

*SCHROTH Racing Harnesses are
engineered and manufactured in Germany.*



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Installation and Operating Instructions for Racing Harnesses

QuickGuide Version: EA 8.2.QG @ www.schroth.com

For FE-Models see supplemental Instruction EA 8.2.1

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MANUAL RACING HARNESSSES

PLEASE READ CAREFULLY. THIS MANUAL CONTAINS IMPORTANT INFORMATIONS.

WARNING

WARNINGS provide important information about proper installation, use or modification of the SCHROTH racing harness.

Ignoring these Warnings will significantly reduce the performance of the racing harness system, which can result in serious personal injury or death.

WARNING

Risk of serious injury or death. NOT street legal.
Do **NOT** install Profi racing harness belts into street legal vehicles. They **DO NOT** meet federal and state vehicle safety regulations and are designed and tested to be used exclusively in race cars and only in on-track events.

Only Profi-FE asm® models are intended for Rally sport and street legal use and carry either the ECE-R 16 approval label for Europe or includes the following language for the USA: "meets the applicable provisions of FMVSS 209". It will also carry the FIA homologation label.



RULES AND REGULATIONS

This manual contains important information about installation and use of your new harness belt. Read this manual thoroughly and understand the content before attempting installation. Knowledge gained from extensive testing and accident analysis has increased significantly over the past years so it is important to read and follow the instructions given in this manual, even if you have installed harness belts previously. These instructions represent state-of-the-art knowledge at the time of issuance of this manual, the date of which is set forth on its cover. All instructions are in accordance with current FIA, NASCAR, CART, SCCA and other sanctioning body regulations, as individually indicated in the text. Deviating from these instructions may result in rejection from participation in motorsport events. Regulations may change with short notice and may not be incorporated into these instructions at the date of purchase. Keep yourself up-dated about the latest regulations for the motorsport in which you are participating.

DO YOU HAVE EXPERIENCE INSTALLING RACING HARNESSSES?

The installation procedures explained in this manual assume that you have the knowledge, experience and tools required to install racing harnesses. If you do not have the knowledge, experience and/or tools required or do not understand the instructions, do not install the harness belt – have the harness belt system installed by a professional who will be able to do the job correctly. Your safety and the safety of others who will use the harness belt system are at stake! Always heed all WARNING and SAFETY INSTRUCTIONS boxes. Always read and heed all instructions in this manual carefully. Failure to follow WARNING, SAFETY INSTRUCTIONS and all other instructions could result in severe personal injuries or death.

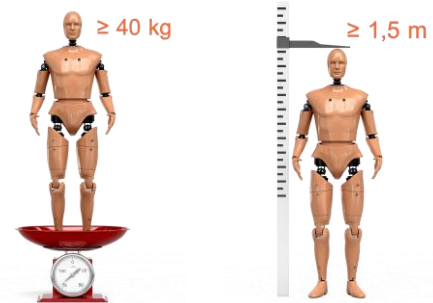
INTENDED USE, DEFINITIONS AND LABELLING

Profi, Formula and Hybrid™ racing harnesses, except for Profi-FE models, and are not approved or intended for use on public roads or off-road. They are designed and approved only for closed circuit race tracks. For legal street use, SCHROTH offers special ECE-R 16.04 [for Europe] respectively United States Department of Transportation approved models [FE-models]. NEVER use unapproved Profi, Formula and Hybrid™ racing harnesses on public roads or off-road.



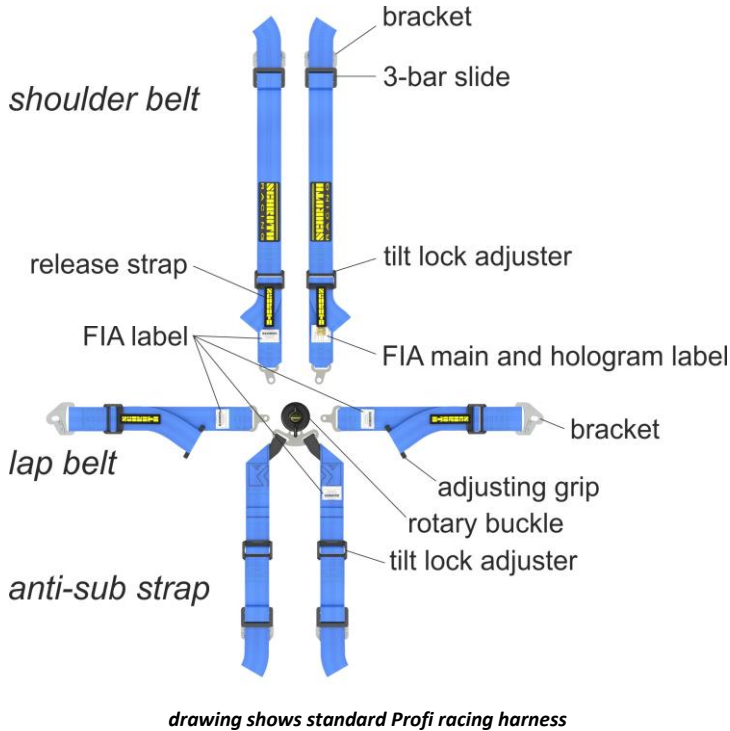
WARNING

Risk of serious injury or death. NOT street legal.
Persons who weigh less than 40 kg [88 lbs.] or who are less than 150 cm [4'11"] tall, regardless of age, must NEVER use SCHROTH racing harnesses.



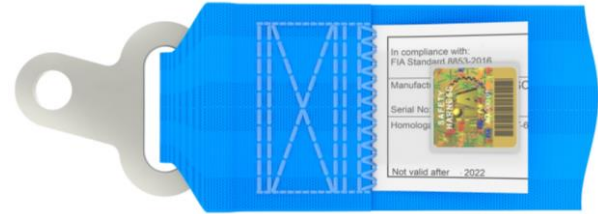
Approvals for racing harnesses are granted by sanctioning bodies like FIA, NASCAR and SFI. Some SCHROTH racing harness models are approved by multiple sanctioning bodies and therefore may carry multiple labels. One of these labels should apply to the motorsport in which you are participating.

DEFINITIONS



FIA HOMOLOGATED RACING HARNESSES

Racing harnesses manufactured for race cars that fall under the FIA regulation, must carry the appropriate FIA labels. FIA-labelled belts are valid for five [5] years from last day of the year of manufacture unless regulated differently by the sanctioning body of the motorsport in which you are participating. The last year of validity is indicated on the label. Each separate strap assembly is labelled with a FIA label. All FIA labels of a belt must have the same colour.



example of a left shoulder belt with a FIA main and hologram label, which always have to be sewn together

FIA Identification labels, which bear the homologation number and the expiration date are attached to each individual subassembly of the racing harness apart from the left shoulder belt.

In compliance with: FIA Standard 8853-2016
SCHROTH
Homologation N ^o : SH.014.17-T-6
For FHR use only Not valid after : 20JJ

example of a FIA identifications label on right shoulder belt

In compliance with: FIA Standard 8853-2016
SCHROTH
Homologation N ^o : SH.014.17-T-6
Not valid after : 20JJ

example of a FIA identifications label on anti-sub strap

SFI APPROVED RACING HARNESSSES


Racing harnesses specifically manufactured for motorsport requiring SFI Spec. 16.1, SFI Spec. 16.5 or SFI Spec. 16.6 approval are SFI tested and labelled. These racing harnesses MUST be replaced two years after the month and year of manufacture. The date of manufacture is indicated on all SFI labels. SFI Spec. 16.1: Label [1] at the left lap belt, [2] at the left shoulder belt and [3] at the Anti-Sub Strap and SFI Spec. 16.5 and SFI Spec. 16.6: Labels are attached to each individual subassembly of the racing harness.

		This Manufacturer Certifies That This Product Meets			
SFI SPEC. 16.1					
Date of Manufacture					
JAN	APR	JUL	OCT	16	17
FEB	MAY	AUG	NOV	18	19
MAR	JUN	SEP	DEC	20	21

		This Manufacturer Certifies That This Product Meets			
SFI SPEC. 16.5					
Date of Manufacture					
JAN	APR	JUL	OCT	16	17
FEB	MAY	AUG	NOV	18	19
MAR	JUN	SEP	DEC	20	21

Models SFI Spec. 16.1 or SFI Spec. 16.5/NASCAR approved racing harnesses may vary from FIA homologated models. However, the changes in brackets or adjusters and adjuster positions from the use of approved racing harnesses, and the varying methods of installation and operation that result, can easily be followed since each racing harness component and its use is described in the appropriate sections of this manual. [See, e.g. the “Brackets” section [pages 15-28], explaining the correct installation and operation also of SFI Spec. 16.1 or SFI Spec. 16.5/NASCAR approved racing harnesses.]

MODELS WITH SCHROTH ASM® SAFETY SYSTEM

THE ASM® SYSTEM => 

asm® is the acronym for anti-submarining [submarining = sliding underneath the lap belt during a frontal impact]. This phenomenon is likely to occur in a 4-point harness belt, and is significantly reduced by the patented asm® safety system. Therefore, all SCHROTH racing harnesses sold as 4-point harnesses and likely to be used as such, are equipped with the asm® system. It consists of an energy converter located in one shoulder belt. May be purchased as left and/or right harnesses, depending upon which side of the lap belt you want to have the buckle attached.

Since every accident is different, always keep in mind that Profi asm® harness belts, just like other racing harnesses, cannot guarantee against severe injuries, death and other risks during an accident. Head and neck supports provide further reduction of head deceleration and neck forces. 4-point harnesses with the asm® system may be used with a FHR device (see FIA HANS Guide Issue: June 2017 under www.fia.com). The asm® system in SCHROTH racing harnesses should never be used with other types of head and neck devices e.g. SFI 38.1 approved.

 WARNING	
Risk of serious injuries or death.	
Never wear a harness restraint without asm® system as a 4-point harness. Submarining may take place during an accident and severe injuries or death may occur	
The shoulder belts containing the asm® safety system must be installed symmetrically or the system may not function properly in an accident and serious injuries or death may occur.	

