UP MAKALU 5 L

Type designation UP Makalu 5 L

Type test reference no DHV GS-01-2955-25

Holder of certification UP International GmbH

Manufacturer UP International GmbH

Classification B

Winch towing Yes

Number of seats min / max 1/1

Accelerator Yes

Trimmers No

BEHAVIOUR AT MIN WEIGHT IN BEHAVIOUR AT MAX FLIGHT (100KG)



WEIGHT IN FLIGHT (130KG)



Harald Buntz

No release



No release

Inflation/take-off

Rising behaviour Smooth, easy and constant rising

Special take off technique required No

Smooth, easy and constant rising

No

Α

Special landing technique required No

A

Speeds in straight flight

Trim speed more than 30 km/h Yes

Speed range using the controls larger than 10 Yes

km/h

Minimum speed Less than 25 km/h Less than 25 km/h

Control movement

Yes

Symmetric control pressure Increasing

Symmetric control travel Greater than 60 cm

Greater than 65 cm

Pitch stability exiting accelerated flight

Dive forward angle on exit Dive forward less than 30°

Dive forward less than 30°

Pitch stability operating controls during

Collapse occurs No

Collapse occurs No

Roll stability and damping

Oscillations Reducing

Reducing

Stability in gentle spirals A

Tendency to return to straight flight Spontaneous exit

Spontaneous exit

Behaviour exiting a fully developed spiral dive A

Initial response of glider (first 180°) Immediate reduction of rate of turn Tendency to return to straight flight Spontaneous exit (g force decreasing,

rate of turn decreasing)

Turn angle to recover normal flight Less than 720°, spontaneous recovery

Symmetric front collapse	A	!A
	Rocking back less than 45°	Rocking back less than 45°
-	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	•	Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	1 3	No No
Folding lines used		
Folding lines used	110	no
Unaccelerated collapse (at least 50 % chord)	A	A
Entry	Rocking back less than 45°	Rocking back less than 45°
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	Dive forward 0° to 30°	Dive forward 0° to 30°
Change of course	Keeping course	Keeping course
Cascade occurs		No
Folding lines used	no	no
	1-	1.
Accelerated collapse (at least 50 % chord)	;A	A Parking to the last them 450
-	Rocking back less than 45°	Rocking back less than 45°
•	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	No	No
Folding lines used	no	no
Exiting deep stall (parachutal stall)	A	A
		Voc
Deep stall achieved		Yes
	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
_	Changing course less than 45°	Changing course less than 45°
Cascade occurs	No	No
<u>High angle of attack recovery</u>	А	A
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Cascade occurs	No	No
Recovery from a developed full stall	A	A
Dive forward angle on exit	i	Dive forward 0° to 30°
	No collapse	No collapse
-	•	No
Cascade occurs (other than collapses)		Less than 45°
Rocking back		Less than 45°
		NA to 10 to - 1- to
Line tension	Most lines tight	Most lines tight
	Most lines tight	Most lines tight
Small asymmetric collapse	Α	1
Small asymmetric collapse Change of course until re-inflation	A Less than 90°	Less than 90°
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 90° Dive or roll angle 0° to 15°	Less than 90° Dive or roll angle 0° to 15°
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)
Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneoure inflation) No
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180°	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no B 90° to 180°
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180°	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180°	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no B 90° to 180°
Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45° Spontaneous re-inflation	Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°

I WIST OCCURS	INO	INO
Cascade occurs	No	No
Folding lines used	no	no
Small asymmetric collapse accelerated	A	A
Change of course until re-inflation	Less than 900	Less than 90°
Maximum dive forward or roll angle	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
	No (or only a small number of collapsed	No (or only a small number of
conapse on the opposite side occurs	cells with a spontaneous re inflation)	collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used	no	no
Large asymmetric collapse accelerated	В	В
Change of course until re-inflation	90° to 180°	90° to 180°
Maximum dive forward or roll angle		Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)	No (or only a small number of collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used		no
Tolding lines used	110	110
Directional control with a maintained asymmetric collapse	А	А
Able to keep course	Yes	Yes
-		Yes
	162	res
180° turn away from the collapsed side		
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control	More than 50 % of the symmetric control travel
possible in 10 s Amount of control range between turn and	More than 50 % of the symmetric control	•
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel	control travel A No
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No No	No A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A No Stops spinning in less than 90°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	No A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release	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	control travel A No A Stops spinning in less than 90° No A Changing course less than 45°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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°	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure	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° No A Standard technique	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 Standard technique
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight	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 Standard technique Stable flight
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Recovery Dive forward angle on exit Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°

