OPERATION MANUAL

744R-0000010 IE

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

JSC Peterburgsky Traktorny Zavod
Kirovsky Zavod OJSC
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www.kirovets-ptz.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
DM - daily 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

Edition as of 2016

DEAR CUSTOMER,

Warranty service, maintenance and repair of your tractor shall be carried out by representatives of JSC Peterburgsky Traktorny Zavod service centers only *

JSC Peterburgsky Traktorny Zavod service centers are carrying out:

Types of maintenance	Frequency in engine hours of tractor operation
Maintenance at the preparation of a new or overhauled tractor for operation running-in	---
Maintenance of tractor at the execution of running-in	10
Maintenance upon completion of running-in:	
K-744R1St tractor	50
tractors of remaining models	30
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 operation conditions
Maintenance in special operation 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 every 2 months, and under a canopy and at outdoor sites – once a month

During the post-warranty period, it is also recommended to contact service centers of JSC Peterburgsky Traktorny Zavod.

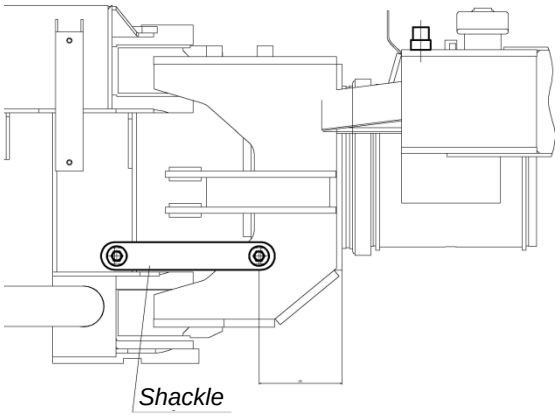
If maintenance and repairs are not carried out in specialized service centers of JSC Peterburgsky Traktorny Zavod, the manufacturer does not bear responsibility within the warranty and post-warranty period for the quality of released products.

* The addresses of service centers are indicated in the service books for the tractor and on the Peterburgsky Traktorny Zavod JSC's web site.

CONTENTS

NOTICE TO OPERATOR!

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



IN ORDER TO PREVENT FRAME DESTRUCTION, BEFORE TRACTOR TRAVELLING IT IS REQUIRED TO DISMANTLE THE SHACKLE THAT LOCKS TRACTOR SEMI-FRAMES DURING TRANSPORTATION.

Dismantled shackle with fasteners shall be installed at the front link bosses of the rear semi-frame.

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

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

IT IS PROHIBITED to use parking brake during motion.

IT IS PROHIBITED to tow the tractor by suspension unit.

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 open plugs of the tank filler at the cooling fluid temperature over 70°C.

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

IT IS PROHIBITED to use fuses with rated value contradicting 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 with the tractor at a voltage exceeding the voltage controller 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 unsealed air feed channels from the air cleaner to the engine and dust suction channels from the air cleaner.

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

REMINDER FOR OPERATOR

Before proceeding to work with the tractor, please thoroughly read the operation manual for the tractor, paying special attention to the "Safety requirements" section.

To ensure safe work with the tractor, primarily study all the requirements set forth in this section and further strictly fulfill them, especially the following:

● At turns, select the speed providing for safe travel. ***IT IS PROHIBITED*** to make a sharp turn at a gear exceeding 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 and 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 (slope angle shall not exceed 5°) only with the "slow" position of the mode change lever; avoid sharp turns and moving over obstacles.

● When crossing dams, dikes and bridges, make sure of the possibility to drive ahead and use only low gears.

● Trenches, hillocks and other obstacles shall be crossed by tractors with mounted implements at the right angle, at a low gear, avoiding sharp pounding and large rolls of the tractor.

● Maximum speed of a tractor train motion (up to 30 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, glaze ice, etc., travel at low gears, do not admit abrupt braking and turning.

● When moving on slippery roads, it is recommended to drive the tractor train "stretched out" - to this end, brake the hooked-up vehicle first by means of hand brake valve and then use the tractor brakes.

● ***IT IS PROHIBITED*** to use parking brake in motion and manual fuel feed lever in hauling operations.

● Traveling speed of the tractor with mounted implements shall not exceed 15 km/h in motion over an even road and 10 km/h in motion over a bumpy road or off-road.

● When the tractor is moving with a tyre pressure below 1.7 kgf/cm^2, the speed shall not exceed 20 km/h.

SYMBOLS

Symbols being used on the tractor (instrument panel, fuse block, throw-in lever for lighting and signal units) are given below.


fuel


oil pressure in engine


engine oil temperature


engine cooling fluid emergency temperature


emergency engine oil temperature


engine oil filter

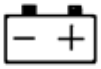

engine fan coupling actuation


engine error (for Mercedes engine)


oil pressure in transmission


gearbox oil filter


actuation of stops


storage battery


heater fan


front window washer


front window wiper


rear window wiper/washer


left turn indicator activation


right turn indicator activation


Emergency alarm


“Road-train” sign


air filter

emergency air pressure in the 1st circuit

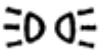
emergency air pressure in the 2nd circuit


oil level in the hydraulic system


emergency oil temperature in the hydraulic system

parking brake


pressure in the pneumatic system


marker lights


front head lighting


rear head lighting


low beam


high beam

neutral gear


pressure filter of mounted implements


pressure filter of steering control


thermostart (electric torch ET)


power take-off shaft engaged

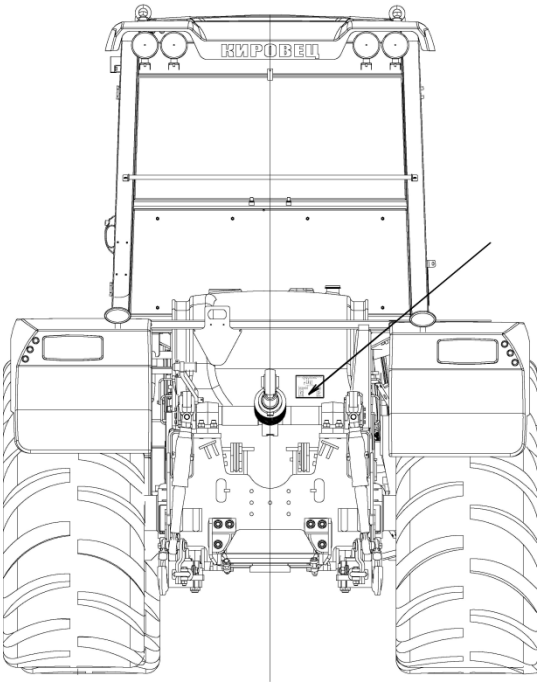

power take-off shaft disengaged

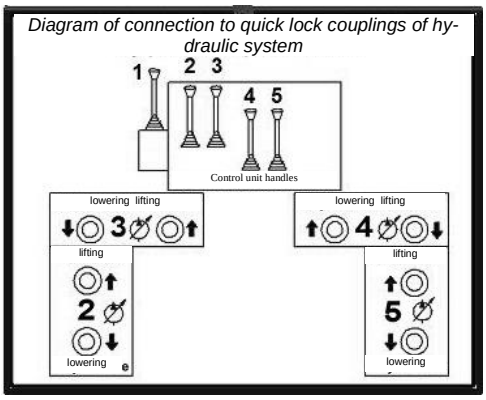

slower

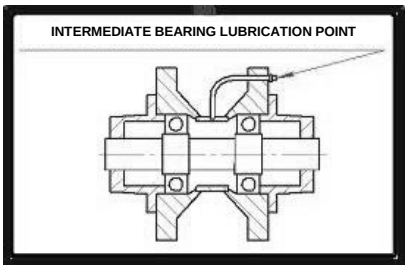

faster

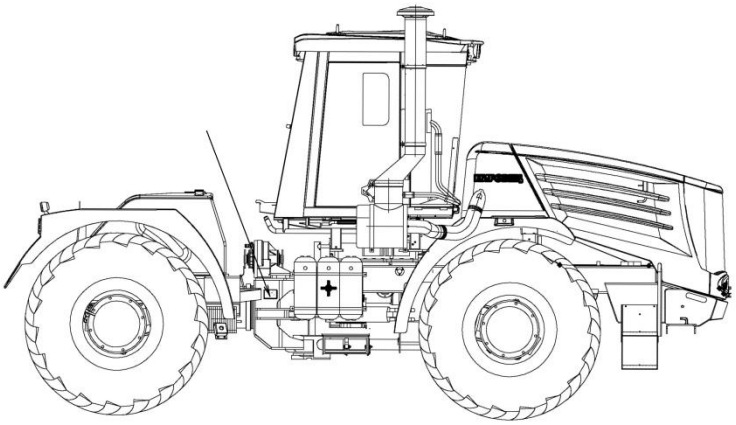
	horn		flasher lamp
	battery master switch		linkage lifting
	linkage lowering		floating position of hydraulic paths to connect hydraulic implements
	floating position of linkage		service operations of hydraulic implements

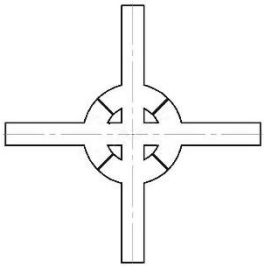
INSTRUCTION PLATES



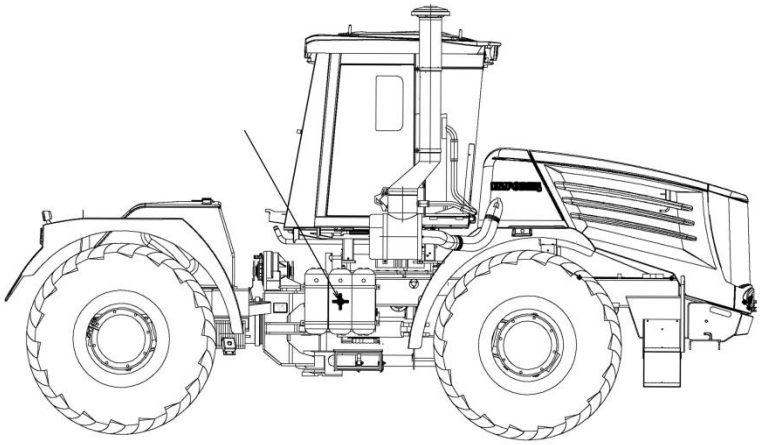


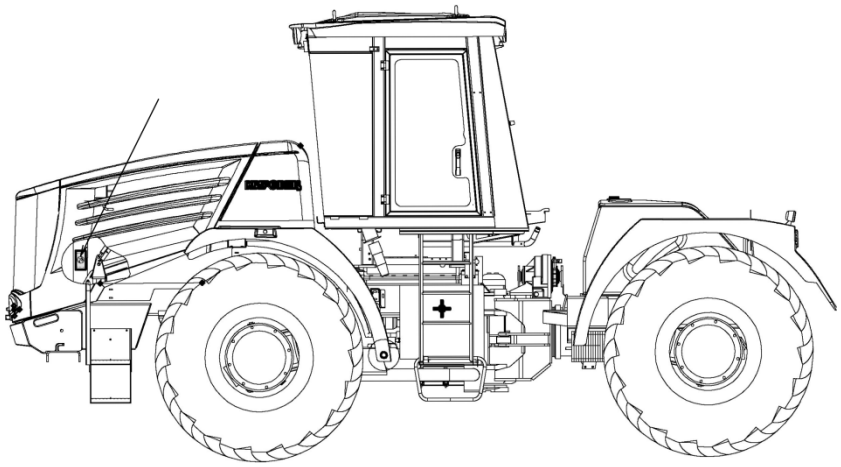


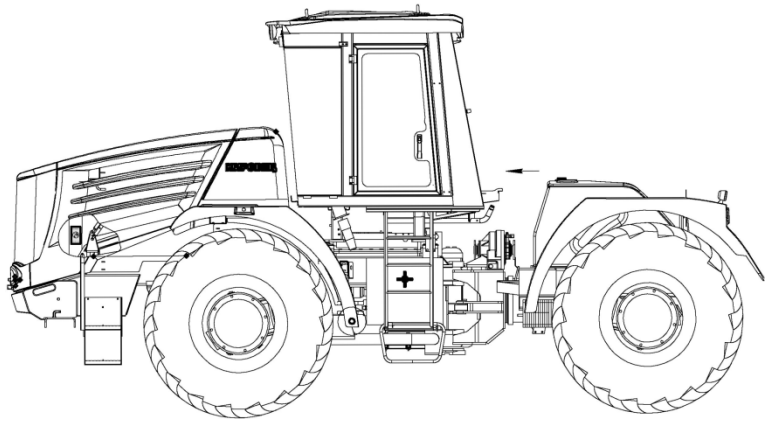




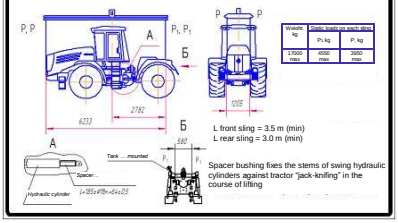
Center of gravity symbol







SLINGING DIAGRAM FOR K-744R1, K-744R2, K-744R3, K-744R4 TRACTORS



MAIN SAFETY RULES

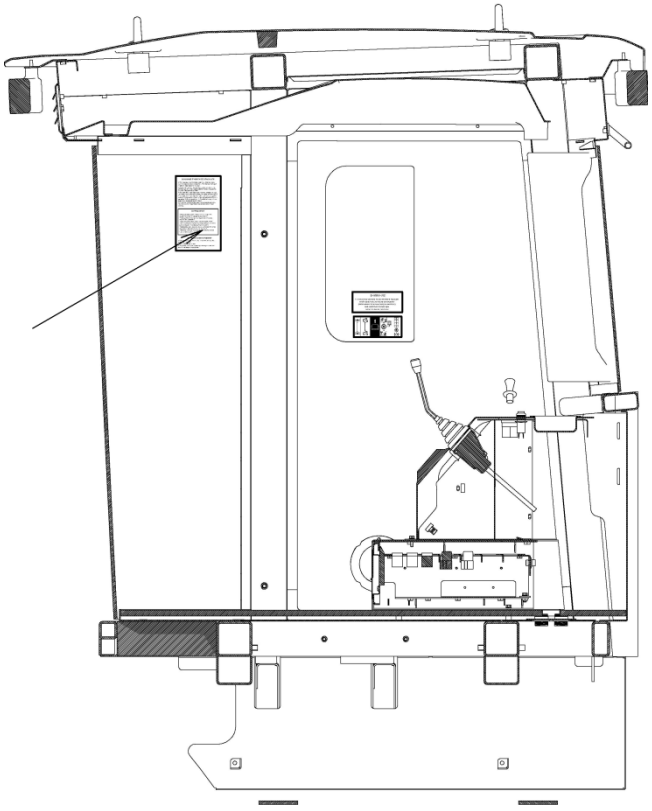
- When moving, select the speed providing for timely stoppage and safe turning of the tractor (tractor train).
- Maximum speed of a tractor train motion (up to 30 km/h) is allowed only on roads with dry hard pavement.
- • Do not switch modes in GB during tractor (tractor train) motion on steep ascents and descents.
- • Be especially careful during tractor motion across the slope: do not perform operations at the speed exceeding 13.4 km/h (modes I and II), avoid sharp turns and driving over obstacles.
- When uncoupling pieces of equipment and trailers, disconnect the connectors of electrical, hydraulic and pneumatic systems.

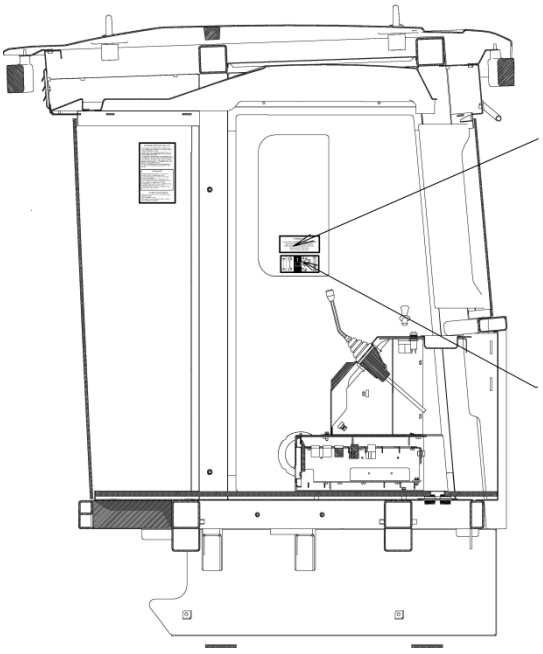
IT IS PROHIBITED TO DO THE FOLLOWING:

- Enter tight turns at speeds over 16 km/h (gear 1 of mode IV).
- Switch off the engine during motion on sharp ascents and descents.
- Use coasting during motion down the slope.
- Use the manual fuel feed lever (hand throttle) in hauling operations.
- Drive the tractor at the speed over 20 km/h with the tyre pressure below 1.7 km/cm.
- Operate the tractor in motion across the slope with the slope angle exceeding 5 degrees.

FIRE EXTINGUISHING PROCEDURE

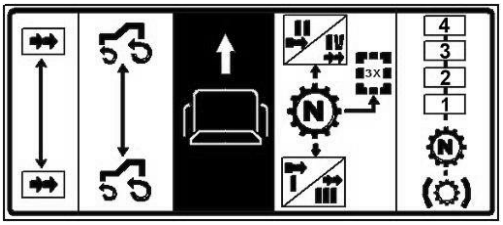
- De-energise the electrical system - press the "Battery disconnect switch" button.
- Stop the engine.
- Extinguish the center of fire, using a fire-extinguisher or any other available means.

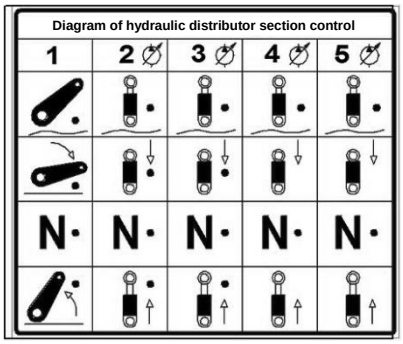


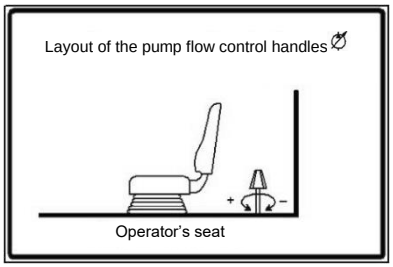


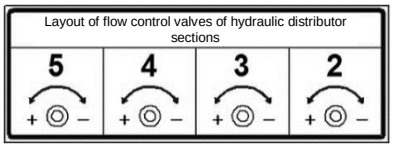
ATTENTION!

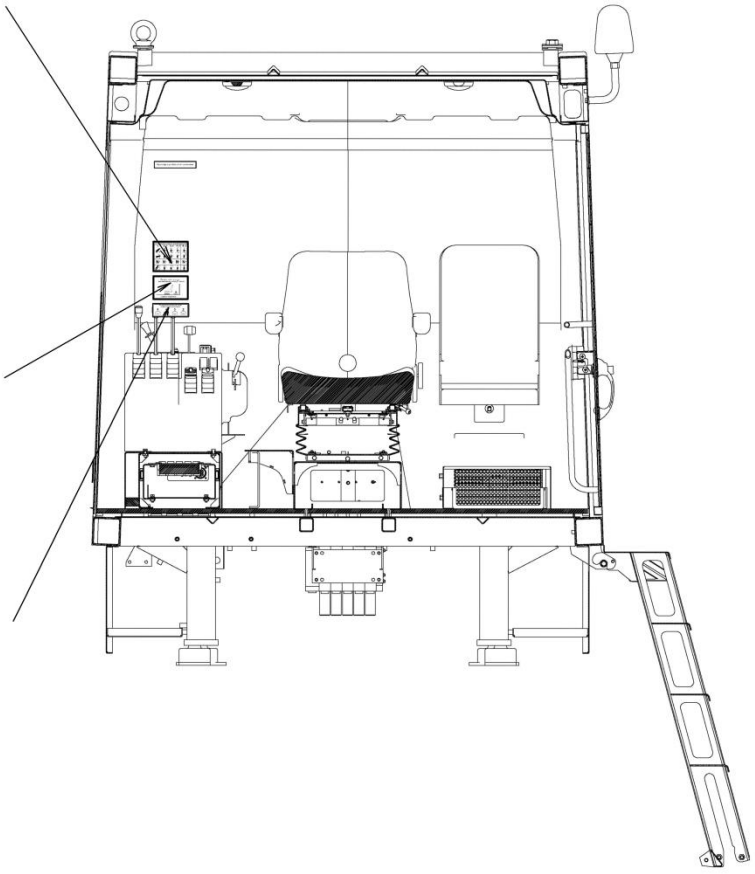
Use the “neutral gear after stop only” position of the gear-change lever (switching on the synchroniser brake) only when changing over the modes











1 INTRODUCTION

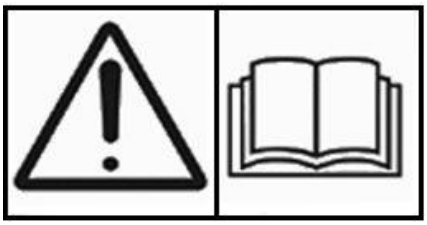
The Operation Manual for Kirovets K-744R1, K-744R2, K-744R3, K-744R4 tractors is intended for drivers, mechanics and other persons related to operation of such tractors. The manual contains a brief description of the design of tractors and their specifications, main rules of operation and maintenance. The data on engines of models YAMZ-238ND5 (YAMZ OJSC), 8481.10 (TMZ OJSC), OM460LA (Mercedes), Cummins are set forth in the operation manuals which are supplied together with the tractors and are an integral part of this book.

Before proceeding to tractor operation, it is necessary to study its design and operation rules. Long-term and reliable operation of Kirovets tractors is ensured in case of proper operation and timely execution of maintenance.

2 SAFETY REQUIREMENTS

2.1 GENERAL

Tractor design ensures safety of tractor operations.

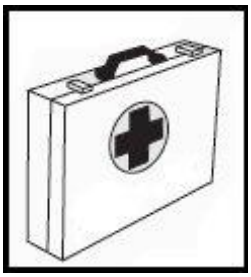


In order to avoid accidents, strictly observe the “Road traffic rules” and safety measures set forth in this section.

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

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

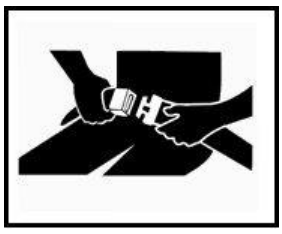
The tractor should be completely equipped and serviceable.



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

If needed to use cabin windows as an escape exit, break the glasses with the hammer provided for in the cabin.

Keep the cabin clean; no foreign objects are allowed in the cabin.



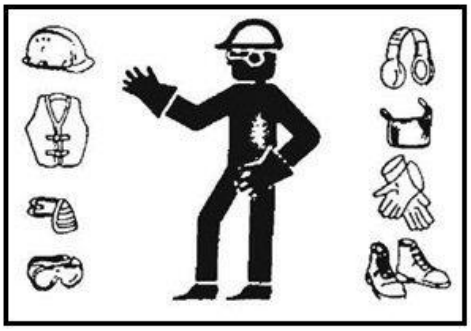
Allowing more than two persons including the driver in the tractor cabin ***IS PROHIBITED***.

The seats shall be in good working condition.

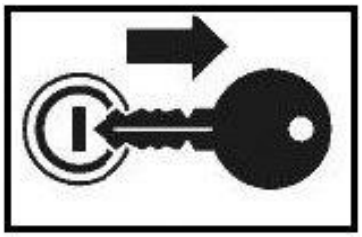
The driver and the passenger shall be fastened by safety belts.

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

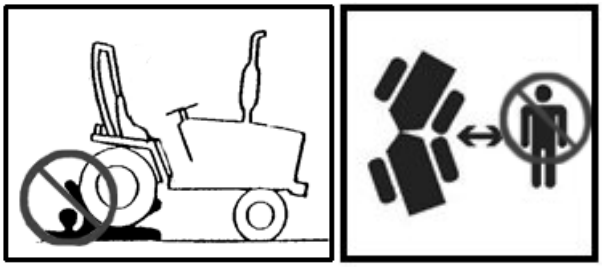
2.2 SAFETY MEASURES DURING DEPRESERVATION, INSTALLATION, TEST OPERATION AND RUNNING-IN



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



Prepare the tractor for operation only with the engine being shut down and the parking brake being pulled up; 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.

2.3 SAFETY MEASURES DURING TRACTOR OPERATION

Before starting the engine, the change-gear lever and the change-mode level shall be in the “Neutral N” position (Fig.15); levers of the hydraulic distributor of mounted implements 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 leaving the tractor, set the change-gear lever and the change-mode level into the “Neutral N” position (Fig.5); levers of the hydraulic distributor of mounted implements - into the “Neutral” position; pull up the parking brake and shut down 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 parking brake during motion.

IT IS PROHIBITED to tow the tractor by suspension unit.

When the tractor is moving with linkage being lifted incompletely, it is necessary to adjust the horizontal brace struts for a length preventing from touching the elements of the linkage of the rear wings.

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

IT IS PROHIBITED to open plug of the expansion tank at the cooling fluid temperature over 70°C.

In case of accident or excessive increase of the engine crankshaft rotation rate, immediately deactivate the fuel feed using the shutdown handle.

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

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

Tractor brakes shall be in good working condition. When braking the tractor traveling over dry and hard ground using the service brake, the braking distance shall not exceed 13 m at the speed of 8.33 m/s (30 km/h) and 6.5 m at 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.

Air pressure in the pneumatic system of brakes in the course of operation shall be equal to 0.65-0.8 MPa (6.5 – 8.0 kgf/cm2).

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

Before switching on the "battery disconnect” switch after a long-term outage of the tractor (over 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 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 exceed 10 km/h.

When turning, select the speed providing for a safe traffic. ***IT IS PROHIBITED*** to enter tight turns at a gear exceeding the first gear of the fourth mode.

When crossing dams, dikes and bridges, make sure of the possibility to drive ahead and use only low gears.

Before passing route portions requiring engagement of both driving axles (ascents, heavy-going areas), actuate 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 and modes on steep ascents and descents;

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

it is allowed to operate across the slope (slope angle shall not exceed 5°) only in modes I...II, avoiding sharp turns and not driving over obstacles.°

Ford across water obstacles only after a thorough preparation and inspection of the route of travel. Fording is allowed with the depth of 0.8 m max for K-744R1 tractors and 1.0 m max for K-744R2, K-744R3, K-744R4 tractors.

Coupling to, and mounting of agricultural machines and implements on the tractor shall be carried out by persons operating such machines. Coupling worker who mounts a machine 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 operation manual for such machines or implements.

Approach the agricultural machines, implements or trailers on the tractor at the minimum speed with the drain gate drive pedal being depressed incompletely, having honked in advance.

Having connected the trailing implements and pumped through the hydraulic system, check the level of oil in the hydraulic tank and, if necessary, refill it.

IT IS STRICTLY PROHIBITED to stay under an 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.

When working with hydraulic agricultural machines and implements, it is necessar6y to remember that the maximum working pressure at the outlet of quick lock rupture devices is at least 15.0 MPa (150 kgf/cm^2).

Trenches, hillocks and other obstacles shall be crossed by tractors with mounted implements at the right angle, at a low gear, avoiding sharp pounding and large rolls of the tractor.

IT IS PROHIBITED to travel on trailing implements and mounted machines not designed for this purpose, and outside the tractor cabin.

Trailing implements and trailers shall have rigid couplers preventing 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 who are aware of the rules of work with trailers, semi-trailers and other vehicles should be admitted to work with them.

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

When using the tractor in hauling 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 travel 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, glaze ice, etc., travel at low gears, do not admit abrupt braking and turning;

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 the hand brake valve 17, Fig.14, and then use the tractor service brakes;

in case of occurrence of a danger for driving, take measures to decrease the speed and stop the road-train;

in case of a sudden stop of the tractor on the surfaced portion of roadway, switch on the alarm signaling. To this end, press the button pos. 5 on the control panel (Fig. 13). At the same time, both turn indication lamps on the instrument panel (Fig. 6) start blinking;

trailer brakes shall be adjusted in accordance with the requirements set forth in the operation manual for trailers;

travel of the tractor train at maximum speed of 8.39 m/s (30 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 the jack-knifing or skid are eliminated;

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

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

When driving with a vehicle:

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

IT IS PROHIBITED to use the manual fuel feed lever; 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 all 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 operating pre-start heating system unattended;

When working with 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 engine operation under 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 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 with 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 of tyres, operate the tractor on roads with hard pavement during not more than 30% of the total period of operation;

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

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

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

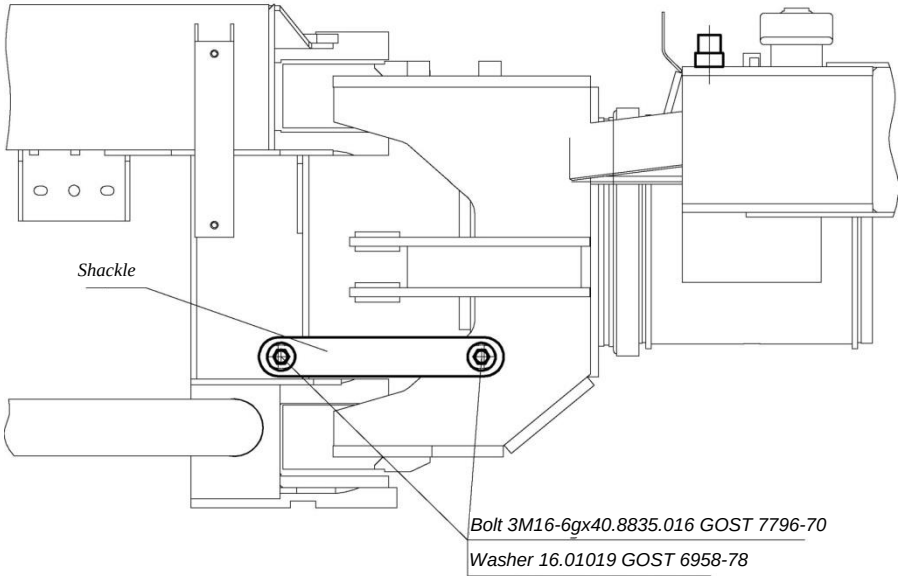
2.4 SAFETY MEASURES DURING MAINTENANCE, TROUBLE-SHOOTING AND PLACEMENT FOR STORAGE

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

Execute maintenance, troubleshooting and dirt cleaning operations only with the engine being shut off, parking brake being pulled up and 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.

When jacking the tractor, use reliable jacks with the carrying capacity of at least 120,000 N (12,000 kgf); perform jacking as per jacking diagram using “DK” marks on the tractor. In order to avoid jack-knifing of tractor semi-frames in the course of tractor jacking, install split bushings on the swing hydraulic cylinder stems preventing the movement of stems.

When carrying out maintenance in the area of horizontal pivot tube, prevent jack-knifing of tractor semi-frames by connecting (locking) them using the shackle fixed on the rear semi-frame.



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.

When washing the tractor, applying and removing lubricants, the workers shall be provided with aprons, gantlets and protective goggles.

When installing and dismantling wheels, strictly follow 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 disconnect switch being switched off.

When carrying out maintenance for storage batteries, it is necessary to comply with 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 PROHIBITED to check the degree of battery charging by short-circuiting the terminals;

IT IS PROHIBITED to use open fire when 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, a disappearing stair shall be installed and fixed on the tractor.

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 inadvertent displacement of the tractor. The tractor shall be installed on strong, specially prepared stands or saw buck.

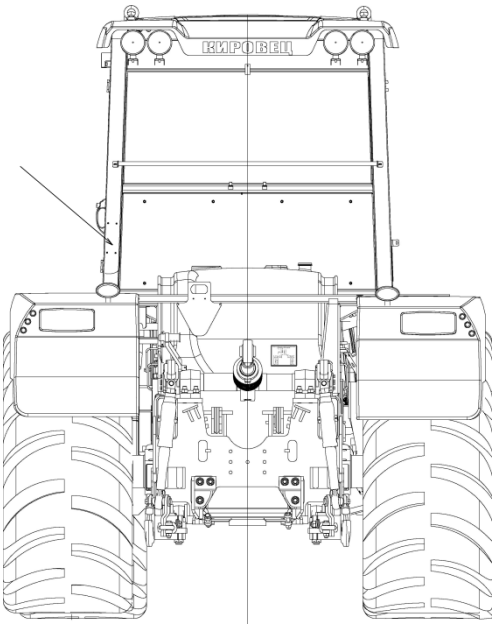
Remember that cooling automotive fluids and antifreeze agents are poisonous and the ingress of even a small amount of them into human body can cause a heavy intoxication.

CAUTION! If needed to dismantle the starter, cut out the protective bracket welded to the side member at the face end side of the starter.

2.5 FIRE SAFETY REQUIREMENTS

Every driver must be aware of fire safety regulations, fire-extinguishing methods and must fulfill fire prevention measures.

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



The spaces to park the tractor and store fuels and lubricants shall be plowed around with a strip of at least 3 m width 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 mechanized method. When filling oil and checking the oil and fuel level, do not use open fire and do not smoke.

If needed to perform a repair in field conditions with the use of electrical gas welding, the parts and assembly units shall be pre-cleaned and washed to remove the fuel and lubricants.

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

Do not admit accumulation of strawy products on the engine.

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

When the engine shuts down, switch off the battery master switch.

Periodically clean the exhaust pipe from sludge and carbon deposit.

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

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

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

stop the fuel feed;

extinguish the center of fire with the use of the fire-extinguisher or any other means at hand.

Do not pour water onto burning fuel.

In order to avoid an explosion of storage batteries, ***IT IS PROHIBITED*** to work with the tractor at a voltage exceeding the voltage controller level set in accordance with the ambient temperature.

IT IS PROHIBITED to use fuses with rated value contradicting to the electrical diagram value.

When working with the tractor, it is prohibited to wear a uniform impregnated with oil and 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.

3 GENERAL DESCRIPTION AND TECHNICAL FEATURES

3.1 PURPOSE AND SCOPE OF APPLICATION OF THE TRACTOR

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, hooking up with which allows to perform plowing, reclamation, harrowing, sowing, scuffing, disk harrowing, deep plowing, tilting the soil without or before plowing, snow capture and other kinds of work. In addition, the tractors can be effectively 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 design, 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	Name	Q-ty of machines in the hookup	Method of connection
PVR-3,5	Attachment to 7 to 9-furrow plows for soil compaction	1	---
OP-12	Implement for pre-sowing preparation of soil	1	Drawbar brace
PTK-9-35 (40)	9-furrow plow	1	Drawbar brace
PNL-8-40	8-furrow plow	1	Suspension unit
PRK-8-4	8-furrow plow	1	The same
PGP-7-40	7-furrow plow	1	-- " --
PN-8-35	Mounted 8-furrow plow	1	-- " --
PUN-8-40	Multipurpose mounted 8-furrow plow	1	-- " --
PRUN-8-45	Multipurpose mounted 8-furrow plow ripper	1	Suspension unit
PRK-8-40	Combined 8-furrow plow ripper	1	The same
PCH-4,5	Chisel-type plow	1	-- " --
PD-4-35	Tier-type plow	1	-- " --
PPN-4-40	Deep plow	1	-- " --
PTN-3-40/40A	Tier-type plow	1	-- " --
PNI-8-40	Plow with adjustable width of catch	1	-- " --
OPT-3-5	Implement for tilting the soil without or before plowing	1	-- " --
---	Plow of "paraplow" type	1	-- " --
PBN-6-50	Plow for reclaiming cultivated bogs	1	-- " --
RVK-7,2	Combined broad-catching hookup for pre-sowing soil preparation	1	-- " --
AKP-5	Combined hookup for main preparation of soil for winter crops	1	-- " --

Make	Name	Q-ty of machines in the hookup	Method of connection
MSP-2	Machine for mixing carbonate and solonetz horizons	1	-- “ --
ALS-2,5	Meadow hookup for solonetz soils	1	-- “ --
FP-4,2	Mill for pastures	1	-- “ --
PS-2,9	Ripper	1	-- “ --
PG-3-5	Subsurface plow	1	-- “ --
GUN-4	Subsurface plow - fertiliser distributor	1	-- “ --
MIK-1.4	Stone extracting machine	1	-- “ --
DE-227	Snow plow of mill type	1	-- “ --
VNK-11	Pushing drag harrow	1	-- “ --
PK-10	Engineless combined grain harvester	1	-- “ --
KPSH-11	Subsurface cultivator	1	-- “ --
KTS-10-02	Heavy sectioned cultivator	1	-- “ --
KLSH-10/15	Rod-type cultivator	1	-- “ --
SVSH-10	Snow ridger	1	-- “ --
SVU-2,6A	Snow ridger	3	Coupler SP - 16/16A
KPS-4	Cultivator	4—5	The same
KPE-3,8A	Heavy-duty cultivator	3	-- “ --
KSHU-18	Broad-catching cultivator	1	Drawbar brace
LDG-15	Disc-type scuffer	1	The same
LDG-20	Scuffer	1	-- “ --
LDS-6	Scuffer-sower (with attachment for connecting two LDS-6 units)	2	-- “ --
SP-16/16A	Coupler	1	-- “ --
2KPG-2.2	Connection	1	-- “ --
SG-21	Harrow-type coupler	1	-- “ --
BDT-720	Heavy-duty disc-type harrow	1	-- “ --
BDT-7	Disc-type harrow	1	-- “ --
BDT-10	Heavy-duty disc-type double-gang harrow	1	-- “ --
BD-10A	Disc-type harrow	1	-- “ --
BMSH-20	Grub-hoe harrow	1	-- “ --
---	Heavy-duty three-link blade-type harrow	1	-- “ --
BZTS-1,0	Harrow	42	Coupler SG-21
BZSS-1,0	The same	42	Coupler SG-21
ZBNTU-1,0	Heavy-duty harrow	7	The same
BIG-3A	Needle-type harrow	5–6	Coupler SP-16/16A
VIP-5,6	Leveller-disperser	3	The same
ZKVG-1,4	Roller	4	-- “ --
SZ-3,6	Sower	5	-- “ --
SZU-3,6	The same	5	-- “ --
SZA-3,6	-- “ --	5	-- “ --
SZO-3,6	-- “ --	5	-- “ --
SZP-3,6	-- “ --	5	-- “ --
SZT-3,6	-- “ --	5	-- “ --
SLT-3,6	-- “ --	5	-- “ --

Make	Name	Q-ty of machines in the hookup	Method of connection
SZS-2,1	Cultivator sower	7	-- “ --
SZSHR-3,6	Seed-fertiliser row drill (instead of SZ-3,6)	1	-- “ --
STS-2,1	Seed-fertiliser tiller planter	5	-- “ --
---	Seed-fertiliser close-row planter (instead of SZU-3,6)	1	-- “ --
---	Seed-fertiliser press non-coupling planter (instead of SZP-3,6)	1	-- “ --
--	Seed-fertiliser row-drill tusk-type planter (instead of SZA-3,6)	1	-- “ --
---	Seed-fertiliser broad-catching planter	1	Drawbar brace
---	Seed-fertiliser non-coupling planter with attachment for soil compaction (instead of SZT-3,6 and SLT-3,6)	1	The same
---	Cultivator tiller planter for broad-band sowing	1	-- “ --
SZS-12	Cultivator sower	1	-- “ --
SZS-14	The same	1	-- “ --
ZPTS-12B	Self-emptying trailer (MMZ-768B)	1	Hydraulic pick-up hitch
OZTP-8572	The same	1	The same
1PTS-9B	Semi-trailer (MMZ-771B)	1	-- “ --
OZTP-8573	The same	1	-- “ --
CTA-10	-- “ --	1	-- “ --
PSE-45	Trailer tank	1	-- “ --
PZHU	Machine for distribution of liquid fertilisers and pesticides	1	-- “ --
RUM-14	Machine for fertiliser distribution	1	-- “ --
RUM-16	The same	1	-- “ --
RUM-20	-- “ --	1	-- “ --
PRT-24	Machine for distribution of solid organic fertilisers	1	-- “ --
PRT16	The same	1	-- “ --
MZHT-24	Machine for distribution of liquid organic fertilisers	1	-- “ --
MZHT-16	The same	1	-- “ --
MVB-12	Machine for intrasoil distribution of mineral fertilisers	1	-- “ --
CTA-30	Tank	1	Hydraulic pick-up hitch
AVA-1	Hookup for fertiliser distribution	1	-- “ --
---	Hookup for fertiliser distribution on meadows and pastures	1	-- “ --

CAUTION! 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.

CAUTION! Reclamations on tractor failures in case of its hooking-up with agricultural machines and implements which are not agreed upon with Peterburgsky Traktorny Zavod JSC will not be accepted for consideration. The tractor warranty will be cancelled.

Serial numbers of tractor components


PETERBURGSKY TRAKTORNY ZAVOD JSC KIROVSKY ZAVOD OJSC

KIROVETS TRACTOR

K-744P

№ 201 г.

AB 28

TOTAL PERMISSIBLE WEIGHT*: 14370-19600 kg

PERMISSIBLE LOAD ON FRONT AXLE*: 7516-9450 kg

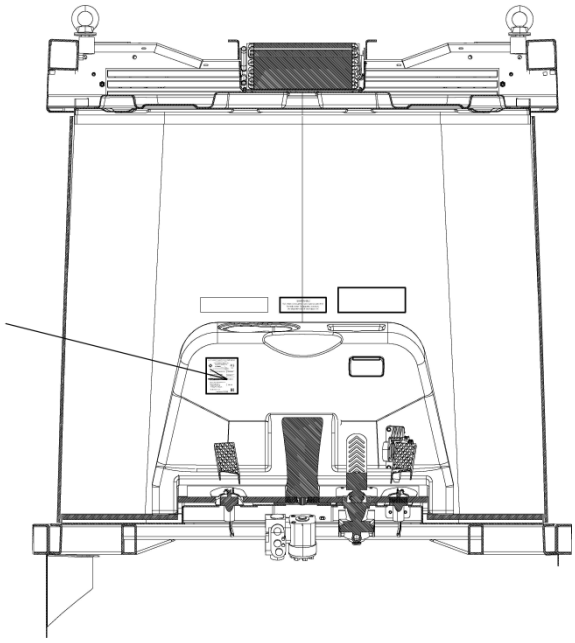
PERMISSIBLE LOAD ON REAR AXLE*: 6854-8200 kg

PERMISSIBLE TRAILER TOWING CAPACITY WITH PNEUMATIC BRAKE DRIVE 36000 kg

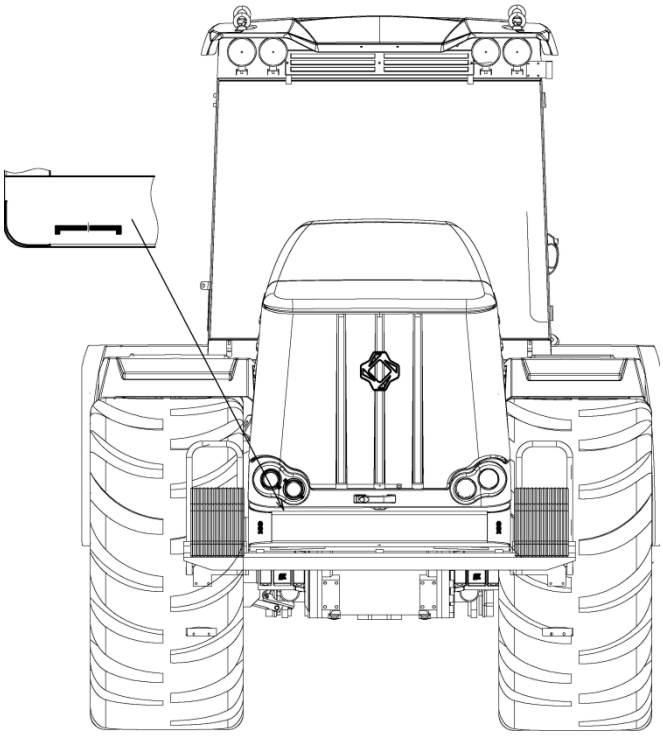
* depending on tyres

Made in RUSSIA

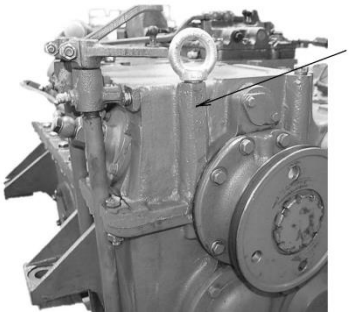
The tractor nameplate with indication of the tractor make and model, name of manufacturer, country, manufacturer's trademark as well as year of manufacture is glued to the left pocket located at the front console of the cabin.



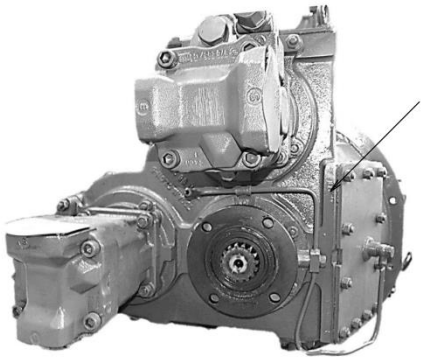
The tractor serial number is stamped on the front plane of the bumper in RH corner (in the direction of tractor travel). The number includes the tractor model, i.e. K744R1, K744R2, K744R3 or K744R4, a letter denoting the year of manufacture, and subsequent four digits corresponding to the ordinal number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



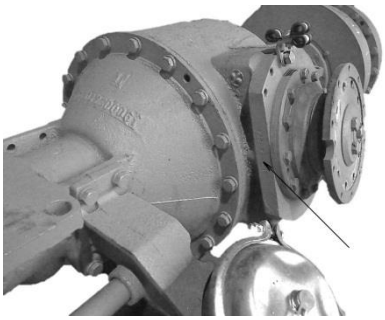
Gearbox serial number is stamped on the upper part of the gearbox, in the area of compressor drive pulley, vertically under the lifting eye nut.



