

Advanced (403)

Maneuver Descriptions

And

Suggested Downgrades

2016-17

Purpose: The purpose of this guide is to furnish an accurate description of each maneuver of the Advanced (403) pattern sequence. Study of this guide by the competitor will help him learn exactly what is expected, while study by the judge will help them decide precisely how well the competitor meets these expectations. The competitor or judge should refer to the AMA Judge’s Guide for general information regarding downgrades such as the “One Point per 15 degree Rule”. All maneuvers must have a level entry and exit.

Sequence: Below is the listed sequence for Advanced. U, D, and T represent Upwind, Downwind and Turnaround, respectively.

Advanced Sequence

Maneuver	KF
1. Takeoff Sequence (U)	1
2. Figure M with 1/4 rolls (U)	4
3. 1/2 Cuban-8 with full roll, exit inverted (T)	2
4. Triangle Loop with positive snap roll on top, exit inverted (D)	4
5. 1/2 Square Loop, full roll up (T)	2
6. Cuban-8 from top, 2 of 4 pt. roll first, two 1/2 rolls reversed , exit inverted (U)	4
7. 1/2 Loop from top (T)	1
8. 3 Horizontal Rolls (D)	3
9. 1/2 Square Loop, 2 of 4 pt. roll up (T)	2
10. 2 Turn Spin (U)	3
11. Humpty Bump with options (1/2 roll up or 1/4 rolls up & down) (T)	2
12. Slow Roll (D)	3
13. Top Hat, 3/4 roll up, 1/4 roll down (T)	2
14. Double Immelmann with 2 pt. roll first, full roll second (U)	4
15. 1/2 Reverse Cuban-8 with 2 of 4 pt. roll (T)	2
16. Four Point Roll (D)	4
17. Stall Turn, 1/2 roll up, 1/2 roll down (T)	2
18. Avalanche (U)	3
19. Landing Sequence (U)	1
TOTAL K-Factor	49

Maneuver Descriptions:

1. **Takeoff Sequence (U):** The takeoff maneuver will be scored in one half (1/2) point increments from 10 to 0. The model smoothly, not suddenly, accelerates to takeoff speed. When flying speed is reached it gently lifts off the ground and climbs at a gradual angle. The lift off should be within one (1) meter of center for maximum points. (Measured as one meter each side of center) The aircraft must not deviate in track during takeoff but may change heading after liftoff to maintain a straight track with the takeoff roll. The maneuver is complete when the model is approximately two (2) meters (6-1/2 feet) from the ground.

It is not necessary for the model to stand still on the ground with the engine running without being held before the takeoff begins. It is also not necessary for the model to reach 2 meters in the same distance as the takeoff role. The takeoff should not be downgraded for wing dips caused by air turbulence unless the wings are not immediately leveled.

Downgrades:

- Model jumps from the ground.
- Lift off is not within one meter each side of center.
- Model retouches the ground after becoming airborne.
- Steep climb angle.
- Model gallops in elevation during climb.
- Track not maintained through completion of maneuver.
- Wings not level at any time.
- Throttle not smoothly accelerated.
- Model passes behind the judge's line, scored zero (0) points.

2. **Figure M with 1/4 rolls up and down (U):** Perform 1/4 inside loop before center to an upward vertical track (up line), hesitate, perform 1/4 roll, hesitate, perform a stall turn through 180 degrees to a downward vertical track (down line), hesitate, perform 1/4 roll, hesitate, perform a half outside loop on center to a vertical track (up line), hesitate, perform 1/4 roll, hesitate, performs a stall turn through 180 degrees to a downward vertical track (downline), hesitate, perform 1/4roll, hesitate, perform 1/4inside loop and finish in level upright flight in the same direction as the beginning of the maneuver. Bottom of center half outside loop and Entry and Exit altitudes are to be the same.

Downgrades:

- Model not level at start and finish.
- Track does not become exactly vertical.
- Model track not vertical at start and finish of stall turn.
- Pivot radius greater than 1/2 wingspan.
- Pendulum movement after stall.
- Loop segments not round with same size and radius.
- Rolls not centered on vertical tracks
- Under or over rotation of roll elements. Apply "One Point per 15-Degree Rule".

