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F L I G H T M A N U A L
F O R
A S A I L P L A N E

Model: **SZD-56-2 "Diana - 2"**

Serial No: **.....**

Registration: **.....**

Issue I, March 2006

Pages identified by „Appr.” are approved by:

On behalf of President
of Civil Aviation Office

Signature:

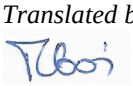
Stamp:

Original date of approval: March 1,, 2006

This sailplane is to be operated in compliance with information and limitations contained herein. This manual should be always stored onboard.

This is translation of the original Polish document agreed with airworthiness Authority

Translated by:



Tadeusz Zboś

SECTION 0

0. ISSUANCES

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 Section 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.

Rev. No	Affected Section	Affected Page	Date of Issue	Approval	Date of Approval	Date of Insertion	Signature

0.2. List of effective pages

Section	Page	Date	Section	Page	Date
0	0.1	01.03.2006		Appr. 4.12	01.03.2006
	0.2	01.03.2006		Appr. 4.13	01.03.2006
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	Appr. 2.10	01.03.2006	8	8.1	01.03.2006
3	3.1	01.03.2006		8.2	01.03.2006
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0.3. Table of contents

0.4. Table of figures

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SECTION 1

1. GENERAL

1.1. Introduction

The sailplane Flight Manual has been prepared to provide pilots and instructors with information for safe and efficient operation of the SZD-56-2 "Diana-2" sailplane.

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

1.2. Certification basis

This type of sailplane, designated SZD-56-2 "Diana-2" has been approved for operation by the Polish airworthiness Authority (Civil Aircraft Inspection Board) in accordance with Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes JAR-22, Amendment 7 of 1 September 2003, and gained Type Certificate No BG 203/1.

Category of Airworthiness: **Utility.**

1.3. Warnings, cautions and notes

The warnings, cautions and notes used in the Flight Manual are defined as follows:

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

CAUTION: ***means that 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 safety but which is important or unusual.***

1.4. Descriptive and technical data

SZD-56-2 “Diana-2” is a single seat, high performance sailplane intended for FAI 15-meter Class. Thanks to its high performances, “Diana-2” is especially suitable for competition flying.

Sailplane constructed of carbon / aramide / epoxy composites, with sandwich structures employing hard PVC foam core.

Monocoque structure fuselage of characteristic silhouette, aft of the cockpit area passing in a small diameter tube. Over the wing portion, the fuselage spar ends are protruding out from the fuselage.

Two-panel wing of multi-tapered outline employs the airfoil family, from KL-002-128F/17 at the root onto KL-002-122F/17 at the tip. Detachable winglets based on the distinct airfoil family. Wing structure in multicell, monocoque torque box layout. Air brake extending on wing top surface only. Flaperon of 0.17 chord ratio over the whole wing span. On flaperon bottom surface, the pneumatic turbulizers are provided, supplied from NACA air-intakes. Each wing panel contains two integral ballast tanks with independent jettison valves. Total capacity of wing tanks ranges 248[litre] (65.5[gal]). Wing / fuselage connection is accomplished by shoving the wing panels on the fuselage spar ends, and locking these with two bolts parallel to wing chord. The air brake control systems, and water tank valves actuation connected automatically {at wing rigging), while coupling in flaperon control system - by means of joint secured with sleeve.

Horizontal tailplane in „T” arrangement mounted on a fin with horizontal, mechanically locked bolt. Elevator control coupling by means of joint with locking sleeve. In a fin the antenna for board transceiver is provided. At fin root, a water ballast tank of 5.6[litre] (1.48[gal]) capacity is installed.

The sprung, retractable landing gear equipped with the TOST AERO 4.00 x 4, 300mm diameter wheel, and drum brake. Tail wheel of 100mm diameter with polyurethane tread. Tow release installed on a fuselage bottom, front part.

One piece, front-hinged, upwards opening cockpit canopy, closed with two grips on canopy frame. Emergency jettison accomplished by opening the canopy locks and pulling onto stop the red grip at the base of instrument panel, followed by pushing the canopy upwards.

Control stick on the right hand cockpit side. Mushroom type instrument panel.

The correct pilot’s attitude in a cockpit set by means of the on-ground adjustable back rest with adjustable head rest, or head rest only, supplemented with the in-flight adjustable pedals.

Due to cockpit arrangement, a pilot higher than 180 cm may find the position in a cockpit with removed back rest more comfortable. In such case, pilot leans his back against wheel house wall, and the head against head-rest – this latter constituting optional equipment of the sailplane.

Effective cockpit ventilation is ensured by the nose air intake with control valve, side blow with air stream direction-, and intensity control, as well as by the side slide window with deflectable ventilation tab.

Control systems of elevator, rudder, flaperon and air brake - push-rod type. Longitudinal trim control - spring type. Tow release and wheel brake control - cable type.

TECHNICAL DATA:

Span		15.00	[m]	49.21	[ft]
Length		6.88	[m]	22.57	[ft]
Height (fin with tail wheel)		1.35	[m]	4.43	[ft]
Wing profile		KL-002-128F/17 at wing root, through KL-002-122F/17 at tip			
Root chord		0.712	[m]	2.33	[ft]
Mean Standard Chord		0.615	[m]	2.02	[ft]
Wing area		8.64	[sqm]	93.0	[sqft]
Aspect ratio		26.04			
Dihedral		2	[deg]		
Tailplane span		2.50	[m]	8.20	[ft]
Empty weight (approx.)		182	[kg]	401	[lb]
All-up mass:	-without water ballast	297	[kg]	655	[lb]
	-with water ballast	500	[kg]	1102	[lb]
Maximum cockpit load		115	[kg]	253	[lb]
Wing surface loading:	-maximum	57.87	[kg/sqm]	11.85	[lb/sqft]
	-minimum	27.43	[kg/sqm]	5.62	[lb/sqft]

1.5. Three-view drawing

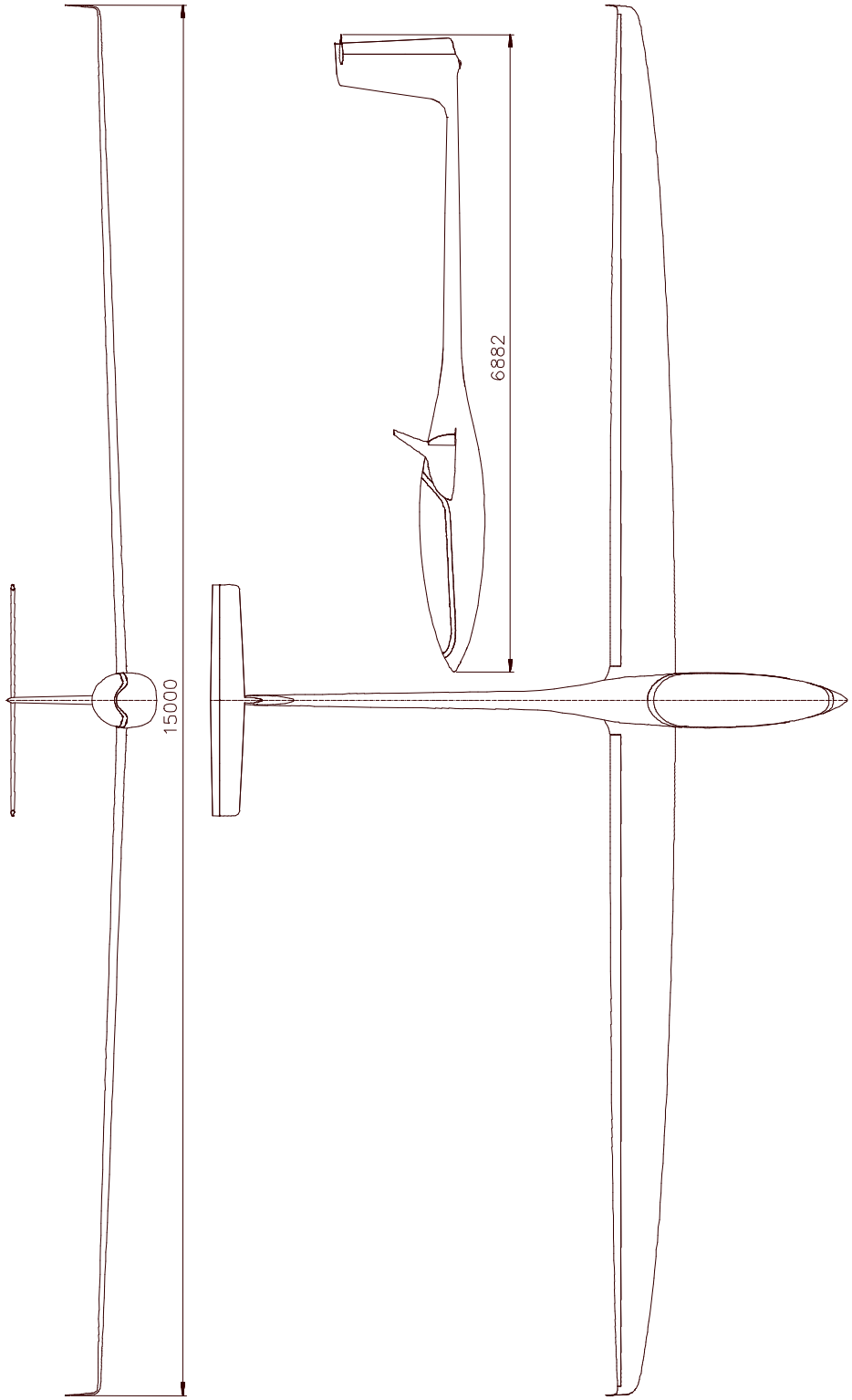

Fig. 1/1 Three-view drawing

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SECTION 2

2. LIMITATIONS

2.1. Introduction

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

The limitations included in this Section and in Section 9 have been approved by the Civil Aircraft Inspection Board.

2.2. Airspeed

Airspeed limitations and their operational significance are shown below:

	Speed	IAS [km/h]	IAS [kt]	Remarks
$\mathbf{V_{NE}}$	Never exceed speed	277	149	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.
$\mathbf{V_{RA}}$	Rough air speed	198	107	Do not exceed this speed except in smooth air, and then only with caution. Examples of rough air are lee-wave rotor, thunderclouds etc.
$\mathbf{V_{A}}$	Manoeuvring speed	198	107	Do not make full or abrupt control movement above this speed, because under certain conditions the sailplane may be overstressed by full control movement.
$\mathbf{V_{FE}}$	Maximum flap extended speed:			Do not exceed these speeds with the given flap setting.
	-2°	277	149	
	0°	277	149	
	+8°	277	149	
	+14°	224	121	
	+28°	224	121	
$\mathbf{V_{T}}$	Maximum aerotowing speed	139	75	Do not exceed this speed during aerotowing.
$\mathbf{V_{LO}}$	Maximum landing gear operating speed	200	108	Do not extend or retract the landing gear above this speed.

In the following table the allowed V_{NE} values for various flight altitudes are given:

!!!

Absolute flight altitude [km]	0 ÷ 2	3	4	5	6	8	10
IAS [km/h]	277	264	249	236	224	200	177
Absolute flight altitude [1000 ft]	0÷6.6	9.8	13.1	16.4	19.7	26.3	32.8
IAS [kt]	149	142	134	127	121	108	96

2.3. Airspeed indicator markings

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

Marking	(IAS) value or range [km/h]	[kt]	Significance
White arc	92 ÷ 224	50 ÷121	Positive flap operating range. (Lower limit is $1.1V_{S0}$ in landing configuration at maximum weight; upper limit is maximum speed permissible with flaps extended positive.)
Green arc	111 ÷ 198	60÷107	Normal operating range. (Lower limit is $1.1V_{S1}$ at maximum weight and most forward C.G. with flaps neutral; upper limit is rough air speed.)
Yellow arc	198 ÷ 277	107÷149	Manoeuvres must be conducted with caution and only in smooth air.
radial Red line	277	149	Maximum speed for all operations.
Yellow triangle	94	51	Approach speed at maximum weight without water ballast.

