

Ми-8 MTB-1 HELICOPTER

MAINTENANCE SCHEDULE

PART I. HELICOPTER FRAME AND POWER UNIT

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1. GENERAL

1.1. The present Maintenance schedule (MS) is the basic document, determining the scope and schedule of Ми-8 МТБ-1 helicopters maintenance operations.

The timely and high-quality execution of maintenance operations ensures the maintaining of specified level of serviceability and readiness of the helicopter for flight.

1.2. The maintenance schedule consists of two parts:

Part I – “Helicopter frame and power unit”

Part II – “Helicopter equipment and avionics”

1.3. The maintenance schedule includes the following types of maintenance to be carried out on the helicopter:

- line maintenance;
- periodic maintenance;
- maintenance during helicopter storage;
- seasonal maintenance;
- special maintenance.

1.4. The line maintenance includes the following operations:

- Post-flight check operations – BC;
- Parking maintenance of helicopter – OC;
- Pre-flight check operations – OB;

Inspection and maintenance operations – maintenance checks OB-1, A-1, A-2, B.

1.5. The post-flight check operations (BC) are performed after each landing of the helicopter, the engines being shutdown.

1.6. The parking maintenance of helicopter (OC) is performed:

- when the flight crew transfers the helicopter for maintenance or storage for a period of more than 2 hours;
- when the helicopter is displaced to the other parking apron.

1.7. The pre-flight check operations (OB) are performed immediately prior to each flight irrespective of performed line maintenance check.

1.8. The helicopter maintenance in accordance with “OB-1” maintenance check is performed prior to helicopter flight:

- if the helicopter parking period after line maintenance is 12 hours and more;
- if “A-1” maintenance checks were carried out after flights the day before, regardless of previous parking period;
- after periodic maintenance.

1.9. The helicopter maintenance in accordance with “A-1” maintenance check is performed:

- after helicopter landing, when the time in flight is 45 minutes and more, and if “A-2” maintenance checks are not required;
- during scheduled refueling of the helicopter, when the time interval between landings is less than 45 minutes;
- after flights, when the total flying time today is less than 7 hours.

1.10. The helicopter maintenance in accordance with “A-2” maintenance check is performed:

after flights, when the total flying time today is 7 hours and more, and periodic maintenance is not required;

Note: When the total flying time today is less than 7 hours, the “A-2” maintenance checks are performed once per two days, during which at least one flight was performed.

- after any periodic maintenance checks;
- after special maintenance (in accordance with instructions of section 7 of present maintenance schedule).

1.11. The helicopter maintenance in accordance with “B” maintenance check includes the operations, performed with intervals of (25 ± 5) flight hours, and the count is kept from numbers, divisible by 25 hours (only for helicopter frame and power unit).

1.12. The periodic maintenance consists of preliminary operations, inspection and maintenance operations, lubrication and final operations.

1.13. The periodic maintenance is assigned basing on the helicopter flying time in hours, since it was placed in service or after the last overhaul and includes the basic maintenance checks Ф-1,

to be performed every (50 ± 10) flight hours, and additional operations Φ -2, 3 and 4 to be carried out every 100, 300 and 500 flight hours respectively, regardless of tolerance at the previous periodic maintenance.

1.14. There is a single tolerance equal to ± 10 flight hours for all periodic maintenance operations. In case of step-by-step maintenance procedure it is allowed to increase the tolerance up to ± 20 flight hours for operations with intervals of 100 hours and more.

1.15. The maintenance of engines, units and instruments is determined by the helicopter flying time. In case of replacement of the engine (engines) and other components due to expiration of service life or before the expiration date, carry out the maintenance checks, required by helicopter flying time, and additional operations:

- connected with replacement of the engine (engines) or components;
- inspection of helicopter frame structural components and systems points, which are accessible only with the removed engine or component.

The subsequent maintenance of engine (engines) and other components is performed according to maintenance checks, corresponding to the helicopter flying time.

1.16. When performing all periodic maintenance checks it is necessary to check the operating time of engines, oils and all units, having the limited service life, to exclude their overtime operation in the next flight and to determine the necessity of their replacement.

1.17. The helicopter maintenance during storage is performed during intervals between flights and includes the following operations:

- helicopter preparation for storage;
- helicopter maintenance every (10 ± 2) days; (30 ± 5) days; 3 months ± 10 days; 6 months ± 1 month;
- helicopter preparation for flight after storage.

1.18. The seasonal maintenance is performed during helicopter preparation for autumn-winter and spring-summer periods of operation.

1.19. The special maintenance is performed after:

- flight in turbulent atmosphere (when exceeding the permissible limit loads), steep turns, lightning strike, flying in icing conditions, hard landing, at increased vibration level, resonance conditions and staying on the ground in storm weather;
- replacement of engines, main, intermediate and tail gear boxes, main and tail rotors hubs.

1.20. All operations, specified in Maintenance Schedule (MS), should be performed in accordance with task cards, included in Maintenance Manual of Ми-8МТ helicopter, as well as maintenance procedures and storage instructions, included in Maintenance Manuals of vendor items.

Follow the instructions of Air Transport Department and Maintenance Manuals of Ми-8МТ helicopter, TB3-117BM engine, BP-14 gear box and another components, as well as effective civil aviation bulletins when it is required to perform operations, not specified in the above-mentioned documents.

All revisions and supplements should be introduced in MS in proper time according to directives of Air Transport Department and industry bulletins, validated by Air Transport Department.

1.21. The task card with the same number, that is in the Ми-8МТ helicopter Maintenance Manual (8MT-0007-00PЭ), third edition, or in the Vendor items Maintenance manuals – for vendor items, corresponds to each MS item.

When performing the checks of helicopter equipment and avionics in the laboratory for compliance with appended Instructions on checking instruments and sets, follow the references to the documents, indicated in the column "Remarks".

1.22. When performing any of helicopter maintenance checks, eliminate all troubles, revealed by crew in flight and detected during maintenance.

1.23. On completion of operations, connected with replacement, installation and adjustment of units in helicopter, engines control systems and another systems, make certain of serviceability of units and systems, and compliance of control position to position of controlled element.

1.24. On completion of operations, connected with hinging-up of instrument panels, perform the checkup of pressure instruments.

1.25. The helicopter maintenance is performed by technical maintenance personnel, trained for each of specialties, familiar with structure, instructions on technical maintenance and repair of aviation equipment in civil aviation (ИТАПАТ ГА -93), Instruction on safety precautions, present maintenance schedule; authorized for Ми-8МТ helicopters maintenance in accordance with established procedure and responsible for completeness and quality of performed operations.

1.26. The technical maintenance personnel, authorized for helicopter maintenance on one's own, is responsible for organization and control of quality of performed operations in accordance with present MS.

1.27. The quality step-by-step inspection of operations, performed during periodic maintenance of the helicopter, is carried out by aircraft maintenance station maintenance personnel, assigned in accordance with Civil aviation ministry Instruction No. 29/И dated 12.10.89 "Standard statement on technical control department of airline aircraft maintenance station, production enterprise and flight institution of civil aviation".

1.28. Technical documentation should be drawn up in accordance with effective statements after each maintenance of the helicopter.

1.29. The engines fuel system should be always filled with fuel. Once the fuel system has been emptied, preserve the fuel system pipelines and units not later than 24 h after fuel has been drained.

1.30. Removal of factory lead seals of helicopter units, engines and units of helicopter equipment, whose warranty terms have not elapsed, for troubleshooting is performed only by representative of supplier factory. On completion of troubleshooting the seals of the units and equipment should be applied by representative of supplier factory, with a corresponding entry on performed operation made in the Log-Book (Certificate) of the respective unit.

1.31. In case of pre-term or unscheduled removal of any item from the helicopter, hang out a pennon in plain view in the cockpit and tag, indicating that this item has been removed.

2. SAFETY PRECAUTIONS

2.1. Prior to carrying out the operations in the helicopter, it is necessary to make certain that the helicopter is grounded, all automatic circuit breakers and switches of electrical loads are in OFF position.

2.2. The ground power sources may be connected to the helicopter mains only if the permission of the flight engineer, engineer or chief of maintenance crew has been given. When power supply sources are connected to the helicopter, hang out a placard **HELICOPTER ENERGIZED**.

2.3. It is necessary to deenergize the helicopter mains when carrying out the operations on removal and installation of helicopter equipment and avionics in the helicopter, as well as inspecting the wiring of distribution devices (junction boxes) and troubleshooting in the electric circuits. Hang out placards **"WORKS ARE CARRYING OUT. DO NOT ENERGIZE!"** in the cockpit at the external power and emergency power-up switches, as well as at the connectors of ground power sources connection.

2.4. In all cases of helicopter standing on the ground, the РИО-3 radioisotope ice detector probe should be covered with protective casing.

It is **STRICTLY PROHIBITED** to open the radioactive sources like РИО-3 radioisotope ice detector and to remove the base plate with radioactive element from them in service.

The detectors together with the radioactive sources are not to be destroyed and buried at the operator.

When working with the radioisotope sources follow the "Basic sanitary regulations on operation with radioactive substances and sources of ionizing radiation" ОСП № 950-72.

2.5. When the transmission and controls (manual, pedal and collective pitch/throttle) are being tested and adjusted, it is prohibited to perform any operations in the areas of moving elements. Prior to turn the transmission and move the controls, it is necessary to give warning commands to the maintenance personnel, working in the specified areas, and to receive their reports on safety.

2.6. During engines cranking it is prohibited to stay and carry out the operations in the engine and gear box compartments, tail boom and in the area of helicopter rotors. The top engine access hatch in the cockpit should be closed.

2.7. Be careful and avoid touching the hot parts to prevent burns when inspecting the power plant and walking on the servicing platforms after engines shutdown.

2.8. When inspecting the helicopter make use of serviceable lamps with protecting grids only. Damaged cable insulation, sparking and loose plug-to-socket connection are not allowed.

2.9. Make certain that hydraulic jacks, hoisting cranes and electrically controlled movable hoists are serviceable prior to their application. It is strictly prohibited to use faulty hoisting devices or devices having the expired inspection (per specifications) time.

2.10. Inflate the landing gear wheel tyres with compressed air from high-pressure bottles and blow out the parts assemblies using a special reducer, adjusted to pressure in accordance with technical requirements.

2.11. It is not allowed to use the protruding elements and the other objects of helicopter structure instead of stepladders, except for specially designed elements (servicing platforms on the cowlings of engine and gear box compartments, steps etc.)

2.12. It is not allowed to carry out any operations standing on the tail boom.

2.13. All operations on installation and removal of engines, gear boxes, main rotor hub and blades should be performed under the direction of responsible person, having the authorization to perform slinging operations (engineer, headman), using hoisting devices and rigging arrangement, specified by technology.

2.14. The helicopter should be lifted by means of all hydraulic jacks simultaneously. Nobody should stay on or under the helicopter during lifting. Do not attempt to lift the helicopter if the wind velocity is more than 8 m/s.

2.15. It is not allowed to tighten the connections, nuts and to relocate the fastening (attachment) of pipelines of air and hydraulic systems being under pressure.

2.16. As the decay products of Б-3В synthetic oil are toxic, prevent getting of oil onto exposed areas of skin. If oil gets on the exposed areas of skin, it is necessary to wash it immediately with

warm water and soap. If Б-3В oil gets on the parts and surfaces of the helicopter, remove it immediately with cloth, wetted in gasoline for technical purpose, and wipe dry this surface.

2.17. It is not allowed to refuel the helicopter:
with the engines running;
when the fire-fighting means are not available;
during storm.

2.18. Helicopter electrical system power supply and units, servicing the refueling, should be switched on before refueling and switched off on its completion.

2.19. During helicopter refueling it is not allowed to:

- perform maintenance of radio, electric and oxygen equipment;
- switch on and off the automatic circuit breakers and switches in the helicopter cockpit and cabin;
- perform any operations, connected with sparking, in the helicopter and at the distance of 25 m from the helicopter.

2.20. Engines starting and testing on completion of periodic maintenance checks or after elimination of troubles should be performed on specially assigned or mooring sites, as well as on parking sites provided that the requirements of item 7.7.4 НПП ГА-85 are fulfilled.

2.21. When the engines are being tested, nobody should stay within the main rotor blades swept area, as well as within tail rotor zone. It is not allowed to stay closer than 25 m from the helicopter, except for technician, observing the starting.

2.22. Only if the engines are operating at idle power it is allowed to approach to the helicopter, at that one should remember that the lowest left front and right rear areas are the most dangerous areas of blades rotation.

3. LINE MAINTENANCE

M.S. item	Name of equipment and description of maintenance operations	Remark
	Post-flight check operations (BC)	
10.00.00a	Prepare the parking site to receive helicopter and check the availability of fire-fighting means.	
10.10.00a	Accept the helicopter at parking site.	
72.00.00 TC 504	Measure run-down time of gas generator rotor.	The gas generator rotor run-down should be measured by flight engineer with making mandatory entry on minimum run-down time in the helicopter Log Book at the end of flight day.
12.10.00a	After engines shutdown during rotor run-down listen in order to check engines and transmission units for foreign noise.	
	With main rotor speed decreasing watch over rotation of blades. Check that blade droop stops operate properly.	
	Before pressure drop in hydraulic system, check charging of hydraulic accumulators using pressure gauge by moving the controls.	Hydraulic accumulator charging check is to be performed by flight engineer.
10.10.00б	Place chocks under helicopter main landing gear wheels. Put rubber cap on visual ice indicator, place cover on pitot-static tube and protecting cover on PИO-3 ice detector. Ground the helicopter.	Placing of chocks and performing of all subsequent operations should be only after full stop of rotors. This operation is performed by flight technician, responsible for helicopter post-flight check operations.
12.10.00б	Install blanks on inlet ducts of engines (if dust protection device is not installed), place covers on dust protection devices, and install blanks on fan inlet, air bleed pipes of AM-9B engine, covers-blanks on engines exhaust pipes, blank on AM-9B engine exhaust pipe. Make certain that the KO-50 heater air intake shutter is closed.	The blanks should be installed on the exhaust pipes only after the pipes cooling down, but not earlier than 10 minutes after engines shutdown.
12.10.00з	Drain condensate from sump filter of pneumatic system.	In case of sump filter valve freezing, warm it up with the warm air or cloth, wetted in hot water.
12.10.00ж	Drain fuel from drain tank.	
12.10.00и	Check for external damages and leaks of fuel, oil and AMF-10 hydraulic fluid on the engines and gear box cowlings and fuselage skin.	
12.10.00в	Obtain information from crew and get familiar with entries in Log Book on units operation in flight.	
	Preparation of helicopter for storage (OC)	
12.10.00е	Accept the helicopter and airborne items from crew according to the list in the flight log. Check the availability of the fire-fighting means on board, inspect the cockpit and make certain that:	
	- control levers of engine shutdown valves are locked in "ОСТАНОВ" (SHUTDOWN) position;	
	- separate throttle control levers are locked in neutral position;	
	- fuel emergency shut-off valves are closed;	
	- security lock is placed and locked on the collective pitch/throttle control lever, and the throttle control twist grip is turned to the left;	
	- all automatic circuit breakers and switches of loads and power sources are switched off;	
	- covers on pitot-static tubes and protecting cover on PИO-3 ice detector are placed;	
	- landing gear wheels are braked;	
	- main rotor is braked and there are no blades above the tail boom and horizontal stabilizer.	

