tessier

LA TECHNOLOGIE DU SKI ASSIS

Leisure DUALSKI

Instruction and maintenance manual

www.dualski.com

TABLE OF CONTENTS

Manual for Dualski from n° DS703 to DS900

Design, manufacture, marketing & after-sales service

TESSIER SARL

Z.I. François Horteur
73660 Saint Rémy de Maurienne - France
info@dualski.com www.dualski.com
Tel. +33 (0) 479.83.51.52 Fax. +33 (0) 479.83.51.53

1. PRESENTATION AND INSTRUCTIONS FOR USE

The objective for the following explanations is not to teach the user to ski but to give basic advices for the use of this equipment.

The **Dualski®** is intended for those disabled at the lower limb, allowing them to ski in an independent manner after some initial instruction.
An **assistance bar** (optional) allows the accompanist to help the seated skier during the learning phase.
The articulated **piloting bar** (optional) is designed for the driving of the Dualski by an accompanist to make skiing partially or totally dependant person.
For those two options, read the specific document before use.

The first prototype appeared in 1996. The Dualski has changed considerably since then and has become a high-performance apparatus with a great deal of versatility. It has a totally articulated frame allowing the fitting of two skis with standard bindings. The technique used for the Dualski has been the subject of two patent applications.

Choice of skis

Autonomous skiing:
As for an able-bodied person, this depends on the type of ski used, the weight of the skier and his ability. Our own experience has shown us that it is necessary to use skis that are approximately 10 cm shorter in relation to an able-bodied person of the same weight and ability. Medium-of-the-range parabolic skis are sufficient and are often more efficient than competition skis on which a “Dualskier” could hardly put enough pressure to use their potential. We recommend not sharping the edges of the skis at 87° or 88°. A good sharpening of the ski edges at 90° is enough and avoids ski vibration problems.
With a piloting bar:
When using the Dualski with the piloting bar, medium-of-the-range “carving” skis with a length between 140 and 150 cm are recommended.

Choice of bindings

The binding to be used depends on the skier’s weight and ability. It is advisable never to take one’s skis off so the bindings must always be adjusted to their maximum level.
With the Dualski, we recommend “standard” bindings that can be adjusted up to 14 DIN or more or “pivot” bindings that can be adjusted up to 12 DIN (or 14). “Pivot” type bindings are well adapted to the Dualski because they tolerate punctual overloads

- Standard binding: 14 DIN minimum
- Pivot binding (Rossignol Axial or Look PX): 12 DIN minimum

Mounting the bindings onto the skis

The boots fitting the skis are **325 mm** in length.
Mounting is usually the same as for a shoe of an identical length: the middle of the shoe must be aligned with the marker of the ski.

Protection

When skiing in a Uniski or in a Dualski, the use of a ski helmet is strongly recommended.

Use of skilifts

In France, the Dualski has authorization N° AVMH_735/99_D for the use of chairlifts and ski lifts.
The attachment mechanism « TESSIER harness system » has received authorization N° AVMH_734/99_B.
These authorizations are delivered by the « commission des matériels de ski assis » (committee for seated skiing equipments) presided over by the STRMTG (division of the Ministry of Transport, Equipment, Tourism and Sea).
They are available on request.
Also, the French Handisport Federation has set out regulations for seated skiing.

Use of draglift or T-bar lifts

These practical advices don't replace any aspect of the authorizations.

- The skier must have in his possession the identification sheet of the harness system with specifications in order to be able to show that it is conform.
- It is compulsory that a helper leaves first and is in a position of stopping the skilift, using the emergency button, in the event of a malfunction of the harness system or of any other problem. This is a condition of the authorization's validity.
- The skier must have already prepared his harness before arriving to the ski-lift attendant. The semicircular ring of the harness must be closed. A plastic adjustment enables the arch of the ring to be adjusted. This arch must be closed to the maximum and should just allow the seat of the pole to pass.
- The ski-lift attendant must use the manual departing method for the pole.
- He passes the seat of the perch through the ring.
- At the moment of departing, **the ski-lift attendant must position the ring on the seat of the pole and maintain the pole steadfastly at the front of it**. This enables the « slip-knot » of the harness to work instantaneously.
- The rope of the main hook release should not be attached to the hand but simply held between the hand and stabilizer's handle, as it leaves with the ring in the event of the safety hook release.
- On T-bar lifts, pass the hook one side or on the other side of the T-bar and position it against the pole.
- The safety hook release cord must be put around the wrist and maintained on the stabilizer's handle like a ski pole sword knot.
- Once at the top of the ski lift, the skier releases his harness and go a bit further to pack it.

Use of chairlifts:

This practical advice does not replace any aspect of the authorizations.

- Prior to take the chairlift, inform the chairlift personnel of your presence. They will be vigilant and will use the emergency button in the event of an incident.
- Systematically ask to get on at a slow speed, even requesting that it stops if the chairlift only has 2 places or is unable to go slowly. The speed for getting off the chairlift mustn't be higher than the speed for getting on.
- Before getting ready to embark, unlock the frame and **loosen the Dualski's backrest adjustment strap** in order that the seat is comfortable and safe.
- For embarkation, position oneself as follows :
  - For a chairlift with 2 places: on one of the 2 places.
  - For a chairlift with 3 places: on the middle place.
  - For a chairlift with 4 places or more: on one of the middle places. The footrest bars of the seat's safety rail are mainly positioned every 2 places. In any event, do not position the Dualski between 2 places where the footrests of the seat's safety rail are likely to obstruct. This should be imperatively entirely folded down.
- Lift the Dualski seat and get on with the help of an accompanist if necessary. Close the safety rail as quickly as possible.
- When arriving, raise the safety rail at the last moment and be assisted by the helper when getting off, if necessary, so as to get clear as quickly as possible.
- The **blocks** fixed to the stabilizers (optional) facilitate to go off the chairlift. They allow a good support on the seat of the chairlift to push forward in an efficient way.
- Think to lock back the frame and tighten the backrest's adjustment strap before going onto the piste.

2. GENERAL DESCRIPTION

Elements nomenclature / figure 1 & 2

Repère	Désignation	Quantité
1	Châssis haut	1
2	Châssis bas	1
3	Bras de chassis	2
4	Sabot latéral comprenant (détails sur figure 2) : - 1 sabot latéral en aluminium (4A) - 1 chape avant vissée sur le sabot (4B) - 1 chape arrière vissée sur le sabot (4C) - 1 plaquette de prise de carres vissée sur la chape arrière (4D) - 1 patte anti-déchaussement (4E) - 1 additif pour centrage de la fixation arrière (4F)	2
5	Repose-pieds	1
6	Crochet d'attache du largueur (soudé sur châssis)	1
7	Élément Amortisseur marque Fournales ou Öhlins	1
8	Biellette d'amortisseur	1
9	Vérin de compensation pour utilisation télésiège	2
10	Système de prise de carres (voir descriptif chap. 3)	1
11	Verrou pour utilisation des télésièges	1
12	Siège	1
13	Plaque signalétique	1
14	Sangle de pieds avant	1
15	Sangle de pieds arrière	1
16	Ski & fixation standard	2

