GLIDER REPAIR AND PRODUCTION WORKSHOP

Edward Margański

T E C H N I C A L D E S C R I P T I O N
T E C H N I C A L S E R V I C E M A N U A L
P E R I O D I C W O R K S

o f

M D M - 1 "F O X" G L I D E R

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Factory No	
Registration marking	

This is the translation of the original Polish text agreed with the Civil Aircraft Inspection Board. (Polish Airworthiness Authority).

Translated by :

.....Zboś.....

Tadeusz Zboś, MSc. Eng.

0. ISSUANCES

0.1 LIST OF REVISIONS

Any revisions of the present Manual must be indicated with the Revision No and with a vertical line in the left hand margin of amended text.

Item	Page	Revision	Date	Signature
1.	21	Change of „Rudder and airbrake control system" page Bulletin BE -07/97.	25.8.97	
2.	6, 34	Increase in the glider max. allowed weight. Bulletin BE-08/97	29.10.97	
3.	29A	Addition of page 29A (Bulletin BE - 09/98)	16.02.98	
4.	39, 40	Addition of one point to Periodic works list and changes in Schedule of periodic works table	04.06.98	
5.	7, 18	Change of the method of measuring elevator deflection; correction of linear values errors of aileron deflection	16.02.98	
6.	29A	Removal of total energy compensator from board instrument pressure system	31.03.98	
7.	6, 34, 35, 46	Removable balancing weight and revision to rear limit of allowed C.G. position	20.01.99	
8.	36	Change of elevator mass balancing	20.01.99	
9.	39,40	Changes in Schedule of periodic works (table No 3) and addition of items 14, 15 to Periodic works list (Bulletin No BO-18/2011)	30.11.11	
10.	2A 2B, 3A, 4A 28A, 29B, 30A, 31A, 39A, 40A	Page No 2A added *Applicable to gliders with no TL-3424 (electronic) accelerometer installed.* Change to glider equipment - accelerometer. *Applicable only to gliders with TL-3424 (electronic) accelerometer installed.*	10.10.12	
11.	 2, 2i, 2iA 3, 3A, 4, 4A, 6, 9,11,13,15, 17,19,21, 24, 28, 29,29A,29B, 30A,31A, 38, 39,40, 45A,46,46A, 47,47A 5,8,10,12,18, 20,22,23, 25, 41	*removed pages 2A, 2B, 28A, 29A, 39A, 40A, introduced with earlier revisions;* *where used, indexed page No identifies:* *-i,ii, .. added, new page of Manual, not present in the original issue,* *-A,B, .. alternative variant of Manual page, appropriate for equipment installed;* update to: List of revisions, Table of content, List of figures, pg. 2, 2i, 2iA, 3, 3A, 4, 4A; supplemented description of the technical data pg. 6; legend now directly in Figs. 2 - 8, pg. 9, 11, 13, 15, 17, 19, 21; hydr fluid replacement page 24; supplemented description of the glider equipment – page 28; update of instrument pneumatic system, electrical system diagrams and to arrangement of front/rear seat– pages 29, 29A, 29B, 30A, 31A; supplemented description of the periodic works– pages 38, 39, 40; update to Placards and markings, correction of V_{NE} values – pages 45A, 46, 46A, 47, 47A. *numerous translation fixes (English version only);*	25.11.20	

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0.4 LIST OF FIGURES

1. TECHNICAL DESCRIPTION

1.1 Glider description

Wings:

Two-panel planform of considerable taper. Monospar structure with an auxiliary spar, and sandwich type skin. Main spar of double-C section.

Monoplate air brake extended on the upper wing surface only.

Large span, constant chord Friese type aileron , split in two panels, mass-balanced and suspended on 7 hinges.

Overlapping type spar connection with two horizontal bolts, extending up to rear fittings, and connecting also wings to fuselage.

Fuselage:

Monocoque, sandwich structure with integral fin. Seat pans bonded permanently. Two-piece, side hinged canopy opening sidewards to the right.

Total pressure port and air intake for air vent located in the fuselage nose, static pressure ports further aft on both sides of the fuselage nose.

Transceiver antenna installed in the fin.

Aero-towing hook installed in the fuselage nose part.

Winch-launching hook installed in front of the main undercarriage.

Tail unit:

Stabilizer, elevators and rudder of sandwich structure, control surfaces aerodynamically- and mass-balanced.

Control system:

Combined type. For rudder and towing hook a cable system is employed. For wheel brake - a cable/hydraulic one, while for elevator and aileron a push-rod type system is used.

In elevator control system a spring trimming device is provided, operated with a lever located at the base of control stick at front seat.

The control systems of aileron, air brake and elevator couple automatically, when the wings and tailplane are rigged.

Undercarriage:

Faired, fixed undercarriage (with main and tail wheels). Hydraulic disc brake on main wheel, actuation coupled with air brake.

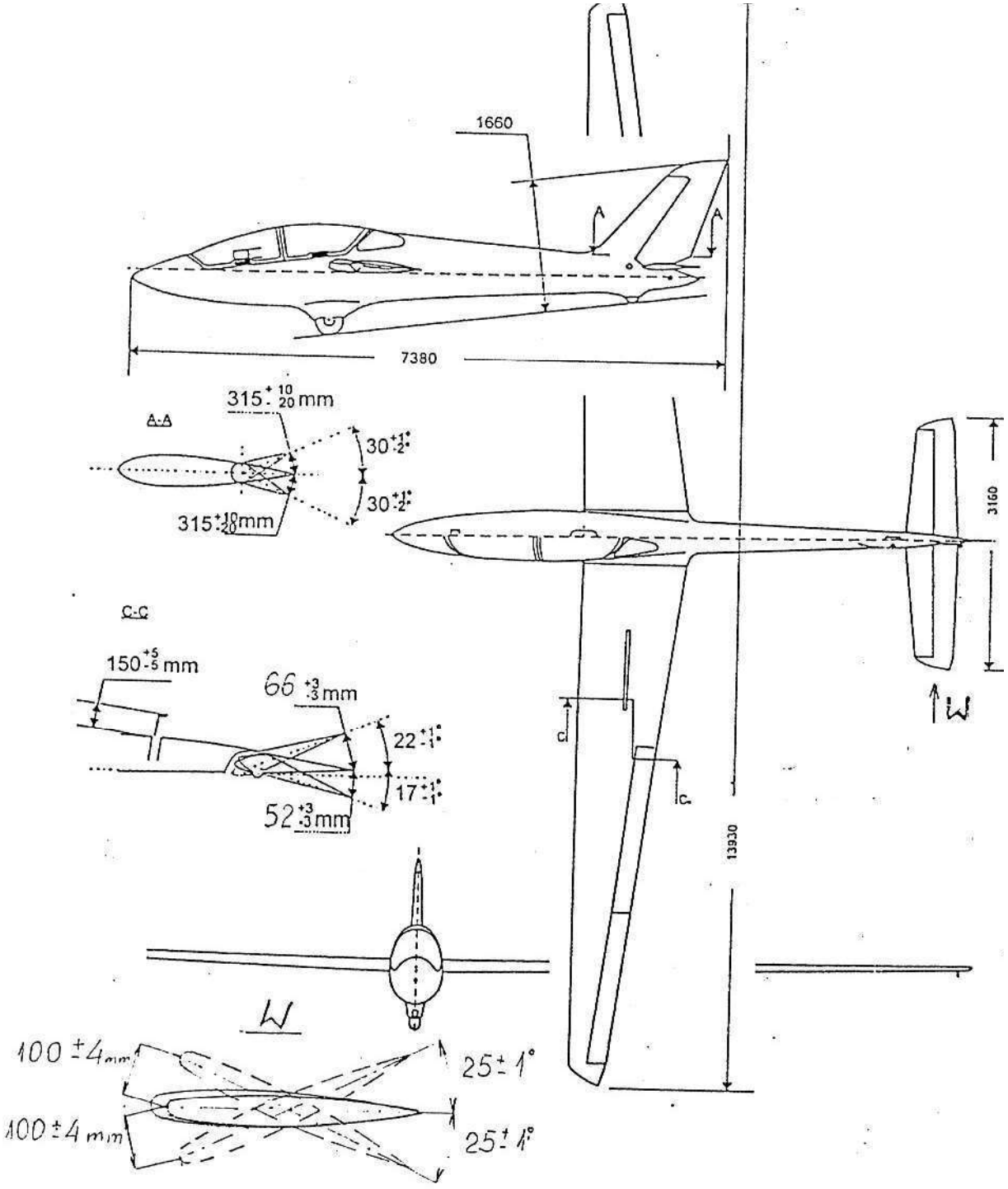
1.2 Main technical data

	Span	14.00 [m]	45.93 [ft]
	Length (up to rudder top edge)	7.38 [m]	24.21 [ft]
	Height (in flight attitude)	2.25 [m]	7.38 [ft]
	Wing dihedral	0	
	Wing area	12.34 [m^2]	132.8 [ft^2]
	Aspect ratio	15.88	
	Root chord	1.308 [m]	4.291 [ft]
11	Mean Standard Chord (MSC) (1)	0.971 [m]	3.186 [ft]
	Wing profile	NACA 64_1 412	
	Tailplane span	3.160 [m]	10.37 [ft]
	Tailplane area	1.873 [m^2]	20.2 [ft^2]
	Tailplane profiles	NACA 63_1 012 ÷ 63006 mod.	
	Fin and rudder area	1.123 [m^2]	12.09 [ft^2]
	Fin and rudder profiles	NACA 63_2 015 ÷ 63_1 012	
7 11	C.G. position (empty glider)	620÷645 [mm] aft of Datum Plane (2)	24.43÷25.41 [in]
11	Nominal empty weight:		
2	-without balancing weights	350 [kG]	772 [lb]
7	-with balancing weights (2x5.5=11.0 kG)	361 [kG]	796.3 [lb]
	Max. weight of structural non-lifting parts (wing-less glider)	165 [kG]	364 [lb]
2	Max in-flight weight	530 [kG]	1168 [lb]
11	C.G. position (in-flight)	213÷379 [mm] aft of DP	8.40÷14.93[in] aft of DP
	Position of load components:		
	Instrument panel at front seat	1580 [mm] fore of DP	62.25 [in] fore of DP
	Balancing weights	1520 [mm] fore of DP	59.89 [in] fore of DP
	Pilot on front seat	950 [mm] fore of DP	37.43 [in] fore of DP
	Instrument panel at rear seat	440 [mm] fore of DP	17.34 [in] fore of DP
	Pilot on rear seat	60 [mm] aft of DP	2.36 [in] aft of DP
	Luggage	not allowed	
	Max. wing surface loading	42.54 [kg/m^2]	8.72 [lb/ft^2]
	Limit manoeuvring load factors	+7 / -5	
	Limit manoeuvring load factors for solo flying (max. useful load 100 kG)	+9 / -6	

11 (1) *Mean Standard Chord (MSC)* - *chord of aerodynamically equivalent rectangular wing*

(2) *Datum Plane (DP)* - *vertical plane passing through the wing leading edge*

Fig. 1. Three-view drawing, main dimensions, control surfaces deflections



To measure elevator deflection, use the method as follows:

With elevator in neutral position, mark reference points on tailplane leading edge and on the forward protruding part of the elevator where they are directly adjacent to each other.

Measure elevator deflection between these reference points.

2. TECHNICAL SERVICE MANUAL

2.1 Glider rigging and de-rigging

It is convenient to rig the glider with 5 persons.

In case the special workshop supports are available, it is possible to rig the glider with 4 or even 3 persons.

Before rigging, all mating surfaces of the rigged components should be cleaned with a cloth and greased.

The main bolts and mating bushings in wings and fuselage should be covered with a grease.

Graphite grease is recommended.

2.1.1 Wings rigging (Fig. 2)

1. Immobilize the fuselage with a shore (or hold it by hand).
2. Open the cockpit canopy and set:
    - control stick - neutral
    - air brake control handgrip, in „retracted" position
    - securing device (2) of main bolts, downward
3. Retracting the air brake, by skipping beyond a dead point, facilitates the wing rigging. (Prior to wing de-rigging the air brake should be retracted. Overcoming the over-centre locking force on de-rigged wing requires appropriate tools and caution, to prevent damage to the coupling.)
4. Align the left-hand wing with fuselage and insert the spar root (7) in the sleeve of fuselage well. While sliding the wing onto a contact between ribs, hold the aileron neutral and pay close attention to coupling in aileron and air brake controls. Move control stick or air brake control handgrip, if necessary.
5. Repeat the above with right-hand wing. Make sure a proper coupling in aileron and air brake control system has been gained.
6. Unload the wing tips, insert the duralumin assembly pin / end of assembly wrench (9) into one of the fittings and align the openings precisely, by slightly rotating the wing at its root. Insert a bolt (8) into the other fitting, and press this home with an advancing-rotary motion of assembly wrench (9).
7. Insert and press down the second bolt (8) the same way.
8. Check unrestricted, full deflections of aileron and air brake.
9. Secure the wing bolts, by rotating the securing elements vertically upwards.
10. Complete the procedure by inserting safety pins (10) into securing elements.

De-rigging requires the reverse sequence.

Prior to de-rigging retract the air brake.

Fig. 2. Wings rigging

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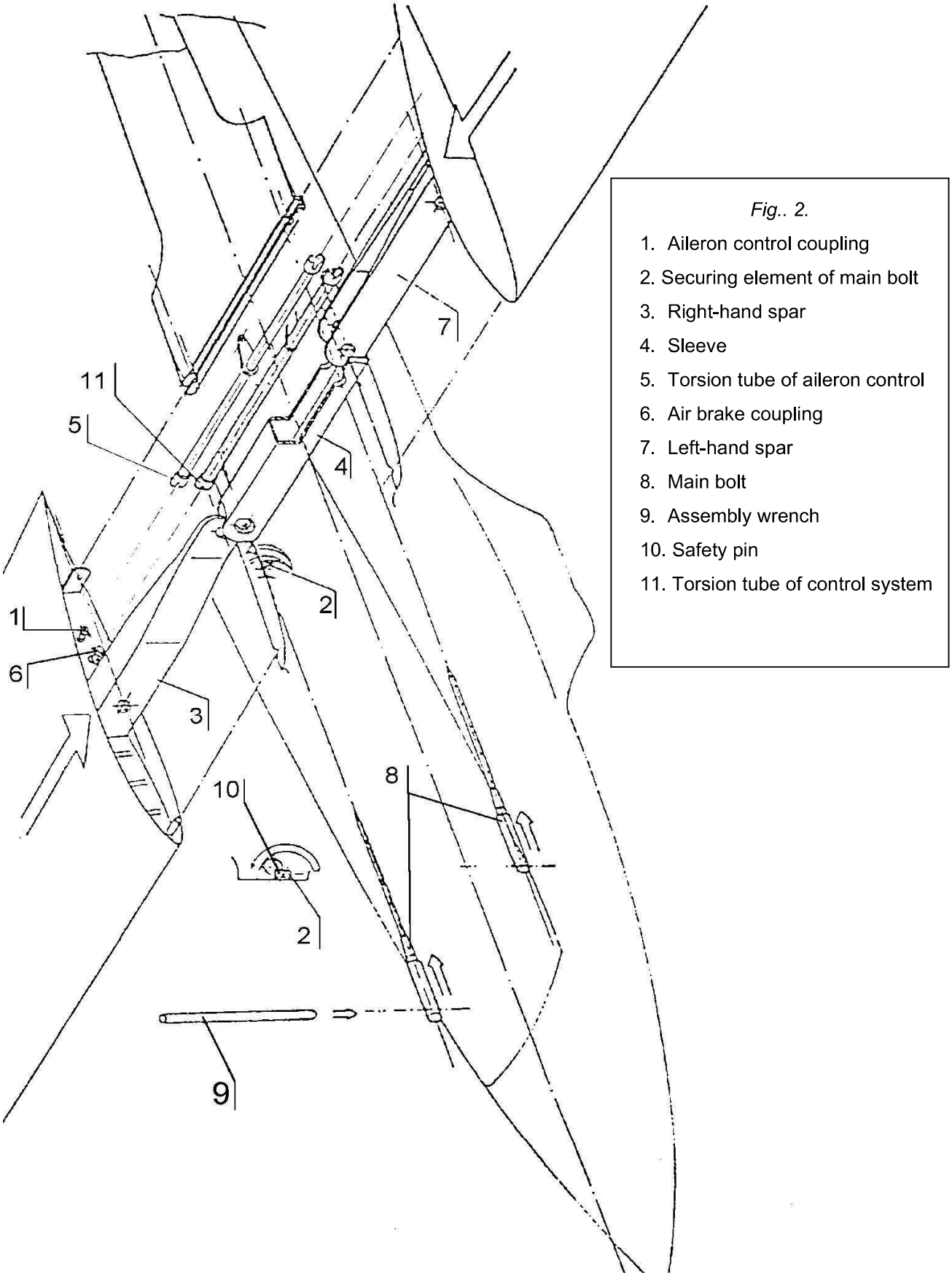

Fig.. 2.

