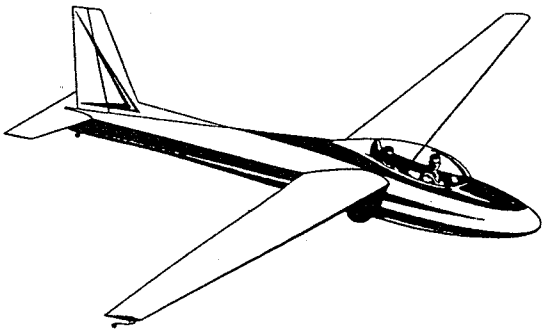


THE 2-32 SAILPLANE

FLIGHT - ERECTION - MAINTENANCE

MANUAL

SCHWEIZER AIRCRAFT CORP.

ELMIRA, N.Y.

SCHWEIZER SGS 2-32

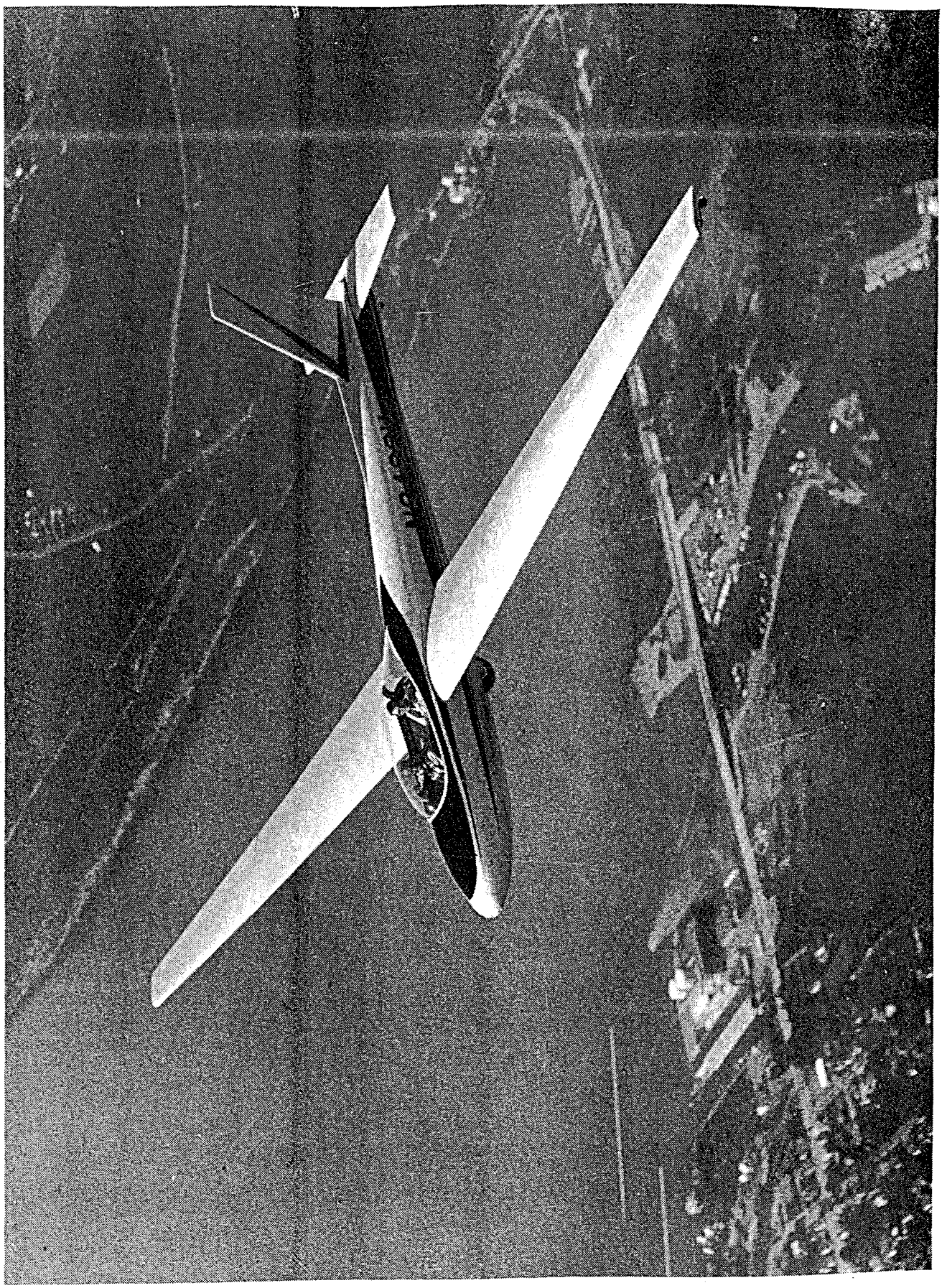
FLIGHT - ERECTION - MAINTENANCE

MANUAL

Schweizer Aircraft Corp.

Box 147

Elmira, N. Y. 14902



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SECTION ONE - FLIGHT PROCEDURES

GENERAL DESCRIPTION

The SGS 2-32 is an all-metal, two-place high performance sailplane built by Schweizer Aircraft Corp. of Elmira, New York. Its capabilities as a high performance sailplane are nearly unlimited because of its loading capacity. It soars well in marginal conditions at light weight and will out-perform all but the exotically designed sailplanes under conditions favorable to heavily wing-loaded sailplanes of 7 - 8 lbs. per sq. ft. Its roomy cockpit, large bubble canopy, easy handling and comfortable seating, remove a great deal of the fatigue usually experienced on flights of long duration, the result of which is better pilot proficiency. The 2-32 is ideal for transition training from low or intermediate to high performance, single place sailplanes. The student can be shown and can experience the characteristics of a laminar airfoil wing. He can be taught how to use the very effective dive brakes that many high performance sailplanes have.

