



Allstar PZL Glider
Sp. z o.o.

FLIGHT MANUAL

for a glider
SZD-51-1 „Junior”

OBOWIĄZUJE W
AllSTAR PZL Glider
Bielsko-Biała

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SECTION 0. ISSUANCES

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0.1. Record of revisions

Any revision of the present manual, except actual weighing data, must be recorded in the following table and in case of approved Sections endorsed by the Agency.

The new or amended text in the revised page will be indicated by a black vertical line in the outer margin, and the Revision No. Number and date of the latest Revision in a given page will be shown in page footer.

After every implementation of Revision, the pages related to this Revision in the following table must be replaced.

Rev. No	Affected Section	Affected Pages	Date of Issue	Approval No & Date	Rev. Inserted Date & Signature

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Rev. No	Affected Section	Affected Pages	Date of Issue	Approval No & Date	Rev. Inserted Date & Signature

0.2. List of effective pages

Section	Page	Date of Issue	Section	Page	Date of Issue
0	0.1	May 2016	5	5.1	May 2016
	0.2	May 2016		5.2	May 2016
	0.3	May 2016		5.3	May 2016
	0.4	May 2016		5.4	May 2016
	0.5	May 2016		5.5	May 2016
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1	1.1	May 2016		5.7	May 2016
	1.2	May 2016		5.8	May 2016
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	2.10	May 2016		7.6	May 2016
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	3.2	May 2016		7.8	May 2016
	3.3	May 2016	7.9	May 2016	
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List of effective pages for Supplements given in page 9.3.

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SECTION 1.

GENERAL

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1.1. Introduction

The Flight Manual has been prepared to provide pilot with information for the safe and efficient operation of the SZD-51-1 "Junior" glider.

This Manual includes the material required to be furnished to the pilot by JAR-22. It also contains supplemental data provided by Producer of the glider.

1.2. Certification basis

SZD-51-1 "Junior" glider has been approved for operation on a base of Type Certificate No BG-143, issued on 20 Dec. 1984, by the Civil Aircraft Inspection Board, General Directorate of Civil Aviation, Ministry of Communication, Republic of Poland. The certification basis are requirements JAR-22, change 3, valid on 31 Jan. 1983, Category of Airworthiness „U" (Utility).

1.3. Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used in the Flight Manual:

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 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.

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1.4. Descriptive data

SZD-51-1 „Junior“ is a one seat, schooling / training glider. Structure of glass-epoxy composite.

WING - two panel, 2-trapeze planform. I-beam spar with (glass) roving caps and fabric web. Glass composite sandwich skin: fabric-foam-fabric. Composite rear web. Root rib, no intermediate/inner ribs.

AILERON - one piece, 20% of wing chord, mass balanced, hanged on 5 hinge points and actuated at 1 point. Glass-fibre structure.

AIR BRAKE – duralumin plates extending on wing upper surface only, with caps tensioned to wing contour.

FUSELAGE – monocoque structure, integral with a vertical fin. The central part comprises the steel truss, to which the wings and undercarriage are mounted.

UNDERCARRIAGE – fixed, no shock absorber, with Ø400×140 mm size wheel equipped with disk brake. Tube pressure 1,5 atm. In the end of fuselage tailboom a fixed tail wheel of Ø200 mm diameter. Wheel brake operated independent of air brake. The wheel can be shielded with removable fairing.

COCKPIT – shielded with a one-piece, side opening canopy. Pilot position close to a seated one, regulated on ground with adjustable back-rest. In-flight adjustable pedals. Instrument panel supported on column. Adjustable cockpit venting, blowing on front portion of canopy and on pilot face.

TAIL UNIT - „T“ shape layout. Rudder, stabiliser and elevator of composite structure. Elevator divided in 2 panels, each one hanged on 3 hinge points. Both elevator panels are equipped with fixed glass-composite tabs to increase the hinge moment. The rudder covered with fabric, mass balanced, hanged on 2 hinge points.

EQUIPMENT - board instruments (listed in item 7.4), sanitary system and first aid kit, moreover the glider is equipped with a permanently installed dipole half-wave radio antenna (in a fin).

TOW RELEASES/ HOOKS - glider is equipped with nose and C.G. tow releases in one of the following arrangements (acc. to customer choice):

- both hooks of SZD-III A-56P type, with no self-release mechanism;
- nose hook TOST E with no self-release, and C.G. hook TOST EUROPA G with self-release mechanism;
- nose hook SZD-III A-56P with no self-release, and C.G. hook TOST EUROPA G with self-release mechanism.

The kind and model of C.G. hook is identified in the placard installed in a cockpit.

The releases are accessible from a cockpit: the nose hook – when the instrument panel and its support column are removed, the C.G. hook – when the seat pan is removed. Both hooks are released by pulling at the common control grip. After releasing the grip, hooks are closed under the action of the return spring.

In winch –launched take-off using the C.G. hook of TOST type with self-release mechanism, a self-release occurs on reaching the maximum cable release angle.

PORTABLE EQUIPMENT - assembling lever, screwdriver, wrench for wheel brake adjustment, canopy canvas cover, back cushion, seat cushion.

MAIN TECHNICAL DATA:

Span	15,00	[m]
Length	6,69	[m]
Height	1,57	[m]
Wing area	12,51	[m ²]
Wing aspect ratio	18,00	
Wing dihedral	3,0	[°]
Root chord	1,115	[m]
Mean Standard Chord	0,88	[m]
Wing airfoil	Wortmann S02-196 // S02/1-158	
Mass of empty glider with equipment essential for flight	200 - 238	[kg]
Maximum allowed in-flight mass	380	[kg]
Minimum mass of wing	105	[kg]

1.5. Glider 3-view drawing

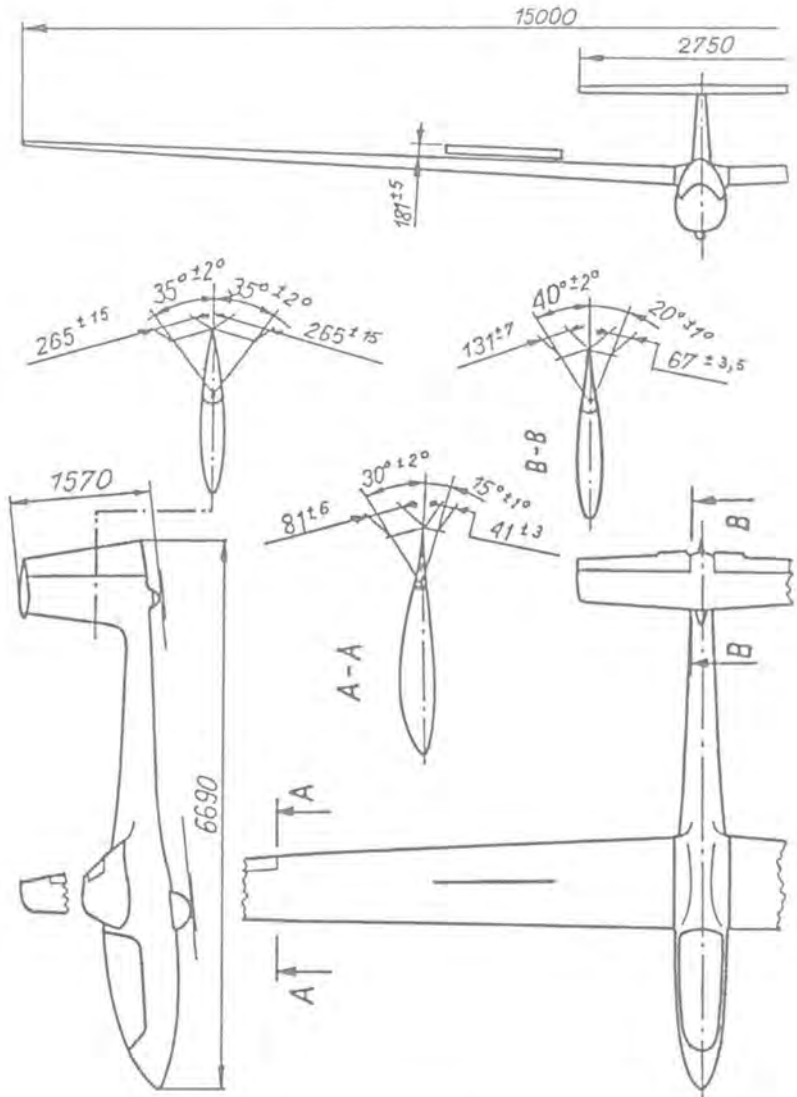


Fig. 1/1 -3-view drawing of SZD-51-1 "Junior" glider

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SECTION 2.

LIMITATIONS

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2.1. Introduction

Section 2 includes operating limitations, instrument markings and basic placards necessary for safe operation of the sailplane, its standard systems and standard equipment.

The limitations included in this Section and in Section 9 have been approved by Agency.

2.2. Airspeed

Airspeed limitations and their operational significance are defined as follows:

	Speed	IAS [km/h]	Remarks
V_{NE}	Never exceed speed	220	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection
V_{RA}	Rough air speed	155	Do not exceed this speed except in smooth air, and then only with caution. Examples of rough air are lee-wave rotor, thunderclouds etc.
V_A	Manoeuvring speed	155	Do not makefull or abrupt control movement above this speed, because under certain conditions the sailplane may be overstressed by full control movement.
V_W	Maximum winch-launching speed	130	Do not exceed this speed during winch- launching
V_T	Maximum aerotowing speed	150	Do not exceed this speed during aerotowing

The never exceed speed V_{NE} should be reduced with altitude, in accordance with the following table:

Flight altitude [km]	0 - 2	3	4	5	6
Indicated airspeed V_{NE} [km/h]	220	209	198	188	178

2.3. Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below:

Marking	(IAS) value or range [km/h]	Significance
GREEN arc	80 - 155	Normal operating range. Lower limit is $1.1 V_{S1}$ at maximum weight and most forward C.G. Upper limit is rough air speed
YELLOW arc	155 - 220	Manoeuvres must be conducted with caution and only in smooth air
RED radial line	220	Maximum speed for all operations
YELLOW triangle	90	Approach speed at maximum weight

V_{S1} = glider stalling speed in given mass configuration, with air brake retracted.

