AIR CADET GLIDING PROGRAM

2-33 SCHWEIZER AIRCRAFT OPERATING INSTRUCTIONS

ENGLISH

(Replaces Chapter 2 Section 2 of the A-CR-CCP-242/PT-005 dated 31 Jan 2012)

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OPI: 2 Canadian Air Division / Director Air Force Training 2017-01-31

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FOREWORD

1. 2-33 Schweizer Aircraft Operating Instructions are issued by the Commander RCAF under the authority of the CDS.

2. This publication is effective on receipt and supersedes all previous editions and amendments, which are to be withdrawn and destroyed.

3. Comments and suggestions should be forwarded through the appropriate Region Chain of Command to the NCA Ops O at NATL CJCR SP GP, info 2 CDN AIR DIV / Dir AF Trg / ACGPSET.

4. There are two manuals pertaining to the 2-33 Schweizer Glider:
   a. Aircraft Operating Instructions (AOI) produced by DND; and

5. The SGS 2-33 Sailplane Flight-Erection-Maintenance Manual produced by K & L Soaring LLC is the legal controlling document that must be carried on board the aircraft during flight. There is no need to carry the AOIs in the glider.

6. All information in this document is applicable for both the 2-33 and 2-33A unless indicated otherwise.

7. All speeds are IAS unless indicated otherwise.

8. Note, Caution, and Warning headings in this manual are defined as follows:

   **NOTE**

   To point out a procedure, event or practice which it is desired or essential to highlight.

   **CAUTION**

   To emphasize operating procedures, practices, etc., which, if not correctly followed, could result in damage to or destruction of equipment.

   **WARNING**

   To emphasize operating procedures, practices, etc., which, if not correctly followed, could result in personal injury or loss of life.
Text and illustration changes are indicated by black vertical lines (I) in the margin of the applicable pages.

Total number of pages for this publication is: 53

Noted changes are those from 31 Jan 2012 edition of the A-CR-CCP-242/PT-005 Chapter 2 Sections 1, 2, 4, 5, 6, and 7. Change 1 consists of the following:

**Section 1 now Aircraft & Systems Description**

1-1 para 2 & 3 added for clarity ....................1
    Figure 1-1 - tire pressures added..............1
    para 5 - solo from front only added...........1
    para 6 - seating information added ............1
1-2 para 8c - information on different braking action of hydraulic system added..............................................1

**Section 2 now Limitations**

2-1 Figure 2-1 - Winch/Auto Launch safety speeds added to chart
    - and - 1080 Gross Weight added.............1
    Figure 2-2 - 1080 Gross Weight added........1
2-2 Figure 2-3 - updated for 1080 Gross......1
2-4 Figure 2-5 - chart added ......................1
2-4 para 1 - max take-off weight updated ... 1
2-5 para 3a and 3b - Seat ballast info added ........................................1
    para 4 - information on interpreting loading graph updated to include seat ballast info .............................1
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<td>- background information added</td>
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<td>cushion and spacer condition updated as per PM from FSOM 142273 and PIF 8-13</td>
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<td>para 3</td>
<td>added to assist clarity</td>
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<td>&quot;front seat&quot; added to para to clarify that VON requirements only apply to front seat</td>
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<td>&quot;FRONT&quot; added to title and info box added</td>
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<td>3-5 para 9 e</td>
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<td>para 27</td>
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<tr>
<td>4-2 Figure 4-2</td>
<td>added to further address PM from 1010-C-GCLB 2014</td>
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<td>Figure 4-3 updated</td>
<td>for 1080 lb MTOW and &quot;SAMPLE ONLY&quot; added</td>
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<td>4-3 PRE-RELEASE CHECK (A)rea</td>
<td>&quot;pre-briefed release point&quot; now reads &quot;desired release area&quot; as per 2016 Stds Writing Board</td>
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<td>&quot;Pre-stall, spin, spiral check&quot;</td>
<td>renamed &quot;SAFETY CHECK&quot; to match A-CR-CCP-242 ACGPM</td>
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<tr>
<td>4-3 SAFETY CHECK (A)titude</td>
<td>reference removed and replaced with &quot;the published minimum altitudes&quot; as per 2016 Stds Writing Board</td>
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<tr>
<td>PRE-LANDING CHECK</td>
<td>- (A)irspeed - ref to pre-determined airspeeds replaced by Calculate the approach speed as per 2016 Stds Writing Board</td>
</tr>
<tr>
<td>4-4 CAUTION for using spoilers with slip</td>
<td>added as per PM from 1010-C-CLB 2014</td>
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<tr>
<td>paras 2 and 3</td>
<td>and CAUTION added, info taken from 2010 owner manual</td>
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<thead>
<tr>
<th>Paragraph</th>
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<tr>
<td>5-2 &quot;UNUSUAL ATTITUDE RECOVERIES&quot;</td>
<td>added and Stall, Incipient Spin, Full Spin, and Spiral Dive recoveries updated as per 2016 Stds Writing Board</td>
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</tbody>
</table>
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para 2 - choice of pushing or pulling
on struts and nose added
para 5 a, b & c - additional steering info
added
6-2 para 12 a & b - explanatory para of
representative tie-downs and their use
added with diagram
6-3 para 14 a - preventing
sideways movements added
6-4 para 14 d - rudder lock info added
6-6 para 18 - "Open-Air" added to title for
clarity and now refers to owner
manual
6-4 para 14 e - information on spoiler
settings and connection to hydraulic
brakes added
Figure 6-4 added as per 2015 MRM
Minute #20
Figure 6-5 added as per 2015 MRM
Minute #20
para 15 d - information on spoiler
settings and connection to weather
and wildlife added
6-6 para 17 - information on carabiner
type hooks and ratchets added
6-6 para 19 - now refers to owner manual
NOTE about winds added

Annex A now Glider Daily Inspection

A-1 - comments and advice removed from
DI sheet - now with information in
Sec 3 - as per 2016 Stds WG
A-1 - DI sheet updated to match
amendments in Chapter 3

Annex B now Glider Open-Air Trailer Loading Check List

B-1 - "OPEN-AIR" added to checklist title
B-1 - 2b - reference to D-ring removed
B-1 - 3a - "control stick" now "control push
rods"

Annex C now Glider Final Assembly Check List

C-1 para 2 - "test" now "first" flight
C-1 - 7 a - title of owner manual added
C-1 - 2nd column added
C-1 - 2nd signature block added

Annex D now Glider Maintenance Flight Card

D-1 Card added as per 2015 MRM, items
as per Stds Os 2016
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SECTION 1 – AIRCRAFT & SYSTEMS DESCRIPTION

GENERAL DESCRIPTION

1. The 2-33 is a conventional two-place tandem intermediate training glider manufactured by Schweizer Aircraft Corporation, Elmira, New York. Its construction is all metal with a fabric cover on the fuselage and the horizontal tail surfaces. It has a one-piece canopy for increased visibility. The wings are tapered in the outboard section and have spoilers/dive brakes incorporated.

2. There are two variants of the 2-33. The 2-33A included a larger rudder with an aerodynamic balance horn. The 2-33AK came as a kit that was completed by the buyer.

(above para added 2016)

3. As all aircraft have been standardized to a large extent, no differentiation will be made between models in this manual and 2-33 will be used to denote all variants.

(above para added 2016)

SPECIFICATIONS

<p>| | |</p>
<table>
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<tr>
<td>Span</td>
<td>51 ft 0 in</td>
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<tr>
<td>Height</td>
<td>9 ft 3 ½ in</td>
</tr>
<tr>
<td>Wing Area</td>
<td>219.48 sq ft</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>11.85 : 1</td>
</tr>
<tr>
<td>Tire Pressures</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Brakes:</td>
<td>28-30 psi</td>
</tr>
<tr>
<td>Mechanical Brakes:</td>
<td>15 psi</td>
</tr>
</tbody>
</table>

Figure 1-1 Specifications

(chart updated 2016)

SEATING CONFIGURATION

4. The ACGP 2-33 Glider is a tandem two seat configuration enabling solo or dual flight.

5. Solo flight is conducted from the front seat only

(above para added 2016)

6. Some pilots may require seat spacers and cushions to ensure the required sight line over the nose. See Section 3 NORMAL PROCEDURES - USE OF SEAT SPACERS AND SEAT CUSHIONS for proper installation and information on acceptable condition.

