

Invacare® Top End® Recreation Handcycles

XLT

XLT Jr.

XLT PRO

Excelerator™

Li'l Excelerator



EN User Manual

DEALER: This manual MUST be given to the user of the product.

USER: BEFORE using this product, read this manual and save for future reference.

For more information regarding Invacare products, parts and services; please visit www.invacare.com



Yes, you can.

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I General

I.1 Symbols

Warnings

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. See the information below for definitions of the signal words.



DANGER

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage or minor injury or both.



IMPORTANT

Indicates a hazardous situation that could result in damage to property if it is not avoided.



Gives useful tips, recommendations and information for efficient, trouble-free use.

I.2 Dealer/Technician Information

The term “qualified technician” in this manual refers to an Invacare qualified technician or a Shimano® certified bicycle repair technician.

1.3 Warranty Information

PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

This warranty is extended only to the original purchaser who purchases this product when new and unused from Invacare or a dealer. This warranty is not extended to any other person or entity and is not transferable or assignable to any subsequent purchaser or owner. Coverage under this warranty will end upon any such subsequent sale or other transfer of title to any other person.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants the frames when purchased new and unused to be free from defects in materials and workmanship for a period of three (3) years from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty.

Invacare warrants the upholstered materials (seat and back) and remaining components of this product when purchased new and unused to be free from defects in materials and workmanship for a period of thirteen (13) months from date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. If within such warranty periods any such product shall be proven to be defective, such product shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address at the bottom of this page. Provide dealer's name, address, the product model number, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACED, PRODUCTS SUBJECTED TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS; PRODUCTS DAMAGE BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO NORMAL WEAR AND TEAR OR FAILURE TO ADHERE TO THE PRODUCT INSTRUCTIONS.

THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES WHATSOEVER, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE SOLE REMEDY FOR VIOLATIONS OF ANY WARRANTY WHATSOEVER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. THE APPLICATION OF ANY IMPLIED WARRANTY WHATSOEVER SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN. INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGE, OR LIMITATION OF HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE EXCLUSION AND LIMITATION MAY NOT BE APPLICABLE.

THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.

2 Overview

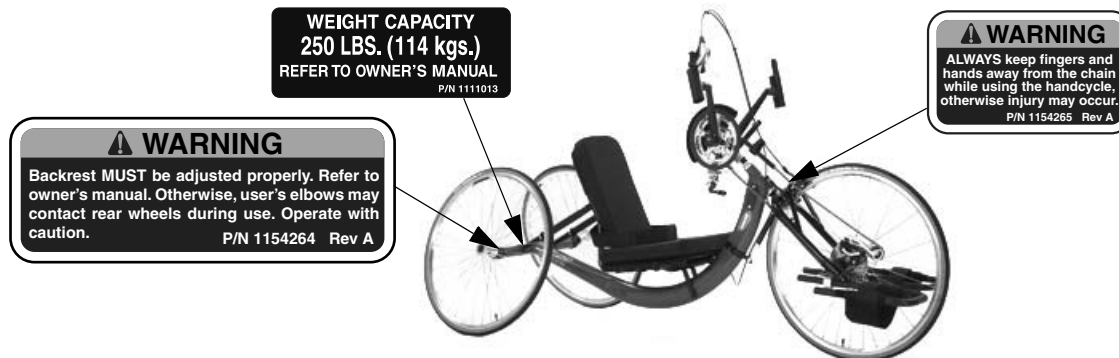
2.1 Label Locations - XLT



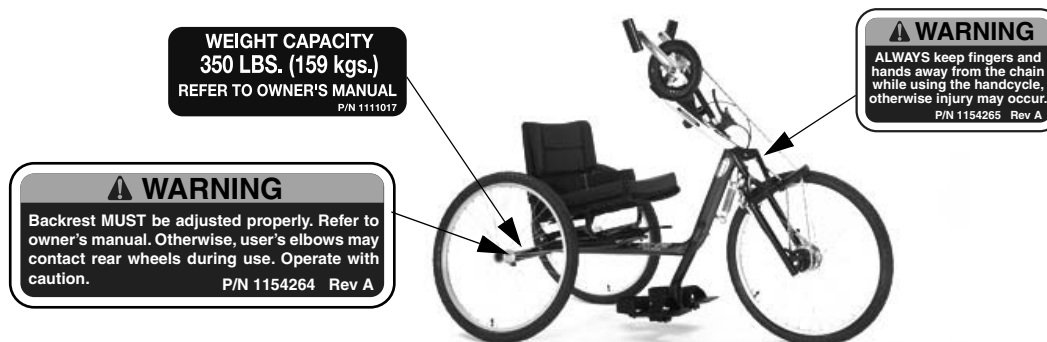
2.2 Label Locations - XLT Jr.



2.3 Label Locations - XLT PRO



2.4 Label Locations - Excelsior



2 OVERVIEW

2.5 Label Locations - L'il Excelerator



2.6 Typical Product Parameters

XLT

Seat Width:	15 or 17 inches (38.1 to 43.2 cm)
Seat Depth:	15 inches (38.1 cm)
Seat-to-Floor (approx.):	12, 13, or 14 inches (30.48, 33.02, or 35.56 cm) with 2 inch (5.1 cm) cushion
Back Style:	Adjustable Back Angle 90° - 110°
Back Height Fixed/Adjustable Angle:	20 inches (Narrow, Tall) (50.8 cm)
Footrest:	Adjustable Fore and Aft
Side - Wheel Clearance:	2 inches - * 2½ inches (5.08 - 6.35 cm)
Rear Axle:	Quick-Release
Rear Wheel Camber:	15° - Standard
Wheels/Tires:	26-inch Spoke High Performance (66.04 cm)
Brakes:	Internal reversing drum brakes and parking brake
Handles:	Ergonomic
Crankset:	Alloy Crankset
Hub:	FRONT - Shimano Nexus® 7 Speed Hub REAR - Precision Black Anodized w/½-inch Quick Release Stainless Axles
Spokes:	14 Gauge Stainless
Shift Levers:	Shimano indexed twist grip with gear display
Gears:	7 Speed
Seat and Back Cushion:	Standard
Upholstery:	Nylon
Weight:	35 lbs (16 kg)
Shipping Weight:	65 lbs (30 kg)
Weight Limitation:	250 lbs (114 kg)
Options:	Standard Options: Safety Flag, Chainguard, Trunk Restraint and cushion Other Options: Mirror, Backpack Hydration System, Computer, Tow Bar, Safety Lights, Helmet, Quad Gloves, Mountain Drive, Bike Rack, Water Bottle and Cage, Tri-pin Quad Handles, Leg Guard Attachment, Alignment Gauge, Crutch Holder, Click Straps, Tool and Tire Repair Kit, Quad Twist Shift Adaptation

2 OVERVIEW

XLT Jr.

Seat Width:	14 inches (35.56 cm)
Seat Depth:	15 inches (38.1 cm)
Seat-to-Floor (approx.):	12, 13, or 14 inches (30.48, 33.02, or 35.56 cm) with 2 inch (5.1 cm) cushion
Back Style:	Adjustable Back Angle 90° - 110°
Back Height Fixed/Adjustable Angle:	11-14 inches (Wide) (27.44 - 35.56 cm) 16½ inches (Narrow, Tall) (41.9 cm)
Footrest:	Adjustable Fore and Aft
Side - Wheel Clearance:	2 inches - 2½ inches (5.08 - 6.35 cm)
Rear Axle:	Quick-Release
Rear Wheel Camber:	15° - Standard
Wheels/Tires:	20-inch Cruiser (50.8 cm)
Brakes:	Internal reversing drum brakes and parking brake
Handles:	Ergonomic, Vertical foam covered or Horizontal foam covered
Crankset:	Alloy Crankset
Hub:	FRONT - Shimano Nexus 7 Speed Hub REAR - Precision Black Anodized w/½-inch Quick Release Stainless Axles
Spokes:	14 Gauge Stainless
Shift Levers:	Shimano indexed twist grip with gear display
Gears:	7 Speed
Seat and Back Cushion:	Foam Insert Standard
Upholstery:	Nylon
Weight:	30-35 lbs (14 - 16 kg)
Shipping Weight:	65 lbs (30 kg)
Weight Limitation:	250 lbs (114 kg)
Options:	Standard Options: Safety Flag, Chainguard, Trunk Restraint and cushion Other Options: Mirror, Backpack Hydration System, Computer, Tow Bar, Safety Lights, Helmet, Quad Gloves, Mountain Drive, Bike Rack, Water Bottle and Cage, Tri-pin Quad Handles, Leg Guard Attachment, Alignment Gauge, Crutch Holder, Click Straps, Tool and Tire Repair Kit, Quad Twist Shift Adaptation

XL T PRO

Seat Width:	15 or 17 inches (38.1 to 43.2 cm)
Seat Depth:	15 inches (38.1 cm)
Seat-to-Floor (approx.):	12, 13 and 14 inches (30.48, 33.02, and 35.56 cm) with 2" (5.1 cm) cushion
Back Style:	Adjustable Back Angle 90° - 110°
Back Height Fixed/Adjustable Angle:	18½ inches (Narrow, Tall) (50.8 cm)
Footrest:	Adjustable Fore and Aft
Side - Wheel Clearance:	2 inches - * 2½ inches (5.08 - 6.35 cm)
Rear Axle:	Quick-Release
Rear Wheel Camber:	15° - Standard (38.1 cm)
Wheels/Tires:	26-inch Spoke High Performance (66.04 cm)
Brakes:	Rapid fire hands-on brake mounted on right pedal. Parking brake on L frame
Handles:	Ergonomic, Vertical, Ovalized Aluminum mounted on Top End V crankset
Crankset:	Top End V Crankset
Hub:	FRONT - Shimano/Top End Components w/ 27 Speed External Cassette REAR - Precision Black Anodized w/½-inch Quick Release Stainless
Spokes:	14 Gauge Stainless
Shift Levers:	Rapid fire hands-on shifter mounted on right handpedal for lower derailleur, Manual shifter for upper derailleur/chainrings.
Gears:	27 Speed
Seat and Back Cushion:	Foam Insert Standard
Upholstery:	Nylon
Weight:	30 lbs (14 kg)
Shipping Weight:	65 lbs (30 kg)
Weight Limitation:	250 lbs (114 kg)
Options:	Standard Options: Safety Flag, Chainguard, Trunk Restraint and cushion Other Options: Computer, Tow Bar, Safety Lights, Helmet, Bike Rack, Water Bottle and Cage, Leg Guard Attachment, Alignment Gauge, Backpack Hydration System, Crutch Holder, Click Straps, Safety Mirrors

2 OVERVIEW

Excelerator

Seat Width:	17 or 20 inches (43.2 cm or 50.8 cm)
Seat Depth:	15 inches (38.1 cm)
Seat-to-Floor (approx.):	Fixed 20/18 inches (50.8 cm/45.7 cm)
Back Style:	Rigid
Back Height (Adjustable):	11-14 inches (27.9 - 35.6 cm) with a 90° angle
Footrest:	Adjustable Height/Angle
Side - Wheel Clearance:	2 inches - * 2½ inches (5.1 - 6.4 cm)
Rear Axle:	Quick-Release
Rear Wheel Camber:	9° - Standard
Wheels/Tires:	24-inch Spoke Cruiser Tires (61 cm)
Brakes:	Hand Crank (internal), Parking Brake
Handpedals:	Ergonomic
Hub:	FRONT - Shimano Nexus® 7 Speed Hub with Internal Drum Brake REAR - Precision Black Anodized w/1/2-inch Quick Release Stainless Axles
Spokes:	14 Gauge Stainless
Shift Levers:	Shimano Indexed Twist Grip
Gears:	7 Speed
Seat and Back Cushion:	Foam Insert
Upholstery:	Nylon Foldover
Weight:	50 lbs (23 kg)
Shipping Weight:	80 lbs (26 kg)
Weight Limitation:	350 lbs (159 kg)
Options:	Standard Options: Safety Flag, Chainguard, Trunk Restraint and cushion Other Options: Computer, Tow Bar, Safety Light, Helmet, Gloves, Mountain Drive, Bike Rack, Water Bottle and Cage, Tri-pin Quad Handles, V Crankset, Auto-style Restraint, Mirror, Crutch Holder and Strap, Quad Twist Shifter Adaptation

L'il Excelerator

Seat Width:	14 inches (35.6 cm)
Seat Depth:	14 inches (35.6 cm)
Seat-to-Floor (approx.):	Fixed 17.5/15.5 inches (44.5 cm/39.4 cm)
Back Style:	Rigid
Back Height (Adjustable):	11-14 inches (27.9 - 35.6 cm)
Footrest:	Adjustable Height/Angle
Side - Wheel Clearance:	2 inches - * 2½ inches (5.1 - 6.4 cm)
Rear Axle:	Quick-Release
Rear Wheel Camber:	9° - Standard
Wheels/Tires:	20-inch Spoke Cruiser Tires (50.8 cm)
Brakes:	Hand Crank (internal), Parking Brake
Handpedals:	Horizontal
Hub:	FRONT - Shimano Nexus® 7 Speed Hub with Internal Drum Brake REAR - Precision Black Anodized w/1/2-inch Quick Release Stainless Axles
Spokes:	14 Gauge Stainless
Shift Levers:	Shimano Indexed Twist Grip with Gear Display
Gears:	7 Speed
Seat Cushion:	Foam Insert
Upholstery:	Nylon Foldover
Weight:	40 lbs (18 kg)
Shipping Weight:	70 lbs (32 kg)
Weight Limitation:	250 lbs (114 kg)
Options:	Standard Options: Safety Flag, Chainguard, Trunk Restraint and cushion Other Options: Safety Light, Helmet, Gloves, Bike Rack, Water Bottle and Cage, Auto-Style Restraint, Mirror, Quad Twist Shifter Adaptation, Crutch Holder

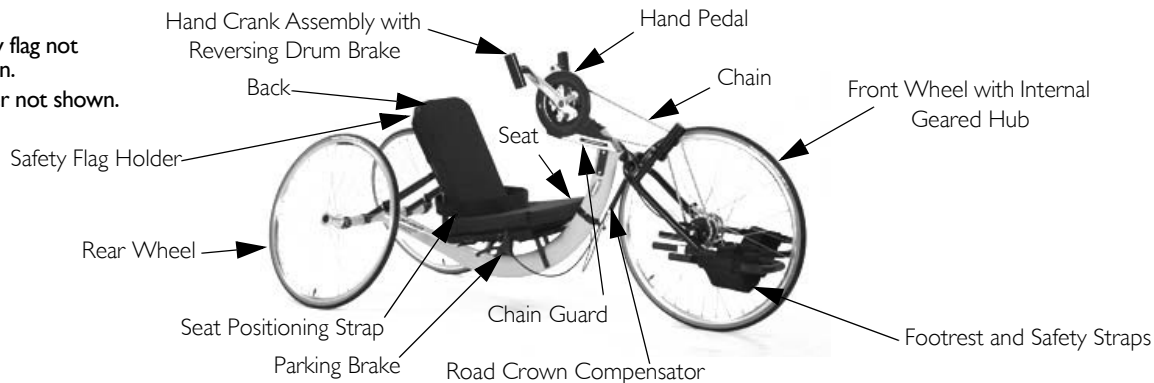
2 OVERVIEW

2.7 Component Identification

XLT



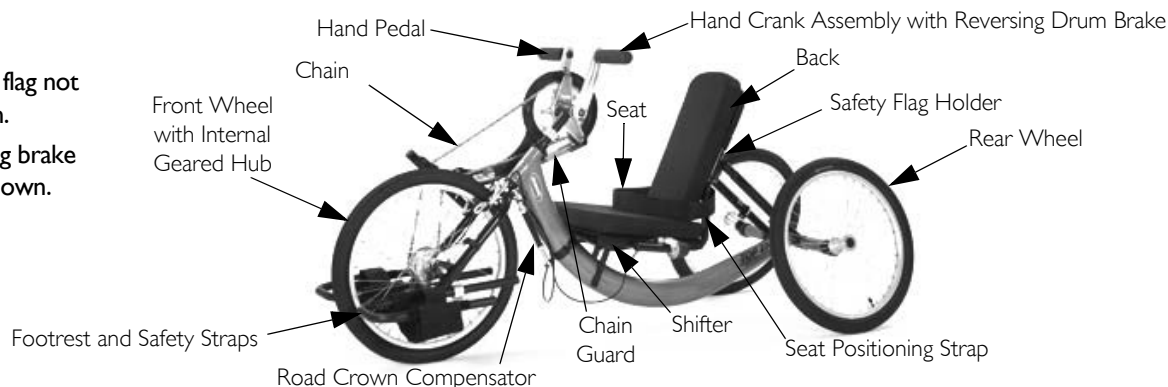
Safety flag not shown.
Shifter not shown.



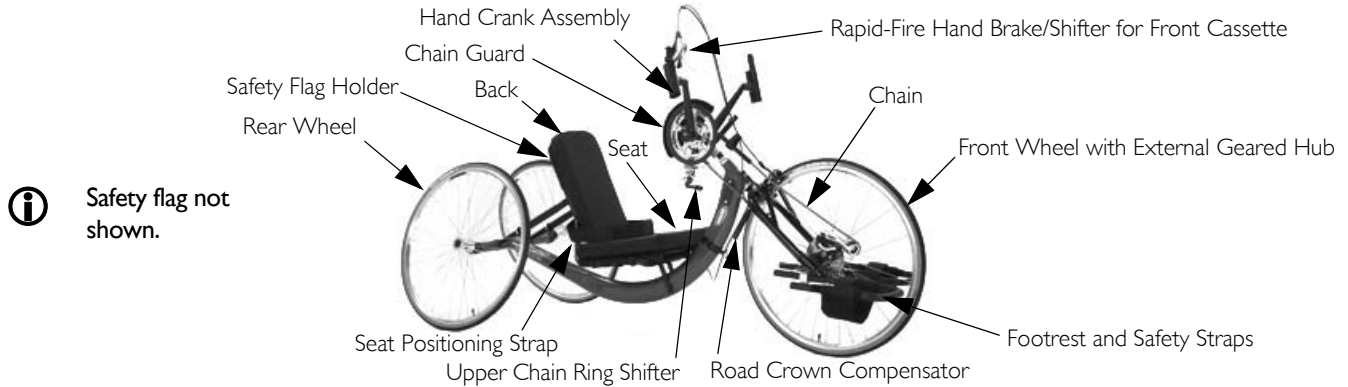
XLT Jr.



