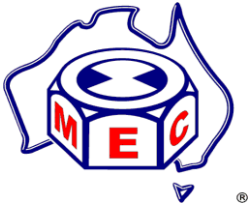


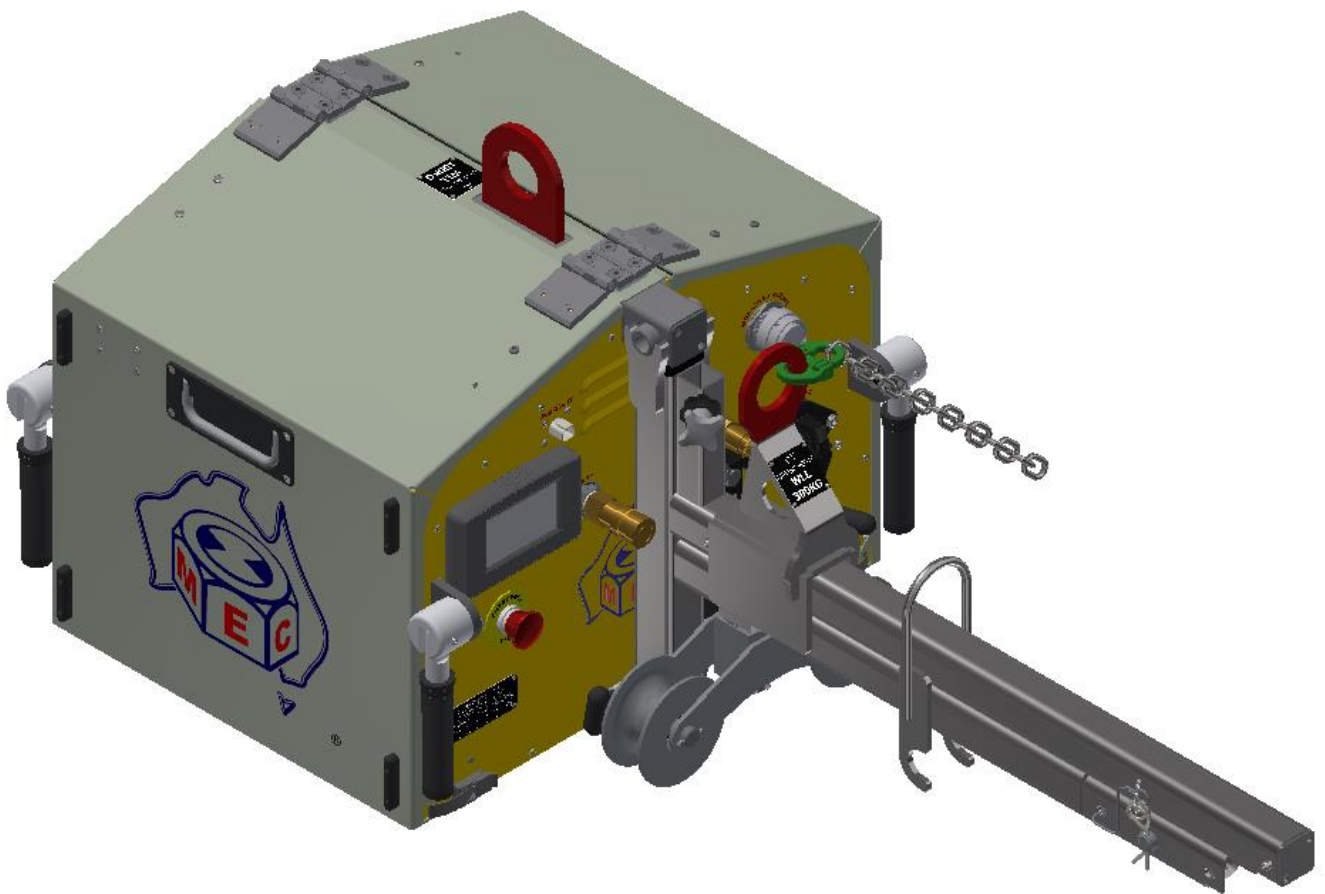
Melville Equipment Corp Pty Ltd



“Proud Australian Manufacturers”



143 Gen 1.2, Battery Trackpack Operation, Training & Maintenance Manual



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MEC Part Number – MANUAL-143-GEN1.2-BE

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1. Preface

Every attempt has been made to present accurate and current information within this manual. However, as product development on the Trackpack and components used within is continuous, the information contained herein may be subject to change without notice, and without incurring obligation.

