



KR-03A

FLIGHT MANUAL



KR-03A "PUCHATEK" GLIDER

FLIGHT MANUAL

Model: KR-03A

Serial No: *KR.04-14.KP*

Registration:

Document No: IU-AB-00.02

Date of Issue: November 1990

Pages identified by "Appr." are approved by:

Signature: *[Handwritten Signature]*
SPECIALISTA KOSP

Authority: *mgr inż. Jerzy Lucja*
GENERAL INSPECTORATE OF
CIVIL AVIATION-CIVIL AIRCRAFT INSPECTION
BOARD /GILC-IKCSP/

Stamp:



Original date of approval:

1990-11-28

This sailplane is to be operated
in compliance with information
and limitations contained herein.



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.



Rev. No.	Affected Section	Affected Pages	Date	Appr.	Date	Date Inserted	Signature	
①	7.8	7.6	1990-03-05	[Signature]	1991-03-08	1991-03-08	[Signature]	
	0.2	0.4 (c)	B2-10/KR-03A/91		[Signature]	1991-07-17		1991-07-17
	0.2	1.2 (c)						
	1.2	2.6						
	2.7	2.8						
	2.10	2.8, 2.9						
	2.11	2.10, 2.11, 2.12,						
	2.12	2.13						
	4.4.3	4.5						
	4.5.2	4.9						
4.5.3	4.9							
②	5.2.2	5.3	1991-07-15	[Signature]	1991-11-15	1991-11-15	[Signature]	
	0.2	0.4 (c)						
	2.5	2.6						
	2.9	2.7						
	2.11	2.9						
	2.42	2.41						
	3.8	3.5						
	5.2.2	5.4						
	5.3.1	5.4						
	6.2	6.3						
6.5	6.4							
6.6	6.10							
6.7	6.11							
7.2	7.3							
7.9	7.7							
③	0.2	0.4, 0.5, 0.6	1991-11-12	[Signature]	1991-11-15	1991-11-15	[Signature]	
	2.11	2.8 (AUS, NZ), 2.9 (AUS, NZ)						
	2.12	2.10 (AUS, NZ)						
	3.4	3.3 (AUS, NZ), 3.4 (AUS, NZ)						
	3.5	3.4 (AUS, NZ)						
	3.6	3.5 (AUS, NZ)						
	4.5.3	4.5 (AUS, NZ)						
	4.5.8	4.12 (AUS, NZ)						
	7.9	7.7 (AUS, NZ)						
	④	0.2	0.4, 0.5, 0.6					1991-11-12
2.11		2.8 (AUS, NZ), 2.9 (AUS, NZ)						
2.12		2.10 (AUS, NZ)						
3.4		3.3 (AUS, NZ), 3.4 (AUS, NZ)						
3.5		3.4 (AUS, NZ)						
3.6		3.5 (AUS, NZ)						
4.5.3		4.5 (AUS, NZ)						
4.5.8		4.12 (AUS, NZ)						
7.9		7.7 (AUS, NZ)						



KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL



Rev. No.	⑤
Affected Section	1.2 1.4 2.3 2.5 2.12 (2) 2.12 (3)
Affected Pages	1.2 1.3 2.4 2.6 2.10 (AUS, NZ) 2.11
Date	1992-02-20 02-23/KR-03A/92
Appr.	<i>[Signature]</i>
Date	1992-03-02
Date Inserted	1992-03-02
Signature	<i>P. Smith</i>

0.3

0.2. List of Effective Pages.

Section	Page	Date
0	0.1	} Nov., 90
	0.2	
	0.3	
	0.4	
	0.5	
	0.6	
	0.7	
1	1.1	} Nov., 90
	1.2	
	1.3	
	1.4	
	1.5	
	1.6	
	1.7	
2	1.2 /C/	June, 91
	2.1	} Nov., 90
	Appr. 2.2	
	Appr. 2.3	
	Appr. 2.4	
	Appr. 2.5	
	Appr. 2.6	
	Appr. 2.7	
	Appr. 2.8	
	Appr. 2.9	
	Appr. 2.10	
	Appr. 2.11	
	Appr. 2.12	
	Appr. 2.13	
Appr. 2.8/AUS, NZ/	Nov., 91	
Appr. 2.9/AUS, NZ/	Nov., 91	
Appr. 2.10/AUS, NZ/	Nov., 91	

② 1991-07-17
 ③ 1991-11-15
 ④ 1991-11-15

0.4

Section	Page	Date
3	3.1	Nov.,90
	Appr. 3.2	
	Appr. 3.3	
	Appr. 3.4	
	Appr. 3.5	
	Appr. 3.6	
	Appr. 3.3/AUS,NZ/	
Appr. 3.4/AUS,NZ/	Nov.,91	
Appr. 3.5/AUS,NZ/	Nov.,91	
4	4.1	Nov.,90
	Appr. 4.2	
	Appr. 4.3	
	Appr. 4.4	
	Appr. 4.5	
	Appr. 4.6	
	Appr. 4.7	
	Appr. 4.8	
	Appr. 4.9	
	Appr. 4.10	
	Appr. 4.11	
	Appr. 4.12	
Appr. 4.9/AUS,NZ/	Nov.,91	
Appr. 4.12/AUS,NZ/	Nov.,91	
5	5.1	Nov.,90
	Appr. 5.2	
	Appr. 5.3	
	Appr. 5.4	
	Appr. 5.5	