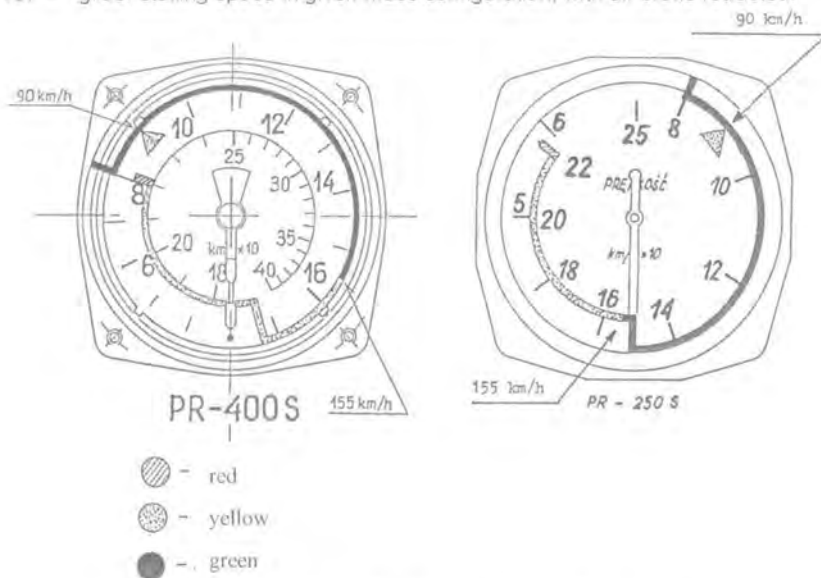


Fig. 2/1 – Airspeed indicator markings
(illustrated with PR-400S and PR-250S type instruments)

2.4. Mass

Maximum in-flight mass:	380 [kg]
Maximum mass of empty glider with equipment essential for flight:	238 [kg]
Maximum mass of equipped „glider without pilot“ *:	265 [kg]
Maximum mass of non-lifting parts **::	160 [kg]
Minimum mass of wing:	105 [kg]
Minimum cockpit load mass (on pilot's seat):	55 [kg]
Maximum cockpit load mass (on pilot's seat):	110 [kg]
Maximum mass in lower baggage compartment	5 [kg]

* Definition of „glider without pilot“ – see item 2.5.2.

** This is the maximum mass of „glider without pilot“ less the minimum mass of wing.

2.5. Centre of gravity (C.G.)

2.5.1. Range of in-flight allowed C.G. position

Reference datum is the plane perpendicular to a plane made by chords of wing root airfoils and passing through wing leading edge at root ribs.

Range of allowed positions of glider C.G in configuration for flight is defined as follows:

$$x_{sc} = 287 \quad \text{to} \quad 482 \quad [\text{mm}] \text{ from reference datum}$$

corresponding to:

$$22,7 \quad \text{to} \quad 44,9 \quad \% \text{ MSC}$$

where „MSC“ stands for „Mean Standard Chord“.

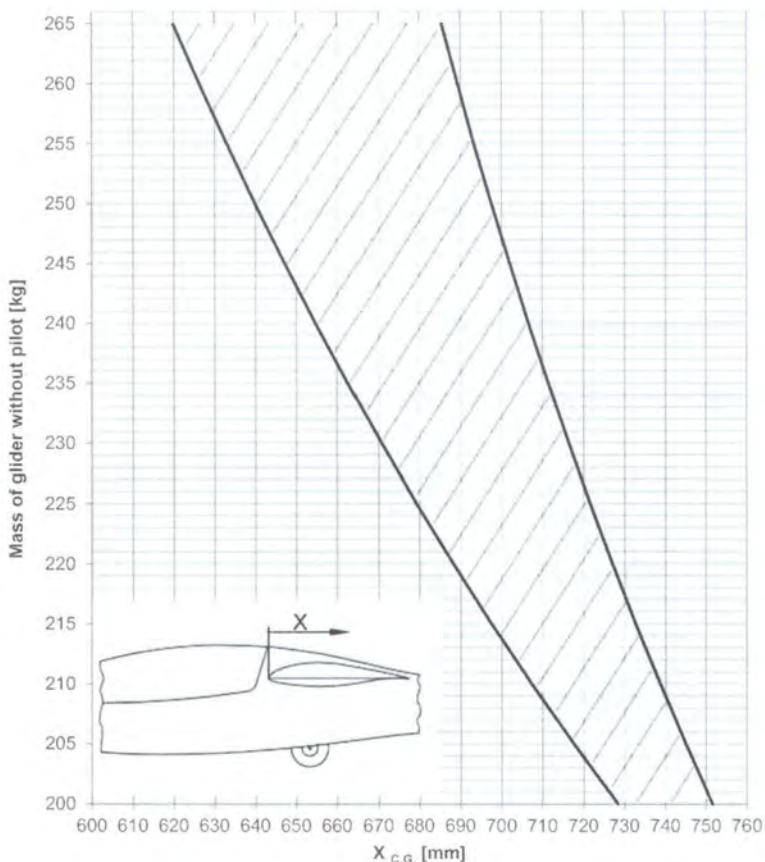
Leading edge of MSC is 86.5 mm aft of reference datum.

NOTE:

Compliance with all limitations related to glider loading plan (item 6.2.) and with limitations to the C.G. position for a glider without pilot (item 2.5.2.) ensures to fit within the allowed range of allowed in flight glider C.G. positions

2.5.2. Range of allowed C.G. positions for a glider without pilot

The procedure of glider weighing and determining its C.G. position is given in Technical Service Manual, item 7.1.



The term „glider without pilot” means a glider with any equipment installed permanently in instrument panel and in baggage compartment, consistent with TSM and actual „Equipment list”, ready to flight, but without a pilot, parachute or hand baggage.

2.6. Approved manoeuvres

SZD-51-1 „Junior” glider is certified in the „U” (utility) Category, and allowed to perform the following aerobatic manoeuvres:

- loop (positive)
- stall turn
- climbing turn
- spin
- lazy eight
- steep turns

Airspeed and recommendations for particular manoeuvres are given in Section 4. (item 4.5.9)

2.7. Manoeuvring load factors

Allowed manoeuvring load factors are:

	at $V_A = 155$ [km/h]	at $V_{NE} = 220$ [km/h]
for positive load	+ 5,3	+ 4,0
for negative loads	- 2,65	- 1,5

NOTE :

Above data are valid for configuration with airbrake retracted.

For flight in configuration with airbrake extended, allowed positive load factor is +3,5 – over the whole range of operational airspeed.

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2.8. Flight crew

The following limitations apply:

- maximum mass of load on the pilot's seat in a cockpit
(pilot + parachute + any additional personal equipment) 110 [kg]
- minimum mass of load on the pilot's seat in a cockpit
(pilot + parachute) 55 [kg]

WARNING:

In flight without parachute, an additional back cushion must be used of at least 9 [cm] thickness, when compressed.

2.9. Kinds of operation

SZD-51-1 „Junior“ glider is certified in the „U“ (utility) Category, and allowed for flight under VFR conditions, by day.

Provided that necessary equipment is installed in the glider (variometer, turn- and bank indicator, compass) and pilot meets the adequate aviation regulations, cloud flynd is allowed.

High altitude flight is allowed, providing the glider is equipped with an efficient oxygen system.

2.10. Equipment

According to JAR-22 requirements, the glider is provided with the following minimum equipment:

- airspeed indicator,
- altimeter,
- 4-point safety harness.

On a glider an additional equipment can be installed, providing the limitations related to mass and C.G. position are observed. The location and mass limitations for installation of additional equipment are given in item 7.3 of Technical Service Manual.

The type of minimum-, and additional equipment components, approved for installation on a glider, are specified in Section 17 of Technical Service Manual.

2.11. Aerotowed, winch-launched and bungee take off

Aerotowed take off

Maximum allowed aerotow airspeed:

$V_T = 150$ [km/h].

The tow-cable must have
a safety-link of strength not more than:

$677 + 10\%$ [daN].

The minimum length of cable for aerotowing,
cannot be less than:

20 [m].

WARNING:

Aerotowed take off allowed on nose hook only.

Winch launched take off

Maximum allowed winch-launching airspeed:

$V_W = 130$ [km/h].

The cable must have
a safety link of nominal strength:

$677 \pm 10\%$ [daN].

WARNING:

Winch launched take off allowed on C.G. hook only.

The glider is allowed for bungee take off.

2.12. Other limitations

- Night flying not allowed.
- Towed flight below tug plane not recommended due to friction of towing cable against fuselage surface.
- Avoid flight in suspected icing conditions.

2.13. Limitations placard

OPERATING LIMITATIONS	
AIRSPEED (IAS)	[km/h]
V _{NE} - never exceed	220
V _A - manoeuvring	155
V _T - aerotowing	150
V _W - winch launching	130
MASS :	[kg]
Max. glider without pilot	265
Max. in-flight	380
Max. cockpit load (on seat)	110
Min. cockpit load (on seat)	55
Max. in lower baggage compartment	5
OTHER LIMITATIONS:	
AEROBATIC MANOEUVRES: loop, stall turn, climbing turn, lazy eight, steep turn, spin	
TOW CABLE SAFETY LINK:	
aerotowed flight:	MAX. 677 + 10% [daN]
winch launching:	NOM. 677 ± 10% [daN]
MAIN WHEEL PRESSURE:	1.5 [at]

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SECTION 3. EMERGENCY PROCEDURES

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3.1. Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur.

CHECKLIST

PROCEDURES IN EMERGENCIES

1. CANOPY JETTISON

- simultaneously push the red grip of canopy jettison and white grip of canopy lock
- push the canopy forwards up

2. BAILING OUT

- jettison the canopy
- release the safety harness
- pull up the legs and exit the cockpit
- pay attention to clear wings and tailplane
- open the parachute

3. SPINNING

- ailerons neutral
- rudder opposite to rotation
- push control stick forwards until rotation stops
- neutralize rudder
- pull out of ensuing diving

3.2. Canopy jettison

- Release the control stick.
- Catch firmly and push forward simultaneously:
 - canopy lock handle (with left hand)
 - canopy emergency jettison handle (with right hand).
- Holding both handles, push upwards and jettison the canopy.

If the canopy cannot be jettisoned, break the perspex starting at the window, use the legs if necessary.

