

# XCHORD MANUAL

REV. 2



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## **Congratulations!**

Thank you for choosing the XCHORD.

The Davinici Glider XCHORD is especially designed 2 liner EN-D glider for the expert pilots who are ready to achieve further, faster and higher than other pilots. Autonomously engineered shark nose profile offers remarkable pitch stability and efficiency on glide.

This is information about the design of the XCHORD, advice how to use it best and how to care for it to ensure it has a long life, We hope that the XCHORD will give you a lot of satisfactory flying times.

**-DAVINCI GLIDERS TEAM-**

### **WARNING!**

**THIS IS NOT TRAINING MANUAL. ATTEMPTING TO FLY THIS OR ANY OTHER PARAGLIDER WITHOUT PROPER INSTRUCTION FROM A CERTIFIED PROFESSIONAL INSTRUCTOR IS EXTREMELY DANGEROUS TO YOURSELF AND BYSTANDERS.**

DAVINCI GLIDERS are carefully manufactured and inspected at the factory. Please use the glider only as described in this manual.

Do not make any modifications to the glider.

As with any sport - without taking the necessary safety precautions, paragliding can be dangerous.

## 1. Technical DATA

XCHORD			S	M	ML	L
CELLS	NUMBER		82	82	82	82
	CLOSED		14	14	14	14
FLAT	AREA	m <sup>2</sup>	21.75	22.80	24.75	26.55
	SPAN	m	12.36	12.66	13.19	13.66
	ASPECT RATIO		6.95	6.95	6.95	6.95
PROJECTED	AREA	m <sup>2</sup>	18.63	19.53	21.19	22.75
	SPAN	m	10.06	10.30	10.74	11.11
	ASPECT RATIO		5.44	5.44	5.44	5.44
FLATTENING		%	14.4	14.4	14.4	14.4
CORD	MAX	m	2.22	2.27	2.36	2.45
	MIN	m	0.30	0.31	0.32	0.33
	AVER	m	1.76	1.80	1.88	1.94
LINES	HEIGHT	m	7.42	7.60	7.85	8.20
	MAIN		3/3			
RISERS	NUMBER	3	A,A'/B			
	TRIMS		No	No	No	No
	ACCELERATOR		145	155	155	155
WEIGHT RANGE	MIN-MAX	KG	75-95	85-105	95-115	105-125
CERTIFICATION	EN-926-1/2 LTF	KG	EN-D	EN-D	EN-D	EN-D
GLIDER WEIGHT		KG	5.3	5.7	6.3	6.4

## 2. MATERIALS DATA

CANOPY		FABRIC CODE	SUPPLIER
UPPER SURFACE		30D MF 7000 E71	DOMINICO TEXTILE CO PORCHER INDUSTRIES
BOTTOM SURFACE		7000 E71	PORCHER INDUSTRIES
PROFILES	Supported	7000 E91	PORCHER INDUSTRIES
	Unsupported	9000 E29	
DIAGONALS		7000 E91	PORCHER INDUSTRIES
LEADING EDGE REINFORCEMENT		2.5/1.8 Plastic pipe	

SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	8000U-130/90/70/50	EDELRID
	9200-30	
MIDDLE CASCADES	8000U-190/130/90/70/50	EDELRID
	9200-30	
MAIN	8000U-360/190/130/50	EDELRID
	DSL 140	LIROS

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	12MM Zero stretch polyester webbing	GUTH&WOLF GMBH
PULLEYS	Ronstan ball bearing	Ronstan

### 3. Introduction and Pilot Target



The XCHORD is the result of a dedicated effort of Davinci R&D team. A totally new and innovative design that has never been seen before, you can experience high stability, handling, and effective/maximum lift force in thermal, as well as glide ratio.

The XCHORD was born to realize the desire of the pilot to fly faster, higher and farther. Based on the 2liner system, XCHORD is the best glider with minimum air resistance and best glide ratio from CFD optimized analysis.

You can make a new records with your XCHORD.

