

Combined tie-downs

User manual

Thank you for choosing a

Combined tie-downs from BraunAbility!

The following manual is an important part of the product, providing you with information on how to achieve maximum performance and safe operation. Keep the manual in a safe place so that you can refer to it when necessary.

If you have any questions about your equipment, please contact us.

Once again, thank you for placing your confidence in our products!



Safe vehicle adaptation solutions

*For your safety BraunAbility products
are designed and tested according to
current directives and standards.*

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Product certificate at the end of the manual.

Safety information

Limitation of use

The development of BraunAbility kits is a continuous process. Applications are added on a regular basis. For more details contact BraunAbility or look on the BraunAbility website.



These BraunAbility restraints are designed to secure the rear of a wheelchair when facing forward in a vehicle and must be used as instructed. The webbing tie-downs are designed to secure wheelchair weights up to 100kg. The use of an appropriate front tie-down and occupant restraint will be required for all.



In addition to the details given in these instructions, users of BraunAbility restraints must refer to the wheelchair manufacturer's 'Instructions for Use in Transport' for full details of tie-down attachment points on the wheelchair, plus any other specific instructions relating to use in transport.



Wheelchair users and their carers must make sure that their wheelchair is recommended for use in transport, including any 'add-on' components such as power tilt or recline options.



BraunAbility recommends the use of a 3 point occupant restraint system to provide greater protection in case of an impact. However we also recognise that some vehicle layout/designs or specific postural or medical conditions do not allow that style of seatbelts to be used easily.

This system is not ISO 10542 compliant if used in 2 point configuration.



In accordance with international regulations, our occupant restraints are designed to be used for passengers weighing 22kg or above. If the passenger weighs less than 22kg, we recommend that a suitable, and appropriately tested child restraint seat is used. This may involve a secondary seat belt restraint as recommended by the original seat manufacturer.

Combined tie-downs

DI-ROBH



DK-ROBT



I-RQEMJ



STK-SOBH



WK-SOBK



K-RQEMJ



General guidance

- Wheelchair Accessories that have not been approved by the Wheelchair Manufacturer must be removed from the wheelchair and secured in the vehicle during transport to reduce the potential for injury. Refer to 'Instructions For Use in Transport' provided with the wheelchair or contact wheelchair manufacturer for further guidance.
- These wheelchair tie-downs comply with all applicable requirements of ISO 10542, including a 48km/h, 20g frontal impact test using a forward facing 85kg surrogate wheelchair and an ATD (test dummy) with a mass of 76.3kg. The test dummy was restrained by both a pelvic and upper-torso restraint. Use of a pelvic only belt may compromise the performance of the WTORS system and should be avoided.
- If the installation is to be used with an occupant head rest anchored to the vehicle, then a vehicle-anchored back rest must be provided to minimise rearward deflection of the wheelchair seatback, preventing neck injury.
- Regular inspection of all parts is recommended and the equipment should be used only if all components are in good condition.
- **Warning:** protect webbing from contacting sharp edges and corners. Replace equipment if the webbing becomes cut, contaminated or frayed.

- Any restraints which have been subjected to a crash situation from which the vehicle must be towed, should, in the interest of safety, be replaced.
- Do not attempt to modify the equipment. For further advice on the installation and use of these restraints, please contact BraunAbility. Please read this manual fully before use.
- Avoid contact with corrosive liquids. Care should be taken to prevent contamination of the webbing with polishes, oils and chemicals.
- The tie-down anchorages should be installed by an experienced technician/vehicle converter. Anchorages should not be installed into unsound materials such as corroded metal, wood, plastic and fibre glass panels, without additional and suitable reinforcement.
- The equipment has been tested in a configuration similar to that recommended by BraunAbility and any deviation from the recommendations here is the responsibility of the installer/user.

