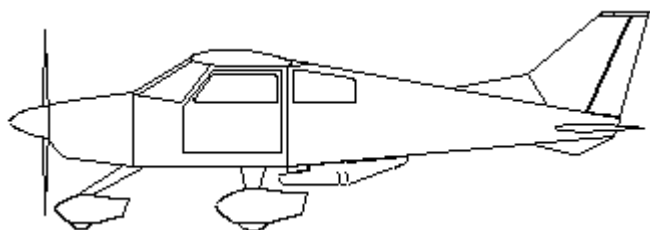


BD-4

SC

OPERATOR'S MANUAL

N682BD



John Steere

CHECK LIST

Preflight Inspection

Cabin Inspection

1. Ensure that all required paperwork is available.
 - Airworthiness certificate
 - Registration certificate
 - Operating handbook
 - Weight and balance data
 - Log book
 - License available and BFR current?
 - Medical certificate available and current?
2. Check that the ignition switch is off.
3. Switch on master switch.
4. Check indicated fuel quantity
5. Master switch off.
6. Fuel valve on preferred tank.

CHECK LIST

Exterior Inspection

1. Inspect the empennage.
2. Remove tail tie down.
3. Check for obstructions in rear chamber of belly scoop.
4. Check for free movement and security of elevator and rudder. Ensure balance weights are secure.
5. Check antennae.
6. Inspect left flap. Check security of flap, there should be only slight movement possible.
7. Inspect the left aileron for security and freedom of movement.
8. Remove Pitot cover and inspect the pitot tube.
9. Remove wing tie-down and ring.
10. Inspect the leading edge of the wing.
11. Check for obstructions in tank vent.
12. Drain a small quantity of fuel from the left fuel tank drain valve and check for water, sediment and proper fuel grade.
13. Inspect upper surface of left wing.
14. Visually check fuel quantity.

CHECK LIST

Exterior Inspection

(Continued)

15. Secure fuel cap.
16. Check left main wheel for condition inflation (45 lbs.) and brake fluid leaks.
17. Inspect static source opening.
18. Ensure air intake filter is unobstructed.
19. Open the oil fill access panel. Check for security of the filler cap, and check conditions in viewable area.
20. Check propeller and spinner for damage.
21. Check the air inlet under the spinner for obstruction.
22. Inspect the nose wheel and fairing. The nose wheel tire should be properly inflated.
23. Check intercooler intake for obstructions.
24. Open the dipstick access panel and check the oil level. Check conditions in the viewable area.
25. Open the header tank access panel and check the water level. The tank should be about half full when the water is cool. Check conditions in the viewable area.
26. Drain a small quantity of fuel from the fuselage drain valve and check for water, sediment and proper fuel grade.
27. Inspect the upper surface of the right wing.

CHECK LIST

Exterior Inspection

(Continued)

28. Visually check fuel quantity.
29. Check for obstruction in the tank vent.
30. Drain a small quantity of fuel from the right fuel tank drain valve and check for water, sediment, and proper fuel grade.
31. Remove wing tie-down and ring.
32. Inspect the leading edge of the right wing.
33. Inspect the right aileron for security and freedom of movement.
34. Inspect right flap. Check security of flap, there should be only slight movement possible.
35. Check right main wheel. The tire should be in good condition and adequately inflated to 45 lbs. There should be no signs of brake fluid leaks.
36. Check for obstructions in front chamber of belly scoop.

CHECK LIST

Before Starting Engine

1. Preflight inspection complete.
2. Seats adjusted and locked in position.
3. Seat belts and shoulder harnesses fastened. Explain operation to passengers.
4. Set fuel shutoff valve to fullest tank.
5. Turn radios and electrical equipment off.
6. Brakes test and hold.

Starting the Engine

1. Circuit breakers in.
2. Open belly scoop flap.
3. Master and Alternator switches ON.
4. Fuel pump #1 on.
5. Throttle closed
6. Propeller area check and shout "Clear".
7. Ignition switch start.
8. Check oil pressure.
9. Radios and GPS on.
10. Transponder set to standby.

CHECK LIST **Before Takeoff**

1. Brakes set.
2. Cabin doors latched. Explain operation to passengers.
3. Flight controls free and moving correctly.
4. Elevator trim set in takeoff position.
5. Water temperature in green arc.
6. Throttle advance smoothly to 1500 rpm.
7. Oil pressure and temperature should be in the green arc.
9. Check voltmeter
10. Check ammeter
10. Check vacuum gauge
11. Turn on fuel pump #2 and watch for pressure increase.
12. Turn off fuel pump #1. Fuel pressure > 28 PSI.
13. Turn fuel pump #1 back on.
14. Apply full throttle. Boost should be > 10 PSI.
15. Reduce throttle to idle.
16. Set the directional gyro to agree with the compass.
17. Set the altimeter to the field elevation.
18. Radios set to desired frequencies.