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M.S. item	Name of equipment and description of maintenance operations	Remark
28.40.00r	Referring to fuel quantity indicator determine the quantity of remaining fuel in tanks. Make an entry on quantity of accepted fuel in the flight log.	
10.20.00a	Make sure of secure closing of engine access top exit cover, blisters, cargo doors (of rear exit), cockpit and entrance doors.	
10.20.00a	Put covers on the fuselage nose section.	The helicopter should be covered in case of scheduled interval between flights of more than 10 days.
10.20.00e	In expectation of wind velocity of more than 20 m/s, moor the main rotor blades and additionally lock the blades with screw clamps.	
10.20.00д	Should the helicopter parking, for more than 5 h, be anticipated due to operating conditions at an outside air temperature below minus 50 °C, drain oil from the BP-14 gear box.	
Pre-flight check operations		
10.00.00a	Check the availability of fire-fighting means on the helicopter parking.	
10.20.00a	Disconnect the main rotor blades mooring ropes, uncover the helicopter (if it was covered and the blades were moored), remove the ties of additional locking (if they have been installed).	When warming up the engines, gear boxes and main rotor hub, remove the covers only prior to starting.
12.10.00б	Inspect the helicopter surfaces. In case of ice formation, snow and hoarfrost, remove them from the fuselage, main and tail rotor, glasses, antennas, air intakes and components of engine inlet ducts. Pay special attention to condition of helicopter nose section surface and areas on the fuselage in front of engine inlets.	
12.20.00б	At ambient air temperature of +5 to -15°C warm up intermediate and tail gearboxes up to oil temperature of +15°C if TC _{mn} hypoid oil is used in them.	
	When using CM-9 oil mixture (two-thirds of TC _{mn} hypoid transmission oil and one-third of АМГ-10 oil by volume) in gearboxes, warm up them to have oil mixture temperature of -15°C at ambient air temperature below -30°C.	
	When using "50/50" oil mixture (50% of TC _{mn} hypoid transmission oil and 50% of АМГ-10 oil by volume) carry out warming-up at ambient air temperature below -45 °C till oil attains temperature of -40 °C	
72.00.00 TC 305	At ambient air temperatures below 0 deg C, as well as in conditions of first frosts after bad weather with rain and wet snow and in cases where helicopter previous pre-flight procedures included warming up of engines without starting them, check engine free turbine gas generator rotors and fan for free rotation.	Rotate rotors after opening emergency fuel shut-off valves.
12.20.00a	With oil temperature of -40 °C and below warm up engines and main gearbox.	
	At ambient air temperature of -30 °C and below warm up drain tee-pipe 8AT-6100-03 of fuel tanks and APU АИ-9В.	
	At ambient air temperature of -40 °C and below warm up main rotor hub.	At ambient air temperature of -40 to -50 °C helicopter may be operated, in cases of urgent necessity, after warming up hubs of main and tail rotors for 30 to 40 min if CM-10 oil mixture is used for hubs feathering hinges.
12.20.00д	Referring to fuel quantity indicator check quantity of fuel in tanks, and refuel, if necessary.	
12.20.00e	Drain fuel sediment from each fuel tank in the clean vessel made of colorless glass and make certain that the drained sediment is free from water, ice and mechanical particles. Make sure of closing of drain valves, filler neck caps and intactness of their locking.	Drain fuel: -prior to refueling; -in 15 minutes after refueling; -on helicopter acceptance by flight crew; -in 12 hours and more after the last fuel sediment drain.

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M.S. item	Name of equipment and description of maintenance operations	Remark
	Note 1. Fuel may become cloudy when cooled, but it is not defect as it becomes transparent when warmed to temperature of 18 to 20 °C. 2. If helicopter was not flown for more than month take fuel samples for analysis before next departure.	Fuel analysis should be performed in accordance with Air Transport Department order No. ДБ-126 dated 17.10.92.
12.20.00ж	Check closing and serviceability of locking devices of filler neck caps and dip sticks of tanks of oil and hydraulic systems and transmission gearboxes. Make sure that the shut-off valves of fuel transfer between external and auxiliary external fuel tanks are open.	
12.20.00з	After helicopter loading inspect fuselage skin in area of cargo doors. Make certain that the skin is free from damage by cargo or loading mechanisms. Inspect floor panels, doors edging, skin, primary structural members and cargo cabin equipment for freedom from damage. Check cargo doors for secure closing.	
12.20.00и	At an ambient air temperature of 5 deg C and below warm up air in cockpit and cargo cabin till condensate evaporates fully from units, components, instruments and instrument panels.	
12.20.00к	Check all the access door covers and cowling panels for secure closing.	
12.20.00л	Remove grounding cable. Remove landing gear wheels chocks at the command of crew captain.	
12.20.00м	Tow helicopter to special engine starting pad and position helicopter upwind.	Tow helicopter if engine starting occurs outside parking area. At wind velocity below 8 m/s orientation of helicopter with respect to wind is not mandatory.
12.20.00н	Make certain that area around helicopter is free from foreign objects, which can be raised by downwash.	The starting pad should be free from dust and friable snow.
12.20.00п	Remove covers and blanks from dust protection devices and exhaust pipes of engines, АИ-9В АPU, fan inlet duct, from air bleed pipes of engines and АИ-9В АPU. Remove the protecting cover from РИО-3 ice detector and cap from pitot-static tube. Inspect the inlet ducts of engines, АPU and fan, as well as dust protection device inlets.	Flight technician responsible for final inspection and preparation of helicopter for flight is also responsible for timely removal of all blanks, covers, locking devices (including blanks from helicopter equipment and avionics).
12.20.00р	Deliver the helicopter to flight crew.	
12.20.00с	Remove landing gear wheels chocks.	
12.20.00т	Observe the engines operation when starting.	
12.20.00у	Disconnect the external power source from the helicopter.	
12.20.00ф	Observe the helicopter taxiing and take-off.	
	Additional pre-flight check operations after engines and systems testing	
	Testing of engines and systems and their maintenance after testing should be performed in the following cases:	
	- on completion of scheduled maintenance;	
	- after replacement or adjustment of units and elimination of defects, that must be followed by checkup of serviceability parameters and airtightness;	
	- during pre-flight preparation for flight with VIP on-board, as well as at ambient air temperature below -30°C.	
	- on preparation of helicopter for flight after storage during 30±5 days.	
10.10.006	Place chocks under landing gear wheels. Obtain information from crew on operation of engines and systems.	
12.10.00е	Make sure that all power sources and loads are switched off and emergency fuel shut-off valves are closed.	
71.10.00а	Inspect the power unit, for this purpose open the panels of engines, fan, gearbox compartment, АИ-9В engine cowlings and check for oil and fuel leakage from engines, gear box, АИ-9В engine, units and pipelines of fuel, oil and hydraulic systems.	

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M.S. item	Name of equipment and description of maintenance operations	Remark
65.10.00a	Check for oil leakage from main rotor hub hinges and hydraulic dampers.	
65.10.00i	Check the air pressure in spars of main rotor blades with visual indicators.	
71.10.00c	Close the panels of engines, fan, АИ-9В engine and gearbox cowlings.	
71.70.00a	Drain fuel from drain tank.	A presence of small quantity of oil in the drained fuel is allowed.
65.20.00a	Make sure that there is no oil leakage from intermediate and tail gear boxes, as well as from tail rotor feathering hinges.	
84.20.00a		
84.30.00a		

INSPECTION AND MAINTENANCE OPERATIONS

M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
21.00.00	AIR CONDITIONING SYSTEM				
	Operations should be preformed in the period of kerosene heater using.				
21.40.00a	Inspect the KO-50 kerosene heater. Make sure of security of attachment, absence of external damages and reliable locking of cowling lock. Drain fuel from drain tank.	-	-	+	
21.40.00b	Inspect the intake portion of KO-50 heater, make sure of absence of mechanical damages.	+	+	-	
21.40.00c	Check the KO-50 heater for serviceability	+	-	-	Prior to heater starting check the impeller for easy rotation.
25.00.00	FURNISHING AND EMERGENCY AND RESCUE EQUIPMENT				
25.10.00a	Inspect the pilots and flight technician seats in the cockpit, make sure of presence and operable condition of seat belts, security of their attachment. Check for presence of foreign objects in the cockpit.	+	-	+	
	Make sure that instrument flight blinds are serviceable (when mounted).	+	-	-	Perform this operation in case of instrument flight.
25.10.00b	Inspect the cargo (passenger) cabin. Make sure that the inner skin, seats and equipment are serviceable and free of dirt. Check the completeness and intactness of seat belts. Check the completeness of helicopter onboard items according to list in the flight log.	-	+	+	
25.60.00a	Make certain of availability of emergency axe, intactness of its fastening and sealing of its handle.	+	+	+	
28.00.00	FUEL SYSTEM				
28.10.00b	Inspect the external and auxiliary external fuel tanks.				
28.10.00c	Make sure of absence of:				
	- damages of tanks and their attachment parts;	-	-	+	
	- fuel leakage from tanks and pipelines.	-	+	+	
29.00.00	HYDRAULIC SYSTEM				
29.10.00a	Inspect the units, pipelines and hoses of hydraulic system. Check them for external damages, loose attachment, damages locking and beading, AMF-10 oil leakage.	-	+	+	Operation per Ф-А1 maintenance check should be performed only at the end of the flight day, if operations per Ф-А2 maintenance check are not performed.
29.10.00b	Check the level of AMF-10 oil in the hydraulic system tanks.	+	-	+	
29.10.00c	Check for leakage from units, hoses and pipelines of hydraulic system.	+	+	+	
32.00.00	LANDING GEAR				
32.10.00a	Inspect the main landing gears, grounding pins. Make sure of absence of corrosion, cracks along welded seams, AMF-10 oil leakage along rods of shock-absorber struts and intactness of locking of nuts and bolts.	-	-	+	
32.10.00b	Check the landing gear shock-absorber struts for proper charging by its compression.	-	+	+	
32.10.00c	Inspect the mechanism of hydraulic stop switching on. Make sure of security of its attachment.	-	-	+	
32.20.00a	Inspect the nose landing gear. Make sure of absence of mechanical damages, leakage of AMF-10 oil from under the rubber sealing rings of shock-absorber strut and intactness of locking of nuts and bolts.	-	-	+	
32.20.00b	Check the charge of shock-absorber strut by indicator.	+	+	+	

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M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
32.40.00a	Inspect the wheels of nose and main landing gears of helicopter. Make sure of absence of lamination, bulging, cuts and punctures of tyre tread.	-	-	+	
32.40.00b	Check the compression of wheel tubes.	+	+	+	
32.70.00a	Inspect the tail bumper. Make sure of absence of mechanical damages, leakage of AMF-10 oil from shock-absorber strut.	-	-	+	
36.00.00	PNEUMATIC SYSTEM				
36.10.00c	Check the air system charging using pressure gauge.	+	-	-	
49.00.00	AIRBORNE AUXILIARY POWER UNIT				
49.10.00a	Inspect the AI-9B engine. Make sure of security of its attachment to the fuselage, attachment of units and pipelines of fuel and oil systems on it and air-tightness of connections.	-	-	+	
49.80.00a	Inspect the air intake, exhaust pipe and air bleed branch pipes of AI-9B engine. Make sure of security of their attachment and absence of mechanical damages.	+	-	+	
49.90.00 TC 201	Check the oil level in the AI-9B engine oil tank.	+	+	+	
52.00.00	DOORS, EXITS, CARGO DOORS				
52.10.00a	Inspect the cargo cabin sliding door. Check the door locking mechanism for proper functioning by door inner and outer handles, as well as smooth travel.	-	-	+	
52.20.00a	Inspect the sliding blisters. Make sure of smooth travel and security of locking. Inspect the glasses. Make certain of absence of cracks, scratches and nicks.	+	-	-	
52.20.00b	Inspect the top exit cover for engines access. Make sure of absence of mechanical damages, reliability of lock operation and integrity of sealing rubber.	-	-	+	
52.20.00c	Inspect the emergency exit-window cover on the cargo cabin starboard. Make sure that cover tightly close the opening, and emergency jettison handle locking is intact.	-	-	+	
52.20.00d	Inspect the emergency exit cover on RH cargo door. Make sure of intactness of skin and emergency jettison mechanism handle locking.	+	+	+	
52.20.00e	Inspect the cover of exit for external load sling. Make certain of absence mechanical damages, tight closing and locking in closed position.	+	-	-	
52.30.00a	Inspect the cargo doors. Make certain of absence of cracks, punctures, dents and corrosion on skin, loose or broken rivets.	-	-	+	
52.50.00a	Inspect the cockpit entrance door. Make certain of its intactness, secure locking of the door in closed position.	-	-	+	
52.60.00a	Inspect the entrance and cargo ramps. Make sure of absence of mechanical damages and secure locking in operating and initial positions.	-	-	+	
53.00.00	FUSELAGE				
53.30.00a	Inspect the skin of fuselage nose and central sections, tail boom and pylon. Make sure of absence of cracks, punctures, corrosion and loose riveted joints.	-	-	+	
53.30.00b	Check the cleanliness of draining holes on the fuselage.	+	-	-	
55.00.00	HORIZONTAL TAIL ASSEMBLY				
55.10.00a	Inspect the stabilizer. Make sure of absence of skin damages, damaged paint-and varnish coating and clogging of draining holes.	-	-	+	
56.00.00	CANOPY, WINDOWS				
56.10.00a	Inspect the cockpit glazing. Make sure of absence of cracks, scratches, nicks and turbidity of glasses.	+	-	-	
56.10.00b	Inspect the frame sections. Make sure of absence of cracks and corrosion.	-	-	+	
56.21.00a	Inspect the cargo cabin blisters glazing. Make sure that they are free from cracks, scratches and nicks.	+	-	-	
56.21.00b	Inspect the opening blisters, make sure that their mechanisms of closing and locking in open position are serviceable.	-	-	+	

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
56.30.00a	Inspect the glasses of door windows, check for dirt, cracks, scratches, turbidity and defects in the framing and sealing.	+	-	-	
65.00.00	HELICOPTER ROTORS				
65.10.00	MAIN ROTOR				
65.10.00a	Inspect the main rotor hub. Make sure it is free from cracks, punctures, corrosion, oil leak from hinges and hydraulic dampers compensation system, and that the locking of all connections is intact. Make certain of absence of metal particles and water in the feathering hinge cups.	+	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed. Replace the oil in case of water detection in the feathering hinge.
65.10.00b	Inspect the blades control levers. Make sure of security of their attachment to housings of feathering hinges and intactness of locking.	+	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.
65.10.00c	Inspect the centrifugal overhang limiters of main rotor blades. Make sure that pawls and stops are free of wear hardening and wear-out.	+	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.
65.10.00d	Check the hydraulic fluid level in the hydraulic dampers compensation tank.	+	+	+	
65.10.00i	Visually check the air pressure in spars of main rotor blades with indicators.	+	+	+	
65.10.00j	Inspect surfaces of spars, tail sections and end fairings of main rotor blades. Make sure there are no bulging and unglueing of blades skin and mechanical damages, damaged paint-and-varnish coating on the spars, cracking and spalling out of sealing compound in joints of tail sections above the spar.	-	-	+	
65.10.00t	Check by-hand the compression (by clamps) of hoses of AMГ-10 hydraulic fluid supply to hydraulic dampers and make certain that hoses outer braiding is not damaged in areas of their pressing by clamps.	-	-	+	
65.20.00	TAIL ROTOR				
65.20.00a	Inspect the tail rotor hub, make sure of absence of cracks, punctures, corrosion, air-tightness of seals of universal joint and feathering hinges, roller assemblies and rod bearing. Make certain that the locking of all connections of tail rotor is intact.	+	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.
65.20.00b	Check the oil level in the hub feathering hinges referring to check cups. Make sure of absence of metal particles.	+	+	+	
65.20.00h	Inspect the tail rotor blades, make sure that they are free from cracks, nicks, dents, punctures, corrosion, damages paint-and-varnish coating, wear of rubber straps and edge tippings, loose screws of tip fairing.	+	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.