1. Aileron control coupling
2. Securing element of main bolt
3. Right-hand spar
4. Sleeve
5. Torsion tube of aileron control
6. Air brake coupling
7. Left-hand spar
8. Main bolt
9. Assembly wrench
10. Safety pin
11. Torsion tube of control system

Tailplane rigging (Fig. 3)

The tailplane rigging should be performed by two persons.

First, set the lever of trimming device to its rear-most position.

One person deflects the rudder fully to one side. The second person holds stabiliser with both hands at lower surface, allowing the elevators to fall down free.

Put the tailplane behind the glider in its plane of symmetry, lined up in extension of chord plane.

Shove the tailplane forwards into the well between the fin and fuselage, pay attention that both elevator control levers (1) entered leading groove of the fuselage wall (2), and the pin (5) entered its socket (6).

The elevator controls are connected automatically, still check visually through the inspection panel if the levers (1) have coupled with the external surfaces of bearing (3).

Align the axes of front bolt sleeve (7), insert the bolt (8) from the left-hand fuselage side, screw on the nut (9) and secure it in place with a safety pin (10).

NOTE: ***If incorrect coupling of elevator control occurs, de-rig the tailplane and repeat rigging process, strictly following the above instruction.***

Tailplane de-rigging requires the reverse sequence.

Fig. 3. Tailplane rigging

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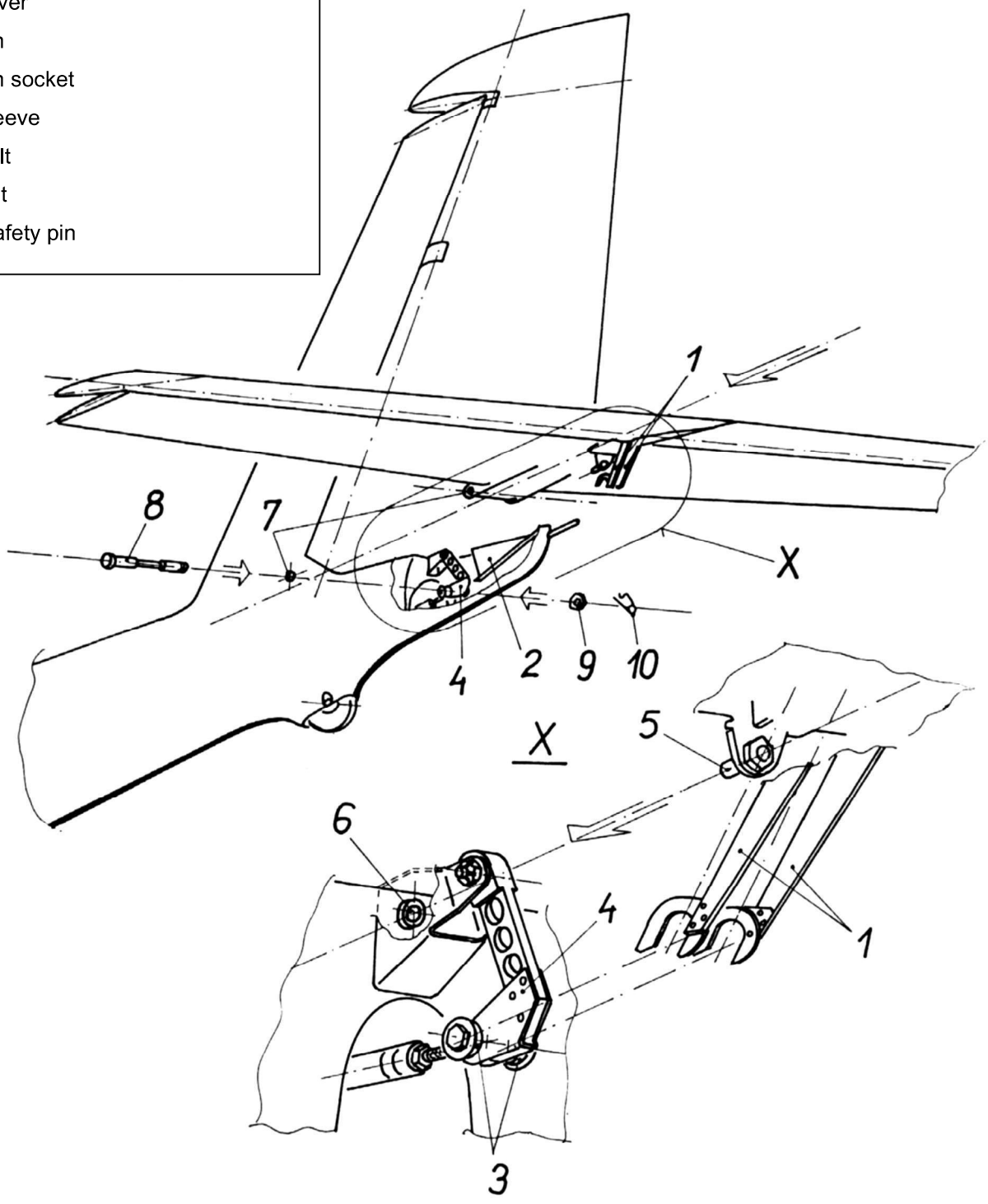
Fig. 3

1. Elevator control lever
2. Case of lever 1 guide
3. External surface of bearing
4. Lever
5. Pin
6. Pin socket
7. Sleeve
8. Bolt
9. Nut
10. Safety pin



2.1.2 Rudder rigging (Fig. 4)

- Insert the pins (1,2,3) of rudder hinge into the nests (4,5,6).
- Put washer (13) on pin (3), screw on the nut (14) and secure with a safety pin (15).
- Remove the covers of inspection hole (7) on fuselage both sides.
- Put the connectors (9), connected with rudder control cables, on both arms of lever (8), pass the bolts (10) through at the top, put washers (11) on the bottom side and screw on self-locking nuts (12).
- Re-attach the inspection hole covers (7).
- Adjust cable tension (equal to 12 [daN], or 27 [lb]), using turnbuckles located in front of the rear seat pedals.

Rudder de-rigging requires the reverse sequence.

NOTE: ***When de-rigging the rudder, first loosen cables with turnbuckles located in front of the pedals.***

Fig. 4. Rudder rigging

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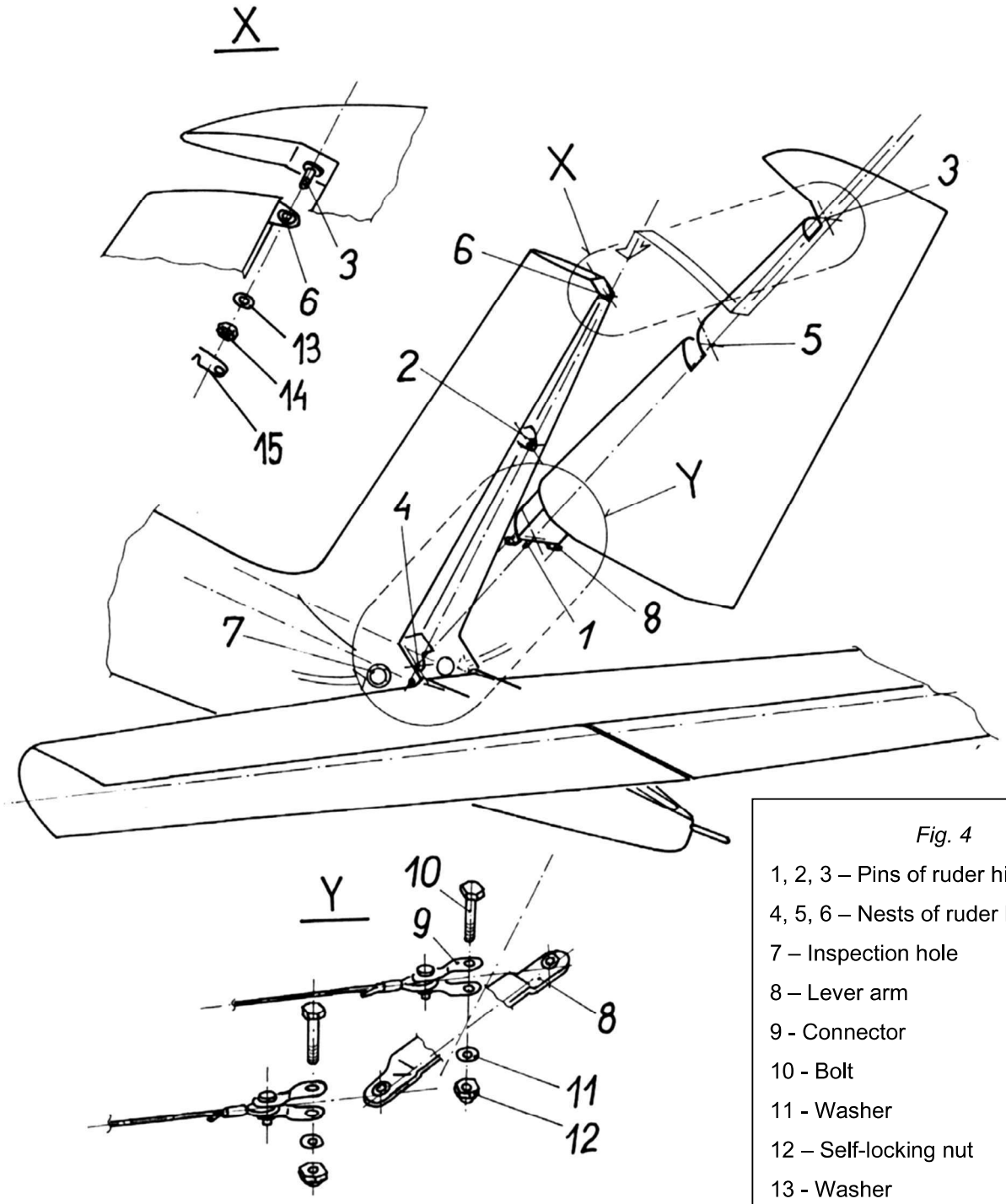

Fig. 4

1, 2, 3 – Pins of ruder hinge

4, 5, 6 – Nests of ruder hinge

7 – Inspection hole

8 – Lever arm

9 - Connector

10 - Bolt

11 - Washer

12 – Self-locking nut

13 - Washer

14 – Castellated nut

15 – Safety pin

2.1.3 Rigging and de-rigging of elevator (Fig. 5)

Assembly and disassembly of both elevator halves is to be performed with the tailplane dismounted from the glider, positioned horizontally, upside down.

Bring the elevator nose into the stabiliser well, inserting the hinge pins (1), (2) in the nests of hinge (3).

Install the second half of elevator on the same way, inserting the trailing edge pin (7) in the corresponding nest (8), the order of elevator halves installation is not critical.

Put on special washers (4) and screw on nuts (5), after locking the elevator halves on rear fitting pin (2), secure the nuts with safety pins (6) or with split pins.

Elevator de-rigging requires the reverse sequence.

Fig. 5. Elevator rigging

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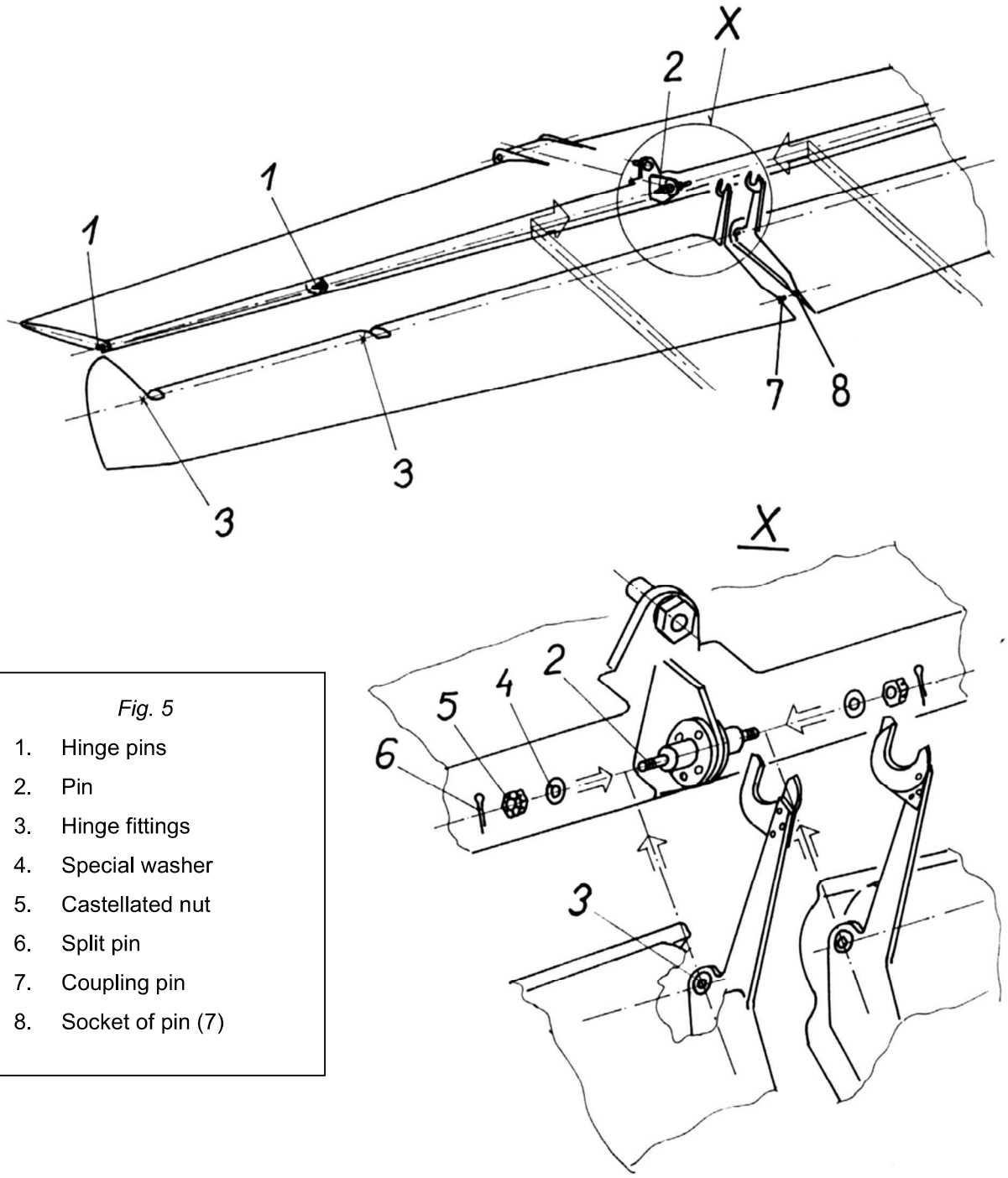

Fig. 5

1. Hinge pins
2. Pin
3. Hinge fittings
4. Special washer
5. Castellated nut
6. Split pin
7. Coupling pin
8. Socket of pin (7)

2.1.4 Aileron rigging (Fig. 6)

Suspend the aileron on wing-side hinges (Fig. 6A). Insert the bolts (9), put on the washers (7) and self-locking nuts (6).

NOTE: ***When rigging the ailerons, do not over-tighten the self-locking nuts (6). Ensure perceptible play between the aileron fittings (8) and wing-side hinges (10), as well as between the aileron fittings (8) and bolts (9) with nuts (6).***

The nut (6) secures the bolt (9) only against shifting out.

Shift the push-rod end (5) into the aileron fitting (3) [Fig. 6B], insert the bolt (4), put on washer (2) and nut (1).

Assemble the opposite aileron half in the same way.

Aileron de-rigging requires the reverse sequence.

2.1.5 Balancing weights installation

The balancing weights consist of two lead plates, installed on lugs screwed in the floor at front seat pan (Fig. 11).

De-rigged weights should be removed from the glider, and preserved against the loss.

