

mackworth

# CPP Portable Lift



## Service Manual

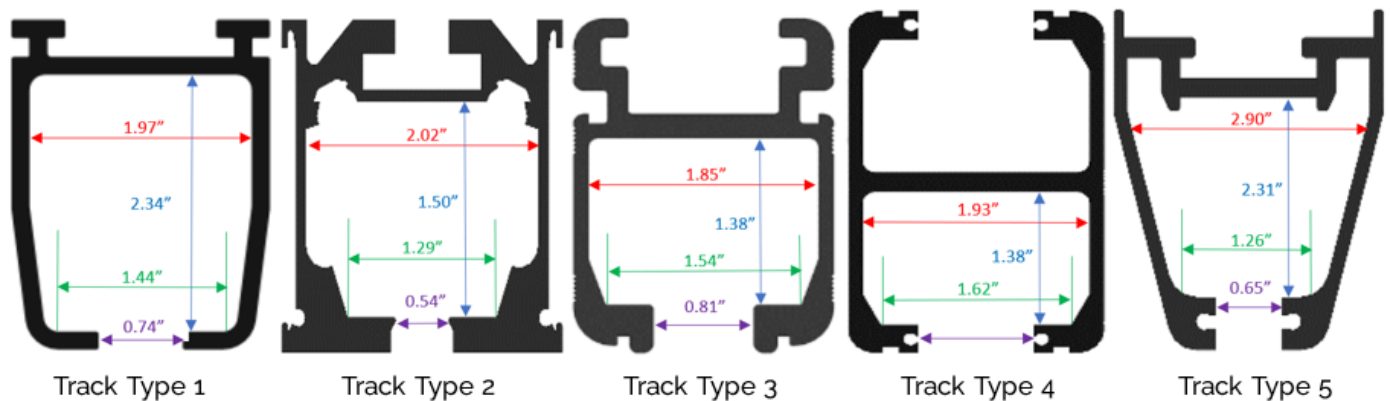
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## 1 Introduction

This manual will explain how to carry out interim servicing and parts replacement on the Mackworth CPP Portable Lift safely and effectively. This document is divided into sections to help a Service Engineer find the correct information. Each section will show in a step by step fashion the correct way to disassemble and assemble the Portable Lift. The aim of the manual is to advise and assist you, so that you can provide a successful service for the end user.

The Mackworth CPP is available in different configurations dependent on track profile. The track profiles are shown below:

When Servicing the portable lift, one of the below track profiles should match.



The list below includes all types of TX that are covered by this Service Manual and which track type they are suitable for.

Portable lift Type	Carry Bar Type	Track Type
CP440P – 108755	Black Carry Bar	Type 1
CP440P – 108772	White Carry Bar	Type 1
CP440P – 108756	Black Carry Bar	Type 2
CP440P – 108773	White Carry Bar	Type 2
CP440P – 108757	Black Carry Bar	Type 3
CP440P – 108774	White Carry Bar	Type 3
CP440P – 108758	Black Carry Bar	Type 4
CP440P – 108775	White Carry Bar	Type 4
CP440P – 108759	Black Carry Bar	Type 5
CP440P – 108776	White Carry Bar	Type 5
CP440P FSG – 108760	Black Carry Bar	FSG
CP440P FSG - 108777	White Carry Bar	FSG

## 2 Safety Precautions

Read and understand this manual in its entirety before servicing the Mackworth CPP Portable lift.

- Mackworth authorised personnel must complete the Full and Interim services of the CPP Portable lift.
- The portable lift must not be in use by the user during any form of servicing.
- The portable lift must be turned OFF during any servicing that requires the external covers of the Portable lift to be removed, or any dismantling of standard parts.
- Always ensure suitable clearance to remove the portable lift from the ceiling track.
- Ensure that all the servicing procedures are followed correctly as instructed in this manual.
- All listed tools and equipment stated in this manual must be used to safely service this portable lift.
- Ensure you have assessed all risks for your environment and any persons within that environment before commencing work.
- Ensure you have all PPE available to carry out the work before commencing.

## 3 Tools and Equipment List

When carrying out work on the Mackworth CPP Portable Lift, you will require the following:

Tools Required	Equipment Required	Lubricants and Sundries Required
1.5mm Allen Key	Step Ladder	Morris Grease – k42EP Multi-
2mm Allen Key	Multi-Meter	Purpose Grease
2.5mm Allen Key	Battery Tester	Loctite 222
3mm Allen Key	Marker Pen	Loctite 243
4mm Ball Ended Allen Key	Cloth	
5mm Allen Key	Lint Free Cloth	
8mm Spanner	Service Documentation	
No. 2 Pozi Drive Screwdriver	Product User Manual	
2mm Slotted Screwdriver	Product Spare Parts Manual	
5.5mm Slotted Screwdriver	Product Commissioning Manual	
External Circlip Pliers 3-10mm	Test Weights –400lb	
Long Nose Pliers	Weight Trolley	
Side Snips	Lifting Straps x2 (Attach weight to Carry Bar)	
Digital Vernier Calliper	Cable Ties – 100x2.5mm (Part No. 000106)	
Tape Measure		
Second Cut Hand File		
Power Drill		
8.5mm Drill Piece		

## **4 Preventative Maintenance**

Maintenance should be completed by an approved service engineer every 6 months to ensure the products required standard is maintained. The service history of the product should be documented each service. This is documented in the service log, found in the back pages of the user manual.

When recording the service in the service log, ensure that the serial number of the portable lift and user manual align. Each portable lift is provided with its own user manual.

The below sub-sections provide detailed instructions on what must be inspected/tested for each component on the portable lift every service. Follow the guidelines below for a successful portable lift service.

### **4.1 Covers**

- Visual inspection of the cover integrity, including cracks, burns or any impact damage.
- Ensure that the covers are fitted correctly, check that the screws are tight.
- Inspect the label integrity, ensure that they are legible and aren't peeling of the covers
- Ensure the serial number is legible.

### **4.2 Carry Bar**

- Inspect the carry bar for damage such as deformation, cracks and large dents which may affect the function and safety of the component.
- Ensure that the carry bar spring clips remain functional.
- Check that the carry bar hooks and springs remain smooth, as sharp edges may cause damage to the slings.
- Ensure that the carry bar is fitted to the QRS Hook properly. See user manual for correct attachment.

### **4.3 Handset**

- Inspect and test handset buttons are all functional.
- Ensure handset labels remain legible.
- Ensure the handset is connected to the portable lift correctly

### **4.4 Batteries**

- Ensure that the battery leads are attached properly between the battery terminals and the PCB
- General examination of batteries for burns at terminals and cuts/exposed wiring along the leads.
- Perform battery test to determine the condition of the batteries.

