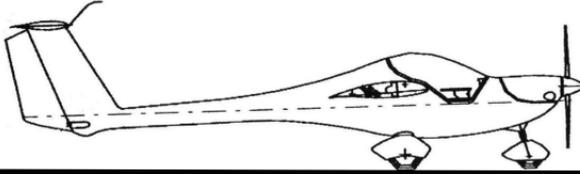


SunDancer

AIRCRAFT FLIGHT TRAINING SUPPLEMENT

VERSION 10/01/2018





**AIRCRAFT FLIGHT TRAINING SUPPLEMENT
FOR SUNDANCER 148/13 DF**

VERSION 10/01/2018

In the Event of an Aircraft Accident or Incident

1. Get a safe distance away from the aircraft as soon as possible.
2. Assess medical needs. Call 911 if needed.
3. Call insurance agent. Report time, date, location and other important details of the accident.*
4. Contact the FAA or NTSB (phone: 1-844-373-9922)
5. Take pictures of the aircraft and site from every angle.
6. Protect the aircraft before it is moved and after it is relocated.

My insurance carrier is: _____

Phone number: _____

Agent: _____

Policy number: _____

A copy of insurance information is in my aircraft logbook.

Notes: _____

Owner name, address, phone:

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1.0 GROUND CHECK AND PREFLIGHT INSPECTIONS

1.1 Ground Check - Pre-inspection

Free the controls, lower the flaps, extend spoilers, turn on position lights, If the glider is tail wheeled, prop up the rear so the tail wheel is slightly off the ground to prevent damage to rudder cables.

- Unlock and raise canopy (Do not push on the vent window frame).

1. Wing

- Wing surface condition.
- Leading edge condition.
- Collect a sample of fuel to check for water contamination.
- Check main landing gear tire for condition and inflation (28 psi)
- Check security of landing gear wheel fairing.

2. Wing Tip (Right Wing)

- Wing tip surface condition.
- Wing tip spar is fully inserted and securely attached.
- Position light is secure and functioning properly.

3. Ailerons and Airbrakes (Right Wing)

- Surface condition clean and free of structural damage
- Attachment secure and pinned. Perform positive control check.

4. Fuselage - Rear

- Surface is clean and free of structural damage.
- Check rescue system cover for integrity and proper sealing.

5. Vertical Tail Unit (Right Side)

- Surface is clean and free of structural damage.
- Pitot tube cover removed. and tubes free of obstruction.
- Position light is secure and functioning properly.

6. Horizontal Tail

- Surface clean and free of structural damage.
- Elevator has free movement to stops, free of structural damage .
- Elevator is correctly seated into the automatic connecting cup.
- Check that the main spar bolt is tightened and safety pinned.

7. Vertical Tail Unit (Left Side)

- Surface is clean and free of structural damage.
- Battery box is properly seated and the cover is secure.

8. Fuselage Rear

- Surface is clean and free of structural damage.
- Check tail wheel attachment and inflation (20 psi)

9. Aileron and Airbrake (Left Wing)

- Surface condition is clean and free of structural damage.
- Attachment is secure and pinned. Perform positive control check.

10. Wing Tip (Left Wing)

- Surface is clean and free of free of structural damage.
- Wing tip spar is fully inserted and securely attached.
- Position light is secure and functioning properly.

11. Wing

- Surface is clean and free of structural damage.
- Leading edge surface is clean and free of structural damage.
- Collect a sample of fuel to check for water contamination.
- Check main landing gear tire for condition and inflation (28 psi)
- Check security of landing gear wheel fairing.

12. Cockpit Safety Check

- Verify that both magnetos and the starter switch are OFF.

13. Engine (Remove Upper Cowling)

- Engine cowling is clean and free of structural damage.
- Rubber engine mounts are soft and free of cracks.
- Engine attachment points are properly attached and secured.
- Check oil quantity after "burping" the engine (see #14).
- Check quantity of cooling fluid.
- Visually inspect the condition of fuel and electrical components.
- The gascolator is clean and without visible water in the fuel.

14. Propeller

DO NOT TOUCH OR HANDLE THE PROPELLER UNLESS YOU HAVE VISUALLY AND PHYSICALLY CONFIRMED THAT THE MAGNETOS AND IGNITION SWITCHES ARE OFF.

Death or serious injury will occur if magnetos or ignition are in the ON position. If the engine has been out of operation for a long time avoid excessive pressure on blade tips and trailing edges.