V_{S1} = glider stalling speed in a given flight configuration,

V_{S0} = stalling speed in a landing configuration, at maximum weight and most forward C.G. position

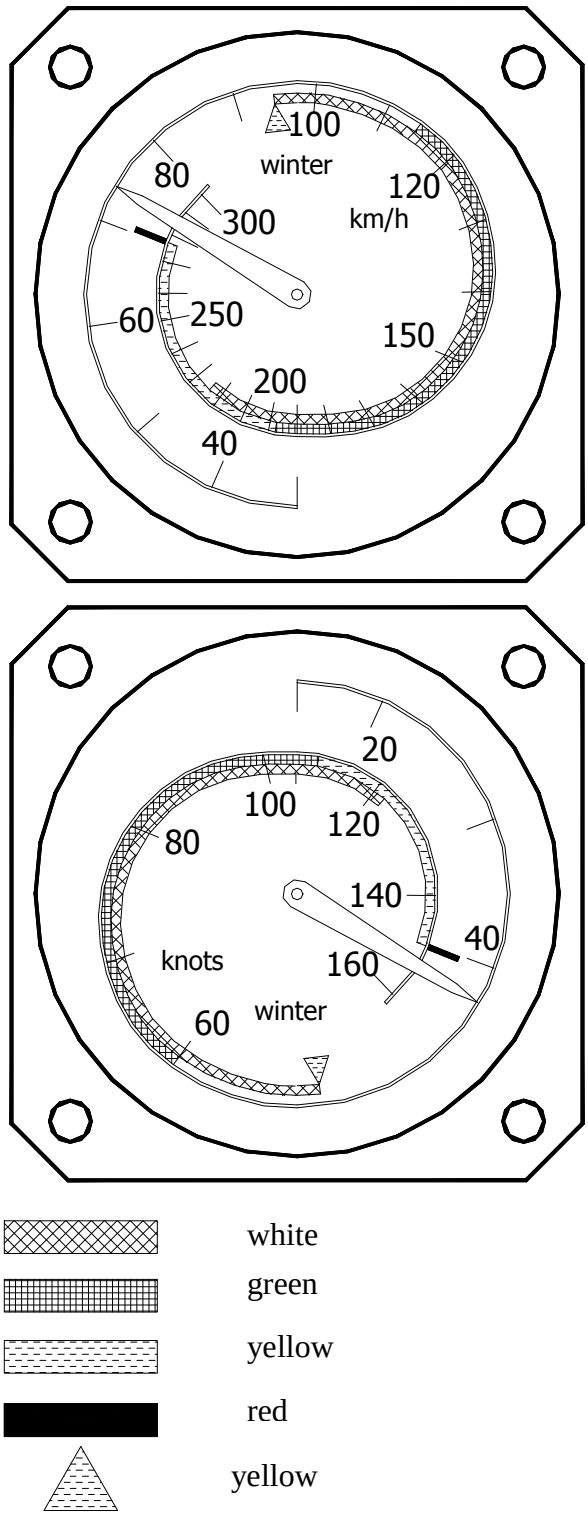

Fig. 2/1 Airspeed indicator marking

2.4. Weight

	[kg]	[lb]
Maximum take-off weight: -without water ballast -with water ballast	297 500	655 1102
Maximum landing weight	500	1102
Maximum weight of all non-lifting parts	90	198
Maximum water ballast in wing tanks	248	547
Maximum water ballast in tail tank	5.6	12.3
Maximum weight in baggage compartment	5.0	11

2.5. Centre of gravity

The limits of in flight permissible C.G. position have been defined as follows:

- front limit 0.2017 [m] (7.94 [in]) aft of DP, corresponding to 19 per cent of MSC,
- rear limit 0.3618 [m] (14.24 [in]) aft of DP, corresponding to 45 per cent of MSC.

Datum Point stands for Datum Point = wing leading edge at root rib.
MSC stands for Mean Standard Chord.

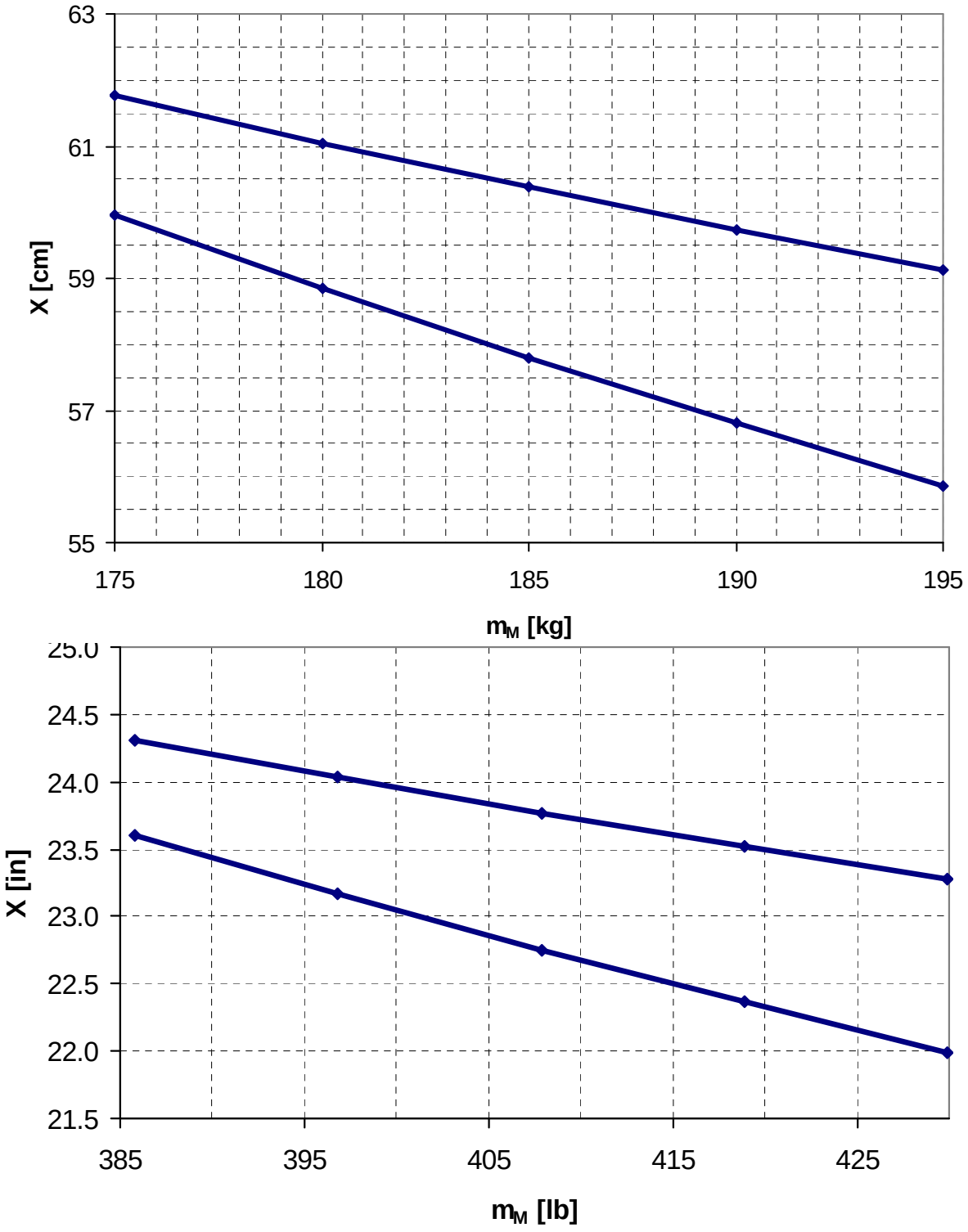

Fig. 2/2 Allowed C.G. range at different empty weights
m_M - empty weight, X - empty sailplane C.G.

Example of C.G. position calculation is given in Section 4, Technical Service Manual of SZD-56-2 “Diana-2”.

2.6. Approved manoeuvres

This sailplane has been certified in „Utility” Category, with no aerobatic manoeuvres allowed.

2.7. Manoeuvring load factors

The allowed manoeuvring load factors are as follows:

	at V_A = 198[km/h] (107 [kt])	at V_{NE} =277[km/h] (149 [kt])
maximum positive load factor	+ 5.3	+ 4.0
maximum negative load factor	-2.65	- 1.5

NOTE: The above refers to the configuration with air brake retracted, and wing flap setting not exceeding +8^o.

With air brake extended, the positive limit manoeuvring load factor is +3.5, over the whole range of operating airspeed.

With wing flaps deflected down by more than +8^o, the positive limit manoeuvring load factor is +4.0, over the airspeed range up to V_{FE} = 224[km/h] (121[kt])

2.8. Flight crew

The pilot + parachute weight must be contained within the following limits:

- minimum 55 [kg] (121 [lb]),
- maximum 110 [kg] (242 [lb]).

2.9. Kinds of operation

This sailplane has been certified in „Utility” Category and is intended for normal soaring flight in accordance with VFR rules, by day.

WARNING: The following are forbidden:

- night flying,

- cloud flying,

- aerobatics.

2.10. Minimum equipment

The minimum equipment required according to JAR-22 standards comprises:

- airspeed indicator
- altimeter,
- pilot safety harness (4-point).

Sailplane standard equipment, apart from the listed above, contains:

- variometer ±5 [m/s] (±10 [kt]),
- compensator of total energy variometer,
- compass,
- first aid kit.

2.11. Aerotow

The maximum allowed aerotowing speed is as follows:

V_T =139 [km/h] (75 [kt]).

The towing rope shall be equipped with the weak link of rated strength:

690 [kg] ±10% (1520 [lb] ±10%).

For aerotow, the length of tow rope must be at least:

30 [m] (98 [ft]).

2.12. Other limitations

WARNING: This sailplane is not adapted for winch-launched take off.

WARNING: Flying with water ballast at ambient temperature below 0^{o}C forbidden

2.13. Limitations placard

This placard is located on the right hand cockpit wall.

OPERATING LIMITATIONS			
Weight:	**[kg]**	**Airspeed IAS :**	**[km/h**
Empty weight	182	V_{NE}	277
Maximum in flight weight:		V_A	198
-with water ballast	500	V_{RA}	198
-without water ballast	297	V_T	139
Cockpit load:		V_{LO}	200
- maximum	115	V_{FE} $+28^o \div +8^o$	224
- minimum	55	V_{FE} $+8^o \div -2^o$	277

OPERATING LIMITATIONS			
Weight:	**[lb]**	**Airspeed IAS :**	**[kt]**
Empty weight	401	V_{NE}	149
Maximum in flight weight:		V_A	107
-with water ballast	1102	V_{RA}	107
-without water ballast	655	V_T	75
Cockpit load:		V_{LO}	108
- maximum	253	V_{FE} $+28^o \div +8^o$	121
- minimum	121	V_{FE} $+8^o \div -2^o$	150

NOTE: Further placards - see Technical Service Manual.

SECTION 3

3. EMERGENCY PROCEDURES

3.1. Introduction

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

CHECKLIST

EMERGENCY PROCEDURES

1. CANOPY JETTISON

- open canopy locks
- pull the emergency jettison grip onto stop
- push the canopy upwards

2. BAILING OUT

- jettison the canopy
- release the safety belts
- pull up the legs and exit cockpit
- watch the wings and tail surfaces
- open a parachute

3. SPINNING

- wing flaps neutral
- ailerons neutral
- rudder opposite to rotation
- release stick forwards, until rotation ceases
- center rudder
- pull out of dive

3.2. Canopy jettison

To jettison the canopy in an emergency:

- open canopy locks (white colour - on canopy frame),
- pull onto stop the emergency jettison grip (red colour - at the bottom of instrument panel),
- resolutely push the canopy up

NOTE: If the canopy cannot be jettisoned, break the perspex starting at the window. Use the leg force, if necessary.

3.3. Bailing out

Bailing out is the last resort, mandatory emergency action if it is not possible to control the glider into the safe landing.

To bail out:

- jettison the canopy, acc. to item 3.2,
- release the safety belts,
- pull up the legs and bail out (if the glider is rotating e.g. spinning - bail out towards rotation centre),
- open the parachute with a delay (depending on circumstances), acc. to its operation instruction.

NOTE: ***If bailing out takes place below 200 [m] (656 [ft]) of altitude, the parachute should be opened immediately after leaving the cockpit, avoiding (as far as possible) collision with the glider.***

3.4. Stall recovery

The stalled glider pitches nose down symmetrically, or with a tendency to bank.

The recovery is troubleless and reliable by “releasing” the stick forwards.

3.5. Spin recovery

This sailplane is not allowed for spinning. Recovery from an inadvertent spin (this concerns also sailplane with water ballast) should be accomplished as follow:

- ailerons neutral,
- wing flaps neutral,
- rudder opposite to rotation
- release stick forwards, until the rotation ceases
- center the rudder, with simultaneous pulling out of ensuing dive

The recovery ensues without significant delay.