Section	Page	Date
6	6.1	Nov.,90
	6.2	
	6.3	
	6.4	
	6.5	
	6.6	
	6.7	
	6.8	
	6.9	
	6.10	
	6.11	
7	7.1	Nov.,90
	7.2	
	7.3	
	7.4	
	7.5	
	7.6	
	7.7	
	7.8	
7.7/AUS,NZ/	Nov.,91	
8	8.1	Nov.,90
	8.2	
	8.3	
	8.4	
	8.5	
9	9.1	Nov.,90



KR-03A

FLIGHT MANUAL



0.3. Table of Contents	Section
General /a non approved section/	1
Limitations /an approved section/	2
Emergency procedures /an approved section/	3
Normal procedures /an approved section/	4
Performance /a partly approved section/	5
Weight and balance /equipment list /a non approved section/	6
Sailplane and system description /a non approved section/	7
Sailplane handling, care and maintenance /a non approved section/	8
Supplements	9



KR-03A

FLIGHT MANUAL



Section 1

1. General	1.2
1.1. Introduction	1.2
1.2. Certification basis	1.2
1.3. Warnings, cautions and notes	1.2
1.4. Descriptive data	1.3
1.5. Three-view drawing	1.5
1.6. Information markings	1.6



1. General

1.1. 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

This type of sailplane /KR-03A/ has been approved by GILC-IKCSP in accordance with JAR-22 including Amendment 3 and the Type Certificate No: BG-153 has been issued on 19.12.1987 for Utility Category of Airworthiness.

The glider has also been approved for operation by:

⑤ FAA acc.to the Type Certificate No.G56EU issued on August 6, 1991

GFA acc.to the Type Certificate No.004 issued on January 13, 1992

1.3. Warnings, cautions and notes

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

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 30° 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 by the skids, or tail wheel.

⑤ It is possible to install an additional instrument panel in the rear cockpit.



KR-03A

FLIGHT MANUAL

General technical data

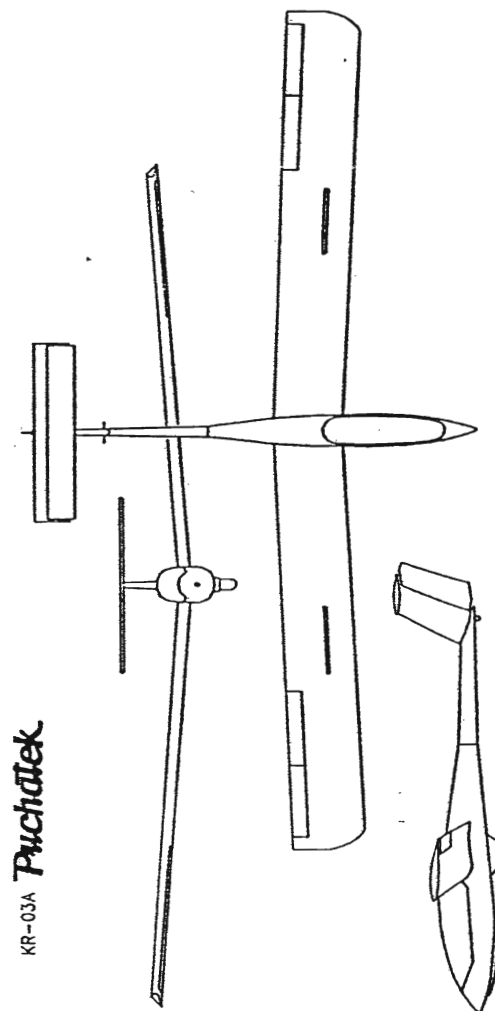
Span	53,80 ft	16,40 m
Length	28,30 ft	8,63 m
Height	5,40 ft	1,65 m
Wing area	209,20 sqft	19,44 m ²
Aspect ratio	13,90	13,90
Wing chord /constant/	3,90 ft	1,20 m
Maximum all-up mass	1190 lbs	540 kg
Maximum wing loading	5,69 $\frac{\text{lbs}}{\text{sqft}}$	27,80 $\frac{\text{kg}}{\text{m}^2}$
Dihedral 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	

1.4



KR-03A

FLIGHT MANUAL

1.5. Three-view drawing

KR-03A Puchdtek

1.5



KR-03A

FLIGHT MANUAL



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	EXT. RETR. 	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



KR-03A

FLIGHT MANUAL



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	 CLOTH 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



KR-03A

FLIGHT MANUAL



Section 2

2. Limitations	2.2
2.1. Introduction	2.2
2.2. Airspeeds	2.2
2.3. Airspeed indicator markings	2.4
2.4. Colour airspeed indicator markings	2.5
2.5. Weight	2.6
2.6. Centre of gravity	2.6
2.7. Approved manoeuvres	2.6
2.8. Manoeuvring load factors	2.7
2.9. Flight crew	2.7
2.10. Kinds of operation	2.8
2.11. Aerotow. winch and bungee-launching	2.8
2.12. Limitations placards	2.10



KR-03A

FLIGHT MANUAL

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.