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MAINTENANCE INSTRUCTIONS

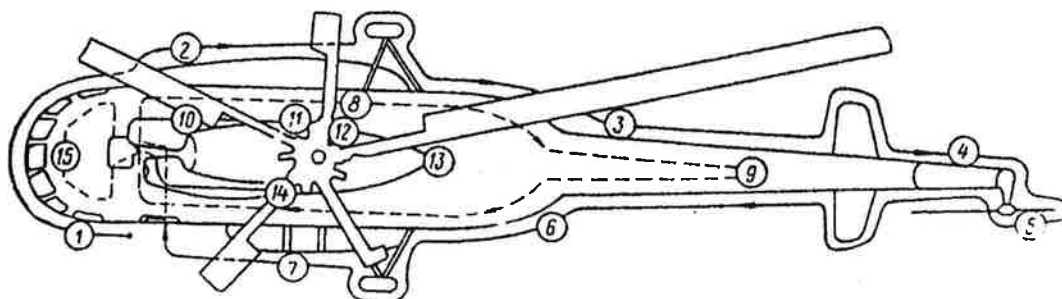
M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
65.20.00i	Check condition of glueing of skin, heating straps, rubber straps and edge tippings.	-	-	+	
65.40.00	CONTROLS				
65.40.00a	Make sure that connections of pull rods with levers of fuel control units are intact. Check that the engines control levers and engines shutdown levers are not jammed being shifted. Check the locking of all engines control levers.	-	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.
65.40.01	Inspect the KAY-30Б and PA-60Б hydraulic actuators. Make sure of air-tightness and security of attachment.	-	-	+	
65.50.00	SWASH PLATE				
65.50.00a	Inspect the swash plate. Make sure that it is free from notches, punctures, cracks and corrosion and that the locking is intact.	-	+	+	Operation per Φ -A1 maintenance check should be performed only at the end of the flight day, if operations per Φ -A2 maintenance check are not performed.
65.50.00f	Check condition and attachment of swash plate carrier clip displacement limiter.	+	+	+	Perform this operation after helicopter staying on parking site in storm conditions and after impact activation of freewheel clutches.
71.00.00	POWER UNIT				
71.10.00	COWLINGS				
71.10.00b	Inspect the power unit cowlings panels. Check for mechanical damages on the cowlings and make sure of locks serviceability.	-	-	+	
71.20.00	ENGINE FASTENING				
71.20.00a	Inspect the units fastening the engines to the helicopter and engines' rear supports to the main gear box. Check the locking of fastening nuts and bolts and make sure of absence of mechanical damages, corrosion and oil leak from spherical supports.	-	-	+	
71.60.00	ENGINES AIR INTAKES				
72.30.00 TC 201	Inspect visible areas of air intakes, engine inlet ducts, inlet guide vanes, compressor first stage blades. Make certain that ducts are clean, inspect for foreign objects, loose rivets, mechanical damages (scores, dents, nicks), oil leaks from forward mounts of engines.	+	+	+	
71.60.00a 72.30.00 TC 201	Inspect dust protection device and compressor inlet ducts, after removing fairings. Make certain of cleanliness of ducts and separators, absence of foreign objects, loose rivets, mechanical damages, abrasive wear and oil leaks from forward mounts of engines.	-	-	+	
71.60.00b	Inspect dust protection device without fairing removal. Make sure that it is free from foreign objects, mechanical damages and loose rivets.	+	+	+	
72.00.00	TB3-117BM ENGINE				
72.00.00 TC 301	Inspect the TB3-117BM engines for absence of mechanical damages, corrosion, anticorrosion coating damages, loose attachment of units.	-	-	+	
72.00.00 TC 303, 309	Perform emulsification of engines flow sections.	-	-	+	Perform this work in case of helicopter operation in seaside regions and within 5 km from coastline, as well as under conditions of humid tropical climate.
72.40.00	COMBUSTION CHAMBER				

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
72.40.00 TC 201	Inspect the casings of engines combustion chambers. Check for cracks, traces of overheating and bulging.	-	-	+	
72.58.00 72.53.00 TC 201	Inspect visible areas of exhaust pipes, housings of fourth and fifth bearing supports, and free turbine blades; make sure of freedom from cracks, nicks, traces of corrosion and overheating.	-	-	+	
72.60.00 TC 203	Check condition of flexible shaft housing, stiffening brackets and their attachment clamps.	-	-	+	
73.00.00	ENGINE FUEL FEED SYSTEM				
73.00.00	Inspect the pipelines of engines fuel feed system. Make certain of air-tightness, security of attachment, intactness of locking and absence of fuel leaks under cowlings on the pod floor.	-	-	+	
78.00.00	EXHAUST SYSTEM				
78.00.00 TC 201 78.00.00a	Inspect the nozzles of engines exhaust pipes and their clamps. Check them for condition, fastening and intactness of locking. Inspect where accessible the clamp lugs for absence of cracks.	-	+	+	
79.00.00	LUBRICATION SYSTEM				
79.10.00a	Check the oil level in the engines oil tanks and make an entry on oil quantity in the section 6 of flight log and work order.	+	+	+	
	Calculate the oil consumption per hour. Make an entry in the flight log.	-	-	+	
79.10.00b	Inspect the engines oil tanks and check condition of their attachment and air-tightness.	+	-	+	
79.20.00a	Inspect the pipelines, hoses and units of engines lubrication system, make certain of their air-tightness, security of attachment and locking intactness.	+	+	+	
79.20.00b	Inspect the engines oil coolers. Check them for mechanical damages and oil leaks in connections.	-	-	+	
84.00.00	TRANSMISSION				
84.10.00	MAIN GEAR BOX				
84.10.00a	Check the oil level in the main gear box referring to oil dipstick. Refill, if necessary.	+	+	+	When the gear box is not equipped with oil dipstick, the oil level is determined by oil gauge glass.
84.10.00д	Inspect the BP-14 gear box, flanges of gear box attachment to gear box frame, pan and covers of drivers for absence of cracks and corrosion.	-	-	+	
84.10.00e	Leak-test main gearbox-mounted units. Make certain that covers of oil filters, ПС-1 magnetic chip detector plugs are leak-tight and that areas of pipe-to-hose joints are leak-tight and their locking devices are not disturbed.	-	+	+	
84.10.00и	Remove, inspect and wash the magnetic plugs.	-	-	+	Perform this operation on gear boxes, not equipped with ФФС-1 or ПС-1 magnetic chip detector plugs.
84.12.00a	Inspect the main gear box oil cooler, pipelines of oil supply system. Make certain of security of attachment, absence of oil leaks on honeycomb cells, shells and detachable joints, as well as bulging of shells and dirt on oil cooler honeycomb cells.	-	+	+	
84.20.00	INTERMEDIATE GEAR BOX				
84.20.00a	Inspect the intermediate gear box. Make certain that it is free from oil leaks.	-	-	+	
84.20.00b	Check oil level in intermediate gear box referring to oil gauge glass.	+	-	-	If gear box was used in operation with oil level below lower mark, withdraw this gear box from service and forward for overhaul.
84.30.00	TAIL GEAR BOX				

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Maintenance check			Remark
		OB-1	A-1	A-2	
84.30.00a	Inspect the tail gear box. Make certain that it is free from oil leaks.	-	-	+	
84.30.00b	Check oil level in tail gear box referring to oil gauge glass.	+	-	-	If gear box was used in operation with oil level below lower mark, withdraw this gear box from service and forward for overhaul.
132.20.00	AIRBORNE HOIST BOOM AND ЛПГ-150М ELECTRIC WINCH				
132.20.00a	Inspect the airborne hoist boom.	+	-	-	
132.20.00б	Check the ЛПГ-150М winch for serviceability. Inspect the winch rope in the area of its way out from hook swivel, including swivel disassembly.	+	-	-	Perform this check in case of expected operation of ЛПГ-150М winch in flight.
132.50.00	EXTERNAL LOAD SLING SYSTEM				
132.50.00a	Inspect the external load sling system, slings, universal joints, cables, ЛПГ-150М winch, ДГ-64М shackle and weight-measuring device. Make certain of their serviceability.	+	-	+	Inspection should be performed in case of expected operation of external load sling system in flight.
132.50.00r	Prepare the helicopter for loads transportation on external load sling system.	+	-	-	
148.00.00	AIR COOLING SYSTEM FOR DIFFERENT UNITS				
148.10.00b	Inspect the fan inlet duct and blades for condition (where accessible) and make certain that there are no mechanical damages and foreign objects in the duct.	-	-	+	
148.10.00b i. 4	Set the blades of guiding device against the mark "3" (in winter) or mark "Л" (in summer) with the help of spline "H" of splined shaft.	-	-	+	Perform this operation at the ambient air temperature above or below +5 °C.



Helicopter inspection route

4. PERIODIC MAINTENANCE

M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
	PRELIMINARY PREPARATION FOR MAINTENANCE		
12.20.00	Tow the helicopter to area for carrying out periodic maintenance (if necessary).	50	
10.10.00б	Place chocks under helicopter main landing gear wheels, ground the helicopter.	50	
12.10.00к	Prepare ground equipment required for maintenance.	50	
21.00.00	AIR CONDITIONING SYSTEM		
	Operations should be performed in the period of kerosene heater using.		
21.40.00f	Disassemble heater nozzle and wash it. After assembly test fuel nozzle for fuel capacity, leak-test, check quality of fuel atomization and flow.	300	
21.40.00g	Check condition of plug unit of KO-50 kerosene heater.	100	
26.00.00	FIRE-FIGHTING EQUIPMENT		
26.20.00a	Inspect the bottles, pipelines and sprayers of fire extinguishing system. Make certain of security of their attachment and cleanliness of spray manifold openings.	100	
28.00.00	FUEL SYSTEM		
28.20.00a	Inspect the pipelines, hoses and units of fuel system. Make certain of security of attachment, absence of fuel leaks, and intactness of locking.	100	
28.20.00e	Inspect 463B pump and 610200A solenoid valve of KO-50 heater for condition and check for secure attachment.	100	Operation should be performed in the period of kerosene heater using.
28.20.00i	Check the operation of fuel bypass manifold with the service tank filling.	500	
29.00.00	HYDRAULIC SYSTEM		
29.10.00e	Check the hydraulic accumulators charging.	100	
29.10.00o	Remove, inspect and wash filter element of fine filters using ultrasonic device:		
	- 8Д2.966.017-2 filter of main hydraulic system;	100	
	- ФГ11БН filter of main hydraulic system and auxiliary hydraulic system filters.	300	
29.10.00p	Visually check the АМГ-10 hydraulic fluid after pouring it into a glass vessel.	500	
29.10.00f	Pump through and check the main and auxiliary hydraulic systems for serviceability with autopilot actuation by airfield hydraulic unit. When pumping check the leak-tightness of hydraulic system units and hoses.	500	
32.00.00	LANDING GEAR		
32.10.00c	Check clearance in AM-800K microswitches of hydraulic stop actuator.	100	
32.40.00c	Check clearance between wheel brake shoes and brake drum and test operationally brakes and return springs.	300	
36.00.00	PNEUMATIC SYSTEM		
36.10.00b	Visually inspect and check condition of pipelines, beading parts and units of air and brake systems of the helicopter. Make certain that they are serviceable.	100	
36.10.00f	Inspect filtering elements of AK-50T1 air compressor from individual spare parts kit. When the new filtering element is not available, flush and dry up the used one. Make certain that there is no jamming of intake valve.	300	Perform this operation after every 100 flight hours in the area with dusty atmosphere or at high atmospheric humidity.
36.10.00g	Clean the AK-50T1 air compressor pressure control valve.	300	Bulletin TM 2542-БЗ-Г.

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
49.00.00	AIRBORNE AUXILIARY POWER UNIT		
49.10.00d	Wash the filtering element of engine fine fuel filter 11ТФ3ОСТ.	300	
53.00.00	FUSELAGE		
53.10.00a	Inspect the tail boom framework, the bolts of tail boom attachment to fuselage and pylon from the inside. Make sure that there are no cracks on the angle-pieces and kneepieces, loose rivets and bolted joints.	100	
53.10.00b	Check tightening torque of nuts of bolts fastening the tail boom and pylon.	500	
53.10.00i	Inspect the frame No. 10 of fuselage central section from the inside of cargo cabin in the area of attachment of fittings of helicopter main landing gears.	100	
53.40.00c	Inspect the fittings and supports of transmission tail shaft and brackets for blocks of tail rotor control wire cables.	100	
55.00.00	HORIZONTAL TAIL ASSEMBLY		
55.10.00b	Inspect the stabilizer spar and its hinge fittings. Make sure of absence of cracks, integrity of bolts of stabilizer flange joint and intactness of locking.	300	
65.00.00	HELICOPTER ROTORS		
65.10.00	MAIN ROTOR		
65.10.00e	Check tightening torque of bolts fastening the blade control levers.	300	
65.10.00e i. 4.5	Check tightening torque of nuts of hydraulic dampers brackets attachment to feathering hinges trunnions by bolts.	500	
65.10.00f	Check tightening torque of nut fastening main rotor hub on the main gear box shaft.	500	
65.10.00j	Inspect the main rotor blades. Make sure that they are free from mechanical damages, swelling and separation of blade skin, edge tipplings and rubber straps, cracking and spalling out of sealing compound in joints of tail sections.	50	
65.10.00k	Inspect the lugs in root end-pieces and their strips at the points of bolts location, check locking of nuts of bolts fastening the blades to main rotor hub. Check by marks tightening of screws of tip fairings.	100	
65.10.00l	Check the minimum operation pressure of spar damage indicators, and make an entry about that in the blade certificate.	300	
65.10.00m	Remove the main rotor blades.	500	
65.10.00k	With blades removed inspect lugs of feathering hinge and blade butts, attachment holes, journal and jaws of butts in areas of attachment bolts location.	500	
65.10.00j	Inspect the spar. Make certain that it is free from cracks, streaks, nicks and traces of corrosion. Check tail sections joints sealing for condition.	500	
65.10.00n	With blades removed check condition of skin of main rotor blades for adhesive bonding using ИАД-2 (ИАД-1) instrument or by tapping.	500	
65.10.00o	Install main rotor blades on the helicopter.	500	
65.10.00r	Remove magnetic plugs of feathering hinges of main rotor hub and inspect them.	100	
65.20.00	TAIL ROTOR		
65.20.00d	Check tightening torque of nuts of bolts attaching tail rotor hub to flange of tail gearbox shaft.	-	Do after first flight only or after first 100 flight hours with the newly installed tail rotor.
65.20.00i	Inspect tail rotor blades and check them by tapping and by touch for condition of adhesive bonding of skin of tail sections, of heating straps, rubber straps and blade edge tipplings.	50	
65.20.00j	Remove tail rotor blades.	500	
65.20.00k	With blades removed, inspect lugs of blade butts and of housings of tail rotor hub feathering hinges. Make certain that they are free from cracks, corrosion and mechanical damages.	500	
65.20.00l	Install tail rotor blades.	500	

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
65.20.00m	Measure axial play of tail rotor rod bearing.	100	
65.20.00n	Measure backlash of shafts and forks of tail rotor blades control levers.	100	
65.40.00	CONTROLS		
65.40.00a 65.40.00f	Inspect control rods, brackets, levers and bellcranks in flight control and engines control systems. Make sure that they are free from mechanical damages. Make certain of security of all connections and presence and intactness of locking of bolted joints.	100	
65.40.00c	Check the МП-100М mechanism in the engines speed re-adjustment system for serviceability.	100	
65.40.00d	Inspect the hydraulic stop in the helicopter longitudinal control system. Check the adjustment of hydraulic stop and its switching-on mechanism.	500	
65.40.00f	Check condition and tension of tail rotor control wire cables and make certain that locking devices of turnbuckles are intact.	300	
65.40.00g	Check condition and tension of the engine shutdown control and main rotor brake control wire cables.	300	
65.40.00h	Using setup scales, check displacement of swash plate in the longitudinal and lateral directions. Make certain of absence of plays in helicopter control system connections.	500	
65.40.00i	Check adjustment of microswitch of the moving stop mechanism of СПУУ-52-1 system.	100	
65.40.00δ	Inspect the bracket of hydraulic actuators attachment. Make certain that it is free from cracks. Check the attachment of bracket to the main gear box and of supports of hydraulic actuators to bracket.	100	
65.40.00δ i. 3	Check tightening torque of nuts of supports fastening the hydraulic actuators.	500	
65.40.00η	Wash the filtering elements of KAY-30Б and PA-60Б hydraulic actuators.	500	
65.50.00	SWASH PLATE		
65.50.00c	Check the studs of slide bracket attachment and the nuts of studs securing the swash plate upper flange for tightening.	500	
71.00.00	POWER UNIT		
71.00.00a	Inspect the branches of air discharge from overflow valves of TB3-117BM engines.	50	
71.00.00b	Drain the condensate from moisture traps of power synchronizing system of TB3-117BM engines.	100	
71.60.00a	Remove fairings.	50	
72.30.00 TC 201	Inspect the engine inlet ducts, inlet guide vanes, compressor first stage blades. Make certain that ducts are clean, inspect for foreign objects, loose rivets, mechanical damages, erosive wear and oil leaks from forward mounts of engines. Inspect the dust protection devices.		On detection of traces of wear of leading edges of compressor rotor first stage blades during visual inspection, measure the value of wear of compressor first stage using УБ360-2455 device.
72.30.00 TC 202	With fairing removed, measure wear of leading edges of compressor rotor first stage blades by dust protection device and wear of leading edges of not less than 1 mm. CAUTION: When engines are operated at low altitudes with high content of dust and sand in air, and if previously measured value exceeded 1 mm, then the subsequent measurement of wear should be performed per A-2 maintenance check.	50	When operating engines without dust protection devices and wear of leading edges not exceeding 1 mm, measure wear every 25±5 flight hours.
71.60.00c	Check the dust protection device for serviceability in the dust-cleaning mode.	50	

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
71.60.00d	Inspect engine dust protection device separators.	100	After 200 flight hours inspect them every 50 flight hours.
71.60.00e	Inspect the swivel branch and dust removal throat of dust protection device.	100	
72.00.00	TB3-117BM ENGINE		
72.00.00 TC 512	When testing the engine, check the compressor inlet guide vanes angles characteristics.	300	
72.00.00 TC 501, 603	Inspect and check engine units and their attachment, as well as intactness of locking in visible areas.	50	
72.00.00 TC 603	Inspect the TB3-117BM engines starting system air ducts. Make certain that they are serviceable and securely attached.	50	
72.00.00 TC 606	Check engine and main gearbox for coaxiality.	100	
72.30.00 TC 201	Check position of pointers of compressor guide vanes dials. Pointers should be at $(27^{+1.5})$ deg mark.	50	
72.90.00 TC 204	Remove, inspect and wash the protective filter in the pipeline of oil return from fourth and fifth bearing supports.	100	
72.90.02 TC 201, 202	Remove, inspect and wash oil filter.	50	
72.90.13 TC 201	Remove, inspect, wash and check chip detector for actuation.	50	
73.00.00	ENGINE FUEL FEED SYSTEM		
73.02.00 TC 202	Clean jet orifice of ejector.	✓ 100	
73.11.04 TC 205	Wash the filtering element of fuel filter using ultrasonic device.	100	
73.12.05 TC 602	Remove, inspect and wash air filter of HP-3BM fuel control unit.	100 ✓	In conditions with high content of dust perform this operation every 50 hours.
73.12.05 TC 603	Remove, inspect A3 and АП air bleed jets together with adapt-ers.	✓ 100	In conditions with high content of dust perform this operation every 25 hours.
73.12.05 TC 604	Remove, inspect and wash fuel filters of HP-3BM fuel control unit.	100	
73.12.05 TC 303	Bleed air from fuel system of engines.	100	
73.16.10 TC 205	Remove, inspect and wash fuel filter of IM-3A actuator.	✓ 100	
78.00.006	Check tightening of attachment clamp of engine exhaust nozzle.	✓ 100	This operation should be also performed on helicopter receipt from repair base or industrial plant.
80.00.00	STARTING SYSTEM		
80.12.00 TC 203	Remove, inspect and wash air starter filter using ultrasonic device and check the cleanliness of washing with the help of test device.	100	In conditions with high content of dust perform this operation every 25 hours.
84.00.00	TRANSMISSION		
84.10.00ж	Remove, inspect and wash oil filter of main gear box.	100	Under conditions of tropical or maritime climate perform this operations after every (25 ± 5) flight hours.

