# THIS TECHNICAL MANUAL HAS BEEN DEVELOPED FOR AND INTENDED TO BE USED BY A QUALIFIED TECHNICIAN WORKING FOR AN AUTHORIZED KI MOBILITY DEALER.





## **A** WARNING **A**

WARNING: Repairs and adjustments not made by a qualified technician working for an authorized Ki Mobility Dealer can result in poor performance or failure of the device which may cause serious injury or death.

This technical manual is designed to aid in the different procedures that may be needed for the Tsunami and Little Wave wheelchairs. This technical manual does not replace, but aids the owner manual, adjustment guides and instructions. The procedures shown in this technical manual should only be performed by an Assistive Technology Practitioner (ATP) or clinical professional trained to do wheelchair repairs, adjustments and retrofits.

Additional information can be found in the Tsunami and Little Wave Owner Manuals. The owner manuals can be found on the Ki Mobility website.

If you have any questions or concerns about any aspect of this wheelchair, this manual, or the service provided by us or your retail supplier, please do not hesitate to contact us by telephone at:

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### **Tools**

Please see the list below to identify the tools needed throughout this tech manual. Always check tools to ensure the ends are not stripped and that the tool can perform its function properly without damaging any parts or hardware on the chair.

Tools Needed							
2.5mm Allen Wrench	Two 8mm Wrenches						
3mm Allen Wrench	Two 10mm Wrenches						
4mm Allen Wrench	13mm Wrench						
5mm Allen Wrench	17mm Wrench						
5.5mm Allen Wrench	19mm Wrench						
6mm Allen Wrench	24mm Wrench						
Utility blade	Phillips Screwdriver						

#### **Chair Measurement References**

The Tsunami and Little Wave wheelchairs are capable of many adjustments to configure the chair to the user's needs. See the diagram below for terms that are commonly used during the process of adjusting the chairs.

#### A. Seat Width (see diagram 1)

Measured from outside of frame tube on one side to the outside of frame tube on the other side.

#### B. Seat Depth (see diagram 3)

Measured from front of back posts to front edge of seat sling. Seat sling starts at beginning of bend at front of frame.

#### C. Sling Position (see diagram 2)

In Performance Position (0"), sling is at front of frame to keep chair shorter and more maneuverable. The 1" or 2" seat sling position extends the frame in front of the sling by that amount. Adding more frame can improve stability and provide support to aid in transfers.

#### D. Front Frame Bend (see diagram 3)

Angle between front seat tube and ground.

#### E. Footrest Taper (see diagram 1)

Indicates bend of front frame creating footrest. Taper is measured from outside of seat frame to outside of front tube.

#### F. Front Seat Height (see diagram 1)

Measured from floor to top of seat tube at front of seat sling.

#### G. Footrest Width (see diagram 1)

Measured from inside of front tube to inside of front tube on other side. Footrest width is listed below for each seat width and taper.

<b>Seat Width</b>	Straight	1" Taper	2" Taper		
Outside Measurement	2" Narrower than Seat Width	4" Narrower than Seat Width	6" Narrower than Seat Widtl		
12"	9.5"	7.5"			
13"	10.5"	8.5"			
14"	11.5"	9.5"			
15"	12.5"	10.5"			
16"	13.5"	11.5"	9.5"		
17"	14.5"	12.5"	10.5"		
18"	15.5"	13.5"	11.5"		
19"	16.5"	14.5"	12.5"		
20"	17.5"	15.5"	13.5"		

#### H. Seat to Footrest Length (see diagram 3)

Measured from front edge of seat sling to top rear of footrest. Footrest length of at least 2.5" shorter than front seat height recommended.

#### I. Rear Seat Height (see diagram 3)

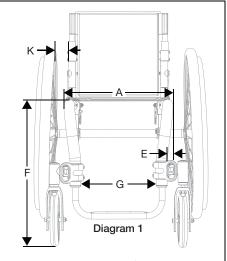
Measured from floor to top of seat tube at front of back post. Rear seat height is custom to needs.

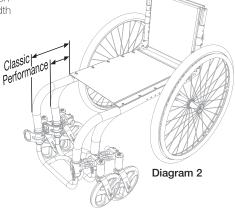
#### J. Center of Gravity Preset (see diagram 3)

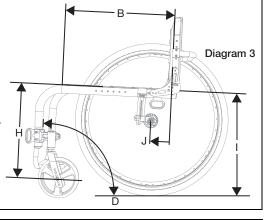
Measured from front of back post to center of rear axle. 0" indicates axle will be directly under back post.

#### K. Rear Wheel Spacing (see diagram 1)

Measured from outside of seat back to inside of rear tire. Adjustable out .5" from setting.





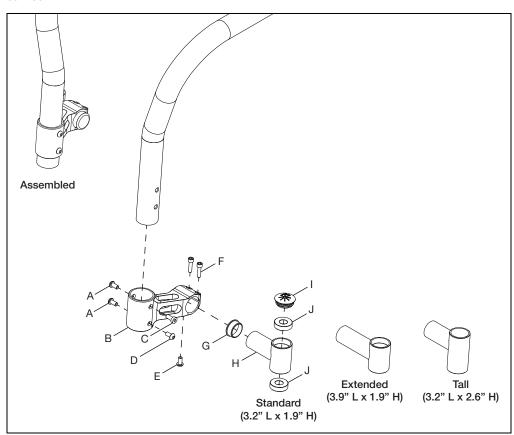


#### **Caster Mount**

NOTE: The footrest tube must be removed prior to installation to allow the caster mount to slide onto the chair frame.

- 1. Install the two end caps (G & I) and two bearings (J) into the caster housing (H).
- 2. Install the caster housing assembly into the caster mount (B) and secure with three bolts (E & F) using a 4mm Allen wrench.
- 3. Install the caster mount assembly onto the chair frame and secure by installing the four bolts (A, C & D) through the caster mount and chair frame holes using a 4mm and a 5mm Allen wrench.

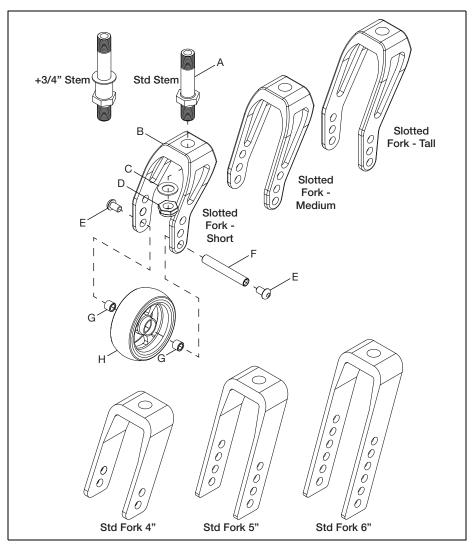
NOTE: There are three different sizes of the caster housing available - standard, extended and tall. Caster housing size is dependent on caster size, front seat height and footplate selection. If additional help is needed regarding caster housing size please contact Ki Mobility customer service.



NOTE: Different configurations achieve the desired front seat height based on caster size. If making a change to front seat height or caster size, the combination of fork and stems could vary.

- 1. Install stem (A) into fork (B) with washer (C) and nut (D) using a 16mm wrench.
- 2. Install caster wheel (H) into fork (D) with two screws (E), a threaded barrel (F) and two spacers (G) using two 4mm Allen wrenches.

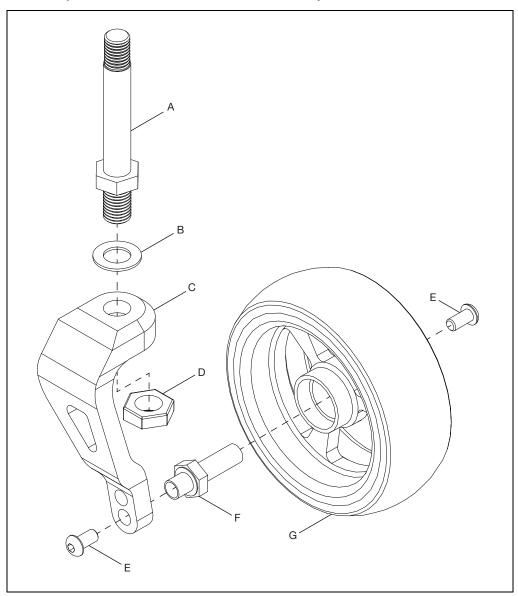
NOTE: There are two sizes of caster stems (standard and +3/4") and three sizes of slotted forks (short, standard and tall) and standard forks (4", 5" and 6") that can be used. The image below shows the stems and forks. The installation process is the same for whichever stem and fork you use.



#### **Single Sided Fork**

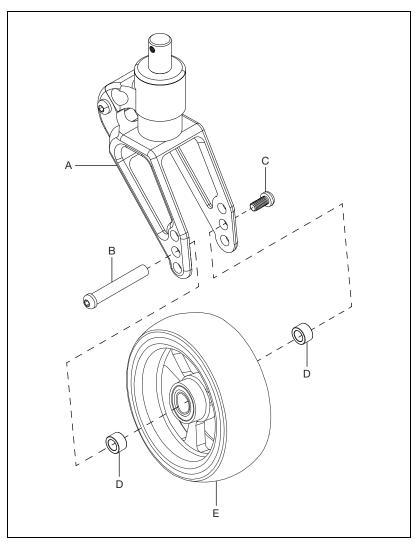
- 1. Install stem (A) into single sided fork (C) with washer (B) and nut (D) using a ½" wrench.
- 2. Install caster wheel (G) onto fork (C) with two screws (E) and the axle shaft (F).

NOTE: There are three sizes of caster stems (standard,  $\pm 3/4$ " and  $\pm 1$ ") that can be used. The installation process is the same for whichever stem and fork you use.



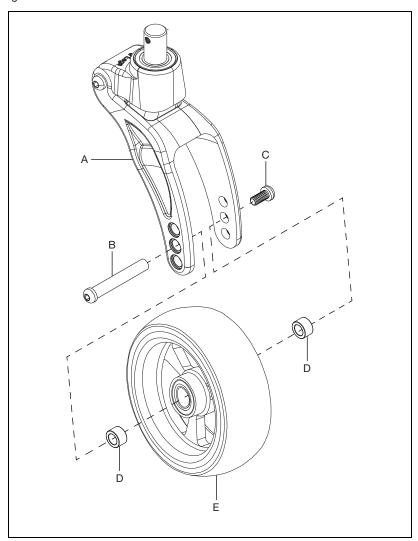
#### **Frog Legs Ultra Sport Fork Assembly**

1. Install Frog Leg Ultra Sport Fork (A) onto caster wheel (E) with axle (B), screw (C) and two spacers (D) using two 4mm Allen wrenches.



