

PILATUS AIRCRAFT LTD.
STANS (Switzerland)

APPROVED FLIGHT MANUAL
and
OPERATING MANUAL

for

SAILPLANE
MODEL PILATUS B4-PC11A

Registration

Serial No.

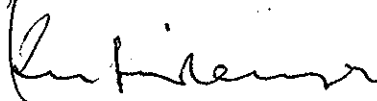
Document No. 23-11-00-01574 E

December 1974

This sailplane must be operated
in compliance with the present manual.

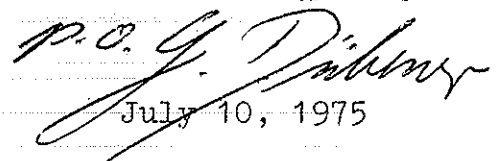
This manual must be kept in the
sailplane at all times.

PILATUS AIRCRAFT LTD.
Techn. Publications



Flight Manual, Sect. 1-5
Pages 1 to 29 approved:

SWISS FEDERAL AIR OFFICE
Section for Aeronautical Material



July 10, 1975

Log of Revision

Any revision of the present manual, except on page 1, must be recorded in the following table, and endorsed by the responsible air 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. will be shown on the bottom left-hand of the page.

Rev. No.	Section	Page	Date	Approval	Date
1	3.2(g), 2.5(o) Supplement No. 01580 E	13, 7 1, 2	Feb. 1, 1977	SWISS FEDERAL AIR OFFICE Section for Aeronautical Material <i>p.o.g. Dubois</i>	<i>March 1, 1977</i>
2	Special Requirements	29A	Jan. 17, 1979	SWISS FEDERAL AIR OFFICE Section for Aeronautical Material <i>p.o.g. Dubois</i>	<i>January 22 1979</i>
3	1.4, 2.4 4.1, 4.2 4.5	2, 5 18, 19 24, 25, 26	Aug. 20 1979	Federal Office for Civil Aviation Section of Aeronautical Material <i>p.o.g. Dubois</i>	<i>October 31 1979</i>
4	Metric Units added throughout, no sub- stantial changes. Reprinted in enti- rety due to extent of revision		Aug. 8 1980	Federal Office for Civil Aviation Section of Aeronautical Material <i>p.o.g. Dubois</i>	<i>Sept. 18 1980</i>

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List of Supplements

Flight Manual Supplements are issued to provide information associated with optional equipment or modifications. The equipment concerned, if installed, is listed in para. 4.4 of the basic Manual.

The following supplements are approved by the Swiss Federal Air Office and included in the present Manual.

Document No.	Description
01533	Operation with Tow Coupling on the Bow
01580	Flick (Snap) Figures

PART 1 - FLIGHT MANUAL1. Description1.1 Distinctive Features

- Single seat Standard Class sailplane for training and aerobatics.
- All metal construction, shoulder wing configuration and T-tail.
- Fixed main landing wheel with brake (retractable wheel optional) and tail wheel.
- Speed limiting spoilers (air brakes) on the upper surface of the wings.

1.2 Certification Basis

Lufttüchtigkeitsforderungen für Segelflugzeuge (LFS),
Category AEROBATIC.

1.3 Type Certificate

- Swiss Type Certificate:
For basic model B4-PC11 (NORMAL Category):
No. S43-02, dated June 12, 1972.
For models B4-PC11A and AF (AEROBATIC Category):
No. S43-02, issue 2, dated January 31, 1975.
- FAA Type Certificate No. G25EU, Revision 2,
dated March 16, 1977.

1.4 Technical Data

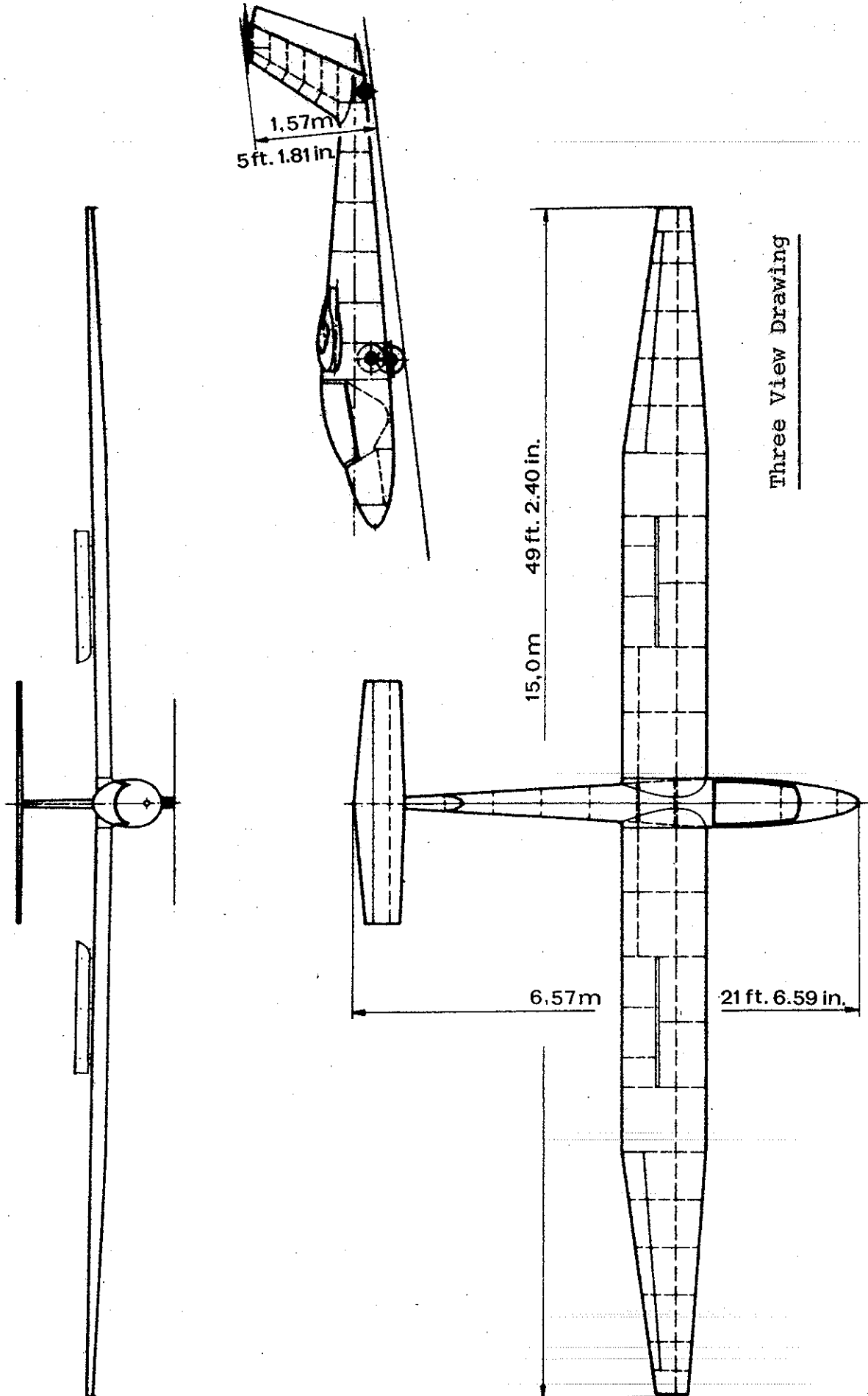
- | | | |
|----------|--------|-----------------|
| - Span | 15.0 m | (49 ft 2.40 in) |
| - Length | 6.57 m | (21 ft 6.59 in) |
| - Height | 1.57 m | (5 ft 1.81 in) |

1.4 (Cont'd)

- Mean aerodynamic chord	0.979 m (3 ft 2.54 in)
- Aspect ratio	16.0
- Dihedral angle	1°
- Wing profile	NACA 64 ₃ - 618
- Angle of incidence of wing	+1° 30'
- Wing area	14.05 m ² (151.23 sq. ft)
- Wing loading	24.90 kp/m ² (5.10 lb/sq.ft)
- Angle of incidence of horizontal stabilizer	-3°

- Changes against basic model B4-PC11:

Elevator downward deflection increased;
rudder upper end shortened.
(Instruction for conversion see PILATUS
Document No. 01575)



Three View Drawing

2. Limitations

2.1 <u>Air Speeds (CAS)</u>	km/h	(mph)	(kts)
- Max. speed (V_{NE}) and for air brake lifting (V_{BS})	240	149	130
- Manoeuvring (V_A)*	163	101	88
- Max. on aero tow (V_{AT})	163	101	88
- Max. on winch (V_{WT})	130	81	70
- Minimum speed	67	42	36
- Stalling speed	61	38	33

*) Control surface deflection: full deflection until V_A , straight line decrease, to 1/3 deflection at V_{NE} .

