

TYPE-6 PRIMARY TRAINER

MAINTENANCE MANUAL

Vol. 1

AIRCRAFT AND ENGINE

REPRODUCED IN THIS FORM
BY

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THE PEOPLE'S REPUBLIC OF CHINA

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CAUTION

ENGINE MANAGEMENT

BEFORE STARTING THE ENGINE ENSURE INLET MANIFOLDS ARE DRAINED IN ACCORDANCE WITH THE MAINTENANCE MANUAL IF THE ENGINE HAS NOT BEEN STARTED FOR TWO DAYS OR MORE

AN ATTEMPT TO START THE ENGINE WITHOUT DRAINING THE INLET MANIFOLDS MAY RESULT IN DAMAGE TO THE ENGINE

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CHAPTER I

AIRCRAFT PREPARATION

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CHAPTER I AIRCRAFT PREPARATION

Article 1 Aircraft preparation is an important link of engineering maintenance support, for it will directly influence the mission completion and flying safety. Maintenance personnel must accomplish aircraft preparation accurately, conscientiously and timely so as to keep the aircraft constantly in a good condition.

Aircraft preparation can generally be divided into preliminary aircraft preparation, pre-flight aircraft preparation and between-flight aircraft preparation.

SECTION 1 PRELIMINARY AIRCRAFT PREPARATION

Article 2 Preliminary aircraft preparation, which forms the most basic part of aircraft preparation, is one that is carried out in advance of a new mission after a day's flight is finished. It mainly comprises post-flight inspection, trouble shooting, refueling, air charging, cleaning and lubricating.

Before carrying out preliminary aircraft preparation, arrange the working place first, get the necessary equipments and tools ready; take off the fabric covering and the control surface clamps; untie the mooring cable and place the tail support. Those who are working on the aircraft must follow the relevant regulations laid down in Appendix I and adopt safety measures.

POST-FLIGHT INSPECTION

Article 3 Post-flight inspection is an important link to ensure the quality of aircraft preparation. The components of the aircraft will, after flight, undergo changes to different extents and therefore any inadvertence or carelessness may lead to trouble or hidden hazard. Maintenance personnel must perform post-flight inspection conscientiously and get to know the changes in the components so as to find out the defectives existing on the aircraft in time. The contents and requirements prescribed in this section must be followed and Fig. 2-1 checkout circuit should be taken as a reference during the check. At the same time, the check on some components and relative positions should be strengthened according to the concrete condition, service characteristics and breakdown law of the aircraft, and opinions from the pilots.

PROPELLER AND FLAPS

Article 4 Check the cylinder compression force. Rotate the propeller for two revolutions during which it can be felt that the compression force of every cylinder is uniform and powerful. Whenever the condition is doubtful, measure the force with a pressure gauge, which should not be less than 3.5kg/cm².

Article 5 Check the propeller hub, oil reservoir and the balance weight for fixation and oil reservoir for oil leakage; there is no lubricating grease thrown out around the propeller sleeve, investigate the cause if there is.

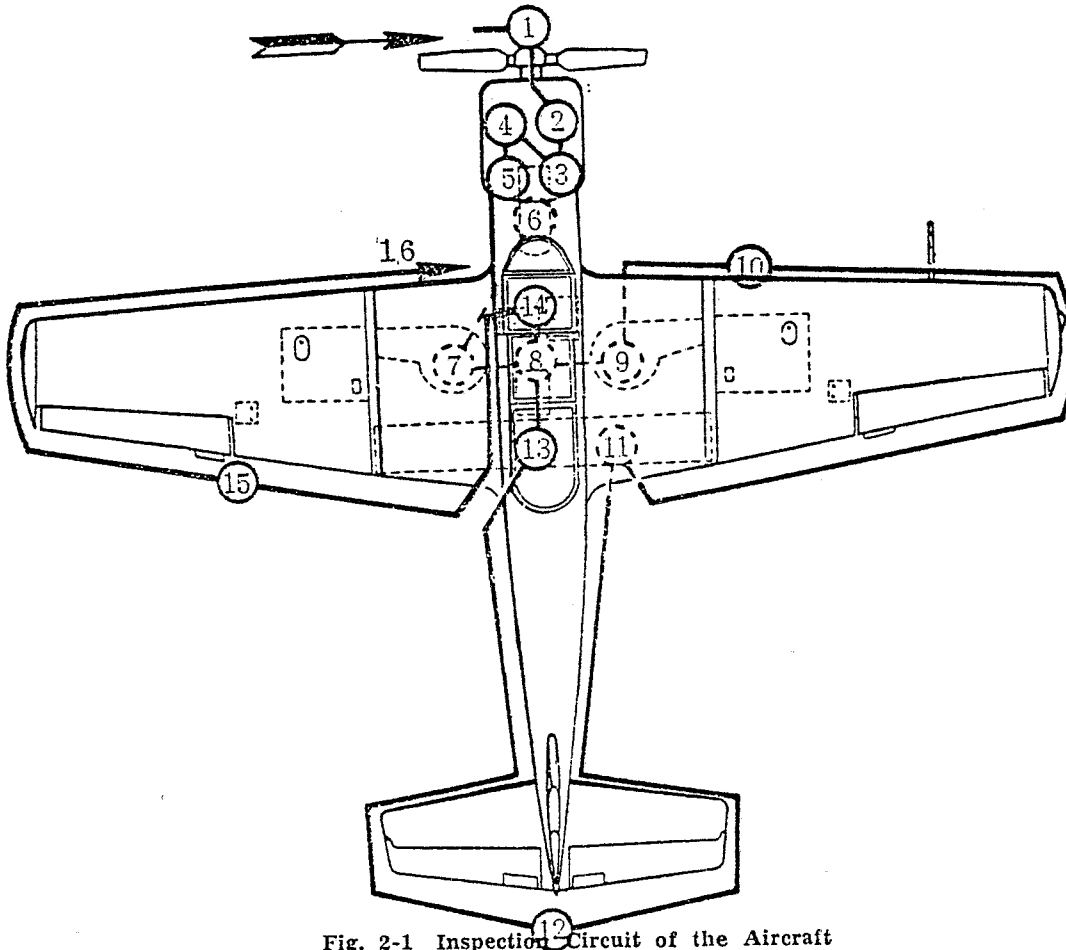


Fig. 2-1 Inspection Circuit of the Aircraft

- | | |
|-----------------------------------|----------------------------------|
| (1) Propeller and Flaps | (9) Right Main Gear and Gear Bay |
| (2) Engine Front Right Side | (10) Right Wing |
| (3) Engine Rear Right Side | (11) Flap |
| (4) Engine Front Left Side | (12) Fuselage and Empennage |
| (5) Engine Rear Left Side | (13) Rear Cockpit |
| (6) Nose Gear and Nose Gear Bay | (14) Front Cockpit |
| (7) Left Main Gear and Gear Bay | (15) Left Wing |
| (8) Under Side of the Middle Wing | (16) To the Engine Cowling |

Article 6 Check the propeller blades.

(1) Check that the propeller blade root is free from crack. If there are longitudinal crack on the blade, it can not be used further.

(2) Check that the propeller blades are free from deformation and crack. The surface should be smooth. Blister and flake-off of the lacquer coating must be removed if existing.

Article 7 Check the flaps.

(1) Check the guide vanes and the blades for security, damage, deformation and crack. Check the axial clearance of the blades for normality, if doubtful, measure it with a feeler gauge, which should not be more than 0.5 mm.

(2) Check the connection of the rocker arm and the driving rod for reliability and good lubrication, and the brace rod of the flaps for fracture.

ENGINE FRONT RIGHT SIDE

Article 8 Check the speed regulator and its oil filter for oil seepage, the support for crack and the connection of the rocker arm and the driving rod for reliability. The neck of the spherical joint must be free from friction and lubrication satisfactory.

Article 9 Check the oil sump and its filter for oil seepage.

Article 10 Check the cylinders.

(1) Check the joint of the cylinder barrel and the casing for oil seepage and the cylinder cooling fins for fracture.

(2) Check the push-rod sleeve, rocker arm axle and the cover of the rocker arm chamber for oil seepage.

(3) Check the spark plugs, electric cables and starting nozzle for looseness and the shield for friction and damage.

(4) Check the fixation of the air inlet duct for reliability, and the duct for abrasion and deformation. Inspect the gap between the air inlet duct and the engine mounting ring for normality, the normal one is not less than 2mm.

(5) Check the fixation of the exhaust pipe for reliability, and the pipe for crack and evidence of smoke leakage.

(6) Check the fixation of the cylinder baffle for reliability.

Article 11 Check the fixation of the air inlet heating box for reliability, and the box for friction and crack.

ENGINE REAR RIGHT SIDE

Article 12 Check the engine accessories.

(1) Check the fixation of the gasoline pump, oil pump and their pipes for security and the pumps and pipes for oil seepage.

(2) Check the air compression pump and its vent pipe for fixation and judge whether there is any air leakage at the pipe joint in accordance with the oil stain. Check the air filter of the air compression pump for cleanness; remove and clean it if necessary.

(3) Check the fixation of the magneto and its switch wire for reliability, and the mounting seat for oil seepage.

Article 13 Check the joint of the engine mounting for reliability, and the lugs and the welding lines for crack. Check it with a magnifying glass whenever there is doubt. Check the bonding strip for wire-breaking. If the fracture of a bonding strip exceeds 1/3 of the cross-sectional area, it must be replaced (This regulation is applicable to all the bonding strips on the aircraft).

Article 14 Check the oil tank for reliable fixation, crack and oil seepage.

Article 15 Check the nose gear indicator rod for looseness, bending and side-wearing; the red paint mark is clear.

Article 16 Check the fixation of the compressed air solenoid valve for reliability, and the valve for air leakage. Check that the safety wire on the mechanical handle is intact.

Article 17 Check the firewall oil filter, the heating sensor rod box and its pipes for security, crack and oil seepage, the vent pipe of the oil tank is through and the attaching lugs of the lower cowling of the engine are intact.

ENGINE FRONT LEFT SIDE

Article 18 Check the atmosphere vent of the deceleration casing for sign of fuel injection.

Article 19 Check the cylinders by following Article 10.

Article 20 Check the fixation of the carburetor, the connections of the rocker arms of the air inlet heating valve, the the throttle and altitude regulator with the driving rods for reliability. The neck of the spherical joint should be free from friction and lubrication satisfactory.

ENGINE REAR LEFT SIDE

Article 21 Check the accessories of the engine.

(1) Check the oil pump filter and the pressure regulating valve for oil seepage.

(2) Check the starting compressed air distributor and its pipes for reliable fixation, oil seepage, air leakage and friction.

(3) Check the magneto and its switch wires by following item (3) in Article 12.

Article 22 Check the engine mounting by following Article 13.

Article 23 Check the air filter, non-return valve, pressure regulating valve and oil-water separator for reliable fixation and air leakage, and the fixing seat for crack.

Article 24 Check the bronze thimble for damage and crack.

Article 25 Check the dilute solenoid valve, firewall gasoline filter and fuel shut-off valve for reliable fixation and fuel seepage.

Article 26 Check the gasoline system for tightness. All the accessories and passage joints should be free from fuel seepage when pressurized with a hand pump. The gasoline pump should be removed for sealing device inspection if there is fuel leaking from the fuel spillage pipe.

NOSE GEAR AND NOSE GEAR BAY

Article 27 Check the shock absorber strut.

(1) Check the shock absorber strut and wheel fork for crack. Pay a special attention to the check of the welding lines.

(2) Check the shock absorber strut for oil seepage, and find out the cause if there is oil trace on the inner cylinder surface.

(3) Judge whether the pressure of the shock absorber strut is normal in the light of the inner cylinder protrusion and the shock absorption in taxing. If suspicious, the aircraft must be jacked up to, measure the pressure with a pressure gauge, which should be $20 \pm 1 \text{ kg/cm}^2$. ($284 \pm 14 \text{ psi}$)

NOTE: The shock absorber strut is filled and charged with No. 10 aviation hydraulic fluid and nitrogen. Compressed air can be used instead if nitrogen is not available.

(4) Check whether the axial clearance of the circular body is normal or not with a feeler gauge, which should not be more than 0.3mm.

Article 28 Check the nose wheel.

(1) Check the tyre. Replace it if the cord ply is exposed due to abrasion or cutting; if it is only slightly damaged by cutting and there is no influence upon flight safety, the tyre can be used further.

(2) Judge the tyre pressure in the light of the tyre compression for normal condition. The distance from the centre of the wheel shaft to the ground is 185 mm when the pressure is normal. If the condition is doubtful, measure it with a pressure gauge, the pressure should be 2.3kg/cm². (33 p s c)

(3) Check the nose wheel for reliable fixation, the tyre valve core cap for looseness and the earthing conductor for touching the ground.

Article 29 Check the torque links. The fixation of the torque links must be reliable, the rotation of the bolt and locking ring is free and the bolt is free from axial clearance.

Article 30 Check the shimmy damper for oil seepage, the lower-cover screw for looseness; the clearance between the lower-cover and the rocker arm is normal (it should not be less than 0.5mm). The joint of the rocker arm with the rotation shaft spline must be free from moving clearance in the rotating direction. Check that the driving rod is free from breaking and the clearance between the driving rod and the wear plate is normal.

Article 31 Check the nose gear bay.

(1) Check that the indicator rod cable is free from wire-breaking, the fixation and connection of the retraction jack with the foldable stay rod reliable, and the tightness of the middle bolt of the foldable stay rod proper; the fixing nut can be turned by hand, but the middle bolt is free from axial clearance.

(2) Check that the retraction jack is free from air leakage, the safety nut of the adjustable joint of the piston rod free from looseness and the security reliable; the piston rod and rubber sealing ring is free from dry wearing owing to lack of oil, the clearance of the spherical joint is normal, the fixation is reliable and the lubrication is in a good condition.

(3) Check that the compressed air pipes are free from friction, damage and air leakage, and change them if the abrasion depth is more than 0.15mm or the dent depth more than 0.5 mm (this regulation applies to all the rigid pipes of the compressed air system). Check whether the partition of the fixing joint of the hose for landing gear retraction is free from crack.

(4) Check the lock hook for reliable fixation; push the lock hook to see whether it is flexible, the hook cylinder and the bidirectional valve are free from air leakage.

(5) Check to see that the connection of the front control stick with the elevator driving lever is reliable and the bonding jumper free from wire-breaking.

Article 32 Check that the gasoline tank vent pipe is through.

LEFT LANDING GEAR AND LEFT LANDING GEAR BAY

Article 33 Check the landing gear bay.

(1) Check the compressed air pipes for friction, damage and air leakage.

(2) Check the lock hook mechanism for reliable fixation, and the support for crack; push the lock hook to see whether it is flexible, the lock hook is free from air leakage.

(3) Check the foldable stay rod and retraction jack for reliable fixation, the tightness of the middle bolt of the foldable stay rod is proper, the fixing nut can be turned by hand, but the middle bolt is free from axial clearance; the fixing nut of the adjustable joint of the piston rod is free from looseness, and security is in a good condition. See the mounting seat of the foldable stay rod is free from crack and the retraction jack and bidirectional valve are free from air leakage.

(4) Judge whether there is compressed air in the emergency landing gear lowering system in the light of "hardening" feeling by means of swinging the hose of landing gear emergency lowering lightly. If the condition is doubtful, dismount a landing gear emergency lowering pipe for inspection.

(5) Check the indicator rod for security, curvature, deformation and side-wearing.

Article 34 Check the shock absorber strut.

(1) Check the shock absorber strut for reliable fixation, and the strut for crack. A special attention should be drawn to the strut root and the welding lines. Check them with a magnifying glass if doubtful.

(2) Check the shock absorber strut for oil seepage and find out the cause if there is oil trace on the inner cylinder surface.

(3) Judge whether the pressure of the shock absorber strut is normal or not in the light of the inner cylinder protrusion and the shock absorption in taxiing. If suspicious, the aircraft must be jacked up to measure the pressure with a pressure gauge, which should be $48 \pm 1 \text{ kg/cm}^2$. (682 + 14 psc)

(4) Check the fixing nut of the inner cylinder cavity for looseness.

Article 35 Check the wheel.

(1) Check the outer tyre. Replace it if the cord ply is exposed due to abrasion or cutting; if it is slightly damaged by cutting and there is no influence upon flight safety, the tyre can be used further.

(2) Check the tyre pressure in the light of the tyre compression for normality. If the pressure is normal, the inner boundary line of the first flange of the tyre should touch the ground (or the distance from the centre of the wheel shaft to the ground is 220 mm). If suspicious, measure the pressure with a pressure gauge, which should be 3.2 kg/cm^2 . (45-5 psc)

(3) Check the wheel for reliable fixation and tyre misalignment, and the tyre valve core cap and brake tube for looseness.

(4) Check the brake drum for deformation.

Article 36 Check the door for reliable fixation, crack and deformation. The red paint mark on the lock ring should not be misaligned. The distance from the lock ring to the elbow is about 60 mm and the horizontal angle is $13^{\circ}20'$ (Fig. 2-2).

Article 37 Check the gasoline tank. Open the drain access panel to see whether there is any fuel leakage by means of visual inspection and smelling, and see the tank fixing belt is not broken by means of patting the bottom of the tank.

MIDWING UNDERSIDE

Article 38 Check the midwing, flap, fairing and access covers for damage and deformation, and the screws and rivets for looseness.

Article 39 Check the inside of midwing.

(1) Check the consumption tank, gasoline filter and its pipes for security and fuel seepage; the pipes are free from friction.

(2) Check the fixation and connection of the controlling rocker arm, driving rod and torque pipe for reliability, the bonding strip is free from wire breaking.

(3) Check the brake distributor, oil-water separator, brake pressure controller and their pipes for air leakage, the fixation of the brake distributor driving mechanism being reliable, the brake pressure controller rocker arm being flexible and the cables free from wire-breaking.

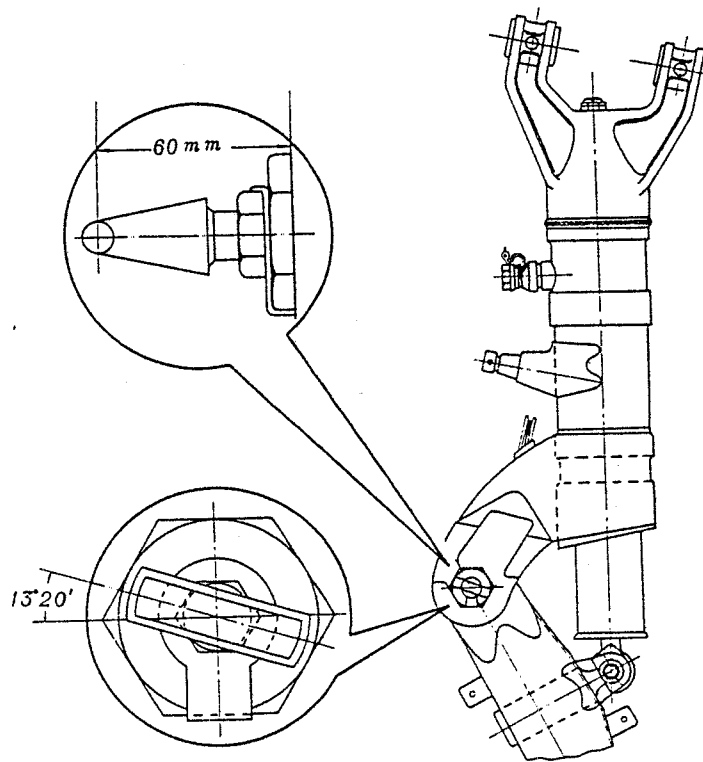


Fig. 2-2 Setting Schematic Diagram for Lock Ring Distance and Angle

- (4) Check the honeycomb of the oil cooler, oil drainer and their pipes for oil seepage, oil cooler air valve should be free from damage and it can close tightly.
- (5) Check that the inside of the midwing is free from foreign object.

RIGHT LANDING GEAR AND RIGHT LANDING GEAR BAY

Article 40 Check the right landing gear and its bay by following the check contents for the left landing gear and left landing gear bay.

RIGHT WING

Article 41 Check that the oil cooler air inlet duct is clean and free from foreign object.

Article 42 Check the wing for damage and deformation, and the screws and rivets for looseness.

Article 43 Check that the joint of fuel tank vent pipe is free from fuel seepage and the rubber sealing ring of the tank cover is free from damage.

Article 44 Check the aileron.

- (1) Check the fabric covering and the trim tab for damage.
- (2) Check whether the aileron is flexible, free from friction, jamming and the sound of metal impact at the limit position. Judge whether there is any excessive clearance at each joint of the driving rods by means of holding the trailing edge of the aileron and shaking it lightly.

(3) Check the suspension joints, fixing points, driving rods and rocker arm for reliable connection, lubrication should be good and the bonding strip free from wire-breaking.

FLAP

Article 45 Check the flap.

(1) Check the connection and fixation of the aileron driving rod with the rocker arm in the flap for reliability and the bonding strip for wire-breaking.

(2) Check the pulley for damage, the rubber cord for looseness and the cable for wire-breaking; the fixation of the jack and indicator rod is reliable.

(3) Check the flap skin and the wing ribs for damage, crack and deformation, and the screws and rivets for looseness.

FUSELAGE AND EMPENNAGE

Article 46 Check the main compressed air bottle and emergency compressed air bottle for air leakage.

Article 47 Check the fuselage and empennage for damage and deformation, and the screws and rivets for looseness.

Article 48 Check the elevator and rudder.

(1) Check the fabric covering and trim tab for damage.

(2) Move the elevator and rudder to see whether they are flexible and free from friction and jamming. Each of the suspension points should be free from excessive clearance and its lubrication satisfactory.

(3) Check the trim tab for clearance, the cable is free from wire-breaking and it is not coming off the pulley, and the lubrication is satisfactory.

Article 49 Check the ground air charging connector for air leakage.

Article 50 Survey that the inside of the fuselage is free from foreign object.

REAR COCKPIT

Article 51 Check the canopy.

(1) Check that the canopy glass is clean and transparent and free from crack and deformation, the roller rail free from abrasion and the stop block free from damage.

(2) Check to see that the canopy is flexible, the clearance normal, the fixation of the handle reliable and the spring elasticity good. Check whether the canopy can be locked when it is closed and the cable is free from wire-breaking.

Article 52 Check the left console.

(1) Retract and extend the flap. It should be free from jumping during its retraction and extension. The valve should be flexible and free from air leakage, and the locating disk free from looseness.

(2) The throttle and pitch control lever should be flexible and free from jamming and impacting with the console at the front and rear limit positions when being operated.

(3) The rotation of the trim tab controlling wheel should be flexible and the cable free from wire-breaking.

