Operator’s Manual

All-Terrain Wheelchair

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Team 1

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Client: Melody Kettle
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SAFETY INSTRUCTIONS

- Please make sure to read through all safety instructions prior to using this wheelchair. If you fail to follow the safety guidelines, a tip-over, fall or loss of control may occur and cause serious injury to the user and operator of the chair.
- Adults or authorized persons are responsible for operation and propulsion of the chair. Adult supervision is required when the wheelchair is in use to reduce the risk of injury.
- Take time to become familiar with the chair controls before using it.
- This product is intended for indoor and outdoor use.
- All safety harnesses and belts must be fastened when sitting in the chair.
- When tilting the chair, do not exceed an angle beyond the strength and comfort of the operator and user.
- Do not use this chair on stairs.
- Exercise extreme caution when operating the wheelchair in crowded areas so not any cause harm to others.
- Keep hands and fingers clear of the wheels as they can get caught in the spokes and cause injury.
- Make sure to do a safety check prior to use, to ensure wheelchair is in proper working order.
- Do not use this chair UNLESS you are sure that both quick-release rear axles are locked. An unlocked axle may come off during use and cause a fall.
- An axle is not locked until the quick-release button pops out fully. An unlocked axle may come off during use, resulting in a fall, tip-over or loss of control and cause severe injury to the rider or others.
- Tilt Safety:
  - Always verify that the arms of the rider are stable on the armrests or within the armrests.
  - Always verify that the legs of the rider are stable on the footrest/leg rest.
  - Never place hands, feet or foreign objects into the tilt mechanism.
  - Never add chair accessories that are not specifically designed for a quickie wheelchair.
  - Never exceed a tilted position that aligns the backrest parallel to the ground.
PARTS AND ACCESSORIES:

All-terrain wheelchair

Front view

Side View

Quick release front wheel assembly

Quick release rear tires (front and back view)
Footrests

Armrests

Tilt in Space Seat Chassis

Seat Quick Release Pins

Handle Brake Levers

Hub drum cable brakes

Emergency Brakes
Shock Assemblies

Rear axle and shock assembly

O₂ Cylinder Holder

Medical Storage Basket
FEATURES

All-Terrain wheelchair

- Tilt in Space Chassis
  - Base chair frame
  - Reclining mechanism
  - Handlebars
- Light Weight Aluminum Frame
  - T-shape design
  - Quick release pin mounts for storage
- Three Wheel Design
  - Rear wheels
    - Large diameter tires
    - Quick wheel release pins
    - Bike hub assembly with quick release
  - Front wheel
    - Small bike tire
    - Cambered fork for 360° rotation
    - Turn bearing
- Hub Drum Brakes
  - Axial hub brake system to rear wheels and shock assembly
  - Cable connected to brake levers
  - Quick release pin socket sleeves
  - Nylon lock nuts
- Emergency brakes
- Hand brake handle levers
  - Right:
- Shock assemblies
  - Upper and lower aluminum housing
  - Adjustable Air Shocks
  - Axial hub brake spacer assembly
- O₂ Cylinder Holder
  - Adjustable clamp
  - Adjustable longitudinal bracket mounts
- Storage Basket
  - Bracket mounts to frame
# TABLE OF CONTENTS

**Custom All-Terrain Wheelchair**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important Safety Information</td>
<td>2</td>
</tr>
<tr>
<td>Parts and Accessories</td>
<td>3</td>
</tr>
<tr>
<td>Features</td>
<td>7</td>
</tr>
</tbody>
</table>

1. **Introduction**

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 General Overview</td>
<td>9</td>
</tr>
<tr>
<td>1.2 How to use the wheelchair</td>
<td>9</td>
</tr>
</tbody>
</table>

2. **Maintenance**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
</table>

3. **Technical Description**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
</table>

4. **Troubleshooting**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
</table>
1. INTRODUCTION

1.1 General Overview

This project involved the design of a new wheelchair for Melody Kettle, who suffered a tragic anoxic brain injury at 18 months of age. Melody’s current wheelchair does not allow her to traverse uneven terrain. Her family expressed many improvements that they would like to have done in order to improve Melody’s quality of life.

The custom wheelchair built for Melody used the Quickie Tilt in Space frame as a starting point. The wheelchair was stripped and rebuilt from the ground up. Shocks were added to improve the comfort of the chair and bigger, wider tires were added to allow for off-road use. Also, a three-wheel design was used to increase the ease-off maneuverability. An O₂ cylinder holder and a basket were also added to accommodate Melody’s medical equipment.

