

EMOTION – discover the magic

AFS®

DHV 1
EMOTION



U-TURN

- Handbook – English Rev.1.02
- Maintenance Guide Rev.1.6
 - DHV Example Certification
 - DHV Example Registration

Stand: August 2007 / Revision 1.01

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All technical details in this manual have been carefully checked by U-TURN. However we like to mention that we don't take any liability for possible mistakes, neither in legal responsibility, nor in liability cases that derive from mistakable details. We preserve the right to change this manual in any way to achieve technical improvements.

You've got the stuff to fly!

The U-Turn team would like to congratulate you on the purchase of your new U-Turn paraglider. You have made an excellent choice. We wish you long and enjoyable flights and many happy landings with your U-TURN EMOTION.

The Research and Development team at U-Turn can proudly look back at many successful years in the flight sport industry. Our own concepts not only meet but exceed industry standards. The combination between the latest computer based technology and the know-how of experienced test pilots and professional pilots provides an excellent ground for quality. We certainly keep our customers needs in mind, and always appreciate your input and constructive criticism. Should there be any open questions please feel free to contact your U-TURN dealership or our company. We are glad to assist you in any possible way.

In order to provide you with the latest information on technical development and innovations at U-Turn, we ask that you complete the questionnaire attached, and mail it to the following address:



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E-mail: info@u-turn.de



Please read the handbook carefully before using your U-Turn EMOTION for the first time. We composed this handbook, in order to make the handling of your new U-Turn EMOTION as safe and easy for you as possible.



U-TURN GmbH
Esslinger Straße 23
D-78054 Villingen-Schwenningen



NAME:.....

FIRST NAME:.....

STREET:.....

ZIP CODE/CITY:.....

TELEPHONE:.....

E-MAIL:.....

.....

PARAGLIDER TYPE:.....

SERIALNUMBER:.....

Date of purchase:.....

Dealership:.....

.....

Tested by:.....

Flying hours:.....

Paraglider since:.....

Miscellaneous:.....

.....

.....

.....



Yes, I would like to get the newsletter by email.

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EMOTION S	Seite

Introduction

U-Turn stands for uncompromising safety, best components and outperforming flight-characteristics. The limits of physics are unbribable. To do the most practicable within this given frame is our goal. We concede: This is an ambitious and somehow immodest demand, but you'll find U-Turn always at the cutting edge of technology. Oscar Wilde once said in his very british understatement his taste is just basic: Only the best is always good enough. The U-Turn team agrees with this attitude: We always want to deliver the best possible glider. Not more, but certainly not less. Customer's wishes are key for the U-Turn stuff, so we appreciate any comments. Please feel free to contact your competence center or U-Turn directly when you're in need for a good piece of advice.

General Description: EMOTION

To be able to fly already today with the security and safety of tomorrow – this is made possible with the EMOTION. Not only does this new DHV1-paraglider from U-Turn fulfill the rules and regulations of the DHV and the CEN-norms for a safe

category 1 wing. It is also constructed in such a way as to easily fulfill the higher and demanding requirements which are to be expected next year.

In the run-up to a test pilot-hearing along with the manufacturers end of August at the Achensee the EMOTION was tested from the DHV under the new requirements. The test-flight was executed at the upper weight-limit of size M. Clear statement of the DHV tech dept.: Even regarding the higher demands concerning the resistance against collapses and the demands to easily stop a dive spiral the EMOTION unquestionably is a DHV-1-canopy.

The aspect ratio of the EMOTION has in fact been slightly reduced In comparison to the BODYGUARD, the reference model among the safest category 1 paragliders.

Nevertheless constructor Ernst Strobl has decreased the curvature at the wing ends. The EMOTION gains agility and improved handling reaction because of this. The AFS system provides the safety and security: The Automatic Flight Stabilization influences all cells and prevents in the majority of all cases unpleasant asymmetric deflations already during their initial phase.

The EMOTION is delivered from the factory with a conventional riser. In this way we can fulfill the wish of those flying students who wish to start in the „normal“ fashion with the corresponding start procedure. Additionally the B-stall as a method to lose height quickly can be instructed and practised. The EMOTION can be made available optionally with the well known divided riser system. With this the EMOTION can perform the B-stall safely, that is sinking at a rate of around 5m/s while still being fully manoeuvrable with a glide ratio of 1:3,5.

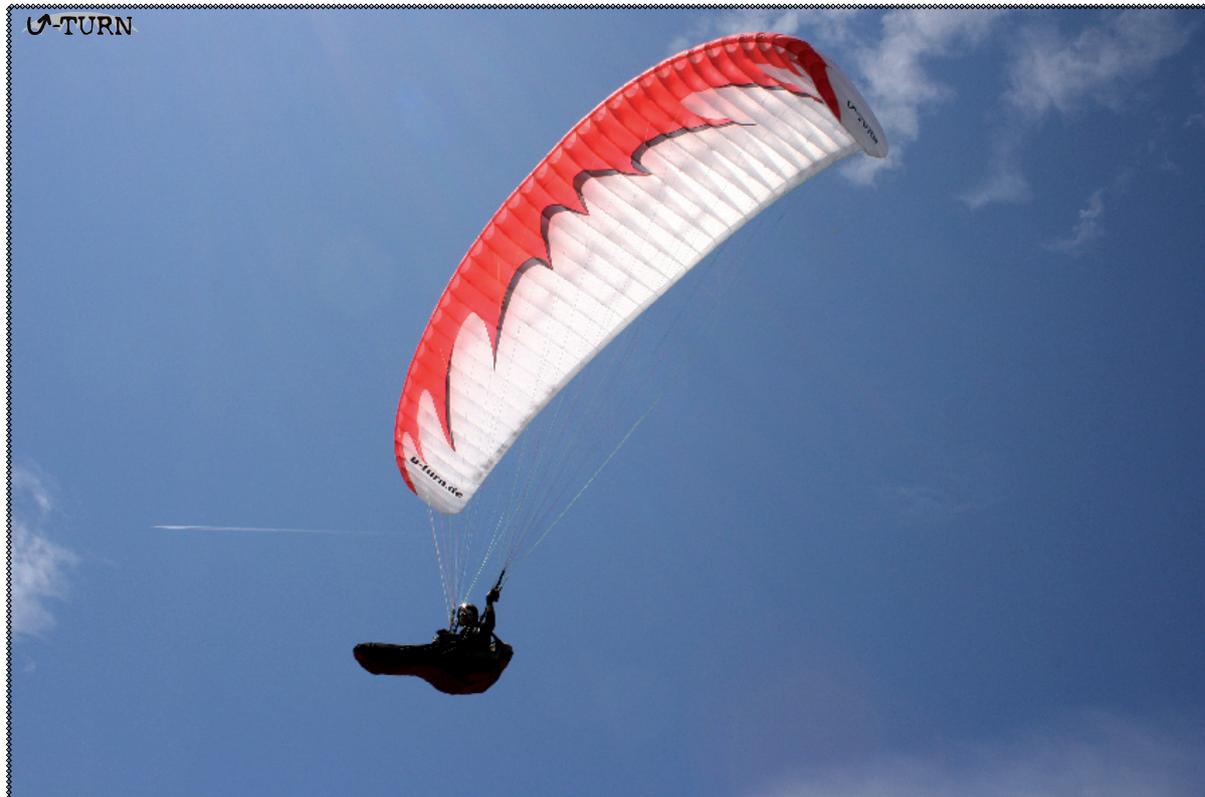
General Description: EMOTION

This for example makes it easier for inexperienced pilots to land on small landing areas which is more difficult to manage when the maximum gliding ratio has to be used without the B-stall technique.

In any case the EMOTION is very suitable for instruction purposes with both harness systems.

Another selection possibility is available for the EMOTION as well: It can be optionally fitted out with the MYLAR-FIX-system, a unique folding system to protect the sensitive leading edges and air intakes. „We want to offer even more service to the student pilot with this option in addition to the harness choice: The paraglider may be customized individually or the price can be optimized“, emphasizes U-Turn co-founder Thomas Vosseler.

The EMOTION is available in four colors and in the sizes XS (55 – 80kg), S (70 - 90kg), M (85 - 110kg) and L (100 -130kg). This excellent performing 1-category paraglider closes the gap which lies between the BODYGUARD and the INFINITY II.



With the AFS-system U-Turn introduces an unique safety feature. To fly safely means to fly actively - the system employed on the EMOTION allows this to happen automatically to a certain level. The secret of the AFS-system is based on a pre-tensioning principle. In the area of the brake attachment points the undersurface is pre-tensioned. Whilst the sail is gliding through smooth air, there is enough pressure inside and the pre-tensioning is neutralised: The effect of internal pressure is more powerful than the pre-tensioning and the trailing edge stays aerodynamically perfect in the air like a conventional glider. When entering turbulent air with the EMOTION the system adjusts immediately, even the slightest drop of internal pressure allows the system to react. The pre-tensioning at the trailing edge is effectively like pulling the brakes.

Ernst Strobl recalls the fine-tuning, „Our computer-based calculations were impressively confirmed during our tests“.