Article 53 Check the magneto switch. The switch handle should be flexible and free from idle travel.

Article 54 Check whether there is air leaking sound from the landing gear valve, the safety pin is flexible and the locating disk free from looseness.

Article 55, Check the pedal mechanism.

(1) Check that the pedal is flexible and free from excessive clearance. And there is no metal impacting sound at the extreme position, the adjusting handle should be free from rotation when the pedal is moved; the rubber pad on the rudder stop pin is in a good condition.

(2) Check the support for deformation, the fixation of the support fixing shaft is reliable, the fixing nut on the shaft is free from rotation when the pedal is moved. The pedal belts should be free from wear and damage.

(3) Check that the cables and bonding strips are free from touching and wire-breaking.

Article 56 Check that the cockpit ventilation device is flexible and its fixation reliable.

Article 57 Check the emergency compressed air system for tightness. Judge whether there is any air leakage in the system in the light of the indication of the pressure gauge.

Article 58 Check that the fixation of the seat is reliable, quick-release fastener flexible and the safety belt in a good condition.

Article 59 Operate the control stick to check it for flexibility, friction and impact. Judge whether there is any excessive clearance at the joints of the driving rods by means of shaking the stick lightly forward and backward.

Article 60 Check the brake system for operation.

(1) The brake handle is flexible when being manipulated, the cable is free from wire-breaking, pull out the both ends of it for inspection if necessary.

(2) Neutralize the pedals to brake to inspect whether the brake system is free from air leaking sound. When the pedals are applied to the extreme positions alternatively, air bleeding sound of brake releasing from the right and left wheels should be heard. Then neutralize the pedals again and release the brake handle; in order to check whether there is residual air in the system, press the brake release button after the sound of air bleeding dies out.

(3) Check that the brake release button is flexible and free from looseness.

Article 61 Check that the inside of the cockpit is free from foreign object.

Article 62 Check the radio bay.

(1) Check the compressed air pipes for friction, damage and air leakage.

(2) Check the connection of the elevator driving rod, rocker arm and cable for reliability and the bonding strip for wire-breaking.

FRONT COCKPIT

Article 63 Check the front cockpit by following the check contents for the inspection of the rear cockpit, additionally.

(1) Check the signal gun and the signal flares for reliable fixation. Wipe up the gun if necessary.

(2) Check the main compressed air system valve for flexibility and air leakage.

(3) Check the cocks of the oil cooler valve and flaps for flexibility, the cock should co-ordinate with the indication of the indicator.

(4) Manipulate the hand pump to see it is flexible and free from sticking.

(5) Check the primer for flexibility and fuel seepage.

(6) Check the seat lifting mechanism for flexibility. The connecting nut of the handle and the driving rod should be free from looseness and disconnection.

LEFT WING

Article 64 Check the left wing. Perform the same check as for the right wing, in addition, check that the footrest strip is free from crack, and step cable is free from wire-breaking and the rivets at the fixing points free from looseness and crack.

ENGINE COWLING

Article 65 Check the engine cowling and strut for damage and deformation, the pin seating is free from crack and the buffer pad free from damage.

TROUBLE SHOOTING

Article 66 Trouble is the "enemy" of flight safety. The troubles discovered in flight and inspection must be traced to the source and removed thoroughly. In removing the troubles, it is compulsory to:

(1) Gain a clear understanding of conditions. It is, first of all, necessary to know in detail the symptom and peculiarities of the troubles and the occasion they took place and other relevant conditions before removing the troubles.

(2) Analyse the cause. Upon the symptom of trouble and the understanding of the conditions, one must discard the dross and select the essential, eliminate the false and retain the true, proceed from the one to the other and from the outside to the inside so as to find out the true cause.

(3) Remove the troubles thoroughly. A correct method must be adopted to remove the troubles according to the cause. After removal of the troubles, test or flight test must be carried out if necessary.

REFUELING, REPLENISHING OF OIL AND CHARGING OF COMPRESSED AIR

Article 67 Aircraft refueling and oil replenishing.

The fuel used for this aircraft is No. 70 aviation gasoline, the refueling amount is that the fuel level is 20-30 mm to the rear edge of the filler (150 litres). No. 20 aviation lubrication oil is provided for this type of aircraft and the replenishing amount is 14-17 litres.

Article 68 Compressed air charging.

The pressure of the main compressed air system is 40-50 kg/cm², while that of the emergency compressed air system is 45-50 kg/cm².

SERVICING WORK OF CLEANING AND LUBRICATING

Article 69 Dismount the air inlet filter of the carburetor and the dust-free filter of the engine cowling and clean them, then apply a coat of gasoline-oil mixture.

Article 70 Remove the oil sump filter to check whether there are metal chips in the oil, if there are, find out the cause.

Article 71 Drain out the sediments in the midwing oil-water separator (this should be done after the accomplishment of flight).

Article 72 Wipe out the dust and oil contamination on the surface of the engine and aircraft.

Article 73 Coat the exhaust pipe, landing gear inner cylinder, cylinder piston rod and wheel brake drum with anti-rust oil in the rainy season or in the wet region.

CONCLUSIVE WORK OF PRELIMINARY AIRCRAFT PREPARATION

Article 74 After accomplishing preliminary aircraft preparation, it is necessary to:

- (1) Recall all the work done must be reliable and effective.
- (2) Get to know the fulfilment of preliminary aircraft preparation of each speciality.
- (3) Check up tools, dusters and tidy up the ground equipment and working place.
- (4) Close the engine cowling and access panels, make sure that the power supply switch in the cockpit is set to "OFF" and all the cocks and handles are at the defined positions, then close the canopy.
- (5) Put on the rudder clamps, cover the aircraft with fabric covering and chock the wheels. Tie the mooring cable and lead-seal the aircraft, and hand it over to the officer on duty of the aircraft park (hangar).

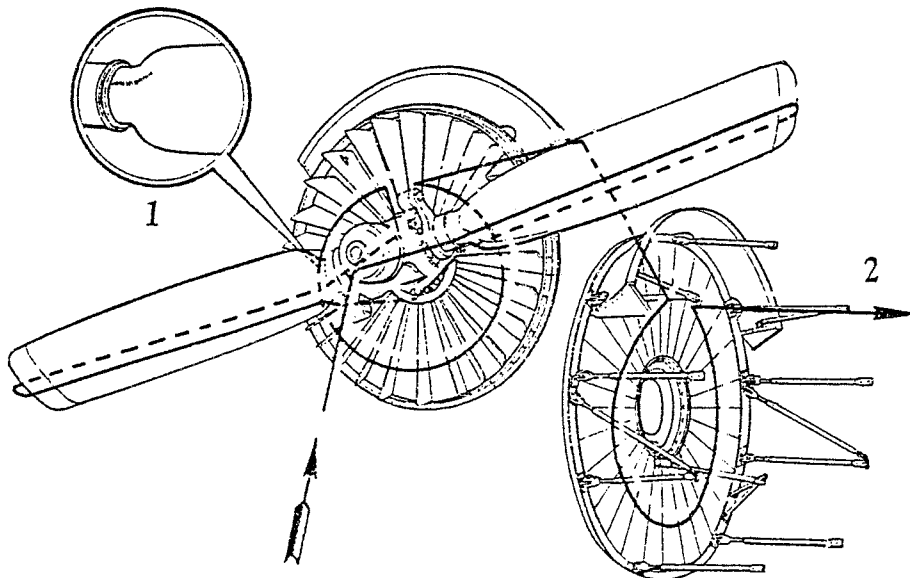


Fig. 2-3 Inspection Circuit for Propeller and Flaps

1. Scheme of Crack at the Propeller Blade 2. To the Speed Regulator

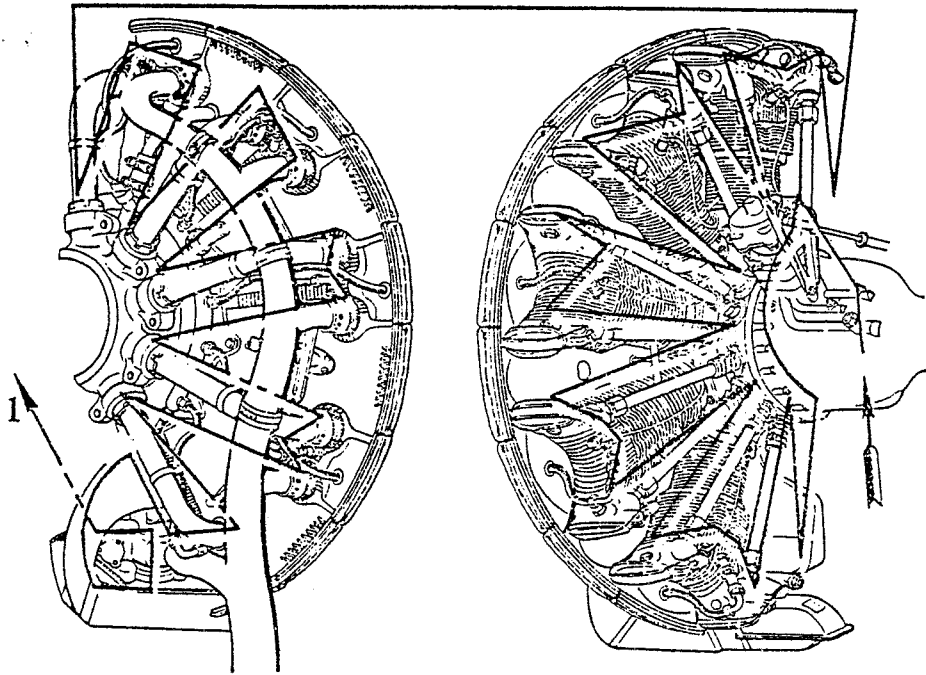


Fig. 2-4 Inspection Circuit for Engine Front Right Side

1. To the Gasoline Pump

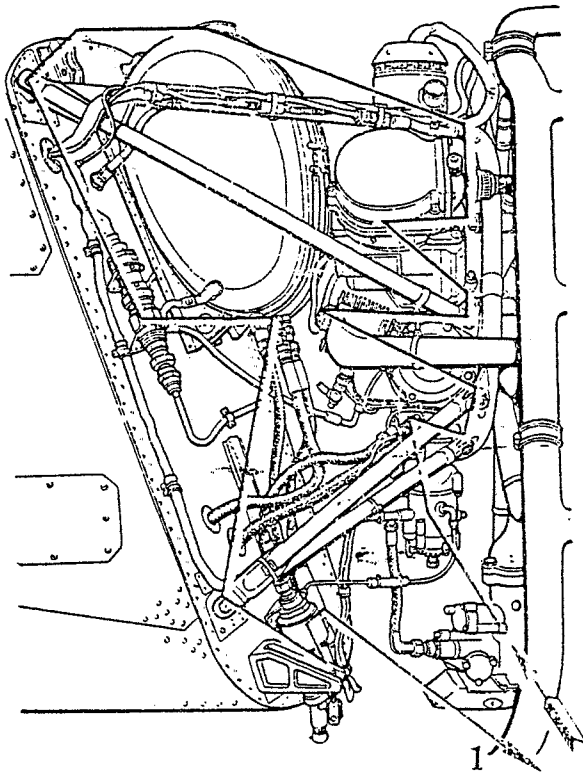


Fig. 2-5 Inspection Circuit for Engine Rear Right Side

1. To No. 5 Cylinder

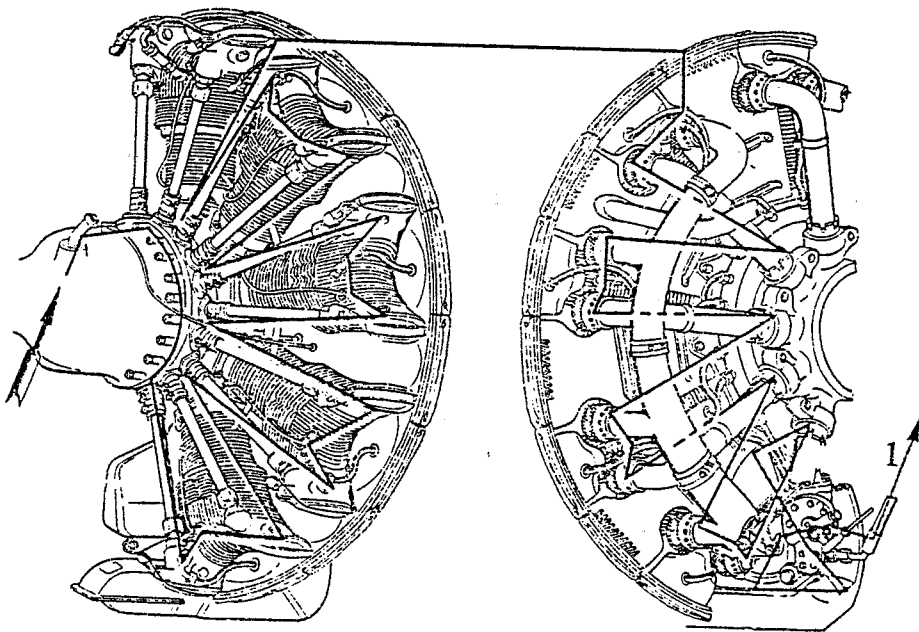


Fig. 2-6 Inspection Circuit for Engine Front Left Side

1. To the Oil Pump

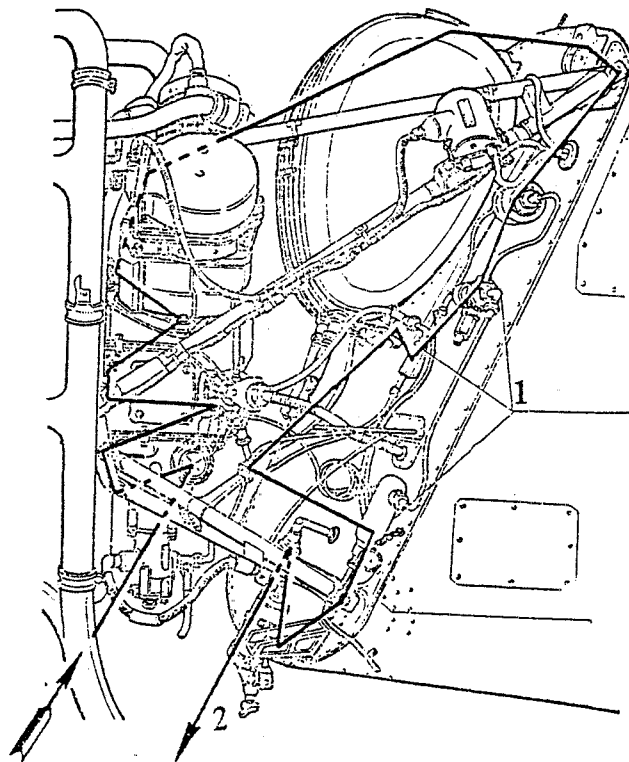


Fig. 2-7 Inspection Circuit for Engine Rear Left Side

1. The Places Being Vulnerable to Crack
2. To the Mounting Seat of Nose Wheel Shock Absorber Strut

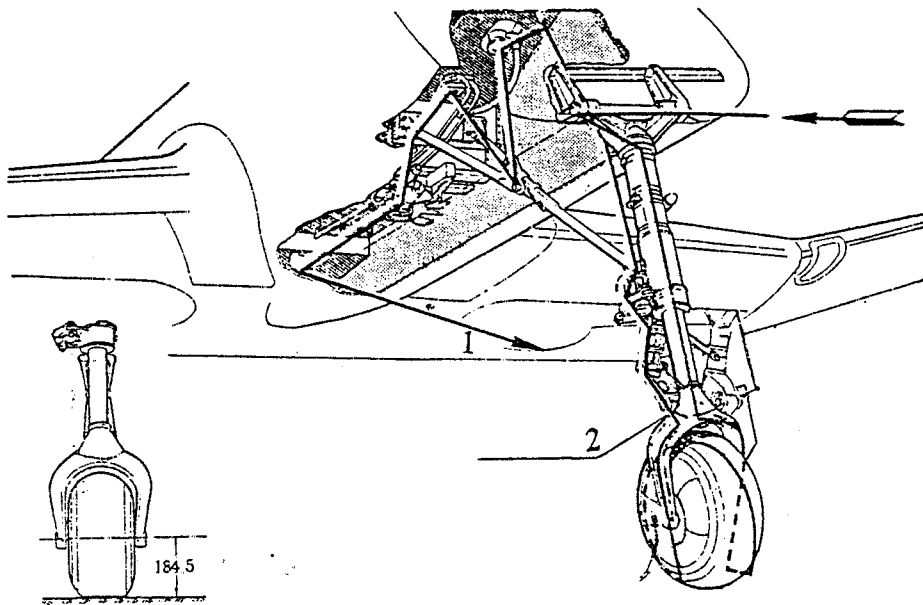


Fig. 2-8 Inspection Circuit for Nose Gear and Nose Gear Bay

1. To the Left Landing Gear Bay 2. The Place Being Vulnerable to Crack

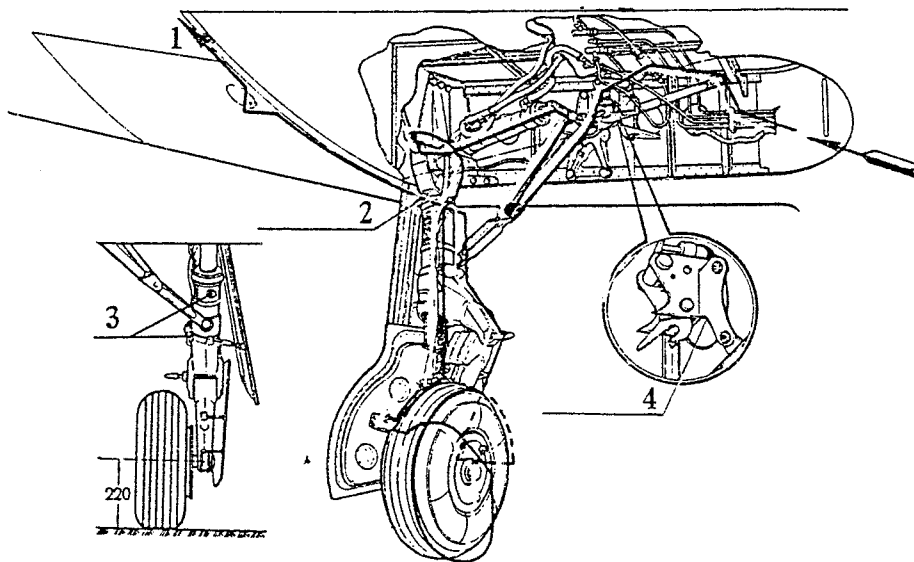


Fig. 2-9 Inspection Circuit for the Left Landing Gear and Left Landing Gear Bay

1. To the Fuel Consumption Tank Bay 3. The Places Being Vulnerable to Crack
 2. The Places Being Vulnerable to Crack 4. The Places Being Vulnerable to Crack

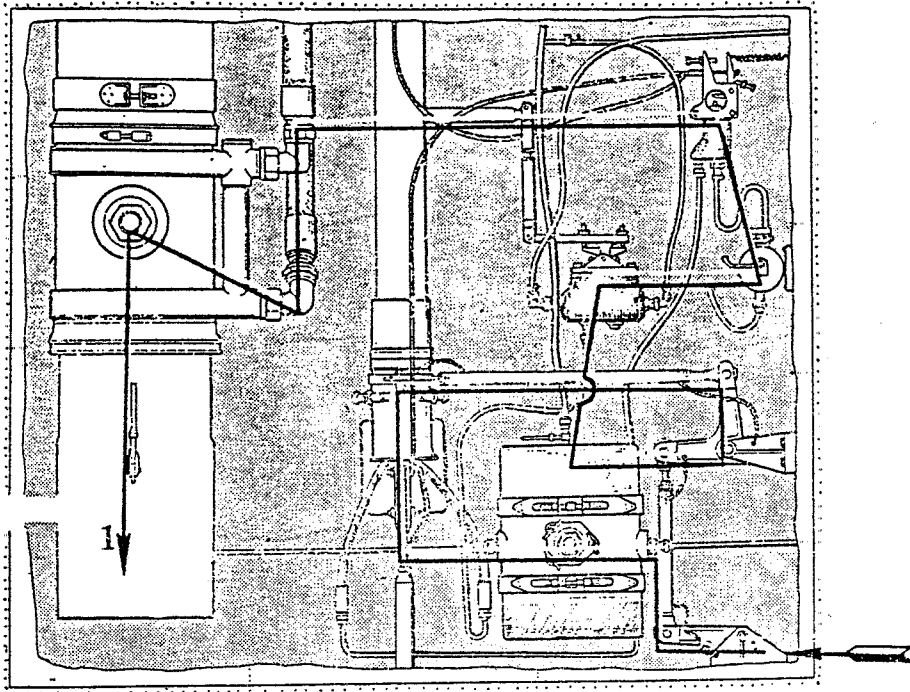


Fig. 2-10 Inspection Circuit for the Midwing Underside

1. To the Right Landing Gear Bay

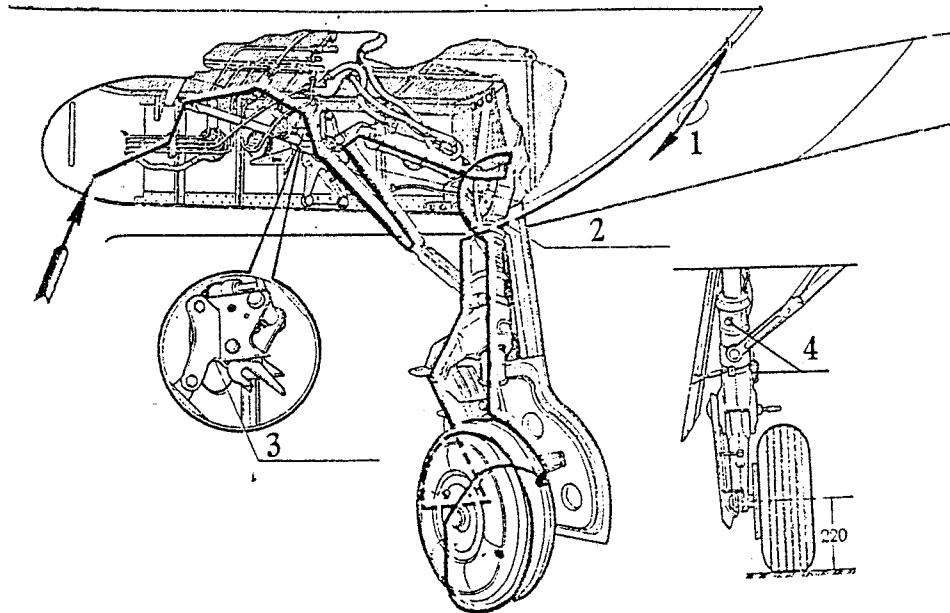


Fig. 2-11 Inspection Circuit for Right Landing Gear and Right Landing Gear Bay

- | | |
|---|---|
| 1. To the Right Wing | 3. The Places Being Vulnerable to Crack |
| 2. The Places Being Vulnerable to Crack | 4. The Places Being Vulnerable to Crack |