3.6. Recovery from spiral dive

Depending on aileron-, and wing flap position in a spin, sailplane can pass into spiral dive.

Recovery from this flight condition should be accomplished as follows:

- wing flaps neutral,
- ailerons neutral
- rudder neutral
- release the stick slightly forwards and gently pull out of dive, controlling the airspeed

3.7. Other emergencies

3.7.1. Landing with water ballast

For the sake of landing gear loads, landing with water ballast should be restricted to the indispensable cases (e.g. balked take-off, malfunction of ballast tanks valve control, unsuccessful take-off for competition task).

Approach at speed raised by 10 ÷ 20 [km/h] (5 ÷ 11 [kt]).

Touch down with care, preferably on a paved runway.

Cross-wind, heavy- and pancake landing should be avoided.

3.7.2. Flight and landing with asymmetric water ballast

For the sake of design characteristics, appearance of asymmetric water ballast in a normal operation, carried in accordance with sailplane manuals, is not much probable.

Slight asymmetry to wing ballast distribution remains, in general, imperceptible to a pilot and does not significantly affect the flight or landing safety.

Higher degree of asymmetry results in a distinct sailplane tendency to bank. This tendency depends on wing flaps setting and airspeed. With ballast tank full in one wing panel, and empty in the second, the aileron opposite full deflection is necessary when approaching the stall speed. At stall speed, there is a tendency to bank towards „heavy” wing. The correct controls action will result in regaining the level flight.

Turns towards the „light” wing are recommended.

Asymmetry can appear due to:

1. Water outflow on one side through the leaky valve in one wing. The asymmetry can increase gradually until reaching the full / empty configuration of corresponding (front or rear) wing tanks.
   In case of increasing sailplane tendency to bank, the following procedure should be employed:

   – open all discharge valves,
   – maintain the forced, slight bank of sailplane towards the „light” wing,
   – avoid sailplane stall, especially in turns towards the „heavy” wing,
   – change to lateral balance must be observed,
   – on regaining the correct lateral balance, discharging of the water ballast can be stopped, and the flight task can be continued acc. to the program.

2. The lack of -, or restrained water outflow from one of wing tanks during water ballast discharge.

   When an increasing tendency to bank appears, after opening the valves, the following should be observed:

   – retard landing, if at all possible (resign the accelerated descent with air brake extended), or even make use of ascending air current to climb,
   – maintain the forced bank towards the „light” wing
   – avoid sailplane stall, especially in turns towards the „heavy” wing,
   – if, after approx. 10 minutes, the asymmetry ceases gradually - flight task can be continued acc. to the program,
   – if, after approx. 10 minutes, the asymmetry remains unchanged or is increasing further - turn to the nearest airfield and report necessity of emergency landing.

   Touch down to be accomplished with sailplane bank towards the „light” wing, at raised speed and at a safe distance from obstacles on a „heavy” wing side. If, in ground roll, sailplane will bank towards the „heavy” wing - immediately deflect the rudder to the opposite side, and release the stick forwards. Braking on the main wheel facilitates maintaining the direction in ground roll.

   Even with ventilation holes choked entirely, the time for water ballast discharge does not exceed 10 minutes.

3.7.3. Flying and landing with tail water ballast

The tail ballast tank can remain not drained due to e.g. water icing, valve malfunction or tension member break.

If, after discharge of water ballast, a sailplane longitudinal balance has changed distinctly to „tail heavy”, the following procedure should be employed:

- re-set several times the valves control handle between the front and aft positions,
- leave the control handle in aft position (all valves open),
- continue flight avoiding sailplane stall and spin.

WARNING: Pilot below 70 kg (154 [lb]) should land on the nearest airfield.

3.7.4. Landing with main wheel retracted

Landing with undercarriage retracted is allowed only if correct extending and locking it is impossible. Prior to landing, the water ballast must be jettisoned.

During landing with undercarriage retracted:

- select the possibly smooth grass surface or a soft ploughed field,
- land against the wind,
- touch down with care, avoid heavy or pancake landing.

3.7.5. Landing with ground loop

If it is unavoidably necessary in landing to shorten the ground run (e.g. to avoid collision with an obstacle), a controlled ground loop should be made as follows:

- bank the glider towards a wing opposite to an obstacle and, in case of cross-wind component, against the wind if at all possible,
- in line with turning, release the stick forward and deflect the rudder opposite to the turn.

3.7.6. Break or inadvertent release of towing rope

In case of break, or inadvertent release of towing rope at a low altitude, proceed as follows:

- pull the tow release (if the rope remained attached to the glider),
- extend the undercarriage,
- tighten the shoulder belts,
- select a landing site,
- land off-field or, if possible, on the airfield.

In case of unavoidable collision with the terrain obstacles, off the airfield,
DO NOT ALLOW THE HEAD-ON CRASH !

3.7.7. Water jettison at temperatures below 0℃

Till reducing the flight altitude and entering the air of temperature above 0°C (32 [°F]), the icing of wing flaps in the area of water discharge valves, as well as this of fuselage tail with rudder must be taken into account. This may result in blocking the a.m. control surfaces, as well as in shifting the C.G position further aft. To prevent the locking of control surfaces, deflect these more often than usual, and pay also attention to any abnormalities in longitudinal balance of sailplane.

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SECTION 4

4. NORMAL PROCEDURES

4.1. Introduction

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

4.2. Sailplane rigging and de-rigging

Three persons are necessary for sailplane rigging and de-rigging (with available wing supports - two persons).

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

4.2.1. Wing rigging

The following description together with Fig. 4/1 define the procedure of wings rigging.

Sequence of operations in rigging:

1. Put the air brake hand grip in a cockpit in its front position (do not lock this), and the hand grip of water ballast tank valve in a „closed” position.
2. Retract the air brake in the wing.
3. Shove the main fitting socket (1) of one wing panel on the corresponding fuselage spar (2). While shoving, keep the planes of wing and fuselage enclosing ribs parallel.
4. In continued motion, the fuselage spar pivot (3) should mate with the ball nest inside the socket.
5. Moving at wing tip, align the main (1) and rear (6) fitting openings with corresponding openings in fuselage spar (7) and with these of fuselage rear fitting (8). The torque tubes of automatic coupling in air brake - (4), and wing ballast valves (5) control system are to be shifted towards the assembled wing panel.
6. Having juxtaposed the wing with fuselage, as above, insert the main bolt (9) and next rotate this, which should result in catching the bolt notch at angle bar (13) on fuselage rib, and the pin (10) at the spring clamp (11).
7. Repeat the operations under items 3 through 6 on opposite wing.
8. Having rigged both wings, connect the wing push rods (12) of flaperon control system with appropriate push rods in a fuselage.
9. Secure the spring clamps with safety-pins to prevent the main bolt pin sliding off.

Wing de-rigging requires the reverse sequence of operation.

NOTE: When rigging or de-rigging, do not catch wings at trailing edge as this may result in damage to control surfaces.

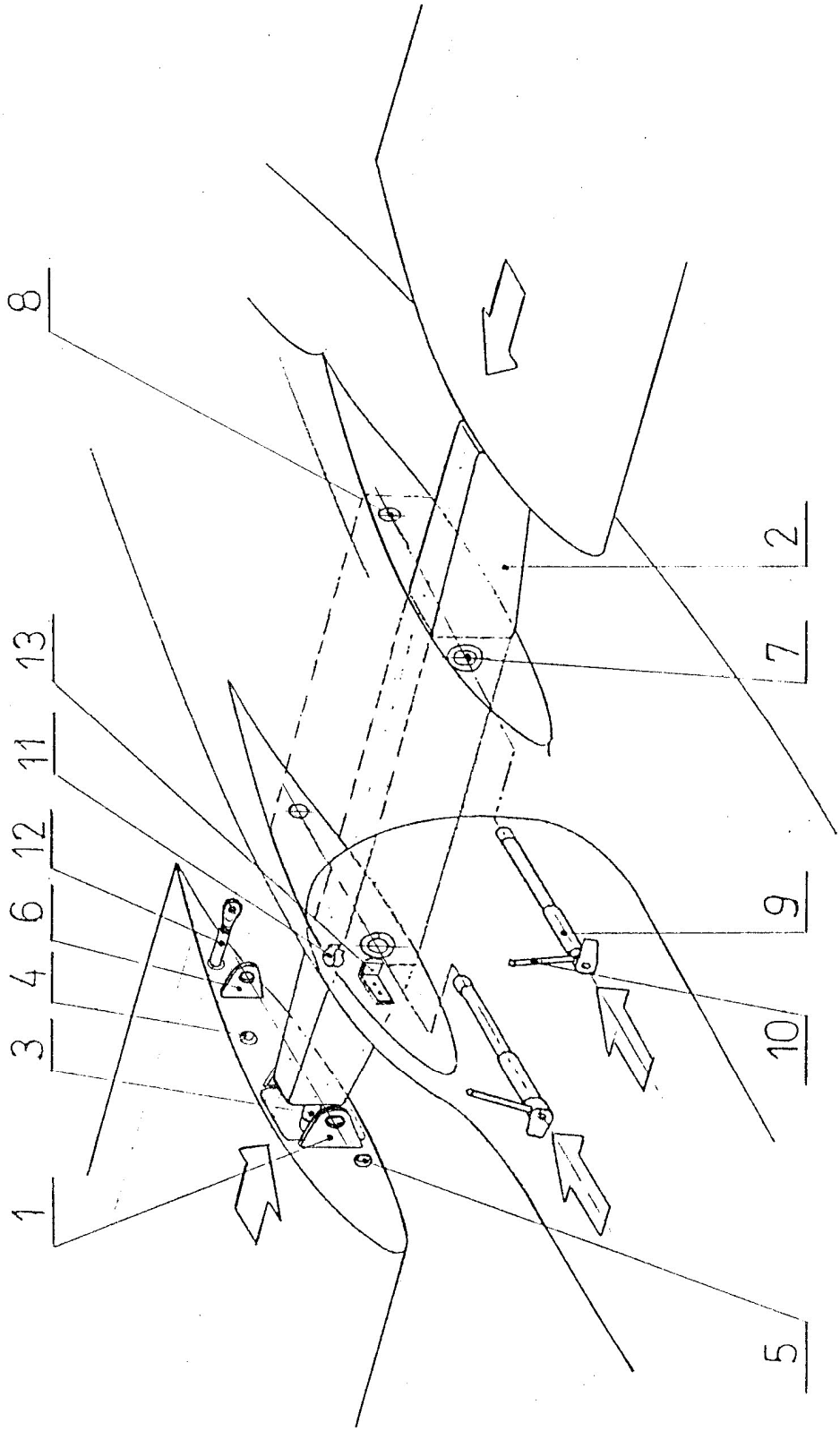

Fig. 4/1 Wing rigging

4.2.2. Tailplane rigging

Sequence of operations in tailplane rigging (see Fig. 4/2):

1. Disassemble the fairing (1), removing first the screw (5).
2. Put the horizontal tailplane on the fin, inserting the protruding from stabilizer „T” shape arm (7) of main fitting into a socket (10).
3. Connect the front (4), and main (7) fittings of horizontal and vertical tailplanes with bolt (6). Insert the pin (9) in the opening in fin rib and secure this with a safety pin.
4. Connect the elevator control system by coupling the push rod (3) with the top lever (2).
5. Put the fairing (1) on, and secure this with screw (5).

Tailplane de-rigging requires the reverse sequence of operation.