(above para added 2016)
7. **Tow Release Knobs:**
   a. **Front.** Located at centre bottom of the instrument panel.
   b. **Rear.** Located at top left of the front seat back.
   c. **Operation.** To release, pull red knob out fully.

8. **Spoiler and Brake Levers:**
   a. **Front.** Located on the left side of cockpit below the level of the instrument panel.
   b. **Rear.** Located at centre of the left side of cockpit.
   c. **Operation.** Push forward and down to unlock, and pull straight back to desired position. The wheel brake is actuated only at the extreme aft position of the spoiler/wheel-brake control handle. The rearward pressure applied on the spoiler handle controls the degree of braking. Gliders may be equipped with either a mechanical or a hydraulic brake system. The hydraulic system provides firmer braking action.

(above para amended 2016)

9. **Control Column.** Front and rear controls are conventional in design and are mounted on a single torque tube.

10. **Rudder pedals.** The following are applicable:
   a. **Front.** The conventional left and right toe pedals are located forward of the floorboard and are adjustable. Some 2-33 are equipped with rudder blocks on the front rudder pedals that can be lifted up and over to provide additional adjustments for leg length.

   (sub para 10a amended 2016)

   b. **Rear.** The conventional left and right toe pedals, located on either side of the front seat, are not adjustable.

11. **Trim Lever.** One of three types of trim control is provided in the front cockpit, depending on the year of manufacture of the glider:
   a. A bungee-type control mounted on the floor in front of the control column; or
   b. A **bungee type** control mounted on the left cockpit wall below the spoiler handle:
      1. Operation – trim can be set to one of the four notches. The pilot can adjust the trim forward or aft to help remove control column pressure
      2. Trim should be set to full forward for take-off.
      3. Setting bungee type trim in cruise flight:
(a) Set attitude as required;
(b) Move trim handle to alleviate control column pressure; then
(c) Adjust trim as necessary for other attitudes.

c. A **ratchet-type** control mounted on the base of the control column (Stick Trim). A lever on the control column adjusts a ratchet system mounted below the cockpit floor.

1. **Operation of Stick Trim** - The trim is operated with the fingers of the control column hand by aft pressure on the locking lever. The control stick is then moved to the position that gives the desired attitude at which point the locking lever is released to engage the trim lock.

2. Stick Trim should be full forward for take-off.

3. **Setting Stick Trim in cruise flight:**
   (a) if time and altitude permit, allow the control column to move to the trimmed position;
   (b) gently squeeze and hold the Stick Trim lever back against the control column;
   (c) while holding the Stick Trim lever in position, adjust the control column position to set the desired cruise attitude/airspeed;
   (d) once established, gently release the Stick Trim lever; then
   (e) give the Stick Trim lever a small push forward to positively engage the ratchet.

(above sub paras added 2016)

12. **Instruments.** Flight instruments are mounted on the instrument panel in the front cockpit, and include altimeter, airspeed indicator, magnetic compass and either a VSI or variometer. Some gliders are equipped with instrument panel mounted radios and transponders.
Figure 1-2 Cockpit

Figure 1-3 Example Instrument Panel
SECTION 2 – LIMITATIONS

Airspeed Limitations

<table>
<thead>
<tr>
<th>Gliders with a Max Gross Weight of 1040 lbs</th>
<th>Gliders with a Max Gross Weight of 1080 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>98 mph</td>
<td>V\textsubscript{NE} Never Exceed Speed</td>
</tr>
<tr>
<td>98 mph</td>
<td>Max Dive Speed</td>
</tr>
<tr>
<td>98 mph</td>
<td>Max Air Tow Speed</td>
</tr>
<tr>
<td>98 mph</td>
<td>Max Speed (spoilers open)</td>
</tr>
<tr>
<td>69 mph</td>
<td>Max Auto / Winch Speed</td>
</tr>
<tr>
<td>65 mph (^1)</td>
<td>V\textsubscript{A} Manoeuvring Speed (^1)</td>
</tr>
<tr>
<td>50 mph</td>
<td>Winch/Auto Launch Safety Speed</td>
</tr>
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Figure 2-1 Airspeed Limitations (updated 2016)

Limit Load Factor

<table>
<thead>
<tr>
<th>Maximum Take-off Weight</th>
<th>1040 lbs</th>
<th>1080 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimate Load Factor (^2)</td>
<td>7.0 G (^2)</td>
<td></td>
</tr>
<tr>
<td>Limit Load Factor (^1)</td>
<td>4.67 G (^1)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2-2 Limit Load Factor (updated 2016)

CAUTION

1. Over 65 mph, the pilot must manoeuvre with caution. Although the limit load factor of 4.67 G should never be exceeded, the pilot can do so inadvertently with abrupt manoeuvres. Speeds between 65 mph and the 98 mph (or 66 mph and 100 mph for those gliders with gross weight of 1080 lbs) shall be treated as a cautionary range and manoeuvring within this range should be reduced to a minimum as velocity increases.

CAUTION

2. A safety factor of 1.5 is required for certification giving an ultimate load factor of 7.0 G to allow for material variations and inadvertent atmospheric conditions. Because of its light wing loading, the 2-33 can develop very high loads if speed limitations are not rigidly observed.
UNDERSTANDING THE FLIGHT ENVELOPE

The following paragraphs are taken from The SGS 2-33 Sailplane Flight-Erection-Maintenance Manual, K&L Soaring and are provided to assist with understanding Figure 2-3 Flight Envelope:

"The FAA* required design flight envelope is presented on the [graph]. On the horizontal axis are indicated velocities in miles per hour, and on the vertical axis are load factors expressed in "G" units.

The straight lines labeled [sic] "gust load factors" represent the effect of the FAA required 24 ft. per second gust on the sailplane as speed varies. They diverge from the one "G" situation where the glider would be at rest or in perfectly balanced level flight. The curved lines diverging from zero "G" represent forces which can be induced by moving the elevator (or other) control abruptly at various speeds. As you can see, the faster you fly the more effect moving your controls..."
will have. Gusts will also have more effect as speed increases.

The speed for maneuvering [sic] with caution occurs where "G" loading from an abruptly moved control meets the 4.67 limit load factor. Assuming smooth and limited movements of the controls, the placard or "red-line" speed occurs where gusts could meet the 4.67 limit load factor without any maneuvering [sic].

Normal placard speeds are reduced 10% from design speeds to provide an extra margin of safety. Thus, on the graph, the diagonal hatched area indicates speeds at which you must use caution in maneuvers [sic]. You should neither maneuver [sic] nor fly so fast as to expose your ship to loads within the crosshatched area marked, "NO MANEUVER"[sic].

It can be inferred from the graph that abrupt maneuvering [sic] in gusty conditions is dangerous and can lead to very high "G" loads.

In normal operation the major cases of high "G" loads are tight spirals in thermals which would not normally exceed 2 or 2.5 G's. Winch or auto towing can produce high loads, but if the auto-winch placard speed is observed, this will be within safe limits. The best ground launch climb is obtained at speeds well below placard limits.

* FAA - Federal Aviation Authority, the United States government organisation equivalent to Transport Canada.

