



KR-03A

FLIGHT MANUAL



KR-03A "PUCHATEK" GLIDER

FLIGHT MANUAL

Model: KR-03A

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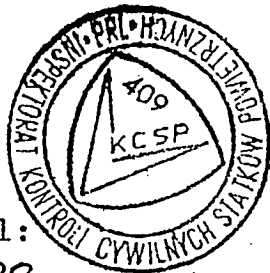
SPECIALIST A KOSP

Signature:

mgr inż. Jerzy Jagielko

Authority: GENERAL INSPECTORATE OF
CIVIL AVIATION-CIVIL AIRCRAFT INSPECTION
BOARD /GILC-IKOSP/

Stamp:



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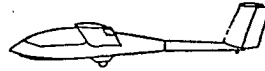
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This sailplane is to be operated in compliance with information and limitations contained herein. Sections 2,3,4 and 5 comprise the approved Flight Manual.



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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 responsible airworthiness authority.

The new or amended text in the revised page will be indicated by a black vertical line in the left hand margin, and the Revision No. and the data will be shown on the bottom left hand of the page.

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	0.2	0.4	1991-07-17 B2-12/KR-03A/91	<i>Brookly</i>	1991-07-17	1991-07-17	<i>P. Brookly</i>
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②	0.2	0.4, 0.5, 0.6	1991-11-15 B2-18/KR-03A/91	<i>Brookly</i>	1991-11-15	1991-11-15	<i>P. Brookly</i>
	2.11	2.8 (AUS, NZ), 2.9 (AUS, NZ)					
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④	2.12	2.10 (AUS, NZ)	1991-11-15 B2-M/KR-03A/91	<i>Brookly</i>	1991-11-15	1991-11-15	<i>P. Brookly</i>
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	2.3	2.4	1993-07-29	Nelu	1993-07-29	1993-07-29	P. Sankh
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	2.12(2)	2.10 (AUS, NZ)	1993-07-29	Nelu	1993-07-29	1993-07-29	P. Sankh
	2.12(3)	2.11					
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 ③ 1991-11-15
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1. General1.1. Introduction

The sailplane flight manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of the KR-03A "Puchatek" sailplane.

This manual includes the material required to be furnished to the pilot by JAR-22. It also contains supplemental data supplied by the sailplane manufacturer.

1.2. Certification basis

② This type of sailplane /KR-03A/ has been approved by GILC and accepted by the Canadian Department of Transport in accordance with Canadian Airworthiness Manual Chapter 522 dated January 1986. Type Approval G-115 has been issued on April 25, 1995. for the Utility Category.

1.3. Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used in the flight manual.

② 1991-07-17

1.2 /C/



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WARNING: means that non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

CAUTION: means that the non observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety

NOTE: draws the attention on any special item not directly related to the safety but which is important or unusual.

1.4. Descriptive data

The KR-03A "Puchatek" glider is designed for basic schooling using the winch-launching or aerotowing, basic aerobatics training thermal and wave flying, hill soaring and passenger flights as well. After the small adaptation it can be used for blind flying training and bungee-launching.

The metal monocoque structure. The cantilever wing, rectangular outline 3^o swept forwards, fabric covered on its trailing portion.

The fuselage comprises the cockpit with two tandem seats. T-tail arrangement. The metal control surfaces in trailing part fabric covered. One piece canopy starboard hinged. Instrument panel before the front seat only. The main undercarriage with hydraulic shock-absorber is equipped with the disc brake. Front and rear fuselage portions are protected

⑥ by the skids or wheels.
⑤ It is possible to install an additional instrument panel in the rear cockpit.

⑤ 1992-03-02
⑥ 1993-07-29

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General technical data

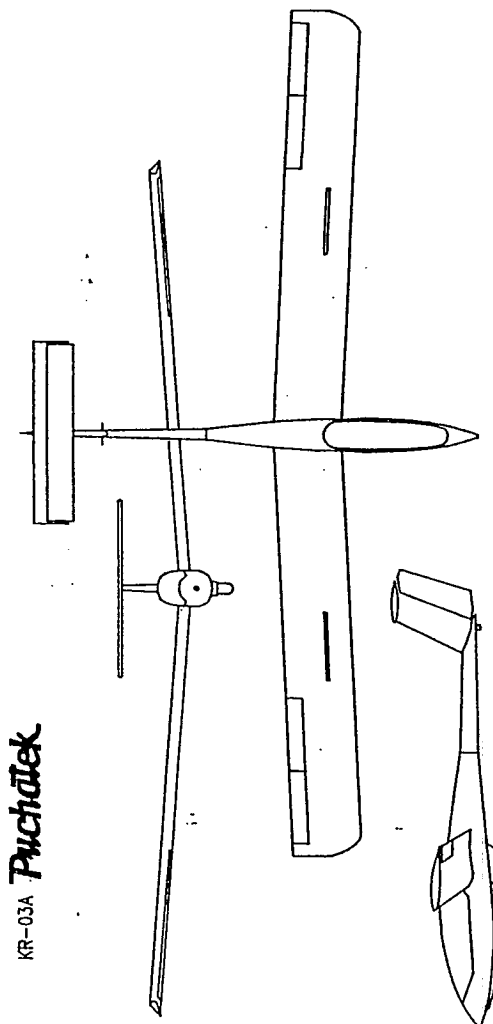
Span	53,80 ft	16,40 m
Length	28,30 ft	8,63 m
Height	5,40 ft	1,65 m
Wing area	209,20 sqft	19,44 m ²
Aspect ratio	13,90	13,90
Wing chord /constant/	3,90 ft	1,20 m
Maximum all-up mass	1190 lbs	540 kg
Maximum wing loading	5,69 $\frac{\text{lbs}}{\text{sqft}}$	27,80 $\frac{\text{kg}}{\text{m}^2}$
Dihedral angle	4°	4°
Sweep angle	- 3°	- 3°
Wing-to fuselage incidence	5°	5°
Tailplane span	11,50 ft	3,50 m
Wing aerofoil	FX S02/1-158	
Tailplane aerofoil	FX 71-L-150/30	
Manoeuvring load factors	+ 5,3/-2,65	

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1.5. Three-view drawing

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1.6. Information markings

In the front and rear cockpit of KR-03A glider the following information markings are installed:

No	PLACARD	CONCERNS:	LOCATION
1	2	3	4
1		longitudinal trimming	Front seat-on the upper wall of trimmer control box Rear seat-below the trimmer control ball in position "tail heavy"
2		canopy emergency jettisoning	Front seat on the right cockpit board Rear seat edge below the emergency jettisoning lever
3		extending of the airbrake	Front seat on the left cockpit board Rear seat edge symmetrically in the range of airbrake control lever movement
4		towing hook	Front seat-on the left bottom corner of instrument panel Rear seat-on the front seat above the releasing hand grip
5		pedals adjustment	Front seat-on the I pilot's floor in the glider plane of symmetry behind the front pedals



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1	2	3	4
6		seat adjustment	Rear seat-on the right board above the rear seat fastening support
7		wheel braking	Front seat on the left board before the wheel Rear seat brake lever support
8		air conditioning	Front seat-on the instrument panel above the air conditioning control knob
9		ON OFF	Front seat-on the instrument panel the placard "OFF" above and the right and left side of turn indicator switch
10		balancing weight	Front seat-on the left and right board before the front seat and above 1 in / 25 mm / over the floor
11	 SOFT ITEMS ONLY	luggage compartment	On the left side of the luggage compartment in the distance of about 2,8 in / 70 mm / in respect to the plane of glider symmetry and 2,8 in / 70 mm / in respect to the luggage compartment front
12		first aid kit	
13		no smoking	Front seat and Rear seat-on the right board



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2. Limitations2.1. Introduction

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

The limitations included in this section and in Section 9 have been approved by: GENERAL INSPECTORATE OF CIVIL AVIATION-CIVIL AIRCRAFT INSPECTION BOARD/GILC-IKCSP/. Compliance with these limitations is mandatory.

2.2. Airspeeds

Airspeed limitations and their operational significance are shown below:

	Speed	/IAS/	Remarks
V_{NE}	Never exceed speed	107 kts /200 km/h/	Do not exceed this speed in any operation and do not use more than 1/3 of control deflections
V_{RA}	Rough air speed	80 kts /150 km/h/	Do not exceed this airspeed except in smooth air and then only with caution.

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	Speed	/IAS/	Remarks
V_A	Manoeuvring speed	80 kts /150 km/h/	Do not make full 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	67 kts /125 km/h/	Do not exceed this speed during winch-launching
V_T	Maximum aerotowing speed	70 kts /130 km/h/	Do not exceed this speed during aerotowing
	Maximum permissible speed for air brake operation and flight with air brake extended	107 kts /200 km/h/	Do not exceed this during air brake operation and flight with air brake extended

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2.3. Airspeed indicator markings

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

Marking	/IAS/ value or range	Significance
Green arc	43-80 kts /80-150 km/h/	Normal operating range /lower limit is maximum weight $1,1 V_{S1}$ at most forward c.g. upper limit is rough air speed/.
Yellow arc	80-107 kts /150-200 km/h/	Manoeuvres must be conducted with caution and only in smooth air
Red line	107 kts /200 km/h/	Maximum speed for all operations
Yellow triangle	48 kts /90 km/h/	Approach speed at maximum weight

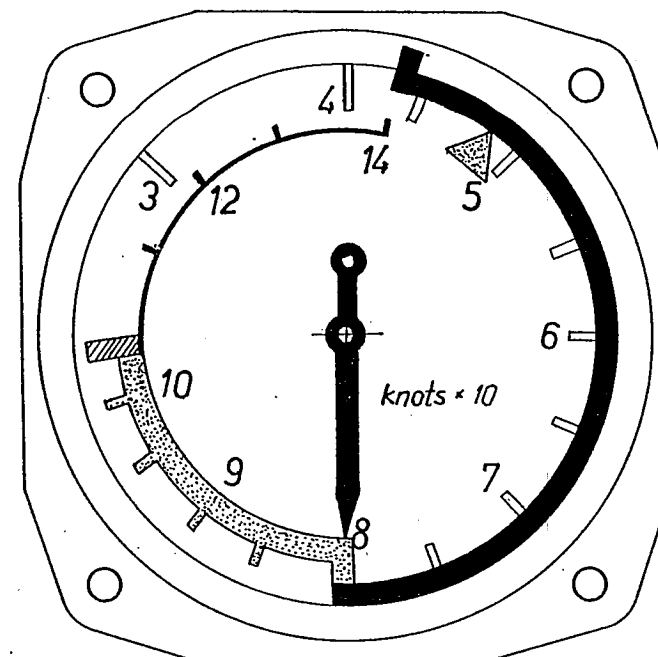





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2.4. Colour airspeed indicator markings



-  - red
-  - yellow
-  - green





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2.5. Mass /weight/

Maximum take-off mass	1190,5 lbs/540kg/
Maximum landing mass	1190,5 lbs/540kg/
Maximum mass of non-lifting parts	377,0 lbs/171kg/
Maximum load in the luggage compartment /soft items only/	11 lbs /5 kg/

2.6. Centre of gravity

Allowable range of c.g. location for flight /measured in respect to wing root chord leading edge/ is:

0,223 + 1,04 ft /0,068 + 0,317 m/

what corresponds the range of 21,5 + 43 per-cent of MSC. The above c.g. range corresponds to the permissible loadings of glider for flight contained in chapter 2.9.