Before installing and using the combined tie-downs

- Ensure that the wheelchair is correctly maintained and that the settings of any adjustable parts are made according to 'Instructions for Use in Transport'.
- Whenever possible remove any items of luggage etc that may be attached to the wheelchair and secure or store separately during transport in order to reduce the potential for injury to other passengers travelling in the vehicle.
- Extra care must be exercised when using vehicle boarding aids such as passenger lifts or ramps during the loading process. Refer to 'Instructions For Use' for information on safe slopes.
- Position the wheelchair facing forward - centrally in the designated region of the vehicle. **Ensure the wheelchair brakes are applied.**
- To minimise the potential for head injuries in an impact, allow a clear space of at least 400mm behind and 650mm, (FCZ, front clear zone), in front of the head of the wheelchair user, (Fig A). The shoulder belt anchorage must be roof or side-wall anchored at a height level such that the belt webbing passes over the midpoint of the occupant shoulder and at a height that is at or just above the level of the occupants shoulders so as not to impose downward loads on the spine.
- A height provision (HHT) ranging from 1000mm to 1550mm should be made, depending on the size of the passenger. There should also be 200mm of clear space either side of the wheelchair centre line. If these clear space dimensions cannot be provided then any structure protruding in this space should be adequately padded and comply with impact performance requirements of ECE Regulation 21 'FMVSS 201'. All vehicle padding should comply with the flammability requirements of ECE Regulation 118 'FMVSS 302'.

Note: seated head height (HHT) ranges from as low as 1000mm for a 6-year-old child to 1550mm for a tall adult.

- Wheelchair users, their carers and family are advised to check vehicle specifications to ensure that sufficient floor space is available to accommodate the wheelchair and tie-down system. These distances are based upon the desire to maintain clear zones for potential head excursions of occupants provided with both upper and lower torso restraints.
- Users of heavy powered wheelchairs are also advised to check vehicle carrying capacity. If in doubt consult the vehicle supplier for further details.
- Any airbag, as fitted to the vehicle, shall be used only as a supplementary occupant restraint if designed to be used in combination with the wheelchair tie-down.
- Installers of these restraints should take note of any vehicle airbag position when planning the installation. Airbags can cause serious injury if a wheelchair-seated occupant is seated too close to an airbag position. If in doubt contact the vehicle manufacturer or your National Automotive Regulatory Body for advice.

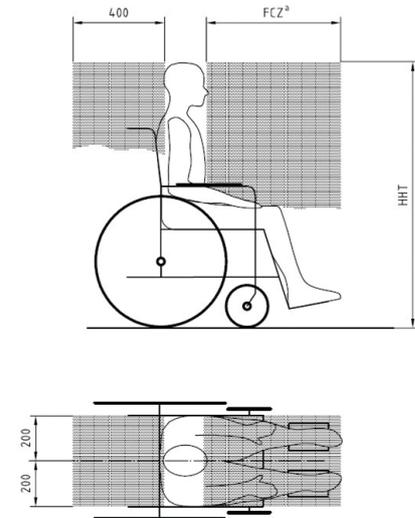


Figure A

Fit and use

Fitting and using the combined tie-downs

Retractable occupant restraints: Wheelchair tie-down

The rail will have been installed in the vehicle in accordance with our own and the vehicle converter's instruction. Position wheelchair within vehicle as required.

1. Attach the front wheelchair tie-down (not supplied as part of this product) in accordance with its own instruction.
2. Place the combined rear webbing restraint into the rail behind the wheelchair. It is acceptable to use the restraint either for left hand or right hand use. The double inertia reel should be fitted to the rail adjacent to the 3rd point anchorage. When possible, the rear webbing tie-down should be positioned with the karabiner or hook gates face outboard from the wheelchair (Fig 1). If using tongue & buckle, the buckle may be positioned facing inboard or outboard (Fig 2).
3. Attach each tie-down into the floor rail by aligning the ATF (aluminium track fitting) feet with the cut-out sections of the rail (Fig 3). **Note:** the yellow plungers must face toward the rear of the vehicle. Press down on the ribbed part of the ATF, (Fig 3A), and push firmly down towards the wheelchair until the yellow plunger drops and locks into the rail. If using rail lengths giving adjustability on the positioning of the ATF, then ensure that ATF is sited opposite each other. **IMPORTANT: Check the plungers are fully engaged on both sides.**
4. Remove the webbing from the Velcro patch and release the over-centre buckle.
5. Attach the karabiner / hook / tongue & buckle to the wheelchair mainframe to create an angle of about 30 to 45° within the rear view zone (Fig 4). (Some wheelchairs will indicate this tie-down position Fig 5).
6. Pull the webbing through the over-centre buckle until it is tight. With the free hand, begin to close the buckle. Once the webbing is retained, fully close the buckle using both hands (Fig 6). Re-secure the Velcro to prevent the loose end from becoming a trip hazard.
7. The occupant restraint must now be fitted.