Fig. 6. Aileron (left hand) rigging

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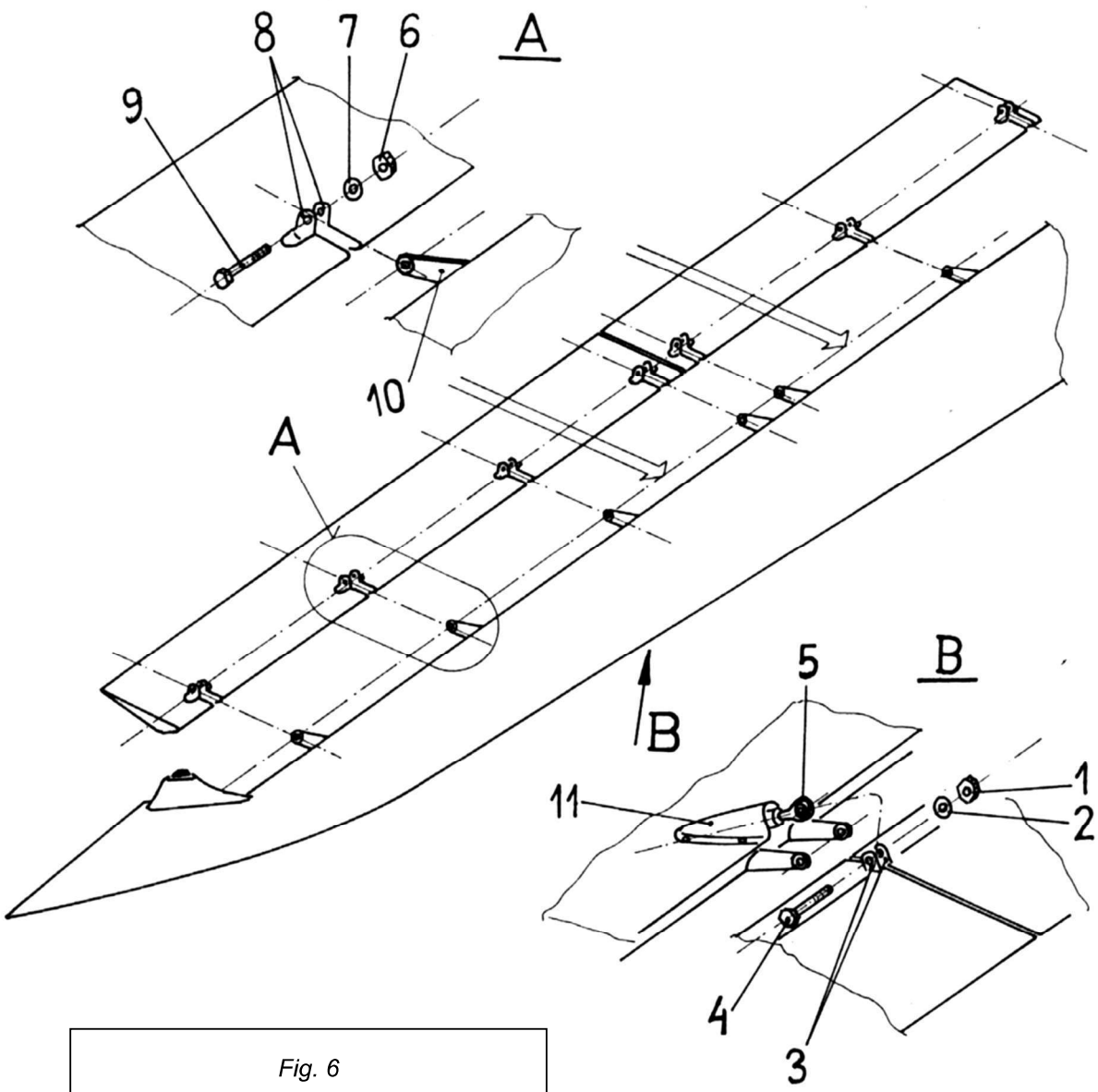

Fig. 6

1. Self locking nut
2. Washer
3. Aileron central fitting
4. Crew
5. Push rod end
6. Self locking nut
7. Washer
8. Aileron fitting
9. Screw
10. Wing-side hinge
11. Fairing

2.2 Control systems and their adjustment

2.2.1 General

On the glider, a push-rod type elevator and aileron control system, as well as combined push-rod/cable system for air brake control have been employed. The rudder and towing hooks are actuated with cable type system. For wheel brake a cable actuated hydraulic system is provided.

Access to control systems adjustment is ensured by means of:

- removable cover on front seat control column,

- removable floor, in a recess behind the rear seat,

- inspection holes in fuselage tail portion.

Adjustment is to be performed when excessive deviations of the measured control surface deflections are stated from the values given in Fig. 1, or after repairs involving the disassembly and replacement of any control system elements or their support.

When adjusting push-rod ends, ensure that the check-hole is enclosed by the thread of push-rod end.

After adjustment, secure the adjusted elements against rotation.

2.2.2 Aileron and elevator control system (Fig. 7)

Adjust the aileron control system by means of end (2) of short push-rod (3) actuating directly the aileron, as well as with adjustment to the travel limit stops of front control column (1)

Correct deflections of aileron (Fig. 1):

down $17^{o\ \pm1}$ (or $52^{\pm3}$ [mm] / $2.05^{\pm0.12}$ [in])

up $22^{o\ \pm1}$ (or $66^{\pm3}$ [mm] / $2.60^{\pm0.12}$ [in])

NOTE: ***Check the range of aileron deflections following significant changes in operational temperatures (transition from winter to summer operation). Make appropriate adjustments, if necessary.***

Elevator deflection should be adjusted by means of the "R" ends of the push-rod, by checking that the push-rods are perpendicular to the lever with the elevator neutral and by adjusting the height of travel limit stop at front control column (7) and (8).

Correct deflections of elevator (Fig. 1):

down $25^{o\ +1/-1}$ (or $100^{\ +4/-4}$ [mm] / $3.9^{\ \pm0.16}$ [in])

up $25^{o\ +1/-1}$ (or $100^{\ +4/-4}$ [mm] / $3.9^{\ \pm0.16}$ [in])

On completing the adjustment, check if the elevator does not interfere with rudder or with fuselage, when fully deflected.

Fig. 7. Aileron and elevator control system

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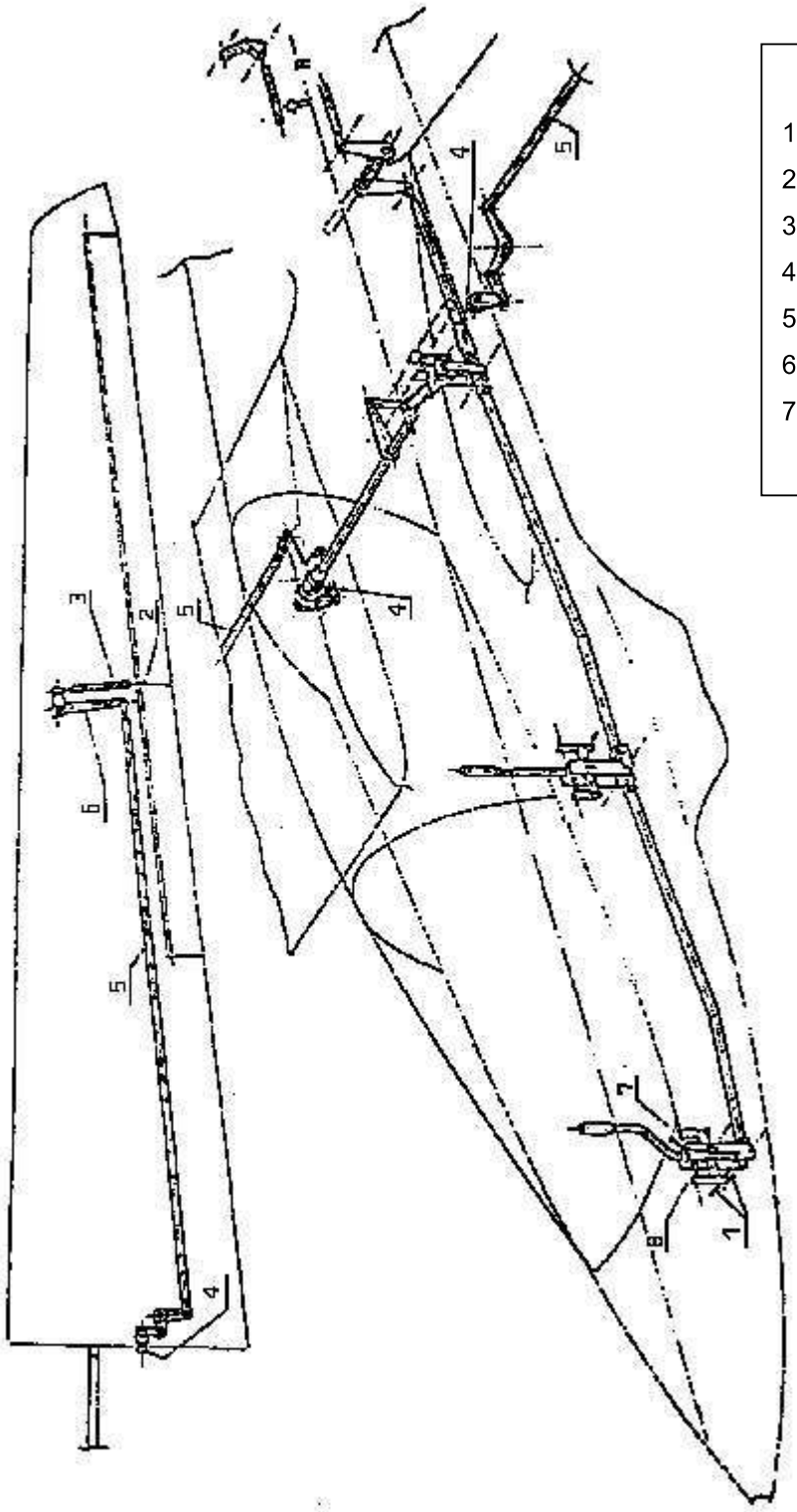

Fig. 7

1. Aileron stops
2. Push-rod ends
3. Short push-rod
4. Coupling in aileron control
5. Aileron push-rod
6. Lever
7. Elevator travel limiting stops

The spring of trimming device ((18) in Fig. 11) is not adjustable. In case of incorrect operation the spring should be replaced.

Elevator stick force, for an elevator trimmed in neutral position, should be:

- stick completely aft $4.0^{\pm 0.1}$ [daN] / $9.0^{\pm 0.22}$ [lb]
- stick completely forward $2.0^{\pm 0.1}$ [daN] / $4.5^{\pm 0.22}$ [lb]

2.2.3 Rudder control system (Fig. 8)

The rudder control system is adjusted by means of turnbuckles (3) and rudder stops (1) and (2) (on pedals and on lever arms - item 8 in Fig. 4).

In case of control system cables replacement, make sure that neutral rudder corresponds to pedals neutral, and that pedals are positioned correctly (see detail "A" in Fig. 8).

The correct value of cable tension should be $12^{\pm 2}$ [daN] / $27^{\pm 4.5}$ [lb].

In the fuselage rear portion the cables are attached to the lever arms (8 in Fig. 4) at the base of the rudder, by means of connectors (see Fig. 4 item 7).

To adjust the pedals position to pilot's height, squeeze the adjusting grip (Fig. 11 item 11) until the locking pin is disengaged from the guide, and slide the pedals along the guide tube (12) to the required position.

Ensure the locking pin re-engages in the new position.

2.2.4 Air brake control system (Fig. 8)

The correct locking (skip beyond a dead point) of air brake plates (5) is adjusted within the air brake box at the push-rod end (4). This becomes accessible by removing the air brake plate (6). To do so, the split pins (7) of plate fixing bolts (8) are removed, the bolts taken out and the plate disassembled.

The fitting of the air brake cap (9) to the wing contour is done by adjusting the spring load tension with nuts (10).

It is recommended to adjust the right hand plate while the left hand wing is de-rigged and vice-versa.

The wheel brake control is coupled with actuation of air brake. The wheel brake is actuated by cable (11) led to a pump (13 detail „B") and next, with a hydraulic system line (14) to the brake caliper (9 in Fig. 9b).

Procedures relating to wheel brake verification and adjustment are described in paragraph 2.3. "Undercarriage".

Fig. 8. Rudder and air brake control system

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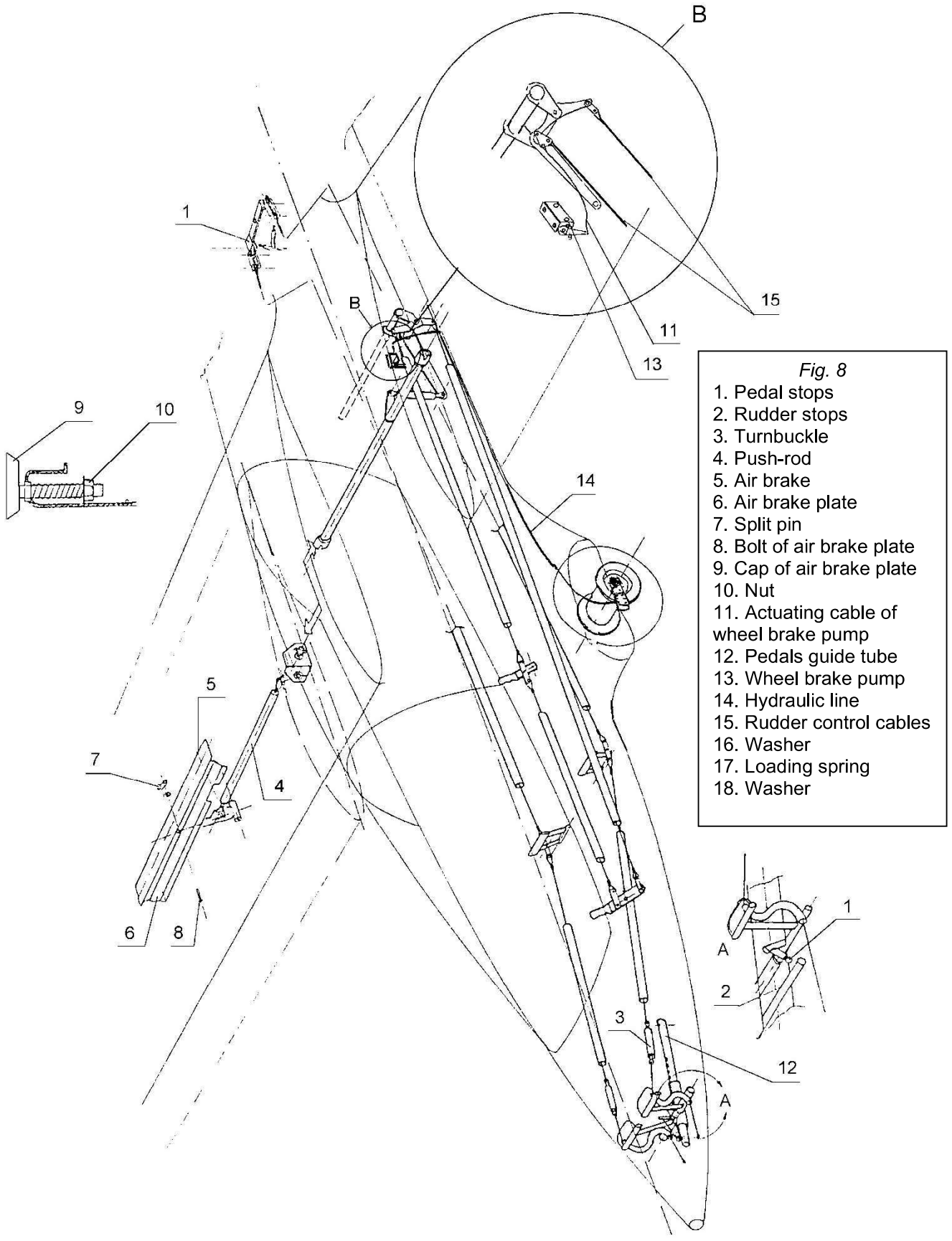


Fig. 8

1. Pedal stops
2. Rudder stops
3. Turnbuckle
4. Push-rod
5. Air brake
6. Air brake plate
7. Split pin
8. Bolt of air brake plate
9. Cap of air brake plate
10. Nut
11. Actuating cable of wheel brake pump
12. Pedals guide tube
13. Wheel brake pump
14. Hydraulic line
15. Rudder control cables
16. Washer
17. Loading spring
18. Washer

2.2.5 Allowed play at control stick

The allowed value of play, measured at the control stick end is:

- with aileron fixed d_h = ±3 [mm] / ±0.12 [in],
- with elevator fixed d_l = ±3 [mm] / ±0.12 [in].