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 bevel gear housing in the area of inlet flange on the left.



3.2 BRIEF DESIGN DATA

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

K744R3, K744R4 tractors weigh more due to installation of ballast.

On the tractors, the possibility to install the flasher lamp 2RL 006846-011 (Hella) is provided. The flasher lamp 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 lamp on the regular bracket, take out the power cord and connect the flasher lamp. The lamp activation switch is located on the ceiling panel of the cabin.

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

YAMZ-238ND5 and 8481.10-11 – 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 and OM460LA (Mercedes) engines are installed on K-744R2Pr, K-744R3Pr and K-744R4Pr tractors.---

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

The **air cleaning system** is dry, double-stage, combined, with dust suction into the exhaust pipe. Air cleaners manufactured by Remiz are 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 bast possible heat conditions, the engines are provided with an automatic fan control system.

CAUTION! In order to avoid radiator destruction, ***IT IS PROHIBITED*** to increase the engine speed over 1200 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 within 3...5 seconds each time, or by forced lowering of the linkage.

CAUTION! ***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 (in K-744R1St, K-744R2St, K-744R3St, K-744R4St tractors - located under the cabin on the left in the direction of tractor travel, at the vertical hinge pivot area; in K-744P2Pr, K-744R3Pr, K-744R4Pr tractors - combined with the fuel strainer and located on the right at the rear beam of the cabin), fuel strainer and fine mesh filter, high-pressure fuel pump with variable speed regulator, automatic coupling for fuel injection advance, low-pressure and high-pressure fuel pipelines and nozzles.

The **exhaust system** has one silencer and connecting branch pipes.

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

The ***semi-rigid coupling and pump drive reducer*** serve for transmission of torque from the engine to the gearbox. The reducer also actuates the pumps of hydraulic systems for control of turns and linkage as well as provides engine disengagement from transmission in case of cold start. 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-mode, with constant-mesh gears, with a mechanical mode change drive and hydraulic gear change without power flow break-up within any of the modes. It allows to change the tractor speed, drive in reverse, engage the rear driving axle, transmit torque to the power take-off (PTO) as well as ensure actuation of the steering control pump from the wheels when towing the tractor 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 cardan shaft of the gearbox, cardan shaft of the front axle, intermediate shaft of the rear axle, intermediate bearing and cardan shaft of the rear axle.

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

Both axles of the tractor 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; they are installed in rear-axle drives of the leading axles.

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

Both leading axles have wheels with low-pressure tyres installed. Tyres 28,1R-26 of model FD-12 are installed on K-744R1 tractors; tyres 30,5R-32 of model F-81 are installed on K-744R2, K-744R3, K-744R4 tractors.-

Tractors K-744R2, K-744R3, K-744R4 may have pneumatic tyres 1050/50R25 installed, they have 172 load index and A8 speed index.

The **tractor turn control system** has a power drive.

The tractor turns using two hydraulic cylinders due to swinging the tractor semi-frames against each other around the vertical hinge pivot. On new tractors, the total free play in the connections of “hydraulic cylinder - semi-frame lifting eyes” (along the hydraulic cylinder axis) can not exceed 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 RM 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.

Diagram of the hydraulic system for steering control and mounted implements is given in Appendix 2.

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

Cabin has a built-in protection framework, is all-metal, two-seat, air-tight, noise-proof, with extended visibility sector. It has heating, ventilation, air conditioning and audio systems. The cabin is fitted with one entry door on the left side. Cabin door and side window and almost completely transparent and fitted with convenient small vent windows.

Two seats fitted with safety belts **are installed in the cabin**. The driver's seat is spring-supported, adjustable depending on driver's weight and height as well as by the angle of back inclination in the longitudinal direction, it has convenient fold-back arm rests.

Steering column with integrated instrument panel can be adjusted by tilt: rated tilt of the column is 25° towards horizon. The steering column tilt is adjustable by 2° in forward direction and by 21° in backward direction against the rated angle.

Tilt angle shall be fixed using the handle located at the left side of the column.

It is possible to install steering column with steering wheel adjustment by height.

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

The system provides for simultaneous operation of the brake drives of the front and rear tractor wheels, the energy accumulator drive, the parking brake, air extraction for tyre pumping and at tractor towing, blowing off 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 speed of the trailer as a part of the road-train and for its automatic braking in case of a break of the coupling 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 keep functioning. The circuit independence is provided by installation of a triple protection valve 3 into the mainline downstream of the pressure controller 1, which ensures the "cut-off" of the failed circuit from serviceable ones. In doing so, the serviceable circuits will keep functioning and will provide for tractor braking.

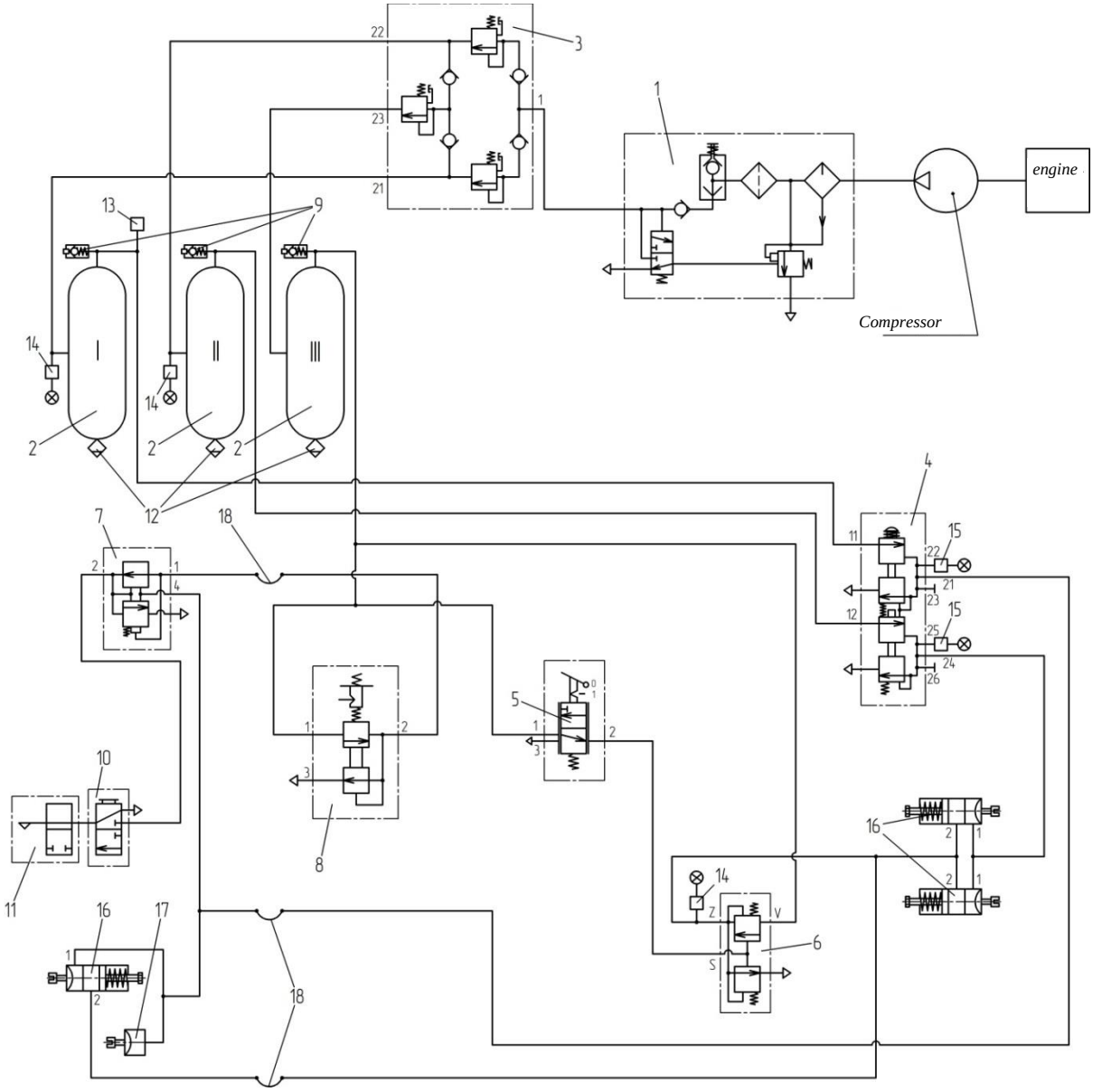
The first circuit performing the function of rear wheel braking consists of receiver 2 (I) connected with brake valve 4; service braking chambers 16 and 17 of the rear axle; and hose 18. The connection is provided by plastic tubes and fittings. The second circuit providing for front wheel braking consists of receiver 2 (II) and service braking chambers 16 of the front axle. The third circuit serving to control energy accumulators of the parking brake and control the 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 controller 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 controller automatically maintains the operating 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, drive the actuators that press the blocks to the brake drums, and the tractor wheels will get braked. When the pedal is returned into the initial position, a 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 directly through the acceleration valve into the atmosphere. With valve 5 being open, air is supplied through valves 6 and 7 to the energy accumulators of the tractor brake chambers and brake head 11. The wheels are not braked. Upon valve closing (or with the engine shut down), the air pressure becomes less than the pressure of energy accumulator spring which moves the stem acting upon the actuators. The wheels get braked; in doing so, the pressure in the brake head decreases to zero.

With no pressure in the chambers with spring accumulator, wheel brakes are braked. In order to the tractor with a faulty pneumatic system, it is required to screw out the bolts located on the accumulator casing

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

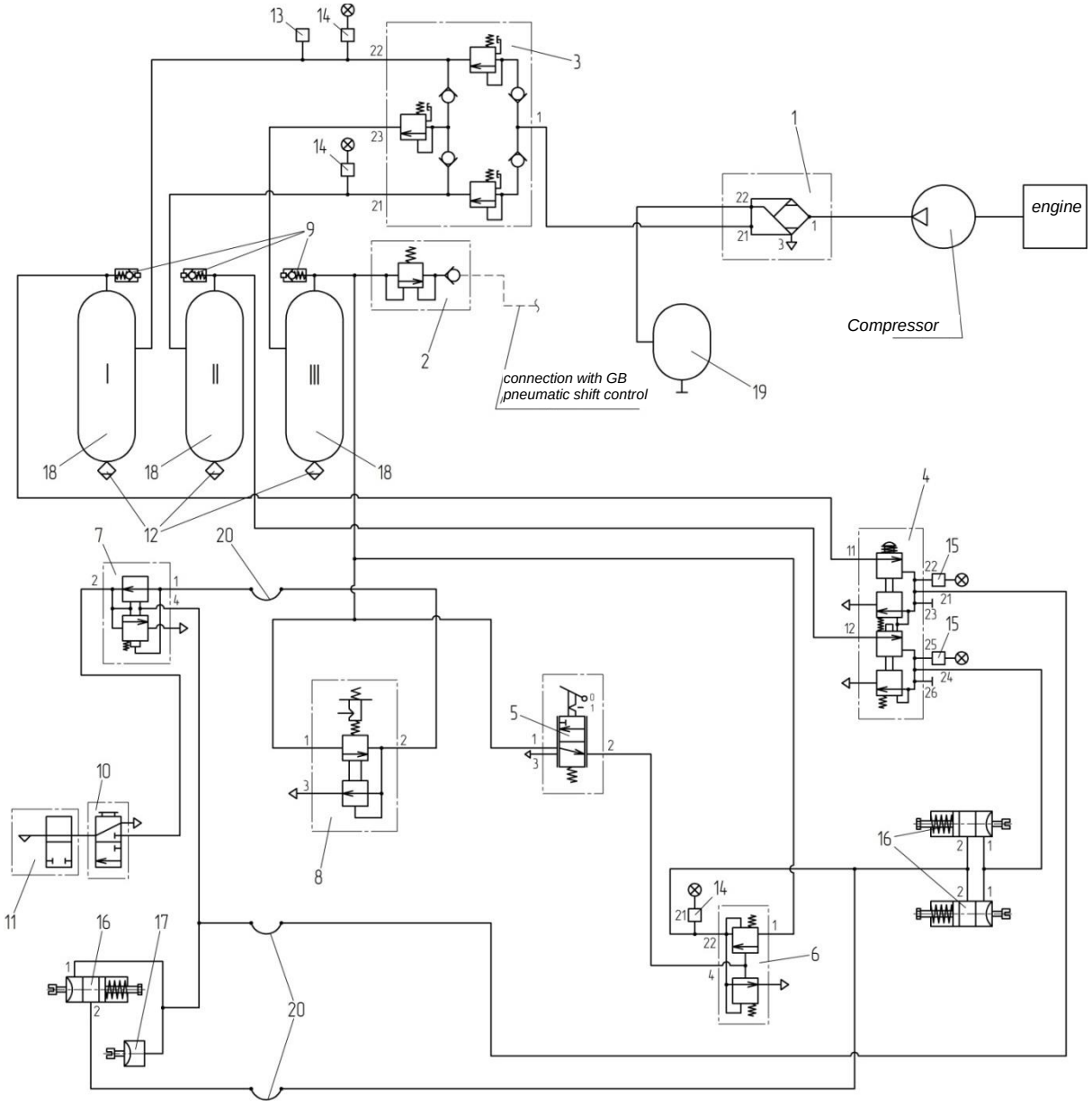


Schematic pneumatic diagram of the braking system

1 - pressure regulator; 2 - receiver; 3 - triple protection valve;
4 - two-section brake valve with pedal; 5, 8 - reverse-acting brake valve with manual control; 6 - acceleration valve; 7 - trailer brake control valve single-wire drive; 9 - control output 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 “30” type; 18 - hose

Tractors with pneumatic shift control of gearbox have pressure controller with adsorber installed instead of regular pressure controller, the former is designed to dehumidify and clean the compressed air discharged by the compressor to the tractor pneumatic system, to maintain the pressure in the system within 0.65 to 0.8 MPa range, and to protect the system from overloads.

The controller is connected to regeneration receiver serving to restore adsorbent properties inside the controller.



Schematic pneumatic diagram of the braking system with compressed air dehumidification

1 - pressure controller with adsorber; 2 - single protection valve;
3 - triple protection valve; 4 - two-section brake valve with pedal;
5, 8 - reverse-acting brake valve with manual control; 6 - acceleration 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 - braking signal pneumatic switch; 16 - brake chamber with spring energy accumulator; 17 - brake chamber of “30” type; 18 - receiver; 19 - regeneration receiver; 20 - hose

Pressure controller with adsorber

The controller provides for dehumidification of the compressed air discharged by the compressor to the tractor pneumatic system and maintaining the pressure in the system within 0.65 to 0.8 MPa range. The controller is fitted with electric heating.

Operation description

The figure illustrates a simplified diagram of the controller, showing the principle of its operation.

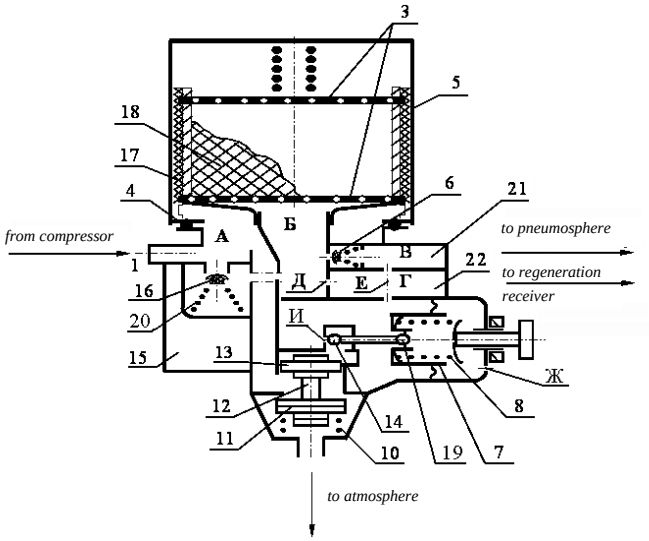


Diagram of pressure controller with adsorber

1, 21, 22 - outputs; 3 - filter gasket; 4 - seal; 5 - casing; 6 - check valve; 7 - servo piston; 8, 10 - springs; 11 - safety valve; 12 - pull rod; 13 - piston; 14, 19 - ball valves; 15 - heating unit; 16 - relieve valve; 17 - urethane-foam filter; 18 - celite adsorber; 20 - spring; А, Б, В, Г - cavities; Д, Е, И - channels; Ж - atmosphere vent

Compressed air from the discharge pipeline of the compressor shall be supplied to outlet 1 and then to cavity А, successive passes through filters 17 and 3, celite adsorber 18, and gets to cavity Б. At the same time, compressed air from cavity А is supplied to safety valve 11.

Cleaned and dehumidified air in cavity Б forces check valve 6 away, gets to cavity В and to the pneumatic system vehicle through outlet 21. At the same time, compressed air from cavity Б is supplied via channel Д to cavity Г and further to the regeneration receiver (outlet 22).

Compressed air pressure is supplied from cavity В via channel Е to servo piston 7 and control ball valve 14. Deflection-and-pressure parameter of spring 8 of servo piston 7 is selected so as to have control ball valve 14 tightly pressed against the seat with the pressure in the vehicle pneumatic system being less than $0.8_{-0.05}$ MPa, so the compressed air pressure would not be transmitted to piston 13 connected by pull rod with safety valve 11 which is pressed against its seat by the force of spring 10.

Upon excess of air pressure in the vehicle pneumatic system beyond $0.8_{-0.05}$ MPa value, servo piston 7 moves to the right while compressing spring 8, and valve 14 in the course of its spring pre-compression reduction move away from its seat jointly with servo piston 7 while transmitting the compressed air pressure to piston 13 of safety valve 11.

At the same time, an additional force is transferred to safety valve 11 via pull rod 12, disturbing a balance between the compressed air pressure of cavity A and spring 10, which results in safety valve 11 opening, thus connecting cavity A to the atmosphere.

At the same time, check valve 6 gets pressed against its seat, preventing compressed air release from the vehicle pneumatic system to the atmosphere. Simultaneously, purified air from the regeneration receiver (outlet 22) via cavities Г and Б enters the adsorber from below (and recovers the adsorbent), to cavity A and then to the atmosphere via discharge valve 11, jointly with excessive moisture and impurities.

When compressed air pressure in the vehicle pneumatic system drops to the value of $0.65^{+0.05}$ MPa, servo piston 7 under the impact of spring 8 moves to the left, and control ball valve 14 gets pressed against its seat and blocks the compressed air access to piston 13 of safety valve 11. As a result, spring 10 presses safety valve 11 to the seat, isolating cavity A from the atmosphere.

Relieve valve 16 is provided for in case of adsorber clogging; with a pressure drop in cavities А and Б being 0.20 to 0.25 MPa, it connects the said cavities. At the same time, air from the compressor is supplied directly to the vehicle pneumatic system.

CAUTION! Recommended interval for regeneration holder maintenance (adsorbing envelope replacement) – 2 years max.

CAUTION! When finding liquid in receivers, it is recommended to carry out immediate maintenance of the regeneration holders as per the method below.

Disassembly

– disassemble the holder by installing and clamping it in vice with soft pads on jaws to prevent deformation of cap 1, as shown in Fig. 1.

– screw out screw 8 by rotating ring 2 around the holder axis, combining catches of base 3 with grooves of the ring, after which move the ring downward.

– take out the base, unclamp the holder in vice and perform the final disassembly.

Assembly

Assemble the holder as per Fig. 1.

– install mesh 6, filter 13, drying envelope 10, second filter 13, sleeve cover 5 and spring 7 in sleeve 4. Glue filters 11, 12 onto the sleeve, put cap 1 with ring 2 on top. Turn the sub-assembly over, install and clamp it in vice with soft pads on jaws.

– put rings 16, 17 onto base 3. Install the base with the rings at the sub-assembly, aligning base grooves with cap grooves. The base should be tightly pressed against the cap, spring 7 should be compressed.

– move ring 2 all the way up, rotate it around the holder axis, align semi-circular groove of the ring with M3 threaded hole. Install washer 9 and screw 8. Install gasket 14 and ring 15.

– perform the assembly under conditions preventing the possibility of ingress of chips, grit, etc, on the parts being assembled.

– surfaces of all rubber parts should be lubricated with a thin layer of grease ZHT-72 ЕГ 38101345-77 (consumption rate is 0.01 – 0.012 g/cm^2). Replacing material is grease Agrinol ZHT-72 TU U 26.4–30802090-058:2006.

– when installing rubber parts, prevent the possibility of a damage to them. Cuts, marks, etc. on the surfaces of rubber parts are not allowed.

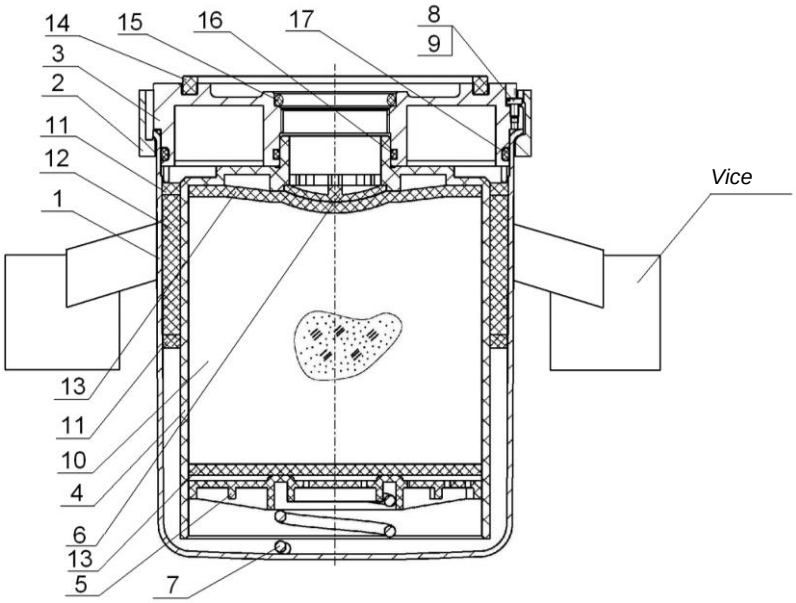


Fig. 1 Regeneration holder 8043.35.12.460

1- 8043.35.12.115 cap; 2- 8043.35.12.122 ring; 3- 8043.35.12.121 base;
4- 8043.35.12.139 sleeve; 5- 8043.35.12.141 sleeve cover; 6- 8043.35.12.142 mesh;
7- 8043.35.12072 spring; 8 - screw M3-3gx5.58A 016 GOST 1491-80;
9- washer 3.65Г,016 GOST 6402-70; 10- 8043.35.12.520-01 drying envelope;
11 - 8043.35.12.071 filter; 12 - 8043.35.12.073 filter; 13 - 8043.35.12.143 filter;
14 - 8043.35.12.074 gasket; 15 - ring 036-044-46-2-3 GOST 9833-73/GOST 18829-73;
16 - ring 040-045-30-2-3 GOST 9833-73/GOST 18829-73;
17 - ring 120-126-36-2-2 GOST 9833-73/GOST 18829-73

Replacement of components

Perform a replacement using one of the repair kits below, depending on technical condition of the components.

Repair kit 8673.00.00.00-03:

Drying envelope 8043.35.12.520-01 – 1 pc.

Repair kit 8673.00.00.00-05:

Drying envelope 8043.35.12.520-01 – 1 pc.

Filter 8043.35.12.071 – 2 pcs.

Filter 8043.35.12.073 – 1 pc.

Filter 8043.35.12.143 – 2 pcs.

Gasket 8043.35.12.074 – 1 pc.

Spring 8043.35.12.072 – 1 pc.

Repair kit 8673.00.00.00-01:

Drying envelope 8043.35.12.520-01 – 1 pc.

Filter 8043.35.12.071 – 2 pcs.

Filter 8043.35.12.073 – 1 pc.

Filter 8043.35.12.143 – 2 pcs.

Gasket 8043.35.12.074 – 1 pc.

Spring 8043.35.12.072 – 1 pc.

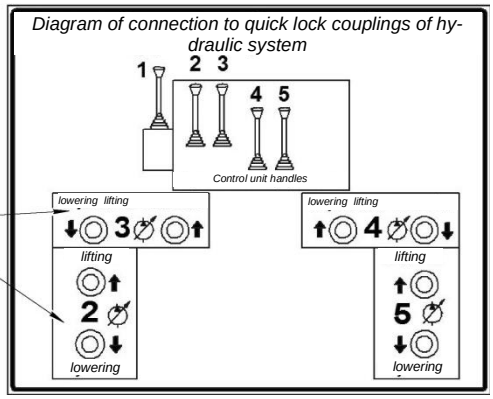
Ring 036-044-46-2-3 GOST 9833-73/18829-73 – 1 pc.

Ring 040-045-30-2-3 GOST 9833-73/18829-73 – 1 pc.

Ring 120-126-36-2-2 GOST 9833-73/18829-73 – 1 pc.

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 controller serve as power supply sources. Power consumers' 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. Plug sockets for the connection are located at the control unit and outside the cabin base. The diagram of electrical equipment is given in Appendixes 10, 10A, 10B, 10C.

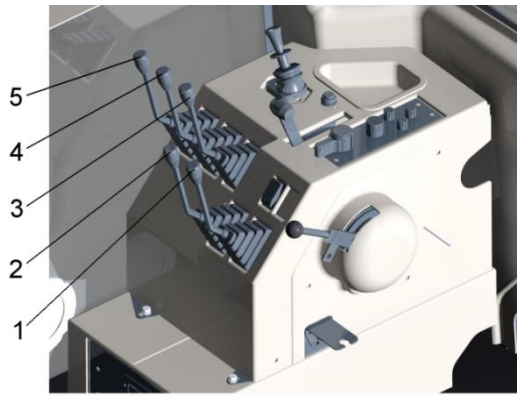
Hydraulic system. The tractor is provided with a hydraulic system and a three-point linkage which serves for connection of mounted and semi-mounted agricultural machines and implements to the tractor, for their adjustment in operating position and transfer into transportation position. A 5-section hydraulic distributor with remote cable-operated control is installed on the tractors in the hydraulic system of working equipment; 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 controllers, the handles of four flow rate controllers 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.



Couplings to connect hydraulic motor

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.

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

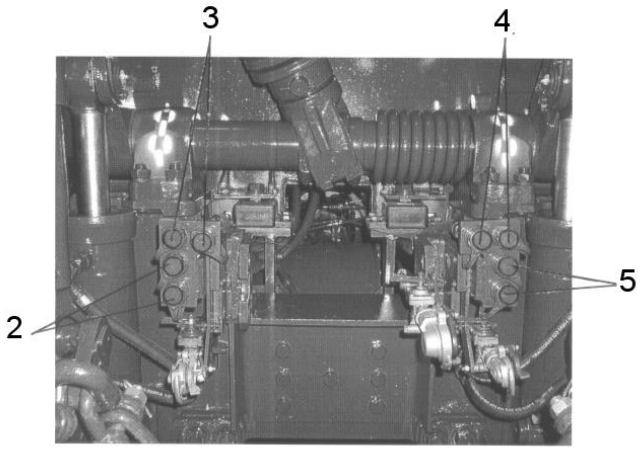


Layout of control levers of the tractor hydraulic distributor

1 – control of the hydraulic system for tractor mounted implements;
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, of the automatic switch of return to neutral.

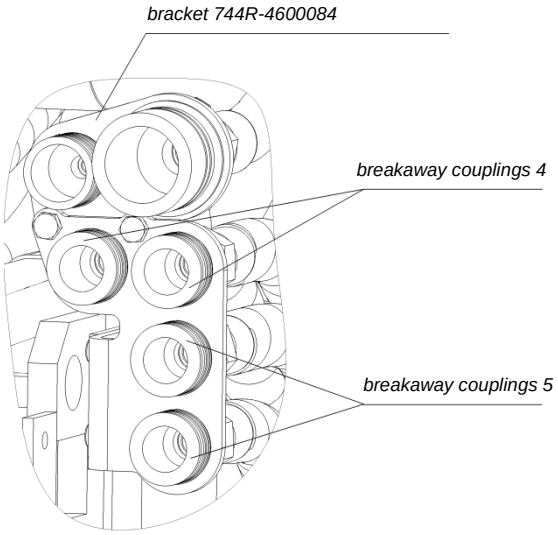
Gate valves of all the sections, being in “floating” position, are released from the locking mechanism manually and returned to neutral under the action of spring.



Layout of outputs on the tractor for connecting external hydraulic lines

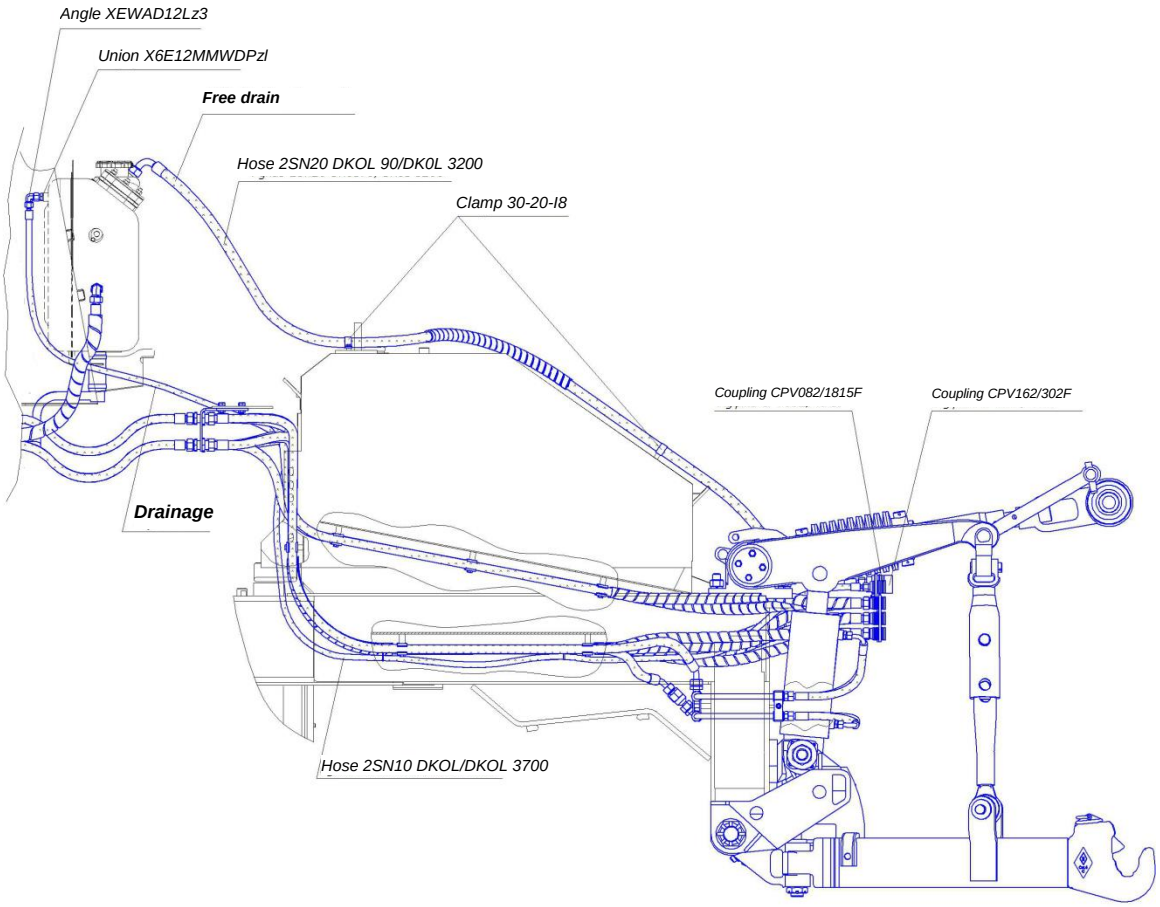
2, 3, 4, 5 – outputs for connecting external hydraulic lines from handles 2, 3, 4, 5 with the same name

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 kit providing for “free” drain (bypassing the hydraulic distributor) into the hydraulic tank and a kit for hydraulic motor drainage.



In order to connect “free” drain and drainage paths, it is necessary to install bracket 744R-4600084 on the brackets under breakaway couplings 4 and 5.

The free drain kit consists of hose 2SN 20 DKOL 90/DKOL, L=3200, breakaway coupling CPV162/302F (1") and two clamps 30-20-M8.



Installation of free drain and drainage paths

The installation of the free drain kit 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=3200, fitting with valve 90°, connect it to the pipe fiting 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 1000...1200 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 vertical hinge pivot;

– connect the hose fitting with breakaway coupling CPV162/302F.

The drainage kit consists of angle XEWAD12Lz3, union XGE12M16ZLWDPz3, hose 2SN 10 DKOL/DKOL, L=3700, and coupling CPV082/1815F (1/2").

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

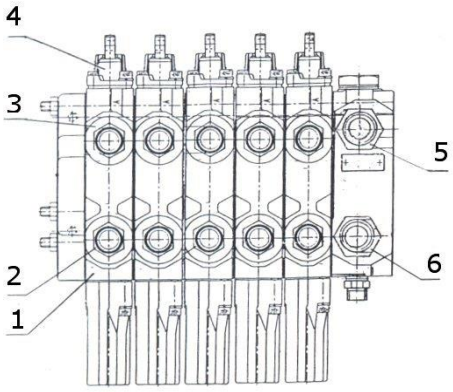
– dismantle the plug M16 on the hydraulic tank wall at the cabin side;

– install angle XEWAD12Lz3 on the tank boss;

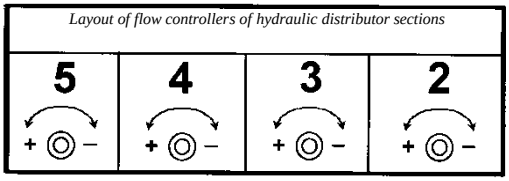
– connect hose 2SN10 DKOL/DKOL, L=3700 to the angle and lay it over the route, having it fastened by plastic clamps to the hoses (under the fuel tank);

– connect the coupling to the free end of the hose. Connect the drainage (for hydraulic motor housing leaks) route valve of agricultural implement to the coupling.

CAUTION! It is necessary to connect only the hydraulic motor drainage line (if any) to this route. Connecting the drain line thereto ***IS FORBIDDEN.***



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



Layout of flow controllers of hydraulic distributor sections

In order to connect corresponding hydraulic lines of the hydraulic system of agricultural machine or implement to be hooked up with tractors to the tractors, and to prevent oil leaks from high-pressure hydraulic hoses in case of their disconnection or emergency rupture, four pairs of quick lock rupture members are provided (Fig.30).

In order to reduce peak loads arising upon changeover of gate valves of the operating equipment hydraulic distributor in the tractor hydraulic system (at the “pipe - hydraulic distributor” route), a hydraulic accumulator is installed (Appendix 2).

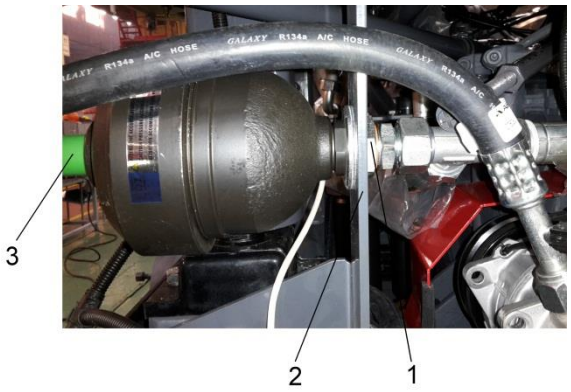
CAUTION! ACCUMULATOR IS A PRESSURISED VESSEL. IT IS ABSOLUTELY PROHIBITED TO WELD OR DISASSEMBLE THE HYDRAULIC ACCUMULATOR HOUSING.

The hydraulic accumulator requires periodic inspection for the sufficiency of nitrogen filling pressure. Hydraulic accumulator charging pressure should be 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 every 6 months or upon tractor launch into operation after long-term storage.

CAUTION! THE INSPECTION SHALL BE PERFORMED BY TRAINED PERSONNEL USING SPECIAL TOOLS.

Perform the inspection as follows:



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

2. Remove cap 3 and check the filling pressure by means of a special tool, the pressure should be 80...85 bar. 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.

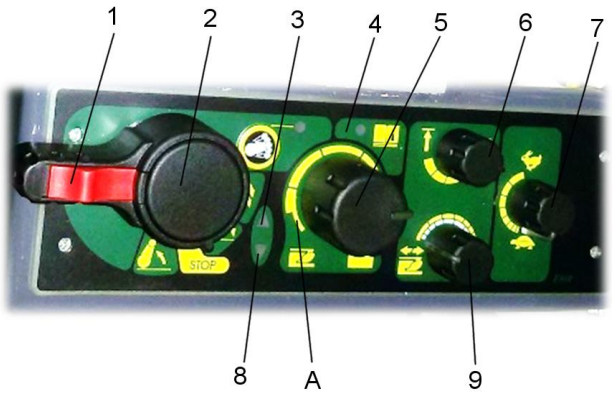
The hydrostatic power steering for tractor turns, steering column adjustable by angle and height, instrument panel with automatic control of the operation of tractor systems significantly facilitate driver’s work.

CAUTION! In order to ensure operation of the hydraulic system in cold weather, it is necessary to warm up the working fluid to the temperature of at least 20...25°C. It is allowed to perform warming up by the hydraulic system operation with the safety valve. To this end, it is necessary to turn the tractor all the way in at the engine speed of 1000...1200 RPM and keep it in the extreme position for several seconds.

EHR system (position control of the suspension axis), if any

Linkage is operated by the control panel (fig. 2) located at the hydraulics board in the tractor cabin and by remote buttons 1 and 2 (fig. 4). When MI electronic hydraulic control system has faults, the diagnostic alarm device 4 (fig. 2) informs about the fault and, if required, the MI control system operation is blocked.

Linkage control panel



Linkage control panel

1 - holding lock of the linkage control handle;
2 - linkage control handle;
3 - indicator of linkage lifting (red);
4 - failure diagnostics indicator (red);
5 - soil cultivation depth control handle;
6 - control handle for limitation of linkage lifting height;
7 - lowering speed control handle;
8 - linkage lowering indicator (green);
9 - handle for selection of adjustment method

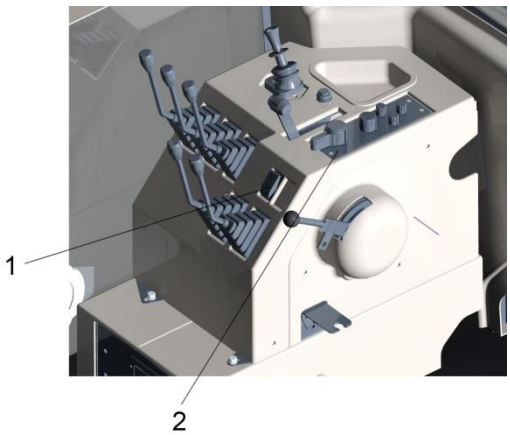


Fig. 3 Hydraulics board

1 - EHR system activation switch (generator's D+ terminal);
2 - linkage control panel

The rear linkage is controlled as follows:

- use handle 9 (fig. 2) to set proper control method depending on the nature of operation; Handle clockwise rotation all the way in - positional control mode; counterclockwise rotation all the way in - power control mode; in between - combined control. Preferred is the combined control mode. Since the tractor has only a position sensor (fig. 4), handle 9 shall be set to “POSITIONAL CONTROL” position (all the way in clockwise)

- use handle 6 to set the required lift height of the attachment in transport position. Handle clockwise rotation all the way in corresponds to the maximum lift, counterclockwise rotation all the way in corresponds to the minimum lift;

- use handle 5 to set the required soil cultivation depth. Handle clockwise rotation all the way in corresponds to the minimum depth, counterclockwise rotation to position “A” corresponds to the maximum lift; counterclockwise rotation all the way in corresponds to "FLOATING POSITION".

- move handle 2 to the low locked position in order to lower the linkage. Then, during the work, it is required to set up the adjust the best possible operation conditions for the mounted implement:

- using handle 9, select combination of control methods (with power control available);

- using handle 5, select soil cultivation depth;

- using handle 7, select linkage lowering and lifting speed. Handle clockwise rotation all the way in corresponds to the maximum lowering (lifting) speed, counterclockwise rotation all the way in corresponds to the minimum lowering (lifting) speed.

Handle 2 has four positions:

a) middle position - off;

b) upper position - lifting;

c) lower position - lowering (in operation - automatic control);

d) pressing handle down (without locking) from the lower position - implement landing in case of implement raising in the course of soil cultivation.

Indicator 8 illuminates during linkage lowering or landing, indicator 3 illuminates during its lifting.

In case of agricultural implement raising when it penetrates tight soil or pot holes, land the implement by pressing handle 2 further downwards. After handle 2 is released, it will return into fixed position “LOWERING”. At the same time, agricultural implement reaches the depth that was set earlier with handle 5. Agricultural implement shall raise with handle 2 moving to the upper position.

In the course of operation, indicators 3 or 8 will illuminate upon linkage position correction.

CAUTION! WHEN INDICATOR 3 DOES NOT GO OUT AFTER THE IMPLEMENT IS LIFTED UP, OPERATION OF THE TRACTOR IS **PROHIBITED** TO PREVENT GNS PUMP AGAINST FAILURE!

CAUTION! WHEN THE TRACTOR IS STOPPED FOR EMERGENCY REASONS, TO PREVENT FURTHER LANDING OF AGRICULTURAL IMPLEMENT YOU MUST SET CONTROL HANDLE 2 TO POSITION “OFF”.

WHEN THE TRACTOR STARTS MOVING, SET THE HANDLE TO POSITION “LOWERING” AND THE IMPLEMENT WILL LAND FOR THE DEPTH SET EARLIER!

You have to learn the following details of how to operate the linkage:

- after the engine is started, diagnostics indicator 9 lights up to signal that control system works and it is locked;

- to activate and unlock the control system you have to set switch 1 (fig. 3) to On position (press the symbol), and put handle 2 (fig. 2) into operation position once (lifting up or lowering down). At the same time, diagnostics indicator 9 goes out.

- after the system is unlocked at switching for the first time due to safety reasons, rear linkage lowering and lifting speed is automatically restricted. To remove the lifting or lowering speed restriction, set handle 2 to position OFF and then to position LIFTING or LOWERING.

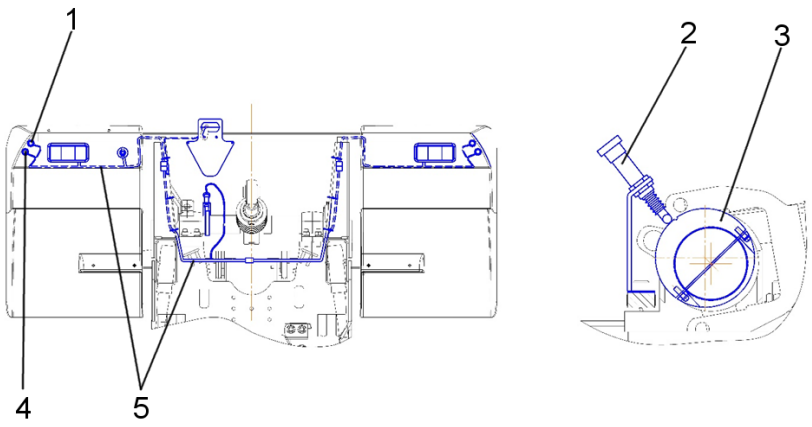


Fig. 4 Linkage control with remote buttons and installation of position sensor

1 - button LIFTING of linkage; 2 - position sensor; 3 - eccentric workpiece;
4 - button LOWERING DOWN; 5 - connection wire harnesses.

Remote linkage control buttons

Rear linkage is normally controlled by remote buttons with the purpose of attachment of agricultural machines and implements. Rear unit can be lifted and lowered with remote buttons installed on wings of the rear wheels in any control modes: handles 2, 5, 6, 7, 9 (fig. 2) can stay in free position as the cabin control system is blocked in this case. To lift the linkage press and hold any button 1 (fig. 4) at the right or left wing. To lower the linkage down, press and hold any button 4 at the right or left wing.

Due to safety reasons, the remote buttons operate with interruptions. When lift up button 1 is pressed and hold (lowering buttons 3), the linkage goes up (down) within 5 seconds and then stops. To continue the lifting (lowering) process, press the respective button again and hold it!

WARNING! WHEN WORKING WITN REMOTE BUTTONS OF THE LINKAGE CONTROL SYSTEM, NEVER STAY BETWEEN THE TRACTOR AND THE IMPLEMENT BEING ATTACHED!

TO PEVENT ACCIDENTS, **NEVER USE** BUTTONS FOR MECHANICAL MOVEMENT OF EHR SECTION SOLENOID-OPERATED VALVES

Diagnostics of failures in linkage electronic control system

Electronic control system by BOSCH installed at your tractor has the self-diagnostic function, and in case of failure it provides code information using diagnostic failure indicator 4 (fig. 2) at the linkage control panel. After the engine is started, as it was stated earlier, and when the linkage control system operates without failure, indicator 4 lights continuously. After handle 2 is operated upward or downward, indicator 4 goes out.

After the engine is started and the system is activated using switch 2 (fig. 3), when an error is found in the system, diagnostic indicator 4 starts producing code information related to such error and blocks the system, if required.

The error code is produced as a two-digit number; first digit equals to the number of flashes of indicator 4 after the first long pause, and the second digit equals to the number of flashes after second long pause. For example, indicator 4 operates with following algorithm:

- engine starts;
- system is activated;
- lighting is continuous;
- after the system is unblocked, the indicator goes out;
- indicator flashes 3 times;
- long pause (indicator does not illuminate);
- indicator flashes 6 times;
- long pause (indicator does not illuminate).

This means that the error code in the system is “36”. When several errors are present, the system indicates error codes one after another and separates them with a long pause.

The system defines three groups of errors: complex, average and simple errors.

