AIRCRAFT COMPOSITE STRUCTURES
DEVELOPMENT AND PRODUCTION LTD.

SAILPLANE MAINTENANCE MANUAL

Model: **B1-PW-5**

Serial No:

Year of manufacture:

Registration:

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This sailplane is to be operated in compliance with information and limitations contained herein and good aeronautical practice principles.

The English translation has been made to the best of our knowledge and belief, but in case of uncertainty the Polish original is authoritative.

0.1 RECORD OF REVISIONS

Any revision of the present Manual must be recorded in the following table. A black vertical line in the left-hand margin and the Revision No will indicate the new or amended text in the revised page, and the date will be shown on the bottom left hand corner of the page.

Rev. No	Affected section	Affected pages	Date of issue	Approval	Date of approval	Date of insertion	Signature

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0.3 TABLE OF CONTENTS

SECTION 1

GENERAL

1.1 INTRODUCTION

This Maintenance Manual has been prepared to provide pilots, instructors and mechanics all necessary information for the safe and efficient servicing of the B1-PW-5 sailplane.
This Manual includes the material required by the JAR-22 Airworthiness Requirements and supplementary information supplied by the sailplane manufacturer.

1.2 CERTIFICATION BASIS

This type of sailplane has been approved by Civil Aircraft Inspection Board in accordance with Joint Airworthiness Requirements JAR-22 issue 28 October 1995 with Change 5

The Type Certificate No **BG-214** has been issued on 12 June 2001, category of airworthiness "U" (utility).

1.3 WARNINGS, CAUTIONS, NOTES

WARNING:

MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO AN IMMEDIATE OR IMPORTANT DEGRADATION OF THE FLIGHT SAFETY.

CAUTION:

MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO A MINOR OR TO A MORE OR LESS LONG TERM DEGRADATION OF THE FLIGHT SAFETY.

NOTE:

Draws the attention on any special item not directly related to safety, but which is important or unusual.

1.4 DESCRIPTION

BASIC DATA

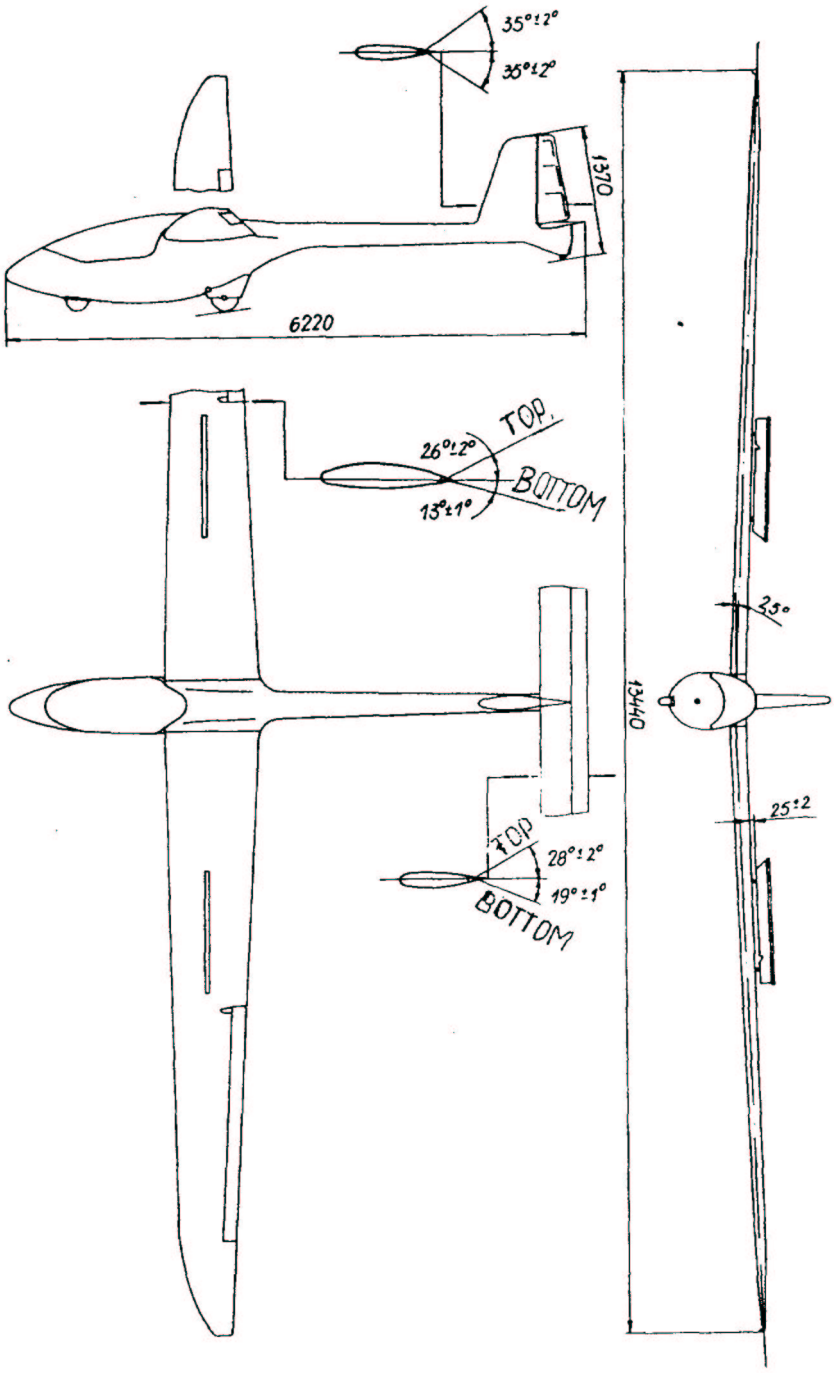
wing span …….13.44 m = 44 ft 1 in
length……. 6.22 m = 20 ft 5 in
height ……... 1.86 m = 6 ft 1 in
wing area ……10.16 m^2 = 109.4 ft^2
aspect ratio ……17.8
wing loading…….29.5 kg/m^2 = 6.05 lb/ft^2
Mean Aerodynamic Chord (MAC)……..… 0.798 m = 31 $^7/_{16}$ in

SAILPLANE DESCRIPTION

B1-PW-5 is the single-seat sailplane with the cantilever mid-wing and standard tailplane arrangement. The structure is all glass-epoxy composite.
The wings are of trapeze contour with bow-shaped tips. The wing employs the monospar structure with sandwich shells.
The plate air brake extends on the upper wing surface only.
The fuselage shells are of monocoque structure, stiffened with frames.
Rudder is fabric covered.
The pilot's cockpit is equipped with in flight adjustable pedals and back rest adjustable on ground. The canopy opens forwards.
The fixed landing gear consists of the main wheel with shock absorber and drum brake, a nose wheel and a tailskid with small wheel. Small wheels are also attached on the wing tips.
Sailplane is equipped with:

- two take-off hooks (nose hook for aerotowing and C.G. hook for winch-launching),
- special ballast (placed in special ballast bay under the pilot's seat) and tail ballast (placed in tail ballast bay under the tailplane),
- K-1 probe in the fin providing compensated pressure to the instruments (e.g. total energy variometer, flight computer).

1.5 TREE-VIEW DRAWING



all dimensions in mm

B1-PW-5 sailplane
Fig. 1-1

1.6 ABBREVIATIONS

A - ampere
Ah - ampere-hour
8C - degree of Celsius
C.G. - centre of gravity
cm - centimetre
daN - decanewton
ft - foot
g - gram
h - hour
in - inch
kg - kilogram
kG - kilogram-force
km - kilometre
kt - knot
lb - pound
lbf - pound-force
m - meter
MAC - mean aerodynamic chord
mm - millimetre
MPa - mega Pascal
V - volt

SECTION 2

SAILPLANE DESCRIPTION

2.1 INTRODUCTION

Section 2 contains the description of the sailplane and its systems, equipment, list of placards and markings with their location as well as the assembly data necessary for the proper operation of the sailplane.
The data concerning equipment other than provided in standard sailplane are contained in Section 9 of this Manual.

2.2 DESIGN

2.1.1 WINGS

The wings have the trapeze contour with the bow-shaped tip leading edge. The NN 18-17 laminar profile is constant along the span. The singular spar is of double - T shape in the wing part and of box type in the bayonet portion. The spar caps are made of glass roving. The wing spar bayonets are situated not symmetrically (the right-hand is before the left-hand one). The wing shells are of sandwich type. On the lower wing surface two inspection holes covered with the plates fastened with screws allow for control systems inspection. The anchoring hole is located in the wing tip.

AILERON

Slottless aileron is mass balanced. Suspended on five hinges. On the inner rib the lever for the control system connection is installed. The monocoque aileron shells are stiffened with a web.

AIR BRAKE

The duralumin sheet air brake plate suspended on two arms is extended on the upper surface only. It contains a cap spring loaded to fit the wing contour when retracted.

2.2.2 TAILPLANE

The tailplane consists of the stabilizer with a single spar and elevator. The monocoque shells of both are stiffened with ribs. On the elevator trailing edge a fixed trimming tab is installed.

2.2.3 FUSELAGE

The fuselage is integral with fin. Monocoque shells are stiffened with frames. The cockpit is covered by one - piece canopy opened forwards. The opened position is aided with a gas spring. On the fuselage top the inspection hole enables the rigging. On the tailskid a hole for anchoring is provided.

2.2.4 RUDDER

The rudder mass-balanced, fabric covered is suspended on two hinges.

2.2.5 LANDING GEAR

Nose Wheel:
The nose wheel 4" 85-17 uses the 260x85 Aero 6 PR tire.
Tire pressure: 0.2 MPa = 29 psi.

Main Wheel:
The main wheel 4" Liliput uses the 4.00-4 Aero 6 PR tire. It is suspended on an articulated arm with shock absorber made of rubber rings. The drum brake is mechanically controlled. The wheel is located behind the sailplane C.G. Tire pressure is: 0.35 MPa = 51 psi.

Tailskid:
The tailskid is equipped with a small wheel that has a solid rubber tire.

2.2.6 SPECIAL BALLAST

Special ballast consists of eight, painted red, leaden weights numbered from 1 to 8. The weights fit in special ballast bays under the pilot's seat. The special ballast bay is accessed by removing the cover (see item 3.5.9 of this Manual).
Weights with numbers 1, 2, 3, 4, 5, 6 and 8 each have a mass of $6^{-0.3}$ kg = $13.2^{-0.7}$ lb; weight number 7 has a mass of $5{,}4^{-0.3}$ kg = $11.9^{-0.7}$ lb.

Every weight has marks as follows:

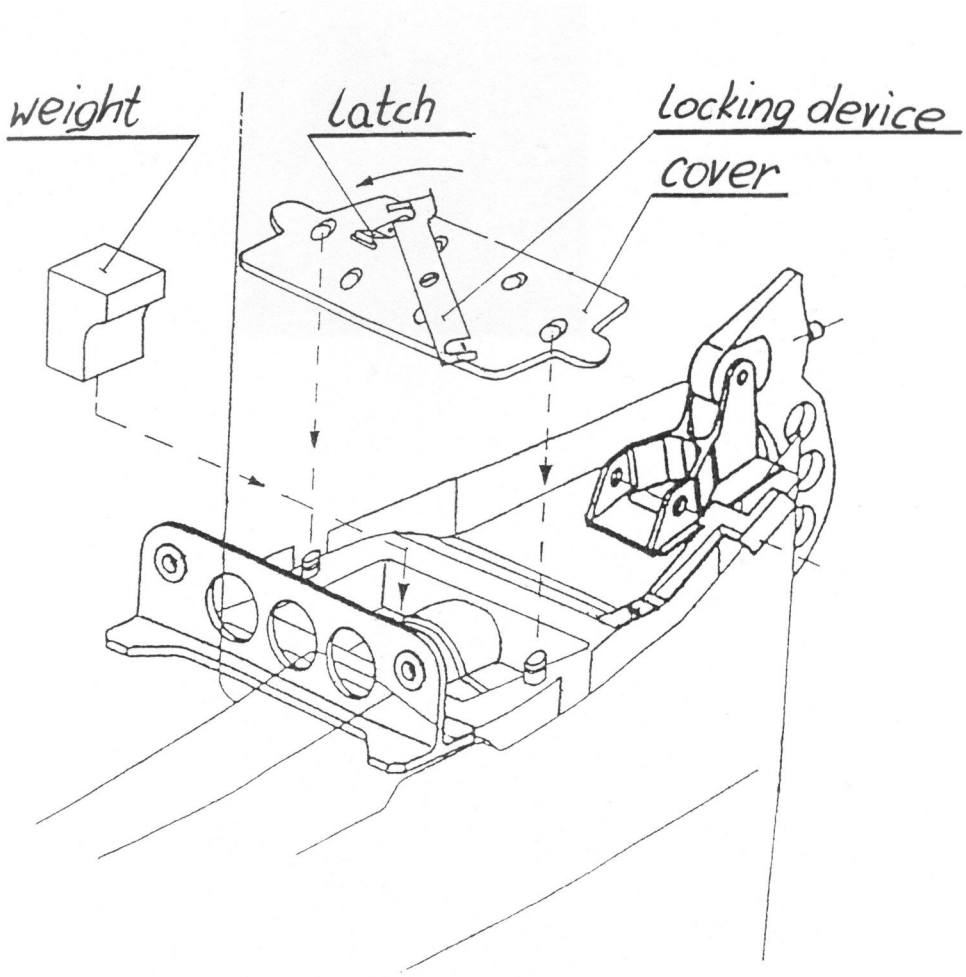
- manufacturer's name,
- sailplane serial number,
- sailplane type,
- ballast bay number, for which the weight is fitted,
- weight.

2.2.7 TAIL BALLAST

Tail ballast consists of four identical, painted red, lead weights. The weights fit in a tail ballast bay located in the rear fuselage under the tailplane (Fig. 2-1).
Every weight has a mass of approximately 1 kg = 2.2 lb and has marks as follows:

- manufacturer's name,
- sailplane serial number,
- sailplane type,
- weight.

The tail ballast bay is accessible after removing the tailplane and removing the ballast bay cover (see item 3.2.8 of this Manual).



Tail ballast
Fig. 2 - 1

2.3 CONTROL SYSTEMS

CAUTION:

THE ADJUSTMENT OF ELEVATOR, RUDDER, AILERON, AIR BRAKE AND TOWING CABLE RELEASING CONTROL SYSTEMS SHOULD BE TREATED AS THE SAILPLANE REPAIR, SO ALL THE CONDITIONS CONTAINED IN SECTION 8 OF THIS MANUAL SHALL BE OBSERVED.

1) Adjustment of control systems will be performed when excessive play appears during normal operations. Normally the push-rod systems need no adjustment.
2) The threads of the adjustable ends should cover the inspection hole in the push-rod.
3) The adjustable ends of the push-rods should be secured with lock-nuts.
4) The adjustable ends of the push-rods should be adjusted so that for every location of the cockpit controls (e.g. the stick full forward and right) play will be felt when turning the push-rod on its longitudinal axis. This does not concern only the push-rods connected to the levers having the non-self- aligning bearings.
5) The screw stops on the stick, control column console and pedals should be secured with lock-nuts.
6) The threads of turnbuckle ends on the rudder control system should not be visible. The turnbuckles should be protected with a locking wire.

2.3.1 ELEVATOR CONTROL SYSTEM

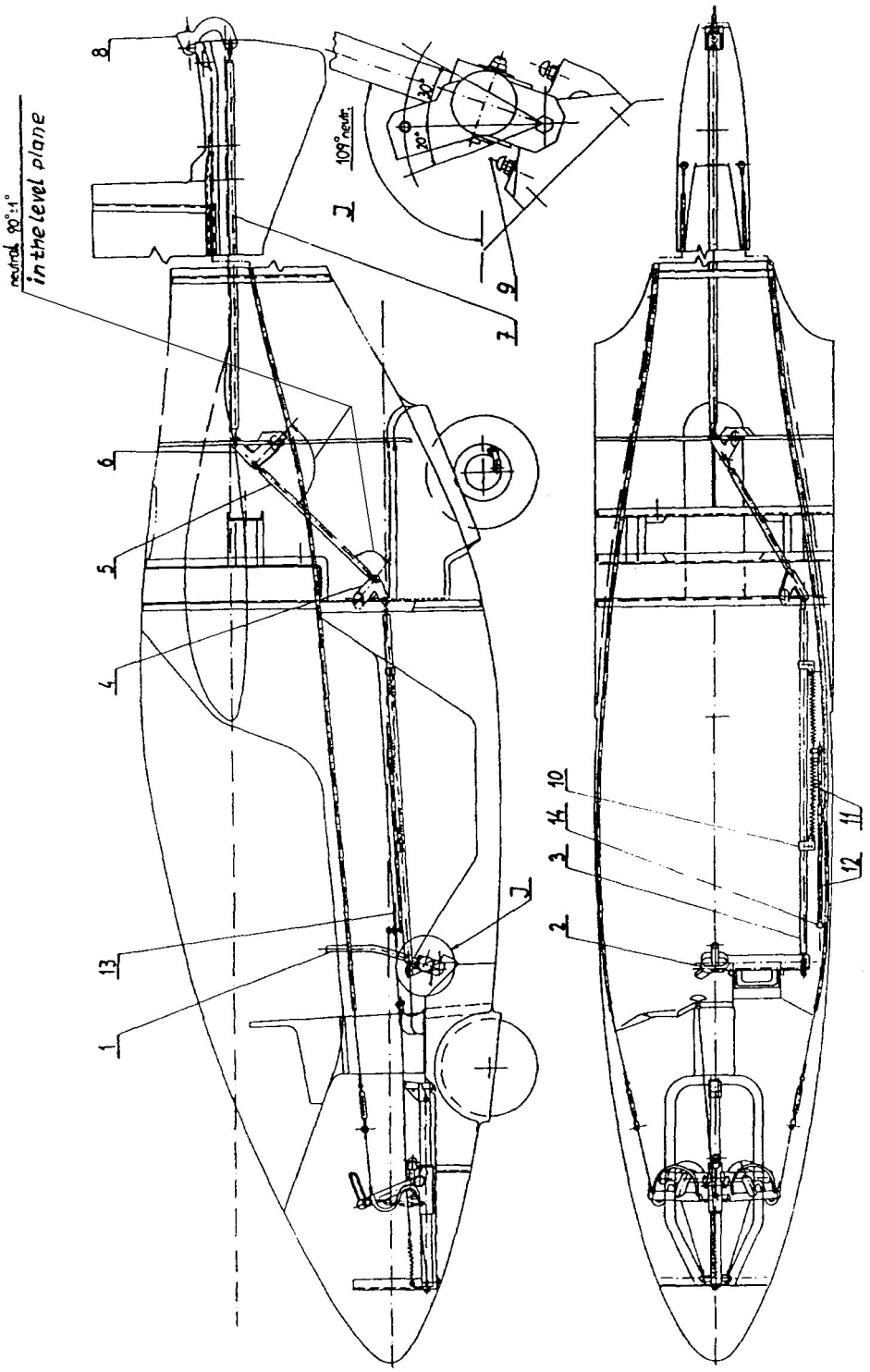
Push-rod system as shown on Fig. 2 - 2:
1 - control stick,
2 - control column,
3 - eye-fork push-rod,
4 - lever on the main frame,
5 - double-fork push-rod,
6 - lever on the rear frame,
7 - long double-fork push rod,
8 - elevator lever,
9 - stop on the control column console.

The neutral setting is adjusted by means of length variation of (3), (5) and (7) push-rods in the sequence as above using adjustable ends when the control stick is in neutral position. The levers (4), (6), (8) and elevator should take their neutral position respectively.
The elevator deflections (acc. to Fig. 1-1) are set by adjusting the screw stops (9) on the control column console.

2.3.2 TRIMMING DEVICE

Spring trimming device as shown on Fig. 2 - 2:
10 - clamp on push-rod,
11 - spring,
12 - push-rod,
13 - trimming lock-device on the seat board,
14 - ball set.

The trimming device should be adjusted so that when the tailplane is removed the control stick is in neutral position when the trimming device ball is on its "5" location. The adjustment is made by means of sliding the clamps (10) on the push-rod, retaining the constant distance between them.



