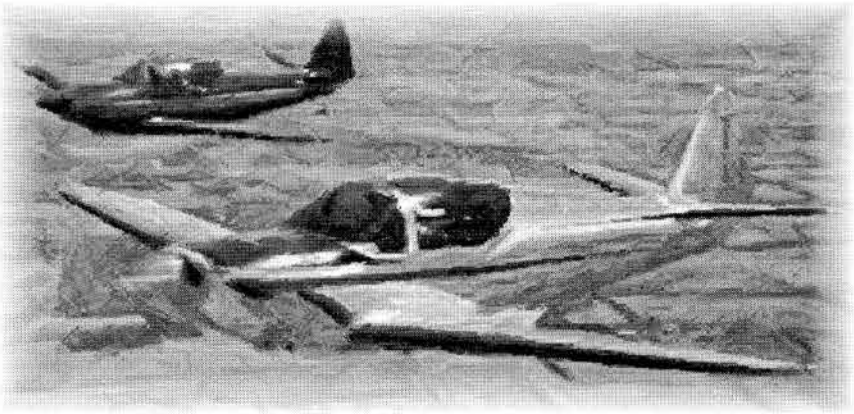

Globe / Temco Swift GC-1A / GC-1B

Initial / Recurrent
Pilot Training Handbook

Revision 8
March, 2004

NOTICE: This Globe / Temco Swift GC-1A / GC-1B Pilot Training Handbook is to be used for aircraft familiarization and training purposes only. It is not to be used as, nor considered a substitute for, the manufacturer's Pilot or Maintenance Manuals, or contradict approved airframe placards.

ACKNOWLEDGEMENTS

This guide was a collaboration of efforts by Sam Swift, Rick Stroud, John Davis, and Charlie Nelson. If you have any questions, suggestions, or have found an error; please email Sam Swift at flyboycpa@aol.com or Charlie Nelson at SwiftlyChs@aol.com .

Introduction

Congratulations to you for choosing the Globe / Temco Swift for your next aircraft to be checked out in! The Swift is a unique airplane that depends on quality instruction given and received in order to maximize the potential of the airplane, as well as minimizing potential losses within our fleet.

The Swifts have many approved modifications which greatly change the scope of instructional requirements needed to adequately familiarize a pilot new to the Swift. The following are some of the examples of differences you'll find in those Swifts still flying:

- **Engines**
  - Continental C-85 (85 or 90hp)
  - Continental C-125 (125 hp)
  - Continental C-145 / O-300 (145 hp)
  - Continental IO-360 (210 hp)
  - Lycoming O-290 (derated to 125 hp)
  - Lycoming O-320 / IO-320 (150 or 160 hp)
  - Lycoming O-360 (180 hp)
  - Lycoming IO-360 (200 hp)
  - Franklin (PZL) 6A-350 (220 hp)

- **Fuel Pumps**
  - Electric
  - Wobble

- **Flight Controls**
  - Yokes
  - Sticks

- **Fuel System**
  - Stock Main Tanks (27.8 gallons)
  - Temco Auxiliary Baggage Tank (additional 9 gallons)
  - Alturair Auxiliary Belly Tanks (additional 9 gallons)
  - Merlyn Products Auxiliary Wing Tanks (additional 26 gallons)

- **Miscellaneous Mods & STC's**
  - Small Tire STC (15-6.00x6) w/ stall strip reduction
  - Nagle Bubble Canopy
  - Wing-Slot Enclosure

There are many other small nuances appropriate to each individual Swift that will need to be addressed throughout your training. It is recommended that you engage the services of a competent and current Swift instructor that is fully qualified in, and familiar with the operation of the Swift. NTSB accident data shows us that the majority of the recent accidents/incidents involving Swifts are among those pilots that possess a high amount of total time, high tailwheel time, and low time in the Swift.

This training curriculum will address those things that you will need to know in order to safely operate your Swift.

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Principles of Tailwheel Flying

It wasn't too many years ago that all new aviators received their first lessons in tailwheel aircraft. Student pilots soloed Cubs, Champs, Luscombes, and many similar aircraft after only a few hours of instruction. To these students, this is all they knew and mastery of flying tailwheel aircraft came quickly. Today, with the dominance of the tricycle geared airplanes in the training environment, pilots (and instructors) have become lazy with regard to the usage of the rudder since you can typically plant a tricycle gear airplane on the ground and as long as all three wheels are on the ground, it will stay straight. The tailwheel (or conventional-geared) airplane requires the pilot to maintain absolute directional control using a combination of rudder and aileron until the plane has come to a complete stop. Tailwheel airplanes are more prone to what is called a "groundloop."

Stated simply, a groundloop is the result of the pilot losing directional control of the airplane causing it to pirouette rapidly around the yaw axis. Depending on the speed the groundloop happens, damage can range from nothing to totaling-out the airplane. The scenario in most high-speed groundloops is when the pilot loses directional control; the plane departs the side of the runway, and spins around damaging the outer portion of the wing and horizontal stab plus a possible collapse of the outboard landing gear. A good demonstration of a groundloop can be performed in your local grocery store. Simply load your shopping cart with your groceries and pull the cart backwards down the aisle by the handle. Notice how once the cart begins to swerve (groundloop) it takes a small amount of correction with your wrist (rudder) to keep it straight. If you let the swerve get too advanced, you quite possible don't have enough strength in your wrist to keep the cart straight. If you catch the swerve early enough, the correction needed to stay straight is much less. The same principles apply to keeping a tailwheel aircraft aligned with the centerline of a runway. The reason for the relatively uncontrollable pirouette is because the majority of the aircraft's weight is behind the axis of rotation (the main gear). The momentum of the weight of a decelerating aircraft constantly wants to make the airplane "swap ends." Proper usage of rudder (and sometimes individual wheel brakes) is necessary to keep the airplane aligned with the centerline.

It is the general consensus that for the Swift, the only acceptable landing is what is referred to as a wheel-landing. The alternative is called a three-point landing (or full-stall landing). For most tailwheel aircraft the normal (i.e.-calm or relatively light wind conditions) landing is the three point landing. The three-point landing is performed when the aircraft touches down at the same time the aircraft is in a full-stall, nose-high angle-of-attack. This causes the plane to touchdown on all three tires at the same time. Benefits to this type of landing, if performed properly, are that the plane touches down at a lower groundspeed, requires less runway length, and less prone to bouncing back into the air. The primary reason cited against the three-point landing is that once the airplane is in the nose-high attitude, the relative wind is able to flood the inside of the wheel wells, causing a dramatic increase in drag and subsequent loss of lift if in a low power situation.

The wheel landing is accomplished when the airplane touches down in a more level attitude on the main gear first, then the tailwheel settles to the runway as airflow diminishes over the tail

during deceleration.

The primary benefit to a wheel-landing is that you typically have more control authority of the aircraft since you fly a slightly faster and flatter approach (a necessity in a strong crosswind). Additionally, over-the-nose visibility is enhanced as a result of the flatter approach.

The most critical phase of your Swift instruction is that point after landing when the plane is decelerating. This is when the tailwheel is lowering itself to the runway and things begin to get busy. Focused attention is required in order to keep the plane straight. The design of the Swift places additional demands on the pilot that need to be considered.

The takeoff phase is also plagued with some potential causes for groundloops. As with most aircraft, there are forces acting against you to keep you from running a straight line down the runway for takeoff. As a review, the four "left-turning tendencies" are:

- Torque
- P-Factor
- Gyroscopic Precession
- Slipstream Effect

Their impact on tailwheel flying is most pronounced in the takeoff phase. On most general aviation aircraft, it is commonly taught that as you begin your takeoff roll and subsequent climbout, right rudder is needed to compensate for the above-listed turning tendencies. The effect of these on a tailwheel aircraft are more pronounced. As you begin the takeoff roll and accelerate the airplane, you will use forward pressure on the stick/yoke to lift the tail. Under calm wind conditions, as you lift the tail, gyroscopic precession of the propeller will cause the nose of the plane to yaw to the left, requiring right rudder to maintain the centerline. Conversely, if you rapidly pull back on the yoke/stick, this will yaw the nose of the plane to the right, requiring left rudder to stay straight. Additionally, torque from the engine and slipstream effect from the thrust of the propeller will yaw the nose to the left, again requiring right rudder. P-factor affects the plane while in a 3-point attitude due to the downward blade having more pitch than the upward blade, causing the plane to yaw to the left.

In a Swift, these demands for right rudder on takeoff should be evaluated carefully. Those Swifts with larger engines develop more torque and more slipstream effect, requiring more right rudder than those with smaller engines. This is more pronounced on the Swift than many other taildraggers since the overall length of the fuselage is very short. This gives very little leverage for the rudder to keep the airplane straight. The current wind conditions must be closely looked at, as well. A strong crosswind from the left will push on the left side of the vertical stabilizer and fuselage causing the nose to yaw to the left. This will require more right rudder to counteract the crosswind <u>plus</u> that required for the other turning tendencies. If the wind is strong, you might consider going against the regular traffic pattern and using the opposite end of the runway in order to keep the crosswind on the right side of the airplane. There have been numerous situations where Swifts have had enough crosswind from the left, which when added to the other turning tendencies, have caused the Swift to go off the left side of the runway while the pilot held full right rudder causing substantial damage!

Please bear these considerations as you begin your transition into the Swift.

The original GC-1 was designed and built by R.S. "Pop" Johnson in 1941. The "All Metal" Globe Swift GC-1A, was designed by K.H. "Bud" Knox, Chief Engineer for Globe Aircraft Corp and built by John Kennedy's Globe Aircraft Company of Fort Worth, Texas. It earned its CAA Type Certificate on May 7, 1946. The Type Certificate for the GC-1B was issued September 22, 1946. A total of 428 models GC-1A's and 504 GC-1B's were produced by Globe during 1946. The demand led to a tremendous backlog whereby Globe entered into an agreement with Temco (Texas Engineering and Manufacturing Co.). Temco built 329 GC-1B's during 1946. Subsequently, Globe Aircraft went bankrupt with Temco purchasing the rights to continue building the Swift. With the end of production by Temco in 1951, a total of 1521 Swifts were built by both companies combined. Today, the Swift Museum Foundation owns the Type Certificate to the Swift.