- Bottom of center half outside loop and entry and exit altitudes not the same.
- Center half loop not an outside loop; score is zero (0).

3. **Half Cuban-8, with full roll on 45, exit inverted (T):** From upright, perform 5/8 inside loop to a 45-degree downline. On this line hesitate, perform a full roll, hesitate, and then perform a one 1/8 outside loop to level inverted flight in the opposite direction.

Downgrades:

- Loop segments not round and of equal radius.
- Changes in track during loop segments or during prescribed roll.
- Roll elements not centered on 45-degree downline.
- Under or over rotation of roll elements. Apply “One Point per 15 Degree Rule”.
- 45-degree downline not at 45 degrees. Apply “One Point per 15 Degree Rule”.

4. **Triangle Loop with Positive Snap Roll on top, exit inverted (D):** From inverted flight, perform 1/8 outside loop to a 45 degree upline, hesitate, perform 3/8 outside loop to level flight, hesitate, performs a positive Snap Roll, hesitate, perform 3/8 outside loop, hesitate, perform 1/8 outside loop to level inverted flight at the same altitude as entry.

Downgrades:

- Upline and/or downline not 45 degrees.
- Upline and downline not of equal length.
- Loop segments not round and of equal size and radius.
- Roll elements not centered on line.
- Over or under rotation of prescribed roll. Apply “One Point per 15 Degree Rule”
- Changes in track during loop segments.

5. **Half Square Loop with Full roll up (T):** From inverted flight, perform 1/4 outside loop to a vertical track (up line), hesitate, perform a full roll, hesitate perform 1/4 outside loop to recover in level upright flight in the opposite direction as entry at a higher altitude.

Downgrades:

- Corner loop segments not of equal radius.
- Model upline track not vertical before and after prescribed roll.
- Prescribed roll not on middle of vertical line.
- Over or under rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”.
- Changes in track in loop segments or during prescribed roll.
- Roll rate not constant.

6. **Cuban-8 from top, 2 of 4 pt. roll first, two 1/2 rolls reversed second, exit inverted (U):** From upright perform 5/8 outside loop to a 45-degree upline. On this line hesitate, perform a 2 of 4 point roll, hesitate, perform 5/8 outside loop to a 45-degree upline. On this line hesitate, perform two 1/2 rolls reversed, hesitate, perform 1/8 inside loop to level inverted flight.

Downgrades:

- Loop segments not round and of equal radius.
- Changes in track during loop segments or during prescribed roll.
- Roll elements not centered on 45-degree downline.
- Under or over rotation of roll elements. Apply “One Point per 15 Degree Rule”.
- 45-degree downline not at 45 degrees. Apply “One Point per 15 Degree Rule”.
- Half rolls not opposite; score is zero (0).

7. **Half Loop from Top (T):** From inverted flight perform 1/2 inside loop to recover in level upright flight in the opposite direction as entry.

Downgrades:

- Changes in heading during half loop
- Half loop not a constant radius

8. **3 Horizontal Rolls (D):** From upright perform 3 complete revolutions in either direction. Center is that point when the airplane is inverted during second roll.

Downgrades:

- Changes in heading (track) during rolls
- Changes in altitude during rolls
- Roll rate not constant
- Model does not do exactly 3 rolls. Apply “One Point per 15 Degree Rule”.
- Wings not level at beginning or end of roll sequence. Apply “One Point per 15 Degree Rule”.

9. **1/2 Square Loop, 2 of 4 pt. roll up (T):** From upright perform 1/4 inside loop to a vertical track (up line), hesitate, perform 2 of 4 point roll, hesitate, perform 1/4 outside loop to recover in level upright flight in the opposite direction as entry at a higher altitude.

Downgrades:

- Corner loop segments not of equal radius.
- Model upline track not vertical before and after prescribed roll.
- Prescribed roll not on middle of vertical line.
- Over or under rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”.
- Changes in track in loop segments or during prescribed roll.
- Roll rate not constant.

