8KCAB Super Decathlon

Transition Training

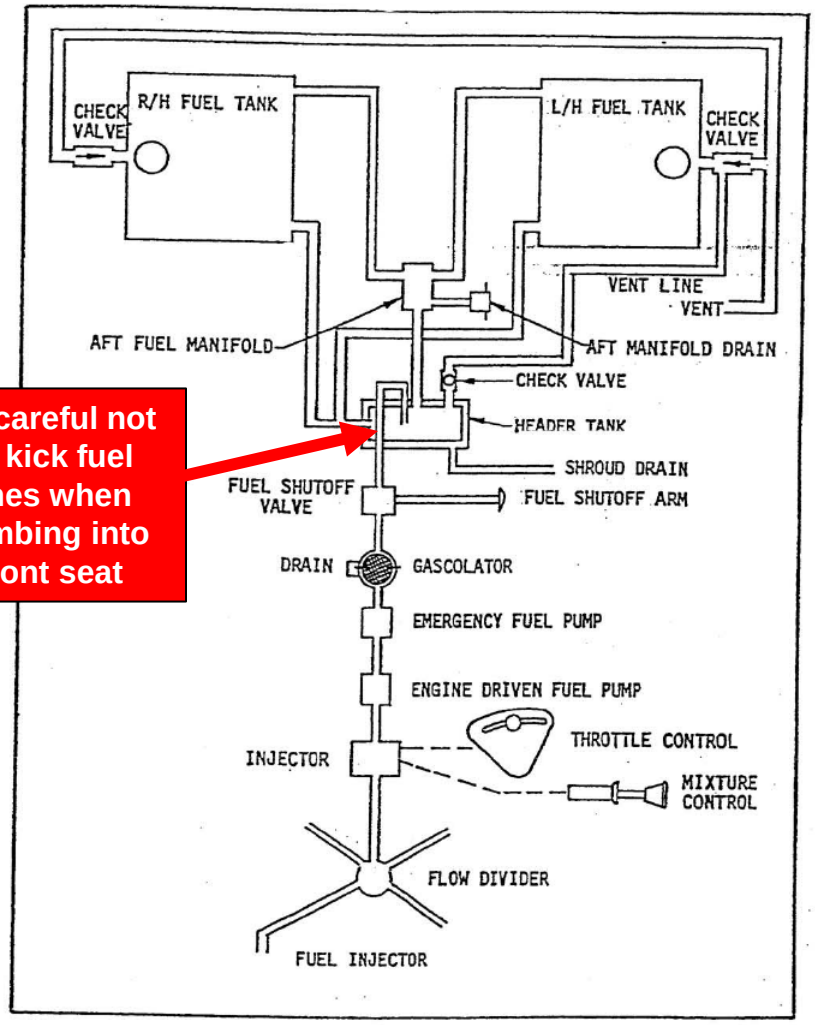
Content

Airplane and Systems

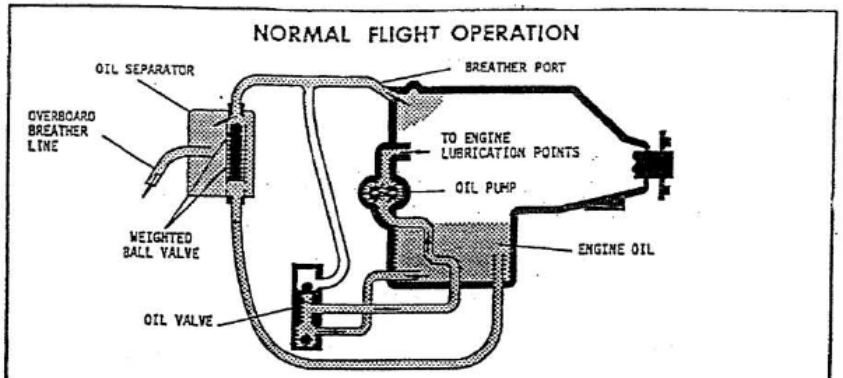
General

- Lycoming AEIO-360-H1B
  - 4 cylinder, 180 HP
  - Hartzell constant speed propellers (N16DV is composite)
  - Inverted oil and fuel systems
- Tailwheel steering (with castering)
- Performance
  - ~125 KTAS on 9 gal/hr.
  - Aerobatics category is max 1,800 lbs. allowing approx. 20 gals of fuel, which gives us 1 hr. + 1 hr. reserve
- No flaps
- Fuel pump not required for take-off and landing
  - Some manuals say otherwise
- Parachutes for aerobatics

Inverted Systems



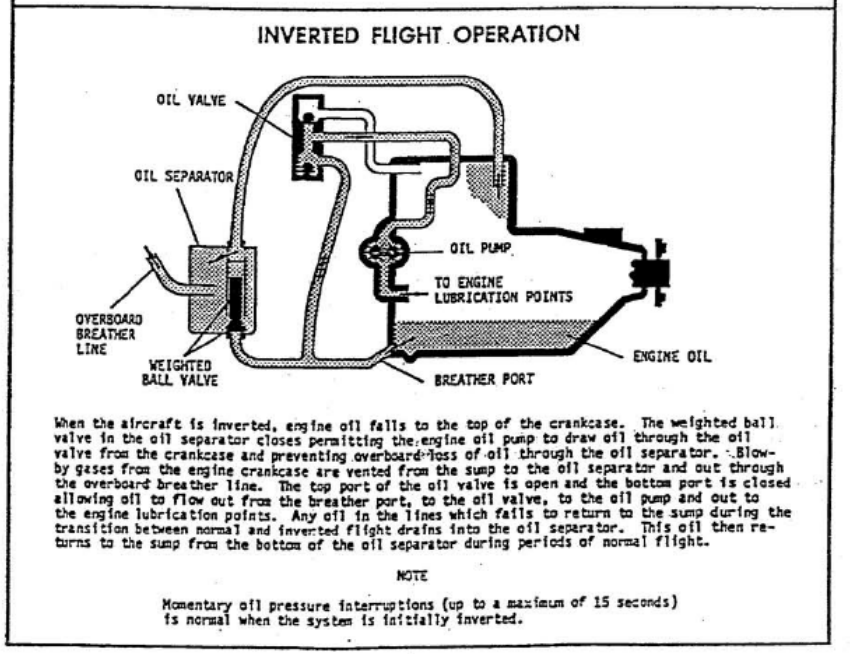
Be careful not to kick fuel lines when climbing into front seat