2.7. Approval manoeuvres

KR-03A glider is certified in Utility category with the following manoeuvres approved:

- looping
- stall turn
- spiral dive
- climbed turn
- lazy eight

The recommended entry speeds and the remarks on performing the above manoeuvres are contained in chapter 2.12.

② 1971-07-17
③ 1991-11-15
⑤ 1992-03-02



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2.8. Manoeuvring load factors

Maximum limit positive and negative load factors under different flight conditions are:

positive: 5,3 g at V_A

4,2 g at V_{NE}

negative: - 2,65 g at $V_{p.G./=73,4kts}$
/136 km/h/

- 2,0 g at V_{NE}

2.9. Flight crew

KR-03A glider has the following crew limitations:

- Solo flight on the front seat only,
- The front seat is for pilot or student-pilot,
- The rear seat is for instructor or passenger,
- Minimum permissible load mass on the front seat /without front ballast/ is:

- 145,5 lbs /66 kg/,

- Minimum permissible load mass on the front seat /front ballast of $m = 21$ lbs /9,5 kg/ /

- 121,3 lbs /55 kg/,

- ③ - Rear ballast of 11 lbs/5 kg/ is to be used exclusively to demonstrate multiturn spin in c the crew mass is in excess of 320 lbs/145 kg/,
- For the load mass in the glider above 220,5 lb /100 kg/ the use of the front balancing

③ 1991-11-15
⑥ 1993-07-29

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weights is prohibited.

2.10. Kinds of operation

KR-03A glider is intended for normal sailplanning and performing of aerobatic manoeuvres acc.to chapter 2.7. It is allowed for day flying in VFR conditions.

- Cloud and night flying is allowed where National operational regulations so permit. Flying in icing conditions is prohibited. The performing of multi-turn spinning and the schooling in entry and recover of spinning are allowed.

2.11. Aerotow, winch-launching and bungee-launching

KR-03A glider is intended for aerotowing, winch-launching and bungee-launching.

Aerotow

For aerotowing the front hook shall be used. The recommended aerotow cable length is 131,2 + 164 ft / 40 + 50 m/. The minimum length is 65,6 ft / 20 m/.

- The strength of towing cable or safety link is required not greater than 2300 lbs ± 10 % / 1030 daN ± 10 %/.

Aerotowing airspeed:

at climbing 51,0 + 59,0 kts / 95 + 110 km/h /
at cruising 65,0 + 70,0 kts / 120+ 130 km/h /

② 1991-07-17

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Winch-launching

For winch launching the c.g.hook shall be used only.

The glider is allowed for take-off by means of winch coupled with the cable back-pulling device.

The winch-launching speed is

48,0 + 59,0 kts / 90 + 110 km/h /

and cannot be less than 43,0 kts / 80 km/h /

The strength of cable safety link for winch - launching is required not greater than 2300 lbs ± 10 % / 1030 daN ± 10 % /.

②

Bungee-launching

The KR-03A glider is allowed the bungee - launching. To bungee-launch use the recognize and approved bungee catapult and releasing equipment. The hook for bungee-launching is mounted with two screw to the front ferrule of the front skid or to the bracket placed before the front wheel in case this bracket is installed by the manufacturer.

③

It is forbidden to fix the hook in other place. The hook is to be mounted for bungee-launching only /see.3.2.11 M M/ and it has to be removed in case of other kind of take-off.

④

The releasing equipment of the glider is fixed to the lug of the rear skid or tail wheel.

⑤

The take-off occurs at the airspeed of 31+36 k / 58+65 km/h /.

The ground run length amounts 26+115 ft / 8+35 m. The airbirning speed and ground run length, depends on the glider loading and wind velocity.

⑥

The bungee-launching with a downwind component is not recommended.

② 1971-07-17

③ 1991-11-15

④ 1993-07-29

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2.12. Limitation placards

1. Placard of permissible airspeeds:

PERMISSIBLE AIRSPEEDS, KTS		IAS
V _{NE}	MAXIMUM PERMISSIBLE AIRSPEED IN SMOOTH AIR	107
V _{RA}	MAXIMUM PERMISSIBLE AIRSPEED IN GUST CONDITIONS	80
V _A	MANOEVURING SPEED /SHARP CONTROL DEFLECTIONS/	80
V _T	MAXIMUM PERMISSIBLE AEROTOWING-AIRSPEED	70
V _W	MAXIMUM PERMISSIBLE WINCH-LAUNCHING-SPEED	67
MAXIMUM PERMISSIBLE AIRSPEED FOR AIRBRAKE OPERATION AND FLIGHT WITH AIRBRAKE EXTENDED		107

2. Placard of limitations:

LIMITATIONS
1. KR-03A GLIDER ALLOWED FOR DAY FLYING IN VFR CONDITIONS
2. SOLO FLIGHT ON THE FRONT SEAT ONLY
3. WINCH-LAUNCHING ON THE c.g. HOOK ONLY
4. FLYING IN ICEING CONDITIONS PROHIBITED
5. BACK CUSHIONS MUST BE USED FOR FLIGHTS WITHOUT PARACHUTES

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② 1991-07-17

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3. Placard of permissible loadings:

PERMISSIBLE LOADINGS OF KR-03A	
ALL-UP MASS	1190.5 lbs (540 kg)
EMPTY WEIGHT
FOR THE GLIDER LOADING MASS ABOVE	220.5 lbs (100 kg)
THE USE OF THE FRONT BALANCING WEIGHTS IS PROHIBITED	
FOR THE LOADING MASS ON THE FRONT SEAT BELOW	145.5 lbs (66 kg)
THE USE OF BALANCING WEIGHTS IS MANDATORY	
MAX. LOAD IN THE LUGGAGE COMPARTMENT (SOFT ITEMS ONLY TO BE SECURED)	11 lbs (5 kg)
USE THE REAR BALLAST FOR DEMONSTRATION OF MULTITURN SPIN ONLY AT THE LOADING MASS ABOVE	
	320 lbs (145 kg)

③

③

⑤

⑥

4. Placard of allowed aerobatic manoeuvres:

MANOEVRE	ALLOWED AEROBATICS	
	ENTRY AIRSPEED IAS kts (km/h)	
	LIGHT CREW 121 + 242 lbs (55 + 110 kg)	HEAVY CREW 242 + 452 lbs (110 + 205 kg)
LOOPING	89 + 92	92 + 94
STALL TURN	(165 + 170)	(170 + 175)
SPIRAL DIVE	55 (110)	65 (120)
CLIMBED TURN (CHANDELLE)	92 (170)	97 (180)
LAZY EIGHT	75 (140)	92 (170)
AEROBATICS IN SMOOTH AIR ONLY		

⑥

②

③

② 1991-07-17

③ 1991-11-15

⑤ 1992-03-02

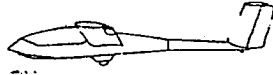
⑥ 1993-07-27

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5. Placard of V_{NE} variation versus altitude, version (a) or (b):

a/

ALTITUDE		V_{NE} AIRSPEED IAS	
m	ft	km/h	kts
0000	0.0	200	107
1500	4921	200	107
1800	5906	197	106
2000	6562	195	105
2200	7218	193	104
2400	7874	191	103
2600	8530	189	102
2800	9186	187	101
3000	9842	185	100
3200	10499	183	99
3400	11155	182	98
3600	11811	180	97
3800	12467	178	96
4000	13123	176	95

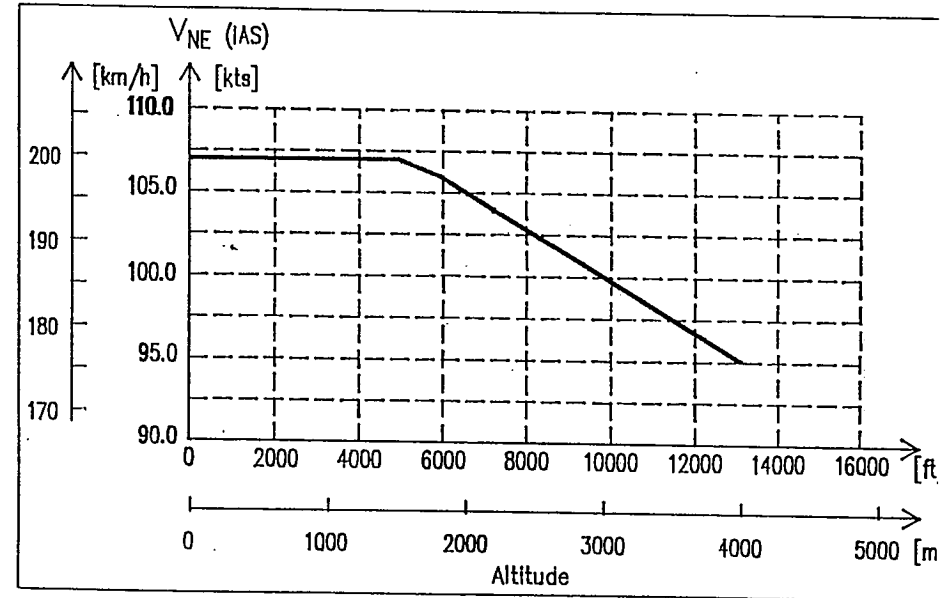


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Section 3

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3. Emergency procedures

3.1. Introduction

In this section the procedures in danger and emergency conditions are described.

3.2. Canopy jettison

The procedures for the canopy jettison are the following:

1. Release the control stick.
2. Catch firmly and pull back simultaneously:
 - hand-grip of the canopy lock /with left hand/
 - hand-grip of the emergency canopy jettisoning /with right hand/
3. Holding the hand-grips push the canopy upwards and jettison.

3.3. Bailing out

Bailing out and parachute using is the only way of rescue when the controlled return to the earth is impossible. In case of two persons crew the bailing out decision is taken by the ship captain. When the altitude allows for the crew member being not captain bails out first. The captain exits as a second, or when he has used all the possible ways to ensure the crew member to leave the cockpit.