Appr. 2.2



KR-03A

FLIGHT MANUAL



	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

Appr. 2.3



KR-03A

FLIGHT MANUAL

2.3. Airspeed indicator markings

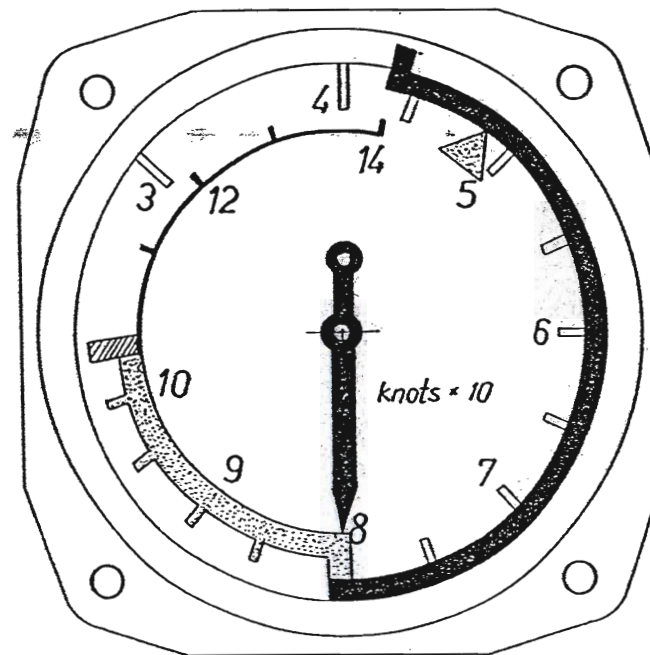
Airspeed indicator markings and their colour-code significance are below:




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



KR-03A

FLIGHT MANUAL

2.4. Colour airspeed indicator markings

-  - red
-  - yellow
-  - green

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/

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/

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

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 performing the above manoeuvres are contained in chapter 2.12.

771-07-17
191-14-15
12-03-02

Appr. 2.6

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 $V_{p.G./=73,4kts}$

- 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

- For the load mass in the glider above 220,5 lbs /100 kg/ the use of the front ballast

© 1991-14-15

Appr. 2.7





weights is prohibited.

10. Kinds of operation

KR-03A glider is intended for normal sailplaning 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 iceing conditions is prohibited. The performing of multi-turn spinning and the schooling in entry and recover of spinning are allowed.

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 31,2 + 164 ft / 40 + 50 m/. The minimum lengths 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:

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

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
② 2300 lbs ± 10 % / 1030 daN ± 10 % /.

Bungee - launching

The KR-03A glider is allowed the bungee - launching. To bungee-launch use the recognized 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. The hook is to be mounted for bungee-launching only/see.3.11 M.I./and it has to be removed in case of other kind of take-off. The releasing equipment of the glider is fixed to the lug of the rear skid.

- ① The take - off occurs at the airspeed of
- ② 31 + 36 kts / 58 + 65 km/h /.
- The ground run length amounts 26+115 ft/8+35 m/
- The airborning speed and ground run length, depends on the glider loading and wind velocity.
- ③ The bungee-launching with a dawnwind component is not recommended.



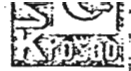
2.12. Limitation placards

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 MANŒUVRING 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. FLIGHTS WITHOUT PARACHUTES WITH BACK CUSHIONS ONLY



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)

③

③

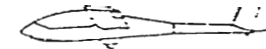
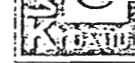
⑤

4. Placard of allowed aerobatic manoeuvres:

MANŒUVRE	ALLOWED AEROBATICS	
	ENTRY AIRSPEED IAS	
	kts (km/h)	
	LIGHT CREW	HEAVY CREW
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		