Removing the wheelchair tie-down

First remove the occupant restraint

1. Release the webbing tension in each strap by pressing the silver release on the over-centre buckles and detach the karabiner /hook /tongue & buckle from the wheelchair frame. **Note:** in an emergency, if using the tongue & buckle version, the tie-down can be quickly removed from the wheelchair by simply pressing each buckle release button.
2. Close the over-centre buckle and return the webbing end to the Velcro patch.
3. Lift the yellow plunger fully and slide back away from the wheelchair to align the ATF feet with the rail cut outs, lift away from the rail and store securely.



Figure 1



Figure 2



Figure 3

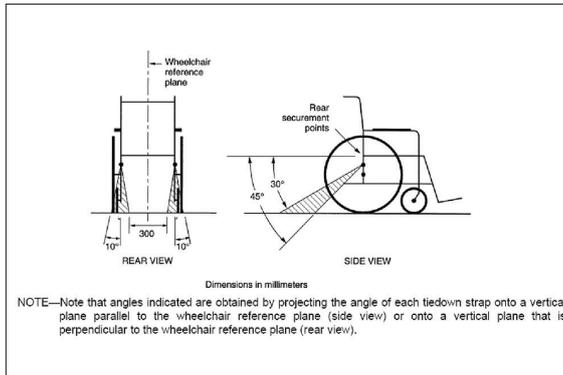


Figure 4



Figure 5



Figure 6

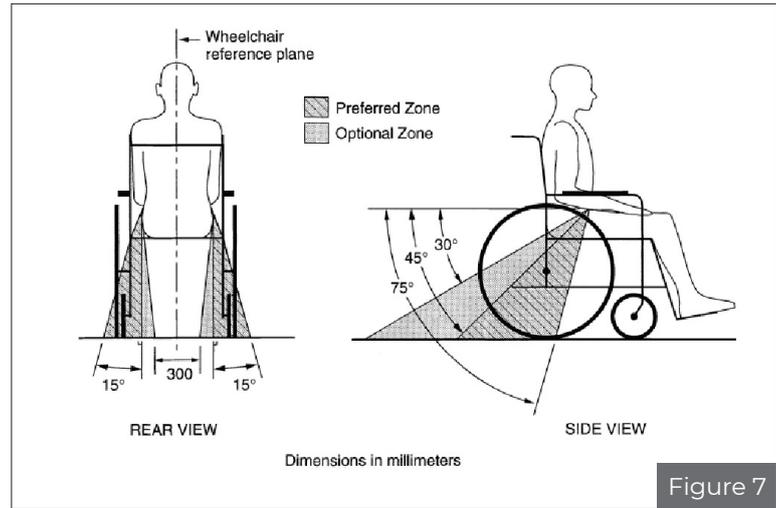


Retractable Occupant Restraint : 3 Point configuration

1. Position the 3rd point fixing into the cant rail (Fig 8), so that it is vertically above the inertia reel casing fixed onto the floor fixing. Unfasten the tongue and buckle.
2. Moving to the inertia reel, pull the black webbing upwards and unfasten the tongue from the grey webbing buckle.
3. Position the black webbing to form the lap belt and insert the tongue into the buckle stalk, (Fig 9).
4. Ensure that the lap belt lays low on the pelvis of the occupant, running as close as possible over the hips on both sides.
5. Remove the black plastic cover on the grey shoulder belt tongue, if necessary, and fit into the 3rd point fixing.
6. Position the grey webbing to form the shoulder belt and insert the buckle into the tongue.
7. Adjust the height of the shoulder belt to clear the occupant's shoulder by approximately 25mm or 1 inch (Fig 10).
8. The lap belt anchor points should be positioned to achieve belt angles of 30° or more to the horizontal and preferably between 45° and 75° in order to fit low across the pelvis reducing the possibility of the belt loading the abdomen (Fig 7). The pelvic restraint is designed to bear upon the bony structure of the body and should be worn low across the front of the pelvis with any junctions between the pelvic and shoulder restraints located near the wearers hips.

Removing the occupant restraint

1. Release the grey shoulder belt from the lap belt section, then from the 3rd point fixing and carefully allow the shoulder belt to return to the retractor.
2. Disconnect the black lap belt from the buckle stalk on the aisle side and carefully allow the lap belt webbing to return onto its retractor.
3. Connect the shoulder belt buckle to the lap belt tongue above the opening of the retractor box.
4. The wheelchair tie-down should now be removed.





Retractable Occupant Restraint: 2 Point configuration

1. Ensure the Comfort Clip is released (Fig 12) and unfasten the tongue from the grey webbing buckle.
2. Pull the metal tongue on the black webbing upwards to release the webbing from both inertia reels. Position the webbing across the occupant with the black webbing forming the lap belt and the grey webbing forming the shoulder belt (Fig 13).
3. Insert the tongue fixed to the black webbing into the stalk buckle (Fig 11A)
4. Adjust for comfort by raising the webbing on the shoulder by two finger widths, unlock the Comfort Clip to take up the slack, then re-lock the clip so that it rests on the reel cover.
5. The lap belt anchor points should be positioned to achieve belt angles of 30° or more to the horizontal and preferably between 45° and 75° in order to fit low across the pelvis reducing the possibility of the belt loading the abdomen (Fig 7). The pelvic restraint is designed to bear upon the bony structure of the body and should be worn low across the front of the pelvis with any junctions between the pelvic and shoulder restraints located near the wearers hips.

Removing the occupant restraint

1. Release the Comfort Clip.
2. Release the grey shoulder belt from the lap belt section, and carefully allow the shoulder belt to return to the retractor.
3. Disconnect the black lap belt from the buckle stalk on the aisle side and carefully allow the lap belt webbing to return onto its retractor.
4. Connect the shoulder belt buckle to the lap belt tongue above the opening of the retractor box.