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3.3. Bailing out

Leaving the cockpit is an obligatory rescue action for the crew, if the glider cannot be brought to safe landing e.g. in case of :

- fire or technical damage making impossible the continuation of controlled flight;
- sudden, serious pilot's indisposition (e.g. loss of sight);
- conditions when return to the ground is completely cut-off by tight, vast area of fog or by clouds extending to the ground surface

Sequence of action in bailing out:

Having jettisoned the canopy (see item 3.2), the sequence of action in bail out is as follows:

- release the safety harness
- bail out towards the axis of possible glider rotation
- if the altitude allows for, open the parachute with delay,
at altitudes below 200 m open the parachute immediately

In necessity of bailing out at high altitude, take into account

- a) possibility of elevating a pilot with open parachute by strong ascending currents (in a cloud) and associated risk of oxygen starvation and of parachute icing;
- b) danger of frostbite due to low temperature of ambient air.

For these circumstances, it may be advisable to stay in a cockpit of the faulty glider (if its condition allows for) until descending to altitude allowing for safe parachute jump.

3.4. Stall recovery

Wings level stall

Stalling the glider in level straight flight is possible only with light pilot (55 – 70 kg), by pulling the control stick considerably (clearly perceptible force) and with the fuselage nose raised evidently above horizon.

Actual stalling is preceded with distinct fuselage vibration. At approx. 55 km/h glider drops the nose down. If necessary it is possible to prevent the roll by use of ailerons. Recovery is accomplished by releasing the control stick forward, loss of altitude does not exceed 30 m.

In flight with average (70 – 90 kg) and heavy (90 – 110 kg) pilot, fuselage vibrations appear at approx. 70km/h. Flight with control stick pulled completely back is possible at approx. 68 km/h airspeed, without dropping nose down.

Turning flight stall

Staling the glider in turning flight is possible with light pilot as well.

Fuselage vibrations appear like in level flight. When dropping nose down, glider increases bank angle. Recovery is accomplished by releasing the stick forward, loss of altitude approx. 30 m.

In flight with average and heavy pilot, glider can circle with control stick pulled completely aft without dropping the nose down.

NOTE:

The given above airspeeds refer to dry glider, with air brake retracted. Rain, icing or extended air brake increase the stalling speed !

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3.5. Spin recovery

For every allowed loading condition the glider can be safely entered into, and recovered from a spin. At front C.G. positions (pilot 90 – 100 kg) full deflection of control surfaces is necessary to retain glider spinning (elevator and aileron fully deflected in the direction of rotation), otherwise glider ceases to spin.

The remaining spinning characteristics of the glider are listed in the following table:

SPINNING CHARACTERISTICS			
Pilot [kg]	55 - 70	70 - 90	90 - 110
C.G. position	rear	medium	front
Way of entering	Enter stall and full deflection of elevator and rudder	Enter stall in turning flight, full deflection of all control surfaces	
Recommended aileron deflection	in the direction of rotation or neutral		in the direction of rotation
Longitudinal oscillations	up to 3 turns		no oscillations
Possible are:			
1 turn		yes	yes
2 turns		yes	yes
5 and more turns		yes	no
Loss of altitude in one turn	70 to 100 m.		
Time of one turn	3 to 4 s.		
Method of recovery - normal procedure:			
1st Set ailerons neutral			
2nd Apply rudder opposite to the direction of rotation			
3rd Short pause			
4th Release the stick forward until rotation ceases			
5th Neutralise rudder and pull the glider out of diving			
Airspeed in recovery is 140 to 160 km/h.			
Delay in recovery	1/2 to 3/4 turn	up to 1/2 turn	0

3.6. Spiral dive recovery

In case of inadvertently entering a spiral dive, pilot should immediately take the action to recover from this flight condition. The procedure is as follows:

- set the control stick for aileron neutral
- deflect slightly the rudder, opposite to the direction of rotation
- push the stick slightly forwards
- neutralise the rudder and, by smoothly pulling the stick back, pull out of symmetrical diving, controlling the airspeed simultaneously

3.7. Other emergencies

3.7.1. Break, or inadvertent release of towing cable at low altitude

In case of break-, or inadvertent release of towing cable at low altitude, the pilot should:

- release the towing hook (if the cable remained with the glider),
- tighten the shoulder belts,
- bring the glider to stable gliding flight,
- land on the selected site, taking into account wind and other factors important for landing, In case of inevitable collision with terrain obstacles - do not allow a head-on crash.

3.7.2. Threat of exceeding the maximum allowed airspeed

In case of unintended airspeed increase, resulting in a threat of exceeding the maximum allowed airspeed, the air brake should be extended in advance and then a suitable manoeuvre accomplished to reduce the airspeed and stabilise the flight conditions.

Excessive stick pulling in such conditions is prohibited.

3.7.3. Landing in high plantation

When landing in high corn or grass, there is a threat of damage to glider, since even slight asymmetrical catching with a wing may result in a sudden, uncontrollable ground loop.

In inevitable cases a possibly precise landing is necessary, assuming the surface of plantation as ground surface. After touch down, brake the main wheel

SECTION 4.

NORMAL PROCEDURES

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4.1. Introduction

Section 4. provides description of glider rigging, checklists and amplified procedures for the conduct of normal operation.

4.2. Glider rigging and de-rigging

3 persons are necessary for glider rigging and de-rigging. Prior to rigging, all mating surfaces of connected assemblies should be cleaned with clean cloth and lubricated.

4.2.1. Wing rigging

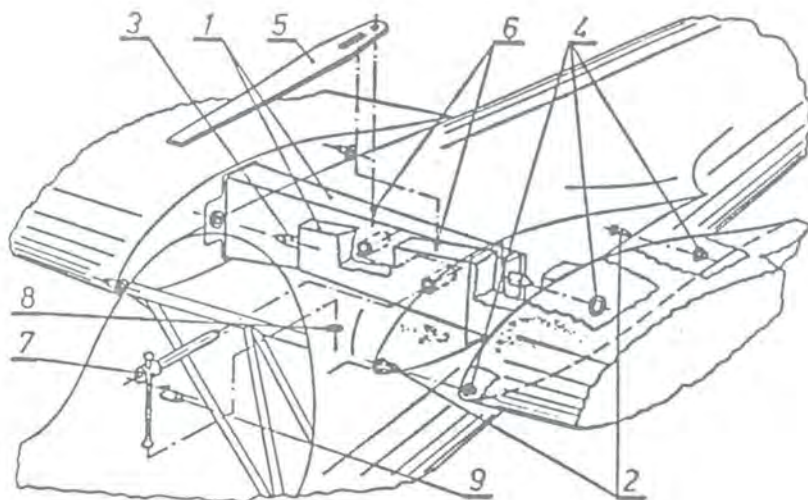
Sequence of operation in rigging (Fig. 4/1):

- a) Move the air brake grip in a cockpit to front position, set the control stick in a glider plane of symmetry.
- b) Retract the air brake plates, set the ailerons neutral.
- c) Juxtapose the right, and next the left wing with fuselage. When shoving in the spar roots (1), the protruding spar pivots (3) must enter the mating nests (4) in wing root ribs. The connectors in aileron-, and air brake actuating systems must be connected as well.
- d) Catch the assembling lever (5) at counter stops (6) in spars and finally (pull) both wing panels onto fuselage.
- e) Connect the spars with a bolt (7), and secure by inserting a pin in a hole (8) and lock with a safety pin (9)

NOTE:

After rigging, check visually through the inspection opening in fuselage a correct coupling in the aileron and air brake control systems.

De-rigging of wings is to be accomplished in reversed sequence.



1. wing spar roots
2. fuselage pivots
3. spar pivots
4. pivot nests
5. assembling lever
6. counter stops of spars
7. bolt
8. securing hole
9. cotter pin

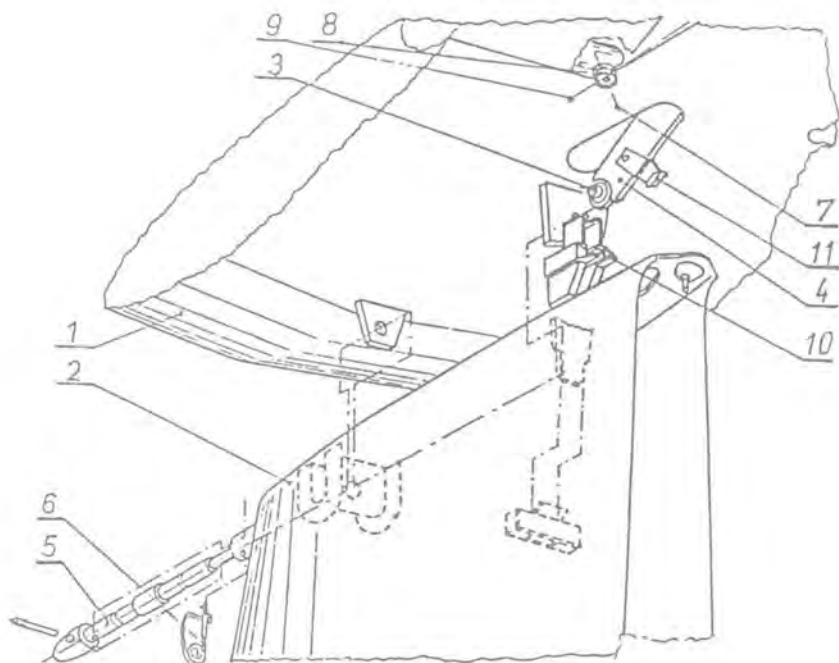
Fig. 4/1 – Wing / fuselage rigging

4.2.2. Tailplane rigging (with elevator automatic coupling)

Rigging of tailplane (with elevator automatic coupling) is to be accomplished as follows (Fig. 4/2a):

- a) Set the grip of trimming device in a cockpit in its front position.
- b) Put the tailplane (1) with elevator deflected upward, on top of the fin (2). Ensure that the rolls (3) of elevator lever slide into the guides (10) of the push rod end.
- c) Connect the fittings inserting the bolt (5) in the hole in a fin leading edge and secure it with safety pin (6).
- d) After rigging, check correct operation of the system over the full range of control stick deflections.

De-rigging of tailplane requires the reversed sequence of operation. Take out the bolt (5) and remove the tailplane.



