Evektor Harmony N999VP -- Checklist

AEROBATICS AS WELL AS INTENTIONAL SPINS ARE PROHIBITED!

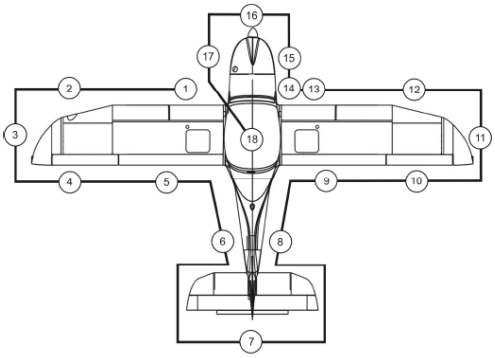

Figure 4-1 Scheme of airplane preflight check

PRE-FLIGHT

CABIN

1. Canopy- **UNLOCK**
2. Arrow Documents and LSA Waiver – **IN AIRCRAFT**
3. Ignition Switch – **OFF**
4. Flaps – **LOWER** for Inspection
5. Ballistic Recovery System – Remove Lock / Flag

LEFT WING

1. Main Gear/Brake Lines/Pants – **CHECK**
2. Tire Inflation and Condition – **CHECK**
3. Fuel Cap Visually -- **CHECK Level / Lock**
4. Wing Leading Edge – **UNDAMAGED**
5. Pitot Static Tube -- **CHECK Clear**
6. Landing Light Condition – **CHECK**
7. Wingtip/Strobe/Fuel Vent – **CLEAN & UNDAMAGED**
8. Aileron Deflection, Hinge and Pushrod Security – **CHECK**
9. Fuel Sump -- **CHECK Color/Water**
10. Wing Surface Condition – **CHECK**
11. Flap Deflection, Hinge and Pushrod Security – **CHECK**

EMPENNAGE

1. Surface and Tail Skid – **UNDAMAGED**
2. Antennae – **SECURE**
3. Horizontal Stabilizer – **SECURE**
4. Elevator movement/security – **CHECK**
5. Elevator Trim Tab movement – **CHECK**
6. Vertical Stabilizer – **SECURE**
7. Rudder security – **CHECK**
8. Pushrod locknut for elevator/elevator Trim Tab – **CHECK**
9. Tail Skid Condition - **CHECK**

RIGHT WING

1. Flap Deflection, Hinge and Pushrod Security – **CHECK**
2. Wing Surface Condition – **UNDAMAGED**
3. Fuel Sump – **CHECK for color / water**
4. Aileron Deflection, Hinge and Pushrod Security – **CHECK**
5. Wingtip Strobe/Fuel Vent – **UNDAMAGED & CLEAR**
6. Wing Leading Edge – **UNDAMAGED**
7. Fuel Cap Visually -- **CHECK Level / Lock**
8. Main Gear/Brake Lines/Pants – **CHECK**
9. Tire Inflation and Condition – **CHECK**

ENGINE COWLING

1. Canopy Attachment and Condition (Right Side) – **CHECK**
2. Nose Gear/Control Rods/Pants – **CHECK**
3. Tire Inflation and Condition – **CHECK**
4. Before First Flight of the Day: Engine Bed, Attachment, Exhaust System, Engine Cowling, Fuel & Electrical System Condition -- **Check**
5. Coolant Level – First Flight of Day:: **Open Cap, Verify FULL**
6. Overflow Bottle **-- Between MIN and MAX**
7. Oil Level -- **CHECK** (*verify ignition is **OFF*** - *Remove bayonet cap*, turn propeller slowly by hand in direction of engine rotation several times *to pump oil from the engine into the oil tank* – process is finished *when air is returning back to the oil tank* and *can be noticed by a gurgle from the open oil tank*. Install bayonet cap.)
8. Cowling & Fasteners – **Re-attach & SECURE**
9. Air Intakes and Radiators – **CLEAR**
10. Prop/Spinner -- **CHECK** for Nicks/Cracks
11. Exhaust – **SECURE**
12. Canopy Attachment and Condition (Left Side) – **CHECK**

WARNING! ***ONLY ONE*** *PERSON MAY BOARD OR DISEMBARK AT ANY TIME.*
TWO PEOPLE STANDING ON WINGS WILL FORCE TAIL DOWN AND DAMAGE MAY OCCUR.

