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## DHV TESTREPORT EN926-2:2014

UP MAKALU 4 SM

**Type designation** UP Makalu 4 SM  
**Type test reference no** DHV GS-01-2208-16  
**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 (75KG)

Test pilots



Beni Stocker

## BEHAVIOUR AT MAX WEIGHT IN FLIGHT (95KG)



Harald Buntz

Inflation/take-off

A

A

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

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

Landing

A

A

**Special landing technique required** No

No

Speeds in straight flight

A

A

**Trim speed more than 30 km/h** Yes  
**Speed range using the controls larger than 10 km/h** Yes  
**Minimum speed** Less than 25 km/h

**Trim speed more than 30 km/h** Yes  
**Speed range using the controls larger than 10 km/h** Yes  
**Minimum speed** Less than 25 km/h

Control movement

A

A

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

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

Pitch stability exiting accelerated flight

A

A

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

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

Pitch stability operating controls during accelerated flight

A

A

**Collapse occurs** No

No

Roll stability and damping

A

A

**Oscillations** Reducing

Reducing

Stability in gentle spirals

A

A

**Tendency to return to straight flight** Spontaneous exit

Spontaneous exit

en : Verhalten beim Verlassen einer vollständigen Steilspirale

A

A

**en : Erstes Ansprechen des Gleitschirms (die ersten 180°)** Drehgeschwindigkeit

**en : unmittelbare Verringerung der Drehgeschwindigkeit**

**Tendency to return to straight flight** en : selbstständiges Ausleiten (G-Kraft abnehmend, Drehgeschwindigkeit

**en : selbstständiges Ausleiten (G-Kraft abnehmend, Drehgeschwindigkeit**

	abnehmend)	abnehmend)
<b>Turn angle to recover normal flight</b>	Less than 720°, spontaneous recovery	Less than 720°, spontaneous recovery
<b>Symmetric front collapse</b>	<b>A</b>	<b>A</b>
<b>Entry</b>	Rocking back less than 45°	Rocking back less than 45°
<b>Recovery</b>	Spontaneous in less than 3 s	Spontaneous in less than 3 s
<b>Dive forward angle on exit</b>	Dive forward 0° to 30°	Dive forward 0° to 30°
<b>Change of course</b>	Keeping course	Keeping course
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>en : Symmetrischer Frontklapper mindestens 50% Flügeltiefe</b>	<b>A</b>	<b>A</b>
<b>Entry</b>	Rocking back less than 45°	Rocking back less than 45°
<b>Recovery</b>	Spontaneous in less than 3 s	Spontaneous in less than 3 s
<b>Dive forward angle on exit</b>	Dive forward 0° to 30°	Dive forward 0° to 30°
<b>Change of course</b>	Entering a turn of less than 90°	Keeping course
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>en : Symmetrischer Frontklapper im beschleunigten Flug</b>	<b>A</b>	<b>A</b>
<b>Entry</b>	Rocking back less than 45°	Rocking back less than 45°
<b>Recovery</b>	Spontaneous in less than 3 s	Spontaneous in less than 3 s
<b>Dive forward angle on exit</b>	Dive forward 0° to 30°	Dive forward 0° to 30°
<b>Change of course</b>	Entering a turn of less than 90°	Keeping course
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>Exiting deep stall (parachutal stall)</b>	<b>A</b>	<b>A</b>
<b>Deep stall achieved</b>	Yes	Yes
<b>Recovery</b>	Spontaneous in less than 3 s	Spontaneous in less than 3 s
<b>Dive forward angle on exit</b>	Dive forward 0° to 30°	Dive forward 0° to 30°
<b>Change of course</b>	Changing course less than 45°	Changing course less than 45°
<b>Cascade occurs</b>	No	No
<b>High angle of attack recovery</b>	<b>A</b>	<b>A</b>
<b>Recovery</b>	Spontaneous in less than 3 s	Spontaneous in less than 3 s
<b>Cascade occurs</b>	No	No
<b>Recovery from a developed full stall</b>	<b>A</b>	<b>A</b>
<b>Dive forward angle on exit</b>	Dive forward 0° to 30°	Dive forward 0° to 30°
<b>Collapse</b>	No collapse	No collapse
<b>Cascade occurs (other than collapses)</b>	No	No
<b>Rocking back</b>	Less than 45°	Less than 45°
<b>Line tension</b>	Most lines tight	Most lines tight
<b>en : Kleiner einseitiger Klapper</b>	<b>A</b>	<b>A</b>
<b>Change of course until re-inflation</b>	Less than 90°	Less than 90°
<b>Maximum dive forward or roll angle</b>	Dive or roll angle 0° to 15°	Dive or roll angle 15° to 45°
<b>Re-inflation behaviour</b>	Spontaneous re-inflation	Spontaneous re-inflation
<b>Total change of course</b>	Less than 360°	Less than 360°
<b>Collapse on the opposite side occurs</b>	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)
<b>Twist occurs</b>	No	No
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>en : Großer einseitiger Klapper</b>	<b>A</b>	<b>A</b>
<b>Change of course until re-inflation</b>	Less than 90°	Less than 90°
<b>Maximum dive forward or roll angle</b>	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
<b>Re-inflation behaviour</b>	Spontaneous re-inflation	Spontaneous re-inflation
<b>Total change of course</b>	Less than 360°	Less than 360°
<b>Collapse on the opposite side occurs</b>	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)
<b>Twist occurs</b>	No	No
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>en : Kleiner einseitiger Klapper im beschleunigten Flug</b>	<b>A</b>	<b>A</b>
<b>Change of course until re-inflation</b>	Less than 90°	Less than 90°
<b>Maximum dive forward or roll angle</b>	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
<b>Re-inflation behaviour</b>	Spontaneous re-inflation	Spontaneous re-inflation
<b>Total change of course</b>	Less than 360°	Less than 360°
<b>Collapse on the opposite side occurs</b>	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)
<b>Twist occurs</b>	No	No
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no
<b>en : Großer einseitiger Klapper im beschleunigten Flug</b>	<b>A</b>	<b>B</b>