#### **4.5 Trolley/Wheels**

- Examine the wheels for damage such as cracking and general wear
- Ensure that the wheels are running smoothly in the track (track may have debris inside)
- Ensure that the portable lift traverses with handset command smoothly. (powered traverse portable lifts only)
- Ensure that the Trolley system functions, that the portable lift is positioned on the trolley hooks and is secure.

#### **4.6 Toggle Switch and Pull Cord**

- Ensure that the two phase switch is fully operational.
- The portable lift should operate as normal when the switch is pushed into the up position.
- Power to the portable lift should be removed when the toggle switch is in its down position.
- Inspect the condition of the pull cord, ensure that the cord has not been modified (cut to length)
- Ensure that the pull cord label remains legible.

#### **4.7 Lift Motor**

- Visual inspection on the component for any abnormalities.
- Inspect the motor gear shaft for wear. Excess wear should be cleaned and an inspection on the gearing condition should be done after. If the gear shaft is badly worn it must be replaced.
- Ensure that the motor gear shaft is meshing correctly with the hub.
- Re-grease the motor gear shafts.
- Perform lift/lower test to ensure the lift motor is functioning correctly, this should be done with and without load. Ensure to listen for any unusual sounds and rattling coming from the motor.

#### **4.8 Lift Tape Hub (Spool)**

- Inspect the hub teeth for wear. Excess wear should be cleaned and an inspection on the gearing condition should be done after. If the hub is badly worn it must be replaced.
- Ensure that the hub teeth are meshing correctly with the lift motor gear shaft.
- Re-grease the hub.
- Test the function of the over-speed cam. Ensure that it returns to position after displacement.

#### 4.9 Lift Tape

- Inspect the full length of the lift tape for any fraying or damage to the materials integrity.
- Ensure that the stitching remains in good condition, there should be no sign of any loose threads or fraying by the bindings, this should be checked at both ends of the lift tape.
- Ensure that the lift tape label remains legible.

#### 4.10 Limit Switches

- Ensure that the limit switches remain functional.
- Test the bottom limit switch activates by fully lowering the lift tape out of the hub during normal use.
- Test that the bottom limit switch activates when the carry bar is removed from the portable lift.
- Test the upper limit switch activates by raising the lift tape all the way up to the top limit.
- Inspect the limit switch wires and solder points for any damage and exposed wire. Make sure to check inside the chassis as the cable runs inside.

#### 4.11 PCB (Printed Circuit Board)

- Inspect the PCB for any damage such as cracks and electrical burns.
- Ensure that all the relevant components are plugged into the board correctly.
- Inspect the wiring for each component that plugs into the PCB. Ensure there are no exposed wiring.

#### 4.12 LED Indicator (Membrane)

- Ensure that the buttons remain functional on the membrane.
- Test LED is functioning correctly, ensure that the LED is indicating the correct light for each scenario (where applicable)

#### 4.13 Charging

- Inspect the condition of the charging unit, ensure that the casing remains intact and there is no cuts or exposed wires.
- Inspect the condition of the charging dock (handset case), ensure that the jack plug remains fixed into the case and the handset docks correctly into the plug.

#### 4.14 Fixings

- Inspect all the main nuts, bolts, screws and other fixings are secure and tight, if any fixings are loose ensure to tighten accordingly.

#### **4.15 Ceiling Track**

- Ensure that the track profile matches the profile of the portable lift trolley.
- Inspect the integrity of the track system. Ensure that the track is not damaged and/or deformed.
- Inspect the condition of the track brackets, ensure that the brackets and track are secured in place with the track wedges. The track wedges should be locked in place with the M3 screws on either side.
- Ensure that the alignment between two track sections align, and that there is no gap between two aligning tracks. Test the traversing of the portable lift between the track sections is smooth and allows transfer.
- Ensure that the end stops, safety bolt and end caps are all secured correctly to the track system.
- Clear out the internal of the track profile from any debris.

#### **4.16 Slings**





- Inspect the sling for cuts, frays, tears and burns along its full profile of the sling and straps.
- Inspect the slings stitching for any tears, stretching and loose threads along the full profile of the sling and straps.
- Ensure that the label remains secure and legible.

If there is a problem discovered with the sling, it should be noted on the service sheet and be brought to the attention of the person(s) who requested the service to be carried out. In addition, notify the customer on-site or the manager if it is a care facility. The serial number, type of sling, and condition should be noted on the service sheet. Mark the date of inspection on the sling service label.



## 5 Component Condition Guide

The section will assist in determining if the condition of any key components is suitable for use or if they require replacement. See images below as reference.

Lift Tape Condition	
<p>Acceptable Condition</p> 	<p>Unacceptable Condition – Do not use</p> 
Lift Spool (Hub) Condition	
<p>Acceptable Condition</p> 	<p>Unacceptable Condition – Do not use</p> 

## 6 Testing

The section will assist in ensuring that the portable lift has undergone the required function testing and load testing following its service.

### 6.1 Functional Testing

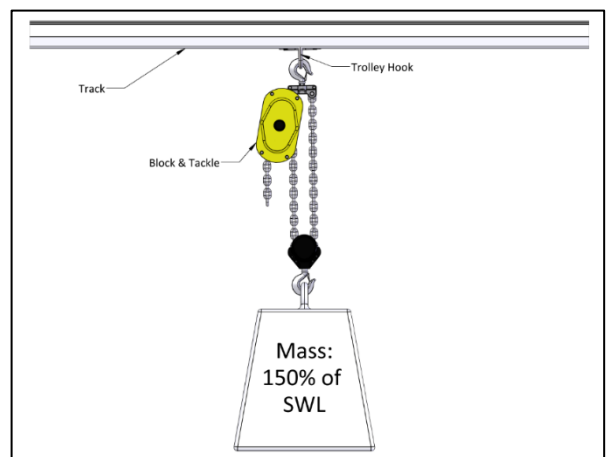
The guidelines below will ensure that the main functional components of the portable lift are functioning as intended following a service. **Functional testing should be done after each service.**

1. Position the portable lift in a suitable position in the middle of the room (in track), clear of any obstacles.
2. Raise the portable lift to its upper limit. (Confirming the handset button and upper limit switch is functional). Once the upper limit switch has been reached, the portable lift should stop raising and the LED will display **"solid blue on LED 1, and an audible alarm will sound two beeps (0.5s apart)"**. Ensure to listen to the motor for any unusual noises during lift.
3. Lower the portable lift till the carry bar reaches the floor. (Confirming that the handset button and lower limit switch is functional). Once the carry bar reaches the floor, the portable lift should stop lowering and the LED will display **"solid blue on LED 1, and an audible alarm will sound two beeps (1s apart)"**.
4. Repeat step 2 and 3 with the portable lift loaded.
5. Repeat step 2 and 3 using the membrane buttons to ensure they are functioning correctly.
6. Test the toggle switch is functioning correctly. Pull the pull cord down one step to ensure power is cut from the portable lift.
7. Press and hold the e-lower button on the handset to test the e-lower function. The portable lift should begin to lower while sounding an audible alarm.
8. Repeat step 7 using the e-lower button found on the membrane to test function.
9. Traverse the portable lift through the full track system to ensure movement is smooth throughout the tracks and the transition between track sections.
10. Ensure that transition gates (if applicable) are functioning as intended and allow the portable lift to pass through into a h-system.