During normal flight, the weighted ball valve at the top of the oil separator is open allowing blowby gases from the engine crankcase to be vented from the breather port, to the oil separator and out through the overboard breather line. The top port of the oil valve is closed and the bottom port is open allowing oil to flow from the sump out through the oil valve, up to the pump and out to the engine lubrication points.

NOTE

Momentary oil pressure interruptions (up to a maximum of 15 seconds) is normal when the system is initially returned to normal operation from inverted flight.



When the aircraft is inverted, engine oil falls to the top of the crankcase. The weighted ball valve in the oil separator closes permitting the engine oil pump to draw oil through the oil valve from the crankcase and preventing overboard loss of oil through the oil separator. Blow-by gases from the engine crankcase are vented from the sump to the oil separator and out through the overboard breather line. The top port of the oil valve is open and the bottom port is closed allowing oil to flow out from the breather port, to the oil valve, to the oil pump and out to the engine lubrication points. Any oil in the lines which fails to return to the sump during the transition between normal and inverted flight drains into the oil separator. This oil then returns to the sump from the bottom of the oil separator during periods of normal flight.

NOTE

Momentary oil pressure interruptions (up to a maximum of 15 seconds) is normal when the system is initially inverted.

NOVA PILOTS

Oil

- Summer: AeroShell W100 Plus
- Winter: AeroShell W80 Plus

- Do not fly with less than 6 quarts

- Oil is available in the hangar, or
  - Call Projet at (703) 889-8558 or 128.95 MHz

Parachute

- When
  - With passenger and banking more than 60° or pitching more than 30°

- Verify repacking
  - Within 180 days
- Bail out procedure
  - Close throttle
  - Jettison door
  - Remove headset
  - Release seat belt
  - Dive straight out and aft
  - Open parachute immediately
    - Pull handle out

N878AC: Garmin G430

- Standard Garmin “buttonology”
- Manual at
  - http://www.flythedecathlon.com/garmin-430-quick-reference-guide/

N16DV: Garmin G3X, GNX375, G5

- Touchscreen!
  - (Only 1 comm)
- IFR capable
  - But not certified

NOVA PILOTS

Limitations

Airspeed Limitations

Speed	IAS (MPH)	Remarks
V_{NE}	200	**Never Exceed Speed** is the speed limit that may not be exceeded at any time.
V_{NO}	160	**Maximum Structural Cruising Speed** is the speed that should not be exceeded except in smooth air, and then only with caution.
V_A Normal Aerobatic	 121 132	**Operating Maneuvering Speed** is the maximum speed at which full control travel may be used. Below this speed the airplane stalls before limit loads are reached. Above this speed, full control movements can damage the airplane.

Certified for…

- VFR Day
  - Strobes must work (no red beacon)
- VFR Night
  - N878AC has no attitude indicator and VFR night is not recommended
  - N16DV has full IFR suite and VFR night is OK
- NO IFR
  - While N16DV is fully IFR capable and can be used for IFR training, none of the aircraft are IFR certified

Other Limitations

- Max demonstrated crosswind: 17 Knots (20 MPH)
- N878AC max gross weight: 1,800 lbs.
- N16DV max gross weight normal cat.: 1,950 lbs.
  - Max gross weight aerobatic category remains at 1,800 lbs.
- Max weight in Baggage Compartment: 100 lbs.
- Max speed with open window: 130 IAS (MPH)
- Max G-Load: +6g/-5g
  - **Decathlon, LLC limits are +4g/-2g and <u>NO SNAP ROLLS</u>**
- Avoid continuous RPM 2000-2250
- Solo front seat only

Aerobatic Flight

- Airplane is +6g, -5g in Acrobatic Category
  - Operating Procedure is +4g to -2g and IAC Sportsman maneuvers only (no snap rolls)
- Student must have received instruction in the listed aerobatic maneuvers before attempting them solo
- Suggested introductory flights:
  - Experience level based on Flight 1
    - Required dual maneuvers: Aileron Roll, Loop, Competition Turn, Spin
    - Allowed solo maneuvers: Aileron Roll, Loop, Competition Turn
  - Experience level based on Flight 2
    - Required dual maneuvers: Barrel Roll, Slow Roll, Inverted Flight, Immelmann, Spin recovery
    - Additional allowed solo maneuvers: Barrel Roll, Slow Roll, Inverted Flight, Immelmann, Spin recovery
  - Experience level based on Flight 3
    - Required dual maneuvers: Split S, Cuban 8, Hammer Head
    - Additional allowed solo maneuvers: Split S, Cuban 8, Hammer Head

