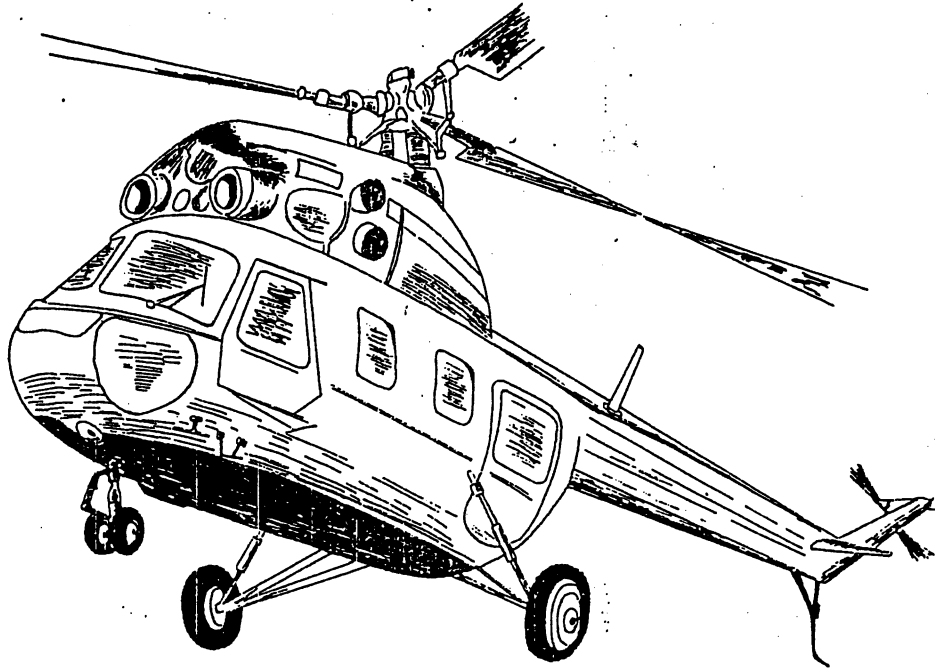




WYTWORNIA SPRZĘTU KOMUNIKACYJNEGO  
„PZL-ŚWIDNIK”

*original*



# Mi-2 HELICOPTER

## MAINTENANCE MANUAL

### EQUIPMENT

Doc. No 50.211.011/A

10/10/10



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LOG OF REVISION

A vertical line on the page outer margin indicates the latest revised part of the text.

Item	Basis of Revision	Revised Pages Nos.	Date of Revision and Signature	Remarks
1	2	3	4	5
1	SERVICE BULLETIN No 2/Mi-2/85	4-1/1, 4-20/1, 4-21/1, 4-22/1, 4-23/1, 4-24/1. Z-1/1, Z-37/1, Z-38, Z-39, Z-40, Z-41, Z-42, Z-43, Z-44, Z-45, Z-46, Z-47, Z-48, Z-49, Z-50, Z-51, Z-52, Z-53, Z-54, Z-55.	April 1987  Introduced by WSK-PZL-ŚWIDNIK	
2.	2D-3913	3-9/1, 4-11/1, 4-18/1, 4-19/1, Z-1/1, Z-56, Z-57, Z-58.	August 1990 Introduced by WSK-PZL-ŚWIDNIK	
3.	2D -3955	0-7/1, 1-3/1, 1-14/1, 2-1/1, 2-2/1, 2-11/1, 2-13/1, 3-1/1, 3-4/1, 3-5/1, 3-6/1, 3-7/1, 3-10/1, 3-11/1, 3-13/1, 3-17/1, 3-20/1, 4-1/2, 4-7/1, 4-10/1, 4-13/1, 4-18/2, 4-20/2, 4-21/2, 5-1/1, 5-4/1, 5-5/1, Z-1/2, Z-29/1.	August 1990  Introduced by WSK-PZL-ŚWIDNIK	
4.	2D-3961	4-1/3, 4-15/1, 4-19/2.	September 1990 Introduced by WSK-PZL-ŚWIDNIK	
5.	2D-3970	4-21/3.	December 1990 Introduced by WSK-PZL-ŚWIDNIK	
6.	2D-3986	6-1/1, 6-3/1, 6-4/1, 6-5, 6-6.	March 1991 Introduced by WSK-PZL-ŚWIDNIK	
7.	2D-3994	2-9/1, 3-12/1, 4-11/2, 8-4/1, Z-1/3, Z-59.	May 1991 Introduced by WSK-PZL-ŚWIDNIK	
8.	2D-4081 Bulletin 1/Mi-2/93	0-7/2, 2-7/1, 4-6/1, 4-11/3, 4-24/2.	April, 1993 Introduced by WSK-PZL-ŚWIDNIK	
9.	Bulletin 2/Mi-2/94	4-20/3	March 1994 Introduced by WSK -PZL-Świdnik	







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GENERAL INFORMATION

1. INITIAL POSITION OF CONTROLS
2. SWITCHING ON AND OPERATION CHECK OF THE EQUIPMENT
3. ROUTINE MAINTENANCE
4. PERIODICAL INSPECTION
5. DUAL CONTROL HELICOPTER MAINTENANCE
6. MAINTENANCE OF HELICOPTER WITH AGRICULTURAL EQUIPMENT
7. HOIST AND EXTERNAL CARGO HOOK MAINTENANCE
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9. EQUIPMENT TROUBLESHOOTING

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GENERAL INFORMATION

1. "Maintenance Manual" is prepared on the basis of current design documentation and the Helicopter Technical Description as well as Description and Service Instructions for individual devices and determines the maintenance principles of Mi-2 helicopter equipment.
2. "Technical Description of Mi-2 Helicopter", "Electric Diagram File" as well as individual Technical Descriptions and service instructions are included in each helicopter documentation as supplementary data.
3. After circuit (system) checking, set controls in initial position. Then, check the next circuit (system).
4. The technical service of the helicopter should be performed by skilled staff well acquainted with the helicopter and equipment design and this Manual.
5. The technical staff performing the helicopter maintenance operations must keep strictly to the general safety rules to avoid accidents or damage to the equipment.
6. All operations on the helicopter should be performed by means of efficient tools and instrument.
7. It is forbidden to displace any of the control system elements marked in red colour. When operating with such elements it is necessary to comply with all concerned requirements.
8. In order to protect the batteries from excessive discharge, the electric equipment should be tested only through ground supply source.  
In special cases, when no ground supply equipment is available and the equipment must be tested the batteries may be used. It is necessary to remember that the helicopter is airworthy when the 12-SAM-28 batteries voltage is minimum 24 V at a current load of 10 to 12 A for 12-SAM-28 batteries, 85 to 100 A for 20NKBN-25-U3 batteries, and 27 A for F20/27H1C batteries.
9. When operating the helicopter electric network, the following principles must be observed:
  - All damaged circuit-breakers, switches, change-over switches, relays and contactors are not repairable and must be replaced by new ones.
  - Should any circuit-breaker or relay actuate itself, the cause must be detected and repaired.
  - All plug connectors must have reliable and foolproof connection.
  - Electric wiring must be soldered with LC-40A or LC-60 solders.
  - If a negative terminal wire comes loose, disconnect it, remove paint and any impurities from the connection area, next connect it to the helicopter frame and apply red paint. Unnecessary sanded off spots must be coated with 17A or CH-10 lacquer.
  - When connecting and disconnecting the electrical wiring to the terminal plate maintain a clearance between them to avoid short-circuiting them.
  - When previously removed accessories are reinstalled, the electrical wires should be fixed properly.
  - When plugs or receptacles get contaminated, wash them off with pure spirit or gasoline. Under no circumstances should they be cleaned mechanically.



- screened wires should not be damaged and they should be connected properly to the helicopter electrical bonding.
  - in case of bundles repair the screws should be coated with a mixture of AK-20 adhesive and DM enamel prior to fastening the KES-2097A and ITG-1 indicators, 5K push-buttons, 2-7422 and SD-16A signalling devices.
10. In case of helicopter conversion from one version to another as well as engines, main gearbox, hub or main rotor blade replacement, the KI-13AK, GIK-1, ARK-9 compasses deviation should be checked and if necessary, compensated.
- Moreover the KI-13AK magnetic compass deviation should be tested and compensated, if necessary, after outer mirror mounting or dismounting or other magnetic mass change near the compass e.g. windscreen or its arm replacement e.t.c.
11. In order to avoid incorrect radio bearing do not read the ADF indications while communicating by the HF or VHF transceivers because the ADF can be interferenced by them.
12. Make sure that all receivers and electric power sources are switched off prior to live equipment check.
13. The specification of the testing-measuring equipment recommended for periodical repairs and current servicing of M1-2 helicopter equipment is included in Enclosure No. 9.
14. To facilitate the helicopter repairs, connectors, devices, terminal plates and electric wiring bundles arrangement on the fuselage is shown in Enclosure No. 10.
15. During periodical repairs it is allowed to remove from the helicopter only instruments and devices to be tested in laboratory.
16. After first flight with tail rotor, intermediate gear-box or tail rotor gear-box installed anew, the KI-13AK magnetic compass and GIK-1 gyro-magnetic compass deviation should be verified and compensated, if necessary.
17. During GIK-1 gyro-magnetic-compass and ARK-9 ADF compensation, reduce deviation value to zero at the relative bearing of 0 and 180 degrees.
- NOTE: During servicing M1-2 helicopter, not only this Manual should be followed but also other User's instructions concerning periodical repairs.



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18. If any part of equipment has been removed from the helicopter a plate with inscription  
ATTENTION! THE HELICOPTER IS INCOMPLETE should be placed in the cockpit.
19. In case of electric machine brushes replacement new brushes should be set on working  
position.
20. The present Manual contains information referring to all M1-2 helicopters.  
However, among individual helicopters there are some differences in equipment resulting  
from constant technical progress or from special Customer's orders.  
User should select information which refers to his helicopter only.





## C O N T E N T S

### Chapter 1

#### 1. INITIAL POSITION OF CONTROLS

1.1. Equipment arrangement in the cockpit .....	3
1.2. Instrument panel .....	4
1.3. Circuit-breaker panel .....	6
1.4. Red lighting dimming panel .....	6
1.5. Flare launcher panel .....	7
1.6. Fire extinguishing panel .....	7
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1.9. Co-pilot's panel .....	11
1.10. Agricultural equipment control panel .....	12
1.11. Lower left panel .....	12

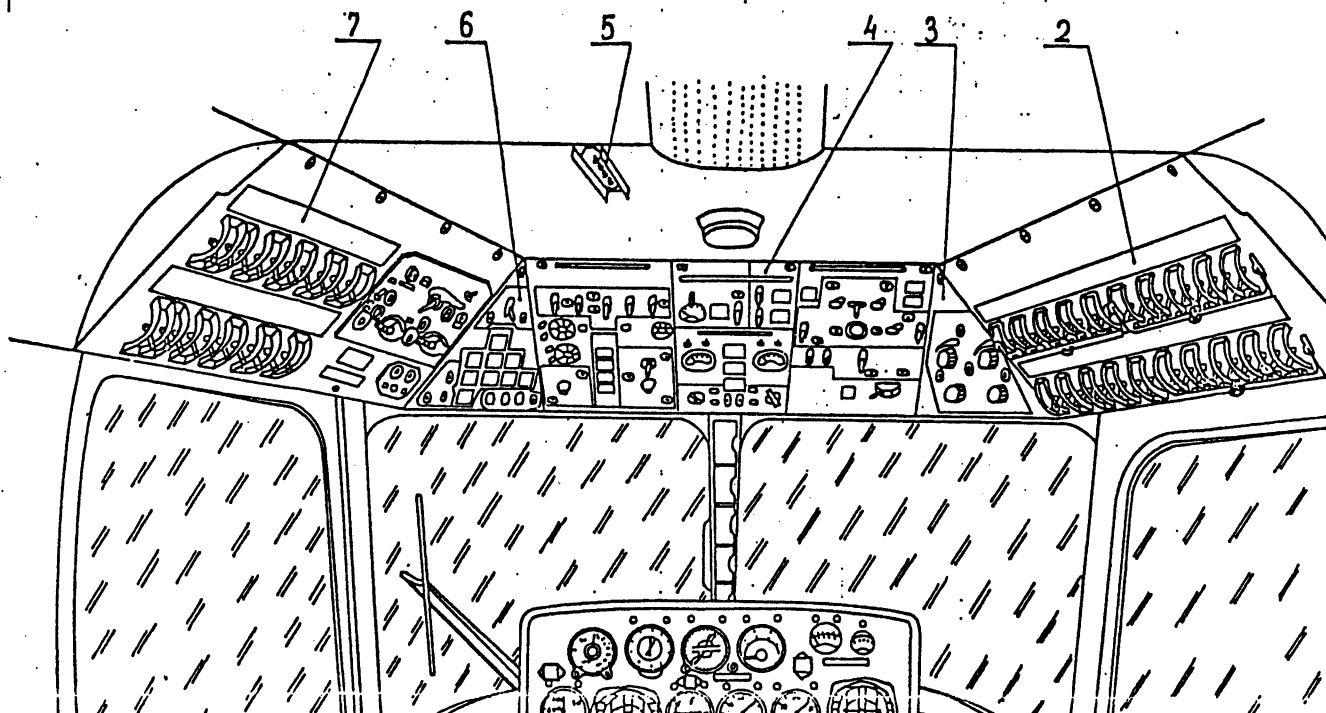




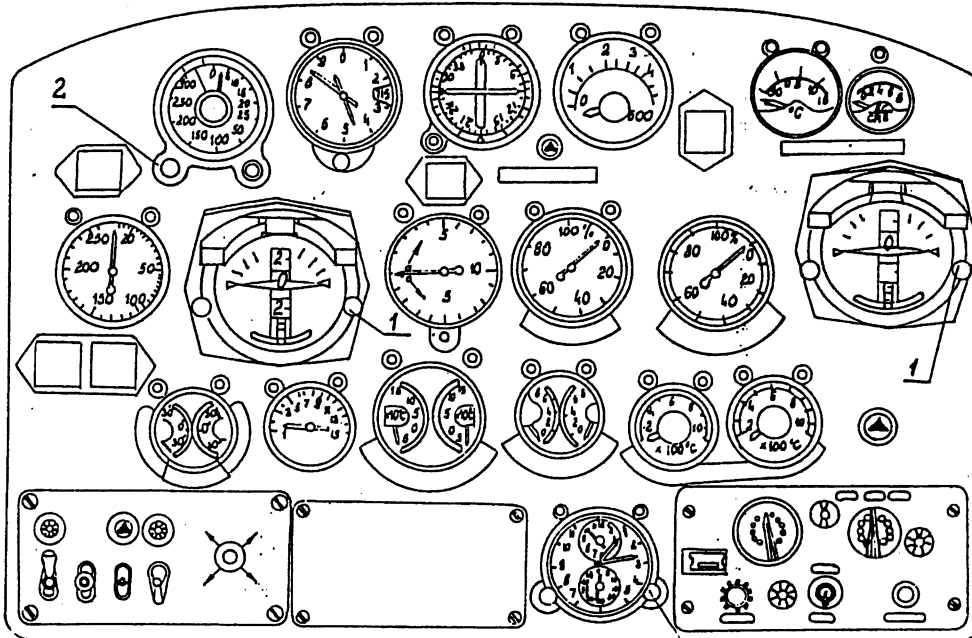


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1. INITIAL POSITION OF CONTROLS

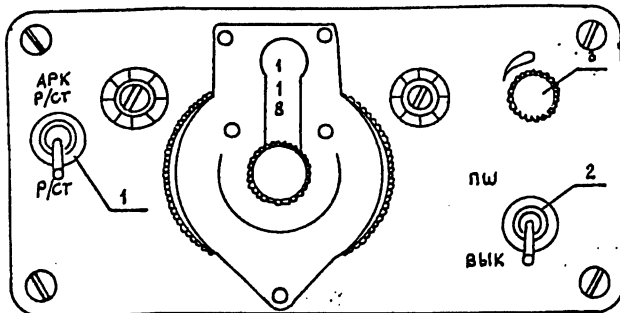


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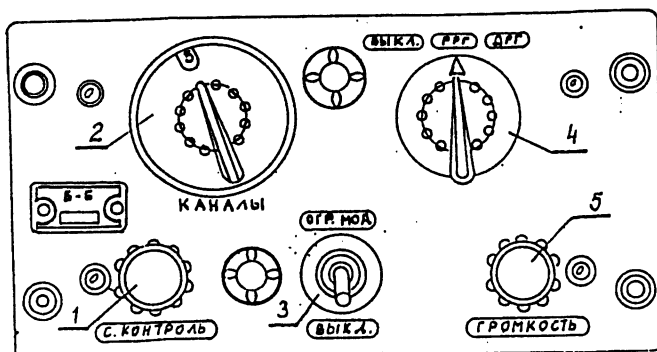




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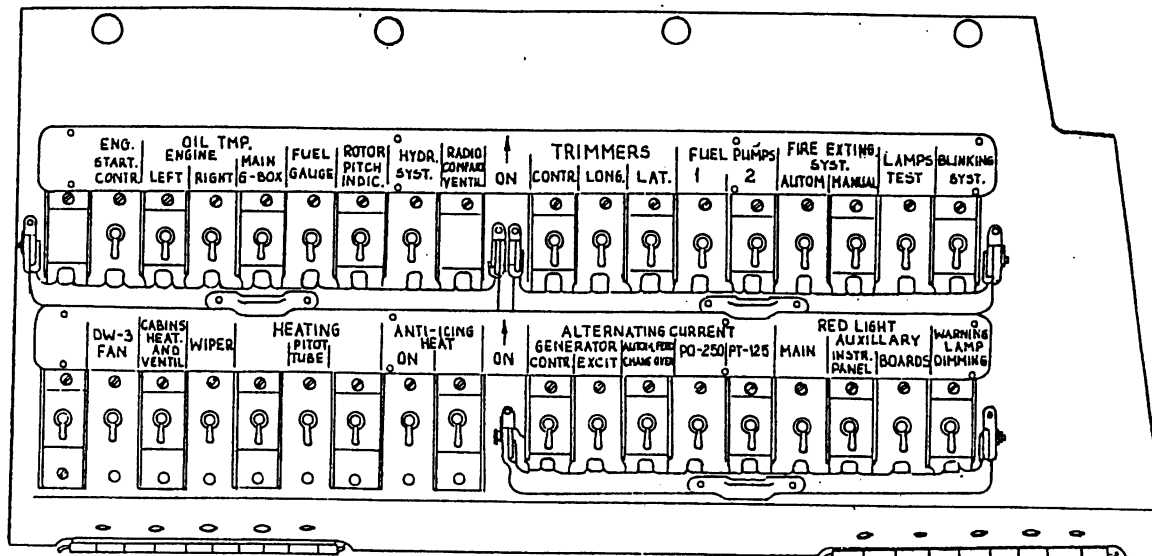
1.2.2. R-860 transceiver control panel  
/installed on Mi-2 helicopters till .31.12.1983./



1.2.3. R-842 transceiver control panel

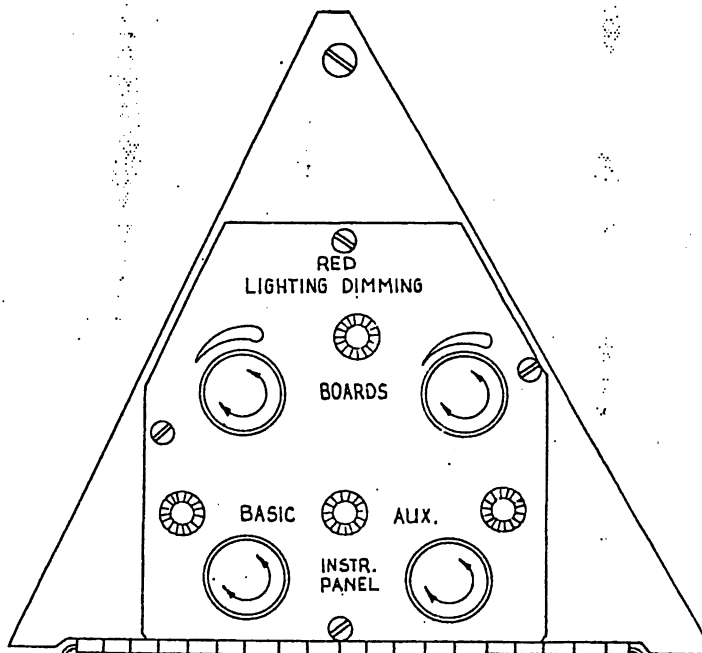
Item	Specification	Position
<b>SELECTOR SWITCH PANEL</b>		
1.	DIM transformer selector switch "TRANSF.DRPO MAIN-SPARE".	MAIN /upwards/
2.	Landing light selector switch "LANDING-TAX. LIGHT"	central
3.	Lighting dimmer selector switch "BRIGHT-DIM"	central
4.	RW-3 radar altimeter "ON-OFF"	OFF /downwards/
5.	Wiper selector switch "STARTING-1st SPEED-2nd SPEED-RETURN-OFF"	OFF /central/
<b>R-860 TRANSCEIVER CONTROL PANEL</b>		
1.	Mode selector "APK P/CT-P/CT"	P/CT /downwards/
2.	Squelch switch "ПН-БЫК."	БЫК /downwards/
3.	Voice volume knob	to the right to dead end.
<b>R-842 TRANSCEIVER CONTROL PANEL</b>		
1.	Control voice volume knob "С.КОНТРОЛЬ"	to the left to dead end
2.	Channel selector "КАНАЛЫ"	to the left to dead end.
3.	Modulation limiter switch "ОГР.МОД. БЫКЛ."	БЫКЛ. /downwards/
4.	Mode selector "БЫКЛ. - РРР - АРТ"	БЫКЛ. /to the left/
5.	Voice volume knob "ГРОМКОСТЬ"	to the left to dead end

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1.3. Circuit breaker panel

/all circuit breaker switched off /downwards/

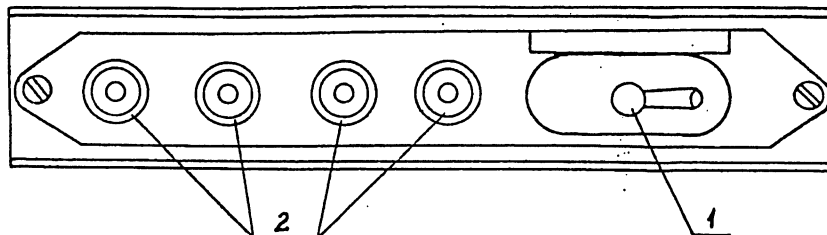


1.4. Red lighting dimming panel

All brightness adjustment knobs - to the left to dead end.

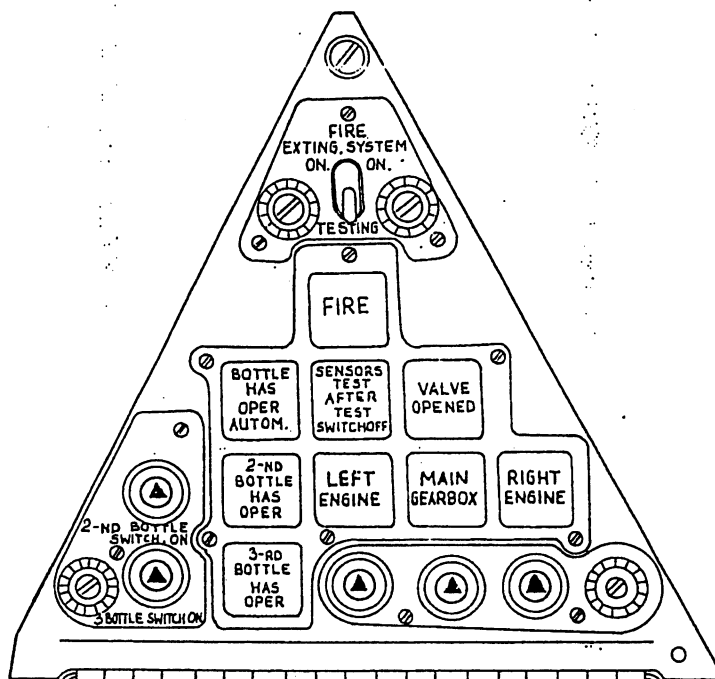


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1.5. Flare launcher panel

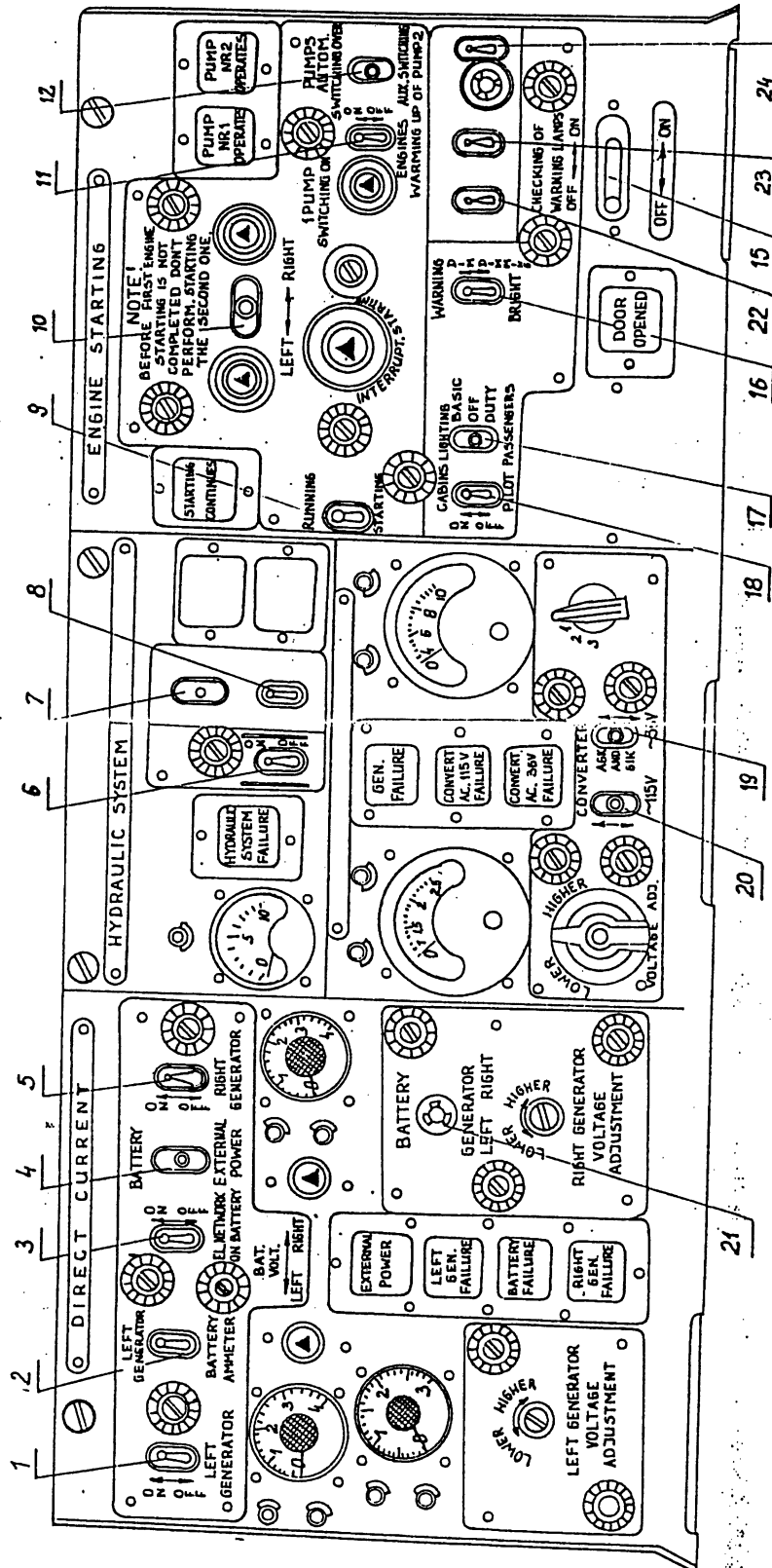
Item	Specification	Position
1.	Flare launcher selector switch "RACKETS ON-OFF"	OFF /backwards/
2.	Flare firing push-buttons	down to dead end /pull with 10 ± 20N force/



1.6. Fire extinguishing panel

Mode selector "FIRE EXTING. SYSTEM ON-TESTING" placed  
 in TESTING position /downwards/,

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1.7. Central panel



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Item	Specification	Position
1.	L.H. generator switch "LEFT GENERATOR-ON-OFF".	OFF /downwards/
2.	Ammeter selector switch "LEFT GENERATOR-BATTERY-AMMETER".	BATTERY /downwards/
3.	Switch "EL.NETWORK ON BATTERY-ON-OFF"	OFF /downwards/
4.	Power supply selector switch "BATTERY-EXTERNAL POWER".	central
5.	R.H. generator switch "RIGHT GENERATOR-ON-OFF".	OFF /downwards/
6.	Hydraulic system switch "ON-OFF"	OFF /downwards/
7.	Anti-icing system switch "MANUAL-AUTOM."	central
8.	Windscreen heating system switch "WINDSCREEN HEAT.-ON-OFF".	OFF /downwards/
9.	Engine starting selector switch "CRANKING-STARTING".	STARTING /downwards/
10.	Engine starting selector switch "LEFT-RIGHT".	central
11.	Engines warming up switch "ENGINES WARMING UP-ON-OFF".	OFF /downwards/
12.	Fuel pumps selector switch "PUMPS AUTOM. SWITCHING OVER-AUX. SWITCHING OF PUMP 2".	central
13. and 14.	Red lighting dimming switches "RED LIGHTING-MAIN-AUX.-MEDIUM-BRIGHT-DIM".	central
15.	Signalling lights testing switch "SIGNALLING LIGHTS TEST-ON-OFF".	OFF /to the left/
16.	Blinking system brightness switch "WARNING LIGHTS-DIM-DIMMING".	DIMMING /downwards/
17.	Passenger cabin lighting selector switch "CABINS LIGHTING -PASSENGERS-BASIC-OFF-DUTY".	OFF /central/
18.	Cockpit lighting switch "CABINS LIGHTING-PILOT-ON-OFF".	OFF /downwards/
19.	~ 36 VAC supply switch "CONVERTER-GENERATOR-AGK AND GIK - ~36V".	central
20.	~ 115 VAC supply selector switch "CONVERTER-GENERATOR- ~115V".	central
21.	Voltmeter selector switch "BATTERY- GENERATOR-LEFT-RIGHT".	central

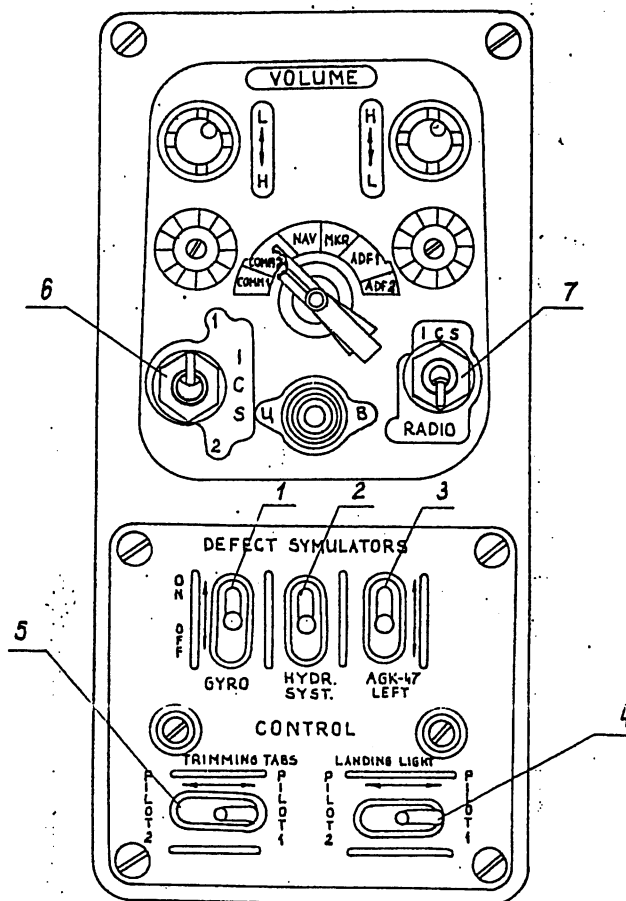






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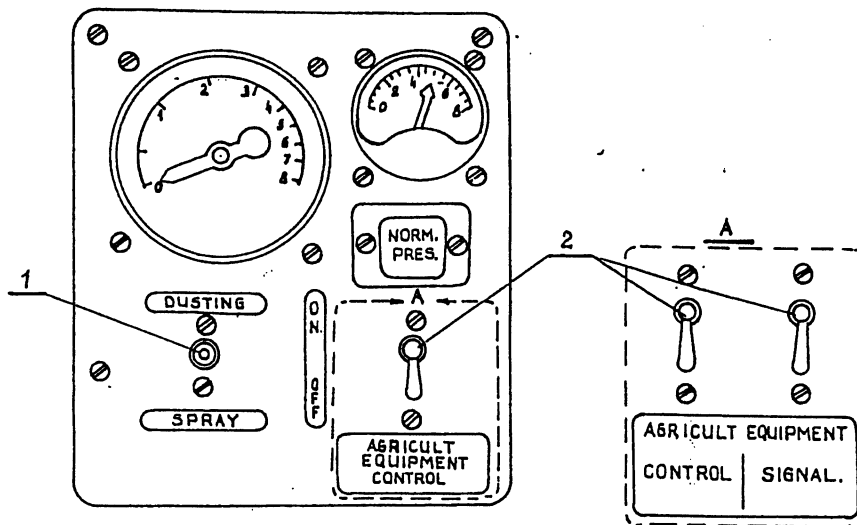
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1.9. Co-pilot's control panel

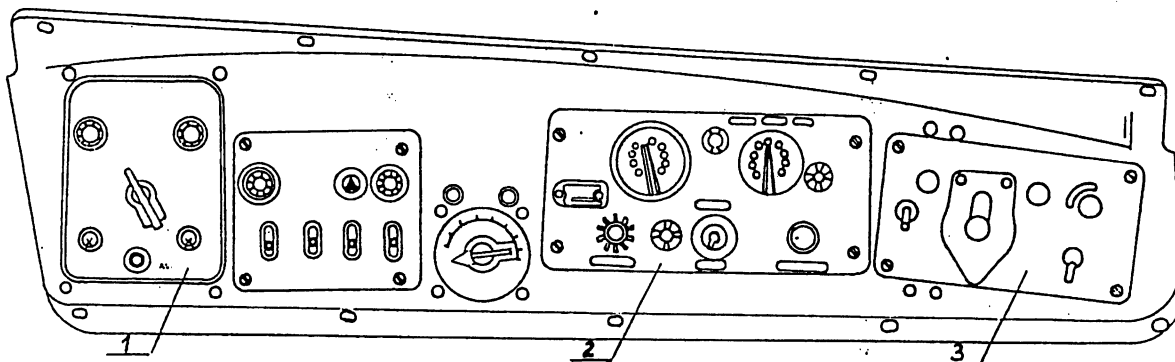
Item	Specification	Position
<b>DEFECT SIMULATORS</b>		
1.	"GIK-1" GYRO switch	ON /upwards/
2.	"HYDR. SYST." switch	ON /upwards/
3.	"AGK-47 LEFT" switch	ON /upwards/
4.	Landing light control switch "LANDING LIGHT-PILOT 2-PILOT 1"	PILOT 1 /to the right/
5.	Trim system switch "TRIMMING TABS-PILOT 2-PILOT 1"	PILOT 1 /to the right/
<b>SPU INTERCOM UNIT</b>		
6.	Intercom selector switch "ICS1/2"	1 - /upwards/
7.	"ICS-RADIO" selector switch	optional

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1.10. Agricultural equipment control panel.

Item	Specification	Position
1.	Mode selector "DUSTING-SPRAY"	central
2.	Circuit breakers	OFF /downwards/



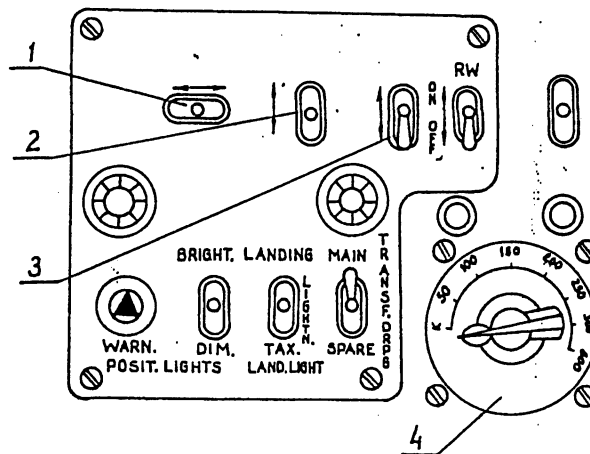
1.11. Lower left panel /on helicopters from No. 10.01/

Item	Specification	Position
1.	SPU intercom unit	see Fig. 1.9
2.	R-842M transceiver control panel	see Fig. 1.2.3.
3.	R-860 transceiver control panel	see Fig. 1.2.2.



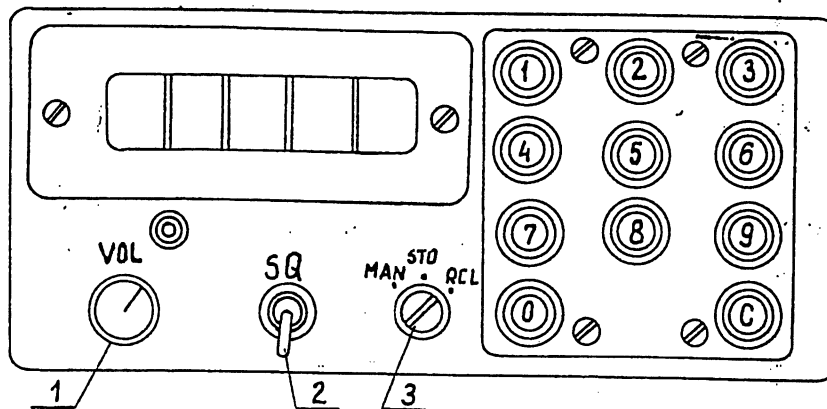
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1.11.1. Lower left panel selector switches  
/on helicopters to No. 09.50/

Item	Specification	Position
<b>AUXILIARY TRIM SYSTEM CONTROL</b>		
1.	Longitudinal control switch "AFT-FORWARD"	central
2.	Lateral control switch "LEFT-RIGHT"	central
3.	Control mode selector "AUXILIARY-STICK"	STICK /downwards/
4.	Decision height knob "OFF-K-50-100-150-200-250-300"	OFF /to the left to dead end/
<b>NOTE:</b> Remaining selectors and switches should be set in position shown on Fig. 1.2.1. and 1.11.		



