Installation Instructions

4-Point Wheelchair Restraint Systems
using Vehicle Anchorages & Accessories

WHEELCHAIR OCCUPANT TIEDOWN SYSTEM

Wheelchair Occupant tiedown system

INSTRUCTIONS FOR INSTALLATION OF WOTS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

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PRIOR TO INSTALLING, PLEASE CAREFULLY READ ALL INSTRUCTIONS AND WARNINGS

INSTRUCTIONS FOR INSTALLATION OF WOTS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

WARNING

- The system is an integrated whole; refrain from interchanging or substituting any of its components
- Consult with WOTS before making any alterations or modifications to the system or its components.
- The installer bears the responsibility of ensuring that the installation adheres to all relevant regulations and standards.
- Only an experienced technician should install the systems and components.
- WOTS systems and components have undergone testing in a configuration similar to the one outlined in these instructions. Any deviation from these recommendations falls under the responsibility of the installer.
- In some countries, regulations and standards necessitate the installation of a shoulder belt for the system to be considered compliant.
- Avoid installing anchorages or any system component into unsound materials, such as corroded metal, wood, plastic, or fiberglass panels, without appropriate reinforcement.
- Check with local authorities for specific regulations, requirements or standards
- Vehicle interior padding must meet FMVSS 201/302 and ISO 3795 requirements.
- Prevent webbing from touching sharp corners and edges.
- When a head restraint is anchored to the vehicle, a vehicle-anchored back restraint must be provided to minimize rearward deflection of the wheelchair seatback, thus preventing injury..
- Airbags should be utilized solely as supplementary occupant restraints, combined with a wheelchair tie-down and belt-type occupant restraint system compliant with WC 18/19, SAE J2249, and ISO 10542 requirements.
- If the wheelchair passenger is situated less than 7” (175mm) from the airbag module, or if any after-market device is installed in a way that obstructs or undermines the airbag's deployment, the airbags should be disconnected.
- Inform your supervisor of any possible faults or damage.
- Replace any systems or components, including those permanently fixed to the floor or wall, that may have been in use during a vehicle impact resulting in towing.
- For installation or usage queries about wheelchair and occupant securement systems, contact your nearest WOTS office.

MAINTENANCE & CARE

- Periodically clean the webbing with mild soap and water. After cleaning, fully extend the belts and position them to prevent water from entering the retractors until completely dry. Avoid contaminating the webbing with polishes, oils, or other chemicals, especially battery acid.
- Occasionally lubricate tiedown buckles at the hinges, taking care not to contaminate the webbing.
- Clean bolt threads and reapply the permanent thread locker if bolts are adjusted.
- Always keep belts clean and off the floor.
- Prevent belt webbing from coming into contact with oil, gases, polishes, and chemicals to avoid contamination.
- Any frayed, contaminated, or damaged webbing should be replaced promptly to ensure safety.
- Regularly inspect, clean, and maintain all systems and components.

WOTS INSTALLATION INSTRUCTIONS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Introduction

Purpose of 4-Point Wheelchair Securement Systems

The WOTS 4-Point wheelchair & occupant securement systems, when used as recommended, provide the safest means of transportation for wheelchair passengers unable to transfer from their wheelchairs when traveling in motor vehicles. Each component has been designed, engineered and tested to work as one comprehensive system. In the event of a collision or sudden stop, the system isolates the forward forces of the occupant from those of their chair by directing the chair's forces to the vehicle floor and anchorages.

Regulations and Standards

The WOTS Securement 4-Point Securement Systems and components comply with various safety regulations and standards, including ADA, FMVSS & CMVSS 209/210/222/302, CSA Z604/Z605 & D409, AS2942, and CE Directive 93/42/EEC. Additionally, these systems undergo crash testing to 30mph (48kph), 20G, and adhere to the applicable requirements of WC 18/19, SAE J2249*, and ISO 10542*.