### 6.2 Track Testing

The guidelines below will ensure that the track system is safe and suitable for use with the portable lift. **Track testing should be done annually.**

1. The full track system must be tested with 1.5x the SWL to ensure that the track fixings remain secure within the ceiling/wall. The test must be done with a pulley block (block and tackle) and not the portable lift. The portable lift is not suitable to lift more than its SWL.



## **7 Additional Documentation**

See the list of available documents you may or may not need to refer to for a successful service. All documents will be available to view on the Mackworth website: <http://mackworthusa.com>

- Spare Part Manual – 992086
- User Manual -999086
- Commissioning Manual – 997086
- Troubleshooting Guide – 990086
- Ceiling Track Installation Manual – 996080

## 8 Removal and Replacement

This section will cover the details of how to remove, refit and replace all serviceable parts of the portable lift. Ensure to read and understand each step thoroughly before removing any component from the portable lift.

Ideally, the portable lift should be removed from the track and placed on a work bench before any dismantling. But servicing can be done with the portable lift remaining within the track system. (Depending on the service required).

Unless stated otherwise, all images refer to a Mackworth CPP with a standard trolley assembly (Track Type 1). Where necessary, additional images for alternative track and portable lift types have been included.

Before carrying out any dismantling of the portable lift, the power should be turned off using the red pull cord.

### 8.1 Side Covers

This section will cover the details of how to remove, refit and replace the portable lift side covers.

#### Removal

1. Use a slotted screwdriver to remove the two brass screws from the rear cover of the portable lift.



2. Gently remove the cover from the portable lift.



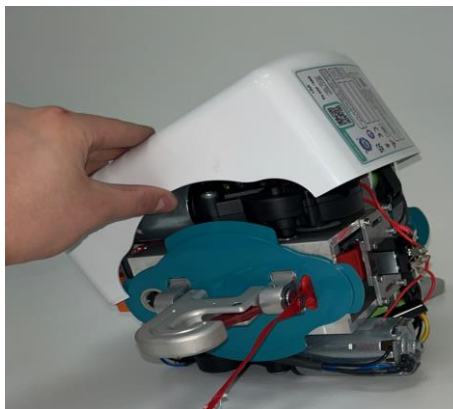
3. Rotate the portable lift 180° and gently rest the portable lift on the lift motor.



4. Using a slotted screwdriver, remove the two brass screws from the front cover.



5. Gently remove the cover from the Portable lift.



### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- Make sure the profile edges of the covers align with the bottom cover.

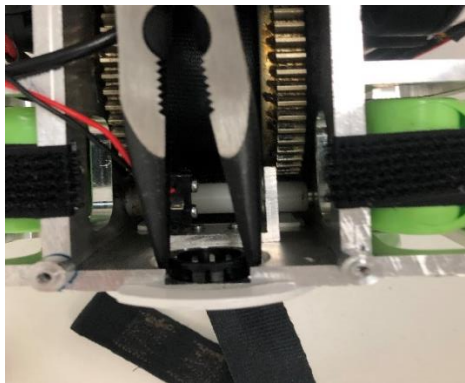
## 8.2 Top/Bottom Covers

### 8.2.1 Top Cover

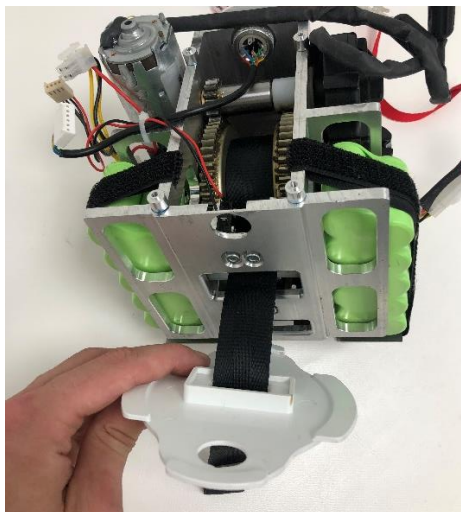
This section will cover the details of how to remove, refit and replace the portable lifts top cover.

#### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the top QRS Hook from the chassis. (Refer to section 8.13)
4. Remove the QRS Hook from the lift tape. (Refer to section 8.13)
5. Using long nose pliers, remove the bung that secures the cover to the chassis by pressing the retaining clips inwards.



6. Pull the top cover away from the chassis and feed the lift tape through the slot to remove.



#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

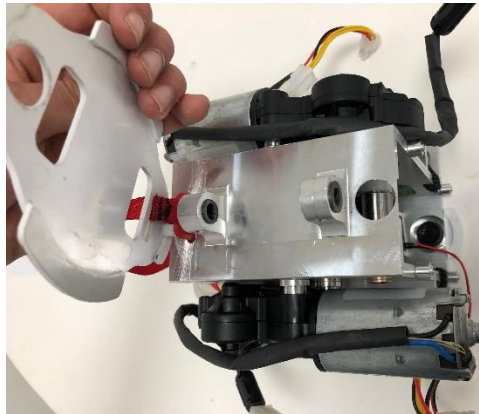
- Make sure the cover slot is fed through the lift tape in the correct direction.
- Make sure to align the cover with the bung hole.
- Attach the bung by pressing the bung into the hole.

### 8.2.2 Bottom Cover

This section will cover the details of how to remove, refit and replace the portable lifts bottom cover.

#### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the QRS Hook from the chassis. (Refer to section 8.13)
4. Remove the handset cable port from the portable lift. (Refer to section 8.11)
5. Pull the top cover away from the chassis to remove.



#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

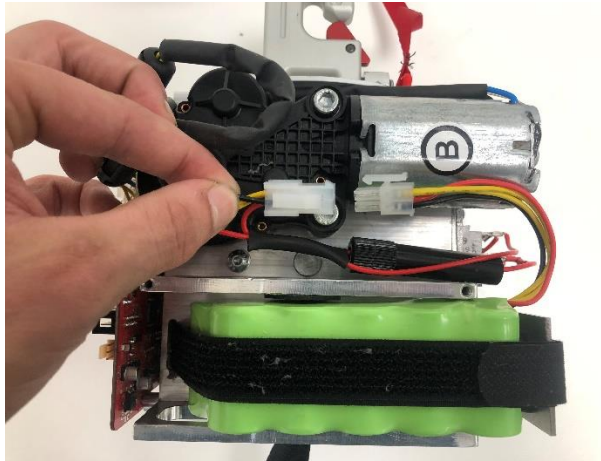
- Ensure the red pull cord is pulled through its designated slot.
- Ensure that the handset port fits into its designated slot.
- Ensure that the bottom cover is flush up against the bottom of the chassis.