Normal Procedures

N878AC: No Avionics Switch

Twist to 3 O'clock

Press ALT to turn on

Hold OFF to turn off

Twist to 1 O'clock

NOVA PILOTS

Engine Start

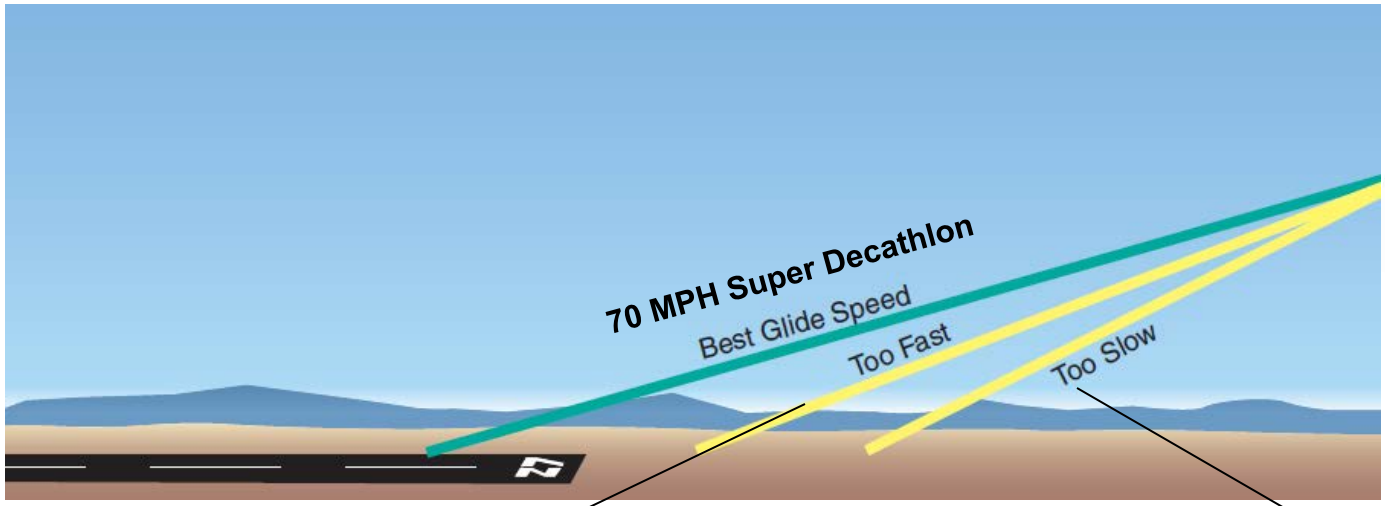
- Cold Start
  - Mixture rich
  - Throttle ½ open
  - Prime 3 seconds
  - Mixture lean
  - Throttle 1 inch
  - Start
  - Mixture rich
- Hot Start
  - Priming not necessary
    - May cause flooding
- Flooded Start
  - Fuel pump off
  - Wait for a minute
  - Mixture full lean
  - Throttle full forward
  - Crank several revolutions
  - When engine starts
    - Retard throttle
    - Slowly advance mixture to full rich

V-speeds

Speed	IAS (MPH)	Remarks
V_R	55-60	On short field take-off use the lower end of the scale and climb out at 58 IAS (MPH).
V_X	58	**Best Angle of Climb Speed** is the speed that should be used when climbing over an obstacle.
V_Y	80	**Best Rate of Climb Speed** is the speed that will make you get away from the ground as fast as possible. Also used for enroute climb.
V_{REF}	80 **70** 60	**Wheel landing** recommended final approach speed (power required to slow descent rate). **3-point landing** recommended final approach speed. **Short field landing** recommended final approach speed (power required to slow descent rate).

