

NORMAL PROCEDURES CHECKLIST

BEFORE-PREFLIGHT:

- 1) Weather, flight plan, charts, plates, airport information, etc.?
- 2) Fuel & weight issues: e.w.: 3,401
maximum takeoff weight: 5,200
maximum landing weight: 4,940
maximum zero-fuel weight: 4,400 (allows fuselage load up to **999**)
forward & aft baggage limits: 150 each
maximum cabin load with full fuel: 737
inboard usable fuel: $34.3 + 34.3 = 68.6$ gals.
outboard usable fuel: $54.3 + 54.3 = 108.6$ gals.
total usable fuel capacity: 177.2 gals.
Lycoming IO-540-C4B5, 91/96 octane minimum
*See POH worksheet 6-13 and C. G. chart 6-17
- 3) Accelerate-Stop Distance – CHECK, see POH Fig. 5-17
- 4) Headsets, flashlights, handheld, kneeboard, portable GPS, maps, charts, rosary etc. - positioned
- 5) Airworthiness Certificate, Registration Certificate, latest Weight & Balance report, and POH on board?

PREFLIGHT:

- 1) Controls - Release yoke if belted, controls free
- 2) Gear handle - DOWN
- 3) Master switch - ON
- 4) Gear lights - 3 Green?
- 5) Alternator inoperative lights – ON?
- 6) Pitot heat, Windshield de-ice - If used: warm to touch & off

- 7) Exterior lights - Check those required by flight conditions, night
- 8) Fuel selectors - ON and Set to fullest tanks
- 9) Electric fuel pumps - Check then OFF
- 10) Crossfeed - Drained then OFF
- 11) Cowl flaps - OPEN
- 12) Master switch - OFF
- 13) Magneto switches - Confirm OFF
- 14) Mixtures - Idle cut-off
- 15) Emergency exit - Confirm secure
- 16) Trim - Set for takeoff

EXTERIOR INSPECTION:

- 1) Rear baggage door - Secure & Locked
- 2) Antennas - Secure
- 3) Crossfeed drain - No drip after sumping
- 4) Right wing - Remove any exterior gust locks; check surfaces, hinges and security. Frost?
- 5) Right tie-down - Untied
- 6) Right fuel caps - Note quantities (to compare with Shadin) & secure caps
- 7) Right fuel drains under nacelle - Drain 3, (GATS jar?)
- 8) Right gear - Chock removed
- 9) Right engine - Oil level recorded, dipstick SECURE, ("snap" down)
- 10) Right engine - Feel under oil cooler for leak

- 11) Right prop & spinner – Check
- 12) Windshield - Check
- 13) Nose baggage door - Secure & locked
- 14) Nose gear - Chock removed
- 15) Left engine - Oil level recorded, dipstick SECURE, ("snap" down)
- 16) Left engine - Feel under oil cooler for leak
- 17) Left prop & spinner - Check
- 18) Left gear - Chock removed
- 19) Left fuel caps - Note quantities (to compare with Shadin) & secure caps
- 20) Left wing - Remove any exterior gust locks; check surfaces, hinges and security. Frost?
- 21) Left fuel drains under nacelle - Drain 3, (GATS jar?)
- 22) Pitot - Cover removed & stowed
- 23) Empennage - Check condition & freedom, remove any gust lock

ENTERING AIRCRAFT:

- 1) Show passengers "hard" handles on fuselage & hard step - advise that nothing else is sturdy – "no step and no touch" spots that are not "hard".
- 2) Advise passengers to not touch, lean on, or "slam" cabin door, pilot can operate it best from left seat

BEFORE STARTING ENGINES:

- 1) Cabin door - Lock AND secure auxiliary Latch

- 2) Door seal – Inflated
- 3) Seats & belts & shoulder straps - Positioned & locked
- 4) Passenger briefing as necessary - “exits, sterile cockpit, etc.”
- 5) Parking brake - Set
- 6) Circuit breakers - Checked & set
- 7) Confirm - Crossfeed - OFF
 Fuel pumps - OFF
 Fuel valves - ON
 Cowl Flaps - OPEN
 Mixtures - Idle Cut Off
 Avionics & Autopilot master - OFF
 Gear handle - DOWN
- 8) Master switch - ON
- 9) Confirm - Door ajar light – OFF... Gear lights - 3 Green
- 10) Alternators - ON