In case of complex errors, the adjustment procedure stops and the system goes off. The system cannot be operated from the panel or remote buttons. Diagnostics indicator generates an error code. When the error is corrected and the engine is started, the system operation restores. In case average errors, the adjustment is stopped and the system is blocked. The system can be operated only from remote buttons and it is not operated from the main panel. Diagnostics indicator generates an error code. When the fault is corrected and the engine is started, the system operation restores.

In case simple errors, the diagnostics indicator generates an error code, but the system can be operated without blocking. With simple errors, linkage control system doesn’t operate properly and gives wrong measurements for soil. After the error is corrected, the diagnostics indicator goes out.

When the system detects an error of any complexity, the following must be done:

- determine the code;
- stop the engine;
- according to instructions provided in error code table “Possible errors of electronic linkage control systems and troubleshooting”, correct the error;
- start the engine and start working, if no errors are present.

Possible errors of electronic linkage control systems and troubleshooting

Linkage control system wiring diagram is given in figure 5. Procedure for diagnostics of electronic linkage control system errors is given in Table 1.

CAUTION! LINKAGE CONTROL SYSTEM CONNECTORS SHALL BE DISCONNECTED ONLY WHEN THE ENGINE IS SHUT DOWN!

CAUTION! INDICATED VOLTAGE VALUES SHALL BE MEASURED WITH ENGINE IN OPERATION, TAKING PROPER SAFETY MEASURES FOR LIVE ELECTRIC EQUIPMENT!

CAUTION! NUMBERING OF PINS IN HARNESS CONNECTORS IS GIVEN ON THE CASING PARTS OF CONNECTORS!

CAUTION! ONLY AUTHORISED DEALERS SHALL REPAIR ELECTRONIC LINKAGE CONTROL SYSTEMS. OTHERWISE, THE GUARANTEE FOR ELECTRONIC LINKAGE CONTROL SYSTEMS BECOMES VOID!

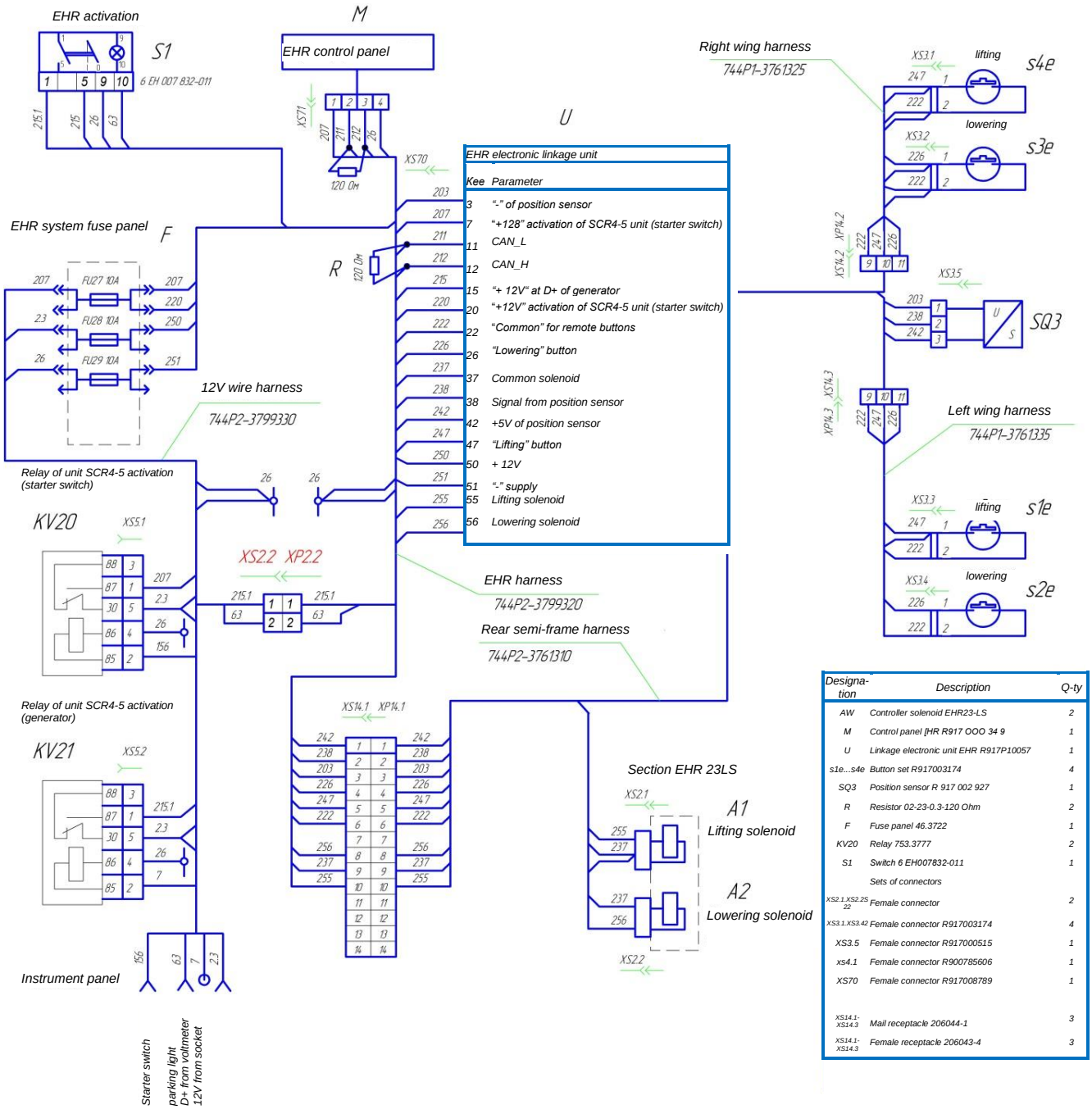
Table 1

Code	Fault description, possible cause	Fault check method
Complex faults		
11	Failure in the control circuit of **lifting** solenoid valve. Break in solenoid coil or control harness.	Disconnect the harness from the and check the solenoid coil for break using a multi-meter. Coil resistance shall not exceed 2...4 Ohm. If the coil is in good condition, check solenoid control harnesses for mechanical damage and, using a multi-meter, check wire 255 for disconnection from solenoid terminal to terminal 55 of 56-pin connector of the electronic unit
12	Failure in the control circuit of **lowering** solenoid valve. Break in solenoid coil or control harness.	Disconnect the harness from the and check the solenoid coil for break using a multi-meter. Coil resistance shall not exceed 2...4 Ohm. If the coil is in good condition, check solenoid control harnesses for mechanical damage and, using a multi-meter, check wire 256 for disconnection from solenoid terminal to terminal 55 of 56-pin connector of the electronic unit

Code	Fault description, possible cause	Fault check method
13	Failure in the control circuit of **lowering** or **lifting** solenoid valve. Short circuit in one of the solenoid valves or short circuit of solenoid control wires in harness	Disconnect harnesses from the solenoid and check the solenoids for short circuit using a multi-meter Coil resistance shall not exceed 2...4 Ohm. Or measure the solenoid valve current consumption by supplying 6V. The current shall not exceed 3.2 A. Disconnect the connector from the electronic unit and check wires 255 and 256 for short circuit in comparison with wire 237 (solenoid valves shall be disconnected)
14	Failure of the remote buttons for **lifting** control. Short circuit of wires or sticking of one of the remote buttons for **lifting** control.	Check harnesses coming from the remote buttons for linkage lifting control for mechanical damage. By turn, disconnect each lifting button until the fault disappears. During this procedure the engine shall be shut down. If the buttons are disconnected and the fault is still present, disconnect the connector from the electronic unit and, using a multi-meter, check terminals 247 and 222 for short circuit
15	Failure of the remote buttons for **lowering** control. Short circuit of wires or sticking of one of the remote buttons for **lowering** control.	Check harnesses coming from the remote buttons for linkage lowering control for mechanical damage. By turn, disconnect each button until the fault disappears. During this procedure the engine shall be shut down. If the buttons are disconnected and the fault is still present, disconnect the connector from the electronic unit and, using a multi-meter, check terminals 222 and 226 for short circuit
16	Electronic unit failed. Constant supply voltage feeding the control panel is below the required level. Maybe connectors of the sensors for linkage force and position were short-circuited due to water getting into the connectors.	Disconnect EHR harness from the main control panel. Measure constant supply voltage at pins 203 (negative) and 242 (positive) of the panel connector; it shall be of 5V (the engine shall be in operation). If the supply voltage is low or absent, check the electronic unit connector for reliability of connection. By turn, disconnect the sensors for linkage force and position.
17	Excess of the general supply voltage of SRC4-5 unit	When the general supply voltage of SRC4-5 unit exceeds 19V. Check output voltage in the vehicle mains. Generator voltage controller failed
Average faults		

Code	Fault description, possible cause	Fault check method
22	**Position sensor** failed Sensor wire is broken, the sensor is not connected or not adjusted.	1. The position sensor is not adjusted. Disconnect the harness connector from the sensor. Screw the sensor out. Lift the linkage to the uppermost position using remote buttons or solenoid button “Lifting”. Screw the sensor all the way in by hand and then screw it out for two turns. Connect the harness connector to the sensor. Using the control panel, lower the linkage and lift it to the uppermost position. Lifting indicator shall go out. If it illuminates, screw the position sensor further in by 1/6 of a turn. Recheck system’s operation. If needed (the lifting indicator doesn’t go out in the upper position of the linkage), turn the sensor further in again and repeat the check. When the linkage is adjusted correctly, then it shall be lifted and lowered in its utmost positions from the control panel. When the linkage after the lifting comes to its uppermost position, the lifting indicator shall go out.
		2. Position sensor failed. Dismantle the position sensor from the tractor to check how it operates. According to wiring diagram for the linkage control system, which is attached to the manual, 5V shall be supplied to terminal 3, to terminal 1 of the “frame” (negative), to sensor pins; then press with your finger the moving sensor stem and, using a multi-meter, measure the sensor output voltage between terminals 2 (signal) and 1 (negative). When the stem (core) is moved to its full length, the sensor output voltage shall change within 10% to 90% of the supply voltage to sensor 3. Fault (break) of harness in the sensor circuit. Check the harness by the diagram (fig. 5)
23	Control panel failed. Failure of **potentiometer 2** (fig. 2) of soil cultivation depth: see voltage as per wiring diagram (fig. 5)	Check connection reliability of control panel and electronic unit connectors; check EHR harness for mechanical damage.

Code	Fault description, possible cause	Fault check method
24	Control panel failed. Failure of potentiometer 6 (fig. 2) of the uppermost linkage position	Check connection reliability of control panel and electronic unit connectors; check EHR harness for mechanical damage.
28	Control panel failed. Failure of linkage control handle 2 (fig. 2)	Check connection reliability of control panel and electronic unit connectors; check EHR harness for mechanical damage.
Simple faults		
33	Low voltage	EHR system supply is below 8V. Battery is low. Check the generator output voltage
34	Control panel failed. Failure of potentiometer 7 (fig. 2) of linkage speed control	Check connection reliability of control panel and electronic unit connectors; check EHR harness for mechanical damage.
36	Control panel failed. Failure of potentiometer 9 (fig. 2) that combines the plowing modes: power – position	Check connection reliability of control panel and electronic unit connectors; check EHR harness for mechanical damage.
Code is not generated	Inadvertent linkage lift after engine starting	Gate valve LIFTING of EHR section is stuck in open position. Disconnect harness blocks from LIFTING and LOWERING solenoids. If the fault is still present, correct the error in the hydraulic system



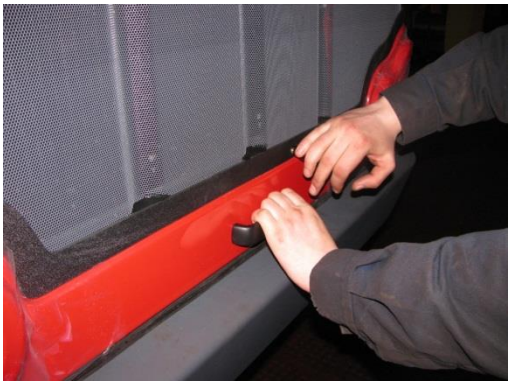
Designation	Description	Q-ty
AW	Controller solenoid EHR23-LS	2
M	Control panel [HR R917 OOO 34 9	1
U	Linkage electronic unit EHR R917P10057	1
s1e...s4e	Button set R917003174	4
SQ3	Position sensor R 917 002 927	1
R	Resistor 02-23-0.3-120 Ohm	2
F	Fuse panel 46.3722	1
KV20	Relay 753.3777	2
S1	Switch 6 EH007832-011	1
	Sets of connectors	
XS2.1,XS2.2S 22	Female connector	2
XS3.1.XS3.42	Female connector R917003174	4
XS3.5	Female connector R917000515	1
xs4.1	Female connector R900785606	1
XS70	Female connector R917008789	1
XS14.1-XS14.3	Mail receptacle 206044-1	3
XS14.1-XS14.3	Female receptacle 206043-4	3

Fig.5 EHR system wiring diagram

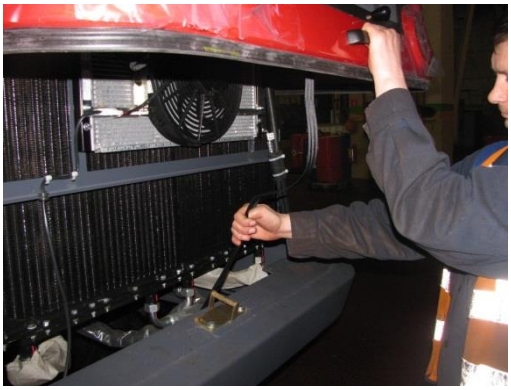
For outer illumination and signaling, four headlights are installed on the tractor with high and low beams as well as eight lights for service illumination, four turn indicators, four fender lamps, "road-train sign", two lateral repeaters of turn indicators, two “stop signal” lights.

Plastic hood opening mechanism

To open the plastic hood, it is necessary to do the following:



Holding the hood with one hand, shift the latch to the right until the click with the other hand. The lock will get unblocked and the hood will begin opening under the action of gas springs



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

The inertial mechanism of the belt structure allows to fix the hood in open position at any angle. In the process of opening, it would be sufficient to accelerate the belt in the upward direction, and it will get blocked, thus holding the hood at the required height. In order to release blocking, it is necessary to slightly pull the belt downwards, and the hood will keep opening.

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

Smoothly, without jerks, pull the hood by the belt downwards. At the initial moment of movement an additional resistance can arise, caused by the design of gas shock absorber (built-in damper). When lowering, the belt will automatically be rewinding until the closing

Having lowered the hood to the chest level, it is necessary to re-catch the handle and close the hood until the lock operates.

Safety measures

In order to observe safety measures with regard to prevention of inadvertent hood closing, stops are provided for in the boot design, they are located in parallel to the gas springs.
In order to bring the stop into the fixed position, it is necessary to open the hood, take off the spring locking splint 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 locking in the reverse sequence.

3.3 BASIC TECHNICAL DATA

Parameters	K-744R1 Standard Premium	K-744R2 Standard Premium	K-744R3 Standard Premium	K-744R4 Standard Premium
Tractor make	Kirovets			
Engine	YAMZ-238ND5/8481.10-11 Cummins 6LTAA8.9-C300	8481.10 OM460LA E3A/5	8481.10-02 OM460LA E3A/4	8481.10-04 OM460LA E3A/5
Type	wheeled, agricultural general purpose			
Hauling class as per GOST 27021	5	5…6	6…8	6…8
Nominal tractive force, kN, (tf)	50 (5)	50 (5)	75 (8)	75 (8)
Wheel arrangement	4x4			
Engine capacity, kW (h.p.), at least:				
- rated engine capacity	220 (300) / 220.6 (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)
Engine crankshaft speed 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, not more than **	220 (167) / 212 (156) 213 (157)	220 (162) 205 (151)	213 (157) 205 (151)	213 (157) 205 (151)
- at the operating capacity, max	237 (174) / 220 (167) 237 (174)	240 (177) 213 (157)	230 (170) 213 (157)	230 (170) 213 (157)
- at the maximum capacity on the PTO shaft, max	257 (189) / 240 (176) 257 (189)	265 (193) 225 (166)	250 (185) 225 (166)	250 (185) 225 (166)
Maximum capacity on the PTO shaft at the engine crankshaft rated speed, kW (h.p.), at least	189 (257)	216 (294) 235 (319)	243 (331) 267 (363)	262 (363) 279 (380)
Relative oil consumption of the engine, %, max:				
for fuel burning	0.5 / 0.3 0.5	0.3 0.25	0.3 0.25	0.3 0.25
total, in operation, with regard to grease change	1.0 / 0.64 1.0	0.7 0.5	0.7 0.5	0.7 0.5
Efficiency factor of the transfer from the engine outlet shaft to the power take-off (PTO) shaft end, at least	0.92			
Tractor speed without regard to slippage, km/h:				
forward drive				
the least, decreased speed	4.49 4.72	4.72		
the highest, operating speed	17.0 17.9	17.84		
the highest, hauling speed	28.84	29.26		
reverse drive				
the least speed	5.5 5.86	5.86		
the highest speed	20.97 22	22.4 22	22.4 22	22.4
Number of gears				
forward drive	16			
reverse drive	8			
Tractor weight, kg, max:				

** The parameters are determined at the engine manufacturer plant

Parameters	K-744R1	K-744R2	K-744R3	K-744R4
	Standard Premium	Standard Premium	Standard Premium	Standard Premium
design weight (in basic configuration)	13820 / 14065 13290	14600 14140	16400 16000	16400 16000
operating weight (in basic configuration)	14900 / 15145 14370	15680 15220	17500 17000	17500 17000
- operating weight with the wheel pairing kit	16670 / 16915 16140	17780 17620	19600 19200	19600 19200
Weight distribution over axles in the basic configuration, kg:				
front axle	7516 / 7686 8046	8470 8010	9450 8800	9450 8800
rear axle	6854 / 6929 6854	7210	8050 8200	8050 8200
Weight distribution over axles with the wheel pairing kit, kg:				
front axle	7516 / 7686 8046	8470 8010	10500 9900	10500 9900
rear axle	6854 / 6929 6854	7210	9100 9300	9100 9300
The biggest of mean conventional pressure values for driving machines, kPa (kgf/cm^2), max				
with single wheels	110 (1.1)			
with paired wheels	80 (0.8)			
Road clearance (with the tyre static radius of 790 mm for K-744R1 830 mm for K-744R2, K-744R3, K-744R4), mm, at least:				
under the main gear of the driving axle	520	560		
under the axle of the vertical hinge of pivot of the frame	460	500		
Tractor wheel spacing, mm	2115	2100		
with single wheels	2115	2100		
with paired wheels	2115	3090		
The least radius of turn (by the trace of the outer wheel with rear axle disengaged), m	7.98			
Tractor base, mm	3750			
Fordable depth, m, max	0.96	1.0		
Linkage carrying capacity (at the distance of 610 mm from the suspension axis as per GOST 19677), kgf, min	5500			
Implement carrying capacity depending upon the operating weight of the tractor as per GOST 19677, %, min	20			
Fluid pressure in the hydraulic system for control over the linkage and hydraulic mechanisms of agricultural machines, MPa (kgf/cm^2):				
maximum pressure (valve opening completion)	18…20 (180…200)			
at the hydraulic system outlet, at least	15 (150)			
Duration of continuous operation without fuel refill at the engine load by 70% of the rated operating capacity, engine hours, at least	13	12 14	12 13	12 13

Parameters	K-744R1	K-744R2	K-744R3	K-744R4
	Standard Premium	Standard Premium	Standard Premium	Standard Premium
Overall dimensions, mm:				
length (with the linkage lifted)	7350			
width with single wheels (at the wheel level)	2865	2875		
width with paired wheels (at the wheel level)	2865	3865		
height	3846	3876		
Tractor braking distance at the speed of 8.3 m/s (30 km/h), m, max	13			
Static lateral stability angle, degrees, min	35			
Ascent and descent angle, degrees, max	18	20		
Angle of tractor holding by parking brake, degrees, min	20			
Tractor semi-frame turn angle, degrees, at least				
around the horizontal hinge pivot	±16			
around the vertical hinge pivot	±32			
Lifetime until the first overhaul at TϒO=80, engine hours, at least:				
for tractor	8000			
for engine	8000			
for transmission	8000			
for undercarriage	full period for tractor			
for tyres	2000	5000		
Service life	10 years			
Power take-off	option			
Wheel pairing kit	option			
Floating drawbar	option			
EHR (linkage control)	option			
Linkage	basic configuration			

4 CONTROLS

4.1 INSTRUMENT PANEL

Fig. 6 Instrument panel

1. Menu recall button
2. RETURN button.
3. Indicator for audio signal muting in case of failure
4, 5. Menu selection buttons
6. Indicator for instrument panel illumination

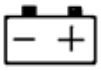
The control is exercised by 4 keys:

Buttons 4 and 5 in the main window serve for the following:

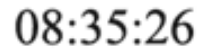
– arrow "UP" (button 5) - illumination of keys (main page), pressing button 5 ("UP") – going through menu tabs;

– arrow "DOWN" (button 4) - buzzer muting (main page), pressing button 4 ("SOWN") – going through menu tabs.

				
Left turn indicator	Head lamp high beam indicator lamp	Head lamp low beam indicator lamp	Parking brake pulling up indicator lamp	Right turn indicator

	Thermostart indicator lamp	It shall light up after the thermostart button is held until the thermoelement is hot enough. Used at tractors with 8481.10 engine.
	Indicator lamp of engagement of the engine fan coupling.	Used at tractors with YaM3 engine.
	Indicator lamp of engine error (for Mercedes engine)	Used at tractors with Mercedes engine
	Indicator lamp of marker lights	
	Battery discharge indicator lamp	The lamps lights up when there is no charging current from the generator.
	Indicator lamp for signaling on emergency air pressure in the 2nd circuit of pneumatic system	The lamp lights up at air pressure drop of 4.5…5.5 kgf/cm^2
	Indicator lamp for signaling on emergency air pressure in the 1st circuit of pneumatic system	The lamp lights up at air pressure drop of 4.5…5.5 kgf/cm^2
	Indicator lamp for emergency oil temperature in the hydraulic system	The lamp lights up when the oil temperature in the hydraulic system reaches the emergency value of 85^{+2} °C
	Indicator lamp for inadmissible oil level in the hydraulic system	The lamp starts flashing at oil level drop below the critical value; at the same time, the instrument panel provides an intermittent sound signal. Short-term “flashing” of the indicator lamp is allowed in case of travelling over road irregularities causing oil level changes in the hydraulic tank.
	Indicator lamp for clogging of the engine oil filter	
	Indicator lamp for clogging of the steering control pressure filter	Short-term activation of the indicator lamp for clogging of the pressure filter of steering control hydraulic system is allowed until the operating temperature of the hydraulic system oil reaches ~40-50°C.
	Indicator lamp for clogging of the mounted equipment pressure filter	

	Engine oil emergency pressure indicator	At the engine oil pressure: YaMZ - <0.08 MPa; TMZ (8481.10) - <1.0 MPa; OM460LA (Mercedes) - <0.05 MPa emergency oil pressure sensor actuates. ***Upon actuation of the emergency oil pressure sensor, lamp starts blinking in 5 s and the instrument panel provides an intermittent sound signal.***
	Indicator lamp for GB filter clogging	
	Indicator lamp for air filter clogging	
	Indicator lamp for cooling fluid emergency temperature.	for 8481.10 engine – 90°°C (a short-term (up to 10 min) temperature rise to 95°C is allowed). ***When the cooling fluid temperature reaches 95°C the lamp starts blinking and the instrument panel provides an intermittent sound signal.*** for YaMZ –238ND5 engine – 100°°C. ***When the cooling fluid temperature reaches 100°C the lamp starts blinking and the instrument panel provides an intermittent sound signal.*** for OM460LA (Mercedes) engine – 95°°C. ***When the cooling fluid temperature reaches 95°C the lamp starts blinking and the instrument panel provides an intermittent sound signal.***
	Neutral gear engagement	
	Maintenance	The lamp lights up after every 250 lifetime hours. To deactivate M indication, it is required to press button RETURN on the instrument panel and hold it for 2-3 sec
	Actuation of small brakes	With engine in operation, it is not allowed to keep the mode of small brakes activation on for more than 50 s. Otherwise, ***the lamp will start blinking and the instrument panel will provide an intermittent sound signal***



- local (astronomical) time (shall be set in menu “Time setting”)

- tractor speed

- lifetime hours (provided that engine is started)

- indicator of oil pressure in GB

Oil pressure in the GB hydraulic system at gears with the crankshaft rotation rate of 900-1800 RPM shall be:

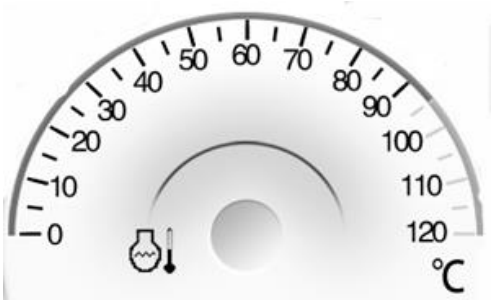
1.0 - 1.2 MPa (10 - 12 kgf/cm^2) - for K-744R1, K-744R2 tractors;-

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

Oil pressure growth at each gear shall be rapid. The pressure on neutral gear and at engagement of synchroniser brakes shall not be less than on transmission gears.

Upon pressure fall in the hydraulic system below 10 kgf/cm^2 for at least 30 s, indicator starts blinking and the instrument panel provides an intermittent sound signal on low pressure in GB. When a buzzer sounds in the course of operations, they shall be stopped; using mechanical pressure gauge, make sure that the pressure in GB corresponds to the operating pressure.

1632 1/min - engine RPM speed



- engine cooling fluid temperature indicator ***(letter "C" = "Cold" in the beginning. This mark corresponds to +40°C)***

Maximum operating temperature of cooling fluid:

for 8481.10 engine – 90°°C
for YaMZ-238ND5 engines – 100°°C.
for OM460LA (Mercedes) engine – 95°°C.

Do not permit operation of 8481.10, YaMZ-238ND5 and OM460LA engines under load at the cooling fluid temperature below 70°°C.

- fuel level indicator

- indicator of air pressure in the pneumatic system

In the course of operation, air pressure in the pneumatic system shall be 0.65 - 0.8 MPa (6.5 – 8 kgf/cm^2).

When pressing button 1 for menu indication (Fig. 7), the following data window opens; it consists of the following sections:

– mechanism condition;
– time adjustment;
– extra adjustments;
– device information.

Fig. 7 Data window of the instrument panel

Oil pressure in the mainline of the unit of heated YaMZ-238ND5 engine shall be within the range of 0.45 – 0.6 MPa (4.5 – 6 kgf/cm^2) at the nominal rotation rate.

A short-term lighting of the symbol for indicator lamp of the emergency oil pressure in the engine is allowed  at minimum rotation rate with the engine being heated.

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 rotation rate.

Oil pressure in the mainline of the unit of heated OM460LA (Mercedes) engine shall be within the range of 0.25 – 0.5 MPa (2.5 – 5.0 kgf/cm^2) at the nominal rotation rate.

Mechanism condition

This section indicates the main parameters of sensors in digital form (Fig. 8).

Fig.8 Section "Mechanism condition"

Time adjustment

This section is to set up the real time and date (Fig. 9). The adjustment is made with buttons 4, 5 and 1. Then reset display to save the settings.

Fig. 9 Section "Time adjustment"

Extra adjustments

In order to enter this section, it is required to enter the password with controls (buttons 4, 5 and 1). The password is "**8888".** Then press button 1 for menu indication. A page of additional menu opens; it is given in Fig. 11.

Fig.10 Section "Extra adjustments". Password entry

Fig.11 Section "Extra adjustments". Additional menu

"Machine model - K744R - - - -" - default parameter, with possibility to add symbols 1, 2, 3, 4…..

"Date of manufacture" - 2016. - -. - - (year.month.day) " - shipment date.

"Ration of speeds" - 03.67 - tractor tachometer setup (03.67 – default value, used for tractors with Mercedes and YaMZ engines, for 8481.10 engines (OJSC "TMZ") it is required to enter parameter **– 2.57)**

"Engine type" - 0 (YaMZ-TMZ-Merc) - there are two types of settings "**0 (YaMZ-TMZ-Merc)" -** for YaMZ and TMZ engines and "**1 (engine Mercedes OML – 460)** for "Mercedes" engines.

"Type of fuel tank" - V800 - 780 l tank volume is assumed. **NOTE!** The value shall not be changed.

"Langauge" – selection of language – Russian, English, Czech.

Device information (fig. 12)

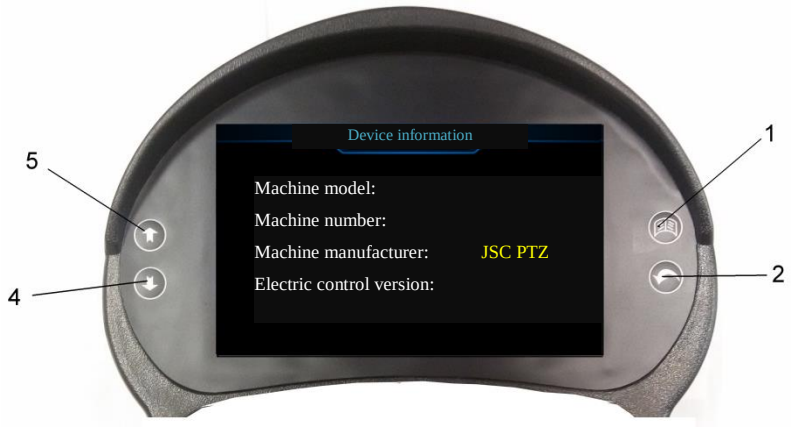


Fig. 12 Section "Device information"

This section displays the following data lines:

"Machine model" – the parameter shall be set up in additional settings.

"Machine number" – assigned as per tractor number before the shipment.

"Machine manufacturer" – JSC PTZ - by default.

"Electric control version" – boot file (firmware).

4.2 CONTROL PANEL

Key switch panel (Fig. 13) is located on the steering column under the steering wheel.

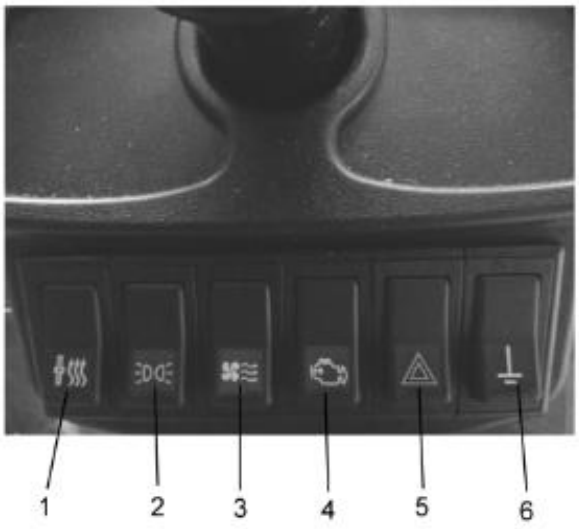


Fig. 13 Control panel

1. Thermostart button for tractors with 8481.10 engine
2. Switch key for marker lights and headlamps
3. Cabin heater switch key
4. Engine fan switch key for tractors equipped with YaMZ engine
5. Alarm signaling switch key
6. Battery master switch key

1 - ET activation button for tractors with 8481.10 engine

Upper position of the key – PRE-START HEATER IS OFF.

Lower position of the key – PRE-START HEATER IS ON (unlocked position).

To check ET operability, it is required to:

– switch on the battery master switch;

– turn the starter and instrument switch to position INSTRUMENTS ARE ON;

– press and hold the key until the indicator  lights up on the panel;

– start the engine while holding the key in unlocked position.

2 - Marker lights switch key

Upper position of the key - OFF.

Middle position of the key - MARKER LIGHTS ARE ON.

Lower position of the key - LOW/HIGH BEAM IS ON.

3 - Cabin heater switch key

Upper position of the key - HEATER IS OFF.

Middle position of the key - FIRST SPEED OF HEATER IS ON.

Lower position of the key - SECOND SPEED OF HEATER IS ON.

4 - Engine fan switch key for tractors equipped with YaMZ engine

Upper position of the key - FAN IS ON IN AUTOMATIC MODE

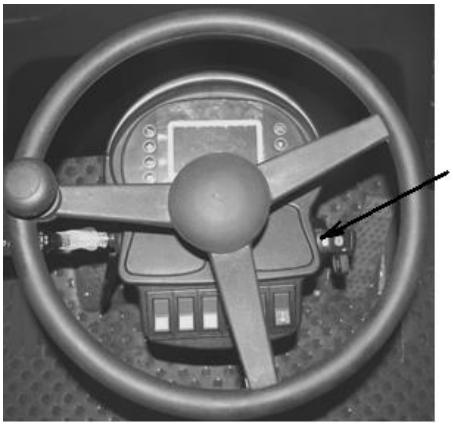
Lower position of the key - FAN IS ON IN FORCED MODE

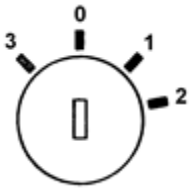
5 - Alarm signaling switchover key

It is designed for simultaneous switching on the left and right turn indicators in flashing mode in case of inadvertent outage of the tractor on the roadway.

6 - Battery master switch key

4.3 STARTER AND INSTRUMENT SWITCH





Starter and instrument switch provides for activation of the instrument panel, terminal 15 and start.

Starter and instrument switch has the following positions:

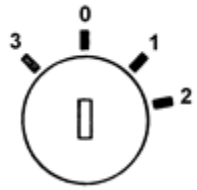
zero position (locked) – the key is inserted vertically;

first position (locked) – the key is turned in the clockwise direction. Power is supplied to the generator excitation winding; activation of relay for terminal 15, instrument panel;

second position (unlocked) - with the key turned further in the clockwise direction, power is supplied to the starter relay winding with preservation of the signals for generator excitation, instrument panel power supply, terminal 15 activation;

third position (unlocked) - the key is turned in counter-clockwise direction from the zero position. This position is provided for a preliminary view of parameters at the instrument panel.

OM460LA engine starting sequence shall be implemented in strict accordance with the operation manual for the engine.



The engine shall be started by turning the key into position “2”.

The engine shall be shut down by returning the key into position “0”. Position “3” is not engaged.

In case indicator lamp 43 is still on after the engine start-up, it is necessary to shut down the engine and contact a service station. 

The tractor is equipped with the electric torch (ET) for engine start-up at the ambient temperature down to minus 20°C.

The choice of oil and cooling fluid to be used in the engine at the temperature from minus 20°C is described in the operation manual for the engine.

Oil and cooling fluid shall be chosen in accordance with the operation manual for the engine and with the appendix (“Specification for operating materials”).

Fuel strainer (located on the right under the cabin) is equipped with a boosting pump and heating (24 V). A fuel sediment drain valve is located at the lower part of the filter bowl.

CAUTION!

1. In order to ensure a long-term and reliable operation of the engine, use only certified diesel fuel grades. Try to avoid the ingress of water and foreign matter into the fuel.

2. In case of welding operations at the tractors with Mercedes engines, it is necessary to disconnect the power wires “+” and “-” from storage batteries (wires 1 and 7, see the wiring diagram). Connect wire terminals between each other by means of M10 bolt with nut. When connecting storage battery to the electric circuit, first connect "+", then "-". Non-fulfilment of this requirement can lead to a failure of the engine electronic control system.

4.4 TRACTOR SYSTEM CONTROL

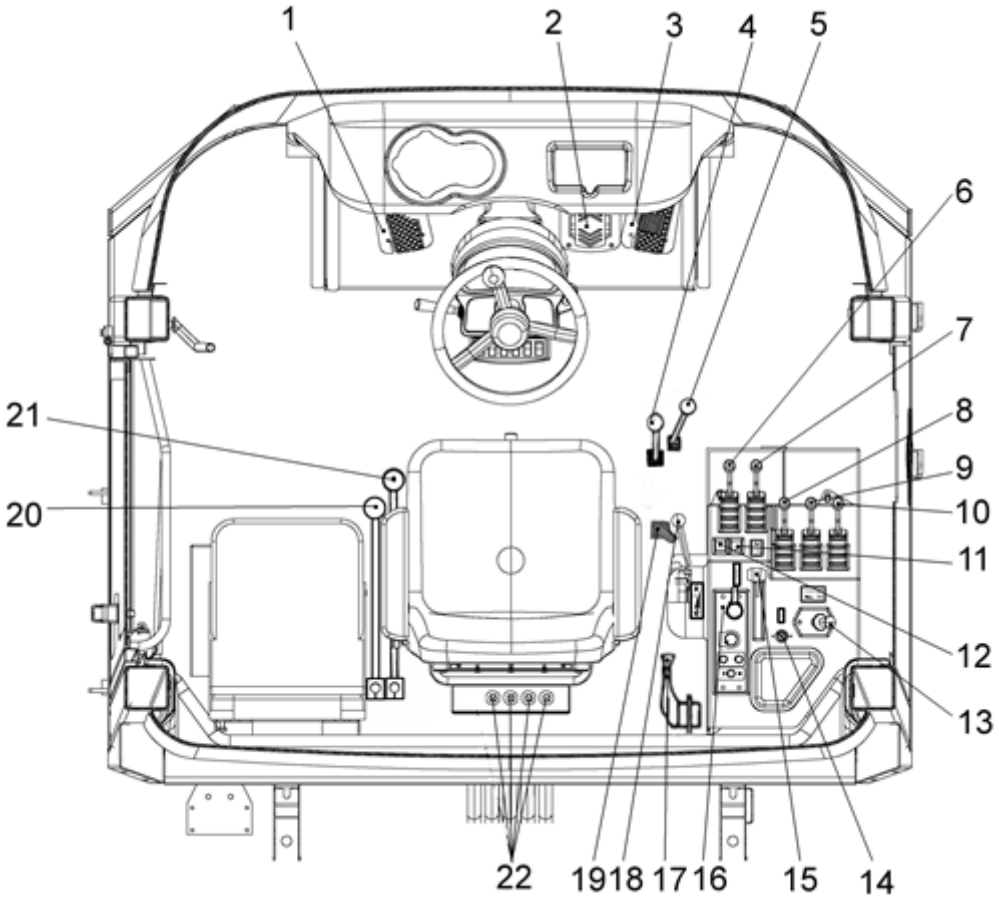


Fig. 14 Layout of control levers and handles in the cabin

1. Drain gate valve control pedal (drain pedal).
2. Service brake control pedal.
3. Fuel feed pedal.
4. GB mode change lever.
5. Gear change lever.
6. Linkage mechanism control handle.
7, 8, 9, 10. Handles for control of hydraulic drives of the machines to be hooked up.
11. EHR activation button (for tractors with EHR).
12. Buttons for manual fuel feed at tractors with Mercedes engine.
13. Parking brake handle (in the pulled up position - braking).
14. Plug socket 12V.
15. PTO engagement handle (for tractors with PTO).
16. Linkage control panel (for tractors with EHR).
17. Trailer partial braking valve handle (“Down” position - brake releasing, “Up” position - braking).
18. Fuel feed control handle (except for tractors with Mercedes engines).
19. Engine shutdown handle.
20. “Fast” and “Slow” mode engagement lever.
21. Rear driving axle engagement lever.
22. Handles for control over the rate of oil flow to the actuator (agricultural implement).

Positions of handles 6, 7, 8, 9, 10: PULLED UP from neutral gear – lifting; PUSHED UP from neutral gear – lowering (1st position) and floating (2nd position).

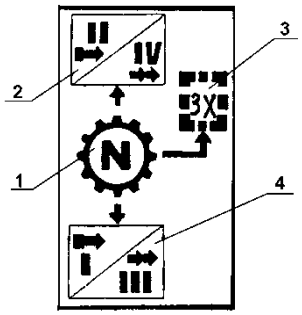


Fig. 15 Diagram of mode change lever positions

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

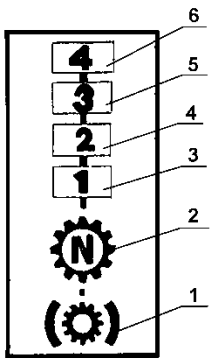


Fig. 16 Diagram of gear change lever positions

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

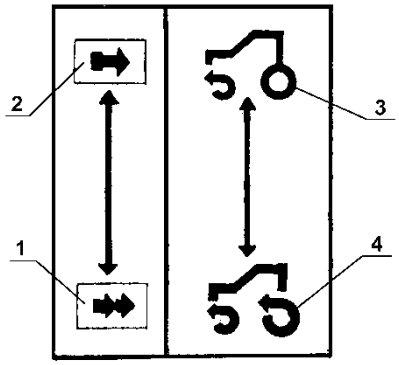


Fig. 17 Diagram of positions of the fast and slow mode lever and the rear axle engagement lever

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

The gear change lever has six fixed positions. Switch the lever from position “N” to the 1st gear position with drain pedal depressing. When tractor is driving, change gears within the selected mode by consecutive shifting the lever forward from the 1st gear position to the position of 2nd, 3rd and 4th gears without drain pedal depressing. When pressing the drain pedal at 2nd, 3rd or 4th gear, the pedal will “hang up”. In order to return the pedal into the initial position, press the pedal, switch level 5 (Fig.14) into position 1 or “N”, release the pedal. In position “engagement of synchroniser brakes”, transfer the lever from position “N” backwards, slightly raising it. Use this position only to change modes with the tractor stopped.

CAUTION! In case of engine warming up and tractor parking with engine in operation, the gear change lever and the mode change lever (Fig.14) shall be in position "Neutral N".

CAUTION! The mode change lever as well as the levers of slow and fast mode engagement should be used only with the tractor stopped. In doing so, the gear change lever shall be in position "Engagement of synchroniser brakes". In case of mode engagement difficulties, it is necessary to depress the drain pedal shortly.

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

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

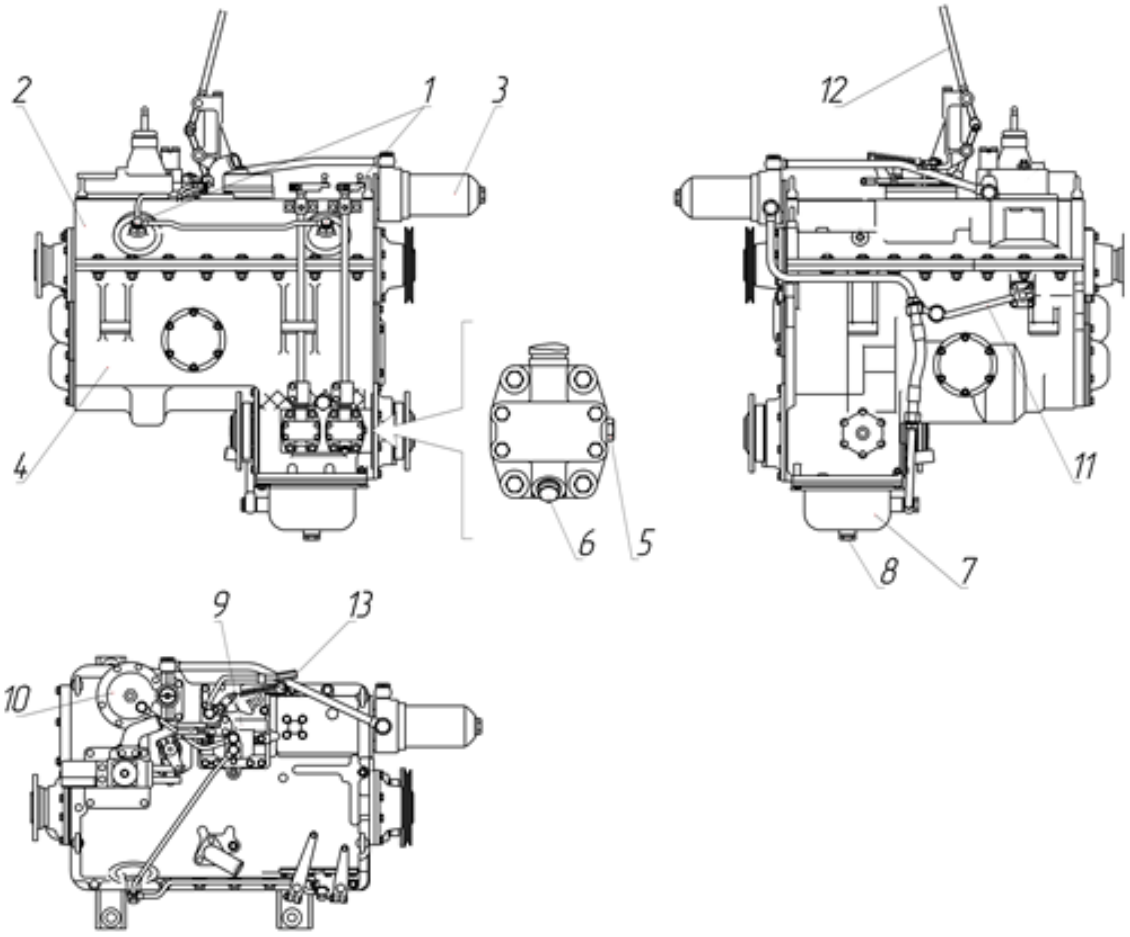
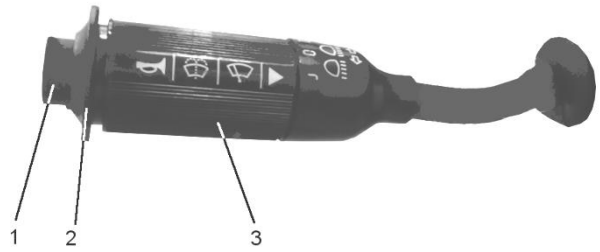


Fig.18 Gearbox

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 measurement point in the hydraulic system of GB and sensor installation

4.5 UNDERSTEERING SWITCH



1. Sound signal activation.
2. Front window washer activation. It is provided by pressing the ring towards the steering column.
3. Front windshield wiper switch.

Positions:

"0" - OFF;

“I” - first speed of the wiper motorised reducer on;

“II” - second speed of the wiper motorised reducer on;

“J” - intermittent mode of the wiper and washer control on.

