

Su-27SKM
INSTALLATION AND OPERATION
MANUAL

Book 9
FLIGHT PREPARATIONS

in four parts

Part 2-1

AIRCRAFT WEAPONS

Gunnery. Armament control system. Bombs.

Maintenance procedures

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INSTALLATION AND OPERATION MANUAL

2

INTRODUCTION

Installation and Operation manual (I/O M) is a single document, containing technical description and operating manual for the aircraft.

Installation and Operation Manual contains information, necessary for study and carrying out of works on technical operating and ground maintenance of the aircraft. Aircraft systems electric circuits described in I/O M are included in Album of Electrical Diagrams (AED), which is a part of Installation / Operation and Maintenance Manual (I/O & MM) delivered together with the aircraft. Text of I/O M includes the corresponding references.

Instructions on aircraft operation during flight are stated in Flight Operation Manual (FOM). List and time schedule of works, performed at different types of aircraft maintenance, are given in Maintenance Schedule (MS).

Text of Manual is broken down by groups. Each group is assigned with number, which is the number of Book too. Each book is broken down by parts too. Books parts include either only technical description (subject: "Description and operation"), or operating manual (subjects: "Fault analysis and rectification", "Maintenance procedures").

Books (parts), containing technical description, have "DESCRIPTION AND OPERATION" title. Books (parts), containing "Fault analysis and rectification", "Maintenance procedures" subjects for maintenance schedule and removal and installation, have "MAINTENANCE SCHEDULE AND REMOVAL AND INSTALLATION OPERATIONS" title. Books (parts), containing "Maintenance procedures" subject for maintenance schedule, have "FLIGHT PREPARATIONS" title.

Manual is broken down by the following groups (Books):

- 1 - Basic Performance;
- 2 - General Information on Aircraft
- 3 - Airframe;
- 4 - Aircraft systems;
- 5 - Power plant and fuel system;
- 6 - Avionics;
- 7 - Aircraft weapons;
- 8 - Aircraft equipment;
- 9 - Flight preparations.

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Breakdown of Book by parts is given in each part of this Book.

Besides, Introduction of Book 2, Part 1 includes list of all Books of I/O M with breakdown by parts and theirs summary.

During study and operation of the aircraft it is necessary to refer to Installation and Operation Manual for systems and component parts installed on the aircraft. These Manuals are essential part of complete set of I/O & MM delivered together with aircraft.

List of all I/O & MM attached to the aircraft is given in the List of Service Technical Papers.

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9/2-2	012.92.40 012.92.50 012.92.60 012.92.70	Aircraft weapons Guided missiles Rockets Chaff and flares dispenser system Stores lifting and removal devices
9/3	012.93.00	Avionics
9/4	012.94.00 012.95.00 012.96.00 012.97.00 012.98.00	Aircraft equipment Electrical equipment Instruments Oxygen equipment Survival equipment Flight data recording systems

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	012.92.32	BD3-USK-A
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9/2-2		Aircraft weapons
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	012.92.41	AKU-470
	012.92.42	AKU-58AE
	012.92.43	VSU
	012.92.44	APU-470M
	012.92.45	P-72-1DB2
	012.92.46	AKU-170E
	012.92.50	Rockets
	012.92.51	B8M-1
	012.92.52	B13L
	012.92.53	S-25
	012.92.60	Chaff and flares dispenser system
	012.92.70	Stores lifting and removal devices

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LIST OF ABBREVIATIONS

AB	- aerial bombs
ACS	- armament control system
ACS PWR	- armament control system power supply
AF&EN	- airframe, engine
AKU-470	- missile ejector unit
AKU-58AE	- missile ejector unit
APU-470M	- missile rail launcher
AW	- aircraft weapons
BD3-USK-A	- shackled rack
BD4-USKM-B	- shackled rack
BIG	- built-in gun
BIT	- initiated built-in test
BI-U-01	- actuating unit
BI-U2-01	- actuating unit
BM-30PK-02	- mounting unit
BPE-30PT-01	- power channel transformer
BP-15P	- power supply unit
BRPI-30PK	- aircraft and mission data recorder
BRTsU-30PK	- target designation selector unit
BTsVM	- mission computer
BS-30PK-02	- coupler unit
BVR	- beyond visual range combat
CP	- multifunction panel
DF	- dog fight
EGB	- engraved button
EKV	- electric-primer sleeve
EPU	- pyroelectric device
ENT	- ENTER button

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LIST OF ABBREVIATIONS

FD	- flight (forward) direction
FT	- fire trigger
FHS-RHS	- forward hemisphere – rear hemisphere
GM	- guided missiles
HUD	- ILS-31 Head-up Display
IIT-BSch-3	- current pulse indicator
JB	- junction box
LG DOWN SIM	- Landing Gear extended simulation
LG WOW SIM	- Weight-on-wheel simulation
LG UP SIM	- Landing Gear retracted simulation
LG UP	- Landing Gear retracted
LP	- launch permitted
MBD3-U6-68	- multi-shackled rack
MBS	- locking and indication mechanism
MFB	- multifunction button
MFI	- multifunction indicator
MPI	- impulse unit
MVN	- ARMED-SAFE mechanism
P-72-1DB2	- missile rail launcher
PNP-30PK	- ground testing panel
PTS	- control stick
PTS-250S	- three-phase static inverter
PVU	- rod-shaped arming device
PWR	- power
OLS (IRST)	- 52SH optical locator station
RDR	- N001-VEP1 radar
REE	- avionics equipment
SPARES	- spares parts
STR	- stores

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LIST OF ABBREVIATIONS

TRH	- throttle control arm
UPK-300M	- universal hoist trolley
VSU	- wing tip attachment
WCS-A	- Sh101VEP1 weapon control system, air-to-air mode
WCS-S	- SUV-P-RI weapon control system, air-to-ground mode
WPN	- aircraft weapons
ZI	- weapon simulator
φ_0	- independent mode

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Items description	State Standard (ГОСТ)
1. Antistatic additive SIGBOL (СИГБОЛ)	ТУ 38 -101741-78
2. Binder	ГОСТ 17308-88
3. Cleaning rags	ТУ 63-17877-82
4. Cotton napkin	ГОСТ 4644-75
5. Emery paper of grain size 5, 6	ГОСТ 6456-82
6. Emery paper of grain size 25	ГОСТ 5009-82
7. Enamel AS-1115 (АС-1115)	ТУ 6-10-1029-83
8. Enamel EP-140 (ЭП-140)	ГОСТ 24709-81
9. Enamel HV-16 (ХВ-16)	ТУ 6-10-1301-83
10. Fluoroplastic tape	ТУ 301-05-49-90
11. Fuel TS-1 (ТС-1)	ГОСТ 10227-86
12. Locking wire 0,5 (0,8; 1)-TC-12X18H10T	ГОСТ 18143-72
13. Locking wire 0,3 Л63М	ГОСТ 1066-90
14. Lubricant No.9	ТУ 38 -001116-84
15. Lubricant ОКБ-122-7 (ОКБ-122-7)	ГОСТ 18179-72
16. Lubricant PVK (ПВК)	ГОСТ 19537-83
17. Lubricant PFMS-4S (ПФМС-4С)	ТУ 6-02917-79
18. Lubricant TsIATIM-221 (ЦИАТИМ-221)	ГОСТ 9433-80
19. Paint NTs-25 (НЦ-25)	ГОСТ 5406-84
20. Paper ODP-35 (ОДП-35)	ГОСТ 16711-84
21. Paraffin paper BP-3-35 (БП-3-35)	ГОСТ 9569-79
22. Paste ALKM-1 (АЛКМ-1)	ТУ 6-10-1933-84
23. Petroleum solvent NEFRAS-S 50/170 (НЕФРАС-С 50/170)	ГОСТ 8505-80
24. Polyethylene film	ГОСТ 10354-82
25. Primer EP-0215 (ЭП-0215)	ТУ 6-10-1966-84

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27. Primer FL-086 (ФЛ-086)	ГОСТ 16302-79
28. Oil K-17	ГОСТ 10877-76
29. Rectified ethyl spirit	ГОСТ 18300-87
30. Sewing threads No.0	ГОСТ 6309-93

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2	Removal of BD4-USKM-B from hardpoint No.1.		205
3	Functional test of BD4-USKM-B.		207

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5	Installation and removal of PPL cartridges from cartridge-actuated mechanism of BD4-USKM-B rack.	012.92.34	219
MBD3-U6-68 RACK			
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2	Removal of MBD3-U6-68 from hardpoints No.1 and No.2.	012.92.34	203
3	Installation of MBD3-U6-68 on hardpoints No.3 and No.4.	012.92.34	205
4	Removal of MBD3-U6-68 from hardpoints No.3 and No.4	012.92.34	209
5	Installation of MBD3-U6-68 on hardpoints No.9 and No.10.	012.92.34	211
6	Removal of MBD3-U6-68 from hardpoints No.9 and No.10.	012.92.34	215
7	Inspection, cleaning and lubrication of MBD3-U6-68 racks.	012.92.34	217
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9	Suspension of stores on MBD3-U6-68.	012.92.34	225
10	Removal of stores from MBD3-U6-68.	012.92.34	231

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To Maintenance Schedule	ASSEMBLY CHART 1		Pages 201-204
Para	Description of operations.	Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
1. GENERAL.	Inspection, cleaning and lubrication of built-in gun.		
1.1. Make sure that:	<ul style="list-style-type: none"> - on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2; - on upper LH board of instrument board M/ARM switch is set to OFF; - on PNP-30PK panel in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF. 	<p>2. INSPECTION OF BUILT-IN GUN.</p> <p>2.1. Open panels for access to the article: at first 103-PII, then the others. Open panel for access to the cartridge-box and loading mechanism on LH strake between frames No.17a and No.18.</p> <p>2.2. Check external condition of units of built-in gun and ventilation systems, condition of threaded and riveted joints, condition of corrosion-resistant coatings. Make sure that necessary locking and sealings are at place.</p>	If there are burns, scratches, dents, clean damaged areas with

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ASC 1 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monit oring	
Built-in gun units and systems must be free of dents, nicks, cracks and other mechanical damages.	a napkin, wet with kerosene. Dry for 10 minutes. Then grind them with emery paper No.25. Clean the treated areas with a napkin, wet with kerosene.		<p>2.3. Check attachment safety of electrical connector of 9-A-407IK article. Check the locking of electrical connectors. Check attachment of wire bundle on vertical wall. Free end of the bundle between 9-A-407IK articles and attachment clamp must not be more than 10 in (200-250 mm).</p> <p>2.4. Check attachment safety of feeder hose and cartridge-link tray.</p>

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>3. CLEANING AND LUBRICATION OF BUILT-IN GUN</p> <p>3.1. Clean units of built-in gun from contamination, carbon deposit and residues of old lubricant.</p> <p>For that:</p> <ul style="list-style-type: none"> - wash internal surface of compartment for 9-A-4071K article with TS-1 fuel and wipe it to dry; - remove carbon deposit from external surface of fuselage with TS-1 fuel. <p>After carbon deposit removal wash the treated surface with nefras with antistatic additive or with TS-1 fuel.</p> <p>Remove the copper film from titanium fillets along the fuselage by emery paper No.25.</p> <p>If necessary, repair the damaged paint coating in compartment and on the surface of fuselage, refer to 020.10.01, Book 2/1.</p> <p>3.2. Apply lubricant No.9 on elements of flexible feeder hose, feeder neck, guide rails in the cartridge-box, external elements of the gun, guides of breech, extractor, deflector surface, barrel bore.</p> <p>3.3. To prevent carbon deposit formation apply PFMS-4S lubricant on guides of carriage of built-in gun rear attachment unit, spherical fitting point of front unit and internal surface of the front support-stop.</p> <p>3.4. Close the panels.</p>	

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Testing equipment (TEQ)	Tools and accessories	ASC 1 (continued) Consumable items
	1. Test-tube brush. 2. Ladder 11.9930.5.960.000. 3. Ladder 30.9930.8025.000.	1. Lubricant PFMS-4S (ПФМС-4С). 2. Lubricant No. 9. 3. Fuel TS-1 (TC-1). 4. NEFRAS - S 50/170 (НЕФРАС-С 50/170) 5. Antistatic additive SIGBOL (СИГБОЛ). 6. Calico napkin. 7. Locking wire 0.8-TC12X18H10T. 8. Emery paper No.25.

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To Maintenance Schedule	ASSEMBLY CHART 2		Pages 205-207/208
Para	Description of operations.	Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
	Removal of 9-A-4071K article from the aircraft		

1. Make sure that:

- on switch board the following switches are set to OFF:
SPECIAL SYS 1, SPECIAL SYS 2 ;
- on upper LH board of instrument board M/ARM switch is set to OFF;
- on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.

2. Install ladders, refer to Fig. 201.

3. Open panels for access to the article: at first 103-II, then the others.

4. Make sure that the article is unloaded, refer to ASC 7.

5. Disconnect electric bundle, feeder neck and cartridge-link tray from the article.

6. Open top semiclamp on the front support and on the front unit.

7. Move UPK-300M lifting crane to the aircraft and prepare it for operation.
Install the crane, refer to Fig. 201.

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ASC 2 (continued)			
Procedure and technical requirements	Operations to be done, if not to Monit oring	Operations to be done, if not to Monit oring	Operations to be done, if not to Monit oring
8. Attach the sling to the article barrel and breech (Fig. 202). Lift the article with crane till the slings tension.			
9. Carefully lift the article by the barrel. Then move it forwards and disengage from the rear unit.			

Notes. 1. Do not damage fitting points on front and rear units.
2. Removal of 9-A-4071K article from the aircraft can be done manually by two Armament specialists.

10. Lift the article from the bay and remove it from the aircraft.

11. Close the clamps on the front support and on the front unit. Close the panels.

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ASC 2 (continued)		
Testing equipment (TEQ)	Tools and accessories	Consumable items
	<ol style="list-style-type: none">1. General-purpose lifting crane UPK-300M (YIIK-300M).2. Slings 11.9981.3.800.000.3. Ladder 11.9930.5.960.000.4. Ladder 30.9930.8025.000 – 2 pcs.5. Screwdriver 1,6x9x250.6. Wrench 322/0-3529 S=277. Socket wrench 322/0-3286 S=24.	

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To Maintenance Schedule	ASSEMBLY CHART 3		Pages 209-214
Para	Description of operations.		Manhours
	Installation of 9-A-4071K article on the aircraft.		
	Procedure and technical requirements	Operations to be done, if not to specification Monit oring	

1. Prepare the article for installation on the aircraft, refer to ASC 1. Make sure that after depression (during assemblage) of the article, neck on the casing for filling (refilling) with water is installed at 30° angle to the vertical from the article LH side (looking forward).

2. Open panels for access to the article: at first 103-PII, then the others. Open upper semiclamps on the front support and on the front unit.

3. Move the article to the aircraft. Prepare lifting crane for operation. Attach slings to the article barrel and breech (Fig. 202).

Lift the article. Apply thin layer of PFMS-4S lubricant on fitting points of 9-A-4071K article: guides of rear unit carriages and spherical fitting point of front unit.

Note. Installation of the 9-A-4071K article on the aircraft can be done manually by two Armament specialists.