The information provided within this manual is the sole property of Melville Equipment Corporation Pty Ltd (MEC) and as such, reproduction or replication of any material contained within is not allowed without the written consent of MEC.

Information provided within this manual assumes:

- The person(s) operating the machinery have read and understand this manual and other manuals provided for specific components
- The person(s) operating are properly trained and equipped to safely and professionally operate this machinery
- The person(s) operating utilise the correct attachments and/or tools, and are trained and equipped to use them safely and professionally

SERVICING THE 143 TRACKPACK

This manual contains safety, operation and periodic maintenance instructions. MEC recommends that servicing of equipment, other than periodic maintenance, must be performed by MEC or certified and authorised dealer. Please read the following warning.



SERIOUS INJURY OR DEATH COULD RESULT FROM THE IMPROPER REPAIR OR SERVICE OF THIS EQUIPMENT.

REPAIRS AND / OR SERVICE OF THIS EQUIPMENT MUST ONLY BE PERFORMED BY MELVILLE EQUIPMENT CORP. PTY LTD. OR CERTIFIED AND AUTHORISED DEALER.

THE USER SHALL NOT MODIFY THE DESIGN OR CONFIGURATION OF EQUIPMENT WITHOUT CONSULTING MEC



2. Safety Information

This operation and training manual is intended to complement existing site procedures.

The following site documentation must be reviewed by the trainee before commencing training:

- Safe Work Procedures (SWP)
- Isolation Procedures

If the training package information conflicts with existing site documentation, then the authorised site and/or end user is to consult with MEC in regards to any possible amendments or modifications required.

The following practices and procedures must be adhered to:

- Always complete Pre-Operation Checks prior to use and report any defects if found
- Only connect equipment to compatible MEC equipment
- Only operate the equipment for its intended purpose
- Never operate with guards missing or damaged
- Personal protective equipment as a minimum should be worn at all times according to this manual and as per site specifications
- Ensure isolation procedures are followed prior to carrying out any maintenance
- If any faults or damage to this machine are found during pre-operation checks or operation, tag the machine “Out-of-Service” and follow site procedures

Following the above mentioned and the information contained within this manual will ensure safe and efficient operation of the equipment.



3. Safety Symbols

The safety symbols and signal words, as shown below, are used to emphasise all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to the equipment.

3.1. Safety Symbols & Signal Words

	This safety alert and signal word indicates a hazardous situation which, if not avoided, <u>will</u> result in <u>death or serious injury</u> .
	This safety alert and signal word indicates a potentially hazardous situation which, if not avoided, <u>could</u> result in <u>death or serious injury</u> .
	This safety alert and signal word indicates a potentially hazardous situation which, if not avoided, <u>may</u> result in <u>minor or moderate injury</u> .
	This signal word indicates a potentially hazardous situation which, if not avoided, <u>may</u> result in <u>property damage</u> .
	This signal word indicates a situation which, if not avoided, <u>will</u> result in <u>damage to the equipment</u> .
	This signal word indicates a situation which, if not avoided, <u>may</u> result in <u>damage to the equipment</u> .



3.2. Hazard Warning Signs

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all instructions to avoid possible injury or death.
	This is the fire risk symbol. It is used to alert you to the potential of a fire starting if ignition sources are present.
	This is the explosive risk symbols. It is used to alert you to the potential of an explosion /explosive substances present.
	This is the toxic hazard symbol. It is used to alert you to the presence of toxic substances.
	This is the corrosive risk symbol. It is used to alert you to the presence of corrosive substances.
	This is the electric shock risk symbols. It is used to alert you to the presence of an electrical supply.
	This is the battery symbol. It is used to alert you to the potential hazard of electrical supply, battery acid and leaking batteries.