### 8.3 Batteries

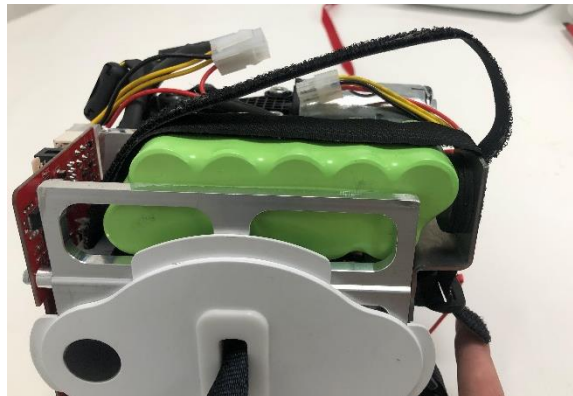
This section will cover the details of how to remove, refit and replace the batteries.

#### Removal

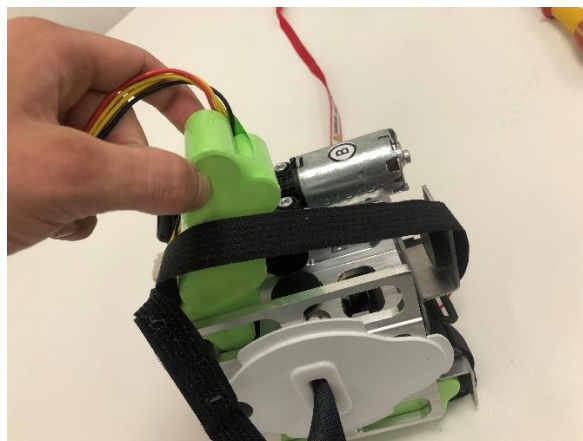
1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Disconnect the battery power leads from the PCB.



3. Release the Velcro straps to give access to the batteries.



4. Remove the battery from its position



5. Repeat step 2 to 6 to remove the opposite battery.



## Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

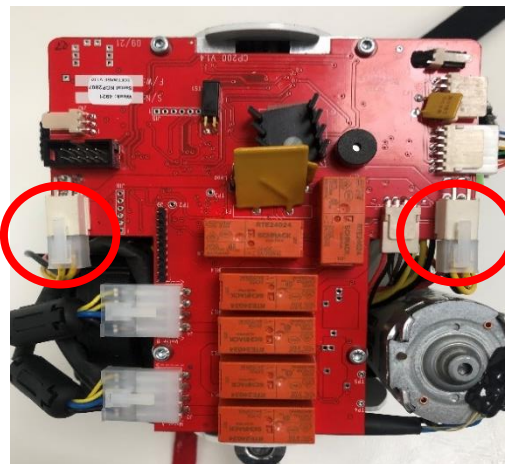
- Ensure to place the batteries back into the brackets in the correct orientation. (the cable should be at the PCB end facing outwards).
- Ensure that the battery A and motor A are on the same face of the chassis. Same applies to battery B and motor B. Battery B does NOT have a suppressor on the cable.
- Ensure the Velcro is reattached correctly.

### **8.4 PCB**

This section will cover the details of how to remove, refit and replace the PCB.

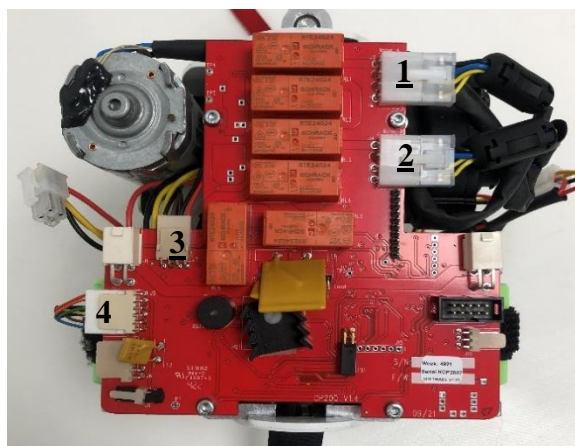
#### Removal

- 1.** Remove the side covers from the portable lift. (Refer to section 8.1)
- 2.** Disconnect the power leads from the PCB.

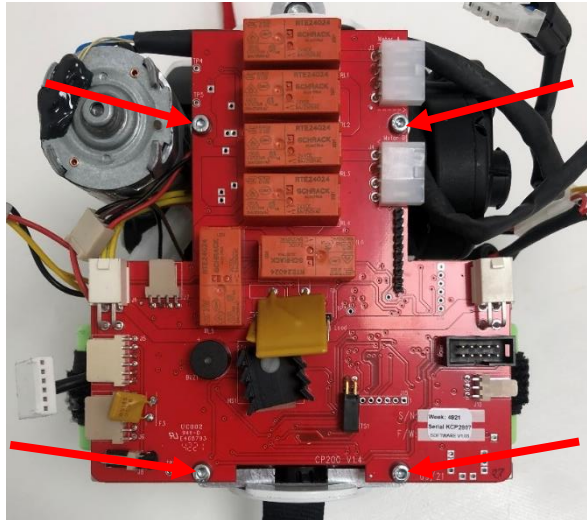


- 3.** Remove the remaining connections from the PCB ports. There is no correct order to disconnect.

- Motor A
- Motor B
- Limit Switch
- Handset Port



- Using a 2.5mm Allen Key, remove the four M3 screws securing the board to the chassis.



- The PCB can now be removed from the portable lift.

### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

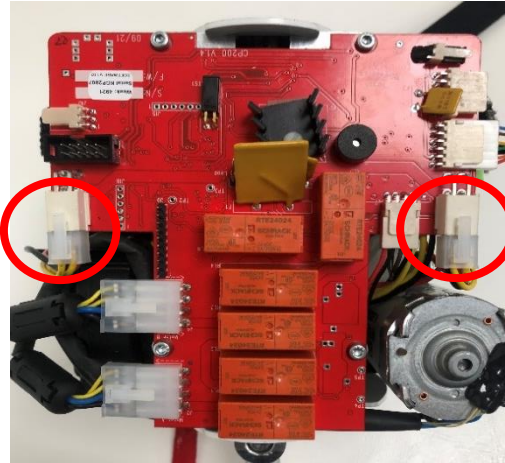
- The power lead should always be connected last.
- Make sure to connect each component to the correct port.
- Ensure that the motors are connected to the correct port. The correct motor port is inscribed onto the PCB.
- Make sure to secure the PCB to the chassis before reconnecting the power, do not allow the board to come into contact with the chassis other than its designated mounts.