2.2 Flight Load Factors

- Maximum positive + 7.00 g
- Maximum negative - 4.79 g

2.3 Operating Limits

- (a) VFR day only.
- (b) Cloud flying day, provided that the following instruments installed:
Airspeed indicator - Altimeter - Compass -
Turn and bank indicator - Variometer.
- (c) Approved aerobatics:
(Accelerometer and pedal straps mandatory,
5-belt safety harness recommended.)

All figures resulting in positive or negative acceleration.

Flick (snap) figures not approved'
(Flick figures in accordance with Supplement Doc.No. 01580 only.)

2.4 Weights and C.G. Limits

- Maximum gross weight 350 kp (770 lbs)
- Gross weight Centre of Gravity location aft Datum
minimum 0.30 m 11.81 in.
maximum 0.44 m 17.32 in.
- Datum Vertical tangent to leading edge of wing
- Levelling means Slope of rear top surface of fuselage between stations 1512 and 2772 mm: 1000:80

2.5 Placards

The placards listed under (a) through (l) comply with the requirements of the LFS; for U.S. registered sailplanes, placard items (b) through (r) are required. See FAA Type Certificate Data Sheet G25EU. Placards required by other Air Authorities are listed in Annex page 29 A.

(a) On right-hand cabin wall:

STANDARD CLASS GLIDER
PILATUS B4-PC11A

THIS AIRCRAFT COMPLIES WITH CATEGORY "AEROBATIC"
OF THE GERMAN LFS.

LIMITATIONS

MAXIMUM SPEEDS:

- IN CALM WEATHER AND TURBULENCE
- ON AERO TOW
- ON WINCH

STALLING SPEED:

LOAD: SEE FLIGHT MANUAL

APPROVED AEROBATICS:

SEE FLIGHT MANUAL

(or:)

km/h	mph	kts
240	149	130
163	101	88
130	81	70
61	38	33

(b) On left-hand cabin wall:

PRE-FLIGHT CHECK

- BALLAST ON TAIL REMOVED
IF PILOT'S WEIGHT BELOW LIMIT
- PARACHUTE SECURED
- SEAT AND PEDALS ADJUSTED
- SAFETY BELTS SECURED
- CANOPY LOCKED
- PEDAL STRAPS ENGAGED

2.5 (Cont'd)

- ALTIMETER CHECKED
- AIR BRAKES IN
- TRIM SET FOR TAKE OFF
- TOW ROPE IN
- CONTROLS FREE

(c) Adjacent to the respective control and with symbol:

- AIR BRAKE IN - OUT
- WHEEL BRAKE
- WHEEL DOWN - UP (if retractable wheel installed)
- TOW RELEASE
- TRIM CONTROL
- CANOPY JETTISON - PULL TO OPEN
- PULL TO ADJUST PEDALS (Rudder control)

(d) Adjacent to tow coupling:

RATED LOAD 500 \pm 50 kp (or: 1100 \pm 110 lbs)

(e) Above the main wheel:

1.9 At - 27 psi

(f) Above the tail wheel:

2.5 At - 35 psi

(g) On rudder and elevator surfaces:

DO NOT PUSH

(h) Adjacent to static pressure entry on fuselage skin:

STATIC PRESSURE
KEEP CLEAR

(i) Adjacent to oxygen control valve (if installed):

DURATION TABLE

for the respective system installed.

(k) Adjacent to hole through fuselage tail:

BALLAST
MANOEUVERING TAIL WHEEL

2.5 (Cont'd)

- (l) Adjacent to tow coupling:

ATTENTION

REMOVE LOCKING DEVICE BEFORE WINCH TOW

- (m) THIS GLIDER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS.
- (n) CLOUD FLYING: PERMITTED ONLY WHEN THE FOLLOWING INSTRUMENTS ARE INSTALLED: AIRSPEED INDICATOR, ALTI-METER, MAGNETIC COMPASS, TURN AND BANK IND., VARIOMETER
- (o) APPROVED AEROBATIC MANEUVERS:

Figures	Recommended Entry Speed		Expected Acceleration
	km/h	kts	
Lazy eight	170	92	+ 2 g
Steep spiral	120	65	+ 3 g
Looping positiv	180	97	+ 3 g
Wing over	180-190	97-103	+ 2.5 g
Roll off the top (Immelmann)	180	97	+ 3 g
Climbing half roll	140	75	+ 2 g
Roll controlled	140-160	75-86	-
Inverted flight	120	65	- 1 g
Tail slide	180	97	+ 2.5 g
Looping negative, starting from normal attitude	70	38	- 2.5 g
Looping negative, starting from inverted flight	200	108	- 2.5 g
Spin	see Flight Manual		

ACCELEROMETER MUST BE INSTALLED.

2.5 (Cont'd)

(p) NIGHT FLYING IS PROHIBITED.

(q)	NEVER EXCEED SPEED	240 km/h	130 kts	149 mph
	MANEUVERING SPEED	163 km/h	88 kts	101 mph
	AIRPLANE TOW SPEED	163 km/h	88 kts	101 mph
	AUTO-WINCH TOW SPEED	130 km/h	70 kts	81 mph
	DIVE BRAKES EXTENDED	240 km/h	130 kts	149 mph

(r) MAXIMUM WEIGHT: 350 kg (770 lbs)

2.6 Flight Instrument Markings

(a) Air Speed Indicator

		km/h	(or)	kts	(or)	mph
- Maximum:	Red radial	240		130		149
- Cautionary:	Yellow arc	240-163		130-88		149-101
- Normal:	Green arc	163-67		88-36		101-42

(b) Accelerometer

- Max. positive:	Red radial	+ 7.0
- Max. negative:	Red radial	- 4.7

3. Controls and Procedures

3.1 Description of Controls

- (a) Elevator and Aileron control:
by conventional control stick. Movements transmitted by rods and bellcranks.
- (b) Rudder control:
by pedals; movement transmitted by cables until bellcrank rear of frame 4, and control rods to the rudder.
- (c) Pedal adjustment for reach:
by spring loaded mechanism, providing inclination change of rudder pedals. Black coloured knob on the instrument panel pedestal bottom right-hand.
- (d) Longitudinal trim control:
by two adjustable springs attached to the elevator control rod, controlled by green coloured knob on cabin wall right-hand.
- (e) Air brakes (speed limiting spoilers),
located on both wings upper side, are controlled by a blue coloured handle on port cabin wall; movement transmitted by control rods and bellcranks. Operation at all speeds permitted.
- (f) Wheel brake (Model TOST):
by a grip on the air brake handle.
- (g) Tow coupling (Model TOST):
located in front of landing wheel, near the C. of G., controlled by (yellow coloured) pull-knob on instrument panel pedestal bottom left-hand.

Locking hook PILATUS No. 119.99.11.074 (optional) prevents automatic coupling release when tow cable slackens during aero tow. Hook must be removed before winch tow.

3.1 (Cont'd)

(h) Canopy lock and Jettison control:

by red coloured lever on port cabin wall. Locking pins in front and rear; hinge pins right-hand. Jettison in an emergency by unlocking the control lever and lifting the canopy.

(i) Adjustment of seat back:

inclination adjusted via cable control on right-hand cabin wall by disengaging of spring-loaded pins in holes, controlled by a cable.

(k) Cabin ventilation:

"Butterfly" type vent on top of instrument panel provides windshield defrosting or fresh air supply to the pilot.

(l) Landing wheel retracting (optional):

Spring-loaded elbow mechanism, controlled by lever on port cabin wall via control linkage.