	This is the hot surface symbol. It is used to alert you that the surfaces may be hot.
	This is the dangerous gases symbol. It is used to alert you to the presence of dangerous gases.
	This is the fluid under pressure symbol. It is used to alert you that there are fluids under pressure in this machinery.
	This is the sharp edges symbol. It is used to alert you to the presence of sharp edges or cutting hazard.
	This is the keep hands clear symbol. It is used to warn you to keep hands clear as there are pinch points present.
	This is the rotating parts symbols. It is used to warn you of rotating parts on the machinery. Keep clear of rotating parts.

3.3. Personal Protection Symbols

	This is the eye protection symbol. It is used when eye protection must be worn.
	This is the hearing protection symbol. It is used when hearing protection must be worn.
	This is the head protection symbol. It is used when head protection must be worn.
	This is the hand protection symbol. It is used when hand protection must be worn.
	This is the foot protection symbol. It is used when feet protection must be worn.
	This is the protective body clothing symbol. It is used when protective clothing must be worn.

	This is the face protection symbol. It is used when face protection must be worn.
	This is the long hair protection symbol. It is used when long hair is required to be contained or restrained.

3.4. Prohibition Symbols

	This is the naked flame symbol. It is used when there is not to be a fire, naked flame, ignition sources and smoking nearby.
--	---

4. Safety Precautions

To ensure safe operation, please read and understand the following statements and their meanings. Also refer to supporting manuals from the engine manufacturer on specific operation and maintenance of the engine. This manual contains safety precautions which are outlined below.



Ensure all personnel operating this equipment are properly trained to ensure safe operation



Wear personal protective equipment around this machinery.

For example: safety glasses, hearing protection, head protection, protective clothing and safety shoes at all times.



Accidental Starts can cause severe death or injury.

Disable engine by disconnecting negative (-) battery cable. Ensure machinery is started in the neutral position.



Rotating parts can cause severe injury

Stay away whilst machine is in operation. Ensure ALL guarding is in place and secured before operation.



Hot parts can cause severe burns.

Beware of hot parts on the machinery – i.e. exhaust, engine, hoses, radiator, solenoids, exposed metal components, etc.





Carbon monoxide can cause severe nausea, fainting or death.

Avoid inhaling exhaust fumes and never operate the engine in a closed or confined area.



Fuel can cause fires and severe burns.

Do not fill the fuel tank while the engine is hot or running.



Explosive gas can cause fires and severe acid burns.

Charge battery only in a well-ventilated area. Keep sources of ignition away.



High Pressure fluids can puncture skin and cause severe injury or death.

Do not work on fuel or hydraulic system without proper training and safety equipment. Ensure all hose connections are tight.

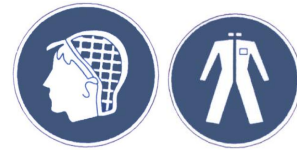


! WARNING



Clamping parts can cause severe injury.
Stay away whilst machine is in operation.
Ensure ALL guarding is in place and secured before operation.

! WARNING



Loose hair, clothing and jewellery can cause severe injury.
Ensure hair is restrained; loose clothing not to be worn and jewellery must be removed before operating the machinery.

! CAUTION



Electrical shock can cause injury.
Do not touch wires whilst engine is running.

! WARNING



Attachment hoses must have a minimum working pressure rating of 3000psi. Do not use hoses and fittings that are not pressure rated.



	
 	
Ignition sources can cause fires and severe burns. There is <u>not</u> to be a fire, naked flame, ignition sources or smoking around any MEC machinery.	

	
 	
Toxic and/or Hazardous substances utilised in this machinery. Beware of toxic and/or hazardous substances used within this machinery. Do not inhale, swallow or touch toxic/hazardous substances.	