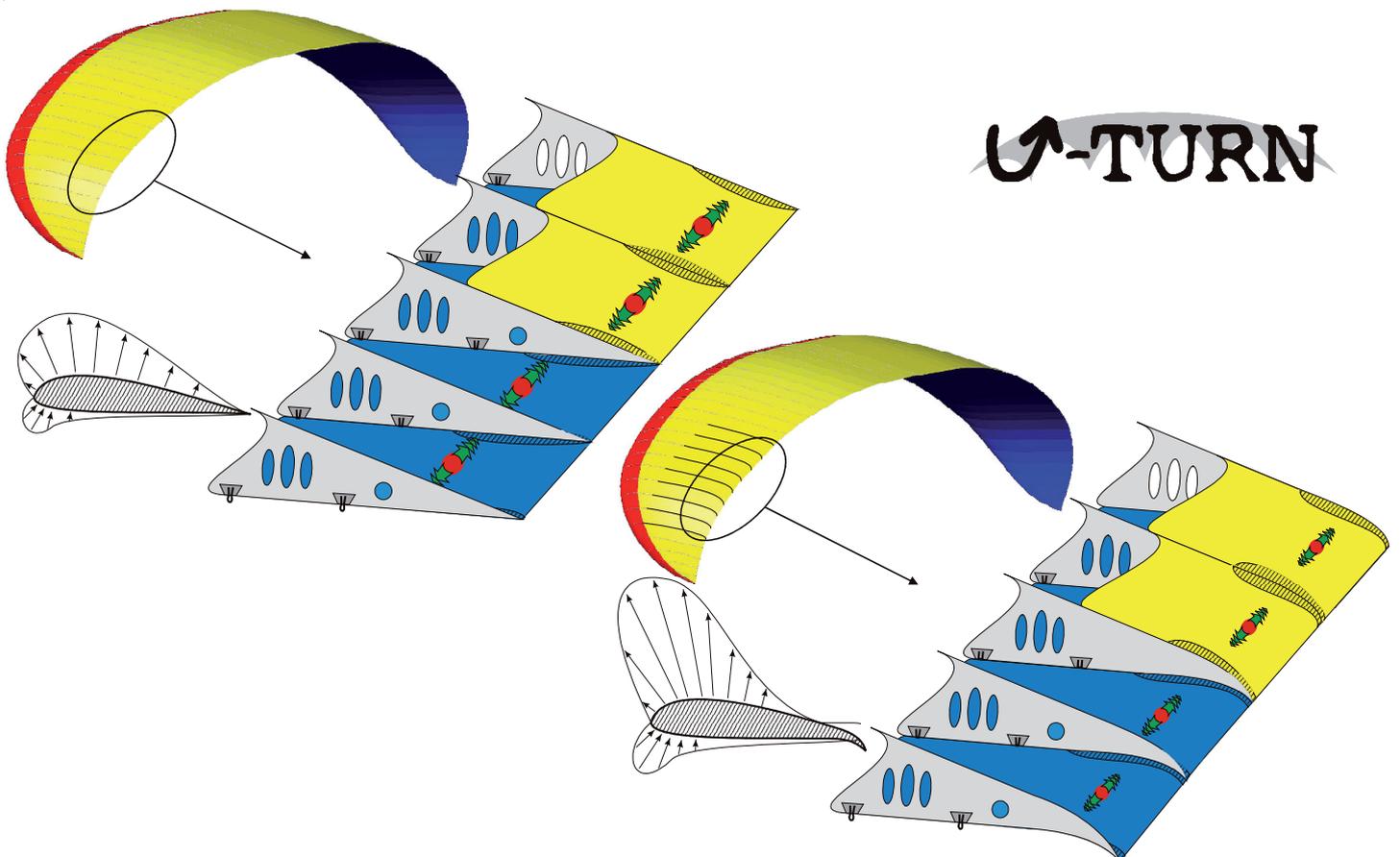
The system is extremely responsive so that a top-quality manufacturing is key. U-Turn Co-founder Thomas Vosseler adds, „We will guarantee a strongly supervised manufacturing process“.

The AFS works like the Electronic Stability Programs known in the automotive industry, you could call it an „ESP for the air“. It intervenes for the benefit of safety when an inexperienced pilot, or a pilot in trouble, enters turbulence and is unable to fly actively.

„This is a major step as far as safety is concerned. The main reason for accidents, the full collapse of the canopy, is minimized dramatically“.

Even without AFS the EMOTION would be a very safe glider says Strobl. Due to the extremely pulled down winglets and the resulting spread of the canopy the EMOTION has far more than average resistance to collapses. „The EMOTION glides stably ahead even after an accelerated asymmetric collapse, a situation that may happen after leaving a thermal, even with 50% of the wing area collapsed“.

says Strobl. This is simply outstanding. The computer optimised wing layout leads to very good thermal lift and maximizes the stall characteristics, both improving safety.



Mylar Fix System

U-Turn stands for innovative ideas and with the Mylar Fix System the company has once again proven itself as a trendsetter. The system allows the pilot to pack the paraglider, even during light wind conditions alone and without help at the packing area, in such a way as to ensure that the profile front side Mylar-reinforcements do not get creased. This caring method leads to a significantly longer lifetime of the paraglider and better performance simultaneously. Serious creasing of the leading profile can be avoided for years when carried out correctly and with sufficient care during the folding operation. This is very important because creased reinforcements even for short time area strain reliefs in flight tend to return to the creased condition. The result: The paraglider will not be correctly in the air stream and loses performance and ultimately will be more susceptible for unwanted flying situations. This behaviour is similar during the start phase. The less the reinforcements are creased the easier it is to raise and start the EMOTION AFS. A small detail which however can hardly be overestimated in its use and impact and contributes significantly to uphold the value and high performance of the EMOTION.

On the right and left (from the middle of the glider) Mylar reinforcement is reinforced velcro. 1) Take this out of the velcro anchorage



...and thread through the slots in Mylar reinforcements 2 and 3 etc.



Press each reinforcement neatly onto the next. That will make for a strong packing that is protected from bending.



Once all reinforcements are precisely beaded and gathered up you can attach the velcro to its counterpart and the neatly stacked Mylar reinforcement will stay in shape.



Ensure that the velcro sits tight – and the profile edge stays in shape.



That's what the finished glider looks like. Now the back part can be folded rail by rail and rolled up.



New features

Along with these safety features the U-Turn EMOTION also offers comfort features to enhance the fun of the sport. With the Easy Fix, the harness of the gliders are being fixed after the glider is folded. The Dirt-Outs on the flying terrain, make the removal of dirt and foliage in the canopy easier. In fact the U-Turn EMOTION does not only set new safety standards, it also changes the way paragliders are constructed.

Although the entire developmental process was dictated by safety, Ernst Strobl managed to create a piece of equipment that is guaranteed fun. With that in mind, the U-Turn EMOTION is, without compromise, made to be safe, without compromising the joy of paragliding.

 **Important:** Having the necessary level of experience never substitutes the need to familiarize yourself with the glider before leaving the ground. Please carefully read the handbook and take advantage of the support your flight school, as well as U-Turn, offer.

Please always remember that aviation can potentially be dangerous and your safety lies in your own hands. We strongly encourage you to fly conservatively; this includes the choices you make concerning flight conditions as well as the choices you make during flight.

General description - Material specifications

Materialliste U-Turn Emotion XS, S, M, L			
Bezeichnung der Verwendung	Herstellerbezeichnung	technische Maße / Dimension	Umfertiger / DIN Nr.
im Gesamtsystem			
		Gewicht / Festigkeit	
Füßhängeschlaufen	Nylon	7,2 g/m / Bruchlast 110kg / 13mm Breite	Kolon Industrial Co. Korea
Beschleunigerleine	Nylon	Ø 4,0mm = Bruchlast 350 daN	
Beschleuniger- Bremsrolle	GIN Rolle		GIN Gliders Korea
Beschleunigerschloß	Brummelhook		GIN Gliders Korea
Bremsaufhängungen	Nylon	7,2 g/m / Bruchlast 110kg / 13mm Breite	Kolon Industrial Co. Korea
Bremsgriff	High Tenacity Polyester Vorn 22mm	25 g/m / 1000 hg Bruchlast	Techni Sangles, France
Bremsgriffaufhängung	High Tenacity Polyester Vorn 22mm	25 g/m / 1000 hg Bruchlast	Techni Sangles, France
Bremsgriffbefestigung	Magnet		GIN Gliders Korea
Bremsstammleine 2,3mm Ø	Dynema Lines	2,3mm = 250daN	GIN Teijin Korea
Leinen, DC100, PSSL120, 160, 200 GIN TGL160, 200, 220, 280	Lyros lines	siehe Obsession Gerätebeschreibung	Rosenberger Tauwerke GIN Gliders Korea
Gurtumlenkungen	Stainless Steel	8g / Ø 3,8mm / Bruchlast 800hg	Ansung Precision CO. Korea
Leinenschlosser	Stainless Steel	12g / Ø 4,3mm / Bruchlast 1000hg	Ansung Precision CO. Korea
Obersiegel - A - B - C	9092 EBSA - 9017 E77A - 9017 E77F	45 g/m² - 40 g/m² - 40 g/m² (PA 6.6 HT)	Panther Marins, NCV, France
V-Toppe	RS3	40 g/m² (PA 6.6 HT)	Parotax, Germany
Profinoze Verstärkung	P 260	283 g/m²	Dimension-Polyant, Germany
Rippen, Profile	RS3	42 g/m² (PA 6.6 HT)	Parotax, Korea
Tragegurt	High Tenacity Polyester Vorn 22mm	25 g/m / 1000 hg Bruchlast	Techni Sangles, France
Untersiegel - A - B - C	9017 E38A - 9017 E38A - 9017 E38F	40 g/m² (PA 6.6 HT)	Panther Marins, NCV, France
Verstärkung Anlenkhunkte B/C/D	W 420	180 g/m²	Panther Marins, NCV, France
Nähfadens Koppe	High Tenacity Polyester Vorn 150D/2	0,05 g/m² / 2,9 kg Bruchlast	Armann & Sohne GmbH, Germany
Nähfadens Leinen	High Tenacity Polyester Vorn 150D/3	0,083 g/m² / 3,2 hg Bruchlast	Armann & Sohne GmbH, Germany