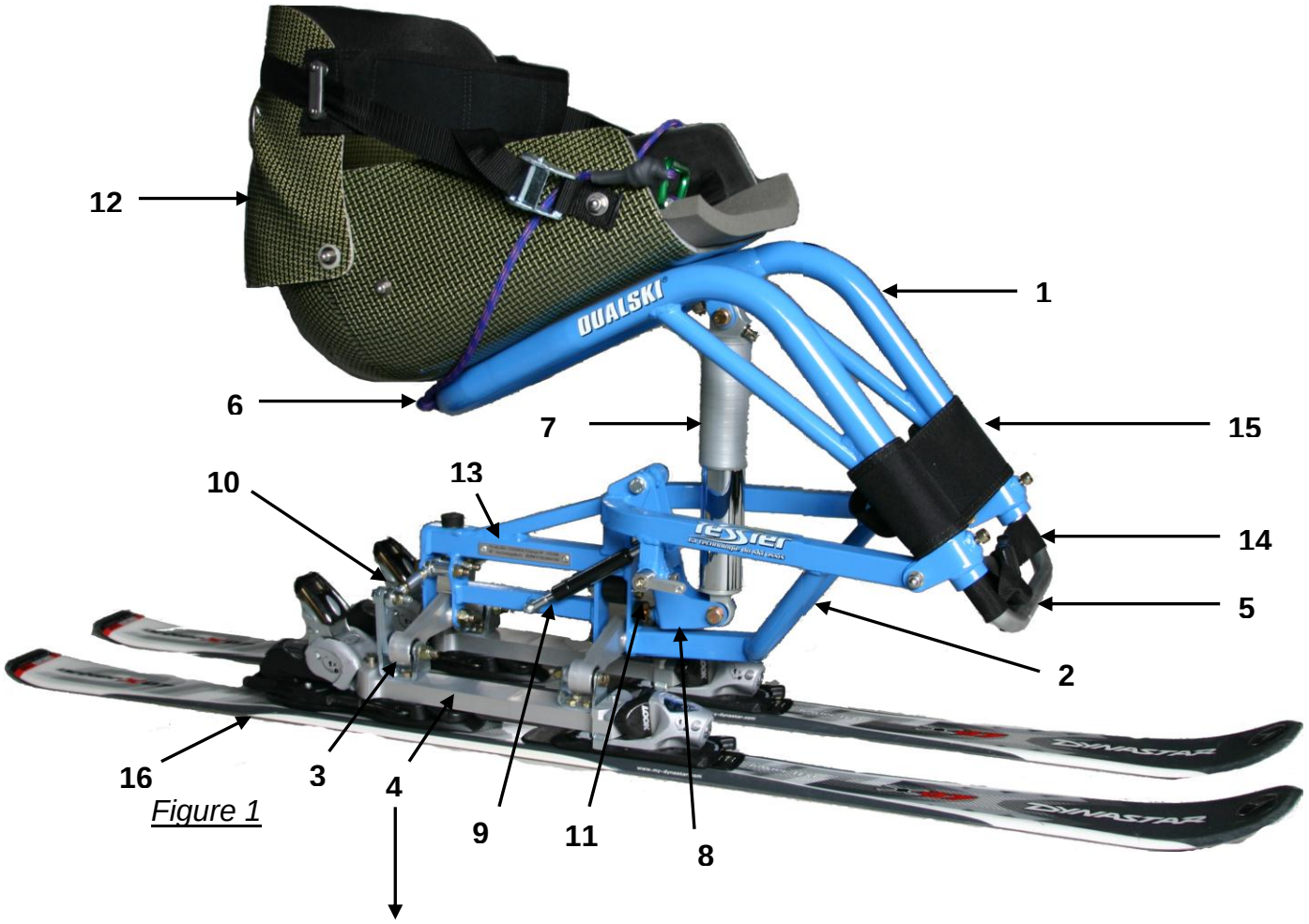


Figure 1

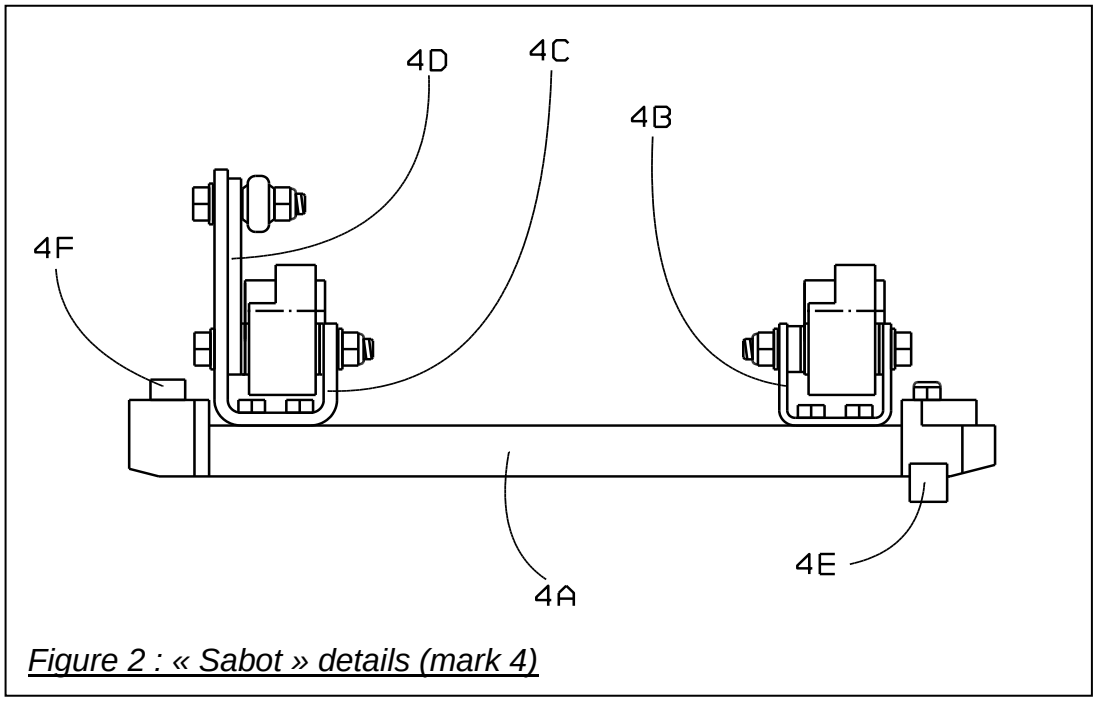


Figure 2 : « Sabot » details (mark 4)

3. SYSTEM FOR CARVING OUT TURNS

Explanations according to figures 3 and 4:

On the Dualski, the tilt angle of the skis is different in relation to the seat, depending on the chosen configuration: F, M or P.

These configurations correspond to "angle plates" (1) of varying heights. These can be replaced later on, as required.

F = Facile (Easy): The ski tilt angle is less significant than the tilt angle of the seat. This makes the swivelling of the skis and side-slipping easier. This configuration is advisable for those beginning as well as those with more serious disabilities. It's also the configuration we recommend when the Dualski is used with the piloting bar.
P = Performant (Advanced): The tilt angle is more important as with the F configuration. The Dualski is more difficult to ski with, but it offers better performances. This configuration is recommended for good skiers.
C = Carving: This configuration allows a very incisive skiing style and is reserved to very good skiers. With this configuration it becomes hard to make the Dualski sliding.