**SURFACE WIND OPERATIONAL LIMITATIONS**

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<tbody>
<tr>
<td>Max Headwind</td>
<td>25 kts (28 mph)</td>
</tr>
<tr>
<td>Max 90° Crosswind</td>
<td>8 kts (10 mph)</td>
</tr>
<tr>
<td>Max Tailwind</td>
<td>5 kts (6 mph)</td>
</tr>
<tr>
<td>Wind Gusts</td>
<td>10 kts (12 mph)</td>
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</table>

Figure 2-4 Surface Wind Operational Limitations
shown example: 10 KT wind 45° off runway heading

solution: Enter wind angle at 45°, follow radial inward to 10 KT wind speed arc. At the intersection of the radial and the arc, read straight down for the crosswind component and straight across for the headwind component.

could you fly a 2-33 in this example? yes!

figure 2-5 crosswind component chart
WEIGHT and BALANCE

1. Maximum take-off weight of the aircraft is 1040 pounds or 1080 pounds.

   (above para updated 2016)

2. The glider must be operated within the maximum limit of take-off weight, and it must be balanced within the forward and rearward C of G limit. The weight and empty C of G of each glider is determined at manufacture or on subsequent reweighing and this information must then be used to calculate the operational weight and balance.

3. Some pilots may need a ballast to keep the C of G within approved limits. There are two types of removable ballast approved for use in the ACGP 2-33:

   a. A **ballast block** installed in the nose of the glider between the rudder pedals. This ballast is far ahead of the pilot seat and the effect of its installation on the C of G is indicated on the loading graph.

   b. A **seat ballast** fitted under the cushion or, if needed, the lowest seat spacer. In this case, the weight of the ballast is added to the pilot's weight. Accordingly, the Loading Graph (Fig 2-5) does not include seat ballast information.

   (above sub paras added 2016)

4. **Loading Graph.** Each ACGP 2-33 has a Loading Graph located in a visible area of either cockpit which allows the pilot to easily determine the correct loading, solo or dual, with or without ballast. References to Ballast in the Loading Graph in Figure 2-5 refer to the red removable ballast, not the Seat Ballast. Add the weight of the Seat Ballast to weight of the pilot before using the Loading Graph.

   (para updated 2016)
Figure 2-6 Sample 2-33 Loading Graph for a 1040 lb gross weight glider

1. Project horizontal line at front seat load.
2. Project vertical line at rear seat load.
3. If intersection of the lines is within the envelope, the C.G. is within limits.
4. Gross weight must not exceed 1040 lbs.
5. Solo flight from front seat only.

Figure 2-7 Sample Cockpit Placards for a 1040 lbs gross weight glider

FRONT C of G LIMIT

Max Weight Limit

No Ballast

Ballast

FLIGHT LIMITS 2-33A
SAC BALLAST IN

MAX WT AFT PILOT/220# FWD
MIN WT AFT PILOT/100# FWD
MIN WT FWD PILOT SOLO

FLIGHT LIMITS SOLO FRONT SEAT ONLY

MODEL SGS 2-33 SERIAL
WITH 220# PILOT FWD MAX WT AFT PILOT
WITH 100# PILOT FWD MIN WT AFT PILOT
MIN WT FWD PILOT SOLO
MAX WT FWD PILOT SOLO

INSTRUMENT FLIGHT PROHIBITED
MAX GLIDE OR DIVE 98 MPH
MAX AERO TOW 98 MPH
MAX AUTO OR WINCH TOW 69 MPH
MAX DIVE BRAKE OPERATION 98 MPH

SCHWEIZER AIRCRAFT CORP. ELMIRA N.Y.
5. **Placards.** Placard weights are installed in the cockpit of the 2-33. The following example details how to interpret the factory placards:

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
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<tbody>
<tr>
<td>Maximum weight aft pilot/220 lbs forward</td>
<td>150 lbs</td>
</tr>
<tr>
<td>Minimum weight aft pilot/100 lbs forward</td>
<td>120 lbs</td>
</tr>
<tr>
<td>Minimum weight forward pilot solo</td>
<td>134 lbs</td>
</tr>
</tbody>
</table>

Figure 2-8 Example Cockpit Placard for a 1040 lbs gross weight glider.

a. **Maximum Weight Aft Pilot/220 Forward 150.** If the front seat occupant, including any seat ballast, weighs 220 lbs, then the maximum weight of the rear seat occupant cannot be more than 150 lbs, since the maximum useable load for this glider is 370 lbs (220 plus 150). Adherence to this limit is essential to ensure that the useable maximum weight of the glider is not exceeded.

b. **Minimum Weight Aft Pilot/100 Forward 120.** If the front seat occupant, including any seat ballast, weighs 100 lbs, then the minimum weight of the rear seat occupant cannot be less than 120 lbs, in order to properly balance the glider. Adherence to this limit is essential to ensure that the aft C of G is maintained within the approved limit.

c. **Minimum Weight Forward Pilot, Solo 134.** Adherence to this placard is essential to ensure that the C of G is maintained within approved limits for solo flight. Ballast, either block or seat, must be added if the weight of the solo pilot is less than the placard minimum.
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SECTION 3 – NORMAL PROCEDURES

DAILY INSPECTIONS

1. Before the glider’s first flight of the day, a Daily Inspection (DI) shall be performed by either an aircraft maintenance engineer, a qualified glider pilot, or a student qualified to carry out DIs.

   (para updated 2016)


   a. Cockpit/Interior Fuselage:

      (1) Check canopy attachment points for security and condition of latches. Check canopy for condition and cleanliness. Use plastic cleaner or soap and water. Do not use glass cleaner.

      (2) Confirm that the radio/instrument battery is in and secure with attaching wires clear of the feet area.

      (3) Carry out a Radio Check: transmit and receive.

      (4) Check condition and security of the instruments. Gently check air hose connections behind dash. Check altimeter setting against field elevation.

      (5) Check front ballast bracket is secure and pin is installed.

      (6) Check front and rear release. Confirm there is tension, the cable is free, and operation is smooth.

      (7) Check front and rear rudder pedals for security and wear. Confirm rudder pedal springs and cable are attached and all rudder pedals have freedom of movement.

      (8) Check front and rear control column for freedom of movement and confirm proper application of ailerons and elevator.

      (9) Check trim lever for freedom of movement and effectiveness.

      (10) Check front and rear spoiler handles for freedom of movement and operation.

      (sub paras amended 2016)

      (11) Check rear door hinge, catches and rear window attachment points.

      (12) Check control cables and pulleys for security and wear.

      (13) Check wing pins for position and wing bolts for wear.
(14) Check brake and spoiler connections for security.

(15) Check interior of fuselage for signs of wear.

(16) Check seat and back cushions and spacers for condition: not broken, returns to shape if compressed, Velcro secure.

(17) Check front and rear seat belts for excessive wear or rips.

(sub paras amended 2016)

b. **Right Wing/Fuselage:**

(1) Check wing strut bolts for security. Confirm safety/cotter pins are in place.

(2) Check out-rigger wheels for security and wear.

(3) Check spoiler/dive brake hinges and connections for security and wear.

(4) Check aileron hinges, attachment points and pushrods for security.

(5) Check condition of wing.

(6) Check canopy fairing on upper wing surface is flush and secure.

(7) Check right fuselage fabric for wear.

c. **Tail Assembly:**

(1) Check right inspection port covers for security.

(2) Check rudder cable connection for security.

(3) Check all hinges and bolts on tail assembly for security.

(4) Check pushrod attachment to elevator horn for security.

(5) Check horizontal stabilizer struts and stabilizer attachment to fuselage for security.

(6) Check tail wheel assembly for freedom of movement and security.

d. **Left Wing/Fuselage:**

(1) Check wing strut bolts for security.

(2) Check out-rigger wheels for security and wear.

(3) Check spoiler/dive brake hinges and connections for security and wear.

(4) Check aileron hinges, attachment points and pushrods for security.
(5) Check condition of wing.

(6) Check that canopy fairing on upper wing surface is flush and secure.

(7) Check left fuselage fabric for wear.

e. **Nose/Wheel Area:**

(1) Check skid and skid plate for security and wear.

