

mackworth

# TX Advanced Ceiling Track Hoist



## Service Manual

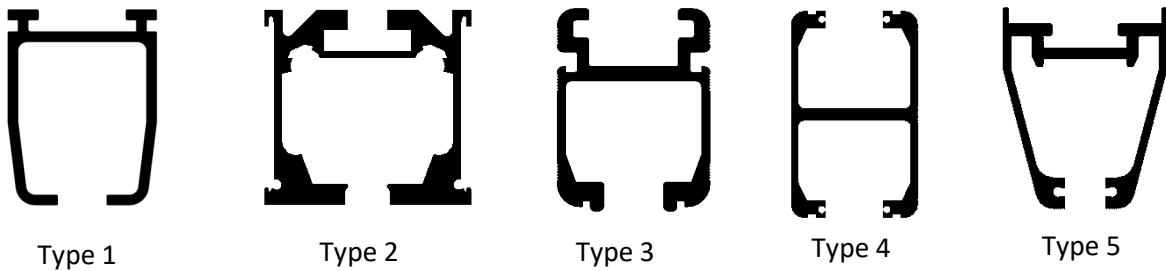
## Contents

1.0	Introduction .....	3
2.0	– Safety Precautions .....	4
3.0	Servicing .....	5
3.1	Inspection Guide .....	5
3.2	Program Mode Instructions .....	9
3.3	Lift Tape Condition .....	12
3.4	Troubleshooting – Hoist Safety Mechanisms .....	13
4.0	Testing .....	14
4.1	Hoist Testing Procedure .....	14
4.2	Testing the Charger .....	15
4.3	Battery testing .....	18
5.0	Tools, Equipment and Lubricants Required for Servicing .....	21
6.0	Decommissioning .....	22
6.1	Hoist Removal .....	22
6.2	Hoist Dismantling .....	22
6.3	Hoist Disposal .....	22
7.0	Spare Parts List .....	23
8.0	Troubleshooting .....	24
9.0	Servicing – Removal and Replacement .....	29
9.1	External Covers .....	29
9.2	PCB .....	32
9.3	Batteries .....	35
9.4	Traverse Motor – Powered Traverse Hoist Only .....	36
9.5	Lift Motor .....	37
9.6	QRS Hook .....	38
9.7	Bottom Cover .....	39
9.8	Limit Switch .....	41
9.9	Hub .....	43
9.10	Lift Tape .....	45
9.11	Wheels .....	47
9.12	Charging Beak .....	50
9.13	– Battery Lead Fuse .....	57
9.14	Traverse Shaft and Idle Gear (Powered Models Only) .....	58
9.15	Air Grommet .....	60
9.16	Toggle switch .....	61
9.17	E-Lower cord .....	63
9.18	Traverse Idle Gear .....	64
9.19	Communications Port .....	65

## 1.0 Introduction

This manual will explain how to carry out interim servicing and parts replacement on the Mackworth TX Advanced Ceiling Track Hoist 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 Ceiling Track Hoist. 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 TX Advanced is available in different configurations dependent on track profile. The track profiles are shown below:



When Servicing the TX Hoist, one of the above 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.

TX400 Advanced Hoist Type	Track Type	TX600 Advanced Hoist Type	Track Type
TX440 Advanced PT – 122617	Type 1	TX600 Advanced PT – 122622	Type 1
TX440 Advanced PT – 122656	Type 3	TX600 Advanced PT – 122666	Type 3
TX440 Advanced PT – 122659	Type 4	TX600 Advanced PT – 122669	Type 4
TX440 Advanced PT – 122662	Type 5	TX600 Advanced PT – 122672	Type 5
TX440 Advanced QRT – 122678	Type 1	TX600 Advanced QRT – 122679	Type 1
TX440 Advanced QRT – 122688	Type 3	TX600 Advanced QRT – 122689	Type 3
TX440 Advanced QRT – 122693	Type 4	TX600 Advanced QRT – 122694	Type 4
TX440 Advanced QRT – 122698	Type 5	TX600 Advanced QRT – 122699	Type 5
TX440 Advanced RTC – 122703	Type 1	TX600 Advanced RTC – 122704	Type 1
TX440 Advanced RTC – 122708	Type 3	TX600 Advanced RTC – 122709	Type 3
TX440 Advanced RTC – 122713	Type 4	TX600 Advanced RTC – 122714	Type 4
TX440 Advanced RTC – 122718	Type 5	TX600 Advanced RTC – 122719	Type 5
TX440 Advanced MTCC – 122616	Type 1	TX600 Advanced MTCC – 122621	Type 1
TX440 Advanced MTCC – 122655	Type 2	TX600 Advanced MTCC – 122665	Type 2
TX440 Advanced MTCC – 122658	Type 3	TX600 Advanced MTCC – 122668	Type 3
TX440 Advanced MTCC – 122661	Type 4	TX600 Advanced MTCC – 122671	Type 4
TX440 Advanced MTCC – 122664	Type 5	TX600 Advanced MTCC – 122674	Type 5
TX440 Advanced PTCC – 122619	Type 1	TX600 Advanced PTCC – 122624	Type 1
TX440 Advanced PTCC – 122657	Type 3	TX600 Advanced PTCC – 122667	Type 3
TX440 Advanced PTCC – 122660	Type 4	TX600 Advanced PTCC – 122670	Type 4
TX440 Advanced PTCC – 122663	Type 5	TX600 Advanced PTCC – 122673	Type 5
TX440 Advanced MTPA – 122615	Type 1	TX600 Advanced MTPA – 122620	Type 1
TX440 Advanced PTPA – 122618	Type 1	TX440 Advanced PTPA – 122623	Type 1

## 2.0 – Safety Precautions

**Read and understand this manual in its entirety before servicing the Mackworth TX Advanced Hoist.**

- Mackworth authorised personnel must complete the Full and Interim services of the TX Advanced Ceiling Track Hoist.
- The Hoist must not be in use by the user during any form of servicing.
- The Hoist must be turned OFF during any servicing that requires the external covers of the Hoist to be removed, or any dismantling of standard parts.
- Always ensure suitable clearance to remove the hoist from the ceiling track.
- Ensure that the all 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 Hoist.
- 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.

### 3.0 Servicing

#### To be completed by Approved Service Engineer

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.

When Servicing the Ceiling Track Hoist, ensure to fill out the Service Log which is located in the back of the User Manual. When doing so, ensure the Serial Number of the product and the User Manual match up. Each Ceiling Track Hoist has its designated User Manual which is supplied to the User during commissioning.

#### 3.1 Inspection Guide

The table below is a guide on how to inspect the hoist during servicing, all component checks must be completed each service to ensure that the hoist is safe for use. Any component that fails to meet the required condition must be replaced. Refer to section 9.0 for detailed instructions on component replacements.

Component	Service/Inspection required
<b>Generic:</b>	Visual inspection of the externals of the Ceiling Track Hoist. Significant damage that may affect the function of the hoist along with a clear safety hazard is unacceptable.
	Check the labelling on the hoist to ensure they are all still legible, this includes the Serial Number and other important markings.
	Clean the hoist at the end of each service. See user manual for cleaning details.
	Check all main nuts and bolts, screws and fixing to see if they are loose, if so tighten accordingly.
<b>Lift Motor:</b>	Inspect the components for damage that may affect the function and safety of the product.
	Listen for any unusual sounds when operating the motor, this should be done loaded and unloaded.
	Fully lift and lower the hoist to ensure that the motor is performing as intended. The lifting and lowering speed should be fairly consistent throughout the motion of travel.
	Ensure the Manual Emergency Lowering device is performing.
<b>Hub and Gearing:</b>	Ensure that the hub gearing is in good condition, excess wear should be cleaning and an inspection on the condition must be conducted to ensure the gearings are in a safe condition until the next service.
	The hub should be re-greased during service.
	Ensure that the meshing of the hub and motor gearing is smooth.
	Test the function of the Over-Speed Cam. Using a small Allen key, place it through the slot in the chassis and test the functionality of the Cam by pushing it outward. The Cam should automatically spring back to position once the force has been removed.

<b>Lift Tape:</b>	Inspect the full length of the lift tape for any damage such as fraying. See section 3.2 below as a reference for unacceptable wear.
	There must be no signs of failure to the stitching of the lift tape, this is most noticeable at the lowered where the carry bar is attached.
<b>Toggle Switch:</b>	Ensure that the Emergency Stop can be activated by pulling the E-Lower Cord down one step. The operation should be smooth and can be reversed when pressed back to the ON position.
	Ensure that the emergency lower is functioning when activated. When released it must become jammed in the E-Lower position.
<b>Limit Switch:</b>	Fully lower the lift tape to reach maximum length, at this point the lower limit switch should be activated and stop the hoist. The LCD should display the message: "Down Lim_Sw!"
	Fully raise the lift tape to reach minimum length, at this point the upper limit switch should be activated and stop the hoist. The LCD should display the message: "Up Lim_Sw!"
	Lower the lift tape without any load (do not remove the carry bar), the lift tape should reach the bottom limit without any issues. If the hoist performs a stop/start motion, the limit switch may be damaged.
	Remove the carry bar, the limit switch should display "Down Lim_Sw!"
<b>Carry Bar:</b>	Inspect the carry bar for damage, this includes deformation, cracking or large dents that may affect its function or safety.
	Ensure that the carry bar spring clips remain functional.
	No sharp edges shall be found on the carry bar as this has the potential to damage the slings.
	Ensure that the carry bar is fitted to the QRS hook correctly. Refer to the user manual for correct attachment.
<b>Handset:</b>	Inspect the components for damage that may affect the function and safety of the product.
	Verify that all the handset controls are functioning.
	Ensure that the handset is connected to the Hoist correctly and that the connections are secure.
<b>PCB and electrics:</b>	Inspect the PCB for any electrical burns.
	Ensure that all the wires are connected to the PCB correctly, as well any other wire connections.
	Inspect all wires for any damage.
	Ensure that the air tubes are connected to the PCB and air grommet properly, as well as being fitted to the correct air switches. Ensure that there are no cuts in the air tubes.
<b>LED Indicator:</b>	Ensure that the LED is functioning correctly. See the display message table in the user manual to confirm.
	Ensure that the LED is not cracked or damaged.
<b>LCD Display:</b>	Ensure that the LCD is functioning correctly. See the display message table in the user manual to confirm.
	Ensure that the LCD Display is not cracked or damaged. The display text should be legible.
	Using the display screen and handset, enter the program mode to view the hoist data, such as total lifts. The relevant information should be filled into the service log.
	Enter the program mode to ensure that the pre-set amps have not been altered. Or edit the amps when required.

	Enter the program mode to reset the preventative maintenance. For guidance using the program mode, see section 3.1.
<b>Charging:</b>	Check that the charging beak is able to dock into the charging dock smoothly without excess force.
	Ensure the charging is active when the hoist is docked into the charging dock. The hoist LED will flash orange along with the display stating it is “charging”, or it will display “charged” which will result in a LED displaying green.
	Ensure that there are no exposed wires from the charging dock or port.
<b>Batteries:</b>	If the hoist is having power issues or difficulties charging, the battery voltage should be measured using a Voltmeter to determine the status of the batteries.
	Test the batteries on the Hoist using the battery tester to see if they still hold charge properly, test the two batteries while running the hoist to see if they equally draw charge.
	Check for any damage or leaks on the batteries.
<b>Wheels:</b>	Examine the products Wheels for signs of damage or wear, ensure they run freely and are not cracked.
	Ensure the product is able to traverse freely with ease.
<b>Powered Traversing:</b>	Ensure that the Hoist is able to power traverse along the track smoothly without issues, such as stop/starting.
	Ensure that the powered traverse is able to dock into the charging dock correctly.
	Ensure that the direction of powered traversing corresponds correctly with the directional arrows on the bottom cover.
<b>Communications Port:</b>	Ensure that the communications port is not damaged, such as cracks or burns.
	Ensure that the communications port is functional with the given accessory.
<b>Return to Charge:</b>	Ensure that the function of the return to charge is functional when operated.
	Ensure the RTC docking is successful and charging occurs.
<b>Quick Release System:</b>	Ensure that the QRS attachment to the trolley is safe and as intended. See user manual for correct attachment procedure.
	Inspect the traversing of the QRS Trolley, ensure the traversing is smooth.
<b>Constant Charge:</b>	Ensure that the constant charge beak is in contact with the ceiling track charging strips.
	Inspect the beak for damage that may affect its function or safety.
<b>Ceiling Track:</b>	Perform a quick inspection on the ceiling track to ensure that the Hoist is safe for use on the ceiling track.
	Assess all track fixings to ensure they are safe for use until the next service.
	Ensure the joints between the two track sections (if any) have no gap between them and that they are smooth and level. If there is a rough transition, use a small file to blend the two surfaces for smooth transition.
	Ensure that the Installation of brackets are correct and fitted properly, as well as the correct amount of brackets have been installed. If necessary, tighten the bracket screws with a 3mm Allen key.

	<p>Ensure that the bolt ends stops have been installed in the track for safety. Tighten the bolts if necessary. If non-existent, see Installation manual on how to install. The end stop is a safety component that ensure the Hoist is confined to the track.</p> <p>If the track is up against the wall, ensure that a track bolt has been fitted correctly. If non-existent, see Installation manual on how to install.</p> <p>Clean the internal of the ceiling track if there is any debris that could affect the function of the hoist.</p>
<p><b>Slings:</b></p>	<p>Inspect the applied sling thoroughly with regards to the following points:</p> <ul style="list-style-type: none"> <li>- Any damage such as cuts, frays, tears, burns on the sling or sling straps</li> <li>- Any sign of stitching failure, where the fabric is found to be stretching, tearing and coming undone</li> <li>- Are the straps fully intact</li> <li>- The labels and serial numbers should all be legible.</li> </ul> <p>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.</p>





1

How To Clear Maintenance		
F / W S / N	5 . 0 1 0 0 0 0 0 0 0 0	Green LED
1Beep		
Press The Up Button Once		
MAINTENANCE CLR PM7	NO	Green LED
1Beep		
Press The Up and Down Buttons Once Simultaneously ("NO" on LCD will flicker)		
MAINTENANCE CLR PM7	NO	Green LED
1Beep		
Press The Up Button Once ("YES" on LCD will flicker)		
MAINTENANCE CLR PM7	YES	Green LED
1Beep		
Press The Up and Down Buttons Once Simultaneously		
MAINTENANCE CLR PM7	YES	Green LED
1Beep		
To Exit Program Mode, Wait 10 Seconds		
NORMAL MODE		Green LED
3 Beeps On Exit		
Wait For 1 Second		
BATTERY 100%		Green LED
No Beep		

2

How To Set Load		
F / W S / N	5 . 0 1 0 0 0 0 0 0 0 0	Green LED
1Beep		
Press The Down Button Once		
MAINTENANCE SET LOAD	4	Green LED
1Beep		
Press The Up and Down Buttons Once Simultaneously ("4" on LCD will flicker)		
MAINTENANCE SET LOAD	4	Green LED
1Beep		
Press The Up/Down Button To Set Load The Current Number on LCD will flicker)		
MAINTENANCE SET LOAD	2 4	Green LED
1Beep		
Press The Up/Down Buttons Simultaneously To Confirm Set Load		
MAINTENANCE SET LOAD	2 4	Green LED
1Beep		
To Exit Program Mode, Wait 10 Seconds		
NORMAL MODE		Green LED
3 Beeps On Exit		
Wait For 1 Second		
BATTERY 100%		Green LED
No Beep		

3

How To Set Traverse Speed		
F / W S / N	5 . 0 1 0 0 0 0 0 0 0 0	Green LED
1Beep		
Press The Up Button Once		
MAINTENANCE CLR PM7	NO	Green LED
1Beep		
Press The Up Button Once		
PROGRAM MODE DIGIT 1	3 4 T	Green LED
1Beep		
Press The Up Button Once		
PROGRAM MODE DIGIT 2	2	Green LED
1Beep		
Press The Up and Down Buttons Once Simultaneously ("2" on LCD will flicker)		
PROGRAM MODE DIGIT 2	2	Green LED
1Beep		
Press The Up/Down Button To Set Traverse Speed (The Current Number on LCD will flicker)		
PROGRAM MODE DIGIT 2	5	Green LED
1Beep		
Press The Up and Down Buttons Simultaneously To Confirm Set Traverse Speed		
PROGRAM MODE DIGIT 2	5	Green LED
1Beep		
To Exit Program Mode, Wait 10 Seconds		
NORMAL MODE		Green LED
3 Beeps On Exit		
Wait For 1 Second		
BATTERY 100%		Green LED
No Beep		

4

How To Set PM Alarm		
F / W S / N	5 . 0 1 0 0 0 0 0 0 0 0	Green LED
1Beep		
Press The Up Button Once		
MAINTENANCE CLR PM7	NO	Green LED
1Beep		
Press The Up Button Once		
PROGRAM MODE DIGIT 1	3 4 T	Green LED
1Beep		
Press The Up Button Once		
PROGRAM MODE DIGIT 2	2	Green LED
1Beep		
Press The Up Button Once		
PROGRAM MODE PM ALARM ON		Green LED
1Beep		
Press The Up and Down Buttons Once Simultaneously ("ON" on LCD will flicker)		
PROGRAM MODE PM ALARM ON		Green LED
1Beep		
Press The Up/Down Button To Set PM Alarm ("OFF" on LCD will flicker)		
PROGRAM MODE PM ALARM OFF		Green LED
1Beep		
Press The Up and Down Buttons Simultaneously To Confirm Set PM Alarm		
PROGRAM MODE PM ALARM OFF		Green LED
1Beep		
To Exit Program Mode, Wait 10 Seconds		
NORMAL MODE		Green LED
3 Beeps On Exit		
Wait For 1 Second		
BATTERY 100%		Green LED
No Beep		

5



<b>How To Activate / Deactivate RTC</b>		
F/W S 01	Green LED	1Beep
S/N 00000000		
Press the Up Button Once		
MAINTENANCE CLR PM7 NO	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC ON	Green LED	1Beep
Press the Up and Down Button Simultaneously "ON" on the LCD will flicker		
MAINTENANCE RTC ON	Green LED	1Beep
Press the Up/Down button to alter parameters		
MAINTENANCE RTC OFF	Green LED	1Beep
Press the Up and Down Button Simultaneously to confirm parameter		
MAINTENANCE RTC OFF	Green LED	1Beep
To Exit Program, Wait 10 Seconds		
NORMAL MODE	Green LED	Sustained Beep
Wait For 1 Second		
MAINTENANCE RTC ON	Green LED	1Beep

6



<b>How To Set RTC Time</b>		
F/W S 01	Green LED	1Beep
S/N 00000000		
Press the Up Button Once		
MAINTENANCE CLR PM7 NO	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC ON	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC TIME 80	Green LED	1Beep
Press the Up and Down Button Simultaneously "80" on the LCD will flicker		
MAINTENANCE RTC TIME 80	Green LED	1Beep
Press the Up/Down button to alter parameters		
MAINTENANCE RTC TIME 120	Green LED	1Beep
Press the Up and Down Button Simultaneously to confirm parameter		
MAINTENANCE RTC TIME 120	Green LED	1Beep
To Exit Program, Wait 10 Seconds		
NORMAL MODE	Green LED	Sustained Beep
Wait For 1 Second		
MAINTENANCE RTC TIME 120	Green LED	1Beep

7



<b>How To Set RTC Time</b>		
F/W S 01	Green LED	1Beep
S/N 00000000		
Press the Up Button Once		
MAINTENANCE CLR PM7 NO	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC ON	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC TIME 80	Green LED	1Beep
Press the Up and Down Button Simultaneously "80" on the LCD will flicker		
MAINTENANCE RTC TIME 15	Green LED	1Beep
Press the Up/Down button to alter parameters		
MAINTENANCE RTC TIME 24	Green LED	1Beep
Press the Up and Down Button Simultaneously to confirm parameter		
MAINTENANCE RTC TIME 24	Green LED	1Beep
To Exit Program, Wait 10 Seconds		
NORMAL MODE	Green LED	Sustained Beep
Wait For 1 Second		
MAINTENANCE RTC TIME 24	Green LED	1Beep

8



<b>How To Set RTC Time</b>		
F/W S 01	Green LED	1Beep
S/N 00000000		
Press the Up Button Once		
MAINTENANCE CLR PM7 NO	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC ON	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC TIME 60	Green LED	1Beep
Press the Up Button Once		
MAINTENANCE RTC TIME 15	Green LED	1Beep
Press the Up and Down Button Simultaneously "60" on the LCD will flicker		
MAINTENANCE RTC SPEED 4	Green LED	1Beep
Press the Up/Down button to alter parameters		
MAINTENANCE RTC SPEED 8	Green LED	1Beep
Press the Up and Down Button Simultaneously to confirm parameter		
MAINTENANCE RTC SPEED 8	Green LED	1Beep
To Exit Program, Wait 10 Seconds		
NORMAL MODE	Green LED	Sustained Beep
Wait For 1 Second		
MAINTENANCE RTC SPEED 8	Green LED	1Beep

### 3.3 Lift Tape Condition

In this section the images below will show two types of lift tape condition, one in which the wear is minimal and therefore in an acceptable condition, whereas the other Lift Tape has a level of wear which is unacceptable and requires a change during the current service.