The maximum angulations angle are: F = 51°, P = 55°, C = 59°

Replacement of the angle plates « F », « P » or « C »

Replacement method for the angle plates:

Note : for this operation, **do not touch** the tilt adjustment system (2) of the skis.
It is advised to first replace a side and then the other and to operate in a dry place.

1- Loosen the 2 « locknuts » of diameter 8 at the points 3 and 4 and remove the screws.
2- Replace the plates by positioning the engraved letter F, P or C upwards. Respect the positioning of the 3 serrated cup washers (A).
3- Screw back correctly the two nuts (with a dynamometric spanner, the torque is 2.4 mKg). If the nylon collars of the nuts are damaged, then replace them.
4- Do the same for the other side.
5- Verify that skis are flat.

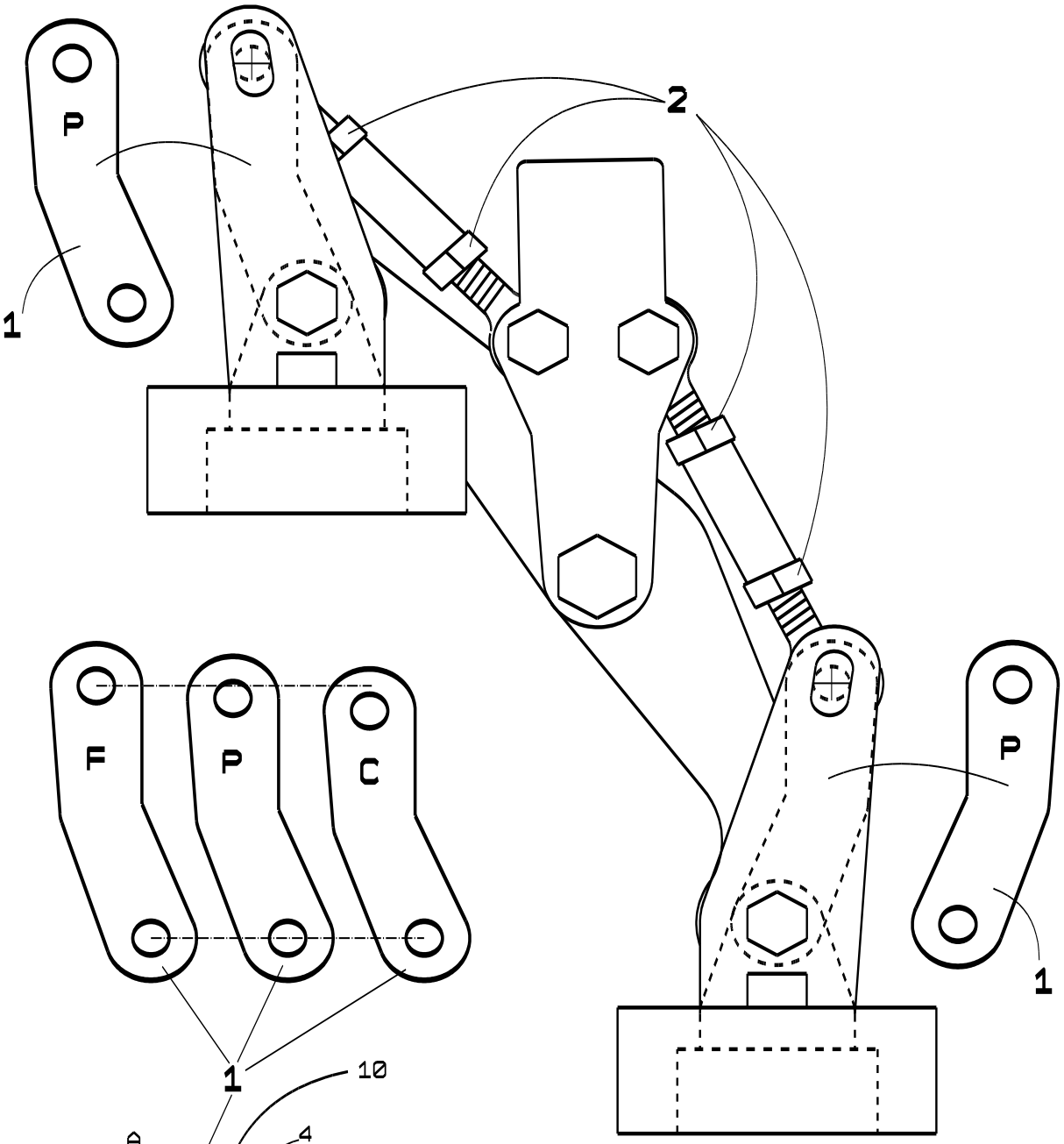


Figure 4

Figure 3

4. SKILIFT HARNESS

Description according to figure 5

No.	Comment
1	Polymer ring with an outside diameter of 35 mm, length of 370 mm, scleroscope hardness of 70 A.
2	Main swivel hook release – Wichard brand.
3	The swivel means that the release hook mechanism can be turned to where the skier is.
4	A plastic adjuster enables the opening of the ring to be easily adjusted.
5	Granny knot. A 7mm diameter rope is tied twice at the end of the ring.
6	6 mm diameter link.
7	Opening safety hook – Wichard brand When the poles are equipped with a clamp ring instead of the nut tightening the seat, then this hook can be attached to the clamp ring.
8	Snap hook to attach the rope on the apparatus while the skier is seated.
9	7 mm diameter traction cord.
10	Most of the knots are covered with a sheath.
11	6 mm diameter main release cord. It has a 150 mm long sheath to make release easier if the ring suddenly turns.
12	An eight knot helps the skier with the cord.
13	6 mm diameter safety release cord. The loop at the end enables the skier to pass his hands through before grasping the handle of his stabilizer. In the event of release, the safety snap hook stays next to the apparatus.