(2) Check tow release mechanism wear, condition, and proper engagement. Inspect release arm and hook for damage, cracks, deformation, and freedom of movement on pivot bolt. Inspect release arm slot for excessive wear. Confirm snubber is in place. (Depending on operating conditions, the unused release mechanism may be secured in place)

(3) Check wheel, tire pressure and brake area for wear, leaks, and condition. inflation (15 psi if mechanical brakes, 28-30 psi if hydraulic brakes)

(4) Check pitot tubes and static vent for obstructions. Do not blow into the pitot tube.

(sub paras amended 2016)

**COCKPIT ERGONOMICS**

3. Some pilots may require seat spacers and cushions to ensure the required sight line over the nose. Incorrect installation might result in control column interference.

(para added 2016)

4. **VON Marking** - Vision Over the Nose (VON) refers to the ability to perform all visual tasks required for the safe take-off, flight manoeuvres, and landing of an aircraft while acting as pilot-in-command from the front seat.

(sub paras amended 2016)

5. The ACGP 2-33 requires a VON of 8.1 degrees to enable the front-seat pilot to see the tow plane while preparing for launch, the tow plane while on tow, most of the tow rope during tow, and the aiming point on approach; all without looking through the distortion associated with the lowest portion of the canopy that bends to meet the metal framing.

6. To simplify this requirement and set an achievable and measurable standard, all ACGP 2-33 gliders have a VON mark affixed to the pitot tube IAW Technical Order C-12-382-000/CF-012. See Figure 3-1.
7. **Front Seat Cockpit Fitting Guide** - To meet the minimum VON of 8.1 degree requirement and to ensure the front seat pilot has full access to all controls, a combination of seat-spacers and cushions may be required. Figure 3-2 is to be used as an initial guide to determine these requirements. The final configuration of spacers will depend on the individual pilot's physique and preference – and may require changes from aircraft to aircraft. However, in no case shall the maximum number of front seat back-spacers be exceeded.

<table>
<thead>
<tr>
<th>FRONT SEAT PILOT STATURE</th>
<th>SEAT BACK-SPACERS and CUSHION</th>
<th>SEAT PAN SPACERS and CUSHION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5' 0&quot; to 5' 1'</td>
<td>One curved back-spacer, 2 flat back-spacers, and 1 cushion</td>
<td>One 1&quot; seat-spacer and 1 cushion</td>
</tr>
<tr>
<td>5' 1&quot; to 5' 2&quot;</td>
<td>One curved back-spacer, 1 flat back-spacers, and 1 cushion</td>
<td>One 1&quot; seat-spacer and 1 cushion</td>
</tr>
<tr>
<td>5' 2&quot; to 5' 3&quot;</td>
<td>One curved back-spacer and 1 cushion</td>
<td>One 1&quot; seat-spacer and 1 cushion</td>
</tr>
<tr>
<td>5' 3&quot; and over</td>
<td>1 cushion</td>
<td>1 cushion</td>
</tr>
</tbody>
</table>

The above are only an initial guide. The final configuration of spacers will depend on the individual pilot's physique and preferences. All pilots must use at least one back and one seat cushion.

Figure 3-2 Front Seat Fitting Guide (updated 2016)

8. **Maximum Number Of Front Seat Back-Spacers** - Excessive use of spacers may result in control column interference and reduction of seating area. Excessive use of cushions will negate the shock absorbing benefits of the specially designed ACGP spacers. Therefore the maximum number of front seat back spacers is one curved back-spacer, two flat back-spacers, and one cushion.

9. **Front Seat Spacer Usage** - The following instructions amplify those of C-12-382-000MS-Z01 and shall be used for the step-by-step installation of spacers and cushions in all ACGP 2-33 gliders:

   a. The curved back-spacer is for the front seat only.

   **NOTE**

   Only one curved back-spacer shall be used.

   b. Installation of back-spacers shall be such that the seating area is not compromised. Excessive reduction of the seating area may be a contributing factor to pilots sliding under the lap belt.
c. Seat-spacers can either be set to the rear of the seat-pan or against the back spacers - whichever placement is used, the seat-spacer cannot extend so far forward as to prevent full motion of the control column.

NOTE

The addition of seat-spacers shall allow the pilot to grasp the control column with the palm. If only the fingertips can grasp the control column, positive control of the glider may be compromised.

d. One back cushion and one seat cushion shall be used at all times. Use of more than one cushion in either location will negate the shock absorbing benefits of the specially designed ACGP spacers.

e. When only a back cushion is used, the curved back spacer may be installed to provide relief from the front seat back top brace.

f. Use of back-spacers to move the pilot ahead to intercept the VON is preferred over seat-spacers, since seat-spacers raise the pilot up and away from the controls.

g. If a seat ballast is used, the ballast must be the first item stacked on the wooden seat pan. In these cases, the ballast takes the place of the seat spacer.

(sub paras added 2016)

10. See Figures 3-3 to 3-7 for installation diagrams.
11. **Proper Strap-in** - The lap belt must be tightened first to prevent the buckle from moving up toward the sternum when tightening the shoulder straps. If you cannot pull the lap belt tight enough on your own, ask for assistance.

12. The shoulder harness is to be secured such that neither strap can slide off the shoulder, and be "snug" enough to prevent forward body movement while still allowing enough slack to allow a thumb to slide under the strap.

13. **Final Confirmation** - Once properly strapped in, always confirm that the final combination of cushions, spacers, and rudder adjustments, allows the front seat pilot to:

   a. See the VON mark, with head at the level or chin tilted upward and with the canopy closed;

   b. Move the control column to its full forward stop;
c. Move both rudder pedals forward to their full stop, with the knee still slightly bent;

d. Open and close the spoilers; and

e. Activate the release knob.

CONTROL COLUMN AND SEAT SPACERS

14. Regardless of what combination of seat cushion, seat spacer, or seat ballast is used, and whether these combinations are used in the front or the rear cockpit, the glider pilot shall confirm full deflection of the controls prior to take-off on every flight.

(para added 2016)

CUSHION AND SPACER CONDITION

15. The following shall be used to assess if a seat cushion is serviceable:

a. Place the seat cushion on any flat surface;

b. Press down with your palm until the cushion begins to take the shape of your hand;

c. Remove your hand;

d. The cushion should begin to return to its original (smooth) form; and

e. If the cushion does not display the ability to mould itself to the shape of your palm, or does not display the ability to return to its original form within 30 minutes of being compressed, the cushion shall not be used.

16. Cushions with a broken underside shall not be used.

17. Do not use broken spacers.

18. Cushions or spacers with faulty Velcro should be replaced or repaired as soon as practical.

(paras added 2016)

LIMITED PRE-FLIGHT INSPECTION (WALK-AROUND)

19. Prior to strapping into a glider, including after a crew change, all glider pilots will perform a limited pre-flight inspection (walk-around), which will include an inspection of the following items:

a. Wing leading edges – look for unreported damage;

b. Wheels and skid – tire inflation, condition, bolts, brake leaks;

c. Elevator pushrod assembly – bolt, nut, and cotter pin in place; and
d. Pitot/static assembly – no blockages and is aimed direct into airflow

(sub-para updated 2016)

PRE-TAKE-OFF CHECK (BCISTRSC)

20. Check the following:

a. **(B)**allast. Weight limitations and ballast.

b. **(C)**ontrols. Controls functional; rudder pedals adjusted.

c. **(I)**nstruments. Instruments checked; radio and altimeter set.

d. **(S)**poilers. Operation, then close and lock.

e. **(T)**rim. Trim set full forward.

(sub-para updated 2016)

f. **(R)**elease. Operation and security.

g. **(S)**traps. Straps secure front and back seat.

h. **(C)**anopy/Door. Canopy, rear window and door closed and locked. Confirm security of canopy latch by touch.