Design Specifications (stock airframe)

Wingspan		29' 4"
Length		20' 10.75"
Height		6' 1"
Gross Weight (stock)		1570 pounds (GC-1A) 1710 pounds (GC-1B)
STC'd Gross Weight Increase	(if < 200hp) (if ≥ 200hp)	1835 pounds 1970 pounds
Baggage Capacity		50 pounds (GC-1A) 100 pounds (GC-1B)
Wing Area		131.63 sq ft
Fuel Capacity (see *Fuel System* section for STC'd auxiliary fuel tanks)		27.8 gallons

Above: GC-1A Swift

The Type Certificate Data Sheet (TCDS) for the Swift is shown on the following pages for your reference:

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

A-766
Revision 14
GLOBE
GC-1A
GC-1B

December 4, 2003

TYPE CERTIFICATE DATE SHEET NO. A-766

Type Certificate Holder: Swift Museum Foundation, Inc.
P.O. Box 644
Athens, Tennessee 74114

1 - Model GC-1A, 2 PCLM, Approved May 7, 1946

Engine	Continental, C-85-12 or C-85-12F
Fuel	73 min. octane aviation gasoline
Engine limits	For all operations, 2575 rpm (85 hp)
Airspeed limits	Level flight or climb 140 mph (122 knots) True Ind. Glide or dive 185 mph (161 knots) True Ind. Flaps extended 90 mph (78 knots) True Ind.
C.G. Range	(+31.4) to (+35.5) with L.G. extended. Moment change due to retraction of gear +157 in. lbs.
Empty weight C.G. range	(+29.3) to (+30.4) If empty weight C.G. falls within pertinent range, it is unnecessary to check critical forward and aft C.G. positions. Ranges are not valid for non-standard arrangements.
Maximum weight	1570 lbs.
No. seats	2 (+42.5)
Maximu baggage	50 lbs. (+60.5)
Fuel capacity	27.8 gals. (+47)
Oil capacity	4.5 qts. (-14.5)

Control surface movements				
Flaps			Down	39° or 30°
Elevators	Up	22°	Down	20°
Elevator trim tab	Up	23°	Down	17°
Ailerons	Up	19.5°	Down	15°
Rudder	Right	24°	Left	26°

Serial Nos. eligible	2 to 1000, inclusive (also eligible as GC-1B upon completion of conversion according to TEMCO Customer Service Maintenance Bulletin No. 27, dated June 18, 1948.)
Required equipment	In addition to the pertinent required basic equipment specified in CAR 4a, the following items of equipment must be installed: Items 1, 101; 105 or 110 and 111; 201, 202, 301, 302, and 303.

Page No.	1	2	3	4	5
Rev. No.	14	11	11	14	13

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II - Model GC-1B, 2PCLM, approved September 20, 1946

Engine	Continental C-125-1 or C-125-2
Fuel	80 min. octane aviation gasoline
Engine limits	For all operations, 2550 rpm (125 hp)
Airspeed limits	Level flight or climb 140 mph (122 knots) True Ind. Glide or dive 185 mph (161 knots) True Ind. Flaps extended 90 mph (78 knots) True Ind.
C.G. Range	(+29.6) to (+34.7) with L.G. extended. (Moment change due to retraction of gear +157 in. lbs.)
Empty weight C.G. range	None
Maximum weight	1710 lbs.
No. of seats	2 (+42.5)
Maximum baggage	100 lbs. (+60.5)
Fuel capacity	27.8 gals. (+47)
Oil capacity	2 gals. (-20.3)

Control surface movements

Flaps			Down	30°
Elevators	Up	24°	Down	18.5°
Elevator trim tab	Up	10°	Down	22°
Ailerons	Up	19.5°	Down	16°
Rudder	Right	24°	Left	26°

Serial Nos. eligible	1001 and up. (GC-1A, serial numbers 2 to 1000 inclusive are eligible as GC-1B upon completion of conversion according to TEMCO Customer Service Maintenance Bulletin No. 27, dated June 18, 1948.)
Required equipment	In addition to the pertinent required basic equipment specified in CAR 4a, the following items of equipment must be installed: Items 3, 107, 110, 111, 201, 202, 301, 302, and 303.

Specifications Pertinent to All Models

Datum	Forward face of firewall at bottom
Leveling means	Window sill between (+37) and (+62)
Certification basis	Type Certificate No. 766 (CAR 4a)
Production basis	None. Prior to original certification a CAA agent must perform a detailed inspection for workmanship, materials, and conformity with the approved technical data and a check of the flight characteristics.
Export eligibility	Eligible for export to all countries subject to the provisions of MOP 2-4, except as follows: Canada - Landplane - eligible. - Skiplane - not eligible.
Equipment:	A plus (+) or minus (-) sign preceding the weight of an optional item indicates the net weight change when that item is installed. Approval for the installation of all items of equipment listed herein has been obtained by the aircraft manufacturer except those items preceded by an asterisk (*). The asterisk denotes that approval has been obtained by someone other than the aircraft manufacturer. An item marked with an asterisk may not have been manufactured under a CAA monitored or approved quality control system, and therefore attention should be paid to workmanship and conformity with pertinent data called for in this specification.

Propellers and Propeller Accessories	GC-1A	GC-1B
1. Propeller - Beech controllable, R002 or R003 with R002-205-72, R003-230-72 or R003-235-72 blades. Dia. 72 in. Pitch at 26 in. sta.: Low 14°, high 19°	30 lbs. (-35)	- - - - -
2. Propeller - Koppers Aeromatic, F200 with 00-72C, 00-72D or 00-72F blades. Dia. 72 in. Pitch at 27 in. sta.: Low 11°, high 23.5°	29 lbs. (-34)	- - - - -
3. Propeller - Sensenich 73KR59, 73BR54 or any other fixed pitch wood propeller eligible for the engine speed and power and which meets the following limits: Static rpm at max. permissible throttle setting: Not over 2250, not under 2000. No additional tolerance permitted. Dia: Not over 73 in., not under 71.5 in.	- - - - -	14 lbs. (-40)
4. Propeller - Koppers Aeromatic, F200 with 00-73D, 00-73E, or 00-73F blades with the following limits:		
(a) Model GC-1A Parts List Assembly 4305A. Low pitch setting 11° at 24 in. sta. Static rpm at maximum permissible throttle setting: Not over 2525, not under 2525. No additional tolerance permitted. Dia: Not over 73 in., not under 71.5 in. Installation and operation must be accomplished in accordance with Koppers "Installation and Operation Procedure No. 18C."	29 lbs. (-34)	- - - - -
(b) Model GC-1B Item 108 required. Parts List assembly 4261 or 4277. Low pitch setting 13.6° at 24 in. sta. Static rpm at maximum permissible throttle setting: Not over 2500, not under 2500. No additional tolerance permitted. Dia: Not under 73 in., not under 71.5 in. Installation and operation must be accomplished in accordance with Koppers "Installation and Procedure No. 9B."	- - - - -	29 lbs. (-41)
5. Propeller - Beech controllable, R002 or R003 with R003-201-72T or R003-231-72T blades. Dia. 72 in. Pitch at 27 in. sta.: Low 14.5°, high 19.5°	29 lbs. (-35)	- - - - -
6. Propeller - Beech controllable R100-101 hub with R100-217-73T blades. Static rpm at maximum permissible throttle setting: Not over 2275, not under 2175 No additional tolerance permitted. Pitch at 3/4 radius: Low 15°, high 23°. Item 108 required with this item.	- - - - -	+26 lbs. (-40)
7. Hampton Spinner Model No. 1B, Dwg. No. 100 (Optional with Koppers Aeromatic F-200 propeller)	- - - - -	2 lbs. (-40)
8. Propeller - McCauley 1A170		
(a) Model 1A170-DM7357 Static rpm at maximum permissible throttle setting: Not over 2050, not under 1950. No additional tolerance permitted. Diameter: Not over 73 in., not under 71.5 in. Approved on Continental C125-2 engine only	- - - - -	33 lbs. (-40)

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		GC-1A	GC-1B
	(b) Model 1A170-DM735	------	33 lbs. (-40)
	Static rpm at maximum permissible throttle setting: Not over 2180, not under 2080. No additional tolerance permitted. Diameter: Not over 73 in., not under 71.5 in. Approved on Continental C125-2 engine only		
*9.	Propeller - Sensenich M74DR-1, fixed pitch metal	------	30 lbs. (-40)
	Static rpm at maximum permissible throttle setting: Not over 2250, not under 2000. No additional tolerance permitted. Diameter: Not over 73 in., not under 71.5 in. Approved on Continental C125-2 engine only.		
10.	Propeller – Hartzell BHC-C2YF-1BF/7663DR, constant speed	------	46 lbs. (-40)
	Pitch settings at 41" station: low 12.8° ± 0.2°; high 30.0° ± 1.0°		
	Diameter: Not over 76", not under 72", in one inch increments		
	Spinners: Hartzell 82A229802, D-4798P		
	Maintain propeller in accordance with Hartzell Owners Manual #115N and Hartzell Maintenance Manual #113B		
	Approved on Continental IO-360 series engine installed per STC SA53NW only.		
	Engines and Engine Accessories - Fuel and Oil System		
101.	Carburetor air heater	2 lbs. (-15)	-----
102.	Cabin air heater	2 lbs. (-11)	-----
103.	Oil radiator	4 lbs. (-13)	-----
104.	Starter - Delco-Remy 1109656	16 lbs. (- 8)	-----
105.	Two engine-driven fuel pumps (Upper AC10538-III or Continental 40585-III, lower Continental 40452)	4 lbs. (-26)	-----
106.	Carburetor air filter	X	X
107.	Carburetor air heater	-----	1 lb. (-19)
108.	Oil radiator (Harrison 3875) Required when item 4 or 6 is installed.	-----	4 lbs. (-13)
109.	Starter - Delco-Remy A-40098	-----	15 lbs. (- 7)
110.	Engine-drive fuel pump (AC1523066)	2 lbs. (-26)	2 lbs. (-33)
111.	(a) Wobble pump (Air Corps. Type D-2)	3 lbs. (+34)	3 lbs. (+34)
	(b) Wobble pump (Aero Supply No. 54609)	1 lb. (+34)	1 lb. (+34)
112.	9-gallon auxiliary fuel tank installation GC-1B eligible for this installation in the baggage compartment in accordance with Texas Engineering & Manufacturing Company Drawing No. 11-420-5016, Rev A.	-----	14 lbs. (+61)
113.	Fuel tank venting system (TEMCO Drawing No. 11-420-5060). GC-1A (except serial nos. 2 thru 128) and GC-1B below serial no. 3501 eligible for this item in accordance with TEMCO Customer Service Maintenance Bulletin No. 25 dated December 10, 1947. GC-1A, Serial Nos. 2 through 128 eligible for this item in accordance with TEMCO Customer Service Maintenance Bulletin No. 25 Supplement No. 1 dated June 18, 1948.		
114.	Fram oil-filter (CAA Approved Fram Installation Sheet No. 62604 and 62605)	5 lbs. (- 3)	5 lbs. (- 3)
115.	"CODA" exhaust silencers	-----	3 lbs. (-22)
116.	Davis Model W-125 exhaust silencer installed in accordance with Davis Installation Dwg. No. W-125-C and Davis Photograph No. P-125-1 (with Item 401 only)	-----	+8 lbs. (-18)
117.	Hanlon-Wilson Model 193 muffler-heater exhaust system per TEMCO Dwg. No. 11-440-5046 "C".	-----	+6 lbs. (-25)