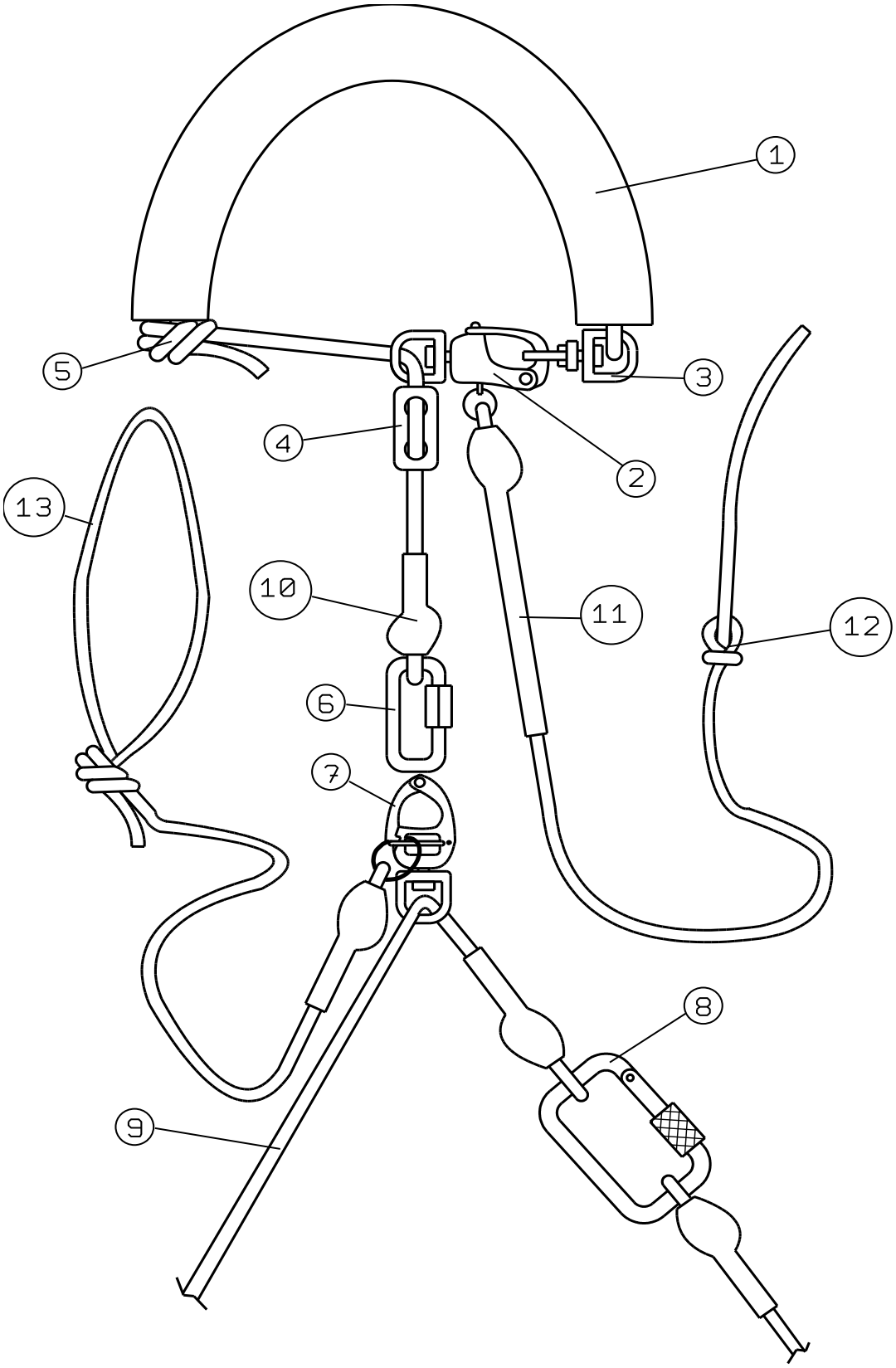
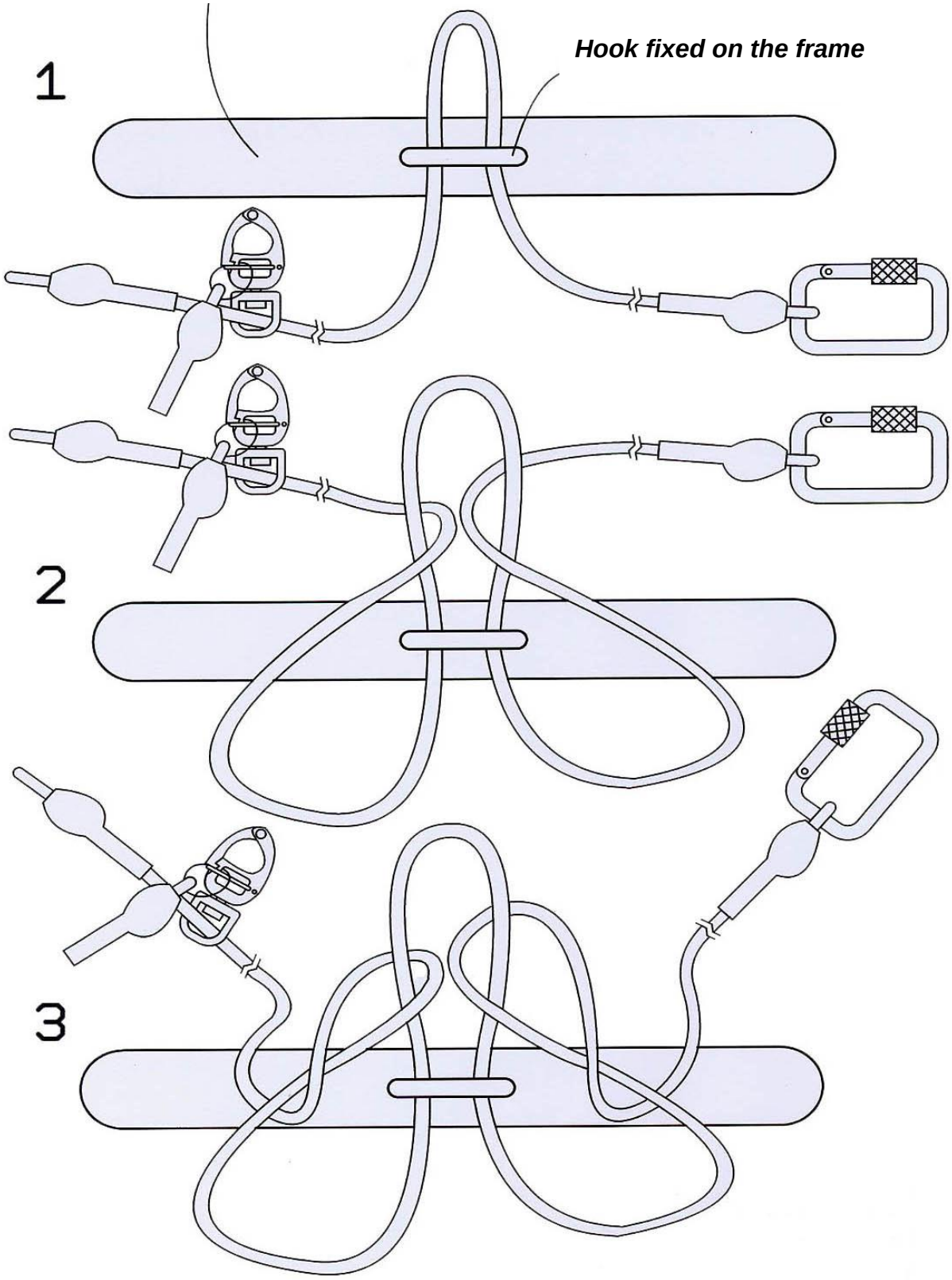
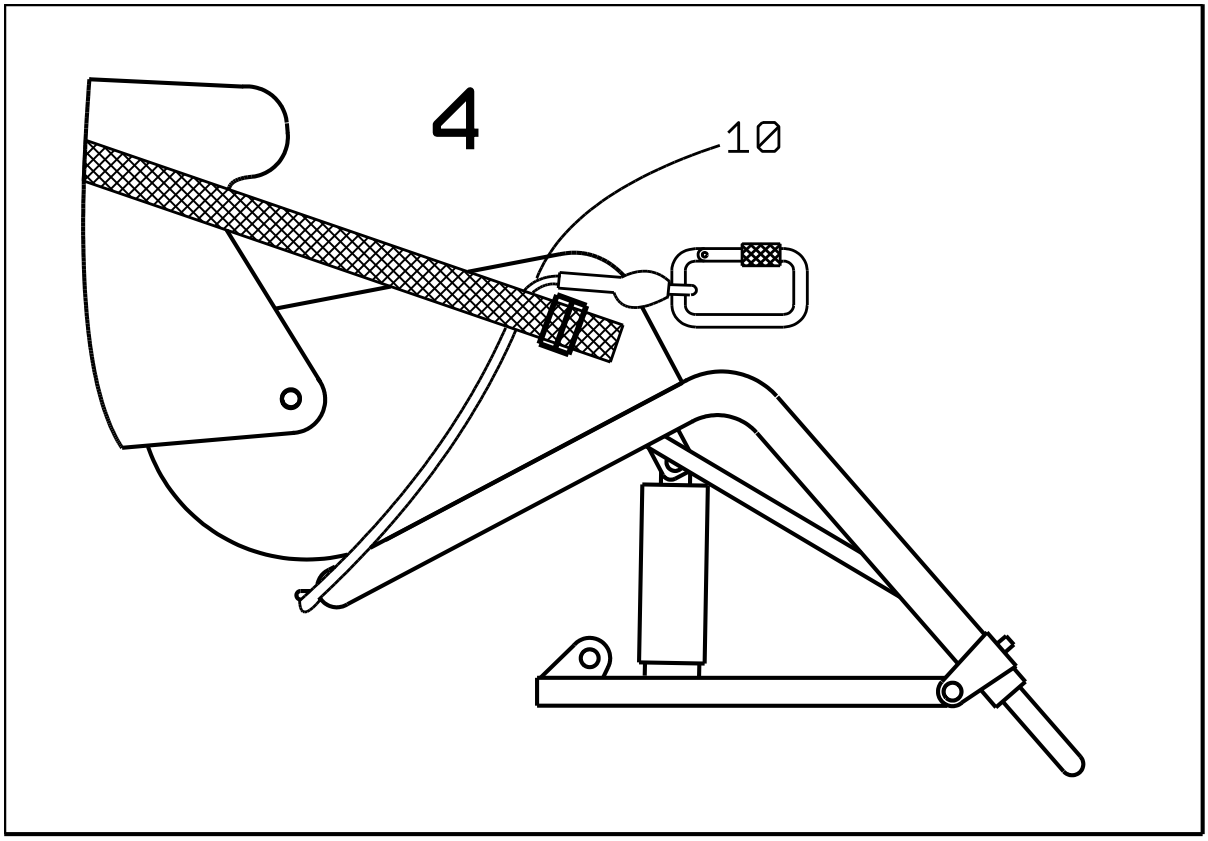