2.2.6 Allowed friction forces in control systems

The allowed values of friction force in control systems, measured at the centre of stick hand grip (pedal foot), control surfaces neutral, are :

- for aileron 0.2 through 1.0 [daN] / 0.45 through 2.25 [lb],
- for elevator 0.2 through 1.8 [daN] / 0.45 through 4.05 [lb],
- for rudder 5.0 [daN] / 11.24 [lb].

2.2.7 Specifications for cable in glider control systems

Following diameters of aircraft-grade steel cables (with steel core) have been used:

- rudder control ∅ 3.2 [mm] / 0.125 [in]
- air brake control ∅ 3.2 [mm] / 0.125 [in]
- towing hooks control ∅ 2.5 [mm] / 0.10 [in]
- pedals adjustment tension member ∅ 2.5 [mm] / 0.10 [in]
- wheel brake pump control ∅ 2.5 [mm] / 0.10 [in]

NOTE: ***The cables should be replaced every six years, or whenever more than one strand is broken or friction damaged.***

The correct value of cable tension should be within the range $12^{\pm 2}$ [daN] / $27^{\pm 4.5}$ [lb].

Cable ends are factory spliced, but it is allowed to clamp the cable end employing the method approved by the airworthiness Authority.

2.3 Undercarriage

2.3.1 General

Glider undercarriage consists of fixed main and tail wheels.

The main undercarriage is mounted to steel fittings, embedded in the fuselage structure.

The pressure in main wheel tyre is 0.2 [MPa], which corresponds to approx. 2.5 [cm] / 1.0 [in] of tyre deflection for the empty glider (length of tyre trace chord is approx. 18 [cm] / 7 [in]).

The tube valve is accessible from the right hand side - use the valve stem extension (see special tools) when inflating the tyre.

2.3.2 Wheel brake (Fig. 9 a,b,c,d)

The wheel brake caliper is actuated hydraulically (self-adjustable, floating saddle type, Fig. 9). The master brake cylinder (pump) (31) is located on the left hand side of fuselage, under the removable access cover behind the rear seat.

Coupling between the wheel brake action and air brake actuation is to be adjusted by loosening the locking nut (33), adjusting the regulation screw (32) engagement length, the ones installed on brake cylinder lever (34), connected by means of cable (11 in Fig. 8) to air brake control system.

There is a rubber membrane in the compensating pot under the screwed-on cover,. The main brake cylinder should be filled so, as to avoid forming of air bubbles under the membrane. A damaged membrane should be replaced immediately.

NOTE: ***The hydraulic fluid is chemically active and may affect e.g. lacquer coating. When filling, avoid splashing and keep the vicinity clean. Use DOT4 brake fluid only.***

To replace the worn brake pads (minimum thickness 2.6 [mm] / 0.1 [in]) perform the operations specified under items 1 through 4 of paragraph 2.3.3.

Do not disconnect the flexible hydraulic hose.

To remove the worn brake pads, re-bore rivets (28) fastening these to plates (26) and (29), and rivet-in the new pads.

Brake assembly requires the reverse sequence.

Tightening torque on screw (30) is 7.5 through 8 [Nm] / 5.5 through 5.9 [lb ft].

The piloting bolts (18) of floating saddle can not be seized.

The condition of hydraulic hose (10) is to be verified periodically.

Thickness of brake disc should be at least 4.3 [mm] / 0.17 [in] (measure this minimum at several locations). Inspect the brake disc against cracks, severe abrasion, grooves, corrosion or deformation. The axial play should not exceed 0.2 [mm] / 0.08 [in].

Corrosion or small notches can be smoothed with abrasive paper of 400 grade. For more severe corrosion the brake disc should first be cleaned with a wire-brush, than with abrasive paper of 200, and finally of 400 grade.

11 ***NOTE: Hydraulic fluid should be exchanged every two years, at minimum.***

When the fluid was replaced or hydraulic hose disconnected (which should be avoided) the brake system should be de-aerated.

To do this, affix a piece of tight-fitted transparent plastic hose over the bleed nipple (23), and dip its free end into the pot filled with hydraulic fluid. Loosen the bleed-air valve (24), while the assisting person is moving the lever (34) of master cylinder.

This procedure should be repeated several times, until fluid in the hose completely free of the air bubbles could be seen. Check regularly the hydraulic fluid amount and replenish, if necessary.

Finally, gently tighten the bleed-air valve (23) and put on the cap (22).

To facilitate this procedure, the brake bleeding kit is available from TOST factory.

2.3.3 Disassembly and assembly of main wheel (Fig. 9 a, b, c, d)

1. Undo the nuts (3) and remove the screws (2) and clamps (1), which fasten the wheel to fuselage. Do not allow the wheel to fall down and stress the hydraulic hose.
2. Shift the wheel out from the undercarriage well, while pulling out approx. 100 [mm] /3.94 [in] of hydraulic hose (10) at the same time.
3. Remove wheel axle (4), distance sleeve (5) and brake anchor lever (8) together with clamp (9), the latter is to be suspended to avoid undue stress on the flexible hose.
4. Unscrew both screws (30), connecting the housing of clamp (9) with back plate (29) and dismount the remaining elements (21), (8), (9), (26), (29).
5. Discharge air from tyre.
6. Undo the screws (12), connecting the hub halves and brake disk (13)

   Remove the tyre and tube, as well as the inner spacer sleeve (15).

NOTE: ***When assembling or disassembling the main hub halves, the tube inflation valve should be screwed out entirely.***

Wheel assembly requires the reverse sequence.

Pay attention to the correct connection between the brake anchor lever (8) and the pin located in a recess on the wheel fitting.

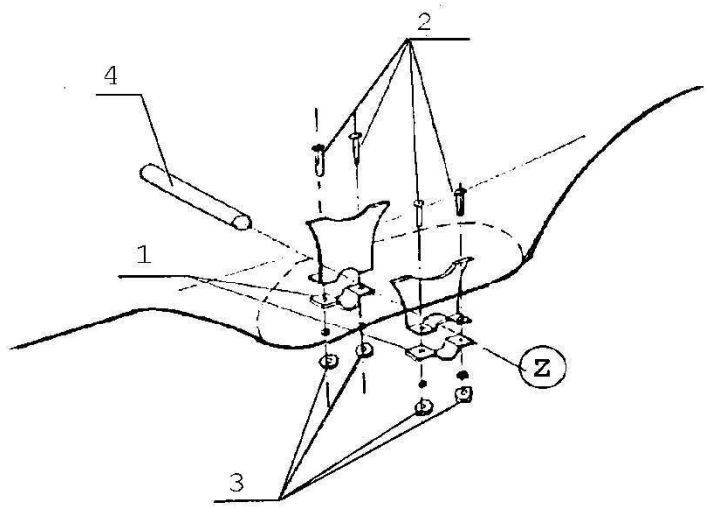
The screws (30) that connect clamp housing (9) with back-plate (29) should be tightened with a torque of 7.5 through 8 [Nm] / 5.5 through 5.9 [lb ft].

2.3.4 Tail wheel

Tail wheel ∅ 200 x 50 [mm] / 7.88 x 1.97 [in], with integral hub, is mounted on a wheel axle installed in fuselage by means of a nut secured with special washer.

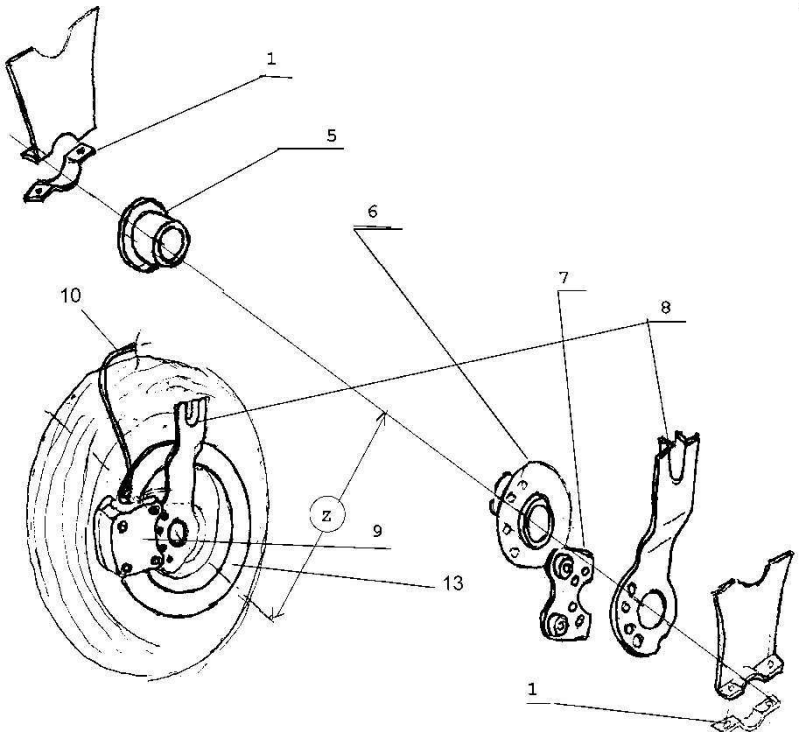
The tail wheel pressure of 0.15 [MPa] corresponds to tyre deflection approx. 1.0 through 1.5 [cm] / 0.4 through 0.6 [in] (length of the tyre trace chord is approx. 10 [cm] / 4 [in]).

Fig. 9 Main landing gear with brake.



a) Wheel mounting, well

1. Axle clamps
2. Mounting screws.
3. Nuts.
4. Wheel axle



b) Wheel with brake

1. Axle clamps

5. Right hand distance sleeve

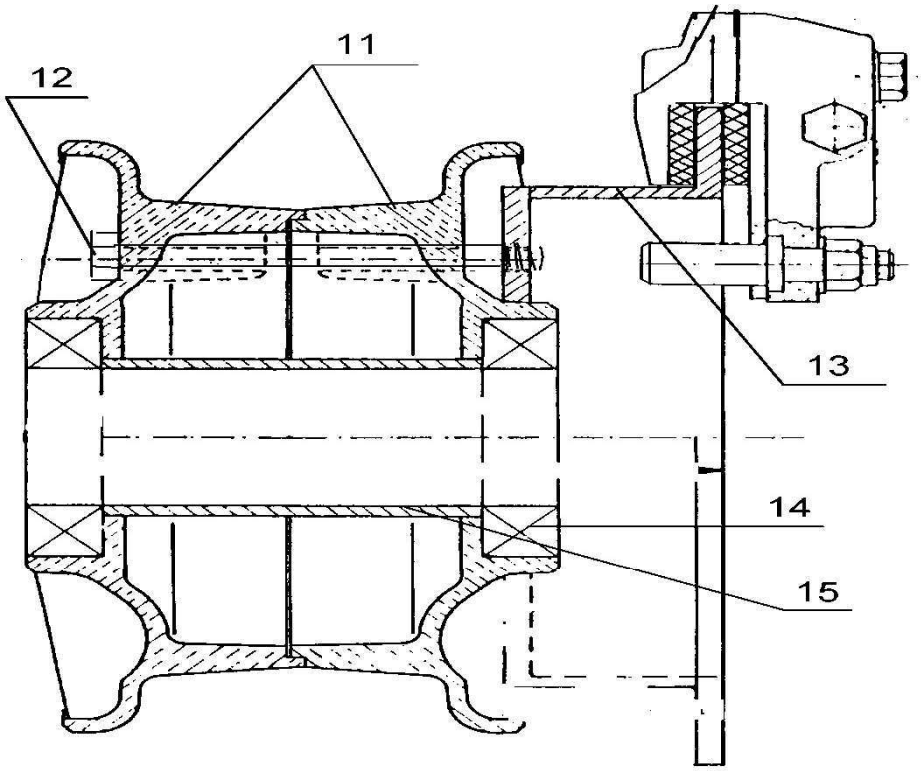
6. Left hand distance sleeve

7. Brake anchoring plate

8. Brake anchoring lever

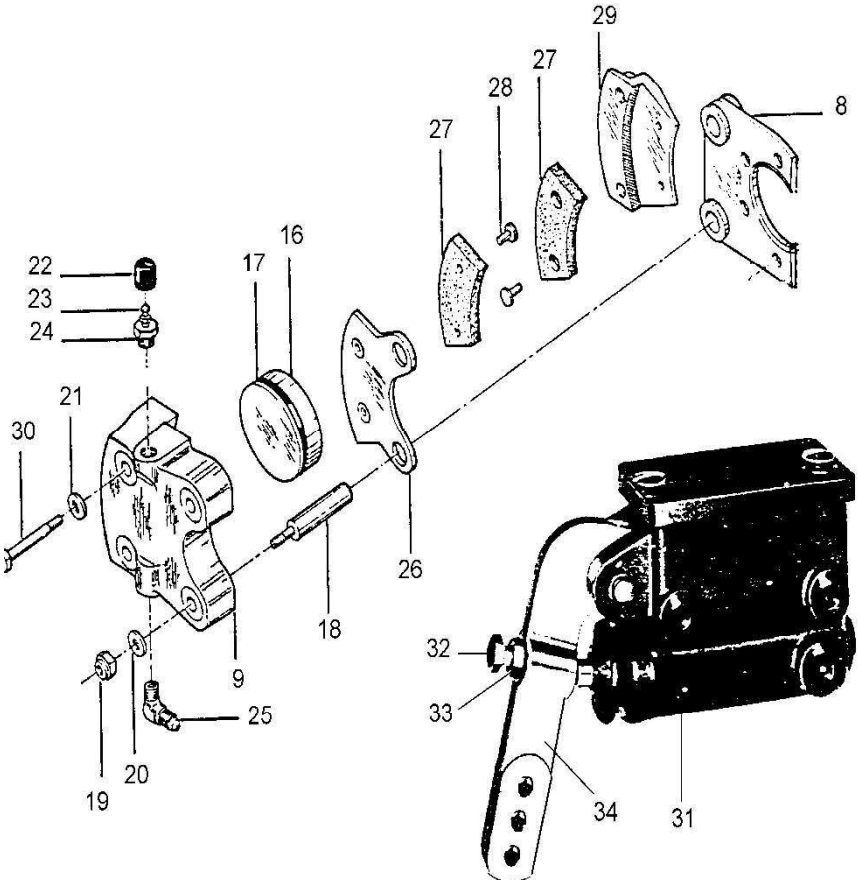
9. Caliper

10. Brake pipe



c) Hub (section)

11. Hub halves
12. Connecting screws
13. Brake disc
14. Wheel bearings
15. Inner spacer sleeve



d) Assembly of brake cylinder clamp

9. Clamp housing
16. Piston with sealing
17. 0-ring
18. Piloting bolts
19. Nuts
20. Washers
21. Washers
22. Cap
23. Nipple
24. Bleed-air valve
25. Pipe coupling
26. Plate with brake pad
27. Brake pad
28. Pad rivet
29. Rear plate with pad
8. Brake anchoring plate
30. Screw
31. Brake cylinder
32. Adjusting screw
33. Securing nut
34. Brake cylinder lever

2.4 Instrument panel and glider equipment

2.4.1 Standard equipment

Glider standard equipment consists of:

front seat instrument panel, with following instruments (Fig. 11):

- airspeed indicator	(1)	- compensator	(item 7, Fig. 10)
- altimeter	(2)	- compensation bottle	(item 8, Fig. 10)
- variometer	(3)	- bank & slip indicator	(5)
- accelerometer	(4)	- compass	(6)

Moreover, to the standard equipment belong:

- 5-point safety harness
- front towing hook TOST E85
- seat cushion

Minimum equipment

11

Minimum equipment of the glider depends on the intended type of operation and consists of the components, location and range of indication (where specified). Specific equipment models listed in the table below have been verified by the manufacturer, but are not mandated by the manufacturer as the only acceptable types.

component & location	range of indication	remarks
Type of operation:	**normal /soaring flight**	
airspeed indicator, *at front seat*	300 [km/h] (160 [kts])	PZL PR 400s or Winter 6 FMS 5
altimeter, *at front seat*		PZL PW-12, W-12s or Winter 4 FGH 10
5-point safety harness, *at front-, and at rear seats*		SZD CT.J5.00.00 or Hooker Harness 1022430 1H423903/ 1CS924-J
parachute or back cushion:, *for each crew member*		
Type of operation:	**aerobatic flight** (in addition to the above)	
accelerometer, *at front seat*	9/-6 g	AM-10, MGL INFO-1 or TL Elektronic TL-3424
for dual aerobatic instruction, an accelerometer required in both instrument panels		

The glider is equipped with instrument panel mounted to the fixed windshield at front seat (Fig. 11.). Direct access to airspeed indicator (item 1, Fig. 11.) and to variometer (item 3, Fig. 11.) is ensured (available by hand from bottom side). To disassemble any of remaining instruments, the whole instrument panel must be removed from glider.The procedure (see Fig. 11.) is as follows:

1. Remove 4 screws fastening the panel from top side to the fixed windshield.
2. Shift the panel back as far as the pneumatic ducts allow for.
3. Disassemble required instrument.