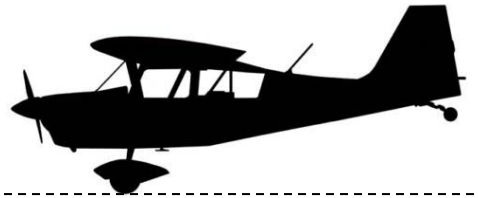
Glide Speed

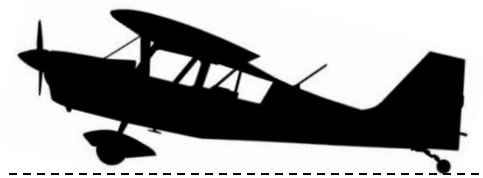
- Landing profiles



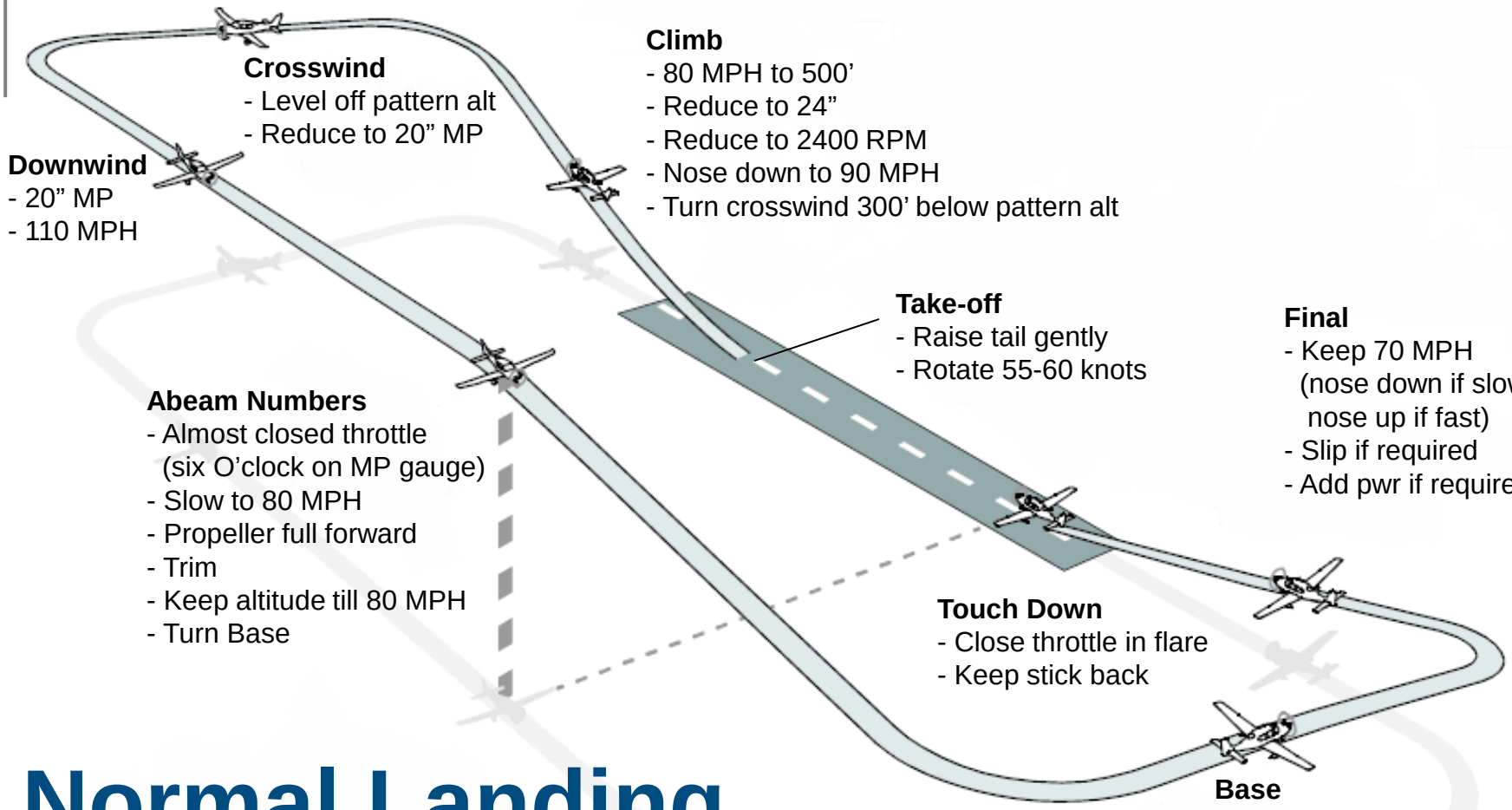
70 MPH 3-point landing