1.2.2. RS6105 transceiver control panel

Item	Specification	Position
RS6105 TRANSCEIVER CONTROL PANEL		
1.	Voice volume adjustment knob VOL	optional
2.	Squelch switch SQ	optional
3.	Memory selector - in RS 6105M only	RCL



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2. SWITCHING ON AND OPERATION CHECK OF THE EQUIPMENT

2.1. SWITCHING ON AND OPERATION CHECK OF D.C. SUPPLY SYSTEM

CAUTION

1. PAY ATTENTION TO SYNCHRONIZED OPERATION OF BOTH GENERATORS
2. DURING PARKING IN WINTER DO NOT LEAVE THE BATTERIES IN HELICOPTER

2.1.1. Switching on the D.C. supply system.

2.1.1.1. Switching on the external power supply.

Connect the SzRAP plug into the receptacle on the helicopter left side and set the BATTERY - EXTERNAL POWER selector into EXTERNAL POWER position. This selector is located on the central panel.

2.1.1.2. Switching on the power supply from batteries.

Place the batteries in battery compartment. Set the BATTERY-EXTERNAL POWER selector in BATTERY position.

Power supply selector is located on the central panel.

NOTE: Electric power consumers supplied by dual bus-bars and generators, are switched on by EL.NETWORK ON BATTERY selector located on central panel.

2.1.1.3. Switching on STG-3 D.C. generators.

Switch on the LEFT GENERATOR, AND RIGHT GENERATOR switches located on central panel.

2.1.2. Operation check of D.C. supply system

The voltage measurement for each battery is carried out separately by means of W-1 voltmeter. The BATTERY-GENERATOR-LEFT-RIGHT voltmeter selector should be set in BATTERY position and appropriate BATT.VOLT. LEFT-RIGHT push-button should be pressed in. The selector, push-buttons and voltmeter are located on central panel.

NOTE: During starting engines when the batteries are connected in series, the voltmeter reads the voltage of a single battery only.

The same voltmeter is used for measurement of the generators voltage by setting its selector to GENERATOR LEFT or GENERATOR RIGHT position. The amperage measurements of D.C. passing from or to the generators is effected by means of two A-1 ammeters installed on the central panel.

The ammeters do not measure the amperage of D.C. supply while starting engines with batteries or external power supply. An amperage of battery or external power supply will be indicated after placing the BATTERY AMMETER - LEFT GENERATOR selector to BATTERY AMMETER.

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## 2.2. SWITCHING ON AND OPERATION CHECK OF A.C. SYSTEM

### CAUTION

1. PAY ATTENTION TO CORRECTNESS OF OPERATION OF DW-3 FAN WHICH COOLS RN-600 VOLTAGE REGULATOR.
2. WHEN MAIN ROTOR RPM IS LESS THAN 70% IT IS FORBIDDEN TO SWITCH ON GO16PCz 8 A.C. GENERATOR.  
WHEN DURING OPERATION OF THE GENERATOR MAIN ROTOR RPM DROPS BELOW 70%, THE GENERATOR SHOULD BE SWITCHED OFF.
3. KWR-2 ACTUATING AND ADJUSTMENT BOX 2nd SERIES, CAN COOPERATE WITH RN-600 VOLTAGE REGULATOR, 2nd SERIES ONLY.

### 2.2.1. Switching on A.C. generator

Switch on D.C. power supply. Switch on GENERATOR-CONTR.EXCIT. circuit breakers located on the circuit breaker panel.

The generator will be excited and connected to electrical network when any of the following systems is switched on:

- main rotor and tail rotor anti-icing system,
- windscreen heating system,
- electrical system of agricultural equipment

or when one of the converters /PO or PT/ has failed, or when one of the CONVERTER-36V-115V-GENERATOR selectors located on the central panel is set into GENERATOR position.

### 2.2.2. Switching on PO-500/PO-250/converter "/115 VAC power supply/

Switch on D.C. power supply. Switch on PO-500/PO-250 and AUTOM.FEED CHANG.OVER circuit breakers located on the circuit breaker panel. Set the CONVERTER-GENERATOR- 115V selector switch into CONVERTER position. The switch is located on the central panel.

### 2.2.3. Switching on PT-125C/PT70C/converter /36V AC, 3 phase power supply/

Switch on D.C. power supply. Switch on PT-125/PT-70 and GENERATOR CONTROL circuit breakers located on the circuit breaker panel. Set the CONVERTER-GENERATOR 36V selector switch into CONVERTER position. The switch is located on the central panel.

### 2.2.4. Operation check of A.C. system

WF-250 voltmeter, installed on the central panel is used for monitoring A.C. generator output voltage. Alternating current input of main rotor and tail rotor heating sections is measured by means of AF-100 ammeter and PGK-5P2N-A ammeter switch.

WF-250 voltmeter measuring range ..... from 0 to 250 V

AF-100 ammeter measuring range ..... from 0 to 100 A  
with TF-100/1A transformer



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### 2.3. SWITCHING ON AND OPERATION CHECK OF TRIM SYSTEM

#### CAUTION

1. DO NOT, UNLESS NECESSARY, SWITCH-OVER THE TRIMS SWITCH, BECAUSE ITS LIFE IS LIMITED.
2. CONTINUOUS OPERATION OF MP-100M LINEAR ACTUATOR MAY LAST OVER 6 CYCLES.

Turn on the D.C. system supply and three TRIMMERS-CONTR.LONG.LAT. circuit breakers. The check of trim positions is accomplished by means of the UPES-21 dual instrument consisting of UPES-21 indicator, on the instrument panel and the UPES-D transmitters installed under the cockpit floor and mechanically coupled with the MP-100M linear actuator. Measuring range of the UPES-21 is  $30^{\circ}$ - 0 -  $30^{\circ}$ .

### 2.4. SWITCHING ON AND OPERATION CHECK OF HYDRAULIC SYSTEM

NOTE: In case of removing any hydraulic system circuit breaker, remember to reinstall it in opposite position i.e. "OFF" upwards position.

Turn on the D.C. supply system, HYDRAULIC SYST. circuit breaker and the hydraulic system ON/OFF switch. In dual control helicopters two switches should be on/. The circuit breakers are located on the circuit breaker panel, and the ON/OFF switch on central panel. The other switch marked HYDR.SYST. is used for simulation of hydraulic system failure and it is installed on the co-pilot's panel/.

To turn off the hydraulic system on the helicopters with dual controls it is enough to set any of this switches in OFF position.

The checking of the hydraulic system pressure is performed by means of the DIM-100 inductive pressure gauge, which consists of the UI-100K indicator and ID-100 transducer. The indicator is installed on the central panel, and transducer in the GB-2 unit.

The DIM-100 measuring range is ..... from 0 up to  $100 \text{ kg/cm}^2$ .

### 2.5. SWITCHING ON AND OPERATION CHECK OF FUEL PUMPS

#### CAUTION

IT IS FORBIDDEN TO TURN THE PUMPS ON WHEN THERE IS NO FUEL IN THE TANK

Switch on D.C. supply and two FUEL PUMPS 1-2 circuit breakers.

In order to actuate the main pump, set the mode selector in the PUMPS AUTOM. SWITCHING OVER position and press in the 1 PUMP SWITCHING ON push button.

In order to actuate the stand-by fuel pump, the mode selector should be in arbitrary position excluding the neutral one.

When the mode selector is placed in AUX.SWITCH OF PUMP 2 position; there is no possibility to actuate the main pump.

The fuel pump operation is indicated by means of the "PUMP No. 1 OPERATES" and "PUMP No.2 OPERATES" signalling lights.



## 2.6. SWITCHING ON LIGHTING AND SIGNALLING SYSTEMS

### CAUTION

1. IT IS PROHIBITED TO OPERATE THE RED LIGHTING SYSTEM WITH REDUCED NUMBER OF BULBS.
2. DURING SERVICING IT IS NECESSARY TO KEEP FROM NEEDLESS SWITCHING ON THE MPRF-1A LANDING-TAXING LIGHT, ESPECIALLY LANDING LIGHT WHICH MAY CONTINUOUSLY BE ON NO LONGER THAN 15 MIN. KEEP FROM NEEDLESS SWITCHING ON THE LANDING LIGHT DRIVING MECHANISM, BECAUSE IT NEEDS COOLING DOWN TO AMBIENT TEMPERATURE AFTER MAKING FIVE CYCLES.
3. THE "PITOT HEAT IN GOOD ORDER" LIGHT EFFICIENCY CHECKING SHOULD BE NOT LONGER THAN 1 MIN., IN ORDER TO AVOID OVERHEATING OF THE PITOT TUBE.
4. BEFORE THE EKS-46 FLARE LAUNCHER LOADING IT IS NECESSARY TO PULL OUT THE PUSH BUTTONS ON THE FLARE LAUNCHER PANEL.

Switch on D.C. supply.

Ceiling lamps are turned on by means of LIGHTING circuit breaker on the L.H. panel and the adequate CABINS LIGHTING switch.

The cockpit and passenger cabin ceiling lamp switches are located on the central panel.

The switch of the radio compartment ceiling lamp is near this lamp.

The SBK cabin lamp is turned on, after previous switching on "LIGHTING" circuit breaker; by means of push button or brightness adjustment knob situated on the lamp fixture.

The FR-100 lamp is switched on through the CARGO LIGHT circuit breaker located on L.H. panel.

The portable lamp receptacles power supply is switched on by means of VAC. CLEANER SOCKETS circuit breaker which is located on L.H. panel.

The anticollision lamp is activated through the ANTICOLL. LIGHT circuit breaker on L.H. panel.

If the engines are inoperative it is necessary to turn on additionally the EL. NETWORK ON BATTERY switch.

The EKS-46 flare launcher is activated through the SIGNAL ROCKETS circuit breaker on L.H. panel.

The selected flare shooting follows after pressing adequate push-button on the flare launcher control panel.

The position lights power supply is switched on by means of POSITION LIGHTS circuit breaker on L.H. panel and their switching off and brightness adjustment is performed by means of BRIGHT-DIM. switch. Signalling with the lights is performed by means of POSIT. LIGHTS-WARN. switch; the BRIGHT-DIM switch should be in DIM or in neutral position /OFF/.

The push button and switch are located on the instrument panel and on the helicopters up to No. 16.22 - on the lower left panel.

The MPRF-1A landing-taxing light power supply is switched on by means of HEADLIGHT-CONTR-LIGHT circuit breakers located on the upper left panel.

The light switching on and lighting mode selecting is performed by means of LAND. LIGHT-LANDING-TAX. selector located on the instrument panel.

The landing light retraction is controlled by means of T5102-00 switch installed on collective pitch lever.





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On the helicopter with dual-controls the light selector "1-PILOT-2" is located on the copilot's panel, and the second push-button for landing light retraction is located on copilot's collective pitch lever.

The red lighting supply is switched on by means of RED LIGHT circuit breakers. The light brightness is adjusted with four four-position switches: RED LIGHTING, LIGHT-MIDDLE-DIM-OFF, two of them are located on the instrument panel and the two others on central panel.

The switches on the instrument panel are designed for the instrument panel lighting control and switches located on the central panel for the other panels lighting control.

On the helicopters from No. 20.01, red lighting brightness is adjusted stepless by means of four potentiometers knobs, which are located on the red lighting dimming panel.

Switching on the signalling system is performed by means of "BLINKING SYST." and "WARNING LAMP DIMMING" circuit breakers.

When checking signalling lights it is necessary to switch on the "LAMPS TEST", "MAIN G-BOX OIL TEMP", "FUEL GAUGE", "PITOT TUBE HEAT" circuit breakers and "CHECKING OF WARNING LAMP" switch. The circuit breakers are located on the circuit breakers panel and the switch - on the central panel.

The signalling of the passenger cabin door opening is actuated after switching-on the "WARNING LAMP DIMMING" circuit breaker.

## 2.7. SWITCHING ON AND OPERATION CHECK OF ANTI-ACING, HEATING AND VENTILLATION SYSTEMS.

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The circuit breakers are located on the circuit breaker panel and the selector on the central panel.

When engines operate, the blades anti-icing system should start operating which can be observed on the AF-100 ammeter readings.

Automatic switching on is performed after setting the mode selector into AUTOMAT, position and when ice-detector which is switched on by means of ANTI-ICING, DETECTOR circuit breaker is actuated. The circuit breaker is on the circuit breaker panel.

The current input of main and tail rotor blade heaters is measured by means of AF-100 ammeter located on the central panel. The ammeter operates with the TF-100/1A transformer located on the heating panel.

The ammeter is switched over to individual groups of heater by means of PCK-SP2N-A switch installed under the ammeter.

To switch on the heating system of 1st pilot windscreen, switch on the following circuit breakers: ANTI ICING-ON, GENERATOR - CONTROL - EXCIT. and the WINDSCREEN HEAT switch located on the central panel.

When the windscreen reaches temperature of  $+30 \pm 2^{\circ}\text{C}$ , the heating device switches off power supply and the windscreen starts to cool down and when its temperature drops below  $+28^{\circ}\text{C}$ , the heating is switched on again. The heating valves of the compressor guide vanes are switched on by means of the ANTI-ICING circuit breaker and ENGINE WARMING UP switch or by setting the MANUAL-AUTOM. mode selector into MANUAL position. All the switches are located on the central panel.

Heating of clock, Pitot tube and batteries is switched on by means of the following circuit breakers: HEATING CLOCK, PITOT TUBE, BATTERIES.



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The mode selector is located on the fire extinguishing panel

In order to check the fire extinguishing system set the operation mode selector to TEST position. Then SENSORS TEST - AFTER TEST SWITCH OFF light located on the fire extinguishing panel should light up,

Test the fire extinguishing system depressing the three pushbuttons installed on each SSP-6BI block successively.

If the system is efficient, the following lights go on: FIRE located on the instrument panel, VALVE OPEN, FIRE and proper COMPARTMENT located on the fire extinguishing panel and the light installed in the radio compartment,

2.9. SWITCHING ON THE INSTRUMENTS

CAUTION

1. IT IS PROHIBITED TO EXCEED ALTITUDE OF 5000 M, WHEN THE ALTIMETER POINTERS ARE DEFLECTED BY MEANS OF THE REGULATOR KNOB.
2. THE ALTIMETER HOUSING UNTIGHTNESS MAY BE RESULTED FROM IMPROPER FASTENING OF THE REGULATOR KNOB. THEN IT IS NECESSARY TO TIGHTEN THE REGULATOR SLEEVE.
3. FOR HELICOPTERS FROM NO. 20.01, TOTAL PRESSURE SYSTEM UNTIGHTNESS MAY BE RESULTED FROM INSUFFICIENT TIGHTENING OF THE SCREW PLUGGING THE PRESSURE STABILIZER DRAINING HOLE.
4. PRIOR TO SWITCHING ON AND OFF POWER SUPPLY  
CHECK IF THE ATTITUDE INDICATOR IS LOCKED.

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2.9.3. Switching on power plant monitoring instruments

Switch on D.C. power supply.

Switch on 115V A.C. power supply from PC-500 /PC-250/ converter.

Main gear box and engines are switched on by three oil temperature indicators.

OIL-TMP ENGINE-LEFT-RIGHT and MAIN G-BOX circuit breakers located on circuit breaker panel.

Fuel quantity indicator is switched on by FUEL GAUGE circuit breaker, located on the circuit breaker panel.

Main rotor pitch indicator is switched on by means of ROTOR PITCH INDIC. located on the circuit breaker panel.

NOTES: 1. The main gearbox oil overtemperature indicator operates simultaneously with the main gearbox oil temperature indicator.

2. DIM inductive pressure gauges are activated after switching on the PO-250 /PO-500/ converter or after switching over A.C. power supply to G016PCz8 generator.

3. The other instruments are switched on simultaneously with individual systems or they are independent from electrical power supply.

2.10. SWITCHING ON RADIO EQUIPMENT

2.10.1. Switching on R-860 transceiver



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2.10.3. Switching on ARK-9 Automatic Direction Finder

In order to switch on the ARK-9 automatic direction finder the following operations should be performed:

- switch on the D.C. and 115V A.C. power supply,
- switch on the ARK-9 and ICS circuit breakers on the upper left panel,
- set the BHK-KOMΠ-AHT-PAM mode selector on the automatic direction-finder control panel to "AHT" position,
- set the mode selector on the intercom unit to ADF-1 position.

2.10.4. Switching on RW-3 or A-037 radar altimeter

WARNING

STAYING IN THE RADAR ALTIMETER TRANSMITTING ANTENNA EMISSION FIELD  
IS STRICTLY FORBIDDEN

CAUTION

1. IT IS STRICTLY FORBIDDEN TO SWITCH ON THE RADAR ALTIMETER WITHOUT ANTENNAE OR TESTER CONNECTED.
2. IT IS STRICTLY FORBIDDEN TO PAINT THE RADAR ALTIMETER ANTENNAE LOWER AREAS DURING HELICOPTER SERVICING.



2.10.6. Switching on SPU-7 intercom

In order to switch on the SPU-7 intercom the following operations should be performed:

- switch on the D,C. power supply
- switch on "S<sub>10</sub>" circuit breaker on upper left panel,
- set the ICS 1/2 switch located on the intercom unit to "1" position.

2.11. SWITCHING ON NEUTRAL GAS SYSTEM

CAUTION

AT AMBIENT TEMPERATURE BELOW 0°C, THE "NEUTRAL GAS SYSTEM" SWITCH SHOULD BE SWITCHED ON AFTER 5 TO 10 MINUTES FROM THE TIME OF SWITCHING ON THE "NEUTRAL GAS SYST.HEAT" SWITCH

2.11.1. Switching on neutral gas system when main fuel tank is full

NOTE: The neutral gas system is switched on after starting and testing the engines before flight.

Switch on the NEUTRAL GAS and FIRE EXTING.SYST.-AUTOM. circuit breakers located on the circuit breaker panel. Switch on NEUTRAL GAS SYST.HEAT switch located on the central panel. This will cause switching on electrical heating of gas bottle and pressure reducing valve.

Set the NEUTRAL GAS switch located on the central panel into ON position.

This will activate the explosive cartridge which opens the GZCM pyrohead and the





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## 2.12. SWITCHING ON RS6105 /RS6105M/ TRANSCEIVER

Switch on D.C. power supply.

Switch on VHF and ICS circuit breakers located on the upper left panel.

On the intercom unit:

- set the ICS-RADIO switch to RADIO position.
- set the mode selector into COMM-4 position.
- set ICS switch to 1 position.

On the RS6105 transceiver control panel:

- switch on the transceiver - rotating VOL knob to the right.
- press in the delete key marked with a letter C.
- select required frequency by means of keys marked from 0 to 9.
- check the frequency on the display.
- switch on squelching - SQ switch downwards.
- switch on lighting /if necessary/.

In RS 6105M transceiver control panel:

- prior to switching on D.C. power supply set STC-MAN-RCL memory operation mode to RCL position;
- after switching on D.C. power supply with VOL knob, a frequency value is displayed as programmed previously on channel 0 (key 0);
- when selecting a new frequency value among the values programmed on the other channels 1-9 it is not necessary to depress the delete key C, only selected key should be depressed;
- a selected frequency is programmed by means of keys 0-9 with memory selector in MAN position;
- to store the programmed frequency in memory set the selector in position STC and depress appropriate key for the frequency to be memorized;

## 2.13. SWITCHING ON BAKKAN TRANSCEIVER

Set on the Intercom unit the following items:

- SIU-RADIO selector in RADIO position;
- operation mode selector in UKF position;
- mains selector in I position;

Switch on UKF and SFU switches on the left panel.

Set squelching switch in BbIK/ (down) position at audible noise in earphone, then reposition the switch to ПЩ position.

The frequency programming is performed by means of concentric knobs installed on the transceiver panel.





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### 3. ROUTINE MAINTENANCE

Routine maintenance is made in an effort to prevent helicopter malfunction and to keep its airworthiness standard unchanged.

#### 3.1. PRELIMINARY FLIGHT PREPARATION

Preliminary flight preparation is a basic helicopter inspection.

Preliminary flight preparation is performed after each flying day or after two flying days depending on helicopter technical condition.

In case of short helicopter parking, preliminary flight preparation is performed at least every 7 days.

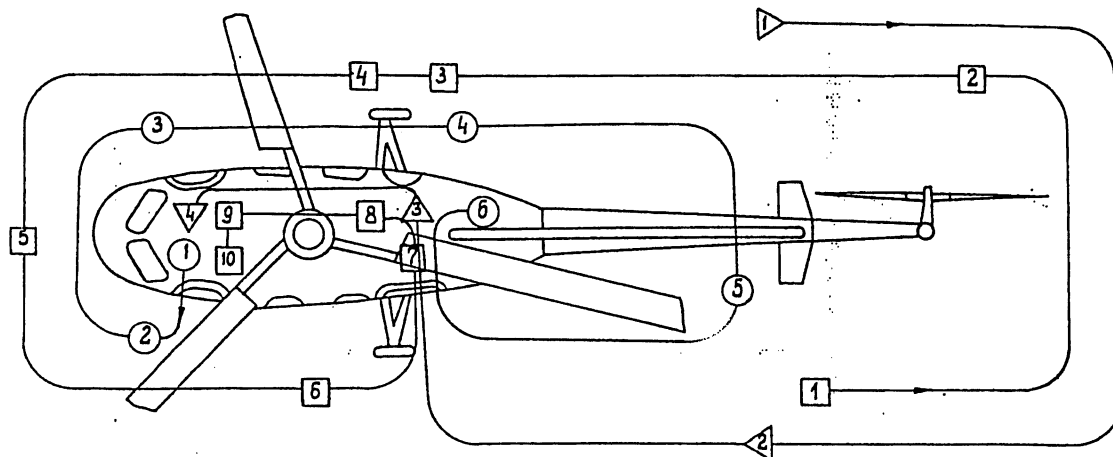
Preliminary flight preparation includes checking both helicopter condition and equipment operation.

This control check of helicopter condition performed thoroughly is the basic preparation of helicopter for flight. It is conducted on days of preliminary flight preparation by the skilled ground personnel. The typical sequence of helicopter inspection is shown in Fig.3.1. To conduct the inspection all access covers, control panels, distribution boxes /SR/ and instrument panel should be ground.

NOTE: Open the overhead panels in the following sequence:

- the upper left panel,
- the circuit-breaker panel

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3.1. Typical sequence of helicopter inspection

△ - Sequence of radio equipment inspection



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In engines and main gear-box compartments check:

- condition and fastening of igniters, extinguisher valves, STG-3 starter generator, GO16PCz8 alternator, fire detectors, FMK-21 programming mechanism, ST-1 transmitter, main rotor slip-ring, 2-7422-00 or RIO-3 ice detectors;
- bundles of wires, main rotor slip-ring distribution box, and other devices;
- transformer, relays, bus-bars and condition of wires located on heating plate.

In front part of fuselage check:

- batteries and their containers condition;  
If necessary, wipe dry the containers and batteries.
- battery plugs condition; if necessary, clean the vent holes.
- the condition of pipes and draining holes of battery containers and their compartment,
- cleanness of battery connectors and plug-in sockets,
- blow with compressed air the draining pipes in inspection ports and battery containers, (12-SAM-28)
- electrolyte level in each cell, it should be 6 to 8 mm above the lower plate but not higher than the upper plate. Before checking the electrolyte level tilt the battery 2-3 times by 30 + 45 degrees in order to eliminate air bubbles. Check the condition of containers lagging.

NOTE: 1/ If necessary, lubricate the battery container fastening latches with CIATIM-201 grease.

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Under the helicopter fuselage, check:

- condition and fastening the FR-100 landing light;

Inside the radio compartment, check:

- condition of shock absorber of SSP-6BT, AOS-81M, RN-600, RIO-3 or RP-7422-00 blocks;
- correct setting and fastening of DW-3 fan;
- condition and fastening of: AC distribution box /SR/, fire-extinguishing system, EKSR-46 flare launcher, pyrohead connector and pressure indicator of third extinguisher bottle;
- condition and fastening of connectors and wire bundles;
- condition and fastening of fuses in AC fuse box and their accordance with the rated values.

Under the front and rear parts of cockpit and passenger cabin floor, check:

- condition and fastening of: FR-100 landing light, SD-16A /SC-14D/ pressure signalling unit, the MP-100M linear actuators, KBM-31 capacitor, microswitch of rotor brake lever, microswitch of cargo hook arming signalling /in helicopters from No. 27.01/, electrical wires, as well as SzR connectors.

Inside cockpit, check the condition and fastening of:

- push-buttons located on cyclic and collective control sticks,
- SBK lamp and DW-3 fan,
- flare launcher control panel;
- fuses on the CRU /central distribution unit/ and their accordance with the rated values.

In the circuit breaker panel, check:





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Under upper left panel, check:

- fuses for accordance with the rated values marked on fuse plate and their fastening reliability.

On the instrument panel/and behind and over the instrument panel/ check the fastening and condition of:

- RN-120U voltage regulators and their shock absorbers, AZP-11 overvoltage protection devices, AZP- control push-buttons, draining pipes of batteries, electrical wires, red lighting and signalling system elements, resistors and TP-400 fuses.

When it was raining during flight, check the space behind the central panel for water leaks. When water leak is evident, wipe it with dry clean rag and make the skin water-tight. Close the overhead panels and instrument panel and check if all panels and instrument panel locks are properly closed.

Check efficiency of selectors, switches and circuit-breakers which are located on the panels and instrument panel.

Check the condition and fastening of electrical equipment.

Check, if all controls are in initial position.

After the inspection, if it is necessary to check operation of electrical system, switch on D.C. power supply.

#### 3.1.1.2. D.C. power supply check

Set the power supply mode selector in BATTERY position. As the result LEFT GENERATOR FAILURE and RIGHT GENERATOR FAILURE lights will light up.

Check the voltage with board voltmeter. To do this, set the voltmeter selector switch in BATTERY position.

The W-1 voltmeter reads the voltage from both batteries. The voltage measurement of each battery separately is accomplished by means of push-buttons located on the central panel. The voltage should be not less than 24V at load current from 10 up to 12A.

NOTE: The load current from 10 up to 12A is obtained as the result of simultaneously switching on: PT-70C converter, PWD-6M heating, DW-3 fan and FR-100 landing light or PT-125C converter, DW-3 fan and FR-100 landing light.

Connect the external power supply at voltage range from 24 up to 28.5V to the network.

Set the power supply mode selector in EXTERNAL POWER position, as the result of this the EXTERNAL POWER advisory light should light up.

Switch on the BATTERY HEATING circuit breaker and check battery heating operation.

The current consumption of battery heating should be 4A /the A-1 ammeter reading/.

Switch off the HEATING BATTERY circuit breaker.

Set the W-1 voltmeter and A-1 ammeter switches in BATTERY position.

Activate the PO-500 /PO-250/ converter.

The voltmeter should read voltage of external power supply; the ammeter - the current input of converter and signalling lights.

Switch off the PO-500 /PO-250/ converter.

Set the switch of W-1 voltmeter in LEFT GENERATOR position, then in RIGHT GENERATOR position and switch on DW-3 circuit breaker.



The voltmeter should not read voltage in both positions of switch, and the fan should not operate. Set the NETWORK ON BATTERY switch in upper position, as the result of this the DW-3 fan should operate, and voltmeter should read voltage after setting the switch in LEFT GENERATOR or RIGHT GENERATOR position.  
Set the NETWORK ON BATTERY switch in lower position.

#### 3.1.1.3. Red lighting check

Switch on the RED LIGHT -MAIN - AUXILIARY-INSTR. PANEL-BOARDS circuit breakers located on circuit breaker panel and HF and ARK-9 circuit breakers located on upper left panel.

Switch on the ARK-9 by means of switch located on ARK-9 control panel.

Check the dimming of instrument and overhead panels lighting by means of potentiometers knobs located on red lighting dimming panel.

Check the illumination of inscriptions on ARK-9, R-860, R-842 and SPU-7 panels as well as on compass.

Brightness of radio equipment panels lighting is controlled by means of INSTR. PANELS-MAIN potentiometer through the RED LIGHT-MAIN circuit breaker.

The above mentioned controlling is performed by means of INSTR. PANEL-AUXILIARY potentiometer if the RED LIGHT-MAIN and AUXILIARY-INSTR. PANEL circuit breakers are switched on.

Switch off the RED LIGHT, HF and ARK-9 circuit-breakers.

NOTE: 1. The red lighting lamps /two pieces/ of UW-P1 altimeter are located inside the indicator in helicopters with the RW-3 radar altimeters installed. One lamp should light simultaneously with main red lighting system of instrument panel, the second one with auxiliary system.

2. Red lighting is dimmed by means of selectors mounted in helicopters to No.19.50. The selectors are located on the instrument panel and on the central panel.

#### 3.1.1.4. Internal lighting check

Switch on the LIGHTING circuit breaker and check the operation of red and white SBK portable lamp. Set the CABINS LIGHTING-PILOT switch in ON position; the cockpit illumination lamp should light up.

Set the CABIN LIGHTING-PASSENGERS switch in DUTY position, as a result of this, the blue light should light up. Then set the switch in BASIC position as a result of this two white lights should be on /on helicopters to No. 32.50 - one white light/.

NOTE: The CABINS LIGHTING-PASSENGERS switch is mounted in helicopters to No.11.50.

The switch activates two lights in passengers cabin. The blue light is not installed.

Check the lighting of the radio compartment /the switch is located behind the radio compartment door/.

Set the controls in initial position.

#### 3.1.1.5. External lighting check.

Switch on the HEADLIGHT-CONTR.-LIGHT and CARGO LIGHTING circuit breakers and check the FR-100 landing light operation.

Check the MPRF-1A landing light operation by means of LIGHTING-LANDING-TAXYING selector switch. Using the MPRF-1A control toggle switch located on the collective pitch lever check operation of landing light in extended and retracted positions.



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Switch on the POSIT.LIGHT circuit breaker.

Set the mode selector in BRIGHT position and check the intensity of position lights.

Set the mode selector of position lights in central position.

Press in the WARN push button, as the result of this the position lights should light up after push-button releasing the position lights should go off; Set the mode selector of position lights in DIM position. The position lights should be darkened. Press in the WARN push button. The position lights should light up.

Switch on the EL.NETWORK ON BATTERY switch and the ANTI-COLL.LIGHT circuit breaker; check operation of the OSS-61 anti-collision light.

NOTE: The LANDING-TAXYING, BRIGHT-DIM selectors and WARN push-button are installed in helicopters with single control: - to No. 16.22 on lower left panel, and from No.16.23 on instrument panel.

#### 3.1.1.6. Signalling system check

Switch on the LAMPS TEST, BLINKING SYSTEM, WARNING LAMP DIMMING, MAIN G-BOX OIL TEMP., ANTI-ICING HEAT WARNING and FUEL GAUGE circuit breakers.

Set the CHECKING OF WARNING LAMP switch in ON position as a result of this, the following lights on the fire extinguishing panel should go on: FIRE, LEFT ENGINE, RIGHT ENGINE, MAIN G-BOX, BOTTLE HAS OPER.AUTOM., 2-ND BOTTLE HAS OPER., 3-RD BOTTLE HAS OPER.; The VALVE OPENED light will blink.

NOTE: The SENSORS TEST, AFTER TEST SWITCH OFF light should go on only during fire-extinguishing.

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Check the DOOR OPENED signalling light by opening and closing the passenger cabin door. As the result of this, the DOOR OPENED signalling light should go on and off respectively. Set the controls in initial position.

3.1.1.7. Trim system operation check

Switch on TRIMMERS CONTR-LONG.-LAT. circuit breakers located on the circuit breaker panel.

Check the trims operation by means of a toggle switch located on the cyclic control stick.

Operation of trimming system can be monitored by means of UPES-21 indicator located on the instrument panel. The mode selector with "BASIC" and "DOUBL" positions is installed under the left door in the cockpit.

When checking by means of the switch located on the controlstick, set the mode selector in "BASIC" position. Set the mode selector in "DOUBL" position and check the trims operation using trimmers switch located aside. After checking seal the switch using threads and switch off the circuit breakers.

3.1.1.8. Fire-extinguishing system check

CAUTION

1. SET THE MODE SELECTOR OR FIRE-EXTINGUISHING SYSTEM IN "ON" POSITION BEFORE ENGINE STARTING ONLY.
2. WHEN CHECKING THE FIRE-EXTINGUISHING SYSTEM THE CIRCUIT BREAKERS, PUSH-BUTTON AND SELECTOR SHOULD BE SWITCHED ON IN THE FOLLOWING SEQUENCE: FIRST SWITCH ON THE FIRE-EXTINGUISHING SYSTEM, THEN CIRCUIT BREAKERS.



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Pay attention to simultaneous lighting up of signalling lights on the instrument and fire-extinguishing panels as well as in radio compartment.

Make sure, if all the lights are switched on and then release the push-button. All the signalling lights should go off. Check the remaining SSP-6BI in the same way.

Check operation of fire-extinguishing valves by pressing in turn manual control push-buttons of fire-extinguishing system. The following lights should light up: VALVE OPENED and one of mentioned below: LEFT ENGINE, RIGHT ENGINE or MAIN G-BOX which indicates the fired compartment.

After releasing the push-button, the VALVE OPENED light and the respective light signalling fire in the compartment should go off.

If signalling lights are not getting off but remain blinking after depressing and realising the SSP-6BI control unit push-buttons or fire-extinguishing system manual control push-buttons, it means that the solenoid valve is jammed and the valve remains opened.

In this case switch off the FIRE-EXTINGUISHING SYSTEM-AUTOM. circuit breaker and after 2 seconds switch it back on.

If after switching on the circuit breaker, the VALVE OPENED signalling light blinks, it means that the valve is faulty and should be repaired or replaced.

3.1.1.9. EPK-2T-75 windscreen wiper operation check /in helicopters from No. 23.15/

CAUTION

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3.1.1.10. Checking AS-2/W operation / for helicopters up to No. 23.14/

Check wiper blade adherence on front windshield. The blade should adhere properly on its whole length in any position. Pour clean water on windshield and switch on "WIPER" circuit breaker. The wiper blade should clean the windshield surface completely in the whole range of its movement.

3.1.1.11. Checking the Pitot Tube Heating and fans operation

Switch on PITOT TUBE HEAT circuit breaker and RADIO VENT. circuit breaker. Depress PITOT TUBE HEAT TEST pushbutton located on the left upper panel. Then PITOT HEAT IN ORDER goes on and fan installed in radio compartment should start to operate. For helicopters to No. 13.50 check by hand if Pitot tube heating circuit is operative, after max. 1 minute.

Switch off PITOT TUBE HEAT and RADIO VENTIL. circuit breakers,

Switch on the EL. NETWORK on BATTERY and CABINS HEAT AND VENTIL. circuit breakers, then DW-1KM fan should operate.

Switch off CABINS HEAT AND VENTIL- circuit breaker,

3.1.1.12. RIO-3 detector check

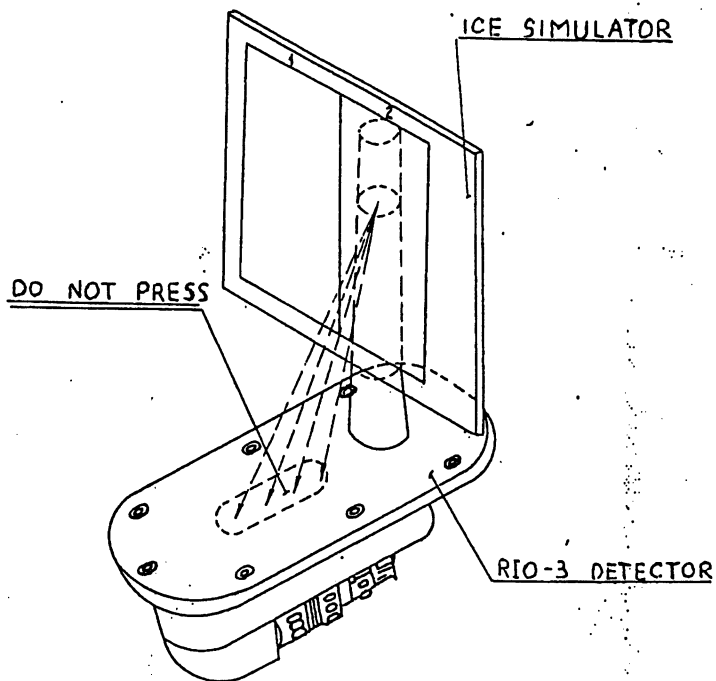
For helicopters with RIO-3 installed, switch on ANTI-ICING SIGNAL circuit breaker and depress HEAT TEST RIO-3 pushbutton located on left upper panel. Then RIO-3 HEAT IN ORDER light should go on.

- switch on 115V A.C. power supply provided by PO-500 /PO-250/ converter.

Further procedures shall be performed according to Enclosure No. 14



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- set the mode selector in AUX.SWITCHING OF PUMP 2 position. The PUMP No. 2 OPERATES advisory light should light up.
- switch off the PUMP No, 2 circuit breaker, and set the mode selector in central position.

### 3.1.2. Flight instruments

#### 3.1.2.1. Inspection

In the cockpit perform the following:

- check condition of the instrument panel and its fastening and shock-absorption.
- check fastening and condition of UPES-D compressed air system indicators.
- check correct setting of indicators pointers.
- check barometric pressure readout of altimeter for compliance with airport ambient pressure. When the altimeter pointers rest on zero, pressure value on barometer scale should comply with airport pressure within tolerance of  $\pm 1.5$  mm Hg.

On the fuselage port side:

- remove the cover from Pitot tube /FWD/ and check its fastening, its inlet and draining holes cleanness as well as condition and fastening of the TNW-45K thermometer. On the fuselage starboard; check condition and fastening of liquid thermometer /if installed/ and KES-2097A fuel gauge transmitter.

In engine and main gearbox compartments, check:





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3.1.2.3. AGK-47W or AGK-47B operation check.

Switch on the 36V A.C. power supply.

After 5 minutes unlock the attitude indicator. The aircraft silhouette should set itself horizontally, whatmore, its oscillation should not exceed  $\pm 1$  mm and the misalignment with the horizon line should not exceed  $\pm 1^\circ$ . The turn indicator pointer should set itself in front of the fixed index centre within  $\pm 0.5$  mm for AGK-47W or  $\pm 1$  mm for AGK-47B.

After 300 hours of the AGK-47W operation - not more than 1.5 mm. The bank indicator ball should set itself between the two vertical marks.

3.1.2.4. GIK-1 gyro magnetic compass operation check.

Switch on GIK-1 circuit breaker.

In 2-3 minutes after pressing the slaving push-button, the indicator card should move against the scale and set itself, or swing back and forth around one given position with max. amplitude of  $\pm 0.5$  mm.

Check the smoothness of travel and velocity of card setting.

To do this, press slaving push button and at the same time approach the transmitter with a permanent magnet /or any piece of metal/ until the card deflects /by angle of  $30-40^\circ$ /. When the card movement ceases, release push-button and remove magnet to the distance of min. 3m, next, after 15-20 sec, press in the slaving push-button. The card should return to the initial position /the push-button is located near the UGR-1K indicator/. Calculation of card setting velocity: the angle of card deflection is divided by the return time to initial position.