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MAINTENANCE INSTRUCTIONS

M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
84.10.00ц	Perform the Б-3В oil checkup for water content. Make an entry on checkup results in the gear box log book.	-	Perform this operation every two months regardless of helicopter flight hours.
84.10.00д 84.11.00а 84.12.00а	Inspect the main gear box, check its attachment to the gear box frame and frame attachment to the fuselage. Make certain of intact locking, air-tight gear box connections, as well as units and pipelines connected to gear box.	50	
84.11.00а	Inspect the units of gear box frame (upper and lower) along all lugs and girth welding of pipes with units, and make certain that there are no cracks.	50	
84.10.00и 84.10.00ш	Remove, inspect and wash ПС-1 magnetic chip detector plugs (ФСС-1 and magnetic plugs).	50	
84.11.00в	Check tightening torque of bolts fastening the gear box frame to the fuselage.	500	
84.11.00е i. 11-18	Check fastening of units on the main gear box rocking them by hand.	300	
84.40.00а	Inspect the tail shaft. Make certain of absence of shaft twisting and loosening of taper bolts.	100	
84.40.00б	Make sure that there are no displacement of rubber races and idle stroke of protective washers of tail and end shafts.	100	
84.40.00с	Inspect the fan drive cardan shaft, check the locking of needle bearing locks.	300	
84.40.00д	Check break and side clearance in tail shaft splined joints.	100	
84.40.00д i. 6	Check tightening torque of nuts of bolted joints of tail transmission shaft flanges, as well as attachment of tail transmission shaft flanges to gear boxes.	500	
84.20.00с 84.30.00с	Remove, inspect, wash and reinstall into place magnetic plugs of intermediate and tail gear boxes.	100	
84.20.00д	Check tightening torque of nuts of bolts fastening the intermediate gear box.	500	
84.30.00д	Check tightening torque of nuts of bolts fastening the tail gear box.	500	
84.50.00а	Check adjustment of transmission brake shoes.	300	
132.20.00	AIRBORNE HOIST BOOM AND ЛПГ-150М ELECTRIC WINCH		
132.20.00а	Inspect the airborne hoist boom, working grooves and flanges. Make certain that working grooves are free from cracks, damaged paint-and-varnish coating and wear.	50	
132.20.00б	Check the ЛПГ-150М winch for serviceability.	100	
132.20.00д	Check clearances on the hoist boom.	100	
132.20.00	Check electric winch fastening on the hoist boom base.	100	
132.10.00	Inspect the electric winch rope, make certain that it is free from breaks, dents, rust and outstanding broken wires. Pay special attention to the area of cargo arrangement.	20 cycles	
132.20.00	Replace the ЛПГ-150М electric winch rope.	50 cycles at people hoisting-lowering and 200 cycles at cargoes hoisting-lowering.	On cargo hoisting - lowering during first 50 cycles the number of hoistings and lowerings of people is reduced by respective number.
132.30.00а	Perform inspection of tie-down equipment.	50	
132.50.00	EXTERNAL LOAD SLING SYSTEM		
132.50.00в	Inspect the ДГ-64М shackle and its attachment fitting. Clean the shackle from dirt and dust. Check the shackle kinematics, the value of overlapping of the cocking lever by the electro-magnet quadrant, and security of shackle locking and intactness of lever spring.	100	

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M.S. item	Name of equipment and description of maintenance operations	Intervals (flight hours)	Remark
132.50.00e	Inspect the weight-measuring device. Make certain that it is serviceable and securely attached, free from AMF-10 hydraulic fluid leaks. Make sure that there is no clearance between the pin of the crosspiece and the body of the weight-measuring device.	100	
148.00.00	AIR COOLING SYSTEM FOR DIFFERENT UNITS		
148.10.00a	Inspect the air cooling system of different units. Make certain of security of units attachment and intactness of locking.	50	
	FINAL OPERATIONS		
1	Check closing and locking of drain valves, covers and plugs of filler necks.	50	
2	Take away tools and fixtures.	50	
3	Clean up the cockpit, cargo cabin (passenger cabin).	50	
4	Check the complete set and serviceability of onboard and emergency and rescue equipment, tie-down equipment for cargoes securing, availability and serviceability of helicopter tie-down fittings in accordance with list.	50	
5	Wash the helicopter from the outside in case of necessity.	50	
6	Close all covers of cowling, exits and cargo doors.	50	
7	Take all ground equipment away from the helicopter.	50	
8	Perform preparation for starting and testing of engines, transmission and helicopter systems.	50	
9	Install all blanks and place protective covers.	50	
10	Attach lead seals and hand over the helicopter to person on duty on the parking spot.	50	

5. HELICOPTER MAINTENANCE AFTER FIRST FLIGHT AND FIRST 100 FLIGHT HOURS WITH NEWLY MOUNTED UNITS

M.S. item	Name of equipment and description of maintenance operations	Intervals	
		First flight	First 100 flight hours
65.10.00e	Check tightening torque of bolts fastening the blade control levers and of nuts of bolts fastening the brackets of hydraulic dampers to feathering hinge trunnions.	+	+
65.10.00f	Check tightening torque of nuts fastening the main rotor hub on the main gear box shaft.	+	+
65.20.00d	Check tightening torque of nuts of bolts fastening the tail rotor hub to the tail gear box shaft flange.	+	+
72.90.02 TC 201, 202	Remove, inspect and wash engines oil filters.	+	-
78.00.00b	Check tightening torque of turnbuckle of clamp fastening the engine exhaust nozzle.	+	-
84.10.00и 84.10.00ж 84.10.00ш	Inspect and wash the ПС-1 magnetic chip detector plugs (ФСС-1 and magnetic plugs) of main gear box and oil filter.	+	-
84.11.00b	Check tightening torque of bolts fastening the gear box frame to the fuselage.	+	+
84.11.00c	Check tightening torque of bolts fastening the gear box frame struts to feet mounted on gear box and articulated struts to main struts.	+	+
84.11.00e	Check tightening of nuts fastening the feet to main gear box.	+	+
84.20.00d	Check tightening torque of nuts of bolts fastening the intermediate gear box.	+	-
84.30.00d	Check tightening torque of nuts of bolts fastening the tail gear box.	+	-

6. MAINTENANCE DURING STORAGE

1. Helicopter and engines should be placed in storage with fuel, oil and hydraulic systems being full.

2. If fuel is drained from fuel system of engine, latter should be preserved not later than in 24 hours.

NOTE: In winter time helicopter should be stored filled with fuel containing ПБК fluid.

3. If, for some reasons, helicopter does not fly and engines are not preserved, accomplish operations as follows:

M.S. item	Name of equipment and description of maintenance operations	Intervals				Remark
		10±2 days	30±5 days	3 months ±10 days	6 months ±1 month	
6.1	OPERATIONS TO BE PERFORMED TO PREPARE THE HELICOPTER FOR STORAGE					
6.1.1.	Lubricate exposed surface of tail bumper shock strut piston.					
6.1.2.	Install all plugs, cover helicopter and blades of main and tail rotors with protective covers.					
6.1.3.	Moor main rotor blades and use screw clamps for additional locking of blades.					
6.1.4.	Make certain that cowlings, cargo doors and all of the pod access doors are closed. Install blanks or covers made of waterproof fabric on the engines inlet and outlet ducts.					
6.2.	OPERATIONS TO BE PERFORMED DURING HELICOPTER STORAGE					
6.2.1.	Clean the helicopter from dust, dirt, snow and ice.	-	+	+	+	
6.2.2.	Perform the helicopter inspection in the volume of OB1 maintenance check.	-	+	+	+	
6.2.3.	Crank rotor of АИ-9В engine manually, by turbine blades, in direction of its rotation by 15 to 20 revolutions. Remove plug of exhaust branch pipe preliminarily.	+	+	+	+	
6.2.4.	Crank rotors of engine gas generators and power turbines by 4 to 5 revolutions.	-	+	+	+	
6.2.5.	Clean А3 and АП air bleed jets of HP-38M fuel control unit (without removal and washing of jets).	+	+	+	+	
6.2.6.	Start engines and let them run at cruising power II for 3 to 5 minutes. Note. Prior to engines starting make certain that oils used in main units of helicopter systems comply with current period of seasonal operation. Check replacement time of oil in engines and main gear box	-	+	+	+	Under tropical and maritime conditions, carry out this work every 10±2 days with subsequent flushing and emulsifying of air flow duct.
6.2.7. 29.10.00f	Check main and auxiliary hydraulic systems for serviceability, when engines are operative.	-	+	+	+	
6.2.8.	Having tested the engines, check for fuel, oil and АМГ-10 hydraulic fluid leakages.	-	+	+	+	
6.2.9.	Inspect the oil and fuel filters of engines.	-	+	+	+	
6.2.10.	Replace the lubricant on the exposed surface of the tail bumper shock strut piston.	-	+	+	+	

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M.S. item	Name of equipment and description of maintenance operations	Intervals				Remark
		10±2 days	30±5 days	3 months ±10 days	6 months ±1 month	
6.2.11.	Replace ЦИАТИМ-201 grease in scope of servicing every 25 and 50 light hours as indicated in "Lubrication Charts".	-	-	+	+	
6.2.12.	Replace ЦИАТИМ-201 grease in scope of servicing every 100 flight hours as indicated in "Lubrication Charts".	-	-	-	+	
6.2.13. 26.20.00f	Check mass of charge of onboard portable fire extinguishers ОУ-2.	-	-	+	+	
6.2.14. 23.20.03a 26.20.03b	Check mass of charge of carbonic acid in ОСУ-5 fire extinguisher of inert gas system and reliability of squib actuated valve opening.	-	-	-	+	
6.2.15 26.20.03c	Clean the gas and piston chambers, piston, spring, plug end surface and block of ОСУ-5 fire extinguisher squib actuated valve from carbon deposit.	-	-	-	+	
6.2.16 65.10.00	Check oil level in flapping, drag and feathering hinges of main rotor hub. Refill on detection of leaks.	-	+	+	+	
6.3.	OPERATIONS TO BE PERFORMED ON HELICOPTER PREPARATION FOR FLIGHTS AFTER STORAGE					
6.3.1.	Remove lubricant from exposed surface of the tail bumper shock strut piston.	-	+	+	+	
6.3.2.	Take fuel samples from all tanks for analysis.	-	+	+	+	Analysis should be performed in accordance with order No. 126 dated 17.10.92.
6.3.3.	Replace grease in friction assemblies of main rotor hub, swash plate and tail rotor hub.	-	+	+	+	
6.3.4.	Check oil in main and tail rotor hubs feathering hinges for absence of water.	-	-	+	+	
6.3.5.	Perform the test flight.	-	-	+	+	

7. SEASONAL MAINTENANCE

Perform these operations together with the regularly scheduled periodic maintenance check.

M.S. item	Name of equipment and description of maintenance operations	Maintenance check		Remark
		ОЗП*	ВЛП*	
21.00.00	AIR CONDITIONING SYSTEM			
21.40.00f	Inspect the air heater and inner cavity of combustion chamber for condition. Flush the 773H pressure regulator gauze. Check the fuel box and pipeline connections for leak-tightness. Check the fuel box jets and heater fuel filter for condition.	+	-	
36.00.00	PNEUMATIC SYSTEM			
36.10.00e	Drain condensate from pneumatic system bottles.	+	-	
32.00.00	LANDING GEAR			
32.40.00d	Inspect the landing gear wheels and replace the grease in bearings.	+	+	
32.40.00c	Check the brakes of helicopter main landing gear wheels.	+	+	
52.00.00	DOORS, EXITS, CARGO DOORS			
52.20.00g	Check operation of emergency jettison mechanism of blisters, cargo cabin entrance door, exit-window cover in the cargo cabin and exit cover on the right cargo door.	+	+	
71.00.00	POWER UNIT			
71.60.00h	Clean orifices of angle connection supplying hot air for blowing temperature sensor of HP-3BM fuel control unit	+	-	
	FINAL OPERATIONS			
1	Check condition of covers and blanks. Make certain that they are intact.	+	+	

*ОЗП - autumn/winter check
ВЛП - spring/summer check

8. LIST OF OPERATIONS, AFTER WHICH TEST FLIGHT SHOULD BE PERFORMED

1. Replacement of engine or main gearbox, and HP-3BM fuel control unit.
 2. Replacement of swash plate.
 3. Replacement of main rotor hub.
 4. Replacement of main rotor blades (if more than three blades are replaced at the same time).
 5. Replacement of tail rotor (test should be performed on hovering).
 6. Depreservation of helicopter and engines preserved for period of three months or more regardless of depreservation time.
 7. When preparing the helicopter for flights after three months of storage without preservation.
 8. Installation of equipment or correction of troubles affecting helicopter stability and controllability (when detecting a trouble, which may be revealed only in flight).
- Test flight is not needed after replacement of hydraulic actuators provided that control settings comply with specifications and functional check is performed using ground hydraulic unit.

CAUTION!

1. After test flight related to carrying-out of operations per items 1, 2, 3, 5, perform maintenance, specified in section 9.2.
2. After test flight related to carrying-out of operations per items 6, 7 and 8, perform maintenance in the scope of A2 maintenance check, and thoroughly inspect those units and assemblies, checkup of which was the reason of test flight.
3. In all cases of replacement of units, assemblies and parts, perform the checkup of attachment, locking and air-tightness of joints of units and parts, which were subjected to mounting and adjustment.
4. During the test flight after replacement of engines (engine), perform the checkup of helicopter thrust performance with mandatory entry to be made in the flight log.

9. SPECIAL MAINTENANCE

9.1 Maintenance operations performed after flight in turbulent atmosphere, after steep turns, lightning strike, after flying in icing conditions, after resonance conditions, after staying on the ground in storm weather, after hard landing and high vibrations. In case of main or tail rotor blades strike against obstacles, as well as under another abnormal operating conditions follow the ПРАПИ-88 instructions.

M.S. item	Name of equipment and description of maintenance operations	Remark
	Perform the helicopter inspection in the volume of A-2 maintenance check.	
28.10.00b 28.10.00c	Inspect the external and auxiliary external fuel tanks. Make certain that there are no cracks on the units and bands fastening the tanks, as well as leaks along the joints and bearing surfaces of shell.	
32.10.00a 32.20.00a 32.40.00a	Inspect the landing gears, struts, attachment fittings and landing gear wheels, paying special attention to welded seams. Make certain that they are free from cracks.	Perform this operation only after hard landing or ground resonance.
53.10.00a 53.10.00i 53.30.00a	Thoroughly inspect the skin, primary structural members of fuselage, tail boom and pylon. Make certain that strong frames are free from cracks and loose rivets.	
53.10.00b	Check tightening torque of nuts of bolts fastening the tail boom and pylon.	
65.10.00b 65.10.00c	Inspect the blades centrifugal overhang limiters and control levers. Make certain that levers are free from damages, and centrifugal overhang limiters are free from wear hardening.	
65.10.00e	Check tightening torque of bolts fastening the blades control levers.	
65.10.00b	Make sure of security of attachment and absence of plays in the swash plate carrier and blades control levers.	
65.20.00d	Check tightening torque of nuts of bolts fastening the tail rotor hub to tail gear box flange.	
65.10.00n 65.20.00i	Check the quality of glueing of main and tail rotors skin by tapping using textolite hammer.	
71.20.00a 84.10.00a	Inspect the attachment fittings of engines, main, intermediate and tail gear boxes. Check them for cracks and loose attachment bolts (studs).	
72.00.00 TC 606	Check engine and main gearbox for coaxiality.	
84.30.00d	Check tightening torque of nuts of bolts fastening the intermediate gear box.	
84.40.00d	Check the tail shaft misalignment and eccentricity.	

Note. After helicopter staying on the ground in storm weather perform operations per items 53.10.00a, 53.10.00i, 53.30.00a, 65.10.00b, 65.10.00c, 65.10.00e, 65.20.00d, 65.10.00n, 65.20.00i only.