3.2 Procedures

(a) Preflight Inspection

- Cabin clean, no loose articles
- Tail ballast - removed if pilot's weight below limit
- Seatback and pedals - adjusted
- Canopy - locked
- Air brake control - locked
- Tow cable - engaged and checked
- Parachute - line and belts secured
- Safety belts - secured
- Pedal straps - engaged

3.2 (Cont'd)

- Flight controls - free and full travel
- Altimeter - set
- Barograph (if installed) - ON
- Accelerometer - unlocked

(b) Take-off on winch

- Trim - mid position with mean C.G. *)
- Max. airspeed - ~~130~~ km/h (81 mph, 70 kts)

(c) Take-off on tow

(Length of tow : 40 to 600 m (130 to 200 ft))

- Trim - mid position with mean C.G. *)
- Air speeds - maximum 163 km/h (101 mph), (88 kts)
- minimum 100 km/h (62 mph), (53 kts)

Note:

With the tow coupling near the C. of G., the sailplane tends to swing when the pilot does not pay attention, or at cross wind. The sailplane should be correctly guided and aligned with the towing aircraft.

(d) Flight

- In safe altitude - retract wheel (if retractable)
- Stalling speed at maximum gross weight:
 - with angle of bank 0° - 61 km/h (38 mph) (33 kts)
 - with angle of bank 30° - ~~67~~ km/h (42 mph) (36 kts)
 - with air brakes extended - ~~67~~ km/h (42 mph) (36 kts)

Stall warning with air brakes retracted occurs at approximately 64 km/h (40 mph, 35 kts) by buffeting.

*) Pilot weight between 75 - 90 kg (165 - 200 lbs)

3.2 (Cont'd)

- Gliding speed
at best lift/drag ratio (35) 85 km/h (53 mph, 46 kts)
- Minimum sink rate at
76 km/h (47 mph, 41 kts ISA) 0.64 m/sec (126 ft/min)
- Rolling speed from 45 to 45°
bank angle at approx. 100 km/h 3 sec
(62 mph, 54 kts)
- At low air speed, (approx. 64 km/h (40 mph, 35 kts), the
controllability of the plane is sustained about all axis.
In a stall, the nose drops smoothly; with elevator control
released, the air speed recovers immediately.

Warning

Use oxygen in altitude above 4000 m (13'000 ft)

(e) Landing

- Landing wheel (if retractable) - extend
- Approach speed - approx. 85 km/h
(53 mph, 46 kts)
- Gliding angle - to be controlled
by air brake
- Landing roll distance - to be controlled
by wheel brake

Notes

1. The chafing protection strip in front of the main
wheel prevents any damage to the plane on uneven
ground, or at forced braking.
2. Side slip is more efficient with the air brakes out.

(f) Cloud flying

(approved with equipment listed under para 2.3/b)

- IFR instruments - ON and monitored
- Air speed - within green range
- At air speed exceeding
approx. 145 km/h - slowly extend
(90 mph, 78 kts) air brakes

Observe icing

3.2 (Cont'd)

(g) Aerobatics

- Equipment required as shown in para 2.3/c.
- Recommended entry speeds and expected acceleration values are listed below for the approved basic aerobatic figures which are represented in para. 3.3. Any combination of these manoeuvres is permitted.

Figures	Entry Speed			Expected Accele- ration
	km/h	mph	kts	
Lazy eight	170	105	92	+ 2 g
Steep spiral	120	75	65	+ 3 g
Looping positive	180	112	97	+ 3 g
Wing over	180-190	112-118	97-103	+ 2.5 g
Roll off the top (Immelmann)	180	112	97	+ 3 g
Climbing half roll	140	87	75	+ 2 g
Roll controlled	140-160	87-100	75-86	-
Inverted flight	120	75	65	- 1 g
Tail slide	180	112	97	+ 2.5 g
Looping negative, starting from normal attitude	70	43	38	- 2.5 g
Looping negative, starting from inverted flight	200	124	108	- 2.5 g
Spin	see following page			

Important

During aerobatic manoeuvres carefully monitor the air speed, and extend the air brakes prior to reach the upper limit.

During critical acceleration phases monitor accelerometer.

3.2 (Cont'd)

- The spin is possible at all C.G. conditions; however, in forward C.G. position, the manoeuvre is not definite and the glider tends to irregular movement.

Starting the spin:

When minimum speed is achieved in horizontal flight, pull elevator control to the stop, and at the same time apply rudder control to the desired direction; then apply full aileron control to the same direction (e.g. rudder pedal left - aileron left - spin turns counter clockwise).

This procedure ensures a definite spin manoeuvre. Without aileron control, the spin may stop after one turn, especially with forward C.G. position. With the C.G. aft, elevator/rudder control is sufficient to start the spin.

During spin the glider turns continuously and rapidly.

Stopping the spin:

Apply full rudder control in opposite direction to the turn, and hold the control stick in neutral position; pull out smoothly.

Note

Do not push the stick beyond the neutral position to avoid extreme speed increase.

- Following aerobatic manoeuvres (before landing) :

Read maximum acceleration values. If the limits should be exceeded, proceed as described in the Maintenance and Repair Manual, section 6.

Note

g-values occurred during landing may not be taken into account.

3.2 (Cont'd)

(h) Emergency Action

To jettison the canopy, pull locking handle and lift the canopy, pushing rearwards if necessary.

(i) After Landing

- If a g-limit has been exceeded in flight, proceed as per Maintenance and Overhaul Manual, Section 6.
- Before hangarage, unlock the speed brake to release the tension loaded mechanism.

(k) Disposition of Ballast

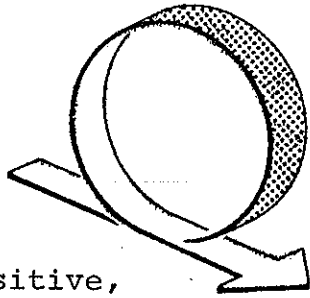
To avoid C.G. location below the limit, resulting from a pilot weight above approx. 100 kgs (220 lbs) and to provide optimal C.G. condition (minimum 35 % MAC) for spin training, a ballast device is available. This equipment consists of two lead plates which can be attached to the rear fuselage 3,65m; 143,7 inch. aft datum) by means of a bolt through the fuselage. Instructions are provided under paras 4.2/4.3.

Note

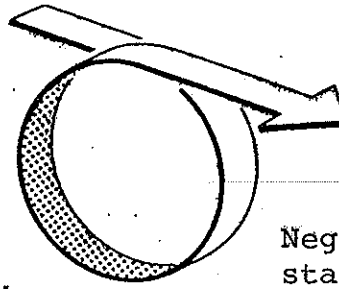
The swivelling tail wheel for ground manoeuvring, P/N 119.99.11.057, can also be attached to this point.

3.3 Aerobatic Figures

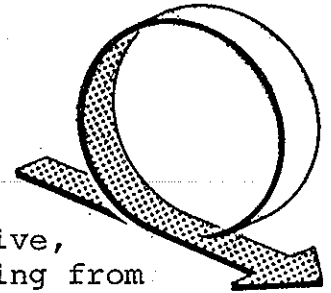
The following is a graphical presentation of the basic aerobatic figures listed in page 13.



Positive,
starting from
normal attitude

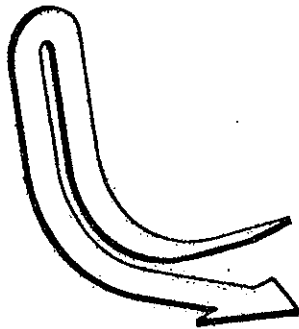


Negative,
starting from
normal attitude

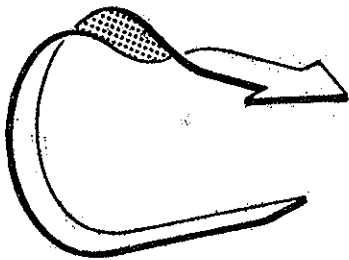


Negative,
starting from
inverted flight

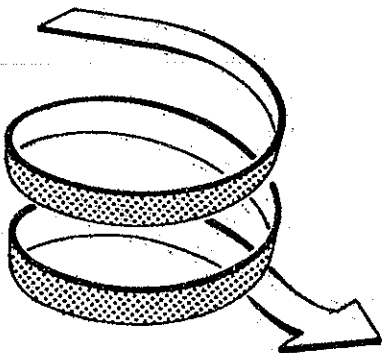
L o o p i n g



W i n g O v e r



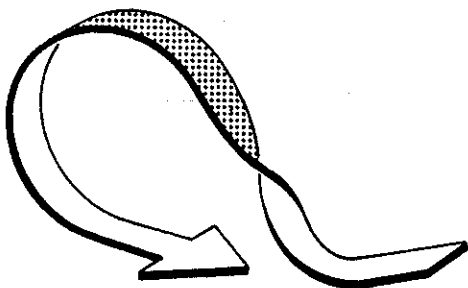
R o l l o f f t h e T o p
(Immelmann)