#### Acceptable Condition

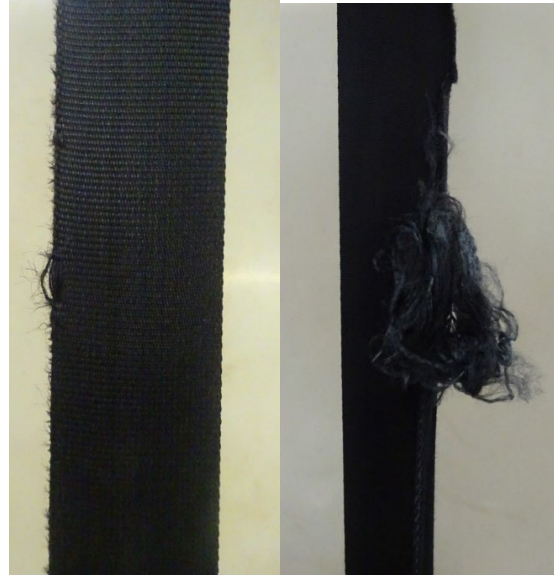
It can be seen there is a very small amount of wear to the tape but nothing substantial that requires an immediate Lift Tape replacement. It is advised the Service Engineer informs the Customer of the dangers of Lift Tape fraying and that they keep an eye on the tapes condition.



#### Unacceptable Condition

In the first image you can see a clear increase in wear with additional fraying. This is the start of the Lift Tape starting the fraying process which will only increase each lift. If the Lift Tape is discovered in this condition or worse, at any point along the tape, the Lift Tape should be replaced immediately.

The second image is an example of extreme wear which is a condition the Lift Tape should never be allowed to reach. This condition is endangering the safety of the patient.



### 3.4 Troubleshooting – Hoist Safety Mechanisms

#### **Hoist does not lower while Hoist is in use**

When this occurs the E-Lower Cord is to be pulled to safely lower the patient from the hoist. For details on how to use the E-Lower Cord, refer to the user manual. Once the patient has been removed from the hoist, follow the relevant troubleshooting guide procedure to service adequately.

#### **Hoist has lost all power while in use**

When this occurs the E-Lower Cord cannot be used to safely lower the patient. The next mechanism to lower the patient safely is to activate the emergency wind down mechanism. With the use of a step ladder, remove the cap from the external cover. The user is provided with a 4mm Allen key when receiving the product, use this tool to wind down the motor manually until the patient is safely removed from the hoist. For further details on the emergency wind down, refer to the user manual. Once successful, follow the relevant troubleshooting guide procedures to service adequately.

#### **Hoist Over-Speed Cam has been activated while in use**

When this occurs the E-Lower Cord and emergency wind down mechanism cannot be used to safely lower the patient. The hoist gearing mechanism has failed and therefore cannot be used to lower the patient. The Over-Speed Cam has been activated to prevent the patient from free fall.

To safely lower the patient from the hoist the emergency services should be contacted immediately. Do not attempt to lower the patient until emergency services have arrived.

Once the patient has been safely removed, the hoist should not be serviced and must be decommissioned. The hoist is beyond the point of repair and should not be reused.

Decommission the hoist following the correct decommissioning procedure. See section 6.0

## 4.0 Testing

### 4.1 Hoist Testing Procedure

Below is the full testing procedure required to complete an Annual Hoist Service.

The SWL of either 200kg or 272kg (440lb / 600lb) is an essential load for the testing of the hoist. A mode of transportation to transport the weights to the hoist is required.

The weights must be attached to the hoist carry bar securely and follow the below procedure in order:

1. Raise the weight to the hoist upper limit. Be aware of any unusual noises while raising the safe working load.
2. Lower the weight to a safe height, but still fully suspended from the Hoist.
3. Traverse the hoist around the full track system and observe. Watch for any abnormalities such as noise or traversing trouble. Also inspect the track system for any abnormalities such as creaking, cracking, traversing the whole track system should test every bracket and accessory to the tracking system, observe for any fragilities in the brackets and supports.
4. Dock the hoist with the suspended weight in the charging dock. Ensure the hoist is charging correctly. (With constant charge, check the charging occurs at the current location). (With RTC, activate the function and allow the hoist to traverse into the dock).
5. Traverse the hoist out of the dock.
6. Begin to lower the hoist using the down function on the handset.
7. Pull the E-Lower Cord to test the E-Stop function.
8. Pull the E-Lower Cord again and continue to hold to test the E-Lowering function.
9. Lower the Hoist using the down function on the handset until the weight can be detached.
10. Continue to lower until the lift tape has been fully extended to test the lower limit switch.
11. Raise the hoist back to its original height.
12. Traverse the hoist back into the charging dock without weight to test docking. Ensure the hoist can dock properly unloaded. (With constant charge, check the charging occurs at the current location). (With RTC, activate the function and allow the hoist to traverse into the dock).
13. For Powered Auxiliary Hoists, test the interaction of the hoist with the accessory and ensure that the communication is successful. If the accessory is damaged, refer to the service manual for the specific accessory at hand.
14. Traverse the Hoist back to its starting position.
15. Test complete.

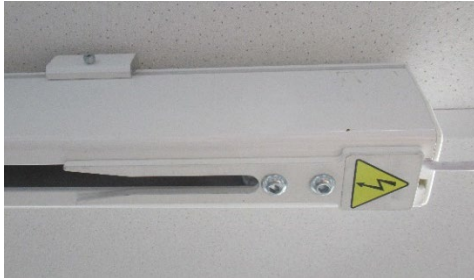
## 4.2 Testing the Charger

Within this section it will explain the correct procedure on inspecting the charger for servicing procedures or replacement.

Step 1 - Isolate the charger from the power source. By unplugging the charger if available, if it's mains fitted then isolate the power from the consumer unit (House Breaker).



Ensure the power is isolated before you start to test the charger



Step 2 - Remove end cap, ensuring not to damage the cap or the power cable.



Step 3 - Check that both brass connector screws are in a good un-damaged state.



Step 4 - Connect the crocodile clips to the multi-meter probes.



Step 5 - Make sure the unconnected multi-meter reads 0.0, if not you will need to zero the meter by using the zero button.



Step 6 - Unscrew both bolts on the charging dock.

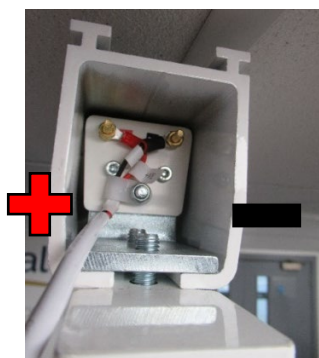


Step 7 - Slide the charging dock off the track till the top plate of the clamp is flush with the end of the track. Tighten the screws up to stop the charger moving during testing.

(If track is located near a wall or object, remove the charger at the other end and test on the bench)



Step 8 - Identify the positive and negative connection screws.





Step 9 - Attach the multi meter C clips, Positive terminal to positive test cable and negative terminal to negative test cable.



Step 10 - Check the results on the multi-meter, The Reading MUST Be between 27v -28v. if it's not the charger should be removed and must be replaced.



Step 11 - Remove the C clips off terminals.



Step 12 Loosen both charger screws



Step 13 - Slide the charger back to its original place and re tighten the screw to secure it in place.



Step 14 Replace the end cap and secure in place by lightly tapping it in.



Step 15- Un-isolate the power source and check if the charging dock is working properly.

### 4.3 Battery testing

Within this section it will explain the correct procedure on testing the batteries for servicing procedures or replacement. (To be completed by a competent person)

Step 1 – Take the ACT Battery tester out of the packaging and place on a level surface



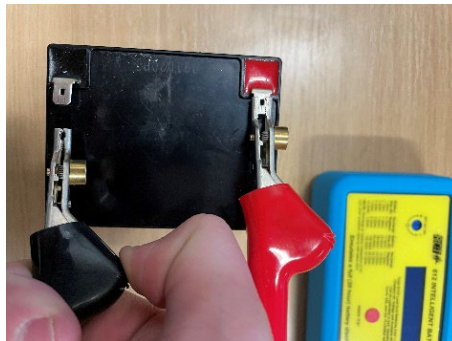
Step 2 – take the Lead acid 12v 5Ah battery and locate near tester



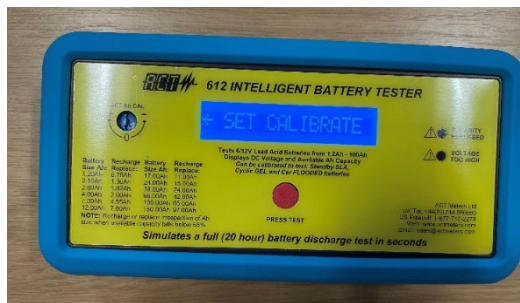
Step 3 – Attach the positive connector to the positive terminal in below orientation



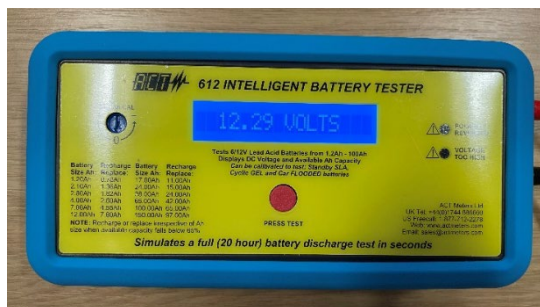
Step 4 - Attach the positive connector to the positive terminal in below orientation



Step 5 – Wait for the tester to wake up and ensure to set the machine ‘SET Ah Cal’ to ‘0’



Step 6 – After it has been set the Tester will show you the battery voltage, ensure this is between 12-13 volts



Step 7 – Press the Red button the start the test



Step 8 – the tester will show a Ah reading, ensure this is above 3.0 Ah



## 5.0 Tools, Equipment and Lubricants Required for Servicing

When carrying out work on the Mackworth TX Advanced Hoist, you will require the following:

### **Tools Required**

2mm Allen Key  
2.5mm Allen Key  
3mm Allen Key  
4mm Ball Ended Allen Key  
5mm Allen Key  
8mm Spanner  
No. 2 Pozi Drive Screwdriver  
2mm Slotted Screwdriver  
5.5mm Slotted Screwdriver  
External Circlip Pliers 3-10mm  
Long Nose Pliers  
Side Snips  
Digital Vernier Calliper  
Tape Measure  
Second Cut Hand File  
Power Drill  
8.5mm Drill Piece

### **Equipment Required**

Step Ladder  
Multi-Meter  
Battery Tester  
Marker Pen  
Cloth  
Lint Free Cloth  
Service Documentation  
Product User Manual  
Product Spare Parts Manual  
Product Commissioning Manual  
Test Weights – 200kg/400lb or 272kg/660lb  
Weight Trolley  
Lifting Straps x2 (Attach weight to Carry Bar)  
Service Stand  
Grease Gun  
Cable Ties – 100x2.5mm (Part No. 000106) x 4

### **Lubricants and Sundries Required**

Morris Grease – k42EP Multi- Purpose Grease  
Loctite 222  
Loctite 243

## 6.0 Decommissioning

The following section will instruct on how to correctly decommission the TX Advanced Hoist at the end of use. This section is relevant to both the TX440 Advanced and TX600 Advanced.



The product may be contaminated and has to be disinfected before decommissioning. See section 'Cleaning' in the user manual for details of how to do this.

### 6.1 Hoist Removal

To successfully remove the Hoist from the Ceiling Track, refer to the Commissioning Manual for full details. A summary of the correct order on how to remove the TX and its components has been listed below. It is highly recommended that the Commissioning Manual is used to ensure a safe removal.

1. Turn OFF the Hoist by pulling down the E-Lower Cord to its middle switch.
2. Detach the Carry Bar from the Hoist.
3. Detach the Handset from the Hoist
4. At the end of the Track, remove the End Cap, Safety Bolt and End Stop.
5. Carefully slide the Hoist out of the Track.
6. Turn OFF the Charger at the Wall Socket and remove the plug.
7. Remove the charging unit from the wall using a pozi head screwdriver.
8. Detach and carefully slide the Charger out of the Track.
9. Ensure the End Stop, Safety Bolt and End Cap are refitted to the Track once all the above steps are complete.
10. Hoist removal is complete.

### 6.2 Hoist Dismantling

All serviceable components of the hoist should be dismantled prior to the disposal of the hoist. For guidance on how to dismantle all of the Hoist components, refer to section 9.0 – Servicing within this manual for removal and replacement details. Each sub-section will give in depth details on how to dismantle each component of the hoist.

### 6.3 Hoist Disposal



When the hoist has completed its life cycle and can no longer perform to its intended use safely the hoist must be decommissioned by an approved Service Engineer. The following specifies the importance of correct disposal procedure including local laws and being environmentally friendly.

Please observe the local laws on recycling and respect the current laws for disposal within the community the device is being used within. If there is any uncertainty of the below guidelines, contact your local authorities to determine the proper method of disposal of potentially biohazardous parts and accessories.

The relevant components utilised in the manufacture of the device that can be recycled at the end of the device life are:

Fully recyclables:	Consideration when Recycling:
Chassis	Batteries
Plastic Covers	Wiring Looms – electronics
Metallic Internals – Hub etc.	PCB
Initial packaging of the device (cardboard)	Hand Control
Metallic fixing – Screws etc.	Motors
Plastic Mouldings – Wheels etc.	Lift Tape
Carry Bar	Charger

Ensure that this list is used as guidance and that the local laws in the given community overrule the suggested component disposal in the table above.

## 7.0 Spare Parts List

For the full list of Spare Parts available for this product. Please refer to the latest revision of the Spare Parts Manual.

Document Number: 992674

The Spare Parts Manual can be located on the Mackworth Website: <http://mackworthusa.com>

## 8.0 Troubleshooting

Should a problem arise with the use of the Hoist, this section offers guidance to all known faults revolving the product. The list of faults below offers the correct actions in sequence to resolve the issue.

For each step per scenario, if the step does not determine the issue, continue to the following step in sequence until the fault is found. Once the fault is found, refer to the action guide with the corresponding number to resolve the issue. After following the correct action, check that the Hoist is now functioning correctly, and perform a simple test. See Section 4.0 for correct test procedure.

For guidance on how to dismantle the Hoist to perform troubleshooting actions, see section 9.0 – Servicing.

If the fault is not found and/or the solutions do not correct the problem, contact your local Mackworth authorized dealer immediately.

Troubleshooting Guide:	Action Guide:
<p><b><u>Hoist doesn't turn on:</u></b></p> <p><i>Operate the handset to determine if the Hoist powers up. If it does not – Follow the Troubleshooting guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check the Handset is correctly connected to the Air Grommet.</li> <li>2. Check the Handset air tube is not damaged, e.g. cuts and holes.</li> <li>3. Check the E-Lower Cord has not been used, this will leave the toggle switch in OFF mode.</li> <li>4. Doc the Hoist into the Charger to see if the Hoist begins to Charge, it is possible the Hoist is out of battery.</li> <li>5. Check the Battery Lead connection points are connected properly, from battery to PCB.</li> <li>6. Check for any damage to the battery leads, e.g. cuts and breaks.</li> <li>7. Check to see if the Fuse on the Battery Lead has blown.</li> <li>8. Check the Limit Switch Wires for any damage, cuts and breaks. For thorough inspection, removal is recommended. See section 9.8 for guidance.</li> <li>9. Perform a visual check on the PCB for any damage, e.g. blown components.</li> <li>10. Using a Battery Tester, check that both Batteries are providing around 12V to the PCB.</li> <li>11. Replace current PCB.</li> <li>12. Replace current Limit Switch Block.</li> <li>13. Replace current Toggle Switch.</li> </ol>	<p><b><u>Hoist doesn't turn on:</u></b></p> <p><i>Operate the handset to determine if the Hoist powers up. If it does not – Follow the Troubleshooting guide below.</i></p> <ol style="list-style-type: none"> <li>1. Re-attach the Handset to the Air Grommet – See User Manual on Handset attachment.</li> <li>2. Remove the Handset from the Hoist and Replace – See User Manual on Handset attachment.</li> <li>3. Press the red tab vertically to switch the toggle switch from OFF to ON.</li> <li>4. If Hoist LED flashes orange, use Handset to attempt to turn on Hoist. <b>If unsuccessful, continue Troubleshooting Guide and refer to the section on “Hoist not Charging” as this is likely the guide to resolve the issue.</b> If Hoist turns on, allow the Hoist to charge before testing. If Hoist does show signs of charging but does not turn on, continue this Troubleshooting Guide.</li> <li>5. Re-attach the Battery Leads as shown in section 9.3.</li> <li>6. Remove the Battery Leads and Replace as shown in section 9.3</li> <li>7. Replace the Fuse as shown in section 9.13</li> <li>8. Replace the Limit Switch Block – See section 9.8</li> <li>9. Replace the PCB – See section 9.2</li> <li>10. If voltage is below 12V. Replace the Batteries – See Section 9.3</li> <li>11. See section 9.2 on PCB replacement.</li> <li>12. See section 9.8 on Limit Switch Block replacement.</li> <li>13. See section 9.16 on Toggle Switch replacement.</li> </ol>