#### Frog Legs Phase 2 Carbon Fork Assembly

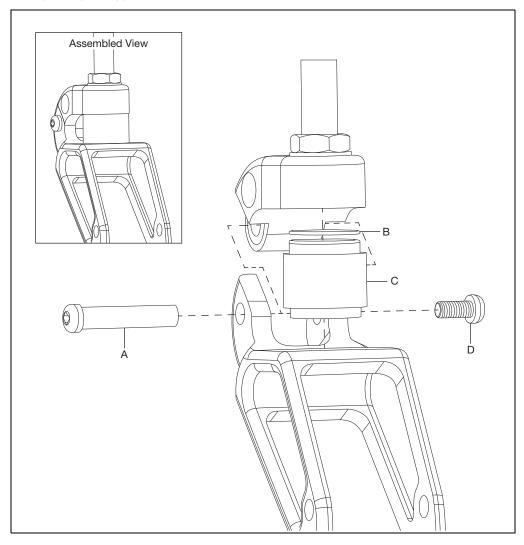
1. Install Frog Leg Phase 2 Carbon Fork (A) onto caster wheel (E) with axle (B), screw (C) and two spacers (D) using two 4mm Allen wrenches.



#### Frog Legs Ultra Sport Fork Polymer Replacement

NOTE: The Ultra Sport fork has different polymers that can be used based on the chair user's weight and preferred ride. The Phase 2 fork has one polymer that works for any configuration. If ever needed, the replacement procedure is the same for a Phase 2, but no coin is needed.

- 1. Remove the pivot pin screw (D) using a 4mm Allen wrench.
- 2. Use a punch or small screwdriver and a rubber mallet to push the pivot pin (A) out.
- 3. Open the fork assembly and remove the polymer (C) and coin (B).
- 4. Install the new polymer (C) and coin (B).
- 5. Insert the pivot pin (A) back into the fork assembly. A punch or small screwdriver can be used to help align holes if needed.
- 6. Secure the assembly by reinstalling the pivot pin screw (D) using a 4mm Allen wrench.
- 7. Repeat steps on opposite side.



### **Caster Angle and Squaring**

To maintain optimal performance of your Tsunami and Little Wave, the front caster housing should always be aligned perpendicular to the ground. Your chair is shipped aligned. It is recommended that caster squareness is checked after making adjustments to the chair configuration related to any of the following items: caster size or type, camber, rear wheel, tire, center of gravity and seat heights. Caster squareness should always be the last check made prior to use after adjustments or changes to the chair have been made.

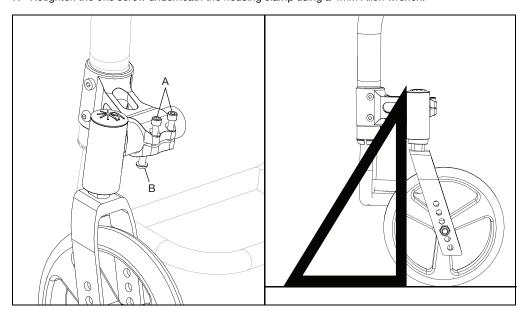
After all other adjustments are made you should check your caster housing alignment and realign if the housing is not perpendicular to the ground.

NOTE: A hole has been drilled in the caster housing to ensure squareness. This hole helps keep the caster square, but it does allow adjustment of up to 4° in the case that the caster needs to be resquared. See instructions below.

#### Adjusting the Caster Angle:

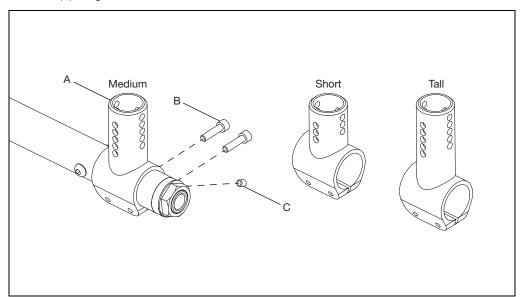
For optimum performance, the caster housing should always be at 90° angle to the floor (perpendicular to the ground).

- 1. To change the angle, place the chair on a flat surface (such as a table).
- Loosen the two 5mm Allen screws on the top of the caster housing clamp. This will allow the caster pivot tube to rotate freely (A).
- 3. Loosen the one screw (B) underneath the housing clamp using a 4mm Allen wrench.
- 4. Place a large right triangle against the table surface and the front surface of the caster bearing housing. This will align the caster stem rotational axis perpendicular to the floor surface.
- 5. When the alignment is correct, retighten the two 5mm retaining screws to 80 in/lbs.
- Tighten screws in a balanced fashion tighten one screw to 50 in/lbs and then the second to 50 in/lbs. Return to the first screw and tighten to 80 in/lbs and then tighten last screw to 80 in/lbs. Repeat on opposite side.
- 7. Retighten the one screw underneath the housing clamp using a 4mm Allen wrench.

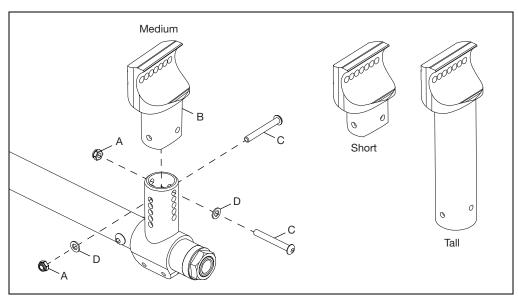


#### **Standard Tower Index Mount**

1. Install the camber mount clamp (A) onto the camber tube and secure with two bolts (B) and the set screw (C) using a 4mm Allen wrench and a 2.5mm Allen wrench.



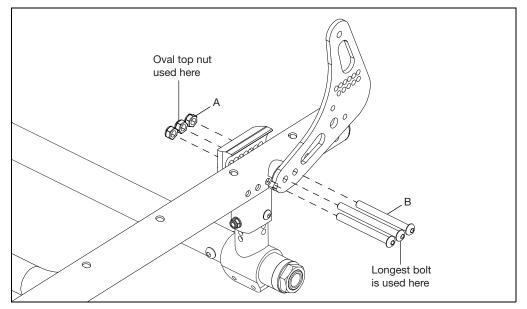
Install the camber mount (B) onto the camber mount clamp and secure with two bolts (C), two washers (D) and two nuts (A) using a 4mm Allen wrench and an 8mm wrench.



3. Install camber mount and camber tube assembly onto the frame with three bolts (B) and three nuts (A) using a 5mm Allen wrench and a 10mm wrench. The hardware used to attach the camber mount to the frame is also used to attach the back plate.

NOTE: The holes used for mounting the camber mount and the back plate set the seat depth. Use the holes that provide the desired seat depth.

NOTE: One long bolt (65mm) and one oval top nut are used in the attaching of the camber mount and back plate. See the image below for the location of those two pieces of hardware.

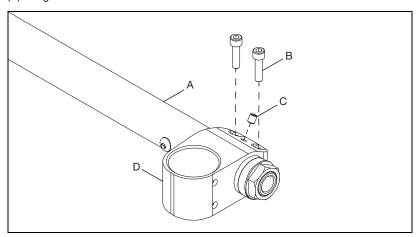


4. Repeat steps on opposite side.

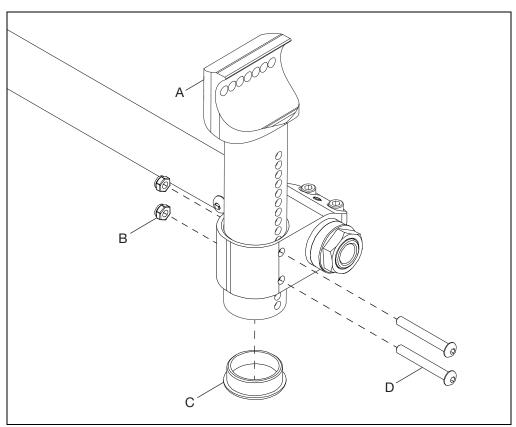
NOTE: Ensure both sides of chair have the camber mount and back plate mounted in the same configuration.

#### **MX Tower Index Mount**

1. Install the camber mount clamp (D) onto the camber tube (A) and secure with two bolts (B) and the set screw (C) using a 4mm Allen wrench and a 2.5mm Allen wrench.



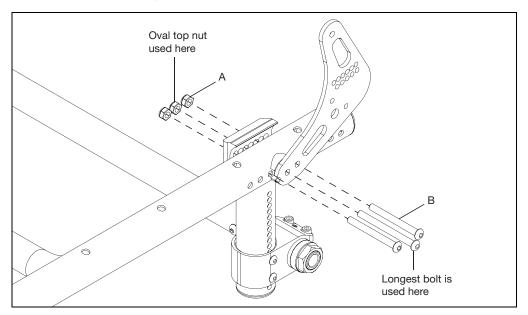
2. Install the camber mount (A) onto the camber mount clamp and secure with two bolts (D) and two nuts (B) using a 4mm Allen wrench and an 8mm wrench. Install the end cap (C) into the camber mount tube.



3. Install camber mount and camber tube assembly onto the frame with three bolts (B) and three nuts (A) using a 5mm Allen wrench and a 10mm wrench. The hardware used to attach the camber mount to the frame is also used to attach the back plate.

NOTE: The holes used for mounting the camber mount and the back plate set the seat depth. Use the holes that provide the desired seat depth.

NOTE: One long bolt (65mm) and one oval top nut are used in the attaching of the camber mount and back plate. See the image below for the location of those two pieces of hardware.



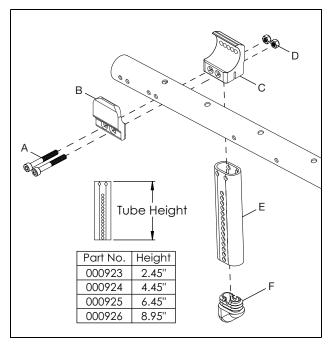
4. Repeat steps on opposite side.

NOTE: Ensure both sides of chair have the camber mount and back plate mounted in the same configuration.

