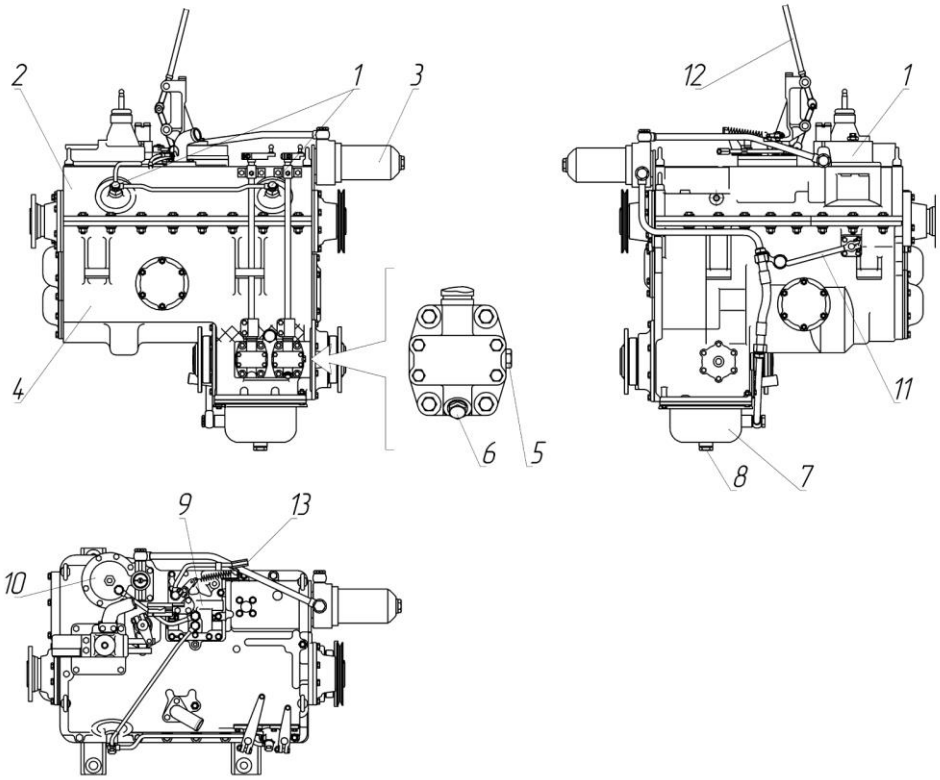


Fig.10 Transmission gearbox

1 – synchroniser brakes; 2 – upper half of the case; 3 – GB filter;
4 – lower half of the case; 5 – upper reference plug; 6 – lower reference plug;
7 – tray with pump; 8 – drain plug; 9 – gear change mechanism;
10 – hydraulic accumulator; 11 – towing changeover lever;
12 – gear change lever;
13 – working pressure measuring point in the GB hydraulic system

4.6 Switch block on the steering column

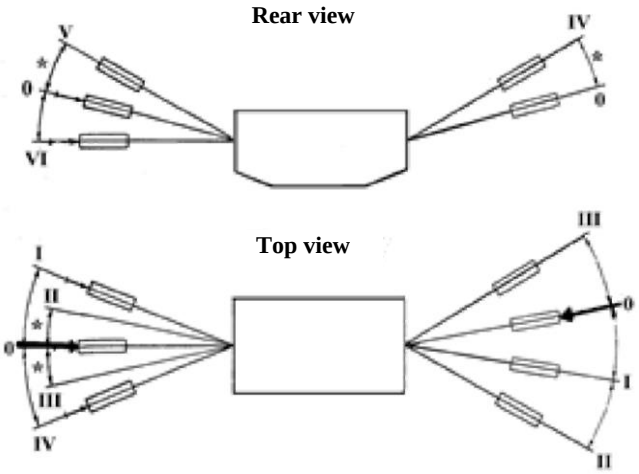


Fig. 11 Switch block on the steering column

* – non-fixed positions

Left switch

0 – low beam switching-on;

1 – switching-on of the fixed position of the right turn indicator;

II – switching-on of the non-fixed position of the right turn indicator;

III – switching-on of the non-fixed position of the left turn indicator;

IV – switching-on of the fixed position of the left turn indicator;

V – switching-on of high beam flashing signal;

VI – switching-on of high beam;

→ – switching-on of sound signal;

Right switch

I – switching-on of front window wiper;

IV – switching-on of front window washer;

← – switching-on of rear window washer;

II, III – not involved.

4.7 Switches on the overhead panel in the cabin

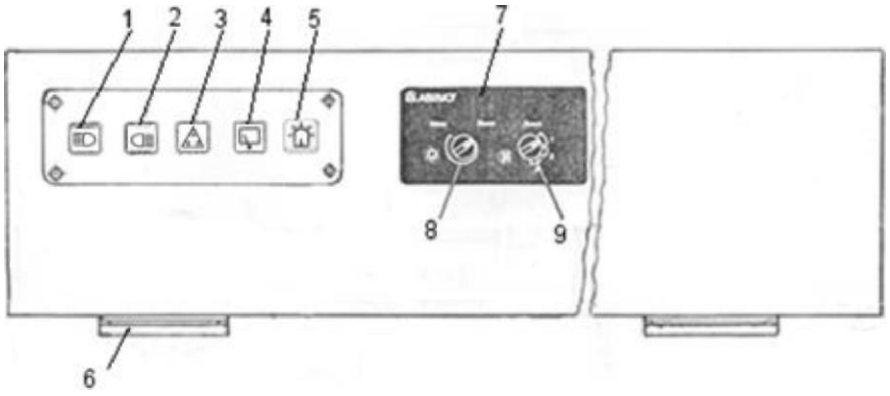


Fig. 12 Switch block and louvre on the overhead panel in the cabin

1. Front service headlight switching key.
2. Rear service headlight switching key.
3. “Road-train” sign switching key.
4. Rear window wiper switching key.
5. Rotation beacon switching key.
6. Round louvre with variable clear opening, 10 pcs.
7. Air conditioner control panel.
8. Temperature regulator. It controls the temperature of air flowing from the evaporator into the cabin.
9. Fan switch. It serves for regulation of the velocity of air flow passing through air-conditioner. In the OFF position, the air conditioner is not in operation.

If the temperature regulator is in the OFF position and the fan switch is not in the OFF position, then the air conditioner will operate only for inflow of the outer air into the cabin.

ATTENTION! It is not recommended to cool down air in the cabin more than by 6°C in respect to the ambient temperature, as it can be the cause of cold-related diseases.

4.8 Fuse blocks

For K-744R1 tractors of the Standard and Premium design versions, K-744R2, K-744R3, K-744R4 tractors of the Standard design version

Left fuse block		Right fuse block	
10A	scale illumination	10A	left end marker lights
10A	heater	10A	right end marker lights
30A	air conditioner	10A	low beam of left traffic headlights
10A	stop signals	10A	low beam of right traffic headlights
10A	sound signal	10A	high beam of left travelling headlights

Left fuse block		Right fuse block	
15A	front window wiper; front window washer; rear window washer	10A	low beam of right traffic headlights
10A	alarm signaling	25A	engine start-up
10A	turn indicators	20A	dome lamp; rear window wiper; “Rod-train” sign
20A	high beam, low beam of traffic headlights	20A	switching-on of battery master switch
10A	alarm signaling	20A	front head lights
10A	generator excitation winding	20A	rear service lights
20A 12V	circuit 12 V		reserve
	reserve		reserve

For *K-744R2, K-744R3, K-744R4 tractors of the Premium design version*

Left fuse block		Right fuse block	
30A	ET electrical unit power supply	10A	left end marker lights
10A	scale illumination	10A	right end marker lights
10A	heater	10A	low beam of left traffic headlights
30A	air conditioner	10A	low beam of right traffic headlights
10A	stop signals	10A	high beam of left traffic headlights
20A	front window wiper; front window washer; rear window washer	10A	low beam of right traffic headlights
10A	sound signal	25A	engine start-up
10A	turn indicators	10A ADM2FR	ADM2FR electrical unit power supply
20A	high beam, low beam of traffic headlights	20A	dome lamp; rear window wiper; “Rod-train” sign
10A	alarm signaling	10A	switching-on of battery master switch
10A	ET start-up	15A	front head lights
7,5A MR	MR electrical unit power supply	15A	rear service lights
	reserve	10A 12V	circuit 12 V

4.9 Driver’s seat and additional seat

The driver’s seat (Fig.15) is adjustable over height, angle of back inclination in the longitudinal direction and depending upon the driver’s weight.

Perform the adjustment by weight by moving handle 4.

Adjust the back installation at the required angle by pressing handle 1.

In order to adjust the seat position in the longitudinal direction, lift handle 2 and set the seat in the required position and lower the handle.

Having seated on the set, which is installed in the cabin, adjust the load weight according to your own weight. To increase the load weight, rotate knob 4 in the clockwise direction; to decrease the weight rotate the knob in the anticlockwise direction until the red-colored band appears in window 5.

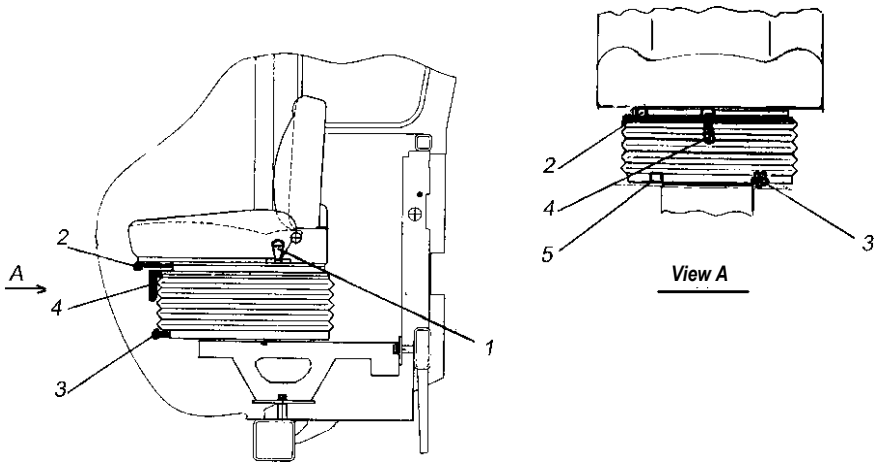


Fig. 15 Driver's seat

1 – back inclination adjustment handle; 2 – handle of retainer of longitudinal movement of the seat (adjust the seat position in the longitudinal direction with the handle being lifted upwards); 3 – handle for seat adjustment over height; 4 – handle for load adjustment by the operator's weight; 5 – indicating window for load adjustment over operator's weight

Additional seat – soft, not spring-supported. The additional seat is fastened on the rear wall of the cabin.

4.10 Lighting and alarms

Four traffic headlights are installed on the tractor for roadbedillumination.

The following elements are installed for illumination of the work area:

– four rotary headlights on the front of the cabin;

– four rotary headlights on the rear of the cabin;

In accordance with the traffic safety requirements, the tractor is equipped with the following light signal devices:

– front lights having two section: one section – with colorless diffuser for designation of tractor end markers, the section – with orange diffuser for signaling the tractor turn;

– rear lights having three sections: extreme outer sections – turn indicator (orange) and then – stop signal (ruby), end marker (red);

– “Road-train” sign consisting of three lights with orange-colored diffusers installed on the cabin;

– license plate illumination light installed on the bracket above the left wing of the tractor.

On the supporting beam of the rear left wing, a plug socket is installed for connection electrical equipment of trailers.

A plug socket 12 V is installed under the cabin on the bottom to the right for connecting the lighting fixture. A dome light with built-in switch is installed on the rear wall of the cabin.

During travelling over motor roads only front traffic headlights are uses, which have low and high beam modes. In order to avoid dazzling of oncoming vehicles as well as vehicles moving behind, ***IT IS PROHIBITED*** to switch on the front and rear service headlights during transportation activities.In hooking up the tractor with trailer (semi-trailer), it is obligatory to switch on the “Road-train” sign.

Lighting and signaling control shall be performed by the handle for switching-on of the lighting and signaling instruments (see Fig.11) as well as by the switch of switch block (see Fig.12).

4.11 Engine preparation and start-up

4.11.1 Before engine start-up make sure that the levers of hydraulic distributor of the hydraulic system of mounted implement are in the neutral position and the parking brake is engaged, the engine shutdown handle is pushed in up to the stop. The gear change lever and the mode change lever shall be in the “Neutral N” position. Set the lever of manual fuel feed into the position corresponding to the minimum rotational speed of the engine crankshaft.

4.11.2 Perform the engine start-up in the following sequence:

– if necessary, fill the engine feed system with fuel. To this end, pump out the system during 2...3 min by manual fuel boosting pump (it is located under the cabin, on the right, in the area of vertical hinge pivot);

– turn on the battery master switch. In doing so, the indicator lamps 27 and 18 (see Fig. 1, 2, 3) or 27 and 44 (see Fig. 4) will come on, the glare of built-in indicator lamp 41 of the engine oil pressure is possible, the indicatorlamps 8 and 10 are burning with flashing light.

The burning of indicator lamps 1 and 2 is allowed.

– insert the key into the keylock switch of the starter and instruments;

– turn the key into the second position.

– release the key after the engine start-up. The key shall spontaneously return to the initial position. The starter operation duration shall not be more than 15s. Unless the engine begins operating steadily, it is necessary to switch off the starter and repeat the start-up 1–2 min later. If after three attempts the engine does not get started, fins and eliminate the faults.

4.11.3 After start-up warm up the engine to the cooling fluid temperature of 40–45 C° first at the minimum rotational speed and then at medium values of the rotational speed of crankshaft. The oil pressure in the mainline of the unit of heated engine shall be within the range of 0.45–0.6 MPa (4.5–6 kgf/cm^2) at the nominal rotational speed and not less than 0.1 MPa (1 kgf/cm^2) at the minimum rotational speed. In doing so, the indicator lamps 1, 2, 18, the built-in indicator lamp 41 of the engine oil pressure shall go out, the flashing of lamp 8 shall stop.

ATTENTION!In case of permanent flashing of indicator lamp 8it is necessary to check one of the following parameters:

– oil pressure in the engine is below the standard value;

– pressure in air cylinders of both circuits is below the standard value;

– cooling fluid temperature is above the standard value;

– parking brake is pulled up.

4.12 Engine start-up at negative temperatures

For tractors with 8481.10 and OM457LA (Mercedes) engines:

The electrical torch (ET) of the tractor provides start-up of the engine at the outdoor temperature to minus 20 °C.
The engine start-up at such outdoor temperatures should be performed in the following sequence:

1. Meet the requirements set forth in Item 4.11.1 of subsection 4.11.

2. Activate the battery master switch by switch 15 (Fig. 1, 2, 3, 4).

3. Insert the key into the keylock-switch of the starter and instruments, turn the key into the first position, issue a sound signal and press the ET 13 button (Fig.2). 1–2 min later the indicator lamp 22 on the instrument panel will come on. 10–15 sec later turn the key in the clockwise direction into the second position without releasing the ET button.

4. After the engine start-up, release the key and ET button. The key shall return to the first position. The ET button having been released, the indicator lamp 22 (Fig.2) shall go out.

ET for tractors with OM457LA (Mercedes) engine is switched on automatically when the key of ignition lock is turned into the first position.

5. Meet the requirements set for in Item 4.11.3 of subsection 4.11.

At the outdoor temperature below minus 15°C, it is recommended, before engine start-up by means of ET, to disengage the engine from transmission by means of the lever located on the reducer with semi-rigid clutch.

For tractors with ЯМЗ-238НД5 и Cummins 6LTAA8,9-C300 engines:

At the ambient temperature below minus 10°C it is necessary, before the start-up to warm up the engine by means of the pre-starting heating system.

4.12.1 Safety measures when using the heater

The heater control panel is installed in the front part of the K-744R1 tractor under facing of the radiator.

Only those persons that have thoroughly read the operating instruction of the heater shall be admitted to use the heater.

In using the heater, one should permanently remember that abnormal operation of the heater or its faults could be the cause of fire.

During operation of the heater, the driver shall permanently monitor the system operation. In case of a flame or smoke appearing at the gas inlet of the gas discharge pipe, it is necessary to immediately switch off the heater and after its stop to proceed to elimination of the fault or adjustment.

IT IS PROHIBITED to perform warming up of the engine by the heater in closed premises with poor ventilation in order to avoid poisoning of people by off gases.

IT IS ABSOLUTELY PROHIBITED to switch on the heater without cooling fluid.

IT IS PROHIBITED to switch on the heater immediately after shutdown or unsuccessful attempt to activate it without blowing of the gas duct during at least 15–20 seconds.

The valve for feeding fuel to the heater shall be open only during the time when the heater is in operation. During the rest of that period of time, the valve for feeding fuel to the heater must be closed.

4.12.2 Heater operation

Preparation for operation

4.12.2.1 Check the availability and level of non-freezing fluid in the engine cooling system by short-term opening of the release valve on the boiler and on the heater pump set and the level in the expansion tank of the engine.

Before starting the heater boiler, check the availability of fuel in the boiler fuel tank.
If necessary, refill diesel fuel to the tank according to GOST 305-82, wherefore do the following:

– open the boot and undo the cap of the tank filler port (the tank is located on the right-hand side-member of the frame in the front part of the engine);

– insert a funnel into the tank filler port and refill fuel into the tank (tank capacity is 7 litres). For 30...40 minutes of boiler operation the fuel consumption equals to 3...4 l);

– take off the funnel and screw the tank filler port cap.

In case when fuel drops get onto the outer surface of the tank, wipe the tank surface with a dry oil cloth.

4.12.2.2 Open the valve for feeding fuel into the heater and pump out the heater fuel system with a pump for manual engine fuel pumping-out.

Activation of the heater

4.12.2.3 Blow down the boiler gas duct– run the pump set for 15–20 seconds by setting motor switch 1 (Fig. 16) into the “Operation” position.

4.12.2.4 Press electrical heater button 3 (Fig. 16) and hold it in the ON state depending upon the ambient temperature according to Table 2.

Table 2

Ambient temperature	to minus 20°C	to minus 30°C	to minus 40°C	to minus 60°C
Electrical heater running time, s	20	30	60	90

4.12.2.5 Upon expiry the heating time set motor switch 1 and electromagnetic valve switch 2 into the “Operation” position. At the same time turn flag 5 of heater button in the clockwise direction and gold it (no more than 30 s) until a typical hum appears in the boiler indicating the ignition of fuel in the burner.

4.12.2.6 Unless upon expiry 20–30 seconds the heater begins running, set the electromagnetic valve switch into the “Blowdown” position and release the heater button. Upon expiry of 90–150 seconds switch off the motor. Then repeat the start-up. Unless as a result of two attempts the heater begins steadily running, it is necessary to determine and eliminate the fault, after which perform the heater start-up.

Operation and shutdown of the heater

General construction and layout of the heater of ПЖД-30 type is shown in Fig. 17...19.

4.12.2.7 The duration of heater operation for heating the engine to the state ensuring the engine start-up depends upon the ambient temperature.

4.12.2.8 The heater should be switched off when the temperature in the engine cooling system reaches the temperature over 90°C.

4.12.2.9 To shut down the heater it is necessary to set the electromagnetic valve switch into the “Blowdown” position and 90–150 seconds later switch off the motor. Close the heater fuel valve.

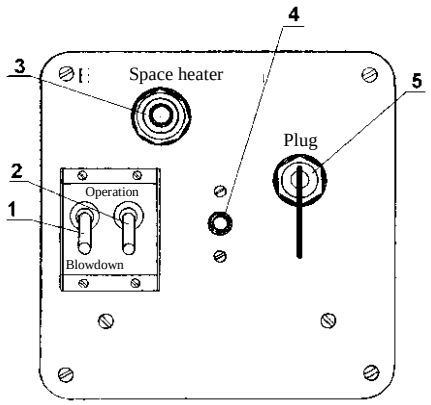


Fig. 16 Heater panel board
1 – motor switch; 2 – electromagnetic valve switch; 3 – fuel electrical heater button; 4 – power circuit automatic shutdown button; 5 – spark plug switch.

After heating the engine perform start-up the same as under positive temperature with the account of features specified below.

At a negative ambient temperature the duration of continuous operation of the starter shall not exceed 20 seconds. Perform start-up having preliminarily disengaged the gearbox, wherefore set the lever on the pump drive reducer forward to the stop in the direction of travel of the tractor, set the manual fuel feed lever in the middle position.After warming up, connect the motor with the gearbox having preliminarily shut off the motor, set the manual fuel feed lever in the position corresponding to the minimum rotational speed of the engine crankshaft.

In case of unsuccessful start-up, pull out the engine shutdown handle and then retract it, after which repeat the start-up.

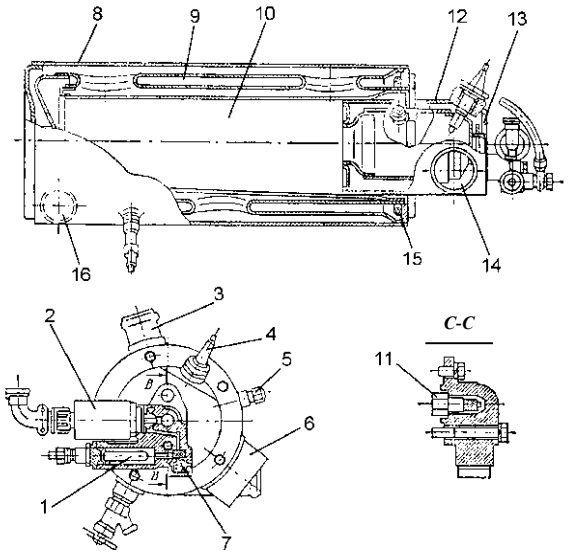


Fig. 17 Heating boiler
1 – fuel electrical heater; 2 – electromagnetic fuel valve; 3, 16 – fluid outlets; 4 – spark plug; 5 – fuel inlet to the heater; 6 – gas outlet; 7 – fuel filter; 8 – boiler casing; 9, 10 – gas cavities; 11 – nozzle; 12 – burner; 13 – air swirler; 14 – air inlet; 15 – fuel heater.

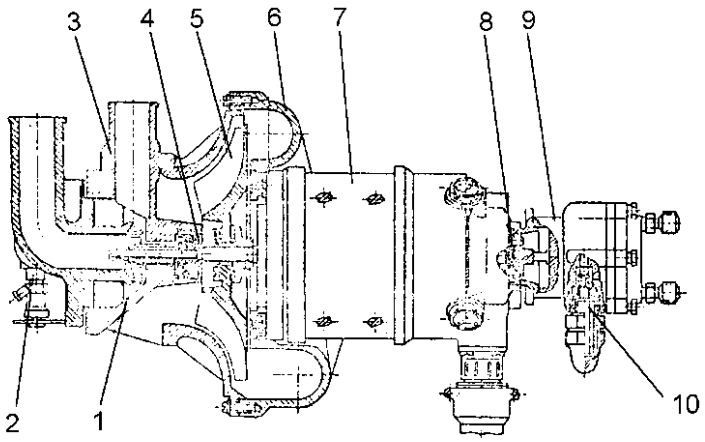


Fig. 18 Pump set

1 – fluid pump impeller; 2 – drain valve; 3 – fluid pump; 4 – collar; 5 – fan impeller; 6 – fan housing; 7 – motor; 8 – connecting coupling; 9 – fuel pump; 10 – reducing valve.

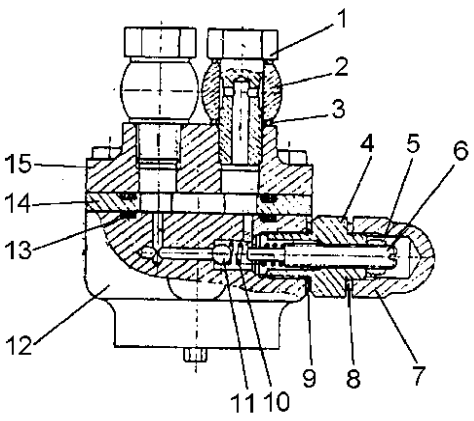


Fig. 19 Fuel pump reducing valve

1 – fuel line bolt;
2 – rotating angle joint;
3, 8, 9, 13 – O-rings;
4 – union; 5, 7 – nuts; 6 – adjustment screw;
10 – spring; 11 – ball; 12 – fuel pump casing;
14 – spacer; 15 – fuel pump cover.

4.13 Engine start-up from external power supply

If it is impossible to start the engine from storage batteries due to their strong discharge, it is permitted to start the engine from an external power supply of from accumulator battery of another tractor.

ATTENTION! In case of engine start-up from the accumulator of another tractor, it is necessary to strictly obey the following rules:

1. Perform the engine start-up with switched-off battery master switch of the tractor, which engine is to be started from an external power supply. It is necessary to switch on the battery master switch immediately when the engine being started began steadily operating.

2. The engine of the tractor, which accumulator is used as an external power supply, shall be shut off.

A failure to obey these rules can lead to increased discharge of the accumulator of the vehicle, from which the start-up is performed or to a failure of its generator.

4.14 HVAC system operation

The system can be operated in the mode of ventilation, heating and air conditioning.

Ventilation

In order to perform forced air supply into the cabin it is necessary to switch on the fan (handle 9 (Fig.12)) into one of the positions 1, 2 and 3.

Heating

Two heaters serve for heating the cabin. The autonomous heater OC-8, pos. 1 (Fig. 20) is located to the left of the driver's seat. The heater fans are activated by button 38 (Fig. 1, 2, 3, 4).

The second heater, pos. 2, is located under the cabin roof with an evaporation-heating unit of the air conditioner. The hot fluid supply is performed by activation of the valves – one valve (pos. 3) located in the supply line to heater OC-8, and the other valve (pos. 4) located under the left front pillar of the cabin.

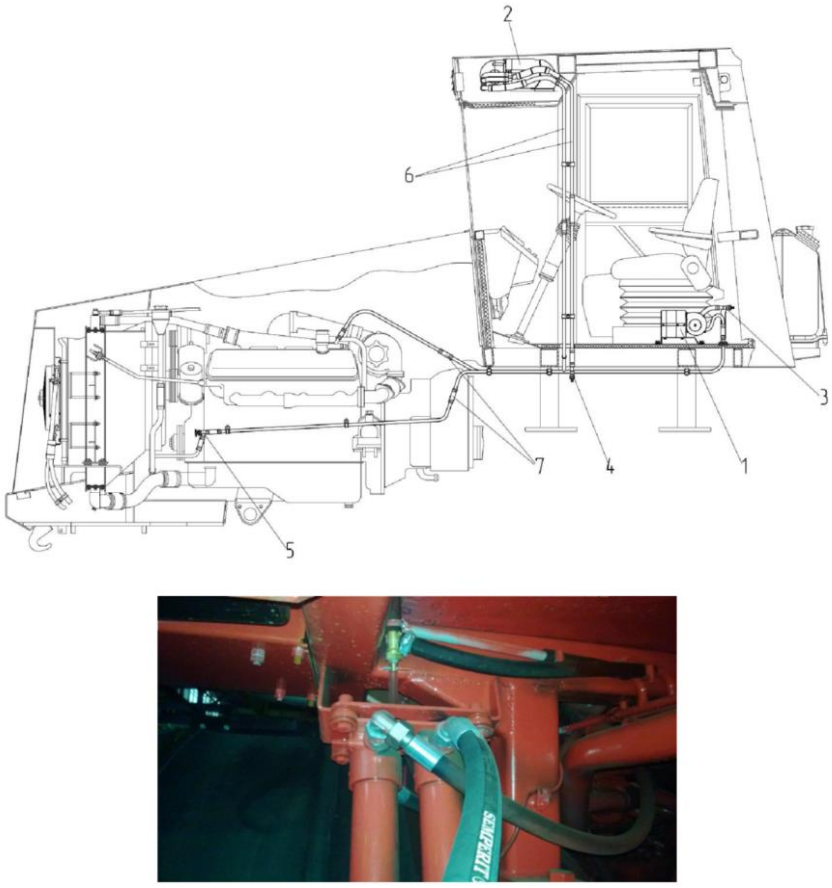


Fig. 20 Heating system

1 – heater OC-8; 2 – heater of the evaporation-heating unit;
3, 4, 5 – valve BC11; 6 – pipes; 7 – connecting hoses

Air conditioning

The activation of air conditioner is performed by handles “9” (velocity of air supply) and “8” (air cooling degree) (Fig. 12).

In order to activate the upper heater, it is necessary to open the valve for coolant supply to it (under the left front pillar of the cabin). By means of handle “9” adjust the heat flux.

ATTENTION! In order to enhance the reliable operation of the air conditioning system, before its shutdown the engine should have operated at the minimum rotational speed of idle run during 3...5 minutes.

4.15 Taking off

After the engine start-up make sure that all tractor systems are functioning.

Check the operation of light and sound signaling, braking system, hydraulic systems for control over turns and mounted implement, make sure of the absence of faults.

Check the readings of indicating instruments.

The oil pressure in the GB hydraulic system at the engine crankshaft rotational speed of900–1,800 RPM shall be 1.0–1.2 MPa (10–12 kgf/cm^2) for K-744R1, K-744R2 tractors and 1.1–1.3 MPa (11–13 kgf/cm^2) for K-744R3, K-744R4 tractors. The oil pressure growth on each transmission shall be fast. The pressure on neutraland in engagement of synchroniser brake shall not be less than on transmission gears.

Set the pressure in tyres depending upon the kind of work being executed (see Table 4 of Section 6).

Perform taking off as follows:

– set the handle for manual fuel feed into the position corresponding to the minimum rotational speed of the engine crankshaft;

– set the gear change lever into the position of “Engagement of synchroniser brakes”;

– depending upon the value of load on the hook, type and conditions of the forthcoming operation, select the GB operating mode.

In case of difficulties in the engagement of modes and rear gear, it is necessary to shift and release the drain pedal or make a movement by the steering wheel. In case of difficulties in the engagement of rear axle, it is necessary to install the tractor on a horizontal section with the semi-frames being in the straight position;

– set the gear change lever in the “N” position;

– bring the engine crankshaft rotational speed to 1,300–1,400 RPM;

– issue a sound signal;

– shift the drain pedal;

– set the gear change lever in the first gear position;

– deactivate the parking brake, indicator lamp 10 (Fig. 1, 2, 3, 4) will go out;

– release the drain pedal and at the same time increase the rotational speed of the engine crankshaft.

4.16 Gear change

Begin tractor motion only at the first gear with the drain pedal being shifted, perform further change of gears by consecutive transferring the gear change lever into the position of the second, third or fourth gear without shifting the drain pedal.

Remember that during movement at the second, third or fourth gear the drain pedal can be used only in emergency cases (in case of emergency stops) as in such cases the drain pedal return is blocked (the pedal “hangs up”). In order to return it into the initial position, it is necessary to transfer the lever into the first gear position or into the “N” position with the pedal being fully shifted.

During tractor motion by coasting and before stopping, shift the drain pedal, transfer the gear change lever into the “N” position and release the drain pedal. ***IT IS PROHIBITED*** to transfer the gear change lever into the position of “Engagement of synchroniser brakes” during tractor movement.

4.17 Stop

Perform the tractor stop as follows:

– set the manual fuel feed lever into the minimum feed position;

– smoothly release the fuel feed pedal;

– shift the drain pedal;

– set the gear change lever in the “N” position;

– stop the tractor by several smooth presses of the brake pedal. In pressing the brake pedal, the indicator lamps 21 will come on (Fig. 1, 2, 3,4);

– release the drain pedal;

– pull up the parking brake;

– provide the engine running during three-five minutes at the medium rotational speed of the crankshaft, then reduce the rotational speed to the minimum value and pull the engine stop lever (on K-744R1St, K-744R2St, K-744R3St, K-744R4St tractors) or set the ignition lock key in “0” position (on K-744R1Pr, K-744R2Pr, K-744R3Pr, K-744R4Pr tractors);

– after stopping the engine return the handle into the initial position, set the gear change lever in the “Engagement of synchroniser brake” position, set the ignition lock switch in the “O” position and switch off the battery master switch.

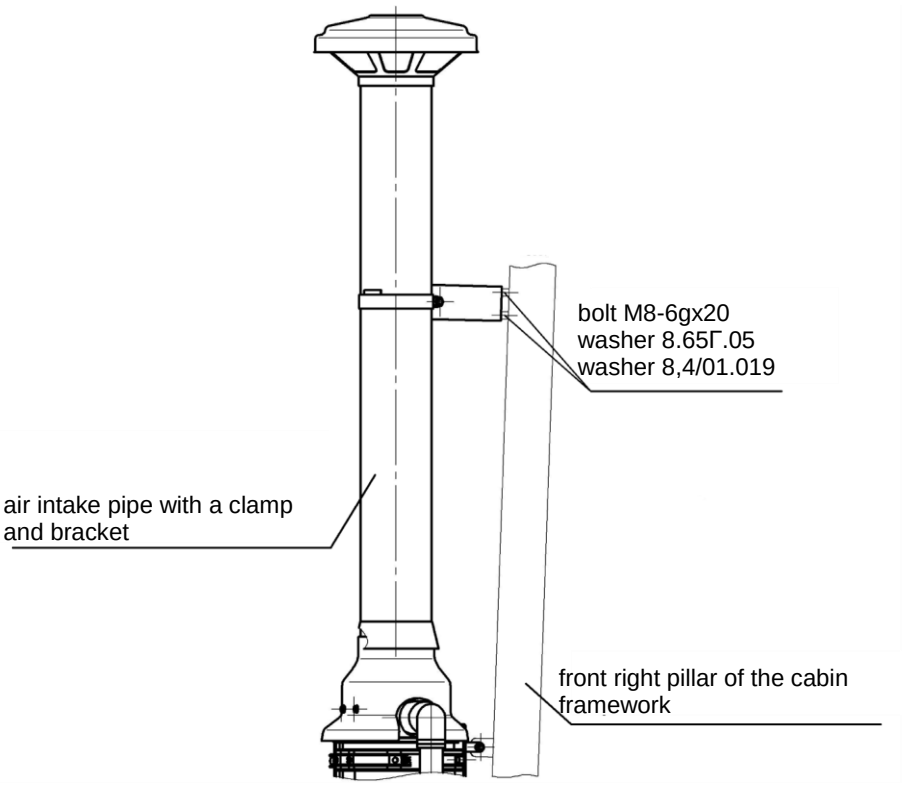
5 FINAL ASSEMBLY, ADJUSTING AND RUNNING-IN

5.1 General

During shipment from the manufacturer-plant certain parts and assemblies, for convenience of transportation and better safe-keeping, are not installed on the tractor and stowed separately. The tractor preparation for operation consists of depreservation, installation of the assemblies attached, execution of works relating to maintenance, start-up and running-in of the tractor.