S t e e p S p i r a l

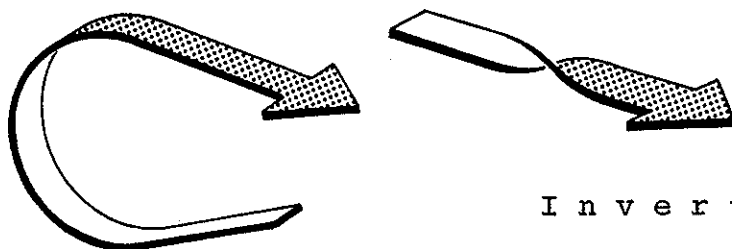


R o l l



Climbing Half Roll

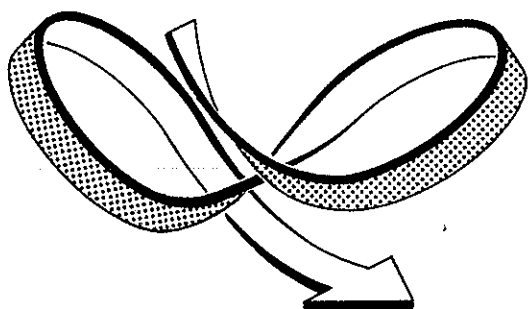
(Retournement)



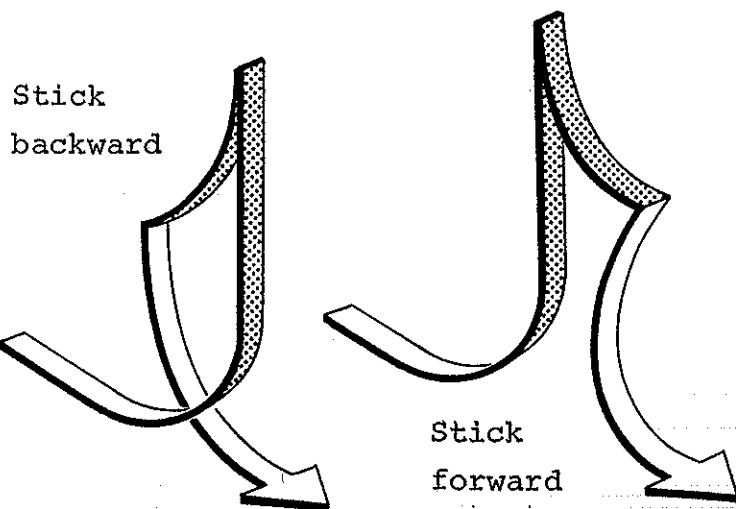
Inverted Flight



Spin



Lazy Eight



Stick
backward

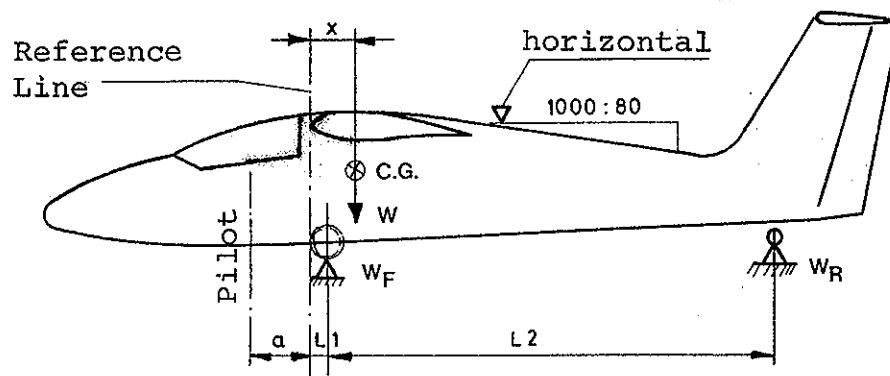
Stick
forward

Tail slide

4. Weight and Balance Information

This section states the actual weight and C.G. location with corresponding equipment of the individual sailplane.

4.1 Record of Empty Weight and C.G. Location



a max. aft: 0.530 m (20.9 in.)

a max. forward: 0.610 m (24.0 in.)

Datum

Vertical tangent to leading edge of wing.

Levelling Means

longitudinal : slope of rear top surface
of fuselage: 1000:80

lateral: upper surface of wing over main
spar (dihedral angle of wing 1°)

Condition of Sailplane

Landing wheel extended; canopy installed; equipment
as shown in para 4.4.

4.1 (Cont'd)

Serial No.

Distances between Wheels

- fixed landing wheel
- retractable wheel

L 1	L 2
0.147 m (5.79 in)	3.368 m (132.60 in)
0.164 m (6.46 in)	3.351 m (131.93 in)

(mark applicable figure with "x")

(a) Record of Empty Weight

- Scale reading forward	W _F	=	()
- Scale reading rear	W _R	=	()
Empty Weight	W	=	()
			=====

(b) Empty Weight C. of G.

$$x = \frac{W_R \cdot L_2}{W} + L_1$$

$$x = \frac{\quad}{\quad} + \quad = \quad (\quad)$$

4.2 State of Empty Weight and Load

The following list records the up-to-date empty weight and specifies the resultant load limits. Whenever equipment is changed, and following any repair which affects the weight or arm, the new empty weight and resultant loads must be entered in the following list. An instruction how to calculate these figures is given in the Annex (pages 24(A)-26(A) of this Manual. The entry must be endorsed by the responsible air authority.

4.2 (Cont'd)

Serial No.

Date	Subject	()	()	()	Approval
	Empty Weight as recorded page 18 Load: - max. without ballast - max. with ballast of _____() installed - minimum				
	New Empty Weight Resultant load: - max. without ballast - max. with ballast of _____() installed - minimum				
Rev. 4					Page 19

4.3 Loading Instruction

Before each flight, the actual load (pilot plus changeable equipment) must be ascertained and compared with the respective value of the list para 4.2. In this calculation, the weight of load items located rear of the pilot's seat (barograph, radio, oxygen etc.) may be added to the Empty Weight with zero arm, while only the weight of pilot plus parachute must be taken into account for the "load" figure, as far as the maximum gross weight of 350 kp (770 lbs) is not exceeded.

If the actual load is kept within these figures, weight and balance of the sailplane are within the approved limits, provided that a pilot with the maximum permissible weight is located in the rearmost position.

If the weight of the pilot is approx. 5 kp (10 lbs) below the upper limit, the seat back may be positioned, when necessary, a few holes forward. A pilot with the minimum permissible weight, however, should select the most forward position, but with only 2 kp (4 lbs) above the minimum weight, he may select an average seat back position.

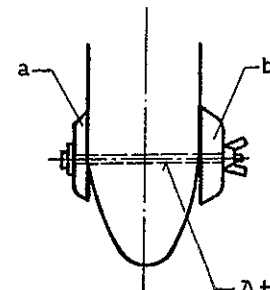
If the pilot's weight should be below the minimum, a lead cushion must be positioned in the seat.

The value for "maximum load without ballast", recorded in para 4.2, results in forward C.G. limit. Exceeding pilot weights must be compensated by ballast on fuselage tail as described in para 3.2/k and shown by sketch below.

To obtain optimal C.G. location for spin training, ballast weights must also be installed. The following table shows the ballast weights required to obtain a C.G. condition of between 35 and 40 % MAC, dependent on pilot's weight and empty weight.

4.3 (Cont'd)

Pilot + Parachute* Wt.	Ballast (incl. bolt)	
	No.	Wt.
84-92 kp (185-203 lbs)	a	2.3 kp (5.0 lbs)
93-98 kp (205-216 lbs)	b	4.6 kp (10.0 lbs)
98 kp and up (216 lbs)	a+b	6.8 kp (15.0 lbs)



Attachment
bolt
0.14 kp
(0.3 lbs)

*) Pilot in rear seat position.

Warning

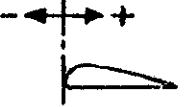
Flying with a condition out of these limits is not approved.

4.4 Equipment

The following list shows equipment items which may be installed in the present sailplane. Items marked "x" are included in the Empty Weight recorded under para 4.2; items marked "o" represent changeable equipment delivered with the sailplane, but they are not included in the recorded Empty Weight.