-LTF and EN certification

The XCHORD is certified during official testing as LTF /EN-D.

The glider has been type-tested for “one-seated” use only.

-Suitability for expert pilots

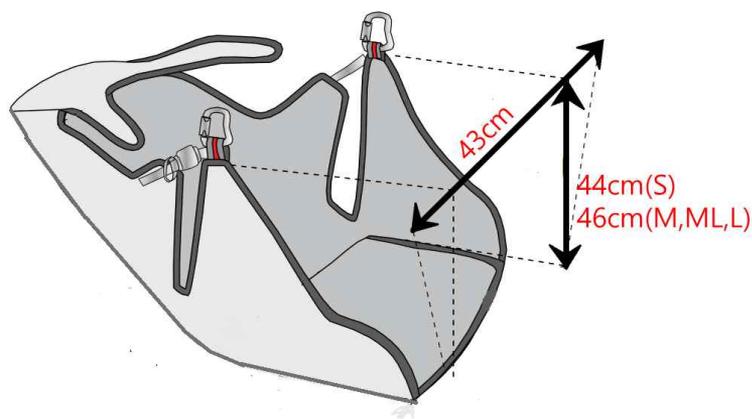
The XCHORD is not suitable for beginner or intermediate pilots, aerobatics, training or tandem flights.

-For the XCHORD it has minimum of 50cm symmetrical travel length at maximum total-load.

It would be dangerous to use the brake travel according to those numbers, because it is not practicable to measure the brake travel during flight, and in turbulences the stall might occur with less brake travel. If you want to use the whole brake travel of your glider safely, it is necessary to do many intended spins and full stalls to get a feeling for the stall behaviour.

#### 4. Harness

The XCHORD is certified for harnesses in Group GH(without rigid cross-bracing). The suspension points of the chosen harness should ideally have a caraviner distance of approximately 43cm and a height of 44cm for S size, 46cm for M, ML, L sizes.

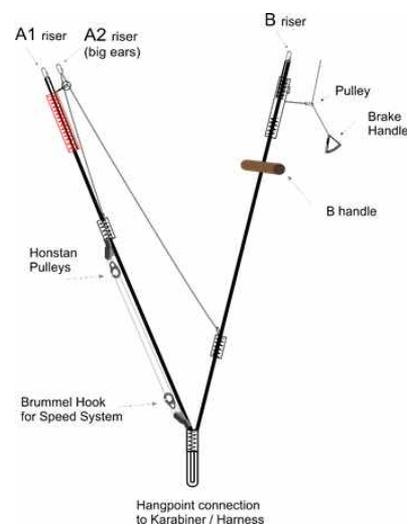


We recommend adjusting the harness in a very similar way to the test adjustment. Excessive cross-bracing increases the risk of twisting the risers. A looser setting will result in a tendency to lean towards the collapsed side. Lower hang points reduce the roll-stability of your harness and can slow down the reopening of asymmetric collapses. Higher hang points (+ 2 up to +4 cm) have no influence on inflight safety and can therefore be tolerated.

## 5. Risers

The XCHORD has been designed with 2 risers system. The A1 riser is covered with RED webbing, to allow for easy identification. The A risers are split into two, the smaller riser - holding only the outermost A line - is A2 and has been designed this way to make applying big ears easily. They also feature ergonomic wooden handles for efficient B-riser control.

	Standard [mm]	Accelerated [mm]	Travel length [mm]
A1	515	360	155
A2	510	442	68
B	500	500	0



## 6. Lines

They come in different diameters of Kevlar and Dyneema lines. They must to be inspected every 100 hours or 12months maximum.

In case of Brake lines, it was cut a little longer, so every pilot can adjust it according to his personal taste.

But you must always leave 10cm before the brakes line starts acting in order to avoid trailing edge deformation when the wing is fully accelerated. In case the brake handle comes loose during flight or any brake lines is cut you can use the B riser softly for directional control instead of brake line.