Before the beginning of operation of a new tractor execute the following operations:

– install the air intake pipe on the tractor;

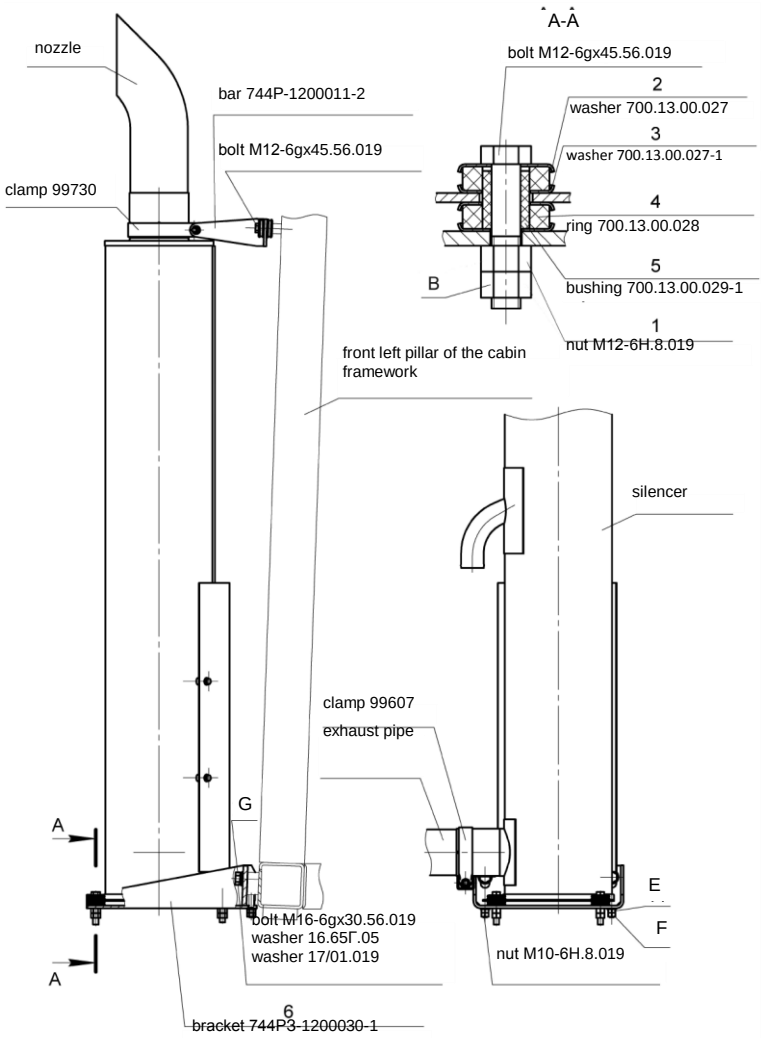


– install a silencer on the tractor;

During installation of the silencer screw the nut, pos. 1, to the full contact between the parts, pos. 2, 3, 4, 5, after which screw the nuts, pos. 1, for another 1...2 turns and lock with nut B.

The tolerance of coaxility of the exhaust pipe in respect of the silencer branch pipe is Ø2 mm. Provide by movement of the bracket, pos. 6, with nut E, lock with nuts F, after which tighten the bolts, pos. G.

Gas blow-by in the connection between the exhaust pipe and the silencer during the engine start-up and operation is not allowed.



– in order to enhance reliability of leak-tightness over the butt joint of “exhaust pipe – silencer” during installation of the silencer on the tractor, it is necessary to apply a layer of Loctite 5920 sealant on the exhaust pipe over the circumference (it is available in the SPTA kit for the tractor) by a solid roller with the thickness of 5...7 mm at the distance of 5...10 mm from the pipe end;

–install headlights, hinge pivot of central track rod, mirrors, window wiper brushes, safety belts, silencer, nozzle and air intake pipe; warmth-keeper in winter season;

– connect the minus bar to the battery master switch terminal;

– remove shims from under the spring attachment;

– fill settled fuel to the tractor;

– it is necessary to screw or unscrew the generator adjustment bolt 6582 depending upon the season (see Fig.28);

– disengage the rear axle. Engage the rear axle in case of tractor operation with agricultural implements or under heavy road conditions;

– adjust the traffic headlights (see subsection 5.1.3).

Before operation of the tractor it is necessary to reinstall the mounted implement parts (Fig. 21, 22, 23) and light signal equipment removed earlier.

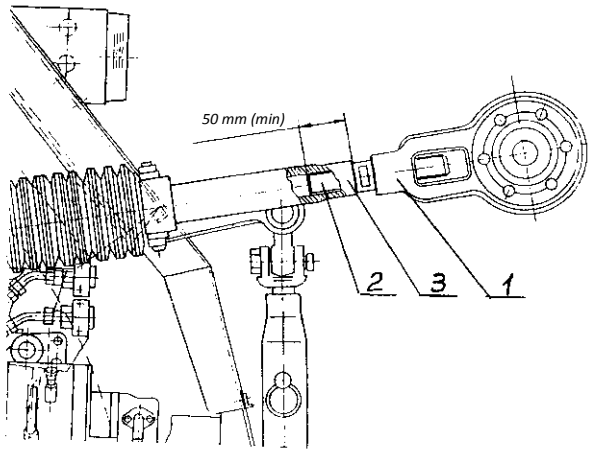


Fig. 21 Installation of the hinge pivot of the upper link

1 – hinge pivot; 2 – tightening screw;
3 – central track rod pipe

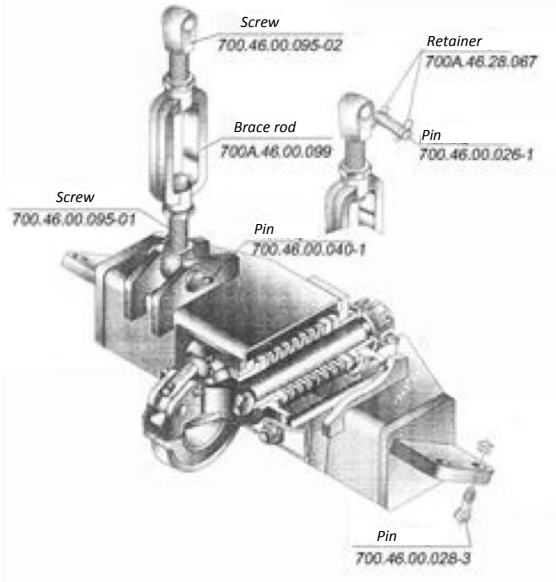


Fig. 22 Installation of hydraulic hook

Upon completion of preparatory works, perform maintenance at the tractor preparation for operating running-in.

5.1.1 Adjustment of lower links

The adjustment of the lower links (Fig.23) shall be performed in the following sequence:

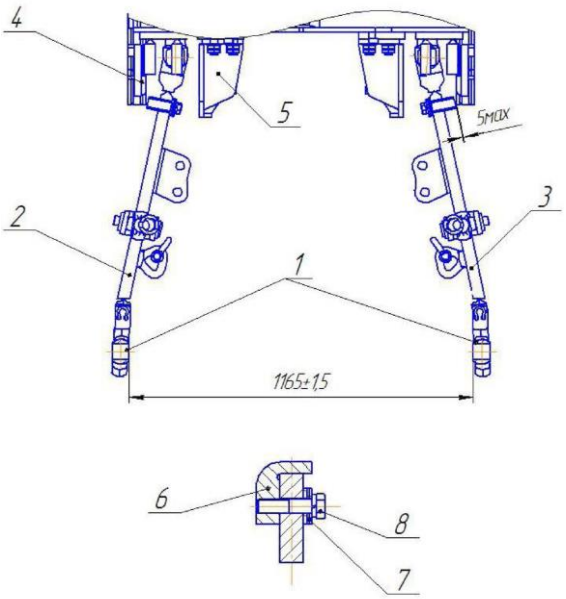


Fig. 23 Adjustment of lower links

1 – rear hinge pivots; 2, 3 – lower track rods;
4 – outer stop; 5 – internal stop; 6 – stop;
7 – washer; 8 – bolt

– fix the lower links 2 and 3 with each other, providing the size of 1,165±1.5 mm between lifting eyes of rear hinge pivots 1.

– lift the mounted implement providing the distance of 1,180...1,280 mm from the supporting surface to the lower links; in doing so, the links 2 and 3 shall be located between the outer stop 4 and the internal stop 5 (Fig. 23). Stops 744Р3-46 28021-1, pos.6, shall be installed on the side of outer stops.

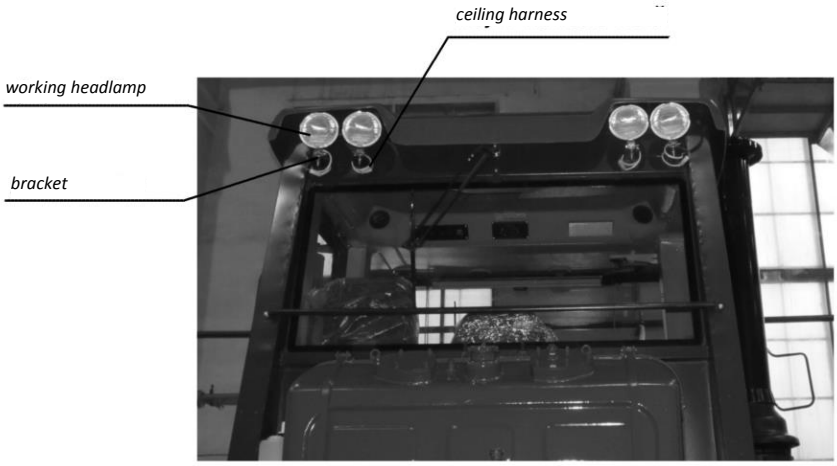
– by means of moving washers 7 from under the head of bolt 8 under stop 6, if necessary, provide the value of lateral movement of lower links to be no more than 5 mm.

5.1.2 Installation of light signaling equipment

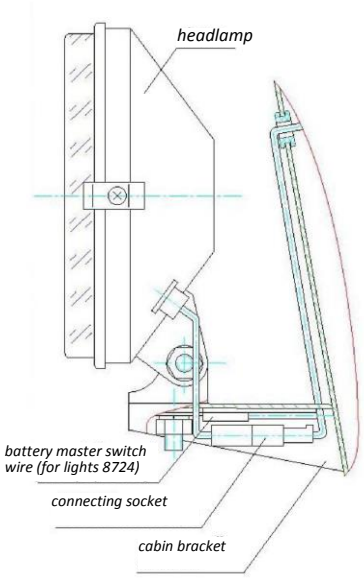
ATTENTION!During final assembly of the tractor with regard to light signaling equipment, it is necessary to thoroughly see for the fact that electrical harnesses and wires should not touch sharp edges, moving parts of the tractor as well as should not be clamped against sharp edges during erection operations.

Perform installation of light signaling equipment with the battery master switch being switched off. The front and rear work lights should be mounted on the installation brackets in the upper part of the cabin on the front and on the rear respectively.

Front working headlamps



Rear working lamps



Installation and connection of the working lamp

Perform connection of the front traffic and service headlights, rear service lights, front and rear lights, lateral turn repeaters and road-train sign according to the electrical schematic diagram (see Appendix).

During installation of the lamp for license plates and “Road-train” sign use the grounding wires from the SPTA kit connecting them according to the electrical diagram. Signal wire – to the lamp contact of the light, and “frame” wire (with round tip) – to the fastening bolt of the light housing.

5.1.3 Adjustment of head lights

Head illumination lamps (outer – low beam, internal – high beam) are built into the boot. The primary direction of the light fluxes is adjusted at the manufacturer-factory in accordance with GOST R 41.48-2004. However in the course of operation, at the replacement of lamps, the direction of light fluxes can change, which requires the necessity of additional adjustment of headlamps.

In order to adjust the headlamp light, install the tractor on the even horizontal ground at the distance of 5 m from the screen (wall). Adjust headlamps in sufficiently darkened conditions.

Perform marking of the screen for regulation of the position of light spots of headlights according to Fig.24. Align the position of vertical axis O of the screen (it shall be in the longitudinal axis of symmetry of the tractor). In accordance with recommendations set forth in GOST R 41.48-2004 (Item 6.26.1.2), select the value of B=125 mm to the distance to the screen 5 m.

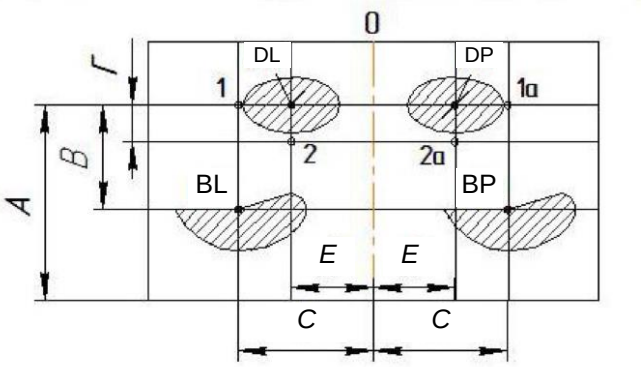


Fig. 24 Diagram of screen marking for headlamp regulation

O is the vertical axis of symmetry; 1, 1a, 2, 2a are the projections of geometric centres of lamps to the screen; BL, BP are the points of combination of the centres of light spots of the left and right headlamps of high beam; (A=1,320 mm; B=570 mm; C=125 mm; D=50; E=450)

Headlight regulation is performed by means of the head of TORX E5 wrench with the internal layout of the “star”. The layout of regulating screws on left headlights is shown in Fig.24a (view from inside the boot). On the right headlights, the layout of screws correspond to the mirror mapping.

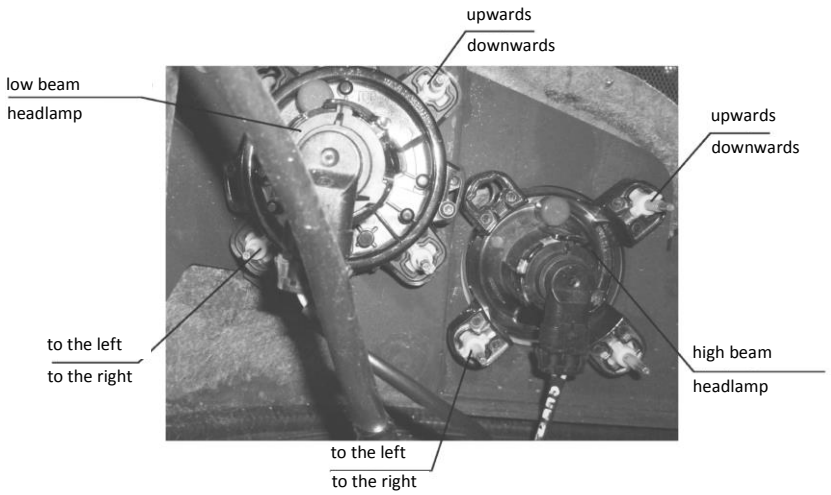


Fig.24a Layout of regulating screws on left headlights (view from inside the boot)

For regulation of the direction of light fluxes of headlamps, it is necessary to lift the boot, wear the head of TORX E5 wrench onto the adjustment screw and turn it in the required direction.

For left headlamps a turn of the upper adjustment screw of the headlamp in the clockwise direction (anticlockwise direction) leads to a turn of the light beam upwards (downwards) respectively and a turn of the lower adjustment screw of the headlamp in the clockwise direction (anticlockwise direction) leads to a turn of the light beam to the left (to the right) respectively. Having lowered the boot, compare the result obtained to the required value. The regulation is performed several times until the situation is reached similar to the screen marking diagram.

The adjustment is performed for each lamp separately; in doing so, it allows to avoid flare from other lamps by means of installation of non-transparent screens or by disconnection of connectors from the corresponding lamps.

The regulation of lamps can be performed without opening the boot. To this end, it is necessary to remove the protective casing of the radiator and carry out regulation in accordance with the instruction mentioned above.

5.1.4 Check of window washers

The cabin windscreen washer is installed on the rear of the tractor to the right in the direction of travelling, on the bracket. The cabin rear window washer is installed on the rear of the tractor to the left in the direction of travelling, on the bracket.

In order to check the operation of washers, fill the tanks with a fluid for window washers and switch on the battery master switch. Consecutively activate the washer of the front and rear windows by changeover of the right handle on the understeering switch into the corresponding position according to Fig.11.

If necessary, adjust the direction of water jet from spraying nozzles.The fluid jets shall be directed to the upper part of window wiper brushes.

5.2 Tractor running-in

For a new tractor it is necessary to perform running-in, during which rubbing parts while being operated under small loads are well run in to each other.

Perform the tractor running-in in accordance with the requirements set forth herein as well as the Operating manual for the engine.

Correctly performed running-in shall be a prerequisite of the long-term operation of the tractor. Perform running-in also after the capital repair of the tractor.

Perform running-in during:

the first 50 engine hours of operation for K-744R1St tractor;

the first 30 engine hours of operation for tractors of the remaining models.

Perform running-in of the tractor by hooking them up with the trailer or that of the tractor with agricultural machines and implements on the modes avoiding the possibility of engine overloads. The running-in mode can be changed due to selecting the implement type, limiting the grip width, depth of soil treatment and the unit speed.

In the process of tractor operation on light hauling operations, perform running-in in all modes and gears of the forward travel, accompanying tractor operation by sharp turns to the right and to the left in modes I and II and smooth turns in modes III and IV.

During tractor operation with mounted agricultural machines and implements perform checkup of the hydraulic system of the mounted device, wherefore carry out several lifting and lowering operations for the implement at the medium and maximum rotational speed of the engine crankshaft.

During running-in see for the engine operation, avoid its overload. To prevent the engine from smoking, do not admit any fall of the crankshaft rotational speed, watch operation of the sets of transmission, hydraulic systems and electrical equipment; in addition, check of there are leaks from under seals and pipelines as well as air inflow in the suction mainline.

The list and content of operations relating to maintenance in the course of preparation, conduction and upon completion of the operating running-in are set forth in the corresponding subsections of the instruction as well as in the service log-book.

6 OPERATION AND ADJUSTMENT REGULATIONS

6.1 Procedure for tractor preparation for operation

During tractor preparation for operation:

1) perform preparation of the tractor for operation only with the engine being shut off (except special inspection operations) and the parking brake being pulled up; the mounted agricultural implements shall be lowered;

2) check the tractor condition by external inspection having paid attention to the absence of leaks of fuel, oil, cooling fluid, electrolyte and, if necessary, eliminate the leaks;

3) check the level and, if necessary, refill oil into the engine lubrication system and hydraulic system, cooling fluid into the standby (expansion) tank to the level of 100–120 mm from the upper plane;

4) check the engine condition by external inspection;

5) before switching on the battery master switch after a long-term outage of the tractor (more than one day – 24h), especially in summer season, open the lid of the storage battery container for a period of not less than 5 min in order to remove the explosive hydrogen-air mixture; the storage batteries shall be reliably fixed and closed with a lid;

6) fill fuel into the tractor. Before filling, the fuel should be subjected to settling during 10 days (at least). The filler ports of the tank and other reservoir are tightly closed as the vents are protected against any ingress of duct therein. The intake hose shall be at the height excluding suction of mechanical impurities and water. The grades of fuel being used are given in Appendix 6 “Filling reservoirs”. Before every filling drain the fuel sludge from the fuel tank. Perform mechanical filling with preliminary removal of the filler port filter, manual – with the use of filter;

7) check the engine operation by ear and according to the readings of indicating instruments; the heated engine shall operate steadily, without smoke, without foreign rattle and noise;

8) check the operation of tractor control mechanisms, operation of the braking system, lighting and signaling, hydraulic system for control over turns and mounted implements. To this end:

a) pedals, handles and levers shall operate without jamming, pedals shall freely return to the initial position under the action of springs, levers shall provide reliable fixing against spontaneous engagement and disengagement;

b) make sure of reliable and simultaneous action of brakes during tractor motion. The service brakes shall ensure full stop of the tractor on dry hard covering providing good adhesion of wheels with the road;

c) perform 2–3 full turns of the tractor on the spot on a concrete or asphalt ground. The turn shall pass smoothly, without jerks, vibrations, oscillations;

d) perform 1–2 lifting and lowering operations of the mounted implement; in doing so, the handle of hydraulic distributor shall be fixed in the “Lifting” and “Forced lowering” positions and automatically return to the “Neutral” position and from the “Floating” position – return to the “Neutral” position after manual release from the fixing position. Perform checking at the nominal rotational speed of the engine crankshaft. The absence of fixing of the handle in the “Forced lowering” position is allowed in case of non-loaded mounted implement;

e) switch on the battery master switch on the instrument panel, with such switching-on the indicator lamp 27 shall come on (Fig. 1, 2, 3, 4).

f) if necessary, on the basis of your own convenience, make adjustments of the position of mode change lever 1 and rear axle engagement lever 12 (Fig.6).

Switch on the corresponding switches of illumination of the instrument panel, internal lighting of the cabin, outer lights. With such switching-on, the lamps of corresponding instruments will get alight.

Press the sound alarm button on the understeering switch – the sound signal should be heard.

Check the serviceability of lamps in the indicator block on the instrument panel by activation of buttons 28 and 32 (Fig.1, 2, 3, 4).

Activation of the handle of turn signal, “right” – “left”; in doing so, the lamps of lights should flash.

Press the brake pedal; in doing so, the rear light lamps should come on with bright red light. Check that the air pressure in the pneumatic system is not below 0.45 MPa (4.5 kgf/cm^2).

Pull up the parking brake; in doing so, signal lamp 10 on the instrument panel (Fig. 1, 2. 3. 4) should flash.

After switching on the battery master switch (pos. 15, Fig. 1, 2, 3, 4) the engine hour meter/voltmeter (pos. 16, Fig. 1, 2, 3,4) shall show the tractor operating time in engine hours. After engine start-up the instrument shall show the voltage in the accumulator circuit, it shall be equal to 27±0.7 V;

9) adjust the driver’s seat depending upon the weight and height;

10) set the required air pressure in tyres.

The standard values of operating modes of the tyre shall correspond to Tables 3 and 4.

Maintain record-keeping for each tyre separately. To this end, a “Tyre operation registration card” is to be established (Appendix 8), which is the main document characterizing the tyre operation in case of reclamation, write-off to scrap as well as in other cases. The internal pressure in tyres should be registered in the “Log-book for registration of measurements of the internal air pressure in tyres” (Appendix 7).

The pressure measurement is carried out once in every five days before tractor travelling for work execution. The results are registered in the log-book.

Table 3

For tyre of 30,5R32 type

Permissible loads on tyres at the speed up to 35 km/h

Pressure in tyres, MPa (kgf/cm^2)	0.11 (1.1)	0.12 (1.2)	0.13 (1.3)	0.14 (1.4)	0.15 (1.5)	0.16 (1.6)	0.17 (1.7)
Load on one tyre, N (kgf)	36,030 (3,675)	38,090 (3,885)	39,460 (4,025)	41,470 (4,230)	43,190 (4,405)	53,680 (4,575)	46,220 (4,715)
Note. At the speed of no more than 20 km/h it is allowed to increase the load on tyre up to 20% without increase of the internal pressure.							

For tyre of 28,1R26 type

Permissible loads on tyres at the speed up to 35 km/h

Pressure in tyres, MPa (kgf/cm^2)	0.11 (1.1)	0.12 (1.2)	0.13 (1.3)	0.14 (1.4)	0.15 (1.5)	0.16 (1.6)	0.17 (1.7)
Load on one tyre, N (kgf)	32,370 (3,300)	33,940 (3,460)	35,120 (3,580)	36,980 (3,770)	38,450 (3,920)	39,730 (4,050)	41,200 (4,200)
Note. At the speed of no more than 16 km/h it is allowed to increase the load on tyre up to 20% without increase of the internal pressure.							

Table 4

For tyre of 30,5R32 type

Recommendations on internal pressure in tyres

Kind of works	Pressure in tyres, MPa (kgf/cm^2)	
	Front wheels	Rear wheels
Hauling operations	0.17 (1.7)	0.17 (1.7)
Ploughing with semi-mounted plough and other agricultural operations	0.14 (1.4)	0.14 (1.4)
Ploughing with mounted plough	0.14 (1.4)	0.14 (1.4)
Early spring agricultural operations with trailing machines	0.09 (0.9)	0.09 (0.9)

For tyre of 28,1 R26 type

Recommendations on internal pressure in tyres

Kind of works	Pressure in tyres, MPa (kgf/cm^2)	
	Front wheels	Rear wheels
Ploughing and other agricultural operations	0.17 (1.7)	0.16 (1.6)
Early springagricultural operations with trailing implements	0.14 (1.4)	0.11 (1.1)
Hauling operations with additional loading on the tractor hydraulic hook from the trailer	0.17 (1.7)	0.15 (1.5)

6.2 Operating rules and control over tractor during operation

When working on the tractor:

see for the readings of instruments and signal devices. The readings of instruments and signaling of indicator lamps shall correspond to the directives set forth in the “Controls” section. ***IT IS PROHIBITED*** to work with the indicator lamps 1, 2, 8, 9, 10 (Fig. 1, 2, 3, 4), the signal devices built into the receivers of temperature and pressure gauges and the clogging indicator lamp being alight;

keep the cabin clean; no presence of foreign things is allowed in the cabin;

all tractor control levers shall admit fixing in the corresponding positions;

in case of accident or excessive increase of the rotational speed of the engine crankshaft, immediately deactivate the fuel feed by pulling the engine shutdown handle;

do not permit the engine operation on load at the cooling fluid temperature below 70°C;

in case of the engine oil and cooling fluid temperature rising above the permissible value, stop the tractor and set the minimum rotational speed of the engine crankshaft; when the normal values will be achieved continue travelling;

in order to avoid overheating of the cooling fluid, it is necessary to see for the absence of fouling of the water radiator plates. To this end, when working in dusty conditions, it is necessary to perform radiator blowdown with compressed air under the pressure of 5...7 kgf/cm^2 during every shift from both sides – from the radiator front and from the fan casing side. In case of repeated overheating of the engine, it is necessary to thoroughly check the condition of the radiator core. To this effect, it is necessary to free the fastening of condenser of the air conditioner assembly with the fan from the frame and carefully throw out it forward, then check the absence of clogging between the radiator plates by inside light inspection using a portable lamp. If necessary, perform blowdown or (in case when dirt is not removed by means of blowdown) wash the radiator core with water under the pressure of 5...7 kgf/cm^2;

tractor brakes shall be in good working order. During braking of the tractor travelling over dry and hard ground using the service brake, the braking distance shall not be more than 13 m at the speed of 8.33 m/s (30 km/h) and no more than 6.5 mat the speed of 20.2 km/h. The brake pedal being fully depressed shall not bump up against the cabin floor;

it is not allowed to drive the tractor under facilities with the driving clear height below 4 metres;

during turns select the speed providing safe traffic. ***IT IS PROHIBITED*** to perform a sharp turn at a gear higher than the first gear of the fourth mode;

during tractor motion with the pressure in tyres below 170 kPa (1.7 kgf/см^2) the speed shall not exceed 5.56 m/s (20 km/h);

during motion ***IT IS PROHIBITED*** to use the parking brake;

IT IS PROHIBITED to tow the tractor by the mounted implement mechanism;

during motion down the slope ***IT IS PROHIBITED***to use coasting;

see for the absence of leaks of cooling fluid, oil, fuel, electrolyte; in case of a leak being detected eliminate it;

regularly clean the tractor from dust and dirt, check the tractor configuration, reliability of all outer fastenings;

IT IS ABSOLUTELY PROHIBITED to connect uncleaned pipelines and hydraulic cylinders of agricultural machines and implements to the hydraulic system of the tractor;

check the oil level in GB after engagement of the PTO shaft, if necessary, refill it.

Fulfil the following rules of operation for pneumatic tyres:

a)do not permit tractor operation with significant wheel slip;

b) do not permit tractor operation and parking on damaged and blown-out tyres;

c) do not permit travelling on tyres with decreased internal pressure even for small distances as it leads to tyre failures;

d) in order to avoid increased wear if tyres, operate the tractor on roads with hard pavement during no more than 30% of the total period of operation;

e) protect tyres from the ingress of fuel, oil and other petroleum products thereon;

in case of execution of hauling operations, set the fuel supply lever into the position of minimum fuel feed;

strictly obey the instructions set forth in the “Safety requirements” section.

ATTENTION! In order to prevent untimely failure of the rear axle cardan gear and reduce the wear of tyres, it is necessary to engage the rear axle only in case of tractor operation with agricultural implements and during movement in heavy road conditions.

During movement in good road conditions (on roads with compact ground or with pavement) the rear axle shall be disengaged.

6.3 Installation and dismantling of wheels with tyres

Tyres shall be operated and stored in accordance with the tyre operation instructions for tractors and agricultural machines.

Mount only serviceable tyres, inner tubes and rims corresponding by size and type (Fig.25). The rims shall be free of mechanical damage, bends, flattened edges, burrs and shall be cleaned from rust and painted. Tyres shall be clean, dry. Before installation tyres and inner tubes shall be poured with talc. The installation and dismantling of tractor wheels shall be carried out by two workers by means of two installation blades.

The first blade is a lever, one end of which is made in the form of a fork and serves only for removing the tyre shoulders from the rim shelves and the other end serves for tyre installation. The second blade has one end in the form of a bent air-foil ensuring reliable grip by the rim lip as well as removal tyre shoulders from the rim shelves paired with the fork end of the first blade, the other end is a box wrench for the locking screw of hydraulic jack. When mounting a tyre see that during installing the wheel on the tractor the direction of wheel rotation should coincide with the arrow applied onto the tyre surface. The installation and dismantling, insertion of tyre shoulders are possible only when the diametrically opposite part of the tyres in respect of the shoulder to be inserted is flush-mounted into the rim groove. The application of soap solution onto the tyre shoulders during installation and dismantling operations considerably facilitates the installation and dismantling and extends the tyre lifetime.

Fig. 25 Tyre, inner tube and rim of the tractor wheel

<u>Perform tyre installation onto the rim in the following sequence:</u>

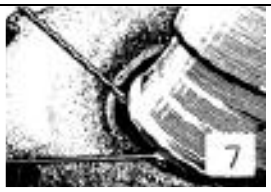
	put the tyre onto an even ground and fit the rim on it with the lip facing downwards, located closer to the groove so that a part of the tyre shoulder should get into the rim groove;
	insert the first blade between the upper shoulder of the tyre and the rim so that the bent end should reliably grip the tyre shoulder and, acting as a lever, introduce the tyre shoulder being installed behind the rim lip. Repeat this operation several times until the introduction of the shoulder being mounted stops causing difficulties;

	in order to facilitate further mounting, use the second blade. Insert it between the tyre shoulder and the rim and press out the rim upwards, insert the other blade closer to the tyre shoulder introduced and repeat the previous operation. Sequentially moving over the circumference, repeat this operation several times until the rim lip gets into the tyre cavity;
	introduce the last rim segment into the tyre by smoothly pressing both blades simultaneously;
	place the tyre at an angle to the wall, press out the rim against the wall so that the tyre cavity should be fully free, and, taking the inner tube on the valve side, introduce it into the tyre cavity;
	insert the valve into the valve hole and fix it with the nut; in doing so, see for the correct position of the valve, do not admit its warping. Put the inner tube fully on the rim, pull the rim and pressurise the inner tube in order to avoid the possibility of inner tube jamming between the tyre shoulders and the rim;
	put the tyre on the floor. On the opposite side of the valve, insert both installation blades at the distance of 250–300 mm from each other so that they should reliably grip the rim lip, and, pressing the blades downwards, introduce the tyre shoulder behind the rim lip;
	holding one blade in such position, take off the second blade and insert it at the distance of 50–100 mm from the first blade so that it should grip the lip and, pressing with the blade downwards, introduce the tyre shoulder behind the rim lip. The installation will be significantly facilitated if the tyre is simultaneously pressed by foot. In order to facilitate the process of introduction of the tyre upper shoulder, flush mount by means of feet the tyre part being opposite to the shoulder introduced into the rim groove;
	the installation finishes at the valve by means of both blades;

Pump the tyre to the normal pressure, then fully release air from the tyre and pump again to the pressure of 0.28 MPa (2.8 kgf/cm^2), having held under this pressure until the tyre shoulders seat the rim shelf; then release air until the recommended pressure in the tyre gets established. Perform pumping of tyres within enclosing net (area).

Perform tyre dismantling from the rim in the following sequence:

	fully release air from the tyre;
	take off the tyre shoulders from both conic rim shelves by means of the fork end of the first blade and the bent end of the second blade. Perform taking off the shoulders first from the shelf being opposite to the valve hole in the following sequence:
	insert the bent end of the second blade between the shoulder lip of the rim and the tyre and press out the tyre shoulder downwards;
	insert the fork end of the first blade into the gap generated between the shoulder lip of the rim and the tyre so that the bent end of the second blade should be in the groove of the fork blade;
	press out the tyre shoulder downwards with the first installation blade. Repeat the operations set forth in Items 1, 2, 3 over the whole rim circumference to complete removal of the tyre shoulders from the seating shelves;
	insert the installation blades on both sides of the valve hole at the distance of 100 mm and, pushing the opposite shoulder of the tyre by feet into the installation groove of the rim, extract a part of the tyre shoulder behinds the rim lip;
	step aside from the part of tyre shoulder extracted over the circumference for a distance where it is possible to introduce the second blade without difficulties with the bent end between the rim lip and the tyre shoulder, and again extract the tyre shoulder behind the rim lip;
	repeating the operation as per Item 5, take off the upper shoulder of the tyre;
	put the wheel at an angle in respect of the wall and extract the inner tube;

	rotate the wheel with the tyre and take off the second shoulder of the tyre from the rim, wherefore:
	lift the rim upwards so that it should become possible to insert both blades between the tyre shoulder and the rim at the distance of 200–250 mm between the blades, press out the rim upwards, first by one blade, then by another blade, free the second installation blade, leaving the rim in the pressed-out state;
	insert the bent end of the second installation blade into the gap between the shelf and the tyre shoulder at the distance of 150–200 mm from the first blade, and, gripping the shoulder lip of the rim extract the rim from the tyre. Repeat this operation several times until the rim fully go out from the tyre.

ATTENTION! During removal and installation of wheels, install the technological pins located on the driving axle planet carrier in the vertical plane. Before removal of doubled wheels from the hub (or one of them) release air from both wheels.

Installation of additional wheels on tractors

To provide tractor operation on soils with increased moisture content (early spring works, etc.) in order to reduce the specific pressure on the ground and improve the tractor's passing ability it is provided to install additional wheels with parts for their installation.

The set includes the following:

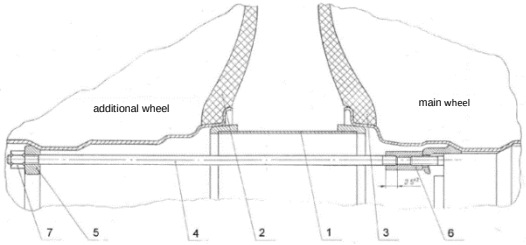
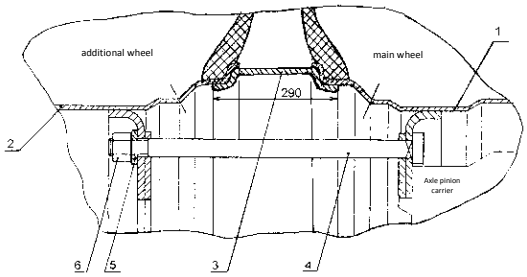
for K-744R1 tractor:

4 wheel assemblies (2 left and 2 right), 4 spacer collars, 4 pressing rings, 32 stud bolts, 32 special nuts.

for K-744R2, K-744R3, K-744R4 tractors:

4 disk wheel assemblies (2 left and 2 right), 4 spacing collars, 32 special bolts, 32 nuts, 32 washers.

Perform installation of the set, running-in and maintenance in the following sequence:

No.	K-744R1 tractor	K-744R2, K-744R3, K-744R4 tractors
	Installation of the wheel set	
1.	 **Installation of additional wheel** 1 – spacer ring; 2 – additional wheel; 3 – main wheel; 4 – stud (long); 5 – pressing ring; 6 – special nut; 7 – nut	 **Installation of additional wheel** 1 – main ring; 2 – additional wheel; 3 – spacing ring; 4 – special bolt; 5 – washer; 6 – nut
2.	Replace (alternately) standard mounting nuts, pos. 3, fastening the main wheel with special nuts 6. The tightening torque for special nuts equals to 14...20 kgf·m	Hang the main wheel 1 of the tractor above the ground surface.
3.	Screw in the long studs 4 for the depth of 25...27 mm into the special nuts	Install the spacing ring 3 into the main wheel of the tractor having ensured its uniform seating over the whole diameter.
4.	Install the spacer ring 1 and press it with the additional wheel assembly 2.	Install the additional wheel 2 on the spacing ring 3 so that the grooves in the disc of additional wheel should be located opposite to the grooves of the main wheel disc.
5.	Introduce studs 4 into the holes of pressing ring 5 and fix the additional wheel by means of standard nuts 7. Insert the pressing ring with the chamfered edge (around the wheel diameter) inside the rim of the additional wheel.	Introduce special bolt 4 with the head through the grooves in discs of (additional and main) wheels, turn it at 90° around the axis, and engage it with the square bolt head and recess of the main wheel disc.
6.	The nuts shall be tightened in a criss-cross manner using standard wrench with tightening torque of 14...20 kgf·m	Install washers 5 and pull up the additional wheel to the main one using nuts 6
7.		Perform tightening of nuts in criss-cross manner using standard wrench with tightening torque of 14...20 kgf·m
	Running-in and maintenance	
1.	Set the air pressure in tyres: – in main tyres – (1.1±0.1) kgf/cm^2; – in additional tyres – (0.9 ±0.1) kgf/cm^2;	Set the air pressure in tyres: – in main tyres – 1.1 kgf/cm^2; – in additional tyres – 0.8 kgf/cm^2.