②

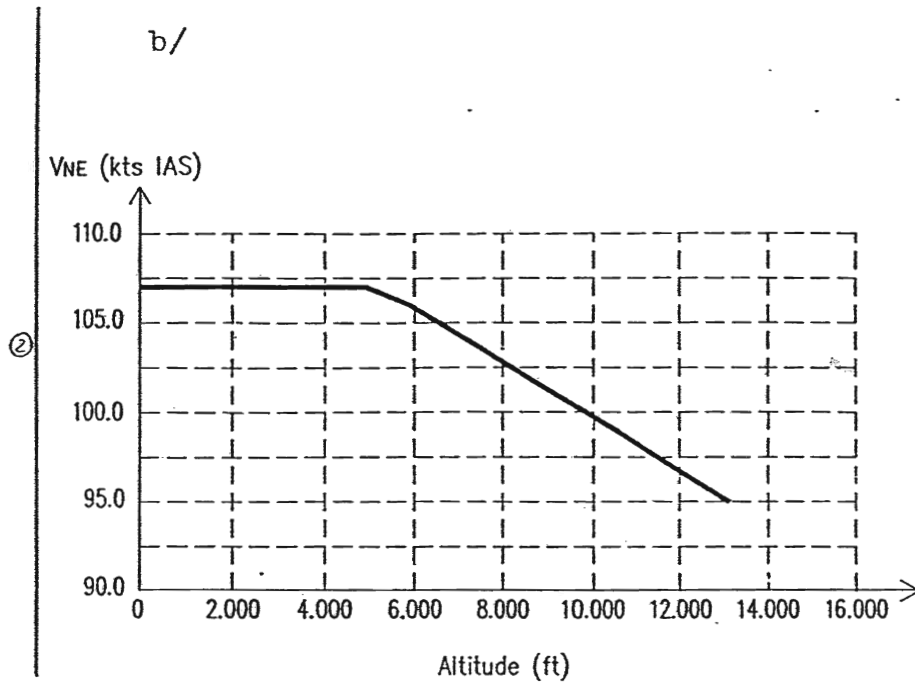
③



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

b/





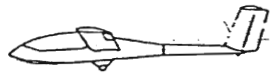
Section 3

3. Emergency procedures	3.2
3.1. Introduction	3.2
3.2. Canopy jettison	3.2
3.3. Bailing out	3.2
3.4. Stall recovery	3.3
3.5. Spin recovery	3.4
3.6. Spiral dive recovery	3.4
3.7. Side-slip recovery	3.5
3.8. Fire	3.5
3.9. Other emergencies	3.5
3.9.1. Breaking or unintended towing cable releasing at low altitude	3.5
3.9.2. Flight with an incorrect trimming	3.5
3.9.3. Danger of exceeding the maximum permissible airspeed	3.6



KR-03A

FLIGHT MANUAL

3. Emergency procedures3.1. 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:

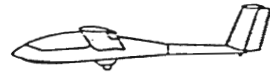
1. Jettison the canopy.
2. Release the safety harness.
3. Pull back the legs and bail out.

Appr. 3.2



KR-03A

FLIGHT MANUAL



- 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:

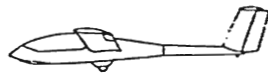
1/ Stall in straight flight with air brake retracted and extended

1. Resolutely push the stick forwards more than to neutral.
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

Appr. 3.3



1. Resolutely push the stick forwards more than to neutrum 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 neutrum 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:



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

Smoking in the cockpit is prohibited.

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.





KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL

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.

Appr. 4.2



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.

Appr. 4.3





KR-03A

FLIGHT MANUAL



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 inspection4.4.1. Adjustment of the rear seat

The rear seat in the loaded 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.

Appr. 4.4.



KR-03A

FLIGHT MANUAL

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/.

② 1791-07-17

Appr. 4.5.



KR-03A

FLIGHT MANUAL



4.5. Normal procedures and recommended speeds.

General 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 procedures

Aerotowing 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.

Appr. 4.6



KR-03A

FLIGHT MANUAL



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.

Appr. 4.7



KR-03A

FLIGHT MANUAL

Bungee - launching

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

1. Make the bungee cables spacing symmetrically 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:

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

4.5.2. Flight.Free 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.



KR-03A

FLIGHT MANUAL

Circling

The circling behaviours of KR-03A gliders are correct. The lateral controllability 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.

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

The approach of KR-03A is correct and safe. Basically 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 8 kts / 4m/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.



KR-03A

FLIGHT MANUAL

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 window on the left side should be opened. Location of the window ensures the correct controlling of the flying path.

4.5.7. Aerobatics

Apr. 4.10



KR-03A

FLIGHT MANUAL



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/.

Apr. 4.11





KR-03A

FLIGHT MANUAL



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.





KR-03A

FLIGHT MANUAL



Section 5

5. Performance.	5.2
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. Additional information.	5.4
5.3.1. Demonstrated crosswind performance.	5.4
5.3.2. Speed polar.	5.5



KR-03A

FLIGHT MANUAL

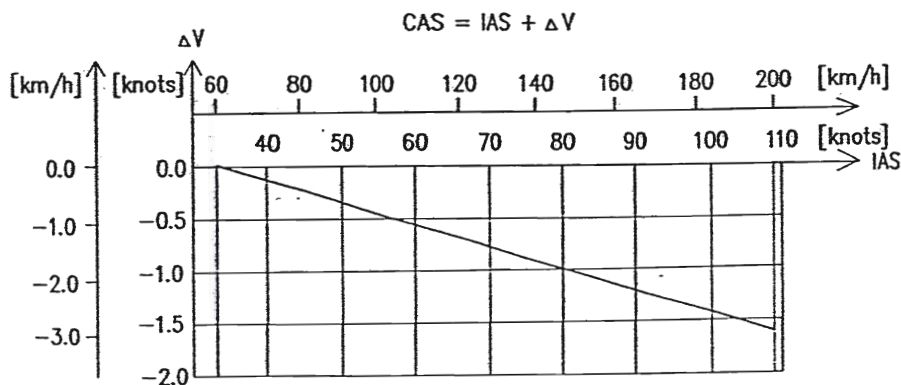
5. Performance5.1. Introduction

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 data5.2.1. Airspeed indicator system calibration

The aerodynamic correction diagram /averaged/



Appr. 5.2



KR-03A

FLIGHT MANUAL

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 airbrakes extended the stall speed depends on the glider mass and is greater by about 5 kts /10 km/h/ than the stall speed for smooth configuration. KR-03A glider warns the approach to stall speed by means of fuselage vibrations which appear 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 that due to the flow perturbation caused by the extended airbrakes the structure vibrations appear. These vibrations are separated from the vibrations which 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:

© 1991-07-17

Appr. 5.3



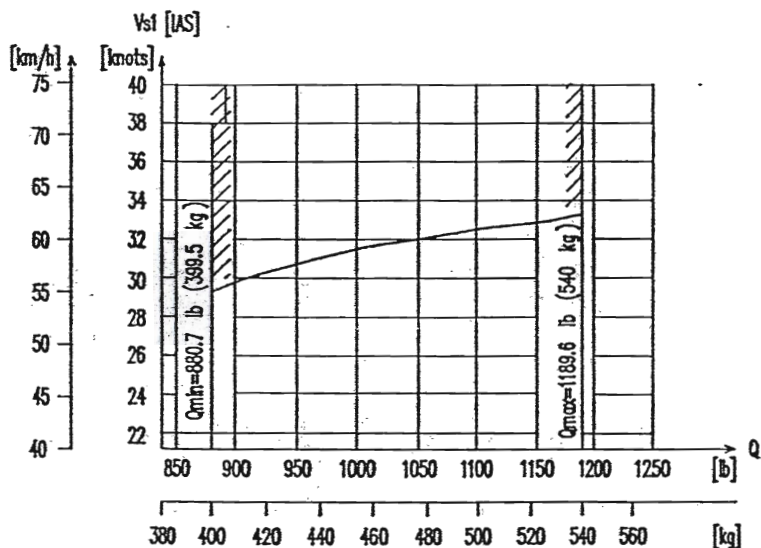
KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL



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 8 kts / 4 m/s / and the take-off in this

③ 1991-11-15

Appr. 5.4

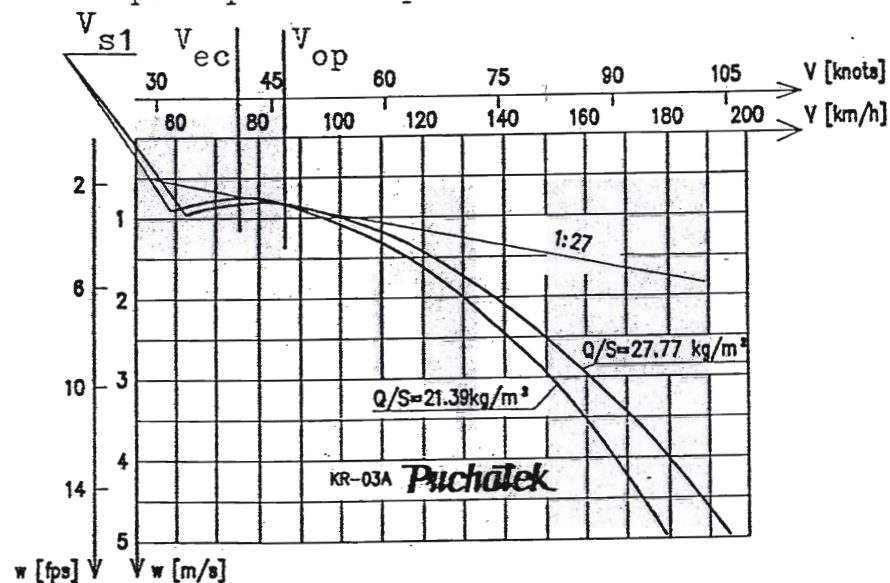


condition does not require the exceptional pilots skill.

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} .

Appr. 5.5





KR-03A

FLIGHT MANUAL



Section 6

6. Mass /weight/ and balance	6.2
6.1. Introduction	6.2
6.2. Empty glider mass and moment in the basic configuration	6.2
6.3. Mass of non-lifting parts	6.3
6.4. Glider mass	6.4
6.5. Useful load	6.4
6.6. C.g. locations envelope	6.4
6.7. Equipment list	6.10



KR-03A

FLIGHT MANUAL

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.

Serial No: 04-14 KP.....



KR-03A

FLIGHT MANUAL



Mass of empty glider with basic equipment m_{st} /lbs/ /kg/	348,9		
Location of c.g. of empty glider with basic equipment in respect to root rib leading edge b /ft/ /m/	0,545		
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/	190,1		
Maximum permissible load mass $m_{load} = 540 - m_{st}$ /lbs/ /kg/	191,1		
Date, signature and seal of the Inspection	31.07.2011		

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:



KR-03A

FLIGHT MANUAL



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



KR-03A

FLIGHT MANUAL



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/



KR-03A

FLIGHT MANUAL



- 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 /.

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

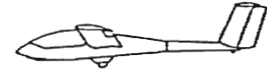
$$M_{st} = 1388,7 \text{ lbft } / 192 \text{ kgm/}$$

2. Crew /see page 6.8 and 6.9 /.



KR-03A

FLIGHT MANUAL



- 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:

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

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

$$1388,7 - 549,7 - 72,3 + 7,3 = 774$$



KR-03A

FLIGHT MANUAL



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



KR-03A

FLIGHT MANUAL



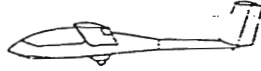
Moment of rear seat pilot's mass in respect to the root rib leading edge M_2 /lbft/; / M_2 / /kgm/							
19,8 /9/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-79,5 /-11/	-79,5 /-11/	-72,3 /-10/	-
17,6 /8/	-43,4 /-6/	-50,6 /-7/	-72,3 /-10/	-79,5 /-11/	-79,5 /-11/	-72,3 /-10/	-
15,4 /7/	-43,4 /-6/	-50,6 /-7/	-72,3 /-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