4. Lower the article in the bay carefully.

5. Hold the article by its barrel. Put guide bosses on the article breech into guide slots of rear unit of built-in gun.

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ASC 3 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monit oring	
<p>6. Move the article rearward until its spherical support is above the fitting point of the front unit. Prevent damages of fitting points on front and rear attachment units of built-in gun.</p> <p>7. Lower the article barrel. Make sure that spherical support of the article is installed into spherical fitting point of the front unit of built-in gun.</p> <p>8. Close the upper semiclamp on the front unit. Check clearance between eye lug of hydraulic brake housing and upper semiclamp. The clearance must not be more than 0.48 in (12 mm).</p> <p>9. Install clamping nut, providing clearance equal to $(0.04 + 0.008)$ in $\{(1^{+0.2}_{-0.4})\text{mm}\}$ between -0.016 inclined mounting surfaces of upper semicclamp and front unit bracket. Check the clearance using feeler No.4. After clearance check lock the clamping nut with safety pin.</p> <p>10. Install the upper semiclamp on the front support and attach it by stud. Lock the stud with a pin. Make sure that the radial clearance between the barrel and front support clamp is equal and is not less than 0.008 in (0.2 mm).</p> <p>11. Connect feeder hose to the article. For that align neck (1) on the feeder hose moving element with the article feed window. Then close the neck lock by turning the handle (2) by 90° (Fig. 207). Lock the handle with spring-loaded stop.</p>			

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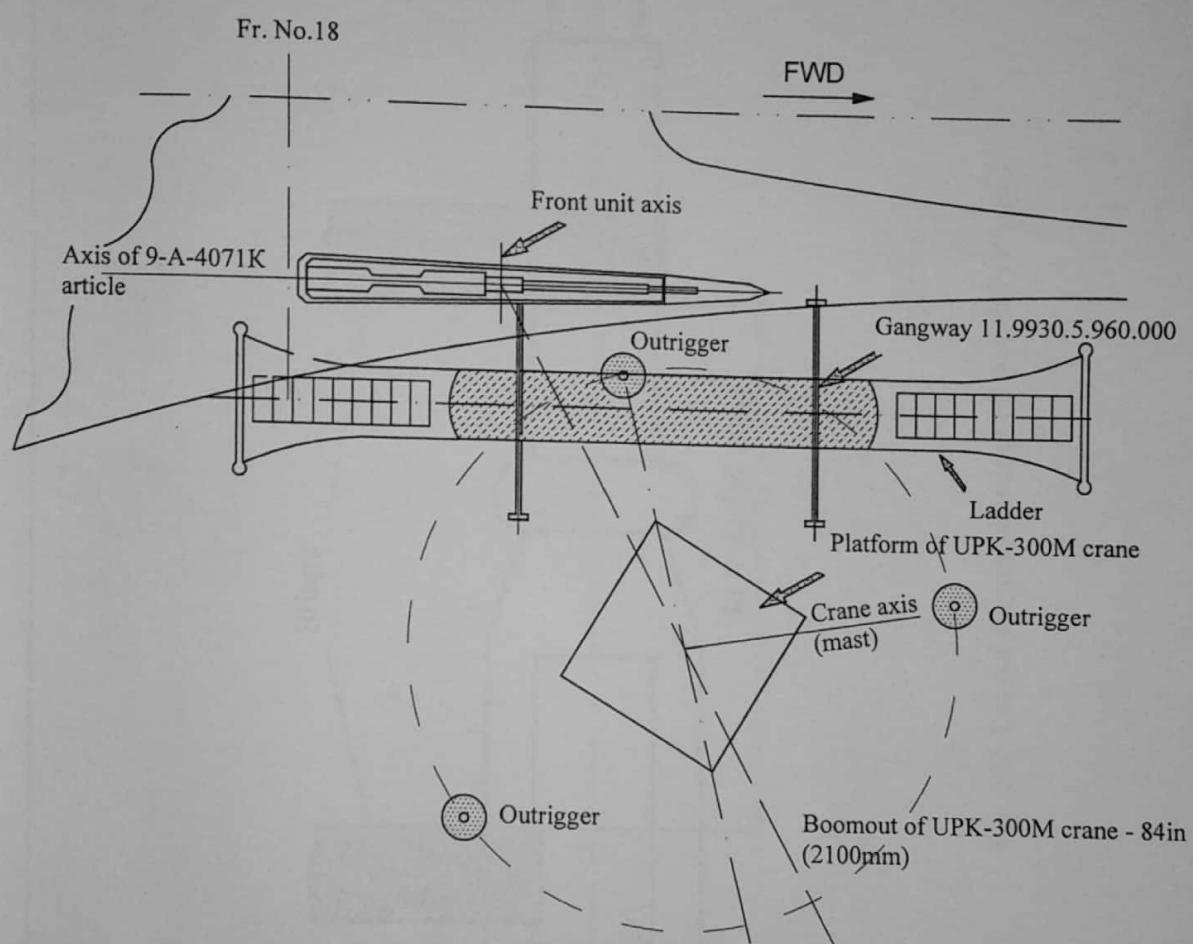


Fig. 201. Layout diagram of UPK-300M crane, ladders
and 9-A-4071K article in relation to the aircraft.

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ASC 3 (continued)

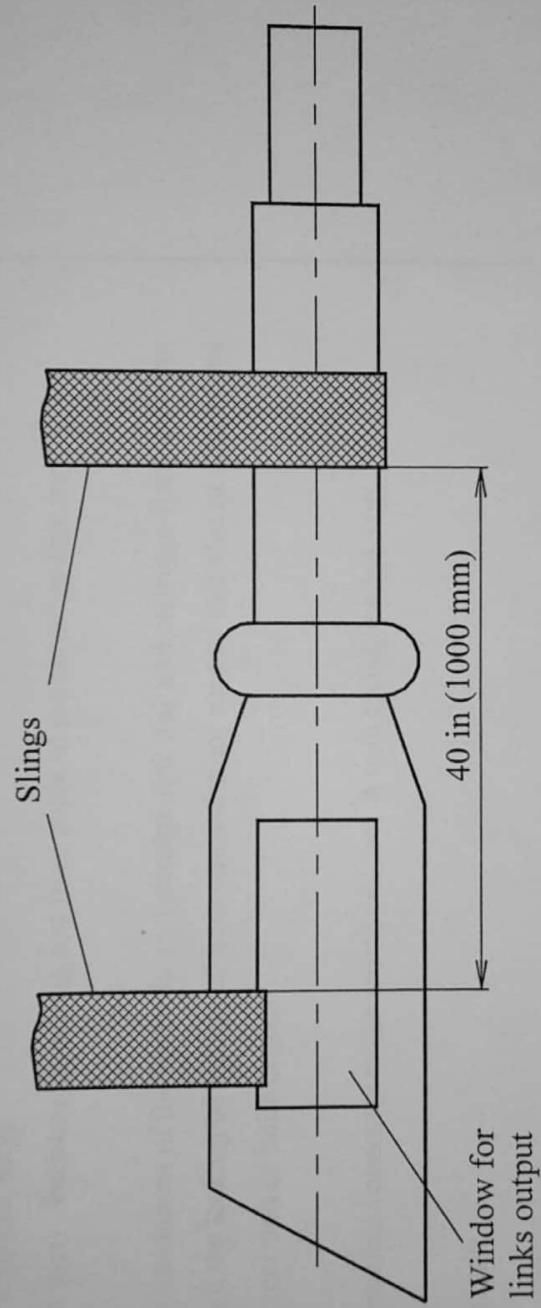


Fig. 202. Layout diagram of slings on 9-A-4071K article

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ASC 3 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
12. Connect cartridge-link tray to the article. Check dimensions: - 1,6 in (40 mm) – between adjustable casing of the cartridge-links collector and rear guide of the cartridge-link tray; - 1,4 in (35 mm) - between the casing and front guide of the cartridge-link tray.			
13. Check safe attachment of the feeder hose, cartridge-link tray and cartridge-links collector casing. Check the locking of clamps of front unit and front support and also of adjustment elements of rear unit of built-in gun.			
14. Connect electrical connector to the article and lock it with spring-loaded stop.			
15. Close the panels.			
16. At replacement of 9-A-4071K article or its barrel perform operations, refer to ASC 13, 150.00.00, Book 7/8			

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ASC 3 (continued)		
Testing equipment (REQ)	Tools and accessories	Consumable items
	<p>1. General-purpose lifting crane UPK-300M (УТК-300М).</p> <p>2. Slings 11.9981.3.800.000.</p> <p>3. Ladder 11.9930.5.960.000.</p> <p>4. Ladder 30.9930.8025.000 – 2 pcs.</p> <p>5. Screwdriver 1,6x9x250.</p> <p>6. Wrench 322/0-3529 S=27.</p> <p>7. Socket wrench 322/0-3286 S =24</p> <p>8. Feeler No. 4</p>	<p>1. Lubricant PFMS-4S (ПФМС-4С).</p>

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To Maintenance Schedule	ASSEMBLY CHART 4		Pages 215- 217/218
Para	Description of operations		Manhours
	Serviceability check of control circuits of 9-A-4071K article	Procedure and technical requirements	Operations to be done, if not to specifications
			Monitoring

1. Open panels to get access to the article: at first 103-ПI, then the others.

2. Open bore of 9-A-4071K article barrel, refer to ASC 7. Insert ИИТ-БСч-3 (ИИТ-БЦ-3) indicator into the barrel bore. Close the barrel bore. Install contactor housing on its place and lock it with retainer.

3. Connect contactor turning the handle on the housing of additional igniter fuse forward in the direction of the barrel.

4. Connect ground power supply to the aircraft, refer to ASC 1, 012.94.00, Book 9/4.

5. In the cockpit, on switch board set SPECIAL SYS 1, SPECIAL SYS 2 switches to ON.

6. On PNP-30PK in RH LG bay set ACS PWR switch to ON and after built-in test of ACS set LG UP SIM switch to ON.

7. On upper LH board of instrument board set M/ARM switch to ON

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ASC 4 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monit oring
<p>8. Press and hold FIRE trigger. At that, indicator lamp must flash. Set LG UP SIM switch to OFF. Indicator lamp must go OFF. Press the trigger and set LG UP SIM switch to ON again. Indicator lamp must flash.</p> <p>9. Set M/ARM switch to OFF and make sure that indicator lamp goes OFF. Release FIRE trigger.</p> <p>10. Set to OFF the switches that were set to ON, refer to paras 5, 6, 7.</p> <p>11. Connect test lamp to the contact of additional igniter fuse on the contactor housing and to the housing of 9-A-4071K article.</p> <p>Note. You can use Ts-4353 (Л-4353) device instead of test lamp.</p> <p>12. Set to ON the switches, refer to paras 5, 6, 7.</p> <p>13. Press FIRE trigger. At that test lamp must flash (Ts-4353 device must record short-time + 27V voltage). Release FIRE trigger.</p> <p>Note. Command is sent to the contact of additional igniter fuse for the current ammunition load only once. To perform the check again, do operations, refer to paras 10, 12</p>	

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ASC 4 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>14. Set to OFF the following switches:</p> <ul style="list-style-type: none"> - on upper LH board of instrument board - M/ARM; - on PNP-30PK: LG UP SIM and ACS PWR. - on switch board: <p>SPECIAL SYS 1, SPECIAL SYS 2.</p> <p>15. Disconnect ground power supply from the aircraft, refer to ASC 1, 012.94.00, Book 9/4.</p> <p>16. Remove indicator from the barrel bore, refer to ASC 7. Close the barrel bore.</p>		
Testing equipment (TEQ)	Tools and accessories	Consumable items
1. Device Ts-4353 (Ц-4353)	1. Test lamp 11.9781.3.900.000. 2. Indicator ИТ-БСч-3 (ИИТ-БЩ-3) 11.9781.3.450.000. 3. Ladder 11.9930.5.960.000. 4. Ladder 30.9930.8025.000 – 2 pcs	

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To Maintenance Schedule	ASSEMBLY CHART 5		Pages 219- 235/236
Para	Description of operations.		Manhours
	Built-in gun loading.		
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
1. GENERAL INSTRUCTIONS			
1.1. Make sure that:			
	- on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2;		
	- on upper LH board of instrument board M/ARM switch is set to OFF;		
	- on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.		

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ASC 5 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>2. LOADING OF AMMUNITION IN BUILT-IN GUN.</p> <p>Note. To load ammunition, lift container for ammunition to 5 ft (1,5 m) height. Use trolley 11.9980.3.900.000. Container must be aligned with loading door.</p> <p>Displacement of container position in relation to door by not more than 1,6 in (40 mm) along aircraft center line is permitted (Fig. 204).</p> <p>Use A-1310M trolley for loading of cartridge-box and transportation of container with cartridges to the aircraft.</p> <p>2.1. Open panels to get access to 9-A-4071K article: at first panel No. 103-P_{II}, then the others. Open panel No. 103-Г_{II} to get access to the cartridge-box and cartridge-box loading mechanism.</p> <p>2.2. Disconnect contactor of 9-A-4071K article. For that turn handle located on the housing of additional igniter fuse to horizontal position (to OFF engraving). The housing of additional igniter fuse must move backwards.</p>	

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ASC 5 (continued)	
Procedure and technical requirements	Operations to be done, if not to Meeting specifications
<p>2.3. Prepare cartridge-belt. For that:</p> <ul style="list-style-type: none">- make sure that all cartridges are in the cartridge-belt;- make sure that links have no cracks, deformations, dents and nicks. <p>Clearance between link hook and cartridge case must be within 0,04 to 0,06 in (within 1 to 1,5 mm). If not to specifications, replace the defective link and disconnect the cartridge belt using the releasing device.</p>	<p>Check marking, which was applied with red paint during loading of cartridges in the belt (marking can be performed by chalk) on the 15th cartridge from the belt beginning (15 cartridges must be put on the rails), and then after each 13 cartridge (loop, hanging under the rails) marking must be applied on each 14th, 15th and 16th cartridges.</p>

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ASC 5 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>2.4. Open panel No. 103-4EH on the LH side for cartridge-belt loading (the panel opens inside). For that open locks. Loosen thumb-nuts on the belt guide-chute and compress it. Install the belt guide-chute in the panel hole from below the strake and expand it. Tighten thumb-nuts.</p> <p>2.5. Detach hook of cable from socket on the rear wall of cartridge-box. Release winch and feed unit, for that press button (13) (Fig. 205) until stop, pull the cable with you hand and pass it through the panel (for the loading of cartridge-belt) up to the belt.</p> <p>2.6. Remove the stud that connects extender with pusher rod. Remove extender from pusher rod and remove stop from rails. Put the pusher on the bottom of cartridge-box. Apply lubricant on the rails of cartridge-box. Use lubricant No.9 and test-tube brush, screwed on swab rod.</p>	

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ASC 5 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>CAUTION. 1. EXAMINE AND MAKE SURE, THAT THE FOLDING SCREEN IS AT VERTICAL POSITION IN THE AREA OF ROLLER (OTHERWISE, USE SWAB AND MOVE THE SCREEN TO THE VERTICAL POSITION).</p> <p>2. APPLY THE LUBRICANT ON RAILS AND CHECK THE SCREEN POSITION BEFORE EACH LOADING OF CARTRIDGE-BELT IN THE BOX.</p> <p>2.7. Engage the hook with the first link of cartridge-belt. Push the lock button located on the side face of front wheel of feed unit. At that, flag of mechanism for locking of winch and wheel of feed unit goes out of the front wheel operating area.</p> <p>2.8. Install handle of drive in the socket and turn it clockwise. Lift the cartridge-belt.</p> <p>Note. You can load cartridge-belt without belt guide-chute. In this case, it is necessary to hold the belt with hands and guide it in the panels from below. Make sure that cartridges do not hit the air intake.</p>		

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ASC 5 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>2.9. After the fourth cartridge pushes inside the button (13) of locking mechanism (Fig. 205), the winch and feed unit disengage automatically. At that, button (15) with lock pin must be unlocked and pushed out. If it does not occur, prize the button (15) with the screwdriver and release the button. After this, loosen the tension of cable (9), detach hook (10) and remove it from the area of cartridges moving down between the cartridge-box and the cartridge-box loading mechanism, for that take up the cable slack by turning the barrel (11) of winch with your hand.</p> <p>2.10. Turn drive handle, guide the belt from below and move the cartridge belt in the cartridge box. Put the first 15 cartridges on the guides and as far as they are loaded, push them slowly in the cartridge-box. To provide stable moving of cartridge-belt on rails, it is recommended to divide ammunition load on bundles, and move the ammunition by the parts consisting of 2-3 clusters. Prevent jerks and skewness. For loading of cartridge-box, refer to (Fig. 206).</p> <p>2.11. After loading of cartridge-box and after the last cartridge is installed on the guides, examine ammunition load from the LH side and make sure that cartridge-belt is loaded correctly (Fig. 208). To attach hook on the wall of cartridge-box, loosen the cable. For that extend it to the necessary length, engage the hook, take up cable slack. Remove the drive handle.</p>	

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ASC 5 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monit oring	
<p>Note. 1. Difficulties (jamming) of the cartridge-belt during its pulling through can occur:</p> <ul style="list-style-type: none">- if there is no lubricant on the rails guides;- if cartridge-belt is not in correct position on the rails guides because of force, applied during pushing the clusters to the cartridge head or bottom;- if cartridge head or bottom falls under the rail, when cartridge is on guide rails. <p>In case of cartridge-belt jamming during cartridge-box loading, it is necessary to unload and then load the cartridge-box again. After the cartridge-box is loaded and pusher is installed, first cartridge must be at the outlet from the rigid feeder hose.</p> <p>2. To check correct loading of cartridge-belt in the cartridge-box during training for cartridge-box loading, you can use endoscope (with sight tube length 45,7...46,9 in (1160...1190 mm)), which is used for survey of defects of 99 article.</p>			

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ASC 5 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monit oring	
<p>CAUTION. IF CARTRIDGE-BELT IS LOADED INCORRECTLY, IT IS NECESSARY TO UNLOAD CARTRIDGE-BOX FULLY AND DO OPERATIONS AS PER PARA 2.7 – 2.11.</p> <p>2.12. Engage 11.9135.3.007.900 hook with the first link and pass it inside the rigid feeder hose of 9-A-4071K article. Push forward the belt in the cartridge-box by hand.</p> <p>2.13. Hang pusher stop with extender on the rails of cartridge-box (Fig. 207). Install extender on the rod, for that install stud, which connects rod to the extender (Fig. 209). Disconnect feeder hose from the article.</p> <p>2.14. Load the article, refer to paras 1.1 – 1.6 ASC 7.</p> <p>2.15. Connect article to feeder hose and pull cartridge-belt up to the article extractor by long hook. Then continue the loading, refer to para 1.7÷1.10 ASC 7.</p> <p>2.16. Close panels for access to the article.</p> <p>CAUTION. PANEL BETWEEN FRAMES No.16 AND No.18 CLOSES AFTER CONTACTOR CLOSING</p> <p>2.17. Close cartridge-box cover.</p>			

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ASC 5 (continued)