ANCHORAGE LOCATIONS AND GEOMETRIES

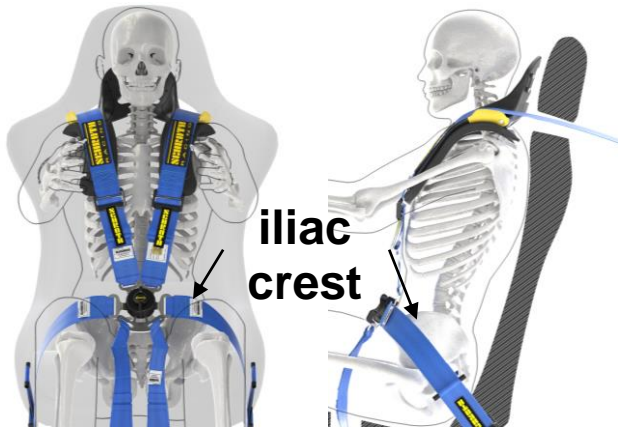
BELT ROUTING

- optimise strap routing around and from the wearer's body
- optimise anchor point locations

An occupant can be effectively restrained **ONLY** by load transfer through the hard points of the occupant's body. The only accessible hard points are the following:

- pelvic [iliac crest]
- thorax [chest] to a limited degree only
- clavicle [shoulders]

Therefore, it is essential to optimise strap routing as shown in the following image.



WHAT MAY HAPPEN TO YOUR BODY AND RACING HARNESS=> **SCHROTH Tech Tip** WITHOUT FHR [FRONTAL HEAD RESTRAINT] SYSTEM

- The forward pelvic movement will lower belt angularity, which can result in submarining. If the initial angle is not within the suggested range, submarining may result in severe internal injuries or death as the belt rides into the soft tissue above the pelvic bone the liver and kidneys. This scenario relates into a harness belt worn in a 4-point configuration.
- The lap belt will slide into the corner of the bucket seat openings, and incorrectly positioned adjusters will interfere with the seat. This may cause the adjuster to loosen the lap belt or cut the webbing, thereby significantly diminishing effective restraint and resulting in serious injury or death.
- Lap belts perform best when their anchor points are located adjacent to the seat width. Routing outward will increase the strap load resulting in further elongation. The resultant stress may exceed the structural strength of the racing harness or the anchor points. [E.g. a 45° routing off the body will increase the load by approximately 40% compared to the ideal routing].
- A shoulder belt adjuster positioned too high will ride further up and may cut into the occupant's neck, which could result in severe injury or death. It also increases the likelihood of clavicle [shoulder] fractures.
- With the expected strap elongation and body compression it is likely the head or chest will impact the steering wheel. Extreme head deceleration loads, spine stress and neck tension may occur causing basal skull and spinal fractures and resultant severe injury or death.

WITH FHR [FRONTAL HEAD RESTRAINT] SYSTEM

- The most effective way to reduce the risk of head and neck injuries is to wear a SCHROTH FHR.
- Extremely long shoulder belts allow for extra elongation and head movement and should be avoided.
- Long shoulder belts also provide more slack during the rebound phase so the belts may slide off the occupant's shoulders or FHR. SCHROTH FHR specific restraints with lower elongation rates for such strap lengths are designed.

SLED TESTING WITHOUT FHR [FRONTAL HEAD RESTRAINT]



SLED TESTING WITH SCHROTH FHR [FRONTAL HEAD RESTRAINT]



SAFETY INSTRUCTIONS

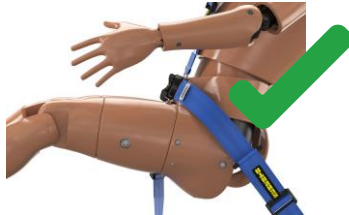
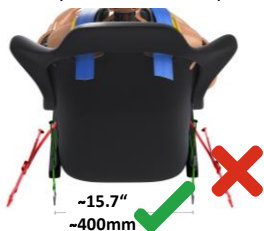
Optimal performance of your racing harness requires proper installation and proper use. Heed and obey the following instructions with respect to racing harness geometry and routing:

- Bracket installation and operation
- Wearing the racing harness
- Adjusting the racing harness

LAP AND SHOULDER BELT ROUTING [APPLIES TO ALL RESTRAINT TYPES]

To achieve optimal restraining function – lap belt strap length must be as short as possible. This requirement can be achieved by following the instructions set forth below:

- Lap belt straps must be routed over the pelvic bone to stay **firmly and tightly** in the crest between the pelvic bone and the upper thigh => **SCHROTH Tech Tip**
- Lap belt downward angle should be approximately 60° measured from the horizontal, passing through the occupant's hip joint. This is the suggested angle for upright seating [15-20° backrest declination]. A higher backrest declination, e.g. 30° – 40°, as is common in open wheel race cars, requires a belt angle of 70° – 80°.
- Make sure there are no sharp edges [seat structure, seat mounts, chassis] that may tear or cut the lap belt webbing.



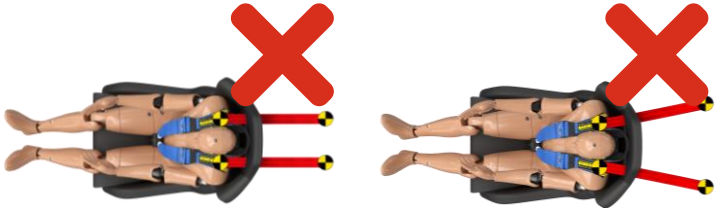
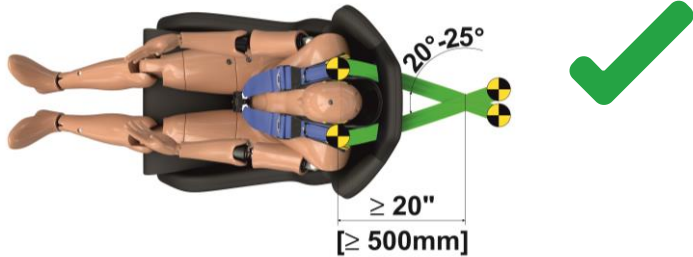
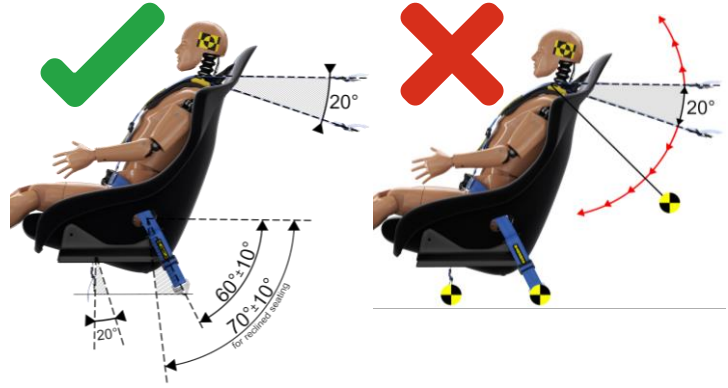
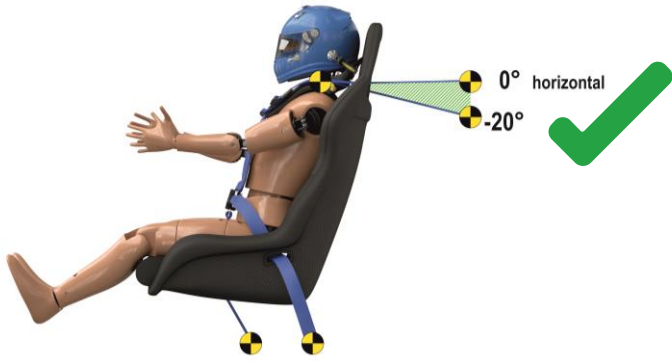
CONTINUATION LAP AND SHOULDER BELT ROUTING [APPLIES TO ALL RESTRAINT TYPES]

- Shoulder belts must run from the shoulders horizontally or down, at no more than a 20° angle. In cases where the shoulder belts must be routed down to the chassis floor, support by a roll cage bar or harness guide at the appropriate height is essential to establish the horizontal shoulder strap routing off the shoulder/HANS®. Most racing seats are not designed and tested to carry shoulder belt crash loads from downward installation. Severe injury or death could result. A 45° downward shoulder belt installation is possible with seats that SCHROTH has positively tested to take a load measured during a 50 km/h [31 mph] and 28 G impact with a 75 kg (175 lb) dummy. Refer to the list of SCHROTH approved racing seats in section “**About Seats**”.

! WARNING

Risk of serious injuries or death.

45° downward shoulder belt installation is not recommended with FHR.



POSITIONING OF SHOULDER STRAP ANCHOR POINTS WITH FHR

SAFETY INSTRUCTIONS

Shoulder belt mountings located more than 200 mm [8"] from the back of the user's seat or angled upwards are not good restraint practice and are most strongly discouraged. If longer belts are used, the inside edges of the belts should be still closer together at their mounting points, even touching or crossing, but both belt and FHR performance are severely compromised.

For 75 mm [3"] webbing the recommended anchor points can be found in the table below (mid point to mid point of the webbing):
For FHR specific, 50 mm wide webbing, reduce the values in the table by 25mm [1"].



FHR - collar width in mm [inch]	120 [4.7"]							
distance from FHR in mm [inch]	100 [3.94"]	200 [7.9"]	300 [11.8"]	400 [15.7"]	500 [19.7"]	600 [23.6"]	700 [27.6"]	800 [31.5"]
distance of anchor points in mm [inch]	135 [5.31"]	95 [3.74"]	55 [2.17"]	15 [.59"]	-25 [-.98"]	-65 [-2.6"]	-105 [-4.1"]	-145 [-5.7"]
	side by side						crossed over	

FHR - collar width in mm [inch]	140 [5.5"]							
distance from FHR in mm [inch]	100 [3.94"]	200 [7.9"]	300 [11.8"]	400 [15.7"]	500 [19.7"]	600 [23.6"]	700 [27.6"]	800 [31.5"]
distance of anchor points in mm [inch]	155 [6.1"]	115 [4.5"]	75 [3"]	35 [1.4"]	-5 [-.2"]	-45 [-1.8"]	-85 [-3.3"]	-125 [-4.9"]
	side by side						crossed over	

FHR - collar width in mm [inch]	160 [6.3"]							
distance from FHR in mm [inch]	100 [3.94"]	200 [7.9"]	300 [11.8"]	400 [15.7"]	500 [19.7"]	600 [23.6"]	700 [27.6"]	800 [31.5"]
distance of anchor points in mm [inch]	175 [6.9"]	135 [5.31"]	95 [3.74"]	55 [2.17"]	15 [.59"]	-25 [-.98"]	-65 [-2.6"]	-105 [-4.1"]
	side by side						crossed over	

FHR - collar width in mm [inch]	180 [7.1"]							
distance from FHR in mm [inch]	100 [3.94"]	200 [7.9"]	300 [11.8"]	400 [15.7"]	500 [19.7"]	600 [23.6"]	700 [27.6"]	800 [31.5"]
distance of anchor points in mm [inch]	195 [7.7"]	155 [6.1"]	115 [4.5"]	75 [3"]	35 [1.4"]	-5 [-.2"]	-45 [-1.8"]	-85 [-3.3"]
	side by side						crossed over	

ANTI-SUB STRAP ROUTING



Risk of severe injury and death.