HOOK-UP PROCEDURE

21. Once the tow rope has been attached to the release mechanism, confirm the security of the release mechanism visually and through the application of tension:

a. From a 90 degree side angle to the nose of the glider, visually confirm the step of the tow hook is seated against the release arm (See Figure 3-7);

   (1) If the tow hook is not seated against the release arm (See Figure 3-8), have the pilot activate the release mechanism and repeat the hook-up. Recurring instances of the tow hook not seating against the release arm may indicate a problem that needs to be investigated by an AME: and

   (2) If the tow hook is able to slide through the release arm (see Figure 3-8), do not continue with the flight. Do not fly the glider until advised by an AME.

b. Tug on the tow rope, pulling it forward in line with the glider's longitudinal axis; and

c. Re-inspect the release assembly to ensure that is has remained completely closed.

**CAUTION**

If the release assembly has opened, even partially, do not continue with the launch. Do not fly the glider until advised by an AME.
22. See Figure 3-9 for additional diagrams depicting ways to identify proper and improper tow rope hook ups.
### SCHWEIZER GLIDER RELEASE MECHANISM

The following diagrams depict what a correct glider hook-up should look like from outside and inside the cockpit, and demonstrate five common indications of an incorrect glider hook-up.

#### CORRECT HOOK-UP

![Glider Release Arm](image1)

- The tow hook and release arm are hooked up properly and ready for flight.
- Note the method used for protecting the rope. During hook-up, any such protection must be moved back to ensure a good view of the release mechanism.

#### CORRECT HOOK-UP

- The front cockpit release knob should be flush with the instrument panel.

#### CORRECT HOOK-UP

- The rear cockpit release knob should be flush to the wooden stopper.

#### INCORRECT HOOK-UP

- The tow hook is resting on the front left-side of the release arm.
- Again, note the rope protection has been moved far enough back to view the entire release mechanism.

#### INCORRECT HOOK-UP

- The tow hook step is clearly visible; therefore the tow hook is too far out of the release arm.

#### INCORRECT HOOK-UP

- The tow hook is resting on the side of the release arm.

#### INCORRECT HOOK-UP

- The front cockpit release knob is not flush with the instrument panel.

#### INCORRECT HOOK-UP

- The rear cockpit release knob is not flush to the wooden stopper.

---

*Figure 3-9 Glider Hook-Up Examples*
USE of C OF G and FORWARD TOW HOOKS

23. Always use the forward tow hook for air tow. Winch or auto launches may be executed using either the forward or the C of G tow hook, although using the C of G tow hook will result in a higher launch altitude; there is no tendency to oscillate with either method.

LAUNCH SPEEDS

24. **Air Tow:** Normal air tow speeds are 65 to 70 mph. During transits, airspeeds may be increased. If turbulence is encountered during transits, airspeed should be reduced.

25. **Winch and Auto Launch:** Normal climb speeds are in the range of 55 to 60 mph (25 mph above the stall speed) although the airspeed might vary at each stage of launch.

26. **Max Winch and Auto Launch Speeds:** If the airspeed continues to increase such that the maximum launch speed may be exceeded, immediately reduce the climb angle (i.e. reduce the pitch angle by lowering the nose) to prevent overstressing the glider. The airspeed should be then stabilized at a safe speed. If this procedure is unsuccessful:

   a. **But** the airspeed is still within acceptable limits, yaw the glider from side to side to direct the winch operator to reduce power.

   b. **And** the airspeed exceeds or will probably exceed the launch limit abort the launch (release the glider). Be prepared to counter an abrupt nose-up moment.

27. **Winch and Auto Launch Safety Speed.** The ground launch safety speed for any glider is based on the formula: $1.5V_s$. If the airspeed falls below the safe climbing speed, or continues to decrease, the launch shall be immediately aborted (glider released) and a landing carried out.

28. **Calculating Auto Launch Speeds:** Various factors affect the required speed of the auto launch vehicle, such as glider attitude, pilot technique, wind gradient, etc. The following technique can be used to estimate the vehicle speeds required to safely auto launch a 2-33 glider:

   a. Subtract the surface wind from the maximum launch speed;

   b. Subtract an additional 5 mph as safety factor;

   c. After the glider is in safe climb, reduce by 10 mph;

   d. Subtract the surface wind again to accommodate wind gradient; and

   e. Continually adjust vehicle speed to compensate for glider attitude, pilot technique, wind gradient, etc.
Page intentionally left blank.
## SECTION 4 - AIRCRAFT HANDLING

### GENERAL

<table>
<thead>
<tr>
<th>1040 lbs gross weight</th>
<th>FLIGHT SPEEDS</th>
<th>1080 lbs gross weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DUAL</strong></td>
<td><strong>SOLO</strong></td>
<td><strong>DUAL</strong></td>
</tr>
<tr>
<td>55 to 60</td>
<td>55 to 60</td>
<td>55 to 60</td>
</tr>
<tr>
<td>55 mph</td>
<td>50 mph</td>
<td>55 mph</td>
</tr>
<tr>
<td>50 mph</td>
<td>45 mph</td>
<td>52 mph</td>
</tr>
<tr>
<td>23:1</td>
<td>L/D (Best Glide Ratio)</td>
<td>23:1</td>
</tr>
<tr>
<td>42 mph</td>
<td>38 mph</td>
<td>Min Sink Speed</td>
</tr>
<tr>
<td>3.1 fps (186 fpm)</td>
<td>2.6 fps (156 fpm)</td>
<td>Min Sink Rate</td>
</tr>
<tr>
<td>43 mph</td>
<td>39 mph</td>
<td>Spiralling Speed</td>
</tr>
<tr>
<td>39 to 42 mph</td>
<td>34 to 37 mph</td>
<td>Buffeting Speed</td>
</tr>
<tr>
<td>41 mph</td>
<td>36.5 mph</td>
<td>Stall Speed (30° bank)</td>
</tr>
<tr>
<td>40 mph</td>
<td>36 mph</td>
<td>Stall Speed (spoilers open)</td>
</tr>
<tr>
<td>38 mph</td>
<td>34 mph</td>
<td>Stall Speed (level flight)</td>
</tr>
</tbody>
</table>

Figure 4-1 Flight Speeds (updated 2016)

### 2-33 Speeds and Ratios with Full Spoilers/Dive Brakes Extended

<table>
<thead>
<tr>
<th>SPEED (Miles/Hour)</th>
<th>SPEED (Feet/Second)</th>
<th>SINK (Feet/Second)</th>
<th>SINK (Feet/Minute)</th>
<th>DIVE ANGLE</th>
<th>L/D RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>66.00</td>
<td>6.66</td>
<td>400</td>
<td>6°</td>
<td>9.5 : 1</td>
</tr>
<tr>
<td>50</td>
<td>73.33</td>
<td>9.43</td>
<td>566</td>
<td>7.4°</td>
<td>7.7 : 1</td>
</tr>
<tr>
<td>60</td>
<td>87.99</td>
<td>14.28</td>
<td>857</td>
<td>9.3°</td>
<td>6.1 : 1</td>
</tr>
<tr>
<td>70</td>
<td>102.66</td>
<td>20.00</td>
<td>1200</td>
<td>11.24°</td>
<td>5 : 1</td>
</tr>
<tr>
<td>80</td>
<td>117.33</td>
<td>33.30</td>
<td>1998</td>
<td>16.5°</td>
<td>3.4 : 1</td>
</tr>
<tr>
<td>90</td>
<td>131.99</td>
<td>41.66</td>
<td>2500</td>
<td>18.4°</td>
<td>3 : 1</td>
</tr>
</tbody>
</table>

Information from: *Engineering Report R-153 Sailplane Dive Test Data* prepared by L Schweizer 11-7-78

Figure 4-2 Speeds and Ratios with Spoilers Extended (added 2016)
WARNING

1. It is unsafe to make an approach with dive brakes open in the speed range of 36 to 43 mph, as the rate of descent is so great that a proper flare for landing cannot be made.