Elevator control system
Fig. 2 - 2

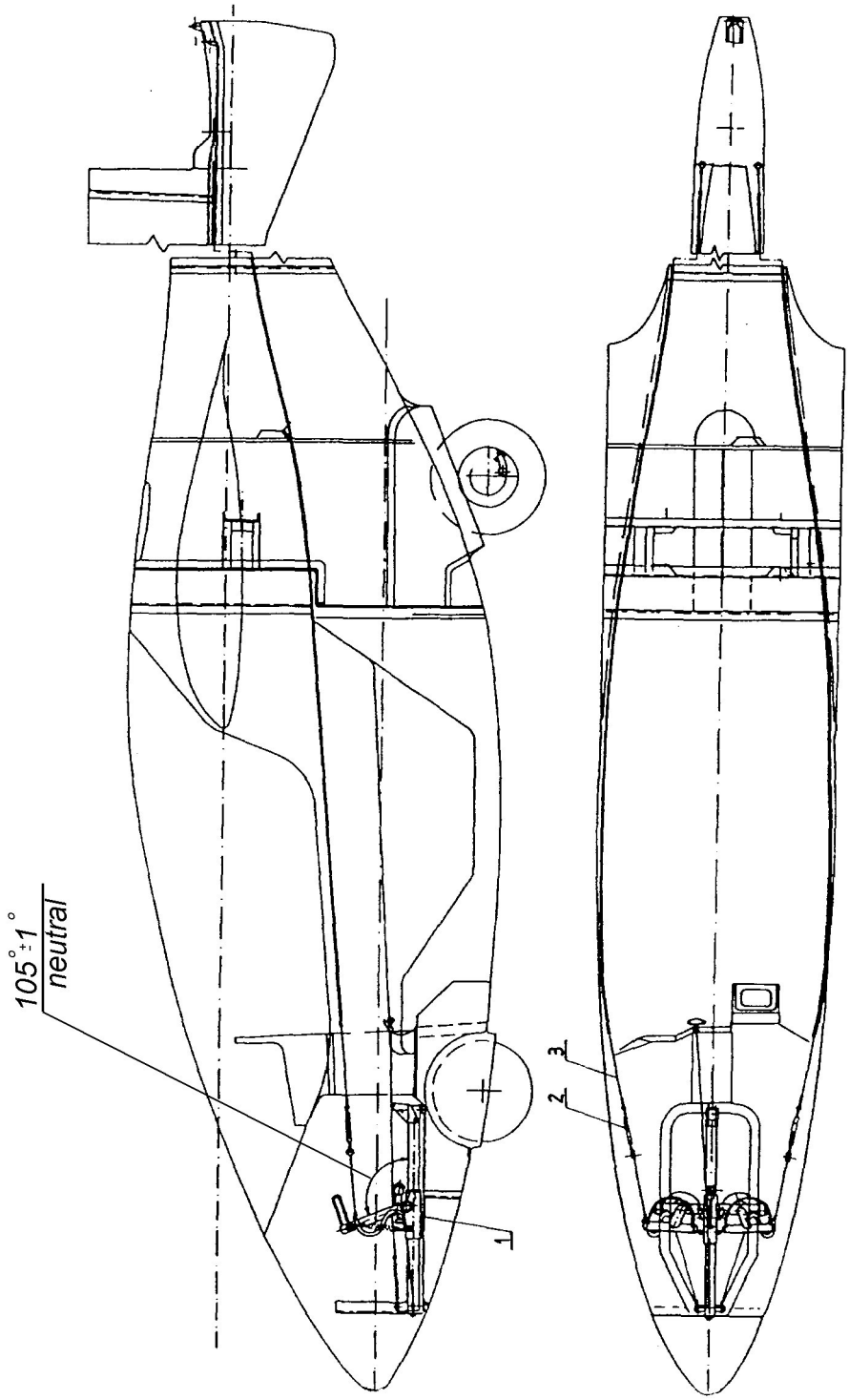
2.3.3 RUDDER CONTROL SYSTEM

Cable system as shown on Fig. 2-3:
1 - pedals,
2 - turnbuckle,
3 - rudder tension member.

The neutral rudder setting is adjusted by means of turnbuckles (2) length for the pedals in neutral position.
The rudder deflections (acc. to Fig. 1-1) are adjusted with screw stops on the pedals. The tension of pedal spring should range 861.5 daN = 1863.4 lbf.

CAUTION:

WHEN THE PEDALS ARE FULLY DEFLECTED, THE PLAY BETWEEN THE DEFLECTED RUDDER AND ITS STOP ON THE FIN SHOULD BE PERCEPTIBLE.



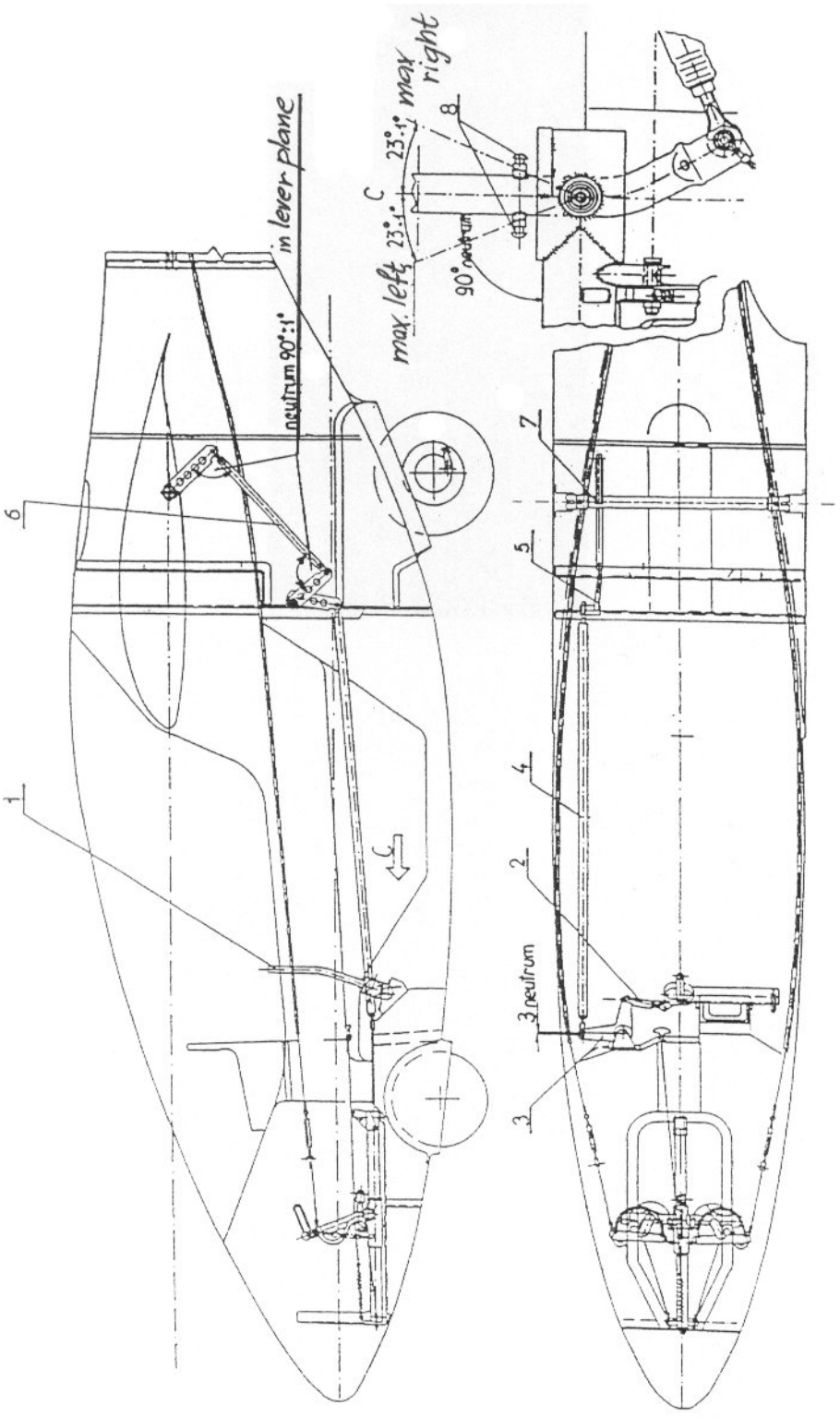
Rudder control system
Fig. 2-3

2.3.4 AILERON CONTROL SYSTEM

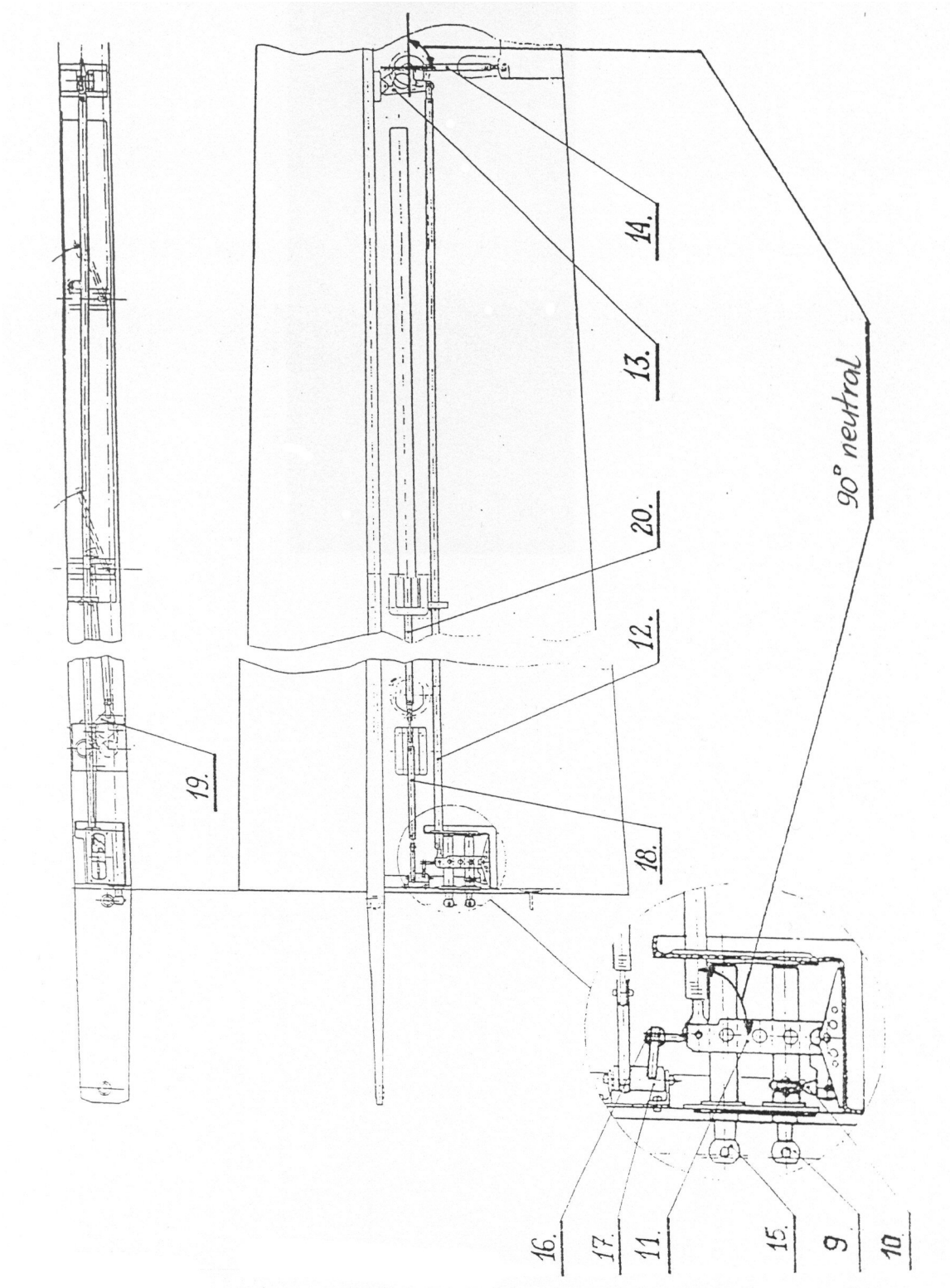
Push-rod system in fuselage as shown on Fig. 2-4:
1 - stick,
2 - short push-rod,
3 - lever on the pedal floor,
4 - fork-eye push-rod,
5 - lever on the main frame,
6 - double-eye push-rod,
7 - fuselage torsion tube,
8 - stops on the stick.

Push-rod system in wing as shown on Fig. 2-5:
9 - torsion tube,
10 - double-eye push-rod,
11 - intermediate lever,
12 - long push-rod,
13 - differential lever,
14 - short push-rod.

The aileron deflection differentiation takes place on levers (13) in the wings. The neutral setting is obtained by adjusting the ends of push-rods (2), (4), (6), (12), (14) in the sequence as above, by means of the adjustable ends for the stick in neutral position so that the levers (3), (5), (7), (11), (13) and ailerons gets their neutral locations. The aileron deflections (acc. to Fig. 1-1) are adjusted by means of screw stops (8) on the stick.



Aileron control system in fuselage
Fig. 2-4



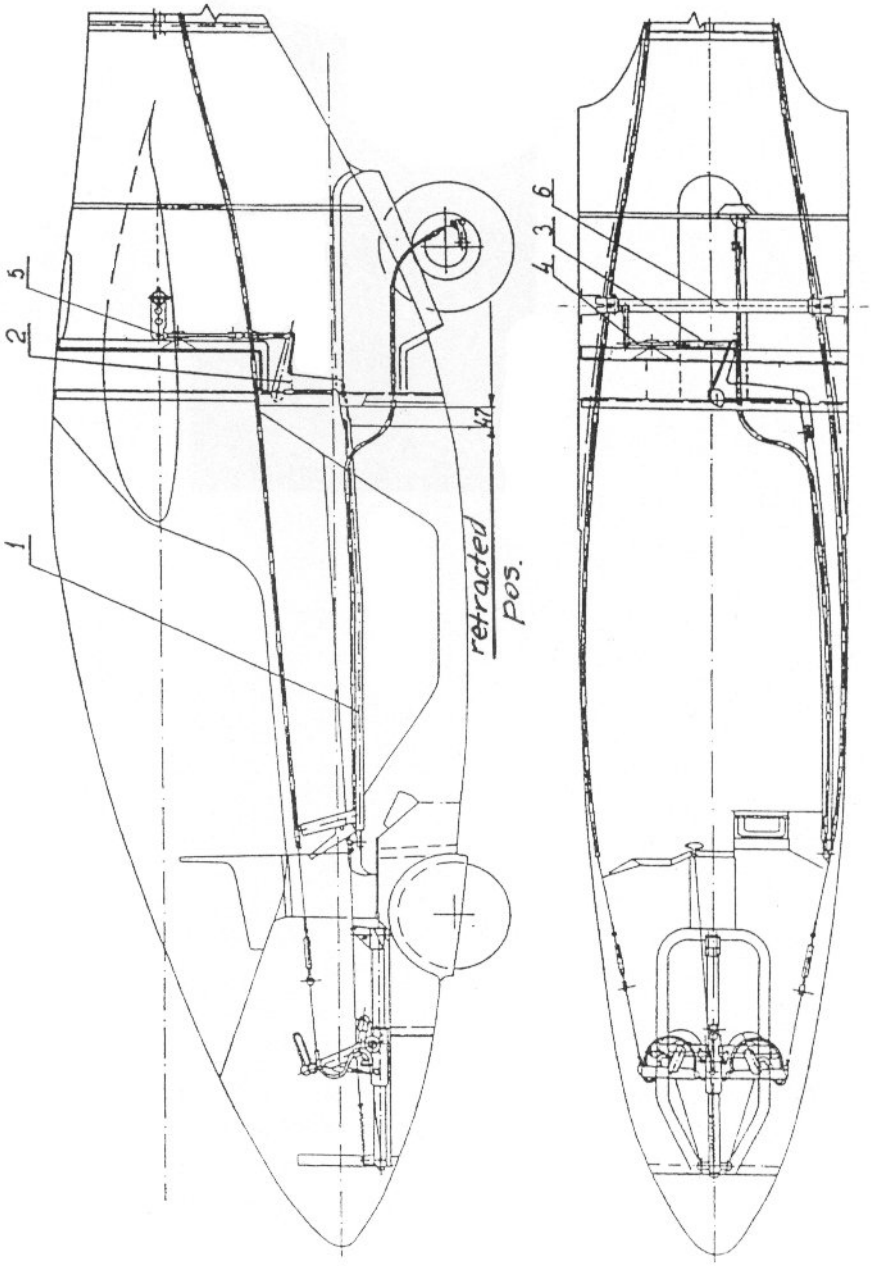
Aileron control system in wing
Fig. 2-5

2.3.5 AIR BRAKE CONTROL SYSTEM

Push-rod system in fuselage as shown on Fig. 2-6:
1 - push-rod with air brake handle,
2 - lever on the main frame,
3 - push-rod,
4 - intermediate lever,
5 - joining push-rod,
6 - fuselage torsion tube,

Push-rod system in wing as shown on Fig. 2-5:
15 - torsion tube,
16 – short push-rod,
17 - intermediate lever,
18 - eye-fork push-rod,
19 - locking lever,
20 - fork-eye push-rod,

The air brake retracted location is positioned by adjusting the push-rods (20) length with adjustable ends when the air brake plate's caps are removed and the levers (19) lean on the stops. Upper edge of each plate should be 11 mm = $^{7}/_{16}$ in under wing contour (measurement should be made on the end of plate closer to the fuselage). The "retracted" position of the system is adjusted by means of push-rods (3), (5) length when the lever (2) is positioned as in drawing. The air brake plates when extended should move symmetrically (see Fig. 1-1). For correctly adjusted system in fuselage the above movement can be corrected with push-rods (20). When retracted the air brake plates should be locked simultaneously.

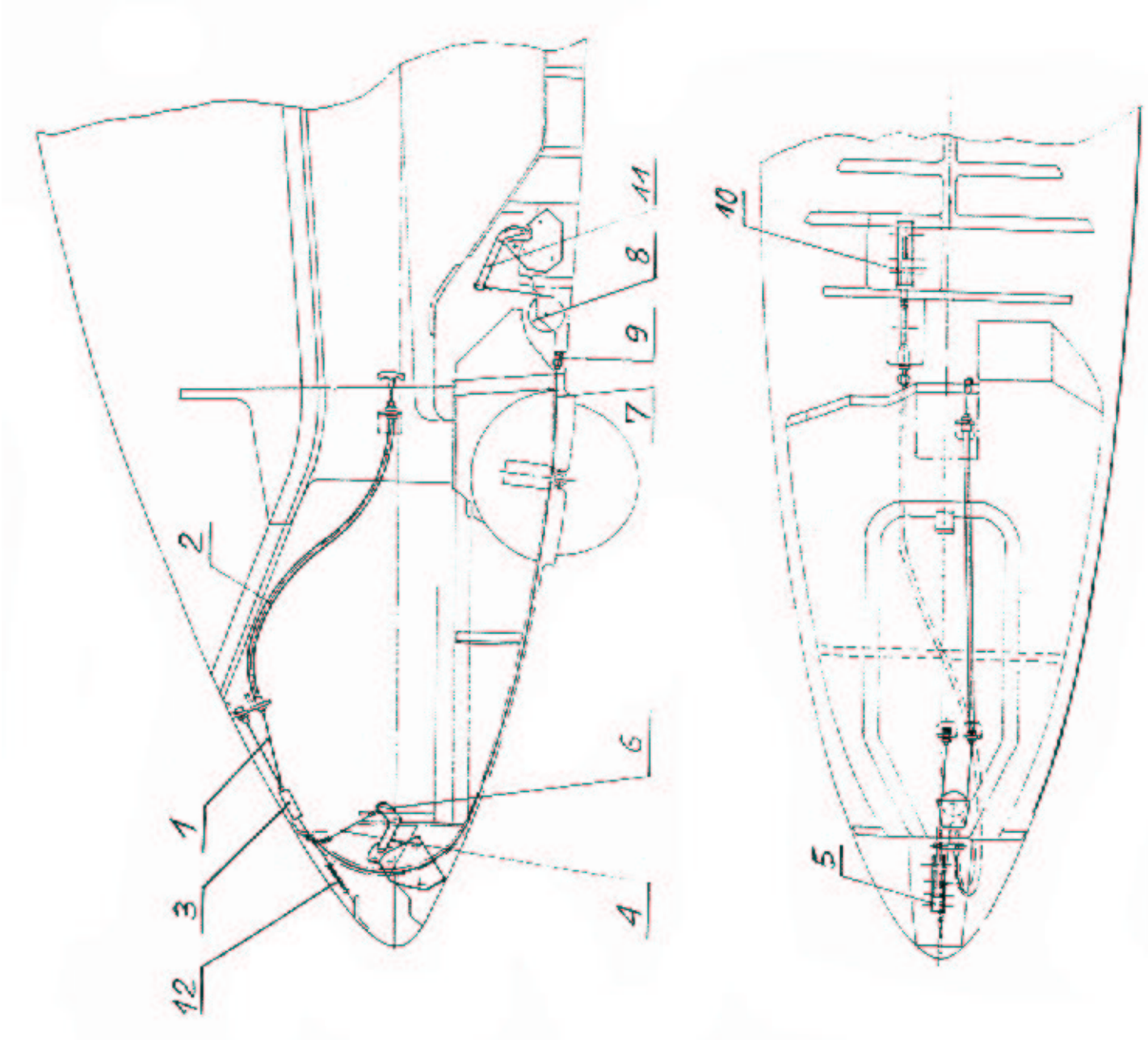


Air brake control system
Fig. 2-6

2.3.6 TOWING CABLE RELEASING SYSTEM

Cable system as shown on Fig. 2-7:
1 - tension member with hand-grip,
2 - bowden,
3 - pulley,
4 - nose hook tension member,
5 - E-85 nose hook (see: Section 4 of this Manual),
6 - nose hook lever,
7 - C.G. hook tension member,
8 - pulley,
9 - adjustable screw,
10 - Europa G 88 C.G. hook (see: Section 4 of this Manual),
11 - C.G. hook lever,
12 - spring.

The adjustment and proper operation of the system are described in Section 3 of this Manual (see: item 3.4.4).