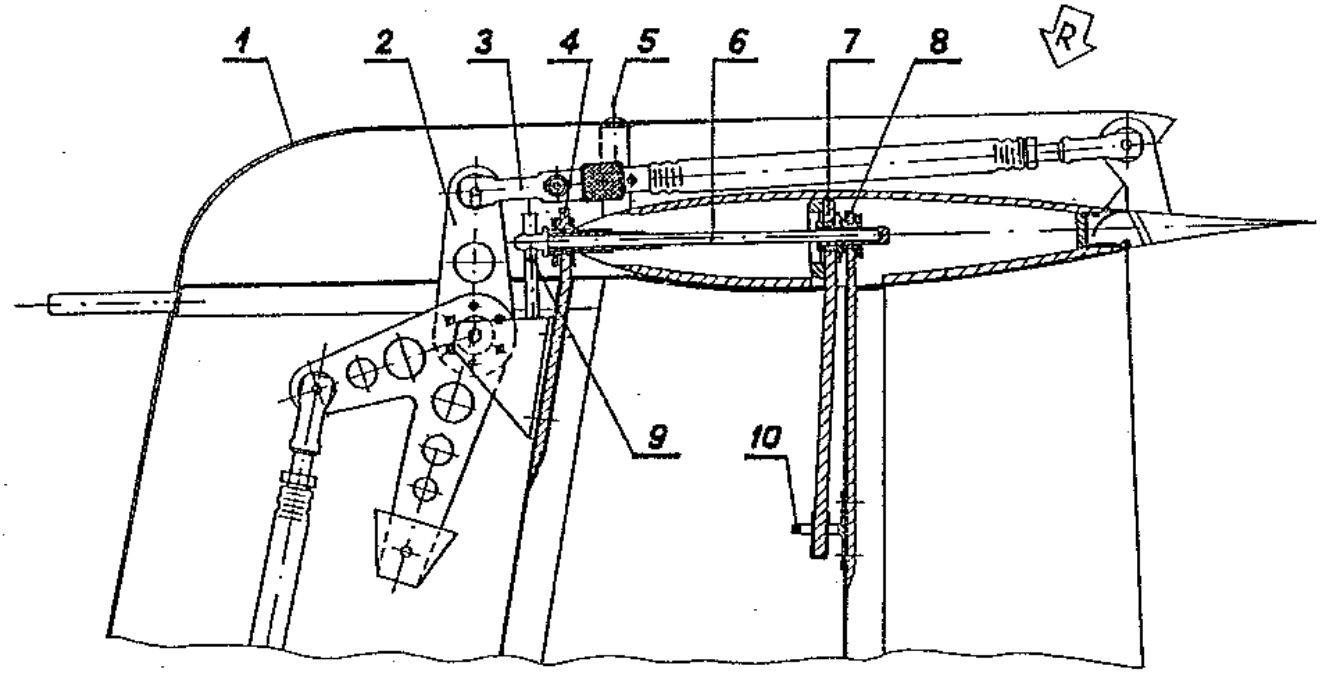

Fig. 4/2 Tailplane rigging

4.3. Daily inspection

Before flying, the glider should be inspected carefully. This concerns also the gliders stored in hangar since, as learnt by experience, these are exposed to damage during manoeuvring or when in rest (e.g. rodents).

During the inspection, the followings should be checked:

1. Glider documents, validity of Inspection Certificate - complete the records.
2. Condition of the fuselage, wing and tailplane structure and skin (visual inspection).
3. Reliable securing of the wing and tailplane bolts.
4. Reliable securing of the flaperon - (through the fuselage top access hole), and elevator controls.
5. Condition of canopy, correct closing and opening, and condition of its emergency jettison system.
6. Cockpit interior, position of pedals, back rest locking, safety belts, lack of loose items.
7. Unrestricted deflections and plays in control systems of flaperon, rudder, stabilizer and air brake.
8. Correct operation of longitudinal trim system.
9. Undercarriage condition, wheel rollability, wheel tyre pressure (by eye), cleanness of the undercarriage well, deflection of shock absorber.
10. Operation and efficiency of wheel brake.
11. Condition and operation of tow release.
12. Water ballast system: symmetric operation (i.e. opening and closing of discharge valves), correct tanks filling, valves and fillers leak-proof, venting openings clear.
13. Instruments, pressure ports, battery connection.
14. Transceiver, make a communication test.

4.4. Pre-flight inspection

Inspection before flight

Prior to flying, check what follows:

1. Locking of assembly bolts connection, and in control systems.
2. Unrestricted deflection of control surfaces over the full range of deflection angles and control forces.
3. Check if sailplane loading conforms with loading plan given in Section 6 of this Manual. Check the C.G. position (see TECHNICAL SERVICE MANUAL, Section 4).
4. Correct filling of water ballast tanks.
5. Transportation tail wheel removed.
6. Back rest correctly mounted and secured.
7. Parachute condition.

Procedures before take off

The list of inspection procedures, to be followed immediately before take-off, has been enclosed at the base of instrument panel.

PRE-FLIGHT CHECKLIST	
1.Ballast: - ventilation	- CHECK
- lateral balance.	- CHECK
2.Transport tail wheel removed	- CHECK
3.No loose items in a cockpit	- CHECK
4.Parachute	- PUT ON
5.Safety belts	- FASTEN
6.Landing gear locking	- CHECK
7.Controls full deflection	- CHECK
8.Air brake	- RETRACT
9.Trimming device - for take off	- SET
10.Wing flaps - for take off	- SET
11.Altimeter setting	- CHECK
12.Cockpit canopy	- CLOSE
13.Transceiver	- CHECK
14.Towing rope connection	- CHECK

4.5. Normal procedures and recommended speeds

4.5.1. Aerotowed take off and climb

In aerotowed take off with water ballast:

- recommended tug airplane with possibly high thrust, ensuring high acceleration over the first phase of ground roll,
- avoid take off from high grass, especially with cross wind,
- take off against the wind, in case of cross wind - take off allowed with cross wind component not exceeding 5 [m/s] (10 [kt]),
- prior to take off with water ballast, a lateral balance of sailplane should be checked - with wings level.
- position the sailplane exactly into a wind,
- for take off (ground roll) select a dry, hard and flat terrain,
- set the wing flaps at no more than 21^o (in case of lower amount of water ballast 14^o or 8^o)
- for aerotow employ the towing rope of 30 [m] (98 [ft]) length, at minimum,
- ground roll should be initiated with stick pushed completely fore, until rising the tail
- before lifting the tail, control the ground roll direction with resolute, full deflections of rudder
- if this does not inadvertently affect the ground roll, raising the tail may be agitated by delicate braking on main wheel

In case of:

- change to direction in ground roll by more than $15^o \div 20^o$ or
- touching ground with a wing, right after starting the ground roll,

take the following action without delay:

  - release the towing rope
  - maintain the control stick pushed forwards onto stop,
  - aileron opposite to bank may be used but, due to high lateral inertia of wing with water ballast, efficiency of this manoeuvre is limited
  - use the wheel brake

- after lifting the tail, control the ground roll direction with gentle rudder deflections
- after lifting the tail, if wings are maintained level (no distinct bank), sailplane response to control deflection is positive and with no delay. Maintaining the attitude does not require an exceptional piloting skill.
  The sailplane maintained in correct attitude behind a tug airplane is directionally and laterally stable.
- on lifting off, and gaining safe altitude above ground, the wing flap deflection may be reduced so to reduce the aileron control force, maintaining at the same time a good tug plane visibility
- setting the climbing flight parameters, it is recommended to continue the flight at +10° through +12° flap setting,
- over the whole take off run, from ground roll start until gaining safe altitude, it is not recommended to take any action different from these indispensable to conduct take-off. Do not retract landing gear, change wing flap position etc.

In aerotowed take off without water ballast:

- position the sailplane into a wind, as far as possible,
- for take off (ground roll) select a dry, hard and flat terrain,
- set the wing flaps at no more than 14^o, the optimum range however is 8^o through 3^o
- set the trimming device for take off. To do so press the trim lever on control stick, set control stick at 30 per cent of full deflection range from its foremost position and release the trim lever,
- set the stick to aileron neutral position, check visually on a wing
- keep your left hand close to release hand grip,
- ground roll to be initiated with the control stick pushed completely forward, until raising a tail
- before lifting the tail, the ground roll direction is to be corrected with resolute, full deflections of rudder, in most cases however this is not necessary since soon after ground roll start the sailplane is lifting the tail and becomes laterally and directionally more stable

In case of:

- change to direction in ground roll by more than $20^o \div 30^o$ or
- touching ground with a wing, right after starting the ground roll,

take the following action without delay:

- release the towing rope
- maintain the control stick pushed forwards onto stop,
- apply aileron opposite to bank,
- use the wheel brake

- after lifting the tail, control the ground roll direction with gentle rudder deflections,
- after lifting the tail, if wings are maintained level (no distinct bank), sailplane response to control deflection is positive and with no delay,
- on lifting off, and gaining safe altitude above ground, the wing flap deflection may be reduced so to reduce the aileron control force, maintaining at the same time a good visibility of tug plane,
- at an altitude of approx. 150 [m] (330 [ft]), retract the landing gear and correct the longitudinal trim

Recommended aerotow speed is:

without ballast	110 ÷ 120 km/h (59 ÷ 65 [kt])
with ballast	120 ÷130 km/h (65 ÷ 70 [kt].

NOTE: ***In case of touching ground with a wing, and change to the direction by more than 15^o, release the towing rope immediately and push the control stick forward with simultaneous rudder deflection opposite to possible rotation.***

4.5.2. Free flight

Making use of wing flaps:

Adjustment of wing flap setting allows better adoption of the sailplane to actual flight condition.

Flap settings +8° through -2° are suitable for straight flight and, over the range of corresponding airspeeds, these are optimum settings. Flap settings +14° through +21° are aimed for use while circling. The +14° setting is normally used for centering into thermals as well as for leaving the turbulent lift zones. Settings +14° and +21° are used when the thermal has been centered, which allows for tight & steady circling in its core. The +28° setting is used for landing only.

Optimum flap setting at various airspeed range depend strongly on wing surface loading.

In a diagram under item 5.3.3 the optimum wing flap setting is given, versus sailplane weight and airspeed.

WARNING: ***In case of instantaneous or sudden wing flap displacements, the wing lift changes abruptly, which may result in abrupt alterations of flight altitude. Thus care must be exercised in this respect while flying close to the ground surface or near to other sailplanes (gaggle flying).***

Low speed flight and stall characteristics:

In flight at a low airspeed down to stall “Diana-2” behaves normally, in a way representative for most sailplanes. When stalled, the sailplane falls symmetrically, or with a tendency to drop the wing.

The stall warning is present in the whole range of C.G. positions, the clear stall warning buffeting occurs at airspeeds higher by approx. 5 [km/h] (3 [kt]) than the values given in the table, item 5.2.2.

Side slip

This sailplane performs a very flat, inefficient side slip.

Side slip in a landing configuration (air brake and undercarriage extended, flaps at $+28^{o}$ setting) is inefficient as a manoeuvre aimed to increase sink speed. This may be safely performed within the airspeed range from the recommended approach speed up to the V_{FE} =224[km/h] (121[kt]) value. In a steep, dynamic slip a reversal of rudder control force will appear. The pulling force is low, and does not hinder piloting. In steady flight conditions, force reversal does not appear. Releasing the controls in a slip results in sailplane transition to symmetrical flight. Partial-, or full water ballast does not affect the sailplane slip characteristics. The readings of airspeed indicator in a slip are approx. 5 through 20[km/h] (3 through 11[kt]) below the real values.

4.5.3. Approach

Decision on landing, despite sailplane high glide ratio, should be taken early enough. At an altitude of 100[m] (330[ft]) above the landing site (at the very least), flaps should be set to $+14^{o}$ through $+28^{o}$, and landing gear extended. Additionally, for flight path control in approach the air brake should be used.

Approach should be done at approx. 95 [km/h] (51 [kt]) speed, while in turbulence - approx. 10 [km/h] (5 [kt]) above this value.

4.5.4. Landing

Prior to landing, the water ballast should be jettisoned.

NOTE: ***Landing with full, or in part jettisoned water ballast allowed only in necessary instances, and then on airfield only.***

WARNING: *Wing flap* ***manoeuvring close to the ground is not recommended since this may result in dangerous alterations to flight altitude.***

In a landing ground roll, pull the elevator control back, to facilitate maintaining the directional stability, and to avoid the nose touch down when braking on the wheel.

4.5.5. Flight with water ballast

Wing tank water ballast allows to adopt the optimum value of wing surface loading to the anticipated in flight weather conditions. Tail water ballast allows to obtain the more aft in flight C.G. position, when flying with water ballast (better performances).

Capacities of water ballast tanks are as follows:

front tank in a wing	2 x 81.4 [litre] (2 x 21.5[gal])
rear tank in a wing	2 x 42.5 [litre] (2 x 11.2[gal])
tail tank	5.6 [litre] (1.48[gal])

NOTE: ***This is to remember that, in line with increasing surface loading, both the minimum speed and the take off run distance are rising as well.***

General guidelines on water ballast application

Taking the decision on using water ballast, it is to remember that the maximum allowed sailplane weight, as well as the range of permissible C.G. position may not be exceeded, when filling the tanks (in wing and in tail).

Tables and formulas allowing to select the correct amount of water ballast are given in Section 6 of this Manual, as well as in Section 4 of Technical Service Manual.

Only plain, filtered water should be used when filling the tanks.

Flying with water ballast allowed only at temperatures above 0°C (32 °[°F]).

WARNING: Water freezing may result in a serious damage to sailplane, internal structure getting flooded, incorrect C.G. position, water valves blocking etc.