Troubleshooting Guide:	Action Guide:
<p><b><u>Hoist doesn't charge:</u></b></p> <p><i>There are two various troubleshooting guides for this issue. Refer to the most relevant guide.</i></p> <p><b>Standard Charging:</b></p> <p><i>Dock the Hoist correctly (ensure the beak is making contact with the Dock) to determine if the Hoist will charge, if the display does not show "charging" or the LED does not flash orange, follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check the Charger is turned on at the power supply – the charging unit LED should show a steady green light when turned on, and flashing orange when the Hoist is charging.</li> <li>2. Check Charger wiring for damage, e.g. cuts and breaks.</li> <li>3. Check Voltage and Current through the Charging Dock.</li> <li>4. Check the Charging Beak is not damaged, e.g. Cracks, breaks, Contact Strips are intact.</li> <li>5. Check Charging Beak wiring from the beak to the PCB for damage or disconnection.</li> <li>6. Check PCB for damage near the Charging Beak connection point, e.g. blown components.</li> <li>7. Check the Batteries output using a Battery Tester.</li> <li>8. Replace Charging Beak</li> <li>9. Replace Charger</li> <li>10. Replace PCB</li> </ol>	<p><b><u>Hoist doesn't charge:</u></b></p> <p><i>There are two various troubleshooting guides for this issue. Refer to the most relevant guide.</i></p> <p><b>Standard Charging:</b></p> <p><i>Dock the Hoist correctly (ensure the beak is making contact with the Dock) to determine if the Hoist will charge, if the display does not show "charging" or the LED does not flash orange, follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Turn the Plug Switch at the wall on.</li> <li>2. Replace Charger Assembly. See Installation Manual for Charger installation.</li> <li>3. Use a Voltmeter and Ammeter to determine the Voltage and Amps of the Charging Dock, the voltage should show 24VDC. Amperes should show 1A. If there is no Voltage or Current running through the Charger, check the Fuse in the Plug. Replace if necessary. If there is no fault to be found, replace the Charging Doc Unit. See the Installation Manual to install Charger</li> <li>4. Replace the Charging Beak. See Section 9.12</li> <li>5. If the wire is damaged, replace the beak (see section 9.12), if wiring is disconnected from board, re-connect correctly (see section 9.12)</li> <li>6. Replace the PCB – See section 9.2</li> <li>7. If Batteries or non-responsive, replace the batteries.</li> <li>8. See section 9.12 for Charging Beak replacement.</li> <li>9. See Charger Installation within the Installation Manual.</li> <li>10. See section 9.2 on PCB replacement.</li> </ol>
<p><b><u>Constant Charge:</u></b></p> <p><i>Do not operate the Hoist and allow the Hoist to charge at its current location. If the display does not show "charging" or the LED does not flash orange, follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check the Constant Charge Charger is turned on at the power supply – the charging unit LED should show a steady green light when turned on, and flashing orange when the Hoist is charging.</li> <li>2. Check that the Constant Charge Beak is in contact with the Ceiling Track charge strips.</li> <li>3. Check Charger wiring for damage, e.g. cuts and breaks.</li> <li>4. Check Voltage and Current through the Charging Dock.</li> </ol>	<p><b><u>Constant Charge:</u></b></p> <p><i>Do not operate the Hoist and allow the Hoist to charge at its current location. If the display does not show "charging" or the LED does not flash orange, follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Turn the Plug Switch at the wall on.</li> <li>2. Inspect the Beak for damage that may cause the lowered height. Replace if necessary.</li> <li>3. Replace Charger Assembly. See Installation Manual for Charger installation.</li> <li>4. Use a Voltmeter and Ammeter to determine the Voltage and Amps of the Charging Dock, the voltage should show 24VDC. Amperes should show 1A. If there is no Voltage or Current running through the Charger,</li> </ol>

Troubleshooting Guide:	Action Guide:
<ol style="list-style-type: none"> <li>5. Check the Constant Charge Beak is not damaged, e.g. Cracks, breaks.</li> <li>6. Check the Constant Charge Strips within the Track are not damaged, e.g. poor connections, broken strips.</li> <li>7. Check Charging Beak wiring from the beak to the PCB for damage or disconnection.</li> <li>8. Check PCB for damage near the Charging Beak connection point, e.g. blown components.</li> <li>9. Check the Batteries output using a Battery Tester.</li> <li>10. Replace Charging Beak</li> <li>11. Replace Charger</li> <li>12. Replace PCB</li> </ol>	<p>check the Fuse in the Plug. Replace if necessary. If there is no fault to be found, replace the Charging Doc Unit. See the Installation Manual to install Charger</p> <ol style="list-style-type: none"> <li>5. Replace the Charging Beak. See Section 9.12</li> <li>6. See the Installation Manual for the specific ceiling track for service and repairs to the constant charge strip.</li> <li>7. If the wire is damaged, replace the beak (see section 9.12), if wiring is disconnected from board, re-connect correctly (see section 9.12)</li> <li>8. Replace the PCB – See section 9.2</li> <li>9. If Batteries or non-responsive, replace the batteries.</li> <li>10. See section 9.12 for Charging Beak replacement.</li> <li>11. See Charger Installation within the Installation Manual.</li> <li>12. See section 9.2 on PCB replacement.</li> </ol>
<p><b><u>Hoist doesn't lift:</u></b></p> <p><i>There are three various troubleshooting guides for this issue. Refer to the most relevant guide.</i></p> <p><b>No Error Indication:</b></p> <p><i>Attempt to raise/lower Hoist with handset, but Hoist is not responding. Hoist does not give any indication of what the fault could be. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check the Lift Motor Wires are connected properly between the Toggle Switch and Motor.</li> <li>2. Check for damage along the Motor Wires, e.g. Cuts and breaks.</li> <li>3. Check for damage along the two Toggle Switch Wires which provide power to the Lift Motor.</li> <li>4. Check Lift Motor gearing inside the Hoist for damage. The teeth could be worn down and no contact is being made with the Hub.</li> <li>5. Check Hub teeth for damage. The teeth could be worn down and no contact is being made with the Lift Motor.</li> <li>6. Check PCB for damage near the Toggle Switch, e.g. blown components.</li> <li>7. Replace Lift Motor.</li> <li>8. Replace PCB</li> <li>9. Replace Toggle Switch</li> </ol>	<p><b><u>Hoist doesn't lift:</u></b></p> <p><i>There are three various troubleshooting guides for this issue. Refer to the most relevant guide.</i></p> <p><b>No Error Indication:</b></p> <p><i>Attempt to raise/lower Hoist with handset, but Hoist is not responding. Hoist does not give any indication of what the fault could be. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Connect the Motor Wires and Toggle Switch Wires correctly. See 9.5 for guidance.</li> <li>2. Replace the Lift Motor. See section 9.5 for guidance.</li> <li>3. Replace the Toggle Switch. See section 9.16 for guidance.</li> <li>4. Replace the Lift Motor. See section 9.5 for guidance.</li> <li>5. Replace the Hub. See section 9.9 for guidance.</li> <li>6. Replace the PCB. See section 9.2 for guidance.</li> <li>7. See section 9.5 on guidance to replace the Lift Motor.</li> <li>8. See section 9.2 on guidance to replace the PCB.</li> <li>9. See section 9.16 on guidance to replace the Toggle Switch.</li> </ol>

Troubleshooting Guide:	Action Guide:
<p><b>High Current:</b></p> <p><i>Attempt to raise/lower Hoist with handset, the LCD Displays the message “High Current” and the alarm beeps for 3 seconds. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check Program Mode to determine if the Load is set to 24 Amps.</li> <li>2. Inspect the internal gearing between the Hub and Lift Motor for wear, swarf and damage.</li> <li>3. Check for lift tape fraying/wear that may be jamming the gears within the Hoist.</li> <li>4. Check Battery Voltage using Battery Tester as high current could be due to low battery.</li> <li>5. Check PCB for any damage, e.g. Blown components.</li> <li>6. Replace the Lift Motor.</li> <li>7. Replace the PCB.</li> </ol> <p><b>No Limit Switch:</b></p> <p><i>Attempt to raise/lower Hoist with handset, the LCD Displays message “No Lim_Sw!” and the Hoist alarms a continuous beep. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Fully inspect the condition of the Limit Switch Block wires for cuts and breaks. For thorough inspection, removal of the Limit Switch Block is recommended. See section 9.8 for guidance.</li> <li>2. Remove the Limit Switch Block and inspect the rollers for damage, e.g. a roller is jammed and isn’t functioning as intended. Use your finger to press the rollers individually and listen for the limit switch clicks.</li> <li>3. Check PCB for any damage, e.g. Blown components.</li> <li>4. Replace the Limit Switch Block.</li> <li>5. Replace the PCB.</li> </ol>	<p><b>High Current:</b></p> <p><i>Attempt to raise/lower Hoist with handset, the LCD Displays the message “High Current” and the alarm beeps for 3 seconds. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Follow section 3.1 on how to enter program mode to adjust load and ensure the PCB is set to 24 Amps.</li> <li>2. Remove swarf from gearing if any. Replace Hub (section 9.9) and/or Lift Motor (section 9.5) if necessary due to damage and wear.</li> <li>3. Replace the Lift Tape (section 9.10) and remove any frayed material jamming the gears.</li> <li>4. Charge Hoist if Battery Voltage is 24.5V or lower. Test Hoist once sufficiently charged.</li> <li>5. Replace the PCB, see section 9.2 for guidance.</li> <li>6. See section 9.5 to replace Lift Motor.</li> <li>7. See section 9.2 to replace the PCB.</li> </ol> <p><b>No Limit Switch:</b></p> <p><i>Attempt to raise/lower Hoist with handset, the LCD Displays message “No Lim_Sw!” and the Hoist alarms a continuous beep. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Replace the Limit Switch Block. See section 9.8 for guidance.</li> <li>2. Replace the Limit Switch Block if Block is damaged. See section 9.8 for guidance.</li> <li>3. Replace the PCB. See section 9.2 for guidance.</li> <li>4. See section 9.8 on guidance for Limit Switch Block replacement.</li> <li>5. See section 9.2 on guidance for PCB replacement.</li> </ol>
<p><b><u>LED and/or LCD inactive:</u></b></p> <p><i>Attempt to raise/lower Hoist with handset, the Hoist does perform commands but the LCD Display does not respond or LED light has no colour. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Check LCD Display or LED externally for any impact damage, e.g. cracks or breaks.</li> </ol>	<p><b><u>LED and/or LCD inactive:</u></b></p> <p><i>Attempt to raise/lower Hoist with handset, the Hoist does perform commands but the LCD Display does not respond or LED light has no colour. Follow the Troubleshooting Guide below.</i></p> <ol style="list-style-type: none"> <li>1. Replace the Bottom Cover of the Hoist. See section 9.7 for guidance.</li> </ol>

Troubleshooting Guide:	Action Guide:
<ol style="list-style-type: none"> <li>2. Check the LCD Display or LED wiring for damage such as cuts or breaks. Ensure they are plugged in.</li> <li>3. Inspect the PCB for any damage such as blown components.</li> <li>4. Replace the Bottom Cover Assembly.</li> <li>5. Replace the PCB.</li> </ol>	<ol style="list-style-type: none"> <li>2. Plug the wires in correctly or replace the Bottom Cover if the wires are damaged. See section 9.7 for guidance.</li> <li>3. Replace the PCB. See section 9.2 for guidance.</li> <li>4. See section 9.7 for guidance on Bottom Cover replacement.</li> <li>5. See section 9.2 for guidance on PCB replacement.</li> </ol>
<p><b><u>E-Stop Cord not functioning:</u></b></p> <p><i>Attempt to halt power to the Hoist using the E-Stop Cord. The E-Stop Cord does not carry out the motions of: ON, OFF, E-Lower</i></p> <ol style="list-style-type: none"> <li>1. Inspect the E-Lower Cord red tab within the Chassis for displacement or jamming around the Toggle Switch.</li> <li>2. Check for any damage around the E-Lower Cord such as cracks or breaks that have caused the failure.</li> <li>3. Inspect the functionality of the Toggle Switch alone to determine if the Motions of: ON, OFF, E-Lower are working correctly</li> </ol>	<p><b><u>E-Stop Cord not functioning:</u></b></p> <p><i>Attempt to halt power to the Hoist using the E-Stop Cord. The E-Stop Cord does not carry out the motions of: ON, OFF, E-Lower</i></p> <ol style="list-style-type: none"> <li>1. Reposition the red tab correctly around the Toggle Switch, for guidance see section 9.17 on E-Lower Cord Fitting.</li> <li>2. Replace the E-Lower Cord. See section 9.17 for guidance.</li> <li>3. Replace the Toggle Switch if not functioning correctly. See section 9.16 for guidance.</li> </ol>
<p><b><u>Hoist has power but does not respond to handset commands:</u></b></p> <p><i>Attempt to raise/lower with the handset but the Hoist does not respond. (E-Lower Cord is functioning, indicating there is power).</i></p> <ol style="list-style-type: none"> <li>1. Check the Handset is correctly connected to the Air Grommet.</li> <li>2. Check the Handset air tube is not damaged, e.g. cuts and holes.</li> <li>3. Check the Air Grommet tubes are connected correctly at both ends, Air Grommet and PCB connection points.</li> <li>4. Check the Air Grommet tubes from the Air Grommet to PCB are not damaged, e.g. cuts and breaks.</li> <li>5. Replace the Handset and test functions.</li> <li>6. Replace the PCB as the Air Switch could be damaged.</li> </ol>	<p><b><u>Hoist has power but does not respond to handset commands:</u></b></p> <p><i>Attempt to raise/lower with the handset but the Hoist does not respond. (E-Lower Cord is functioning, indicating there is power).</i></p> <ol style="list-style-type: none"> <li>1. Re-attach the Handset to the Air Grommet – See User Manual on Handset attachment.</li> <li>2. Remove the Handset from the Hoist and Replace – See User Manual on Handset attachment.</li> <li>3. Re-attach the Air Grommet tubes correctly. For guidance to connect to the PCB, see section 9.2. To re-attach at the Air Grommet end, there is a label on the inside of the Chassis colour coding the tubes to the correct connection point.</li> <li>4. Replace the Air Grommet assembly. See section 9.15 for guidance.</li> <li>5. See User Manual for guidance on fitting new handset.</li> <li>6. See section 9.2 on PCB replacement.</li> </ol>

## 9.0 Servicing – Removal and Replacement

This section will cover the details of how to remove, refit and replace all serviceable parts to the Hoist. The step by step process is to be followed in sequence to perform a successful service on the Hoist. Unless stated otherwise, all images refer to a Mackworth TX600 Advanced with a Standard Wheel Assembly (Track Type 1). Where necessary, additional images for Alternative Track Types have been included.

**NOTE: Before carrying out any work on a TX Hoist, remember to switch off the power first. This action can be carried out by pulling on the E-Lower cord once.**

When Servicing the TX Hoist, a work bench or table should be used, along with a protective cover such as a cloth to avoid damaging the Hoist. The TX Service Stand is highly recommended to assist during servicing. See image below of the Service Stand.

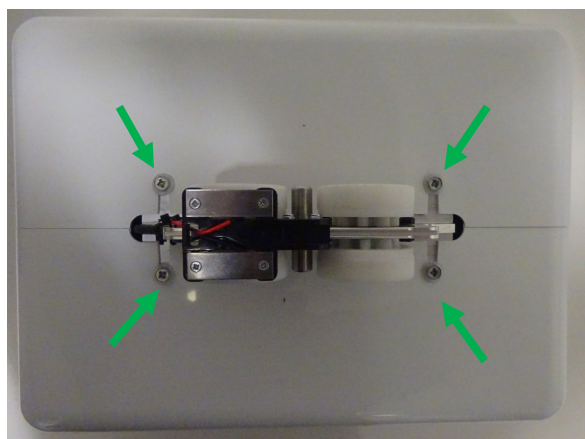


### 9.1 External Covers

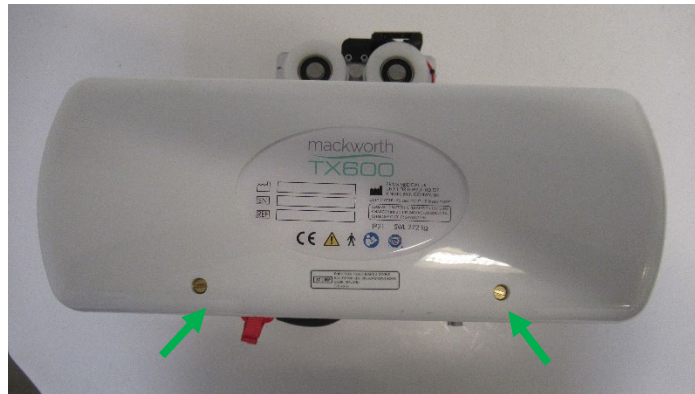
This section will instruct the correct procedure on how to remove and replace the External Covers.

#### Removal

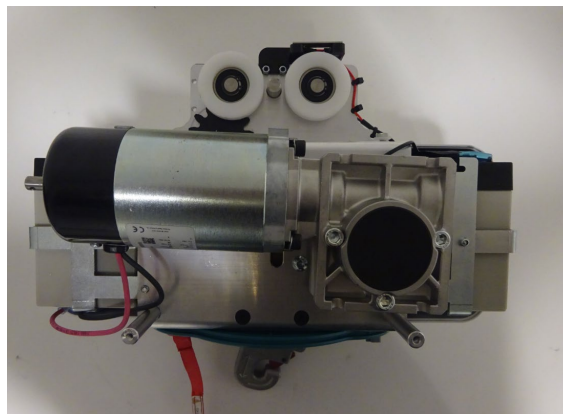
Step 1 – Using a Pozi Screwdriver, loosen the four screws (Arrowed), the screws do not need to be removed.



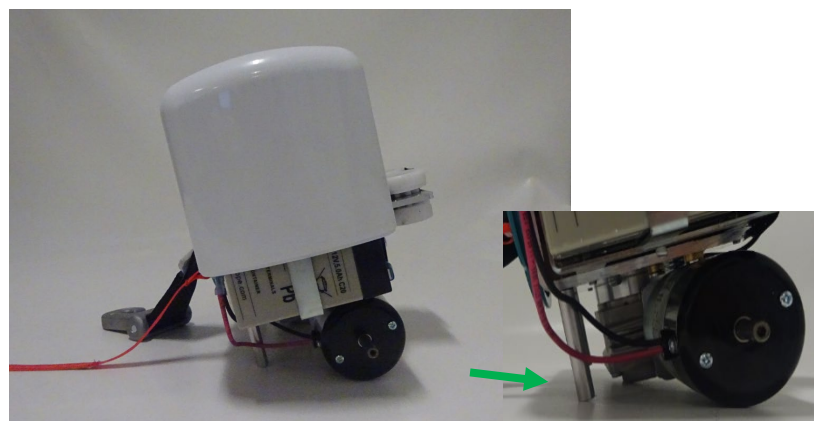
Step 2 – Use a slotted screwdriver to remove the two brass screws. (Arrowed)



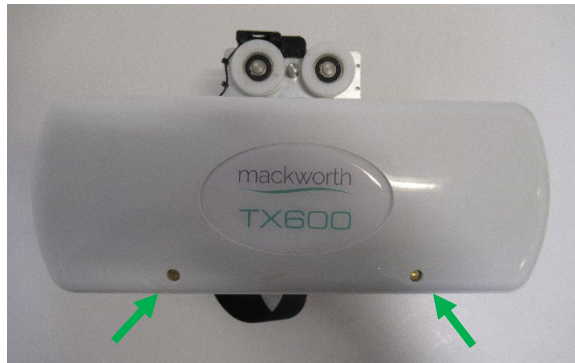
Step 3 – Gently remove the cover away from the Hoist.



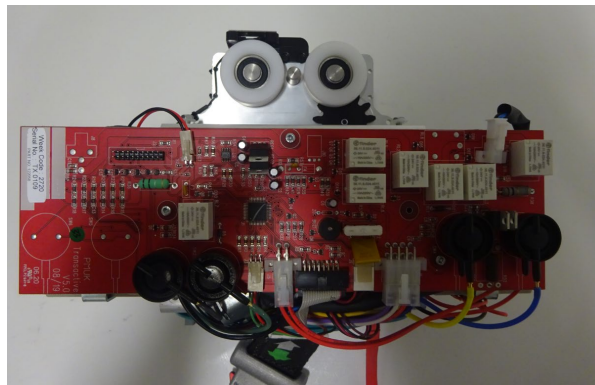
Step 4 – Rotate the Hoist 180 degrees and gently position the Hoist in the below orientation. **Be careful positioning the Hoist on the Lift Motor.**



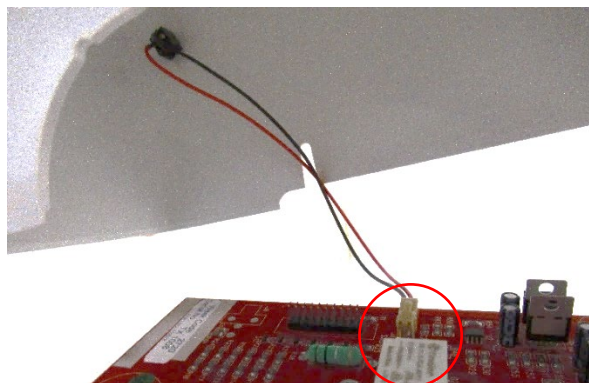
Step 5 - Using a slotted screwdriver remove the two brass screws from the second cover. (Arrowed)



Step 6 – Gently remove the cover away from the Hoist.