- Blades, hub and spinner are clean and free of structural damage.
- Propeller is free of fore and aft movement.
- Propeller rotates freely in the direction of rotation.
- Rotate propeller in the direction of rotation to "burp" the engine.
- Check oil quantity after "burping" the engine.
- Oil cooler and radiator are clean and free of obstruction.
- Landing light is secure and functioning properly.
- Replace engine cowling
- Remove engine inlet caps (if present).

15. Cockpit

- Check the condition and security of the canopy.
- Check that the control stick moves freely.
- Instruments - Check condition.
- Fuel Gauge - Check fuel quantity and compare it to fuel dipstick.
- Check that rescue system cables are properly attached.
- Secure loose items in the cockpit and baggage areas.
- Check that ailerons, flaps and airbrakes move correctly.
- Return flaps and airbrakes to neutral positions.
- Turn off position lights.
- Turn off master switch.

16. Final Safety Check

- Pitot covers have been removed.
- Static ports are uncovered.
- Cowl plugs have been removed
- Rescue system safety pin is properly installed.

2.0 PRE-FLIGHT CHECKLIST

- WEATHER BRIEFING (1-800-992-7433)**
- FILE FLIGHT PLAN (1-800-992-7433 FSS Specialist)**

2.1. Before Entering the Cockpit

1. Magnetos and master switch - OFF
2. Safety harness - Check security and integrity.
3. Check that covers and caps have been removed.
4. Cockpit - Make sure that items and baggage are securely stowed.
5. Chocks - Remove and stow

2.2. After Entering the Cockpit

1. Magnetos and starter switch - OFF
2. Check the function of the handbrake.
3. Engage parking brake.
4. Check for free movement of controls.
5. Rudder control - **Check during taxi.**
6. Trim- Check control movement.
7. Instruments - Check condition.
8. Check throttle and choke lever movement.
9. Fuel valve - OFF
10. Switches and breakers - OFF
11. Secure safety belt.
12. Close and lock canopy (Do not push on the vent window frame).

2.3. Before Engine Start

1. Fuel Valve - ON
2. Fuel - Check quantity and compare to fuel dipstick measurements.
3. Master switch - OFF
4. Circuit breakers - OFF
5. Throttle - Closed
6. Choke - Set according to engine temperature.
7. Control stick - Full aft.
8. Brake - Ensure proper engagement.

2.4. Engine Start

(If cold start: choke on and throttle closed.)

1. Clear the area.
2. Master switch - ON.
3. Magnetos - ON.
4. Auxiliary fuel pump ON.
5. Ignition key - engage the starter.
6. Throttle - Set to 2,500 rpm idle.
7. Oil - Check for positive oil pressure within 10 seconds.
8. Choke - Closed.
9. Auxiliary fuel pump OFF.

Caution: To avoid shock loading start the engine with throttle lever set for idling or max. 10 % opened, then wait 3 sec to reach constant engine speed before accelerating.

The starter should be activated for max.10 sec., then 2 min. pause for starter cooling. After engine starting adjust the throttle for smooth running at 2500 rpm.

Check oil pressure which should increase within 10 sec. Increase engine speed after oil pressure reaches 2 bars and is steady.

2.5. Engine Warm-up and Check

1. Warm at idle until oil temperature reaches min 50° C.
2. Brake - Ensure proper engagement.
3. Check engine acceleration from idle to maximum.
4. Circuit breakers - ON.
5. COMM - On and set to frequency.

Caution:

Engine check should be performed with the glider pointing upwind and not on loose terrain (the propeller will pick up debris which can damage the propeller)

2.6. Taxiing

1. Rudder control - Check for free movement
2. Brakes - Check for effectiveness

2.7. Run-up

1. Turn into the wind
2. Brakes - Fully applied.
3. Oil temp > 50° C (125 ° F), test ignition at 4,000 rpm.
4. Airbrakes - Freedom of movement. Retract fully and lock..
5. Trim - Set to neutral position.
6. Engine controls - Choke OFF.
7. Fuel control - Open and set to selected tank.
8. Fuel - Check quantity
9. Auxiliary fuel pump - ON
10. COMM - Set to frequency.
11. Instruments - Set and checked.
12. Altimeter - Set to conditions.
13. Safety harness - Secured and tightened.
14. Cockpit - Canopy locked.
15. Rescue system - Remove the security pin.
16. Strobes - ON
17. Determine "Emergency Return" plan. Tell passenger.