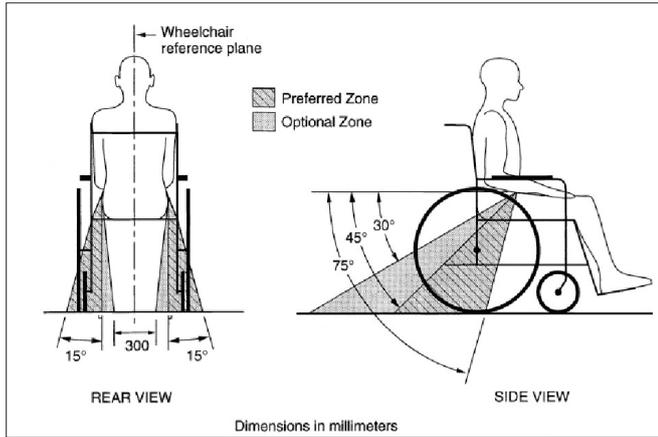


Figure 7



Figure 13



Figure 12



Figure 11



Retractable occupant restraint: Wheelchair tie-down

1. The floor anchors will have been installed in the vehicle, in accordance with our own and the vehicle converters instructions. Position the wheelchair within the vehicle as required.
2. Attach the front wheelchair tie-down (not supplied as part of this product) in accordance with its own instruction.
3. Place the combined rear webbing restraint next to the floor anchors behind the wheelchair. It is acceptable to use the restraint either for left hand or right hand use. The double inertia reel should be fitted adjacent to the 3rd point anchorage. When possible, the rear webbing tie-down should be positioned with the karabiner or hook gates face outboard from the wheelchair (Fig 1). If using tongue & buckle, the buckle may be positioned facing inboard or outboard (Fig 2).
4. Attach each tie-down onto the rear floor anchor points by aligning the protrusion within each cleat to the slot on the floor anchors (Fig 14). Slide the cleat fully home (Fig 15), (raising the anchor from its housing if using the retractable floor anchor), rotate the cleat through 90° to align the karabiner/ hook fixing or tongue and buckle with the wheelchair rear vertical frame.
5. Remove the webbing from the Velcro patch and release the over-centre buckle. Attach the karabiner/hook fixings, or tongue and buckle, to the wheelchair mainframe to create an angle of about 30-45° within the rear view zone (Fig 4). (Some wheelchairs will indicate this tie-down position, Fig 5). Pull the webbing through the over-centre buckle until it is tight. With the free hand, begin to close the buckle. Once the webbing is retained, fully close the buckle using both hands, (Fig 6).
6. Re-secure the Velcro to prevent the loose end from becoming a trip hazard.
7. The occupant restraint must now be fitted - refer to pages 12-15.

Removing the wheelchair tie-down

First remove the occupant restraint

1. Release the over-centre buckle on the rear strap, loosen the webbing and remove the karabiner / hook or tongue & buckle arrangement from the wheelchair.
2. Pull the webbing, close the over-centre buckle and re-secure the Velcro.
3. Remove each rear combined restraint from the anchor by rotating the tie-down through 90° so that the raised protrusion on the cleat is aligned with the indent on the floor anchors (Fig 14). Slide off.