Landing Gear and Floats			
201.	6.00-6 wheels and brakes (Goodyear L6H/MBL or LF6H/MDB) with 6.00-6 tires	31 lbs. (+24)	31 lbs. (+24)
		GC-1A	GC-1B
202.	Tail wheel assemblies		
	(a) Scott 6x2.00	4 lbs. (+179)	4 lbs. (+179)
	(b) 6x2.00, steerable, installed in accordance with Firestone Dwg. DFA-277. (Item 203 required).	4 lbs. (+179)	4 lbs. (+179)
	(c) 6x2.00, steerable, installed in accordance with TEMCO Dwg. 11-350-5002. (Item 203 required.)	5 lbs. (+179)	5 lbs. (+179)
	(d) 6x2.00, steerable, TEMCO Assy. No. 11-350-5120. (Item 203 required)	5 lbs. (+179)	5 lbs. (+179)
	(e) Scott 3250, steerable, installed in accordance with TEMCO Dwg. 11-351-3630, C change. (Item 203 required)	7 lbs. (+179)	7 lbs. (+179)
203.	Tail wheel steering mechanism	2 lbs. (+170)	2 lbs. (+170)
204.	Copilot brake pedal installation.	5 lbs. (+9)	5 lbs. (+9)
Electrical and Radio Equipment			
301.	(a) Reading R-24 battery and battery box - 12-volt, 23 amp. hr., 5 hr. rate	26 lbs. (-4)	24 lbs. (-4)
	(b) Willard AW-12-25 manifold vent-battery 12-volt, 25 amp. hr., 5 hr. rate	24 lbs. (-4)	24 lbs. (-4)
	(c) Concorde RG-35A battery12-volt, 29 amp. hr., 5 hr. rate	29.5 lbs. (-4)	29.5 lbs. (-4)
302.	Engine-driven generator (Delco Remy 1101876)	10 lbs. (-8)	10 lbs. (-7)
303.	Hydraulic system energizer (Adel model N-15668)	6 lbs. (-3)	6 lbs. (-3)
304.	Two-way radio (General Electric AS-1B)	12 lbs. (+16)	12 lbs. (+16)
305.	Deleted (equipment same as Item 302)		
306.	(a) Dual fixed landing lights per TEMCO Dwg. No. 11-552-R3718, change "B"	5 lbs. (+21)	5 lbs. (+21)
	(b) "CODA" landing lights (Gordon Beach Aircraft Service, Installation Dwg. No. S-125-1102)	2.5 lbs. (+35)	2.5 lbs. (+35)
307.	Safe flight stall warning indicator per TEMCO Dwg. No. 11-600-5101, change "B".	1 lb. (+19)	1 lb. (+19)
Interior Equipment			
401.	Draft seal bulkhead, TEMCO part 11-210-5014	No wt. change	No wt. change
Miscellaneous (not listed above)			
601.	(a) Cabin window installation TEMCO Dwg. 11-213-5096, Assembly Fuselage "New Look" Kit-without turnover ring.	+4 lbs. (+73)	+4 lbs. (+73)
	(b) Cabin window and turnover structure installation TEMCO dwg. 11-213-5095 change "A" fuselage window and Ring Turnover Structure "New Look" kit.	+7.5 lbs. (+68)	+7.5 lbs. (+68)
*602.	Hydraulic systems modified in accordance with Ruleto, Ruleto Industries, Inc., 4823 Rosecrans Avenue, Hawthorne, CA, Drawing Nos. R-1004, R-1005, R1006 and installation instructions SHK-1.		Use actual weight change

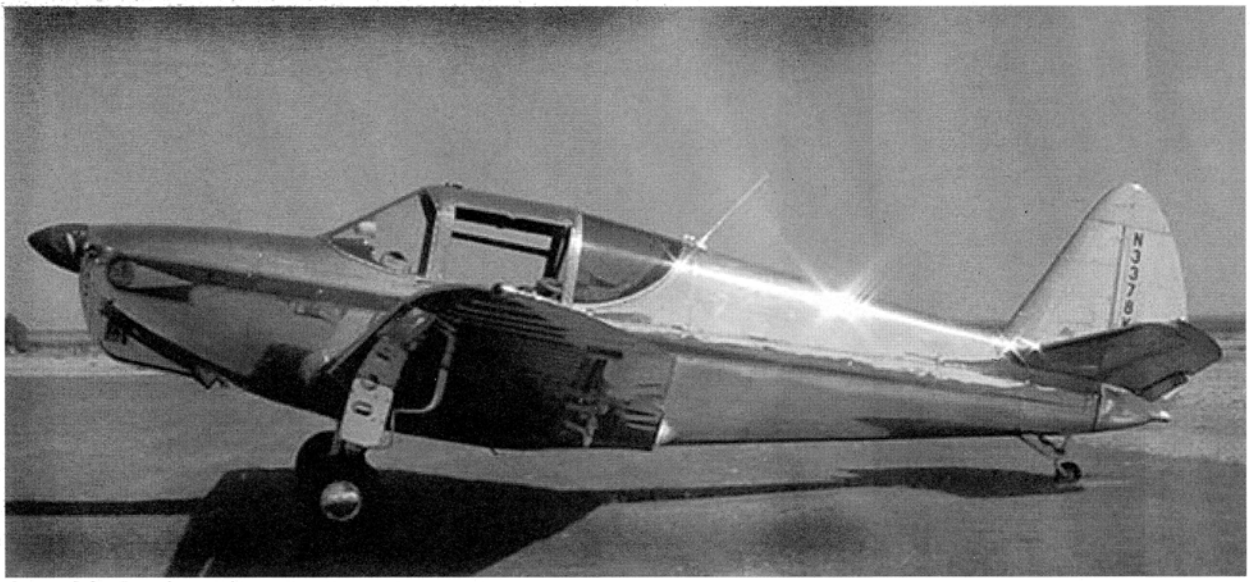
NOTE 1. Weight and balance report including list of equipment included in certificated weight empty, and loading instructions when necessary, must be in each aircraft at the time of original certification and at all times thereafter (except in the case of air carrier operators having an approved weight control system).

NOTE 2. Placard instrument panel:
(a) "INTENTIONAL SPINS PROHIBITED."
(b) "DO NOT LOWER LANDING GEAR ABOVE 100 MPH."

.....END....

Airframe

The fuselage of the Swift is of all-metal semi-monocoque construction consisting of the conventional longerons, bulkheads, frames, and stringers. The entire structure is covered with various thicknesses of Alclad aluminum skin which is riveted to the structure. Attachment of the wing and center section is accomplished by means of four (4) bolts and necessary rivets at fuselage stations +32 and +62.531 (zero reference is the firewall). The cabin enclosure on the stock airframe consists of a Plexiglas windshield, two side sliding Plexiglas panels, and two rear stationary sections behind the seats. The forward-hinging hatch adorns the top of the cockpit to allow entrance to the cabin area once the side windows are slid down. Some Swifts have the Nagle Canopy which is a sliding bubble canopy, while others have gull-wing doors fitted.



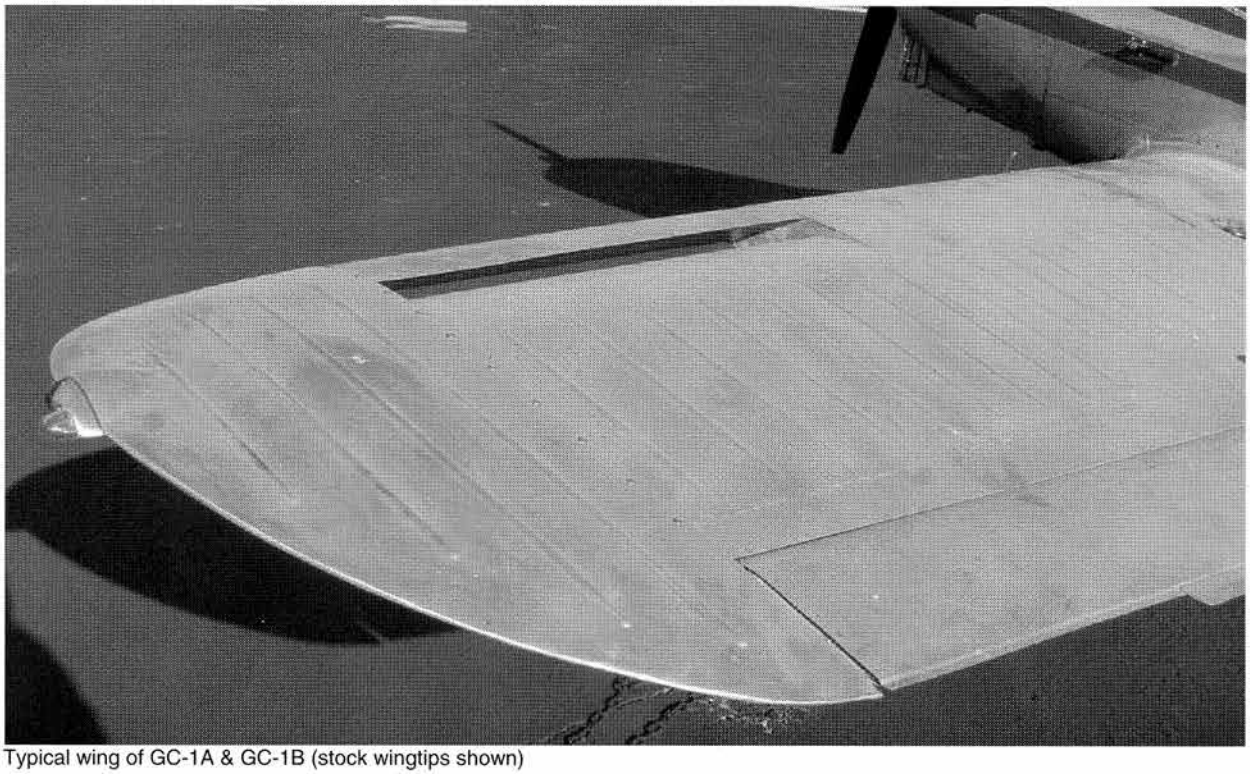
Stock GC-1B Airframe, N3378K shown

Wing

The wing is of all-metal construction employing stressed skin and a full cantilever design consisting of the following members—center section, two (2) outer wings, two (2) wingtips, and two (2) slots. Some Swifts are modified so that their wing slots have been covered over with aluminum skin. The all metal wing is of a conventional stressed skin, two spar design with the main spar at the 30% chord. The main spar carries all normal loads, while the rear spar is only effective in reacting against chord loads. The rear spar also provides means for attachment of the aileron and flap.