STARTING COLD ENGINES:* (Hot/flooded starts, see POH 4-6, 4-11(b) and (c))

**(These procedures differ slightly from POH, presumably because of GAMI injectors?)*

- 1) Rotating Beacon – ON
- 2) Mixtures - Full Rich
- 3) Props - High RPM, low pitch
- 4) **LEFT ENGINE:**
 - A) Throttle - Full open
 - B) Left electric fuel pump - ON 5 SECONDS +/-
 - C) Throttle - Closed to ¼ Inch

- D) Left magnetos – ON
- E) Clear Prop - Confirm and announce
- F) Starter - Engage Left
- G) Throttle - Maintain 1,000 RPM during warm-up
- H) Oil Pressure – Check (30 sec. or less for good indication)
- I) Vacuum - Check left red button sucks IN
- J) Alternator - Left inoperative light - OFF
- K) Gear handle - Snaps up to neutral if left hyd. pump OK
(Right hydraulic pump can be checked after Left engine is shut down at the conclusion of flight.)

RIGHT ENGINE:

- A) Throttle - Full open
- B) Right electric fuel pump - ON 5 SECONDS +/-
- C) Throttle - Closed to ¼ Inch
- D) Right magnetos - ON
- E) Starter - Engage RIGHT
- F) Throttle - Maintain 1,000 RPM during warm-up
- G) Oil Pressure – Check (30 sec. or less for indication)
- H) Vacuum - Check right red button sucks IN
- I) Alternator - Right inoperative light - OFF

PRE-TAXI and TAXI:

- 1) Lights - As needed. (Landing light off in taxi and when in position and hold; landing light ON when crossing a runway and on takeoff.)

- 2) Altimeters, D/G – Set
- 3) Transponder – Standby & SET (avoid 7500- hijack, 7600 - lost comm., 7700 - emergency)
- 4) Autopilot - Confirm OFF
- 5) Radar - Standby
- 6) Avionics Master - ON
- 7) Shadin “ENTER/TEST” button, (on left) – Press
(Confirm “GOOd”; K-factor (pulse count) is set to “gallons”; confirm maximum usable fuel = 177)
- 8) Shadin “REM/USED” toggle (center) - Move to “USED”, (to right), to see fuel used since last fuel entry. Move to “REM”, (to left), to see fuel remaining on board. Compare & confirm by visual or other method.
- 9) Confirm fuel “REM” or input correct setting of Shadin, (see Shadin procedures supplement, below, Page 12.)
- 10) ATIS/AWOS, etc. - Listen & Copy
- 11) Obtain and copy taxi & departure clearances as required
- 12) Parking brakes - OFF
- 13) Toe brakes - CHECK when in motion
- 14) Flight instruments - Responsive when moving ?
- 15) Heater - Test run if required

BEFORE TAKEOFF & ENGINE RUN-UP:

- 1) Parking brakes - SET
- 2) Fuel selectors - Confirm tank selection & crossfeed OFF
- 3) Altimeters & D/G - Confirm settings
- 4) Avionics – Set for departure

- 5) Autopilot - Confirm OFF
- 6) Trim - Confirm set for takeoff
- 7) Flaps - Visually confirm no flaps
- 8) Flight controls - Free and correct (no gust locks?)
- 9) Prop/wing de-ice systems - As required
- 10) Mixture - Full rich if leaned in taxi
- 11) Props - High RPM, low pitch
- 12) Throttles - Advance to 1,500 RPM
- 13) Feathering check - **Max 500** RPM drop – engine damage possible below 1,000 RPM in feather
- 14) Throttles - Advance to 2,200 RPM - Check prop governor by exercising props - **Max 300** RPM drop
- 15) Magneto check both engines @ 2,200 RPM:
Maximum drop - 175 RPM
Maximum difference - 50 RPM
- 16) At 2,200 RPM - Re-confirm oil pressure, alternator function, and vacuum
- 17) Throttles - Check idle ca. 550 to 600 RPM, then advance to 1,200
- 18) Transponder – Verify correct squawk #, then ON
- 19) Time – Copied
- 20) Electric fuel pumps - ON