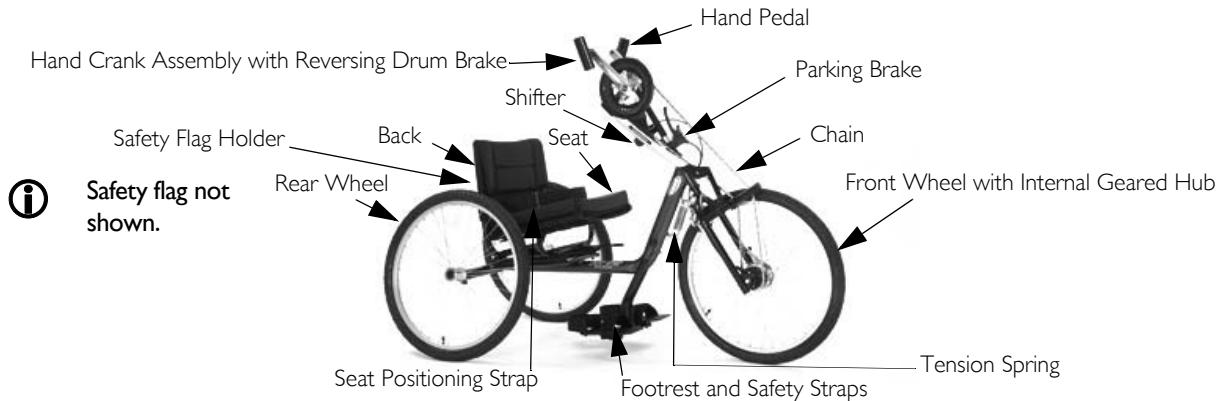
Safety flag not shown.
Parking brake not shown.



XLT PRO

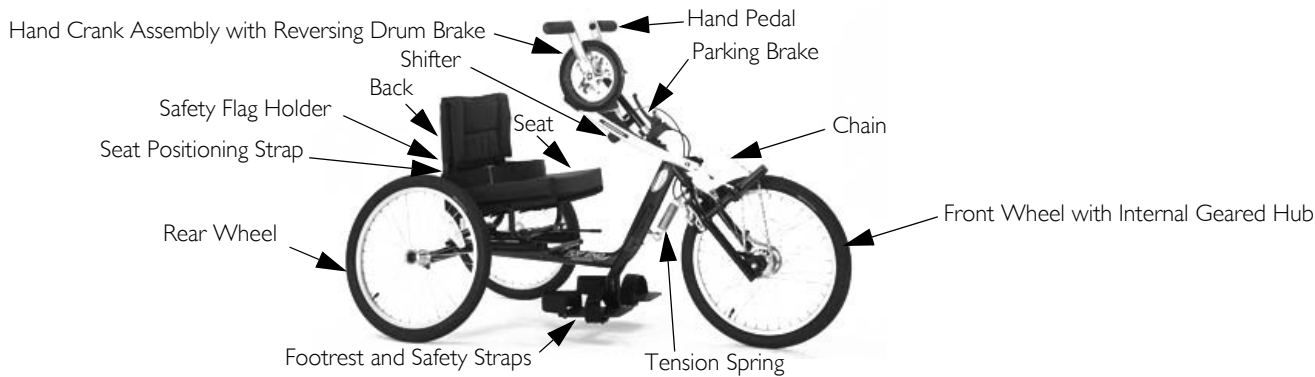


Excelerator



2 OVERVIEW

L'il Excelerator



2.8 Tire Pressure Conversion



PSI rating is printed on the side of the tire.

Conversion formula: 1 psi = 6.895 kPa (approx. 7 kPa).

PSI	KILOPASCALS	PSI	KILOPASCALS
50	345	90	621
55	379	95	655
60	414	100	690
65	448	105	724
70	483	110	758
75	517	115	793
80	552	120	827
85	586		

3 Safety

The safety section contains important information for the safe operation and use of this product.

3.1 General Guidelines



WARNING

DO NOT use this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as owner's manuals, service manuals or instruction sheets supplied with this product or optional equipment. If you are unable to understand the warnings, cautions or instructions, contact a healthcare professional, dealer or technical personnel before attempting to use this equipment - otherwise, injury or damage may occur.

A qualified technician **MUST** perform the initial set up of this wheelchair. Also, a qualified technician must perform all procedures specifically indicated in the manual.



ACCESSORIES WARNINGS

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.



NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

Check all parts for shipping damage and test before using. In case of damage, DO NOT use. Contact Invacare/Carrier for further instruction.

3 SAFETY

3.2 Proper Fit

The handcycle **MUST** be adjusted to fit the rider. Check the seat position, back angle, quick-release axles, footrest fore/aft position, hand crank height for proper fit and smooth operation of your handcycle.

- The rider **MUST** be able to see over the hand crank.
- The rider **MUST** have a slightly bent elbow when the hand pedals are toward the front of the handcycle (farthest from the rider's face).
- The rider's knees **MUST** not obstruct hand crank operation.
- XLT Series - the rider **MUST** have a slight bend at the knee when feet are in the footrests. Feet should be flat against footrest hoop.
- XLT Series requires a 18" turning radius. If leg touches tire during turn and the user cannot sense this, a leg guard attachment is recommended.
- Excelerator Series - the rider **MUST** have a 90° bend at the knee when feet are in the footrests.
- Excelerator Series - Footrests **MUST** be adjusted to allow a minimum of a 2-inch clearance between the bottom of the footrest and the ground.

3.3 Operating Information



WARNING - RISK OF INJURY OR DAMAGE

HANDCYCLE USER

As a manufacturer of handcycles, Invacare endeavors to supply a handcycle to meet many needs of the end user. However, final selection of a handcycle to be used by an individual rests solely with the user and his/her health care professional capable of making such a selection

TRANSPORT

Invacare recommends that a handcycle user is NOT transported in vehicles of any kind while in a handcycle. As of this date, the Department of Transportation has not approved any tie-down systems for transportation of a user while in a handcycle, in a moving vehicle of any type.

SEAT POSITIONING STRAP

SERIOUS INJURY CAN OCCUR IN THE EVENT OF A FALL FROM THE PRODUCT.

ALWAYS wear your seat positioning strap. Invacare strongly recommends using the seat positioning strap as an additional safeguard for the handcycle user. The seat positioning strap is a positioning belt only. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, the belt MUST be replaced IMMEDIATELY

BRAKES

(XLT PRO Model Only) If the brake cable show signs of wear or if it has become tangled because of improper transportation techniques, the cable MUST be replaced or the brake may fail. Should the primary brake fail, the parking brake can be used a backup emergency brake.

(ALL HANDCYCLE Models) Before riding your handcycle, ALWAYS check the function of the brakes. Be sure that the brakes and all other features of your handcycle are operating properly.



WARNING - RISK OF INJURY OR DAMAGE

Care, consideration and practice **MUST** be taken and observed in the following safety points. Otherwise, injury or damage may occur.

Safe use requires the close attention of the user as well as the assistant. This user manual points out the most common procedures and techniques involved in the safe operation and maintenance of the handcycle. It is important to practice and master these safe techniques until you are comfortable in maneuvering the handcycle.

A helmet **MUST ALWAYS** be worn when operating the handcycle.

Shoes **MUST ALWAYS** be worn and feet **MUST** be secured to the footrests with the straps when operating the handcycle.

Before riding your handcycle, **ALWAYS** check the function of the brakes. Be sure that the brakes and all other features of your handcycle are operating properly.

ALWAYS keep fingers and hands away from the chain while using the handcycle.

The Backrest **MUST** be adjusted properly. Otherwise, user's elbows may contact rear wheels during use. Operate with caution.

DO NOT let children play near the handcrank or the chain. Otherwise, injury or damage may occur.

The user is responsible for normal upkeep and maintaining the handcycle in proper operating condition.

The manufacturer is not responsible for failure, damage or injury caused by improper operation or maintenance by the end-user.

To determine and establish your particular safety limits, practice transferring activities in the presence of a qualified health care professional before attempting active use of the handcycle.

Care **MUST** be taken when operating on roads, streets or highways. Use safety flag when operating on roads, streets or highways. The safety flag is an option for these handcycle models.

Operation of the handcycle is subject to all traffic rules and regulations. (This may include the use of a safety lights and reflectors for dusk/night riding.) Give pedestrians the right of way.

Slow down when turning or cornering, otherwise injury or damage may occur.

**WARNING - RISK OF INJURY OR DAMAGE**

Use proper hand signals when turning.

Slow down at all street intersections and observe to the right, to the left and back to right again before proceeding.

DO NOT attempt to move up or down an incline with an ice or oil film. Avoid all surface hazards.

DO NOT attempt to ride over curbs or obstacles or speed bumps. Doing so may cause your handcycle to "bottom out" and/or turn over and cause bodily harm or damage to the handcycle.

DO NOT attempt to lift the handcycle by any removable (detachable) parts. Lifting by means of any removable (detachable) parts of an handcycle may result in injury to the user or damage to the handcycle.

DO NOT stand on the seat or frame of the handcycle.

DO NOT carry any riders.

DO NOT carry any items that may obstruct your view or prohibit you from operating the handcycle properly.

DO NOT attempt to adjust or clean the internal gear hub with reversing drum brake. This should only be performed by a bicycle professional.

TIRE PRESSURE

DO NOT use your handcycle unless it has the proper tire pressure. DO NOT overinflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm.

DO NOT ride on a flat or under inflated tires. Riding on flat or underinflated tires can cause injury, as well as, damage to the tire, tube and handcycle wheels.



WARNING - RISK OF INJURY OR DAMAGE

WEIGHT LIMITATION

The Invacare XLT series handcycles have a weight limitation of 250 lbs (113.4 kg).

The Invacare Excelerator handcycle has a weight limitation of 350 lbs (158.7 kg).

The Invacare L'il Excelerator handcycle has a weight limitation of 250 lbs (113.4 kg).

STABILITY AND BALANCE

For stability and proper operation of your handcycle, you **MUST** at all times maintain proper balance. Turning and cornering affects the stability and balance of the handcycle and user. Your handcycle should remain upright and stable during turns and cornering when operated correctly.

Invacare recommends using seat positioning strap for additional safety.

A NOTE TO HANDCYCLE ASSISTANTS

When learning assistance techniques for the handcycle, have an experienced assistant help you before attempting it alone.

When you are assisting with a transfer to/from the handcycle, remember to use good body mechanics. Keep your back straight and bend your knees when lifting or positioning the handcycle for the end-user.

Also, be aware of detachable parts. These must **NEVER** be used for lifting supports or to move the handcycle, as they may be inadvertently released, resulting in possible injury to the user and/or assistant.

PERCENTAGE OF WEIGHT DISTRIBUTION

Transferring in and out of the handcycle, turning and cornering will cause a change to the normal balance, the center of gravity, and the weight distribution of the handcycle. To determine and establish your particular safety limits, practice transferring activities in several combinations in the presence of a qualified health care professional before attempting a transfer alone.

Proper positioning is essential for your safety.

3.4 Transferring Into/Out of the Handcycle



WARNING - RISK OF INJURY OR DAMAGE

Before attempting to transfer in or out of the handcycle, every precaution should be taken to reduce the gap distance. Position the handcycle on level ground and as close as possible to the object you are transferring into or out of. The object you are transferring into or out of **MUST** also be secured before attempting any transfer. The parking brake of the handcycle **MUST** be engaged before attempting any transfer.

CAUTION

When transferring, position yourself as far forward as possible in the seat. This will prevent damage to the upholstery.



This activity may be performed independently provided you have adequate mobility and upper body strength.

1. Position the handcycle on level ground and as close as possible along side the object to/from which you are transferring.
2. If possible, position the handcycle at a 45° angle to the object to/from which you are transferring.
3. If installed, apply the parking brake on the handcycle.
4. Position the hand pedals as far forward as possible. This will create more room to transfer.



If necessary, lift the front wheel off the ground and rotate the front tire.

5. Secure object that you are transferring into or out of. Apply wheel locks (if installed) if the object is a handcycle.



During independent transfer, little or no seat platform will be beneath you. Although it may be difficult to wedge the transfer board between the handcycle seat and the handcycle seat, use a transfer board if necessary.

6. Lift and place left leg past the front frame across the seat and over the center tube.
7. Place one hand on far side of seat.
8. Shift body weight onto object while transferring.
9. To transfer out of the handcycle, reverse the procedure and use the backrest to push off.



WARNING - RISK OF INJURY OR DAMAGE

If installed on handcycle, parking brake and wheel locks **MUST** be engaged.

WHEELCHAIRS

Wheel locks are not brakes.

Engaging the wheel locks may not prevent the wheelchair from moving on all floor surfaces including those that may be wet or slick. **ALWAYS** exercise caution when transferring into or out of the wheelchair.

The steps below are specifically for transfer to/from a wheelchair and **DO NOT** correspond to the steps in the procedure on the previous page. Follow a similar procedure to transfer to/from an object other than a wheelchair. Refer to the steps on the previous page for more information.

STEP A: Shift body weight to the edge of the wheelchair upholstery closest to the handcycle.

STEP B: Lift and place **LEFT** leg across seat.

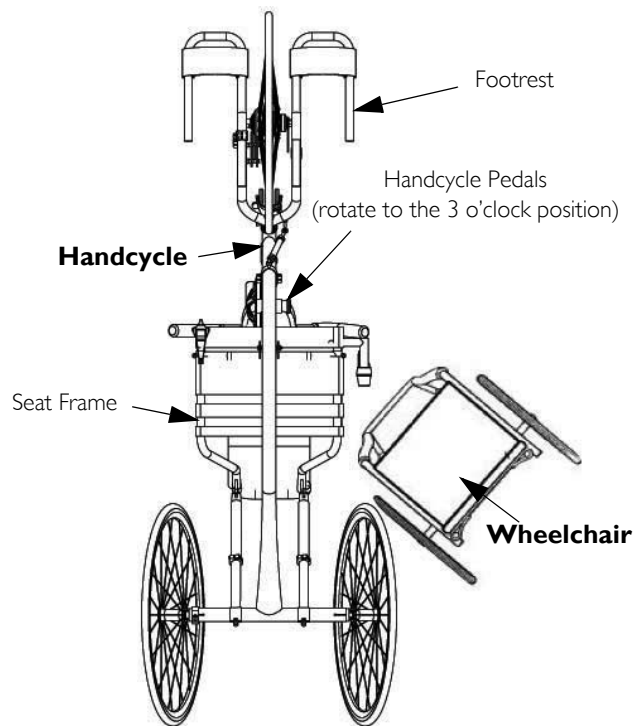
STEP C: Place **LEFT** hand on the left side of handcycle seat frame, **NOT** on crank.

STEP D: Place **RIGHT** hand on the wheelchair frame.

STEP E: Lift and shift weight down into handcycle seat.

STEP F: Place both legs onto handcycle footrests and secure safety straps.

STEP G: Adjust the handcycle seat. Refer to Adjusting the Seat on page 46.



4 Safety Inspection/Troubleshooting



Every six months or as necessary, take your handcycle to a qualified technician for a thorough inspection and servicing. Regular cleaning will reveal loose or worn parts and enhance the smooth operation of your handcycle. For safe and proper operation, your handcycle **MUST** be cared for just like any other vehicle. Routine maintenance will extend the life and efficiency of your handcycle.

4.1 Safety Inspection Checklist

Initial adjustments should be made to suit your personal body structure and preference. Thereafter follow these maintenance procedures:

Inspect/Adjust Initially and Weekly

- ☐ Inspect for bent or broken frame.
- ☐ Inspect parking brake - Adjust brake shoes to front rim. Check for worn or missing shoes. Check for wax or oil on rim.
- ☐ Ensure cable anchor is attached securely to brake arm.
- ☐ Ensure the brakes are working before you begin a ride. When fully applied, the handcycle should come to a complete stop.



CAUTION

As with any vehicle, the wheels/castors and tires should be checked periodically for cracks, flat spots and wear, and should be replaced.

- ☐ Ensure axle nuts are tight. Wheel should be centered in fork. Keep wheel bearings adjusted and keep spokes tight and wheel in proper alignment.
- ☐ Inspect rim and fork assembly for damage.
- ☐ Ensure axle nut and wheel mounting nuts are secure.
- ☐ Ensure that the rear wheels are properly secured to the frame.
- ☐ Inspect wheels for excessive side movement or binding when lifted and spun.
- ☐ Inspect for flat spots, wear and proper inflation.
- ☐ Inspect chain/chain guard for damage, rust, tension and stretch. Adjust if necessary. Lubricate each link (3-IN-ONE® oil or a quality bike lubricant). Check for damage or looseness.
- ☐ Adjust shifter/brake cables according to shifter/brake manufacturer's instructions (included with the handcycle).
- ☐ Inspect front fork. Keep tight and lubricate (All purpose grease).
- ☐ Inspect footrest mounting hardware is tight and footrest secure.
- ☐ Inspect footrest straps for wetness and/or damage.
- ☐ Inspect seat positioning strap (if installed) for any signs of wear. Ensure buckle latches or hook and loop fastener is secure. Verify hardware that attaches strap to frame is secure and undamaged. Replace if necessary.

4 SAFETY INSPECTION/TROUBLESHOOTING

- ☐ Inspect upholstery for rips or sagging.
- ☐ Clean upholstery with light detergent and water.
- ☐ Check that all labels are present and legible. Replace if necessary.
- ☐ Ensure that axles are free of debris.