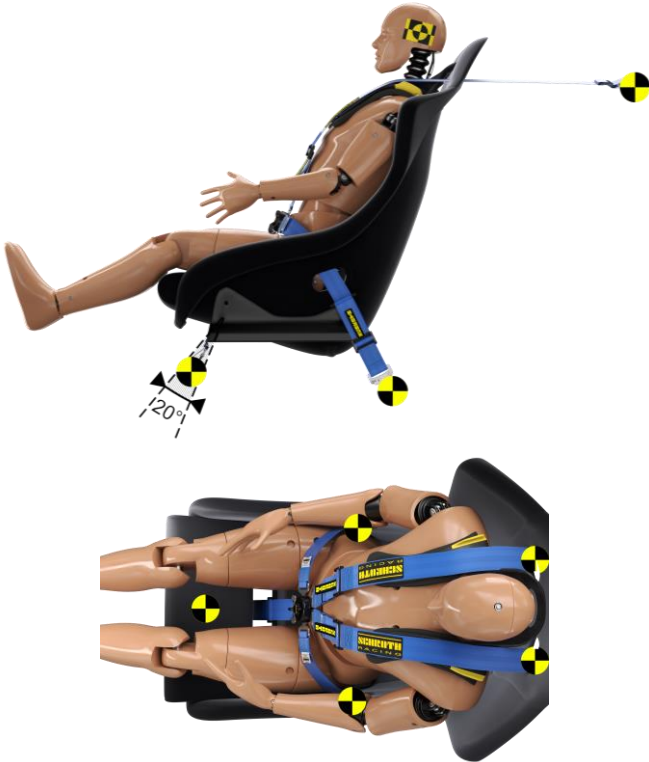
Use the SCHROTH Racing Harness only if the racing seat is designed with anti-submarining holes.

NEVER run the anti-submarining straps over the front edge of a factory seat down to the floor. Such routing does not provide the desired anti-submarining effect, and in fact encourages submarining, which can cause severe injury and death.

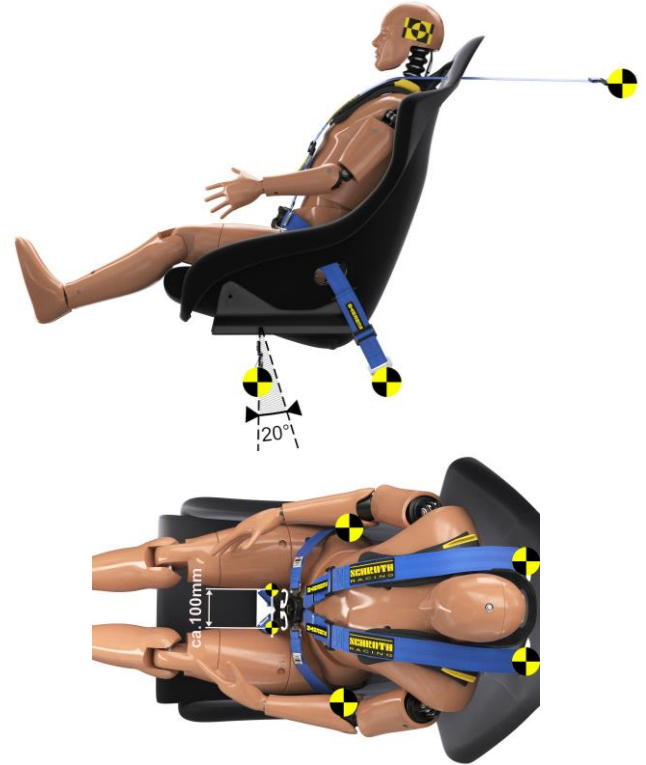
ANTI-SUB STRAP ROUTING [5-POINT] ONLY USA

Anti-submarining strap routing in any seating position must follow the tangential touching of the occupant's chest and groin. Such routing is a compromise to help reducing the risk of crotch and groin injuries during a frontal impact.

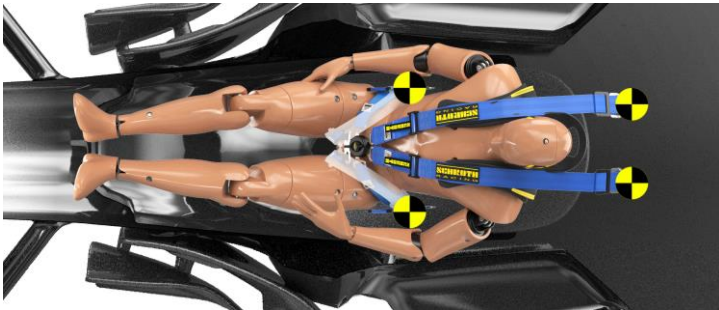
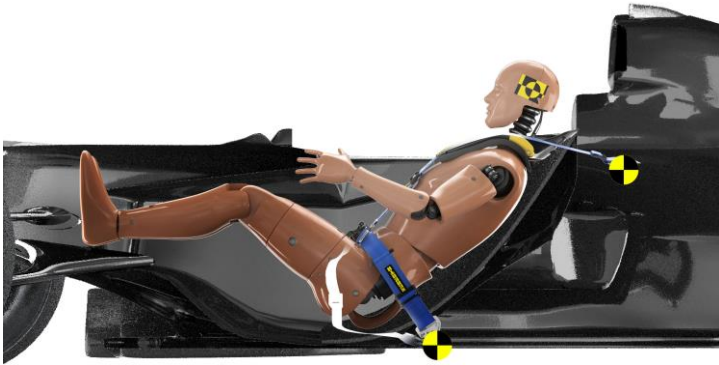
5-point racing harnesses are less safe, proven by computer simulation, sled testing and in real world accidents. Therefore SCHROTH strongly recommends the use of 6-point racing harnesses only.



ANTI-SUB STRAP ROUTING [6-POINT]



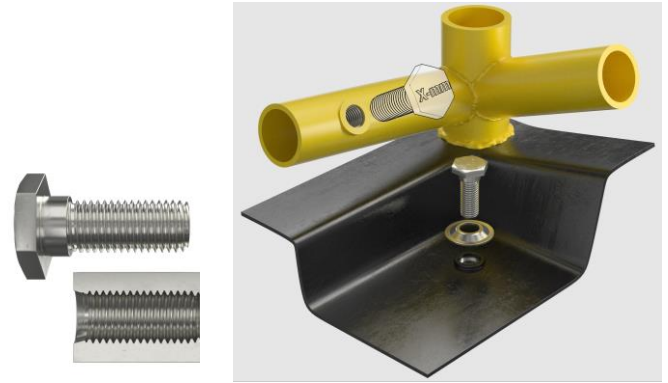
ANTI-SUB STRAP ROUTING [FORMULA]



This anti-sub strap design requires sitting on the straps or having a thin seat panel allowing the straps to run rearwards right underneath the driver's buttocks.

IMPORTANT INFORMATION ABOUT BOLTS AND TORQUES

BOLT DIAMETER



! WARNING

BOLT FAILURE MAY RESULT IN SEVERE INJURIES OR DEATH.

- Never use bolts of the wrong diameters or bolts that are too short and may allow the bolts to become loose and separate from the anchorages. Use of improper bolts will cause the racing harness to fail.
- Never use bolts that are too long and may intrude into the fuel tank or other parts of the car.
- Always tighten bolts with the proper torque. Improperly tightened bolts may loosen during harness belt use and may become separated during a crash.
- Never over-tighten bolts. Over-tightening bolts may destroy the thread and allow the bolt to separate during a crash.

TIGHTENING TORQUES BY BOLT DIMENSION

- Each bolt diameter and type of thread requires an individual torque for proper tightening. The torques are defined by national and international standardisation organisations.
- For safe installation always tighten bolts to the recommended torque.
- For any installation use e.g. “Loctite 243” or spring washers where recommended to secure bolt fastening.

	M 8	5/16"	M 10	3/8"	7/16" 20 UNF	15/32"	1/2"
Torque in Nm	25	25	50	50	40	87	113
Torque in ft-lb	18,5	18,5	37	37	30	64,5	83,5



CREATING A NEW ATTACHMENT POINT

- FIA does not allow welding or drilling to roll cages, except as conducted and certified by the roll cage manufacturer. Use manufacturer specified roll cage bars for racing harness installation.
- For new attachment points to the chassis, heed the following **WARNING**.



WARNING

Roll cage bars used to mount the shoulder belts must be homologated by the roll cage manufacturer for such use.
Each anchor point must withstand a minimum load of 15 kN (3.372 lbf).
Any new attachment points drilled for racing harness attachment must be strengthened by a reinforcement plate meeting FIA specification (see “Accessories and Spare Parts” www.schroth.com).



WARNING

SCHROTH recommends, whenever possible and suitable, the use of existing factory provided anchor points for the lap- and shoulder belts.

! WARNING

Damage to components from drilling can result in fire, explosion or mechanical failure and cause severe injuries or death.

If you intend to drill a hole, make sure not to damage the fuel tank, fuel lines, electrical wires, brake lines or other important components.

