

$Kg \times 2.205 = lbs.$

$Km/h \times 0.536 = knots (kt.)$

GLIDER REPAIR AND PRODUCTION WORKSHOP

EDWARD MARGAŃSKI

BIELSKO - BIAŁA * MIĘDZYBRODZIE ŻYWIECKIE

FLIGHT MANUAL
OF
MDM-1 "FOX" GLIDER

Factory No	204
Reg. marking	N 35 ZZ

ISSUE II, November 1994

The pages marked with "Appr." have been approved by Airworthiness Authority (Civil Aircraft Inspection Board).

Signature:

Seal:

Date of original approval:

The glider shall be used acc. to the information and limitations contained in this Manual.

Translated by :

Stafiej
.....

Wiesław Stafiej D.Sc. Ae. Eng

0.1. LIST OF REVISIONS

All revisions to this Manual should be listed in the below table. In case of approved pages the record should be signed by the Authority representative.

The new or amended text on the revised page shall be marked with a vertical line on the left margin and the number with date of revision recorded on the bottom at lefthand side of page.

Rev No	Affected section	Affected page	Date of issue	Approval	Date of approval	Date inserted	Signat.

0.2. LIST OF EFFECTIVE PAGES

Section	Page	Date of Issue	Section	Page	Date of Issue
0	(i)	Nov. 1994	7	7.1	Nov. 1994
	(ii)	Nov. 1994		7.2	Nov. 1994
	(iii)	Nov. 1994		7.3	Nov. 1994
1	1.1	Nov. 1994		7.4	Nov. 1994
	1.2	Nov. 1994		7.5	Nov. 1994
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Section 1

GENERAL

- 1.1. Introduction.
- 1.2. Certification basis.
- 1.3. Warnings, cautions and notes.
- 1.4. Glider description and technical data.
- 1.5. Three - view drawing.

1.1. Introduction.

This glider Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of the MDM-1 Fox glider.

This Manual includes the material required by JAR-22 requirements. Moreover it contains the supplemental data supplied by the glider producer.

1.2. Certification basis.

This type of glider has been approved by Airworthiness Authority as complying the JAR-22 requirements Change 4 of May 7-th, 1987 and has the Statement No 26/94 issued on July 27-th, 1994 in Aerobatic Category.

1.3. Warning, caution and note.

The words "warning", "caution" and "note" used in this Manual have the following meaning :

- WARNING : NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO AN IMMEDIATE OR IMPORTANT DEGRADATION OF THE FLIGHT SAFETY.
- CAUTION : NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO A MEDIATE MINOR OR A LONG TERM DEGRADATION OF THE FLIGHT SAFETY.
- NOTE : DRAWS THE ATTENTION TO THE OPERATION PARTICULARS NOT DIRECTLY RELATED TO FLIGHT SAFETY BUT WHICH ARE IMPORTANT OR UNUSUAL.

1.4. Glider description and technical data.

MDM-1 "Fox" is a performance aerobatic two-seater with mid-wing arrangement and conventional tail-unit. The glass/epoxy and carbon/epoxy composite structure.

Wings :

Two-panel, trapeze outline of a considerable taper. Monospar structure with an auxiliary spar, sandwich covering. Spar of double-C shape.

Monoplate air brake extended on the upper surface only.

Friese type aileron of constant chord and large span in two panels, mass-balanced, suspended on 6 hinges.

The overlapping spar connection with two horizontal bolts extending up to rear fittings connects also wings to fuselage.

Fuselage :

Monocoque, sandwich structure with integral fin. The seat pans bonded fixed. Two part canopy opened sideward to right.

In the fuselage nose the air intake for total pressure and air conditioning, static pressure ports on the fuselage sides.

The transceiver antenna installed in the fin.

The towing hook installed in the front fuselage part.

The winch-launching hook installed before the main undercarriage.

Tail unit :

Stabilizer, elevators and rudder of sandwich structure aerodynamic and mass balanced.

Control system :

Mixed. Rudder, wheel brake and hook employ the cable system, elevator and aileron the push-rod one.

The elevator system has a spring trimming device controlled with a lever at the control stick base at the front seat.

Undercarriage :

Fixed undercarriage, faired. Main wheel brake is coupled with air brake.

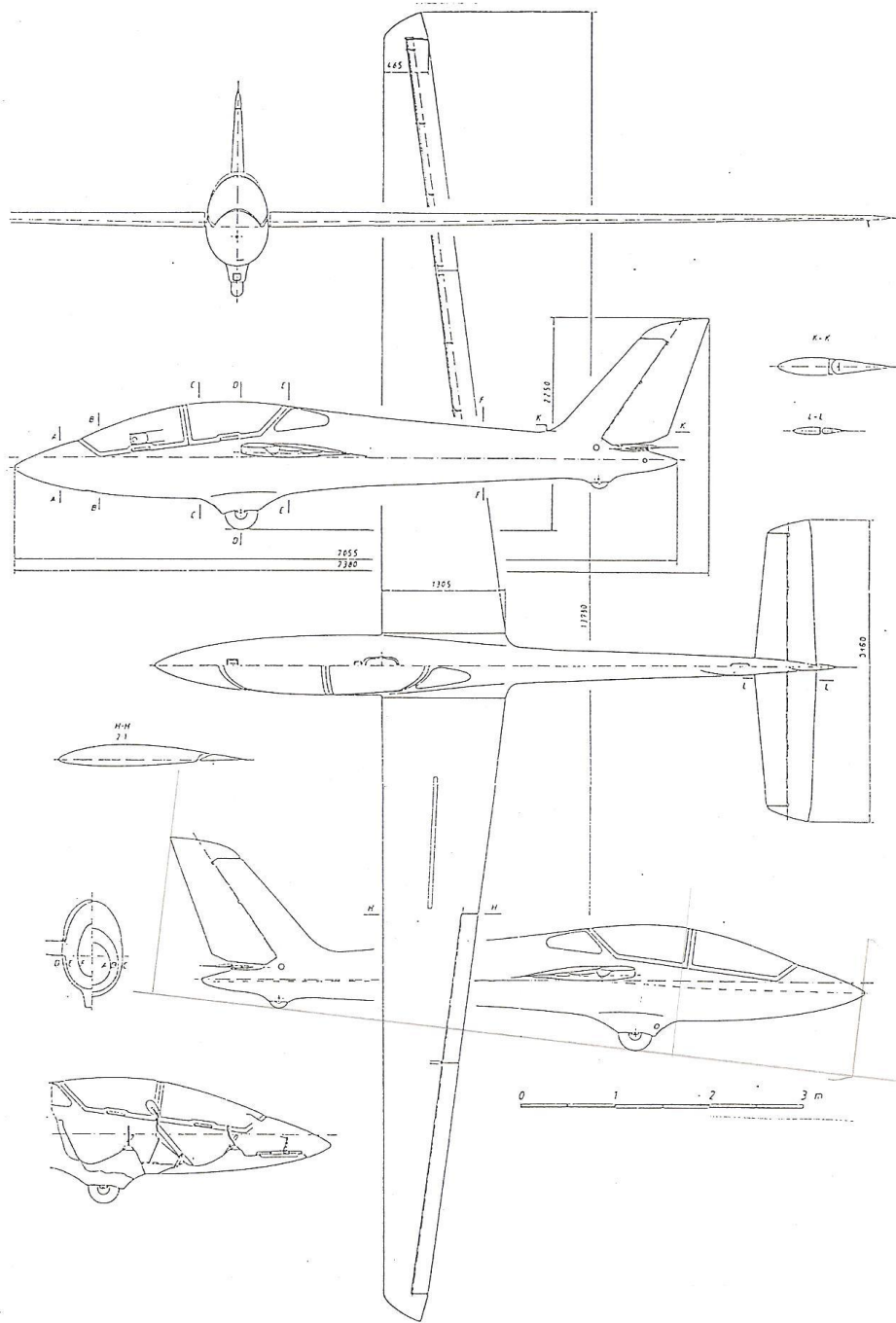
Main technical data :