No.	K-744R1 tractor	K-744R2, K-744R3, K-744R4 tractors
2.	Perform a 1.5-hour running-in of the tractor on doubled wheels with tightening of additional wheel fasteners every 30 min.	Perform an 8-hour running-in of the tractor on doubled wheels with tightening of additional wheel fasteners every 2 hours.
3.	During shift maintenance (once in every 8–10 engine hours of tractor operation) tighten the additional wheel fasteners to the stop.	During shift maintenance (no more than 10 engine hours of tractor operation) tighten the additional wheel fasteners to the stop.
4.	Tractor main wheels shall be tightened at the first maintenance (M-1, once in every 125 engine hours).	Tractor main wheels shall be tightened at the first maintenance (M-1, once in every 125 engine hours).

Tyre operation record-keeping

Maintain record-keeping for each tyre separately. To this end, a “Tyre operation registration card” is to be established, which is the main document characterizing the tyre operation in case of reclamation, write-off to scrap as well as in other cases. The internal pressure in tyres should be registered in the “Log-book for registration of measurements of the internal air pressure in tyres”. The results are recorded in the log-book in accordance with the type operation rules for tractors.

6.4 Connection of the hydraulic system of agricultural machines, implements and vehicles to the tractor hydraulic system

The connection is provided by means of eight hydraulic fast-coupling cutoff clutches (Fig.26) installed on the rear semi-frame of the tractor and connected to four service sections of hydraulic distributor.

The connection of hydraulic system of the tractor and agricultural implement shall be performed in the following sequence:

– connect hoses 6 to the hydraulic system of agricultural implement;

– pull hose 9 to the stop; in doing so, balls 7 will settle opposite the groove of closing sleeve 3;

– install valve 5 into clutch 1 to the stop;

– release hose 9, clutch 1 under the action of spring 8 will return into the initial position;

– make sure of reliability of fixing valve 5 in housing 1.

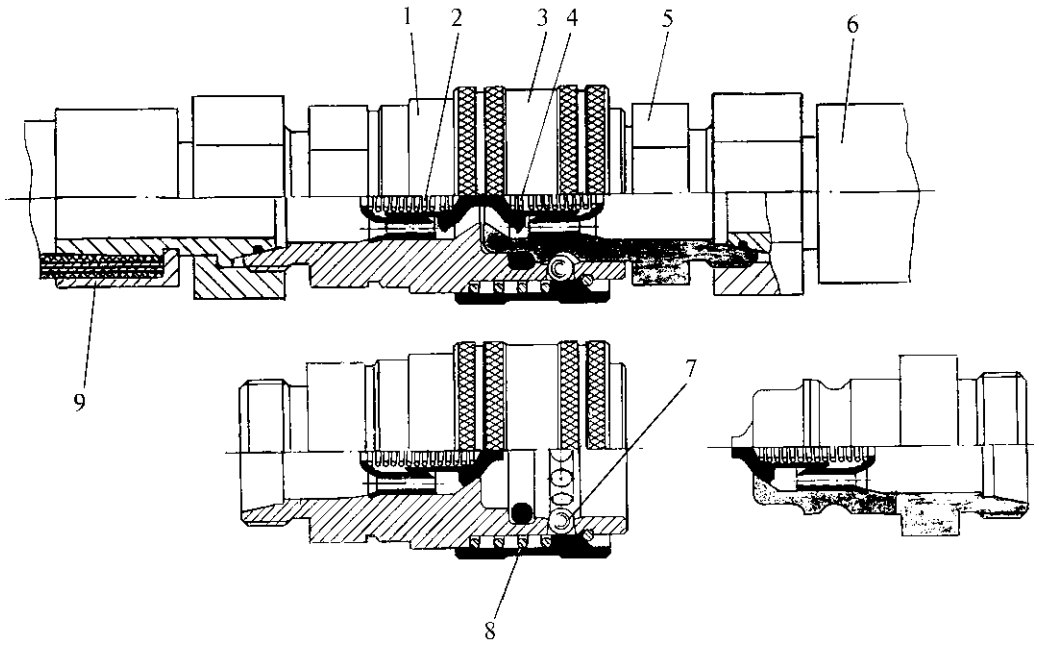


Fig. 26 Diagram of operation of fast-coupling cutoff devices
1 – clutch, 2, 4, 8 – springs; 3 – closing sleeve; 5 – valve;
6, 9 – hoses; 7 – balls

6.5 Connection of the hydraulic system of agricultural machines, implements and vehicles with tractor drawbars

The following elements are provided to connecting the tractor with agricultural machines, implements and vehicles (see Table 1): mounted 3-point device, hitch iron, hydraulic hook.
The mounted implement provides connection with mounted agricultural machines and implements having three connecting elements, with butt-joining with the central track rod and lower links with Walterscheid connection; with semi-mounted implements having two connecting elements, with butt joining with the lower links with Walterscheid connection. The connection shall be carried out as follows:

a) install globe joints on the axles of trailing agricultural machines or implements;

b) set the agricultural machine or implement in the operating position on the even ground and smoothly approach at the rear gear so that the trailing device of lower links should be below the ball hinge pivots;

c) lift lower links 7 (Fig. 26a) by means of hydraulic cylinders until the locks get operated;

d) by regulating vertical strut 6 adjust the difference over the height of axles of trailing implement;

e) disconnect central track rod 1 from bracket 3, connect it to the pillar on the frame of agricultural machine (implement) and fix by means of axle-pins.

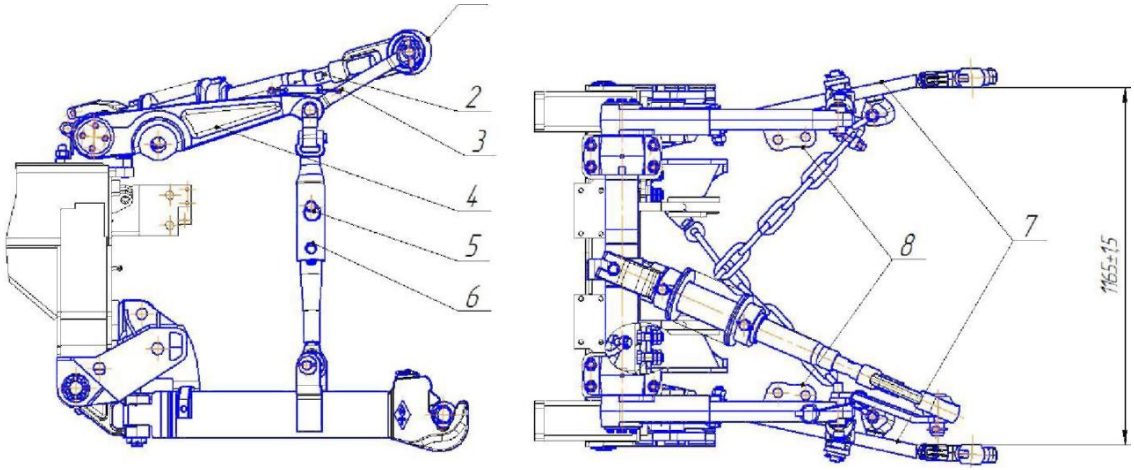


Fig. 26a Mounted implement

1 – central track rod; 2 – tightening screw; 3 – bracket; 4 – main lever; 5 – pin; 6 – vertical brace strut; 7 – lower links; 8 – platform for hydraulic hook

Having connected a mounted agricultural machine (implement) to the tractor at three points or a semi-mounted one at two points, perform preliminary installation of its frame into the horizontal position. Perform installation by means of changing the length vertical brace struts and central track rod.

In connecting mounted or semi-mounted agricultural machines and implements, the length of vertical strut 6 (Fig.26a) shall be minimum for ensuring the maximum traffic clearance.

Note. Perform connection of the lower link and the central track rod to coupling elements of agricultural machine (implement) with the tractor parking brake being pulled up.

In disconnection of the machine or implement from mechanisms of tractor mounted equipment, disconnect the central track rod and fix it, then disconnect the lower links.
The mounted device is adapted for hooking up with implements having coupling of the following categories:

– НУ-4 (cat. 4 ISO 730) – main;

– НУ-3 (cat. 3 ISO 730) – additional;

– “Kirovets”– additional.

The parameters of connecting dimensions of the mounted implement categories are given in Fig.26band in the table.

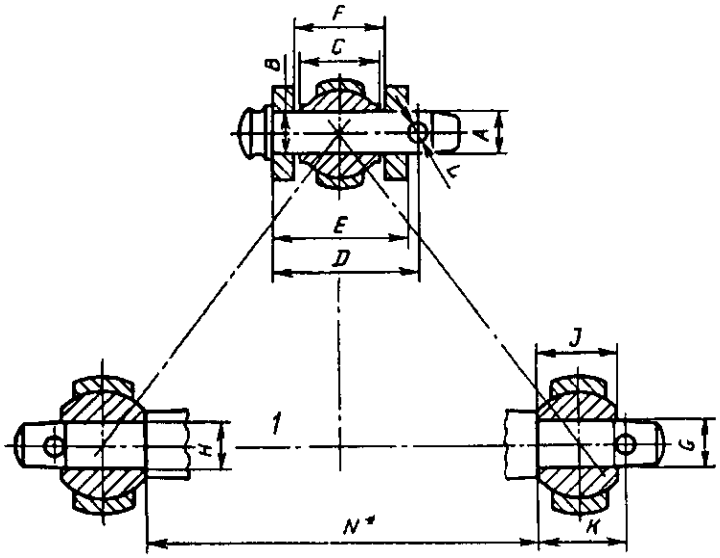


Fig. 26b Dimensions of connecting elements of the implement on the tractor

Designation of implement parameters					
Parameter according to the figure	**Kirovets**	**GOST 10677-2001**		**ISO**	
				ISO 730/1	**ISO 730/3**
		НУ-3	**НУ-4**	**Cat. 3**	**Cat. 4N**
Hinge pivot of the upper (central) link					
A (rod pin)	$39.5_{-0.8}$	$31.75_{-0.2}$	$45_{-0.8}$	$31.75_{-0.25}$	$45_{-0.8}$
B (holes for implement lifting eyes)	$40^{+0.62}$	$32^{+0.25}$	$45.2^{+0.3}$	$32^{+0.25}$	$45.2^{+0.3}$
C	$98_{-0.97}$	51 max	64 max	51 max	64 max
E	183 max	95 max	132 max	95 max	132 max
F	99 min	52 min	65 min	52 min	65 min
Hinge pivot of the lower links					
C (pin)		$36.6_{-0.2}$	50.8_{-01}	$36.6_{-0.2}$	$50.8_{-1.1}$
H (hole for pin)	$60^{+0.46}$	$37.4^{+0.35}$	$51^{+0.5}$	$37.4^{+0.35}$	$51^{+0.5}$
J	$80_{-0.74}$	$45_{-0.2}$	$57.5_{-0.5}$	$45_{-0.2}$	$57.5_{-0.5}$
General dimensions					
M (height of pillar on the implement)	1,100	685–700 (900 for ploughs)	1,100	560 min (recom.)	1,100 min (recom.)
T	1,120	965±1	1,165±1.5	965±1	$1,168_{-3}$

Hydraulic hook provides connection of the tractor to vehicles and hauling-process devices. The connection by means of a hydraulic hook installed on platforms 12 (see Fig.23) of the mounted implement shall be carried out as follows:

approach to the hitch frame of transportable facility with lowered hydraulic hook at a low speed, which has a latch installed in the “open” position.In doing so, it is necessary to visually combine the planes of symmetry of coupling devices of “hook-hitch” type; when the distance between their connecting elements equals to 0.6–1.0 m, leave the cabin and make sure of coincidence of the hook mouth and the hitch in the vertical plane, if necessary, rotating the steering wheel, ensure such coincidence; continue tractor approach to the hook stop in the hitch, then, operating the hydraulic distributor lever, lifting the mounted implement, introduce the hook mouth into the hitch and lift the hook into the transportation position to the height of 700 mm;

close the latch and install drawbars;

connect the implement hydraulic system to the tractor hydraulic system;

join the connecting heads of the pneumatic system.Before connecting the tractor pneumatic system, press the valve of the tractor connecting head and, having opened the separating valve, blow down the system until condensate is removed. At negative temperatures repeat this operation after completion of work too;

connect electrical equipment.

If a road train is composed (out of a semi-trailer and trailer), then reconnect the end marker lights to the trailer;

connect safety chains of the vehicle (semi-trailer or trailer) to the connecting links located on the lifting eyes of lower links of the mounted device.

REMEMBER! The latch and arrestor catch of the hook shall be located in the longitudinal vertical plane above the hook mouth and locked with splint pin.

The hitch iron provides connection of the tractor with trailing agricultural machines (implements), which hitch frames have coupling hitches.

The hitch iron shall be installed into hinge pivots 11 (see Fig. 23) of lower links 10, 17 and fastened by means of axle-pins. In doing so, the length of vertical struts shall be adjusted so that the pins connecting the outer and internal pipes should pass through the lower hole of the outer pipe and the upper hole of the internal pipe. The hitch iron shall be installed at the height of 400–500 mm from the ground service to the lower plane of the hitch iron mouth.

REMEMBER! In hooking up the tractor with trailing agricultural machines to be connected by means of hitch iron, the horizontal struts in the transverse plane shall be adjusted for movement by 150–200 mm. In carrying out the transportation of the above-mentioned machines, the lower links shall be fully locked against transverse movements by horizontal brace-struts.

6.6 Order of work with agricultural machines (implements) and vehicles

6.6.1 Order of work with mounted and semi-mounted agricultural machines (implements)

In hooking up mounted and semi-mounted agricultural machines and implements, fulfil the following rules:

a) lower and lift agricultural machines and implements only in rectilinear movement of the tractor;

b) avoid turns of the tractor with agricultural machines (implements), which service elements are in soil.

d) in order to avoid failures of 28,1R-26 tyres, it is recommended to perform hauling travels of K-744R1 tractors with heavy mounted implements at the speed over 10 km/h.

REMEMBER! A turn of the combined unit with deepened service elements can lead to an accident.

c) during operation of the tractor combined unit ***IT IS PROHIBITED*** to set the hydraulic distributor handles into the “Forced lowering” position for the service position of agricultural machines (implements).

Holding the handle of hydraulic distributor of the hydraulic system for control over service equipment in the “Lifting” or “Forced lowering” position, absence of automatic return of the handles of hydraulic distributor into the “Neutral” position can lead to overheating of the working fluid of the tractor hydraulic system and to a failure of units of the steering control and mounted equipment systems;

at the transportation of an agricultural machine or implement the work tools shall be in the transport position and the hydraulic distributor handles shall be in the “Neutral” position.

REMEMBER! In hooking up the tractor with mounted and semi-mounted agricultural machines to be connected to three or two points of the mounted device, the length of horizontal brace-struts shall be adjusted so that the rear hinge pivots of lower links should freely moved in the transverse plane for 150–200 mm.

The final adjustment and setting of agricultural machines and implements shall be carried out in the field (in case of ploughing – at passing the third groove; in case of other operations – at the first passage).

In the groove, adjust the mounted machines first for the same depth of the front and rear work tools and then set the required depth of treatment and finally align in the longitudinal plane by means of the central track rod and in the transverse plane – by changing the length of vertical brace-struts.

> Note. The procedure for regulation of work tools of agricultural machines (implements), their operating modes as well as their transfer into the transportation position are indicated in the operating manuals for these machines and implements.

The drain line from the hydraulic motor shall be connected, via a hose with the internal diameter of 20 mm, length of 3,200 mm (it is available in the SPTA kit), directly to the cover of the hydraulic tank filter being the right-hand in the direction of tractor motion, avoiding the hydraulic distributor.

In hooking up with implements equipped with hydraulic motors (for example, fan), their hydraulic lines should be connected to the 2nd and 3rd pair of clutches of the tractor hydraulic system. Connect the hydraulic motor line to the “Lowering” position. Perform shutdown of the hydraulic motor by setting the handle of hydraulic distributor into the “Floating” position.

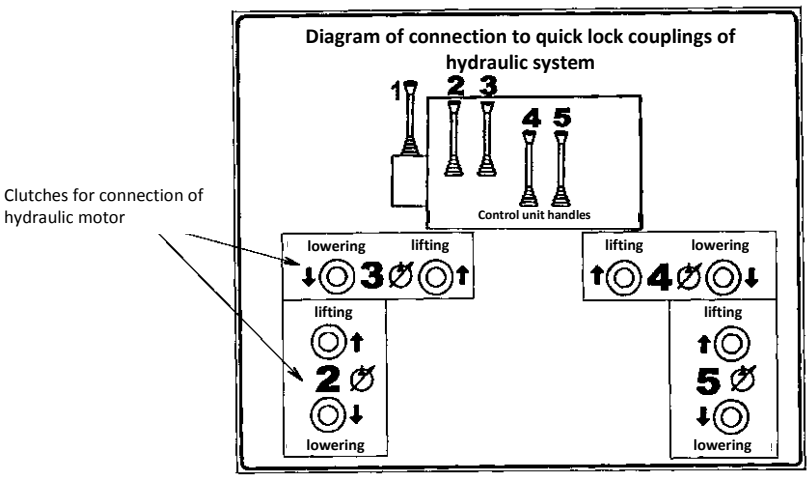


Fig. 27 Nameplate on the rear wall of the fuel tank

6.6.2 Tractor operation with ploughs

The depth of ploughing under the front and rear housings of the plough is set only by screws of the front and rear mechanisms of carrier wheels of the plough.

In preparing the plough for long-term transportation, the length of central track rod decreases so that the outermost point of the plough in the lifted state should not exceed the external height of the tractor.

In hooking up with a mounted plough, in order to provide the floating mode, the pins of vertical struts of the mounted implement shall be installed so that they should pass through lower holes of outer and longitudinal grooves of internal pipes of vertical struts (open strut).In doing so, dimension A (Fig.23) on the top and on the bottom shall not be more than 60 mm.

6.6.3 Order of work with vehicles

ATTENTION! The road-train in the following sequence and composition: tractor, semi-trailer (1ПТС-9Б or ОЗПТ-8573) and trailer (3ПТС-12Б or ОЗПТ-8572) is designed for carriage of cargoes over all types of roads. Under unfavorable road conditions the tractor hooks up only with one semi-trailer or trailer.

In using the tractor with other vehicles, fulfil the following additional requirements:

a) the load on tractor wheels shall not exceed the data indicated in Table 3;

b) all machines to be used for transportation of cargoes shall be equipped with pneumatic or pneumatic-hydraulic brakes securing traffic safety;

c) the braking system of the trailing vehicle shall provide own deceleration of trailers with cargo at the emergency braking with at least 5.5 m/s^2.

The time from the moment of pressure drop at the connecting head level to 90% of the initial value until the moment, at which the pressure in the trailing vehicle actuator being in the least favorable conditions reaches 75% of the steady-state value with the control member being fully operated, shall not exceed 0.4s;

d) the total weight of the load being conveyed including the trailer shall not exceed 36 t.

During motion of the tractor with all kinds of vehicles use the fuel feed pedal setting the manual feed handle into the position securing taking-off of the tractor with the vehicle with allowance for theload weight.

6.6.4 Work with power taking off (PTO)

Power take-off (PTO) is designed to transfer the engine power to the work tools of the machines to be hooked up with the tractor.

PTO consists of a connecting clutch with valve, single-speed reducer with oil pump, front and rear cardan shafts.

During operation fulfil the following requirements:

a) with the connecting clutch being disengaged the reducer with rear card shaft shall admit barring by hand;

b) perform engagement of the connecting clutch on load with the steady-state pressure in the gearbox hydraulic system being not less than 11 kgf/cm^2.

ATTENTION! On tractor with power take off being installed, ***IT IS PROHIBITED*** to perform U-turn of the tractor at the maximum articulation angle with the power take off clutch being engaged.

6.7 Winter operation features

It is recommended to combine the preparation for winter operation and the execution of M-AW (autumn-winter) with regular M-2 or M-3.

In order to ensure trouble-free operation of the tractor in winter season, timely replace the summer oil and fuel grades with winter ones according to the lubrication table and appendix ("Filling tanks"). Preliminarily wash up the fuel tank.

During installation of 6582 generator set the voltage regulator into the "Winter" position (Fig.28) having turned the adjustment screw to the stop. In other cases no adjustment is required.

Perform engine start-up at negative ambient temperatures according to the guidelines set forth in Item 4.12.

To maintain the tractor systems in good working order during long-term outage of tractors in the autumn-winter period, it is recommended, upon expiry of 2–3 weeks of tractor outage, to perform a checkup for tractor system functioning in motion during 60 minutes sequentially at all GBmodes and gears.

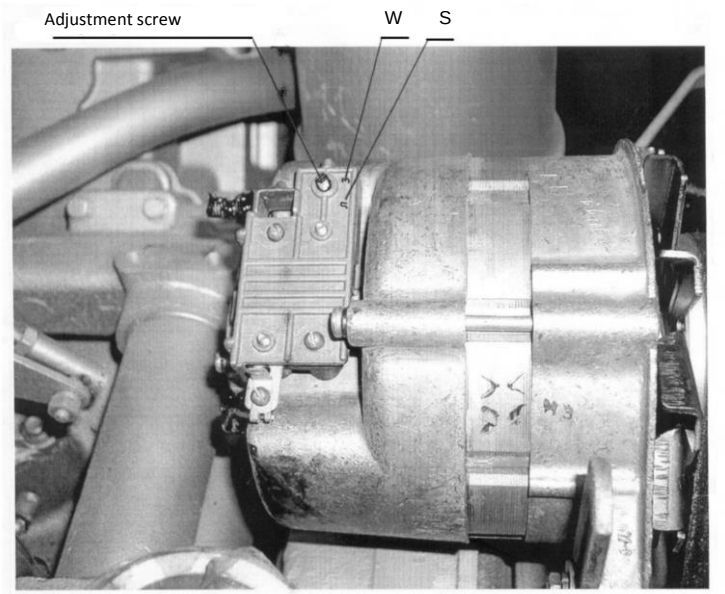


Fig. 28 6582 generator of 8481.10 engine with built-in voltage regulator, which has passed "pre-season" voltage regulation

In order to set the voltage regulator into the "Summer" position, it is necessary to undo the adjustment screw to the stop.

In order to set the voltage regulator into the "Winter" position, it is necessary to turn the adjustment screw to the stop.

Perform engine start-up at negative ambient temperatures according to the guidelines set forth in Item 4.12.

After engine start-up, before taking off:

a) give the engine operate during4 min, gradually increasing the crankshaft rotational speed;

b) ***IT IS PROHIBITED***to load the engine for full power at the cooling fluid temperature below 70°C;

c) make sure of normal operation of the hydraulic system for control over turns and brakes;

d) if it is supposed to operate the hydraulic system for control over mounted implements, then prepare it for operation. To this end, run the system during 3–4 min gradually increasing the crankshaft rotational speed, then perform several switching-on operations for “Lifting” and “Forced lowering” and make sure of normal operation of the system.

In order to decrease the rotational speed when the engine is in operation, open the air bleeding valve and, after air pressure drop to the nominal value (the pressure regulator has been warmed up with passing air flow), close the valve.

Maintain the storage batteries in the charged state avoiding their discharge more than by 25%.

Remove the storage batteries from the tractor in the following cases:

a) at the ambient temperature of minus 25–30°C with an interruption in operation for more than 24 hours;

b) at the ambient temperature below minus 30°C with an interruption in operation for 10 hours. Perform storage of batteries according to the operating instruction (“Lead starting storage batteries”).

Protect the storage batteries taken off from the ingress of dirt and metal things onto terminals and electrical connection areas.

In order to prevent the engine overrun ***IT IS ABSOLUTELY PROHIBITED*** to pour hot water over the high-pressure fuel pump before the start-up. In the process of the whole period of operation ***IT IS PROHIBITED*** to wash the fuel pump with water under pressure.

At the end of working shift drain the sludge from fuel filters and fuel tank as well as condensate from air cylinders; fully fill the fuel tank with fuel. The engine shutdown handle shall be advanced.

To provide trouble-free operation of the tractor braking system at negative ambient temperatures, open the disconnecting valves of connecting head after completion of work and bleed air in order to remove condensate from the system.

In using the tractor in winter season, it shall be provided with heated parking lots.

6.8 Rules of tractor transportation, towing and jacking

The tractors are conveyed mainly by railway. Apart from railway transport, it is possible to use water (river or sea) transport as well as special trailers for transportation of tractors.

The tractor, as loaded on an open rolling stock (flatcar) with the account of packing and fastening, shall be placed within the outlines of the main external dimensions for loading.

Perform installation of the tractor onto the flatcar with wooden floor having preliminarily cleared the flatcar floor from debris, dirt (snow, ice), check the condition of decking. Pour a thin layer of clean dry sand onto the areas of support of wheels, bumping posts, cases with SPTA kit.

Before placing the tractor on the flatcar, it is necessary to do the following:

1) lift the mounted implement maximally upwards;

2) bring the pressure in tyres to 2.3 kgf/cm^2;

3) set the control levers into neutral position;

4) drain fuel from the fuel tank and condensate from air cylinders;

5) switch off the battery master switch (the indicator lamp on the instrument panel will go out);

6) disconnect the minus bus from thebattery master switch terminals and fix it using the standard bolt on the frame;

7) remove the air intake and exhaust pipes, protect the holes on the parts removed and on the tractor against the ingress of dust and moisture. Fix the air intake pipe and silencer on the flatcar.

8) in order to avoid the articulation of tractor semi-frames during its loading or unloading, fit split bushings onto the stems of hydraulic cylinders of turn by means of a crane;

9) after installation of the tractor onto the flatcar pull up the parking brake.

In performing loading and unloading of the tractor, observe the corresponding guidelines set forth in the “Safety requirements” section. Perform placement, fastening and lead-sealing of the tractor on the railway flatcar in accordance with the “Specification for placement and fastening of loads in cars and containers”.

Perform loading and unloading of the tractor by crane with the carrying capacity of not less than 20,000 kgf according to the mooring diagram (Fig.29). In slinging the tractor, ***IT IS PROHIBITED*** to stay under the tractor, use faulty tools and ropes.

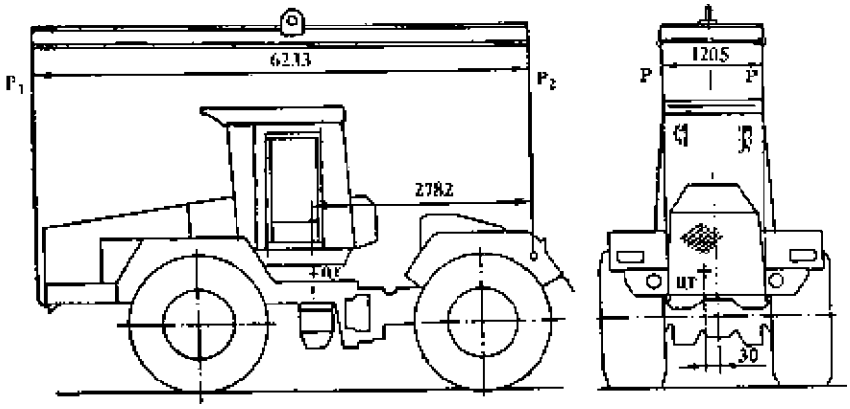


Fig. 29 Mooring diagram of the tractor (in basic configuration)

Maximum static loads on each sling:

P_1 = 4,700 kgf; P_2=4,050 kgf; CG – centre of gravity

Perform towing of the tractor only with a rigid coupler according to the requirements of “Road traffic regulations”. In doing so, the towing speed shall not exceed 15 km/h.

For towing the tractor with faulty engine turn the transmission disengagement lever on the pump drive reduce (PDR) towards the engine up to the stop. Towing switchover lever 11 (Fig.10) shall be lifted upwards and the mode and gear selected in GB of the tractor being towed shall conform to the tow car speed during towing.

During jacking (Fig.30) install the tractor on the even horizontal ground, insert pads under the wheels having preliminarily shutting off the engine, pull up the parking brake, set the mode change lever into the “N” position, gear change lever into the position of “activation of synchroniser brakes”, levers of the hydraulic distributor of the hydraulic system of mounted equipment into “Neutral” position. In order to avoid knife-jacking of tractor semi-frames, fit split bushings onto the stems of hydraulic cylinders of turns preventing their movement. Use only serviceable jack. It is prohibited to stay under the tractor lifted on the jack. During jacking the tractor use reliable jacks with the carrying capacity of not less than 12,000 kgf; perform hacking according to the jacking diagram using “DK” marks on the tractor.

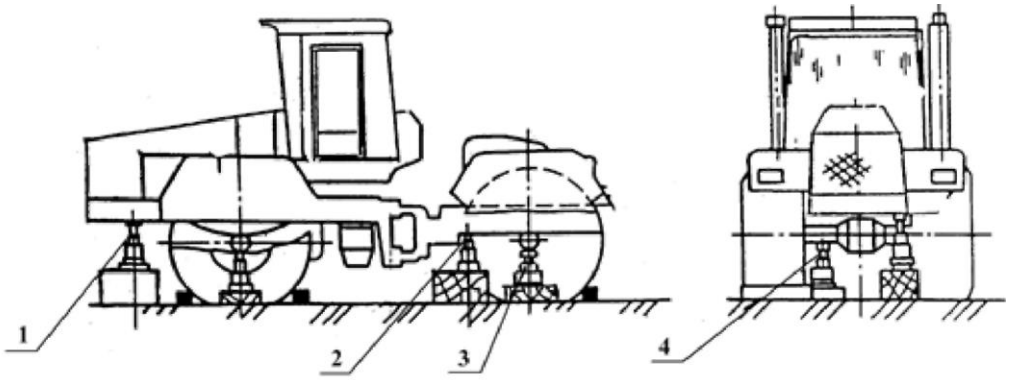


Fig. 30 Tractor jacking diagram

1 – under left or right side members of the front semi-frame of the tractor at the distance of400–500 mm from the bumper; 2 – under left or right side members of the rear semi-frame at the distance of 350–400 mm from the rear axle; 3 – under casing of rear axle; 4 – under casing of front axle.

6.9 Gearbox pressure control and adjustment

In the course of operation of the tractor, the GB pump performance decreases.

In order to extend the GB repair interval, periodically check and perform adjustment of the pressure in GB.

The pressure monitoring is carried out by means of mechanical manometer with the upper limit of 1.6 MPa (16 kgf/cm^2). Accuracy class – not coarser than 1.5. Measurement point – see Fig.10.

The oil pressure in the hydraulic system of heated gearbox at the transmissions with the crankshaft rotation speed of 900–1,800 RPM shall be as follows:

1.0–1.2 MPa (10–12 kgf/cm^2) – for K-744R1, K-744R2 tractors;

1.1–1.3 MPa (11–13 kg/cm^2) – for K-744R3, K-744R4 tractors.

The pressure on neutraland in engagement of synchroniser brake shall not be less than on transmission gears.

The pressure regulation shall be carried out by turning plug 7 (Fig.31).

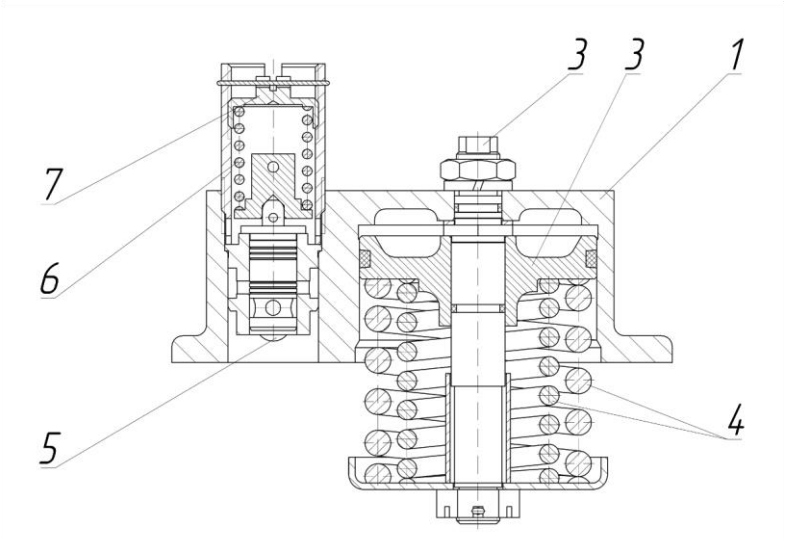


Fig. 31 GB hydraulic accumulator with pressure control valve

1 – housing; 2 – stem; 3 – piston; 4 – hydraulic accumulator spring; 5 – valve;
6 – valve spring; 7 – adjustment plug

ATTENTION! Hydraulic accumulator springs are always in the compressed state. The dismantling of hydraulic accumulator shall be performed by a qualified specialist.

6.10 Driving shaft

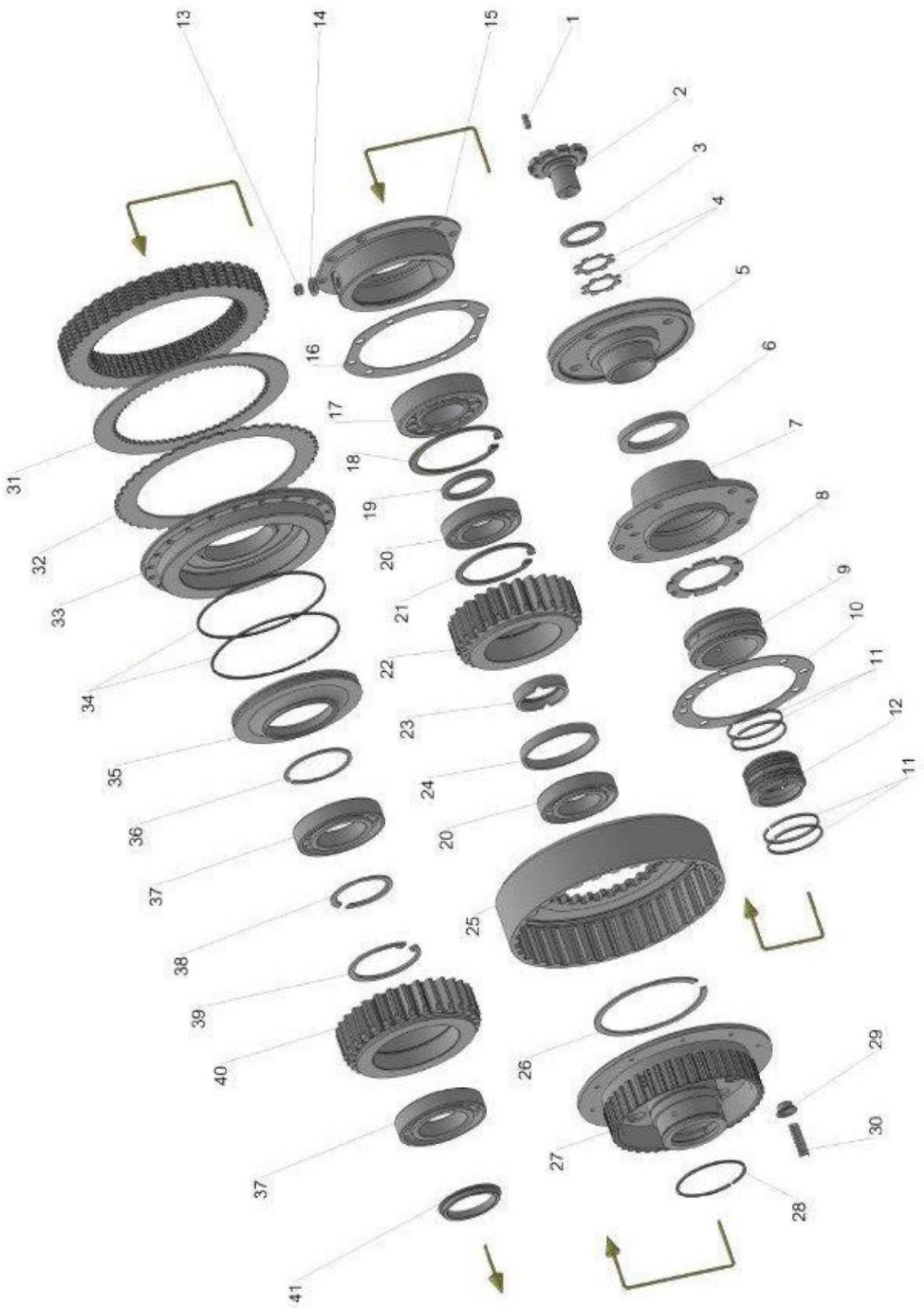
The driving shaft with polymer seals is interchangeable with shafts of previous design and has a high degree of unification with them. Due to the use of advanced materials the reliability of shaft seals has considerably be enhanced.