4.4 (Cont'd)

Serial No.

Item	P a r t	Weight ()	Arm ()
	<p>I. <u>Minimum Equipment</u> (Standard USA)</p> <p>Air speed indicator () Model</p> <p>Altimeter () Model</p> <p>Compass Model</p> <p>Accelerometer (mandatory for aerobatics) Model</p> <p>Safety harness 4-belt Model 5-belt</p> <p>Tow coupling (near C.G.) Model TOST Combi Europe 73 G</p> <p>Pedal straps</p> <p>Seat cushion</p>		
	<p>II. <u>Optional (additional) Equipment</u></p> <p>Fine rate of sink indicator Model</p> <p>Compensating bottle</p> <p>Electric turn and bank indicator Model</p> <p>Artificial horizon Model</p>		

4.4 (Cont'd)

Serial No.

Item	P a r t	Weight ()	Arm ()
	Battery (lead/acid) Model		
	Battery (dry) Model		
	Tow coupling on bow Model TOST E 72		
	Clock Model		
	Speed Command (SC) Model		
	Flight Data Computer Model		
	Retractable landing wheel (shift)		
	Landing gear warning device Pilatus P/No. 119.40.11.014		
	Tow coupling locking device Pilatus P/No. 119.99.11.074		
	<u>Radio</u>		
	DITTEL FSG 15 complete (without antenna)		
	BECKER AR7 complete (without antenna)		
	Antenna Model		
	<u>Oxygen Equipment</u>		
	Model		

4.5 Determination of New Empty Weight and Load

(Metric Units - for British and US Units see pages 24A,25A,26A)

(a) Empty Weight and Moment

If an additional equipment with known weight and arm has been installed in the sailplane, the new empty weight and moment are determined by addition. For items located aft of the Reference Line, the distance figures are considered to be minus (-) and, vice versa, for items in front of the Reference Line the figures are noted as plus (+).

Example 1

Oxygen equipment installed

(located aft of Reference Line)	(kp)	(m)	(mkp)
- Existing Empty Weight	232	0.655	152
- Oxygen equipment	<u>+ 6</u>	+0.200	<u>+ 1.2</u>
- New Empty Weight	$W_E = 238$		$M_E = 153.2$

Example 2

Additional instrument installed

(located in front of Ref. Line)	(kp)	(m)	(mkp)
- Existing Empty Weight	232	0.655	152
- New instrument	<u>+ 3</u>	-1.1	<u>- 3.3</u>
- New Empty Weight	$W_E = 235$		$M_E = 148.7$

Example 3

Existing instrument removed

(located in front of Ref. Line)	(kp)	(m)	(mkp)
- Existing Empty Weight	232	0.655	152
- Instrument removed	<u>- 3</u>	-1.1	<u>+ 3.3</u>
- New Empty Weight	$W_E = 229$		$M_E = 155.3$

4.5 Determination of New Empty Weight and Load

(a) Empty Weight and Moment

If an additional equipment with known weight and arm has been installed in the sailplane, the new empty weight and moment are determined by addition. For items located aft of the Reference Line, the distance figures are considered to be minus (-) and, vice versa, for items in front of the Reference Line the figures are noted as plus (+).

Example 1

Oxygen equipment installed

(located aft of Reference Line)	lbs	in.	in.lbs
- Existing Empty Weight	533	26.4	14,071
- Oxygen equipment	+ 14	+ 8.0	+ 112
- New Empty Weight	$W_E = 547$		$M_E = 14,183$

Example 2

Additional instrument installed

(located in front of Ref. Line)	lbs	in.	in.lbs
- Existing Empty Weight	533	26.4	14,071
- New instrument	+ 7	- 40.0	- 280
- New Empty Weight	$W_E = 540$		$M_E = 13,791$

Example 3

Existing instrument removed

(located in front of Ref. Line)	lbs	in.	in.lbs
- Existing Empty Weight	533	26.4	14,071
- Instrument removed	- 7	- 40.0	+ 280
	$W_E = 526$		$M_E = 14,351$

4.5 (Cont'd)

(b) Maximum Load without Ballast on Tail

This figure (L_1) is given by the forward C.G. limit (0.30 m) and the rearmost seat position (0.53 m).

Based on the new values for Empty Weight (W_E) and Moment (M_E), the maximum load without ballast is calculated as follows:

$$L_1 = \frac{M_E - (0.30 \cdot W_E)}{0.30 + 0.53} \quad \text{(Formula 1)}$$

(c) Maximum Load with Ballast Installed

This figure (L_2) is derived from the max. permissible gross weight (350 kp) as the difference against the empty weight plus ballast weight (W_B) as follows:

$$L_2 = 350 - (W_E + W_B) \quad \text{(Formula 2)}$$

(d) Minimum Load

This figure (L_3) is given by the rear C.G. limit (0.44 m) and the most forward seat position (0.61 m).

Based on the above values for Empty Weight (W_E) and Moment (M_E), the minimum load is calculated as follows:

$$L_3 = \frac{M_E - (0.44 \cdot W_E)}{0.44 + 0.61} \quad \text{(Formula 3)}$$

4.5 (Cont'd)

 (b) Maximum Load without Ballast on Tail

This figure (L_1) is given by the forward C.G. limit (11.81 in.) and the rearmost seat position (20.9 in.).

Based on the new values for Empty Weight (W_E) and Moment (M_E), the maximum load without ballast is calculated as follows:

$$L_1 = \frac{M_E - (11.81 \cdot W_E)}{11.81 + 20.9} \quad \text{(Formula 1)}$$

 (c) Maximum Load with Ballast Installed

This figure (L_2) is derived from the max. permissible gross weight (770 lbs) as the difference against the empty weight plus ballast weight (W_B) as follows:

$$L_2 = 770 - (W_E + W_B) \quad \text{(Formula 2)}$$

 (d) Minimum Load

This figure (L_3) is given by the rear C.G. limit (17.32 in.) and the most forward seat position (24 in.).

Based on the above values for Empty Weight (W_E) and Moment (M_E), the minimum load is calculated as follows:

$$L_3 = \frac{M_E - (17.32 \cdot W_E)}{17.32 + 24} \quad \text{(Formula 3)}$$

4.5 (Cont'd)

(e) Example with Record

With the values for Empty Weight and Moment given in Example 2 ($W_E = 239$ kp, $M_E = 158.7$ mkp), the maximum loads are calculated as follows:

- Max. load without ballast (Formula 1):

$$L_1 = \frac{158.7 - (0.30 \cdot 239)}{0.30 + 0.53} = 104.8 \text{ kp}$$

- Max. load with ballast of 4.6 kp installed (Formula 2):

$$L_2 = 350 - (239 + 4.6) = 106.4 \text{ kp}$$

- Min. load (Formula 3):

$$L_3 = \frac{158.7 - (0.44 \cdot 239)}{0.44 + 0.61} = 51.0 \text{ kp}$$

The record in page 19 would be as follows:

Date	Subject	(kp)	(m)	(mkp)	Approval
1.3.73	New Empty Weight (with instrument P/N....)	239		158.7	
	Load:				
	- max. without ballast	104.8			
	- max. with ballast of 4.6 kp	106.4			
	- minimum	51.0			

Note

Ensure that max. gross weight
of 350 kp is not exceeded.

4.5 (Cont'd)

(e) Example with Record

With the values for Empty Weight and Moment given in Example 2 ($W_E = 540$ lbs, $M_E = 13,791$ in.lbs), the maximum loads are calculated as follows:

- Max. load without ballast (Formula 1):

$$L_1 = \frac{13,791 - (11.81 \cdot 540)}{11.81 + 20.9} = 226.6 \text{ lbs}$$

- Max. load with ballast of 10 lbs installed (Formula 2)

$$L_2 = 770 - (540 + 10) = 220 \text{ lbs}$$

- Minimum load (Formula 3):

$$L_3 = \frac{13,791 - (17.32 \cdot 540)}{17.32 + 24} = 107.4 \text{ lbs}$$

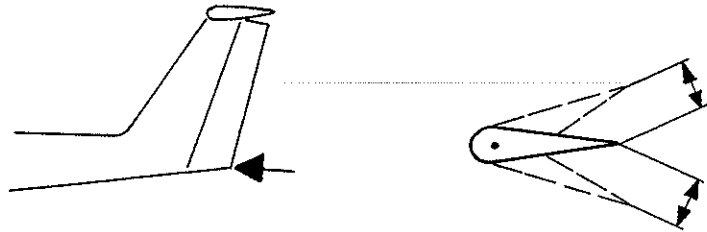
The record in page 19 would be as follows:

Date	Subject	lbs	in.	in.lbs	Approval
1.3.73	New Empty Weight (with instrument P/N...)	540		13,791	
	Load:				
	- max. without ballast	226.6			
	- max. with ballast of 10 lbs	220			
	- minimum	107.4			

Note

Ensure that max. gross weight
of 770 lbs is not exceeded.