Turn indicators shall be activated with handle moving clockwise and counter-clockwise.

Fixed activation of the high beam lamp is provided by switch shifting away from the steering wheel.

If needed, the possibility of short-term high beam activation ("winking") is provided for by shifting the switch towards the steering wheel.

4.6 SWITCHES AND ACCESOIRIES AT THE OVERHEAD PANEL IN THE CABIN

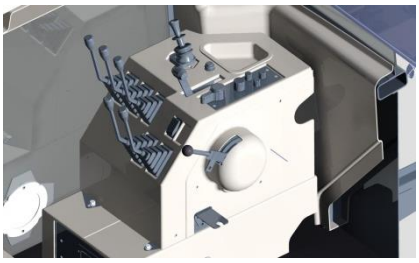
1. Air circulation louvre
2. Front service headlight activation key
3. Rear service headlight activation key.
4. Flasher lamp activation key.
5. “Road-train” sign activation key.
6. Rear window wiper activation key.
7. Temperature controller. It controls the temperature of air flowing from the evaporator into the cabin.
8. Fan switch. It serves to adjust the velocity of air flow passing through the air conditioner.
9. Car audio.
10. Round louvre with variable clear opening, 10 pcs.

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

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

4.7 SWITCH AND PROTECTION PANEL

Switch and protection panel (fuse and relay panel) is located under lever control unit. To access the unit, pull the catch of the switch panel lock



Fuse panel of K-744R1St tractor

10A	“Road-train” sign, cabin illumination, flasher lamp	10A	generator excitation winding
10A	outer service front lamps	10A TGB	transmission gearbox
10A	inner service front lamps	10A	“+” 24V for pressure switches of pneumatic and hydraulic systems
10A	outer service rear lamps	25A	engine start-up
10A	inner service rear lamps	5A	low beam, left lamp
30A	air conditioner	5A	low beam, right lamp
10A	brake lamp	5A	high beam, left lamp
10A	instrument illumination, steering column supply	5A	high beam, right lamp
10A	sound signal, power supply for navigation system consumers	10A EHR	EHR system activation (rear linkage control)
10A 24/12	24V of voltage converter	10A EHR	EHR system activation (rear linkage control)
10A	mirror heating	10A	car audio
10A	front window wiper	10A 12V	socket 12V
10A	rear window wiper	10A	"-" EHR

Fuse panel of K-744R2St, K-744R3St, K-744R4St tractors

10A	“Road-train” sign, cabin illumination, flasher lamp	10A EHR	EHR+generator excitation winding
10A	outer service front lamps	10A КПП	"+"24V of TGB control circuits
10A	inner service front lamps	20A	pre-start heating
10A	outer service rear lamps	25A	engine start-up
10A	inner service rear lamps	5A	low beam, left lamp
30A	air conditioner	5A	low beam, right lamp
10A	brake lamp	5A	high beam, left lamp
10A	instrument illumination, steering column supply	5A	high beam, right lamp

10A	sound signal, power supply for navigation system consumers	10A EHR	EHR system activation (rear linkage control)
10A 24/12	24V of voltage converter	10A EHR	EHR system activation (rear linkage control)
10A	mirror heating	10A	car audio
10A	front window wiper	10A 12V	socket 12V
10A	rear window wiper	10A	"-" EHR

Fuse panel of K-744R2Pr, K-744R3Pr, K-744R4Pr tractors

30A	ET electronic unit supply	10A	ET
10A ADM2FR	ADM2FR electronic unit supply	10A MR	MR electronic unit supply
10A	"Road-train" sign, cabin illumination, flasher lamp	5A EHR	EHR activation relay
10A	outer service front lamps	10A TGB	transmission gearbox
10A	inner service front lamps	10A	24V for pressure switches of pneumatic and hydraulic systems
10A	outer service rear lamps	5A	low beam, left lamp
10A	inner service rear lamps	5A	low beam, right lamp
10A	instrument illumination, steering column supply	5A	high beam, left lamp
10A	horn	5A	high beam, right lamp
10A	fuel filter heating	10A EHR	EHR system activation (rear linkage control)
10A	mirror heating	10A EHR	EHR system activation (rear linkage control)
10A	front window wiper	10A	car audio
10A	rear window wiper	10A 12V	socket 12V
30A	air conditioner	10A	power supply for navigation system consumers
10A	brake lamp	10A	signal for low beam and upper beam headlamp relay
10A 24/12	24V of voltage converter	10A	"-" EHR

4.8 DRIVER'S SEAT AND ADDITIONAL SEAT

Driver's seat (Fig.19) is adjustable by height, angle of back inclination in the longitudinal direction and by weight of the driver.

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 seat position in the longitudinal direction, lift handle 2, set the seat in the required position and lower the handle.

Having seated on the seat, adjust the load according to your own weight. To increase the load weight, rotate knob 4 clockwise; to decrease the weight, rotate it counter-clockwise.

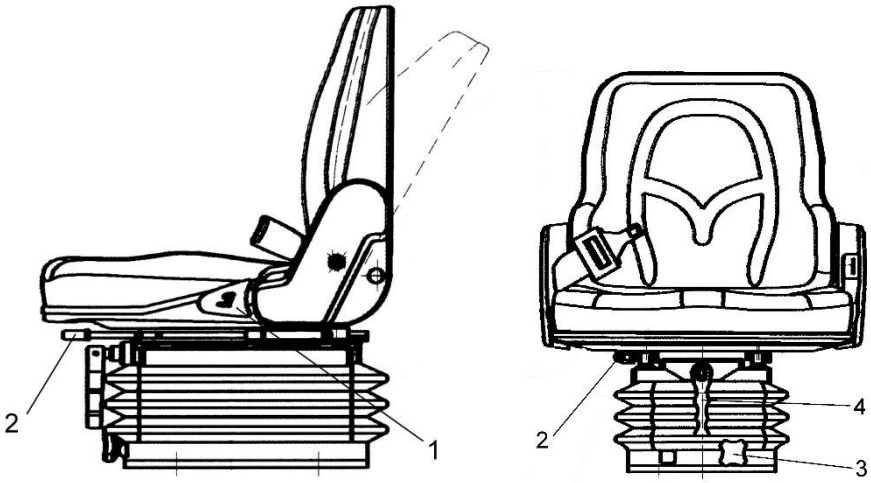


Fig. 19 Driver's seat

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

Additional seat - soft, unsprung, fastened on the rear wall of the cabin.

4.9 LIGHTING AND ALARMS

Four headlamps are installed on the tractor for roadbed illumination.

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 back of the cabin.

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

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

– rear lights with 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 to connect electrical equipment of trailers.

A plug socket 12 V is installed under the cabin on the bottom right to connect the lighting fixture.

Two dome lights with a switch are installed at the ceiling part of the cabin.

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

4.10 ENGINE PREPARATION AND START-UP

4.10.1 Before engine start-up make sure that the levers of hydraulic distributor of the linkage hydraulic system are in the neutral position, the parking brake is engaged and the engine shutdown handle is pushed all the way in. Gear change lever and mode change lever shall be in the “Neutral N” position. Set the manual fuel feed lever into the position corresponding to the minimum engine crankshaft speed.

4.10.2 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 for 2...3 min by manual fuel boosting pump;

- switch on the battery master switch  .

- SET GB MODE to neutral position (‘N’ indicator will light up on the instrument panel)

- turn the key clockwise to the first position (position INSTRUMENTS ON)

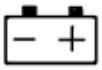
The tractor engine can be started when the instrument panel front board looks as follows.

The tractor can be started with following indicators displayed:

 – emergency pressure in the second pneumatic system circuit;

 – emergency pressure in the first pneumatic system circuit;

In all other cases, eliminate the fault as per indication of alarm parameters.

4.10.3 After the start-up, warm up the engine to the cooling fluid temperature of 40--45 °C° first at the minimum speed and then at average speed of the crankshaft. Oil pressure in the mainline of the heated engine unit shall be within the range of 0.45-0.6 MPa (4.5 -6 kgf/cm^2) at the rated speed and at least 0.1 MPa (1 kgf/cm^2) at the minimum speed. At the same time, indicator lamps  ,  ,  , engine oil pressure indicator lamp  shall go out, the flashing of lamp for the emergency parameter of one of the tractor systems shall stop.

CAUTION! If the emergency parameter indicator lamp of one of the tractor systems keeps flashing permanently, one of the parameters must be checked:

– 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.

4.11 ENGINE START-UP AT NEGATIVE TEMPERATURES

For tractors with 8481.10 and OM460LA (Mercedes) engines:

Electrical torch (ET) of the tractor ensures start-up of the engine at the outdoor temperature down to minus 20 °^{0}C.

Engine start-up at such outdoor temperatures should be performed in the following sequence:

1. Meet the requirements set forth in Item 4.10.1 of subsection 4.10.

2. Switch on the battery master switch with key 6 (Fig. 13) ⊥.

3. Insert the key into the switch of starter and instruments, turn it to the first position, honk and press button 1 of ET activation (and hold it) (Fig.13) . 1-2 min later, indicator lamp on the instrument panel will light up. 10-15 sec later, turn the key clockwise into the second position without releasing the ET button.

3. After the engine start, the key should return to the second position, then release the ET button, and indicator lamp (Fig. 6) shall go out.

ET for tractors with OM460LA (Mercedes) engine shall be switched on automatically when the key of ignition lock is turned into the first position.

4. Meet the requirements set forth in item 4.10.3 of subsection 4.10.

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

For tractors with YaMZ-238ND5 and Cummins 6LTAA8.9-C300 engines:

At the ambient temperature below minus 10° ^{0}C, before the start-up it is necessary to warm up the engine by means of the pre-start heating system.

4.11.1 Safety measures when using the heater

Pre-start heater control panel is located under the hood, to the left in the direction of tractor travel, behind the cooling unit.

Only those persons that have thoroughly read the operation manual for the heater shall be admitted to use it.

When using the heater, always remember that breaches of heater operation regulations or heater faults can 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 proceed to fault elimination or adjustment after its shutdown.

IT IS PROHIBITED to warm up 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 the shutdown or unsuccessful attempt to activate it without blowdown of the gas duct for at least 15-20 seconds.

The valve for feeding fuel to the heater shall be open only for the time of heater operation. For the remaining time, the valve for feeding fuel to the heater must be closed.

4.11.2 Heater operation

Preparation for operation

4.11.2.1 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 heating 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 hood and undo the cap of the tank filler port (the tank is located at the left-hand side on the fan housing);

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

– take out the funnel and screw in 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 rag.

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

Activation of the heater

4.11.2.3 Blow down the boiler gas duct – run the pump unit for 15-20 seconds by setting motor switch 1 (Fig. 20) into position OPERATION.

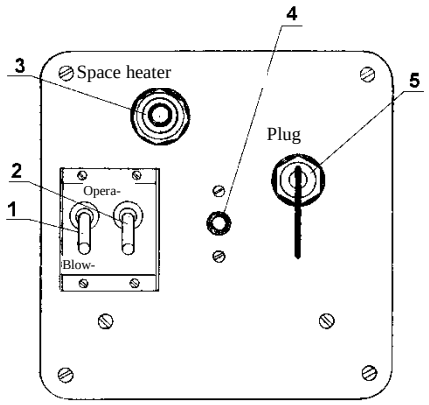


Fig. 20 Heater panel board

1 – motor switch; 2 – solenoid valve switch; 3 – fuel electrical heater button; 4 – power circuit automatic shutdown button; 5 – spark plug switch.

4.11.2.4 Press electrical heater button 3 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

4.11.2.5 Upon heating time expiry, set motor switch 2 and solenoid valve switch 2 into position OPERATION. At the same time, turn plug activation flag 5 clockwise and hold it (for 30 s max) until a typical hum appears in the boiler, indicating the ignition of fuel in the burner.

4.11.2.6 Unless the heater starts running in 20-30 seconds, set the electromagnetic valve switch into position BLOWDOWN and release the plug activator. Switch off the motor in 90-150 seconds. Then repeat the start-up. Unless as a result of two attempts the heater begins running steadily, it is necessary to determine and eliminate the fault, after which start the heater up.

Operation and shutdown of the heater

General design of PZhD-30 heater is given in Fig. 21...23.

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

4.11.2.8 The heater should be switched off when the temperature in the engine cooling system (by the standard thermometer in the cabin) exceeds 90°C.

4.11.2.9 To shut down the heater it is necessary to set the solenoid valve switch into position BLOWDOWN and switch off the motor in 90-150 seconds later. Close the heater fuel valve.

Start the engine up after its heating in the same manner as at positive temperatures with the account of the features below.

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

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

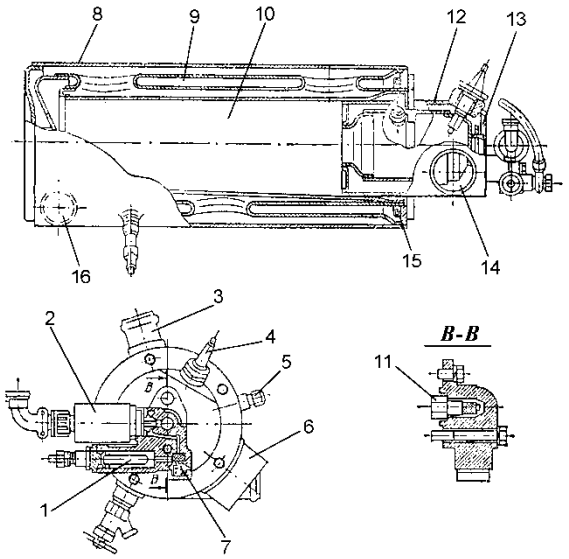


Fig. 21 Heating boiler

1 – fuel electrical heater; 2 - solenoid 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.

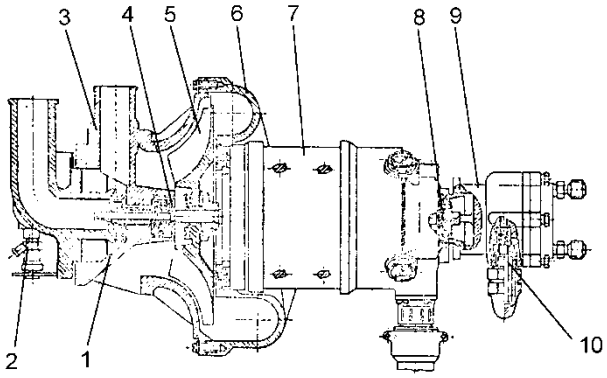


Fig. 22 Pump unit

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

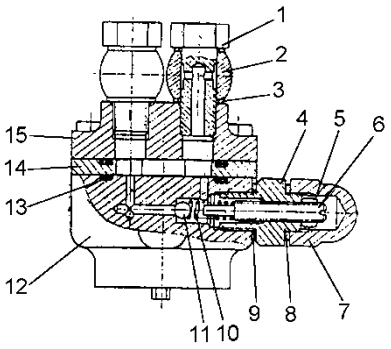


Fig. 23 Fuel pump reducing valve

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.

4.12 ENGINE START-UP FROM EXTERNAL POWER SUPPLY

If the engine cannot be started from storage batteries due to their discharged state, it is permitted to start the engine from an external power supply of from storage battery of another tractor.

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

1. Start the engine 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 upon the start of a steady operation of the engine being started.

2. 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 storage battery of the vehicle, from which the start-up is performed, or to a failure of its generator.

4.13 HVAC SYSTEM OPERATION

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

Ventilation

To perform forced air supply to the cabin, switch the fan (handle 8) on to position 1, 2 or 3.

Heating

Two heaters serve for cabin heating. Autonomous heater, pos. 1 (Fig. 24) is located to the left of the driver's seat. Heater fans shall be activated by button 3 (Fig. 13).

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 at the supply line to the heater, and the other valve (pos. 4) located under the left front pillar of the cabin.

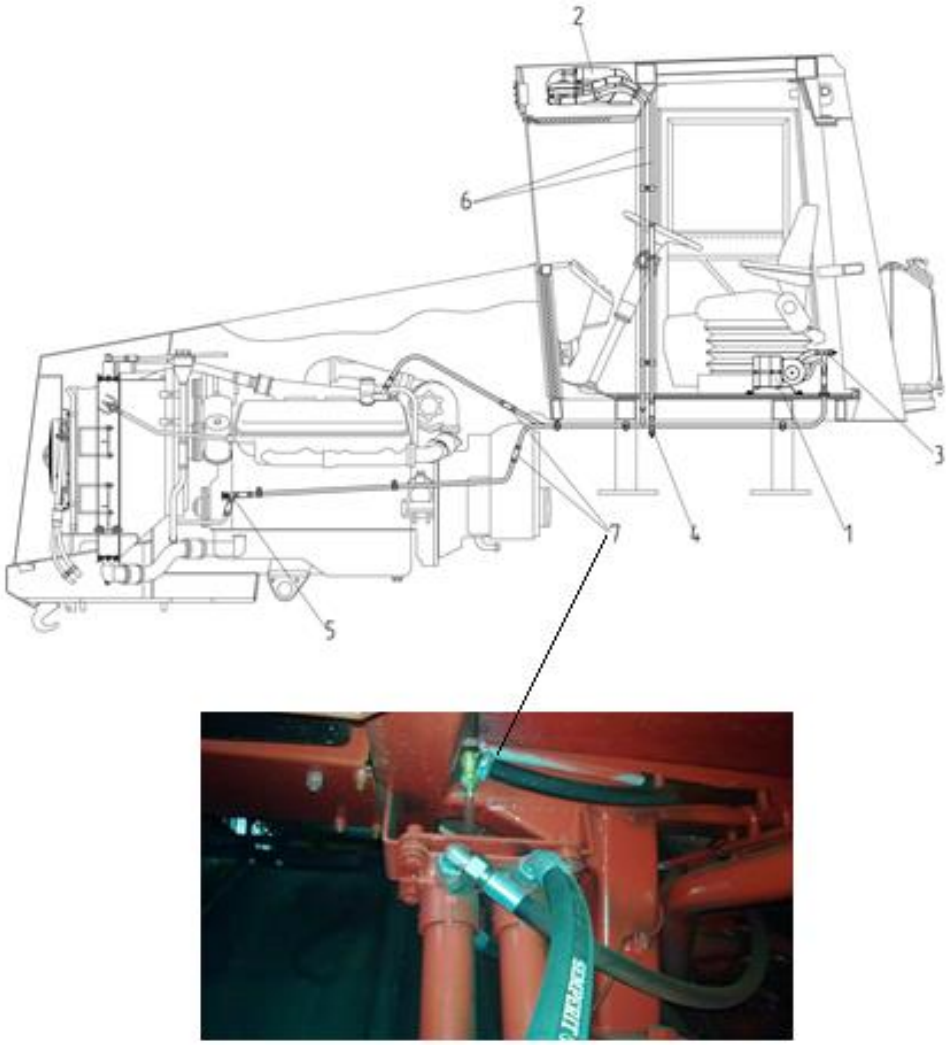
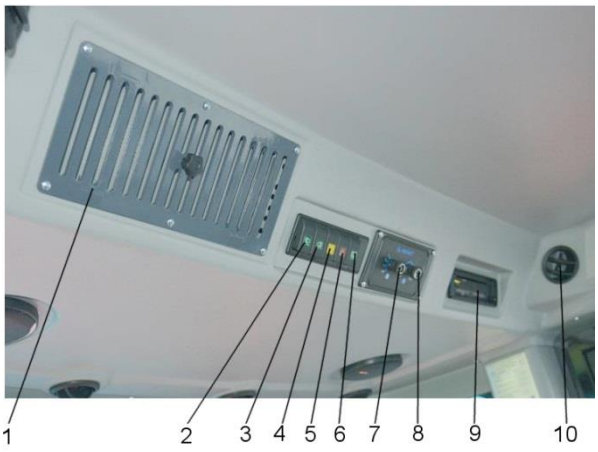


Fig. 24 Heating system

1 – heater; 2 – heater of the evaporation-heating unit;
3, 4, 5 – valve VS11; 6 – pipes; 7 – connecting hoses

Air conditioning



Air conditioner shall be activated by handles 8 (air supply rate) and 7 (air cooling degree).

In order to activate the upper heater, it is necessary to open the valve for coolant supply thereto (pos. 7, Fig.24) (under the left front pillar of the cabin). Adjust the heat flux by handle 8.

CAUTION! In order to enhance a reliable operation of the air conditioning system, before its shutdown the engine should operate at the minimum idle run speed for 3...5 minutes.

4.14 TAKING OFF

Tractor preparation for driving

Before engine start-up, make sure that levers of modes and gears are in **neutral position** (mode lever freely moves from left to right and back).

Slightly raise the gear change lever and switch it to the rearmost position ("small brakes" are on), then switch it forward by one step to position NEUTRAL.

Press the "frame" activation button on the switch panel

Activate the parking brake by PULLING the parking brake all the way in.

Turn the ignition key clockwise and start the engine.

Make sure that the engine operates smoothly, all tractor systems are functioning, air pressure in the brake system corresponds to the standard range of 6-8 kg/cm^2 (indicator lamps of braking circuits went out).

The gear change lever shall be set to position "SMALL BRAKES" (slightly raise the lever and PULL it by one step all the way in).

Enable mode with the mode lever. Mode diagram is depicted on the right side window of the cabin. In case of difficulties when enabling a mode, rotate steering wheel to the left and right.

CAUTION! When enabling a mode, DO NOT DEPRESS the drain pedal!

Set the gear change lever to neutral position (one step of the lever with forward motion).

Depress the drain pedal with left foot and enable the first gear (one step forward by the gear change lever)

Disable the parking brake (parking brake lever PUSH).

Gradually release the drain pedal and start moving. Gears shall be changed by PUSHING (upshift) and PULLING (downshift) the gear change lever. In doing so, do not depress the drain pedal.

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 steering control and of the linkage, make sure of the absence of faults.

Check the readings of indicating instruments.

Oil pressure in the GB hydraulic system at the engine crankshaft speed of 900-1800 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) K-744R3, K-744R4 tractors. Oil pressure growth at each gear shall be rapid. The pressure on neutral gear and at engagement of synchroniser brakes 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 engine crankshaft speed;
- set the gear change lever into position 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 reverse gear, it is necessary to press 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 put the tractor on a horizontal ground with semi-frames in straight position;

- – set the gear change lever to position "N";

– – bring the engine crankshaft speed to 1300- – 1400 RPM;

– - honk;

– - depress the drain pedal;

– - switch the gear change lever to the first gear position.

– deactivate the parking brake, and indicator lamp  on the instrument panel (Fig. 6) will go out. When tractor travels with activated parking brake at the speed exceeding 1 km/h, parking brake lamp on the instrument panel will start blinking and the instrument panel will provide an intermittent sound signal;

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

4.15 GEAR CHANGE

Tractor shall take off at the first gear only, with the drain pedal depressed; then change gears by consecutive switching the gear change lever into the positions of the second, third or fourth gear without depressing the drain pedal.

Remember: when driving at the second, third or fourth gear, the drain pedal can be used only in emergency cases (for emergency stops) as the drain pedal return is locked in such cases (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 position “N” with the pedal fully depressed.

During tractor coasting and before its stoppage, depress the drain pedal, switch the gear change lever into position “N” and release the drain pedal. ***IT IS PROHIBITED*** to transfer the gear change lever into position ENGAGEMENT OF SYNCHRONISER BRAKES when tractor is driving.

4.16 STOPPAGE

Stop the tractor as follows:

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

– smoothly release the fuel feed pedal;

– depress the drain pedal;

– set the gear change lever to position "N";

– stop the tractor by several smooth presses of the brake pedal;

– release the drain pedal;

– pull up the parking brake;

- let the engine run for 3 to 5 minutes at the average crankshaft speed, then reduce the speed to the minimum value and pull the engine shutdown lever (at K-744R1St, K--744R2St, K-744R3St, K-744R4St tractors) or turn the starter and instrument key-lock switch to position “0” (at K-744R1Pr, K-744R2Pr, K-744R3Pr, K-744R4Pr tractors);

– after shutting the engine down return the handle into the initial position, switch the gear change lever to position ENGAGEMENT OF SYNCHRONISER BRAKES, set the starter and instrument keylock switch to position “0” and switch off the battery master switch.

5 5 FINAL ASSEMBLY, ADJUSTING AND RUNNING-IN

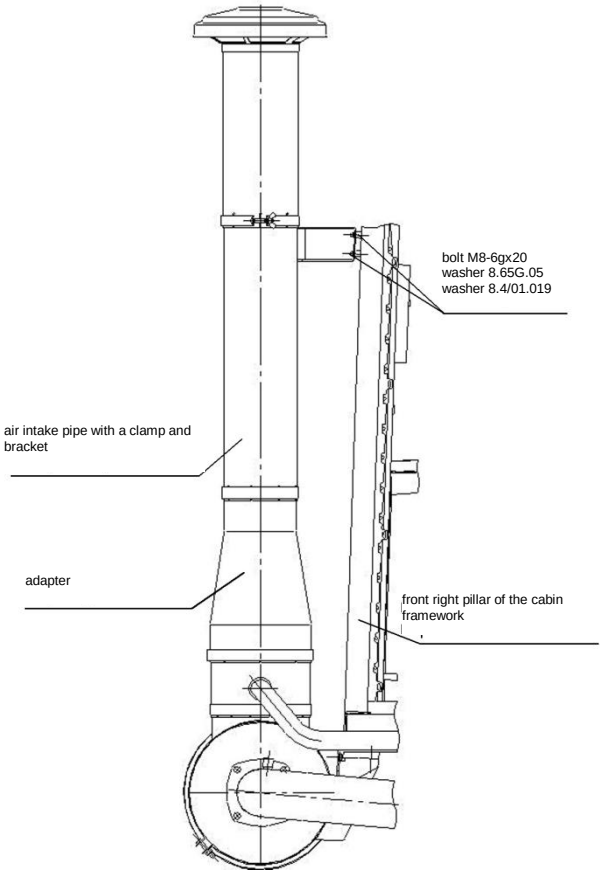
5.1 GENERAL

When shipping from the plant, certain parts and assemblies are not installed on the tractor and stowed separately for convenience of transportation and better safe-keeping. Tractor preparation for operation consists of depreservation, installation of the assemblies and parts 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:

– remove process plug from the adapter;

– install air intake pipe on the tractor;

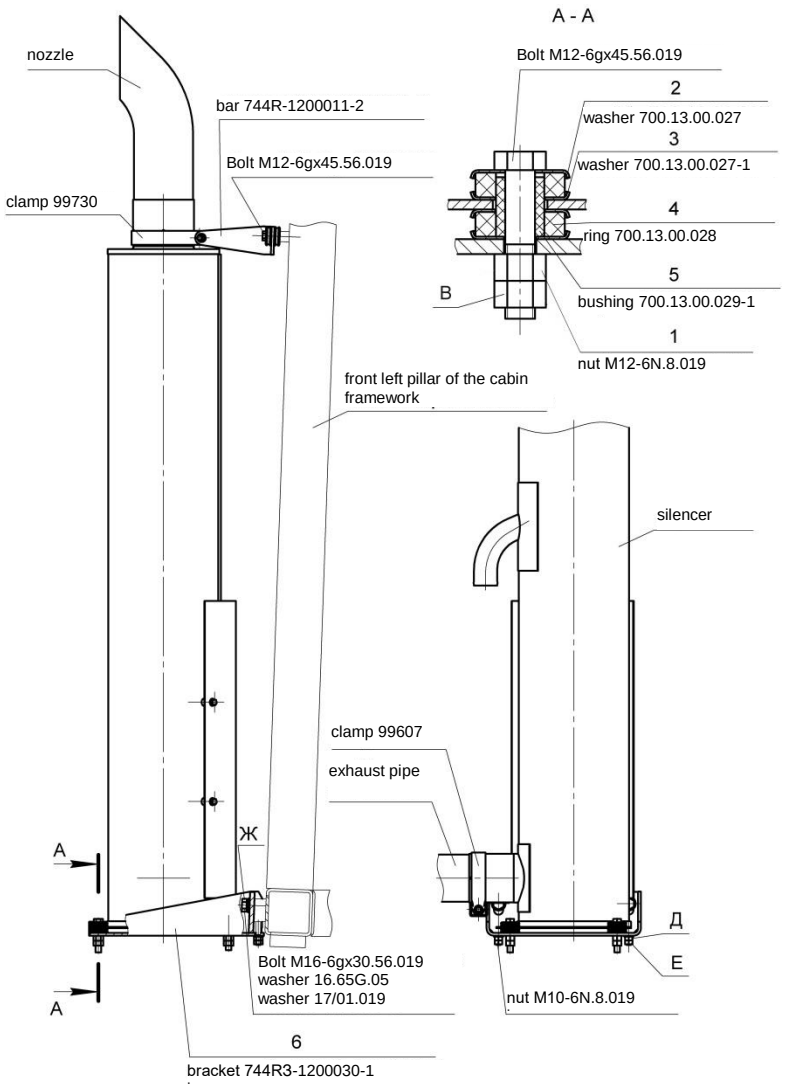


– install silencer on the tractor;

When installing silencer, screw in the nut, pos. 1, to the full contact between the parts, pos. 2, 3, 4, 5, after which screw in the nuts, pos. 1, for another 1...2 turns and lock them with nut B.

The tolerance for coaxility of the exhaust pipe in respect of the silencer branch pipe is Ø∅2 mm. Provide it by movement of the bracket, pos. 6, with nuts Д, perform locking with nuts Е, after which tighten the bolts, pos. Ж.

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



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

– install headlights, hinge pivot of central pull 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;

– 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 bring the linkage to the operating position (Fig. 25, 26, 27) and reinstall the light signal equipment removed earlier.

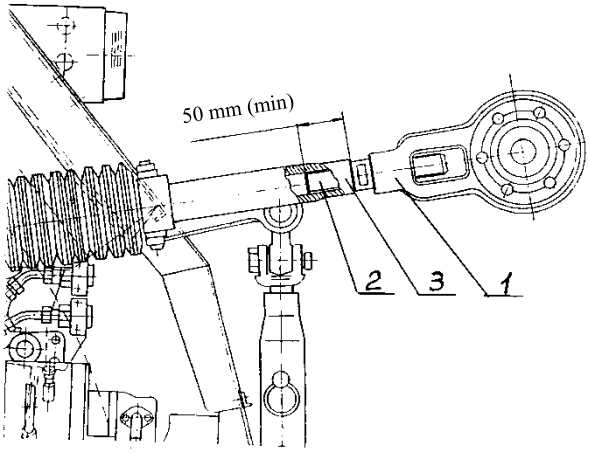


Fig. 25 Installation of the linkage center rod pivot

1 – pivot; 2 – tightening screw;
3 – center rod pipe

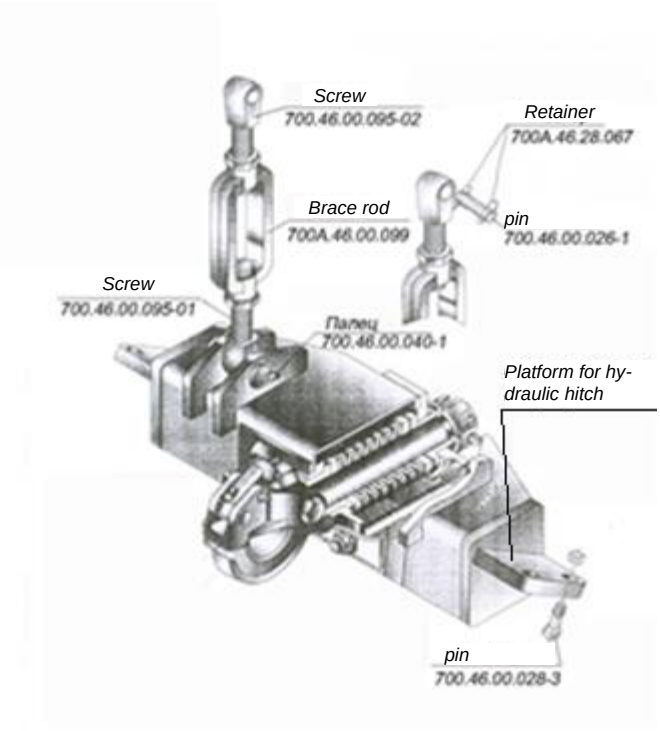


Fig. 26 Installation of hydraulic hitch

Hydraulic hitch platforms shall be installed below the bottom rod platforms.

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

5.1.1 Adjustment of lower rods

Lower linkage rods (Fig.27) shall be adjusted as follows:

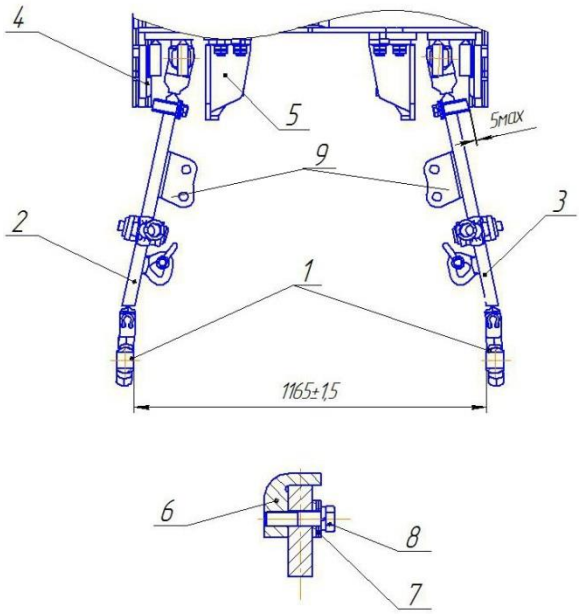


Fig. 27 Adjustment of lower linkage rods

1 – rear hinge pivots; 2, 3 – lower rods;
4 – external stop; 5 – internal stop;
6 – stop; 7 – washer; 8 – bolt; 9 – platforms for hydraulic hitch

– fix lower rods 2 and 3 with each other, providing the size of 1165±1.5 mm between lifting eyes of rear hinge pivots 1.

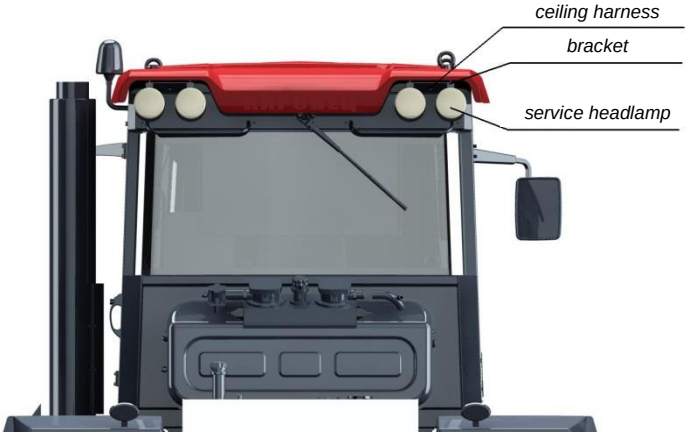
– lift the linkage, providing for the distance of 1180...1280 mm from the supporting surface to the lower rods; in doing so, the rods 2 and 3 shall be located between outer stop 4 and internal stop 5 (Fig. 27). Stops 744R3-46 28021-1, pos.6, shall be installed at the side of outer stops.

– by means of moving washers 7 from under the head of bolt 8 under stop 6, if needed, provide for the lateral movement of lower rods of 5 mm max.

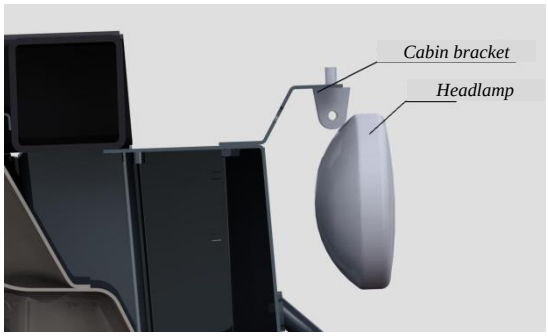
5.1.2 Installation of light signalling equipment

CAUTION! During final assembly of the tractor with regard to light signaling equipment, it is necessary to thoroughly ensure that electrical harnesses and wires do not touch sharp edges, moving parts of the tractor, and are not clamped against sharp edges during erection operations.

Perform installation of light signaling equipment with the battery master switch switched off. The front and rear service headlamps shall be mounted on the installation brackets at the upper part of the cabin, fore and aft, respectively.



Rear service headlamps



Installation and connection of the service headlamp

Perform connection of the front and rear service headlamps, front and rear lights, lateral turn repeaters and road-train sign as per the wiring diagram (see Appendix).

5.1.3 Adjustment of head illumination lamps

Head illumination lamps (outer - low beam, internal - high beam) are built into the hood. Primary direction of the light fluxes is adjusted at the manufacturing plant as per GOST R 41.48-2004. However, when changing lamps in the course of operation, the direction of light fluxes can change and require an additional adjustment of headlamps.

In order to adjust the headlamp light, put the tractor onto an even horizontal ground in 5 m from a screen (wall). Adjust the headlamps in fairly dark conditions.

Mark the screen to adjust the position of headlight spots according to Fig.28. Align the position of vertical axis O on the screen (it shall be in the longitudinal axis of the tractor symmetry). In accordance with recommendations set forth in GOST R 41.48-2004 (item 6.26.1.2), select the value of B=125 mm for 5 m distance to the screen.

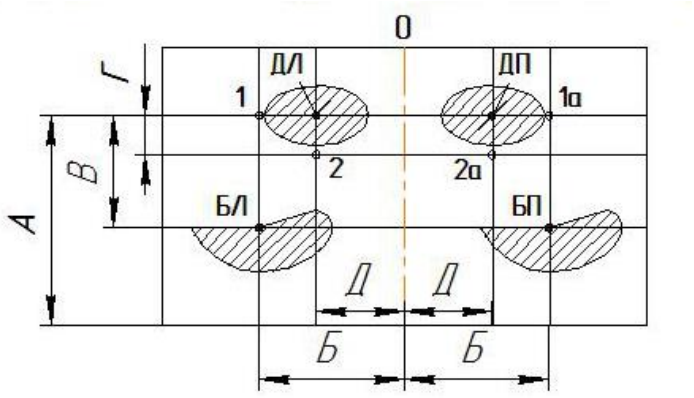


Fig. 28 Diagram of screen marking for headlamp adjustment

O is the vertical axis of symmetry; 1, 1a, 2, 2a are the projections of geometric centers of lamps to the screen; BL, BP are the points combining the centers of the front and rear headlight spots; (A=1320 mm; B=570 mm; C=125 mm; D=50; E=450)

Headlights must be adjusted using the head of TORX E5 wrench with the internal “star”. The layout of adjustment screws at left headlights is given in Fig.29 (view from inside the hood). Screws of the right headlights are arranged in the mirror image.

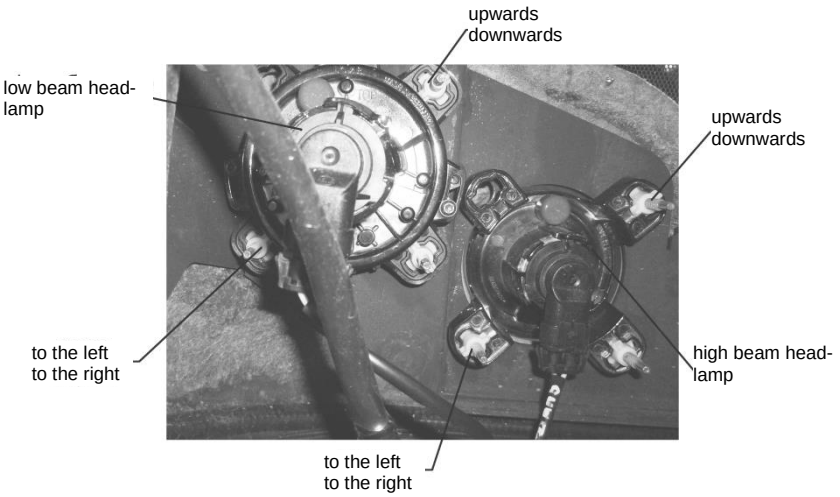


Fig.29 Layout of adjustment screws on left headlights (view from inside the hood).

For the adjustment of direction of the headlight fluxes it is necessary to lift the hood, put TORX E5 head onto the adjustment screw and turn it in the required direction.

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

The adjustment shall be performed for each lamp separately; in doing so, a flare from other lamps is prevented by installation of non-transparent screens or by disconnection of connectors from the respective lamps.

The lamps can be adjusted without opening the hood. To this end, it is necessary to take off the protective casing of the radiator and carry out the adjustment in accordance with the manual above.

5.2 TRACTOR RUNNING-IN

New tractor requires a running-in to make sure that friction parts are well run in to each other while being operated under low loads.

Perform the tractor running-in as per requirements set forth herein as well as in the Operation Manual for the engine.

Running-in when correctly performed is a prerequisite for a long-term operation of the tractor. Running-in is also required after a tractor overhaul.

Running-in shall be performed within:

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

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

The tractor shall be run in by hooking up with the trailer or agricultural machines and implements under modes preventing the possibility of engine overloads. Running-in mode can be changed by selecting the implement type; limiting the grip width, soil cultivation depth and unit speed.

In the course of tractor operation with mounted agricultural machines and implements, check the linkage hydraulic system, wherefore carry out several lifting and lowering operations for the implement at the average and maximum speed of the engine crankshaft.

During the running-in, see for engine operation, avoid its overload. To prevent the engine from smoking, do not admit a crankshaft speed drop, watch operation of the transmission units, hydraulic systems and electrical equipment; in addition, check for the leaks from under seals and pipelines, and for air inflow in the suction mainline.

The list and contents of maintenance operations in the course of preparation, conduction and after the completion of operation running-in are set forth in the corresponding subsections of the manual as well as in the service logbook.

6 OPERATION AND ADJUSTMENT REGULATIONS

6.1 PROCEDURE FOR TRACTOR WORK PREPARATION

When preparing the tractor for operation:

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

check the tractor condition by external inspection, making sure there are no leaks of fuel, oil, coolant, electrolyte; if required, eliminate the leaks;

3) check the level and, if necessary, refill oil into the engine lubrication system and hydraulic system, cooling fluid into the expansion tank to the level visible through the glass;

4) check the engine condition by external inspection;

Before switching on the battery master switch, after a long-term outage of the tractor (over 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 settled for 10 days (at least). Necks of the tanks and other reservoirs shall be completely closed and the vents shall be protected against any ingress of dust therein. The intake hose shall be at a height excluding suction of mechanical impurities and water. Grades of the fuel being used are given in Appendix 6 “Filling reservoirs”. Before every filling, drain the fuel sludge from the fuel tank. When filling oil manually, use the filter;

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

8) check the operation of tractor control mechanisms, operation of the braking system, lighting and signaling, of the hydraulic system for control over turns and linkage. 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. Service brakes shall ensure full stop of the tractor on dry hard pavement 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. Turns shall be made smoothly, without jerks, vibrations, oscillations;

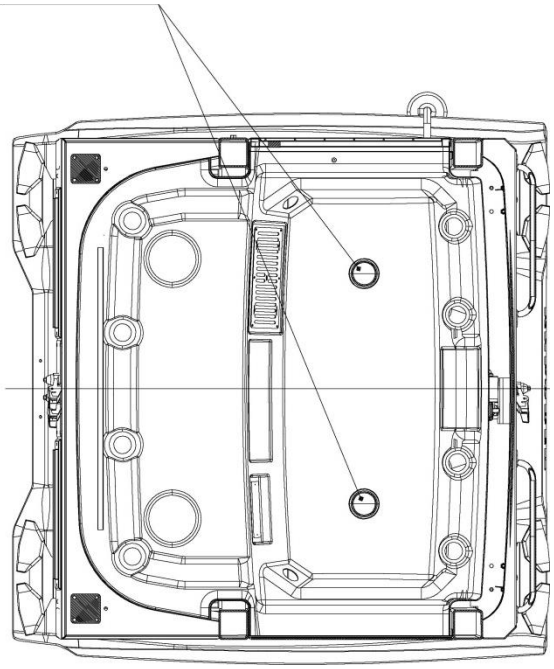
d) perform 1-2 lifting and lowering operations of the linkage; in doing so, the handle of hydraulic distributor shall be fixed in the LIFTING and FORCED LOWERING positions and automatically return to NEUTRAL position, and from FLOATING position - return to NEUTRAL position after manual release from the locking. Perform checking at the rated speed of the engine crankshaft. No fixing of the handle in FORCED LOWERING position is allowed in case the linkage is not loaded;

e) switch on the battery master switch. ⊥

f) if necessary, on the basis of your own convenience, make adjustments of the position of mode change levers 1 and rear axle engagement lever 21 (Fig.14).

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

Cabin ceiling lamps



When ceiling lamp are turned to the right the lighting is on, to the left - the lighting is off.

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

Activation of the turn signal handle “right” - “left”; at the same time, the lamps at instrument panel and the light lamps should flash.

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

Pull up the parking brake; in doing so, signal lamp  on the instrument panel (Fig. 6) should flash.

Having switched on the "frame" and turned the starter and instruments switch to position "I", counter of tractor lifetime hours on the instrument panel (Fig. 6) shall show a digital value.

After the engine start, battery charging indicator shall go out at the instrument panel.

Tractor condition menu represents the current voltage value in the battery circuit, it shall be 27±0.7V;

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

10) set the required air pressure in tyres.

SELECTION OF THE BEST POSSIBLE INTERNAL PRESSURE IN TYRES, DEPENDING UPON OPERATION CONDITIONS AND LOAD ON TRACTOR AXLES

Selection of the best possible pressure in the tyres of wheel tractors and degree of its influence on the roadhold depend on the type of soil and the load acting on tractor axles. Air pressure in the tyres impacts the support spot of wheel contact with the soil and, depending on soil conditions, influences its roadhold properties and tractor productivity in operation. Tyre load standards for selection of operation mode with various internal pressures and speeds shall be set by the tyre manufacturer and given in Table 3.

Pressure value depends on the speed and loads on tractor axles, created by the weight of hooked-up machines with regard to own operation weight of the tractor and ballast, and to operation conditions.