- 1 - horizontal tailplane
- 2 - fin
- 3 - elevator lever rolls
- 4 - elevator lever
- 5 - bolt
- 6 - safety pin

- 7 - elevator mounting bolt
- 8 - nut
- 9 - cotter pin
- 10 - rolls guide
- 11 - stop

Fig. 4/2a – Tailplane rigging

NOTE:

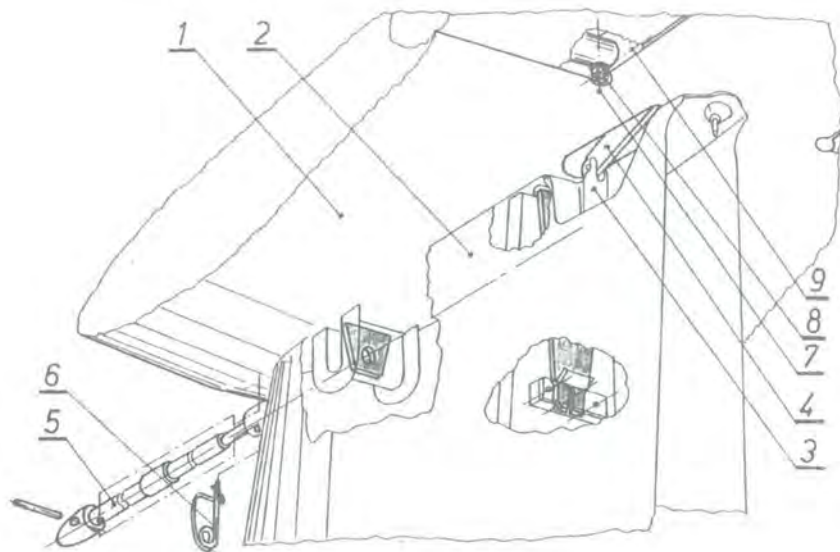
After rigging the glider, check all connections and operation of controls.

4.2.3. Tailplane rigging (without elevator automatic coupling)

Rigging of tailplane (without elevator automatic coupling) is to be accomplished as follows (Fig. 4/2b):

- a) Set the grip of trimming device in a cockpit in its front position.
- b) Put the tailplane (1) on the fin (2).
- c) Connect the quick-release end of push rod (3) with an elevator lever (4).
- d) Connect the fittings inserting the bolt (5) in the hole in a fin leading Edge and secure it with safety pin (6).
- e) After rigging, check correct operation of the system over the full range of control stick deflections.

De-rigging of tailplane requires the reversed sequence of operation. Take out the bolt (5) and remove the tailplane.



1 - horizontal tailplane
2 - fin
3 - quick-release end
4 - elevator lever
5 - bolt

6 - safety pin
7 - bolt
8 - nut
9 - cotter pin

Fig. 4/2b – Tailplane rigging

NOTE:

After rigging the glider, check all connections and operation of controls.

4.3. Daily inspection (before flights)

1. Check the validity of Glider Inspection Certificate in the glider Log Book.
2. Check the structure integrity and condition of external surface on wing, fuselage and tailplane.
3. Check the correct rigging of wings and securing of main bolt in wing/fuselage connection.
4. Check the operation of controls when actuated from cockpit; ailerons, elevator, trimming device, rudder. Check clearance at control stick with control surfaces immobilised (holding aileron and elevator based on their stop).
5. Check the operation of air brake (extending, retracting, over-center lock).
6. Check the correct connection and securing of connecting elements in assemblies joint and in control systems, especially condition of cotter pins in rudder tension cable.
7. Check the condition and operation of towing hooks/ releases
8. Check the operation of main wheel brake (try to roll the glider with clenched to stop wheel brake lever, localised on air brake handle)
9. Check the condition of undercarriage, the pressure in main and tail wheel tire (visually), and rollability of wheels.
10. Check the condition of total-, and static pressure ports, and operation of airspeed indicator (it should respond when gently blowing at pressure ports).
11. Check the operation of turn indicator.
12. Check the correct operation of canopy locks, condition of link supporting the canopy open and securing of the emergency jettison of the canopy.
13. Check the correct rigging of tailplane.
14. Check the tension of cables in rudder control system in a cockpit (by touch – press with finger).
15. Check the plays in connection of:
 - wing/fuselage
 - tailplane/fuselage
 - aileron/wing
 - elevator/stabiliser
 - rudder/fin

These plays are assessed indicative, moving the tip of wing or tailplane up and down, and forward and back.

NOTE:

Pull at the trailing edge of control surfaces, when pressing simultaneously with finger on control surface and its apron – to assess play at hinge points.

16. Check the pilot's harness.

4.4. Pre-flight procedures

Pre-flight inspection

- a) Check the completeness of on-board equipment (glider log book, Flight Manual, tools, anchoring equipment, covers, ground towing cable).
- b) Check the parachute tension members and put the parachute on.
- c) Select the appropriate thickness of back cushion or correct position of back rest, take place in the cockpit, adjust position of pedals, fasten the seat belts.
- d) Check the unrestricted full deflection of control surfaces and air brake. Set the trimming device in position from „6“ (light pilot) to „8“ (heavy pilot) counting from front one. For winch-launched take off, respectively between „6“ and „8“ (see Fig. 7/1).
- e) Check the operation of turn indicator, if installed.
- f) Close the canopy and check reliable locking.
- g) Connect the towing cable, and check reliable connection when surging several times at the cable.

Pre-flight checklist

On the cockpit right hand side provided is a placard with checklist of pre-flight action, to be accomplished by pilot immediately before take off.

PRE-FLIGHT CHECKLIST	
1. Loose items in cockpit	- CHECK
2. Back rest, pedals	- ADJUST
3. Parachute	- PUT ON
4. Safety harness	- FASTEN
5. Controls deflection	- CHECK
6. Air brake	- RETRACT
7. Trimming device	- SET
8. Altimeter	- SET
9. Canopy	- LOCK
10. Radio	- CHECK
11. Tow cable attachment	- CHECK

4.5. Normal procedures and recommended airspeeds

4.5.1. Winch launching and bungee launched take off

Winch launching

Before connecting to a hook the winch cable, check its location. The cable should form a gentle arch on the left – NOT RIGHT! side of take off axis.

Set the trimming device in position between "6" (light pilot) to "8" (heavy pilot).

The take off is correct and easy. In steep climbing the stick forces are low. The best launching speed is in the range 95 through 105 km/h.

To obtain the maximum altitude, at the end of climbing path the stick can be pulled slightly – the control forces are low even for incorrectly trimmed glider.

Before releasing the cable by a pilot it is recommended to relieve the launching cable by pushing the stick forwards. For the intended self-release (only with TOST EUROPA G model) the position of control stick is to be retained until the self-release occurs.

After releasing the cable, the glider should be immediately brought to normal gliding flight and the cable release grip pulled once again, for safety reasons.

The longer the launching cable, the higher altitude achieved. With cable of 700 m length and winch of 200 PS, the releasing altitude in still air is 250 to 280 m.

NOTE:

Do not change setting of trimming device during take off.

WARNING:

Winch launched take off is allowed with C.G.hook only.

Bungee launch

For launching use the normal rubber bungee cord in „V” arrangement, with arm of approx. 25 m length, engaged by means of central ring to a special hook in fuselage nose. The tail catch is to be attached on the lug installed in the end of tailboom, behind the tail wheel.

Allowed cross wind component is 15 km/h.

Ground crew for bungee cords are 2 x 4 persons (at minimum), on the outer side of launching cord.

For take off, set the trimming device and elevator neutral.

After lift off and separation of cord from the hook, pilot should stabilise the flight with airspeed not lower than $V = 80$ km/h.

SZD-51-1 „Junior”	FLIGHT MANUAL	SECTION 4. NORMAL PROCEDURES
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4.5.2. Aerotowed- take off, and flight

In school flights, use long towing cable (40 m at minimum).

Before take off, set the slider of trimming device in position (counting from foremost one) between „6” (light pilot) and „8” (heavy pilot).

In ground roll (until lift off) control the glider to roll on the main wheel.

The recommended aerotowing airspeed, when climbing – not under 100 km/h.

WARNING:

Aerotowed take off is allowed with nose hook only.

4.5.3. Free flight

4.5.3.1. Circling

Depending on bank angle and glider in-flight mass, the circling airspeed is 80 to 85 km/h. Time of bank reversal $45^\circ/45^\circ$ is approx. 3 – 4 sec.

4.5.3.2. Side slip

The side slip is to be carried out at 90 km/h, or higher airspeed by banking the glider with simultaneous opposite deflection of rudder. In flight with bank angle up to 30° the direction of flight can be retained, at higher bank angle the glider has tendency to turn. With increase in bank angle, the airspeed readings are reduced to 0. Glider recovery from side slip is to be accomplished by raising the lower wing to level and neutralising all controls.

4.5.4. Approach to landing

Approach airspeed is 90 through 100 km/h (yellow triangle on airspeed indicator dial). Angle of flight path in approach is to be adjusted with air brake. High efficiency of air brake allows for wide range of selected approach angles. Extending and retracting air brake does not result in perceptible changes to glider pitch. The air brake can be operated over the whole allowed airspeed range (open gently above 180 km/h).

In diving flight with air brake extended at 220 km/h airspeed, the flight path angle is higher than 45° .

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4.5.5. Landing

Avoid abrupt extending and retracting air brake at low altitude, close to ground. Touch down on 2 points (main and tail wheels). In a landing ground roll, the wheel can be braked.

Post flight procedures

- switch off the turn and slip indicator, and all other electrical equipment,
- if necessary, drain the pneumatic ducts of instrument system according to item 7.5,
- clean the cockpit and whole glider,
- put on the dry covers – on the dry and clean glider only

4.5.6. Acquainting flight

Before acquainting flight pilot should be familiar with operating limitations and remaining recommendations contained in this Flight Manual.

It is recommended to carry out the acquainting flight under thermalling conditions. The flight should comprise: circling, stalling in wings level- and in turning flight, flight at airspeed increased (in the range 100 to 200 km/h, depending on altitude and weather conditions) and repeated several times verification of the air brake operation.

4.5.7. High altitude flight

It should be taken into account that with increased altitude, the value of true airspeed is higher than the indicated one. Therefore the never exceed speed V_{NE} should be reduced in accordance with table in item 2.2 of this Manual.

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4.5.8. Flying in rain

When flying in rain, the general degradation of glider performance should be taken into account. For safety reason the minimum airspeed in wing level-, and in turning flight should be increased by approx. 10 km/h.

In poor visibility conditions and fogged canopy glassing, the air-venting ducts and the side window should be opened.

The glider wetted by rain should be dried before next flight.

After a long flight in rain fall (or cloud flight), drain the instruments pneumatic system (item 7.5.1)

WARNING:

With a wet glider do not fly above the „0” isotherm since this constitutes a threat of glider overall icing.