2.8. Take-off

1. Avoid fast throttle / standing starts. (3-5 seconds to full throttle)
2. Rotate and hold nose wheel off at 30 - 40 knots
3. Let it fly off – Don't "Pull" it up
4. Climb at < 59 knots – Seek highest RPM
5. Retract flaps (if used) at 500 AGL
6. Slightly reduce throttle at 1,000 AGL
8. Auxiliary fuel pump - OFF at 1,000 AGL
9. Monitor gauges / EIS for proper operation
10. Reduce throttle. Seek large EGT Drop

2.9. Descent

1. Throttle - Idle.
2. Speed - < 59 knots.
3. Trim - As necessary to reduce stick pressure

CLOSE FLIGHT PLAN (122.0 or 1-800-992-7433)

2.10. Landing Approach: Downwind

NO DISTRACTIONS UNTIL AFTER LANDING

1. Auxiliary fuel pump ON
2. Fuel: Select fullest tank
3. Safety harness: Tighten
4. Wheel brake: Test function
5. Test airbrake (spoiler) operation
6. Landing area: Check runway, base leg obstructions
7. Trim to maintain stable speed of < 59 knots in the pattern
8. Reduce rpm (2250 - 2400) opposite runway numbers
9. 1/2 Flaps at no greater than 59 knots; None if strong wind.
10. Maintain 59 knots 500-700 fpm descent

2.11. Landing Approach: Base Leg

1. Maintain 59 knots / 500-700 fpm descent
2. Adjust trim as necessary
3. Maintain uniform 2250-2400 rpm
4. Use airbrakes as needed.

2.12. Landing Approach: Final

1. Maintain 50 knots + 1/2 wind gusts.
2. Apply full flaps when field "made"
3. Adjust trim, airbrake as necessary
4. Throttle adjustments, as needed
5. Slow below 40 knots in ground effect
6. Stay off the nose wheel at touchdown
7. Use brakes sparingly

2.13 Landing: Balked Landing

1. Throttle full
2. Airbrakes: Closed and locked
3. Flaps: Raise slowly to neutral
4. Trim: As necessary
5. Climb speed: 55 knots

2.14. After Landing and Clearing the Runway

1. Announce, "Clear of runway"
2. Retract flaps, spoilers
3. Strobes to OFF
4. Auxiliary fuel pump OFF

2.15. Shutting Down After Stopping

1. Radio and transponder OFF.
2. GPS and EFIS OFF.
3. Instrument and main breakers OFF.
4. Hold throttle against stop – RPM < 2,000
5. After 3-5 sec 1st mag OFF – Then 2nd mag OFF
5. Open canopy–3 points
6. Remove headsets, GPS
7. Hang up or pack headsets
8. Replace the BRS safety pin
9. Exit the airplane ONE PERSON at a time
10. Close (Do not push on the vent window frame), secure, and cover canopy

2.16. Flight in the Rain

When flying in the rain, no additional steps are required. Glider qualities and performance are not substantially changed.

2.17. Feather the Propeller

1. Engine speed to idle.
2. All electronics turned OFF.
3. Shut off the engine with the magneto switches
propeller stops, pull the propeller control lever to the rear position.
5. Turn ON electronics as needed.

Safety Tip: Turn ON the magneto switches after engine stop. This will help facilitate a restart in case of an emergency.

Note:

When the propeller is feathered a micro switch completes a circuit diverting power from the starter and the engine will not start. If landing as a glider, switch the magnetos ON and unfeather the propeller while on downwind. That makes it easier to start the engine in case of a balked landing.

2.18. Restart After Feathering

1. Slowly push the propeller control lever forward into the operating position.
2. Electronics OFF
3. Magnetos to ON position.
4. Throttle closed.
5. Fuel pump ON.
5. Choke to FULL if needed.
6. Start the engine with the ignition key.
7. Turn ON electronics.
8. Fuel pump OFF.
9. Choke OFF

Caution:

After a long engine off flight, engine restart will require full choke. The throttle MUST be closed. RPM should be below 3,500 until oil temp is normal (But use full power immediately if necessary).