Step 7 – **(Quick Release Trolley System Hoists only)** – While removing the Cover, ensure to disconnect the charging lead from the PCB.



## Refitting / Replacement

Step 8 – Refitting is a reversal of the removal process noting the following points:

- A) Make sure the profile edge marries up with the bottom cover.
- B) Ensure the slots on the top side of the cover align with pozi screws.
- C) Ensure you fit the brass screws first on both covers prior to tightening the four pozi screws.

## 9.2 PCB

This section will instruct the correct procedure on how to remove and replace the PCB.

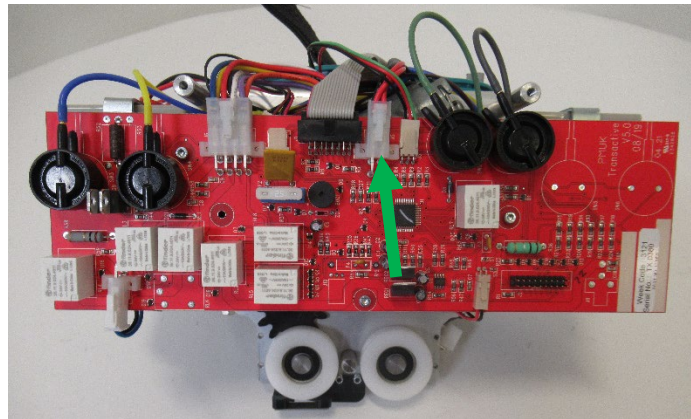
### 9.2.1 Powered Traverse PCB

This section will instruct the correct procedure on how to remove and replace the Powered Traverse PCB, this procedure can also be used as guidance when servicing a Manual Traverse PCB. See section 9.2.2 instructions on removing a Powered Auxiliary Hoist PCB.

#### Removal

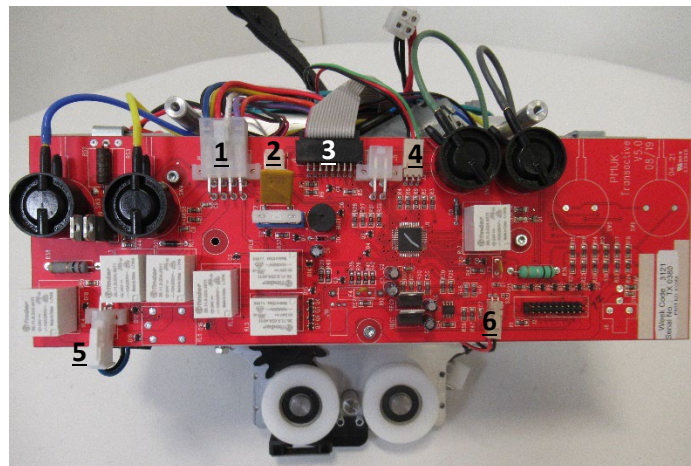
Step 1 – Remove external covers of the Hoist. (Refer to section 9.1)

Step 2 - Remove the Power supply cable, by pressing down on the latch and then pull perpendicularly away from the PCB. (Arrowed)



Step 3 – Remove the remaining connectors in the numerical order labelled below.

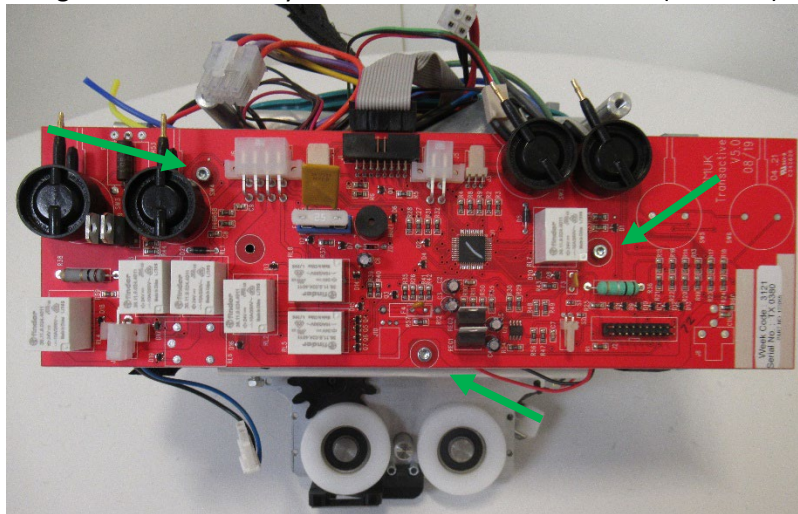
1. Toggle switch
2. Limit switch
3. LCD/Display
4. LED
5. Traverse Motor
6. Charging Beak





Step 4 – Remove the coloured air tubes (Grey and Green) by gently pulling on the air tubes individually until they release from their individual air switches on the PCB.

Step 5 – Using a 2.5mm Allen key remove the three M3 screws. (arrowed)



Step 6 – Remove the PCB from the Hoist.

### Refitting / Replacement

Step 7 - Refitting is a reversal of the removal process noting the following points:

- A) Make sure the power cable is connected last.
- B) Air tubes to be fully pushed onto air switches.
- C) Check for any holes within the air lines.

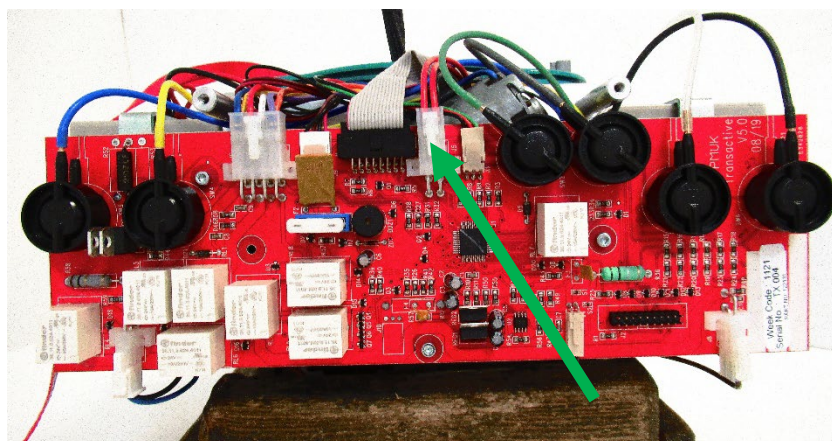
### 9.2.2 Powered Auxiliary PCB

This section will instruct the correct procedure on how to remove and replace the Powered Auxiliary PCB.

#### Removal

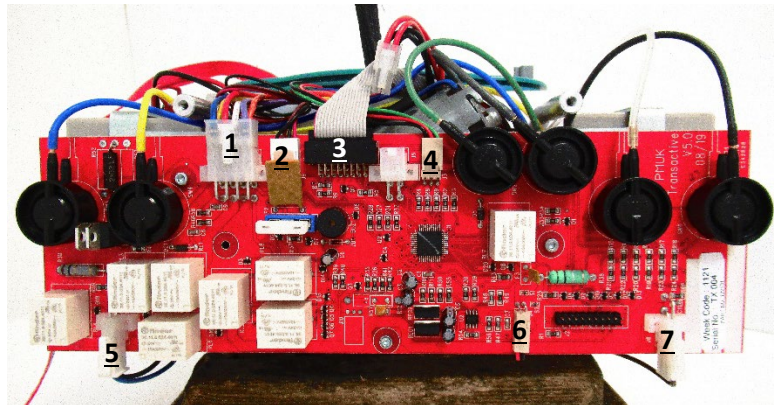
Step 1 – Remove external covers of the Hoist. (Refer to section 9.1)

Step 2 - Remove the Power supply cable, by pressing down on the latch and then pull perpendicularly away from the PCB. (Arrowed)



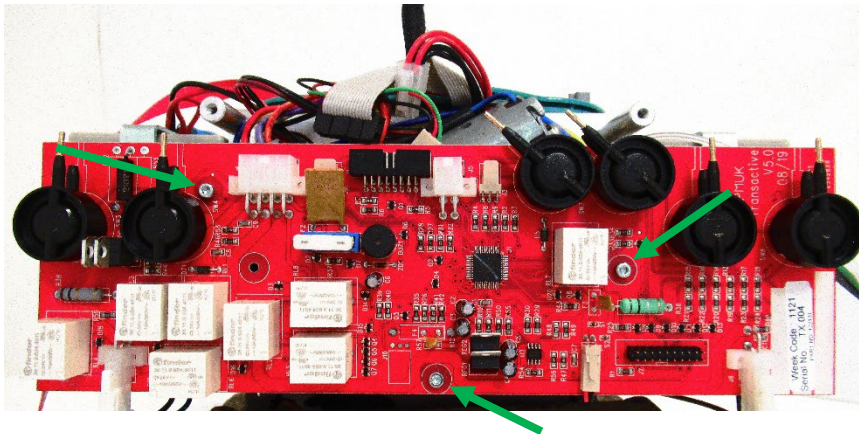
Step 3 – Remove the remaining connectors in the numerical order labelled below.

1. Toggle switch
2. Limit switch
3. LCD/Display
4. LED
5. Traverse Motor
6. Charging Beak
7. Communications Port



Step 4 – Remove the coloured air tubes (Grey, Green, Yellow, Blue, White and Black) by gently pulling on the air tubes individually until they release from their individual air switches on the PCB.

Step 5 – Using a 2.5mm Allen key remove the three M3 screws. (Arrowed)



Step 6 – Remove the PCB from the Hoist.

### Refitting / Replacement

Step 7 - Refitting is a reversal of the removal process noting the following points:

- D) Make sure the power cable is connected last.
- E) Air tubes to be fully pushed onto air switches.
- F) Check for any holes within the air lines.

### 9.3 Batteries

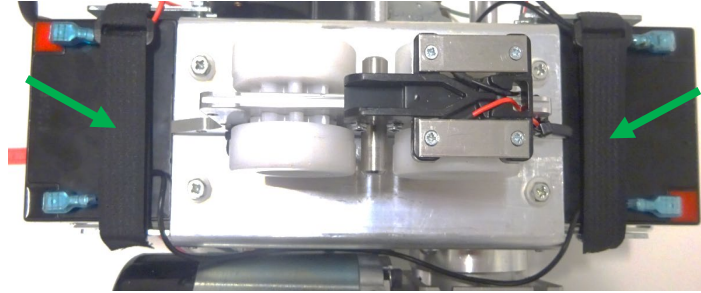
This section will instruct the correct procedure on how to remove and replace the Batteries.

#### Removal

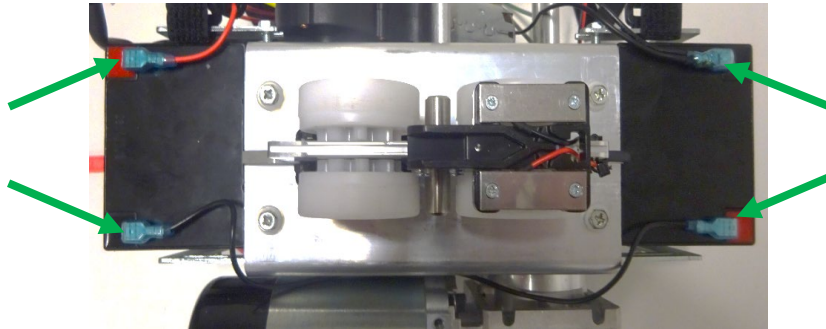
Step 1 – Remove external covers of the Hoist. (refer to section 9.1)

Step 2 - Disconnect the power lead from PCB. (See section 9.2 PCB for reference)

Step 3 – Release the Velcro straps (arrowed) to give access to the Batteries.



Step 4 – Detach the power cables from the battery terminal. (Arrowed)

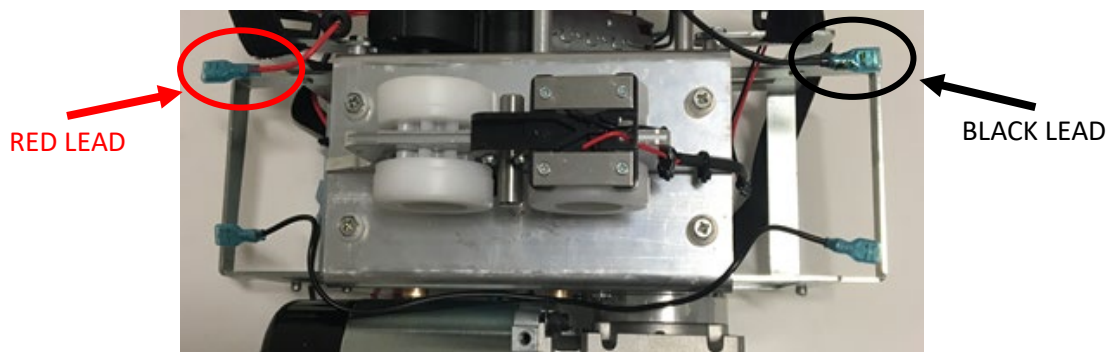


Step 5 – Remove both batteries from their brackets.

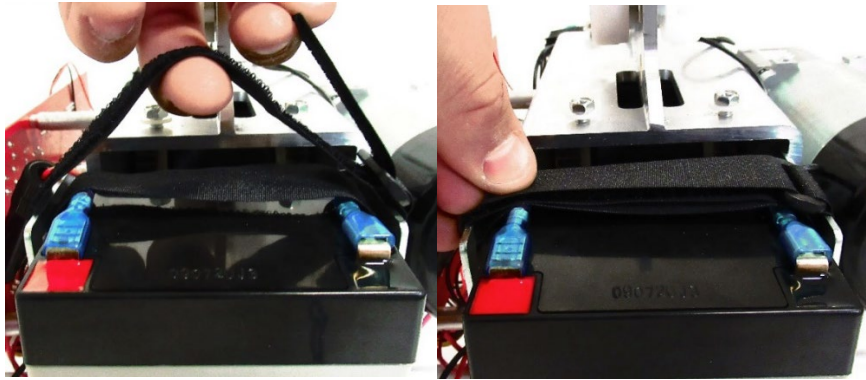
#### Refitting / Replacement

Step 6 - Refitting is a reversal of the removal process noting the following points:

- A) Make sure the battery terminal are on the outer edge and the terminals are pointing inwards.
- B) Ensure the positive lead (Red) goes to the correct side of the Hoist (Circled) and the negative lead (Black) goes to the correct side of the Hoist (Circled).



C) Ensure Velcro is installed in the below fashion.



## 9.4 Traverse Motor - Powered Traverse Hoist Only

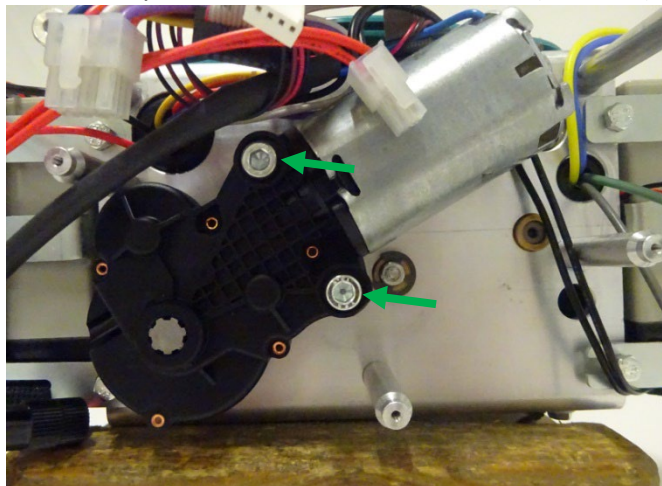
In this section it will explain the correct procedure on removing and reinstalling the Traverse Motor for servicing procedures or replacement.

### Removal

Step 1 – Remove external covers of the Hoist (refer to section 9.1)

Step 2 – Remove the PCB from the hoist (refer to section 9.2)

Step 3 – Using a 5mm Allen key remove the two M6 x 40 bolts. (arrowed)



Step 4 – Slide the motor off the traverse shaft by pulling the Motor away from the Chassis

### Refitting / Replacement

Step 5 - Refitting is a reversal of the removal process noting the following point:

- A) Ensure the Traverse Motor is attached in the correct orientation, allowing the motor to align with the motor mounts.

## 9.5 Lift Motor

This section will instruct the correct procedure on how to remove and replace the Lift Motor.

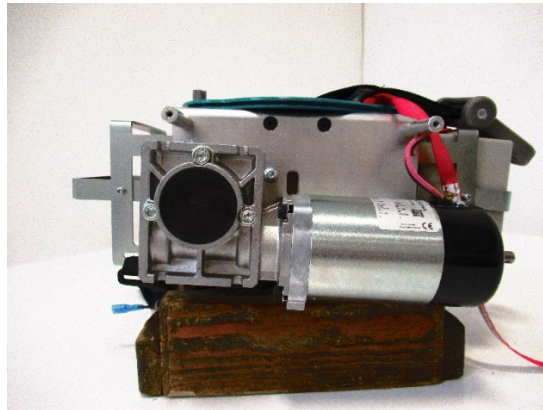
### Removal

Step 1 – Remove external covers of the Hoist. (refer to section 9.1)

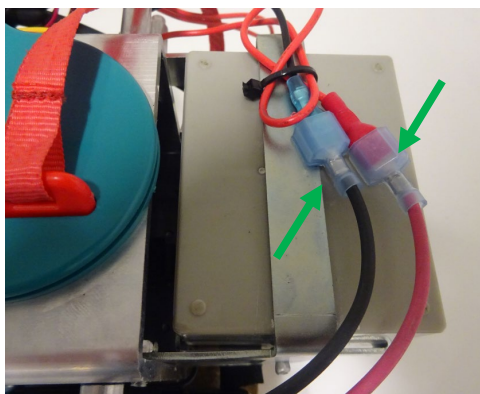
Step 2 - Disconnect the power lead from PCB. (further information refer to section 9.2)

Step 3 – Remove one battery (shown in image below) following section 9.3.

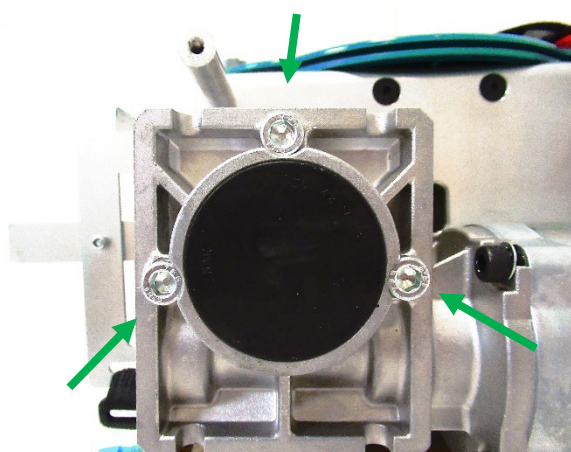
Step 4 – Position the Hoist in the below orientation, the use of the Service Stand is recommended.