CAUTION

2. Treat speeds above Va as a cautionary range. Manoeuvring within this range should be reduced to a minimum as velocity increases.

(SAMPLE ONLY - DO NOT USE FOR FLIGHT - see Owner Manual for actual chart)

Figure 4-3 Sample Performance Curves (added 2016)
PRE-RELEASE CHECK

(A)rea. Ensure glider is approaching the desired release area;

(sub-para amended 2016)

(A)ltitude. Ensure glider is at or is approaching the pre-briefed altitude;

(A)titude/Position. Ensure glider is in the proper attitude, i.e. wings level/high tow; and

(T)raffic. Check for conflicting traffic in the practice area, especially at the release point.

SAFETY CHECK

(A)ltitude. Ensure entry altitude will permit recovery by the published minimum altitudes

(sub-para amended 2016)

(S)traps. Straps secure front and back.

(C)anopy. Canopy, rear window, and door closed and latched. Confirm security of canopy latch by touch.

(O)bjects. Ensure no loose objects.

(T)raffic/Terrain. Check for conflicting traffic and ensure clear of built-up areas.

PRE-LANDING CHECK

(S)poilers. Check operation and position.

(W)ind. Assess wind speed and direction.

(A)irspeed. Calculate the approach speed.

(sub-para amended 2016)

(R)adio. Make radio call, report position and intentions.

(sub-para amended 2016)

(T)rim/Traffic. Set trim as required and check for conflicting traffic.

(S)traps. Check front and back seat harness security.

(C)anopy. Canopy, rear window, and door closed and latched. Confirm security of canopy latch by touch.

SLIPPING

1. The 2-33 can be slipped both while moving forward and while turning.
CAUTION

See Figure 4-2. Combining a forward slip with use of full spoilers will result in a very rapid rate of descent, at times increasing to 1,000 fpm or greater. Waiting for the exact altitude before removing the control inputs for the slip will often result in descending below the intended altitude.

(Caution added 2016)

TOUCH DOWN

2. Touch down can be done with spoilers open or closed, although it is preferable to land with them open. With spoilers open, plan the flare two to five feet above the ground at 43-46 mph. By holding a level attitude close to the ground, the glider will settle into a smooth and level touch down.

(above para added 2016)

CAUTION

If the control column is moved too far back during or after touchdown, especially with spoilers closed, the glider may lift off again (ballooning).

(Caution added 2016)

3. Once on the ground, use braking as required. Use of extreme hard braking or pushing the glider nose into the ground should be avoided unless absolutely necessary to avoid obstacles.

(above para added 2016)
SECTION 5 - EMERGENCY HANDLING

LAUNCH EMERGENCIES

1. Should the glider pilot be required to abort a launch prematurely, or should the launch rope break, the following shall apply:

<table>
<thead>
<tr>
<th>Air Tow Rope Break or Premature Release:</th>
<th>Winch or Auto Launch Rope Break or Premature Release:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(G)lide - Set or maintain normal gliding attitude;</td>
<td>(G)lide - Set or maintain normal gliding attitude;</td>
</tr>
<tr>
<td>(A)ssess - Altitude and location;</td>
<td>(P)ull - Release twice</td>
</tr>
<tr>
<td>(S)elect - Appropriate response and landing area; and</td>
<td>(A)ssess - Altitude and location; and</td>
</tr>
<tr>
<td>(P)ull - Release twice</td>
<td>(S)elect - Appropriate response and landing area</td>
</tr>
</tbody>
</table>

CANOPY OPEN IN FLIGHT

2. Continue to safely fly the aircraft, and:
   a. Assess your situation, considering the phase of flight, position, and altitude; and
   b. If able, close the canopy. If unable to close the canopy, plan for sufficient altitude and airspeed to compensate for the increased drag when returning for landing.
UNUSUAL ATTITUDE RECOVERIES

STALL and INCIPIENT SPIN

Simultaneously:
- Release sufficient back pressure to recover from the stall (reduce angle of attack);
- If spoilers are open, close immediately;
- Stop wing drop with opposite rudder; and
- Once the wings are no longer stalled return to desired flight attitude.

FULL SPIN

- Apply full rudder against the rotation of the spin, centralize the ailerons, and if spoilers are open, close immediately;
- Pause momentarily;
- Move the control column steadily forward until the spinning stops;
- Centralize the rudder, look up; and
- Pull out of the dive.

NOTE

In most cases, the 2-33 will come out of the spin after applying full rudder and centralizing ailerons — in which case immediately level the wings and pull out of the dive.

SPIRAL DIVE

- Level wings with coordinated control movements; and
- Pull out of the dive.

(above paras added 2016)
Section 6 - Ground Movements

Moving

1. When moving the glider for distances other than from the landing area to the parking or launching area, the controls should be locked in place. The seat belt or control locks may be used for this purpose.

   (above para added 2016)

Moving by Hand

2. Surfaces - Use the struts to push or pull the glider. The nose handle may be used for short distances.

   (above para amended 2016)

3. Control - In most cases, control of the glider ground crew should be assumed by a person at a wing tip. Control is announced by calling "My Wing".

4. Backward - Have someone stationed at the tail to lift when required and to assist with avoiding obstacles.

5. Steering - It is preferable to use the wing tips for steering since the wing tip persons have the better view and have better leverage for turning. Further:

   a. When steering from the "inside" wingtip during a turn, the wing person can increase the rate of the turn (decrease radius) simply by slowing down or standing still. To decrease the rate of turn (increase the radius) the inside wingtip person can walk faster. Steering from the inside wing tip is the easiest, safest, and most effective location during ground handing.

   b. When steering from the "outside" wingtip during a turn, the wing person must move quickly to keep up with the wing tip when the glider turns, unless the forward motion of the glider is slowed to a crawl. Steering with the outside wingtip also makes it difficult to accurately control the rate and radius of the turn; if the crew want to increase the rate of turn (decrease the radius) the outside wing person must move even faster.

   c. Steering by the tail is acceptable, however the fragility of the horizontal stabilizer should be considered. Placards denoting safe and unsafe handling areas shall be observed. Keep the tail high when moving the glider in high winds.

   (sub paras amended 2016)

Towing by Vehicle

6. The minimum length of rope between a tow vehicle and the glider shall be at least 30 feet.

7. Several gliders may be towed forward at once in a “train” with the second and
subsequent gliders attached to the glider’s tail tie-down point. The minimum length of these ropes shall be 30 feet. To prevent structural damage to the lead glider, a maximum of six gliders are to be towed at once and this number is to be reduced when rough terrain or winds dictate.

**TOWING BY TOW BAR**

8. The 2-33 glider may occasionally be moved using a tow bar attached to the rear tie-down point provided there are no occupants in the glider and the terrain is smooth. Occasional use means several times per aircraft per year vice frequent use of several times per aircraft per day. Frequent use is prohibited. When moving the glider with a tow bar, the tow bar itself provides the steering and braking. Normally, only one person is required at one wing tip to maintain wings level. When manoeuvring around other aircraft or into/out of hangars, personnel shall be positioned at each wing tip to ensure proper clearance.

9. The only tow bars authorized for ACGP use are those manufactured and identified in accordance with Drawing QETE-00063. This tow bar has been designed to limit glider structural damage and no tow bar modifications are authorized without approval from the National Technical Authority (NTA).

**TIE-DOWN**

10. All locations where gliders are left unattended for more than a few hours are deemed to represent a high wind hazard.

11. Based on a 600 lb empty weight, the typical 2-33 glider facing into the wind may be subjected to lift forces ranging from 150 lbs to 3,350 lbs. See Figure 6-2 for methods used to minimize lifting forces.