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Next produce pressure in the Pitot tube total pressure system corresponding to the speed of 250 km/h. If the reading of the instrument does not change after 1 minute, the system can be considered to be airtight.

- NOTE: 1. After each tightness check, during the procedure of nulling the instruments, care should be taken not to exceed 10m/s value on the rate of climb indicator.
2. In case the XS-3 tester is applied during check of the static pressure system airtightness, it is possible to produce negative pressure in both systems - static and total simultaneously. In this case it is not necessary to disconnect the static pressure pipe from the airspeed indicator.  
In this case, the air speed indicator pointer may deflect slightly /in the range of 2 mm/ from zero to the left.  
The total pressure system is checked by means of XS-3 tester in the same way as with KPU-3.
3. When checking the airtightness, it is necessary to check the reading error of airspeed indicator and altimeter. The airspeed indicator reading error at 40 km/h should not exceed  $\pm 3$  km/h and the altimeter reading error at 1000 m should not exceed  $\pm 25$  m.

### 3.1.3. Radio equipment

#### 3.1.3.1. Inspection



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- damage of grounding conductors and their proper connection to the blocks and helicopter structure. The grounding connection spots should be free of dust, humidity and dirt.

In the rear part of the passenger cabin, check fastening and condition of:

- ARK-9 loop antenna block.

On the instrument panel, check condition and fastening as well as lock wiring of:

- communication transceiver panel connectors;
- PSW-UM altitude selector connectors;

On the cockpit ceiling, check condition and lock wiring of:

- SPU-7 intercom unit connectors.

On the upper left panel, check fastening and condition of the ARK-9 ADF control panel and its connectors lock wiring.

### 3.1.3.2 Checking RS 6105 /RS 6105M/ or BAKŁAN transceiver operation

- Switch on DC supply,
- switch on SPU<sup>1</sup> and VHF<sup>2</sup> circuit breakers on the left upper panel,
- set SPU - RADIO switch on SPU<sup>1</sup> intercom unit to RADIO position and ICS switch to 1 position, and set the mode selector to VHF<sup>2</sup>-1 or VHF<sup>2</sup>-2 position,
- select the channel and check communication quality as well as SPU and squelch

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Repeat the check with the operating frequency selector switch in II position.

3.1.3.4. RW-3 radar altimeter operation check.

- switch on the RW-3 circuit breaker on the upper left panel;
- by turning the adjustment knob, set the decision height index on the 10m graduation;
- switch on the radar altimeter by means of the RW-3 switch located on the instrument panel;
- after switching on the radar altimeter, the pointer should move clockwise into the scale dark section;
- 1 - 3 minutes after switching the radar altimeter on, the pointer should set itself on the scale zero graduation with a max. error of  $\pm 0.5$  m.

When the pointer passes below the decision height index, a red signalling light should light up on the lower left corner of the indicator plate. This light should keep on shining all the time as the pointer remains below the dangerous height index.

Along with the lighting up of the decision height lamp, there is an audible 400 Hz signal in the headphones. The signal lasts from 4 to 8 seconds.

If the altimeter pointer deflects from the scale zero graduation more than  $\pm 0.5$  m within the limit of  $\pm 1$  m, it is necessary to adjust the pointer to  $0 \pm 0.5$  m position by means of the zero adjustment knob.

NOTE: The DO NOT USE RW-3 signalling light is switched on during flight only.

CAUTION

1. IT IS STRICTLY FORBIDDEN TO PERFORM ZERO REGULATION WITH THE ENGINE RUNNING



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3.1.3.7. SPU-7 intercom operation check

- switch on the "SPU" circuit breaker on the upper left panel;
- set the ICS-RADIO selector switch in "ICS" position;
- check audio reception of transmitting stations;
- make two-way communication using push-button RADIO located on the cyclic control stick and W.O. /general call/ push-button on medic staff intercomm unit located on rear wall of passenger cabin;
- in helicopters to No. 35.01, make communication by means of ICS push-button located on the instrument panel;
- check voice volume adjustment;

Switch off power supply and set the controls in the initial position.

3.2. PREFLIGHT INSPECTION

The preflight inspection is performed to check the helicopter readiness for the scheduled flight.

NOTE: The flare launcher maintenance is described in Enclosure No. 10 of this Manual /for helicopters from No. 41.01/.

3.2.1. Before starting the engines

Check the battery voltage at 10 to 12 A current load.

Remove the covers from P/D-6M Pitot tube and RIO-3 ice detector.

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3.2.2.2. G016PCz8 A.C. generator operation check.

With main rotor rpm lower than 70% do not connect the generator to helicopter network. When connecting the generator to the network, check if the A.C. receivers are disconnected, then turn the WS-33 resistor knob located on the central panel to extreme left position. Switch on the G016PCz8 A.C. generator. The voltmeter should indicate the output voltage. Adjust the voltage to 208 V using the VOLTAGE ADJ.-LOWER-HIGHER knob of WS-33 resistor. Check the operation of DW-3 fan installed in the radio compartment.

3.2.2.3. Flight instrument check.

Check the operation efficiency of the power plant instruments: TUE-48, 2TUE-211, ITG-1828, /ITG-182G/ temperature indicators, DIM-8, 2DIM-8, DIM-100 pressure indicators, ITE-1, ITE-2 rpm indicators, USzW-1 blade pitch indicator, KES-2097A fuel quantity indicator, MWU-100 MA-40 pressure gauges.

On helicopters up to No. 29.22., the MW-30 pressure gauge is installed instead of the MA-40 pressure gauge. On helicopter up to No. 13.50 - MWU-15 pressure indicator.

3.2.2.4. Anti-icing system operation check

At minimum blade pitch and 78% of main rotor rpm, turn on the anti-icing system, setting the selector switch in MANUAL position and measure the amperage in the heater circuits, according to the readings on the ammeter located on the central panel.

The current intensity at the selector switch set to "1" and "2" should be 56-64A, in posi-



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- check condition and fastening of MPRF-1A landing-taxying light, BANO-45 and HS-39 position lights, OSS-61 anti-collision lights, FR-100 external cargo light, ice detector;
- in rainy weather, it is necessary to check if there is no water behind the overhead panels in the cockpit;
- check fastening and condition of the battery containers plug-in connectors, and whether there is no deposit on the plug pins;
- check cleanness of batteries, containers, battery compartment and its draining pipes;
- check voltage of each battery under 10-12A load, when the voltage is less than 24V, the battery must be replaced;
- check condition of SzRAP-500 external power supply receptacle;
- install a cover onto RIO-3 ice detector.

#### 3.4.2. Flight instruments

- note the crew's remarks about functioning of the instruments,
- check fastening of the PWD-6M Pitot tube and its bracket, as well as cleanness of the inlet and draining holes of the bracket and PWD tube,
- check fastening and shock-absorption of the instrument panel. Visually inspect the instruments, their fastenings and their pointers positions;
- check efficiency of the Pitot tube heating system,
- repair the malfunctions encountered during flight inspection.

#### 3.4.3. Radio equipment

Check condition of the antenna insulators, cables and the rubber caps.

Check condition, fixing and lock-wiring of the control panels and radio equipment blocks connectors.

Check the fastening security of the radio equipment blocks, connections and fastening of the antenna leads.

Check shock-absorption and insulators, check braided screen and insulation of cables.

Check fastening of the antenna masts and condition of the loop antenna.

Note the crew remarks on the radio equipment operation during flight.

Perform the following on the equipment reported to be malfunctioning during flight:

- check their operating efficiency for evidence of defect,
- repair the defects encountered during flight and inspection,
- enter the performed work into the helicopter log book.

NOTE: 1. The Helicopter mooring has an influence on the ARK-9 radar readings.

2. If interference in radio communication occurs during flight /reported by the crew/ pay special attention to the cleanness of slip-rings /tail and main rotor heating system/ and if necessary clean them with a rag wetted in gasoline or with a fine abrasive paper.

The slots in the slip-rings should be thoroughly blown with compressed air at the pressure of 1 to 1.5 kg/cm<sup>2</sup>.







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#### 4. PERIODICAL INSPECTION

##### 4.1. AFTER FIRST STARTING THE NEWLY INSTALLED ENGINE.

Check condition, fastening and security of the engine units. Check connectors as well as conductors installed on the engines and inside the engine compartment as provided for the inspection procedures of preliminary flight preparation.

##### 4.2. AFTER FIRST /TEST/ FLIGHT

Perform the procedures provided for preliminary flight preparation.

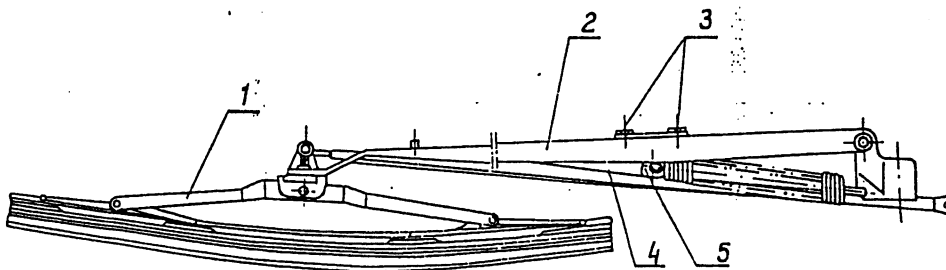
##### 4.3. $50^{+10}_{-5}$ HOURS INSPECTION

Perform the procedures provided for postflight inspection.  
Additionally perform the following:

###### 4.3.1. Electrical equipment

- check and clean the draining holes of GO16PCz8 generator drive flange
- check the contact force of EPK-2T-75 windscreen wiper blade by means of a dynamometer. The force should be of  $11.8 \pm 0.98$  N /  $1.2 \pm 0.1$  kg/ in extreme left position of the blade.  
The contact force should be adjusted by means of a catch /5/ on the blade arm

/fig. 4.1./.



4.1. ARM AND BLADE OF THE EPK-2T-75 WINDSCREEN WIPER

- 1 - blade
- 2 - slider
- 3 - screw
- 4 - coupling bar
- 5 - catch

###### 4.3.2. Flight instruments

Inspect the KI-13AK magnetic compass ligroin for dirt, air bubbles as well as leaks.



#### 4.4. 100 <sup>+20</sup><sub>-10</sub> HOURS INSPECTION

Perform the 50 Hours Inspection.

Visually check condition of plug pins and plug-in sockets of electric equipment, flight instruments and radio equipment which have been removed from helicopter for checking on the test stand, if necessary, wash them with spitbit /gasoline/ and dry.

Additionally:

##### 4.4.1. Electrical equipment

1. Check soldering of electrical wires to relays and contactors contacts.
2. Check condition and fastening of conductors behind the windscreen cover /on which correction diagrams are located/.

Check condition of wire bundle insulation, efficiency of wire connection to terminals and W-2MN /W-2M/ windscreen clamps fastening.

3. Check fastening of all the negative electric wire terminals to helicopter structure and all grounding conductors.
4. Check fastening of the battery negative terminals and their surfaces condition.
5. Ventilate the electrical network. In order to do that open all the access panels, box covers, cockpit electrical panels and cabin door.
6. STG-3 starter generators.

Check fastening of the STG-3 starter generators negative terminals, condition and contact tightness of plugs and sockets.

Check condition of commutator and brushes. When the carbon deposit on the commutator is irremovable with gasoline, the commutator must be cleaned with "00" grade glass paper. Clean the dirty collector with rag wetted in the B-70 gasoline.

Check the height of brushes. If brushes height is lower than 18 mm /at higher side/, it is necessary to replace them. Check the correct setting of brushes in the brush holders. Check the brush holder spring for proper alignment. Check all the clamping elements for security.

After inspection blow the generator with compressed air at pressure from 98 up to 147 kPa /1 + 1.5 kG/cm<sup>2</sup>/.

If the brushes need replacement by new ones performed according to drawing No.2345.015, do not grind them in, as the brushes are supplied already ground-in.

In this case the brushes are ground-in at idle running of generator only.

The brushes grinding-in is sufficient, if the brush mirror surface amounts min. 70% of the working surface.

Check the brush spring contact-force by means of dynamometer. The force should be within 8 up to 10 N /800 - 1050 G/.

Check the electric wire fastening to generator terminal plate for security.

- NOTES:
1. To rotate the STG-3 armature turn the compressor first stage blades by hand.
  2. In order to replace brushes it is allowed to remove the starter generator from the engine.
  3. After installing the starter generator, a minimum clearance of 0.5 mm between clamping half-rings must be observed.
  4. When the brushes need grinding-in, perform it according to the procedure given in Enclosure No. 6.



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7. MPRF-1A landing-taxying light

Check smoothness of extending and retracting the landing light.  
Check the motor current input which should amount max. 2.6A.  
Check the operation time of landing light bulb.  
Replace the landing light bulb when its life time given in log card has elapsed.

8. OSS-61 anti-collision light.

Perform the visual inspection of the light slip rings and motor commutator.  
When the carbon deposit appears on the rings or commutator, it is allowed to clean it with a glass paper.  
If it is necessary, replace the DR-1.5 R motor brushes with new ones.  
The rotational speed of luminous flux -  $90 \pm 20$  rpm.  
After inspection blow the motor with compressed air at pressure of 150 kPa /1.5 kg/cm<sup>2</sup>/.

9. MP-100M linear actuator.

Measure the current input of each linear actuator. It should amount max. 2 A.

10. The W-2MN /W-2M/ heated windscreen.

Check and adjust, if necessary, setting of windscreen heating controller according to the procedure included in Enclosure No. 1.

11. GO16PCz8 A.C. generator.

Check fastening of the GO16PCz8 generator.  
Remove dust, impurities and surplus of lubricant.  
Check the wiring and generator cooling system for security.

12. PT-125C /PT-70C/ converter.

Blow the converter with compressed air. If it is necessary, wipe the rings with clean rag wetted in gasoline.  
When the brushes of the PT-125C converter motor are worn to 13.5 mm /PT-70C converter motor brushes to 12.5 mm and PT-70C converter speed governor brushes to 10 mm/ replace them with new ones of the same type.  
Check the commutator condition. The new brushes should be ground-in according to the procedure included in Enclosure No. 6.  
After inspection blow the converter with compressed air at pressure of 200 kPa /2 kg/cm<sup>2</sup>/.  
Check the current input which should be:  
- 8.3 A or less at rated current load for PT-125C converter;  
- 5.4 A or less at rated current load for PT-70C converter.

13. PO-500 converter.

Check condition and fastening of brushes, brush holders, collector and rings.  
The minimum height of brushes: for motor - 16 mm and for generator - 11.5 mm.  
Clean the commutator and rings and blow them with compressed air at pressure from 150 to 200 kPa /1.5 to 2 kg/cm<sup>2</sup>/.  
Check condition of converter fastening and its shock absorption as well as electrical connections.

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14. The PO-250 converter.

Check the converter brushes for excessive wear. The brushes are considered to be worn and due for replacement if motor brushes are reduced to 10 mm, and generator brushes - to 12.5 mm.

Check commutator condition and wipe it with clean rag wetted in gasoline.

Grind-in the new brushes according to the procedure enclosed in Enclosure No. 6.

After inspection, blow the converter with 200 kPa (2 kg/cm<sup>2</sup>) compressed air.

Check the current input which should not exceed 25 A at 2.17 A (rated) loading.

15. The DW-1KM fan.

Check fastening of the fan, wire bundles and connectors.

Check operation of the fan.

16. The ECN-75 fuel pumps.

NOTE: It is not allowed for the fuel pumps to operate without fuel.

Check current input of the fuel pumps, which should not exceed 3.6 A.

17. The AS-2/W windscreen wiper (on the helicopters up to No. 23.14 inclusive).

Check fastening of wiper, motor and the F-14A noise filter as well as current input which should not exceed 2.5 A.

18. Main rotor blades (to be performed only for those blades which have flown

1000 <sup>+0</sup>  
-100 hours). Check the blades according to § 4.8.6 of this manual. In case of

negative result, the blades can be serviced without switching on the anti-icing system.

19. F20/27H1C M batteries.

Carry out the visual inspection after every 100 flight-hours (or every 4 weeks).

Final work

Check the electric equipment under voltage within range scheduled for preliminary flight operation.

Check the RP-7422 ice build-up detector according to § 4.10.4 of this manual (in summer service conditions).

Check by means of ohmmeter or test-bulb the evidence of voltage as well as whether short-circuits do not appear in the supply circuits of the G2SM cartridge operated valves of fire extinguisher.

It is necessary to keep the following order:

- in order to check the cartridge-operated valves circuits it is necessary to lock the valve lever, next unscrew and detach connectors from the valve and then switch on the fire-fighting system (the mode selector is set in "ON" position); check the valve supply circuits by pressing in the manual control and next the 2nd and 3rd bottle push-buttons of any compartment fire-fighting system;
- set the fire-extinguishing mode selector to "TEST" position and watch for 5 sec. the "VALVE OPENED" signalling light which should not light up. Only two signalling lights should go on: "BOTTLE HAS OPER", and "SENSORS TEST, AFTER TEST SWITCH OFF".
- switch off the fire-extinguishing system after the test finishing, and set the mode selector to "TEST" position; connect and lock the connectors.  
Switch on the fire-extinguishing system after connecting the wires and make sure that the lights signalling opening of bottle do not light up.



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If the lights go on, this indicates that the wire connections are not efficient. In this case it is necessary to tighten the connectors and secure them.

Unlock the valve opening lever.

NOTE: 1. GZSM cartridge-operated valves should be checked at least every 3 months.  
2. If the VALVE OPENED light starts to blink, after setting the mode selector into TESTING position, it means, that fire-extinguishing valve is jammed.  
In this case, it is necessary to repair or replace the valve.

#### 4.4.2. Flight instruments

1. KI-13AK magnetic compass.

Check the time of the compass card stabilizing. The time of full compass card stabilizing at  $90^\circ$  deflection should not exceed 17 s. at operation temperature range from  $+60^\circ\text{C}$  to  $-60^\circ\text{C}$ , and the same time, the first return deflection should not be greater than  $40^\circ\text{C}$ . If the above mentioned values are exceeded, check the compass for ligroin leakage. Refill the ligroin volume according to the procedure enclosed in Enclosure No. 5. Check the compass card stagnation angle which should not exceed  $\pm 1^\circ$ , at an angle of deflection of  $5^\circ$  and after knocking  $-0^\circ$ .

2. PWD-6M Pitot tube.

Check the current intensity of the tube heating which should be within the range from 3.6 to 3.9 A. In the helicopters with total pressure stabilizer it is necessary to unscrew the stabilizer plug, drain off the condensate and blow the stabilizer through this hole.

3. GIK-1 gyrocompass.

Check fastening of the transformer located in SK-11 box tightening of the nuts on the set bolts, check condition and fastening of fuses.

#### Final work

Check the flight instruments under voltage in the range provided for preliminary flight preparation.

#### 4.4.3. Radio equipment

1. RS 6105/RS 6105M/ or BAKLAN transceiver

Check condition, fastening and connection reliability of cables, power supply conductors and control panels as well as grounding of radio blocks. In RS transceiver check power supply voltage - downstream of voltage reducer.

2. R-842 /R-842M/ transceiver

Check condition of cables, tightness of coupling nuts, connections, grounding leads and transceiver shock-absorption, and by means of IN-11 strain gauge check tension of transceiver antenna cables; the tension should be  $70 \pm 5\text{N}$  /  $7 \pm 0,5\text{ KG}$ /. If necessary, adjust the tension by means of turnbuckles.

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NOTE: The IN-11 strain gauge must be calibrated for an antenna cable 1.8 mm thick.  
Wash the quartz resolver contacts according to JaM 5.409.000 Instruction enclosed to the R-842 transceiver tuning Instruction.

3. ARK-9 Automatic Direction Finder /ADF/

Check:

- condition and fastening of cables and tightening of cable connections coupling nuts,
- condition of grounding leads, cables and block connectors,
- condition of shock-absorbers,
- condition of sense antenna and its cables.

4. RW-3 radar altimeter

Check condition of dehydrator /silica gel/.

Check tightening of cable connection coupling nuts.

Check fastening of suspension frame and condition of its shock-absorbers.

5. RW-UM radar altimeter

a/ Remove from helicopter:

- transceiver block,
- altitude indicator,
- decision height switch.

b/ Check on test-stand:

- modulation band, which should be  $17 \pm 2$  MHz,
- transmitter mean frequency /444  $\pm 6$  MHz/,
- radar altimeter calibration /the radar altimeter indication accuracy should be within  $\pm 5$  m/,
- radar altimeter sensitivity /75 dB at attenuation of 100 m on T-1 tester/;
- altitude indicator pointer blocking voltage /11.5  $\pm 1.5$ V/,
- accuracy of reading out decision altitude, which should be from +10% to -5% at altitudes 100, 150, 200, 250, 300 and 400 m and from +20% to -10% at 50 m altitude.

c/ Perform the following on units removed from helicopter:

- clean with brush or blow with compressed air at pressure of 100 to 150 KPa /1 to 1.5 KG/cm<sup>2</sup>/,
- inspect all elements, pay special attention to capacitors, resistors, choking coils and transformers,
- check fastening of all internal electrical wires of transceiver block.

d/ Install radar altimeter on helicopter.

4.4.4. Operation check with operating engines

After completing 100 hour inspection, perform the following with operating engines and at main rotor rpm not less than 70%.





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Switch on D.C. power supply.

1. Checking 115V A.C. bus bar supply from PO-500 /PO-250/ converter and stand by supply from GO16PCz8 generator.

a/ Switch on alternating current supply from PO-500 /PO-250/ converter.

115V A.C. should appear on bus bars. The "115 V CONVERTER FAILURE" signalling light should go off.

b/ Check converter output voltage by means of a voltmeter with measuring range 150V /accuracy category not lower than 2/ connected to 115V plug-in socket, changing the current loading from 100% /all 115V receivers turned on/ to 0.

The voltage should be within the limit  $115V \pm 3\%$ .

/The voltage is regulated by means of a resistor installed in PO-250 control box/.

NOTE: Operations specified in item a + b are allowed to be performed with engines inoperative.

c/ Check, if lagging occurs when changing power supply from converter over to generator.

At main rotor rpm not slower than 70% switch on GENERATOR-EXCIT. and GENERATOR-CONTROL circuit breakers.

Check operation of stand-by power supply to 115V bus bars by setting GENERATOR-115V CONVERTER change-over switch to GENERATOR position.

From the time of setting GENERATOR-115V CONVERTER, switch in GENERATOR position to the time of connecting the 115V bus bars to ATB-3, the lag should be about 0.5 s. at the same time the 115V CONVERTER FAILURE light should light up.

The voltmeter connected to 115V plug-in socket should read  $115V \pm 3V$ .

d/ By switching off PO-500 /PO-250/ circuit breaker check automatic switching over from converter supply to generator supply with operating converter and GO16PCz8 generator prepared for operation /GENERATOR - 115V CONVERTER switch in 115V CONVERTER position/. The 115 V CONVERTER FAILURE light should light up. The voltmeter /according to paragraph 1.b/ should read 115 V.

The WF-250 voltmeter should read 208V.

e/ Switch on "PO-500" /PO-250/ circuit breaker, then switch off and on AUTOM. FEED CHANGE OVER circuit breaker or set 115 V CONVERTER-GENERATOR change over switch in neutral position and then in 115 V CONVERTER position.

The 115V CONVERTER FAILURE light should go off.

The voltmeter /according to para. 1.b./ should read 115V and the WF-250 voltmeter should read 0.

NOTE: The ADF and RIO-3 should be switched off.

f/ Switch off alternating current supply from PO-500 /PO-250/.

2. Checking 36V bus bar supply from PT-125C /PT-70C/ converter and stand-by supply from GO16PCz8 /GO16PCz8-RS/ generator.

a/ Switch on alternating current supply from PT-125C /PT-70C/.

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36V A.C. should appear on the bus-bars.

The " 36V CONVERTER FAILURE" light should go off.

- b/ Check the converter output voltage using a voltmeter with measuring range of 60 V /accuracy category not less than 2/ with current loading changing from 100% /all 36V receivers on/ to 0.

The voltage between the bus bars should be within:

- for PT-70C -  $36^{+3}_{-1}$  V
- for PT-125C -  $36^{+5}_{-1.5}$  V

NOTE: The operations mentioned in item a and b are allowed to be performed with engines inoperative.

- c/ When the GO16PCz8-RS/GO16PCz8/ generator is ready for operating, check the stand-by power supply of the 36V bus bars by means of setting " 36V CONVERTER FAILURE" light should light up. The voltmeter connected to the 36V bus bars should indicate voltage. The WF-250 voltmeter should read 208 V.

- d/ With operating converter / 36 CONVERTER-GENERATOR switch in CONVERTER position/ and the GO16PCz8 generator ready for operation, check the automatic switching over of 36V bus bar supply from converter to generator by switching off PT-125C /PT-70C/ circuit breaker.

The operation sequence is the same as in para. 2.c., the only difference will be lag in switching on GO16PCz8 due to "coasting" of converter.

Switch on converter again by switching on PT-125C /PT-70C/ circuit breaker and by setting " 36V CONVERTER-GENERATOR" switch in neutral position, then in CONVERTER position.

The " 36V CONVERTER FAILURE" light should go off. The voltmeter connected to the 36V bus bars should read 36V and WF-250 voltmeter should read zero.

- e/ Switch off alternating current supply from PT-125C /PT-70C/.

3. Check operation of AZP- overvoltage protection device.

NOTE: 1. Actuation of AZP- device is checked at main rotor rpm from 80 to 84%.

2. When checking, the NETWORK ON BATTERY switch should be set in OFF position.

Press in L.H. AZP- TEST push-button.

The LEFT GENERATOR FAILURE light should light up.

After the device has operated, press in push-button switching off the device. The LEFT GENERATOR FAILURE light should go off.

The above mentioned operations should be repeated when checking the AZSP- device of R.H. generator.

4. Check heating of cockpit left hand windscreen.

With the main rotor rpm not slower than 70% switch on GENERATOR EXCITE, ANTI-ICING ON circuit breakers and WINDSCREEN HEAT. switch.

Check efficiency of windscreen heating by touching it by hand.

NOTE: At ambient temperature above  $30 \pm 2^{\circ}\text{C}$  the windscreen heating does not switch on.

After completing the checking, set the circuit breakers and switches in initial position.



4.5. AFTER EVERY 300 <sup>+60</sup><sub>-30</sub> HOURS INSPECTION.

Accomplish the 100 hours inspection.

Additionally:

4.5.1 Electrical equipment.

1. Door open signalling system check.

Check setting of passenger cabin door open signalling system microswitch. The microswitch travel should be from 0.5 to 1.0 mm from position at door closed to position in which the "DOOR OPENED" signalling light will light up.

2. The GO16PCz8 (GO16PCz8-RS) A.C. generator.

Remove the retaining band, check the brushes assembly paying close attention to easy movement of brushes in brush holders, condition of rings and brush surfaces.

Measure the brushes height. The brushes with height reduced to 16.5 mm (for GO16PCz8-RS to 17 mm) should be replaced by new ones of the same type. Prior to replacement, the brushes should be thoroughly ground-in (see Enclosure No. 6). After completing the inspection blow the generator with compressed air at pressure of 150 - 250 kPa (1.5 - 2 kg/cm<sup>2</sup>).

Check D.C. supply polarity for the GO16PCz8-RS.

3. Main and tail rotor slip-rings.

Check brushes for free movement. The brushes should displace freely in their holders by the spring pressure. When slip-rings rotate, the brushes should not touch the slip-ring insulating washers. The clearance between brushes and washers should not be lower than 0.5 mm. Wash the slip-rings with clean rag wetted with poor gasoline. If necessary, clean the slip-rings by fine grained abrasive paper. Blow the slip rings with dry compressed air at pressure of 100 - 150 kPa (1 - 1.5 kg/cm<sup>2</sup>).

4. SSP-6BI fire extinguishing control block.

Disconnect the plug from the block. When contact pins are corroded, wash them with rag wetted in spirit. Check the SSP-6BI block sensitivity. The operating voltage should be from 28 to 50 mV or 42 - 96 mV (in accordance with a log card) at internal wiring resistance of 2 ohms, see Enclosure 18.

5. The AZP1-1SDT overvoltage protection device.

Check the device for proper operation. The operating voltage should be from 220 to 232 V.

6. The SP-0,4E fuel filters contamination signallizer.

Remove the signallizer and check according to Technical Specifications. Check the signallizer external circuit. A/m check to be performed according to Enclosure 17.

7. The F20/27H1C M batteries.

Dismount the batteries and give it back to the service station for Periodical Inspection (every 300 flight-hours or every 3 months).

Final work.

After completing Periodical Inspection check the electrical equipment under voltage in scope provided for preliminary flight preparation.

4.5.2. Flight instruments.

Check the following equipment for compliance with Technical Specifications:

1. TUE-48 thermometer.

Check the thermometer reading error which should not exceed  $\pm 5^{\circ}\text{C}$  at ambient temperature of  $+ 25 \pm 5^{\circ}\text{C}$  in working measuring range i.e. from  $- 40^{\circ}\text{C}$  to  $130 \pm 5^{\circ}\text{C}$ .

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2. 2TUE-111 thermometer assembly

Check the thermometer reading error:

The measuring range

from  $-70^{\circ}\text{C}$  up to  $-50^{\circ}\text{C}$

from  $-40^{\circ}\text{C}$  up to  $130^{\circ}\text{C}$

from  $+140^{\circ}\text{C}$  up to  $150^{\circ}\text{C}$

at ambient temperature of  $+20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

Permissible reading error

$\pm 10^{\circ}\text{C}$

$\pm 5^{\circ}\text{C}$

$\pm 10^{\circ}\text{C}$

3. DIM-100, DIM-8, 2DIM-8 induction pressure gauges.

In working range of scale the reading error should be not exceeded  $\pm 4\%$  of the max. value; in other scale range -  $\pm 6\%$  of the max. value; at ambient temperature of  $+20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

NOTE: When installing the ID-8 transmitter on the engine make sure that a pipe aligns with the ID-8 transmitter fitting.

4. ITG-182G /B/ turbine inlet temperature indicator.

Check the indicator reading error:

The measuring range

from  $450^{\circ}\text{C}$  up to  $750^{\circ}\text{C}$

from  $750^{\circ}\text{C}$  up to  $1000^{\circ}\text{C}$

in other range

The reading error

$\pm 12^{\circ}\text{C}$

$\pm 15^{\circ}\text{C}$

$\pm 30^{\circ}\text{C}$

NOTE: The reading error /at ambient temperature of  $+20 \pm 5^{\circ}\text{C}$ / may be determined by feeding voltage to the indicator contacts. The voltage should corresponds to the indicator scale graduations /See the table in Enclosure No. 8/.

The TIT indicator is connected in series with resistor of  $7.5 \pm 0.05$  ohms.

The voltage is measured by comparatory method by means of portable comparator of 0.2 accuracy category.

The reading error is the difference between indicator readings and temperature value which corresponds to voltage supplied to the indicator contacts.

The reading error can be measured after keeping the indicator min. 2 h in normal conditions  $/20 \pm 5^{\circ}\text{C}/$ .

5. T-82P or T-82G thermo-couples.

Check the resistance of thermocouple circuit which is composed of: compensating leads connecting the measuring element to the terminal plate and compensating wire bundle with 8 thermo-couples connected parallelly.

The resistance of thermocouple circuit should be  $7.5 \pm 0.05$  ohms at temperature of  $20^{+5}_{-10}^{\circ}\text{C}$ .

The checking procedure is performed by means of arbitrary type Wheatstone's bridge by connecting the compensating lead with plug to its terminals.



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6. The USzW-1 blade pitch indicator

The reading error should not exceed  $\pm 4^\circ$  which corresponds to  $\pm 1.8$  mm on scale arc.

7. The UPES-21 trim position indicator

The reading error:

- in range from  $-10^\circ$  to  $10^\circ$  inclusive  $\pm 1.5^\circ$
- in other range  $\pm 2^\circ$

8. ITE-1 main rotor rpm indicator

At ambient temperature of  $+20 \pm 5^\circ\text{C}$  the reading error should not exceed:

- in operating range  $\pm 0.5\%$
- in other range  $\pm 1\%$
- permissible oscillation of pointer  $\pm 1$  mm.

9. ITE-2 engine rpm indicator

At ambient temperature of  $+20 \pm 5^\circ\text{C}$  the reading error should not exceed:

- in operating range  $\pm 0.5\%$
- in other range  $\pm 1\%$
- permissible oscillation of pointer  $\pm 1$  mm.

10. ACzS-1 Clock

The time reading error per 24 hours should be max.  $\pm 20$ s at ambient temperature of  $+20 \pm 5^\circ\text{C}$ .

11. Instruments using an impact and static air supply

Disconnect the instruments from air supply system.

Blow through the piping of total and static pressure system with dry compressed air at pressure of  $50 \pm 100$  kPa /  $0.5 \pm 1$  kg/cm<sup>2</sup>/w

Final work

After completing Periodical Inspection, check flight instruments under voltage as scheduled for preliminary flight preparation.



#### 4.5.3. Radio equipment

##### 1. R-B60 transceiver

Remove transceiver from helicopter and check:

- EDN-145R electric motor, regulate the MNK coupling bushes and lubricate working surfaces,
  - side-tone voltage,
  - condition of plug-in pins, cable connector sockets, transceiver power supply cables and shock-absorbing frame,
  - power supply ranges by means of measuring block as well as laryngophon supplying voltage,
  - antenna equivalent current value, transmitter modulation depth, receiver sensitivity and squelch efficiency.
- Install transceiver on helicopter, check condition and tightening of nuts coupling cable connectors and supply cables.

##### 1a. RS1602 transceiver

Check:

- condition of transmitting-receiving relay contacts,
- receiver sensitivity which should not be less than 2  $\mu$ V at  $\frac{\text{signal} + \text{noise}}{\text{noise}} = 6 \text{ dB}$ ,
- receiver output power, which should not be less than 5W/5052 on the entire band,
- modulation depth which should not be less than 85% for the modulating signal of 1000HZ and input level  $> 200 \text{ mV}$ .
- receiver output power, which should not be less than 200 mW/60052.

##### 2. R-B42 transceiver

Remove transceiver from helicopter and check:

- condition of elements assembling, quartz switch contactors and antenna relay,
  - operation of automatic tuning device,
  - current value in output circuit,
  - receiver sensitivity.
- Install transceiver block on helicopter and check the efficiency of shock-absorbing frame.

##### 3. ARK-9 ADF

Remove from helicopter the following ADF blocks: receiver, control panel, antenna block, supply block, loop antenna block.

Check assembling as well as elements.

Inside receiver:

- check the roll switch contacts,
  - wash with spirit the contacts of drum switch circuits,
  - lubricate the accessible moving parts of drum switch with CIAIIM-201 grease.
- Lubricate the first and second set of geared connections.

Check the output voltage of supply block.

Inside loop antenna block:

- wash rings and collector brushes with spirit,
- remove dirt and waste Grease from regulator and other parts /in accessible places not needing disassembling/.



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- lubricate the gear wheels on central axle, compensator and the bearing near the current collector with CIATIM-201 grease,
- lubricate the gear wheels and the reducer bearings with OKB-122-4 grease,
- lubricate the roll pins of compensator slider with OKB-122-4.

Check condition of contacts in the switch plates on the control panel. Replace the plates if they are bent or their contacts are partly burnt.

Check the wire connectors and blocks condition.

Install the previously removed blocks into the helicopter.

On the helicopter, check:

- receiver sensitivity,
- limiting sensitivity for homing and bearing,
- scaling precision,
- automatic direction finder operation for each heading angle and the audio reception of transmitting stations operating at all ADF subranges.

### 3. The RW-3 radar altimeter

Remove the radar altimeter block and indicator from the helicopter and check:

- blocks and wires connectors condition.

Check the following parameters on the test stand:

- supply voltage,
- transmitter radiation power,
- modulation bands and transmitter intermediate frequency,
- basic and additional frequency transmitter modulation,
- noise intensity,
- radar altimeter calibration,
- radar altimeter general sensitivity and the reliable emitting,
- frequency distribution and single emitting,
- decision height signal emitting,
- supply voltage alternation influence.

Install the indicator and radar altimeter block into the helicopter.

### 4. The A-037 Radar altimeter

Remove the transmitting-receiving block and the indicator, and check the following data:

- radar altimeter calibration and accuracy,
- dangerous altitude signal emission,
- indicator scale lighting.

### Final work

Check the radio navigation equipment under voltage in the helicopter as schedules for preliminary flight preparation.



#### 4.6. 600<sup>+60</sup><sub>-30</sub> HOURS INSPECTION

Perform the 300 hours inspection.

Additionally:

##### 4.6.1. Electrical equipment

###### 1. KSO-5073 tail rotor slip-rings

Perform the visual inspection and replace the slip-ring brushes.

If it is necessary, grind-in the brushes according to the procedure included in Enclosure No. 6.

###### 2. DW-3 fan motor

Check:

- condition of commutator,
- the fastening reliability of brush holders, springs and cables condition as well as freedom of brushes movement in clamping rings.

Measure the brushes height and define their wear. The brushes of reduced height 10 mm should be replaced. Blow the motor with dry air at pressure of 100-150 kPa /1-1.5 KG/cm<sup>2</sup>/. Set the brushes so that, the marking should be pointed according to motor rotor rotation.

###### 3. EPK-2T-75 windscreen wiper

Remove the cover from motor; check: the contacts reliability in all points of wires connection, brushes grinding-in to commutator and brushes freedom of movement in clamping rings of brush holders.

The brushes with height reduced to 9.5 mm should be replaced by spare ones of the same designation.

Perform grinding-in and lapping of brushes according to the procedure included in Enclosure No. 6.

Blow the motor with compressed air at pressure of 100 +150 kPa /1 - 1.5 KG/cm<sup>2</sup>/, in order to remove dust from brushes.

Measure the current input at starting speed, it should not exceed 3.0 A.

NOTE: 1. It is not allowed to disassemble and lubricate an electrical mechanism of windscreen wiper while the windscreen wiper is in service.

2. It is not allowed turning on the motor with brushes height reduced below 8.5 mm.

3. Operation of wiper removed from helicopter should be checked at voltage reduced to 18 + 20V.

###### 4. The RIO-3 ice detector

Check the output data according to RIO-3 Detector Maintenance Instruction.

###### 5. The PO-500 converter

Check the following data:

- the insulation resistance /should be min. 20 MΩ/,





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- the current intensity at idle running /it should not exceed 17 A/,
  - the output voltage variation /not greater than  $\pm 3\%$  at supply voltage change within the range of  $27 \pm 10\%$  volts and load change from 110% to 0.
6. G016PCzB-RS A.C. generator /acc. to Enclosure No. 13/
- replenish the grease, type WNII NP-207, in the bearings,
  - check the electromagnet circuit in the interrupting unit.