Internal pressure in tyres for each specific tractor hook-up case is different. That is why, when tractor operation conditions are changed, it is required to check and, if needed, adjust the pressure in tyres. Non-observance of the pressure standards significantly reduces the tyre operation period.

It is possible to select the tyre pressure and to determine the need for ballasting, weight and type of ballast only after determining the value of loads on tractor axles. The exact value of load on front or rear tractor wheels in a specific case of tractor usage can be determined only by the way of actual weighing of the tractor with the hooked-up machine.

When selecting the standards for operating modes of the tyre, follow the data given in Tables 3 and 4.

Best possible tyre pressure shall be determined by tractor weighing using the following method:

– determine the weight on the front axle with operating equipment lowered;

– determine the weight on the rear axle with operating equipment lifted;

Set the tyre pressure as per measured weight. When operation conditions are changed, tyre pressure and ballasting may need an adjustment'.

 **CAUTION! SET TYRE PRESSURE WITH REGARD TO LOADS AND SPEEDS IN EFFECT FOR THE WORK BEING PERFORMED!**

Keep the records 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 "Logbook for registration of measurements of the internal air pressure in tyres" (Appendix 7).

Pressure is measured at least once in every five days before tractor traveling for work execution. The results shall be registered in the logbook.

Check the tyre pressure using serviceable instruments with division value of 10 kPa max, which would provide for credibility of measurements. Acceptable maximum pressure deviations in tyres are ± 10 kPA by readings of the pressure gauge that must be systematically checked for the reading accuracy. Air pressure in tyres shall be controlled in cold state.

Mounted controls add a lot of load on the rear axle that is why take this additional weight into account when selecting the tyre pressure. For the tractors with heavy mounted implements, it is required to reduce the rear tyre pressure to assume an additional load during transport movement.

RULES OF PNEUMATIC TYRE OPERATION

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

When the tractor is moving with a tyre pressure below 0.17 MPa, the speed shall not exceed 20 km/h.

To prevent an untimely failure of tyres, observe the following rules:

– do not permit tractor operation with significant wheel slip;

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

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

– in order to avoid increased wear of tyres, operate the tractor on roads with hard pavement for 30% of the total period of operation max;

– protect tyres from the ingress of fuel. oil and other oil products thereon;

– do not admit tractor operation with internal tyre pressure not corresponding to the prescribed standard for specific case of its use;

– adjust the tyre pressure value when tractor operation conditions are changed, since pressure change impacts the tractor operation properties and efficiency.

CAUTION! When working with significant traction forces, a slippage against tractor sides may be observed. It can be remedied by increasing pressure in the tyres, however the traction force reduces with that.

Table 3

Standards for loads on single tyre to select operational modes of work with various internal pressures

Tyre manufacturer	Load on a single tyre, kg, with internal pressure, MPa, At the speed designated by the symbol										
	0.06	0.08	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.19*
Tyre 28,1R26 158A8											
Voltair-Prom, ROSAVA	–	2900	3220	–	3450	–	3850	–	4250	–	–
Belshina*	–	–	–	3300	3460	3580	3770	3920	4050	4200	4200*
Altaisky shinny combinat	–	3000	3250	–	3550	–	3875	–	4125	4200	–
Tyre 30,5R32 162A6											
Belshina* ROSAVA	–	–	–	3675	3885	4025	4230	4405	4575	4745	4745*
Altaisky shinny combinat	–	–	–	4100	4225	4330	4395	4485	4630	4745	–
Tyre 800/65R32 167A8											
Voltair-Prom,	3200	3650	4160	–	4660	–	5075	–	5450	–	–
Altaisky shinny combinat	–	3650	4160	–	4660	–	5075	–	5450	–	–
* – internal pressure in tyre, corresponding to the maximum permissible load for transport works on roads with improved pavement											

Table 4

Standards for air pressure in tyres at the actual load and speed

Load on the axle, kg	Speed, km/h	Pressure in tyres, MPa				
		28,1R26			30,5R32	800/65R32
		Altaisky shinny combinat	Belshina	Voltair-Prom, ROSAVA		
6500	V□10	0.10*	0,11*	0.10*	0,11*	0.10*
	10<V□20	0.10	0.11	0.10	0.11	0.10
	20<V□40	0.10	0.11	0.10	0.11	0.10
7500	V□10	0.10*	0,11*	0.10*	0,11*	0.10*
	10<V□20	0.10	0.11	0.10	0.11	0.10
	20<V□40	0.12	0.14	0.12	0.12	0.10
8500	V□10	0.10*	0,11*	0.10*	0,11*	0.10*
	10<V□20	0.13	0.13	0.13	0.11	0.10
	20<V□40	0.17	0.17	0.16	0.15	0.12
9000	V□10	–	–	–	0,11*	0.10*
	10<V□20	–	–	–	0.12	0.10
	20<V□40	–	–	–	0.16	0.12
9500	V□10	–	–	–	0.12*	0.10*
	10<V□20	–	–	–	0.14	0.10
	20<V□40	–	–	–	0.17	0.14
10000	V□10	–	–	–	0.14*	0.10*
	10<V□20	–	–	–	0.17	0.11
	20<V□40	–	–	–	–	0.15
10500	V□10	–	–	–	0.17*	0.10*
	10<V□20	–	–	–	–	0.12
	20<V□40	–	–	–	–	0.16

ATTENTION! VALUES MARKED BY THE SYMBOL "*" SHALL BE APPLIED ONLY IN CASES WHEN TYRES ARE NOT CONTINUOUSLY OPERATED AT HIGH TORQUES.

USE THE VALUES GIVEN IN TABLE 3 FOR FIELD OPERATIONS AND OTHER CONTINUOUS OPERATION CONDITIONS AT HIGH TORQUES!

6.2 OPERATION RULES AND CONTROL OVER TRACTOR DURING OPERATION

When working with the tractor:

see for the readings of instruments and signal devices. Readings of instruments and signals of indicator lamps shall correspond to the directives set forth in the "Controls" section. ***IT IS PROHIBITED*** to work with emergency lamps of the instrument panel on;

keep the cabin clean; no presence of foreign matters 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 engine crankshaft speed, immediately stop the fuel feed by pulling the engine shutdown handle (for the tractors with YaMZ and TMS engines) or by switching off the ignition (tractors with Mercedes engine);

do not permit engine operation under 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 engine crankshaft speed; continue traveling when the normal values are achieved;

in order to avoid overheating of the cooling fluid, it is necessary to see for the absence of clogging of the water radiator plates. To this end, when working in dusty conditions, it is necessary to perform radiator blowdown every shift with compressed air under the pressure of 5...7 kgf/cm^2 during every shift or (in case of contamination not removable by purging) rinse the radiator core with water under 5…7 kg/cm^2 pressure as per cl. 7.5.4.

tractor brakes shall be in good working order. When braking the tractor traveling over dry and hard ground using the service brake, the braking distance shall not exceed 13 m at the speed of 8.33 m/s (30 km/h) and 6.5 m at 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 clearance height below 4 metres;

when turning, select the speed providing for a safe traffic. ***IT IS PROHIBITED*** to enter tight turns at a gear exceeding the first gear of the fourth mode;

in the course of tractor traveling with the pressure in tyres below 170 kPa (1.7 kgf/cm^2), the speed shall not exceed 5.56 m/s (20 km/h);

IT IS PROHIBITED to use parking brake when moving.

IT IS PROHIBITED to tow the tractor by suspension unit.

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 fasteners;

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 with 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 of tyres, operate the tractor on roads with hard pavement for 30% of the total operation period max;

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

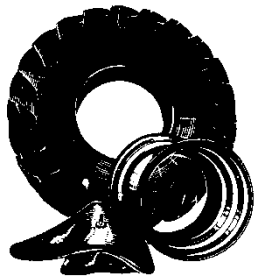
strictly obey the instructions set forth in the “Safety requirements” section.

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

When moving 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.

Tyres shall be clean, dry. Before installation, tyres and inner tubes shall be poured with talc. Installation and dismantling of tractor wheels shall be carried out by two workers by means of two tyre irons.

The first tyre iron is a lever, one end of which is fork-shaped and serves only for removing the tyre shoulders from the rim shelves and the other end serves for tyre installation. One end of the second tyre iron is bent, ensuring reliable grip by the rim lip as well as removal of tyre shoulders from the rim shelves paired with the fork end of the first tyre iron, the other end is a box wrench for the locking screw of hydraulic jack. When mounting a tyre, make sure that the direction of wheel rotation in the course of wheel installation on the tractor coincides with the arrow on the tyre surface. Installation, dismantling and insertion of tyre shoulders are possible only when the diametrically opposite part of the tyre is flush-mounted into the rim groove in respect of the shoulder to be inserted. Application of soap solution onto the tyre shoulders during installation and dismantling operations considerably facilitates the installation and dismantling and extends the tyre lifetime.

Perform tyre installation onto the rim in the following sequence:

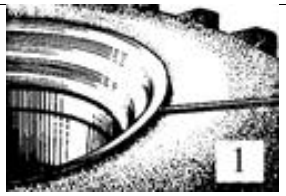
	put the tyre onto an even ground and fit the rim thereon with the lip located closer to the groove facing downwards, so as to have a part of the tyre shoulder entering the rim groove;
	insert the first tyre iron between the upper shoulder of the tyre and the rim to make the bent end reliably grip the tyre shoulder and, using it as a lever, introduce the tyre shoulder being mounted 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 tyre iron. Insert it between the tyre shoulder and the rim and press out the rim upwards, insert the other tyre iron closer to the tyre shoulder introduced and repeat the previous operation. In a continuous circular motion, 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 tyre irons simultaneously;

	put the tyre inclined against the wall, press out the rim towards the wall to make the tyre cavity completely free and bring the inner tube into the tyre cavity having taken the tube at the valve side;
	insert the valve into the valve hole and fix it with a 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 inflate the tube in order to avoid the possibility of its jamming between the tyre shoulders and the rim;
	put the tyre on the floor. At the opposite side of the valve, insert both tyre irons in 250-300 mm from each other in a way ensuring their reliable grip on rim lip and introduce the tyre shoulder behind the rim lip by pressing the tyre irons down;
	holding one tyre iron in such position, take out the second tyre iron and insert it in 50-100 mm from the first one so that it will grip the lip and introduce the tyre shoulder behind the rim lip by pressing the tyre iron down. The mounting will be much easier if you press the tyre by foot at the same time. In order to facilitate the process of introduction of the tyre upper shoulder, sink in by feet into the rim groove the tyre part being opposite to the shoulder introduced;
	the installation shall be finished by two tyre irons at the valve;

Inflate the tyre to the normal pressure, then fully release air from the tyre, inflate it again to the pressure of 0.28 MPa (2.8 kgf/cm^2), keep this pressure until the tyre shoulders seat on the rim shelves; then release air until the recommended pressure in the tyre gets established. Inflate the tyres within a protective fencing (area).

Dismantle the tyre 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 tyre iron and the bent end of the second one. Take off the shoulders from the shelf being opposite to the valve hole first, in the following sequence:

	insert the bent end of the second tyre iron between the shoulder lip of the rim and the tyre and press out the tyre shoulder downwards;
	insert the fork end of the first tyre iron into the gap appeared between the shoulder lip of the rim and the tyre to have the bent end of the second tyre iron in the groove of the fork-shaped tyre iron;
	press out the tyre shoulder downwards with the first tyre iron. Repeat the operations set forth in Items 1, 2, 3 over the whole rim circumference until a complete removal of the tyre shoulders from the seat shelves;
	insert the tyre irons at both sides of the valve hole at the distance of 100 mm and extract a part of the tyre shoulder by the rim lip, pushing the opposite shoulder of the tyre by feet into the installation groove of the rim;
	step aside from the part of tyre shoulder extracted over the circumference for a distance where it is possible to introduce the bent end of the second tyre iron between the rim lip and the tyre shoulder without difficulties, and again extract the tyre shoulder by the rim lip;
	repeating the operation as per Item 5, take off the upper shoulder of the tyre;
	put the tyre inclined against 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 to be able to insert both tyre irons between the tyre shoulder and the rim with 200-250 mm between the tyre irons, press out the rim upwards, first by one tyre iron, then by the other one, get the second tyre iron free, leaving the rim in the pressed-out state;
	insert the bent end of the second tyre iron into the gap between the shelf and the tyre shoulder in 150-200 mm from the first blade and extract the rim from the tyre, gripping the shoulder lip of the rim. Repeat this operation several times until the rim completely leaves the tyre.

CAUTION! When removing and mounting the wheels, install the temporary pins located on the driving axle pinion cage in the vertical plane. Before removal of paired wheels from the hub (or one of them) release air from both wheels.

Installation of extra wheels on tractors

To ensure tractor operation on soils with increased moisture content (early spring works, etc.), installation of extra wheels on tractors is provided for with parts for their installation in order to reduce specific pressure on the soil and improve the tractor's passing ability.

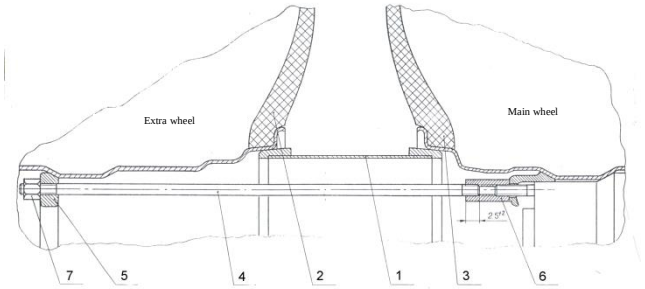
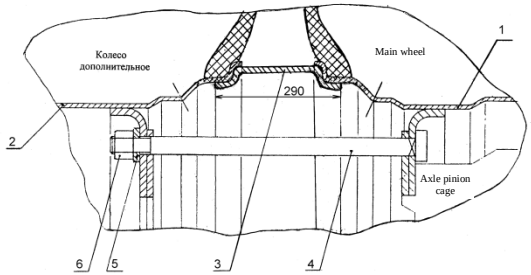
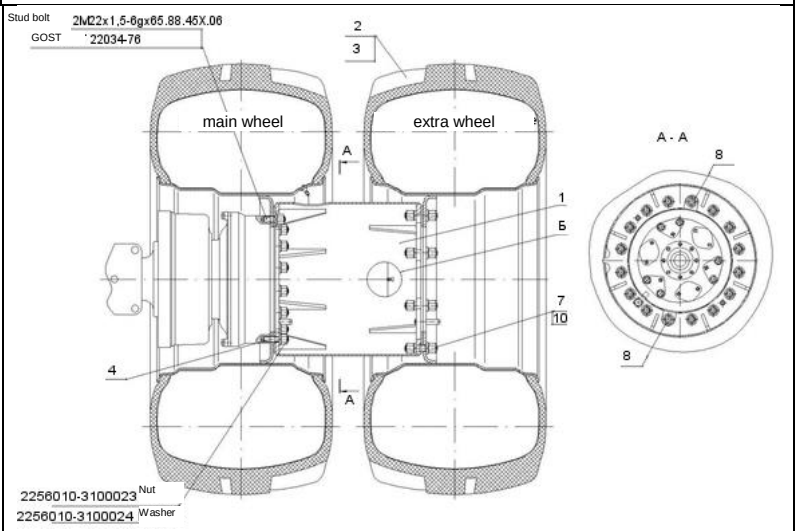
The kit includes the following:

for K-744R1 tractor:
4-wheel assembly (2 left and 2 right wheels), 4 spacer collars, 4 pressing rings, 32 stud bolts, 32 special nuts.

for K-744R2, K-744R3, K-744R4 tractors:
4-disk wheel assembly (2 left and 2 right wheels), 4 spacing collars, 32 special bolts, 32 nuts, 32 washers;

4-disk wheel assembly (2 left and 2 right wheels), 4 spacers, 56 stud bolts, 32 nuts, 32 washers.

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

No.	K-744R1 tractor	K-744R2, K-744R3, K-744R4 tractors	
	Installation of the wheel set		
			"rigid" pairing mechanism
1.	 **Installation of extra wheel** 1 – spacer ring; 2 – extra wheel; 3 – main wheel; 4 – stud bolt (long); 5 - pressing ring; 6 - special nut; 7 - nut.	 **Installation of extra wheel** 1 - main wheel; 2 - extra wheel; 3 - distance ring; 4 - special bolt; 5 - washer; 6 - nut	 **Installation of extra wheel** 1 – spacer; 2 – right wheel; 2 – left wheel; 4 – stud bolt; 7 – washer; 10 – nut
2.	Replace standard nuts for main wheel fastening 3 with special nuts 6 (one-by-one). Special nut tightening torque is 14...20 kgf·m	Hang main wheel 1 of the tractor above the ground.	**Tractor operation with installed kit for wheel pairing at haulage range gears is forbidden**.

No.	K-744R1 tractor	K-744R2, K-744R3, K-744R4 tractors	
3.	Screw in the long stud bolts 4 for 25...27 mm into the special nuts	Install distance ring 3 into the main tractor wheel having ensured its uniform seating over the entire diameter.	Before spacer installation it is required to replace fourteen standard stud bolts (2M22x1,5-6gx65.88.45X.06 GOST 22034-76) at each pinion cage of both axles with stud bolts 4. At the same time, two stud bolts remaining at the axle pinion cage must be located in opposition to each other, as shown in Section A-A. Stud bolts 4 shall be installed on thread locker. Tightening torque for stud bolts 4 is 200 N·m (20 kgf·m).
4.	Install spacer ring 1 and press it with extra wheel assembly 2.	Install extra wheel 2 on distance ring 3 so as to have grooves in the extra wheel disk in opposition to grooves of the main wheel disc.	Hang main wheel of the tractor above the ground.
5.	Introduce studs 4 into the holes of pressing ring 5 and fix the extra wheel by means of standard nuts 7. Insert the pressing ring with chamfered edge (around wheel diameter) inside the rim of the extra wheel.	Introduce the head of special bolt 4 through disc recesses of (extra and main) wheels, turn it by 90°° around the axis, and engage it with the square bolt head and recess of the main wheel disc.	Install spacer 1 on the main tractor wheel, providing the alignment of the inner tube valve with hole Б in the spacer. Tightening torque of the nuts for spacer fastening to the main wheel (nut 2256010-3100023) is 350 N·m (35 kgf·m), the tightening shall be performed crosswise.
6.	Nut tightening shall be performed crosswise, using standard wrench with tightening torque of 14...20 kgf·m	Install washers 5 and pull up the extra wheel to the main one using nuts 6	Install extra wheel 2 or 3 on spacer 1, meeting the following requirements: – inner tube valve should coincide with hole Б in spacer 4; – direction of extra wheel tread pattern shall be the same as one of the main wheel.
7.		Nut tightening shall be performed crosswise, using standard wrench with tightening torque of 14...20 kgf·m	Install washers 7 and tighten nuts 10 for extra wheel attachment to the spacer. Tightening torque of the nuts is 10 - 600 N·m (60 kgf·m), the tightening shall be performed crosswise.

No.	K-744R1 tractor	K-744R2, K-744R3, K-744R4 tractors	
		Running-in and maintenance	
1.	Set air pressure in tyres: – in main tyres – (1.1 ± 0.1) kgf/cm^2; – in extra tyres – (0.9 ±0.1) kgf/cm^2.	Set air pressure in tyres: – in main tyres – 1.1 kgf/cm^2; – in extra tyres – 0.8 kgf/cm^2.	Set air pressure in tyres: – for main tyres – (0.1±0.01) MPa [(1.1±0.1)] kgf/cm^2; – for extra tyres – (0.078±0.01) MPa [(0.8±0.1)] kgf/cm^2.
2.	Perform a 1.5-hour running-in of the tractor on paired wheels with tightening of extra wheel fasteners every 30 min.	Perform an 8-hour running-in of the tractor on paired wheels with tightening of extra wheel fasteners every 2 hours.	Tractor with installed wheel pairing kit shall be run in for at least two hours without load, then the tightening torque of main and extra wheel nuts shall be checked.
3.	During shift maintenance (once in every 8 - 10 engine hours of tractor operation), fully tighten extra wheel fasteners.	During shift maintenance (no more than in 10 engine hours of tractor operation), fully tighten extra wheel fasteners.	During shift maintenance (no more than in 10 engine hours of tractor operation), check the tightening torque of main and extra wheel nuts. Tractor main wheels shall be tightened at the first maintenance (M-1, once in every 125 engine hours).
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

Keep the records for each tyre separately. To this end, a “Tyre operation record card” is to be established, which is the main document characterizing the tyre operation in case of a reclamation as well as in other cases. The internal pressure in tyres should be registered in the “Logbook for registration of measurements of the internal air pressure in tyres” The results shall be recorded in the logbook as per tyre 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 ensured by means of eight hydraulic quick-lock cutoff couplings (Fig.30) installed on the rear semi-frame of the tractor and connected to four service sections of hydraulic distributor.

Connect the hydraulic system with no pressure in hoses only.

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

- Before the connection, set hydraulic distributor levers into position FLOATING.
- pull hose 9 all the way in; in doing so, balls 7 will settle opposite the groove of closing sleeve 3;
- install valve 5 all the way in clutch 1;
- release hose 9; clutch 1 under the action of spring 8 will return into the initial position;
- make sure of reliability of valve 5 attachment in housing 1.

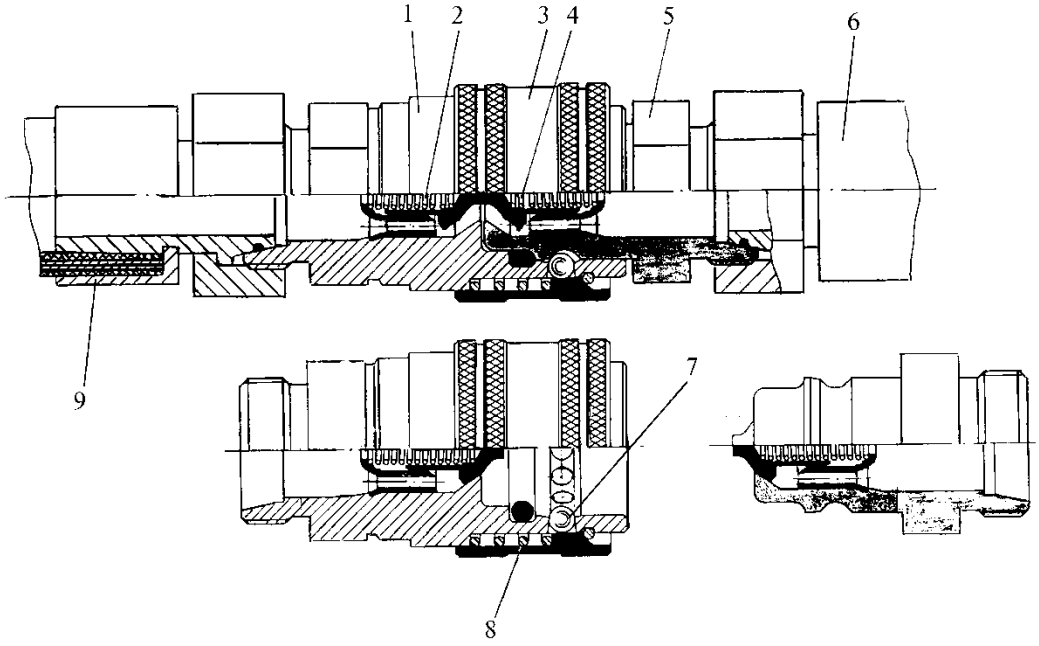


Fig. 30 Diagram of operation of quick-lock cutoff devices
1 – couplings, 2, 4, 8 – springs; 3 – closing sleeve; 5 – valve;
6, 9 – hoses; 7 – balls

6.5 CONNECTION OF AGRICULTURAL MACHINES, IMPLEMENTS AND VEHICLES WITH TRACTOR DRAWBARS

The following elements are provided for to connect the tractor with agricultural machines, implements and vehicles (see Table 1): mounted 3-point device, hitch iron, hydraulic hook.

Linkage provides for connection to mounted agricultural machines and implements having three connecting elements, as well as coupling with the central pull rod and lower links with Walterscheid connection; to semi-mounted implements having two connecting elements, as well as coupling with lower links with Walterscheid connection. The connection shall be implemented 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 even ground and smoothly approach in reverse so as to have the trailing device of lower links below the globe joints;

c) lift lower links 7 (Fig. 31) by means of hydraulic cylinders until the locks actuate;

d) using vertical strut 6, adjust the difference over the height of trailing implement axles;

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

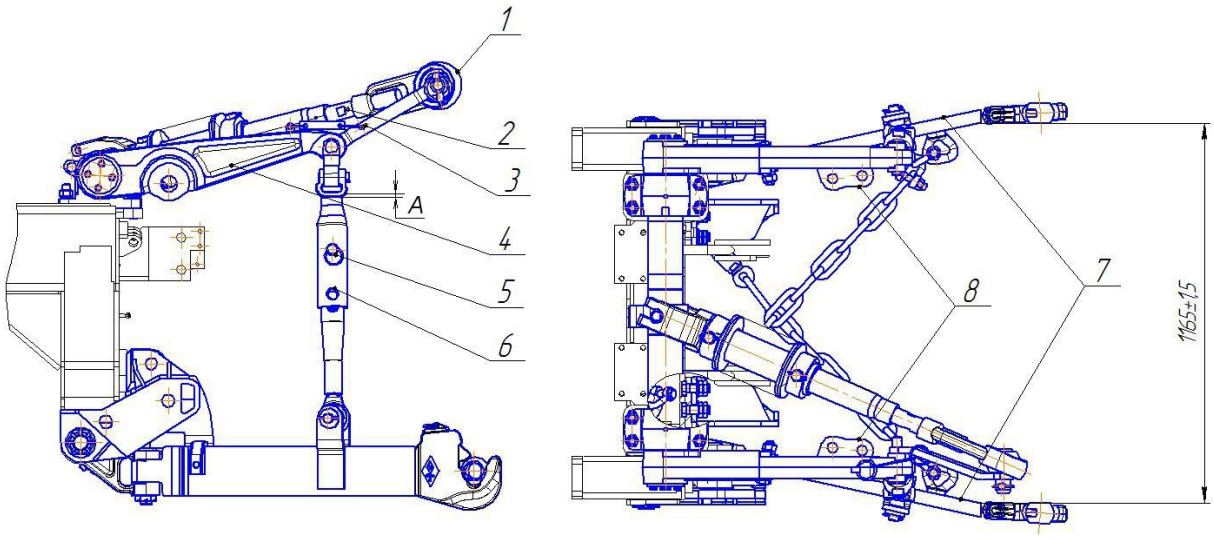


Fig. 31 Linkage

1 – central pull 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 changing the length of vertical brace struts and central pull rod.

When connecting mounted or semi-mounted agricultural machines and implements, the length of vertical strut 6 (Fig.31) shall be minimum to ensure the maximum traffic clearance.

N o t e . Perform connection of the lower link and the central pull rod to coupling elements of agricultural machine (implement) with the tractor parking brake being pulled up.

When disconnecting a machine or implement from tractor linkage mechanisms, disconnect the central pull rod and fix it, then disconnect the lower links.

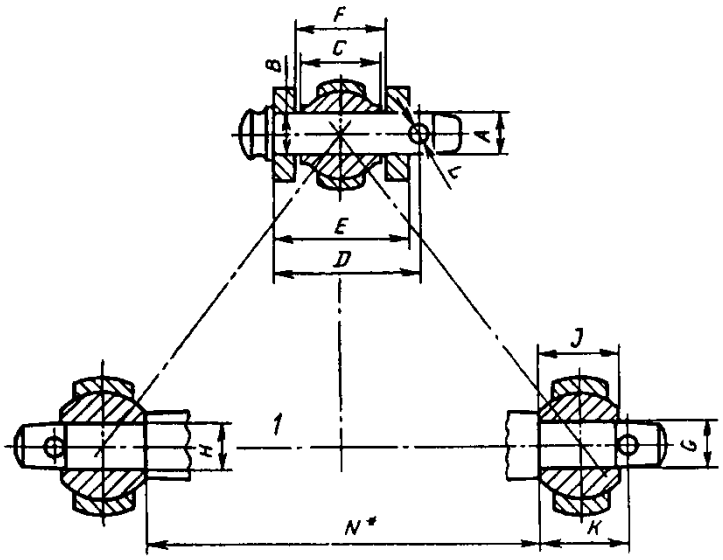
Linkage is adapted for hooking up with implements with the following categories of coupling:

– NU-4 (cat. 4 ISO 730) – main;

– NU-3 (cat. 3 ISO 730) – additional;

– Kirovets – additional.

The parameters of coupling dimensions of the linkage categories are given in Fig. 32 and in the table.



Designation of linkage parameters					
Parameter according to the figure	**Kirovets**	**GOST 10677-2001**		**ISO**	
				ISO 730/1	**ISO 730/3**
		NU-3	**NU-4**	**Cat. 3**	**Cat. 4N**
Hinge pivot of the upper (central) pull rod					
A (rod pin)	$39.5_{-0.8}$	$31.75_{-0.2}$	$45_{-0.8}$	$31.75_{-0.25}$	$45_{-0.8}$
B (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					
G (pin)		$36.6_{-0.2}$	$50.8_{-0.1}$	$36.6_{-0.2}$	$50.8_{-1.1}$
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)	1100	685-700 (900 for plows)	1100	560 min (recom.)	1100 min (recom.)
N	1120	965±1	1165±1.5	965±1	1168_{-3}

Fig. 32 Dimensions of linkage connecting elements on the tractor

Hydraulic hook provides for connection of the tractor to vehicles and process transport carriers. The connection by means of a hydraulic hook installed under platforms 8 (see Fig.31) of the linkage shall be implemented as follows:

approach the hitch of the transported machine at a low speed with lowered hydraulic hook which has a latch set into “open” position. In doing so, it is necessary to visually combine the planes of symmetry of “hook-hitch” coupling units; 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 needed, provide for such coincidence by steering wheel rotation; continue tractor approach until the hook stops in the hitch, then, operating the hydraulic distributor lever, lift the linkage in order to 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 machine 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 the completion of work as well;

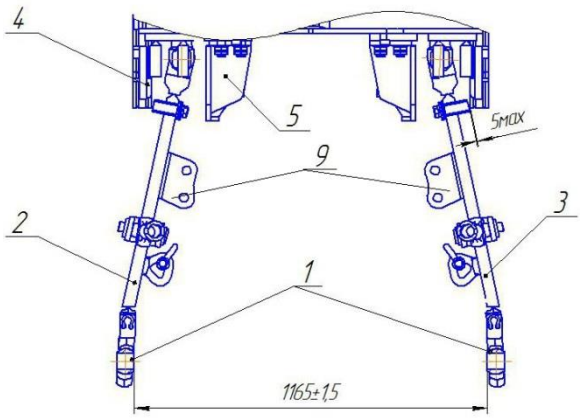
connect electrical equipment.

If a road train is composed (with semi-trailer and trailer), reconnect the 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 linkage.

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

Hitch iron provides connection of the tractor with trailing agricultural machines (implements) having hitch frames with coupling hitches.



Hitch iron shall be installed into hinge pivots 1 of lower links 2 and 3 of the linkage and fastened by axle-pins. In doing so, the length of vertical struts shall be adjusted so as to have the pins connecting the outer and internal pipes pass through the lower hole of the outer pipe and the upper hole of the inner pipe. ***Hitch iron*** shall be installed at the height of 400-500 mm from the ground surface to the lower plane of the hitch iron mouth.

REMEMBER! When 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. When transporting the above-mentioned machines, lower links of the linkage shall be fully locked against transverse movements by horizontal struts.

6.6 PROCEDURE OF OPERATION WITH AGRICULTURAL MACHINES (IMPLEMENTS) AND VEHICLES

6.6.1 Procedure of operation with mounted and semi-mounted agricultural machines (implements)

When hooking up mounted and semi-mounted agricultural machines and implements, fulfill the following rules:

a) lower and lift agricultural machines and implements only when the tractor moves directly;

b) avoid turns of the tractor with agricultural machines (implements) whose operating parts are in soil.

d) in order to avoid failures of 28,1R-26 tyres, it is not recommended to perform hauling of K-744R1 tractors with heavy mounted implements at the speed over 10 km/h.

REMEMBER! Turning a machine with landed operating parts can lead to an accident.

c) during operation of the tractor unit ***IT IS PROHIBITED*** to set the hydraulic distributor handles into position FORCED LOWERING for the operating position of agricultural machines (implements).

When transporting an agricultural machine or implement, their operating parts shall be in the transport position and the hydraulic distributor handles shall be in position NEUTRAL.

REMEMBER! When hooking up the tractor with mounted and semi-mounted agricultural machines to be connected to three or two points of the linkage, the length of horizontal struts shall be adjusted so as to have rear hinge pivots of lower links of the linkage freely moving in the transverse plane by 150-200 mm.

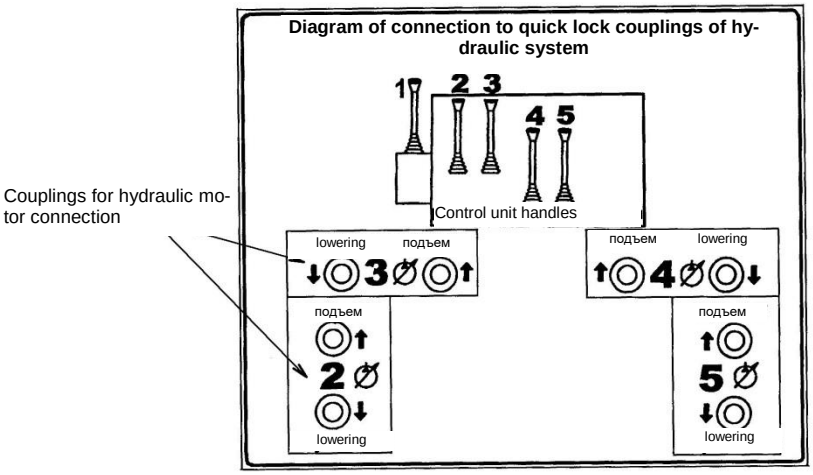
The final adjustment and setting of agricultural machines and implements shall be carried out in the field (in case of plowing - at passing the third furrow; in case of other operations - at the first passage).

In the furrow, adjust mounted machines first for the same landing of the front and rear operating parts and then set the required depth of cultivation and finally align them in the longitudinal plane by means of the central pull rod and in the transverse plane - by changing the length of vertical struts.

> N o t e . The adjustment procedure for operating parts of agricultural machines (implements), their operation modes as well as their transfer into the transportation position are indicated in the operation manuals for these machines and implements.

Drain line from the hydraulic motor shall be connected via a hose with the inner diameter of 20 mm, length of 3,200 mm (available in the SPTA kit) directly to the cover of the hydraulic tank filter being on the right in the direction of tractor travel, bypassing the hydraulic distributor.

When hooking up with implements equipped with hydraulic motors (e.g. fan), their hydraulic lines should be connected to the 2nd and 3rd pair of couplings of the tractor hydraulic system. Connect the hydraulic motor pressure line to position LOWERING. Shut the hydraulic motor down by setting the handle of hydraulic distributor into position FLOATING.



6.6.2 Tractor operation with plows

Depth of plowing under the front and rear housings of the plow shall be set only by screws of the front and rear mechanisms of plow carrier wheels.

When preparing the plow for long-term transportation, the length of central pull rod shall be decreased so that have the outermost point of the plow in the lifted state not exceeding the external height of the tractor.

When hooking up with a mounted plow, in order to provide for the floating mode, pins of vertical struts of the linkage shall be installed in a manner allowing them to pass through lower holes of outer, and longitudinal grooves of inner pipes of vertical struts (open strut). In doing so, dimension A (Fig.31) on the top and on the bottom shall not exceed 60 mm.

6.6.3 Procedure of operation with vehicles

CAUTION! Road-train with the following sequence and composition: tractor, semi-trailer (1PTS-9B or OZTP-8573) and trailer (ZPTS-12B or OZTP-8572) is designed for carriage of cargoes over any types of roads. With unfavorable road conditions, the tractor hooks up only with one semi-trailer or trailer.

When using the tractor with other vehicles, fulfill the following additional requirements:

a) the load on tractor wheels shall not exceed the values 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) braking system of the trailing vehicle shall provide for natural deceleration of trailers with cargo at an emergency braking of 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 when 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) total weight of the cargo being transported with the trailer shall not exceed 36 t.

When the tractor travels with any types of vehicles, use the fuel feed pedal and set the manual feed handle at the same time into the position ensuring tractor taking off with the vehicle, with allowance for the cargo weight.

6.6.4 Operation with power take-off (PTO)

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

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

Fulfill the following requirements in the course of operation:

a) with the coupling disengaged, rotation of the rear cardan shaft is not allowed;

b) engage the coupling on load with the steady-state pressure in the gearbox hydraulic system of at least 10 kgf/cm^2.

CAUTION! ***IT IS PROHIBITED*** to perform U-turn of the tractors with installed power take-off at the maximum angle of semi-frames jack-knifing with the power take off coupling 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 6 (“Filling tanks”). Preliminarily wash up the fuel tank.

To maintain tractor systems in good working order during a long-term outage of tractors in the autumn-winter period, upon expiry of 2 or 3 weeks of tractor outage it is recommended to check tractor system functioning in travel within 60 minutes at all GB modes and gears in sequence.

Start up the engine at negative ambient temperatures as per guidelines set forth in Item 4.12.

After engine start-up, before taking off:

a) let the engine operate for 4 min, gradually increasing the crankshaft rotation rate;

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 linkage control, then prepare it for operation. To this end, run the system for 3-4 min, gradually increasing the crankshaft rotation rate, then perform several system activations for LIFTING and FORCED LOWERING and make sure of normal operation of the system.

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

Remove 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. Store the batteries as per operation manual "Lead starting storage batteries".

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

In order to prevent engine overrun, ***IT IS ABSOLUTELY PROHIBITED*** to pour hot water over the high-pressure fuel pump before the start-up. Throughout the entire operation period, ***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.

When 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 transported 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 being loaded into an open rolling stock (flat car), with the account of packing and fastening, shall be placed within the main external dimensions for loading.

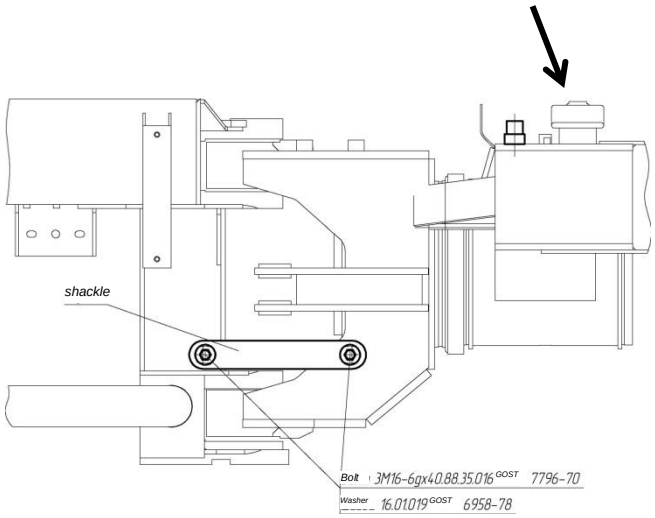
Install the tractor onto a flat car with wooden floor cleared from debris, dirt (snow, ice) in advance, check the condition of decking. Pour a thin layer of clean dry sand onto the areas supporting wheels, bumping posts, cases with SPTA.

Before placing the tractor onto flat car, it is necessary to do the following:

1) lift the linkage all the way up;
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;
6) disconnect the negative busbar from the battery 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 flat car.
8) in order to avoid jack-knifing of tractor semi-frames in the course of its loading or unloading, use a crane to fit split bushings onto swing hydraulic cylinder stems;

9) when transporting the tractor on flat railway car, prevent jack-knifing of tractor semi-frames by connecting (locking) them using the shackle fixed on the rear semi-frame.

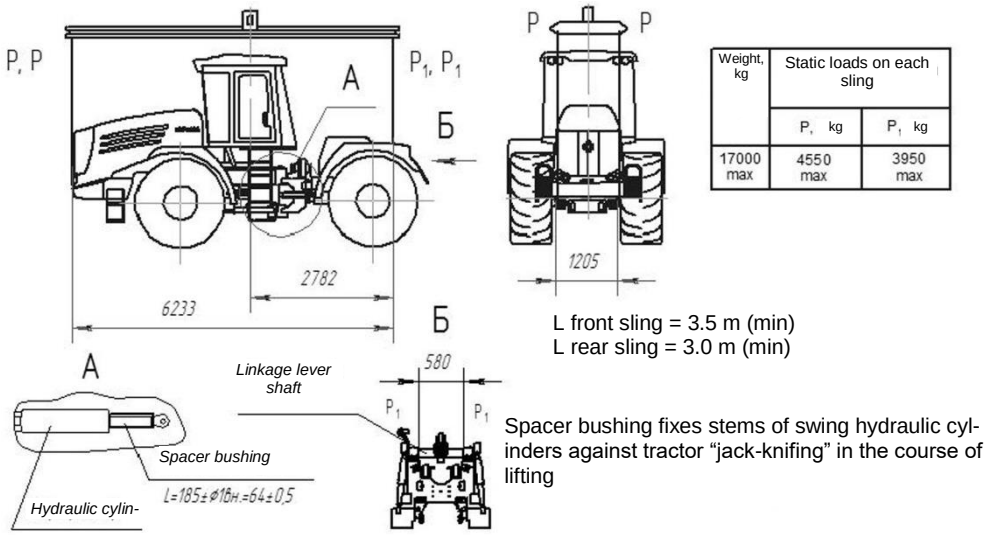
When not in operation, the shackle is fixed on the front link of the rear semi-frame



10) pull up the parking brake after installation of the tractor onto the flat car.

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

Load and unload the tractor by crane with the carrying capacity of at least 20,000 kgf according to the slinging diagram (Fig.33). When slinging the tractor, ***IT IS PROHIBITED*** to stay under the tractor, use faulty tools and ropes.



Weight, kg	Static loads on each sling	
	P, kg	P1 kg
17000 max	4550 max	3950 max

Fig. 33 Slinging diagram of the tractor (in basic configuration)

Maximum static loads on each sling:

P=4550 kg; P_1=3950 kg

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 reducer (PDR) all the way towards the engine. Towing switchover lever 11 (Fig.18) 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.

To jack the tractor up (Fig.34), set it on even horizontal ground, insert pads under the wheels after shutting off the engine, pull up the parking brake, set the mode change lever into the position N, gear change lever - into position ACTIVATION OF SYNCHRONISER BRAKES, levers of the hydraulic distributor of the mounted equipment hydraulic system - into position NEUTRAL.

In order to avoid jack-knifing of tractor semi-frames, install split bushings on the swing hydraulic cylinder stems or locking shackle on the frame, preventing the movement of stems.

Use only serviceable jack. It is prohibited to stay under the tractor lifted on the jack. When jacking the tractor, use reliable jacks with the carrying capacity of at least 12,000 kgf; follow the jacking diagram using “DK” marks on the tractor.

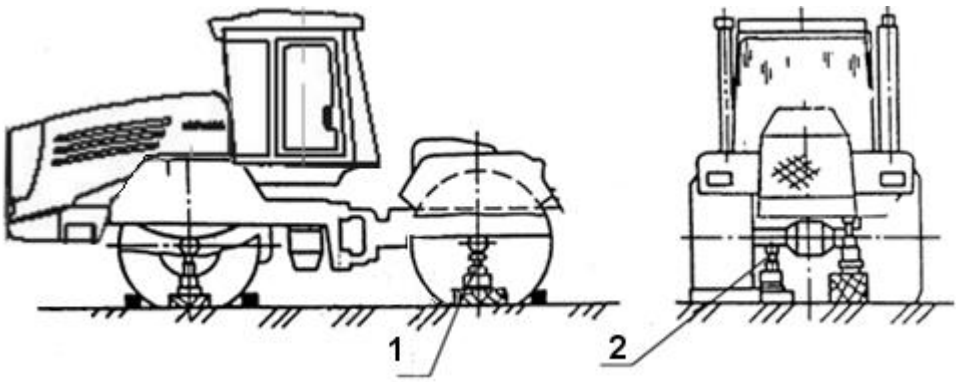


Fig. 34 Tractor jacking diagram

1 – under casing of rear axle semi-frame; 2 – under casing of front axle semi-frame.

6.9 GEARBOX PRESSURE CONTROL AND ADJUSTMENT

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

In order to extend the GB repair interval, periodically check and adjust the pressure in GB.

Pressure monitoring is carried out by means of mechanical pressure gauge with the upper measurement limit of 1.6 MPa (16 kgf/cm^2). Accuracy class - at least 1.5. Measurement point - see Fig.18.

Oil pressure in the hydraulic system of heated GB at gears with the crankshaft rotation rate of 900-1800 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 neutral gear and at engagement of synchroniser brakes shall not be less than on transmission gears.

Pressure shall be adjusted by turning plug 7 (Fig.35).

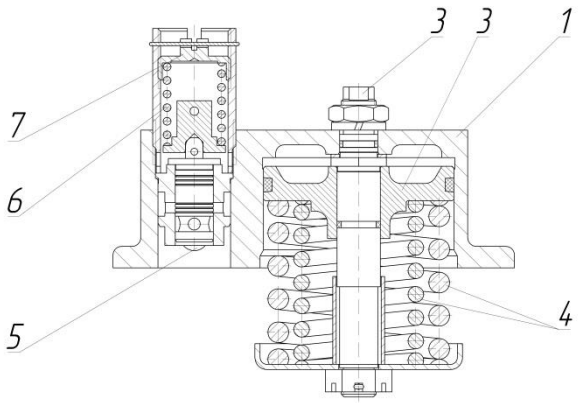


Fig. 35 GB hydraulic accumulator with pressure control valve

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

CAUTION! Hydraulic accumulator springs are always in the compressed state. Hydraulic accumulator shall be dismantled by a qualified specialist.