Span	14,0 m	
Length (up to the fin top)	7,38 m	
Height (in flight attitude)	2,25 m	
Wing dihedral	0°	
Wing area	12,34 m ²	
Aspect ratio	15,88	
Root chord	1,308 m	
Mean Standard Chord (MSC)	0,971 m	
Wing profile	NACA 64_412 ₁	
Tailplane span	3,160 m	
Tailplane area	1,873 m ²	
Tailplane profiles	NACA 63_012 ÷ 63006 mod.	
Fin and rudder area	1,123 m ²	
Fin and rudder profiles	NACA 63_015 ÷ 63_012 ₂ ₁	
Maximum empty glider mass		
-without ballast	345 kg	760.7 lbs
-with 8,5 kg ballast	353,5 kg	396.9 lbs
All-up mass	525 kg	1157.6 lbs
Max. wing loading	42,54 kg/m ²	8.71 lbs/ft ²
Allowable load factors	+7/-5	
Allowable load factors for solo flying	+9/-6	

Main technical data:

Span	14.0 [m]	45.93 [ft]
Length (up to rudder top edge)	7.38 [m]	24.21 [ft]
Height (in flight attitude)	2.25 [m]	7.38 [ft]
Wing dihedral	0	
Wing area	12.34 [m ²]	132.8 [ft ²]
Aspect ratio	15.88	
Root chord	1.308 [m]	4.291 [ft]
Mean Standard Chord (MSC)	0.971 [m]	3.186 [ft]
Wing profile	NACA 64 ₁ 412	
Tailplane span	3.160 [m]	10.37 [ft]
Tailplane area	1.873 [m ²]	20.2 [ft ²]
Tailplane profiles	NACA 63 ₁ 012 ÷ 63006 mod.	
Fin and rudder area	1.123 [m ²]	12.09 [ft ²]
Fin and rudder profiles	NACA 63 ₂ 015 ÷ 63 ₁ 012	
C.G. position of empty glider	620÷645 [mm]	24.43÷25.41 [in]
	aft of the Datum Plane	
(Datum Plane = leading edge of wing Root Rib, see also Technical Service Manual item 2.4.)		
Maximum empty glider weight:		
-without balancing weights	350 [kG]	772 [lb]
-with 11,0 kG balancing weights	361 [kG]	795,5 [lb]
Max. weight of non-lifting parts (wing-less glider)	165 [kG]	364 [lb]
All-up weight	530 [kG]	1169 [lb]
Allowed in-flight C.G. position	213÷379 [mm]	8.40÷14.93 [in]
Locations of load components:		
Instrument panel at front seat	1580 [mm] fore of DP	62.25 [in] fore of DP
Balancing weights	1520 [mm] fore of DP	59.89 [in] fore of DP
Pilot on front seat	950 [mm] fore of DP	37.43 [in] fore of DP
Instrument panel at rear seat	440 [mm] fore of DP	17.34 [in] fore of DP
Pilot on rear seat	60 [mm] aft of DP	2.36 [in] aft of DP
Luggage	not allowed	
Max. wing surface loading	42.54 [kg/m ²]	8.72 [lb/ft ²]
Limit manoeuvring load factors	+7 / -5	
Limit manoeuvring load factors for solo flying (max. useful load 100 kG)	+9 / -6	

1.5. Three - view drawing, dimensions.



Section 2**LIMITATIONS**

- 2.1. Introduction.
- 2.2. Airspeed IAS.
- 2.3. Airspeed indicator markings.
- 2.4. *Power plant, fuel and oil.* - NOT APPLICABLE
- 2.5. *Power plant instrument markings.* - NOT APPLICABLE
- 2.6. Mass.
- 2.7. Centre of gravity.
- 2.8. Approved manoeuvres.
- 2.9. Manoeuvring load factors.
- 2.10. Flight crew.
- 2.11. Kinds of operation.
- 2.12. Minimum equipment.
- 2.13. Aerotowing, winch - and autotow launching
- 2.14. Other limitations
- 2.15. Limitations placards in cockpit

$$(km/h) \times 0.536 = \text{Knots (kt)}$$

2.1. Introduction.

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

The limitations contained in this chapter and in chapter 9 have been approved by Civil Aircraft Inspection Board.

2.2. Airspeed.

Airspeed limitations and their designations used in this Manual:

	Speed	IAS [km/h]	Remarks
V _{NE}	Never exceed speed	152 kt 282 km/h	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.
V _{RA}	Rough air speed	225 120 kt	This speed can be exceed in smooth air only and then with caution. Examples of rough air are: lee-wave rotor, Thundercloud etc.
V _A	Manoeuvring speed	214 115 kt	Do not make full or abrupt control movements above this speed, because under certain conditions the structure can be overstressed.
V _W	Maximum winch-launching speed	150 IAS 148 CAS	Do not exceed this speed during winch - or aerotow - launching.
V _T	Maximum aerotowing speed	150 IAS 80 kt 148 CAS	Do not exceed this speed during aerotowing

2.3. Airspeed indicator marking.

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

Marking	IAS - value or range	Significate
Green arc	92 - 214 [km/h] <i>49 KT - 115 KT</i>	Normal operating range (Lower limit is $1.1 V_{S1}$ at maximum weight, most forward c.g. and flap retracted. Upper limit is rough air speed).
Yellow arc	214 - 293 [km/h] <i>115 KT - 157 KT</i>	Manoeuvres must be conducted with caution and in smooth air only.
Red radial line	293 [km/h] <i>157 KT</i>	Maximum permissible speed for all operations.
Yellow triangle	115 [km/h] <i>62 KT</i>	Approach speed at maximum weight.

2.4. Power plant. - NOT APPLICABLE

2.4. Power plant instrument markings. - NOT APPLICABLE

$Kg \times 2.205 = lbs.$

2.6. Mass.

Maximum take-off mass	525 kg	1157 lb.
Maximum landing mass	525 kg	
Maximum mass of all non-lifting parts	155 kg	342 lbs
Maximum mass in baggage compartment	0 kg	

2.7. Centre of gravity.

Range of the in-flight c.g. : 22 thru 39 per cent of MSC.

L O A D I N G P L A N

Loading version	1 person	2 persons
All-up mass [kg]	981 lbs 445	1157 lbs 525
Maximum cockpit loading mass [kg]	220 lbs 100	397 lbs 180
Minimum cockpit loading mass [kg]	70 without 154 ballast 105 55 + 121 lbs obligatory removable ballast of 8.5 kg 18.7 lbs	100 220 lbs
<p>NOTE :</p> <p>1. SOLO FLIGHT ON THE FRONT SEAT ONLY</p> <p>2. THE PILOT OF 100 THRU 110 kg MASS SHOULD BE RECOGNIZED AS TWO-PERSONS CREW</p>		

2.8. Approved manoeuvres.

This glider is certified in the Aerobatic Category.
Approved aerobatic manoeuvres :

Loop, inverted loop, stall turn, inverted stall turn, controlled roll, quick roll, inverted quick roll, quick roll in angle downward, inverted quick roll in angle downward, normal quick roll downward, inverted quick roll downward, half-controlled roll upward-half loop, normal spinning, inverted spinning, tail slide (not longer then 2 seconds).