TAKEOFF & CLIMB:

- 1) Electric fuel pumps – CONFIRM ON
- 2) Throttles - Advance gradually to full forward & guard

- 3) Pass V_{mc}, 64 KIAS (red line), begin rotation @ 70 KIAS
- 4) Pass V_{yse}, 88 KIAS (blue line) A.S.A.P.
- 5) Obstacle clearance speed, V_x = 89 KIAS
- 6) Gear - UP when positive ROC established
- 7) Normal climb at V_y, 103 KIAS
- 8) Electric fuel pumps – OFF, at safe altitude, *ONE AT A TIME*
- 9) Cruise climb at 120 KIAS, props set to 2,500-2,575
- 10) Cowl flaps - as required by OAT & CHT

CRUISE:

- 1) Power - Set and lean for desired efficiency, see POH, 5-32
(2,400/24, 100° F. EGT rich of peak is a best-power intermediate cruise setting, and 2,200/20, 100° F. rich of peak is a best power, long-range cruise setting. Best economy settings at peak EGT can cook Lycoming valves... hence the rich of peak settings seem wiser. Target lower power settings (below 65%), a CHT of less than 380° F. – 400° F., and oil temp 165° - 220°.)
- 2) Power change sequences:
INCREASE: Mixture - enrich; Prop – increase RPM; Throttle – advance
DECREASE: Throttle – reduce; Prop – decrease RPM; Mixture - lean
- 3) Cowl flaps - as required by OAT & CHT
- 4) Engine gauges – Scan regularly

DESCENT:

- 1) ATIS/AWOS, etc. - Listen & Copy & Set Altimeters to local
- 2) Mixtures - Enrich with descent
- 3) Airspeed - Not to exceed V_a, 131 KIAS in turbulence, and V_{ne}, 221 KIAS under any circumstance. Avoid shock cooling, (>50° F./min.)

BEFORE LANDING:

- 1) Safety belts; seats; cabin contents - Secure
- 2) Exterior lights - As required
- 3) Radar & Autopilot – OFF
- 4) Heater - OFF, fan ON to cool down
- 5) Fuel selectors - On, fullest tanks
- 6) Crossfeed - OFF
- 7) Landing gear - Extend below 132 KIAS
Confirm 3 green
- 9) Flaps - Extend $\frac{1}{4}$ below 141 KIAS
 $\frac{1}{2}$ below 123 KIAS
if desired, full below 108 KIAS
- 10) Trim - Reset
- 11) Mixture - Full rich, or as field elevation requires
- 12) Electric fuel pumps - ON
- 13) Props - High RPM, low pitch
- 14) Landing gear - Confirm 3 green... again
- 15) Pattern speeds - Above 88 KIAS, (Vyse), 75 on short final
- 16) Cowl flaps - As required by OAT & CHT

GO-AROUND:

- 1) Props - High RPM, low pitch
- 2) Throttles - Full forward

- 3) Flaps - Retract gradually, in steps
- 4) Gear - Retract when positive ROC established
- 5) Cowl flaps - As required by OAT & CHT
- 6) Airspeed - Accelerate to climb at V_y , 103 KIAS to TPA
- 7) Pattern speeds - Above 88 KIAS, (V_{yse}), 75 on short final
- 8) Landing gear - Extend below 132 KIAS
Confirm 3 green
- 9) Flaps - Extend $\frac{1}{4}$ below 141 KIAS
 $\frac{1}{2}$ below 123 KIAS
if desired, full below 108 KIAS
- 10) Trim - Reset
- 11) Mixture - Full rich, or as field elevation requires
- 12) Electric fuel pumps - ON
- 13) Props - High RPM, low pitch
- 14) Landing gear - Confirm 3 green again

AFTER LANDING & CLEAR OF RUNWAY:

- 1) Flaps - Retract – (**AVOID** gear handle!!! - do not rely on squat valve)
- 2) Electric fuel pumps - OFF
- 3) De-icing - OFF
- 4) Transponder - Standby
- 5) Heater - OFF, continue FAN until cool
- 6) Cowl flaps - Open