3.0 EMERGENCY PROCEDURES

3.1 Engine Failures

3.1.1. Engine failure during take-off

1. Throttle - retard to idle.
2. Ignition - OFF
3. Magnetos - OFF

3.1.2. Engine failure immediately after take-off

1. Speed - Keep gliding speed at 55 knots. Sink rate 250 feet per minute.
2. Altitude - Below 160 feet: land in direction of take-off. Over 160 feet: choose landing area.
3. Wind - Evaluate direction and velocity.
4. Landing area - Choose area free of obstacles. Land into the wind.
5. Airbrakes (spoilers) - Extend as needed.
6. Fuel valve - OFF.
7. Ignition - OFF.
8. Safety Harness - Tighten.

9. Master switch - To OFF position before landing.
10. Land

3.1.3. Engine failure in-flight (forced landing)

1. Speed - Keep gliding speed at 55 knots. Sink rate 250 feet per minute.
2. Altitude. Below 160 feet: land in direction of take-off. Over 160 feet: choose landing area.
3. Wind - Evaluate direction and velocity.
4. Landing area - Choose area free of obstacles. Land into the wind.
5. Airbrakes (spoilers) - Extend as needed.
6. Fuel valve - OFF.
7. Ignition - OFF.
8. Safety Harness - Tighten.
9. Master switch - OFF position before landing.
10. Land

3.1.4. Attempt In-flight restart

1. Speed - Keep speed a bit higher at 55 knots.
2. Altitude - Check.
3. Landing area - Choose according to altitude (safest area).
4. Master switch - ON.
5. Fuel valve - OPEN.
6. Choke - As necessary.
7. Throttle - For 1/3 power.
8. Ignition - ON.
9. Starter - Turn switch on.

4.0 SMOKE OR FIRE

4.1. Smoke or fire on the ground

1. Fuel valve - OFF.
2. Throttle - FULL
3. Master switch - OFF.
4. Ignition - OFF.
5. Abandon the glider
6. Phone 911

4.2. Fire during take-off

1. Fuel valve - OFF.
3. Speed - 55 knots.
4. Master switch - OFF.
5. Ignition - OFF.
6. Land and brake.
7. Abandon the glider.
6. Call 911

4.3. Fire in flight

1. Fuel valve - OFF.
2. Throttle - FULL
3. Master switch - OFF after using up residual fuel in the carburetor and the engine has stopped.*
4. Ignition - OFF.
5. Speed - 55 knots
6. Landing - Choose emergency landing area.
7. Emergency landing - See 3.6.1
8. Abandon the glider
9. Call 911

* Note: Estimated time to pump fuel out of the carburetor is 30 seconds.

5.0 LANDING EMERGENCIES

5.1. Emergency landing

An emergency landing may be carried out due to engine failure and when the engine cannot be restarted.

1. Speed - 55 knots.
2. Trim - As needed.
3. Safety harness - Tighten.
4. Air brake - Extend as needed. Flaps as needed.
5. COMM 121.5 - Report your location if possible.
6. Fuel valve - OFF
7. Ignition and master switch - OFF.
8. Activate SPOT device (if available)

5.2. Precautionary landing *

A precautionary landing may be carried out due to low fuel and /or bad weather conditions.

1. Choose landing area. Determine wind direction.
 2. COMM - Report your intentions.
 3. Perform a low-altitude pass into the wind over the landing site at a speed of 59 knots to thoroughly inspect the area.
 4. Perform landing checklist.
 5. Perform an approach at increased idle with airbrakes extended as needed.
 6. Reduce power to idle when over runway threshold and touch down.
 7. After stopping, switch off all switches. Close the fuel valve. Seek help.
- * Watch the chosen area continuously during precautionary landing.

5.3. Landing with a flat tire

1. Approach - Normal.
2. Touch down - Good tire first. Use ailerons to keep the damaged tire above the ground as long as possible.
3. Maintain the direction of the landing rollout. Apply braking control.

5.4. Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the lowest speed possible. Maintain direction with rudder pedal input.
2. If the tail wheel is damaged perform touch-down at the lowest possible speed and maintain direction with rudder input, if possible.

5.5 Recovery from an unintentional spin

1. Throttle - Retard to idle.
2. Control stick - Hold ailerons at neutral.
3. Rudder - Apply full opposite rudder.
4. Control Stick - Forward elevator as needed to break spin.
5. Rudder - Neutralize the rudder immediately after stopping the spin.
6. Recover from the dive.