System Checklist

The complete WOTS kit is meticulously designed and engineered to serve as an integrated securement system, ensuring maximum transportation safety for wheelchair passengers.

In general, a complete wheelchair/passenger securement system includes the following parts:

- Wheelchair Tiedown Retractors or Manual Belts (4)
- Occupant Lap Belt* (1)
- Occupant Shoulder Belt* (1) & mounting hardware

  *Occupant lap and shoulder belt may be a combination lap/shoulder belt
- Installation Instructions (1)
- User instruction manual
- In-vehicle instruction card
- Warranty registration card

It's important to verify that all these parts are included in the system. If anything is missing, it's advisable to contact the nearest WOTS office or distributor for assistance.

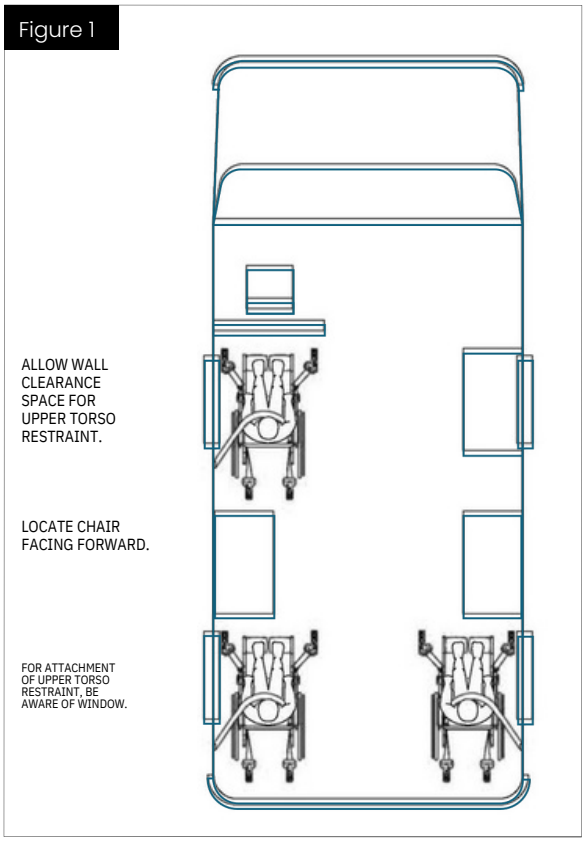
INSTRUCTIONS FOR INSTALLATION OF WOTS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Recommendations for Wheelchair Placement

Here are the recommendations for the layout of designated Wheelchair Locations:

- Tiedowns must be installed to ensure that wheelchair passengers are facing forward. However, it's important to note that wheelchair passengers may face rearward when in compliance with ADA regulations.
- Wheelchair locations should be positioned as close to the accessible entrance as feasible, guaranteeing an unobstructed path to each location, especially if multiple locations are available.
- Make sure there is ample space for the driver/attendant to maneuver around the wheelchair location and to adequately secure wheelchair passengers.
- Inspect for wall clearance, ensuring there is enough space to install floor anchorages and shoulder belts as illustrated in Figure 1.
- The Wheelchair passenger Frontal Clear Zone (FCZ) requirements outlined in Figure 2 are established based on the potential movements of the passenger during a crash.
- It's crucial to maintain recommended distances between anchorage points and vehicle interior components to prevent injuries to wheelchair passengers within the designated Frontal Clear Zone (FCZ).
- To minimize the risk of head and chest injuries to wheelchair passengers, vehicle interior components should not be positioned in the designated Wheelchair Location unless they meet the impact requirements outlined in FMVSS 201 or an equivalent standard.