The center section is also constructed with two spars. This continuous main spar carries through the fuselage at station +36 and includes five formed metal ribs and two spars which attach to the fuselage at station +62.531. The landing gear support and retracting mechanisms are installed near the outboard ends of the center section on detachable transverse bulkheads. The center section structure is covered with Alclad aluminum skin which is stiffened in a spanwise direction by intercostals channel sections. A walkway is provided on each side of the cabin for entrance and exit to the cockpit area.

The construction of the outer wing is essentially the same as that for the center section, employing four main ribs with intercostals ribs installed along the leading edge for reinforcement. The structure is covered with Alclad skin which is stiffened by offset beads running chordwise between the front and rear spars.



Typical wing of GC-1A & GC-1B (stock wingtips shown)

Continental C-85

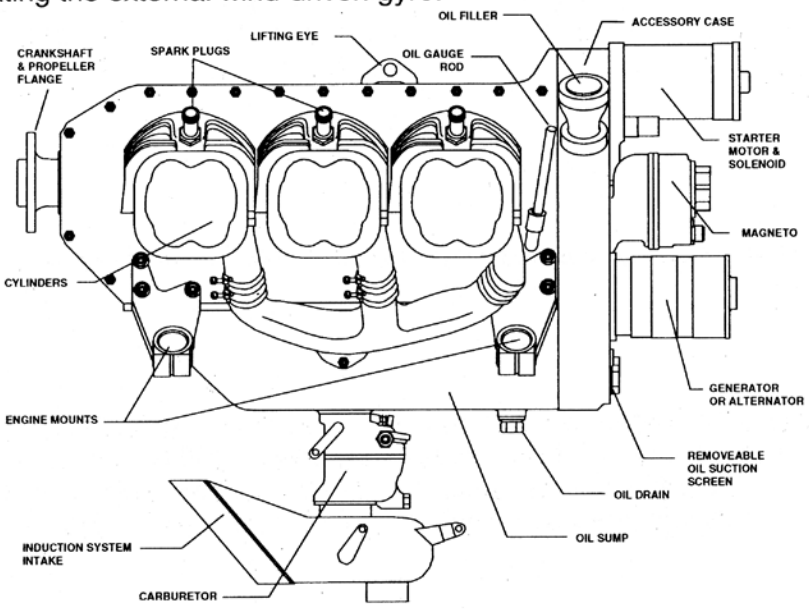
The Continental C-85 is a horizontally-opposed four-cylinder air-cooled carbureted engine rated at 85 horsepower (at 2575 rpm). As shown on the Type Certificate Data Sheet (TCDS), this was the original engine certified for the GC-1A Swifts. Many original GC-1A Swifts are still in existence. Some C-85's have been modified in the field to increase their top horsepower rating to 90.

Continental C-125

The Continental C-125 is a horizontally-opposed six-cylinder air-cooled carbureted engine rated at 125 horsepower (at 2550 rpm). As shown on the TCDS, this was the engine originally certified in the GC-1B Swifts.

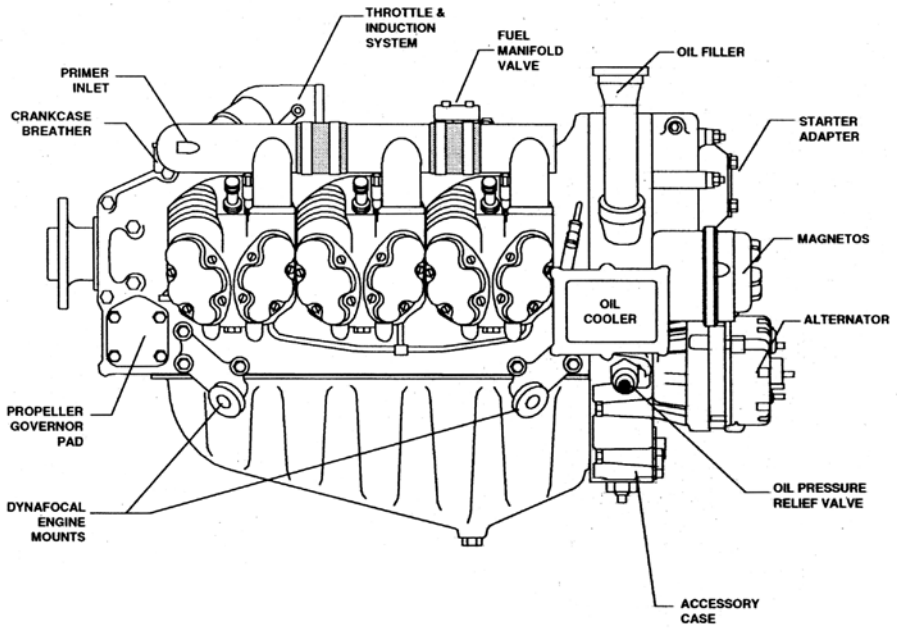
Continental C-145 / O-300 series

The Continental C-145 / O-300 series engine is physically similar to the C-125. Models of these engines put out 145 horsepower (at 2700 rpm) and are commonly installed in the model GC-1B. Some models (namely the O-300-D) have provisions for an engine-mounted vacuum pump, thereby eliminating the external wind-driven gyro.



Continental IO-360 series

The Continental IO-360 series engines are horizontally-opposed six-cylinder air-cooled fuel-injected engine rated at 210 horsepower (at 2800 rpm). This engine is the most popular choice among the super Swifts with higher horsepower.



Lycoming O-290

The Lycoming O-290 is a four-cylinder carbureted engine that, for the Swift, is derated to only give 125 horsepower.

Lycoming O-320

The Lycoming O-320 series engine is a four-cylinder carbureted engine that will put out a horsepower rating of 150 (with the 7:1 compression pistons) or 160 (with 8 ½:1 compression pistons) at 2700 rpm. Some fuel-injected versions, the IO-320, have been approved via the Field Approval process, though are less common than the carbureted O-320.

Lycoming O-360

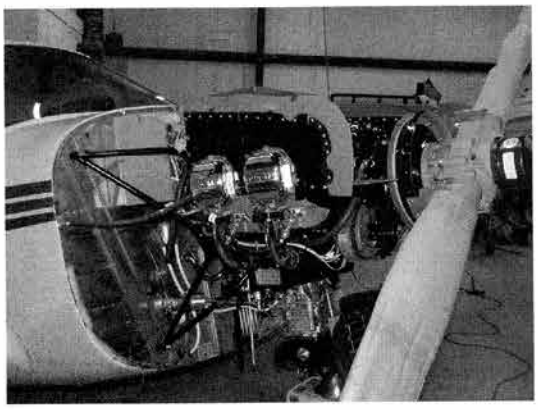
The Lycoming O-360 is one of the most popular upgrade engines used in the Swift. It is a four-cylinder carbureted engine rated at 180 horsepower (at 2700 rpm).

Lycoming IO-360

The Lycoming IO-360 is a four-cylinder fuel-injected engine that is rated at 200 horsepower (at 2700 rpm).

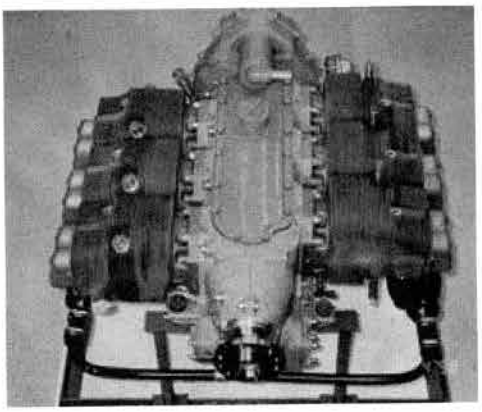
Franklin (PZL) 6A-350

The Franklin 6A-350 is a six-cylinder carbureted engine producing 220 horsepower at 2800 rpm. While not common in Swifts, there are a number of them in existence. The Franklin-powered Swifts are noted for their smoothness and performance with very low fuel consumption. Many Franklins have been plagued with high oil and cylinder-head temps.



(left): Typical Lycoming O-360 installation, the O-320 is similar.

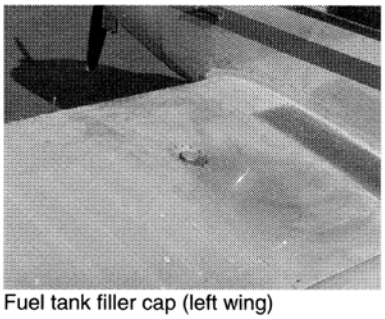
(right): Franklin 6A-350

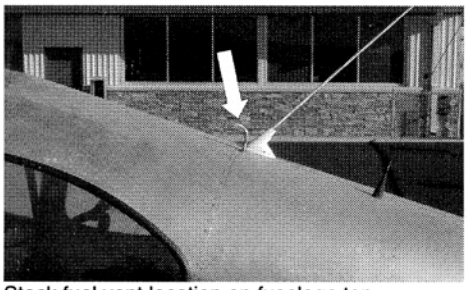


Main Fuel System

The stock fuel system consists of two interconnected 13.9 gallon metal tanks situated within the centersection of the airframe along with a fuel sump, fuel strainer, an engine-driven diaphragm-type fuel pump, an emergency hand pump (wobble pump), and shut-off valve. Most of the Swifts still in existence no longer have the hand-operated wobble pump, instead having the electrically operated fuel boost pump.