The procedures for bailing out is the following:

1. Jettison the canopy.
2. Release the safety harness.
3. Pull back the legs and bail out.

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4. If the glider rotates quickly bail out towards the rotation direction.
4. Wait 3 seconds at least and open the parachute. If the exit takes place at the altitude below 650 ft / 200 m/ open the parachute immediately after exit.
 - If the exit occurs at the high altitude it is necessary to take into account:
 - 1/ the possibility of climbing the pilot with parachute in strong thermics /in clouds/ and the associated danger of oxygen lack, low temperature or icing.
 - 2/ The danger of the body to be frozen.In respect to the above circumstances it may be recommended to stay in the cockpit of the damaged glider cockpit /if its condition allows for/ till the altitude drops into the level ensuring the safe parachute exit.

3.4. Stall recovery

Stall recovery of KR-03A glider is the following:

1/ Stall in straight flight with air brake retracted and extended

1. Resolutely push the stick forwards more than to neutrum.
2. Accelerate the glider up to 43 kts /80 km/h / airspeed

The height loss in stalling at straight flight is about 230 ft /70 m/

2/ Stall in turning

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1. Resolutely push the stick forwards more than to neutral simultaneously gain the symmetric flight with the proper actions of elevator and rudder.
2. Accelerate the glider up to 43 kts /80 km/h/ airspeed.

The height loss in stalling at turning is about 197 ft /60 m/.

3.5. Spin recovery

KR-03A glider performs the multi-turns spin for the rear c.g. locations /34 + 43 % of MSC/.

For front c.g. locations /21,5+34% MSC/ the spinning is recovered automatically or enters the spiral dive.

The most spinning favourable aileron is deflected towards the rotation. The spinning of KR-03A sailplane is of a steep characteristics and the recovery is easy and quick.

The recovery procedure is the following:

1. Deflect the rudder opposite to the glider rotation.
2. Push the stick into near the neutral and simultaneously neutralize the ailerons.
3. Pull-out of the diving with the elevator movement.

The height loss in spinning ranges about 330 ft / 100 m/ for one turn and in recovery up to 330 ft /100 m/.

3.6. Spiral dive recovery

The procedures for spiral dive recovery are the following:



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1. Using the aileron movement regain the horizontal flight.
2. Using the elevator adjust the required airspeed.

3.7. Side-slip recovery

The procedures for side-slip recovery are the following:

1. Put the controls into neutral position.
2. Identify the glider attitude in respect to the horizon.
3. Using the elevator regain the required flight parameters.

3.8. Fire

- ③ Smoking in the cockpit is prohibited.

In case fire appears in the cockpit the following is to be done:

1. As far as possible, the fire is to be put out or its source is to be removed from the cockpit.
2. Possibility of fire's expansion is to be limited by removing combustible objects and in case necessary by canopy's jettisoning.
3. Jettison the canopy and try to put out the fire by means of side slips and then land acc. to emergency procedure.
4. If altitude is high enough point the glider, as far as possible at an uninhabited area and bail out.
5. Pilot /commander/ may take a decision to omit items 1 up to 3.

③ 1991-11-15
⑥ 1993-07-29

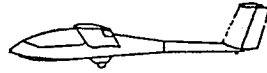
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3.9. Other emergencies

3.9.1. Breaking or unintended towing cable
releasing at low altitude

Observe the following procedures:

1. Release the hook /towing cable off/.
2. Regain the glide flight.
3. Land taking into account the wind direction and intensity, the environment conditions and situation.

3.9.2. Flight with an incorrect trimming

In case of lack of front balancing /light pilot/ break the flight and land on the airfield avoiding the low airspeeds.

3.9.3. Danger of exceeding the maximum
permissible airspeed

In case of unintended airspeed increment creating the danger of the maximum permissible in normal flight airspeed of 107 kts / 200 km/h / open the air brake and then perform the proper manoeuvre to decrease the airspeed and regain the correct flight. The excessive stick pulling in such circumstances is prohibited.

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4. Normal procedures4.1. Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operation.

4.2. Rigging and deriggingRigging of wings

1. Arrange the glider components /fuselage, wings, tailplane/ in the position most favourable for rigging.
2. Remove the bolts out of the main framework and rear fitting block.
3. Lift the wing and insert the wing main fittings into the fuselage framework lugs and simultaneously pay attention to the correct location of the rear fitting in the lug of rear fitting block.
4. Centralize the holes for main bolts, insert the bolts and slightly screw in.
5. Insert the rear bolt, screw on and secure the nut of rear bolt.
Screw in the inspection hole cover.
6. Tighten the main bolts.
7. Use the same procedures for the second wing.
8. Move resolutely the wing tips "up-down" and "forwards-backwards" several times.

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9. Tighten the main bolts with torque moment of 17,7 lbft /24 Nm/ and secure with wire /each bolt separately/.

10. Connect the control systems of air brake and aileron.
Derigging requires the inverted sequence.

Rigging of tailplane

1. Remove the safety pins, screw off the nuts and remove the washers out of the rear pivots of the stabilizer.
2. Lift the stabilizer and insert the stabilizer fittings on the fin fittings pushing the stabilizer till to stop.
3. Put on the washers on the rear pivots screw in the nuts till to stop. Secure the nuts with safety pins.
4. Connect the elevator control system.
5. Check the correct connection and elevator operation. Put on the fairing and screw in the fastening screws.

Derigging requires the inverted sequence.

The detailed description of rigging and derigging procedures is contained in Maintenance Manual, Chapter 3.

4.3. Daily inspection

Before the flying day it should be checked:

1. Validity of glider documents.
2. Integrity of the structure and coverings.

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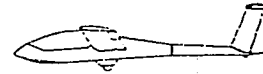
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3. Securing of rigging elements and control system connections.
4. Operation of control systems.
5. Operation of towing hooks.
6. Closing and opening of the canopy and the condition of the cable supporting the canopy in opened position.
7. Condition of undercarriage, wheel rollability, pressure in the tyre /deflection of about 1 in /25mm/ /.
8. Fixing of the rear seat and back-rest.
9. Pilots' safety belts.
10. Total and static pressure heads.
11. Airspeed indicator operation /it should react on the blows into the heads/.
12. Turn indicator operation.

4.4. Preflight inspection

4.4.1. Adjustment of the rear seat

① The rear seat in the unloaded condition may be reset in the following way:

1. Open the canopy.
2. Turn the carrying tube to left till it is released out of the fitting.
3. Adjust the seat into the required position and turn the carrying tube into its initial position.

4.4.2. Adjustment of the front pedals

The adjustment of the front pedals is carried on as follows:

1. Put the legs onto the pedals.
2. Release the pedal locking by means of pulling the adjusting tension member.
3. Adjust the pedals in required position pulling or pushing them with legs.
4. Release the adjusting tension member. Check the correct pedals locking.

4.4.3. Preflight procedures

1. In case of flights without parachutes the seats have to be equipped with back cushions which are supplied by the manufacturer with the glider.
2. Balance the glider with the weights according to the loading mass. Check the weights to be correctly fixed.
3. Adjust the rear seat. For solo flight the rear pilots belts shall be fastened together
- ② 4. Take place in the cockpit, adjust the pedals and fasten the belts.
5. Make the full movements of control surfaces, air brake and trimming device. Put the trimming slider according to the take-off kind and crew mass.
6. Check the turn indicator operation.
7. Close the canopy.
8. Connect the towing cable and check the coupling pulling the cable several times firmly /surging/.



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4.5. Normal procedures and recommended speedsGeneral control characteristics of KR-03A glider

KR-03A glider is correct and easy in controlling with the behaviours similar to the training types. It features:

1. Short ground run at take-off.
2. Good lateral and directional controllability
3. Safe behaviours at the low airspeed without the tendency to automatic entering the spin.

4.5.1. Take - off proceduresAerotowing take-off and towed flight

For aerotowing the front hook shall be used. Before take-off the towing cable should be hooked and tensioned.

Put the trimming slider into the position:

- solo flight - between "neutral" and "nose heavy"
- heavy crew - "neutral"

During the ground run at the speed of 16+22 kts /30+40 km/h/ adjust the glider attitude /lift the tail or nose depending on the crew mass/ by slight pushing or pulling the stick. Depending on the take-off mass airborning occurs at the airspeed of 35+38 kts /65+70 km/h/.

When the airspeed is stable the trimming should be corrected. The recommended towing speeds are given in chapter 2.11.

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Winch - launching

For winch-launching the c.g. hook shall be used only.

The glider should be positioned in line with cable direction. The small deflection to left of the above line is allowed.

Before the take-off put the trimming slider into the position:

- light crew: - "nose heavy" between 8+11 slots
- heavy crew: - "tail heavy" between 4+7 slots

The correction of trimming during the take-off is not recommended. The take-off process of KR-03A does not differ in the essential way from the winch-launching of other gliders.

The ground-run is short and depends on the crew mass and wind intensity.

The ground run and near ground flight should be performed with the stick pushed forward of neutrum to avoid the tail impact on ground in the airborning moment. When the altitude of 50 + 65 ft /15 + 20 m/ is gained pass smoothly into the climbing.


In the final section of climbing to obtain the correct flying path the stick should be pulled to the required position.

Before the cable releasing the stick should be pushed and the cable releasing hand-grip pulled /two times to be sure that the cable is released. The recommended winch-launching speed is given in chapter 2.11.

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Bungee - launching

Before the bungee-launch the following conditions have to be performed.

1. Make the bungee cables spacing simmetrically to the longitudinal axis of the glider /angle of flare $30^\circ + 35^\circ$ /.

2. Put the trimming slider into the position:
 - light crew - "nose heavy" on 5 th slot
 - heavy crew - "tail heavy" on 4 th slot

The correction of trimming during the take-off is not recommended.

Using the controls during the take-off is not practically necessary.

Glider keep direction and lateral stability.

After lift-off accelerate the glider up to $43 + 46$ kts / $80 + 85$ km/h / and continue the flight.

The Bungee catapult's stretching requirements:

- ① - 12 person if wind velocity is grater than 4 kts / 2 m/s /
- 16 person with heavy crew and no wind conditions.

4.5.2. FlightFree flight

The trimming device allows the glider to be trimmed in the below given airspeed range:

- light pilot - from about $32,0 + 81,0$ kts / $60 + 150$ km/h /
- heavy crew - from about $38,0 + 97,0$ kts / $70 + 180$ km/h /

Before the flight the pilot should be familiar with the speed polar given in chapter 5.3.

Circling

The circling behaviours of KR-03A gliders are correct. The lateral controlability is good. The recommended thermalling airspeeds are $35 + 43$ kts / $65 + 80$ km/h / depending on loading, bank angle and the thermal characteristics.

Flight with air brake extended

The airbrake of KR-03A limits the diving airspeed to the permitted value and allow for controlling the approach angle. The air brake may be operated on the airspeeds up to V_{NE} with no danger of damaging the structure.

- ② For the glider without an aiding spring in the airbrake control system the forces in excess of 45 lbs / 20 daN / may arise when retracting airbrakes.