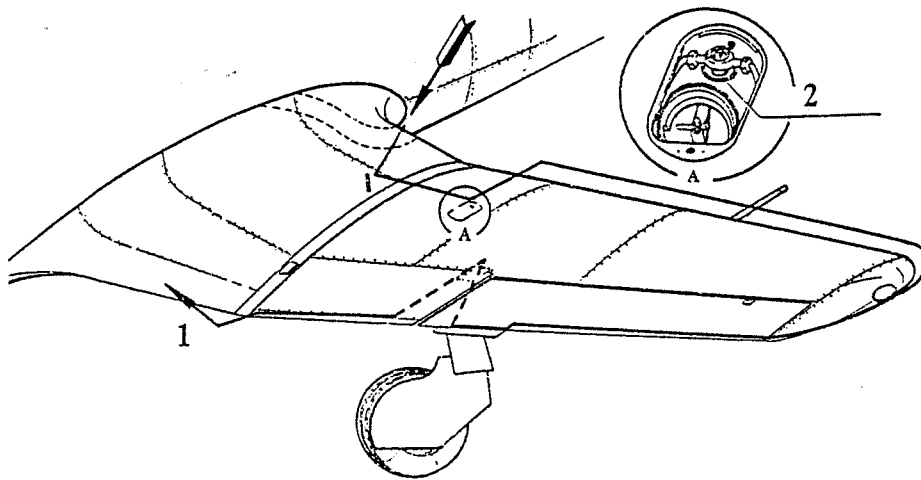


Fig. 2-12 Inspection Circuit for the Left Wing

1. To the Flap

2. The Place Being Vulnerable to Crack

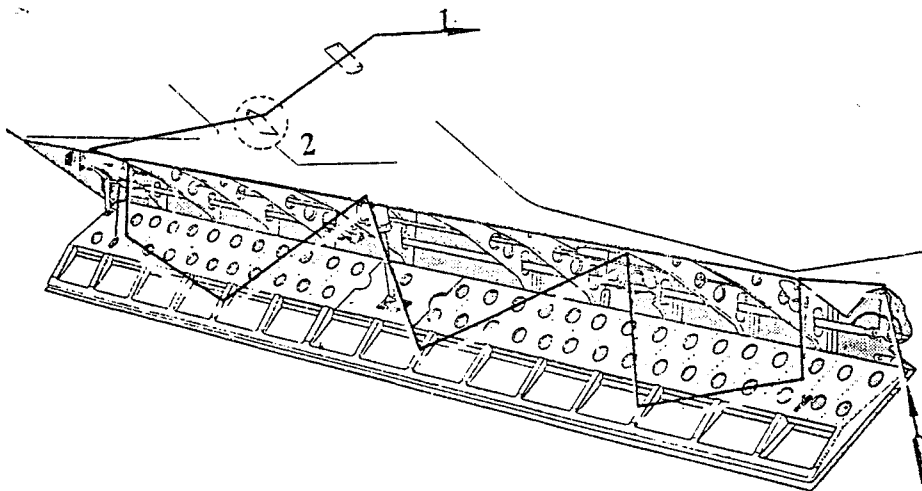


Fig. 2-13 Inspection Circuit for the Flap

1. To the Right Side of the Fuselage

2. The Place Being Vulnerable to Crack

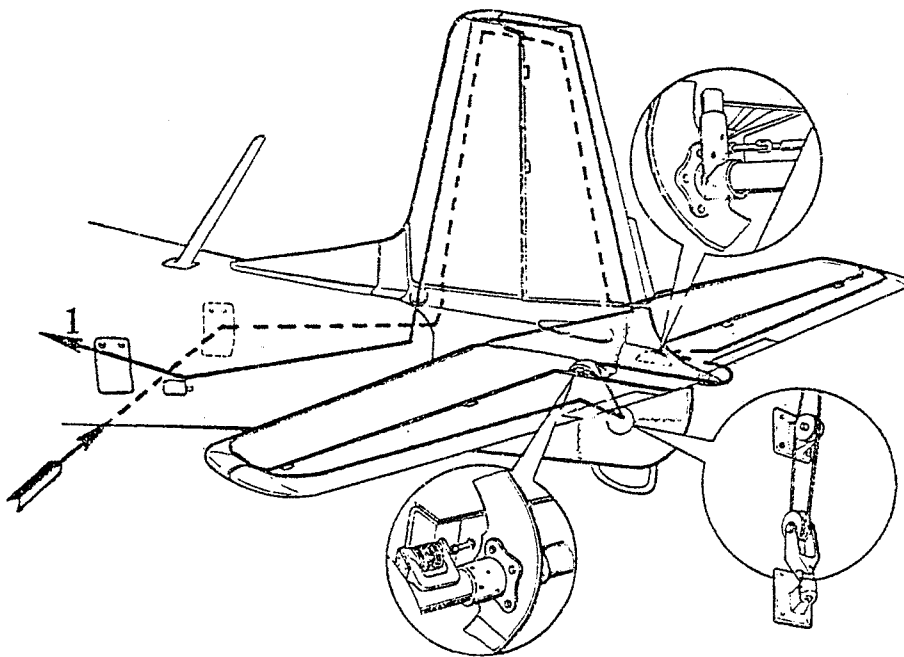


Fig. 2-14 Inspection Circuit for the Fuselage and Empennage

1. To the Rear Canopy

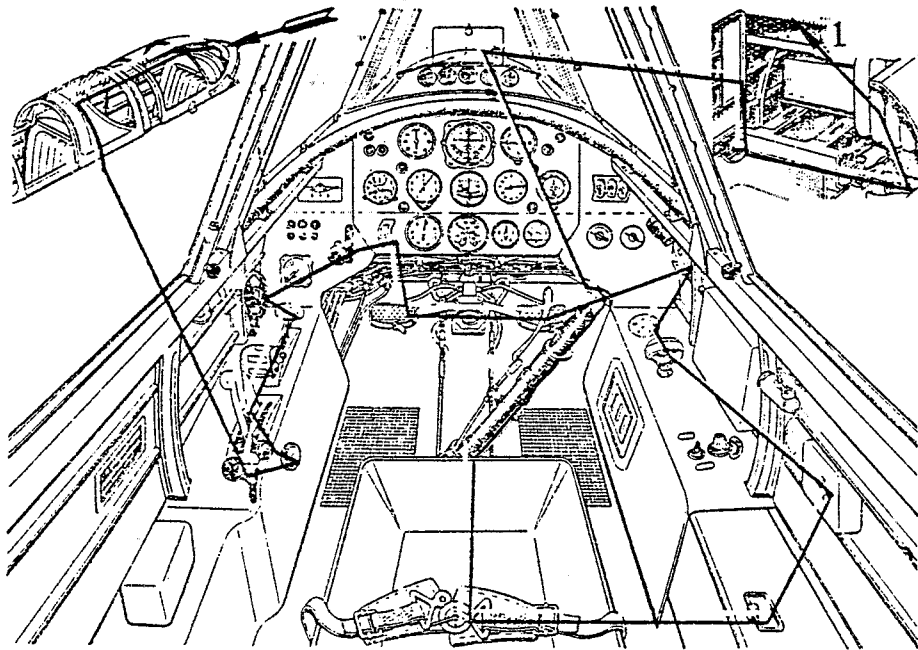


Fig. 2-15 Inspection Circuit for the Rear Cockpit

1. To the Front Canopy

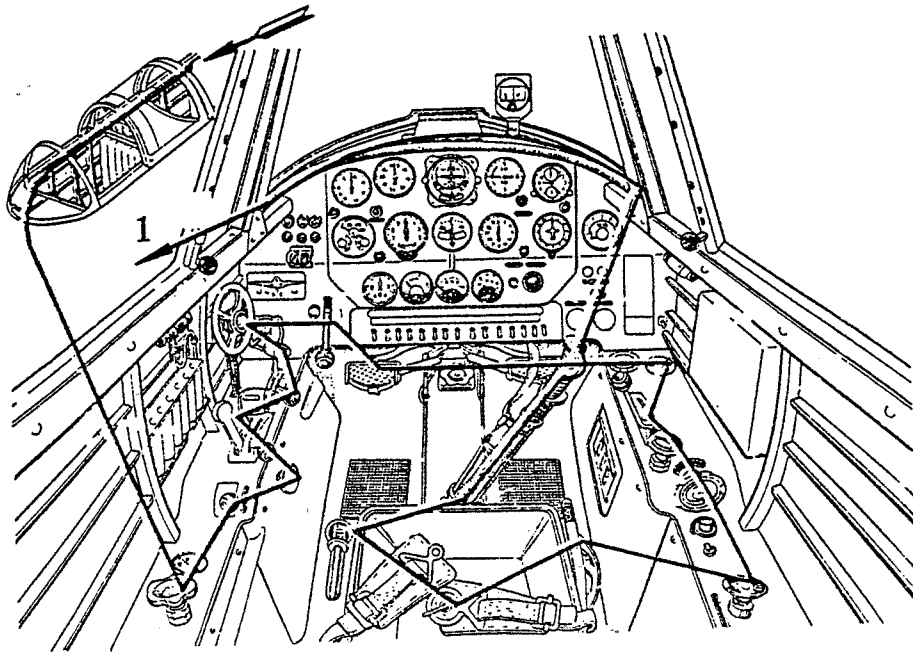


Fig. 2-16 Inspection Circuit for the Front Cockpit

1 To the Left Wing

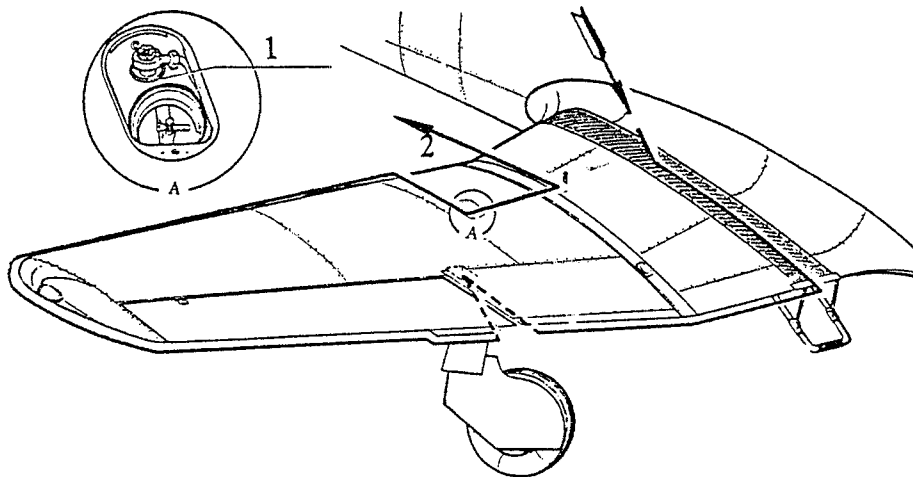


Fig. 2-17 Inspection Circuit for the Left Wing

1. The Place Being Vulnerable to Crack 2. To the Engine Cowling

SECTION 2 PREFLIGHT AIRCRAFT PREPARATION

Article 75 Based on preliminary aircraft preparation, preflight aircraft preparation is a preparation that is carried out within a period of time before the starting of a flight according to the concrete mission. The purpose of doing so is to make the aircraft meet the need of the flight mission and give a final appreciation of the reliability of the aircraft technical equipments so that the aircraft can be put into a defined preparation state on time. The main content of preflight aircraft preparation is to carry out preflight inspection, engine test running and replenishing oil and fuel, and air-charging as well.

Article 76 In performing pre-flight aircraft preparation, first of all, survey the exterior and lead-seal of the aircraft and take over the aircraft from the officer on duty of the aircraft park (hangar). Then get the needed tools and equipments ready, remove the fabric covering, rudder clamp, tail support and untie the mooring cable; adopt safety measures and act upon the relevant regulations in Appendix I.

Drain out 0.5 litre gasoline from the centre gasoline filter to check whether there is any water and impurity; the reason must be made clear if there are; if necessary, the gasoline system must be washed before the aircraft is moved.

ENGINE TEST

Article 77 Engine test. Carry out engine test by following the relevant regulations in Appendix II.

PREFLIGHT INSPECTION

Article 78 Preflight inspection is the final inspection before the aircraft is released to fly. The aircraft may undergo some changes under the influence of external condition during the parking period, inadvertence must be overcome although preliminary aircraft preparation has been done already. The contents and requirements regulated in this section must be acted on during the inspection. The check on some components and relative positions, at the same time, should be strengthened in accordance with the present day flight mission, the work done in preliminary aircraft preparation and climatic change.

Article 79 Check the propeller and flaps.

- (1) Check the propeller for damage, and the oil reservoir for oil leakage.
- (2) Check the pin of the demountable blade of the flaps for security.

Article 80 Check the engine.

- (1) Check that the engine^acowling lock catch is well locked and the slot on the lock catch is aligned with the red paint mark.
- (2) Check the gasoline system and oil system for seepage.
- (3) Drain away the sediments in the firewall oil-water separator.

Article 81 Check the nose gear and nose gear bay.

- (1) Check the shock absorber strut. Judge whether its pressure is normal in the light of its compression during engine running.
- (2) Check the tyre. Judge whether its pressure is normal in the light of tyre compression.

(3) Check the lock hook for flexibility. The hook should be in the open position.

(4) Check the retraction/extension cylinder, lock hook cylinder, bidirectional valve and the landing gear lowering pipe for air leakage.

(5) Check whether the gasoline tank vent pipe is through.

Article 82 Check the left landing gear and landing gear bay.

(1) Check that the lock hook is flexible, and the landing gear lowering pipe, retraction/extension cylinder, lock hook cylinder and bidirectional valve are free from air leakage. Judge whether the compressed air goes into the emergency hose by means of feeling the hose becoming "hardened".

(2) Check whether the pressure of the shock absorber strut and the tyre is normal.

Article 83 Check the midwing underside. Inspect whether the gasoline drainer security is reliable and free from fuel seepage. Survey all the inspection access covers are well caught.

Article 84 Check the right landing gear and landing gear bay. Perform the same check as that for the left landing gear and landing gear bay.

Article 85 Check the right wing.

(1) Check whether the air inlet duct of the oil cooler is free from foreign object.

(2) See that the landing gear indicator rod is free from bending and deformation and all the inspection access covers are well caught.

(3) Inspect the gasoline content. There should be a distance of 20-30mm from the fuel level to the rear edge of the filler when the tank is fully refueled. The fuel tank cap should be well covered after inspection.

(4) Check whether the aileron is flexible and free from stagnating.

(5) Check that the wing skin is free from damage and deformation.

Article 86 Check the fuselage and empennage. The skin of the fuselage is free from damage and deformation, all the access covers are well caught, the elevator and rudder must be flexible and free from stagnating.

Article 87 Check the rear cockpit.

(1) Check that the canopy glass is clean and free from crack.

(2) Check the flap for normal operation and the valve for air leakage.

(3) Survey that all the controlling handles and cocks are in the defined position.

(4) Check that the pressure of the emergency compressed air system should meet the requirement. The system must be free from air leakage.

(5) Check that the control stick and pedals are flexible and free from stagnating. Check whether there is air leaking sound by means of grasping the brake handle. Judge whether the operation of a single brake is normal by means of applying the pedals alternately.

(6) Check that the door of radio bay is well caught and the inside of the cockpit is free from foreign object.

Article 88 Check the front cockpit. Perform the same check as that for the rear cockpit, at the same time, check that:

(1) The cock of the main compressed air system is in the open position. The pressure of the system should not be less than 35kg/cm².

(2) The nose wheel indicator rod is free from bending and deformation.

(3) The oil content should meet the requirement (14-17 litres). Put the oil tank cover on after inspection.

(4) The fixation of the front seat is reliable.

Article 89 Check the left wing. Perform the same inspections as for the right wing.

Article 90 After accomplishing pre-flight aircraft preparation, it is necessary to:

(1) Check up the tools and dusters.

(2) Get to know the fulfilment of pre-flight aircraft preparation of each speciality. Fill in the "Flight Clearance Form". Report the exercising of aircraft preparation to the higher level and hand over the aircraft to the pilot.

Article 91 Aircraft inspection before taxing out.

Help the pilot start the engine before taxing out. After engine start, pay a special attention to checking that the magneto switch must be in the "1+2" position and the primer is well locked; judge the normal operation of the engine by means of listening to its operating sound. If the operation is abnormal, shut down the engine and try to find out the cause.

SECTION 3 BETWEEN-FLIGHT AIRCRAFT PREPARATION

Article 92 Between-flight aircraft preparation is a preparation done after landing and before another dispatching so that the aircraft can be ensured for successive starting-out. The characteristics for the preparation are that the time is pressed and the task is urgent. One therefore must try his best to accomplish the preparation within the shortest possible time with the prerequisite of ensurance of preparatory quality.

The main content of between-flight aircraft preparation is to carry out between-flight inspection, trouble shooting, refueling and replenishing of oil.

BETWEEN-FLIGHT INSPECTION

Article 93 The performing of between-flight inspection must be acted upon in conformity with the contents regulated in this section. It is essential to take the initiative to ask opinions of the pilot before the inspection, for it is the pilot who knows best the operating condition of the aircraft in the air. Therefore the problems reflected by the pilot must be made clear, reported in time and dealt with conscientiously.

Article 94 Check the propeller. The propeller blade is free from damage and crack and the oil reservoir free from oil leakage.

Article 95 Check the engine.

(1) See whether the rear part of the engine is free from seepage through the gap of the engine cowling.

(2) Drain out the sediments in the firewall oil-water separator, then close it tightly.

Article 96 Check the landing gears.

(1) Judge whether the pressure of the shock absorber strut and the tyre is normal in the light of their compression.

(2) Check that the shimmy damper is free from oil leakage and the driving rod free from break.

- (3) Check that the tyre is free from wear, cutting and misalignment.
- (4) Check that the pipes in the landing gear bay are free from air leakage.

NOTE: A special inspection should be given to the landing gear, midwing spar and "O" frame if the landing action is too rough.

Article 97 Check the fuselage, wings and empennage. The skin is free from damage and deformation, and all the inspection access covers are well caught.

Article 98 Check the cockpit.

(1) Check that the magneto switch in the front cockpit is set to "O" and the ignition controlling switch in the rear cockpit is at the "FRONT COCKPIT" position.

(2) The cylinder head temperature and oil temperature should be normal.

(3) The landing gear handle in the front cockpit is firmly seating in "DOWN" position and that in the rear cockpit is really in the "NEUTRAL" position.

(4) The pressure of the main compressed air system should meet the requirement, if the pressure is less than 35kg/cm², find out the cause.

(5) The cockpit is free from foreign object.

REFUELING, REPLENISHING OF OIL AND CHARGING OF COMPRESSED AIR

Article 99 Carry out refueling, replenishing of oil and charging of compressed air according to the requirement of the flight mission.

INTERMEDIATE INSPECTION

Article 100 Intermediate inspection must be carried out for individual aircraft taking part in two-shift flight when the shifting personnel are doing the handing-over. The contents for intermediate inspection, on top of accomplishing of pre-flight inspection, are inclusive of the checks as follows:

(1) With the engine cowling opened, check that the connection of the driving rods of the throttle and pitch control lever with the rocker arms is reliable, the accessories, gasoline system and oil system are free from oil leakage. The atmosphere vent pipe of the deceleration casing is free from evidence of fuel injection.

(2) See that the landing gear is free from crack. Pay a special attention to the inspection of the root of the landing gear and welding lines. The fixing shaft of the main landing gear is free from break and disengagement.

(3) Check that the fixation of the shimmy damper driving rod and rocker arm is reliable and the driving rod free from break.

(4) Judge whether there is any fuel leakage from the gasoline tank by means of visual inspection and smelling, and the fixing belt of the tank is broken by means of tapping the bottom of the tank.

(5) Clean the air inlet filter and apply gasoline-oil mixture on it if the flight is carried out in the windy and sandy season or in the dusty airfield.

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CHAPTER II

PERIODIC INSPECTION

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CHAPTER II PERIODIC INSPECTION

Article 101 Periodic inspection is a periodic maintenance work carried out after the aircraft technical equipment has been used for a given number of service hours (times). The periodic inspection of aircraft and engine is mainly to make a profound investigation of their technical conditions so as to find out the performance change of the components and the early wearing and damage inside the components, thoroughly remove the troubles discovered and carry out the servicing work such as adjustment, cleaning and washing, lubricating, etc. so that the tactical and technical performance of the aircraft can be well kept and restored.

Periodic inspection covers a large quantity of work and deals with various aspects, the technics are rather complicated. The engineering personnel must therefore strictly obey the regulations, continuously improve the working method, closely organize and strengthen the cooperation, develop the spirit of industriousness and consecutive operation, raise working efficiency and accomplish the periodic inspection task for every aircraft accurately and speedily with the prerequisite of quality ensurance.

Article 102 The periodic inspection of aircraft and engine is based on the flying hours of the aircraft (the operating time of engine on the ground can be converted to 20% of flying time), it can be divided into: 50 ± 5 hours, 100 ± 10 hours, 200 ± 10 hours and every 300 ± 30 landings four kinds. When carrying out 100-hour periodic inspection, 50-hour periodic inspection must be incorporated; while the contents for 50-hour and 100-hour periodic inspection must be included in 200-hour periodic inspection when it is being carried out.

Usually, the periodic inspection of the engine should be combined together with that of the aircraft. If the periodic inspection cycle of a newly-installed engine is not up, the engine can have its periodic inspection done ahead of schedule.

SECTION 1 PERIODIC INSPECTION OF THE AIRCRAFT

50±5-HOUR PERIODIC INSPECTION

Article 103 Blow off the sediments in the compressed air bottles.

(1) Bleed the compressed air in the main and emergency compressed air systems, then screw out the plugs of the compressed air bottles.

(2) Blow off the sediments in the main and emergency compressed air bottles with compressed air.

(3) Remove the rust and dirt on the plugs of the air bottles and apply a coat of anti-rust oil on them. Then fit the plugs and charge the air bottles to check for air tightness.

Article 104 Air filter disassembly and inspection.

(1) Remove the air filter.