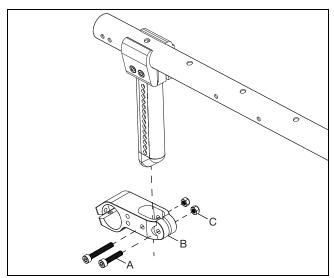
### **Camber Mount Assembly - Little Wave**

NOTE: Install one side at a time so you are able to install the camber tube properly in a later step. NOTE: The outside clamp (B) is not used when the COG is set at -0.5 or less.

1. Install the tower clamps (B & C) onto the frame with the camber mount tube (E) and the camber tube cap (F) using two screws (A) and two nuts (D) with a 4mm Allen wrench.

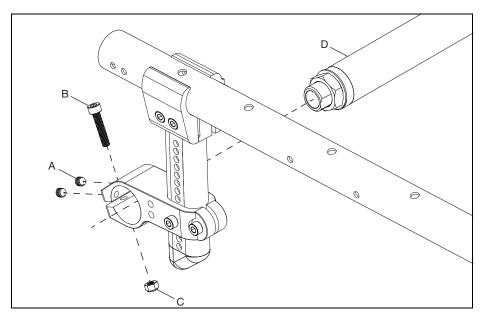


Install the camber tube mounting clamp (B) onto the camber mount tube and secure with two screws
 (A) and two nuts (C) using a 4mm Allen wrench and an 8mm wrench.



### **Camber Mount Assembly - Little Wave**

3. Install camber tube (D) into the camber tube mounting clamp and secure with screw (B) and nut (C) using a 4mm Allen wrench and an 8mm wrench. Install and tighten the two set screws (A) with a 2.5mm Allen wrench.



4. Repeat steps on opposite side.

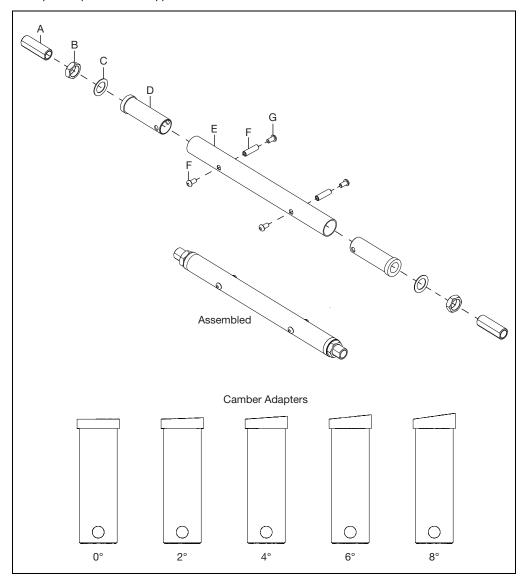
### **Camber Tube and Adapters**

NOTE: The caster squareness and toe-in/toe-out should always be checked anytime a change is made to camber degree.

1. Install axle receiver, axle receiver nut, axle plate washer and camber adapter into the camber tube.

#### NOTE: The camber adapter is available with 0°, 2°, 4°, 6° and 8° camber.

- Secure the camber adapter into the camber tube with two screws and a threaded barrel using two 4mm Allen wrenches.
- 3. Repeat steps 1 and 2 on opposite end of camber tube.



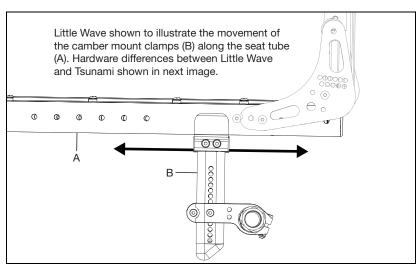
### **Center of Gravity Adjustment**

The most important adjustment on your Tsunami or Little Wave wheelchair is the position of the rear axle.

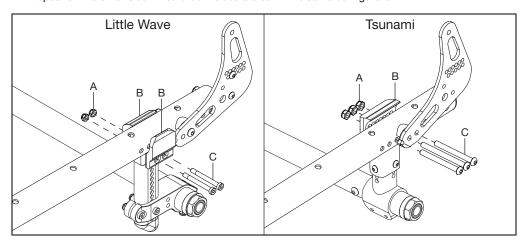
NOTE: Changes to the center of gravity may affect the rear seat height, toe-in/toe-out of the rear wheels and the squareness of the casters. If you change your center of gravity position, readjust all of these settings if necessary.

NOTE: Adjusting the chair's center of gravity will require readjusting the location of the wheel locks (if provided). Adjust the center of gravity by moving the two camber mount clamps (B) forward or rearward on the seat tube (A).

Moving the camber mount clamps forward shortens the wheelbase and lightens the front end, making your chair more maneuverable. Moving the camber mounts rearward makes the chair more stable and less likely to tip over rearward.



- 1. To adjust the center of gravity location, remove both rear wheels.
- 2. Remove the screws (C) and nuts (A) that secure the camber mounts (B) to the seat tubes.
- Slide the camber mount forward or rearward along the seat tube to the desired hole location. Reinstall screws and nuts. In some cases where the attaching bolts also go through the backrest plate, longer bolts are required (Tsunami image below shows an example).
- 4. Repeat on the other side. Ensure both sides are set in the same configuration.



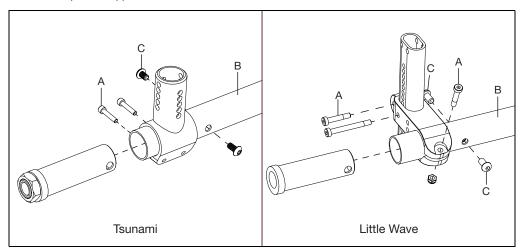
### **Setting Toe to Zero**

NOTE: A wheelchair equipped with 0° camber plugs cannot have a toe-in-toe-out condition. This adjustment is only required when using 2°, 4°, 6° and 8° camber adapters.

Toe refers to how well the rear wheels of the chair are aligned relative to the ground. It affects how well the chair will roll. Drag or rolling resistance is optimally minimized when the wheel toe is set to zero.

#### Setting the toe to zero:

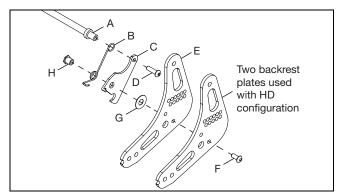
- 1. Loosen the four cap screws (A) (2 per side) that secure the camber tube clamp.
- 2. Rotate the camber tube (B) until the screws (C) that secure the camber spuds are level with the ground. The toe is now set at zero.
- 3. Before tightening the screws (A), make certain that the camber tube is centered left-to-right relative to the wheelchair frame. There should be an equal gap on both sides or none at all.
- 4. Tighten screws in a balanced fashion tighten one screw to 50 in/lbs and then the second to 50 in/lbs. Return to the first screw and tighten to 80 in/lbs and then return to the second screw and tighten to 80 in/lbs. Repeat on opposite side.



NOTE: Remove any cushion or seating components that may be in the way of the current backrest removal. Remove the current backrest before beginning.

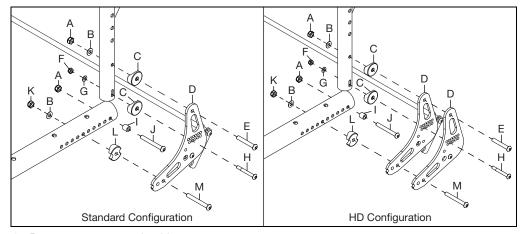
#### Standard Tsunami Backrest

- 1. Install the backrest latch (C) onto the backrest plate (E) with screw (F), washer (G), backrest latch spring (B) and backrest latch pivot bushing (H) using a 3mm Allen wrench.
- 2. Attach the backrest release bar (A) to the backrest latch (C) with screw (D) and backrest latch spring (B) using a 3mm Allen wrench.



3. Install the backrest assembly to the back post and frame with three screws (E, H & M), three saddles (C & L), three washers (B & G) and three nuts (A,F & K) using a 3mm Allen wrench, a 4mm Allen wrench, an 8mm wrench and a 10mm wrench. Install the bolt (J), backrest latch strike bushing (I) and a nut (A) onto the frame and in the backrest latch so it catches. See table below for bolt sizes.

Bolt	Description	Size
Е	One bolt size used	40mm
Н	One bolt size used	40mm
М	<ul> <li>When bolt mounts the back plate to the frame, no engagement to tower.</li> <li>When bolt goes through tower and slide, but not backrest plate. Only used on titanium chairs.</li> <li>When bolt goes through backrest plate and tower.</li> <li>When bolt goes through backrest plate, tower and slide. Also used when bolt goes through backrest plate and tower on HD chair.</li> </ul>	•55mm •60mm •65mm •70mm
J	One bolt size used	50mm



4. Repeat steps on opposite side.

NOTE: The seat depth is determined by the holes used when mounting the backrest assembly. Ensure both sides are set in the same configuration.

NOTE: Remove any cushion or seating components that may be in the way when removing current backrest. Remove the current backrest and back posts before beginning.

#### **Locking Fold Down Back**

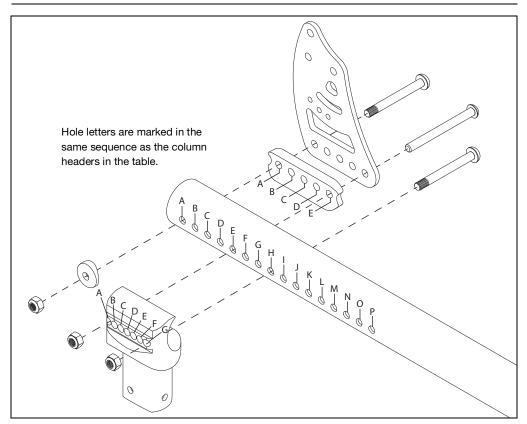
NOTE: The new Locking Fold Down Back assembly, standard and transit, uses new backrest tubes. If the chair does not already have the new backrest design, new backrest tubes are needed as the old tubes are not compatible.

#### **CG** and Hardware Reference Table

The table and diagram (shown on the next page) show the correct bolt lengths to use depending on the configuration of the backrest. They also show which holes to use when mounting the backrest to achieve the desired center of gravity depending on the configuration of the backrest. Installation steps begin on the next page.

