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Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes



Flight test report: EN 926-2:2013 & LTF 91/09

Manufacturer Sky Paragliders a.s. Certification number PG_1083.2016
Address Okružní 39 Date of flight test 19. 07. 2016

73911 Frýdlant nad

Ostravicí Czech Republic

Glider model Exos M Classification C
Serial number 2155-11-0925 Representative None
Trimmer no Place of test Villeneuve

Folding lines used no

Test pilot Thurnheer Claude Zoller Alain

Harness Sup' Air - Access M Flugsau - XX-Lite

Harness to risers distance (cm) 43 43

Distance between risers (cm) 42 44

Total weight in flight (kg) 75 95

1. Inflation/Take-off	В			
Rising behaviour	Easy rising, some pilot correction is required	В	Easy rising, some pilot correction is required	В
Special take off technique required	No	Α	No	Α
2. Landing	Α			
Special landing technique required	No	Α	No	Α
3. Speed in straight flight	A			
Trim speed more than 30 km/h	Yes	Α	Yes	Α
Speed range using the controls larger than 10 km/h	Yes	Α	Yes	Α
Minimum speed	Less than 25 km/h	Α	Less than 25 km/h	Α
4. Control movement	С			
Max. weight in flight up to 80 kg				
Symmetric control pressure / travel	Increasing / 40 cm to 55 cm	С	not available	0
Max. weight in flight 80 kg to 100 kg				
Symmetric control pressure / travel	not available	0	Increasing / 45 cm to 60 cm	С
Max. weight in flight greater than 100 kg				
Symmetric control pressure / travel	not available	0	not available	0
5. Pitch stability exiting accelerated flight	A			
Dive forward angle on exit	Dive forward less than 30°	Α	Dive forward less than 30°	Α
Collapse occurs	No	Α	No	Α
6. Pitch stability operating controls during accelerated flight	Α			
Collapse occurs	No	Α	No	Α
7. Roll stability and damping	A			
Oscillations	Reducing	Α	Reducing	Α
8. Stability in gentle spirals	A			
Tendency to return to straight flight	Spontaneous exit	Α	Spontaneous exit	Α
9. Behaviour exiting a fully developed spiral dive	A			
Initial response of glider (first 180°)	Immediate reduction of rate of turn	Α	Immediate reduction of rate of turn	Α

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Tendency to return to straight flight	Spontaneous exit (g force decreasing, rate of turn decreasing)	Α	Spontaneous exit (g force decreasing, rate of turn decreasing)	Α
Turn angle to recover normal flight	Less than 720°, spontaneous recovery	Α	Less than 720°, spontaneous recovery	Α
10. Symmetric front collapse	Α			
Approximately 30 % chord				
Entry	Rocking back less than 45°	Α	Rocking back less than 45°	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit Change of course	Dive forward 0° to 30° Keeping course	Α	Dive forward 0° to 30° Keeping course	Α
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	
At least 50% chord				
Entry	Rocking back less than 45°	Α	Rocking back less than 45°	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit / Change of course	Dive forward 0° to 30° / Keeping course	Α	Dive forward 0° to 30° / Keeping course	Α
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	
With accelerator				
Entry	Rocking back less than 45°	Α	Rocking back less than 45°	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit / Change of course	Dive forward 0° to 30° / Keeping	Α	Dive forward 0° to 30° / Keeping	Α
2.10 to mail alligio on other original go of coalico	course		course	•
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	
11. Exiting deep stall (parachutal stall)	Α			
Deep stall achieved	Yes	Α	Yes	Α
Recovery	Spontaneous in less than 3 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 0° to 30°	Α
Change of course	Changing course less than 45°	Α	Changing course less than 45°	Α
Cascade occurs	No	Α	No	Α
12. High angle of attack recovery	A			
Recovery	Spontaneous in less than 3 s	Α.	Spontaneous in less than 3 s	A
Cascade occurs	No	Α	No	Α
13. Recovery from a developed full stall	B		D: 1 1000 1 000	
Dive forward angle on exit	Dive forward 0° to 30°	A	Dive forward 30° to 60°	В
Collapse	No collapse	A	No collapse	A
Cascade occurs (other than collapses)	No	A	No Less than 45°	A
Rocking back	Less than 45°	Α		A A
Line tension 14. Asymmetric collapse	Most lines tight C	Α	Most lines tight	А
•				
Small asymmetric collapse				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 15° to 45°	Α .	to 15°	Α .
Re-inflation behaviour	Spontaneous re-inflation	A	Spontaneous re-inflation	A
Total change of course	Less than 360°	A	Less than 360°	A
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α
Twist occurs	No	Α	No	Α
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	