The central portion of the panel contains space for a board computer or aerobatic program chart. The rear seat instrument panel is installed on a lateral tube (Fig. 12.). Disassembly of rear panel instruments is available by removing the cover fastening screws.

11

The glider is adopted for installation of Becker transceiver type AR 6201 or earlier and an additional lap belt J5.10.00. (transceiver and additional belt do not belong to the standard equipment). To customer order, and by prior arrangement with the producer, the glider can be adopted for installation of other type of equipment elements different from those specified in standard equipment list. In case of essential changes in the installation, appropriate information will be provided in the specially prepared Supplement to this Manual.

When using the glider for cross-country flights, and necessary installation of ELT emergency radio, the recommended location is a pan in fuselage between the main and rear spars. When installing the ELT, ensure a secure installation and observe the glider weight & balance limitations.

2.4.2 Board instrument pneumatic system

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Fig. 10. Board instrument pneumatic system

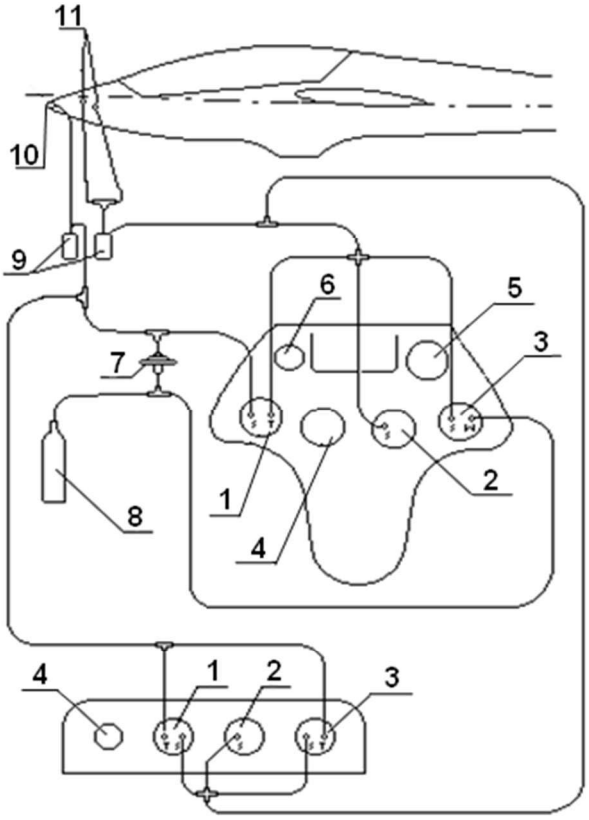
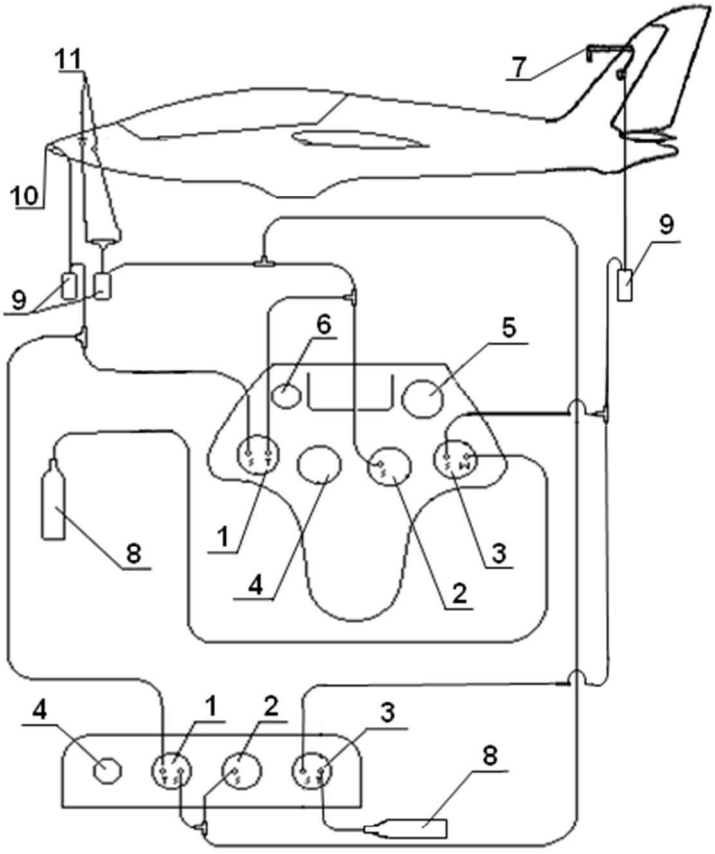


Fig. 10A. Board instrument alternative pneumatic system in case of TE probe installation



Legend to Fig. 10:
1 – airspeed indicator
2 – altimeter
3 – variometer
4 – accelerometer
5 - bank & slip indicator
6 – compass
7 – total energy compensator
8 - compensation bottle
9 – drainage units
10 - total pressure head
11 - static pressure ports

Legend to Fig. 10A:
1 – airspeed indicator
2 – altimeter
3 – variometer
4 – accelerometer
5 - bank & slip indicator
6 – compass
7 – TE probe
8 - compensation bottle
9 – drainage units
10 - total pressure head
11 - static pressure ports

The factory built-in TE probe pneumatic duct terminates under the front instrument panel on the right hand side. In lack of pneumatic ducts between front and rear variometers, these are to be added inside a tunnel underneath right-hand side rim of cockpit, where other pneumatic and electric installations are to be found. Compensation bottle is to be fitted in a holder beneath back seat on the right, drainage unit is to be fitted in a holder in a glider nose, next to factory built-in ones. In lack of holders for compensation bottle and/or drainage unit, contact the manufacturer of the glider for the necessary elements. TE probe pneumatic ducts should be blown with air prior to connecting it to the instruments.

NOTE: ***After flying in rain, or if water is suspected to have entered the pressure ducts, disconnect the tubing from the instruments and blow out with air.***

2.4.3 Towing hooks

As a standard, the glider is equipped with a TOST E85 nose hook in the forward fuselage, in front of the control stick. The hook is accessible after removing the cover, and disassembling the right hand balancing weight (item 13 in Fig. 11) as well as opening the right hand inspection hole in the floor.

To an order a TOST G88 model C.G. hook can be installed. In a place where a nose hook is mounted, the SZD III A56P model can be installed as well.

2.4.2 Board instrument pneumatic system

Fig. 10 Board instrument pneumatic system

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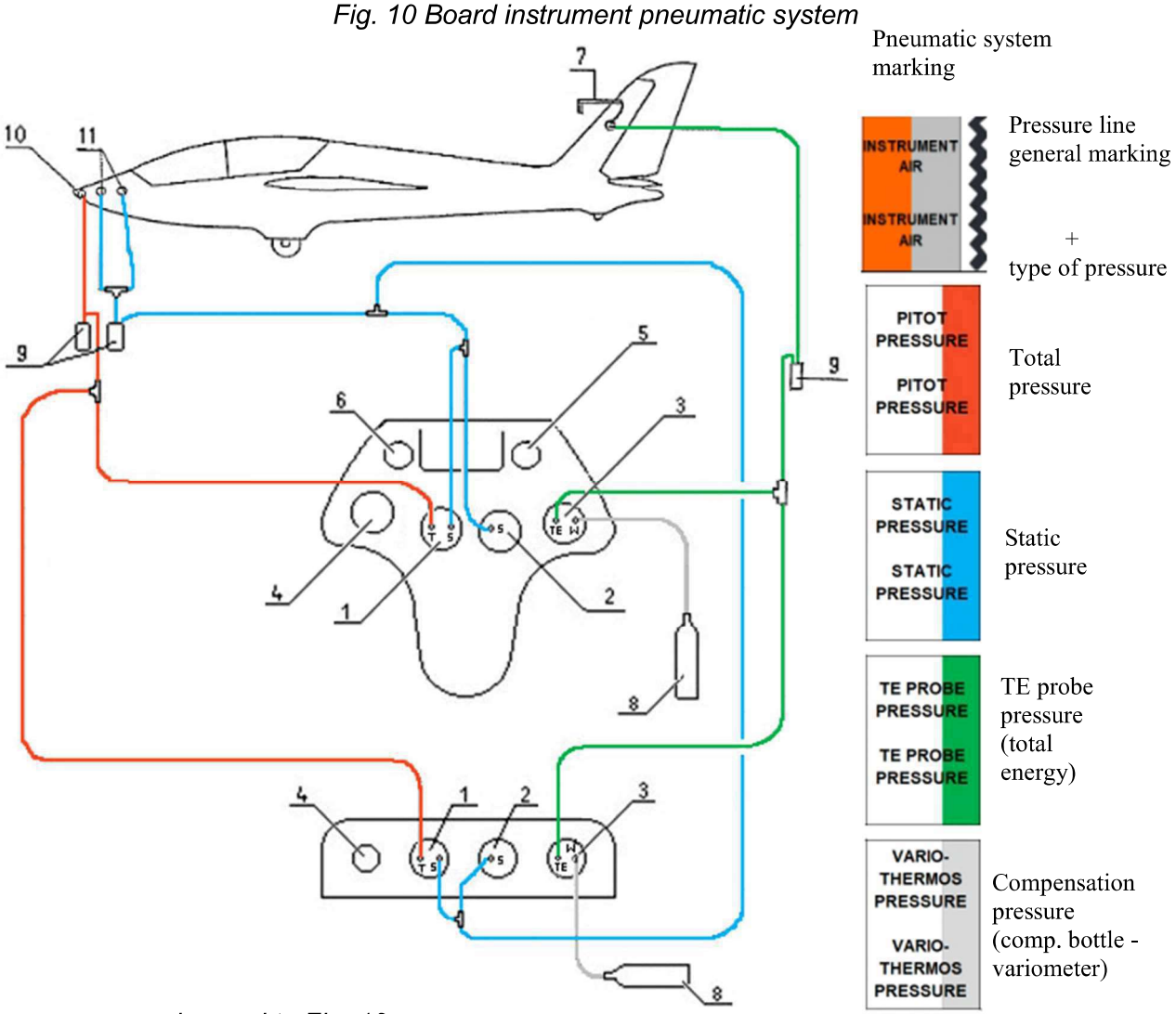

Legend to Fig. 10:

1 - airspeed indicator	*7 – TE probe*
2 - altimeter	*8 - compensation bottle*
3 - variometer	*9 - drainage units*
4 - accelerometer	*10 - total pressure head*
5 - bank & slip indicator	*11 - static pressure ports*
6 - compass	

NOTE: ***After flying in rain, or if water is suspected to have entered the pressure ducts, disconnect the tubing from the instruments and blow out with air.***

2.4.3 Towing hooks

As a standard, the glider is equipped with a TOST E85 front hook in the fuselage front part, in front of the control stick. The hook is accessible after removing the cover, and disassembling the right hand balancing weight (item 13 in Fig. 11) as well as opening the right hand inspection hole in the floor.

To an order, the TOST G88 C.G. hook can be installed. In place of TOST, the SZD III A56P front hook can be installed as well.

2.4.4. Electrical system

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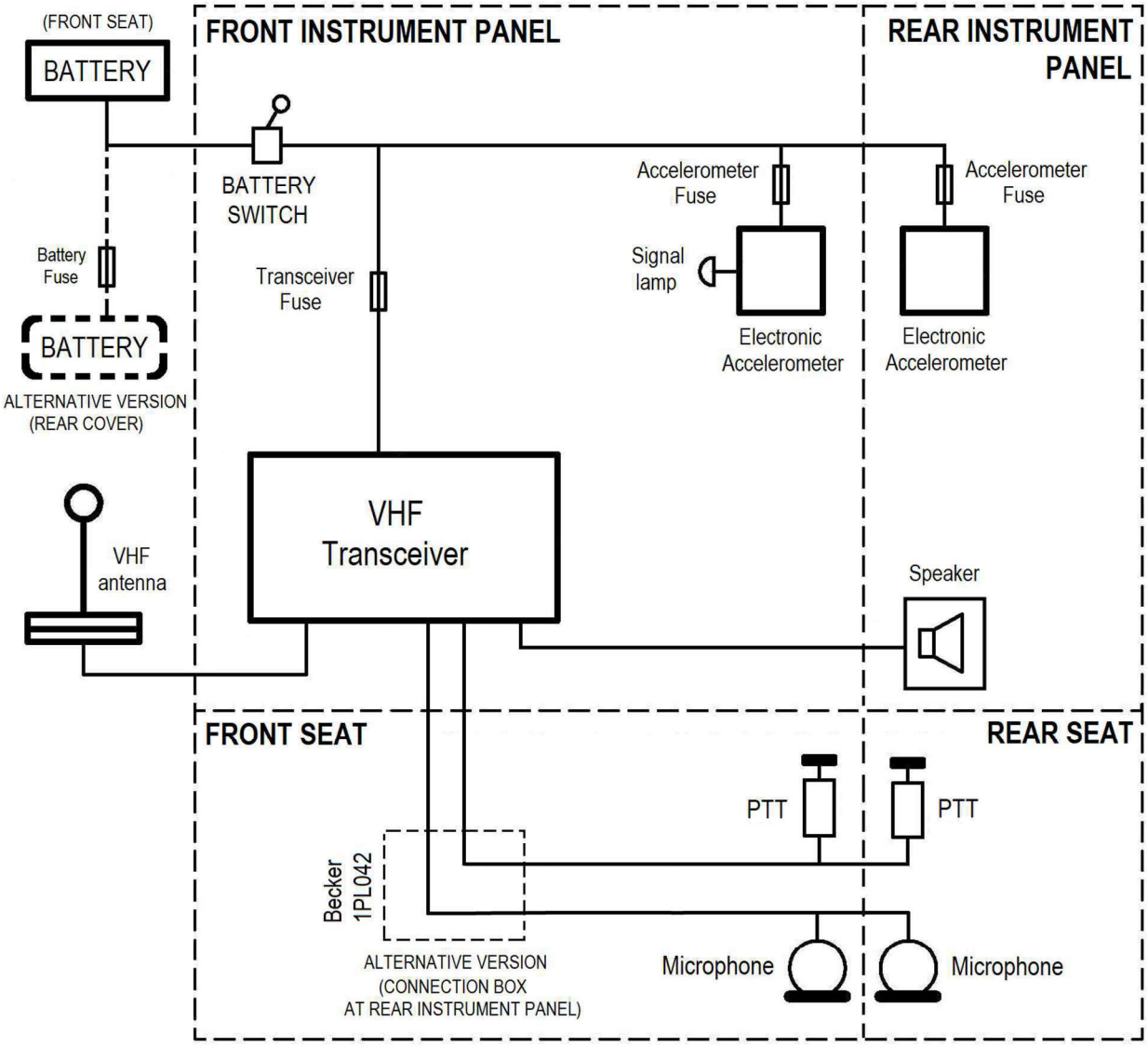
Fig. 10B. Glider electrical system with electronic accelerometers installed



The glider is equipped with battery for powering on-board receivers, stored in a special container in front of the front seat.

Battery specification:

- type – gel battery, AGM, LiFePO4;
- nominal voltage – 12V;
- nominal capacity – min.5Ah;
- weight – 3.0 kg max;
- dimensions – suitable for installation in a special container, as above.