80 MPH Wheel landing (use power to slow descent rate)

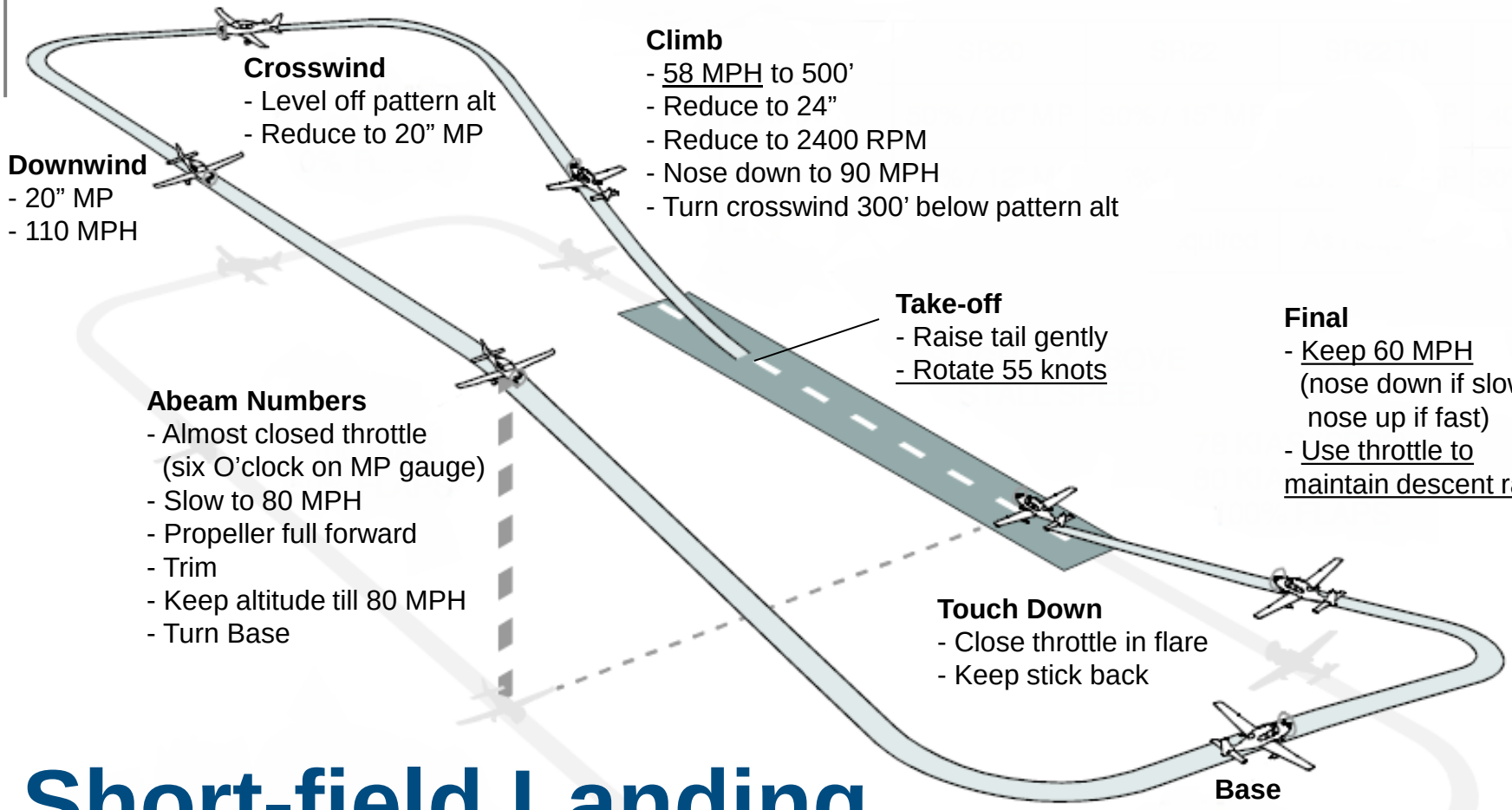




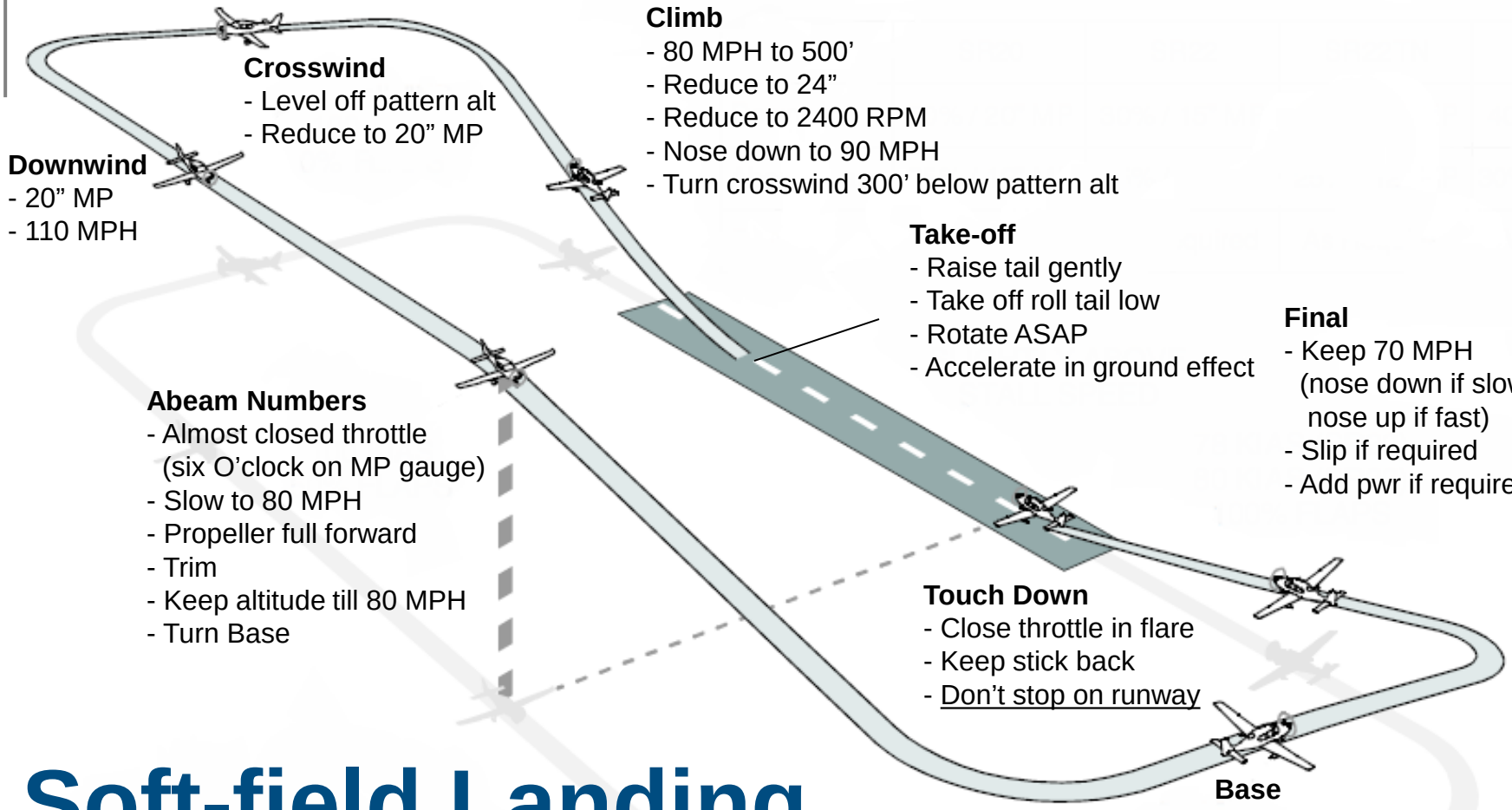
60 MPH Short-field landing (use power to slow descent rate)