CHECK LIST

Takeoff

1. Landing light on
2. Transponder set to altitude encoding
3. Full throttle
4. Engine instruments in the green.
5. Lift nose wheel at 65 mph.
6. Climb at 75-mph. until clear of obstacles. V_x
6. Establish 95-mph. climb. V_y
7. Turn off fuel pump #2 when a safe altitude is attained.

CHECK LIST

Before Landing

1. Seats and belts secured.

After Landing

1. Flaps up.
2. Transponder set to standby.
3. Landing light off.

Shutdown

1. Radios off.
2. Ignition off
3. Fuel pumps off
4. All lights turned off.
5. Pitot heat turned off.
6. Master switch off.
7. Headsets power off
8. GPS off

Wing Removal Procedure

1. Drain wing tanks completely
2. Remove two bolts under each wing, near root.
3. Remove screws that fasten fiberglass fairing to the fuselage.
4. Remove inspection plate under wing, near root.
5. Remove access panels from headliner.
6. Remove aileron drive bolts through access holes in headliner.
7. Position wing rack under wing.
8. Position brace under opposite wing.
9. Lower rear edge of forward overhead access panel in cabin.
10. Screw wing push-off rod into wing at least three turns.
11. Use wing pry bar to force wing 2.5" from fuselage.
12. Disconnect fuel line, vent line, and electrical connector.
13. Pry wing off center spar about 3" and remove connections inside spar.
14. Remove the wing push-off rod.

Wing Assembly Procedure

1. Position wing on wing rack.
2. Position brace under opposite wing.
3. Position wing about 3" from end of center spar.
4. Complete all connections inside spar.
5. Grease center spar and aileron torque tube.
6. Slide wing onto spar until it is 2.5" from fuselage. Aileron torque tube must be aligned with its socket.
7. Lower rear edge of forward overhead access panel in cabin and screw the wing push-off rod into wing at least three turns.
8. Connect fuel line, vent, and electrical connector.
9. Use wing pry bar to seat wing against fuselage. Guide wing skin under fuselage skin overhang.
10. Install two bolts under wing near the root, and install covers.
11. Install screws that retain fairing to fuselage.
12. Install the aileron drive bolts in each wing.
13. Replace access panels in the headliner.
14. Remove the wing push-off rod and close the forward access panel.

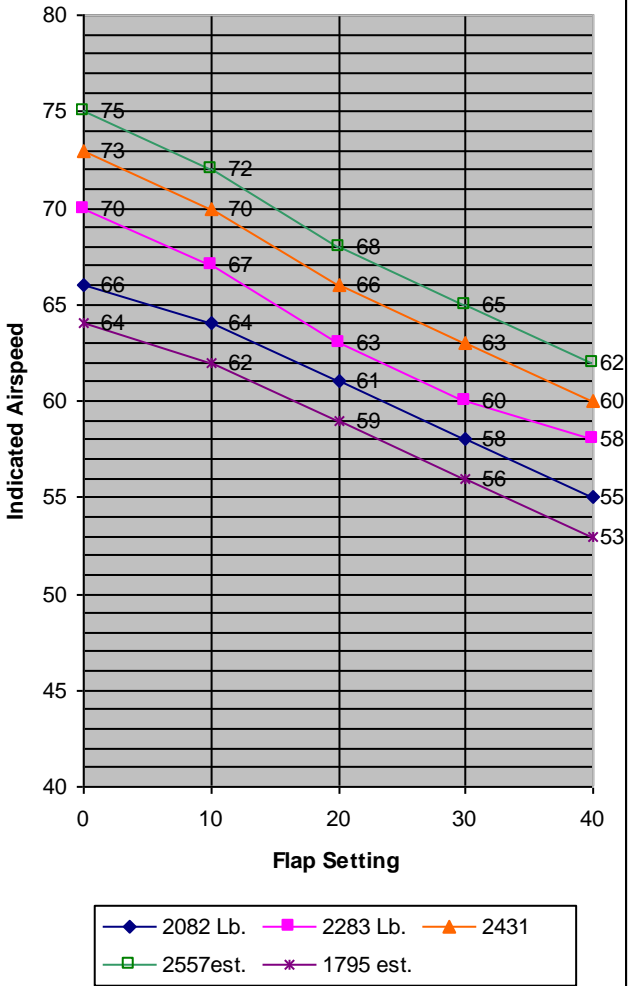
SPECIFICATIONS

Wing Span	29.2 ft.
Wing Area	116.7 ft.
Wing Chord	48 in.
Aspect ratio	7.3
Length overall	21.4 ft.
Height overall	7.2 ft.
Horizontal tail span	7.3 ft.
Aileron area	3.5 sq. ft.
Flap area	9.6 sq. ft.
Fin area	6.9 sq. ft.
Rudder area	1.5 sq. ft.
Horizontal tail area	21.3 sq. ft.
Cabin width	41 in.
Cabin length	89 in.
Cabin height	41 in.
Flap span	96"/side
Fuel capacity	42 gal.
Unusable fuel per tank	0.5 gal.
Aileron deflection - up	25°
Aileron deflection - down	17°
Elevator deflection - up	15°
Elevator deflection - down	6°
Servo tab - up	18°
Servo tab - Down	10°
Rudder left and right	16°
Flap deflection	10° 20° 30° 40°