The two main fuel tanks are fabricated from aluminum and are connected to a common sump located beneath the floor of the fuselage. Filling of both tanks is accomplished through the filler neck on the left fuel tank.


Fuel tank filler cap (left wing)


Stock fuel vent location on fuselage top

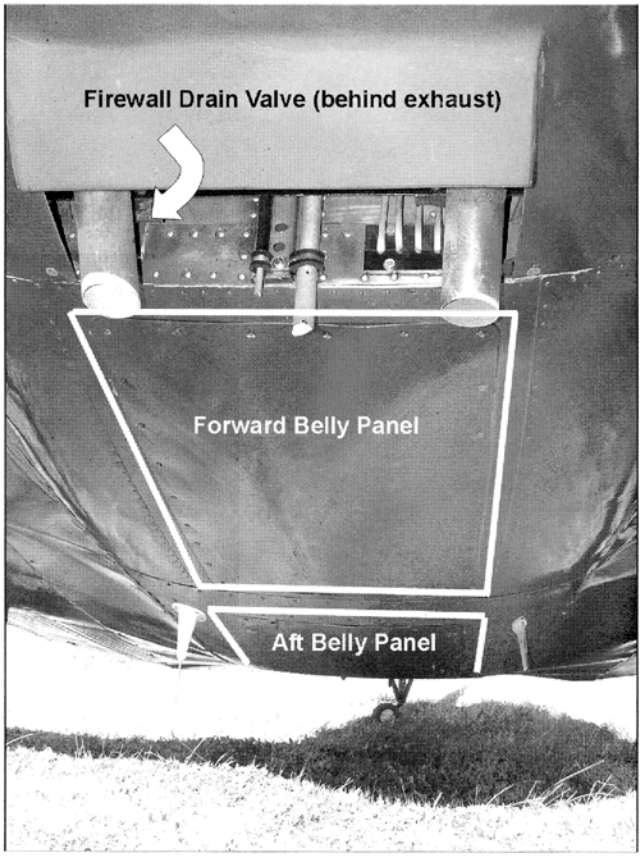
NOTICE: It is extremely important during the refueling of the Swift that the aircraft either be parked with the left wing uphill or with the left landing gear strut extended upwards to raise the left wing above the level of the right to ensure that the right wing gets completely full of fuel. When refueling, the rate of flow to the right tank is limited by the right tank vent line. Sufficient time must be allowed for venting to get the right tank completely full. If this is not accomplished, approximately 4 gallons of fuel will be missing from the "topped-off" Swift. Numerous accidents due to fuel exhaustion in Swifts have been attributed to this.

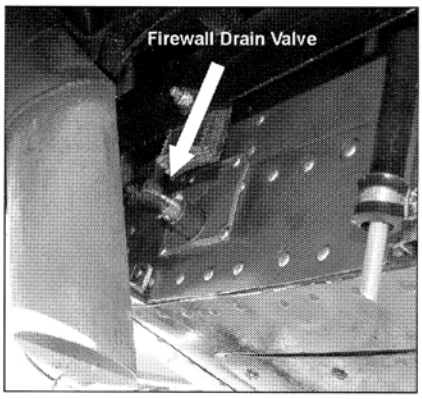
NOTICE: Ensure that the person fueling the Swift does not allow the fuel nozzle to lay over at an angle while inserted into the fuel tank. This causes undue stress on the neck of the fuel tank eventually causing cracks to form. Also, ensure that the fuel nozzle is not allowed to hit the bottom of the tank. To repair these means to remove the left wing!!

With the above mentioned considerations in mind, it is most common that the owner/pilot of the Swift fuels the aircraft himself/herself.

Depending on the modifications to your Swift, your fuel vent may be in one of several locations. For those aircraft with a stock canopy and hatch, the fuel vent will be located along the top of the fuselage aft of the cabin area. Those Swifts with the Nagle Bubble Canopy vent under the belly of the aircraft. In either case, if *Swift Service Information Letter #16* has not been complied with, inaccurate fuel level indications can be expected in flight. For more information on this subject, consult the *Swift Maintenance* and *Operations Manual ("Blue Book").*

It is important to note that when performing your preflight inspection, the only way to properly drain your fuel system is to remove the aft belly panel in order to have access to the rear sump drain valve. Some aircraft have a smaller access door on the aft belly panel so that removal of the panel is not required. On the firewall is a quarter-turn drain valve which drains the fuel strainer. Both the strainer (fwd) and sump (aft) should be checked for the presence of water before flight and after refueling. When the aircraft is sitting on the ground, the inside-aft portions of the main fuel tanks extend behind the level of the fuel sump. If water is suspected or if the aircraft has been subjected to long term outside storage, it is essential that the tail be raised in order for the water to move into the sump and not be trapped in the aft part of the fuel tank.





(left): Underside of GC-1B showing relationship of lower belly panels (both forward and aft).

(above): Close-up of firewall showing ¼ turn firewall sump drain valve.

Auxiliary Fuel Systems

An optional 9-gallon aux tank, offered by Temco, was available from the factory and resided in the baggage area aft of the seats. Operation of the Temco tank is performed by moving the fuel selector to the aux position. This tank is fueled from a separate fuel neck on the left side of the fuselage. Three precautions per the use of the Temco aux tank, as follows:

1. It has it's own fuel drain and must be checked in addition to the main sump and strainer.

2. In flight at high cruise speeds (low angle of attack), the fuel pick-up at the aft or back of the tank can fail to pick up all of the fuel. Lower airspeed and/or a climb can result in getting the last bit of fuel from the tank.

Auxiliary Fuel Systems (continued)

3. With fuel-injected Continental engine installations and the vapor return of excess fuel to the main tanks, the 9-gallon capacity will be exhausted quickly (usually by the time you expect to have used only 4 ½ gallons of the capacity).

NOTICE: With fuel-injected Continental engine installations, as a precaution to prevent fuel from overflowing out of the vent in flight, you should ensure that a sufficient amount of fuel has been burned from the main tanks prior to selecting the auxiliary fuel, as the vapor return will return some fuel to the main tanks. See text of detailed procedure, below.

Another auxiliary fuel system was STC'd for the Swift by Alturair in San Diego, CA. The Alturair Auxiliary tanks consist of two interconnected 4.5 gallon tanks located in the centersection of the aircraft. Often referred to as "belly tanks" or "kidney tanks," the Alturair tanks hold a total of 9 gallons and work in conjunction with the main tanks as a single tank. No switching is required for the Alturair tanks.

Merlyn Products of Spokane, WA holds the STC for wing tanks that provide an additional 26 gallons of fuel. The two tanks are installed in the outboard wing panels. The fuel selector valve in the cockpit will be marked with two additional positions-Left Aux and Right Aux. The usage of these tanks varies with the engine installed in the airframe. For the fuel-injected Continental IO-360's, the procedure is to burn from the main tanks until the fuel gauge reads approximately ½-full. Low boost is turned on and the fuel selector valve is turned to the chosen aux tank (then low boost is turned off). The engine draws more fuel out of the tank than is needed for normal operation and is returned to the main tank via an overflow line. In essence, this "refills" the main tank. If you do not first burn fuel out of the main tank before using the Merlyn aux tanks, you will dump fuel overboard in flight through the fuel vent. This procedure does not apply to the Lycoming IO-360s. Those with the Lycoming engine can burn from the aux tanks immediately after reaching safe altitude.

NOTICE: If your Swift has outboard wing auxiliary tanks installed, you should always perform your takeoff and landing with the fuel selector valve on the Main (or On) tank.

NOTICE: Aerobatics with fuel in the outboard wing auxiliary tanks is not recommended.

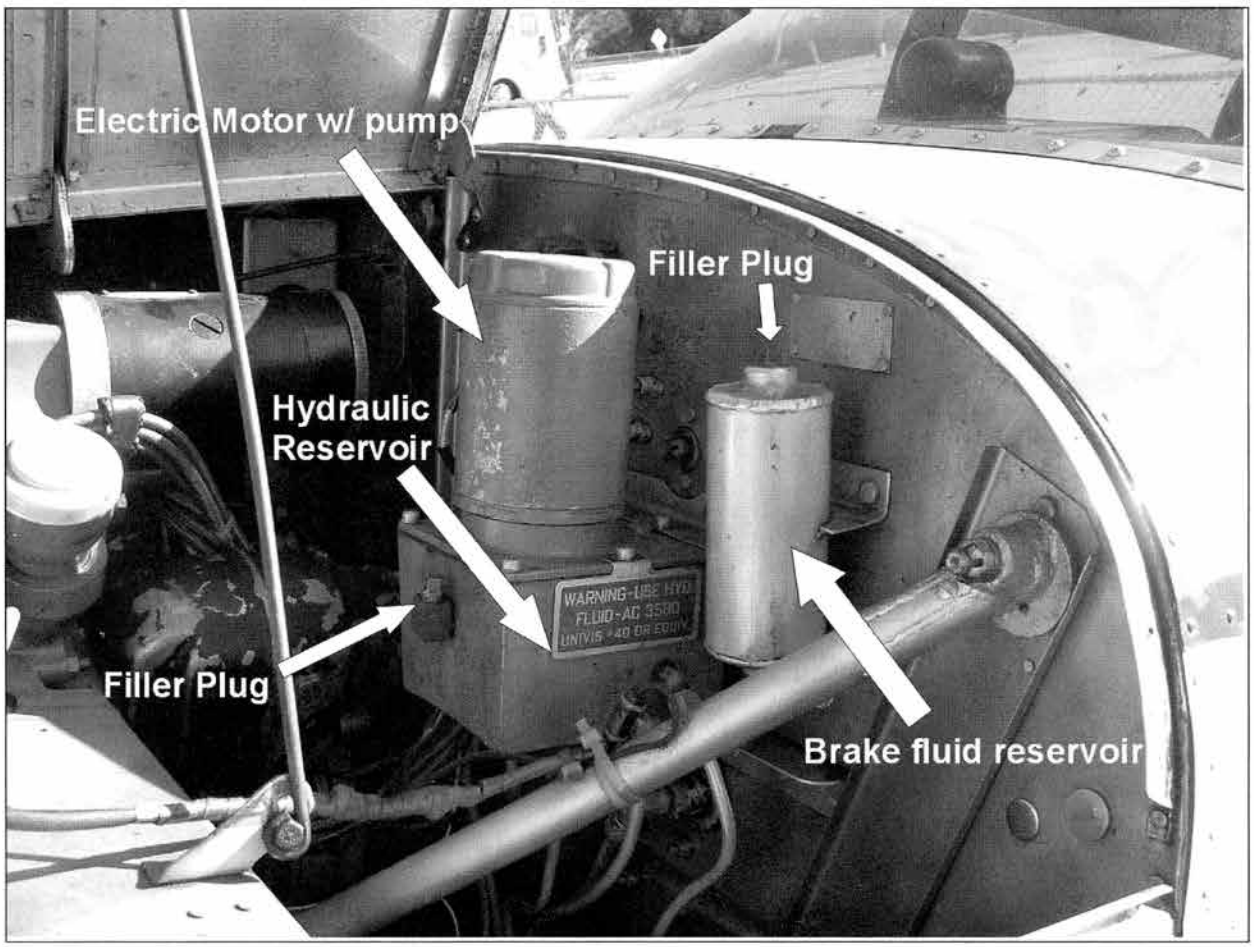
Auxiliary Fuel Pumps (wobble and electric)

When the Swift was first manufactured, it was equipped with a hand-operated wobble pump to serve as backup to the engine-driven fuel pump. It is installed forward and below the pilot's seat, easily accessible to the pilot in the event the engine-driven pump should fail in-flight. It may also be used to raise fuel pressure to the carburetor when starting the engine. It is recommended by the Swift Museum Foundation that the hand-operated pump be replaced with an electric pump (STC available from the Museum). Several Swifts have been lost due to fuel starvation after the engine-driven fuel pump failed. Generally, there is insufficient time to hand pump enough pressure to provide positive fuel flow through the fuel lines into the engine to continue running if at low altitude.