(2) Disassemble and check the filter:

A. The copper gauze is free from rust and damage.

B. The rubber seal is intact.

(3) Wash the felt pad and dry it by airing. Clear the rust and dirt in the inner chamber of the casing and on the spring, and apply a coat of anti-rust oil.

(4) Assemble the air filter carefully for correct location of the copper gauze and felt pad. And check it for air tightness by means of air charging after assembling.

Article 105 Oil the retraction cylinders and unlocking cylinders of the landing gears and flap.

Replenish 5-10grams of castor oil or No. 8 aviation lubricating oil into each retraction cylinder through the nipples of the cylinder retraction and extension pipes and 3-5grams of castor oil or No. 8 aviation lubricating oil into each of the lock hook cylinder through its nipple.

Article 106 Check the joint face of the foldable stay rod of the landing gear.

Remove the middle bolt of the foldable stay rod and check the joint faces of the upper and lower stay rods for wear and scratch. If slight scratch occurred, grind it with fine emery paper.

Clean the joint faces by washing and apply No. 2 low-temperature grease on them.

Fit the middle bolt of the foldable stay rod. Do not overtighten the nut during fitting (just screw the nut manually, the bolt is free from axial clearance) so as to avoid affecting landing gear retraction and extension.

Article 107 Check the clearance of the foldable stay rod.

When the landing gear lever is at "DOWN" position and pressure of the main compressed air system is 25-30kg/cm², using a feeler gauge, measure the clearance of the joining of the upper and lower stay rods, which should be 0.05-0.15mm.

A force of 15-20kg should be applied at the joining of the upper and lower stay rods when measuring the clearance of the foldable stay rods of the main landing gears (Fig. 3-1).

Article 108 Check the landing gear and flap for normal retraction and extension.

(1) Landing gear retraction and extension.

The retraction and extension of the landing gear should be normal when it is operated by the landing gear lever in the front and rear cockpit with an air pressure of 20-50kg/cm².

A. When the landing gear is retracted in and locked, the red signal lights should come on and the indicator rods should go in (the exposed length of the indicator rods should be 7-10mm for the nose gear and 2-3mm for the main gear). As the landing gear lever is set to "NEUTRAL" from "UP" position, the landing gear should not fall down by itself and the signal lights should not flash.

B. With the landing gear lowered down and locked, the green lights should come on and the indicating rods come out.

C. The retraction and extension should be normal when the landing gear is operated by the landing gear lever in the rear cockpit regardless of the landing gear lever in the front cockpit at any position.

D. The left and right landing gears should operate simultaneously during retraction and extension test. A difference of 2 seconds between the extension of the nose gear and that of the main gear is permissible, and the total time of landing gear retraction should not be more than 10 seconds. The movement should be smooth and free from impulsing, stagnating, impacting and abrading.

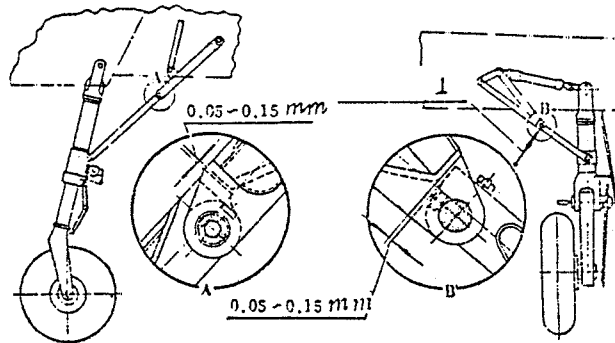


Fig. 3-1 Foldable Stay Rod Clearance

1. Applying a force of 15-20kg.

CAUTION: The position of the landing gear lever in the front cockpit should be conformed with the actual condition of the landing gear prior to setting the landing gear lever in the rear cockpit to "NEUTRAL" position from "UP" or "DOWN" position.

(2) Emergency landing gear lowering.

Retract the landing gear, select the cock of the main compressed air system off, then open the emergency cock and set the landing gear lever to "NEUTRAL". At this time, the landing gear should be at down-lock position, the indicating rods come out and the green lights come on. Immediately after the emergency lowering, operate the flap lever and brake handle to check the emergency retraction and extension of the flap and the brake operation. Then, check the tightness of the emergency compressed air system. After inspection, close the emergency cock and bleed the air in the system by means of pressing the brake release button. Open the cock of the main compressed air system and retract the landing gear once or twice so as to ascertain that the bidirectional valve works normally.

NOTE: Back pressure should be applied for landing gear retraction and lowering on the ground.

(3) Flap retraction and extension.

Retract and extend the flap with flap levers in the front and rear cockpit. When the flap is retracted in, the flap and wings are correctly aligned, and the indicator rod should go in and vice versa.

(4) Check the unlocking pressure of the landing gear lock hook.

Set the landing gear lever to "DOWN" and push the hook to lock, then gently open the cock of the main compressed-air system. Close the cock immediately at hearing unlocking sound. At this moment, the unlocking pressure should not be more than $8\text{kg}/\text{cm}^2$ for the main landing gear and not more than $10\text{kg}/\text{cm}^2$ for the nose gear.

(5) Check the operation of the nose wheel centring device.

Pull the nose wheel to the right and left limiting positions respectively, it should come back to "NEUTRAL" position by itself within 8 seconds without stagnating.

Article 109 Check the balance weights of elevator and rudder for security and crack after removing the tailwing fairing.

NOTE: If the balance weight has a clearance, usually it should not be eliminated by means of tapping the conical pin.

100±10-HOUR PERIODIC INSPECTION

Article 110 Disassemble and check the non-return valve and pressure regulating valve in the compressed air system.

- (1) Remove the non-return valve and pressure regulating valve.
- (2) Disassemble the valves and check that:
 - A. The valve rubber is free from damage and cleavage.
 - B. The spring is free from serious rust.
- (3) Remove the rust and dirt in the inner chamber of the casing and on the spring, then apply a coat of anti-rust oil.
- (4) Valve installation. Charge the valves with compressed air to check the valves for tightness and the pressure regulating valve for regulating operation after installation. Then adjust the pressure regulating valve to keep the maximum air charging pressure within 45-50kg/cm².

Article 111 Disassemble and inspect the bidirectional valve of the landing gear and flap.

- (1) Remove the valve for disassembly during which care should be taken not to deform the casing by turning.
- (2) Check the parts:
 - A. The casing is free from damage and deformation and the horn free from crack and deformation.
 - B. The rubber of the valve core is free from damage, cleavage, looseness and disengagement.
- (3) Remove the rust and dirt in the inner chamber of the casing and on the spring, and apply a coat of anti-rust oil.
- (4) Assemble the valve. Check the valve core for free movement in the casing prior to assembly. Set the valve vertically during assembly. Otherwise, the valve core will be easily damaged by crushing.
- (5) Install the valve. The pipes at both ends should be tightened first and then the middle connector during installation. If not, the horn will be easily damaged due to ununiform force applied.

Article 112 Compressed air solenoid valve disassembly and inspection.

- (1) Remove the valve with its air inlet and outlet pipes disconnected first then the valve.
- (2) Disassemble the valve and check that:
 - A. The small air bleed valve rod is free from bend and deformation.
 - B. The rubber of the inlet and exhaust valves and servo piston as well is free from damage and cleavage.
 - C. The filter gauze on the inlet valve is free from damage.
- (3) Clean the rust and dirt on the inlet connector, inlet valve and spring, and apply a coat of anti-rust oil.
- (4) When assembling, check the piston travel which should not be more than 1.7mm for the servo piston and 1.15-1.3mm for the working piston.
- (5) Test the valve after assembly.
 - A. Check the inlet valve for air tightness.

Install the compressed air solenoid valve to a tester. There should be no air leaking at the inlet connector and exhaust hole at an air pressure of 45-50kg/cm².

- B. Check the compressed air solenoid valve for operation.

With power on and at an air pressure of 10-50kg/cm², the valve should be in normal operation and free from air leaking sound.

NOTE: Power-on check duration should not exceed 1 minute each time.

(6) Install the valve. Wire-lock the mechanical handle prior to connecting the inlet and outlet pipes.

Article 113 Check the compressed air system for tightness.

Close the cock of the main compressed air system when the pressure in the system is within 45-50kg/cm² (the landing gear lever and flap lever are at "UP" or "DOWN" position). The pressure drop should not exceed 1kg/cm² within 10 minutes.

Article 114 Canopy cleaning and inspecting.

(1) Remove the movable canopy.

(2) Cleaning and checking.

A. The sliding rail of the roller should be free from serious abrasion.

B. The roller should rotate freely and the ball race is free from damage and looseness.

C. Wash the roller and coat it with No. 2 low-temperature grease.

(3) Install the canopy. Avoid damaging the roller in installation. Check the canopy for free movement after installation.

Article 115 Clean and check the firewall gasoline filter.

(1) Remove the filter.

(2) Clean the filter and check that:

A. The gauze is free from damage and unsoldering.

B. The seal washer is free from damage and cleavage.

C. Clean the filter by washing.

(3) Install the filter. Operate hand pump to exhaust out the air from the pipe in installation. And check air tightness after installation.

Article 116 Check the fixation of the wings and empennage.

Remove the wing fairing band and tail fairing.

Check wings, vertical and horizontal tail for security, the fixing lug and front spar of the horizontal stabilizer are free from crack. The fixation of gasoline pipe is reliable and the gasoline hose free from aging and fuel seepage.

Article 117 Change the lubricating grease on the pulling rods and connectors of the tail control system, trim tab control system and in the aileron inspection access, and that on the suspension connectors of the ailerons.

Article 118 Check the gasoline tank and its fixation.

The tank should be free from fuel seepage and the two fixing belts of the tank should have a proper and same tightness. Crack on the fixing support or belt is not permissible and the felt pad should be intact.

200±10-HOUR PERIODIC INSPECTION

Article 119 Check for pendulum motion.

With the landing gear at "DOWN" position, measure, at the wheel shaft, the landing gear pendulum motion which should not exceed 3mm for the nose gear to the left and right and 8mm for the main gear oscillating forward and backward (Fig. 3-2).

NOTE: This should be done prior to landing gear removal.

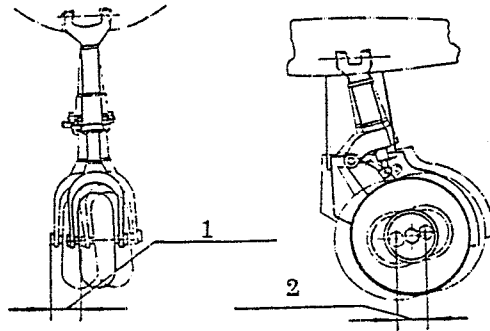


Fig. 3-2 Landing Gear Pendulum Motion

1. Not More Than 3mm

2. Not More Than 8mm

Article 120 Landing gear disassembly and check.

- (1) Remove the landing gear.
- (2) Disassembly and check are to be done by the repair unit (or repair factory).

(3) Check the shock absorber strut. Check the fixing shaft of the shock absorber strut and places on the absorber strut in which cracks are likely to occur by means of magnetic inspection.

(4) Check the shock absorber strut fork joint for eccentricity and the copper bush for looseness.

(5) Install the landing gear. Clean all the movable connectors and parts and coat them with No. 2 low-temperature grease before installation.

NOTE: Remember the installing positions of bolts, bushes and washers when removing the lower door.

Article 121 Disassemble and check the brake disc.

(1) Remove the brake blocks and place them in order according to the removal sequence.

(2) Carry out checking:

A. Inflate the tube with a pressure of not more than $0.5\text{kg}/\text{cm}^2$ to check it for damage, aging and leakage.

B. The brake disc fixing nuts are free from looseness.

(3) Install the brake blocks in accordance with the removal sequence.

Article 122 Disassemble and check the retraction cylinders of the landing gear and flap.

(1) Remove the cylinders.

(2) Disassembly and inspection are to be done by the repair unit (or repair factory).

(3) Install the cylinders. Care should be taken to avoid reverse installation of the microswitch pressing rod during the installation of the main landing gear retraction cylinder. And after installing flap retraction cylinder, measure the flap movement which should be $40^\circ \begin{smallmatrix} +1.5^\circ \\ -1^\circ \end{smallmatrix}$ or $317 \begin{smallmatrix} +11\text{mm} \\ -7.5\text{mm} \end{smallmatrix}$ (Fig. 3-7).

Article 123 Disassemble and check the foldable stay rod.

(1) Remove the foldable stay rod.

(2) Check that the movable joints, spherical bearing and bronze bush are free from damage and the mounting seat free from crack.

(3) Install the foldable stay rod. The movable joints should be cleaned and coated with No. 2 low-temperature grease before installation.

NOTE: When the pressure in the main compressed air system is not less than 25kg/cm^2 , select the landing gear lever "DOWN", using measuring instrument, measure the deviation between the junction of the upper and lower stay rods and the line of upper and lower fixing points, the value is 5^{+3}mm (Fig. 3-3). A force of 15-20kg must be applied at the junction in checking the main gear.

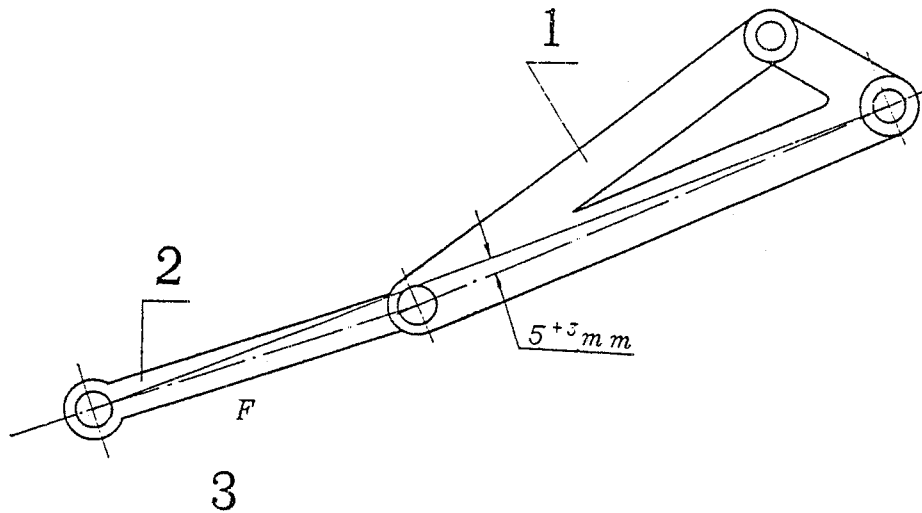


Fig. 3-3 Foldable Stay Rod Installation

1. Upper Half of the Foldable Stay Rod
2. Lower Half of the Foldable Stay Rod
3. Normal Direction of the Force Applied

Article 124 Disassemble and check the shimmy damper.

- (1) Remove the shimmy damper.
- (2) Disassembly and check are to be done by the repair unit (or repair factory).
- (3) Install the shimmy damper.

After installing the shimmy damper, pull and push the nose wheel leftward and rightward to check whether it can reach the limiting position, if not, adjustment should be made.

Article 125 Disassemble and check the lock hook mechanism and its cylinder.

- (1) Remove the mechanism and its cylinder (the front lock hook support may not be removed).
- (2) Disassemble it and check that:
 - A. The lock hook support is free from crack and the spring free from deformation and fracture.
 - B. The fixing pin should be free from serious wear.
 - C. The leather cup is free from damage and cleavage and its fixing snap ring for security.
- (3) Remove the rust and dirt on the parts and coat the spring with anti-rust oil.
- (4) Assemble the lock hook mechanism and its cylinder. A quantity of 3-5 grams of castor oil or No. 8 aviation oil should be filled into the cylinder prior to assembly.

Article 126 Disassemble and check the brake pressure regulator.

- (1) Remove the regulator.
- (2) Disassemble the regulator and check that:
 - A. The valve rod is free from bending and deformation.
 - B. The air inlet valve, exhaust valve and rubber sleeve are free from damage and cleavage.
- (3) Remove the rust and dirt on the parts and coat the air inlet joint and spring with anti-rust oil.
- (4) Test the regulator after assembly.

Check the brake pressure regulator for air tightness. There should be no air leakage at the air inlet connector and bleed hole when the inlet pressure of the brake regulator is 45-50kg/cm², and also no leakage at the outlet joint and bleed hole when the brake pressure is 8-9kg/cm² with the brake handle being held. Release the brake handle, no residual air should be left in the regulator.

Article 127 Disassemble and check the brake pressure distributor.

- (1) Remove the distributor.
- (2) Disassemble the distributor and check that:
 - A. The valve rubber and rubber sleeve are free from damage and cleavage.
 - B. The valve rod is free from bending and deformation.
 - C. The air passage on the casing is not blocked.
- (3) Remove the rust and dirt on the parts and coat the inlet connector and spring with anti-rust oil.

(4) Test the distributor after assembly.

A. Check the piston for flexibility.

The piston should spring up automatically under the action of an air pressure of not more than 0.5kg/cm² during braking.

B. Check the distributor for operation.

When applying brake, operate the lever to left and right limiting positions quickly and respectively to check that the air pressure in the right and left inner chambers can be released completely, but a residual air pressure of not more than 0.5kg/cm² is permissible in the inner chambers when the lever is operated slowly.

C. Check air tightness.

There should be no air leakage at the inlet and outlet connectors and piston air bleed hole when the brake pressure is in maximum.

Article 128 Measure the braking pressure.

Disconnect the pipe on the brake disc and connect a pressure gauge between, then neutralize the rudder and grasp the brake handles in the front and rear cockpit respectively. When the brake rocker arm contacts with the stop pin, the braking pressure should be 8-9kg/cm². If the brake rocker arm could not contact with the stop pin or the brake pressure could not meet the requirement, adjust the brake cable or the stop pin.

NOTE: The braking pressure difference between the left and right wheels should not exceed 0.5kg/cm².

Article 129 Blow the pipes of the compressed air system through. Blow the following pipes through with compressed air:

the pipes for retraction and lowering of the landing gear and flap, the braking pipe and air inlet pipe of the compressed air solenoid valve, the air inlet pipes of

the filter and the two non-return valves on the right firewall, and the pipe connecting the pressure gauge of the main compressed air system.

CAUTION: It is imperative to jack up the aircraft and make sure that the retraction pipe is really disconnected prior to blowing the landing gear retraction pipe through so as to prevent landing gear retraction by mistake.

Article 130 Disassemble and check the magneto switch.

(1) Remove the magneto switch.

(2) Disassemble the switch and check that:

A. The handle is flexible in rotation and free from serious wear.

B. No metal powder exists between the contacts of the control disc and the contacting screw is not loose.

C. The rotating disc is free from crack.

(3) Assemble the megneto switch.

Attention that the spring on the rotating disc should not drop off and the fixing nut of the cover should not be over-tightened during assembly.

Measure the circuit with an ohmmeter after magneto switch assembly. The result should meet the requirements given in the following table:

Ohmmeter Indication	Switch Position	Magneto			
		0	1	2	1+2
Left		"0"	"∞"	"0"	"∞"
Right		"0"	"0"	"∞"	"∞"

CAUTION: It is forbidden to rotate the propeller after the magneto has been removed.

Article 131 Disassemble and check the tyre.

(1) Remove the wheel.

(2) Disassemble the wheel and check that:

A. The tube should be free from damage, folding and aging.

B. The fixing nut of the charging connector is not loose.

C. Cord ply exposure or fracture due to wear or cutting is not permissible on the tyre.

(3) Assembly.

A. Dust French chalk between the tyre and tube when assembling.

B. After tyre assembly, charge the tyre with a little compressed air and let the wheel jump on the ground for several times in the circular direction to prevent tube folding. Then perform air charging (2.3kg/cm² for the nose wheel and 3.2kg/cm² for main wheel) and paint red mark at the junction of the wheel rim and tyre.

(4) Installation. Do not overtighten the fixing nut during wheel installation. When the nut is tightened, the wheel should be free from axial clearance and can rotate freely (i.e. it can rotate ½-1½ circles by inertial force).

NOTE: Renew the lubricating grease of the wheel bearing if it is contaminated.

Article 132 Inject lubricating oil into the bronze thimbles of the throttle, pitch control and flap.

Article 133 Check the frames and stringers of the rear fuselage.

Get into the fuselage to check the frames and stringers for crack and deformation and the rivets for looseness.

Article 134 Renew the lubricating grease in the control system.

Clean all of the movable joints, pulleys and bearings according to the points shown in Fig. 3-4. Then coat them with No. 2 low-temperature grease.

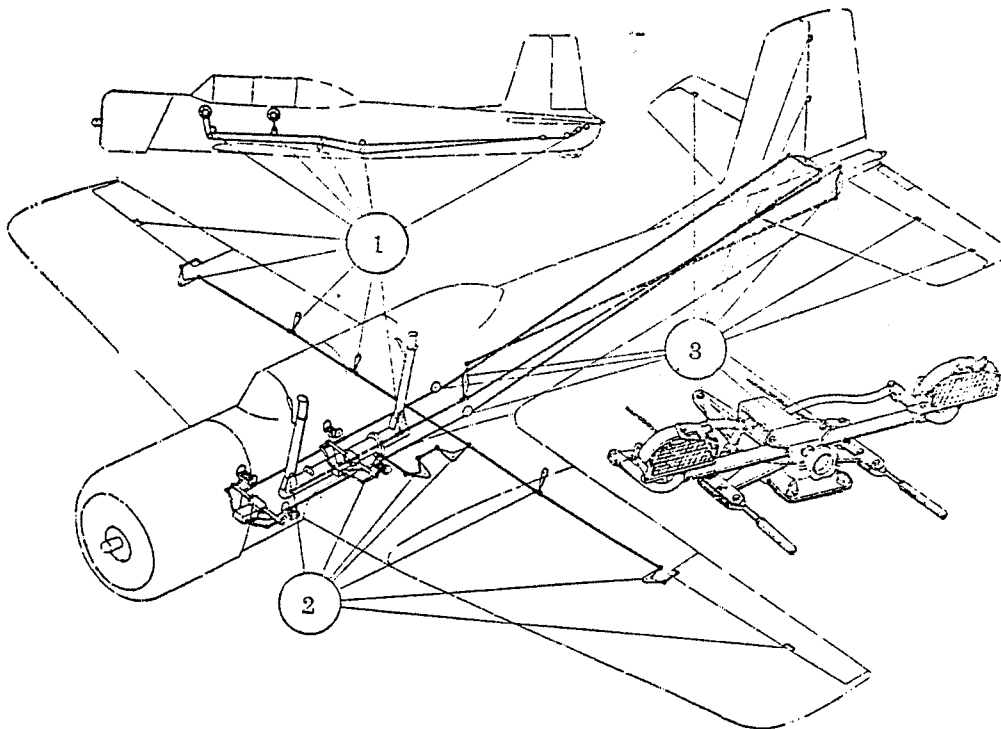


Fig. 3-4 Lubrication Points of Control System
1, 2 and 3. Lubrication points

PERIODIC INSPECTION OF EVERY 300 ± 30 LANDINGS

Article 135 Measure the protrusion of the inner cylinder of the shock absorber strut.