Inspect/Adjust Periodically

- ☐ Inspect upholstery for rips or sagging.
- ☐ Clean upholstery with light detergent and water.
- ☐ Inspect hand grips for looseness. If loose, replace.
- ☐ Check that all labels are present and legible. Replace if necessary.

4.2 Troubleshooting

Veers Right	Veers Left	Sluggish Turn or Performance	Wheel Flutter	Squeaks and Rattles	Looseness in Handcycle	Solutions
X	X					Check road crown compensator and adjust to neutral
X	X	X	X			Check tires for correct and equal pressure
X	X					Check hardware and adjustment.
		X	X	X	X	Check for loose axle nuts.
				X	X	Check spokes and nipples.
		X		X	X	Check chain for proper tension and adjustment.
			X		X	Check that goose neck fittings are secure.

4.3 Suggested Maintenance Procedures



WARNING - RISK OF INJURY OR DAMAGE

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may result.

DO NOT overtighten hardware attaching to the frame. This could cause damage to the frame tubing.

1. Before using your handcycle, make sure all nuts and bolts are tight. Check all parts for damage or wear and replace. Check all parts for proper adjustment.
2. Check brakes.



WARNING - RISK OF INJURY OR DAMAGE

Damaged brakes may not stop the handcycle. Injury or damage may occur. Always check brakes before each use of the handcycle.

- Check cables for signs of wear or fraying and replace to avoid failure.
 - Squeeze the brake lever firmly or pedal backwards and check for proper brake function.
 - Adjust for pad wear if necessary.
 - Check pads for wear and replace if necessary.
 - Ensure rotors are free of foreign substances and oils.
3. Check parking brake cable and shifter adjustment cables for proper adjustment and operation. Refer to Adjusting/Replacing Seven Speed Shifter on page 67 and Replacing/Adjusting the Parking Brake on page 76.



WARNING - RISK OF INJURY OR DAMAGE

DO NOT use WD-40®, 3-IN-ONE® oil or other penetrating lubricants on quick-release axles. Otherwise, binding and/or damage to the handcycle can occur.

4. Clean/oil quick-release axles and or threaded once a week with a Teflon® lubricant.
5. Keep quick-release axles free of dirt and lint to ensure positive locking and proper operation.



WARNING - RISK OF INJURY OR DAMAGE

DO NOT use the handcycle unless it has the proper tire pressure (p.s.i.). DO NOT overinflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm.

4 SAFETY INSPECTION/TROUBLESHOOTING

6. Recommended tire pressure is listed on the side wall of the tire. If tire needs replaced, contact a local bike shop for replacement.



CAUTION

As with any vehicle, the wheels and tires should be checked periodically for cracks and wear, and should be replaced.

7. The wheels and tires should be checked periodically for cracks and wear, and should be replaced if damaged.
8. Check chain for slack and readjust if necessary. Installing/Adjusting Twenty-Seven Speed Cassette Chain on page 70.
9. Regularly check for loose spokes in the front and rear wheels. If loose, have them aligned at your local bike shop.
10. Check road crown compensator for proper operation. Refer to Installing/Removing/Adjusting the Road Crown Compensator on page 63.
11. Check upholstery for sagging, rips or tears. Refer to Replacing Seat Upholstery on page 81.
12. Check alignment of front wheel. If it wobbles or takes too much effort to turn by hand, have it aligned at your local bicycle shop.

5 Initial Setup



WARNING - RISK OF INJURY OR DAMAGE

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

DO NOT operate the handcycle if the hand crank obstructs your view. If the hand crank obstructs your view, adjust the hand crank height before using the handcycle - otherwise injury or damage may occur.



Required tools:

- Adjustable Wrench (10-12 inches)
- 5, 6, 8, 9 and 32 mm Wrenches
- $\frac{3}{16}$ -inch Allen Wrench
- $\frac{1}{4}$ -inch Allen Wrench
- $\frac{1}{2}$ -inch Box Wrench
- $\frac{1}{2}$ -inch Socket Wrench
- $\frac{1}{8}$ -inch Allen Wrench
- Medium Flat Screwdriver
- Medium Phillips™ Screwdriver

1. Install the rear wheels. Refer to Installing/Adjusting the Rear Wheel and Quick-Release Axles on page 50.
2. Adjust footrest. Refer to Adjusting the Footrest on page 43.





Excelerator Series - Foot should be flat on the footrest with the knees in a 90° angle.

XLT Series - The sole of the foot should rest against the inside edge of the footrest when the knee is slightly bent.

3. Adjust hand crank assembly if the user is unable to see over the hand crank or if knees obstruct hand crank rotation. Refer to Adjusting Hand Crank Height on page 45.

5 INITIAL SETUP

4. Perform one of the following:
 - XLT PRO - Adjust chain length if the hand crank has been adjusted by adding or subtracting links. Special tools are necessary and procedure should be performed by a qualified technician. Refer to Installing/Adjusting Twenty-Seven Speed Cassette Chain on page 70.
-  If necessary, take the XLT PRO to a bike shop to adjust the chain length.
- All handcycles except XLT PRO - Adjust chain tension idler. Refer to Adjusting the Chain Tensioner on page 69.
5. Check brakes and parking brake function. Refer to Suggested Maintenance Procedures on page 29.
6. Perform one of the following:
 - All handcycles except for XLT PRO - Pedal backwards to ensure reversing drum brake works properly.
 - XLT PRO - Squeeze brake handle on hand pedal to ensure the brake is working properly.
7. Adjust seat and/or back if necessary. Refer to Adjusting the Seat on page 46 and Adjusting Back Angle on page 48 as necessary.
-  Adjust the backrest so the user has a slight bend in the elbow when extended or at the 3 o'clock position.
8. Check that all hardware is tight.
9. Assemble the safety flag by sliding the top half into the plastic midsection.
10. Mount safety flag in holder secured to back tube.

6 Operation





WARNING - RISK OF INJURY OR DAMAGE

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

Before operating the handcycle, review the General Guidelines in this manual.

Damaged brakes may not stop the handcycle. Injury or damage may occur. Always check brakes before each use of the handcycle.

1. Check brakes. Refer to Suggested Maintenance Procedures on page 29
2. Engage the parking brake.
3. Transfer into the handcycle.
4. Ensure that the hand crank is not obstructing your view. DO NOT operate the hand cycle if hand crank obstructs your view. If the hand crank obstructs your view, adjust the hand crank height before using the handcycle.
5. Ensure the footrest is adjusted properly.
 -  XLT Series - footrest should be adjusted so that when seated with feet in the footrests, there is a slight bend at the knee.
 - Excelsior Series - footrest height should be adjusted so that when seated with feet in the footrests, there is a 90° bend at the knee.
6. Ensure the seat is adjusted properly.
 -  XLT Series - seat should be adjusted so that when seated with feet in the footrests, there is a slight bend at the knee and a slight bend at the elbow when the hand pedals are furthest away or at the 3 o'clock position.
 - Excelsior Series - When seated, the seat should be adjusted so there is a 90° bend at the knee and a slight bend at the elbow when the hand pedals are furthest away or at the 3 o'clock position.
7. Secure footrest straps over top of feet.
8. Secure the seat positioning strap.
9. Release the parking brake.

6 OPERATION

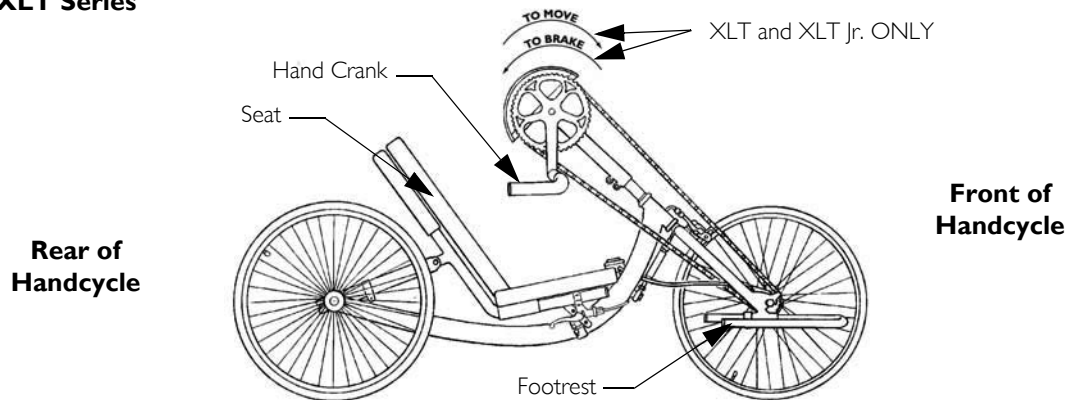


WARNING - RISK OF INJURY OR DAMAGE

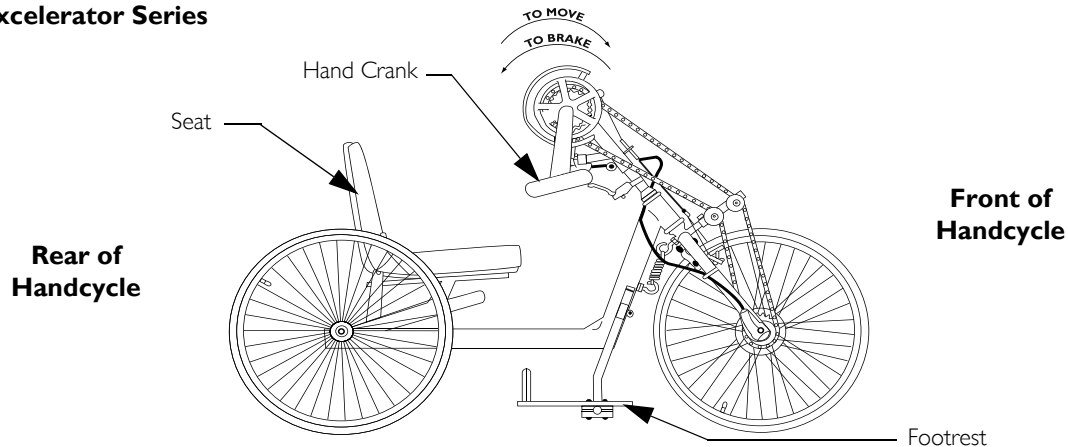
The handcrank assembly is used for propelling and steering of the handcycle. At least one hand **MUST** be on the hand crank assembly at all times. Otherwise, injury or damage may occur.

10. Place at least one hand onto the hand pedals. Angle the hand pedals in at the top and out at the bottom.
11. Rotate (pedal) the hand crank forward (toward the front) to propel the handcycle forward. Rotate (pedal) the hand crank backward (toward the rear) to apply the brake and slow down or stop.

XLT Series

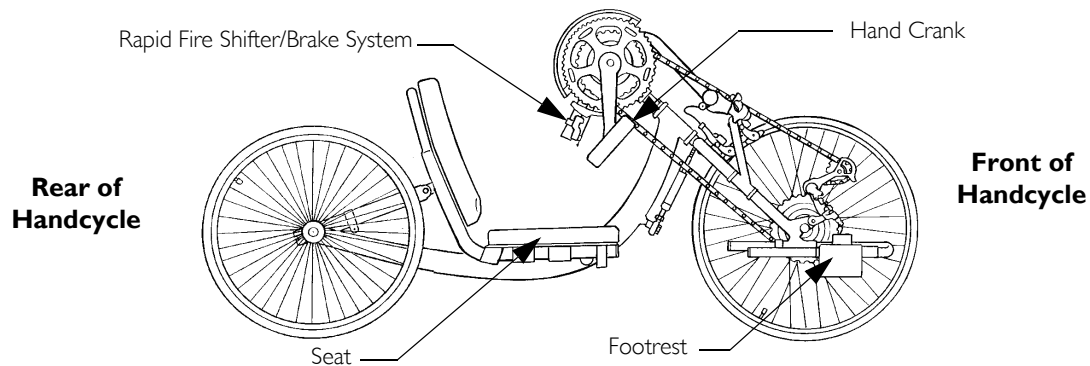


Excelerator Series



6 OPERATION

XLT PRO



6.1 Braking

XLT, XLT Jr., Excelerator, Li'l Excelerator Handcycles have internal gearing (7 speeds). Internal geared handcycles are equipped with reversing drum brakes. External geared handcycles have hand brakes.

Reversing Drum Brakes

Use the brakes intermittently on your handcycle to bring it to a complete stop. Apply by pedaling in reverse.

(XLT PRO Model Only) Hand Brakes/Hands-On Brakes

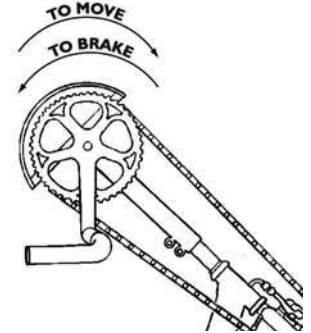


WARNING - RISK OF INJURY OR DAMAGE

The twenty-seven speed cassette on the XLT PRO model uses the hand brake as the primary brake. Reverse pedaling **WILL NOT** stop the bike.

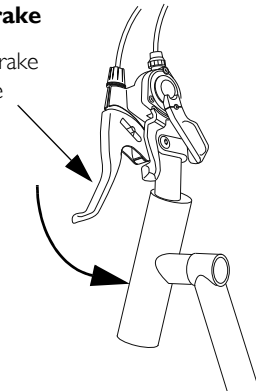
In situations where caution is advised (heavy traffic, intersections, etc.) hands should be kept in the "ready" position to prepare for braking.

1. Squeeze brake handle(s) as needed to slow or come to a complete stop.
2. Release when desired speed is achieved.



Rapid-Fire Hands-On Brake

Squeeze Brake Handle



6 OPERATION

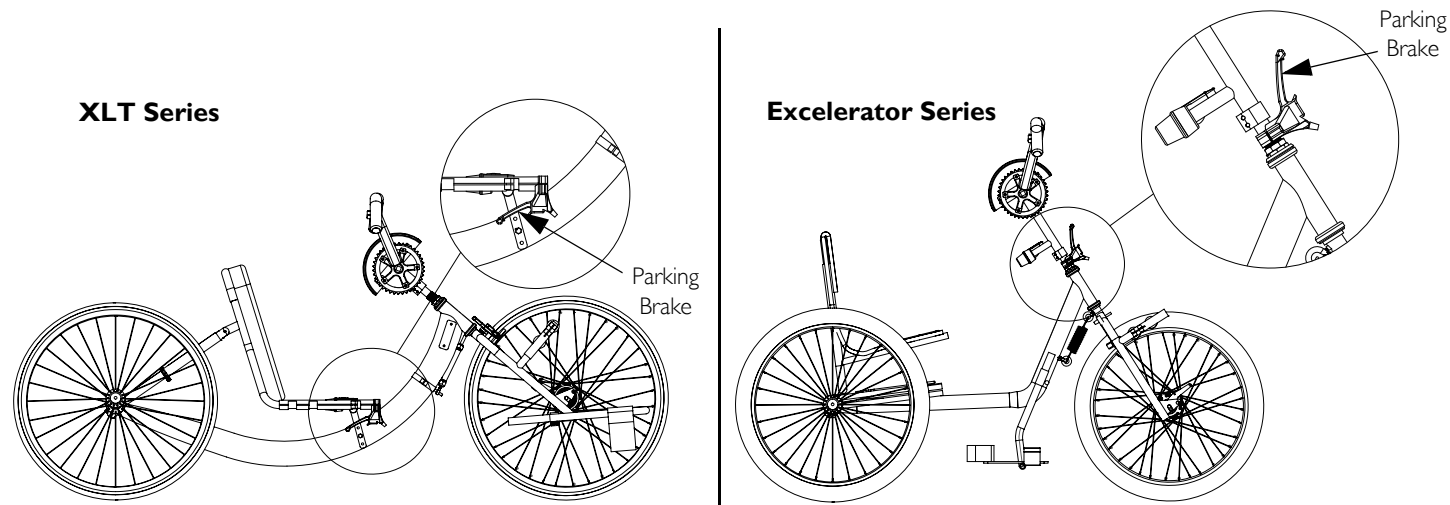
6.2 Using Parking Brake

XLT Series

- To Engage the Parking Brake - squeeze the handle and push the ratchet lever and lift until the handle locks in place.
- To Disengage the Parking Brake - squeeze and release the ratchet button.

Excelerator Series

- To Engage the Parking Brake - squeeze the handle and push the stop button in until the handle locks in place.
- To Disengage the Parking Brake - squeeze and release the handle.



6.3 Shifting Gears

Handcycles with Seven Speed Hub

To shift gears while moving, hold onto the hand crank assembly with one hand, continue pedaling, but ease pressure on the pedals and select the gear required with the other hand. When the handcycle is stationary, simply select gear required.

XLT, XLT Jr. and Exceleator Series

- Upshift - twist the grip or quad twist shifter to 2, 3, 4, 5, 6 or 7. Repeat until the desired gear is achieved.
- Downshift - twist the grip or quad twist shifter the opposite way as you would if doing upshift. Repeat until the desired gear is achieved.

Mountain Drive



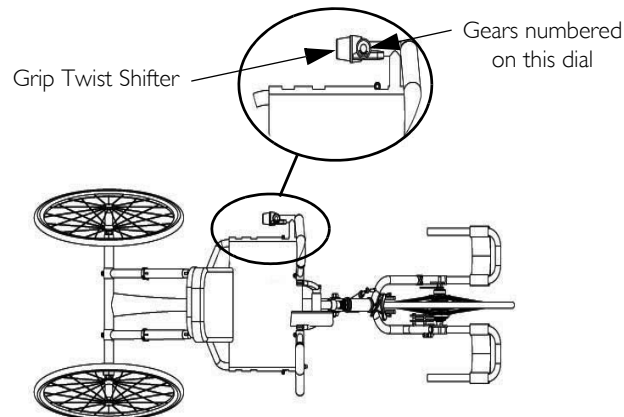
CAUTION

DO NOT shift the mountain drive option under load (i.e. using a high gear to start the handcycle in motion or to climb a hill, etc.). Shifting the mountain drive option under load will damage the internal workings of the mountain drive option and will void the warranty. The mountain drive option should be maintained by a qualified technician according to the manufacturer's instructions included with the handcycle.