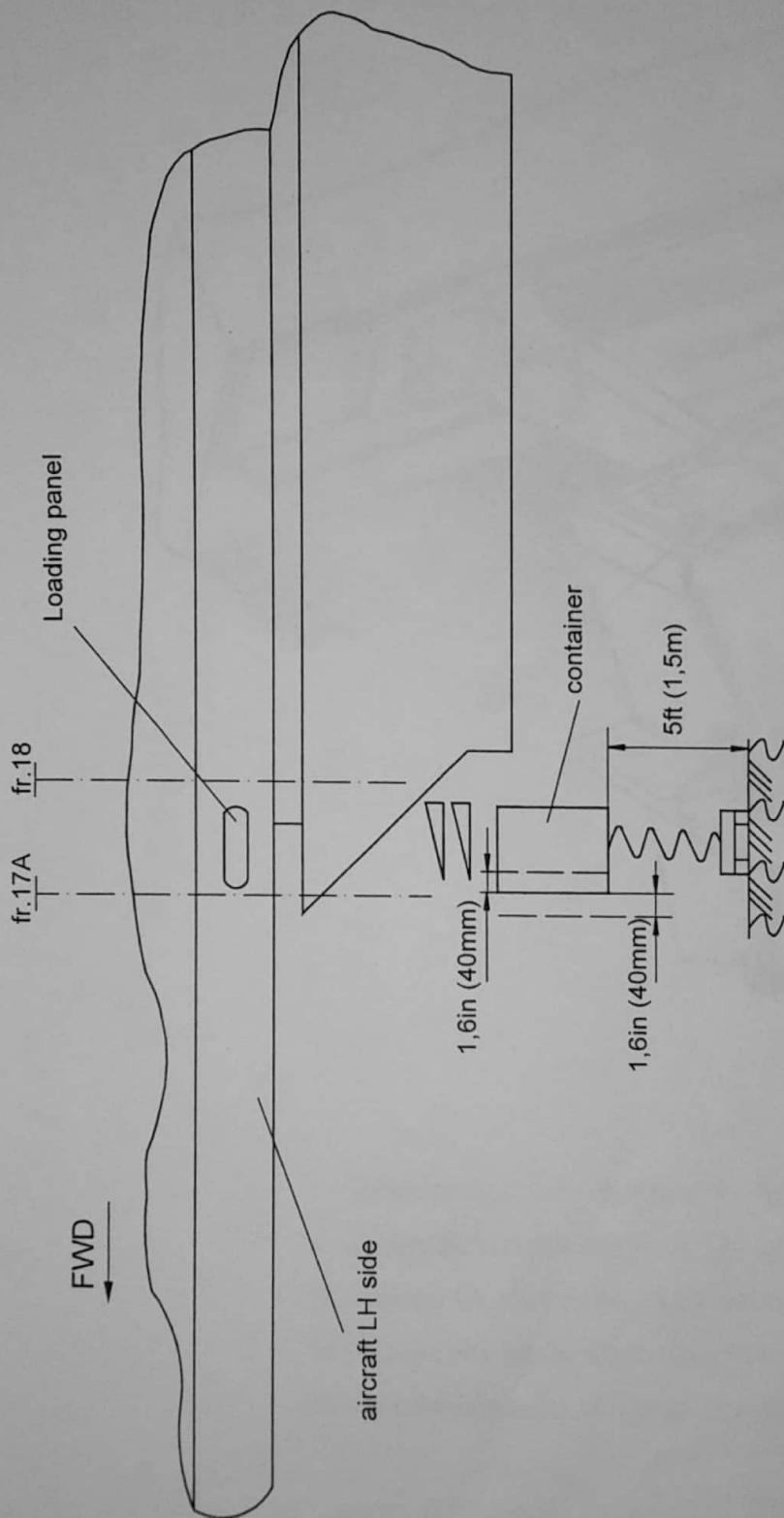
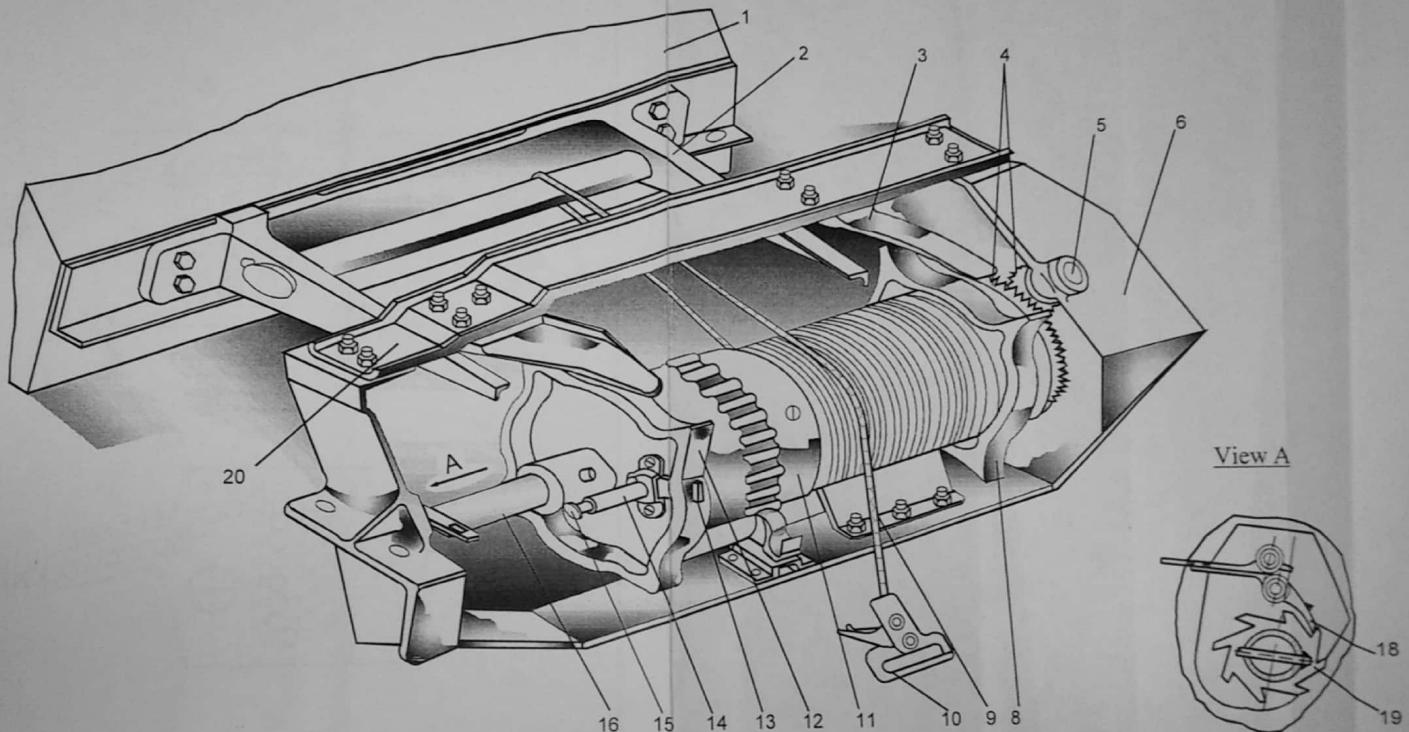


Fig. 204. Layout diagram of container in relation to the loading panel on the aircraft.

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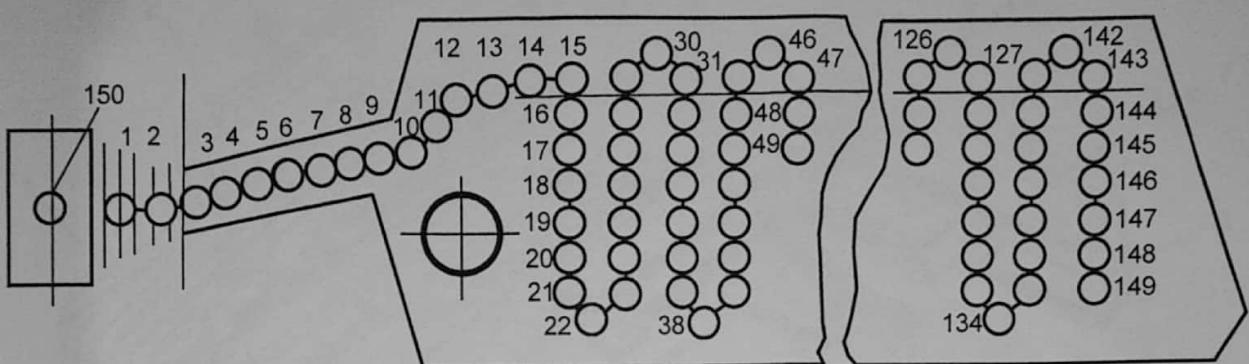
1 – cartridge-box; 2, 6 – brackets; 3 – limiter; 4 – cone gears;
5 – socket for actuator handle; 8, 12 – gear wheels; 9 – cable; 10 – hook;
11 – barrel; 13 – button for winch and feeder unit release; 14 – collar lock;
15 – button of lock for winch and feeder unit interlocking;
16 – mechanism axle; 18 – stop; 19 – ratchet wheel; 20 – quick-removable plate.

Fig. 205. Loading mechanism (front top view)

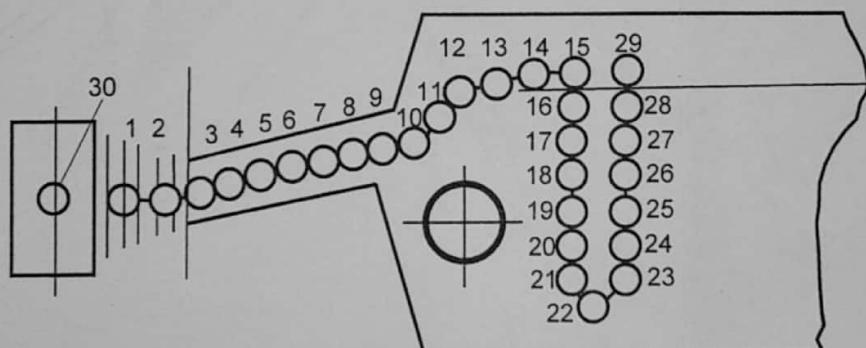
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A



B

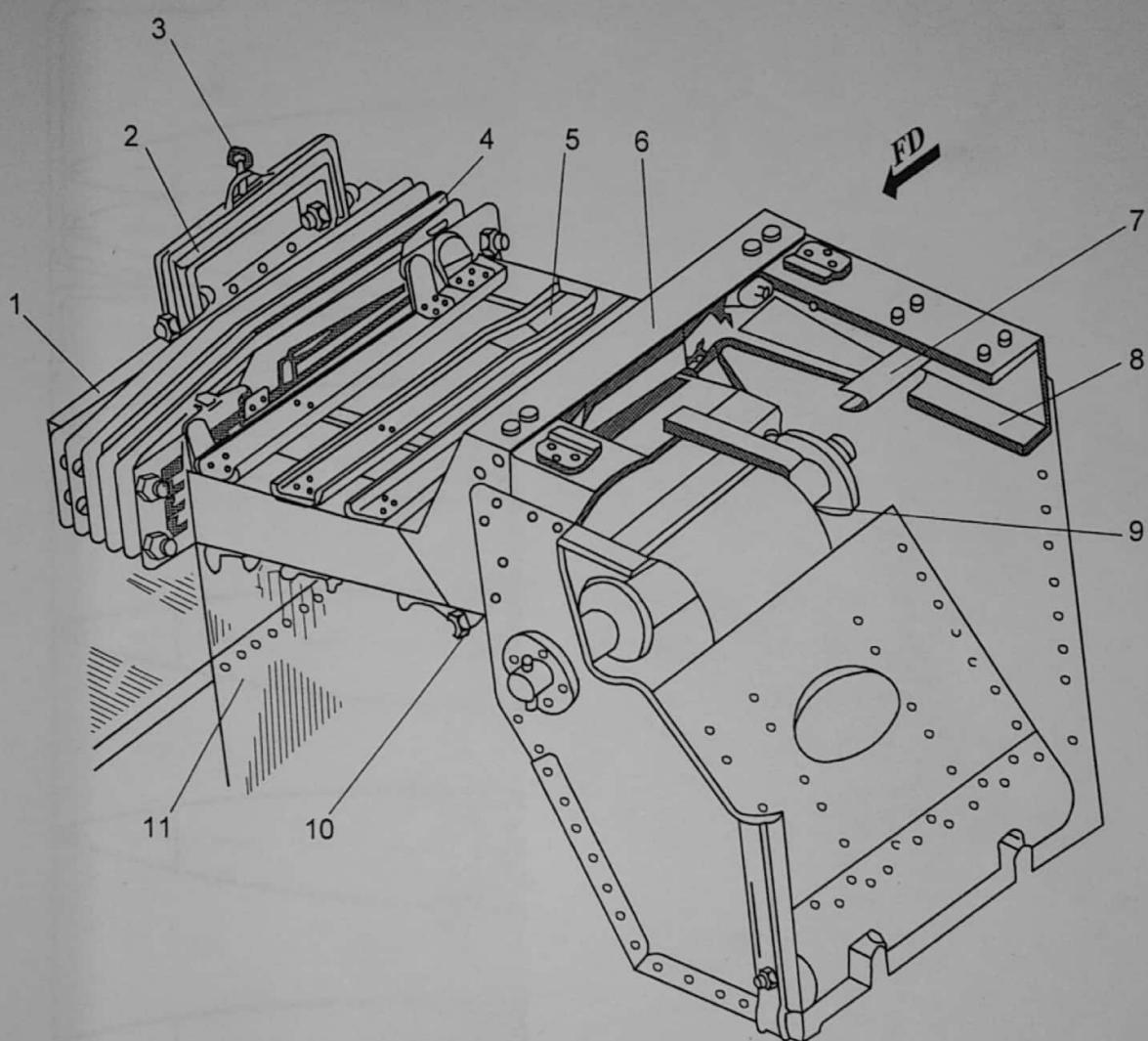


A – basic variant;

B – training firing variant.

Fig. 206. Variants of cartridge box loading

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1 – neck; 2 – lock handle; 3 – spring-loaded stop;
4 – moving part of feeder hose; 5 – fixed part of feeder hose;
6 – cartridge-box; 7 – limiter; 8 – guide rails; 9 – roller;
10 – bracket; 11 – internal bay wall.