Auxiliary Fuel Pumps (wobble and electric) (continued)

Acceptable fuel pressures are in the range of 2.0 – 4.0 psi (3.0 – 4.0 psi is recommended). If you notice that your fuel pressure gauge is beginning to show around 2.0 psi, you should consider replacing your engine-driven fuel pump. Pressures above 4.0 psi can cause an excessively rich fuel mixture. With all of the engines <u>except</u> the Continental IO-360, it is standard practice to have the boost pump in the ON position for takeoff and landing. For Continental IO-360's, the high boost is used for initial priming and hot-starts (vapor purging). Low boost is commonly used when changing to auxiliary tanks. In the event of complete engine-driven fuel pump failures, the low boost is used continuously in such emergencies.

The Swift utilizes an electro-hydraulic system which operates the retraction of the landing gear and operation of the flaps. As equipped from the factory, the Swift had an Adel power package installed on the upper left corner of the firewall. Most aircraft have been upgraded to the Merlyn Products hydraulic motor or other similar systems. The power package consists of an electric motor, hydraulic pump, selector valves (i.e. – the gear and flap handles), and a hydraulic reservoir. Hydraulic lines are connected to ports on the power package and routed to the various hydraulic equipment located on the airplane.



Firewall photo showing location of hydraulic system

Landing Gear

With the larger engines installed in the Swifts, the higher climb speeds increase the air loads on the gear legs during retraction. This increased stress puts undue demand on the small Adel electric motor, often causing the hydraulic pump circuit breaker to pop. The Merlyn motor is designed to be operated at a higher psi to handle this additional demand. It is still recommended, though, that climb speeds be kept below 80 mph until retraction of the gear is complete (i.e.-hydraulic pump ON light is extinguished) regardless of the pump being used.

Landing Gear (continued)

The retraction system consists of a hydraulic cylinder with a geared piston, the idler gear and actuating arm. The operation of the landing gear system is dependent upon energy furnished by the electric hydraulic pump. The pump, when in operation, supplies hydraulic fluid under pressure to either the up or down lines as selected via the selector valve (gear handle) to the integral cylinder in the Adel retraction units where the hydraulic energy is utilized to actuate the landing gear. Hydraulic fluid that is displaced by the action of the piston in the retraction unit is returned to the integral reservoir mounted on the firewall beneath the hydraulic pump motor.

Flaps

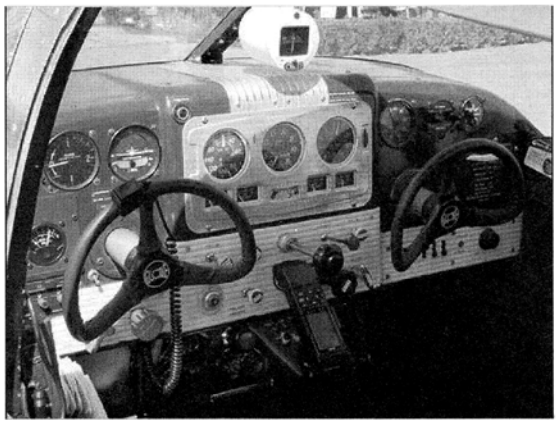
The wing flap hydraulic system consists of a hydraulic cylinder, located in the fuselage and the necessary plumbing and fittings to connect the cylinder to the right hand ports of the power unit. Operation of the hydraulic flaps is the same as the landing gear.

Wheel Brakes

The hydraulic brake system consists of two brake cylinders located beneath the instrument panel. Mechanical linkages connect the rudder pedals to the brake cylinders. Each cylinder furnishes fluid under pressure to the corresponding brake assembly on each wheel when the tops of the respective pedals are depressed. Most Swifts have been converted from the original Goodyear wheels/brakes to the more popular Cleveland wheels/brakes. They offer smoother and more reliable operation with the added benefit of readily available spare parts. The hydraulic reservoir is located on the firewall next to the main hydraulic reservoir.

The movable surfaces of the airplane consist of two ailerons, two elevators, two flaps, one rudder and elevator trim tab. These surfaces are controllable from the cockpit or cabin in the conventional manner by means of cable and pulley systems in conjunction with push-pull rods.

Cockpit showing control-stick conversion



Cockpit showing stock control yoke configuration

Ailerons

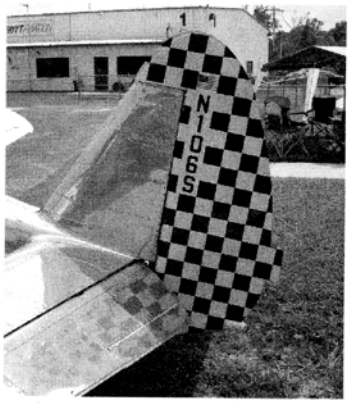
The aileron is an all aluminum alloy structure covered with Alclad skin. The stock aileron control system consists of a chain drive connecting two control columns and are attached to the necessary cables with are routed over pulleys through the fuselage and wing centersection to aileron bellcranks located in the wing. Stick conversions are available which eliminate the control wheels and their associated hardware. Control throws for the GC-1A are 19.5° up and 15° down (± 2°); throws for the GC-1B are 19.5° up and 16° down (± 2°).

Elevators

The two elevators are constructed of an all aluminum allow structure covered with Alclad skin. The control systems consists of cables attached to the control columns (or sticks) which pass through the fuselage to the elevator bellcrank located at the rear of the fuselage. Control throws for the GC-1A are 22° up and 20° down (± 1°); throws for the GC-1B are 24° up and 18 ½° down (± 1°).

Rudder

The rudder is of all aluminum alloy structure covered in Alclad and is attached to the vertical stabilizer at three hinge points. Rudder control is provided by dual sets of rudder pedals attached to a common torque tube. Rudder cables pass through the fuselage through pulleys to the rudder bellcrank. Control throws for the GC-1A & GC-1B are 26° left and 24° right (± 1°).



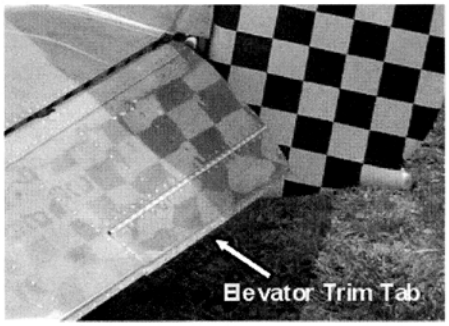
Flaps

The flaps are of all aluminum alloy structure covered in Alclad and attached to the wing at three hinge points. Fully extended, the flaps on the GC-1A will extend 39°. The flaps on the GC-1B are fully extended at 30°. In normal operation the flaps are either fully retracted or full down. Some Swifts are equipped with a "momentary" flap switch which allows the flaps to be placed in an intermediate position at the pilot's discretion. This is often helpful if operating on grass or dirt runways.

Elevator Trim Tab

There is one elevator trim tab mounted on the trailing edge of the left elevator half with a piano-style hinge. The trim tab is of all aluminum construction and operated from the cabin with a rotating hand crank. The stock installation is mounted overhead behind and between the seats. If your Swift has the Nagle bubble canopy installation, there is an electric elevator trim system installed since the overhead structure is removed in the bubble canopy installation.

In the GC-1A, the trim tab control throws are 23°up and 17°down. The GC-1B trim tab control throws are limited to 10° up and 22° down.

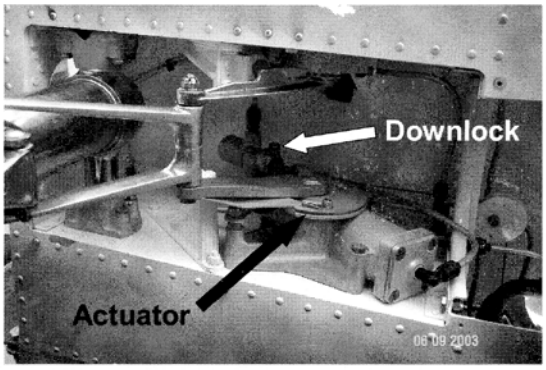


Aileron & Rudder Trim Tabs

There are trim tabs for both the ailerons and rudder. They are adjusted to a fixed position by the pilot and are not adjustable from the cockpit. These tabs are small sheet aluminum strips riveted to the trailing edges of their respective control surface.

Main Landing Gear-general

The airplane has a conventional landing gear consisting of the main retractable gear and a full swivel steerable non-retractable tailwheel. Retraction of the main gear is accomplished by means of hydraulic actuating cylinders connected by linkages to each of the landing gear struts. Limit switches are installed in the wheel wells to operate the landing gear position indicating lights on the instrument panel, and also to control the operation of the hydraulic motor. A mechanical down lock is installed in each wheel well and engages automatically when the gear is extended and releases automatically when the gear selector handle is placed in the up position. The main landing gear is of the single leg, half fork type, consisting of a spring-oil type strut (Adel Precision Products) or air-oil type strut (Engineering Laboratories Inc).