Step 5 – Disconnect the positive and negative leads to the motor. (Arrowed)



Step 6 – Use 5mm Allen key to remove the three bolts. (arrowed)

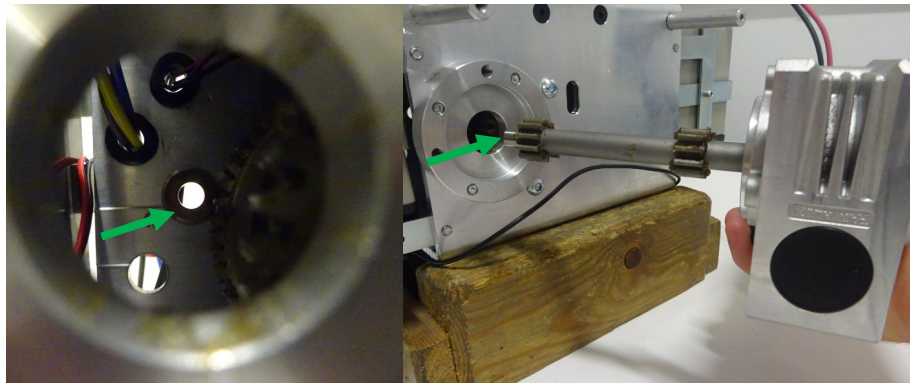


Step 7- Remove the Motor, by pulling away from the chassis.  
**CAUTION! Motor might be hot.**

### Refitting / Replacement

Step 8- Refitting is a reversal of the removal process noting the following point:

- A) Ensure the motor aligns with the motor mount tapped holes.
- B) Ensure the motor gear shaft lines up with the Oilite bush



## 9.6 QRS Hook

This section will instruct the correct procedure on how to remove and replace the QRS Hook.

### Removal

Step 1 – Using a 2mm Allen key unscrew the grub screw (arrow) until it releases its hold on the Pin.

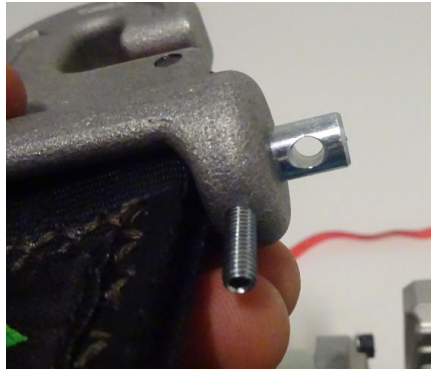


Step 2 – Slide the pin out of the hook to release the lift tape.

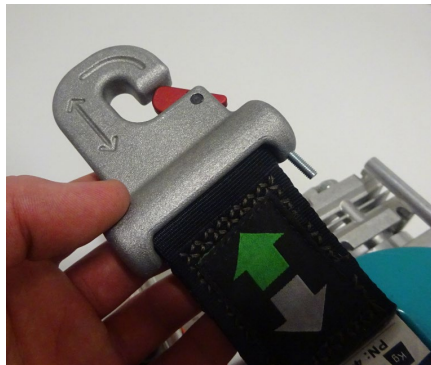
### Refitting / Replacement

Step 3 - Refitting is a reversal of the removal process noting the following point:

- A) Make sure the hole in the QRS pin lines up with the grub screw



B) Ensure the hook is attached to the lift tape in the below orientation.



## 9.7 Bottom Cover

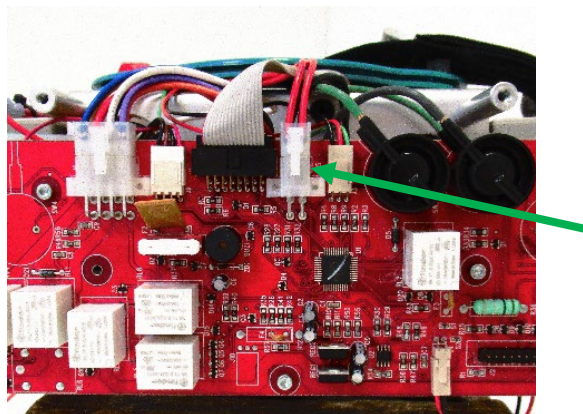
This section will instruct the correct procedure on how to remove and replace the Bottom Cover.

### Removal

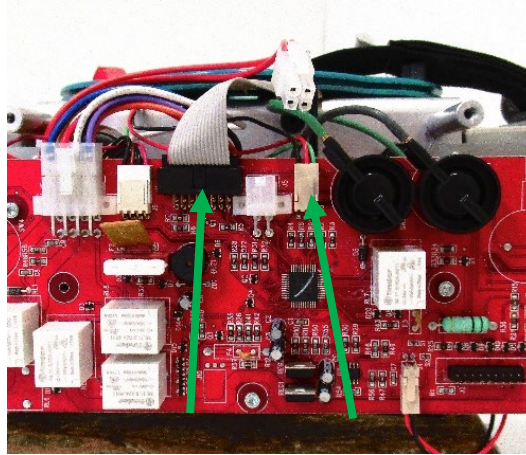
Step 1 - Remove external covers of the Hoist. (refer to section 9.1)

Step 2 – Remove QRS Hook. (refer to section 9.6)

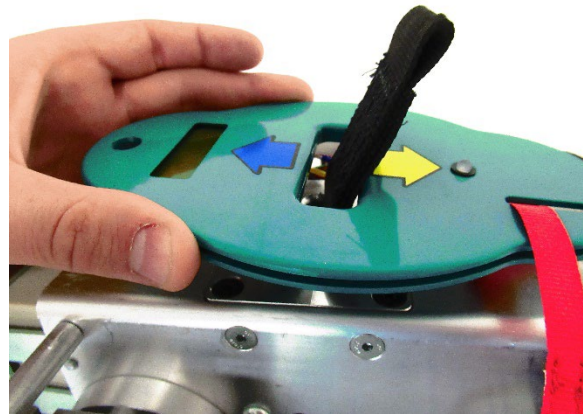
Step 3 – Disconnect the power cable from the PCB.



Step 4 – Disconnect the display and LED cable from the PCB. (Arrowed)



Step 5 - Gently pull the bottom cover away from the chassis and feed the Lift Tape through to detach it from the unit.



### **Refitting / Replacement**

Step 6 - Refitting is a reversal of the removal process noting the following point:

- A) Make sure the lift tape is fed through the slot in the correct direction
- B) Ensure the E-lower cord is pulled through its designated slot.
- C) Ensure the air grommet lines up with the hole.



## 9.8 Limit Switch

This section will instruct the correct procedure on how to remove and replace the Limit Switch Block.

### **Removal**

Step 1 - Remove external covers off the Hoist. (refer to section 9.1)

Step 2 – Remove the PCB from the Hoist. (refer to section 9.2)

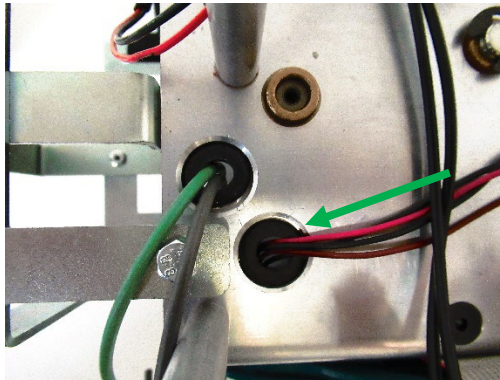
Step 3 – Remove the Battery from the battery brackets. (refer to section (9.3)

Step 4 – Remove the Lift Motor. (Refer to section 9.5)

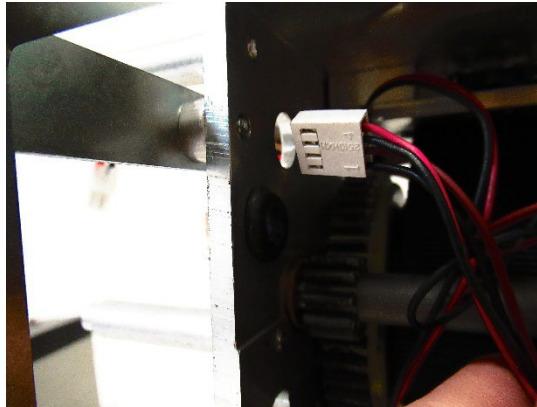
Step 5 – Remove Lift Tape. (Refer to section 9.10)

Step 6 – Remove Bottom Cover. (Refer to section 9.7)

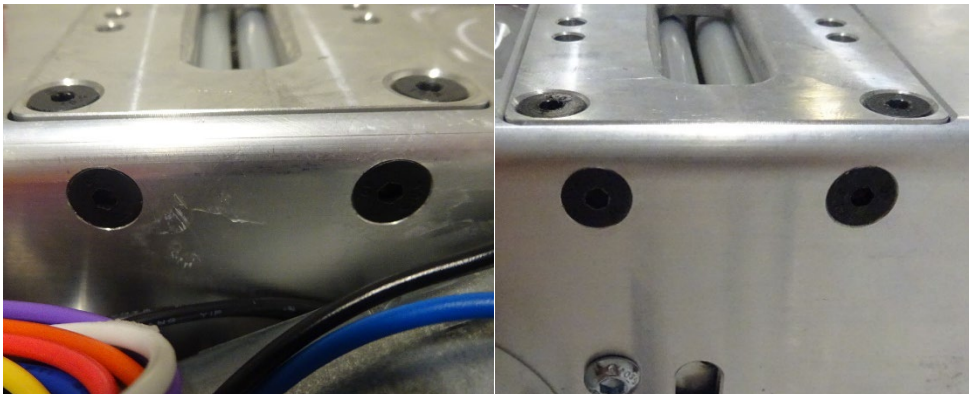
Step 7 – Using a slotted screw driver, prise the grommet (arrowed) from the chassis.



Step 8 – Guide the Limit Switch Wires and Connector into the Chassis.

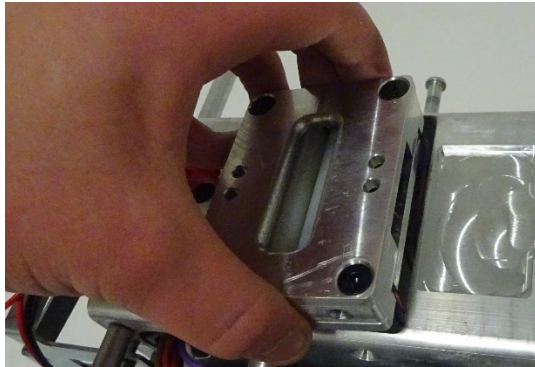


Step 9 – Use a 3mm Allen Key to remove the four Screws securing the Limit Switch Block.



Step 10 – Once all four screws have been removed, slide your hand inside the Hoist and push the limit switch block upwards.

**Ensure not to trap the wires while removing the Limit Switch Block.**



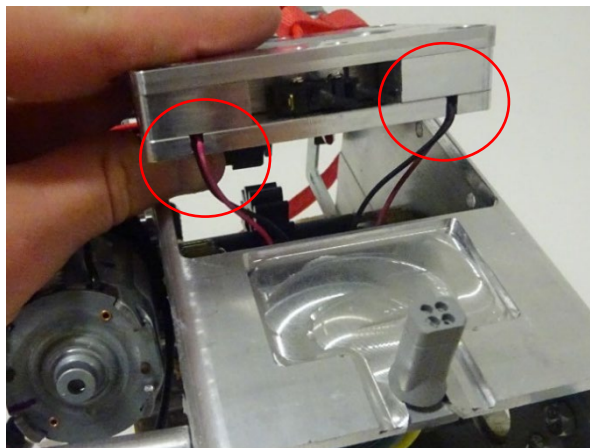
Step 11 – While guiding the limit switch block out of the chassis, carefully guide the wiring loom out with the unit.

### **Refitting / Replacement**

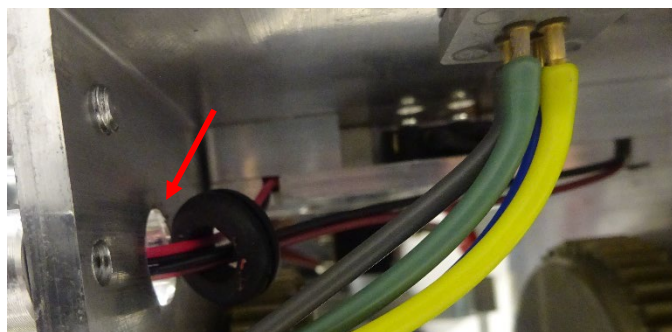
Step 12 - Refitting is a reversal of the removal process noting the following point:

A) When placing the Limit switch up to the chassis make sure the orientation is correct

**Risk of trapping wires highlight by red circle.**



B) After rerouting the wires make sure you pull the wiring back through the hole to reduce the slack inside the chassis, and refit the grommet.



## 9.9 Hub

This section will instruct the correct procedure on how to remove and replace the Hub.

### **Removal**

Step 1 - Remove external covers off the Hoist. (refer to section 9.1)

Step 2 – Remove the PCB from the Hoist. (refer to section 9.2)

Step 3 – Remove the Battery from the battery brackets. (refer to section (9.3)

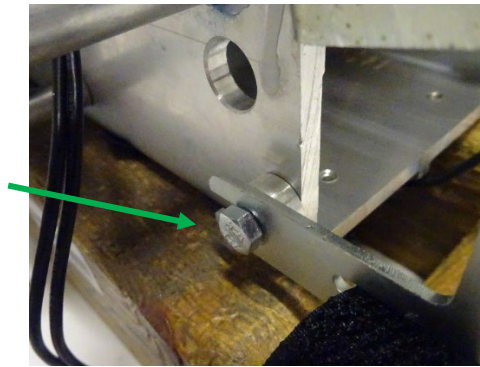
Step 4 – Remove Lift Motor. (Refer to section 9.5)

Step 5 - Remove Bottom Cover. (Refer to section 9.7)

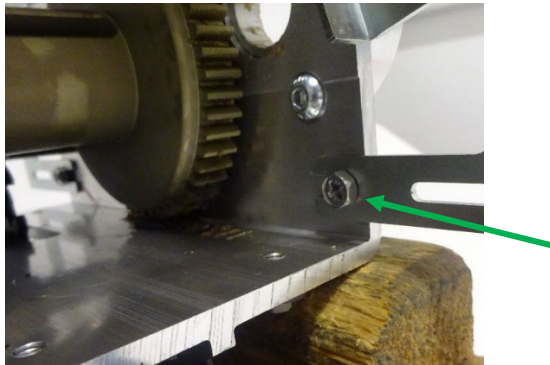
Step 6 - Remove Lift Tape. (Refer to section 9.10)

Step 7 – Remove Air Tube Grommet (refer to section 9.15)

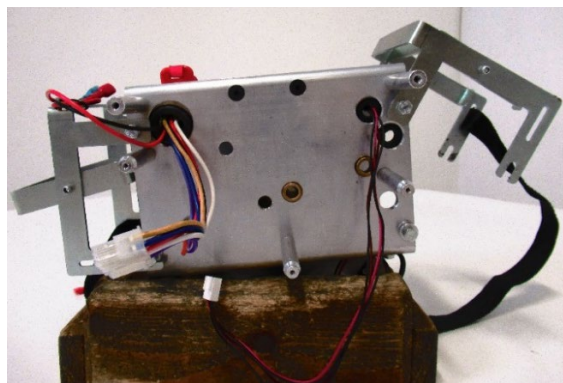
Step 8 – Using an 8mm spanner, loosen the M5 x 12 screw (arrowed) – The screw is not required to be removed. (This is the Battery Bracket beside the Air Grommet)



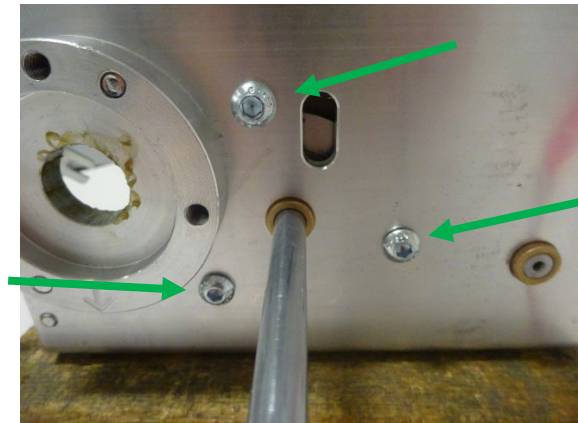
Step 9 – Using an 8mm spanner or a Pozi screw driver remove the M5 x 8 screw (arrowed) from the chassis.



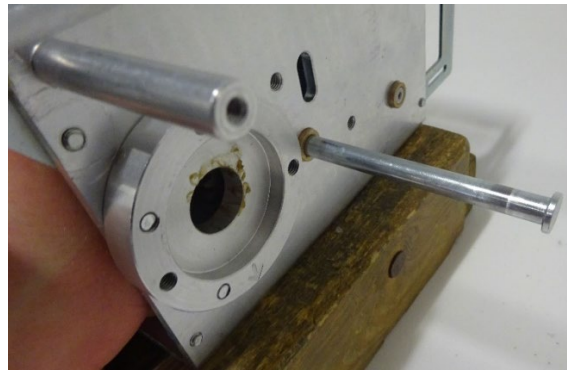
Step 10 - Pivot the battery bracket to its maximum height.



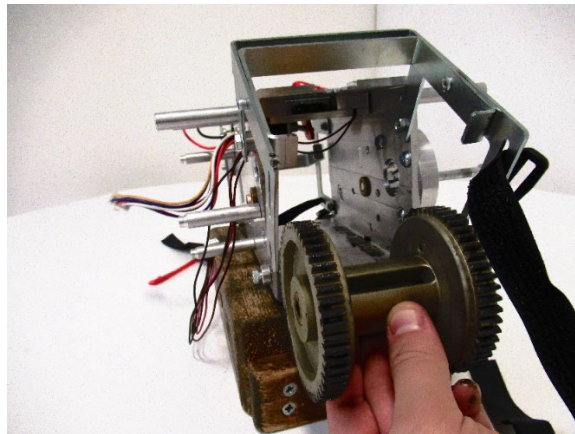
Step 11 – Using a 4mm Ball point Allen Key, remove the three M6 x 16 over speed screws.



Step 12 – Support the Hub with your hand, while removing the strap pin.



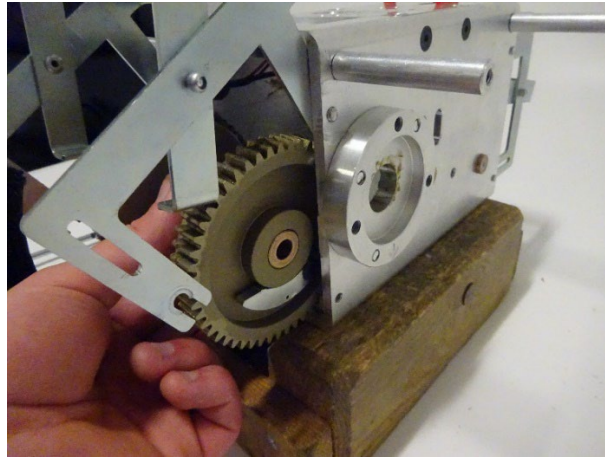
Step 13 – Slowly guide the Hub out of the chassis. (As shown below)



### Refitting / Replacement

Step 14 - Refitting is a reversal of the removal process noting the following point:

- A) If replacing Hub, grease with Morris Grease – K42EP multi-purpose.
- B) When inserting the Hub back into the Chassis make sure the orientation is correct.  
The Over-Speed Cam must face the Lift Motor side of Chassis.