U-TURN

Take-off weight-area load

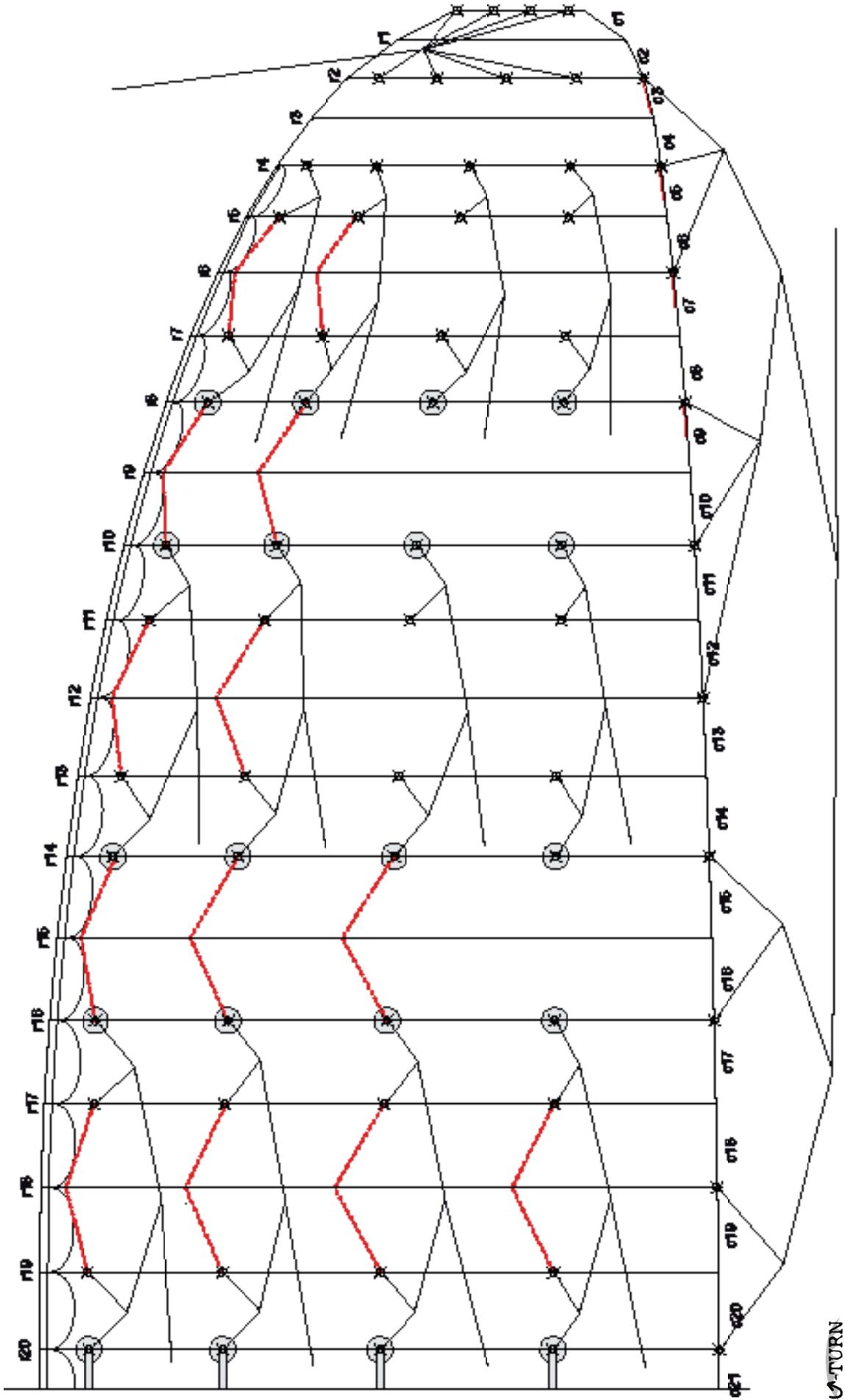
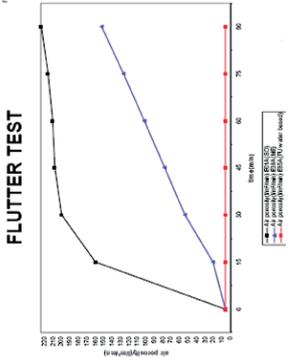
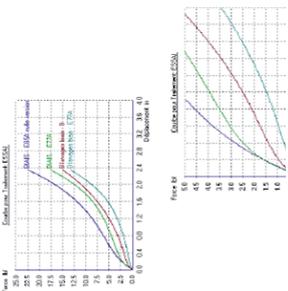
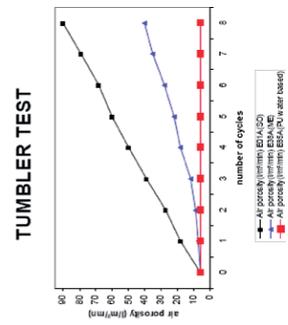
Flächenbelastungstabelle für U-Turn EMOTION																
Start Weight (kg)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130
EMOTION L										5,5	3,4	3,6	3,4	3,9	4,1	4,3
EMOTION M							3,0	3,2	3,3	3,5	3,7	3,9				
EMOTION S				2,7	2,9	3,1	3,3	3,5	3,7							
EMOTION XS	2,3	2,5	2,7	2,9	3,1	3,3										

EMOTION	XS	S	M	L
Startgewicht	55 - 80 kg	65 - 90 kg	80 - 110 kg	100 - 130 kg
Fläche ausgelegt	24 m ²	26 m ²	28,5 m ²	31,0 m ²
Fläche profiziert	21,85 m ²	23,63 m ²	25,63 m ²	27,65 m ²
Spannweite ausgelegt	11,0 m	11,44 m	11,91 m	12,38 m
Spannweite profiziert	9,3 m	9,67 m	10,07 m	10,46 m
Streckung	4,94	4,94	4,94	4,94
Streckung profiziert	3,95	3,95	3,95	3,95
Zellenzahl	41	41	41	41
V-Titten	38 Körnchen	38 Körnchen	38 Körnchen	38 Körnchen
V-Mitt	22 Körnchen	22 Körnchen	21 Körnchen	20 Körnchen
V-Breite	46 Körnchen	46 Körnchen	46 Körnchen	46 Körnchen
Konstruktionsart / Besondereheiten	APR, BR, fixed patch			
Zahl der Tragpunkte	5	5	5	5
Zahl der Lehnenbockwerke	2	2	2	2
Füllbeschleunigung/Timer	Arbeitslos	Arbeitslos	Arbeitslos	Arbeitslos
Kopfgewicht	4,0 kg	5,0 kg	5,4 kg	5,9 kg
Zubehörg	DRV1	DRV1	DRV1	DRV1