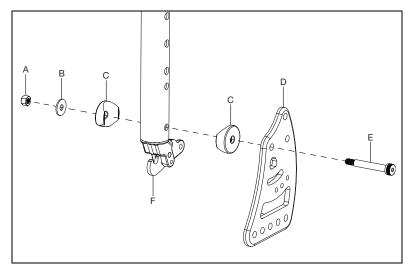
NOTE: Hole letters are marked in the same sequence as the column headers in the table.

	Stackup Nut/		Nut/Tower/Tube	Nut/Tower/Tube/Large Saddle/Bracket	Nut/Tube/Large Saddle/Bracket	Nut/Small Saddle/Tube/Large Saddle/Bracket	
		Total Length	55.5mm	65mm	50.5mm	53.7mm	
		Bolt Needed	003232 (55mm)	101127 (65mm)	101781 (50mm)	003232 (55mm)	
	Standard Tower	MX-Tower					
	-1.5		A/A	E/C/A		G/E	
	-1.25		B/A	F/C/B		F/E	
	-1			C/B/A, G/D/C		F/E	
	-0.75			B/A/A, F/C/C		E/E	
	-0.5			A/A/A, G/D/D	E/E		
	-0.25	-1.5		B/B/B, F/D/D			
	0	-1.25		A/B/B, G/E/E	A/A		
	0.25	-1		B/C/C, F/E/E		A/A	
	0.5	-0.75		A/C/C, E/E/E		A/A	
	0.75	-0.5		B/D/D, D/E/E		A/A	
	1	-0.25	G/G	C/E/E		A/A	
≥	1.25	0	F/G	B/E/E		A/A	_
Ş	1.5	0.25	G/H	A/E/E		A/A	힏
CENTER OF GRAVITY	1.75	0.5	B/F, F/H			A/A, D/D	HOLE ALIGNMENT
F)	2	0.75	A/F, G/I		D/D	A/A	Ę
E C	2.25	1	B/G, F/I			A/A, D/D	N N
Ę	2.5	1.25	A/G, G/J			A/A, E/E	Ē
CEI	2.75	1.5	B/H, F/J			A/A, E/E	É
	3	1.75	A/H, G/K			A/A, E/E	
	3.25	2	B/I, F/K			A/A, E/E	
	3.5	2.25	A/I, G/L			A/A, E/E	
	3.75	2.5	B/J, F/L			A/A, E/E	
	4	2.75	A/J, G/M			A/A, E/E	
	4.25	3	B/K, F/M			A/A, E/E	
		3.25	A/K, G/N			A/A, E/E	
		3.5	B/L, F/N			A/A, E/E	
		3.75	A/L, G/O			A/A, E/E	
		4	B/M, F/O			A/A, E/E	
		4.25	A/M, G/P			A/A, E/E	



#### **Backrest Installation**

 Install new backrest by installing pivot (F) into backrest tubes and securing with bolt (E), back plate (D), two saddles (C), washer (B) and nut (A) using a 5mm Allen wrench and an 8mm wrench. Repeat on opposite side.



- 2. Install bolt (G), lock washer (E) and strike hex (D) onto the backrest plate (F) using a 4mm Allen wrench and a 10mm wrench. Repeat on opposite side.
- Install backrest release bar (A) and secure with screw (N) using a Phillips screwdriver. Do not
  overtighten. There will still be play and slight rotation of the release bar once secure. Repeat on
  opposite side.
- 4. Install two bolts (I & J), two lock washers (E & M), arc adjustment cam (H), washer (O) and strike hex (D) using a 3mm and 4mm Allen wrench and a 10mm wrench. Repeat on opposite side.

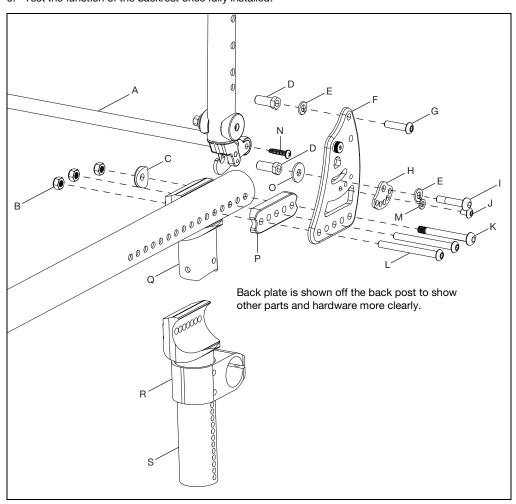
NOTE: The angle of the backrest can be adjusted using the different arc adjustment cam holes. Choose the configuration that works best for the chair user.

5. Secure backrest assembly to the frame by installing two bolts (K & L), saddleback (P), camber mount tube (Q), saddle (C) and three nuts (B) using a 4mm Allen wrench and a 10mm wrench. Repeat on opposite side.

NOTE: The table and the first image are used to determine which holes are used for mounting.

NOTE: Offset camber mount (R) and tall camber mount tube (S) are used in place of medium camber mount tube (Q) when the MX-Tower is used.

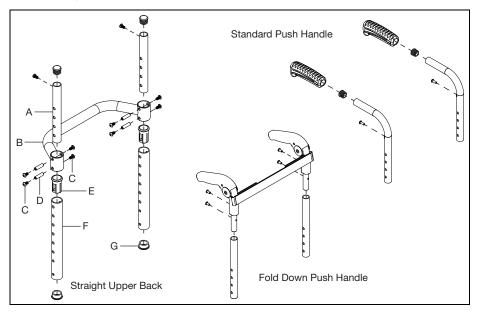
6. Test the function of the backrest once fully installed.



### **Height Adjustable Back Post**

1. Install the height adjustable back post (F), plugs (G), sleeve (E), screws (C), threaded barrels (D) and the upper back tube assembly (A) using two 3mm Allen wrenches.

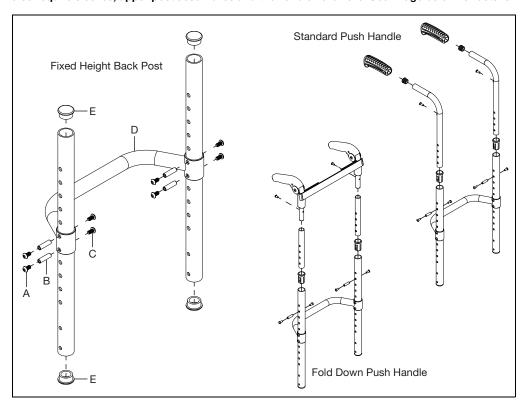
NOTE: The straight upper back, standard push handle and fold down push handle upper backs are shown in the image below.



### **Fixed Height Back Post**

1. For the fixed height back post, install the rigidizer bar (D), screws (A & C), threaded barrels (B) and plugs (E) using two 3mm Allen wrenches.

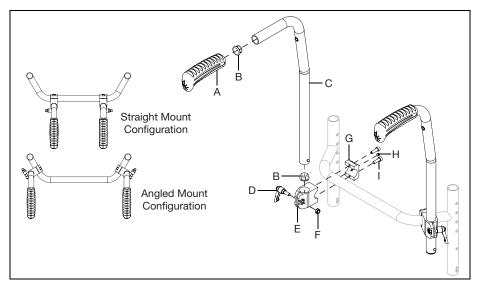
NOTE: The fixed height back post, standard push handle and fold down push handle upper backs are shown in the image below. The standard push handle and fold down push handle upper backs also require sleeves, upper post assemblies and the handle hardware. See image below for details.



### **Rigid Stroller Handle**

- 1. Install the stroller handle clamp (E & G) onto the rigidizer bar and secure with two screws (I) and a set screw (H) using a 5mm Allen wrench. The clamps can be installed in the straight mount configuration or the angled mount configuration. See image below.
- 2. Install the backpost (C), with the handles (A) and plugs (B) installed, into the clamp and secure by installing the clamp handle (D) and nut (F) using a 10mm wrench.

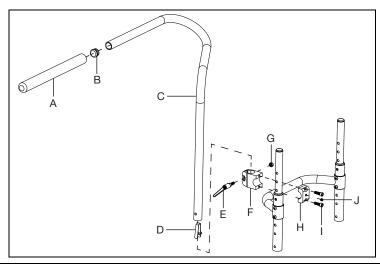
NOTE: The detent button on the bottom of the back post will click into place when properly installed.



### **Ergo Stroller Handle**

- 1. Install the ergo stroller handle clamp (F & H) onto the middle of the rigidizer bar and secure with two screws (I) and a set screw (J) using a 5mm Allen wrench.
- 2. Install the backpost (C), with the handle (A) and plug (B) installed, into the clamp and secure by installing the clamp handle (E) and nut (G) using a 10mm wrench.

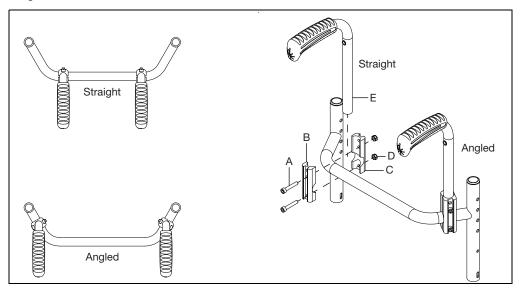
NOTE: The detent button (D) on the bottom of the back post will click into place when properly installed.



### **Bolt-On Push Handle**

1. Install the clamps (B & C) and bolt-on push handle tube (E) onto the rigidizer bar and secure with two screws (A) and two nuts (D) using a 5mm Allen wrench.

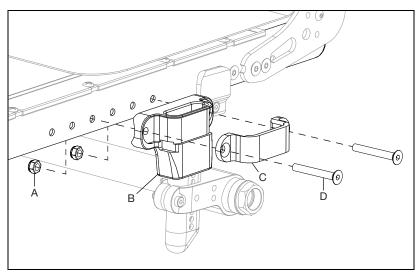
NOTE: The clamps can be installed onto the rigidizer bar in the straight or angled orientation. See image below for details.



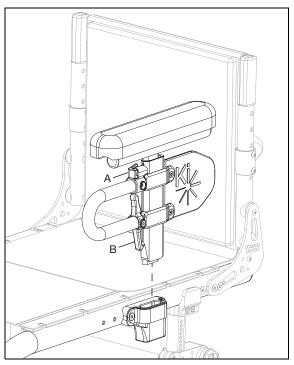
2. Repeat installation step with the second bolt-on push handle.

### **Height Adjustable T-Arm**

1. Install the T-Arm receiver (B) and the T-Arm bracket (C) onto frame with two bolts (D) and two nuts (A) using a 5mm Allen wrench and a 10mm wrench.