NOTE: INTENTION SPINS ARE PROHIBITED!

6.0 OTHER EMERGENCIES

6.1. Vibration

If vibration appears, set the engine speed to a power setting where the vibrations are the lowest. Land as soon as possible.

6.2. Carburetor icing

Carburetor icing shows itself through decreased engine power and an increase in engine temperature. To recover engine power, follow these recommendations:

1. Max speed - 59 knots.
 2. Throttle - Set for 1/3 power.
 3. If possible, leave the icing area.
 4. After 1 to 2 minutes, gradually increase engine power to cruise setting.
- If you fail to recover engine power, land in the nearest safe area.

6.3. Deployment of the rescue system

1. Stop the engine by switching off the magnetos.
2. Pull out the emergency deployment handle.
3. Fuel - OFF.
4. Ignition - OFF.
5. COMM: 121.5. Make an emergency declaration.
6. Transponder: Squawk 7700.
7. Activate SPOT device (if equipped).
8. Tighten the restraint harness.
9. Cover your face with you hands and remain in this position until landing.

6.3.1 Deployment of the rescue system - off-field landing

1. Make sure the safety pin is removed from the activation handle
2. Tighten seat belts.
3. When the aircraft's main wheels are approximately 12 inches above the ground pull the chute activation handle and deploy the chute. The chute will act as a drogue chute to bring the aircraft to an immediate stop.

Supplement: SunDancer Gliding Distance and Endurance

Key: Glide Ratio 26:1 / 30:1 at 55 Knots

Starting AGL	Nautical Miles	Statute Miles	Glide Time (Minutes)
1,000	4 / 5	5 / 6	4 / 5
1,500	6 / 7	7 / 8	6 / 7
2,000	8 / 9	9 / 11	8 / 10
2,500	10 / 12	12 / 14	11 / 12
3,000	12 / 14	14 / 17	13 / 15
4,000	17 / 19	19 / 22	17 / 20
5,000	21 / 24	24 / 28	22 / 25
6,000	25 / 29	32 / 34	26 / 30
7,000	30 / 34	34 / 39	30 / 35
8,000	34 / 39	39 / 45	35 / 40
9,000	38 / 44	44 / 51	40 / 45
10,000	42 / 49	49 / 56	44 / 51

Assumption: Propeller feathered. No wind. No obstructions. No thermals. No downdrafts. All values are approximate, err on the side of caution.

SUPPLEMENT: USEFUL LOAD CALCULATOR

This calculator will help you determine how much fuel to carry to not exceed maximum take-off weight of 1,320 lbs.

For the purposes of this calculator the total weight = empty weight of aircraft (from weight and balance information) + weight of pilot and passenger + weight of all baggage

Calculation: total weight (from above) + current fuel weight (from measurement) must be equal to, or less than 1,320 pounds. If greater than 1,320 pounds, adjust baggage weight or fuel weight.

Total Weight (lbs)		Max Take-off Weight : 1,320 lbs		Fuel Weight: 6.2 lbs / gallon
Fuel	One Tank	Useful Load	Both Tanks	Useful Load
Totally Empty	0 gallons	lbs	0 gallons	lbs
1/4 Full	3.4 gallons (21 lbs)	lbs	6.9 gallon (43 lbs)	lbs
1/2 Full	6.6 gallons (41 lbs)	lbs	13.2 gallons (82 lbs)	lbs
3/4 Fuel	10.1 gallons (63 lbs)	lbs	20.1 gallons (125 lbs)	lbs
Tank is Full	13.1 gallons (82 lbs)	lbs	26.5 gallons (165 lbs)	lbs

Altimeter setting ("Hg)	Pressure altitude conversion factor
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

Pressure Altitude Calculator

Pressure altitude is the altitude indicated on your altimeter if it is set to 29.92 in/HG.