Figure 1



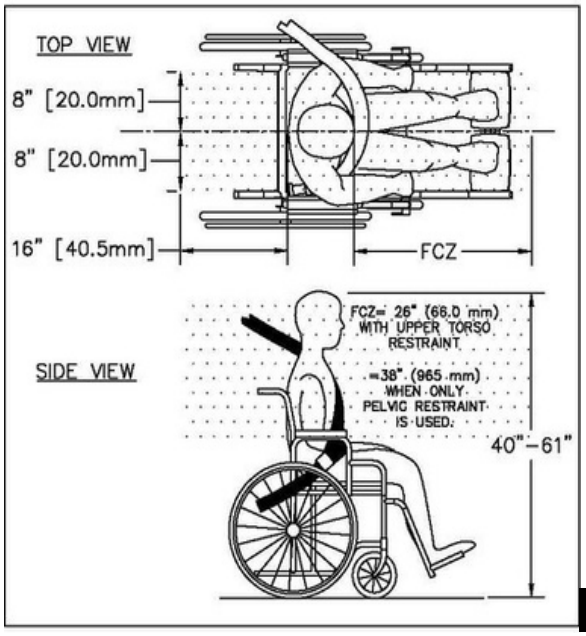


Figure 2

Recommended Frontal Clear Zones (FCZ):

Seated Head Height (SHT) ranges from 40" (1,016mm) for a 6-year old child to 61" (1,550mm) for a tall adult. Note: We strongly recommend the use of lap and shoulder belts to reduce possibility of head and chest impacts with vehicle components. FCZ may not be achievable with wheelchair-seated drivers.

INSTRUCTIONS FOR INSTALLATION OF WOTS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Installation of Floor Anchorage

If the floor anchorage provided does not match these instructions, please contact your nearest WOTS office or visit our website at www.wotsusa.com to access additional instructions.

Recommendations for floor anchorage layout

Here are the optimal installation practices and recommended distances (center-to-center) between floor anchorages, as illustrated in Figure 3:

1. Front to Front = 26" - 34" (660 - 860mm)
2. Rear to Rear = 13" - 15" (330 - 380mm)
3. Front to Rear = 42" - 60" (1,070 - 1,520mm)*

* Important Note: For public transit vehicle installations, 'Front to Rear' spacing of 42" – 75" (1,070 – 1,900mm) is safe, acceptable and ADA approved. However, spacing greater than 60" (1,520mm) may cause operational difficulties with wheelchair tiedowns and we recommend using webbing loops or belt extenders in the event wheel- chair passengers may have a very small mobility aid.

* Note: Recommended distances are based on common wheelchair sizes. Exceptionally large or small wheelchairs may require anchorage spacing that differs from our recommendation. Consider optimal tiedown angles (Figure 4) to determine exact placement of floor anchorages.

Other Items to consider when determining floor anchorage placement:

- Tiedowns should avoid passing through the wheels of the wheelchair.
- Tiedowns must maintain a clear path from floor anchorages to the wheelchair frame, avoiding interference with any parts of the wheelchair (e.g., footrests).
- The optimal angle of tiedowns for crash protection and maximum stability of the wheelchair is depicted in Fig 4.
- Preferred locations and angles of tiedowns from wheelchair securement points to vehicle anchor points are provided. Front tiedowns should be angled outward for lateral stability whenever possible.
- The distance (D) between tiedowns should be 12" (305 mm)