1.2 Step by step instructions

- When using the wheelchair, make sure to fasten all safety belts and harnesses to prevent injury during use.

- Make sure that the chair rolls easily and that all parts are functioning smoothly.
- Repair any problems. Your local bicycle shop can help you diagnose and fix most problems.
- Check that both quick-release rear axial pins are locked. When in the locked position, the button on the pin will be fully exposed (popped out). If not locked properly, the wheels could fall off; resulting in injury.
• To tilt the chair back:
  o Squeeze the left handle to disengage the locking mechanism and rotate the seat back. By releasing the handle, the locking mechanism is re-engaged.

  o The desired degree of the seat can be seen on the seat indicator.

• To engage the drum brakes, squeeze the right handle until the chair starts to decelerate and comes to a complete stop.

• To adjust the air shocks, attach the provided air pump and inflate them to the desired pressure.
Wheelchair Storage:

- Moving Front Handle bars down
  - Locate the silver push pin on the back side of the wheelchair handlebars located near the bottom
  - Push the pin in and push the handlebar towards the front wheel until it can move no further
  - Repeat to the other handlebar

- Removing rear wheels
- Locate the quick release pins located in the center hub axle of the rear wheel

- Push the button in and pull the entire rear wheel out of the socket sleeve to release from axial hub assembly
- The wheelchair will now rest on the rollerblade wheels in the assembly seen below

- Moving front wheel assembly:
  - Slightly lift up the underside wheelchair frame
  - While the frame is suspended, remove the quick release pins on either side by pushing in the button and pulling each pin out of the frame
Graph the long bar of the aluminum frame and push towards the wheelchair back to rotate to its stored position seen below.

2. MAINTENANCE

- Before each use, make sure that each of the nuts and bolts that govern the moving parts of the collapsible design are secure so they do not become lost while in use. Use the above tools to secure them.
- If the tires are low in pressure, use an air pump to bring them back to the air pressure indicated on the side of the tire. Make sure the cap screws on the tires are secured. If the tires have holes, replace the tire before the next use.
- If pins and securing bolts are damaged or lost, replace them right away before next use.
- Do not drag the frame against the ground or scratch it against the wall for fear of scratching the paint coat and risking metal corrosion.
- If safety belt becomes worn or damaged, replace right away before the next use.
- Take the wheelchair to your local bicycle shop for periodic maintenance.
- Regular cleaning of the chair will help to ensure that it works properly.
- The chair needs to be checked periodically for safety.
- Check axial and axial sleeves periodically to make sure that they are tight and functioning properly.
- Clean painted surfaces with mild soap periodically.
- Protect the finish by applying a coat of non-abrasive auto wax after cleaning.
- Store the chair in a clean dry area. Failure to do so could result in rust or corrosion.

3 TECHNICAL DESCRIPTION
**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4.63 ft</td>
</tr>
<tr>
<td>Width</td>
<td>27.29 in</td>
</tr>
<tr>
<td>Height</td>
<td>3.21 in</td>
</tr>
<tr>
<td>Seat Angle</td>
<td>0-45°</td>
</tr>
<tr>
<td>Weight</td>
<td>42 lbs</td>
</tr>
<tr>
<td>Maximum Load</td>
<td>347 lbs</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-10 – 120 °F</td>
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<tr>
<td>Wheels</td>
<td>2 foot diameter, 2 inch thick</td>
</tr>
<tr>
<td>Brakes</td>
<td>Emergency and hub drums</td>
</tr>
<tr>
<td>Shocks</td>
<td>Air shock assemblies</td>
</tr>
</tbody>
</table>
4 TROUBLESHOOTING

- Tilt in Space Mechanism
  - If the tilt in space mechanism starts to not be as fluid as normal, the pulley lines might be loose and not working properly. Start by adjusting the cables to tighten up the throw. If the problem continues take the wheelchair to your local bicycle shop for maintenance.

- Brakes
  - If the brakes stop working properly, check to see that all cables are still attached. Make sure that the cables are tight and adjusted properly. Remove the wheels and inspect the brake pads. If damaged, take the wheelchair to your local bicycle shop for maintenance.

- Tires
  - If at anytime your wheels loose pressure, make sure that there are no punctures in the tires. If no punctures are found, inflate the tires to the recommended pressure located on the side of the tire. If tires continue to loose pressure take the wheelchair to your local bicycle shop for maintenance.