Figure 5

Installation of the ski lift harness on the Dualski

Frame seen from backward





Fixing the harness to the Dualski according to sketches 1, 2, 3 and 4

1. Take the cord, winding it around the seat, with the closing snap hook on the right and the safety snap hook with its release cord on the left. Pass the cord through the hook.
2. Then pass each end of the cord with their snap hook through the loop as carried out in 1.
3. In order to completely immobilize the cord, pass each end through the 2 loops as carried out in 2, so as to tie a simple knot on each side.
4. Adjust the length of the cord so that the closing snap hook just exceeds that of the strap holding the seat's backrest in place (10).

Note: the cord of the harness must always pass between the seat and the strap of the backrest (10).

5. « FOURNALES » SHOCK ABSORBER

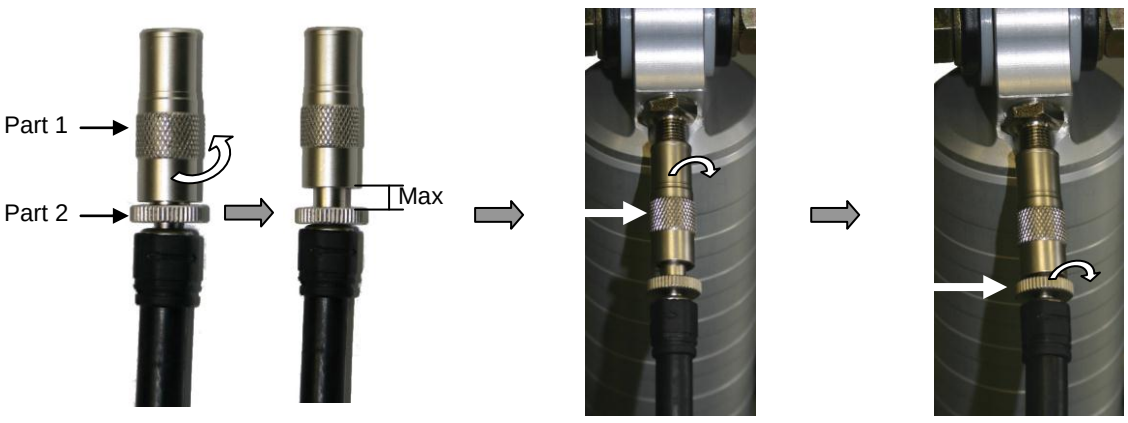
The Fournales suspension element brings together an air spring and a hydraulic shock absorber, forming a unique combination known as air/hydraulic.
In seated skiing, with a traditional « spring-absorber » combination, the strength of the spring should be adapted to the weight and performance of the skier by replacing the spring in order to obtain a good suspension.
In the case of a Fournales shock absorber, the spring is replaced by compressed air. This technical solution means that the air spring can be easily adapted through simple inflation, using the Fournales pump 0-30 kg/cm² or Scott pump 0-40 kg/cm², available as an option.

Inflation rules:

Dualski higher model (315 mm between the two axes of the shock absorber):
Person's weight x 0,24. Example: the person's weight = 70 kg = 70 x 0,24 = 16,8 Kg/cm².
Inflate to 17 Kg/cm².
Dualski lower model (295 mm between the two axes of the shock absorber):
Person's weight x 0,27. Example: the person's weight = 70 kg = 70 x 0,27 = 18,9 Kg/cm².
Inflate to 19 Kg/cm².
Dualski lower model with piloting bar
Person's weight x 0,30. Example: the person's weight = 70 kg = 70 x 0,30 = 21 Kg/cm².

Inflation method:

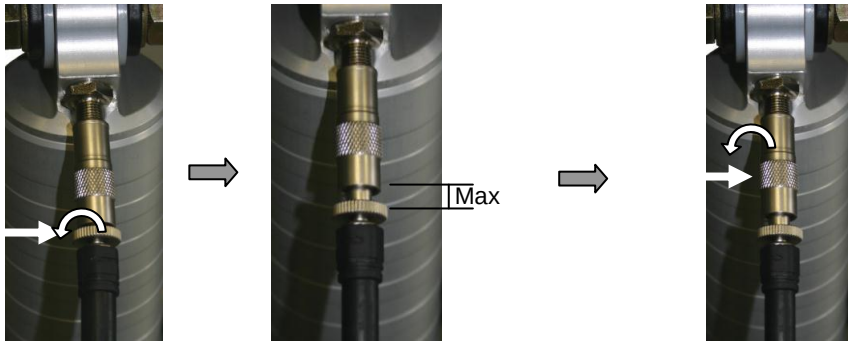
1. Remove the valve cap.
2. Screw the pump to the valve of the shock absorber:
   -**Fournales pump**: Screw until the needle of the pressure indicator moves, do a quarter of turn more. (Don't tight too much, it could damage the valve).
   -**Scott pump**: There are 2 steps to screw the pump.
      A) Hold the part 1 and unscrew totally the part 2.
      B) Screw totally the part 1 on the shock absorber's valve.
      C) Screw totally the part 2 so the pump is plugged, under pressure.