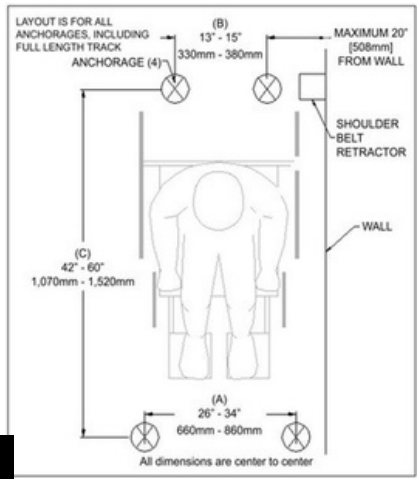


Figure 3

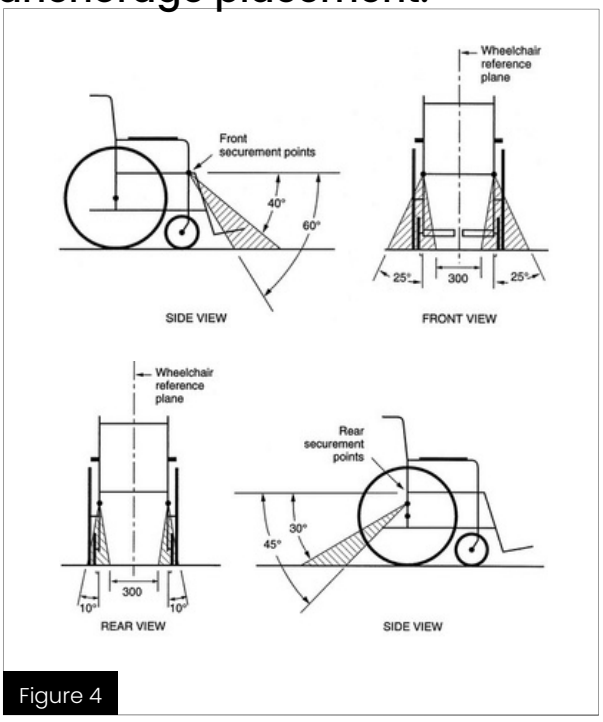


Figure 4

INSTRUCTIONS FOR INSTALLATION OF WOTS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Installation of Floor Anchorage

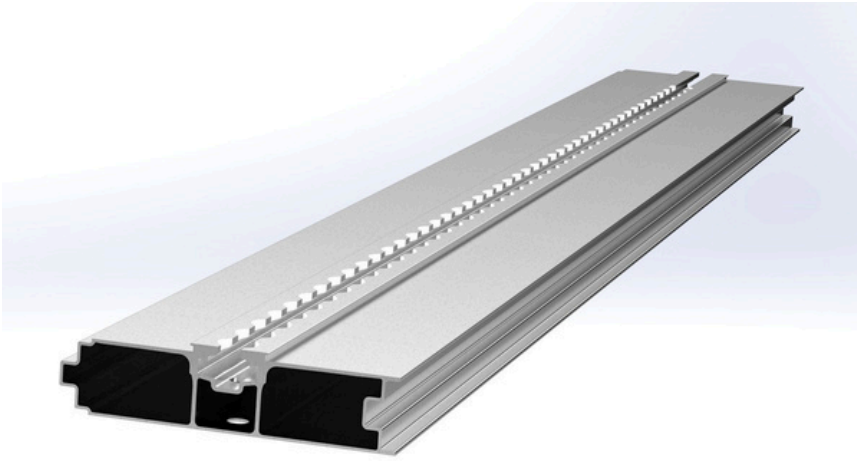
IMPORTANT

- Before installing floor anchorages: Consult local transportation and regulatory authorities for minimum/maximum Wheelchair Location space and emergency exit requirements.
- Inspect the underside of the vehicle floor to identify any utilities, frames, cross-members, fuel tanks, or other potential obstructions before starting installation.
- The recommended distance between the wall and the nearest rear floor anchorage should not exceed 20" (510mm). A greater distance may impede proper shoulder belt use, increasing the risk of wheelchair passenger injury.
- Avoid installing anchorages or any system component into unsound materials such as corroded metal, wood, plastic, or fiberglass panels without suitable reinforcement.
- If WOTS-provided hardware is not used, ensure that only minimum Grade 8 hardware coated for adequate corrosion protection per ISO 7253 or ASTM B117 is utilized.
- Vehicle anchor points may require reinforcement. The installer or manufacturer is responsible for ensuring that anchorages are installed onto suitable floor and wall structures, meeting applicable performance requirements beyond the scope of this document.