The shaft elements consist of friction clutch I, friction clutches II and III, friction clutch IV.

The installation of such parts as 744P-1701367, 744P-1701014 onto the driving shaft shall be carried out jointly with 744P-1701517 bushing installed inside. In case of separate installation, there is a high probability of sealing ring shearing.

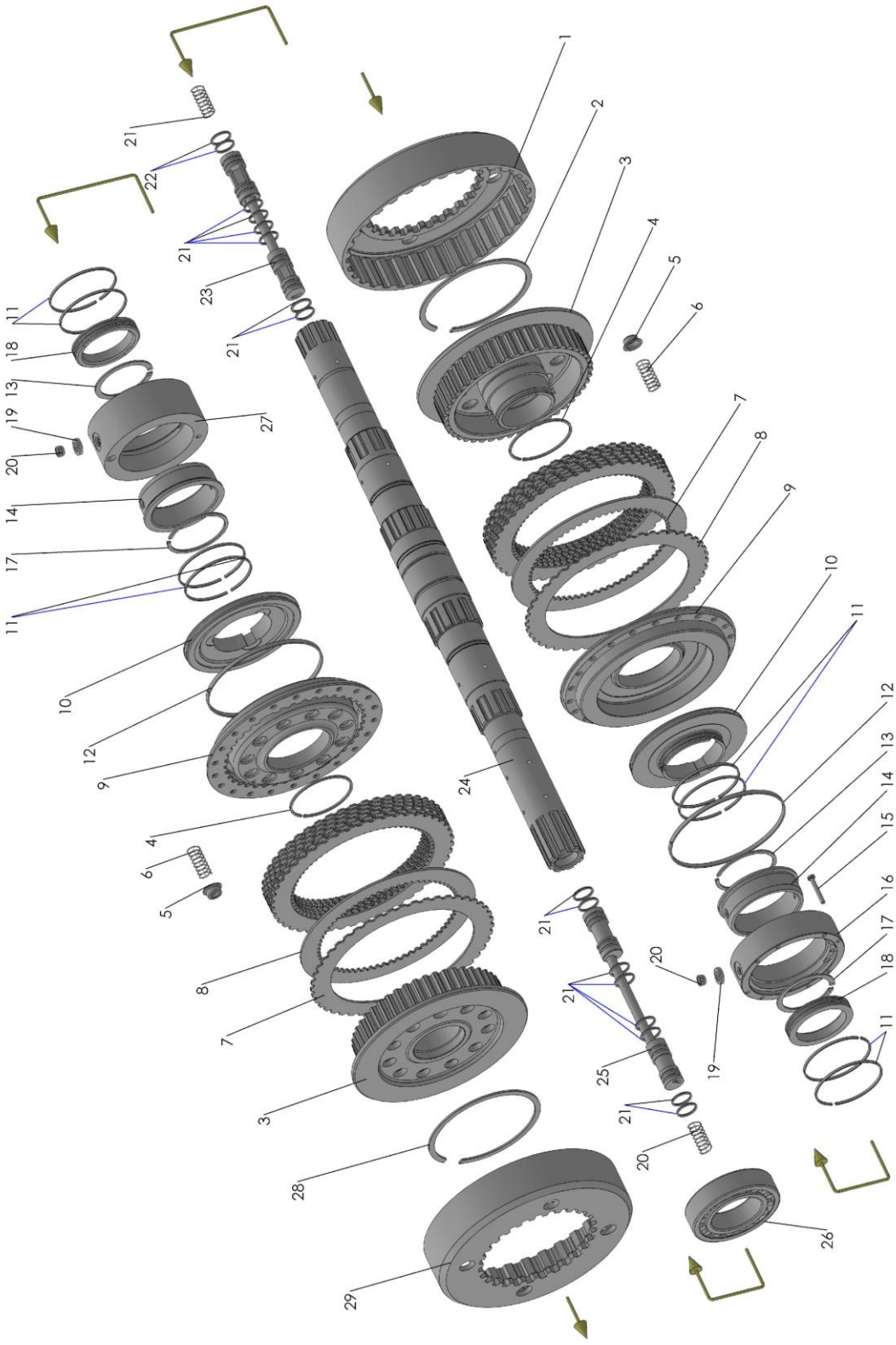
Perform replacement of 700A.17.01.430/-450 collars without removing 744P-1701367, 744P-1701014 parts.

Driving shaft (friction clutch I)



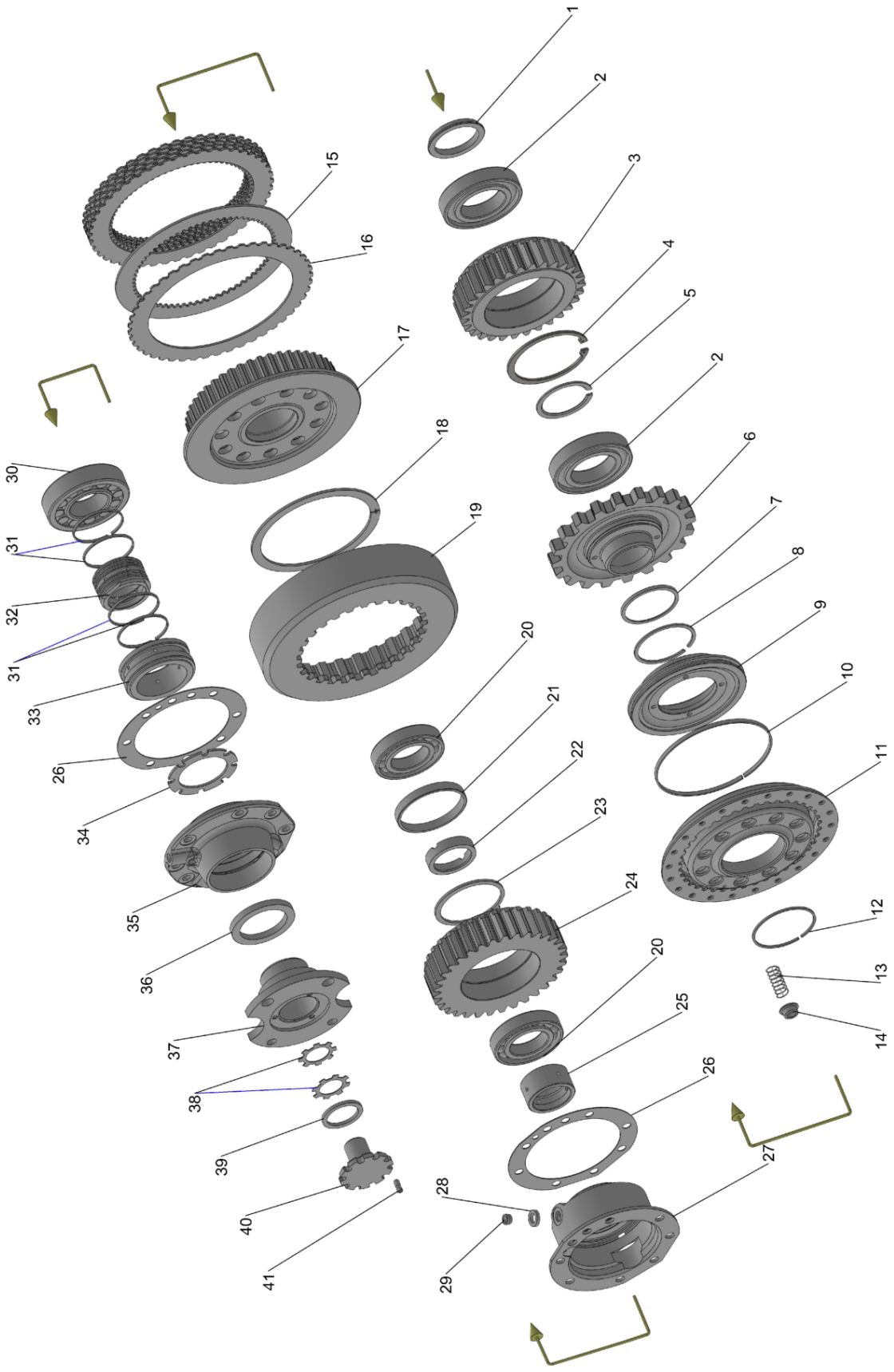
No.	Designation	Description	Quantity
1.	700.17.01.428	Screw	1
2.	700.17.01.021-1	Nut	1
3.	700.17.01.399	O-ring	1
4.	700.17.01.408	Washer	8 max
5.	2256010 – 17.01.013	Sheave	1
6.	700A.17.01.450	Collar 75x100x10	1
7.	744P-1701367	Flange	1
8.	744P-1701515	Ring	1
9.	744P-1701516	Bushing	1
10.	700A.1701368	Gasket	1
11.	744P-1701511	O-ring	4
12.	744P-1701517	Bushing	1
13.	700.17.01.062	Bushing	1
14.	700.17.01.027	O-ring	1
15.	700A.17.01.018	Carrier	1
16.	700A.17.01.114	Gasket	1
17.	2312KM	Bearing	1
18.	C130 GOST 13943-86	Ring	1
19.	700.17.01.361-6	Intermediate ring	1
20.	36212	Bearing	2
21.	C110 GOST 13943-86	Ring	1
22.	700A.17.01.056-3	Pinion	1
23.	700.17.01.028	Spacer ring	1
24.	700.17.01.029	Intermediate ring	1
25.	700A.17.01.055-3	Drum	1
26.	700A.17.01.497	Ring	1
27.	744P-1701540	Right drum	1
28.	744P-1701521	O-ring	1
29.	700.17.01.033-1	Sleeve	11
30.	700A.17.01.034-2	Spring	11
31.	700A.17.01.038-4	Driving disc	6
32.	744P-1701020	Friction disc	7
33.	744-1701060	Pressing disc	1
34.	700.17.01.459	O-ring	2
35.	700A.17.01.057-1	Right disc	1
36.	700A.17.01.101-1	Ring	1
37.	214A	Bearing	2
38.	700A.17.01.106	Ring	1
39.	C125 GOST 13943-86	Ring	1
40.	700A.17.01.045-5	Pinion	1
41.	700A.17.01.029-3	Bushing	1

Driving shaft (friction clutches II and III)



No.	Designation	Description	Quantity
1.	700A.17.01.069-2	Drum	1
2.	700A.17.01.498	Ring	1
3.	744P-1701047	Middle drum	2
4.	744P-1701521	O-ring	2
5.	700.17.01.033-1	Sleeve	22
6.	700A.17.01.034-2	Spring	22
7.	700A.17.01.038-4	Driving disc	10
8.	744-1701020	Friction disc	12
9.	744-1701060	Pressing disc	2
10.	744P-1701049-1	Middle disc	2
11.	744P-1701512	O-ring	8
12.	700.17.01.459	O-ring	4
13.	C80 GOST 13940-86	Ring	2
14.	744P-1701514	Bushing	2
15.	3M6x55	Bolt	8
16.	700A.17.01.590	Cover	1
17.	700A.17.01.101-1	Ring	2
18.	744P-1701513	Bushing	2
19.	700.17.01.027	O-ring	2
20.	700.17.01.062	Bushing	2
21.	700.17.01.343	Spring	2
22.	700A.34.22.067	O-ring	16
23.	700.17.01.710-02	Oil pipeline	1
24.	700A.17.01.011-2	Driving shaft	1
25.	700.17.01.710-01	Oil pipeline	1
26.	53516K	Bearing	1
27.	700A.17.01.130	Middle support	1
28.	700A.17.01.498-01	Ring	1
29.	700A.17.01.059-2	Drum	1

Driving shaft (friction clutch IV)



No.	Designation	Description	Quantity
1.	700A.17.01.029-3	Bushing	1
2.	214A	Bearing	2
3.	700A.17.01.031-5	Pinion	1
4.	C125 GOST 13943-86	Ring	1
5.	700A.17.01.106	Ring	1
6.	700A.17.01.043-2	Pinion	1
7.	700.17.01.324-2	Collar	1
8.	700A.17.01.101-1	Ring	1
9.	700A.17.01.042-1	Left disc	1
10.	700.17.01.459	O-ring	2
11.	744-1701060	Pressing disc	1
12.	744P-1701521	O-ring	1
13.	700A.17.01.034-2	Spring	11
14.	700.17.01.033-1	Sleeve	11
15.	700A.17.01.038-4	Driving disc	5
16.	744P-1701020	Friction disc	6
17.	744P-1701520	Left drum	1
18.	C180 GOST 13940-86	Ring	1
19.	700A.17.01.041-4	Drum	1
20.	36212	Bearing	2
21.	700.17.01.029	Intermediate ring	1
22.	700.17.01.028	Spacer ring	1
23.	C110 GOST 13943-86	Ring	1
24.	700A.17.01.039-4	Pinion	1
25.	700.17.01.026-5	Spacer bushing	1
26.	700A.17.01.071	Gasket	2
27.	700A.17.01.020-1	Left support	1
28.	700.17.01.027	O-ring	1
29.	700.17.01.062	Bushing	1
30.	2312KM	Bearing	1
31.	744P-1701511	Ring	4
32.	744P-1701514	Bushing	1
33.	744P-1701516	Bushing	1
34.	744P-1701515	Ring	1
35.	744P-1701514	Left carrier	1
36.	700A.17.01.430	Collar 75x100x10	1
37.	700A.17.01.319	Flange	1
38.	700.17.01.408	Washer	8 max
39.	700.17.01.399	O-ring	1
40.	700.17.01.021-1	Nut	1
41.	700.17.01.428	Screw	1

7 MAINTENANCE

7.1 Types and frequency of maintenance

The types and frequency of maintenance are given in Table 5 for the tractor and in the engine operating instruction for the engine.

Using the tractor without execution of regular maintenance ***IS ABSOLUTELY PROHIBITED.*** It is allowed to deviate the actual frequency (advancing or delay) M-1, M-2 up to 10% and M-3 up to 5% from the established frequency.

Seasonal maintenance (SM) of tractors shall be performed twice a year: M – SS (spring – summer) – at steady-state ambient temperature of not less than plus 5°C, and M – AW (autumn – winter) – less than plus 5°C. The conduction of seasonal maintenance of tractors shall be combined with the execution of regular maintenance operations.

The enterprise shall have a time schedule for each month for conduction of M-1, M-2 and M-3 and in the corresponding months – M-SS and M-AW.

In the service log-book of the tractor it is necessary to record the conduction all maintenance operations, except (ShM – shift maintenance) with indication of date, maintenance type as well as operating time from the moment of beginning of operation of tractors, new or overhauled.

Table 5

Types and frequency of maintenance

Types of maintenance	**Frequency**
	in engine hours of tractor operation
Maintenance at the preparation of a new or overhauled tractor for operating running-in	---
Maintenance of tractor at the execution of running-in	10
Maintenance upon completion of the execution of running-in	50
Shift maintenance (ShM)	10
First maintenance (M-1)	125
Second maintenance (M-2)	500
Third maintenance (M-3)	1,000
Seasonal maintenance (M-SS), (M-AW)	At the transition to spring-summer or autumn-winter operating conditions
Maintenance in special operating conditions (sandy, stony or boggy soils, desert, low-temperature and high-mountain conditions)	It shall be performed in the conditions drastically differing from typical ones
Maintenance during long-term storage	It shall be performed in closed premises not less than once in every 2 months, and under a canopy and at open-door sites once a month

7.2 List and contents of work by types of maintenance to be performed by operator in the process sequence

ATTENTION! EXECUTION OF ENGINE MAINTENANCE – ACCORDING TO THE OPERATING INSTRUCTION OF THE ENGINE.

Maintenance at the preparation of a new or overhauled tractor for operating running-in, at the execution of operating running-in, upon completion of operating running-in

Job content	Preparation for operating running-in	Execution of operating running-in	Completion of operating running-in	Note
Inspect and clean the tractor from dust and dirt	●		●	
Remove preservation lubrication from open parts of stems of the hydraulic cylinders, spherical surfaces and threaded connections of mounted implements	●			
Check the tractor condition by visual inspection paying attention to the absence of leaks of fuel, oil, cooling fluid and electrolyte, absence of extraneous noise, rattle in the engine and in transmission blocks and, if necessary, eliminate all faults	●	●	●	Upon detection of leaks and their elimination it is necessary to check the level of fluids indicated
Check the level and, if necessary, refill:				
– oil to tank of hydraulic systems of the mounted implement and turn control	●		●	
– oil into the transmission gearbox hydraulic system	●			
– oil to the cases of main and final gears of driving axles	●			
– cooling fluid to expansion (standby) tank	●	●	●	For tractors with OM457LA engine – to the level of 85...90 mm from the upper plane of the filler port
– oil to the engine lubrication system	●	●		
– electrolyte (or distilled water) into storage batteries			●	
Wash up the following:				
– filter of centrifugal cleaning of engine oil;			●	
– transmission gearbox filter;			●	
– breathers of driving axles, PDR (pump drive reducers), fuel tank, single-speed PTO reducer (if any)			●	
Replace cardboard filtration elements and wash up the housings of hydraulic tank			●	

Job content	Preparation for operating running-in	Execution of operating running-in	Completion of operating running-in	Note
filters				
Drain the following:				
– condensate from the air cylinders		●	●	
– 0.1 l of fuel from coarse mesh and fine mesh fuel filters;		●	●	
Lubricate the following:				
– fluid pressure cylinder pins of implement-attaching linkage and steering hydraulic system	●			
– supports of service brake expanders	●			
– axles of the frame vertical hinge;	●			
– spring eyes	●			
– main lever shaft supports of the mechanism of attachment	●			
Check the following and adjust, if required:				
– drive belt tension			●	
– rod travel in brake chamber of the service brakes			●	
– fuel injection lead angle:				
– for ЯМЗ-238НД engine			●	
– for 8481.10 engine			●	
Expansion gaps in the valve mechanism having preliminarily tightened the nuts fastening the cylinder heads or rocker pivots:				
– for 8481.10 engine			●	
– for ЯМЗ-238НД engine			●	
Replace oil:				
– in engine lubrication system			●	
– in transmission gearbox hydraulic system			●	
– in main and final drive casing of the drive axle system			●	
Set the pressure in tyres	●			
Check the condition of tyres and air pressure therein			●	
Check the drive belt tension and adjust, if required	●	●		
Check the electrolyte level, condition of terminals and vents in storage battery plugs. If necessary, refill distilled water. Lubricate the non-contact parts of terminals and wire lugs with technical vaseline	●		●	

Job content	Preparation for operating running-in	Execution of operating running-in	Completion of operating running-in	Note
Check the electrolyte density and, if necessary, bring it to the required value depending upon the climatic area, in which the tractor is operated	●			
Check the condition of filtration elements of the 1st and 2nd stages of air cleaner and, if necessary, perform their maintenance			●	
Check threaded connections and other connections of the engine and the entire tractor and tighten, if necessary	●		●	Pay special attention to tightening the nuts of fasteners, wheels, driving axle brackets, wedge connections of the axles of vertical pivot of frame, bolts for fastening clamps for intermediate bearing
Check how does the engine work by ear and by monitoring instruments	●	●	●	Perform operation during the tractor being in service
Check the operation of tractor control mechanisms, operation of brakes, window wipers, lighting and signaling, hydraulic systems of mounted implements and steering control	●	●	●	
Set the switch of seasonal adjustment of the voltage regulator into the position corresponding to the season	●			
Upon shutdown of the engine, immediately check the operation of turbocompressor and engine centrifugal oil filter by ear		●	●	

Additional maintenance operations after running-in

Job content	Note
Perform maintenance of nozzles:	
– for 8481.10 engine	Execute the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
Check the fasteners and tighten, if necessary:	
– tractor wheels	Execute the operations at the first two maintenance sessions from the beginning of operation (M-1) (125, 250 engine hours)
– drive axle clamp nuts;	Execute the operations at the first two maintenance sessions from the beginning of operation (M-1) (125, 250 engine hours)

Job content	Note
– bolts for fastening the “pinion carrier – hub” at final gears of driving axles	Execute the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
– bolts for fastening cases to the main gear casing	Execute the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
– cardan shaft flanges	Execute operation during the first 1,000 engine hours at M-1 (once in every 125 engine hours)
– spring eye and spring clip plate nuts	Execute the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
Check the tightness of the air supply line from the air cleaner to engine.	

Shift maintenance (ShM)

Job content	Note
Clean the tractor from dust and dirt	
Check the tractor condition by visual inspection paying attention to the absence of leaks of fuel, oil, cooling fluid and electrolyte, absence of extraneous noise, rattle in the engine and in transmission blocks and, if necessary, eliminate all faults	
Check the level and, if necessary, refill:	
– cooling fluid to expansion (standby) tank	
– oil to the engine lubrication system	
Drain condensate from air cylinders	In winter, drain sludge daily, in summer – not less than once a week
Check the engine condition by external inspection	
Perform a check of air conditioning:	Execute the operations once a week
– coolant filling level	
– electrical contacts for connecting electromagnetic clutch	
– hoses for the presence of damage	
Blow down the electromagnetic clutch with compressed air in order to remove dust	
Check how does the engine work by ear and by monitoring instruments	
Check the operation of tractor control mechanisms, operation of brakes, window wipers, lighting and signaling, hydraulic systems of mounted implements and steering control	
Upon shutdown of the engine, immediately check the operation of turbocompressor and engine centrifugal oil filter by ear	

First maintenance (M-1), second maintenance (M-2), third maintenance (M-3)

Job content	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Note
Inspect and wash the tractor	●	●	●	
Check the tractor condition by visual inspection paying attention to the absence of leaks of fuel, oil, cooling fluid and electrolyte, absence of extraneous noise, rattle in the engine and in transmission blocks and, if necessary, eliminate all faults	●	●	●	

Job content	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Note
Wash up the following:				
– filter of centrifugal cleaning of engine oil;	●	●	●	
– transmission gearbox filter;		●	●	
– breathers of driving axles and single speed PTO, PDR			●	
Check the level and, if necessary, refill:				
– oil to the engine lubrication system;	●			
– oil to the tank of hydraulic systems of mounted implement and steering control;	●	●		
– oil to the gearbox hydraulic system;	●	●		
– oil to the cases of main and final gears of driving axles;	●	●		
– cooling fluid to the standby tank	●			
Replace oil:				
– in engine lubrication system;	**In accordance with the engine operating instruction**			
– in hydraulic system of the mounted implement and steering control;			●	Execute the operation every other M-3
– in transmission gearbox hydraulic system			●	
– in main and final drive casing of the drive axle system			●	Execute the operation every other M-3 session
Replace:				
– filtering elements and wash up hydraulic tank filter housings	●	●	●	Execute the operation every other M-1 session (250 engine hours)
– filtering element and wash up the filter housing, oil filter of the engine	**In accordance with the engine operating instruction**			
– filtering elements of pressure filters of the hydraulic system and wash up the filter housings				When the filtering element clogging indicator lamp is alight at the working fluid temperature above 20°C
– oil filter of the engine	**In accordance with the engine operating instruction**			
– coarse mesh fuel filter			●	
– fine mesh fuel filter	**In accordance with the engine operating instruction**			
Drain the following:				
– condensate from the air cylinders	●	●	●	
0.1 l of fuel each from coarse mesh fuel filter and fine mesh filter	●	●	●	
Check the following and adjust, if required:				
– drive belt tension	●	●	●	
– drain pedal drive		●	●	

Job content	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Note
– rod travel in brake chamber of the service brakes	●	●	●	
– blocking the engine start-up with engaged gear	●	●	●	
– fuel injection lead angle		●	●	
– expansion gaps in the valve mechanism having preliminarily tightened the nuts fastening the cylinder heads	**In accordance with the engine operating instruction**			
Check the condition of tyres and air pressure therein	●	●	●	
Check the electrolyte level, condition of terminals and vents in storage battery plugs. If necessary, refill distilled water. Lubricate the non-contact parts of terminals and wire lugs with technical vaseline	●	●	●	
Check the electrolyte density and degree of charge of storage batteries and, if necessary, perform their boost charging or replace them with those charged		●	●	
Check the condition of filtration elements of the 1st and 2nd stages of air cleaner and, if necessary, perform their maintenance	●	●	●	perform maintenance in case when lamp 29, Fig. 1, 2, 3, 4, indicating filtering element clogging comes on
Check the condition of filtration elements of the cabin ventilation and, if necessary, perform their maintenance	●			
Lubricate the following:				
– fluid pressure cylinder pins of implement-attaching linkage and steering hydraulic system	●	●	●	
– supports of service brake expanders	●	●	●	execute the operation every other M-1 session
– main lever shaft supports of the mechanism of attachment	●	●	●	
– axles of the frame vertical hinge;		●	●	
– frame horizontal hinge;			●	
– cardan shaft crosspiece and bearings	●	●	●	execute the operation every other M-1 session
Check the fasteners and tighten, if necessary:				
– tractor wheels	●	●	●	see Appendix 4
– drive axle clamp nuts	●	●	●	see Appendix 4
– cardan shaft flanges	●	●	●	see Appendix 4
– bolts for fastening the “pinion carrier – hub” butt-joint			●	see Appendix 4
– bolts for fastening cases to the main gear casing			●	see Appendix 4
– wedge connections of axles of the		●	●	

Job content	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Note
frame vertical hinge;				
– mounting bolts of intermediate bearing holders		●	●	see Appendix 4
– spring earand spring clip plate nuts		●	●	
Check how does the engine work by ear and by monitoring instruments	●	●		
Check the operation of tractor control mechanisms, operation of brakes, window wipers, lighting and signaling, hydraulic systems of mounted implements and steering control	●	●		
Upon shutdown of the engine, immediately check the operation of turbocompressor and engine centrifugal oil filter by ear	●	●		
Check the tightness of the air supply line from the air cleaner to the engine	●			
Check the tightness of the clean air supply line to the engine and dust removal line from the air cleaner		●	●	
Perform maintenance for engine nozzles	●			execute the operation for ЯМ3238НД5 engine after the first 250 engine hours
Drain condensate from the engine supercharge air cooler (SAC)	●			only for tractor with Mercedes engines
Check the operation of all tractor's mechanical parts under no-live load and under load state			●	perform operation during the tractor being in service
Check the ease of rotation of the turbocompressor rotor and, if necessary, perform its maintenance			●	

ATTENTION! In case of tractor operation in the climatic conditions requiring no seasonal maintenance (M-SS, M-AW), perform oil change in the gearbox hydraulic system once in every 1,000 engine hours.

Seasonal maintenance – spring-summer (M-SS) and autumn-winter (M-AW)

Job content	M-SS	M-AW	Note
Bring the density of electrolyte in the storage batteries to the summer standard value	●		
Check the operation of the pneumatic system of service brakes	●	●	
Replace oil of winter grades with summer grades according to the lubrication table:			
– in engine lubrication system	●		
– in transmission gearbox hydraulic system	●		
– in the hydraulic system tank for mounted implements and steering control	●		execute the operation once in every 2,000 engine hours
– in main and final drive cases of the drive	●		execute the operation once in

Job content	M-SS	M-AW	Note
axle system*			every 2,000 engine hours
Lubricate the spring ears	●	●	
Check the cooling liquid density		●	if necessary, refill concentrated anti-freeze agent of Tosol AM brand
Bring the density of electrolyte in the storage batteries to the winter standard value		●	
Replace oil of summer grades with winter grades according to the lubrication table:		●	
– in engine lubrication system		●	
– in transmission gearbox hydraulic system		●	
– in the hydraulic system tank for mounted implements and steering control		●	Execute the operation once in every 2,000 engine hours
– in main and final drive cases of the drive axle system*		●	Execute the operation once in every 2,000 engine hours
Wash up the filtering elements and the housing of coarse mesh fuel filter		●	Execute the operation only on 8481.10 engine
Clean and wash up the protection nets of water and oil radiator and supercharge air cooler		●	Execute the operation only on 8481.10 engine simultaneously with change of the cooling automotive fluid of Tosol A-40M brand
Prepare and check the operation of the pre-start heating system		●	When the pre-start heating system is available
Check the electric torch blocks		●	Execute the operation only on 8481.10 engine with the help of specialists at workshops or at tractor service stations (TSS)

7.3 Types and lists of maintenance work during storage

Maintenance during long-term storage in closed premises, under canopy and at open sites

Job content	Note
Check the correctness of tractor installation on props or on pads	
Check the availability of lead-seals and completeness of tractor configuration (taking into account the tractor parts and assemblies taken off and being kept at the warehouse)	
Check the density of electrolyte and, if necessary, recharge the batteries	Execute the operation once a month
Check the air pressure in tyres	
Check reliability of leak-tightness of components	
Check the availability of protective grease, integrity of painting, absence of corrosion on the surfaces	

* Do not replace oil in case when all-season oil grades are used

– check the level and refill oil

– oil change

– lubrication

– oil

– plastic grease

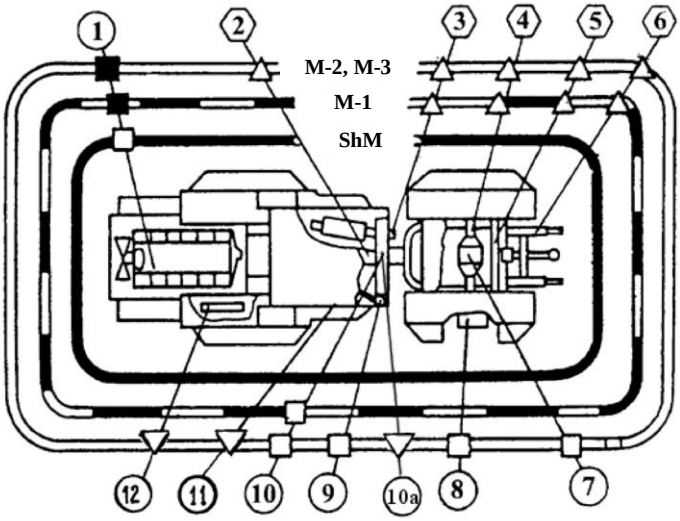


Fig. 32 Tractor lubrication diagram

7.4. Lubrication table

Table 6

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation		lubrication during storage				
		temperature						
		from minus 40°C to +5°C	from +5°C to +40°C			main lubricants	substitutes	
1.	Engine lubrication system*	In summer: Engine oils:						
		– M-10-Д(м) GOST 8581;				250		
		– Angrol (SAE30) M-10-Д(м) TU 0253-326-057427746-97;				250		
		– M-10-Д(а) TU 0253-007-13230476-95;				250		
		– SamOil-4126 M-10-Д(м) TU 38301-13-008-97				250		
		In winter:						
		Engine oils:						
		– M-8-Д(м) GOST 8581;				250		
		– Angrol (SAE20W) M-8-Д(м) TU 0253-326-057427746-97;				250		
		– TNK Revolux D1 10W-40 TU 0253-001-44918199-2005				250		To be used on the following engines: ЯМЗ-238НДЗ/ /НД4/НД5, 8481.10, 8481.10-02, 8481.10-04
		For all-seasonal use:						
		– М-6$_3$/14-Д(м) TU 38.401938-92;				250		

* For tractors with OM457LA engine – in accordance with the operating manual for the engine and the guidelines issued by Mercedes Benz for operating materials. For tractors with Cummins engine – in accordance with the operating manual for the engine

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation		lubrication during storage				
		temperature						
		from minus 40°C to +5°C	from +5°C to +40°C			main lubricants	substitutes	
		– Angrol (SAE10W/40) М-5$_3$/14-Д(м) TU 0253-283-05742746-95;				250		
		– SamOil-4127 М-6$_3$/14-Д(м) TU 38301-13-008-97				250		
		– Spektrol Champion (SAE15W/40, APICF-4) М-5$_3$/14-Д(м) TU 0253-15-06913380-98				250		
		– TNK Revolux D2 TU 0253-001-44918199-2005				250		To be used on the following engines: ЯМЗ-238НДЗ/ /НД4/НД5, 8481.10, 8481.10-02, 8481.10-04
		– TNK Revolux D1 15W-40 API CF-4/CF/SJ TU 0253-001-44918199-2005				250		
		- TNK Revolux D3 TU 0253-001-44918199-2005				250		To be used on OM457LA and Cummins engines
2.	Axles of the frame vertical hinge	Loctite 8103 lubricant		Main lubricant being used	2 by 0.3 l each	500		
		Substitutes:						
		Lubricant No.158 TU 38.101.320-77					250	
3.	Hydraulic cylinder pins of the hydraulic system of steering control	Litol-24 lubricant GOST 21150		Main lubricant being used	4 by 0.05 l each	125	60–65	
		Substitutes:						
		Press-solidol G Solidol G GOST 1033						

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation		lubrication during storage				
		temperature						
		from minus 40°C to +5°C	from +5°C to +40°C			main lubricants	substitutes	
		Press-solidol S Solidol S GOST 4366						
4.	Supports of service brake expanders	Litol-24 lubricant GOST 21150		Main lubricant being used	8 by 0.05 l each	250	125	
		Substitutes:						
		Press-solidol G Solidol G GOST 1033						
		Press-solidol S Solidol S GOST 4366						
5.	Supports of the shaft of mounted implement levers	Litol-24 lubricant GOST 21150		Main lubricant being used	2 by 0.05 l each	125	60–65	
		Substitutes:						
		Press-solidol G Solidol G GOST 1033						
		Press-solidol S Solidol S GOST 4366						
6.	Hydraulic cylinder pins of the mounted implement	Litol-24 lubricant GOST 21150		Main lubricant being used	4 by 0.05 l each	125	60–65	
		Substitutes:						
		Press-solidol G Solidol G GOST 1033						
		Press-solidol S Solidol S GOST 4366						
7.	Cases of main gears of driving axles	For all-seasonal use: Transmission oil ТСп-15К GOST 23652		See Section 9	2 by 10 l each	2,000		
		Substitutes:						

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation		lubrication during storage				
		temperature						
		from minus 40°C to +5°C	from +5°C to +40°C			main lubricants	substitutes	
		For all seasons to the temperature of minus 15°C Тап-15В		See Section 9			2,000	
8.	Cases of final gears of driving axles	For all-seasonal use: Transmission oil ТСп-15К GOST 23652		See Section 9	4 by 3.5 l each	2,000		
		Substitutes:						
		For all seasons to the temperature of minus 15°C Тап-15В		See Section 9			2,000	
9.	Hydraulic system of the transmission gearbox	Engine oil M-8В2 GOST 8581	Engine oil M-10В2 GOST 8581		1 by 23 l each	TSS		
		Substitutes:						
		Oil М8-ДМ GOST 8581	Oil М10-ДМ GOST 8581					
			Engine oil М-12ВУ TU 38.001.248-76				TSS	
10.	Hydraulic system of the mounted implement and steering control	Oil ВМГЗ TU 38.101479-86	МГЕ-46В TU 38.001347-83	Oil to be used	1 by 175 l each	2,000		
		Substitutes:						
			Oil И-30А GOST 20799-88	Oil to be used			2,000	
11.	Supports of vertical rollers for change transmission gears	Litol-24 GOST 21150		Main lubricant being used	2 by 0.05 l each	500		
		Substitutes:						
		Solidols according to GOST 1033 and GOST 4366					250	
12.	Spring ears	Litol-24 lubricant GOST 21150		Main lubricant	2	500		

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation		lubrication during storage				
		temperature						
		from minus 40°C to +5°C	from +5°C to +40°C			main lubricants	substitutes	
				being used				
		Substitutes:						
		Solidols according to GOST 1033 and GOST 4366					250	
	Frame horizontal hinge	Loctite 8103 Substitutes:		Main lubricant being used	1 by 2.8 l each	in dismantling the block		
		Lubricant No.158 TU 38.101.320-77		Main lubricant being used		in dismantling the block		
	Brake lever	Litol-24 lubricant GOST 21150		Main lubricant being used	4	in dismantling the block		
		Substitutes:						
		Lubricant No.158 TU 38.101.320-77		Main lubricant being used		in dismantling the block		
10a	Bearings of intermediate support	Litol-24 lubricant GOST 21150		Main lubricant being used	2 by 0.3 l each	once in every 250 engine hours		
		Substitutes:						
		Lubricant No.158 TU 38.101.320-77		Main lubricant being used				
	Cardan shaft crosspiece bearings	Litol-24 lubricant GOST 21150		Main lubricant being used	8 by 0.15 l each	according to maintenance		
		Substitutes:						
		Lubricant No.158 TU 38.101.320-77		Main lubricant being used				
	Slotted connections of cardan shafts	Litol-24 lubricant GOST 21150 Substitutes:		Main lubricant being used		in dismantling the block		Perform the change of lubricant in the cardan shaft of driving axles once in every 4,000 engine hours

Position No. in lubrication (filling) diagram, Fig.32	Description of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of change of lubricants (engine hours, maintenance type)		Note
		lubrication and filling during operation temperature		lubrication during storage		main lubricants	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
		Lubricant No.158 TU 38.301-40-25-94		Main lubricant being used				

N o t e .