Recovery Spontaneous in less than 3 s

Spontaneous in less than 3 s

Twist occurs No

Dive forward 0° to 30° Stable flight

Alternative means of directional control	Α
180° turn achievable in 20 s Yes	Yes
Stall or spin occurs No	No
Any other flight procedure and/or configuration described in the u	user's manual

UP MAKALU 5 M

Type designation UP Makalu 5 M

Type test reference no DHV GS-01-2956-25

Holder of certification UP International GmbH

Manufacturer UP International GmbH

Classification B

Winch towing Yes

Number of seats min / max 1/1

Accelerator Yes

Trimmers No

BEHAVIOUR AT MIN WEIGHT IN BEHAVIOUR AT MAX FLIGHT (85KG) **WEIGHT IN FLIGHT (110KG)**







Josef Bauer No release No release

1 T 6	lation.	/halea	-66
THE	lation	/take-	OH
		,	

Rising behaviour Smooth, easy and constant rising Special take off technique required No

Smooth, easy and constant rising No

<u>Landing</u>	¦A
	a technique required No

Α

On a side to seem to be fitting.	1.2
Speeds in straight flight	A

В Trim speed more than 30 km/h Yes Yes

Speed range using the controls larger than 10 Yes km/h

> Minimum speed Less than 25 km/h 25 km/h to 30 km/h

ontrol	movement

Symmetric control pressure Increasing

Symmetric control travel Greater than 60 cm

Greater than 65 cm

Pitch stability exiting accelerated flight

Dive forward angle on exit Dive forward less than 30° Collapse occurs No

Dive forward less than 30°

Pitch stability operating controls during

Collapse occurs No

Roll stability and damping A **Oscillations** Reducing

Reducing

Stability in gentle spirals A

Tendency to return to straight flight Spontaneous exit

Spontaneous exit

Behaviour exiting a fully developed spiral dive A

Initial response of glider (first 180°) Immediate reduction of rate of turn Tendency to return to straight flight Spontaneous exit (g force decreasing, rate of turn decreasing)

Turn angle to recover normal flight Less than 720°, spontaneous recovery

Symmetric front collapse	A	A
	Rocking back less than 45°	Rocking back less than 45°
-	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	•	Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	1 3	No
Folding lines used		
Folding lines used	110	no
Unaccelerated collapse (at least 50 % chord)	A	A
Entry	Rocking back less than 45°	Rocking back less than 45°
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	Dive forward 0° to 30°	Dive forward 0° to 30°
Change of course	Keeping course	Keeping course
Cascade occurs		No
Folding lines used	no	no
A continued to the man (at least 50 % about)	1.	i.
Accelerated collapse (at least 50 % chord)	<u>A</u>	A
-	Rocking back less than 45°	Rocking back less than 45°
•	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs		No
Folding lines used	no	no
Exiting deep stall (parachutal stall)	A	A
	III	4
Deep stall achieved		Yes
	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
_	Changing course less than 45°	Changing course less than 45°
Cascade occurs	No	No
<u>High angle of attack recovery</u>	А	A
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Cascade occurs	No	No
Recovery from a developed full stall	A	A
·	i	Dive forward 0° to 30°
Dive forward angle on exit		
-	No collapse	No collapse
Cascade occurs (other than collapses)	NO .	
B 11 1 1		No 450
Rocking back	Less than 45°	Less than 45°
Line tension	Less than 45°	Less than 45°
Line tension Small asymmetric collapse	Less than 45° Most lines tight	Less than 45° Most lines tight
Line tension Small asymmetric collapse Change of course until re-inflation	Less than 45° Most lines tight A Less than 90°	Less than 45° Most lines tight A Less than 90°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no A Less than 90°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No No Less than 90°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No Dive or roll angle 15° to 45°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no A Less than 90° Dive or roll angle 15° to 45°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no A Less than 90°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No No Less than 90°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No Dive or roll angle 15° to 45°