Fig. 207. Feed hose and cartridge box

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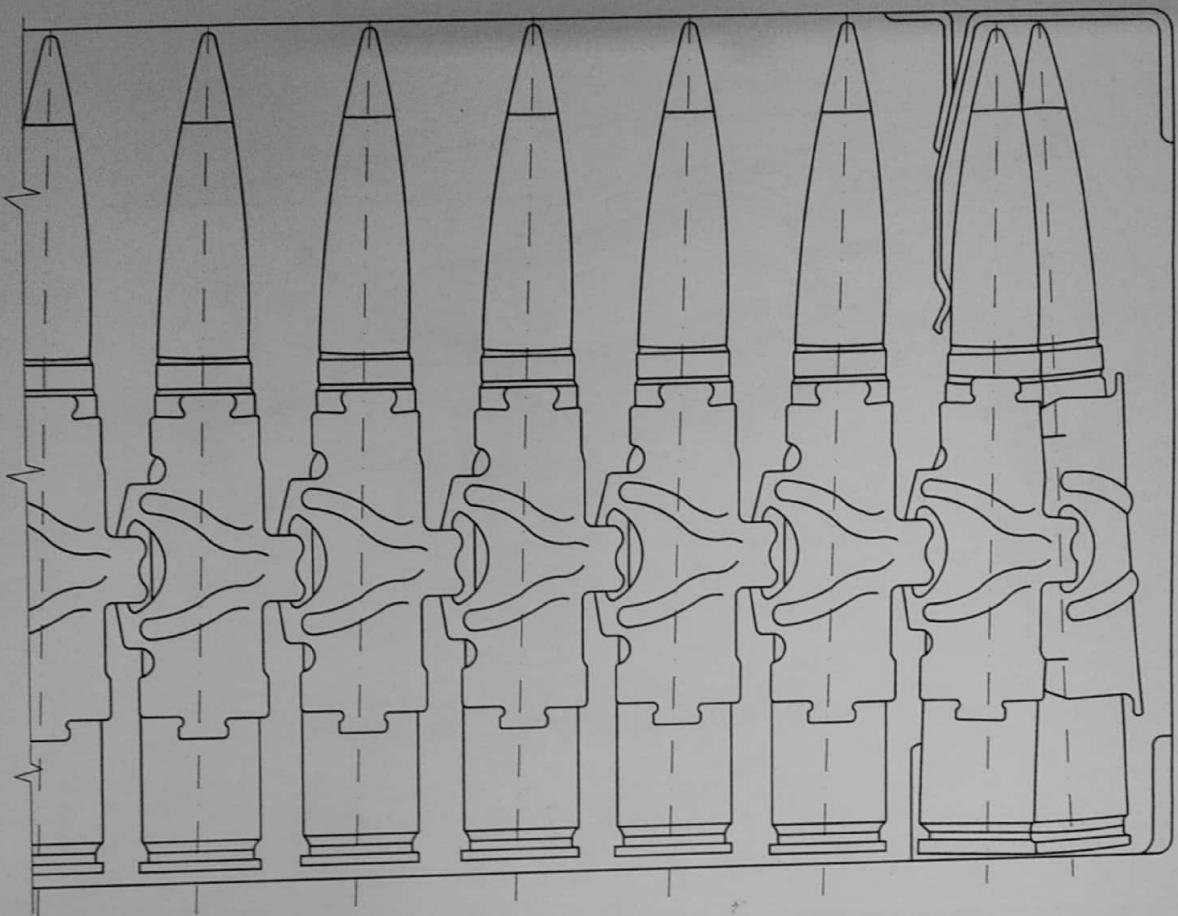
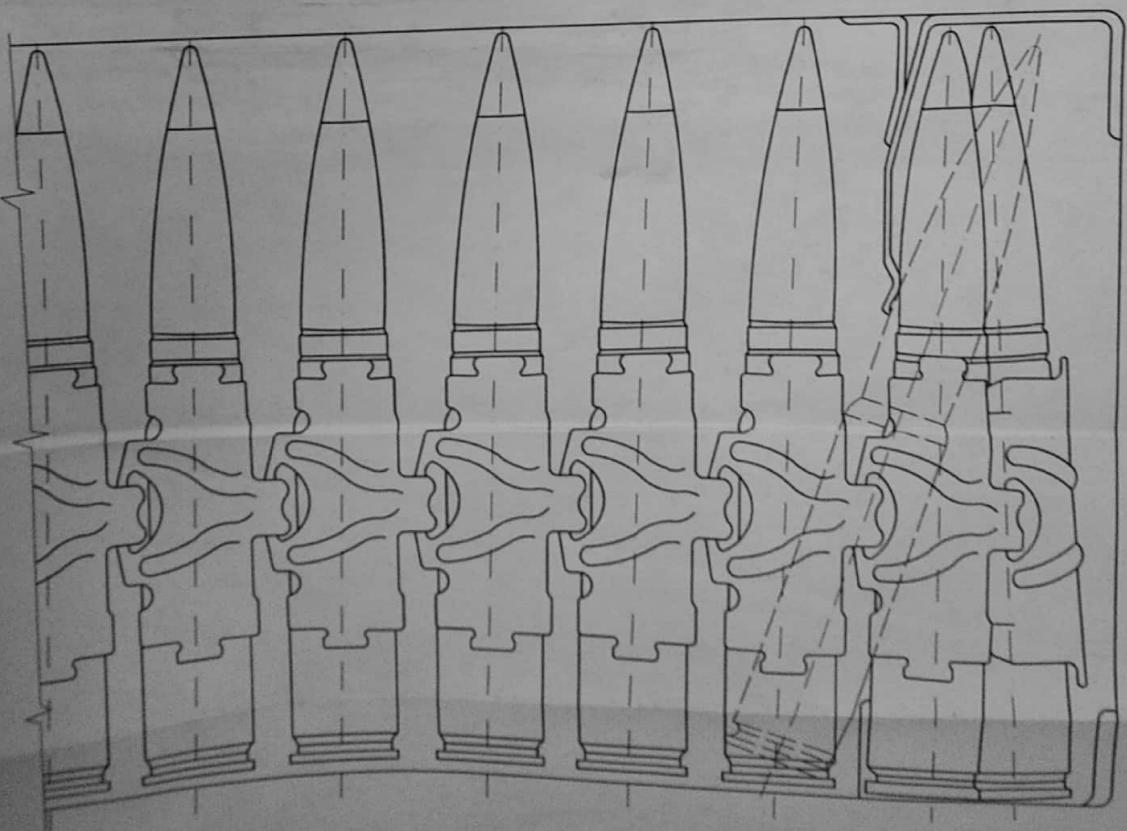
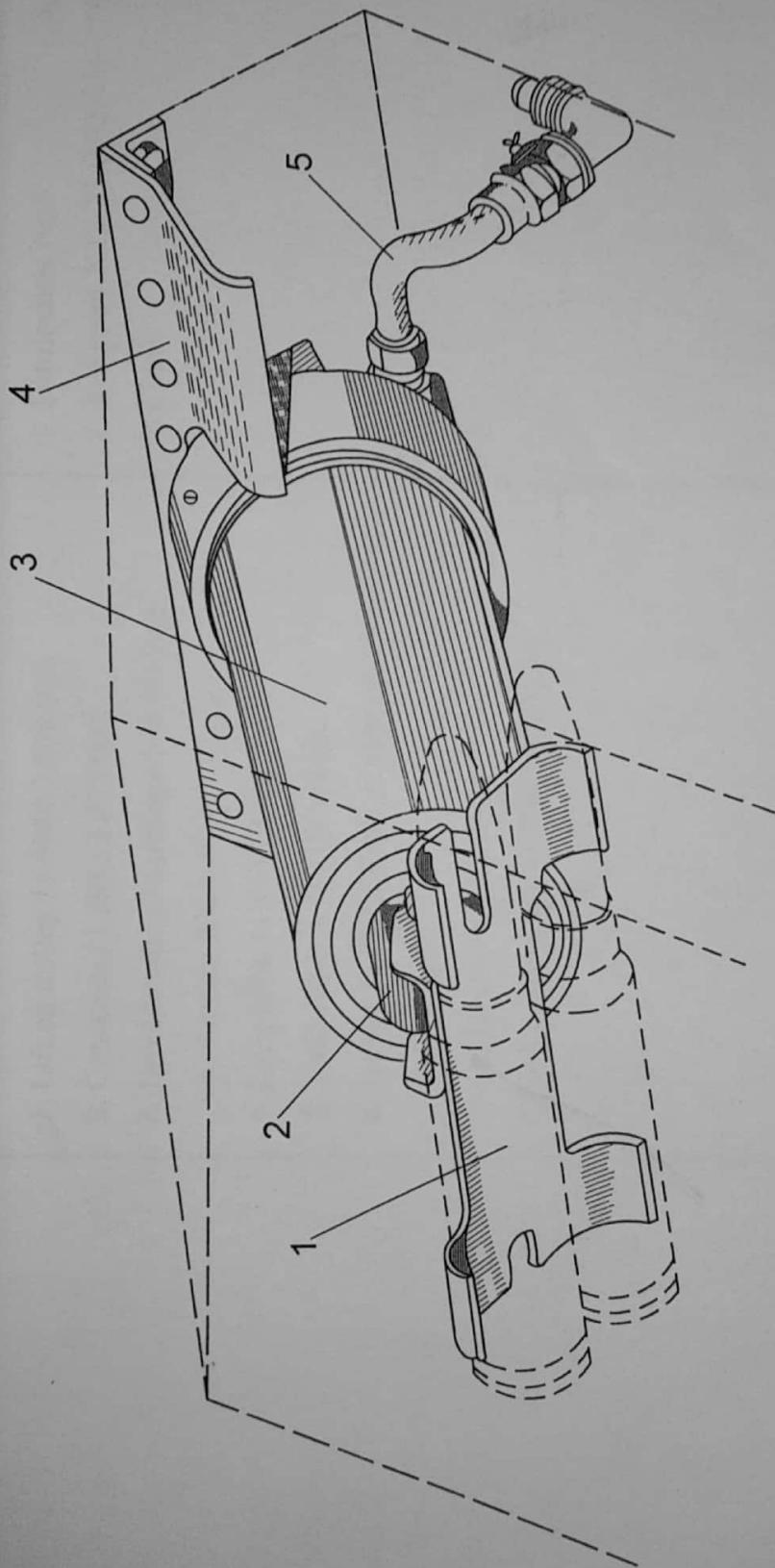


Fig. 208 Loading of cartridge-belt in the cartridge-box.



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ASC 5 (continued)



1 – stop; 2 – rod; 3 – cylinder; 4 – splice strip; 5 – hose.

Fig. 209. Pusher

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ASC 5 (continued)	
Testing equipment (TEQ)	Tools and accessories
	<ol style="list-style-type: none">1. Lifting trolley 11.9980.3.900.000.2. Container 11.9981.3.700.000.3. Drive handle of cartridge-box loading mechanism 322/0-4033.4. Long hook 11.9135.3.007.900.5. Tools for 9-A-4071K article.6. Ladder 11.9930.5.960.000 for operation with built-in gun.7. Ladders 30.9930.8025.0008. Belt guide-chute 11.9983.3.900.000

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To Maintenance Schedule	ASSEMBLY CHART 6			Pages 237-242
Para	Description of operations			Manhours
	Built-in gun unloading.			
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
1. GENERAL INSTRUCTIONS.				
1.1. Make sure that:				
	- on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2;			
	- on upper LH board of instrument board M/ARM switch is set to OFF;			
	- on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.			
2. INSPECTION OF BUILT-IN GUN ASSEMBLY AFTER FIRING.				
	CAUTION. TO PREVENT FREEZING OF PNEUMATIC PUSHER RODS AT LOW TEMPERATURES IMMEDIATELY AFTER ENGINES SHUTDOWN, OPEN PANEL FOR ACCESS TO THE CARTRIDGE BOX AND PUT THE PNEUMATIC PUSHER TO INITIAL POSITION.			

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ASC 6 (continued)	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>2.1. Open panels for access to the article: at first 103-PII, then the others. Open panel of cartridge-links collector on RH strake between frames No.17a and No.18.</p> <p>2.2. Disconnect contactor of the article. For that turn handle located on the housing of additional igniter fuse to horizontal position (to OFF engraving). The housing of additional igniter fuse must move backwards.</p> <p>2.3. Put knockout rod in the hole below additional igniter fuse, move the igniter fuse upwards and remove it.</p> <p>2.4. Push on the contactor retainer lock. Prize the retainer with screwdriver and turn it upwards until stop. Move the contactor housing with reloading handle forward until stop toward the barrel. Now the barrel bore is open. Make sure that there are no cartridges in the cartridge chamber.</p> <p>WARNING. MAKE SURE THAT MOVING ELEMENTS OF THE GUN ARE IN EXTREME FRONT POSITION. OTHERWISE, MOVING ELEMENTS OF THE GUN CAN MOVE RAPIDLY WHEN YOU OPEN THE CONTACTOR RETAINER.</p> <p>2.5. Put the used links in the special bag 11.9982.3.285.000</p> <p>2.6. Put the pneumatic pusher to initial position. The stop (1, Fig. 209) must be on the rails of cartridge-box.</p>			

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ASC 6 (continued)	
Procedure and technical requirements	Operations to be done, if not to Monit oring specifications
<p>3. REMOVAL OF CARTRIDGE-BELT FROM BUILT-IN GUN.</p> <p>3.1. Perform operations, refer to paras 1, 2, except for para 2.4.</p> <p>3.2. Release cartridge-box. For that turn the handle of feeder mechanism to OFF engraving.</p> <p>3.3. Unlock the cartridge-link tray and move it aside from the gun. Then disconnect the hanging end of links-belt, push it in the cartridge-links collector. Use hook and screwdriver to push the cartridge-belt from gun cartridge-feed window to the feeder hose. Remove the cartridge from the cartridge-chamber, refer to ASC 7.</p> <p>3.4. Remove cartridge-belt from the cartridge-box and from feeder hose. For that:</p> <ul style="list-style-type: none"> - on the winch of cartridge-box loading mechanism set to OFF return ratchet gear (19), (Fig. 205). For that push the lever of stop (18); - unlock the winch and gear wheels (8) and (12). For that press the button (13) of locking mechanism; - assemble the pneumatic pusher. Remove the stud that attaches the extender on the pusher housing. Remove the extender; - lower the pusher on the bottom of the cartridge-box; - remove the stop from the rails; - remove the last cartridge from the box with the hook, attached to the swab rod. 	

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ASC 6 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monit oring
<p>Put the cartridge on the gear wheels of the loading mechanism.</p> <p>To prevent incorrect position of the cartridges on the winch, it is recommended to install on the button (13) the second cartridge from the belt end (No.148 at the basic loading and No.28 at training loading);</p> <ul style="list-style-type: none"> - remove the loop from the rails on the bottom of the cartridge-box in front of the winch; - gradually lower the belt into the container. For that turn the winch handle with right hand and hold the cartridge-belt with left hand above the winch barrel; - remove cartridge-belt loops from the rails one after another with the hook, attached on the swab rod. Lower the cartridge-belt into the container using loading mechanism; - turn one or two last loops that remain on the rails, with a hook. Put them on the bottom of the box; - push the cartridge-belt from the flexible feeder hose to the rigid feeder hose. At that use the hook and screwdriver to hold the free link on the belt and prevent it from engagement with elements of flexible feeder hose; - remove remaining cartridge-belt from the box and lower it in the container using loading mechanism. Prevent engagement of the links with rigid pivoting door of the cartridge-box to avoid its deformation (Fig. 210); - install the stop on the cartridge-box rails and attach it together with pneumatic pusher with quick-removable stud. 		

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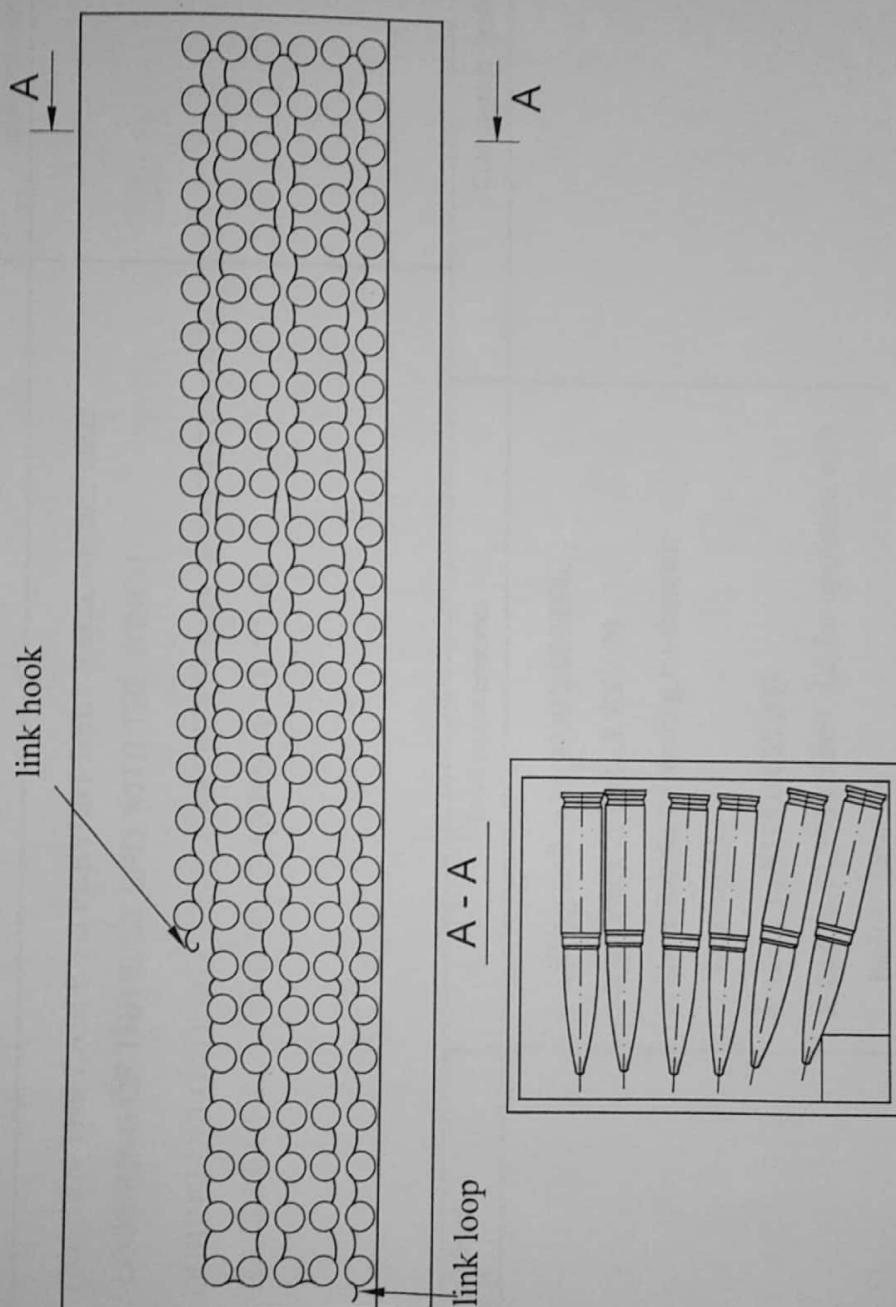


Fig. 210: Loading of ammunition in container for transportation and storage.

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ASC 6 (continued)		
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>CAUTION. 1. TIGHTEN THE CABLE TO PREVENT BELT FAILURE BEFORE LOWERING OF THE BELT END WITH THE WINCH.</p> <p>2. DURING UNLOADING OF THE CARTRIDGE-BOX DO NOT RELEASE HANDLE OF LOADING MECHANISM ACTUATOR.</p>		
Testing equipment (TEQ)	Tools and accessories	Consumable items
	1. Lifting trolley 11.9980.3.900.000. 2. Container 11.9981.3.700.000. 3. Drive handle of loading mechanism 3222/0-4033. 4. Hook 11.9135.0.025.000. 5. Ladder 11.9930.5.960.000 for operation with built-in gun. 6. Ladder 30.99930.8025.000 2 pcs. 7. Tools for 9-A-4071K article. 8. Bag for links 11.9982.3.285.000.	