9.2 HELICOPTER MAINTENANCE WITH NEWLY MOUNTED UNITS.

M.S. item	Name of equipment and description of maintenance operations	After replacement of					
		Engine	Main gear box	Inter-mediate gear box	Tail gear box	Tail rotor	Main rotor hub
	AFTER FIRST TESTING						
72.00.00 TC 504, i. 3	When engine runs down, check by listening that there is no abnormal noise therein. Make sure that gas generator and power turbine rotors rotate smoothly. Measure gas generator rotor run-down time.	+	-	-	-	-	-
72.90.02 TC 201, 202	Remove, inspect and wash:	+	-	-	-	-	-
	- engine oil filter;						
72.90.00 TC 204	- safety filter in the oil scavenge pipeline of bearings IV-V;						
72.90.13 TC 201	- CC-78 chip detector;						
73.11.04	- fine fuel filter;						
73.12.05 TC 604	- fuel filters of HP-3BM unit and ИМ-3А actuator.						
72.90.00 TC 201	Replace oil in engine and air starter oil system with self-lubrication.	+	-	-	-	-	-
73.12.05 TC 303	Bleed air from engine fuel system.	+	-	-	-	-	-
84.50.00	As soon as main rotor comes to rest, check by feel the brake drum temperature. WARNING. After engine shutdown, do not apply main rotor brake.	-	+	-	-	-	-
	Remove, inspect and wash:						
84.10.00ж	- main gear box oil filter;	-	+	-	-	-	-
84.10.00и 84.10.00ш	- ПС-1 detector plugs (ФСС-1 and magnetic plugs);	-	+	+	+	-	-
65.40.00j	Using setting scales, check displacement of swash plate and perform check for absence of plays in control system.	-	+	-	-	-	-
72.00.00 TC 601, 603	Check joints of units, pipelines and parts, which were subjected to mounting and adjustment, for reliable attachment, locking and for air-tightness.	+	+	-	-	-	-

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M.S. item	Name of equipment and description of maintenance operations	After replacement of					
		Engine	Main gear box	Inter-mediate gear box	Tail gear box	Tail rotor	Main rotor hub
	AFTER TEST OR FIRST FLIGHT						
	Perform maintenance per A-2 maintenance check and additionally perform the following operations:						
72.90.02 TC 201, 202	Remove, inspect and wash the engine oil filter.	+	-	-	-	-	-
72.00.00 TC 606	Check and, if necessary, adjust coaxiality of engine and main gear box.	+	+	-	-	-	-
	Remove, inspect and wash:						
84.10.00ж	- main gear box oil filter;	-	+	-	-	-	-
84.10.00и 84.10.00ш	- ПС-1 chip detector plugs (ФСС-1 and magnetic plugs);	-	+	+	+	-	-
84.40.00d	Check the tail shaft misalignment at the brake.	-	+	-	-	-	-
84.40.00b	Check tightening torque of nuts of bolts fastening the gear box frame to the fuselage.	-	+	-	-	-	-
84.40.00j	Check tightening torque of nuts fastening the main rotor hub on the main gear box shaft. NOTE: Perform this check also after elimination of troubles associated with removal of main rotor hub.	-	+	-	-	-	+
84.20.00d 84.30.00d	Check tightening torque of nuts fastening the intermediate and tail gear boxes.	-	-	+	+	-	-
84.40.00d	Check tightening and locking of nuts of bolted joints of tail transmission shaft flanges, which were subjected to removal and installation.	-	-	+	+	-	-
65.20.00d	Check tightening torque of nuts fastening the tail rotor hub to tail gear box shaft flange.	-	-	-	+	+	-
65.10.00	Check the clearance between lower cone and housing of main rotor hub along the full length using feeler gage. The filler gage 0.03 mm should not pass through. Note. Perform this operation only in case of installation of hub of first category.	-	-	-	-	-	+

LUBRICATION CHARTS

The following oils and lubricants are used:

1. Oil for hypoid gearings Тс_{гип} (ТУ 38.101.1332-90 specifications).
2. Oil MC-20 and MC-14 (ГОСТ 21743-76 standard).
3. Synthetic oil Б-3В (ТУ 38.101295-85 specifications).
4. Hydraulic fluid АМГ-10 (ГОСТ 6794-75 standard).
5. Oil ВНИИП-25 (ГОСТ 11122-84 standard).
6. Oil mixture CM-9 (2/3 of Тс_{гип} oil and 1/3 of АМГ-10 hydraulic fluid by volume).
7. Oil mixture CM-10 (75% of MC-14 oil and 25% of dioctylsebacate by volume).
8. Oil mixture 50/50 (50% of Тс_{гип} oil and 50% of АМГ-10 hydraulic fluid by volume).
9. Grease ОКБ-122-7 (ГОСТ 18179-72 standard).
10. Grease ЦИАТИМ-201 (ГОСТ 6267-74 standard).
11. Grease СТ (HK-50) (ТУ 38.101.1219-89 specifications).
12. Grease ПФМС-4С (ТУ 6-02-917-79 specifications).
13. Additive АКOP-1 (ГОСТ 15171-78 standard).

When performing lubrication operations it is necessary to clean the hinges and attach fittings lubricators from dust and stale grease, and clean the filler neck plugs. When forcing the grease with grease gun or replacing the oil, make use of serviceable fixtures, tools and materials only. Check the applied fixtures for lubrication and oil filling for cleanliness prior to using and check the grease quality.

WARNING. Wipe the surfaces of enclosed bearings and their protecting washers only with dry cloth. IT IS NOT ALLOWED to remove stale grease with a cloth, wetted in gasoline or kerosene.

NOTES.

1. The main and tail rotor hubs operation using ВНИИП-25 low-temperature oil and CM-9 and CM-10 oil mixtures is allowed only for a period equal to the half of the specified service life of the main and tail rotor hubs until first overhaul and half of the life between overhauls. For the remained service life use oils MC-20, MC-14 or Тс_{гип} hypoid transmission oil. Make an entry on operating time using each type of oil in the certificate.

2. The grease ЦИАТИМ-201 should be forced into the bearings of swash plate and main rotor hub only with grease guns (Ш-1), modified as per drawing В-9917-100 or 8АТ-9917-500, and supplied with the helicopter.

3. In the northern areas at stable temperatures below -25°C for lubrication of wheel bearings make use of grease mixture, consisting of 75% of HK-50 and 25% of ЦИАТИМ-201 grease, prepared by the Operator's Service of combustive-lubricating materials.

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
HELICOPTER FRAME (FIG. 1)						
1	Cockpit door lock	1	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
2	Cockpit door hinges	2	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.

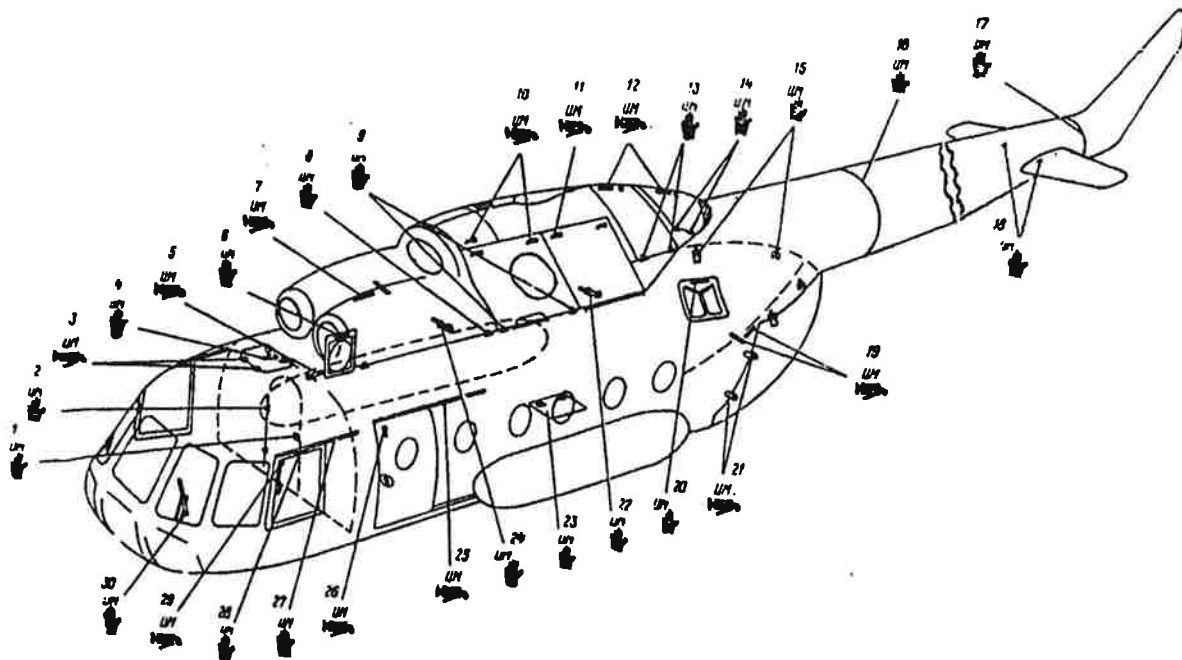


Fig. 1. Lubrication of fuselage units

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
3	Hinges of engine access top exit	3	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
4	Lock mechanism of engine access top exit cover	4	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
5	Mechanism and pins of KO-50 heater cowling panel lock	5	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
6	Pins of exit-window emergency jettison	6	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
7	Mechanism and pins of lock of engine compartment panels closing	7	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in	When preparing the helicopter to autumn-

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					gasoline before-hand.	winter and spring-summer period.
8	Hinges of engine compartment panels	8	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
9	Hinges of fan compartment panels	9	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
10	Mechanisms and pins of locks of fan compartment panels	10	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
11	Mechanism and pins of locks of gear box compartment panels	11	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
12	Mechanism and pins of locks of rear compartment panels	12	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
13	Hinges of rear compartment panels	13, 14	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
14	Hinges of cargo doors locking	15	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.
15	Jointing bolts of tail boom	16		ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline before-hand.	When preparing the helicopter to autumn-winter and spring-summer period.

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16	Jointing bolts of pylon	17		ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting on the helicopter.
17	Bearing and axles of stabilizer hinging	18	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting on the helicopter.
18	Mechanism and pins of cargo doors locks	19	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting on the helicopter.
19	Pins of emergency jettison of exit cover on the cargo doors	20	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
20	Hinges of cargo doors	21	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
21	Leather collars 8AT-6900-54 of air cylinders - dampers of RH and LH covers of engines cowling.	22, 24	4	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
22	Hinge joints of exit for external load sling	23	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
23	Upper guides of cargo cabin door	25	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
24	Cargo cabin door emergency jettison mechanism	26	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
25	Upper and lower guides of blisters	27	4	ЦИАТИМ-201	Lubricate, remove stale	When preparing the

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					grease with hair brush, wetted in gasoline beforehand.	helicopter to autumn-winter and spring-summer period.
26	Pins of blisters emergency jettison	28	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
27	Mechanism of locks of RH and LH blisters opening	29	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
28	Mechanism of windshield wipers of heated glasses	30	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.

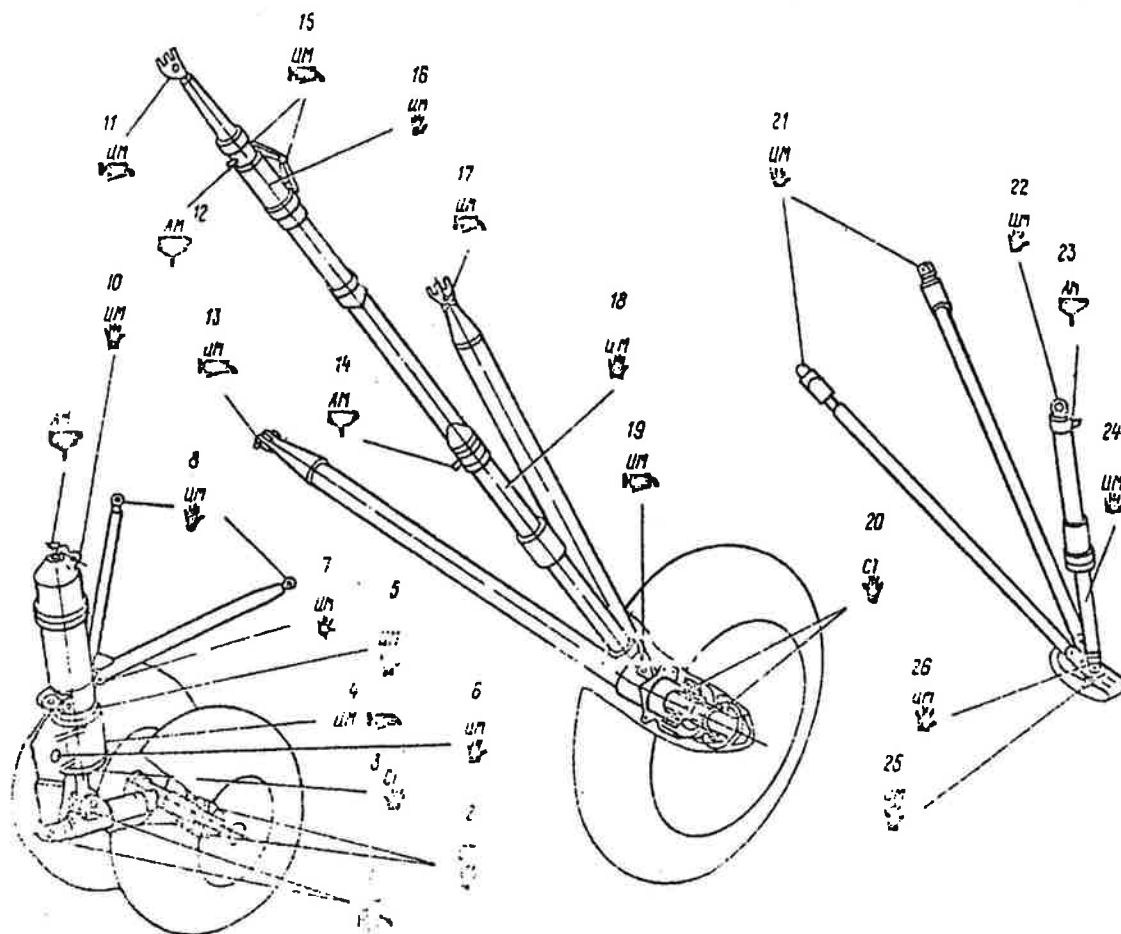


Fig. 2 Landing gear

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
LANDING GEAR (FIG. 2)						
1	Hinged joints of nose landing gear	1	2	ЦИАТИМ-201	Force grease with grease gun till it appears from gaps in hinges.	When mounting on the helicopter and after every (100±10) flight hours.
2	Bearings of nose landing gear wheels	2	2	СТ (HK-50)	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
3	Lock of nose landing gear	3	1	СТ (HK-50)	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
4	Grease nipple 1-Б1 of swivel bracket of nose shock strut	4	2	ЦИАТИМ-201	Force grease with grease gun till it appears from gaps in hinges.	After every (100±10) flight hours.

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
5	Carrier junction unit	6	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	Prior to carrier junction.
6	Lower point of bracing strut fastening to nose shock strut	7	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting the landing gear on the helicopter and preparing to autumn-winter and spring-summer period.
7	Upper points of bracing strut fastening of nose landing gear	8	2	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting on the helicopter.
8	Nose landing gear shock strut hydraulic fluid filler	9	1	ЦИАТИМ-201	Hydraulic fluid level checkup should be performed at vertical position and full compression of shock strut. АМГ-10 level should reach the edge of filler opening.	In case of leakage check the fluid level and refill, if necessary. Replace when mounting the landing gear on the helicopter and overhaul.
9	Upper attach fitting of nose shock strut	10	1	ЦИАТИМ-201	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When mounting on the helicopter.
10	Grease nipples 1-Б1 of bolts of fastening the main landing gears shock struts to fuselage units	11	2	ЦИАТИМ-201	Force grease with grease gun till it appears from gaps in hinges.	After every (100±10) flight hours.
11	Main landing gears shock strut low-pressure cavity oil filler	12	2	АМГ-10	АМГ-10 oil level should reach the thread of filler.	In case of leakage check the fluid level and refill, if necessary. Replace when mounting the landing gear on the helicopter and overhaul.
12	Grease nipples 1-Б1 of bolts fastening the struts of main landing gears to units on frame No. 11 and	13, 17	4	ЦИАТИМ-201	Force grease with grease gun till it appears	After every (100±10) flight hours.