- 7) Exterior lights - As required
- 8) Trim – Re-Set for next takeoff
- 9) Door seal - Deflate

SHUTDOWN:

- 1) Avionics & Autopilot master - OFF
- 2) Exterior lights - All OFF, except rotating beacon
- 3) Heater & Fan - OFF
- 4) Magneto "P" lead & switch check, if desired.
- 5) Left engine Mixture - Idle cut off
- 6) Gear handle – Select "Down" *after left engine stops turning*. Snaps to neutral if right hydraulic pump is OK
- 7) Right engine Mixture - Idle cut off
- 8) Magnetos - OFF, both engines
- 9) Vacuum - red buttons - Check both popped out
- 10) Alternator inop. lights - Check on
- 11) Shadin fuel readings - Checked and noted
- 11) Master switch - OFF
- 12) Time & Hobbs – Copied
- 13) Cowl flaps – Closed

SHADIN DIGITAL FUEL MANAGEMENT SYSTEM

NORMAL PROCEDURES CHECKLIST SUPPLEMENT

WARNING: This system measures FLOW, **not** QUANTITY. Quantity must be determined and entered manually by pilot.

A) Pressing the "ENTER/TEST" button (button on left) will produce, in sequence:

- 1 a "GOOD" if the display is OK
- 2 the K-factor (pulse count units): per "gal." is desired
- 3 the maximum usable fuel: 177 (full) is expected
- 4 software & revision version #
- 5 distance to a waypoint or destination – (to check integrity of data interface)

B) To reset quantity after fuel is added:

Method (1): "Ramping" (for partial or "fill-up" additions)

"REM/USED" toggle (in center) - move to "REM", (to left), to see last fuel remaining on board figure – AND continue to HOLD toggle in "REM" position as you simultaneously... Press AND HOLD "ENTER/TEST" button to **increase** quantity... RELEASE REM/USED toggle and ENTER/TEST button when desired quantity is reached.

To **decrease** an accidental excessive fuel entry, move "REM/USED" toggle to "USED", (to right), AND continue to HOLD toggle in "USED" position as you simultaneously... press and hold ENTER/TEST button. Release toggle and button when desired quantity is reached.

Method (2): "FULL/ADD" toggle switch (for "fill-up" additions)

Shadin "FULL/ADD" toggle (on right) - move to "FULL FUEL", (to left), and HOLD as you press Shadin "ENTER/TEST" button.

Verify "177" is displayed by moving "REM/USED" toggle to "REM", (to left).

The *LEFT WINDOW* displays total fuel flow of both engines. (Separate engine fuel flows can be displayed by moving "REM/USED" and "FULL/ADD" toggles toward each other... "squeeze them").

The *RIGHT WINDOW* display is selected by the "REM/USED" toggle switch and the ROTARY KNOB.

toggle	"USED"	displays fuel used
toggle	"REM"	displays fuel remaining
knob	"Endurance"	hours and minutes endurance at present burn
knob	"NM/gal"	mpg
knob	"Gal to Dest"	fuel required to reach the active waypoint FLASHING display = insufficient, and the gallons shortage will display as a negative number
knob	"Gal Reserve"	fuel remaining upon reaching the active waypoint FLASHING display = less than 45 min. reserve on reaching the active waypoint

N700KQ "V" speeds, in Knots, IAS

$V_A = 131$ = Design Maneuvering Speed - the maximum speed at which the application of full available aerodynamic control will not overstress the aircraft.

$V_{FE} = 108^*$ = Maximum Flap Extended Speed - the highest speed permissible with flaps in a prescribed extended position*.

* full = 108; half = 123; quarter = 141

$V_{LE} = 132$ = Maximum Landing Gear Extended Speed - the maximum speed at which an aircraft can be safely flown with the landing gear extended.

$V_{LO} = 132$ = Maximum Landing Gear Operating Speed - the maximum speed at which the landing gear can be safely extended or retracted.

$V_{MCA} = 64$ = Air Minimum Control Speed - the maximum speed at which the airplane is directionally controllable as defined by FAR certification standards, particularly §23.149.