<b>Change of course until re-inflation</b>	Less than 90°	90° to 180°
<b>Maximum dive forward or roll angle</b>	Dive or roll angle 15° to 45°	Dive or roll angle 15° to 45°
<b>Re-inflation behaviour</b>	Spontaneous re-inflation	Spontaneous re-inflation
<b>Total change of course</b>	Less than 360°	Less than 360°
<b>Collapse on the opposite side occurs</b>	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)	en : Nein (oder nur eine kleine Anzahl von eingeklappten Zellen mit selbstständiger Wiederöffnung)
<b>Twist occurs</b>	No	No
<b>Cascade occurs</b>	No	No
<b>en : Faltleinen wurden benutzt</b>	no	no

**Directional control with a maintained asymmetric collapse**

A

A

Able to keep course Yes

Yes

180° turn away from the collapsed side possible in 10 s Yes

Yes

Amount of control range between turn and stall or spin More than 50 % of the symmetric control travel

More than 50 % of the symmetric control travel

**Trim speed spin tendency**

A

A

Spin occurs No

No

**Low speed spin tendency**

A

A

Spin occurs No

No

**Recovery from a developed spin**

A

A

Spin rotation angle after release Stops spinning in less than 90°

Stops spinning in less than 90°

Cascade occurs No

No

**B-line stall**

A

A

Change of course before release Changing course less than 45°

Changing course less than 45°

Behaviour before release Remains stable with straight span

Remains stable with straight span

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°

Cascade occurs No

No

**Big ears**

A

A

Entry procedure Dedicated controls

Dedicated controls

Behaviour during big ears Stable flight

Stable flight

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°

**Big ears in accelerated flight**

A

A

Entry procedure Dedicated controls

Dedicated controls

Behaviour during big ears Stable flight

Stable flight

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°

Behaviour immediately after releasing the accelerator while maintaining big ears Stable flight

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 user's manual**

No other flight procedure or configuration described in the user's manual

**Supplementary remarks**

Bei sehr großem Leinenzug bei Ohren Einklappen , Nachziehen der Leinen, Sackflug erreichbar, aber durch Standardverfahren nicht erreichbar.