	
	
Injury can occur due to terrain and operating speeds. To ensure safe work is achieved, do not exceed walking pace whilst operating this equipment. Also note the terrain conditions (underfoot and rail conditions). Do not walk on sleepers or the rail head.	

	
	
Electrification can occur if used on live third rail and/or fourth rail. Do not use equipment on live third rail and/or fourth rail electrification.	



Injury can occur through incorrect operation of the equipment.

Only operate the equipment for its intended use. Failure to do so may result in injury. Do not ride on or tow the equipment.



Vibration Hazard

Normal and proper use of this equipment will expose the operator to vibration. Vibration exposure may cause and/or contribute to injury throughout the body. Ensure proper procedures are followed for vibration exposure levels to reduce the risk of injury. Refer to Specifications for vibration level data.



Noise Hazard.

Ensure adequate hearing protection is worn whilst using this machinery. High sound levels may cause permanent hearing loss. Refer to Specifications for noise level data.



5. Equipment Stickers & Tags

Below are the stickers and tags utilised on this equipment.



IDTAG02 – Model & Serial No. Tag



IDTAG07 – Trackpack Pivot Positions



IDTAG08 – Lifting Point WLL 150kg

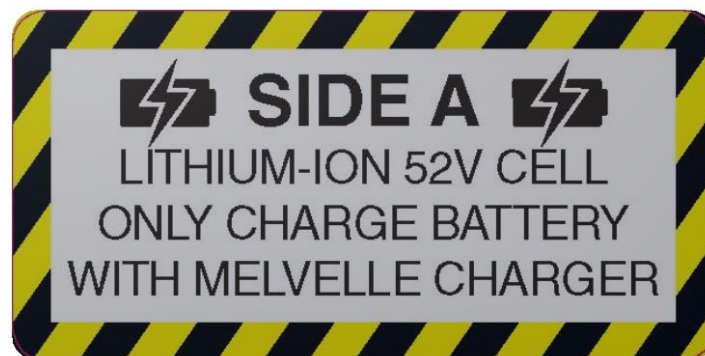




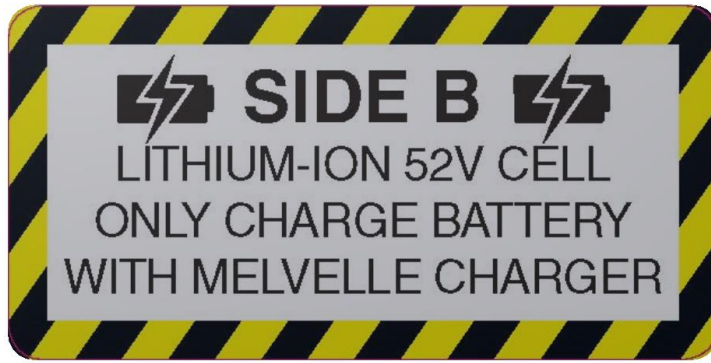
IDTAG10 – Lifting Point WLL 300kg



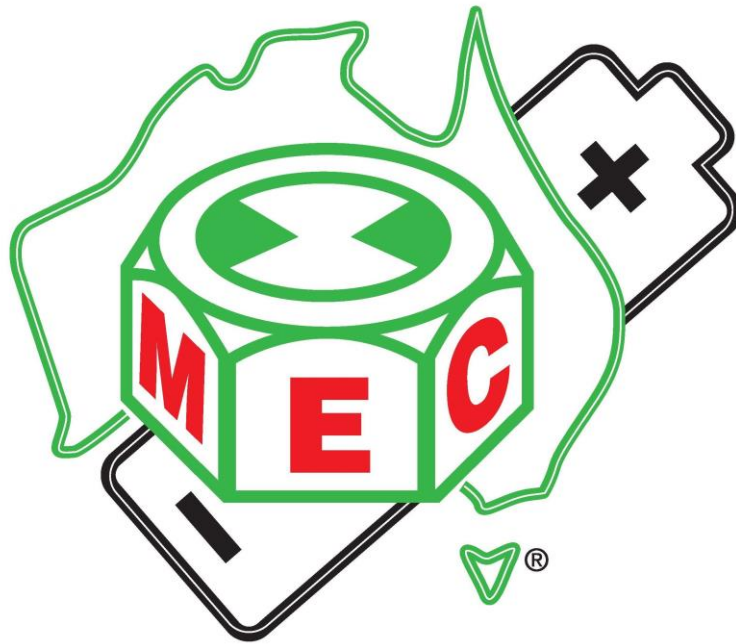
LAB0003 – Melvelle Newcastle Sticker



LAB0055 – Battery Trackpack Battery Side A



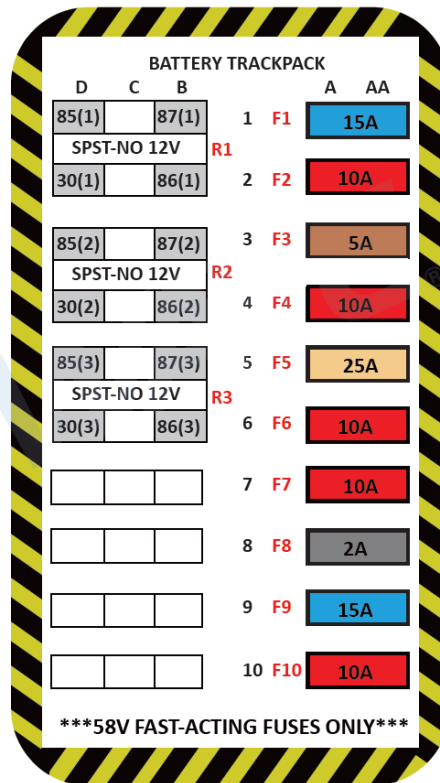
LAB0055 – Battery Trackpack Battery Side B