Manufacturer selects the maximum certification weight, but V_{MCA} for piston aircraft may not exceed $1.2 \times V_{S1}$ at maximum takeoff weight. Manufacturer selects control standard of "zero yaw" OR with an angle of bank not to exceed 5° . Certification conditions further include critical engine (left for N700KQ) inoperative, prop windmilling; not more than 5° bank into the right engine; takeoff power on right engine; landing gear up; flaps in takeoff position (up for N700KQ); most rearward CG.

[Simulated Single Engine power setting: 2200 RPM / 11" MP]

$V_{NE} = 221$ = Never Exceed Speed.

$V_{NO} = 175$ = Maximum Structural Cruising Speed. ("Normal Operating")

$V_S = 61$ = Stalling Speed, or the minimum steady flight speed at which the airplane is controllable.

$V_{S1} = 61$ = Stalling Speed or minimum steady flight speed in a specific configuration, for N700KQ, gear and flaps up.

$V_{SO} = 55$ = Stalling Speed, or the minimum steady flight speed at which the airplane is controllable in the landing configuration, gear and flaps down.

$V_{SSE} = 80$ = Intentional One Engine Inoperative Speed - a minimum speed selected by the manufacturer for intentionally rendering one engine inoperative for pilot training. (V_{MCA} demonstrations to be conducted above 5,000 feet... engine at 2200/11" MP)

$V_X = 89$ = Best Angle-of-Climb Speed.

$V_{XSE} = 83$ = Best Single Engine Angle-of-Climb Speed.

$V_Y = 103$ = Best Rate-of-Climb Speed.

$V_{YSE} = 88$ = Best Single Engine Rate-of-Climb Speed.

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N700KQ - WEIGHT ISSUES

Empty Weight: 3,401 lbs.

Maximum Zero Fuel Weight: 4,400 lbs.

Maximum Landing Weight: 4,940 lbs.

Maximum Gross Weight: 5,200 lbs.

A 4,400 lbs. "Zero Fuel Weight" limitation was imposed in 1983 (AD 83-22-01 R1) to discourage excessive fuselage loading (fuel loading in wings counteracts the wing lift that bends the wing upwards, but fuselage loads can amplify bending loads on wing roots by the downward force at the roots added to (not counteracting) the wing lift upward force).

The most recent (12/17/07) weight and balance review showed the "Empty Weight" to be 3,401 lbs., allowing 999 lbs. to be loaded in the fuselage before any fuel is loaded.

With a maximum "Gross Weight" limit of 5,200 lbs., and 999 lbs. loaded in the fuselage, 800 pounds of fuel (133 gallons) could be loaded... not the 177 gallons maximum the tanks can hold. Essentially, the inboard tanks could be filled, and the outboards filled about 60%. (N.B. the "outboards" in each wing of N700KQ are 2 interconnected bladders... a 34.3 gallon one and a 20 gallon one... comprising a 54.3 gallon usable capacity in each wing. The inboards are individual 34.3 usable gallon bladders.)

The aircraft was actually weighed 1/2/07 **WITH FULL FUEL**, and the result was 4,460 lbs. Subtracting this from the maximum "Gross Weight" would leave 740 lbs. for passengers and luggage, with full fuel on board.

If we keep the fuselage loading below 740 lbs., we will not exceed the "Zero Fuel Weight" limit or the maximum "Gross Weight" limit.

Between 740 lbs. and 999 lbs. in fuselage load, we begin to need an offsetting reduction in fuel loading.

The "Maximum Landing Weight" limit is 4,940 lbs., indicating that 260 lbs. or 43 gallons of fuel needs to be burned off after a Maximum Weight takeoff before landing. That would take about 1:20 to 1:40 of flight, depending on power settings. To be immediately under the "Maximum Landing Weight" limit and under the "Zero Fuel Weight" limit AND have full fuel, would require that the fuselage load be limited to about 480 lbs.

Previous owners suggested loading the rear baggage area (up to 150 lbs.) before placing baggage in the nose compartment (up to 150 lbs.) to avoid a nose-heavy feeling.