- To switch mountain drive ON - push the gear shift button IN from the right side while the option is UNDER NO LOAD.
- To switch mountain drive option OFF - push the gear shift button IN from the left side while the option is UNDER NO LOAD.



View is looking down at the handcycle from above.
Quad twist shifter not shown.



6 OPERATION

XLT PRO Handcycles with Twenty-seven Speed Hands-on Rapid Fire Shifter/Brake System



CAUTION

DO NOT attempt to shift gears while the XLT PRO Handcycle is stationary.
DO NOT press both shifter levers down at the same time. Doing so may damage the shifter and will void the warranty.
The gears WILL NOT shift when both levers are pressed simultaneously.
DO NOT use excessive force. This may damage the shifter and void the warranty.

There are two shifters installed on the XLT PRO Handcycle. The right handpedal shifter operates the nine gears on the lower derailleur on the front wheel and the manual shifter operates the three chain rings on the upper derailleur on the crank assembly.

Shifting the chain on the lower derailleur towards the centerline of the handcycle is for climbing/accelerating (easier cranking) (lever A) and is called a downshift. Moving the chain on the lower derailleur out or away from the centerline of the handcycle is for speed (harder cranking) (lever B) and is called an upshift.

To shift gears, you **MUST** turn the crank forward with the chain under some tension while the handcycle is moving.

During operation, the chain should run smoothly over the chain rings. If there are problems with the chain, discontinue use and contact your local bike shop.

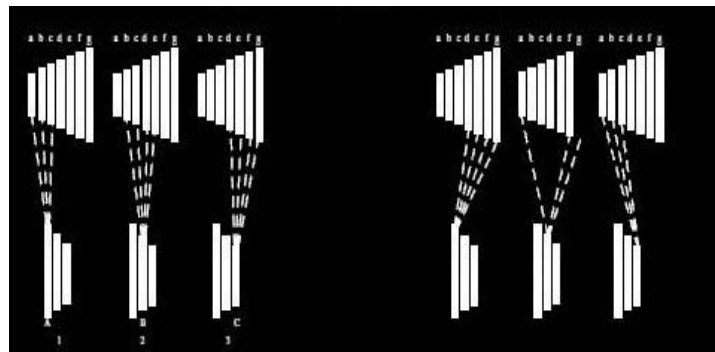
Refer to this chart and information that follows for an explanation of the upper derailleur chain rings in combination with the lower derailleur gears:

- If your pedaling cadence is too slow, shift into a lower gear.
- If your pedaling cadence is too fast, shift into a higher gear.
- The chain should not rub on the front of the derailleur chain guide.
- Shift into a lower gear in order to facilitate easy start-up.
- NEVER shift gears while stationary or while pedaling backwards.
- Keep eyes on the road when changing gears.

Lower derailleur gears (right shifter)	Upper derailleur chain rings (manual shifter or cable driven shifter)	Use for:
1-9	Smallest	Climbing Hills or Strong Headwinds
10-18	Medium	Flats or Gradual Rolling Terrain
19-27	Largest	Descending Hills or Strong Tailwinds

Recommended

Not Recommended



Lower Deraillleur (Right Side Shifter on Hand Pedal)

- Shifting from Harder Gears to Easier Gears (Downshift) -

Rapid Fire Shifter -

Push shift lever closest to center with thumb and release. Repeat until the desired gear is achieved.

- Shifting from Easier Gears to Harder Gears (Upshift) -

Rapid Fire Shifter -

Pull shift lever located towards the outside using thumb or index finger and release. Repeat until the desired gear is achieved.

Upper Deraillleur (Manual Shifter on Crank Set)

- Shifting from Easier or Smaller Chainring to Harder or Larger Chainring (Upshift) -

Manual Shifter -

Move shifter lever up.

- Shifting from Harder or Larger Chainring to Easier or Smaller Chainring (Downshift) -

Manual Shifter -

Move shifter lever down.

6 OPERATION

6.4 Backing-Up

XLT, XLT Jr., Excelerator, Li'l Excelerator

Use the rear wheels (i.e. like a manual wheelchair) to backup. When backing up, keep the front wheel straight. The weight of the hand crank may engage the reversing drum brake while backing up. Lift the hand pedals up to avoid this problem.

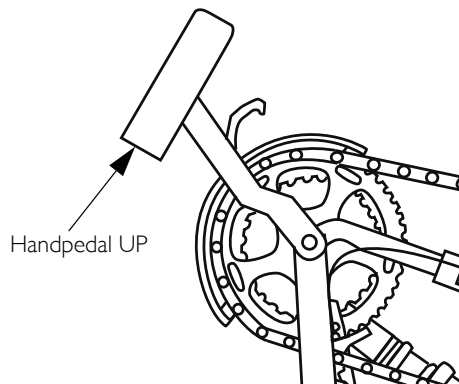
XLT PRO

Turn the front wheel straight and put the handpedals in the up position. Place one hand on a rear wheel (or ground) and the other hand on one of the handpedals and start to back up, keeping control of the handcycle at all times.

6.5 Maneuvering in Tight Areas

XLT PRO

If you cannot make a full turn, just crank a half or quarter crank, bring the crank back up again, turn a little bit at a time until you turn your way around. If you need to turn a full 180, you will need to keep the handpedals in the up position so the cables do not get tangled up and push backwards on the rear wheel with your other hand. Move the handcycle forward with the handpedals and use the rear wheels to manually push backwards until you are turned around.



7 Riding Position



WARNING - RISK OF INJURY OR DAMAGE

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

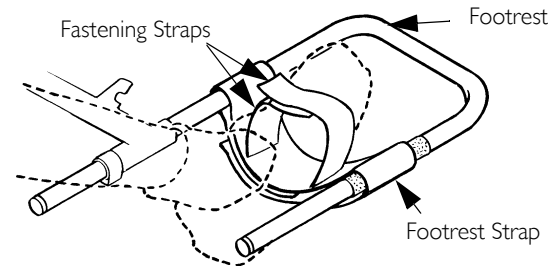
7.1 Using Footrest Strap



WARNING - RISK OF INJURY OR DAMAGE

Footrest straps **MUST** be inspected before each use. Exposure to moisture (i.e.- wet weather or puddles) will damage fastening strips. Footrest strap will not hold feet securely in footrest if fastening strips are damaged. **DO NOT** operate handcycle if footrest straps are wet or damaged, otherwise severe injury may occur.

ALWAYS wear shoes and securely strap feet in using straps provided. Severe injury may occur if feet are not secured while the handcycle is in motion.



XLT Series

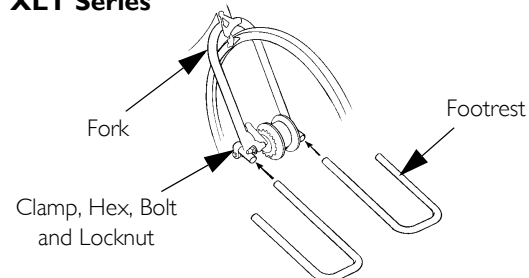
1. Place feet in footrests.
2. Secure feet to footrest strap using small fastening straps.

7.2 Adjusting the Footrest

XLT Series

1. Remove the hex bolt and locknut that secure the footrest to the fork.
2. Slide footrest to desired position.
3. Reinstall hex bolt and locknut. Tighten securely.
4. Repeat STEPS 1-3 for the opposite footrest if necessary.

XLT Series



7 RIDING POSITION

Excelerator Series

Adjusting Footrest Height



The range of the footrest is 0 to 4-1/2 inches.

Footrest height should be adjusted so that when the user is seated with feet in the footrests, there is a 90° bend at the knee. If this cannot be achieved by adjusting the footrest height, adjust the seat position. Refer to Adjusting the Seat on page 46.

1. Loosen the socket screws on each footrest bracket.
2. Slide the footplate up or down to the desired height. Allow at least 2 inches of ground clearance.
3. Tighten the two socket screws that secure each footrest bracket.

Adjusting Footrest Angle

1. Loosen the button screws and locknuts that secure the half clamps to the footrest weldment.



The footplate clamps are located under the footplates.

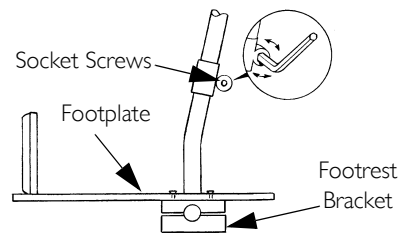
2. Position footplates to an appropriate angle for the user.
3. Tighten the button screws and locknuts that secure the half clamps to the footrest weldment.

Adjusting Footrest Depth

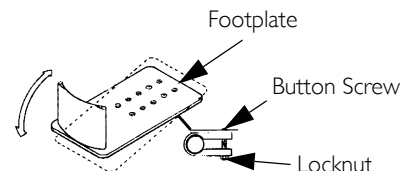
1. Remove the button screws and locknuts that secure the footplates to the half clamps.
2. Adjust the footplates to one of five depths.
3. Line up the mounting holes in the footplates with the mounting holes in the footplate clamps.
4. Install the button screws into the mounting holes and tighten securely with the locknuts.

Excelerator Series

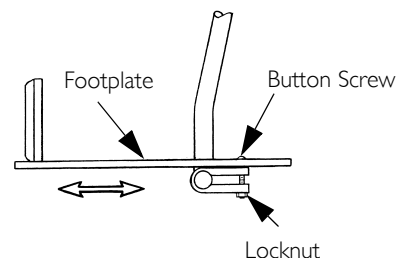
Height Adjustment



Angle Adjustment



Depth Adjustment



7.3 Adjusting Hand Crank Height



WARNING - RISK OF INJURY OR DAMAGE

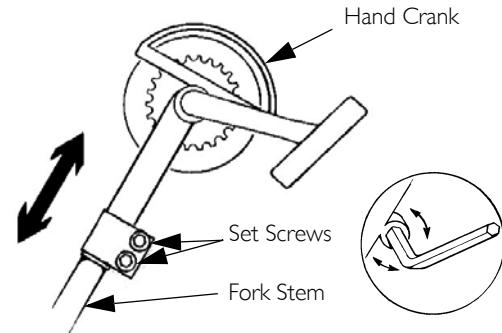
DO NOT operate the handcycle if the hand crank obstructs your view. If the hand crank obstructs your view, adjust the height before using the handcycle - otherwise, injury or damage may occur.

1. Loosen, but DO NOT remove the two set screws securing the hand crank to the fork stem.
2. Move the hand crank assembly up or down on the fork stem until you are comfortable with the position for operational purposes.



The hand crank should be positioned so that when the hand is toward the front of the handcycle, the arm is slightly bent. The arm should NEVER be fully extended (locked) at any point while cranking.

3. Tighten the hex nut to secure the hand crank in the desired position.
4. Tighten the chain if necessary. Refer to Installing/Adjusting Seven-Speed Hub Chain on page 67 or Refer to Installing/Adjusting Twenty-Seven Speed Cassette Chain on page 70.



7 RIDING POSITION

7.4 Adjusting the Seat

i The parking brake might need to be removed before seat adjustment and then reassembled to the handcycle once the seat is adjusted to the desired position. Refer to on page 74.

1. Activate parking brake. Refer to [Braking](#) on page 37.
2. If necessary, remove upholstery. Refer to [Replacing Seat Upholstery](#) on page 81 and [Replacing Back Upholstery](#) on page 82.
3. Perform one of the following procedures depending on the model of your handcycle:

XLT Series:

i XLT Series - The seat should be adjusted so that when seated with feet in the footrests, there is a slight bend at the knee and a slight bend at the elbow when the hand pedal is furthest away.

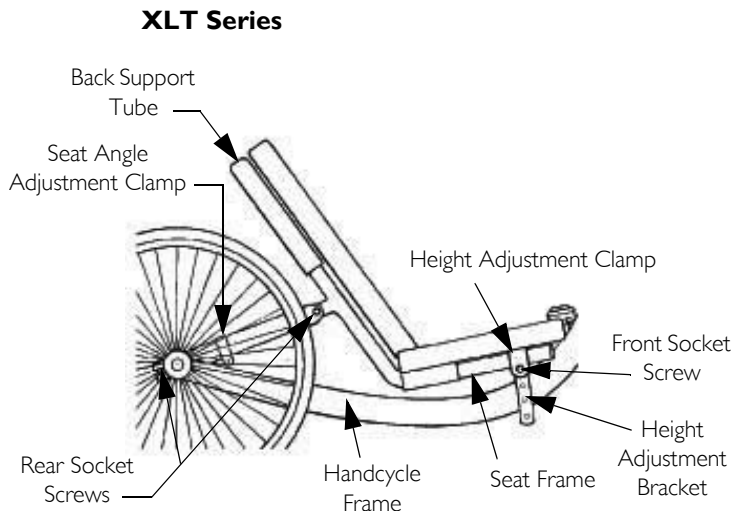
- Loosen, but **DO NOT** remove the four rear socket screws that secure the rear seat frame and the two front socket screws that secure the front of the seat frame to the handcycle frame.

i There are socket screws on the right and left side of the handcycle.

- Loosen, but **DO NOT** remove the hex bolts and locknuts that secure the two seat angle adjustment clamps to the rear seat supports.

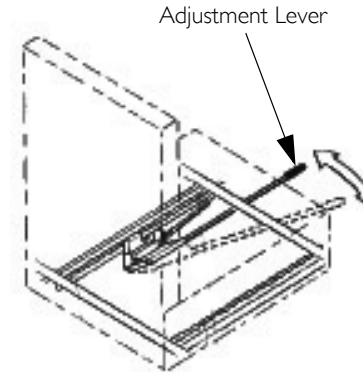
i There is one clamp on the right and left side of the handcycle.

- **Moving the Seat Rearward** - While lifting up on the back support tubes, push the seat rearward to the desired position.
- **Moving the Seat Forward** - While pushing down on the back support tubes, pull the seat forward to the desired position.
- **Adjusting Seat Height** - Remove the two socket screws securing the front of the seat frame and align the seat height adjustment clamp with the desired height adjustment hole in the seat height adjustment bracket.
- Install the two socket screws to secure the front of the seat frame to the handcycle frame.
- Tighten the six socket screws that secure the seat frame to the handcycle frame and the hex bolts and locknuts that secure the two seat angle adjustment clamps to the rear seat supports.





Excelerator Series:

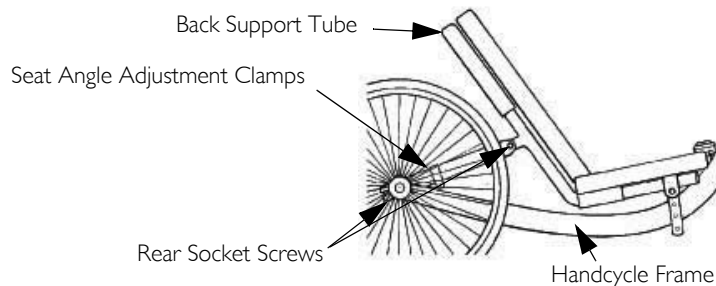
- i** Excelerator Series - To ensure proper fit, adjust the height of the footrest **BEFORE** adjusting the sliding seat. The seat should be adjusted so when seated with the users feet are in the footrests, there is a 90° bend at the knee.
- i** The parking brake might need to be removed before seat adjustment and then reassembled to the handcycle once the seat is adjusted to the desired position. Refer to on page 74.
- Activate the parking brake.
 - Grasp forward/rearward adjustment lever and push it to the right and slide seat forward or rearward. If necessary, hold onto the hand crank to stabilize your body while adjusting seat.
 - Ensure that the seat is properly engaged into the seating position you desire by “jiggling” the seat, making sure that the seat engages into the locking notch and adjustment lever returns to its original forward facing position.

Excelerator Series

7 RIDING POSITION

7.5 Adjusting Back Angle

1. If installed activate parking brake.
2. Loosen, but do not remove the four rear socket screws that secure the seat frame to the handcycle frame.
 There are two socket screws on the right and left side of the handcycle.
3. Loosen, but do not remove the hex bolts and locknuts that secure the two seat angle adjustment clamps to the rear seat supports.
 There is one clamp on the right and left side of the handcycle.
4. Perform one of the following:
 - Increasing Back Angle - While lifting up on the back support tubes, pull the seat upward to the desired position.
 - Decreasing Back Angle - While pushing down on the back support tubes, push the seat down to the desired position.
5. Tighten the four socket screws that secure the seat frame to the handcycle frame securely.
6. Tighten the hex bolts and locknuts that secure the two seat angle adjustment clamps to the rear seat supports securely.



7.6 Adjusting Back Height



This procedure applies to Excelerator and Li'l Excelerator models only.

1. Remove the back upholstery from the handcycle. Refer to Replacing Back Upholstery on page 82.

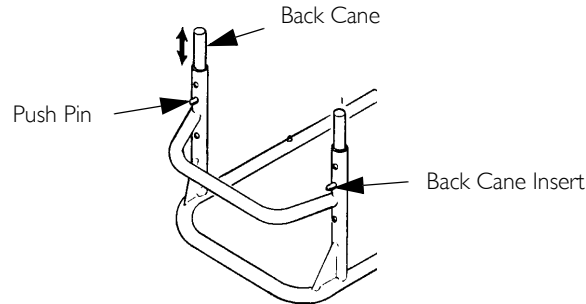


WARNING

Push pin **MUST** protrude through hole in back cane.

Ensure that both back cane inserts are at the same height before reassembling the handcycle.

2. Press the push pin on the back cane insert tube in and adjust the back height to one of three heights depending on original back height.
3. Install the back upholstery onto the handcycle. Refer to Replacing Back Upholstery on page 82.



8 Wheels



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

DO NOT use the handcycle unless it has the proper tire pressure (p.s.i.). DO NOT overinflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm. Tire p.s.i. is printed on the tire wall.