4. Pull the tie-down away from the floor anchor and store safely.

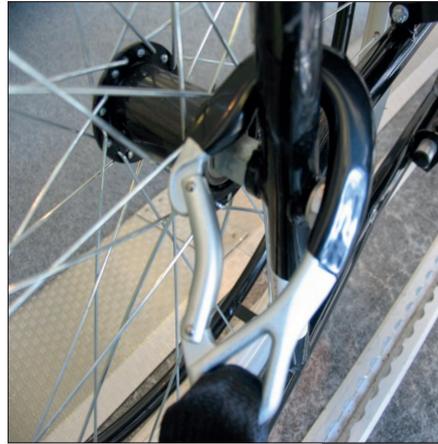


Figure 1



Figure 2



Figure 15



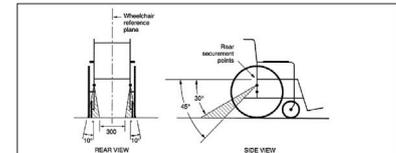
Figure 6



Figure 14



Figure 5



NOTE—Note that angles indicated are obtained by projecting the angle of each tie-down strap onto a vertical plane parallel to the wheelchair reference plane (side view) or onto a vertical plane that is perpendicular to the wheelchair reference plane (rear view).

Figure 4



3 point static occupant restraint

1. The floor anchors will have been installed in the vehicle, in accordance with our own and the vehicle converters instructions. Position the wheelchair within the vehicle as required.
2. Attach the front wheelchair tie-down (not supplied as part of this product) in accordance with its own instruction.
3. The rear wheelchair tie-down should be fitted as indicated on page 16.
4. The occupant restraint should be installed in accordance with previous safety information using the supplied hardware as shown opposite (Fig 16).
Note: if fitting hardware, other than that provided in this kit, is to be used then the fixing bolts should be of an equivalent cross section and an equivalent grade namely B.S. Grade 'S' (ISO 8.8).
5. The componentry is assembled as shown opposite (Fig 16), with the upper 3rd point bolted to an approved anchorage position on the vehicle body. Bolts should be tightened to a torque of 40Nm. If installing the ATF of the removable 3rd point, then a suitable rail section, known as a cant rail, should be installed in the vehicle. **Note:** all vehicle anchorage points may require reinforcement as necessary to meet any required minimum strength recommendations for the vehicle.
6. Install the static lap belt section - tongue side into the stalk opposite the 3rd point anchorage (Fig 17).
7. Install the static lap belt section - buckle side into the stalk nearest to the 3rd point anchorage (Fig 18).
8. Draw the two sections around the occupant's waist and clip the lap belt adjuster into the lap belt buckle, adjusting as firmly as possible, consistent with user comfort, so that the lap belt sits low over the front of the pelvis and bears over the bony part of the body.
9. Disconnect the shoulder belt snap clip from its storage position, (Fig 19), and draw across the upper body connecting it into the static lap belt section - tongue side snap button (Fig 20). Adjust the shoulder belt tension to suit the user comfortably (Fig 21).