- For new attachment points to the chassis you must use a FIA specified reinforcement plate [see "Racing Accessories" www.schroth.com].
- Drill a hole of 12 mm [15/32"; ½"] diameter for lap- & shoulder belt and standard anti-sub strap attachments.
- Use seal compound and stick the reinforcement plate from underneath the chassis to the floor panel. The seal also helps to prevent water intrusion.
- Use SCHROTH supplied bolts and eyebolts only! They are tested for quality and fit to the threads provided by the SCHROTH reinforcement plate and to the SCHROTH brackets.

! WARNING

Risk of crushing injury or death.

Make sure your car is safely secured against accidental or unintentional drop and against external unwished downward operation of the lift before positioning yourself underneath a car is raised up on a lifting platform or sitting on chocks.



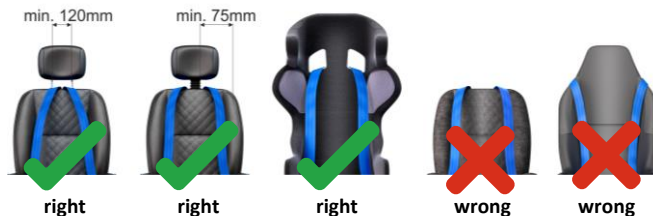
REINFORCEMENT PLATE WITH EYE BOLT

ABOUT SEATS SEAT REQUIREMENTS

! WARNING

Risk of severe injuries or death. Use only racing seats.

Racing harnesses will function properly only when installed in vehicles equipped with seats having a headrest or backrests with seatbelt openings in an integrated headrest. Otherwise the shoulder belts will slide off occupant's shoulders during an accident. Never modify factory seats to create new slots. The seat structure may be impaired or sharp edges of the seat frame may damage the racing harness webbing.



SCHROTH APPROVED SPECIAL SEATS

Seats approved by SCHROTH for shoulder belt installation more than 20° but maximum 45° down.

FIA HOMOLOGATED SEATS:

Keiper Recaro:

070.80.xxx Profischale, 070.81.xxx Profischale
070.90.032 Profischale SP-A, 070.91.032 Profischale SP-G
Pole Position

König:

RS 1000 , RS 2000, RSL 1000, RSL 2000

Protech Seating Limited (Corbeau):

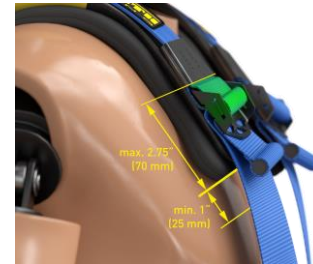
PRO-RACE PR-1 SEAT, PRO-RACE PR-3 SEAT, PRO-RACE PR-4 SEAT, PRO-SPORT PS-1 SEAT, PRO-SPORT PS-3 SEAT, PRO-SPORT PS-4 SEAT

Wiechers:

300, 301, 302, 303, 304, 305, 307, 403/413, 404/414

INITIAL RESTRAINT ADJUSTMENT DURING INSTALLATION

While first installing your racing harness the following items may require minor adjustments to the belts.



- **Shoulder belt tilt lock adjusters** must be positioned as shown in images above when using a FHR or 250mm (10") below the collarbones when not using a FHR.
- **Lap belt tilt lock adjusters** must not be positioned within the openings of the bucket seats. Adjusters must be either outside of the seat opening or close to the rotary buckle inside the seat.
- **Anti-sub strap tilt lock adjusters** are recommended to be positioned either in the opening of the seat pan or right above. This position will allow adjustment without interfering in an uncomfortable manner with your upper thighs.

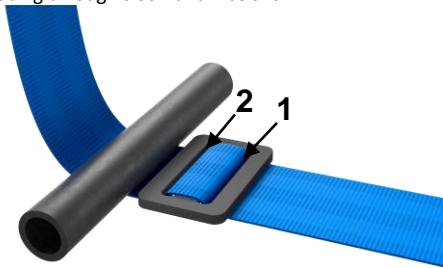
WRAP SYSTEMS AND INSTALLATIONS TO ROLL CAGE BARS AND FOR END FITTINGS

3-BAR SLIDE – WRAPPING INSTRUCTIONS

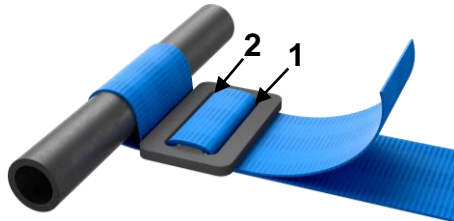
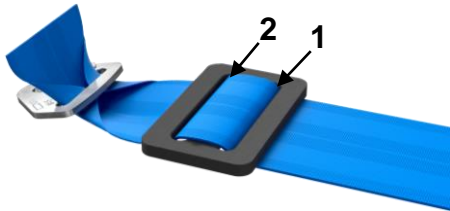
Do not install a lap belt directly to a roll cage using the wrap around technique.

WRAPPING INSTRUCTIONS:

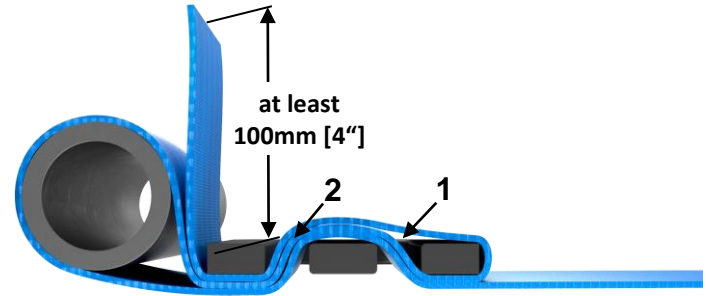
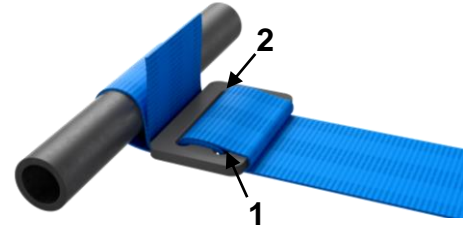
1. Slide the webbing through slot 1 and 2 as shown



2. In case of the combination with a bracket and 75 mm [3"] webbing, fold the webbing in as shown in next image and follow the further instructions.



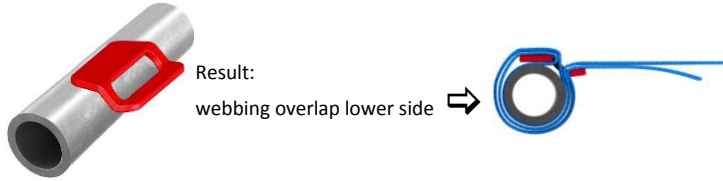
3. Make sure the strap end protrudes at least 100 mm [4"] or even longer from slot 2. If it is less than 100 mm [4"] disassemble and start over again. If longer, roll in the strap end and fix it by a cable tie.



4. Check again for proper shoulder belt tilt lock adjuster positioning and for the 3-bar slide to be as close as possible to the roll cage bar or end bracket.

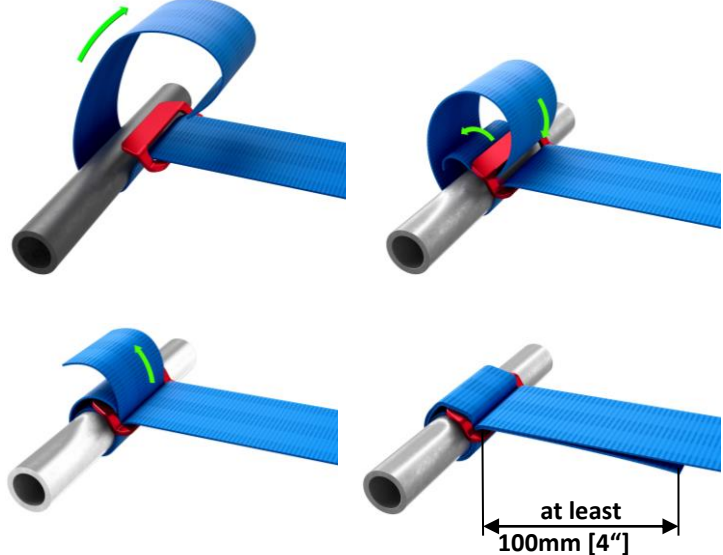
2-BAR SLIDE – WRAPPING INSTRUCTIONS

Do not install a lap belt directly to a roll cage by wrap around technique.
(for use with 50mm [2"] webbing only)



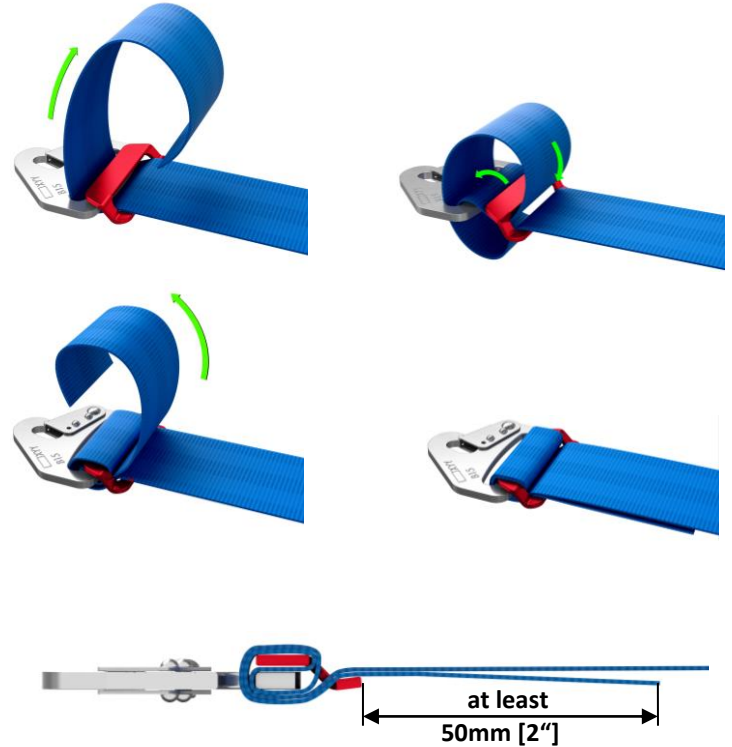
WRAPPING INSTRUCTIONS:

Slide a minimum of 600mm [24"] of strap length through 2-bar slide and from underneath around roll bar.