1. The volume of waste oil collected in case of oil change is equal to 80% of the filling tanks.
2. In using Litol-24 lubricant, it is not allowed to mix it with calcic (solidols), sodic and aluminium lubricants.
3. At the ambient temperature +5°C and over use summer oil grades during the whole year.

7.5 Contents and procedure of maintenance operations

7.5.1 Change of oil in the engine

Install the tractor on a horizontal ground. In order to achieve better results, change oil in **the engine being heated.**

1. In order to drain oil, undo the drain plug on the oil tray of the engine and take off the lid of oil filler port having preliminarily cleaned it from dust and dirt.

On K-744R1St tractors (with ЯМЗ-238НД5 engine), further undo the plug on the upper header of the engine oil radiator for oil drainage from the radiator to the oil tray.

After full drainage, screw in the plugs.

2. Before filling oil clean the oil filler port from dust and dirt. Fill oil into the engine through the oil filler port. Check tightening of the drain plug of the oil tray.

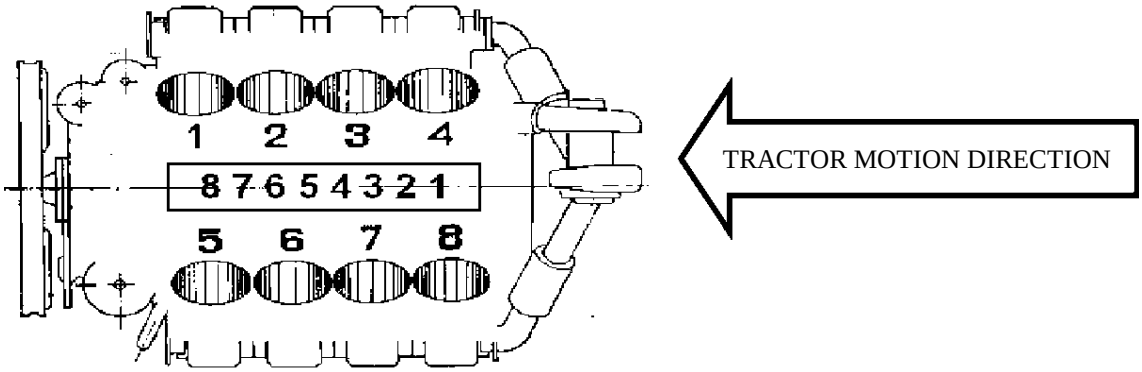
Monitor the oil level according to oil probe.

3. In order to fill oil into the engine lubrication system, run the engine for 2...3 minutes and 10...15 minutes after the stop refill oil.

7.5.2 Adjustment of cylinder valves on 8481 engine

Installation and dismantling of the plastic arch on the tractor for adjustment of the cylinder valves on 8481 engine (TMZ, OJSC)

Right-hand row of cylinders



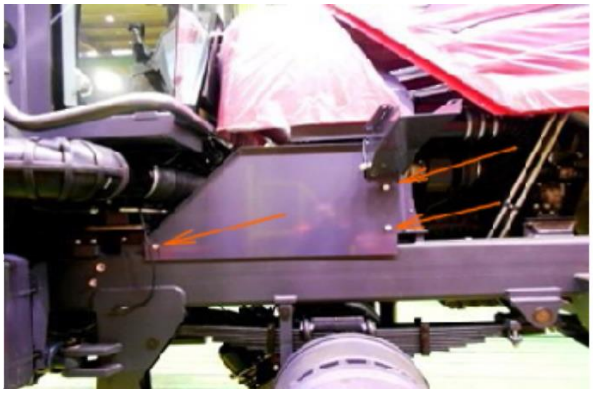
Left-hand row of cylinders

Tools for the execution of work:

1. A set of ratchet wrenches – 1 set.
2. Combined wrench with the open-end part for (10–24) mm.
3. White marker for metal (to mark out bracket and fasteners contours).
4. Old cloth or any other material for binding the arch in order to avoid damage of the paint-and-varnish coating.

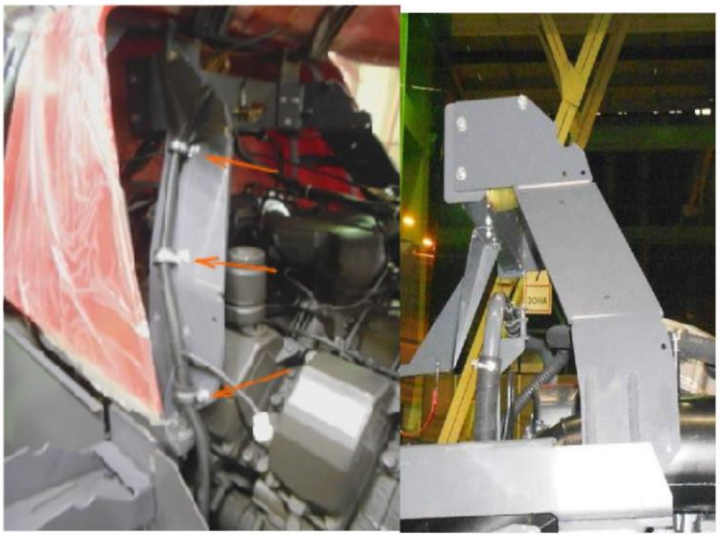
1 Dismantling of plastic arch

1.1 Undo 4 nuts M10 inside the wing and 2 bolts M10 at the side, disconnect the electrical male connector of the turn indicator. Remove the wing having preliminarily wrapped or bind it in film in order to prevent damage of the paint-and-varnish coating, put into a specially allocated place (dismantling of the left-hand wing is similar).

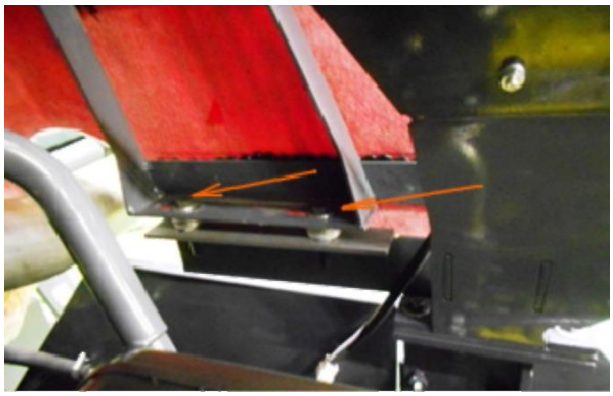


1.2 Undo 3 bolts M8 from the lateral facing sheet to ensure convenience of access to the arch fasteners.

1.3 Open the plastic boot and insert a retainer into the upper hole of the technological stop.



1.4 Undo 3 bolts M12 on the external side of brackets and take off clamps with electrical wiring.



1.5 Undo 4 bolts M10 on both sides of arch fastening (-700) with bracket (-705) (before dismantling, outline the contour of fasteners and bracket with marker in order to simplify the assembly).

ATTENTION! All adjustment washers and shims shall be kept and stowed into a specialized container. During installation shall be placed in their positions in the same quantity.

1.6 Take off the retainer from the technological stop and close the boot.

1.7 Dismantle the arch (-700) from the tractor having preliminarily wrapped or bind it in film in order to prevent damage of the paint-and-varnish coating, and put into a specially allocated place. **ATTENTION! Dismantling of the arch shall be performed together with an assistant.**

1.8 Open the plastic boot and insert the retainer into the upper hole of the technological stop.

1.9 Loosen the clamp and disconnect the branch pipe of case gas drainage from valve cover 3 of the cylinder.

1.10 Undo two lower bolts M10 on the bracket (-140) (before dismantling, outline the bracket contour with marker in order to simplify the assembly).

1.11 Loosen three bolts M10 on the top of the bracket (-140) and undo the two outermost bolts. Leave the middle bolt and turn the bracket (-140) aside towards the cabin. **ATTENTION! During dismantling of the bracket the second worker shall hold the upper angle of the boot on the right-hand side in the direction of tractor motion.**

1.12 Undo 4 bolts M8x40 of the valve cover of the head of cylinder block 3 and remove the valve cover of the head of cylinder block 3.

1.13 Install the valve cover of the block head and fix it with 4 bolts M8 with the tightening torque $M=2^{+0.5}$ kgf·cm. The bolts shall be tighten in a criss-cross manner.

1.14 Install the branch pipe of case gas drainage and fix it with a clamp. The clamp tightening torque is $M=1.5^{+0.5}$ kgf·cm.

1.15 Install the bracket (-140) and place it over the pre-outlined contour and tighten the 2 bolts M10 on the bottom and 3 bolts M10 on the top of the bracket having maintained the tightening torque $M=5^{+0.6}$ kgf·cm.

1.16 Lay the electrical harness over the bracket (-140) and fix it with clamps.

1.17 Dismantling of the left-hand side is similar to the operations described in Items 1.1...1.16.

1.18 Perform the assembly in the reverse order.

1.19 Install the arch and place it in respect of the boot.

1.20 Install the lateral facing sheets and tighten 3 bolts M8 with M=3 kgf·cm (on both sides).

1.21 Install plastic wings onto the brackets and tighten 4 bolts M10 with M=5 kgf·cm and 2 bolts M10 with M=5 kgf·cm on the side, connect the electrical male connector (turn indicator).

7.5.3 Air cleaner maintenance

Perform maintenance of cylindrical filtering elements (cassettes) of the air cleaner in case when the clogging alarm indicator operates.

For dismantling cassettes 3 (Fig.33), it is necessary to undo winged nut 8, take off cover 7 and having sequentially undone nuts 6 remove them from the air cleaner housing.

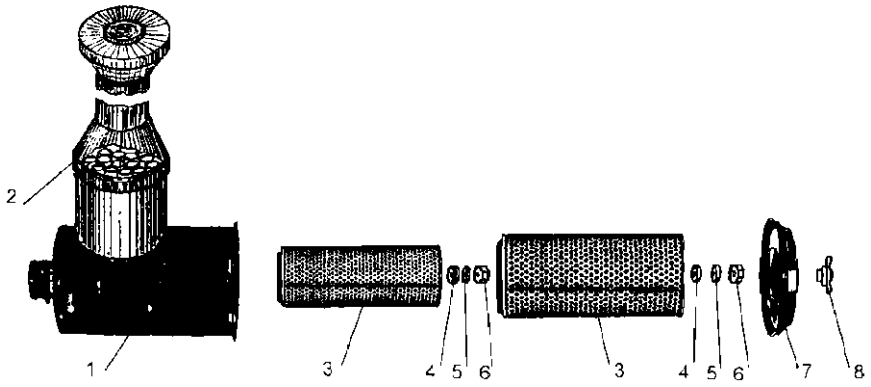


Fig.33 Air cleaner

1 – air cleaner housing; 2 – cyclone apparatus; 3 – filtering elements (cassettes); 4 – sealing gasket; 5 – washer; 6 – nut; 7 – cover; 8 – winged nut

For dismantling cassettes 3 (Fig.33a) of the Donaldson air cleaner, it is necessary to take off cover 7, extract the cassettes, sequentially rotating them in the clockwise direction and at the same time pulling them up.

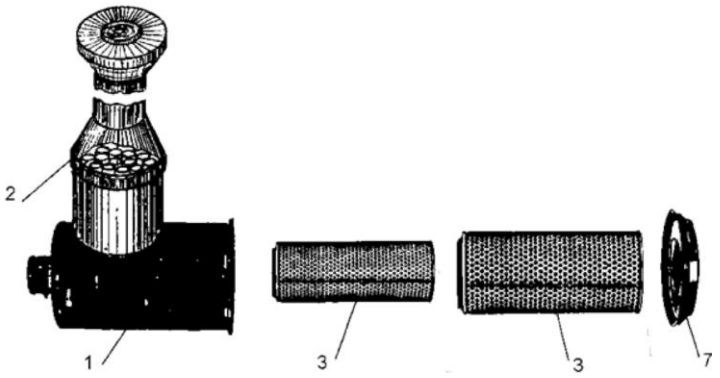


Fig.33a Air cleaner

1 – air cleaner housing; 2 – cyclone apparatus; 3 –filtering elements (cassettes); 7 – cover

Perform cleaning of cassettes by their blowdown with compressed air (Fig.33b) or by washing (Fig.33c) in a detergent solution.

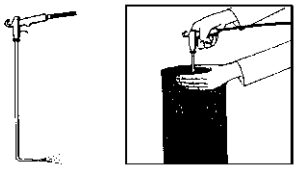


Fig. 33bBlowdown of cassettes

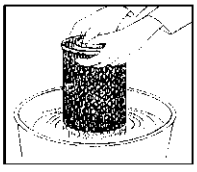


Fig. 33cWashing of cassettes

Perform the assembly of air cleaner in the order reverse to the sequence described above.

Perform maintenance of flat filtering elements (cassettes) of the air cleaner in case when the clogging alarm indicator operates. For dismantling of cassettes 1, 2 (Fig.33d), it is necessary to take odd cover 3 fixed by two locks and remove them from housing 4 of the air cleaner.

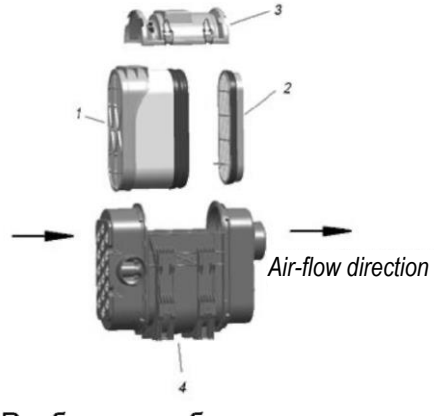


Fig.33d Air cleaner

1 – main filtering element; 2 – safety filtering element with a plastic handle; 3 – cover with retainers; 4 – filter housing

Perform dismantling and assembly of the air cleaner in the following sequence:

1 Shut off the engine. Take off the air cleaner cover.

2 Extract the main filtering element. For extraction, use the handle, by means of which press the filtering element, shift it approximately by 5 mm, then pull up the handle.

3 Extract the safety filtering element.
For extraction use the plastic handle located on the face panel of the filtering element.
The replacement of safety filtering element shall be performed during the 3rd replacement of the main filtering element.

4 Check the filtering element after blowdown or in case of replacement with a new one. Inspect the filtering element. In case when cuts, fractures, burrs are detected on the sealing surface, the use of filtering element is not allowed.

Perform the assembly of air cleaner in the order reverse to the sequence described above.

Perform cleaning of cassettes by its blowdown with compressed air.

Blowdown of cassettes

a) connect the hose to the compressed air source with the pressure of not higher than (0.2–0.3) MPa [(2–3) kgf/cm^2].

b) activate the air supply;

c) direct a jet of dry air to the rear end of the filtering element (on the side of safety filtering element), perform air-blasting of filtering element until all dust is removed. Adjust the air-blasting intensity by modifying the air supply. During air-blasting be careful in order to avoid fractures of the filtering material. If there are fractures or any other through defects, replace the filtering element.

5–6 cleaning operations of filtering elements are allowed.

ATTENTION! In order to avoid the ingress of dust into the cylinder piston group of the engine, it is necessary to pay special attention to the following:

1. During cleaning (blowdown) of the filtering element, do not allow the ingress of dust into the internal cavity of the cassette and the suction path of the engine.

2. Avoid installation of a cassette with defected seals at the ends, in particular, with seals not being glued.

3. See for firm adherence of the end rubber seals of the cassettes to the air cleaner housing.

4. Regularly check the reliability of tightening and perform, if necessary, retighten the clamps fastening the corrugated branch pipe connecting the air cleaner with the suction branch pipe of the engine turbocompressor. During maintenance of the air cleaner check the suction path downstream of the air cleaner for the absence of any traces of dust therein. In case of detection of dust, immediately eliminate the causes of its occurrence.

Check tightness of the clean air supply line to the engine and dust removal line from the air cleaner

After each removal and installation of air cleaner onto the tractor or its disconnection from the engine, it is necessary to check tightness of the areas of joints of the cleaned air supply line to the engine as well as the dust removal line from the air cleaner. Perform checking by means of the device of КИ-4870-ГОСНИТИ type or by means of a U-shaped water manometer. Before checking tighten all clamps of the line hoses. Perform checking with the engine operating on idle run at the crankshaft rotational speed of 30.0 s^{-1} (1,800 RPM). Press the device tip to the area of joint or assumed leak-tightness fault. Variation of the water level in the tube gives evidence of a leak-tightness fault.

Upon elimination of the fault, check the leak-tightness again. ***IT IS PROHIBITED*** to operate the engine with unpressurised air feed channels from the air cleaner to the engine and dust suction from the air cleaner.

In the course of operation of the tractor, it is necessary to check leak-tightness of the cleaned air supply line to the engine during M-1 session.

IT IS ABSOLUTELY PROHIBITED to operate with clogged or ice-covered grill of the air intake pipe cover and without free gas outlet from the exhaust pipe, as it leads to the ingress of exhaust gases through the dust suction pipe to the air cleaner cassettes.

7.5.4 Cooling system maintenance

Filling and check of the cooling fluid:

a) perform filling the tractor cooling system through the filler port and plug of the expansion tank to the level of 60–80 mm from the upper plane of the filler port of the expansion tank plug; during operation avoid any drop of the level in excess of the permissible value.

b) avoid leaks of cooling fluid;

c) in order to prevent prior clogging of the cooling system perform filling and drain of cooling fluid into a clean reservoir avoiding the ingress of oil products therein;

d) a drain valve located on the pipe connecting the radiator to the water pump is provided under the radiator for draining the cooling fluid on tractors with 8481.10/-02/-04, OM457LA (Mercedes) engines. On the tractor with ЯМЗ-238НД5 engine, the valve is located on the heating boiler. There is a drain plug on the left-hand block of 8481.10/-02/- 04, ЯМЗ-238НД5 engines;

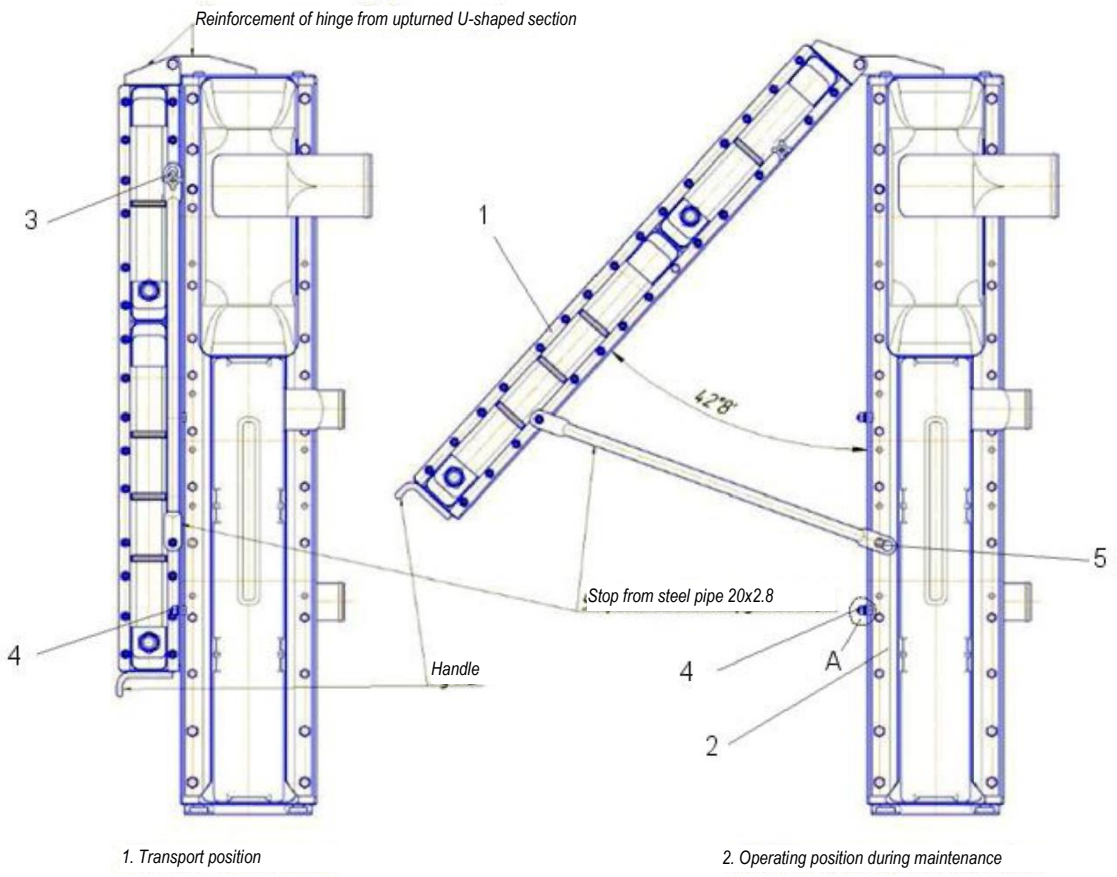
e) perform filling and refill of the cooling system only using automotive cooling fluids specified in the instruction for the engine.

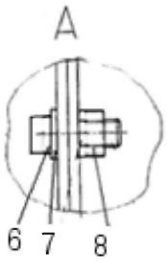
ATTENTION! In order to avoid overheating of the cooling fluid, it is necessary to see for the absence of fouling of the water radiator plates. To this end, when working in dusty conditions, it is necessary to perform radiator blowdown with compressed air under the pressure of 5...7 kgf/cm^2 during every shift on both sides – from the radiator front and from the fan casing side.

In case of repeated overheating of the engine, it is necessary to thoroughly check the condition of the radiator core. To this effect, it is necessary to free the fastening of condenser of the air conditioner assembly with the fan from the frame and carefully throw out it forward, then check the absence of clogging between the radiator plates by inside light inspection using a portable lamp. If necessary, perform blowdown or (in case when dirt is not removed by means of blowdown) wash the radiator core with water under the pressure of 5...7 kgf/cm$^{2.}$

In order to enhance the effectiveness of cleaning of the radiator block cores from dust, chaff, etc., the possibility of separation of the oil radiator block 1 from engine cooling block 2 is provided on the tractors.

For tractors of the Premium design version





Tractor radiator block

1 – oil radiator blocks; 2 – engine cooling block; 3 – screw; 4 – stud; 5 – axle; 6 – bolt; 7 – washer; 8 – nut

The oil radiator block in the upper part is fastened by hinges to the engine cooling block.

In the lower part of the cooling block, there are one stud 4 each on its both side walls.

In the initial position, the oil radiator block 1 is installed on the cooling block 2 by means of fasteners 6, 7, 8 (view A).

In order to clean the radiator cores, it is necessary to do the following:

1. Undo nuts 8 and throw out the lower part of the oil radiator block from the cooling block, then, holding the block thrown out, move the stop into the lower position and fix it on axle 5.

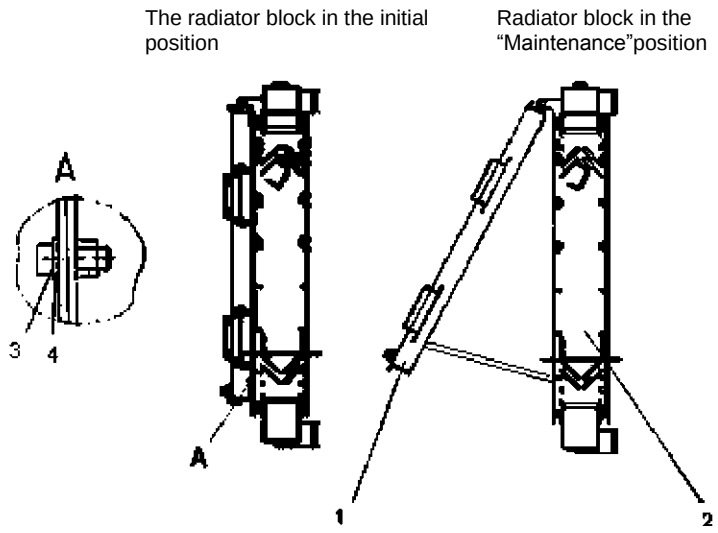
2. During cleaning the radiator cores ***IT IS PROHIBITED*** for the operator to stay in the area overlapped by the oil radiator block.

3. Upon completion of maintenance of the cores, holding the oil radiator block, move the stop into the initial position and fix it with screw 3.

4. Fasten the oil radiator block 1 to the cooling block 2 by means of nuts 8 and washers 7.

5. Check the reliability of fastening of the hydraulic system hoses to the oil radiator block.

For tractors of the Standard design version



Tractor radiator block

1 – oil radiator block;
2 – engine cooling block;
3 – bolt; 4 – washer

The oil radiator block in the upper part is fastened by hinges to the engine cooling block.

In the lower part of the cooling block, there are one stud each on its both side walls.

In the initial position, the oil radiator block 1 is fixed on the cooling block 2 by means of fasteners 3, 4 (view A).

In order to clean the radiator cores, it is necessary to do the following:

1. Undo the fasteners and throw out the lower part of the oil radiator block from the cooling block, then, holding the block thrown out, move the stop into the lower position and fix it on axle.

2. During cleaning the radiator cores ***IT IS PROHIBITED*** for the operator to stay in the area overlapped by the oil radiator block.

3. Upon completion of maintenance of the cores, holding the oil radiator block, move the stop into the initial position and fix the oil radiator block 1 to the cooling block 2 by means of fasteners 3, 4.

7.5.5 Gearbox maintenance

Level check and oil filling

Install the tractor on a horizontal ground.

The oil level can be checked by unscrewing the plugs of upper 5 and lower 6 (Fig.10) reference holes. Before checking the oil level, start the engine and run for 3...5 min at the crankshaft rotational speed of 11.7...16.7 s^{-1} (700...1,000 RPM). Shut off the engine and monitor the oil level during no more than 3 minutes. The level shall be within the reference holes. If necessary, refill oil.

If the tractor is equipped with PTO, check the oil level in GB after operation of the engine with the PTO clutch being engaged.

Oil change

a) Undo drain plug 8 (Fig. 10), drain oil. For better removal of waste oil and sludge, perform drainage immediately after shutdown of the engine. Clean the plug magnet. Put the plug back in place.

b) Wash up filter 3 of the gearbox.

c) Install the filter onto the gearbox. Pay ***attention*** to the fact that the pack of filtering elements 10 (Fig. 34) in the assembled filter shall be firmly tightened with nut 13.

d)Undo the plug of the oil filler port.

e) Fill clean oil into the gearbox.

f) Check the oil level in GB.

g) Screw in the plug of the oil filler port.

Washing of the gearbox filter

a) Undo plug 9 (Fig. 34) of the filter and drain oil.

b) Unscrew base 6 and separate cup 7 of the filter assembly from housing 1.

c) Undo nut 13 fastening the filter sections and remove the locking nut 12, bushings 4, 11 and filtering elements 10.

d)Wash cup 7 and all parts of the filter in diesel fuel.

e) Assemble the filter. Pay ***attention*** to the fact that the pack of filtering elements 10 (Fig. 34) in the assembled filter shall be firmly tightened with nut 13.

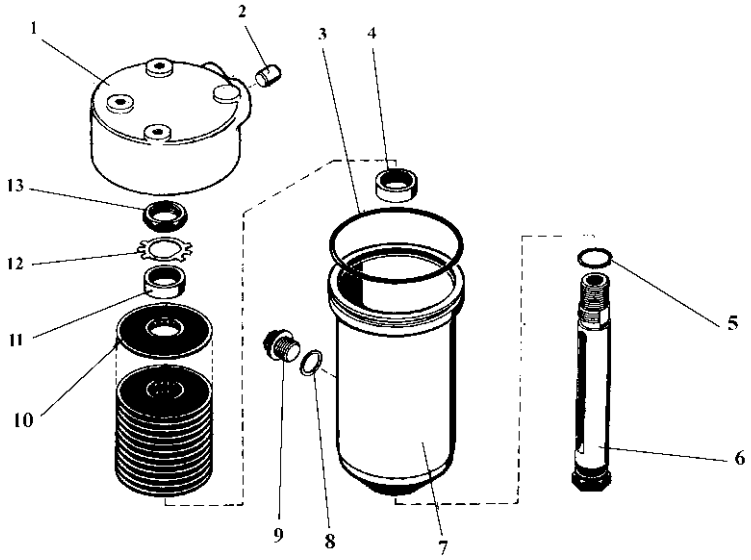
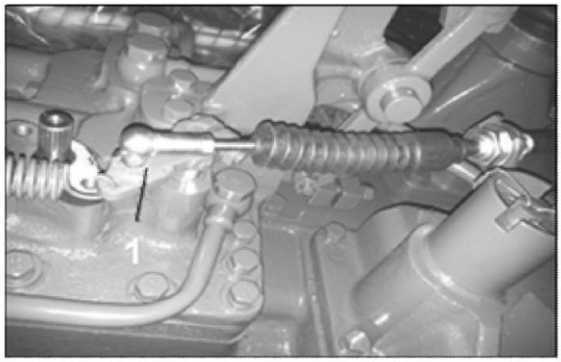


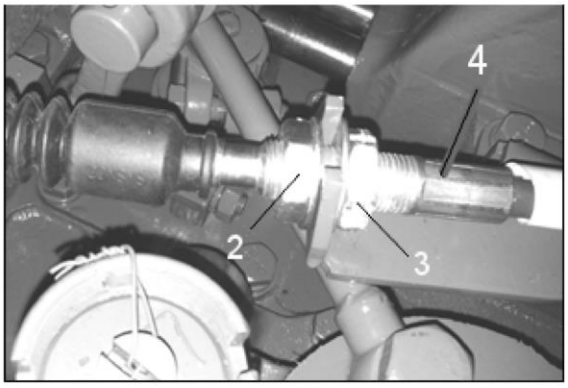
Fig. 34 Gearbox filter with pressure valve

1 – housing; 2 – plug; 3, 5 – ring; 4, 11 – bushing; 6 – base; 7 – cup; 8 – gasket; 9 – plug; 10 – filtering element; 12 – washer; 13 – nut

Adjustment of drain pedal drive

During maintenance sessions M-2 and M-3 (after 500 engine hours of operation), it is necessary to perform adjustment of the drain pedal drive:





– install the control rod of the gear change mechanism in the fixed position corresponding to the neutral gear engagement;

– with loosened nut, pos. 2, screw the adjustment nut, pos.3, until the beginning of turn of the lever, pos.1, under the action of cable, pos. 4;

– undo the adjustment nut, pos.3, by one revolution;

– lock the adjustment nut, pos.3, by means of the nut, pos.2;

– check functioning of the wire rope drive, e.g. with the drain pedal being pressed the changeover from neutral to the 1st gear and vise versa shall be performed without jamming. After pressing the pedal the slow pedal return into the initial position is not allowed.

7.5.6 Maintenance of driving axles, service brakes

Check of the level, filling and change of oil in main gear cases

Install the tractor on a horizontal ground. In order to check the oil level, undo the plug from the reference hole. The oil level in the main gear case shall coincide with the lower edge of the reference port. Fill oil through the reference port by means of funnel with hose and drain oil through the port in the bottom part of the case. Before filling unscrew the breather and close the port with a plug. Wash the breather in diesel fuel, blowdown with compressed air and install it in place.

Check of the level, filling and change of oil in final gears

In order to check the level and fill oil in final gears, it is necessary to place one of the two triangular marks 1 (Fig.35) on the pinion carrier in the extreme lower position and undo plug 2. Fill oil by means of funnel. Drain oil through the drain port (reference) when it is located in the bottom position using the attachment for oil drainage.

Change oil in the following sequence:

– install one of the pinion carriers in the oil drainage position;

– drain oil from the final gear;

– install the second pinion carrier in the oil drainage position;

– drain oil from the second final gear;

– fill fresh oil into the first final gear and screw the plug.

Change oil in the remaining final gears in a similar manner.

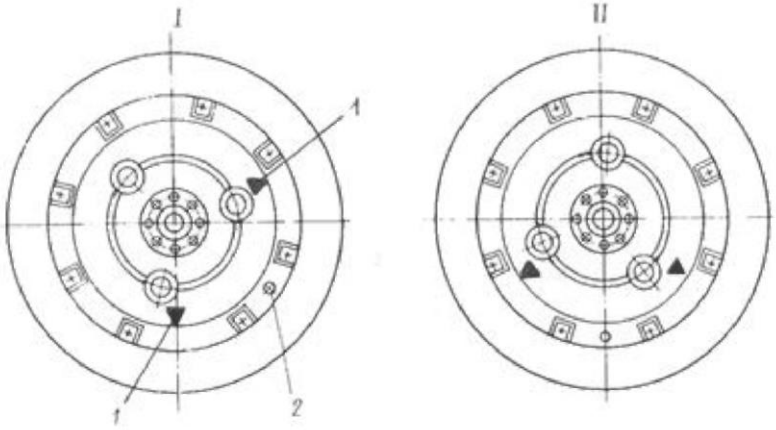


Fig.35 Final drive

1 – triangular mark; 2 – plugs of reference port I – pinion carrier position for oil level check and filling; II – pinion carrier position for oil draining

Check and adjustment of the travel of stems of the brake chambers of service brakes

a) Check air pressure in the pneumatic system, if necessary, fill the system to the pressure of 6.5–8 kgf/cm^2.

b) Shift the brake pedal and check the travel of stems of brake chambers 6 (Fig. 36). The stem travel shall be within 30–45 mm, the travel difference between the right-hand and left-hand stems shall not be more than 7 mm.

If necessary, perform the following adjustment: rotating axle 5 reach the travel value of 30–45 mm, rotate the worm each time at 1/6 of turn (60°) to the regular fixed position. Thereafter check the tractor in motion.

Make sure of reliable and simultaneous action of brakes, absence of heating of brake drums 1 during the tractor motion without using brakes.