#### 4.6.2. Flight instruments

Check the following instruments for compliance with Technical Specifications:

1. WR-10UK /WR-10UK-A/ rate of climb indicator  
The indication error  $\pm 1$  m/s at temperature of  $20 \pm 5^\circ\text{C}$ .  
The unevenness of pointer movement is max. 0.25 m/s.  
Zero offset is max. 0.3 m/s at temperature of  $20 \pm 5^\circ\text{C}$ .  
Airtightness of the indicator static system should be such that at the pressure of 600 mm  $\text{H}_2\text{O}$ , the pressure drop during 1 min. does not exceed 3 mm  $\text{H}_2\text{O}$ .
2. US-250UK /US250UK-B/ airspeed indicator  
The indication error:  
Over scale range from 20 up to 40 km/h not greater than  $\pm 3$  km/h.  
Over remaining range not greater than  $\pm 5$  km/h.  
Zero offset should be not greater than  $\pm 2$  mm on scale arc.  
The hysteresis of indications is not greater than 5 km/h.  
The unevenness of the pointer movement is not greater than 2 mm 1 scale range from 20 up to 250 km/h.  
Airtightness of the indicator casing should be such, that at negative pressure corresponding to air speed of 250 km/h, the indication does not drop more than 50 km/h within one minute.
3. WD-10K /WD-10K-A/ double pointer altimeter

#### CAUTION

THE VALUES OF SUPPLIED PRESSURE SHOULD NOT EXCEED:

AT MAX. PRESSURE - 790 mm Hg,  
AT MIN. PRESSURE - 190 mm Hg,

The indication error over the graduations should be as follows:

		0 m - $\pm 15$ m
		500 m - $\pm 20$ m
		1000 m - $\pm 25$ m
		2000 m - $\pm 35$ m
from 3000m	to	4000 m - $\pm 45$ m
from 5000m	to	6000 m - $\pm 60$ m

The hysteresis of the indicator:

- at altitude from 0 up to 4000 m not greater than 30 m.
- at altitude from 5000 up to 10 000 m not greater than 50 m

Airtightness of the instrument casing should be such, that at pressure corresponding to 5000 m, acc. to the instrument, the pointer deflection during 1 min is not greater than 100 m

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The readings over the barometric scale should not differ more than 1.5 mm Hg at pressure inside the instrument casing of 760 mm Hg /the pointer deflection should not exceed  $\pm 10$  m/.

NOTE: If it is necessary, after altimeter and airspeed indicator check, update their correction diagrams.

4. The PWD-6M Pitot tube

Check:

- the insulation resistance of electrical elements which should not be lower than 20 M $\Omega$  , at temperature of  $+20 \pm 5^{\circ}\text{C}$  and humidity not greater than 80%.

5. The KES-2097A fuel quantity indicator

The indication error should not exceed /in relation to nominal value of the indicator scale/:

- over zero graduation  $\pm 2.5\%$
- over other scale part  $\pm 5\%$ .

The signalling device operating error should be  $\pm 3\%$  in relation to capacity of the tank.

The scaling table of KES-2097A fuel quantity indicator is shown in Enclosure No. 7.

NOTE: Having installed the KES-2097A fuel quantity indicator transmitter check the clearance between the ECN-75 pumps casing and transmitter float over its full travel.

The clearance should ensure free travel of the float.

6. AGK-47W attitude indicator

If airplane silhouette will be deflected from horizontal position to any side by  $15^{\circ}$ , its recovery time is from 3 up to 7.5 min at normal temperature.

The allowable stop /bank or misalignment/ of the miniature airplane at recovery is max.  $1^{\circ}$ .

The periodical swinging /vibration/ of the silhouette amounts max  $\pm 1$  mm with relation to fixed horizon indexes. When the silhouette and fixed horizon indexes are not aligned, the permissible misalignment should not exceed  $\pm 1^{\circ}$ .

The misalignment of turn indicator pointer with fixed index max.  $\pm 0.5$  mm.

1.5 mm misalignment of turn indicator pointer with fixed index is permissible when the AGK-47W has operated more than 300 h. The deflection of turn indicator pointer in relation to the fixed index can not exceed 10 up to 14 mm at the normal temperature and turn angular speed of  $18^{\circ}/\text{sec}$ .

The current input - 0.4 A.

7. AGK-47B attitude indicator.

- the misalignment of turn indicator pointer with fixed index - max. 1 mm.

The deflection of turn indicator pointer in relation to the fixed index can not exceed 10 - 13 mm at normal temperature and turn angular speed of  $4^{\circ}/\text{s}$ , but at turn angular speed of  $1.5^{\circ}/\text{s}$  - min. 1.0 mm.

- the other data of AGK-47B are in accordance to AGK-47W.

8. SC-14D /SD-16A/ Pressure Signallizer.

Operating pressure of SC-14D signallizer should amount 24,5 kPa  $\pm 6\%$  /0,25 kg/cm<sup>2</sup>  $\pm 6\%$ /.



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SD-16A static pressure system should be sealed properly to provide a pressure drop not greater than 8 mm Hg during 1 minute at 300 mm Hg.

SD-16A signalling device should operate at pressure  $24,5 \pm 1,96$  kPa.

9. GIK-1 gyro-magnetic compass

Check magnetic transmitter for:

- a/ fastening of the extended rollers and deviation compensator,
- b/ effluents on transmitter and plug connection surfaces.

Check the sensitivity and output power of amplifier. The input signal value should not exceed at amplifier stable operation:

- 1 channel - 1.5 mV
- 2 channel - 60 mV
- 3 channel - 60 mV

The output voltage should be max. 20V at resistance of  $1000 \Omega$ .

Check gyrostabilizer for:

- a/ the rate gyro deflection from azimuth - max.  $4^\circ$  per 15 min.
- b/ the conduction reliability of potentiometer assembly at slaving speed of  $3-6^\circ$  per s.

Having installed the GIK gyro-magnetic compass in the helicopter, check as follows:

- a/ press the slaving push-button after 2 - 3 min from switching on the power supply.

The movable compass card will turn and should stop and oscillate with max. amplitude of  $0.5^\circ$  near the synchronized position.

- b/ The slaving speed and smooth movement of compass card are checked as follows:

Set the permanent magnet near the magnetic transmitter, at pressed in the slaving push-button, as the result the indicator compass card makes turn by angle of  $160 - 170^\circ$ .

Release the push-button after the turn.

Remove the permanent magnet from transmitter to min. 3 m distance after the push button come back into initial position and next after 15 - 20 s press in the push-button and turn on the stop-watch.

The compass card should rotate and stop at previous heading. When the compass card stops turn off the stop-watch.

The speed is defined by ratio of compass card angle degrees quantity to time which is measured on the stop-watch.

The slaving speed for GIK should be min.  $8.5^\circ$ /s.

The slaving speed for G-3M should be min.  $10^\circ$ /s and for UGR-1K - min.  $15^\circ$ /s.

4.6.3. Radio Equipment

- 1. A-037 radar altimeter

Check the working frequency range.

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#### 4.7. AFTER 1000 -100 FLIGHT HOURS INSPECTION

- Accomplish periodical inspection as scheduled after 600 flight hours /pnt. 4.6/.
- Check devices acc. to log cards and replace devices which first T.B.O. is over. There are replacement procedures in the Enclosure - 15.

Additionally:

##### 4.7.1. Electrical equipment

1. Main rotor collector KWN-5074.
  - Measure collector brushes height and if necessary replace them for new ones.
  - Minimal brushes height permissible is equal to 16,5 mm.
2. Fire extinguishing system.
  - Replace M180 and M190 bundles that are in engine compartments in compliance with procedures included in enclosure 15.
  - Check fire extinguishing system insulation resistance.
  - Use 100V megohm-meter while checking.
  - Insulation is admitted to be good if its resistance amounts to approximately  $1M\Omega$ .
3. TKE-52PK /150/ Starting System Fuel Valve Relay.  
The TKE-52PK/150/ Starting System Fuel Valve Relay replace with thenew one. Inspect the relays: TKE 56PD /546/, TKE52PD/ TKD101D1/ /170/ /171/.
  - Connect wires to new relay acc. to Central Distribution Unit connection diagram 1
    - refer to Electric Diagrams File.

Solder wires in the following way:

- take identification tubes off relay terminals;
- cut wires off relay;
- remove insulation from wires at a distance of 6 + 7 mm from their ends;
- insert wires ends into relay terminals holes /acc.to connection diagram 1/ and crook them;
- lubricate soldered spots with dissolved in-spirit calaphony, solder them, and then coat with red varnish;
- slide identification tubes over relay terminals.

##### 4. SKND-11-1A igniter.

- Check bundles and igniters for security and condition.
- Unlock and disconnect high voltage cable connectors.
- Check cable socket and igniter pin for condition.
- Socket and pin surfaces should be clean with no carbon deposit.
- If carbon deposit and other dirt are present on these surfaces, wash them down with petrol.
- Connect and tighten up high voltage cable connector.
- Tighten up nut that couples cable igniter by hand only without using tools.
- Replace igniter in compliance with procedure included in Enclosure 15.

##### Final work

Having completed periodical inspection, check electrical equipment within the scope of preliminary preparation.

##### 4.7.2. Board Instruments

Check insulation resistance of the drive control meters.

The insulation resistance of tachometers, thermometers and oil pressure gauges is consired to be acceptable if its value is not smaller than 1 megaohm.

- \* Inspect the helicopters which comply with requirements included in the Bulletin No.3/M1-2/93.



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The insulation resistance of tachometers, thermometers and oil pressure gauges is measured at the connectors removed from the transmitters /indicators and wire group/. The insulation resistance of outlet temperature meters is considered to be acceptable if its value is not smaller than 20 KOHms.

The insulation resistance of outlet temperature meters is measured at the connector removed from the indicator /thermocouple and wire group/.

NOTE: When measuring the insulation resistance of the outlet temperature meter use a 100V megaohmmeter.

In cases the insulation resistance value is smaller than the values mentioned above, it is necessary to define which indicator - element, thermocouple or group of wires has a lower value and replace it with a new one.

Final work

Having completed the periodical inspections, check the board instruments within the scope of preliminary preparation.

4.7.3. Radio Equipment

- 1 - BAKŁAN transceiver

Check the transceiver working data without removing from the helicopter.

- 2 - RS 6105 /RS 6105 M/ transceiver - minimum once in 3 years.

Remove the transceiver and check it acc. to enclosure 12.

Final work

Having completed periodical inspection, check board - instruments within the scope of preliminary preparation.

4.8. SPECIAL INSPECTION

4.8.1. After every 500  $\pm$  10 flight hours

Replace for new 50.39.220.00.00 bundles which are on tail rotor acc. to procedures of enclosure 15.

Change ECN-75 fuel pumps operation sequence acc. to procedure of enclosure 16 on helicopters for T.B.O. = 1000 h.

Accomplish it along with successive operations that take place after 100 h of flight.

4.8.2. After 750  $\pm$  10 h of flight

Change ECN-75 fuel pumps operation sequence acc. to procedure of enclosure 16 on helicopters for (first) T.B.O. = 1500 h.

Accomplish it along with successive operations that take place after 50 h of flight.

4.9. MAINTENANCE DURING SHUT DOWN

4.9.1. After every 10  $\pm$  2 days

Accomplish operations for pre-flight preparation.

4.9.2. After every 30  $\pm$  5 days

Accomplish operations that are provided for after every 10 days.  
Charge batteries.



Check upper panel from outside for traces of water.  
Turn on all transceivers for 10 - 15 minutes while drying.

4.9.3. After every 3 months  $\pm$  10 days

Perform inspections foreseen after each 30 days.  
Perform inspections foreseen for basic inspection.  
Vent dry electric network. To do so open the latches, covers, electric panels and the cabin doors.

4.10. SEASON MAINTENANCE

Perform the work provided for Basic Inspection to accomplish the helicopter preparation for autumn-winter or spring-summer service.  
Besides, perform the special work mentioned below.

4.10.1. Batteries

- charge and discharge the batteries to attain electrolyte density of 1.280 G/cm<sup>2</sup> at temperature +25°C.

The standard value of electrolyte density should be kept within the limit during entire period of batteries service.

- check the heating of battery containers.

The current input of the heater should be about 4A /according to ammeter reading/.

- NOTE:
1. The battery containers heating system should be supplied by external power supply unit or helicopter D.C. generators, only and never by board batteries.
  2. The heating system should be switched on before the flight at temperature lower than -5°C.
  3. The electrolyte congelation of discharged battery occurs at ambient temperature of -5°C. The battery should be kept in dry room in which temperature should be within the range +5°C up to +30°C.

4.10.2. Board instruments preparation

1. PWD-6M Pitot tube check

In order to prevent humidity condensation in piping perform as follows:

- disconnect the total and static pressure pipes from instruments,
  - blow the piping by compressed air from a bottle; pay attention that the air pressure is in range from 50 + 100 kPa /0.5 - 1 kG/cm<sup>2</sup>/ /In order to measure the pressure connect the pressure gauge into the pipe by means of T-connection/. In order to prevent water penetration from the bottle to the piping, set the bottle with stub pipe upwards.
  - after finishing to blow, connect the piping to instruments.
- In helicopters which are equipped with the total pressure stabilizer, unscrew the stabilizer plug, drain the condensate and blow the stabilizer through the opening of total pressure system.
- check connection for correctness as well as the system for airtightness.



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4.10.3. W-2MN /W-2M/ windscreen heating system check

Check the windshields of cockpit. Make sure there is no evidences of any damages. If it is necessary, clean ice and other contaminations from the windscreen /ice should be removed by hot air of temperature not higher than  $+50^{\circ}\text{C}$ , preceded by a preheater/.  
Check the windscreen heating system operation. If the windscreen heating system does not start operating at temperature lower than  $+30 \pm 2^{\circ}\text{C}$ , adjust the windscreen heating regulator /Enclosure No. 1, para 5/.

4.10.4. Adjustment of RP-7422 ice build-up detector

Remove the 2-7422-00 transmitter from its mounting place. Switch on the circuit breakers marked ANTI-ICING-SIGNAL. and ON - located on the circuit breaker panel. Set the MANUAL-AUTOM. change over switch into AUTOM. position. Dip the transmitter in a mixture of water and ice of temperature  $0^{\circ}\text{C}$ . After max. 8 minutes /when the transmitter gets temperature of melting ice/, the signalling lights ANTI-ICING SYSTEM ON and ANTI-ICING SYSTEM OPERATES located on the central panel should light up. Set the MANUAL-AUTOM. switch into neutral position - the ANTI-ICING SYSTEM OPERATES signalling light should go off. /The ANTI-ICING SYSTEM ON signalling light is on, and it is off when the SIGNAL circuit breaker is switched off/.

Take the transmitter out from the mixture of water and ice and after switching on the SIGNAL circuit breaker. Dip the transmitter probe in water of temperature  $+4^{\circ}\text{C}$ . The signalling light should not light up. Dip once again the transmitter probe in water of temperature  $0^{\circ}\text{C}$ . Now the signalling light should be on. If the signalling light is on at temperature  $0^{\circ}\text{C}$ , dip the transmitter in a mixture of water, ice and spirit of temperature  $-1^{\circ}\text{C}$ .

After max. 8 minutes the detector should start operating.

If the detector does not operate at that temperature or if it starts operating at temperature of  $+4^{\circ}\text{C}$ , adjust the detector.

Disconnect the connector from the G-3M gyro-stabilizer /located in the radio compartment/ and remove the gyro-stabilizer to get access to the RP-7422 ice build-up detector block.

When the signalling lights are not light up or when they are on at temperature of  $+4^{\circ}\text{C}$ , move smoothly the resistor slider 4 /Fig. 4.2./ located in the RP-7422 till the malfunction is eliminated. Having completed entire work provided for inspection and adjustment install parts and assemblies which have been previously removed from the helicopter.

NOTE: 1. When the detector has operated for time period provided in log card, replace the thyatron.

2. After replacement of thyatron perform adjustment of detector.

4.10.5. RI0-3 detector check

For helicopters with the RI0-3 detector installed, perform the check according to procedure given in Enclosure No. 14.

4.10.6. Main and tail rotor blades check

Check the heater blanket and insulation resistance of tail and main rotor blades.

The heater blanket resistance of main rotor blades should amount: for I and II zones of each blade -  $9,8 \pm 0,05\Omega$  and for III zone -  $10 \pm 1,5\Omega$ .

The heating blanket resistance of tail rotor blades measured on 74 K terminal blocks, should amount  $13,1 \pm 0,5\Omega$  / with MT12 and MT8 wires disconnected from network/.



The insulation resistance for main rotor blades should amount minimum 0.05 MΩ and for tail rotor blade minimum 0.7 MΩ.

#### 4.10.7. Clock heating system check.

Switch on the "CLOCK-HEATING" circuit breaker located on the breaker panel. Check the heating efficiency by measuring current intensity (check at temperature lower than + 25 °C). The resistance of electrical heating:  $50 \pm 2 \Omega$ ; the current intensity: 0.6 A. Switch off the circuit breaker.

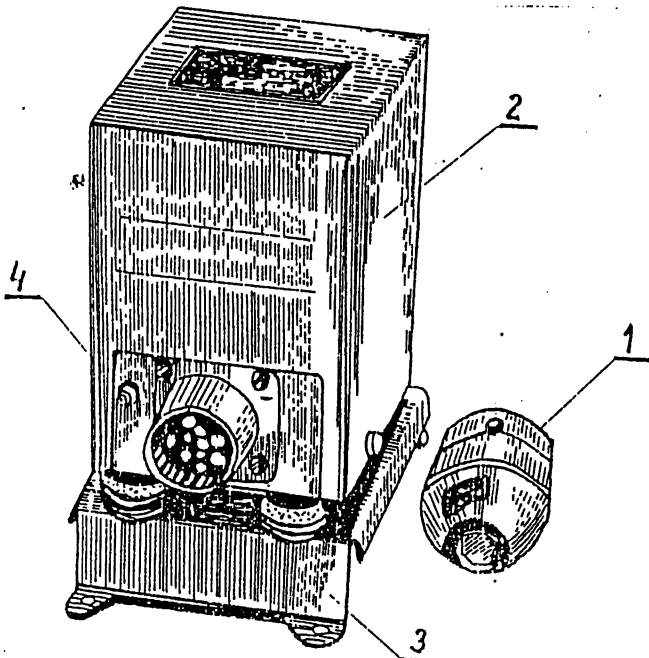
#### 4.10.8. Engine anti-icing valve check.

1. Checking separate switchin on:
  - switch on the "ANTI-ICING-ON" circuit breaker panel,
  - switch on the "ENGINES WARMING UP" switch on the central panel,
  - touch the MKT-4-2 (EMT-244) valve by hand and check its operation.  
The valve vibration should be sensible when switching on and off the "ENGINES WARMING UP" switch, as well as the click of valve engagement should be audible.
  - switch off the switch.
2. Checking of switching on simultaneously with anti-icing system.
  - set the "AUTOM.-MANUAL" selector located on the central panel to "MANUAL" position,
  - check the operation by the same manner as separately switching on,
  - switch off the circuit breaker and set the selector to neutral position.

#### 4.10.9. General Inspection of the F20/27H1C M batteries.

Dismount the batteries and give them back to the service station for carrying out the General Inspection and maintenance.

**NOTE:** Perform the work mentioned in §§ 4.10.1, 4.10.2., and 4.10.7. twice a year i.e. during helicopter preparation to autumn-winter and spring-summer service and the work given in the other §§ during preparation to autumn-winter service only.



#### 4.2. THE RP-7422 ICE BUILD-UP DETECTOR.

- 1 - transducer
- 2 - sensor block
- 3 - base
- 4 - resistor slider





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5. DUAL CONTROL HELICOPTER CHECK

Maintenance of helicopter with dual control system is performed in accordance with Chapter 1, through 4 of this Manual with regard to mentioned below instructions.

5.1. PRELIMINARY FLIGHT PREPARATION

Turn on external power supply.

5.1.1. Trim system control check

Switch on the CONTR., LONG. and LAT. circuit breakers. Make sure the TRIMMING TABS switch on the copilot's control panel is on PILOT 1 position, and check trims operation with the switch on the pilot's cyclic stick. Check trims operation by means of switch on the copilot's cyclic stick - trims should not operate. Set the TRIMMING TABS switch in PILOT 2 position and check trims operation with the switch on the copilot's cyclic stick.

Check trims operation by means of a switch on the pilot's cyclic stick - trims should not operate.

Correct operation of lateral and longitudinal trim control system can be monitored on the trims position indicator located on the instrument panel.

Set the TRIMMING TABS switch and the appropriate circuit-breakers in an initial position.

5.1.2. External cargo hook control system check

Switch on: the CARGO RELEASE-BASIC-EMERG. circuit-breakers /on upper left panel/ and WARNING LAMP DIMMING on the circuit breaker panel. Lock the hook; the HOOK ARMED signalling light should light up. Press in the emergency release push-button located on the copilot's cyclic stick.

The hook should unlock and HOOK ARMED signalling light should go off. Check the normal release circuit using the push-button on the pilot's collective pitch lever as well as an emergency release activated by a push-button on the pilot's cyclic stick.

Switch off the circuit-breakers.

5.1.3. MPRF-IA landing light check

Switch on the HEADLIGHT-CONTR. LIGHTING circuit breakers on the upper left panel.

Make sure, the LANDING LIGHT switch on copilot's control panel is set in PILOT1 position, and by pressing in the landing light control push-button located on pilot's collective pitch lever, check the landing light travel.

Set the LANDING LIGHT switch in PILOT 2 position and by pressing in the landing light control push-button located on copilot collective pitch lever, check the landing light travel.

Set the LANDING LIGHT switch and circuit breakers in initial position.

5.1.4. Red lighting dimming system check

The operation check is the same as for single control version; pay attention to copilot's panel illumination.

5.1.5. Hydraulic system check

Check the hydraulic system for switching off by the copilot's panel switch; place the HYDR.SYST switch in OFF position.

After checking, set HYDR.SYST. switch in ON position.

5.1.6. SPU-7 intercom system check

Switch on the SPU circuit breaker on the upper left panel.



Set the ICS-RADIO selector switches of all intercom units /located on cockpit ceiling, co-pilot's control panel and passenger cabin rear wall/ to ICS position.  
Initiate communication between copilot, pilot and the third crewmember /physician/ by pressing in the push-buttons located on the pilot's and copilot's cyclic stick and O/W push-button on the physician intercom control unit.  
Set the selector switch in RADIO position. When the ICS button is pressed in, the voice volume should be the same as with the selector switch in ICS position.

- NOTE:** 1. The voice volume of the intercom operating in the ICS mode is adjusted using both intercom units.
2. The voice volume of the intercom operating in the RADIO mode is adjusted using a single intercom unit.
3. When the side-tone and intercom volume adjustment knobs on pilot's intercom unit are set in extreme right position, the volume adjustment from the co-pilot's intercom unit is impossible and inversely.

#### 5.1.7. Transceivers check

Switch on the VHF1 or VHF2 circuit breakers on the upper left panel. On the pilot's and copilot's intercom units set the ICS-RADIO selector switch to RADIO and the ICS1/2 switch to 1 position. When checking the VHF1 transceiver operation, set the mode selector on the pilot's and copilot's intercom units in COMM1 position, and when checking the VHF 2 transceiver operation - in COMM 2 position.

By pressing in the RADIO push-button on the cyclic stick, initiate a communication with a ground radio station to check the reception quality and voice volume.  
Switch off the SPU and VHF circuit breakers.

#### 5.1.8. Attitude indicator operation check

Switch on the 36 V AC power supply.  
Set the AGK-47 switch of copilot's panel in OFF position.  
Attitude indicator installed on the left side of the instrument panel should not operate.  
Set the AGK-47 switch of the copilot's panel to ON. Check operation of the pilot's and copilot's AGK-47W attitude indicators.

#### 5.1.9. GIK-1 gyro-magnetic compass operation check

Switch on the GIK-1 circuit breaker.  
The GYRO switch on the copilot's control panel should be off. After 2 or 3 minutes switch on the GYRO switch on copilot's panel - compass card should travel against the scale, and then stop at a determined position.  
Switch off the 36 V AC power supply.

#### 5.1.10. ARK-9 automatic direction finder operation check

Switch on the 115 V AC power supply.  
Switch on the ARK-9 and SPU circuit breakers on the upper left panel.  
Set the mode selector of pilot's and copilot's intercom control units in ADF 1 position.  
Check the ARK-9 ADF operation by means of both intercom units.



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#### 5.5.11. Radar altimeter operation check

Perform checking procedure similarly as for the single-control helicopter; at the same time the decision height signalling sound should be audible identically in pilot's and copilot's headphones.

#### 5.2. PREFLIGHT INSPECTION

During preflight inspection, check, as follows:

- condition and fastening of the VHF-2 transceiver antenna,
- antenna cable tension and condition of the R-842 transceiver antenna insulators,
- condition and fastening of radar altimeter antenna,
- operation of the avionics that have been questioned by the pilot only,
- operation of attitude indicators and gyro-magnetic,
- operation of trims and landing light controls,

#### 5.3. TURN ROUND SERVICING

Get acquainted with pilot's remarks on operation of the equipment being controlled from the copilot's panel. Repair any malfunctions.

#### 5.4. POSTFLIGHT INSPECTION

Prior to postflight inspection, ask pilot about remarks on any devices malfunctions noticed during flight. Repair malfunctions, which arised during flight with regard to pilot remarks and check condition and fastening of:

- copilot's panel and intercom unit;
- trims and landing light switches on control sticks.

After checking, repair noticed malfunction.

#### 5.5. PERIODICAL INSPECTION

Every  $300^{+60}_{-30}$  flight hours.

Remove the copilot's panel.

Check condition and fastening of:

- selectors, switches, red lighting bulbs, intercom unit and grounding of the panel;
- push-buttons on copilot's collective pitch lever and cyclic stick;
- wires and bundles behind panel and under the floor.

- NOTE:
1. Thoroughly check condition of wires, located under the floor together with tail rotor control system. Check operation according to Chapter 5.1. PRELIMINARY FLIGHT PREPARATION.
  2. Perform periodical inspection of the copilot's attitude indicator according to instruction given in Chapter 4 of this Manual.

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6. MAINTENANCE OF HELICOPTER WITH AGRICULTURAL EQUIPMENT

Maintenance of helicopter with agricultural equipment is performed according to Chapter 1 through 4 of the present Manual with regard to below mentioned instructions:

6.1. PRELIMINARY FLIGHT PREPARATION

6.1.1. Visual Inspection

Check condition and fastening of:

- ID-8 transmitter, SD-4 (or SC-13) pressure relay, MT-3000M and MU-332A electrical motors, as well as connections and electrical wire bundles, on R.H. hopper;
- DIKZ-4D transmitter, MT-3000M and MU-332A motors as well as connections and wire bundles, located on the L.H. hopper;
- connections and wire bundles of agricultural equipment control panel located inside the cockpit.

6.1.2. Check MU-332A Motor for Operation

Check operation of MU-332A motors (The check is performed with empty hoppers).

Perform the check as follows:

- connect the external power supply;
- switch on the circuit breakers on the agricultural equipment control panel and set the BATTERY ON NETWORK switch in ON position;
- set the mode selector into DUSTING position;
- press in the OPENED push-button located on the helicopter cyclic stick.

NOTES: On the helicopters up to No.08.01, electrical motors start operating when the circuit breakers on the agricultural equipment control panel are switched on and the mode selector is set into DUSTING position.

The MU-332A motor operation should not last longer than 55 sec. Then, after that time there should be an interval of 8 minutes. After five such cycles make 16 minutes.

- on the helicopters from No. 107.01, set the operation mode selector switch into middle position then press down the push button on the upper agricultural equipment control panel. Thus the MU-332A elec. motors start to operate.
- set all control devices into initial position.

6.1.3. Check MT-3000M Elec. Motors for Operation

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CHECK THE MT-3000M MOTOR AT MAIN ROTOR RPM NOT LOWER THAN 70%

Check the spraying installation as follows:

- switch on GENERATOR circuit breaker: CONTROL-EXCITING on the automatic circuit breaker panel;
- turn on AC circuit breakers in the radio bay,
- turn on circuit breakers on the agricultural equipment control panel;
- set operation mode selector into "SPRAYING" position; the "NORMAL PRESSURE" light should come on at full tanks for chemicals,

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and the pressure gauge should indicate pressure which shows normal operation of the MT-3000M motor,  
- turn off the circuit breakers except the circuit breakers in radio bay.

Check the dusting system for operation (the system is to be checked when the tanks for chemicals are empty).  
Adopt the following procedure:

- switch on GENERATOR: CONTROL-EXCITING circuit breakers on the C.B. panel (C.B. = circuit breaker);
- turn on AC C.B. in the radio bay;;
- turn on C.B.s on the agricultural equipment control panel;
- set "DUSTING" operation mode selector switch into "DUSTING" position. The fan elec. motors should be on - air should be delivered from the air ducts.

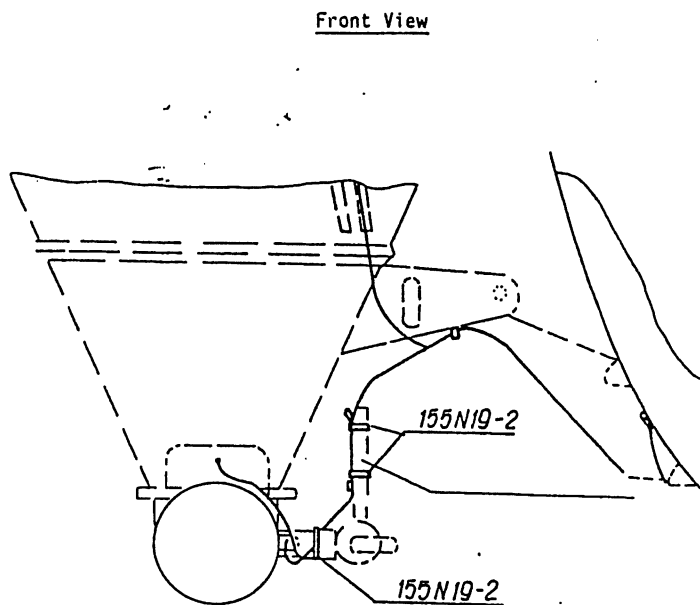
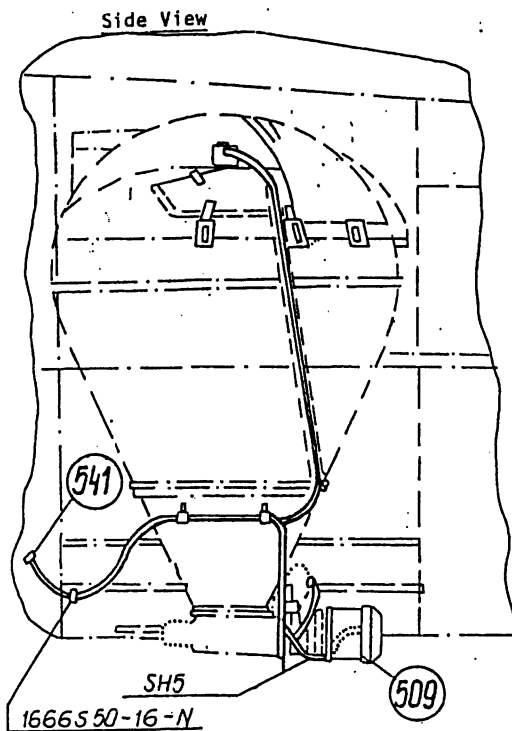
Turn off the C.B.s except the C.B.s in the radio bay.

- NOTE: 1. If air is sucked during spraying then one of the causes can be an incorrect sense of the MT-3000 motor shaft rotation. In this case change two supplying cables one for another: EP-130 another: EP-130 and EP-132 cables for the L.H. motor, EP-141 and EP-139 cables for the R.H. motor.
2. The DIKZ-4 indicator installed on the helicopters beginning from serial No. 08.02 is to be checked according to the "Airframe Maintenance Manual". The guidelines given in this Manual are to be observed during the agricultural equipment check.
  3. Check the valves for chemicals flow when the tanks provided for chemicals are empty.  
The valves can be opened for chemical outflow during ground tests in indispensable cases only.
  4. A single circuit breaker has been mounted on the agricultural control panel since the equipment No. 305.
  5. Install the elec. harnesses according to drawings 6,1 through 6,4 during the tanks for chemicals mounting in such a way to avoid water inside the connections.
  6. C.B.s in the AC box have been installed since heli. No 55.01. Switch over the C.B.s once during the pre-flight preparation.

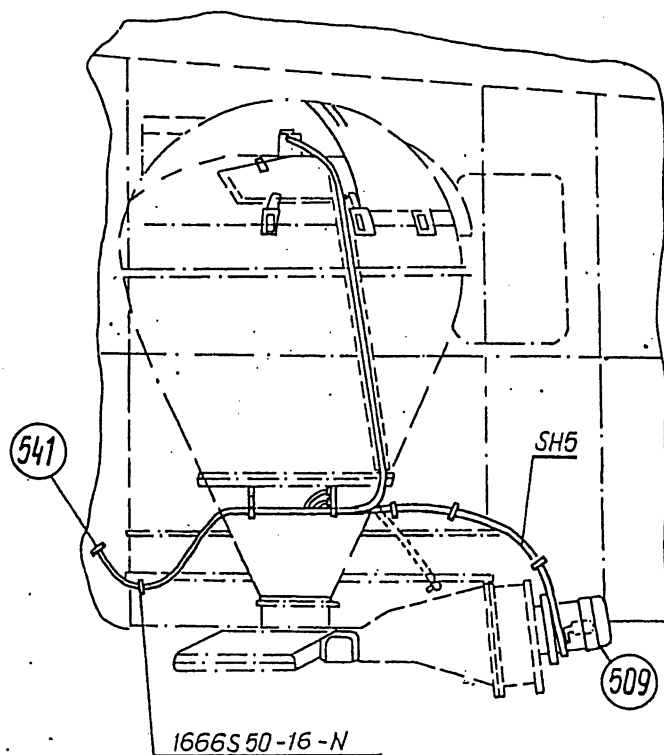


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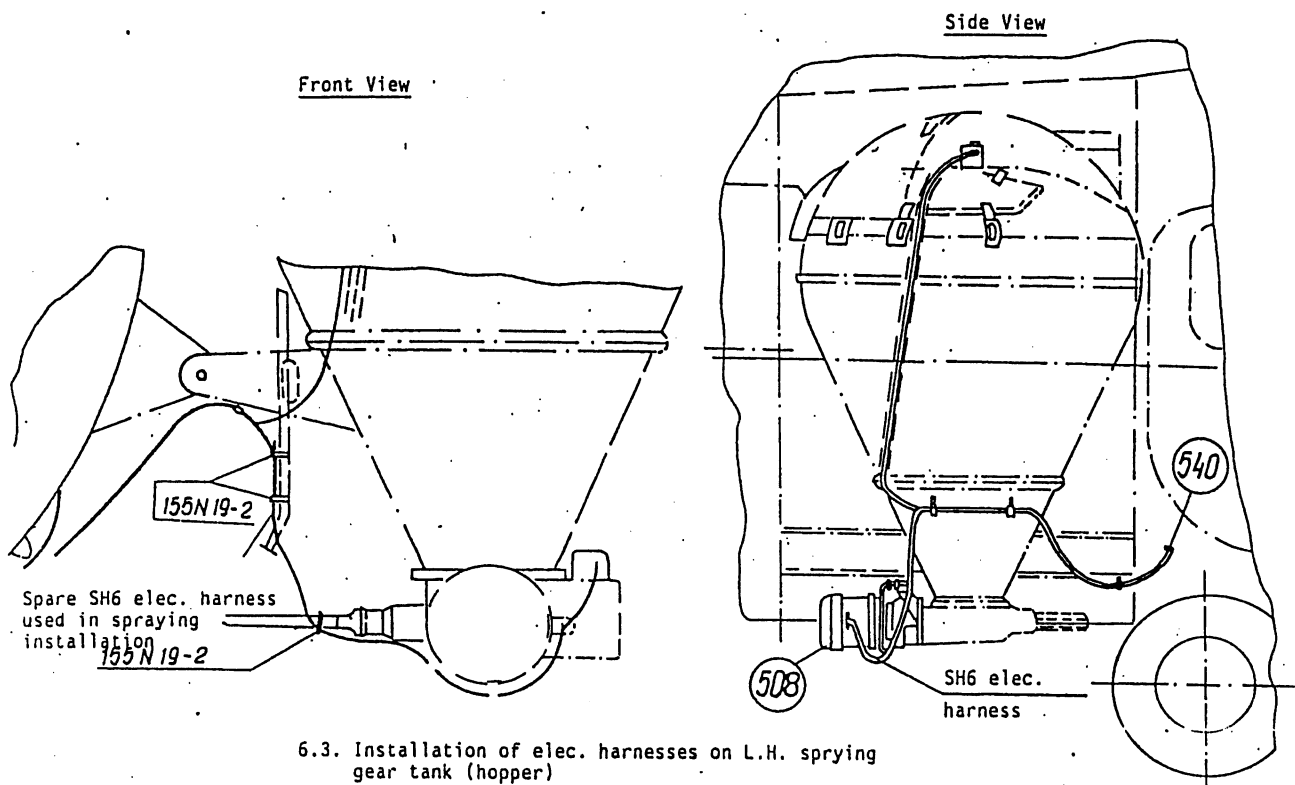
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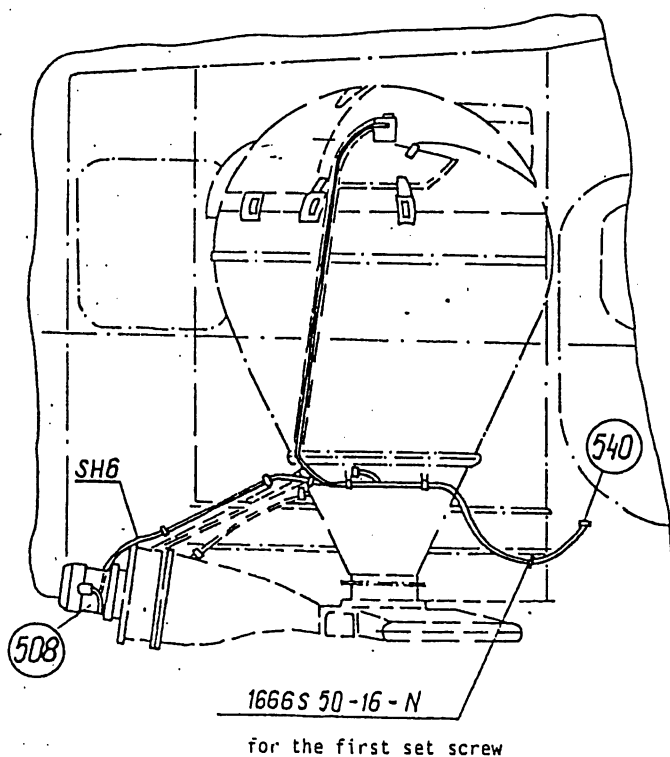
6.1. Installation of elec. harnesses on the R.H. spraying gear tank



6.2. Installation of elec. harnesses on the R.H. dusting gear tank.



6.3. Installation of elec. harnesses on L.H. spraying gear tank (hopper)



6.4. Installation of elec. harnesses on the L.H. dusting gear tank



## 6.2. PERIODICAL INSPECTION

Perform the procedures according to Chapter 4 of the present Manual and additionally:

### 6.2.1. Every 100 $\begin{smallmatrix} +20 \\ -10 \end{smallmatrix}$ flight hours

Perform the work provided for Preliminary Flight Preparation.