A hypothetical light 3-passenger (470 lb.) load with 60 lbs. baggage in the rear compartment and full fuel will exceed the Maximum Landing Weight on takeoff, and will push the edge of the envelope. Three hours of fuel burn will improve this dramatically. This is not a "full seats, full fuel, full baggage" aircraft.

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EMERGENCY PROCEDURES

CRITICAL SPEEDS:

V_{MCA} = 64 KIAS
 V_{XSE} = 83 KIAS
 V_{YSE} = 88 KIAS
 V_A = 131 KIAS
 V_{NE} = 221 KIAS

SECURING ENGINE & FEATHERING PROCEDURE:

Throttle	- CLOSE
Prop	- FEATHER promptly when greater than 1,000 RPM
Mixture	- Idle Cut-Off
Cowl Flaps	- Close
Magneto	- OFF
Electric fuel pump	- OFF
Fuel selector	- OFF
Alternator	- OFF
Prop Sync.	- OFF
Electrical load	- Reduce
Crossfeed	- Consider use

ENGINE FAILURE DURING TAKEOFF BELOW V_{MCA} (64 KIAS):

Throttles	- CLOSE IMMEDIATELY
Brakes	- Stop straight ahead, if runway remains

If insufficient runway remains:

Throttles	- CLOSE IMMEDIATELY
Brakes	- SLOW as much as possible
Mixtures	- Idle Cut-Off
Master	- OFF
Fuel selectors	- OFF
Magnetos	- OFF

Maintain directional control and avoid obstacles if possible.

ENGINE FAILURE DURING TAKEOFF BETWEEN V_{MCA} and V_{XSE} (64 to 83 KIAS):

DECISION: ABORT or CONTINUE

If *ABORT*, follow "ENGINE FAILURE DURING TAKEOFF BELOW V_{MCA} PROCEDURES", above.

(WARNING! Many combinations of weight, configuration, and ambient conditions can make single engine climb marginal or impossible. Also see comments at SINGLE ENGINE GO-AROUND, below)

If "*CONTINUE*", ACCELERATE to 83 KIAS in ground effect, and follow "ENGINE FAILURE 83 KIAS and ABOVE", next...

ENGINE FAILURE DURING TAKEOFF, 83 KIAS, (V_{XSE}), and ABOVE:

Airspeed	- 83 KIAS <i>MINIMUM</i> , 88 KIAS (V_{yse}) when clear of obstacles
Direction	- Maintain Control
Power	- Maximum
Gear	- Retract
Flaps	- Confirm UP
Prop (inop. engine)	- FEATHER
Bank	- 5° toward good engine
Cowl Flaps (inop. engine)	- CLOSE
Cowl Flaps (good engine)-	- CLOSE, as much as engine temps permit
Climb	- straight
Inop. Engine	- see SECURE ENGINE & FEATHERING, above
Landing	- ASAP, (See SINGLE ENGINE LANDING)

ENGINE FAILURE DURING CLIMB:

Airspeed	- Maintain 88 KIAS
Direction	- Maintain Control
Inop. Engine	- see SECURE ENGINE & FEATHERING, above
Landing	- ASAP, (See SINGLE ENGINE LANDING)

ENGINE FAILURE DURING FLIGHT, BELOW V_{MCA} (64 KIAS):

- Rudder - Apply toward operative engine
- Throttles, (both) - Retard
- Pitch - Lower nose, accelerate above 64 KIAS
- Power - Increase operative engine as required
- Restart - Attempt if altitude permits, & see ENGINE FAILURE DURING FLIGHT, ABOVE V_{MCA} (64 KIAS), next...

ENGINE FAILURE DURING FLIGHT, ABOVE V_{MCA} (64 KIAS):

- Inop. Engine - Identify
- Good engine - Power as needed
- Electric fuel pump - ON, Inop. Engine
- Fuel quantity, selection - Select sufficient tank
- Oil pressure, temp. - Check
- Magneto switches - Confirm ON

If no restart, - see SECURE ENGINE & FEATHERING, above

Operative engine, POWER, MIXTURE, FUEL SELECTION, FUEL PUMP, COWL FLAPS... AS REQUIRED

- Bank - 5° toward good engine
- Electrical Load - Minimum required
- Landing - ASAP, & see SINGLE ENGINE LANDING, next...

