PART 3

HANDLING

List of Chapters

PART 3

CHAPTER 1 - HANDLING

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GROUND HANDLING

1. The aircraft may be manoeuvred on the ground by a minimum of two people, one at the nose and one at the wing tip. The wing tip nearest to any obstruction is to be manned. In confined spaces extra personnel are to monitor the second wing tip and/or the tail. Additional personnel are also to be used when retrieving or manoeuvring the aircraft in wind speeds of more than 20 knots.

2. A tail dolly is provided to ease ground handling. When the tail dolly is not fitted the aircraft may only be turned if the nose handler presses down on the nose to balance the aircraft on its mainwheel.

CAUTION: When fitting the tail dolly onto a glider particular care is to be taken to avoid damage to the total energy probe, pitot/static probes and the fuselage gel coat forward of the fin.

3. The aircraft may be moved by hand with or without a tail dolly fitted, either nose first or tail first. To minimise the risk of damage to the canopy, the glider should be pushed tail first whenever possible, with the canopy locked.

a. **Tail First.** Handlers should push back on the nose section or the leading edge at the wing roots. A wing tip handler is to hold the wing tip at waist level.

b. **Nose First.** Gliders may be moved nose first by pushing on the rear fuselage above the wing roots or by pulling on the front seat back support member. When the canopy is opened it is to be supported by an extra handler.

Parking

4. The aircraft may be parked crosswind with the canopy hinges facing into the wind and the downwind wing on the ground in wind speeds up to 30 knots. If the aircraft is left unattended it is to be picketed at the downwind wing tip and at the tail.

5. The aircraft may be left unattended in the open in forecast winds of less than 35 knots. In this case both wings are to be supported with trestles. Lashing tape is to be placed over the wing tips attached to a water barrel in front of and behind the wing. Care is to be taken to avoid the lashing tape passing over the ailerons. Additional water barrels are to be placed either side of the rear fuselage, just forward of the fin, and lashing tape passed between them around the fuselage. Tyres are to be placed either side of the rudder to prevent it blowing in the wind. A tyre is to be carefully wedged under the aircraft nose to prevent the aircraft pivoting laterally about the mainwheel. Waterproof covers are to be fitted to the wings, canopy, fuselage and tailplane.

6. When precipitation is likely to affect an aircraft on the ground, the pitot and total energy sources are to be made weatherproof using the covers or tape as required. When the aircraft is being prepared for take-off a thorough check is to be made by the aircraft commander during the external checks that all the pressure sources are clear.

Retrieval By Vehicle

Amd 1

7. The glider may be towed nose first, from either the nose hook or belly hook ~~from the nose hook~~, behind a suitable vehicle using a tow rope 35 to 40 feet long, incorporating a weak link assembly at the glider end of the tow rope. The vehicle is not to tow more than one glider at a time. The wing tip is to be manned during towing. A handler is to be positioned by the left side of the nose within easy reach of the front canopy so that, if necessary, he can open it quickly and release the tow rope. Canopies are to be closed and locked with the DV panel in the front canopy left open during towing. The release is not to be operated by reaching an arm through the DV panel. In no circumstances is the towing vehicle to exceed walking speed when a glider is being towed.

8. The glider may also be retrieved tail first using the supplied towing arm and tail dolly. The maximum towing speed is to be 10 mph. This method of towing is not suitable for use in confined areas unless both wing tips are manned and the combination's speed reduced to walking speed.

CAUTION 1: Over undulating ground it is possible for the glider to bounce off the towing arm.

CAUTION 2: In strong winds or during tight turns it is possible for the wing tip dolly to be lifted clear of the ground.

NORMAL OPERATION

Daily Pre-Flight Inspection

9. Before operating the aircraft ensure that the AF and BF servicings have been completed in accordance with the flight servicing schedule (AP101G-1001-5B1).

10. Before the first winch launch each day the CG hook is to be checked for correct operation from both cockpits. The back release function is also to be checked.

11. Before the first aerotow launch each day the nose hook is to be checked for correct operation from both cockpits.

12. Before each launch the weight and balance checks are to be completed using the aircraft placard.

13. Before each launch a ground handler is to check the cable parachute for soundness, the weak link and shock absorber rope for integrity and all karabiners and shackles for security.