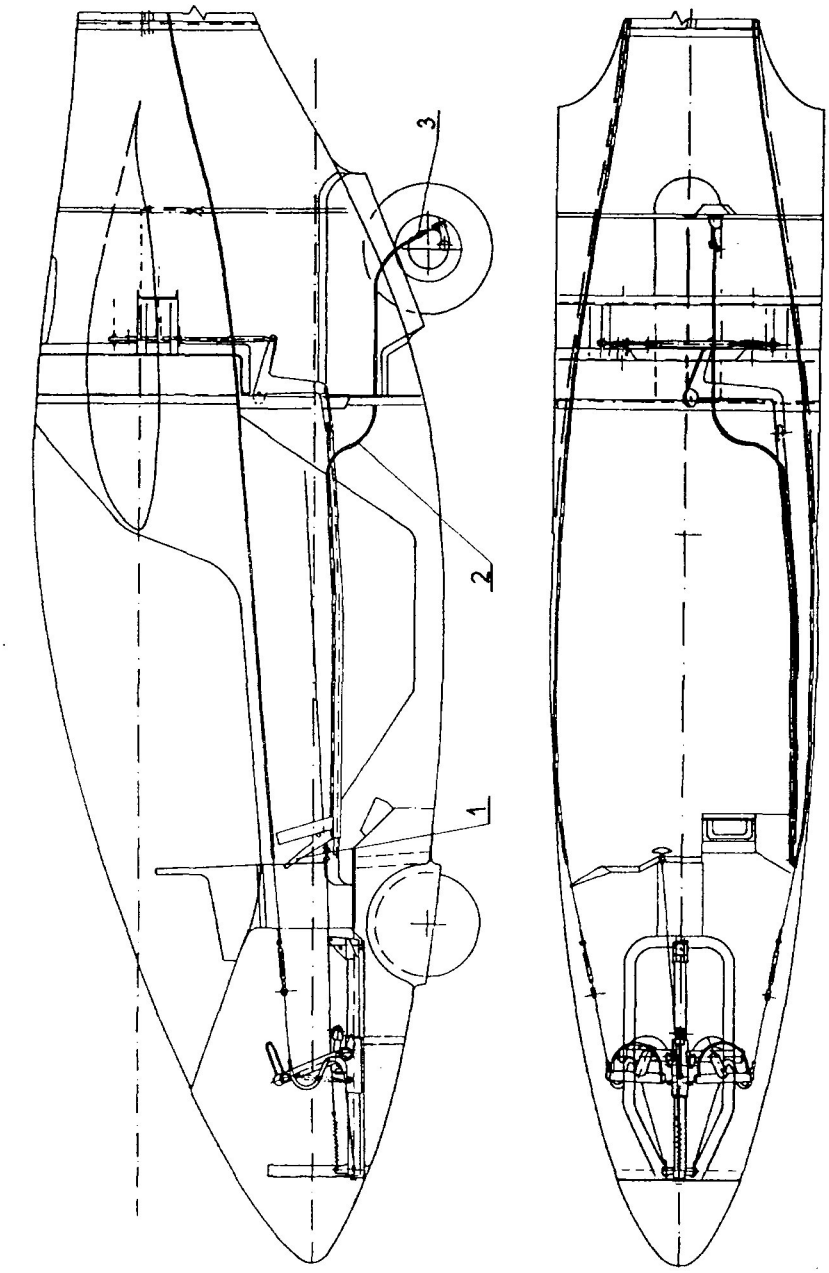


Towing cable releasing system
Fig. 2-7

2.3.7 MAIN WHEEL BRAKE CONTROL SYSTEM

Cable system as shown on Fig. 2-8:
1 - wheel brake lever,
2 - tension member,
3 - adjustable screw.

The adjustment of the system is described in Section 3 of this Manual.



Main wheel brake control system
Fig. 2-8

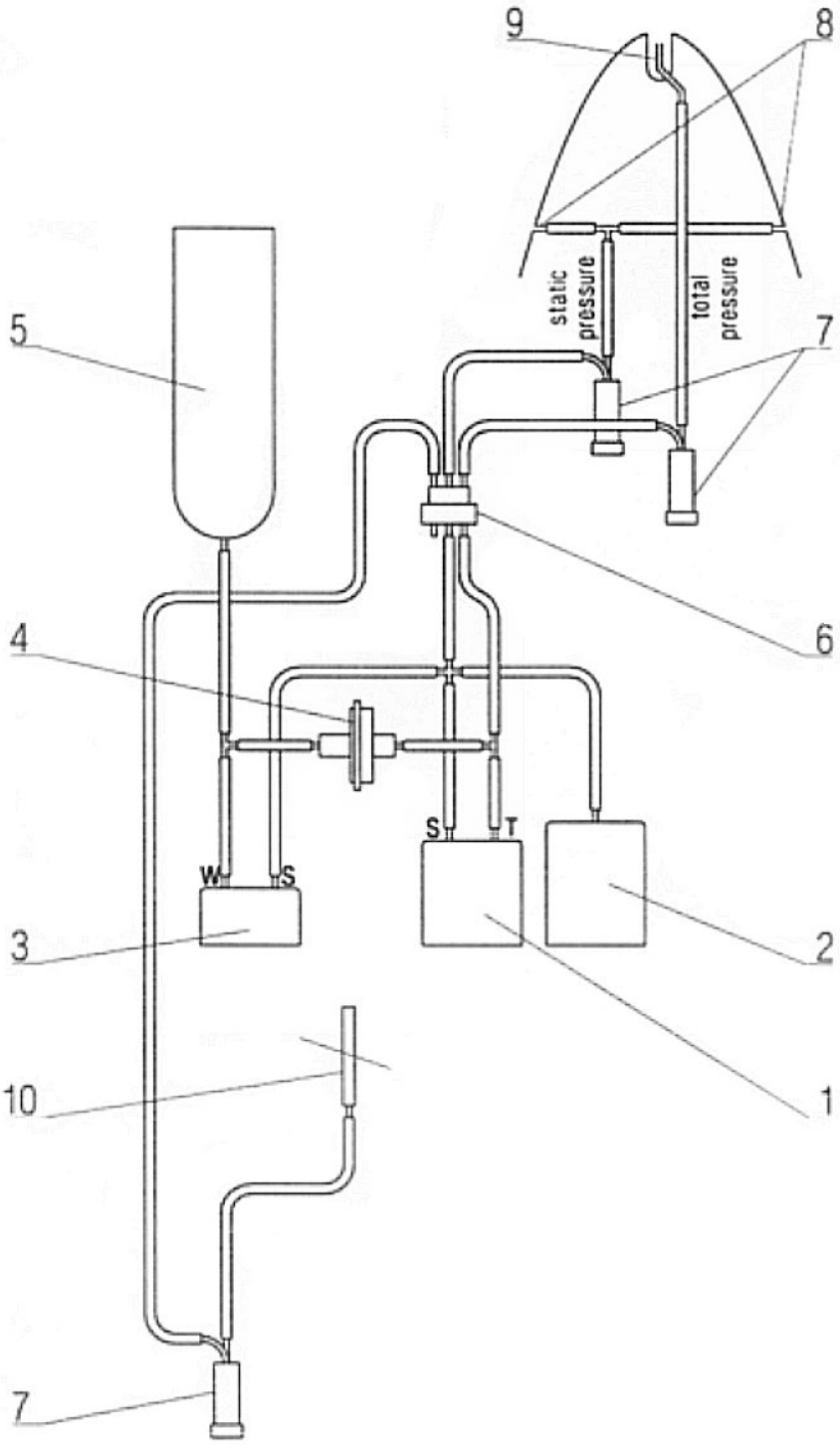
2.4 SYSTEMS AND EQUIPMENT

2.4.1 INSTRUMENTS PRESSURE SYSTEM

Instrument pressure system (standard) as shown on Fig. 2-9:
1 - airspeed indicator (see: item 2.4.3 Instruments),
2 - altimeter (see: item 2.4.3 Instruments),
3 - variometer (see: item 2.4.3 Instruments),
4 - total energy variometer compensator (see: Section 4 of this Manual),
5 - compensating bottle,
6 - connector,
7 - drainage units,
8 - static pressure port on the fuselage side,
9 - total pressure port in the fuselage nose,
10 - K-1 probe socket.

The connector (6), which allows for the complete disconnection of the instrument panel out of the sailplane, has the ends marked with the coloured points to be connected with the ducts on the following way:

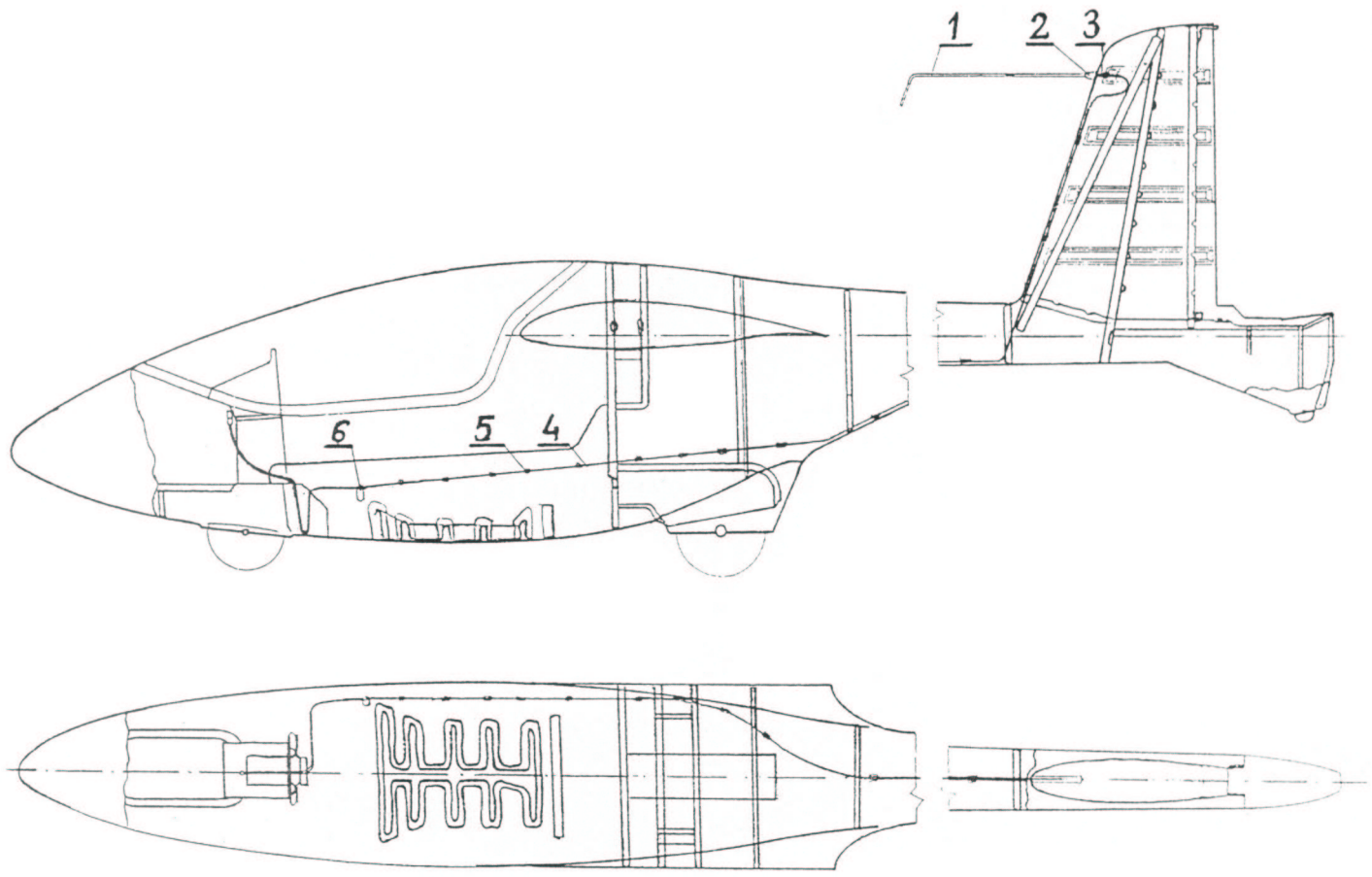
- red - for static pressure,
- black - for total pressure,
- white - for K-1 probe,
- yellow - reserve.



Instruments pressure system
Fig. 2-9

2.4.2 K-1 PROBE SYSTEM

Installation (Fig. 2-10) contains: K-1 probe (1), tightening band (2), socket (3) placed in the leading edge of the fin, polyethylene duct &5x9 (4) attached to the fuselage by cups (5), drainage unit (6) placed under the pilot's seat and connected to the connector under the control panel.



K-1 probe system
Fig. 2-10

2.4.3 INSTRUMENTS

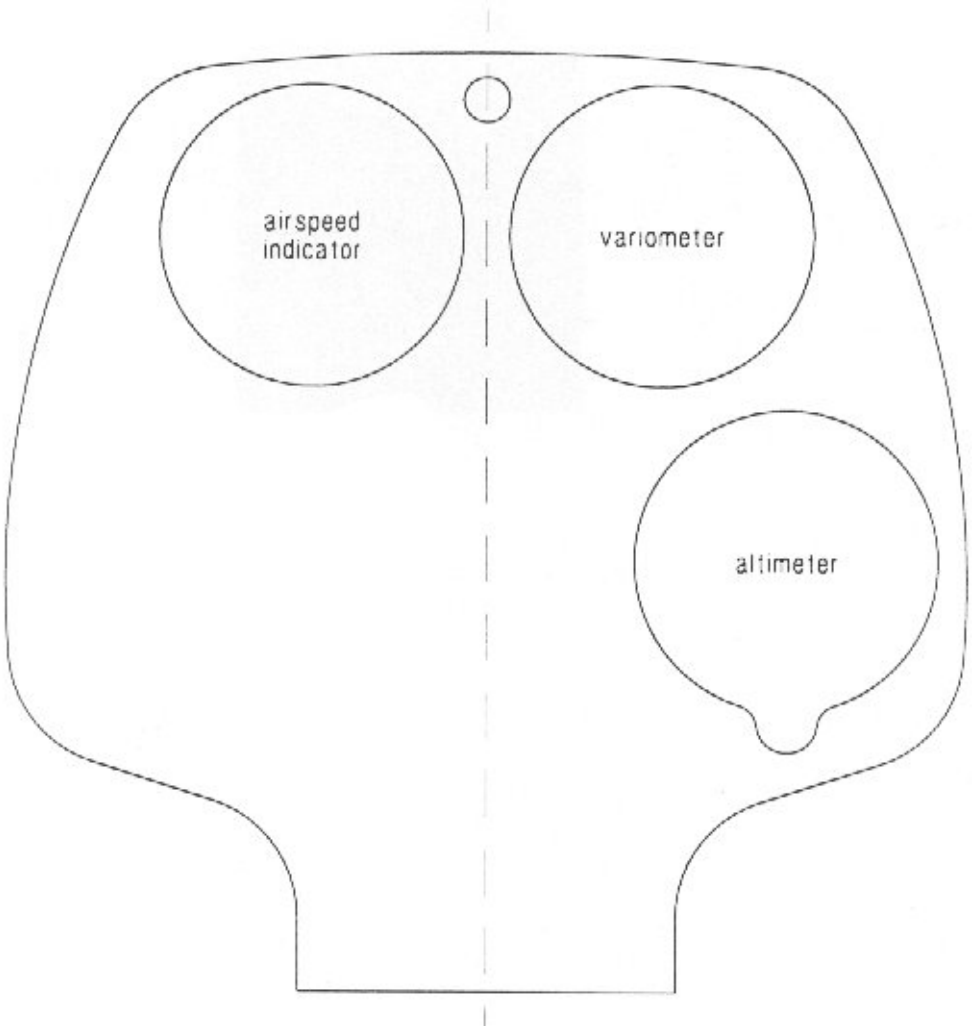
The sailplane is equipped with a set of instruments necessary for flying in full operation range defined in FLIGHT MANUAL.

- magnetic compass,
- total energy variometer with compensator and compensating bottle,
- sailplane airspeed indicator,
- altimeter,

The sailplane could be equipped with additional instruments e.g.:

- turn and bank indicator (see Section 4 of this Manual),
- electric variometer,
- flight computer.

The instruments are located in the instrument panel as shown on Fig. 2-11. Magnetic compass is installed on the anti-reflex cover on canopy.

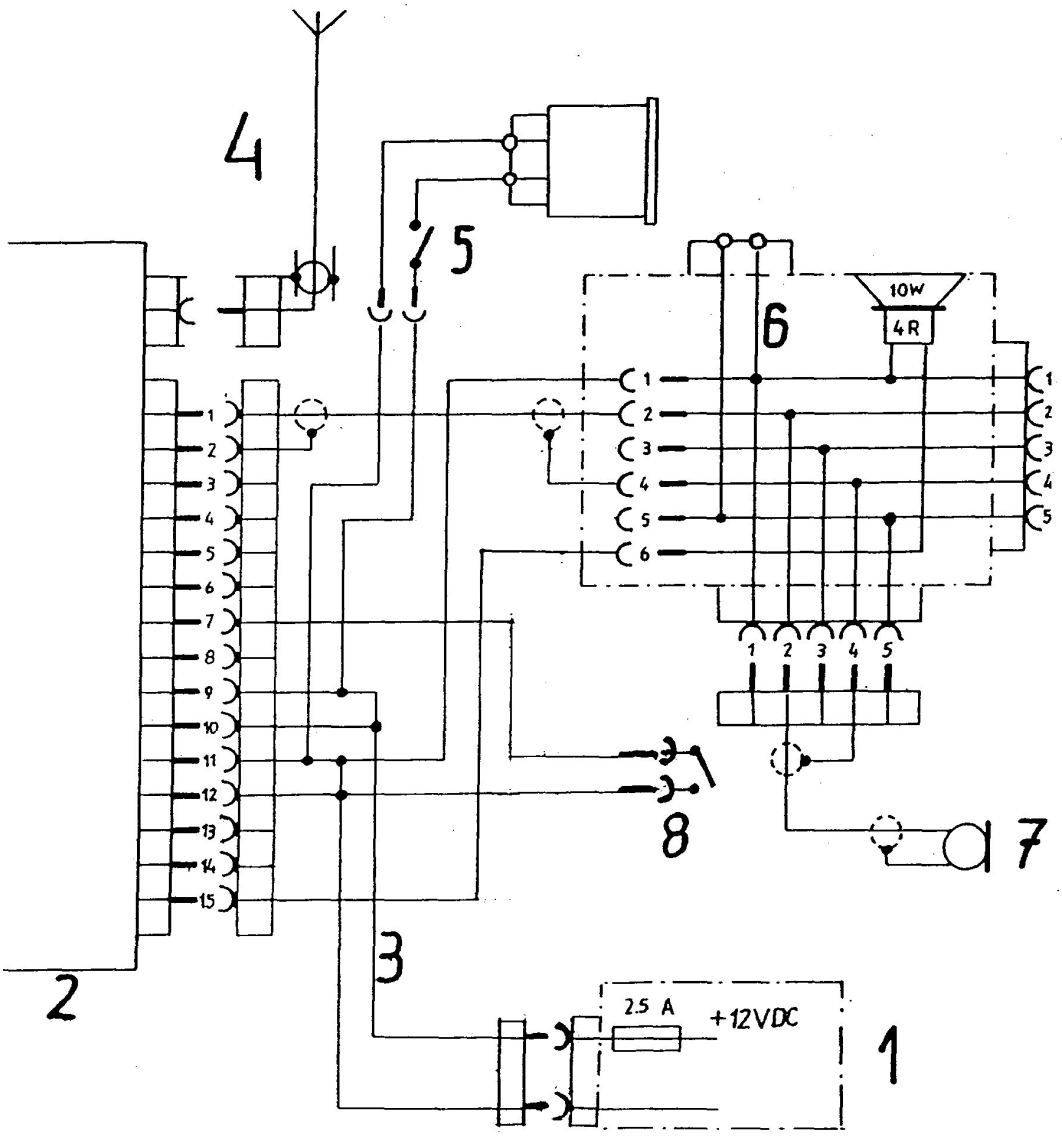


Instrument panel
Fig. 2-11

2.4.4 ELECTRICAL AND RADIO SYSTEM

Electrical and radio system depends on transceiver type and additional instruments installed. Fig. 2-12 shows an electrical and radio system for FSG 70/71 transceiver and EZS-4 turn indicator as an example.

1 - power supply 12 V/6.5 Ah,
2 - FSG 70/71 transceiver in the instrument panel,
3 - connecting wires with plugs,
4 - dipole antenna fixed in the fin,
5 - turn indicator switch in the instrument panel,
6 - loudspeaker,
7 - dynamic microphone,
8 - push-to-talk button on the control stick,



Electrical and radio system scheme (example)
Fig. 2-12

2.4.5 ELECTRICAL BONDING SYSTEM

- wire connecting the control stick with the C.G. hook fastening screw.

2.4.6 VENTILATION SYSTEM

- air intake with adjustable diaphragm fix glued in the fuselage nose,
- duct connecting the air intake with the distributing funnel,
- air-flow control tension member.

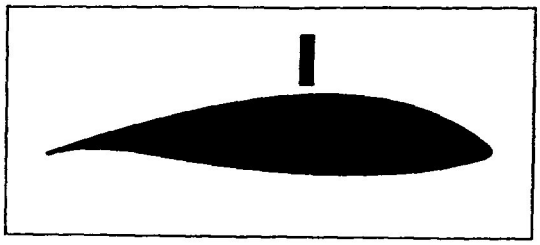
2.4.7 COCKPIT EQUIPMENT

- four parts pilot's belts,
- seat cushion,
- pocket for documents on the right-hand wall,
- bellows on the stick.

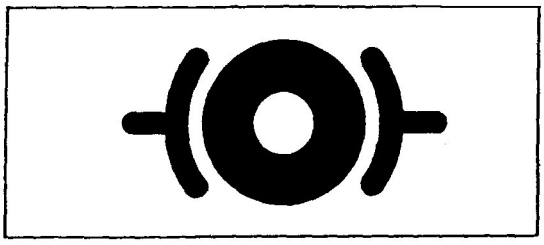
2.5 PLACARDS AND MARKINGS

Placards and markings in cockpit (as shown on Fig. 2-13 through 2-17):

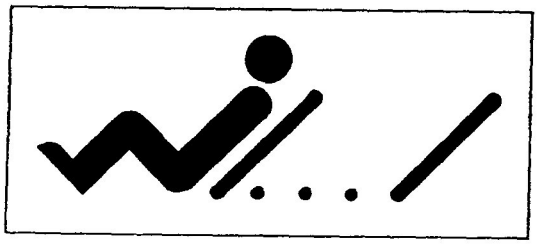
1 - towing cable release,
2 - pedal adjustment,
3 - canopy lock (right-hand side),
4 - trimming device,
5 - air brake,
6 - wheel brake,
7 - canopy lock (left-hand side),
8 - weight limitation and cable weak-link breaking force placard,
9 - airspeed and aerobatics limitation placard,
10 - wing rigging placard,
11 - wing de-rigging placard,
12 - back rest adjusting placard,
13 - luggage compartment load limitation placard,
14 - marking of intermediate location of the main bolts,
15 - cockpit ventilation,
16 - canopy emergency jettison,
17 - positions of trimming device,
18 - tail ballast load placard,
19 - loading conditions caution placard,
20 - special ballast loading caution placard.