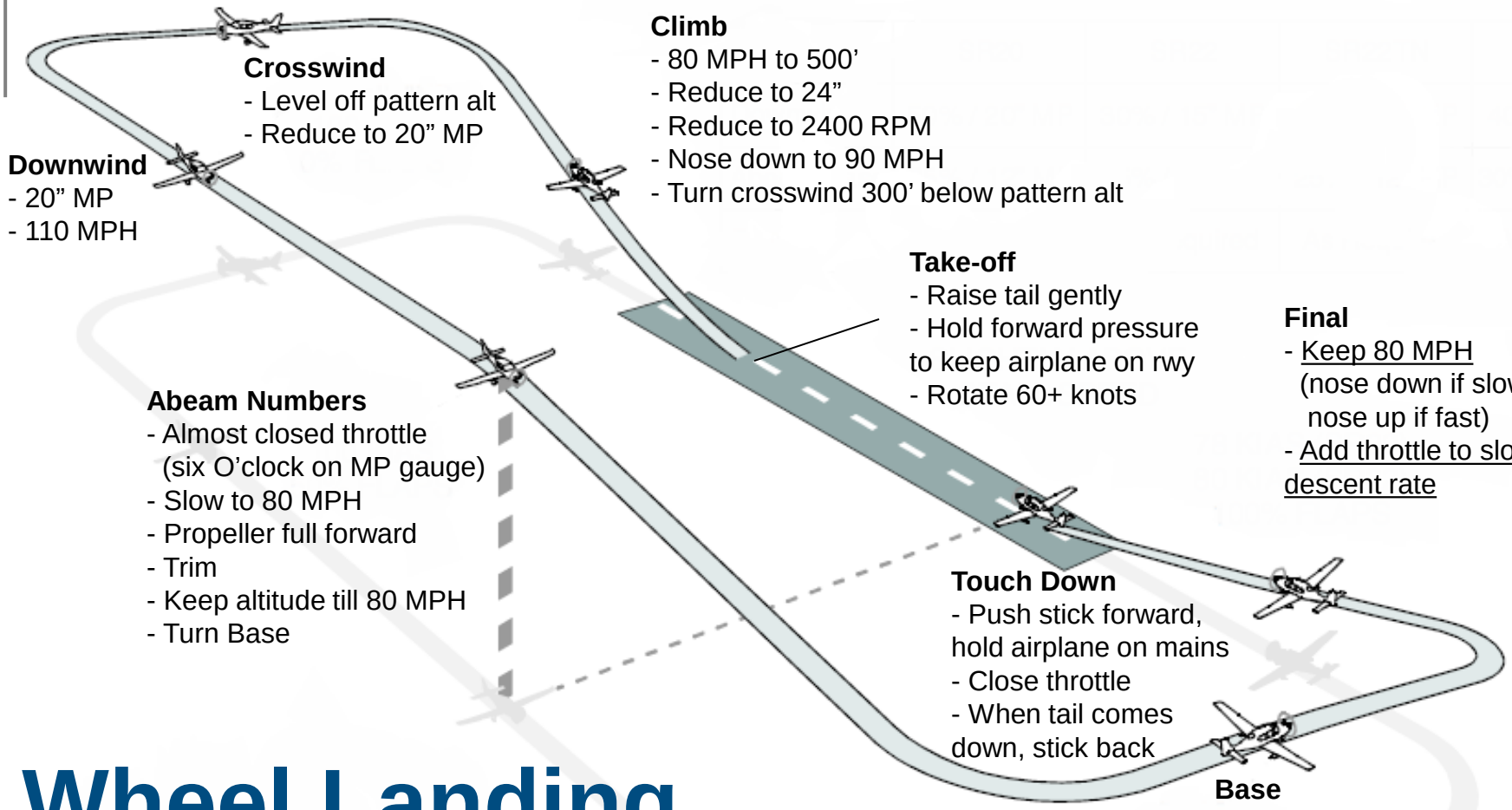
Normal Landing Super Decathlon Pattern Work



Short-field Landing Super Decathlon Pattern Work



Soft-field Landing Super Decathlon Pattern Work



Wheel Landing Super Decathlon Pattern Work

Leaning

- Lean to above 1300° above 3000 ft.
  - For aerobatic flight and practice area
- For X-country flight
  - POH says lean to peak EGT
    - If engine runs rough, then enrich until smooth

Emergency Procedures

Engine Failure in Flight

Airspeed – Establish best glide
- 70 IAS (MPH)

Best field – Locate landing area

Checklist
- Fuel Pump..... ON
- Alternate Induction Air..... HOT
- Mixture ..... RICH, AS REQUIRED
- Fuel Selector.....ON
- Magneto Switches..... CHECK, BOTH ON
- Propeller Control…… FULL FORWARD

If no start
- Throttle……... CHANGE POSITION
- Mixture……... CHANGE POSITION

If not windmilling
- Starter …… ENGAGE

Declare emergency, squawk 7700, ELT On

Exit – Prepare exiting aircraft
- Final approach speed 75 IAS (MPH)
- Everything engine/fuel/electric - off
- Seat belts secured

Engine Fire in Flight

Engine Fire in Flight

1. Mixture ..... CUTOFF
2. Fuel Valve ..... OFF
3. Electric and Magneto ..... ALL OFF
4. Cabin heat…….. OFF
5. Use fire extinguisher if available (not available in N878AC/16DV)
6. Land immediately