10. The lap belt anchor points should be positioned to achieve belt angles of 30° or more to the horizontal and preferably between 45° and 75° in order to fit low across the pelvis, reducing the possibility of the belt loading the abdomen (Fig 7). The pelvic restraint is designed to bear upon the bony structure of the body and should be worn low across the front of the pelvis with any junctions between the pelvic and shoulder restraints located near the wearer's hips.

Removing occupant restraint

1. Unfasten the lap belt tongue & buckle, unfasten each lap belt section from their respective stalk and remove lapbelt from the occupant.
2. Disconnect the shoulder belt snap clip from the snap button, remove, shoulder belt from the occupant.
3. The wheelchair tie-down will be removed as indicated on page 16.

Occupant restraints should not be held away from the body by wheelchair components or parts, such as armrests or wheels, and should not be worn twisted in any way. Occupant restraints should be adjusted as firmly as possible and consistent with user comfort. Upper torso restraints should fit over the shoulder or shoulders.

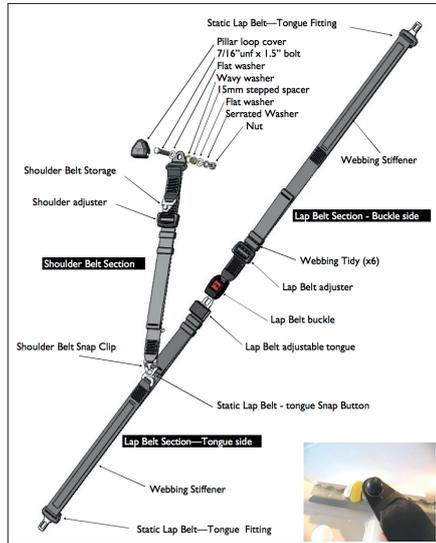


Figure 16

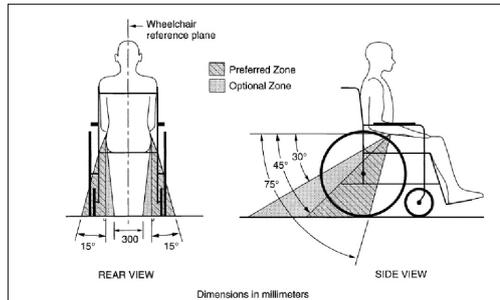


Figure 7

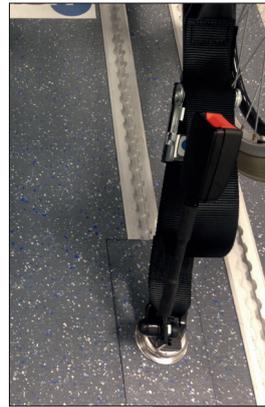


Figure 17

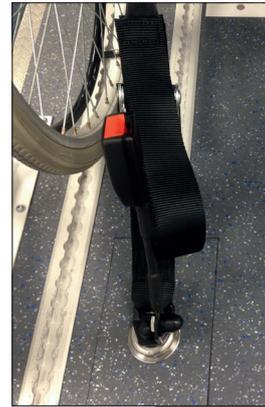


Figure 18



Figure 19

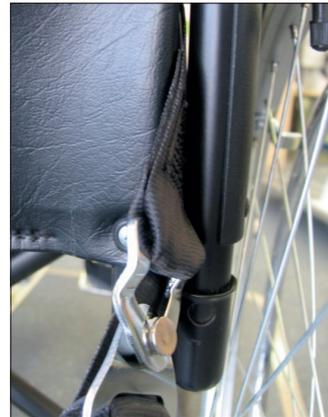


Figure 20



Figure 21

3 point WAV retractable occupant restraint

1. The floor anchors will have been installed in the vehicle, in accordance with our own and the vehicle converters instructions. Position the wheelchair within the vehicle as required.
2. Attach the front wheelchair tie-down (not supplied as part of this product) in accordance with its own instruction.
3. The rear wheelchair tie-down should be fitted as indicated on page 16.
4. The occupant restraint should be installed in accordance with previous safety information using the supplied hardware (Fig 22). **Note:** if fitting hardware, other than that provided in this kit, is to be used then the fixing bolts should be of an equivalent cross section and an equivalent grade namely B.S. Grade 'S' (ISO 8.8).