I WIST OCCURS	INO	INO
Cascade occurs	No	No
Folding lines used	no	no
Small asymmetric collapse accelerated	A	A
Change of course until re-inflation	Less than 900	Less than 90°
Maximum dive forward or roll angle	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
	No (or only a small number of collapsed	No (or only a small number of
conapse on the opposite side occurs	cells with a spontaneous re inflation)	collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used	no	no
Large asymmetric collapse accelerated	В	В
Change of course until re-inflation	90° to 180°	90° to 180°
Maximum dive forward or roll angle		Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)	No (or only a small number of collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used		no
Tolding lines used	110	110
Directional control with a maintained asymmetric collapse	А	А
Able to keep course	Yes	Yes
-		Yes
	162	res
180° turn away from the collapsed side		
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control	More than 50 % of the symmetric control travel
possible in 10 s Amount of control range between turn and	More than 50 % of the symmetric control	•
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel	control travel A No
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No No	No A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A No Stops spinning in less than 90°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	No A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release	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	control travel A No A Stops spinning in less than 90° No A Changing course less than 45°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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°	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure	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° No A Standard technique	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 Standard technique
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight	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 Standard technique Stable flight
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Recovery Dive forward angle on exit Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°

Recovery Spontaneous in less than 3 s

Spontaneous in less than 3 s

Twist occurs No

Dive forward 0° to 30° Stable flight

Alternative means of directional control	Α
180° turn achievable in 20 s Yes	Yes
Stall or spin occurs No	No
Any other flight procedure and/or configuration described in the u	user's manual

UP MAKALU 5 SM

Type designation UP Makalu 5 SM Type test reference no DHV GS-01-2957-25 Holder of certification UP International GmbH

Manufacturer UP International GmbH

Classification B

Winch towing Yes

Number of seats min / max 1/1

Accelerator Yes

Trimmers No



BEHAVIOUR AT MIN WEIGHT IN BEHAVIOUR AT MAX FLIGHT (75KG) WEIGHT IN FLIGHT (100KG)

Test pilots



Mario Eder **Josef Bauer** No release No release

Initiation/take-on	įA	A
	Rising behaviour Smooth, easy and constant rising	Sn
Special take off te	echnique required No	No

Smooth, easy and constant rising

<u>Landing</u>		Α	Α
	Special landing technique required	No	No

Speeds in straight flight	Α	Α
Trim speed more than	30 km/h Yes	Yes

Speed range using the controls larger than 10 Yes km/h

> Minimum speed Less than 25 km/h Less than 25 km/h

Con	itrol movement	1	Α	A
	S	ymmetric control pressure	Increasing	Increasing

Symmetric control travel Greater than 55 cm Greater than 60 cm

The state of the s	1	I I
Pitch stability exiting accelerated flight	A	A
£		

Dive forward angle on exit Dive forward less than 30° Dive forward less than 30° Collapse occurs No

	I control of the cont	į.
Pitch stability operating controls during	-	-
	i A	i A
laccelerated flight		T
L		

Collapse occurs No No

Roll stability and damping **Oscillations** Reducing Reducing

Stability in gentle spirals A Tendency to return to straight flight Spontaneous exit Spontaneous exit

Behaviour exiting a fully developed spiral dive A

Initial response of glider (first 180°) Immediate reduction of rate of turn Tendency to return to straight flight Spontaneous exit (g force decreasing, rate of turn decreasing)