The following table, located on a right hand cockpit side wall, allows to find the limit altitudes for flight with water ballast, in the absence of board thermometer.

MAX. FLIGHT ALTITUDE WITH WATER BALLAST					
Min. temperature on ground[°C]	13.5	17.5	24	31	38
Max. flight altitude [m]	1500	2000	3000	4000	5000
Min. temperature on ground[° F]	56.5	69.5	81	90	96
Max. flight altitude [1000 ft]	5	8	11	14	17

Filling the wing tanks

Tanks in the right-, and left hand wing panels are independent, valves opening and closing symmetrically (mechanical interconnection).

Start filling with the front tanks in a wing.

If the predicted amount of wing water ballast exceeds 162.8[litre] (43.0 [gal]), the wing rear tanks are to be filled as well.

The total capacity of wing tanks ranges 248[litre] (65.5[gal]).

The sequence of operations in filling wing tanks is the same for the front-, and for the rear ones.

When filling the wing tanks:

- set the sailplane level - with no bank (support the wing with a brace or by hand),
- close the discharge valves,
- insert a funnel into filler,
- choke the rear tank inlet in a funnel with a plug,
- open the venting orifice located in safety valves

- pour the water in measured amount or brim-full, until obtaining the continuous outflow from the filler,
- repeat this procedure for filling the wing rear tanks.

WARNING: Never fill the tanks with water supply hose inserted directly into tank filler.

- having filled the tanks, remove funnels and close valves,

Filling the tail ballast tank

Tail tank is installed at the base of the fin, filler on the right hand fin surface.

The discharge valve of tail ballast tank is opened every time the valves of wing front tanks are being opened (controls interconnection).

NOTE: Tail ballast tank should be filled, as a rule, after filling the wing tanks.

Pour water in the measured amount through the funnel inserted into the filler. An eventual excess of water flows out through the venting opening.

Jettison of ballast water

Discharge of ballast water is controlled by means of lever located on the cockpit right hand side.

Rotating the short lever backwards results in opening of discharge valves of wing rear tanks.

Rotating the long lever backwards results in opening the discharge valves of wing front and rear tanks together with the tail tank valve.

Water outflow can be stopped (i.e. the discharge valves of wing and tail tanks closed) by rotating the appropriate lever of water discharge control forwards.

It is not possible to discharge the water from wing front tanks without discharging first the water from wing rear tanks.

Water from wing tanks flows partially on the wing bottom surfaces and fuselage. Water outflow remains imperceptible from the cockpit. Time of water complete jettison depends on the amount of water. With wing tanks full, it takes approx. 3 minutes (jettison of water from tail tank is accomplished in shorter time).

4.5.6. High altitude flight

One should keep in mind that, in line with increasing flight altitude the true airspeed is higher than this indicated one.

Therefore the maximum allowed airspeed V_{NE} must be reduced according to the table, item 2.2, of this Manual.

4.5.7. Flight in rain

When flying in rain, a degradation to sailplane performances should be taken into account. In circling, and in approach increase airspeed by approx. 10 [km/h](5.4 [kt]).

In poor visibility or with foggy canopy glassing, open the side window and cockpit ventilation valve.

It is recommended to remove the rain drops and dry the sailplane prior to take-off.

Do not enter the icing condition zones with a wet glider.

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SECTION 5

5. PERFORMANCES

5.1. Introduction

Section 5 provides approved data for airspeed indicator system calibration and stall speeds. This contains also non-approved further values and data.

The data in a charts have been computed from flight tests with the sailplane in good condition and using average piloting techniques.

5.2. Approved data

5.2.1. Airspeed indicator system calibration

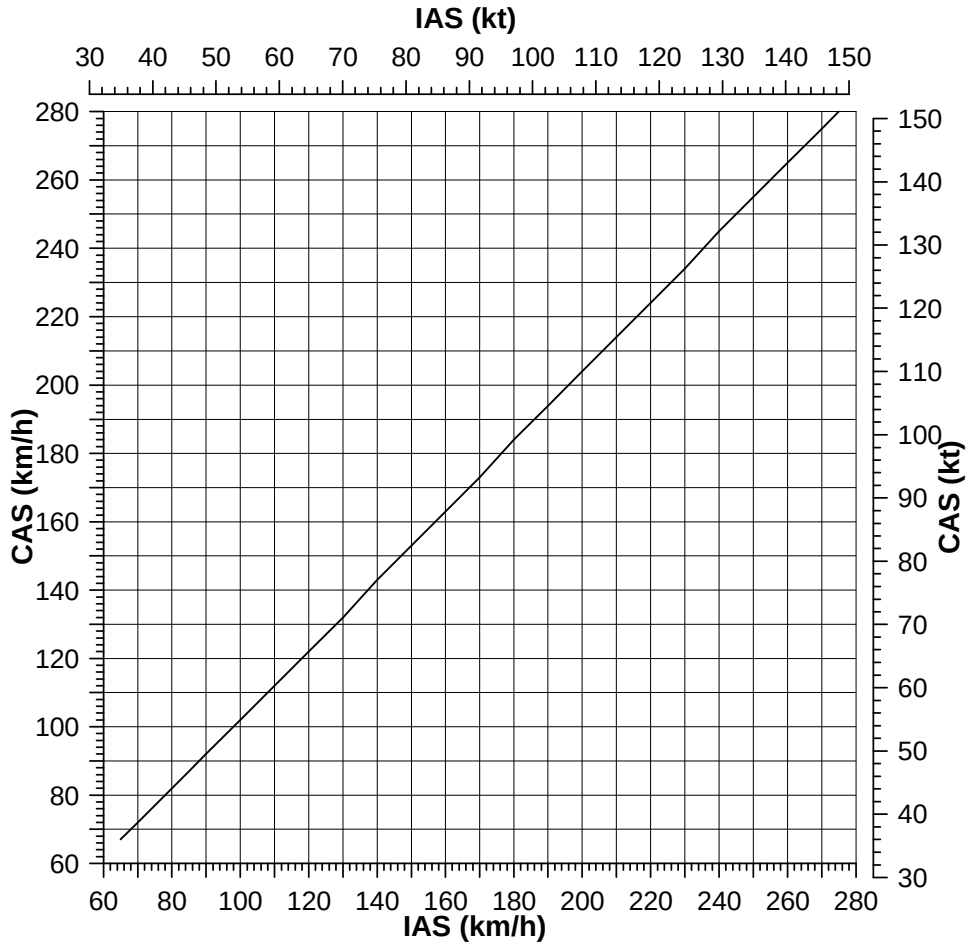


Fig. 5/1 IAS Calibration

NOTE: ***The above diagram presents CAS versus IAS.***

CAS - Calibrated Airspeed - instrument value (airspeed indicator reading), corrected for instrument error and aerodynamic calibration error.

IAS - Indicated Airspeed - instrument reading corrected for instrument error only. IAS values presented in this Manual are given assuming zero instrument error.

5.2.2. Stall speeds

In the following table the IAS stall speeds values (airspeed indicator readings) are given for particular wing flap settings, both in straight flight and in circling:

wing flap setting	in flight mass							
	283[kg] (624[lb])				500[kg] (1102[lb])			
	straight flight		circling ϕ=45°		straight flight		circling ϕ=45°	
	[km/h]	[kt]	[km/h]	[kt]	[km/h]	[kt]	[km/h]	[kt]
-2°	82	44	90	49	101	55	109	59
+3°	78	42	86	46	94	51	105	57
+28°	70	38	82	44	84	45	100	54

Landing gear extending does not affect the stall speeds value.

Altitude loss during recovery from stall depends on the actual glider loading, and is contained within the range:

up to 90[m] (300[ft]) approx.

5.3. Additional, non approved information

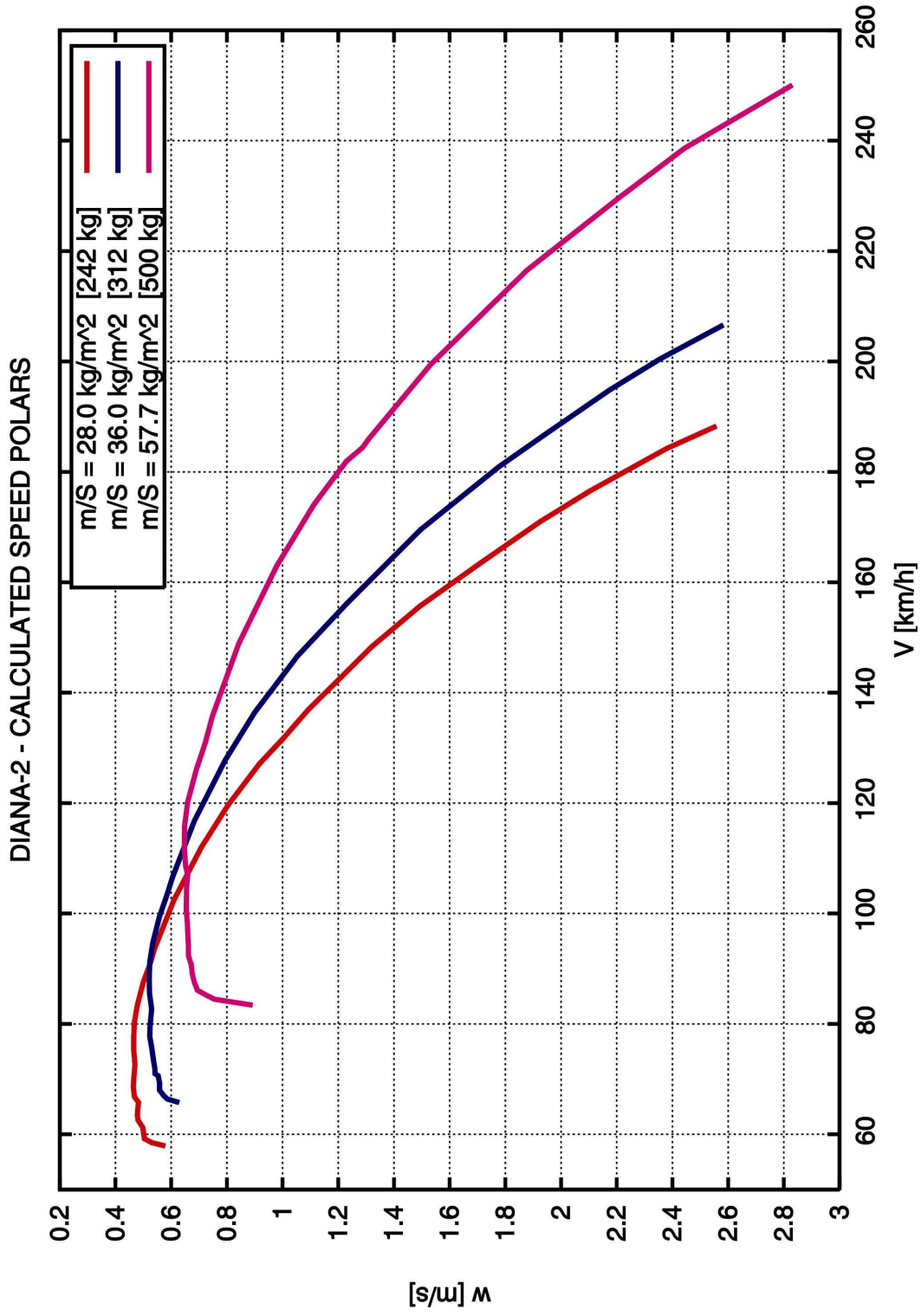
5.3.1. Demonstrated cross wind performance

The correct sailplane behaviours in take off and landing have been demonstrated at cross wind component of:

in aerotowed take off.....17[km/h] (9[kt]),

in landing.....17[km/h] (9[kt]).