8.1 Installing/Adjusting the Rear Wheel and Quick-Release Axles



If drag on either side occurs, repeat this procedure until the handcycle rolls correctly.

1. Make sure that the axle receiver hex nut is securely tightened before installing the rear wheels.
 2. Depress detent pin in the quick-release axle and slide axle through the axle receiver.
 3. Release detent pin ensuring that the locking pins are fully released.
- i** Locking pins **MUST** protrude past the end of the axle receiver to fully release. Any excessive play **MUST** also be eliminated.
4. Increase or decrease end play by adjusting the locknut on the end of the quick-release axle.

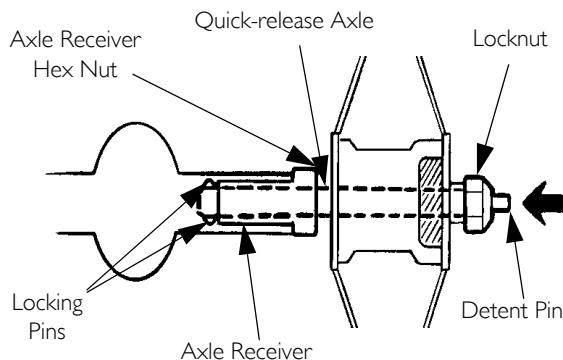


WARNING

Make sure detent pin is fully released before operating the handcycle.

Keep locking pins clean.

5. Reinstall rear wheel on the handcycle.
6. Tilt handcycle onto either rear wheel and spin raised wheel. It should spin freely with no excessive drag.
7. Repeat STEPS 1-6 for the opposite wheel.



8.2 Determining Toe In/Toe Out

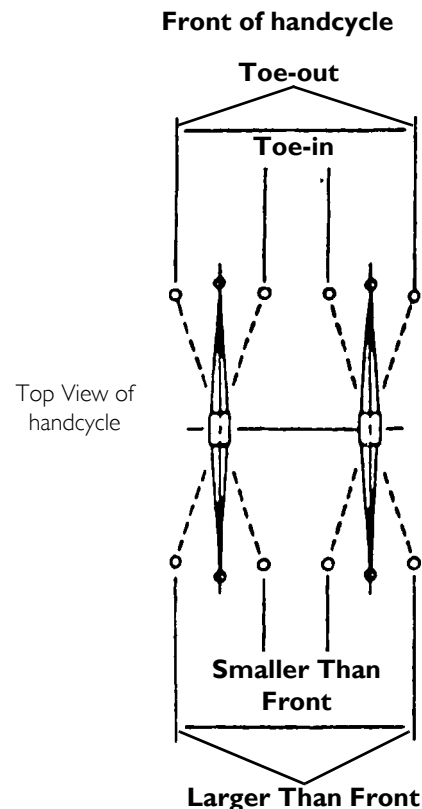
1. Inflate all pneumatic tires to recommended tire pressures (listed on the sidewall of the tire).
2. Measure the distance between the center lines at the rear and front of the rear wheels at approximately 12 inches from the ground/floor.



For optimum accuracy, perform STEP 2 with the handcycle occupied.

STEP 2 may be performed with using alignment gauge (available as an option for the handcycle). Refer to [Using the Alignment Gauge](#) on page 90.

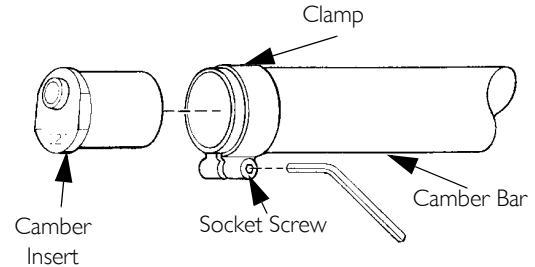
3. Determine the difference between the two measurements. If the difference between the two measurements is greater than 1/8-inch (for maximum rollability), one of two conditions exists:
 - If the back centerline measurement of the rear wheels is smaller than the front centerline measurement of the rear wheels, a toe-out condition exists.
 - If the back centerline measurement of the rear wheels is LARGER than the front centerline measurement of the rear wheels, a toe-in condition exists.
4. If the difference between the measurements is greater than 1/8-inch, correct the toe-in/toe-out condition. Refer to [Adjusting Toe In/Toe Out](#) on page 52.



8 WHEELS

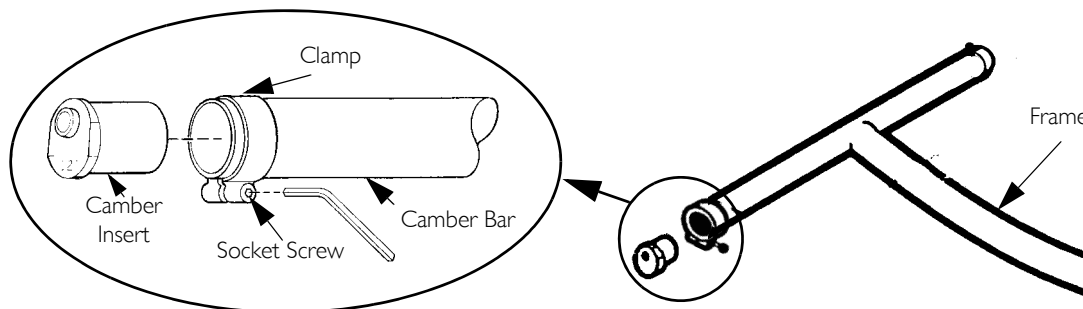
8.3 Adjusting Toe In/Toe Out

1. Loosen, but do not remove the socket screws and clamps that secure camber inserts to the camber bar.
2. Slowly rotate the camber insert until the rear wheels are approximately in a straight line.
3. Securely tighten the socket screws and clamps that secure the camber inserts to the camber bar.
4. Measure the distance between the center lines at the rear and front of the rear wheels at approximately 12 inches from the ground/floor. Refer to Determining Toe In/Toe Out on page 51.
5. Repeat STEPS 1-4 until the toe in/toe out measurement is less than 1/8-inch (for maximum rollability).



8.4 Replacing Camber Inserts

1. Loosen, but do not remove the socket screws and clamps that secure the camber inserts to the camber bar.
2. Remove the existing camber insert from the camber bar.
3. Install the new camber insert into the camber bar.
4. Adjust the toe in/toe out of the handcycle. Refer to [Adjusting Toe In/Toe Out](#) on page 52.



8.5 Replacing Tire Tube and Tuning/Replacement of Spokes



Invacare recommends that these procedures be performed by a qualified technician.

9 Service Procedures



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

9.1 Installing Hand Crank Handles

Horizontal Handles

1. Thread the handle into the hand crank (Detail “A”).
2. Unscrew the handle to remove it from the handcrank.

Installing Tri-pin Quad Handles

1. Thread the bracket into the handcrank.
2. Use a 15mm wrench to thread handles and posts into the bracket.

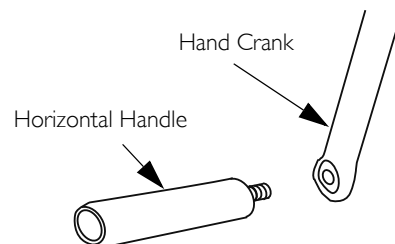
Adjusting Tri-pin Quad Handles and Posts



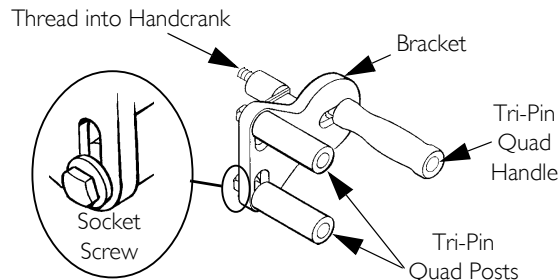
If necessary, the rider should hold the handle to determine the proper position of the handles and posts. The wrist should go between the two posts.

1. Loosen socket screws to adjust handle position (Detail “B”).
2. Tighten socket screws to secure handles in desired position.

DETAIL “A” - HORIZONTAL HANDLES/ DELTRIN HANDLES



DETAIL “B” - TRI-PIN HANDLES



9.2 Installing Ovalized Aluminum Handles



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

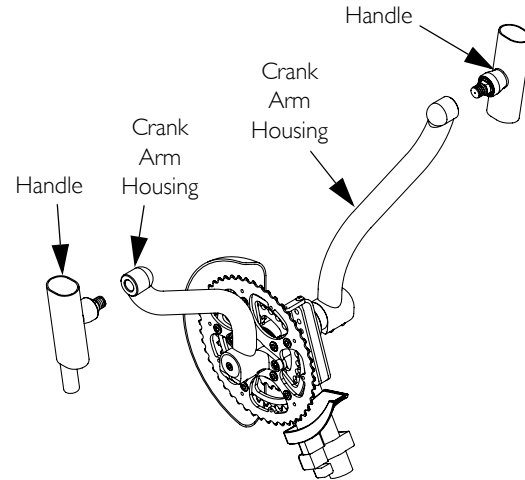
Failure to install handle assembly properly could result in injury.

It is recommended to inspect this assembly prior to and after each use.

Screw handle into crankarm housing (right handle has right-handed thread; left handle has left-handed thread).



Handle should spin freely with minimal play. If handle does not spin freely, contact Top End Customer Service at the phone number on the back cover of this manual.



9 SERVICE PROCEDURES

9.3 Replacing Fork/Crank Assembly



Invacare recommends that the following procedure be performed by a qualified technician.

XLT Series

1. Note the position of the crank assembly.
2. Loosen, but do not remove the two socket screws that secure the crank assembly to the existing fork.
3. Slide the crank assembly down towards the front wheel.
4. Remove the chain from the crank assembly.
5. Remove the crank assembly from the existing fork.
6. Remove the socket nut on the back of the existing fork that secures the brake assembly.
7. Note brake assembly hardware position and remove the brake assembly from the existing fork.
8. Remove the road crown compensator from the existing fork. Refer to Installing/Removing/Adjusting the Road Crown Compensator on page 63.
9. Loosen, but do not remove the socket screw that secures the shifting lever to the seat frame.
10. Remove the hex bolt and locknut that secure the brake arm to the brake arm clamp.
11. Remove the brake arm clamp from the existing fork.
12. Loosen, but do not remove the two cap nuts that secure the front wheel to the existing fork.
13. Remove the front wheel from the existing fork.
14. Lay the chain flat.



Laying the chain flat will prevent kinks in the chain.

15. Remove the two hex bolts, locknuts and clamps that secure the footrests to the existing fork.
16. Note the position of the footrests and remove the footrests from the existing fork.
17. Remove the two top nuts that secure the existing fork to the frame.
18. Note the o-ring and bearing position and remove the existing fork from the frame.

19. Slide the bottom bearing onto the new fork.
20. Slide the new fork into the frame.
21. Position the o-ring and bearing on the new fork.
22. Install the two nuts onto the new fork and tighten securely.
23. Position the footrest clamps on the new frame.
24. Install the footrests onto the new fork to the position noted in STEP 18 and secure with the two hex bolts and locknuts.
25. Position the chain around the hub of the front wheel.
26. Install the front wheel onto the new fork.



Make sure the washer and the non-turn washer are on the outside of the new fork.

27. Line up the projecting ends of the non-turn washer with the slot in the new fork.
28. Repeat STEPS 27-28 until the projecting ends of the non-turn washer line up with the slot in the new fork.
29. Torque the two cap nuts 260-390 in-lbs (29.4 - 44.0 n-m).
30. Install the brake arm clamp onto the new fork.
31. Secure the brake arm to the brake arm clamp with the hex bolt and locknut. Torque to 22-26 in-lbs.
32. Reinstall the shifting lever onto the seat frame and secure with the socket screw.
33. Install the road crown compensator onto the new fork. Refer to Installing/Removing/Adjusting the Road Crown Compensator on page 63.
34. Install the brake assembly onto the new fork. Refer to the hardware position noted in STEP 7 and tighten securely with the socket nut.
35. Slide the crank assembly onto the new fork.

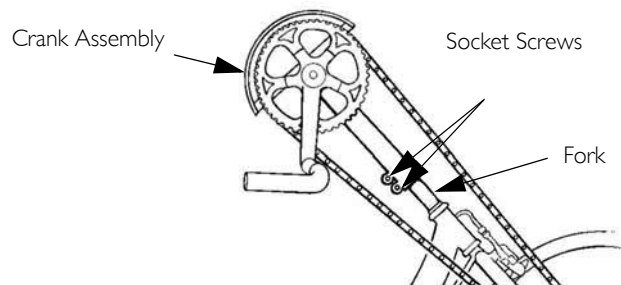


Make sure the sprocket on the crank assembly is in line with the sprocket on the front wheel.

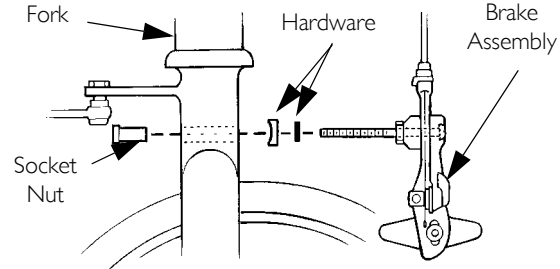
36. Reinstall the chain onto the crank handle sprocket.
37. Move the crank handle to the position determined in STEP 1 and tighten the two socket screws securely.

9 SERVICE PROCEDURES

STEPS 1, 2, 3, 35, 36, 37

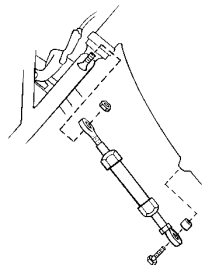


STEPS 6, 7, 34

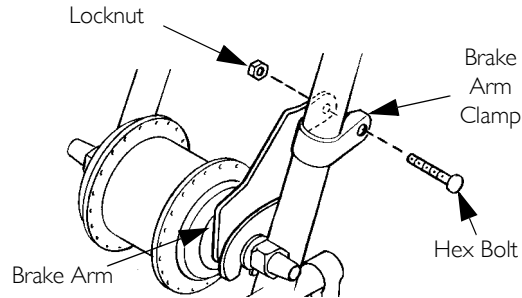


STEPS 8, 33

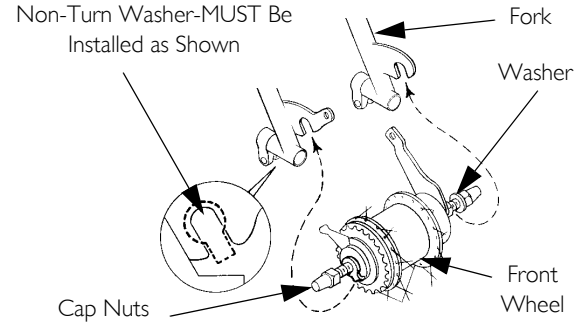
Road Crown Compensator



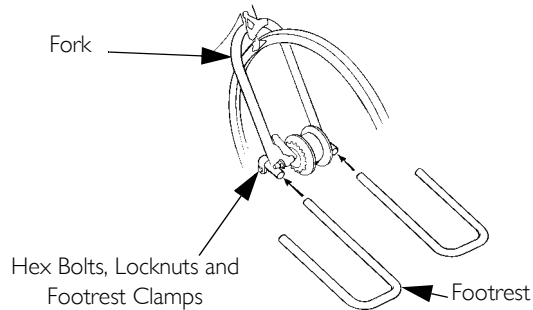
STEPS 10, 11, 30, 31



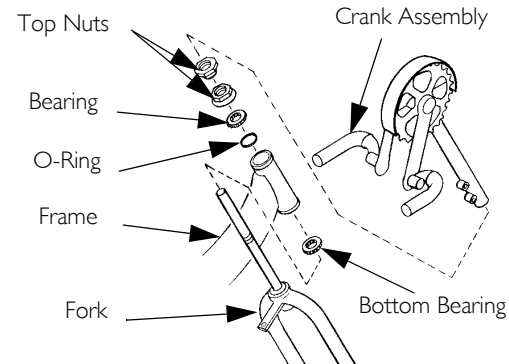
STEPS 12, 13, 26, 27, 28, 29



STEPS 15, 16, 23, 24



STEPS 5, 17, 18, 19, 20, 21, 22, 35



9 SERVICE PROCEDURES

Excelerator Series

1. Install washer and ball bearing housing onto fork assembly.
2. Slide fork assembly through the opening in the front frame (Goose Neck).
3. Install ball bearings onto the fork assembly.
4. Place the locknut over the fork assembly and tighten.
5. Tighten the setscrews.



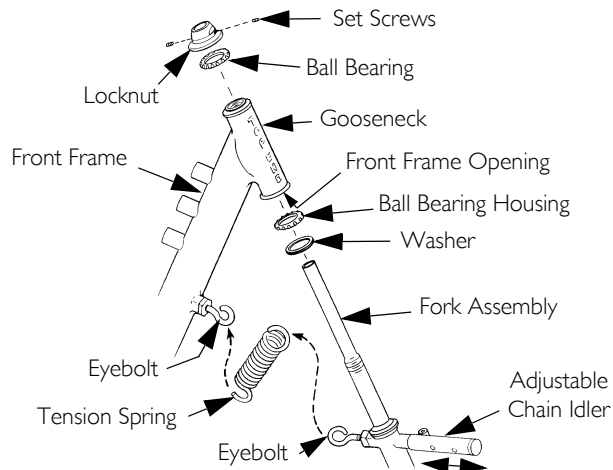
The tension spring is NOT intended to keep the handcycle straight when pedaling but to keep the handcycle from leaning excessively to one side or another.

6. Tighten the eyebolts onto the fork assembly and front frame.



Tension is applied by loosening or tightening the eye bolts. This should be done before installation of the tension spring.

7. Using a medium flat screwdriver, hook the tension spring to the fork assembly and front frame eye bolts.



9.4 Replacing the Crank Arms



This procedure applies to the XLT PRO only.

For all other models, a special tool is needed. Removal of the crank arms must be performed at a bike shop.