### 8.5 Lift Motor

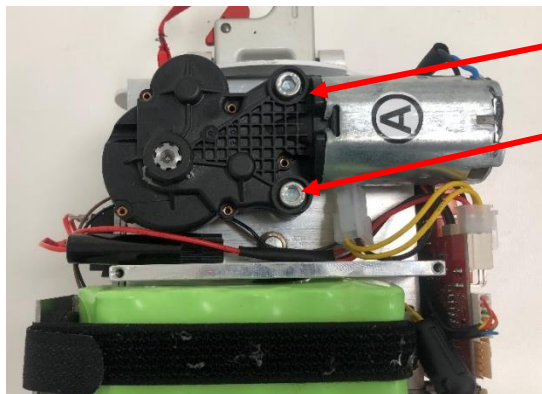
This section will cover the details of how to remove, refit and replace the Lift Motor.

#### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Disconnect the power lead from the PCB.



3. Disconnect the motor leads from the PCB. (See section 8.4 for further information)
4. Remove the cable routing of lift motor B from under the PCB. (PCB removal is recommended)
5. Using a 5mm Allen Key, remove the two bolts securing the motor to the chassis.



6. Remove the motor from the chassis, be careful not to damage the gear shaft during removal.
7. Repeat step 5 and 6 to remove the opposite motor.

#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

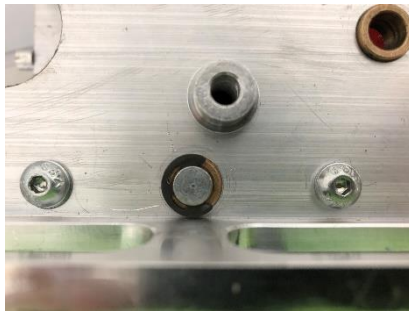
- Ensure that the motor aligns with the tapped holes on the motor mount.
- Ensure that Motor A and B are attached to the correct face. Use the PCB for reference.
- Ensure to route the Motor B cable under the PCB.
- Ensure that the motor cables are connected to the correct port on the PCB.

## 8.6 Lift Tape

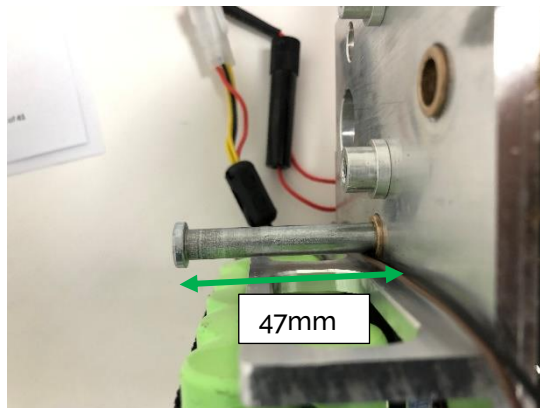
This section will cover the details of how to remove, refit and replace the Lift Tape.

### Removal

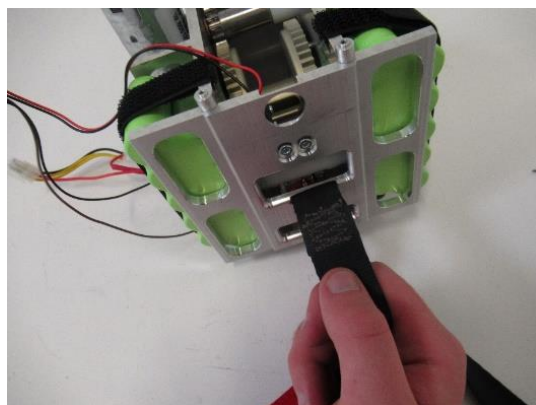
1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the top QRS hook from the portable lift. (Refer to section 8.13)
4. Remove the top cover from the portable lift. (Refer to section 8.2)
5. Remove the motors from the portable lift. (Refer to section 8.5)
6. Pull the lift tape from the portable lift until it has fully unwound from the hub.
7. Using a small slotted screwdriver, remove the 8mm e-clip from the strap pin. Be careful not to lose the e-clip.



8. Slide the strap pin out of the chassis until 47mm of the pin is visible, this allows lift tape removal without displacing the hub.



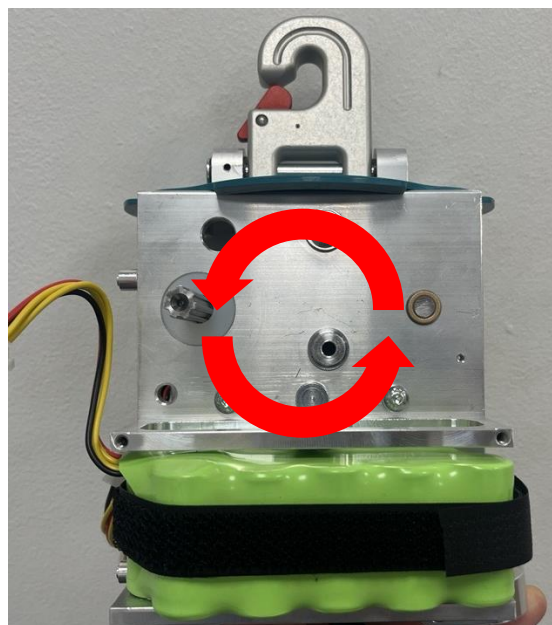
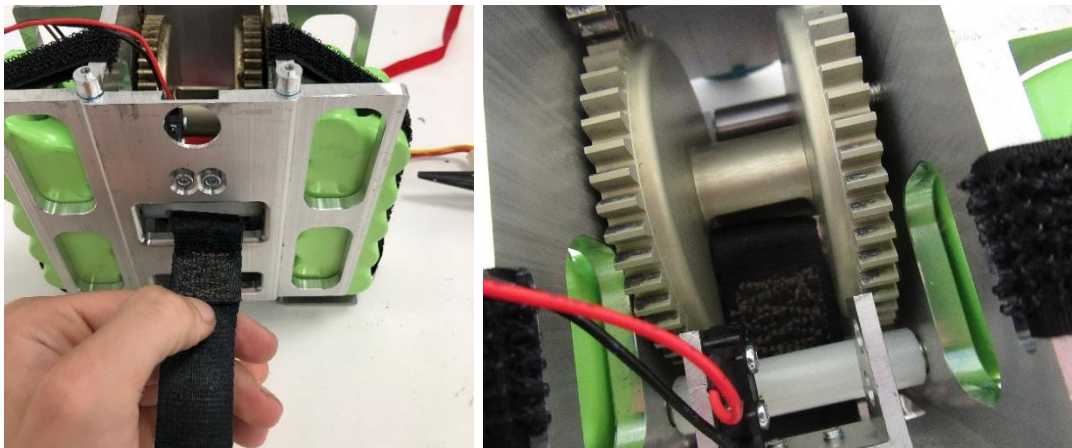
9. Gently pull the lift tape through the limit switches to remove from the portable lift.



Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- When refitting the lift tape, ensure that the stitching fold is opposing the face of the black bung.
- For easier refitment, open up the loop of the tape as shown, this can make it easier for the strap pin to fit through the tape when inside the hub.
- When sliding the pin back through the chassis, be careful not to catch the lift tape and cause damage to its integrity.
- Inspect the condition of the e-clip, if the clip has been stretched, replace with a new e-clip.
- Once the pin is pushed back through the chassis, ensure to refit the e-clip. This is done using long nose pliers.
- Wind the lift tape around the hub by rotating the hub in an anti-clockwise direction.
- Pull the lift tape while holding the hub to allow the lift tape to stretch and tighten, then continue to wind around the hub.
- Refit the removed components to the portable lift.

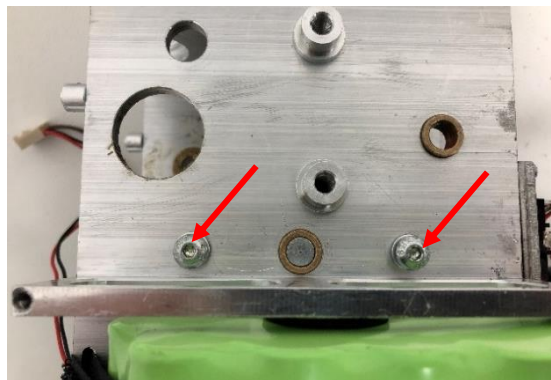


## 8.7 Lift Hub (Spool)

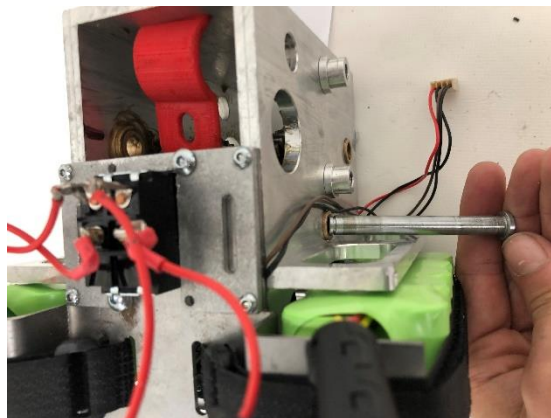
This section will cover the details of how to remove, refit and replace the Lift Tape.

### Removal

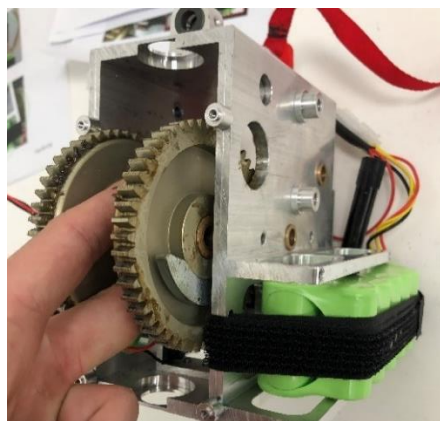
1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the top cover from the portable lift. (Refer to section 8.2)
4. Remove the lift motors from the portable lift. (Refer to section 8.5)
5. Remove the motor shafts from the portable lift. (Refer to section 8.10)
6. Remove the lift tape from the portable lift (Refer to section 8.6)
7. Using a 4mm Allen Key, remove the two overspeed screws from the chassis.



8. Remove the strap pin from the chassis, this should already be loose from the lift tape removal. If not, remove the 8mm e-clip.



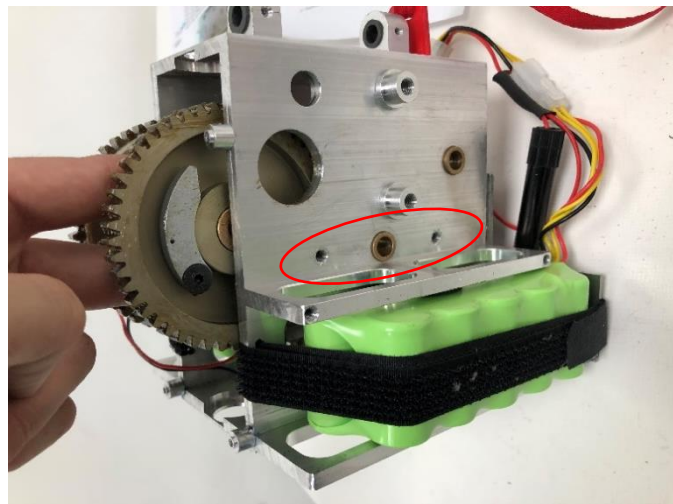
9. Slowly guide the hub out of the chassis. Be careful not to damage the teeth during removal.



Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- When refitting the hub, if required, grease the hub using the recommended grease (Morris Grease – K42EP multi-purpose).
- When inserting the hub back into the chassis, make sure the overspeed cam is facing same face as the overspeed cam screws.
- Make sure to refit the overspeed cam screws into the chassis.
- Test the overspeed cam is working by flicking the cam with an Allen Key through the slot in the chassis. (See image below)
- Refer to the lift tape refitting guide for further details.



## 8.8 Limit Switches

This section will cover the details of how to remove, refit and replace the Limit Switches.

### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the batteries from the portable lift. (Refer to section 8.3)
4. Remove the handset port from the portable lift. (Refer to section 8.11)
5. Remove the top cover from the portable lift. (Refer to section 8.2)
6. Remove the e-stop assembly from the portable lift. (Refer to section 8.9)
7. Using a 3mm Allen Key, remove the four screws shown to release the limit switch assembly.

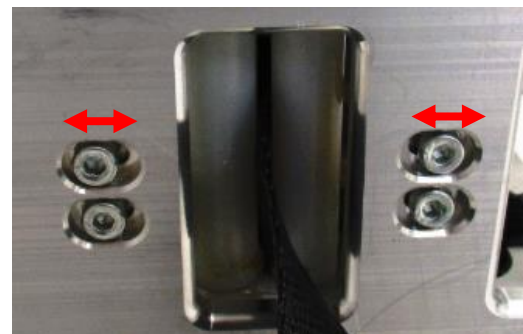
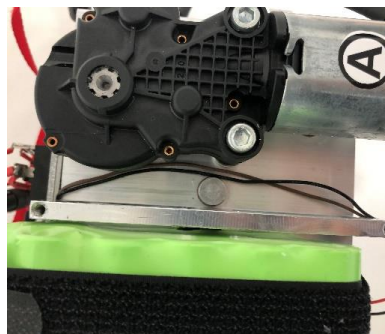
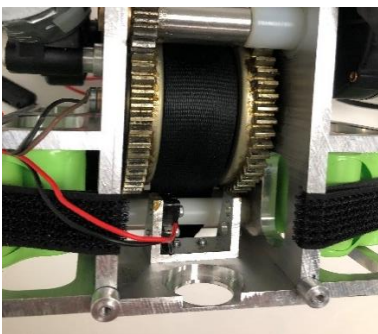


8. Once the four screws have been removed, remove the limit switch assembly through the side exit of the chassis. Be careful not to trap/catch the wiring while removing.

### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- When fixing the individual switches, fix the black and brown wire block to the back face of the portable lift first (e-stop side)
- Route the black and brown wire along the chassis side face underneath motor A.
- Fix the black and red wire block to the front face of the portable lift (PCB side)
- Attach the limit switches to the chassis with the four screws but do not tighten.
- To set the switches, slide a switch inward until it activates against the roller (the switch will click). Once it has activated, move the switch outward until it releases. (the switch will click again). Once it has released, tighten the screws to set the limit switch.
- Repeat these steps for the second limit switch.
- Manually test the switches are working by pressing the rollers in and out. You should hear the switches clicking when activated and released.



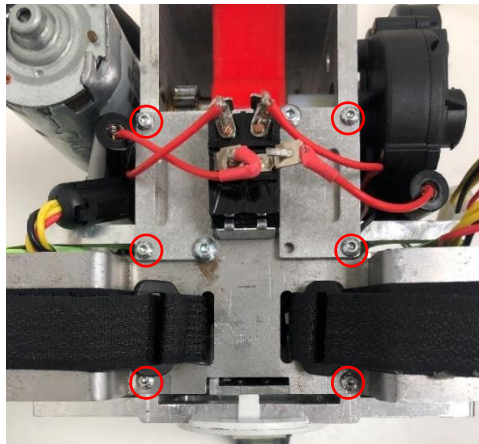


### 8.9 Toggle Switch and E-Lower Cord

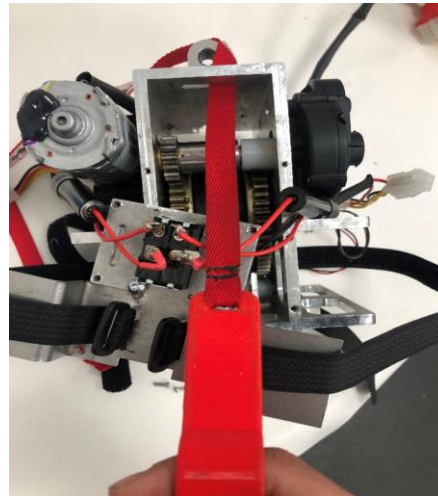
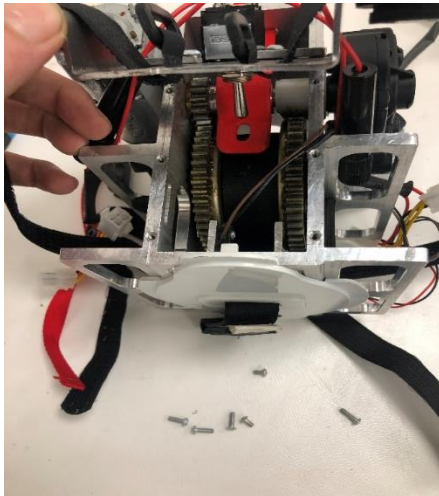
This section will cover the details of how to remove, refit and replace the Toggle Switch assembly.

#### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the batteries from the portable lift. (Refer to section 8.2)
3. Remove the 6 screws which secure the toggle switch assembly to the chassis using a 2mm Allen Key.



4. Remove the toggle switch assembly from the chassis, and slide the pull cord out of the chassis slit.



#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

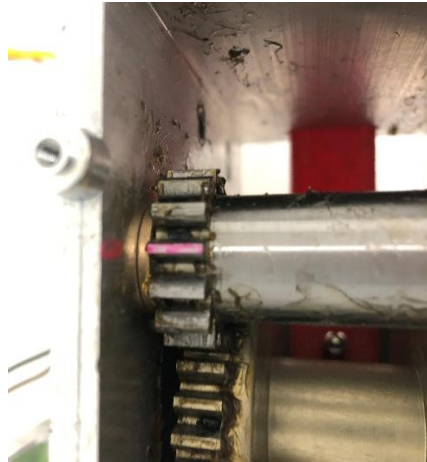
- Ensure to fit the pull cord onto the toggle switch and through the chassis slit.

## 8.10 Motor Shafts

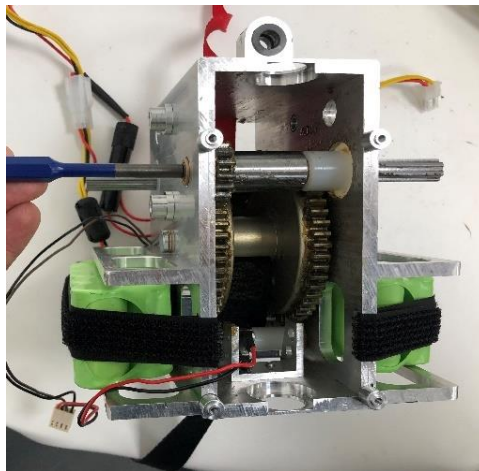
This section will cover the details of how to remove, refit and replace the motor shafts.

### Removal

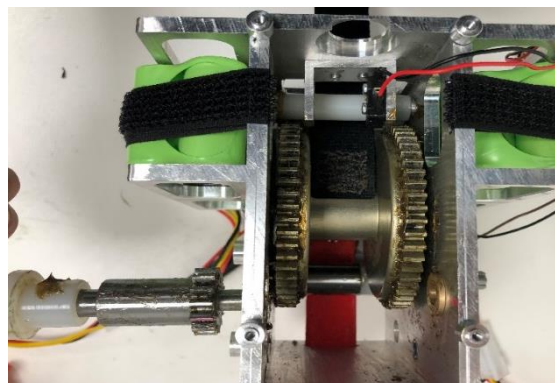
- 1.** Remove the side covers from the portable lift. (Refer to section 8.1)
- 2.** Remove the PCB from the portable lift. (Refer to section 8.4)
- 3.** Remove the lift motors from the portable lift. (Refer to section 8.5)
- 4.** Mark a line between the motor shaft tooth and the chassis as shown, these must align to allow the motor to align during refitment.



- 5.** Using a parallel pin punch and hammer, lightly tap the motor shaft out from the chassis.