5.3 Rudder Control



- Control surface deflection:
left and right 230 mm \pm 10 mm ea (9.05 in \pm 0.4 in)
- Stops: on bellcrank rear of bulkhead 4 (accessible through hand hole)
- Adjustment: 2 adjusting screws on bellcrank mentioned above

5.4 Air Brakes

- Stops:

position OUT	Pin through control rod on guide in bulkhead 3
position IN	Stop on bellcrank in over-dead center position of the control mechanism
- Adjustment:

position OUT	No adjustment required. Pin hole is drilled during manufacturing.
position IN	(a) Elbow mechanism rear of bulkhead 4. Over-dead center position adjusted during manufacturing (see Maintenance and Repair Manual para 2.5/ba). (b) Pretension of air brakes regulated by turning the vertical control rod heads on bellcrank to obtain a hand force of $3.5 \begin{matrix} +0.25 \\ -0 \end{matrix}$ kp ($7.70 \begin{matrix} +0.15 \\ -0 \end{matrix}$ lbs) to unlock the mechanism each side (see Maintenance and Repair Manual para 2.5/bb).

5.5 Landing Gear Retracting Mechanism

- Travel of extension: 240 mm (9.45 in)

- Stops:

position OUT	Elbow of strut
position IN	Pin in control rod (in cockpit) is engaged in guide rail

- Adjustment: No adjustment required.

Special Requirements1. Canadian DOT Special Requirements1.1 Placards

The following placards, referenced in para 2.5, are required (see DOT T.C. No. G-96):

(b) through (n) and the following items (s) und (t):

- (s) STANDARD CLASS GLIDER
PILATUS B4-PC11A

THIS AIRCRAFT COMPLIES WITH CATEGORY "AEROBATIC" OF THE GERMAN LFS.

THE FOLLOWING MAXIMUM PERMISSIBLE AIRSPEEDS (CAS) ARE NOT TO BE EXCEEDED:

SMOOTH AIR	130 kts	149 mph
ROUGH AIR	88 kts	101 mph
AIRPLANE TOW	88 kts	101 mph
AUTO/WINCH TOW	70 kts	81 mph
AIR BRAKES EXTENDED	130 kts	149 mph

LOAD: SEE FLIGHT MANUAL

MAXIMUM WEIGHT: 770 lbs

- (t) AEROBATICS, INCLUDING SPINNING, MUST BE ACCOMPLISHED IN ACCORDANCE WITH THE APPROVED FLIGHT MANUAL FOR THE PILATUS B4-PC11A. AN ACCELEROMETER AND PEDAL LOOPS MUST BE INSTALLED IF AEROBATICS ARE TO BE PERFORMED BY THE GLIDER.

1.2 Maneuvers

Outside loops and flick (snap) figures not permitted.

Note

Supplement Document No. 01580
not applicable to Canadian
operators.

- E n d -

PART 2 - OPERATING INSTRUCTION

1. Assembly and Disassembly

1.1 Preparation

- Prepare required tool:
 - clean clothes
 - grease of mineral or synthetic basis (e.g. Aero Shell Grease 7); or white coloured anti-seize paste "Molykote DX" which is recommended.
 - handle for horizontal stabilizer attachment bolt (stowed in the cockpit bag)
- Remove canopy.

1.2 Wing Assembly (see Fig. 1)

- Insert right-hand wing and push in the centre bolt (1) half way, then install the outer bolt (2) and the rear one (3).
 (Wing remains supported.)
- Insert left-hand wing; completely install the centre bolt (1) followed by the bolts (4) and (5).
- Secure all bolts on main bulkhead using safety pins; insert cross pins of rear attachment bolts into the holes of the root ribs left and right; ensure that the springs in the cross pins are in correct position and not damaged.
- Reconnect aileron and airbrake control rods by installation of pins (6 and 7) and secure them.
- Following preflight check, install wing-fuselage fairing.

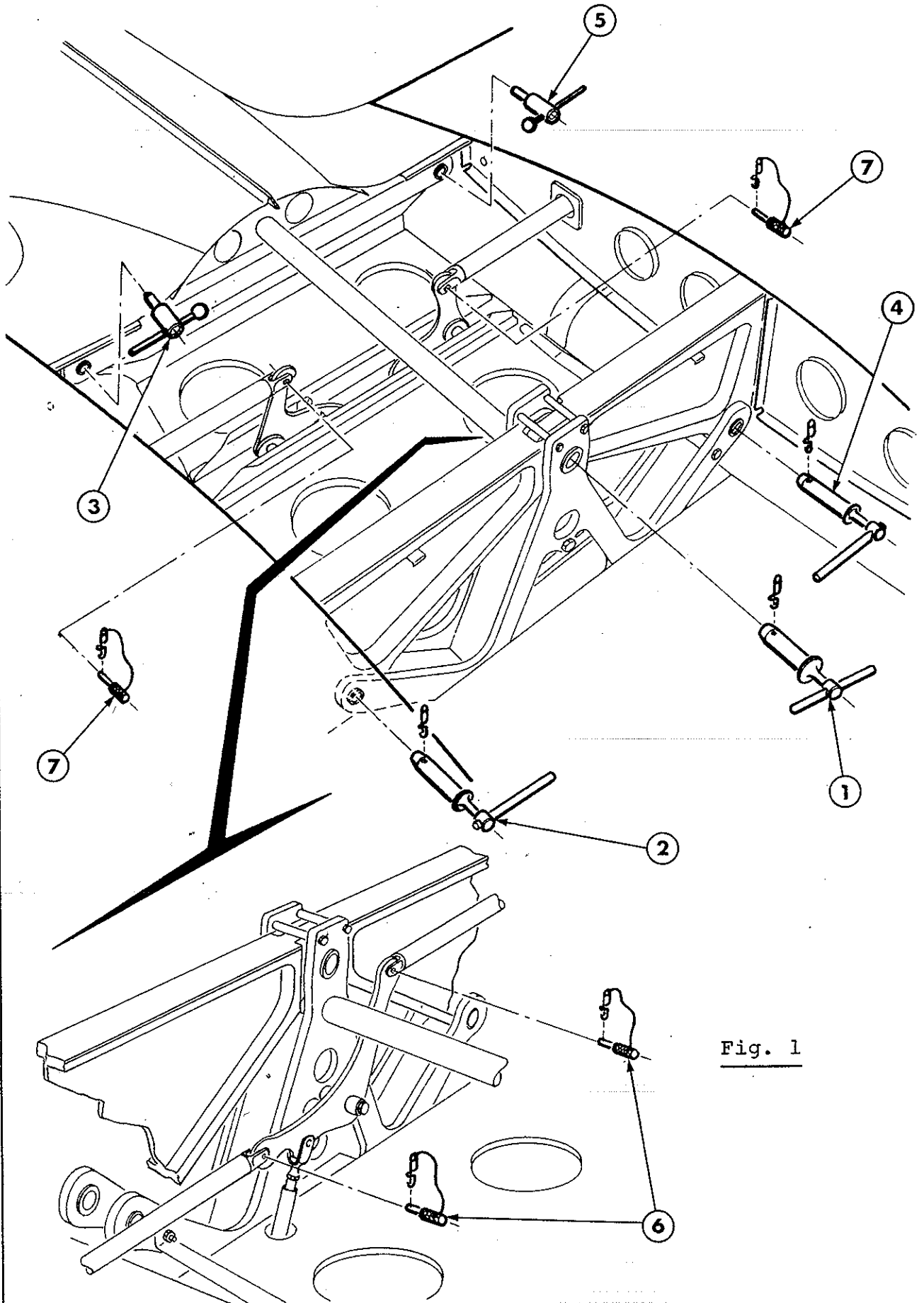


Fig. 1

1.3 Empennage Assembly (see Fig. 2)

- Pull out attachment bolt (1), using handle (2).
- Prepare elevator control connection; inspect all parts for proper condition.
- Put on horizontal stabilizer and insert it perpendicularly.
- Install attachment bolt (1); screw out the handle and stow it in the cockpit bag. Ensure that the safety spring (3) is engaged.
- Reconnect elevator control rods by installing pin (4) and secure it.