Emergency Descent

1. Power Lever ..... IDLE
2. Mixture ..... AS REQUIRED
3. Airspeed..... VNE (200 IAS)

Abnormal Procedures

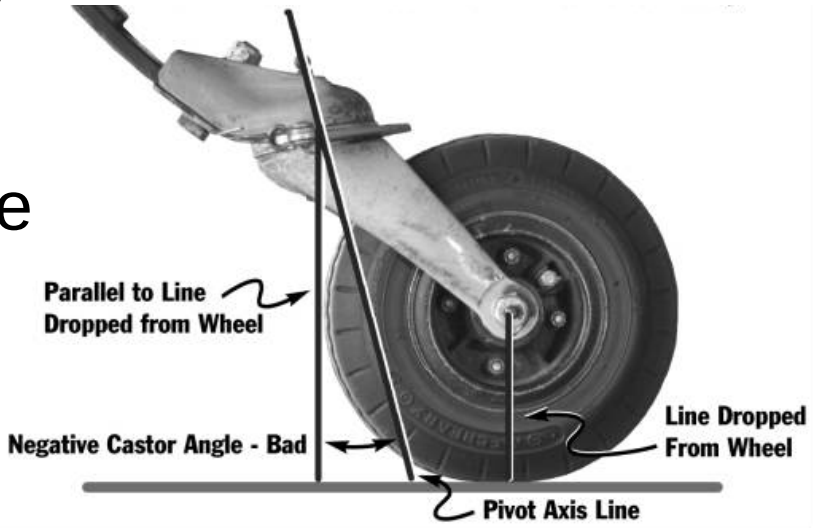
Alternator Failure

- Alternator failure indicated by steady discharge on amp meter
  - Cycle master switch
  - Check circuit breaker
    - Note: The alternator field current circuit breaker is located under the instrument panel and not on the panel with the other circuit breakers
    - Locating this circuit breaker in flight might not be practical
  - If excessive discharge continues, turn off non-essential electrical equipment
  - Land as soon as practical
    - Do not enter SFRA or 30 miles Class B veil without transponder active and in ALT mode (mode C)

Tailwheel Shimmy

- On landing, tailwheel might start shimmying
  - Typically, with a person in back seat and worn tire
  - Caused by castor angle (see illustration)

- Stop shimmy immediately
  - Maintain airplane control
  - Release stick back pressure (no need to lift tail)
  - Wait for shimmy to stop
  - Apply back pressure again



Performance

Stall Speed

Angle of bank	Stall Speed
0°	53 CAS (MPH)
20°	55 CAS (MPH)
30°	61 CAS (MPH)
40°	75 CAS (MPH)

Takeoff Distance

Pressure Altitude Ft.	Distance (Ft.)									
	0° C		10° C		20° C		30° C		40° C	
	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'	Ground Run	Total To Clear 50'
0	456	833	481	879	508	928	533	975	559	1021
1000	485	886	512	935	540	987	567	1036	594	1087
2000	520	951	550	1005	578	1057	608	1112	639	1169
3000	561	1026	591	1081	624	1141	657	1201	688	1258
4000	602	1101	635	1161	670	1224	704	1287	740	1354
5000	652	1192	690	1261	725	1326	762	1394	802	1466
6000	708	1294	746	1363	781	1438	828	1514	669	1588

Landing Distance

Pressure Altitude Ft.	Distance (° F)									
	0° C		10° C		20° C		30° C		40° C	
	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'	Ground Roll	Total To Clear 50'
0	413	1023	421	1042	428	1060	435	1078	442	1095
1000	421	1042	428	1060	436	1080	443	1097	450	1114
2000	429	1062	437	1081	444	1099	452	1118	459	1137
3000	437	1081	445	1100	453	1120	460	1140	468	1157
4000	445	1102	453	1120	461	1141	469	1160	476	1179
5000	453	1122	462	1143	470	1162	478	1182	486	1202
6000	462	1143	470	1164	479	1185	487	1205	495	1225

Cruise Performance 5000 ft

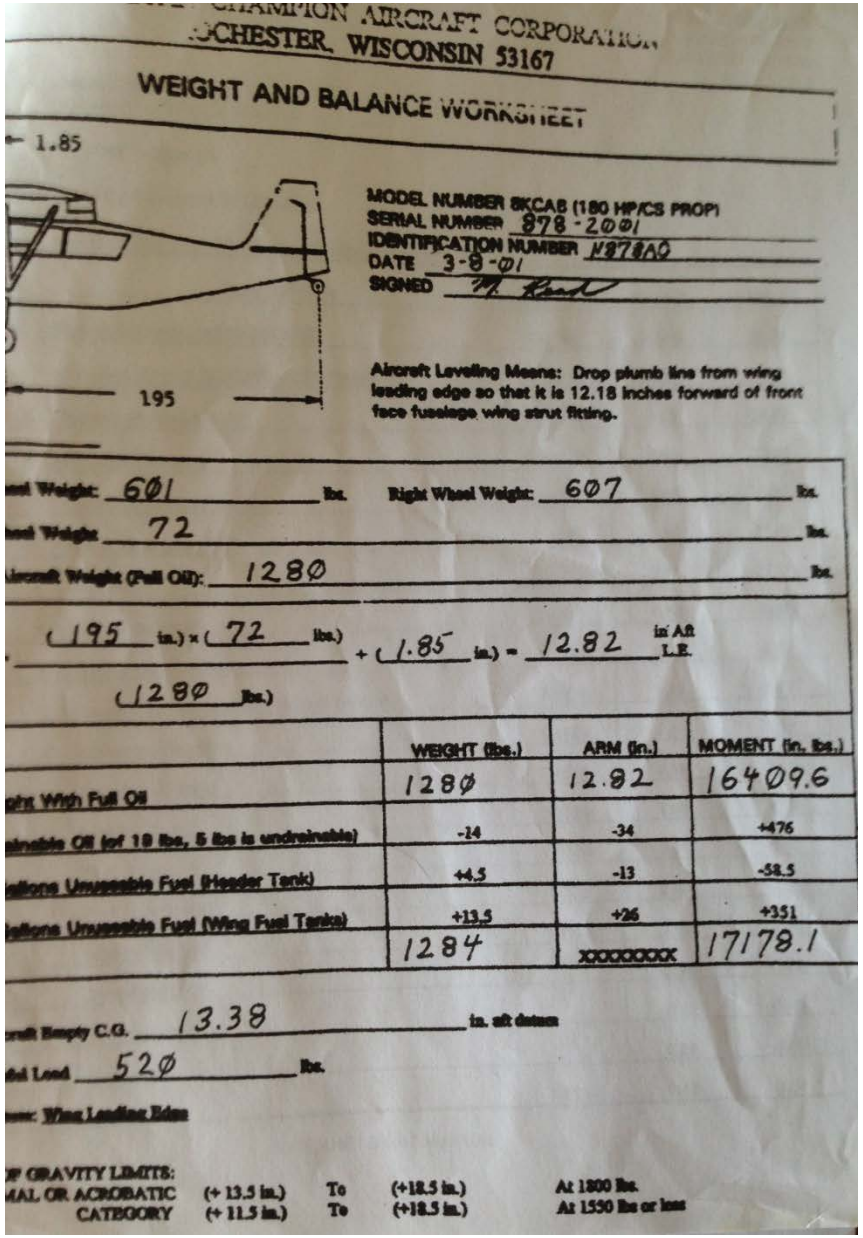
% POWER	RPM	M.P.	TAS MPH	GPH
80	2600	23.6	151	12.0
75		22.4	147	9.7
70		21.3	143	9.3
65		20.1	139	8.8
60		18.9	134	8.3
55		17.7	128	7.9
80	2500	24.1	151	11.8
75		22.9	147	9.6
70		21.7	143	9.1
65		20.5	139	8.7
60		19.3	134	8.1
55		18.1	128	7.7
80	2400	24.9	151	11.5
75		23.6	147	9.5
70		22.3	143	8.9
65		21.0	139	8.5
60		19.8	134	8.0
55		18.5	128	7.6