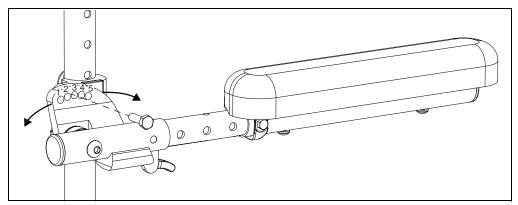


2. Install the T-Arm assembly into the receiver. Ensure the latch (B) "clicks" into place. Adjust the height by loosening the height lever (A) and sliding the T-Arm post up or down. Repeat steps on opposite side.

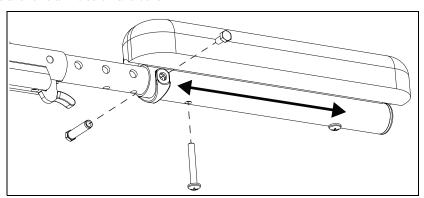


### Angle Adj. Locking Flip Up Extendable Armrest - Available on Little Wave

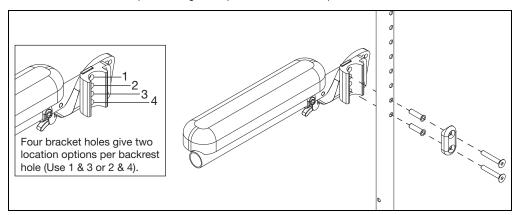
1. Set the angle of the armrest. There are five holes that can be used to set the angle. Tighten the bolt once angle is set.



Set the length of the armrest. To adjust the length, remove the bolts and spacer on the tube and the screw closest to the back of the chair. Slide the armrest to desired length available by the predrilled holes and reinstall the screw and bolts.



3. Set the height of the armrest. There are four holes on the armrest that allow for two different height settings for each set of holes on the back tube. Use the holes that provide the correct height setting for the user. The two bolts pass through the spacer, sleeves, back posts and into the armrest.

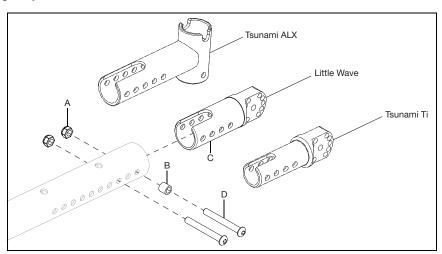


### **Swing Away Armrest**

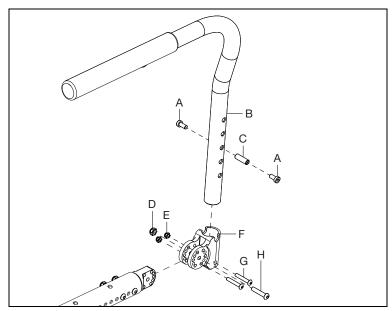
1. Install the swing away arm mount (C) onto the end of the frame tube with two bolts (D), bushing (B) and two nuts (A) using a 4mm Allen wrench and a 10mm wrench. Repeat on opposite side.

NOTE: Depending on the configuration, the backrest hardware may need to be removed to install the arm mount. Reinstall with the same hardware once the arm mount is in place.

NOTE: If you are installing the Tsunami ALX mount shown below, the next step of installing the receiver can be skipped because the receiver and mount are one piece. The Tsunami ALX version is not angle adjustable.

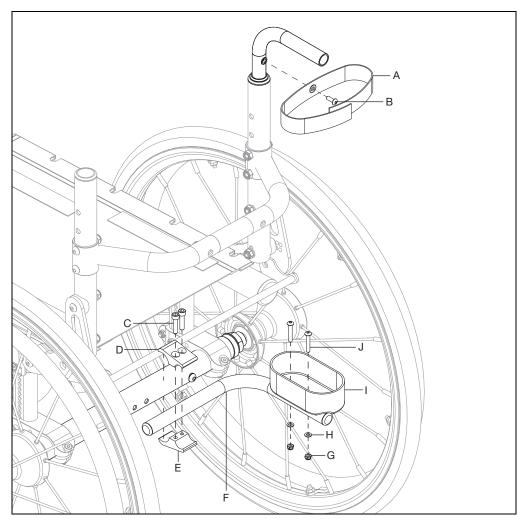


- Install the swing away receiver (F) onto the swing away arm mount with three bolts (G & H) and three
  nuts (D & E) using a 3mm Allen wrench, a 4mm Allen wrench, an 8mm wrench and a 10mm wrench.
  Repeat on opposite side.
- 3. Finish by installing the two bolts (A) and the threaded barrel (C) using two 5mm Allen wrenches. The hole that the two bolts and the threaded barrel are installed in determine the armrest height. Finish by dropping the armrest into the receiver. Repeat on opposite side.



#### **Cane and Crutch Holder**

- 1. Install crutch holder cup (I) onto the crutch holder tube (F) with two screws (J), two washers (H) and two nuts (G) using a 3mm Allen wrench and an 8mm wrench.
- 2. Install the crutch holder tube assembly onto the camber tube with the clamps (D & E) and two bolts (C) using a 5mm Allen wrench.
- 3. Install the crutch holder velcro strap (A) onto the back post (ensure the crutch holder cup and velcro strap are on the same side of chair) with a screw (B) using a 3mm Allen wrench.



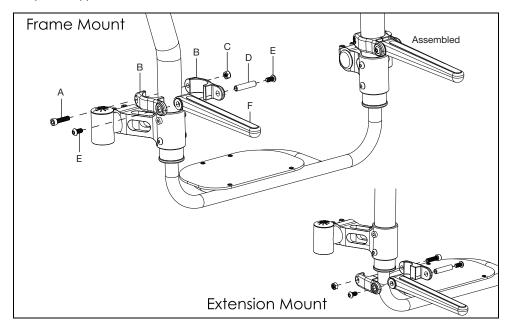
### **Luggage Carrier**

NOTE: There are different sizes of clamps to fit all types of chairs and configurations. The carrier is mounted to the frame or footrest tube on rigid chairs and mounted on the footrest hangers or extension tubes on catalysts and tilt chairs. If hangers have been omitted the carrier is mounted to the vertical front frame tube. The image below shows a luggage carrier being installed on a chair with a footrest extension. The installation is the same whether it is being installed on the frame or footrest tubes.

- 1. Install luggage carrier fork (F) and clamp (B) by installing two screws (E) and barrel nut (D) through the clamp and fork using two 4mm Allen wrenches.
- 2. Secure the clamp in the desired location by installing and tightening the screw (A) and nut (C) on the backside of the clamp using a 5mm Allen wrench.

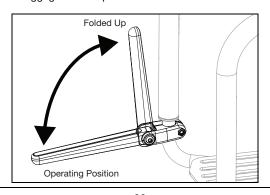
NOTE: The nut for the backside screw goes into a recess in the clamp. Ensure that nut stays in place.

3. Repeat on opposite side.



#### Using the Luggage Carrier

- Operating position for the luggage carrier is when the forks are folded down (See image below). The max weight capacity is 55lbs.
- 2. When not in use, fold the luggage carrier up.



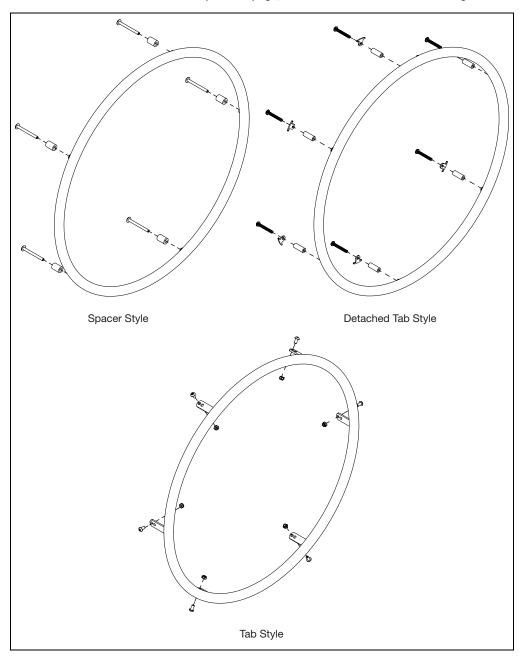
### **Handrim Configurations**

NOTE: Not all wheels listed below are available for specific models. See an order form or the online parts manual for more information on your specific chair model.

					Handrim	Hardware C	hart									
Wheel			Handrim Connection				Handrim									
Wheel	Wheel Part Number	Connection Points	Tab	Spacer	Screw	Aluminum Anodized	Superlight	Plastic Coated	Projection	Natural Fit Standard	Natural Fit LT	Flex Rim				
18" Ki Spoke	200529	3				100206		101106								
20" Ki Spoke	200530	6			Aluminum,	200536		200542								
22" Ki Spoke	200531		100698	100653	Plastic Coated, Projection: 100654 Natural Fit:	100560		100576	100569	200538	200201					
24" Ki Spoke	20053 2					200349		100577	200547	100793	200202					
25" Ki Spoke	200533				100835	200350		101870	200548	200539	200540					
26" Ki Spoke	200534					200351		100578	200549	100907	101454					
24" Superlight	101159	6			100536	100754	101161	100836		100830	100828					
25" Superlight	101160	Ů			100000	101197	101160	101091		101464	101460					
20" 5- Spoke X Core	101961			Aluminum		101897		101963								
22" 5- Spoke X Core	101962	5		Aluminum, Projection, Natural Fit: 100629	100724	101898		101964								
24" 5- Spoke X Core	100960			Plastic Coated: 101756		100975		100976	200546							
25" 5- Spoke X Core	100960			101730	101893					100768	100769					
20" Spinergy Spox	See Spinergy Spox Page	Spinergy Spox					103125		103179							
22" Spinergy Spox			Spinergy Spox				Screw:	100827		100808		100889	100888			
24" Spinergy Spox				Spinergy Spox	Spinergy Spox	6			100669 Nut: 100657	100766	101161	100615		100830	100828	
25" Spinergy Spox								100007	100767	101160	100765		101464	101460		
26" Spinergy Spox							101477		101148		200200	100950				
22" Spinergy LX						100827		100808		100889	100888					
24" Spinergy LX	See Spinergy	6			Screw: 100669	100766	101161	100615		100830	100828	200213				
25" Spinergy LX	LX Page			Nut: 100657	100767	101160	100765		101464	101460	200208					
26" Spinergy LX						101477		101148		200200	100950					
22" Maxx Performance Spoke	105135				Superlight Screw: 100669	100560	101161	100576	100569	200538	200201					
24" Maxx Performance Spoke	105136	6	100698	100653	Superlight Nut: 100657 Screw (Excluding Superlight): 100654	200349		100577	200547	100793	200202					

### **Handrim Construction**

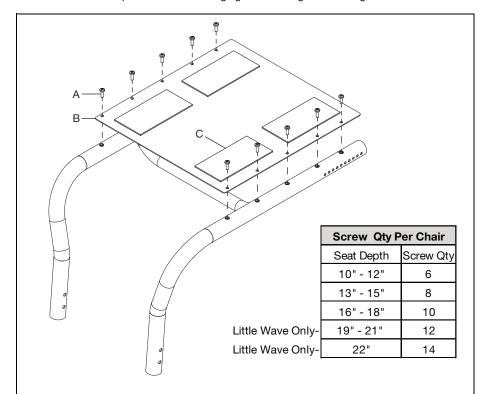
The sequencing of hardware for the three styles of handrims is shown below. The specific hardware used is determined in the chart on the previous page, based on the tire and handrim being used.