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ASC 7 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
To fill the article: - press the plug handle by hand and move the plug handle from the safety clamp. Set the plug to position, in which the plug handle is above the recess on the neck. Plug falls down, and makes clearance along inside perimeter of the neck. WARNING. BE CAREFUL WHEN YOU OPEN THE FILLER NECK AFTER FIRING. HOT WATER CAN EJECT FROM THE NECK. - fill the water until water appears from the neck; - turn the plug handle in direction of clamp and put the plug in the neck; - move the plug handle behind the clamp. Lock plug in this position. CAUTION. REFILL COOLING SYSTEM WITH WATER AFTER EACH FIRING (DO NOT REMOVE 9-A-4071K ARTICLE FROM THE AIRCRAFT). 1.4. Open the barrel bore, for that: - press the contactor retainer lock with hand, prize the retainer up with the screwdriver and turn it up until stop; - install the reloading handle on the article. The handle fork must enclose the cap pin. The handle pin must get inside the hole on the contactor housing;		

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ASC 7 (continued)	Operations to be done, if not to Monit oring specifications
<p>Procedure and technical requirements</p> <ul style="list-style-type: none"> - move the contactor housing with handle forwards until stop towards the barrel - barrel bore is open. 1.5. Move the article cover rearwards until stop. Put the cartridge between the deflector and the cover. Move the cover together with cartridge forwards. Move the cartridge to the ramming chute and move it by hand in the cartridge-chamber (you must hear a "click" of recoil mechanism). 1.6. Install the contactor housing on its place by reloading handle. For that, move the housing rearwards, and lock it by retainer. Barrel bore is closed. 1.7. Put the cartridge-belt in the cartridge-feed window of the gun: <ul style="list-style-type: none"> - turn the feeder mechanism handle by hand or with screwdriver in direction of OFF engraving; - remove cartridge-link tray; - use the hook 11.9135.3.007.900 to pull the cartridge-belt, until the first cartridge touches the lugs of the gun decline device; - turn the feeder mechanism handle in direction of ON engraving. The belt must be locked in the cartridge-feed window by latch-fingers. Make sure that the clamp of the latch-fingers is tightly pressed to the housing of gun extractor. - make sure that lugs of link are in gun decline device slots; - install cartridge-link tray. 	

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ASC 7 (continued)		
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
1.8. Install additional igniter fuse in the related socket.		
1.9. Install housing of additional igniter fuse on its place, for that turn handle on housing of additional igniter fuse to position with ON engraving. Make sure that handle is locked in ON position.		
1.10. 9-A-4071K article is loaded and can be used for firing: the first cartridge is in the cartridge-chamber and is locked, the second cartridge is on the decline line, electrical connector of 9-A-4071K article harness is connected to aircraft electrical connector and locked.		
	2. UNLOADING OF 9-A-4071K ARTICLE.	
	2.1. Make sure that:	
	<ul style="list-style-type: none"> - on switch board SPECIAL SYS 1, 2 switches are set to OFF; - on upper LH board of instrument board M/ARM switch is set to OFF; - on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF. 	
	<ul style="list-style-type: none"> - disconnect contactor of the article. For that turn handle located on the housing of additional igniter fuse to horizontal position (to OFF engraving). The housing of additional igniter fuse must move backwards. 	

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ASC 7 (continued)

Procedure and technical requirements	Operations to be done, if not to Monit oring
<p>2.2. Remove the cartridge-belt from the cartridge-feed window of the gun:</p> <ul style="list-style-type: none"> - turn the feeder mechanism handle by hand or with screwdriver in direction of OFF engraving; - pull cartridge-belt out from the cartridge-feed window in the direction that is opposite to the feed direction. Use 11.9135.0.025.000 hook and screwdriver. <p>2.3. Press on the contactor retainer lock with hand, prize the retainer up with the screwdriver and turn it up until stop. Use the reloading handle to move the contactor housing forwards in the direction of barrel until stop.</p> <p>WARNING. MAKE SURE THAT MOVABLE PARTS OF 9-A-4071K ARTICLE ARE IN EXTREME FRONT POSITION. IF MOVABLE PARTS OF THE ARTICLE ARE IN INTERMEDIATE POSITION, THEY CAN MOVE RAPIDLY DURING OPENING OF CONTACTOR RETAINER.</p> <p>2.4. Remove the cartridge from the cartridge-chamber:</p> <ul style="list-style-type: none"> - move article cover rearwards; - engage the hook (from 9-A-4071K article tools) to the cartridge edge and push the recoil lever shank with knockout rod to move the cartridge to the extractor; - remove the cartridge from the article; - install the cover on its place. 	

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ASC 7 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Mount oring
<p>2.5. Use knockout rod. Remove additional igniter fuse.</p> <p>CAUTION. DO NOT USE ADDITIONAL IGNITER FUSE AGAIN AFTER "HOT" WORKS.</p> <p>2.6. Install the contactor housing on its place and lock by retainer. Check connection of article electrical connector with the aircraft power system.</p> <p>2.7. Install housing of additional igniter fuse on its place, for that turn handle on housing of additional igniter fuse to position with ON engraving. Make sure that handle is locked in ON position.</p> <p>2.8. Close panels for access to the article.</p>		

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ASC 7 (continued)		
Testing equipment (TEQ)	Tools and accessories	Consumable items
	<ol style="list-style-type: none">1. Crater.2. Ladder 11.9930.5.960.000 for operation with built-in gun.3. Ladder 30.9930.8025.000.4. Hook 11.9135.0.007. 900.5. Hook 11.9135.0.025.000.6. Tool for 9-A-4071K article.	

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To Maintenance Schedule	ASSEMBLY CHART 8		
Para	Description of operations.	Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
	Preparation of built-in gun for operation.		
1. Preparation of built-in gun for operation.			
1.1. Open panels to get access to the article. At first open 103-RP panel, then open the other panels.			
1.2. Make sure that:			
	- on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2; - on upper LH board of instrument board M/ARM switch is set to OFF; - on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.		
		De-energize the firing electrical circuit. For that pull the handle on the housing of additional igniter fuse to yourself, then turn it to horizontal position (to OFF engraving). The housing of additional igniter fuse must move backwards.	
		Make sure that 9-A-4071K article is correctly loaded:	
		- the cartridge must be in the cartridge chamber (from the lower side of breech, in front of the rear assembly carriage: find by touch the base of the case of the cartridge, which is in the bore);	

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ASC 8 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitor oring
<ul style="list-style-type: none"> - barrel bore must be closed (contactor housing and pin of 9-A-4071K article cover are connected, retainer is locked); - cartridge-belt must be attached in feed window of 9-A-4071K article (the first cartridge, located on decline line, must thrust against legs of decline device of 9-A-4071K article; cramp of latch-fingers on extractor of 9-A-4071K article is tightly pressed to the extractor housing; handle of the feeder mechanism is in ON position (engraved)); - link shanks must be in extractor slots. <p>Make sure that the following units are correctly installed and locked: pusher, cartridge-link tray, feeder hose, electrical connectors and electrical bundle.</p> <ol style="list-style-type: none"> 1.3. Install housing of additional igniter fuse on its place. For that pull the handle on the additional igniter fuse housing to yourself and turn it to ON position (engraved). Make sure that handle is locked in ON position. 1.4. Make sure that there are no foreign objects in built-in gun compartment. Close panels located above 9-A-4071K article between frames No.16 and No.18. 	

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ASC 8 (continued)		
Testing equipment (TEQ)	Tools and accessories	Consumable items
	<ol style="list-style-type: none">1. Screwdriver 7810-0941.2. Ladder 30.9930.8025.000 2 pcs.3. Ladder 11.9930.5.960.000.	

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To Maintenance Schedule Para	ASSEMBLY CHART 9	Pages 255-256
Description of operations.	Procedure and technical requirements	Operations to be done, if not to specifications
Aircraft preparation for a training-firing flight	1. Unload 9-A-4071K article, refer to ASC 7. 2. Prepare and load the cartridge-box with cartridge-belt for training firing, refer to ASC 6. 3. Load 9-A-4071K article, refer to ASC 7. 4. Set TRAINING switch to ON on PNP-30PK.	Manhours
		Monitoring

CAUTION. DO NOT INSTALL ADDITIONAL IGNITER FUSE DURING TRAINING
FIRING WITH AMMUNITION LOAD OF 30 CARTRIDGES.

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Testing equipment (TEQ)	Tools and accessories	ASC 9 (continued)	
		Consumable items	
	<ol style="list-style-type: none">1. Tools from spares set for 9-A-4071K article.2. Ladder 11.9930.5.960.000 for operation with built-in gun.3. Ladder 30.9930.8025.000 – 2 pcs4. Drive handle of loading mechanism 322/0-4033.		

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To Maintenance Schedule	ASSEMBLY CHART 10		Pages 257- 261/262
Para	Description of operations.	Manhours	Monitoring
	$30 + 6$ $- 3$ -days storage inspections		
	Procedure and technical requirements	Operations to be done, if not to specifications	
PROTECTION OF DETACHABLE BOLTED CONNECTIONS			
<ol style="list-style-type: none"> 1. Thoroughly degrease places of bolts installation with nefras, dry them at temperature from 15 to 30 °C for 10 to 15 minutes. 2. Apply PVK gun lubricant or TsIATIM-221 lubricant on the bolt and on the hole and install the bolts. 3. After assemblage apply (using brush) uniform layer of gun lubricant or TsIATIM-221 lubricant on the bolt head and on the bolt projecting part with 0,2 to 0,28 in (5 to 7 mm) overlap on the part. 			

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ASC 10 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
INSPECTION, CLEANING AND LUBRICATION OF GUN AMMUNITION LOADS	<p>1. Remove all cartridges from the aircraft and put them on rack. The rack must be wooden and must not have protruding nails, cramps, etc.</p> <p>Note. It is permitted to store ammunition, removed from the aircraft or delivered from the warehouse, in container 11.9981.3.700.000 under cover.</p> <p>2. Remove old lubricant and contaminations from cartridge-belts. Remove old lubricant and contaminations from cartridge-belts using clean dry rags, and then wipe cartridge-belts with rags wet in nefras with addition of 5% to 10% of lubricant No.9.</p>		

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ASC 10 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
3. Check external condition of ammunition loads cartridges. The loaded cartridge-belts must not have cartridges or links with the following defects: - damages of fuse diaphragms, play of ballistic caps, free rotation and axial play of shells in cartridge-cases; - cracks on case mouths, which can be seen by the naked eye; - corrosion of primers, shells and igniters in the area of diaphragms press-in (beading); - incorrect fitting of primer and dents on cartridge-cases; - links with cracks or extended links along the pitch.	Return cartridges and links, which are not to specifications, to the warehouse and replace by new ones. Use clean woollen napkin to remove corrosion products from the surface of shells. Do not use emery paper or sand.		

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ASC 10 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
Apply a thin layer of lubricant No.9 on the cartridges of ammunition load. Apply the lubricant by scrubber. Wet scrubber with lubricant and squeeze strongly in such a way, that there is a thin lubricant film on the cartridge, which can be seen only by lustre.			
CAUTION. MAKE SURE THAT ELECTRIC-PRIMER SLEEVE OF ADDITIONAL IGNITER FUSE AND CARTRIDGE HAVE NO DIRT AND LUBRICATE.			
4. Do operations on loading of built-in gun, refer to ASC 5.	If the link is not aligned with cartridge, adjust the cartridge-belt, so that front lugs of link thrust against the cartridge-case shoulder.		

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Working equipment (WED)	Tools and accessories	ASC 10 (continued) Consumable items
	<ol style="list-style-type: none">1. Wooden rack or veneer sheet, or canvas.2. Tool, applied to 9-A-4071K article.3. Ladder 11.9930.5.960.000.4. Ladder 30.9930.8025.000 2 pcs.	<ol style="list-style-type: none">1. Cleaning rags.2. Napkins.3. Lubricant No.9.4. NEFRAS-S 50/170 (НЕФРАС-С 50/170).5. Lubricant TsiATIM-221 (ЦИАТИМ-221).6. Lubricant PVK (ПВК).

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To Maintenance Schedule	ASSEMBLY CHART 1		Pages 201-223/224
Para	Description of operations	Manhours	
	Test of armament control system using weapon simulators		
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>WARNING. DO NOT PERFORM OPERATIONS AS PER PRESENT ASSEMBLY CHART, IF:</p> <ul style="list-style-type: none"> - IF THERE IS ANY WEAPONS AT LEAST ON ONE HARDPOINT. - THERE ARE ANY CARTRIDGES IN MISSILE EJECTOR LAUNCHERS, RACKS; - CONTACTOR OF GUN IS CLOSED. <p>1. Make sure that necessary missile rail launchers, missile ejector launchers or racks are installed on the aircraft.</p> <p>CAUTION. BEFORE COMMENCEMENT OF OPERATIONS MAKE SURE THAT:</p> <ul style="list-style-type: none"> - SAFETY PINS ARE INSTALLED IN AKU-470 HOLES WITH PLACARDS: «BEFORE CHARGING DRIVE INSTALL SAFETY PIN No.3»; «BEFORE TAKEOFF REMOVE SAFETY PIN No. 1»; «CHECK OF LEVER CLOSING WITH SAFETY PIN No. 2» (2 PCS.). 			

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<ul style="list-style-type: none">- SAFETY PINS ARE INSTALLED IN AKU-170E HOLES WITH PLACARDS: «BEFORE INSTALLATION OF CARTRIDGE, INSERT PIN No. 2»; «CHECK OF RETAINER FOR LOCKING SAFETY PIN No.1,3».- SAFETY PINS ARE INSTALLED IN AKU-58AE HOLES WITH PLACARDS: «USE LOCKPIN No.3 TO CHECK CLOSED POSITION OF STOP»;«LOCKPIN No.1»;«LOCKPIN No.2». <p>THE PNEUMO-PYROUNIT DISTRIBUTOR IS IN THE RETURN POSITION, I.E. THE HAIRLINE ON THE BUSHING IS NOT ALIGNED WITH THE HAIRLINES ON THE AKU REAR FAIRING, WHERE THERE IS THE PLACARD: «CAUTION! SWITCH TO DROP»</p> <ul style="list-style-type: none">- SAFETY PINS ARE INSTALLED IN BD3-USK-A AND BD4-USKM-B;- THE BOOM IS RETRACTED;- WEIGHT ON WHEELS (AIRCRAFT IS NOT INSTALLED ON THE JACKS).	

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ASC 1 (continued)			
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
2. Open: - on AKU-470: panels to get access to pressure gauges of pneumatic systems and reference electrical connectors;	- on AKU-58AE: rear fairings to get access to pressure gauges of pneumatic systems, cartridges racks and reference electrical connectors;	- on BD3-USK-A, BD4-USKM-B: panels to get access to reference electrical connectors.	3. Remove pyrojectors from AKU-170E. WARNING. MAKE SURE THAT THERE ARE NO CARTRIDGES IN AKU-170E, AKU-58AE, BD3-USK-A, BD4-USKM-B; 4. Check initial position of armament control system controls, refer to Table 201.