5. The componentry is assembled (Fig 22), with the upper 3rd point and lower reel anchorage points bolted to an approved anchorage position on the vehicle body. The inertia reel should be mounted at an angle of 90°/90° as viewed in 2 planes to the road level (see inset photo opposite). The reel and its bracketry is bolted through the vehicle and reinforced on the underside, if required, with the 100mm diameter load spreader plate and nyloc nut. All bolts should be tightened to a torque of 40Nm. **Note:** all vehicle anchorage points may require reinforcement as necessary to meet any required minimum strength recommendations for the vehicle.
6. Once installed, check the free running of webbing into and out of the inertia reel and check the 'lock up' facility of the reel by engaging a short tug at various intervals along the extension and retraction of the webbing in and out of the reel.
7. Adjust the drop link position at or above the shoulder height to comfortably suit the user, and draw the running tongue across the occupant, through the furthest arm of the wheelchair and connect into the far side rear tie-down stalk to form a diagonal belt (Fig 23).



8. Disconnect the fixed tongue from its buckle, attached to the inertia reel (Fig 24), pass it through the near arm of the wheelchair and connect back into the near side rear tie-down stalk, forming the complete lap and diagonal (Figs 23 & 25).
9. The lap belt anchor points should be positioned to achieve belt angles of 30° or more to the horizontal and preferably between 45° and 75° in order to fit low across the pelvis, reducing the possibility of the belt loading the abdomen (Fig 7). The pelvic restraint is designed to bear upon the bony structure of the body and should be worn low across the front of the pelvis with any junctions between the pelvic and shoulder restraints located near the wearer's hips.

Removing occupant restraint

1. Unfasten the tongue from the stalks, remove the occupant restraint and let the webbing retract back into the housing.
2. Fit running tongue into the 3rd point shoulder hook (Fig 26) & fixed tongue into the buckle tang (Fig 24)
3. The wheelchair tie-down should be removed as indicated on page 18 or 20 as indicated on page 16.

Figure 22



Figure 23

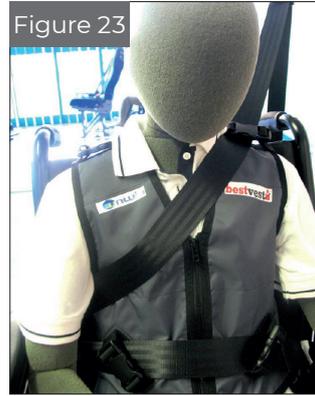


Figure 24



Figure 26



Figure 25

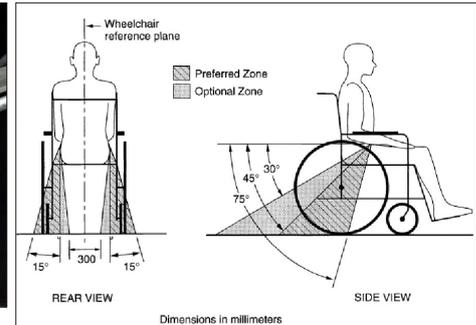


Figure 7

Occupant restraints should not be held away from the body by wheelchair components or parts, such as armrests or wheels, and should not be worn twisted in any way. Occupant restraints should be adjusted as firmly as possible and consistent with user comfort. Upper torso restraints should fit over the shoulder or shoulders.