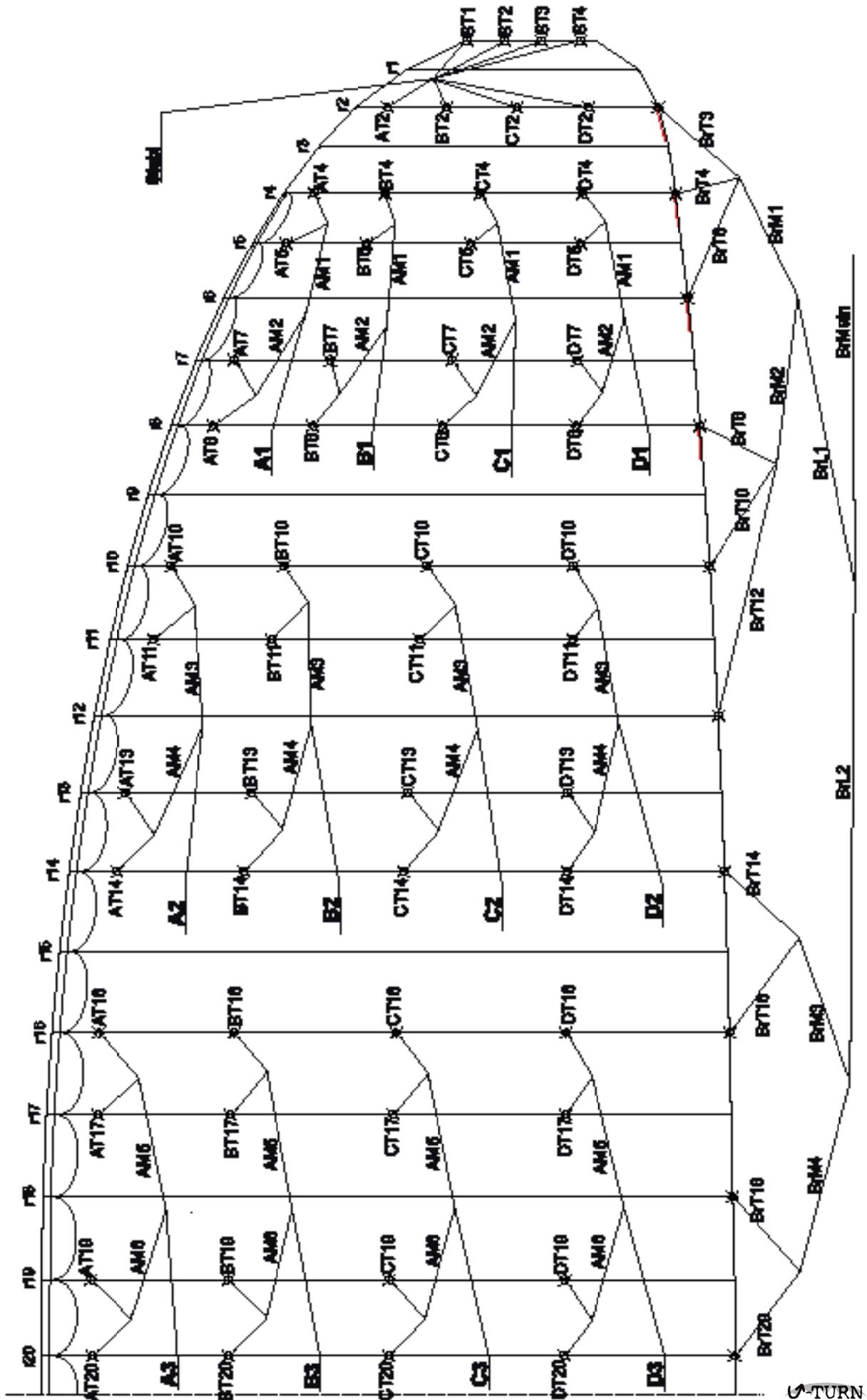
You will find further details regarding the construction and measurement of the U-Turn EMOTION in the “Typenkennblatt” or, in case of equipment with example registration, in the “Luftsportgeräte-kennblatt” in accordance with paragraph four of the “Luftverkehrs-zulassung”. (See attachments) You can find possible technical changes in the attachment to this manual.

 **Warning:** any self inflicted changes to the construction that go beyond the allowed adjustment options, void the operating license and are potentially life threatening. Use of this paraglider is at your own risk. The producer and distributor cannot be held liable.

On page 5, material list, you can find information on which NCV Material Nylon is used and where.



U-TURN EMOTION LINE CODE





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GmbH
Poststrasse 11
95192 Lichtenberg
Tel.: +49 9288710
Fax: +49 92887124
<http://www.liros.de>

EMOTION				01.07.2007					
A-Lines				B-Lines <i>55er lenght is 700mm!</i>					
r20	AT20	AM5	A3	r20	BT20	BAM5	B3		
r19	AT19			r19	BT19				
r17	AT17	AM5		r17	BT17	BAM5			
r16	AT16			r16	BT16				
r14	AT14	AM4	A2	r14	BT14	BAM4	B2		
r13	AT13			r13	BT13				
r11	AT11	AM3		r11	BT11	BAM3			
r10	AT10			r10	BT10				
r8	AT8	AM2	A1	r8	BT8	BAM2	B1		
r7	AT7			r7	BT7				
r5	AT5	AM1		r5	BT5	BAM1			
r4	AT4			r4	BT4				
r2	AT2			r2	BT2				
Stabilo	ST1			Stabilo	ST1		ST1		
C-Lines				D-Lines					
r20	CT20	CM3	C3	r20	DT20	DM3	D3		
r19	CT19			r19	DT19				
r17	CT17	CM5		r17	DT17	DM5			
r16	CT16			r16	DT16				
r14	CT14	CM4	C2	r14	DT14	DM4	D2		
r13	CT13			r13	DT13				
r11	CT11	CM3		r11	DT11	DM3			
r10	CT10			r10	DT10				
r8	CT8	CM2	C1	r8	DT8	DM2	D1		
r7	CT7			r7	DT7				
r5	CT5	CM1		r5	DT5	DM1			
r4	CT4			r4	DT4				
r2	CT2			r2	DT2				
Stabilo	ST1			Stabilo	ST1				
Brake				Brake					
r20	BfT20	BfM4	BfL2	BfMain	r20	DSL 70	DSL 70	TGL 200	Brake line
r19	BfT19				r19	DSL 70			
r18	BfT18	BfM3			r18	DSL 70	DSL 70		
r14	BfT14				r14	DSL 70			
r12	BfT12	BfM2	BfL1		r12	DSL 70	DSL 70	TGL 200	
r10	BfT10				r10	DSL 70			
r8	BfT8				r8	DSL 70			
r6	BfT6	BfM1			r6	DSL 70	DSL 70		
r4	BfT4				r4	DSL 70			
r2	BfT2				r2	DSL 70			

Emotion				Emeconfig			
A-Lines				B-Lines			
r20	DC 100	TGL 220	TGL 400	r20	DC 100	TGL 220	TGL 400
r19	DC 100			r19	DC 100		
r17	DC 100	TGL 220		r17	DC 100	TGL 220	
r16	DC 100			r16	DC 100		
r14	DC 100	TGL 220	TGL 280	r14	DC 100	TGL 220	TGL 280
r13	DC 100			r13	DC 100		
r11	DC 100	TGL 220		r11	DC 100	TGL 220	
r10	DC 100			r10	DC 100		
r8	DC 100	TGL 200	TGL 220	r8	DC 100	TGL 200	TGL 220
r7	DC 100			r7	DC 100		
r5	DC 100	TGL 200		r5	DC 100	TGL 200	
r4	DC 100			r4	DC 100		
r2	DC 100			r2	DC 100		
Stabilo	DC 100			Stabilo	DC 100		TGL 220
C-Lines				D-Lines			
r20	DC 100	PPSL 120	TGL 400	r20	DC 100	DSL 70	TGL 280
r19	DC 100			r19	DC 100		
r17	DC 100	PPSL 120		r17	DC 100	DSL 70	
r16	DC 100			r16	DC 100		
r14	DC 100	PPSL 120	TGL 280	r14	DC 100	DSL 70	TGL 220
r13	DC 100			r13	DC 100		
r11	DC 100	PPSL 120		r11	DC 100	DSL 70	
r10	DC 100			r10	DC 100		
r8	DC 100	DSL 70	TGL 220	r8	DC 100	DSL 70	PPSL 120
r7	DC 100			r7	DC 100		
r5	DC 100	DSL 70		r5	DC 100	DSL 70	
r4	DC 100			r4	DC 100		
r2	DC 100			r2	DC 100		
Stabilo	DC 100			Stabilo	DC 100		

Line ID	stameter	strengh after 5000 heading	strengh eff.
TGL 140	1.4mm	78,2	140 kg
TGL 200	Brake line		200 kg
TGL 220	1.6mm	138,1	220 kg
TGL 280	1.8mm	158,1	280 kg
TGL 400	2.1mm	181,9 kg	400 kg
DC 100	0.8mm	kg	110kg
DSL 70	0.95mm	85kg	82kg
PPSL 120	1.15mm	135 kg	158kg

Lines and risers

We use DC60, DSL70, PPSL120, PPSL160, PPSL200 Lyros lines as well as PPSL275 with a special weaved Dyneema core. They have a high tear strength and are unlikely to bend. This stretch resistance denies changes in flight characteristics caused by different stretching after a short time of usage. An optimum of safety and strength in relation to drag is achieved by the use of different line diameters.

The whole line system consists of single elements that are sewed and looped on both ends. All suspension and brake lines are forked in the upper part. The different colour of the lines guarantee easy handling and control. All suspension lines are looped separately in rapidlinks and connected to the risers. The rapidlinks have collectorclips built in to prevent slipping of the lines. The main brakeline is looped through a reel at the D-riser with a colourmarking where a brakegrip has to be tied on.



The manufacturer setting is 0 travel plus 5cm. Shortening more than 5cm is not allowed and results in a „brake“ condition in flight which is extremely dangerous for takeoff, flight and landing.

The basic setting provides sufficient braking action at landing and in extreme flight conditions besides a comfortable armposition in trimmed flight.



Never change the default adjustment of the lines before the first flight with the EMOTION. Please note that with the height of the harness mounting also the relative brakedistance changes. When adjusting the setting, both sides have to be symmetrically and a permanent knot has to be used. Optimum solution is the „Spierenstich“ knot with its high slide resistance and its little effect on the lines.

Risers

The A- and B- risers have a different colour to ensure positive identification at takeoff and during a B-stall descent. The length of all risers has been chosen in a way to get easy access to all lines and lineshacksles in flight for special manoeuvres.

