This harness belt, when properly installed and used according to applicable instructions can minimize injury. The ability of any restraint system to minimize or prevent injuries is directly related to the type and severity of accident. No restraint system can prevent injury or death in every accident.

Racing harness belts are NOT designed to be installed into street legal vehicles, and DO NOT meet federal and state vehicle safety regulations. They are designed and tested to be used exclusively in race cars and only in on-track events.

“This article is sold without warranty, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, all of which are specifically disclaimed, and no warranty or representation is made as to this product’s capability to protect the user from any injury or death. Racing is dangerous! The user assumes the risk.

DO YOU HAVE EXPERIENCE INSTALLING RACING HARNESSES?

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 and death.

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

FIA HOMOLOGATED RACING HARNESSES

Racing harnesses manufactured for motor sport in countries, or for racing series 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 motor sport in which you are participating. The last year of FIA validity is indicated on the label. Each separate strap assembly is labelled. All FIA labels of a belt must have the same colour.

SFI APPROVED RACING HARNESSES

Racing harnesses specifically manufactured for motorsport requiring SFI Spec. 16.1 or SFI Spec. 16.5 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.

ANCHORAGE LOCATIONS AND GEOMETRIES

BELT ROUTING

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
- thorax [chest] to a limited level only
- clavicle [shoulders]

Therefore, it is essential that strap routing be optimised as described in the following graphs.
Lap Belt Routing
- 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.
- 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.

Shoulder Belt Routing
- Shoulder belts must run from the shoulders horizontally or down, at no more than a 20° angle.
- For the best restraint of the occupant's upper torso, anchor points should not be further back than 200 mm [8"] from back of user's seat.
- In the event that the anchor points are further towards the rear of the vehicle (e.g. using a roll cage bar for wrap around attachment) the distance between the strap anchorages will narrow or even cross over as described in following graphs.
- It is especially crucial to follow this strap routing when a Head And Neck Support is in use.

Shoulder belts shall cross over when the anchor points are located more than approx. 500 mm [20"] behind the seat backrest.

For 75 mm [3"] webbing wrap around installation the following approx. anchor point distances are suitable:

<table>
<thead>
<tr>
<th>Distance from seat in mm</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor point distance in mm</td>
<td>150</td>
<td>100</td>
<td>75</td>
<td>75</td>
<td>-75</td>
<td>-100</td>
<td>-150</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance from seat in inch</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
<th>28</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor point distance in inch</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>-3</td>
<td>-4</td>
<td>-5</td>
</tr>
</tbody>
</table>

Shoulder belts shall cross over when the anchor points are located more than approx. 500 mm [20"] behind the seat backrest.

For 75 mm [3"] webbing bolt on installation the following approx. anchor point distances are suitable:

<table>
<thead>
<tr>
<th>Distance from seat in mm</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor point distance in mm</td>
<td>150</td>
<td>100</td>
<td>50</td>
<td>0</td>
<td>-50</td>
<td>-100</td>
<td>-150</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance from seat in inch</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
<th>28</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor point distance in inch</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>-2</td>
<td>-4</td>
<td>-6</td>
</tr>
</tbody>
</table>

Anti-Sub Strap Routing
6-point Models where Anti-Sub Straps are Connected to the Buckle

Anti-submarining strap routing shall be vertical down from the groin, and preferably approximately 20° back.

Anchor points shall be approximately 100 mm [4"] lateral apart from each other. In case of a low seating position (e.g. in open wheel race cars), this separation may be reduced since the anchor points are closer to the thighs.
FORMULA MODELS

This anti-sub strap design requires sitting on the straps or having a thin seat panel allowing the straps running rearwards right underneath the driver’s buttock and attaching in the region near or on the lap belt anchorages.

The anti-submarining strap routing over the upper thighs and attachment to the shoulder belt latches with the buckle in between, does not provide a direct load path from the shoulder belts down to the anti-submarining strap anchor points. The indirect routing requires a type of preloading of the anti-submarining straps during a frontal impact. This is achieved by sitting on the anti-submarining straps, routing them rearwards and attaching them in the region near or on the lap belt anchorages.