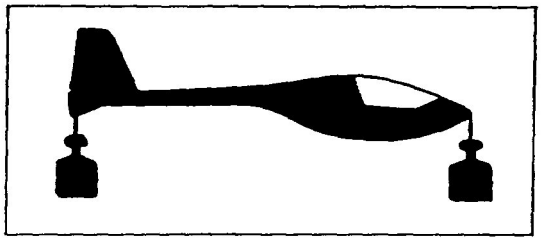
air break



wheel break



seat back-rest adjustment



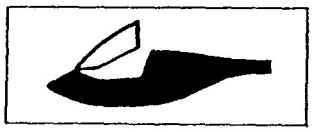
trimming device

cable release

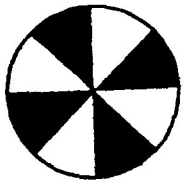
pedal adjustment

11 • 9 • 7 • 5 • 3 • 1

position of trimming device



canopy lock



ventilation

canopy jettison

Placards and markings in cockpit
Fig. 2-13

maximum winch-launching speed	V_W =	65 knots
maximum aerotowing speed	V_T =	81 knots
manoeuvring speed.....	V_A =	81 knots

Allowed manoeuvres: loop, stall turn, spin, spiral

empty weight .....max.	419	lb
gross take-off weight	661	lb
maximum cockpit load	242	lb
minimum cockpit load	122	lb
maximum force damaging the towing cable or safety link ..	1574	lbf

WARNING:

PILOTS OF BODY+PARACHUTE WEIGHT OF BELOW 132 lb MUST HAVE THE BACK-REST AT FRONT LIMIT LOCATION.

luggage max. 11 lb

CAUTION:

THIS SAILPLANE IS EQUIPPED WITH TAIL BALLAST.
CHECK THE LOADING CONDITIONS.

CAUTION:

THIS SAILPLANE IS EQUIPPED WITH SPECIAL BALLAST.
USING CONTROL HOLES IN PILOT SEAT CHECK NUMBER OF BALLAST WEIGHTS.
DO NOT OVERLOAD MAXIMUM COCKPIT WEIGHT.

Placards and markings in cockpit
Fig. 2-14

TAIL BALLAST LOADING TABLE.	
Cockpit load (pilot + parachute + special ballast)	Allowable number of tail ballast weights
from 122 to 133 lb	use of tail ballast not allowed
from 133 to 144 lb	1or less
from 144 to 155 lb	2 or less
from 155 to 166 lb	3 or less
over 166 lb	4 or less

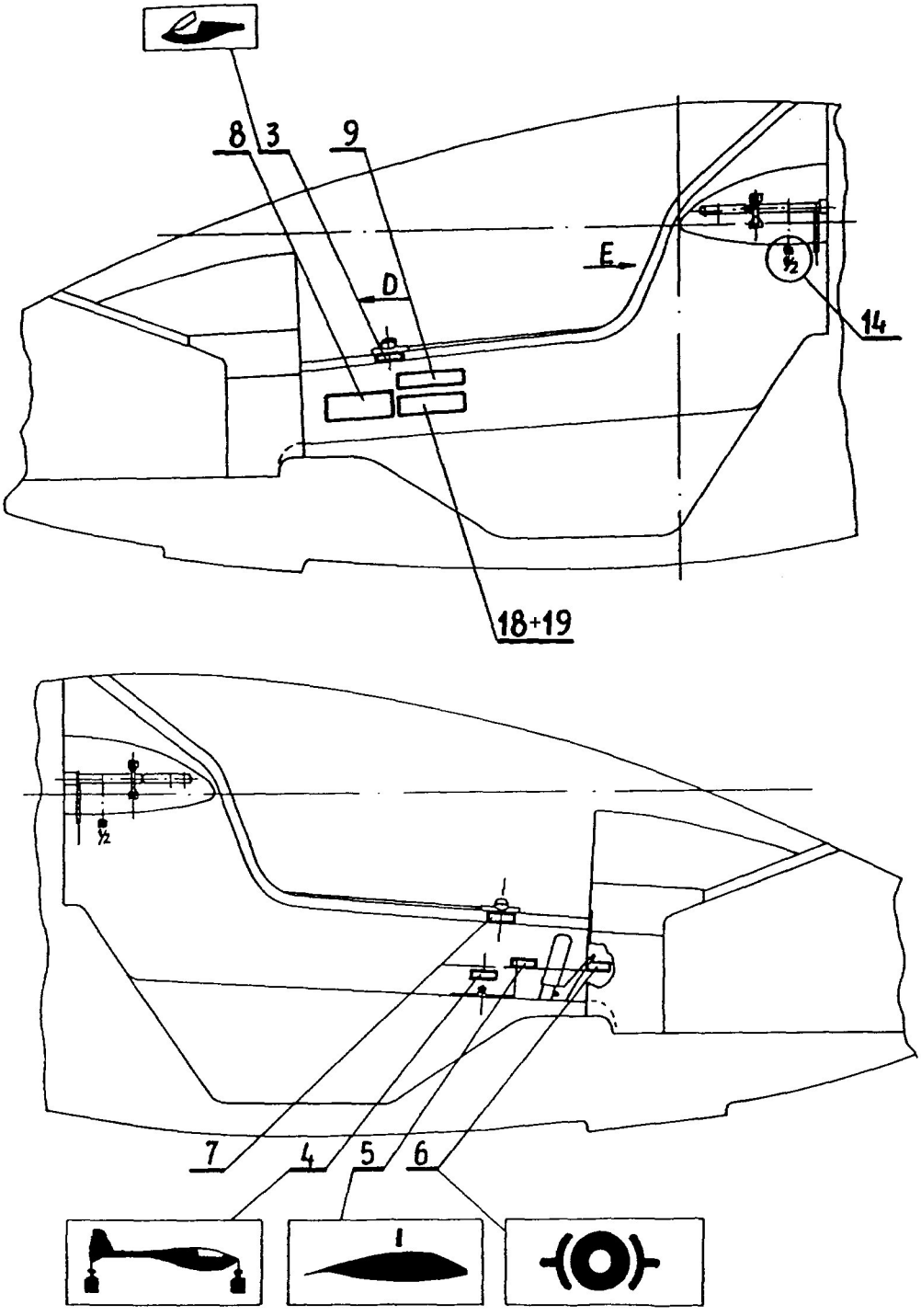
RIGGING THE WINGS

- insert the RIGHT wing
- insert the main bolts up to ½ marks
- insert the right rear bolt home
- insert the LEFT wing
- insert the main bolts until they click

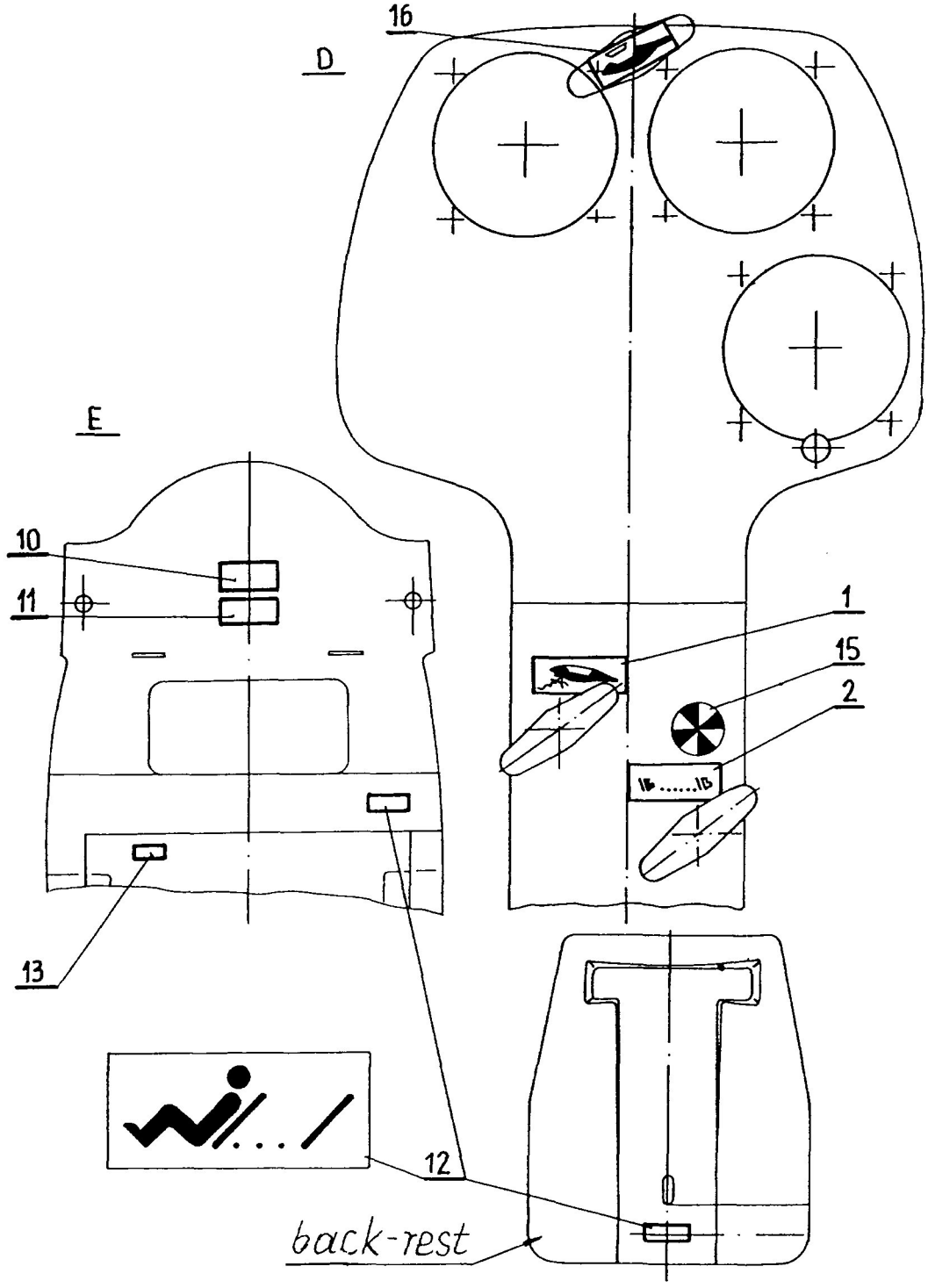
DE-RIGGING THE WINGS

- pull out the main bolts up to ½ marks
- pull out the left rear bolt to its full extend
- remove the LEFT wing
- pull out the right rear bolt to its full extend
- pull out the main bolts to its full extend
- remove the RIGHT wing

Placards and markings in cockpit
Fig. 2-15



Placards and markings in cockpit - placing
Fig. 2-16



Placards and markings in cockpit - placing
Fig. 2-17

2.6 ASSEMBLY DATA

2.6.1 ALLOWED PLAYS IN SET CONNECTIONS

The plays should be identified by repeated measurement of the bolt and sleeve diameters in several directions by means of a micrometer screw (the bolt and the sleeve can get oval). The minimum measured bolt diameter should be subtracted from the maximum measured sleeve diameter. If the plays do not exceed values defined below the sailplane is operable up to the next required measurement period (see: Section 5 of this Manual), otherwise see: Section 8 of this Manual.

Connection	Mating parts	Allowed play
wing-fuselage	main bolts - spar sleeves main bolts – main frame sleeves	0.12 mm (0.0047 in)
wing-fuselage	rear bolts - rear frame sleeves	0.1 mm (0.0039 in)
tailplane-fuselage	stabilizer front bolt - inner ring of bearing - outer ring of bearing in fuselage fitting (summary play)	0.2 mm (0.0079 in)
tailplane-fuselage	stabilizer rear bolt - holes in fuselage fitting stabilizer rear bolt - fitting sleeves in stabilizer	0.1 mm (0.0039 in)

2.6.2 ALLOWED PLAYS IN CONTROL SYSTEMS

Control system of:	Play measurement	Allowed play
elevator	on stick end - elevator locked	2.5 mm (0.098 in)
aileron	on stick end - first one, then the second aileron locked	3 mm (0.118 in)

2.6.3 ALLOWED CONTROL FORCES

Control system of:	Force measurement	Allowed value
elevator	on stick hand-grip centre	max. 0.4 daN (0.9 lbf)
aileron	on stick hand-grip centre	max. 0.4 daN (0.9 lbf)
rudder	on pedal cross bar	max. 5 daN (11.24 lbf)
air brake	on hand-grip centre - at unlocking	min. 5 daN (11.24 lbf) max. 10 daN (22.48 lbf)
towing cable releasing	on hand-grip	max. 10 daN (22.48 lbf)
canopy emergency jettison	on hand-grip	min. 5 daN (11.24 lbf) max. 15 daN (33.72 lbf)

SECTION 3

CURRENT MAINTENANCE OF SAILPLANE

3.1 INTRODUCTION

Section 3 contains the list and description of the procedures performed in normal sailplane service except of the servicing the components listed in Sections 4 and 9 and periodic procedures defined in Section 5.

3.2 CURRENT MAINTENANCE OF SAILPLANE

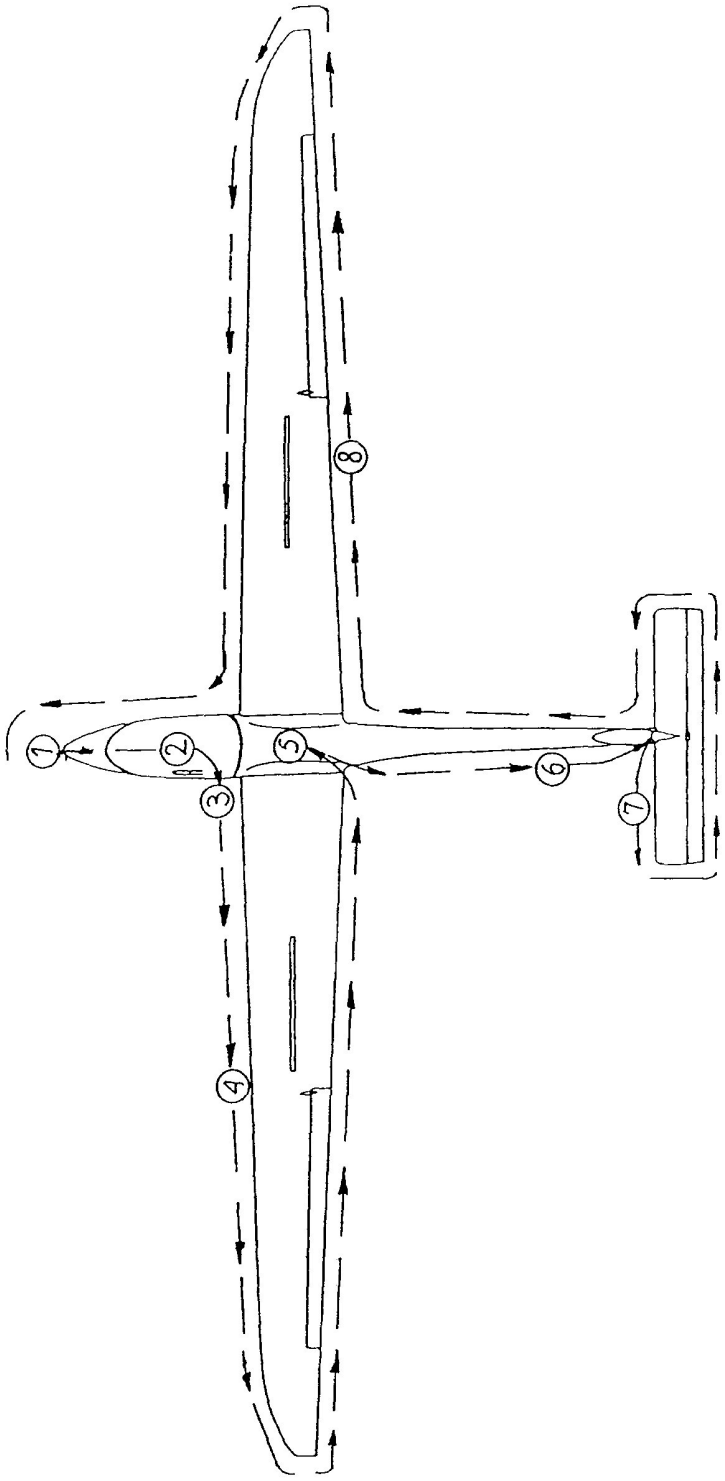
3.2.1 PRE-FLIGHT INSPECTION

NOTE:

Before flight check the validity of the Certificate of Airworthiness and the completion of periodic inspections.

Before flight and after every rigging, inspections are recommended according to the diagram (see: Fig. 3-1):

1.- check the fuselage front part, surface condition, the pressure ports being not obscured,
2.- check the condition of perspex surface, open the canopy,
- check the wing fitting bolts to be inserted and secured,
- check the instruments and pressure system connection,
- check the correct operation of the elevator, rudder and ailerons - maximum deflections, plays and friction,
- check the correct operation of air brake - the maximum extended position and locking in retracted position,
- check the operation of trimming device,
- check the operation of nose and C.G. take-off hooks,
- check the cockpit for movable items - remove,
- check the opening and locking of the canopy,
- check the safety belts, pilot's back-rest, seat cushion,
- check the loading of the special ballast bay,
3.- check the condition and pressure in pneumatics,
- check the rollability of wheels,
- check the operation of wheel brake and shock absorber,



Pre-flight inspection
Fig. 3-1

4.- check the upper and lower wing surface, leading and trailing edge,
- check the aileron, surface condition, suspension, plays, deflections and friction,
- check the air brake, conditions, plays extending, retracting, fitting the caps to the wing contour,

5. - check if the fuselage inspection hole is covered,

6.- check the fuselage rear part, especially the bottom part and tailskid,
- check the fin - surface condition,
- check the K-1 probe - fitting, positioning and tightness,
- check the rudder for fabric covering damages, upper hinge and cable fitting securing,

7.- check the loading of the tail ballast bay,
- check if the cover of the tail ballast bay is closed and secured,
- check the tailplane, fitting, securing and surface condition,
- check the elevator deflections, plays, friction,

8.- as per item 4.

3.2.2 PROCEDURES AFTER FLIGHT

- switch-off the electrical devices,
- clean the cockpit and the whole sailplane,
- perform inspection the same as the pre-flight one,
- complete the records in sailplane Log Book,
- drain, if necessary, the ducts of total and static pressure system and the K-1 probe system.

DRAINAGE OF THE TOTAL AND STATIC PRESSURE SYSTEM AND THE K-1 PROBE SYSTEM

After the flight in rain it is necessary to:

1) dry the drainage units after removing the drainage plugs,
2) disconnect the total and static pressure duct and K-1 probe duct out of instruments,
3) blow, if necessary, the ducts of total pressure, static pressure and K-1 probe heads (e.g. within air pump for wheel inflating),
4) re-connect the duct to the instruments.

3.2.3 PARKING, ANCHORING AND TAXIING

PARKING

When parking the canopy should be closed and eventually secured with a cover.

NOTE:

The non-anchored sailplane cannot be left without supervision.

ANCHORING

- place the sailplane to have the wind blowing side-back,
- place the wing down against the wind,
- anchor the sailplane on the wing tip, nose hook and fuselage end,
- immobilize the control stick by means of pilot's belts.

TAXIING

The sailplane should be moved on an airfield by means of motor, car or other device using the nose hook at the maximum speed 6 km/h observing the generally applicable rules.
During taxing the canopy should be closed and the control stick secured with pilot's belts.
For taxing, the sailplane should be balanced to stay on the nose wheel. Removing the tail ballast or putting additional weight on the pilot’s seat should do balancing.

NOTE:

Pushing the sailplane by means of wing or tailplane tips as well as control surfaces is prohibited.

3.2.4 STORAGE AND ROAD TRANSPORTATION

STORAGE

The sailplane should be stored in dry and vented room. In case of a prolonged storage the anti corrosive protection of fittings is necessary (e.g. with a grease).
When stored in de-rigged condition the sailplane components should be positioned in a way to avoid the permanent deformations:

- wings - leading edge down, resting on spar root (near root rib) and on trapeze part end using the soft, fitted support,
- fuselage - on wheels, supported under the tailskid; under the fuselage cockpit portion a soft fitted support may be used,
- tailplane - leading edge down, resting on both tips on a soft, fitted support.

NOTE:

The sailplane, after parking in the open air, must be inspected to ensure it is free of water. Then dry, clean and vent the whole structure.

ROAD TRANSPORTATION

The sailplane should be carried on a trailer adopted for sailplane transportation, having the devices for fastening the wings, fuselage and tailplane.
To prepare the sailplane for ground transportation it is necessary to:

- check the sailplane to be complete,
- empty the cockpit,
- immobilize the control stick by means of pilot's belts,
- lock the canopy and the window,
- put a cover on the canopy,
- secure against knocking the ends of control systems elements protruding out of the wings,
- fix the sailplane components on trailer in a way to avoid damages and permanent deformations (see: storage - the tailplane may be positioned level).

NOTE:

When using open trailed secure the sailplane with covers.

3.2.5 CLEANING AND CARE

The sailplane should be washed with water and normal detergents using the sponge or a soft rag. After washing check the drainage holes to be not clogged and dry, if necessary, the structure inside (it concerns especially the air brake boxes). For washing the textile parts the washing agents acc. to the procedure's directions should be applied. The cockpit should be regularly cleaned with a vacuum cleaner.

NOTE:

The use of organic solvents (gasoline, nitro, etc.) for perspex cleaning is prohibited.