2.9. Manoeuvring load factors.

Allowable load factors	+7/-5
Allowable load factors for solo flight	+9/-6

2.10. Flight crew.

The crew consists of one or two persons.
In case of solo flight the use of front seat only is allowed.

2.11. Kinds of operation.

Cloud, icing conditions and night flying is PROHIBITED.

2.12. Minimum equipment

- altimeter,
- airspeed indicator,
- variometer,
- side-slip indicator,
- accelerometer,
- compass.

2.13. Aerotow and winch and autotow - launching.

For aerotow the nylon towing cables of 20 + 60 [m] length with safety link 677 [daN] +/- 10 [%] installed shall be used.

For winch-launching the cable with safety link of 677 [daN] ± 10% strength shall be used.

Maximum winch-launching speed is 150 km/h.

The autotow-launching is PROHIBITED.

2.14. Other limitations.

No.

2.15. Limitations placards.

The following placards should be placed on the visible place in the cockpit:

LIMITATIONS
1. Night flying prohibited.
2. Cloud flying prohibited
3. Flying in expected icing condition prohibited
4. The full aerobatics acc. to Flight Manual item 4.5.9.

Crew	Allowable load factors
2 persons	+7/-5
1 person of mass with parachute not greater than 100 kg	+9/-6

SPEED LIMITATION	
IAS	[km/h]
V_{NE}	282 152 kt
V_{RA} Rough air	225 120 kt
V_A Manoeuvr	214 115 kt
V_{Winc}	150
V_{Tov}	150 80 kt

BEFORE FLIGHT
- CHECK THE COCKPIT
- ADJUST THE PEDALS, BACK REST AND REMOVABLE BALLAST
- CHECK THE CONTROL SURFACES DEFLECTINS
- PUT THE ALTIMETER AND ACCELEROMETER INTO "0" READING
- FASTEN THE SAFETY BELTS
- CHECK THE TRIMMING DEVICE POSITION

Flight altitude	[m]	up to 2.000	3.000	4.000
	[ft]	6560	9840	13125
V_{NE}	[km/h]	282	265	248
	[kt]	152	143	134

Appr. 2.6

LOADING PLAN		
Crew	1 person	2 persons
All-up mass [kg]	445 <i>981 lbs</i>	525 <i>1157 lbs</i>
Maximum cockpit load mass [kg]	100 <i>220 lbs</i>	180 <i>397 lbs</i>
Minimum cockpit load mass [kg]	70 <i>154 lbs</i> without ballast	100 <i>220 lbs</i>
	<i>121 lbs</i> 55 + obligatory removable ballast of 8.5 kg <i>18.7 lbs</i>	
NOTE :		
1. SOLO FLIGHT ON THE FRONT SEAT ONLY		
2. THE PILOT OF 100 THRU 110 kg MASS PARACHUTE INCLUDED SHOULD BE RECOGNIZED AS TWO-PERSONS CREW		

Section 3

EMERGENCY PROCEDURES

- 3.1. Introduction.
- 3.2. Canopy jettison.
- 3.3. Bailing out.
- 3.4. Stall recovery.
- 3.5. Spin recovery.
- 3.6. Spiral dive recovery.
- 3.7. Power-plan failure - NOT APPLICABLE
- 3.8. Fire.
- 3.9. Other emergencies.

3.1. Introduction.

Section 3 provides the exact procedures in emergencies which may occur.

3.2. Canopy jettison.

1. Pull back with both hands simultaneously the red lever on the righthand canopy side and the canopy opening lever on the lefthand side.
2. Push the canopy upwards if it would be necessary.

WARNING : IT IS IMPOSSIBLE TO JETTISON THE BOTH CANOPY PARTS BY ONE PERSON.
IN CASE OF TRAINING FLIGHT THE PUPIL SHALL BE FAMILIAR WITH THIS
CONDITION.

3.3. Bailing out.

1. Jettison the canopy.
2. Release the belts.
3. Put hands on boards and leave the cockpit.
4. When the glider spins leave on the side towards which the autorotation developed.

3.4. Stall recovery.

During the stall in turn the glider warns with the satisfactory advance that the critical incidence is approached.

The stall depends on gentle nose dropping below the horizon.
The aileron control is efficient till to the stall.

Altitude loss in symmetrical stall ranges 15 thru 25 [m].

The lateral balance controlled with aileron and with stick pulled full leads to a deep stall condition associated with a considerable sinking (about 8 m/s).

The recovery is easy and immediate by the stick releasing forwards slightly in front of the neutrum or by the controls free.

3.5. Spin recovery.

The spinning is unstable. During the spinning the pitch inclination and angular speed change.

The recovery delay is of maximum value in the second turn where the turn acceleration and inclination decrement occur. The delay does not exceed one turn.

The recovery procedure is the standard one:

1. Deflect the rudder opposite to rotation.
2. Release the stick slightly in front of the neutrums.
3. Return the rudder to neutrums.
4. Recover the glider out of diving.

NOTE: DEFLECTION OF THE AILERON TOWARDS SPINNING INCREASES THE DELAY.
DEFLECTION OF THE AILERON OPPOSITE TO SPINNING CHANGES THE SPINNING INTO A SPIRAL SLIDE.

3.6. Spiral dive recovery.

1. Deflect the aileron and rudder opposite to circling direction.
2. When the symmetrical flight is obtained neutralize the aileron and rudder.
3. Decrease the airspeed.

3.7. *Power-plant failure - NOT APPLICABLE*

3.8. Fire.

NOT OCCURABLE.

3.9. Other emergencies.

NOT KNOWN.

Section 4

NORMAL PROCEDURES

- 4.1. Introduction.
- 4.2. Rigging and de-rigging.
- 4.3. Daily inspection.
- 4.4. Preflight inspection.
- 4.5. Normal procedures and recommended speeds.
 - 4.5.1. Launch, run up, ground rolling.
 - 4.5.2. Take-off and climb.
 - 4.5.3. Flight.
 - 4.5.4. Approach.
 - 4.5.5. Landing.
 - 4.5.6. *Flight with water ballast - NOT APPLICABLE*
 - 4.5.7. High altitude flight.
 - 4.5.8. Flight in rain.
 - 4.5.9. Aerobatics.

4.1. Introduction.

Section 4 provides the procedures of normal operation. Normal procedures associated with optional equipment is contained in section 9.

4.2. Rigging and de-rigging.

To perform the glider de-rigging after a field landing four persons having the basic technical training are necessary.

Before starting the de-rigging of everyone set all persons should be informed in details on the necessary procedures to be done.

The de-rigged sets preferably should be placed on the trailer at once. In case a trailer is not in disposition the wings and tailplane may be put on grass for a short time period being sure that no extending stones or other hard objects are present.

DO NOT PUT ON THE GROUND THE BOLTS AND SCREWS.

The sets should be de-rigged in the below described sequence.

4.2.1. De-rigging of the tailplane.

For de-rigging of the tailplane two persons are necessary.