4.5.3. Approach

- ② The approach of KR-03A is correct and safe. Basicly the landing should be performed against the wind but in necessary cases it may be performed the landing with the side wind component of up to 12kts / 6m/s / or rear wind of 6 kts / 3m/s /.

Recommended approach airspeeds:

- in smooth air: $43,0 + 48,5$ kts / $80 + 90$ km/h /
- in gust conditions: $45,8 + 51,2$ kts / $85 + 95$ km/h / depending on the loading.

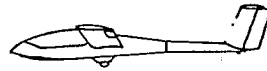
The approach angle should be controlled by means of air brake.





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4.5.4. Landing

The landing procedure of KR-03A glider is the standard one. Depending on the glider mass and air brake extending degree the ground touching occurs at about 35,0 + 37,8 kts /65 + 70 km/h/ airspeed. It is recommended to touch the ground with air brake partially extended.

The length of landing ground-run in windless conditions is:

- without wheel braking-about 295 + 328 ft /90 + 100 m/
- with wheel braking-about 197 + 262 ft /60 + 80 m/ depending on the loading.

4.5.5. High altitude flight

KR-03A glider is permitted for altitude flying according to the national regulations and equipment.

4.5.6. Flight in rain

The flights of KR-03A glider in rain are not recommended, however due to the large canopy the good visibility in rain is ensured. In case of poor visibility through the canopy perspex the window on the left side should be opened. Location of the window ensures the correct controlling of the flying path.

4.5.7. Aerobatics

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Before the take-off to aerobatic flying it is necessary to:

1. Check the correct balancing with the weights /concerns the solo flight/.
2. Remove the free objects out of the cockpit.
3. Check the securing of the supporting tube of the rear seat.
4. Check the full deflections of control stick and pedals with the safety belts fastened.
5. In case of solo flying, fasten the rear seat safety belts and remove the useless pillows.

During the flight immediately before performing the aerobatics:

1. Fasten the back belts.
2. Trim the glider on 59 + 65 kts /110 + 120 km/h/ airspeed.
3. Check the correct canopy and air brake locking.
4. Shut the window and air conditioning intake.

The manoeuvres on KR-03A gliders are to be performed as follows:

1. Looping, stall-turn, spiral-in conventional manner.
2. Climbed turn-at the entry airspeed of 92 + 97 kts /170 + 180 km/h/ make the sharp pulled turn with 45° bank in such a way that in recovery on the back direction /180°/ the airspeed is: 37,7 + 43,0 kts /70 + 80 km/h/.

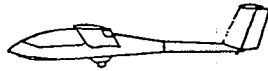
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3. Lazy eight-at the entry airspeed of 75,5 + 91,7 kts /140-170 km/h/ make the sharp pulled turn with 45° bank in such a way that after the direction reversal by 180° the airspeed is about 43 kts /80 km/h/. After the next 45° recover the glider out of the turn and gain once more the airspeed of 75,5 + 91,7 kts /140 + 170 km/h/ and repeat the same manoeuvre to the opposite direction and recover into the original direction. The entry airspeeds for the particular aerobatic manoeuvres are given in chapter 2.12.

4.5.8. Side - slip

The side-slip entry airspeed is 43,0+48,5kts /80 + 90 km/h/. The procedures for performing the side-slip are the following:

- 1/ Bank the glider into wing.
- 2/ Prevent the glider to turn by means of rudder deflection.

The airspeed indications in the side-slip are not the true ones. When entering the side-slip the airspeed indications rapidly drop down to 21,5 + 27,0 kts /40 + 50 km/h/ and when the side-slip becomes stable the airspeed increases to 37,7 + 40,5 kts /70 + 75 km/h/ depending on pitch and bank attitude of the glider.



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Section 5

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5.3.1. Demonstrated crosswind performance	5.4
5.3.2. Speed polar	5.5



5. Performance

5.1. Introduction

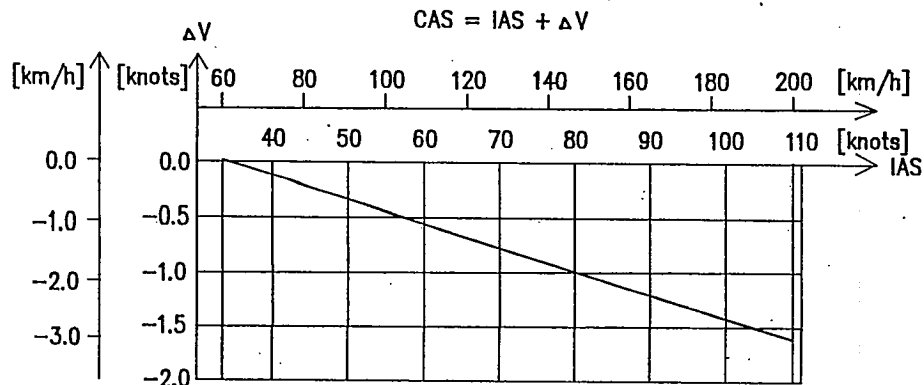
Section 5 provides approved data for glider performances, stall speed and non-approved other information.

The data in tables and diagrams has been computed from actual flight tests with the glider in good condition and using average piloting techniques.

5.2. Approved data

5.2.1. Airspeed indicator system calibration

The aerodynamic correction diagram /averaged/



5.2.2. Stall speeds

The straight flight stall speed of KR-03A glider depends on:

- all-up mass
- c.g. location in flight

and ranges from about 30,7 kts /57 km/h/ for the minimum crew mass to about 38,8 kts /72 km/h/ for the all-up mass.

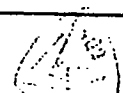
The stall speed in the turn is slightly higher and depending on bank angle it ranges for:

- light pilot - about 33,4 + 35,0 kts
/ 62 + 65 km/h /
- heavy crew - about 41,0 + 43,0 kts
/ 76 + 80 km/h /

Both in straight and turning flight with airbrak extended the stall speed depends on the glider's mass and is greater by about 5 kts /10 km/h/ the the stall speed for smooth configuration. KR-03A glider warns the approach to stall speed by means of fuselage vibrations which appear at about 3 kts /5 km/h/ before the stall occurs.

The stall in flight with airbrakes extended is of similar characteristics as for smooth configuration. The only important difference is the due to the flow perturbation caused by the extend airbrakes the structure vibrations appear. These vibrations are separated form the vibratio wich give warning of the approach of the stall. Stall characteristics are safe. Flight with the stick pulled full is possible.

The variation of stall speed versus glider mass is plotted below:





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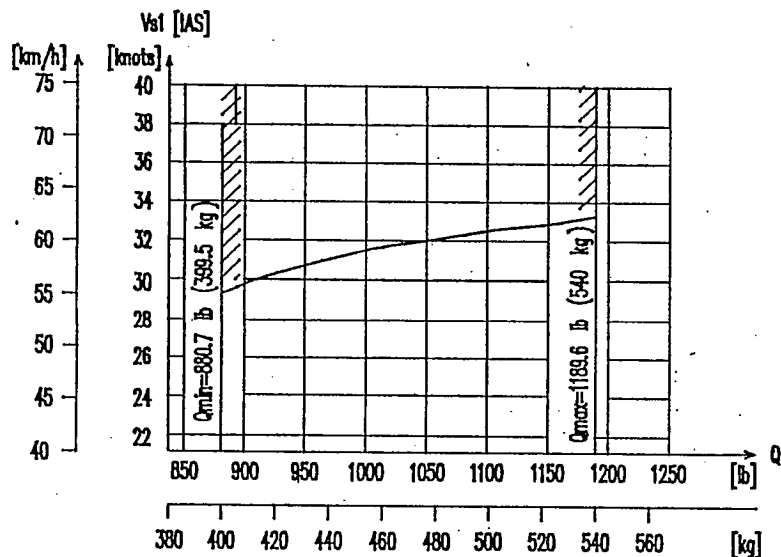


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NOTE: The stall speed depends on the glider mass and c.g. location. On the diagram the function of V_{s1} versus glider mass is plotted. For a given mass the variable c.g. position is possible depending on the pilot's mass on front and rear seat. For the cockpit loadings where the second seat pilot's mass is higher than the pilot's mass in front seat the airspeed V_{s1} increases slightly when compared with this one on the diagram.

5.3. Additional information

5.3.1. Demonstrated crosswind performance

The allowable sidewind component is 12 kts / 6 m/s /. The take-off does not

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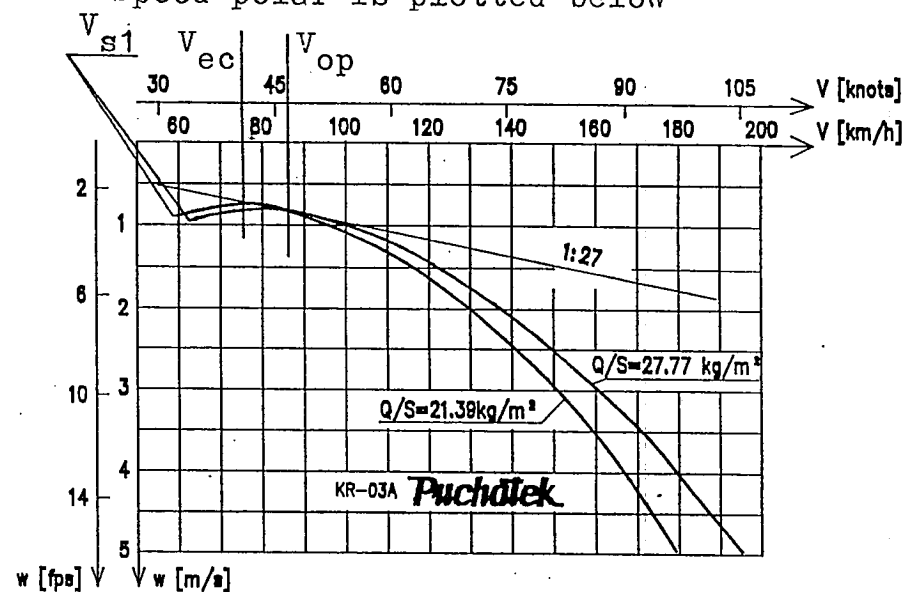
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require exceptional pilot's skills when the sidewind component amounts to 8 kts / 4 m/s /.

The above concerns the aerotow and winch - - launching as well.

5.3.2. Speed polar

Speed polar is plotted below



Speed polar of KR-03A "Puchatek" glider

On the speed polar diagram the specific points are noted stall speed for the maximum and minimum crew mass.

The economic and optimum airspeeds are noted for the average load values V_{ec} , V_{op} .

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Section 6

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6. Mass /weight/ and balance6.1. Introduction

This section describes the procedures for establishing the basic empty mass and moment of the glider, the graphical checking of c.g. weighing table and list of equipment.