Main Landing Gear Annunciator Lights

The instrument panel mounted annunciator lights for the landing gear consist of a four light system in the stock airframe. A green, amber, red, and large red warning light. Some Swifts have been modified to include in addition to the large red warning and amber lights, to have two green, and two red lights (one for each gear).

The one large red gear warning light on the instrument panel, when activated (flashing) indicates that the landing gear is still retracted when the power is reduced to a predetermined setting, usually around 15-17" manifold pressure. The other red light is illuminated when the gear is no longer down and locked. The amber light is illuminated anytime the hydraulic motor is in operation (i.e.-flap or gear operation). A green gear light along with the amber or red light indicates one or both gear not down and locked.

NOTICE: A green gear light does not necessarily mean that the gear is down and locked. The only time it ensures that the gear is safely down and locked is when it is the only light(s) illuminated! The first gear to reach the down position turns on the green light, the remaining red light stays illuminated until the second gear is down and locked.

Main Gear Annunciator Lights (continued)

Some combinations of the lights can indicate various configurations of the gear, as follows:

GEAR DOWN	GEAR UP	GEAR IN-TRANSIT	ONE UP & ONE DOWN
RED-OFF	RED-ON	RED-ON	RED-ON
AMBER-OFF	AMBER-OFF	AMBER-ON	AMBER-OFF
GREEN-ON	GREEN-OFF	GREEN-OFF	GREEN-ON
RED FLASHER-OFF	RED FLASHER-ON (if low power)	RED FLASHER-OFF	RED FLASHER-OFF

Adel Precision Products

This unit consists of an upper and lower strut, torque knee, internal spring, and piston incorporating two O-rings and one leather ring type packing. The internal spring in the cylinder assures that the piston is fully extended upon contact with the ground as well as when the gear is retracted into the wheel well. The hydraulic fluid in the lower portion of the cylinder acts as a shock absorber and dampener. As the piston travels, it forces the fluid out of the lower strut through an orifice into the upper strut. When the shock strut is in the extended position the fluid which was originally displaced flows back into the lower portion of the strut and is available for the next landing.

Engineering Laboratories Inc (ELI)

The ELI gear consists of an upper and lower strut, torque knee, internal piston incorporating a restricting orifice and a single O-ring type packing. This air-oil type shock strut is fully extended upon contact with the ground as well as when the gear is retracted into the wheel well by air pressure acting upon the piston. The hydraulic fluid in the lower portion of the cylinder acts as a shock absorber and dampener. As the piston travels, it forces the fluid out of the lower strut through a restricting orifice into the upper strut.

Tailwheel and Tailwheel Strut

The Swift has several tailwheels approved, as shown in the Type Certificate Data Sheets (pages 5-9). There are both steerable and non-steerable models for the Swift.

The Swift has a hydraulic strut for ride cushioning. The strut should be periodically examined for leaking of hydraulic fluid.

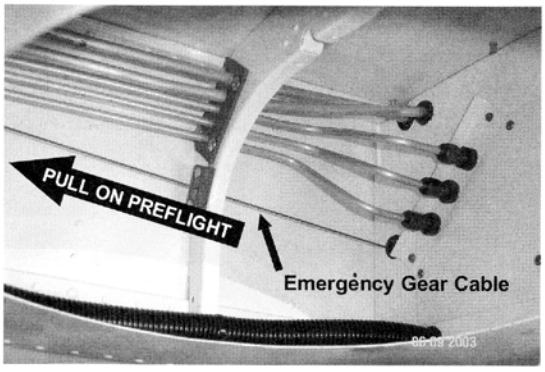
Emergency Gear Extension System

The Swift is equipped with a manual operated landing gear extending system for use in the event of a hydraulic system failure. This system consists of a screw-type (jackscrew) actuator, pull down cable, and necessary pulleys for its operation. The jackscrew is used to contract the 1/16" diameter pull down cable. This cable is secured to pulleys that are attached to the gear actuators and is routed along the front of the center section main spar and over an idler pulley on

Emergency Gear Extension System (continued)

the emergency actuator. This idler pulley is mounted on a bracket that is actuated by a flexible hand crank located between the seats. Clockwise rotation of this crank raises the idler bracket on the actuator assembly (jackscrew) thereby contracting the pull cable. The ends of this cable being attached to the hydraulic gear actuators cause them to rotate thus extending the landing gear without the aid of hydraulic pressure. Typically, it requires approximately 45-55 turns clockwise to extend the gear. The gear selector handle must be selected to the "Gear Down" position before exercising the manual gear extension system.

NOTICE: As part of your preflight procedure, you should pull the emergency pull-down cable outboard to ensure that the internal spring returns the cable tight. Additionally, you should ensure that the cable is properly routed on all of the pulleys and hasn't slipped.



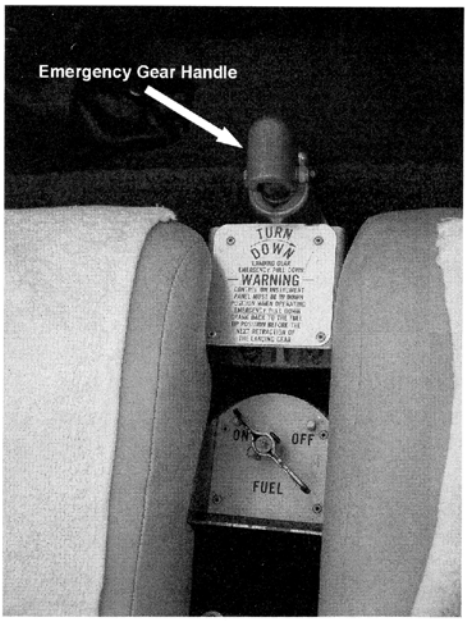


Photo (above): View inside of right wheel well. Be sure to check the tension of the emergency gear extension cable in each wheel well during preflight. You should be able to pull it outwards (toward respective wingtip) a couple of inches and the internal spring return it to its original position, while remaining on its pulleys.

Photo (right): View inside cockpit between seats at Emergency Gear Extension Handle (handle shown in stowed position).

NOTICE: When extending the landing gear via the emergency extension system, it is important to note the number of turns of the handle to understand "IF" a tightening of the crank is indicating the end of the cycle. EXAMPLE, when cranking the gear down, the initial start will be tight as the first gear falls out of the well. It will again become tight as the second gear comes out of the wheel well and finally when you reach the end of the cycle.

NOTICE: After extending the landing gear with the emergency gear extension system, it is critical that the crank be rewound (counter-clockwise) prior to the next flight. Significant damage to the centersection will result if the gear is retracted when the cable has not been rewound. It is very important that "AS" the crank reaches the "UP" end of the cycle, the crank not be forced to the stop or its end. The crank must be allowed to drop into its resting slot the last time it passes freely. Forcing it even ¼ of a turn too much can cause the internal tension spring to bind and not keep tension on the cable and allow it to become entangled and unavailable for use when needed. For more information, refer to the *Swift Maintenance & Operations Manual (Blue Book).*

Emergency Gear Extension System (continued)

The flap handle can also be used to lower the landing gear. This is only possible if you have determined that the cause of the normal gear extension failure is due to the hydraulic pump not turning on when the gear handle is placed in the down position. This is possible since the flaps and gear use the same hydraulic pump motor. As long as the gear handle is in the down position (remember, the gear and flap handles are simply hydraulic selector valves), the actuation of the flaps turns on the hydraulic pump and creates hydraulic pressure against any open port, thus causing the gear to continue to extend. It may take several flap extension and retraction cycles to move enough fluid to extend the gear since the hydraulic pump is turned off when the flaps reach the full-flap position.

The procedure is as follows:

(a) Place the landing gear handle in the down position
(b) Cycle the flaps up and down until you get one (or two) green light(s) and no red light

If the flap-method does not work, you should use the normal emergency gear extension procedure, as shown below:

(a) Place landing gear selector handle in the DOWN position.
(b) Turn OFF the Landing Gear switch/circuit breaker (NOTE: this will remove power to the hyd pump and also turn off the Landing Gear Annunciator Lights).
© If possible, pull the Hydraulic Pump circuit breaker, some of the older push-pull types are difficult to pull.
(d) Place the emergency pull-down handle in the horizontal position and crank in the clockwise direction approximately 45-55 turns until the handle begins to reach its limits. (read aforementioned cautions on cranking the handle, above)
(e) Turn ON the Landing Gear switch/circuit breaker to ensure that only green gear lights are on indicating that the gear is safely down and locked.
(f) As a last resort, if the gear lights still indicate one or more gear not down and locked, manually rip up the upholstery between the pilot's seat and the cabin floor. By hand, with a glove or cloth, grasp the emergency pull-down cable and give a healthy yank "up" toward yourself to hopefully pull the gear against the stop and turn on the desired "gear down and locked" indication.
(g) Turn OFF the Landing Gear switch/circuit breaker after determining that the gear is down. (NOTE: this eliminates the possibility of power being restored to the gear if the malfunction was intermittent. Additionally, it shows consistency in the cockpit of the landing gear system condition and switch position.)

The Swift pilot must be aware of the center-of-gravity (CG) limitations appropriate for the aircraft they are operating. Many STCs for Swifts affect the CG range of the aircraft. It is recommended that you, as the operator, check the latest Weight & Balance report to determine your ability to load the aircraft. The following are some of the limitations placed on Swifts. It is the pilot's responsibility to check the paperwork for the Swift you are operating to determine any limitations on gross weights and center-of-gravity limitations. For those aircraft with multiple STCs, you should apply the most restrictive of the CG locations for your planning. You should perform several sample W&B scenarios to determine your ability to load the airplane.