Procedures with a wet glider

Due to a type of construction (glass-epoxy composite) the glider is resistant to moisture and weather conditions. In case of severely wetted glider, e.g. after landing on water or outdoor parking after off-field landing, it is recommended to ventilate the interior by opening the access holes, opening a canopy and extending an air brake.

After drying, the glider should be wiped with flannel cloth.

4.5.9. Aerobatics

Before performing aerobatics, trimm the glider at 120 to 140 km/h airspeed and verify reliable locking of trimming device and of air brake.

The glider is capable to perform correctly and {safely} the following manoeuvres:

- loop and stall turn (recommended entry speed 165 to 175 km/h),
- climbing turn (recommended entry speed 165 to 175 km/h),
- lazy eight and steep turn,
- spin (spinning characteristics – see item 3.5.).

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SECTION 5.

PERFORMANCE

5.1. Introduction	5.2
5.2. Approved data	5.2
5.2.1. Airspeed indicator system calibration.....	5.2
5.2.2. Stall speeds.....	5.3
5.3. Non-approved, further information	5.4
5.3.1. Demonstrated cross-wind performance.....	5.4
5.3.2. Flight polar	5.4
5.3.3. Directions for cross-country flight calculation	5.6

5.1. Wprowadzenie

Section 5. provides approved data for airspeed calibration, stall speeds value and non-approved further information.

5.2. Approved data

5.2.1. Airspeed indicator system calibration

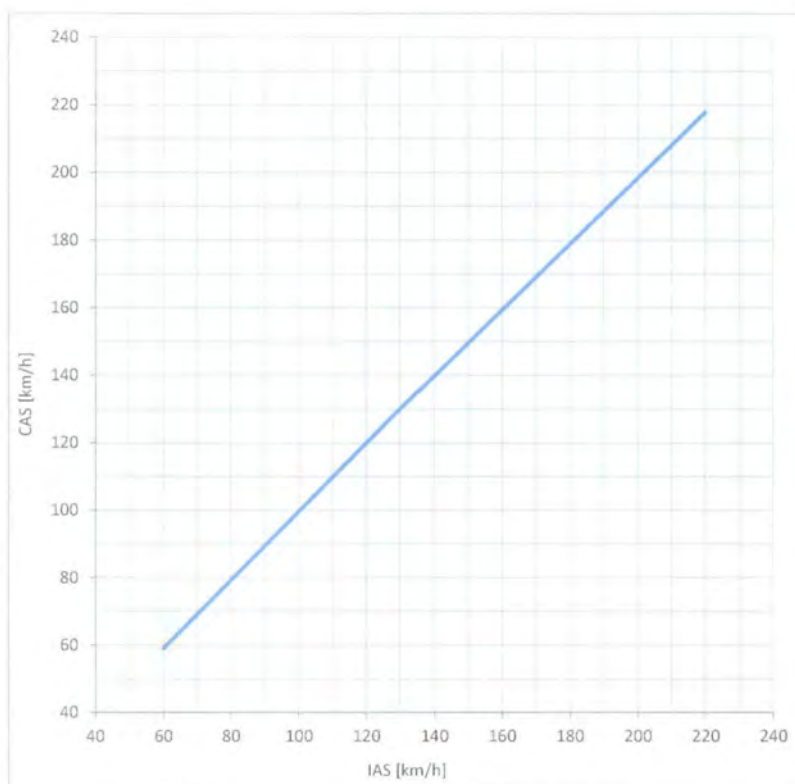


Fig. 5/1 – Calibration diagram: $V_{CAS} = f(V_{IAS})$

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5.2.2. Stall speeds

Wings level stall

C.G. position		rear	front
airbrake	retracted	55	68

5.3. Non-approved further information

5.3.1. Demonstrated cross-wind performance

Flight condition	Maximum cross-wind component
Winch-launching	15 [km/h]
Aerotowed take off	15 [km/h]
Landing	15 [km/h]

5.3.2. Flight polar

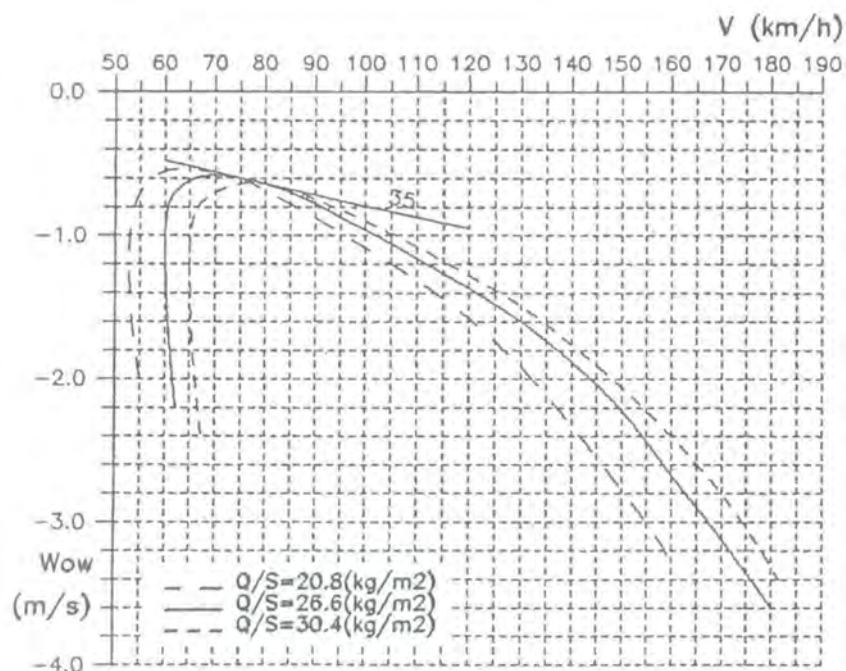


Fig. 5/2 – Flight polar

The presented in Fig. 5/2 flight polar has been determined for a glider with 333 kg mass (wing loading 26,6 kg/m²), and it has the following characteristics:

	flight speed [km/h]	rate of descent [m/s]
Minimum rate of descent	70	0,58
Max. glide ratio (D = 35)	80	0,63
rate of descent vs flight speed	100	0,96
	110	1,16
	120	1,37
	130	1,60
	140	1,88
	150	2,22
	160	2,67
	170	3,12
180	3,60	

5.3.3. Directions for cross-country flight calculation

Scale on the calculation (McCready) ring of variometer for SZD-51-1 glider
(glider in-flight mass 333 kg, wing loading Q/S = 26,6 kg/m²)

Ring [km/h]	70	80	90	100	110	120	130	140	150	160	170
Variometer [m/s]	0,0	1,0	1,35	1,7	2,1	2,65	3,5	4,7	6,0	7,0	8,1

Parameters of inter-thermal flight in calm air (no descending currents)
(glider in-flight mass 333 kg, wing loading Q/S = 26,6 kg/m²)

Average climb [m/s]	0,5	1,0	1,5	2	2,5	3,0	3,5	4,0	4,5	5,0
Inter-thermal airspeed [km/h]	87	105	125	130	137	142,5	147	157	165	170
Cross-country speed [km/h]	34,5	51	62,5	72,5	79,5	85,5	91	96	100,5	105

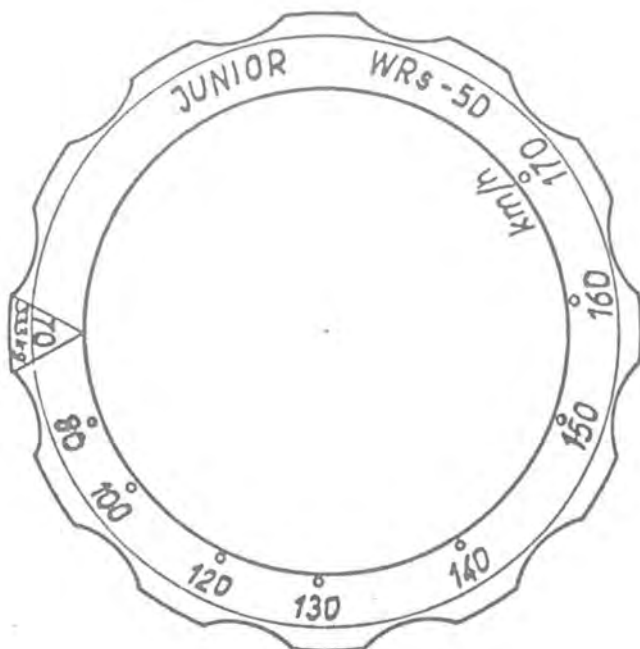


Fig. 5/3 – McCready ring for SZD-51-1 "Junior" glider

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SECTION 6.

MASS AND BALANCE

6.1. Introduction.....	6.2
6.2. Permitted payload range.....	6.2
6.3. Method of calculation for the glider C.G. position	6.4
6.4. Weight and balance record.....	6.6

6.1. Introduction

Section 6. contains information on mass, C.G. position for a glider without pilot and payload range within which the glider may be safely operated.

Procedures for weighing the glider and the method for determining its actual C.G. position are contained in Section 7 of Technical Service Manual for SZD-51-1 „Junior“ glider.

6.2. Permitted payload range

The payload can be deployed in two areas:

1. pilot's seat and its surroundings – pilot with parachute + portable equipment mounted on pilot, boards, frame of glazing of cockpit canopy, the total mass of which must be contained in the range from 55 to 110 kg
2. lower baggage compartment (C in Fig. 7/3 of TSM) localised behind pilot back-rest, where only a soft luggage is allowed with mass up to 5 kg

The pilot's seat, depending on its production variant, is equipped with a pack of back cushions or with an adjustable back-rest. Selection of appropriate cushion pack or allowed position of adjustable back-rest, in a function of pilot's mass, are presented in the following placards, localised on right hand board in the glider cockpit.