NEGATIVE G BELT (7TH POINT)

Used in conjunction with a 6-point formula crotch belt system as an additional point to maintain the position of the lap belt in “Negative G” i.e. rollovers

IMPORTANT INFORMATION ABOUT BOLTS AND TORQUES

BOLT DIAMETER

- Stock thread holes commonly are 7/16” 20 UNF. Therefore, all TAKATA models come with bolts and eye-bolts matching this dimension.
- For all other dimensions you must provide the correct bolt diameter, type of thread and bolt length. USE ONLY bolts grade 8.8 and higher.

TIGHTENING TORQUES BY BOLT DIMENSION

- Each bolt diameter and type of thread requires an individual torque for proper tightening. The torque as listed below is defined by national or 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.

<table>
<thead>
<tr>
<th>Bolt Diameter</th>
<th>M 8</th>
<th>5/16”</th>
<th>M 10</th>
<th>3/8”</th>
<th>7/16” 20 UNF</th>
<th>15/32”</th>
<th>1/2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque in Nm</td>
<td>25</td>
<td>25</td>
<td>50</td>
<td>50</td>
<td>40</td>
<td>87</td>
<td>113</td>
</tr>
<tr>
<td>Torque in lbinch</td>
<td>18.5</td>
<td>18.5</td>
<td>37</td>
<td>37</td>
<td>30</td>
<td>64.5</td>
<td>83.5</td>
</tr>
</tbody>
</table>

Creating a new attachment point

- For new attachment points to the chassis heed the following WARNING box.

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. Any damage to such components can result in fire or explosion and severe injuries or death can result.

- For new attachment points to the chassis you must use a FIA specified reinforcement plate [see list of accessories in TAKATA catalogue].
- Drill a hole of 12 mm [15/32”] diameter for lap- & shoulder belt and 5-point anti-sub strap attachments.
- Use with this product supplied bolts and eyebolts only! They are tested for quality and fit to the threads provided by the TAKATA reinforcement plate and to the brackets.

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 minimum of 250 mm (10”) below the collar bone or lower if possible.
- If a Head and Neck Support is worn, the adjuster must be positioned low on the yoke end of the Head and Neck Support.
- Lap belt tilt lock adjusters must not be positioned within the openings of the seats. Adjusters must be either outside of the seat at a minimum distance of 40 mm (1.5”) from the opening or close to the rotary buckle inside the seat.
**WRAP SYSTEMS TO ROLL BAR INSTALLATION AND BRACKETS ASSEMBLY**

**3-BAR SLIDE WRAP**

This installation is commonly used for:
- shoulder strap roll cage installation and
- to assemble open strap ends to brackets or approved harness hardware.

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

Racing harness with end brackets assembled to the shoulder belts by a 3-bar slide allow to dismount the brackets and use the 3-bar slide for wrap around installation directly to the roll cage. Also brackets can be exchanged e.g. from a snap-on to a bolt-in bracket or vice versa.

**INSTALLATION**

1. position D-Ring to roll bar with wider bar atop
2. slide a minimum of 600mm (24") of strap length through D-Ring and from underneath around roll bar [first loop]
3. slide strap from atop through D-Ring slot towards roll bar and back between roll bar and first loop until it protrudes from slot in D-Ring [second loop].
4. Pull at shoulder belt to check that wrap will tighten when being loaded.
5. Wrap strap end around roll bar again [third loop] and thread through D-Ring again. Shoulder belt is now sandwiched between first loop webbing and protruding strap end.
6. Make sure strap end protrudes at least 100 mm [4"]

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6. Make sure strap end protrudes at least 100 mm [4"]

**WARNING**

Incorrect wrap techniques or positioning 3-bar slides too far away from the roll cage bar or from any bracket may allow webbing to slide or slip during an accident. Extra elongation will occur which may reduce the effectiveness of the racing harness and the Head and Neck Support, if worn. Shoulder belts may slide off the Head and Neck Support or will lengthen allowing the head and chest to impact onto the steering wheel. Severe injuries or death may occur.