Turn angle to recover normal flight Less than 720°, spontaneous recovery

Symmetric front collapse	A	!A
	Rocking back less than 45°	Rocking back less than 45°
-	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	•	Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	1 3	No
Folding lines used	110	no
Unaccelerated collapse (at least 50 % chord)	A	A
Entry	Rocking back less than 45°	Rocking back less than 45°
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	Dive forward 0° to 30°	Dive forward 0° to 30°
Change of course	Keeping course	Keeping course
Cascade occurs		No
Folding lines used	no	no
la contendad antiques (at toget 50 % about)	1-	i.
Accelerated collapse (at least 50 % chord)	;A	A Paralina has been then 450
-	Rocking back less than 45°	Rocking back less than 45°
•	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	No	No
Folding lines used	no	no
Exiting deep stall (parachutal stall)	A	A
	F	4
Deep stall achieved		Yes
	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
_	Changing course less than 45°	Changing course less than 45°
Cascade occurs	No	No
<u>High angle of attack recovery</u>	А	A
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Cascade occurs	No	No
Recovery from a developed full stall	A	A
Dive forward angle on exit	i	Dive forward 0° to 30°
-	No collapse	No collapse
Cascade occurs (other than collapses)	No	No
	Less than 45°	Less than 45°
	Less than 45° Most lines tight	
Line tension		Less than 45°
Line tension Small asymmetric collapse	Most lines tight	Less than 45° Most lines tight
Line tension Small asymmetric collapse Change of course until re-inflation	Most lines tight A Less than 90°	Less than 45° Most lines tight A Less than 90°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Most lines tight A Less than 90° Dive or roll angle 0° to 15°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No Less than 90°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no B 90° to 180°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no A Less than 90° Dive or roll angle 15° to 45°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No Less than 90°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no B 90° to 180°
Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°

I WIST OCCURS	INO	INO
Cascade occurs	No	No
Folding lines used	no	no
Small asymmetric collapse accelerated	A	A
Change of course until re-inflation	Less than 900	Less than 90°
Maximum dive forward or roll angle	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
	No (or only a small number of collapsed	No (or only a small number of
conapse on the opposite side occurs	cells with a spontaneous re inflation)	collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used	no	no
Large asymmetric collapse accelerated	В	В
Change of course until re-inflation	90° to 180°	90° to 180°
Maximum dive forward or roll angle		Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
Total change of course	Less than 360°	Less than 360°
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)	No (or only a small number of collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used		no
Tolding lines used	110	110
Directional control with a maintained asymmetric collapse	А	А
Able to keep course	Yes	Yes
-		Yes
	165	res
180° turn away from the collapsed side		
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control	More than 50 % of the symmetric control travel
possible in 10 s Amount of control range between turn and	More than 50 % of the symmetric control	•
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel	control travel A No
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency	More than 50 % of the symmetric control travel A No	control travel A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No No	No A No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A No Stops spinning in less than 90°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	No A No A
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A No A Stops spinning in less than 90°	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	control travel A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release	More than 50 % of the symmetric control travel A No A Stops spinning in less than 90° No	Control travel A No A No A Stops spinning in less than 90° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release	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	control travel A No A Stops spinning in less than 90° No A Changing course less than 45°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	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°	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
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	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°	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°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs	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° No	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° No
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure	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° No A Standard technique	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 Standard technique
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight	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 Standard technique Stable flight
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Recovery Dive forward angle on exit Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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 Standard technique Stable flight Spontaneous in less than 3 s
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
possible in 10 s Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	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° No A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique	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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°

Recovery Spontaneous in less than 3 s

Spontaneous in less than 3 s

Twist occurs No

Dive forward 0° to 30° Stable flight

Alternative means of directional control A	A
180° turn achievable in 20 s Yes	Yes
Stall or spin occurs No	No
Any other flight procedure and/or configuration described in the u	ser's manual

UP MAKALU 5 S

Inflation/take-off

Type designation UP Makalu 5 S Type test reference no DHV GS-01-2958-25

Holder of certification UP International GmbH Manufacturer UP International GmbH

Classification B

Winch towing Yes

Number of seats min / max 1/1

Accelerator Yes

Trimmers No

BEHAVIOUR AT MIN WEIGHT IN FLIGHT (65KG)