The empty glider weighing procedures are described in Maintenance Manual of KR-03A glider, chapter 3.9

The range of c.g. location of empty glider with the basic equipment measured aft of the root rib leading edge is

$$b = 1.719 + 1,876 \text{ ft} / 0,524 + 0,572 \text{ m/}$$

6.2. Empty glider mass and moment in the basic configuration

Weighing table of KR-03A glider.

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Mass of empty glider with basic equipment m_{st} /lbs/ /kg/		762.2	345.5
Location of c.g. of empty glider with basic equipment in respect to root rib leading edge b /ft/ /m/		1.87	.571
Moment of the mass of empty glider with basic equipment in respect to root rib leading edge $M_{st} = m_{st} \times b$ /lbft/ /kgm/		1425.3	197.3
Maximum permissible load mass $m_{load} = 540 - m_{st}$ /lbs/ /kg/		427.8	194.5
Date, signature and seal of the Inspection	20 June 95	<i>[Signature]</i>	m.227287

The mass of empty glider with basic equipment should range 738,5 + 771,6 lbs /335 + 350 kg/ and the moment: 1269,7+1448,1 lbs ft /175,54 + 200,2 kgm/.

6.3. Mass of non-lifting parts

The non-lifting parts are:
fuselage with:



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- tailplane	33,0 \pm 1,1 lbs	/15 \pm 0,5 kg/
- rudder	7,7 \pm 0,66 lbs	/3,5 \pm 0,3 kg/
- canopy	27,5 \pm 0,66 lbs	/12,5 \pm 0,3 kg/
- rear seat	12,1 \pm 0,44 lbs	/5,5 \pm 0,2 kg/
- front seat	9,2 \pm 0,44 lbs	/4,2 \pm 0,2 kg/
- instrument panel	6,6 \pm 0,44 lbs	/3,0 \pm 0,2 kg/
- main wheel with undercarriage arm	16 \pm 0,44 lbs	/7,3 \pm 0,2 kg/

Maximum all non-lifting parts mass is:

377 lbs /171 kg/

6.4. Glider mass

Maximum permissible glider mass: 1190,5 lbs /540 kg/

Minimum wing mass: 379,0 lbs /172 kg/

Front balancing weights mass: 21,0 lbs /9,5 kg/

6.5. Useful load

Max. useful load is understood as a difference between the all up mass of the glider 1190.5 lbs /540 kg/ and its real empty mass.

Maximum pilot+parachute mass 242,5 lbs /110 kg/

Minimum pilot+parachute mass 121,25 lbs / 55 kg/

6.6. C.g. locations envelope

Before the flying and before the every change of load condition the in-flight c.g. location

should be checked.

The procedures are:

1. On the vertical axis of diagram on page 6.10 find the glider mass value calculated from the formula:

$$m = m_{st} + m_1 + m_2 + m_w$$

where:

m_{st} - mass of empty glider with basic equipment /see page 6.3 /.

m_1, m_2 - mass of front and rear pilots /with parachute or back cushion /

m_w - sum of the masses of additional equipment and balancing weights installed /see page 6.11 /

2. On the horizontal axis of the diagram on page 6.10 find the moment value calculated from the formula:

$$M = M_{st} + M_1 + M_2 + M_w$$

where:

M_{st} - empty glider moment /see table page 6.3/



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M_1, M_2 - moments of front and rear pilots
/with parachute or back cushion /

M_w - sum of the moments of additional
equipment and balancing weights
installed /see page 6.11 /.

NOTE: In the moment sum pay attention to the
moment sign /positive or negative/ of
every particular moment.

3. From the points found in item 1 and 2 draw
in the lines perpendicular to the axes of
diagram and find the intersection point.
If this point is located inside the dashed
area the glider c.g. is in the correct
location. In other case the balance should
be corrected with the weights and repeat
the checking procedures.

Example:

The checking of correct c.g. location

1. Empty glider data: /real data, as the
example, see page 6.3. /.

$$m_{st} = 760 \text{ lbs} / 345 \text{ kg/}$$

$$M_{st} = 1388,7 \text{ lbft} / 192 \text{ kgm/}$$

2. Crew /see page 6.8. and 6.9. /.



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- front seat $m_1 = 154,0 \text{ lbs} / 70 \text{ kg/}$
 $M_1 = -549,7 \text{ lbft} / -76 \text{ kgm/}$

- rear seat $m_2 = 176,0 \text{ lbs} / 80 \text{ kg/}$
 $M_2 = -72,3 \text{ lbft} / -10 \text{ kgm/}$

3. Additional equipment /see page 6.11 /.

WES-5 variometer: $2,86 \text{ lbs} / 1,3 \text{ kg/} -14,4 \text{ lbft}$
 $/ -2 \text{ kgm/}$

RS-6101 transceiver: $7,9 \text{ lbs} / 3,6 \text{ kg/} +21,7 \text{ lbft}$
 $/ + 3 \text{ kgm/}$

$$m_w = 10,76 \text{ lbs} / 4,9 \text{ kg/}; M_w = +7,3 \text{ lbft}$$

$$/ + 1 \text{ kgm/}$$

4. Glider mass in flight.

$$m = 760 + 154 + 176 + 10,76 = 1100,76 \text{ lbs}$$

$$/ m = 345 + 70 + 80 + 4,9 = 499,9 \text{ kg/}$$

5. Moment in flight.

$$M = 1388,7 - 549,7 - 72,3 + 7,3 = 774 \text{ lbft}$$

$$/ M = 192 - 76 - 10 + 1 / = 107 \text{ kgm/}$$



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The lines perpendicular to the diagram axes drawn through the points of $m = 1100,76$ lbs /499,9 kg/ and $M = 774$ lbft /107 kgm/ intersects in point "P" which is contained in the dashed area. So the c.g. location is correct.

Moment of front seat pilot's mass in respect to the root rib leading edge M_1 /lbft/; / M_1 / /kgm/							
19,8 /9/	-455,7 /-63/	-549,7 /-76/	-622 /-86/	-716 /-99/	-788,4 /-109/	-875 /-121/	-
17,6 /8/	-448,5 /-62/	-542,5 /-75/	-614,8 /-85/	-708,8 /-98/	-781 /-108/	-869 /-120/	-
15,4 /7/	-441 /-61/	-535 /-74/	-607,6 /-84/	-694 /-96/	-774 /-107/	-860,7 /-119/	-
13,2 /6/	-431,0 /-60/	-528 /-73/	-593 /-82/	-687 /-95/	-766,7 /-106/	-853,5 /-118/	-
11,0 /5/	-426,7 /-59/	-520,7 /-72/	-585,8 /-81/	-680 /-94/	-752 /-104/	-846,2 /-117/	-
8,8 /4/	-	-513,5 /-71/	-578,6 /-80/	-672,7 /-93/	-745 /-103/	-831,8 /-115/	-
6,6 /3/	-	-506,3 /-70/	-571,4 /-79/	-669,4 /-92/	-737,7 /-102/	-825,0 /-114/	-
4,4 /2/	-	-499 /-69/	-564 /-78/	-658 /-91/	-730,5 /-101/	-817,3 /-113/	-
2,2 /1/	-	-491,8 /-68/	-556,9 /-77/	-651 /-90/	-723,3 /-100/	-810 /-112/	-
0 /0/	-	-477,4 /-66/	-549,7 /-76/	-614,8 /-89/	-716 /-99/	-802,8 /-111/	-882,4 /-122/
m_1 /lbs / m_1 / /kg/	110,2 /50/	133,2 /60/	154,3 /70/	176,4 /80/	193,4 /90/	220,4 /100/	242,5 /110/

m_1 - mass of pilot and parachute or back cushion.



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Moment of rear seat pilot's mass in respect to the root rib leading edge M_2 /lbft/; / M_2 / /kgm/							
19,8 /9/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-79,5 /-11/	-79,5 /-11/	-72,3 /-10/	-
17,6 /8/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-79,5 /-11/	-79,5 /-11/	-72,3 /-10/	-
15,4 /7/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-72,3 /-10/	-79,5 /-11/	-72,3 /-10/	-
13,2 /6/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-72,3 /-10/	-79,5 /-11/	-72,3 /-10/	-
11,0 /5/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-
8,8 /4/	-	-50,6 /-7/	-72,3 /-10/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-
6,6 /3/	-	-50,6 /-7/	-65 /-9/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-
4,4 /2/	-	-50,6 /-7/	-65 /-9/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-
2,2 /1/	-	-43,4 /-6/	-65 /-9/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-
/0/	-	-43,4 /-6/	-65 /-9/	-72,3 /-10/	-72,3 /-10/	-65 /-9/	-72,3 /-10/
m_2 /lbs / m_2 / /kg/	110,2 /50/	133,2 /60/	154,3 /70/	176,4 /80/	193,4 /90/	220,4 /100/	242,5 /110/

m_2 - mass of pilot and parachute or back cushion.

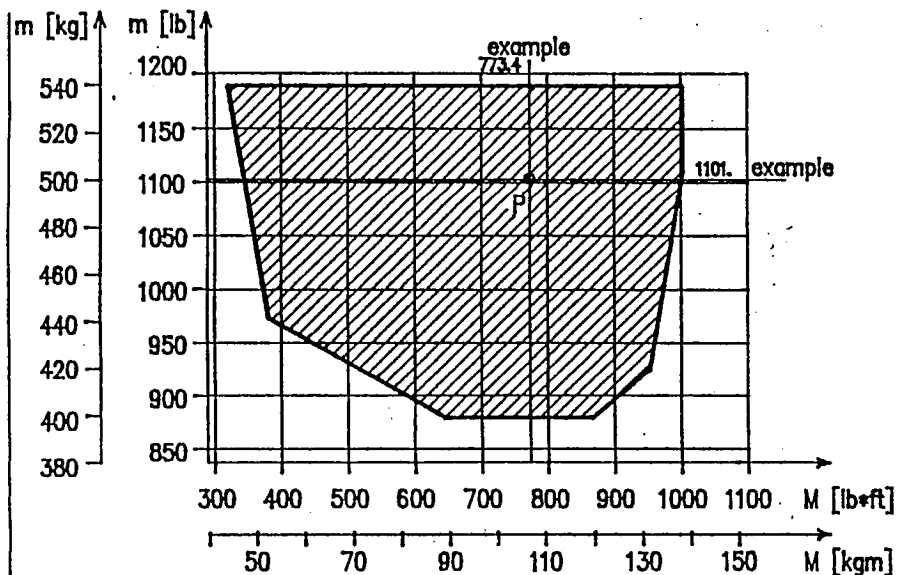


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Graphical checking of in-flight c.g.location

6.7. Equipment list

The items marked with X are contained in the basic empty glider mass as given in chapter 6.2.