7 MAINTENANCE

7.1 TYPES AND FREQUENCY OF MAINTENANCE

Types and frequency of maintenance are given in Table 5 for the tractor and in the engine operation manual for the engine.

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

Seasonal maintenance (SM) of tractors shall be performed twice a year: M – SS (spring – summer) – at steady-state ambient temperature of at least plus 5°C, and M – AW (autumn – winter) – of less than plus 5°C. Seasonal maintenance of tractors shall be combined with regular maintenance operations.

Company must have a time schedule of M-1, M-2 and M-3 for each month, and of M-SS and M-AW - for their respective months.

Service logbook of the tractor must indicate date and type of all executed maintenance operations except ShM (shift maintenance), as well as lifetime hours from the beginning of operation of new or overhauled tractors.

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 operation running-in	---
Maintenance of tractor at the execution of running-in	10
Maintenance upon completion of running-in:	
K-744R1St tractor	50
tractors of remaining models	30
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 operation conditions
Maintenance in special operation 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 every 2 months, and under a canopy and at outdoor sites — once a month

7.2 LIST AND CONTENTS OF WORK BY TYPES OF MAINTENANCE TO BE PERFORMED BY OPERATOR IN THE PROCESS SEQUENCE

CAUTION! ENGINE MAINTENANCE SHALL CORRESPOND TO THE ENGINE OPERATION MANUAL.

Maintenance when preparing new tractor for running-in, carrying out running-in, upon completion of running-in

Job description	Preparation for running-in	Execution of running-in	Completion of running-in	Notes
Inspect and clean the tractor from dust and dirt	●		●	
Wipe preservation grease off open parts of hydraulic cylinder stems, spherical surfaces and threaded connections of the linkage	●			
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 units; if necessary, eliminate all faults	●	●	●	Upon leak detection and elimination it is necessary to check the level of respective fluids
Check the level and, if necessary, refill:				
- oil into tank of hydraulic systems of the linkage and for steering control	●		●	
- oil into the gearbox hydraulic system	●			
- oil into cases of the main and final gears of driving axles	●			
- cooling fluid into expansion tank	●	●	●	
oil to the engine lubrication system	●	●		
- electrolyte (or distilled water) into storage batteries			●	
Wash:				
- filter for centrifugal cleaning of engine oil			●	
- gearbox filter			●	
- breathers of driving axles, PDR (pump drive reducers), fuel tank, single-speed PTO reducer (if any)			●	
Replace cardboard filter elements and wash up the housings of hydraulic tank filters			●	
Drain:				
- condensate from air cylinders		●	●	
- 0.1 l of fuel from strainers and fine mesh fuel filters		●	●	

Job description	Preparation for running-in	Execution of running-in	Completion of running-in	Notes
Check and adjust, if required:				
- drive belt tension			●	
- travel of brake chamber stems of the service brakes			●	
- fuel injection lead angle:				
- for YaMZ-238ND engine			●	
- for 8481.10 engine			●	
Expansion gaps in the valve mechanism, after tightening the nuts of cylinder heads or rocker pivots:				
- for 8481.10 engine			●	
- for YaMZ-238ND engine			●	
Replace oil:				
- in the engine lubrication system			●	
- in the gearbox hydraulic system			●	
- in cases of the main and final gears of driving axles			●	
Set the pressure in tyres	●			
Check the condition of tyres and air pressure therein			●	
Check the engine drive belt tension and adjust it, 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 petroleum jelly	●		●	
Check the electrolyte density and, if necessary, bring it to the required value depending upon the climatic area where the tractor is operated	●			
Check the condition of filter elements of the 1st and 2nd air cleaner stages and, if necessary, perform their maintenance			●	

Job description	Preparation for running-in	Execution of running-in	Completion of running-in	Notes
Check threaded connections and other connections of the engine and the entire tractor and tighten them, if needed	●		●	Pay special attention to tightening the wheel fastening nuts, driving axle brackets, wedge joints of the frame's vertical hinge pivot axles, clamp fastening bolts for intermediate bearing
Check how does the engine work by ear and by monitoring instruments		●	●	Perform the operation in the course of tractor's work
Check the operation of tractor control mechanisms, operation of brakes, window wipers, lighting and signaling, hydraulic systems of the linkage and for steering control	●	●	●	
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 description	Notes
Perform maintenance of nozzles:	
- for 8481.10 engine	Perform the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
Tighten mounting bolts of intermediate bearing holders	Tightening torque is 3 kgf·m
Check and, if needed, tighten the fasteners:	
- of tractor wheels	Performs the operations at the first two maintenance sessions from the beginning of operation (M-1) (125, 250 engine hours)
- drive axle clamp nuts;	Performs the operations at the first two maintenance sessions from the beginning of operation (M-1) (125, 250 engine hours)
- bolts for fastening the "pinion carrier - hub" joint at final gears of driving axles	Perform 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	Perform the operation at the first maintenance from the beginning of operation (M-1) (125 engine hours)
- cardan shaft flanges	Perform the operation within the first 1000 engine hours at M-1 (once in every 125 engine hours)
- spring eye and spring clip plate nuts	Perform 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 air cleaner to engine.	

Shift maintenance (ShM)

Job description	Notes
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 units; if necessary, eliminate the faults	
Check the level and, if necessary, refill:	
- cooling fluid into expansion tank	
oil to the engine lubrication system	
Drain condensate from air cylinders	Drain sludge daily in winter and at least once a week in summer
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 magnetic coupling connection	
- check hoses for damage	
Blow down the magnetic coupling 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 the linkage and for 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 description	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Notes
Inspect the tractor and wash it over	●	●	●	
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 units; if necessary, eliminate the faults	●	●	●	
Wash:				
- filter for centrifugal cleaning of engine oil	●	●	●	
- gearbox filter		●	●	
- breathers of driving axles and single speed PTO, PDR			●	
Check the level and, if necessary, refill:				
- oil into the engine lubrication system;	●			

Job description	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Notes
- oil into tank of hydraulic systems of the linkage and for steering control;	●	●		
- oil into the gearbox hydraulic system;	●	●		
- oil into cases of the main and final gears of driving axles;	●	●		
- cooling fluid into expansion tank	●			
Replace oil:				
- in the engine lubrication system;	**As per engine operation manual**			
- in hydraulic system of the linkage and for steering control;			●	execute the operation every other M-3 session
- in the gearbox hydraulic system;			●	
- in cases of the main and final gears of driving axles			●	execute the operation every other M-1 session (250 engine hours)
Replace:				
- filter elements and wash up hydraulic tank filter housings	●	●	●	execute the operation every other M-1 session (250 engine hours)
- filter element and and wash up the filter housing, oil filter of the engine	**As per engine operation manual**			
- filter elements of pressure filters of the hydraulic system and wash up the filter housings				When the indicator lamp for filter element clogging is alight at the working fluid temperature above 20°C
- oil filter of the engine	**As per engine operation manual**			
- fuel strainer			●	
- fine mesh fuel filter	**As per engine operation manual**			
Drain:				
- condensate from air cylinders	●	●	●	
0.1 l of fuel each from strainer and fine mesh filter	●	●	●	
Check and adjust, if required:				
- drive belt tension	●	●	●	
- drain pedal drive		●	●	
- travel of brake chamber stems of the service brakes	●	●	●	
- blocking the engine start-up with engaged gear	●	●	●	
- fuel injection lead angle		●	●	
Expansion gaps in the valve mechanism, after tightening the nuts of cylinder heads	**As per engine operation manual**			
Check the condition of tyres and air pressure therein	●	●	●	

Job description	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Notes
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 petroleum jelly	●	●	●	
Check the electrolyte density and degree of charge of storage batteries and, if necessary, charge or replace them with those charged		●	●	
Check the condition of filter elements of the 1st and 2nd air cleaner stages and, if necessary, perform their maintenance	●	●	●	perform maintenance in case when indication lamp 29, Fig. 1, 2, 3, 4 for filter element clogging lights up
Check the condition of cabin ventilation filter elements and, if necessary, perform their maintenance	●			
Lubricate the following:				
- pins of hydraulic cylinders in hydraulic systems of the linkage and for steering control	●	●	●	
- supports of service brake cams	●	●	●	execute the operation every other M-1 session (250 engine hours)
- main lever shaft supports of the linkage mechanism	●	●	●	
- frame’s vertical hinge pivot axles;		●	●	
- frame’s horizontal hinge pivot;			●	
- cardan shaft crosspiece bearings	●	●	●	execute the operation every other M-1 session (250 engine hours)
Check and, if needed, tighten the fasteners:				
- of 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” joint			●	see Appendix 4
- bolts for attaching housings to the main gear case			●	see Appendix 4
- wedge connections of the frame’s vertical hinge pivot axles;		●	●	
- mounting bolts of intermediate bearing holders		●	●	see Appendix 4
- spring eye and spring clip plate nuts		●	●	
Check how does the engine work by ear and by monitoring instruments	●	●		

Job description	M-1 (125 engine hours)	M-2 (500 engine hours)	M-3 (1000 engine hours)	Notes
Check the operation of tractor control mechanisms, operation of brakes, window wipers, lighting and signaling, hydraulic systems of the linkage and for 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 air cleaner to engine.	●			
Check the tightness of the clean air supply line to engine and of the dust removal line from air cleaner.		●	●	
Perform maintenance for engine nozzles.	●			Execute the operation for YaMZ-238ND5 engine after the first 250 engine hours
Drain condensate from the engine supercharge air cooler (SAC).	●			only for tractors with Mercedes engines
Check the operation of all tractor's mechanical parts at idle run and under load			●	Perform the operation in the course of tractor's work
Check the ease of rotation of the turbocharger rotor and, if necessary, perform its maintenance			●	

CAUTION! In case of tractor operation under climatic conditions requiring no seasonal maintenance (M-SS, M-AW), perform oil change in the gearbox hydraulic system once in every 1000 engine hours.

Seasonal maintenance - spring-summer (M-SS) and autumn-winter (M-AW)

Job description	M-SS	M-AW	Notes
Bring the density of electrolyte in storage batteries to the summer standard value.	●		
Check the operation of the service brake pneumatic system	●	●	
Replace oil of winter grades with summer grades according to the lubrication table:			
- in the engine lubrication system	●		
- in the gearbox hydraulic system	●		
- in the tank of hydraulic systems of the linkage and for steering control	●		Perform the operation once in every 2000 engine hours
- in cases of the main and final gears of driving axles *	●		
Lubricate the spring eyes	●	●	

* Do not replace oil in case when all-season oil grades are used

Job description	M-SS	M-AW	Notes
Check the cooling liquid density		●	If needed, refill concentrated anti-freeze agent of Tosol AM brand
Bring the density of electrolyte in storage batteries to the winter standard value.		●	
Replace oil of summer grades with winter grades according to the lubrication table:		●	When using seasonal oil
- in the engine lubrication system		●	
- in the gearbox hydraulic system		●	
- in the tank of hydraulic systems of the linkage and for steering control		●	
- in cases of the main and final gears of driving axles *		●	
Wash up filter elements and housing of the fuel strainer		●	Perform the operation only with 8481.10 engine
Clean and wash up the protection grills of water and oil radiator and of supercharge air cooler		●	Perform the operation only with 8481.10 engine; at the same time, change 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 units		●	Perform the operation only with 8481.10, involving specialists at workshops or at tractor service stations (TSS)

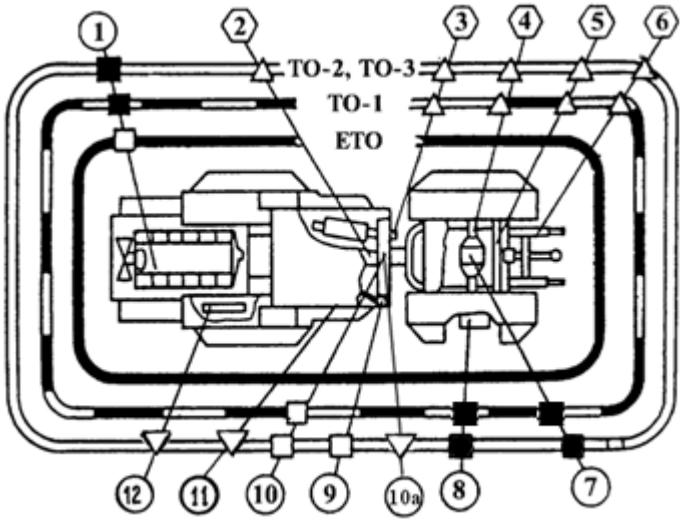
7.3 TYPES AND LISTS OF MAINTENANCE OPERATIONS DURING STORAGE

Maintenance during long-term storage
in closed premises, under canopy and at outdoor sites

Job description	Notes
Check the correctness of tractor positioning 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	Perform the operation once a month
Check the air pressure in tyres	
Check 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

- level check and oil refill
- oil change
- grease
- oil
- plastic grease



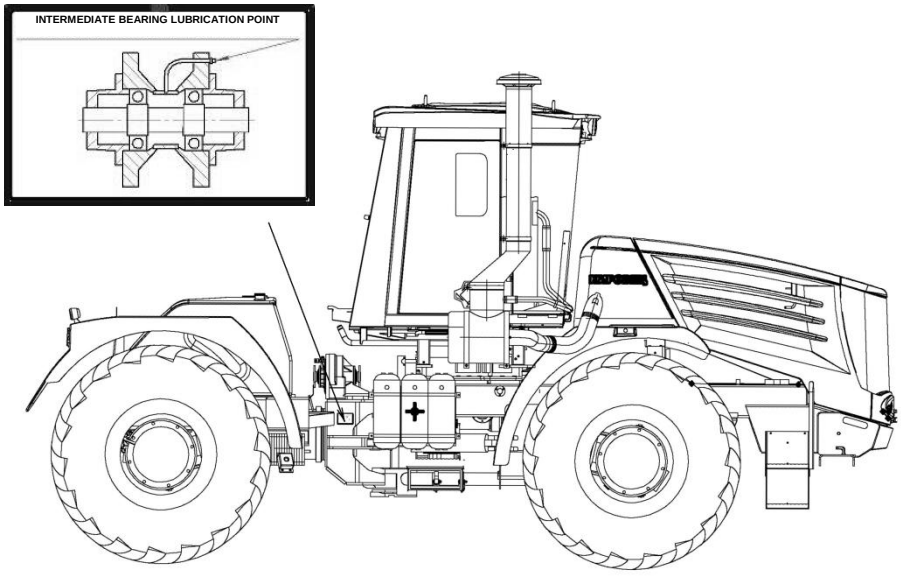


Fig. 36 Tractor lubrication diagram

7.4. LUBRICATION TABLE

Table 6

Position No. in lubrication (filling) diagram, Fig.36	Name of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of grease (engine hours, maintenance type)		Notes
		lubrication and filling during operation temperature		lubrication during storage		main greases	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
1.	Engine lubrication system	As per operation manual for the engine				250		
2.	Frame's vertical hinge pivot axles	Loctite 8103 grease		Main grease being used	2 by 0.3 l each	500		
		Substitutes:						
		Grease No.158 TU 38.101.320-77					250	
3.	Hydraulic cylinder pins of the hydraulic system for steering control	Litol-24 grease GOST 21150		Main grease being used	4 by 0.05 l each	125	60-65	
		Substitutes:						
		Cup grease G Solid oil G GOST 1033						
		Cup grease S Solid oil S GOST 4366						
4.	Supports of service brake cams	Litol-24 grease GOST 21150		Main grease being used	8 by 0.05 l each	250	125	
		Substitutes:						
		Cup grease G Solid oil G GOST 1033						
		Cup grease S Solid oil S GOST 4366						
5.	Supports of main levers' shaft of the mounted equipment	Litol-24 grease GOST 21150		Main grease being used	2 by 0.05 l each	125	60-65	
		Substitutes:						

Position No. in lubrication (filling) diagram, Fig.36	Name of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of grease (engine hours, maintenance type)		Notes
		lubrication and filling during operation temperature		lubrication during storage		main greases	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
		Cup grease G Solid oil G GOST 1033						
		Cup grease S Solid oil S GOST 4366						
6.	Hydraulic cylinder pins of the linkage	Litol-24 grease GOST 21150		Main grease being used	4 by 0.05 l each	125	60-65	
		Substitutes:						
		Cup grease G Solid oil G GOST 1033						
		Cup grease S Solid oil S GOST 4366						
7	Cases of main gears of driving axles	For all-seasonal use: Transmission oil TSp-15K GOST 23652		See Section 9	2 by 10 l each	250		every other M-1
		Substitutes: Shell Spirax AD SAE 80W90; Shell Spirax S3 AX 80W90; Shell Donax TD 10W30; Shell Spirax S4 TXM TS3p-8 TU 38.1011280-89 For all seasons to the temperature of minus 15°C Tap-15V		See Section 9			250	

Position No. in lubrication (filling) diagram, Fig.36	Name of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of grease (engine hours, maintenance type)		Notes
		lubrication and filling during operation temperature		lubrication during storage		main greases	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
8	Cases of final gears of driving axles	For all-seasonal use: Transmission oil TSp-15K GOST 23652		See Section 9	4 by 3.5 l each	250		
		Substitutes: Shell Spirax AD SAE 80W90; Shell Spirax S3 AX 80W90; Shell Donax TD 10W30; Shell Spirax S4 TXM TS3p-8 TU 38.1011280-89 For all seasons to the temperature of minus 15°C Tap-15V		See Section 9			250	every other M-1
9.	Gearbox hydraulic system	Engine oil M-8V2 GOST 8581	Engine oil M-10V2 GOST 8581		1 by 23 l each	TSS		
		Substitutes: see Appendix 5					TSS	
10.	Hydraulic system of the linkage and for steering control	For all-seasonal use: RW X-Hydraulic S Force HV-ZF 32		Oil to be used	1 by 175 l each	2000		
		Substitutes:						
		Oil VMGZ TU 38.101479-86	MGE-46V TU 38.001347-83	Oil to be used			2000	
11.	Supports of vertical rollers for gearbox mode switchover	Litol-24 GOST 21150		Main grease being used	2 by 0.05 l each	500		
		Substitutes:						
		Solid oils as per GOST 1033 and GOST 4366					250	

Position No. in lubrication (filling) diagram, Fig.36	Name of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of grease (engine hours, maintenance type)		Notes
		lubrication and filling during operation temperature		lubrication during storage		main greases	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
12.	Spring eyes	Litol-24 grease GOST 21150		Main grease being used	2	500		
		Substitutes:						
		Solid oils as per GOST 1033 and GOST 4366					250	
	Frame's horizontal hinge pivot	Loctite 8103		Main grease being used	1 by 2.8 l each	for assembly dismantling		
		Substitutes:						
		Grease No.158 TU 38.101.320-77		Main grease being used		for assembly dismantling		
	Brake lever	Litol-24 grease GOST 21150		Main grease being used	4	for assembly dismantling		
		Substitutes:						
		Grease No.158 TU 38.101.320-77		Main grease being used		for assembly dismantling		
10a	Bearings of intermediate support	Litol-24 grease GOST 21150		Main grease being used	2 by 0.3 l each	once in every 250 engine hours		
		Substitutes:						
		Grease No.158 TU 38.101.320-77		Main grease being used				
	Cardan shaft crosspiece bearings	Litol-24 grease GOST 21150		Main grease being used	8 by 0.15 l each	as per maintenance		
		Substitutes:						
		Grease No.158 TU 38.101.320-77		Main grease being used				

Position No. in lubrication (filling) diagram, Fig.36	Name of lubrication points	Description of grade and designation of standard for lubricants and fluids			Number of lubrication points and their capacity	Frequency of grease (engine hours, maintenance type)		Notes
		lubrication and filling during operation temperature		lubrication during storage		main greases	substitutes	
		from minus 40°C to +5°C	from +5°C to +40°C					
	Slotted connections of cardan shafts	Litol-24 grease GOST 21150		Main grease being used		for assembly dismantling		Change the grease in cardan shaft of front driving axle once in every 4000 engine hours.
		Substitutes:						
		Grease No.158 TU 38.301-40-25-94		Main grease being used				

N o t e . 1. Volume of the waste oil collected upon oil change is 80% of the filling tanks volume.
2. When using Litol-24 grease, it is not allowed to mix it with calcium (solid oils), sodium and aluminum greases.
3. At the ambient temperature of +5°C and over, use summer oil grades throughout the year.

7.5 CONTENTS AND PROCEDURE OF MAINTENANCE OPERATIONS

7.5.1 Change of oil in the engine

Put 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 drip pan of the engine and take off the lid of oil filler port after cleaning it from dust and dirt.

On K-744R1St tractors (with YaMZ-238ND5 engine), additionally undo the plug on the upper header of engine oil radiator for oil drainage from the radiator to the oil drip pan.

After full drainage, screw in the plugs.

2. Clean the oil filler port from dust and dirt before filling oil therein. Through the oil filler port, fill oil into the engine. Check tightening of drain plug of the oil drip pan.

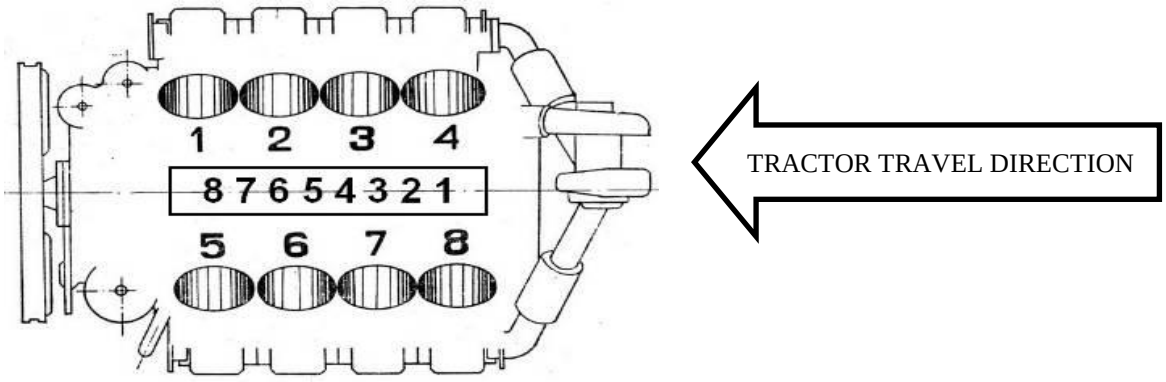
Use oil probe to monitor the oil level.

3. In order to fill oil into the engine lubrication system, run the engine for 2...3 minutes and refill oil in 10...15 minutes after the stop.

7.5.2 Adjustment of cylinder valves at 8481 engine

In order to perform the cylinder adjustment operation, it is required to dismantle the plastic arch on the tractor and mount it back after the adjustment.

Right-hand row of cylinders



Left-hand row of cylinders

Tools for execution of work:

1. A set of ratchet wrenches - 1 set.

2. Combined wrench with open-end part for (10-24) mm.

3. White marker for metal (to mark out outlines of brackets and fasteners).

4. Rags or any other material for binding the arch in order to avoid damage of the paint-and-varnish coating.

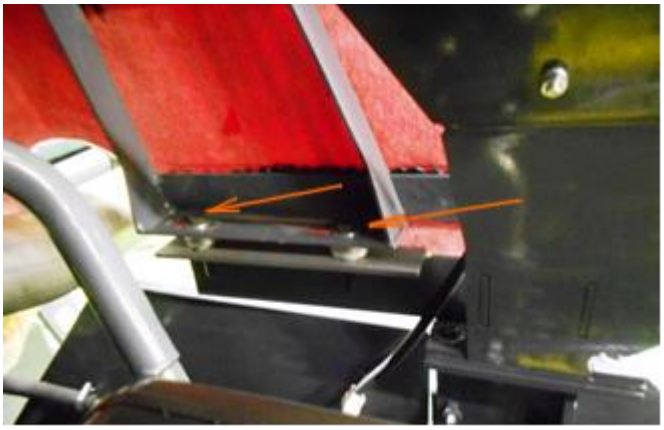
1 Plastic arch dismantling

1.1 Undo 4 nuts M10 inside wing 4 and 2 bolts M10 at the side, disconnect electrical male connector of the turn indicator. Take off the wing after wrapping or binding it in film in order to prevent damage of the paint-and-varnish coating, put it at 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 hood and insert retainers into the upper hole of process stoppers.

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 at both sides of the arch fastening with bracket (before dismantling, mark out outlines of fasteners and bracket in order to simplify the assembly).

CAUTION! All adjustment washers and shims shall be kept and stowed in a specialised container. During installation they shall be placed in their positions in the same quantity.

1.6 Take off the retainer from the process stopper and close the hood.

1.7 Dismantle the arch from the tractor after wrapping or binding it in film in order to prevent damage of the paint-and-varnish coating, put it at a specially allocated place. **CAUTION! The arch shall be dismantled using the help of assistant.**

1.8 Open the plastic hood and insert the retainer into the upper hole of the process stopper.

1.9 Loosen the clamp and disconnect the crankcase gas exhaust pipe from valve cover 3 of the cylinder.

1.10 Undo two lower bolts M10 on the bracket before dismantling, mark out bracket outline in order to simplify the assembly).

1.11 Loosen three bolts M10 on the top of the bracket and undo two outermost bolts. Leave the central bolt and turn the bracket aside towards the cabin. **CAUTION! In the course of bracket dismantling the second worker shall hold the upper corner of the hood on the right in the direction of tractor travel.**

1.12 Undo 4 bolts M8x40 of the valve cover of cylinder block 3 head and take off the valve cover of cylinder block 3 head.

1.13 Install the valve cover of the block head and fix it with 4 bolts M8 with the tightening torque of $M=2^{+0.5}$ kgf-m. Tighten the bolts crosswise.

1.14 Install the crankcase exhaust gas pipe and fix it with a clamp. Tightening torque of the clamp is $M=1.5^{+0.5}$ kgf-m.

1.15 Install the bracket (-140), place it over the pre-marked outline and tighten 2 bolts M10 on the bottom and 3 bolts M10 on the top of the bracket, having maintained the tightening torque of $M=5^{+0.6}$ kgf-m.

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 hood.

1.20 Install the lateral facing sheets and tighten 3 bolts M8 with M=3 kgf-m (at both sides).

1.21 Install plastic wings onto the brackets and tighten 4 bolts M10 with M=5 kgf-m and 2 bolts M10 with M=5 kgf-m on the side, connect the electrical male connector (of turn indicator).

7.5.3 Air cleaner maintenance

Perform maintenance of flat filter elements (cartridges) of the air cleaner in case when the clogging alarm indicator actuates.

To dismantle cartridges 3 (Fig.37), it is necessary to undo nut 8, take off cover 7, undo nuts 6 one-by-one and remove them from the air cleaner housing.

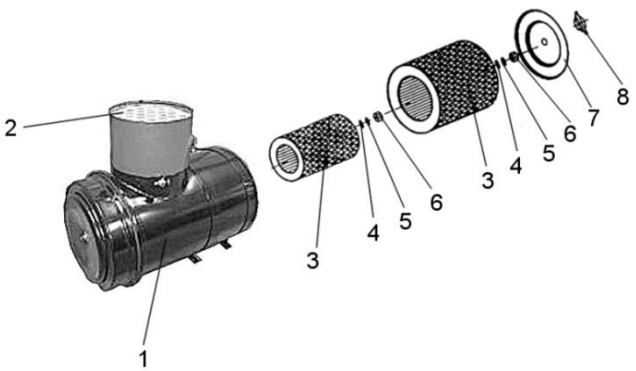


Fig.37 Air cleaner
1 - air cleaner housing;
2 - cyclone unit;
3 - filter elements (cartridges);
4 - sealing gasket;
5 – washer; 6 – nut; 7 – cover;
8 - nut

Cleaning the cartridges by blowdown with compressed air (Fig.38) or by washing (Fig.39) in a detergent solution.

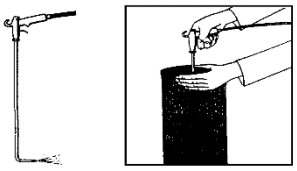


Fig. 38 Cartridge blowdown

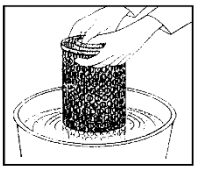


Fig. 39 Cartridge washing

Assemble air cleaner in the order reverse to the sequence described above.

Cartridge blowdown

a) connect the hose to compressed air source with the pressure of (0.2-0.3) MPa [(2-3) kgf/cm^2] max.

b) start the air supply;

c) direct a dry air jet to the rear end of the filter element (at the safety filter element side), perform air-blasting of the filter element until all dust is removed. Adjust the air-blasting intensity by adjusting 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 filter element.

5-6 cleaning operations of filter elements are allowed.

CAUTION! 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. When cleaning (blowing down) the filter element, do not allow ingress of dust into the internal cavity of the cartridge and the suction path of the engine.

2. Do not allow mounting cartridges with defected seals at the ends, in particular, with seals not being glued and with the filter paper damaged.

3. See for firm adherence of the end rubber seals of the cartridges to the air cleaner housing.

4. Regularly check the reliability of tightening and, if necessary, retighten the clamps fastening the corrugated branch pipe that connects the air cleaner with the suction branch pipe of the engine turbocharger. During maintenance of the air cleaner, check the suction path downstream 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 the tightness of clean air supply line to the engine and dust removal line from the air cleaner

After each removal and installation of air cleaner in the tractor or its disconnection from the engine, it is necessary to check tightness of connector areas of the cleaned air supply line to the engine as well as of the dust removal line from the air cleaner. To perform this check, use KI-4870-GOSNITI device or U-shaped water manometer. Before the check, tighten all clamps of line hoses. Perform the check with the engine operating on idle run at the crankshaft rotation rate of 30.0 s^{-1} (1800 RPM). Press the device tip to the area of connector or assumed leak-tightness fault. Water level variation 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 non-tight air feed channels from the air cleaner to the engine and dust suction channels 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 in the course of M-1.

IT IS ABSOLUTELY PROHIBITED to work 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 cartridges.

7.5.4 Cooling system maintenance

Filling and check of the cooling fluid:

a) fill in the tractor cooling system through the expansion tank filler to a level visible via the sight hole of the tank. When working, do not allow level reduction beyond the permissible level.

b) avoid leaks of cooling fluid;

c) in order to prevent premature clogging of the cooling system, cooling fluid shall be filled and drained into a clean reservoir; ingress of oil products therein must be prevented;

d) a drain valve located on the pipe connecting the radiator to the water pump is provided under the radiator to drain the cooling fluid from tractors with 8481.10/-02/-04, OM460LA (Mercedes) engines. In tractors with YaMZ- 238ND5 engine, the valve is located on the heating boiler. There is a drain plug on the left-hand block of 8481.10/-02/- 04, YaMZ-238ND5 engines;

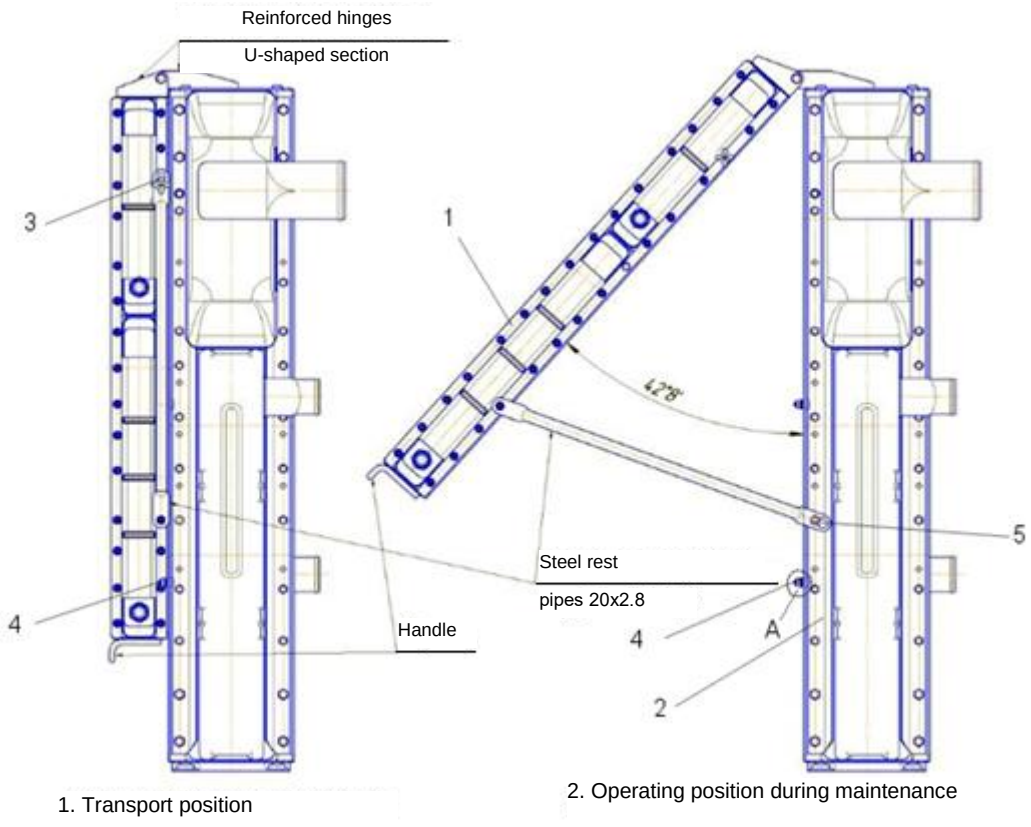
e) fill and refill the cooling system only using automotive cooling fluids specified in the manual for the engine.

CAUTION! 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 at both sides - from the radiator's front and from the fan casing side.

In case of a repeated overheating of the engine, it is necessary to thoroughly check the condition of the radiator core. In particular, see for the absence of fouling between radiator plates by checking clearances therein with the help of a standard portable lamp. If needed, blow down or (in case when dirt is not removed with 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 oil radiator block 1 from engine cooling block 2 is provided for the tractors.

For the tractors of Premium design version



1. Transport position

2. Operating position during maintenance

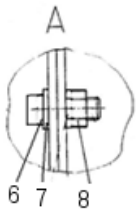


Fig. 40 Tractor radiator block

1 – oil radiator block; 2 – engine cooling block;
3 – screw; 4 – stud; 5 – axle; 6 – bolt; 7 – washer; 8 – nut

Oil radiator block is fastened to the engine cooling block in the upper part by hinges.

In the lower part of the cooling block, there are one stud 4 on its both side walls each.

In the initial position, oil radiator block 1 is installed on 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 bring the lower part of the oil radiator block away from the cooling block, then, holding the block brought away, move the rest into the lower position and fix it on axle 5.

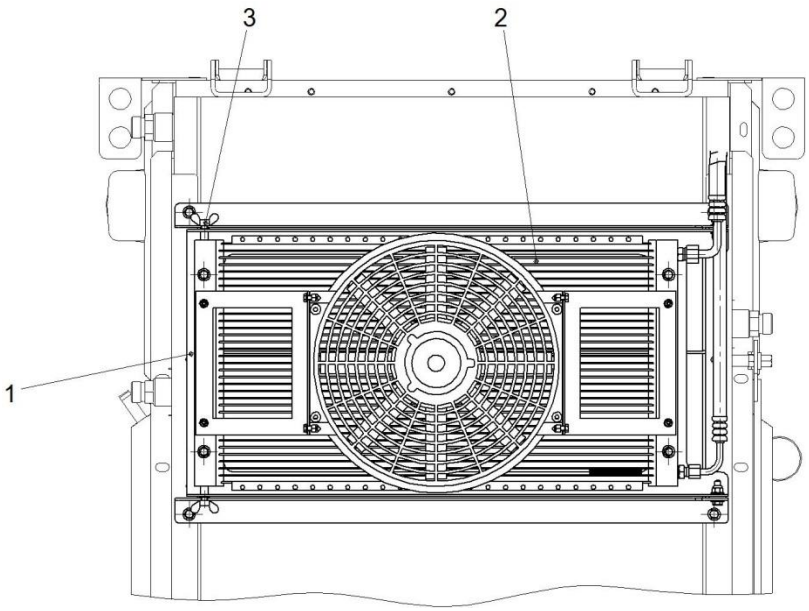
2. When cleaning the radiator cores, ***IT IS PROHIBITED*** for the operator to stay in the area blocked off by the oil radiator block.

3. Upon completion of maintenance of the cores, hold the oil radiator block and, in doing so, move the rest into the initial position and fix it with screw 3.

4. Fasten oil radiator block 1 to cooling block 2 by means of nuts 8 and washers 7.

5. Check reliability of fastening of the hydraulic system hoses to the oil radiator block.

<u>For K-744R2, K-744R3, K-744R4 tractors of Premium design version</u>



1 – condenser frame; 2 - condenser with fan;
3 – winged screw

In order to clean the cells of condenser 2 and of the oil radiator, a mechanism allowing to clean the radiator core is provided for.

For a rapid cleaning without condenser dismantling and system depressurisation, it is required to loosen two screws 3 and extend the left-hand part, having turned the condenser jointly with frame 1 around the fastening axle. After the maintenance return everything to the initial positions.

For the tractors of Standard design version

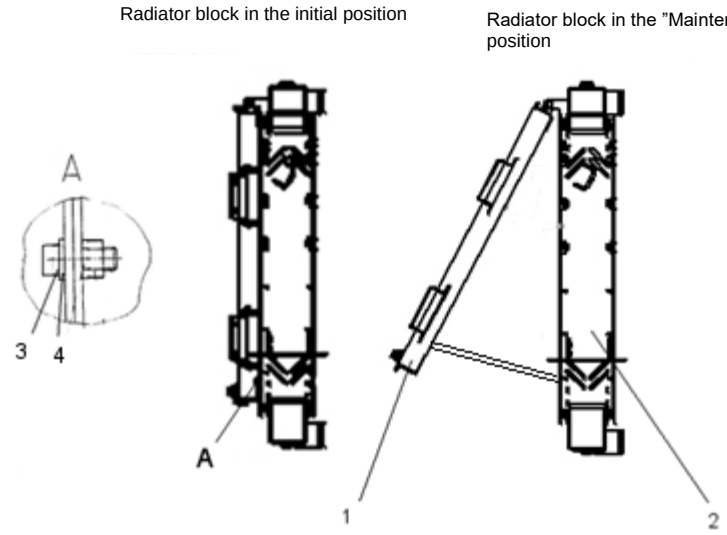


Fig. 41 Tractor radiator block

1 – oil radiator block;
2 – engine cooling block;
3 – bolt; 4 – washer

Oil radiator block is fastened to the engine cooling block in the upper part by hinges (Fig. 41).

In the lower part of the cooling block, there are one stud each on its both side walls.

In the initial position, oil radiator block 1 is fixed on cooling block 2 by means of fasteners 3, 4 (view A).

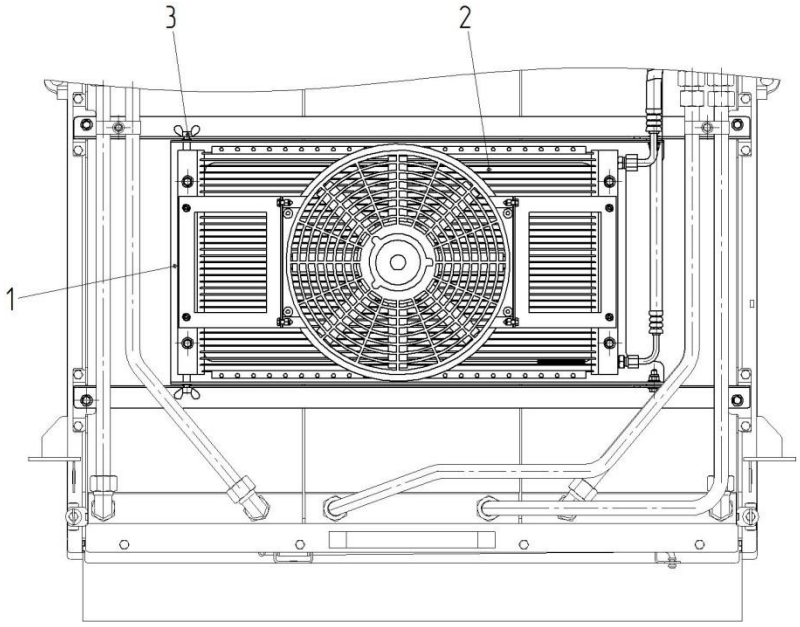
In order to clean the radiator cores, it is necessary to do the following:

1. Undo the fasteners and bring the lower part of the oil radiator block away from the cooling block, then, holding the block brought away, move the rest into the lower position and fix it on the axle.

2. When cleaning the radiator cores, ***IT IS PROHIBITED*** for the operator to stay in the area blocked off by the oil radiator block.

3. Upon completion of maintenance of the cores, hold the oil radiator block and, in doing so, move the rest into the initial position and attach oil radiator block 1 to cooling block 2 by means of fasteners 3, 4.

For K-744R1 tractor of Standard design version

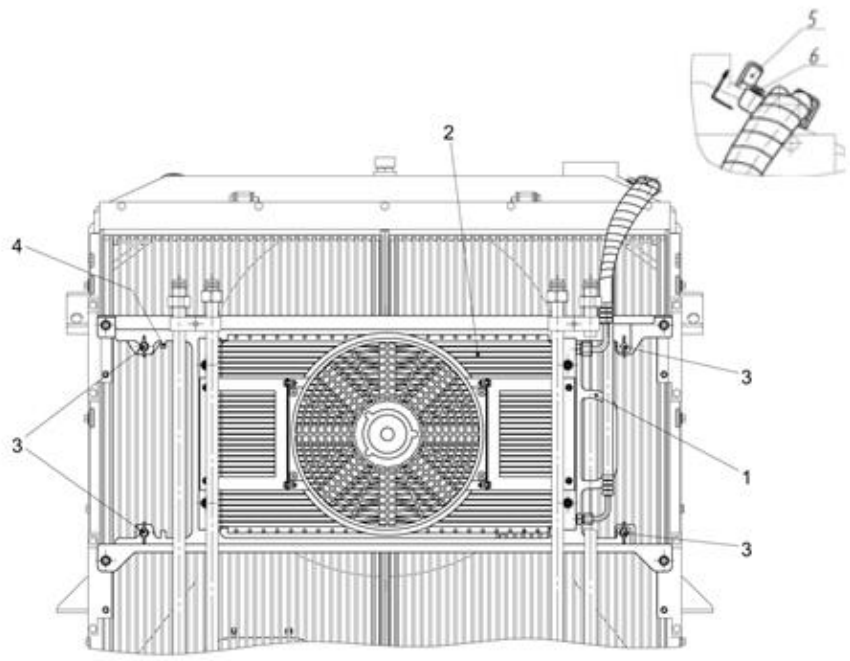


1 – condenser frame; 2 - condenser with fan;
3 – winged screw

In order to clean the cells of condenser 2 and of the oil radiator, a mechanism allowing to clean the radiator core is provided for.

For a rapid cleaning without condenser dismantling and system depressurisation, it is required to loosen two screws 3 and extend the left-hand part, having turned the condenser jointly with frame 1 around the fastening axle. After the maintenance return everything to the initial positions.

For K-744R2, K-744R3, K-744R4 tractors of Standard design version



1 – condenser frame; 2 - condenser with fan;
3 – winged screw; 4 – limiter; 5 – bracket; 6 – bolt

In order to clean the cells of condenser 2 and of the oil radiator, an extendable quick-disconnect attachment structure allowing to clean the radiator core is provided for.

In order to clean the surfaces from dust and dirt, without condenser dismantling and system depressurisation, it is required to get air conditioner refrigerant hoses free; to this end, disengage bracket 5 by pushing it and then moving upwards. Undo two screws 3 on the right and loosen two screws 3 on the left; then pull frames of condenser 1 by the handle and extend the condenser all the way to the right towards limiters 4. After the maintenance return everything to the initial positions.

7.5.5 Gearbox maintenance

Level check and oil filling

Put the tractor on a horizontal ground.

Oil level can be checked by undoing the plugs of the reference ports: upper one 5 and lower one 6 (Fig.18). Before checking the oil level, start the engine and run it for 3...5 min at the crankshaft rotation rate of 11.7...16.7 s^{-1} (700...1000 RPM). Shut off the engine and monitor the oil level within 3 minutes max. The level shall be between the reference ports. 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 coupling engaged.

Oil change

a) Undo drain plug 8 (Fig. 18), drain oil. For better removal of spent oil and sludge, perform drainage immediately after engine shutdown. 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 pack of filter elements 10 (Fig. 42) 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. 42) of the filter and drain oil.

b) Unscrew base 6 and detach cup 7 of the filter assembly from housing 1.

c) Undo nut 13 that fastens filter sections and take out locking nut 12, bushings 4, 11 and filter 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 pack of filter elements 10 (Fig. 42) in the assembled filter shall be firmly tightened with nut 13.