Made of rigid and stretch resistant Polyester-belts, the EMOTION risers guarantee a long-term, stable trim.

Speed System

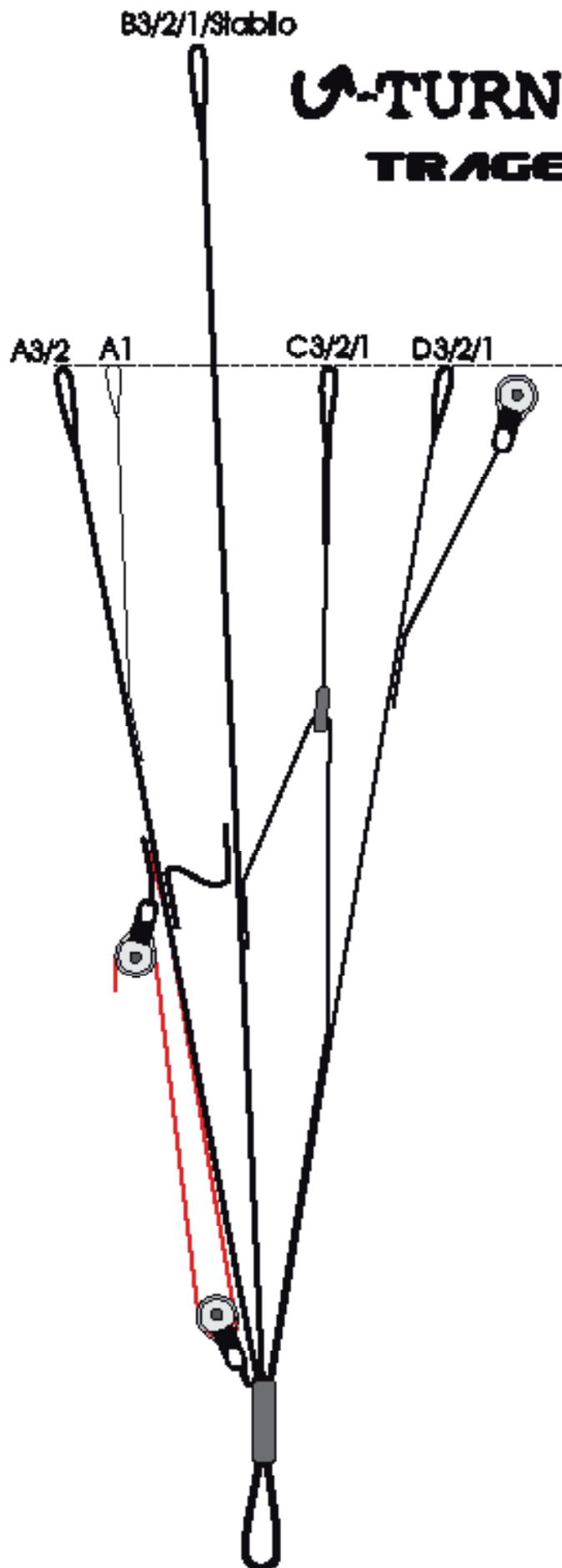
The EMOTION is equipped with a very effective leg-actuated speedsystem that increases the speed btw. 13 and 17 km/h depending on model and pilots weight area load respectively. During extreme manoeuvres the speedsystem should not be activated, when entering an extreme manoeuvre it should be immediately deactivated. All extreme manoeuvres (i.e. stalls...) get more dynamically at higher speed.

Because the maximal adjustment of the accelerator is related to the safety characteristics of the canopy it may happen, that – using certain harnesses - the broad accelerator adjustment is not available.

Suitable Harness

All officially approved harnesssystems with mounting about the breast height are suitable for the EMOTION (they have to be DHV rated GH). The lower the mounting, the better is the steering by shifting of the bodyweight.

The positioning of the mounting also changes the relative brakedistance. If you have any questions about the usage of your harness with the EMOTION, ask your U-TURN dealer or directly contact U-TURN. We assist you in any possible way.



TURN EMOTION

TRAGEGURT / RISER

REV2 26.08.2007

Suitable Rescue System

It is required by the law and absolutely necessary for safe operation of your paraglider that you always carry a rescue system with you. When choosing a rescue system, watch out that it is approved and suitable for the intended takeoff weight.

Operation

 This instruction manual only pays attention to those points of flying technique which are important for the EMOTION. It is not meant to substitute a basic flying education in an approved flying school! If a flying education and the appropriate experience is missing, paragliding is dangerous to life.

Field of Operation

The EMOTION has been developed and tested for ordinary takeoffs, winching, and is also well suitable for motorized operations. An unauthorized or unapproved use of the EMOTION, or operation out of its operational limits is improper and dangerous.

Aerobatics

Aerobatics are illegal and dangerous. There is a danger of unpredictable flight conditions that could result in overstressing material and pilot.

Motorised Paragliding

 The OBSESSION is well suitable for motorized operation due to its outstanding takeoff performance, its wide weight range and its easy handling. Please note that a separate approval is necessary for the glider / motor-combination. If you intend to operate the OBSESSION motorized, please contact the motor manufacturer, U-Turn and the DULV (Deutscher Ultraleichtflug Verband) for official approval. Use only approved motor / glider combinations and adhere to the aeronautical regulations as well as the training requirements.

Pre-Flight Check

A careful preflight-check is absolutely mandatory. Double-check everything if you don't fly by yourself and make sure the person flying your OBSESSION does the same. Also ensure that the pilot flying your OBSESSION, knows its operational limits and has the required license.

All lines, risers and the canopy have to be carefully checked for damage before every takeoff. Even in case of minor damages takeoff is not an option.

After the glider is unpacked and laid on the ground in a half-circle-shape, check following items:

- Lay down the canopy to draw on the middle line before the outer lines, when pulling up the glider with the A-risers, to get an easy and stable takeoff.
- Set yourself up into the wind to get a symmetrical load on both sides when pulling up the canopy.
- The risers may not be twisted to enable smooth looping of the brakelines.
- Make sure no lines are under the canopy to avoid a dangerous situation on takeoff.
- Preflight all other equipment after the check of the glider carefully.

Take off

The U-Turn EMOTION has a very easy take off. It is one of very few gliders that received a rating of "Take of speed: minimal" in the DHV-certification.

It is important to evenly lay out the canopy with care. The middle of the glider is determined by the U-Turn EMOTION logo at the leading edge. It is sufficient to only hold the A-main harnesses. Being that the U-Turn EMOTION shows no tendencies to shooting forward it only needs to be slowed down minimally in the take-off phase. Necessary correction in direction using the brakes should only be performed once the canopy is above the pilot, otherwise the glider might fall back due to excessive braking.

The remaining harness should not be held during take off. The canopy will fill up with evenly distributed pull but altogether very light startimpulse.

Unlike other gliders it is not necessary to fill the U-Turn EMOTION with strong inflation motion or even several fast steps. This is also true for very little wind and even zero wind. The easiest and safest way to start the U-Turn EMOTION is moderate inflate.

Once the pilot ensures that the canopy is fully opened above him, the final decision for take off can be made. After several forceful steps they take off.

Turning

The OBSESSION has a normal agility and reacts directly and instantly to steering inputs.

You can fly flat turns with little altitude loss by shifting of bodyweight. A combination of appropriate pull on the inner brakeline and shift of bodyweight is the best way for a coordinated turn. The turn radius depends on the amount of pull on the brakeline.

At about 75% of brakeline travel, the OBSESSION increases bank significantly and performs a fast steep turn that can be continued to a diving spiral. The diving spiral has to be initiated and terminated slowly. The bank angle is controlled by increasing and decreasing the pull on the inner brakeline.



WARNING: A rapid pull on the brakeline may cause a spin.

Active flying

The EMOTION should be flown with light braking on both sides when there is turbulent air. An increase in angle of attack provides better stability. When entering heavy thermics or strong turbulences watch out that the canopy does not get behind the pilot. To avoid that, release the brakes a bit to get an increase in speed when entering the updraft.

If the canopy gets in front of the pilot when leaving a updraft or entering a downdraft the brakes have to be applied to counter that. Accelerated flight however is adviseable when flying thru a downdraft zone. The EMOTION is very stable overall, never the less is active flying a big flight safety factor. Collapsing and deforming of the canopy can be avoided by active flying (as above mentioned) in turbulent air.

Landing

Start your landing preparation at sufficient altitude. Due to its excellent flaring characteristics, the EMOTION is very easy to land. Glide in fairly normal to a straight-in final against the wind and get up in the harness early enough. According to the wind, the brakes have to be pulled firmly and dynamically, about one meter above ground, beyond the stalling point. If there is a strong headwind, be careful with the amount of braking. Don't perform landings out of steep turns and big directional changes short prior landing, to avoid PIO's.

Winching

Because of its excellent landing characteristics, the OBSESSION is well suitable for winching operations. Take the following points into account:



- maximum line tension for winching is 100kp.
- if not operating at your usual winch, get acquainted with the local procedures and get a good briefing by a local pilot.
- body position and pulling up the canopy does not differ from a normal takeoff. The canopy has to be completely over the pilot at takeoff. No early steering inputs to avoid falling back of the canopy or being pulled off with a non flyable glider. Never give the takeoff-command before you have total control over your glider. Don't turn too much during the takeoff-phase and before reaching the minimum safe altitude.
- never winch the OBSESSION with loads outside the allowable weight range
- all involved persons, machines and accessories have to have the appropriate licenses, approvals, certifications for winching.