<table>
<thead>
<tr>
<th>WIND</th>
<th>LIFT</th>
<th>NET LIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 mph</td>
<td>750 lb</td>
<td>150 lb</td>
</tr>
<tr>
<td>40 mph</td>
<td>1 300 lb</td>
<td>700 lb</td>
</tr>
<tr>
<td>50 mph</td>
<td>2 000 lb</td>
<td>1 400 lb</td>
</tr>
<tr>
<td>60 mph</td>
<td>2 900 lb</td>
<td>2 300 lb</td>
</tr>
<tr>
<td>70 mph</td>
<td>3 950 lb</td>
<td>3 350 lb</td>
</tr>
</tbody>
</table>

Figure 6-1 Lifting Forces on a Tied Down 2-33

12. **Representative Glider Tie-Down Methods.** The most suitable tie-down method is dependent upon the combination of wind conditions and length of time.

a. **Item A** at Figure 6-2 depicts a tie-down method suitable for calm winds or short periods of time such as a Flight Line Tie-down. This method should not be used in high wind conditions because of the increased angle of attack created by leaving the tail on the ground.

   (sub-para added 2016)

b. **Item B** at Figure 6-2 depicts a tie-down method more suitable for windy conditions
or long periods of time such as Permanent or Temporary Tie-down. Using the system at Item B will decrease the angle of attack and help to diminish the lift forces outlined in Figure 6-1.

(sub-para added 2016)

13. To ensure sufficient clearance is provided between parked aircraft, a minimum of 15 feet should be maintained between glider wing tips. This will permit ease of movement of aircraft into and out of tie-down areas without risk of wing tip contact. The clearance also provides some protection in the case of an adjacent aircraft partially breaking loose from its tie-down.

PERMANENT TIE-DOWNS

14. When required to use Permanent Tie-Downs, the following standard shall be met:

a. The glider tail shall be supported on a stand that is high enough to reduce the angle of attack as much as possible. See Figure 6-2 B. Consideration should also be given to preventing the tail from moving sideways once on the tail stand;

(sub-para amended 2016)
b. At least one tie-down to a ground anchor shall be provided at each wing, the tail and the nose such that the angle between the tie-down rope and the vertical is at least 30 degrees. In lieu of the nose tie-down, two ground anchors may be provided at the tail, each on opposite sides of the longitudinal axis;

c. Individual ground anchors, either provided or constructed, shall be capable of withstanding an upward vertical force at least equal to the average tensile strength of the tie-down rope/strap;

d. In-cockpit rudder and control locks shall be used to prevent movement during unattended periods (See Figures 6-4 and 6-5); and

(sub-para added 2016)

e. For those gliders with hydraulic brakes, avoid leaving the spoilers deployed as this results in undue fatigue on the wheel brake components.

(sub-para added 2016)

Control Column Lock - Used in rear cockpit only.

Installation:

Ensure the threaded rod is modified such that the wing nut cannot be threaded off.

Back wing nuts off to end of threaded rod.

Angle/Tilt the block and slide the block over control column.

Slide the block around the far front seat support tube.

Lower the block around the nearest front seat support tube.

Lower the entire block until level while seating the support tubes into the block.

Push the block together.

Finger tight only.

Do not use a wrench.

Figure 6-4 Control Column Lock (figure added 2016)
Must use two units. One for each rudder pedal.

Loosen wing nut. Set flat head into hole in floorboard (just ahead of the seat). Rest the mid-pedal bar inside the u-shaped portion of the lock. Repeat for the next rudder pedal. Finger tighten only. Do not use a wrench.

Figure 6-5 Rudder Locks  (figure added 2016)

TEMPORARY TIE-DOWNS (OVERNIGHT, DEPLOYMENTS)

15. If permanent tie-downs are neither available nor practical to construct, the following standard shall be met:

    a. Steel “tent-peg” style tie-down anchors shall be used. They shall be at least 42 inches in length and at least 1/2-inch in diameter and constructed so that a smooth, circular attachment point is available for the tie-down rope/strap;

    b. Two tie-down anchors shall be provided for each wing and the tail;

    c. The tie-down rope/strap angle (angle from the glider attachment point to the tie-down anchor) shall be at least 30 degrees from the vertical;

    d. The use of portable tail stands is recommended (Using a tail stand alleviates the need to leave spoilers open, however if the need to leave spoilers open exists, give consideration to preventing weather and wildlife from entering the interior of the wing);

    (sub-para amended 2016)

    e. Controls and control surfaces shall be locked to prevent inadvertent movement during unattended periods; and

FLIGHT LINE TIE-DOWN (HOURS)

16. When leaving the glider unattended for a short period of time, and when no high winds are expected, the following minimum standard shall be met:

    a. One wing shall be tied down with a rope/strap to a ground anchor;

    b. One other attachment point (nose, tail, or other wing) shall be tied down with a rope/strap to prevent pivoting;

    c. Controls shall be immobilized; and
d. Spoilers shall be deployed.

TIE-DOWN ROPES AND STRAPS

17. Tie-down ropes and straps shall have an average minimum strength of 2700 lb. Whether rope or strap, the physical pull of a single pilot is sufficient for applying tension. Use of carabiner style hooks is preferred over open face hooks since wing rocking during heavy winds can cause open style hooks to release. Use of ratchets to tighten straps or ropes can lead to over-tensioning due to mechanical advantage. Use of ratchets should be restricted to very experienced crews.

(para updated 2016)

USE OF OPEN-AIR TRAILERS

18. When using open-air trailers, refer to the 2-33 Sailplane Flight-Erection-Maintenance Manual. When loading, confirm all checks are completed by using Annex B Glider Open-Air Trailer Loading Checklist.

(para added 2016)

ERECITION PROCEDURE

19. Refer to the 2-33 Sailplane Flight-Erection-Maintenance Manual for assembly. Considering that the glider may be disassembled and assembled rather frequently, the number of bolted attachments is kept to a minimum. However, all of the attachment fittings may be made with the appropriate AN bolts, nuts and cotter pins specified in the maintenance manual. The LS-1 safety pin is an acceptable alternate for the No. 1 and 2 commercial safety pins.

NOTE

Carefully consider how winds will interact with wings and fuselage during assembly and disassembly.

(NOTE added 2016)

20. Post-Assembly Independent Inspection.

a. Complete and sign GLIDER FINAL ASSEMBLY CHECKLIST - ANNEX C.

NOTE

Ensure that two entries are made in the journey log. Suggested entries as follows: “Aircraft assembled in compliance with the 2-33 parts and maintenance manual section A” (Signature)

“Flight controls checked for correct assembly, locking and sense of operation” (Signature)

These signatures do not have to be done by an AME but by persons duly qualified for elementary work and independent checks by the
RCA Ops O or RC Eng O.
# ACGP 2-33 GLIDER DAILY INSPECTION

(amended 2016)

Complete before the glider’s first flight of the day.

<table>
<thead>
<tr>
<th>Registration:</th>
<th>Date:</th>
</tr>
</thead>
</table>

## DOCUMENTATION / COCKPIT

<table>
<thead>
<tr>
<th>CHECK OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>( )</td>
</tr>
</tbody>
</table>

1. **Journey Log**: snags, time on the airframe
2. **Battery**: in & secure, wires away from the feet area
3. **Radio Check**: transmit & receive
4. **Canopy**: attachment points, latches, cleanliness
5. **Front Release Knob**: tension, cable is free, operation
6. **Instruments**: condition & security, air hose connections, check alt against field elevation
7. **Ballast**: bracket secure, pin installed
8. **Rudder Pedals**: springs, cables, freedom of movement
9. **Control Column & Trim**: freedom of obstructions, correct movement of control surfaces
10. **Spoilers & Brake Control**: freedom of movement, wheel brake operation
11. **Publications Pouch**: installed, contents
12. **Front Seat Belt**: condition
13. **Frt Seat Cushions and Spacers**: condition
14. **Rear Door & Rear Windows**: condition, latches, attachment points
15. **Rear Release Knob**: tension, cable is free, operation
16. **Rear Rudder Pedals**: movement, cables free
17. **Rear Control Column**: freedom of obstructions, correct movement of control surfaces
18. **Rear Seat Belt**: condition, secure if not in use
19. **Rr Seat Cushions and Spacers**: condition
20. **Forward Wing Attachment Bolts**: in & safetied
21. **spoiler Disconnect**: pin in & safetied
22. **Aileron Disconnect**: bolts, nuts, cotter pins in & safetied
23. **Control Cables**: security & wear
24. **Rear Fuselage Interior**: condition