The items marked with O are not contained in the basic empty glider mass but can be delivered together with the glider.



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Manu- factory	Optio- nal	Name	Type	Mass lbs /kg/	Arm ft /m/	Moment lbft /kgm/	Date of Inst.	Appro- ved
X		Instrument panel in the front cockpit equipped with:	AB.71.100.00.02					
	O	- assigned indi-	PR-250S					
	O	- altimeter	R-128, PM-12-PK					
	O	- engine	RS-1					
	O	- variometer	PH-01, NR-5D					
	O	- computer	KWEC-2					
	O	- compensation	PM-420C					
	O	- bottle-slip indi-	PH-01					
	O	- crotor of turn	EZS-3, EZS-4					
	O	- indicator with						
	O	- the slide-slip						
	O	- indicator						
	O	- Electrical vario-	WES-5					
	O	- meter	AB.71.200.00.00					
	O	- Instrument panel						
	O	- in the rear						
	O	- cockpit equipped						
	O	- with:						
	O	- airspeed indica-						
	O	- tor	PR-250S					
	O	- altimeter	R-128, PM-12-PK					
	O	- transceiver	RS-6101-1					
	O	- Front towing hook	SZD-III A-56					
	O	- Rear towing hook	SZD-III B-85					
	O	- Safety belts/front	SZD-III A-56					
	O	- and rear-seat/	SZD-III A-56					
	O	- Front seat cushion	SZD-III A-56					
	O	- Rear seat cushion	SZD-III A-56					
	O	- First aid kit /non	SZD-III A-56					
	O	- equipped/	SZD-III A-56					
	O	- Front ballast	AB.82.200/300.00.01					
	O	- weight	AB.82.100.00.01					
	O	- Rear ballast	AB.82.100.00.01					



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Section 7

7. Glider and systems description	7.2
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7.7. Luggage compartment	7.5
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7.10. Miscellaneous equipment	7.8
© 7.10.1. Front balancing weights	7.8



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7. Glider and systems description7.1. Introduction

This Section provides the information on the glider and operation of its systems.

7.2. Airframe

KR-03A glider is all metal cantilever design with midwing and T-tail arrangement. The seats are of tandem location.

WING: In two panels, rectangular with laminar Wortman's profile FX-S02/1-158.
Metal structure, main and auxiliary rear spars. Trailing portion fabric covered.

AILERON: Metal structure, two panels, fabric covered suspended on four hinges.

TAILPLANE: One piece stabilizer, metal structure fixed in three points on the fin.
Elevator of metal structure, two panels, fabric covered.

FIN and RUDDER: Fin integral with fuselage.
Rudder of metal structure, fabric covered.

FUSELAGE: All metal, two frames of central part the front one in the main spar plane, the rear one in the auxiliary spar plane.



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COCKPIT: Covered with one piece canopy hinged on right board on two hinges, in opened position is supported with cable, which during canopy closing is automatically pulled to the cockpit inside. The controls of both seats are coupled. The control operation is a conventional one.

Location of hand-grips:

Control	Location	Colour
Slider of air brake	left side	blue
② Hand-grip of wheel brake	left side	orange or black
Slider of trimming device	left side	green
Hand-grip of towing cable releasing	left side	yellow
Lock of canopy	left side	red
Emergency canopy jettison	right side	red sealed

The cockpit is air conditioned independently for each seat by means of the side windows in perspex. Moreover the front seat has the adjustable air-blow for the front region of perspex above the instrument panel controlled with the hand-grip /black ball/ in the instrument panel.



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Before the front seat the nests for balancing weights of total mass of 21 lbs /9,5 kg/ are provided.

7.3. Flight controls

All the flight controls in KR-03A glider are doubled.

Controlling with rudder

Cable control system. Adjustable front pedals, fixed rear pedals. Adjustable stops on front and rear pedals, fixed stops on the rudder.

Controlling with elevator

② Push-rod control system equipped with deflection stops. The conventional controlling by means of central control stick. The stops are supplied accordingly as fixed ones on the elevator and adjustable ones in the cockpit.

Controlling with aileron

Push-rod control system. The fixed stop in the wing and adjustable stops in the cockpit. The ailerons are non-symmetrically deflected.

Controlling with trimming device

KR-03A glider is equipped with spring trimming actuated by push-rod system. Controlled at front and rear seat. The stop is located only at front seat.

7.4. Airbrake system

The airbrake employs the single plates



extended on upper and lower wing surface, equipped with spring loaded metal caps. The combined push-rod and cable control system. The retracted position is locked by means of "dead point".

7.5. Landing gear system

One wheel, one trace landing gear. Main wheel of \varnothing 350 x 135 mm size with disc brake. Oleo-pneumatic shock absorber. Rear skid with rubber disc. Front skid of wooden-composite structure secured with metal sheet on the bottom with rubber disc as the shock absorber.

① Nose and tail part of the fuselage can be equipped with wheels instead of skids.

7.6. Seats and safety harness

Fixed front seat and in ground adjustable rear seat /four locations/. The seats are provided for parachute or back cushion which size, thickness and compressibility are similar to those of parachute. Both seats are equipped with four part safety harness /two back and two abdomen belts/.

7.7. Luggage compartment

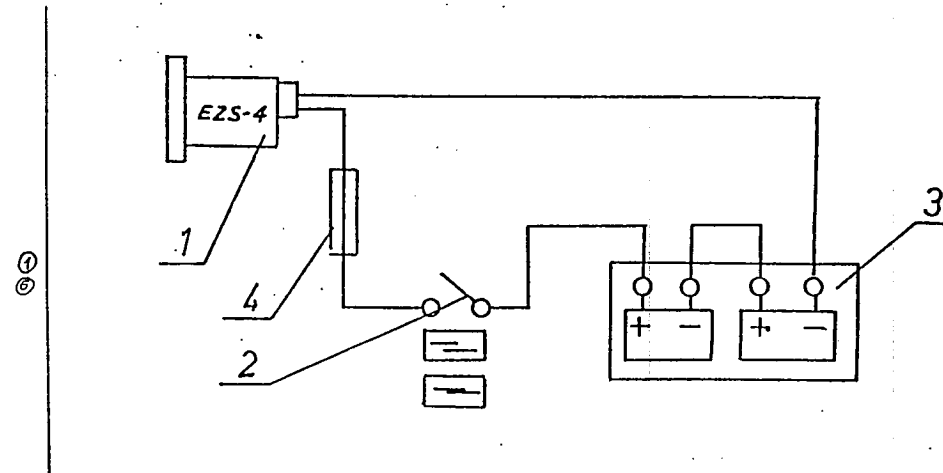
Luggage compartment is located behind the rear seat in the fuselage central part. It is provided for carrying the pilot's dress. Optionally it is possible to install the transceiver in the luggage compartment.



7.8. Electrical system

- ① The electrical system concerns the EZS-4 turn indicator installation. The correct battery polarity must be observed obligatory. In other case the indications will be error.

Scheme of turn indicator installation:



- ① 1. EZS-4 turn indicator
 2. Switch on the instrument panel
 ① 3. Battery nest-it employs two batteries of 4.5 V
 ② 4. Fuse of 80 mA

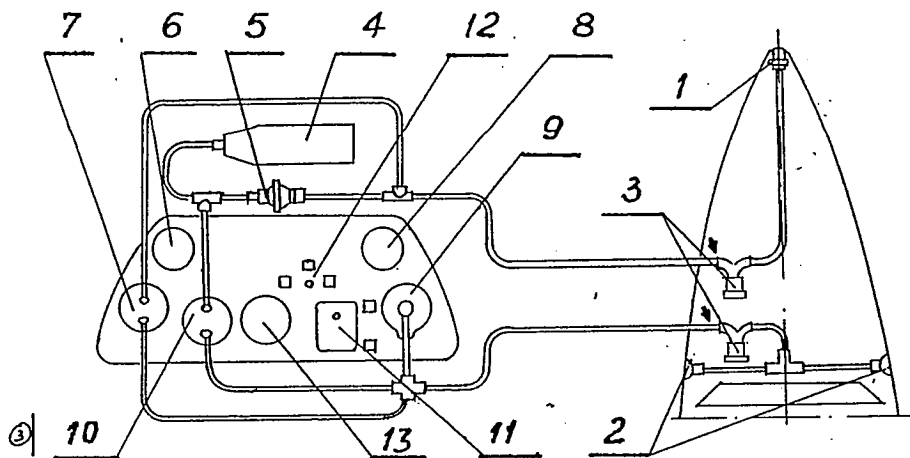


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7.9. Pitot and static system

Pitot and static system of KR-03A glider with basic equipment is shown below.



Board instruments installation:

- 1 - total pressure head
- 2 - static pressure head
- 3 - drainage unit
- 4 - compensation bottle
- 5 - compensator
- 6 - turn indicator
- 7 - airspeed indicator
- 8 - compass
- 9 - altimeter
- 10 - variometer
- 11 - nest for turn indicator batteries
- 12 - turn indicator switch
- 13 - free place for an instrument



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NOTE: Arrows show the ends of drainage unit 3 which should be disconnected to drain the condensate.

7.10. Miscellaneous equipment⑥ 7.10.1. Front balancing weights

To balance the glider crew according the table of permissible loads in chapter 2.12, KR-03A glider is equipped with two balancing loads of total mass of 21 lbs /9,5 kg/.

To install the weights screw in till to stop the screws on the weight screw into the nest on the floor under the front seat. Screw in with hand force. Do not use the tools. The weights are not changeable one with other.

7.10.2. Rear ballast

For flights aiming demonstration of the multiturn spin at the crew mass in excess of 320 lbs/145 kg the rear ballast of 11 lbs/5 kg/ is to be additionally fixed the glider's tail.

- ⑥ The rear ballast is to be placed on the left tail handle for lifting/used for handling a glider/ and then fastened by means of a bolt that is to be screwed home handly.

NOTE:

The rear ballast is to be used exclusively to demonstrate multiturn spin in case the crew mass is in excess of 320 lbs/145 kg/.



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Section 8

8. Glider handling, care and maintenance	8.2
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8.4.2. Road transportation	8.3
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8.5.3. Maintenance	8.5

8. Glider handling, care and maintenance8.1. Introduction

This Section contains manufacturer's recommended procedures for proper ground handling and servicing of the glider. It also identifies certain inspection and maintenance requirements which must be followed if the glider is to retain the 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 periods

Range of procedures to be performed immediately before take-off is given in chapter of this Manual. The time schedule for inspection of KR-03A glider and the procedure range for particular inspections are given in chapter 4 of Maintenance Manual.

8.3. Glider repairs

The range and way of performing the repairs allowed to be done by the user himself are listed in Repair Manual for KR-03A glider. The list of materials for repairs is enclosed herein.