### 6.2.2. Every 300 $\begin{smallmatrix} +60 \\ -30 \end{smallmatrix}$ flight hours

Perform the works provided for 100 hours inspection.

Check the following devices for compliance with Technical Specification:

MU-332A motor

- current input (normal) - 23A
- if the brushes are worn to 11 mm, replace them with new ones.  
If it is necessary to grind-in the brushes perform this according to the procedure given in Enclosure No. 6.
- clean the commutator and blow the motor with compressed air.

SD-4A (or SC-13) pressure relay

- operating pressure 29.4 KPa (0,3 kg/cm<sup>2</sup>).
- operating pressure error at normal temperature  $\pm 4,9$  kPa (0,05 kg/cm<sup>2</sup>)
- insulation resistor at temperature  $+20 \pm 5^{\circ}\text{C}$  - 20 M,

NOTE: DikZ-4 indicator is checked according to the Maintenance Manual - Airframe.





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7. HOIST AND EXTERNAL CARGO HOOK MAINTENANCE

7.1. EXTERNAL CARGO HOOK MAINTENANCE

CAUTION

IN ALL CASES SUSPENSION LOCK SHOULD BE OPENED /EXCEPT FOR CARGO SUSPENSION/  
IN ORDER TO RELEASE THE SPRING OF PBD-59IW DRIVING MECHANISM

7.1.1. Preliminary flight preparation

Perform operation check of suspension lock as follows:

1. Close the lock in the following order:

- a/ rotate the attaching hook home in opposite to the flight direction,
- b/ holding the attaching hook by hand, place the BDZ-53I spanner fully onto the tensioner lever end and rotate it in the flight direction, until characteristic rattle of PBW-59IW driving mechanism is heard.

2. Check efficiency of PBD-59IW driving mechanism trigger by pressing home the trigger push-button through the hole of lock housing by means of the tensioner spanner stick. The driving mechanism should start operating and the lock should open.

3. Check the cargo release circuit efficiency:

Switch on the circuit breakers: CARGO RELEASE BASIC-EMERG. /on the upper left panel/ and WARNING LAMP DIMMING on the circuit breaker panel.

Close the lock; the signalling light HOOK ARMED should light up.

Press in the normal cargo release switch on the collective pitch lever, the lock will be opened and the HOOK ARMED signalling light will go off. Close the lock. Press in the emergency cargo release push-button on the cyclic stick; the lock should be opened and the HOOK ARMED signalling light go off.

NOTE: 1. On helicopters from No. 27.01 check the signalling of cargo hook ropes extension. When the WARNING LAMP DIMMING circuit breaker is switched on and the hook is lowered the HOOK DOWN yellow signalling light on instrument panel will light up. When the hook is retracted, the signalling light will go off.

2. Operation check of emergency and normal release should be performed at least twice.

4. Inspection:

- check condition of the lock electrical bundle. The failure of the lock electrical wire bundle may be caused by sharp bends or may result from handle removal before plug disconnecting and carrying the lock by holding a bundle. The damaged metal braid should be wrapped with insulating tape.
- check plastic components of PBW-59IW driving mechanism plugs and MWN-48W mechanism for cracks. If breaks or cracks are detected in plastic components, these components should be replaced, for this purpose remove the PBW-59IW driving mechanism and MWN-48W mechanism from the lock.
- check the minimum operating voltage of PBD-59IW driving mechanism when the DC power is supplied to the connector.  
The driving mechanism should not operate at voltage below 10 V,



#### 7.1.2. Preflight inspection

Check the cargo release circuit efficiency according to Chapter 7.1.1. item 3. Check connection of the lock electrical bundle.

#### 7.1.3. Turn round servicing

Repair the malfunctions reported by the crew.

#### 7.1.4. Postflight inspection

Repair the malfunctions, reported by the crew.

#### 7.1.5. Periodical inspection 100<sup>+20</sup><sub>-10</sub> flight hours

### CAUTION

WHILE WASHING THE LOCK DO NOT ALLOW THE GASOLINE TO PENETRATE TO THE LOCK ELECTRICAL BUNDLE, PARTICULARLY AT SOLDERED CONNECTIONS OF WIRES AND SOCKET PLUGS OF PBD-59IW AND MWN-48W; THE LOCK SHOULD BE AIR DRIED AFTER WASHING.

When performing inspection and operation check proceed as follows:

- remove the hook from the helicopter and wipe it with a rag wetted in gasoline.
- check whether any jamming occurs during the rotation of all lock mechanism levers.

To do that, close the lock and by pressing in the trigger push-button of the operating mechanism, open the lock.

When the lock is being opened, the follower lever should follow the gib of carrier lever and the "active, passive" rod should be rest slightly due to the force of the spring.

When the lock is being shut, the intermediate lever should turn upwards to enable freedom of rod roller movement under the thrust pad of intermediate lever.

In case of rod jamming - wash thoroughly the axle of intermediate lever, thrust axle and "active-passive" rod, using 2 or 5% solution of CIATIM-201 and gasoline and a brush. While washing, do not allow the solution to penetrate to the electrical cables, D701 microswitch, PBD-59IW driving and MWN-48W mechanisms.

Check the operation of driving mechanism spring /Fig. 7.1./ under load of 120 N; to do this, proceed as follows:

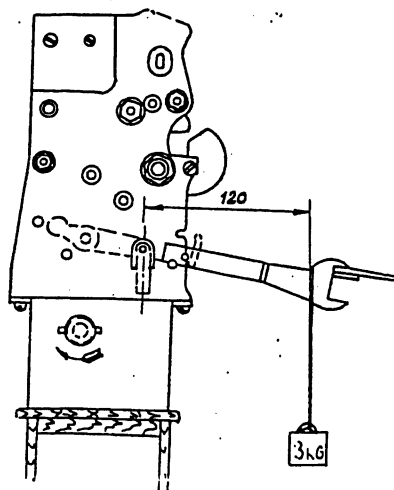
- place the lock in vertical position with the driving mechanism pointed downwards on a work bench. Place the BDZ-53I tensioner spanner fully onto the tensioner lever end;
- hang a weight of 3 kgs on the spanner at a distance of 120 mm from driving mechanism bolt axle;
- by pressing the spanner, tension the driving mechanism;

d/ press in the trigger push-button, the driving mechanism should engage and the weight hung on the spanner should be lifted by means of driving mechanism bolt whose entire travel should be not shorter than 14.5 mm. This corresponds to the minimum permissible load created by the driving mechanism spring at the bolt end /not less than 120 N/.

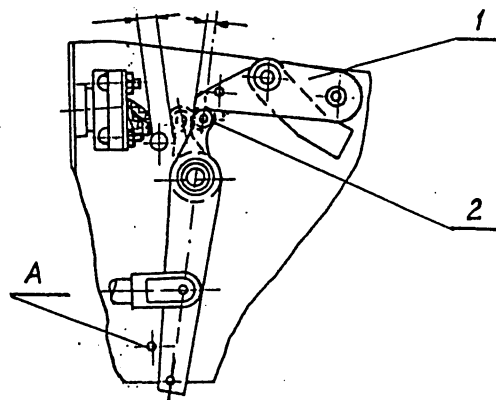
A hook whose driving mechanism lifts a weight of 3 kgs to the extreme bolt travel should be considered as fit for operation.



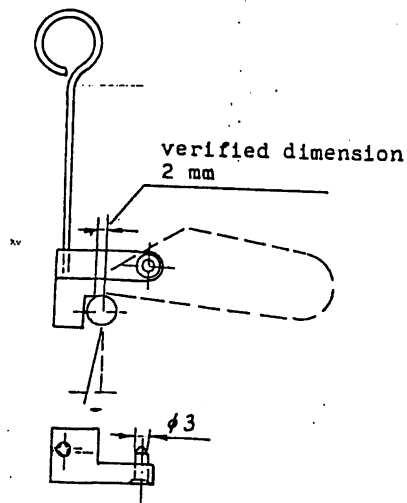
- check the value of engagement "B" /Fig. 7.2./ of the thrust pad of intermediate lever with tensioner lever roller; it should be not less than 2 mm.
- The engagement value is checked by means of a special gauge /Fig. 7.3./; the clearance eliminated in the lock opening direction - and is obtained by adjusting the driving mechanism clutch so that the tensioner lever rests against the rod of 6 mm dia, and 100 mm length inserted in the opening "A" /Fig. 7.2./



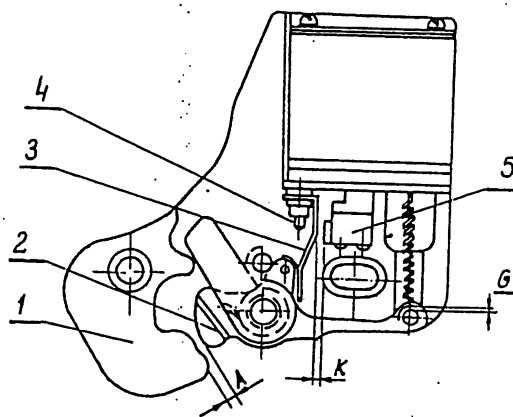
7.1. Driving mechanism spring operation check



7.2. Checking of intermediate lever thrust pad with roller  
1 - intermediate lever  
2 - roller



7.3. Gauge for engagement check



7.4. Mechanism adjustment check  
1 - cargo hook  
2 - abutment  
3 - spring  
4 - MWN-48W mechanism clamping screw  
5 - D-701 microswitch



- check the clearance "E" /Fig. 7.2/ between the tensioner lever roller with the lock mechanism being opened and the electrical cables. The clearance should not be less than 3 mm. The clearance is checked by means of a feeler gauge.
- check the clearance "A" between a attaching hook and abutment. The clearance should amount from 1,5 to 3 mm. The clearance is checked by means of gauges of following diameters:
  - measuring rod 1.5 mm dia - going through
  - measuring rod 3 mm dia - not going through
- check the clearance "C" /Fig. 7.4/ between the follower lever roller and the MWN-48W bolt with the lock being closed; it should be not less than 0.3 mm. The clearance is checked by means of feeler gauge. The clearance can be adjusted by inserting M 162 washers under the MWN-48W.
- check the clearance "K" /Fig. 7.4/ between the D701 microswitch actuating push-button and the spring in the "LOCK CLOSED" position. The clearance should be from 0.1 mm to 0.5 mm. It is checked by means of a feeler gauge. It can be adjusted by moving the spring through its oval opening under the bolt.

- NOTES: 1. The PBD-59IW driving mechanism and MWN-48W mechanisms being not in accordance with requirements included in this chapter and driving mechanisms with broken springs or mechanisms with improper reversion of bolt should be replaced.
2. When performing the periodical inspection, pay attention to condition of cotter pin for fastening tensioner lever to PBD-59IW bolt clutch. When cotter pin is broken replace it by a spare one.

#### 7.1.6. Maintenance at helicopter rest

If helicopter has not been in service for a long period of time; maintenance should be performed at least once every three months  $\pm$  10 days according to periodical inspection after each 100 flight hours.

NOTE: The hooks removed from helicopter should be preserved and periodically inspected during long storing on the shelves or in the boxes.

#### 7.2. LPG-4 HOIST MAINTENANCE

##### CAUTION

1. DO NOT ACTUATE THE HOIST IF THE ROPE LOAD IS LESS THAN 30 N /3 kGs/.
2. IT IS NOT ALLOWED TO TURN ON ELECTRICAL MOTORS SIMULTANEOUSLY IN OPPOSITE ROTATION DIRECTIONS.
3. ELECTRICAL HOIST UNIT IS DESIGNED FOR SHORT TIME OPERATION. ALLOWABLE OPERATION MODE AT SIMULTANEOUS OPERATION OF BOTH MOTORS IS AS FOLLOWS:
  - a/ LOWERING OF CABLE WITH LOAD OF 800 N /80 kGs/ TO THE LENGTH OF 30M AND 15 s. TIME INTERVAL.
  - b/ LIFTING UP THE CABLE WITH LOAD OF 800 N /80 kGs/ TO THE LENGTH OF 30M AND 15 s. INTERVAL, 3 MIN INTERVAL FOLLOWS AFTER FOUR SUCH CYCLES.
  - c/ LOWERING THE CABLE WITH LOAD OF 1176 N /120 kGs/ TO THE LENGTH OF 30M AND 15 s. INTERVAL.
  - d/ LIFTING UP THE CABLE WITH LOAD OF 1176 N /120 kGs/ TO THE LENGTH OF 30M 3 MIN INTERVAL FOLLOWS AFTER ONE SUCH CYCLE.



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4. THE NUMBER OF CYCLES IS HALF OF THE PREVIOUS NUMBER AND THE INTERVAL TIME IS PROPERLY INCREASED IN CASE OF ONE ELECTRIC MOTOR ON AND WITH NORMAL LOAD.
5. THE SLIP OF THE FRICTION CLUTCH APPEARS WHEN LOAD OF THE CABLE IS FROM 1470 UP TO 1960 N /FROM 150 UP TO 200 kg/.  
THE TIME OF SLIP IS NOT LONGER THAN 3 s. AFTER EACH SLIP - THE ELECTRICAL MECHANISM SHOULD BE COOLED DOWN TO AMBIENT TEMPERATURES

#### 7.2.1. Preliminary flight preparation

##### 7.2.1.1. Visual inspection

The hoist electric mechanism with control devices should have no cracks, bends or other failures.

##### 7.2.1.2. Hoist operation check on helicopter

Switch on the HOIST, MOTORS 1 and 2 circuit breakers.

Switch on the circuit-breakers on the KUL-4 box, after previous checking, the rope winds over the hoist drum. After underslinging the load /3 kg/ press in the DOWN push-button /if the cable is wound up/ or UP /if the cable is unwound/ located on the PUL-1A control panel,

When lowering the load make sure that the cable is always strained.

When lowering the load keep the UP button pressed in on the PUL-1A control panel until the motor stops.

##### 7.2.1.3. Checking the hoist emergency switching off

Switch off the  $W_1$  and  $W_2$  circuit breakers on the KUL-4 box at pressed in the DOWN push-button.

Then motors should stop and start operate after switching on the  $W_1$  and  $W_2$  circuit breakers. Repeat the check at pressed in the UP push-button.

NOTE: The speed of load lowering and lifting is reduced by pressing down the lever on the PUL-1A control panel.

#### 7.2.2. Preflight inspection

- inspect visually condition of the electric hoist,
- switch on the supply, lower the rope by short-lasting pressing the DOWN push-button on the control panel, and lift the rope pressing in the UP push-button.

#### 7.2.3. Periodical inspection

##### 7.2.3.1. Every $100^{+20}_{-10}$ flight hours

- carry out the preliminary flight preparation,
- check the fastening reliability of separate hoist components, and reliability of the plug connectors,
- clean the dirty external surfaces,
- wash guides and carriage leading screw with gasoline and lubricate them with CIATIM-221 grease,
- check the rope condition and coat it with a thin layer of CIATIM-221 grease.



7.2.3.2. Every 300<sup>+60</sup><sub>-30</sub> flight hours

- carry out the work provided for 100 hours inspection,
- check the limiting microswitches operation after completing the rope unreel and reeling, On the drum 3 + 5 coils should remain after stopping unreeling the rope, and having reeled the rope there should remain 1.5 mm of the rope that is not wound on the drum.
- check the carbon brushes wear in electric motors - the brushes height should not be less than 11.5 mm,
- clean the electric motor commutators and the brush holders; remove the carbon dust using a tampon soaked in rectified spirit and blowing them with compressed air.  
In case of commutators scorching clean them with a glass-paper or an abrasive cloth.
- check the electromagnetic clutch operation in electric motors; supply the D&C. of continuously controlled voltage to 3rd and 5th contacting terminals of the motor and while observing the voltmeter indications check if there occurs a characteristic click accompanying the clutch engagement and disengagement. The voltmeter readings should be as follows: max. 14 V for clutch engagement and max. 6 V for clutch disengagement.

7.2.3.3. Every 600<sup>+60</sup><sub>-30</sub> flight hours

- carry out the work provided for 300 hours inspection,
- check the friction clutch; hold it slipping only once for no more than 3 s.  
The slip slip should occur at a rope load from 1470 to 1960 N /150 + 200 kg/,
- check the electric motors current input at a rope load of 780 N /80 kg/ not more than 44 A,
- check the insulation resistance that should be not less than 20 MΩ.

Electromechanism /the limiting microswitches are on/

Connector	Insulation resistance as measured between the terminals	
SzR32P10ESz1	1, 3, 5, 7	Ground
	1	3, 5, 7
	3	5, 7
	5	7
	5, and 1	Ground
SzR20P5ESz10	5	1
2 pcs		



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Control box /W<sub>1</sub> and W<sub>2</sub> circuit breakers switched on/ type KUL-4 and KUL-4 of 2nd series.

Connector	Insulation resistance as measured between the terminals	
SzR20P2ESz6	1 and 2	Ground
SzR28P7EG9	1	2
	2, 3, 5, 6	Ground
	1	2, 3, 5, 6
	2	3, 5, 6, 7
	3	5, 6, 7
	5	6, 7
SzR20P47G8	6	7
	3 and 4	Ground
	3	4

Control panel /terminals disconnected and the release switch in ON position/.

Connector	Insulation resistance as measured between the terminals	
SzR28P7EG9	1, 2, 3, 5, 6, 7	Ground
	1	Remaining
	2	"
	3	"
	4	"
	5	"
	6	"
	7	"

#### 7.2.4. Maintenance at helicopter rest

If helicopter was not in service for a long time, the maintenance should be performed at least once every three months  $\pm$  10 days according to the procedure of 100 hours inspection.

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## 8. HELICOPTER CONVERSION

During helicopter conversion follow the Maintenance Manual - Airframe and adequate diagrams included in Electrical Diagrams File.

### 8.1. DUAL CONTROL TO SINGLE CONTROL CONVERSION AND VICE VERSA .

- when removing pilot's collective pitch lever, disconnect OF2; OF5; OF7; UL25; UL28 wires from 75K /671/ terminal plate, which is installed under pilot's collective pitch lever, under helicopter floor /see diagrams: 50.70.050.00.00 and 50.70.080.00.00/.
- when removing copilot's collective pitch lever, disconnect OF5; OF7; OF19 from 74K /783/ terminal plate which is mounted on 2F frame, /see the diagram 50.70.050.00.00/. Disconnect wires through the access panel located under copilot's seat.
- when removing copilot's cyclic stick, disconnect the /781/ connector of LS66 wire bundle mounted on 3N frame. Perform the operation through access panel located near the 3N frame. Protect the connector part remaining inside helicopter with the plug No. 50.72.013.00.00.
- when removing copilot's control panel, disconnect the /782/ connector of LS66 wires bundle. Protect the connector part remaining inside the helicopter with the plug No. 50.72.014.00.00 and wrap the part removed along with panel linen or cellophane.
- when installing the collective pitch lever of single controls connect correspondingly wires to 75K /671/ terminal plate /diagrams: 50.70.050.00.00 and 50.70.080.00.00/.

NOTE: 1. On dual controls helicopter, the OF2 wire of pilot's collective pitch lever is connected with OF18 wire on 75K /671/ terminal plate.

2. On single controls helicopter, the OF2 wire of pilot's collective pitch lever is connected with the OF2 free wire on 75K /671/ terminal plate.

- connect UT3 wire with UT1 wire which is permanently connected with TRIMMERS-CONTR. circuit breaker, on the circuit breaker panel.

NOTE: 1. The copilot's cyclic stick should be removed together with rubber ring.

2. When installing the dual control, operations are performed in the opposite sequence. Having disconnected the UT3 wire, insulate with insulating tape and band it to wires bundle.

3. On helicopters up to No. 16.22 inclusive, except for helicopter No. 13.45 follow the supplement to "Electrical Diagrams File" included in the supplement to "Mi-2 Dual Controls Helicopter Technical Description and Flight and Maintenance Manual".

4. When installing and dismantling the electric wire bundle pay attention that the wires bundles would be damaged by cyclic stick travel, or by other parts of the structure.

5. When installing and dismantling wires on 73K, 74K and 75K terminal plates use the cap 50.91.578.00.00 and dielectric holder of 1 : 10 set.

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6. After retrofit check/ live condition/ the following circuits: trimming system, MPRF-1A landing light control, gyrocompass and AGK-47W according to this Manual
7. In case of single controlled helicopter retrofit to dual controls configuration, it is allowed to omit removal of SPU/842/ pushbutton and the socket /892/ for helicopters from No. 35.01 /see diagram 50.70.100.00.00/
8. On helicopters equipped with separated intercom system- the following procedure shall be performed after removing copilot's panel:
  - adjust decision height /dangerous altitude/ signal voltage for RW-3 system if necessary;
  - using the armature 50.72.000.14.00 connect RW 125 wires with RW 126 wires on the terminals of the board /814/ installed on the left upper panel. The armature is included in the spare parts kit 1:1 for the helicopter.

8.2. RETROFIT OF THE HELICOPTER EQUIPPED WITH DUAL CONTROLS TO PASSENGER OR AMBULANCE VERSION

NOTE: In case of the helicopter retrofit it is necessary to comply with requirements included in the NOTES of CHAPTER 8.1, PARA 4,5,6.

- disconnect OF 2 wire from OF 18 wire on the terminal plate 75K/671/ and connect with OF 2 free wire / see diagram 50.70.050.00.00/.
  - when dismantling copilot's control panel, release the safety catch and disconnect the connector /782/ and LS6/ group of wires /782/.
- Protect the connector part remaining in the helicopter using a plug 50.72.014.00.00. The part of the connector dismantled with the panel to be wrapped with cloth or cellophane.
- connect UT3 wire with UT1 wire permanently connected to TRIMMERS CONTR. circuit breaker on the circuit breaker panel / see diagram 50.70.040.00.00/.
  - connect RK 113 wire with RK1 wire located on the terminal plate 73K /791/ which is installed at upper edge of the panel/ using connecting link 50.72.000.14.00/.
- /see diagram 50.70.100.00.00 and photodiagram No.7/.

NOTE: When installing copilot's seat and control panel, perform a/m procedure in opposite sequence.

8.3. INSTALLING AND REMOVING THE COPILOT'S CONTROL PANEL

On the helicopters equipped with single control system it is possible to install the copilot's control panel with SPU-7 intercom unit installed on it providing internal communication between a crew member on the R.H. seat and the pilot or medical staff member, by depressing O/W pushbutton. Such retrofit is possible on helicopters from No. 16.23.

When installing the copilot's control panel perform the following procedure:

- install the housing 54.72.183.00.00 of WG-15K switches and PPG-15K selectors on the copilot's panel using two screws fixing the plate to the panel.
- The GYRO, HYDR. SYST. and AGK-47 LEFT circuit breakers shall be in ON position, and TRIMMING TABS and LANDING LIGHT shall be in PILOT 1 position.
- install the copilot's control panel on the push- rods column by means of 3172A-4-12 screws provided there.
  - remove plug 50.72.014.00.00 connect and secure the panel connector.

NOTE: To remove copilot's seat perform A/m procedure in opposite sequence. Then panel connector shall be wrapped with cloth or cellophane.

8.4. INSTALLING CARGO TRANSPORT OR AMBULANCE EQUIPMENTS

NOTE: When installing a/m equipments use diagram 50.70.080.00.00



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8.4.1. LPG-4 hoist installation

- connect UL17 and UL18 wires of K16 wire bundle correspondingly to the wires of 73K/459/ terminal plate which is installed over the passenger cabin door.
- connect UL7, UL11, UL70 and UL110 wires of K34 and K16 wire bundles, to 75K /456/ terminal plate which is installed over the passenger cabin door.
- connect two M329 wires of K13 wire bundle to the screw located next to 75K /456/ terminal plate.
- connect PUL-1A panel connector to KUL-4 box.
- connect connectors to KUL-4 box and secure them.
- check the system operation under voltage in accordance with method given in Chapter 7.2.1. "Preliminary Flight Preparation".

8.4.2. External cargo hook installation

- connect two /736/ and /737/ connectors of ZG1 and ZG2 wire bundles to sockets installed on the fuselage lower skin /one connector is situated next to the front landing gear shock absorber, and the other next to frame No. 8 on the helicopter starboard/.
- eliminate the excessive wire bundles sag by fastening them with tape and clips.
- check the system operation under voltage according to the method given in Chapter 7.1.1.

8.5. AGRICULTURAL VERSION EQUIPMENT INSTALLATION

NOTE: When installing the equipment follow the diagram 50.70.060.00.00

- connect and secure two /540/ and /541/ plugs of R.H. and L.H. hoppers wire bundles to the sockets installed on helicopter fuselage.
- eliminate the excessive wire bundles sag by fastening them to brackets, with chlorovinyl tape and clips.
- install the agricultural equipment control panel, connect and secure /741/ plug to socket which is installed on the battery compartment casing.
- on helicopters from No. 08.02 which are manufactured in non-agricultural version, install the relay and fuse plate with /742/ connector in the A.C. connection box /see connection box diagram/.

- NOTE: 1. During first installation of the agricultural equipment solder SzR connector of EMKO-M electromagnet.
2. During helicopter conversion to agricultural version and vice versa, replace the EM.AIRDROP placard on the cyclic stick handle by the OPEN one and vice versa.
3. In this manual the numbers of equipment collective diagrams are used. The diagram file may contain single system diagrams which are included in their collective ones. Eg. The collective diagram No. 50.70.050.00.00 /lighting system/ includes single system with numbers from 50.70.051 up to 59.00.01.





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9. EQUIPMENT TROUBLESHOOTING

9.1. MU-332A Electric motor

Defect	Cause	Remedy
1	2	3
1. Motor inoperative when supply is turned on	a/ External supply circuit disconnected or defective b/ Loose connector or improperly soldered c/ No electrical contact between brushes and commutator  d/ Excitation winding broken	a/ Check and connect external supply circuit b/ Inspect and repair or replace connector c/ Remove brushes from brushholders and clean side surfaces with fine grain abrasive paper /No.170 or 200/. If brushes are shorter than 10mm, install new brushes d/ Replace the motor
2. Motor rpm too low	a/ Supply voltage too low b/ Output shaft overloaded c/ Rotor catches brushholders or pole shoes d/ Bearings jammed or damaged e.g. due to lack of grease	a/ Check and adjust supply voltage b/ Reduce shaft load c/ Replace the motor d/ Replace the motor
3. Strong sparking brushes resulting in commutator burning out	a/ Wrong contact between brushes and commutator surface due to brushes jamming in brushholders b/ As in /a/ due to brushes locking in brushholders; brushes worn out c/ Brushes do not fit to commutator curvature d/ Dirty commutator  e/ Rotor winding electrically shorted f/ Commutator sections shorted g/ Rotor winding broken	a/ Remove brushes and clean their side surfaces with No. 170 or 200 abrasive paper b/ Replace the brushes c/ Grind-in the brushes d/ Clean the commutator with cotton rag wet in gasoline. Contaminants which cannot be cleaned with the rag remove by means of No.170 or 200 abrasive paper. e/ Replace the motor f/ Replace the motor g/ Replace the motor



1	2	3
4. Motor rpm too high	a/ Motor underloaded or supply voltage too high b/ Excitation winding shorted	a/ Apply nominal load or adjust supply voltage b/ Replace the motor
5. Insulation resistance too low	a/ Insulation polluted with carbon dust from worn out brushes	a/ Clean the motor with compressed air stream to remove the dust

## 9.2. MT-3000M /MT-3000/ Electric motor

Defect	Cause	Remedy
1	2	3
1. Motor inoperative when turned on or its rpm too low	One of supply conductors disconnected or broken; wrong contact in the connector	Inspect and repair supply circuit and/or the connector
2. Motor overheated	Motor mechanically or electrically overloaded	Connect an ammeter into supply circuit and check motor supply current. Adjust load and/or supply voltage so as to get supply current lower than 16 A.

## 9.3. SKND-11-1A /SKND-11-1/ Igniter

Defect	Cause	Remedy
1	2	3
1. No spark on ignition plug	a/ Capacitor or winding shorted e.g. due to open circuit operation  b/ Electrical breakdown in high voltage circuit or in ignition plug  c/ Primary winding circuit broken	a/ Replace the igniter <u>CAUTION</u> OPEN CIRCUIT OPERATION /WITHOUT IGNITION PLUG/ IS NOT ALLOWABLE. CHECK THE CIRCUIT AND ELIMINATE OPEN CIRCUIT CAUSE.  b/ Replace high voltage circuit or the plug  c/ Replace the igniter
2. Board supply network fuses blow out	Contact breaker points hitch each other due to one of the following reasons:  a/ Supply voltage lower than 12 V or higher than 29.7V  b/ Contact breaker points polluted  c/ Resistance of conductors between battery and the igniter greater than 0.15Ohms	a/ Inspect supply network for voltage fluctuation cause and repair the network  b/ Find and eliminate cause of dusting. Clean the breaker contacts  c/ Ensure good contact in supply circuit



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1	2	3
3. Ignition plug breakdown	a/ Breaker points covered with dust, oil or fuel b/ Supply current lower than allowable value c/ Poor contact in the supply or high voltage circuit	a/ Find and eliminate cause of pollution. Clean breaker points b/ Replace the igniter c/ Repair the contact

9.4. ITE-1 and ITE-2 tachometers

Defect	Cause	Remedy
1	2	3
1. The indicator pointer stays at zero with engine operating	a/ No connection between the tachometer generator and indicator; or connection shorted b/ Connectors of the generator or indicator damaged or loose c/ Indicator motor coupling spring broken d/ Measuring element, axle broken, hair-spring or measuring element unsoldered e/ Stator winding of the transmitter or the indicator broken	a/ and b/: Inspect conductors and connectors and repair the defective ones c/ Replace the generator d/ Replace the indicator e/ Replace the generator or the indicator
2. The indicator pointer moves in opposite direction with the engine operating	Conductors between the generator and the indicator reversed	Reverse any two phases/wires in the connector of generator or indicator/.
3. Retarded beginning of synchronized operation or pointer swing at low rpm	a/ Dirty bearings in the front or rear screen b/ Two low voltage supplied from generator; winding shorted c/ Shaft end worn out or too big clearance	a/ Replace the indicator b/ Replace the generator c/ Replace the generator
4. Pointer swing at high rpm or on whole measuring range or pointer skipping	Dirty bearings or foreign particles ingested into slots between the measuring element and the magnet or between the rotor and the stator	Replace the generator or indicator



1	2	3
5. The pointer does not return to zero after engine shut-down	a/ Foreign particles present in magnetic clutch slot or attenuator slot; pollution b/ Measuring element axle broken	a/ Replace the indicator b/ Replace the indicator
6. The pointer does not stay on zero	Hairspring deformed or hairspring clamping weak	Replace the indicator
7. Too big error at room temperature	Core partly demagnetized or air slots width changed due to shocks. Clamping weak or shunt displaced.	Replace the indicator

## 9.5. ITG-182G /or ITG-182F/ Turbine inlet temperature indicator

Defect	Cause	Remedy
1	2	3
1. Indicator pointer stays at "zero" while gas temperature is $+200^{\circ}\text{C}$ or more	a/ Compensation lead broken between the connection plate and the indicator b/ The defective indicator c/ Wires reversed on the connection plate	a/ Replace compensation lead b/ Replace the indicator c/ Correct wire connections on engine connection plate
2. Indicator pointer skipping	a/ Wrong contacts of the wires on indicator terminals b/ Wrong contact on connection plate	a/ Tighten indicator connector nut b/ Tighten nuts on connector plate
3. Erratic thermometer indications	a/ Defective indicator b/ Resistance of the external thermometer wires differs from $7.5 \pm 0.05$ Ohms	a/ Replace the indicator b/ Check wire resistance, adjust to $7.5 \pm 0.05$ Ohms

## 9.6. Relays

Defect	Cause	Remedy
1	2	3
1. Relay fails after being energized 2. Do not activate or has unstable electrical contact	Relay coil broken or poor contact inside the relay a/ Load circuit disconnected poor contact on external terminals b/ Dirty relay points c/ Too weak pressure on relay points	Replace the relay a/ Inspect the output circuit and correct contacts b/ Replace the relay c/ Replace the relay



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13. Relay points sinter or welded	Output circuit overloaded	Replace the relay and correct output circuit load
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**9.7. KES-2097A Fuel quantity indicator**

Defect 1	Cause 2	Remedy 3
1. The pointer does not move after transmitter being connected to the indicator	a/ No supply voltage in helicopter network b/ Supply conductors broken	a/ and b/: Repair supply network
2. The pointer shows full tank while the tank is empty	Transmitter wire ends reversed	Reverse transmitter wires
3. The pointer strikes a left or right pointer limiter after the transmitter is turned on	a/ Wires between pin 1 and the indicator broken b/ Wires between pin 2 and the indicator broken c/ Transmitter potentiometer broken	a/ and b/: Repair the wires  c/ Replace the transmitter
4. Signalling lamp does not light up	Signalling lamp supply wires damaged a/ Lamp damaged b/ Signalling device damaged c/ Signalling device damaged	Repair the wires  a/ Replace the lamp b/ Replace the transmitter c/ Replace the transmitter

**9.8. A-1K Ammeter**

Defect 1	Cause 2	Remedy 3
1. The pointer stays at "zero" after supply is turned on	a/ Ammeter switch damaged b/ No contact on wire connections c/ Wire between the ammeter and the shunt broken d/ Ammeter damaged	a/ Replace the switch b/ Check the contacts  c/ Replace the wire d/ Replace the ammeter
2. Pointer moves to the left when measuring current	Wires reversed	Reverse the wires
3. Pointer skipping /drop to zero/	Poor connection of the wires on the ammeter or the shunt terminals	Check and tighten connections.

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1	2	3
4. Erratic indications	a/ Resistance changed in the ammeter circuit b/ The ammeter or the shunt damaged	a/ Check wire connections in the ammeter circuit b/ Replace the ammeter or the shunt

9.9. SSP-BI Control unit

Defect	Cause	Remedy
1	2	3
1. Control lamps do not light up during tests	a/ Sensor circuit open b/ Wires between sensors and the control unit broken c/ Wires between the control unit and the lamps broken d/ Control bulb burnt out e/ RPS-5 relay defective	a/ Replace the defective sensor b/ Check and repair the wires c/ Check and repair the wires d/ Replace the bulb e/ Replace the SSP6-BI unit
2. Control lamps are on after the testing is over	a/ RPS-5 relay points hitch b/ P-1 relay points hitch each other.	a/ Replace the SSP6-BI unit b/ Replace the SSP6-BI unit



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Enclosure 1

W-2MN /W-2M/ WINDSCREEN HEATING CONTROL DEVICE SERVICING

1. W-2MN /W-2M/ silicone windscreen handling

When servicing the W-2MN /W-2M/ silicone windscreen, take care of its condition and protect it against scratches and cracks.

When helicopter is parking the windscreen should be protected against hard objects striking or damage.

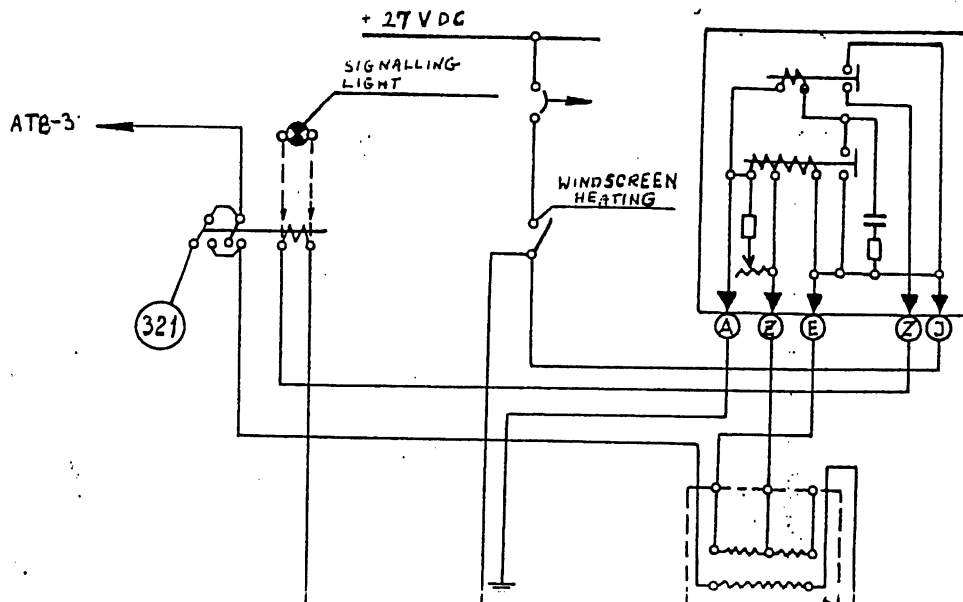
At helicopter long lasting rest, the windscreen should be protected by cover against sunrays, rain, dust and other contamination. Before installation, the cover should be thoroughly dried and cleaned from sand and dust particularly at side adjacent to the windscreen. Take precautions when windscreen covering, avoid striking the windscreen with buckles and other metal parts of the cover.

After and before flight, in case of windscreen contamination, clean it thoroughly with a soft rag wetted in water or spirit.

To avoid windscreen damage due to work inside the cockpit, the windscreen internal side may be covered with paper.

On the ground, the windscreen heating system is switched on in the following cases only: for checking and to eliminate internal and external icing, glass evaporation during parking

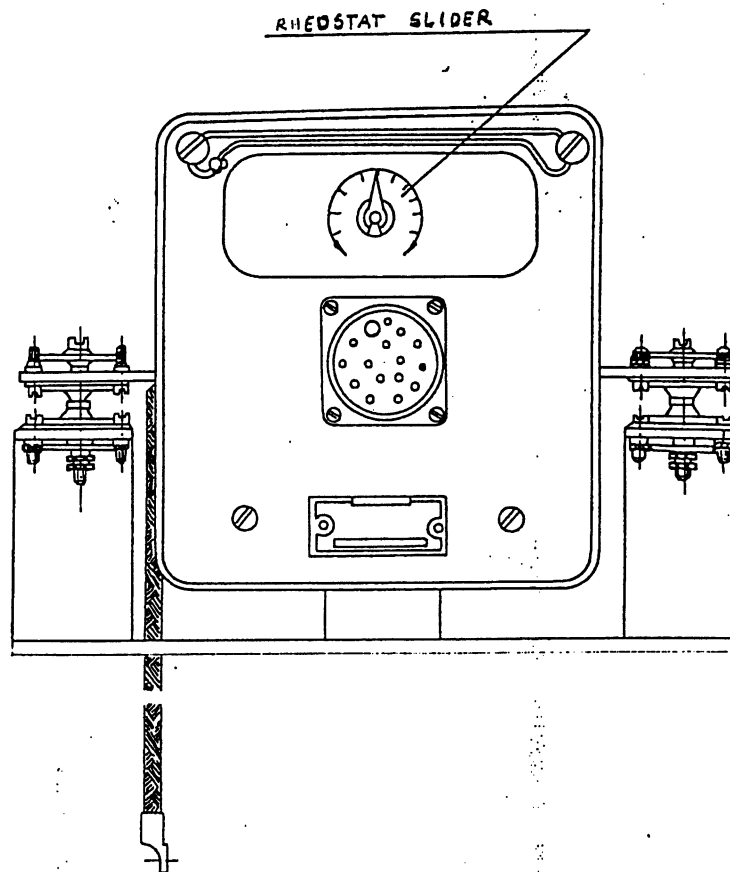
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Z.1.2. Front view of AOS-81MB windscreen heating control device

When the difference is greater, repeat adjustment of the control device.  
Disconnect the wires from the decade rheostat and connect them to the windscreen thermistor.  
Disconnect the test light or voltmeter wires from the coil of relay which switches on the windscreen pane heating. /Terminals A and B; see Fig. Z.1.1/.  
Switch on the windscreen heating system with engines operating and check its operation by touching with a hand.