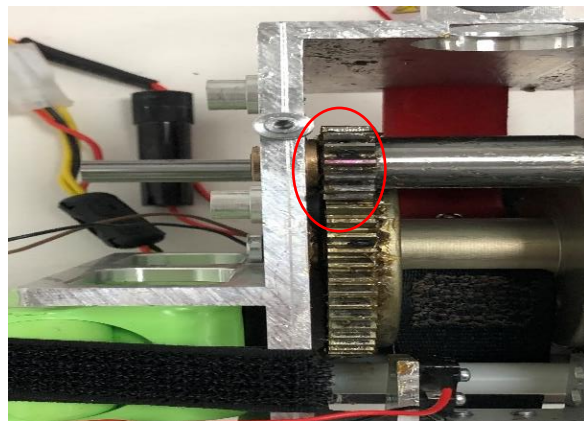
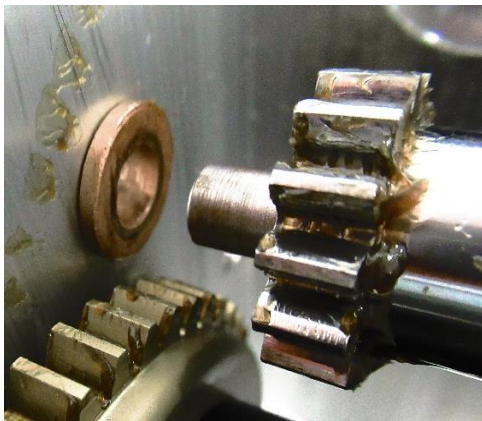
- 6.** Remove the motor shaft from the chassis.



Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- Ensure that the white spacer is fitted onto the shaft as shown.
- Ensure that the motor shaft fits into the Oilite bush at the other face of the chassis.
- Ensure that the marked line aligns between the shaft and chassis to allow the motors to align correctly.

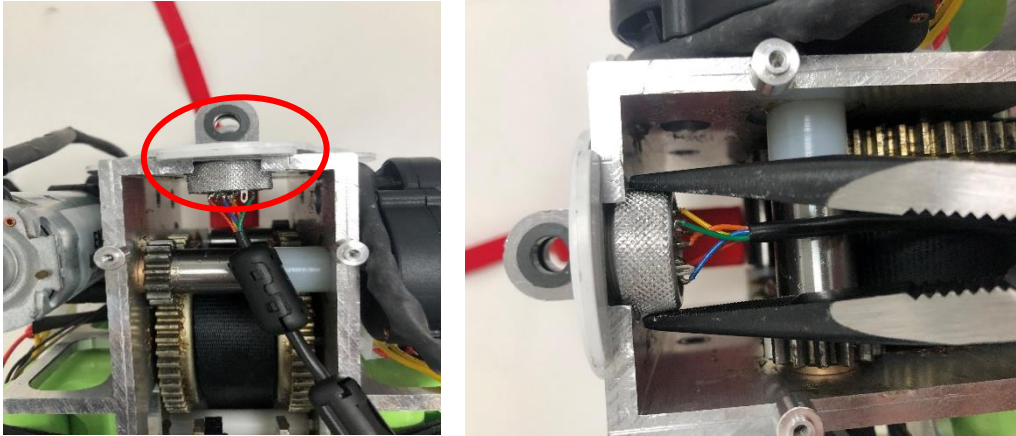


### 8.11 Handset Port

This section will cover the details of how to remove, refit and replace the Handset Port.

#### Removal

1. Remove the side covers from the portable lift. (Refer to section 8.1)
2. Remove the PCB from the portable lift. (Refer to section 8.4)
3. Remove the bottom QRS from the portable lift. (Refer to section 8.13)
4. Twist and remove the threaded port retainer anticlockwise to release the handset port. (Pliers may be required)



5. Remove the handset port by pulling it through the bottom cover as shown.



#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

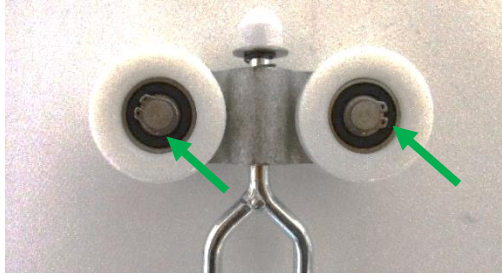
- The handset port will align with a slot in the bottom cover, make sure to fit into this slot before tightening.

## 8.12 Trolley Wheels

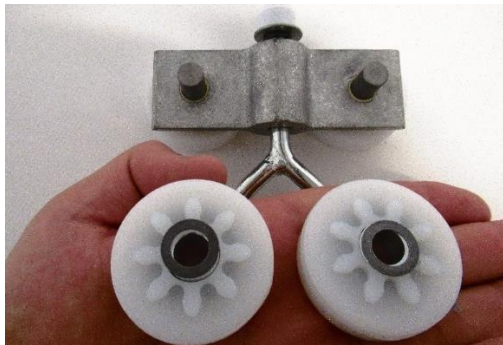
This section will cover the details of how to remove, refit and replace the trolley wheels, this section covers all wheel variants. The images below refer to track type 1 wheels but the same procedure will apply to all other track types.

### Removal

1. Using circlip pliers, remove the circlips from the wheel axel on both wheels.



2. Remove the wheels and spacers from the circlip side of the trolley.



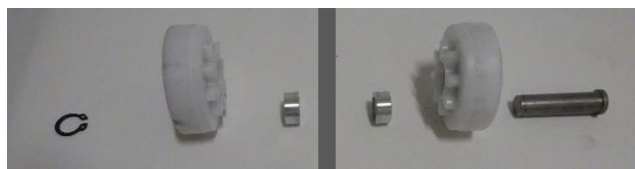
3. Remove the axels with the remaining wheels and spacers from the opposite side of the trolley.



### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- When refitting the wheels, see the exploded diagram below for guidance on the assembly order.
- Inspect the condition of the e-clips, if the clips have been stretched, replace with a new e-clip.



## 8.13 QRS Hooks

### 8.13.1 Top QRS Hook

This section will cover the details of how to remove, refit and replace the Top QRS Hook.

#### Removal

1. Using a 2mm Allen Key, loosen the grub screw from the hook until it releases the pin. The grub screw doesn't need to be fully removed.



2. Slide the pin out from the lift tape to release the QRS Hook.

#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- Ensure that the hole in the pin aligns with the grub screw.
- Care must be taken not to damage the lift tape when inserting the pin through the loop.



### 8.13.2 Bottom QRS Hook

This section will cover the details of how to remove, refit and replace the Top QRS Hook.

#### Removal

1. Using a 1.5mm Allen Key, remove the two grub screws on either side of the chassis as shown.



2. Using a 2mm Allen Key, loosen the grub screw on the QRS until it releases its hold on the pin



3. Slide the pin out to release the QRS Hook.



#### Refitting / Replacement

Refitting is a reversal of the removal process noting the following points:

- Ensure that the holes in the pin aligns with the grub screws.

**Dealer/service contact details:**

**Contact details:**

**Mackworth USA**  
54 West Industrial Drive  
O'Fallon, MO 63366 USA  
314-889-1000  
www.mackworthusa.com

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