- The glider is supported on the wing.
- Put the trimming device spring back till to stop, stick free, rudder deflected sideways.
- Remove the safety pin, nut and take out the tailplane main bolt (in the nose portion of stabilizer in its plane).
- Push the stabilizer backwards on the leading edge till the stabilizer front fitting disengages from between the sleeves. Then holding the stabilizer on both sides allow both elevators to deflect down. Shift the tailplane backwards. The control system disconnects automatically.
- Put the main bolt into the fittings in fuselage, put on the nut (not tighten) and safety pin.
- Put the stabilizer on the trailer or prepared place.

4.2.2. De-rigging of the wings.

Two persons hold the glider on the wing tips.

- Desecure the main bolts by means of turning downwards the securing devices protecting the bolts against shifting-off (The securing devices are located in bolt faces and are accessible from the cockpit inside).
- Insert the pin into the hole on the main bolt base (on arbitrary side).
- After lifting the wing tips a little to easy the bolt remove the bolt with rotary-linear motion (oscillating).
- Remove the pin out of the de-rigged bolt and take-off the second bolt in the same manner.
- Lifting one wing at its root holding it on the leading edge in the vicinity of rear fitting and on the tip shift it out of the fuselage on distance of 70 thru 80 [mm].

Disconnect the aileron control system of the de-rigged wing.

The fourth persons firmly holds the tip of the second wing.

- Shift the wing out of the fuselage.
- In the same way remove the second wing. The fourth person holds the fuselage at the fin or cockpit part to secure it against falling down sideways.
- The main bolts should be inserted into the fuselage main fittings and secured by means of turning the securing device upwards into vertical position (to avoid the bolts to be lost).

4.2.3. Final remarks.

The rigging of the glider requires the inverted sequence, preferably with 5 persons.

All the contact surfaces, main bolts and their sleeves should be covered with the graphite grease.

NOTE: THE RIGGING OF THE GLIDER SHOULD BE PERFORMED UNDER A SUPERVISION OF THE MECHANICIEN TRAINED IN SERVICING THE GLIDER OF THIS TYPE.

4.3. Daily inspection.

Check :

1. Glider documents (check, complete the records).
2. External inspection, structure and covering condition.
3. Securing of assembling elements and control systems connections. Check the securing of main bolts of wings, tailplane, control systems, where accessible.
4. Correct operation of control systems.
5. Operation of towing hook.
6. Undercarriage condition, wheels rollability, operation of wheel brake.
7. Air pressure in wheels (by eye), the undercarriage well to be clean.
8. Pilot's belts.
The spring on belt clamp must be neither bent nor broken.
9. External condition of static and total pressure ports.
10. Operation of instruments and battery condition.
11. Condition of pedals and adjustment possibility.
12. Operation of air-conditioning throttle. It is visible through the nozzle on the fuselage nose.
13. Canopy, locks and jettison system condition.
14. Transceiver, check the communication operation.

NOTE: WHEN LEAVING THE GLIDER ON THE AIRFIELD IN THE SUNNY DAY THE CANOPY PERSPEX SHOULD BE NECESSARILY PROTECTED WITH A COVER TO AVOID A FIRE OF COCKPITT EQUIPMENT DUE TO THE FOCUSING EFFECT OF PERSPEX !!!

4.4. Preflight inspection.

1. Perform item 3 of daily inspection.
2. Find the most comfortable position in the cockpit.
3. Remove or secure the free objects in the cockpit.
4. Put on the parachute.
5. Take place, fasten the belts.
6. Check all the devices being accesible by hand.
7. Check the full control movements.
8. Check the air brake to be locked.
9. Put the altimeter to "zero" reading.
10. Put the accelerometer to "zero" reading.
11. Connect the towing cable, check the sure connection.
12. Close and lock correctly the canopy.
13. Check the transceiver communication and inform of being ready.

4.5. Normal procedures and recommended speeds.**4.5.1. Launch, run up, ground rolling.**

1. Towing cable connection
 - Pull the release handle full.
 - Put the small ring of the cable end into the hook and release the handle.
 - CHECK THE CORRECT CABLE CONNECTION PULLING THE CABLE SEVERAL TIMES!

2. Winch-launching.

WARNING: FOR THE WINCH-LAUNCHING THE C.G. HOOK LOCATED BEFORE THE MAIN UNDERCARRIAGE WHELL SHALL BE USED.

- Before take-off the winch operator should be informed that the increased launching speed must be maintained, similar as for high performance gliders with water ballast.
- Before take-off put the trimming device into:
 - from: 1st slot at front - for light pilot, solo,
 - to: 3rd slot at front - two persons crew.
- Run-up requires the pushing of the stick till the tail raises. When airborne and accelerated the glider can pass into climbing.
- In case the wing hitches the ground, release the rope immediately.
- Recommended steep climbing airspeed is 105 thru 120 km/h.
- Before releasing the towing cable the pilot should slightly disload the cable.
- In case the cable exceeds the 80° angle the automatic release takes place.
- After releasing the cable the releasing handle in cockpit should be pulled several times, and the glider should pass into glide.

3. Aerotow take-off

- When tensioning the cable, brake the wheel. This avoid the cable to be rolled under the wheel. In case of surge and looseing of the cable release it immediately.
- It is recommended to push the stick to rise up the tail as soon as possible.
- In case the wing tip hitches the ground release the cable immediately.

4.5.2. Take-off and climb.

- After setting the aerotow airspeed balance the stick force with trimming device.
- The aerotow flight below the aeroplane is not recommended due to the cable friction on fuselage surface.

4.5.3. Flight.

The glider in free flight is correctly controllable, the control surfaces deflections are proportional, forces of low value.

The stall warning in the form of perceptible vibration appears at about 2-4 [km/h] before the dropping down.

In thermal and soaring flights due to a small margin between the warning and stalling speed the careful controlling and attention are necessary.

Flight in thunder conditions should be avoided.

4.5.4. Approach.

The efficiency of air brake allows for precise adjustment of approach angle.

The operation force on air brake lever is moderate.

The air brake can be extended and retracted up to the never exceed airspeed.

At the airspeeds above ^{107 kt.} 200 [km/h] extend the air brake gently to avoid the surging of the pilot forwards.

The opened air brake creates the considerably intensive buffeting of the tailplane increasing with the airspeed. This, however, makes no controlling trouble.

4.5.5. Landing.

Approach at ^{62 kt.} 115 [km/h] airspeed. In turbulent air or rain at ^{67 kt.} 125 km/h]. The air brake extended results the nose pitching which requires the stick to be pulled.

Touch ground with main and tail wheels. Due to wheel brake do not touch ground with full extended air brake.

Avoid the strong wheel braking. In ground run hold the stick full back. The glider tends to pitch on the nose.

Due to the lack of shock absorber land on the selected smooth airfield part.

4.5.6. *Flight with water ballast. - NOT APPLICABLE*

4.5.7. High altitude flight.

Due to the lack of oxygen equipment the flights up to 3000 [m] STD only are allowed.

4.5.8. Flight in rain.

Flight in rain does not create neither the considerable performance decrement nor the changes in behaviours.

In circling and in approach use the airspeed increased by about 5 km/h]. In the poor visibility or in case of moistured perspex open the window and the cockpit air conditioning.

When the glider intensively gets wet it should be wiped with a flanel rag and left for drying with extended air brake.

Next day the glider should be de-rigged and the fittings and bolts greased.

After flying in rain it should be:

- drained the drainage-units by removing the drainage plugs,
- disconnected the total and static pressure ducts,
- blown the ducts, if necessary, with a pump (AFTER THE INSTRUMENT ARE DISCONNECTED).
- having the ducts dried connect the system and CHECK THE TIGHTNESS OF THE CONNECTIONS.