After care

Equipment storage and maintenance

- Store the restraint safely off the floor to avoid damage and ensure that it cannot become a projectile in an accident. This can be achieved by using a wall mounted storage bag such as SLR1111.
- Regularly inspect the wheelchair restraint systems for damage, wear or malfunction. If any problems are identified replace it immediately. When not in use, keep loose occupant webbing ends connected to their corresponding buckle sleeves, etc, to prevent them from becoming trip hazards and from flailing around when the vehicle is in motion.
- All webbing and components can be cleaned as necessary, but care should be taken to prevent contamination of the webbings with polishes, oils and chemicals, particularly battery acid.
- To clean the straps use warm soapy water and a clean soft cloth. Rinse with clear water and allow to air dry. To disinfect, use a mild spray disinfectant and do not use products containing bleach. **Important: when cleaning or disinfecting, do not immerse or flood buckles, karabiners fitting or floor anchors in the disinfectant or water.**
- If the vehicle is involved in an accident when any restraints are deployed, remove them from service and replace immediately. If in doubt please contact BraunAbility.

Warranty

BraunAbility products are extensively tested using BraunAbility anchorage systems, and our full warranty normally only applies to BraunAbility equipment when used with BraunAbility branded anchorages or as instructed. BraunAbility have also participated in test programs with other manufacturers anchorage products and will support warranty on the BraunAbility products when used in conjunction with such jointly tested systems. For further details on specific applications please contact the Sales Office. In other situations, using BraunAbility products, for which BraunAbility has not participated in a joint test program, a limited BraunAbility warranty will apply.

Declaration of conformity

Manufacturer /

BraunAbility UK Ltd
Unwin House
The Horseshoe Coat Road
Martock, Somerset, TA12 6EY,
UK

Phone: +44 1935 827740
E-mail: info@braunability.eu
www.braunability.eu

Declares that the products /

Retractable Occupant Restraint:

DI-ROBT, DI-ROBH, DI-ROBK,
DK-ROBT, DK-ROBH, DK-ROBK,
DI-SOBT, DI-SOBH, DI-SOBK,
DK-SOBT, DK-SOBH, DK-SOBK,
DI-SOBJ, DI-ROBJ, DK-ROBJ,
DK-SOBJ

Static Occupant restraints:

STK-SOBT, STK-SOBH, STK-SOBK,
STK-SOBJ

WAV Retractable occupant restraints:

WK-SOBT, WK-SOBH, WK-SOBK, WI-SOBJ, WK-SOBJ

WAV Combined Rear Tie Downs:

K-ROBJ, K-SOBJ, I-ROBJ, I-SOBJ, K-RQPJ, K-RQMJ, K-RQEMJ,
K-RQEPJ, K-SQPJ, K-SQMJ, K-SQEMJ, K-SQEPJ, I-RQEMJ, I-RQEPJ,
I-RQPJ, I-RQMJ, I-SQMJ, I-SQPJ, I-SQEPJ, I-SQEMJ

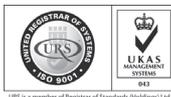
Conforms to applicable paragraphs in the following Directives, Standards and Regulations /

214/2014/EU Paragraphs 2.3.1 and 2.3.2 ISO 10542:2012
RESNA WC-4 2012 Section 18
R.107.06
2007/46/EC

BraunAbility, Martock, 1st April 2020



Rob Butcher
Director of Engineering



URS is a member of Registrar of Standards (Holdings) Ltd.

Quality system certified in accordance with ISO 9001:2015

Illustrations, descriptions and specifications in the user manual are based on current product information. BraunAbility UK Ltd reserves the right to make alterations without previous notice.

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BraunAbility UK Ltd
Unwin House
The Horseshoe, Coat Road
Martock, Somerset, TA12 6EY,
UK

Phone: +44 1935 827 740
E-mail: info@braunability.eu
www.braunability.eu