5.3.2. Polar speed (calculated)



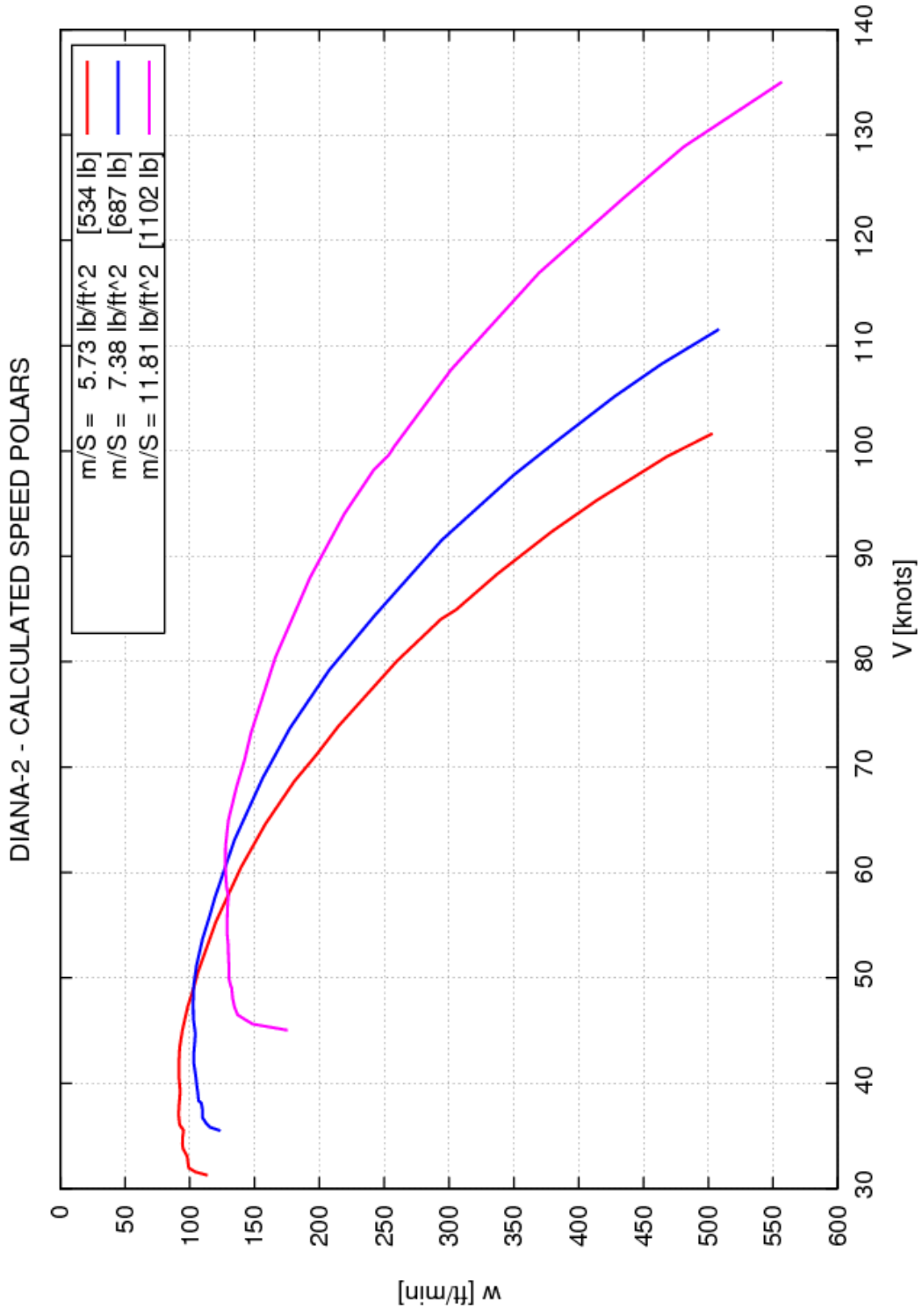
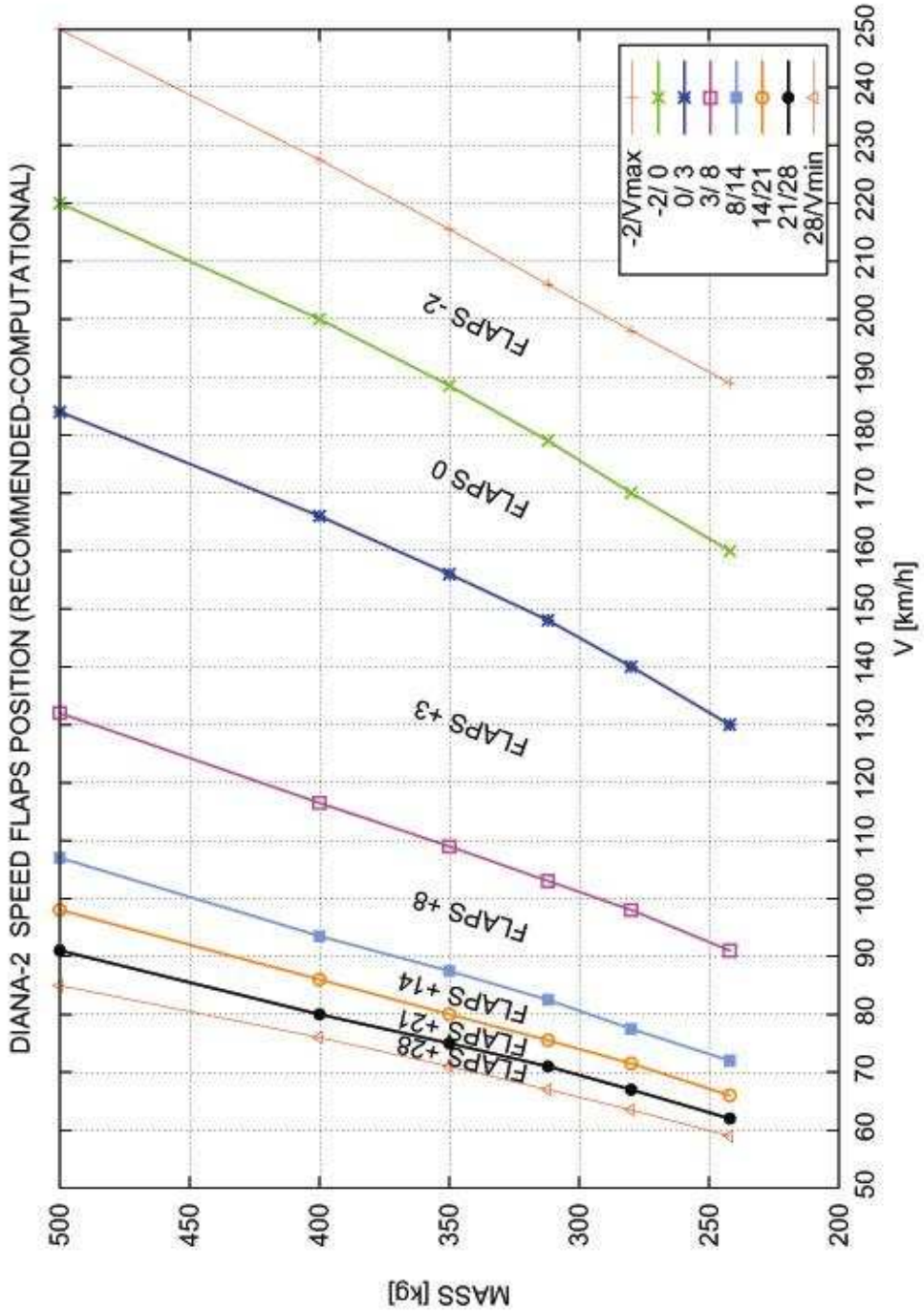


Fig. 5/2 Polar speed (calculated)

5.3.3. Data on optimum use of wing flap



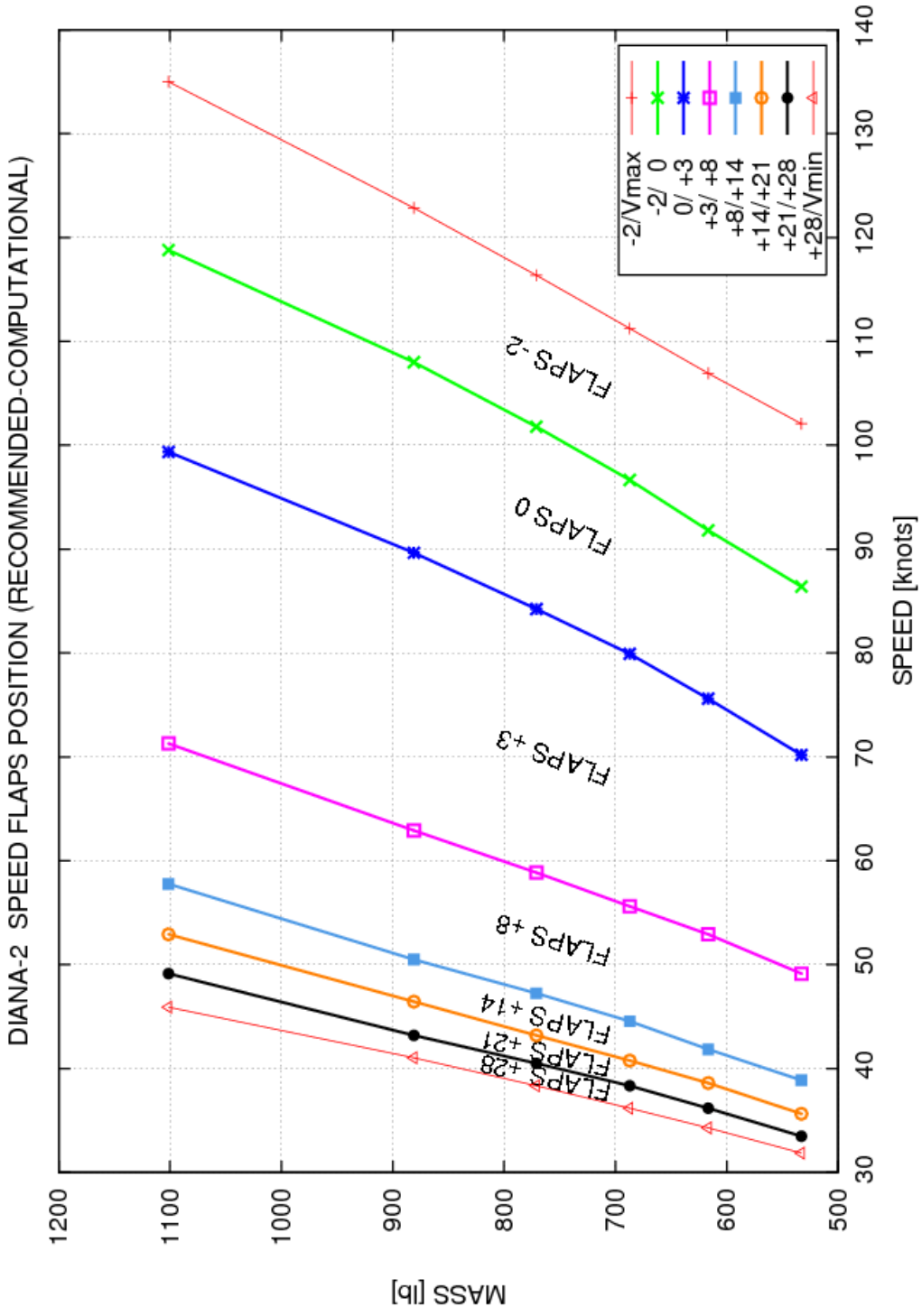


Fig. 5/3 Data on optimum use of wing flap

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SECTION 6

6. WEIGHT AND BALANCE

6.1. Introduction

This Section contains the payload range within which the sailplane may be safely operated.

Procedures for weighing the sailplane and the calculation method for establishing the permitted payload range, as well as the list of equipment available for this sailplane, and equipment installed in the weighed sailplane are contained in the Technical Service Manual, Sections 4 and 6.

6.2. Weight and balance record / permitted payload-range

The entries in the following tables are valid only for the sailplane the Fact. No of which is shown on the head page of this Flight Manual.

The loading plan is to be calculated basing on the last weighing.

Valid for Serial No:

Date	Empty weight	C.G. position	Permitted weight of pilot & parachute				Approved	
			with water ballast		without water ballast		Date	Signed
			Max.	Min.	Max.	Min.		

For calculation of the permitted max. and min. pilot weight refer to Technical Service Manual, Section 4.

To verify the correctness of sailplane loading condition refer to Technical Service Manual, Section 4.

The following table allows to determine the permissible water ballast in a wing.