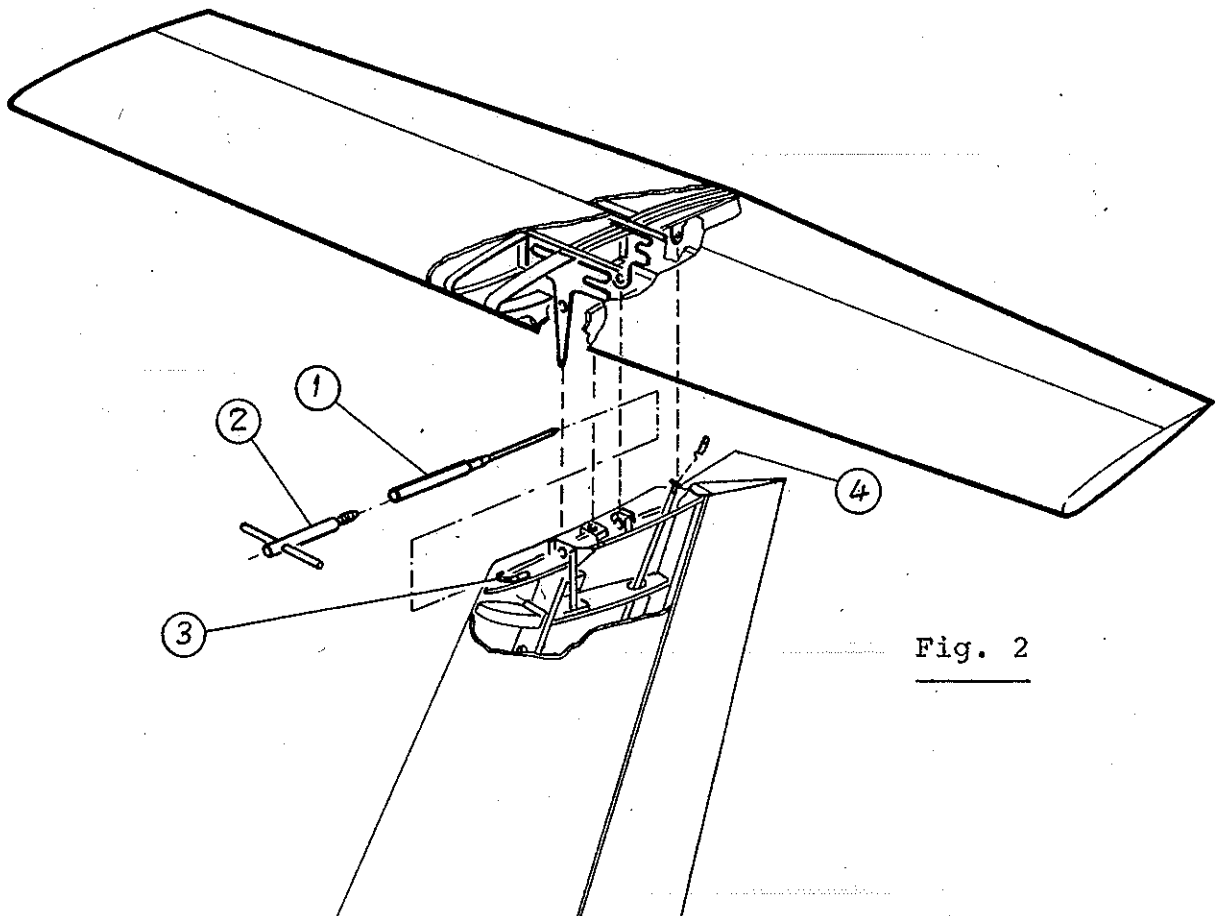


Fig. 2

1.4 Wing Removal

- The wings are removed in reverse sequence of assembly.
- Reinstall all attachment bolts and control rod connection bolts in their holes and secure them.

1.5 Empennage Removal

- Remove the horizontal stabilizer in reverse sequence of installation.
- The handle of the attachment bolt is stowed in the cockpit bag.

2. Preflight Check

Following sailplane assembly and before first flight of day carry out the following checks:

- Wing attachment bolts and control rod bolts secured.
- No foreign matter (tools, clothes) between the main bulkheads. Subsequently install the wing-fuselage fairing.
- Horizontal stabilizer attachment bolt and elevator control rod connection secured.
- Control stick and pedals free and full travel.
- Springs of trim control for condition.
- Function of airbrake control.
- Canopy locking mechanism and hinges for condition and proper function (jam). Plexiglas clean.
- Safety belts for condition.
- Instruments for condition and correct indication.
- No foreign matter or loose particles in the cockpit, particularly in pedal area.
- Wings, fuselage and empennage for damages of the skin, wrinkles, dents, cracks, loose rivets. Tapes over wing-aileron and stabilizer-elevator gaps for adherence.
- Static pressure holes and pitot tube free.
- Tow coupling clean; proper function. For winch tow remove locking device.
- Tyre pressure.
- Ballast on tail removed.

3. Transportation of Sailplane

If the glider is being transported in a trailer, the following should be observed:

- Support the components as described in PILATUS Document No. 23-11-90-01508. Drawing No. 110.90.002 refers to all dimensions necessary for supporting.
- Fix all control surfaces using gust locks (available from PILATUS).
- Lock aileron, airbrake control rods and attachments in the wings, using cords or rubber belts.
- Fix the elevator control rod to the fin end rib.
- Take care that no chafing, jamming or deformation can arise, and avoid entry of water and dirt into the glider.
- On an open air vehicle, protect the canopy, the area of horizontal stabilizer attachment and cover the pitot tube.
- Ensure all components cannot be shifted during transportation.

4. Mooring

For mooring the glider (wind from tail), special ring screws, P/N 936.31.11.101, are available. They are screwed into the threaded holes provided under each wing, and serve as tie-down rope attachment points.

Note

Before installing the ring screws, clean the threaded holes, but do not use a thread chaser for this purpose to prevent damaging of the heli-coil insert.

Tie-down additionally the fuselage tail, install the gust locks on control surfaces and cover the pitot tube.

Protection of the canopy is recommended. A plastic cover, P/N 119.99.11.054 is available from PILATUS.

In any case, the gust locks should be fitted and the pitot tube covered.

5. Maintenance and Care

5.1 General

The B4 all metal glider requires minimal maintenance.

