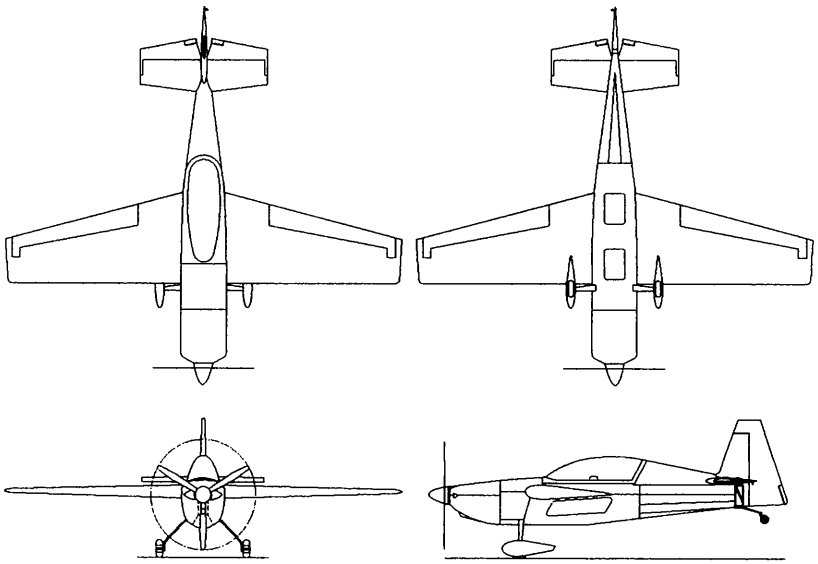
Pilot's Operating Handbook
And
Flight Manual



EDGE 540-T

Serial no: 2017

CERTIFIED EXPERIMENTAL

Manufactured by:

Zivko Aeronautics Inc
502 Airport Road
Building 11
Guthrie, OK 73044
405-282-1330
www.zivko.com

EDGE 540 T
AEROBATIC TANDEM

Operating Manual Revisions Index

Revision Number	Pages Affected	Description	Date
ZAI - 54T - 001	Pages 10 and 16	Locking of control surfaces to prevent hitting stops.	10-31-2001
ZAI - 540 - 002	Pages 12 and 13	Lay-out and pre-flight inspection modified.	11-07-2001
ZAI -54T - 002	Page 11	Addition of single place canopy install instructions	02-11-2003

Contents:

1 Introduction

This handbook contains the information required for successful operation of the Edge 540-T aerobatic airplane. It assumes the user of the handbook is a competent pilot and is familiar with aerobatic aircraft operation and performance. Zivko Aeronautics Inc suggests full familiarity with this manual to enable the pilot to operate the airplane safely, efficiently and ensure that they get the best results and performance.

1.1 Notes

1.1.1 It is the pilots responsibility to ensure full familiarity with all the aircraft systems and performance.

1.1.2 Amendments to this manual will be made available to currently registered owners when required.

1.1.3 Should this flight manual be lost, immediately contact Zivko Aeronautics Inc for a replacement.

1.1.4 **Important aviation documentation:** If found please return to Zivko Aeronautics Inc, 502 Airport Road, Guthrie OK 73044.

CAUTION
Flying aerobatics could result in injury, bodily harm, or even **death** if not performed correctly.

2 General Information

The Edge 540-T is an experimental single engine, two place, aerobatic airplane. It is constructed from a steel tube fuselage and composite wing, empennage and fairings. Powered by a modified Lycoming IO-540EXP the aircraft has exceptional aerobatic performance and is ideal for use in aerobatic training and competition aerobatics. The airplane is fitted with a full dual flight control system to facilitate full aerobatic flight training requirements. **Solo flight should be performed from the rear seat only.** Primary flight instruments (airspeed, altimeter and compass) are provided in the front seat for reference.

2.1 Certification

The Edge 540-T is certified under 14 CFR 21.191 in the experimental category.

2.2 Main information

2.2.1 Overall Dimensions

Length:	23ft 0"
Height:	7ft 9"
Span:	25ft 10"

2.2.2 Wing

Span:	25ft 10"
Area:	106ft^2
Airfoil design:	Unique John Ronz Design
Chord:	Root: 66" Tip: 33"
Aileron Deflection:	+/-25°

2.2.3 Horizontal

Span:	8ft 1"
Area:	22ft^2
Elevator Deflection:	+/-25°

2.2.4 Vertical

Area:	14ft 10"
Height:	5ft 2"
Rudder Deflection:	+/-30°

2.2.5 Engine

Modified Textron-Lycoming AEIO-540-EXP Rated power: 327HP @ 2450RPM. Refer to Textron Lycoming Aircraft Engines Series AEIO-320,-36 & 540 operators manual for further operating information. **Note:** As the engine on the Edge 540 is a modified AEIO-540 some operating information may differ from that stated in the Lycoming manual. Please refer to engine modifier for further information.