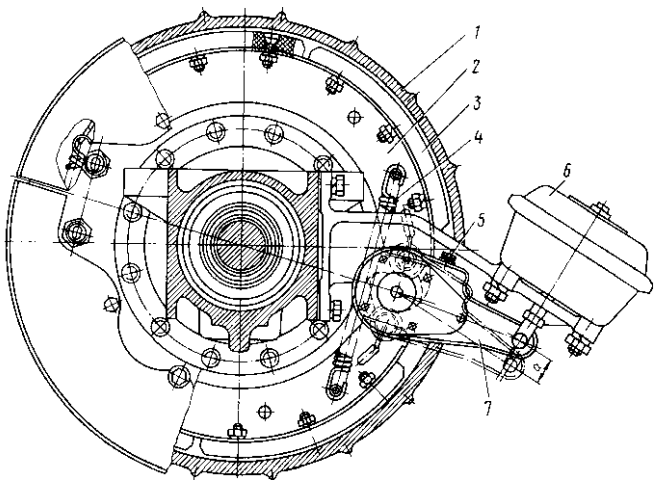


Fig. 36 Service brake
1 – brake drum; 2 – brake block; 3 – cover plate; 4 – spring; 5 – worm axle; 6 – brake chamber; 7 – brake lever; a – travel of stem of brake chamber

7.5.7 Cardan shaft maintenance

In the process of operation observe the following rules of maintenance for cardan shafts:

a) at the end of each shift check by touch the degree of heating of bearing assemblies (if you stand by hand – the heating is normal). In case of overheating, remove the cardan shaft. Eliminate faults at TSS or in a workshop. In case of removal of cardan shafts from the tractor or their installation on the tractor, one cannot use the installation blade or any other items to be inserted into the hinge pivot for cardan shaft barring. It entails the damage of seals, which can lead to prior failure of cardan joints;

b) systematically check fastening of cardan joint flanges. All nuts shall be reliably tightened;

7.5.8 Maintenance of tractor pneumatic system

Drain condensate from air cylinders

In order to ensure normal operation of the pneumatic drive, after completion of work drain condensate from the air cylinders as the presence of condensate can lead to its ingress into the tubes and instruments of the braking system and their failure.

In winter it is necessary to see for condensate drainage especially thoroughly in order to avoid its freezing in the drive tubes.

Check the operation of the tractor pneumatic system

a) Fully release air from the pneumatic air by pressing several times the brake pedal.

b) Start the engine and transfer the level of manual fuel feed into the position of crankshaft maximum rotational speed and switch on the chronometer.

c) Fill air into the system to the maximum pressure to be determined by termination of movement of the air pressure gauge pointer, which is noticeable by eye. Being in serviceable condition and having the normally adjusted pressure regulator, the compressor shall fill the system to the pressure of 0.65–0.8 MPa (6.5–8.0 kgf/cm^2) no more than within 180 s (3 min).

d) Press the brake pedal; in doing so, the pressure should sharply fall and then there should be no movement of the air pressure gauge pointer, which is noticeable by eye while the pedal is shifted.

e) Shifting and releasing the brake pedal, bleed air to the pressure to not less than 0.65 MPa (6.5 kgf/cm^2). Then check the pressure fall; it shall not exceed 0.05 MPa (0.5 kgf/cm^2) during (30±2) min at a free position of the pedal and (15±1) min – at the pedal being fully shifted. If the pressure falls to a greater extent, find visually the air leakage point and eliminate the fault. If the air pressure regulation limits in the pneumatic system do not conform to the specified values, i.e. are within the range of 0.65–0.8 MPa (6.5–8.0 kgf/cm^2), then it is necessary to perform maintenance of the pressure regulator.

Pressure regulator maintenance

Before maintenance of the pressure regulator, inspect and clean it from dust and dirt.

By means of the adjustment bolt, adjust pressure for compressor activation into operation for air discharge into the pneumatic system, which shall be 0.65 MPa (6.5 kgf/cm^2), and the pressure for compressor disconnection from the pneumatic system, which shall be 0.8 MPa (8.0 kgf/cm^2).

The adjustment shall be performed by bolt 7 (Fig.37) with locking nut 8 located in the upper part of the regulator. In case of decreased air pressure, the adjustment bolt should be screwed in, in case of increased air pressure – it should be backed off. If one cannot manage to correctly adjust the pressure limits, then it is necessary to dismantle the regulator for repair. It is recommended to clean and wash the pressure regulator filter periodically, once in every two months. It is especially important if case when oil gets into condensate due to a compressor fault.

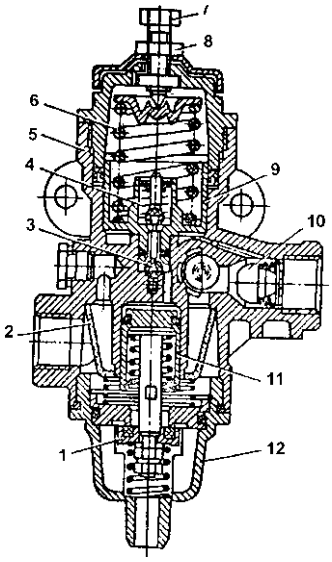


Fig. 37 Pressure regulator
1 – pressure relief valve; 2 – filter; 3 – inlet valve; 4 – outlet valve; 5 – housing; 6 – spring; 7 – adjustment bolt; 8 – locking nut; 9 – servo piston; 10 – check valve; 11 – pressure relief piston; 12 – cover

In order to clean the filter, undo cover 12 and carefully take it off along with pressure-relief piston 11 and filter 2. Wash the filter in petrol and blow it with compressed air. Perform the assembly in the reverse order.

Brake system unit maintenance

Taps and valves do not need any special maintenance. If in the course of operation any defects are detected, then the taps shall by replaced.

The maintenance of connecting heads consists of periodical inspection, cleaning from dirt. The connecting heads are closed with covers for their protection against the ingress of dirt, snow, moisture therein.

Blowdown of pneumatic system

To provide trouble-free operation of the tractor braking system at negative ambient temperatures, press the connecting head valve after completion of work and, having opened the disconnecting valve, blow the system until the condensate is removed. In addition, remove condensate from air cylinders through outlet valves.

7.5.9 Maintenance of hydraulic systems of mounted equipment and steering control

Check of the oil level and change of oil in the hydraulic tank of the hydraulic systems of mounted implements and steering control

Install the tractor on a horizontal ground.

Check the oil level in the hydraulic tank by the inspection window 25 (Fig.38), oil should be visible in the inspection window. Fill clean oil through the filter of filler port 7. When checking the oil level in the hydraulic tank, make sure of the absence of foam generation.

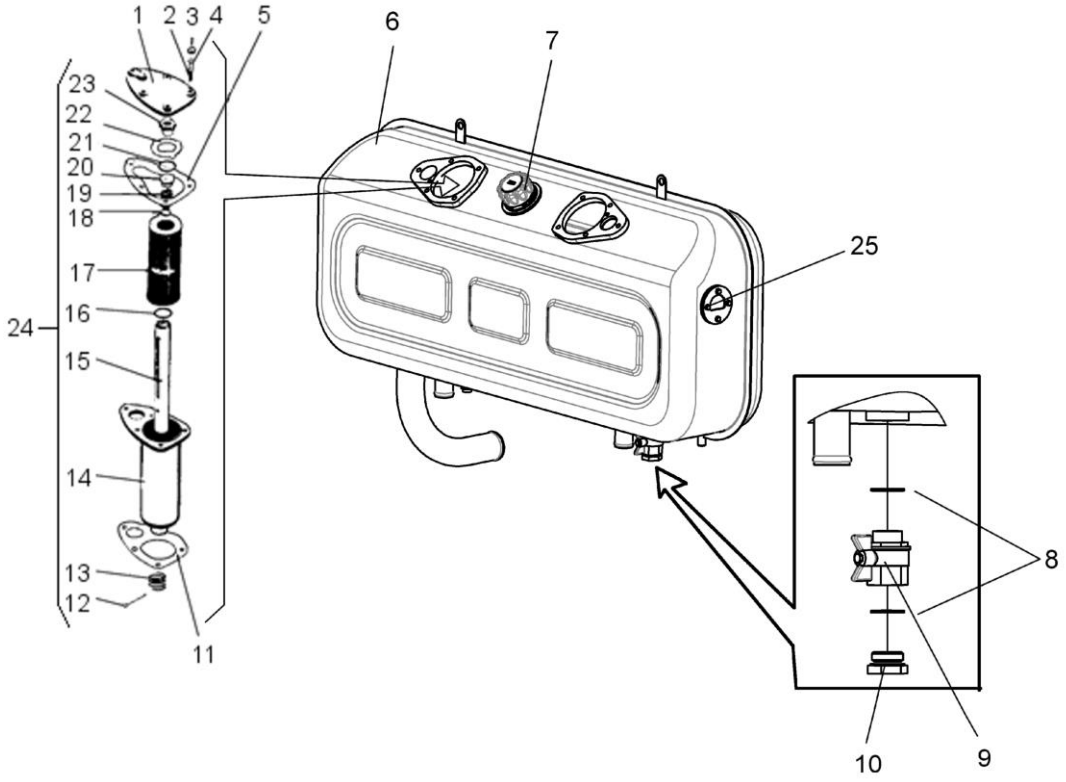


Fig.38 Hydraulic tank

1 – cover; 2 – stud; 3 – nut; 4 – washer; 5 – gasket; 6 – tank housing; 7 – oil filler port; 8 – O-ring; 9 – globe valve; 10 – plug; 11 – gasket; 12 – splint pin; 13 – spring; 14 – filter housing; 15 – pipe; 16 – ring; 17 – filtering element; 18 – washer; 19 – spring; 20 – valve; 21 – ring; 22 – washer; 23 – valve socket; 24 – filter assembly; 25 – inspection window

Keep clean during oil change; the oil being used serves not only as a service fluid but at the same time it performs lubrication of pump bearings; therefore the contamination of working fluid with mechanical impurities or water causes the generation of burrs on the surface of journal bearings and results in pump failures.

Change oil in the following sequence:

a) immediately after shutdown of the engine undo plug 10, open globe valve 9 and drain heated oil;

b) replace filtering elements 17, wash the net filter;

c) wash the filler port 7 in diesel fuel and blow it;

d)fill oil into the hydraulic tank, start the engine and run for 2...3 minutes at a low crankshaft rotational speed without rotating the steering wheel. The hydraulic distributor levers shall be in the Neutral position;

e) increase the rotational speed of the engine crankshaft and make several turns of the tractor to the right and to the left up to the stop and several up and down movements of the mounted implement;

f) shut off the engine and check the oil level in the hydraulic tank and leak-tightness of connections; if necessary, refill oil into the tank.

Change of filtering elements of main filters of the hydraulic tank

a) Under fastening nuts 3 (see Fig. 38) and take off cover 1.

b) Dismantle filter 24 with filtering element and install it on the base of housing 14 (with splint pin 12 upwards).

c) Having squeezed spring 13, take off splint pin 12 and remove the spring.

d) Take off pipe 15 along with filtering element 17 from housing 14.

e) Remove lower rubber ring 16 and filtering element 17.

f) Wash up the filter housing in diesel fuel.

g) Change the filtering element and assemble the filter in the reverse sequence. The change of the second element shall be carried out in a similar manner.

Pressure filter maintenance

Fig. 39 Pressure filter

1 – electrical visual indicator of clogging of DE-500 filter; 2 – filter cup

In order to enhance the operating reliability of the hydraulic system for steering control, a pressure filter HMM422C25XNR (Fig. 39) with filtering element CHP422C25XN is installed on the tractor.

Perform maintenance of the pressure filter in case when indicator lamps 24 and 26 on the lower block of indicator lamps of the instrument panel comes on (Fig.1, 2, 3, 4).

In order to perform maintenance of the pressure filter, unscrew the filter cup, replace the filtering element and wash the cup. Perform replacement of CHP422C25XN filters according to signal of the clogging sensor on the instrument panel.

Elimination of leaks in pipelines, hoses and seals of hydraulic units of the hydraulic systems for steering and mounted implement control

When there are leaks in seals of low-pressure hoses, execute the following operations:

a) dismantle the low-pressure hose having drained the working fluid from the hydraulic system pipelines;

b) check the quality of internal surface of the hose, replace it if any damage is detected;

c) examine the pipeline surface and “zigs” on the pipe; if any violation of surface cleanness is detected, clear the affected area with file and grind the sealing surface;

d) install the hose and again tighten the clamps in the established order.

In case of leaks in the unions and angles of hydraulic units, execute the following operations:

a) remove the union or angle;

b) remove the rubber rings and thoroughly check the absence of cuts or tears on its working surface; if the above-mentioned defects are detected, replace the ring;

c) examine the surfaces being sealed; if any hair-lines, traces of treatment are detected, dress them by scraper and grind;

d) wash the surfaces being sealed with diesel fuel;

e) assemble the union or angle with nut and rubber rings, lubricate the sealing surface in the housing with oil and screw the union or angle into the housing avoiding cutting the ring being sealed until the nut contacts the housing. Perform final installation of the angle with the nut being in the fixed position.

In order to prevent leakage in the hydraulic system during operation, it is necessary to take into account the following:

– tightening of high-pressure pipe connections and hoses with one wrench without supporting the second connection element is not allowed and can lead to destruction of welded joints of pipelines as a result of deformation;

– tightening of the sleeve connection of high-pressure pipes and hoses with a wrench reinforced by pipe can also lead to deformation of the welded joint of pipe and to its leak;

– at dismantling of low-pressure hoses it is necessary to avoid damage of the internal rubber layer;

– the leak-tightness of seals of the parts of hydraulic system units by means of a rubber ring of the round cross-section depends upon cleanness of the sealing surfaces, conservation of the ring integrity and depth of installation grooves;

– most leaks cannot be eliminated by tightening.

ATTENTION! It is allowed to start the engine after repair of the system in case when the intake pipe being is not filled with the working fluid only at the working fluid temperature of not less than minus 20°C. In case of tractor repair at the ambient temperature below minus 20°C, fully drain the working fluid from the hydraulic tank and before start-up fill the hydraulic tank with the working fluid heated to the temperature of 50–60°. Filling of the hydraulic tank with the working fluid drained from pipelines during dismantling without cleaning is not allowed in order to avoid a steering control failure.

ATTENTION! In order to increase the operational life of pumps, the filling of hydraulic system after drainage of the working fluid from the oil-intake pipe should be performed as follows:

1. Refill oil into the hydraulic tank through the oil filler port; in doing so the oil level shall reach the middle of the housing of filter 11 (Fig.38).
2. Start the engine.
3. Pump out the system by making 3...5 tractor turns to the stop and 4 up and down movement of the implement.
4. Refill oil into the hydraulic tank.

Installation and operation of high-pressure hoses

During installation and operation of hoses observe the following rules:

a) do not admit any twist of hoses during installation and dismantling, check the correctness of installation of hoses by the rectilinearity of the marking strip;

b) during installation on the tractor do not admit that the hoses should not rubbed or damaged by parts of assemblies of the tractor;

c) do not subject the hoses to the action of mechanical loads as it can lead to their destruction;

d) do not permit the ingress of fuel and lubricants on the outer runner layer of hoses.

7.5.10 Tractor wheel maintenance

Check of the condition of tyres and wheels

a) Every day before tractor departure examine the tyres and wheels, clean the tyres from foreign matter jammed in the tyre tread. The parts of wheels with cracks and tyres with defects reaching the cord or through defects should not be permitted for operation.

b) Protect tyres from the ingress of fuel, oil and other petroleum products therein.

c) Tighten the wheel fastening nuts uniformly in a criss-cross manner using a special wrench supplied along with the tractor.

d) To provide more uniform wear of the tyre tread pattern, it is necessary, once in every 1,900–2,000 engine hours, to interchange positions of the front and rear wheels observing the direction of rotation of wheels in accordance with the arrow applied on the tyre surface.

Check of air pressure and tyre inflation pressure

a) Undo the valve cap.

b) Measure the air pressure in tyres by means of tyre manometer.

c) Remove the protection cap from the reference outlet valve located on the air cylinder and connect the hose for tyre inflation to the valve.

d) Connect union to the tip of this hose.

e) Connect the union tip to the tyre valve.

f) Start the engine.

g) Inflate the tyre to the required pressure (in accordance with the recommendations set forth in Table 4).

h) Remove the hose and check the pressure.

i) Screw in the valve cap.

7.5.11 Electrical equipment maintenance

Execute the maintenance operations for storage batteries in accordance with their operating instruction, which is to be attached to the tractor.

Check of the battery charging rate

With the engine being shut off:

Switch on the headlights for 2 minutes, switch them off, wait for a minute and check the battery by means of a load diagnostics instrument, for example, H-2001

To this end, connect the "–" clip to the "–" battery clamp, then make contact by the probe on the "+" battery clamp without pressing. The reading of battery voltage will appear on the digital indicator. In order to determine the battery charging rate, follow the table:

Voltage, V	Charge level, %
12.72	100
12.50	75
12.35	50
12.10	25

In case of contact of the battery clamp "+" **with pressing,** the load of 200A will be connected. Hold the probe on the "+" clamp **with pressing** during 5 s. Unless the voltage on the screen is below 9V, the battery is serviceable.

If the diagnostic device is missing, the monitor the voltage by the digital voltmeter on the instrument panel.

With the headlights being switched off, the voltmeter voltage shall not be less than 24.5V. If the voltage is lower than the above-mentioned value, it is necessary to take off the battery and charge the batteries from a fixed charging device.

If the voltage of higher than or equal to 24.5V, then perform start-up of the engine. Run the engine for at least 2 minutes at idle. Then increase the rotational speed to 1,500 RPM and activate the full load (service lights, headlamps, salon heaters are switched on). If the voltmeter readings are between 27.2V and 28.8V, then the generator is operating normally.

Seasonal regulation of the integral voltage regulator at the installation of 65.82 generator

The voltage regulator (Fig.28) has the following two voltage levels:

minimum level ("L") – (27.2±0.7) V;

maximum level ("Z") – (29.4±0.7) V;

"L" level – in case of tractor operation during the summer operating period and the autumn-winter operating period at the ambient temperature from 0 to minus 20°C.

"Z" level – in case of tractor operation at the ambient temperature below minus 20°C.

Setting various voltage levels in the tractor electrical circuit during the year is necessary to ensure the normal charging conditions of the storage batteries and normal work of the users.

The changeover of seasonal regulation of the voltage regulator is performed by turning the adjustment screw into one of the positions (“L”, “Z”).

The remaining maintenance operations indicated in this section should be executed at TSS or in repair workshops.

Check of correctness of the readings of monitoring instruments by reference standards

The check of monitoring and measuring instruments of the tractor is performed by means of Э204 or 531-ГАРО devices or any other similar devices.

Check of pressure gauges completed with sensor

Remove the pressure sensor from the tractor and install it into the connecting coupling of the device by means of a union. Connect the sensor housing to the tractor “frame ground” and the terminal to the wire disconnected from the sensor. By means of pump and valve, set the pressure values by the reference manometer equal to 0.5; 1.0 MPa (5; 10 kgf/cm^2), after which determine the difference in readings of the reference manometer of the device and pressure gauge on the tractor instrument panel.

The difference in readings shall not exceed ±0.2kgf/cm^2 for pressure gauges of the engine and pneumatic system and ±0.3 kgf/cm^2 for manometer of the gearbox hydraulic system.

If the difference is greater than the above-mentioned values, check the pressure sensor.

Check of pressure sensors

Install the sensor being checked into the connecting coupling. Connect the sensor terminal to socket “I”, and “frame ground” – to socket “II”, set the check switch into position “I”. Connect the tractor storage battery to sockets “B” of the device observing the polarity. By means of pump set the pressure equal to 10 kgf/cm^2, then, smoothly bleeding air through the valve set the pressure equal to 5 and 0 kgf/cm^2. In each case, register the readings of micro-amperemeter with the button being pressed.

The micro-amperemeter readings shall be within the following ranges: (157±7) μA, (42±3) μA, (13±1) μA for sensors of pneumatic system and engine;(57±5) μA, (25±2) μA, (13±1) μA for sensors of gearbox hydraulic system.

The sensors and gauges shall be subject to replacement unless the micro-amperemeter readings correspond to those listed above.

Check of temperature gauges completed with sensor

Remove the sensor from the tractor and install it into a reservoir with water, bring water to boiling by means of a heater, after which, having connected the sensor housing to the tractor “frame ground” and the terminal – with the wire disconnected from the sensor, determine the temperature gauge reading. When the sensor is in boiling water, the temperature readings shall be 95–105°C.

Unless this condition is met, check the temperature sensor.

Check of temperature sensor

Set the check switches into position 1. Install the sensor being checked into the cup for heating and bring water in the cup to boiling by means of a heater. Connect the sensor terminal to the socket, and the “frame ground” – to socket II and determine, at the water boiling temperature, the micro-amperemeter readings with the button being pressed.

The micro-amperemeter readings shall be within the range of (33±2) μA.

Faulty sensors and gauges shall be subject to replacement.

Check of the condition of electrical wiring

In order to identify a wire break, activate the circuit and, by means of reference lamp or combined device Ц-4324, determine the break area. To this end, connect one wire from the device or lamp to the “frame ground”, and touch, with the end of the other wire, alternately the clamps, tips or cores of the wire, starting from the storage battery to the non-operating user. See when the lamp will go out or the device pointer will deviate to zero. It will mean that the circuit has a break at the section from the non-operating user to the given connection point.

In order to determine the closure of wires with each other or to the “frame ground”, disconnect all ends of the wires being checked from the fastening clamps. Using the device, measure resistance of the wire being checked with respect to the “frame ground” (the other wire). In case when the closure is missing, the device will correspond to the infinite value of resistance. If the closure is present, the device will show a finite resistance value.

Maintenance of air conditioning system

In operation with the use of air conditioner, it is necessary to do the following:

1. Every day perform an inspection of the condenser and remove chaff, vegetation particles, stuck dirt from the plates and interplate cavities and blow off the condenser with compressed air as well as check the tension V-belt of the compressor drive.

2. During execution of M-1, M-2, M-3 check the belt tension of the compressor drive and, if necessary, make adjustments. The belt deflection (Fig.40) when a force of 4±0.2 kg is applied at point “P” shall be within 9...14 mm.

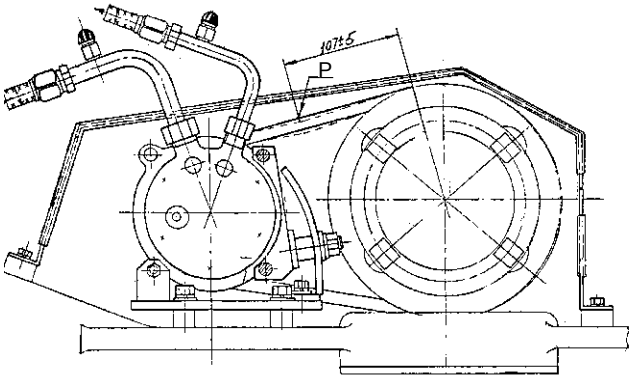


Fig. 40 Adjustment of the tension of belt of the compressor drive

3. In winter season it is necessary to take off the compressor drive belt from the sheaves.

4. The filter dehydrating the moisture and oil separator must be changes once a year.

5. The frequency of replacement of air filter of the air conditioning system shall be once in every 500 engine hours but not less than once a year.

6. The frequency of cleaning and purging the air filter of the air conditioning system is once in every 125 engine hours during M-1.

ATTENTION! During operation of the tractor it is necessary to take into account the following features of the air conditioning system.

1. At the ambient temperature below 0°C the system does not function (the system is deactivated by the sensor).

2. In order to exclude a system failure during tractor operation and non-use of the air conditioner during this period of time, it is necessary to do the following:

2.1. Once in every two weeks run the compressor for 5 min.

2.2. At the ambient temperature below 0°C run the compressor for 5 minutes once in every two weeks in a room with the temperature above 0°C.

3. In case of warehousing storage (at the ambient temperature above or below 0°C), the periodic start-up of the compressor is not required.

Recommendations for maintenance of the air conditioning system

1. Perform filling of the system with R134a Freon gas in the capacity of 950 g.*

2. The filling the system with Freon gas and replacement of system units shall be performed only by specialists dealing with air conditioning maintenance and repair.

3. ***IT IS ABSOLUTELY PROHIBITED*** to mix the refrigerant, R134a Freon gas, with any other refrigerants or use any refrigerant, except the permissible one.

4. IT IS PROHIBITED to:

work with one (out of 2) faulty fan of the evaporator unit;

fill the engine cooling system and air conditioning system with water.

5. Use oil of ZXL100PG or PAG-100 grade for lubrication of the compressor. The volume of oil to be filled is 200 ml (with compressor Sanden SD7H15) or 150 ml (with compressor Zexel TM-14HD)*. It is not allowed to store or keep it in the opened form more than for 30 min. In case when the above-mentioned period is exceeded, oil shall not be suitable for use.

6. It is not allowed to use waste oil.

7. The ingress of moisture into oil is not allowed.

8. In case of depressurizing in case of the system being overcharged, it is necessary to replace the filter dehydrating the moisture and oil separator.

Note. * The data on the amount of Freon gas and refrigerating oil are given for the system filled at the manufacturer-factory. In case of system overcharging in the course of operation, in order to determine the required amount of oil in the compressor, it is necessary to consult specialists of Peterburgskytraktorny zavod, JSC or a specialized enterprise dealing with maintenance and repair of air conditioners.

ATTENTION! The operation and maintenance of the air conditioning system should be performed in accordance with the instruction for air conditioner attached to the tractor.

7.6 Procedure for executing works on the use of spare parts from the SPTA kit

Replacement of filtering elements of hydraulic systems, sensors, fuses, electrical lamps and other parts

The works on replacement of filtering elements of hydraulic systems of the mounted implement and steering control, gearbox, sensors, fuses, electrical lamps and other parts comprising the SPTA kit shall be executed during routine maintenance and at the discretion of the driver.

8 TOOLS AND ACCESSORIES

A set of tools and accessories is supplied along with the tractor.

Hydraulic jack (to be supplied as an option)

The hydraulic jack is designed for jacking the tractor and has the following main parameters and dimensions:

Carrying capacity, kN (tf) 120..... (12)

Lifting height (travel of hydraulic plunger), mm, not less than 165

Height of pickup above the floor, mm ..... 243±5.0

Weight of jack being filled, kg, no more than 10.5

Before lifting the tractor, perform several rockings with lever (5–7 times) with the shutoff stem being unscrewed, after which screw in the stem and perform lifting by means of the tommy blade.

The jack is filled with oil AU OST 38.01412-87. For operation of the jack at the ambient temperature below minus 30°C it shall be filled with oil ВМГЗ-С TU 38.101.479-86 or МГЕ-10А OST 38.01281-82. The volume of oil being filled is (400±20) ml.

During transportation and storage the jack screw shall be screwed in, the plungers shall be lowered, the shutoff stem shall be unscrewed.

Head light ERA G7

The head light is designed for local illumination during inspection, maintenance and repair of the tractor.

9 STORAGE REGULATIONS

Perform preparation, storage and depreservation of the tractor in accordance with the provisions set forth in this section, operating instructions for the engine and storage batteries, which are attached to the tractor.

Put the tractors for storage:

storage between shifts – break in use up to 10 days;

short-term storage – from 10 days to two months;

long-term storage – over two months.

The operations related to tractor preparation for storage shall be executed by specialized teams or mechanical workers under supervision of a person being responsible for storage. The mechanical workers shall put the prepared tractor for storage and the responsible persons shall accept it for storage. The placement of tractor for long-term storage and its withdrawal from long-term storage shall be executed by certificates.

Store tractors in closed premises or under canopy. It is allowed to store at open equipped sites with obligatory execution of activities relating to preservation, pressurization of the tractor and removal of components, which are to be kept in the warehouse.

Check the tractor condition during the period of storage not less than once in two months in case of storage in closed premises and once a month in case of storage at open sites and under canopy. After strong winds, rains and show drifts immediately perform checking and elimination of the defects detected. The results of periodic checks shall be executed in the check log-book. During storage perform maintenance in accordance with the guidelines set forth in Item 7.3.

9.1 Tractor preparation for short-term and long-term storage

The tractor shall be placed for short-term and long-term storage directly after completion of works and activities as per M-1.

The tractor preparation for short-term storage shall consist of the following:

– clean the tractor from dust, dirt, leaks of oil, vegetable and other remains. After cleaning and washing blow off the tractor with compressed air in order to remove moisture;

– press the valve of the tractor connecting head and, having opened the separating valve, blow down the system until condensate is removed;

– check the level and, if necessary, refill oil into the gearbox, cases of main and final gears of driving axles.

If the tractor is kept at negative temperatures, it is necessary to replace oils of summer grades with winter grades in the engine and gearbox lubrication systems according to the lubrication table.

After drainage of sludge from air cylinders wipe the valves dry, apply plastic grease;

– undo plugs and breathers of the fuel tank, hydraulic tank of the hydraulic systems of the mounted implement and steering control, PDR, expansion tank, PTO; wash them up and wipe dry; lubricate the threaded joints of plugs with plastic grease and screw them in place; wrap (cover) with polyethylene film and bind with packing twine;

– blow off the filtering element of the air cleaner with compressed air. Wrap polyethylene film around the upper part of the exhaust and air intake pipes along with the above-listed plugs of filler ports and bind with packing twine;

– apply preservation oil or grease on threaded connections of the central track rod, vertical struts, spherical surfaces of the central track rod and lower links of the mounted implement, protruding parts of the stems of hydraulic cylinders of hydraulic systems of steering control and mounted implements; preliminarily clean, remove traces of corrosion, wash up, degrease the surfaces and dry them. Having applied the preservation oil or grease, wrap the above-listed threaded joints, spherical surfaces and parts with polyethylene film of paraffin paper, bind with packing twine;

– set the levers and pedals of control mechanisms in the position excluding arbitrary activation of the tractor and its units into operation;

– install the tractor on props or pads excluding warping and bending of semi-frames and other assemblies and providing unloading of pneumatic wheels and springs. The clearance space between tyres and bearing surface shall be 80–100 mm;

– disconnect the storage batteries, clean, remove traces of corrosion and electrolyte; clean up vents, lubricate connection terminals with plastic grease. Determine the level and density of electrolyte in accordance with the operating instruction “Lead starting storage batteries”. In case when the tractor is to be stored at low temperatures or for more than one month, remove the storage batteries and put them to the warehouse. Headlamps, generator, starter should be cleaned, blown off with compressed air and the parts fastening them and connecting terminals should be lubricated with plastic grease;

– close the cabin door and lock it with key, bind wire around the door handle and lead-seal it, install leas seals on the radiator facing and boot locks.

10 TROUBLESHOOTING

Fault	Remedy
Transmission fault	
Increased heating of the pump drive reducer: absence of lubricant, clogging of oil channels.	Clean the oil supply channels
Oil pressure in the gearbox is missing or insufficient:	
Oil leak in oil pipeline connections.	Eliminate the leak.
Decreased oil level in gearbox.	Refill oil.
Oil pressure sensor or gauge is faulty.	Replace it.
Sticking of the pressure valve of the hydraulic system.	Wash up and adjust the pressure valve. Perform adjustment of the pressure valve at nominal rotational speed of the engine on any of gears for the pressure of 11–12 kgf/cm^2 by screwing the plug. Perform monitoring by manometer of the class not less than 2.5 with the limit measurement scale of 15–20 kgf/cm^2. The oil pressure in the GB hydraulic system at the engine crankshaft rotational speed of 900–1,800 RPM shall be 1.0–1.2 MPa (10–12 kgf/cm^2) for K-744R1, K-744R2 tractors and 1.1 –1.3 MPa (11–13 kgf/cm^2)for K-744R3, K-744R4 tractors at the engine crankshaft rotational speed of900–1,800 RPM. The oil pressure growth on each gear shall be fast. The pressure on neutral and in engagement of synchroniser brake shall not be less than on transmission gears.
Loss of performance of the gearbox pump.	Check and adjust pressure in accordance with Item 6.9. If necessary, replace the pump.
Increased noise in the pressure valve area at the Neutral position of gear change lever with the full shift of drain pedal.	Check the oil level in gearbox. During installation of PTO on the tractor, perform the level check with PTO being engaged.
Continuous increase of the oil level in gearbox, oil throwing from the gearbox breather tube, fast overheating of oil in gearbox, loss of power (oil overflow in GB due to “leakage” from the hydraulic tank through PDR pump seals).	Determine the pump with “leakage”, eliminate the fault by means of replacement or repair.
Tractor “deformation” with the main shaft geared clutch being engaged at the gear change lever position of “actuation of synchroniser brakes”:	
Disc warping.	Replace the discs.
Wear of synchroniser brake blocks.	Replace the synchroniser brake blocks.
Adjustment of the drain gate valve control drive:	
Slow return of the drain pedal. Increase of the shifting force, jamming at changeover N-1, 1-N with the drain pedal being fully shifted. Drain pedal hanging up on the 1st gear.	Adjust the drain pedal drive. With the wire rope drive being adjusted correctly, the drain pedal in the depressed position shall rest against the bolt at the gear-shift mechanism (GSM) drain lever being turned up to the stop in the clockwise direction. With the drain pedal being released,

Fault	Remedy
	the drain lever should be turned to the stop in the clockwise direction. If necessary, replace the wire rope of remote control.
Oil leaks from driving axles:	
– increased oil level;	Drain the excess of oil.
– breather contamination; – failure of seals.	Wash and blow off the breather. Replace the seals.
Jerks at taking off and rattle – loosening of fixture of the connecting flanges of cardan shafts.	Tighten the nuts.
Increased heating of shafts in the area of bearing assemblies of cardan shafts – absence of lubricants, ingress of dust and dirt due to collar damage and wear.	Lean and wash oil-conducting channels of the crossbar. Replace worn and damaged parts.
Faults of the hydraulic system of steering control	
Oil foaming and throwing through the filler port of the hydraulic tank:	
– insufficient amount of oil; – air inflow in pipelines connecting the hydraulic tanks to pumps.	Refill oil. Eliminate the air inflow in the connecting pipelines or over the plug of siphon device in the centre of the upper wall of hydraulic tanks.
The tractor and the steering wheel do not turn:	
– insufficient amount of oil in the hydraulic tank;	Fill oil into the hydraulic tank until the level appears in the inspection window.
– the pumps do not rotate due to shutdown of the engine.	Turn the lever on the engine shutdown PDR towards the cabin.
Jamming of the gate valve or hydraulic motor of the hydraulic steering wheel.	Replace the hydraulic steering wheel.
Heavy steering control:	
– the pump performance is low or the flow regulator throttle is clogged;	Check the time of full tractor turn from one extreme position to the other at the engine crankshaft rotational speed of 1,300 and 1,900 RPM and at the maximum possible rotational speed of the steering wheel. If the time of turn is the same (and over 5 s), then the cause of the fault is the ingress of foreign particles into the gap between the throttle and the adjustment screw of the flow regulator. It is necessary to dismantle the flow regulator (it is installed on the left-hand pump in the direction of tractor motion) and wash its parts in diesel fuel without disturbing the adjustment screw. If the time of turn is still more than 5 s, it is necessary to replace the pump of steering control system.
– internal oil leaks over hydraulic cylinder seals;	Replace the hydraulic cylinders with repaired (or new) ones and checked for leak-tightness.
Increased oscillations of tractor semi-frames at the turn on the spot and in motion:	
– presence of air in service cavities of hydraulic cylinders and hydraulic sets;	By running the engine at the maximum rotational speed at idle heat the hydraulic system to the temperature of 50–60°C and by turning the

Fault	Remedy
	steering wheel to the right and to the left three revolutions each without reaching the safety valve (without reaching the “stop”) pump out the hydraulic system until smooth turn of semi-frames and the safety valve is reached (reaching the “stop”). Execute the works with the rear axle being disengaged. During pumping out the hydraulic system, turn the steering wheel at the maximum rotational speed in order to exclude its oscillations. In case of leaks occurring, eliminate them.
– the grade of service oil in the hydraulic system does not correspond to the specified grade.	Replace oil according to the lubrication table.
Increased free travel of the steering wheel:	
– presence of air in the hydraulic system.	Heat and pump out the hydraulic system as mentioned above.
Faults of the hydraulic system for control over the mounted implement	
Increased heating of oil in the hydraulic system:	
– insufficient amount of oil; – fault of oil radiator of the hydraulic system for steering control.	Refill oil. Replace the faulty radiator.
The mounted implement is lifting slowly:	
– insufficient amount of oil; – air inflow in pipelines connecting the hydraulic tanks to pumps.	Refill oil. Eliminate the air inflow.
– increased oil leak in the pump, hydraulic distributor; – defect of leak-tightness of seals of the hydraulic cylinder piston.	Replace the defective assembly. Restore the piston seals or replace the hydraulic cylinder.
The handle of hydraulic distributor does not return to the “Neutral” position from the “Lifting” or “Forced lowering” positions at the end of operating stroke:	
– increased heating of oil; – jamming of gate valves in the housing of hydraulic distributor irrespective of the oil temperature.	Eliminate the fault as specified above. Replace the hydraulic distributor.
Increased draft of the implement in the transportation position with hydromechanical valves being closed – insufficient tightness of the hydraulic cylinder piston.	Check the leak-tightness of hydraulic cylinders for lifting.
Faults of pneumatic system	
Lighting up of the “parking brake is activated” indicator lamp with the engine being in operation and the parking brake being deactivated:	
– air leak in the parking brake circuit.	Eliminate the air leak.
There is no pressure in one or two air cylinders.	
The triple safety valve is faulty (see the	Replace the valve.