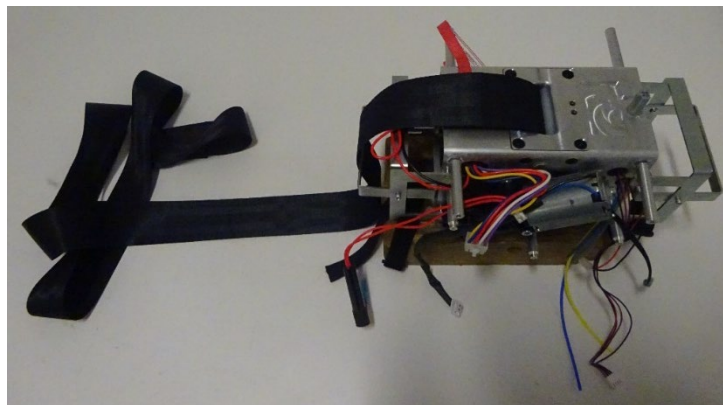


## 9.10 Lift Tape

This section will instruct the correct procedure on how to remove and replace the Lift Tape.

### **Removal**

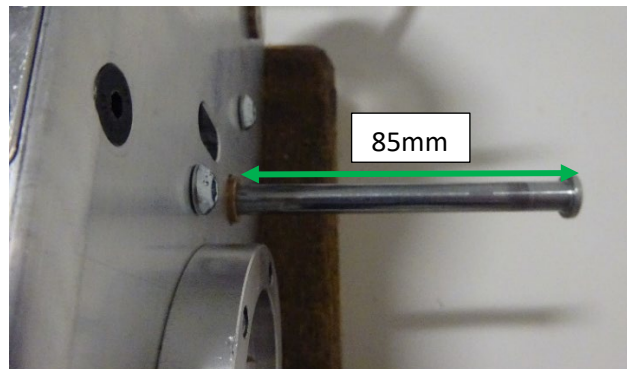
- Step 1 - Remove external covers from the Hoist. (refer to section 9.1)
- Step 2 – Remove the PCB from the Hoist. (refer to section 9.2)
- Step 3 – Remove the Battery from the battery brackets. (refer to section (9.3)
- Step 4 – Remove QRS Hook. (Refer to section 9.6)
- Step 5 – Remove Bottom Cover from Hoist. (Refer to section 9.7)
- Step 6 – Remove Lift Motor from Hoist. (Refer to section 9.5)
- Step 7 – Pull the lift tape until it have fully unwound from the Hub.



Step 8 - Using a small slotted screwdriver remove the 8mm E-clip from the Strap pin.



Step 9 – Slide the Strap Pin from the Chassis out until 85mm of Pin is showing. This will release the Lift Tape while securing the Hub.



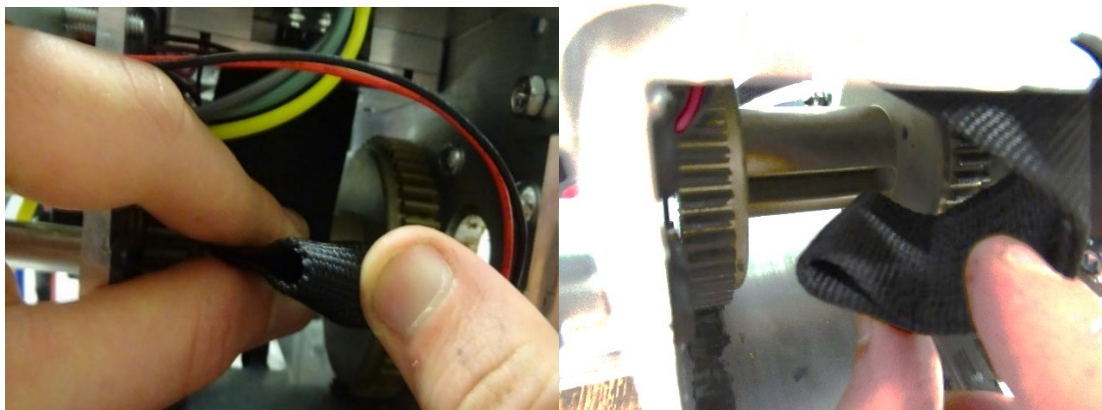
Step 10 - Gently pull the Lift Tape through the Limit Switch Block to release from the Hoist.



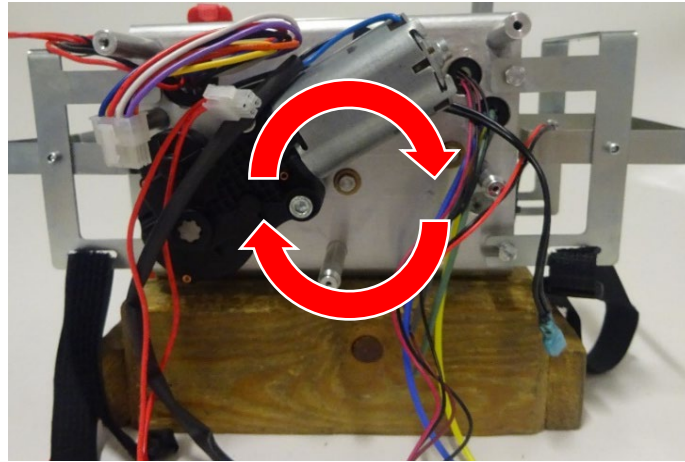
### **Refitting / Replacement**

Step 11 - Refitting is a reversal of the removal process noting the following point:

- A) When reinserting the lift tape through the limit switch block make sure that the fold over lip is facing the Red E-lower Cord, resulting in the arrow label at the other end also facing the E-lower Cord.
- B) Before inserting the Lift Tape into the Hub, use your thumb to open the loop, this is to help the strap pin slide through once located in the Hub.



- C) When winding the lift tape back around the hub make sure to rotate the hub in a clockwise direction while looking at the Hoist in the direction shown in the image below.



- D) Use long nose pliers to reattach the 8mm E-Clip to the end of the strap pin.

## 9.11 Wheels

This section will explain the correct procedure on removing and reinstalling all wheel variants used with the Ceiling Track Hoist

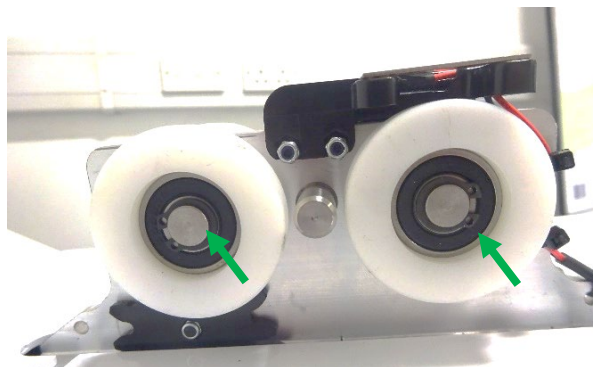
### 9.11.1 Wheels (excluding QRT Variants)

Within this section it will explain the correct procedure on removing and reinstalling all wheel variants of the Hoist (excluding the QRT System Hoist), this section will include Track Type 1, 2,3,4,5. See Section 1 for guidance on the track type profiles.

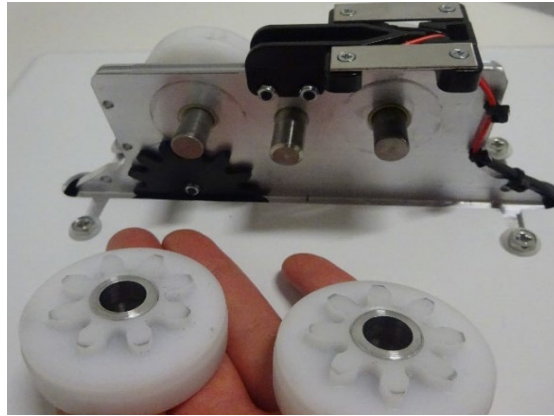
**The images below refer to the Standard Wheel (Track Type 1), but the same procedure will apply to all the Wheel variants.**

#### Removal

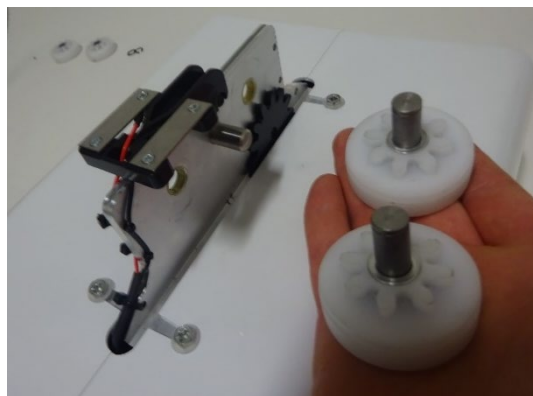
Step 1 – Using circlip pliers, remove the circlips from both wheels. (arrowed)



Step 2 – Remove the two Wheels from the Hoist as shown – Ensure the Spacers are situated within the Wheels.



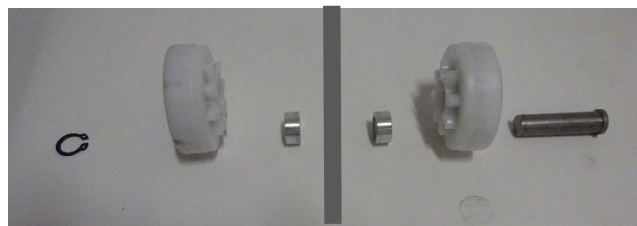
Step 3 – From the front face of the Hoist, remove the Axel along with the other Wheels as shown.



**Refitting / Replacement**

Step 4 - Refitting is a reversal of the removal process noting the following points:

- A) If replacing with brand new wheels, the below image is an exploded diagram of how the Wheels are fitted together along the axel. The Grey line indicates the Chassis Wall.



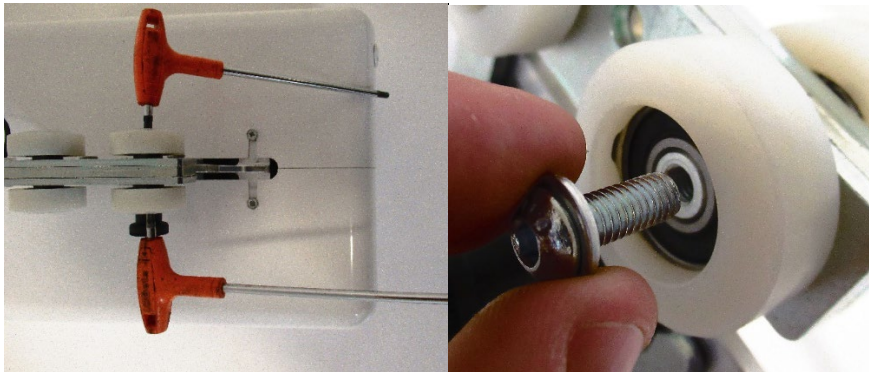


## 9.11.2 QRT System Wheels

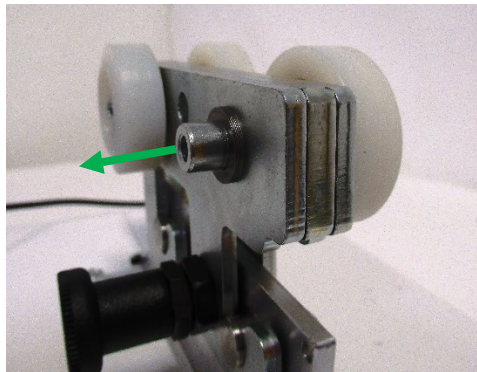
Within this section it will explain the correct procedure on removing and reinstalling all wheel variants of the QRT System Hoists, this section will include Track Type 1, 3, 4 and 5. See Section 1 for guidance on the track type profiles.

### **Removal**

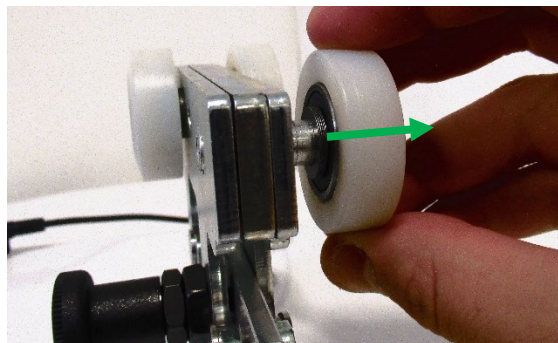
Step 1 – Using two 4mm Allen Keys, remove the one screw along with its washer from the Wheel Axel.



Step 2 – Remove the Wheel and seven washers from the axel.



Step 3 – Remove the Axel along with the second wheel and seven washers from the Trolley.



Step 4 – Repeat steps 1-3 for the second pair of wheels to complete wheel removal.

### **Refitting / Replacement**

Step 5 - Refitting is a reversal of the removal process.

## 9.12 Charging Beak

Within this section it will explain the correct procedure on removing and reinstalling all Charging Dock variants, Including Track Type 1, 2,3,4,5. See section 1 for guidance on the track type profiles.

### 9.12.1 Charging Beak - Standard (Track Type 1)

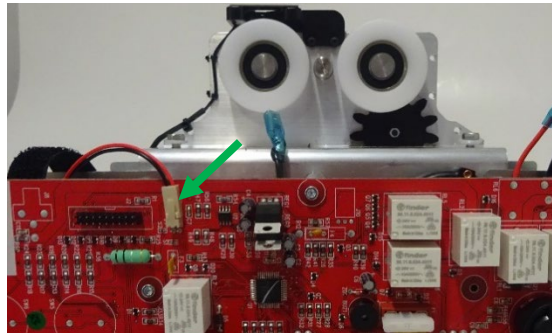
Within this section it will explain the correct procedure on removing and reinstalling the Charging Beak for servicing procedures or replacement.

#### **Removal**

Step 1 - Remove external covers off the Hoist. (refer to section 9.1)

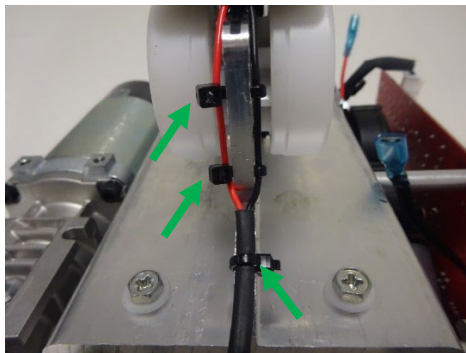
Step 2 – Remove the Battery from the battery brackets. (refer to section (9.3))

Step 3 – Disconnect the Charging Beak from the PCB.

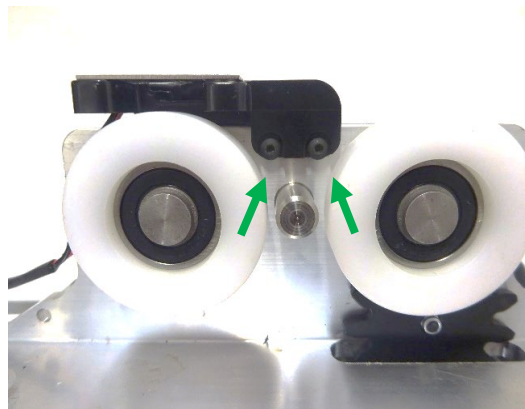


Step 4 – Reroute the Wire from under the Battery Bracket.

Step 5 – Cut all three Cable Tie's that secure the wire to the Chassis.



Step 6 – Using a 2mm Allen Key, Remove the M3x12 Screws and M3 Nyloc Nuts to release the Charging Beak.

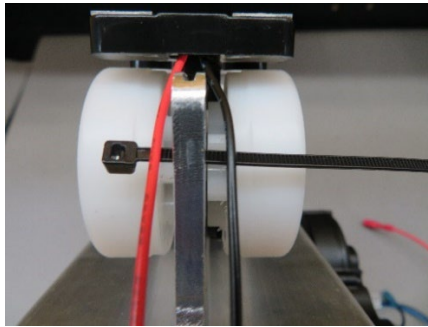


## **Refitting / Replacement**

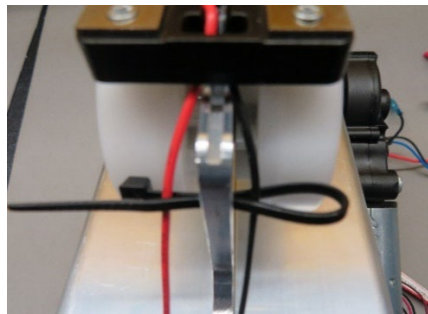
Step 7 - Refitting is a reversal of the removal process noting the following point:

**Three cable ties are required!** – Re-secure the Wire with cable ties as instructed below:

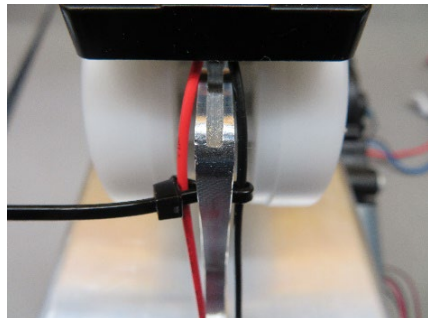
A1) Insert the cable tie (100mm x 2.5mm) through the top hole in the Chassis plate and along the back of the red and black wires.



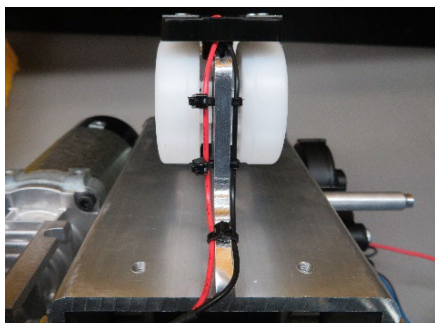
A2) Fold the cable tie around the Black wire and pass the cable tie back through the hole and over the Red wire.



A3) Tie the cable tie retaining the Black wire and Red wire.



A4) Repeat this process for the second cable tie. For the bottom hole a cable tie 100mm x 2.5mm can be passed through the hole then around the Black and Red wires and tied off. Finally, snip of the surplus cable once secured.



## 9.12.2 Charging Beak - Track Type 2, 3, 4, 5 and Powered Auxiliary

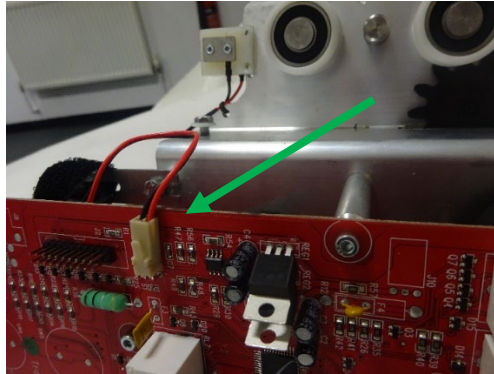
Within this section it will explain the correct procedure on removing and reinstalling the Charging Beak for servicing procedures or replacement.

### **Removal**

Step 1 - Remove external covers off the Hoist. (refer to section 9.1)

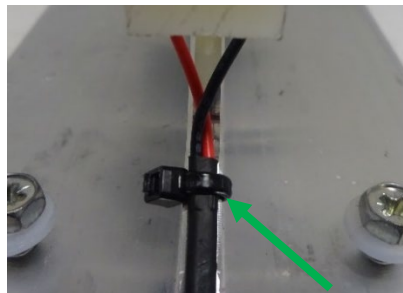
Step 2 – Remove the Battery from the battery brackets. (Refer to section (9.3))

Step 3 – Disconnect the Charging Beak from the PCB.

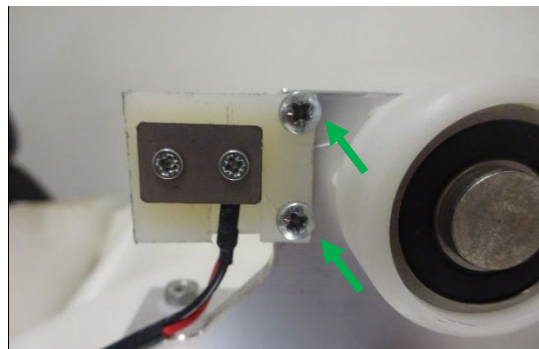


Step 4 – Reroute the Wire from under the Battery Bracket.

Step 5 – Cut the cable tie that secure the wire to the Chassis.