When the inner cylinder of the strut is fully extended, measure the distance from the concave edge of the inner cylinder fixing nut to the flange of the inner cylinder. The protrusion of the inner cylinder should be 185 ± 2 mm for the nose strut and 113 ± 2 mm for the main struts. Cause must be found out if there is a change in the protrusion of the inner cylinder. If necessary, disassemble and inspect the landing gear.

Article 136 Renew the lubricating grease of the wheel bearing.

(1) Remove the wheel and take out the bearing.

(2) Clean the bearing and check that:

A. The inner race and roller retainer are free from crack and deformation, and the rollers are not coming out of the retainer.

B. The bearing is in freedom of rotation and free from rust. Coat it with No. 4 high-temperature grease.

(3) Install the bearing carefully and attention not to damage roller retainer by tapping.

Article 137 Check the brake block and wheel hub.

(1) Thickness check of the brake block. Select two thinner brake blocks to check their thickness which should not be less than 8mm (Fig. 3-5).

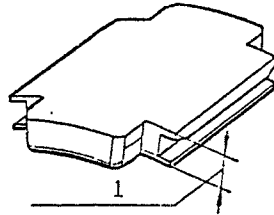


Fig. 3-5 Thickness of Brake Block
1. Not Less Than 8mm

(2) Hub check.

A. There should be no crack on the hub.

B. The brake drum should not be deformed and the fixing screws are not loose.

C. The felt sealing ring should be intact and free from dislocation.

Article 138 Inject No. 8 aviation lubricating oil into the brake cable sleeve.

Article 139 Inject No. 2 low-temperature grease into all the grease nipples of the landing gear.

NOTE: Article 136, Article 138 and Article 139 should be properly conducted ahead of schedule in the stage of major subject flight training, for the landings are less.

SECTION 2 PERIODIC INSPECTION OF THE ENGINE

50±5-HOUR PERIODIC INSPECTION

Article 140 Drain out the sediments in the firewall oil filter. Check the sediments drained from the firewall oil filter for metal chips, and find out the cause if there are.

Article 141 Renew the grease on the rocker arm mechanism.

Remove the rocker arm chamber covers of No. 1, 2, 3, 8 and 9 cylinders and the contaminated grease inside, then inject 40-50 grams of No. 4 high-temperature grease into each of the rocker arm chambers.

If there is red dirt on the rocker arm mechanism, the rocker arm should be removed and thoroughly cleaned, at the same time, measure its axial clearance which is not more than 0.2mm.

NOTE: It is not necessary to do this work on the engines produced after the sixth batch.

Article 142 Clean the spherical joint of the needle rocker arm of the carburetor.

Remove the cover of the rocker arm mechanism and wash off the dirt on the spherical joint with gasoline. The throttle should be moved during washing. Apply a little oil after cleaning.

Remove the needle for cleaning if necessary. But the flexibility of the throttle must be inspected after throttle fitting.

Article 143 Clean and check the breaker mechanism and distributor mechanism of magneto.

(1) Remove the rear cover of the magneto and take out the conduct rod.

(2) Inspect the breaker mechanism.

A. Clean the breaker contacts with chamois or silk dipped with spirit with the breaker contacts at fully "OPEN" position, using a feeler, measure the gap between the contacts of breaker, which should be 0.25-0.35mm. If the gap is not normal, adjustment should be made according to the requirements in APPENDIX VII and the gap must be rechecked after being adjusted.

B. Check the breaker for security and the contacts for normal concentricity and parallelism. If the contacts' eccentricity is more than 0.1mm or non-parallelism is more than 1mm (i.e. when the contacts are closed and, with a feeler of 0.05mm put in between them, the depth exceeds 1mm), either of them must be remedied.

C. Check the spring leaf for rust, replace it if there is. Clean the leaf and coat it with No. 22 turbine oil.

D. If the oil container lacks oil, fill it with a little No. 22 turbine oil.

(3) Inspect the distributor mechanism.

A. The distributor brush should be free from crack and the fixing screw free from looseness.

B. The distributor disc should be free from crack and burn and the carbon rod free from damage. If the spring in the jack of conduct rod got rusted extremely, it should be replaced.

C. The conduct rod should get no de-welding on both ends and its insulation be intact.

D. The high-tension cable is well secured and free from damage.

E. Clean the distributor brush and disc with chamois or silk cloth dipped with spirit.

(4) Installation. Care should be taken to insert the conduct rod correctly during distributor disc installation.

Article 144 Engine test. Do it in accordance with the regulations in APPENDIX II.

100±10-HOUR PERIODIC INSPECTION

Article 145 Renew oil, clean and check the oil filter.

(1) Drain out all the oil in the system from the firewall oil filter, oil cooler and sump, using a gauze to filter it, inspect whether there are metal chips in the oil.

(2) Clean and check the oil filter.

Remove the filters of the firewall, oil pump, speed regulator and oil sump and check the filters for metal chips. The cause must be found out if there are. The gauze is free from damage and the seal washers free from damage and cleavage.

Clean and refit the filters after inspection.

(3) Replenish the oil tank.

Article 146 Clean and check the carburetor filter.

(1) Remove the filter.

(2) Clean it and check that:

A. The gauze is free from break and damage.

B. The seal washer is free from damage.

C. Clean the filter. If there is dirt or impurity in it, remove the blank and clean the filter thoroughly.

(3) Fit the filter. Operate the hand pump to exhaust the air in the pipe. And check the sealing after fitting.

Article 147 Drain out the sediments in the carburetor fuel chamber and clean the air restricting jet.

(1) Remove the lower drain plug of the fuel chamber to drain out the sediments, and then refit the plug.

(2) Clean the air restricting jet.

Remove the thread plug of the air restricting jet and clean the jet by operating the hand pump while moving the throttle till clean gasoline flows out from the jet. Then blow through the jet with compressed air at a pressure of not more than 0.5kg/cm^2 .

Article 148 Measure cylinder compression force.

Check cylinder compression force of every cylinder with a preferable cylinder head temperature ranging $40^{\circ}\text{-}60^{\circ}\text{C}$, which is not less than 3.5kg/cm^2 .

Article 149 Check the air valve mechanism and air valve clearance.

(1) Check the valve mechanism.

Inspect the rocker arm pulley for freedom of rotation, the valve spring for fracture, and the washers at the both sides of the rocker arm for rotation; if there is rotational motion for the washer, it should be remedied.

(2) Check the air valve clearance.

Rotate the propeller to find out the top dead centre of the compression stroke of a cylinder as shown in Fig. 3-6. Then measure, with a feeler, the clearance between the air valve rod and the rocker arm pulley, which should be $0.3\text{-}0.4\text{mm}$. If the clearance is not normal, it should be adjusted. Make sure that the safety nut is tightened and recheck the clearance after adjusting.

Check the rest cylinders as that mentioned above.

(3) Clean the cover of the rocker arm chamber and ascertain that the rubber seal is free from damage and the fixing steel cable free from wire-breaking, then refit the cover.

200±10-HOUR PERIODIC INSPECTION

Article 150 Check the spark plug.

(1) Remove the spark plug.

(2) Remove the carbon deposits on the spark plugs and check that the electrode and ceramics are free from crack, or they should be replaced. Measure the spark plug gap which should be $0.4\text{-}0.5\text{mm}$.

(3) Test.

Fit the spark plug on the tester and carry out the test of spark continuation between the electrodes when the spark plug gap is 0.4mm and the air pressure is 11.5kg/cm^2 or the gap is 0.5mm and the pressure is 9kg/cm^2 .

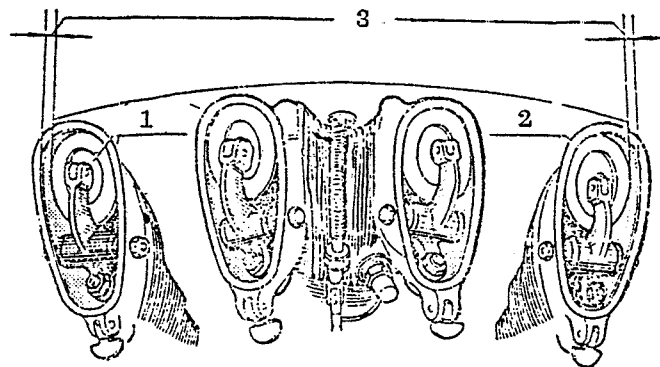


Fig. 3-6 Top Dead Centre of Compression Stroke

1. Spring Pressing Disc

2. Rocker Arm Chamber

3. When the distances from the two spring pressing discs to the edge of the rocker arm chamber are equal, it means that the compression stroke of the centre cylinder is at the top dead centre.

(4) Refit the spark plug.

Article 151 Tighten the nut of the thrust bearing of the engine.

Remove the propeller and tighten the nut of the thrust bearing with special tool.

Article 152 Check the spherical joints of the throttle and pitch control rocker.

Remove the spherical joints of the throttle and pitch control rocker. Check the joints with a magnifying glass after cleaning, the joints and neck are free from crack and damage.

Inspect the throttle and pitch control for flexibility after fitting the spherical joints.

Article 153 Clean and check the idling air filter. Remove the filter, clean it and check that the gauze should be free from damage and the rubber seal ring free from damage and cleavage.

Article 154 Clean the oil system.

Drain out all the oil in the system and then clean the oil tank, oil cooler and pipes with kerosene. Replenish the tank with oil after cleaning.

NOTE: When a special equipment is used for cleaning the oil system, the pressure at the outlet of the pump must not be more than 4kg/cm².

Article 155 Inspect the fixation and security of the two-stage valve of the air compression pump.

Article 156 Check to see whether the mounting angle of the magneto meets the requirement (for measuring method refer to APPENDIX VII).

SECTION 3 WORK TO BE DONE FOR SEASON TRANSITION

Article 157 Nature condition exerts a great influence on the technical performance of aircraft and engine as well as the physical and chemical characteristics of aviation material, oil and fuel. Therefore, season transition work should be

done before the coming of winter and summer every year as the atmosphere temperature reaches 5°C.

The contents for season transition work prescribed in this section must be followed, in the meanwhile, the check on the relevant parts should be strengthened in accordance with the local natural characteristics.

WORK TO BE DONE IN THE TRANSITION OF SUMMER TO WINTER

Article 158 Wrap up oil tank, oil cooler, firewall oil filter, temperature sensing rod box and speed regulator with heat keepers. And wrap up the metal pipe of the oil cooler with felt and cotton cloth, then coat it with brown paint and water glass.

Article 159 Wind up asbestos ropes around the cables of the 3rd, 4th, 5th, 6th, 7th and 8th cylinders (it needs only to wind up asbestos rope around the cables at the front of the baffle and the durite hose of the push-rod sleeve if the engine is heated from the front part), then coat them with water glass.

Article 160 Remove, clean and check the gasoline tank (the consumption tank may not be removed) and central gasoline filter.

Article 161 Remove and clean the compressed air bottle.

NOTE: The method for cleaning the compressed air bottle:

A. Fill the compressed air bottle fully with water solution containing 30% of sodium hydroxide at a temperature of 70°C. Keep as it is for two to three hours, then pour out half of the water solution. Shake the bottle for 5-10 minutes before pouring out all the solution.

B. Wash the bottle clean with water.

C. Fill 2-3 litres of water solution containing 0.3% potassium dichromate and 20% sodium hydroxide into the bottle, shake the bottle for 4-5 minutes, then pour out all the solution and bake the bottle dry.

Article 162 Inspect the cable tension of the rudder, elevator and trim tab.

Article 163 Check the dilute solenoid valve for operation and sealing.

Remove the restricting cup of the outlet joint of the dilute solenoid valve to check its restricting hole, the aperture of which is 1.6mm. Turn on the starting switch, operate the hand pump, select the switch of the dilute solenoid valve "ON", gasoline should flow out from the outlet of the dilute solenoid valve; turn off the dilute solenoid valve and operate the hand pump continuously to check the dilute solenoid valve for sealing. Refit the restricting cup and outlet joint after inspection.

Article 164 Measure the air pressure of the shock absorber strut and wheel tyre.

Article 165 Fit the regulating valve at the inlet of the oil cooler.

Article 166 Measure the movements of the flap, aileron, trim tab, rudder and elevator (Fig. 3-7).

Article 167 Remove the bronze thimble support of the throttle and check carefully that the fixing position is free from crack.

Article 168 Inspect the steering adapter of the elevator pull-rod for security and normal clearance.

Article 169 Run the engine to check its mixture ratio.

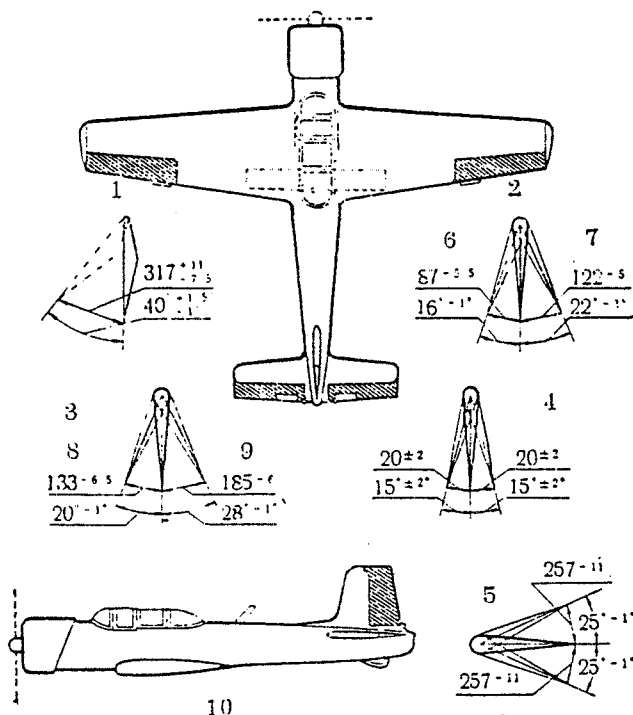


Fig. 3-7 Control Surfaces Movements

- | | |
|-------------|--------------------------------|
| 1. Flap | 5. Rudder |
| 2. Aileron | 6. and 8. Downward |
| 3. Elevator | 7. and 9. Upward |
| 4. Trim Tab | 10. "O" is the Measuring Point |

WORK TO BE DONE IN THE TRANSITION OF WINTER TO SUMMER

- Article 170 Remove the heat keeping device of the oil system.
- Article 171 Check the cable tension of the elevator, rudder and trim tab.
- Article 172 Measure the air pressure of the shock absorber strut and wheel tyre.
- Article 173 Check the insulation of the high tension cable.
- Article 174 Measure the movements of the flap, aileron, trim tab, rudder and elevator (Fig. 3-7).
- Article 175 Take off the regulating valve at the inlet of the oil cooler.
- Article 176 Remove the bronze thimble support of the throttle and check carefully that the fixing position is free from crack.
- Article 177 Inspect the steering adaptor of the elevator pull-rod for security and normal clearance.
- Article 178 Run the engine to check its mixture ratio.

CHAPTER III

AIRCRAFT STORAGE

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CHAPTER III AIRCRAFT STORAGE

Article 179 Although there is no mechanical wearing during the period of aircraft storage, yet the components would ceaselessly undergo some changes under the influence of nature; if a proper care could not be taken in this period, rust and defectives would likely happen. Therefore the work of storage must be done conscientiously in conformity with the regulations prescribed in this chapter. When the natural condition changes drastically, be good at analysing the concrete condition and adopt the measures accordingly to strengthen the maintenance so as to make sure of the aircraft being free from rust, trouble and damage, once needed, they can be put into service immediately.

Article 180 As for the aircraft parking in the open, regular preparation against the attack of rain, snow and sandy wind is necessary. When raining, snowing or sandy wind is over, the servicing work is required as follows:

(1) After raining.

A. Remove and dry the fabric covering of the aircraft and the canopy cover by airing. Open the canopy and all the access panels, and lower down the flap to air the aircraft.

B. Remove accumulated water in the aircraft and rust on the components.

C. Replace the degenerated lubricating grease. If the wheels have been immersed in water, they would have to be removed to clean up accumulated water in the wheel hubs and braking disks and replace the bearing lubricating grease.

(2) After snowing.

Clear accumulated snow from and around the aircraft. Untie the fabric covering to clear out accumulated water on the aircraft if the snow has melted.

(3) After sandy wind.

Untie the fabric covering to check the exterior of the aircraft for damage, thoroughly remove sand and dust on the aircraft and replace the dust-contaminated lubricating grease.

SECTION 1 STORAGE OF UNPRESERVED AIRCRAFT

Article 181 The servicing work for an unpreserved aircraft suspended in service, during the storage period, should be carried out in accordance with the cycle and contents specified in this section.

Article 182 Every 15 ± 2 -days' maintenance work.

(1) Check the aircraft according to the pre-flight inspection contents. Remove the troubles discovered.

(2) Start the engine and run it at 1200-1400 RPM for 10-15 minutes (release the sediments from the central gasoline filter before engine starting).

(3) Retract and lower the landing gears and the flap.

(4) Clear dust and rust from the aircraft and engine.

Article 183 Every 30 ± 5 -days' maintenance work.

(1) Accomplish 15 ± 2 -days' maintenance work.

(2) Inject 5-10grams of castor oil or No. 8 aviation lubricating oil into the retraction/extension cylinders of the landing gears and flap (this should be carried out prior to the extension and retraction of the gears and flap).

(3) Replace the lubricating grease on the exposed joints of the control system.

SECTION 2 STORAGE OF PRESERVED AIRCRAFT

Article 184 The aircraft to be suspended in service for more than three months should be preserved according to the regulations in Appendix III. The servicing work for preserved aircraft should be carried out in accordance with the cycle and contents specified in this section during the storage period.

Article 185 Every 15 ± 2 -days' maintenance work.

(1) Check the aircraft for exterior and mooring state.

(2) Inspect whether the pressure of the tyre and shock absorber strut is normal or not. Charge it if the pressure is low.

(3) Open the door for ventilation as the aircraft is stored in a hangar.

(4) When the ambient temperature is above 15°C , rotate the propeller for 4-6 rounds (This work may not be done to an engine which has already been preserved for more than three months).

(5) Check the exterior preservation of the aircraft. Add inhibiting grease if there is not.

APPENDIXES

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APPENDIXES

APPENDIX I MAIN SAFETY MEASURES

To prevent ground accident and ensure safe operation must be the important condition for a successful accomplishment of the maintenance work. The engineering personnel must heighten the sense of responsibility, strictly obey the safety rules, proficiently master the operational skill, and check and supervise each other so as to prevent the occurrence of fire, electricity shock, misconducting of landing gear retraction and hurting people by the propeller's rotational motion.

- (1) Those who are going to work on the aircraft, prior to work, must:
 - A. Not bring the inflammable and explosive things that have nothing to do with the maintenance work, and the articles that are easy to be left in the aircraft (for example, lighter, matches and coins).
 - B. Check uniform dressing so as to prevent the buttons from being left in the aircraft (re-check it after work).
- (2) Before starting working, make sure that:
 - A. The magneto switches in the front and rear cockpit are really at "O" position, and the ignition control switch in the rear cockpit is set at "FRONT COCKPIT" position.
 - B. The battery switch and all the switches of power consumption equipments must be selected "OFF".
 - C. The landing gear lever in the front cockpit is at "DOWN" position, and that in the rear cockpit is at "NEUTRAL" position and locked with the safety pin.
- (3) It is forbidden to prop off the propellers when the cylinder head temperature is higher than 80°C.
- (4) The working personnel on the aircraft should not exceed 5 at one time, it should not exceed 3 when the aircraft is jacked up. It is not allowed to get aboard or get down the aircraft during the jacking-up or lowering-down of the aircraft.
- (5) When the aircraft is to be jacked up, use the main jacks to jack it up first. If the nose jack or main jacks are used separately, the tail jack must be employed simultaneously.
- (6) It is forbidden to switch on the power to the aircraft under the following conditions:
 - A. Refueling the aircraft.
 - B. Defueling the aircraft.
 - C. Blowing and cleaning the engine with gasoline.
 - D. Removing or fitting the components which are not controlled by switches.
 - E. Removing or fitting, or having already removed the components which would influence power feeding.

F. The components or circuits concerning power feeding in the power supply system have gone wrong and the troubles have not yet been removed.

NOTE: When coming across the cases in D, E, F mentioned above, hang a board inscribed "NO POWER-ON" on the receptacle socket of the ground power.

(7) It is forbidden to use the working lamp and electric solder iron with poor insulation on the aircraft.

APPENDIX II ENGINE RUNNING

Engine running is one of the most important measures to inspect the operation of an engine. The operation performance of the engine might undergo certain changes in application due to the effects of various factors. When testing the engine, be good at discovering any minor changes in performance data and operating state timely by means of analysis and comparison of the operation sounds and the instruments' indications so as to judge whether the engine performance is normal and the operation reliable.

The engine test running should be carried out in accordance with the curve for engine running (Fig. 1).

- (1) Preparation prior to engine running.
 - A. Check the oil quantity which should not be less than 12 litres.
 - B. Get the fire extinguishing equipments ready.
 - C. Clean the ground surface near the propeller.
 - D. Chock the wheels.
 - E. Appoint a person on guard.

NOTE: 1. For an unpreserved engine stopping service for more than two days, the drain plugs of air inlet tubes of No. 4, 5 and 6 cylinders must be unscrewed and the propeller turned to drain out the accumulated oil from the cylinders.

2. For an unpreserved engine stopping service for more than 7 days, the following work must be carried out:

- a. Inject 40-50g oil heated to 40°-60°C into No. 1, 2, 3, 8 and 9 cylinders with an oil gun respectively as the piston is at bottom dead centre.
- b. Inject 1.3-1.5 litres oil heated to 40°-60°C through the front and rear vent holes of the casing respectively.

(2) Engine test running.

A. Start.

a. Make sure that the magneto switch is at "O" and then issue the order: "Prop off the propellers!"

CAUTION: In order to prevent engine hydraulic shock, rotate the propellers before starting when the cylinder head temperature is below 80°C; during rotation, see whether it is too heavy, find out the cause if it is.

b. While propping off the propellers, let the throttle be fully open, operate the primer 3-5 times (5-7 times in winter), then give the order "Clear the propellers".

c. After hearing "Cleared!", set the throttle to the position corresponding to 700-900RPM, turn on the switches of the battery, generator, starting, landing gear signal lights and engine instruments and put the magneto switch at "1+2" position, then press the starting button to start the engine. Cut off the engine at once if

the oil pressure can not reach 1.5kg/cm^2 within 15-20 seconds after engine starting, and find out the reason.