3.2.6 SAILPLANE RIGGING AND DE-RIGGING

A) Rigging team: 2 persons (or 3 persons having no assembly jigs).
B) Rigging jigs: fuselage support, wing tip support (about 1.2 m high).
C) Rigging procedures:
   1. clean and grease all fittings, bolts and joints of control systems,
   2. put the fuselage on the support (having no support one person should hold the fuselage), open the canopy, put the air brake lever front, open fuselage inspection hole, pull out the rear bolt to its full extent,
   3. rig the right-hand wing first: the spar end should be inserted into the fuselage, align the wing/fuselage fittings, insert the right-hand main bolt into "1/2" location (bolt lever place into the grip), insert the left-hand main bolt also into "1/2" location (as above), insert the right-hand rear bolt till stop (see: Fig. 3-3),

CAUTION:

THE BOLTS SHALL BE INSERTED BY HAND ONLY, NO TOOLS ALLOWED. IN CASE OF JAMMING (EXCESSIVE MOTION DRAG) STOP THE RIGGING AND CHECK THE FITTINGS AND BOLTS FOR CORRECT CLEANING.

NOTE:

During rigging check the fitting of fuselage and wing automatic connections of air-brake and ailerons control systems.

   4. rest the wing tip on the support (having no support one person should hold the wing),
   5. left-hand wing rigging: insert the spar end into the fuselage, align the wing/fuselage fittings, insert the left-hand main bolt till it will be secured by a click, then the right-hand main bolt on the same way,
   6. tailplane rigging: deflect the rudder till to stop, align the tailplane/fuselage position (the front stabilizer pins shall be fitted into the fuselage fittings), insert the rear bolt (placing the latch in lower position) till it gets secured by means of latch. The elevator is connected automatically (see: Fig. 3-4),

7. check securing of the main wing bolts and the rear bolt of tailplane, close the fuselage inspection hole.

De-rigging requires the reverse sequence.

3.2.7 RIGGING AND DE-RIGGING OF THE SPECIAL BALLAST

Rigging or de-rigging of the Special ballast requires the following sequence:

- remove cover of the special ballast bay,
- put in or take out appropriate number of ballast weights (pay attention to weights and ballast bays numbers),
- replace the cover of the ballast bay.

Assembling and disassembling of the special ballast bay cover is shown in item 3.5.9 of this Manual.

3.2.8 RIGGING AND DE-RIGGING OF TAIL BALLAST

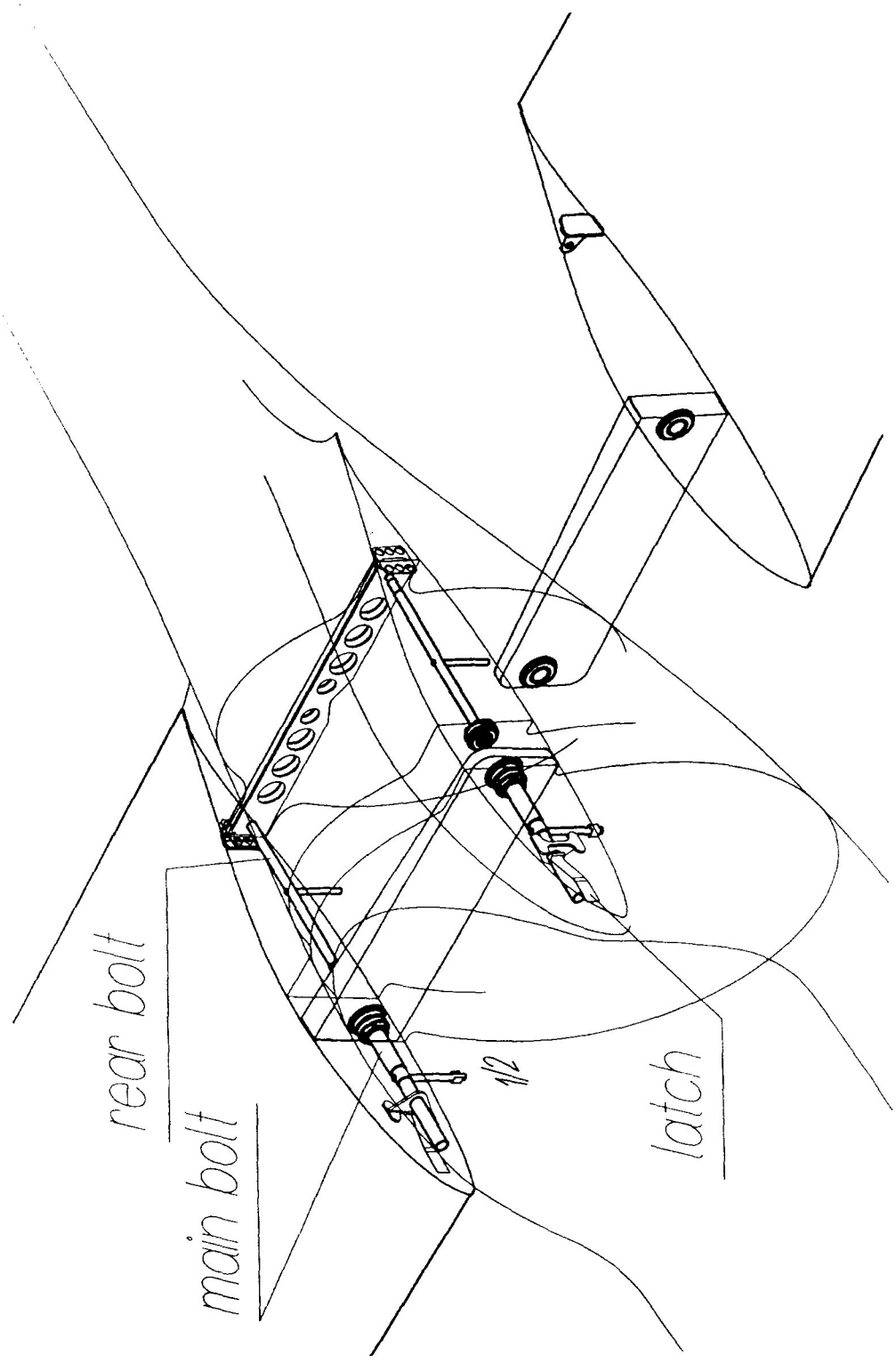
Rigging or de-rigging of the tail ballast requires the following sequence:

1) remove the tail plane,
2) press the latch and turn the locking device clockwise until the cover unlocks,
3) remove the tail ballast bay cover,
4) put in or take out appropriate number of ballast weights (to determine allowable number of ballast weight use the TAIL BALLAST LOADING TABLE from the Flight Manual);
5) place the cover and press it slightly, then turn the locking device counter clockwise till the latch clicks (see Fig.2-1),
6) rig the tailplane.

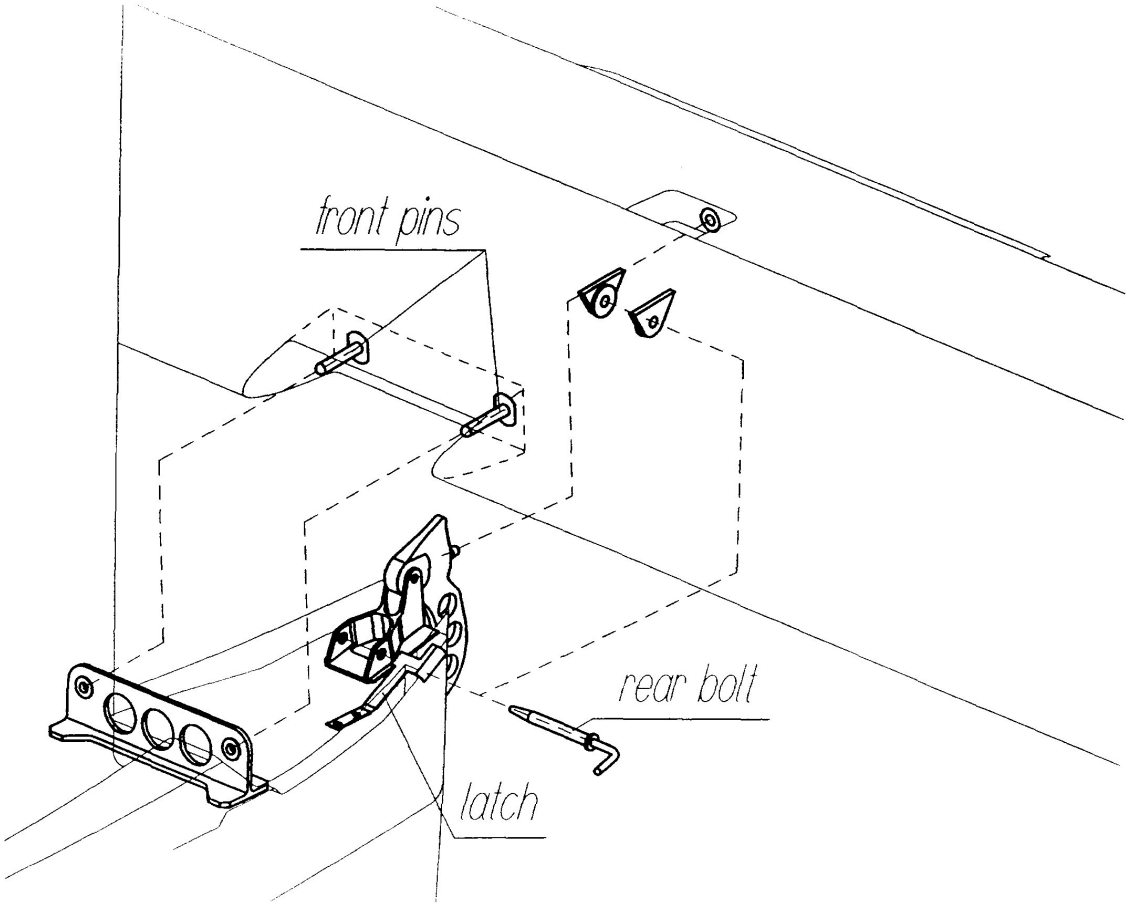
Fig. 3-2 (reserved)

CAUTION:

THE TAIL BALLAST BAY COVER SHOULD BE SECURED. BOTH ENDS OF LOCKING DEVICE SHOULD BE PLACED INSIDE THE CUTS IN POSITIONING PINS.



Rigging the wings
Fig. 3-3



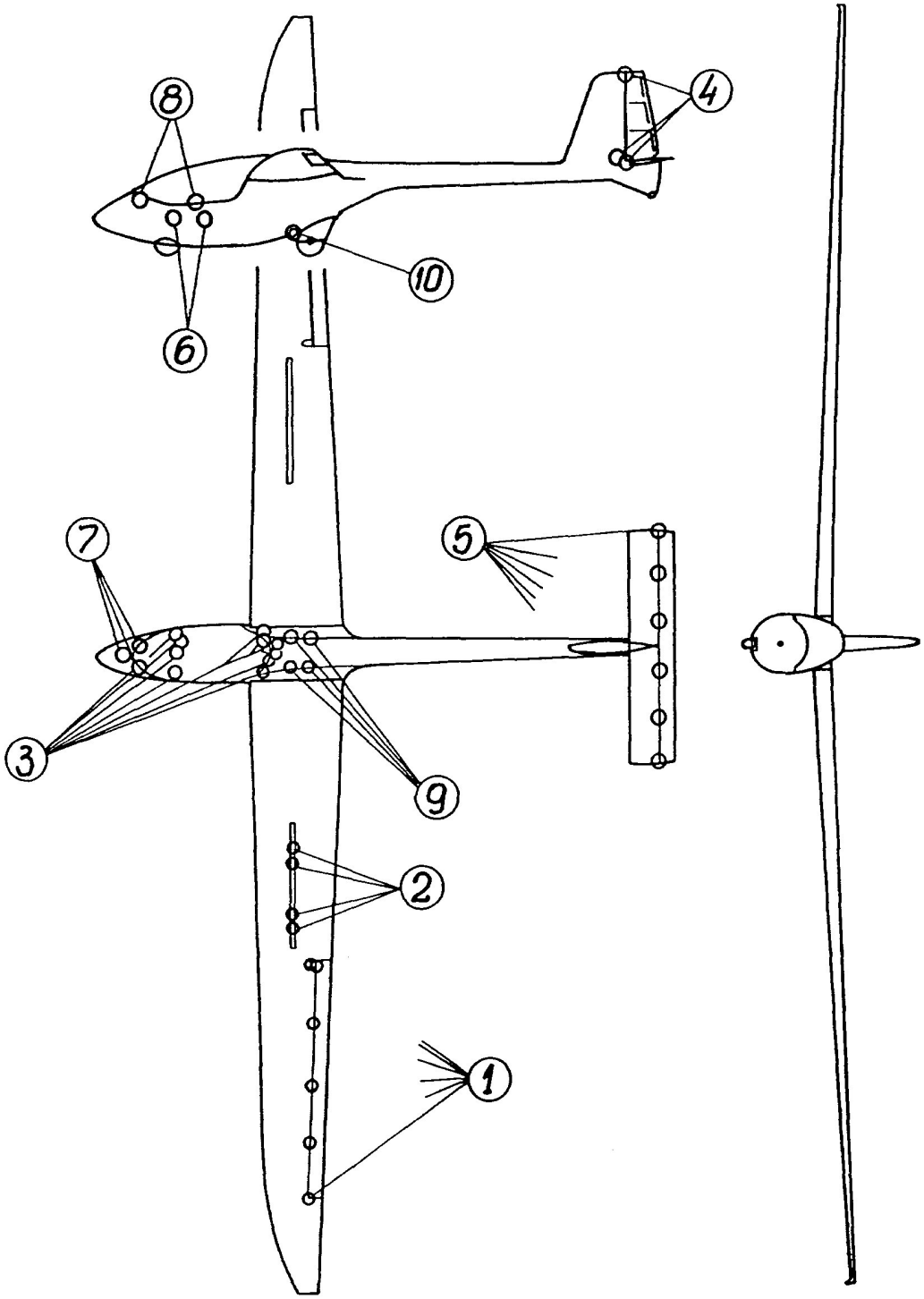
Rigging the tailplane Fig. 3-4

3.3 LUBRICATION

Grease for bearings should be used for the lubrication. The lubrication is applied to the joints having moveable surfaces or ball bearings with open balls (self-aligning).

Lubrication items as shown on Fig. 3-5:

1. Aileron hinges and self-aligning bearings of the aileron control system in wings.
2. Suspension of the air brake plates.
3. Self-aligning and articulated bearings of the aileron, elevator and air brake control system.
4. Rudder hinges and rudder tension members ends.
5. Elevator hinges.
6. Air brake push-rod guide and its fitting.
7. Guide and bearings of pedals.
8. Canopy locks and emergency jettison mechanism.
9. Automatic joints of aileron and air brake control system.
10. Main wheel arm bearings.



Lubrication plan
Fig. 3-5

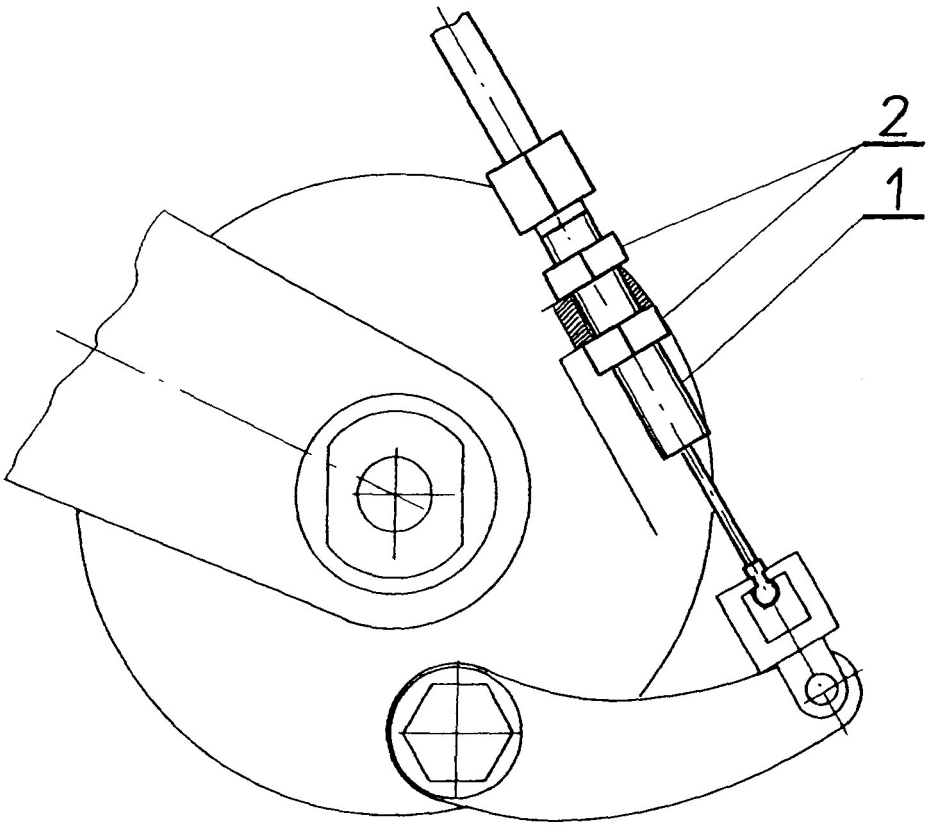
3.4 ADJUSTMENTS

3.4.1 ADJUSTMENT OF WHEEL BRAKE LEVER IDLE MOVEMENT

The adjustment is to be carried on acc. to Fig. 3-6, by means of adjusting screw (1) at the main wheel hub. The adjusting screw is accessible after removing the inspection door in the wheel fairing. Correctly adjusted brake has the minimum idle movement, which ensures the complete brake shut-off when the pilot's lever is released. After every adjusting the adjusting screw shall be secured with locking nuts (2).

NOTE:

Too large an idle movement results in decreasing brake efficiency. Too small an idle movement increases rolling drag and brake shoe wear.



Adjustment of wheel brake idle movement
Fig. 3-6

3.4.2 ADJUSTMENT OF AIR BRAKE DEAD-POINT CONTROL FORCE

Every spring pulling the cap to the plate should be tensioned so, that the force necessary to lift the cap (applied in spring location) at air brake extended ranges 1.2 daN = 2.7 lbf. This does not concern the springs on short screws (on the fuselage end of the cap), where the nuts should be tightened so that about 1 mm = 0.04 in of the screw protrudes. The adjustment is carried on with the nuts pressing the springs.

3.4.3 ADJUSTMENT OF CANOPY JETTISON FORCE

To adjust the force, screw in (to decrease the force) or screw-out (to increase the force) the pin (1) (see: Fig. 3-12). Normally the canopy jettison force adjustment is not necessary. The correct fitting of canopy and hinge is to be adjusted by means of screws (6). The canopy should be fixed without play. The pin (1) should press the canopy into the hinge.

3.4.4 ADJUSTMENT OF SIMULTANEOUS ACTION OF TAKE-OFF HOOKS

For the adjustment, the adjusting screw (9) is to be used (see: Fig. 2-6) It is accessible when pilot's seat pan is removed. The correctly adjusted towing cable releasing system works so, that for released cockpit hand-grip both hooks are locked and the cables at the hooks have a perceptible play. When the cockpit hand-grip is pulled both hooks are simultaneously released, using the whole movement range (no hand movement of lever of any hook towards releasing can be made).

WARNING:

THE TOWING CABLE RELEASING SYSTEM, WHEN NOT CORRECTLY ADJUSTED, MAY CAUSE DIFFICULTIES IN RELEASING THE TOWING CABLE OR SELF-RELEASING.

3.5 ASSEMBLY AND DISASSEMBLY OF SAILPLANE COMPONENTS

CAUTION:

BEFORE ASSEMBLING OF THE SAILPLANE COMPONENTS ALL THE WORKING METAL SURFACES SHOULD BE CLEANED AND GREASED. THE REPEATED USE OF SELF-LOCKING NUTS, SAFETY PINS AND SECURING WASHERS IS PROHIBITED.

3.5.1 ASSEMBLY AND DISASSEMBLY OF THE AILERON

Disassemble the aileron on the following way (Fig. 3-7):

- Disconnect the aileron control system by means of removing the nut (1) and screw (2) with connect the push-rod end with the aileron lever.
- Remove the safety pin (3) and the nut (4).
- Deflect the aileron full down and take it out axially towards wing-tip.

Assembly requires the reverse sequence.