Weight & Balance

N878AC Weight

- Gross: 1,800 lbs.
- Empty: 1,294 lbs.
- Useful load: 510 lbs.

- 20 gals. fuel: 120 lbs.
- Useful Load
  - With 20 Gal **390 lbs.**



CHAMPION AIRCRAFT CORPORATION
ROCHESTER, WISCONSIN 53167

WEIGHT AND BALANCE WORKSHEET

1.85

195

MODEL NUMBER 8KCAB (180 HP/CS PROP)
SERIAL NUMBER 878-2001
IDENTIFICATION NUMBER N878AD
DATE 3-8-01
SIGNED

Aircraft Leveling Means: Drop plumb line from wing leading edge so that it is 12.18 inches forward of front face fuselage wing strut fitting.

Left Wheel Weight: 601 lbs. Right Wheel Weight: 607 lbs.
Tail Wheel Weight: 72 lbs.
Aircraft Weight (Full Oil): 1280 lbs.

(195 in.) × (72 lbs.) + (1.85 in.) = 12.82 in Aft L.E.
(1280 lbs.)

	WEIGHT (lbs.)	ARM (in.)	MOMENT (in. lbs.)
Aircraft With Full Oil	1280	12.82	16409.6
Drainable Oil (of 10 lbs, 5 lbs is undrainable)	-14	-34	+476
Gallons Unusable Fuel (Header Tank)	+4.5	-13	-58.5
Gallons Unusable Fuel (Wing Fuel Tanks)	+13.5	+26	+351
	1284	XXXXXXXX	17178.1

Aircraft Empty C.G. 13.38 in. aft datum
Useful Load 520 lbs.
Datum: Wing Leading Edge

CENTER OF GRAVITY LIMITS:
NORMAL OR ACROBATIC (+13.5 in.) To (+18.5 in.) At 1800 lbs.
UTILITY CATEGORY (+11.5 in.) To (+18.5 in.) At 1550 lbs or less

N16DV Weight

- Max gross weight normal cat.: 1,950 lbs.
- Max gross weight aerobatic cat.: 1,800 lbs.

- Empty = 1312 lbs.
- Useful load = 638 lbs. normal category
- Useful load = 488 lbs. aerobatic category

- Useful load normal with 20 gals. = **518 lbs.**
- Useful load aerobatic with 20 gals. = **368 lbs.**

Next…

- Read the POH
  - This presentation was just examples of what you need to know and does not supersede any information found in the POH
- Read limitation and notes (next two pages)
- Fill out renter exam
- Go fly and have fun..!

Owner Imposed Limitations

- Cleaning of airplane after each flight is required
- Max G-Load is +4g to -2g
  - If unintentionally inverted, roll the plane upright
    - Do not pull on stick (could easily cause over-G)
- Snap rolls are not permitted
- Lean mixture for taxi
- Monitor tire pressure in main tires
  - Even slightly low pressure might cause a tube to burst and result in a flat tire
- Pouch on left sidewall is for FAA mandated flight manual only
  - Not for use by renter

Notes of Caution

- When closing heat, push firmly on black knob(s)
- Be careful not to kick fuel lines when climbing into front seat
  - Header tank under instrument panel
- There are cable restraints on the rear seat that prevent the seatback from coming fully forward and limiting rear stick travel when the rear seat is unoccupied
  - Care should be exercised when accessing the baggage area not to pull the rear seatback forward beyond the limits of the cable restraints
  - A broken cable restraint renders the airplane non-airworthy
- If bouncing on (especially wheel) landing – go around!
  - Do not push on stick (might cause pilot induced oscillations and prop strike)

Handover to Next Pilot

- As a courtesy to the next pilot
  - Refill to 20 gallons (1/2 tank each side)
  - Clean bugs off windshield and leading edge…

Resources

- flythedecathlon.com
  - 8KCAB POH
  - Parachute manual
  - 8KCAB checklist
  - Garmin guides
  - and more…