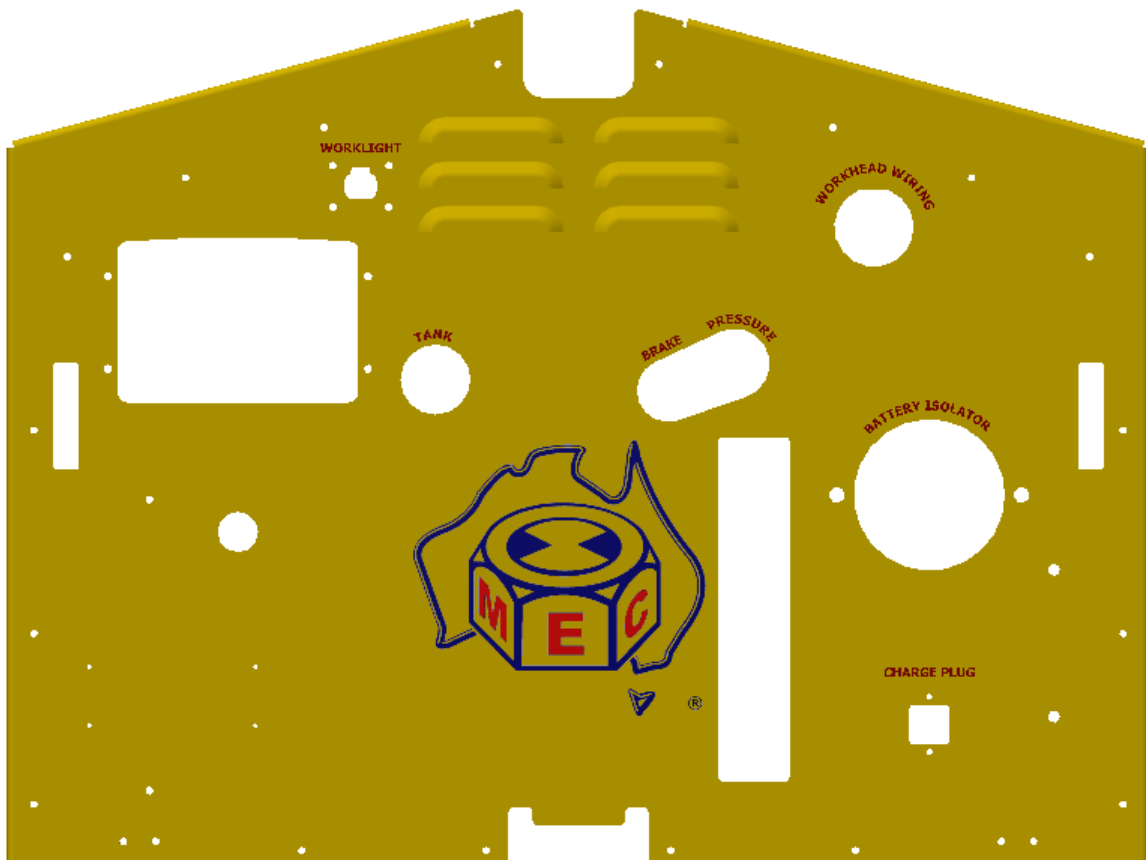
MELVELLE ELECTRIC SERIES

LAB0057 – Battery Trackpack Side Sticker





LAB0124 – Battery Trackpack Fuse Box Sticker



LAB0108 – Engraved Front Guard





LAB0108 – Engraved Rear Guard

Stickers & Tags Locations

Refer to Further Documents section: 12.3 - Battery Trackpack Gen 1.2 General Assembly for sticker locations drawings for all models.