The 2-32 is impressive and, when used for an initiation flight, the student or person who is interested in soaring will get a much better idea of what the ultimate in soaring really is. This will do much towards promoting the sport.

Overall dimensions are:
- Length - 26.75 ft.
- Span - 57 ft.
- Height - 9 ft.
- Wing Area - 180 sq.ft.
- Aspect Ratio - 18.05

FLIGHT CONTROLS:

1. Control Sticks:
   Front and rear are conventional.

2. Rudder Pedals:
   Front and rear are conventional.

3. Trim Control:
   Located directly under main right side Longeron front and rear and is in easy reach of pilots. Turns counter-clockwise for nose-down trim and clockwise for nose-up trim. Trim range varies with loaded condition of sailplane.

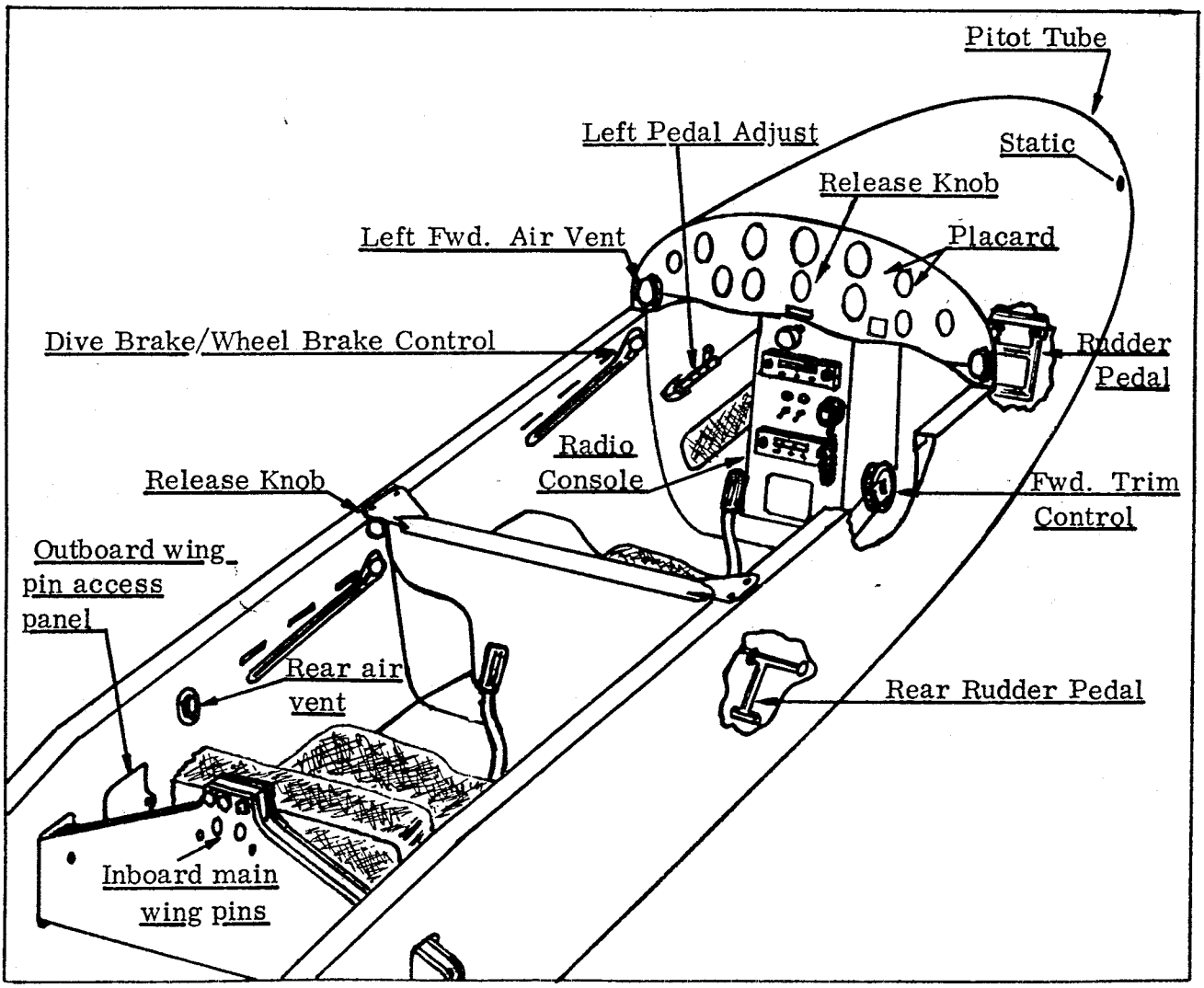
4. Tow Releases:
   Front release knob is located at center bottom of instrument panel. Rear release is located directly behind top left of front seat back. To actuate releases, pull knob full aft.

FLIGHT CONTROLS, cont'd.:

5. Dive Brake Levers:
   Front and rear are located on left side of cockpit and within easy reach of pilots. Pull back to open dive brakes and push forward to close them. More force is needed to closing than for opening. Dive brakes should normally be locked, and this is done by rotating lever up and then pulling back 1/4 to 1/2 inch.

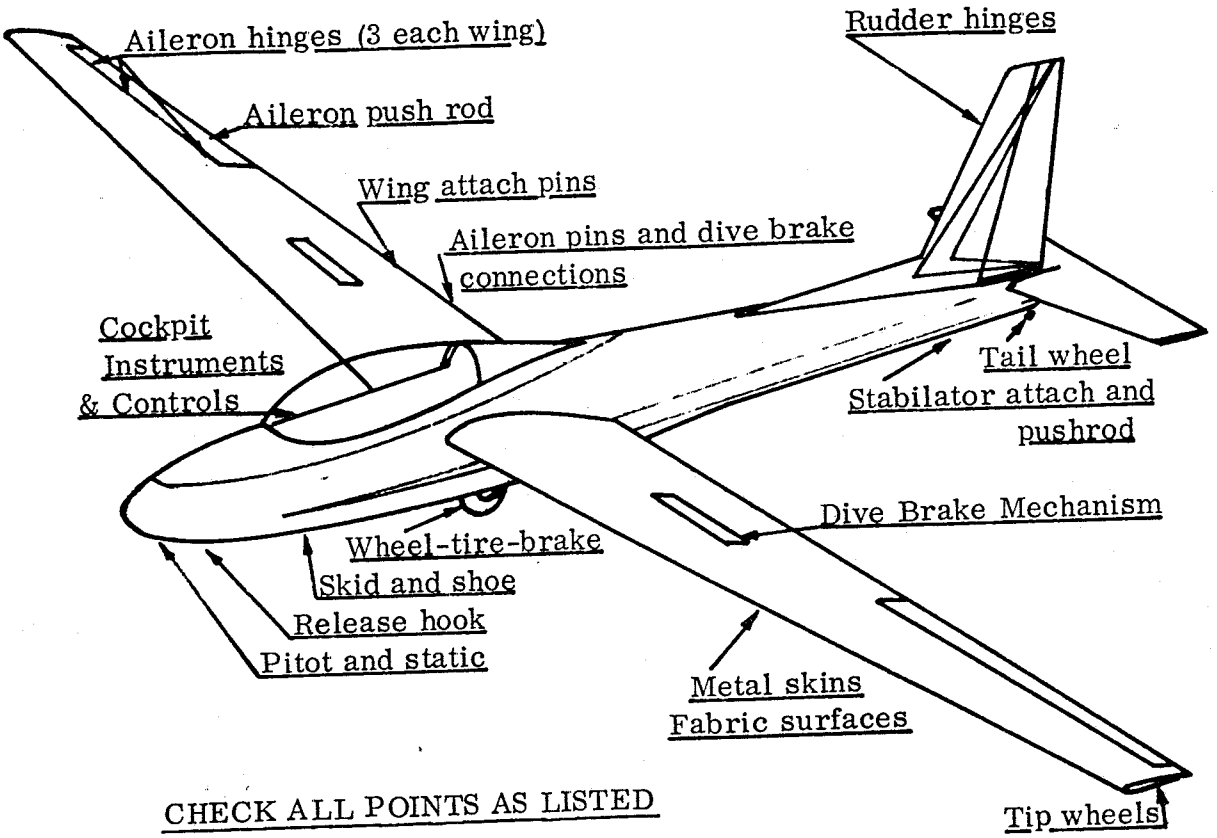
6. Wheel Brake:
   Actuated when last 1/4 to 1/2 inch of dive brake control is used. Extra pull force is needed to achieve this.

7. Instruments:
   Front - ASI, is required. Additional instruments may be added up to full panel.



SGS 2-32 Cockpit (Instruments & Controls)

PREFLIGHT INSPECTION



CHECK ALL POINTS AS LISTED

1. Wing:
   a. Dive Brakes and their mechanism.
   b. Ailerons, hinges, pushrods, connections and fabric.
   c. Skins and general appearance.

2. Tail Assembly:
   a. Hinge points, pushrods & connections, (rudder and stabilator).
   b. Stabilator taper pins.
   c. Tail wheel assembly.
   d. Aft part of fuselage for general appearance.
   e. Remove inspection plate and check stabilator and rudder mechanisms.

3. Fuselage:
   a. Flight controls for free and normal movement.
   b. Release hook and mechanism.
   c. Instruments, pitot tube and static openings.
   d. Canopy and hinge points.
   e. Safety belts and shoulder harnesses.
   f. Main wing carry-thru and rear carry-thru wing-fuselage pins.
   g. Aileron pins and automatic dive brake connections.
   h. Fuselage skins.
   i. Wheel, tire and brake.

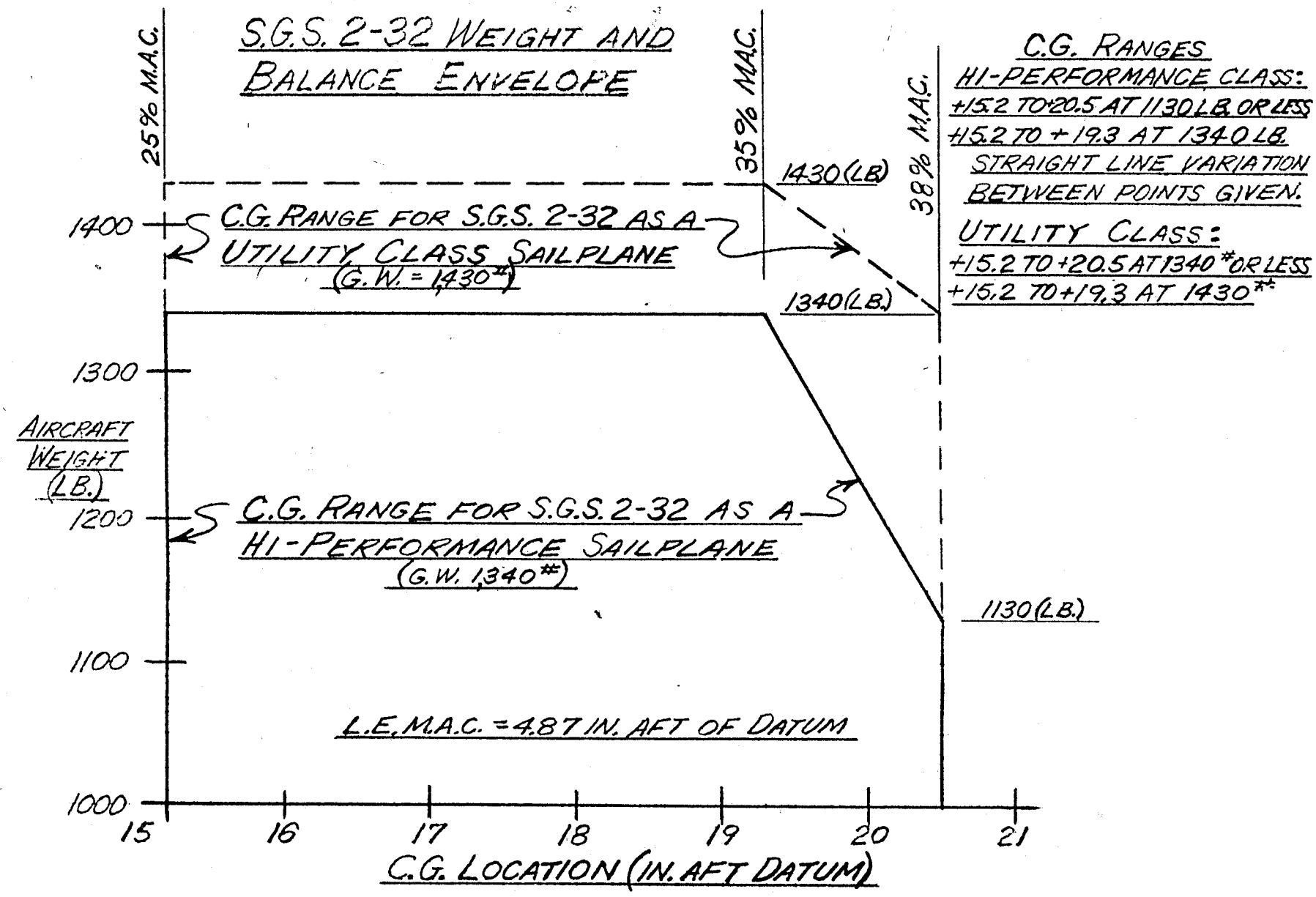
WEIGHT AND BALANCE

The 2-32 is a high performance two place tandem sailplane of clean aerodynamic design.

Solo flight is from front seat only. The placard in the ship gives basic minimum loading conditions and the pilot should familiarize himself with the weight and balance sheets to cover various loadings since there are a wide variety of loading conditions possible. No permanent equipment should be removed or added without checking the effects on the weight and balance form and placard.

The weight and balance envelope is shown on the following page. Note that 35% MAC (Mean Aerodynamic Chord) is the maximum rearward limit at a gross weight of 1, 340 lbs. With the gross weight reduced to 1, 130 lbs., the rearward limit is at 38% MAC. While it is legal to fly with the cg aft of 35% MAC, it is strongly recommended that, whenever practical, the cg be maintained at, or forward of, 35%. The range of 33 to 35% yields the best handling and soaring characteristics. In the aft portion of the cg range, the ship will stall more readily and recovery time is longer.

The dive brakes are effective and provide a much better means of rapid descent than spins so that there should be no normal requirement for spins.



WEIGHT AND BALANCE ENVELOPE
PREPARED BY: K. SMITH 6/17/64 CHECKED BY: S.G.S. 2-32
SCHWEIZER AIRCRAFT CORP. ELMIRA, N.Y.
REVISED 4-7-65

AERO TOWING

Towing is normal. Excellent visibility, the convenience of a trimmer and light control pressures remove most of the work from towing. A minimum indicated airspeed of 60 mph in the sailplane is recommended for best control. This is a heavier sailplane than most, and, due to the long fuselage and small clearance of the aft fuselage, a too low speed take-off will cause a hard bumping of the tail wheel on the runway. This will result in a series of tail bumps if correction control is not undertaken immediately. More care is required on a rough terrain take-off. The IAS of the sailplane should be between 45 and 50 mph before lift off. Be sure an adequate tow plane is used for towing. It is a good idea to brief any tow pilot on speed to tow, especially if he is unfamiliar with towing heavily wing loaded sailplanes.

AUTO OR WINCH TOWING

Auto Towing:

Because of its weight, either dual or solo, and the higher flying speeds, several factors should be considered before auto or winch towing the 2-32.

1. Pilot or Instructor should have considerable experience in auto-winch towing and experience in the 2-32.

2. The cable, wire or rope must be in very good condition and strong enough to do the job. Minimum strength of line or safety leader should be 1, 350# (3/8 manila), maximum - 2, 000#.

3. The tow car must have the ability to tow at higher speeds and with a heavier load on tow.

4. Due to the higher towing speed, a longer runway will be required to reach the same altitude that a slower tow with a lighter sailplane would produce.

5. The 2-32 does not have a CG Hook. Therefore, porpoising can be expected if too much back-stick is used during the climb.

6. The tow car driver should be familiar with the flight characteristics of the 2-32.

Maximum Speed - Auto-Winch Towing:

The maximum permissible auto-winch tow speed is 86 mph. However, there is no need to intentionally exceed 65 mph for any normal operation.

The Ground Run & Take-off:

Set trim slightly nose down. As the 2-32 begins its forward movement on tow, enough back-pressure is held to raise the skid off the runway so that it is in a level attitude. As the ground speed increases most back pressure is released to hold the level attitude. As flying speed is reached (42 - 45 solo, or 46 - 48 dual), enough back-pressure is added to get airborn. At an indicated 50 mph solo, or 55 mph dual, a medium climb can be started. This is held until 100' of altitude is reached where more back-pressure and a steeper climb is used. The ideal climb angle is governed by the indicated airspeed. However, a steep climb with under 55 mph solo, or 60 mph dual, is not recommended. If too much back-pressure is applied during the climb, the horizontal tail will stall and unstall causing the nose to pitch up and down. This is known as porpoising and can easily be stopped by easing forward on the stick until it ceases. The best climb angle is at an airspeed just before the sailplane porpoises. When reaching the top of the tow, which is near to release time, four things occur that indicate this. First, the sailplane will be at nearly a level attitude with the stick well back. Second, a sensation of being pulled down will be felt. Third, the rate of climb will fall off to practically nothing. Fourth, the tow car will be nearing the end of the runway and slowing down which in turn slows the sailplane. At this point, the pilot levels the sailplane to normal flight attitude and releases.

WINCH LAUNCHING

The procedure for Winch Towing the 2-32 is basically the same as for Auto Towing. However, there are some differences.

1. Acceleration at the beginning of the ground run for takeoff is much faster than an Auto Tow would be if both were using the same horsepower engine. The pilot should be prepared for this and react accordingly. The ground run will be much shorter.

2. Winches are run with a line speed suitable for the aircraft being towed.

3. Some Winches are equipped with tension meters which the winch operator uses to establish the towing speed of the sailplane. The pilot must establish the proper climbing attitude almost immediately to give the proper reading on the tension meter. If too little climb is established, the tow will over speed because of lack of tension. If the Winch Tow red line is exceeded, the flight should be terminated by a straight in landing, or, a short pattern as required.

   It should be noted that the tensions used to properly tow different type sailplanes will vary with their weight and flying speeds, and must be determined for each type of aircraft.

FREE FLIGHT

Flying Weight	Wing Loading	IAS	Minimum Sinking Speed
1020#	5.67#/sq.ft.	46 m.p.h.	2.08 FPS
1200#	6.72#/sq.ft.	50 m.p.h.	2.24 FPS
1340#	7.44#/sq.ft.	52 m.p.h.	2.38 FPS
1430#	7.94#/sq.ft.	54 m.p.h.	2.56 FPS

Flying Weight	Wing Loading	IAS	Glide Angle
1020#	5.67#/sq.ft.	55 m.p.h.	34 - 1
1200#	6.72#/sq.ft.	59 m.p.h.	34 - 1
1340#	7.44#/sq.ft.	63.5 m.p.h.	34 - 1
1430#	7.94#/sq.ft.	66.5 m.p.h.	34 - 1

Flying Weight	Wing Loading	Stalling Speed
1020#	5.67#/sq.ft.	41 m.p.h.
1200#	6.72#/sq.ft.	44 m.p.h.
1340#	7.44#/sq.ft.	46 m.p.h.
1430#	7.94#/sq.ft.	47 m.p.h.

Level flight stalls are normal and straight ahead, but may fall off in either direction due to gustiness or control position. Recovery is normal. Stalls while turning result in fall-off in direction of turn. Recovery is normal.

	Spiralling in Thermals			
	1020#	1200#	1340#	1430#
30° Bank	48 mph	52 mph	55 mph	58 mph
45° Bank	50 mph	54 mph	57 mph	60 mph

PLACARD SPEEDS

	Class I Hi-Perform.	Class II Utility
Max. Glide Speed, Dive Brakes Open	158 mph	139 mph
Max. Glide Speed, Dive Brakes Closed	150 mph	139 mph
Max. Aero Tow Speed	120 mph	110 mph
Max. Auto-Winch Tow Speed	86 mph	86 mph

SLIPS:

Normally executed slips can be performed, but with the effectiveness of the dive brakes, it is very unlikely that slipping becomes necessary.

SPINS:

The 2-32 has a long span and the all up weight is relatively high. Therefore, certain recovery procedures are necessary. Pilots with little or no spin training should not attempt spins in the 2-32 without prior dual training with a qualified instructor.

Spin entries are normal throughout the C.G. range. After the entry, there will probably be one nose up and down oscillation before the stable spin occurs. The rotations are relatively slow with an altitude loss of approximately 300' per turn. Recovery technique is normal, except that considerably more control is needed to stop the rotation and lower the nose. Instead of easing off back pressure on the stick, it must be pushed forward of neutral and instead of neutralizing rudder, opposite rudder must be applied. The rotation can be stopped in 1/4 to 1/2 a turn. Pull outs, depending on the loading of the sailplane, can be made at airspeeds of 75 - 90 mph without appreciable G-loads. Spins can be done with dive brakes open and the pull out will be at a slower airspeed.

Aerobatics:

The 2-32 is fully aerobatic, but pilots with no previous aerobatic experience should not attempt them without prior instruction. Due to the cleanness and weight of the sailplane, a badly executed maneuver may result in exceeding the maximum placard speed.

LANDING

Pattern: It is standard practice to fly a traffic pattern. Downwind, base leg and final approach. Extra speed is also used depending on wind velocity and gust conditions. It is good practice to add 1 mph to airspeed for each mph of wind.

Dive Brakes: Approach should be made high, with use of dive brakes, as needed. Dive brakes increase sink, which in turn makes a steeper and more controllable glide path. They can also be used to lose altitude rapidly at any time during a flight, or during a tow to take up slack, or to lower sailplane from a too high position.

The 2-32's dive brakes are extremely effective. They will limit the aircraft's speed to approximately 145 mph in a vertical attitude in light weight condition; or 158 mph at full gross.

At slow speeds, care must be taken to lower the nose before brake (or additional brake) is applied as airspeed will decrease quite rapidly as brakes are opened. A minimum airspeed of 65 mph (plus wind speed allowance) is recommended for the pattern and final approach with the 2-32.

Touch Down: Can be done with dive brakes either partially open or closed although it is preferable to land with them 1/4 to 1/2 open. Once the flare out is initiated, airspeed will decrease quite rapidly. Care must be taken to maintain sufficient speed as sailplane will settle. Too slow a speed and too much rotation will cause the tail wheel to touch first.

By holding a level attitude close to the ground, the sailplane will settle to a smooth, level touch-down. DO NOT FLARE OUT TOO HIGH - this can cause a very hard landing which could result in injury to occupants or sailplane.

When the main wheel has touched down, full dive brake can be applied.

Taxiing after Touch Down: Even though sailplane is on the ground, it should literally be flown to a stop with use of all controls. Wheel brake may be used if a quick stop is desired or necessary. Care should be taken to keep the wings level with ailerons during taxi as the long wing could cause a ground loop if allowed to drag.

COLD WEATHER OPERATION OF THE 2-32

GENERAL PROVISIONS:

Since the 2-32 is ideal for winter flying; as well as high altitude wave flying, these sailplane quite often will be used in cold weather associated with this type of flying.

If any flying is to be done in freezing weather or at high altitude, it is recommended that a low-temperature lubricant be used on all pivot points - bearing surfaces or other moving parts. To do this, the pins or bolts should be removed and cleaned of any old grease or oil with a solvent, and then apply low-temperature grease such as Esso "Beacon #325", or equivalent grease meeting low-temperature requirements of Spec. MIL-G-3278, (See QPL-3278).

DIVE BRAKES:

Two types of freezing are possible with the dive brake system. The first is actual freezing down of the dive brake doors, and the second, high friction of the dive brake control system due to the low temperature effect on lubricants.

Snow or ice on top surface of the wing usually will be melted by the sun which results in a water film on the dive brake door seals. In flying, as the air cools with altitude, this water freezes the doors to the seals so that they may not be able to be opened. It is recommended that these doors and seals should be checked and dried off before flying if cold temperatures are expected. De-icer solution can be applied to the rubber to help keep them from sticking.

The dive brake system should be carefully cleaned and lubricated with low temperature grease. The most important point here is to be sure that the slide rod and housing are clean.

TRIM TAB ACTUATOR:

A rubber boot has been provided to discourage the formation of ice and freezing of this unit. (Ships below Serial No. 30 do not have this. A kit is available from SAC for retrofit.) It is important here to be sure that the jack-screw threads and all of the pivots in the rear control system are greased with low temperature grease.

ICE AND FROST ON SAILPLANE:

Ice and frost on a sailplane can be dangerous in that it can greatly increase the stalling speed. All ice or frost should beremoved from the sailplane before flying. This can best be done by cleaning off the excess snow and then letting the sun melt off the balance of ice or frost. If hangars or blowers are available, they should be used in cleaning snow or ice from sailplane. Care must be exercised in cleaning off the surfaces so finish and skins will not be scratched or fabric torn.

CANOPY PROVISIONS:

Be sure that the bolts, holding canopy glass to canopy frame, are just snug, so plastic can move as it expands and contracts. It is recommended that clear

view panels be used inside the canopy to provide necessary visibility when exhaled breath freezes on canopy. These clear-view panels can be taped to canopy with plastic electricians tape so that a small dead air space exists between the two. SAC has standard clear-view panels for those interested.

BATTERIES:

Dry and wet batteries lose voltage with low temperatures. Insulating them helps to delay loss of voltage. Some of the new type batteries have improved cold weather performance and should be investigated.

WHEEL FREEZING:

In late fall or early spring when slush or mud is on the field, it is possible to get the wheel well filled on take-off. Then during flight, if it gets cold enough, this can freeze and lock the wheel prior to landing. There is no remedy for this except to avoid the slush or mud. The consequence for landing with a locked wheel is not severe - at most, a blown tire.

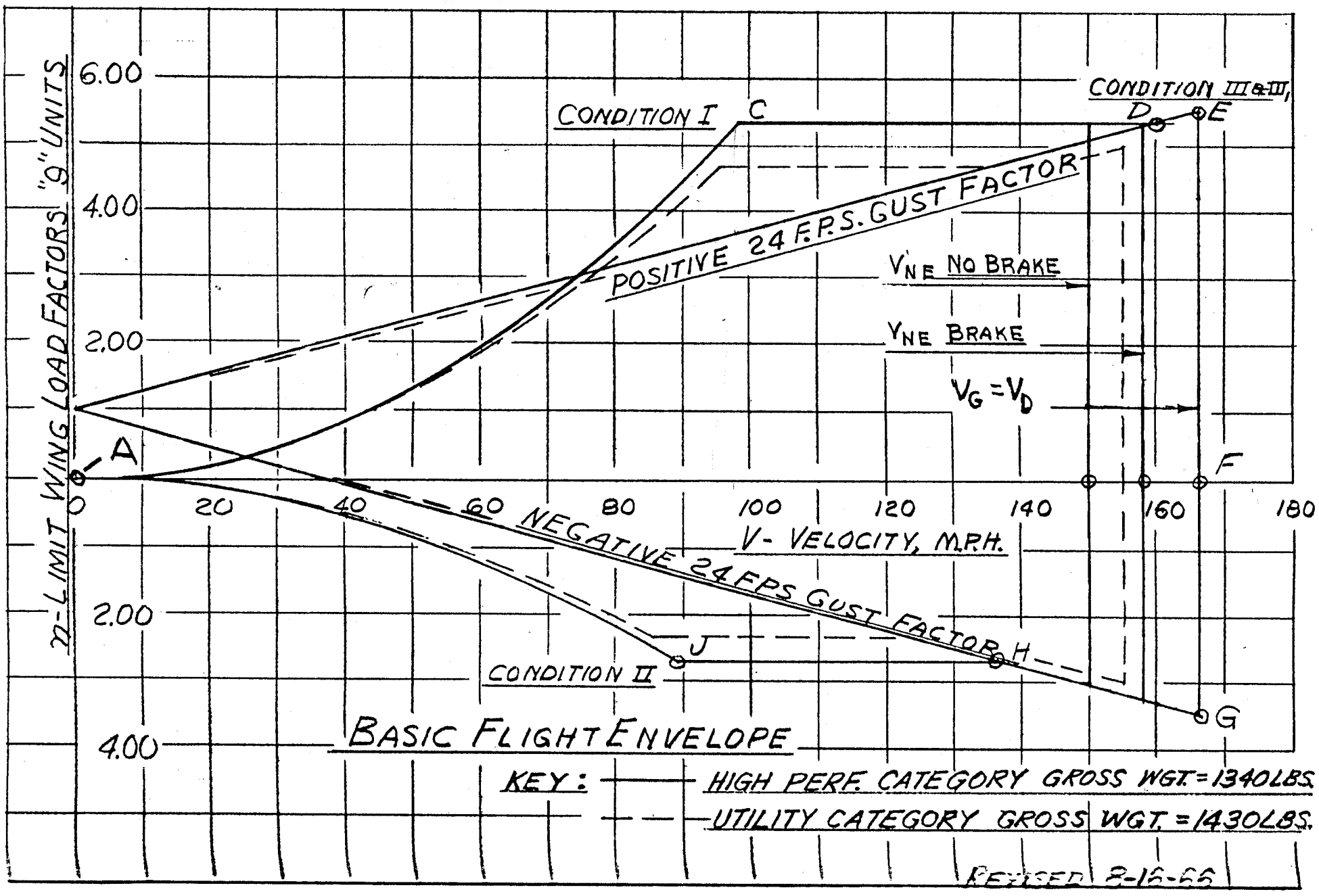
With the aft control stick removed, and dual seat belts and shoulder harness installed, the 2-32 will accommodate two average sized passengers. A special floor plate covers the control stick opening.

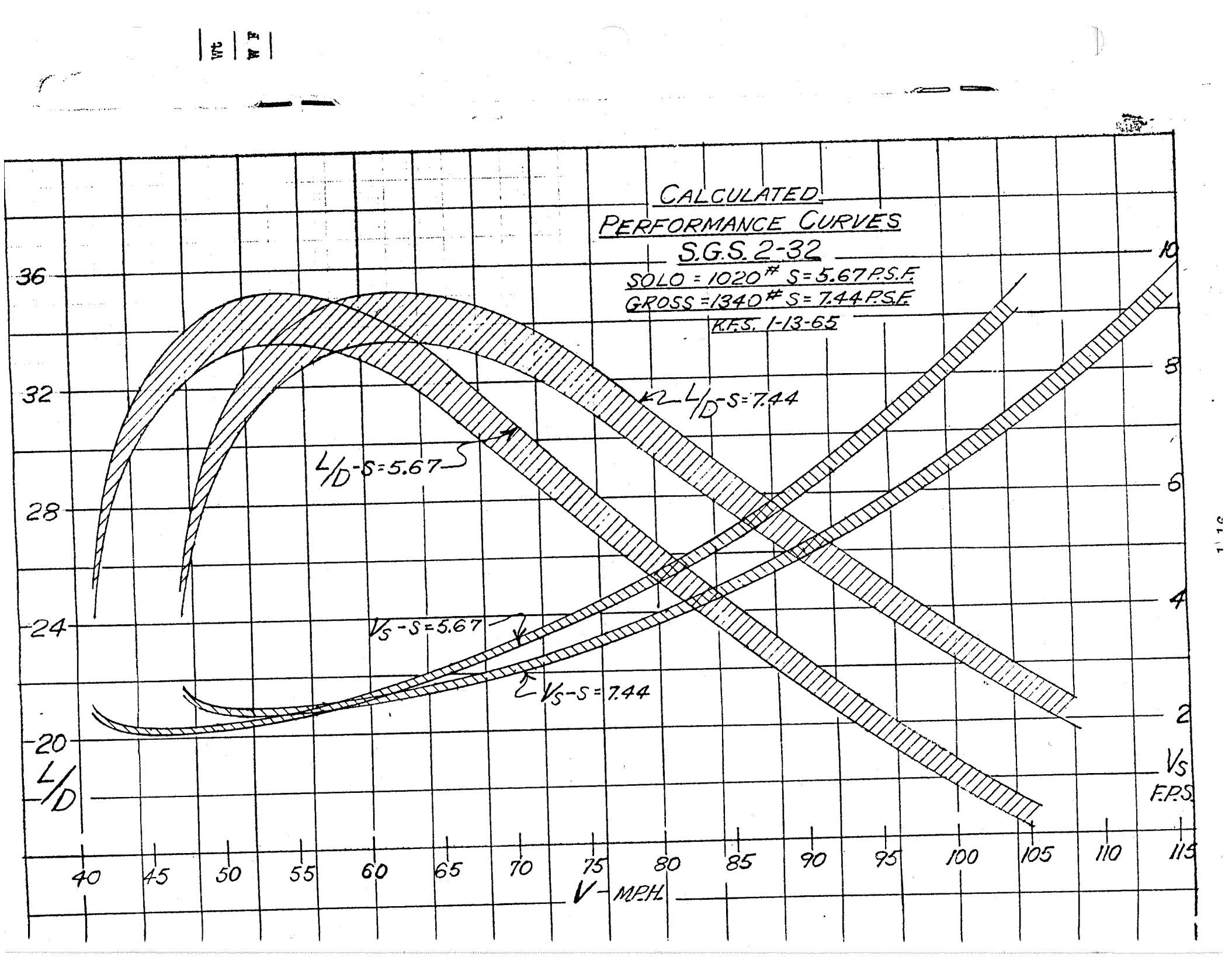
2-32 FLIGHT ENVELOPE

The following graph shows the aircraft's basic flight envelope. Note that aircraft should be operated within this envelope at all times. The dash lines show the placard limits for flight with brakes and without brakes. From points A to C, and A to J, abrupt maneuvers will not exceed the load factor indicated by this line. Above C (98 mph), the maneuver must be limited to avoid excessive load factors. The gust line is based on the standard 24 ft./sec. gust. In case of extreme turbulence, such as in wave conditions and clouds, gusts can be much higher and the aircraft should be operated as slow as practical considering the fact that under turbulent conditions a safe margin above stall should be maintained.

While there is no specific restriction against aerobatics, sailplane aerobatics is a specialized field and requires experience and instruction to do safely. It is entirely too easy to exceed flight limits in improperly executed maneuvers and we do not recommend aerobatics.

Bear in mind that while the load factors in the Flight Envelope carry a 50% margin of safety, these margins should not be used intentionally and are for inadvertent conditions only. This is also generally true in over speeding - a 20% increase in speed over the placard will use up the margin of safety. A wise pilot will never use more speed, or pull more G's, than the condition requires.


6.00
4.00
2.00
0
2.00
4.00
N- LIMIT WING LOAD FACTORS "g" UNITS
20
40
60
80
100
120
140
160
180
V- VELOCITY, M.P.H.
CONDITION I
C
CONDITION III & III,
D
E
POSITIVE 24 F.P.S. GUST FACTOR
VNE NO BRAKE
VNE BRAKE
VG = VD
A
F
NEGATIVE 24 FPS GUST FACTOR
H
J
CONDITION II
G
BASIC FLIGHT ENVELOPE
KEY:
HIGH PERF. CATEGORY GROSS WGT. = 1340 LBS.
UTILITY CATEGORY GROSS WGT. = 1430 LBS.
REVISED 2-16-66


CALCULATED
PERFORMANCE CURVES
S.G.S. 2-32
SOLO = 1020# S = 5.67 P.S.F.
GROSS = 1340# S = 7.44 P.S.F.
K.F.S. 1-13-65
L/D - S = 7.44
L/D - S = 5.67
VS - S = 5.67
VS - S = 7.44
L/D
VS F.P.S.
V - M.P.H.
36
32
28
24
20
10
8
6
4
2
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115

OPTIMUM SPEED CHART

S.G.S. 2-32 GROSS WEIGHT = 1200#

W = Variometer Reading
V = Horiz. Airspeed of Glider
Wt= Average Rate of Climb expected in next thermal

Wt = 000 F.P.M.		Wt = 200 F.P.M		Wt = 400 F.P.M.		Wt = 600 F.P.M.		Wt = 800 F.P.M
W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH
000	47	--	47	--	47	--	47	--	47
100	55	--	55	--	55	--	55	--	55
200	63	000	63	--	63	--	63	--	63
300	69	100	69	--	69	--	69	--	69
400	74	200	74	000	74	--	74	--	74
500	79	300	79	100	79	--	79	--	79
600	83	400	83	200	83	000	83	--	83
700	87	500	87	300	87	100	87	--	87
800	91	600	91	400	91	200	91	000	91
900	95	700	95	500	95	300	95	100	95
1000	100	800	100	600	100	400	100	200	100
1100	104	900	104	700	104	500	104	300	104
1200	108	1000	108	800	108	600	108	400	108
1300	112	1100	112	900	112	700	112	500	112
1400	116	1200	116	1000	116	800	116	600	116
1500	120	1300	120	1100	120	900	120	700	120

1. Fly a little slower than indicated at high altitude.
2. Use a lower Wt than actual if conserving height is very important.

OPTIMUM SPEED CHART

S.G.S. 2-32 GROSS WEIGHT = 1340 lbs.

W = Variometer Reading
V = Horizontal Airspeed of Glider
Wt= Average Rate of Climb expected in next thermal

Wt = 000 F.P.M.		Wt = 200 F.P.M.		Wt = 400 F.P.M.		Wt = 600 F.P.M.		Wt = 800 F.P.M.	
W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH
000	53	--	53	--	53	--	53	--	53
100	60	--	60	--	60	--	60	--	60
200	66	000	66	--	66	--	66	--	66
300	71	100	71	--	71	--	71	--	71
400	77	200	77	000	77	---	77	--	77
500	82	300	82	100	82	--	82	--	82
600	86	400	86	200	86	000	86	--	86
700	90	500	90	300	90	100	90	--	90
800	94	600	94	400	94	200	94	000	94
900	98	700	98	500	98	300	98	100	98
1000	101	800	101	600	101	400	101	200	101
1100	104	900	104	700	104	500	104	300	104
1200	107	1000	107	800	107	600	107	400	107
1300	110	1100	110	900	110	700	110	500	110
1400	112	1200	112	1000	112	800	112	600	112
1500	114	1300	114	1100	114	900	114	700	114
1600	117	1400	117	1200	117	1000	117	800	117
1700	119	1500	119	1300	119	1100	119	900	119
1800	121	1600	121	1400	121	1200	121	1000	121

1. Fly a little slower than indicated at high altitude.
2. Use a lower Wt than actual if conserving height is very important.

OPTIMUM SPEED CHART

S.G.S. 2-32 GROSS WEIGHT = 1340 lbs.

Wt = 1000 F.P.M.		WT = 1200 F.P.M.		Wt = 1400 F.P.M.		Wt = 1600 F.P.	
W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MPH	W F.P.M.	V MP
--	53	--	53	--	53	--	53
--	60	--	60	--	60	--	60
--	66	--	66	--	66	--	66
--	71	--	71	--	71	--	71
--	77	--	77	--	77	--	77
--	82	--	82	--	82	--	82
--	86	--	86	--	86	--	86
--	90	--	90	--	90	--	90
--	94	--	94	--	94	--	94
--	98	--	98	--	98	--	98
000	101	--	101	--	101	--	101
100	104	--	104	--	104	--	104
200	107	000	107	--	107	--	107
300	110	100	110	--	110	--	110
400	112	200	112	000	112	--	112
500	114	300	114	100	114	--	114
600	117	400	117	200	117	000	117
700	119	500	119	300	119	100	119
800	121	600	121	400	121	200	121