WOTS INSTALLATION INSTRUCTIONS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Integrated L track to floor

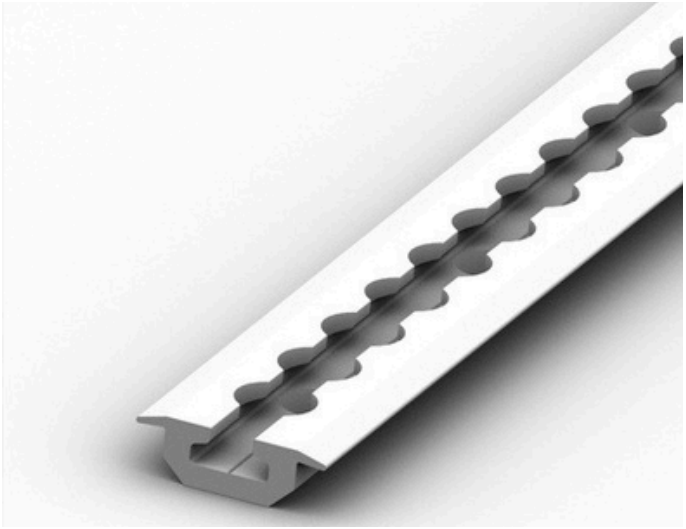
Directly mount the floor restraint to the floor panel which has integrated L track



ALFO 3.0

Standard Pareto L-Track

Directly mount the floor restraint to the standard Pareto L-track



Standard L-Track

WOTS INSTALLATION INSTRUCTIONS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Aluminum L-Track

3 Profiles: Regular, Flange & Surface Rail. Contact your nearest WOTS office for part numbers.

IMPORTANT

- If not using WOTS provided hardware, only use minimum 5/16" (8mm) Grade 8, flat head, 82 degree, countersunk bolts coated for adequate protection against corrosion per ISO 7253 or ASTM B117.

- Determine the location of anchorages per Figures 3 & 4. L-Track can be installed perpendicular or parallel to wheelchair location; it includes a full-length track.
- If **recessing track** into the floor (Figure 6a), route the area in floor for each track; 1.42" (36mm) wide x 1/2" (13mm) deep and proceed to Step 4.
- If the **surface mounting** track onto the floor (Figure 6b), place the track on the floor and proceed to Step 5.
- Clean out debris and place tracks in routed areas.
- With the track in position, use it as a template to mark the center holes to be drilled.
- Remove the track and drill 5/16" (8mm) holes through the floor per the track drilling pattern.. Note:
- Standard track drilling pattern = holes every 4" (102mm).
- Place sealant in floor openings (recessed track only) and reinstall the track.
- Pass 5/16" (8mm) bolts through the track and floor.
- From underneath the vehicle floor, place backing plates and washers over bolts. The sealant may be used between the backing plate and the floor if desired.
- Securely fasten bolts and lock nuts as shown in Figures 10a & 10b, ensuring at least 2 – 3 threads are sticking out. **Recommended torque = 35 FT/LB (47 N.m.).**