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
	13				from gaps in hinges.	
13	Main landing gears shock strut high-pressure cavity oil filler	14	2	АМГ-10	Hydraulic fluid level checkup should be performed at vertical position and full compression of shock strut. АМГ-10 level should reach the edge of filler opening.	In case of leakage check the fluid level and refill, if necessary. Replace when mounting the landing gear on the helicopter and overhaul.
14	Bolts of splined joint	15	6	ЦИАТИМ-201	Force grease with grease gun.	After every (100±10) flight hours.
15	Grease nipples 1-Б1 of bolts of fastening the shock strut of main landing gears to lower universal joint	19	4	ЦИАТИМ-201	Force grease with grease gun.	After every (100±10) flight hours.
16	Bearings of main landing gear wheels	20	4	СТ (НК-50)	Lubricate, remove stale grease with hair brush, wetted in gasoline beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
17	Upper attach fittings of tail bumper bracing struts	21	2	ЦИАТИМ-201	Wash out and lubricate	When mounting on the helicopter.
18	Upper attach fitting of tail bumper shock strut	22	1	ЦИАТИМ-201	Wash out and lubricate	When mounting on the helicopter.
19	Tail bumper shock strut cavity filler	23	1	АМГ-10	Fill up with АМГ-10 oil	When mounting on the helicopter.
20	Face of tail bumper shock strut piston	24	1	ЦИАТИМ-201	Apply a thin layer, remove stale grease with cloth, wetted in gasoline beforehand.	When placing the helicopter for storage and after every 30±5 days of storage.
21	Lower attach fitting of tail bumper shock strut	25	2	ЦИАТИМ-201	Wash out and lubricate	When preparing the helicopter to autumn-winter and spring-summer period.
22	Tail bumper fastening bolt	26	1	ЦИАТИМ-201	Wash out and lubricate	When preparing the helicopter to autumn-winter and

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
						spring-summer period.

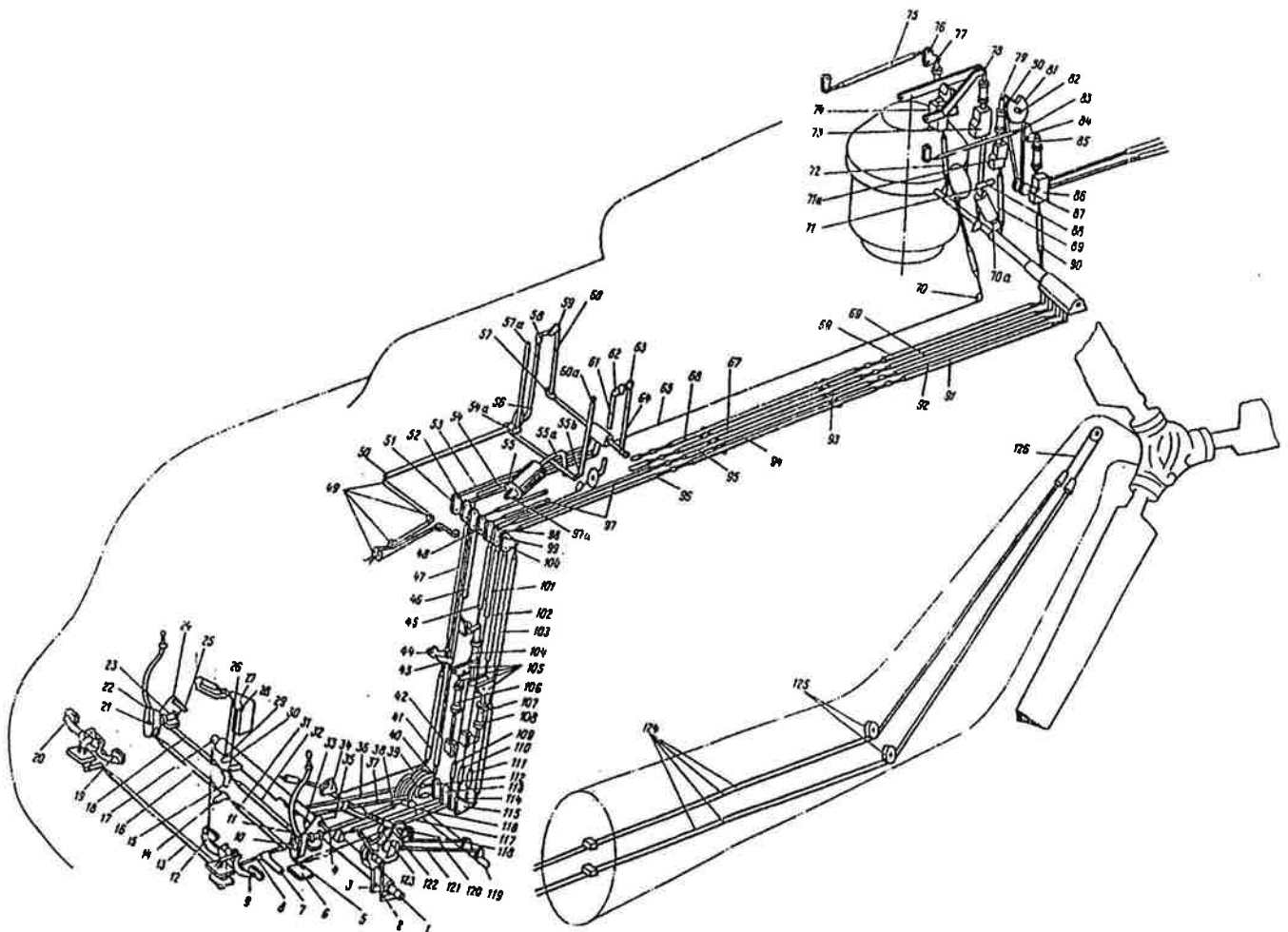


Fig. 3. Helicopter control (Sheet 1 of 2)

1.	Bearing of COLLECTIVE PITCH/THROTTLE CONTROL system shaft
7, 80.	Bearing of pedal control rocker
9, 12.	Bearings of pilot's pedals
10, 11.	Bearings of pilot's manual control column
14, 15, 76, 84.	Manual control rocker bearings
17.	Bearing of COLLECTIVE PITCH/THROTTLE CONTROL shaft
19, 20.	Bearings of co-pilot's pedals
21, 22, 23.	Bearings of co-pilot's manual control column
24.	Bearing of rockers of pilot and co-pilot's manual control columns
25.	Bearing of manual control column rod
26.	Bearing of co-pilot's COLLECTIVE PITCH/THROTTLE CONTROL lever carrier
27.	Bearing of co-pilot's collective pitch/throttle control lever rod
28.	Bearing of co-pilot's collective pitch/throttle control lever rocker
33, 48.	Bearings of manual control rocker
34.	Bearings of brake control stick
43, 44.	Bearings of collective pitch/throttle control system rockers
49.	Rollers of engines shut-down control system
50.	Wire-cables of engines shut-down control system
51, 52.	Bearings of collective pitch/throttle control system
54a, 55a, 55b, 60a.	Bearings of rods of engines speed re-adjustment

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57.	Bearings of shaft supports
59, 63.	Hinged bearings Ш6 of collective pitch/throttle control system
65.	Wire-cables of main rotor brake control system
70.	Rollers of main rotor brake control system
70a, 71.	Bearings of movable stop mechanism of tail rotor pitch limit system СППУ-52
71a, 73, 74, 86.	Bearings of hydraulic actuators supports
77, 78, 79, 85.	Bearings of end-pieces of hydraulic actuators
82.	Bearing of pedal control sector
87.	Rollers of pedal control system
93.	Rollers of control rods
97a.	Bearing of МП-100-2с housing
118.	Bearing of rod of pilot's collective pitch/throttle control lever
119.	Bearing of collective pitch/throttle control system shaft
122.	Bearing of pilot's collective pitch/throttle control lever carrier
123.	Bearings of pilot's collective pitch/throttle control lever rocker
124.	Wire-cable of pedal control system
125.	Rollers of pedal control system
126.	Bush-roller chain of pedal control system

Fig. 3 (Sheet 2 of 2)

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
HELICOPTER CONTROL (FIG. 3)						
1	Bearings of rods of levers and control rockers with nipples			ЦИАТИМ-201	Force grease with grease gun through nipple, clean all nipples from dust and stale grease with cloth, wetted in gasoline and squeezed, beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
2	Bearings without nipples: open-type;			ЦИАТИМ-201	Lubricate by hand, remove stale grease with hair brush, wetted in gasoline or dehydrated kerosene, beforehand.	When preparing the helicopter to autumn-winter and spring-summer period.
	enclosed type.			ЦИАТИМ-201	Wipe the surface of bearings and protecting washers with dry cloth. Apply a layer of grease with hair brush.	When preparing the helicopter to autumn-winter and spring-summer period.
3	Bush-roller chain of main rotor control			ЦИАТИМ-201	Wipe with dry clean cloth and lubricate. NOTE. It is strictly prohibited to wash the chain in the gasoline or kerosene.	After every (100±10) flight hours.
4	Wire-cables and rollers of main rotor brake control system and engines shut-down control system			СТ (HK-50)	Wipe and lubricate the surface of wire-cables, axles of rollers and guides.	After every (100±10) flight hours.
5	Supports of hydraulic actuators of longitudinal, lateral, pedal controls and collective pitch control		8	ЦИАТИМ-201	Force grease through nipple in the support housing.	When mounting on the helicopter and after every (100±10) flight hours.
6	Wire-cables and rollers of pedal control system			СТ (HK-50)	Wipe and lubricate the wire-cables surfaces, passing over rollers, and rollers. Remove grease from wire-cables in the area of textolite blocks and from blocks in order to prevent abrasive wear.	After every (100±10) flight hours. When preparing the helicopter to spring-summer period.

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
ENGINES AND TRANSMISSION (FIG. 4)						
1	Engine oil tank filler neck	1	2	Б-3В oil	Fill the tank with oil from servicing truck or vessel through the funnel with mesh. The mesh size not over 63 μ . Oil level in the oil tank should correspond to 8-11 l per oil gage glass.	Refill oil after flight, if necessary. Replace oil after every (300 \pm 10) flight hours, but not less than once a year.
2	Starter gearbox CB-78 with independent lubrication	1a	2	Б-3В oil	Replace oil	After every (300 \pm 10) flight hours, but not less than once a year.

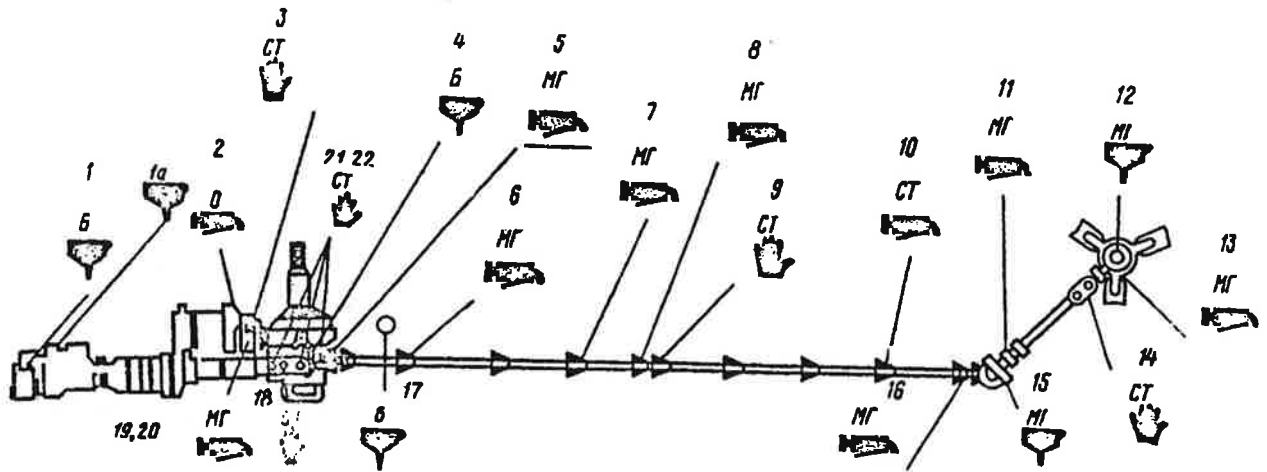


Fig. 4. Lubrication of engines and transmission units

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
3	Bearing unit of fan rotor 8A-6311-00	2	1	OKБ-122-7	Force grease through cap nipple till it is squeezed out of check hole on the flange (from the side of universal-joint shaft) and of fan impeller slit.	When mounting the fan on the helicopter and after every (500±10) flight hours.
4	Hinges of fan drive shaft	19, 20	2	TC _{run}	Force oil through nipple till it appears from valve. CAUTION. The use of low-grade grease for lubrication of fan drive shaft hinges will result in increased wear of universal joint parts.	When mounting on the helicopter and after every (500±10) flight hours.
5	Splines of fan drive shaft	3	1	CT (HK-50)	Grease abundantly during installation.	When mounting on the helicopter.
6	Filler neck of main gear box NOTE. The oil level on the gear-boxes, not equipped with oil dipstick, is determined per oil gage glass.	4	1	Б-3В	Fill the gear box with oil from servicing truck or vessel through the funnel with mesh. The	Refill oil after flight, if necessary. Replace oil after every (300±10) flight

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					mesh size not over 63 μ . Oil level in the main gearbox should reach the upper edge of oil dipstick groove.	hours, but not less than once a year.
7	Splined joints of tail shaft	5, 6, 7, 8, 10, 11, 13, 16	8	TC _{гн}	Force oil through any of two holes on flange till oil appears from other hole.	When mounting on the helicopter and after every (100 \pm 10) flight hours.
8	Splines of tail rotor drive shaft	9	1	CT (HK-50)	Grease abundantly during installation.	When mounting on the helicopter.
9	Tail gear box case	12	1	CM-9 and "50/50" oil mixtures are used in all seasons. It is allowed to use TC _{гн} oil in summer at the ambient air temperature up to +5°C.	Prime oil through clean funnel with metal screen (not less than 494 meshes per cm ²). The oil level should be between marks "H" and "B" on the oil dipstick. The amount of oil primed in the gear box is 1.7 l.	Refill oil after flight, if necessary. Replace oil mixture when mounting the gear box on the helicopter and after every (500 \pm 10) flight hours.
10	Splines of pylon drive shaft	14	1	CT (HK-50)	Grease abundantly during installation.	When mounting on the helicopter.
11	Intermediate gear box case	15	1	CM-9 and "50/50" oil mixtures are used in all seasons. It is allowed to use TC _{гн} oil in summer at the ambient air temperature up to +5°C.	Prime oil through clean funnel with metal screen (not less than 494 meshes per cm ²). The oil level should be between marks "H" and "B" on the oil dipstick. The amount of oil primed in the gear box is	Refill oil after flight, if necessary. Replace oil mixture when mounting the gear box on the helicopter and after every (500 \pm 10) flight hours.

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					1.3 l.	
12	НШ-39М pump drive unit (main gear box drive - pump drive adapter)	18	2	ПФМС-4С It is allowed to use СТ (HK-50) grease.	Fill the main gear box drive gear internal space with grease. Quantity of grease - 9 cm ³ , which corresponds to ca. $\frac{3}{4}$ of drive gear internal space. Lubricate the splines of pump shaft and adapter.	When mounting the НШ-39М pump and after every (500±10) flight hours.
13	Threaded part of forks of struts fastening the engines		8	АМС-3 or ЦИАТИМ-201	Grease the threaded part of strut forks, remove stale grease beforehand.	When mounting on the helicopter and preparing the helicopter to autumn-winter and spring-summer period.
14	Oil tank of АИ-9В engine	17	1	Б-3В	Prime (add) oil in oil tank through priming filter with maximum 63 μ mesh size.	Prime (add) oil when mounting the engine on the helicopter. Then, add as required. Replace oil after every (12±1) months.
15	Splines of tachometer indicators drives, generator drives and АК-50Т compressor	21, 22	4	СТ (HK-50)	Grease abundantly during installation.	When mounting on the helicopter.
MAIN ROTOR HUB (FIG. 5)						
1	Fastening of hydraulic damper housing to clip	1	5	ЦИАТИМ-201	Force grease with grease gun through nipple till it appears from gaps in hinges.	When mounting on the helicopter and after every (50±10) flight hours.
2	Hinge of hydraulic damper fastening to flapping hinge pin	2	5	ЦИАТИМ-201	Force grease with grease gun through nipple till it appears from	When mounting on the helicopter and after every (50±10)

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					gaps in hinges.	(50±10) flight hours.