## 7. Accelerator system

XCHORD is equipped with a accelerator system. The profile of XCHORD has been designed to fly stable through its entire speed range. It is useful to accelerate when flying in strong winds or in extreme descending air. For fitting and positioning the speed bar consult the instructions of the harness manufacturer. Before every flight check that the speed bar works freely and that the lines are long enough to ensure that it is not engaged permanently.

The use of the accerlerator system reduces the angle of attack and the canopy may be more sensitive to collapses therefore do not use near the ground or in

turbulent air and in case you are hit by turbulence remove your feet off the speed bar as quickly as possible. Always far away from the ground when using the speed bar. We therefore do not advise to use the speed bar near the ground.

You have to adjust the harness to the speed system so you can use all the speed travel.

To do so you have to be seated in the ground meanwhile you are in your harness and adjust the lines by pulling up the risers with tension. Another person help to do this is recommended. Make sure also that the speed bar is not pulling down the risers when you are not using it.

Once all the gear is rigged you have to test the whole speed travel in calm air.

## **8. Pre-flight check**

To know yourself with the glider it is a good idea to perform practice inflations and ground handling in advance.

You should have no difficulties flying the XCHORD for the first time in suitable conditions, but as with all new equipment.

When you have the new glider, the below points should be inspected.

- Check the lines are clear and not twisted.
- Connection points between the glider and harness.

- Check that the brake handles are correctly attached and that each line runs freely through the pulley.
- All harness buckles are closed.
- The Karabiners are fully closed and not damaged.
- The sewing, condition of the lines and connection of the lines are right
- Internal damage to ribs and diagonal ribs.
- Damage to the top and bottom panels and seams between panels.

## 9. Take-Off

To get the right wing shape for the take-off, pull the brake until the canopy shows at the perfect banana shape on the flat ground. While inflating the XCHORD, you should hold both of the A risers on your hands. Smoothly and gradually inflate the wing with stretched. We recommend that you do not pull risers too forward or down, which could cause a collapse of the leading edge, but simply follow them until the glider reaches its angle of flight. It is important that the centre of gravity of your body stay in front of your feet during the inflation of the glider to constantly load the risers. A controlled inflation allows you to check the canopy and lines during the last phase as it comes up and thus avoids the need to use brakes. Depending on the wind conditions or the slope, an adequate use of brakes can help you to take-off quicker.

## 9.1 Tow launch

The XCHORD was designed as a foot launchable solo paraglider only. The XCHORD may be tow-launched. It is the pilot's responsibility to use suitable harness attachments and release mechanisms and to ensure that they are correctly trained on the equipment and system employed.

## 10. In flight characteristics

XCHORD has the best stable glide performance in a normal position with no any brakes. The minimum sink rate is achieved by applying approx. 15% of the brakes. When using more than 30% of the brakes, the aerodynamics and the performance of the glider are likely to deteriorate and the effort to manoeuvre will increase quickly. In case of extremely high brake pressure there is a great risk of a stall. Which occurs at a full brake travel (100% of the brakes) 65cm. In normal flying conditions the optimal position for the brakes, in terms of performance and safety, is within the top third level of the braking range.

Alternative Steering:

In the unlikely event, that a brake line releases from the brake handle, or breaks, or the brake-lines are tangled up, the glider is manoeuvrable using the B riser(rear-risers). By pulling gently on the rear-risers,

it is possible to steer the glider and land safely. Don't pull the rear-risers too much, to avoid a deep stall!

## **11. Deflations**

In spite of the XCHORD has great stability of the flight, strong turbulence or piloting error may cause a portion of the wing suddenly to be a deflation. it is a EN-D glider therefore active piloting is recommended in case of an asymmetric or frontal collapse. Active piloting will reduce the loss of altitude and a change of direction.

### **11.1 Asymmetric collapse**

Asymmetric collapse usually happens when the pilot has not foreseen this possible reaction of the wing.

To prevent the collapse from happening, pull the brake line corresponding to the compromised side of the wing, this will increase the angle of incidence. If the collapse does happen, the XCHORD will not react violently, the turn tendency is very gradual and it is easily controlled. Lean your body towards the side that is still flying in order to counteract the turn and to maintain a straight course, if necessary slightly slow down the same side. The collapse will normally open by itself but if that does not happen, pull completely on the brake line on the side, which has collapsed (100%). Do this with a firm movement. You may have

to repeat this operation to provoke the re-opening. Take care not to over-brake on the side that is still flying (turn control) and when the collapse has been solved; remember to let the wing recover its flying speed.

Bring both brakes down symmetrically to speed up the reopening of the paraglider, and then raise your hands back up immediately.

### **11.2 Frontal collapse**

The profile of the XCHORD has been designed to widely tolerate extreme changes in the angle of attack. A symmetric collapse may occur in heavy turbulent conditions, on entry or exit of strong thermals or lack of adapting the use of the accelerator to the prevailing air conditions. Symmetrical collapses usually re-inflate without the glider turning, but you can symmetrically apply the brake lines with a quick deep pump to quicken the re-inflation. Release the brake lines immediately to recover optimum flight speed.

### **11.3 Full stall**

Full stall can occur when you fully pull the both brakes enough long time. This means that the wing loses its forward momentum. Also weather conditions can cause a full stall. This is a serious deviation from normal flight and can be difficult to manage. If a stall

occurs at less than 100 m above the ground, throw your reserve parachute.

To recover to the normal flight you must release both brakes. After this usually comes a front dive with a possible front deflation. An asymmetric recovery (one control released faster than the other) from a full-stall can cause a big dynamic collapse. The full-stall is a hazardous manoeuvre and as such outside the scope of this manual. You should practice and learn this manoeuvre only on a SIV course under professional instructor.

#### **11.4 Deep stall**

It is possible for gliders to enter a state of deep stall. This can be caused by several situations including; flying the glider when wet; very old glider; or after a front/symmetric deflation.

When you meet this situation you should fully raise up the both brakes and push the A-risers forwards or use the speed bar symmetrically to regain normal flight.

#### **11.5 Asymmetrical stall**

It can take place when you pull one of the brakes too hard, or while spiraling at a small speed in turbulence you increase the angle of attack. Rotation in the asymmetrical stall is called negative spiral. This is one of the most dangerous flying situations. In order to get

out of asymmetrical stall, just release the brakes. There may follow side thrust forward with a following wing collapse.

### **11.6 B stall**

Traditional B-line stalls are not possible with 2 liners glider like XCHORD. Pulling the B lines firmly will result in a full stall. Do not do it.

### **11.7 Cravat**

If the tip of your wing gets stuck in the lines, this is called a cravat. Due to the large amount of drag, cravats can turn your wing into a spiral dive very quickly. This can be disorientating and difficult to control if allowed to develop. To recover from a cravat immediately, anticipate the movement of the wing, first stabilise the direction of your wing with outside brake and weight shift. Once you have control of the rotation and sink rate, apply strong deep pumps of the brake on the cravated side whilst weight shifting away from the cravat. It is important to lean away from the cravat otherwise you risk spinning or deepening the spiral. The aim is to empty the air out of the wing tip whilst it is unloaded. Correctly done, this action will clear the cravat. If it is a very large cravat and the above options have not worked, then a full stall is another option. This should not be attempted unless

you know what you are doing and have a large amount of altitude. Remember, if the rotation is accelerating and you are unable to re-open the wing or control the decent rate, you should throw your reserve parachute whilst you still have enough altitude.

## 12. Descent Techniques

### 12.1 Big ears

Sink rate can be decreased in a controlled way by folding both wing tips. While holding the brakes you should symmetrically pull the A-main-3. When you try big ears, reaching -3 or -4 m/s, speed reduces slightly between 3 and 5 km/h and piloting becomes limited. The angle of attack and the wing loading also increases.

In order to return to the normal flight, you should release the A-risers and pull the brake short times until wing tips regain pressure.

Spiraling is not permitted with big ears, because of the increased load on the remaining lines so that they can be physically deformed.

We recommend the pilot to re-inflate asymmetrically, to avoid unnecessary change on the angle of attack, more so if you are flying near the ground or flying in turbulence.

## 12.2 Spiral dive

The XCHORD is a manoeuvrable wing which responds to any input easily. To initiate the spiral, apply one brake progressively to about 35% and hold it in its position. The speed of rotation will increase progressively as well as the pressure on the brake and the centrifugal force that is perceived. The angle or the speed of rotation can be decreased or increased by releasing or pulling the brake by several length step by step. Once mastered the spiral allows you to descend by more than 10 m/s. Movements which are extremely abrupt or badly synchronized or very quick initiation of the spiral can result in an asymmetrical collapse or a spin. CAUTION: A deep spiral is no harmless manoeuvre. The kinetic energy obtained must be reduced by slow releasing of the inside brake.

## 13. Landing

We recommend to land with trimmers to the normal slow position. Don't use the sharp turns or radical maneuvers. The XCHORD is a high speed glider, any action on the brakes may cause significant reactions.

When you are 1-2m over the ground, you should face into wind and standing upright and ready to run. Finally you may pull the brakes smoothly for minimize vertical speed.

Don't hit the ground by your overtake the glider.

If you in windy condition, as soon as you touch the ground you have to turn around to face the glider and move towards it during full pulling break symmetrically.

#### **14. SIV and Collapse lines**

The XCHORD was certified with the use of collapse lines, therefore if you wish to induce collapses during SIV training, collapse lines must first be installed correctly. Collapse lines are available as an optional extra and should be added to the wing before inducing collapses. The collapse lines will come with an added on instruction manual and an extra manual explaining how they should be installed properly. Be sure to attach to both sides of the canopy for symmetric deflations. Davinci Gliders would like to remind you that SIV manoeuvres should be learnt under the supervision of a qualified instructor and always used with caution. We strongly recommend expert tuition over water with all the necessary safety precautions in place. Only attempt SIV with this wing if you have previous SIV experience with a high aspect ratio wing. Ensure that you fully understand the correct and safe use of this equipment before attempting SIV

#### **15. Packing your XCHORD**

Spread the XCHORD completely out on the ground.

Separate the lines to the each side. The XCHORD must be folded cell to cell to keep the plastic reinforcement at the leading edge lie flat on each other and don't get bent. Try to pack your XCHORD as loosely as the rucksack allows, because every fold weakens the fabric.

Avoid packing the glider where it is wet or abrasive conditions(sand, asphalt pavement, concrete).

We recommend when you don't use the XCHORD for a long time, store XCHORD lay on the flat table or bottom without any bending plastics.

Always use the protective bag to avoid direct contact with the harnesses and buckles of any friction between the blade and the rucksack.

## **16. Maintenance and cleaning**

Cleaning should be carried out with only pure water. If the glider comes in contact with salt water, clean thoroughly with fresh water. Do not use solvents of any kind, as this may remove the protective coatings and destroy the fabric.

## **17. Caring tips**

- Do not expose your glider to the sun any longer than necessary
- Keep it away from water and other liquids
- Do not let the front edge hit the ground

- Keep your glider away from fire
- Do not put anything heavy on your glider, do not pack it in a rucksack too tightly.
- Regularly inspect the canopy, lines, risers and harness. If you find any defects, contact your dealer or the manufacturer. Do not attempt to repair the paraglider by yourselves.
- If you detect a damaged line, inform the dealer or manufacturer about the line number according to the line plan
- Keep your XCHORD in a bag in a dry well-ventilated place under neutral temperature and humidity conditions
- If you do not use the glider, then once a month you should unpack it, ventilate it well, and then pack it back in the bag

## **18. Warrantee**

The producer guarantees the correctness of the declared characteristics and the paraglider's normal performance for two years or 250 hours flying time after the purchase date. The producer conducts special, and after warranty repairs and maintenance at the owners' request for an extra price.

We recommend to inspect your paraglider (including checking suspension line strength, line geometry, riser geometry and permeability of the canopy material) one

time at one years, or every 100 hours of flying time (whichever comes first); Those inspection must be made by manufacturer, importer, distributor, dealer or other authorised persons. The checking must be proven by a stamp on the certification sticker on the glider as well in the manual book.

### **19. Respecting nature and environment**

Finally, we would ask each pilot to take care of nature and our environment. Respect nature and the environment at all times but most particularly at take-off and landing places. Respect others and paraglider in harmony with nature.

Do not leave marked tracks and do not leave rubbish behind. Do not make unnecessary noise and respect sensitive biological areas.

The materials used on a paraglider should be recycled. Please send old Davinci gliders back to us Davinci Gliders offices. We will undertake to recycle the glider.

### Check Line sheet(with riser)

The measured values at the lower surface of the tailing edge, all depth and spacing of the articulation points were determined under tensile load of 50N.

#### S size

	A	B	C	D	Brake
1	7363	7336	7301	7373	7612
2	7256	7229	7207	7280	7429
3	7232	7204	7175	7249	7286
4	7280	7251	7205	7277	7242
5	7203	7179	7154	7228	7045
6	7086	7062	7048	7111	6913
7	7046	7021	7000	7055	6839
8	7073	7050	7027	7070	6865
9	6870		6847		6751
10	6760		6749		6690
11	6695		6700		5560
12	6633		6627		6710
13	6595		6628		

#### M size

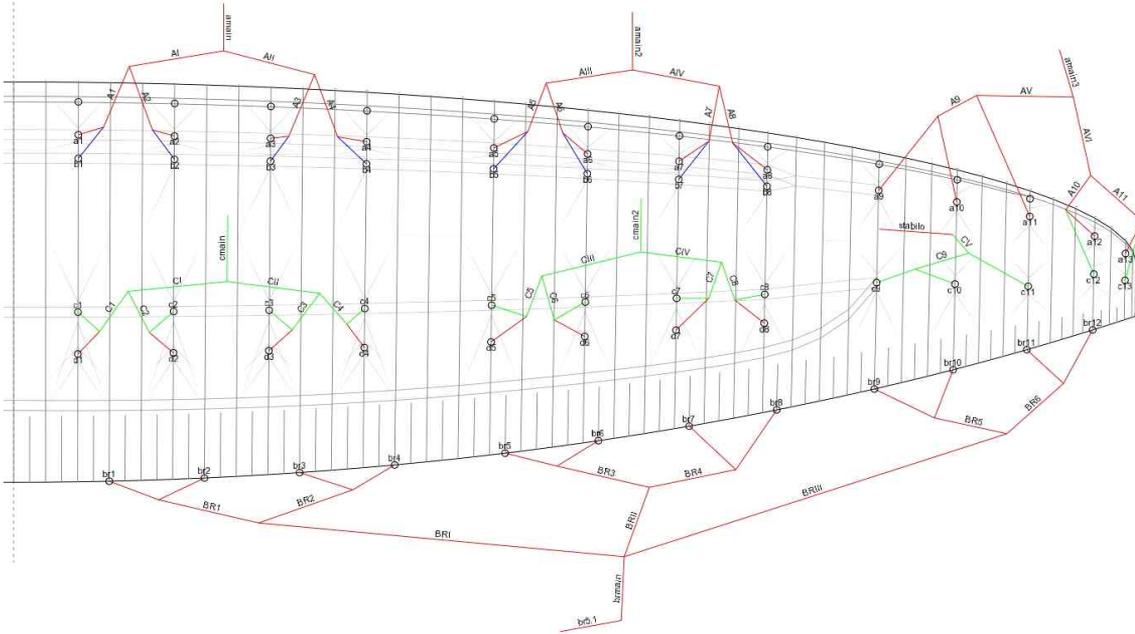
	A	B	C	D	Brake
1	7633	7610	7578	7658	8010
2	7525	7497	7484	7568	7783
3	7495	7464	7451	75325	7620
4	7545	7519	7485	7564	7594
5	7475	7454	7448	7530	7337
6	7345	7321	7326	7388	7157
7	7288	7270	7267	7329	7088
8	7317	7304	7310	7359	7220
9	7095		7103		7056
10	6986		7001		6986
11	6932		6959		7023
12	6877		6883		7204
13	6848		6893		