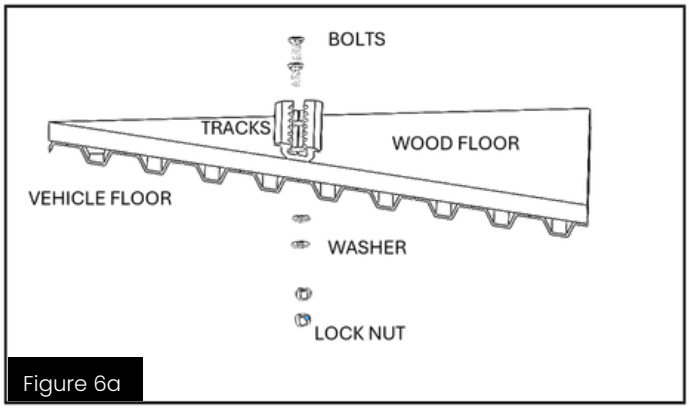


Figure 6a

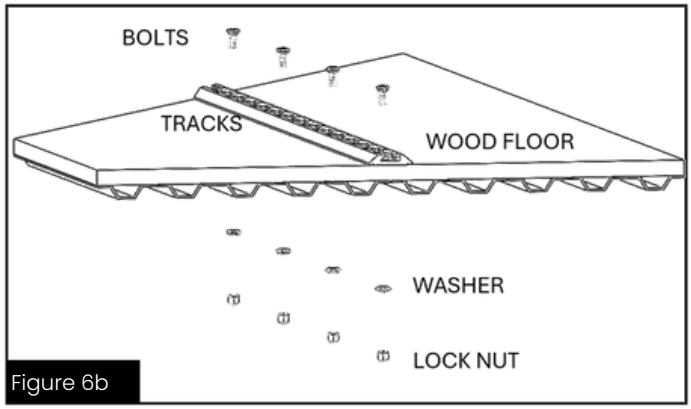


Figure 6b

WOTS INSTALLATION INSTRUCTIONS 4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Shoulder Belt Anchorage Installation

WOTS provides several styles of shoulder belts for a variety of applications. This section describes the placement and installation instructions for fixed, retractable and combination shoulder belts.

IMPORTANT

- Lap belts should always rest against the bony parts of the person sitting in the wheelchair. They should not touch any part of the wheelchair like armrests, panels, wheels, or frame.
- Don't attach anchorages or any parts of the system to weak materials like rusted metal, wood, plastic, or fiberglass panels unless they're reinforced properly.
- If you're not using hardware provided by WOTS, make sure to use high-quality Grade 8 hardware that's coated to prevent corrosion, following standards like ISO 7253 or ASTM B117.
- The points where the wheelchair is secured to the vehicle might need extra support. It's the responsibility of the installer or manufacturer to make sure these anchorages are fixed onto strong parts of the vehicle's floor and walls. These parts need to be strong enough to meet safety standards beyond what's mentioned in this document.

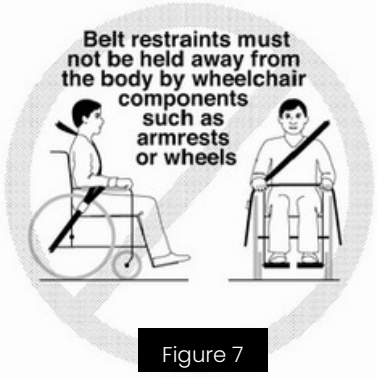


Figure 7

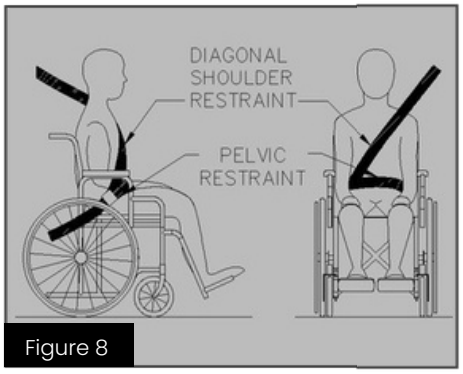


Figure 8

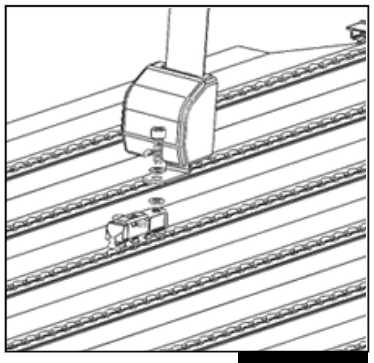


Figure 9

Installing Lower Retractable Shoulder Belt Anchorage

IMPORTANT

- Check underneath the vehicle to see if there are any pipes, frames, or fuel tanks that might get in the way before you start installing anything.
- Only change the size of the backing plate if you really need to, because making it smaller can make the weight on the floor uneven. Leave at least 0.6 inches (15mm) of space around the hole in the plate.
- Figure out where to attach the shoulder belt in the wheelchair area. Usually, the lower attachment point should be near or just behind the rear floor anchors.
- Put the retractor base where you want it and mark where you need to drill a hole.
- Drill a 3/8 inch (10mm) hole in the floor through the center of the L-bracket and put a bolt through it. It's a good idea to use sealant between the floor and the bracket.
- From under the vehicle, put the backing plate and washer over the bolt. You can use sealant between the backing plate and the floor if you want.
- Tighten the lock nut securely, leaving about 2 to 3 threads sticking out. Recommended torque = 35 FT/LB (47 N.m.).