	Weight (lbs.) x	*Arm (inches)* [4]	*= Moment (in.-lbs)*
Basic Empty Weight [1] (includes oil & unusable fuel)			
Pilot		+42.5	
Passenger		+42.5	
Fuel-Main Tanks [2,6]		+47.0	
Fuel-Aux Tanks [2,3]			
Baggage		+60.5	
Total Weight			

The following are some of the CG limitations for the Swift:

Stock GC-1A airframe	+31.4" to +35.5" with the gear extended [5]
Stock GC-1B airframe	+29.6" to +34.7" with the gear extended [5]
GC-1B's with 1835# Gross Weight Increase	+29.6" to +33.5"
GC-1B's with 1970# Gross Weight Increase	+29.6" to +33.0"
GC-1B's with modified Bonanza (stub) tips	+29.6" to +33.0"
GC-1B's with any of the following engines:	
Lycoming IO-360 (200 hp)	
Continental IO-360 (210 hp)	
Franklin (PZL) 6A-350 (220 hp)	+29.6" to +33.0"

1. Refer to your latest Weight & Balance information contained in your Airframe logs for your Basic Empty Weight, CG, & Moment.
2. Remember, 100LL Avgas weighs 6 pounds per gallon.
3. Use the Arm appropriate to the auxiliary fuel tank installed in your Swift, as follows:
   - Merlin Auxiliary Wing Tanks — 26 gallons (156 pounds) maximum with an arm of +47.0
   - Temco 9-gallon Baggage Tank — 9 gallons (54 pounds) maximum with an arm of +61.0
   - Alturair 9-gallon Belly Tanks — 9 gallons (54 pounds) maximum with an arm of +47.0
4. Arm is referenced in Inches aft of Datum (the firewall).
5. Moment change of landing gear retraction is +157 in.-pounds.
6. For conservative fuel planning, it is recommended to assume "full tanks" contain 26 gallons (instead of 27.8, as shown on the TCDS).

Pre-Takeoff

☐ 1. Review location and function of all cockpit switches and controls.

NOTICE: Ensure that the pilot locates the landing gear and flap controls and understands how they work!

☐ 2. Put the pilot on the right side of the aircraft (assuming no brakes).
☐ 3. Start the engine, using the checklist with the CFI assisting with brakes, as necessary.
☐ 4. Taxi the aircraft on a taxiway until the pilot has a feel of the rudder action on the ground and can coordinate power and rudder to turn the aircraft.

WARNING! Monitor cylinder-head (CHTs) and oil temperatures to prevent overheating.

☐ 5. The pilot should show emphasis on proper placement of the flight controls to compensate for various wind conditions. Taxiing slowly with winds is an excellent way to develop a feel for the aircraft and brakes.

☐ 6. Conduct aborted takeoff runs on the runway. Attain sufficient speed to raise the tail then reduce power (slowly) and let the tail settle back to the runway. Repeat until the CFI is satisfied that the pilot can properly coordinate power, elevator, and rudder.

WARNING! Monitor cylinder-head (CHTs) and oil temperatures to prevent overheating.

In-Flight Maneuvering

☐ 1. Pilot is on the right side of the aircraft (Assume no brakes on right)
☐ 2. CFI ensures that the pilot is using the checklist
☐ 3. Complete normal TO and climb out of airport traffic pattern
☐ 4. Have the pilot either retract the landing gear or call out the action to the CFI to accomplish (speed no more than 80mph until gear is retracted)
☐ 5. Climb to a safe altitude and safe area for aircraft maneuvering
☐ 6. The CFI should complete the *Swift Stall & Approach Speed Chart* (see p.30)
☐ 7. Instruct the pilot in coordination, normal and steep turns and have he/she practice the maneuver
☐ 7. Introduce the pilot to stalls both power off and power on and have he/she practice the maneuver
☐ 8. Introduce the pilot to full flap/gear down stalls both power off and partial power and have he/she practice the maneuver
☐ 9. Introduce the pilot to flight at minimum controllable airspeed (MCA) gear and flaps down and have he/she practice the maneuver
☐ 10. Demonstrate the effect of retracting flaps while at MCA and have the pilot practice the maneuver.

CAUTION! Retracting the flaps causes a strong pitch-up and can stall the aircraft if done at low indicated airspeeds.

☐ 11. Demonstrate the effect of pitch changes without power changes both gear/flaps up and down.

☐ 12. Demonstrate pitch and power coordination to control glidepath both gear/flaps up and down and have the pilot practice the maneuver.

Landing

☐ 1. Have the pilot return to the airfield and practice approaches emphasizing pitch/power coordination to control glidepath (initiate a go-around at a safe altitude on final) until the CFI is satisfied with the pilot's approach procedure.

CAUTION! Low indicated airspeeds and improper use of power on final can result in high rates of descent.

☐ 2. The CFI demonstrates a wheel landing for the pilot while the pilot follows through on the controls.

CAUTION! Three-point landings should not be attempted by the beginning Swift pilot. Swifts do not three-point well, especially when operating at or near a forward C.G.

☐ 3. The CFI has the pilot practice wheel landings to a full-stop with the CFI providing braking assistance as necessary until satisfied the pilot has mastered both glidepath control and directional control.

CFI and pilot switch seats

Flight

☐ 1. The CFI switches places with the pilot (on the ground with the engine off).

☐ 2. CFI monitors the pilot as he/she starts the plane using the checklist.

☐ 3. Taxi the aircraft on a taxiway until the pilot has a feel of the rudder action and brakes on the ground and can coordinate power, rudder, and brakes to maneuver the aircraft.

WARNING! Full up elevator will not hold the tail down with full power and brakes on – monitor engine temperatures.

☐ 4. Do not proceed until the CFI determines the pilot has mastered the use of the brakes, rudder, and power while taxiing.

☐ 5. Conduct aborted takeoff runs on the runway. Attain sufficient airspeed to raise the tail then reduce power (slowly) and let the tail settle back to the runway. Repeat until the CFI is satisfied that the pilot can coordinate power, elevator, rudder, and brakes.

☐ 6. Complete a normal takeoff and climb out of the traffic pattern.

☐ 7. Ensure the pilot retracts the gear at the appropriate time.

☐ 8. Climb to a safe altitude and safe area for aircraft maneuvering.

☐ 9. Have the pilot accomplish turns, steep turns, and power-on and power-off stalls (flaps/gear both up and down) both as a review and to see the maneuvers from the left side. Repeat each maneuver until the CFI is satisfied that the pilot can perform the maneuvers to the appropriate PTS.

☐ 10. Return to the airfield and have the pilot practice approaches and go-arounds until the CFI is satisfied that the pilot has mastered pitch/power coordination to control the glidepath. The CFI monitors that the pilot lowers the landing gear and the flaps at the appropriate time during the approach. The CFI also monitors that the pilot correctly retracts the gear and flaps (gear first, then flaps) during the go-around.

☐ 11. The CFI talks the pilot through the first wheel landing. Takeoffs and landings (to a full-stop) are accomplished until the CFI is satisfied that the pilot has mastered takeoffs and landings in both calm and crosswind conditions.

Emergency Procedures

☐ 1. The pilot departs the airport and proceeds to a safe area for maneuvering.

☐ 2. The CFI demonstrates the glide characteristics of the Swift at best glide speed and configuration, as follows:

a) flaps up
b) gear up
c) 80-90 mph (varies with weight of aircraft)
d) prop control (if equipped) to Full Low RPM

☐ 3. The CFI recovers the aircraft and has the pilot perform several in-flight power losses (from a safe altitude) until satisfied the pilot can safely select a suitable emergency landing site and properly configure the aircraft for the descent.

☐ 4. With the pilot maintaining best glide speed, the CFI has the pilot extend the gear and flaps to demonstrate the increase in descent rate. The CFI uses this demonstration to demonstrate the drag effects of both the gear and flaps and how to effectively determine whether or not to extend them in an actual emergency to extend or shorten the glide.

☐ 5. The CFI talks the pilot through an emergency gear extension procedure – first, by using the flaps to lower the gear; and second, via the emergency gear handle located between the seats.

WARNING! After an emergency extension, it is imperative that the emergency gear cable be rewound prior to subsequent retraction of the landing gear to prevent damage to the center-section.

☐ 6. The pilot then demonstrates proper use of the emergency gear extension procedure and discusses what the various combinations of landing gear and hydraulic pump annunciator lights mean.

Logbook Endorsement

☐ 1. The pilot's logbook is endorsed for high-performance/complex/tailwheel if not already endorsed.

☐ 2. The pilot is also a Certificate of Completion for the Letter of Authorization in Swift, per the agreement with the insurance carriers.

Swift Stall & Approach Speed Chart

Due to differences in pitot tubes, static sources, and their respective locations most Swifts are not consistent among each other with respect to indicated airspeed vs. true airspeed. Therefore, it is recommended that the CFI initially perform a series of stall tests with the training aircraft to properly determine these indicated speeds. For most general aviation aircraft, an approach speed of $1.3V_s$ is sufficient; however, for G.A. aircraft with short wings (Swift, RV's, etc.) it is recommended to use an approach speed of $1.4V_s$. For most Swifts, this works out to 60-80mph but check your particular aircraft to be sure. The lighter-weight Swifts (i.e.-stock) are closer to the 60mph side, while the heavier Swifts (super custom 210 hp, etc) are closer to 80mph for final approach speed. Perform stall tests at least twice per configuration to determine that the speeds recorded are accurate. The most meaningful configuration will be the stall performed in the landing configuration with a power setting that will simulate the final approach power setting (1700-1900 rpm, or so). This will be the stall speed that we will multiply by 1.4 to determine the best approach speed under normal conditions. Typically, this will be performed with the trainee on board, so you will most likely be near gross weight and any subsequent solo flights will be at a lower weight and your calculated approach speed will be conservative.

Example (N3760K):

POWER	*GEAR*	*FLAPS*	*V_s*	
IDLE	DOWN	DOWN	55 mph	
IDLE	UP	UP	60 mph	
13"mp/1600 rpm	DOWN	DOWN	53 mph	⇦ Approach Configuration
25"mp/2500 rpm	UP	UP	55 mph	
25"mp/2500 rpm	DOWN	DOWN	47 mph	

Therefore, using the approach configuration stall speed of 53 mph, the appropriate final approach speed would be 74 mph (53 x 1.4 = 74).

Your aircraft:

POWER	*GEAR*	*FLAPS*	*V_s*	*FINAL APPROACH SPEED*
IDLE	DOWN	DOWN	_____	
IDLE	UP	UP	_____	
13"mp/16-1700 rpm	DOWN	DOWN	_____	x 1.4=_____
25"mp/2500 rpm	UP	UP	_____	
25"mp/2500 rpm	DOWN	DOWN	_____	

I acknowledge that the training for the Swift checkout and LOAIS was performed in accordance with the curriculum as set forth above.

Student _____ Date _____

Certified Flight Instructor _____ Date _____

Mailing Information:

Student Name	Instructor Name
Student's Address	Instructor's Address
Student's City, State, Zip	Instructor's City, State, Zip
Student's Phone # (optional)	Instructor's Phone # (optional)

COMMENTS (optional): _____

In order to process the Letter Of Authorization In Swift, a copy of this signed page shall be mailed, faxed, or emailed to:

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