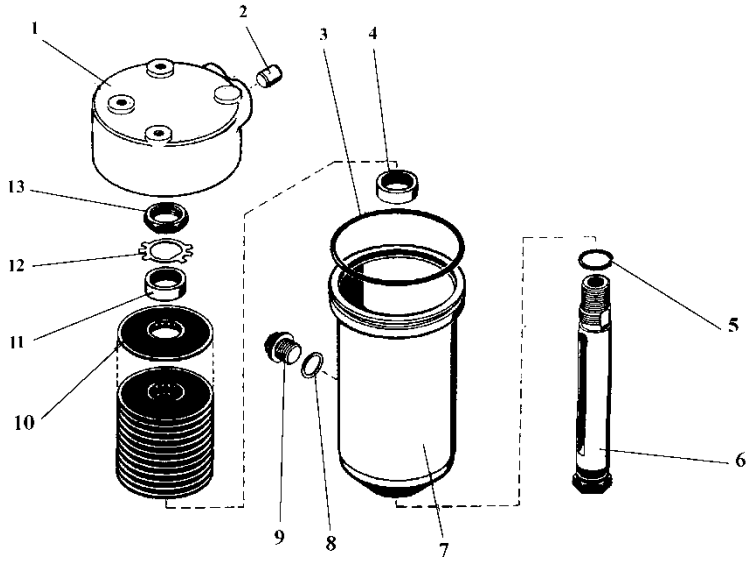
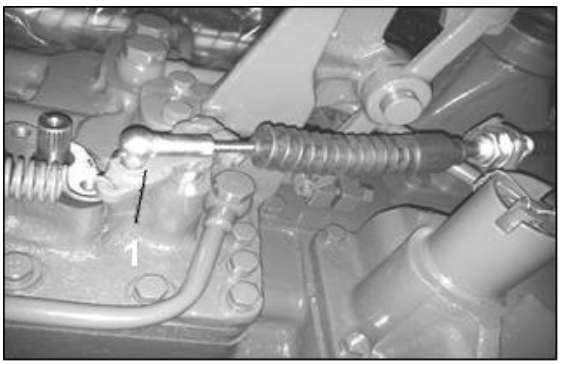
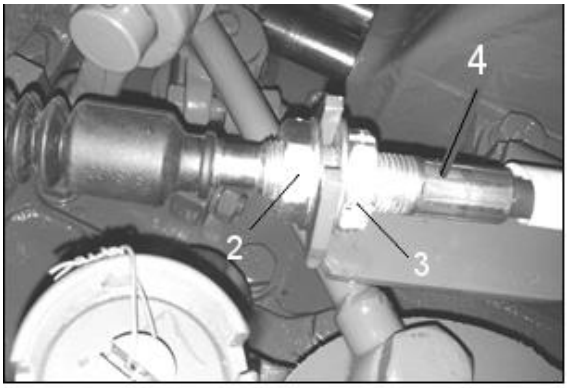


Fig. 42 Gearbox filter with pressure valve
1 – housing; 2 – blind plug; 3, 5 – ring; 4, 11 – bushing; 6 – base; 7 – cup; 8 – gasket; 9 – plug; 10 – filter element; 12 – washer; 13 – nut

Adjustment of drain pedal drive

In the course of M-2 and M-3 sessions (after 500 engine hours of operation) it is necessary to adjust the drain pedal drive:





– install the gear control rack in the fixed position corresponding to the neutral gear engagement;

– with loosened nut, pos. 2, screw in 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 turn;

– lock the adjustment nut, pos.3, by means of the nut, pos.2;

– check functioning of the wire rope drive - with the drain pedal pressed, changeover from neutral to 1st gear and vise versa shall be performed without jamming. After pressing the pedal a slow pedal return into the initial position is not allowed.

7.5.6 Maintenance of driving axles, service brakes

Level check, filling and change of oil in main gear cases

Put the tractor on a horizontal ground. In order to check oil level, undo the plug from the reference port. 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 a funnel with hose and drain oil through the port in the bottom part of the case. Unscrew the breather and close the port with a plug before oil filling. Wash the breather in diesel fuel, blow it down with compressed air and mount it back in place.

Level check, filling and change of oil in final gears

In order to check the level and fill oil in final gears, it is necessary to set one of the two triangular marks 1 (Fig.43) on the pinion carrier to the extreme lower position and undo plug 2. Fill oil by means of funnel. Drain oil through the drain port (reference port) when it is located in the bottom position, using the attachment for oil drainage.

Change oil in the following sequence:

– set one of the pinion carriers to the oil drainage position;

– drain oil from the final gear;

– set the second pinion carrier to the oil drainage position;

– drain oil from the second final gear;

– fill fresh oil into the first final gear and screw in the plug.

Change oil in the remaining final gears in a similar manner.

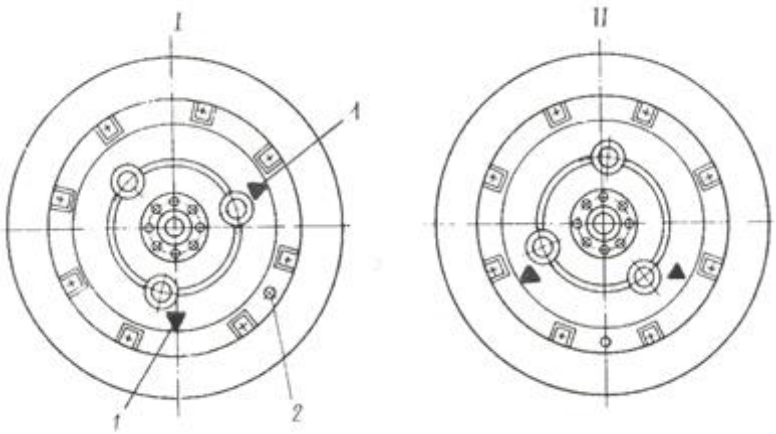


Fig.43 Final gear

1 - triangular mark; 2 - reference port plugs

I – pinion carrier position for oil level check and refilling; II – pinion carrier position for oil drainage

Check and adjustment of the travel of brake chamber stems in 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) Depress the brake pedal and check the travel of brake chamber stems 6 (Fig. 44). Stem travel shall be within 30-45 mm, travel difference between the right-hand and left-hand stems shall not exceed 7 mm.

If necessary, perform the following adjustment: rotate axle 5 to reach the travel value of 30-45 mm, rotate the worm each time at 1/6 of turn (60°) to the next fixed position. Thereafter check the tractor in driving.

Make sure of reliable and simultaneous action of brakes, absence of heating of brake drums 1 when the tractor drives without using brakes.

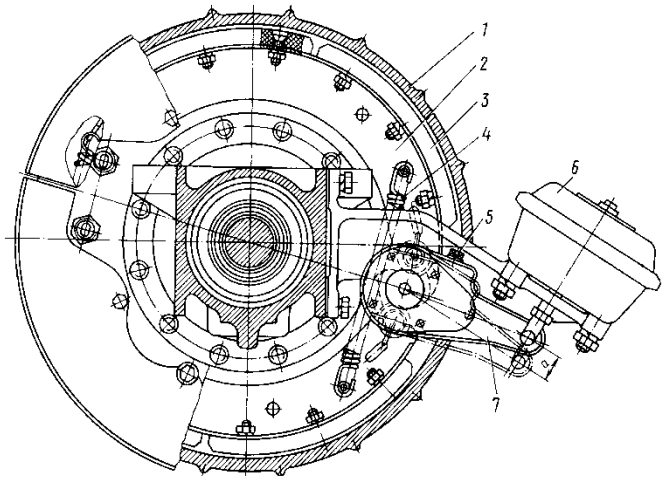


Fig. 44 Service brake
1 - brake drum; 2 - brake shoe; 3 - pad;
4 - spring; 5 - worm axle;
6 - brake chamber; 7 - brake lever;
a - brake chamber stem travel

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 it's not too hot – the heating is normal). In case of overheating, take off 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 tyre iron or any other items to be inserted into the joint for cardan shaft barring. This entails a damage of seals, which can lead to premature 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

Condensate drainage from air cylinders

In order to ensure normal operation of the pneumatic drive, remove condensate from air cylinders after the completion of work, as condensate may get into tubes and instruments of the braking system and lead to their failure.

To remove condensate, move aside plug stem at the lower part of the cylinder.

In winter it is necessary to see for condensate absence with special attention in order to avoid its freezing in the drive tubes.

Tractor pneumatic system operation check

a) Fully release air from the pneumatic air by pressing the brake pedal several times.

b) Start the engine, set the manual fuel feed into the position of maximum crankshaft speed and switch on the chronometer.

c) Fill air into the system to reach the maximum pressure being determined by termination of movement of the air pressure gauge pointer, which is noticeable by eye. When in serviceable condition and with a normally adjusted pressure controller, the compressor shall fill the system up to the pressure of 0.65-0.8 MPa (6.5-8.0 kgf/cm2) within 180 s (3 min) max.-

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) Press and depress the brake pedal to bleed air down to the pressure of 0.65 MPa (6.5 kgf/cm^2) min. Then check the pressure drop; it shall not exceed 0.05 MPa (0.5 kgf/cm^2) over (30±2) min with a free position of the pedal and over (15±1) min – with the pedal being fully pressed. If the pressure falls to a greater extent, visually find the air leakage point and eliminate the fault. If the limits for air pressure adjustment in the pneumatic system do not conform to the specified values, i.e. are not 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 controller.

Pressure controller maintenance

Before maintenance of the pressure controller, inspect and clean it from dust and dirt.

Using the adjustment bolt, adjust the compressor activation pressure 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).

Bolt 7 (Fig.45) with locking nut 8 located at the upper part of the controller shall be used for adjustment. The adjustment bolt should be screwed in with low air pressure and screwed out - with high air pressure. If one cannot manage to correctly adjust the pressure limits, the controller should be dismantled for repair. It is recommended to clean and wash the pressure controller filter periodically, once in every two months. It is especially important in case when oil gets into condensate due to a compressor fault.

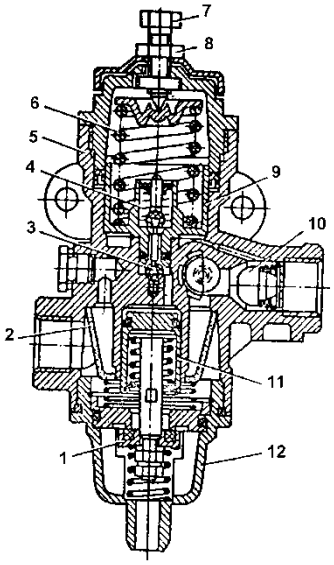


Fig. 45 Pressure controller

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 benzine and blow it down with compressed air. Perform the assembly in the reverse order.

Brake system unit maintenance

Taps and valves do not need any special maintenance. Replace taps in case of any defects detected in the course of operation.

Maintenance of connecting heads consists of systematic inspection, cleaning from dirt. Connecting heads are closed with covers protecting them against the ingress of dirt, snow, moisture.

7.5.9 Maintenance of hydraulic systems of the linkage and for steering control

Level check and change of oil in the hydraulic tank of the hydraulic systems of the linkage and for steering control

Put the tractor on a horizontal ground.

Check oil level in the hydraulic tank via the sight hole 25 (Fig.46); oil should be visible through the sight hole. Fill clean oil through the grill of filler port 7. When checking oil level in the hydraulic tank, make sure of the absence of foam generation.

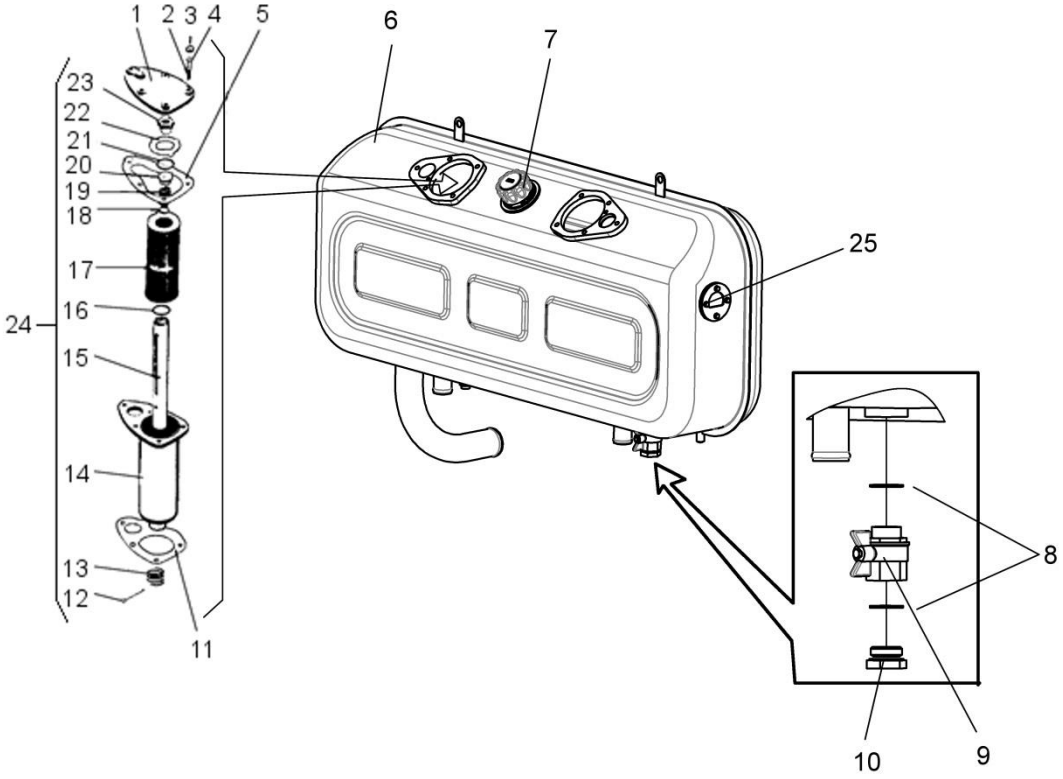


Fig.46 Hydraulic tank

1 – cover; 2 – stud; 3 – nut; 4 – washer; 5 – gasket;
6 – tank housing; 7 – oil filler port; 8 – O-ring;
9 – ball valve; 10 – plug; 11 – gasket; 12 – splint pin; 13 – spring;
14 – filter housing; 15 – pipe; 16 – ring; 17 – filter element; 18 – washer;
19 – spring; 20 – valve; 21 – ring; 22 – washer; 23 – valve socket;
24 – filter assembly; 25 – sight hole

Keep clean during oil change; the oil is used 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 formation 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 ball valve 9 and drain heated oil;

b) replace filter elements 17, wash the filler port grill;

c) wash filler port 7 in diesel fuel and blow it down;

d) fill oil into the hydraulic tank, start the engine and run it for 2...3 minutes at a low crankshaft speed without rotating the steering wheel.- Hydraulic distributor levers shall be in “Neutral” position;

e) increase the engine crankshaft speed and make several turns of the tractor all the way to the right and left; lift up and lower down the linkage several times;

f) shut off the engine and check oil level in the hydraulic tank and leak-tightness of connections; if necessary, refill oil into the tank.

Change of filter elements of the hydraulic tank main filters

a) Undo fastening nuts 3 (see Fig. 46) and take off cover 1.

b) Dismantle filter 24 with filter element and install it on the base of housing 14 (with splint pin 12 upwards).

c) Having compressed spring 13, take out splint pin 12 and take off the spring.

d) Take off pipe 15 along with filter element 17 from housing 14.

e) Take off lower rubber ring 16 and filter element 17.

f) Wash the filter housing in diesel fuel.

g) Change the filter element and assemble the filter in reverse sequence.

The second element shall be changed in a similar manner.

Pressure filter maintenance

Fig. 47 Pressure filter

1 – electrical visual indicator of filter clogging DE-500; 2 – filter cup

In order to enhance the operating reliability of the hydraulic system for steering control, pressure filter HMM422C25XNR (Fig. 47) with filter element CHP422C25XN is installed in the tractor.

Perform maintenance of the pressure filter in case when indicator lamps 24 and 26 light up on the lower block of indicator lamps of the instrument panel (Fig.1, 2, 3, 4).

In order to perform maintenance of the pressure filter, unscrew the filter cup, replace the filter element and wash the cup. Replace filter element of CHP422C25XN filters on appearance of the clogging sensor signal on the instrument panel.

Elimination of leaks in pipelines, hoses and seals of hydraulic units of the hydraulic systems for steering control and of the linkage

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 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 surface damage is detected, file the damaged area and grind the sealing surface;

d) install the hose and tighten the clamps again in the prescribed order.

In case of leaks in unions and angles of hydraulic units, perform the following operations:

a) take off the union or angle;

b) remove rubber rings and thoroughly see for the absence of cuts or tears on their working surface; if the defects above are detected, replace the ring;

c) examine the surfaces being sealed; if any notches, signs of treatment are detected, dress them by scraper and grind them;

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 until the nut contacts the housing, avoiding cuts of the ring being sealed. Perform final installation of the angle with the nut being in 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;

- when dismantling low-pressure hoses, it is necessary to avoid damage of the internal rubber layer;

- leak-tightness of round-section rubber rings providing seals for parts of hydraulic system units depends upon cleanness of sealing surfaces, conservation of ring integrity upon mounting and depth of installation grooves;

- most leaks cannot be eliminated by tightening.

CAUTION! In order to increase the lifetime of pump operation, the hydraulic system shall be refilled after drainage of the working fluid from the oil intake pipe as follows:
1. Refill oil into the hydraulic tank through the oil filler port; in doing so, oil level shall reach the middle of housing of filter 11 (Fig.46).
2. Start the engine.
3. Pump out the system by making 3...5 tractor turns from end to end and by moving the linkage up and down 4 times.
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 straightness of the marking strip;

b) install hoses on the tractor in a manner preventing their rubbing or damaging by parts of assemblies of the tractor in operation;

c) do not expose hoses to mechanical loads as it can lead to their destruction;

d) do not permit the ingress of fuel and lubricants on the outer rubber layer of hoses.

7.5.10 Maintenance of tractor wheels

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 tyre treads. Wheel parts with cracks and tyres with defects reaching the cord or passing through should not be permitted for operation.

b) Protect tyres from the ingress of fuel, oil and other petroleum products.

c) Tighten wheel nuts crosswise in a uniform manner, using a special wrench supplied along with the tractor.

d) To provide for a more uniform wear of the tyre tread pattern, once in every 1900 – 2000 engine hours interchange positions of the front and rear wheels while observing the direction of rotation of wheels in view of 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 tyre pressure gauge.

c) Take off 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 a 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 recommendations set forth in Table 4).

h) Take off 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 operation manual to be supplied with the tractor.

Check of the battery charging rate

With the engine 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, N-2001

To this end, connect the "-" clip to the "-" battery clamp, then make contact by the probe on the "+" battery clamp without pressing.–– Battery voltage reading will appear on the digital indicator. In order to exactly 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 a contact of the battery clamp "+" **with pressing**, the load of 200A will be connected. Hold the probe on the "+" clamp **with pressing** for 5 s. Unless the voltage on the screen is below 9V, the battery is in good working order.

If a diagnostic device is missing, then monitor the voltage by the digital voltmeter on the instrument panel.

With the headlights switched off, the voltmeter voltage shall not be less than 24.5V. If the voltage is less, it is necessary to take off the battery and charge it from a fixed charger.

If the voltage is higher than or equal to 24.5V, then start the engine up. Run the engine for at least 2 minutes at idle. Then increase the speed to 1500 RPM and give the full load (service lights, headlamps, salon heaters are on). If the voltmeter readings are between 27.2V and 28.8V, the generator is operating normally.

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 the condenser down with compressed air, as well as check the tension of V-belt of the compressor drive.

2. When performing M-1, M-2, M-3, check the tension of the compressor drive belt and, if necessary, make adjustments. When the force of 4±0.2 kg is applied at point “P”, belt deflection (Fig.48) shall be within 9...14 mm.

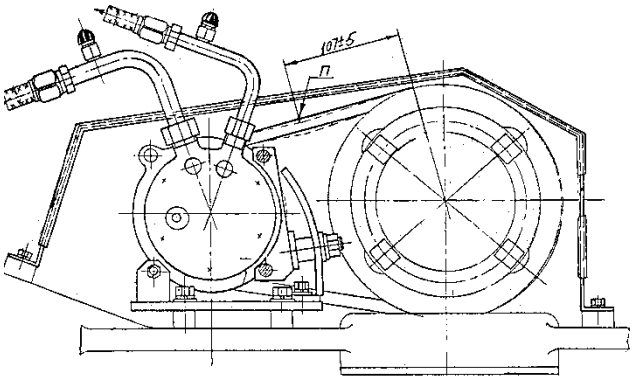


Fig. 48 Adjustment of the tension of the compressor drive belt

3. In winter season it is necessary to take off the compressor drive belt from the sheaves.

4. Dehydration filter of the moisture and oil separator must be changed once a year.

5. The frequency of air filter replacement in the air conditioning system shall be once in every 500 engine hours but at least once a year.

6. The frequency of air filter cleaning and purging in the air conditioning system shall be once in every 125 engine hours during M-1.

CAUTION! 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 operate (the system is deactivated by the sensor).

2. In order to prevent a system failure during tractor operation and non-use of air conditioner within this period, 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), periodic start-up of the compressor is not required.

CAUTION! In order to prevent compressor jamming after winter period or a long-term service interruption, perform manual barring of compressor shaft for 10 turns clockwise (to this end, supply +12/+24V to the compressor coupling for its activation). This operation is required to supply oil from compressor case to the cylinders and lubricate them.

Recommendations for maintenance of the air conditioning system

1. Fill the system with 950 g* of R134a halocarbon.

2. System filling with halocarbon 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 R134a halocarbon 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 compressor lubrication. 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 open for more than 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 spent oil.

7. The ingress of moisture into oil is not allowed.

8. In case of depressurising upon system refilling, it is necessary to replace the dehydration filter of the moisture and oil separator.

N o t e . * The data on the amount of halocarbon and refrigerating oil are given for the system filled at the manufacturer's plant. In case of system refilling in the course of operation, in order to determine the required amount of oil in the compressor, it is necessary to advice with experts of Peterburgsky Traktorny Zavod or a specialised enterprise dealing with maintenance and repair of air conditioners.

CAUTION! Air conditioning system shall be operated and maintained in accordance with the instruction for air conditioner supplied with the tractor.

8 STORAGE REGULATIONS

Perform preparation, storage and depreservation of the tractor in accordance with the provisions set forth in this section and operation manuals for the engine and storage batteries supplied with the tractor.

Put the tractors for:

storage between shifts	- service interruption up to 10 days;
short-term storage	- from 10 days to two months;
long-term storage	- over two months.

Operations related with the tractor preparation for storage shall be executed by specialised teams or mechanical workers under supervision of the person responsible for storage. Mechanical workers shall put the prepared tractor for storage and the responsible persons shall accept it for storage. The placement of tractor for, and its withdrawal from a long-term storage shall be documented by certificates.

Tractors shall be stored indoors or under canopy. It is allowed to store them at equipped outdoor grounds with obligatory execution of the activities related to preservation, pressurisation of the tractor and removal of its components to be kept in the warehouse.

Check the tractor condition during the period of storage at least once in two months in case of indoor storage and once a month in case of storage outdoors and under canopy. After strong winds, rains and snow drifts see for and eliminate the detected flaws immediately. The results of periodic checks shall be recorded in the inspection logbook. Maintenance during the storage shall be performed in accordance with the guidelines set forth in item 7.3.

8.1 TRACTOR PREPARATION FOR SHORT-TERM AND LONG-TERM STORAGE

The tractor shall be placed for short-term and long-term storage immediately after the completion of works and activities as per M-1.

The tractor preparation for a short-term storage consists of the following:

- clean the tractor from dust, dirt, leaks of oil, vegetative and other remains. After the cleaning and washing, blow off the tractor with compressed air in order to remove moisture;

- check the level of oil and, if necessary, refill it into the gearbox and cases of main and final gears of driving axles.

If the tractor is stored at negative temperatures, it is necessary to replace oils of summer grades with winter grades in the engine and gearbox lubrication systems and driving axles according to the lubrication table.

After drainage of sludge from air cylinders, wipe the valves dry, apply plastic grease;

- undo plugs of hydraulic tank in the hydraulic systems of the linkage and for steering control, PDR, expansion tank, PTO; wash them up and wipe dry; lubricate the threaded joints of plugs with plastic grease and screw them back in place; wrap (cover) them with polyethylene film and bind them with packing twine;

- blow off filter 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-mentioned plugs of filler ports and bind them with packing twine.

- apply preservation oil or grease on threaded connections of the central pull rod, vertical struts, spherical surfaces of the central pull rod and lower links of the linkage, protruding parts of the stems of hydraulic cylinders in hydraulic systems for steering control and of the linkage; pre-clean and remove traces of corrosion; wash up, degrease and dry up the surfaces. Having applied the preservation oil or grease, wrap the above-mentioned threaded joints, spherical surfaces and parts with a polyethylene film of paraffin paper, bind them with packing twine;

- set the levers and pedals of control mechanisms to the position preventing inadvertent activation of the tractor and its units into operation;

- put the tractor on props or pads in a position where semi-frames and other assemblies cannot be warped or bent and pneumatic wheels and springs can be unloaded. Clearance between the tyres and seating area shall be 80 - 100 mm;

- disconnect the storage batteries; clean and 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 operation manual “Lead starting storage batteries”. In case when the tractor is to be stored at low temperatures or storage period exceeds one month, take off storage batteries and deliver them to the warehouse. Headlamps, generator, starter shall be cleaned, blown off with compressed air; their fasteners and connecting terminals shall be lubricated with plastic grease;

9 TROUBLESHOOTING

Fault	Troubleshooting
Transmission faults	
Increased heating of the pump drive reducer: no grease, clogging of oil channels.	Clean the oil supply channels
No or insufficient oil pressure in the gearbox:	
Oil leak at oil pipeline connections.	Eliminate the leak.
Decreased oil level in GB.	Refill oil.
Oil pressure sensor or gauge is faulty.	Replace it.
Hydraulic system pressure valve is stuck.	Wash up and adjust the pressure valve. Adjust the pressure valve with rated engine speed at any gear for the pressure of 11-12 kgf/cm^2 by screwing the plug in. Use pressure gauge of at least 2.5 class with the measurement scale limit of 15-20 kgf/cm^2. Oil pressure in the GB hydraulic system at gears with the engine crankshaft speed of 1800 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 speed of 900-1800 RPM. Oil pressure growth at each gear shall be rapid. The pressure on neutral gear and at engagement of synchroniser brakes shall not be less than on transmission gears.
Loss of GB pump performance.	Check and adjust pressure in accordance with item 6.9. If necessary, replace the pump.
increased noise at the pressure valve area when the gear change lever is in Neutral position or with the drain pedal fully pressed.	Check the oil level in GB. If the tractor is equipped with PTO, perform the level check with PTO engaged.
Constant increase of the oil level in gearbox, oil discharge from the GB breather tube, rapid over-heating of oil in GB, loss of power (GB overfilling with oil due to "overflow" from the hydraulic tank through PDR pump seals).	Find the pump with "overflow", perform a replacement or repair to eliminate the flow.
Tractor imbalance with the load shaft gear coupling engaged and the gear change lever in "actuation of synchroniser brakes" position:	
Disc warping.	Replace the discs.
Wear of synchroniser brake shoes.	Replace the synchroniser brake shoes.

Fault	Troubleshooting
Maladjustment 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 fully pressed. Drain pedal stuck at the 1st gear.	Adjust the drain pedal drive. With the wire rope drive adjusted correctly, the drain pedal in the depressed position shall rest against the bolt with the gear control drain lever turned all the way in clockwise. With the drain pedal released, the drain lever should be turned all the way in clockwise. If necessary, replace the remote control wire rope.
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 hammering - loosened attachment of the connecting flanges of cardan shafts.	Tighten the nuts.
Increased heating of shafts at the area of bearing assemblies of cardan shafts - absence of lubricants, ingress of dust and dirt due to collar damage and wear.	Clean and wash oil-conducting channels of the crossbar. Replace worn and damaged parts.
Faults of the steering control hydraulic system	
Oil foaming and discharge 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 to the connecting pipelines or over the plug of siphonal device at the center of the upper wall of hydraulic tanks.
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 sight hole.
- the pumps do not rotate due to engine shutdown.	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.
Difficult steering control:	
- the pump performance is low or the flow controller throttle is clogged;	Check the time of full tractor turn from one extreme position to the other at the engine crankshaft speed of 1300 and 1900 RPM and at the maximum possible rotation speed of the steering wheel.

Fault	Troubleshooting
	If the time of turn is the same (and is over 5 s), then the cause of fault is the ingress of foreign particles into the gap between the throttle and the adjustment screw of the flow controller. It is necessary to dismantle the flow controller (installed on the left-hand pump in the direction of tractor travel) 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 overflows over hydraulic cylinder seals;	Replace the hydraulic cylinders with repaired (or new) ones that have been checked for leak-tightness.
Increased vibrations of tractor semi-frames at turns on the spot and in motion:	
- presence of air in service cavities of hydraulic cylinders and hydraulic units;	By running the engine at the maximum idle run speed, heat up the hydraulic system to the temperature of 50 – 60°C and pump out the hydraulic system until a smooth turn of semi-frames and the safety valve are achieved (reaching the “stop”) by turning the steering wheel to the right and to the left three revolutions each without achieving the safety valve (without reaching the “stop”). Perform the works with the rear axle disengaged. When pumping out the hydraulic system, turn the steering wheel at the maximum speed in order to exclude its vibrations. Eliminate any occurring leaks.
- the grade of service oil in the hydraulic system does not correspond to the specified grade.	Replace oil as per lubrication table.
Excessive 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 linkage control	
Excessive 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 linkage is lifting slowly:	
- insufficient amount of oil; - air inflow in hydraulic pipelines connecting the hydraulic tank with the pump.	Refill oil. Eliminate the air inflow.
- excessive oil leak in the pump, hydraulic distributor; - Seals of the hydraulic cylinder piston are not leak-tight enough.	Replace the defective assembly. Restore the piston seals or replace the hydraulic cylinder.
The handle of hydraulic distributor does not return to position “Neutral” from position “Lifting” or “Forced lowering” at the end of operating travel:	

Fault	Troubleshooting
- excessive oil heating; - 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 implement in the transportation position with hydromechanical valves closed - insufficient leak-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 in operation and the parking brake deactivated:	
- air leak in the parking brake circuit.	Eliminate the air leak.
No pressure in one or two air cylinders.	
The triple safety valve is faulty (see the diagram in the appendix).	Replace the valve.
Pressure controller often actuates with the pneumatic system 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 units.	Replace the unit.
Ineffective braking or no braking with the brake pedal fully pressed.	
Travel of brake chamber stems is not adjusted.	Adjust it.
Brake valve is faulty.	Connect pressure gauges to the valves of reference outlet of the brake valve upper and lower sections. If the pressure by pressure gauge readings is less than by the instrument panel indicator (Fig. 6) at the full travel of the brake valve lever, replace the brake valve.
Air leak from brake chambers.	Replace the chamber membrane.
Electrical equipment faults	
Electrolyte level decreases very fast:	
- leak of electrolyte from battery jars;	Repair or replace the storage battery.
- the voltage controller maintains a high level of voltage in the electrical system of the tractor.	Replace the generator.
The turn indicator lights are faulty:	
- the fuse is blown;	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 electric wiring serviceability.
- faulty disconnecting relay of the turn indicator;	Replace the disconnecting relay.
- light lamps are burnt out.	Replace the lamps
Rattling noise of the sound signal:	

Fault	Troubleshooting
- loosened fasteners of signal connection, cover or coil;	Tighten the fasteners.
- cracks in the membrane.	Replace the signal.
The sound signal does not activate:	
- the fuse is blown; - faulty contact in the signal button.	Eliminate a short-circuit in the wiring, after which replace the fuse. Restore the contact.
Instrumentation does not provide readings or provides incorrect readings:	
- the fuse is blown; - faulty contact in the indicator-sensor circuit; - faulty indicator or sensor.	Eliminate a short-circuit in the wiring, after which replace the fuse. Check the reliability of wire connection to indicators and sensors. Replace the indicator or sensor.
The indicator lamp "Battery charging" is on (at the instrument panel) with the engine in operation:	
- tension of the generator drive belt is not sufficient;	Tighten the belt.
- break in the power circuit of 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 brush assembly; if necessary, replace the brushes, springs.
- earth fault of the wires feeding the generator excitation winding;	Eliminate a short circuit in the power circuit of the generator excitation winding
- voltage controller has decreased the level of voltage being controlled in the electrical network of the tractor.	Replace the generator.

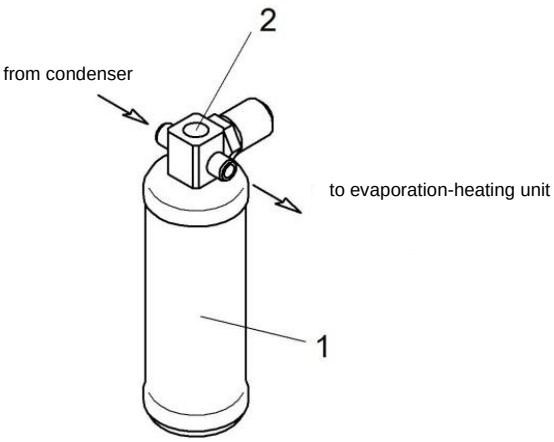


Fig. 49 Receiver of air conditioning system
1 – receiver; 2 – sight hole

Condition of refrigerant in sight hole 2 Fig. 41			
Description	Almost transparent fluid Some gas bubbles may appear	Transparent fluid. No bubbles Refrigeration capacity is not sufficient	Milk-colored fluid Large amount of gas bubbles
Condition of the system	The system is filled normally	It is possible that the system is overfilled Contact the service center	The amount of refrigerant is insuf-ficient. Contact the service center

Fig. 50 Check the amount of refrigerant via the sight hole

Fault	Troubleshooting
Inefficient 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. 50). Contact the service center in case of insufficient or excess level of halocarbon.
Air conditioner cannot be activated	Electric wiring is faulty. Check the contacts of electric wiring harness. Fuse defect. Replace the fuse. Low pressure in the system. ***Check the pressure. If needed, check the system for leaks and refill the system.*** Excessive pressure in the system. Check the condition of condenser; if necessary, blow it down with compressed air.
The air conditioner gets activated and switches to 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 overfilled) and, if necessary, bleed the excessive amount of refrigerant.*** Check the air filters; if needed, replace them.
The air conditioner gets activated and switches to cyclic operation with the operating cycle of 5 s min.	If the temperature in the cabin is not high, then the evaporator overcooling protection picks up, which is not a fault. Check the fan performance (replace it, if needed).
Loud noise of the compressor.	Ball bearing defect. ***Replace the compressor.*** Electromagnetic coupling defect. ***Replace the coupling.***
V-belt noise.	The belt is worn out, replace it.

N o t e . The works selected in bold type shall be executed only by certified specialists.

10 CLAIMING PROCEDURE

10.1 In case of detecting a failure or fault and absence of violations set forth in item 10.2, the user shall be obliged to call a representative of the Service Centre providing maintenance and repair of equipment at 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, Russia
Peterburgsky Traktorny 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 at the Peterburgsky Traktorny Zavod CJSC web site.

10.1.1 Manufacturer's representative invites and tractor quality claims should be sent via the enterprise (organisation) which has sold (supplied) the tractor and has an agreement with the manufacturer's plant.

10.2 Reports about failures and faults found during the warranty period and quality claims shall not be sent to the manufacturer's plant in the following cases:

10.2.1 Violation of the rules of operation, transportation and storage set forth in the operation manual and GOSTs when such violation was the cause of failure.

10.2.2 Elimination of a failure or fault by replacing tractor components with the use of individual SPTA kit supplied with each tractor.

10.2.3 Tractor dismantling and repair before the arrival of manufacturer's plant representative in due time, when this resulted in impossibility to determine the cause of failure.

10.3 Engine failure or fault reports (save for Cummins and Mercedes engines) should be send to the first address and, additionally:

- for the engines manufactured by Avtodizel OJSC:
to Avtodizel OJSC's regional service and to Avtodizel OJSC at the following address:
75 Oktiabrya pr., Yaroslavl, 150040
Avtodizel OJSC
Fax: (4852) 58-81-28
E-mail: garantia@adzl.ru

- for engines manufactured by Tutayevsky Motorny Zavod OJSC:
to Tutayevsky Motorny Zavod OJSC at the address:
1 Stroitelei ul., Tutayev, Yaroslaskaya obl., 152300
Tutayevsky Motorny Zavod OJSC
Tel.: (48533) 2-35-65
E-mail: OGO721@mail.ru

10.4 In the failure or fault report, it is necessary to indicate the following data:

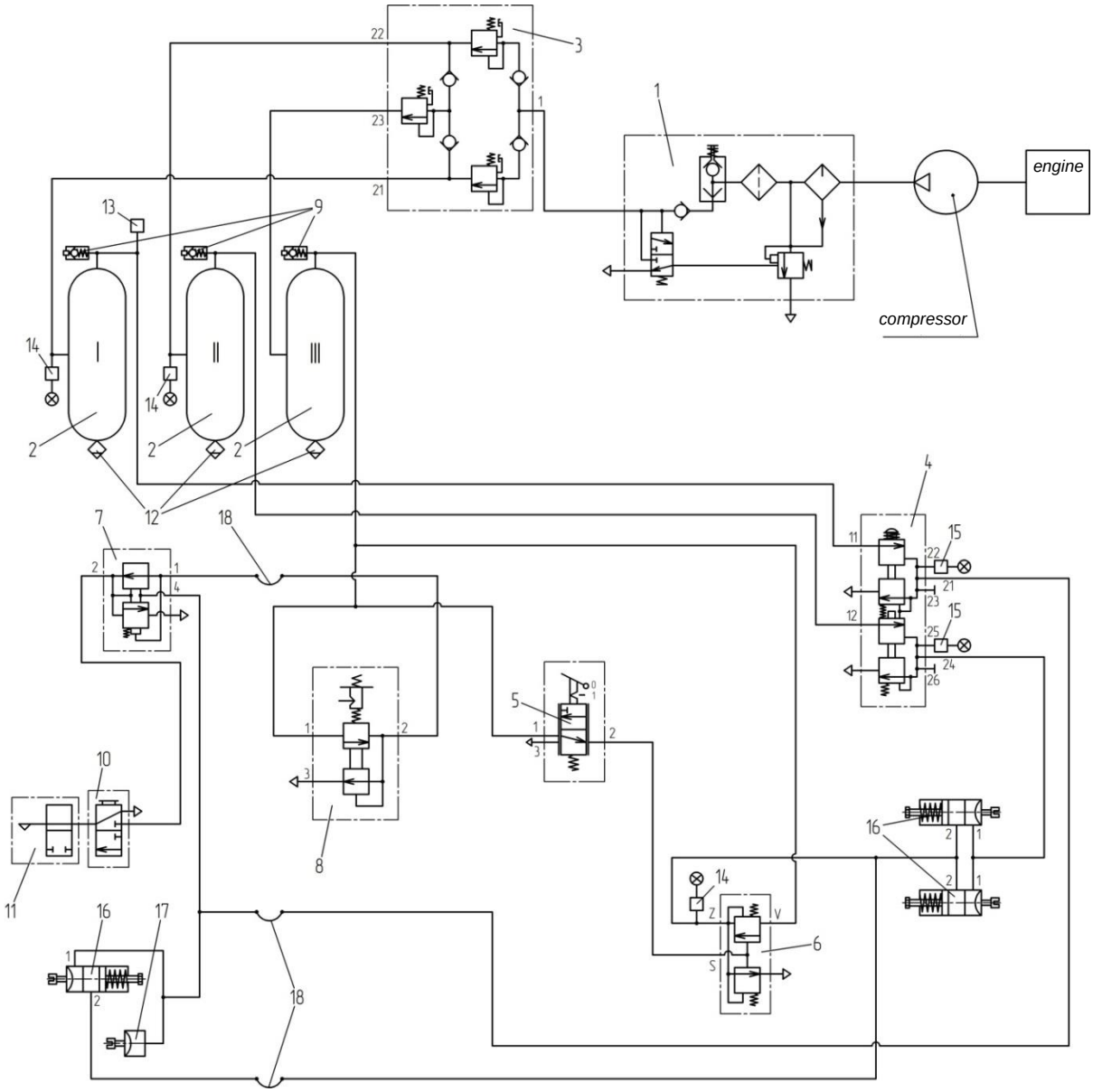
serial number of the tractor, serial number of the engine and total engine hours;
nature and form of the failure or fault;
user's exact address.

CAUTION! ***This procedure for presenting faults and reviewing claims shall be valid only on the territory of the Russian Federation.***

The fulfillment of this procedure guarantees that the user will rapidly make decisions for identification of failures and issues of the tractor and their elimination.