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3. Checking and adjustment of AOS-81M control device insensitivity interval

With the decade rheostat connected in place of rheistor, check the relay operation according to the test light by applying 6 cycles of switching on and off the device. Each cycle is performed as follows: smoothly increase the  $R_r$  resistance /of decade rheostat/ for 5 up to 10 sec to obtain value higher than resistance which causes the test light to light up by 30 up to 50 ohms.

Then smoothly decrease the  $R_r$  resistance to the value lower than resistance which causes the test light to light up by 30 up to 50 ohms.

At the sixth cycle, read out the resistance of switching on the test light  $/R_{T1}/$  and switching it off  $/R_{T2}/$  according to  $R_T$  scale.

The insensitivity interval  $/\delta/$  is calculated as follows:

$$\delta = \frac{R_{T1} - R_{T2}}{R_{T1}} \times 100\%$$

The insensitivity interval should not exceed 20%.

NOTE: The AOS-81M windscreen heating control device is interchangeable with AOS-81MB and AOS-81MB2 devices.



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Enclosure 2

KI-13AK COMPASS DEVIATION COMPENSATION

1. Preliminary steps

Position the helicopter on deviation compensation stand and remove all steel objects within a radius of 100 m from the stand.

NOTE:

1. Flight batteries must be charged /DC voltage not less than 24V when loaded with a current from 10 to 12A/.
2. The EPK-2T-75 windscreen wiper must be set in extreme left position during deviation measurement and compensation.

2. Compass installation error measurement.

Position the helicopter on North heading and record the compass reading error. Then, position helicopter on East heading and record the compass reading error. Repeat the measurements for South and West headings. Add up 4 reading error values and divide the sum by 4, the result will be the compass installation error.

3. Compass installation error correction.

Position the helicopter on North heading.  
Unfasten compass holder clamping screws.  
Turn the compass by an angle equal to previously calculated compass installation error value. If the error is positive, turn the compass clockwise to increase N heading readings by the calculation value. In case of negative error, turn the compass counter clockwise to decrease the compass readings. After that, tighten 3 compass clamping screws and check the compass error on East, South and West headings. The compass installation error is considered corrected when its value does not exceed  $\pm 2^\circ$ .

4. Compensation of the KI-13AK compass deviation with engines operative.

- NOTE:
1. Deviation compensation may be executed only after completing the compensation of the GIK-1 gyro magnetic compass deviation.
  2. Do not use the batteries for engines starting.
  3. The main rotor rpm should be approximately 78%.

Switch on all electric receivers except for: battery heating, Pitot tube heating, cabin heating and ventilation /the DW-1K or DW-1KM fan/, the DW-3 fan, windscreen wipers, the GO16PC28RS AC generator and receivers supplied from this generator /anti-icing system and agricultural equipment/.

The STG-3 DC generators must be connected to the helicopter network obligatorily. Position the helicopter on North heading using the GIK-1 gyro magnetic compass as a reference. by turning the "NS" corrector magnet with a screwdriver get the deviation on 0 heading to the value of  $K_0 = 0$ .

Turn the helicopter to East heading.

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Adjust the "EW" corrector magnet so as to get deviation equal to

$$\Delta K_{90^\circ} = 0.$$

Turn the helicopter to South heading and record the compass reading.

Adjust the "NS" corrector magnet screw until the compass card turns to a half of the deviation angle recorded on South heading.

Turn the helicopter to West heading and record the compass reading.

Adjust the "EW" corrector magnet screw until the compass card turns to a half of the deviation angle recorded on West heading.

After completing the compensation of semicircular deviation of the compass, the final /quadrantal/ deviation should be measured and recorded as follows.

Position the helicopter to North heading. Measure and record the compass deviation. Repeat the measurement for 8 helicopter headings in  $45^\circ$  increments and record the results.

Residual compass deviation cannot exceed  $\pm 5^\circ$  on any helicopter heading.

Stick a label with measurement date and signature on correction screws for compensator protection.

Fill in deviation compensation record according to the enclosed form and draw a compass correction diagram to be located in the cockpit cassette:

Deviation compensation record of the KI-13AK compass  
Semicircular deviation compensation

Magnetic heading/MK/	$0^\circ$	$180^\circ$	$90^\circ$	$270^\circ$
Compass reading/KK/				
Deviation $\Delta K$ /				
Residual deviation				

Reference objects location

MK	$0^\circ$	$45^\circ$	$90^\circ$	$135^\circ$	$180^\circ$	$225^\circ$	$270^\circ$	$315^\circ$
Reference object								

Final deviation record

Magnetic heading/MK/	$0^\circ$	$45^\circ$	$90^\circ$	$135^\circ$	$180^\circ$	$225^\circ$	$270^\circ$	$315^\circ$
Compass reading/KK/								
Deviation								

Compass installation error

$$\Delta K = \frac{\Delta K_{0^\circ} + \Delta K_{90^\circ} + \Delta K_{180^\circ} + \Delta K_{270^\circ}}{4}$$



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Enclosure 3

GIK-1 GYRO-MAGNETIC COMPASS DEVIATION COMPENSATION

NOTE: The helicopter batteries should be charged.

1. Position the helicopter on the deviation compensation plate.
2. Switch on flight batteries.
3. Switch on the following circuit-breakers: "PT-125" or "PT-70", "GIK-1" and "CONVERTER 36V".
4. After 2 - 3 minutes have elapsed, determine the induction transmitter installation error for  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$  and  $270^\circ$  headings according to the formula:

$$\Delta K = \frac{\Delta K 0^\circ + \Delta K 90^\circ + \Delta K 180^\circ + \Delta K 270^\circ}{4}$$

5. If the transmitter installation error exceeds  $1^\circ$ , correct the error as follows:  
unfasten three transmitter mounting screws and turn the induction transmitter by an angle equal to the calculated error value. Read the indications for  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$  and  $270^\circ$  headings.
6. Semicircular deviation compensation.

Unlock the corrector shafts of deviation compensator located on the induction transmitter.

- 6.1. Position a helicopter on  $0^\circ$  heading and find the deviation value according to the formula:

$$\Delta K 0^\circ = MK - KK$$

where:

MK is a magnetic heading /in this case  $0^\circ$ /

KK is compass reading

- 6.2. Turn the helicopter to  $180^\circ$  heading and find the deviation value according to the formula:

$$\Delta K 180^\circ = MK - KK$$

- 6.3. With helicopter heading  $180^\circ$ , adjust "NS" compensator shaft so as to get deviation value equal to:

$$\frac{\Delta K 0^\circ + \Delta K 180^\circ}{2}$$

Repeat steps 6.1. and 6.2. for  $90^\circ$  and  $270^\circ$  headings. Using "EW" compensator shaft get the compass deviation value equal to:

$$\frac{\Delta K 90^\circ + \Delta K 270^\circ}{2}$$

Tighten and secure with brass wire clips and screws on compensator shafts.

7. Mark transmitter body and mounting flange with red paint to simplify transmitter reassembling. Draw horizontal line 10 mm and 2 mm thick.

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8. Correct deviation on 24 headings using cam-tape compensation mechanism as follows:

- position the helicopter on  $0^\circ$  heading.
- monitor the UGR-1K indicator with slaving push button pressed in.
- adjust compensator screw so as to correct deviation  $\Delta K_0 = MK - KK$ .
- repeat the above steps for each heading from  $0^\circ$  to  $360^\circ$  in  $15^\circ$  increments.

9. Measure the compass deviation on 24 headings once more.

Deviation cannot exceed  $\pm 1^\circ$  on any heading; if it does repeat compensation as described in item 8.

10. Fill in deviation compensation record and plot the correction diagram.

NOTE: Deviation on  $0^\circ$  and  $180^\circ$  headings should be fully corrected /equal to  $0^\circ$  if possible/.

Deviation compensation record of the GIK-1 gyroinductive compass

MK $^\circ$	KK $^\circ$	$\Delta K^\circ$	MK $^\circ$	KK $^\circ$	$\Delta K^\circ$
0			195		
15			210		
30			225		
45			240		
60			255		
75			270		
90			285		
105			300		
120			315		
135			330		
150			345		
165			360		
180					

Induction transmitter installation error

$$\Delta K = \frac{\Delta K 0^\circ + \Delta K 90^\circ + \Delta K 180^\circ + \Delta K 270^\circ}{4}$$





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Enclosure 4

D.C. GENERATOR CONTROL SYSTEM TEST AND ADJUSTMENT

Keep engine rpm between 80 and 84 per cent for this test and adjustment.

1. D.C. generator voltage adjustment

Set the BATTERY-EXTERNAL POWER switch to BATTERY position. Switch on LEFT GENERATOR switch. Set the RIGHT GENERATOR and EL.NETWORK TO BATTERY switches to OFF position.

Set the voltmeter selector to LEFT GEN. The W-1 voltmeter reading should be approximately equal to 28.5 V.

The RIGHT GENERATOR FAILURE signalling light should light up.

Set the voltmeter selector to RIGHT GEN. Voltmeter reading should be equal to zero.

Set the voltmeter selector to BATTERY. The voltmeter will measure the battery voltage.

Check the WS-25A /or WS-25B/ rheostat operation:

Turn the LEFT GENERATOR VOLTAGE ADJUSTMENT knob counter clockwise /voltage should decrease/ and clockwise /voltage should increase/. Voltage adjustment of at least  $\pm 1.5$  V should be possible if rheostat operation is correct. Adjust voltage to 28.5 V and switch on the DW-3 circuit breaker to check voltage on double supply bus bar.

Switch on any current receiver that loads D.C. network with 10 to 20A and set the ammeter selector to LEFT GENERATOR.

Monitor the A-1 ammeter which should measure total of previously connected current loads and the last one. Left generator voltage should not decrease under this load.

Set engine rpm between 61 and 87.5 per cent and increase generator current load between 50 and 100 A. Generator voltage should remain between 26.3 and 29.7 V.

Switch off the left generator.

Repeat the above procedure for the right generator and check operation of right generator switches, circuit-breakers, signalling lights and the right rheostat.

2. Generators parallel operation adjustment

Switch on batteries and both generators.

Set the voltmeter selector to BATTERY.

Adjust engine rpm to 82 per cent. Vary each generator load separately between minimum and 50 to 100 A and monitor the voltmeter. The RN-120A voltage regulators should keep voltage approximately constant and voltage should remain between 26.3 and 29.7 V.

Set the ammeter selector to LEFT GENERATOR.

Load both generators simultaneously and check each generator current under common load of 50 to 100 A.

Generators current should not differ more than 10 per cent of total output current. If current difference is bigger than 10 per cent at any load, adjust the WS-25A /or WS-25B/ rheostats.

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- NOTE: 1. If current input difference is higher than 10 per cent, increase engine rpm to 87.5 per cent and keep the engine running at this rpm for at least 1 to 2 minutes and by means of WS-25A /WS-25B/ rheostats adjust the generator voltages properly.
2. Adjust simultaneously both rheostats, increasing the generator current by one rheostat and decreasing it by another one.
3. If current difference is still bigger than 10 per cent of total load, set the both rheostat knobs to middle position and adjust the RN-120 V voltage regulators adjustment screws.
4. If currents are still unequal, check wires and connections in whole circuit between generator minus terminal to ammeter shunt connectors.

Rheostats type WS-25AM with knobs are mounted on helicopters with serial numbers 31.01 and subsequent.

3. Generators parallel operation check.

After completing the current adjustment check again each generator operation separately.

Set engines rpm between 61 to 87.5 per cent and vary current load.

Voltage should remain between 26.3 and 29.7 at any load.



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Enclosure 5

KI-13AK COMPASS LIGROIN REFILLING

In order to check and refill ligroin in the KI-13AK compass, remove the compass from the helicopter.

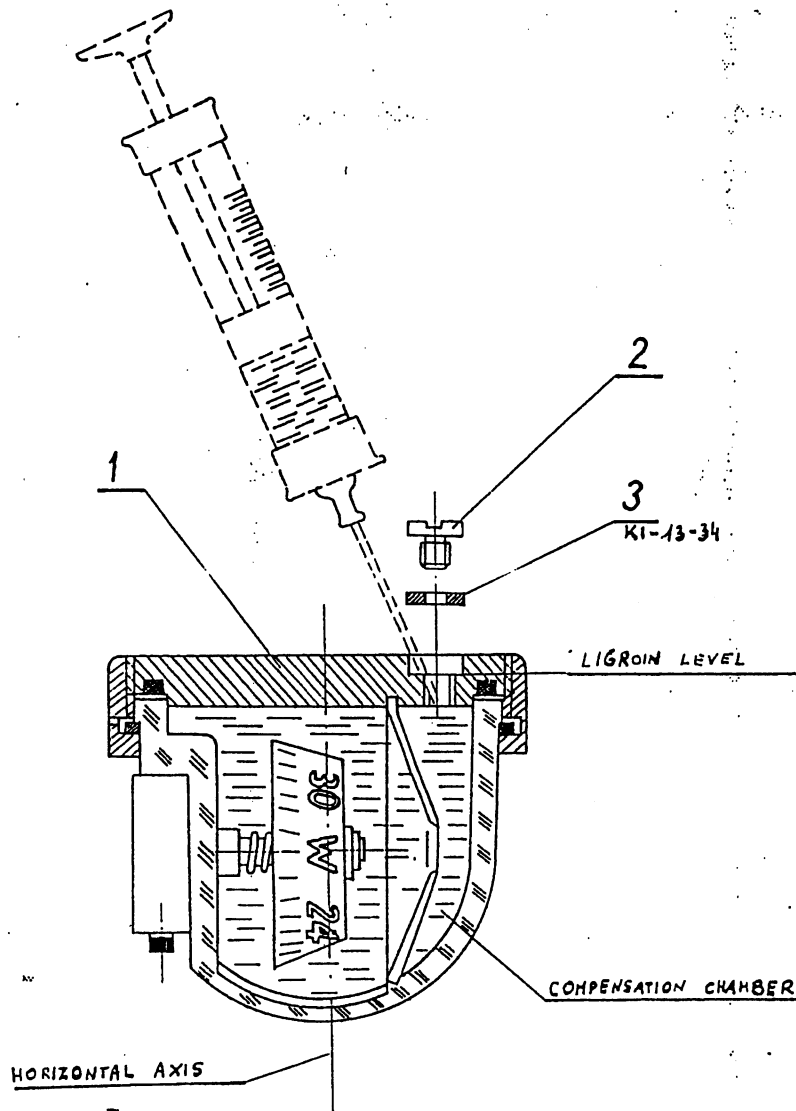
1. Check the ligroin level by turning compass slowly by  $360^\circ$  around its horizontal axis. If air bubbles are seen in the window it means that the ligroin is below allowable level.
2. Tapping slightly the compass with a finger, turn the compass around its horizontal axis to force the air bubbles back into the compensation chamber.
3. Set the compass with cover /1/ upwards /see Fig. 2.5.1/.
4. Using the screwdriver, undo plug /2/ with rubber gasket /3/.
5. Using a 2 ccm capacity siringe, inject needed amount of ligroin through the hole in the cover.
6. Covering the hole with a finger, repeat operation given in item 2.
7. Set the compass window upwards. No air bubbles should appear in the window. If air bubble appears in the window till more ligroin into compensation chamber.
8. Turn compass cover upwards and slightly tap it with a finger so that air bubbles are entirely removed. Next using a siringe fill the chamber with ligroin to the top /see Fig. 2.5.1/.
9. Using a siringe withdraw  $1.2 \pm 0.1$  ccm of ligroin volume variation due to changes of temperature.
10. Check condition of the rubber gasket for wearing. If the gasket is damaged, replace it with a new one.
11. Check compass for air bubbles acc. to item 1.
12. Insert the rubber gasket on the plug and screw it in the compass cover using a screwdriver. Take care when screwing in the plug, as either too loose or too hard tightening damaging the gasket will cause the compass to lose its air-tightness.
13. Install the compass into the helicopter and perform its compensation.

NOTE:

1. Compasses manufactured after 1969.08.01 must be mounted in clamping rings supplied with compass.
2. Compass sets installed on helicopters manufactured after 1970.01.01 are supplied with spare gaskets KI-13-34.



3. On helicopters from No.27.01 the steel nut 3310A-5 and washer 15A49-5 attaching lighting system to KI-13AK compass are replaced by 4 duralumin nuts 3313A-5 due to negative influence of steel nuts to compass readings.



2.5.1. Refilling KI-13AK compass with ligroin



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Enclosure 6

GRINDING IN OF CONVERTOR, GENERATOR AND MOTOR BRUSHES

1. CONVERTER BRUSHES GRINDING IN

Newly installed brushes must be ground-in.

Prepare an abrasive paper strip, the width of the strip being equal to commutator race or slip-ring width. Use abrasive paper with grain diameter 8 to 12 according to the GOST3647-59 standard.

Insert the strip between brushes and commutator or slip-ring, abrasive side outwards. Turn rotor by hand in its rotation direction till the brushes are roughly ground in. Remove abrasive paper strip and clean the converter with compressed air stream. Operate the converter on idle, running for 2 or 3 hours to fully grind in the brushes. Brushes grinding is completed if 70 or 80 per cent of brush contact area is smoothly polished.

2. THE GO16PCz8 GENERATOR BRUSHES GRINDING IN

a/ Prepare a glass paper strip of the width equal to ring width and wind the strip round the ring, abrasive side outwards; counter to operation direction. All brushes must be lifted up when winding the glass paper round the ring.

b/ Insert brushes in brush holders and press with spring.

c/ Install a handle on multilegged end of generator shaft and turn the shaft by hands to grind in brushes.

After grinding in, the brushes can not be shorter by more than 0.5 mm than the initial height. Clean the generator with compressed air stream and run generator with no load connected till 70 to 80 per cent of contact area is smoothly polished.

Check brush springs pressure: Insert a brush 23.5 mm high into a brush holder and lift the springs above brush surface by means of dynamometer.

Pressure should be equal to 5.5 up to 6.0 N.

3. MOTOR BRUSHES GRINDING IN

Remove the motor from helicopter to replace brushes.

New brushes should be grinded in so as to get contact area: less than 75 per cent of brush operating area.

Perform rough grinding in of brushes in the following manner:

Prepare an abrasive cloth strip of the width equal to commutator width, 300 to 400 mm long.

Use abrasive cloth strip type BTS-180 /GOST5009-52/ or abrasive paper.

Insert the strip so as to cover approximately 180° of the commutator, abrasive side outwards /to the brushes/.

Pull out strip ends through casing windows.

Insert the brush into brush holder and press it with a spring.

Move the abrasive strip /pull strip ends/ over collector surface till the brush surface fits tight to the collector.

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During grinding in, do not diminish brush height by more than 0.5 up to 0.6 mm.  
After rough grinding clean and run the motor with no load for 2.5 to 3 hours,  
use 8 to 10V supply voltage/ till 70 to 80 per cent of contact area is smoothly polished.  
After completing grinding in and polishing, remove dust created by these operations.

4. THE STG-3 STARTER-GENERATOR BRUSHES GRINDING IN

The STG-3 starter-generator brushes grinding in procedure is the same as described in Item 2.

Do not grind in STG-3 brushes in starter-operation mode with no load connected,



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Enclosure 7

CONVERSION TABLE FOR CHECKING THE KES-2097A FUEL GAUGE ON THE UPT-48M TEST STAND

V /1/	mm
0	+ 90
50	+ 73.5
100	+57.3
150	+ 42.1
200	+ 28.6
250	+ 14.4
300	0.0
350	- 12.6
400	- 26.0
450	- 39.2

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Enclosure 8

ITG-1 TEMPERATURE INDICATOR CALIBRATION DATA

Indicator gradua- tions to be checked	Input voltage /mV, below/ at specified ambient temperature /°C/										
	15	16	17	18	19	20	21	22	23	24	25
200	7.53	7.49	7.45	7.41	7.37	7.33	7.29	7.25	7.21	7.17	7.13
300	11.61	11.57	11.53	11.49	11.45	11.41	11.37	11.33	11.29	11.25	11.21
400	15.80	15.76	15.72	15.68	15.64	15.60	15.56	15.52	15.48	15.44	15.40
500	20.05	20.01	19.97	19.93	19.89	19.85	19.81	19.77	19.73	19.69	19.65
600	24.31	24.27	24.23	24.19	24.15	24.11	24.07	24.03	23.99	23.95	23.91
700	28.55	28.51	28.47	28.43	28.39	28.35	28.31	28.27	28.23	28.19	28.15
800	32.72	32.68	32.64	32.60	32.56	32.52	32.48	32.44	32.40	32.36	32.32
900	36.77	36.73	36.69	36.65	36.61	36.57	36.53	36.49	36.45	36.41	36.37
1000	40.72	40.68	40.64	40.60	40.56	40.52	40.48	40.44	40.40	40.36	40.32
1100	44.56	44.52	44.48	44.44	44.40	44.36	44.32	44.28	44.24	44.20	44.16





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Enclosure 9

LIST OF MEASURING INSTRUMENTS AND TESTERS FOR PERIODICAL AND ROUTINE MAINTENANCE  
OF MI-2 HELICOPTER EQUIPMENT

Item	Instrument description	Type	Purpose
1	2	3	4
1.	DC ammeter, range: 0.3A, 0.75A, 1.5A, 7.5A, 15A, 30A, 75A, 150A.	M45MT Class 1	Measurement of DC current input of electrical equipment
2.	DC voltmeter, range: 3V, 7.5V, 15V, 30V.	M45MT Class 1	Measurement of DC voltage
3.	Panel mounted AC ammeter; 400 Hz; range: 10 A.	E421T	Measurement of AC current input by test stands
4.	Panel mounted AC voltmeter; 400 Hz; range: 150 or 300 V.	E421 Class 2.5	Measurement of AC consumption by test stands
5.	AC ammeter, range: 10A, 50A, 100 A; 400 Hz	Optional Class 1	Measurement of AC consumption by electrical equipment
6.	AC voltmeter, range: 10V, 50V, 100V; - 400 Hz	Optional Class 1	Measurement of AC consumption by electrical equipment
7.	Multifunction meter	C4313 or TT-1	Measurement of AC and DC voltage amperage and resistance
8.	Megohmmeter ; 500V DC rating	M110M	Insulation resistance measurement
9.	Wheatstone bridge	Optional	Measurement of blade heater components resistance
10.	Low resistance meter- min. operating range $10^{-4}$ Ohms	Optional	Measurement of grounding resistance and transient resistance of minus terminals

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1	2	3	4
11.	Decade rheostat, range: 10x1, 10x10, 10x100, 10x1000 Ohms	Optional Class 1	Regulation of AOS-81MB2 windscreen heating control unit
12	Standard pressure gauge; range: 0 to 0.5 kg/cm <sup>2</sup>	Optional Class 0.4	Checking of pressure indicators type SD-16A and SC-13
13	GIK-1 gyromagnetic compass test stand	UPK-3 II series	Checking GIK-1 compass at periodical inspections
14	Tachometer test stand	KTU-1M	Checking tachometers at servicing inspections
15	Test stand	UPG-4B	Checking of attitude indicators
16	Test stand	UPT-4BM	Checking of fuel indicators
17	Test stand	XS-3	Checking of aneroids and manometers
18	Test stand	KPU-3	Checking tightness of aneroids and manometers
19	Test stand	GUPM-300	Checking pneumatic pressure gauges
20	Spring dynamometer range: 0 to 1.5 kg/cm <sup>2</sup>	Optional	Checking pressing force of wipers and motor and converter brushes
21	ADF test set	IRK-2	Ramp testing of ARK-9 ADE.
22	Test kit	KSR-2 KSR-5	Checking of R-860 transceiver
23	Modulator factor and current meter	ITM-1M or ITM-5M	Ramp testing of R-860 transceiver
24	Output voltage meter; input resistance 20 kilohms range 15 to 30 V	W3-10A or IW-4	Output voltage measurement of transceiver and ADF
25	Electronic tube tester	LZ-1	Checking of GU-17 tube of R-860 transceiver



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1	2	3	4
26.	Cathode voltmeter	WKT-3 A4-M2	Checking of radar altimeter and R-860 transceivers /range: 30V, 9.5V, .11,5V/
27.	Tester with power meter	T-1	Maintenance of RW-UM units
28.	Oscilloscope	EO-6 or any other type	Monitoring waveforms in electronic equipment /ARK-9, RW-UM/
29.	High sensitivity power meter	MZ-1 IMM-6	Measuring power of RF currents
30.	Audio generator	GZ-3 GZ-4A ZG-12M	Checking radar altimeters: RW-UM /82-142 Hz and 2 kHz/, RW-3 /0.5 to 65 kHz/
31.	VHF generator	GSS-12 or G5-7A GSS-7	Checking of R-860 transceiver range: 115 to 140 MHz

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1	2	3	4
39.	Frequency counter	Cz3-1	Measuring frequency of RW-3
40.	Voltmeter	W3-2A	Measuring voltage of RW-3
41.	Oscilloscope	SI-5 SI-1	Monitoring waveform during inspection of RW-3
42.	Stopwatch	PW-53SzCz	Checking "dangerous height" signal length of RW-3
43.	Portable compensator	Optional	Checking of ITG-1 temperature indicator
44.	Precision resistor $7.5 \pm 0.050\text{ohms}$	Optional	Checking of ITG-1 temperature indicator
45.	Tester	TPS-3	Checking of RIO-3

NOTE: 1. Items 3 and 4 are to be installed on stationary test stands.

2. Items in column 3 are products made in the USSR.



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Enclosure 10

EKS-46 FLARE LAUNCHER SERVICING

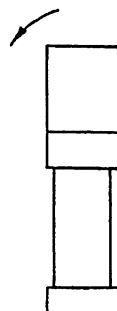
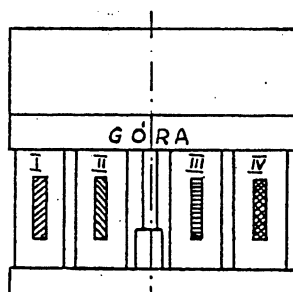
1. During preflight inspection load the launcher /if necessary/ with flares and ignitors,  
To load the launcher proceed as follows:
  - 1.1. Check if all buttons on flare launcher panel are out, turn off flare launcher circuit breaker, set the switch on control panel to "OFF" position.
  - 1.2. Unlock and unscrew cassette tightening bolt.
  - 1.3. Pull out the magazine-lock 6 to 8 mm away from the barrel set and deflect it by 90° /Fig.2.10.1/
  - 1.4. Pull out cassette /the barrel set with the magazine-lock/.
  - 1.5. Insert flare cartridge into the barrels according to coloured marks inside the cassette.
  - 1.6. Push the magazine-lock to its primary position.
  - 1.7. Insert ignitors in magazine ignitors seats and turn the spring push handle by 90° to fix the ignitors.
  - 1.8. Insert the loaded cassette into the launcher.  
Tighten and lock cassette bolt. When reloading the cassette repeat steps 1.1. through 1.3. remove used shells from the cassette and repeat steps 1.4 through 1.8.
2. In order to ensure reliable operation of the flare launcher, check operation of its components before and after used as follows:
  - 2.1. After launcher discharge clean and wipe dry barrels and ignitor seats. Coat blacken surfaces with thin grease layer.
  - 2.2. Before launcher loading check and clean firing pin holes.
  - 2.3. Before and after usage check electrical ignition circuit.  
Contacts must be clean and reliably connected.
3. Small chips and flaws on carbolit parts which do not disturb launcher operation are allowable.
4. In case of wrong operation of the ignition circuit check soldered contacts of the connector and connector board.
5. Flare launchers dismounted from the helicopter should be stored in dry room at approximately constant temperature. In case of prolonged storage flare launchers should be periodically checked, cleaned and greased anew.

NOTE: When reloading the launcher mount the cassette as shown on Fig. 2.10.1 /inscription "GÓRA" /TOP/ upwards/.



### Cassette description

### How to insert cassette



magazine

### Colours:

- 1 - yellow
- 2 - green
- 3 - red
- 4 - white

### 2.10.1. The EKSR-46 flare launcher cassette

### CAUTION

THE SWITCH "FLARES" ON THE CONTROL PANEL MAY BE SET UP IN POSITION "ON" ONLY WHEN IT IS SURE THAT THE FLARE FIRING SWITCHES ARE RELEASED. CHECKING CONSISTS IN PRESSING AND RELEASING THE SWITCH. THE RELEASING MUST BE ACCOMPANIED BY SLIGHT RATTLE CAUSED BY BREAKING THE RESISTANCE THRESHOLD IN EACH SWITCH.



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Enclosure 11

LOCATION OF SOME EQUIPMENT, CONNECTORS, TERMINAL PLATES AND WIRE BUNDLES  
OVER THE FUSELAGE

List of equipment shown on Fig. Z.II.1 and Z.II.2

No.	Type	Figure and scheme number	Location
1	2	3	4
115	ST-1A	50.70.030.00.00	Main gearbox
130	2PT32P12ESz1	50.70.010.00.00; -030;-070	L.H. engine
131	2RT32P12ESz1	50.70.030.00.00; -030;-070	R.H. engine
262	A-802A	50.70.050.00.00	Rear door framing
286	ID	50.70.100.00.00	Tail boom
317	ECN-75	50.70.040.00.00	Main fuel tank
370	P-1	50.70.030.00.00	Main gearbox compartment
395	KES-2097A	50.70.040.00.00	Main fuel tank
412	SzR60PK47NSz2	50.70.020.00.00; -50;-70;-100	No. 9F frame
413	SzR60PK47NSz2	50.70.020.00.00; -50;-060;-070;-100	No. 9F frame
414	SzR60PK47NSz2	50.70.020.00.00; -030;-050;-060;-070;-090;	No. 9F frame
415	SzR60PK47NSz2	50.70.020.00.00; -070;-090	No. 9F frame
416	SzR60PK47NSz2	50.70.010.00.00; -040	Under the DC distribution plate /CRU/
430	SzR48PK20NG4	50.70.040.00.00; -060;-080;-100	Under cyclic stick handle
454	75K	50.70.070.00.00;	Engine compartment
455	74K	50.70.040.00.00 :	Under cockpit floor
460	SzR20PK4NSz8	50.70.050.00.00; -070	Tail boom
465	73K	50.70.050.00.00	No. 4F frame
540	SzRG32P12NSz1 SzRG32P12ESz1	50.70.060.00.00	No. 6F frame
541	SzRG32P12NSz1 SzRG32P12ESz1	50.70.060.00.00	No. 6F frame
608	SzRG28PK7NSz9	50.70.090.00.00	Main gearbox compartment
609	SzRC28PK7NSz9	50.70.090.00.00	Main gearbox compartment

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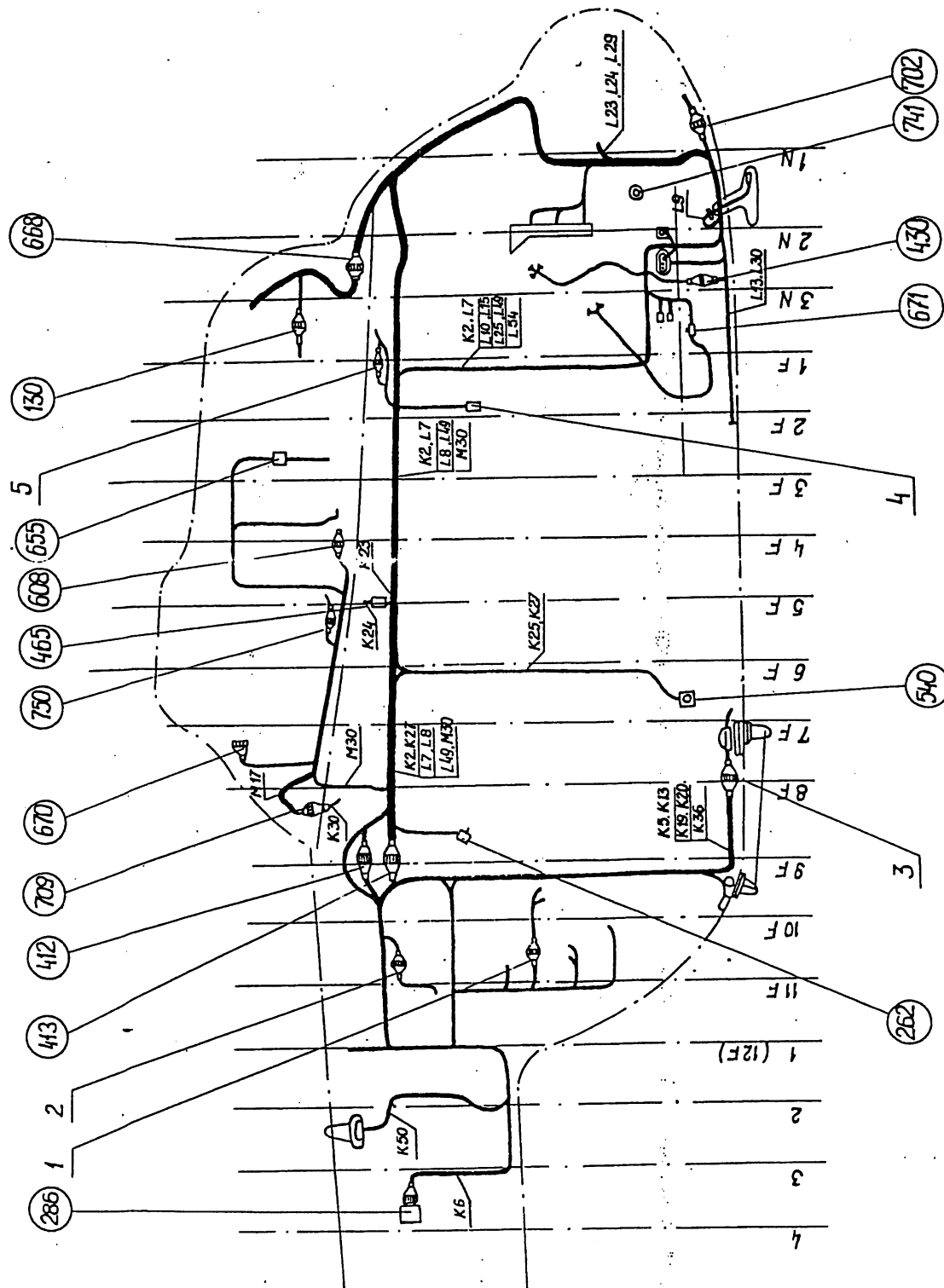
1	2	3	4
656	K-82	50.70.030.00.00	L.H. engine
657	K-82	50.70.030.00.00	R.H. engine
668	SzR55PK23NSz1 SzR55P23NSz1	50.70.010.00.00; -030;-070;	In front of engines
669	SzRG55PK23NSz1 SzR55P23NSz1	50.70.010.00.00; -030;-070	In front of engines
670	SzR48P20NG1 SzR48P20EG1	50.70.020.00.00; -070	Heating system panel
671	75K	50.70.050.00.00; -080	Under collective pitch lever
702	SzR48PK26NSz2	50.70.010.00.00; -040;-060	Under DC distribution plate /CRU/
703	SzR60P47ESz2 SzR60P47NSz2	50.70.020.00.00; -070;-100	AC distribution box /RK/
709	SzR36PK5NSz1	50.70.020.00.00;	Behind No. 8F frame
710	SzR36PK5NSz11	50.70.020.00.00; -060;-070	No. 9E frame
711	SzR60PK47NG2	50.70.010.00.00; -030;-050;-070	Main gearbox compartment
712	SzR60PK47NSz2	50.70.020.00.00; -070;-90	Main gearbox compartment
736	SzR20PK3NG6	50.70.080.00.00;	Under fuselage
737	SzR20PK3EG6	50.70.080.00.00	On fuselage skin
741	SzR48PK26NG2	50.70.060.00.00	Left wall of cockpit
742	SzR48P20ESz1	50.70.060.00.00	In radio compartment at AC distribution box
750	SzR36PK5NG11	50.70.070.00.00	Under main gearbox
782	SzR60P47NG2 SzR60PK47NG2	50.70.040.00.00; -050;-80;-100	Under cockpit floor

- 1 - PO-250 converter connector
- 2 - RW-UM radar altimeter connector
- 3 - ARK-9 loop antenna connector
- 4 - Copilot headphone connector
- 5 - Copilot intercom connector
- 6 - Refuelling control



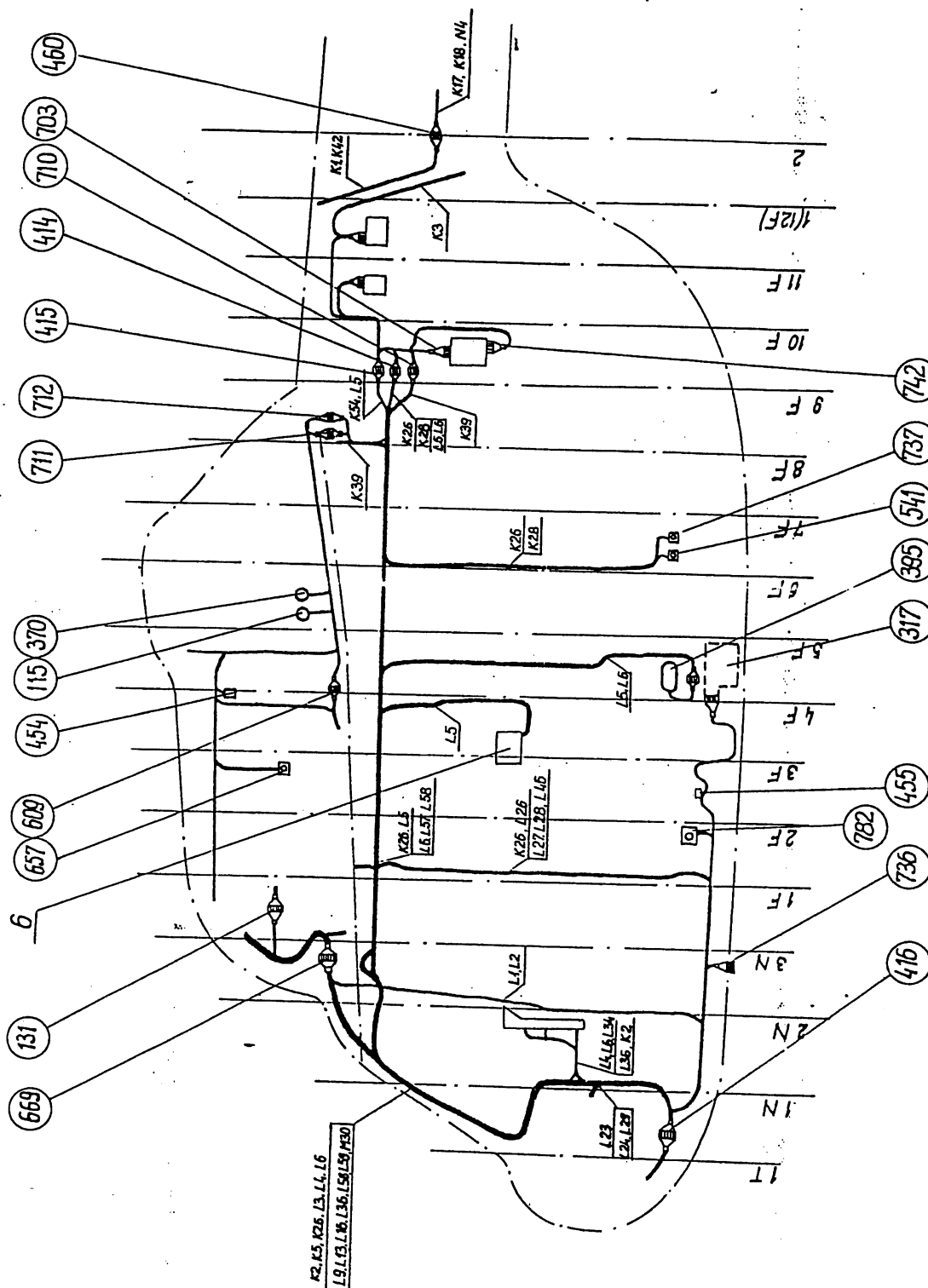


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Z.11.1 Location of connectors, some equipment, terminal plates and wire bundles over the fuselage

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Z.11.2 Location of connectors, some equipment, terminal plates and wire bundles over the fuselage



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Enclosure 12

RS 6105 /RS 6105M/ TRANSCEIVER DATA CHECK

1. Current input check

Check the transmitter input current according to measuring system given in Fig. 2.12.1.