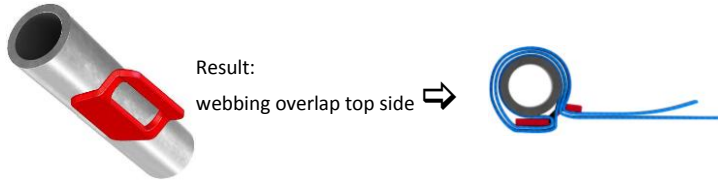


The webbing must be wrapped tightly!

Slide a minimum of 600mm [24"] of strap length through 2-bar slide and from underneath around bracket.

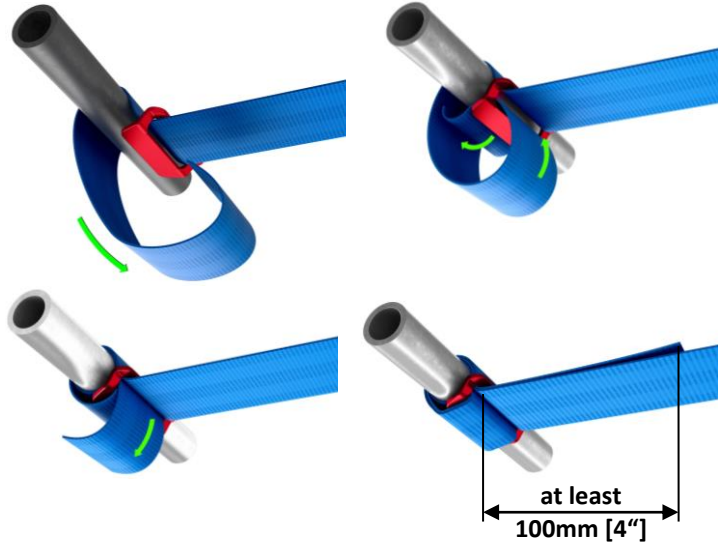


The webbing must be wrapped tightly!



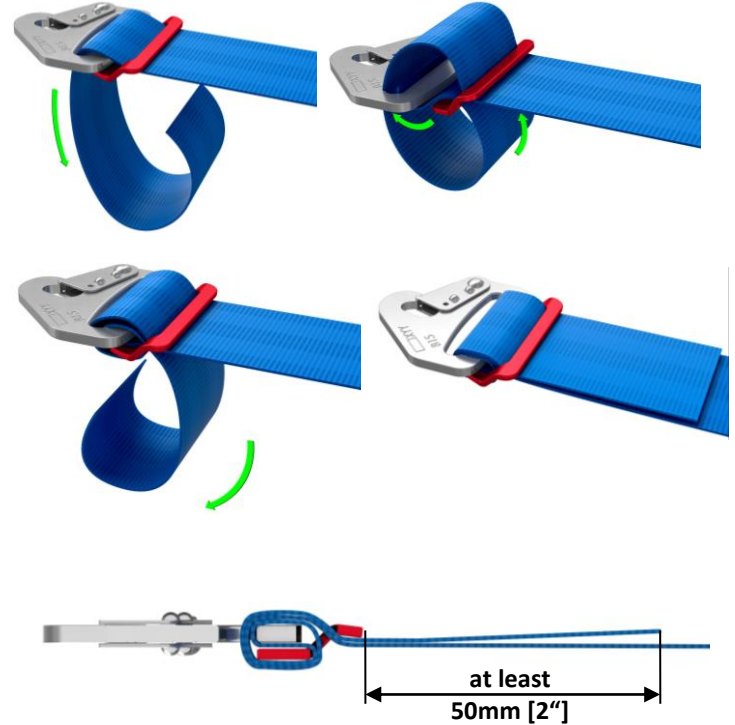
WRAPPING INSTRUCTIONS:

Slide a minimum of 600mm [24"] of strap length through 2-bar slide and from above around roll bar.



The webbing must be wrapped tightly!

Slide a minimum of 600mm [24"] of strap length through 2-bar slide and from above around bracket.



The webbing must be wrapped tightly!

BOLT-IN WRAP BRACKET ASSEMBLING

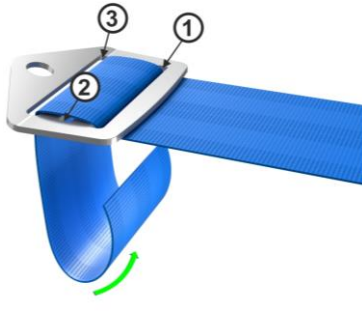
WHAT DO YOU NEED:

- Racing harness with 50 mm (2") or 75 mm (3") webbing and open strap ends
- a bolt-in wrap bracket with 50 mm (2") webbing slot [B 63]
or
- a bolt-in wrap bracket with 75 mm (3") webbing slot [B 40]

WRAPPING INSTRUCTIONS

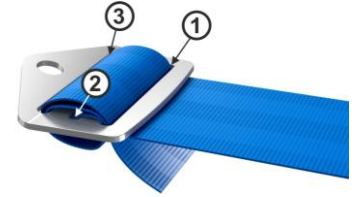
1. webbing shall wrap from the body facing side of bracket up into slot 1.

2. pull through approx. 270 mm (11") and fold down through slot 3 temporarily leaving 50 mm (2") of slack

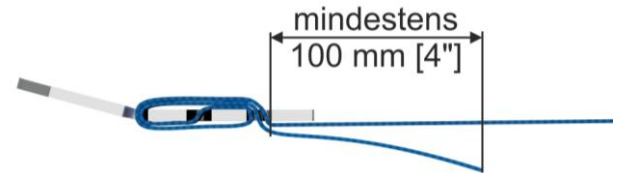
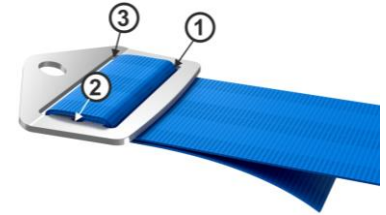


3.

4.



5. pull the lap belt firmly to ensure the wrap is properly tight



The protruding end must be sandwiched between the load taking strap end and an inner webbing fold through slot 1. If this is not achieved, check again for proper routing.

WARNING

Risk of severe injuries or death.

Follow all instructions for Wrap Systems. Avoid slack in the system. 3-bar or 2-bar slides incorrectly wrapped or wrapped too far away from the roll cage bar or from the bracket may allow webbing to slide during an accident. Slippage or elongation will occur which may reduce the effectiveness of the racing harness and the FHR, if worn. Shoulder belts may slide off the FHR or will give extra travel allowing possible head and chest impact into the steering wheel.

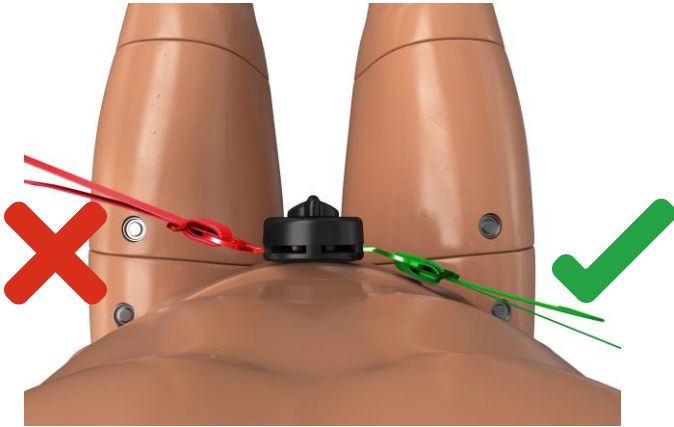
The webbing must be wrapped tightly!

FLEXI BELT™ ASSEMBLING VIA LIGHT WEIGHT WRAP SYSTEM

- Flexi Belt™ allows you to assemble the lap belt either as a pull-up or a pull-down version.
- As end brackets you can assemble SCHROTH snap-hook bracket or any other SCHROTH bracket with a 50 mm [2"] webbing slot.
- The 2-bar slide is to be used for wrapping of the buckle latch/tongue.



- Follow the wrapping instructions above at both strap ends [pages 15-17].
- Make sure that, when the latch is buckled in, the bent part of the buckle latch faces towards the body. See figure below.



- In a pull-down configuration, locate the adjuster as close as possible to the buckle
- In a pull-up assembly make sure, the adjuster is well separated from the strap hole in the bucket seat so the adjuster will not interfere with the seat bucket during a crash. See section “**Anchorage Locations and Geometries**” [pages 5-11]

BOLT-IN BRACKETS

SAFETY INSTRUCTIONS

Install all brackets in direction of pull [stress direction] to avoid extensive stress to the anchor points during driving [fatigue stress] or during an accident.



STAINLESS STEEL BRACKET INSTALLATION – [B 23 A AND B 23 C]

These brackets are commonly used in SCHROTH street legal harnesses [FE models] and other bolt-on installations.

The brackets are made from special stainless steel so they can be pre-bent at installation to the direction of pull of the webbing where it is attached to the bracket as the belt flows over the body. This will help to avoid straps from dumping/loading into bracket slot edges and reduces uneven load to attached webbing. This significantly reduces the risk of webbing tear and cut.

Proper alignment of the webbing pull through the bracket reduces the bending stress [risk of fatigue cracks] to anchor points during driving and during an accident.

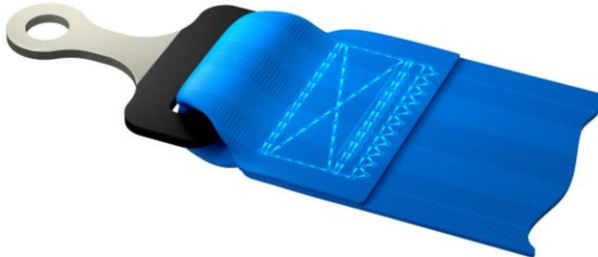
For 50 mm [2"] wide webbing sewn in bracket:

- B 23 A, coming with a 12,2 mm [15/32"] hole for use of 3/8", 10 mm or 7/16" and 15/32" bolts.



For 75 mm [3"] wide webbing sewn in or assembled [with 3-bar slide] bracket:

- B 23 C, coming with a 12,8 mm [1/2"] hole for use of 7/16" and 1/2" bolts.