Fault	Remedy
diagram in the appendix).	
The pressure regulator often operates with the pneumatic system being filled.	
Air leak through connections of the pneumatic system.	Eliminate the leak by tightening the connections (determine the leak area “by ear” or “by touch”).
Air leak through one of the pneumatic sets.	Replace the set.
Ineffective braking or absence of braking with the brake pedal being fully shifted.	
The rod stroke in the brake chambers is not adjusted.	Perform adjustment.
The brake valve is faulty.	Connect manometers to the valves of reference outlet of the upper and lower sections of the brake valve. If at the full stroke of the brake valve lever the pressure according to the manometer readings is less than on the gauge in the instrument panel (Fig. 1, 2, 3, 4), replace the brake valve.
Air leak from brake chambers.	Replace the chamber membrane.
Faults of electrical equipment	
The level of electrolyte decreases very fast:	
– leak of electrolyte from the battery jars;	Repair or replace the storage battery.
– the voltage regulator maintains a high level of voltage in the electrical system of the tractor.	Replace the voltage regulator.
The turn indicator lights are faulty:	
– the fuse has burnt;	Eliminate a short-circuit in the wiring, after which replace the fuse.
– a faulty contact in the terminal connections or a wire break;	Restore the contact in the terminal connections, check the serviceability of electrical wiring.
– the disconnecting relay of the turn indicator is faulty;	Replace the disconnecting relay.
– the light lamps have burnt out.	Replace the lamps.
Rattling noise of the sound signal:	
– the fasteners of signal connection, cover or coil have loosened;	Tighten the fasteners.
– cracks in the membrane.	Replace the signal.
The sound signal does not activate:	
– the fuse has burnt; – faulty contact in the signal button.	Eliminate a short-circuit in the wiring, after which replace the fuse. Restore the contact.
The monitoring and measuring instruments do not provide readings or provide incorrect readings:	
– the fuse has burnt in the instrument panel; – faulty contact in the gauge – sensor circuit; – faulty gauge or sensor.	Eliminate a short-circuit in the wiring, after which replace the fuse. Check the reliability of wire connection to gauges and sensors. Replace the gauge or sensor.
The indicator lamp “Battery charging” is alight (in the instrument panel) with the	

Fault	Remedy
engine being in operation:	
– the generator drive belt is weakly strained;	Tighten the belt.
– break of the power circuit of the excitation winding, oxidation of adapter terminals, loosening of terminal clamps;	Restore the circuit integrity, clean and tighten the adapter terminals.
– hanging up, wear of brushes, fracture of springs in brush holders;	Check the condition of the brush assembly, if necessary, replace the brushes, springs.
– earth fault of wires feeding the generator excitation winding;	Eliminate short-circuit in the power circuit of the generator excitation winding
– the voltage regulator has decreased the level of voltage being controlled in the electrical network of the tractor.	Replace the voltage regulator.
FOR K-744R1St TRACTOR:	
The battery is not charged, the indicator lamp “Battery charging” is not alight (in the instrument panel, upper block of indicator lamps), the engine cannot be started. Cause: break of the generator +D terminal circuit	Press the lamp serviceability check button for the upper block of indicator lamps.In doing so, the “Battery charging” lamp will come on (the extreme right-hand lamp). Holding the button run the engine. Release the button. In this mode it possible to go to the place of destination in order to replace the generator.

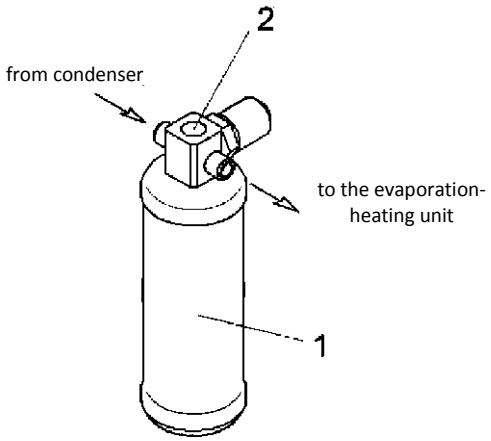


Fig. 41 Receiver of air conditioning system
1 – receiver; 2 – inspection glass

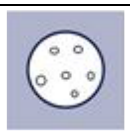
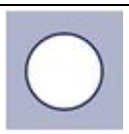
Condition of refrigerant in inspection window 2, Fig.41			
Description	**Almost transparent fluid, solitary gas bubbles are possible.**	**Clear fluid. No bubbles are present. The cold capacity is not sufficient.**	**Mil-colored fluid. Large amount of gas bubbles.**
Condition of the system	**The system is filled normally.**	**It is possible that the system is overcharged. Apply to the service centre.**	**The amount of refrigerant is insufficient. Apply to the service centre.**

Fig. 42 Check the amount of refrigerant according to the inspection window

Fault	Remedy
Ineffective operation of air conditioner	Clean the condenser, compressor with coupling and air filters under the cabin roof with compressed air in order to remove dust and dirt. Activate air conditioner and check the level of refrigerant in the receiver (Fig. 42). In case of insufficient level or excess of Freon gas, it is necessary to apply to the service centre.
Air conditioner cannot be activated	Electric wiring is faulty. Check the contacts of electrical wiring harness. Fuse defect. Replace the fuse. Low pressure in the system. ***Check the pressure. If necessary, check the system for leaks and refill the system.*** Excessive pressure in the system. Check the condition of condenser; if necessary, blow off with compressed air.
The air conditioner gets activated and transfers into cyclic operation with the operating cycle of 0.5–1.0 s.	If the temperature in the cabin is high, a low performance of the fan is possible. ***Check the pressure in the system (perhaps it is overcharged) and, if necessary, bleed the excessive amount of refrigerant.*** Check the air filters and replace, if necessary.
The air conditioner gets activated and transfers into cyclic operation with the operating cycle from 5 s.	If the temperature in the cabin is not high, then the evaporator overcooling protection picks up, which is not a fault. Check the performance of the fan (replace, if necessary).
Strong noise of the compressor.	Defect of the ball bearing. ***Replace the compressor.*** Defect of electromagnetic coupling. ***Replace the coupling.***
V-belt noise.	The belt is worn, replace.

Note. The works selected in in bold type shall be executed only by certified specialists.

11 CLAIMING PROCEDURE

11.1 In case of detecting a failure or fault and absence of violations set forth in Item 11.2, the user shall be obliged to call a representative of the Service Centre providing maintenance and repair of equipment in your region (a copy of failure report shall be sent to the manufacturer's plant) for determination of the defect root cause.

Manufacturer's plant address:

47 Stachek pr., St. Petersburg, 198097
Peterburgskytraktorny zavod, JSC
Tel./fax: (812) 302-62-77
E-mail: garant-sptz@sptz.kzgroup.ru

The addresses of service centres are indicated in the Service Book and on the Peterburgskytraktornyzavod,JSC's web site.

11.1.1 The call of a manufacturer-plant's representative and claims relating to the tractor quality should be sent via the enterprise (organisation), which has sold (supplied) the tractor and has an agreement with the manufacturer's plant.

11.2 Messages on failures, faults and claims relating to quality exposed during the warranty period shall not be sent to the manufacturer's plant in the following cases:

11.2.1 In case of violation of the rules of operation, transportation and storage set forth in the operating instruction and GOSTs if it has been the cause of failure.

11.2.2 During elimination of a failure or fault by replacing tractor components from the individual set of spare parts to be attached to each tractor.

11.2.3 During dismantling and repair of the tractor before arrival of the manufacturer-plant's representative within the established period of time, if as a result it has become impossible to determine the cause of failure.

11.3 Engine failure or fault reports (except Cummins and Mercedes engines) should be additionally sent to the first address:

– as to engines manufactured by Avtodizel, OJSC:
to Avtodizel OJSC's regional service and to Avtodizel, OJSC at the address:
75 Oktyabrya pr., Yaroslavl, 150040
Avtodizel, OJSC
Fax: (4852) 58-81-28
E-mail: garantia@adzl.ru

-as to engines manufactured by Tutayevsky engine plant, OJSC:
to Tutayevsky engine plant, OJSC at the address:
1 Stroitelei ul., Tutayev, Yaroslaskaya obl., 152300
Tutayevsky engine plant, OJSC
Tel.: (48533) 2-35-65
E-mail: OGO721@mail.ru

11.4 In the failure or fault report, it is necessary to indicate the following data:

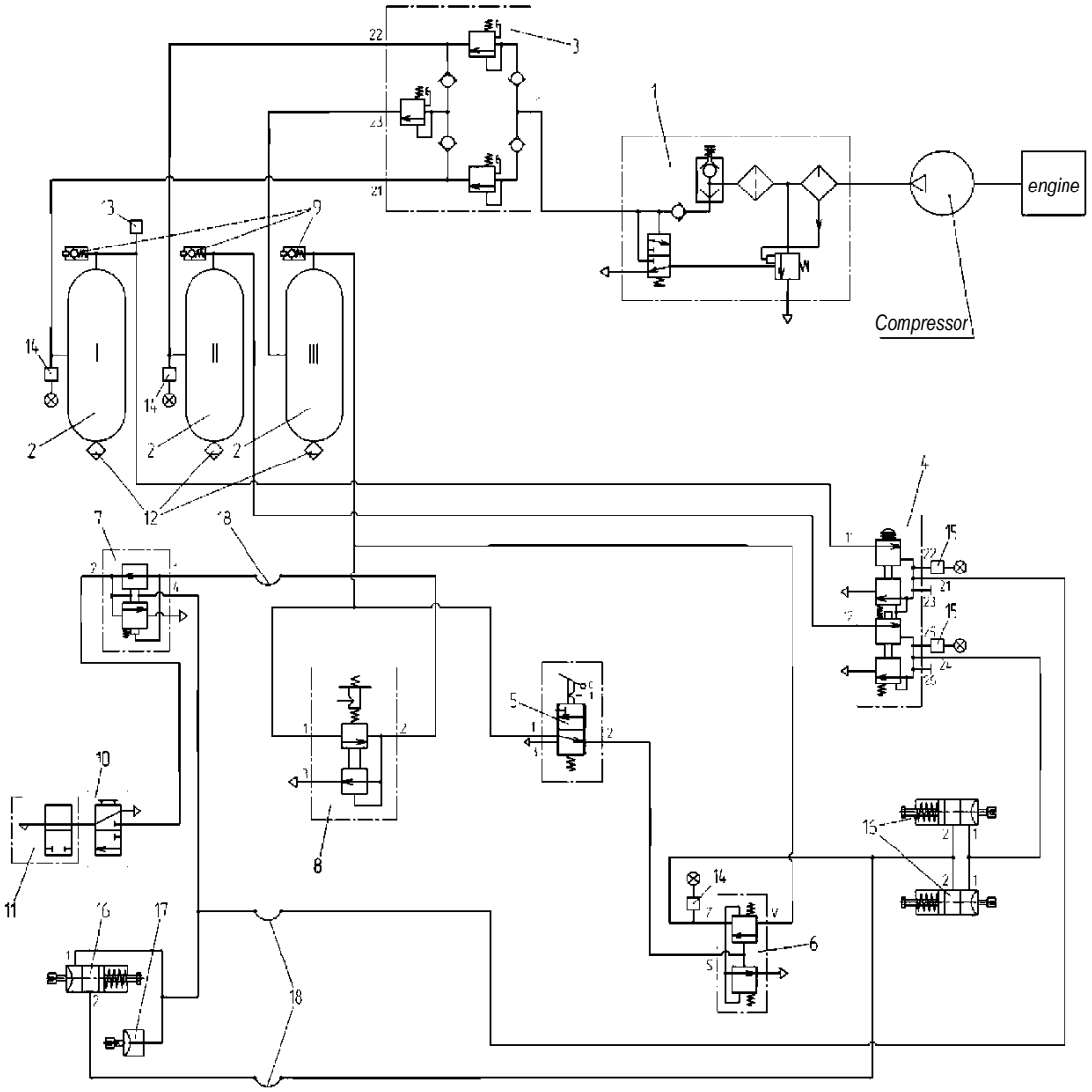
serial number of the tractor, serial number of the engine and total engine hours;
character and external manifestation of the failure or fault;
user's exact address.

Attention! ***This procedure for lodging faults and reviewing claims shall be valid only on the territory of the Russian Federation.***

The fulfilment of this procedure guarantees that the user will operationally obtain a solution for identification of causes and elimination of failures and remarks on the tractor.

APPENDIX 1

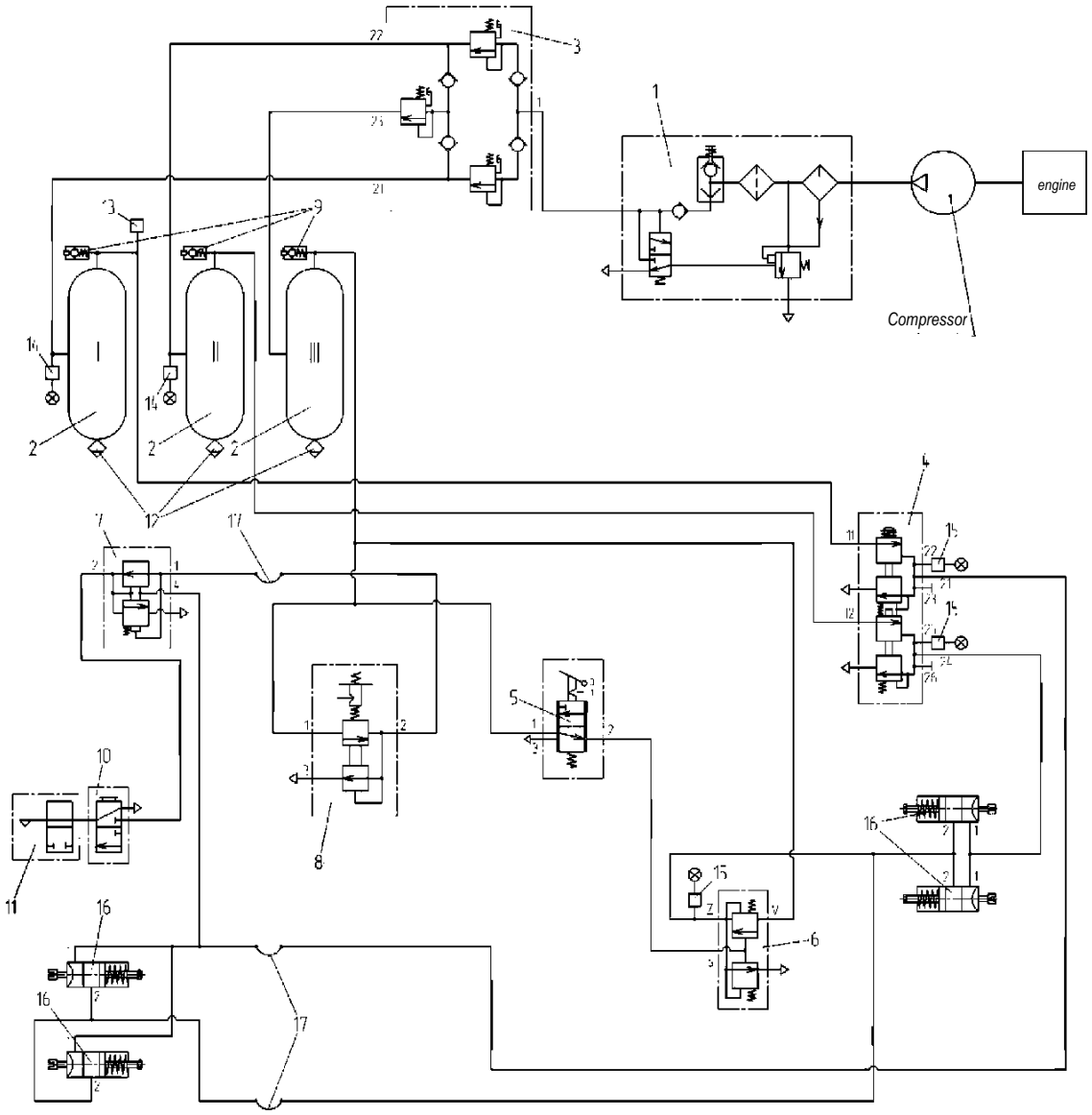
Diagram of the pneumatic system of K-744R1, K-744R2 tractors



1 – pressure regulator; 2 – receiver; 3 – triple protection valve;
4 – two-section brake valve with pedal;
5, 8 – reverse-acting brake valve with manual control;
6 – accelerating valve;
7 – trailer brake control valve with single-wire drive;
9 – reference outlet valve; 10 – cut-out valve;
11 – connecting head of “A” type; 12 – condensate drain valve;
13, 14 – pressure sensor; 15 – pneumatic switch;
16 – brake chamber with spring energy accumulator;
17 – brake chamber of type 30; 18 – hose

APPENDIX 1A

Diagram of the pneumatic system of K-744R3, K-744R4 tractors

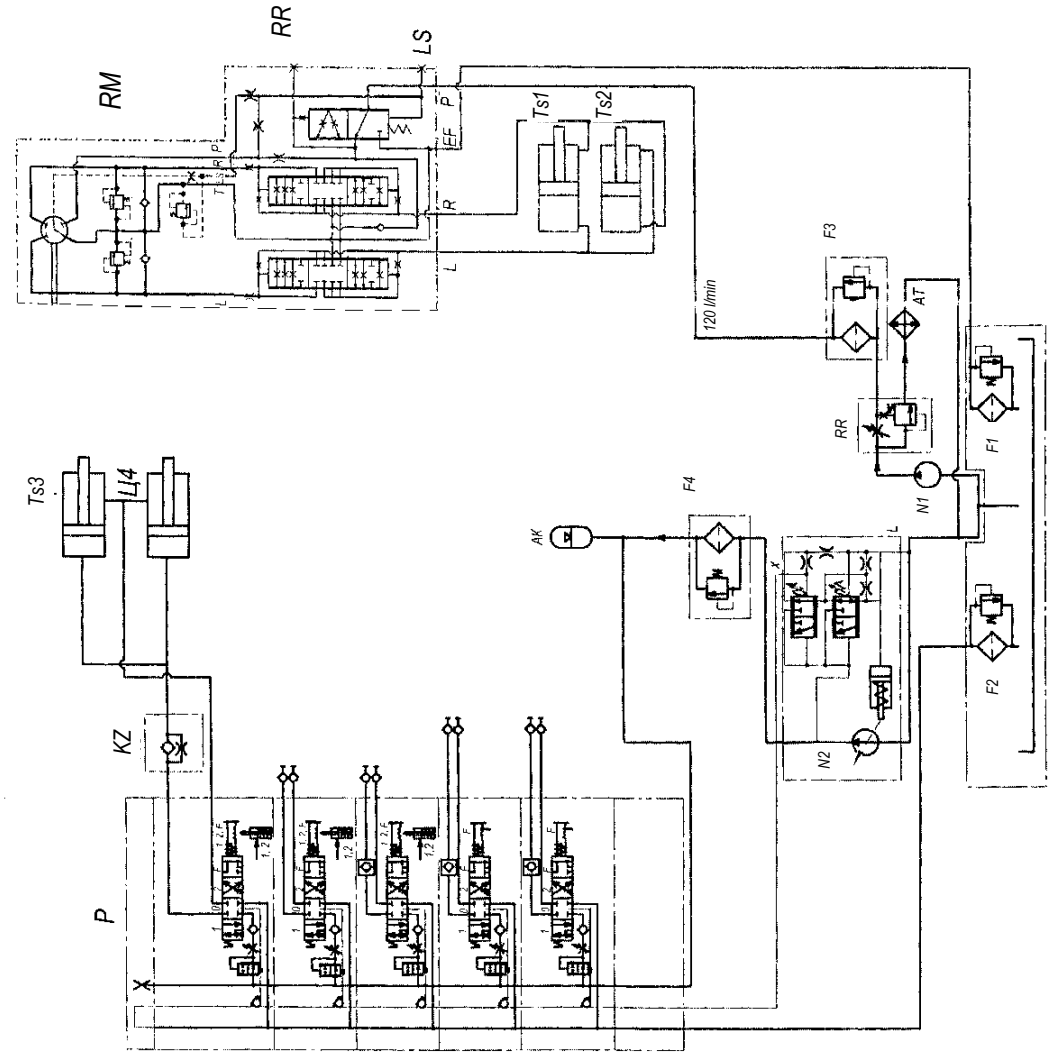


1 – pressure regulator; 2 – receiver; 3 – triple protection valve;
4 – two-section brake valve with pedal;
5, 8 – reverse-acting brake valve with manual control;
6 – accelerating valve;
7 – trailer brake control valve with single-wire drive;
9 – reference outlet valve; 10 – cut-out valve;
11 – connecting head of “A” type; 12 – condensate drain valve;
13, 14 – pressure sensor; 15 – pneumatic switch;
16 – brake chamber with spring energy accumulator; 17 – hose

APPENDIX 2

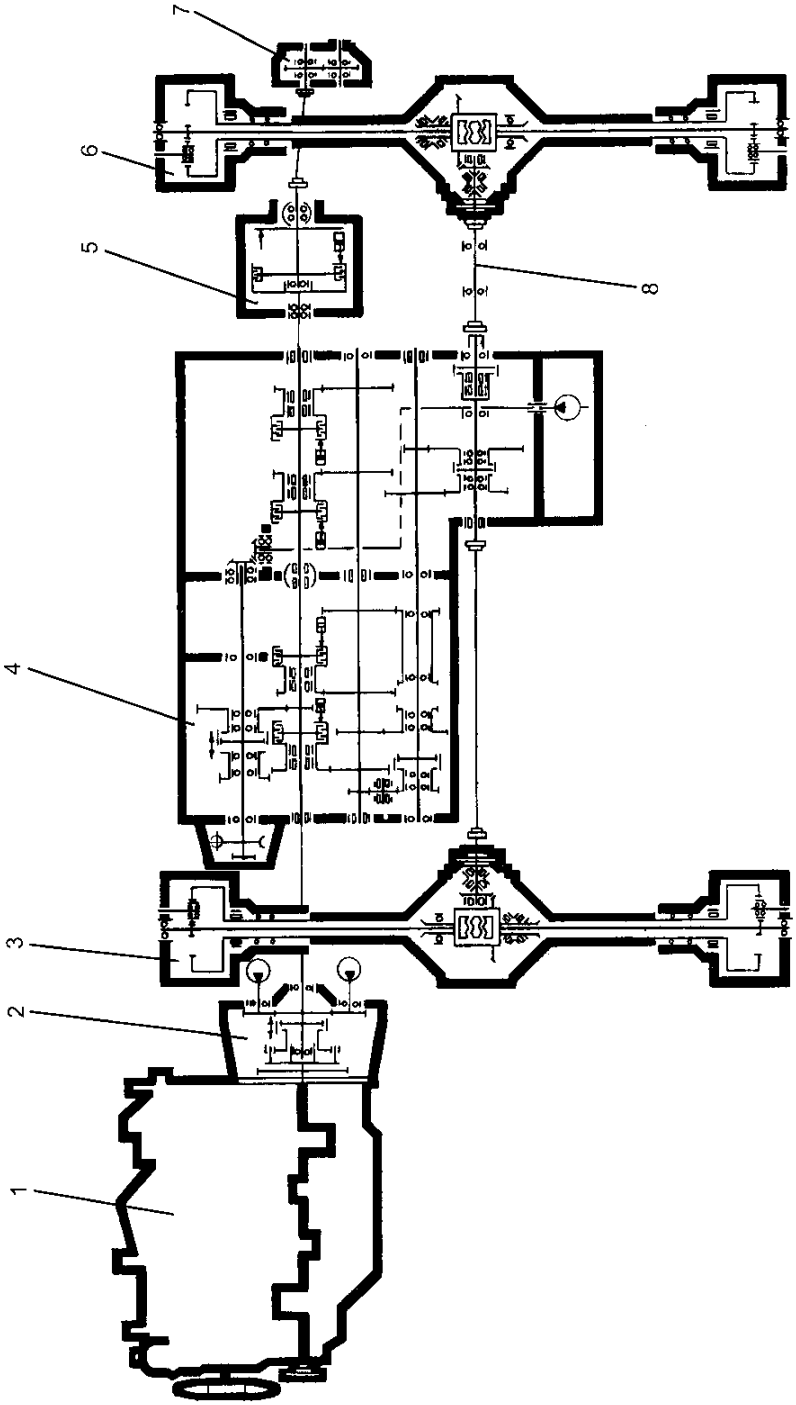
Hydraulic schematic diagram of steering and mounted implement control systems

Pos. Designation	Description	Q-ty	Note
AT	Oil radiator	1	
B	Hydraulic tank 700A.46.14.000-3	1	
KZ	Decelerating valve	1	
N1	Pump NSh of steering control system	1	
N2	Pump for operating equipment system	1	
R	Hydraulic distributor	1	
F1, F2	Filter 700A.46.14.190-2	2	
F3, F4	Filter SMP302B6FV11B4DVE5 (XTT302FV1CB472XX)	2	
Ts1, Ts2	Hydraulic cylinder LI125.50x400	2	Turn
Ts3, Ts4	Hydraulic cylinder LI125.50x200	2	Lifting – lowering
RR	Flow regulator	1	
RM	Steering mechanism	1	



APPENDIX 3

Kinematic diagram of transmission



Kinematic diagram of transmission

1 – engine; 2 – reducer with semi-rigid clutch; 3 – front driving axle; 4 – gearbox; 5 – PTO connecting coupling; 6 – rear driving axle; 7 – single-gear PTO reducer; 8 – intermediate bearing

APPENDIX 4

Fasteners tightening torque values for main assemblies

No.	Point of fastening	Tightening torque, kg·m
1.	Bolts fastening brackets to the engine	7...9
2.	Bolts fastening engine spacers to the frame	15
3.	Bolts fastening semi-rigid coupling to the engine flywheel	3
4.	Nuts fastening the housing of pump drive reducer to the engine	6
5.	Bolts fastening the gearbox AKSS	10
6.	Bolts fastening GB case to AKSS	25
7.	Bolts fastening the intermediate bearing holders	3
8.	Drive axle clamp nuts	50
9.	Wheel fastening nuts	14…20
10.	Hoses of the hydraulic system of steering control and operating equipment:	
	– hoses with internal diameter DN 20	10^{+1}
	– hoses with internal diameter DN 16	$7.4^{+0.74}$
	– hoses with internal diameter DN 12	$4.5^{+0.45}$
	– hoses with internal diameter DN 10	$3.8^{+0.38}$
	– hoses with internal diameter DN 8	$2^{+0.2}$
11.	Bolts fastening the “pinion carrier – hub” butt-joint	28
12.	Bolts fastening casings to the main gear case	28
13.	Bolts fastening cardans from the engine to GB, from GB to PTO	8…10
14.	Bolts fastening cardans from GB to axles	10...12

APPENDIX 5

List of permissible oils and lubricants

In the course of operation it is allowed to fill the tractor systems and perform lubrication of mechanisms with the following oils and lubricants:

– into the gearbox hydraulic tank (instead of M10B2) –

ESSO DIESELUBE S1 SAE 30

ESSO ESTOR HDX SAE 30

MOBIL DELVAC 1110 SUPER

SHELL ROTELLA TX SAE 30

– into axles of the vertical hinge pivot and pins of hydraulic cylinders, intermediate bearing

(instead of Litol-24) –

SHELL Alvanla RA

ESSO UNIREX 3

– driving axle (instead of ТАП-15) –

ESSO EP-90

– into the hydraulic system (instead of oil “A”) –

HM or HV ISO 6743/4 CETOP RP 91H

H-LP-DJN 51524

APPENDIX 6
Refill reservoirs

Description of reservoir	Capacity (mass), l (kg)	Working fluid brand*
Fuel tank	800 (675)	Diesel fuel GOST 305-82 in summer: Л-0.2-40; Л-0.5-40 in winter: minus 35-3-0.5; A-0.2; A-0.4
Diesel lubricating system:		
–ЯМЗ-238НД5; – 8481.10	32 (29) 33 (30)	See Lubrication table
Table of lubrication system for OM457LA (Mercedes) engine	39 max (35 max) 34 min (30.6 min)	Engine oil Shell Rimula (filled at the manufacturer's plant) or oil of any other brand in accordance with prescriptions issued by Mercedes-Benz for operating materials
Diesel cooling system: – YAMZ-238НД5; – 8481.10	 80,89* (86,96 **) 109,120* (118,130 **)	Automotive cooling fluid Tosol-A-40M TU 6-57-95-96
Cooling system for OM457LA (Mercedes) engine	60 (64.5) (50% – antifreeze agent 50% – distilled water)	Glyco Shell (filled at the manufacturer's plant) or antifreeze agent of any other brand in accordance with prescriptions issued by Mercedes-Benz for operating materials
Cooling system for Cummins engine	55 (50% – antifreeze agent 50% – distilled water)	Glyco Shell. It is allowed to use the antifreeze agent manufactured by Fleet Charge Coolant or that of any other brand conforming to the ASTM D-6210 standard and Cummins 14603 standard
Hydraulic system for steering control and mounted implement	175 (158)	See Lubrication table
Hydraulic system of the transmission gearbox	24 (22)	
Main gear case of driving axle (1 case)	10 (9)	
Final gear case of driving axle (1 case)	3.5 (3.25)	
Air conditioning system: - Freon gas R134a; - refrigerating oil ZXL100PG	 950 g 200 ml	

Note. The data on the amount of Freon gas and refrigerating oil are given for the system filled at the manufacturer's plant. In case of system overcharging in the course of operation, in order to determine the required amount of oil in the compressor, it is necessary to consult specialists of Peterburgskytraktorny zavod, JSC or a specialized enterprise dealing with maintenance and repair of air conditioners.

* Working fluids for OM457LA (Mercedes) engine only in accordance with the instruction for the engine and prescriptions for operating materials
** With account of the heating system

APPENDIX 7

Log-book for registration of measurements of the internal air pressure in tyres

Tractor type and make_____ Inventory No._____

Date of measurement	Serial No. of tyre		Serial No. of tyre		Serial No. of tyre		Serial No. of tyre		Note	Inspector's signature
	Position	Pressure	Position	Pressure	Position	Pressure	Position	Pressure		

Note. If any increased or decreased pressure is detected in the machine, then in bringing it to the operating standard value it is necessary to indicate the following: in the numerator – the value of internal air pressure in tyres at the moment of measurement; in the denominator – the value of pressure after its bringing to the standard level.

APPENDIX 8

Tyre operation record card

Size _____ Tyre installation date _____

Model _____ Tyre dismantling date _____

Serial No. _____ Make of the machine and its inventory No.