Input current corresponds to emission of the transmitter without modulation - input current should not exceed 4.5 A.

Check the receiver input current according to the measuring system given in Fig. 2.12.1. which corresponds to the conditions of audio reception with switched off squelching - input current should not exceed 1.4 A.

Measurement of the transmitter's and receiver's power should be carried out at the display digits maximum lighting intensity /illuminate the control panel front plate/.

2. Squelch efficiency check

Checking the receiver squelching should be carried out according to the measuring system given in Fig. 2.12.2.

Setting up the input voltage from high frequencies generator G equal to  $2\mu\text{V}$  and alternately  $20\mu\text{V}$ , check the system capability to achieve desired output power decay measured at WA. It should be done by turning the adjustable regulator of the squelching in the transceiver unit. The squelching operation threshold, should be adjustable in the range of  $2 \pm 20\mu\text{V}$  of the input voltage which is in 30% modulated by the signal of 1000 Hz on the channel nominal frequency. At the time of the squelch operation the receiver output power should not exceed  $0.5\text{ mW}/600\Omega$ .

3. Measuring the low frequency transmitting bandwidth

Measurement of the low frequency bandwidth should be carried out according the measuring system given in Fig. 2.12.2.

The receiver output power should not change more than 6 dB in the 350-2700 Hz bandwidth at HF constant input signal equal to  $50\mu\text{V}$  modulated in 30% range.

4. Checking the receiver automatic gain control operation

The measurement should be carried out according to the measuring system given in Fig. 2.12.2.

The automatic gain control should operate in such a way that at changing the HF input signal in the range of  $5\mu\text{V}$  to 100 mV modulated in its 30% by frequency of 1000 Hz, the L.F. output power change should not exceed 6 dB. At the HF input signal equal 1 V, the distortion electromotive force at the receiver output should not exceed 25% at the power rating.

5. Measuring the receiver audio power

The measurement should be carried out according to the measuring system given in Fig. 2.12.2.

The input signal equal to  $20\mu\text{V}$  modulated in its 30% by the frequency of 1000 Hz should produce at receiver output, the power not smaller than  $200\text{ mW}/600\Omega$  and at least  $100\text{ mW}/600\Omega$  at the input signal equal to  $2\mu\text{V}$ .



#### 6. Measuring distortion at the receiver output

The measurement should be carried out according to measuring system given in Fig. Z.12.2.  
Distortion at the rating power at the receiver output should not exceed 15% for HF signals equal to  $20\mu\text{V} + 10\text{ mV}$  modulated in its 85% with the frequency  $350 + 2700\text{ Hz}$ .

#### 7. Measuring the receiver noise level

The measurement should be carried out according to the measuring system given in Fig. Z.12.2.

In normal conditions attaining the condition  $\frac{S + N}{N} = 6\text{ dB}$  does not require HF signals greater than  $1.5\mu\text{V}$ .

For HF input signals ranging from  $100\mu\text{V}$  to  $100\text{ mV}$  modulated in their 30% by frequency of  $1000\text{ Hz}$ , the ratio  $\frac{S + N}{N}$  at the receiver output at the rated power should be at least 25 dB.

#### 8. Measuring the receiver sensitivity

The measurement should be carried out according to the measuring system given in Fig. Z.12.2.

The input voltage modulated in its 30% by frequency  $1000\text{ Hz}$  when the aim is achieving the ratio  $\frac{S + N}{N} = 6\text{ dB}$  on the receiver output should not exceed  $2\mu\text{V}$ .

#### 9. Measuring the receiver selectivity

The measurement should be carried out according to the measuring system given in Fig. Z.12.2.

For checking the requirements, the HF generator signal level should be set in such a way that the output power is 3 dB lower in relation to the power set for HF signal equal  $10\mu\text{V}$ .

- a/ The level of the input signal; for obtaining the reference power; the input signal should be at least 60 dB greater than the signal producing the reference power /acc. to item a/ at the tuning not greater than  $\pm 35\text{ kHz}$  for the RS6102 transceiver and  $\pm 17.5\text{ kHz}$  for the RS6102 B transceiver.
- b/ The level of the input signal; for obtaining the fixed reference output power the input signal should not change more than 6 dB for tuning min.  $\pm 14\text{ kHz}$  for the RS6102 A transceiver and  $\pm 7.5\text{ kHz}$  for the RS6102 B transceiver.
- c/ The level of the input signal; for obtaining the reference power; the input signal should be at least 80 dB greater than the signal producing the reference power /acc. to item a/ at its tuning in the bandwidth  $118 + 136\text{ MHz}$ . However, the distance from the channel nominal frequency may not be smaller than  $\pm 10\text{ MHz}$ . The above condition does not refer to the occurrence of unpredictable undesired frequencies.

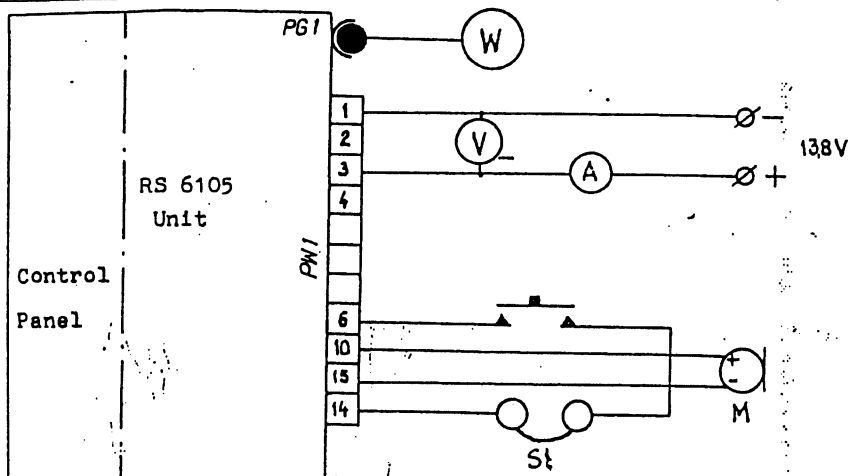
#### 10. Measuring the transmitter output power

The measurement should be carried out according to the measuring system given in Fig. Z.12.1

The output power should be at least  $5\text{ W}/50\Omega$ .



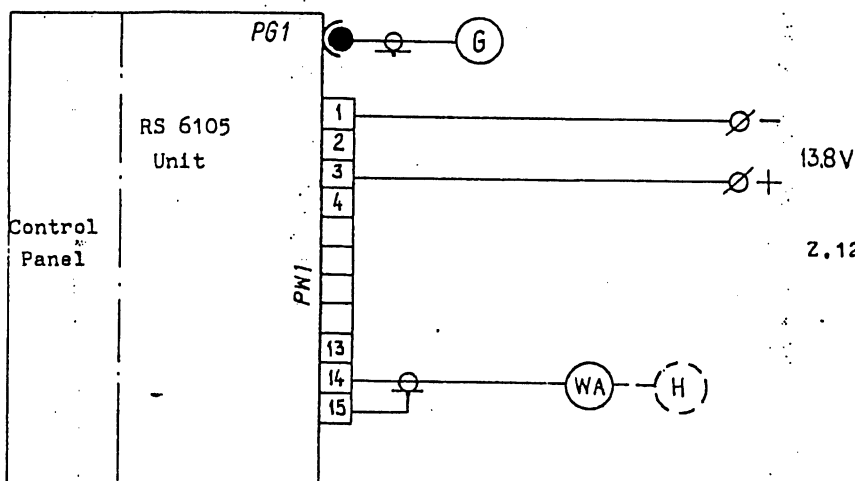
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Z.12.1. Current input  
measurement diagram

- A - the DC ammeter, class 1
- V - the DC voltmeter, class 0.5
- W - HF wattmeter up to 15W/50Ω
- M - carbon microphone 200 mV/200Ω
- P - transmitting key
- S1 - earphone 600 + 3000Ω

NOTE: It is allowed to measure the transmitter power by intermediate method by measuring HF current in the dummy antenna.



Z.12.2. Audio power, distortion,  
and receiver noise level  
measurement diagram

- G - HF generator 1 V - 200 mV modulated with 350-2700 Hz up to 85%
- WA - audio wattmeter 350-2700 Hz up to 1W/600Ω
- H - audio distortion meter



#### 11. Measuring the transmitter modulation factor

The measurement should be carried out according to the measuring system given in Fig. 2.12.3.

It ought to be possible to obtain at least 85% of modulation factor for the modulating signal of 1000 Hz at the input level greater than 200 mV.

#### 12. Measuring the transmitter non-linear distortions

The measurement should be carried out acc. to the measuring system given in Fig. 2.12.3.

The distortions should not exceed 15% in the transmitter demodulated signal for the frequency of 350, 1000 and 2700 Hz at constant level of the modulating signal which brings about 85% modulation depth for 1000 Hz. When the signal which raises 10 dB at the frequency 1 kHz, the distortion should not exceed 25%.

#### 13. Measuring the transceiver modulation characteristics

The measurement should be carried out acc. to the measuring system given in Fig. 2.12.3.

The modulation depth coefficient may not change more than 6 dB for modulation frequencies of 350-2700 Hz if the modulating signal is kept at constant level adjusted for obtaining 85% modulation depth for 1000 Hz.

#### 14. Measuring the level of transmitter noises

The measurement should be carried out according to Fig. 2.12.3.

The noise level in demodulated transmitter signal should be attenuated min. by 35 dB in relation to the level obtained at modulation of the transmitter by the tone 1000 Hz to the depth of 85%.

#### 15. Measuring the transmitter frequency tolerance

The measurement should be carried out according to the measuring system given in Fig. 2.12.4.

The maximal carrier frequency distortion of the transmitter may not exceed the value of  $30 \cdot 10^{-6}$ .

#### 16. Checking the voltage converter operation

At changing the supplying voltage from 22 V to 30 V the reducer output voltage should be  $13.7 \text{ V} \pm 10\%$ ,

NOTES: 1. If there has been no other decision, the checks should be carried out at frequencies: 118.00; 127.925; 128.05; 135.975 MHz.

2. If there has been no other decision, all parameter measurements of the receiver should be carried out with the squelching off.



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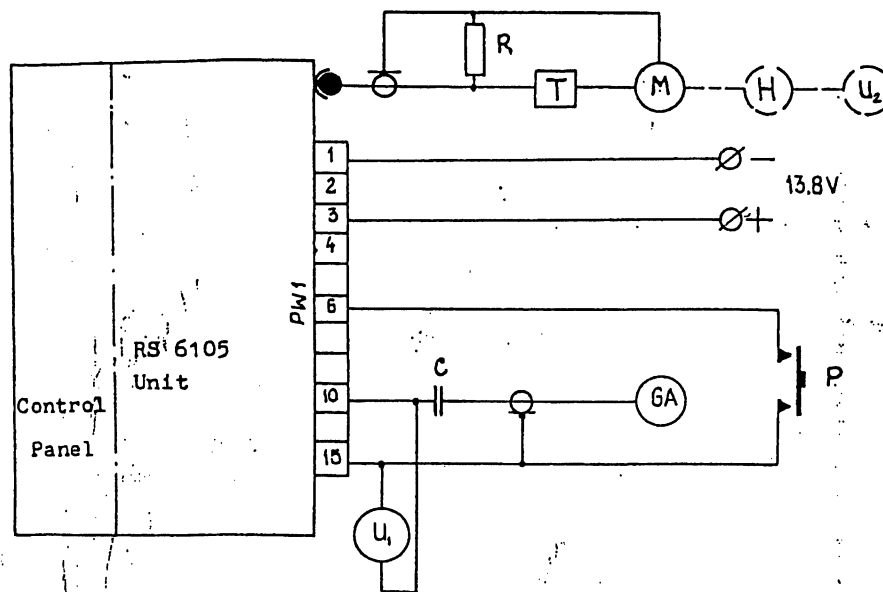


Fig. 2.12.3. The transmitter modulation factor and non-linear distortions measurement diagram.

- GA - audio generator 300 - 3000 Hz, from 100 mV up to 10 V  
C - condenser  $2\mu F/20V$   
U<sub>1</sub> - audio voltmeter 300 - 3000 Hz, 50 mV + 50 V  
R - HF measuring loading  $50\Omega \pm 2\%$  15 W  
T - damper ab. 20 dB at input impedance min. 500  $\Omega$   
M - the modulation depth meter 100 - 150 MHz  
P - transmitter switch  
H - audio distortion meter  
U<sub>2</sub> - the audio voltmeter 300 - 3000 Hz, 50 mV, 50 V

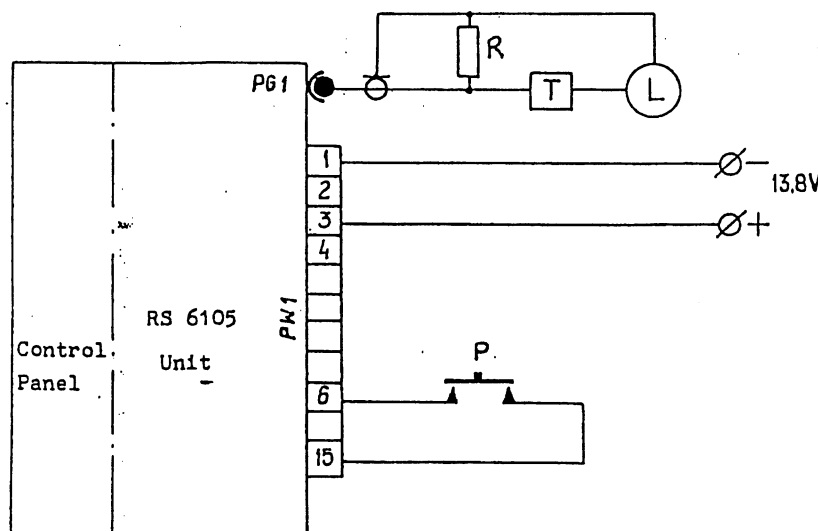


Fig. 12.4. The transmitter frequency tolerance measurement diagram

- R - HF measuring loading  $50\Omega \pm 2\%$ , 15 W  
T - damper ab. 20 dB of the input impedance min, 500  $\Omega$   
L - digital frequency meter 100 - 150 MHz  
P - transmitting key



Enclosure 13

G016PCz8-RS GENERATOR MAINTENANCE

Perform maintenance of G016PCz8-RS generator according to instructions applicable for G016PCz8-RS generator.

After 500 hrs operation of generator perform the following:

- replenish bearings with grease type WNII-NP-207;
- check disengaging device electromagnet circuit.

1. Procedure of replenishing grease.

Grease is replenished in the following way by means of a syringe;  
0.5 grams at the sliding ring side and 0.2 grams from drive side.

- turn syringe knob until grease appears at end fitting;
- set end fitting of syringe on greasing nipple and lock lever;
- turning syringe knob force desired amount of grease into bearing. The amount of forced in grease is determined according to syringe scale.

CAUTION

IT IS FORBIDDEN TO EXCEED THE ABOVE MENTIONED DOSAGE, AS THIS CAN CAUSE PREMATURE BEARING FAILURE. IT ALSO MAY CAUSE GREASE LEAKAGE INTO DISENGAGING DEVICE CAUSING MALFUNCTION OF DEVICE.

- disconnect syringe end fitting after 30 s from greasing.

2. Checking of disengaging device electromagnet circuit

To do so perform the following:

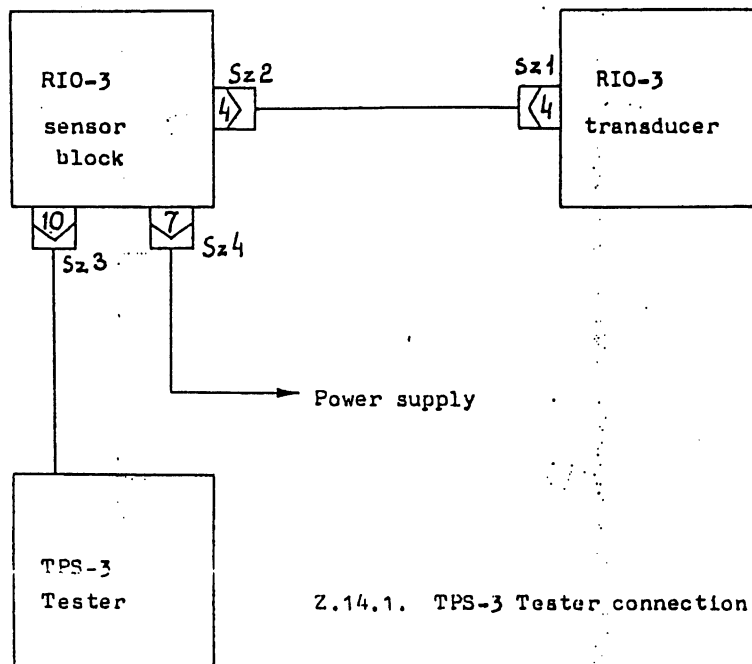
- remove terminal plate cover and terminal jointers;
- remove rubber hood from K2 terminal;
- connect ohmmeter leads /input 4.5V/ to K2 terminal and C3 or C5 terminal; next change lead connection ;
- electromagnet circuit is efficient if the ohmmeter indicates open circuit at one of connections and closed circuit at another connection. /There is a diode between K2 and C3 and K2 and C5.
- install back rubber hood, jointers and cover.

- NOTES:
1. Replace brushes if their height is worn down to 17 mm.  
To determine correct heightness of brushes installed in the generator, observe their wearing down ratio.
  2. Instead of ohmmeter, the UM multifunction meter or alike can be used as a control instrument.
  3. In cases when the disengaging device operates, replace generator.
  4. One turn of 886.455.000 /004.336/ syringe knob forces in approximately 0.8 to 1.0 g of grease.





CHECKING RIO-3 RADIOSCOPIC ICE DETECTOR



Z.14.1. TPS-3 Tester connection diagram

1. Initial preparation

1.1. External inspection

Perform external inspection of transducer and signalling sensor block. Remove protective sleeve from transducer.

There must be no traces of dents, cracks or deformation on transducer. Transducer surface must be free of dirt, dust, snow and the like.

NOTE: 1. Do not paint transducer surface.

2. Take care when inspecting transducer. Perform inspection quickly and replace protective sleeve.

Sensor block, dampers and wire bundles must not be damaged.

1.2. Signalling device operation check and adjustment.

Remove protective sleeve.

Remove plug from "CONTROL" socket on sensor block.

Connect Sz3 plug connector of TPS-3 tester to sensor block /joint CONTROL/ according to Fig. Z.14.1.



Switch on signalling device power supply /115V converter/ and the automatic switch "ANTI-ICING SIGNAL." situated on circuit breaker panel.

After 3 minutes check signalling device operation efficiency, by means of icing simulator, the following way:

- press ice simulator to transducer /ref. Fig.3.2/ section Nom 3 facewards. After max. 15 seconds the following three lights on tester must light up: "HEAT.SIGNL.", "SECTION" and "ICE BUILD-UP" light on the central panel.
- move ice simulator away from transducer. The "SIGNL." light should go off, next:  
after  $5 \pm 3$  s "HEAT." light should go off.  
after  $20 \pm \frac{20}{5}$  s "SECTION" and "ICE BUILD-UP" lights should go off.
- press ice simulator section No. 1 facewards to transducer /fig. 3.2./.  
No signalling lights should go on.

NOTE: To take an accurate measure of additional transducer heating and icing signalling, keep ice simulator Section No. 2 facewards to transducers for 50 seconds.

In cases when the signalling device operation does not comply with given data, adjust it by means of "SENSITIVITY" potentiometer situated on sensor block face plate.

## 2. Season maintenance

Check:

- the whole transducer heating system and condition of sealing rings on removable parts of Sz1 and Sz 2.
- insulation resistance of cable connecting transducer to sensor block and condition of sealing rings on removable parts Sz 2.

### 2.1. Checking of heater and transducer connectors

- unscrew removable parts of Sz1 connectors
- unscrew removable parts of Sz2 connectors
- measure resistance between terminals 2 and 3 of Sz1 connection, which should be  $4.4 \pm 0.2$  Ohms.  
The rubber sealing rings of connectors must not be damaged.

### 2.2. Checking resistance of sensor block cable and connectors

- unscrew removable parts of Sz1 and Sz2 connectors
- using a 500V inductive megohmmeter measure resistance between terminals 2 and 1 of Sz1 or Sz 2 removable parts.



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The resistance should not be less than 100 Ohms.

The rubber sealing rings of Sz2 connectors must be undamaged.

### 2.3. Final work

Connect connectors and safety lock them.

Perform initial preparations works.



Enclosure 15

### REPLACEMENT OF SOME EQUIPMENT

NOTE: Having replaced the equipment written down in the helicopter or engine log book, report this in the a.m. log book.

#### 1. REPLACEMENT OF AGK-47W ATTITUDE INDICATOR

##### 1.1 Removal

1. Cut the lock wire and disconnect the electrical connector from the attitude indicator /1/ /Fig. Z.15.1/.
2. Open the PSG light cover, undo two screws /3/, remove washers /4/ and disconnect the PSG light from the attitude indicator /1/.
- Screw the screws /3/ with washers /4/ in the indicator body.
3. Undo four screws /5/ with washers /6/ and remove the indicator from the instrument panel.
4. Screw the screws /5/ with washers /6/ in the indicator body.

##### 1.2 Installation

1. Level the helicopter in accordance with a field leveling device. Position the attitude indicator in the instrument panel.
2. Temporarily fix the indicator using four screws /5/ and washers /6/ previously undone from the indicator body.
3. Undo two screws /3/ from the indicator, apply the previously removed washers /4/ on the screws and fix with them the PSG light to the attitude indicator.



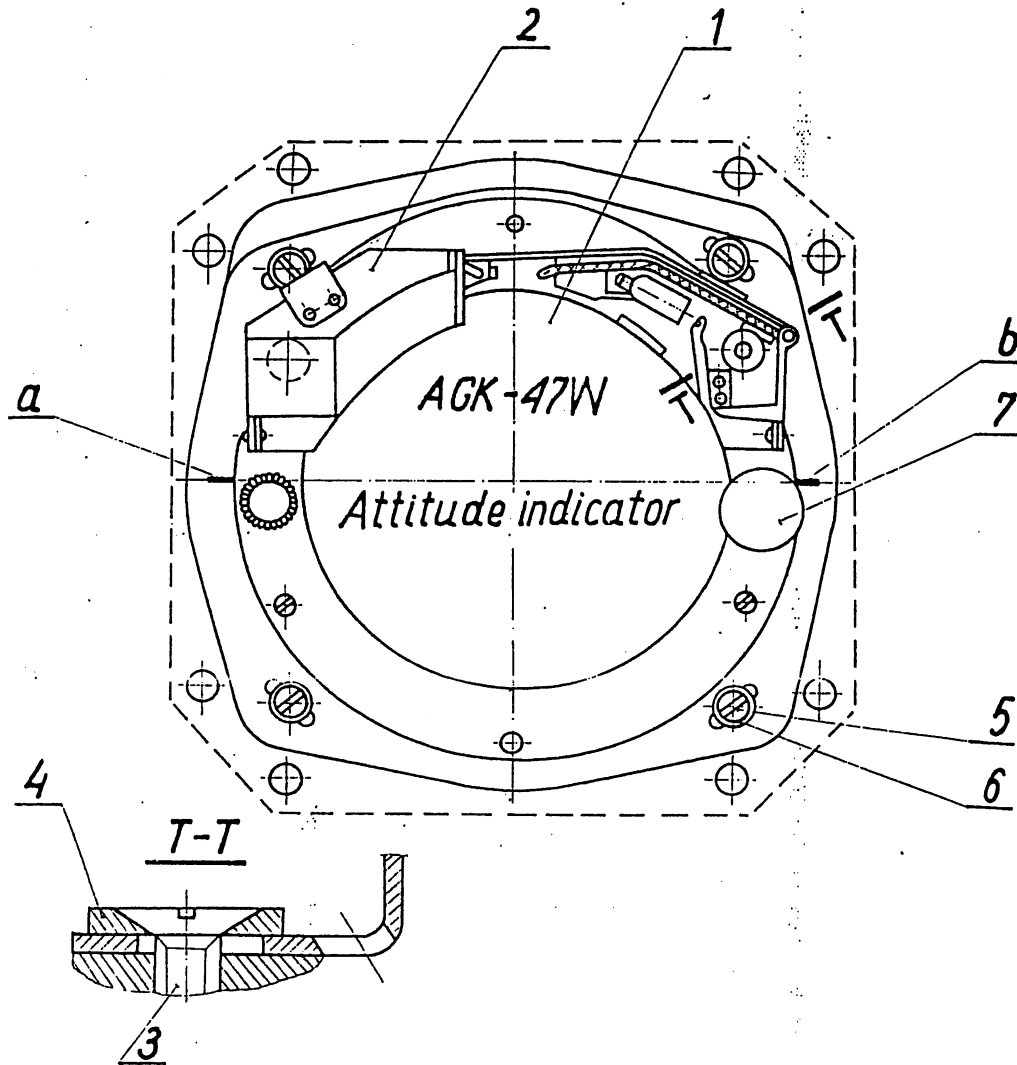
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4. Connect the connector to the attitude indicator and secure it with the lock wire KO  $\phi$  0,6.
5. Switch on power supply and check the attitude indicator operation, release the locking pull rod /7/ - the airplane miniature should overlap the horizon line with accuracy  $\pm 1$  mm. The bank indicator ball should be in the central position.
6. If the miniature and the ball are not in the position stated in para 5, loosen the screws /5/, then set the ball and the miniature in the correct position and tighten the screws.
7. Switch off power supply and lock the attitude indicator.
8. Using red paint, type AG-7P, mark two dashes on the indicator body in points "a" and "b", Fig. 2.15.1 so that they are in alignment with the old dashes, located in the instrument panel.

Equipment list

Item	Nomenclature	Type	Q-ty per 1 helicopter	Remarks
1.	Attitude indicator	AGK-47W	2	



2.15.1 AGK-47W attitude indicator installation

1. Attitude indicator
2. PSG light
3. Screw
4. Washer
5. Screw
6. Washer
7. Locking pull rod



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2. REPLACEMENT OF M180 AND M190 GROUPS OF CONDUCTORS

The groups shall be replaced with engines being removed.

2.1 Removal

1. Remove the lock wire and disconnect the connector /608/ of the M180 group /Fig. Z.15.2/ in the LH engine compartment.
2. Undo the nuts and screws and remove them with washers and clips fastening the M180 groups /Fig. Z.15.2 and Z.15.4/.
3. Undo the nuts, remove the washers, remove the screws fixing the DTBG detectors /9 off/ /Fig. Z.15.2 and Z.15.3/.
4. Remove the M180 group and disconnect the detector sockets.
5. Remove the lock wire and disconnect the connector /609/ of the M190 group in the RH engine compartment.
6. Repeat the same operations as per paras 2-4 for the M190 group in the RH engine compartment.

2.2 Installation

1. Lay the M180 group in the LH engine compartment.
2. Position the DTBG detector sockets on the brackets acc. to Fig. Z.15.3.
3. Connect the connector /608/ of the M180 group /Fig. Z.15.2 and Z.15.5/ and secure it with lock wire.
4. Fasten the M180 group of conductors /Fig. Z.15.2 and Z.15.4/.
5. Screw in the previously removed DTBG detectors to the sockets and secure with lock wire KO  $\phi$  0,6.
6. Repeat the same operations as per paras 1 + 5 for the M190 group of conductors in the RH engine compartment.
7. Check the fire extinguishing system acc. to the "Maintenance Manual - Equipment" /Chapter 3, section 3.1.1.8/.

NOTE: Prior to installation of the M180 and M190 groups in the helicopter, solder the previously removed detector sockets using solder, type POS-61 acc. to the diagram 50.70.090.00.00.

List of products

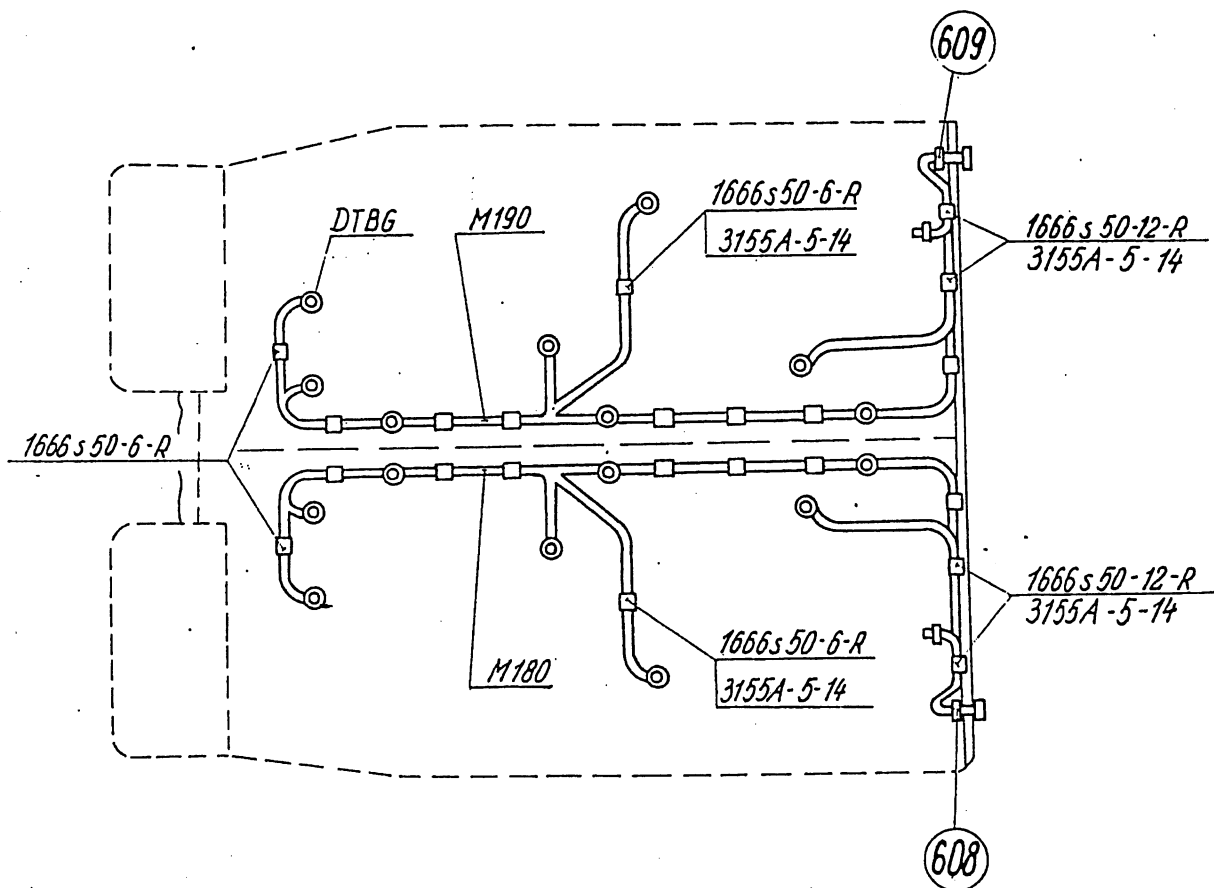
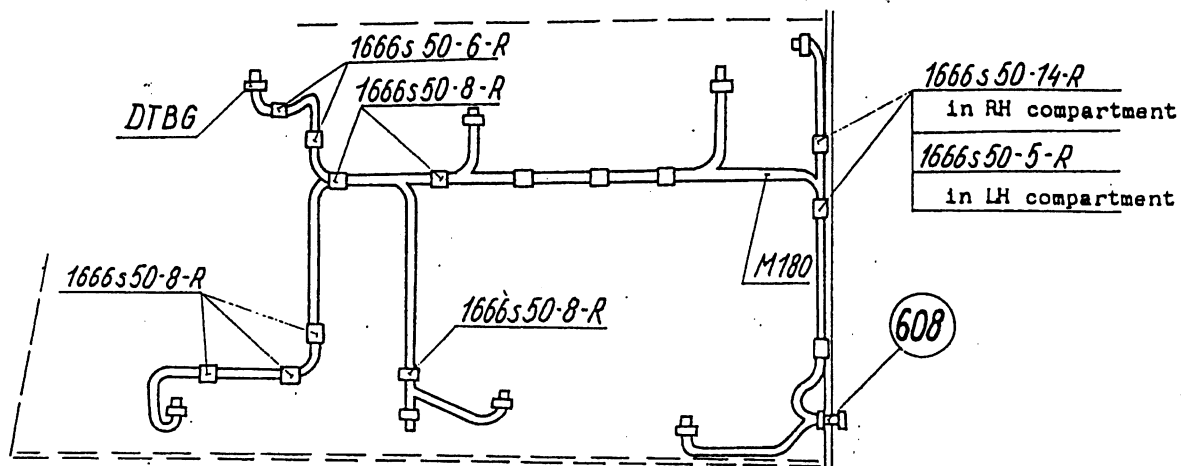
Item	Nomenclature	Drawing No. or designation	Qty per 1 helicopter	Remarks
1.	M180 group	50.71.288.00.01	1	sockets from the groups removed from the helicopter
2.	M190 group	50.71.299.00.01	1	
3.	Clip	1666s50-8-R	22	
4.	Clip	1666s50-6-R	12	
5.	Clip	1666s50-12-R	4	
6.	Clip	1666s50-14-R	2	
7.	Screw	3166A-5-22	11	
8.	Screw	3166A-5-14	8	
9.	Screw	3155-5-14	8	
10.	Nut	3373A-5	11	
11.	Screw	3155A-5-22	1	

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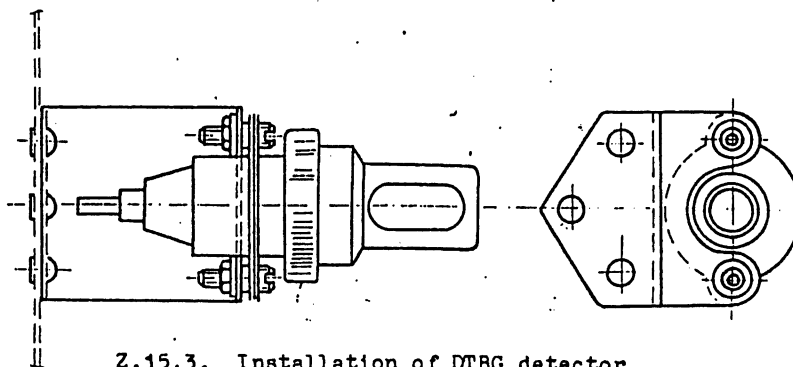
Z.15.2. Location of M180 and M190 groups of conductors



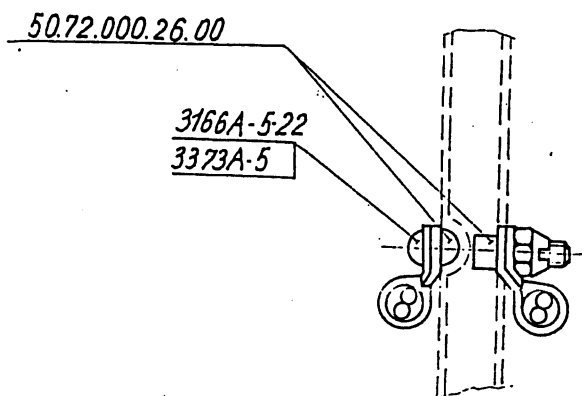


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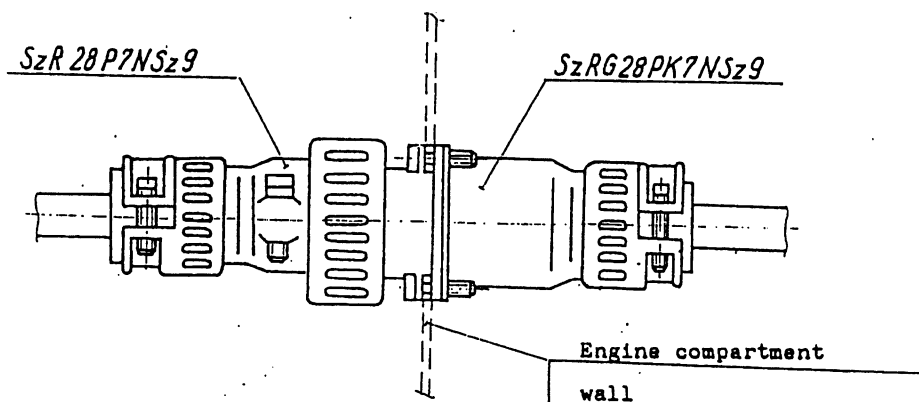
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2.15.3. Installation of DTBG detector



2.15.4. Installation of groups of conductors



2.15.5. Installation of the connector /608/ or /609/

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3. REPLACEMENT OF GROUP OF CONDUCTORS No. 50.39.220.00.00. FOR TAIL ROTOR BLADE HEATER
1. Cut the lock wire /KO  $\phi$  0,8/ securing six screws 3162A-4-20 /Fig. Z.15.6/.
  2. Undo the six screws 3162A-4-20 fixing the cover No. 50.39.200.05.00 and remove them with washers 3402A-0,7-4,2-7 /Fig. Z.15.6/.
  3. Remove the cover 50.39.200.05.00 and the washer 50.39.000.03.03 /Fig. Z.15.7/.
  4. Clean off the sealing compound from the cover 50.39.200.05.00 and washer 50.39.200.06.00.
  5. Undo two nuts 3323A-4 from the terminal plate, type WSK 5736-71, remove the washers 3408-0,8-4-8 and 15A49-4 and disconnect the connectors of the group No. 50.39.200.00.00 /Fig. Z.12.7/.
  6. Remove the bolts 3157A-4-14, yoke 50.39.200.09.00 and washer 50.39.200.07.00 /Fig. Z.15.6/.