10. 2 Turn Spin (U): From upright approach center with decreasing speed until model stalls at center, performs the required 2 turns of rotation (spins) and stop with the wings perpendicular to the flight line in a vertical downward track, hesitate, performs a one-quarter (1/4) inside loop to horizontal upright level flight to finish. Stall is the center of the maneuver and should occur directly over the center pole for Center Box presentation. All spins begin and end with a horizontal line. In order to accomplish a spin, the model must be stalled. The entry should be flown in a near horizontal path with the nose high attitude increasing as the speed decreases. The nose then drops as the model stalls. Simultaneously, the wing drops in the direction of the spin. Spin entry (i.e. stall/break) for center maneuvers should occur directly in front of the judges on the center line/pole. The stall may occur while the airplane has forward motion with respect to the ground.

Downgrades:

- Snap roll or entry not stalled entry - **0 pts.**
- Model climbs or dives during entry. Apply “One Point per 15 Degree Rule” (Entry ends with the stall).
- Model climbs or dives during exit. Apply “One Point per 15 Degree Rule” (Exit begins at completion of quarter loop to level flight).
- Wings not level during entry or exit.
- At stall, spin is forced in the opposite direction to initial wing drop.
- Wings not perpendicular to flight line at end of required number of turns. Apply “One Point per 15-Degree Rule”.
- Spiral dive or pure rotation around roll axis of more than one-half (1/2) turn - **0 pts.**
- Tail of model does not describe a cone during rotation - **0 pts.**
- Wing passes through vertical plane before nose passes through horizontal plane (snap roll entry) – **0 pts.**
- Fuselage reaches a vertical attitude before rotation begins (simulation of stall by application of elevator) -**0 pts.**
- See Description of Maneuvers (Spins) in AMA Competition Regulations for additional criteria.

- 11. Humpty Bump w/Roll Options (half roll up or 1/4 roll up and down) (T):** From upright perform 1/4 inside loop to vertical track (upline), hesitate, perform 1/2 roll, optionally 1/4 roll on this upline, hesitate, perform 1/2 loop to a vertical downline. If 1/4 roll option was chosen, another 1/4 roll is performed on the downline. The model then recovers with 1/4 loop to level upright flight in the opposite direction of entry.

Downgrades:

- Track not vertical in up line and down line.
- Rolls (as specified) not centered in respective vertical lines.
- Over or under rotation on prescribed roll. Apply “One Point per 15 Degree Rule”.
- Loop segments not round with same size and radius.
- If optional cross-box roll is used (1/4 roll), (1/2) loop not 90 degrees to the flight line.

- 12. Slow Roll (D):** Model rolls through 360 degrees. Center is middle of inverted flight.

Downgrades:

- Changes in track
- Changes in altitude.
- Roll rate not constant.
- Model does not roll exactly 360 degrees. Apply “One Point per 15 Degree Rule”.
- Duration of roll less than 3 seconds.

- 13. Top Hat, 3/4 roll up, 1/4 roll down (T):** From upright, perform 1/4 inside loop to a vertical track (up line), hesitate, perform 3/4 roll, hesitate, perform 1/4 inside loop to level inverted flight, hesitate, perform 1/4 inside loop to vertical track (down line), hesitate, performs 1/4 roll hesitate, perform 1/4 inside loop to recover in level flight in the opposite direction as entry.

Downgrades:

- Model not vertical at start and finish of roll elements.
- Rolls not exactly 90 or 270 degrees.
- Model does not fly straight and level inverted and at 90 degrees to the flight line.
- Rolls not centered on line segments.
- Loop segments not round with same size and radius.
- Model not inverted on top line, score is zero (0).

- 14. Double Immelmann with 2 pt. roll first, full roll second (U):** From upright, fly through center, perform 1/2 inside loop, immediately perform 2 of 2 point roll to level inverted flight, hesitate, perform 1/2 inside loop to return to the entry altitude, followed

immediately by a full roll to recover in level upright flight. The horizontal legs, including any required roll, should be equal to the diameter of the half loops, thus forming a square.

Downgrades:

- Half loops not round with constant and equal radius.
- Half loops not completed exactly above or below point of commencement of half loops.
- Horizontal legs not equal to diameter of half loops.
- Rolls not executed immediately after completion of half loops.
- Roll rates not constant and equal.
- Changes in track during half loop, rolls, or lines.
- Entry and exit not at same altitude or not level.
- Under or over rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”.
- Line segments including rolls not straight, horizontal and on track.