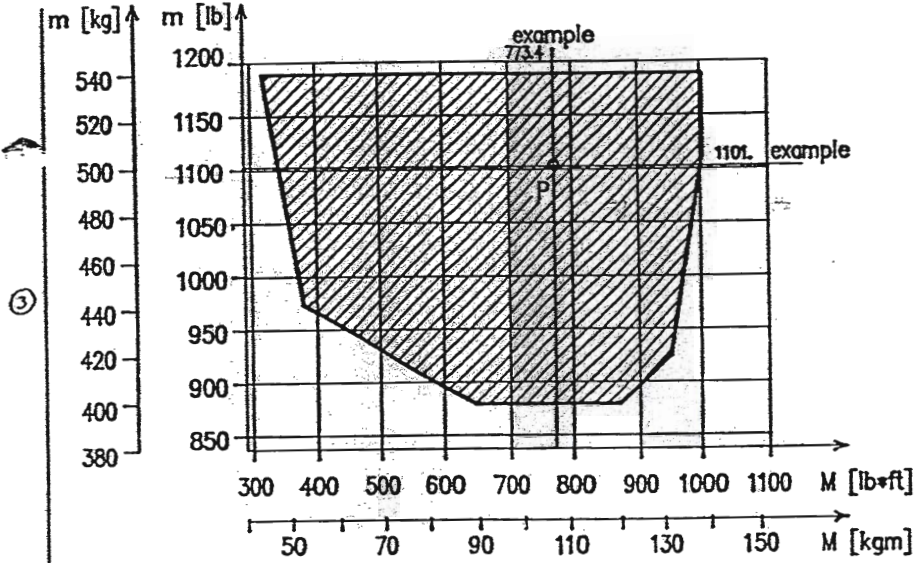


KR-03A

FLIGHT MANUAL



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.

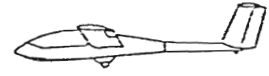
③ 1991-11-15

6.10



KR-03A

FLIGHT MANUAL



Mandatory	Optional	Part	No of part	Mass lbs/kg	Arm ft/m	Moment lbft/kgm	Date of inst.	Date of appr.
X		Instrument panel						
X		Equipped:						
X		Altitude indicator	PR-2503	0,9/0,4		-4,9/-0,7/		
X		Altimeter	W-12S,PW-12-PK	1,3/0,6		-7,3/-1,0/		
X		Variometer	PR-03,WRS-5D	0,5/0,24		-2,9/-0,4/		
X		Compensator	KWEC-2	0,2/0,1		-1,2/-0,2/		
X		Compensation bottle	TM-420C	0,8/0,36		-4,4/-0,6/		
X		Slip and turn indicator	EZS-3,4ZS-4	0,7/0,33		-4,0/-0,5/		
X		Compass	BS-1	0,44/0,2		-2,5/-0,3/		
O		Electric variometer	WEC-5	2,86/1,3		-16/-2,2/		
X		Front towing hook	TOST W-85	1,2/0,5		-3,6/-1,1/		
X		C.s. launching hook	TOST G-88	1,5/0,7		-3,0/-0,4/		
X		Safety belts, front seat	J5-0C-00	2,9/1,3		-3,6/-12,0/		
X		Safety belts, rear seat	J5-00-00	2,9/1,3		-0,3/-0,1/		
X		First aid kit / empty	CT.U1.00.00	0,66/0,3	2,6 / 0,8/	1,7/0,2/		
X		Front seat cushion	AB.72.010.00.01	2,2 / 1,0/	-3,0/-0,9/	-6,6/-0,9/		
X		Rear seat cushion	AB.72.009.00.01	2,6/1,2	-0,3/-0,1/	-0,8/-0,1/		
O		Front right balancing weight	AB.82.300.C0.01	10,5/4,75/	-4,0/-1,2/	-42 /-5,7/		
O		Front left balancing weight	AB.82.200.C0.01	10,5/4,75/	-4,0/-1,2/	-42 /-5,7/		
O		Front side pocket	AB.72.013.00.00	0,44/0,2	-4,6/-1,4/	-2,0/-0,3/		
O		Rear side pocket	AB.72.014.00.00	0,44/0,8/	-2,6/-0,8/	-1,2/-0,2/		
O		Transceiver	RS-6101-1	7,9 /3,6/	2,6 / 0,8/	20,5/2,9/		
O		Additional instrument panel	AB.71.200.00.00	4,0/1,8/	-2,6/0,8/	-10,4/-1,44/		

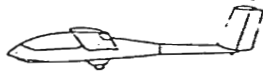
③ 1991-11-15

6.11



KR-03A

FLIGHT MANUAL



Section 7

7. Glider and systems description	7.2
7.1. Introduction	7.2
7.2. Airframe	7.2
7.3. Flight controls	7.3
7.4. Airbrake system	7.4
7.5. Landing gear system	7.5
7.6. Seats and safety harness	7.5
7.7. Luggage compartment	7.5
7.8. Electrical system	7.6
7.9. Pitot and static system	7.7
7.10. Miscellaneous equipment	7.8
7.10.1. Balancing weights	7.8



KR-03A

FLIGHT MANUAL

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.



KR-03A

FLIGHT MANUAL



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
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.



KR-03A

FLIGHT MANUAL



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

Push-rod control system equipped with deflection stops. The conventional controlling by means on central control stick.