Change of course until re-inflation / Maximum dive forward or roll angle	90° to 180° / Dive or roll angle 15° to 45°	В	90° to 180° / Dive or roll angle 45° to 60°	С
Re-inflation behaviour	Spontaneous re-inflation	Α	Spontaneous re-inflation	Α
Total change of course	Less than 360°	Α	Less than 360°	Α
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α
Twist occurs	No	Α	No	Α
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	
Small asymmetric collapse with fully activated accelerator				
Change of course until re-inflation / Maximum dive forward or roll angle	Less than 90° / Dive or roll angle 15° to 45°	Α	Less than 90° / Dive or roll angle 15° to 45°	Α
Re-inflation behaviour	Spontaneous re-inflation	Α	Spontaneous re-inflation	Α
Total change of course	Less than 360°	Α	Less than 360°	Α
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α	No (or only a small number of collapsed cells with a spontaneous reinflation)	Α
Twist occurs	No	Α	No	Α
Cascade occurs	No	Α	No	Α
Folding lines used	No		No	
Laves assumentation allowed with fully activated appalayed				
Large asymmetric collapse with fully activated accelerator Change of course until re-inflation / Maximum dive forward or	90° to 180° / Dive or roll angle	C	90° to 180° / Dive or roll angle 45°	С
roll angle	45° to 60°	С	to 60°	C
Re-inflation behaviour	Spontaneous re-inflation	Α	Spontaneous re-inflation	Α
Total change of course	Less than 360°	Α	Less than 360°	Α
Collapse on the opposite side occurs	Yes, no turn reversal	С	No (or only a small number of	Α
			collapsed cells with a spontaneous reinflation)	
Twist occurs	No	Α	No	Α
Twist occurs Cascade occurs	No No	A A	No No	A A
Cascade occurs	No		No	
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric	No No		No	
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse	No No A		No No Yes	A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course	No No A Yes	A	No No Yes	A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s	No No A Yes Yes More than 50 % of the	A A A	No Yes Yes More than 50 % of the symmetric	A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin	No No A Yes Yes More than 50 % of the symmetric control travel	A A A	No Yes Yes More than 50 % of the symmetric	A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency	No No A Yes Yes More than 50 % of the symmetric control travel A	A A A	No No Yes Yes More than 50 % of the symmetric control travel	A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs	No No A Yes Yes More than 50 % of the symmetric control travel A No	A A A	No No Yes Yes More than 50 % of the symmetric control travel	A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency	No No A Yes Yes More than 50 % of the symmetric control travel A No A	A A A	No No Yes Yes More than 50 % of the symmetric control travel No	A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No	A A A	No No Yes Yes More than 50 % of the symmetric control travel No	A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs	No No A Yes Yes More than 50 % of the symmetric control travel A No A No	A A A A A	No No Yes Yes More than 50 % of the symmetric control travel No No	A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A	A A A A A	No No Yes Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No	A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45°	A A A A A	No Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45°	A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall	No No A Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight	A A A A A A	No No Yes Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No	A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span	A A A A A A	Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span	A A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery	No No A Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s	A A A A A A A	Yes Yes More than 50 % of the symmetric control travel No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s	A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	A A A A A A A A	No Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	A A A A A A A A A A A A A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No	A A A A A A A	No Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs 20. Big ears	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No A	A A A A A A A A A A A A A A A A A A A	Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No	A A A A A A A A A A A A A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs 20. Big ears Entry procedure	No No A Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No A Dedicated controls	A A A A A A A A A A A A A A A A A A A	No No Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No Dedicated controls	A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs 20. Big ears Entry procedure Behaviour during big ears	No No A Yes Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No A Dedicated controls Stable flight	A A A A A A A A A A A A A A A A A A A	Yes Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No Dedicated controls Stable flight	A A A A A A A A A A A A A A A A A A A
Cascade occurs Folding lines used 15. Directional control with a maintained asymmetric collapse Able to keep course 180° turn away from the collapsed side possible in 10 s Amount of control range between turn and stall or spin 16. Trim speed spin tendency Spin occurs 17. Low speed spin tendency Spin occurs 18. Recovery from a developed spin Spin rotation angle after release Cascade occurs 19. B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs 20. Big ears Entry procedure	No No A Yes Yes More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No A Dedicated controls	A A A A A A A A A A A A A A A A A A A	No No Yes Yes More than 50 % of the symmetric control travel No No Stops spinning in less than 90° No Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No Dedicated controls	A

21. Big ears in accelerated flight	A			
Entry procedure	Dedicated controls	Α	Dedicated controls	Α
Behaviour during big ears	Stable flight	Α	Stable flight	Α
Recovery	Spontaneous in 3 s to 5 s	Α	Spontaneous in less than 3 s	Α
Dive forward angle on exit	Dive forward 0° to 30°	Α	Dive forward 0° to 30°	Α
Behaviour immediately after releasing the accelerator while maintaining big ears	Stable flight	Α	Stable flight	Α
22. Alternative means of directional control	Α			
180° turn achievable in 20 s	Yes	Α	Yes	Α
Stall or spin occurs	No	Α	No	Α
23. Any other flight procedure and/or configuration described in the user's manual	0			
Procedure works as described	not available	0	not available	0
Procedure suitable for novice pilots	not available	0	not available	0
Cascade occurs	not available	0	not available	0

24. Comments of test pilot

Comments