MAX. WATER BALLAST IN WING [kg]													
empty weight [kg]	cockpit useful load [kg]												
	55	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**
175	248	248	248	248	248	245	240	235	230	225	220	215	210
180	248	248	248	248	245	240	235	230	225	220	215	210	205
185	248	248	248	245	240	235	230	225	220	215	210	205	200
190	248	248	245	240	235	230	225	220	215	210	205	200	195

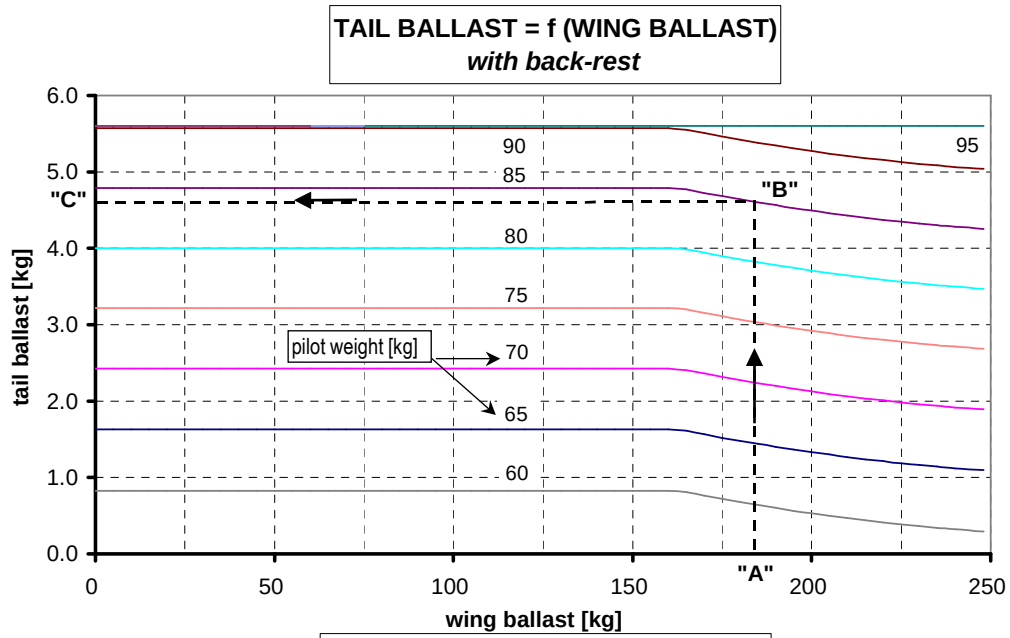
MAX. WATER BALLAST IN WING [lb]														
empty weight [lb]	cockpit useful load [lb]													
	121	**130**	**140**	**150**	**160**	**170**	**180**	**190**	**200**	**210**	**220**	**230**	**242**	**253**
390	547	547	547	547	547	542	532	522	512	502	492	482	470	459
400	547	547	547	547	542	532	522	512	502	492	482	472	460	449
410	547	547	547	542	532	522	512	502	492	482	472	462	450	439
419	547	547	543	533	523	513	503	493	483	473	463	453	441	430

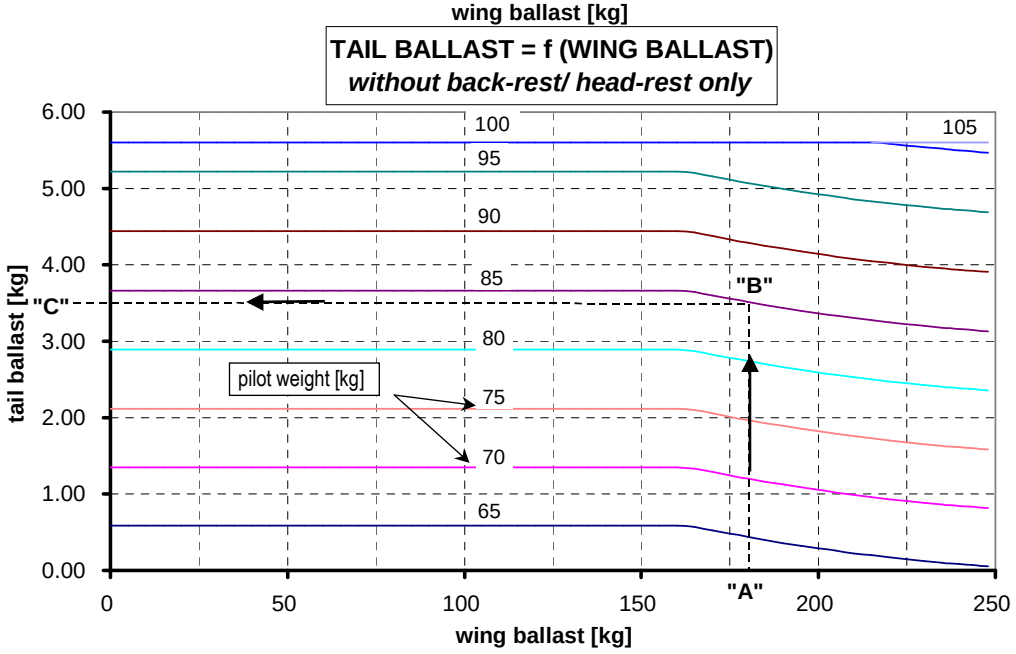
6.3. Tail ballast limitations

NOTE: ***Using the higher amount of tail ballast than resulting from the following diagrams is forbidden – this involves a risk of exceeding the approved rearmost CG position, thus operating the sailplane beyond the verified and approved operating limitations range.***

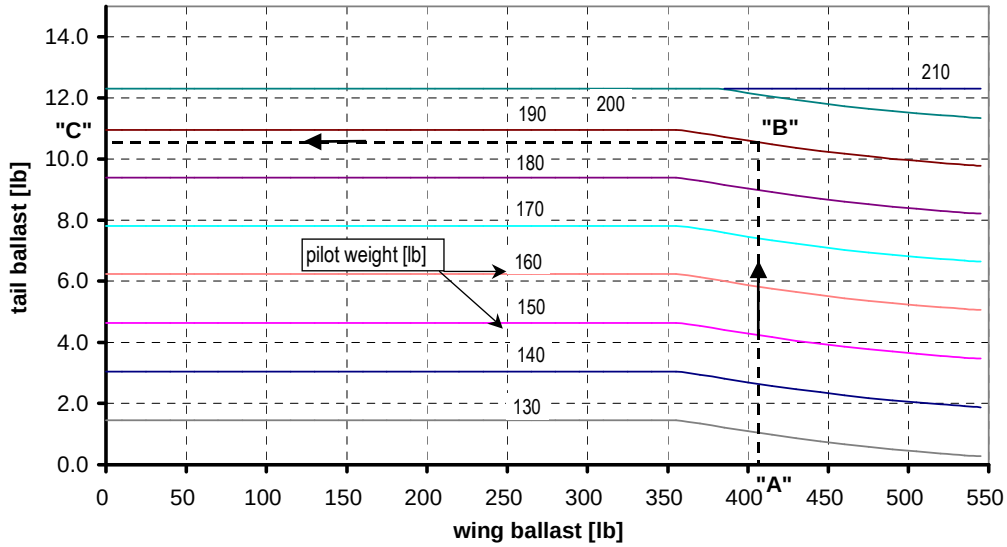
Procedure to determine the tail ballast basing on the following diagram:

- from point „A”, corresponding to the actual amount of wing ballast, draw a vertical line to intersection with curve corresponding to the cockpit load - point „B”
- on a vertical axis, find the maximum permissible amount of tail ballast for the actual loading condition - point „C”

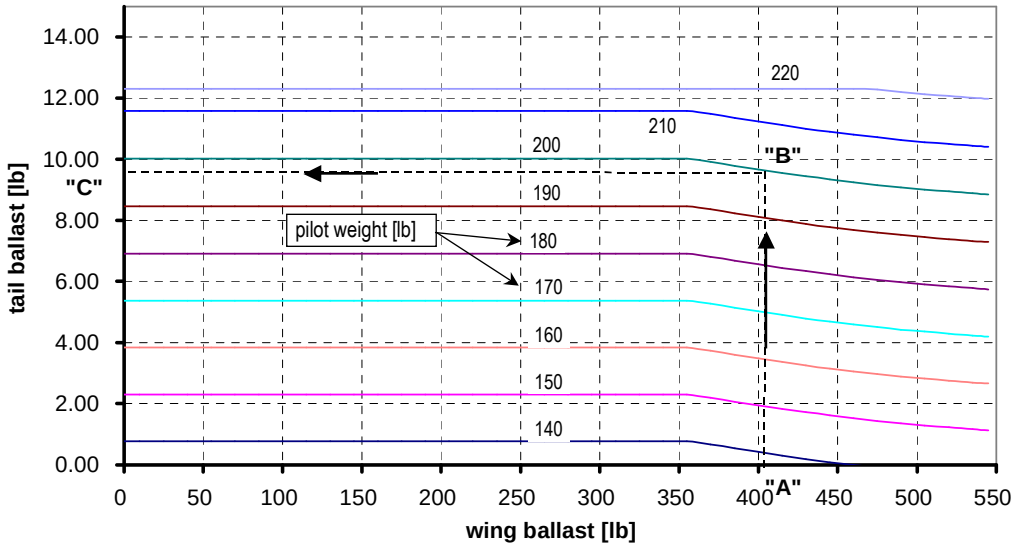




TAIL BALLAST = f (WING BALLAST)
with back-rest



TAIL BALLAST = f (WING BALLAST)
without back-rest/ head-rest only



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SECTION 7

7. SAILPLANE AND SYSTEMS DESCRIPTION

7.1. Introduction

This Section contains description of sailplane and its systems, and provides information on operation of these.

Refer to Section 9 for details of optional systems and equipment.

7.2. Cockpit controls

7.2.1. Aileron & elevator control

Ailerons and elevator are controlled with control stick located on right hand cockpit side. The transceiver „push to talk” button is installed on the control stick.

7.2.2. Rudder

Rudder pedals are in-flight adjustable (9 settings). Grip of pedal adjustment is located in the lower part of instrument panel column.

7.2.3. Wing flaps

Wing flaps are operated by means of a handle located on a cockpit left hand side. Flaps control handle can be locked at 7 various settings. To facilitate access to -, and egress from a cockpit, the flap control handle is folded up.

7.2.4. Longitudinal trim

Trim device is controlled by means of a lever on control stick. Pressure on a lever disconnects the elevator control from trimming spring. On releasing the lever, the spring supports retaining the control stick in selected position. Indicator of trimming device position is located on the right hand cockpit side. With the lever on control stick held pressed, the trimming device may be precisely set with an indicator.

7.2.5. Tow release

The (yellow) grip is installed on a column of instrument panel, on the left hand side. The hook is released on pulling at the grip.

To connect the rope, pull on the yellow grip, insert a rope link and release the grip. Next check the correct connection of rope.

7.3. Instrument panel

The instrument panel (1) with standard equipment comprises the following set of board instruments (see drawing):

- altimeter 60 mm diameter (2)
- airspeed indicator 60 mm dia (3)
- variometer ±10 [m/s] (±2000 [ft/mint]) (4)
- compass KI-13A (10)
- compensator of total energy variometer KWEC-2 (8)