APPENDIX 1

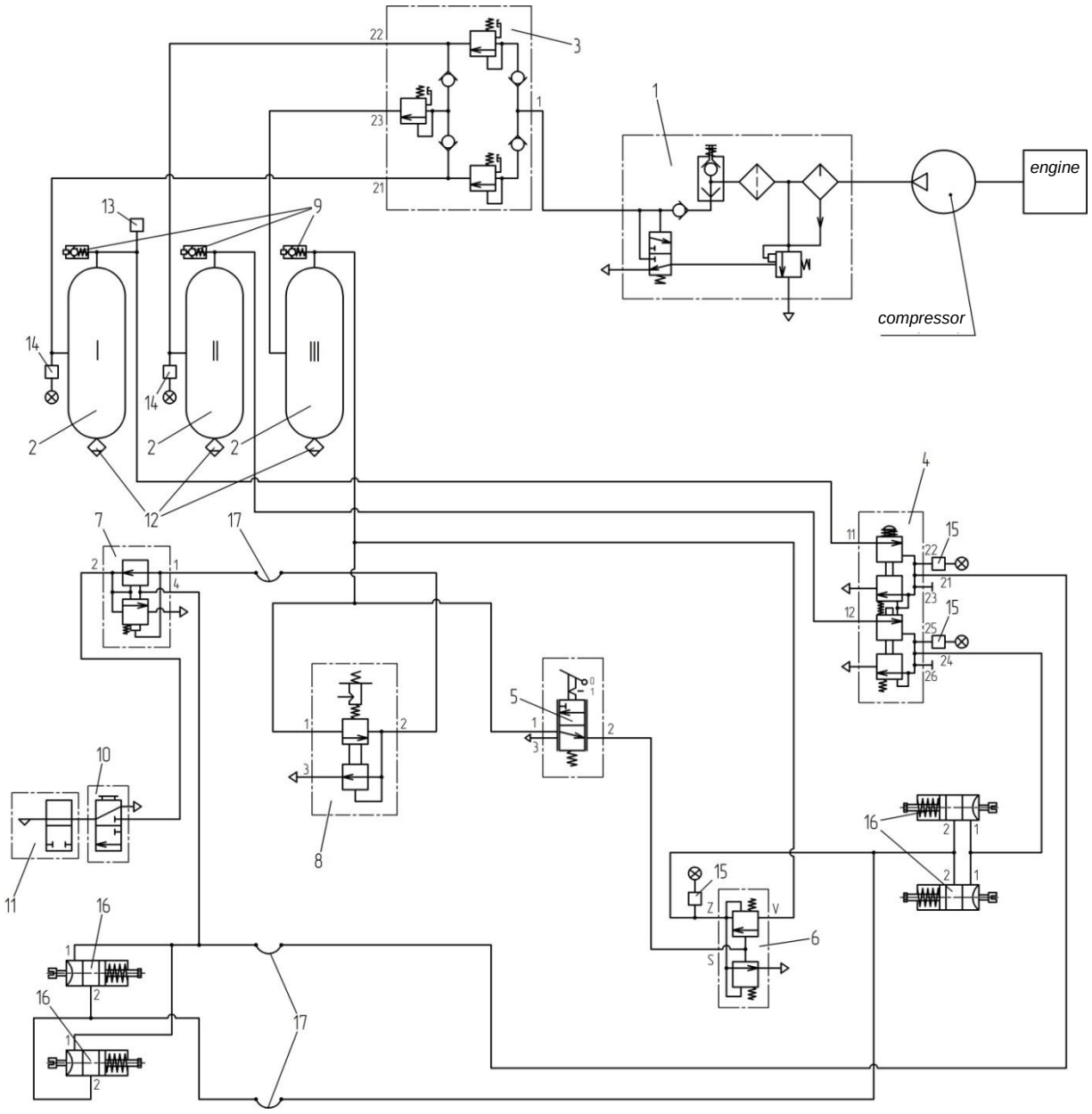
DIAGRAM OF THE PNEUMATIC SYSTEM OF K-744R1, K-744R2 TRACTORS



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 - acceleration 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

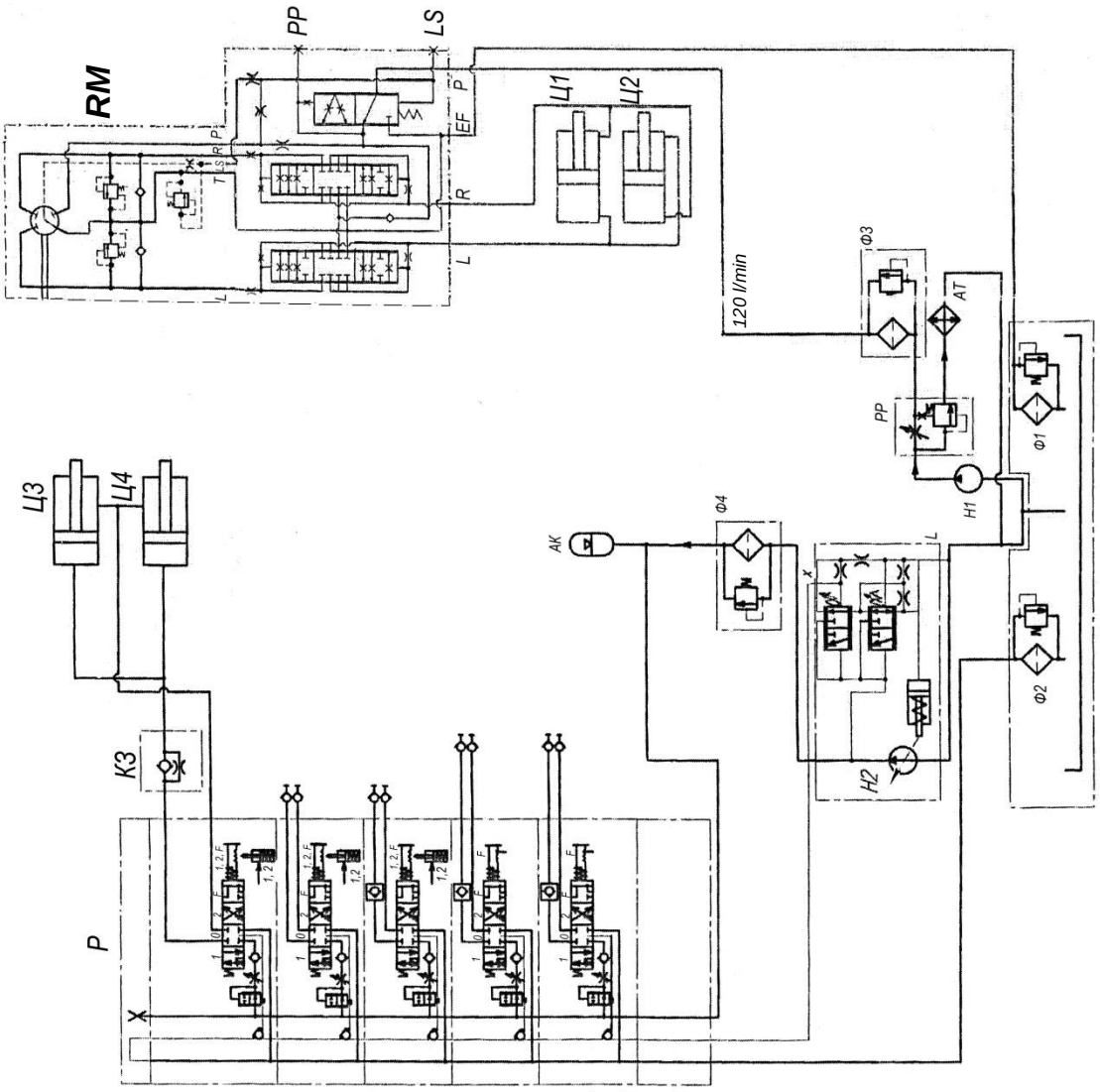


1 - pressure regulator; 2 - receiver; 3 - triple protection valve;
4 - two-section brake valve with pedal;
5, 8 - reverse-acting brake valve with manual control;
6 - acceleration valve;
7 - trailer brake control valve with single-wire drive;
9 - reference outlet valve; 10 - cut-out valve;
11 - connecting 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

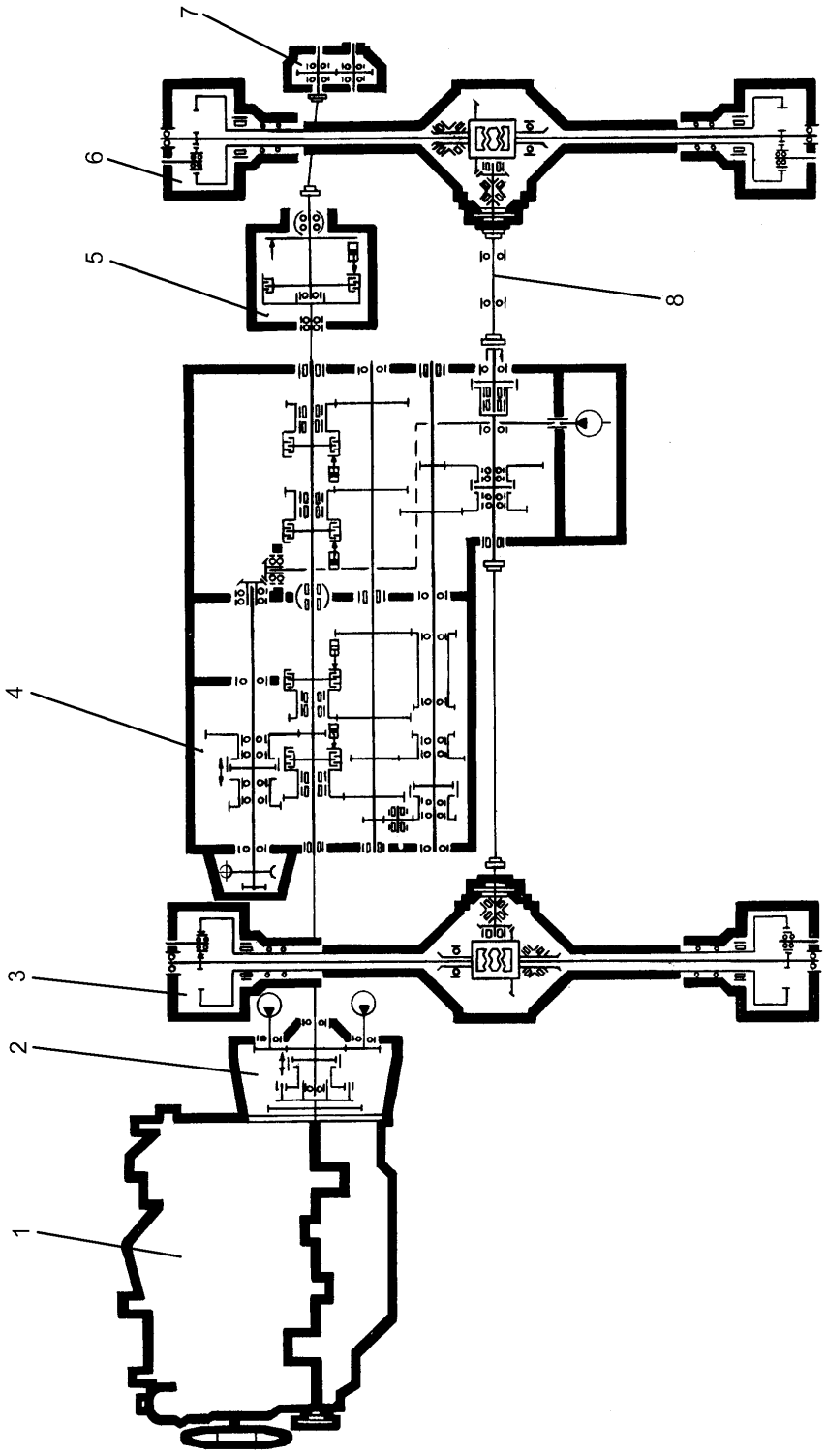
HYDRAULIC SCHEMATIC DIAGRAM OF THE SYSTEMS FOR STEERING CONTROL AND OPERATING EQUIPMENT

Pos. designation	Name	Q-ty	Application
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	1	
N2	Pump of 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 Ts125.50x400	2	Turn
Ts3, Ts4	Hydraulic cylinder Ts125.50x200	2	Lifting - lowering
RR	Flow controller	1	
RM	Steering mechanism	1	



APPENDIX 3

KINEMATIC DIAGRAM OF TRANSMISSION



Kinematic diagram of transmission

1 - engine; 2 - reducer with semi-rigid coupling; 3 - front driving axle; 4 - gearbox;
5 - PTO connecting coupling; 6 - rear driving axle; 7 - single-gear PTO reducer; 8 – intermediate bearing

APPENDIX 4

TIGHTENING TORQUE VALUES FOR FASTENERS OF MAIN ASSEMBLIES

No.	Point of fastening	Torque, kg·m
1.	Bolts attaching brackets to the engine	7…9
2.	Bolts attaching engine spacers to the frame	15
3.	Bolts attaching semi-rigid coupling to the engine flywheel	3
4.	Nuts attaching the housing of pump drive reducer to the engine	6
5.	Bolts attaching the gearbox AKSS	10
6.	Bolts attaching GB case to AKSS	25
7.	Bolts attaching the intermediate bearing holders	3
8.	Drive axle clamp nuts	50
9.	Wheel 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” joint	28
12.	Bolts attaching housings to the main gear case	28
13.	Bolts attaching cardans from the engine to GB, from GB to PTO	15^{+6}
14.	Bolts attaching cardans from GB to axles	7.5^{+2}

APPENDIX 5

LIST OF PERMISSIBLE CHANGES FOR OILS AND LUBRICANTS

In the course of operation б it is allowed to fill the tractor systems and perform lubrication of mechanisms with the following oils and lubricants:

- list of oils allowed to be replaced in GB:

Designation	Standard	Applied with environ-ment temperature	Notes
M-10V_2; M-10G_2; M-10G_2к	GOST 8581	minus 12°C min	summer
M-10DM		minus 16°C min	
M-8G_2		minus 23°C min	winter
M-8V_2; M-8G_2к; M-8DM		minus 28°C min	
SAE 30 (mineral oil)		minus 16°C min	summer
SAE 10W (mineral oil)		minus 25°C min	winter
SAE 15W-30; SAE 15W-40 (mineral oil)	SAE J300	minus 20°C min	all-season
SAE 10W-30; SAE 10W-40 (mineral oil)		minus 25°C min	
SAE 5W-30 (mineral oil)	SAE J300	minus 30°C min	
Grade "A" oil	TU 38.101.1282	minus 38°C min	winter
Shell Spirax S3 TLV, Shell Spirax S2 ATF AX		minus 43°C min	
TS3p8	TU 38.101.1280	minus 48°C min	

APPENDIX 6

REFILL RESERVOIRS

Description of reservoir	Capacity (weight), l (kg)	Working fluid brand *
Fuel tank	800 (675)	Diesel fuel for YaMZ and TMZ engines, GOST 305-82 **in summer:** L-0.2-40; L-0.05-40 **In winter:** for the ambient air temperature above minus 20°C З-0.2 minus 35, З-0.05 minus 35; for the ambient air temperature above minus 30°C З-0.2 minus 45, З-0.05 minus 45; for the ambient air temperature above minus 50°C A-0.2; A-0.05 For OM460LA engines - as per manufacturer's recommendations.
Diesel lubricating system: - YAMZ-238ND5; - 8481.10	 32 (29) 33 (30)	See Lubrication table
Lubrication system for OM460LA (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-238ND5; - 8481.10	 55 73	Automotive cooling fluid Tosol-A-40M TU 6-57-95-96
Cooling system for OM460LA (Mercedes) engine	55 (50% - antifreeze agent 50% - distilled water)	Glyco Shell (filled at the manufacturer's plant) or antifreeze agent of any other brand as per 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 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 of the linkage	175 (158)	See Lubrication table
Gearbox hydraulic system	24 (22)	
Main gear case of driving axle (case 1)	10 (9)	
Final gear case of driving axle (case 1)	3.5 (3.25)	
Air conditioning system:		See Lubrication table

* Working fluids for OM460LA (Mercedes) engine only in accordance with the instruction for the engine and prescriptions for operating materials

Description of reservoir	Capacity (weight), l (kg)	Working fluid brand *
- halocarbon R134a; - refrigerating oil ZXL 100PG	950 g 200 ml	

N o t e . The data on the amount of halocarbon and refrigerating oil are given for the system filled at the manufacturer's plant. In case of system overfilling in the course of operation, it is necessary to consult specialists of Peterburgsky Traktorny Zavod or a specialised enterprise dealing with maintenance and repair of air conditioners in order to determine the required amount of oil in the compressor.

APPENDIX 7

LOGBOOK OF MEASUREMENTS OF THE INTERNAL AIR PRESSURE IN TYRES

Tractor type and make _____ Inventory No. _____

Date of measure-ment	Serial number of tyre		Serial number of tyre		Serial number of tyre		Serial number of tyre		Notes	Inspector's signature
	Position	Pressure	Position	Pressure	Position	Pressure	Position	Pressure		

N o t e . 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 number _____ 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 run 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 kilometres		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 FOR THE ELECTRICAL DIAGRAM OF K-744R1 STANDARD TRACTOR

Pos. name	Name	Q-ty	Notes
A1	Steering column KF00W0D-ELS-PK	1	
A3	Control panel PZhD-600I-1015410.	1	
FU23	Thermo-bimetallic fuse 299.3722 TU37 003.1415-92	1	
FU24	Fuse PV-20, 30V TU16.522.001-82	1	
FV	Ignition plug SN423 TU37.003.634-79	1	
EK	Fuel electrical heater	1	
M9	Motor ME252 TU37.003.1281-86	1	
SA6	Switch VK317-06 GOST VD 3940-86	1	
SA7, SA8	Switch V-45M TU 526.016-73	2	
SB7	Push-button switch 11.3704 TU37.003.710-80	1	
TV	Switching device TK107A TU 003.484-78	1	
XT1	Connecting panel 16.3723 OST37.003.1358-88	1	
YA	Electrical magnet PC335	1	
A6	Air conditioner control panel	1	
A7	Avgust air conditioner	1	
A8	Car audio	1	
A9	Antenna 7691260014	1	Bosch
BA1;BA2	Loud speakers ACV SP-420	2	
BK1	Temperature sensor TM100 TU 37.003.271-76	1	Cooling fluid temperature
BP1	Pressure sensor TKH1.6-T184	1	Gearbox oil
BP2	Pressure sensor 3902.3829010 GOST 1701-75	1	Air in PS (pneumatic system)
BP3	Pressure sensor 18.3829010 TU 37.003.387-78	1	Oil pressure in engine
BV2	Speed sensor 11.3843-Y-HL TU37.003.1148-83	1	
EL1;EL2	Headlamp 1BL 247 042-017 (Hella)	2	D90 mm, H1, 24V low beam
EL1;EL2	Headlamp 1KO 247 042-037 (Hella)	2	D90 mm, H1, 24V high beam

Pos. name	Name	Q-ty	Notes
	Service lamps 8724.3-10-01		
EL3; EL4		2	Front right lamps
EL5; EL6		2	Front left lamps
EL7; EL8		2	Rear right lamps
EL9; EL10		2	Rear left lamps
EL11	Under-h lamp PD308A-U-HL TU37.003.187-80	1	
EL12…EL16	Switch illumination lamp		Hella
EL18	9FF 713 627 011	6	
EL20, EL21	Ceiling lamp 2JA 003 231-001	2	
EL22	License plate lighting lamp OH3 00-02	1	
FU1,FU2	Fuse panel 41.3722 TU37.469.013-95	2	
	Fuses 35.3722 TU37.469.013-95 35.3722 (5A)		
FU2.5, FU2.6			
FU2.7, FU2.8		4	
	352.3722 (10A)		
FU1.1-FU1.5			
FU1.7-FU1.13			
FU2.1-FU2.3			
FU2.9-FU2.13		20	
FU2.4	355.3722 (25A)	1	
FU1.6	356.3722 (30A)	1	
FU22	Fuse 542.3722-60A TU37.469.056-2002	1	
G	Generator	1	
GB1, GB2	Battery 6ST-190A PZ ZhYuIK.563414.013TU	2	
	Hornless sound signals TU37.003.688-75		
HA1	C313	1	
HA2	C314	1	
	Front light 3723.3712-01 TU RB 0588255010-95		
HL1		1	Right
HL2		1	Left
	Side repeater lamp 641.3726-01 TU37.001.2164-2006		
HL3		1	Right turn
HL4		1	Left turn

Pos. name	Name	Q-ty	Notes
HL5… HL7	Turn indicator repeater UP C-24V	3	“Road-train” sign
HL22	Rear light 7313.3716-01		
HL23	TU RB 600124825026-2002	2	
KM	Switch 1420.3737 TU37.003.574-74	1	
	Relay 751.3777 TU37.003.1418.94:		
KV1		1	Battery switch locking
KV2		1	Relay of fan coupling activation
KV3		1	Sound signal
KV4		1	EHR activation (cl. 15)
KV5		1	HER activation (D+)
KV6		1	High beam
KV7		1	Low beam
KV8		1	Brake lamp
KV9		1	Air conditioner compressor
KV10		1	Air conditioner fan
KV11	Relay 738.3747-20 TU 37.003.1418-94		Starter
KV12	Relay 711.3747 TU37.003.1418-94	1	Cl15
KV13	Relay 46.3747010	1	Window wiper relay
M1	Starter	1	Supply with engine
M2	Air conditioner fan	1	Supply with air conditioner
M3,M4	Washer	2	Front/rear
M5	Window wiper motor gearbox A16-60.08	1	front
M6	Window wiper motor gearbox A18-50.00	1	rear
M7	OS-8 heater fan	1	Avgust
SA1	Switch 6RH 007 832-461	1	Front service headlight activation
SA2	Switch 6RH 007 832-461	1	Rear service headlight activation

Pos. name	Name	Q-ty	Notes
SA3	Switch 6EH 007 832-011	1	“Road-train” sign activation
SA4	Switch 6EH 007 832-011	1	Flasher lamp activation
SA5	Switch 6RH 007 832-411	1	Rear window wiper activation
SL1	Fuel level sensor DT7.3-51-800-00	1	
SL2	Hydr. system impermissible oil level alarm sensor	1	
SK1	Cooling fluid emergency temperature sensor TM-111-01 TU 37.003.271-76	1	
SK2	Thermal relay of fan coupling activation	1	Supply with engine
SK3	Hydr. system impermissible oil temperature alarm sensor	1	
SP1	Emergency air pressure sensor DADV-02 TU RB 07513211.004-94	1	Parking brake
SP2	Switch 2802.3829010 TU 37.453.092-93	1	Brake lamp
SP3	Oil filter clogging alarm sensor	1	Supply with engine
SP4	Alarm for emergency oil pressure in engine 3702.3829	1	Oil in engine
SP6	TGB filter clogging alarm sensor	1	
SP7	Halocarbon pressure sensor	1	Supply with air conditioner
SP8	Air filter clogging alarm sensor 13.3839	1	
SP9, SP10	Emergency air pressure sensor 6072.3829	2	1st and 2nd circuit receivers
SP11	Mounted equipment pressure filter clogging alarm	1	Supply with filter
SP12	Steering control pressure filter clogging alarm	1	Supply with filter
SQ1	Neutral mode switch VK 12-41 TsIKS.642241.023	1	Starter activation chain locking
UZ	Voltage transformer PN24/12.5	1	
VD1	Diode KD243B	1	
	Pin contact blocks SRS		Cannon-type power connectors (AMR)
XP1	Pin contact block 213905-1	1	3-contact
	Pin contact block 206838-3	5	24-contact

Pos. name	Name	Q-ty	Notes
XP3		1	
XP4		1	
XP6		1	
XP8		1	
XP16		1	
	Pin contact block 206151-3	4	37-contact
XP2		1	
XP5		1	
XP7		1	
XP15		1	
	Pin contact blocks Supersiel 1.5 282105-1	 3	 3-contact
XP13		1	
XP89		1	
XP90		1	
XP99	282108-1	1	6-contact
	Pin contact blocks OST37.003.032-78		
XP81	502601	1	
	Pin contact block 1-480586-0	2	9-contact
XP17		1	
XP18		1	
	Receptacles SRS		Cannon-type power con-nectors (AMR)
XS1	Receptacle 213889-2	1	3-contact
XS9	Receptacle 182921-1	1	4-contact
XS11	Receptacle 206043-1	1	14-contact
	Receptacle 206837-1	5	24-contact
XS3		1	
XS4		1	
XS6		1	
XS8		1	
XS16		1	
	Receptacle 206150-1	4	37-contact
XS2		1	
XS5		1	
XS7		1	
XS15		1	
	Receptacles Supersiel 1.5		
XS33	282079-2	1	1-contact

Pos. name	Name	Q-ty	Notes
	282087-1	4	3-contact
XS13		1	
XS69		1	
XS69		1	
XS90		1	
XS32	282088-1	1	4-contact
	282090-1	2	6-contact
XS70		1	
XS99		1	
	Receptacle 601202	4	2-contact
XS56		1	
XS63		1	
XS64		1	
XS66		1	
XS71	Receptacle AX-333	1	Hydr. system oil level sensor
	Receptacle 8JA 713631-001	7	For key switches
XS6.1		1	
XS6.2		1	
XS6.3		1	
XS6.4		1	
XS6.5		1	
XS6.6		1	
	Receptacles ISO 10487		
XS79	962189-1	1	Type A
XS80	962191-1		Type B
XS(KV12)	Receptacle KR3702	1	Relay 711.3747
	Receptacles OST 37.003.032-78:		
	602601	9	
XS26		1	
XS36		1	
XS38		1	
XS39		1	
XS43		1	
XS52		1	
XS53		1	
XS54		1	
XS55		1	

Pos. name	Name	Q-ty	Notes
	602602	12	
XS14		1	
XS21-12V		1	
XS22-24V		1	
XS47		1	
XS61		1	
XS62		1	
XS65		1	
XS97		1	
XS98		1	
XS114		1	
XS115		1	
XS58	602604	1	
	602606	3	
XS12		1	
XS34		1	
XS37		1	
	617605	11	
XS(KV1)		1	
XS(KV2)		1	
XS(KV3)		1	
XS(KV4)		1	
XS(KV5)		1	
XS(KV6)		1	
XS(KV7)		1	
XS(KV8)		1	
XS(KV9)		1	
XS(KV10)		1	
XS(KV14)		1	
YC1	Electromagnetic valve for fan coupling	1	Supply with engine
YC2	Solenoid valve of compressor	1	Supply with air conditioner

APPENDIX 9A

LIST OF ELECTRICAL EQUIPMENT ELEMENTS FOR THE ELECTRICAL DIAGRAM OF K-744R1 PREMIUM TRACTOR

Pos. name	Name	Q-ty	Notes
A1	Avgust air conditioner	1	
A2	Air conditioner control panel	1	
A3	Control panel PZhD-600I-1015410.	1	
FU23	Thermo-bimetallic fuse 299.3722 TU 37.003.1415-92	1	
FU24	Fuse PV-2 U-HL-3, 30V TU 16.522.001-82	1	
FV	Ignition plug CH423 TU 37.003.634-79	1	
EK	Fuel electrical heater	1	
M9	Motor ME252 TU 37.003.1281-86	1	
SA6	Switch VK317-06 GOST VD 3940-86	1	
SA7, SA8	Switch V-45M TU 16-526.016-73	2	
SB7	Push-button switch 11.3704 TU 37.003.710-80	1	
TV	Switching device 9301.3734-01-U-HL, 24V TU 37.466.126-2002	1	
XT13	Connecting panel 16.3723 OST 37.003.1358-88	1	
YA	Electrical magnet PC335	1	
VK1	Cooling fluid temperature sensor 3979176	1	Supply with engine
	Pressure sensors TU 37.003.387-78:		
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-U-HL TU 37.003.1148-83	1	Speedometer
	Transport lamp 1AV006213-001:		
EL1,		1	
EL2,		1	
EL23,		1	
EL24		1	
	Service lamp 781.3711 TU 4573-024-05808936-95:		
EL3, EL4,		2	
EL5, EL6,		2	
EL7, EL8,		2	
EL9, EL10		2	
EL11	Under-hood lamp PD308A-U-HL TU 37.003.187-80	1	
EL12…EL18	Lamp A24-2 GOST 2023.1-88	7	

Pos. name	Name	Q-ty	Notes
EL21	Ceiling lamp 11.3714010 TU 37.003.818-77	1	
EL22	License plate lighting lamp FP-131-B GOST 6964-72	1	
	Fuses TU 37.469.013-95:		
FU1, FU2,	352.3722 (10A)	16	Used with fuse panel 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	PV-60AC, 30 V	1	To be used with protection unit BZ-30
FU28	Fuse 542.3722 (90A) TU 37.469.056-2002	1	
G	Generator JFZ2707-010	1	Supply with engine
GB1, GB2	Battery 6ST-190APZ ZhYuIK.563414.013TU	2	
	Hornless sound signals TU 37.003.688-75:		
HA1	C313	1	
HA2	C314	1	
HL1	Front light 3733.3712 TU RB 05882559010-95	1	Right
HL2		1	Left
	Side repeater of turn indicator UP-101-B GOST 6964-72		
HL5…HL7		3	“Road-train” sign
	Indicator lamp units TU 37.003.1109-82:		
HL9	2311.3803-06	1	
HL10	2311.3803-08	1	
	Indicator lamps TU 37.003.1109-82:		
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

Pos. name	Name	Q-ty	Notes
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 RS951-U-HL TU 37.453.056-82	1	
KK1	Hand brake indicator lamp breaker RS493 TU 37.003.588-77	1	
KM	Switch 1420.3737 TU 37.003.574-74	1	
KV1	Relay 738.3747-20 TU 37.469.023-97	1	Engine shut-down
	Relay 901.3747 TU 37.003.1418-94:		
KV2		1	“Frame” locking
KV3		1	High beam
KV4		1	Low beam
KV5		1	Sound signal
KV6		1	Brake lamps
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
KV13	Relay 90.3747 TU 37.003.1418-94	1	Interlocking of 12V circuit
KV14	Contactor KT-127	1	Starter activation
M1	Starter M105R3001SE	1	Supply with engine
M2	Air conditioner fan	1	Supply with air conditioner
M3	Washer 1112.5208000-20 TU 37.003.639-87	1	Front

Pos. name	Name	Q-ty	Notes
M4,	Window wiper motor gearbox 521.3730 TU 37.459.078-86	2	Front
M5			Rear
M6	Washer 1112.5208000-10 TU 37.003.639-87	1	Rear
M7	OS-8 heater fan	1	
R1	Electronic speedometer 31.3802 TU 37.453.077-86	1	
R2	Tachometer PT8040-4	1	
R3	Pressure gauge receiver 33.3810 TU 37.003.387-78	1	Engine oil
R4	Temperature gauge receiver 36.3807 TU 37.003.941-79	1	Cooling fluid
R5	Pressure gauge receiver 3452.3810 TU 37.003.387-78	1	Air in PS (pneumatic system)
R6	Pressure gauge receiver 14.3810 TU 37.003.387-78	1	Gearbox oil
R7	Fuel level gauge receiver 34.3806 TU 37.003.942-79	1	
PV	Engine hour meter - voltmeter UK34.2 RIVP.457381.001TU	1	
R	Resistor S2-23-51 Ohm+10% OZhO.467.081 TU	1	
SA1	Switch panel 89.3709 TU 37.461.012-96	1	
SA2	Switch panel 53.3710.06.09 TU 37.003.1055-81	1	
SA3	Starter and instrument switch 1202.3704-02 TU 37.003.529-77	1	
SA4	Switch VK416B-01 TU 37.003.1174-83	1	Instrument illumination
SA5	Alarm signaling switch 245.3710-01 TU 37.469.022-97	1	
	Unified switches TU 37.003.1222-84:		
SB2	3812.3710-02.07	1	Rear window wiper
SB3	3812.3710-02.07	1	“Road-train” sign
SB4,	3812.3710-02.05	2	Service rear lamps
SB5			Service front lamps
SL	Fuel level sensor E744R-3800070	1	
SP1	Emergency oil pressure alarm 3702.3829 TU37.003.518-74	1	
	Emergency air pressure sensor DADV-01 TU RB 07513211.004-94:		
SP3		1	Parking brake
SP9		1	1st circuit receiver

Pos. name	Name	Q-ty	Notes
	Switch 2802.3829010 TU 37.453.092-93:		
SP4		1	Brake lamp
SP5		1	Brake lamp
SP6		1	TGB filter
SP7	Air filter clogging alarm sensor (Donaldson)	1	Supply with filter
SP8	Halocarbon pressure sensor	1	Supply with air conditioner
SP10	Emergency air pressure sensor DADV-02 TU RB 07513211.004-94	1	2nd circuit re-ceiver
SP12	Steering control pressure filter clogging alarm	1	Supply with filter
SP13	Mounted equipment pressure filter clogging alarm	1	Supply with filter
SQ	Intermediate relay interlock switch 15.3710 TU 37.003.188-76	1	
VD1… VD10	Diode KD202D UZh3.362.036TU	10	
VD11	Diode D242a A0336.206TU	1	
VD12	Diode KD343D dR3.362.029-01TU	1	
	Socket plugs GEO.364.107TU:		
XP1	ShR28PK1NSh4	1	
XP2	ShR32P12NG1	1	
XP3, XP4	ShR40P16NG2	2	
	Pin 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			
XP23	502606	1	
	Socket plugs GEO.364.107TU:		
XS1	ShR28P1NSh4	1	
XS2	ShR32P12NG1	1	
XS3	ShR40PK16NG2	1	
XS4	ShR40PK16EG2	1	
XS6	Socket plug PS400-3723200 TU 37.003.228-77	1	
XS7	Socket outlet PS300A GOST 9200-76	1	
	Receptacles OST 37.003.032-78:		

Pos. name	Name	Q-ty	Notes
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	
XS35	Three-contact socket plug	1	Supply with engine
XS65	Socket plug 8JB 001933-011 (Hella)	1	
	Connecting panels OST 37.003.1358-88:		
XT1 … XT7	17.3723.000	7	
YC1	Solenoid valve of air conditioner compressor	1	Supply with air conditioner
YC2	Solenoid valve for engine shutdown	1	Supply with engine
YC3	Solenoid valve for fuel supply	1	Supply with engine

APPENDIX 9B

LIST OF ELECTRICAL EQUIPMENT ELEMENTS FOR THE ELECTRICAL DIAGRAM OF K-744R2, K-744R3, K-744R4 STANDARD TRACTORS

Pos. name	Name	Q-ty	Notes
A1	Steering column KF00W0D-ELS-PK	1	
A6	Air conditioner control panel	1	
A7	Avgust air conditioner	1	
A8	Car audio	1	
A9	Antenna 7691260014	1	Bosch
BA1;BA2	Loud speakers ACV SP-420	2	
BK1	Temperature sensor TM100 TU 37.003.271-76	1	Cooling fluid temperature
BP1	Pressure sensor TKH1.6-T184	1	Gearbox oil
BP2	Pressure sensor 3902.3829010 GOST 1701-75	1	Air in PS (pneumatic system)
BP3	Pressure sensor 18.3829010 TU 37.003.387-78	1	Oil pressure in engine
BV2	Speed sensor 11.3843-Y-HL TU37.003.1148-83	1	
EK1	Plug	1	Supply with engine
EK2	Plug	1	Supply with engine
KK2	Thermal relay 1202.3741	1	
EL1;EL2	Headlamp 1BL 247 042-017 (Hella)	2	D90 mm, H1, 24V low beam
EL1;EL2	Headlamp 1KO 247 042-037 (Hella)	2	D90 mm, H1, 24V high beam
	Service lamps 8724.3-10-01		
EL3; EL4		2	Front right lamps
EL5; EL6		2	Front left lamps
EL7; EL8		2	Rear right lamps
EL9; EL10		2	Rear left lamps
EL11	Under-h lamp PD308A-U-HL TU37.003.187-80	1	
EL12…EL16	Switch illumination lamp		Hella
EL18	9FF 713 627 011	6	
EL20, EL21	Ceiling lamp 2JA 003 231-001	2	
EL22	License plate lighting lamp OH3 00-02	1	
FU1,FU2	Fuse panel 41.3722 TU37.469.013-95	2	
	Fuses 35.3722 TU37.469.013-95 35.3722 (5A)		

Pos. name	Name	Q-ty	Notes
FU2.5, FU2.6			Used with fuse panel 41.3722
FU2.7, FU2.8		4	
	352.3722 (10A)		
FU1.1-FU1.5			
FU1.7-FU1.13			
FU2.1,FU2.2			
FU2.9,FU2.13		19	
FU2.3	354.3722(20A)	1	
FU2.4	355.3722 (25A)	1	
FU1.6	356.3722 (30A)	1	
FU22	Fuse 542.3722-60A TU37.469.056-2002	1	
G	Generator	1	Supply with engine
GB1, GB2	Battery 6ST-190A PZ ZhYuIK.563414.013TU	2	
	Hornless sound signals TU37.003.688-75		
HA1	C313	1	
HA2	C314	1	
	Front light 3723.3712-01 TU RB 0588255010-95		
HL1		1	Right
HL2		1	Left
	Side repeater lamp 641.3726-01 TU37.001.2164-2006		
HL3		1	Right turn
HL4		1	Left turn
HL5… HL7	Turn indicator repeater UP C-24V	3	“Road-train” sign
HL22	Rear light 7313.3716-01		
HL23	TU RB 600124825026-2002	2	
KM	Switch 1420.3737 TU37.003.574-74	1	
	Relay 751.3777 TU37.003.1418.94:		
KV1		1	Battery switch locking
KV2		1	Generator interlocking relay
KV3		1	Sound signal
KV4		1	EHR activation (cl. 15)
KV5		1	HER activation (D+)
KV6		1	High beam
KV7		1	Low beam
KV8		1	Brake lamp
KV9		1	Air conditioner compressor
KV10		1	Air conditioner fan
KV14		1	Thermostart
KV11	Relay 738.3747-20 TU 37.003.1418-94		Starter
KV12	Relay 711.3747 TU37.003.1418-94	1	Cl15
KV13	Relay 46.3747010	1	Window wiper relay

Pos. name	Name	Q-ty	Notes
M1	Starter	1	Supply with engine
M2	Air conditioner fan	1	Supply with air conditioner
M3,M4	Washer	2	Front/rear
M5	Window wiper motor gearbox A16-60.08	1	front
M6	Window wiper motor gearbox A18-50.00	1	rear
M7	OS-8 heater fan	1	Avgust
SA1	Switch 6RH 007 832-461	1	Front service headlight activation
SA2	Switch 6RH 007 832-461	1	Rear service headlight activation
SA3	Switch 6EH 007 832-011	1	“Road-train” sign activation
SA4	Switch 6EH 007 832-011	1	Flasher lamp activation
SA5	Switch 6RH 007 832-411	1	Rear window wiper activation
SL1	Fuel level sensor DT7.3-51-800-00	1	
SL2	Hydr. system impermissible oil level alarm sensor	1	
SK1	Cooling fluid emergency temperature sensor TM-111-09 TU 37.003.271-76	1	
SK3	Hydr. system impermissible oil temperature alarm sensor	1	
SP1	Emergency air pressure sensor DADV-02 TU RB 07513211.004-94	1	Parking brake
SP2	Switch 2802.3829010 TU 37.453.092-93	1	Brake lamp
SP3	Oil filter clogging alarm	1	Supply with engine
SP4	Alarm for emergency oil pressure in engine 3702.3829	1	Oil in engine
SP6	TGB filter clogging alarm sensor	1	
SP7	Halocarbon pressure sensor	1	Supply with air conditioner
SP8	Air filter clogging alarm sensor 13.3839	1	
SP9, SP10	Emergency air pressure sensor 6072.3829	2	1st and 2nd circuit receivers
SP11	Mounted equipment pressure filter clogging alarm	1	Supply with filter
SP12	Steering control pressure filter clogging alarm	1	Supply with filter
SQ1	Neutral mode switch VK 12-41 TsIKS.642241.023	1	Starter activation chain locking
UZ	Voltage transformer PN24/12.5	1	
VD1	Diode KD243B	1	

Pos. name	Name	Q-ty	Notes
	Pin contact blocks SRS		Cannon-type power con-nectors (AMR)
XP1	Pin contact block 213905-1	1	3-contact
	Pin contact block 206838-3	5	24-contact
XP3		1	
XP4		1	
XP6		1	
XP8		1	
XP16		1	
	Pin contact block 206151-3	4	37-contact
XP2		1	
XP5		1	
XP7		1	
XP15		1	
	Pin contact blocks Supersiel 1.5 282105-1	3	3-contact
XP13		1	
XP89		1	
XP90		1	
XP99	282108-1	1	6-contact
	Pin contact blocks OST37.003.032-78		
XP81	502601	1	
	Pin contact block 1-480586-0	2	9-contact
XP17		1	
XP18		1	
	Receptacles SRS		Cannon-type power con-nectors (AMR)
XS1	Receptacle 213889-2	1	3-contact
XS9	Receptacle 182921-1	1	4-contact
XS11	Receptacle 206043-1	1	14-contact
	Receptacle 206837-1	5	24-contact
XS3		1	
XS4		1	
XS6		1	
XS8		1	
XS16		1	
	Receptacle 206150-1	4	37-contact
XS2		1	
XS5		1	
XS7		1	
XS15		1	
	Receptacles Supersiel 1.5		
XS33	282079-2	1	1-contact
	282087-1	4	3-contact
XS13		1	
XS69		1	
XS69		1	
XS90		1	
XS32	282088-1	1	4-contact
	282090-1	2	6-contact
XS70		1	

Pos. name	Name	Q-ty	Notes
XS99		1	
	Receptacle 601202	4	2-contact
XS56		1	
XS63		1	
XS64		1	
XS66		1	
XS71	Receptacle AX-333	1	Hydr. system oil level sensor
	Receptacle 8JA 713631-001	7	For key switches
XS6.1		1	
XS6.2		1	
XS6.3		1	
XS6.4		1	
XS6.5		1	
XS6.6		1	
	Receptacles ISO 10487		
XS79	962189-1	1	Type A
XS80	962191-1		Type B
XS(KV12)	Receptacle KR3702	1	Relay 711.3747
	Receptacles OST 37.003.032-78:		
	602601	9	
XS26		1	
XS36		1	
XS38		1	
XS39		1	
XS43		1	
XS52		1	
XS53		1	
XS54		1	
XS55		1	
	602602	11	
XS14		1	
XS21-12V		1	
XS22-24V		1	
XS61		1	
XS62		1	
XS65		1	
XS97		1	
XS98		1	
XS114		1	
XS115		1	
XS58	602604	1	
	602606	3	
XS12		1	
XS34		1	
XS37		1	
	617605	11	
XS(KV1)		1	
XS(KV2)		1	
XS(KV3)		1	

Pos. name	Name	Q-ty	Notes
XS(KV4)		1	
XS(KV5)		1	
XS(KV6)		1	
XS(KV7)		1	
XS(KV8)		1	
XS(KV9)		1	
XS(KV10)		1	
XS(KV14)		1	
YA1	ET solenoid valve	1	Supply with engine
YC2	Solenoid valve of compressor	1	Supply with air conditioner

APPENDIX 9C

LIST OF ELECTRICAL EQUIPMENT ELEMENTS FOR THE ELECTRICAL DIAGRAM OF K-744R2, K-744R3, K-744R4 PREMIUM TRACTORS

Pos. name	Name	Q-ty	Notes
A1	Steering column KF00W0D-ELS-PK	1	
A2	Electronic unit MR	1	Supply with engine
A3	Electronic unit FLA A000 446 1207	1	Supply with engine
A4	Electronic unit ADM2FR	1	Supply with engine
A5	Pedal A9413000104	1	Supply with engine
A6	Air conditioner control panel	1	
A7	Avgust air conditioner	1	
A8	Car audio	1	
A9	Antenna 7691260014	1	Bosch
BA1;BA2	Loud speakers ACV SP-420	2	
BP1	Pressure sensor TKH1.6-T184	1	Gearbox oil
BP2	Pressure sensor 3902.3829010 GOST 1701-75	1	Air in PS (pneumatic system)
BV2	Speed sensor 11.3843-Y-HL TU37.003.1148-83	1	
EK1	Plug	1	Thermostatic control
EK2	Filter heating element	1	Fuel filter
EL1;EL2	Headlamp 1BL 247 042-017 (Hella)	2	D90 mm, H1, 24V low beam
EL1;EL2	Headlamp 1KO 247 042-037 (Hella)	2	D90 mm, H1, 24V high beam
	Service lamps 8724.3-10-01		
EL3; EL4		2	Front right lamps
EL5; EL6		2	Front left lamps
EL7; EL8		2	Rear right lamps
EL9; EL10		2	Rear left lamps
EL11	Under-h lamp PD308A-U-HL TU37.003.187-80	1	
EL12…EL16	Switch illumination lamp		Hella
EL18	9FF 713 627 011	6	
EL20, EL21	Ceiling lamp 2JA 003 231-001	2	
EL22	License plate lighting lamp OH3 00-02	1	

Pos. name	Name	Q-ty	Notes
FU1,FU2	Fuse panel 41.3722 TU37.469.013-95	3	
	Fuses 35.3722 TU37.469.013-95		
	35.3722 (5A)		
FU2.3,FU2.6			
FU2.7, FU2.8			
FU2.9		5	
	352.3722 (10A)		
FU1.2-FU1.13			Used with fuse panel 41.3722
FU2.1,FU2.2			
FU2.4,FU2.5			
FU2.10,FU2.13			
FU3.2,FU3.6		25	
FU1.2,FU1.13	356.3722 (30A)	2	
FU22	Fuse 542.3722-60A TU37.469.056-2002	1	
FU29	Sealed fuse (20A)	1	
G	Generator	1	Supply with engine
GB1, GB2	Battery 6ST-190A PZ ZhYuIK.563414.013TU	2	
	Hornless sound signals TU37.003.688-75		
HA1	C313	1	
HA2	C314	1	
	Front light 3723.3712-01 TU RB 0588255010-95		
HL1		1	Right
HL2		1	Left
	Side repeater lamp 641.3726-01 TU37.001.2164-2006		
HL3		1	Right turn
HL4		1	Left turn
HL5… HL7	Turn indicator repeater UP C-24V	3	“Road-train” sign
HL22	Rear light 7313.3716-01		
HL23	TU RB 600124825026-2002	2	
KM	Switch 1420.3737 TU37.003.574-74	1	
	Relay 751.3777 TU37.003.1418.94:		
KV1		1	Battery switch locking
KV2		1	ET lamp acti-vation
KV3		1	Sound signal
KV4		1	EHR activation (cl. 15)

Pos. name	Name	Q-ty	Notes
KV5		1	HER activation (D+)
KV6		1	High beam
KV7		1	Low beam
KV8		1	Brake lamp
KV9		1	Air conditioner compressor
KV10		1	Air conditioner fan
KV11		1	Starter
KV12	Relay 711.3747 TU37.003.1418-94	1	Cl15
KV13	Relay 46.3747010	1	Window wiper relay
M1	Starter	1	Supply with engine
M2	Air conditioner fan	1	Supply with air conditioner
M3,M4	Washer	2	Front/rear
M5	Window wiper motor gearbox A16-60.08	1	front
M6	Window wiper motor gearbox A18-50.00	1	rear
M7	OS-8 heater fan	1	Avgust
R1	Resistor C2-23-0.5-120 Ohm	1	
SA1	Switch 6RH 007 832-461	1	Front service headlight activation
SA2	Switch 6RH 007 832-461	1	Rear service headlight activation
SA3	Switch 6EH 007 832-011	1	“Road-train” sign activation
SA4	Switch 6EH 007 832-011	1	Flasher lamp activation
SA5	Switch 6RH 007 832-411	1	Rear window wiper activation
SA7	Switch 6GM 007 832-241	1	Growth/reduction of engine RPM value
SL1	Fuel level sensor DT7.3-51-800-00	1	
SL2	Hydr. system impermissible oil level alarm sensor	1	
SK3	Hydr. system impermissible oil temperature alarm sensor	1	
SP1	Emergency air pressure sensor DADV-02 TU RB 07513211.004-94	1	Parking brake
SP2	Switch 2802.3829010 TU 37.453.092-93	1	Brake lamp
SP6	TGB filter clogging alarm sensor	1	
SP7	Halocarbon pressure sensor	1	Supply with air conditioner

Pos. name	Name	Q-ty	Notes
SP8	Air filter clogging alarm sensor XX770050	1	Donaldson
SP9, SP10	Emergency air pressure sensor 6072.3829	2	1st and 2nd circuit receivers
SP11	Mounted equipment pressure filter clogging alarm	1	Supply with filter
SP12	Steering control pressure filter clogging alarm	1	Supply with filter
SQ1	Neutral mode switch VK 12-41 TsIKS.642241.023	1	Starter activation chain locking
UZ	Voltage transformer PN24/12.5	1	
VD1	Diode KD243B	1	
	Pin contact blocks SRS		Cannon-type power connectors (AMR)
XP1	Pin contact block 213905-1	1	3-contact
	Pin contact block 206838-3	5	24-contact
XP3		1	
XP4		1	
XP6		1	
XP8		1	
XP16		1	
	Pin contact block 206151-3	4	37-contact
XP2		1	
XP5		1	
XP7		1	
XP15		1	
	Pin contact blocks Supersiel 1.5 282105-1	3	3-contact
XP13		1	
XP89		1	
XP90		1	
XP99	282108-1	1	6-contact
	Pin contact blocks OST37.003.032-78		
XP81	502601	1	
XP76	Pin contact block 1-480586-0	2	9-contact
XP17		1	
XP18		1	
	Receptacles SRS		Cannon-type power connectors (AMR)
XS1	Receptacle 213889-2	1	3-contact
XS9	Receptacle 182921-1	1	4-contact
XS11	Receptacle 206043-1	1	14-contact

Pos. name	Name	Q-ty	Notes
	Receptacle 206837-1	5	24-contact
XS3		1	
XS4		1	
XS6		1	
XS8		1	
XS16		1	
	Receptacle 206150-1	4	37-contact
XS2		1	
XS5		1	
XS7		1	
XS15		1	
	Receptacles Supersiel 1.5		
XS33	282079-2	1	1-contact
	282087-1	4	3-contact
XS13		1	
XS69		1	
XS69		1	
XS90		1	
XS32	282088-1	1	4-contact
	282090-1	2	6-contact
XS70		1	
XS99		1	
	Receptacle 601202	4	2-contact
XS56		1	
XS63		1	
XS64		1	
XS66		1	
XS71	Receptacle AX-333	1	Hydr. system oil level sensor
	Receptacle 8JA 713631-001	7	For key switches
XS6.1		1	
XS6.2		1	
XS6.3		1	
XS6.4		1	
XS6.5		1	
XS6.6		1	
XS6.7		1	

Pos. name	Name	Q-ty	Notes
XS1-21	A013 545 6526	1	Supply with engine
XS2-18	A013 545 6426		
XS70		2	
XS3-15	A013 545 6326	1	
XS4-12	A013 545 6226	1	
XS67	A013 545 6226	1	
XS9.1	A001 545 5626	1	
XS50	A015 545 6726	1	
XS51	A000 153 0022	1	
	Receptacles ISO 10487		
XS79	962189-1	1	Type A
XS80	962191-1		Type B
XS(KV12)	Receptacle KR3702	1	Relay 711.3747
	Receptacles OST 37.003.032-78:		
	602601	9	
XS26		1	
XS36		1	
XS38		1	
XS39		1	
XS43		1	
XS52		1	
XS53		1	
XS54		1	
XS55		1	
	602602	11	
XS14		1	
XS21-12V		1	
XS22-24V		1	
XS61		1	
XS62		1	
XS65		1	
XS96		1	
XS97		1	
XS98		1	
XS114		1	
XS115		1	
XS58	602604	1	
	602606	3	
XS12		1	
XS34		1	
XS37		1	
	617605	11	
XS(KV1)		1	
XS(KV2)		1	
XS(KV3)		1	

Pos. name	Name	Q-ty	Notes
XS(KV4)		1	
XS(KV5)		1	
XS(KV6)		1	
XS(KV7)		1	
XS(KV8)		1	
XS(KV9)		1	
XS(KV10)		1	
XS(KV11)		1	
YC1	ET solenoid valve	1	Supply with engine
YC2	Solenoid valve of compressor	1	Supply with air conditioner