External Checks

14. Carry out the FRC **External Checks** before strapping in.

TAKE-OFF

Checks Before take-Off

15. Carry out the FRC **Take-Off** checks.

Winch Take-Off

16. The following points should be observed during a winch take-off:

a. The cable should be attached to the CG hook in front of the main wheel.

b. Winch launch behaviour is normal at all permitted CG positions and wing loadings.

c. The aircraft has little tendency to balloon or swing on the ground.

d. The permitted speed range for winch launching is 50 to 65 knots.

e. If the speed is accelerating to 65 knots or greater, give the fast launch signal which is yawing the aircraft left and right while maintaining the wings level with aileron. Stop signalling when the speed is within limits. If the speed exceeds 65 knots release the cable at a safe height with the cable under tension.

f. The yellow release knob is at the bottom of the instrument panel and must be pulled to its limit twice when releasing the cable.

Note: If the angle of climb of the aircraft is allowed to become excessive the cable will be automatically released from the CG hook.

Aerotow Take-Off

17. The following points should be observed during an aerotow take-off:

a. The nose hook should be used for aerotow take-offs.

b. The recommended length of towrope is 40 to 60 m (120-200 feet).

c. The glider can be controlled with rudder and aileron using full movement if required.

d. There is no tendency to swing in a strong crosswind.

e. The glider can be lifted off at about 38 knots.

f. The glider lifts off without assistance at about 43 knots if the control column is kept in the neutral position.

g. The yellow release knob is at the bottom of the instrument panel and must be pulled to its limit twice when releasing the rope.

h. The recommended launch speed is 50 to 75 knots. Maximum aerotow speed is 92 knots.

Ground Looping

18. The aircraft is not prone to ground looping on take-off. If one wing touches the ground or the aircraft changes direction by more than 15°, however, the cable must be released immediately.

General Handling

19. Elevator and aileron controls are well matched with negligible freeplay or friction, giving a very pleasant feel. The trimmer is conventional but is less effective at the ends of the CG range. Selecting airbrakes out causes a slight nose-down pitch change. Rudder co-ordination is necessary to maintain balance on entering and exiting a turn. During a turn very little rudder is needed.

Free Flight

20. Full control movements are only allowed up to the maximum manoeuvring speed of 92 knots. Above this speed the controls should be used with care and not more than 1/3 of full range. The following are recommended speeds:

a. Minimum sink:	Dual	46 knots (138 ft/min)
	Solo	43 knots (126 ft/min)
b. Best gliding angle:	Dual	57 knots (37:1)
	Solo	51 knots (36:1)
c. Circuit speed:		50 knots

Slow Flight and Stalling

21. Carry out the FRC **Pre-Stalling** (HASELL) checks.

22. The glider develops a slight buffet just before and during the stall. At the stall, if the stick is pulled back quickly the glider pitches down. Occasionally a wing may drop at the stall.

23. To recover from the stall, move the stick centrally forward to select the recovery attitude, regain flying speed of 50 knots, roll the wings level and then return to the normal gliding attitude.

24. The following are the stalling speeds in straight flight:

a. Dual 41 knots Airbrakes closed

b. Dual 46 knots Airbrakes open

c. Solo 36 knots Airbrakes closed

d. Solo 41 knots Airbrakes open

Spinning

25. The aircraft is very reluctant to enter a spin. The aerodynamic characteristics of the aircraft may be altered by the addition of canards to the nose of the aircraft to make deliberate spinning more likely. Trials experience indicates that fully developed spins can only be consistently achieved during spins to the left with the CG aft of 330mm aft of the datum. Attempted spins at CG forward of this and to the right are permitted but normally result in the aircraft entering a spiral dive after the incipient spin stage.

Note: Mod 003 introduces canard aerofoils (known as spin whiskers) that can be fitted, as required, either side of the nose of the glider. The canards are removable.

26. *Safe Heights.* Three heights are to be observed during spinning:

a. Minimum height to enter spin: 3000 feet AGL.

b. Minimum height to commence recovery: 2500 feet AGL.

c. Abandonment height: 2000 feet AGL *if glider still spinning.*

27. *Weight Limit.* Maximum weight limit with canards fitted is 580 kg.

28. *Spin Entry.* The recommended spin entry technique is as follows for both pre- and post-Mod 003 aircraft:

a. Trim the aircraft, wings level, at 50 knots.

b. Reduce the speed at approximately 1 knot per second until either the stall or full back control column is reached.

c. With the control column held on the back stop, apply full in-spin rudder while maintaining the ailerons neutral.

d. Following the incipient spin stage, the developed spin is smooth and stable. Turn rate and height loss per turn are 3 to 4 seconds and 250 feet (400 feet, post-Mod 003) respectively. When flown solo the developed spin is less stable and large oscillations in pitch may occur.

e. The ailerons are to remain neutral during the spin. Inadvertent use of either in-spin or out-spin aileron can result in the generation of high side forces during the spin entry and the developed spin may become oscillatory and uncomfortable.

29. The standard recovery action of applying full opposite rudder, while easing the stick forward to a centralised position results in spin recovery within approximately one turn. However, any relaxation in the pro-spin rudder will normally result in spin recovery. During the recovery, and as soon as the speed starts increasing, centralise the rudder and ease out of the dive. Due to the large nose down attitude achieved during the recovery the speed increase is rapid and recovery from the dive must be prompt in order to prevent V_{NE} being exceeded.

CAUTION: Do not exceed the permitted CG range. CG must be determined before flight and must not exceed the limits given in Part 2.

30. Post-Mod 003, the addition of the canards causes a reduction in the longitudinal static stability of the glider. This makes accurate trimming and speed control more difficult than pre-Mod. especially when flying at the aft CG positions associated with solo operation.

High Speed Flight

31. Above 92 knots control movements should be restricted to 1/3 of full range. The airbrakes limit the speed to less than V_{NE} in a 45° dive even at maximum flying weight.

Flying in Rain

32. The glider should not be flown in rain. Fly clear of rain as soon as possible. No noticeable deterioration of flying characteristics is caused by wet or lightly iced wings but light airframe buffet may be felt. A heavy deposit on the wing raises the stall speed by about 4 knots (see Part 2 Chapter 1 Page 4 Para 20 (**WARNING**)). The characteristics during lift-off and landing remain the same.

Flight in Icing Conditions

33. The aircraft is not cleared for flight in airframe icing conditions. Fly clear of icing conditions as soon as possible.

Flight in Turbulence

34. The maximum speed for flight in rough air is 92 knots.

AEROBATICS

Preparation for Aerobatic Flights

35. Before executing any aerobatic flights the CG and maximum weights are to be calculated/observed. All loose articles must be removed from the cockpit or secured.

36. Prior to aerobatics, carry out the normal HASELL checks. Minimum recovery height is 1200 feet AGL.

37. In the event of loss of control extend the airbrake and roll to the nearest horizon.

Aerobatic Manoeuvres

38. Only the following listed and described manoeuvres or a combination of those manoeuvres are permitted. All other accelerated manoeuvres, such as snap rolls and manoeuvres performed at high negative g are prohibited.

Loop

39. To accelerate to the loop entry speed of 105 knots, a 45° dive is recommended. Entry into the dive can usefully be made from the latter stages of the HASELL lookout turn, rather than from wings level.

40. Enter the loop at 105 knots along a line feature. Pull up into the loop at 2.5 to 3g aiming to maintain a constant rate of change of pitch. As the speed reduces, move the control column rearwards to maintain the rate of pitch, the wing tips can be used as a reference. Look back for the horizon at the top of the loop and check that the wings are still level. As the speed increases, relax the back pressure to maintain the rate of pitch. Continue pitching until the required attitude is obtained.

Chandelle

41. Enter the chandelle at 90 knots along a line feature. Pull up to a 45° climb and wait for 80 knots. Roll to 45° angle of bank and allow the nose to pitch down below the horizon. Roll out of the turn along the line feature 180°from the entry heading.

After Aerobatic Flight Procedures

42. Prior to landing note the maximum 'g' pulled during the flight.

43. If the speed or g limits have been exceeded during the flight have the aircraft inspected by the engineering staff after landing.

LANDING

Approach and Landing

44. The minimum approach speed is 55 knots in windspeeds of less than 10 knots or 60 knots if the windspeed is greater than 10 knots or in turbulence or with wet wings. The airbrakes are sufficiently powerful for steep approaches. The use of airbrakes causes the glider to be slightly nose-heavy, so that the glider holds the required speed by itself. Add 5 knots if the aircraft is more than 580 kg AUW.

45. Full airbrake may be used during the approach. Application of airbrake beyond $^{2}/_{3}$ lever travel applies the wheelbrakes. Therefore maximum airbrake at touchdown should be less than $^{2}/_{3}$ lever travel.

46. If the nosewheel touches the ground, direction can be controlled by rudder down to 22 knots.

47. After heavy landings or excessive 'g' the entire glider should be checked. The wings and tailplane should be removed for these checks. Refer to the Maintenance Manual. The aircraft should not be flown before any damage has been repaired.

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