4.5.9. Aerobatics.

Before performing the aerobatics the air brake locking shall be checked and the airspeed appropriate for aimed manoeuvre trimmed. The glider performs correctly the manoeuvres listed in Table 1.


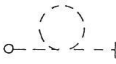
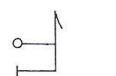
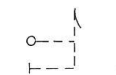
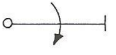
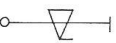

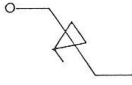

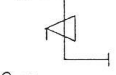

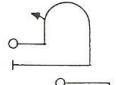
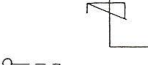

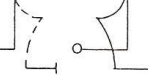
NOTE: WHEN PERFORMING THE COMPETITION AEROBATICS OR TRAINING ON THIS GLIDER IT IS NECESSARY TO :

- ON BEGINNING TO BE FAMILIAR WITH THE GENERAL GLIDER BEHAVIOURS IN NORMAL AND INVERTED FLIGHT,
- REMEMBER TO HAVE A REASONABLE ALTITUDE RESERVE IN THE INITIAL PHASE OF TRAINING IN AEROBATICS,
- INCREASE THE MANOEUVRES AMOUNT STEP BY STEP DUE TO THE SUBJECTIVE DIFFICULTY DEGREE,
- REMEMBER THAT THE FULL GLIDER POSSIBILITIES CAN BE RECOGNIZED AND USED AFTER THE INDIVIDUAL MATCHING OF PILOT'S AND GLIDER BEHAVIOURS.

Depending on loading condition (changes in c.g. location) the glider behaviours vary slightly. The c.g. moved backwards results in :

- possibility of controlling with increased load factor,
- some trouble in introducing to the autorotation manoeuvres.

Tab.1. Allowed aerobatic manoeuvres

It	Kind of manoeuvre	FAI Catalogue symbol	Entry airspeed IAS [km/h]	Average load factor n
1	Normal loop		102 kt 112 kt. 190 - 210	4
2	Inverted loop		129 kt. 139 kt. 240 - 260	-4
3	Normal stall turn		107 kt. 123 kt. 200 - 230	4
4	Inverted stall turn		123 kt. 134 kt. 230 - 250	-4
5	Controlled roll		180 (min.) 96 kt.	
6	Normal quick roll <i>+ Snap</i>		160 - 170 86 kt - 91 kt.	3,5 ÷ 4,5
7	Inverted quick roll <i>- Snap</i>		160 - 170 86 kt. - 91 kt.	-3,0 ÷ -3,5
8	Quick roll in angle downward <i>+ Snap</i>		130 - 145 max 69 kt. - 78 kt.	3,0 ÷ 3,5
9	Inverted quick roll in angle downward <i>- Snap</i>		130 - 140 max 69 kt - 75 kt.	-3,0 ÷ -3,5
10	Normal quick roll downward		120 - 145 max 64 kt. - 78 kt.	3 ÷ 4
11	Inverted quick roll downward		130 - 140 max 69 kt - 75 kt.	-2,8 ÷ -3,5
12	Controlled half roll upward and half loop <i>+ Hump</i>		240 128 kt.	6 ÷ 6,5
13	Normal spinning			do 3,5
14	Inverted spinning			do 3,5
15	Tail-slide		allowed slide time not longer than 2 seconds	

Section 5

INTRODUCTION

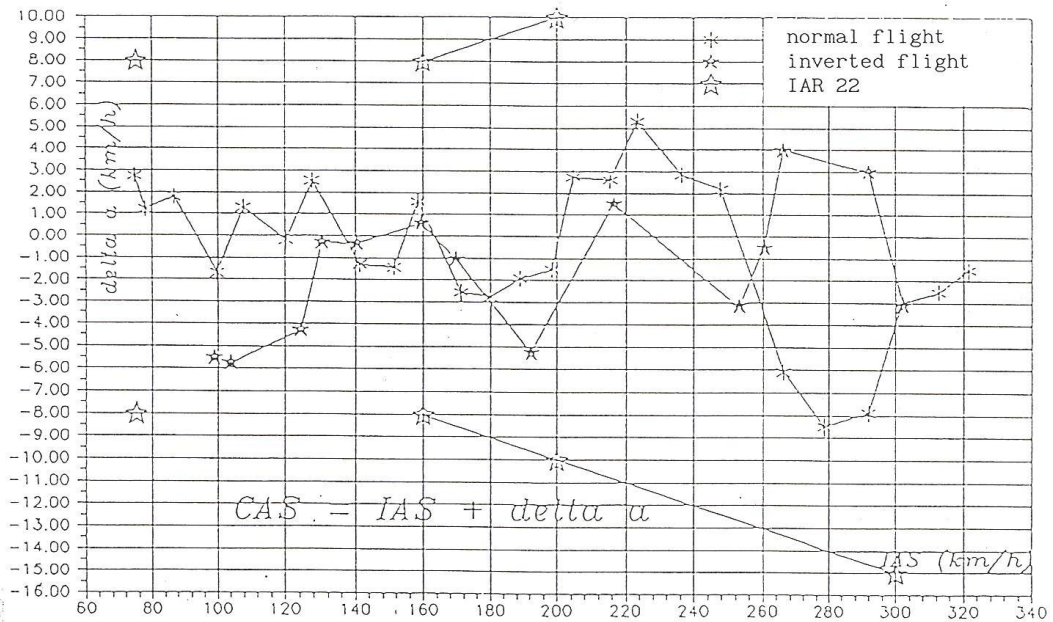
- 5.2. Approved data.
 - 5.2.1. Airspeed indicator system calibration.
 - 5.2.2. Stall speeds.
 - 5.2.3. *Take-off performance. - NOT APPLICABLE*
 - 5.2.4. Additional information.
- 5.3. Non-approved further information.
 - 5.3.1. Demonstrated cross-wind performance.
 - 5.3.2. Flight polar.

5.1. Introduction.

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and non-approved further information. Data in tables has been established on the base of actual flight tests for the glider in good condition and pilot of average skill.

5.2. Approved data.

5.2.1. Airspeed indicator system aerodynamic correction.



Aerodynamic correction of airspeed indicator system.

MDM-1 FOX glider, Fact. No P-13.

5.2.2. Stall speeds.

Stall speeds IAS for the mass :			
Crew		1 person	2 persons
All-up mass	[kg]	455 <i>1003 lbs</i>	525 <i>1157 lbs</i>
Stall speed in smooth configuration	[km/h]	<i>42 kt.</i> 78	<i>45 kt.</i> 84
Stall speed with air brake extended	[km/h]	<i>47 kt.</i> 87	<i>50 kt.</i> 94

Approach to stall is warned with the perceptible and audible oscillations (buffeting).

The stalled glider drops down symmetrically.

Recovery by means of stick releasing takes place without trouble and failless.

The altitude loss in stalling at straight flight and in smooth configuration does not exceed 30 [m].

NOTE: INTRODUCING THE GLIDER INTO STALL IT MUST BE TAKEN INTO ACCOUNT THAT A DEEP STALL CAN DEVELOP. IT OCCURS IN THE WHOLE C.G. LOCATION RANGE. IT IS ASSOCIATED WITH A HIGH VALUE OF SINKING (9÷10 [m/s]) WITH INDICATED AIRSPEED OF ABOUT 85÷100 [km/h] (IAS) WHEN THE LATERAL AND DIRECTIONAL CONTROL IS RETAINED.