WARNING

Risk of severe injury or death.

Never try to drill a larger bolt hole into any bracket. The bracket may be weakened or stick to your drill bit and the bracket and attached webbing and its hardware may spin, risking severe injuries or death.

What Do You Need:

- hammer
- bench vice
- gripper/pliers

Bending Procedure

- Determine direction the bracket should face when installed.
- Use bench vice, gripper and hammer to bend and wind the bracket as needed.
- Make sure the bend allows enough space for the bolt head and wrench.
- Bracket can be wound and bent up to 90° in either direction.



WARNING

Risk of severe injury or death.

Do not bend bracket back and forth several times. Multiple bends in opposite directions will weaken the material and the bracket may fail during an accident.

Make sure the webbing is not damaged during bracket bending or the webbing may fail during an accident.



- Only use bolts as specified above.
- Make sure the bolt diameter fits to the thread hole. Heed all information in section “**Important Information about Bolts and Torques**”, pages 11-13.
- Use e.g. “Loctite 243” to secure bolt.
- Tighten with the adequate torque for the bolt size selected, page 12.
- Prior to final torque to secure the bolt, position the bend of the bracket so it points into the direction of pull. Large pliers work well for this purpose.

B 23 A BRACKET INSTALLATION FOR SNAP-ON USE

B 23 A brackets allow snap-on installation where eye bolts do not have enough space or access to the anchor point or if restricted seat adjustment is restricted or impaired when an eye bolt is installed. Two brackets with bolts.

Hardware Kit is NOT part of harness homologation – verify the acceptance of this installation method with your series regulations.

For installation and bending of brackets follow the instructions under the section “Stainless Steel Bracket installation” above.



Splint pin must be used!

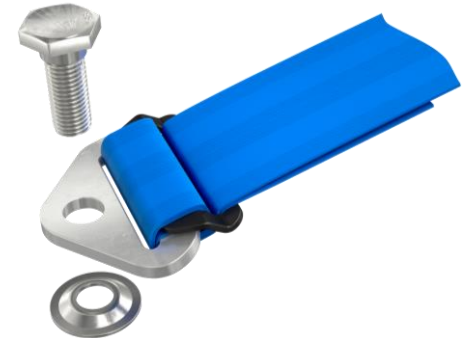


INSTALLATION EXAMPLES

LIGHT WEIGHT BOLT-IN BRACKET B 64.20.XX



BOLT-IN BRACKET B 24.15.13 (SWIVELLING INSTALLATION SHOWN)



BOLT-IN BRACKETS B 40 AND B 63

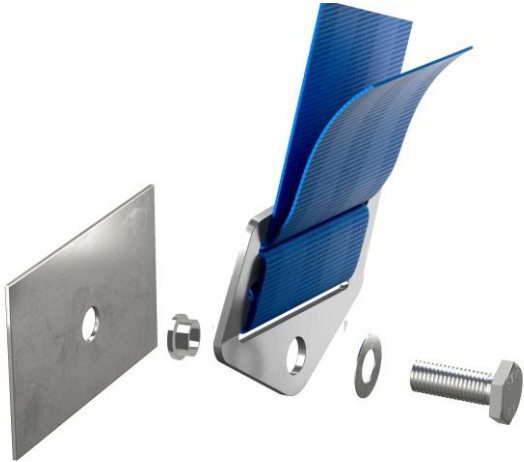
In cases where other than 7/16" 20 UNF threaded bolts will be used, make sure bolts are in the range of those listed above and that they match the anchorage threads in size.

Follow all instructions and informations provided under section "**Important Information about Bolts and Torques**".

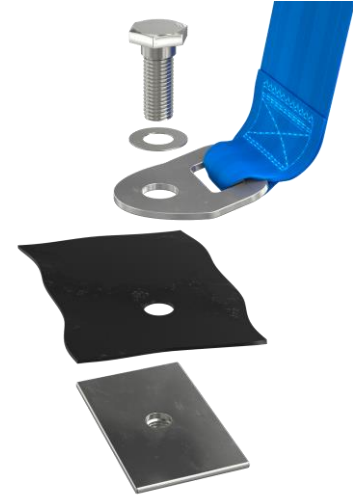
In case you need brackets with a diameter not fitting the bolt size, contact your dealer or importer of this product.

Choose the matching bushing sleeves and washers from the installation kit for the bolt diameter used [1/2" washer not included].

Assemble as shown in drawing below.



BOLT-IN BRACKET BK B 18.XX.YY



Installation example on Sub-Strap

ANTI-SUB STRAP TWIN BRACKET INSTALLATION

Select anchorage position meeting the geometrical requirements described in section **“Anchorage Locations and Geometries”** for 6-point anti-sub strap routing.

Make sure the anchor points are symmetrically aligned to the seat.

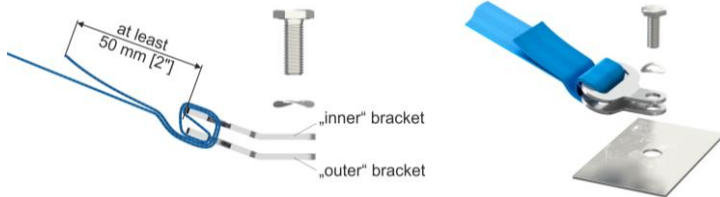
If you have to create anchor points by yourself, strictly follow the procedures and **WARNINGS** in section **“Anchorage Locations and Geometries”**.

Select direction of angled brackets. The twin brackets must point towards the strap slot in the seat when being installed.

Properly position anti-sub strap so it will correctly engage the buckle.

Route webbing through brackets by following these instructions:

- position both brackets onto each other with the angled bend pointing as selected above [4]. You will have an “outer” and an “inner” bracket,
- run webbing from outside through slots of both brackets and fold over.
- Run webbing back through gap between both brackets and through slot of outer bracket.
- Pull webbing through to adjust the proper length.



The webbing must be wrapped tightly!

Use e.g. “Loctite 243” to secure bolt.

Bolt-in both and tighten. Follow all information as well as **SAFETY INSTRUCTIONS** and **WARNING** boxes provided under section titled **“Important Information about Bolts and Torques”**.

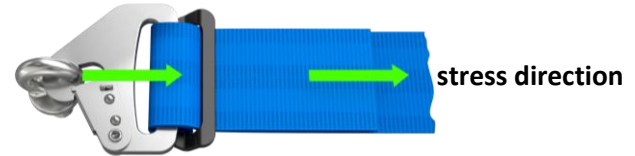
Make sure the brackets stay positioned in the direction of pull.

EYE BOLT INSTALLATION FOR SNAP-ON AND CARABINE BRACKETS

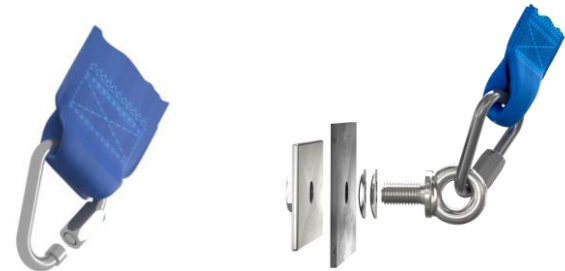
Assemble eye bolt and spring washer as shown in the sketch. Bolt in eye bolt and tighten securely. The optimum torque setting is 40 Nm [30 ft-lb]. Pull either screw driver or similar tool through eye and turn clockwise to tighten the bolt securely.

Make sure the eye’s ring is pointing in direction of pull (stress direction) as shown in the following drawing.

This position will reduce the risk of unintended loosening of the eye bolt by torque forces applied by the harness during racing. If you cannot achieve this position by further tightening or loosening the bolt by a maximum of ¼ turn, dismount the eye bolt and use 2 spring washers achieve the recommended position.



CARABINE BRACKET



Make sure that the lock nut fully engages the counter threads.

ALL THREADS MUST BE ENGAGED BY THE LOCK NUT.

The webbing must always be positioned on the smaller section of the triangular carabiner. The lock nut must always be positioned in the section between the eye bolt and the webbing.

CUSTOM SOLUTIONS

INSTALLATION WITH END LOOP

This installation is commonly used for shoulder belt installation in open wheel race cars and requires a made to measure racing harness.

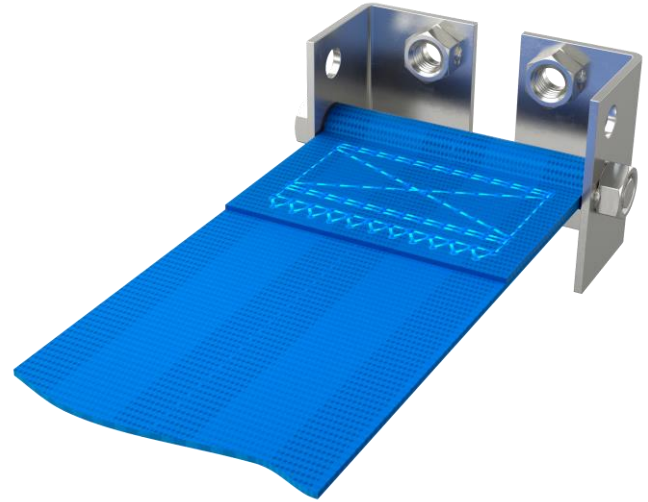
 **WARNING**

Risk of severe injuries or death.

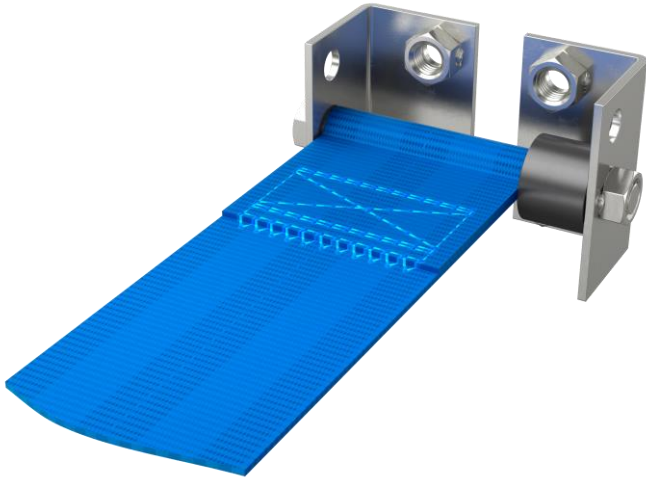
Brace wrap-mounted shoulder belts on each side so that the webbing cannot move from side to side.