8.4. Ground handling



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8.4.1. Airfield transportation

During the airfield transportation the canopy should be closed and the window opened. The air brake may be extended or retracted. The glider /with or without the crew/ may be transported using the front hook to allow for free turning. The transportation cable length should be at least 13 ft /4 m/. The glider can be also rolled on the wheel forwards or backwards.

8.4.2. Road transportation

The glider can be transported on the universal trailer. The information on preparing the glider for transportation and location on the trailer is given in chapter 3.13.2 of Maintenance Manual.

8.5. Cleaning and care

8.5.1. Procedures after flights

After the flight it is necessary to:

- switch off the turn-indicator and replace, if necessary, the exhausted batteries,
- drain theboard instruments air system, if necessary,
- perform the glider inspection same as before the flights and remove the eventual faults.

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8.5.2. Cleaning

Plug all openings and pay the special attention to the static pressure holes before the start of cleaning procedure. Clean with water, add 3 to 5 percent of detergenting agent. The use of cleaning powders is prohibited. To remove the dust or bugs on the leading edges the neutral soap should be used applied with a sponge. Then rinse with clear water carefully to remove all the soap.

Cleaning of cockpit and perspex

The cockpit and perspex when cleaned with usual means are exposed for scratches which result in degradation of transparency and accelerate the wear. Therefore pay the special attention.

Use only clear water or cleaning agents applied for perspex, rags of very clean flannel and sponge. Be sure that no sand or dust particles are present on the sponge or flannel.

Cleaning of cockpit inside

Seats, pillows and floor should be cleaned with a vacuum cleaner and washed using water with soap. The pillows can be cleaned with commonly applicable means for cleaning.

Cleaning of corrosion

In any place where the corrosion occurs in form of spots or affected surface the following means

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of careful should be applied:

1. Clean thoroughly the corrosion affected surface using the brush, sand paper of 600 grade and kerosine.
2. Using the vacuum cleaner remove all dust or oxidations created when cleaning. Dry the corrosion affected area.
3. Apply the layer of padding epoxy film.

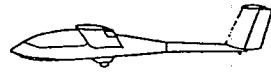
8.5.3. Maintenance

Maintenance procedures should be performed acc.to chapter 3.8 of Maintenance Manual.



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Section 9

Supplements



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KR-03A "PUCHATEK" GLIDER FLIGHT MANUAL

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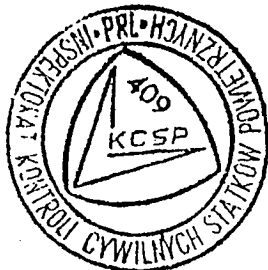
Registration:

Document No: IU-AB-71.00

Ref: Instalation of additional instrument panel in the rear cabin.

Date of issue: March 1991

Approved by: GILC-IKCSP





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0.1. Record of revisions

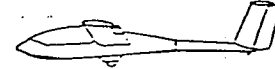
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Affected Section	
Rev. No.	



Instrument panel in the rear cabin is installed on the glider as an optional equipment. It is fastened on the front seat's back.

The panel contains two essential instruments:

1. Airspeed indicator PR-250S
2. Altimeter W-12S

Scheme of the pneumatic system with instrument panels in the front and rear cabin is shown on Fig.1.

NOTE:

Assembling and disassembling of instrument panel introduces the change in glider C.G. location. These changes should be taken into account acc. to the FLIGHT MANUAL directions /section 6.6/

The instrument panel at the rear cabin mass and moment amounts:

mass - 4.0 lb /1,8 kg/

arm - -2,6 ft /-0,8 m/

moment - -10,4 lb x ft /-1,44 kgm/

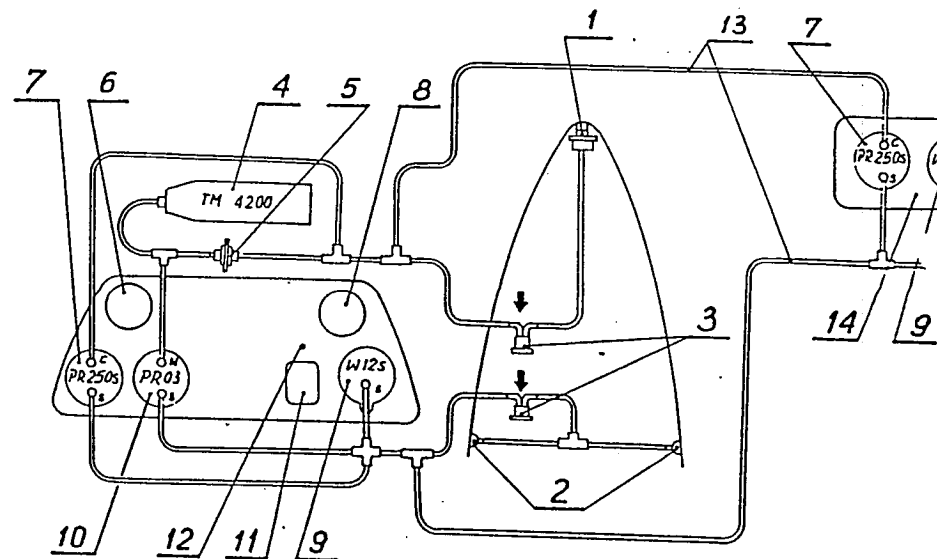


Fig.1. Scheme of pneumatic system

1. Total pressure head
2. Static pressure head
3. Drainage unit
4. Compensation bottle
5. Compensator
6. Slip and turn indicator
7. Airspeed indicator
8. Compass
9. Altimeter
10. Variometer
11. Nest for turn indicator batteries
12. Switch of slip and turn indicator
13. Pneumatic hose
14. Additional instrument panel in the rear cabin

NOTE: Arrows show the ends of drainage unit 3 which should be disconnected to drain the condensate.



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FLIGHT MANUAL of KR-03A "PUCHATEK" glider

Serial No:.....

Registration:

Document No: IU-AB-73.02

Ref: Installation of transceiver RS 6101-1

Date of Issue: November 1990
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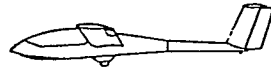
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Rev. No.	Affected Section	Affected Pages	Date	Appr.	Date	Date Inserted	Signature

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CONTENTS

1. TRANSCEIVER
2. OPERATION OF THE TRANSCEIVER
3. SCHEME OF INSTALLATION OF RS 6101-1
ON THE GLIDER



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1. TRANSCEIVER

The transceiver unit consists of the following elements:

1. Transceiving block
2. Battery charger
3. Manipulator
4. Loudspeaker
5. Multiway connector
6. Aerial
7. Dynamic microphone
8. Transmitting and receiving switches

The displacement on the KR-03A glider is shown on Fig.1.

2. OPERATION OF THE TRANSCEIVER

The transceiver operation results from the Technical Manual of RS 6101-1 transceiver description.

Acc. to item 2 of the above Manual the transceiver operation is the following:

1. Switch on the transceiver pressing the red key "ON" on the manipulator. When the voltage indicator moves back into the left field area, when transmitting, shows the bad condition of the charging battery.
2. Select the frequency pressing the proper channel key.
3. When the transceiver is efficient and the "SQ" key is not pressed it should be heard the noise.



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4. After pressing the transmission switch the correspondent can be called. The best distance to microphone is such, that it could be nearly touched with the lip.
5. When receiving the voice intensity can be adjusted by the regulator on the manipulator.
6. When the receiving of far range disappears when the "SQ" key is pressed, release the "SQ" key and try to continue the correspondence.
7. After landing switch off the transceiver releasing the "ON" key.

NOTE: The installation or removing of the transceiver elements /mainly the transceiver block and battery charger/ give the changes in the c.g. location. The above changes shall be taken into account following the directions of Flight Manual /section 6.7./.



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3. SCHEME O INSTALLATION OF RS 6101-1 ON THE GLIDER
Description of Fig.1
1. Transceiving block RS 6101-1
2. Charger 12/V/ 3/AH/ T18/6101-4000
3. Multiway connector T18/6101-7000
4. Foramplifier of microphone
5. Nest compl.
6. Manipulator T18/6101-2000-4
7. Loudspeaker T18/6101-6000
8. Dynamic microphone with the safety link plug
9. Transmitting and receiving switch of front seat
10. Transmitting receiving switch of rear seat
11. Bundle compl./loudspeaker switches N/O /
12. Bundle compl./charger-multiway connector/
13. Bar aeral T18/6101-5000
14. Passing connector UC1-GG-2
15. Plug UC:-W1/R5 /2 pieces/
16. Coaxial duct WL 50-0,96/2,95
17. By-pass
18. Housing of duct bundle
19. Screw fixing the the housing of duct bundle
20. Clamp of duct bundle
21. Clamp locking the aeral cable
22. Nut fixing the transmitting and receiving blo
23. Nut fixing the charging block



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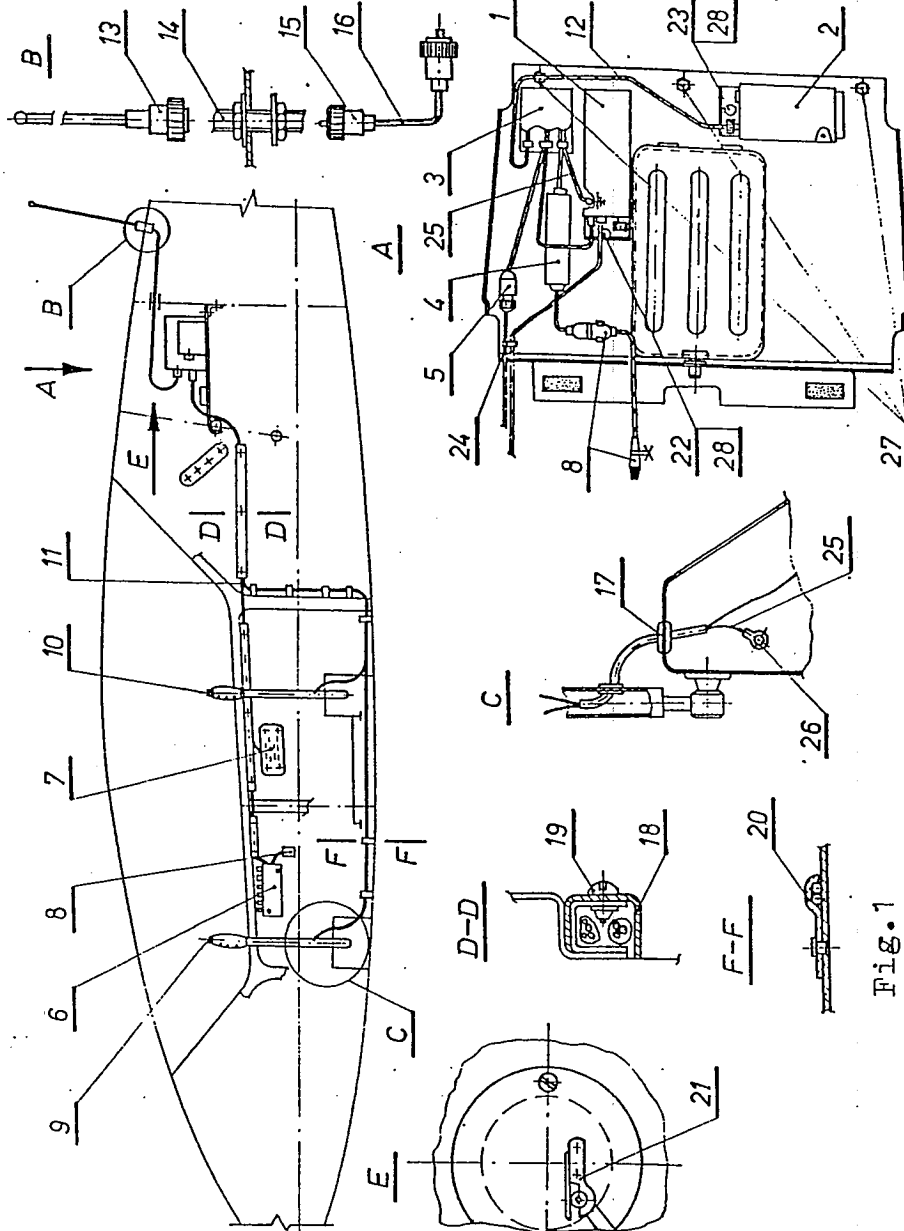
- 24. Clamp for the bundle of free ducts
- 25. Grounding wire /mass/ LYGL - 1,5
- 26. End M4-0-2,5
- 27. Screw fixing the luggage compartment base
- 28. Locking wire