SUCH A FLIGHT CONDITION APPEARS FOR THE STICK PULLED ONLY AND FOR THE LATERAL BALANCE RETAINED WITH AILERON. THE SLIGHT STICK PUSHING OR RELEASING RESULTS IN THE IMMEDIATE PASSING INTO THE NORMAL FLIGHT CONDITION.

5.2.3. *Take-off performance. - NOT APPLICABLE*

5.2.4. Additional information.

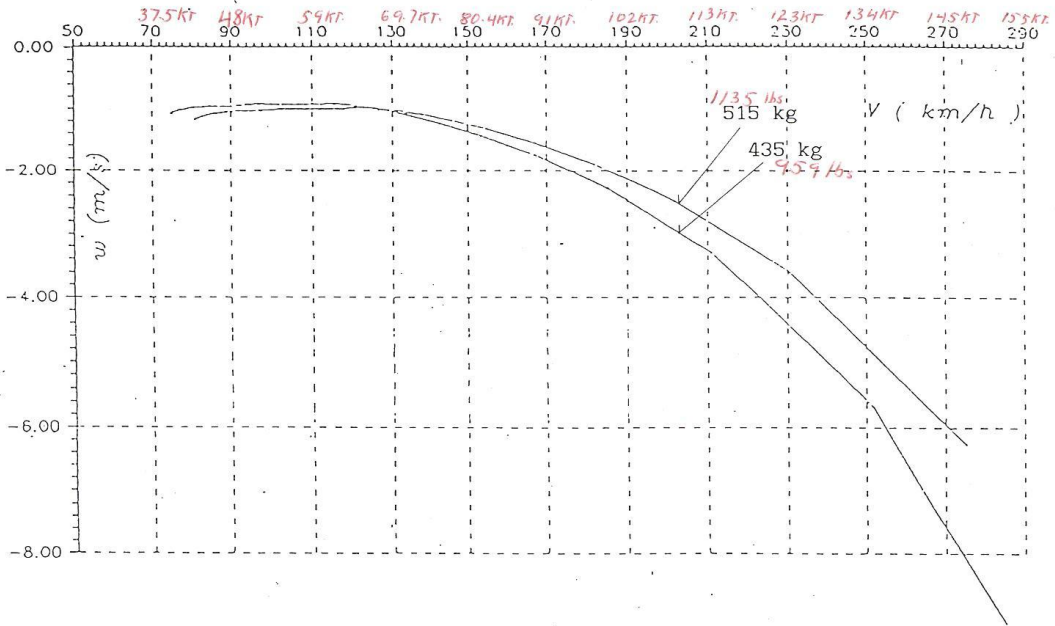
NO.

5.3. Non approved further information.

5.3.1. Demonstrated cross-wind performance.

The aerotowing take-offs and landings have been demonstrated at the wind of side component of up to 17 [km/h].

5.3.2. Flight polar for all-up mass of:
(gross)



Flight polar of MDM-1 FOX for all-up mass of 515 [kg] and 435 [kg] (calculated).

Section 6

MASS AND BALANCE

- 6.1. Introduction.
- 6.2. Records of actual weighings and allowed loading range.

6.1. Introduction.

This Section includes the loading range in which the glider can be operated safely.

The weighing procedure, method of c.g. location calculation and comprehensive list of all equipment available for this glider as well as the equipment installed on the glider during the weighing are contained in Technical Service Manual.

6.2. Records of actual weighings/allowed loading range.

Date	Empty glider mass Q [kg]	Empty glider c.g. location X_{cc} [cm]	Allowed crew mass [kg]										Approved	
			2 persons crew					1 person crew					Date	Signature
			Removable ballast of 8.5 kg installed	Removable ballast of 8.5 kg removed	Mass added on I i II seats	Max	Min	Removable ballast of 8.5 kg installed	Removable ballast of 8.5 kg removed	Mass added on I i II seats	Max	Min		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.		
12.05 1995	338,4 746 lbs.	64	171,5 378 lbs.	91,5 201,7 lbs.	180 396,9 lbs.	100 220,5 lbs.	91,5 201,7 lbs.	55 121,2 lbs.	100 220,5 lbs.	70 154,3 lbs.	12.05.95	<i>[Signature]</i>		

Records of actual weighings/allowed loading range - cont.

Date	Empty glider mass [kg]	Empty glider c.g. location [cm]	Allowed crew mass [kg]						Approved			
			2 persons crew			1 person crew			Date	Signature		
			Removable ballast of 8,5 kg installed	Removable ballast of 8,5 kg removed	Removable ballast of 8,5 kg installed	Removable ballast of 8,5 kg removed	Max	Min			Max	Min
1.	2.	3.	Max 4.	Min 5.	Max 6.	Min 7.	Max 8.	Min 9.	Max 10.	Min 11.	12.	13.

6.2 Records of actual weighing / permitted payload range.

FOX 204

Date	Empty weight [lb]	C.G. position [in]	Permitted crew weight [lb]										Approved	
			2 person crew		without balancing weights		with balancing weights 2 x (12.2 lb)		1 person crew		without balancing weights		Date	Signed
			Max	Min	Max	Min	Max	Min	Max	Min				
1	746,7	25 ³ / ₁₆	4	5	6	7	8	9	10	11	12	13		
			397,5	218,3	421,7	242,5	221,1	121,3	220,5	154,3				

The data, calculated following the procedure given in item 2.7. of Technical Service Manual, should be recorded in columns 2 through 11 of this table (according to Appendix H of JAR-22).

6.2. Records of actual weighings / allowed loading range.

Date	Empty glider mass [kg]	Empty glider c.g. location [cm]	Allowed crew mass [kg]								Approved			
			2 persons crew				1 person crew				Date	Signature		
			Removable ballast of 11,0 kg installed	Removable ballast of 11,0 kg removed	Mass added on I i II seats	Mass added on I i II seats	Removable ballast of 11,0 kg installed	Removable ballast of 11,0 kg removed	Max	Min			Max	Min
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.		

Records of actual weighings / allowed loading range - cont.

Fox 204

Date	Empty glider mass [kg]	Empty glider c.g. location [cm]	Allowed crew mass [kg]						Approved			
			2 persons crew			1 person crew			Date	Signature		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
	338.7	64.0	180.3	99	191.3	110	100.3	55	100	70		<i>Fox</i>

Section 7

GLIDER AND SYSTEMS DESCRIPTION

- 7.1. Introduction.
- 7.2. Devices and levers in cockpit.
- 7.3. Instrument panel.
- 7.4. *Landing gear retracting system. - NOT APPLICABLE*
- 7.5. Seats and safety belts.
- 7.6. Instrument pressure system.
- 7.7. Airbrake control system.
- 7.8. Loading and baggage fixture.
- 7.9. *Water ballast. - NOT APPLICABLE*
- 7.10. *Power-plant. - NOT APPLICABLE*
- 7.11. *Fuel system. - NOT APPLICABLE*
- 7.12. Electrical system.
- 7.13. Other equipment.

7.1. Introduction.

This Section provides description and operation of the glider and its systems. Refer to Section 9 for details of optional equipment.

7.2. Devices and levers in cockpit.

General view on I and II seat of the glider is shown on Figs. 7.1 and 7.2.

All controls are operated conventionally.

The wheel brake is coupled with air brake, the control lever (Fig. 7.1 item 8 and Fig. 7.2 item 3) is located on the lefthand board.

The elevator spring trimming device is operated with a grip at the control stick base on lefthand side at I seat only (Fig. 7.1 item 10).