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



KR-03A

FLIGHT MANUAL



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 ϕ 350 x 435 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.

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.



KR-03A

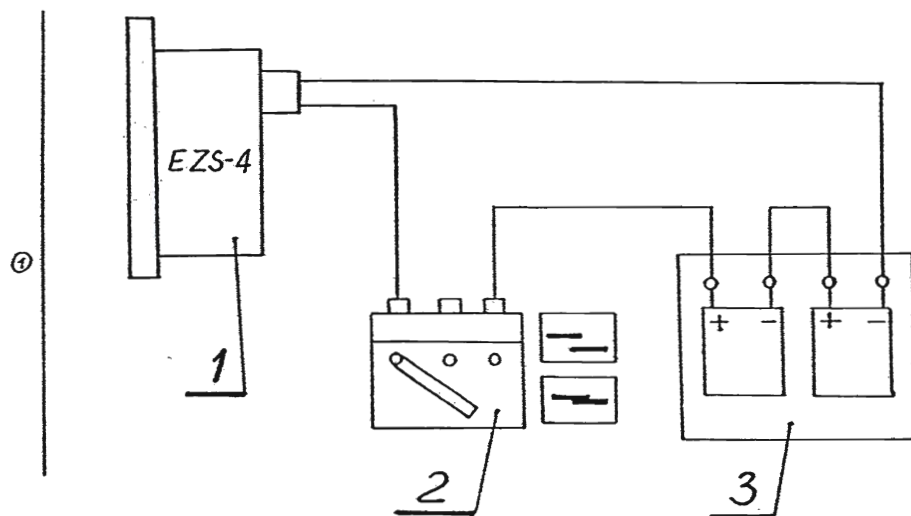
FLIGHT MANUAL



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. Nest for two 4,5 V batteries connected in series

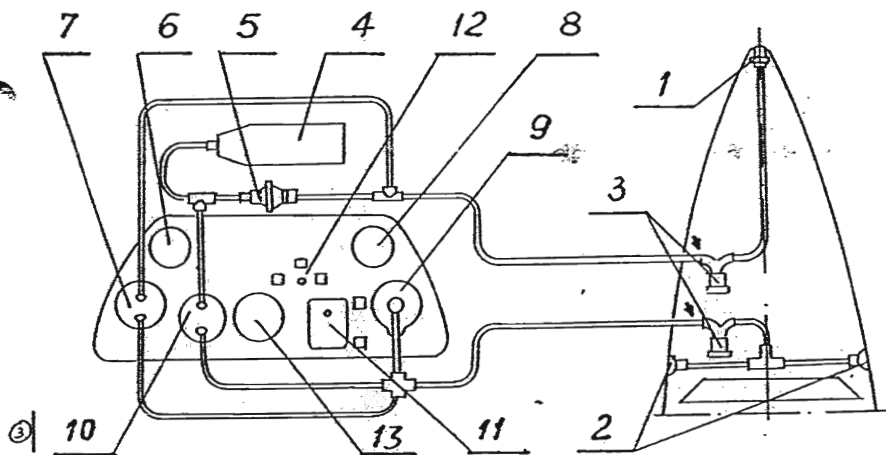


KR-03A

FLIGHT MANUAL

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



KR-03A

FLIGHT MANUAL



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

7.10. Miscellaneous equipment7.10.1. Balancing weights

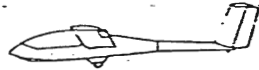
To balance the glider crew according the table of permissible loads in chapter 2.12, KR-03A glider is equipped with two balancing loads of total mass of 21 lbs /9,5 kg/.

To install the weights screw in till to stop the screws on the weight 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.



KR-03A

FLIGHT MANUAL



Section 8

8. Glider handling, care and maintenance	8.2
8.1. Introduction	8.2
8.2. Glider inspection periods	8.2
8.3. Glider repairs	8.2
8.4. Ground handling	8.2
8.4.1. Airfield transportation	8.3
8.4.2. Road transportation	8.3
8.5. Cleaning and care	8.3
8.5.1. Procedures after flights	8.3
8.5.2. Cleaning	8.4
8.5.3. Maintenance	8.5



KR-03A

FLIGHT MANUAL

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



KR-03A

FLIGHT MANUAL

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 3.6 of Maintenance Manual.

8.5. Cleaning and care8.5.1. 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.



KR-03A

FLIGHT MANUAL

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



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.



KR-03A

FLIGHT MANUAL



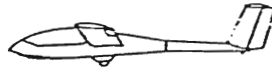
Section 9

Supplements



KR-03A

FLIGHT MANUAL



FLIGHT MANUAL of KR-03A "PUCHATEK" glider

Serial No: *04-14 KP*.....

Registration:

Document No: IU-AB-74.02

Ref: Installation of glider electrical
variometer WES-5

Date of Issue: November 1990
.....

Approved by: GILC-IKCS





KR-03A

FLIGHT MANUAL



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 date will be shown on the bottom left hand of the page.



KR-03A

FLIGHT MANUAL



Rev. No.	Affected Section	Affected Pages	Date	Appr.	Date	Date Instited	Signature



KR-03A

FLIGHT MANUAL



CONTENTS

1. TECHNICAL DESCRIPTION

1.1. Destination and technical data

1.2. Description of desing and operation

2. TECHNICAL SERVICE

2.1. Checking of the correct operation

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

3. SCHEME OF INSTALLATION OF WES-5 ON THE
GLIDER



KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL



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.