Step 6 – Using a Pozi Screwdriver, remove the screws to release the Charging Beak.



### **Refitting / Replacement**

Step 7 - Refitting is a reversal of the removal process noting the following point:

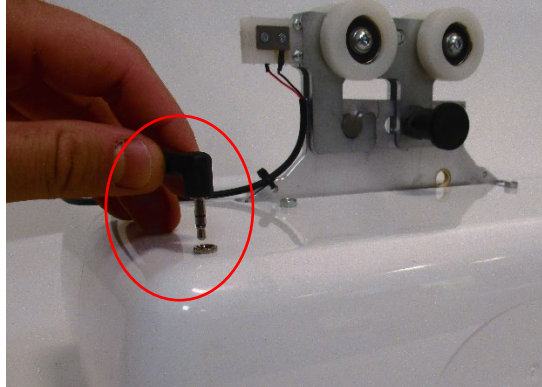
**A) One cable tie is required!** – Re-secure the Wire with cable tie as instructed below:  
Pass through the cable tie (100x2.5mm) through the hole and tie to secure the wire to the chassis. Snip the surplus cable once secured.

## 9.12.3 QRT System Charging Beak

Within this section it will explain the correct procedure on removing and reinstalling the QRT Systems Charging Beak for servicing procedures or replacement.

### Removal

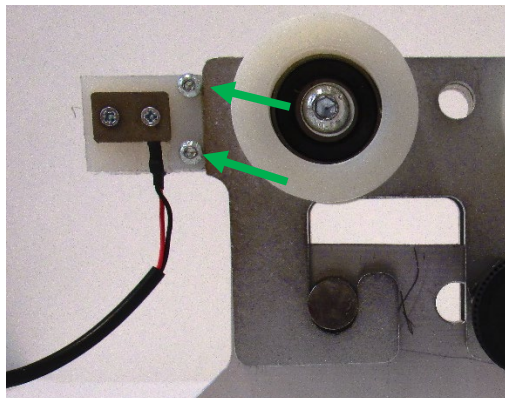
Step 1 – Disconnect the Charging Beak from the external cover plug in.



Step 2 – Cut the cable tie that secure the wire to the Chassis.



Step 3 – Using a Pozi Screwdriver, remove the screws to release the Charging Beak.



### Refitting / Replacement

Step 4 - Refitting is a reversal of the removal process noting the following point:

**A) One cable tie is required!** – Re-secure the Wire with cable tie as instructed below:  
Pass through the cable tie (100x2.5mm) through the hole and tie to secure the wire to the chassis. Snip the surplus cable once secured.

### 9.12.4 Constant Charge

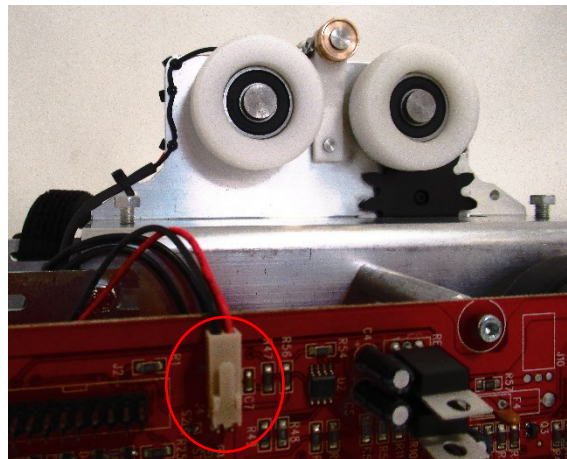
Within this section it will explain the correct procedure on removing and reinstalling the Constant Charge Charging Beak for servicing procedures or replacement.

#### **Removal**

Step 1 - Remove external covers off the Hoist. (Refer to section 9.1)

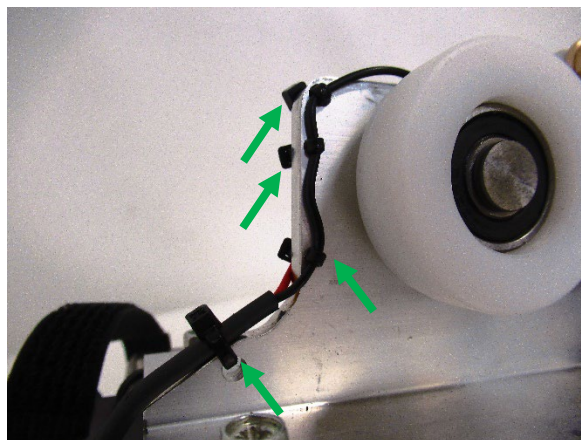
Step 2 – Remove the Battery from the battery brackets. (Refer to section (9.3))

Step 3 – Disconnect the Charging Beak from the PCB.

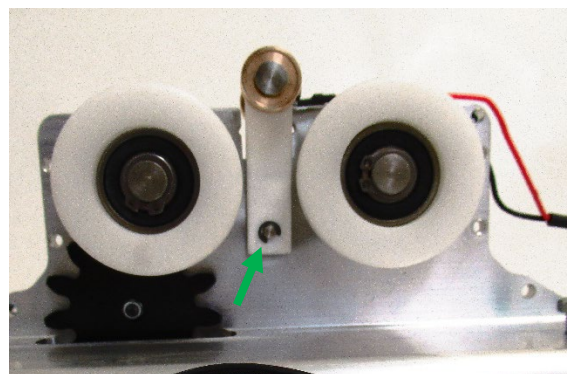


Step 4 – Reroute the Wire from under the Battery Bracket.

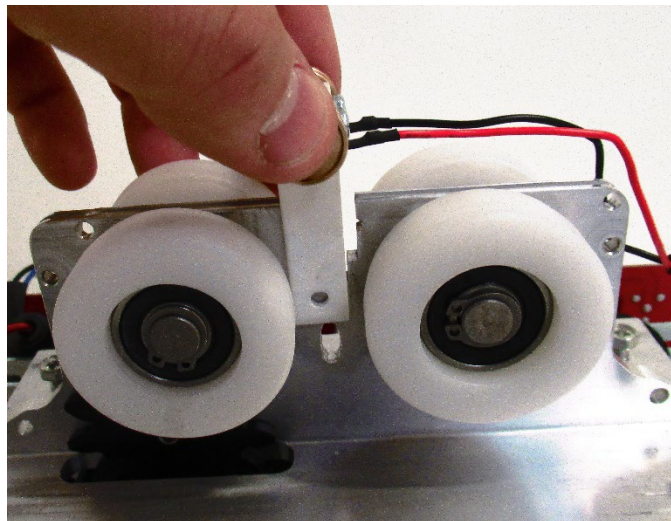
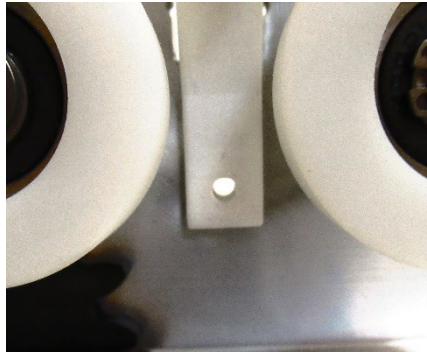
Step 5 – Cut all four Cable Tie's that secure the wire to the Chassis.



Step 6 – Using a 2mm Slotted Screwdriver, remove the E-Clip securing the Charging Port Pin.



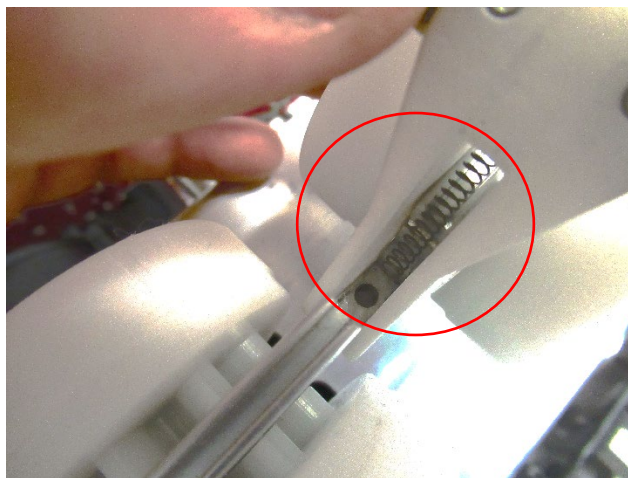
Step 7 – Remove the Pin and the Constant Charge Beak can be removed. Ensure not to lose the spring situated inside the beak.



**Refitting / Replacement**

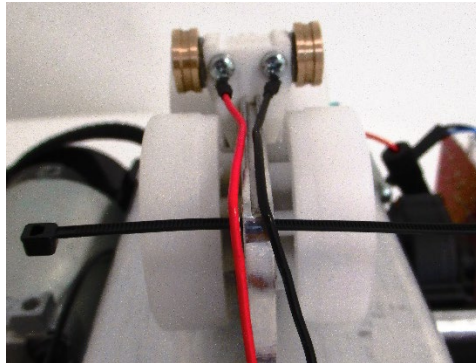
Step 7 - Refitting is a reversal of the removal process noting the following point:

- A) While sliding the Constant Charge Beak into its position, ensure to fit the spring into the hole shown on the top face of the Chassis, with the beak securing it in place. This allows the beak to move vertically when fitted.

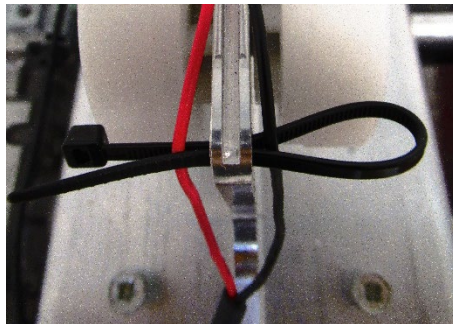


**Three cable ties are required!** – Re-secure the Wire with cable ties as instructed below:

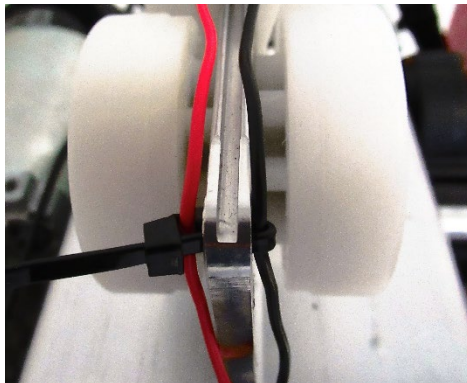
A1) Insert the cable tie (100mm x 2.5mm) through the top hole in the Chassis plate and along the back of the red and black wires.



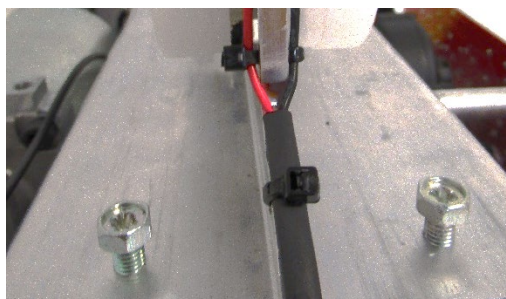
A2) Fold the cable tie around the Black wire and pass the cable tie back through the hole and over the Red wire.



A3) Tie the cable tie retaining the Black wire and Red wire.



A4) Repeat this process for the second and third cable tie. For the bottom hole a cable tie 100mm x 2.5mm can be passed through the hole then around the Black and Red wires and tied off. Finally, snip of the surplus cable once secured.





### 9.13 – Battery Lead Fuse

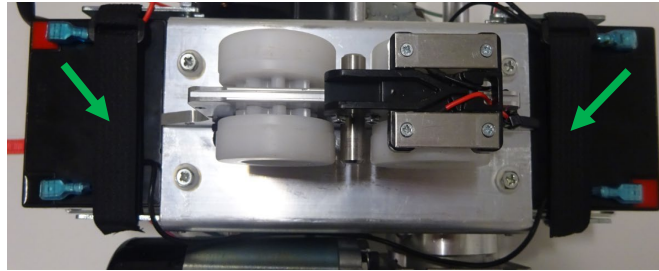
This section will instruct the correct procedure on how to remove and replace the Battery Lead Fuse.

#### **Removal**

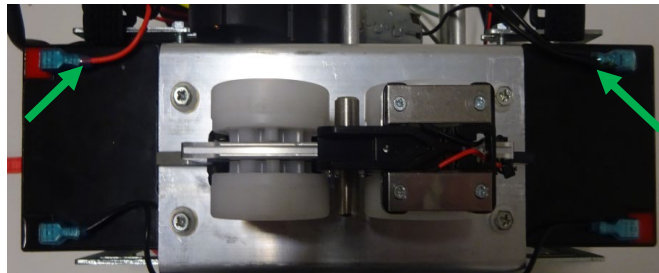
Step 1 - Remove external covers off the Hoist (refer to section 9.1)

Step 2- Disconnect the power lead from PCB.

Step 3 – Release the Velcro straps (arrowed) to give access to the batteries and power lead terminal.



Step 4 – Detach the power cable from the battery terminal (Arrowed). This is the lead with the fuse which is on the board side of the Hoist.



Step 5 – Remove the Main Power lead to access the Fuse.

Step 6 – Unscrew the Fuse Holder to access and remove the Fuse from the Power Lead.



#### **Refitting / Replacement**

Step 8 - Refitting is a reversal of the removal process noting the following points:

- A) Make sure the battery terminal are on the outer edge and the terminals are pointing inwards.
- B) Ensure the positive lead (Red) goes to the correct side of the Hoist (Arrowed) and the negative lead (Black) goes to the correct side of the Hoist (Arrowed).

## 9.14 Traverse Shaft and Idle Gear (Powered Models Only)

Within this section it will explain the correct procedure on removing and reinstalling the Traverse shaft and Idle Gear for servicing procedures or replacement.

### **Removal**

Step 1 - Remove external covers off the hoist (refer to section 9.1)

Step 2 – Remove the PCB from the hoist (refer to section 9.2)

Step 3 – Remove the Battery from the battery brackets (refer to section (9.3)

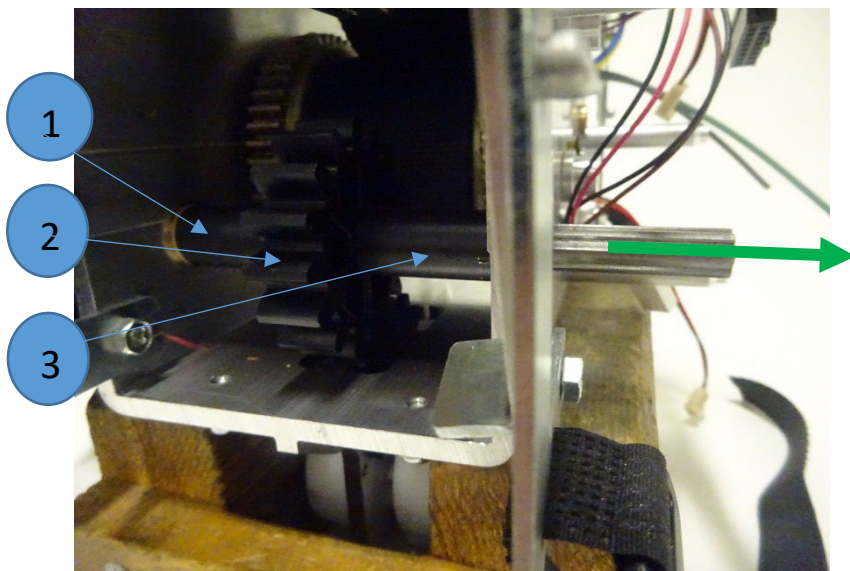
Step 4 – Remove the Traverse Motor from the hoist (refer to section (9.4)

Step 5 - Using a small slotted screwdriver remove the 8mm E-clip from the Traverse Shaft



Step 6 – Remove the washer from the Traverse Shaft

Step 7 – While supporting the two spacers and Idle Gear, labelled 1, 2 and 3 in the image below, slide the drive shaft out of the Chassis

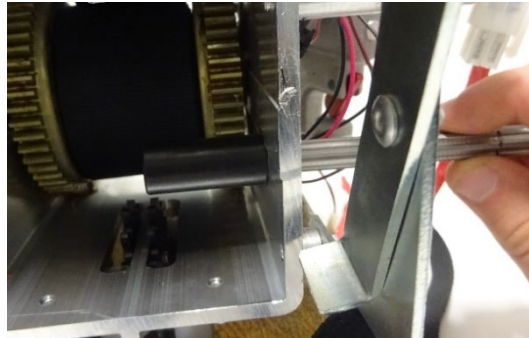


Step 8 – Remove the Spacers and Idle Gear from the Chassis.

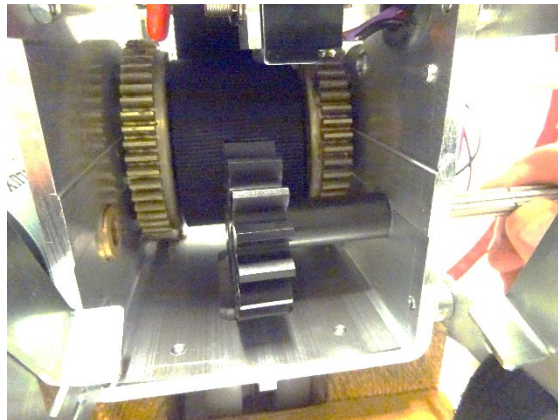
**Refitting / Replacement**

Step 9 - Refitting is a reversal of the removal process noting the following point:

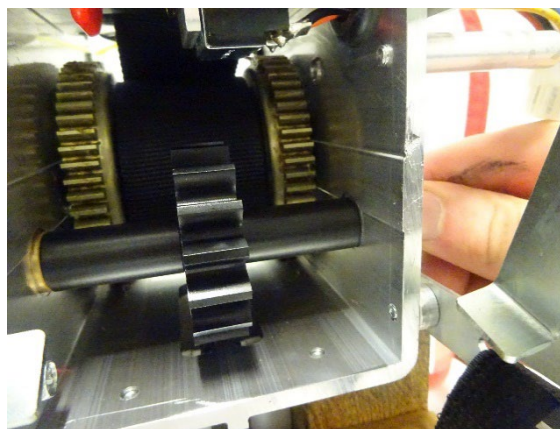
- A) While reinserting the Traverse Shaft, you must one by one, align the spacers and Idle Gear to allow the Traverse Shaft to pass through
- B) The LONGER Spacer (37.1mm – use Vernier calliper to measure) + (Number 3 in the image above) will be aligned first as shown.



- C) Then the Idle Gear must be fitted to the Traverse Shaft as shown



- D) Align the SHORTER Spacer (34.3mm), then slide the Traverse Shaft all the way through the Chassis and into the Bush in the opposite Chassis Wall



- E) Use long nose pliers to reattach the 8mm E-Clip onto the Traverse Shaft

## 9.15 Air Grommet

This section will instruct the correct procedure on how to remove and replace the Air Grommet.