			
Pilot [kg]	55 - 57	58 - 107	108 - 110
PPPP			

Fig. 6/1 – Selection of back cushion pack, depending on pilot's mass

PPPP - back cushion pack

 - double

 - whichever

 - no back cushion



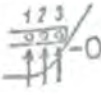

			
Pilot [kg]	55 - 57	58 - 107	108 - 110
ROP			

Fig. 6/2 – Position of adjustable back rest, depending on pilot's mass

ROP - adjustable pilot's back rest



- front position



- position 1, 2, 3 or without back rest



- without back rest

6.3. Method of calculation for the glider C.G. position

Compliance with all limitations related to glider loading (item 6.2) and with limitations for C.G. position of glider without pilot (item 2.5.2) ensures to fit within the in-flight allowed range of glider C.G. position. Regardless from it, you can determine the mass and C.G. position of loaded glider by the following formulas:

$$m_c = m_{bp} + m_{pil} + m_b$$

$$x_{SC} = \frac{m_{bp} \cdot x_{bp} + m_{pil} \cdot x_{pil} + m_b \cdot x_b}{m_{bp} + m_{pil} + m_b}$$

where:

- m_c - all-up mass of loaded glider
- x_{SC} - C.G. position of loaded glider
- m_{bp} - mass of glider without pilot (according to valid weighing, see item 6.4.)
- x_{bp} - C.G. position of glider without pilot (according to valid weighing, see item 6.4.)
- m_{pil} - pilot's mass
- x_{pil} - position of pilot's C.G. (x_{pil} dependent on m_{pil} – see table below)
- m_b - mass in lower baggage compartment
- x_b - position of luggage C.G. ($x_b = 120$ mm)

m_{pil} [kg]	x_{pil} [mm]
55 - 80	500
80 - 110	510

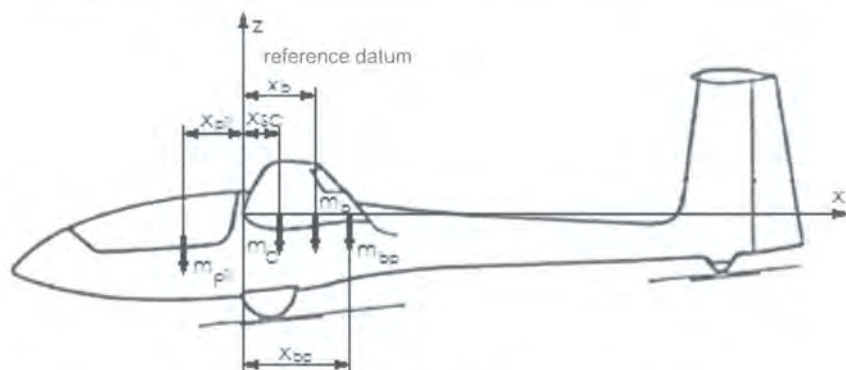


Fig. 6/3 Scheme for calculation of glider C.G.

Reference datum is the plane perpendicular to a plane made by chords of wing root airfoils and passing through wing leading edge at root ribs.

Position of glider C.G., expressed as a percentage to Mean Standard Chord ($x_{SC\%}$) can be calculated by the following formula:

$$x_{SC\%} = \frac{x_{SC} - x_n}{SCD} \times 100\%$$

where:

MSC = 880 [mm] – value of Mean Standard Chord,

x_n = 86,5 [mm] – distance of MSC leading edge from datum.

6.4. Weight and balance record

Results of glider weighing and related C.G. position of glider without pilot (m_{bp} i X_{bp}) should always be recorded in the given below table. For every case a reference must be made – in the weighing report - to the list of equipment, with which the actual weighing has been made.

When changing the equipment, and also in case of glider repair or repainting, the mass and C.G. position of the glider without pilot must be determined by repeated weighing.

Template for „Glider weight and balance report” and „List of equipment” are contained in Section 18 of Technical Service Manual

The C.G. position of the glider without pilot must be within the allowed range shown in the diagram in item 2.5.2. If not, the glider must be balanced by addition (or reduction) of the additional permanent balancing weight (in accordance with information in item 7.1 of Technical Service Manual).

The records in the following table are valid only for the glider with Factory Number given in the title page of this Flight Manual.

TABLE OF WEIGHING
glider without pilot

Date of weighing	Mass m_{bp} [kg]	C.G. position X_{bp} [mm]	Name Signature

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SZD-51-1 „Junior”	FLIGHT MANUAL	SECTION 7. GLIDER AND SYSTEMS DESCRIPTION
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SECTION 7.

GLIDER AND SYSTEMS DESCRIPTION

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7.1. Introduction

Section 7. provides description and operation of the glider and its systems.

7.2. Cockpit and its arrangement

The cockpit allows for pilot up to 1,95 m height, with back parachute. The glider is equipped with adjustable 3-position back-rest or with pack of back-cushions. For extremely high pilot the back-rest should be removed, and pilot should rest directly on rear web of seat pan – position „0“ on placards presented in item 6.2. of this Manual. The pilot's attitude should ensure easy access to release grip as well as easily accomplished full deflection of controls. When flying without a parachute, an additional cushion should be used, with at least 9 cm thickness (when compressed).

The pedals are in-flight adjustable (5 positions). Pulling on the brown hand-grip (on right hand side of instrument panel column) the pedals can be moved back or, when when pressed with both legs, these can be moved forwards. After releasing the hand-grip, the latch is locking the pedals in selected position (one of 5 available adjustments).

Operation of elevator spring trimming device (Fig. 7/1)

Press the hand-grip (release lock-mechanism) – set to desired position – then LOCK (pull upwards).

Opening and closing the canopy

The canopy, opened to the right hand side, is suspended on 2 hinges on right board, which can be dis-engaged by setting the lever of emergency jettison forwards (red grip on right hand side). On the left hand side, opposite to the emergency jettisoning lever, localised is the lever of canopy locking mechanism (white grip) accessible from outside through the window. Unlocking the mechanism by moving the lever forwards, locking – rearwards. The canopy is retained in open position by limiting cable.

Connection of towing cable

Pull the hook releasing grip (yellow) onto stop.

Insert a small ring of cable end into the hook and release the grip..

7.3. Cockpit controls

Operation of the controls is conventional.

The hand-grips are arranged as follows:

CONTROL	HAND-GRIP LOCATION	HAND-GRIP COLOUR
Air brake slider	left-hand side	blue
Wheel brake lever	on air brake slider	anodized aluminum (metallic)
Trimming device slider (with lock)	on left-hand board	green
Towing hook releasing grip	left-hand side	yellow
Canopy lock	left-hand side	white
Canopy emergency jettison grip	right-hand side	red
Pedal adjustment grip	right-hand side of instrument panel column	brown

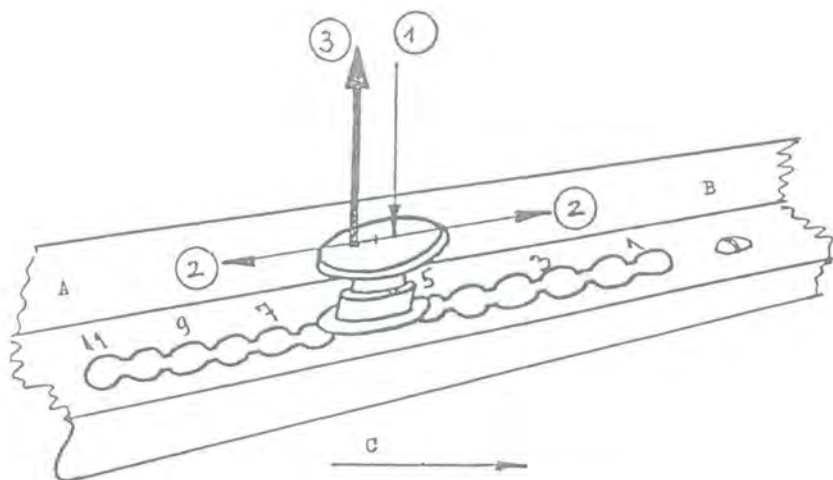


Fig. 7/1 – Operation of trimming device

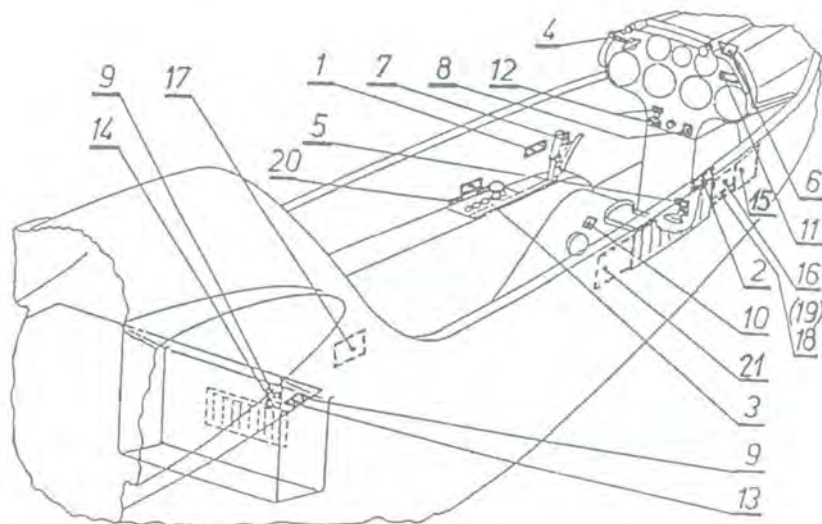
Action:

- 1 - press down
- 2 - change position
- 3 - release, check locking

Position description:

- A - tail heavy
- B - nose heavy
- C - flight direction

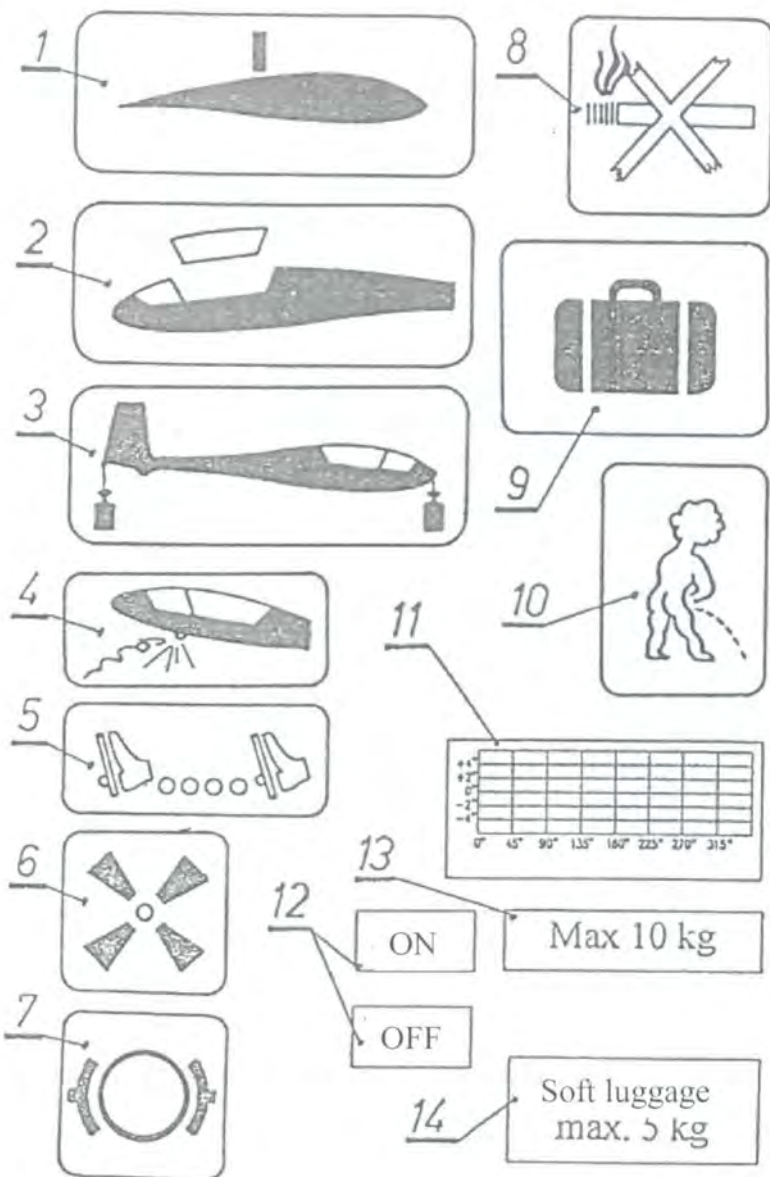
7.4. Controls operation-, and information placards



- | | |
|-------------------------------|---|
| 1 - Air brake extended | 12 - Turn & slip indicator on/ off |
| 2 - Emergency canopy jettison | 13 - Max. 10 kg |
| 3 - Trimming device | 14 - Soft luggage, max. 5 kg |
| 4 - Towing cable release | 15 - Operating limitations |
| 5 - Pedal adjustment | 16 - Back rest adjustment |
| 6 - Cockpit ventilation | 17 - Aircraft identification placard |
| 7 - Wheel brake | 18 - C.G. towing hook (no self-release) |
| 8 - No smoking | 19 - C.G. towing hook (with self-release) |
| 9 - Baggage compartment | 20 - Trimming device / trim position
indicator |
| 10 - Sanitary system | 21 - Pre-flight checklist |
| 11 - Compass deviations | |

Fig. 7/2 – Arrangement of controls operation , and information placards

Placard pattern – placard numbers refer to designations used in Fig. 7/2.



OPERATING LIMITATIONS	
AIRSPPEED (IAS)	[km/h]
V _{NE} - never exceed	220
V _A - manoeuvring	155
V _T - aerotowing	150
V _w - winch-launching	130
MASS :	[kg]
Max. glider without pilot	265
Max. in-flight	380
Max. cockpit load (on a seat)	110
Min. cockpit load (on a seat)	55
Max. lower baggage compartment	5
OTHER LIMITATIONS :	
AEROBATIC MANOEUVRES: loop, stall turn, climbing turn, lazy eight, steep turn, spin.	
SAFETY LINK IN TOWING CABLE	
aerotowing:	MAX. 677 + 10% [daN]
winch-launching:	NOM. 677 ± 10% [daN]
MAIN WHEEL PRESSURE:	1,5 [at]

15

Placards illustrating selection of back cushion pack or position of adjustable back rest dependent on pilot mass are presented in Fig. 6/1 and Fig. 6/2 respectively

16

ALLSTAR PZL GLIDER	
MADE IN POLAND	
TYPE	
REG. No	QC
FACT. No	
YEAR	

17
(A)

17
(B)

	PRZEDS. DOŚWIADCZALNO- PRODUKCYJNE SZYBOW.	
	PZL – BIELSKO	
	ODDZIAŁ	<input type="text"/>
	MADE IN POLAND	
	NR ROZPOZN.	<input type="text"/>
SERIA	<input type="text"/>	KONTROLA
NR FABR.	<input type="text"/>	<input type="text"/>
ROK BUD.	<input type="text"/>	<input type="text"/>

18

C.G HOOK WITHOUT SELF-RELEASE
SZD-III A-56-P

19

C.G HOOK WITH SELF-RELEASE
TOST G

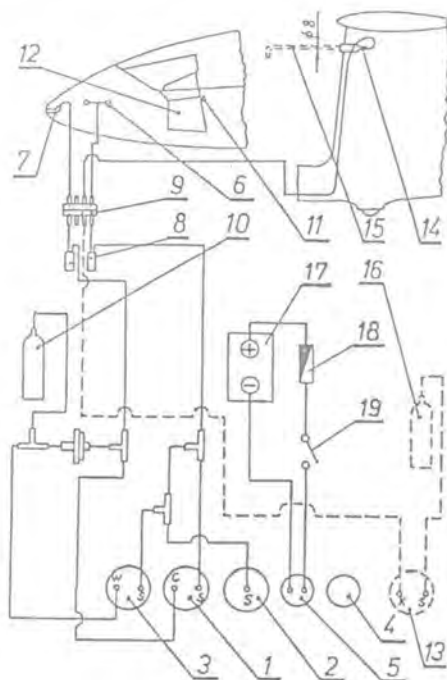
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11 0 9 0 7 0 5 0 3 0 1

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PRE-FLIGHT CHECKLIST	
1. Loose items in cockpit	- CHECK
2. Back-rest, pedals	- ADJUST
3. Parachute	- PUT ON
4. Safety harness	- FASTEN
5. Controls deflection	- CHECK
6. Air brake	- RETRACT
7. Trim device	- SET
8. Altimeter	- SET
9. Canopy	- CLOSE
10. Radio	- CHECK
11. Tow cable attachment	- CHECK

7.5. Board instrument system



- | | |
|--|-------------------------------------|
| 1 - Airspeed indicator | 10 - Bottle |
| 2 - Altimeter | 11 - Instrument panel mounting bolt |
| 3 - Variometer with KWEC-2 compensator
and McCredy ring | 12 - Column of instrument panel |
| 4 - Compass | 13 - Electrical variometer |
| 5 - Turn and slip indicator | 14 - Socket of K = -1 pressure head |
| 6 - Static pressure port | 15 - K = -1 pressure head |
| 7 - Total pressure port | 16 - Compensating vessel |
| 8 - Drainage unit | 17 - Battery 12 V |
| 9 - Duct connector | 18 - Fuse 0,5 ÷ 0,7 A |
| | 19 - Switch |

Rys. 7/3 – Board instrument system
(sample equipment)

The system comprises:

- Instrument panel,
- Total pressure port located in fuselage nose,
- 2 static pressure ports located in fuselage front portion,
- ducts, drainage units and 4-way connector,
- nest for the additional pressure head in a fin.

The instrument panel is attached to its column by means of bolt located in the panel face wall, and shielded on top with the cover mounted to the cockpit board.

"Minimum equipment for flight " comprises the following instruments:

- airspeed indicator, with range $0 \div 250$ [km/h] or $0 \div 400$ [km/h],
- altimeter, with range $0 \div 10000$ [m].

In instrument panel and its column, a space for installation of further instruments and equipment is provided – to the operator order.

7.5.1. Instrument system drainage

After a long flight in rain fall (or cloud flight), complete what follows:

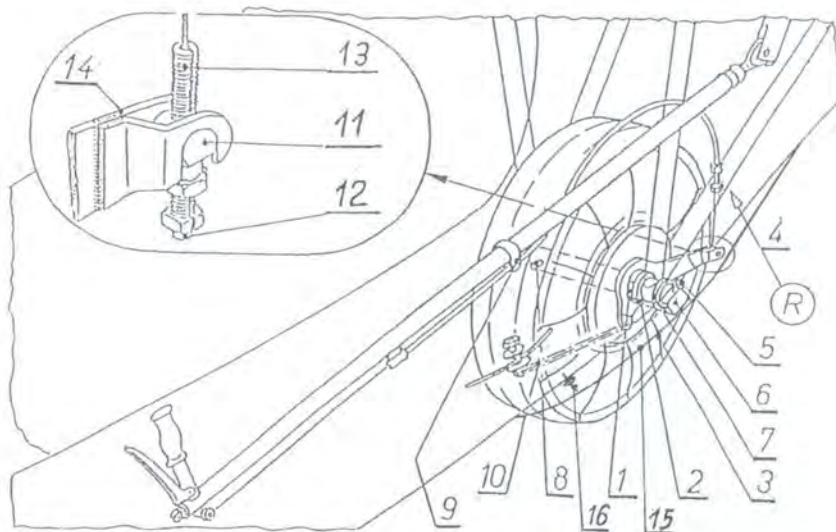
- Dry the drainage units , undoing the drainage plugs
- Disconnect the ducts of total and static pressure from instruments
- If necessary, blow through the ducts of total- and static pressure ports (use a pump for inflating the wheel tube)

NOTE:

Before blowing the ducts, ensure that instruments are disconnected from the blown part of system – threat of damage to board instruments.

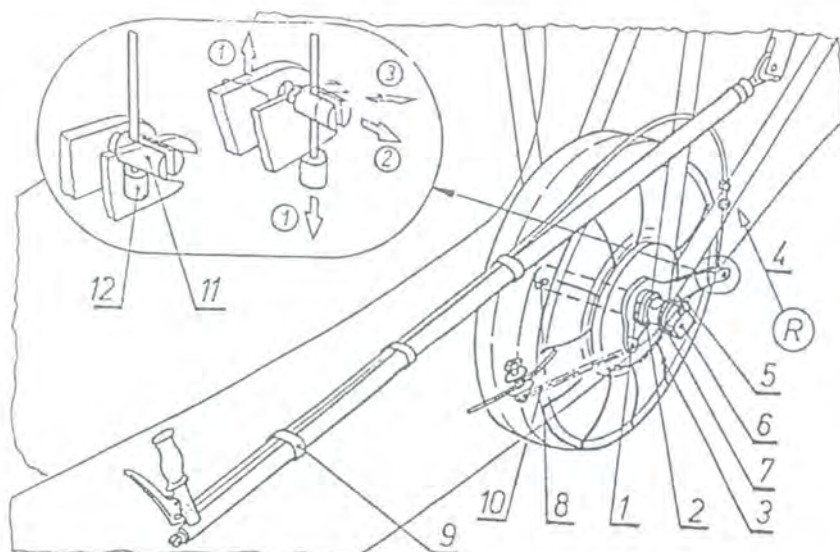
- Screw in the drainage plug, connect the system, check the tightness of the system.