Failure to secure the sideward movement of the wrap-mounted shoulder straps could cause the belts to slide off the shoulder.

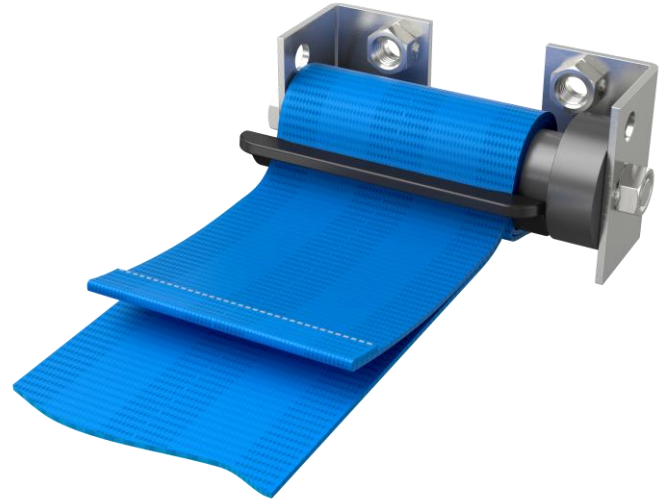
Never use bars of lower grade than the original. Lower grade bars may be too weak and may fail during an accident



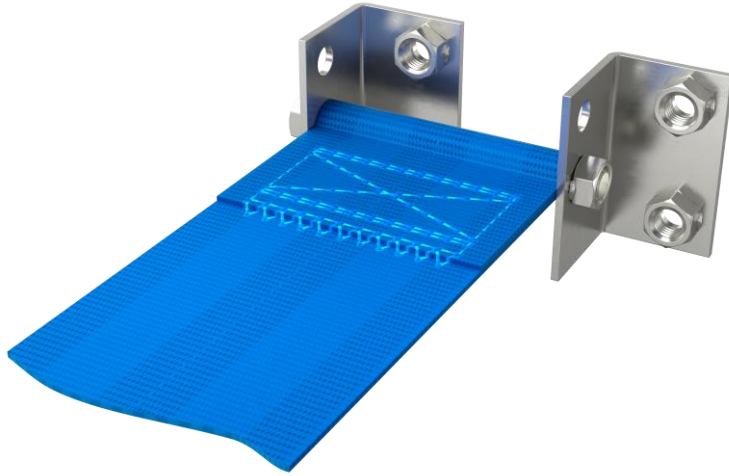
75 mm [3"] webbing installed to custom designed elbow bracket system.



50 mm [2"] webbing of a shoulder belt installed to a 75 mm [3"] designed elbow bracket system.



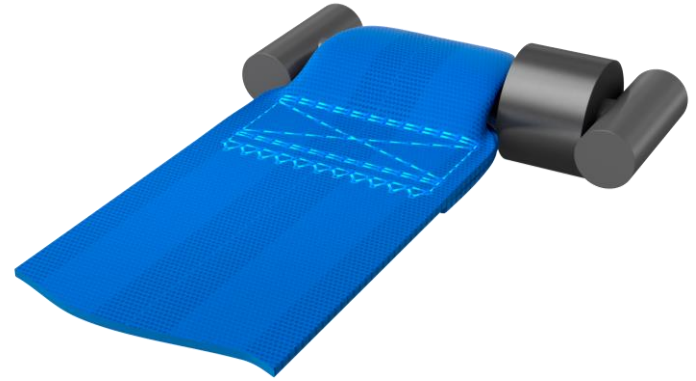
50 mm [2"] webbing with D-Ring slide of shoulder belt installed to a 75 mm [3"] designed elbow bracket system.



50 mm [2"] webbing of a shoulder belt installed to a elbow bracket system with elbow bracket installed reversed to create 50 mm [2"] distance.

- In case of a reversed installed elbow bracket, shorter bars of the same diameter can be used.
- Replacement bars must be at least of same grade than the original one.

- If the bracket allows different heights in installation, choose the bracket that makes the shoulder straps run horizontal or max 20° down from the shoulder or from FHR.



A fold in webbing installed to a bell bar system with spacer.

- Spacers must fully fill the gap between the bar and the wall so webbing can not slide over.

OPERATION

SAFELY WEARING YOUR RACING HARNESS

1. GENERAL INSTRUCTIONS

WARNING

Improper use of any harness belt can cause serious personal injury or death.

To help reduce the risk of serious injury in an accident:

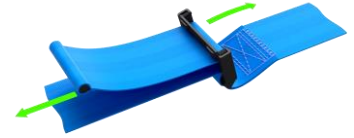
- Never use the harness belt system for persons which weigh less than 40 kg (88 lbs.) or those who are less than 150 cm (4'11") tall, regardless of age.
- Never strap more than one person in place with each harness belt.
- Never use the lap belt portion of the harness belt without the shoulder belts and the anti-submarining strap (if a 5- or 6 point belt is installed).
- All straps must permanently run through the slots of the bucket seat.
- Always make sure that no strap is twisted when worn.
- Always wear the lap belt portion of the harness system low and tight across the pelvis.
- Never wear the belts over heavy clothing as it can interfere with proper positioning and adjustment of the belts, reducing the overall effectiveness of the system.
- Never wear the belts over rigid or breakable objects in or on your clothing, such as eye glasses, pens, jewellery, keys etc. as these may cause injury.
- Never allow straps to rub against sharp objects.

Never allow the belts to be damaged by becoming caught in door or seat hardware.

2. HOW TO OPERATE TILT LOCK ADJUSTERS

SCHROTH racing harnesses utilise "tilt lock adjusters" for quick adjusting the harness belt.

To lengthen a strap, tilt (lift) the adjuster up to 90 degree relative to the strap and pull in direction as indicated.



To tighten a strap, pull at the protruding strap end as indicated.



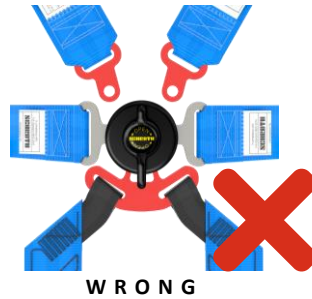
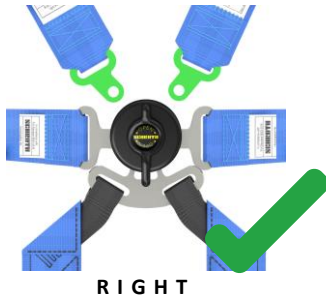
If tilt lock adjusters are equipped with a release strap, simply loosen the harness belt by pulling on the strap to lift the adjuster.



3. HOW TO ENGAGE YOUR RACING HARNESS

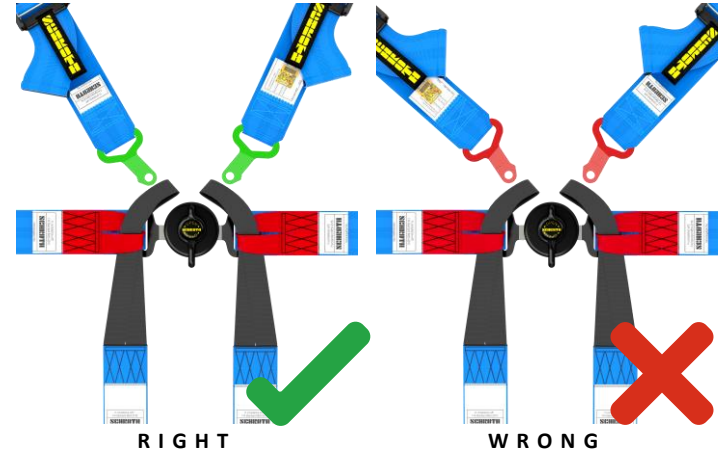
3.1 T-BAR 6-POINT MODELS

- Loosen the shoulder belts to allow for proper positioning of the lap belts and rotary buckle.
- Engage lap belt and tighten securely. If the race car is equipped with a sliding seat track, it is recommend that the seat be slid rearwards by one or two detents. After tightening the lap belt, slide the seat forward again into the correct seating position. This will optimally tighten the lap belt.
- Make sure the rotary buckle is well centered to your body.
- Now engage the anti-sub strap in the bottom slot if it is not fixed at the buckle. Make sure the T-bar ends of the anti-sub strap point away from your body.
- Tighten Anti-sub strap securely.
- Hook in shoulder belt latches. Make sure left and right shoulder belts are not interchanged [see diagram below].

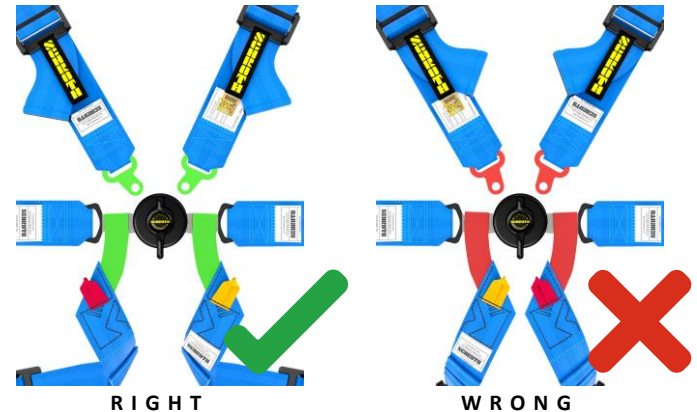


- Tighten shoulder belts securely.