Advanced Handling

Even with its high stability and good flight characteristics it is possible that the OBSESSION gets into an extreme flight condition due to pilot mistakes or turbulent air. To be prepared for such situations and able to handle them in a calm and superior manner it is best to take part in a flight safety course.

Advanced manoeuvres may only be flown at sufficient altitude, in calm air and with professional supervision (i.e. during a safety course). Once again we mention that a rescue system is required by the law.

The following extreme manoeuvres can be either caused intentionally, by pilots mistakes or by bad weather conditions. Every pilot can get in such a situation! All mentioned extreme manoeuvres are dangerous if they are performed without the appropriate knowledge or enough altitude or the necessary introduction.



A wrong execution of these manoeuvres may have fatal consequences!

Wingover

The pilot has to perform right and left turns with increasing bank until the desired angle is reached. Soft braking during up or down swing will prevent the wing ends from closing. Collapsing is only a factor when the bank angle is very high.

Frontstall

A negative AoA caused by turbulences or the simultaneous pulldown of the A-risers by the pilot, results in a frontal collapse of the leading edge. The OBSESSION normally comes out of a frontstall by itself very quickly. Smooth and symmetric applying of the brakes assists the opening of the canopy positively.

Stall

The OBSESSION is not stall sensitive. If in a stall, caused by overpulling on the brakes, the rear risers or a delayed B-stall exit, the release of the brakes or the rear risers, recovers the stall. Should the stall be caused by an extreme flight condition or configuration (i.e. takeoff weight too low), a symmetric forward push on the A-risers or step the speed system recovers the stall.

Warning: Practicing stalls should be done with enough safe altitude. Never apply asymmetric brakes during a stall, it could cause a spin.



Fullstall

To enter a fullstall pull both brakes full travel (ensure no twisted or wrapped lines). The canopy has to be stabilized before recovering the fullstall. Relax both brakes slowly and symmetrically to recover. If done right, the canopy overshoots a little forward without collapsing. Avoid an asymmetric recovery at all means. The dynamic forces drive the canopy to overreact and a collapse could occur.

Caution: Never release the brakes at the beginning of the recovery when the canopy tilts forward, the canopy may accelerate forward in a way that makes contact or even falling into the canopy possible.



The fullstall is a dangerous manoeuvre and should not be performed intentionally except during a flight safety course.

Emergency Piloting

In any situation where normal steering with the brakelines is not possible, the OBSESSION can be steered with the back risers easily.

Negative Turn

To enter a spin the pilot has to fully and quickly pull one of the brakelines when he is near the stallpoint. The glider rotates fast around its center while the inner wingtip flies backwards. For recovery just release the applied brake to let the glider accelerate.

Warning: The spin is a dangerous manoeuvre and should not be performed intentionally except during a flight safety course.



Collaps



Even with its high stability and very good reaction in turbulences, strong turbulences can cause the OBSESSION to collapse. That situation is not really dangerous and clears itself automatically and not impulsively. To support the recovery, firmly apply brakes on the according side and simultaneously steer opposite on the open side. When a large part of the canopy is collapsed be careful and smooth when applying opposite steering to avoid a complete departure of airflow and entering a fullstall.

How to avoid collapses

Single side collapses close to the ground are the number one reason for accidents with paragliders. To avoid them, or how to handle the situation when it happened, some tips and tricks from U-Turn test- and competition pilot Ernst Strobl:

The best way to avoid collapses upfront is the right choice of the paraglider. A lot of pilots fly a glider that is a little too hot to handle for them. So why don't you get a glider with a lower rating but in the end fly better and higher in the updrafts and have a lot more fun and by the way be safer, too. To optimize the feeling for your glider on the ground, try the following:

Practise on the ground with the right wind at a suitable location. Slowly pull up the canopy and try to hold it up as long as possible without looking towards it. That is a good way to improve the feeling for your glider and is a prerequisite for „active flying“ (the key to avoid collapses). Very important is also a close look at the terrain. Watch for obstacles that could cause turbulences (buildings, trees, ...). On certain days, for example a freshly mowed madow as landing field, could cause a lot of thermal activity. Fly very alert on a thermal active day. Watch your canopy, collapses most of the time, announce themselves. Light braking in turbulences mostly avoids a collapse. You should have already practised that on the ground. Should a collapse occur close to the ground don't always try to prevent a turn away. There is a danger when the braking on the open side is too strong, to lose the airflow on this side and stall the glider. Rather use the turn away motion to try to open the collapsed side.

Apply smooth braking on the open side, depending on the size of the collapse, and maybe a little pumping action. Some canopies open a lot better when the brakes are fully applied once on the according side, but that depends on the brakeline adjustment and your armlength. Wrapped lines are cleared by braking the opposite side at enough altitude and pumping the affected side a couple of times. Watch out for a possible stall. If that does not clear the situation, try to pull down the outer line as much as possible. If you are too low for that, stabilize the canopy on the opposite side to avoid turning away, and leave the lines like they are. Instead of any -risky manoeuvre rather concentrate on the landing. In the end one more advice in order to have all kinds of situations under control.

Visit a safety-training above water. There is no better way to practice the right behavior than simulating a dangerous situation. Don't get caught off guard by your first collapse. In addition, during safety-training you can familiarize yourself with the particulars of your equipment and you gain confidence in your glider as well as your own abilities.

Thus far the expert advice concerning collapses, by Ernst Strobl.

Rapid Descent

In any situation where you have to get down ASAP for different reasons (weather, extreme updraft, or other dangers), there are a couple of techniques that are described in this chapter.

 **Caution:** The mentioned manoeuvres for rapid descent stresses the material very much and there may be used mainly only for training purposes or in cases of emergency.

Spiral Dive

Like a normal turn, it is very easy to get the EMOTION into a spiral dive. The spiral dive gets you a descent rate up to 15-20 m/s. To be settled for the real thing, practise it in optimum conditions. The diving spiral gets the pilot down faster than other techniques and is therefore best suited for an emergency descent. They move down vertically within the airmass. Don't forget the G-forces when diving down, and take that into consideration before initiating a rapid descent.

Caution: If initiation is too fast there is a danger of a spin, in this case release the brake and try a smoother initiation.

 **Warning:** Never fly a spiral dive when „big earing“ the glider. It is illegal aerobatics and may overstress the pilot and the material. It is illegal aerobatics and may overstress the pilot and the material.

Big Ears

Pull down on the outer A-risers one after the other (grab the line shackles) about 15-20cm to collapse the wingtips. Hold the brakegrips together with the A-risers. The glider stays fully steerable and descends with 4-7m/s straight forward. If you release the A-risers, the collapsed cells open automatically. Should there be any problem with the reopening, apply easy braking.

„Big earing“ is due to the high wingload a very stable flight condition and well suited for turbulent air. Be aware that you reduce the trimspeed, but that can be compensated by accelerating with your legs.

WARNING: Don't fly extreme manoeuvres in this configuration, the glider is getting overstressed. Full-stalls and spins are dangerous for a rapid descent because a wrong termination could have fatal consequences no matter what glidertype you are flying.



B-Stall

Another very efficient method is the B-Stall. It allows for a rate of descent of 6 to over 9 meters per second. Check the airspace under and behind you prior to initiating a B-Stall. To imitate it you hold the two B-harness above the lines carabiner. While you hold the brakes in your hands at all times, pull them down progressively and symmetrically. Now you stay in this position. Your sail will stop, partially empty, and stabilize itself above your head. End the move by returning the harness symmetrically into their original position.

We recommend not just letting the risers snapping, as that puts enormous load on the fabric, seams and lines. In the paragraph titled „advanced handling“ you can read what to do if you get caught unexpectedly in a stall.



ALL KINDS OF RAPID DESCENTS SHOULD BE PRACTISED
IN SMOOTH AIR AND WITH ENOUGH ALTITUDE TO BE PREPARED FOR EXTREME SITUATIONS WHEN YOU NEED THEM!



Maintenance and Care

Because U-Turn only uses high quality materials your EMOTION will be airworthy for many years if you take good care. The aging of your EMOTION depends on the total flying time, the conditions you fly in, the amount of UV radiation it is exposed to and the intensity and quality of care.

A couple of tips for maintenance and care:

Long exposure to UV radiation and normal use stress the material.

- Don't expose your glider to the sun when there is no need to.
- Consider the choice of terrain where you lay out the glider for takeoff.
- Assymetrical and random folding patterns prolong the lifetime of the material especially in the middle section.

Plase take following points into consideration:

- regular checks for damage
- no unnecessary bending
- after an overstress (treelanding, waterlanding and extreme situations), the lines have to be inspected an maybe exchanged
- in case of changing inflight handling characteristics, the lines have to be checked for their correct length
- don't tie the brakelines on the grips if not needed, it weakens the lines



To clean the canopy use warm water and a soft sponge.