3.5.2 ASSEMBLY AND DISASSEMBLY OF THE AIR BRAKE

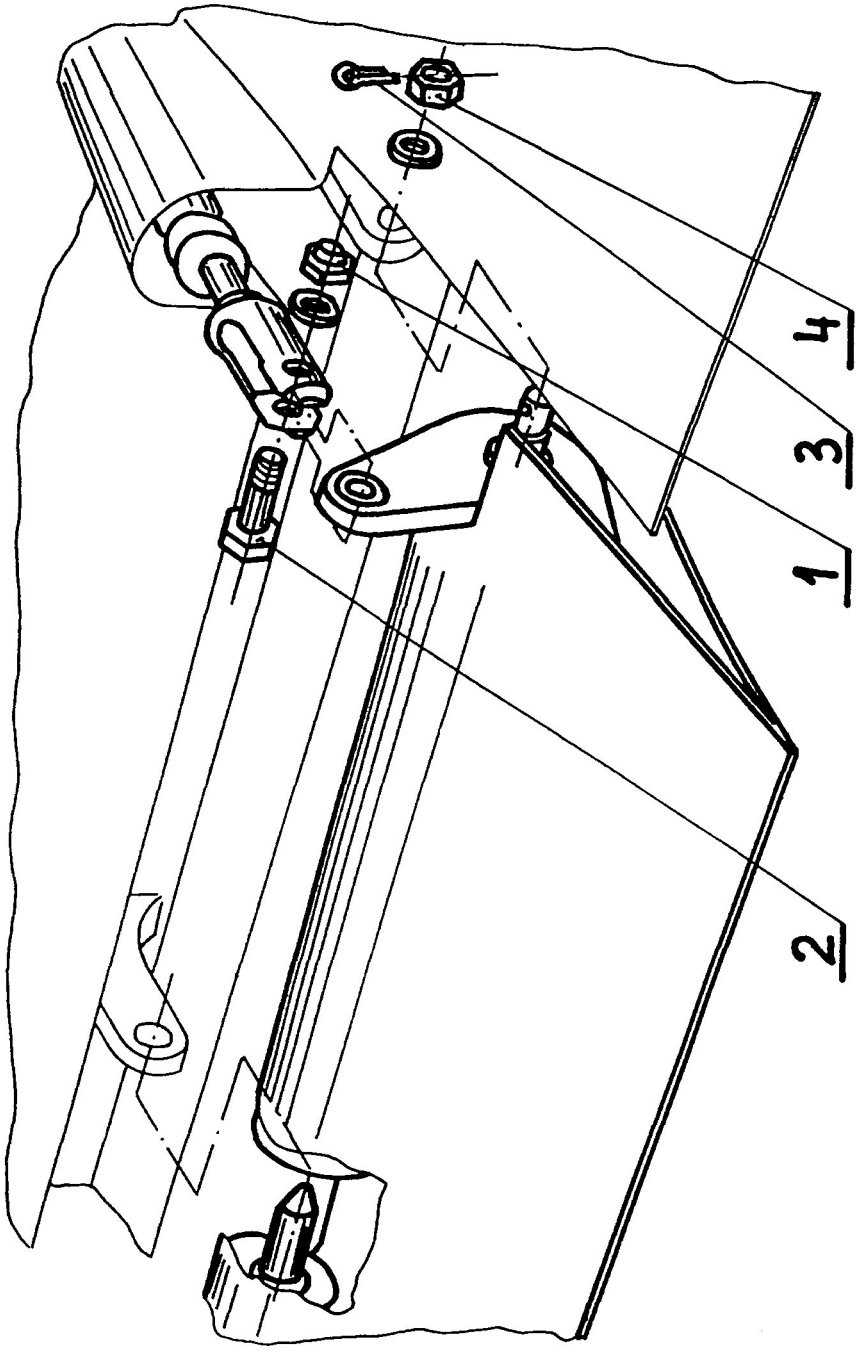
Disassemble the air brake plate in the following way:

- Extend the air brake.
- Remove the fixing rings out of the bolts fitting the plate to the arms of the air brake.
- Remove the bolts fitting the plate.

Disassemble the caps by:

- Remove the nut and remove the cap tensioning springs.
- Remove the cap, paying attention not to bend it.

Assembly requires the reverse sequence. Remember to adjust the dead-point control force if the caps were disassembled.



Aileron assembly
Fig. 3-7

3.5.3 ASSEMBLY AND DISASSEMBLY OF THE RUDDER

To disassemble the rudder (Fig. 3-8):

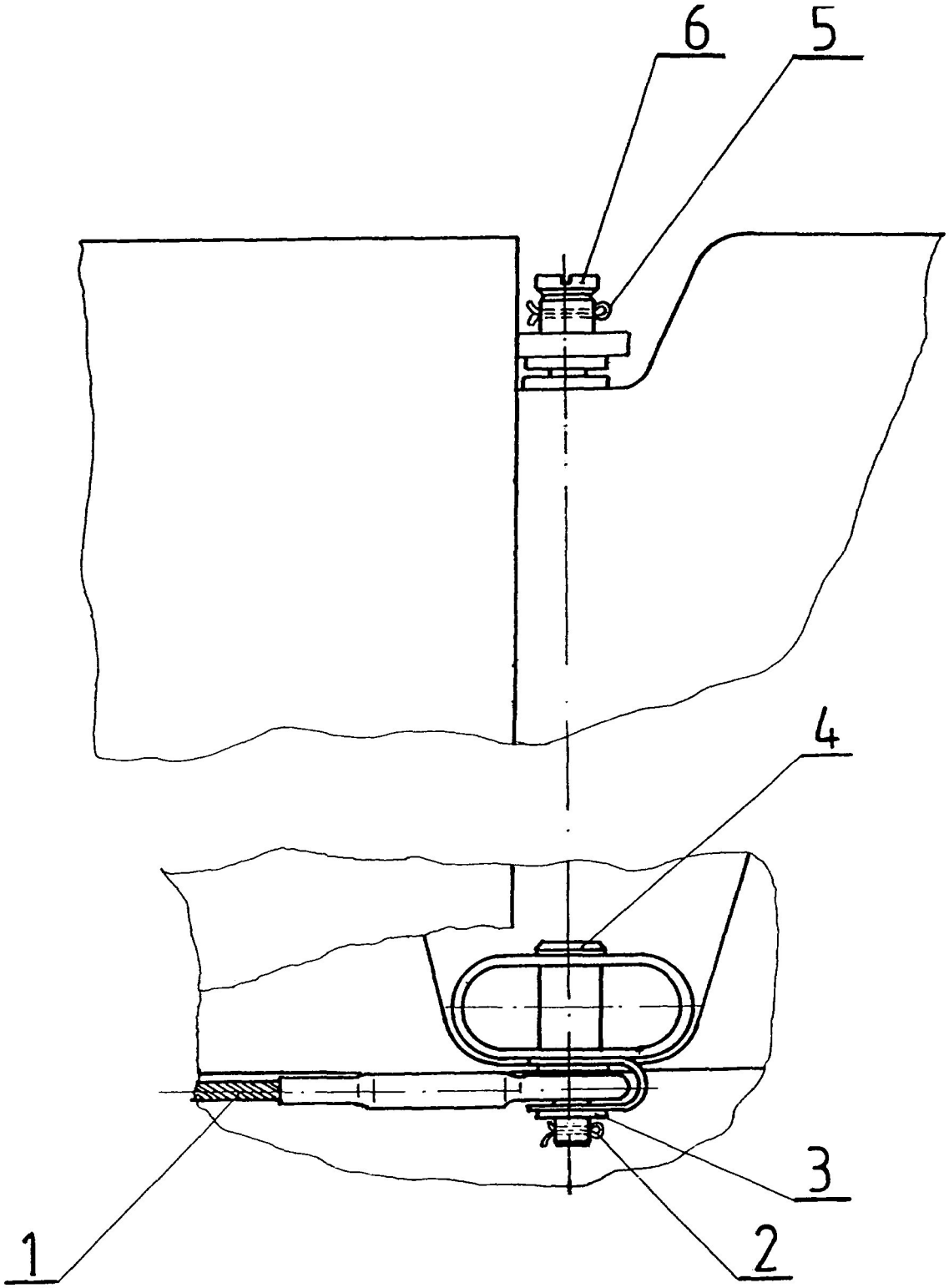
- Disconnect the cable (1) of the rudder control system by means of removing the safety pin (2), washer (3) and bolt (4) which connect the cable end with the rudder lever.

NOTE:

To avoid the cables be pulled inside the fuselage it is recommended, before the cables are disconnected, to lock the pedals on their stirrups or fix them to release the cable tensioning.

- Remove the split-pin (5) and bolt (6), deflect the rudder slightly backwards and remove the rudder axially upwards.

Assemble requires the reverse sequence.



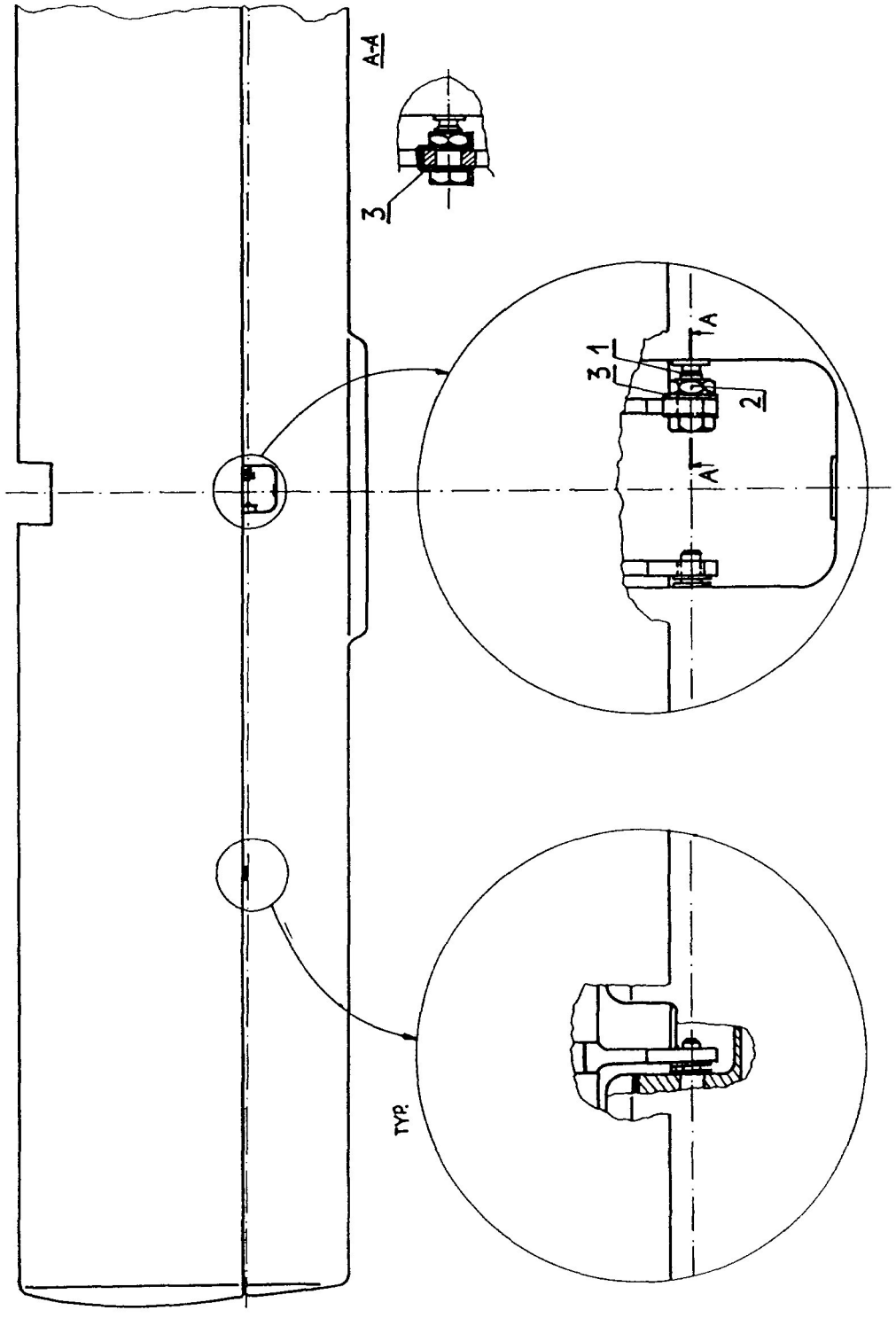
Rudder assembly
Fig. 3-8

3.5.4 ASSEMBLY AND DISASSEMBLY OF THE ELEVATOR

To disassemble the elevator, the following procedure should be used (Fig. 3-9):

- Bend-off the wings of the securing washer (3), remove the nut (2) and the bolt (1).
- Take-out the elevator using axial movement.

Assembly of the elevator requires the inverted sequence. The securing washer shall be replaced with a new one.



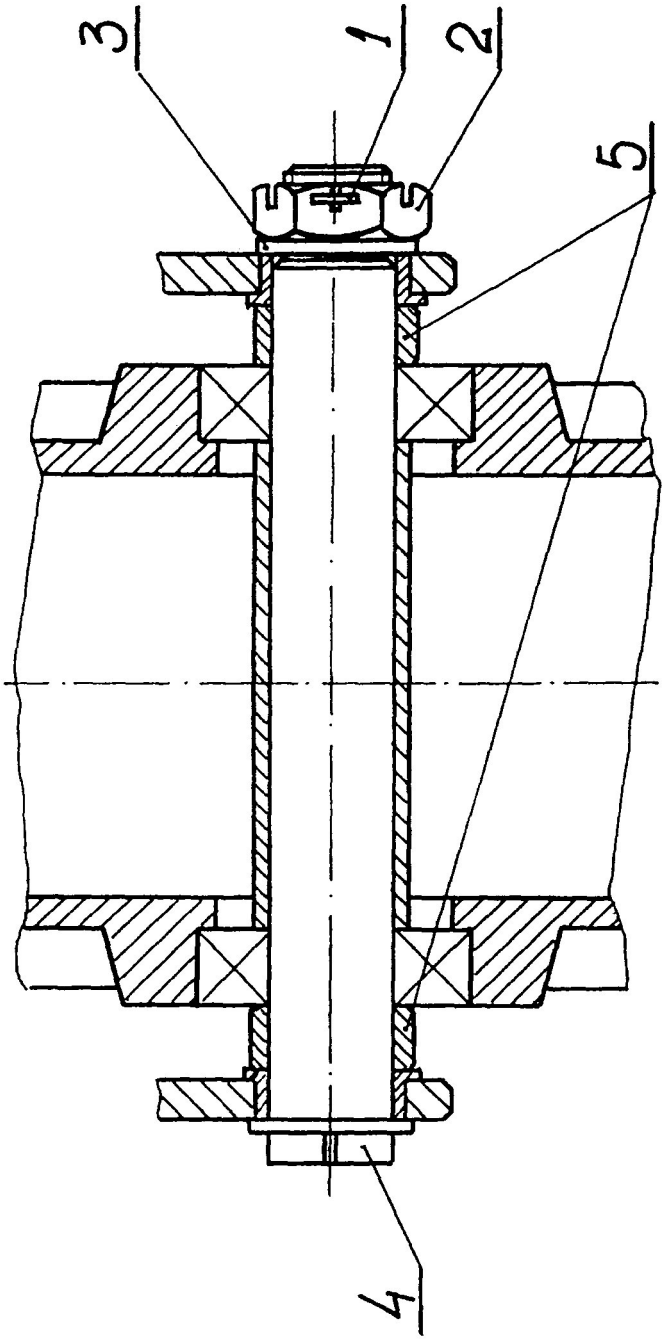
Elevator assembly
Fig. 3-9

3.5.5 ASSEMBLY AND DISASSEMBLY OF THE NOSE WHEEL

Removal of the nose wheel requires the following sequence (Fig. 3-10):

- remove the securing safety pin (1), remote the nut (2) and washer (3),
- remove the nose wheel axle (4).

Assembly of the nose wheel requires the reverse sequence. The distance sleeves (5) shall be installed.



Nose wheel assembly
Fig. 3-10

3.5.6 ASSEMBLY AND DISASSEMBLY OF THE MAIN UNDERCARRIAGE

Wheel disassembly (Fig. 3-11):

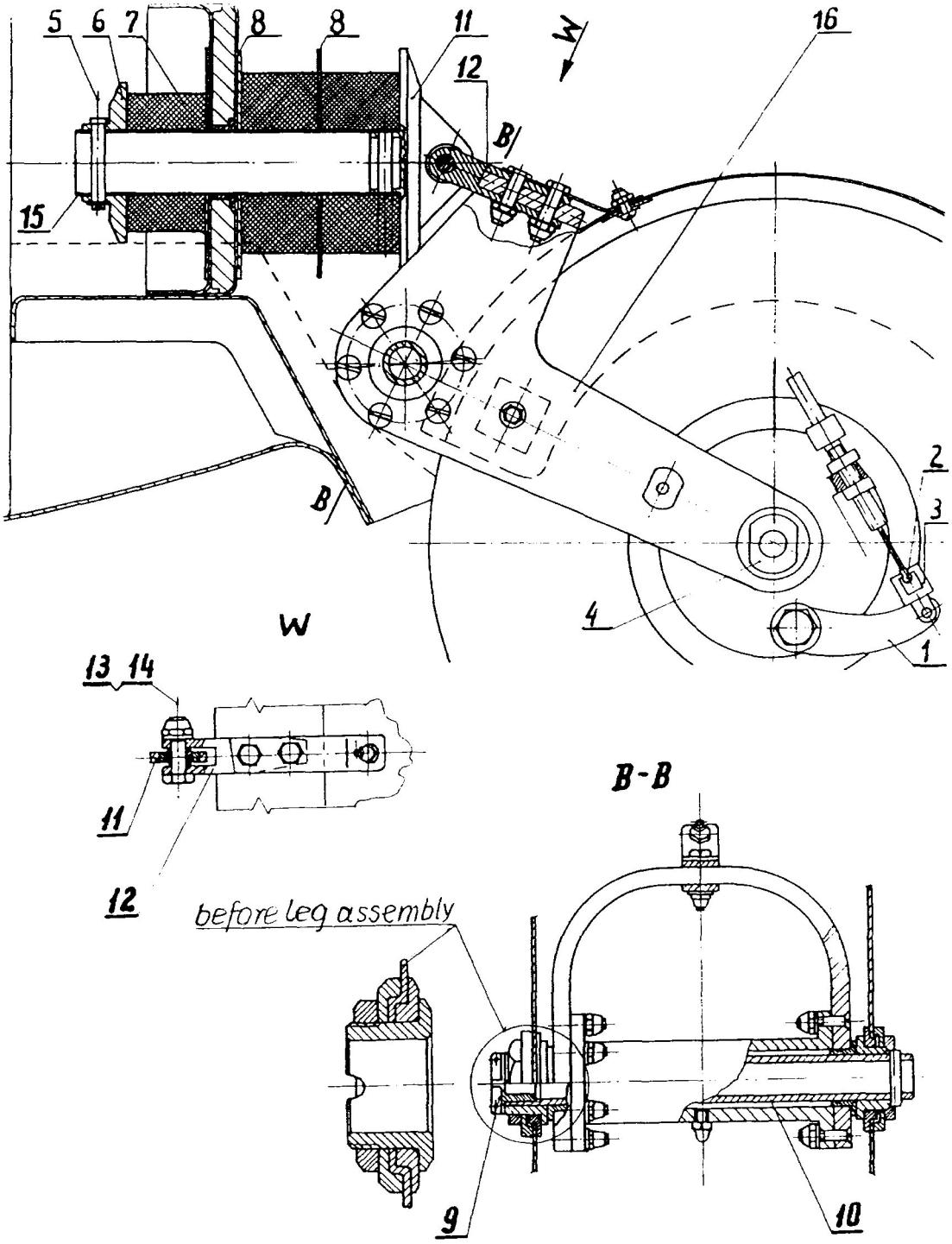
- remove the securing safety-pin out of the main wheel axle, remove the castellated nut, and remove the washer,
- disconnect the tension member of wheel brake lifting the brake lever (1) till the end of tension member (2) moves out of the connector (3),
- remove the axle and take out the wheel.

Assemble of the wheel requires the reverse sequence. Pay attention that the bolt (4) engages the hub hole. Remember to install the distance sleeves.

Disassembly of the arm of main undercarriage and the shock absorber:

- disassemble the wheel,
- remove the safety pin and take out the bolt (5),
- remove the locking fitting (6), bumping ring (7) and insert disc (8),
- remove the securing element out of the special screw (9), remove the screw,
- remove the arm axle (10),
- remove the arm (16) with the shock-absorber axle (15),
- remove the nut (13) and the screw (14),
- remove the shock-absorber fitting (11) out of the arm fitting (12).

Assembly of the shock-absorber and main undercarriage arm requires the reverse sequence.



Main undercarriage assembly
Fig. 3-11

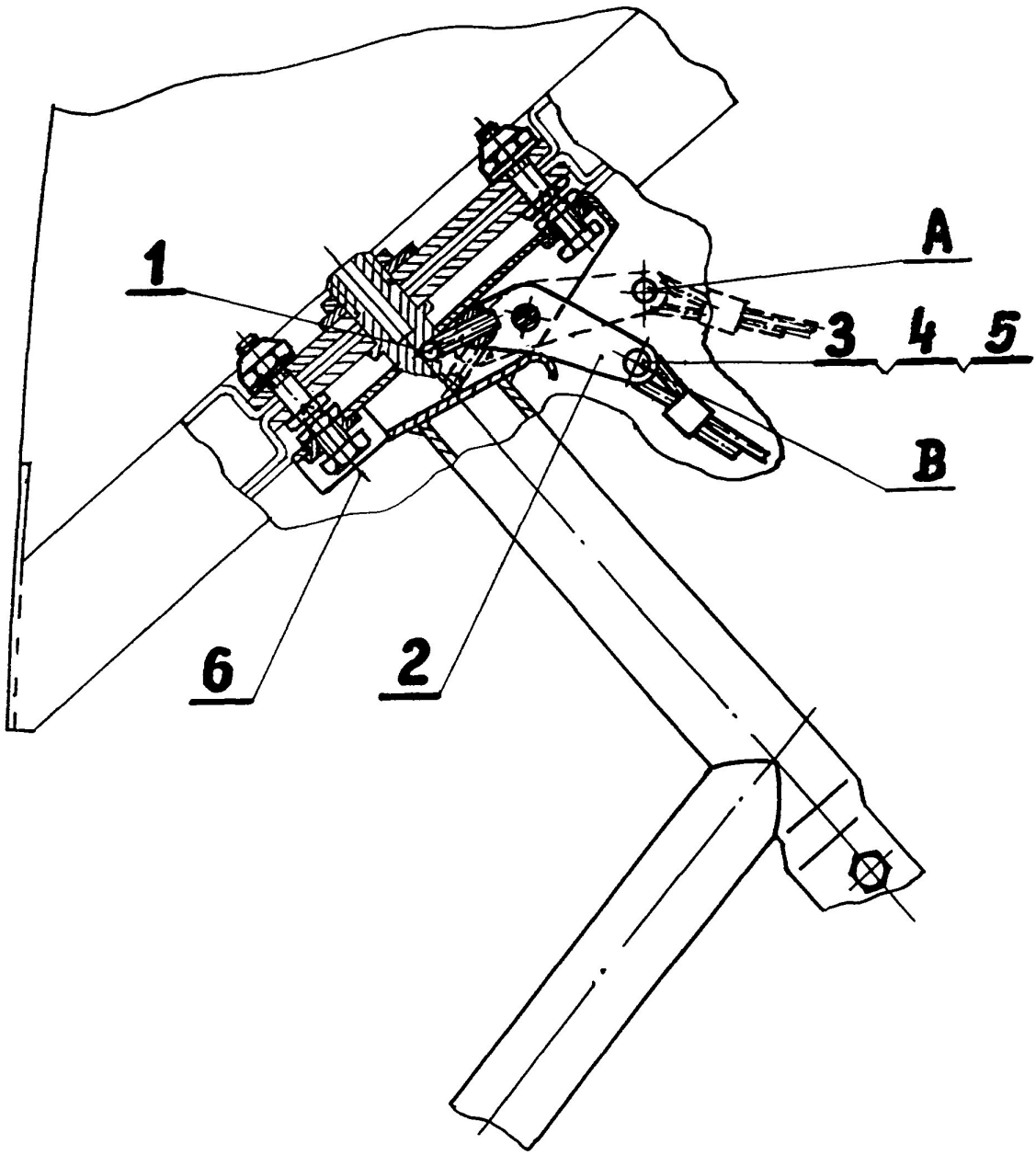
3.5.7 ASSEMBLY AND DISASSEMBLY OF THE CANOPY

Disassembly and assembly of the canopy is to be performed by two persons on the following way (Fig. 3-12):

- Take place in the cockpit and close the canopy (without locking it).
- Take care for having an external assurance to avoid the canopy damages.
- Pull the canopy emergency jettison handle.