### **Removal**

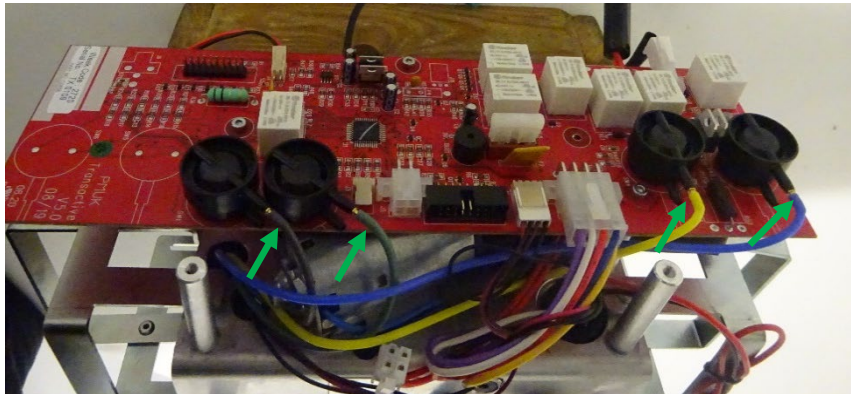
Step 1 - Remove external covers off the Hoist. (refer to section 9.1)

Step 2 – Remove the Battery from the battery brackets. (refer to section (9.3)

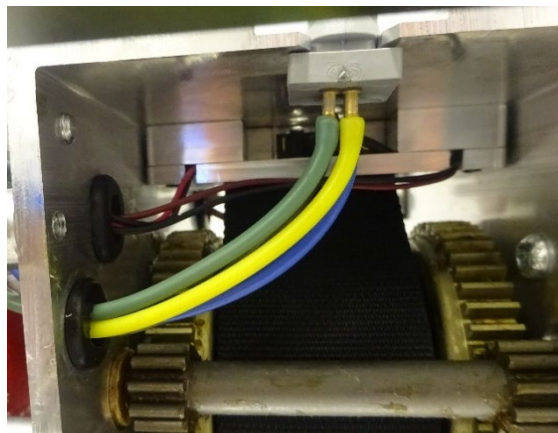
Step 3 – Remove QRS Hook. (Refer to section 9.6)

Step 4 – Remove Bottom cover from Hoist. (Refer to section 9.7)

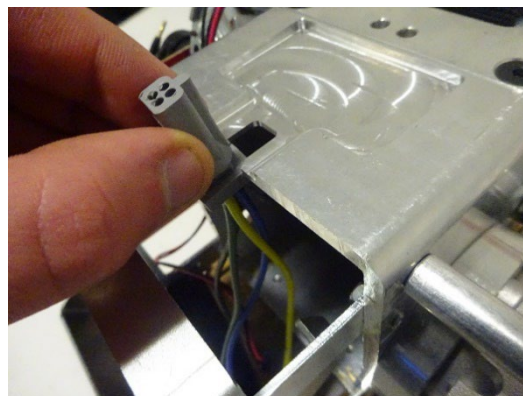
Step 5 - Remove the two Coloured Air Tubes from the Air Switches on the PCB.



Step 6 – Pull all four Air Tubes through the Black grommet in the Chassis Wall.



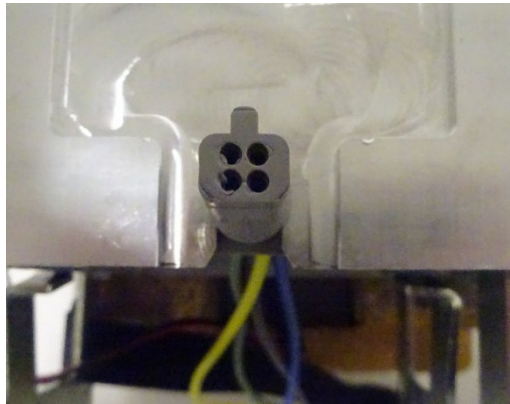
Step 7 – Simply slide the Air Grommet from its positioning and remove.



### **Refitting / Replacement**

Step 8 - Refitting is a reversal of the removal process noting the following point:

- A) Ensure that when repositioning the Air Grommet, it is in the correct orientation as shown below



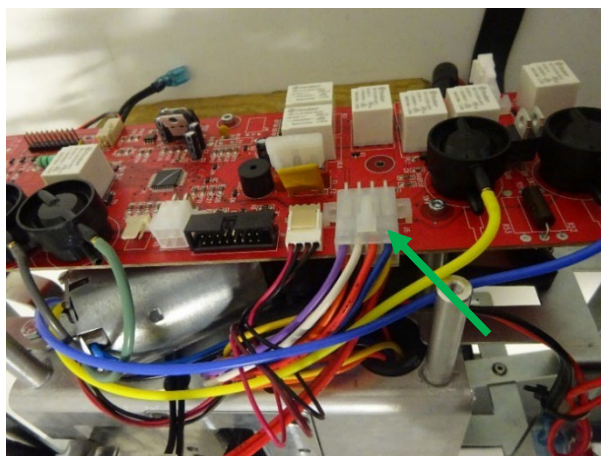
- B) Once the Air Tubes have been refitted, make sure to have pulled the tubes all the way through the Chassis. They should not be left slack inside the Chassis.

## 9.16 Toggle switch

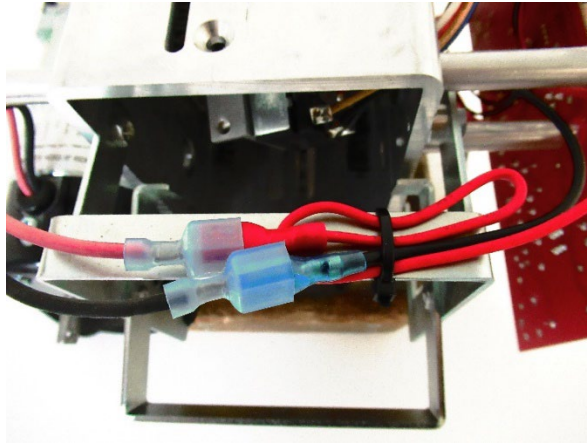
This section will instruct the correct procedure on how to remove and replace the Toggle Switch.

### **Removal**

- Step 1 - Remove external covers off the Hoist. (refer to section 9.1)
- Step 2 – Remove the Battery from the battery brackets. (refer to section (9.3)
- Step 3 – Remove QRS Hook. (Refer to section 9.6)
- Step 4 – Remove Bottom cover from Hoist. (Refer to section 9.7)
- Step 5 – Remove the E-Lower Cord. (Refer to section 9.17)
- Step 6 – Disconnect the Toggle Switch from the PCB.

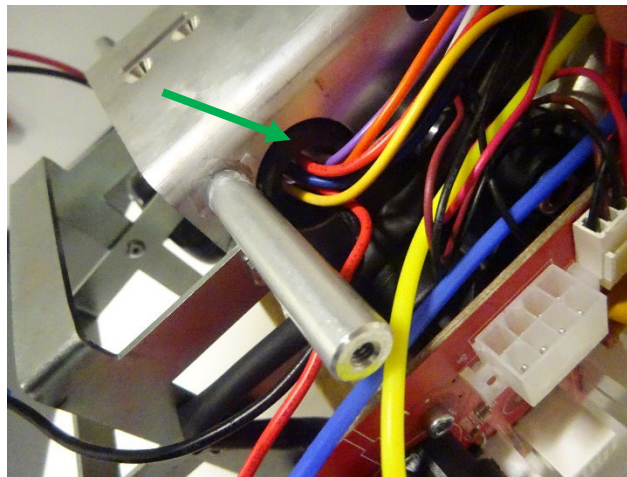


- Step 7 – Disconnect the Motor wires from the Toggle Switch

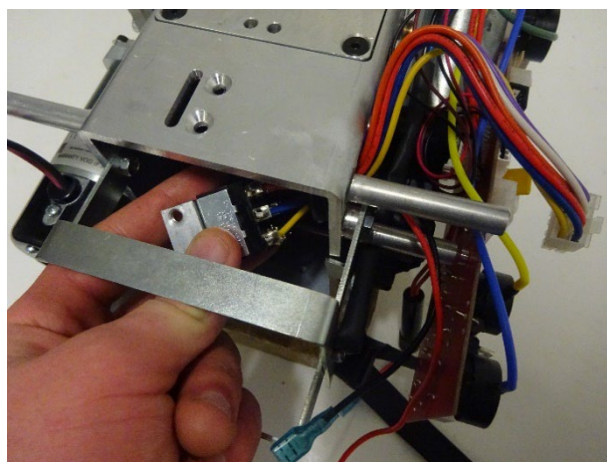


Step 8 – Using Snips, cut the cable ties to release the Toggle Switch wires, see image above for guidance on location.

Step 9 - Using a small flat head screwdriver, detach the grommet (arrowed) from the chassis by forcing it through the hole.



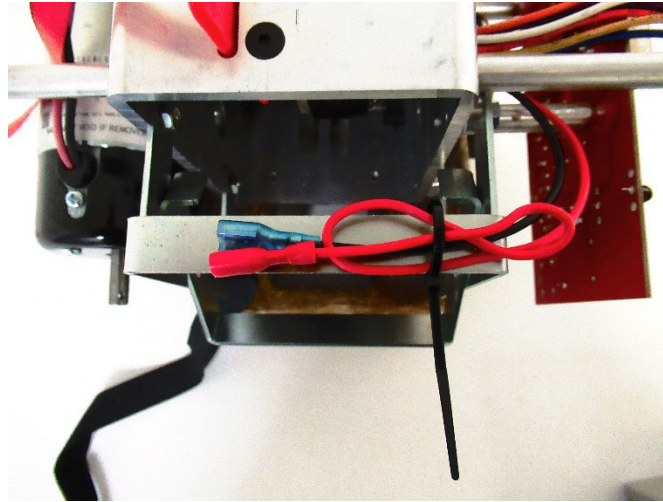
Step 10 – Pull the Toggle Switch from within the Chassis to remove.



### **Refitting / Replacement**

Step 11 - Refitting is a reversal of the removal process noting the following point:

**A) Cable ties is required!** – Reroute the Toggle Switch wires as shown in the image and cable ties into position, cut the surplus once secured

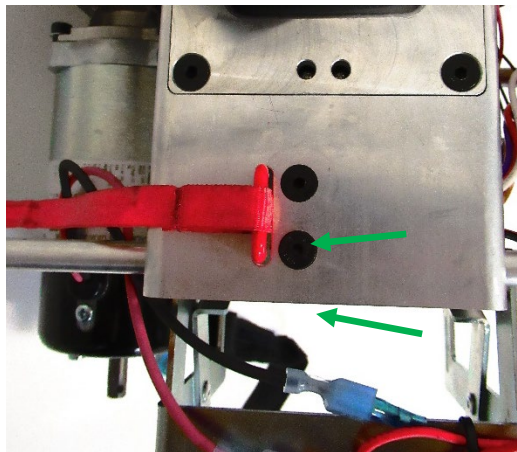


### 9.17 E-Lower cord

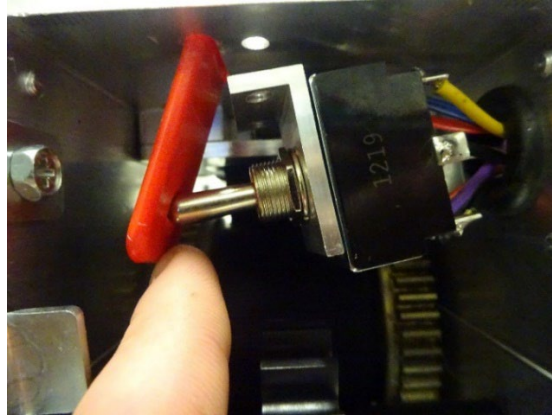
Within this section it will explain the correct procedure on removing and reinstalling the E-Lower Cord for servicing procedures or replacement.

#### **Removal**

- Step 1 - Remove external covers off the Hoist. (refer to section 9.1)
- Step 2 – Remove the Battery from the battery brackets. (refer to section (9.3)
- Step 3 – Remove QRS Hook. (Refer to section 9.6)
- Step 4 – Remove Bottom cover from Hoist. (Refer to section 9.7)
- Step 5 – Use 3mm Allen Key to remove the two M5 x 10 CSK screws. (Arrowed)



Step 6 – Unhook the E-Lower Cord from the Toggle Switch within the Chassis as shown.



Step 8 – The E-Lower Cord can now be removed through the slit in the Chassis.

### **Refitting / Replacement**

Step 9 - Refitting is a reversal of the removal process noting the following point:

- A) When inserting the E-Lower Cord through the Slit, ensure the labelled face is facing the Lift Motor.
- B) To re-attach the Toggle Switch to the Chassis, you must align the Toggle Switch threaded holes with the holes in the Chassis and attach using the 3mm Allen Key and M5 x 10 CSK Screws.

## 9.18 Traverse Idle Gear

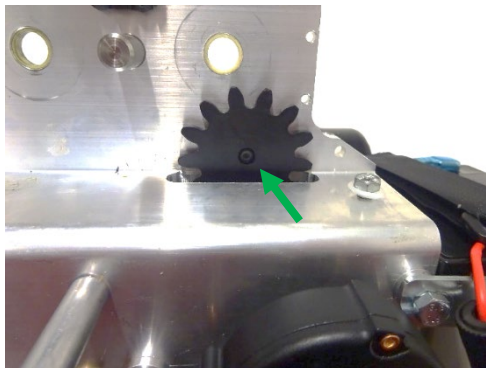
Within this section it will explain the correct procedure on removing and reinstalling the Traverse Idle Gear for servicing procedures or replacement.

### **Removal**

Step 1 - Remove external covers off the hoist (refer to section 9.1)

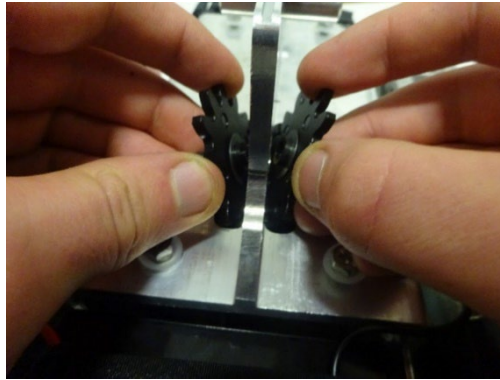
Step 2 – Remove the Wheels from the hoist (refer to section 9.11)

Step 3 – Using a 2mm Allen Key, Remove the M3x12 Screw and M3 Nyloc Nut to release the Traverse Idle Gear.



Step 4 - Split the male and female parts of the Traverse Idle Gear as shown and remove. Ensure to grab the washers placed between each piece of the Traverse Idle Gears.





### Refitting / Replacement

Step 5 - Refitting is a reversal of the removal process noting the following point:

- A) Ensure when fitting the male and female parts together that the shim washers are still in place.
- B) The Female part of the Traverse Idle Gear must be on the same face as the PCB
- C) When securing the two gears together, **do not overtighten**. Once tight, loosen the screw by half a turn to allow the gear ability to rotate freely.

## 9.19 Communications Port

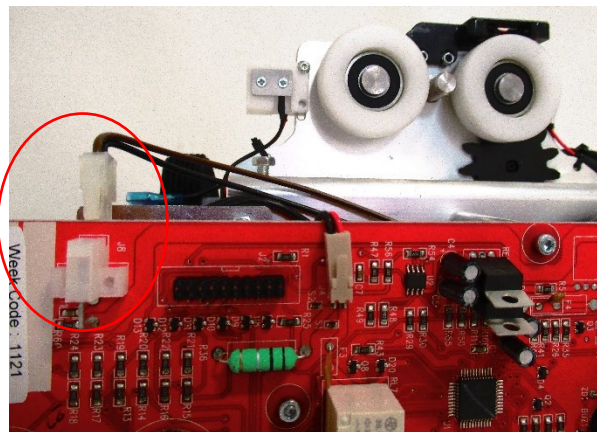
Within this section it will explain the correct procedure on removing and reinstalling the Communications Port for servicing procedures or replacement.

### Removal

Step 1 - Remove external covers off the Hoist. (Refer to section 9.1)

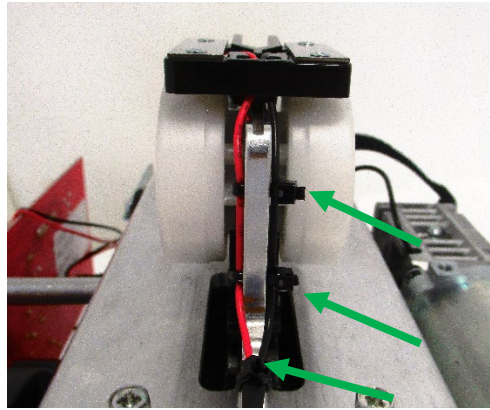
Step 2 – Remove the Battery from the battery brackets. (Refer to section (9.3)

Step 3 – Disconnect the Communications Port from the PCB.

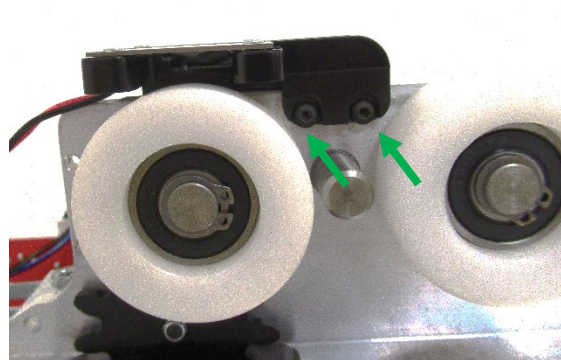


Step 4 – Reroute the Wire from behind the PCB and from under the opposite sides battery bracket.

Step 5 – Cut the three cable ties that secure the wire to the Chassis.



Step 6 – Using a 2mm Allen Key, Remove the M3x12 Screws and M3 Nyloc Nuts to release the Charging Beak.

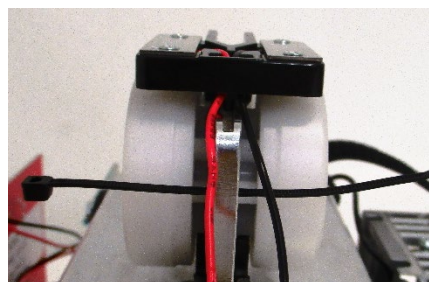


### **Refitting / Replacement**

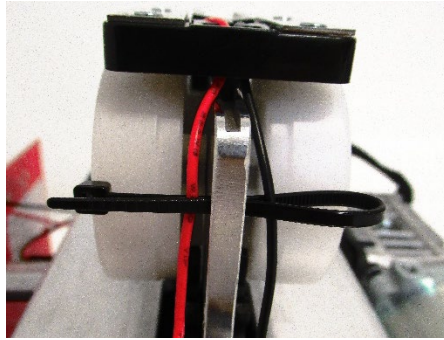
Step 7 - Refitting is a reversal of the removal process noting the following point:

**Three cable ties are required!** – Re-secure the Wire with cable ties as instructed below:

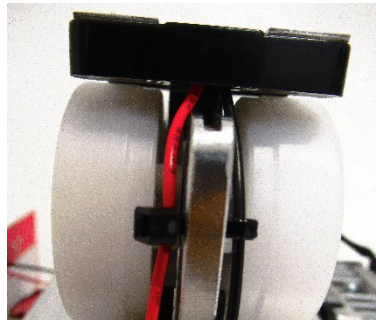
A1) Insert the cable tie (100mm x 2.5mm) through the top hole in the Chassis plate and along the back of the red and black wires.



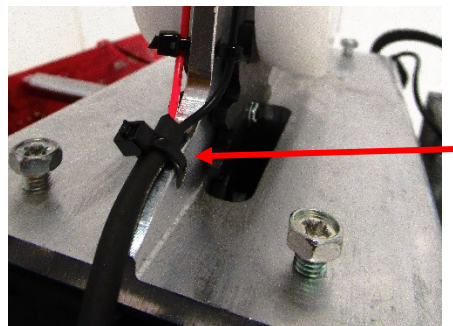
A2) Fold the cable tie around the Black wire and pass the cable tie back through the hole and over the Red wire.



A3) Tie the cable tie retaining the Black wire and Red wire.



A4) Repeat this process for the second cable tie. For the bottom hole a cable tie 100mm x 2.5mm can be passed through the hole then around the Black and Red wires and tied off. Finally, snip of the surplus cable once secured.



## Disclaimer

While every effort has been made to ensure the accuracy of information contained in this service manual, no liability can be accepted by Mackworth for any errors or omissions. Mackworth operates a policy of continuous improvement. Specifications and other data are subject to change without notice.