### **Seat Pan**

### NOTE: Remove any current seating or cushions before installing the seat pan.

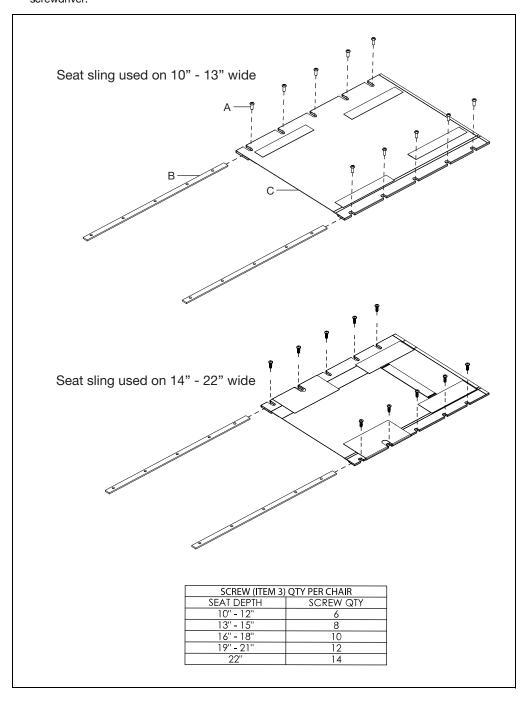
- 1. Install the seat pan (B) onto the chair frame and secure with screws (A) using a Phillips screwdriver.
- 2. If not already done, install the AB Tape onto the seat as shown in the image below. The AB Tape should cover as much area as possible without hanging over the edge or covering one of the screw holes.



Part Number	AB Tape Size	Seat Pan Depth
004458	3" X 4"	10" - 11"
004458 & 004459	3" X 4" & 3" X 5"	12"
004459	3" X 5"	13"
004460	3" X 6"	14" - 22" (19" - 22" Little Wave Only)

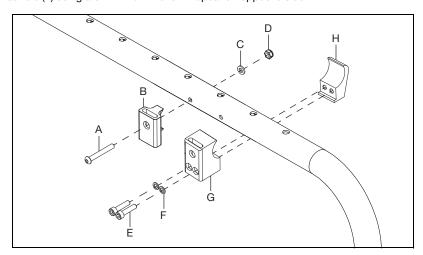
## **Seat Upholstery**

- 1. Install the seat rail (B) into the sleeve on the edge of the seat upholstery (C). Repeat on opposite side. The seat rail is shown outside of the sleeve to show the hole alignment in the image below.
- Secure the seat rail and seat upholstery onto the chair frame with screws (A) using a Phillips screwdriver.



#### Side Guard Receiver

1. There are two types of side guard receivers that may be used. The mounted side guard receiver (B) is installed onto the frame with screw (A), washer (C) and nut (D) using a 4mm Allen wrench and a 10mm wrench. The clamp side guard receivers (G & H) are installed onto the frame with two screws (E) and two washers (F) using a 5mm Allen wrench. Repeat on opposite side.

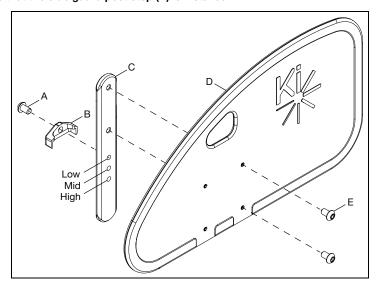


#### Removable Adult Side Guard

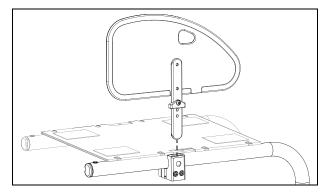
1. Install the adult side guard (D) onto the side guard post (C) with two screws (A) using a 4mm Allen wrench. On the opposite side, install the side guard post stop (B) with a screw (A) using a 4mm Allen wrench.

NOTE: Do not overtighten the post stop (B). Overtightening will flare the vertical sides outward which will prevent the post stop from functioning properly. Check that the post stop is snug, doesn't rattle and stays in place.

NOTE: There are two sets of holes that the side guard post (C) can be installed onto the side guard with. Choose the holes that place the side guard in the desired position. The height is also adjusted with the hole that the side guard post stop (B) is installed in.



Install the side guard assembly into the receiver so the side guard post stop faces the outside of the chair.

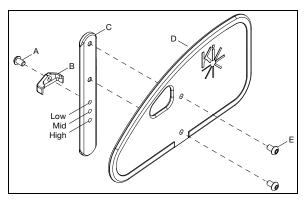


#### Removable Pediatric Side Guard

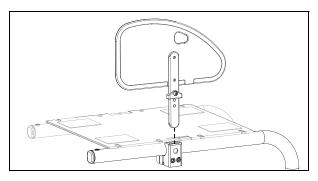
 Install the pediatric side guard (D) onto the side guard post (C) with two screws (A) using a 4mm Allen wrench. On the opposite side, install the side guard post stop (B) with a screw (A) using a 4mm Allen wrench.

NOTE: Do not overtighten the post stop (B). Overtightening will flare the vertical sides outward which will prevent the post stop from functioning properly. Check that the post stop is snug, doesn't rattle and stays in place.

NOTE: The height of the pediatric side guard can be adjusted with the three holes on the side guard post (C).



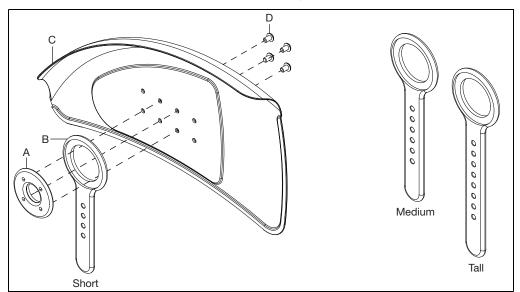
Install the side guard assembly into the receiver so the side guard post stop faces the outside of the chair.



#### Adjustable Fender Side Guard

1. Install post (B), post mount plate (A) and bolts (D) onto the fender (C) using a 3mm Allen wrench.

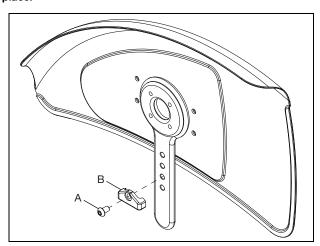
NOTE: There are three mounting positions that can be used. Pick the holes that put the fender in the desired position for the occupant. This can be adjusted again later.



2. Set the height of the back post by installing the post stop (B) with a screw (A) using a 4mm Allen wrench. The height of the post can also be adjusted later if needed.

NOTE: It is possible to install the post stop (B) in a hole high enough that it will not mate to the receiver. Ensure fit after installment before using the side guard.

NOTE: Do not overtighten the post stop (B). Overtightening will flare the vertical sides outward which will prevent the post stop from functioning properly. Check that the post stop is snug, doesn't rattle and stays in place.

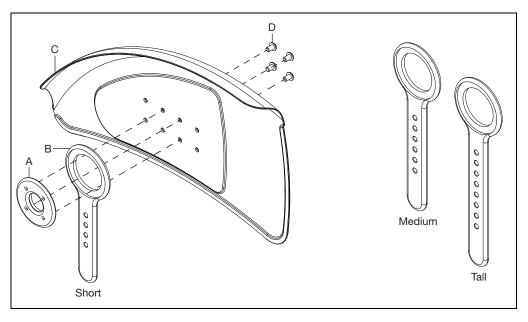


- Install the fender assembly into the receiver by dropping the post into the receiver slot. Adjust the fender if needed.
- 4. Repeat steps on opposite side.

#### **Angle Adjustments**

The angle of the fender can also be changed to align the fender if the profile of the tire if needed.

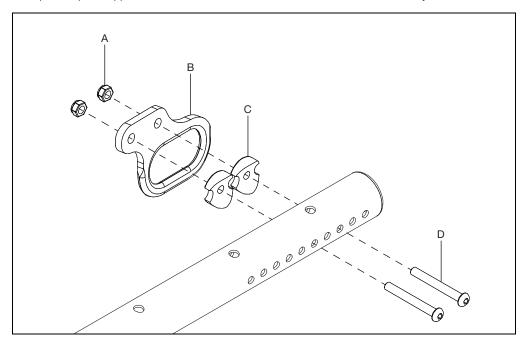
- 1. Remove the four bolts from the post mount with a 3mm Allen wrench.
- 2. Rotate the fender, either way, to align the fender with the profile of the tire.
- 3. Rotate the post mount plate so the four holes align with the desired holes on the fender.
- 4. Reinstall the the four bolts securing the fender to the post and post mount plate using a 3mm Allen wrench.



### **Transit**

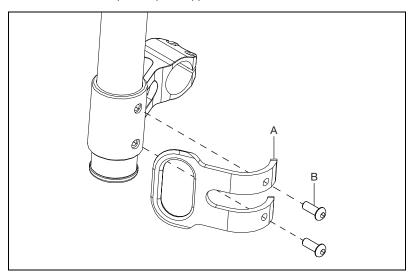
### Tsunami Style Transit

- 1. Install the rear Tsunami Style Transit bracket (B) onto the chair frame with two bolts (D), two saddles (C) and two nuts (A) using a 4mm Allen wrench and a 10mm wrench.
- 2. Repeat steps on opposite side. Backrest is installed as shown in Backrest Assembly section.