BEFORE ENGINE START

1. Hobbs Meter – **CHECK and NOTE**
2. Pre-flight -- **CHECK**
3. Wt. and CG – **CHECK**
4. Passenger Briefing – **COMPLETE**
5. Safety Harness -- **CHECK and Fasten**
6. Control Stick, , Flaps – **CHECK**
7. Rudder Pedals – **Adjusted & FREE**
8. Flaps Function – **CHECK**
9. Parking Brake Handle – **OFF/DOWN**
10. Switches (***except*** **GEN and AUX GEN** which are ***always on***) – **OFF**
11. Circuit Breakers -- **CHECK IN**
12. Carb Heat – **OFF**
13. Throttle – **IDLE**

ENGINE START

1. Master Switch – **ON**
2. Canopy Open / Close Light – **Verify Locked (Green)**
3. Cockpit – Secure Loose Items
4. Fuel Gauge Indicators – **verify fuel quantity matches visual** – **CHECK** (adjust quantity on screen if necessary)
5. Fuel Selector -- **LEFT**
   Start engine with the fuel selector set to LEFT. If you would start the engine with the fuel selector set to RIGHT and the left tank is full, than fuel bleed from the left tank vent may occur (and pollute environment) because a fuel return hose is led only into the left tank and returning fuel will overfill the left tank
6. Electric Fuel Pump – **ON**
7. Verify Fuel Pressure – **OFF** (min. 2.2 PSI)
8. Throttle -- **IDLE**
9. Choke – **AS NECESSARY**
10. Brakes – **APPLY**
11. Beacons – **On**
12. Prop Clear -- **CHECK & CALL OUT**
13. Key-Ignition – **START (place on BOTH)**
    Activate Starter for 10 sec. as a maximum, *then let it cool down for 2 minutes*. – After starting up engine ***DO NOT*** *carry out sudden RPM changes*, after power decrease, wait for about 3 sec. in order to reach constant RPM before reacceleration.
14. Throttle -- **Smooth at 2000 RPM -- FOR 2 MIN**. – **Then Continue at 2500RPM**
15. Oil Pressure **– CHECK** for min. pressure
    Check oil pressure. Pressure ***must increase within 10 sec.*** Increase engine RPM ***until oil pressure is stabilized over 2 bar (29 PSI)***.
    Warming time: depends on outside air temperature wait **until oil temperature reaches 122 °F**.
16. Canopy – **DOWN & VERIFY LOCKED**
17. Fuel Selector – **RIGHT**, Verify proper feeding (for 1 Minute) – **Then: LEFT Tank**

Avionics:

18. Intercom – **ON**
19. Garmin GPS – **ON**
20. COM Radio – **ON**
21. Dim Switch (at night) – **AS NEEDED**
22. Dynon Skyview – **Verify Squawk on ALT**
23. Oil Pressure / Fuel Pressure – **CHECK**
    Oil Press. **Min. 12-29 PSI,**
    Max. 73-**102** PSI
    Oil Temp. Min. **122ºF**,
    ***Optimal Op*: 190-230ºF**,
    Max. **266ºF**
24. Fuel Flow -- **CHECK**

PRE-TAXI CHECK

1. Outside Nav Lights, Strobes, Beacon – **On as Needed**
2. Radio Set / ATIS – **CHECK**
3. Altimeter – **SET**
4. Transponder -- **ALTITUDE**
5. Brakes – **CHECK**
6. Steering – **CHECK**
7. Radio – **SET**
8. Taxi Clearance – **CHECK**
9. Taxi to Run-up Area – **SLEW AIRCRAFT so prop wash clear of taxiway and Nearby Vehicles**

RUN-UP / BEFORE TAKEOFF CHECK

1. Brakes – **HOLD**
2. Throttle -- **4000 RPM**
3. Ignition **CHECK – LEFT, THEN RIGHT; BACK TO BOTH**
4. Max RPM *drop* – **300 RPM**
5. Max RPM *difference* – **120 RPM**
6. Carb Heat -- **CHECK**
   a. Verify RPM drop -- **approx. 50 RPM ON**,
   b. then **OFF**
7. Engine Instruments -- **CHECK OPERATING RANGE:**
   Oil Press. **Min. 12-29 PSI,**
   Max. 73-102 PSI
   Oil Temp. Min. **120ºF**,
   Max. **266ºF**
   Optimal Op: 190-230ºF,
8. Throttle – **IDLE**
9. Controls – **CLEAR**
10. Fuel Selector -- **CHECK LEFT (OR BEST TANK)**
11. Aileron Trim – **NEUTRAL**
12. Flaps -- **15°**
13. Safety Harness -- **TIGHTEN**
14. Canopy – **VERIFY DOWN & LOCKED**
15. Fuel Pump -- **ON**
16. Radio – **SET**
17. IFR Flight – **ACTIVATE** Flight Plan
18. Takeoff Clearance -- **CHECK**