A **B** **C**

⚠ At this moment, the pressure falls of about 2 kg/cm² in the shock absorber, as some of the air contained in the shock absorber fill up the pump.
It's not possible to check the pressure by screwing the pump to the shock absorber.

3. Inflate to the desired pressure using the measuring scale 0 to 30 or 40 Kg/cm².
   It is also possible to lower the pressure using the button located on the opposite side to the pressure indicator.
4. Unscrew the pump:
   - **Fournales pump**: Unscrew the pump.
   - **Scott pump**:
     D) Unscrew totally the part 2
     E) Unscrew the part 1



D **E**

At this moment you hear quickly air escaping. This air comes from the pump and the attachment, but the pressure in the shock absorber remains unchanged. Some oil can be spayed out in small quantity, which is normal.

5. Put back the valve cap.

Important

- Some oil can appear along the sliding chromium-plated tube (especially during the first uses). This doesn't mean there is a leak. This film is even useful for a good working and preservation of the joints of the Fournales shock absorber.

- During the adjustment the Uniski or the Dualski must be empty. If the skier is in the seat, it's absolutely necessary to ease the shock absorber from the weight of the skier during the operations described above.

- If the Uniski or the Dualski has been stocked upside down, wait a moment before inflating the shock absorber otherwise too much oil could been sprayed out from the valve.

- The inflation must be done with a high pressure pump, 0-30 or 0-40 bars.
Do not use any other bicycle pump, compressor or else.

- In case of a personal use of the Uniski or the Dualski, inflate the shock absorber only when you feel a lack of pressure.

Pressure when delivered: ***kg/cm²***

6. ADJUSTMENT AND MAINTENANCE

Footrest

1- Adjustment of the front / back positions of the feet on the footrest :
At the back, the feet are held in place with a large strap which is equipped with two adjustment buckles. Evenly distribute the adjustment between the 2 buckles in order that the middle of the feet presses against the footrest.
2- Height adjustment :
   - Raise the footrest as high as possible by unscrewing the 2 screws - TCHC 8x16 - with a male hexagonal spanner - 6 - before the skier sit in the seat.
   - Once the skier is seated, lower the footrest until there is a finger space between the seating foam and the underside of the knee at the front of the seat. The footrest must be brought out to a maximum of 13 cm between the end of the frame and the bearing surface of the feet.
   - Correctly tighten the 2 screws.
3- Replacement of the straps holding the feet :
If a strap or buckle is damaged, it is necessary to remove the footrest in order to replace it.

Latch for the use of chairlifts

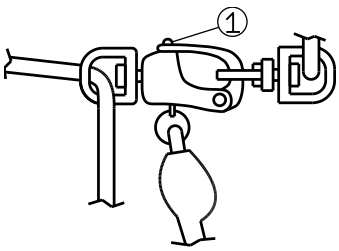
The latch is mounted with waterproof grease.
When this grease looses its efficiency (not before) and the latch becomes harder to use (with cold weather), it means that there is humidity inside and that ice jams it.
Without dismantling it, regularly spray into the latch a lubricant containing silicone. It is advised to unlock the latch into the chairlift position and to lean the apparatus on its side so the lubricant is able to penetrate.

System of carving out turns

Every 30 hours of use, spray over the 4 ball joints (see page 8, figure 3, No. 10) with a silicone based lubricant and without dismantling.
The other pivot joints require no maintenance.

Ski lift harness

Regularly spray over the snap hook (1) with a silicone based lubricant.



Maintenance program

Apart from the above mentioned, the Dualski in fact needs little maintenance; however, it is necessary to:

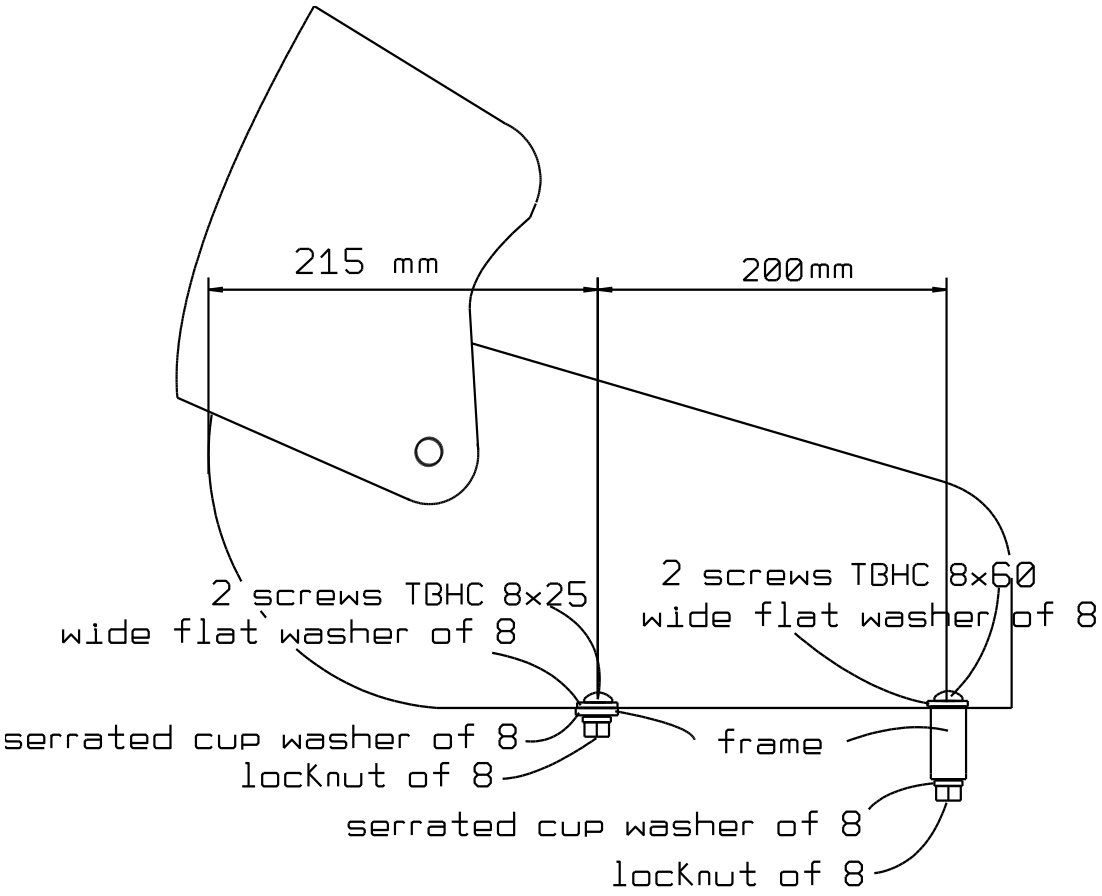
Action	Fréquence
Store the Dualski in a dry place	After each use
Visually check the frame	After each use, or after a shock
Check the condition of the skis and bindings.	After each use, or after a shock
Check that there is no play or wear and tear in any of the pivot joints.	Every 300 hours of use, or after a shock
Check the straps of the frame and seat.	Every 30 hours of use, or after a shock
Spray over the 4 ball joints of the Dualski base	Every 30 hours of use
Send the Fournales shock absorber for a servicing (Contact us). The shock absorber must be exclusively be serviced by Fournales France.	In case of observation of a wrong running
Send the Öhlins shock absorber for a servicing (Contact us). The shock absorber must be exclusively be serviced by Öhlins France.	After each season in case of intensive use, or in case of observation of a wrong running

Don’t hesitate to contact us when in doubt or if you want us to check your Dualski.