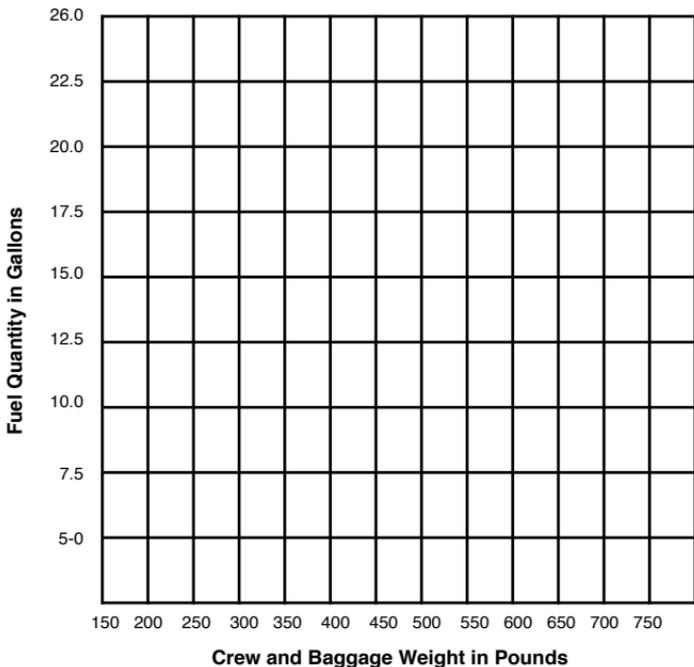
You will need your current pressure altitude to calculate the increase in take-off distance and the reduction in rate -of-climb that you will experience as a result of the effects of altitude temperature.

To find your current pressure altitude

1. Set your altimeter to the current field elevation. Note the altimeter setting for that elevation.
2. Find your current altimeter setting on the accompanying chart. Note the number across from it. Add or subtract that number to or from your indicated altitude. The result is your pressure altitude.
3. Use your pressure altitude and current temperature in °F along with the Density Altitude Chart on page 58 to calculate the density altitude for your current location.
4. Use the pressure altitude and temperature in °F together with the Koch Chart on page 59 to find the effects that density altitude will have on your airplane's performance.

SUPPLEMENT: PERMITTED PAYLOAD RANGE

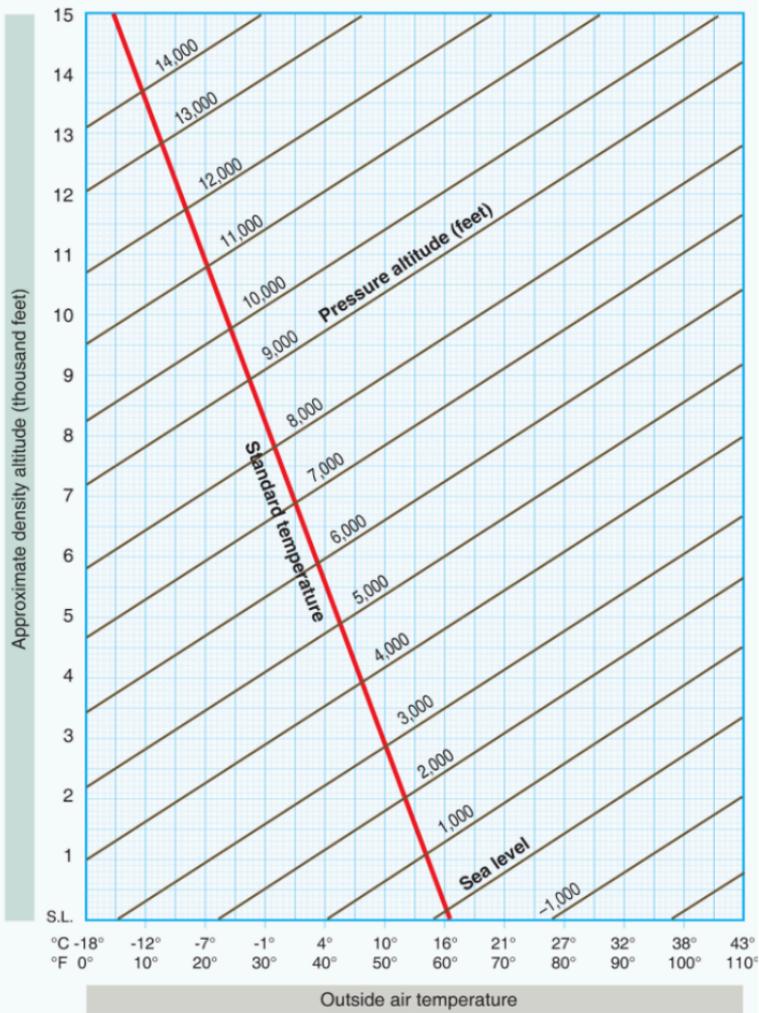
1. Find your aircraft's empty weight from your weight and balance data. Subtract it from 1,320 lbs and mark it on the bottom line of the graph.
2. Subtract 165 lbs (the weight of a full tank of fuel) from your aircraft's empty weight and mark that point along the top of the graph. Connect the two points with a straight line and lightly shade the graph to the left of the line. The shaded area is the range of your permitted payload.
- 3.. The intersections of a horizontal line drawn from fuel quantity and a vertical line drawn from crew and baggage weight must fall within the shaded area. Adjust either the fuel quantity or crew and baggage weight to remain within the shaded area.