Fig. 11 Front seat arrangement

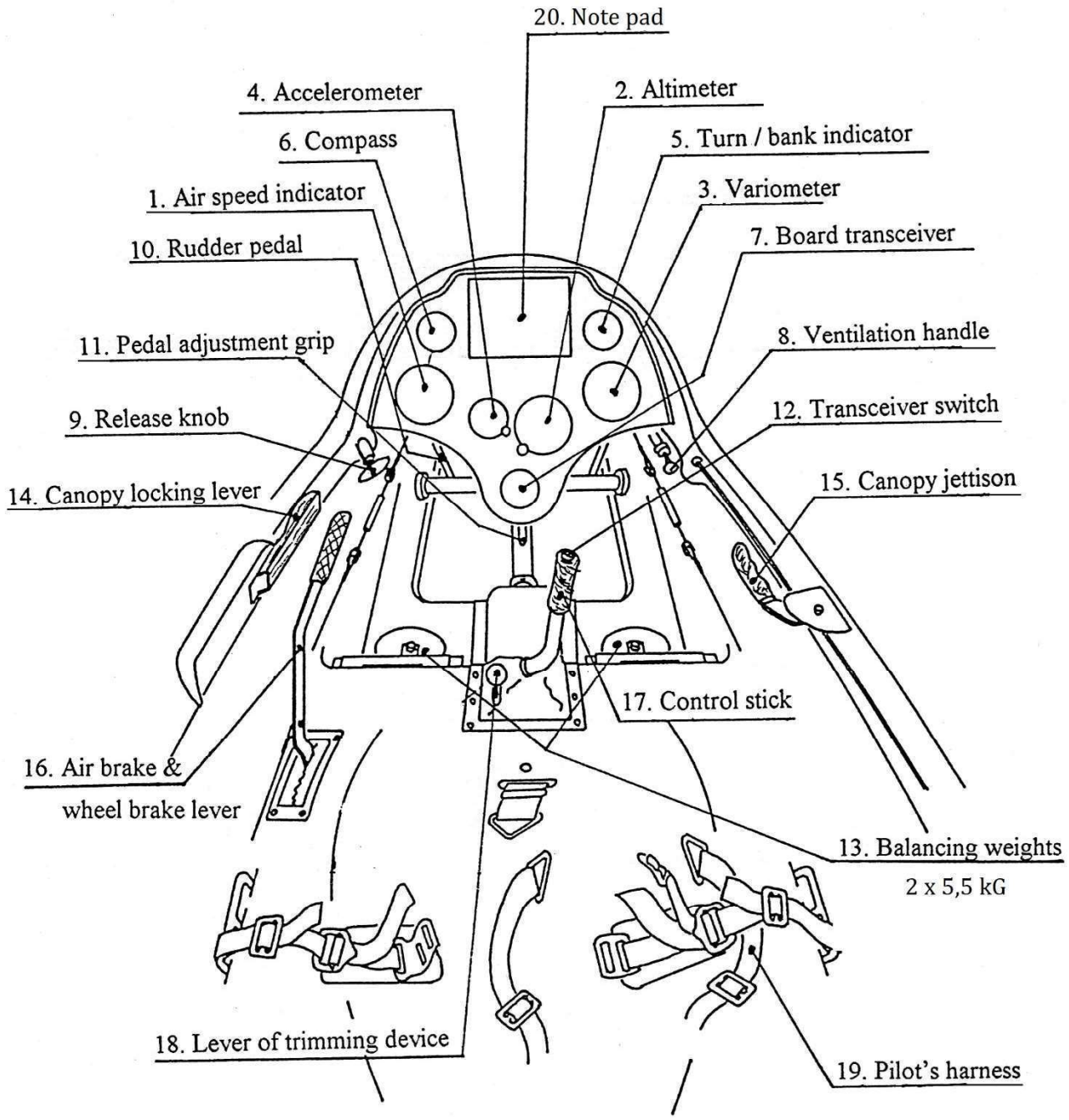


Fig. 11 Front seat arrangement

11

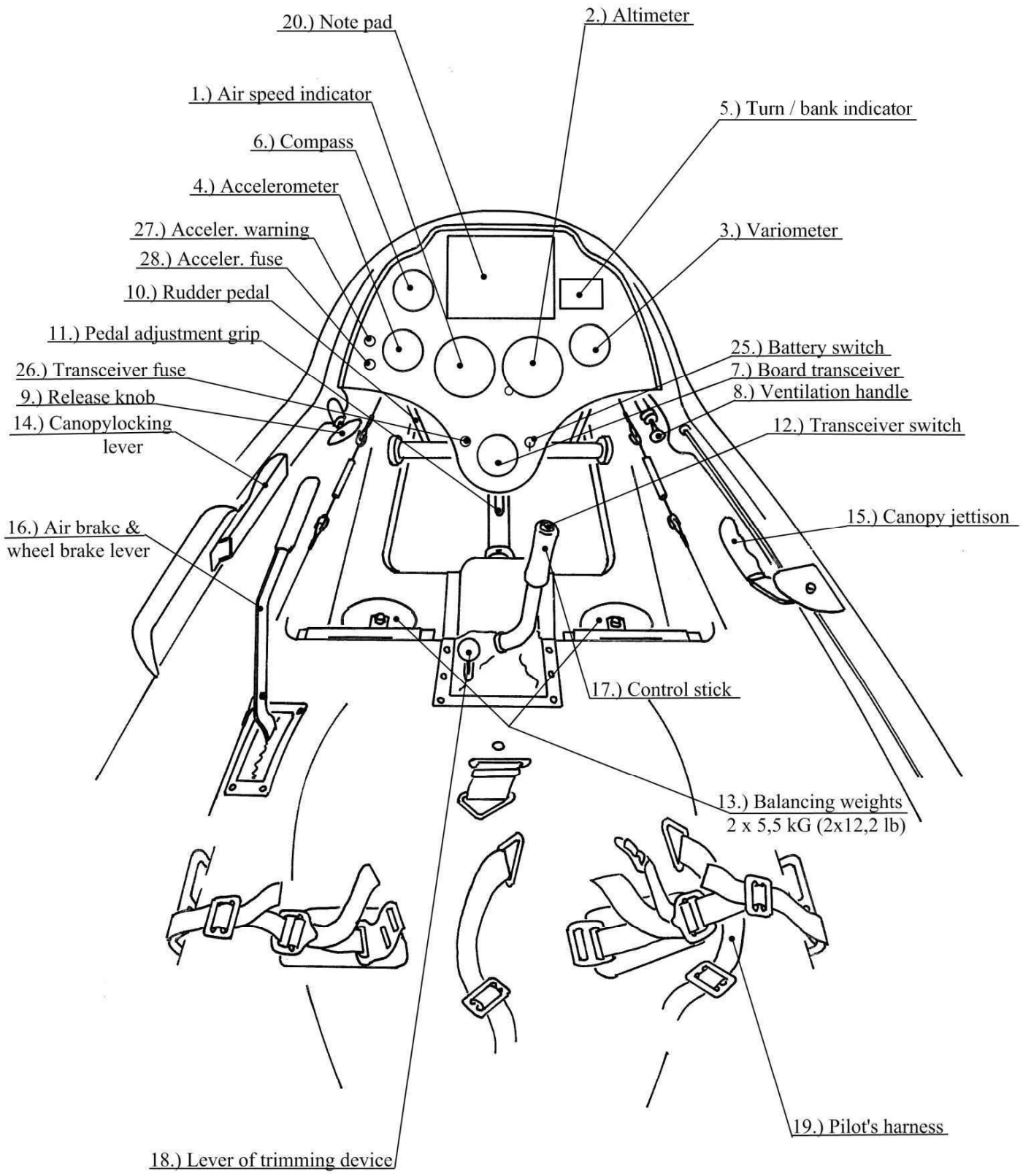


Fig. 12 Rear seat arrangement

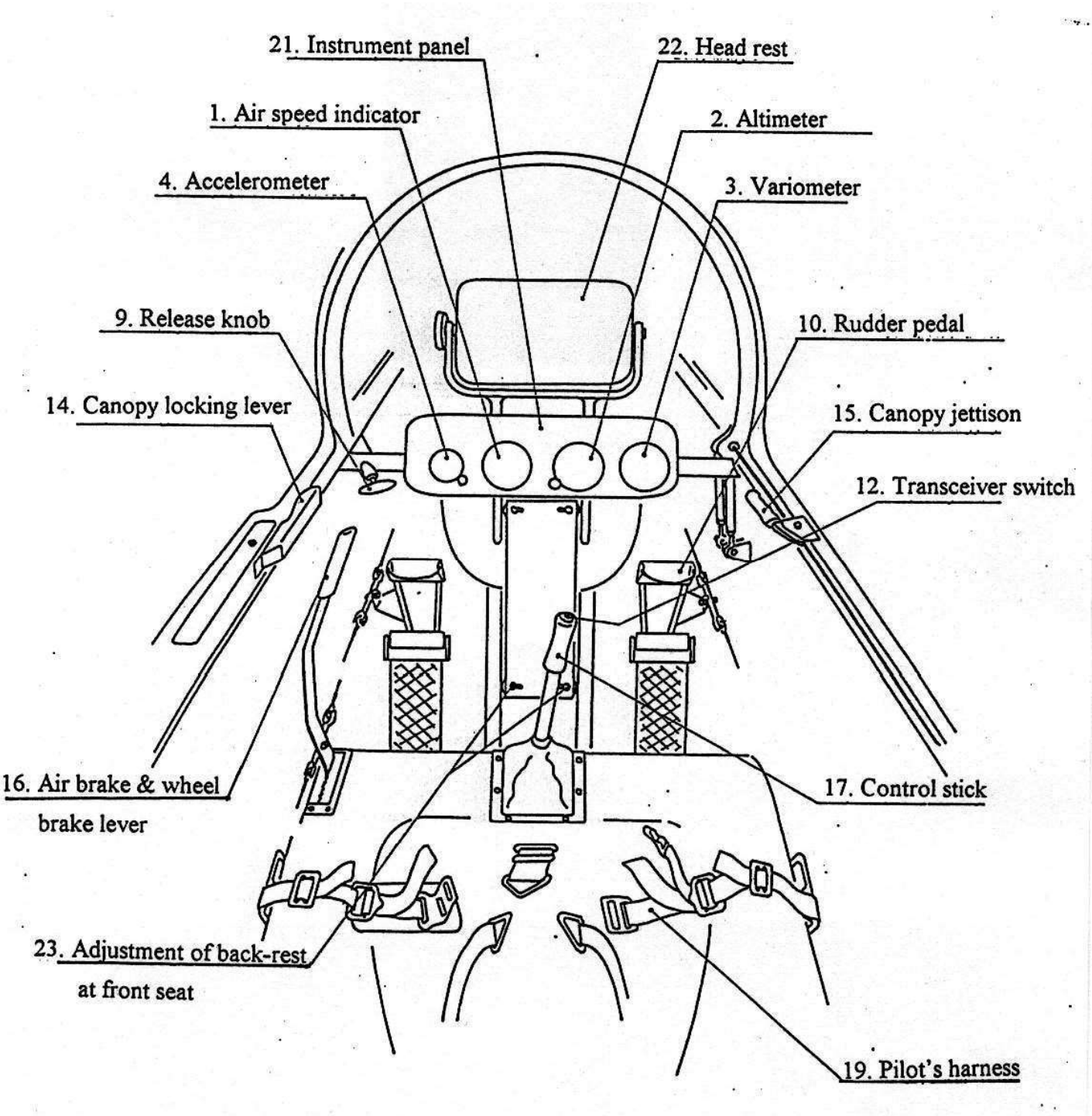
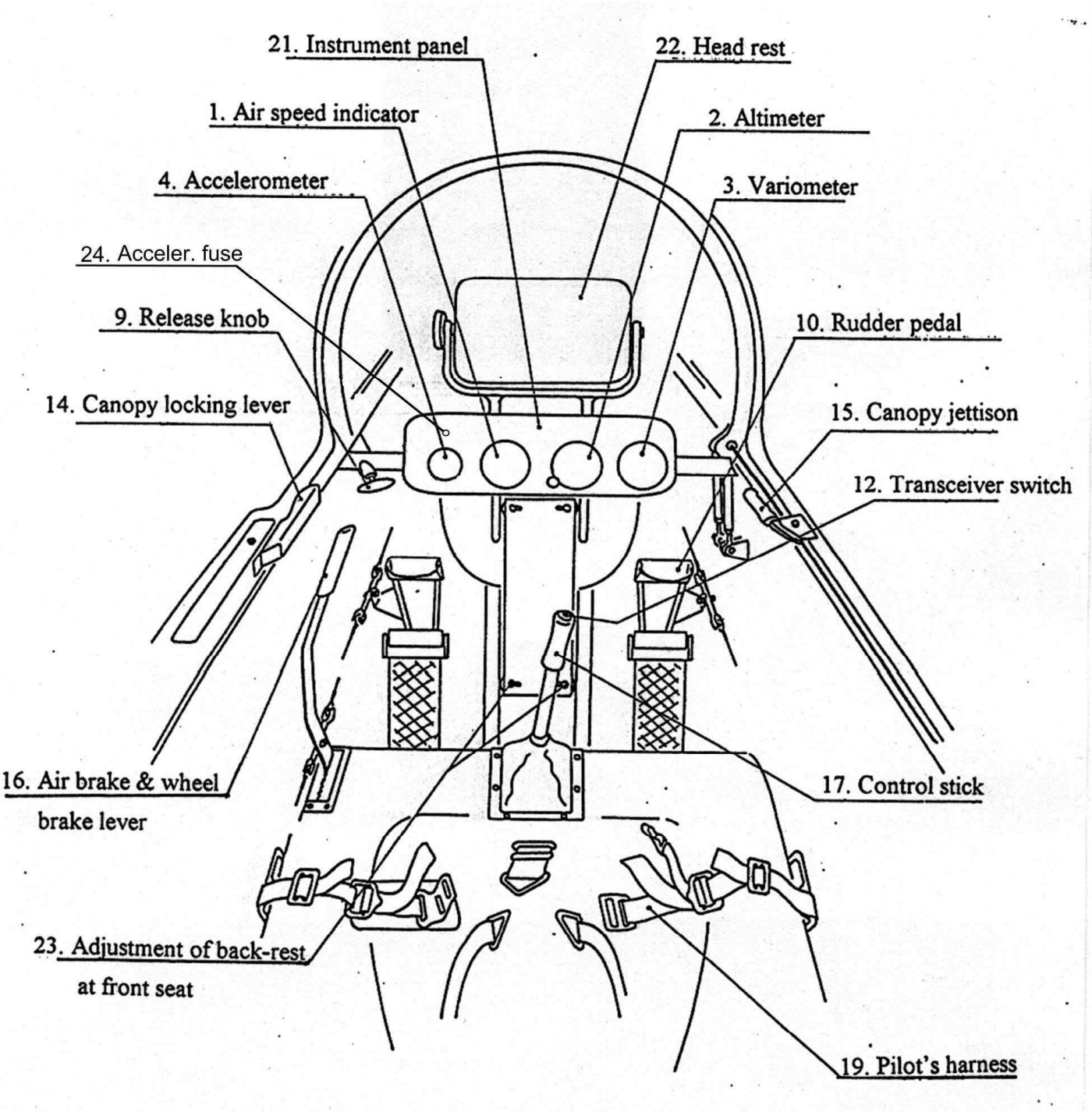


Fig. 12 Rear seat arrangement

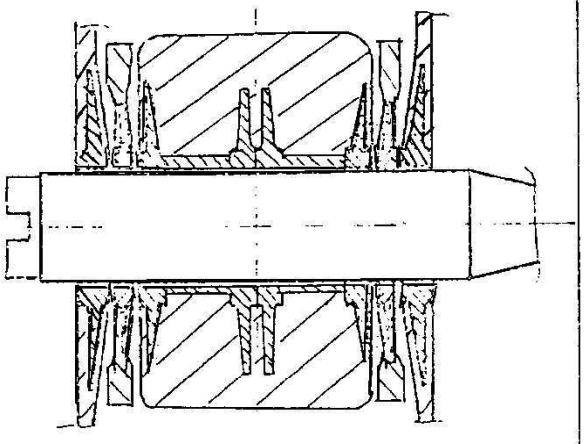
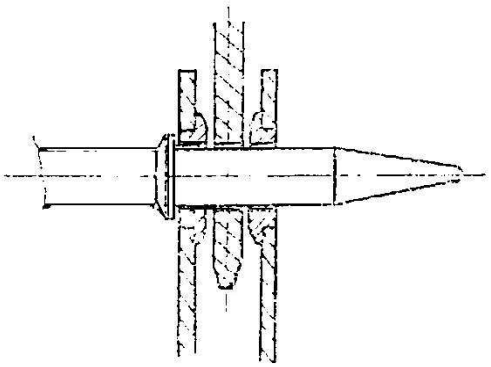
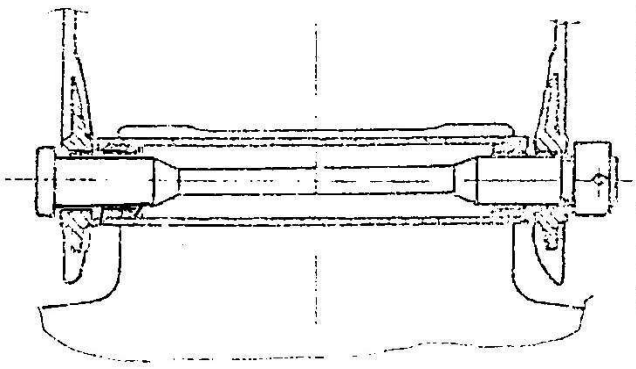
11



2.5 Allowed assembly plays

In the specified below connections the plays may appear in operation.