Right and left are determined from the user seated on the handcycle.

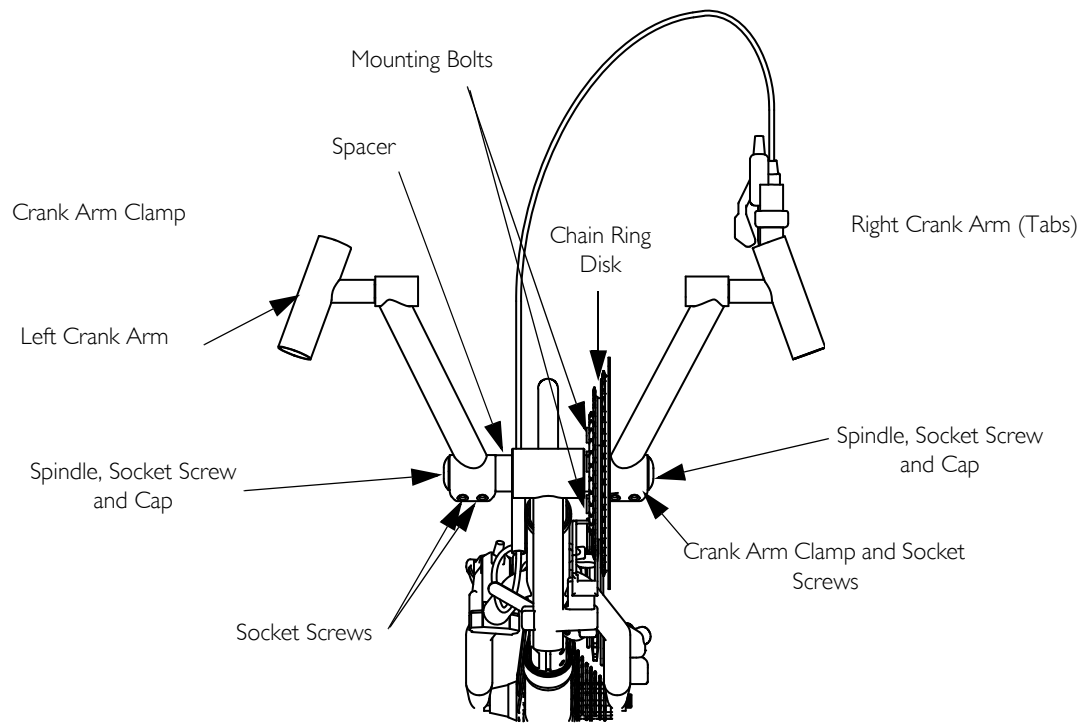
Replacing the Left Side Crank Arms

1. Remove the two socket screws from the existing crank arm clamp.
2. Remove socket screw and cap from the spindle.
3. Use socket screw from crank arm (in the center hole) to open binder of crank arm.
4. Remove the existing crank arm from the spindle.
5. Position the new crank arm onto the spindle so that the new crank arm is evenly aligned with the right side crank arm.
6. Reinstall the socket screw and cap from the spindle. **DO NOT** over tighten.
7. Using the two socket screws, secure the new crank arm clamp to the spindle. Securely tighten.

Replacing the Right Side Crank Arms

1. Remove the two mounting bolts securing the chain ring disk to the tabs of the existing crank arm.
2. Remove the two socket screws from the existing crank arm clamp.
3. Use socket screw from crank arm (in the center hole) to open binder of crank arm.
4. Remove socket screw and cap from the spindle.
5. Remove the existing crank arm from the spindle.
6. Position the new crank arm onto the spindle.
7. Using the two mounting bolts, secure the tabs of the new crank arm to the chain ring disk.
8. Ensure the new crank arm is evenly aligned with the left side crank arm.
9. Reinstall the socket screw and cap from the spindle. **DO NOT** overtighten.
10. Using the two socket screws, secure the new crank arm clamp to the spindle. Securely tighten.
11. Make sure that the spacers between the bottom bracket and crank arms do not spin freely.

9 SERVICE PROCEDURES



i XLT PRO only.

9.5 Installing/Removing/Adjusting the Road Crown Compensator



This procedure applies to XLT, XLT PRO and XLT Jr. only.

The road crown compensator is designed to stabilize the handcycle during transfers and while riding and is not intended to keep the handcycle straight when pedaling but to keep the handcycle from leaning excessively to one side or another.

Installing Road Crown Compensator

1. Position the bolt through the frame end of the road crown compensator.
2. Position the spacer on the bolt.
3. Install the bolt with spacer and road crown compensator into the mounting hole on the frame.
4. Rotate the fork to ensure the front wheel is pointing directly forward.
5. Position the fork end of the road crown compensator on the fork bolt.



If necessary, lengthen or shorten the road crown compensator to position the fork end onto the fork bolt. Refer to Adjusting Road Crown Compensator.

6. Secure the road crown compensator to the fork bolt with the locknut. Tighten securely.

Removing Road Crown Compensator

1. Remove the locknut securing the fork end of the road crown compensator to the fork bolt.
2. Remove the fork end of the road crown compensator from the fork bolt.
3. Remove the bolt and spacer securing the frame end of the road crown compensator to the frame.

Adjusting Road Crown Compensator

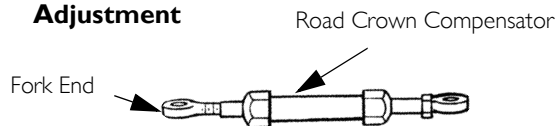


This adjustment is made for handcycling on crowned roads or in heavy winds.

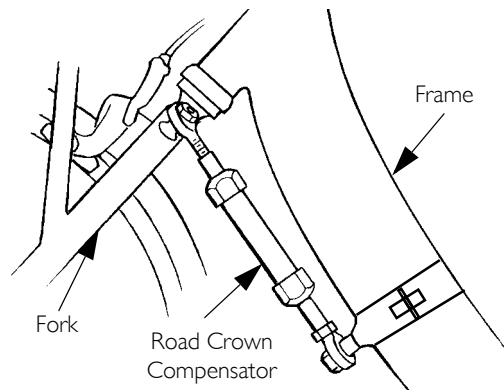
1. Rotate the fork end of the road crown compensator to adjust the length. Clockwise - shortens the road crown compensator and pulls the front wheel to the left. Counterclockwise - lengthens the road crown compensator and pushes the front wheel to the right.

9 SERVICE PROCEDURES

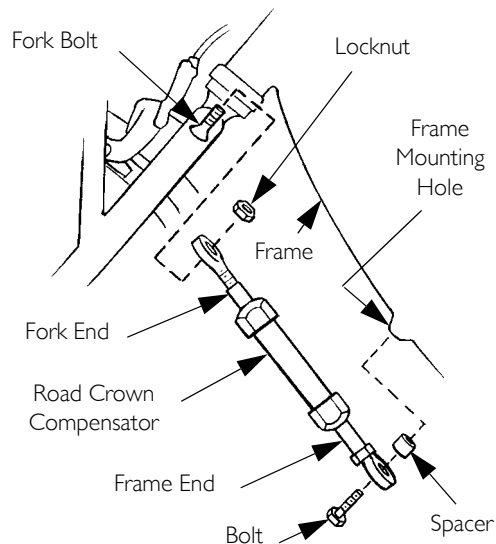
Adjustment



Installed



Removed



9.6 Tension Spring Installation

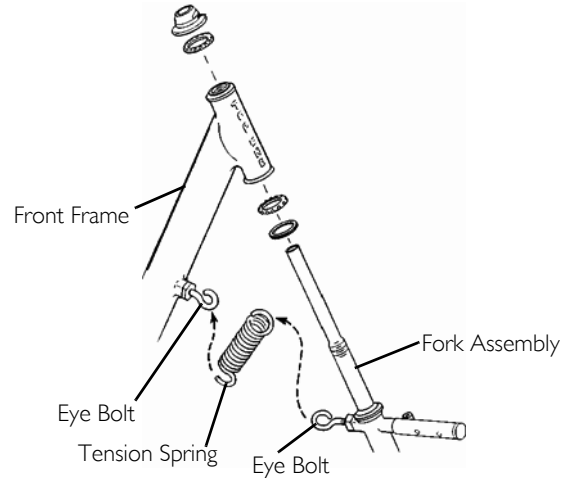


This procedure applies to Excelerator and Lil' Excelerator models only.

The tension spring is NOT intended to keep the handcycle straight when pedaling but to keep the handcycle from leaning excessively to one side or another.

Tension is applied by loosening or tightening the eye bolts. This should be done before installation of the spring.

1. Tighten eye bolts into fork assembly and front frame.
2. Using a medium flat screwdriver, hook the tension spring to the fork assembly and front frame eye bolts.



9 SERVICE PROCEDURES

9.7 Installing Seven Speed Shifter Cable

Excelerator and Lil' Excelerator



The seven speed Shifter Cable runs from the right side of the front frame to its mounting position on the hand crank assembly.

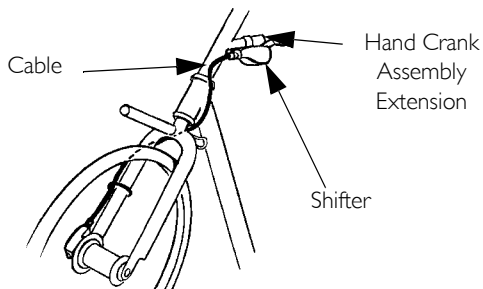
1. Run the cable from the right-side of the fork assembly to mounting position on the left side just below the hand crank assembly.
2. Attach the seven speed shifter to the hand crank assembly extension.
3. Secure with hardware provided.

XLT and XLT Jr.



The seven speed Shifter Cable runs from the right side of the front frame to its mounting position under the left side of the seat.

Excelerator and Lil' Excelerator



1. Run the cable from the right-side of the fork assembly to mounting position on the left side just below the left side of the seat.
2. Attach the seven speed shifter to the seat rail.
3. Secure with hardware provided.

XLT and XLT Jr.



9.8 Adjusting/Replacing Seven Speed Shifter

It is recommended that you take your handcycle to a qualified technician for any shifter adjustment.

Handcycles with seven speed shifters are equipped with SHIMANO hubs. If equipped with a SHIMANO hub, it **MUST** be serviced and adjusted by a qualified technician.



QUALIFIED TECHNICIAN ONLY - Contact Invacare for complete Shimano hub instructions.

9.9 Installing/Adjusting Seven Speed Hub Chain

Installing



WARNING

Idler **MUST** be adjusted to ensure proper chain tension. If proper tension is not present, chain may disengage from the chainring. If the chain is noisy when at proper tension, loosen slightly. After the chain is assembled, start in first gear and on straghtaway.

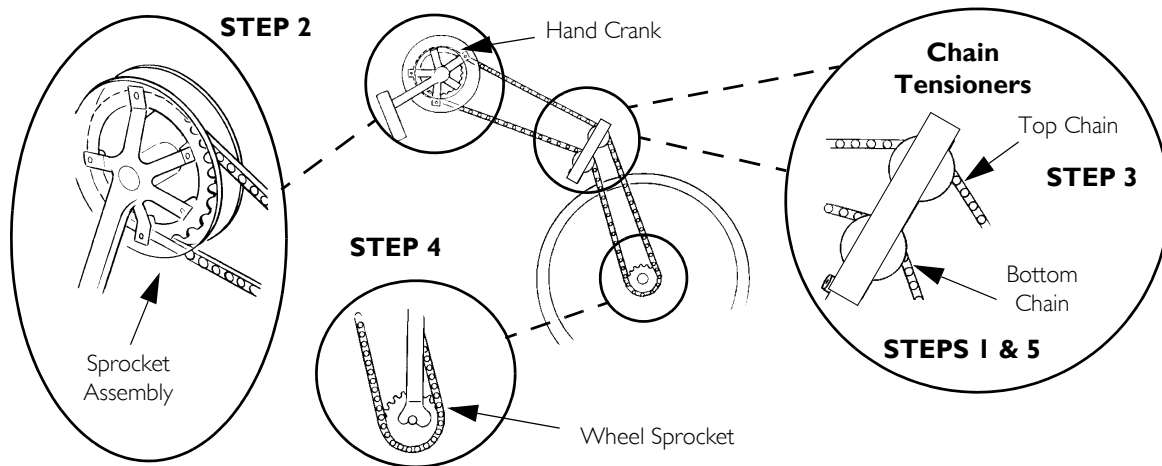
1. Spread the chain out flat and run it over the bottom chain tensioner upwards to the hand crank sprocket assembly.
2. Position chain over the hand crank sprocket assembly.



It may be necessary to turn the hand crank in a clockwise motion to position the chain on the sprocket.

3. Run the chain over the top chain tensioner.
4. Position the chain around the wheel sprocket and back up towards the bottom chain tensioner.
5. Place chain over the top of the bottom chain tensioner.
6. Attach the chain together using the master link (with clip) provided.

9 SERVICE PROCEDURES



Adjusting the Chain Tensioner



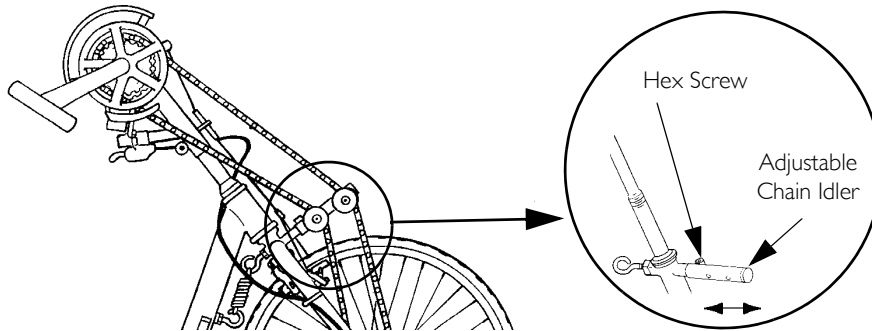
WARNING

Idler MUST be adjusted to ensure proper chain tension. If proper tension is not present, chain may disengage from the chainring. If the chain is noisy when at proper tension, loosen slightly. After the chain is assembled, start in first gear and on straghtaway. Make sure the tensioner is aligned properly, otherwise the chain will fall off.



Repositioning the hand crank assembly loosens or tightens the chain in an up/down position.

1. Ensure the hand crank is adjusted to the proper height. .
2. Loosen the hex screw securing the adjustable chain idler.
3. Adjust the tautness of the chain by moving the adjustable chain tensioner in or out as shown in .
4. Tighten the hex screw to secure the adjustable chain tensioner in place.



9 SERVICE PROCEDURES

9.10 Installing/Adjusting Twenty-Seven Speed Cassette Chain

XLT PRO

Installing Twenty-Seven Speed Cassette Chain

1. Spread the chain out flat and run it around the chain ring on the crank and the sprocket on the hub.

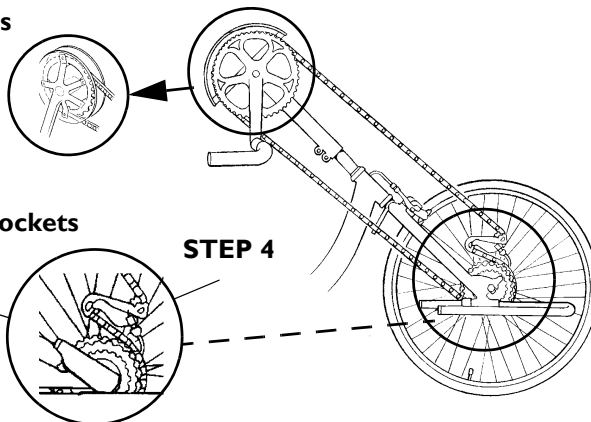


It may be necessary to turn the hand crank in a clockwise motion to position the chain on the small sprocket.

2. Ensure that crank assembly is loosened.
3. Lift up on the chain derailleur and thread the chain under the derailleur.
4. Thread the chain around the wheel sprocket.
5. Run the chain around the bottom of the wheel sprocket and back up towards the hand crank sprocket.
6. Attach the chain together using the master link (w/clip) provided.
7. To tension chain, Refer to Replacing Fork/Crank Assembly on page 56.

Hand Crank Sprocket Assemblies

STEP 5



Chain Derailleur and Wheel Sprockets

STEP 3

STEP 4



9.11 Replacing the Chain Guard Cover

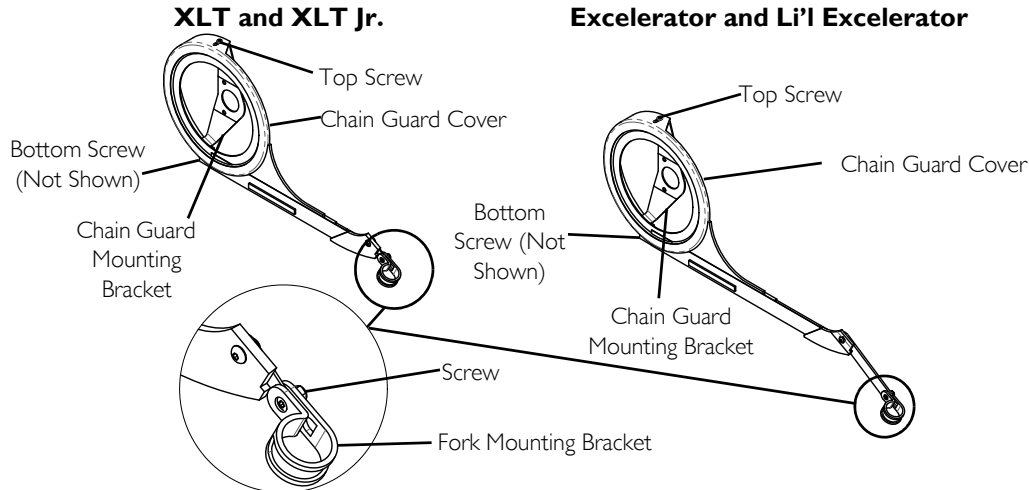
XLT, XLT Jr., Excelerator and Li'l Excelerator



This procedure applies Excelerator, Li'l Excelerator, XLT and XLT Jr. handcycles without the mountain bike option.