If you use a detergent for hard stains, make sure that you rinse intensively afterwards. Never apply any chemicals for cleaning, they weaken the material and damage the coating. Store your glider at a dry and dark location away from any chemicals. After two years or 300 flighthours, whichever occurs first, your OBSESSION has to be inspected by the manufacturer, in case of extreme use we are glad to do that earlier. Only you know about the conditon of your glider. Should there be a need for any repairs that are to be done by the manufacturer.



U-Turn does not warranty and cannot be held liable for any 2-year inspection and repairs not performed by them.



Safety Advices and Liability

This glider complies with DHV, AFNOR (SHV and ACPUL) regulations, for the tested type, at time of delivery (see appendix).

Any unauthorised change leads to termination of operating liscence.! The operation of the glider is at your own risk. Please consider all safety notes, cautions and warnings for safe flying.

Further, we assume that the pilot has the necessary certifications and that the legal limitations are being followed. Use of the equipment is at your own risk. The manufacturer and the dealer don't take any liability for accidents and follow on damages. Please consider all safety notes, cautions and warnings for safe flying.

Special emphasis on following points:

- stick to the rules and regs of the country you fly in
- required licenses and actual experience
- use only suitable, approved and certified accessories (helmet, harness, safety systems...)
- appropriate weather condition
- suitable terrain
- all required checks done and airworthiness of the glider
- personal shape of the pilot
- know your manual and stay within the published limits





Maintenance Guide

By

U-Turn GmbH

As

Developer and Producer

of

Stand: 1.08.2007 / Revision 1.7

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Text: DHV

Text und Grafiken: Ernst Strobl

Alle technischen Angaben in diesem Handbuch wurden sorgfältig von U-Turn überprüft. Wir weisen jedoch darauf hin, dass für evtl. fehlerhaft angegebene technische Angaben keine Haftung übernommen wird. Dies gilt für die juristische Verantwortung sowie die Haftung für Folgen, die auf fehlerhaften Angaben beruhen. Laufende Änderungen zu diesem Handbuch, soweit sie dem technischen Fortschritt dienen, behalten wir uns vor.

I - Inspection and review Intervals

Regular inspection in accordance with the "Luftgeraetepruefordnung" for model-tested paraglider: : for schooling equipment annually, for private consumers every second year. Tandems for commercial use have to be inspected annually. Tandems for private use only every 2 years. The reviews have to take place in the above referenced intervals or latest after 150 hours of flight. Ground handling should be counted as flight hours.

 Generally speaking: If you experience any unusual behavior during flight, the producer should be contacted immediately and the paraglider should be sent in for inspection.

II - Who is allowed to perform the inspection?

Aside from the producer or a person or company appointed by them, only the owner of the glider is allowed to perform the 2-year-inspection – if he has the necessary qualifications.

III - Personal Qualifications for the Post Sale Inspection

 Personal Qualifications for the Post Sale Inspection of single paraglider exclusively for personal use:

- Ownership of a valid, unlimited "air traffic license" for paragliders or an equivalent there of
- Satisfactory type specific instruction with the producer. (a 3-month apprenticeship is necessary)
- A paraglider inspected exclusively for personal use is not to be used by third parties.

Personal Qualifications for reviews of paragliders for third party usage and Tandems:

- 
- An adequate formal education to perform such inspection
 - A profession in the field of "air sports equipment", six practicing months are necessary in the past 24 months.
 - Adequate, payable, type specific instruction with the producer for a minimum of 2 weeks
 - Annual, type specific, continuous training and education
 - A briefing depending on the modell, which has to be renew annually

IV -Necessary Equipment and documents

- Dial gauge preferably by Kretschmer with Manual
- "Bettsometer" with Manual
- Producer's Maintenance Guide
- Original material and -replacement parts as well as the original material list of the gear
- Airworthiness instruction for the gear
- "Luftsportgeraetekenblatt" (see handbook)
- Table of lines length (see handbook)
- previous inspection protocols (if available)
- lit-up table for checking the rescue

1. Identifying the gear

Identification of the flight object by the seal of approval or the type plate

- Are all production documents included?
- Is the type plate and seal of approval at hand, legible and correct?
- If not, please order from the producer or your retailer

 All datas and any changes should be documented in the review protocol

1.1 Inspection of the rescue equipment

Before packing the rescue equipment, the packer should inspect it. If it has been opened during a rescue, another thorough inspection is necessary.

If a packed rescue glider needs to be repacked, a release control is to be performed.
The release power should be between a minimum of 3 and a maximum of 6 kg.

2. Inspection of the Upper and Lower sails, seams, rescue system

Holes and Tears

The upper and lower sail on paragliders as well on rescue systems should be inspected path by path from the leading edge to the trailing edge. If you aware faultiness in any of the aspects addressed below, please contact the producer.

- Check for holes, small or bigger sized tears, expansions or friction damage
- Check for defects on the surface, other abnormalities on the canopy such as old patches
- To check the rescues for holes, friction spots and expansions it is necessary to use a light table

Friction spots and expansions:

- In case of bigger and critical damage and expansion spots, the affected paths have to be replaced by the producer

All datas and any changes should be documented in the review protocol



3. Examination of the V-rips

Check the cells from the leading edge to the trailing edge one by one, to ensure that the seams, partition and reinforcements are in good standing, meaning free of tears, expansions, friction damage or damage to the surface. If the V-rips are faulty, or the seams are loose or missing, you must submit the paraglider to the producer or an authorized inspection site.

All datas and any changes should be documented in the review protocol



4. Checking the tear strength

To be executed with the "Bettsometer" (BMAA approved Patent number GB2270768 Clive Betts Sails). The step by step instruction can be found in the manual.

- Poke a needle sized hole into the upper and lower sails of the A-lines attachment to test the tear strength.
- The maximum limit is determined to be 500g, and a length of less than 5mm.

All datas and any changes should be documented in the review protocol.



5. Measuring porosity of the canopy

On all of the following measuring points the permeability should be at least minimum 20 sec (according to Kretschmer). In the event of lesser readings, the paraglider has to be submitted to the producer.

Measuring locations:

The measurement of the porosity according to the Kretschmer measuring method (please follow the manual closely) should be performed in the following locations of the canopy.

Perform inspections on the Upper and Lower sails respectively:

- Middle cell, about 20-30cm behind the leading edge
- 3rd cell from the middle left/right about 20-30cm behind the leading edge
- 10th cell left/right about 20-30cm behind the leading edge



All datas and any changes should be documented in the review protocol

6. Connectors

Checking the harness and lines locks

- Is there friction damage, breaks, tears or excessive wear and tear?
- Are all seams tight?
- Is the accelerator accessible and intact?
- Are the loops for the brake still tight?
- Are the lines locks free of corrosion, and is the winding accessible?

Measuring with a weight of 5kg, compare the reading with the required data in the DHV- type identification sheet. You can find the acceptable variations in the instructions of the producer. If the harness or any part thereof is faulty, order the replacement parts from the producer.

All datas and any changes should be documented in the review protocol



7. Lines

Checking of the lines strength

Selection of the lines: Choose a medium A-, B- and C- main line, as well as – if available- a medium A- and B- middle floor line, and test its strength with the tensile-testing apparatus.

Velocity of the cylinder: $v=30\text{cm/min}$

breaking/ tensile strength data see attachment on page 28

All data and any changes should be documented in the review protocol



Caution!! Every line diameter an individual set value is assigned.



Should one line not withstand the listed tension load and tear strength, all other lines of this diameter have to be replaced as well. If the inspected lines meet the testing criteria, only these stressed lines must be replaced by new ones. All replaced lines are to be marked with a black marker near the shackle, and documented in the protocol, including the date of replacement and the number of flight hours. For the following inspection, another, original line will be tested. The different lines diameter are assigned a minimum line sewing length (see attachment on page 28)!



8. Inspection of the lines length and the fixing of the lines

Visually check the main floor-, upper floor-, and breaking lines for tears, bends and friction damage.

First the "A-line-level, then B etc.

- Are all lines and all fixings of the lines adequately sewed and attached?
- Are the coatings of the lines precise?
- Are all loops, knots, seams in good condition?
- Is there any friction damage?

Measuring the lines length: Measuring the lines length is part of the regular data check:

- The lines have to be measured with a weight equivalent to 5kg, in order to obtain comparable results. You can find the respective lines length in the chapter titled "Technical data" in your handbook.
- Start measuring from the line shackle to the canopy (including the loops of the lines on the canopy) in accordance with the DHV-Method.
- The DHV numbering begins at the stabilo to the middle. The measuring of the opposite wing side can be performed under the same conditions, by symmetrical comparison
- The results are also to be logged in the protocol and compared with the lines length of the DHV-"Typenkennblatt". Acceptable variations are no more than $\pm 1,5\text{cm}$.
- A faulty line is to be replaced immediately. Please find the correct lines type in your manual (page 9), order from the producer and replace or have it replaced.

All data and any changes should be documented in the review protocol.



9. Visual check of trim

Before any test flight, a visual inspection of the canopy (spread and inflated as well) and lines must be performed. Special attention should be paid to the length of the steering lines (breaking lines). Only if all doubts concerning the steering lines" (breaking lines) has been addressed, a test flight should be conducted.