The assembly of canopy should be carried on with the mechanism located in "canopy opened" position, as follows:

- Put the pin (1) into position as shown on Fig. 3-12.
- The canopy jettison lever (2) put into (A) location.
- Put the canopy into position as shown on Fig. 3-12.
- Turn the canopy jettisoning lever into (B) location and check the correct canopy locking.



Canopy assembling
Fig. 3-12

3.5.8 ASSEMBLY AND DISASSEMBLY OF THE INSTRUMENT PANEL

To disassemble the instrument panel:

- Disconnect the duct connector of instruments pressure system.
- Disconnect the wiring of electrical systems and antenna.
- Remove the securing safety-pin (5) and washer (4) out of the bolt (3) (see: Fig. 3-12) fixing the jettison cable, remove the bolt (3).
- Remove three screws fixing the instrument panel to its column.
- Remove the instrument panel.

Assembly requires the reverse sequence.

CAUTION:

AFTER EVERY INSTRUMENT PANEL ASSEMBLY, CHECK THE CORRECT FITTING OF THE CANOPY EMERGENCY JETTISON CABLE.

3.5.9 ASSEMBLY AND DISASSEMBLY OF THE PILOT'S SEAT PAN, THE COVER OF THE SPECIAL BALLAST BAY, AND THE LUGGAGE COMPARTMENT

Disassembly requires the following procedure:

- Remove the screws fixing the cover of the special ballast bay.
- Remove the cover of the special ballast bay.
- Remove the screws fixing the pilot's seat pan.
- Tie-off the bellow covering the control stick.
- Remove the pilot's seat.
- Remove the screws fixing the luggage compartment.
- Remove the luggage compartment.

Assembly requires the reverse sequence.

NOTE:

To get access to the special ballast bay remove the cover only. Removing of the pilot's seat pan is not necessary.

SECTION 4

PARTS SERVICED ACCORDING TO THEIR OWN MAINTENANCE DOCUMENTS

4.1 INTRODUCTION

4.2 LIST OF THE PARTS APPROVED INDEPENDENTLY OF THE SAILPLANE SERVICED ACC. TO THEIR OWN DOCUMENTS

4.1 INTRODUCTION

Section 4 contains the list of parts approved independently of the sailplane, which are serviced acc. to their own maintenance documents. These documents should be enclosed to this Manual.

4.2 LIST OF THE PARTS APPROVED INDEPENDENTLY OF THE SAILPLANE, SERVICED ACC. TO THEIR OWN DOCUMENTS

Item	Part	Valid maintenance document
1	airspeed indicator	Aircraft Equipment Certificate for airspeed indicator
2	altimeter	Aircraft Equipment Certificate for altimeter
3	variometer	Aircraft Equipment Certificate for variometer
4	magnetic compass	Aircraft Equipment Certificate for magnetic compass
5	variometer compensator	Aircraft Equipment Certificate for variometer compensator
6	pilot's belts	Operation Manual for safety belts
7	nose towing hook (TOST E 85)	Operating Manual for Tow Releases. Series: E 85 - Nose Tow Release
8	C.G. towing hook (TOST Europa G 88)	Operating Manual for Safety Tow Releases. Series: Europa G 88 Safety Tow Release

Continued on the next page.

Item	Part	Valid maintenance document
9	main wheel	Adjustable wheel brake lever manual. Authorized Release Certificate
10	nose wheel	(maintenance - free) Authorized Release Certificate

SECTION 5

PERIODIC WORKS

5.1 INTRODUCTION

Section 5 contains the list and time-schedule of inspections and works which should be periodically performed to ensure safe and efficient operation of the sailplane. The periodic works must be performed only by persons having the skill and qualifications and be approved by the Airworthiness Authority.

5.2 LIST OF PERIODIC WORKS

1) Check the structure integrity and external surfaces of the sailplane in rigged condition with special attention paid to the wing skin near the fuselage, air brake box inside, vicinity of aileron suspension, undercarriage fitting, nose wheel, tailskid and take-off hooks.
2) Check the plays in rigging acc. to item 2.6.1.
3) Check the condition of: spar extending ends, especially around the fittings, ribs near the fuselage especially near the rear fittings and connections with the spar extending ends.
4) Check the condition of main frames after de-rigging the wings, especially near the fittings and glue joints.
5) Check the rest of the sailplane components after de-rigging, pay attention to the fittings.
6) Check the rigging and de-rigging of the sailplane.
7) Check the deflections of the control surfaces acc. to Fig. 1-1.
8) Check the condition and operation of the instruments and transceiver.
9) Check the plays in control systems acc. to item 2.6.2
10) Check the sure canopy locking and correct operation of emergency jettison.
11) Check the condition of the nose wheel, main undercarriage, tailskid and small wheels on the wing tips as well as shock-absorber and wheel brake.
12) Check the sailplane inner structure.
13) Check the condition and proper operation of locking elements of the bolts joining the wings and tailplane to the fuselage.

14) Check the condition and sure securing of the connection of sailplane structure parts and control systems.
15) Check the condition and correct operation of the towing cable release system and hooks. The hooks should release simultaneously.
16) Check the condition of anti-corrosion protection of metal parts.
17) Check the electrical bonding between the towing hook and not painted part of the control stick.
18) Clean and grease the parts to be lubricated acc. to item 3.3.
19) Check the control forces acc. to item 2.6.3.
20) Check the correct operation of control system.
21) Check the tightness of instrument pressure system.
22) Check the adjustment of air brake acc. to item 3.4.2.

5.3 SCHEDULE OF PERIODIC WORKS

The schedule of periodic has to be used:

Period	Work acc. to item 5.2
On the beginning of flying season or after prolonged storage	1 through 22
After every 50 flying hours	1, 9, 11, 12, 14
After every 200 flying hours	1 through 9, 11 through 18
After every 1000 flying hours	the 1000 flying hours inspection to be performed only by persons authorized by the manufacturer
After heavy landing	1 through 5, 8, 11, 12, 19, 20, 21
On the end of flying season or before the prolonged storage	1 through 5, 9, 11, 12, 16, 18

SECTION 6

ALLOWED SAILPLANE LIFE-TIME

6.1 INTRODUCTION

Section 6 contains the lifetime data on sailplane and parts, which are subjected to the replacement except of those, listed in Sections 4 and 9.

6.2 ALLOWED SAILPLANE LIFE-TIME

The allowed sailplane lifetime except of parts listed in item 6.3 and Sections 4 and 9 is 4000 flying hours.

NOTE:

The allowed lifetime will be extended in line with fatigue-test advance.

6.3 LIST OF THE PARTS TO BE REPLACED WITHIN THE SAILPLANE LIFE-TIME

The following parts should be replaced regardless of their condition:

Item	Part	Allowed life-time
1	rudder tension members	1000 flying hours or 6 years
2	wheel brake tension member	1000 flying hours or 6 years
3	towing cable release tension members	1000 flying hours or 6 years
4	canopy jettison tension member	1000 flying hours or 6 years
5	undercarriage shock-absorber rubber rings	2000 landings or 6 years

SECTION 7

WEIGHT AND BALANCE

7.1 INTRODUCTION

Section 7 contains the allowed weight and C.G. location range for empty sailplane as well as the weighting and C.G. location calculation procedure and definition of the completion of empty sailplane. Moreover Section 7 informs on the allowed range of control surfaces C.G. locations and checking methods.

7.2 WEIGHTING AND C.G. LOCATION OF EMPTY SAILPLANE

EMPTY SAILPLANE WEIGHT

Minimum empty weight ..... 180 kg = 396.8 lb
Maximum empty weight ..... 190 kg = 418.9 lb
Maximum fuselage and tailplane weight ..... 112 kg = 246.9 lb

METHOD OF EMPTY SAILPLANE WEIGHTING AND C.G. LOCATION CALCULATION

1) The sailplane should be in completion acc. to item 7.3.
2) Prepare the Weighting Protocol acc. to the pattern shown on Fig. 7-1.
3) Put the position, level and tare 2 balances having the measurement accuracy not lower than 6 0.2 daN = 4.5 lbf. For the cell "Tare 1" record the nose wheel balance result in the non-loaded condition. For the cell "Tare 2" record the tailskid balance result in the non-loaded condition.
4) Put the sailplane on the balances as shown on Fig. 7-1 namely on nose wheel and tailskid. Under the tailskid put the adjustable support. The wings should be level and supported on one tip with the possibly lowest force.
5) Level the sailplane by means of adjustable support under the tailskid in such a way that the levelling point on the wing leading edge near the root rib is the same level as the upper surface of trailing edge in the same cross section. For checking the transparent tube filled with water without air bubbles should be used.
6) Find the balance results and record in the cell "Gross 1" the result of the balance under the nose wheel and in the cell "Gross 2" the result of the balance under the tailskid.

7) Weight the tailskid support and add its weight to the cell "Tare 2". If the support under the nose wheel has been used, its weight should be added to "Tare 1" cell.
8) Calculate the weight and C.G. location acc. to the formulas and record into the proper cells (items 1 and 2).

NOTE:

If the balance results are in [kG] - the weight of the sailplane in [kg] is equal to the calculated weight.
If the balance results are in [daN] - the weight of the sailplane in [kg] is equal the calculated value multiplied by 0.98.

9) For the calculated weight read of the diagram Fig. 7-2 the allowed C.G. location range and record into the Weighting Protocol (item 3).
10) Weight the sailplane components and record their weight into the Weighting Protocol (item 4).
11) Add the weights of sailplane components and record this sum as the sailplane weight.

NOTE:

The sailplane weight of items 1) and 4) may be different due to inaccuracy of balances.

12) The Weighting Protocol should be enclosed to the Certificate of Manufacturing - Repair.
13) The weighting results should be recorded into the FLIGHT MANUAL.

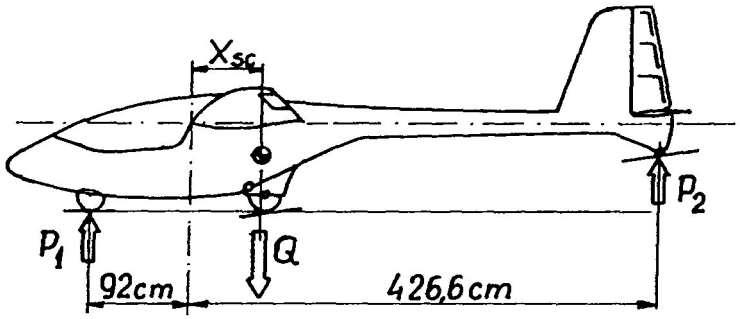
7.3 COMPLETION OF THE EMPTY SAILPLANE

The empty sailplane with the equipment necessary for flight should comprise the complete systems and equipment listed by item 2.4 (in Section 2 of this Manual). When sailplane is equipped with various optional systems and equipment not provided in standard sailplane (acc. to Section 9 of this Manual) the way to consider this equipment in weight and balance is contained in Section 9 of this Manual. During weighting

the elements, which do not belong to the sailplane, equipment should be removed and ballast bays should be empty.
Tail ballast cover should be removed.

SAILPLANE WEIGHTING PROTOCOL

Type: B1-PW-5 Serial No: ..... Registration: .....



Support P1		Support P2	
Weight units	kg, kG, daN	Weight units	kg, kG, daN
Balance accuracy	± . . . . . [. . .]	Balance accuracy	± . . . . . [. . .]
Tare 1	. . . + . . . = . . .	Tare 2	. . . + . . . = . . .
Gross 1	. . . . .	Gross 2	. . . . .
Net 1= Gross 1 - Tare 1	. . . . .	Net 2= Gross 2 - Tare 2	. . . . .

1) Sailplane weight:

Q = Net 1 + Net 2 = ... [kg]

2) C.G. location of empty sailplane:
Xsc = (Net2*426.6 – Net1*92)/(Net1 + Net2) = ... [cm]

3) Limit allowed locations of empty sailplane C.G.:
from . . . . [cm] to . . . . [cm]

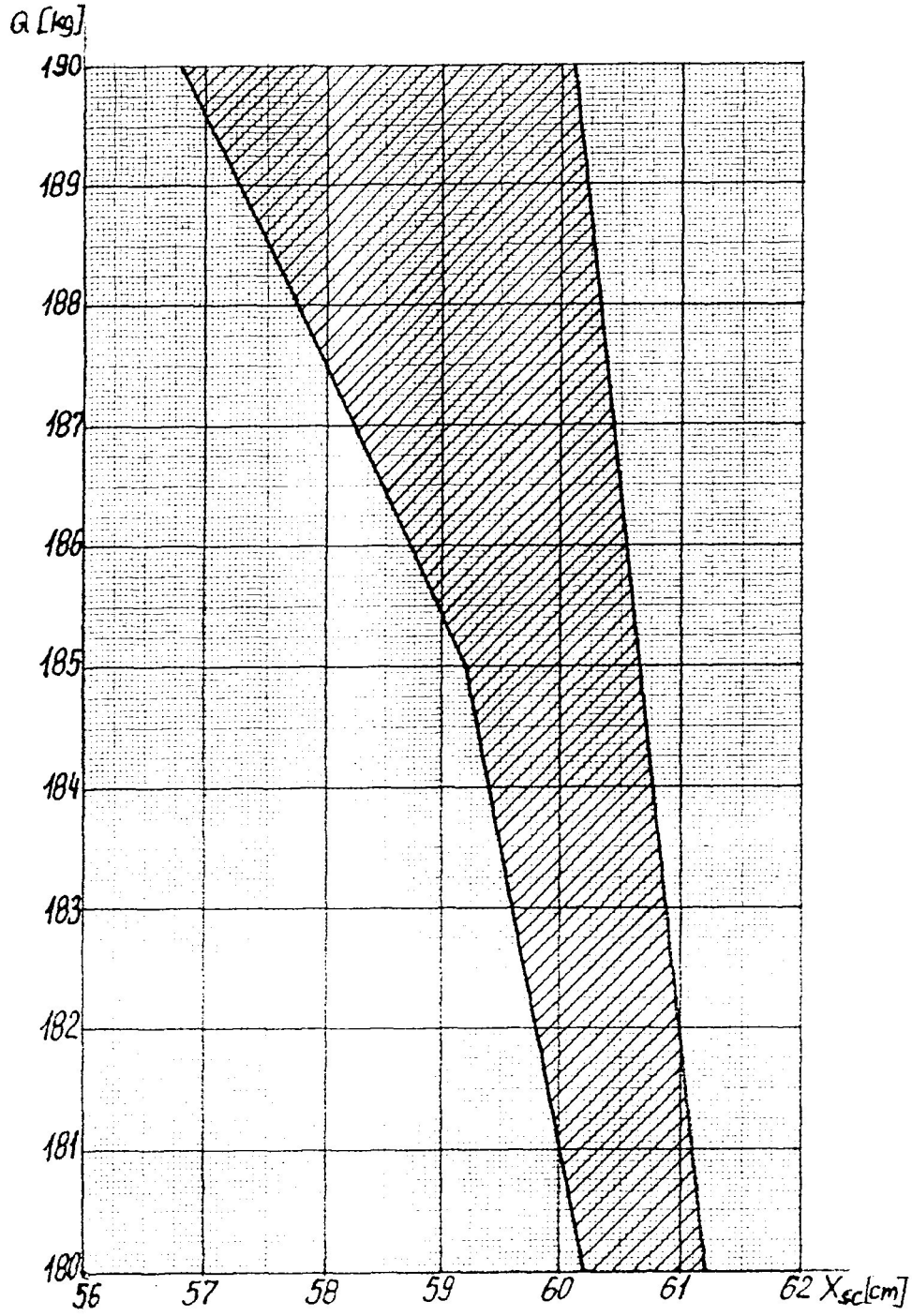
4) Weight of sailplane parts:

left-hand wing	. . . . [kg]
right-hand wing	. . . . [kg]
tailplane	. . . . [kg]
fuselage complete	. . . . [kg]
Sailplane weight	Σ = ... [kg]

5) Allowed empty sailplane weight: min. 180 [kg] max. 190 [kg]
Maximum fuselage with tailplane weight: 112 [kg]

Performed by: . . . . . Date: . . . . . Signature: . . . . . .

Specimen Sailplane Weighting Protocol
Fig. 7-1



Allowed range of C.G. location of empty sailplane
Fig. 7-2

7.4 CONTROL SURFACES MASS-BALANCE

The C.G. location of ailerons and rudder shall be contained within the range shown on Fig. 7-3. The elevator is non mass-balanced.

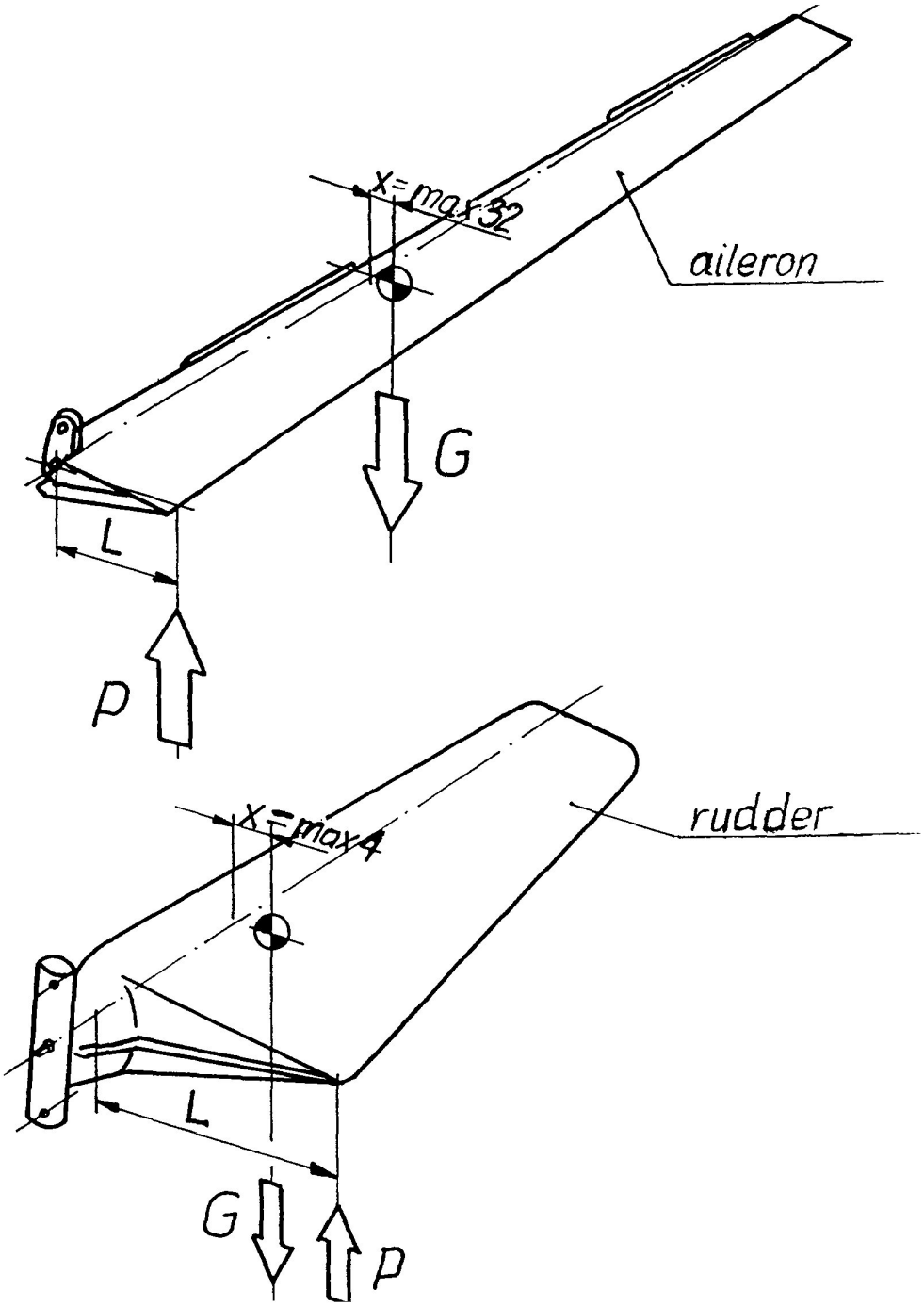
To check the C.G. location of control surface (acc. to Fig. 7-3) :

1) Support the control surface on the hinge axis free for rotation (aileron on the hinge pins, rudder on the lower pin and auxiliary pin located in the rudder upper sleeve).
2) Support the trailing edge on the balance. Find the dimension L (perpendicular to the hinge line) in mm and balance result P.
3) Weight the control surface to find the result G.
4) Location of the control surface C.G. aft of the hinge line is:

$$x = P*L/G$$

NOTE:

The balance results P and G shall be in the same units.



all dimensions in mm

Control surfaces mass - balance
Fig. 7-3

SECTION 8

REPAIRS

8.1 INTRODUCTION

Section 8 describes the way of repairing small damages of the sailplane. In case of every repair the conditions of item 8.2 shall be satisfied.