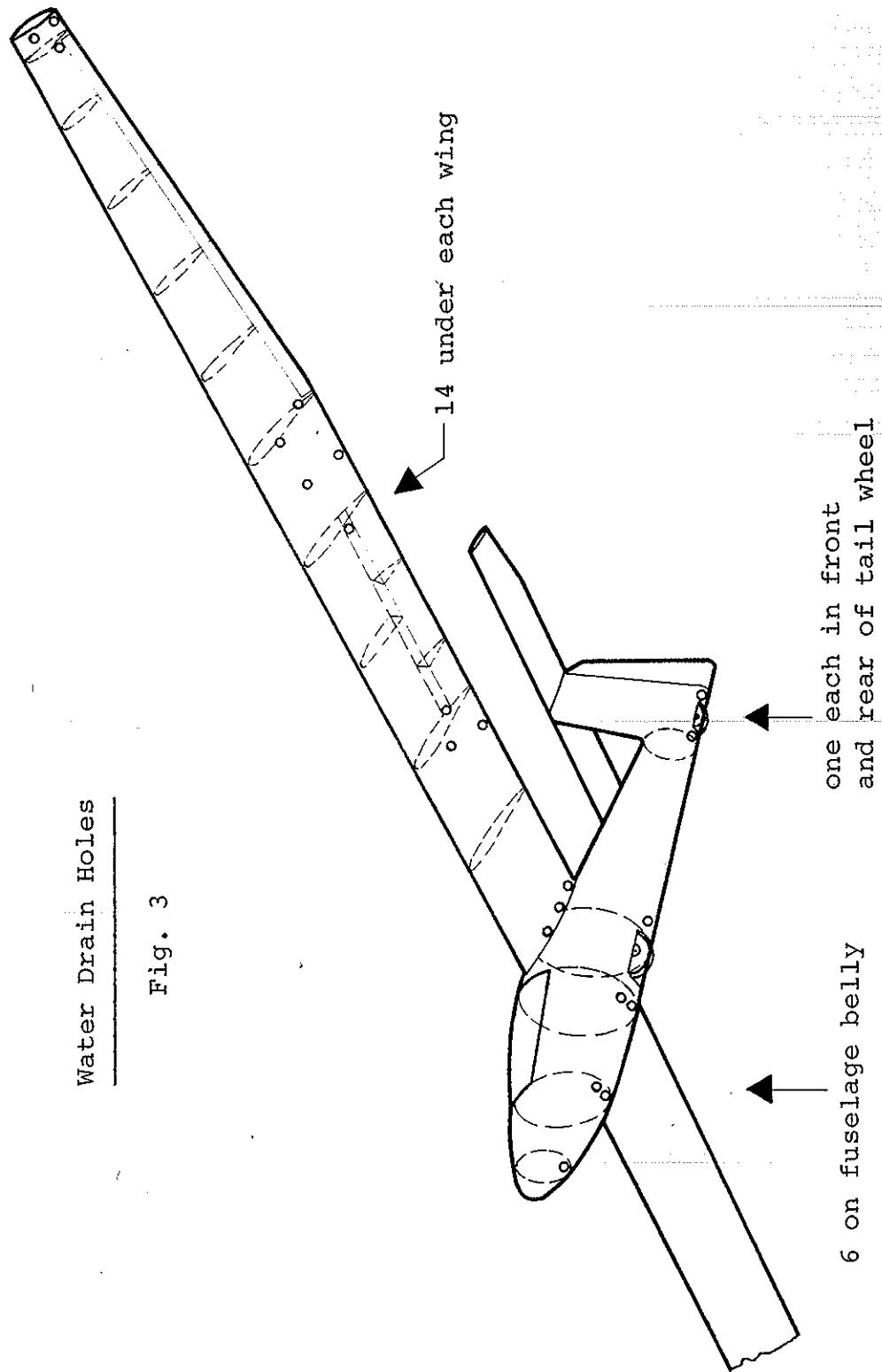
Apart from normally conducted periodic inspection of safety belts, tow coupling and instruments, the glider may be subject to care and cleaning of the outside paint, the plexiglass, and the wheel boxes.

To prevent any corrosion, accumulation of water in the structural compartments must be avoided.

Prior to hangaring, the water drain holes, shown in Fig. 3, should therefore be inspected for free outlets and cleaned if necessary. If, one day, a pilot should have urinated into the cockpit, the compartment must be thoroughly rinsed with water; approx. 5 % of an aluminium corrosion remover (e.g. TURCO W01) may be added to the first rinsing water to neutralize alkaline residues, then flushed with clear water.

Since all controls operate on ball bearings or are guided by plastic material, no lubrication is required, except for the landing wheel retracting mechanism. The bearings of this control are lubricated with molybdenum disulphide based grease, and should only be relubricated during overhaul or repair.

Before hangaring the glider for a longer period, all openings to the sailplane structure should be covered to prevent entering of mice or other animals which could nibble at the foam ribs inside the wings or contaminate with excrements.



Water Drain Holes

Fig. 3

5.2 External Surfaces

Wet surfaces should be dried before hangaring.

To preserve the outside paint and smoothing the surfaces, a car wax may be used. After polishing, the surface should be treated with a wax in order to maintain the protective effect of the paint.

Do not use any silicone product with regard to later paint repair.

Notes

The scheme of existing surface treatment and the list of paint used is given in the Maintenance and Repair Manual.

The upper sides of wings and empennage should be white coloured to prevent extensive heat by sun radiation.

5.3 Canopy

The canopy surface, even the blue coloured, may be cleaned and polished using the conventional plexiglass care products.

5.4 Tow Coupling

The tow coupling model TOST, located in front of the landing wheel, is highly exposed to dirt. It should frequently be cleaned and lubricated.

In periods required by the air authority, the unit has to be overhauled at the manufacturer or in a licenced work shop.

5.5 Wheel Brake

The Bowden control cable for the wheel brake can be readjusted on the drum brake attachment point. The control cable can easily be removed and replaced.

5.6 Air Brakes

With insufficient pre-tension of the air brakes, they can be lifted at higher air speeds, which is indicated by wing and empennage buffeting.

Since the control mechanism may be relieved in course of time, it must periodically (at least every year) be readjusted to obtain the required hand force for unlocking the mechanism. This force is defined in Part 1, para 5.4/b of this manual.

5.7 Pitot Tube

The pitot tube opening in the fuselage bow should be covered whenever the glider is hangared, moored or transported to avoid entry of dust and insects. The cover has to be marked in such a way that it cannot be overseen during preflight check.

The inlet tube should periodically be inspected for the presence of dirt, and the water drain hole on the end of the inlet tube must be kept free.

5.8 Repair

Samples of typical structural and paint repair schemes are given in the Maintenance and Repair Manual which is available from PILATUS. That manual shows also adjustment procedures of the controls and wear limits.

If severe damages should occur, contact this company.

P I L A T U S A I R C R A F T L T D .

S T A N S (S w i t z e r l a n d)

Supplement to Flight Manual

for

S A I L P L A N E

P I L A T U S B 4 - P C 1 1 A

F L I C K (S N A P) A E R O B A T I C

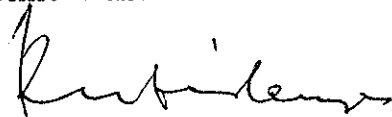
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Doc. No. 01580 E

January 1975

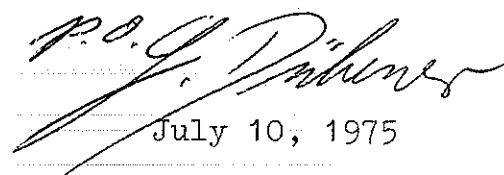
PILATUS AIRCRAFT LTD.

Techn. Publications



Approved:

SWISS FEDERAL AIR OFFICE
Section for Aeronautical Material



July 10, 1975

Log of Revision

Any revision of the present supplement must be recorded in the following table, and endorsed by the responsible air 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. will be shown on the bottom left-hand of the page.

Rev. No.	Section	Page	Date	Approval	Date
1	Metric Units added throughout, no substantial changes. Reprinted in entirety due to extent of revision.		Aug. 8 1980	Federal Office for Civil Aviation Section of Aeronautical Material <i>p.o.g. Döhner</i>	Sept. 18, 1980

FLICK (SNAP) AEROBATIC MANEUVERS

1. Description1.1 Distinctive Features

- Model designation: B4-PC11AF
- Fuselage rear section reinforced as shown in Drawing No. 112.35.11.136/137(e) or PILATUS Document No. 01582.

1.2 Certification Basis

- Lufttüchtigkeitsanforderungen für Segelflugzeuge (LFS), issued February 1966, AEROBATIC Category.
- "Special Conditions for Flick Figures", issues by the Swiss Federal Air Office on December 11, 1974.

2. Limitations2.1 Airspeed Limits

Maximum entry speed
for flick (snap) maneuvers 150 km/h (93 mph, 81 kts)

2.3 Operating Limits(c) Approved aerobatics:

All maneuvers resulting in positive and negative acceleration, including flick (snap) figures.

(Accelerometer and pedal straps mandatory;
5-belt safety harness recommended.)

FLICK (SNAP) AEROBATIC MANEUVERS

2.5 Placards

The following placard supplements item 2.5(o) of the basic Flight Manual (recommended entry speeds) and is provided for US-registered sailplanes only (see note under para 2.5, page 5).

FLICK (SNAP) ROLL ENTRY SPEED: 130 km/h (70 kts), 81 mph

EXPECTED ACCELERATION: + 4 g

3. Controls and Procedures

3.2 Procedures

(g) Aerobatics

The following complements the list under para 3.2(g) of the basic Flight Manual (page 13) and represents the recommended entry speed for the specified figure with the resulting acceleration.

Note

For maximum entry speed see para 2.1.

Figure	Recommended Entry Speed			Expected Acceleration
	km/h	mph	kts	
Flick (snap) roll	130	81	70	+ 4 g

No change to other information given in the basic Flight Manual Document No. 23-11-00-01574 E.