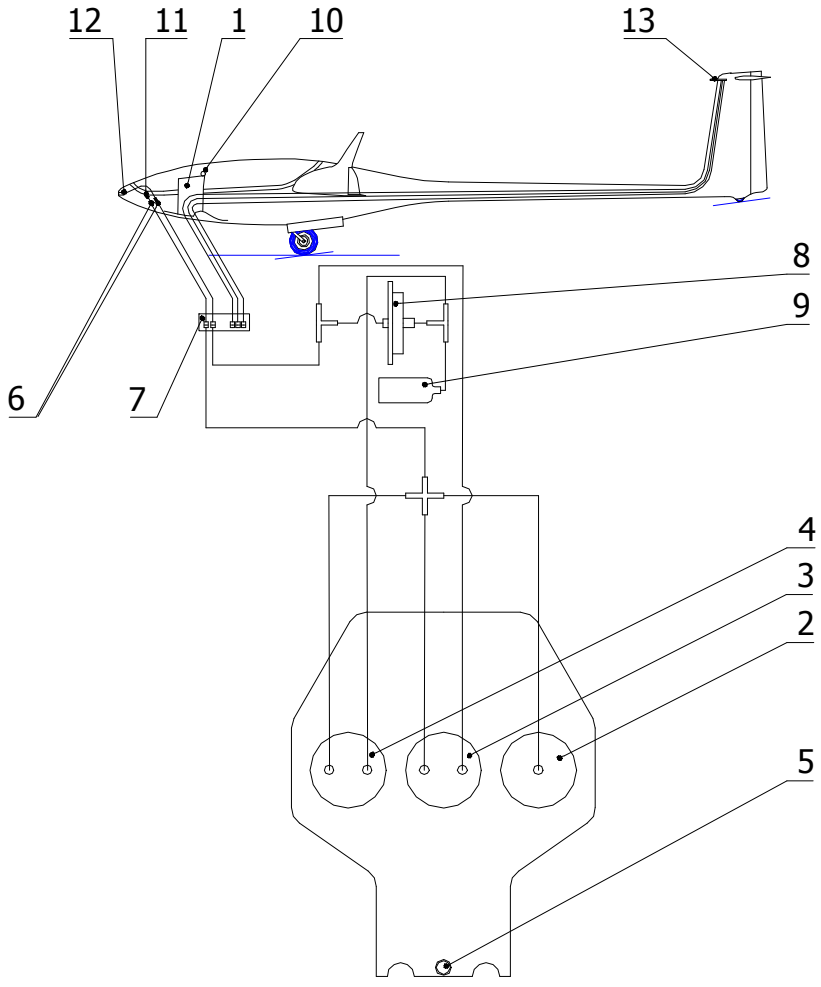

Fig. 7/1 Scheme of board instrument system

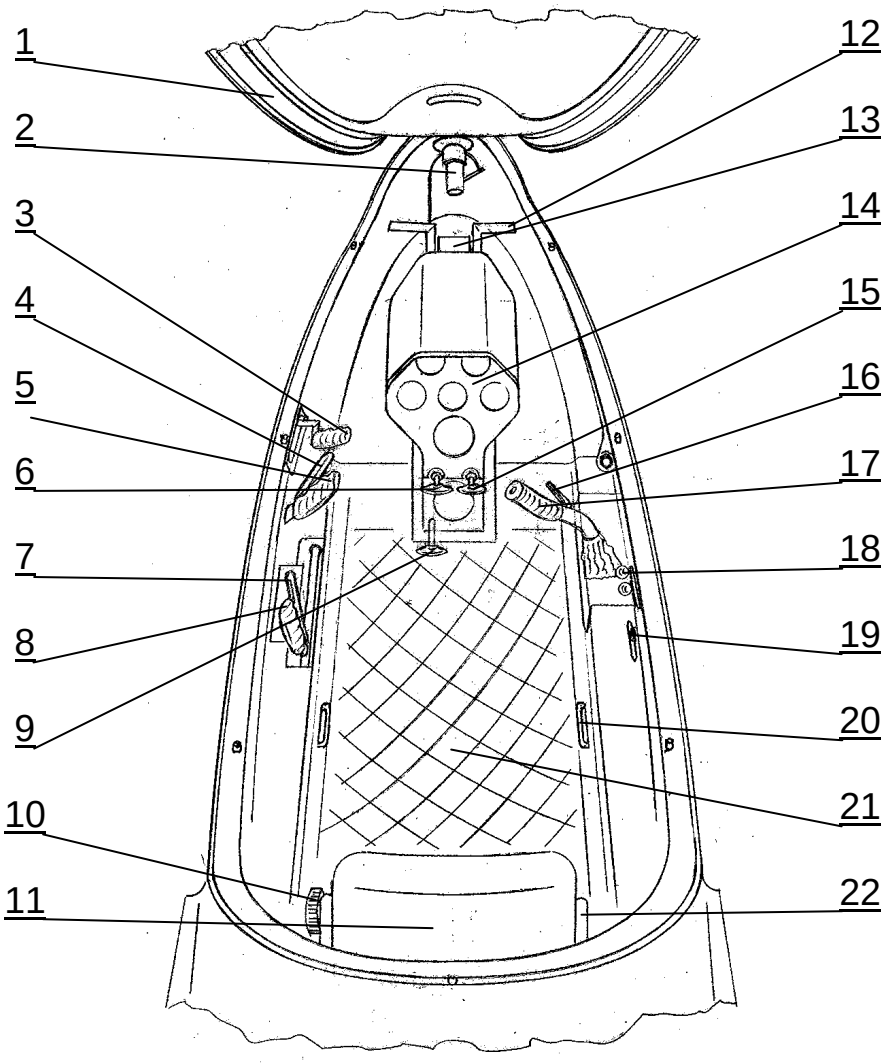

Fig. 7/2 Cockpit view

1. Canopy
2. Canopy hinge
3. Wing flap control handle
4. Wheel brake handle
5. Air brake control lever
6. Tow release grip
7. Landing gear locking lever
8. Landing gear extension/retraction slider
9. Pedal adjustment grip
10. Head rest adjustment
11. Head-rest
12. Pedals
13. Balancing weight
14. Instrument panel
15. Cockpit canopy emergency jettison grip
16. Longitudinal trim lever
17. Control stick
18. Water ballast jettison levers
19. Trim indicator
20. Safety belts
21. Seat cushion
22. Back-rest, or head-rest

7.4. Landing gear

The retraction mechanism of landing gear is controlled with a slider on a left hand cockpit side. With slider in a front position the landing gear is retracted and, in a rear position - extended. A locking lever is provided on a slider grip. The landing gear is extended by shifting the slider grip (8) inboard and backward, not touching the lever (7). The extended landing gear is correctly locked, when after pushing the slider home to its extreme position a characteristic knock can be heard, and slider can not be moved. Unlocking of landing gear mechanism is achieved by pressing the lever. When retracting, it is recommended to pull first the slider grip slightly back, unlock the mechanism at this position and next - to push the slider forwards not touching the lever (7). On pushing the slider home, forwards, lock the landing gear by re-setting the slider grip to the left, towards the cockpit side board (outboard).

The doors of landing gear house are closed automatically, with aid of loading spring.

NOTE: Pressing the locking lever, while on ground, may result in landing gear retraction and damage to the doors of landing gear house.

The brake of main wheel is activated with a lever located on the air brake slider. This lever is used also to lock the air brake in its retracted position.

7.5. Cockpit, canopy, seat and safety belts.

Canopy opening (fore, upwards) is enabled after shifting the lock levers (white) up. The canopy is retained in opened position by means of a gas spring. The cockpit provides space for pilots up to 185[cm] (6[ft]) in height, with a back parachute. The thickness of parachute, or back cushion may not be less than 12[cm] (4.7[in]). Cockpit adjustment to the pilot’s height can be obtained on the way of pedals adjustment (paragraph 7.2.2) and adequate adjustment of back rest (on ground only). The mounting bolts of back rest must be arranged symmetrically and correctly mate with the openings. The adjustable head rest is provided on a back rest.

The four-point safety belts are included in sailplane standard equipment.

7.6. Board instrument system

The board instrument system contains (see drawing item 7.3):

- instrument panel (1)
- compensating bottles (9)
- two static pressure ports in fuselage front part (11)
- total pressure port in fuselage nose (12)
- additional pressure port nest for special instruments (13)
- hose joint (7) enabling disconnection of the instrument panel from sailplane
- drainage units of the total-, and static pressure ducts, accessible in front of the instrument panel (6)

The instrument panel is mounted to a column with a screw (5).

7.7. Air brake

Air brake control is actuated conventionally, with a slider located on the cockpit left hand side.

On the slider a lever is provided - used to lock the air brake in its retracted position and, also to brake the landing gear wheel.

7.8. Baggage compartment

A baggage compartment is located above the fuselage spar, accessible from the cockpit. Baggage is fastened with straps to the lugs provided in baggage compartment. Maximum weight of luggage in baggage compartment 5 [kg] (11 [lb]).

Carriage of dangerous or flammable materials in baggage compartment forbidden.

7.9. Water ballast system

Jettison of water ballast is controlled with levers located on the cockpit right hand side (see item 4.5.5).

7.10. Miscellaneous equipment

7.10.1. Transceiver

Sailplane is adapted for transceiver installation.

As a standard, the tubular antenna is installed in the fin nose, with a cable led to the instrument panel.

7.10.2. Ventilation

The cockpit is ventilated by means of a side window with deflectable ventilation tab. Moreover, an adjustable air blow on the canopy portion above the instrument panel is provided - controlled with a (black) slider on the left hand side, and the adjustable nozzle on the right hand side, in front of the control stick. Pressing the nozzle home stops air blow.

SECTION 8

8. SAILPLANE HANDLING, CARE AND MAINTENANCE

8.1. Introduction

This Section contains manufacturer's recommended procedures for proper ground handling and servicing of the sailplane. In this connection, certain inspection and maintenance requirements are identified which must be followed if the sailplane is to retain the new plane performance and dependability.

It is wise to follow a planned schedule of lubrication and maintenance based on the specific climatic and operating conditions encountered.

8.2. Sailplane periodic inspections

The sailplane inspection should be performed at the beginning of every flying season.

The scope and time periods of all inspections are contained in the Technical Service Manual for SZD-56-2 "Diana-2" sailplane.

8.3. Sailplane alterations or repairs

Repairs and alterations are referred to in the Repair Manual for SZD-56-2 "Diana-2" sailplane.

It is essential that the responsible airworthiness Authority be notified prior to any alterations on the sailplane, to ensure that the airworthiness of the sailplane is not compromised.

8.4. Ground handling / road transport

8.4.1. Ground handling

With respect to ground handling: i.e. securing against wind, towing rope connection, anchoring, proceeding with a wet glider, draining of the instrument pneumatic system - the generally known rules for performance gliders should be observed. Sailplane is to be anchored using towing hook, clamps for wing transport wheels as well as with wide strap at the fuselage-fin transition.

NOTE: Leaving the glider outside, without protection against environmental conditions and sunlight, will harmfully affect durability of the lacquer coat

In case of prolonged pause in operation, sailplane de-rigging is recommended.

If the sailplane is to be stored in rigged condition, the wings should be supported at tips.

The metal fittings and elements should be greased.

Put the individual covers on the sailplane main sets.

NOTE: ***Do not hangar in wet covers. The hangared sailplane should not be exposed to environmental conditions or humidity.***

Put the fuselage on the belly supports, placed in front of the undercarriage house and under the fin. Set the wings chord vertical, and shore the wings with band supports at the leading edge.

Release pressure in the tyre.

For sailplane ground rolling the "tail forwards" attitude is recommended.

Pulling the sailplane at wing tips not recommended.

For motor-car transportation in "nose forwards" attitude the tow release should be used and a towing rope with connection link.

Immobilize the control stick (with safety belts).

8.4.2. Road transport

Standard procedure for transport of de-rigged sailplane on a trailer involves the special composite sleeves shoved on the fuselage spar, on which the wing clamps are installed. The outboard sleeve portions, inserted in the cut-out in side boards of sailplane standard trailer, are used to immobilise the transported sailplane.

In case of glider transport in a trailer, without composite special clamps, the assemblies may be fastened at their external surfaces with the wide clamps upholstered with a soft padding, or with bands supports.

Fasten the wings at the fittings close to the root ribs and support under the leading edge at semispan, wing chord vertical.

The fuselage should be fastened at the undercarriage wheels and at the fuselage spar.

The tailplane to be fixed in clamps.

For transportation, protect the mating surfaces of the fittings, access openings and bearings against dust and dirt.

Immobilize the control surfaces. Protect the canopy with a flannel cover.

In case the open trailer is used, the external surfaces of sailplane main components should be protected with individual covers and, in case of rain, with a plastic foil.

8.5. Cleaning and care

Moisture and direct sunlight have a harmful effect on composite material and lacquer coat therefore, for modern sailplanes, the proper maintenance and care are necessary.

In particular, high moisture combined with high temperature should be avoided (e.g. poorly ventilated trailer with accumulated moisture, exposed to sun rays). If the moisture penetrates into the hardly accessible structure areas, the glider should be de-rigged and its wet components stored in a dry room to get dried.

In case of soiling the external surfaces (e.g. with insects) it is recommended to wash these with a clear water with a gentle detergent, without an abrasive agent. Wipe the washed area with a flannel rag (or shammy). Dry the wet sailplane interior (air brake boxes), make sure the drainage openings are free.

The lifting surfaces should be polished time to time with a polishing paste, chord-wise direction movement, mechanically or manually with a special slat.

NOTE: For lifting surfaces polishing only the non-siliceous agents are allowed.

The remnants of adhesive tape should be cleaned with extraction gasoline.

Canopy perspex should be cleaned with a special care agent or with a large amount of clear water. In no case the dry rag or similar can be used for removal of dust and dirt.

Protect the canopy glassing against dust or sun with a flannel cover.

The safety belts should be regularly inspected against tear, or wear evidence, corroded fittings etc. Check from time to time the correct functioning of belts fastener.

SECTION 9

9. SUPPLEMENTS

9.1. Introduction

This Section contains the supplements necessary to safely and efficiently operate the sailplane when equipped with various optional systems and equipment not provided with the standard sailplane.

9.2. List of inserted supplements

Date of insertion	Doc. No	Title of the inserted supplement

9.3. Supplements inserted