10. Description of the Materials and Technical Data

See Manual on page 6, 7 and 8

11. Miscellaneous

- All measurement and repairs on the paraglider have to be logged into the protocol in their entirety
- If packing and repacking the rescue system it is essential to follow its specific packing instructions. See the rescue systems manual
- Only use original parts for replacement
- For sewing repairs use the original sewing template. Use materials of equal strength and quality as the original.
- The protocols need to be signed and dated.
- Keep all protocols for at least 4 years.

12. Completed Inspections:

Very important!

Prior to performing any repairs or test on your paraglider, we ask you to carefully read the following this will provide you with necessary information on qualifications and conditions for performing the 2yr inspection.

- According to the new DHV/OeaeC regulations, the customer (paraglider owner) can perform the 2yr Inspection himself, with the help of the proper inspection instructions as well as the necessary testing equipment and subject to their own responsibility. It is not necessary to send the paraglider in to the producer for that.
- The 2yr inspection is only to be performed by the paraglider owner, provided, they possess the necessary requirements, or by the producer and his authorized inspection site. Check with your producer for a list of authorized inspection sites.
- The owner must be aware of the responsibility they take on, in performing the 2yr inspection is only legally recognized if signed, dated and provided with the inspectors name in print.
- According to the DHV, it is necessary to repack the rescue every 4 moth.
Valid operating time: 8 years, afterwards up to 12 years if annually re-examine.
- Please check with your insurance company for conditions on performing the 2yr inspection yourself.
- A post sale inspection is only valid if the protocol is complete. Before performing the inspection, check with the producer for updates or changes in the inspection process

 - **Important:** If the proper equipment is not available, please send your paraglider to the producer

- Any kind of guaranty expires, if paragliders, harnesses and protects are not checked, inspected, repaired, packed, new or repacked (also other kinds of maintenence assignments) by a non authorized U-Turn site.
- All maintenance must be performed in accordance with the required readings according to the manual and the specific instructions by the producer and publications by the IHB.
- In the event of any unusual findings during the maintenance process – you must contact the TL, who will then decide on the best way to proceed.

 - All parts used for repair must be original material or replacement parts.

Attachments: 7. Minimal breaking/ tensile strength data

U-TURN Paragliders lines ID and colour, use in Gliders and Kites										
Liros Lines (Paraglider)										
Line ID	diameter	braking strength after 5000 DHV bending test.	strength eff.	min. braking strength on 2 year check	Line colours used in U-Turn Gliders					
TSL 100	1.25mm	110 kg	227 kg	52kg		RED				
TSL 220	1.65mm	121 kg	250 kg	60kg	YELLOW	RED				
TSL 280	1.8mm	130 kg	325 kg	70kg	YELLOW	RED				
TSL 380	2.2mm	105 kg	404 kg	92kg	YELLOW	RED				
DC 80	0.8mm	74kg	84kg	30kg	WHITE	RED				
DC 100	0.8mm	82kg	110kg	40kg	WHITE					
DSL 70	0.95mm	85kg	82kg	40kg	YELLOW	RED	BLUE	GREEN		
PPSL 120	1.15mm	135 kg	150kg	70kg	YELLOW	RED	BLUE			
PPSL 180	1.40mm	165 kg	177kg	80kg	YELLOW	RED	BLUE			
PPSL 200	1.42mm	181 kg	241kg	92kg	YELLOW	RED	BLUE			
PPSL 275	1.90mm	245 kg	283kg	120kg	YELLOW	RED				
Liros Lines (Kite)										
DC 80	0.8mm	74kg	84kg							
DC 100	0.8mm	82kg	110kg							
DC 180	1.1mm	130kg	200kg							
DC 300	1.8mm	185kg	380kg							

GIN Lines (Kite)									
80kg			80 kg		WHITE				
130 kg			130 kg		BLUE				
220 kg			220 kg		BLUE				
Old GIN Lines (Paraglider) 08.2007									
GIN	1.1mm	47kg	80 kg	20kg	YELLOW	RED	BLUE	GREEN	GRAY
GIN	1.3mm	80 kg	100 kg	30kg	YELLOW	RED	BLUE	GREEN	GRAY
GIN	1.6mm	112 kg	180 kg	50kg	YELLOW	RED	BLUE	GREEN	GRAY
GIN	1.8mm	112 kg	200 kg	50kg	YELLOW	RED	BLUE	GREEN	GRAY
GIN (Brake Line)	2.0mm	-	220 kg		YELLOW				
GIN	2.3mm	181,0 kg	400 kg	90kg	YELLOW	RED	BLUE	GREEN	
New GIN Lines (Paraglider) 08.2007									
TGL 80	1.1mm	47kg	80 kg	20kg	YELLOW	RED	BLUE	PINK	
TGL 140	1.4mm	70.2kg	140 kg	30kg	YELLOW	RED	BLUE	PINK	
TGL 220	1.6mm	135.1kg	220 kg	50kg	YELLOW	RED	BLUE	PINK	
TGL 280	1.8mm	150.1kg	280 kg	70kg	YELLOW	RED	BLUE	PINK	
TGL 200 (Brake Line)	2.0mm	-	220 kg		YELLOW				
TGL 400	2.3mm	181,0 kg	400 kg	100kg	YELLOW	RED	BLUE	PINK	

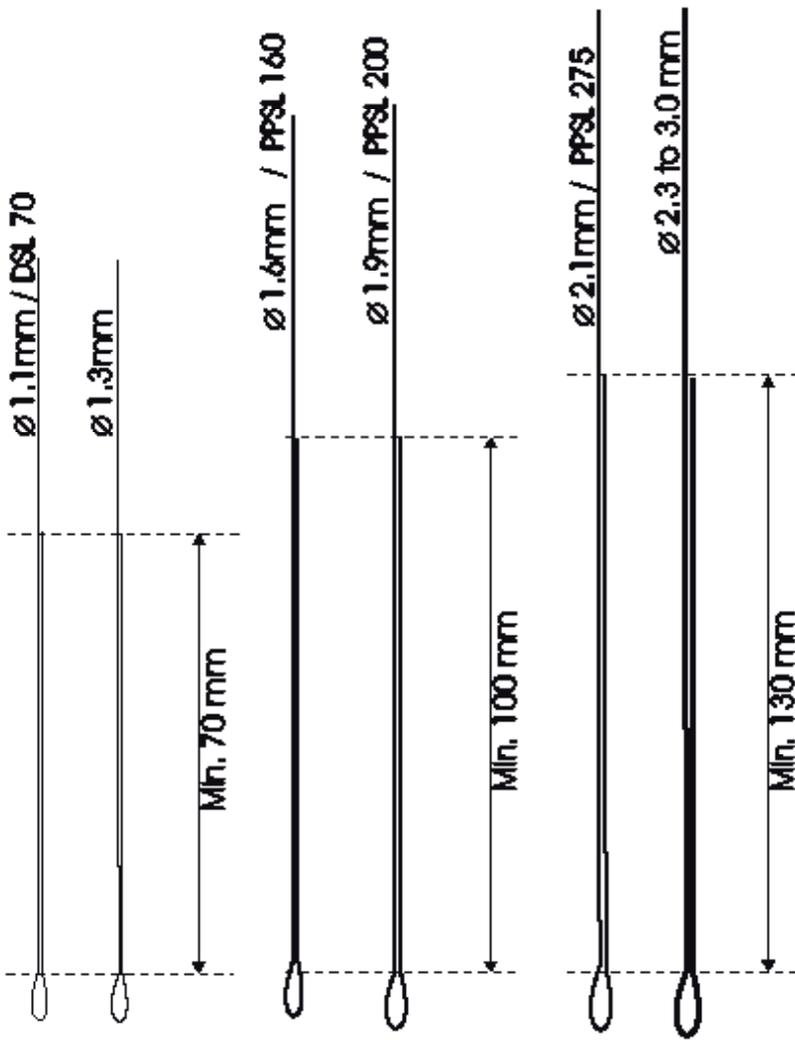
U-Turn Glider Lines Colour info sheet									
2003-2005									
A-LINE	RED	Paraglider: BODY GUARD / Free Force / Infinity / Infinity II / AirForce Classic / LZ Tandem / G-Force (all sizes) / Kites: Nitro cox2 / Oxygen / Helium							
B-LINE	YELLOW								
C-LINE	BLUE								
D-LINE	GREEN								
STAB	RED								
BRAKE Lines	YELLOW								
BRAKE MAIN	FYELLOW								

2006-06.2007									
A-LINE	YELLOW	Paraglider: Morpheus / Ladyguard / Obsession							
B-LINE	RED								
C-LINE	BLUE								
D-LINE	BLUE								
STAB	RED								
BRAKE Lines	FYELLOW								
BRAKE MAIN	FYELLOW								

actual 01.2007									
A-LINE	PINK	Paraglider: Morpheus / Ladyguard / Obsession / EMOTION							
B-LINE	YELLOW								
C-LINE	BLUE								
D-LINE	BLUE								
STAB	PINK								
BRAKE Lines	FYELLOW								
BRAKE MAIN	FYELLOW								

 **Important:** If the minimal breaking/tensile load falls below the limit within the 2-years-check, please contact the technical manager of U-Turn!

Attachments7. Every line diameter has a minimal line sewing length dedicated.



Attachment:

