



Vertical Trek Innovations Continuous Belay System Install Manual

**Global Solutions
For Adventure Parks**





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Rules

Cable Height

When laying the belay system, lifelines must be higher than the users shoulder.

Ascents

When mounting straight or angled T's, the maximum clearance must not exceed 50cm. In addition, training on their use is essential. The hook must be passed through the next T before the user passes in order to reduce fall factors.

Anchors

The parts must be connected to the support via anchor whose resistance is equal to or greater than CMR breaking load of the part used.



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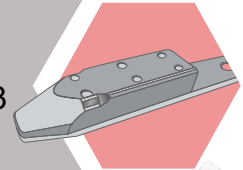




Parts

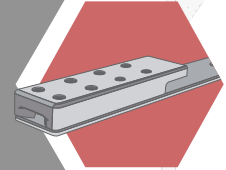
Pack 1 - Mac 3

Supplied with 316L stainless steel plate ref ACB 3-5 + Conical matrix Mac 3 + 8 * 30 bolts for use with 12mm cable or 1/2" 12.7mm



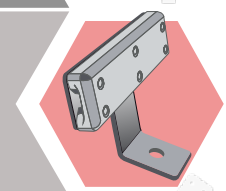
Pack 2 - Mac 4

Delivered with 316L stainless steel plate ref ACB 9-6 + Matrix Mac 4 + bolts 10 * 30 For use with 12mm cable or 1/2" 12.7mm



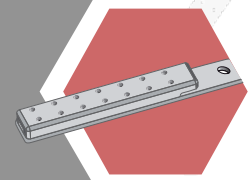
Pack 3 - Straight and Angled T

Supplied with 316L stainless steel plate ref ACB 8-5 or ACB 9-5 + Matrix Mac 2 + Bolts 10 * 30 for use with a 12mm cable or 1/2" 12.7mm



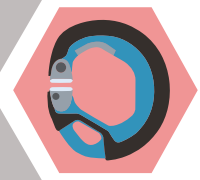
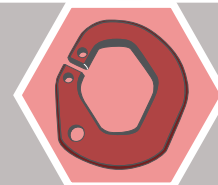
Pack 4 - Mac 7

Supplied with 316L stainless steel plate ref ACB 6-7 + Matrix Mac 7 + 10 * 30 bolts for use with 12mm cable or 1/2" 12.7mm



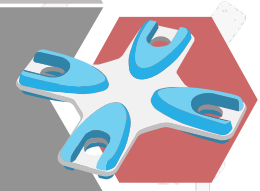
Safety Hooks

ACB and Safety Hook Seven



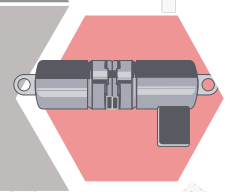
X-Quad Bifurcation Cross Plate

When laying the belay system, lifelines must be higher than the users shoulder.



CBS Unit

When laying the belay system, lifelines must be higher than the users shoulder.



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Working Loads

Reference	Working Load Limit	Breaking/Slipping Load
Pack 1 - Mac 3	10 KN	30 KN Slipping
Pack 2 - Mac 4	20 KN	60 KN Slipping
Pack 3 - Straight/Angled T	20 KN	40 KN Slipping
Pack 4 - Mac 7	30 KN	90 KN Cable Break
X-Quad Cross Plate	30 KN	90 KN Cable Break
CBS Unit	1 Person	15 KN



The safety hooks ACB 4-10alu and Seven comply with the EC regulations (according to the directive 89/686/CCE - RFU 11.104) and are controlled by the APAVE.

SEVEN: 23KN and 15KN small axis

ACB4-10: 25 KN and 12KN small axis



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Using The System

The system must be position so that the safety hook can pass freely on the plates.

Setting Up the System

The anchorage parts should be oriented vertically so that the safety hook may pass through the metal bar (pictured on right).

It is easiest to orient the cable so that it pulls into the flat metal bar, rather than away from it. This helps the safety hook flow more easily through the matrix block.



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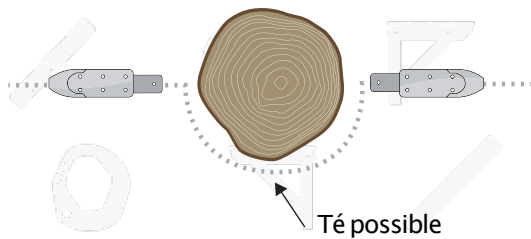


Using The System

Mounting Examples:

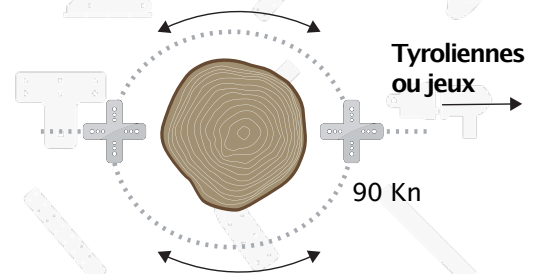
CASE N°01 CLASSIC GAMES

Use of packs 1 or 2 (Te possible)



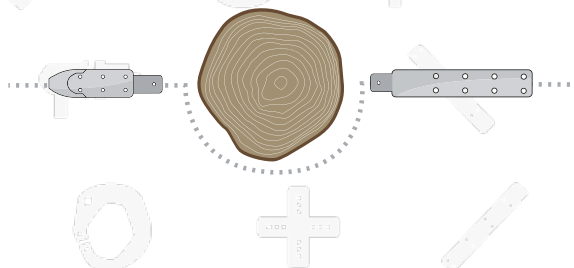
CASE N°02 BIFURCATION CROSS

Bypass of the tree in both directions (Zip Line or sets)



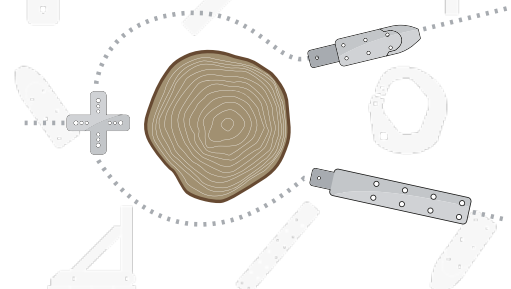
CASE N°03 ZIP LINES

Use of packs 1, 2 or 4



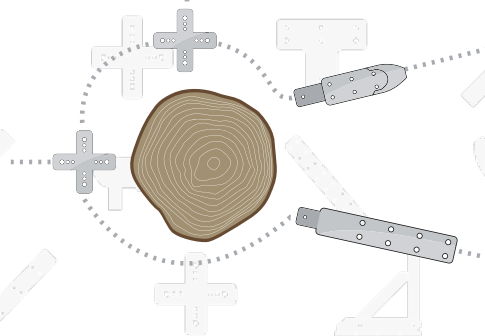
CASE N°04 3 WAYS

Using the bifurcation cross, pack 1 and pack 2 or 4



CASE N°05 4 WAYS

Use of 2 bifurcation crosses, pack 1 and pack 2 or 4

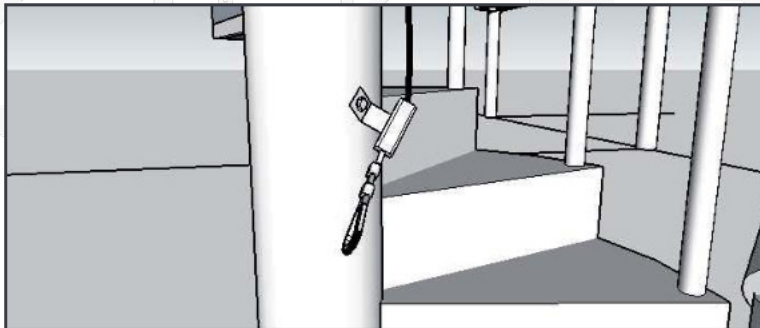


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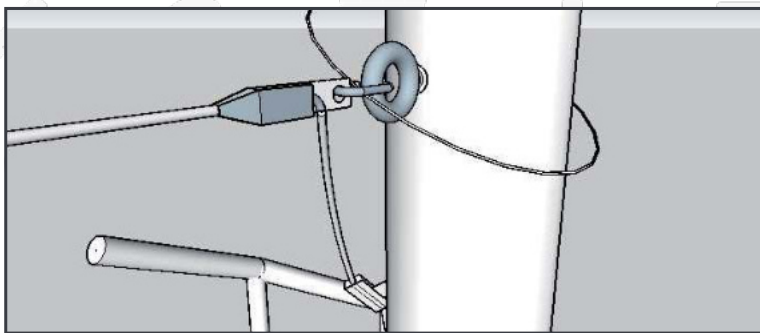
Using The System



01

INPUT / OUTPUT

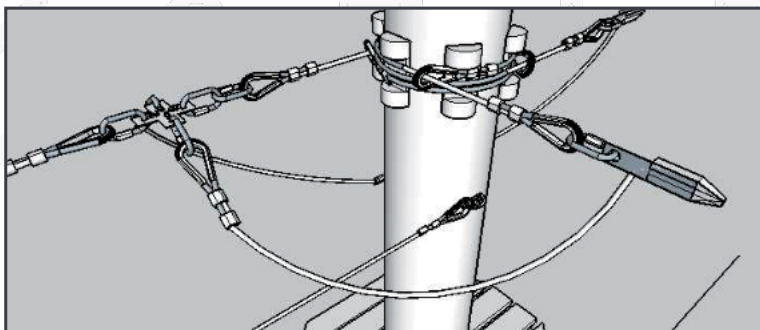
A TÉ or TÉ 70 is used as a point of entry or exit (Back up)



02

1 WAY

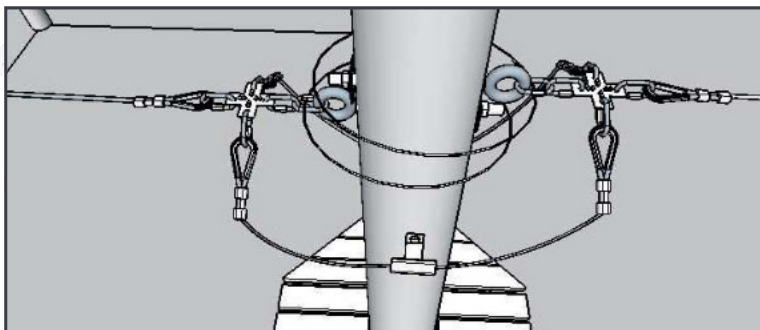
Starting Point: TÉ +PACK 1



03

3 WAYS

Crossing point with cross plate + 2 packs



04

OVERPASS

Point of overtaking with 2 bifurcation crosses + TÉ for holding the cable



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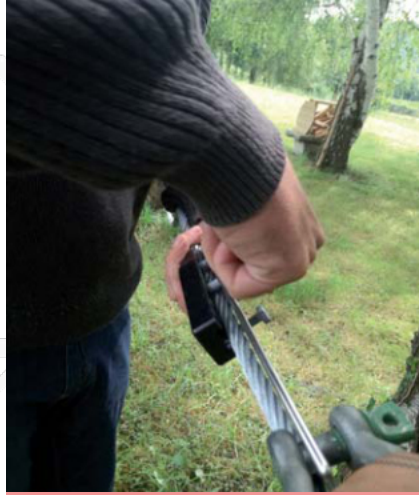


Installing



01

Place the cable and te Matrix on the plate.



02

Use the appropriate bolts to close the PACK.



03

Tighten first homogeneously.



04

Slightly bend the cable at the plate outlet to get an easy passing of the hook.



05

The final tightening torque will be made after a few passes on the cable.



06

This operation is to be reproduced for all packs. Check that the hook slides on the plate.



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Mounting the Cross

The Continuous Belay System “Vertical Trek Innovations” can also include bifurcation for different paths (to facilitate the flow of participants, staff, overtake, or avoid elements that may be too difficult for some participants).

To mount the cross plate, instead of placing a conventional anchor plate, cut your cable and make a turn back. Then place a quick link at the end of the cable braid and hang it on the cross plate. You can also place a thimble and the cable directly into the anchor hole of the cross, though this makes future modification more difficult and prevents creating a breakaway point in the case of an extraction using the standard aluminum safety hook.



Repeat the operation for the two possible paths around the tree. Anchors for bifurcation crosses must be made with minimum 12 mm steel wire (no textile straps).

You can tap both sides of the platform to overpass and be back on a bifurcation cross. You can also direct the users to an escape way.

The use of a bifurcation cross imposes safety hooks with wideners, to avoid that the hook goes out of the cable during using.

The directional choice is made by rotating the hook. The manipulation will have to be taught during the initiation of the users to be mastered.



Xquad is a new bifurcation cross allowing optimized guidance for the passage of the hook.

The wideners also keep the side cables for greater ease of use.

It has the same characteristics and resistance as the classic cross bifurcation.



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Tightening Torques



The tightening torques are to be applied homogeneously.

- Do not apply the torque on a single bolt, slowly approach all the bolts to gradually arrive at the correct value.
- Do not force torque beyond limits as shown in table below.
- Check all bolts, one row must not be tighter than the other (see photo opposite).

Anchor Plate	Torque in Ft/Lbs
Pack 1 - Mac 3	25
Pack 2 - Mac 4	35
Pack 3 - Straight/Angle T	35
Pack 4 - Mac 7	35

IMPROPER INSTALLATION:

The bolts are not evenly tightened.

Bad size of bolts.

The aluminum matrix must not touch the stainless steel plate.



Bad Install:

The below image is an example of poor install practices. As you can see the plate is deformed due to over torquing the bolts.

The anchorage part is also oriented horizontally, making it more difficult for the safety hook to pass through the system.



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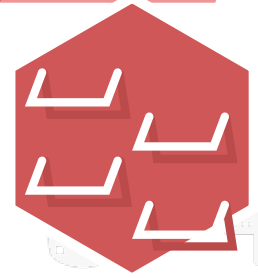




Via Ferrata

The system can also be installed on Horizontal and Vertical Via Ferrata.

In the case of a Vertical Via Ferrata, a lanyard with Energy Absorber must be used to limit fall factors.



HORIZONTAL VIA FERRATA



The use of TE 70 is particularly suitable for intermediate points. Distance up to 4 meters between the horizontal points.

The TE 70 are fixed directly to the rock face with 12mm Spits.



In this context, the installation of zip lines is also possible via the installation of anchorage offering sufficient resistance to the pack used.

Here the fastening assembly of Pack 2 must have a resistance $> 60 \text{ KN}$.

VERTICAL VIA FERRATA

The use of a lanyard with energy absorber for the via ferrata is compulsory.

The TE 70 allows easy movements.

The maximum distance between the points is 2 meters.

In a mixed acrobatic course with no longevity and energy absorber, the spacing of TE 70 will be at a maximum distance of 50cm.

During the briefing session, instruction should be provided so that users pass the safety hook early, in a way that limits fall factors.



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Starting/Ending Points

Regardless of the equipment configuration of the course, an entry and exit point must be positioned at the beginning and at the end of each course.

This measure allows :

- to have a clear reference point for the user,
- to have 2 anchoring points to secure any maliciousness and / or the wear of a fixing piece.



Retrofitting a Course

Choice of Anchorage

Several solution exist and are valid applications for anchoring the Vertical Trek system.

- Cable Anchorage
- Textile Anchors, Strap 2T Minimum
- Drilling

Retrofit with Used Cable

It's possible to reuse the cable already installed on the course if it is in good condition and does not show any damage.

The use of a crimping machine is strongly advised to not end up with a multitude of cable clamps that would hinder the passage of the hook and the fluidity of the system.



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Tarzan Jumps

Sliding Elements with Continuous Belay System

It is possible to perform a tarzan jump, sliding games, with a cable positioned on the side of the user. The cable must be tensioned according to the curve of the user. A maximum offset is required so that once in situation, the cable is not in contact with the user.

Exceptions: Quick jump, high speed tarzan jump. Some configurations should be considered with a Continuous Belay System break line (CBS). The increase of speed in this application will increase the wear on some equipment due to friction from the cable.

In this context it is preferable to use a CBS KIT allowing the realization of the game without follower cable.

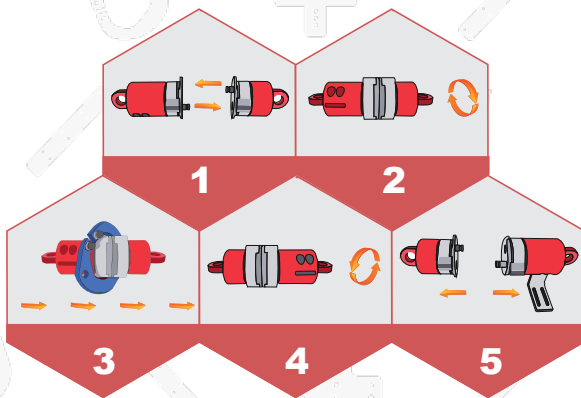


With CBS Unit

Break in cable utilizing the CBS Unit

A notice dedicated to the use of the CBS rupture is available. The CBS assembly must be revised in our workshops or those of our distributing partners every year. The use of CBS is simple. However, an education at the Briefing should be put in place.

SCHEME OF HANDLING THE CBS SYSTEM



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Vertical Ascents

3 Configurations

The climbs and descents must be equipped so as to limit the impact received by the users.

CONFIGURATION 1

With T  or T  70

The T  or T  70 are positioned every 50 cm maximum.

Pre-teaching (briefing) is necessary to limit fall factors :

It is necessary to pass the T  or T  70 before being in factor 1 (harness bridle at the same level as the T ).



CONFIGURATION 2

With Stop fall and T 

Many models exist, rodeos, absorber on cables...

In this context we advocate the use of 2 TE or TE 70.

The first, at the bottom of the scale, will serve as a guide for the cable on one side of the ladder or the net.

The second, placed at the level of the platform, will secure the user during his disconnection with the stop fall.

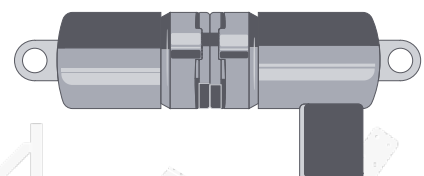
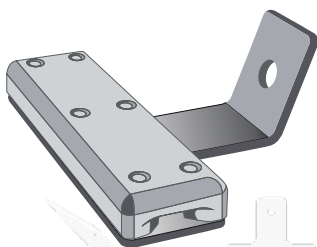


CONFIGURATION 3

With CBS breaking and Stop fall

For large ladders or nets making difficult to manipulate the hook on the TE (we must release a hand to slide the hook on the plates).

In this case the CBS breaking is associated with the Stop Fall.



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Mounting on Different Interfaces

- The system can be mounted on different supports if they offer sufficient strength.

The breaking load (CMR) of the anchor must be equal to or greater than the load of the pack you are using.
 Opposite example: Pack 2 with CMR at 60KN coupled with a 2T lyre shackle whose CMR is at 100KN.
 The whole interface is therefore more resistant than the pack used.



Creating Breaks In a Closed System

- During the installation, it is possible to create evacuation zones.
 Either at the level of the platform between two packs or plates.

A 12mm quick link (maillon rapide) tightened to the key will allow the operator to create a temporary break of the continuous belay system.

You can make continuous belay breaks to facilitate the evacuation of practitioners.

Simply place a quick link connecting the cable to the platforms between two anchor plates.

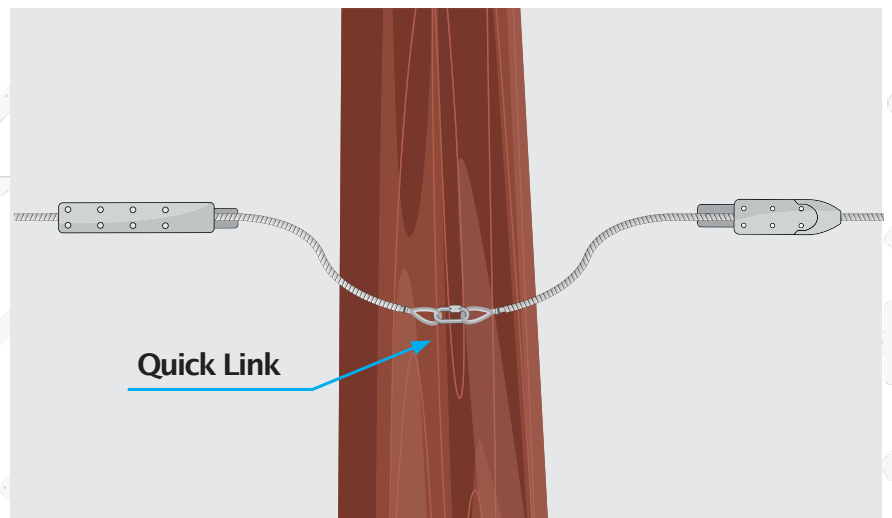
Make 2 conventional splices of cable connected by a quick link (tighten with a wrench).

The system allows the cable to be stacked between 2 plates in accordance with the current standard :

Cable on cable with conventional cable clamps, 4 in one direction and 4 in the other or with aluminum sleeves (use a press).

In this way there is no obligation to have a single cable for the entire course.

A damaged section can easily be replaced without changing the entire cable.



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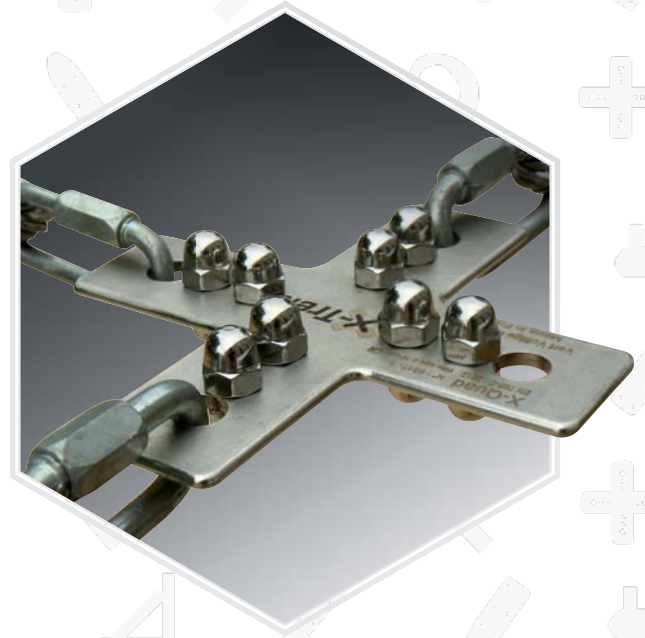
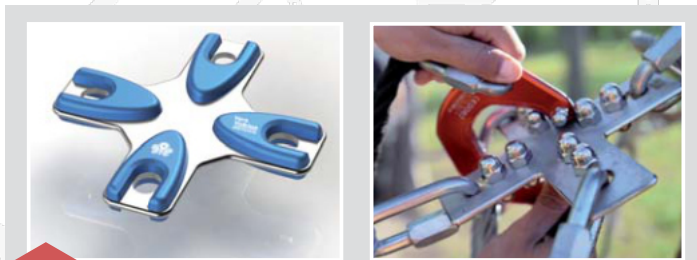


Creating Breaks

In a Closed System Cont.

Breaks can also be created at cross plates.

The cross sides can be mounted using a 12mm quick link.
This one can be unscrewed by an operator and create a temporary lifeline break.
These operations must be performed by an operator.
Reassemble immediately after evacuation of the practitioners.



Safety Hooks

EXAMINATION CERTIFICATE TYPE
(EC examination certificate type)
N° 0082/2173/136/03/15/0088

SEVEN hooks and ACB 4-10A are available for the continuous belay system.

Certificates and operating instructions are supplied with the hooks and available on request.



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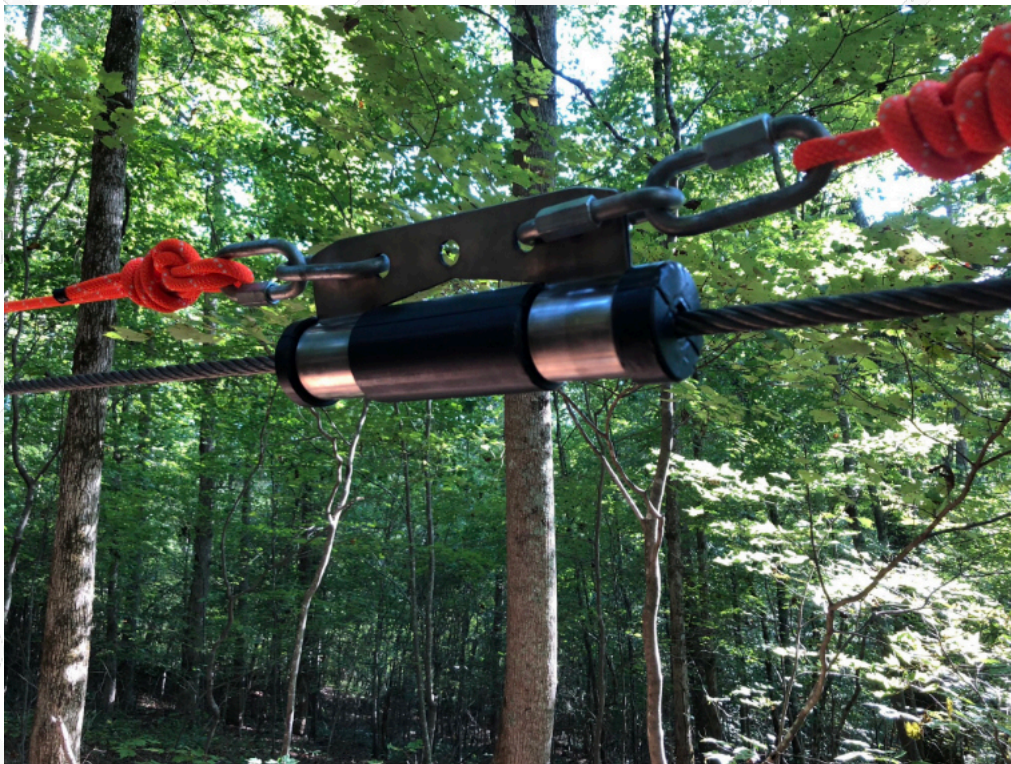




Contact Block

Installing the Continuous Belay Deceleration Contact Block

- The Contact block Pac arrives with all necessary parts for immediate installation and operation. The body is split into two halves to facilitate ease of install on prestrung ziplines.
- Attaching to the wire
- The Pac will separate into 3 parts – (2) hardened plastic halves, steel binder housing, & (2) housing lock bolt sets.
- Upon dismantling the housing, remove one half of the contact block. Place the housing and half of the block onto the zipline. Slide second half of contact block back into housing.
- The contact block must be connected to a deceleration system in a manner that meets or exceeds current industry standards.

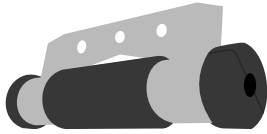


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Contact Block

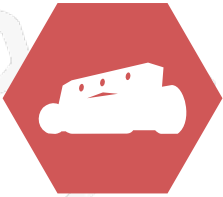


Our contact block can be easily integrated with a variety of deceleration systems and allows seamless transition of our Vertical Trek Innovations Continuous Belay Safety Hooks without needing to disconnect the user or contact block.

Each component is easily replaceable and can be sold separately as needed.



Maintenance



- It is required to check the condition and operation of your contact block and deceleration system daily.
- We recommend adding some non corrosive lubricating agent (i.e. silicone spray) applied inside the contact block to help increase longevity of the unit.
- We recommend implementing a contact face rotation cycle to help increase longevity of the unit.



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Advice

You can call us or one of our partners to launch your equipment. Wherever you are, technical assistance can be provided.

Each item must be equipped in accordance with this manual, otherwise no guarantee will be given to you by the company Vert Voltage Innovation.

If you encounter difficulties during an editing operation of your continuous belay system, please contact us at the numbers listed below.

We thank you for choosing our system and hope that it will give you complete satisfaction.

Simple, Strong, A Safer Participant



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