Seat

The seat is covered with two types of foam:

1. Foam that is damp-proof glued to the seat and in the backrest.
2. At the bottom of the seat, removable and very comfortable foam which has some distinct characteristics :
   - it hardens in the cold, but with the heat from the skier's body it softens and takes the shape of the skier.
   - it can shrink in the seat but will regain its original shape when it is taken off and placed in a warm environment.
   - it is relatively damp-proof but it may be necessary to dry it out.



Seat assembly

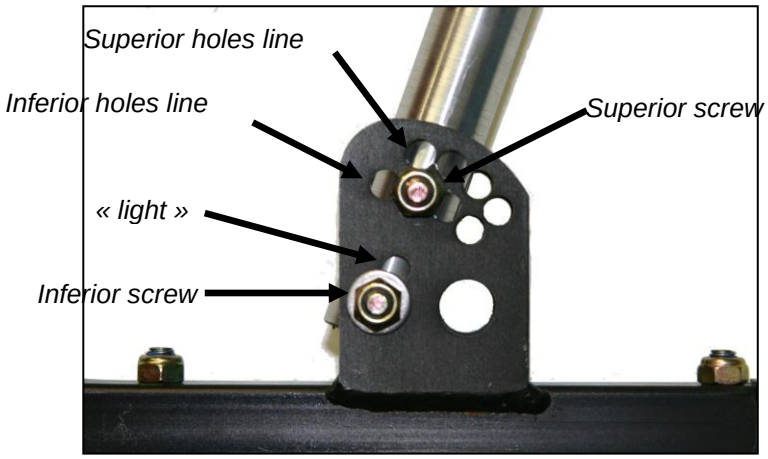
- Use the hardware as in the sketch above.
- **Attention**, screws that are not the original ones and which are too long could damage the seats and chairlifts.
- If the seat is not the original TESSIER one, then it is necessary to drill the rear securing points at a distance of 215 mm from the back of the seat, according to the above sketch. This is important in order to respect the balance of the Dualski during gliding and when using the chairlifts.
- Fixation distances: between front holes: 140 mm, between rear holes: 120 mm, between front and rear holes: 200 mm as indicated on the plan.
  When in doubt, don't hesitate to contact us. The use of a seat which is not a Tessier seat cancels the warranty.

7. HOW TO ADJUST CONFORT STABILIZERS

I.1- Adjustment of the ski angle

To begin, the angle has to be adjusted in order to offer a good support on the tail of the ski. Having a good support is reassuring for the seated skier and that's what allows, among other things, to start a turn.
During all the learning phase of the skier, the stabilizer's angle can be progressively modified to reach a more « sliding » position.

The position of the superior screw defines the angle of the ski.
The *figure 1*'s position corresponds to an adjustment for a beginner.
2 keys of 10 are needed for the adjustment. It's possible to increase or to reduce the angle by steps of 4°. The difference between 2 holes of a same line is 8°, so using the second line it's possible to adjust every 4°.



To adjust the stabilizer:

- Remove the superior screw.
- Slightly unscrew the inferior screw (Without removing it)
- Choice the line (inferior or superior) by making slide the inferior screw in the « light ».
- Put back the superior screw in the appropriate hole and tight both screws correctly.

Figure 1: Adjustment of the angle of Confort stabilizer

I.2 – Adjustment of the length of the stabilizer

The length adjustment must be done after the angle adjustment.
For a beginner, seated in a Uniski or a Dualski, the **skis flat on the ground**, the **elbows** must be **nearly as high as the shoulders**.
A good skier can, after having adjusted the angle of the skis, shorten his stabilizers.

2 keys of 10 are needed for the adjustment. The screw must be tight correctly so there is no play between the two tubes.

I.3 – Blocks installation

Fix the blocks with the height adjustment screw of the stabilizers (use the longer screw delivered with blocks).

I.4 – Armrests adjustment

The adjustment of the length between the handle and the armrest is done thanks to the screw . 2 keys of 10 are needed.

If the armrest is too wide or too narrow, it's possible to modify it thanks to a thermic scraper.
- Remove the strap (as on picture 2).
- Warm up the plastic part inside at the level of the screws.
- Open or push closer the armrest and keep the desired position until the plastic part is cold.

Attention: The Velcro strap mustn't be warmed or burned during the operation.

Figure 2: Warming up of the armrest

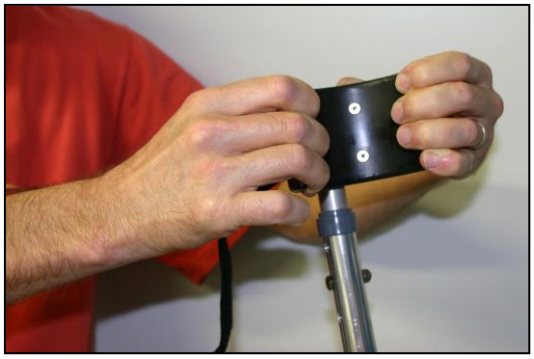
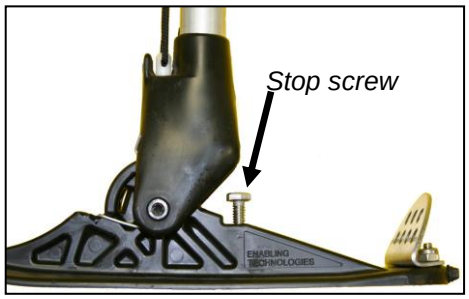


Figure 3: Keeping of the desired shape during cooling of the plastic part

HOW TO ADJUST SUPERLITE® STABILIZERS

General instructions are the same as for Comfort stabilizers.

II.1 - Adjustment of the ski angle



Screw or unscrew the stop screw (thanks to a key of 11) to change the angle. Check that both stabilizers have the same angle.

Figure 4: Adjustment of the angle of Superlite stabilizer

II.2 - Adjustment of the length of the stabilizer
- Release the string.
- Move the quick clip to the desired height.
- Tight the string.

II.3 - Blocks installation
Put the blocks just under the quick clip. Attention, blocks must be low enough so the ski doesn't touch the ground when going off the chairlift.

II.4 - Armrests adjustment
Two keys of 11 are needed.