7.6. Landing gear system



- | | |
|----------------------------------|----------------------|
| 1 - Adjusting nut | 9 - Band |
| 2 - Counter-nut | 10 - Spring |
| 3 - Radial edges | 11 - Pin |
| 4 - End of Bowden tension member | 12 - End of cable |
| 5 - Securing wire | 13 - Adjusting screw |
| 6 - Special screw | 14 - Brake lever |
| 7 - Washer | 15 - Wheel fairing |
| 8 - Axle | 16 - Screw |

Fig. 7/4a – Main wheel with fairing
(concerns gliders provided with this solution of brake actuating system)



- | | |
|----------------------------------|----------------|
| 1 - Adjusting nut | 7 - Washer |
| 2 - Counter-nut | 8 - Axle |
| 3 - Radial edges | 9 - Band |
| 4 - End of Bowden tension member | 10 - Spring |
| 5 - Securing wire | 11 - Pin |
| 6 - Special screw | 12 - Cable end |

Fig. 7/4b – Main wheel

(concerns gliders provided with this solution of brake actuating system)

7.6.1. Main wheel - see Fig. 7/4a or Fig. 7/4b

The $\varnothing 400 \times 140$ main wheel is suspended on 2 truss nodes (protruding out of the fuselage) by means of the axle and 2 distance sleeves.

The wheel hub consisting of 2 halves, is equipped with the disk brake. The tube valve is accessible through the opening in the hub, on the fuselage right hand side.

Tire pressure $0,15 \pm 0,03$ MPa which, for an empty glider, corresponds to the tire to hard ground contact (wings level) extending between two neighbouring radial edges (3).

For filling the tire with air used is a special nozzle delivered with the glider. The pressure can be measured with e.g. motor car tube pressure gauge.

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7.6.2. Main wheel brake

a) on gliders provided with solution illustrated in Fig. 7/4a:

The disk brake is actuated by means of Bowden tension member suspended on the air brake push-rod with band (9).

The cable of tension member is connected to the wheel brake lever (14) with a special pin (11).

The lever is retained in its initial position with a spring (10).

Before adjustment to wheel brake, remove the fairing (15).

The wheel brake actuating system should be adjusted with:

- adjusting screw (13) localised on brake lever
- adjusting nut (1) and counter-nut (2) positioned on left hand side of hub axle, enabling to cancel an axial play of brake disk, resulting of wear to disk lining

b) on gliders provided with solution illustrated in Fig. 7/4b:

The disk brake is actuated by means of Bowden tension member suspended on the air brake push-rod with 3 bands (9). The cable of tension member is connected to the brake lever (14) on wheel with a special pin (11). The lever is retained in its initial position with a spring (10).

The wheel brake actuating system should be adjusted with:

- adjusting screw of Bowden tension member (4) mounted with a console on truss tube
- adjusting nut (1) and counter-nut (2) positioned on left hand side of hub axle, enabling to cancel an axial play of brake disk, resulting of wear to disk lining

NOTE:

The axial play changes the angular movements of the brake lever on a wheel. The correctly adjusted cable length should not result in a displacement of wheel brake lever from its initial position.

7.6.3. Tail wheel

The tailwheel is of $\varnothing 200 \times 50$ size with tire & tube from Continental.

Access to tube valve provided through the cut-out in fairing on fuselage left hand side. Pressure in tail wheel is 0,15 MPa.

7.6.4. Nose skid

For abrasion protection, in the fuselage nose lower portion installed is the small steel skid, seated in a rubber pad.

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7.7. Pilot's belts

The glider is equipped with 4-point safety harness, i.e. shoulder-, and lap-belts (Fig. 7/5).

The belt length is adjustable.

NOTE:

When adjusting the shoulder belt, ensure the minimum wrap length of 60 mm, as shown in Fig 7/5.

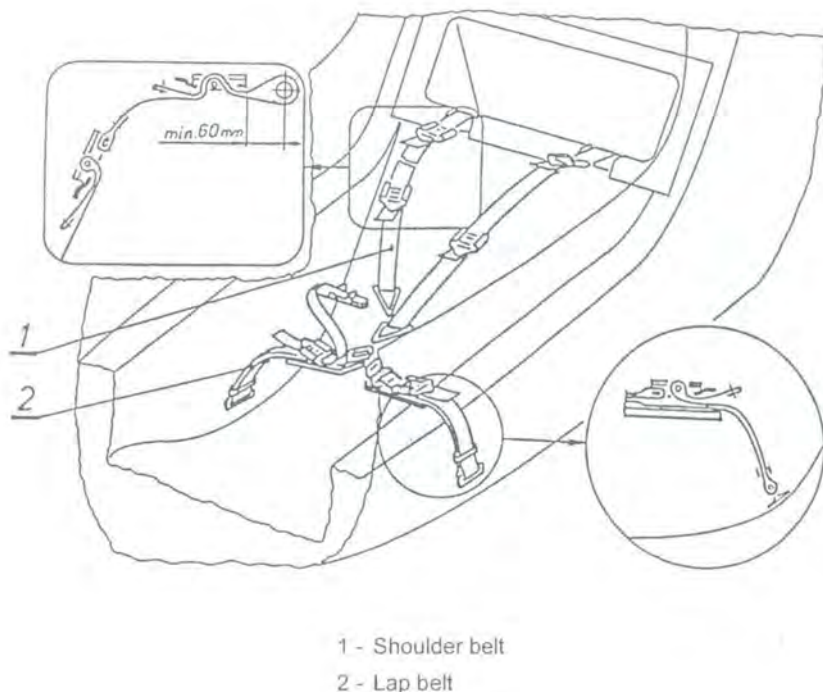


Fig. 7/5 – Pilot's belts

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7.8. Baggage compartment

(see item 6.2. „Allowed range of useful load“, and item 7.3. „Location for installation of glider optional equipment“ in TSM)

The glider is provided with 2 baggage compartments:

- a) Lower compartment "C" – behind pilot's back rest – intended for soft hand luggage only,
- b) Upper compartment "D" – in front of wing spar roots – where only the permanently installed equipment items are mounted (like e.g. battery, transceiver etc.).

The baggage should be deployed as uniformly as possible, and secured against moving.

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SECTION 8.

GLIDER HANDLING, CARE AND MAINTENANCE

8.1.	Introduction	8.2
8.2.	Glider inspection period	8.2
8.3.	Alterations or repairs	8.2
8.4.	Ground handling and transport in the airfield	8.2
8.5.	Cleaning and care	8.4
8.5.1.	Canopy glassing	8.4
8.5.2.	Painted exterior surfaces	8.4

8.1. Introduction

Section 8, contains manufacturer's recommended procedures for proper ground handling and servicing of the glider. It also identifies inspection and maintenance requirements which must be followed if the glider is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2. {Glider} inspection period

The scheduled inspections should be performed in accordance with the glider Technical Service Manual, issue II – Section 15.

8.3. Alterations or repairs

It is essential that the responsible airworthiness Authorities be contacted prior to any alterations on the glider to ensure that the airworthiness of the glider is not compromised.

8.4. Ground handling and transportat in the airfield

The glider with locked canopy can be towed by car or tractor at a speed not exceeding 10 km/h. The length of towing cable - not less than 4 m.

NOTE:

In manoeuvring on muddy surface, especially when rolled backwards, the wheel rollability may be restricted by clogging the wheel chamber with mud. Clean before take-off !

Anchoring the glider

- Set the glider so to have the wind blowing from rear-side direction.
 - Anchor the glider at the following points:
 - WING - support the wing tip on windward side at 30 – 50 cm height, wrap with seat cushion and tie down with anchoring cord to picket or anchor-rod, at a distance approx. 50 cm from the wing tip.
 - FUSELAGE – fix the tailboom to pickets or anchor-rods, stuck in ground on both sides, wrapping the fuselage tube near to the fin with anchoring cord. Avoid direct contact of pickets/ rods with fuselage. Anchor the fuselage nose portion at the nose-, or C.G tow release.
- Moreover:
- AILERON AND ELEVATOR – immobilise using the right hand shoulder belt, connected with right hand lap belt on the control stick hand grip.
 - RUDDER - immobilise by means of clamp (for fin and rudder) made of 2 slats connected at the ends
 - AIR BRAKE - extend, and secure immobilising the grip in a cockpit with the left hand shoulder belt.

Road transport

To prepare the de-rigged glider for a road transport, it is necessary to:

- Check completion of the glider parts and equipment
- Immobilise all items loaded in the cockpit and baggage compartment
- Immobilise the control stick with pilot safety harness
- Immobilise the ailerons and rudder (put on the retainers)
- Lock the canopy and close the window
- Put dry canvas covers on canopy, fuselage, wings and tailplane. Protect against contamination the accessible bearings of control circuit as well as wing and tailplane connecting elements (e.g. wrap with paraffin paper)

When loading the glider assemblies on a trailer, fasten these as follows:

- at external surface – with wide, softly lined clamps or bands,
- wings – at spar root-end
- fuselage – at main-, and tail wheel

8.5. Cleaning and care

8.5.1. Canopy glassing

Wash the canopy perspex with clear water, if necessary with addition of detergent for perspex washing. On ground protect against dust and sand with cover.

NOTE:

Do not wash the cockpit canopy with solvent or gasoline, since these might permanently degrade a transparency of perspex.

8.5.2. Painted exterior surfaces

Wash the external surfaces with clear water, if necessary with addition of a gentle detergent having no abrasive properties, wash up with clear water and wipe dry with flannel cloth or chamois.

After washing check perviousness of drainage openings and dry a wetted structure inside as necessary – this concerns in particular the air brake box.

It is recommended to cover the clean, dry external surfaces with protective agent e.g. one used for furniture.

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SECTION 9. SUPPLEMENTS

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9.2. List of supplements introduced	9.2
9.3. List of effective pages - supplements.....	9.3

9.1. Introduction

Section 9. contains the supplements necessary to safely and efficiently operate the glider when equipped with {optional} equipment and systems not provided with the standard glider.

9.2. List of supplements introduced

Date of Issue	Supplement No	Supplement title	Applicable on this particular S/N

9.3. List of effective pages - supplements

Supplement No	Page	Date of Issue	Supplement No	Page	Date of Issue

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