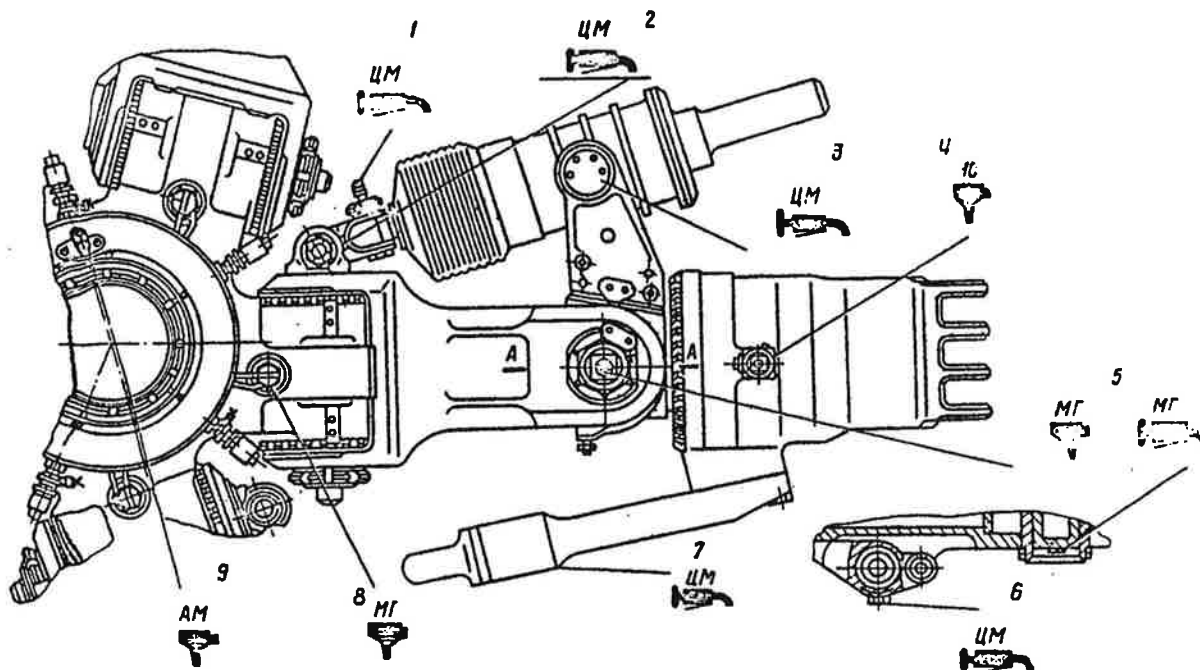


Fig. 5. Lubrication of main rotor hub units

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
3	Hinge of hydraulic damper fastening to feathering hinge trunnion. NOTE. The lubricated points 1 and 2 are not provided on the main rotor hub series 2.	3	10	ЦИАТИМ-201	Force grease with grease gun through nipple till it appears from gaps in hinges.	When mounting on the helicopter and after every (50±10) flight hours.
4	Feathering hinge of main rotor hub	4	5	Oil MC-20 at air temperature above zero or for a short time (up to 10 days) temperature drop down to minus 10°C. Oil ВНИИИП-25 at ambient air temperatures from plus 5 to minus 50°C or for a short time (up to 10 days) temperature rise to plus 10°C. At ambient air temperatures from plus 15 to minus 25°C it is allowed to use the MC-14 oil, while the CM-10	Prime oil through clean funnel with mesh, through the hole for plug. The oil level per B1811M oil gauge should be 15-20 mm. The oil level in the hinges with pressure compensator should coincide with inner hole for plug of feathering hinge housing. When checking the presence of water, drain 200-300 cm ³ of oil from	When mounting the hub on the helicopter. Check the oil level after (50±10) flight hours and on detection of leakage. Add oil, if necessary. Replace oil: after every (100±10) flight hours; on ambient air temperature change. Check the oil for presence of water every 3 months if operating time is less than

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
				oil mixture may be used at temperature from plus 15 to minus 40°C.	each hinge in clean glass vessel and check visually for water presence. Replace oil in case of water determination. Add oil in hinges after sediment drainage.	100 hours.
5	Drag hinge of main rotor hub	5	5	Тс _{гип} hypoid oil at temperature above zero. It is allowed to use this oil at temperature below zero, but not below minus 15°C. CM-9 – in winter at temperature from plus 5 to minus 50°C. It is allowed to use the CM-9 for a short time (up to 10 days) temperature rise to plus 10°C.	Prime oil through clean funnel with mesh, through the hole for plug. Screw the filler plug. Force additionally oil through nipple in the feathering hinge trunnion till it appears from bypass valve in the trunnion stop, free of air bubbles. Screw off the filler plug and check the oil level. The oil level per B1811M oil gauge should be 25-35 mm. Remove the excess of oil using gun. In the hinges with pressure compensator the oil level per B1911M-02 oil gauge should be 30-35 mm. The drop in the oil level down to 55 mm is allowed after flight day.	When mounting the hub on the helicopter. Check the oil level after (50±10) flight hours and on detection of leakage. Add oil, if necessary. Replace oil on ambient air temperature change. Check the integrity of diaphragm and drain condensate from hinges with pressure compensator. Replace the rubber diaphragm in case of oil leak from the plug hole.
6	Axle of blade droop centrifugal limiter pawl	6	5	ЦИАТИМ-201	Force grease through nipple till it appears from under seal. Remove grease from the pawl axle at ambient air temperature below minus 10 degrees C.	When hub is mounted on the helicopter, then every (50±10) flight hours.
7	Hinge of main rotor blade con-	7	5	ЦИАТИМ-201	Force grease	When mount-

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
	control lever				through nipple in the blade control lever hinge. Force grease till it appears from under the protecting washers of shaft head bearings. As for main rotor hubs, manufactured since April of 1983, where cup-type seals are mounted on both end surfaces of shaft head instead of protecting washers, grease should be forced through nipple, till it appears from under the cup of the shaft head end surface, which is most distant from the hub sleeve. The grease appearance from under the lever cover is not allowed.	ing on the helicopter, then every (50±10) flight hours.
8	Flapping hinge of main rotor hub	8	5	TC _{PM} hypoid oil at temperature above zero. It is allowed to use this oil at temperature below zero, but not below minus 15°C. CM-9 – in winter at temperature from plus 5 to minus 50°C. It is allowed to use the CM-9 for a short time (up to 10 days) temperature rise to plus 10°C.	Prime oil through clean funnel with mesh, through the hole for plug. The oil level per B1811M-02 oil gauge should be 30-40 mm. In the hinges with pressure compensator the oil level per B1911M-02 oil gauge should be 30-35 mm. The drop in the oil level down to 60 mm is allowed after flight day. On the helicopters equipped with pendulum vibration damper	When mounting the hub on the helicopter. Check the oil level after (50±10) flight hours and on detection of leakage. Add oil, if necessary. Replace oil on ambient air temperature change. Check the integrity of diaphragm and drain condensate from hinges with pressure compensator. Replace the rubber diaphragm in case of oil

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					it is necessary to remove vibration damper cover to fill the expansion tank and main rotor flapping hinges. Check the oil level in the flapping hinges using oil gauge 8AT-1250-98.	leak from the plug hole.
9	Hydraulic damper expansion tank	9	1	АМГ-10	Fill (add) oil through hole for plug up to the mark on the expansion tank.	When hub is mounted on the helicopter, then add as required. Replace oil after every (500±10) flight hours.
SWASH PLATE (FIG. 6)						
1	Bearings of swash plate end hinges	1	5	ЦИАТИМ-201	Force grease till grease appears from under the valve. As for swash plates, serial number Л4102001, manufactured since 01.02.84, the grease should be forced through nipple in the shaft head till it appears from under the collar mounted in shaft cover.	Every (50±10) flight hours.
2	Bronze bushings of slide and bearings of swash plate universal-joint shaft (in slide)	2	2	ЦИАТИМ-201	Force grease till it appears from under rubber seal of universal joint bearing	When mounting the swash plate on the helicopter and after every (25±5) flight hours.

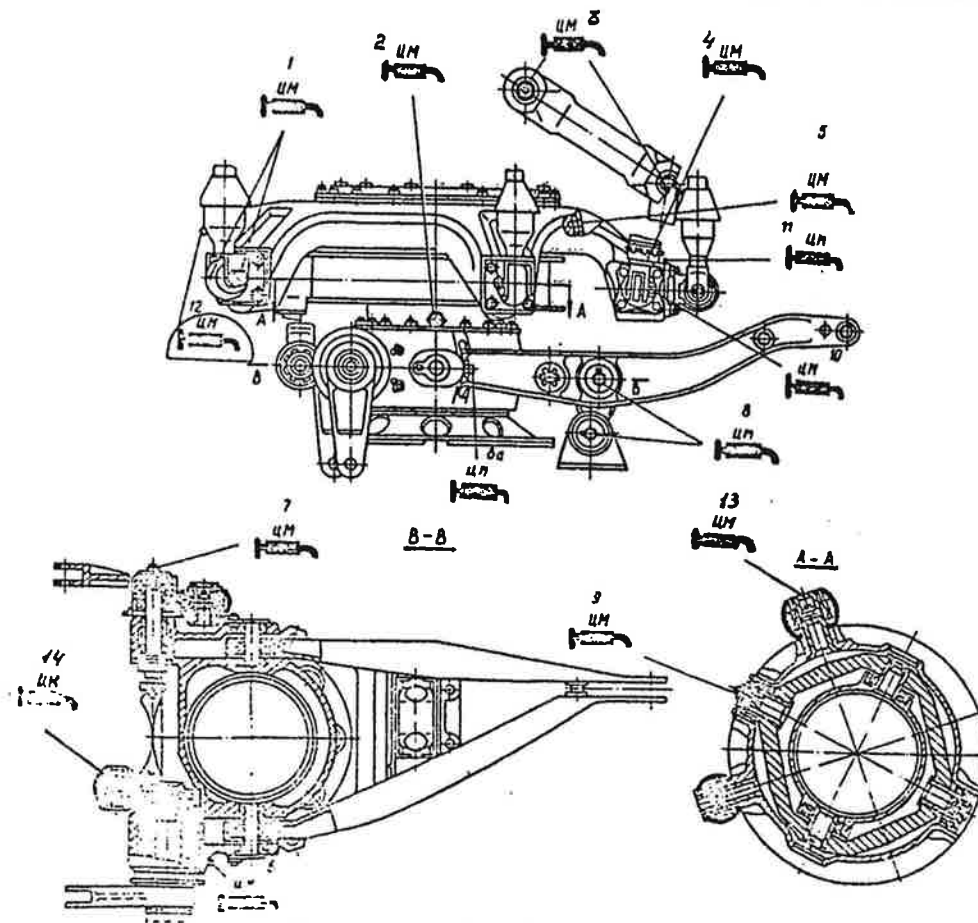


Fig. 6. Lubrication of swash plate units.

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
3	Bearings of swash plate lever clip	3	4	ЦИАТИМ-201	Pack grease with the bearing cap being removed. Tighten the nut of cap fastening with wrench with tightening torque of 0.2-0.5 kgf·m (2-5 N·m). When the bearing cap is provided with nipple, force grease till fresh grease appears from bearings from the outside. For swash plates, serial number Л 4102001, manufactured since 01.02.1984, the grease should be forced till its	When mounting the swash plate on the helicopter and after every (50±10) flight hours.

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					appearance from under the collars.	
4	Bearing of swash plate lever arm	4	1	ЦИАТИМ-201	Force till fresh grease appears from check hole in lever.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
5	Bearing of swash plate	5	1	ЦИАТИМ-201	Force till grease appears from under valve. When forcing turn plate every five-six pushes of grease gun.	Every (25±5) flight hours.
6	Needle bearings of swash plate longitudinal control rocker	6	1	ЦИАТИМ-201	Force till fresh grease appears from under valve. For swash plates, manufactured since 01.02.1984, the grease should be forced till fresh grease appears from under collar mounted in sleeve from the rocker lever side.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
7	Tapered roller bearings of swash plate lateral control rocker	7	1	ЦИАТИМ-201	Force till fresh grease appears from under rubber tube on the rocker axle. On the swash plate with solid axle (without hole) the grease should be forced till its appearance from under pulled seat of nipple ball. The check should be performed after two pushes of grease gun. If necessary, connect the grease gun once again and refill.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
8	Bearings of collective pitch lever	8	4	ЦИАТИМ-201	Force grease through nipple	When mounting the swash

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No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					till new grease comes out through clearances in joints.	plate on the helicopter and after every (50±10) flight hours.
9	Swash plate universal-joint shaft bearings (on external ring)	9	2	ЦИАТИМ-201	Force till fresh grease appears from under rubber sealing	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
10	Bearings ШС-30 of swash plate pull rods	13, 14	5	ЦИАТИМ-201	Force till fresh grease appears from under rubber covers. In case of installation of ШН-30Ю bearings of unlubricated friction, the lubricated points 13 and 14 are missing.	When mounting the swash plate on the helicopter and after every (25±5) flight hours.
11	Bearings of collective pitch lever lug	8a	2	ЦИАТИМ-201	Force till fresh grease appears from bearing.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
12	Needle bearing of lever shaft head	10	1	ЦИАТИМ-201	Force grease through nipple, mounted in the axle of shaft head, till fresh grease appears from under the rings, mounted on the lever shaft.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
13	Bearing 5-236203E of lever shaft	11	1	ЦИАТИМ-201	Force grease through nipple, mounted in the swash plate sleeve, till fresh grease appears from under the collar, mounted in the lever sleeve.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.
14	Bearings 6-3056204 of blades control pull rod unit	12	5	ЦИАТИМ-201	Force grease through the nipple of lower fork of blade control pull rod, till fresh grease appears from bleeding hole in nut 24-1940-941.	When mounting the swash plate on the helicopter and after every (50±10) flight hours.

Ми-8МТВ-1
MAINTENANCE INSTRUCTIONS

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
CAUTION. Operations per items 12, 13 and 14 should be performed for swash plates 8-1950-000, serial number Л 4102001, manufactured since 01.02.1984, as well as for swash plates, serial numbers Л 4101001 and Л 4101004, manufactured in January of 1984.						
TAIL ROTOR (FIG. 7)						
1	Universal joint	1	4	ЦИАТИМ-201	Force grease through nipple till fresh grease appears from check holes "B" of bearings of cardan joint housing (2 pcs), from holes "Г" of bearings cardan joint crosspiece (2 pcs). As for rotors, on which holes "B" and "Г" are absent, force grease till fresh grease appears from under working edges of cardan joint collars.	When mounting the tail rotor on the helicopter and after every (25±5) flight hours, but not less than once a month.

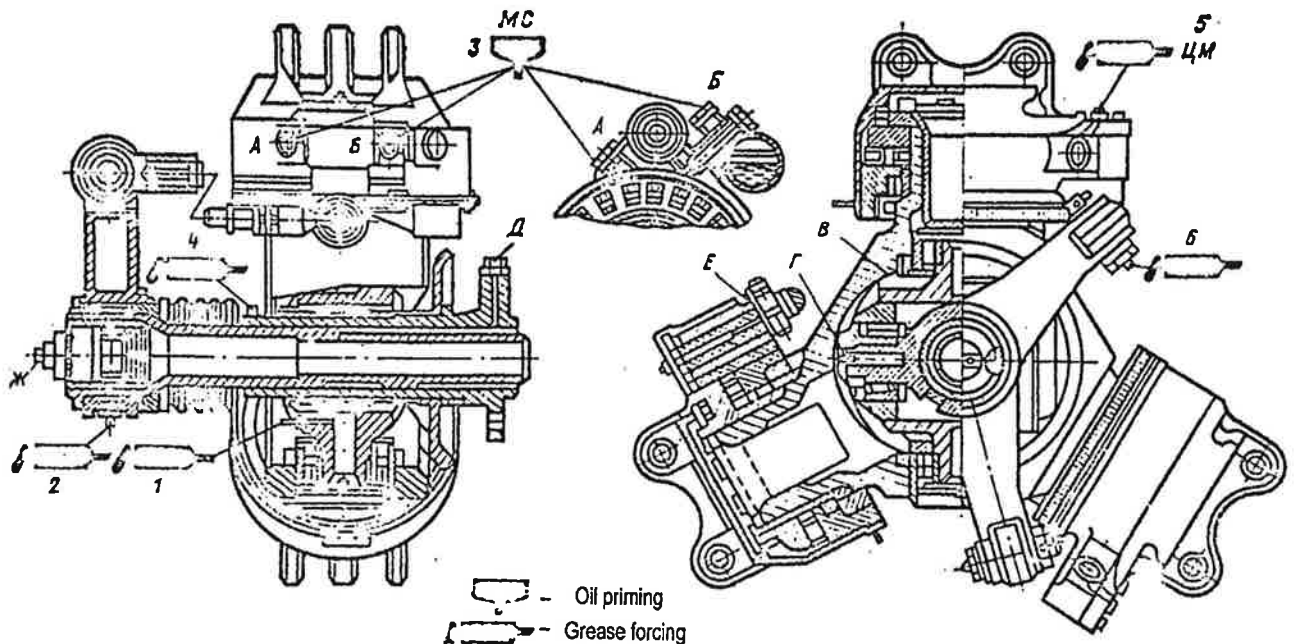


Fig. 7. Tail rotor.