NOTE: If the engine failed in starting for three times, the reason must be found out. Inject 40-50g oil heated to $40^\circ\text{--}60^\circ\text{C}$ through the spark plug holes into No. 1,2,3, 8 and 9 cylinders with an oil gun before another starting, and drain out the accumulated gasoline in the air inlet pipes of No. 4,5 and 6 cylinders. After that, rotate the propellers for 3-4 turns.

B. Engine warm-up.

a. After starting the engine, advance the throttle to increase the RPM to 1000-1200 (1400 in winter) to warm up the engine.

b. The engine warm-up will be over when the cylinder head temperature reaches 120°C and the oil inlet temperature 30°C (20°C for the diluted oil).

C. Check the generator voltage.

After advancing the throttle to the position of 1600-1700 RPM, turn on the "RADIO COMPASS" switch, press the button of "V-A METER" to check the generator voltage which should be $27.5\pm 1\text{v}$.

The generator failure signal light should not flash when the generator is in normal operation. Turn off the "RADIO COMPASS" switch after checking the generator voltage.

D. Check the engine operation in rated regime.

NOTE: The data in the brackets hereinafter are for Type-6 piston engine.

After advancing the throttle to the position of 2300RPM (2100RPM), pull the pitch control lever to decrease the engine speed to 2250RPM (2050 RPM), then advance the throttle to fully open position again, at this moment:

Engine speed	$2250\pm 20\text{RPM}$ ($2050\pm 20\text{RPM}$).
Manifold pressure	present field pressure plus $80\pm 10\text{mm}$ mercury column (plus $30\pm 10\text{mm}$ mercury column).
Oil pressure	$4\text{--}7\text{kg/cm}^2$.
Gasoline pressure	$0.2\text{--}0.5\text{kg/cm}^2$.
Oil inlet temperature	$30\text{--}75^\circ\text{C}$.
The maximum cylinder head temperature	not more than 230°C .

The engine in stable operation and free from vibration.

E. Check the constant speed.

Retard the throttle gradually in rated regime to decrease the manifold pressure by 100-150mm mercury column, at this time, the engine speed should be constant. Advance or retard the throttle suddenly, the engine speed may increase or decrease 50-100RPM, but after 2-3 seconds, the speed should resume 2250RPM (2050RPM). Then, advance the throttle to fully open position.

F. Check pitch control.

Proceed in rated regime. Pull the pitch control lever slowly to high pitch position, the engine speed should decrease to 1350-1450RPM for Type J2-G1 propeller and decrease to 1500-1600RPM for type J9-G1 propeller, then push the pitch control lever to "LOW PITCH" position to enter take-off regime.

G. Check the engine operation in take-off regime, at this moment:

- Engine speed $2350 \pm 20 \text{RPM}$
- Manifold pressure present field pressure plus $85 \pm 10 \text{mm}$ mercury column (plus $35 \pm 10 \text{mm}$ mercury column).
- Oil pressure $4-7 \text{kg/cm}^2$.
- Gasoline pressure $0.2-0.5 \text{kg/cm}^2$.
- Oil inlet temperature not more than 75°C .
- Cylinder head temperature not more than 230°C .

H. Check the operation of magneto and spark plugs.

After retarding the throttle to the position of 1950RPM (1860RPM), make the left and right magnetoes work independently for 15-20 seconds. The engine should not drop more than 60RPM with a single magneto in operation. When the left and right magnetoes are used alternatively, they must be put to work together for 20-30 seconds.

I. Check engine acceleration.

Advance the throttle to fully open position from minimum back position within 2-3 seconds, at this moment, the engine RPM should transit uniformly from idling to take-off regime.

The cylinder head temperature should not be less than 120°C and the oil inlet temperature not less than 30°C in checking engine acceleration.

J. Check the idling operation.

Retard the throttle to the minimum position, at this moment, the operation of the engine should be stable.

- Engine speed $500 \pm 50 \text{RPM}$.
- Oil pressure not less than 1.5kg/cm^2 .
- Gasoline pressure not less than 0.15kg/cm^2 .

The engine should not work at idling for a long time, for the spark plug would suffer from fuel accumulation.

K. Engine cooling and shut-down.

a. Advance the throttle to the position of $700-800 \text{RPM}$ to cool down the engine, make the cylinder head temperature meet the requirements in the following table:

Atmospheric Temperature ($^\circ\text{C}$)	Temperature For Engine Shut-down (not more than $^\circ\text{C}$)
Below 25	150
Above 25	165

b. Advance the throttle to increase the speed to 1900RPM to burn plugs for 10-15 seconds, then retard the throttle to the position of $600-700 \text{RPM}$, switch off the magneto and advance the throttle to fully open position rapidly.

After engine shut-down, turn off all the switches and pull the throttle back to the idling position.

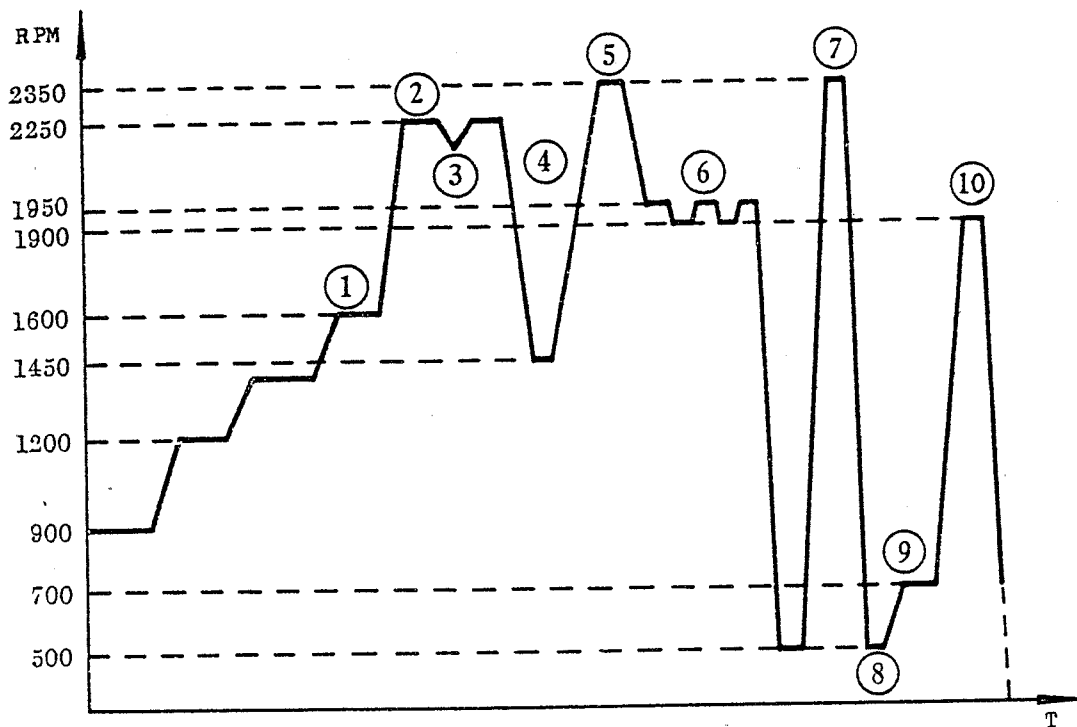


Fig. 1 Curve of Type-6A Engine Test Running

- | | |
|--|--|
| 1. Checking Generator Voltage | 6. Checking the Operation of Magneto and Spark Plugs |
| 2. Checking Operation in Rated Regime | 7. Checking Acceleration |
| 3. Checking Constant Speed | 8. Checking the Idling Operation |
| 4. Checking Pitch Control | 9. Cooling Down |
| 5. Checking Operation in Take-off Regime | 10. Burning Plugs |

NOTE: If it is necessary to check the operation of power supply system by engine test running, proceed as follows:

a. Check the initial power supply voltage of the generator. The generator failure signal light should go out when the engine speed is 1040-1200RPM. At this time, the generator voltage should be $25.5 \pm 1V$.

b. Check the voltage adjusting range of the regulating box. Turn on the "RADIO COMPASS" switch when the engine speed is 1600RPM. At the time when the switch is being turned on, the generator failure signal light should not flash. At this moment, the generator voltage should be $27.5 \pm 1V$. After checking, turn off the "RADIO COMPASS" switch in time. The generator voltage should not be more than 28.5V when the engine speed is 2350RPM.

c. Check the reverse current value.

When the engine speed is 1200RPM, retard the throttle slowly, at the same time, observe the indication of the V-A meter and note the difference of the current values when the pointer begins to return and after the pointer has returned (i.e. reverse current value), the differential value should not be more than 15a; if it is, turn off the "BATTERY" switch immediately.

APPENDIX III PRESERVATION AND DEPRESERVATION OF THE AIRCRAFT AND ENGINE

WORK TO BE DONE FOR PRESERVATION AND DEPRESERVATION FOR THREE MONTHS

(1) Preservation.

A. Renew the oil. Drain out the oil from firewall oil filter, oil cooler and oil sump of the oil system. Then fill the oil tank with fresh oil.

B. Run the engine. Start the engine and run it at 1200-1400RPM for 10-15 minutes.

C. Exhaust out the waste gas in the cylinders. Remove the spark plugs in the front row, let the throttle be at the fully open position, rotate the propellers for 8-10 turns to exhaust out the waste gas in the cylinders.

D. Preserve the air compression pump.

Disconnect the air outlet joint of the air compression pump, then inject dewatered oil heated to 40°-60°C through the air inlet valve while rotating the propellers till the oil flows out from the pressure valve of the air compression pump.

E. Drain out the oil in the oil sump after engine running. Then, inject 3-4 lit. dewatered oil heated to 40°-60°C into the casing through the front and rear vent holes of the casing, and rotate the propellers for 8-10 turns.

F. Preserve the cylinders.

When the piston is located at the bottom dead centre of expansion stroke, inject 100-150g No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C into each cylinder from the spark plug hole by means of a grease gun. Then rotate the propellers for 2-3 turns. Finally, make the propellers stop at level position and again inject 100-150g No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C into each cylinder. The inhibitory oil should be uniformly injected onto the cylinder wall, the exhaust valve and the exhaust valve seat.

G. Blow off the sediments in the compressed air bottles and moisture in the retraction and extension pipes of the landing gears and flap, and the air inlet pipe of the compressed air solenoid valve.

H. Inject 5-10g castor oil or No.8 aviation oil respectively into the retraction cylinders of the landing gears and flap.

I. Preserve the exterior of the aircraft and engine. Get rid of the oil dirt and dust on the aircraft and engine, and coat the metal components without protective coating with No.217 anti-rust grease.

J. Blank all the vent pipes and apertures. Blank the exhaust gas pipe and casing vent hole, and wrap up the opening vent pipes of the gasoline tank and oil tank.

K. Preserve the propeller shaft. Remove the propellers and clean the propeller shaft, the propeller hub spline and the rear conical washer, after that, coat them with fresh oil.

L. Items A, G, H and K may not be carried out in represervation.

NOTE: If continuous preservation is needed as three-month preservation is ended, depreserve the aircraft and engine according to the regulations first, then carry out represervation. But consecutive three-month preservation can't be done more than twice.

(2) Depreservation.

- A. Drain away the inhibitory oil in the cylinders. Remove the spark plugs in the front row and drain plugs on the inlet pipes of No. 4, 5 and 6 cylinders, rotate the propellers to drain out the inhibitory oil, and suck out the inhibitory oil in No. 1, 2, 3, 7, 8 and 9 cylinders with an oil gun.
- B. Swab down the inhibitory oil on the exterior of the aircraft and engine.
- C. Remove the filter in the oil sump to drain away the inhibitory oil in the casing.
- D. Remove the spark plugs and carry out baking and testing.
- E. Remove the rear cover of the magneto, clean and check the interior.

WORK TO BE DONE FOR PRESERVATION AND DEPRESERVATION FOR SIX MONTHS

(1) Preservation.

- A. Renew the oil. Follow Item A for three-month preservation.
- B. Run the engine. Start the engine and run it at 1200-1400RPM for 15-20 minutes.
- C. Exhaust out the waste gas in the cylinders. Follow Item C for three-month preservation.
- D. Drain away the oil in the casing. After that, fill the casing fully with No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C from the front and rear vent holes. Rotate the propellers for 8-10 turns after filling grease, and let the inhibitory oil remain in the casing for 20 minutes, then drain it off completely.
- E. Preserve the cylinders.
When the piston is located at the bottom dead centre of expansion stroke, inject 200-300g No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C into each cylinder from the spark plug hole by means of a grease gun. Then, rotate the propellers for 2-3 turns. Finally, let the propellers stop at level position and again inject 200-300g No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C into each cylinder. The inhibitory oil should be uniformly injected onto the cylinder wall, the exhaust valve and the exhaust valve seat.
- F. Preserve the air compression pump.
Inject No.1 anti-rust grease heated to 15°-30°C or No.217 anti-rust grease heated to 35°-50°C into the air compression pump according to the method and requirement specified in Item D for three-month preservation.
- G. Preserve the gasoline pump.
Inject dewatered oil heated to 60°-80°C through the inlet of the gasoline pump while rotating the propellers till the oil flows out from the outlet of the gasoline pump.
- H. Preserve the carburetor.
 - a. Drain away the sediments in the fuel chamber.
 - b. Remove the upper drain plug on the fuel chamber, and make the throttle fully open, then inject oil heated to 100°-110°C from the oil filter of the carburetor with a pressure of not more than 0.5kg/cm². Simultaneously, take in compressed air at a pressure of 0.5kg/cm² from the air restricting jet to open the valve of the

fuel chamber. When the oil flows out from the upper drain plug hole, install the plug and continue injecting the oil till the oil flows out from the needle. After oiling, move the throttle for 2-3 times.

c. Remove the lower drain plug of the fuel chamber to drain off the oil.

I. Preserve the propeller shaft. Remove the propellers and clean the propeller shaft, the propeller hub spline and the rear conical washer, after that, coat them with No.217 anti-rust grease.

J. Blow off the sediments in the compressed air bottles and moisture in the retraction and extension pipes of the landing gears and flap, and the air inlet pipe of the compressed air solenoid valve.

K. Inject 5-10g castor oil or No.8 aviation oil into the retraction cylinders of landing gears and flap.

L. Disassemble and inspect the brake pressure regulator, compressed air solenoid valve, air filter and non-return valve according to the methods and requirements in periodic inspection.

M. Remove the wheel bearings and clean them with gasoline. After that, apply a coat of industrial vaseline.

N. Preserve the exterior of the aircraft and engine. Follow Item I for three-month preservation.

O. Dust talc powder onto the surfaces of rubberized-fabric hoses and the engine buffer washers and tyres.

P. Blank the vent holes and apertures. Follow Item J for three-month preservation.

Q. Preserve the signal gun. Clean and coat it with No.217 anti-rust grease.

R. Block the vent holes of the flap and landing gear valves with No.2 low-temperature grease.

NOTE: If continuous preservation is needed as six-month preservation is ended, usually depreserve the aircraft and engine, and carry out test flight, then carry out re-preservation in accordance with the regulations.

(2) Depreservation.

A. Drain away the inhibitory oil in the cylinders. Follow Item A for three-month depreservation.

B. Inject 7-8 litres oil heated to 80°-100°C into the casing through the front and rear vent holes of the casing, and rotate the propellers for 6-8 turns. 5-10 minutes later, remove the oil filter in the oil sump, drain off the oil in the casing and clean the filter of the oil sump.

C. When the piston is located at the bottom dead centre, inject 150-200g oil heated to 80°-100°C into each cylinder through the spark plug hole by means of an oil gun, then rotate the propellers for 6-8 turns.

D. Suck out the oil in No. 1, 2, 3, 7, 8 and 9 cylinders by means of an oil gun, then install the spark plugs.

E. Depreserve the gasoline pump.

Disconnect the pipe on the oil filter of the carburetor, then operate the hand pump, at the same time, rotate the propellers till clean gasoline flows out from the outlet of the pipe.

F. Depreserve the carburetor.

a. Remove and clean the oil filter of the carburetor and the idling air filter.

b. Remove the upper drain plug in the fuel chamber, and make the throttle fully open. Then operate the hand pump, and take in compressed air at a pressure of not more than 0.5kg/cm² from the ram pipe (or the air restricting jet) to open the valve of the fuel chamber and let the gasoline flow into the fuel chamber to wash off the oil there. Install the upper drain plug after clean gasoline flows out from the upper drain plug hole of the fuel chamber. Continue operating the hand pump and moving the throttle to clean the needle and the needle sleeve.

c. Remove the lower drain plug of the fuel chamber to drain away the gasoline.

G. Remove the spark plugs and carry out baking and testing.

H. Swab down the inhibitory oil on the exterior of the aircraft and engine.

I. Renew the degenerated lubricating grease in the control system.

J. Remove the wheel bearings and wash off the inhibitory oil. Then coat them with No.4 high-temperature grease.

K. Remove the propeller and wash off the inhibitory oil. After that, coat the propeller shaft, the propeller hub spline and the rear conical washer with fresh oil.

L. Remove the rear cover of the magneto, wash and inspect the interior.

DEPRESERVATION OF A NEW ENGINE

A. Depreserving a new engine generally should be carried out under the condition that the temperature is above 10°C.

B. Remove the oil filter in the oil sump, the blocks of the spark plug holes and the drain plugs of the air inlet duct of No. 4, 5 and 6 cylinders, drain away the inhibitory oil in the casing and cylinders. The propeller shaft should be rotated while draining.

C. Inject 7-8 lit. oil heated to 80°-100°C into the casing from the front and rear vent holes of the casing, and rotate the propeller shaft for 6-8 turns. 5-10 minutes later, remove the oil filter in the oil sump, drain off the oil in the casing and clean the oil filter.

D. When the piston is located at the bottom dead centre, fill 150-200g oil heated to 80°-100°C into each cylinder from the spark plug hole by means of an oil gun, then rotate the propellers for 6-8 turns.

E. Suck out the oil in No. 1, 2, 3, 7, 8 and 9 cylinders by means of an oil gun, then install the spark plugs.

F. Depreserve the gasoline pump. Follow Item E for six-month depreservation.

G. Depreserve the carburetor. Follow Item F for six-month depreservation.

H. Depreserve the magneto, remove the rear cover and clean out the inhibitory oil inside.

I. Wipe out the inhibitory oil on the exterior of the engine.

APPENDIX IV ENGINE REPLACEMENT AND THE WORK TO BE DONE AFTER ENGINE REPLACEMENT

(1) Engine removal.

A. Before removing the engine, it is necessary to:

a. Start the engine and run it at 1000-1200RPM for 15-20 minutes. Drain

off all the oil in the system after engine shut-down.

b. Chock the wheels well, support the tail part of the aircraft by means of a tail jack.

B. Remove the propellers, the nipple of the propeller shaft and the oil separation washer, and then install the hoisting ring.

C. Remove the flaps.

D. Disconnect the driving rods connecting the carburetor, the heater box and the speed regulator.

E. Disconnect the gasoline and the oil pipes connecting the engine, starting priming pipe and the residual fuel pipe of the gasoline pump.

F. Disconnect the pipes leading to the air compression pump and the starting compressed air distributor.

G. Disconnect the switch cable connecting the magneto.

H. Remove the baffles between No. 3 and 4, 6 and 7 cylinders.

I. Install the hoist as shown in Fig. 2 and sling the engine by means of a crane (the lifting weight is not less than 500kg). Then remove the connecting bolt of the slant stay rod and fuselage and lower down the engine.

J. Remove the slant stay rod and install the engine mounting. After that, fix the used engine on the stand in the engine box.

K. Remove the speed regulator bracket, the exhaust pipe and the heater box.

L. Wash the exterior of the engine thoroughly, then preserve it according to the contents for six-month preservation.

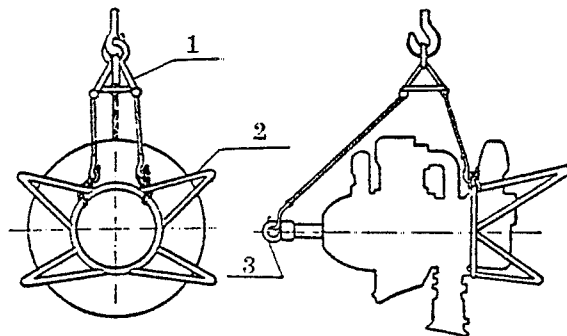


Fig. 2 Scheme of Installing the Engine Hoist

1. Hoist

2. Slant Stay Rod

3. Hoisting Ring

M. Wash and clean the oil tank, the oil cooler and the firewall oil filter.

(2) Engine installation.

A. Check out the engine log book and examine the accessory number.

B. Open the cover of the engine box, install the hoist as shown in Fig. 2, and sling the engine by means of a crane. Afterwards, remove the engine mounting and install the slant stay rod.

C. Lift the engine to the height required and install the connecting bolt of the slant stay rod and fuselage.

D. Install the disassembled components, pipes and cables. When installing the oil separation washer, the hole of the oil separation washer should be aligned with the big oil hole of the propeller shaft.

- E. After engine installation, it is necessary to:
 - a. Check the flexibility of all the control handles. Set the control handles at the front and rear limiting positions respectively, the control rockers should reach the limiting positions and the handles should be free from impacting the console.
 - b. Check the opening of the flaps. The opening of the flaps should be 55°-60° when the flaps are at the fully open position.
 - c. Fill the oil tank with fresh oil.
 - d. Recheck the removed components, pipes and cables for correct installation and reliable fixation; the gasoline and oil systems are free from leakage.
 - e. Engine test running. Perform it according to the regulations in Appendix II.
- II. And check whether the mixture ratio is normal.
 - (3) Work to be done after engine replacement.
 - A. Work to be done after the engine test running for the first time.
 - a. Remove the oil filter in the oil sump and check whether there are metal chips.
 - b. Check the gasoline and oil systems and the accessories for leakage.
 - c. Wash and check the oil filter of the carburetor.
 - d. Check the connection and fixation of the driving rods and control rockers.
 - B. Work to be done after test flight.
 - a. Check the gasoline and oil systems and the accessories for leakage.
 - b. Check the connection and fixation of the engine driving rods and control rockers.
 - c. Solicit opinions from the pilots and remove the troubles discovered.
 - C. Work to be done after the engine air running.
 - a. Accomplish the work to be done after the engine test running for the first time.
 - b. Renew the oil. Drain off the oil from the firewall oil filter, oil cooler and oil sump of the oil system and check for metal chips. After that, fill the oil tank with fresh oil.
 - c. Clean and check the oil pump, speed regulator and firewall oil filter.
 - d. Clean and check the idling air filter of the carburetor.
 - e. Tighten the thrust bearing nut of the engine.
 - f. Check the engine for connection and fixation.
 - g. Remove the rear cover of the magneto to clean and check the breaker mechanism and distributor mechanism.
 - h. Check the two-stage valve of the air compression pump for fixation and safety condition.