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R.8

Fig. 1



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FLIGHT MANUAL of KR-03A "PUCHATEK" glider

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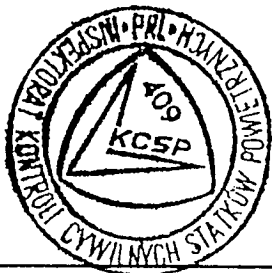
Registration:

Document No: IU-AB-74.02

Ref: Installation of glider electrical
variometer WES-5

Date of Issue: November 1990
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Approved by: GILC-IKCSP





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FLIGHT MANUAL



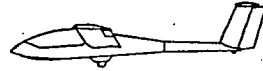
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1. TECHNICAL DESCRIPTION

1.1. Destination and technical data

The WES-5 variometer is designed for the measurement of the vertical speed of a glider and for the acoustic monitoring of these indications.

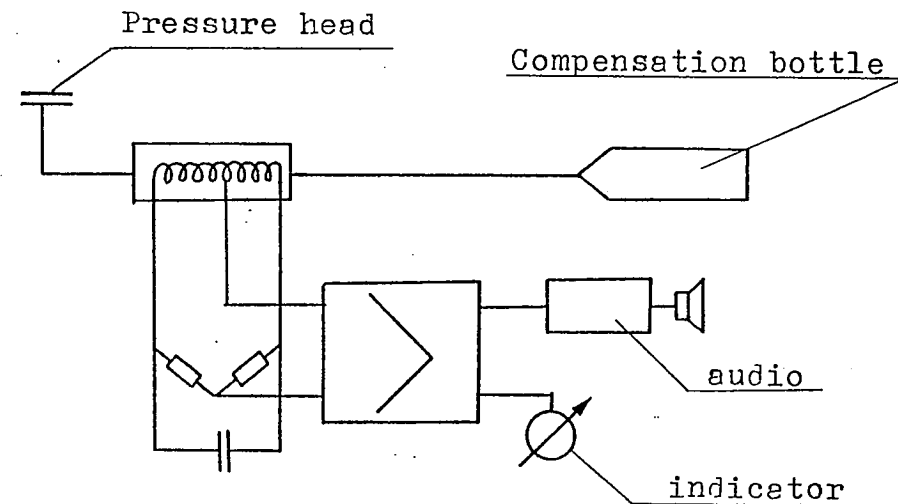
Basic technical data of WES-5

- range ± 5 m/s
- precision of indications at $+68^{\circ}\text{F}/20^{\circ}\text{C}$ / temperature 5 %
- overloading ± 30 m/s
- temperature range -4°F to $+131^{\circ}\text{F}$ / -20°C to $+55^{\circ}\text{C}$ /
- charging voltage /const/ 12 V $\pm 10\%$
- current flow max 150 mA
- mass /without the bottle and assembling parts/ max 1,76 lbs/0,8 kg/

1.2. Description of design and operation

The base of instrument operation uses the measurement of air static pressure variations versus the altitude.

Block scheme of WES-5 variometer



The basic element is the sounder, which connected into the bridge circuit converts the variations of flow intensity of the air into the proportional variations of the resistance. The voltage signal from the bridge diagonal after amplification controls the monitor of electromagnetic register calibrated in m/s. The signal of the amplifier is given into the audio block where it readjusts the frequencies of acoustic generators. The loudspeaker connected to the block output produces the sound of the frequency changing together with the vertical speed of the glider. When the glider climbs on the background of constant sound appears the broken sound with the frequency



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increasing in line with the glider vertical speed.

The variometer collaborates with the comparison bottle of TM-420C type and the compensator of total energy in the form of nozzle of aerodynamic factor $K = -1$.

The comparison bottle is connected to the end marked as "FLASK" and the compensator to the end marked as "K = -1". The comparison bottle and compensator are joined by means of ducts of artificial plastics having the inner diameter of 0,2 in/5 mm/.

It is necessary to use in the pneumatic system the drainage unit since the penetration of water into the sounder damages it.

On the instrument glass the turning knob for regulation of sound intensity is installed.

It is coupled with the switch off and two-position switch of the time constant.

The variometer is equipped with the moveable ring on which the scale for optimum interthermal speeds can be printed.

The scheme of installation of WES-5 on KR-03A "PUCHATEK" glider is shown on Fig.1.

2. TECHNICAL SERVICE

The service of glider electrical variometer should be serviced acc. to the directions of "Technical Description and Technical Service Manual of WES-5".

Chapter 3 of above mentioned Manual describes the particular procedures of checking and servicing the WES-5.

2.1. Checking of the correct operation



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Acc. to item 3.3 of the above mentioned Manual it is necessary to:

- check /by eye/ the correct installation on the instrument panel,
- switch on the charging /the turning knob of the sound intensity adjustment/
- wait 5 min till the sounder gets heat
- plugging the air intake slot in the $K = -1$ nozzle, adjust the zero position of the instrument using the turning knob on the rear wall of the instrument

2.2. Checking of conformity of instrument zero with the acoustic zero

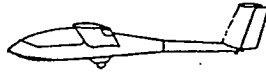
By turning the knob for zero adjusting which is on the rear instrument wall find at which hint position the broken signal appears. The misaccord of acoustic zero and instrument zero should not exceed $\pm 0,08$ in / ± 2 mm/ measured on the instrument dial length.

NOTE: Assembling and disassembling of WES-5 /instrument and bottle/ introduces the change in glider c.g. location. These changes should be taken into account acc. to the FLIGHT MANUAL directions /section 6.7 /.



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3. SCHEME OF INSTALLATION OF WES-5 ON THE
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Description to Fig.1

Item	Name	No of
1	Compensation bottle TM-420C	1
2	Electrical variometer WES-5	1
3	Electro-charging wire	
4	Housing of electric wires	
5	Draing unit	1
6	Multiway connector	1
7	Storage battery	1
8	Pneumatic duct	
9	Pressure head /nozzle K = - 1/	1

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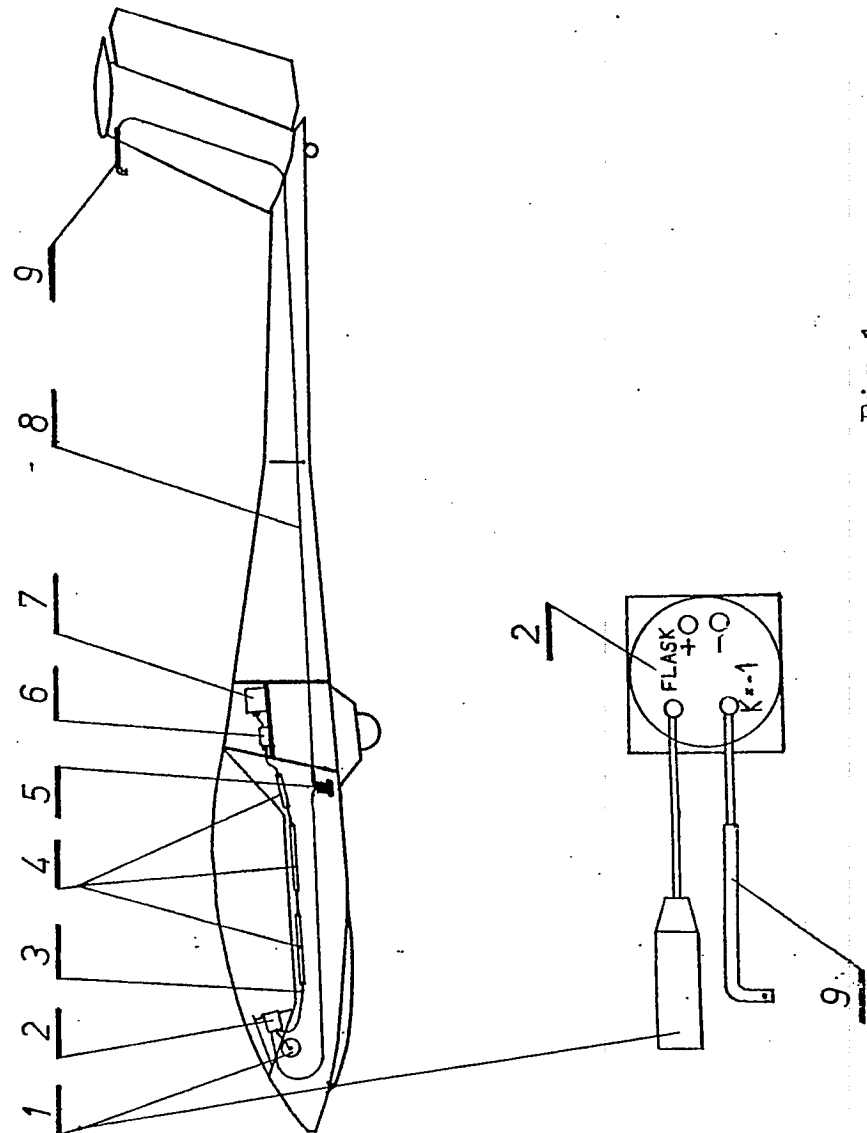


Fig.1

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