8. PILOTING AND ASSISTANCE BARS FOR DUALSKI OR UNISKI

- The **assistance bar**, adaptable for the Dualski or Uniski, is intended to assist ski instructors during seated skiing courses.

- The articulated **piloting bar** is designed for the driving of the Dualski and the Uniski by an accompanist to make skiing partially or totally dependant person. However, we recommend its use on the Dualski which offers an easier piloting than the Uniski.

Those bars (optional) are fixed on the Dualski/Uniski between the seat and the frame using four long screws (8x45 and 8x80) delivered with the bar. So as shown in figure 6, the seat is fixed to the frame at the same time as the bar.

⚠ **Take care** not to loose the shorter screws (8x45 and 8x60) needed to fix seat without the assistance bar. Using too long screws could damage the seats of the chairlifts. For this reason, 4 nuts are welded on the bar to tidy the shorter screws.

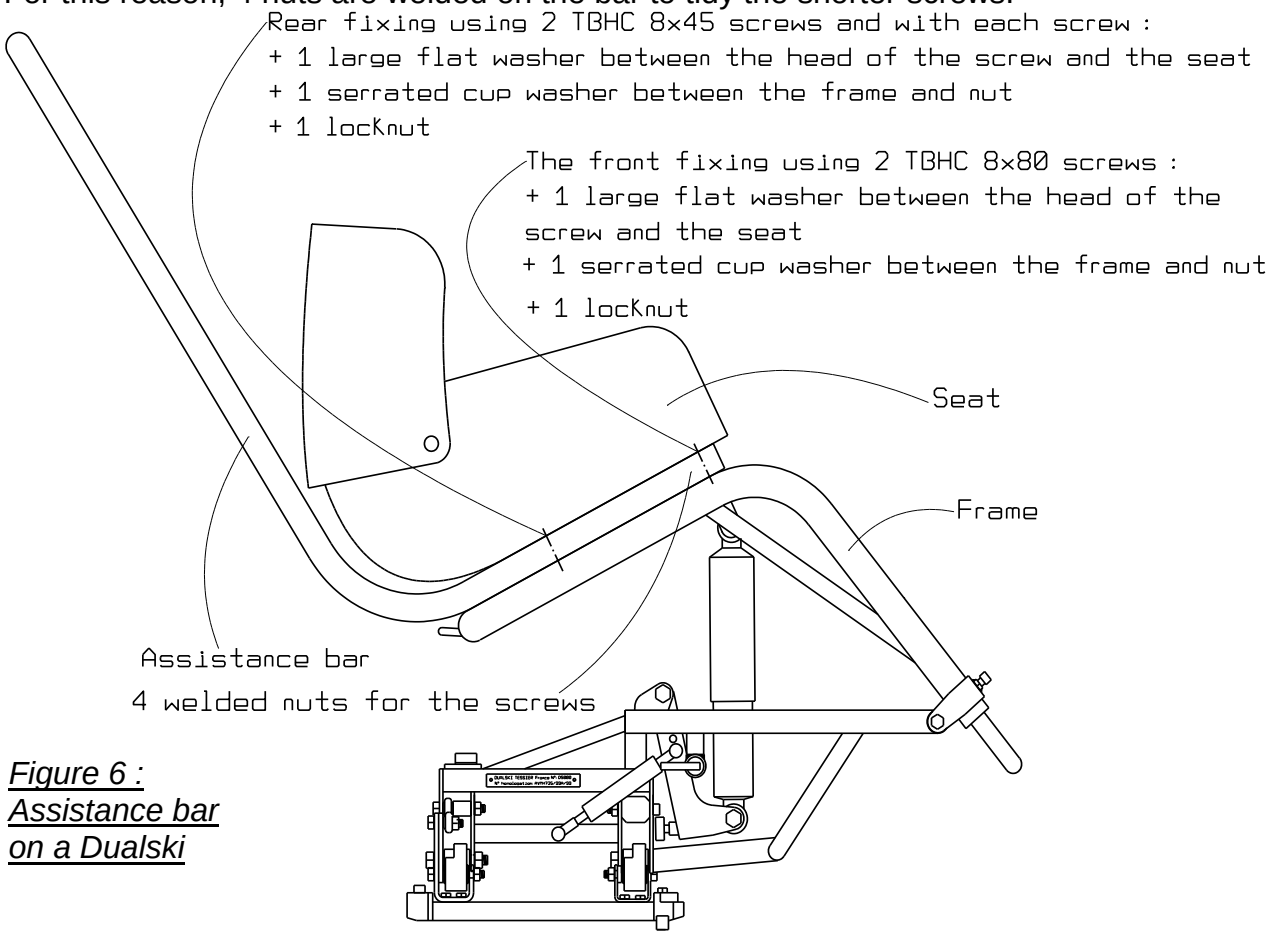


Figure 6 : Assistance bar on a Dualski

The sizes of the bars have been designed in such a way so as not to affect the equilibrium of the Dualski/Uniski on the chairlift and not to obstruct the guardrail passage.
The bars don't affect use of ski lifts and chairlifts or the method of vertical evacuation from a chairlift.
⚠ Those two bars can't be used with a VFC.

Accuracy on the piloting bar

Fold up the piloting bar before using a chairlift. An unfolded bar would make hard to seat correctly on the seat of the chairlift and would obstruct the guardrail passage.

Figure 7 : Piloting bar

A **small jack** pushes the bar to offer a good handling to the accompanist. When folded, it reverses the pressure to fix it well in the "closed" position. A **high position stop** avoids contacts between the bar and the seated skier's head.

The piloting of a Dualski with piloting bar is easy to learn for a good skier but **we strongly recommend to begin with the help of a ski instructor who knows this equipment**. So the learning of how to use it on the snow and on the chairlifts will be faster and done in a totally safe way. The pilot must choose the difficulty of the piste he will use according to his skiing level, his strength and the weight of the seated skier.

Figure 8 : Use of chairlift with a piloting bar

The seated skier can, depending of his ability, use or not stabilisers.
A safety leash must link the apparatus to the accompanist if the seated skier is not autonomous.

9. WARRANTY

TESSIER is very careful with the quality and the reliability of his products.

TESSIER warranties each frame and each component against any production or material defect.

During 3 years:
- The frame

During 1 year:
- The seat, the leg protection, the leg cover, the shock absorber, the straps.
- The outriggers, the skilift harness system.

This warranty doesn't cover:
- The normal wear and tear
- In case of dismantling and incorrect reassembly by the client
- In case of incorrect maintenance by the client
- The use of pieces or accessories not made for the TESSIER frame or incompatibles with it
- Any damage or anomaly following an accident, a wrong use or negligence from the client
- Skis and bindings

This warranty is cancelled in its totality in case of modification of the frame, of the shock absorber or any of its components.

This warranty is limited to the repairing or the replacement of the defective element and this is the only recourse of the warranty. This warranty is applicable from the purchase date. TESSIER is not responsible for direct or indirect damages.

In case of return of the equipment, the transport costs to and from TESSIER's workshop or to and from the authorized dealer of the client's country are at the charge of the client.

Any problem covered by this warranty must be presented to TESSIER or an authorized dealer.