SUPPLEMENT: DENSITY ALTITUDE CHART

Find the pressure altitude of your current location by using the calculation from the Pressure Altitude Calculator on page 57 or by setting your altimeter to 29.92 in/HG (reset the altimeter to your field elevation when done).

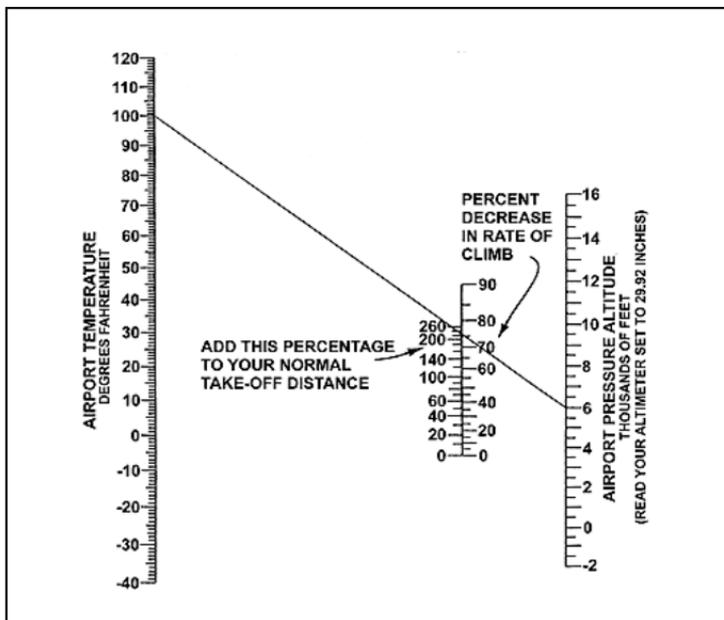
Locate the current temperature on the bottom line. Move vertically to the slanted line representing the current pressure altitude. Move horizontally to the left to find the density altitude for your location.



SUPPLEMENT: KOCH DENSITY ALTITUDE CHART

Firstly find the pressure altitude of your current location by using the calculation from the Pressure Altitude Calculator on page 57 or by setting your altimeter to the "standard atmospheric pressure" of 29.92 in/HG. The altitude indicated on the altimeter set to 29.92 in/HG is the pressure altitude for your location. (Be sure to reset your altimeter to the actual altitude at your location after finding the pressure altitude.)

To find the effect of altitude and temperature (density altitude) on take-off distance and rate of climb connect the airport's "pressure altitude" and the current temperature with a straight line. Read the increase in take-off distance and the decrease in rate of climb from the center chart.



SUPPLEMENT: MEASURING FUEL LEVELS

Although the fuel tanks in your glider are nearly identical in capacity, fuel levels may differ. With that in mind, the actual capacity of each tank was measured - one gallon at a time - until each tank was full.

The fuel capacity of each tank was measured using the **Fuel Hawk Universal 11-inch Fuel Gauge** supplied with your aircraft (a replacement is available from Aircraft Spruce (<https://www.aircraftspruce.com/pages/ps/fueltesters/fuelhawkuniv11.php>)).

The charts below correlate the markings on the Fuel Hawk dip tube to the fuel levels of your glider. These correlations are for the fuel tanks on Sundancer #148

Fuel Hawk Calibration Right Tank	
Reading on Dip Tube	Conversion to Gallons
1/4	2
1-1/4	3
2	4
2-3/4	5
3-3/4	6
4-1/2	7
5	8
6	9
6-1/2	10
7	11
7-3/4	12
8-1/2	13

Fuel Hawk Calibration Left (Pilot Side) Tank	
Reading on Dip Tube	Conversion to Gallons
1/2	2
1-1/2	3
2	4
3	5
3-1/2	6
4-1/2	7
5-1/3	8
6	9
6-1/4	10
7	11
8	12
9	13