#### **Caster Mount Transit Bracket**

1. Install the caster mount transit bracket (A) over the caster mount bracket and secure with two bolts (B) using a 4mm Allen wrench. Repeat steps on opposite side.



### **Transit**

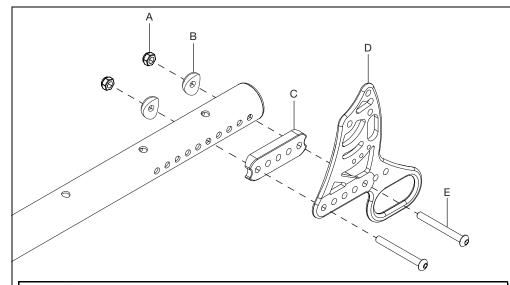
#### Locking Fold Down Backrest with Transit

NOTE: The new Locking Fold Down Backrest assembly, standard and transit, uses new backrest tubes. If the chair does not already have the new backrest design, new backrest tubes are needed as the old tubes are not compatible.

- Remove any cushion or seating components that may be in the way during backrest removal. Also, remove any backrest tubes and/or handles that may be used after the backrest installation process.
- 2. Remove the current backrest assembly. See the Backrest Assembly section for removal instructions.

# NOTE: Refer to parts manual for additional information on compatibility restrictions for the new backrest design.

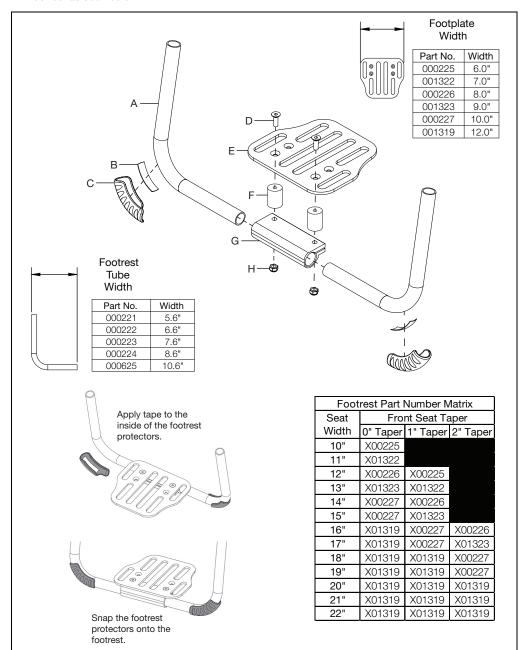
- 3. Install the transit backrest plate (D) onto the frame with two bolts (E), back saddle (C), two saddles (B) and two nuts (A) using a 4mm Allen wrench and a 10mm wrench.
- 4. Repeat on opposite side.
- 5. The rest of the process for installing the backrest is the same as the Locking Fold Down Standard Backrest. See the Backrest Assembly section for remaining installation instructions.



Bolt E		
Length	When Used	
50mm	When bolt goes through the frame, back bracket and back saddle.	
55mm	When bolt goes through the tower and frame only. Also used when bolt goes through the frame, back bracket and back saddles.	
65mm	When bolt goes through the tower, frame, back bracket and back saddle.	

## **Angle Adjustable Footrest**

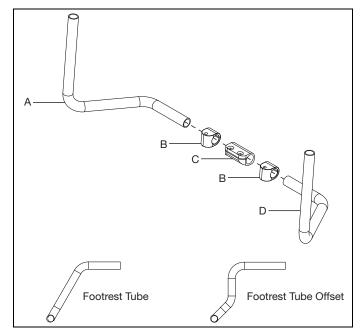
- 1. Install the footrest extension tubes (A) into the footrest adjustable clamp (G).
- 2. Install the footplate (E) onto the clamp and secure with two screws (D) and two nuts (H) using a 5mm Allen wrench and a 10mm wrench. If a riser (F) is being used to elevate the footrest platform, install between the footrest platform and the footrest adjustable clamp.
- 3. Install the footrest protectors (C) by peeling the backing off of the tape (B) and sticking the tape inside the footrest protector. Peel the remaining backing off of the tape and snap footrest protectors onto the footrest as seen below.



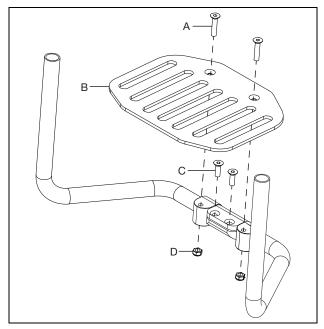
## **Angle Adjustable Flip Under Footrest**

1. Install the footrest tubes (A & D) through the pivots (B) into the footrest flip stop clamp (C).

NOTE: The footrest tube and the footrest tube offset are shown below. The installation process is the same for both footrest tubes.

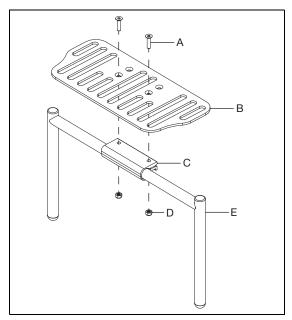


Install two screws (C) into the footrest flip stop clamp to secure the footrest tubes using a 5mm Allen wrench. Install the footrest platform (B) onto the footrest flip stop clamp with two screws (A) and two nuts (D) using a 5mm Allen wrench.

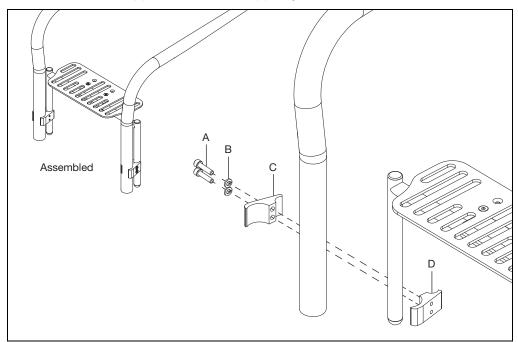


## High Mount Angle Adjustable Footrest - Available on Tsunami

1. Install the footrest adjustable clamp (C) onto the extension tube (E). Install the footrest platform (B) onto the footrest adjustable clamp and secure with two screws (A) and two nuts (D) using a 5mm Allen wrench.



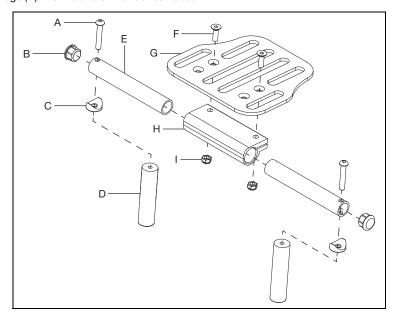
2. Install the two clamps (C & D), one end on the footplate riser tube and the other end around the frame tube, with two screws (A) and two lock washers (B) using a 5mm Allen wrench.



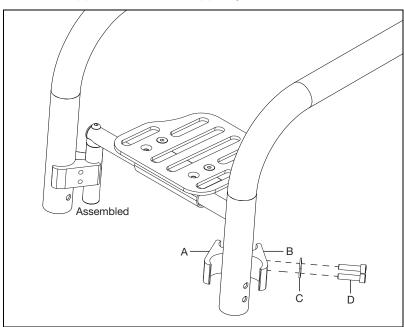
## High Mount Angle Adj. Footrest (10"-14" Wide)

#### \* Available on Little Wave

 Install the footrest tubes (E) into the footrest adjustable clamp (H) and secure by installing the footrest platform (G) onto the clamp with two screws (F) and two nuts (I) using a 5mm Allen wrench. Install the footplate risers (D) onto the footrest tubes with screws (A) and saddles (C) using a 4mm Allen wrench. Install plugs (B) into the end of the footrest tubes.



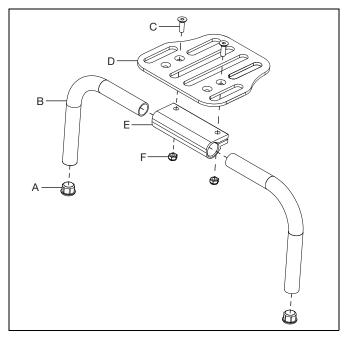
2. Install the two clamps (A & B), one end on the footplate riser tube and the other end around the frame tube, with two screws (D) and two lock washers (C) using a 5mm Allen wrench.



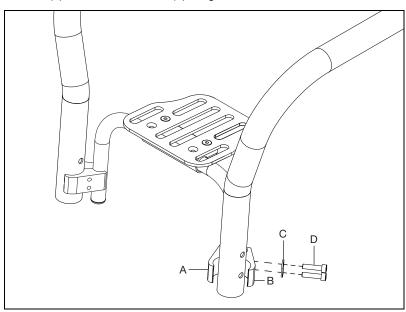
## High Mount Angle Adjustable Footrest (15" - 19" Wide)

#### \* Available on Little Wave

1. Install the footrest tubes (B) into the footrest adjustable clamp (E) and secure by installing the footrest platform (D) onto the clamp with two screws (C) and two nuts (F) using a 5mm Allen wrench. Install the plugs (A) into the ends of the footrest tubes.

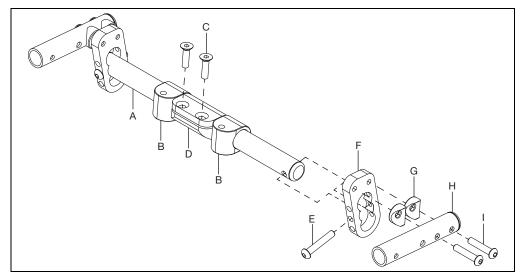


2. Install the two clamps (A & B), one end on the footplate tube and the other end around the frame tube, with two screws (D) and two lock washers (C) using a 5mm Allen wrench.