### ML size

	A	B	C	D	Brake
1	7894	7862	7836	8152	8136
2	7784	7745	7747	8063	7946
3	7756	7715	7715	8031	7789
4	7806	7772	7751	8059	7750
5	7732	7715	7689	8027	7536
6	7597	7568	7569	7888	7386
7	7547	7520	7517	7831	7290
8	7585	7562	7538	7859	7316
9	7354		7337		7163
10	7234		7245		7078
11	7183		7205		7053
12	7111		7125		7147
13	7095		7135		

### L size

	A	B	C	D	Brake
1	8217	8203	8159	8245	8551
2	8101	8086	8072	8155	8370
3	8069	8058	8040	8130	8202
4	8120	8109	8068	8152	8160
5	8048	8039	8025	8108	7954
6	7909	7091	7890	7968	7795
7	7858	7852	7838	7902	7697
8	7884	7878	7866	7915	7735
9	7660		7636		7545
10	7540		7532		7456
11	7475		7481		7417
12	7395		7393		7496
13	7366		7403		



Name	Line type	Name	Line type	Name	Line type	Name	Line type	Name	Line type
a1	8000U-90	b1	8000U-90	c1	8000U-50	d1	8000U-50	br1	9200-30
a2	8000U-90	b2	8000U-90	c2	8000U-50	d2	8000U-50	br2	9200-30
a3	8000U-90	b3	8000U-90	c3	8000U-50	d3	8000U-50	br3	9200-30
a4	8000U-90	b4	8000U-90	c4	8000U-50	d4	8000U-50	br4	9200-30
a5	8000U-90	b5	8000U-90	c5	8000U-50	d5	8000U-50	br5	9200-30
a6	8000U-70	b6	8000U-70	c6	8000U-50	d6	8000U-50	br6	9200-30
a7	8000U-70	b7	8000U-70	c7	8000U-50	d7	8000U-50	br7	9200-30
a8	8000U-70	b8	8000U-70	c8	8000U-50	d8	8000U-50	br8	9200-30
a9	8000U-50			c9	8000U-50			br9	9200-30
a10	8000U-50			c10	8000U-50			br10	9200-30
a11	8000U-50			c11	8000U-50			br11	9200-30
a12	9200-30			c12	9200-30			br12	9200-30
a13	9200-30			c13	9200-30				
								BR1	9200-30
A1	8000U-130 R			C1	8000U-70 R			BR2	9200-30
A2	8000U-90 R			C2	8000U-50 R			BR3	9200-30
A3	8000U-90 R			C3	8000U-50 R			BR4	9200-30
A4	8000U-130 R			C4	8000U-50 R			BR5	9200-30
A5	8000U-90 R			C5	8000U-50 R			BR6	9200-30
A6	8000U-90 R			C6	8000U-50 R				
A7	8000U-90 R			C7	8000U-50 R			BRI	8000U-50 R
A8	8000U-90 R			C8	8000U-50 R			BRII	8000U-50 R
A9	8000U-130 R			C9	8000U-50 R			BRIII	8000U-50 R
A10	9200-30								
A11	9200-30			CI	8000U-130 R			brmain	8000U-190
				CII	8000U-130 R			br5.1	10-200
AI	8000U-190 R			CIII	8000U-130 R				
AII	8000U-190 R			CIV	8000U-130 R				
AIII	8000U-190 R			CV	8000U-130 R				
AIV	8000U-190 R			stabilo	PPSL160				
AV	8000U-190 R								
AVI	8000U-90 R			cmain	8000U-360 R + RED COVER				
				cmain2	8000U-190 R + RED COVER				
amain	8000U-360 R + RED COVER								
amain2	8000U-360 R + RED COVER								
amain3	8000U-190 R + RED COVER								

## Overview