SINGLE ENGINE LANDING:

- Inop. Engine - see SECURE ENGINE & FEATHERING, above
- Seat belts / harness - Secure
- Heater - Off if it has been used, "Fan" ON to cool
- Electric fuel pump - ON, operative engine
- Mixture - RICH, operative engine
- Prop - High RPM, (low pitch), operative engine
- Cowl flaps - As required, operative engine
- Fuel selection - Fullest tank, "ON", operative engine
- Crossfeed - Off
- Airspeed - Maintain 98 KIAS until landing assured

Altitude	- Higher than usual until landing assured
Gear	- Down when landing assured, (on final)
Flaps	- Down when landing assured, (on final)
Direction	- Maintain Control, expect yaw toward operative engine as power is reduced

SINGLE ENGINE GO-AROUND, (Inoperative engine must be secure & feathered): AVOID IF POSSIBLE !

Airspeed	- Hold 88 KIAS, (V_{YSE})
Power	- Maximum
Flaps	- Retract
Gear	- Retract
Cowl flaps	- As required

UNFEATHERING & AIR START:

Fuel selector	- ON
Throttle	- Open 1/2"
Mixture	- Rich
Electric fuel pump	- Prime, then OFF
Prop	- Forward
Magnetos	- ON
Starter	- Engage until prop unfeathers
Prop	- Select reduced RPM as it passes 1,000
Throttle, while warming	- Reduced power, 2,000 RPM max
Cowl flaps	- Closed
Oil Pressure	- Check
Alternator	- On

OVERSPEEDING PROPELLERS:

Throttle	- Retard
Airspeed	- Reduce
Throttle	- Add slowly after RPM is controlled
Airspeed	- Stay below overspeed airspeed
Descend	- At 2,200 RPM
Land	- At 2,400 RPM

Note: Prop will not feather while overspeeding. Do not select feather or shut down engine while overspeeding.

ENGINE ROUGHNESS:

- Electric fuel pumps - ON
- Engine instruments - Scan for cause
- Mixture - Adjust as required
- Alternate Air - OPEN
- Cowl flaps - Adjust for proper CHT
- Fuel - Switch tanks
- Magnetos - Check

ENGINE OVERHEAT:

- Cowl Flaps - OPEN
- Mixture - Richen
- Power - Reduce
- Airspeed - Increase if altitude permits

LOSS OF OIL PRESSURE:

- Secure engine - see SECURE ENGINE & FEATHERING, above

ROUGH AIR OPERATION:

- SLOW to V_A , 131 KIAS, or slightly less
- Avoid abrupt maneuvers
- Seat belts / Harness - Tighten

EMERGENCY GEAR EXTENSION, MANUAL:

132 KIAS = V_{LE}

- Gear selector - DOWN position
- Hand pump - Extend handle & pump

Continue until "3 green" and gear selector returns to neutral

EMERGENCY GEAR EXTENSION, CO₂:

132 KIAS = V_{LE}

Gear selector	- DOWN position
Ring cover	- RAISE
Ring	- PULL

After CO₂ extension: Do NOT attempt to raise gear hydraulically.

GEAR UP LANDING:

Normal DESCENT & BEFORE LANDING checklist – Complete, except gear

Gear selector - UP

Make normal approach with power

Close throttles on short final before touchdown

Master and Magneto switches - OFF*

Fuel valves - OFF

Touch down at minimum speed

(*If time permits, use starters to "bump" props to horizontal)

EMERGENCY MANUAL FLAP EXTENSION:

$V_{fe} - 1/4 = 141$ KIAS

$1/2 = 123$ KIAS

Full = 108 KIAS

Flap selector - Desired DOWN position

Hand pump - Extend handle & pump

ENGINE FIRE ON GROUND:

Electric fuel pump - OFF

Fuel selector - OFF

Brakes - As needed

Throttle - Open

Radio - Call for help

Mixture (if fire continues) - Idle Cut-Off

- Live engine - Off and secure
- Evacuate aircraft
- External fire extinguisher - Use it