- 15. 1/2 Reverse Cuban-8 with 2 of 4 point roll (T):** From upright, perform 1/8 inside loop to a 45-degree upline. On this line hesitate, perform a 2 of 4 point roll, hesitate, perform 5/8 inside loop to level upright flight in the opposite direction of entry.

Downgrades:

- Loop segments not round and of equal radius.
- Changes in track during loop segments or during prescribed roll.
- Roll elements not centered on 45-degree downline.
- Under or over rotation of roll elements. Apply “One Point per 15 Degree Rule”.
- 45-degree downline not at 45 degrees. Apply “One Point per 15 Degree Rule”.

- 16. Four Point Roll (D):** From upright, perform a roll through 360 degrees, hesitating at each 90 degree point; at each hesitation wings are parallel or vertical to the horizon. Center is middle of inverted flight.

Downgrades:

- Hesitations are not at 90, 180, 270, 360. Apply “One Point per 15 Degree Rule” to each.
- Model does not hesitate after each one-quarter roll.
- Roll rate not constant.
- Changes in altitude.
- Changes in track.

- 17. Stall turn, 1/2 roll up, 1/2 roll down (T):** From upright, perform 1/4 inside loop to an upward vertical track (upline), hesitate, perform 1/2 roll, hesitate, perform a stall turn through 180 degrees to a downward vertical track (downline), hesitate, perform 1/2 roll, hesitate, perform 1/4 inside loop to level flight.

Downgrades:

- Track does not become exactly vertical.
- Loop segments not round and of equal size and radius.
- Wings not level during loop segments.
- Changes in track during loop segments or prescribed roll elements.
- Prescribed Roll not centered on lines.
- Over or under rotation of prescribed rolls. Apply “One Point per 15 Degree Rule”.
- Roll rate not constant.
- Pivot radius greater than half wingspan.
- Pendulum movement after stall.

- 18. Avalanche (U):** From upright, perform an inside loop with a positive or negative snap roll centered on the apex of the loop.

Downgrades:

- Loop not round.
- Over or under rotation of snap roll. Apply “One Point per 15 Degree Rule”.
- Snap roll not centered on apex of loop.
- Changes in track during loop or snap.
- Snap roll not a snap (**0 points**) - See rulebook

- 19. Landing Sequence (U):** The landing maneuver will be scored in one half (1/2) point increments from 10 to 0. The maneuver will start two (2) meters from the ground. The model flares smoothly, dissipating flying speed, and then smoothly touches the ground within the landing zone. The maneuver should be considered complete once the plane has slowed below flying speed and rolled 10 meters or comes to a stop and no further downgrades shall be applied after that point. The landing zone shall be marked by lines placed perpendicular across the runway and spaced 30 meters apart. The width of the landing zone is normally the width of the runway but in no case shall it exceed 30 meters. Landing is not a centered maneuver and there is no downgrade for displacement of the touchdown point left or right from center as long as the landing is in the landing zone. If the touchdown is within the runway but not in the landing zone it should be downgraded proportionate to the distance outside the landing zone. The Contest Director may designate any landing zone appropriate to the field if safety considerations dictate. If the landing zone is anything other than standard it should be thoroughly discussed with the pilots and judges before flying is started and no downgrade shall be applied due to the touchdown in the nonstandard landing zone.

The landing will not be downgraded if:

- Wing dips which are caused by air turbulence unless they are not immediately corrected.
- The pilot “slips to a landing” to handle a crosswind condition in which case a wing will be low.
- The model rolls to a controlled stop within 10 meters.
- Displacement of touchdown point left or right as long as the landing is in the landing zone.

Downgrades:

- Model passes behind the judge’s line, zero (0) points.
- Model impacts the runway due to lack of flare.
- Model bounces.
- Changes in track.
- Model ends on its back, zero (0) points.
- Model lands outside landing zone.
- If any undercarriage retracts before the landing is complete, zero (0) points.
- Aircraft porpoises and/or wanders during approach or flare.
- Aircraft lands outside the landing area or runway, zero (0) points.
- Aircraft touches down while not straight to runway and ground track.