This procedure is for replacing the chain guard cover only. If the entire chain guard assembly needs to be replaced, special tools are required. Take the handcycle to a bike repair shop.

1. Remove the two screws securing the existing chain guard cover to the chain guard mounting bracket.
2. Remove the screw securing the fork mounting bracket to the chain guard cover.
3. Remove the existing chain guard cover from the handcycle.
4. Install the new chain guard cover onto the handcycle.
5. Secure the bottom of the new chain guard cover to the fork mounting bracket using the existing screw.
6. Secure the top of the new chain guard cover to the chain guard mounting bracket using the two screws.



9 SERVICE PROCEDURES

9.12 Replacing the Sprocket Guard

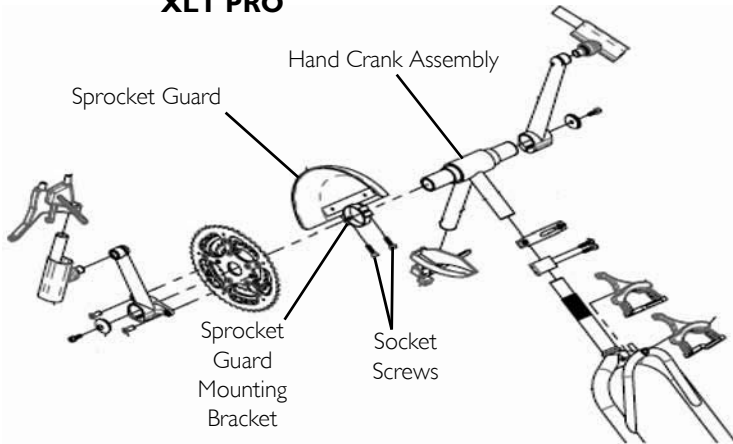
All XLT PRO Handcycles

1. Remove the two socket screws securing the existing sprocket guard mounting bracket to the hand crank assembly.
2. Secure the new sprocket guard mounting bracket to the hand crank assembly using the two socket screws.

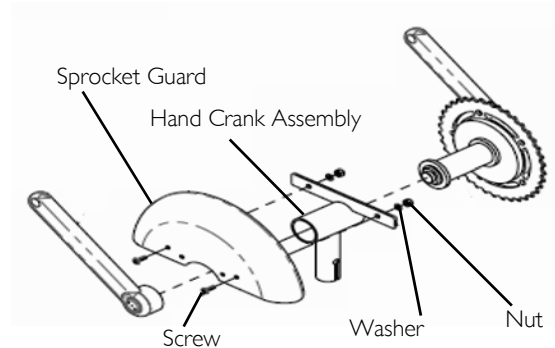
XLT, XLT Jr., Excelerator and Li'l Excelerator with Mountain Bike Option

1. Remove the two screws, nuts and washers securing the existing sprocket guard to the hand crank assembly.
2. Secure the new sprocket guard to the hand crank assembly using the two screws, nuts and washers.

XLT PRO



XLT, XLT Jr., Excelerator, Li'l Excelerator with Mountain Drive Option



Adjusting Twenty-Seven Speed Cassette Chain

1. Loosen, but do not remove the clamp that secure the crank support to the fork.
2. Slide the crank support up and/or down until the proper tension on the chain is achieved.

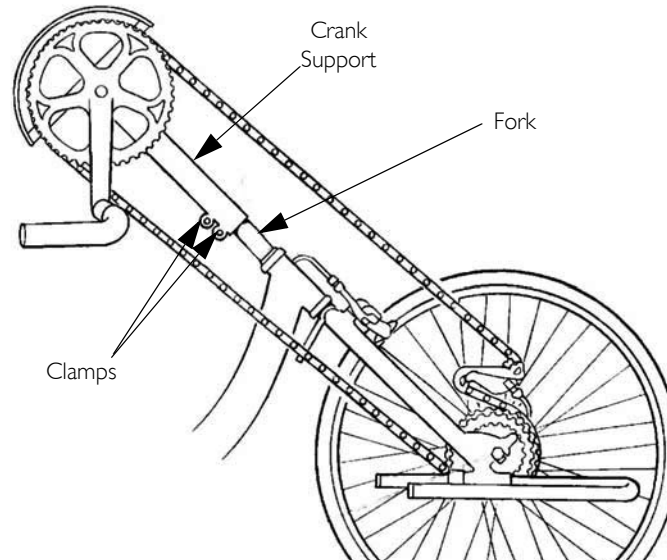


The proper chain tension will be approximately 1/2-inch of chain slack.

If crank is in desired position but chain tension is not correct, links **MUST** be added to or removed from the chain to correct the tension.

This should be performed by a qualified technician.

3. Tighten the clamp that secures the crank handles to the fork securely.



9 SERVICE PROCEDURES

9.13 Removing/Installing the Front Wheel



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.



For ease of installation, secure the handcycle frame approximately 6 inches from the ground or seek assistance.

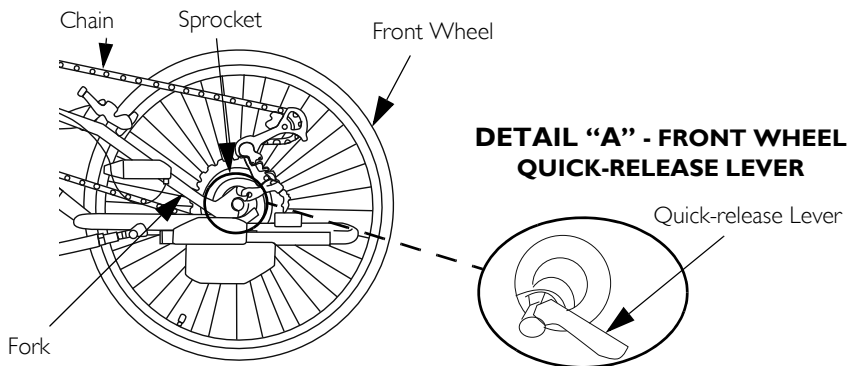
XLT PRO

Removing

1. Open the quick-release lever securing the front wheel to the fork (Detail "A") and loosen the knob on the opposite side of the quick-release lever.
2. Remove the wheel from the fork.
3. Remove the chain from the front wheel.

Installing

1. Loop the chain over the front wheel sprocket.
2. Position the front wheel axle into the fork slots.
3. Tighten the knob on the opposite side of the quick-release lever and secure the wheel to the fork with the quick-release lever.



XLT, XLT jr., Excelerator and Li'l Excelerator**Removing**

1. Remove the hex bolt and locknut that secure the brake arm to the brake arm clamp (Detail "A").
2. Loosen, but do not remove the two cap nuts that secure the front wheel to the existing fork (Detail "B").
3. Remove the front wheel from the existing fork.
4. Remove the chain (not shown) from the front wheel hub.

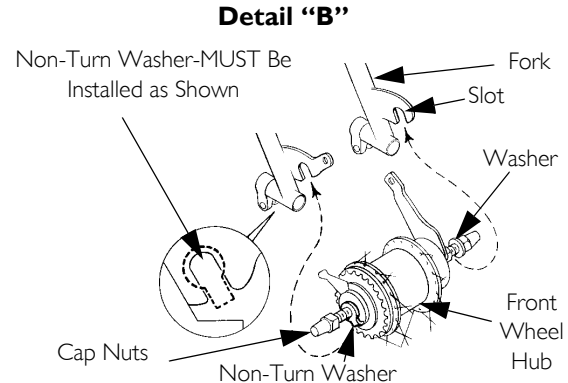
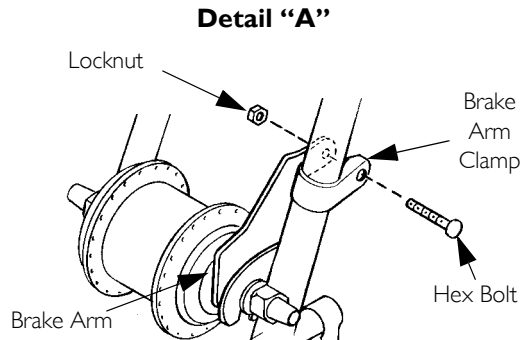
Installing

1. Loop the chain (not shown) over the front wheel hub (Detail "B").
2. Position the front wheel axle into the fork slots.



Make sure the washer and non-turn washer are on the outside of the fork.

3. Line up the projecting ends of the non-turn washer with the slot in the fork.
4. Torque the two cap nuts to 260-390 in-lbs (29.4 - 44.0 n-m).
5. Secure the brake arm to the brake arm clamp with the hex bolt and locknut (Detail "A"). Torque to 22-26 in-lbs.



9 SERVICE PROCEDURES

9.14 Replacing/Adjusting the Parking Brake



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

Replacement of the parking brake **MUST** be performed by a qualified technician.

Adjusting Cable

Loosen the hex nut and turn the adjuster barrel clockwise (tighten) or counterclockwise (loosen) to adjust the cable. Retighten hex nut.

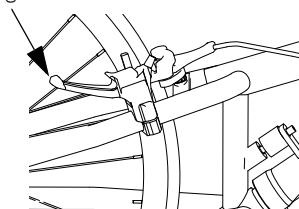
Brake Pads

Adjust the brake pad assembly so that when the parking brake is engaged the brake pads rest solely on the rim of the wheel.

Replacing Brake Pads

1. Remove the mounting nuts and brake pads.
2. Secure the replacement brake pads with hardware and adjust.

Parking Brake



9.15 Replacing the Footrest/Footplates

XLT Series



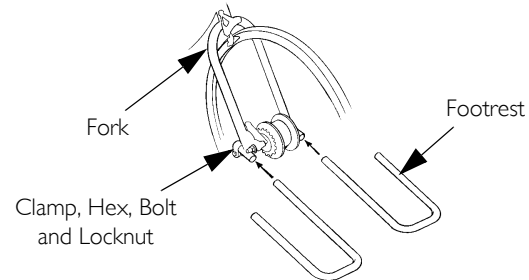
Before disassembly, take note of footrest position.

1. Remove the hex bolt and locknut that secure the footrest to the fork.
2. Remove existing footrest from clamp.
3. Insert new footrest into clamp.
4. Slide footrest to desired position.
5. Install hex bolt and locknut. Tighten securely.
6. Repeat STEPS 1-5 for the opposite footrest if necessary.

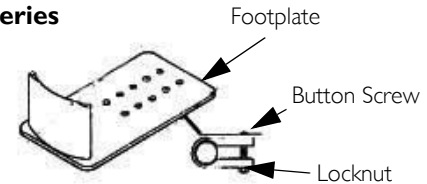
Excellerator Series

1. Remove the button screws and locknuts that secure the footrests to the footplate clamps.
2. Align a new footplate on the footplate clamp at the desired depth.
3. Line up the mounting holes in the footplates with the mounting holes in the footplate clamps.
4. Install the button screws into the mounting holes and tighten securely with the locknuts.

XLT Series



Excellerator Series



9 SERVICE PROCEDURES

9.16 Replacing Footrest Strap

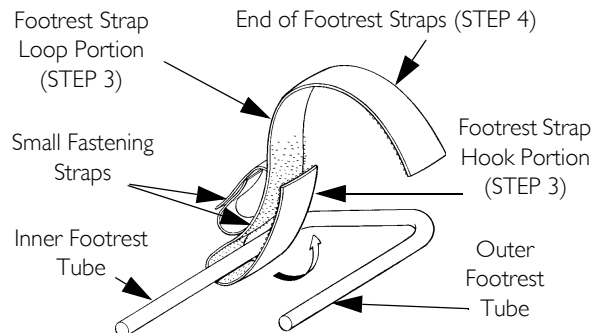
1. Pull apart fastening straps securing existing footrest strap to footrest.



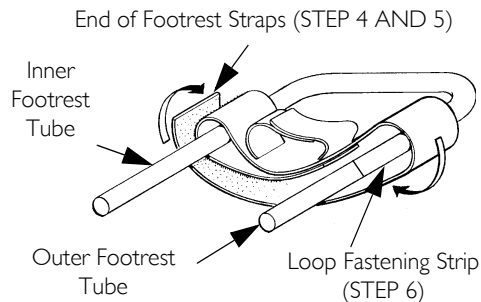
The small fastening straps should face up.

2. Wrap end of footrest strap over and around the inner footrest tube and firmly connect the hook and loop portions of the footrest strap (Detail "A").
3. Wrap end of footrest strap over and around the outer footrest tube and under the inner footrest tube and firmly connect the hook and loop portions of the footrest strap (Details "A" and "B").
4. Ensure the footrest strap is firmly attached to the loop fastening strip on the outer footrest tube.

DETAIL "A"



DETAIL "B"



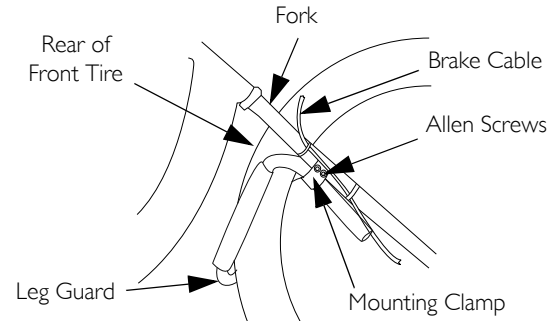
9.17 Replacing the Leg Guard

1. Loosen the two allen screws on each mounting clamp.
2. Remove existing leg guard from clamps.
3. Insert new leg guard into clamps.
4. Position each mounting clamp onto the fork under the brake cable.



The leg guard should surround, but not touch, the rear of the front tire.

5. Adjust the leg guard to the desired position.
6. Tighten both allen screws on each mounting clamp securely.



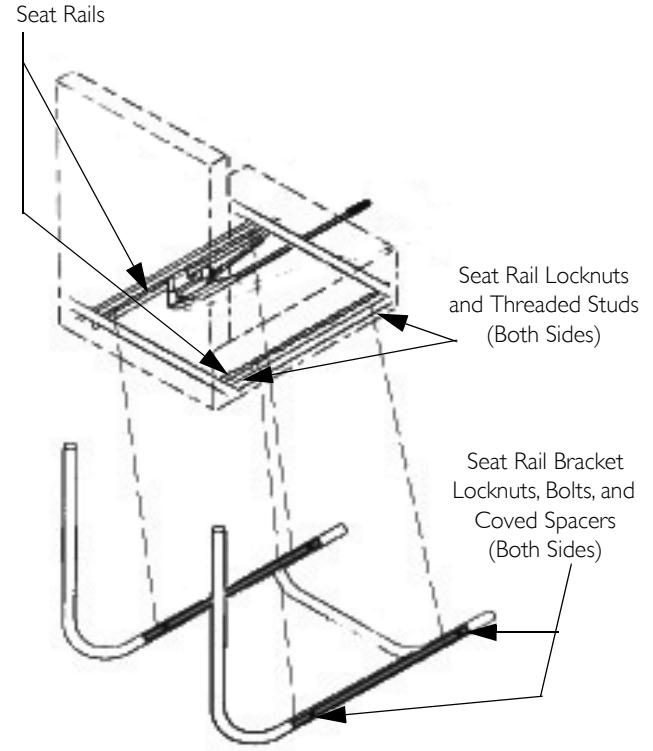
9 SERVICE PROCEDURES

9.18 Replacing Seat



This procedure applies to Excelerator Series Handcycles only.

1. Remove the locknuts, bolts, and covered spacers from both sliding seat rail brackets.
2. Remove sliding seat and seat rails from brackets.
3. Remove the locknuts from the threaded studs from seat rails on both sides of seat.
4. Remove the seat from the seat rails.
5. Reverse STEPS 3-4 to install a new seat onto the seat rails.
6. Reverse STEPS 1-2 to install sliding seat and seat rails onto the seat frame.



9.19 Replacing Seat Upholstery

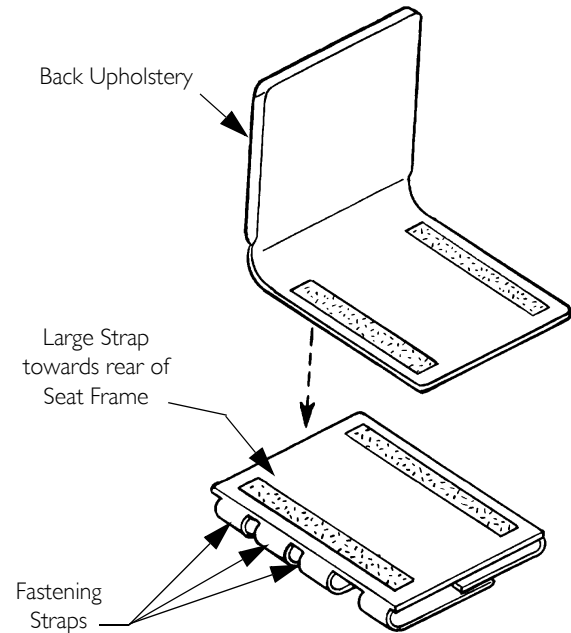


WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

Upholstery **MUST** be inspected **BEFORE** each use. Exposure to moisture (i.e., wet weather or puddles) will damage fastening straps/flaps/strips. **DO NOT** operate the handcycle if upholstery is wet or damaged, otherwise severe injury may occur.

1. Remove seat cushion and back upholstery (if applicable) from chair.
2. Unlatch the four fastening flaps that secure the seat upholstery to the seat frame.
3. Remove the existing seat upholstery.
4. Install the new seat upholstery making sure that the three fastening flaps that are in close proximity to one another are to the rear of the seat frame.
5. Secure the four fastening flaps together.
6. Reinstall seat cushion and back upholstery (if applicable) onto chair.