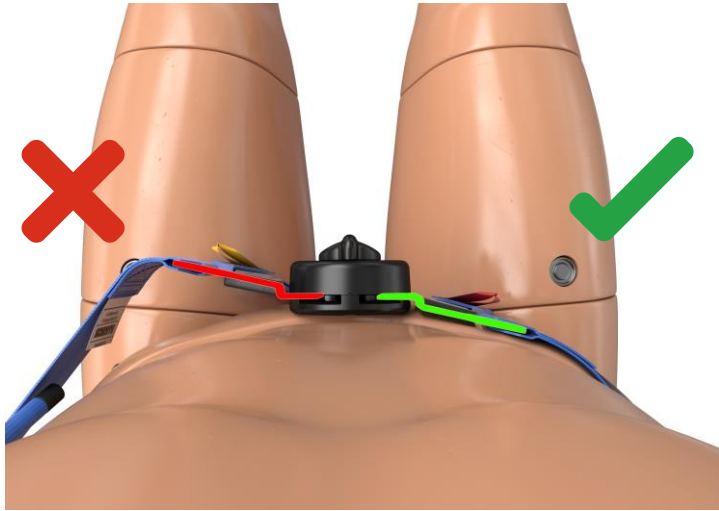
3.2 FORMULA MODELS



3.3 HYBRID MODELS



Make sure that when the latch is buckled in the angled part of the buckle latch faces towards the body. See figure below.



WARNING

**FAILURE TO WEAR AND TIGHTEN THE RACING HARNESS PROPERLY
MAY CAUSE SEVERE INJURIES OR DEATH.**

Always position the belt only as described in this manual. Improper belt positioning may result in reduced safety performance or even malfunction of the racing harness.

Never position lap belts too high [extending above the pelvis], and/or at too low of an angle routing to the mounting point. Lap belts positioned too high or too low, may result in increased pelvic movement, submarining and will create extra load on the anti-sub straps.

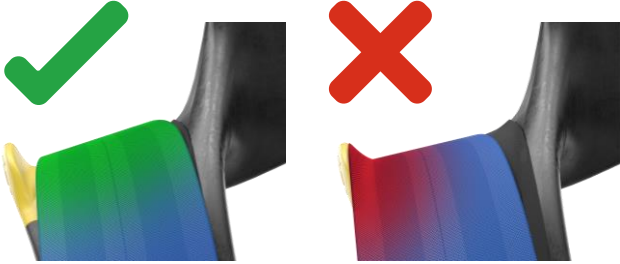
Never wear lap belts loosely. Loosely worn lap belts may result in increased pelvic movement, submarining and will create extra load on the anti-sub straps.

Loose shoulder belts will result in increased head trajectory during an accident.

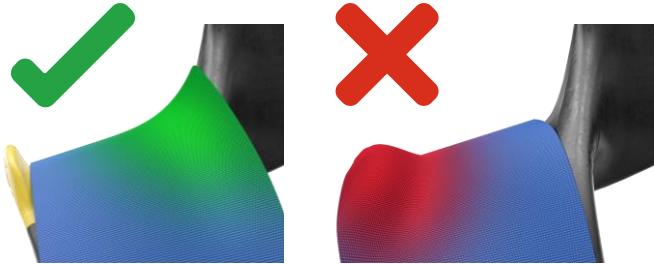
Loose anti-sub straps will allow the lap belt to ride up during an accident and create submarining and/or increase head trajectory.

3.4 WEBBING ROUTING ON FHR

Routing of 2" [50mm] webbing

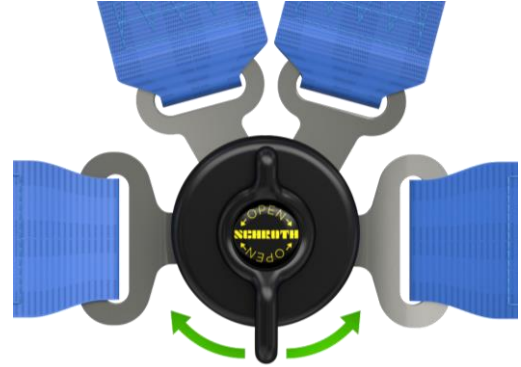


Routing of 3" [75mm] webbing



HOW TO RELEASE YOUR RACING HARNESS

- Loosen the shoulder belts [not necessary in case of an emergency].
- Turn rotary buckle by approx. 90° into either direction.



- All latches except one will release from the buckle.



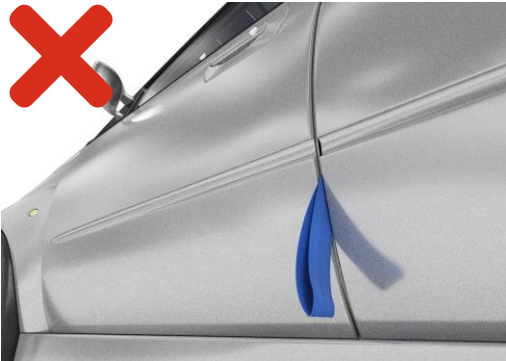
CARE AND MAINTENANCE

 **WARNING**

Risk of severe injuries or death.

Never allow straps to be caught by the seat rail or door.

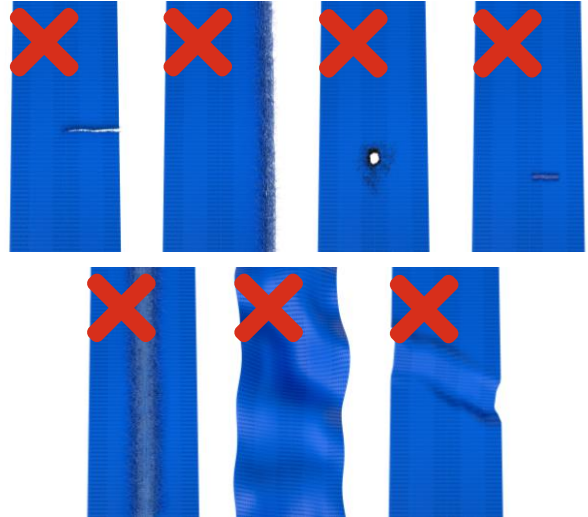
This could weaken the webbing and the racing harness may fail during an accident.



CARE AND MAINTENANCE CONTINUED

INSPECTION

- Inspect the harness belt thoroughly for damage before each use.



Cut and Abrasion as shown here require an immediate belt exchange.

- Make sure that the inspection of the belt is included in regular check-ups of the race car and its equipment.
 - Regularly check correct torque of bolts.
- Check for expiration date of the racing harness as it applies to the regulation of your sanctioning body and/or the FIA, SFI or NASCAR tag, prior to each use.

WARNING

Risk of severe injuries or death.

Never use any belt that is cut, torn or damaged in any way! Replace it immediately, cut the old belt in half, and discard the old belt so that it cannot be used again. Cuts, tears and other damage to the belt will greatly reduce its effectiveness, may cause it to fail.

CARE AND MAINTENANCE CONTINUED

CLEANING



WARNING

Risk of severe injuries or death.

Never clean your racing harness with chemical solvents and spray cleaner.

Webbing or buckle housings weakened by solvents or chemicals may fail during an accident.

WARNING

Risk of severe injuries or death.

Always replace a harness belt used during an accident. It is unfit for further use. The belt may otherwise fail in subsequent accident.

Replace it immediately.

In SCHROTH Profi asm® models a partly or fully ripped open SCHROTH asm® system indicates the need for immediate replacement of the racing harness.

FIA and other sanctioning bodies require that inspectors cut the racing harness, or cut the labels off the racing harness, after an accident.

Always inspect all anchorages for damages such as deformations or cracks, after an accident.

Strictly follow the recommendations of the vehicle or roll cage manufacturer if a repair should be necessary.

Re-use a harness belt that has been in an accident of any type cause serious injuries or death.

EXAMPLES OF IMPROPER INSTALLATION



Risk of severe injuries or death. 3-bar slides positioned in such a way may cut into the occupant's neck during an accident. Never install a racing harness with attachment hardware [such as the 3-bar slide pictured at left] next to the occupant's body or to tor on the inside of the seat openings.



Risk of severe injuries or death. Sharp edges may cut the webbing and the racing harness may fail during an accident. Never run straps over sharp edges and brackets.

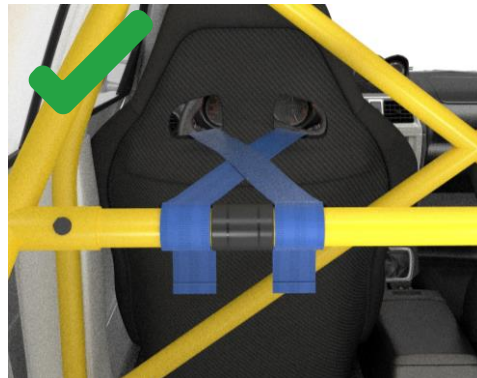


3-bar slides are positioned too far off of the roll cage and there is nothing to prevent lateral movement of the belts along the bar. Webbing is therefore improperly routed and folded back to the final part of the wrap to secure the 3-bar slide. This improper installation may allow webbing to slide through the hardware during an accident. Unintended elongation and severe head impact, resulting in severe injuries or death, may occur. If a FHR were to be used with this type of installation, the shoulder straps may slide off the FHR so its effectiveness in an accident will be eliminated. Severe injuries or death may occur. Always secure wrap around attachments against lateral sliding on the roll cage bar. Otherwise, severe injuries or death may occur.



This webbing runs too far back, and at too low of an angle. A Lap belt cannot be routed straight through seat slots. It will tend to slide off the pelvic bone and result in submarining. This will also add additional load to the anti-sub strap. Severe injuries or death may occur.

CORRECT INSTALLATION



EXAMPLE FOR A SPREADER USING FIA 8857-2001 PADDING MATERIAL

Cross the webbing if the distance from the seat openings to the mounting bolt point or harness bar exceeds 450 mm [18"].

When mounting to a harness bar with a wrap mount and the distance to the bar from the seat is less than 450 mm [18"], a section of roll bar padding, fixed with cable ties, should be added to the outside of each of the shoulder harnesses to ensure that they cannot further separate when unloaded.

3-Bar slides pictured in the **previous examples on page 22** are not positioned next to the roll cage bar and the final locking portion of the wrap has not been completed. This will result in significant slippage through the adjuster and significantly more elongation of the shoulder belts.

ADDRESS

Made in Germany by

SCHROTH SAFETY PRODUCTS GMBH

Im Ohl 14

59757 ARNSBERG

GERMANY

Phone: +49-2932-9742-0

FAX: +49-2932-9742-42

eMail: germany@schroth.com

www.schroth.com

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