NOTE: Before the yoke 50.39.200.09.00 has been removed mark its location with a pencil to avoid change the blade balance when reinstalling the yoke.

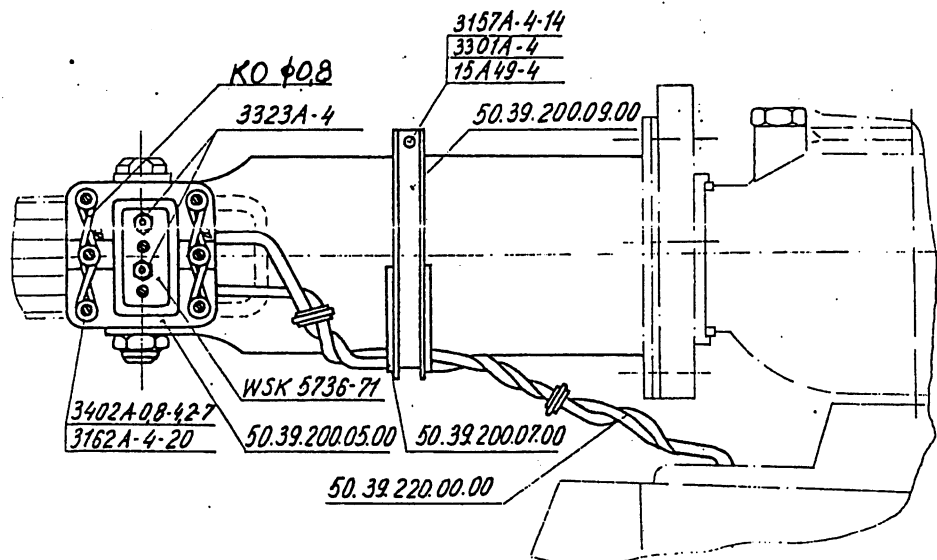
7. Cut the lock wire KO  $\phi$  0,8 securing three screws 3162A-4-12, undo the screws, remove the terminal plate 50.39.200.08.01 and slide off the rubber caps 50.73.14 /50.73.200.06.00/ from the terminals /Fig. Z.15.8, section "K-CK" and "C-C-CK"/. Unwrap the teflon band from the rubber caps 50.73.14 /50.73.200.06.00/.
8. Undo the nuts 3323A-4 /2 off/, remove the washers NG 182305 and NG 172227, unscrew and remove the group 50.39.220.00.00 from the current collector terminals.
9. Apply the rubber caps 50.73.14 /50.73.200.06.00/ onto the new group 50.73.200.06.00 from the side of terminals 50.71.501.12.00.
10. Connect the terminals 50.71.501.12.00 of the group 50.39.220.00.00 to the collector terminals, apply the washers NG 172227 and NG.182305 and screw in the nuts 3323A-4 /Fig. Z.15.8/.
11. Slide the rubber caps 50.73.200.06.00/ on the collector terminals, wrap the caps with threads and coat them with colourless varnish, type 17A.
12. Wrap the caps with a teflon band. Insert the washer 50.39.200.10.00 under the conductors and caps, and then install the terminal plate 50.39.200.08.01 from the top so that the rubber caps with conductors are in a recess in the plate 50.39.200.08.01 /Fig. Z.15.8/.
13. Fix the terminal plate 50.39.200.08.01 using the screws 3162A-4-12 /3 off/ and secure with a lock wire KO  $\phi$  0,8 /Fig. Z.15.8/.
14. Pull the end of the group 50.39.220.00.00 through the yoke 50.39.200.09.00, then install the yoke in the place previously marked /see para 6/ and secure the clamping bolt. /Fig. Z.15.6/.
15. Degrease the internal contact areas of the cover 50.39.200.05.00 and the plate 50.39.200.06.00 with spirit and coat with a sealing compound U30MES-5 /Fig. Z.15.7/.
16. Install the terminals 5837A-15-1 of the group 50.39.200.06.00 on the WSK-5736-71 plate terminals, apply the washers 3408A-0,8-4-8 and 15A49-4 and screw in the nuts 3323A-4. Mark the A67 red paint dashes on the nuts and install the washer 50.39.000.03.03 /Fig. Z.15.7/.
17. Install the cover 50.39.200.05.00 and tighten it with the screws 3162A-4-20 and washers 3402A-0,8-4,2-7 /Fig. Z.15.6/. Secure the screws with lock wire KO  $\phi$  0,8.



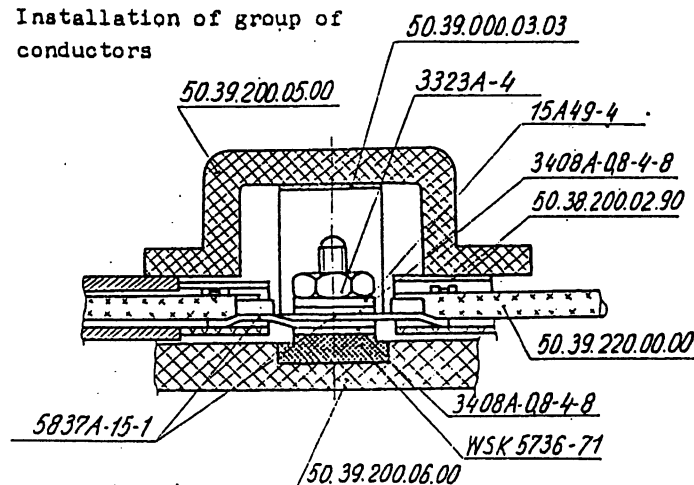
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18. Coat surface flaws /scratches/ using black paint, type EP-140.
19. Measure the insulation resistance. It should be  $0,7 \text{ M}\Omega$ .  
If the resistance is less than  $0,7 \text{ M}\Omega$ , make the teflon layer thicker /see para 12/ /Fig. Z.12.8/.
20. Perform the a/m operations for the second blade.
21. Check the anti-icing system acc. to the section 3.2.2.4 of the present Manual.

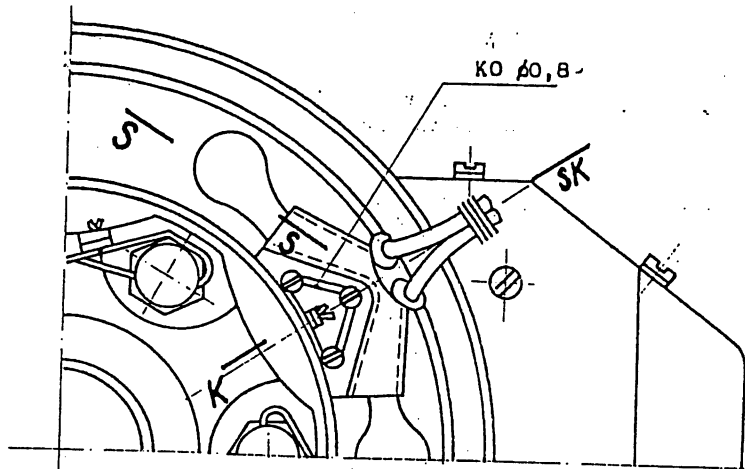


### Z.15.6. Installation of group of conductors

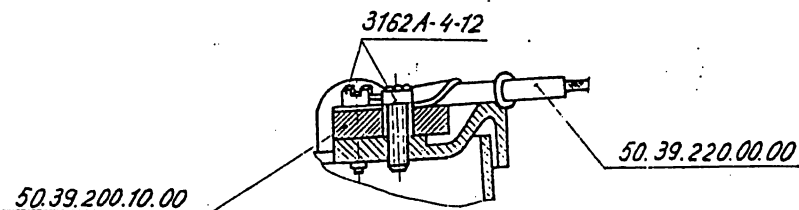


### Z.15.7. Installation of cover

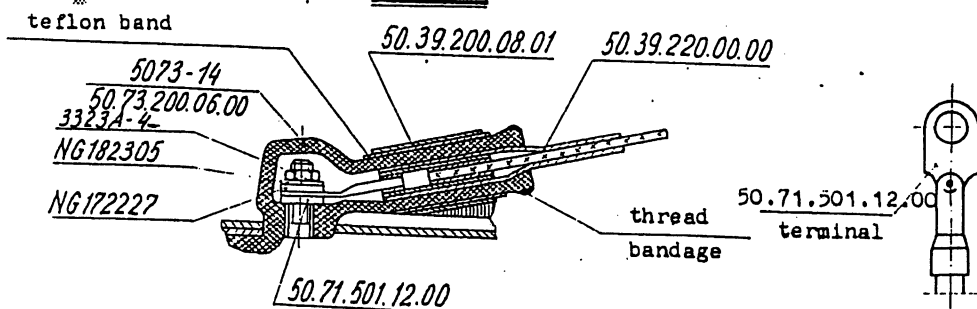
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K-SK



S-S-SK



2.15.8. Installation of rubber caps



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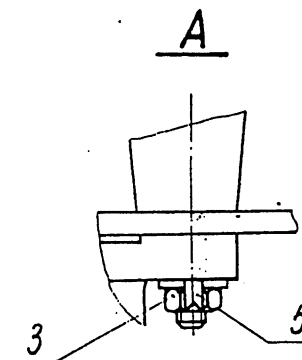
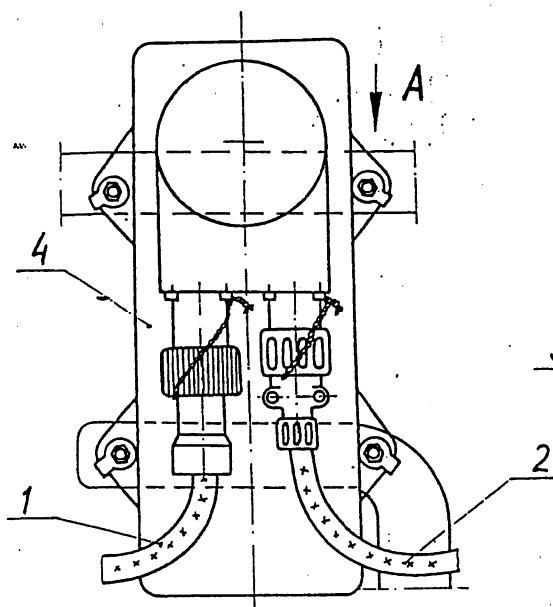
#### 4. REPLACEMENT OF SKND-11-1A IGNITERS

##### 4.1 Replacement of SKND-11-1A igniters not provided with shock-absorption

1. Remove the lock wire and unscrew the connectors /1/ and /2/ from the SKND-11-1A igniter installed on the side wall of the main transmission /Fig. Z.15.9/.
2. Bend out strips of washers securing the nuts /3/ fixing the igniter.
3. Undo the nuts and remove the igniter out of the bolts.
4. Polish the new igniter back and angle bars for fixing the igniter till metallic lusture is obtained.
5. Install the new igniter on the bolts, apply new securing washers /5/ and screw on the nuts previously undone.
6. Bend the securing washers.
7. Paint the cleaned area not covered by the igniter with the transparent varnish, type 17A.
8. Connect the connectors /1/ and /2/ to the igniter and secure with a lock wire KO  $\phi$  0,8.
9. Check value of transition resistance - it should be not less than  $600\mu\Omega$ .

##### LIST OF PARTS

Item	Nomenclature	Type or designation	Q-ty per helicopter	Remarks
1.	Igniter	SKND-11-1A	2	
2.	Securing washer	030822/9K53-1570	4	
3.	Securing washer	030823/9K53-1571	4	



1. High voltage conductor
2. Supply cable
3. Nut
4. SKND-11-1A igniter
5. Washer

Z.15.9. Installation of SKND-11-1A igniter

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#### 4.2 REPLACEMENT OF SKND-11-1A IGNITERS PROVIDED WITH SHOCK-ABSORPTION

1. Remove the lock wire and disconnect the connectors from the SKND-11-1A igniter.
2. Undo the bolt and disconnect electrical bonding from the bracket 50.64.010.00.00 /Fig. Z.15.10/.
3. Disconnect the yokes fixing the oil duct and electrical cable from the bracket of the igniter.
4. Unlock and undo the nuts fixing the igniter to the main transmission.
5. Remove the igniter from the main transmission.
6. Remove the bracket 50.62.411.00.00 and the electrical bonding 6245s56-8-120.
7. Acc. Fig. Z.15.10., section A-A, insert new washers 50.27.000.13.00 /Boff/ into the SKND-11-1A igniter bores.

**NOTE:** The bores should be of 8,5 mm diameter /in order to fix the rubber shock-absorbing washers/.

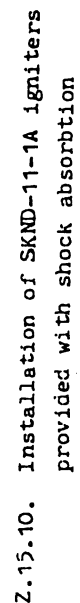
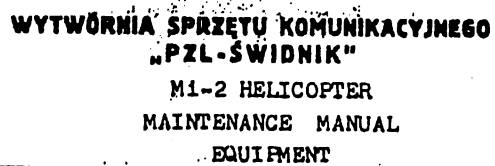
8. Acc. to Fig. Z.15.10, section B-B, screw out two bolts for the bracket 50.62.411.00.00 from the igniter.
9. Install the bracket and tighten it using the bolts 3166A-4-12 screwed out of the igniter, and washers 4.1 PN-77/M-82008, also applying the washers 3401A-1-4-10 removed previously acc. to the section B-B.
10. Undo the screw for fixing the electrical bonding from the igniter.
11. Remove the coating on the igniter back, in the area for electrical bonding.
12. Install the electrical bonding 6245s-56-8-120 in the place from which the bolt was removed, and tighten it using the screw 3166-A-4-10 previously removed, and washers 4.1PN-77/M-82008 and 3402A-1-4-10.
13. The bare areas cleaned for electrical bonding not covered by the bonding terminal should be coated using the transparent varnish, type 17A.
14. Acc. to Fig. Z.15.10, install the igniter on the main transmission pins and secure it using the nuts which have been previously removed and spacers 3402A-0,5-6-14 applying new washers 9K-53 acc. to the section A-A.

**NOTE:** Tighten the nuts so that an axial shock absorbtion is ensured.

15. Bend the securing washers.
16. Acc. to Fig. Z.15.10, connect the electrical bonding to the bracket 50.64.010.00.00 using the screw 3166A-4-6 previously removed.
17. Screw the yokes fixing the oil duct and electrical cable to the igniter angle bar using the Bolts previously screwed out.
18. Connect the connectors to the ignitor and secure with the lock wire KO p 0,8.
19. Check value of transition resistance - it should be not less than  $2000\mu\Omega$ .

#### LIST OF PARTS

Item	Nomenclature	Dwg No. or designation	Q-ty per 1 helicopter	Remarks
1.	_____	_____	_____	acc. to para 4.1.
2.	_____	_____	_____	
3.	_____	_____	_____	
4.	Washer	50.27.000.13.00	16	



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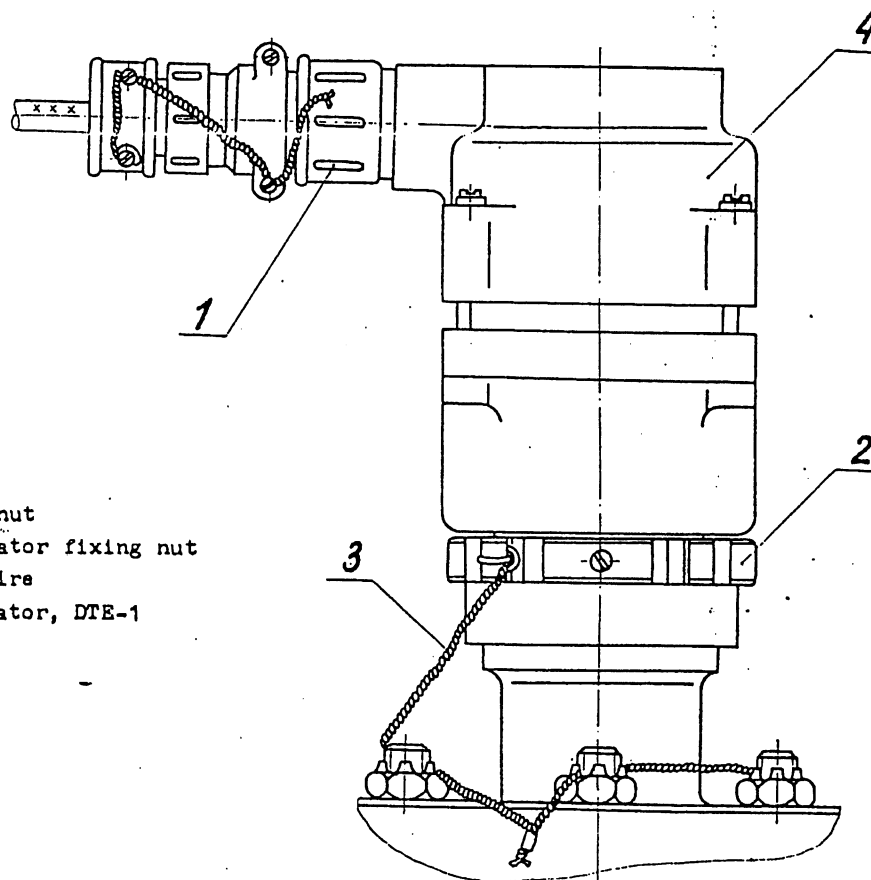


5. REPLACEMENT OF DTE-1 TACHOGENERATOR

1. Remove the lock wire and disconnect the connector /1/ from the DTE-1 tachogenerator which is installed on the main transmission /Fig. Z.15.11/.
2. Cut and remove the lock wire /3/.
3. Undo the nut /2/ fixing the generator to the main transmission and remove the generator.
4. Install new tachogenerator and secure with the lock wire /3/ KO  $\phi$  0,8.
5. Connect the connector /1/ to the tachogenerator and secure using the lock wire KO  $\phi$  0,8.

List of equipment

Item	Nomenclature	Type	Q-ty per 1 heli-copter	Remarks
1.	Tachogenerator	DTE-1	1	



1. Connector nut
2. Tachogenerator fixing nut
3. Nut lock wire
4. Tachogenerator, DTE-1

Z.15.11 Installation of DTE-1 tachogenerator



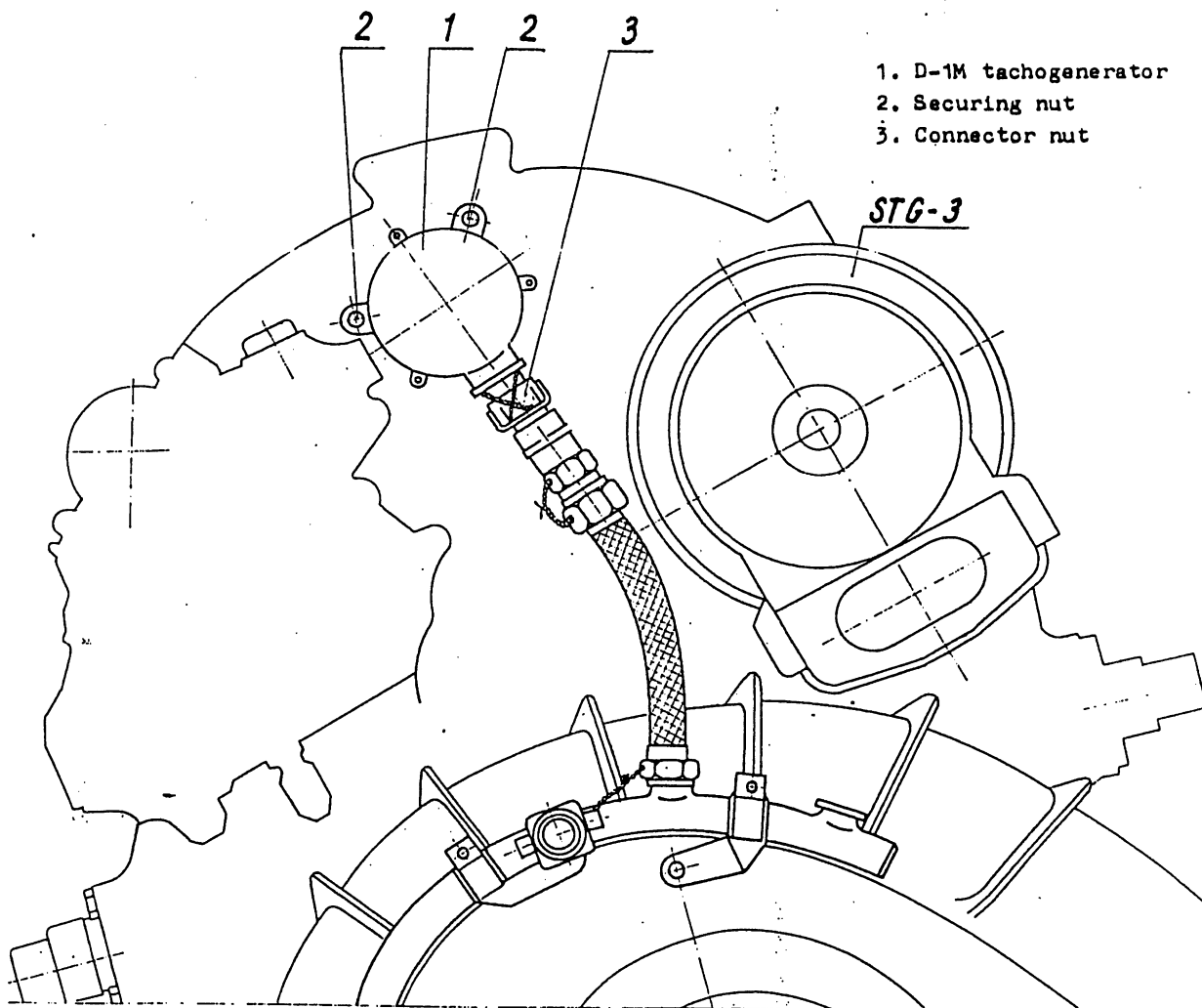


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6. REPLACEMENT OF D-1M TACHOGENERATOR

**NOTE:** Replacement should be accomplished by an electrical equipment technician and an engine fitter.

1. Cut the lock wire and undo the nut /3/ of the tachogenerator /1/ connector, see Fig. Z.15.12.
2. Unlock and undo three nuts /2/ which fix the tachogenerator.
3. Remove the tachogenerator together with the nut washers.
4. Install new tachogenerator.
5. Install the washers and screw on the nuts previously removed.



Z.15.12, Installation of D-1M tachogenerator



6. Secure the nuts fixing the tachogenerator.
7. Connect the connector and secure with the lock wire KO  $\phi$  0,6.

List of equipment

Item	Nomenclature	Type	Q-ty per 1 helicopter	Remarks
1.	Tachogenerator	D-1M	2	

7. REPLACEMENT OF GROUP OF CONDUCTORS No. 50.74.120.00.00 CONNECTING MAIN ROTOR BLADE CONNECTOR TO THE CURRENT COLLECTOR

7.1 Removal

1. Cut the thread bandage and slide off the rubber caps from the collector and blade connectors.
2. Cut the lock wire and disconnect the connectors from the blade and collector.
3. Cut the lock wire and undo two screws with washers for fixing the yokes of the group of conductors to the main rotor hub and the hinge journal. Remove the group from the helicopter.

7.2 Installation

1. Connect the group connectors to the blade and collector and secure with the lock wire KO  $\phi$  0,6.
2. Slide the caps on the connectors and wrap the caps ends with threads, and coat using the varnish 17 A.

NOTE: After each installation of the blade and connection of the connectors, wrap with threads the rubber caps of the collector connectors in areas indicated by A letter in Fig. 2.15.3.

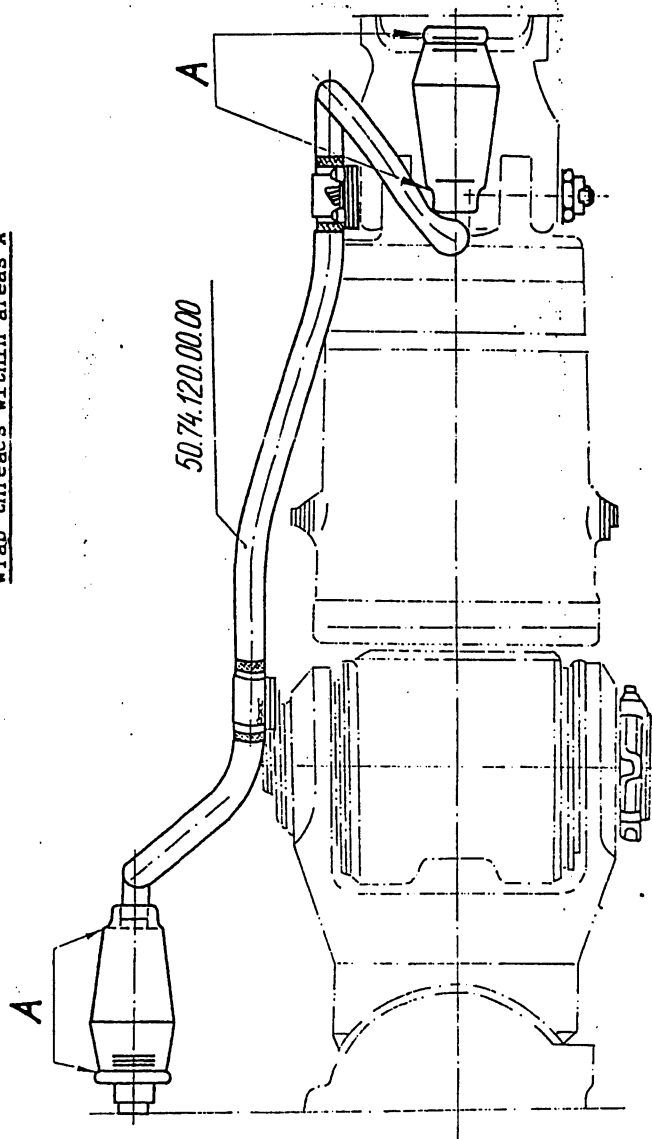
3. Install two yokes on the group within the areas marked with two red dashes and tighten them to the main rotor hub and the hinge journal using the screws and washers previously removed.  
Fill the yokes with rubber washers.
4. Secure the screws using KO  $\phi$  0,8 wire.



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Wrap threads within areas A



Z.15.13. Installation of the group of conductors  
No. 50.74.120.00.00



Enclosure 16

REVERSE OF ECN-75 FUEL PUMPS OPERATION SEQUENCE

1. Remove the cover of the 74K terminal plate /455/ located in the RH side of the cockpit, under the floor, next to the main fuel tank.
2. Undo the nuts from the PB2 and PB102 terminals and disconnect the fuel pump conductors.

NOTE: On the fuel pump conductor terminals there are identification plates with figures 1 and 2 - see Fig. Z.16.1.

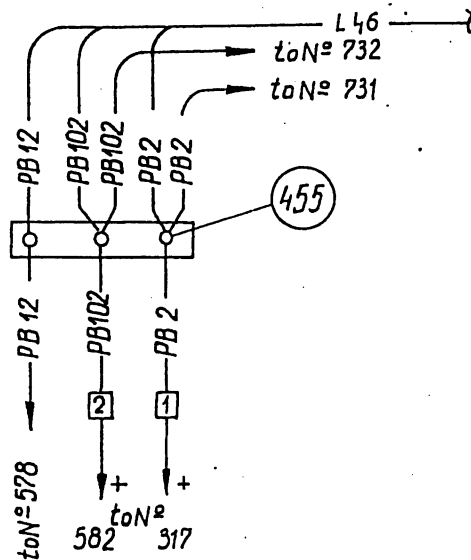
3. Interchange the fuel pump conductors terminals and connect acc. to the diagram shown in Fig. Z.16.2.
4. Screw on the nuts removed previously.
5. Place and fix the 74K terminal plate cover /455/.
6. Check the fuel pumps acc. to section 3.1.1.13 of "Maintenance Manual - Equipment".
7. Report this in the log card of fuel pump assembly 50.61.110.00.01.

List of tools

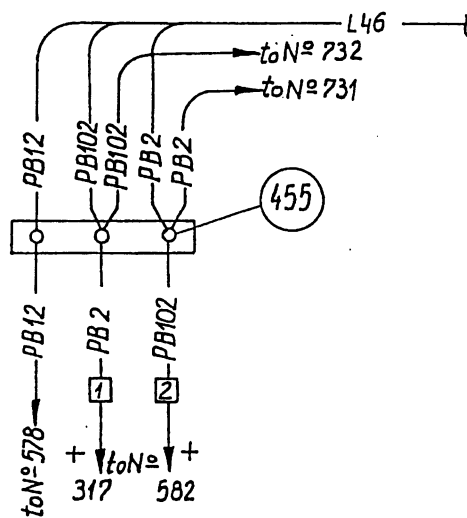
Item	Nomenclature	Type	Remarks
1.	Wrench socket	50.91.578.00.00	from 1 : 10 set
2.	Dielectric handle	50.91.516.00.00	from 1 : 10 set



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2.16.1. Pre-reverse diagram



2.16.2. Post-reverse diagram

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Enclosure 17

CHECKING SP-0,4E SIGNALLIZER AND ITS EXTERNAL CIRCUIT.

1. INSTALLING AND REMOVING SP-0,4E SIGNALLIZER OF THE HELICOPTER.

1.1. Removing the signallizer from the helicopter

- Switch off the electrical circuit;
- Open the hatch of the fuel filters block;
- Unlock and disconnect the signallizer function;
- Drain fuel from filters block;
- Unlock and unscrew 4 fixing bolts of the signallizer and remove the signallizer from the housing;
- Install the cover using four bolts;

1.2. Installing the signallizer on the helicopter

NOTE: When installing a new signallizer, check its functioning in range acc. to para 2 of this Enclosure.

- Open the hatch of fuel filters block;
- Drain fuel from filters block;
- Unscrew 4 bolts and remove old signallizer /or cover/ from the filters housing;
- Install the signallizer using the signallizer bolts and lockwire them.  
It is allowed to wet the inner sealing of the signallizer with fuel to facilitate installing;
- Connect the signallizer function and lockwire.

NOTE: When installing pay particular attention to correct installing procedure and avoid defective sealings.

- Check visually the signallizer air - tight sealing accuracy after operating the fuel pump;
- Vent the fuel system, plug the filters block hatch;
- Check the fuel system functioning in starting, heating and engines checking ranges.  
After engines shutoff check if the signallizer system is completely air - tight.
- Record s/N and service life of installed signallizer /in case of a new signallizer/.

2. EXTERNAL INSPECTION AND SIGNALLIZER CHECK

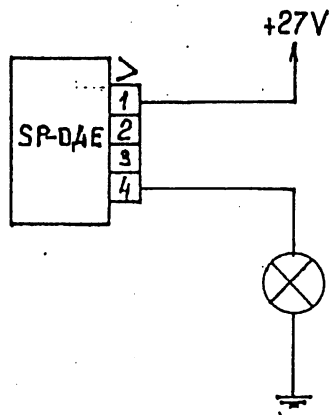
- Inspect externally for mechanical defects;
- Check a sealing rubber washer and rubber rings condition /3 pcs/;
- Check insulation resistance between terminals 1, 4 and signallizer housing by means of megohmmeter 200V.  
Minimum insulation resistance should be 20MΩ



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- using KPU-3 device check with air the activating pressuer of the signallizer installed in connector pipe 50.93.085.00.00 by means of pressure gauge, ranged 0 up to 4  $\text{kg/cm}^2$  /Class 0,6/
- Repositioning the switch /on KPU-3 device/ and rotating the crank - generate a pressure.
- Open the input valve and check if signalling light goes on at determined pressure value.
- After checking the signallizer activation close the input valve and air bleeding valve /on KPU-3 device/  
Checking condition:
  - Temperature -  $+ 20 \pm 5^\circ\text{C}$
  - Working pressure -  $27 \pm 10\%$
  - Signalling light - up to 5 W
  - allowable pressure
    - for signallizer checking - max. 1,2  $\text{kg/cm}^2$
    - activating pressure -  $0,4 \pm 0,1 \text{ kg/cm}^2$

NOTE: Light and signallizer connectron diagram is shown in Fig Z.15.1  
Signaller installation Checking diagram is shown in Fig Z.15.2



Z.15.1 Light and signallizer checking connection diagram



### 3. CHECKING SP-0,4E SIGNALLIZER CIRCUIT

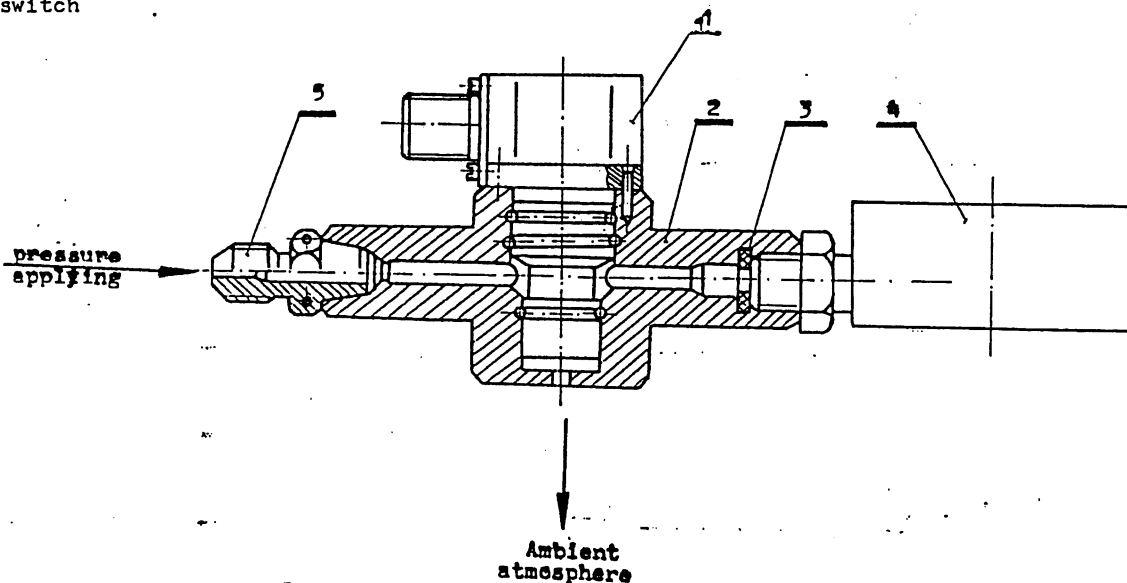
- Disconnect the function from the signallizer
- Short - circuit 1 and 4 terminal on the bundle using a wire.
- Energize "FUEL PUMPS - No 2" circuit breaker located on the circuit breakers panel.
- Disconnect 1 and 4 terminals on the bundle
- Deenergize "FUEL PUMPS-NO 2" circuit breaker
- Connect the junction to the signallizer
- Energize "SIGN.LIGHT CHECK" circuit breaker on the circuit breaker panel and rotary "SIGN.LIGHT CHECK" rotary switch on the central panel.
- Deenergize the circuit breakers and rotary switch

"FILTER CONTAMINED" plate installed On the instruments panel shall go on

The plate continues lighting

"FILTER CONTAMINATED" plate shall go out.

"FILTER CONTAMINATED" plate shall go on.



2.15.2 Connecting pipe 50.93.085.00.00

1. SP-04E Signallizer, 2 - Connecting pipe housing, 3 - Sealing  
 4. Pressure gauge with working range 0,4MPa / 0-4KG/cm<sup>2</sup>  
 5. - Measuring tip.





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ENCLOSURE 18

CHECKING THE SSP-6BI BLOCKS SENSITIVITY

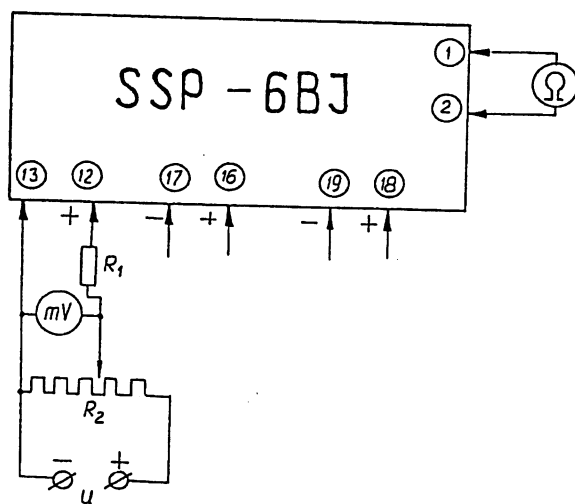
- 1- Remove the SSP- 6BI signalling blocks from the helicopter;
- 2- Install the circuit shown in Fig. Z.18.1.

Note! Milivoltmeter indications shall amount zero.

- 3- Monitoring milivoltmeter indications and slowly move R2 potentiometr slider until circuit closing is indicated by the ohmmeter / reduced resistance/;
- 4- Read the milivoltmeter indications;  
Reading values shall be included in range 28 to 50 mV or 42 to 96 mV.

Note: in case of the block replacement, the value of new block sensitivity shall be in compliance with the data included in the Log Card.

- 5- Repeat checking procedure acc, to para 3 and 4 connecting supply circuit / milivoltmeter and power source/ to terminals 17 and 16 of SSP-6BI block and then to terminals 19 and 18;
- 6 -Install SSP-6BI blocks on the helicopter.



mV - milivoltmeter, range  
up to 150 mV; C1. 0,5  
or 1  
R1 - resistor 2Ω  
R2 - potentiometer  
/ about 1000 Ω /  
U. - battery 2,5 to 4V.  
Ω - ohmmeter

FIG. Z.18.1. Sensitivity check of SSP-6BI block

May 1991

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END

Doc. No. 50.211.011

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