6. Introduction

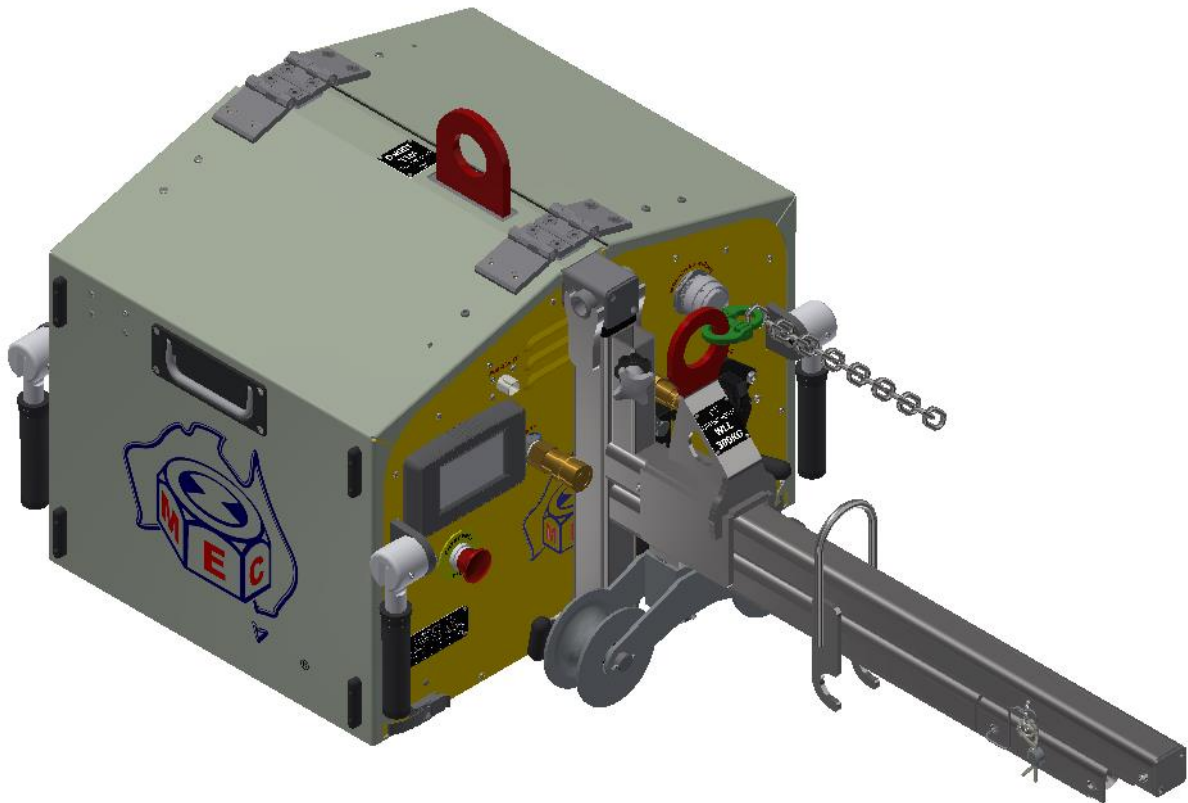
Melville Equipment Corp Pty Ltd (MEC) supply Trackpacks to the rail industry. The 143 Gen 2 battery Trackpack is designed to supply hydraulic power to MEC workheads and the brake cylinder on the machine trolleys. The Trackpack also acts as a counterbalance for MEC workheads that assemble to it.