The allowed play values are contained in the following **Table 1**.

CONNECTION	CONNECTION SCHEME	ALLOWED PLAY Δ
Wing spars to fuselage (main bolt)		Main fittings ϕ 35 [mm] 1,38 [in] Δ−0,18 [mm] 0,007 [in]
		Rear fittings ϕ 16 [mm] 0,63 [in] Δ−0,12 [mm] 0,005 [in]
Tailplane to fuselage (horizontal bolt)		Bolt ϕ 12 [mm] 0,47 [in] Δ−0,10 [mm] 0,004 [in]

2.6 Weighing the glider

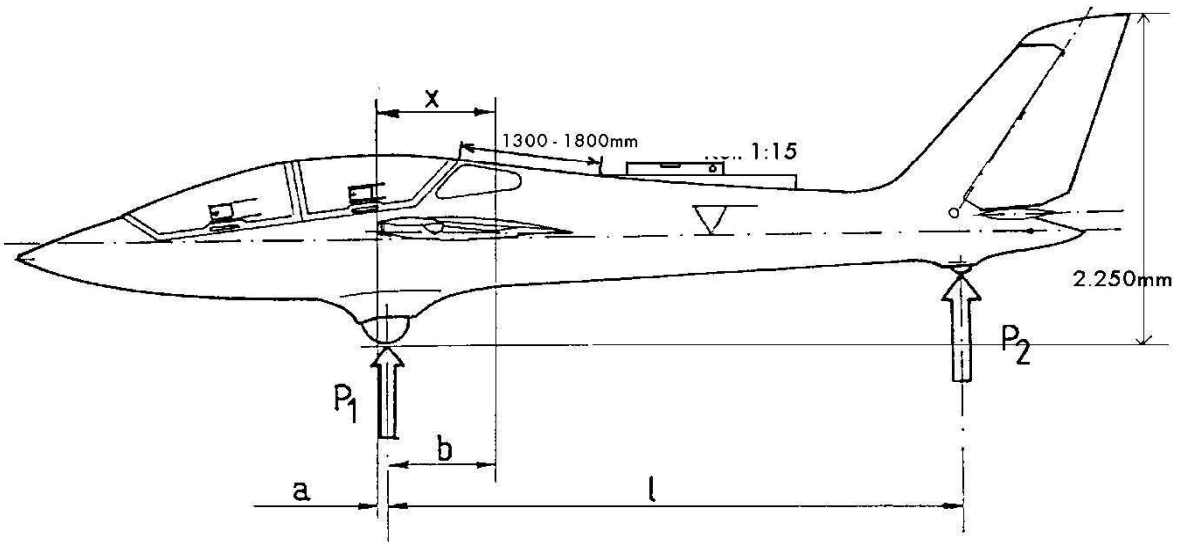
The glider should be re-weighed after every repair (especially this to tailplanes and tail portion of the structure), painting or additional equipment installation.

The glider should be weighed with standard equipment (in accordance with paragraph 2.4.1) with neither balancing weights nor rear seat instrument panel installed, on two balances of ±0.2 [kg] / 0.4 [lb] accuracy.

Support the glider on the main and tail wheels. The difference between supports height should be selected so, that the leading and trailing edges at wing root (levelling points) are on the same level, within a tolerance of ±2 [mm] / 0.08 [in] , or set the glider up in such attitude to obtain the dimension 2250 [mm] / 8.6 [in] (see Fig. 13).

Another way to ensure the correct glider attitude is to put a wedge (height to length ratio 1:15) on top of the fuselage (as shown in Fig. 13), with a levelling gauge on it. The gauge should be levelled by adjusting the support' height.

Fig. 13. Weighing the glider



$Q = P_1 + P_2$

$$X_{CG} = a + b = a + (P_2 * l) / (P_1 + P_2)$$

where: "a" and "l" - should be measured.

The weighing results i.e. Q and X_{CG} values should be recorded in Table 2.

2.7 Allowed loading conditions

On the basis of weighing results, the allowed glider loading conditions should be determined by filling in Table 2, in accordance with the following instruction:

Record appropriately:

- In column 2, the weighing result

$Q = P_1 + P_2$ [kG] | $Q = P_1 + P_2$ [lb]

- In column 3, the result of the formula

$X_{CG} = a + b = a + (P_2 * l) / (P_1 + P_2)$ [cm] | $X_{CG} = a + b = a + (P_2 * l) / (P_1 + P_2)$ [in]

- In column 4, the value calculated acc. to the formula

2 7 | $M_{4Max} = 530 - Q - 11.0$ [kG] | $M_{4Max} = 1168 - Q - 24.4$ [lb]

- In column 5, the value

7 | $M_{5Min} = 110 - 11.0 = 99.0$ [kG] | $M_{5Min} = 242.5 - 24.4 = 218.1$ [lb]

- In column 6, the value calculated acc. to the formula :

2 | $M_{6Max} = 530 - Q$ [kG] | $M_{6Max} = 1168 - Q$ [lb]

- In column 7, the value

$M_{7Min} = 110$ [kG] | $M_{7Min} = 242.5$ [lb]

- In column 8, the value calculated acc. to the formula :

7 | $M_{8Max} = 450 - Q - 11.0$ [kG] | $M_{8Max} = 992.3 - Q - 24.2$ [lb]

- In column 9, the value calculated from the formula :

7 | $M_{9Min} = [X_{CG} * Q - 1672.0 - 37.9 * (Q + 11.0)] / 132.9 \geq 55$ [kG] | $M_{9Min} = [X_{CG} * Q - 1453.14 - 14.92 * (Q + 24.2)] / 52.32 \geq 121.3$ [lb]

- In column 10, the value calculated acc. to the formula :

2 | $M_{10Max} = 450 - Q$ [kG] ≤ 100 [kG] | $M_{10Max} = 992.3 - Q$ [lb] ≤ 220 [lb]

- In column 11, the value calculated acc. to the formula :

7 | $M = (X_{CG} - 37.9) * Q / 132.9 \geq 70$ [kG] | $M = (X_{CG} - 14.92) * Q / 52.32 \geq 154$ [lb]

7 **Table 2. Results of glider weighing, permitted loading conditions.**

Date	Empty weight	C.G. pos. of empty glider	Permitted crew weight [kG]								S/N:	
			2-person crew				1-person crew				Approved	
			with balancing weights 2 x 5,5 kG		without balancing weights 2 x 5,5 kG		with balancing weights 2 x 5,5 kG		without balancing weights 2 x 5,5 kG		Date	Signed
			Total payload on front and rear seats		Total payload on front and rear seats							
	kG	cm	Max	Min	Max	Min	Max	Min	Max	Min		
1	2	3	4	5	6	7	8	9	10	11	12	13

2.8 Control surfaces mass-balance

After each repair, or re-painting of an elevator, aileron or rudder, the C.G. position of the concerned element must be verified. To do this:

1. Weigh the concerned control surface (Q).
2. Suspend the control surface on hinges by a taught chord.
3. Apply the dynamometer at the indicated position on trailing edge, and measure the force (P) required to hold the chord of control surface horizontal.
4. Measure the distance of dynamometer application point from the hinge line (1).
5. Calculate the C.G. position of control surface

s = (P * l) / Q

where :

l = distance between the dynameter application point and hinge line,

P = dynamometer reading,

Q = control surface weight.

Control surface C.G. location is acceptable, when:

- for outboard aileron $s \leq 14$ [mm] (0.55 [in]),
- for inboard aileron $s \leq 14$ [mm] (0.55 [in]),
- for elevator $s \leq 30$ [mm] (1.18 [in])
- for rudder $s \leq 11$ [mm] (0.43 [in]).

8

If „s" exceeds its given above limit, the control surface should be mass-balanced with balancing weight installed at locations indicated with „B" (in Fig. 14):

1. Drill a 10 [mm] / 0.39 [in] diameter hole at, respectively:

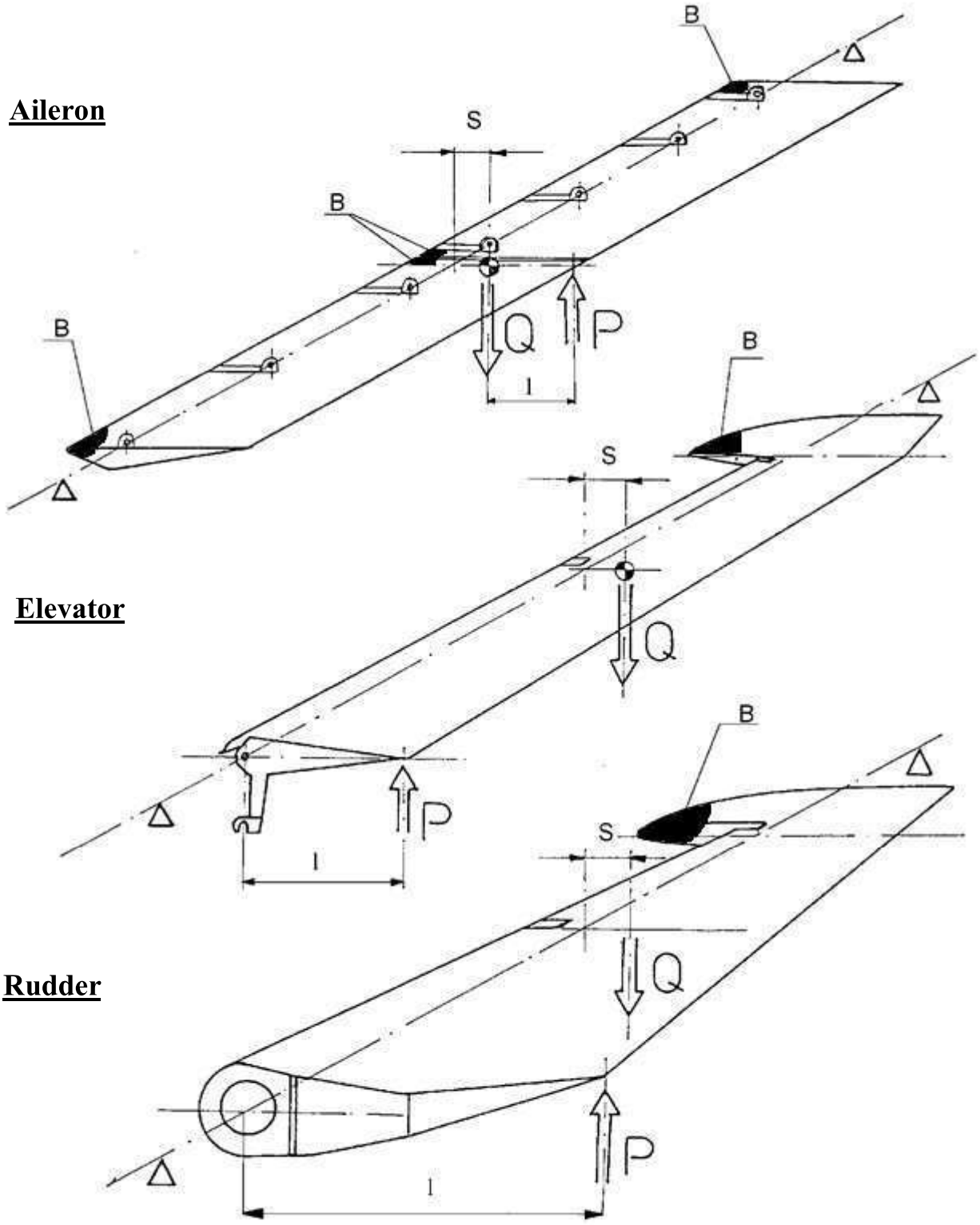
- for aileron - approx. 30 [mm] / 1.2 [in] from leading edge, inside enclosing web
- for elevator and rudder - approx. 120 [mm] / 4.75 [in] from nose, in the web of control surface portion protruding forward

2. Determine the required value of balancing weight.
3. Prepare a resin composition e.g. Ep53 / Z-1 or L-285 / H-286, pour in the plumb shot, and weigh the correct portion.
4. With the control surface held nose down, pour the weighed portion into the nose, through the drilled hole.
5. After resin hardening, check the C.G. position and repair the drilled hole, following the Repair Manual.

2.9 Towing cable safety link

The towing cable safety link of 677 [daN] / 1522 [lb] (± 10 per cent) breaking strength shall be used.

Fig. 14. Control surfaces mass-balance



B - position of control surface mass balance

3. PERIODIC WORKS

3.1 Pre-flight inspection

Prior to the flights, the followings should be checked :

1. Glider documents (verify and complete the required entries).
2. External inspection (structure integrity and condition of surface).
11 3. Security of assemblies and control system joints (wing and tailplane main bolts, control systems where accessible, installation of balancing weights if present).
4. Correct operation of control systems.
5. Operation of towing hooks.
6. Condition of undercarriage, wheels rollability, operation of wheel brake.
7. Correct tyre pressure (inspect visually), cleanness of the undercarriage well.
8. Pilot's belts.

CAUTION: The spring on belt clamp must neither be bent nor broken.

9. External condition of total and static pressure ports.
10. Operation of flight instruments and battery condition.
11. Condition of front seat back-rest and fixing bolts.
12. Operation of valve in air vent . (visible through the nozzle in the fuselage nose).
13. Condition of canopy, locks and jettison system.
14. Security of balancing weights (if installed).
15. Transceiver - communication test.

3.2 Post-flight inspection

After flights, make an inspection similar to this pre-flight one.

Complete the entries to Glider Log Book.

The glider considerably wetted by rain should be wiped down with a flannel cloth, and allowed to get dry with the air brake extended.

On the next day, de-rig the glider and re-grease all fittings and bolts.

After flying in rain, complete the followings:

11
- Empty the drainage-units by removing their drain plugs,
- Disconnect the total, static and control pneumatic ducts, disconnect the instruments and blow out the ducts with compressed air, if necessary,
- After the ducts have dried, reconnect the system and perform a **system leak-check**.

11 ***NOTE:*** ***If a glider load limit has been exceeded, in every case the glider must be de-rigged and subjected to a detailed structural inspection, with special attention paid to:***
- ***condition of the protruding wing spar portion (spar root), root rib and the connection between these (examine against white spots in composite),***
- ***condition of the fuselage sleeve to which the extending spar roots are inserted, check against possible cracks of lacquer coat - especially at wing root and fuselage central part,***
- ***condition of tailplane / fuselage connection,***
- ***possible plays, degradation of stiffness or excessive friction in the control systems, not stated previously.***

To make sure, measure control surfaces deflections and compare these against earlier reference data. In case of any doubts, a contact with Producer is necessary.

3.3 Periodic works

1. Check the condition of the structure, with special attention paid to those elements heavily stressed during take-off, flight and landing.
2. Check the condition of main fittings and bolts mating surfaces, as well as assembly plays.
3. Check reliable securing of the connections in glider main components and control systems.
4. Check the reliable operation of canopy locking and emergency jettison systems.
5. Check the condition and correct operation of the tow hook(s), tow cable loaded by hand.
6. Check the condition of control surfaces and hinges of the elevator, rudder, aileron and air brake, as well as correct operation of the control systems.
7. Check the friction forces in control systems and device actuation force.
8. Check the condition of undercarriage - main wheel, tail wheel and wheel brake operation.
9. Check the condition and correct operation of board instruments.
10. Check the condition of metal details protective coating, especially those exposed to mechanical damage and corrosion (cables, undercarriage elements).
11. Clean and lubricate with the special grease the bearings and connecting elements acc. to the lubrication plan (Fig. 15). In the event of bearing seizure, rinse it with a lubricating penetrant (e.g. WD-40) to restore smooth operation.
12. Check deflections of the control surfaces (Fig. 1).

4 13. Check technical condition of aileron-drive fitting connected with actuating push-rod according to Bulletin No BO 11/98.

9 14. In aileron control circuit, verify the condition of lever console, and its installation in a wing - according to Bulletin No BO-18/2011.

15. In elevator control circuit, on the first push-rod (counting from control surface) verify the condition of external surface, and on the second push-rod verify the tube and installation of the push-rod ends - according to Bulletin No BO-18/2011.