8.2 GENERAL CONDITION FOR REPAIRS

The user should comply with all conditions below:

CAUTION:

BEFORE PERFORMING OF ANY REPAIR THE PROPER AIRWORTHINESS AUTHORITY SHALL BE NOTIFIED TO ENSURE THAT THE SAILPLANE AIRWORTHINESS WILL BE NOT COMPROMISED.

1) Every repair should be recorded in the Sailplane Log Book. If after a repair no noticeable changes of weight and C.G. location of the empty sailplane have been observed, it should be recorded.
2) If the repair changes the weight and C.G. location of the empty sailplane, they should be found acc. to Section 7 of this Manual. If the allowed range shown in Section 7 has been exceeded, the eventual correction is to be made only by a person authorized by the manufacturer.
3) After every repair of aileron or rudder the C.G. position shall be checked acc. to Section 7 of this Manual. If the allowed range shown in Section 7 has been exceeded, only a person authorized by the manufacturer should make correction.
4) The user can perform only repairs described in this Manual. Other repairs are to be performed only by persons authorized by the manufacturer. In case of any doubt, the manufacturer should be contacted to prepare special repair instructions.
5) In case parts replacement are necessary, they should be ordered from the factory together with assembling elements. If necessary, special replacement instructions should be requested.

8.3 COMPOSITE PARTS REPAIR

8.3.1 REPAIR CONDITIONS

When repairing the sailplane composite parts it should be observed the relative humidity below 70% and temperature 19°C (66°F) through 28°C (82°F) in the room where the laminating and hardening are performed. Moreover the room should be clean, free of dust and good illuminated. For health reasons, good venting plus protection materials (clear gloves, apron, and mask) should be used.
Persons who perform repairs must be allowed by a physician and have appropriate qualifications approved by the Airworthiness Authority. After laminating (or gluing) the repaired structure shall be cured in a temperature 19°C (66°F) through 25°C (77°F) for at least 24 hours. After that, cure cycle in temperature 50 to 55°C (112 to 131°F) for 15 hours is necessary. Heating should be started at room temperature and performed with 5°C/h (9°F/h) gradient. Maximum cooling gradient 8°C/h (14°F/h).
Allowed materials and heat treatment details are specified at page 8-11.

8.3.2 DAMAGES CLASSIFICATION

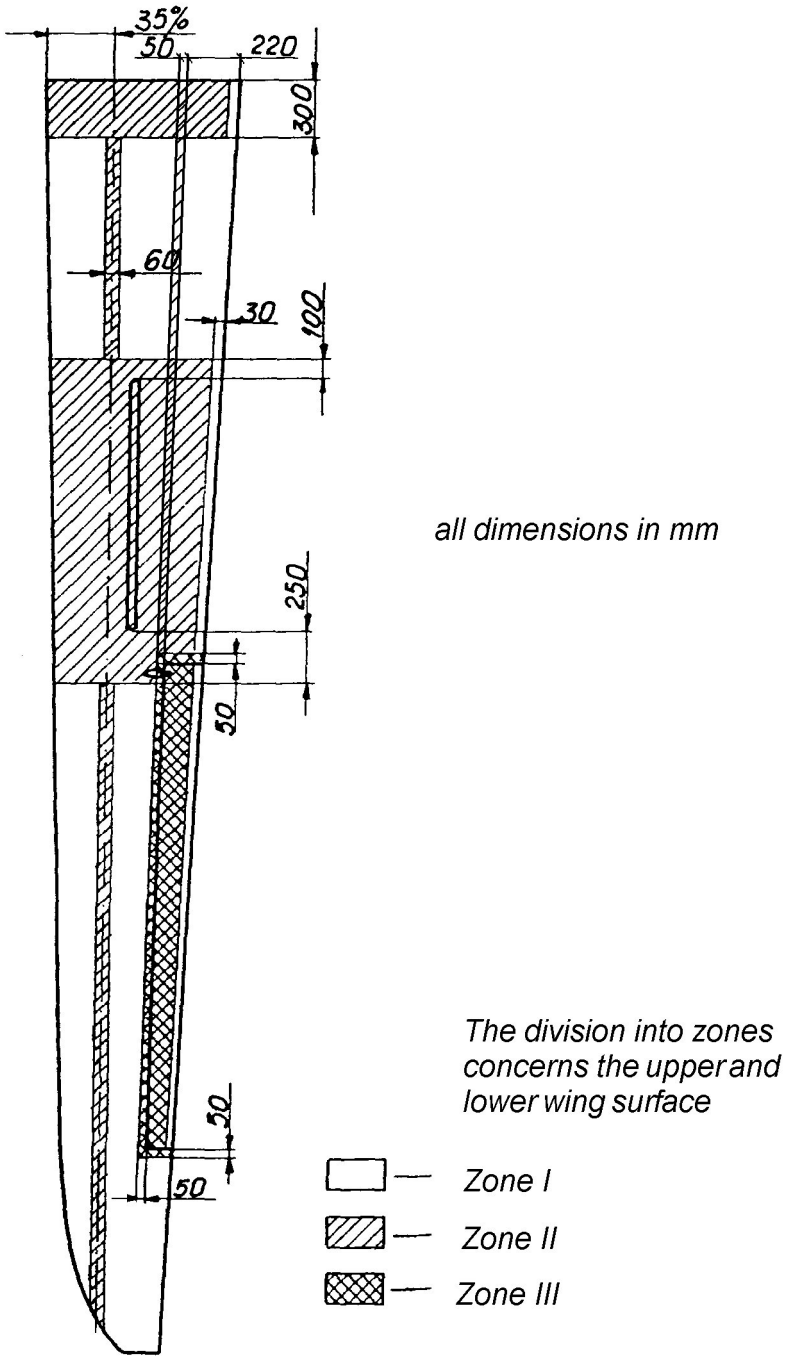
When damage is found, the cause of it should be analysed and carefully checked to ensure that other associated damage is absent, especially in the sailplane inner structure.
Repair of shell damage classified acc. to the Classification Table and Division into Zones:

Zone I - part of wing shells acc. to Fig. 8-1,
Zone II - part of wing shells acc. to Fig. 8-1,
Zone III - part of wing shells acc. to Fig 8-1, aileron, fuselage and tailplane shells, inner structure of sailplane.

Due to the structure's character, repairs by the user are not generally allowed in Zone III. A person authorized by the manufacturer shall classify damages in this Zone individually. The classification should be based on an inspection performed by a person authorized by the manufacturer or the detailed descriptive and photo documentation delivered by user.

Damages classification:

Item	Damage	Allowed damage area		
		Zone I	Zone II	Zone III
1	holes trough	& 150 mm (& 5.9 in)	not allowed	& 10 mm (& 0.4 in) but in distance of 100 mm (3.9 in) min. from the fittings or from other damage
2	holes but not trough	200 mm (7.9 in) along the span 100 mm (3.9 in) in arbitrary direction		As in item 1
3	disglued leading edge	100 mm (3.9 in) of disglued length		
4	disglued trailing edge	150 mm (5.9 in) of disglued length		
5	whitening	As in items 1 and 2		
6	damaged finish	arbitrary		



Sailplane division into zones
Fig. 8-1

8.3.3 TYPICAL REPAIRS DESCRIPTION

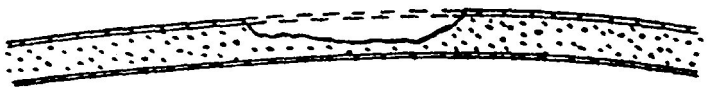
The repairs of composite parts should be performed acc. to the following procedures providing that:

- the correct materials are used (defined on Figures),
- the surfaces to be laminated or glued are carefully prepared, degreased, sanded with a paper of "180" grade and dust removed,
- good protection of materials against getting grease, dirt or moisture,
- the pot-life of mixed composition of approximately 30 minutes in room temperature is observed.

CAUTION:

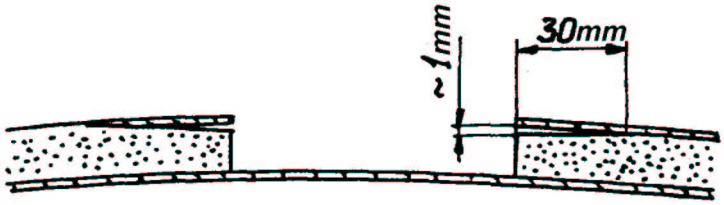
IT IS NECESSARY TO BE ABSOLUTELY SURE THAT THE MATERIALS USED FOR A REPAIR ARE WITHIN THE USABLE STORAGE TIME PERIOD AND ARE NOT UNUSABLE DUE TO OTHER REASONS.

1) SHELL DAMAGED NOT THROUGH



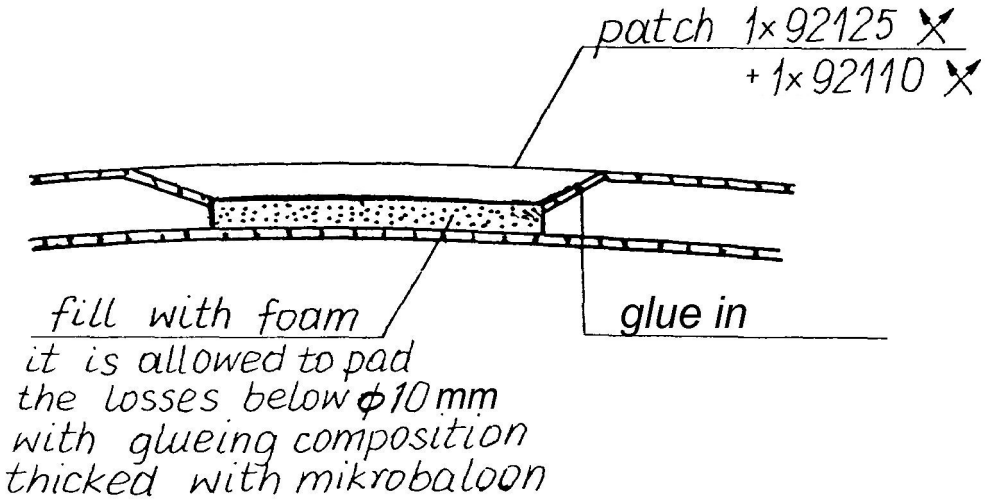
Damage not through
Fig. 8-2

The repair procedure is the following:
- round the hole edges,
- remove the foam out of the hole to get sure that the inner skin is not damaged,
- cut the foam under the outer skin as shown on Fig. 8-3



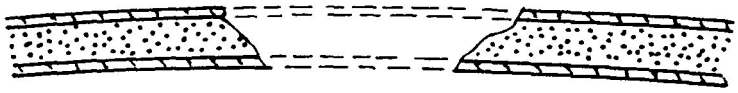
Cutting of the foam
Fig. 8-3

- glue in the foam acc. to Fig. 8-4 being of the height lower by 1 mm (0.04 in) when compared with the old one and glue in the outer skin into the chamfered edges of the foam around the hole,
- after the glue is cured clean the edge of the outer skin around the hole and pad the foam,
- laminate the external skin using the fabrics shown on Fig. 8-4 (see: note on page 8-11).



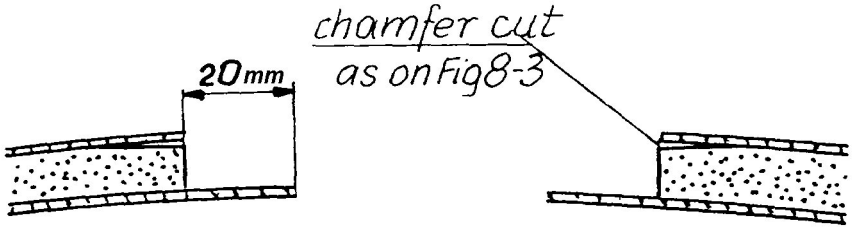
Skin repair
Fig. 8-4

2) SHELL DAMAGED THROUGH

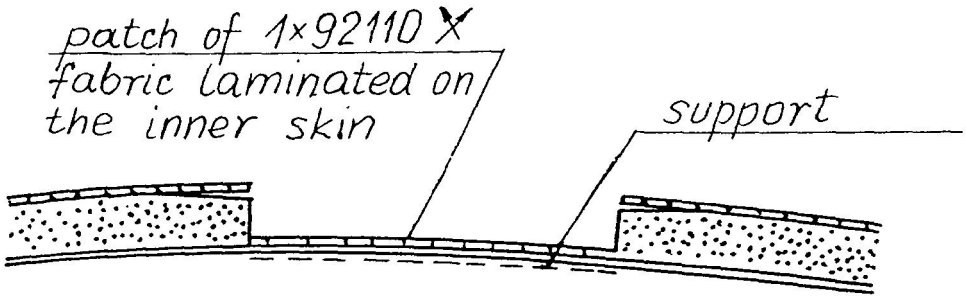


Damage through
Fig. 8-5

The repair procedure is the following:
- clean the hole edge,
- cut the foam around the hole as shown on Fig. 8-6 and cut the foam under the outer skin as described before,
- glue in or laminate on the cleaned inner skin the patch as shown on Fig. 8-7,



Preparation for repair
Fig. 8-6



Inner skin repair
Fig. 8-7

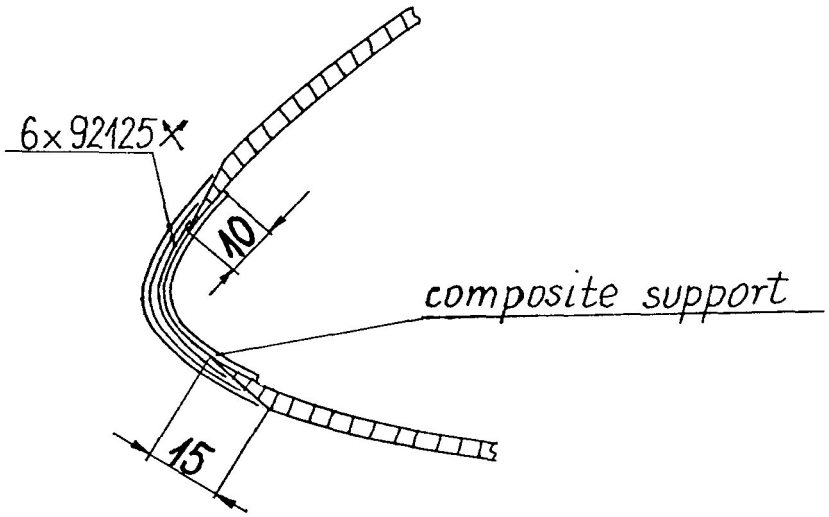
NOTE:

If the hole edges of inner skin are soft first the composite support should be glued in.

- the further repair procedures are the same as before (see Fig. 8-4)

3) WING LEADING EDGE DAMAGE

The repair procedure is the following (as shown on Fig. 8-8):
- clean the hole edge,
- glue in composite support,
- laminate the skin.



all dimensions in mm

Repair of leading edge
Fig. 8-8

4) SKIN DAMAGE IN ZONE III

The repair procedure is the same as for wing leading edge, providing that for repair the 92110 (Interglas)/0917 (Porcher) or 92125 (Interglas)/3063 (Porcher) fabrics (acc. to item 3.8.4) shall be used, having the total thickness the same as this repaired area. The fibre direction of 45^{O} in respect to the symmetry axis of the sailplane shall be observed.

5) DISGLUEING OF THE LEADING OR TRAILING EDGE

After removal of the old glue joint in the area of separation, the surfaces to be glued shall be carefully cleaned and coarsen with "180" sand paper. Then apply the gluing composition with aerosil on both surfaces. Immobilize the both surfaces until the glue is cured. In case of trailing edge use the spring clamps padded with the plywood inserts, in case of nose by means of stripes loaded with weights or rubber tension.

6) LACQUER DAMAGE

VORGELAT T-35 COATS

After the structure repairs or damage of the lacquer coat only, the affected area should be coarsen with "120" sand paper, than padded with the Vorgelat T-35 composition with talc. It is very important to observe the portions due to the colour preservation. When the pad is hard it should be sanded with "120" and then "220" sand papers. The repaired areas cannot exceed the outer contour of the sailplane body. It is especially important in case of wings and fuselage skin before the static pressure ports. After sanding with sand paper, spray the Vorgelat T-35 enamel two times in crossed direction. When it gets hard sand it with "220" then "320", "400" and "600" sand papers. Polish with a polishing paste to get the finish to match the neighbouring areas.

POLYURETHANE AND ACRYLIC COATS

The procedures are the same as for Vorgelat T-35 coat except that for padding the resin with a talc and titanium white and for painting the polyurethane or acrylic enamel should be used.

8.3.4 MATERIALS FOR REPAIRS

When performing the repairs the attested materials with valid storage time period shall be used.

	Laminating composition	Mixture ratio parts by weight	Heat treatment
**	Resin: Epidian 53 Hardener: Z1	100 : 10,5	24h at 25°C (75°F) + 15h at 50-55°C (120-130°F)
	Resin: L 335 Hardener: 335	100 : 38	24h at 25°C (75°F) + 15h at 50-55°C (120-130°F)
*	Resin: L 335 Hardener: 335 (50%) + 340 (50%)	100 : 38	24h at 25°C (75°F) + 15h at 50-55°C (120-130°F)

Remarks:

* - laminating composition of L 335 resin and 335 + 340 hardener is recommended for larger damaged surfaces.

** - laminating composition of Epidian 53 resin and Z1 hardener shall not be used for surfaces designated for enamel painting.

If the laminating composition is to be used as a glue, one of the following fillers should be used:

- Union Carbide microbalon in case of foam gluing-in,
- aerosil in case the leading or trailing edge is glued,
- talc, if the lacquer coat losses are padded.

The marking of Interglas (Germany) or Porcher (France) fabrics used for the repair of sailplane particular parts are listed below:

fabric marking Interglas/Porcher	weight [g/m^2]	thickness of one layer [mm]
91110/0120	110	0,17
92110/0917	163	0,20
92125/3063	280	0,35
92140/1989	395	0,50
92145/2071	215	0,28

NOTE:

Interglas and Porcher fabrics can by used interchangeably as shown in the table.

In case the sandwich structures repaired the foam losses should be supplemented with the DIVINYCELL H60 foam.
All material for repairs may be ordered from the sailplane manufacturer.

8.4 METAL PARTS REPAIR

Metal parts repairs performed by the user himself are not generally allowed. The damaged parts shall be replaced with new ones. It is allowed only to repair the anti-corrosion coats (galvanic and lacquer ones) by means of cleaning with the sand paper "400" and painting with an anti-corrosion pad and enamel. Motorcar lacquers are allowed.

CAUTION:

NO REPAIRS OF BOLTS AND FITTING SLEEVES IN SAILPLANE JOINTS ARE ALLOWED. THE DAMAGED PARTS SHALL BE REPLACED WITH NEW ONES.

CAUTION:

IN CASE EVEN ONE CABLE WIRE IS BROKEN OR CORROSION APPEARS, THAT CABLE SHALL BE REPLACED WITH A NEW ONE.

REPLACEMENT OF METAL PARTS

The user replaces those parts only which can be removed from the sailplane without affecting its structure.
It is impossible to disassemble without affecting the structure the following parts:

- the fittings laminated, glued in or riveted to the structure,
- control system brackets,
- air brake arms,
- rudder control system tension members,
- take-off hook release tension members.

Before installing a part, the conservation agent should be removed, and the surface cleaned. The working faces should be greased.

CAUTION:

THE SELF-LOCKING NUTS AND SPLIT PINS CANNOT BE USED MORE THAN ONCE.

8.5 REPAIR OF RUDDER FABRIC COVERING

The rudder is covered with Superflite 102 heat-stringing fabric, glued in with Superflite U-500 glue. The SF U-500 glue should be thinned to the working density with methyl-ethyl-ketone in volume proportion: 1 part of U-500 for 1 part of methyl-ethyl-ketone.

The repair of the rudder covering requires the following procedure:

- smooth the edges of damage,
- coarse the surface in the region of 2.5-3 cm (0.98-1.18 in) out of damage edge using the "150" sand paper,
- remove carefully the dust out of the coarsen area using the vacuum cleaner,
- apply with brush three layers of SF U-500 glue (the every next layer is applied when the previous one does not stick),
- after the last layer is applied wait till it does not stick (but no longer than 2 hours),
- apply a patch of Superflite 102 fabric with dimensions greater than the damage dimensions by 2.5 cm (0.98 in) in every direction,
- dissolve the glue under the patch applying the methyl-ethyl-ketone on the edges of patch,
- press in the fabric by means of rubbing it with flannel rag,
- after 24 hours past the time the patch was glued it should be tensioned by means of an iron in three sequential temperatures, namely 120, 150 and 180^{O}C (250, 300, 350^{O}F). The fabric should be tensioned with smooth iron movements, and respecting the temperature of 200^{O}C (390^{O}F) being not exceeded.

To protect the rest of fabric covering against heat, a mask of board paper or parchment can be used.

CAUTION

WHEN IRONING AVOID THE CONTACT OF IRON WITH THE COMPOSITE STRUCTURAL ELEMENTS. THE PROLONGED INFLUENCE OF HEAT (3 - 5 SECONDS) CAN INTRODUCE THE IRREVERSIBLE CHANGES OF THE STRUCTURE AND COMPOSITE MECHANICAL PROPERTIES DEGRADATION.

SECTION 9

SUPPLEMENTS

9.1 INTRODUCTION

9.2 LIST OF INSERTED SUPPLEMENTS

9.1 INTRODUCTION

This Section contains the supplements necessary for safe and efficient operation of the sailplane when equipped with various optional systems and equipment not provided in standard sailplane.

9.2 LIST OF INSERTED SUPPLEMENTS

Date of issue	Document No	Title of the inserted supplement