2.2.6 Propeller

Hartzell HC-C3YR-4AX composite, three blade, constant speed, counter balanced with Hartzell governor. The propeller is approved for full aerobatic flight.

2.2.7 Exhaust System

Custom manufactured by Sky Dynamics, Inc.

2.2.8 Fuel

Fuel type: AVGAS 100LL

Total fuel capacity: 61.5 US Gallons (17.5 fuselage + 22 each wing)

2.2.9 Oil System

Christen inverted oil system.

Aeroshell straight mineral SAE 50 should be used for the first 25 hours or until the engine stops using oil and a leak down test indicating that the piston rings are seated. Then Aeroshell Ashless dispersant (detergent) SAE 50.7 should be used for normal operation. Please refer to engine operating manual for more information.

Max. Capacity: 12 qts.
Min. Capacity: 10 qts.

Note: Multigrade oil is not recommended.

Empty weight:	1320lbs
Max gross Takeoff weight:	2200lbs
G rating gross:	±3G
Max gross Landing weight:	2100lbs
Max aerobatic weight single:	1600lbs
G rating single:	±10
Max aerobatic weight dual:	1850lbs
G rating dual:	±8G
Wing loading empty:	12.4 lbs/ft^2 typ.
Maximum airspeed V_{ne}:	230 Kts
Max full aerobatic airspeed V_a:	170 Kts
Power off stall V_{so}:	62 Kts @2200lbs
Max roll rate:	420°/sec typically
Max rate of climb:	3,700 ft/min

3 Equipment

Engine Equipment:

Engine:	Modified Lycoming IO540-EXP
Alternator:	B&C 8 amp
Starter:	B&C lightweight
Fuel Pump:	A/C
Boost Pump:	Welden
Inverted oil system:	Christen
Inverted fuel system:	ZAI
Cold air induction:	Barrett Performance Inc.
Propeller:	Hartzell HC-C3YR-4AX

Landing Gear:

Main gear spring:	Grove Aircraft
Main gear tires:	Airhawk 500 x 5 6ply
Main gear brakes:	Cleveland
Tail wheel:	Aviation products steerable

Instruments/Avionics:

Altimeter (feet) X 2
Airspeed (KIAS) X 2
Becker Com with remote head
Becker Transponder with remote head
ACK A-30 Altitude Encoder
EDM-900 Engine monitor
Compass
G-meter
MAC Trim System
ELT
Two place intercom system

Restraint system:

Harness: Hooker 7 Point Ratchet harness (front and rear).

4 Operational Limitations

This section describes limitations for safe operation of the airplane, and points out important information the pilot should adhere to.

4.1 Airspeed limitations

V_{NE}	Never Exceed Speed:	230knots
V_{NO}	Max. Structural Cruising Speed:	195knots
V_A	Maneuver Speed:	170knots

4.2 Engine Operating Limits

Normal rated power:	327 HP @2450RPM
Max cylinder head temp:	450°F
Fuel grade:	100LL min
Rt. wing tank fuel capacity (non-aerobatic):	22.0 gal
Lt. wing tank fuel capacity (non-aerobatic);	22.0 gal
Fuselage tank fuel capacity (aerobatic):	17.5 gal
Oil grade:	Aeroshell 50W(Mineral Oil for first 25 Hrs)
Oil sump capacity:	12 quarts max, 10 quarts min
Max oil temperature:	245°F
Oil pressure:	75 psi @2450RPM, 190°F
Smoke oil capacity (aerobatic):	8.5 gal

CAUTION

Under normal operating conditions, when changing from non-inverted to inverted flight the oil pressure indicator will flicker due to the oil scavenging system configuration. Inverted flight longer than 4 minutes is not recommended. During knife edge and zero-G flights the oil system cannot function properly for a period exceeding 10 seconds. Flights longer than this may result in complete engine failure.

To prevent an engine overspeed situation occurring upon loss of oil pressure the propeller will fail coarse, thus decreasing engine RPM.

4.3 Aircraft Operating Limits

Max G rating:	±10 @ max single aerobatic weight (1600lbs) ±8 @ max dual aerobatic weight (1850lbs) ±3 @ max gross takeoff weight (2200lbs)
Power off stall @ 1600lbs:	53 Kts typ
Power off stall @ 1850lbs:	57 Kts typ
Power off stall @ 2200lbs:	62 Kts typ
Max Rate of Climb @ 1600lbs:	3,700 ft/min @ 95 Kts (sea level, standard)
Max Rate of Climb @ 2200lbs:	2,700 ft/min @ 100 Kts (sea level, standard)
Takeoff speed @ 1600lbs:	70 Kts
Takeoff speed @ 2200lbs:	85 Kts
Landing speed @ 1600lbs:	70 Kts
Landing speed @ 2100lbs:	85 Kts
Max Climb Angle speed @ 1600lbs:	60 Kts
Max Climb Angle speed @ 2200lbs:	75 Kts
Min Sink Rate @ 1600lbs:	~750 fpm @ 65 Kts
Min Sink Rate @ 2200lbs:	~900 fpm @ 75 Kts
Best Glide @ 1600lbs:	9:1 @ 80 Kts
Best Glide @ 2200lbs:	9:1 @ 95 Kts
Max demonstrated crosswind comp:	15 Kts
Max aerobatic weight:	1600 lbs
Max gross landing weight:	2100 lbs

4.4 Structural Temperature Limitations

The aircraft structure is cured to allow a maximum operating temperature of 180°F (82°C). Structural temperatures above this are not allowed as there will be a rapid decrease in structural performance due to the nature of composite materials.

4.5 Tire Pressure

Required tire pressure is 50 PSI (3.6 Bar).

4.6 Markings and Placards

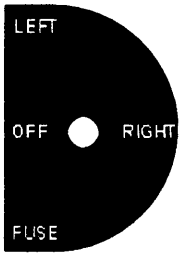
Location: Exterior, bottom, left side.

EXPERIMENTAL

Location: Interior, behind rear seat.

100 OCT. MIN

Location: Exterior, near each fuel filler cap.



Location: Interior, fuel selector valve.

Location: Interior, front & rear, right side longeron.

CANOPY – PUSH TO LOCK

Location: Interior, front & rear, left side longeron.

G-LIMITS:
1 PERSON = ±10G
2 PEOPLE = ± 8G

Location: Interior, rear instrument panel.

WING TANKS MUST BE EMPTY FOR AEROBATICS

Location: Interior, rear instrument panel.

THROTTLE – PUSH FULL

Location: Interior, front & rear throttle.

Location: Interior, propeller control.

Location: Interior, mixture control.

PASSENGER WARNING
THIS AIRCRAFT IS AMATEUR-BUILT AND DOES NOT COMPLY WITH THE FEDERAL SAFETY REGULATIONS FOR A "STANDARD AIRCRAFT".

Location: Interior, front instrument panel.

SOLO FLIGHT SHOULD ONLY BE PERFORMED FROM THE REAR SEAT

Location: Interior, front and rear instrument panel.

5 Aerobatic Flight

The Edge 540-T is designed for full competition Unlimited aerobatics. Listed in section 5.2 below are recommended entry speeds for basic aerobatic maneuvers.

WARNING

Aerobatic maneuvers should **only** be performed with **empty** wing fuel tanks. Due to high G loading during aerobatic flight, wing structural failure may result. Excess fuel can be easily drained from the wing tanks by use of the applicable fuel drains.

NOTE

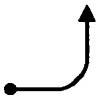
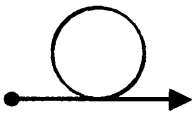
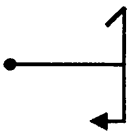
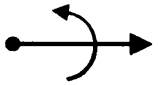
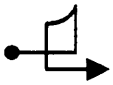
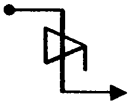
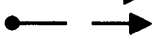
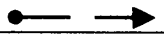
It is the responsibility of the pilot to ensure that the passenger/co-pilot is physiologically capable of aerobatic flight and that the airplane is within C of G limits.

5.1 Load Factor Limits

Weight	Load Factor Limits
1600lbs max single aerobatic	+/-10
1850lbs max dual aerobatic	+/-8
2200 lbs max gross takeoff	+3/-3
2100 lbs max gross takeoff	+3/-3

CAUTION
Landing above max gross aircraft landing weight could result in aircraft structural damage.

5.2 Aerobatic Maneuver Entry Speeds

Maneuver	Recommended Entry Speeds Min KIAS	Max KIAS	Symbol	Remarks
Horizontal Line	V_S	V_{NE}		
45° climbing	80	V_{NE}		
90° up	160	V_{NE}		
45° diving	V_S	V_{NE}		Reduce Throttle
90° diving	V_S	V_{NE}		Reduce Throttle
Pull to Vertical	90	V_{NE}		
Looping	90	V_{NE}		
Stall turn	90	V_{NE}		
Aileron Roll	80	170		Full deflection
Snap Roll	80	140		
Tail slide	80	V_{NE}		
Spin	V_S	N/A		
Knife Edge	90	180		<10sec
Inverted Flight	V_S	V_{NE}		< 4 min