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ASC 1 (continued)

Table 201

Location	Description	Initial position
1	2	3
a) Cockpit PU-30PK-01	AGM PWR switch EMER LAUNCH – EMER JETT selector switch ARMED-SAFE selector switch TRAIN POINT RTRD – NON RTRD TRAIN MIDPOINT selector switch 27I COOL switch 73 COOL switch AIR-GROUND selector switch LP AUTO-MAN selector switch PART-SGL-TRAIN selector switch	lower position neutral SAFE TRAIN POINT RTRD lower position lower position GROUND MAN SGL

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Table 201 (continued)

1	2	3	ASC 1 (continued)
Control stick	A-S switch STORES trigger FIRE trigger	A in upper position in upper position	
Panel N001-16B	FHS-AUTO-RHS switch rotary selector switch: φ_0 -NAV-OLS-RDR-VERT- OPT- HELM	FHS φ_0	
Switch board	switches: SPECIAL SYS 1, SPECIAL SYS 2	set to OFF	
Upper LH board of instrument board	M/ARM switch.	lower position	
Upper RH board of instrument board	WPN TRAIN switch	lower position (under guard)	

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ASC 1 (continued)

Table 201 (continued)

1	2	3
b) RH LG bay of PNP-30PK panel	ACS PWR switch BIT switch TEST switch D9 HEAT ON switch LG UP SIM switch TRAING switch CALIBER selector switch	lower position lower position upper position is not used lower position lower position set to OFF
c) NLG bay	EKRAN COMPR selector switch	lower position (under guard)

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>5. Install ZI-73 (ЗИ-73) weapon simulators on P-72-1DB2 and wing tip attachment (VSU) (Fig. 201).</p> <p>Connect auxiliary resistors units from KPZ-30PI-M (КПЗ-30ПИ-М) kit to the CONTROL electrical connectors of weapon simulators.</p> <p>Install safety pins in the holes of launchers with placard:</p> <p>BEFORE SUSPENDING AND REMOVING ITEM INSERT SAFETY PIN HOME.</p> <p>Install PPD-72 (ППД-72) indicators on the motor ignition contacts. Then remove the pins.</p>	

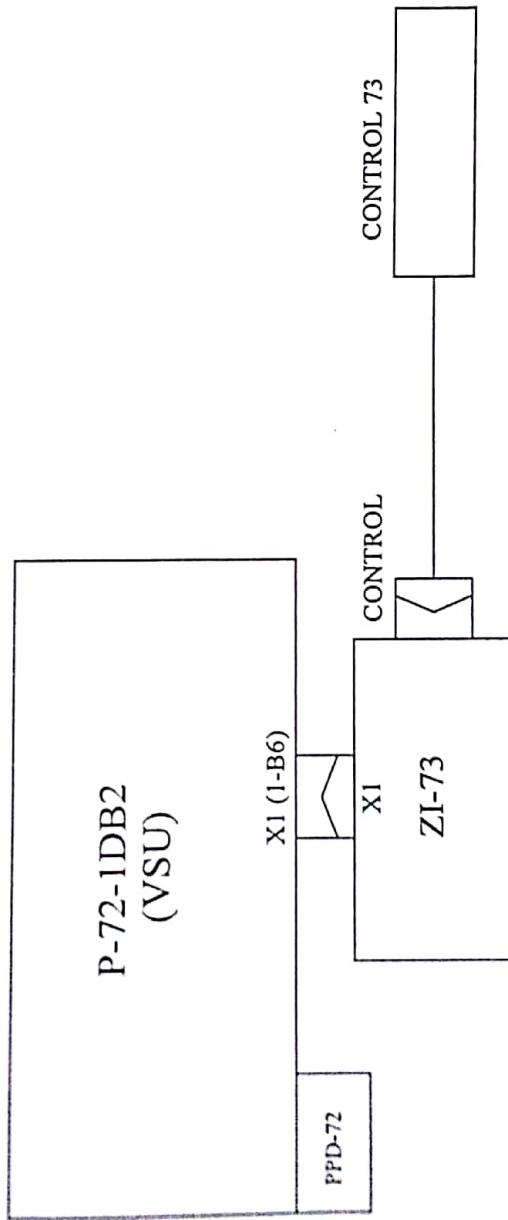


Fig. 201 Diagram of connection of ZI-73 (ЗИ-73) weapon simulator to P-72-1DB2 and of wing tip attachment (VSU).

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>6. Install ZI-27-02 (3II-27-02) weapon simulators on APU-470M (Fig. 202).</p> <p>Set the switches on ZI-27-02 weapon simulators:</p> <ul style="list-style-type: none"> - rotary selector switch - to 27R or 27T position for test of control circuits of the corresponding articles; - ACU switch - set to OFF; - FUSELAGE-WING – to WING position. <p>Install B-470 inserts from KPZ-30PI-M (KIT3-30ПИ-М) kit on the motor start contacts and connect them to ZI-27-02 weapon simulators.</p> <p>7. Install ZI-27-02 weapon simulators on AKU-470 (Fig. 202).</p> <p>Set the switches:</p> <ul style="list-style-type: none"> - rotary selector switch – to 27R position; - ACU switch – set to ON; - FUSELAGE-WING: <p style="margin-left: 20px;">for hardpoints. 9, 10 – WING; for hardpoints. 1, 2 – FUSELAGE</p> <p>Connect ZI-27-02 to XS10 reference electrical connectors of AKU-470.</p> <p>Remove pins from AKU-470 holes with placard: BEFORE TAKEOFF REMOVE SAFETY PIN No. 1.</p>	

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ASC 1 (continued)

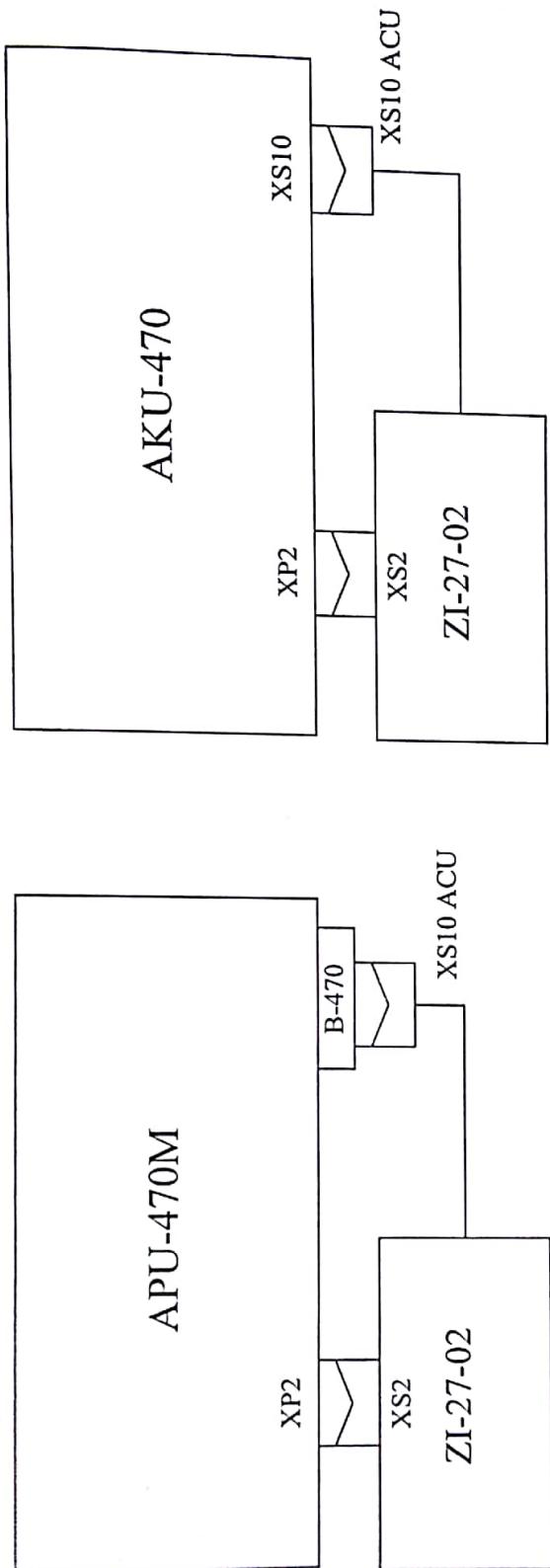


Fig. 202. Diagram of connection of ZI-27-02 (3I-27-02) weapon simulator to
APU-470M and AKU-470.

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monit oring
<p>8. Install ZI-77 (3И-77) weapon simulators on AKU-170E (Fig. 203).</p> <p>Set FUSELAGE-WING switch:</p> <ul style="list-style-type: none"> - for hardpoints. 3, 4, 9, 10 – to WING position; - for hardpoints. 1, 2 – to FUSELAGE position. <p>Connect ZI-77 to XS10 electrical connectors of AKU pyrotechnical ejectors. Remove pins from AKU-170E holes with placard:</p> <p>BEFORE INSTALLATION OF CARTRIDGE, INSERT PIN No. 2</p>	

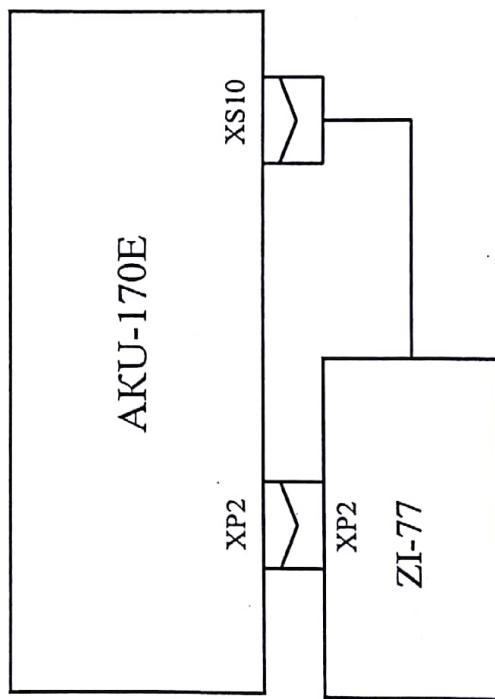


Fig. 203. Diagram of connection of ZI-77 (3И-77) weapon simulator to AKU-170E

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Mounting
<p>9. Install the pin No.2 in AKU-58AE hole with placard FOR SCHEDULED MAINTENANCE.</p> <p>Remove locking from the doors for access to detachable electrical connector. Open and lock them in opened position by pin No. 3.</p> <p>Install ZI-29/31 (ЗИ-29/31) weapon simulators on AKU-58AE (Fig. 204).</p> <p>Set rotary selector switch on ZI-29/31 and 29TE switch to positions corresponding to the articles under the test.</p>	

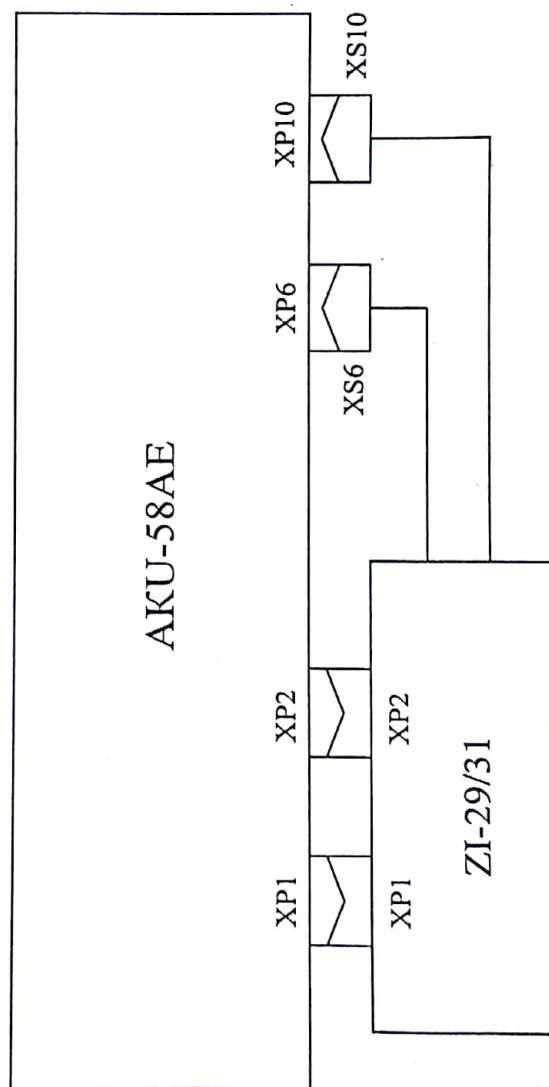


Fig. 204. Diagram of connection of ZI-29/31 (ЗИ-29/31) weapon simulator to AKU-58AE

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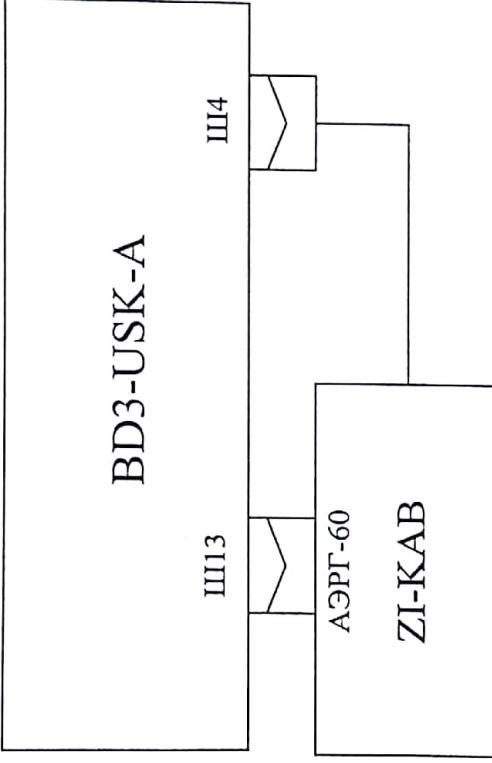
ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>10. Install ZI-KAB (ЗИ-КАБ) weapon simulators on BD3-USK-A to check KAB-500KR control circuits (Fig. 205).</p> <p>Set BD3-BD4 switch to BD3 position.</p> <p>Set TV-L switch to TV position.</p> <p>Set ARMED-SAFE switch on PU-30PK-01 to ARMED position.</p>	

Fig. 205 Diagram of connection of ZI-KAB (ЗИ-КАБ) weapon simulator to BD3-USK-A

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ASC 1 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>11. Install ZI-KAB (ЗИ-КАБ) weapon simulators on BD4-USKM-B to check KAB-1500KR test circuits (Fig. 206).</p> <p>Set BD3-BD4 switch to BD4 position.</p> <p>Set TV-L switch to TV position.</p> <p>Set ARMED-SAFE switch on PU-30PK-01 to ARMED position.</p>		

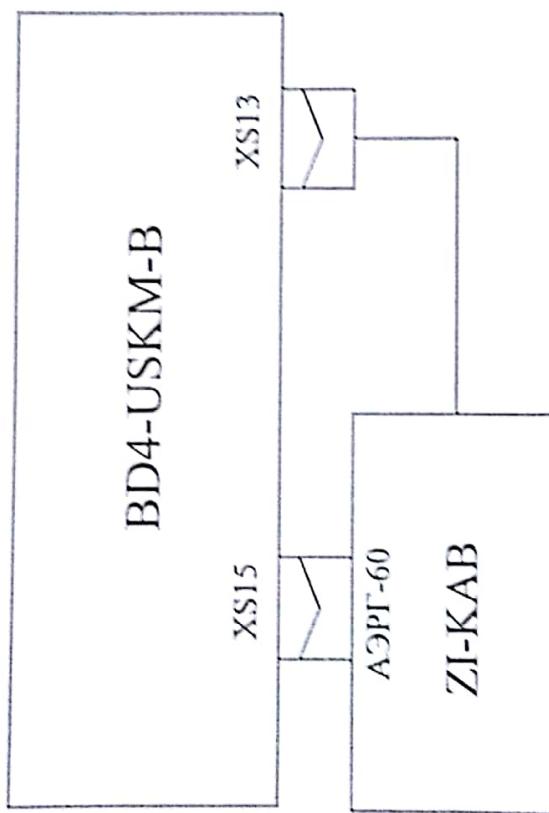


Fig. 206 Diagram of connection of ZI-KAB (ЗИ-КАБ) weapon simulator to BD4-USKM-B.

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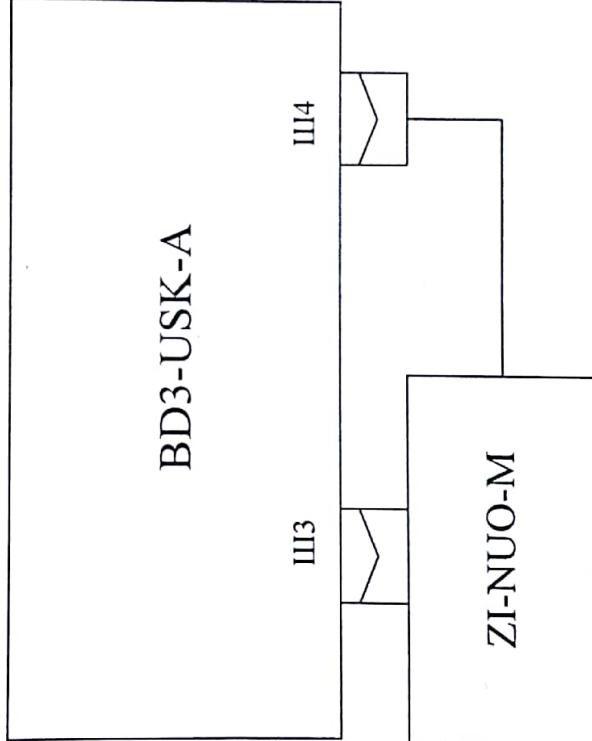
ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>12. Install ZI-NUO-M (ЗИ-НУО-М) weapon simulators on BD3-USK-A to check rockets launch control circuits (Fig. 207).</p> <p>Set rotary selector switch on ZI-NUO-M weapon simulators to position corresponding to the articles under the test</p>	 <pre> graph LR BD3[BD3-USK-A] -- III3 --> ZI1[ZI-NUO-M] BD3 -- III4 --> ZI2[ZI-NUO-M] ZI1 -- feedback --> ZI1 ZI2 -- feedback --> ZI2 </pre>

Fig. 207. Diagram of connection of ZI-NUO-M (ЗИ-НУО-М) weapon simulator to BD3-USK-A.