APPENDIX V DILUTING AND HEATING

(1) Oil diluting.

When the ambient temperature is below 5°C, it is necessary to carry out oil diluting after flight.

A. The method of oil diluting.

a. Start the engine. When the oil temperature is 30°-50°C and the engine speed is 1600RPM, turn on the starting switch first, then the oil dilution switch. For the time of turning on the oil dilution switch refer to the following table.

The Engine Working Time since the Last Dilution (minutes)	Oil Quantity in the Tank (litres)		
	15	12	9
	Time of Turning on the Oil Dilution Switch (minutes—seconds)		
0—15	1—43	1—28	1—14
15—30	2—44	2—21	1—57
30—45	3—27	2—58	2—29
45—60	3—41	3—17	2—46
Undiluted oil	4—36	4—47	3—10

b. After turning off the oil dilution switch, run the engine continuously at 1600RPM for 3 minutes, at the same time, manipulate the pitch control lever for 2-3 times, and then stop the engine. Check the oil quantity.

During oil diluting, the cylinder head temperature should not be above 160°C and the oil temperature not be above 50°C.

B. The characteristics for the engine to use the diluted oil:

a. When the oil temperature is not lower than 20°C and the cylinder head temperature not lower than 120°C, the engine warming up will be over.

b. The oil pressure at the initial of the engine operation is allowed to be less than the normal oil pressure by 1kg/cm², but it should resume normal pressure after operating for 20-30 minutes.

c. If the oil pressure is lower than 1.5kg/cm² as the engine is operating at idle, shut down the engine immediately and investigate the reason. If the oil is overdiluted, renew all the oil in the system.

NOTE: When the ambient temperature is below -20°C, it is necessary to drain off the oil in the oil tank, oil cooler and oil sump after flight; before starting the engine, it is necessary to fill the oil tank with oil heated to 40°-60°C and inject oil heated to 40°-60°C into the casing from the front and rear vent holes of the casing.

(2) Engine heating.

A. When the ambient temperature is below 0°C, it is necessary to have the engine heated before starting. The oil cooler should be heated as well when the ambient temperature is below -20°C.

B. Heat the engine by means of heating equipment until the cylinder head temperature reaches 20°-30°C.

C. The following regulations must be observed in engine heating:

a. The heating equipment and heating pipes should keep a certain distance from the aircraft wheels, gasoline pipes and oil pipes during heating.

b. The hot air temperature at the outlet of the heating pipe should not be higher than 180°C (the hot air temperature should not be higher than 100°C for the oil cooler heating).

c. When heating the engine, put the cotton padded fabric over the engine. The metal heating pipe is not allowed to get near to the cotton padded fabric without heat insulation.

d. It is forbidden to add fuel to the heating equipment when it is operating.

e. Fire extinguishing equipment must be available when heating the engine.

APPENDIX VI THE STARTING COMPRESSED AIR DISTRIBUTOR MOUNTING AND ADJUSTING

(1) Depreserve the starting compressed-air distributor.

A. Immerse the starting compressed-air distributor into gasoline, remove the cover of the distributor and get rid of the inhibitory oil on the inner and outer surfaces of the components.

B. Clean the surfaces of the components, and coat the friction surfaces with oil.

(2) Find out the top dead centre of the compression stroke of No. 4 cylinder by means of a top-dead-centre-indicator and a timer, then rotate the propellers clockwise over the top dead centre by 9.5° (according to the rotation angle of the propeller).

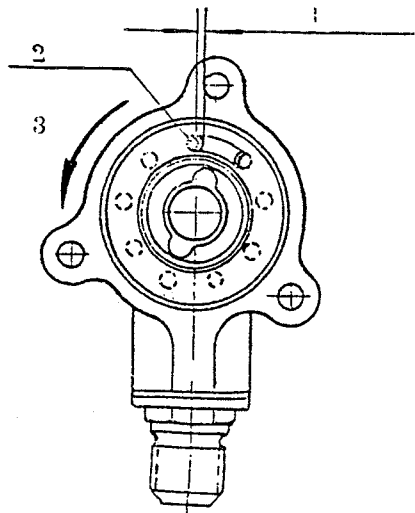


Fig. 3 Adjustment of the Starting Compressed-air Distributor

1. Not more than 0.1mm 3. Rotating Direction
2. To No. 4 Cylinder

(3) Turn the distributing valve in the rotating direction, when the exposure of the hole leading to No. 4 cylinder is not more than 0.1mm (Fig. 3), fix the distributing valve by means of the fixture of the starting compressed-air distributor.

Install the gasket and fix the cover assembly of the distributor on the casing, then take the fixture away. The position of the shaft sleeve should be adjusted if the installation failed.

(4) Connect the starting pipes leading to the cylinders onto the cover of the distributor.

(5) Start the engine to check the operation of the starting compressed-air distributor.

APPENDIX VII THE MAGNETO MOUNTING AND ADJUSTING

(1) Magneto mounting.

Marked Degrees on the Magneto Casing (Automatic Ignition Advance Angle)	Mounting Angle of the Magneto (Propeller Shaft Rotation Angle)
23°	$8.3^{\circ} \pm 0.7^{\circ}$
23.5°	$7.9^{\circ} \pm 0.7^{\circ}$
24°	$7.6^{\circ} \pm 0.7^{\circ}$
24.5°	$7.2^{\circ} \pm 0.7^{\circ}$
25°	$6.9^{\circ} \pm 0.7^{\circ}$
25.5°	$6.5^{\circ} \pm 0.7^{\circ}$
26°	$6.2^{\circ} \pm 0.7^{\circ}$
26.5°	$5.8^{\circ} \pm 0.7^{\circ}$
27°	$5.5^{\circ} \pm 0.7^{\circ}$

A. Find out the top dead centre of compression stroke of No. 4 cylinder by means of a top-dead-centre-indicator and a timer.

B. According to the marked degrees on the magneto casing (automatic ignition advance angle), check out the corresponding magneto mounting angle from the above table, and mark it on the timer. After that, rotate the propellers 50°-60° counter-clockwise, then rotate the propellers clockwise till the pointer of the timer indicates the marked degrees.

C. Make the operating electrode of the distributor brush align with the marking line on the casing, then install the magneto on the engine.

(2) Adjustment of the mounting angle. If the mounting angle is not correct, it can be adjusted according to the following methods:

A. When the mounting angle error is small, it may be adjusted by means of rotating the magneto. Rotate the magneto clockwise, the mounting angle will decrease and vice versa.

When the magneto is rotated from one limiting position to another, the mounting angle will change approximately 4° (rotation angle of propeller shaft).

B. If the mounting angle error is big, it may be adjusted by means of rotating the adjusting bolt of the shaft sleeve. Rotate the adjusting bolt clockwise, the mounting angle will increase, and vice versa.

One turn of the adjusting bolt of the shaft sleeve will make the mounting angle change about 2.3° (rotation angle of propeller shaft).

Before adjusting the shaft sleeve, it is necessary to loosen the fixing bolt and the adjusting bolt of the shaft sleeve. After adjusting, tighten the adjusting bolt first and then the fixing bolt.

(3) After mounting the magneto or adjusting the mounting angle, it is necessary to:

A. Recheck the mounting angle for correctness.

B. Measure the clearance between the magneto and the slant stay rod, which should not be less than 4mm.

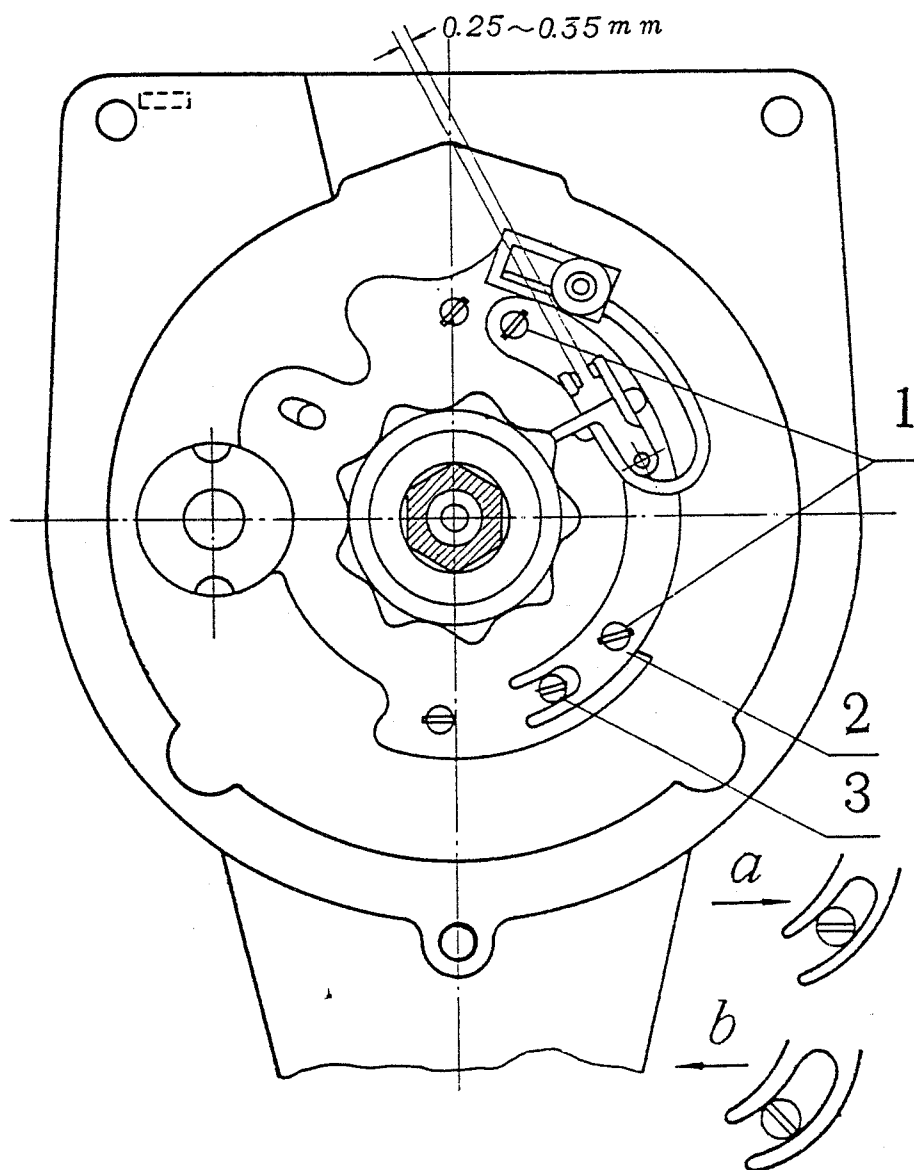


Fig. 4 Clearance Adjustment of the Breaker Contact Points

a. Clearance Decreasing

b. Clearance Increasing

NOTE: When the automatic ignition advance angles of the two magnetoes are equal, conformity of the contact points opening of the breaker should also be checked. In checking, insert feelers of 0.03mm into between the breaker contact points of the two magnetoes, rotate the propellers 15-20° counter-clockwise, then turn the propellers clockwise, as the breaker contact points of the two magnetoes begin to open, the two feelers could be drawn out at the same time.

- (4) Adjustment of the clearance of the breaker contact points of the magneto.
 - A. Loosen the two fixing screws "1" for fixing adjusting plate "2" (Fig. 4), turn the eccentric screw "3", when the cam is at the highest position, adjust the clearance of the contact points to 0.25-0.35mm. Fix and wire-lock the fixing screws "1" of the adjusting plate.
 - B. The breaker contact points should be kept clean.
- (5) After mounting and adjusting the magneto, it is necessary to run the engine to check the magneto for operation.

APPENDIX VIII THE CARBURETOR MOUNTING AND ADJUSTING

- (1) The carburetor mounting.
 - A. Check that the wire-locking and lead sealing of the carburetor are intact, the mounting face clean and free from scratch and dent. The throttle and altitude rocker should open and close freely and fully. And wipe off the inhibitory oil on the outer surface of the carburetor.
 - B. Clean and check the mounting face of the engine carburetor, if there are damaged nicks, grind it with oil stone.
 - C. Put a rubber-asbestos gasket between the mounting faces of the carburetor and engine.
 - D. Install the carburetor on the engine, put the locking washer on the fixing bolt, tighten the four fixing nuts and lock them.
 - E. Install the throttle and the altitude control lever and check its movable range for normality.
 - F. Clean the carburetor filter.
 - G. Install the pipe. In installing, it is necessary to fit the filter first, then install the pipe and manipulate the hand pump so as to discharge the air in the pipe. After installing the filter and the pipe, operate the hand pump to check for tightness.
- (2) Depreservation and inspection of the carburetor.
 - A. Remove and clean the idling air filter.
 - B. Remove the upper drain plug in the fuel chamber and make the throttle fully open. Then operate the hand pump to take in compressed-air at a pressure of not more than 0.5kg/cm² from the ram pipe (or the air restricting jet) to open the fuel chamber valve and let the gasoline flow into the fuel chamber to wash the oil off. As the clean gasoline flows out from the upper drain plug hole of the fuel chamber, put on the upper drain plug. Continue pumping the hand pump and moving the throttle so as to wash the needle and the needle sleeve.
 - C. Remove the lower drain plug of the fuel chamber to drain off the gasoline.
 - D. Install the carburetor heating box and heating pipe.

E. Run the engine to check the operation of the carburetor under various regimes.

(3) The carburetor adjusting.

A. Idling adjustment.

a. The idling mixture ratio may be adjusted by means of the idling needle (Fig.5).

When the idling needle is turned clockwise, the fuel-air mixture will become lean and vice versa.

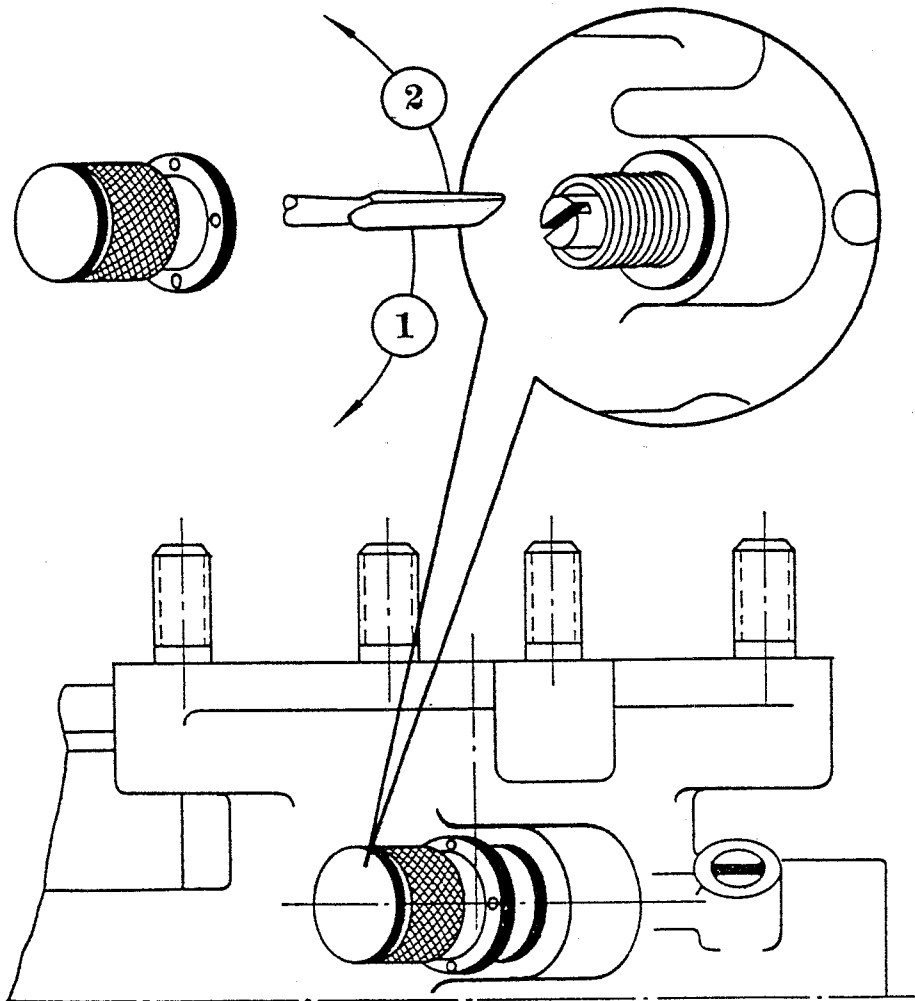


Fig. 5 Scheme of Adjusting the Idling Mixture Ratio

1. Lean 2. Rich

b. The idling speed can be adjusted by varying the opening of the throttle with the help of idling stop screw (Fig. 6).

Turning the stop screw clockwise increases the opening of the throttle and the RPM, and vice versa.

c. When the engine is operating at 500 ± 50 RPM without vibration, sonic "boom" and black smoke, it proves that the idling is well adjusted.

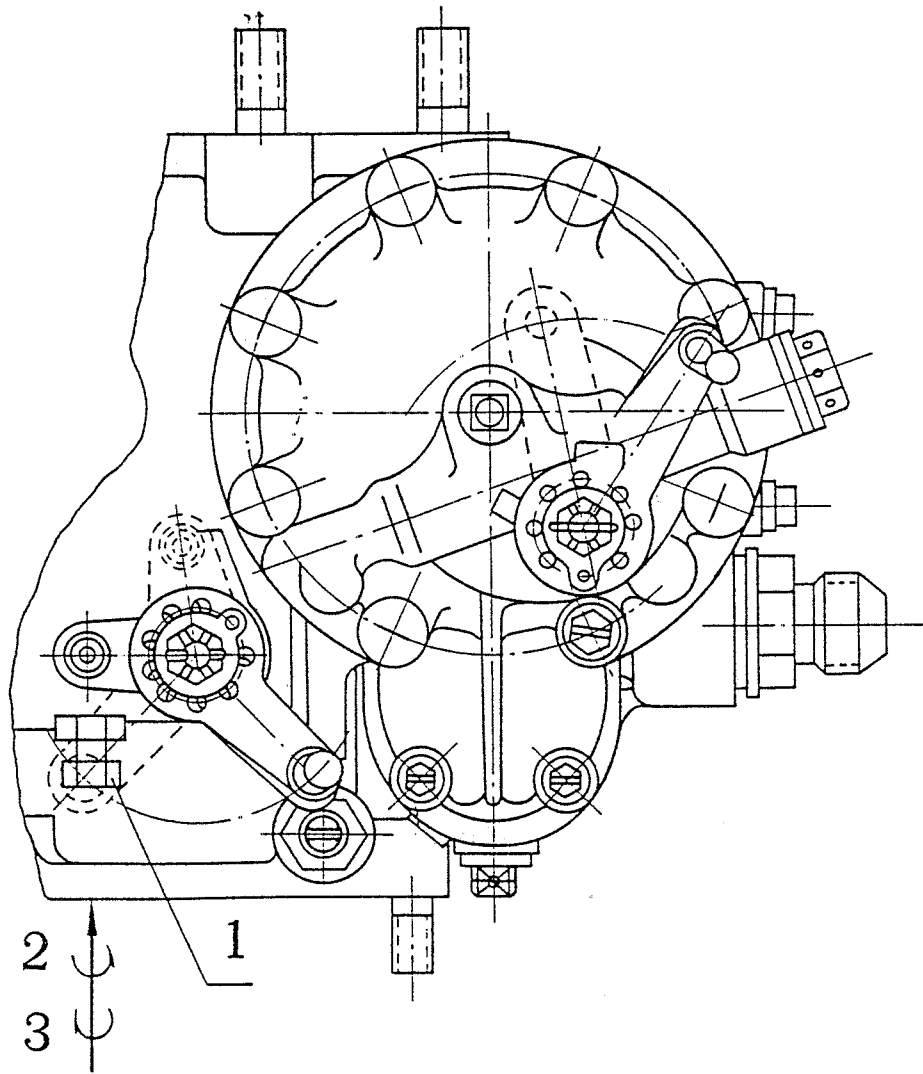


Fig. 6 Scheme of Adjusting the Idling Speed

- 1. Idling-stop Screw
- 2 RPM Increasing
- 3. RPM decreasing

B. Adjustment of the cruising regime.

a. The fuel-air mixture ratio of the cruising regime can be adjusted by means of the main needle (Fig. 7).

When the adjusting screw of the main needle is turned clockwise, the mixture will become lean, and vice versa.

When the adjusting screw of the main needle rotates for one graduation, the fuel consumption will change approximately 5-7g/hp-hr. The adjusting range of the adjusting screw of the main needle usually is two graduations for clockwise or counter-clockwise turning respectively from the position set by the engine plant. If the turning of the adjusting screw for two graduations is still not satisfactory, replace the air restricting jet.

b. After cruising regime adjusting, it is necessary to check the idling, because the change of the main needle position would influence the idling operation of the engine.

C. Adjustment of the rated and take-off regime.

a. The mixture ratio of the rated and take-off regimes may be adjusted by changing the air restricting jet with different aperture (Fig. 8).

When the aperture of air restricting jet increases, the fuel-air mixture will become lean, and vice versa.

A change of 0.1mm in the aperture of the air restricting jet will cause a change about 10g/hp-hr in the fuel consumption.

b. The operation in cruising regime and idling should be checked after air restricting jet replacement.