The canopy is opened with the white lever (Fig. 7.1 item 6 and Fig. 7.2 item 2) located on the lefthand side.

The canopy emergency jettison occurs by pulling simultaneously with both hands the red lever on righthand canopy side and canopy opening lever on the lefthand side (Figs. 7.1 item 11 and 7.2 item 6).

The rudder pedals at front seat can be adjusted in flight by means of tension member ended with a brown hand-grip (Fig. 7.1 item 7) located under the instrument panel.

At II seat no adjustment provided.

The towing cable release control tension member ended with a yellow hand-grip (Figs. 7.1 item 3 and 7.2 item 1) is located on instrument panel on the left side at front seat and at the left side of rest tube of front seat at rear seat.

The air conditioning control tension member is located on the righthand side of instrument panel (Fig. 7.1 item 8).

All levers are provided with the applicable information pictograms.

Fig. 7.1 Front seat view.

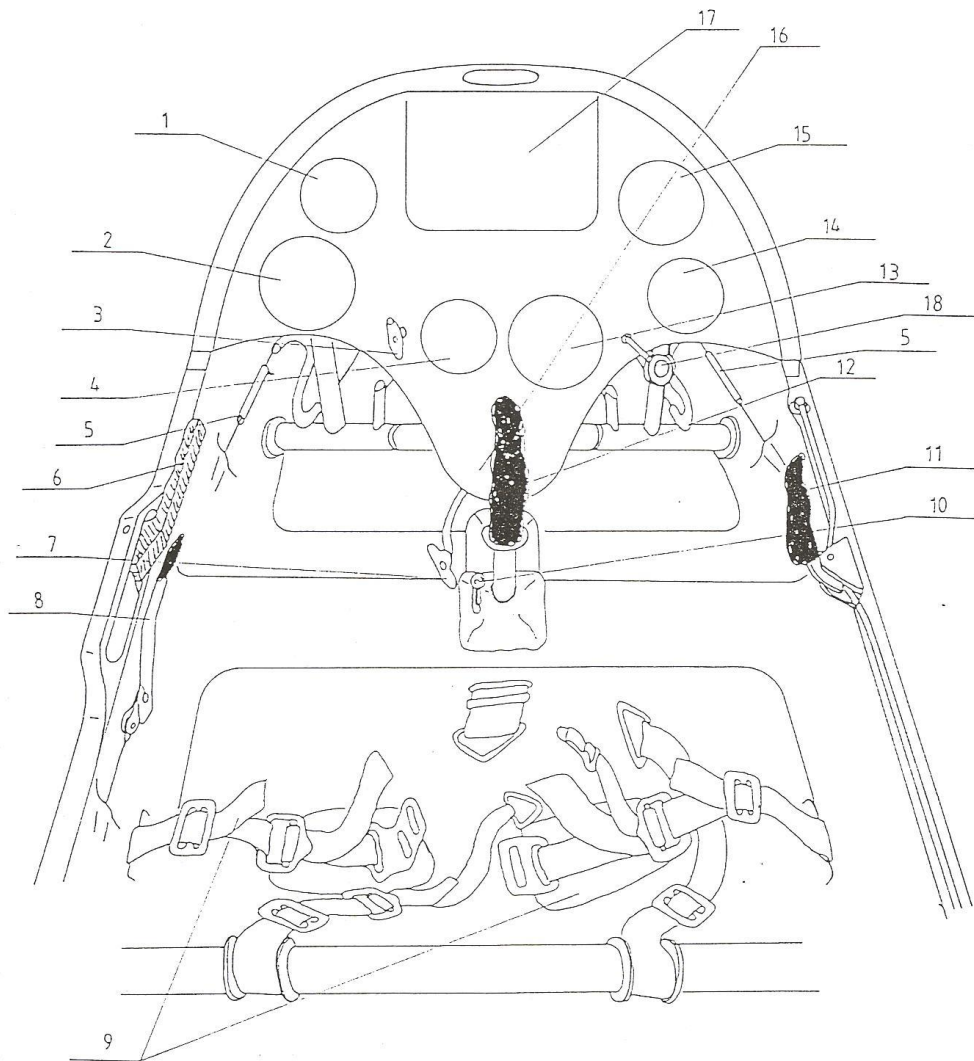
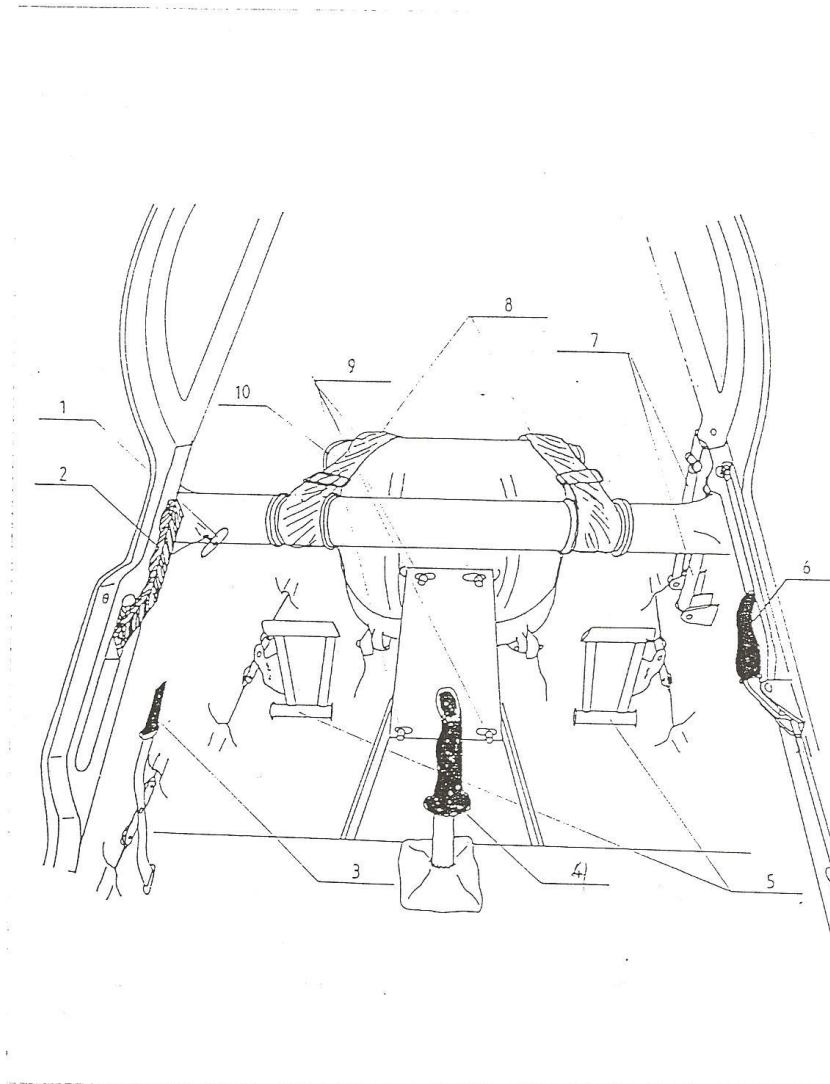


Fig. 7.2 Rear seat view.



7.3. Instrument panel.

Instrument panel is shown on Fig. 7.1.

In the upper row from left : accelerometer (1), place for aerobatic program diagram (17) side-slip indicator (15).

In the lower row from left : compass (2), altimeter (4), airspeed indicator (13), variometer (14).