BEHAVIOUR AT MAX WEIGHT IN FLIGHT (90KG)

Josef Bauer

No release



Juliette Schönsee

No release

Rising behaviour Smooth, easy and constant rising Smooth, easy and constant rising Special take off technique required No No

Α Special landing technique required No

A Speeds in straight flight

Trim speed more than 30 km/h Yes Speed range using the controls larger than 10 Yes Yes km/h

Minimum speed Less than 25 km/h Less than 25 km/h

Control movement

Symmetric control pressure Increasing **Symmetric control travel** Greater than 55 cm Greater than 60 cm

Pitch stability exiting accelerated flight

Dive forward angle on exit Dive forward less than 30° Dive forward less than 30° Collapse occurs No

Pitch stability operating controls during

Collapse occurs No

Roll stability and damping **Oscillations** Reducing Reducing

Stability in gentle spirals A

Tendency to return to straight flight Spontaneous exit Spontaneous exit

Behaviour exiting a fully developed spiral dive A

Initial response of glider (first 180°) Immediate reduction of rate of turn Tendency to return to straight flight Spontaneous exit (g force decreasing, rate of turn decreasing)

Turn angle to recover normal flight Less than 720°, spontaneous recovery

Symmetric front collapse	A	A
Entry	Rocking back less than 45°	Rocking back less than 45°
-	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	•	Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	1 3	No
Folding lines used		
Folding lines used	110	no
Unaccelerated collapse (at least 50 % chord)	A	A
Entry	Rocking back less than 45°	Rocking back less than 45°
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit	Dive forward 0° to 30°	Dive forward 0° to 30°
Change of course	Keeping course	Keeping course
Cascade occurs		No
Folding lines used	no	no
A continued on the man (at the at 50 % about)	1.	i.
·/-	A	A Parking heads have then 450
-	Rocking back less than 45°	Rocking back less than 45°
	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
Change of course		Keeping course
Cascade occurs	No	No
Folding lines used	no	no
Exiting deep stall (parachutal stall)	A	A
· · · · · · · · · · · · · · · · · · ·	F	4
Deep stall achieved		Yes
	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Dive forward angle on exit		Dive forward 0° to 30°
_	Changing course less than 45°	Changing course less than 45°
Cascade occurs	INO	No
High angle of attack recovery	A	A
Recovery	Spontaneous in less than 3 s	Spontaneous in less than 3 s
Cascade occurs	No	No
Recovery from a developed full stall	A	A
Dive forward angle on exit	i	Dive forward 0° to 30°
	No collapse	No collapse
Cascade occurs (other than collapses)	No collapse	No collapse
cascade occurs (other than conabses)	No	No
		No
Rocking back	Less than 45°	Less than 45°
Rocking back		
Rocking back Line tension	Less than 45°	Less than 45°
Rocking back Line tension Small asymmetric collapse	Less than 45° Most lines tight	Less than 45° Most lines tight
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation	Less than 45° Most lines tight A Less than 90°	Less than 45° Most lines tight A Less than 90°
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45°
Rocking back Line tension <u>Small asymmetric collapse</u> Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360°
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation)
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No No no B 90° to 180°
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180°
Rocking back Line tension Small asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle Re-inflation behaviour Total change of course Collapse on the opposite side occurs Twist occurs Cascade occurs Folding lines used Large asymmetric collapse Change of course until re-inflation Maximum dive forward or roll angle	Less than 45° Most lines tight A Less than 90° Dive or roll angle 0° to 15° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneous re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45° Spontaneous re-inflation	Less than 45° Most lines tight A Less than 90° Dive or roll angle 15° to 45° Spontaneous re-inflation Less than 360° No (or only a small number of collapsed cells with a spontaneou re inflation) No No no B 90° to 180° Dive or roll angle 15° to 45°

