1967 Piper Arrow PA28R-180 N3936T

Preflight

1. ARROW documents	16. Alternator belt
2. Record Hobbs	17. Fuel levels–both tanks
3. Extend flaps	18. Fuel sumps x 3
4. Master ON	19. Fuel vents
5. Panel lights and 3 green gear lights ON	20. Stall warning tab
6. Fuel gauges – note level	21. Oil 6-8 qts, dipstick secure, panel closed
7. Switches for beacon and pitot heat ON	22. Main gear tires, shocks, hydraulics, wells
8. Roller for nav lights ON	23. Nose gear tire, shocks, hydraulics, well
9. Circuit breakers IN	24. Windshield – clean
10. Lights visible and 2 pitot tubes heating	25. Cargo secured, and cargo door locked
11. Master OFF	26. Cowling and oil cover secure
12. Control surfaces, hinges	27. Stow tow bar/chocks
13. Antennas	28. Final walk around
14. Prop and spinner	29. Flaps up
15. Air inlets	30. Flight plan FILE

Engine Start

Preflight inspection	COMPLETE
Passengers	BRIEFED
Seats and seatbelts	SECURE
Brakes	SET
Fuel selector	FULLEST
Flaps	UP
Avionics and electrical	OFF
Throttle	OPEN ½"
Prop control	FULL FORWARD
Mixture	FULL LEAN
Master	ON
Beacon	ON
Fuel pump	ON
Mixture	FULL RICH 5 SEC THEN IDLE
"Clear Prop!"	
Ignition	TURN and PUSH IN TO START
Mixture	FULL RICH AS ENGINE STARTS
Throttle	1200 RPM
Oil pressure	GREEN
Fuel pump	OFF
Fuel pressure	GREEN
Alternate air	CHECK
Additional lights	AS NEEDED
Avionics/RADIO/VOR	SET
Transponder	ALT
Headset noise cancel	ON
Fuel tank timer	SET

Run Up

Parking brake	SET
Flight controls	FREE/CORRECT
Stabilator and rudder trim	TAKE OFF POSITION
Fuel pump	ON
Fuel selector	FULLEST
Mixture	FULL RICH
Throttle	2300
Prop control	EXERCISE x3 THEN FULL FWD
Magnetos (max 125 drop, 50 diff)	CHECK
Vacuum	4.8-5.2
Ammeter	CHECK
Throttle	IDLE then 1200
Throttle friction	ADJUST
Heading indicator	SET
Attitude indicator	ADJUST
ATIS/Weather	OBTAINED
Altimeter	SET
Radio and VOR	SET
Transponder	ALT
Doors and windows	CLOSED/LATCHED
Seats and seatbelts	SECURE
Beacon	ON
Landing light	ON
Parking brake	RELEASE
Flight plan	ACTIVATE
Runway clear	VISUALIZE

Take off - normal

Compass, DI	ALIGNED to RUNWAY #
Fuel pump	ON
Flaps	UP
Stabilator trim	TAKE OFF POSITION
Gear lights	3 GREENS
Mixture	FULL RICH
Prop control	FULL FORWARD
Throttle	FULL FORWARD
Engine instruments	GREEN
Airspeed	ALIVE
Rotate	70 mph
Climb	>90-95 mph (to allow gear mvmt)
Landing gear	UP WHEN NO USABLE RUNWAY
Gear in transit	ANNOUNCE
Gear retracted	ANNOUNCE
Climb	V_Y = 100 mph
Trim	AS NEEDED

Climb – above pattern alt

Throttle	SET to MANIFOLD PRESSURE 24"
Prop control	SET TO 2400 RPM
Fuel pump	OFF, CHECK FUEL PRESSURE STABLE
Climb	V_Y = 100 mph
Trim	AS NEEDED

Cruise

Throttle and Prop	AS REQUIRED (e.g. 25", 2200 rpm)
Mixture	LEAN (by exhaust temp)
Trim	AS NEEDED
DG	REALIGN EVERY 15 MIN
FUEL TANK	CHANGE EVERY 30 MIN

Descent and landing

	Weather	OBTAIN
	Altimeter	SET
	DG	SET
	Radio	SET
	Landing light	ON
	Throttle	AS REQ, MANIFOLD > 15"
G	**Fuel selector**	FULLEST
	Fuel pump	ON
	Fuel pressure	CHECK
	Engine instruments	CHECK
U	**Landing gear**	DEPLOY at < 150 mph
	Gear in transit	ANNOUNCE
	Gear extended	CHECK 3 GREENS
M	**Mixture**	FULL RICH
P	**Prop control**	FULL FORWARD
S	**Seatbelts, switches**	CHECK
	Flaps	AS DESIRED
	Airspeed	100/90/80 dwnwnd, base, fnll
	Red, Blue, 3 Greens	ANNOUNCE on SHORT FINAL
	Airspeed	75-80 "OVER THE FENCE"

Shutdown

Flaps	RAISE
Trim	RESET
Fuel pump	OFF
Lights (not beacon)	OFF
Avionics	OFF
Throttle	IDLE
Mixture	IDLE CUT-OFF
Master	OFF
Magnetos	OFF
Beacon	OFF
Keys	REMOVE
Hobbs	RECORD
Aircraft	CLEAN and SECURE