PERFORMANCE

Gross weight	2600 lbs.
Empty weight	1557
Engine rating @ 4000 R.P.M.	199 H.P.
Useful load	1043
Wing loading	21.9 lb./sq. ft.
Power loading	12.84 lb./hp.
Max. speed at sea level	184 mph
Cruising speed @ 2 P.S.I boost	161 mph
Fuel burn rate at cruise	14 GPH
Stalling speed - flaps down 40° @ 2557 lb.	62 mph
Stalling speed - flaps up @ 2557 lb.	75 mph
Rate of climb – Prop pitch = 15°, 1861 lb.	1100 fpm
Best rate of climb speed	95 mph
Best angle of climb speed	75 mph
Maximum range	472 miles

N682BD Stall Performance



OPERATING LIMITATIONS

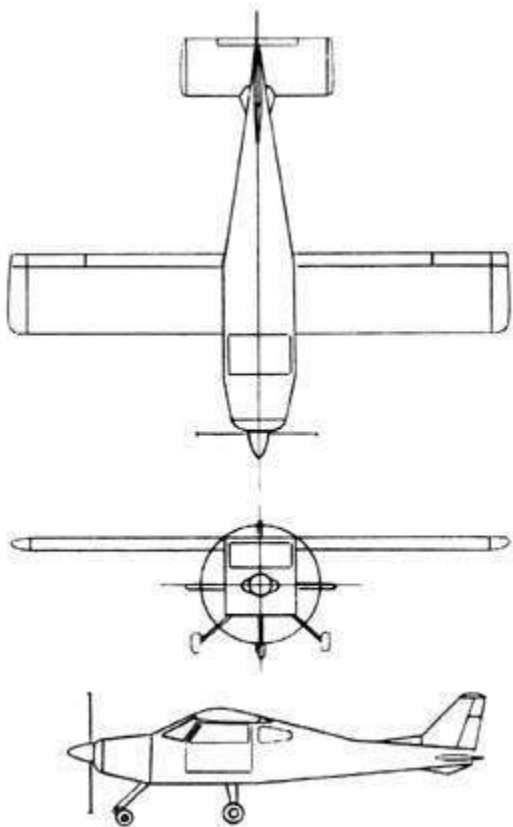
Never exceed speed (smooth air)	234 mph
Maximum structural cruising speed	180 mph
Maximum speed	
Flaps 10°	130 mph
Flaps 10° to 30°	105 mph
Flaps 40°	90 mph
*Maximum maneuvering speed	133 mph

* The maximum speed at which abrupt control travel can be used without exceeding the design load factor.

AIRSPEED INDICATOR MARKINGS

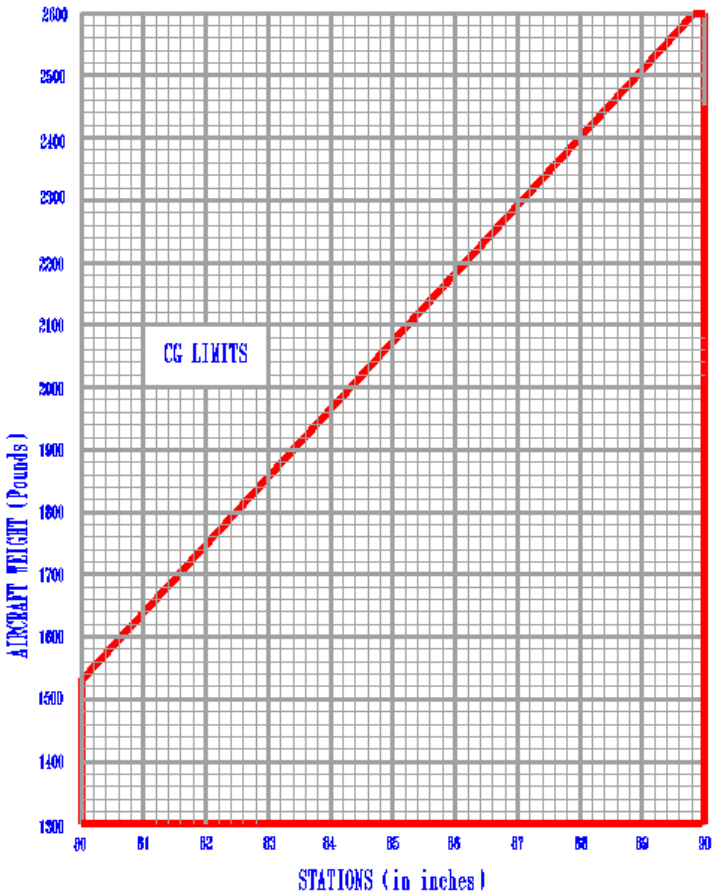
Never exceed (smooth air)	234 mph (red line)
Caution range	180 - 234 mph (yellow arc)
Normal operating range	66 - 180 mph (green arc)
Flap operating range	58 - 105 mph (white arc)