WOTS INSTALLATION INSTRUCTIONS
4-POINT WHEELCHAIR SECUREMENT SYSTEMS

Shoulder Belt Anchorage Installation

Mounting to Fittings (L-Track)

- Determine mounting location of shoulder belt in Wheelchair Location (Figure 2); in general, lower anchorage point should be adjacent to or slightly behind rear floor anchorages.
- Install the appropriate floor anchorage per 'Floor Anchorage Instructions' section.
- Fasten retractor base to applicable Fitting using bracket and hardware as shown in Figure 10.
- Recommended torque = 50 FT/LB (67 N.m.).
- Secure shoulder belt and fitting assembly into appropriate floor anchorage.

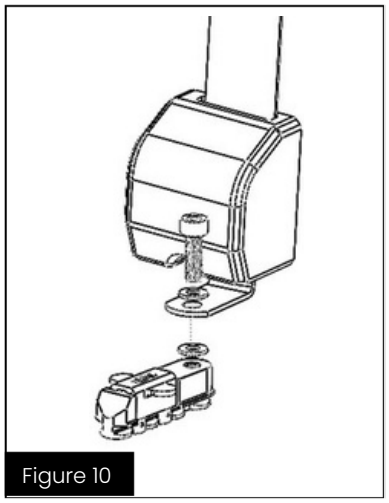


Figure 10

Note: *Retractor in mounted position must be at a zero (0) degree rotation with respect to the bracket arm to ensure proper webbing movement.*

Installing Upper Anchorage

IMPORTANT

- Shoulder belt upper anchorage or guide support should always be positioned so that:
  1. belt webbing always lies across the center of wheelchair passenger's shoulder (Figure 8), and
  2. it extends upward and rearward of the wheelchair occupant's shoulder level to avoid any downward forces on the spine.
- Do not use the triangle wall bracket with Retractable Shoulder Belts.

Mounting Direct to Wall (i.e. Fixed Shoulder Belt)

- Determine a mounting location for the shoulder belt in the Wheelchair Location (Refer to Figure 2); in general, the shoulder belt anchorage point should be adjacent to or slightly behind the rear floor anchorages.
- **For Retractable Shoulder Belts, verify anchorage is directly above the lower anchorage (i.e. straight vertical line) to prevent webbing from rubbing on the cover as it exits the retractor base.**
- Measure and determine the proper mounting height of the upper anchorage based on the style of the shoulder belt:

- With Height Adjustor (shows examples): Mount upper anchorage 61" (1,550mm) or

- more from the floor.
- Make sure the shoulder belt is secure, but can swivel and snap the plastic cover into place.

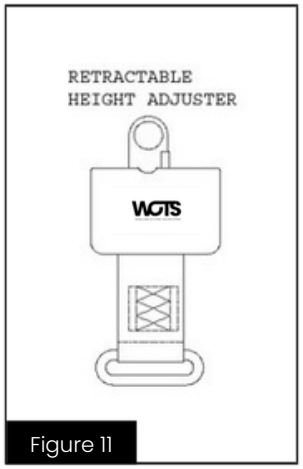


Figure 11

Retractors

Shoulder Belt

Lap Belt

WOTS

WHEELCHAIR OCCUPANT TIEDOWN SYSTEM

If you have any questions, comments and concerns, or need additional information, please do not hesitate to contact us at any of the following locations:

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