**LIGHT WEIGHT D-RING 75 MM (3”) WRAP**

**WRAPPING INSTRUCTIONS:**

1. position D-Ring to roll bar with wider bar atop
2. slide a minimum of 600mm (24") of strap length through D-Ring and from underneath around roll bar [first loop]
3. slide strap from atop through D-Ring slot towards roll bar and back between roll bar and first loop until it protrudes from slot in D-Ring [second loop].
4. Pull at shoulder belt to check that wrap will tighten when being loaded.
5. Wrap strap end around roll bar again [third loop] and thread through D-Ring again. Shoulder belt is now sandwiched between first loop webbing and protruding strap end.
6. Make sure strap end protrudes at least 100 mm [4”]

**D-RING (LV 4) LIGHT WEIGHT WRAP SYSTEM TO BRACKETS**

This light weight system assembles directly to 50 mm (2") slot brackets and is therefore commonly used by TAKATA for anti-sub strap brackets. This system is also absolutely micro slip free.

**WRAPPING INSTRUCTIONS**

1. Place LV 4 with its thicker bar onto the bracket.
2. Run strap end through slot at LV 4 and then from underneath through webbing slot at bracket. Pull through at least 200 mm (8") of webbing. Fold strap end over the wider bar of LV 4 and back through the gap between bracket bar and LV 4 bar.
3. Slide strap end further through the webbing slot at bracket and then fold the strap end through the slot at LV 4.
4. Pull at the load taking strap and the bracket to make sure, the webbing is properly clamped by the wrap hardware.
5. If this is not achieved, check for proper strap routing and follow these instructions step by step again.
6. If the protruding webbing is significant longer than the minimum of 50 mm [2’’], you may fold it over again, run it through webbing slot of the bracket/latch and again back and through the webbing slot at LV 4.
7. In this case, the strap end now protrudes from the down side of the LV 4. Webbing must be wrapped tightly!

**EYE BOLT INSTALLATION FOR SNAP-ON BRACKETS**

- Assemble eye bolt and spring washer as shown in sketch beside.
- Bolt in eye bolt and tighten securely. The optimum torque setting is 40 Nm (350 lbs./inch). 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 as shown in drawing below. 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 eyebolt and use 2 spring washers to come closer to the recommended position.
WARNING

Safe harness belt functioning requires belt and bracket alignment during a crash. Any restriction of the harness belt or bracket may cause the webbing dumping/loading into bracket edges and webbing may become cut and may cause severely injuries 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 and may cause severely injuries or death.

Installation

- Anchor point positioning has to provide a bracket pointing toward the driver as shown in sketch below.
- Webbing shall not run off the bracket under an angle of more than plus or minus 25°.

Wrong

Correct

Correct

Correct

Light Weight Bolt-in Brackets B64.20.08

1. These brackets (B 64.20.08) are commonly used for 50 mm (2") and for a fold in 75 mm (3") sewn in assembly, or with D-Ring 50mm webbing (2") wrap mount.
2. Bolts and washers are not supplied by TAKATA
3. Use bolts with grade 8.8 or higher only.
4. Make sure the bend of the bracket aligns to the direction of pull deviating not more than plus or minus 25°.
5. Before fully tightening position the bracket to align with direction of pull.
6. Use e.g. “Loctite 243” to secure bolt.
7. Tighten the bolt. Follow all instructions and information, WARNINGS boxes provided under section “Important Information About Bolts and Torques”.
8. Make sure the bracket has not turned out of direction of pull. If it has, repeat the procedure as described.

Bolt-in Bracket B 24.15.13

1. These brackets are used for sewn in or 75mm (3") webbing 3-bar wrap mount and 50 mm (2") D-Ring wrap assemblies.
2. 7/16” 20 UNF shoulder bolts are standard
3. Bushing sleeves for 8mm/5/16” bolts are supplied for formula harness anti-sub straps. Bolts will not be supplied by TAKATA. Choose from bolts with grade 8.8 or up only.
4. Make sure the bend of the bracket aligns to the direction of pull deviating not more than plus or minus 25°.
5. Use e.g. “Loctite 243” to secure bolt.
6. Tighten the bolt. Follow all instructions and information, WARNINGS boxes provided under section “Important Information About Bolts and Torques”.
7. Make sure the bracket can swivel after bolt is tightened.