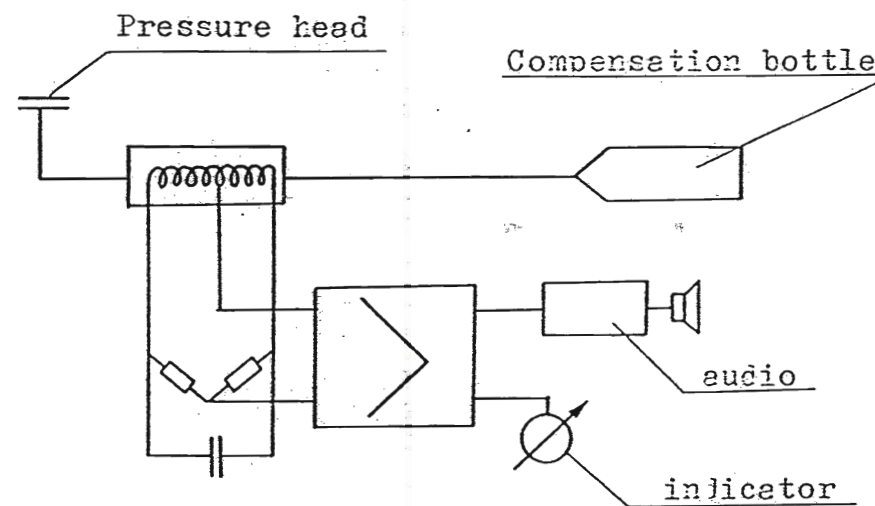
Basic technical data of WES-5

- 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



KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL



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 end 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

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 breaked signal appears. The misaccord of acoustic zero and instrument zero should not exceed $\pm 0,03$ 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 /.



KR-03A

FLIGHT MANUAL



KR-03A

FLIGHT MANUAL



3. SCHEME OF INSTALLATION OF WES-5 ON THE
GLIDER
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

W.8

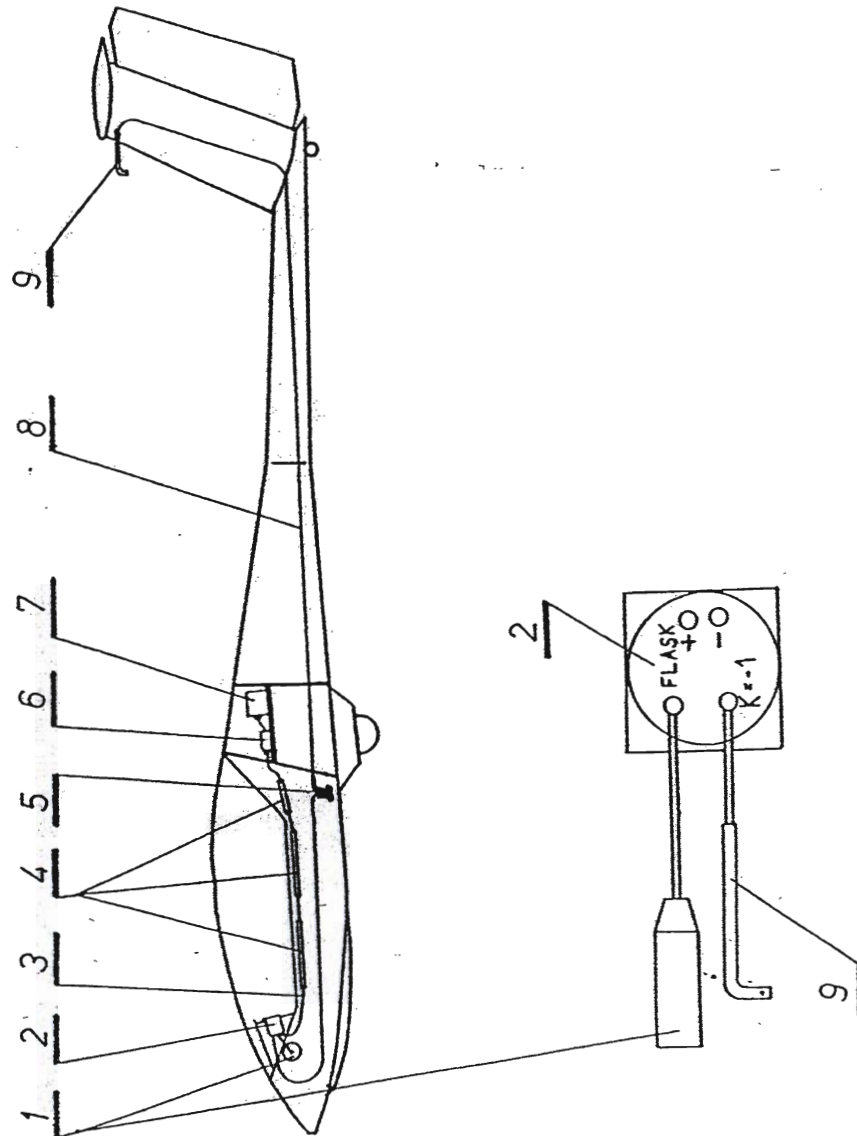


Fig.1

W.9