11 16. Verify, in accordance with instrument manufacturer recommendation, calibration of the TL-3424 accelerometer – *if installed on the glider.*

3.4 Schedule of periodic works

Table 3. Periodic work schedule

	Schedule	*Operations*
4	At the start of flying season	1÷13
	After every 50 flying hours	1÷13
9	After every 100 flying hours or every year, which first	1÷11, 13, 14, 15
	After every 500 flying hours	see Enclosure No 1 to this Manual
	After landing with damage to landing gear	1÷10
	After heavy landing	1, 2, 7, 9
4, 9	After prolonged tail-slide with control stick snatched out of pilot's hands	1÷15
	At the end of flying season, or before the prolonged hangaring	acc. to paragraph 3.6.
11	Every 3 years send TL-3424 to instrument producer for calibration verification (- *if installed on the glider.*)	16

3.5 Allowed glider life-time

Allowed glider service-life is 3000 flying hours.

The mandatory overhaul, every 500 flying hours, is imposed herewith.

The above does not concern:

- tow hooks,
- board instruments,

10 the life-times of which are specified in the equipment producer manuals.

3.6 Hangaring and transportation

In case a prolonged pause in glider operation is planned, glider disassembly is recommended.

The fittings and metal elements should be greased.

Put the individual covers on the glider main components.

The fuselage should be shored with contoured supports in front of the undercarriage well and under the fin.

Shore the wings with chord vertically under the leading edge, at 2/3 semispan, and under the spar extending portion at the root rib.

Reduce pressure in tyres.

NOTE: Do not hangar in wet covers.

To a separate order, producer delivers the closed COBRA-FOX trailer and instruction for loading the glider into trailer.

In case the glider is transported in a different type of trailer, the following procedure is recommend:

- Fix the wings on spar roots near the root rib, and under leading edge at 2/3 semispan location.
- The fuselage may be fixed on its wheels and stabilised at wing/fuselage connection pivots, provided the mating surfaces are adequately protected against scratch.
- Tailplane should be fixed in the trailer with clamps.
- During transportation, the mating surfaces of fittings, inspection holes and bearings should be protected against dust and dirt.
- Immobilize the control surfaces. Protect the canopy with a flannel cover.
- In case an open trailer is used, the external surfaces of the main glider components should be protected with individual covers and, in case of rain, with foil.

For ground rolling the „tail first" attitude is recommended.

Push on the wings leading edge, close to the fuselage, make turns with the tail lifted, using the provided handle. Loading the fuselage nose down by an assisting person would be helpful.

To a separate order a detachable tail dolly can be delivered, facilitating ground handling.

For a glider "nose-first" towing by a vehicle use the nose tow hook, while for „tail-first" towing - a purpose-built hook installed in the fuselage rear part should be used.

NOTE: ***Prior to connecting the towing cable at the tail hook, fasten the control stick in a cockpit with pilot's safety belts to lock the elevator in „upward" position.***

3.7 Lubrication plan

Table 4. Lubrication plan

Lubricated item	*Agent*
1. Aileron hinges and control links 2. Suspension of air brake plate and arms 3. Suspension of control column, push rod bearing and intermediate lever 4. Stabilizer fittings and elevator hinges 5. Rudder hinges 6. Elevator control coupling 7. Wheel bearings and axle 8. Rudder pedal suspension and guides 9. Canopy locks 10.Towing hook 11.Tail wheel axle 12.Coupling of air brake control	bearings grease, e.g. £T 43
13.Bolts and openings of spar fittings	graphite grease
14.Air brake arm axle 15.Brake lever axle in a cockpit	compound oil

3.8 Cleaning and care

In case the external surfaces are soiled (e.g. with insects) it is recommended to wash these with water and a gentle detergent without abrasive agents.

Dry washed surfaces with a flannel cloth (shammy). Dry the wetted glider inside (air brake housing), ensure the drainage holes are clear.

The lifting surfaces should be polished time to time with a fat-free polish.

The canopy perspex should be rinsed with clear water, with eventual aid of agent for perspex cleaning.

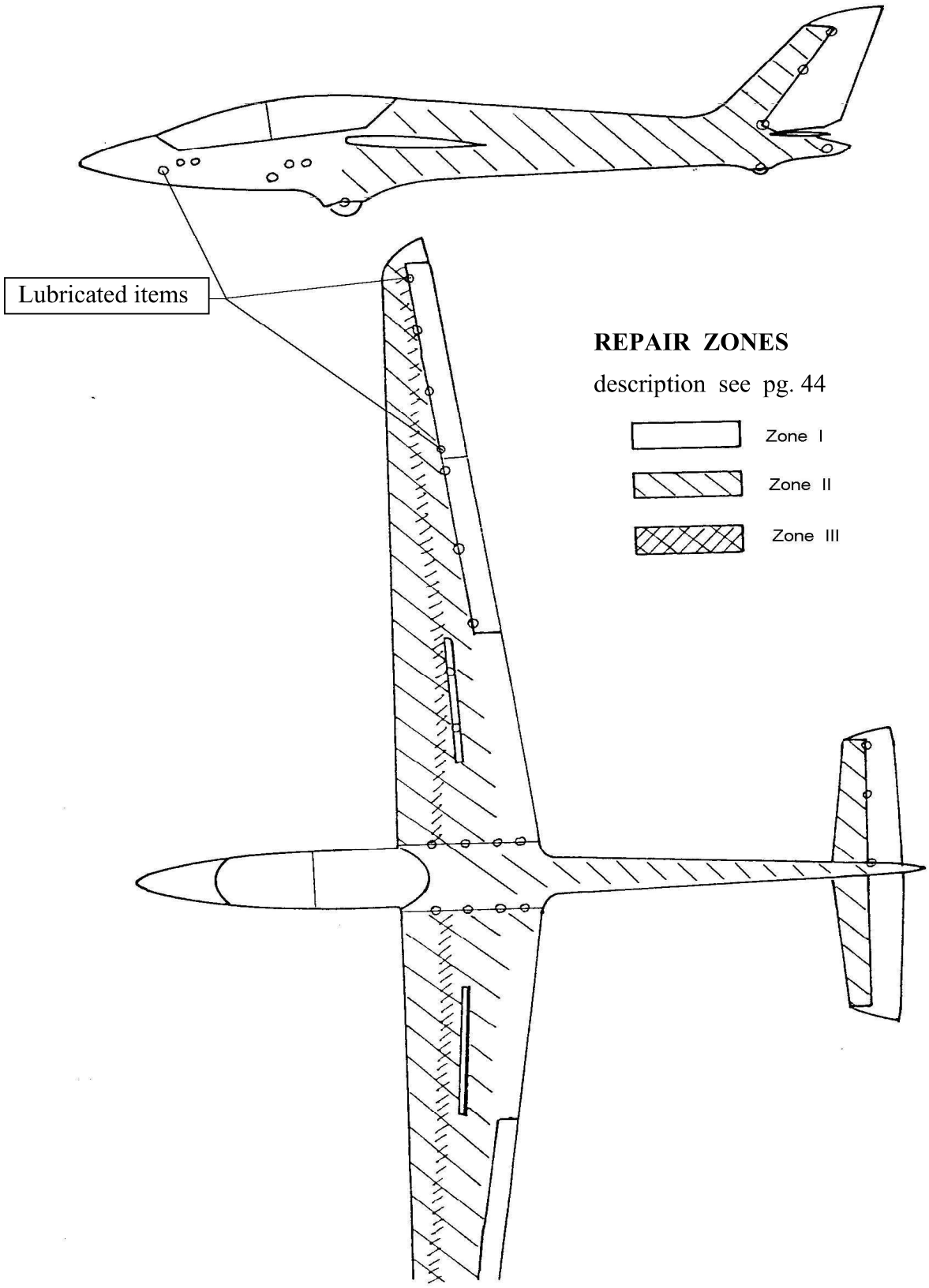
Protect perspex against dust and sun with a flannel cover.

3.9 Special tools

Every glider is equipped with the following special service tools :

1. The brass or aluminium bar to align the wing and fuselage fittings.
2. Extension pipe for inflating the main and tail wheel tyres with air.

Fig. 15. Lubrication plan & arrangement of structural repair zones.



3.10 Glider repairs

In case of minor damages to glider structure in Zone I, not affecting the structure strength, like local scratches, small indentations of outer surface, edges crumbling etc. the user can repair them himself. The zones of glider structure allowed for the user's repair are shown in Fig. 15:

„I" structure zones allowed for the user's repair

„II" structure zones allowed for the repairs at producer, or in authorized workshop only

„III" wing spar caps - not allowed for repair

The repairs of composite structures should be carried on in accordance with recommendation contained in the "Repair Manual of Composite Glider" for the SZD-48 "JANTAR Std" glider family.

The materials allowed for such repairs are specified below:

1. Glass fabrics produced by INTERGLAS.
2. L-285 resin and H-296 hardener.
3. Polyester lacquer Vorgelat T30 (T35) for the external coating.
4. Renovation and acrylic lacquers for cockpit inside.
5. Fillers - Aerosil, chopped roving.

In case the excessive plays in holes for wing or tailplane main bolts appear, the holes should be reamed in assembly with the adjustable reamer, until the ovalization is removed and the reaming traces are visible over the entire bearing surface. The new raw main bolts should then be polished until the play at mating surfaces ranges 60 through 70 per cent of allowed play value, for the connection concerned (see Tab 1, page 32).

In case of damage or wear to other metal parts, the concerned details should be replaced with new ones and adjusted to fit , as necessary.

To an order, producer supplies the user with the drawings of basic composite structures (free of charge), as well as with metal parts for replacement (wing and tailplane main bolts in raw condition) - against payment.

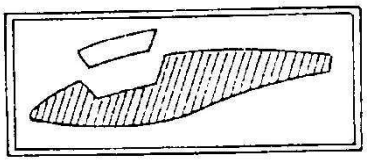
3.11 Additional equipment

To an order, producer delivers the following additional equipment:

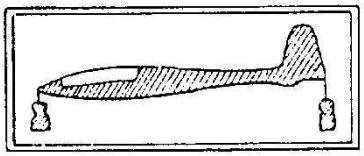
1. Closed Cobra-Fox trailer.
2. Complete set of covers (flannel canopy cover delivered with every glider).
3. Transportation tail wheel (tail dolly).

3.12 Placards and markings

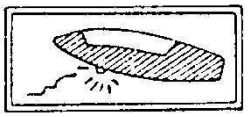
Fig. 16. Information placards



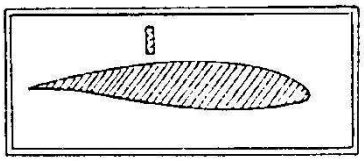
canopy emergency jettison



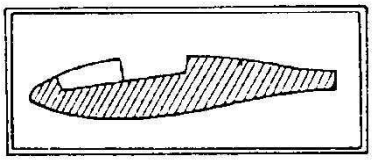
elevator trimming device



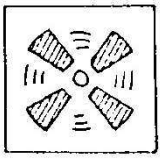
towing hook release



air brake lever



canopy lock lever

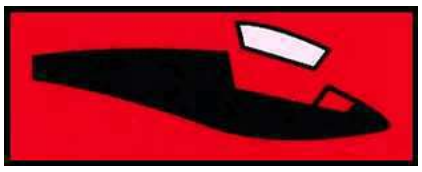


cockpit venting

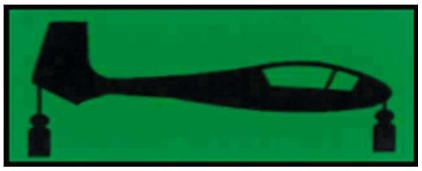
3.12 Placards and markings

Fig. 16. Information placards

11



canopy emergency jettison



elevator trimming device

towing hook release

air brake lever
extended / retracted

canopy lock lever

cockpit venting

No smoking

Fig. 17. Operation placards

Placard located on the right hand side cockpit wall, close to canopy frame at front and rear seats:

11

LIMITATIONS
1. Night flying prohibited
2. Cloud flying allowed, provided pilot and glider meet National Regulations
3. Flying in anticipated icing conditions prohibited
4. Aerobatics allowed, according to Flight Manual item 4.5.9

BEFORE FLIGHT
- Check the cockpit, take on the place
- Adjust the pedals, back rest and balancing weights
- Check the deflection of control surfaces, retract air brake
- Set the altimeter to zero reading
- Fasten and tighten the safety belts
- Check the setting of trimming device
- Lock both pieces of canopy, communication test.

SPEED LIMITATION		
IAS	*[km/h]*	*[kt]*
V_{NE}	*282*	*152*
V_{RA}	*225*	*122*
V_A	*214*	*116*
V_T	*150*	*81*

11

LOADING PLAN								
Pilot with parachute weight						*Balancing weights*		*Limit manoeuvring load factor*
front seat				*rear seat*				
minimum		*maximum*						
[kG]	*[lb]*	*[kG]*	*[lb]*	*[kG]*	*[lb]*	*[kG]*	*[lb]*	
55	*121*	*89*	*196*	*0*	*0*	*2x5.5*	*2x12.1*	*+ 9 / - 6*
70	*154*	*100*	*221*	*0*	*0*	*0*	*0*	
70	*154*	*110*	*243*	*0*	*0*	*0*	*0*	
55	*121*	*110*	*243*	*55*	*121*	*0*	*0*	*+ 7 / - 5*
55	*121*	*70*	*154*	*110*	*243*	*0*	*0*	
Solo flying on front seat only								
*Installation of balancing weights (2*5.5 kG) acc. to FM item 7.2 and Fig. 7.1.*								

11

Flight altitude	*[m]*	0-3000	4000	5000	5500
V_{NE}	*[km/h]*	282	267	253	246
Flight altitude	*[ft]*	0-10000	13000	16000	18000
V_{NE}	*[kt]*	152	145	138	133

11

Fig. 17. Operation placards

Placard located on the canopy glassing, right hand side, close to canopy frame at front and rear seats:

LIMITATIONS
1. Night flying prohibited.
2. Cloud flying allowed provided pilot and glider meet National Regulations.
3. Flying in anticipated icing conditions prohibited.
4. Full aerobatics, according to Flight Manual item 4.5.9.

BEFORE FLIGHT
• Check the cockpit, take on the place
• Adjust the pedals, back rest and balancing weights
• Check the deflection of control surfaces, retract air brake
• Set the altimeter to zero reading
• Fasten and tighten the safety belts
• Check the setting of trimming device
• Lock both pieces of canopy, communication test

SPEED LIMITATION		
IAS	[km/h]	[kt]
V_{NE}	282	152
V_{RA}	225	122
V_A	214	116
V_T	150	81

MDM-1 „FOX”

LOADING PLAN

Pilot with parachute weight						Balancing weights		Limit maneuvering load factor [g]
front seat				rear seat				
minimum		maximum						
[kG]	[lb]	[kG]	[lb]	[kG]	[lb]	[kG]	[lb]	
55	121	89	196	0	0	2x5.5	2x12.2	+ 9 / - 6
70	154	100	221	0	0	0	0	
70	154	110	243	0	0	0	0	+ 7 / - 5
55	121	110	243	55	121	0	0	
55	121	70	154	110	243	0	0	

Solo flying on front seat only
Installation of balancing weights according to item 7.2 and Fig. 7.1 - F.M.

Flight altitude	[m]	0-3000	4000	5000	5500
V_{NE}	[km/h]	282	267	253	246

Flight altitude	[ft]	0-10000	13000	16000	18000
V_{NE}	[kt]	152	145	138	133

11

Placard located close to nose tow hook, fuselage left hand side:

For aerotowing, use 40÷60 m (130÷195 ft)
long nylon cable with safety link
of 677 daN (1525 lb) ±10 % strength

Placard located close to C.G. tow hook, fuselage left hand side:

For winch launching,
use cable with safety link
of 677 daN {1525 lb) ±10 % strength

Placard located on internal housing cover of front tow hook.

BALANCING WEIGHTS
< L R >

Removing the balancing weights

1. Remove the securing wire
2. Un-screw the screws
3. Remove the balancing weights

Placard located above the main wheel axle, fuselage right hand side:

0.2 MPa

Placard located above the tail wheel axle, fuselage right hand side:

0.15 MPa

11

Placard located close to nose tow hook, fuselage left hand side:

For aerotow the towing cable of 40÷60 m (130÷195 ft) length, with safety link of 677 daN (1525 lb) (± 10%) strength shall be used

Placard located close to C.G. tow hook, fuselage left hand side:

For winch launching, the cable with safety link of 677 daN (1525 lb) (± 10%) strength shall be used

Placard located on internal housing cover of front tow hook.

BALANCING WEIGHTS	
< L	R >
Removing balancing weights	
1. Remove the securing wire. 2. Unscrew the screws. 3. Remove the balancing weights.	

Placard located above the main wheel axle, fuselage right hand side:

0.2 MPa

Placard located above the tail wheel axle, fuselage right hand side:

0.15 MPa