Weaving your Harness Safely

1. General Instructions

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 6 point belt is installed).
- All straps must permanently run through the slots of the bucket seat – as shown in the figure below “Correctly Seated”.
- 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.
- Pressure of shoulder belts on your shoulder and chest must be equal.
- Never wear the belts over heavy clothing as it can interfere with proper positioning and adjustment of the belts.
- 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.
- Never use a racing harness belt and a factory 3-point belt in the same seat at the same time.

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

Correctly Seated
2. **HOW TO OPERATE TILT LOCK ADJUSTERS**

TAKATA racing harnesses utilise “tilt lock adjusters” for quick adjustment of 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 WEAR & ENGAGE YOUR RACING HARNESS**

3.1 **4-POINT MODELS AND 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 recommended 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 centred to your body and positioned low and tight, approximately 25-50mm (1-2”) below the belly button.
- Engage the anti-sub strap in the downward pointing slot. Make sure the T-bar ends of the 6-Point models point away from your body.
- Tighten anti-sub strap securely.
- Hook in shoulder belt latches.
- Tighten shoulder belts securely.

3.2 **FORMULA MODELS**

- Loosen the shoulder belts so they will not pull on the rotary buckle when engaged.
- Engage lap belt and tighten securely.
- Make sure the rotary buckle is well centred to the occupant’s body, and positioned approximately 25-50mm (1-2”) below the belly button.
- Run anti-sub straps flat over upper thighs.
- Thread end loop straps from underneath through D-rings on lap belts.
- Hook end loop straps accordingly into left and right shoulder belt latches and secure shoulder belt latches in rotary buckle.
- Make sure left and right shoulder belts are not interchanged as shown in the drawing below “WRONG”.
- Tighten anti-sub straps (if adjusters are available).
- Tighten shoulder belts securely.
- Make sure the shoulder harness is properly positioned on the Head And Neck Support if worn.
- Adjusters must be on lower ends of the Head And Neck Support yokes, approximately 25mm (1”) up from the bottom tip when the shoulder belt is fully tightened.

__SAFETY INSTRUCTIONS__

Make sure the adjusters are correctly positioned to avoid interference with the seat or the wearer’s neck during normal use as well as during an accident. See section of this manual titled “Initial Restraint Installation”.

Made to measure racing harnesses often do not have adjusters at lap belts and/or anti-sub straps. If such a harness is used, make sure body tight length is achieved during initial installation. If necessary re-adjust the strap lengths at brackets.

Follow instructions in section “Wrap Installations”.

4-Point Harness

6-Point T-Bar Harness
HOW TO USE THE BUCKLE

1. BELT FASTENING

1.1 RESETING THE BUCKLE

Turn the lever either left or right until the movement stops. After moving the lever either left or right it will stop at approximately 90°.

This is the reset/open position.

In this position, even if you insert each latch, it will not lock or engage the latches.

1.2 SETTING THE BUCKLE

Return the lever back gently in position and it will automatically set. Shown is the set position.

1.3 INSERTING LATCHES

Insert the latch into the buckle until you hear a distinct clicking sound.

After inserting the latch, be certain to check that the latch cannot be released from buckle. If the latch releases from the buckle, it will not provide the intend restraint to the occupant.

2 BUCKLE RELEASE

To unfasten latches from the buckle, turn the lever [either left or right] until it stops.

The latch will not unfasten if turned less than 25°.

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

Webbing which is caught may be damaged or weakened, the racing harness may fail during an accident and severe injuries or death may occur.

HOW TO RELEASE YOUR RACING HARNESS

a) loosen shoulder belts [not necessary in case of an emergency]
b) turn rotary buckle by approx. 90° into either direction
c) all latches except one will release from the buckle. On Formula-Type models the buckle always stays with the lap belt.

CARE AND MAINTENANCE

INSPECTION

- Inspect the harness belt thoroughly for damage before each use.
- Make sure that the inspection of the belt is included with 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 or SFI tag, prior to each use.

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, and may result in severe injuries or death.