9 SERVICE PROCEDURES

9.20 Replacing Back Upholstery

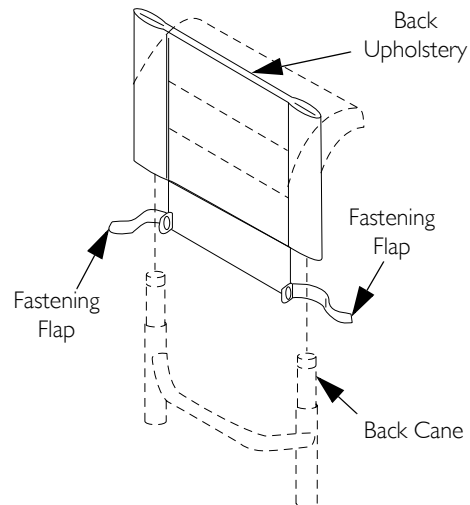
Wide Back Upholstery



WARNING

Upholstery **MUST** be inspected before each use. Exposure to moisture (i.e. - wet weather or puddles) will damage fastening straps/flaps/strips. **DO NOT** operate handcycle if upholstery is wet or damaged, otherwise severe injury may occur.

1. Unlatch the two fastening flaps that secure the bottom of existing back upholstery to the back canes.
2. Unlatch the top of the existing back upholstery.
3. Lift up on the existing back upholstery and remove from the handcycle.
4. Install the new back upholstery onto the handcycle.
5. Securely latch the fastening flaps on the bottom of the new back upholstery to the back canes.



Replacing Narrow Back Upholstery and Cushion



WARNING

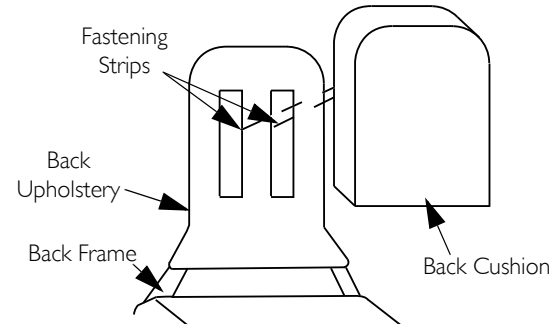
Upholstery and cushion **MUST** be inspected before each use. Exposure to moisture (i.e. - wet weather or puddles) will damage fastening straps/flaps/strips. **DO NOT** operate handcycle if upholstery is wet or damaged, otherwise severe injury may occur.

Replacing the Cushion

1. Pull the existing back cushion to release the fastening strips.
2. Align the fastening strips on the back frame with the fastening strips on the new back cushion.
3. Press the back cushion firmly against the back frame to secure.

Replacing the Upholstery

1. Remove the cushion.
2. Pull up to remove the existing upholstery from the back frame.
3. Slide the new back upholstery over the back frame.



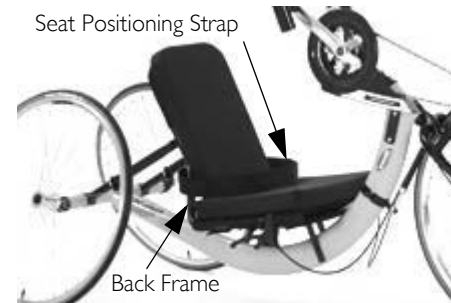
9.21 Replacing the Seat Positioning Strap

On Wide Backs

1. Release the fastening strips securing the existing seat positioning strap to the back frame.
2. Secure the new seat positioning strap to the back frame using the fastening strips.

On Narrow Backs

The seat positioning strap is attached to the back upholstery. Replace the back upholstery to replace the seat positioning strap. Refer to Replacing Narrow Back Upholstery and Cushion.



10 Options



WARNING

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

10.1 Installing Safety Lights



WARNING

Operation of the handcycle is subject to all traffic rules and regulations (this may include the use of a safety lights and reflectors for dusk/night riding).

Batteries

1. Remove the lens cover.
2. Insert the AAA batteries with correct polarity (+ or -).
3. Reinstall lens cover.

Mounting the Safety Light

1. Remove the set screw from the clamp on the safety light.
2. Install the safety light.
 - A. Rear safety light: Pull the back cushion off of the back frame. Position the clamp onto the rear seat post. Install the set screw into the clamp and tighten securely.
 - B. Front safety light: Position the clamp onto the side frame. Install the set screw into the clamp and tighten securely.

Operating the Safety Light

1. Press GREY button to turn safety light on/off.
2. Remove lens cover and slide switch back and forth for pulse or constant mode.

Rear Safety Light



Front Safety Light



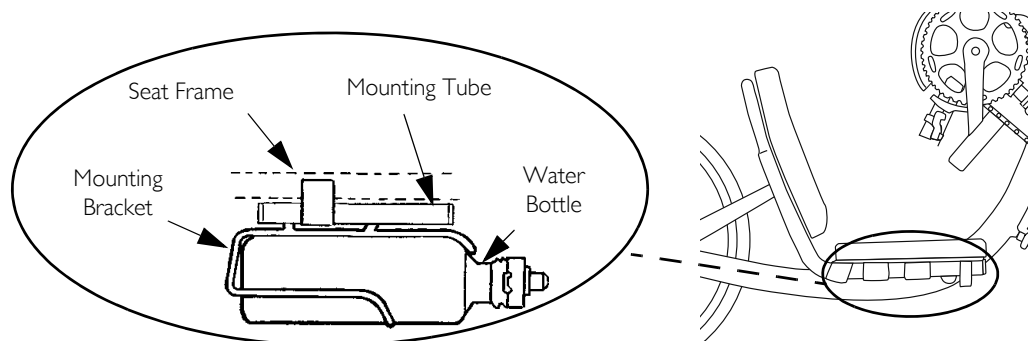
10.2 Installing the Water Bottle

1. Secure the water bottle mounting tube to the seat frame using the hardware provided.



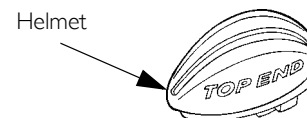
Make sure the water bottle mounting bracket mounting holes are facing downward.

2. Attach the water bottle mounting bracket to the mounting tube using the hardware provided.
3. Push water bottle into mounting bracket until secure.



10.3 Using Safety Helmet

1. Secure helmet using the chin strap.
2. Ensure proper fit.



10 OPTIONS

10.4 Installing/Using the Tow Bar



WARNING

DO NOT use if draft bumper extends past rear wheels. If draft bumper extends past the rear wheels, contact dealer.



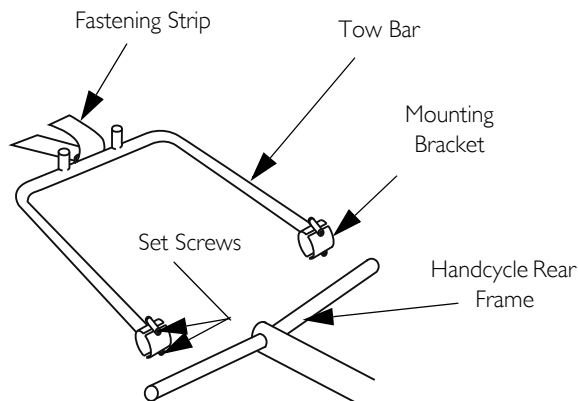
The tow bar will not work with wheelchairs with swingaway front riggings. Only rigid wheelchairs with a tubular style footrest can be towed using the tow bar.

1. Remove the two set screws on each mounting bracket.
2. Position the mounting brackets around the handcycle rear frame.



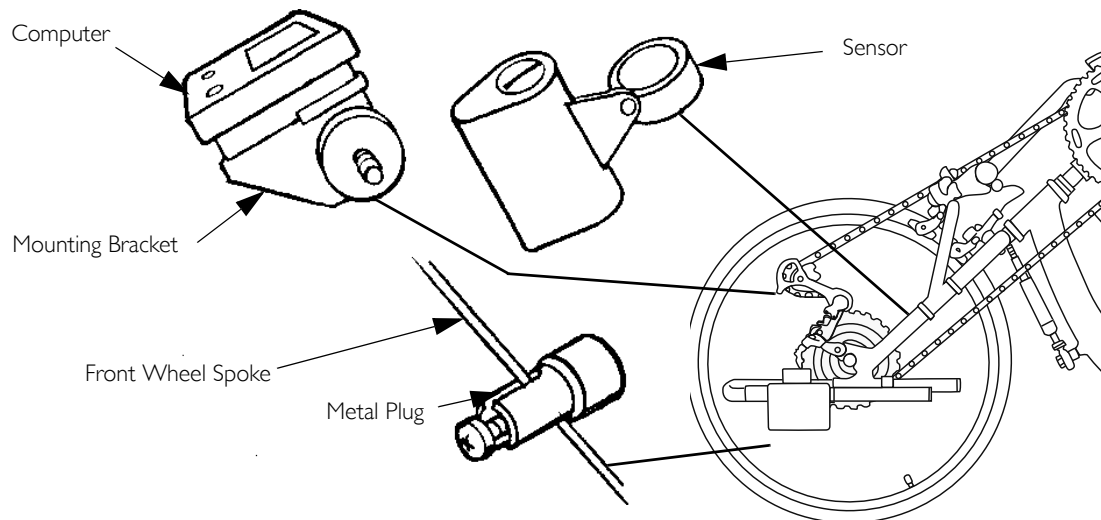
Make sure that the tow bar is centered on the handcycle rear frame.

3. Using two set screws for each mounting bracket, secure the mounting brackets to the handcycle rear frame.
4. Secure the tow bar to the handcycle with the mounting brackets and set screws.
5. Secure the wheelchair to the tow bar with the fastening strips provided.



10.5 Installing the Computer

1. Install metal plug onto spoke of front wheel approximately 2 inches from wheel rim.
 2. Align metal plug with fork assembly.
 3. Secure sensor to fork using hardware provided.
- i** Slot in sensor MUST align with metal plug for mileage, etc. to be registered on the computer.
4. Remove one of the chain guard screws and attach the computer mounting bracket.
 5. Snap computer into mounting bracket.



10 OPTIONS

10.6 Assembling/Adjusting/Using the Handcycle Rack

Assembling the Handcycle Rack

1. Position the receiver with the bracket facing up.
2. Position the rear wheel bar with the wheel brackets facing up.
3. Remove the two large mounting bolts and locknuts from the receiver and set aside.
4. Remove the two small mounting bolts and locknuts from the receiver bracket and set aside.
5. Secure the wheel tray to the receiver with the two large mounting bolts and locknuts.
6. Using two small mounting bolts and locknuts, secure the receiver bracket to the wheel tray.
7. Remove the two mounting bolts and locknuts from the rear wheel bar and set aside.
8. Using two mounting bolts and locknuts, secure the rear wheel bar to the wheel tray.
9. Install the receiver onto the trailer hitch of the vehicle, according to the vehicle manufacturer's instructions.

Adjusting the Handcycle Rack



To properly secure the handcycle, the wheel tray bracket should be adjusted to sit against the front wheel.

Wheel Tray Bracket

1. Remove the four mounting bolts and locknuts securing the wheel tray bracket to the wheel tray.
2. Position the wheel tray bracket in the desired position.
3. Secure the wheel tray bracket to the wheel tray with the four mounting bolts and locknuts.

4. If necessary, the wheel stop may be adjusted to one of three positions to sit against the front wheel. To adjust the wheel stop, perform the following steps:
 - A. Remove the mounting bolt and locknut securing the wheel stop to the wheel tray bracket.
 - B. Position the wheel stop in the desired mounting position.
 - C. Secure the wheel stop to the wheel tray bracket with the mounting bolt and locknut.

Rear Wheel Bar Brackets



To properly secure the handcycle, the rear wheel bar brackets should be adjusted to sit against the rear wheels.

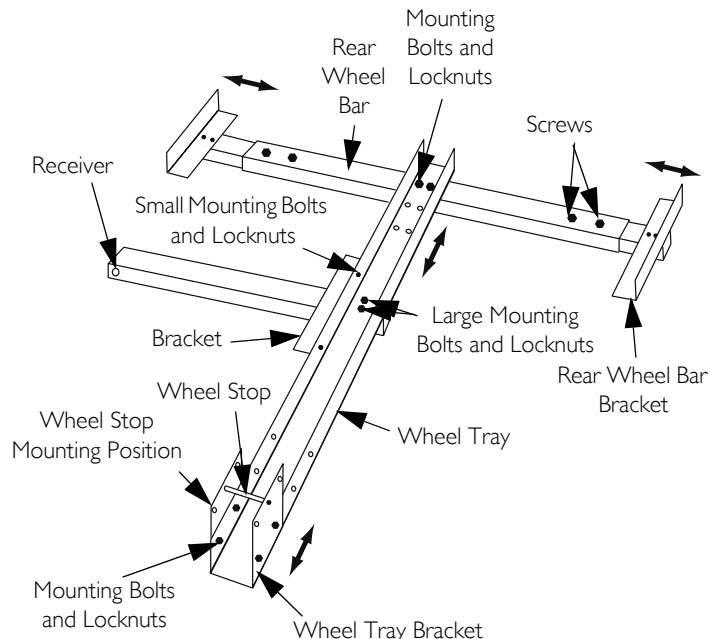
1. Loosen the two screws securing the rear wheel bar bracket to the rear wheel bar.
2. Adjust the rear wheel bar bracket in/out until they sit against the rear wheel.
3. Secure the rear wheel bar bracket to the rear wheel bar with the two screws.
4. Repeat steps 1-3 for the opposite side if necessary.

Rear Wheel Bar



To properly secure the handcycle, the rear wheel bar should be adjusted so the rear wheels sit in the rear wheel bar brackets.

1. Remove the two mounting bolts and locknuts securing the rear wheel bar to the wheel tray.
2. Position the rear wheel bar to one of three mounting positions on the wheel tray.
3. Secure the rear wheel bar to the wheel tray with the two mounting bolts and locknuts.



10 OPTIONS

Using the Handcycle Rack

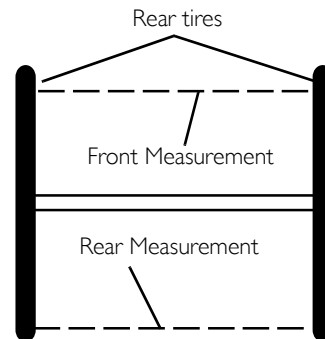
1. Position the handcycle on the rack with the front wheel in the wheel tray bracket.
2. Adjust the handcycle rack so the wheel tray bracket sits against the front wheel and the rear wheel bar brackets sit against the rear wheels.
3. Secure the front wheel to the wheel tray bracket using the strap provided.
4. Secure the rear wheels to the rear wheel bar using the straps provided.

10.7 Using the Alignment Gauge

1. Inflate the tires to recommended tire pressures (listed on the sidewall of the tire).
2. Place the handcycle and alignment gauge on a flat surface.
3. Position the alignment gauge near the rear of the rear tires.
4. Loosen the alignment screw on each side.
5. Position the alignment gauge between the rear of the rear tires.
6. Adjust the alignment inserts so the alignment gauge fits snugly between the rear of the rear tires.
7. Tighten the alignment screws to secure the alignment bar position.
8. Position the alignment gauge at the front of the rear tires and repeat.
9. Examine the gauge. Perform one of the following:
 - A. If the alignment gauge fits snugly between the front of the rear tires, the wheels are aligned. No toe in/toe out adjustment is required.
 - B. If there is extra space between the alignment gauge and rear tires, the tires have a toe out condition. Refer to Adjusting Toe In/Toe Out on page 56.
 - C. If the alignment gauge does not fit between rear tires, the tires have a toe in condition. Refer to Adjusting Toe In/Toe Out on page 56.



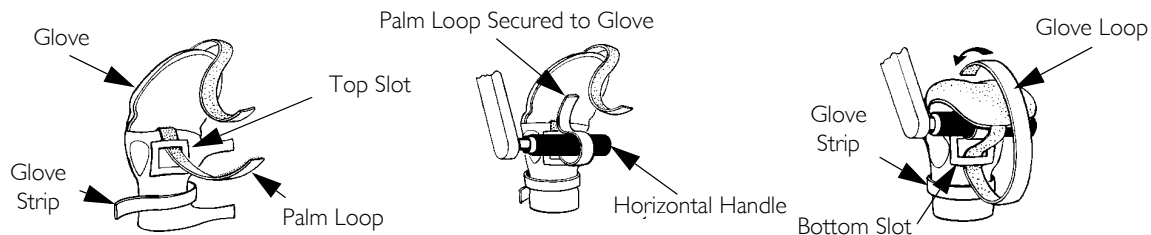
Front of Handcycle



Rear of Handcycle

10.8 Installing Gloves

1. Wrap palm loop around horizontal handle (using top slot only) and secure to glove.
2. Run glove loop through bottom slot on palm and over back of hand until tight. Secure glove loop to back of glove.
3. Reattach glove strips to back of glove.



10 OPTIONS

10.9 Additional Options



These options are available for order through www.topendwheelchair.com or 1-800-532-8677.

A - Leg mount mirror

The leg mount mirror attaches to the outside tube of the footrest with a clamp.

B - Handle mount mirror

This option is for the XLT PRO only. Attaches to the hand pedal post that does not have the shifter installed.

C - Backpack hydration system

To install:

1. Pull cushion off of backrest.
2. Place hook and loop strap from back pack in-between the backrest and cushion.
3. Replace cushion. Attach small straps around the drafting bumper.

D - Tool and tire repair kit

Attaches with buckles around the back bar of the handcycle frame.

E - Cable kit

The cable kit is an extra set of brake and shifter cables for XLT PRO only.

F - Heart rate monitor

The monitor is usually mounted on the crank assembly.

The user attaches the heart rate monitor around his/her chest with a strap that is included with this option.

G - Click Strap

Attach with heavy duty zip ties to the seat or back frame.

A



B



C



D



E



F



G



H - Leg Guard Attachment

1. Loosen the two allen screws on each mounting clamp.
2. Adjust the leg guard to the desired position.
3. Tighten both allen screws on each mounting clamp securely.

I - Crutch Holder

Attach the crutch holder as shown.

H**I**

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One Invacare Way
Elyria, Ohio USA
44036-2125
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