Ми-8МТВ-1
MAINTENANCE INSTRUCTIONS

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
2	Cavity of rod bearing	2	1	ЦИАТИМ-201	Force grease through nipple till fresh grease appears from valve "Ж". For tail rotors up to series 05, the grease should be forced through the nipple in the cover (place "Ж") till fresh grease appearance from check hole (place of nipple – 2 pcs).	When mounting the tail rotor on the helicopter and after every (25±5) flight hours, but not less than once a month.
3	Feathering hinge	3	3	Oil MC-20 at air temperatures above zero or short-term (up to 10 days) temperature drop down to minus 10°C. Oil ВНИИ НП-25 in winter at ambient air temperatures from plus 5 to minus 50°C or short-time (up to 10 days) temperature rise to plus 10°C. It is allowed to use the MC-14 oil at ambient air temperatures from plus 15 to minus 25°C, and CM-10 oil at temperatures from plus 15 to minus 40°C.	Set blade to horizontal position, opposite to the fuselage, with fully extended blade control rod. Unscrew plug "A" on feathering hinge housing and plug "B" on the tank. Set the device 8-100 (ЭСК-1), filled with oil, and fill through the hole for plug "A" till full oil discharge from the device bottle. Check the oil level in the check cup after filling. The oil level checkup should be performed after air bleeding from the feathering hinge cavity, for this purpose set the blade to the lower position and hold it so during 15-20 minutes. Add oil, if necessary. The oil level should be between marks or 15 mm from upper edge of check cup.	When mounting the tail rotor on the helicopter. Add oil if the oil level is below the lower mark on the check cup. Replace oil: after every (100±10) flight hours; on ambient air temperature change.
4	Slide nipple	4	1	ЦИАТИМ-201	Force grease	When mount-

Ми-8МТВ-1
MAINTENANCE INSTRUCTIONS

No.	Lubricated point	Number of item in figure	Qty of lube points	Oil or grease grade	Operations performed	Lubrication schedule
					through nipple till fresh grease appears from check hole "Д" at fully extended slide. After priming push slide from one extreme position to the other one at least three times using pedals. The time required to displace slide from one extreme position to the other is at least 10 s.	ing the tail rotor on the helicopter and after every (25±5) flight hours, but not less than once a month.
5	Bearings of blade control lever shaft	5	3	ЦИАТИМ-201	Force till fresh grease appears from under protecting washers "Е" (grease squeezing from under one washer is tolerated).	When mounting the tail rotor on the helicopter and after every (25±5) flight hours, but not less than once a month.
HYDRAULIC SYSTEM						
1	Hydraulic system tank	-	1	АМГ-10	Fill using ground hydraulic unit of УПГ-300 type (УПГ-250, УПГ-250М, ЭГУ-3).	During overhaul.
EXTERNAL LOAD SLING SYSTEM (FIG. 8)						
1	Universal joint assembly bushing of ДГ-64М lock hanging		1	ЦИАТИМ-201	Force grease through nipple	Every (100±10) flight hours.
2	Hinge of bracket rocker	1		ЦИАТИМ-201	Force grease through nipple	Every (100±10) flight hours.
3	Axle of pulley fastening	2		ЦИАТИМ-201	Force grease through nipple	Every (100±10) flight hours.
4	Hinge axle (for helicopters with boom and bracket made of magnesium alloy)	3		ЦИАТИМ-201	Force grease through nipple	Every (100±10) flight hours.
5	Nipples of airborne hoist boom bolts			ЦИАТИМ-201	Force grease	Every (100±10) flight hours.
6	Guides, carriage guide screw and protruding end of splined shaft of electric winch manual drive			ЦИАТИМ-201	Apply a thin layer	Every (100±10) flight hours.
7	Nipples in the housing of reduction gear 2 of ЛПГ-150М winch			ЦИАТИМ-201	Force 4-6 g of grease.	Every (300±10) flight hours.
8	Moving parts of pulley block			ЦИАТИМ-201	Apply a thin layer	Every (100±10) flight hours.

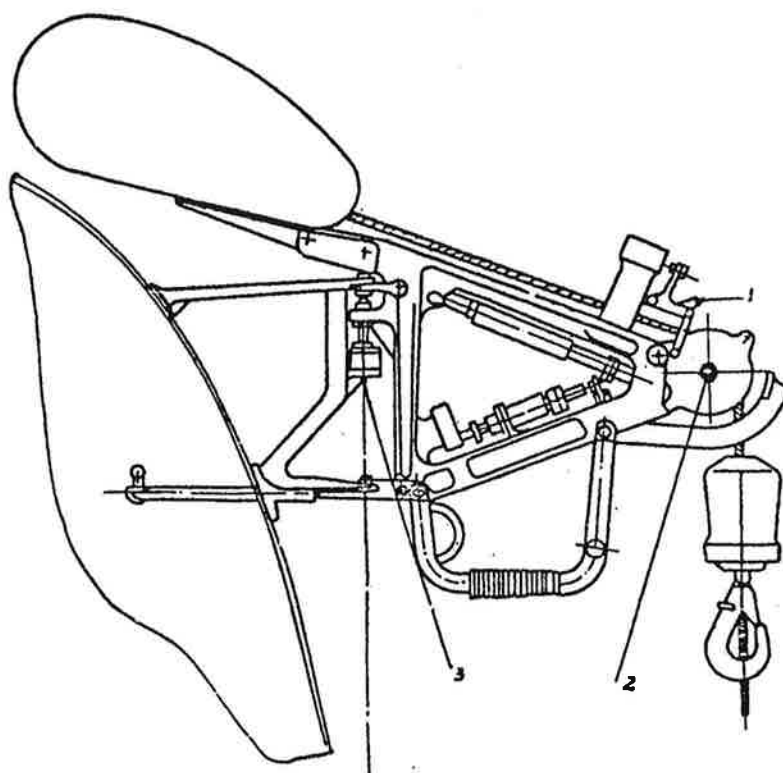


Fig. 8 Lubricated points of hinges of hoist boom with ЛПГ-150М winch

CALIBRATED TIGHTENING OF NUTS AND BOLTS OF HELICOPTER AND APPLIED TOOLS

Supplement

No.	Description of part	Qty	Description of tools	Tools No (ac- cording to draw- ing)	Torque N·m (kgf·m)
HELICOPTER FRAME					
1	Nuts 56-0400-03 of screws of cockpit glasses and sliding blisters fastening - for non-heated glasses;		Calibrated wrench	6442-56/М-175	0.4 – 0.6 (0.04 – 0.06)
	- for electrically heated glasses				1 – 2 (0.1 – 0.2)
2	Nuts 3327A-10КД of bolts fastening the tail boom to fuselage	24	Head, calibrated wrench	8AT-9102-08 8AT-9102-130	31.5 ± 3.15 (3.15 ± 0.315)
	Nuts 3327A-12КД of bolts fastening the tail boom to fuselage	28	Up to 70 N·m (7 kgf·m)	8AT-9102-13 8AT-9102-130	56 ± 5.6 (5.6 ± 0.56)
3	Nuts 3327A-10КД (locking by cotter pins) fastening the pylon to tail boom	7	Head, calibrated wrench	8AT-9102-08 8AT-9102-130	31.5 ± 3.15 (3.15 ± 0.315)
4	Nuts 3327A-12КД (locking by cotter pins) fastening the pylon to tail boom	11	Head, calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-13 8AT-9102-130	56 ± 5.6 (5.6 ± 0.56)
5	Nuts 8A-0800-09 fastening the brac- ing struts of gear box frame to fuse- lage	4	Head – support Head, calibrated wrench 1350 N·m (135 kgf·m)	8AT-9102-05 8AT-9102-110 8AT-9103-10	900 + 150 - 100 (90 + 15) - 10)
6	Nuts 3341A-24 of bolts 140-0800-01 fastening the main gear box to gear box frame and the articulated struts of gear box frame to main struts	12	Head, calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-02 8AT-9102-80	20 + 10 (2 + 1)
7	Nuts 3336A-14 of studs fastening the transmission units on main gear box to connect the bracing struts to gear box frame		Socket head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-25 8AT-9102-80	90 + 10 (9 + 1)
8	Nuts 8A-3150-14 of bolt of stabilizer flange joint	4	Head, calibrated wrench 200 N·m (20 kgf·m)	S=19 8AT-9102-80	60 + 20 (6 + 2)
MAIN ROTOR BLADES					
1	Nuts 3336-22 (8-1910-024) of bolts fastening the blades	10	Socket head Calibrated wrench	8AT-9102-18 8AT-9102-80	80 + 20 (8 + 2)
2	Bolts ПП-2700-141-3 fastening the blade spar stopper	30	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	10 (1)
3	Bolts ПП-2700-141-4 fastening the blade spar stopper	15	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	10 (1)
MAIN ROTOR HUB					
1	Nuts 8-1910-084 fastening the damper to bracket of main rotor hub feathering hinge trunnion	10	Socket head Calibrated wrench	8AT-9102-14 8AT-9102-80	70 + 10 (7 + 1)
2	Nuts 8-1910-327 fastening the bracket to main rotor hub feathering hinge trunnion	40	Socket head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9101-2-17 8AT-9102-130	40 + 20 (4 + 2)
3	Nut 8-1910-089 fastening the main rotor hub on the main gear box shaft	1	Tap wrench 3000 N·m (300 kgf·m) Wrench for main rotor shaft nut.	8AT-9124-300 8AT-9114-01	2400 – 2800 (240 – 280)
4	Nuts 8-1910-023 pins of main rotor flapping hinges	5	Head. Calibrated wrench 1350 N·m (135 kgf·m)	8AT-9102-200 8AT-9103-10	350 + 100 (35 + 10)

Ми-8МТВ-1
MAINTENANCE INSTRUCTIONS

No.	Description of part	Qty	Description of tools	Tools No (ac- cording to draw- ing)	Torque N·m (kgf·m)
5	Nuts 8-1910-049 of pins of main rotor hub drag hinges	5	Head. Calibrated wrench 1350 N·m (135 kgf·m)	8AT-9102-200 8AT-9103-10	300 + 100 (30 + 10)
6	Bolts 8-1910-088 fastening the main rotor blades control levers	20	Socket head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-25 8AT-9102-80	100 + 10 (10 + 1)
7	Screw 8-1910-013 fastening the blade droop limiter stop	10	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	10 – 12.5 (1 – 1.25)
8	Nut 8-1910-604 fastening the hydraulic damper clip pin	5	Calibrated wrench Adapter	8AT-9102-130 6350/717A	60 – 80 (6 – 8)
SWASH PLATE					
1	Nuts 3327A-12КД of studs fastening the guide of swash plate slide on the main gear box	8	Head, Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-13 8AT-9102-130	50 – 60 (5 – 6)
2	Nuts 8-1920-835 of studs fastening the swash plate slide bracket	14	Socket head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-24 8AT-9102-130	13 + 3.5 (1.3 + 0.35)
3	Nuts 3327A-12КД of studs fastening the bracket of swash plate collective pitch lever	4	Head, Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-13 8AT-9102-130	50 – 60 (5 – 6)
4	Nuts 8-1920-811 of bracing bolts fastening the swash plate lever clip	2	Socket head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-03 8AT-9102-80	60 + 10 (6 + 1)
5	Nuts ЭР-8AT-19-1430 of bracing bolts of swash plate lever clip displacement limiter	2		6442-56/И-175	20 + 0.5 (2 + 0.05)
6	Nuts of bolts fastening the bracket of УШБ-1 transmitter	2	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	13 + 3.5 (1.3 + 0.35)
7	Nuts 3336A-10K(8-1940-523) of studs fastening the swash plate upper flange	25	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	23 – 27 (2.3 – 2.7) (16.5 – 20) (1.65 – 2.0)
8	Nuts 198 M54-16 of shafts of upper forks of main rotor blades control pull rods	5	Socket head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-390 8AT-9102-130	40 – 50 (4 – 5)
9	Nuts 24-1940-168 of shafts of upper forks of main rotor blades control pull rods	5	Head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9112-11 8AT-9102-130	45 – 50 (4.5 – 5)
TAIL ROTOR					
1	Nuts 8-3914-039 of bolts fastening the tail rotor blades	5	Head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-01 8AT-9102-130	40 + 20 (4 + 2)
2	Nuts 3327A-14КД fastening the tail rotor hub to tail gear box shaft	8	Head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-03 8AT-9102-80	80 + 30 (8 + 3)
3	Cover 8-3914-603 of tail rotor bearing cavity	1	Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-80	110 + 20 (11 + 2)
4	Nut 8-3914/502 of tail gear box rod	1	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	40 + 10 (4 + 1)
FUEL SYSTEM					
1	Bolts 8-6120-25 fastening the joint straps of external fuel tanks	6	Head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-15 8AT-9102-130	40 + 2.5 (4 + 0.25)
2	Bolts 50-6120-13 of joint straps of increased capacity external fuel tanks (1030 and 1140 l)	8	Head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-01 8AT-9102-80	60 ± 10 (6 ± 1)
3	Bolts 10-6112-14 fastening the joint	4	Head	8AT-9102-21	15 ± 1.5

Ми-8MTB-1
MAINTENANCE INSTRUCTIONS

No.	Description of part	Qty	Description of tools	Tools No (ac- cording to draw- ing)	Torque N·m (kgf·m)
	straps of auxiliary external fuel tank		Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	(1.5 ± 0.15)
	TRANSMISSION				
1	Nuts 3327A-12КД of bolts fastening the intermediate gear box	4	Head Calibrated wrench 70 N·m (7 kgf·m) Device with at- tachment, special wrench for upper nuts, head	8AT-9102-17 8AT-9102-130 0071-20 ЭТ-8AT-15-250 8AT-9102-330 8AT-9102-19	55 + 10 (5ю5ю + 1)
2	Nuts 3327A-10КД fastening the tail gear box	9	Head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-08 8AT-9102-130	25 + 5 (2.5 + 0.5)
3	Nuts 3336A-8КД fastening the fan universal joint shaft to drive flange on main gear box	4	Head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-22 8AT-9102-130	12 + 3 (1.2 + 0.3)
4	Nuts 3327A-12 of: bolts ПШ-1600-02; or bolts ПШ-1600-07, ПШ-1600-8 of tail rotor drive shaft fastening to main and intermediate gear boxes	8 4	Head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-24 8AT-9102-80	70 + 10 (7 + 1)
5	Nuts 3327A-12 of bolts ПШ-1600-1 of tail rotor drive shaft (or nuts of bolts ПШ-1600-05)	12	Head Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-24 8AT-9102-80	70 + 10 (7 + 1)
6	Cover 8-3914-373 of tail gear box bearing cavity	1	Socket head, Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-25 8AT-9102-80	80 + 20 (8 + 2)
	POWER UNIT				
1	Bolts 78570041 of clamps of exhaust branch pipes	2	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	3.5 + 0.5 (0.35 + 0.05)
2	Threaded pin 246-6820-53 fastening the separators of engines dust pro- tection devices	2	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	3.5 + 0.5 (0.35 + 0.05)
3	Bolts 804M55-165 of clamps of AC generators	4	Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-130	3.5 + 0.5 (0.35 + 0.05)
	LANDING GEAR				
1	Stoppers 2194A-8КД and 2194A- 14КД of draining connections of cyl- inders of main and nose landing gears shock struts	3, 2	Head, Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-13 8AT-9102-130	10 ± 1 (1 ± 0.1)
	HYDRAULIC SYSTEM				
1	Nuts 3327A-12 КД of studs fastening the hydraulic actuators bracket on main gear box	12	Socket head, Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-13 8AT-9102-80	25 + 5 (2.5 + 0.5) then 40 – 60 (4 – 6) Note: Tightening is performed in two steps.
2	Nuts 3336-13КД of studs fastening the hydraulic actuators supports on bracket	16	Socket head, Calibrated wrench 200 N·m (20 kgf·m)	8AT-9101-13 8AT-9102-80	60 + 10 (6 + 1)
	FAN UNIT				
1	Drive roller 8A-8311 of fan blades	1	Extractor, head	8AT-9102-11	3 + 1

Ми-8МТВ-1
MAINTENANCE INSTRUCTIONS

No.	Description of part	Qty	Description of tools	Tools No (ac- cording to draw- ing)	Torque N·m (kgf·m)
	rotation cable		Calibrated wrench 200 N·m (20 kgf·m)	8AT-9102-70 8AT-9102-80	(0.3 + 0.1)
	HELICOPTER CONTROL				
1	Locknuts 3320A-16 of booster pull rods 8A-5104-340 end-pieces	4	Head, Calibrated wrench 70 N·m (7 kgf·m)	8TB-9112-11 8AT-9102-130	30 – 40 (3 – 4)
2	Screw fastening the brackets of pedal control wire-cables guide blocks mounting	16			5 + 1 (0.5 + 0.1)
3	Nuts 3327A-12КД of bolts fastening the longitudinal and lateral control rockers	2			10 – 20 (1 – 2)
	EXTERNAL LOAD SLING SYSTEM				
1	Nuts 3336A-10 of bolts fastening the external load sling system to helicop- ter	8	Socket head Calibrated wrench 70 N·m (7 kgf·m)	8AT-9102-08 8AT-9102-130	35 + 3.5 (3.5 + 0.35)