THREE VIEW DRAWING



CG Calculation

	<u>Weight</u>	<u>Station</u>	<u>Moment</u>
Empty	1535	79.18	121536
Front Seats	_____	95.00	_____
Rear Seats	_____	126.00	_____
Fuel	_____	90.27	_____
Baggage	_____	152.00	_____
Total	_____	_____	_____



Equipment List

Compass

Airspeed indicator

Attitude gyro

Altimeter

Turn coordinator gyro

Directional gyro

Vertical speed indicator

Clock

Fuel pressure indicator

Manifold pressure indicator

Oil Temperature indicator

Oil pressure indicator

Water temperature indicator

Water pressure indicator

Voltmeter

Ammeter

Fuel level indicator (2)

Communication radio

Transponder with altitude encoder

Intercom

EGT, 6 probe

FUEL INFORMATION

5-15-2000

Total fuel per wing -	21 gal.
Unusable Fuel -	0.5 gal. per tank.
Fuel flow rate at wing exit -	34.3 gph.
Fuel flow rate at firewall - Measured at fuel rail return line.	30.0 gph.

Modifications to Original Design

- Changed nose gear from tail-wheel to “Murphy” design.
- Increased nose gear strut wall thickness to 3/16” to prevent breakage.
- Used supercharged Ford 3.8 liter V6, rather than a Lycoming engine to reduce cost.
- Added a belly scoop to provide pressure differential across the radiator.
- Increased radius on angles at side of windshield to improve airflow.
- Used Brekke straight fuselage design to provide more room at rear seats.
- Used “JR’s” aluminum wing design in place of fiberglass wing panels.
- Lengthened wings by 22 inches per side.
- Lengthened flaps to 96 inches per side.
- Increased flap deflection angle to 40° to provide additional drag on final approach.
- Added two delrin bearings along the span of each flap to absorb added loads.
- Extended flap actuator rod through three ribs to improve robustness.
- Added enclosed baggage compartment.
- Increased access panel size at rear of fuselage to improve accessibility for service.
- Added large removable panels to provide access to the rear of the control panel.
- Changed from a “Stick” to a “Yoke” control system.
- Moved the battery to the rear of fuselage to balance heavier engine.
- Added an electrical stabilator trim tab drive to reduce sensitivity.

Modifications (continued)

- Add an electrically driven rudder trim system.
- Added a header tank with two fuel pumps, a low fuel level sensor, and a water sensor.
- Added a vent line from the top of the header tank, connected through a “tee” fitting to the outer ends of each wing tank.
- Modified the fuel valve to feed from both wing tanks simultaneously.
- Added fuel sumps, with drains, at the lowest point at the outer edge of each wing tank. The sumps also incorporate forward facing vents that terminate at the inboard end of each wing tank.
- Replaced the gascolator with a drain from the header tank.
- Added mercury switch controlled fuel valves in each wing tank to select front or rear fuel pick-up, depending on aircraft attitude or inertia loading.
- Used Cessna front seats in place of BD design for adjustability.
- Added antenna in wing tip for handheld back-up transceiver.
- Added doubler to main gear legs to reduce splay.
- Changed gear box from .063 to .093” thick aluminum to eliminate cracking problems.
- Added gussets at main gear box attach points to improve robustness.
- Added wing removal assist system.
- Added foam seals at aileron and flap pass-through points on the fuselage.
- Increased windshield thickness to ¼ inch.
- Modified the windshield mounting to ease maintenance or replacement.

Modifications (continued)

- Modified the doors to hinge from top and added two latching pins near the bottom.
- Replaced “sling” style rear seat with a fabricated aluminum bench seat, which can swing up for maintenance.
- Added a movable overhead panel forward of the center-section spar, enclosing the wing removal assist devices, a loudspeaker, and cockpit lighting.
- Added a rudder return cable and pulley to absorb heavy braking pressure.