Garage No. _____ _____

Date of inspection	Tyre position (FR (front right), FL (front left), RR (rear right), RL (rear left))	Tyre mileage from the beginning of operation				Pressure in tyre at the moment of inspection, kgf/cm^2	Technical condition of tyre at the moment of inspection	Defect occurrence circumstances
		in kilometers		in hours				
		Total	Including that during hauling operations	Total	Including that during hauling operations			

Person responsible for record-keeping _____

(signature)

APPENDIX 9

List of electrical equipment elements to the electrical diagram of the K-744R1 Standard tractor

Pos. Designation	Description	Q-ty	Note
A1	Avgust air conditioner	1	
A2	Air conditioner control panel	1	
A3	Control panel ПЖД-600И-1015410:	1	
FU23	Thermo-bimetallic fuse 299.3722 TU 37.003.1415-92	1	
FU24	Fuse ПВ-20, 30В TU16.522.001-82	1	
FV	Ignition plug CH423 TU37.003.634-79	1	
EK	Fuel electrical heater	1	
M9	Motor МЭ252 TU37.003.1281-86	1	
SA6	Switch ВК317-06 GOST VD 3940-86	1	
SA7, SA8	Switch В-45М TU 16-526.016-73	2	
SB7	Push-button switch 11.3704 TU 37.003.710-80	1	
TV	Switching device ТК107А TU 37.003.484-78	1	
XT13	Connecting panel 16.3723 OST 37.003.1358-88	1	
YA	Electrical magnet РС335	1	
BK1, BK2	Sensor ТМ100 TU37.003.271-76	2	Temperature of engine cooling fluid and oil
	Pressure sensors TU37.003.387-78:		
BP1	18.3829010.	1	Engine oil
BP2	ТКН-1.6-Т184	1	Gearbox oil
BP3	Pressure sensor 3902.3829 GOST 1701-75	1	Air in PS (pneumatic system)
BV1	Speed sensor 11.3843-У-ХЛ TU37.003.1148-83	1	Speedometer
	Head lighting lamp:		
EL1, EL2	1 KO 247043-037 (Hella)	2	High beam
EL1a, EL2a	1 BL 247042-017 (Hella)	2	Low beam
	Working lamp 112.07.54-17 TU BY 600124825.055-2009:		
EL3, EL4,		2	
EL5, EL6,		2	
EL7, EL8,		2	
EL9, EL10		2	
EL11	Under-boot lamp ПД308А-У-ХЛ TU37.003.187-80	1	
EL12...EL19	Lamp A24-2 GOST 2023.1-88	8	
EL21	Ceiling lamp 11.3714010 TU37.003.818-77	1	

Pos. Designation	Description	Q-ty	Note
EL22	Licence plate illumination light ФП-131-Б GOST 6964-72	1	
	Fuses TU37.469.013-95:		
FU1, FU2,	352.3722 (10A)	16	To be used with the fuse block 41.3722
FU4, FU6,			
FU7, FU10,			
FU11... FU13,			
FU14... FU17,			
FU24... FU26			
FU5, FU8, FU9,	354.3722 (20A)	7	
FU18, FU19,			
FU22, FU23			
FU3, FU20,	356.3722 (30A)	3	
FU21			
FU27	ПВ-60АС, 30V	1	To be used with protection unit Б3-30
FU28	Fuse 543.3722 (90A) TU37.469.056-2002	1	
G	Generator 312.3771-01 TU37.463.155-98	1	Supply with the engine
GB1, GB2	Battery 6СТ-190АПЗЖЮИК.563414.013ТУ	2	
	Hornless sound signals TU37.003.688-75:		
HA1	С313	1	
HA2	С314	1	
HL1	Front light 3733.3712 TU RB 05882559010-95	1	Right
HL2		1	Left
	Side repeater of turn indicator УП-101-Б GOST 6964-72		
HL3,		1	Right turn
HL4,		1	Left turn
HL5...HL7		3	“Road-train” sign
	Indicator lamp blocks TU37.003.1109-82:		
HL9	2311.3803-06	1	
HL10	2311.3803-08	1	

Pos. Designation	Description	Q-ty	Note
	Indicator lamps TU37.003.1109-82:		
HL11	2212.3803-07	1	Tractor turn
HL12	2212.3803-08	1	Trailer turn
HL13	2212.3803-28	1	High beam
HL14	2212.3803-01	1	1st circuit receiver
HL15	2212.3803-02	1	2nd circuit receiver
HL16	2212.3803	1	Trailer brake
HL17	2212.3803-05	1	Parking brake
HL18	2212.3803-37	1	Attention! Breakdown!
	Lamps A24-2 GOST 2023.1-88:		
HL19		1	Emergency temperature of cooling fluid
HL20		1	Minimum oil pressure in the engine
HL21, HL22	Rear light 7303.3716 TU RB 600124825026-2002	2	
KA	Turn indicator breaker PC951-У-ХЛТU 37.453.056-82	1	
KK1	Hand brake indicator lamp breaker PC493 TU37.003.588-77	1	
KM	Switch 1420.3737 TU37.003.574-74	1	
KV1	Relay 738.3747-20 TU37.469.023-97		Starter activation
	Relay 751.3777 TU37.003.1418-94:		
KV2		1	Interlocking of “frame ground”
KV3		1	High beam
KV4		1	Low beam
KV5		1	Sound signal
KV6		1	Stop signals
KV7		1	Air conditioner compressor
KV8		1	Rear window wiper
KV9		1	Air conditioner fan
KV10		1	Service front lamps
KV11		1	Service rear lamps
KV12		1	Fan coupling
KV13, KV14,		5	Stater

Pos. Designation	Description	Q-ty	Note
KV15, KV16, KV17			interlocking, oil temperature and level, GLONASS, sound signal, pressure TGB
KV18	Relay 90.3747 TU37.003.1418-94	1	Interlocking of 12V circuit
M1	Stater 25.3708-01 TU37.003.1059-81	1	
M2	Air conditioner fan	1	Delivery with air conditioner
M3	Washer 1112.5208000-20 TU37.003.639-87	1	Front
M4,	Window wiper motor gearbox 521.3730 TU37.459.078-86	2	Front
M5			Rear
M6	Washer 1112.5208000-10 TU37.003.639-87	1	Rear
M7	OC-8 heater fan	1	
P1	Electronic speedometer 31.3802 TU37.453.077-86	1	
P2	Tachometer ПТ8040-4	1	
P3	Pressure gauge receiver 33.3810 TU37.003.387-78	1	Engine oil
P4	Temperature gauge receiver 36.3807 TU37.003.941-79	1	Cooling fluid
P5	Pressure gauge receiver 3452.3810 TU37.003.387-78	1	Air in PS (pneumatic system)
P6	Pressure gauge receiver УК2.5-01	1	Gearbox oil
P7	Fuel level gauge receiver 34.3806 TU37.003.942-79	1	
P8	Temperature gauge receiver 36.3807 TU37.003.941-79	1	Engine oil
PV	Engine hour meter – voltmeter УК34.2 РИВП.457381.001ТУ	1	
SA1	Switch block 89.3709 TU37.461.012-96	1	
SA2	Switch block 53.3710.06.09 TU37.003.1055-81	1	
SA3	Starter and instrument switch 1202.3704-02 TU37.003.529-77	1	
SA4	Switch ВК416Б-01 TU37.003.1174-83	1	Instrument illumination
SA5	Alarm switch 245.3710-01 TU37.469.022-97	1	
	Unified switches TU37.003.1222-84:		
SB2	3812.3710-02.07	1	Rear window wiper
SB3	3812.3710-02.38	1	“Road-train” sign
SB4,	3812.3710-02.05	2	Service rear lamps
SB5			Service front

Pos. Designation	Description	Q-ty	Note
			lamps
SK1	Temperature annunciator TM111-01 TU37.003.569-80	1	Cooling fluid
SK2	Thermal relay of fan coupling drive	1	Supply with the engine
SL	Fuel level sensor 744P-3800070	1	
SP1	Pressure annunciator	1	Engine filter
SP2	Emergency oil pressure annunciator 3702.3829 TU37.003.518-74	1	
	Emergency air pressure sensor:		
SP3	ДАДВ-01 TU RB 07513211.004-94	1	Parking brake
SP9, SP10	6072.3829	2	1st and 2nd circuit receiver
	Switches 2802.3829010 TU37.453.092-93:		
SP4		1	Stop signal
SP5		1	Stop signal
SP6		1	TGB filter
SP7	Air filter clogging annunciator sensor (Donaldson)	1	
SP8	Refrigerant pressure sensor	1	Delivery with air conditioner
SP12	Steering control pressure filter clogging annunciator	1	Delivery with filter
SP13	Mounted implement pressure filter clogging annunciator	1	Delivery with filter
SQ	Starter interlocking switch ВК12-41	1	
VD1... VD12	Diode КД202ДУЖ3.362.036ТУ	12	
VD13	Diode Д242а А0336.206ТУ	1	
VD14	Diode КД343ДдР3.362.029-01ТУ	1	
	Socket plugs ГЕО.364.107ТУ:		
XP1	ШР28ПК1НШ4	1	
XP2	ШР32П12НГ1	1	
XP3, XP4	ШР40П16НГ2	2	
	Male contact blocks OST 37.003.032-78:		
XP8, XP17,	502601	5	
XP33, XP36,			
XP45			
XP13, XP56,	502602	8	
XP59, XP61,			
XP62, XP88,			
XP89, XP90			

Pos. Designation	Description	Q-ty	Note
XP10, XP11,	502604	5	
XP20, XP60,			
XP66			
XP23	502606	1	
	Plugs socketГЕО.364.107ТУ:		
XS1	ШР28П1НШ4	1	
XS2	ШР32П12НГ1	1	
XS3	ШР40ПК16НГ2	1	
XS4	ШР40ПК16ЭГ2	1	
XS6	Plug socket ПС400-3723200 ТU37.003.228-77	1	
XS7	Plug socket ПС300А GOST 9200-76	1	
	Receptacle OST 37.003.032-78:		
XS8, XS17,	602601	4	
XS36, XS45			
XS12, XS13,	602602	21	
XS14, XS26			
XS32, XS35,			
XS38, XS39,			
XS43, XS47,			
XS52...56,			
XS59, XS61,			
XS62, XS63,			
XS89, XS90			
XS10, XS11,	602604	8	
XS19, XS20,			
XS21, XS46,			
XS60, XS66			
XS22, XS23,	602606	6	
XS28, XS29,			
XS34, XS37			
XS34, XS37	602608	2	
XS92, XS93,	606003	4	
XS95, XS96			

Pos. Designation	Description	Q-ty	Note
XS30	610608	1	
XS64	607605	1	
XS65	Plug socket 3106.3715	1	
	Connecting panels OST 37.003.1358-88:		
XT1 ... XT9	17.3723.000	9	
YC1	Electromagnetic valve of air conditioner compressor	1	Delivery with air conditioner
YC2	Electromagnetic valve for fan coupling actuation	1	Supply with the engine

APPENDIX 9A

List of electrical equipment elements to the electrical diagram of the K-744R1 Premium tractor

Pos. Designation	Description	Q-ty	Note
A1	Avgust air conditioner	1	
A2	Air conditioner control panel	1	
A3	Control panel ПЖД-600И-1015410:	1	
FU23	Thermo-bimetallic fuse 299.3722 TU 37.003.1415-92	1	
FU24	FuseПВ-2 У-ХЛ-3, 30ВТU16.522.001-82	1	
FV	Ignition plug СН423TU37.003.634-79	1	
EK	Fuel electrical heater	1	
M9	Motor МЭ252TU37.003.1281-86	1	
SA6	Switch ВК317-06 GOST VD 3940-86	1	
SA7, SA8	Switch В-45М TU 16-526.016-73	2	
SB7	Push-button switch 11.3704 TU 37.003.710-80	1	
TV	Switching device 9301.3734-01-У-ХЛ, 24V TU37.466.126-2002	1	
XT13	Connecting panel 16.3723 OST 37.003.1358-88	1	
YA	Electrical magnet РС335	1	
BK1	Cooling liquid temperature sensor 3979176	1	Supply with the engine
	Pressure sensors TU37.003.387-78:		
BP1	18.3829010	1	Engine oil
BP2	19.3829010	1	Gearbox oil
BP3	Pressure sensor 3902.3829 GOST 1701-75	1	Air in PS (pneumatic system)
BV1	Speed sensor 11.3843-У-ХЛ TU37.003.1148-83	1	Speedometer
	Transport lamp 1АВ006213-001:		
EL1,		1	
EL2,		1	
EL23,		1	
EL24		1	
	Working lamp 781.3711 TU 4573-024-05808936-95:		
EL3, EL4,		2	
EL5, EL6,		2	
EL7, EL8,		2	
EL9, EL10		2	

Pos. Designation	Description	Q-ty	Note
EL11	Under-boot lamp ПД308А-У-ХЛ ТУ37.003.187-80	1	
EL12...EL18	Lamp А24-2 GOST 2023.1-88	7	
EL21	Ceiling lamp 11.3714010 ТУ37.003.818-77	1	
EL22	Licence plate illumination light ФП-131-Б GOST 6964-72	1	
	Fuses TU37.469.013-95:		
FU1, FU2,	352.3722 (10A)	16	To be used with the fuse block 41.3722
FU4,FU6,			
FU7, FU10,			
FU11...FU13,			
FU14...FU17,			
FU24...FU26			
FU5, FU8, FU9,	354.3722 (20A)	7	
FU18, FU19,			
FU22, FU23			
FU3, FU20,	356.3722 (30A)	3	
FU21			
FU27	ПВ-60АС, 30V	1	To be used with protection unit БЗ-30
FU28	Fuse 542.3722 (90A) ТУ37.469.056-2002	1	
G	Generator JFZ2707-010	1	Supply with the engine
GB1, GB2	Battery 6СТ-190АПЗЖЮИК.563414.013ТУ	2	
	Hornless sound signals TU37.003.688-75:		
HA1	С313	1	
HA2	С314	1	
HL1	Front light 3733.3712 TU RB 05882559010-95	1	Right
HL2		1	Left
	Side repeater of turn indicator УП-101-Б GOST 6964-72		
HL5...HL7		3	“Road-train” sign

Pos. Designation	Description	Q-ty	Note
	Indicator lamp blocks TU37.003.1109-82:		
HL9	2311.3803-06	1	
HL10	2311.3803-08	1	
	Indicator lamps TU37.003.1109-82:		
HL11	2212.3803-07	1	Tractor turn
HL12	2212.3803-08	1	Trailer turn
HL13	2212.3803-28	1	High beam
HL14	2212.3803-01	1	1st circuit receiver
HL15	2212.3803-02	1	2nd circuit receiver
HL16	2212.3803	1	Trailer brake
HL17	2212.3803-05	1	Parking brake
HL18	2212.3803-37	1	Attention! Breakdown!
	Lamps A24-2 GOST 2023.1-88:		
HL19		1	Emergency temperature of cooling fluid
HL20		1	Minimum oil pressure in the engine
HL21, HL22	Rear light 7303.3716 TU RB 600124825026-2002	2	
KA	Turn indicator breaker РС951-У-ХЛ ТУ 37.453.056-82	1	
KK1	Hand brake indicator lamp breaker РС493 TU37.003.588-77	1	
KM	Switch 1420.3737 TU37.003.574-74	1	
KV1	Relay 738.3747-20 TU37.469.023-97	1	Engine shutdown
	Relay 901.3747 TU37.003.1418-94:		
KV2		1	Interlocking of “frame ground”
KV3		1	High beam
KV4		1	Low beam
KV5		1	Sound signal
KV6		1	Stop signals
KV7		1	Air conditioner compressor
KV8		1	Rear window wiper
KV9		1	Air conditioner fan
KV10		1	Service front lamps
KV11		1	Service rear lamps
KV12		1	Starter interlocking

Pos. Designation	Description	Q-ty	Note
KV13	Relay 90.3747 TU37.003.1418-94	1	Interlocking of 12V circuit
KV14	Contactor КТ-127	1	Starter activation
M1	Starter M105R3001SE	1	Supply with the engine
M2	Air conditioner fan	1	Delivery with air conditioner
M3	Washer 1112.5208000-20 TU37.003.639-87	1	Front
M4,	Window wiper motor gearbox 521.3730 TU37.459.078-86	2	Front
M5			Rear
M6	Washer 1112.5208000-10 TU37.003.639-87	1	Rear
M7	ОС-8 heater fan	1	
P1	Electronic speedometer 31.3802 TU37.453.077-86	1	
P2	Tachometer ПТ8040-4	1	
P3	Pressure gauge receiver 33.3810 TU37.003.387-78	1	Engine oil
P4	Temperature gauge receiver 36.3807 TU37.003.941-79	1	Cooling fluid
P5	Pressure gauge receiver 3452.3810 TU37.003.387-78	1	Air in PS (pneumatic system)
P6	Pressure gauge receiver 14.3810 TU37.003.387-78	1	Gearbox oil
P7	Fuel level gauge receiver 34.3806 TU37.003.942-79	1	
PV	Engine hour meter – voltmeter УК34.2 РИВП.457381.001ТУ	1	
R	Resistor С2-23-51 Ohm+10% ОЖО.467.081ТУ	1	
SA1	Switch block 89.3709 TU37.461.012-96	1	
SA2	Switch block 53.3710.06.09 TU37.003.1055-81	1	
SA3	Starter and instrument switch 1202.3704-02 TU37.003.529-77	1	
SA4	Switch ВК416Б-01 TU37.003.1174-83	1	Instrument illumination
SA5	Alarm switch 245.3710-01 TU37.469.022-97	1	
	Unified switches TU37.003.1222-84:		
SB2	3812.3710-02.07	1	Rear window wiper
SB3	3812.3710-02.38	1	“Road-train” sign
SB4,	3812.3710-02.05	2	Service rear lamps
SB5			Service front lamps
SL	Fuel level sensor Э744Р-3800070	1	
SP1	Emergency oil pressure annunciator 3702.3829	1	

Pos. Designation	Description	Q-ty	Note
	TU37.003.518-74		
	Emergency air pressure sensor ДАДВ-01 TU RB 07513211.004-94:		
SP3		1	Parking brake
SP9		1	1st circuit receiver
	Switch 2802.3829010 TU37.453.092-93:		
SP4		1	Stop signal
SP5		1	Stop signal
SP6		1	TGB filter
SP7	Air filter clogging annunciator sensor (Donaldson)	1	Delivery with filter
SP8	Refrigerant pressure sensor	1	Delivery with air conditioner
SP10	Emergency air pressure sensor ДАДВ-02 TU RB 07513211.004-94	1	2nd circuit receiver
SP12	Steering control pressure filter clogging annunciator	1	Delivery with filter
SP13	Mounted implement pressure filter clogging annunciator	1	Delivery with filter
SQ	Intermediate relay interlocking switch 15.3710 TU37.003.188-76	1	
VD1... VD10	Diode КД202ДУЖ3.362.036ТУ	10	
VD11	Diode Д242а А0336.206ТУ	1	
VD12	Diode КД343ДдР3.362.029-01ТУ	1	
	Socket plugs ГЕО.364.107ТУ:		
XP1	ШР28ПК1НШ4	1	
XP2	ШР32П12НГ1	1	
XP3, XP4	ШР40П16НГ2	2	
	Male contact blocks OST 37.003.032-78:		
XP8, XP17,	502601	5	
XP33, XP36,			
XP45			
XP13, XP56,	502602	6	
XP59, XP61,			
XP62, XP88,			
XP10, XP11,	502604	4	
XP20, XP66			

Pos. Designation	Description	Q-ty	Note
XP23	502606	1	
	Plugs socketГЕО.364.107ТУ:		
XS1	ШР28П1НШ4	1	
XS2	ШР32П12НГ1	1	
XS3	ШР40ПК16НГ2	1	
XS4	ШР40ПК16ЭГ2	1	
XS6	Plug socket ПС400-3723200 ТУ37.003.228-77	1	
XS7	Plug socket ПС300А GOST 9200-76	1	
	Receptacle OST 37.003.032-78:		
XS8, XS17,	602601	4	
XS36, XS45			
XS12, XS13,	602602	18	
XS14, XS26			
XS32, XS38,			
XS39, XS43,			
XS47, XS52,			
XS53...XS56,			
XS59, XS61,			
XS62, XS63,			
XS10, XS11,	602604	6	
XS19, XS20,			
XS21, XS66,			
XS22, XS23,	602606	6	
XS28, XS29,			
XS34, XS37			
XS34, XS37	602608	2	
XS92, XS93,	606003	4	
XS95, XS96			
XS30	610608	1	
XS64	607605	1	

Pos. Designation	Description	Q-ty	Note
XS35	Three-contact plug socket	1	Supply with the engine
XS65	Plug socket 8JB 001933-011 (Hella)	1	
	Connecting panels OST 37.003.1358-88:		
XT1 ... XT7	17.3723.000	7	
YC1	Electromagnetic valve of air conditioner compressor	1	Delivery with air conditioner
YC2	Electromagnetic valve for engine shutdown	1	Supply with the engine
YC3	Electromagnetic valve for fuel supply	1	Supply with the engine

APPENDIX 9B

List of electrical equipment elements to the electrical diagram of the K-744R2, K-744R3, K-744R4 Standard tractors

Pos. Designation	Description	Q-ty	Note
A1	Avgust air conditioner	1	
A2	Air conditioner control panel	1	
BK	Sensor TM100 TU37.003.271-76	1	Temperature of engine cooling fluid
	Pressure sensors TU37.003.387-78:		
BP1	18.3829010	1	Engine oil
BP2	19.3829010	1	Gearbox oil
BP3	Pressure sensor 3902.3829 GOST 1701-75	1	Air in PS (pneumatic system)
BV1	Speed sensor 11.3843-У-ХЛ TU37.003.1148-83	1	Speedometer
EK1, EK2	Plug 11.3740 TU37.003.741-80	2	Thermostart
	Transport lamp 1AB006213-001:		
EL1,		1	
EL2,		1	
EL22,		1	
EL23		1	
	Working lamp 781.3711 TU 4573-024-05808936-95:		
EL3, EL4,		2	
EL5, EL6,		2	
EL7, EL8,		2	
EL9, EL10		2	
EL11	Under-boot lamp ПД308А-У-ХЛ TU37.003.187-80	1	
EL12...EL18	Lamp A24-2 GOST 2023.1-88	7	
EL20	Ceiling lamp 11.3714010 TU37.003.818-77	1	
EL21	Licence plate illumination light ФП-131-Б GOST 6964-72	1	
	Fuses TU37.469.013-95:		
FU1, FU2,	352.3722 (10A)	16	To be used with the fuse block 41.3722
FU4,FU6,			
FU7, FU10,			

Pos. Designation	Description	Q-ty	Note
FU11...FU13,			
FU14...FU17,			
FU24...FU26			
FU5, FU8, FU9,	354.3722 (20A)	7	To be used with the fuse block 41.3722
FU18, FU19,			
FU22, FU23			
FU3, FU20,	356.3722 (30A)	3	
FU21			
FU27	ПВ-60АС, 30V	1	To be used with protection unit БЗ-30
FU28	Fuse 543.3722 (90A) TU37.469.056-2002	1	
G	Generator 4001.3771-42 TU 4573-004-24352420-2003	1	Supply with the engine
GB1, GB2	Battery 6СТ-190АПЗЖЮИК.563414.013ТУ	2	
	Hornless sound signals TU37.003.688-75:		
HA1	С313	1	
HA2	С314	1	
HL1	Front light 3733.3712 TU RB 05882559010-95	1	Right
HL2		1	Left
	Side repeater of turn indicator УП-101-Б GOST 6964-72		
HL5...HL7		3	“Road-train” sign
	Indicator lamp blocks TU37.003.1109-82:		
HL9	2311.3803-06	1	
HL10	2311.3803-08	1	
	Indicator lamps TU37.003.1109-82:		
HL11	2212.3803-07		Tractor turn
HL12	2212.3803-08		Trailer turn
HL13	2212.3803-28		High beam
HL14	2212.3803-01		1st circuit receiver
HL15	2212.3803-02		2nd circuit

Pos. Designation	Description	Q-ty	Note
			receiver
HL16	2212.3803	1	Trailer brake
HL17	2212.3803-05	1	Parking brake
HL18	2212.3803-37	1	Attention! Breakdown!
	Lamps A24-2 GOST 2023.1-88:		
HL19		1	Emergency temperature of cooling fluid
HL20		1	Minimum oil pressure in the engine
HL21, HL22	Rear light 7303.3716 TU RB 600124825026-2002	2	
KA	Turn indicator breaker PC951-У-ХЛТU 37.453.056-82	1	
KK1	Hand brake indicator lamp breaker PC493 TU37.003.588-77	1	
KK2	Additional resistor with electrothermal relay 1202.3741 TU37.003.711-79	1	
KM	Switch 1420.3737 TU37.003.574-74	1	
KV1	Relay 738.3747-20 TU37.469.023-97	1	Starter activation
	Relay 901.3747 TU37.003.1418-94:		
KV2		1	Interlocking of “frame ground”
KV3		1	High beam
KV4		1	Low beam
KV5		1	Sound signal
KV6		1	Stop signals
KV7		1	Air conditioner compressor
KV8		1	Rear window wiper
KV9		1	Air conditioner fan
KV10		1	Service front lamps
KV11		1	Service rear lamps
KV12		1	Thermostart
KV13		1	Starter interlocking
KV14	Relay 90.3747 TU37.003.1418-94	1	Interlocking of 12V circuit
M1	Stater 25.3708-01 TU37.003.1059-81	1	

Pos. Designation	Description	Q-ty	Note
M2	Air conditioner fan		Delivery with air conditioner
M3	Washer 1112.5208000-20 TU37.003.639-87	1	Front
M4,	Window wiper motor gearbox 521.3730 TU37.459.078-86	2	Front
M5			Rear
M6	Washer 1112.5208000-10 TU37.003.639-87	1	Rear
M7	Oc-8 heater fan	1	
P1	Electronic speedometer 31.3802 TU37.453.077-86	1	
P2	Tachometer ПТ8040-4	1	
P3	Pressure gauge receiver 33.3810 TU37.003.387-78	1	Engine oil
P4	Temperature gauge receiver 36.3807 TU37.003.941-79	1	Cooling fluid
P5	Pressure gauge receiver 3452.3810 TU37.003.387-78	1	Air in PS (pneumatic system)
P6	Pressure gauge receiver 14.3810 TU37.003.387-78	1	Gearbox oil
P7	Fuel level gauge receiver 34.3806 TU37.003.942-79	1	
PV	Engine hour meter – voltmeter К34.2 РИВП.457381.001ТУ	1	
SA1	Switch block 89.3709 TU37.461.012-96	1	
SA2	Switch block 53.3710.06.09 TU37.003.1055-81	1	
SA3	Starter and instrument switch 1202.3704-02 TU37.003.529-77	1	
SA4	Switch ВК416Б-01 TU37.003.1174-83	1	Instrument illumination
SA5	Alarm switch 245.3710-01 TU37.469.022-97	1	
SB1	Push button КН-1 106.510.010ТУ		“Frame ground”
	Unified switches TU37.003.1222-84:		
SB2	3812.3710-02.07	1	Rear window wiper
SB3	3812.3710-02.38	1	“Road-train” sign
SB4,	3812.3710-02.05	2	Service rear lamps
SB5			Service front lamps
SB6	Switch 11.3704000 TU37.003.710-80	1	Thermostart
SK	Temperature annunciator ТМ111-01 TU37.003.569-80	1	Cooling fluid
SL	Fuel level sensor Э744Р-3800070	1	

Pos. Designation	Description	Q-ty	Note
SP1	Pressure annunciator	1	Engine filter
SP2	Emergency oil pressure annunciator 3702.3829 TU37.003.518-74	1	
	Emergency air pressure sensor ДАДВ-01 TU RB 07513211.004-94:		
SP3		1	Parking brake
SP9		1	1st circuit receiver
	Switch 2802.3829010 TU37.453.092-93:		
SP4		1	Stop signal
SP5		1	Stop signal
SP6		1	TGB filter
SP7	Air filter clogging annunciator sensor (Donaldson)	1	Delivery with filter
SP8	Refrigerant pressure sensor	1	Delivery with air conditioner
SP10	Emergency air pressure sensor ДАДВ-02 TU RB 07513211.004-94	1	2nd circuit receiver
SP12	Steering control pressure filter clogging annunciator	1	Delivery with filter
SP13	Mounted implement pressure filter clogging annunciator	1	Delivery with filter
SQ	Starter interlocking switch ВК-418 TU37.003.188-76	1	
VD1... VD10	Diode КД202ДУЖ3.362.036ТУ	10	
VD12	Diode Д242а А0336.206ТУ	1	
VD13	Diode КД343ДдР3.362.029-01ТУ	1	
	Socket plugs ГЕО.364.107ТУ:		
XP1	ШР28ПК1НШ4	1	
XP2	ШР32П12НГ1	1	
XP3, XP4	ШР40П16НГ2	2	
	Male contact blocks OST 37.003.032-78:		
XP8, XP17,	502601	5	
XP33, XP36,			
XP45			
XP10, XP13,	502602	10	
XP56, XP58,			
XP59, XP61,			
XP62, XP88,			
XP89, XP90			

Pos. Designation	Description	Q-ty	Note
XP11, XP20,	502604	4	
XP60, XP66			
XP23	502606	1	
	Plugs socketГЕО.364.107ТУ:		
XS1	ШР28П1НШ4	1	
XS2	ШР32П12НГ1	1	
XS3	ШР40ПК16НГ2	1	
XS4	ШР40ПК16ЭГ2	1	
XS6	Plug socket ПС400-3723200 ТУ37.003.228-77	1	
XS7	Plug socket ПС300А GOST 9200-76	1	
	Receptacle OST 37.003.032-78:		
XS8, XS17, XS36	602601	3	
XS10, XS12,	602602	21	
XS13, XS14,			
XS26, XS32,			
XS38, XS39,			
XS43, XS52,			
XS53... XS56,			
XS58, XS59,			
XS61... XS63,			
XS89, XS90			
XS11, XS19,	602604	8	
XS20, XS21,			
XS41, XS42,			
XS60, XS66			
XS22, XS23,	602606	7	
XS27, XS28,			
XS29, XS34,			
XS37			
XS34, XS37	602608	2	
XS92, XS93,	606003	4	

Pos. Designation	Description	Q-ty	Note
XS95, XS96			
XS30	610608	1	
XS64	607605	1	
XS65	Plug socket 8JB 001933-011 (Hella)	1	
	Connecting panels OST 37.003.1358-88:		
XT1 ... XT9	17.3723.000	9	
YA	Electromagnetic valve 11.3741 TU37.003.740-76	1	Supply with the engine
US	Electromagnetic valve of air conditioner compressor	1	Delivery with air conditioner

APPENDIX 9C

List of electrical equipment elements to the electrical diagram of the K-744R2, K-744R3, K-744R4 Premium tractors

Pos. Designation	Description	Q-ty	Note
A1	Electronic unit MR	1	Supply with the engine
A2	Electronic unitADM2FR	1	Supply with the engine
A3	Avgust air conditioner	1	
A4	Air conditioner control panel	1	
A5	Electronic unit FLA A0004461207	1	Supply with the engine
A6	Pedal A9413000104	1	Supply with the engine
BP1	Pressure sensor 19.3829010 TU37.003.387-78	1	Gearbox oil
BP2	Pressure sensor 3902.3829 GOST 1701-75	1	Air in PS (pneumatic system)
BV1	Speed sensor 11.3843-У-ХЛ TU37.003.1148-83	1	Speedometer
EK1	Plug	1	Thermostart
EK2	Fuel heating plug	1	Fuel filter
	Transport lamp 1AB006213-001:		
EL1,		1	
EL2,		1	
EL22,		1	
EL23		1	
	Working lamp 781.3711 TU 4573-024-05808936-95:		
EL3, EL4,		2	
EL5, EL6,		2	
EL7, EL8,		2	
EL9, EL10		2	
EL11	Under-boot lamp ПД308А-У-ХЛ TU37.003.187-80	1	
EL12...EL18	Lamp A24-2 GOST 2023.1-88	7	
EL20	Ceiling lamp 11.3714010 TU37.003.818-77	1	
EL21	Licence plate illumination light ФП-131-Б GOST 6964-72	1	
	Fuses 35.3722 TU 37.469.013-95:		
FU2, FU3, FU5,	352.3722 (10A)	17'	To be used with the fuse block 41.3722
FU7, FU8,			
FU10,			
FU11...FU19,			
FU21, FU22			
FU24...FU26	353 3722 (15A)	3	

Pos. Designation	Description	Q-ty	Note
FU6, FU9	354.3722 (20A)	2	To be used with the fuse block 41.3722
FU20, FU23	355.3722 (25A)	2	
FU1, FU4	356.3722 (30A)	2	
FU27	ПВ-60АС, 30V	1	To be used with protection unit БЗ-30
FU28	Fuse 543.3722 (90A) TU37.469.056-2002	1	
G	Generator	1	Supply with the engine
GB1, GB2	Battery 6CT-190TP or 6CT-190TM TU16.529.951-78	2	
	Hornless sound signals TU37.003.688-75:		
HA1	C313	1	
HA2	C314	1	
HA3	Sound annunciator of emergency parameter	1	
HL1	Front light 3733.3712 TU RB 05882559010-95	1	Right
HL2		1	Left
	Side repeater of turn indicator УП-101-Б GOST 6964-72		
HL5...HL7		3	“Road-train” sign
	Indicator lamp blocks TU37.003.1109-82:		
HL9	2311.3803-06	1	
HL10	2311.3803-08	1	
	Indicator lamps TU37.003.1109-82:		
HL11	2212.3803-07	1	Tractor turn
HL12	2212.3803-08	1	Trailer turn
HL13	2212.3803-28	1	High beam
HL14	2212.3803-01	1	1st circuit receiver
HL15	2212.3803-02	1	2nd circuit receiver
HL16	2212.3803	1	Trailer brake
HL17	2212.3803-05	1	Parking brake
HL18	2212.3803-37	1	Attention! Breakdown!
HL19	2212.3803-49	1	Minimum oil level in engine
HL20	2212.3803-124	1	Emergency engine operating mode
HL21	2212.3803-47	1	Battery charging
HL22, HL23	Rear light 7303.3716 TU RB 600124825026-2002	2	
KA	Turn indicator breaker РС951-У-ХЛ ТУ 37.453.056-	1	

Pos. Designation	Description	Q-ty	Note
	82		
KK1	Hand brake indicator lamp breaker PC493 TU37.003.588-77	1	
KM	Switch 1420.3737 TU37.003.574-74	1	
KV1	Relay 738.3747-20 TU37.469.023-97	1	Starter interlocking
	Relay 901.3747 TU37.003.1418-94:		
KV2		1	Interlocking of “frame ground”
KV3		1	High beam
KV4		1	Low beam
KV5		1	Sound signal
KV6		1	Stop signals
KV7		1	Air conditioner compressor
KV8		1	Rear window wiper
KV9		1	Air conditioner fan
KV10		1	Service front lamps
KV11		1	Service rear lamps
KV12		1	Interlocking of 12V circuit
M1	Starter	1	Supply with the engine
M2	Air conditioner fan	1	Delivery with air conditioner
M3	Washer 1112.5208000-20 TU37.003.639-87	1	Front
M4,	Window wiper motor gearbox 521.3730 TU37.459.078-86	2	Front
M5			Rear
M6	Washer 1112.5208000-10 TU37.003.639-87	1	Rear
M7	OC-8 heater fan	1	
P1	Electronic speedometer 31.3802 TU37.453.077-86	1	
P2	Tachometer PT8040-4	1	
P3	Oil pressure gauge receiver 350-040-004C	1	Engine oil
P4	Temperature gauge receiver 310-040-002C	1	Cooling fluid
P5	Pressure gauge receiver 3452.3810 TU37.003.387-78	1	Air in PS (pneumatic system)
P6	Pressure gauge receiver 14.3810 TU37.003.387-78	1	Gearbox oil
P7	Fuel level gauge receiver 34.3806 TU37.003.942-79	1	
PV	Engine hour meter – voltmeter УК34.2 РИВП.457381.001ТУ	1	
SA1	Switch block 89.3709 TU37.461.012-96	1	
SA2	Switch block 53.3710.06.09 TU37.003.1055-81	1	
SA3	Starter and instrument switch 1202.3704-02 TU37.003.529-77	1	
SA4	Switch ВК416Б-01 TU37.003.1174-83	1	Instrument illumination

Pos. Designation	Description	Q-ty	Note
SA5	Alarm switch 245.3710-01 TU37.469.022-97	1	
SB1	Push button КН-1 106.510.010ТУ	1	“Frame ground”
	Unified switches TU37.003.1222-84:		
SB2	3812.3710-02.07	1	Rear window wiper
SB3	3812.3710-02.38	1	“Road-train” sign
SB4,	3812.3710-02.05	2	Service rear lamps
SB5			Service front lamps
SL	Fuel level sensor Э744Р-3800070	1	
	Emergency air pressure sensor ДАДВ-01 TU RB 07513211.004-94:		
SP1		1	Parking brake
SP4		1	1st circuit receiver
SP5	Emergency air pressure sensor ДАДВ-02 TU RB 07513211.004-94	1	2nd circuit receiver
	Switch 2802.3829010 TU37.453.092-93:		
SP2		1	Stop signal
SP3		1	Stop signal
SP6		1	TGB filter
SP7	Refrigerant pressure sensor	1	Delivery with air conditioner
SP8	Air filter clogging annunciator sensor (Donaldson)	1	Delivery with filter
SP11	Steering control pressure filter clogging annunciator	1	Delivery with filter
SP12	Mounted implement pressure filter clogging annunciator	1	Delivery with filter
SQ	Starter interlocking switch ВК12-418 TU37.003.188-76	1	
VD1... VD7	Diode КД202ДУЖ3.362.036ТУ	7	
	Socket plugs ГЕО.364.107ТУ:		
XP1	ШР28ПК1НШ4	1	
XP2	ШР32П12НГ1	1	
XP3, XP4	ШР40П16НГ2	2	
	Male contact blocks OST 37.003.032-78:		
XP8, XP17,	502601	5	
XP33, XP36,			
XP45			
XP13, XP56,	502602	8	
XP59, XP61,			
XP62, XP88,			

Pos. Designation	Description	Q-ty	Note
XP89, XP90			
XP10, XP11,	502604	5	
XP20, XP60,			
XP66			
XP23	502606	1	
	Plugs socketГЕО.364.107ТУ:		
XS1	ШР28П1НШ4	1	
XS2	ШР32П12НГ1	1	
XS3	ШР40ПК16НГ2	1	
XS4	ШР40ПК16ЭГ2	1	
XS6	Plug socket ПС400-3723200 ТУ37.003.228-77	1	
XS7	Plug socket ПС300А GOST 9200-76	1	
	Receptacle OST 37.003.032-78:		
XS8, XS10, XS17, XS36	602601	4	
XS12, XS13,	602602	19	
XS14, XS26,			
XS32, XS38,			
XS39, XS43,			
XS52... XS56,			
XS59, XS61,			
XS62, XS63,			
XS89, XS90			
XS10, XS11,	602604	8	
XS19, XS20,			
XS21, XS60,			
XS66			
XS22, XS23,	602606	6	
XS28, XS29,			
XS34, XS37			
XS24, XS25	602608	2	
XS92, XS93	606003	4	
XS95, XS96			
XS30	610608	1	

Pos. Designation	Description	Q-ty	Note
	Receptacles:		
XS1-21	A0135456526	1	
XS2-18	A0135456426	2	
XS70			
XS3-15	A0135456326	1	
XS4-12	A0135456226	1	
XS61	A0015451826	1	
XS62	A0001530022	1	
XS63	A0155456726	1	
XS64	A0015454626	1	
XP71	Male contact block A0265459728	1	
	Connecting panels OST 37.003.1358-88:		
XT1, XT2,	17.3723.000	7	
XT5...XT9			
YC1	ET electromagnetic valve	1	Supply with the engine
YC2	Electromagnetic valve of air conditioner compressor	1	Delivery with air conditioner