TAKEOFF

WARNING
TAKE-OFF IS *PROHIBITED IF:*
- ENGINE RUNNING IS IRREGULAR
- IF CHOKE IS OPEN
- IF VALUES OF ENGINE INSTRUMENTS ARE NOT WITHIN THE REQUIRED RANGE

NORMAL Takeoff
1. Flaps -- **15°**
2. Choke – **OFF** (In)
3. Carb Heat **OFF -- CHECK**
4. Fuel Pump **ON -- CHECK**
5. Throttle -- **MAX TAKEOFF POWER**
   (5800 RPM, max. 5 mins.)
6. Stick – **Lighten Up Nose Landing Gear**
7. Rotate **Vr = 43KIAS (Flaps 15°)**
8. Obstacle Clearance Climb
   Vx with Flaps 15° = 56 KIAS (15°Flaps)
   Vx *without* Flaps = 55 KIAS
   TO CLEAR OBSTACLE
9. Flaps UP -- **150ft AGL or End of Runway**
10. **Vy – 65 KIAS (with FLAPS UP)**
11. Fuel Pump -- **OFF AT 500ft AGL**

SOFT FIELD Takeoff:
1. Flaps -- **15°**
2. Choke – **OFF** (In)
3. Carb Heat **OFF -- CHECK**
4. Fuel Pump **ON -- CHECK**
5. Throttle – **AS NEEDED to keep moving**
6. Nose Gear **– KEEP OFF the ground**
7. Throttle -- **MAX TAKEOFF POWER**
   (5800 RPM, max. 5 mins.)
8. Rotate – **Stay in Ground Effect** to gain speed
9. Climb **Vx = 57 KIAS (Flaps 15°)**
10. Flaps UP -- **200ft AGL or End of Runway**
11. **Vy – 65 KIAS (with FLAPS UP)**
12. Fuel Pump -- **OFF AT 500ft AGL**

SHORT FIELD Takeoff:
1. Flaps -- **15°**
2. Choke – **OFF** (In)
3. Carb Heat **OFF -- CHECK**
4. Fuel Pump **ON -- CHECK**
5. Brakes -- APPLY
6. Throttle -- **MAX TAKEOFF POWER**
   (5800 RPM, max. 5 mins.)
7. Rotate **Vr = 43 KIAS (Flaps 15°)**

8. Climb **Vx = 57 KIAS (Flaps 15°) TO CLEAR OBSTACLE**
   [Vy = to 65 KIAS (with Flaps 15°)] –

9. Flaps UP -- **200ft AGL or End of Runway**
10. **Vy – 63 KIAS (with FLAPS UP)**
11. Fuel Pump -- **OFF AT 500ft AGL**

CLIMB

1. Throttle -- **5000RPM**
2. Vy = **63 KIAS (Flaps 0°)**
3. Engine Instruments – **CHECK**
4. Trim – **AS NEEDED**

CRUISE

1. Throttle – **4300(55%), 4800(65%), 5000(78%),** (max. continuous 5500 RPM)
   (Good compromise speed vs. endurance: 5350 RPM acc. To Evektor Factory Rep)
2. Airspeed -- **MAX 5500 RPM, 103KIAS** (VNE 146KIAS)
3. Engine Instruments – **CHECK**
4. Trim -- **As Needed**
5. Fuel Management -- **2 Min Level Flight** for True Reading
6. Fuel Pump -- **ON (When Switching Tanks)**
   a. LEFT -- 1 Hour
   b. RIGHT -- 2 Hours
   c. LEFT for Approach and Landing

Note: It is recommended to alternately switch the tanks during cruise *to equally consume fuel from both tanks* and minimize airplane tendency to bank with unbalanced tanks.

Do not fly with the fuel selector set to RIGHT *if the left tank is full* to avoid fuel bleed from left tank vent.