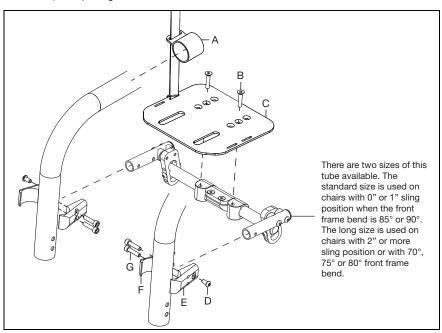


## **High Mount Angle Adjustable Flip Under Footrest**

- Install the pivots (B) and clamp (D) onto the footrest tube (A) and secure with two screws (C) using a 5mm Allen wrench.
- 2. Install the bracket (F) onto the end of the footrest tube and secure with screw (E) using a 4mm Allen wrench.
- 3. Install the footrest flip mount tube (H) onto the bracket with two screws (I) and two saddles (G) using a 4mm Allen wrench.



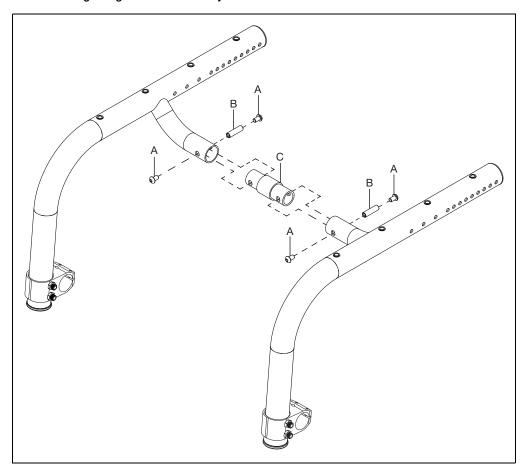
- 4. Install foot platform (C) onto pivots with two screws (B) using a 5mm Allen wrench. While installing the foot platform, slide the flip foot strap (A) onto frame tube.
- 5. Install the top and bottom footplate clamps (E & F) onto the footrest tubes and the frame tubes with three screws (D & G) using a 4mm Allen wrench and a 5mm Allen wrench.



### **Little Wave Frame Width**

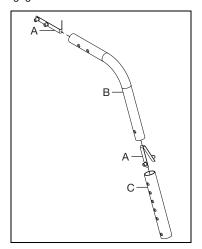
1. The Little Wave frame width is changed with the frame connector (C), which is available in 0", 1", 2" and 3" lengths. Remove the four screws (A) and two threaded barrels (B) using two 4mm Allen wrenches to remove the frame connector. Swap in the new frame connector and reinstall hardware to secure.

NOTE: Other parts and assemblies on the chair need to checked and/or adjusted when the width of the chair is changed. See the corresponding sections on the different parts and assemblies for information regarding installation and adjustments.

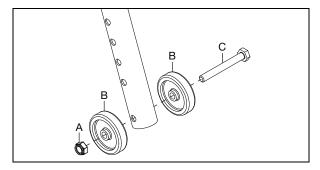


## **Anti-Tips**

1. Assemble the anti-tip by connecting the two anti-tip tubes (B & C) and ensuring they "click" together when the detent buttons (A) engage.

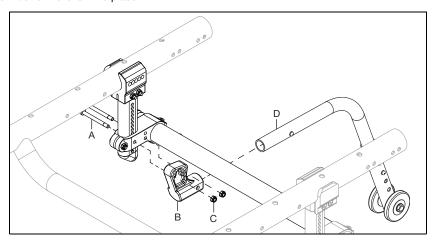


2. Install the wheels (B) onto the anti-tip tube with a bolt (C) and nut (A) using two 10mm wrenches.



#### Little Wave Anti-Tip Receiver

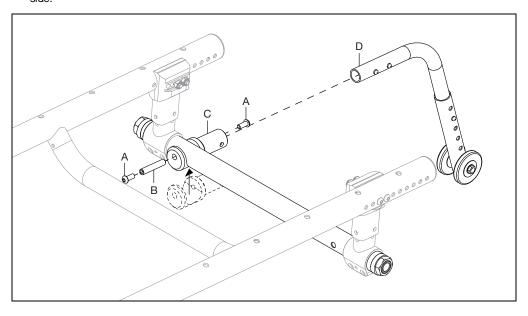
 Install the anti-tip receiver (B) onto the camber tube mounting clamp with two screws (A) and two nuts (C) using a 4mm Allen wrench and an 8mm wrench. Install anti-tip assembly (D) into receiver until detent button "clicks" into place.



## **Anti-Tips**

### Tsunami Anti-Tip Receiver

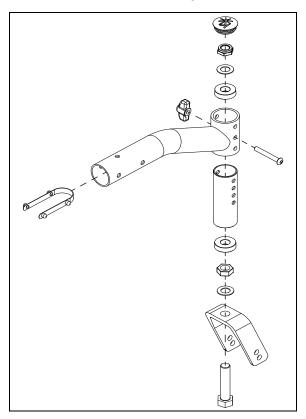
- 1. Install the anti-tip receiver (C) onto the camber tube and secure with two screws (A) and a threaded barrel (B) using two 4mm Allen wrenches. Repeat on opposite side.
- 2. Install the anti-tip assembly (D) into receiver until detent button "clicks" into place. Repeat on opposite side.



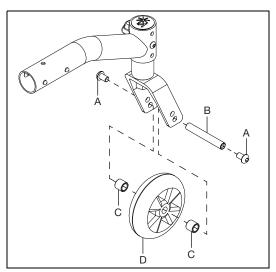
## **Little Wave 5th Wheel**

#### Standard 5th Wheel

1. Assemble the 5th wheel arm mount as shown below using two ½" wrenches.



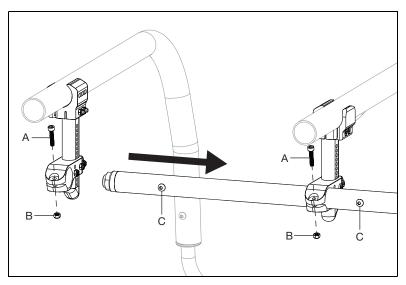
2. Install the caster (D) into the 5th wheel mount forks with two screws (A), threaded barrel (B) and two caster spacers (C) using two 4mm Allen wrenches.



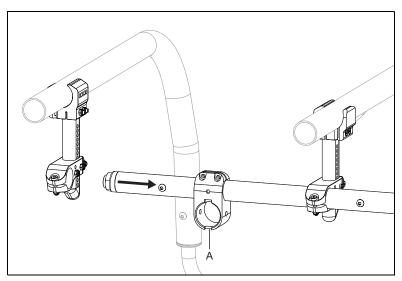
### **Little Wave 5th Wheel**

3. Loosen the camber tube mount clamps by removing the bolt (A) and nut (B) from both sides using a 4mm Allen wrench and an 8mm wrench. Slide the camber tube halfway out as shown below. The screws on the camber tube (C) will also need to be removed to clear the clamps using a 4mm Allen wrench.

NOTE: If you are retrofitting to the standard 5th wheel, remove the camber tube completely because a new camber tube is needed.

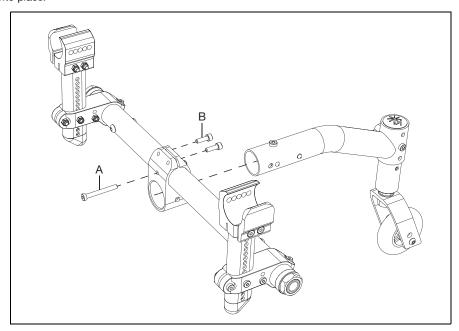


4. Slide the 5th wheel mounting clamp (A) onto the camber tube. Slide the camber tube back to the standard position and reinstall hardware to secure the camber tube in place.



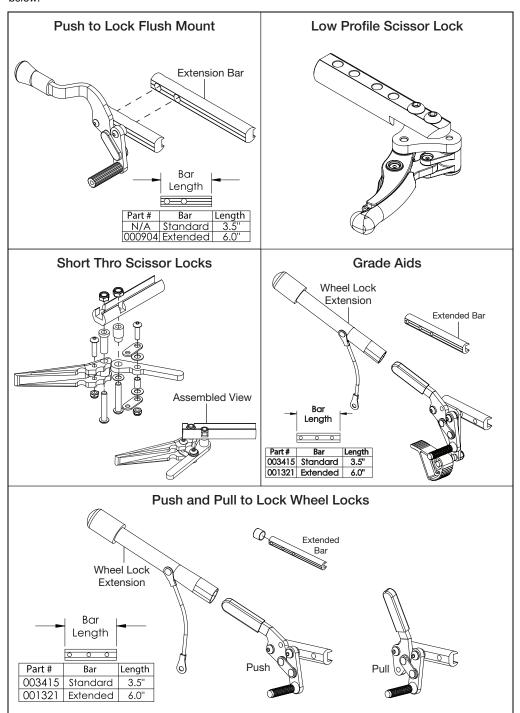
## **Little Wave 5th Wheel**

5. Center the 5th wheel mounting clamp and secure in place by installing three screws (A & B) using a 4mm Allen wrench. Install the 5th wheel into the clamp and ensure the detent buttons "click" or lock into place.



### **Wheel Locks**

See image below for information on the types of wheel locks available. Installation of the wheel lock clamps is on the next page. The Under Seat Scissor Lock always comes assembled so it is not shown below.

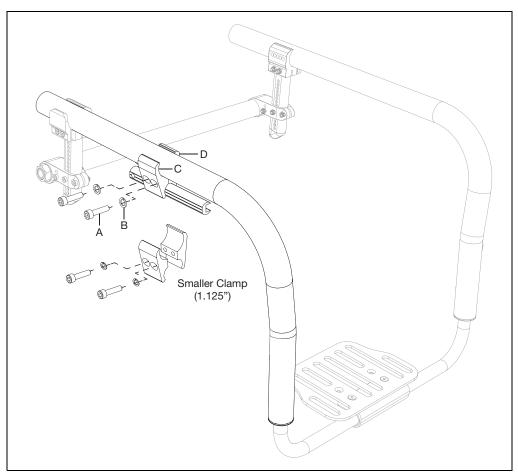


### **Wheel Locks**

#### **Installing Wheel Lock Clamps**

1. The wheel lock assemblies with the wheel lock bars are mounted onto the chair using the wheel lock clamps (C & D). There are two types of wheel lock clamps that are shown below. Install hardware with the wheel lock bar and chair frame in position using a 5mm Allen wrench and a 6mm Allen wrench. Once installed, ensure wheel lock engages at least 1/8" into tire and locks properly prevent the chair from moving when engaged.

NOTE: Always tighten wheel lock hardware by alternating between hardware while tightening a little at a time. This prevents overclamping on one set of hardware which can lead to binding of the fasteners and increased difficulty in removal.





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