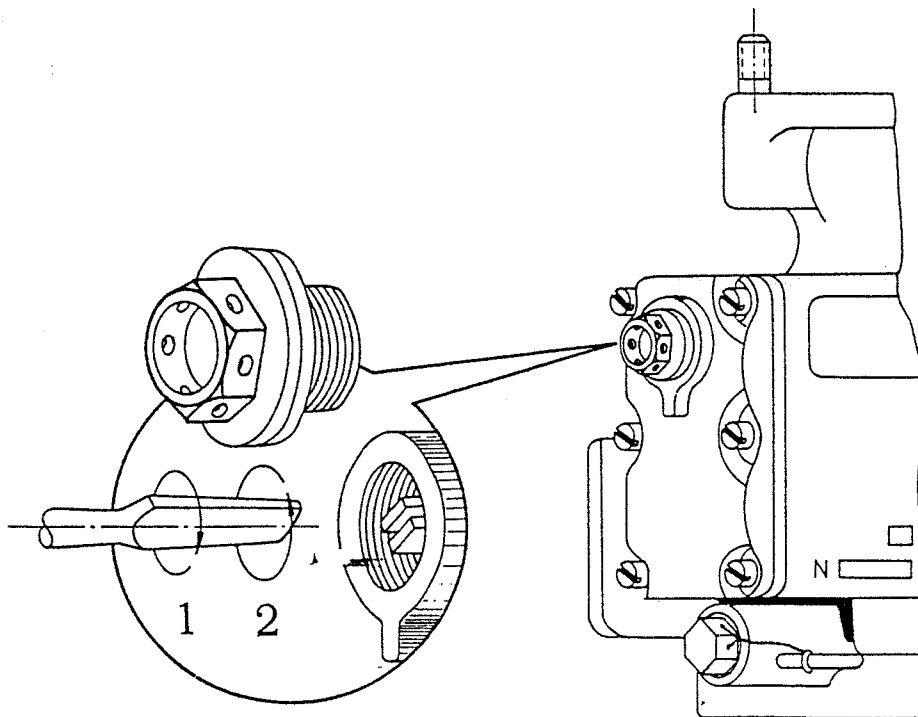


Fig. 7 Scheme of Adjusting the Main Needle

1. Lean 2. Rich

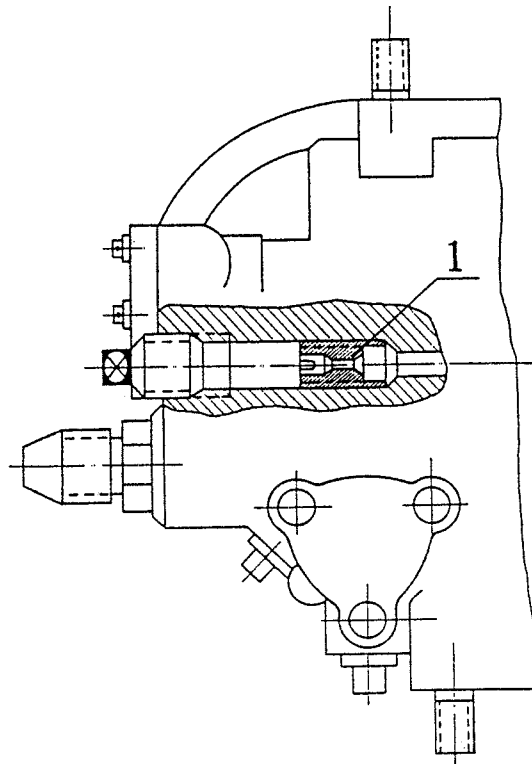


Fig. 8 Scheme of Replacing the Air Restricting Jet

1. Air Restricting Jet

APPENDIX IX THE SPEED REGULATOR MOUNTING AND ADJUSTING

(1) The speed regulator mounting.

A. Depreserve the speed regulator: Wipe off the inhibitory oil on the outer surface.

B. Clean and check the mounting face, the centring cylinder face, the driving shaft and the shaft tail spline of the speed regulator. Grind the damaged nicks with oil stone if there are.

C. Put a rubber-asbestos pad between the speed regulator and the casing mounting face.

D. Install the speed regulator on the engine, put the washer on the fixing bolt, mount the bracket of the speed regulator and tighten the four fixing nuts.

(2) The speed regulator adjusting.

A. Turn the control shaft of the speed regulator to the high pitch limit position (facing the speed regulator, turn it fully clockwise to the end). Then turn back 60° (Fig. 9, A,B).

B. Move the high pitch limiting screw 15mm out from the centre and fix it.

C. Make the rocker with spline lean against the high limiting screw tightly and engage with the control shaft of the speed regulator (Fig. 9 C).

- D. Turn the rocker with spline 60° counter-clockwise. Then adjust the low pitch limiting screw and make it press against the rocker (Fig. 9 D).
 E. Set the pitch control lever in the cockpit at "LOW PITCH" position.
 F. Adjust the length of the control rod and fix it on the rocker with spline.

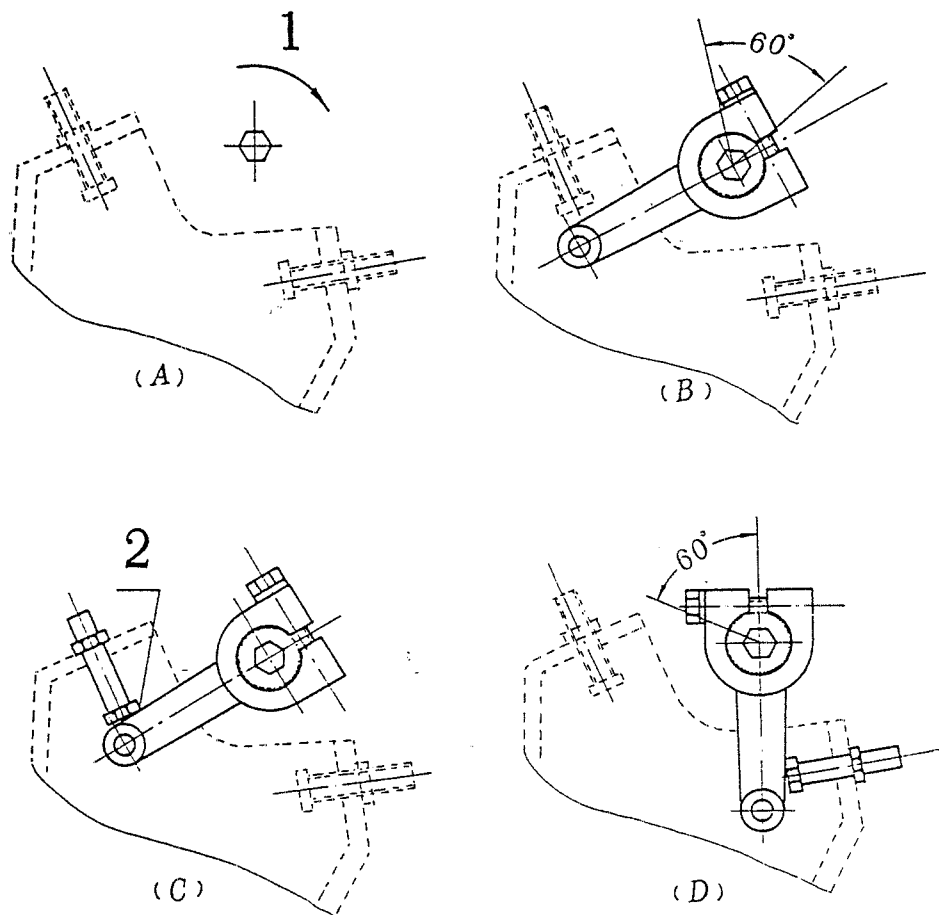


Fig. 9 The Mounting Order of the Rocker of Speed Regulator

1. Screwing to the End

2. Pressing Tightly

G. Check the control system. There should be no moving clearance, blind angle and stagnation between the limiting pins from "LOW PITCH" to "HIGH PITCH".

H. Run the engine to check for the operating condition of speed regulator.

The engine speed should reach 2350 ± 20 RPM when the throttle is fully open and the pitch control lever is set at "LOW PITCH" position.

In rated regime, gently pull the pitch control lever to "HIGH PITCH" position, the speed should decrease to 1350-1450 RPM when Type J2-G1 propeller is used, the speed should be 1500-1600 RPM for Type J9-G1 propeller.

Gradually retard the throttle, make the manifold pressure decrease 100-150 mm mercury column, at this moment the speed should keep constant.

I. When the operation of the speed regulator failed to meet the above requirements, adjust the position of the rocker on the spline shaft and the limiting screws of the high and low pitches.

The spline shaft in relation to the rocker moves one tooth of the gear, the speed will change about 100RPM. And one turn of the high pitch limiting screw will make the speed change about 40 RPM, whereas one turn of the low pitch limiting screw will vary about 20 RPM.

APPENDIX X REPLACEMENT OF THE CYLINDER, PISTON AND PISTON RING, AND ENGINE RUNNING

- (1) Replace the cylinder.
 - A. Remove the cylinder.
 - a. Remove a section of the exhaust collector which obstructs the cylinder disassembly.
 - b. Remove the air inlet pipe. Blank the mounting hole of the air inlet pipe on the casing.
 - c. Remove the cylinder baffle, the spark plugs and the fixing nut of the starting pipe.
 - d. Loosen the nut of the push-rod sleeve.
 - e. Make the piston stop at the top dead centre by rotating the propellers.
 - f. Unscrew the cylinder fixing nut and the locking gasket.
 - g. Remove the cylinder. Hold the piston and the link in cylinder removal.

CAUTION:

- A. The oil pump should be removed before the removing of No. 5 and 6 cylinders.
- B. Take care not to let the rod and the tappet rod head and the tappet rod spring fall down when removing underside cylinders.
- C. In order to prevent the piston rings of No. 9 and other cylinders from coming out from the cylinder skirts due to the main link inclining from the vertical position after removing No. 4 cylinder, it is not allowed to rotate the propellers after the removal of No. 4 cylinder.
- D. When a Type — 6A Piston Aeroengine of the six batch or a Type —6A Piston Aeroengine is going to replace its rubber—asbestos pad at the joining face of the tappet rod guide sleeve of the air inlet and exhaust valves and the intermediate casing, the valves should be in fully open position so as to prevent the tappet rod and pulley from dropping into the casing.

- B. Install the cylinder.
 - a. Oil the piston and the inner wall of the cylinder, put the piston ring notches at different positions and a rubber seal ring coated with yellow sealant and a paper gasket on the cylinder skirt (the cylinder mounting face of the intermediate casing which is not treated with shot cleaning is allowed not to fit paper gasket).
 - b. Clamp the piston ring with the piston ring clamping belt and install it into the cylinder.

- c. The fourth cylinder should be installed first if removed.
- d. Put on the locking washer (the washer with bending lugs should be installed together with the small screw), tighten the fixing nut diagonally and uniformly and lock them.
- e. Tighten the push rod sleeve nut and lock it.
- f. Install the starting pipe and fix it.
- g. In installing the air inlet pipe, screw the cap nut of the air inlet pipe of the casing first (attention not to let the sealing rubber ring be squeezed into the casing), tighten the nut at the joint of the air inlet pipe and the cylinder head and finally the cap nut.
- h. Install the baffle. Install the baffle clamping plate between the seventh and eighth cooling fins of the cylinder (counting upward from the cylinder mounting seat). If the bolt is not aligned with the centre line of the hole, the position of the baffle clamping plate may be moved into between the seventh and eleventh cooling fins, but the baffle clamping plate should be placed between the same cooling fins of the adjacent cylinder.
- i. Install the exhaust pipe and lock it.
- j. Adjust the clearance between the rocker pulley and the air valve lever.
- k. The clearance between the cylinder and the piston:

Measurement Position	Minimum (mm)	Maximum (mm)
Near to the First Piston Ring Groove	0.87	0.965
Near to the Second Piston Ring Groove	0.72	0.815
Near to the Third Piston Ring Groove	0.33	0.525

(2) Replace the piston.

A. Press by hand or tap the piston pin with a punch through the hole of the rear blockage to force the piston pin and the front blockage out from the hole of the piston pin (for the rear blockage of the piston pin is closely matched with the piston pin hole, it therefore should not be taken out in piston replacement).

B. The weight of the installed piston (engraved on the top surface of the piston) should be identical with that of the replaced one, but difference is allowed not to exceed 5 grams.

C. Smear clean oil in the link pin hole, the piston pin hole and on the surface of the piston pin and the blockage, then install the piston (be careful that the spherical surface end of the piston pin blockage should be outward).

D. Smear clean oil on the side surface of the piston, put the notches of the piston rings at different positions (Fig. 10, 11), then install them into the cylinder.

NOTE: The piston, the top of which is marked with "P", is enlarged one in dimension, it only suits the enlarged cylinder in dimension.

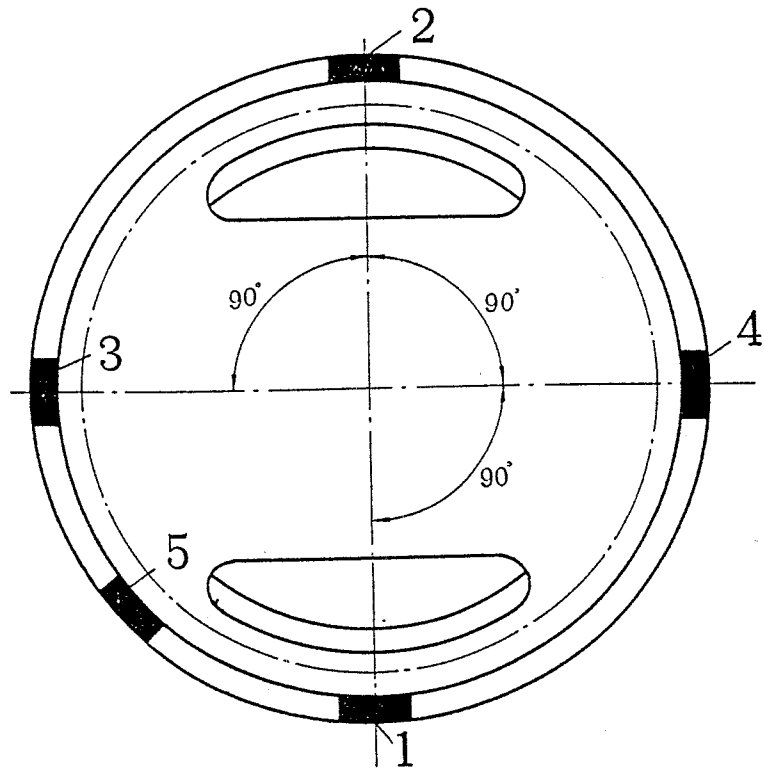


Fig. 10 Scheme of Piston Ring Notch Position of Type-6A Piston Engine

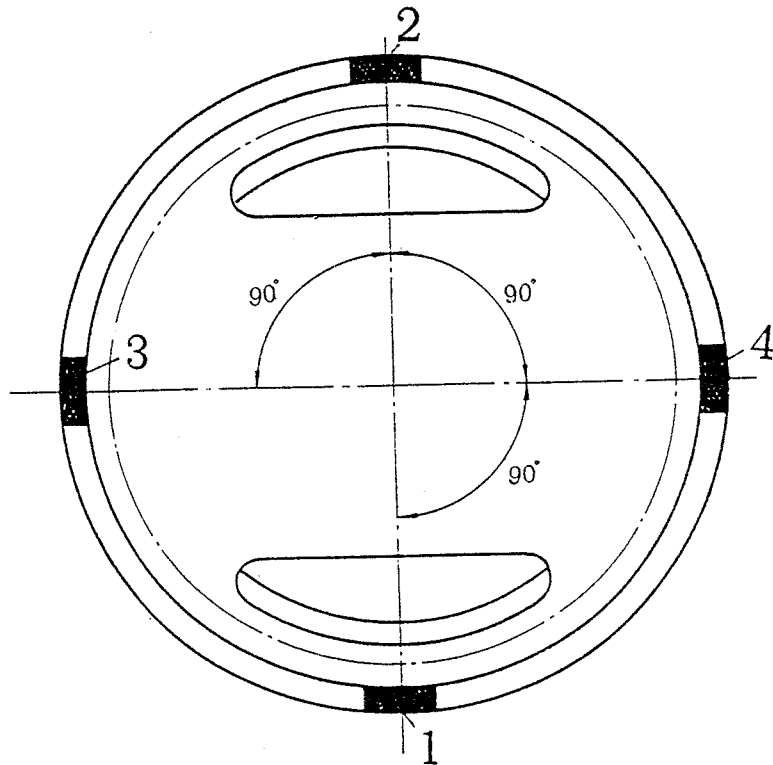


Fig. 11 Scheme of Piston Ring Notch Position of Type-6 Piston Engine

(3) Replace the piston ring.

A. Get rid of the carbon deposit on the top surface of the piston and in the piston ring groove.

B. Depreserve the piston ring: Wipe out the inhibitory oil on the piston ring surface and check that the surface is free from dent and sand-hole.

C. Install the piston ring: The trapezoid sealing piston ring with chromium plating should be installed in the first and second grooves of the piston ring. For the modified piston, install two channel shaped scraper rings in the third groove (install only one "U"-shaped scraper ring in the original position). Install the conical scraper ring in the fourth groove, its conic top (marked with "UP") should face the piston top (Fig. 12, 13).

NOTE: The piston ring, the side surface of which is marked with "P", is enlarged one in dimension, it only suits the enlarged piston in dimension.

D. The clearance and mounting position of the modified ring of Type-6A piston aeroengine:

Piston Ring	Notch Position	Notch Clearance (mm)	Side Clearance (mm)
First	Aligning with the air inlet valve	0.95-1.05	0.085-0.175
Second	180° interval with the first	0.95-1.05	0.085-0.175
Third	90° interval with the second	0.65-0.75	0.07-0.14
Fourth	180° interval with the third	0.65-0.75	0.07-0.14
Fifth	150° interval with the fourth	0.4-0.5	0.105-0.16

E. The clearance and mounting position of the original piston ring of Type-6 piston aeroengine:

Piston Ring	Notch Position	Notch Clearance (mm)	Side Clearance (mm)
First	Aligning with the air inlet valve	0.95-1.05	0.095-0.175
Second	180° interval with the first	0.95-1.05	0.095-0.175
Third	90° interval with the second	0.6-0.7	0.07-0.12
Fourth	180° interval with the third	0.3-0.4	0.105-0.16

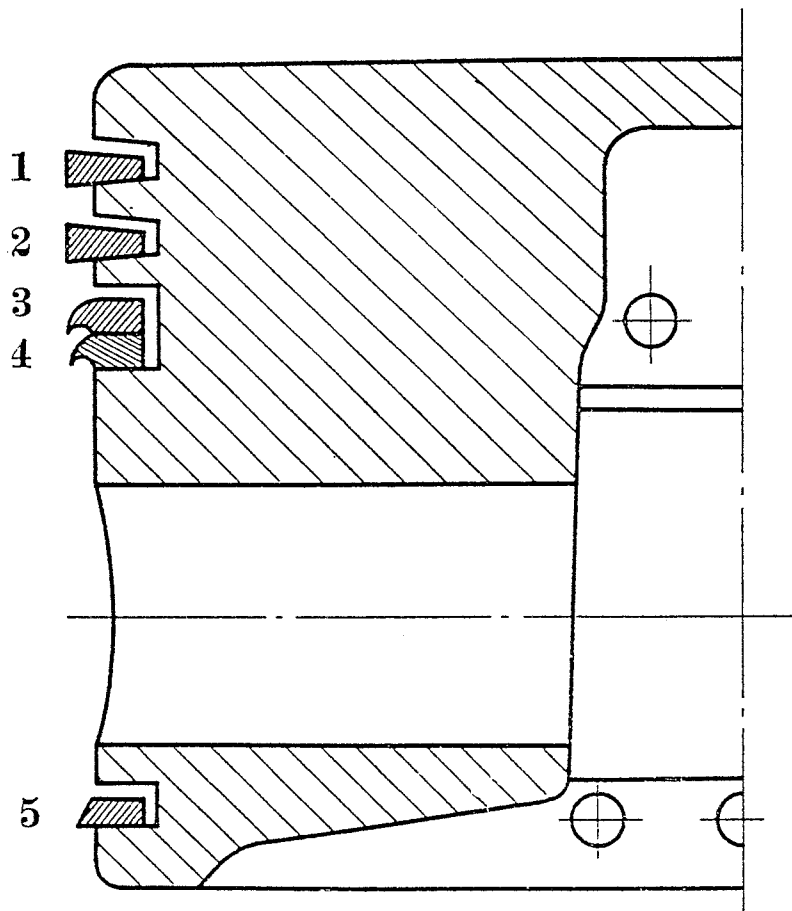


Fig. 12 Mounting Scheme of the Piston Ring of Type-6A Piston Engine

1, 2. Sealing Piston Rings with Chromium Plating

3, 4. Channel-shaped Scraper Rings

5. Conical Scraper Ring

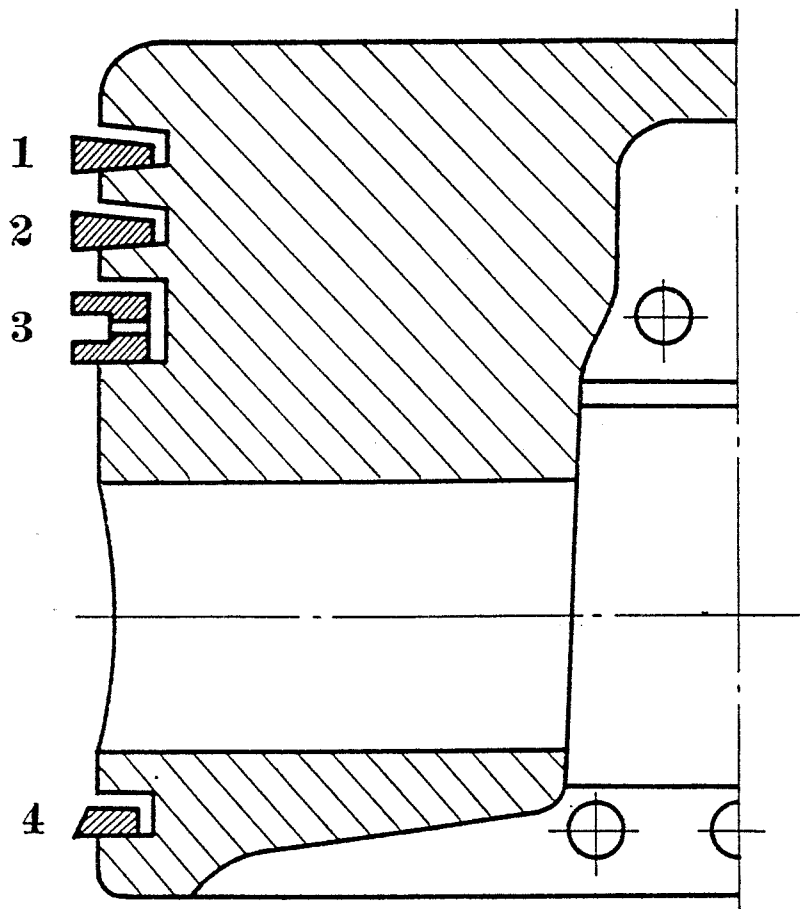


Fig. 13 Mounting Scheme of the Piston Ring of Type-6 Piston Engine

1, 2. Trapezoid Sealing Piston Rings
 3. U-shaped Scraper Ring

4. Conical Scraper Ring

END