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>13. Install ZI-NUO-M (3И-HYO-M) weapon simulators on BD3-USK-A to check bombs jettison control circuits (Fig. 207).</p> <p>Set rotary selector switch on ZI-NUO-M weapon simulators to AB position.</p> <p>Perform check when the following switches are in positions:</p> <p>ARMED-SAFE switch on PU-30PK-01 - in SAFE and ARMED positions and ACTIV-PASSIV switch on ZI-NUO-M in PASSIV and ACTIV positions respectively.</p>	
<p>14. Remove pins from BD3-USK-A and BD4-USKM-B.</p>	<p>CAUTION. 1. TO PREVENT FALLING OF WEAPON SIMULATORS, ATTACH THEM.</p> <p>2. DO NOT INSTALL WEAPON SIMULATORS WITH DIFFERENT TYPES OF AW ON THE SYMMETRIC HARDCOUPONS.</p>

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ASC 1 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
15. Connect ground power supply to the aircraft, refer to ASC 1, 012.94.00, Book 9/4.		
16. Connect air conditioner to the aircraft (the operation must be performed by Airframe and Engine specialist).		
17. Set to ON the following switches on switch board in the cockpit: - A / C AND PWR SYS 1, A / C AND PWR SYS 2; - SPECIAL SYS 1, SPECIAL SYS 2; - EL EQPT SYS 1, EL EQPT SYS 2.		
18. Set to ON WCS-S, EKRAN switches on power board.		
19. On any multifunction indicator select STR indication mode. For that press successively HUD button on MFI framing and STR multifunction button.		
20. Do operations, refer to Table 202.		

- A / C AND PWR SYS 1, A / C AND PWR SYS 2;
- SPECIAL SYS 1, SPECIAL SYS 2;
- EL EQPT SYS 1, EL EQPT SYS 2.

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ASC 1 (continued)

Table 202

Test steps	Indication in cockpit	Indication on PNP-30PK and ZI (3U)
1	2	3
1. On PNP-30PK set BIT, LG UP SIM switches to ON. 2. On PNP-30PK set ACS PWR switch to ON.	In ≈30 s the indication of stores presence on the hardpoints comes ON on STR mnemonic frame of multifunction indicator.	<p>The following indicators on PNP-30PK come ON:</p> <ul style="list-style-type: none"> - ACS PWR; - OPRNL BS, BPE-1, -2, -3, BRPI. - OPRNL ACS indicator flashes and in ≈30 s comes ON. <p>It indicates that built-in test is completed.</p> <p>Make sure that OPERABLE indicator illumination on all ZI weapon simulators is OFF.</p> <p>Make sure that there is no STOP placard on the mnemonic frame</p>

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ASC 1 (continued)

Table 202 (continued)

1	2	3
	<p>On PNP-30PK set ACS PWR switch to OFF and repeat the test from the para No.1</p> <p>3. Press RESET button on weapon simulators subsequently.</p> <p>4. Release RESET button.</p> <p>5. On the ground test panel press ABIT button.</p> <p>6. On the ground test panel set rotary selector switch TEST to 30PK position.</p>	<p>Make sure that OPERABLE indicator illumination on all weapon simulators is ON</p> <p>Make sure that OPERABLE indicator illumination on all weapon simulators is OFF</p> <p>MFPI shows text SELF TEST, then EKRAN OK, then SELECT MODE.</p>

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Table 202 (continued)

ASC 1 (continued)		
1	2	3
Press ABIT button again.	MFPI shows text 30PK TEST. Note. There can be no text 30PK TEST If communication line is serviceable, MFPI shows text: TURN ON M/ARM.	MFPI shows text: PRESS AND HOLD FT Make sure that release of all articles is indicated on multifunction indicator. MFPI shows the following texts: TURN OFF M/ARM, then 30PK OK, HPT OK, END TEST.
		OPERABLE indicators on weapon simulators come ON. On PPD-72 signal lamps must come ON for a short time

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ASC 1 (continued)

Table 202 (continued)

1	2	3
Release STORES trigger.	<p>In case of failure MFPI shows texts about failures:</p> <p>HPT FAIL, NO HPT TEST, FT FAIL and numbers of failed hardpoints.</p> <p>After texts about failures MFPI shows:</p> <p>TURN OFF M/ARM.</p> <p>9. Set M/ARM switch to OFF.</p> <p>Note : After the test is completed, EKRAN goes to standby mode.</p> <p>10. On PNP-30PK set LG UP SIM, ACS PWR switches to OFF.</p>	

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Table 202 (continued)

1	2	3	ASC 1 (continued)
11. Repeat operations, refer to paras 1, 2.			
12. During simulation of stores on wing tip attachment (VSU), P-72-1DB2, APU-470 press EMER LAUNCH – EMER JETT button switch on PU-30PK-01 to EMER LAUNCH position.	Make sure that MFI shows the release of all missiles in order: 5, 6, 3, 4, 7, 8.	OPERABLE indicators must come ON on weapon simulators connected to specified hardpoints. On PPD-72 signal lamps must come ON.	
		Make sure that MFI shows the release of all stores in order: hardpoint No. 2; in 1 s – hardpoints No.1, 3, 4 (3a, 4a), 9, 10; in 0,4 s – hardpoints No.3b, 4b.	OPERABLE indicators must come ON on weapon simulators connected to specified hardpoints.

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>Notes.</p> <p>1. Perform test with ZI-KAB and ZI-29/31 after blue lines appear on the corresponding hardpoints of MFI.</p> <p>2. During test of EMER JETT mode with BD4-USKMM-B it is necessary to compress MBS rod of the rack, and release it after OPERABLE indicators on ZI-KAB come ON.</p> <p>3. Check the discrete commands on page No.8 of TEST mnemonic frame, refer to ASC 58, 012.93.00, Book 9/3.</p> <p>21. Set to OFF the following switches:</p> <ul style="list-style-type: none">- LG UP SIM , ACS PWR, BIT, TEST on PNP-30PK;- EKRAN, WCS-S on power board;- A / C AND PWR SYS 1, A / C AND PWR SYS 2, SPECIAL SYS 1, SPECIAL SYS 2,EL EQPT SYS 1, EL EQPT SYS 2 on switch board.	

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
22. Disconnect ground power supply from the aircraft, refer to ASC 1, 012.94.00, Book 9/4.	
23. Disconnect conditioner (this operation must be performed by Aircraft and Engine specialist).	
24. Remove weapon simulators and put them in corresponding cases.	
25. Install safety pins that were removed during the test.	
Testing equipment (TEQ)	Tools and accessories Consumable items
1. Set of test weapon simulators KPZ-30PI-M (КП1З-30ПИ-М). 2. Indicators PPD-72 (ППД-72) from 11.9783.3.245.000 set.	1. Tools and accessories from sets of spare parts, tools and accessories for finished articles (missile ejector launcher, missile rail launcher and racks).

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To Maintenance Schedule	ASSEMBLY CHART 2	Pages 225-228
Para	Description of operations.	Manhours
	<p>Test of control electric system of built-in gun with weapon simulator ZI-VPU (ЗИ-ВПУ)</p> <p>Procedure and technical requirements</p> <p>1. Open panels for access to the gun. 2. Disconnect the gun contactor. 3. Disconnect electrical connector of aircraft electrical bundle from the gun and connect to it electrical connector of weapon simulator. 4. Set \square – = switch on weapon simulator to \square position. 5. Monitor initial position of the switches, refer to Table 201. 6. Connect the ground power supply to the aircraft, refer to ASC 1, 012.94.00, Book 9/4. 7. On switch board in the cockpit set to ON the following switches: - EL EQPT SYS 1, EL EQPT SYS 2, - SPECIAL SYS 1, SPECIAL SYS 2. 8. On POWER board in the cockpit set to ON the following switches: - WCS-S; - HUD; - WCS-A.</p>	

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ASC 2 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>9. On PNP-30PK in RH LG bay set to ON ACS PWR switch.</p> <p>Make sure that built-in test is completed and the following indicators come ON:</p> <ul style="list-style-type: none"> - ACS PWR; - in ≈10 s OPRNL BS, BPE-1, -2, -3, BRPI. - in ≈30 s OPRNL ACS. <p>10. On PU-30PK-01 set PART-SGL-TRAIN switch to TRAIN position.</p> <p>11. On pilot stick push FIRE trigger to preliminary position. Monitor on HUD indication of built-in gun selection. Press until stop and release FIRE trigger on pilot stick. ZI-VPU indicators must not come ON.</p> <p>12. On upper LH board of instrument board set M/ARM switch to ON.</p> <p>13. Press until stop and release FIRE trigger on pilot stick. ZI-VPU indicators must not come ON.</p> <p>14. On PNP-30PK set LG UP SIM switch to ON.</p>		

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ASC 2 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
15. Press until stop and hold FIRE trigger on pilot stick. On ZI-VPU RELOADING indicator must flash for a short time and OPERATION indicator must flash. Monitor on HUD change of ammunition load indication in the following sequence: 4, 3, 2, 1, A. Release FIRE trigger.	
16. On upper LH board of instrument board set M/ARM switch to OFF.	
17. Set the following switches to OFF: - on PNP-30PK - LG UP SIM and ACS PWR; - in the cockpit on power board - WCS-A, HUD, WCS-S; - in the cockpit on switch board set the following switches to OFF: EL EQPT SYS 1, EL EQPT SYS 2 SPECIAL SYS 1, SPECIAL SYS 2.	
18. Disconnect ground power supply from the aircraft, refer to ASC 1, 012.94.00, Book 9/4.	

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ASC 2 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications
19. Disconnect ZI-VPU electrical connector from electrical connector of built-in gun electrical bundle.	
20. Connect electrical connector of the aircraft electrical bundle to the gun.	
Testing equipment (TEQ)	Tools and accessories
1. Weapon simulator ZI-VPU (ЗИ-ВПУ) from KPZ-30PI (КПЗ-30ПИ) set	1. Tool for aircraft weapons. Consumable items

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To Maintenance Schedule	Description of operations.	ASSEMBLY CHART 3	Pages 229-238
Para			Manhours
	Test of control electric system of bombs jettison from MBD3-U6-68	Procedure and technical requirements	Operations to be done, if not to specifications
			Monitoring

1. Connect PK-68M (ПК-68М) control panels to III3 reference electrical connectors of MBD3-U6-68 racks on hardpoints No. 1, 2, 3, 4, 9, 10.
On all PK-68M control panels set EMERG-TACTIC switch to TACTIC position, and STATIONS switch to "6" position.

2. Use screwdriver to open panels on front fairings of MBD3-U6-68 and hinged covers of MPI-MVN (МПИ-МВН) mechanisms.

3. Arm locks of MBD3-U6-68 and install MBD3-U9.9103-0 (МБД3-У9.9103) accessories on all rack stations.

4. Remove safety pins from all racks. Set interval switches on MBD3-U6-68 to "0.1" position.

5. Set controls to initial positions, refer to Table 201.
Set A-S switch on pilot stick to S position.

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ASC 3 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>6. Connect conditioner to the aircraft. This operation must be performed by Aircraft and Engine specialist.</p> <p>Connect ground power supply to the aircraft, refer to ASC 1, 012.94.00, Book 9/4.</p> <p>7. In the NLG bay on junction box of WCS-S CTRL JB control set to ON the following switches:</p> <ul style="list-style-type: none">- SIMUL ON,- WOW SIM, LG UP SIM. <p>8. On switch board in the cockpit set to ON the following switches:</p> <ul style="list-style-type: none">- EL EQPT SYS 1, EL EQPT SYS 2,- SPECIAL SYS 1, SPECIAL SYS 2. <p>9. On power board in the cockpit set to ON the following switches:</p> <ul style="list-style-type: none">- WCS-S, HUD, WCS-A. <p>In SUV-P-RI enter the bomb code in accordance with flight plan, refer to procedure of ASC 57, Section 012.93.00, Book 9/3.</p> <p>10. Do operations, refer to Table 203.</p>		

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Table 203

Test steps		Indication in cockpit	Indication on PNP-30PK and PK-68M
1		2	<p>On PNP-30PK the following indicators must come ON:</p> <p>ACS PWR;</p> <p>OPRNL, BS, BPP-1, -2, -3, BRPI;</p> <p>OPRNL, ACS indicator flashes and comes ON in ≈30 sec.</p>
		3	<p>In ≈30 s, HUD must indicate presence of stores on hardpoints.</p> <p>HUD must indicate readiness of hardpoints and selection (digits of hardpoints and letters AB).</p> <p>HUD shows LP message.</p> <p>On PU-30PK-01 BOMB light emitting diode must come ON.</p>

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ASC 3 (continued)

Table 203 (continued)

1	2	3
<p>3. On upper LH board of instrument board set M/ARM switch to ON.</p> <p>4. Press and hold STORES trigger on pilot stick.</p>	<p>Monitor on HUD release of stores from hardpoints No. 3, 4, 2 (in order) with time delay.</p> <p>From MBD3-U6-68 on hardpoints No. 3, 4, 2 accessories are dropped with time delay.</p> <p>On PK-68M of hardpoints No. 3, 4, 2:</p> <ul style="list-style-type: none"> - MVN (MBH), SIGNAL lamps come ON; - STATION lamp must flash with time delay and MPI (MTU) lamp must come ON; - after release of the last accessory SIGNAL lamp must go OFF. <p>MVN (MBH), MPI (MTU) lamps must go OFF with time delay.</p> <p>Release STORES trigger.</p>	

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Table 203 (continued)

ASC 3 (continued)		
1	2	3
5. Press and hold STORES trigger on pilot stick.	<p>Monitor on HUD release of stores from hardpoints No. 9, 10, 1 (in order) with time delay.</p> <p>On PU-30PK-01 BOMB light emitting diode must go OFF.</p> <p>LP and AB indication on HUD must go OFF.</p>	<p>From MBD3-U6-68 on hardpoints No. 9, 10, 1 accessories are dropped with time delay.</p> <p>On PK-68M of hardpoints No.9, 10, 1:</p> <ul style="list-style-type: none"> - MVN (MBH), SIGNAL lamps come ON; - STATION lamp must flash with time delay and MPI (MTII) lamp must come ON; - after release of the last accessory SIGNAL lamp must go OFF. <p>MVN (MBH), MPI (MTII) lamps must go OFF with time delay.</p> <p>Release STORES trigger.</p>

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ASC 3 (continued)

Table 303 (continued)

1	2	3
6. On PNP-30PK set LG UP SIM, ACS PWR switches to OFF.	7. On upper LRU board of instrument board set M/ARM switch to OFF.	8. On all PK-68M (IIK-68) panels set EMERG-TRACTIC switch to EMERG position. 9. Arm locks of MBD3-U6-68 and install MBD3-U9.9103-0 (MBD3-Y9.9103) accessories on all rack stations.

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Table 203 (continued)

ASC 3 (continued)

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	1	2	3
10. On PNP-30PK set ACS PWR switch to ON and in ≈ 30 sec set LG UP SIM switch to ON.	HUD must indicate presence, selection and readiness of hardpoints No.1, 2, 3, 4, 9, 10. On PU-30PK-01 BOMB indicator must come ON.	On PNP-30PK the following indicators come ON: - ACS PWR; - OPRNL BS, BPE-1, -2, -3, BRPI, - OPRNL ACS indicator flashes and comes ON in ≈ 30 sec.	
11. On PU-30PK-01 set ARMED-SAFE switch to ARMED position.	Monitor on HUD release of stores from hardpoints (in order): No 2, then in 1 sec – No, 1, 3, 4, 9, 10. At jettison of the last store AB indication must go OFF on HUD and BOMB indicator must go OFF on PU-30PK-01.	On all MBD3-U6-68 accessories are dropped. On PK-68M panels of hardpoints No. 2, 1, 3, 4, 9, 10 STATION lamps flash, SIGNAL, MPI (MMI), MVN (MBH) lamps come ON. SIGNAL lamp must go OFF after release of the last accessory from MBD3-U6-68.	

Table 203 (continued)

1	2	3
<p>Check the operation of MPI mechanisms. For that put tester into all MPI mechanisms of racks one after the other, pulling it downward.</p> <p>Tester lamp must come ON.</p> <p>Release EMER LAUNCH - EMER JETT switch.</p>	<p>All lamps must go OFF on all PK-68M</p>	

13. Set ARMED-SAFE switch on PLI-30PK-01 to SAFE position.

14. Do operations, refer to paras
6, 9, 10.

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ASC 3 (continued)

Table 203 (continued)

1	2	3
15. Press EMER LAUNCH - EMER JETT switch to EMER JETT position and hold it.	Monitor on HUD release of stores from hardpoints (in order): No. 2, 1, 3, 4, 9, 10. On PK-68M panels of hardpoints No. 2, 1, 3, 4, 9, 10 STATION lamp flashes	On all MBD3-U6-68 accessories are dropped.
16. On PNP-30PK set LG UP SIM and ACS PWR switches to OFF.		On PNP-30PK all indication must go OFF.