Power Setting Table - Lycoming Model IO-360-B1E Series, 180 HP Engine

Press. Alt Feet	Std. Alt Temp °F	99 HP – 55% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	117 HP – 65% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	135 HP – 75% Rated RPM AND MAN. PRESS. 2200	2300	2400	Press. Alt Feet
SL	59	21.2	20.7	20.2	19.7	24.0	23.4	22.8	22.2	26.0	25.4	24.7	SL
1,000	55	21.0	20.5	20.0	19.5	23.8	23.2	22.5	22.0	25.8	25.1	24.5	1,000
2,000	52	20.7	20.3	19.7	19.3	23.5	22.9	22.3	21.8	25.5	24.8	24.2	2,000
3,000	48	20.5	20.0	19.5	19.1	23.2	22.7	22.0	21.5	25.3	24.6	24.0	3,000
4,000	45	20.3	19.8	19.3	18.9	23.0	22.5	21.8	21.3	25.1	24.3	23.8	4,000
5,000	41	20.0	19.6	19.1	18.6	22.7	22.2	21.6	21.1	FT	24.1	23.5	5,000
6,000	38	19.8	19.4	18.9	18.4	22.5	22.0	21.3	20.9	--	FT	23.3	6,000
7,000	34	19.6	19.2	18.7	18.2	22.0	21.8	21.1	20.7	--	--	FT	7,000
8,000	31	19.3	18.9	18.4	18.0	FT	21.5	20.9	20.5				8,000
9,000	27	19.1	18.7	18.2	17.8	--	FT	20.6	20.3				9,000
10,000	23	18.9	18.5	18.0	17.6	--	--	FT	20.1				10,000
11,000	19	18.6	18.3	17.8	17.4	--	--	--	FT				11,000
12,000	16	18.4	18.1	17.6	17.2								12,000
13,000	12	FT	17.8	17.4	17.0								13,000
14,000	9	--	FT	17.1	16.8								14,000
15,000	5	--	--	FT	FT								15,000

To maintain constant power, correct manifold pressure approximately 0.17" Hg for each 10° F variation in carburetor air temperature from standard altitude temperature. Add manifold pressure for air temperatures above standard; subtract for temperatures below standard.

Emergency Gear Extension

Panel light dimmer	OFF IN DAYLIGHT
Master	ON
Circuit breakers	IN
Bulbs (if some but not all lit)	EXCHANGE
Airspeed	< 100 mph
Extension knob	FULL DOWN, RETRY
Emergency gear lever	Override ENGAGED
Yaw	LEFT/RIGHT
Emergency gear lever	EMERGENCY DOWN
Yaw	LEFT/RIGHT

Prop Overspeed

Throttle	RETARD
Oil pressure	GREEN
Prop control	LOWEST, THEN SET IF ABLE
Airspeed	REDUCE
Throttle	AS NEEDED FOR <2700 rpm

Engine Failure at altitude

Airspeed	VGLIDE 90 mph
Fuel selector	TANK WITH GAS
Fuel pump	ON
Mixture	FULL RICH
Alternate air	ON
Emergency gear lever	AS REQUIRED
If can't restart	POWER OFF LANDING
If gear up landing needed	Lock/hold gear override in engaged position

Loss of Oil Press/High Oil Temp

Land	ASAP – prepare for power off landing

Loss of Fuel Pressure

Fuel pump	ON
Fuel selector	FULLEST TANK

V speeds	MPH	KIAS
VSO (Flaps down, gear down)	63	55
Vs (Flaps up, gear up)	69	60
VR (normal - 0° flaps)	70	61
VR (short - 25° flaps)	60	52
VX (sea level)	90	78
VY (sea level)	100	87
VGLIDE	90	78
VA (max gross)	134	116
VFE	125	109
VLO UP	125	109
VLE	150	130
VNE	214	186
Vnormal appch (full flaps)	85	74
Vnormal appch (0° flaps)	90	78
Vshort-field appch (40° flaps)	82	71

Alternator Failure

Electrical load	REDUCE
Alt circuit breaker	CHECK
Alt switch	OFF THEN ON
If no response, alt switch	OFF
Land	ASAP
Gear	May need emerg gear extension if batt dead
Position lights	Not illum if batt dead

Spin Recovery

Yoke (P)	FULL FORWARD
Ailerons (A)	NEUTRAL
Rudder (R)	FULL OPPOSITE TO SPIN
Throttle (E)	IDLE
Rudder	NEUTRAL WHEN NO SPIN
Flaps	UP
Yoke	REGAIN LEVEL FLIGHT

Flooded start

Throttle	FULL OPEN
Master	ON
Fuel pump	OFF
Mixture	IDLE CUT-OFF
Starter	ENGAGE
Mixture	ADVANCE
Throttle	RETARD
Oil press	GREEN
Alternator	POSITIVE
Vacuum	4.8-5.2

Engine Fire During Start

Starter	ENGAGE
Mixture	IDLE CUT-OFF
Throttle	OPEN
Fuel pump	OFF
Fuel selector	OFF
If fire continues	EXIT AIRCRAFT

Engine Fire in Flight

Fuel selector	OFF
Throttle	CLOSED
Mixture	IDLE CUT-OFF
Fuel pump	OFF
Heater/defroster	OFF
Power off landing	ASAP

Cabin Smoke in Flight

Master switch	OFF
Vents	OPEN
Cabin heat	OFF
Land	ASAP