Twist occurs	No	No
Cascade occurs	No	No
Folding lines used	no	no
Small asymmetric collapse accelerated	В	A
Channe of annua until un inflation	000 to 1000	Laga than 000
Change of course until re-inflation		Less than 90°
Maximum dive forward or roll angle	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
Re-inflation behaviour	Spontaneous re-inflation	Spontaneous re-inflation
	•	Less than 360°
Total change of course		
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)	No (or only a small number of collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs		No
Folding lines used	no	no
Large asymmetric collapse accelerated	В	B
Oh- C	000 to 1000	4
Change of course until re-inflation		90° to 180°
Maximum dive forward or roll angle	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
Re-inflation hehaviour	Spontaneous re-inflation	Spontaneous re-inflation
	•	'
Total change of course		Less than 360°
Collapse on the opposite side occurs	No (or only a small number of collapsed cells with a spontaneous re inflation)	No (or only a small number of collapsed cells with a spontaneous re inflation)
Twist occurs	No	No
Cascade occurs	No	No
Folding lines used		no
Folding lines used	110	110
Directional control with a maintained asymmetric collapse	A	A
	±	· · · · · · · · · · · · · · · · · · ·
Able to keep course	Yes	Yes
180° turn away from the collapsed side	Yes	Yes
possible in 10 s Amount of control range between turn and stall or spin	More than 50 % of the symmetric control	More than 50 % of the symmetric control travel
Amount of control range between turn and	More than 50 % of the symmetric control	
Amount of control range between turn and stall or spin Trim speed spin tendency	More than 50 % of the symmetric control travel	control travel
Amount of control range between turn and stall or spin	More than 50 % of the symmetric control travel	control travel
Amount of control range between turn and stall or spin Trim speed spin tendency	More than 50 % of the symmetric control travel	control travel
Amount of control range between turn and stall or spin Trim speed spin tendency	More than 50 % of the symmetric control travel	control travel
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs	More than 50 % of the symmetric control travel A No	Control travel A No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs	More than 50 % of the symmetric control travel A No No	Control travel A No A No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency	More than 50 % of the symmetric control travel A No No	control travel A No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No A No	Control travel A No No B
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release	More than 50 % of the symmetric control travel A No A No B Stops spinning in 90° to 180°	control travel A No A No B Stops spinning in 90° to 180°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin	More than 50 % of the symmetric control travel A No A No B Stops spinning in 90° to 180°	Control travel A No No B
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No	control travel A No A No B Stops spinning in 90° to 180° No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release	More than 50 % of the symmetric control travel A No A No B Stops spinning in 90° to 180°	control travel A No A No B Stops spinning in 90° to 180°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs	More than 50 % of the symmetric control travel A No A No B Stops spinning in 90° to 180° No	Control travel A No B Stops spinning in 90° to 180° No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45°	control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span	control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45°	control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s	control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	Control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	Control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No	control travel A No A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°	Control travel A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs	More than 50 % of the symmetric control travel A No A No B Stops spinning in 90° to 180° 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 No A No B Stops spinning in 90° to 180° No A Changing course less than 45° Remains stable with straight span Spontaneous in less than 3 s Dive forward 0° to 30° No
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Behaviour before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight Entry procedure	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight Entry procedure Behaviour during big ears	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	Control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°
Amount of control range between turn and stall or spin Trim speed spin tendency Spin occurs Low speed spin tendency Spin occurs Recovery from a developed spin Spin rotation angle after release Cascade occurs B-line stall Change of course before release Recovery Dive forward angle on exit Cascade occurs Big ears Entry procedure Behaviour during big ears Recovery Dive forward angle on exit Big ears in accelerated flight Entry procedure Behaviour during big ears	More than 50 % of the symmetric control travel A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30°	control travel A No A No B Stops spinning in 90° to 180° 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 Standard technique Stable flight Spontaneous in less than 3 s Dive forward 0° to 30° A Standard technique

Twist occurs No

Dive forward 0° to 30° Stable flight

Alternative means of directional control A	A
180° turn achievable in 20 s Yes	Yes
Stall or spin occurs No	No
Any other flight procedure and/or configuration described in the u	ser's manual