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ASC 3 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>11. In the cockpit set to OFF the following switches:</p> <ul style="list-style-type: none"> - HUD, WCS-A, WCS-S on power board; - EL EQPT SYS 1, EL EQPT SYS 2, - SPECIAL SYS 1, SPECIAL SYS 2 on switch board. <p>12. Disconnect power supply, refer to ASC 1, 012.94.00, Book 9/4.</p> <p>13. Disconnect conditioner (this operation must be performed by Aircraft and Engine specialist).</p>	
<p>Testing equipment (TEQ)</p> <p>1. Control panels PK-68M (ПК-68М) - 6 pcs.</p>	<p>Tools and accessories</p> <p>1. Tool for aircraft weapons.</p> <p>2. Accessories of MBD3-U9.9103-0 (МБД3-У9.9103). (6 pcs. for each rack).</p> <p>3. Arming wrench of MBD3-U6-68.9100-50 (МБД3-У6-68.9100-50).</p> <p>4. Tester BD3-60-21 UMR-Psb1A (БД3-60-21 УМР-Псб1А)</p>

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To Maintenance Schedule	ASSEMBLY CHART 4		Pages 239-241/242
Para	Description of operations.	Manhours	
	Removal and installation of BM-30PK-02		
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
	Removal.		
1. Make sure that:			
	- on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2;		
	- on upper LH board of instrument board M/ARM switch is set to OFF;		
	- on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.		
2. Open the guard of NLG bay between frames No.14 and No.16.			
3. Remove the following units from the first floor of mounting unit located on the RH side between frames No.14 and No.16: BTsVM-486-2M, BS-30PK-02, two units BP-15P, BPE from the ground floor of mounting unit using handles-extractors. For that: preliminary remove locking wire from handles-extractors and disconnect bonding links from the units.			

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ASC 4 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>4. Disconnect electrical connectors of the following second floor units: BRTsU-30PK, BRPI-30PK, of two units BI-U-01, BI-U2-01. Install blankings on counterparts.</p> <p>5. Remove locking wire and screw clamps.</p> <p>6. Disconnect bonding links (second floor of the mounting unit).</p> <p>7. Remove the units.</p> <p>8. Disconnect electrical connectors of the first floor. Install blankings on counterparts.</p> <p>9. Disconnect bonding link of BM-30PK-02 unit.</p> <p>10. Remove bolts that attach BM-30PK-02 unit to the airframe structure.</p> <p>11. Remove BM-30PK-02 unit from the aircraft.</p> <p>12. Install blankings on electrical connectors of BM-30PK-02 unit. Wrap electrical connectors of the aircraft bundles with film and tie with threads.</p>	

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ASC 4 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
<p>Installation</p> <p>1. Perform installation of BM-30PK-02 in sequence, reverse to removal.</p> <p>2. Before installation examine electrical connectors of aircraft bundles, BM-30PK-02 and of the units. There must be no mechanical damages and contaminations on the contacts.</p> <p>3. Lock screw clamps and handles-extractors with wire.</p> <p>4. Check serviceability of armament control system, refer to ASC 1, 2 of the present section.</p>	<p>Wipe the contacts of electrical connectors with spirit.</p>		
<p>Testing equipment (TEQ)</p>	<p>Tools and accessories</p> <p>1. Tool for aircraft weapons.</p>	<p>Consumable items</p> <p>1. Locking wire 0.5-TС-12Х18Н10Т 2. Polyethylene film 3. Cotton threads 4. Industrial rectified ethyl spirit</p>	

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To Maintenance Schedule	Description of operations.	Pages 243-244
Para	Manhours	Monitoring
	Removal and installation of PNP-30PK	
	<p>Procedure and technical requirements</p> <p>Removal of:</p> <p>1. Make sure that:</p> <ul style="list-style-type: none"> - on switch board the following switches are set to OFF: SPECIAL SYS 1, SPECIAL SYS 2; - on upper LH board of instrument board M/ARM switch is set to OFF; - on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF. <p>2. Remove detachable part of the fairing of RH MLG between frames No. 24 – 25.</p> <p>3. Disconnect electrical connectors.</p> <p>4. Disconnect the bonding link.</p> <p>5. Loosen the harness of the panel attachment.</p> <p>6. Remove four screws that attach the panel to the bracket. Remove the panel.</p>	<p>Operations to be done, if not to specifications</p>

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ASC 5 (continued)			
Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring	
7. Install blanking on the panel electrical connector. Wrap electrical connector of the aircraft bundle with film and tie with threads.	<p>Installation.</p> <ol style="list-style-type: none"> 1. Perform panel installation in sequence, reverse to removal. 2. Before installation examine electrical connectors of the aircraft bundle and of the panel. There must be no mechanical damages and contaminations on the contacts. 3. Check serviceability of armament control system, refer to ASC 1 of the present section. 	Wipe the contacts of electrical connectors with spirit.	<p>1. Polyethylene film 2. Cotton threads 3. Industrial rectified ethyl spirit</p>
Testing equipment (TEQ)	Tools and accessories	Consumable items	
	1. Tool for aircraft weapons.		

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To Maintenance Schedule	Para	ASSEMBLY CHART 6	Pages 245-246
Description of operations.		Manhours	Manhours
Removal and installation of PTS-250S		Procedure and technical requirements	Operations to be done, if not to specifications Monit oring
1. Make sure that: - on switch board the following switches are set to OFF; SPECIAL SYS 1, SPECIAL SYS 2; - on upper LII board of instrument board M/ARM switch is set to OFF; - on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF. 2. Open the guard of NLG bay. 3. Remove R-805K3M-01 monoblock, refer to ASC 8, 177.02.00, Book 6/3. 4. Remove BI-U-01 (R1) and BI-U2-01 actuating units from the upper rack of BM-30PK-02. For that disconnect electrical connectors of these units and disconnect bonding links. Remove locking wire and screw clamps. Remove actuating units. 5. Disconnect bonding links of PTS-250S units. 6. Disconnect electrical connectors of PTS-250S units. 7. Remove bolts that attach unity to the panel of the aircraft. 8. Remove the units.			

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Procedure and technical requirements		Operations to be done, if not to specifications	Monitoring
9. Install blankings on the units electrical connectors.			
10. Wrap electrical connectors of the aircraft bundle with film and tie with threads.	Installation	<p>1. Perform installation of bolts in sequence, reverse to removal.</p> <p>2. Before installation examine electrical connectors of the aircraft bundle and of the panel. There must be no mechanical damages and contaminations on the contacts.</p> <p>3. Check serviceability of armament control system, refer to ASC 1 of the present section.</p>	<p>Wipe the contacts of electrical connectors with spirit</p>
Testing equipment (TEQ)	Tools and accessories	Consumable items	<p>1. Polyethylene film</p> <p>2. Cotton threads</p> <p>3. Industrial rectified ethyl spirit</p>

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To Maintenance Schedule	ASSEMBLY CHART 7		
Para	Description of operations.	Pages 247-248	
	Removal and installation of PU-30PK-01	Manhours	
	Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
	Removal		
1. Make sure that:			
	<ul style="list-style-type: none"> - on switch board SPECIAL SYS 1, SPECIAL SYS 2 switches are set to OFF; - on upper LH board of instrument board M/ARM switch is set to OFF; - on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF. 		
2. Remove attachment strips of PU-30PK-01 panel on the left horizontal board in the cockpit.	Open locks for that.		
	3. Disconnect the bonding link.		
	4. Disconnect electrical connector.		
	5. Install blanking on the panel electrical connector.		
	6. Wrap electrical connector of the aircraft bundle with film and tie with threads.		

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ASC 7 (continued)					
Procedure and technical requirements	Operations to be done, if not to specifications				
Installation.	<ol style="list-style-type: none">1. Perform panel installation in sequence, reverse to removal.2. Before installation examine electrical connectors of the aircraft bundle and of the panel. There must be no mechanical damages and contaminations on the contacts.3. Check serviceability of armament control system, refer to ASC 1, 2 of the present section.				
Testing equipment (TEQ)	<table border="1"><thead><tr><th>Tools and accessories</th><th>Consumable items</th></tr></thead><tbody><tr><td><ol style="list-style-type: none">1. Tool for aircraft weapons.</td><td><ol style="list-style-type: none">1. Polyethylene film2. Cotton threads3. Industrial rectified ethyl spirit</td></tr></tbody></table>	Tools and accessories	Consumable items	<ol style="list-style-type: none">1. Tool for aircraft weapons.	<ol style="list-style-type: none">1. Polyethylene film2. Cotton threads3. Industrial rectified ethyl spirit
Tools and accessories	Consumable items				
<ol style="list-style-type: none">1. Tool for aircraft weapons.	<ol style="list-style-type: none">1. Polyethylene film2. Cotton threads3. Industrial rectified ethyl spirit				

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To Maintenance Schedule	ASSEMBLY CHART 8		
Para	Description of operations.	Operations to be done, if not to specifications	Monitoring
	Removal and installation of BI-U, BI-U2, BPE-3OPT-01 units and PTS-250S inverter from adapter racks		
	Procedure and technical requirements		

Make sure that:

- on switch board the following switches are set to OFF:
SPECIAL SYS 1, SPECIAL SYS 2;
- on upper LH board of instrument board M/ARM switch is set to OFF;
- on PNP-30PK in RH LG bay ACS PWR, LG UP SIM switches are set to OFF and ACS PWR indicator is OFF.

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ASC 8 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>1. REMOVAL OF BPE-30PT-01 AND BI-U2 UNITS FROM 11.8804.C.155.901/902 ADAPTER RACKS.</p> <p>1.1. Remove screws, that attach cover of adapter rack (from the side and from below). Remove the cover.</p> <p>1.2. Disconnect electrical connectors on units. Remove bonding links.</p> <p>1.3. Install temporary blankings on disconnected electrical connectors.</p> <p>1.4. Remove 8 screws, that attach BPE-30PT-01, and 6 screws, that attach BI-U2.</p> <p>1.5. Remove units from adapter rack.</p> <p>2. REMOVAL OF PTS-250S AND BI-U UNITS FROM ADAPTER RACKS 11.8804.C.095.901/902.</p> <p>2.1. Remove screws, that attach cover of adapter rack (from the side and from below). Remove the cover.</p> <p>2.2. Disconnect electrical connectors on units. Remove bonding links.</p> <p>2.3. Install temporary blankings on disconnected electrical connectors.</p> <p>2.4. Remove 6 screws that attach PTS-250S (from the top) and 8 screws that attach BI-U (from the top).</p> <p>2.5. Remove the units from adapter rack.</p>		

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ASC 8 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>3. REMOVAL OF PTS-250S UNIT FROM ADAPTER RACK 11.8401.K.000.000.</p> <p>3.1. Remove screws that attach cover of adapter rack (from the side and from below). Remove the cover.</p> <p>3.2. Disconnect electrical connector on the unit. Remove bonding link.</p> <p>3.3. Install temporary blankings on disconnected electrical connectors.</p> <p>3.4. Remove 6 screws that attach PTS-250S (from the top).</p> <p>3.5. Remove the unit from adapter rack.</p> <p>4. REMOVAL OF BI-U UNIT FROM ADAPTER RACKS 11.8401.K.165.000 and 11.8401.K.185.000.</p> <p>4.1. Remove screws, that attach cover of adapter rack (from the side and from below). Remove the cover.</p> <p>4.2. Disconnect electrical connectors on the unit. Remove bonding link.</p> <p>4.3. Install temporary blankings on disconnected electrical connectors.</p> <p>4.4. Remove 8 screws that attach BI-U (from the top).</p> <p>4.5. Remove the unit from adapter rack.</p>	

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ASC 8 (continued)	
Procedure and technical requirements	Operations to be done, if not to specification Monit oring
<p>5. INSTALLATION OF UNITS IN ADAPTER RACKS.</p> <p>5.1. Installation of units in adapter racks is the reverse procedure of their removal. To install screws for attachment of units use HV-16 (XB-16) enamel (grey). To install other screws use ALKRM-1 (AJIKM-1) compound. Wash electrical connectors contacts with spirit.</p> <p>5.2. Check serviceability of armament control system, refer to ASC 1 of the present section.</p>	<p>Consumable items</p> <p>1. Enamel HV-16 (XB-16), grey. 2. Compound ALKRM-1 (AJIKM-1). 3. Industrial rectified ethyl alcohol.</p>

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To Maintenance Schedule	ASSEMBLY CHART 1		
Para	Description of operations.	Pages 201-222	Manhours
	Preparation of weapons system for test with use of AKPA-30 (27)	Operations to be done, if not to specifications	Monitoring
	Procedure and technical requirements		

WARNING. DO NOT PERFORM OPERATIONS AS PER PRESENT ASSEMBLY CHART, IF:

- IF THERE IS ANY TYPE OF WEAPONS AT LEAST ON ONE HARDPOINT.
- THERE ARE ANY CARTRIDGES IN MISSILE EJECTOR LAUNCHERS, RACKS;
- CONTACTOR OF GUN IS CLOSED.

1. Make sure that necessary missile rail launchers, missile ejector launchers or racks are installed on the aircraft.

CAUTION. BEFORE COMMENCEMENT OF OPERATIONS MAKE SURE THAT:

- SAFETY PINS ARE INSTALLED IN AKU-470 HOLES WITH PLACARDS:
- “BEFORE CHARGING DRIVE INSTALL SAFETY PIN No.3”;
- “BEFORE TAKEOFF REMOVE SAFETY PIN No. 1”;
- “CHECK OF LEVER CLOSING WITH SAFETY PIN No. 2” (2 PCS.)

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ASC 1 (continued)

Procedure and technical requirements	Operations to be done, if not to specifications	Monitoring
<p>- SAFETY PINS ARE INSTALLED IN AKU-170E HOLES WITH PLACARDS:</p> <p>“BEFORE INSTALLATION OF CARTRIDGE, INSERT PIN No. 2”, “CHECK OF RETAINER FOR LOCKING SAFETY PIN No.1, 3”.</p> <p>- SAFETY PINS ARE INSTALLED IN AKU-58AE HOLES WITH PLACARDS:</p> <p>“USE LOCKPIN No.3 TO CHECK CLOSED POSITION OF STOP”; “LOCKPIN No.1”; “LOCKPIN No.2”.</p> <p>THE PNEUMO-PYROUNIT DISTRIBUTOR IS IN THE RETURN POSITION, I.E. THE HAIRLINE ON THE BUSHING IS NOT ALIGNED WITH THE HAIRLINES ON THE AKU REAR FAIRING, WHERE THERE IS THE PLACARD: “CAUTION! SWITCH TO DROP”.</p> <p>- SAFETY PINS ARE INSTALLED IN BD3-USK-A AND BD4-USKM-B;</p> <p>- THE BOOM IS RETRACTED;</p> <p>- WEIGHT ON WHEELS (AIRCRAFT IS NOT INSTALLED ON THE JACKS).</p>		

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications
<p>2. Open:</p> <ul style="list-style-type: none">- on AKU-470: panels to get access to reference electrical connectors;- on AKU-58AE: rear fairings to get access to cartridges racks and reference electrical connectors;- on BD3-USK-A, BD4-USKM-B: - panels to get access to reference electrical connectors. - panels to get access to gun. <p>3. Remove pyrojectors from AKU-170E.</p> <p>WARNING. MAKE SURE THAT :</p> <ul style="list-style-type: none">- THERE ARE NO CARTRIDGES IN AKU-170E, AKU-58AE, BD3-USK-A, BD4-USKM-B;- CONTACTOR OF ITEM 9-A-4071K IS OPEN.	

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>4. Bring the AKPA-30 (27) shipping container to the aircraft under check and turn it according to the assembly chart on connection of the shipping container.</p> <p>5. Make sure that all switches on the switch board and power board in the cockpit are set to OFF.</p> <p>6. Set SIMUL ON, LG SIMUL COMP, LG SIMUL UP switches on WCS-S CTRL JB located in the nose LG bay to ON.</p> <p>7. Adjust intercom with operator in cockpit. For that:</p> <ul style="list-style-type: none">- connect flight deck handset to combined services connector through adapter 11.9773.3.050.000;- connect AB-20M device with flight deck handset to the connector of internal communication system through the connector cable. <p>8. Check initial position of controls according to Table 201, ASC 1, 012.92.20.</p>	

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ASC 1 (continued)	
Procedure and technical requirements	Operations to be done, if not to specifications Monitoring
<p>9. To test the R-73E control circuits, connect the БИПИ-М to the БК-73М-02. Connect the БК-73М-02 with the installed БИПИ-М to the symmetric hardpoints 3 and 4 (5 and 6, 7 and 8) in accordance with Figure 201.</p> <p>Insert safety pins into the missile rail launchers holes with the placard:</p> <p>BEFORE SUSPENDING AND REMOVING ITEM INSERT SAFETY PIN HOME.</p> <p>Install inserts B-73 on the missile rail launchers engine firing contacts in accordance with pointer FWD on the B-73 handle, after that remove the safety pins.</p> <p>On the БК-73М-02, set the corresponding number of the hardpoint using the wafer switch.</p> <p>10. To test the R-27R1 (ER1) and R-27I1 (EI1) control circuits on АРU-470M, connect the БИПИ-М to the БК-27М-02. Secure the БК-27М-02 attachment fittings in position АРU.</p> <p>Connect the БК-27М-02 with the installed БИПИ-М to the symmetric hardpoints 3 and 4 in accordance with Figure 202.</p> <p>Install inserts B-470 on the missile rail launchers engine firing contacts and connect wire bundles “B-470 - БК-27” to the БК-27М-02 and to inserts B-470.</p> <p>On the БК-27М-02, set the corresponding number of the hardpoint and the WPN type - (470P - for R-27R1, 4703P - for R-27ER1, 470T - for R-27I1, 4703T - for R-27EI1).</p>	