ENGINE FIRE IN FLIGHT:

- Mixture - Idle Cut-Off
- Electric fuel pump - OFF
- Fuel selector - OFF
- Propeller - Feather
- Good engine power - Increase
- Drag - Reduce, (flaps, gear, cowl)
- Alternator - Off
- Electrical load - Reduce
- Magnetos - Off

- If fire continues - Dive for speed to blow out fire
- Single engine operation - To suitable airport
- Land - ASAP

CABIN FIRE:

- Vents - Closed
- Heater - Off
- Fire extinguisher - Use carefully
- When fire extinguished - Ventilate cabin

ELECTRICAL FIRE:

- Flashlight - In hand if dark
- Master switch - OFF
- Circuit breakers - Identify open breakers (shorted), pull the rest
- Electrical switches - All OFF
- Avionics - All OFF
- Vents - Closed
- Heater - Off
- Fire extinguisher - Use
- When fire extinguished - Ventilate cabin
- Master switch - ON

- Faulty circuit breakers - Leave OFF
- Other circuit breakers - ON, one at a time, minimum for safe flight
- Avionics & switches - ON, one at a time, minimum for safe flight

EMERGENCY DESCENT:

- Throttles - To idle, slowly
- Propellers - Forward, low pitch, high RPM
- Speed of dive - 175 (V_{no}), 131 (V_a) in rough air
- Cowl flaps - Closed to lessen shock cooling

GOING INTO CROSSFEED: Use only to extend range in single engine operation.

- Fuel selector, dead engine side - ON, (inboard or outboard)
- Electric fuel pump, dead engine - ON
- Crossfeed valve - ON
- Electric fuel pump, live engine - OFF (to prevent heating of trapped fuel & vapor lock when coming out of crossfeed)
- Fuel selector, live engine - OFF

COMING OUT OF CROSSFEED:

- Fuel selector, live engine side - ON, (inboard or outboard)
- Electric fuel pump, live engine - ON
- Electric fuel pump, dead engine - OFF
- Crossfeed valve - OFF
- Fuel selector, dead engine side - OFF
- Electric fuel pump, live engine - May now be cut off... use as required

ONE ALTERNATOR INOP LIGHT ON:

- Reduce electrical load to minimum
- Master switch, Inoperative side - OFF temporarily
- Circuit breakers - Reset tripped ones
- Master switch, both sides - ON
- If Inop. light goes out - Reinstate electrical load
- If Inop. light stays on - Inop. side of Master switch OFF and continue with reduced load

BOTH ALTERNATOR INOP LIGHTS ON:

Repeat "One Alternator Inop Light" procedures

If both alternators do not restart (Inop lights stay on)...

- Master switch - ON (run on battery only)
- Alternator circuit breakers - OFF
- Reduce electrical load as much as possible
- Terminate flight & land - ASAP

DOOR OPEN IN FLIGHT:

- Airspeed - Reduce to minimize buffeting
- Terminate flight & land - ASAP

SPIN RECOVERY*:

- Throttles - Retard both to idle
 - Rudder - Full opposite to spin until rotation stops
 - Control wheel, stabilator - Neutral to full forward if necessary
 - Ailerons - Neutral
- Recover from dive when spin stops.

* Spin demonstrations are not required in the certification of aircraft of this weight, and Piper claims none were conducted, so the suggested recovery technique may not work. Avoid spins.

AIRFRAME VIBRATION:

- Airspeed - Reduce to see if vibration stops
- Controls - Handle smoothly & gently
- Terminate flight & land - ASAP... investigate cause of vibration

SEVERE ICING: (see AD 99-14-01)

If one or more of the following visual cues exists, immediately request priority handling from ATC to facilitate a route or altitude change; AND disengage autopilot, while holding the control wheel firmly:

Unusually extensive ice accumulation on the airframe and windshield in areas not normally observed to collect ice...

Accumulation of ice on the upper surface of the wing, aft of the protected leading edge...

Accumulation of ice on the engine nacelles and propeller spinners farther aft than normally observed...

Do not extend flaps when holding in icing conditions.

If flaps are extended, do not retract them until airframe is clear of ice.