## FORWARD FUSELAGE

<table>
<thead>
<tr>
<th>CHECK OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>( )</td>
</tr>
</tbody>
</table>

25. **Main Wheel & Tire**: condition, wear, inflation
26. **Skid & Skid Plates**: condition, wear plate not worn through
27. **Tow Hook**: wear, condition, proper engagement, freedom of movement, snubber in place
28. **Nose Cone**: condition
29. **Pitot/Static**: condition, no obstructions
A-CR-CCP-402/MB-001 SCHWEIZER 2-33 AOIs

LEFT WING

30. **Wing Strut**: condition
31. **Wing Strut Bolts**: in, castle nuts on & safetied, washers as required
32. **Dive Brake**: hinges, connections, security & wear
33. **Wing Skin**: condition
34. **Outrigger Wheel & Spring**: condition & wear
35. **Ailerons & Pushrods**: condition, movement & security
36. **Spoilers**: springs, condition, movement, security

REAR FUSELAGE

37. **Centre Section Fairing**: condition, fasteners secure
38. **Wing Attachment Bolts**: in & safetied, washers, spacers & castle nuts
39. **Fabric**: condition, inspection covers

EMPENNAGE

40. **Vertical Stabilizer**: condition, security
41. **Horizontal Stabilizer**: condition, security
42. **Horizontal Stabilizer Lift Struts**: attachment & safetied
43. **Tail Wheel Assembly**: condition, attachment, security, wear, rotation
44. **Rudder & Elevator**: condition, movement, security
45. **Rudder Cable & Elevator Push Rod**: condition, security
46. **Inspection Plate Cover**: secure

RIGHT WING

47. **Spoilers**: spring, condition, movement, security
48. **Ailerons & Pushrods**: condition, movement & security
49. **Outrigger Wheel & Spring**: condition & wear
50. **Wing Skin**: condition
51. **Dive Brake**: hinges, connections for security & wear
52. **Wing Strut**: condition
53. **Wing Strut Bolts**: in, castle nuts on & safetied, washer

Enter all major & minor unserviceabilities in the journey log defect column.

SIGNATURE: ___________________________ LICENCE NO: ___________________________

**Remark**: This inspection sheet should be reproduced locally on an 8 ½” by 14” sheet.

(Glider DI Sheet amended 2016)
### ANNEX B - GLIDER OPEN-AIR TRAILER LOADING CHECKLIST

1. **FUSELAGE:**
   - a. Centre aligned
   - b. Wing pins secured
   - c. Turnbuckles secured
   - d. Safety/Cotter pins installed

2. **TAIL:**
   - a. Centre aligned
   - b. Secured
   - c. Secure horizontal stabilizer to trailer

3. **COCKPIT:**
   - a. Control push rods - Secured
   - b. Canopy secured
   - c. Pitot tube covered

4. **Struts secure**

5. **WINGS:**
   - a. Small bolt top fitting
   - b. Shoulder of bolts up
   - c. Bolts (two per wing)
     
     - (1) Left wing bolts installed
     - (2) Right wing bolts installed
     - (3) Safety/Cotter pins installed (4)
   - d. Fuselage and Wing Surface clearance
   - e. Wing root openings covered
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>AILERON LOCKS SECURED</td>
</tr>
<tr>
<td>7.</td>
<td>RUDDER LOCK SECURED</td>
</tr>
<tr>
<td>8.</td>
<td>D-TUBES COVERED</td>
</tr>
<tr>
<td>9.</td>
<td>TRAILER:</td>
</tr>
<tr>
<td>a.</td>
<td>Hitch safety pin</td>
</tr>
<tr>
<td>b.</td>
<td>Safety chain secured</td>
</tr>
<tr>
<td>c.</td>
<td>Lights</td>
</tr>
<tr>
<td></td>
<td>(1) signal</td>
</tr>
<tr>
<td></td>
<td>(2) brake</td>
</tr>
<tr>
<td></td>
<td>(3) park</td>
</tr>
<tr>
<td>GLIDER REGISTRATION:</td>
<td>DATE:</td>
</tr>
<tr>
<td>SIGNATURE:</td>
<td></td>
</tr>
</tbody>
</table>
**ANNEX C - GLIDER FINAL ASSEMBLY CHECKLIST**

1. A final check shall be carried out after a full assembly. This check should be performed by more than one person to ensure that all assembly points are double-checked.

2. A Daily Inspection shall also be completed prior to the first flight.

<table>
<thead>
<tr>
<th>1. WINGS</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Surfaces checked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Strut attachment bolts, washers, nuts and safety/cotter pins:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Fuselage (LH &amp; RH) – hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Wings (LH &amp; RH) - hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Aileron locks (LH &amp; RH) - removed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. SPAR BOLTS, SPACERS, NUTS &amp; PINS</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Forward Spar (LH &amp; RH) – hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Rear Spar (LH &amp; RH) – hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Spacers – installed under nuts &amp; can be rotated by hand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. SPOILER CONTROL</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Pin and safety/cotter pin – hardware installed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. AILERON CONTROLS</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bolts, nuts, and cotter pins</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. ELEVATOR CONTROL</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Push rod, bolt, nut and safety/cotter pin – hardware installed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. TAIL SECTION – HORIZONTAL STABILIZER</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Horizontal stabilizer &amp; strut attachment bolts, washers, nuts, cotter pins:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Horizontal stabilizer attachment – hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Struts - fuselage attachment (LH &amp; RH) – hardware installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Struts - horizontal stabilizer attachment (LH &amp; RH) – hardware installed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. LOG BOOK ENTRIES (2) COMPLETED</th>
<th>1ST</th>
<th>2ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Flight controls checked for correct assembly, locking and sense of operation <em>(must be an independent check)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GLIDER REGISTRATION:**

**DATE:**

**NAME & SIGNATURE (1ST):**

**NAME & SIGNATURE (2ND):**

Place document in the aircraft logbook when completed

*(Checklist updated 2016)*
## ANNEX D - GLIDER MAINTENANCE FLIGHT CARD

<table>
<thead>
<tr>
<th>ACGP 2-33 SCHWEIZER GLIDER MAINTENANCE FLIGHT CARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILOT: ___________</td>
</tr>
<tr>
<td>AC REG: ___________</td>
</tr>
<tr>
<td>AIRCRAFT LOG BOOKS (confirm no open maintenance items) ___________________________</td>
</tr>
<tr>
<td>Launch Type: ____________________</td>
</tr>
<tr>
<td>Use the following topics and/or the space provided below to note specific items.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RELEASE: Stiff - Normal - Loose</th>
<th>TRIM: Effective - Non-Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands Off @ 50MPH: ___________</td>
<td>Hands Off @ 38MPH: ___________</td>
</tr>
<tr>
<td>Stall Speed Level Flt: ___________</td>
<td>Stall Wing Drop: ___________</td>
</tr>
<tr>
<td>Stall Speed Spoilers Open Clsd ____</td>
<td>Spoilers can open &amp; close @ VNE ______</td>
</tr>
<tr>
<td>360° Left Turn: ___________</td>
<td>360° Right Turn: ___________</td>
</tr>
<tr>
<td>Left Spin: ___________</td>
<td>Right Spin: ___________</td>
</tr>
</tbody>
</table>

RCA Eng O directions / Pilot Comments:

Pilot Signature: __________________ |
RCA Eng O Signature: __________________ |

(Flight Card added 2016)