PRE-MANEUVER CHECK (Verify)

1. Fuel Selector – ***FULLEST* TANK**
2. Fuel Pump – **ON; CHECK PRESSURE**
3. **Va = 90 KIAS – CHECK & VERIFY**
4. Clearing Turns – **PERFORM**
5. Throttle -- **3000 RPM**
6. Airspeed -- **Va = 86KIAS**
   i. (max 103KIAS)
7. Carb Heat -- **ON**
8. Trim – **AS NEEDED**
9. Engine Instruments – ***CAUTION:***
   a. Undercooling -- **CHECK**

APPROACH / LANDING

1. Radio – **SET**;
2. ATIS - AWOS – ASOS -- **CHECK**
3. Altimeter / Pattern Altitude – **CHECK**
4. Fuel Quantity -- **CHECK**
   2 Min Level Flight for True Reading
5. Switch to -- **LEFT TANK (or Fullest Tank)**
6. Fuel Pump -- **ON (When *Switching* Tanks)**
7. Flight Instruments – **CHECK**
8. Safety Harness -- **TIGHTEN**
9. Brakes – **CHECK**

Caution: at long approaches and descending from high altitude ***it is not suitable*** *to reduce throttle to minimum* to avoid possible engine undercooling and subsequent loss of power. Perform descents at increased idle and check observance of the allowed values on engine instruments.

- ***Abeam the Numbers***:
  a) Throttle – **ADJUST** TO **3000 - 3400 RPM**
  b) Flap Operating Range -- **< 70KIAS** (VFE)
  c) Carb Heat -- **ON**
  d) Fuel Pump -- **ON**
  e) Flaps -- **15°, 60KIAS**
  f) Parking Brake – **CHECK** lever **DOWN**

- ***Base Leg*** **Normal & Short Field** – **60 KIAS / 55 KIAS**
  Mfr. Recommended Speed; [*no less* than Vso 1.4 = (Vso 1.**4** x 37 KIAS = 52 KIAS on Base Leg at Max Gross Weight)]

- ***On Final*** – (55-)**60 KIAS (Flaps 30 or 50°)**
  Mfr. Recommended Speed; [*no less* than Vso 1.**3** = Vso 1.3 x 37 KIAS = 48 KIAS on Final Leg)]
1. Throttle –**Landing (Flaps 30-50°)**
2. Trim -- A**s Needed**

BALKED LANDING / GO-AROUND

1. Throttle -- **MAX Takeoff Power**
2. Flaps -- **15°**
3. Carb Heat -- **OFF**
4. Climb –**Vy 65** or **Vx = 56KIAS (Flaps 15°)**
5. Radio -- **Notify Tower**
6. Trim – **AS NEEDED**
7. Flaps UP – **AT 150ft AGL or End of Runway**

AFTER LANDING

1. Throttle – **IDLE** (1600-1800 RPM)
2. Clear Active Runway -- **CHECK**
3. Flaps -- **Up**
4. Transponder – Keep on **ALT**
5. Fuel Pump -- **OFF**
6. Carb Heat -- **OFF**
7. Trim -- **NEUTRAL**
8. Canopy – **OPEN** for Ventilation

SHUTDOWN / SECURE AIRCRAFT

1. Flight Plan -- **CLOSE**
2. Brakes -- **HOLD**
3. Avionics -- **OFF**
4. Instruments -- **CHECK**
5. Throttle Until Voltmeter Shows -- **14volts 4000RPM**
6. Throttle -- **IDLE**
7. Ignition -- **OFF**
8. Beacons -- **OFF**
9. **Master Switch** -- **OFF** (except GEN and AUX GEN ***always*** on)
10. Hobbs Meter -- **CHECK and Note**
11. Forward and Side Canopy Vents – **CLOSE**
12. Canopy – **CLOSE & LOCK As Appropriate**
13. Chocks or Tie Downs -- **As Appropriate**
14. Canopy Cover -- **As Appropriate**

CAUTION: WHEN HANDLING THE AIRPLANE ***BY MEANS OF THE TOWING BAR, PROPELLER BLADES MUST BE SET ONE BLADE UP*** (THREE BLADE PROPELLER). ***MAXIMUM DEFLECTION OF THE NOSE WHEEL IS ± 10°.***

V-Speeds:

V_R	43 KIAS, **15° Flaps**
V_X	57 KIAS, 15° Flaps – Best *Angle of Climb*
V_Y	**65 KIAS – Best *Rate of Climb* Speed**
V_{NO}	**115 KIAS** Max. Structrl Cruising Speed
V_H	120 KIAS (138 mph – at max. power, *level flight* per LSA regulations)
V_{NE}	**146 KIAS** Never Exceed Speed
V_A	**90 KIAS** Maneuvering Speed
V_{FE}	**70 KIAS** Max. Flap Extended Speed
$V_{L/D\ max}$	**59 KIAS** Flaps UP
V_{S1}	43 KIAS CLEAN 0° Flaps *at Max. Weight*
V_{SO}	37 KIAS DIRTY 50° Flaps *at Max. Weight*

Red Line 37 KIAS, 50° Flaps, max. wt, Landing
White Arc 37-70 KIAS
Green Arc 38-112 KIAS
Yellow Arc 112-146 KIAS
Red Line 146 KIAS, max speed for all ops.

Empty Wt: **802 lbs** (+/- 2%),
Max. Take-off & landing. Wt **1320 lbs**,
Max. Luggage: **55 lbs** –
Gs: **+4.0 / -2.0**

Max. Demonstrated Crosswind Component:

Beginners & Average Pilots	10 kts
Experienced Pilots	15 kts
Max. demonstrated *tail* wind	6 kts

WARNING! ***DO NOT EXCEED*** MAX. WEIGHTS !

Emergency Procedures

For **Evektor N999VP**

Remember: ***Aviate, Navigate, Communicate!***

ENGINE FAILURE AT TAKE-OFF RUN

Throttle Lever – **IDLE**
Brakes – **AS NECESSARY**
Fuel Selector – **OFF**
Ignition – **OFF**
Master Switch – **OFF**

ENGINE FAILURE AT TAKE-OFF

1. Gliding Speed – **Min. 55 KIAS with 15 Flaps**
   Min. 59 KIAS, Flaps UP
2. <150 ft – **land in take-off direction**
3. 150-400 ft – **90º turn is possible**
4. >250 ft – **can try engine start**

5. Throttle lever – **IDLE**
6. Flaps – **AS NEEDED**
7. Fuel Selector – **OFF**
8. Ignition – **OFF**
9. ATC – **Report**
10. Master Switch – **OFF**
11. After Touchdown – **BRAKE AS NEEDED**

ENGINE FAILURE IN FLIGHT

1. Glide Speed – V_{LD} max:
59 KIAS (Flaps 0°) or:
Note: To identify *minimum sink speed*, look for the highest speed forward that will give you the lowest rate of descent
2. Altitude -- **CHECK**
3. Landing Area – **CHOOSE BASED ON WIND DIRECTION**
4. Altitude – **CHECK**
5. Master Switch – **ON**
6. Fuel Pump – **ON**
7. Tank Switch – **SELECT PROPER TANK**
8. Ignition, Prop Spinning – Put on **BOTH**
9. ***Not*** Spinning – Put on **START**
10. Choke – **AS NEEDED**
IF NO START THEN **CONTINUE WITH EMERGENCY LANDING**
11. Hot Air Knob – **PUSH IN**
12. Safety Harness -- **TIGHTEN**
13. Radio Set – **NOTIFY ATC**
14. Transponder – **7700** (EMERGENCY)
15. Fuel Pump – Fuel Selector – Ignition -- **OFF**
16. Flaps -- **30° - 50° Once Landing Assured**
17. Master Switch – **OFF *BEFORE* TOUCHDOWN**

ENGINE STARTING IN FLIGHT

Note: It is possible to start the engine by means of the starter within the whole range of operation speeds as well as flight altitudes. The engine started up immediately after switching the ignition to START position.

If the engine is shut down, the altitude loss during engine starting can reach up to 1000 ft.

1. Gliding Speed – **57 KIAS**
2. Altitude – **CHECK**
3. Master Switch – **ON**
4. Unnecessary Electrical Equipment – **OFF**
5. Fuel Selector – **LEFT**
6. Choke – **AS NEEDED**
7. Throttle Lever – **IDLE** (choke opened) or:
   INCREASED IDLE (choke closed)
8. If propeller is rotating:
   Ignition – **ON**
9. If propeller is not rotating:
   Ignition – **START**
10. If engine starting is unsuccessful, then continue with ***EMERGENCY LANDING*** procedure.