7.4. Landing gear retracting system. - NOT APPLICABLE

7.5. Seats and safety belts.

The front seat back-rest is adjustable on ground by means of bolts relocation (Fig. 7.2 item 9).

Rear seat is not adjustable.

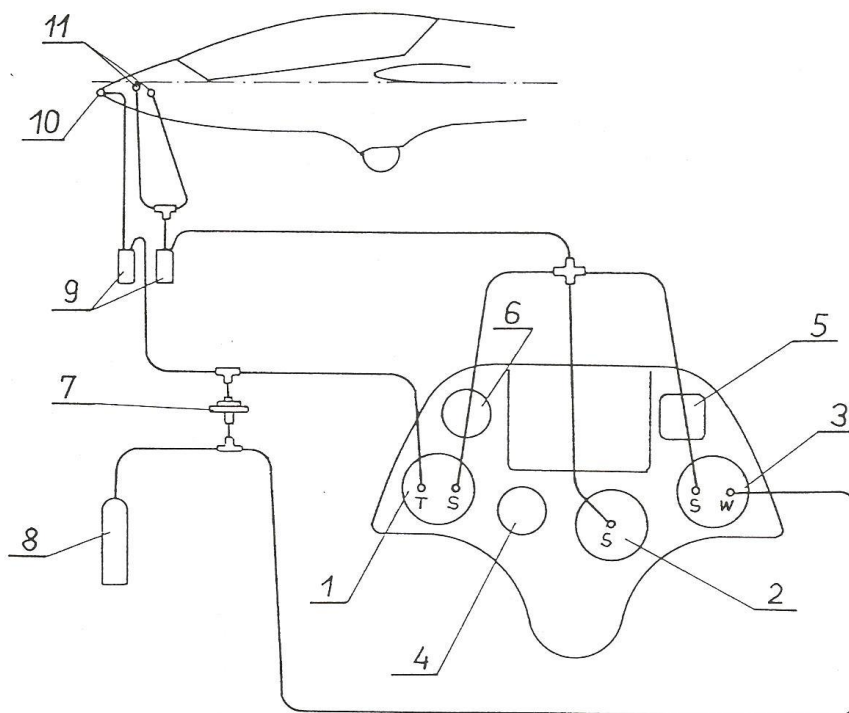
Both seats are equipped with five points safety belts and double fittings of abdomen belts.

7.6. Instrument pressure system. (Fig. 7.3)

The connection system is shown on Fig. 7.3.

NOTE: AFTER FLYING IN RAIN OR IF THE WATER IN DUCT IS SUSPECTED THEY SHOULD BE DISCONNECTED OUT OF THE INSTRUMENTS AND BLOWN WITH AIR.

Fig. 7.3 Scheme of instrument pressure system.



Description :

- | | |
|------------------------------|----------------------------|
| 1 - airspeed indicator | 8 - compensation bottle |
| 2 - altimeter | 9 - drainage units |
| 3 - variometer | 10 - total pressure port |
| 4,5,6 - other instruments | 11 - static pressure ports |
| 7 - total energy compensator | |

7.7. Air brake control system.

The glider is equipped with the plate air brake extended on the upper wing surface.

Control system is the mixed one. From cockpit lever to fuselage torque tube - cables, further the push rods are employed.

The air brake locking in retracted position is ensured by the "dead point".
over center

7.8. Loading and baggage fixture.

No baggage compartment provided.

7.9. Water ballast. - NOT APPLICABLE**7.10. Power-plant. - NOT APPLICABLE****7.11. Fuel system. - NOT APPLICABLE****7.12. Electrical system.**

The battery used for transceiver powering is located behind the II seat.

7.13. Other equipment.

The descriptions of optional equipment (transceiver, board computer etc.) are contained in documents of these instruments and in Section 9.

Section 8

GLIDER HANDLING, CARE AND MAINTENANCE

- 8.1. Introduction.
- 8.2. Glider inspection periods.
- 8.3. Glider alterations and repairs.
- 8.4. Ground handling and road transportation.
- 8.5. Cleaning and care.

8.1. Introduction.

The Section contains manufacturer's recommended procedures for proper servicing of the glider. It also identifies certain inspection and maintenance requirements to retain the performance and reliability of the glider in condition ensured by the producer.

8.2. Glider inspection periods.

Glider inspection periods are specified in Technical Service Manual.

8.3. Glider alterations and repairs.

Before introducing the glider alterations the Airworthiness Authority shall be contacted to be sure these alteration introduce no airworthiness degradation.

The repair procedures should be approved by the producer and Airworthiness Authority.

WARNING: NO INSCRIPTIONS OR MARKINGS ON THE UPPER SURFACES OF WINGS, FUSELAGE AND TAIL-UNIT ARE ALLOWED.

8.4. Ground handling and road transportation.**8.4.1. Connection of towing or winch cable.**

- Pull the releasing handle (yellow) full.
- Insert the small ring of towing cable end into the hook and release the handle.
- Check the cable connection pulling it several times!

WARNING: WINCH-LAUNCHING IS ALLOWED WHEN USING THE C.G. HOOK INSTALLED BEFORE THE MAIN UNDERCARRIAGE WHEEL ONLY.

8.4.2. Airfield transportation.

- Put the trimming device into "tail heavy" position.
- Retract the air brake.
- CORRECTLY LOCK THE CANOPY.

Mechanical transportation:

- The glider should be ground towed with the speed up to 6 [km/h].
- Towing rope length should be no less than 6 [m].

The glider can be ground towed forwards on the towing hook or backwards on the special hook installed in the fuselage rear part.

NOTE: BEFORE CONNECTING THE TOWING CABLE TO THE TAIL HOOK THE CONTROL STICK IN COCKPIT SHOULD BE IMMOBILIZED FULL IN PULLED POSITION BY MEANS OF PILOT'S BELTS TO LOCK THE ELEVATOR IN UPWARD DEFLECTED POSITION.

Hand transportation:

It is recommended to push the glider tail first symmetrically on the leading edge of wings at 1/2 of the midspan.

Make the turns with tail wheel lifted by means of loading the fuselage nose or lifting the tail with the special handle in fuselage rear part.

On the special order the producer delivers the closed trailer COBRA-FOX adapted for the glider and instruction for loading the glider into trailer.

In case the glider is transported on other kind of trailer it is user's responsibility.

In such a case we recommended to observe the following:

- Fix the wings on spar roots near the root rib and on leading edge at 2/3 of semispan.
- The fuselage may be fixed on undercarriage wheels and wing/fuselage connection pivots, providing their contact surfaces are protected against damage.
- Tailplane should be fixed in clamps.
- During transportation the surfaces of fittings, inspection holes and bearings should be protected against dust and dirt.
- Immobilize the control stick and control surfaces. Close the canopy and protect with flanel cover.
- In case of transportation on the open trailer the external surfaces of the main glider components should be protected with individual covers and foil in case of rain.

8.5. Cleaning and care.

The wing leading edge and external lacquer coats should be cleaned with the soft flanel rag or shammy.

The canopy should be protected against a dust with the cover of soft fabric.

For canopy cleaning a special polish for perspex should be used.

Section 9

SUPPLEMENTS

- 9.1. Introduction.
- 9.2. List of inserted supplements.
- 9.3. Supplements.

9.1. Introduction.

This Section contains the appropriate supplements necessary for effective and safe operation of the glider equipped with various additional devices.

9.2. List of inserted supplements.

Date of insertion	Issue	Title of the inserted supplement