FIRE ON THE GROUND

1. Fuel Selector – **OFF**
2. Brakes – **BRAKE**
3. Throttle Lever – **FULL**
4. Hot Air Knob (if installed) – **PUSH**

5. After Engine stops:

6. Ignition – **OFF**
7. Master Switch – **OFF**
8. Airplane – **LEAVE**
9. Manual Extinguisher – **USE**

FIRE DURING TAKE-OFF

1. Fuel Selector – **OFF**
2. Throttle Lever – **FULL**
3. Airspeed – **65 KIAS**
4. Hot Air Knob (if installed) – **PUSH IN**
5. Cold Air Knob – PUSH IN

After Engine stops:
6. Gliding Speed – **55 KIAS (Flaps 15º)**
7. Ignition – **OFF**
8. Master Switch – **OFF**
9. Land the airplane
10. Airplane -- **LEAVE**
11. Manual extinguisher (if available) – **USE**

FIRE IN FLIGHT

1. Fuel Selector – **OFF**
2. Throttle Lever – **FULL**
3. HOT AIR know (if installed) – **PUSH**
4. Gliding Speed – **59 KIAS**
5. Ignition – **OFF**
6. ATC – **REPORT** if possible
7. Master Switch – **OFF**

Note: For extinguishing the engine fire, you can perform slip under assumption that you have sufficient altitude and time.

WARNING! AFTER EXTINGUISHING THE ENGINE FIRE START ENGINE ONLY IF IT NECESSARY TO SAFE LANDING. FUEL LEAK IN ENGINE COMPARTMENT COULD CAUSE FIRE AND FIRE COULD RESTART AGAIN.

8. If you start engine again, **switch OFF** all switches, **switch ON** the Master switch, and then subsequently *switch on* ***only equipment necessary to safe landing***.

9. Emergency Landing – **EXECUTE**
10. Airplane – **EVACUATE**

FIRE IN THE COCKPIT

(if manual extinguisher available aboard)

1. Fire source – **IDENTIFY**
2. Master switch (in case that the source of fire is electrical equipment) – **OFF**
3. Manual extinguisher – **USE**
4. After fire extinguishing – **AERATE** the cockpit with eye ball vents
5. Safety Landing – **CARRY OUT**

WARNING: NEVER AGAIN SWITCH ON THE DEFECTIVE SYSTEM
Note: If a *defective electrical system circuit* was detected as the fire source, *then switch off appropriate circuit breaker* and switch over Master switch to ON position

EMERGENCY LANDING with NON-OP ENGINE

1. Airspeed – **59 KIAS**
2. Landing area – **CHOOSE**, determine wind direction
3. Safety harness – **TIGHTEN UP**
4. Flaps – **LANDING POSITION 50º**
5. Airspeed – **60 KIAS**
6. Radio – **NOTIFY** situation to ATC (if possible)
7. Fuel Selector – **OFF**
8. Ignition – **OFF**
9. Master Switch – **OFF** before touch down

SAFETY LANDING with ENGINE OPERATING

1. Area – **SELECT**, determine **WIND direction**, carry out passage flight with **59 KIAS**
2. Flaps – **IN TAKE-OFF POSITION (15º Flaps)**
3. Radio – **NOTIFY** situation to ATC (if possible)
4. Safety harness – **TIGHTEN UP**
5. Flaps – **LANDING POSITION** (50º Flaps)
6. Airspeed – **60 KIAS**
7. Landing – **CARRY OUT**

LANDING WITH BURST TIRE

CAUTION - *KEEP THE WHEEL WITH BURST TIRE ABOVE THE GROUND AS LONG AS POSSIBLE* BY MEANS OF AILERONS. IN CASE OF NOSE WHEEL BY MEANS OF ELEVATOR.

UNINTENTIONAL SPIN RECOVERY

Note: The airplane has not, when using normal techniques of pilotage, tendency to go over to spin spontaneously.

Standard procedure of recovery from spin:
1. Throttle lever – **IDLE**
2. Control stick – **AILERONS: Neutral Position**
3. Pedals – **KICK in OPPOSITE DIRECTION of SPIN**
4. Control stick – **PUSH FORWARD and HOLD until rotation stops**
5. Pedals – **IMMEDIATELY after rotation stops, put in NEUTRAL POSITION**
6. Control stick – **RECOVER** from diving

CAUTION: ALTITUDE LOSS PER ONE TURN AND
RECOVERING FROM THE SPIN IS 500 UP TO 1000