At time of printing, the Gen 2 Trackpack has a total of ten (10) different rail maintenance workheads able to be assembled to it for use. This is achieved by utilising a haymen-reese style attachment along with hydraulic quick snap connectors. This functionality allows the operators/company a cost effective solution as an array of various workheads are able to be transported to site with only a few Trackpacks required (equal to the number of required operators).

The Gen 2 Trackpack incorporates a detachable boom allowing for a smaller space requirement for transport. The detachable boom also allows for easier assembly if the Trackpack and workhead are being manually assembled on site.

Utilising the adjustable pivot point ensures the counterbalance feature of MEC equipment is maintained across the workheads. This limits the operator lift to <5kg during the use of the machinery, preventing injuries obtained due to manual lifting.

As well as the counterbalance feature, the 143 has inherent safety features built into the design. This includes emergency stop circuit, hose covers and lifting points (mechanical lifts), multiple fold down carry handles (17kg per person) and no manual valve adjustments. These features ensure safe and efficient operation of MEC machinery.



7. Specifications

7.1. FP-143-BEG2 (Rev 1) – GEN 1.2 Battery Trackpack

Electric Motor	Permanent Magnet Synchronous Motor Submersion Pump Motor 3.5KW
Dimensions – Boom attached (normal operation)	1400mm Long x 650mm Wide x 575mm High
Dimensions – Boom in stowage	1215mm Long x 650mm Wide x 895mm High
Dimensions – Boom removed (Trackpack only)	590mm Long x 650mm Wide x 575mm High
Dimensions – Boom only (No Trackpack)	863mm Long x 145mm Wide x 490mm High
Weight (wet) – Includes Complete Trackpack with all fluids (Hydraulic oil)	140kg (308 lb)
Weight (dry) – No fluids included, battery included	130kg (266lb)
Weight Trackpack only (no boom)(wet) – Includes Trackpack with boom removed, includes fluids (hydraulic oil) and batteries	118kg (260lb)
Weight Trackpack only (no boom or batteries)(wet) – Includes Trackpack with boom & both batteries removed, includes fluids (hydraulic oil)	78kg (172lb)
Pressure/nominal flow peak (max pressure)	210bar / 3045psi @ 16 L/min
Pressure/nominal flow (continuous flow)	28L/min @ 90 Bar/1305 psi
Hydraulic oil	ISO68*
Hydraulic oil capacity	13.5L
Recommended hydraulic oil fill volume	10.5L
Hydraulic hose connection size	½" Flat face quick snap (P & T) ¼" Flat faced quick snap (Brake)
Pressure settings	Dependant on workhead attached**
Battery	2x 52V lithium ion
Battery capacity	62.4Ah
Battery operating temperature	0°C to 45°C
Battery storage temperature	-20°C to 40°C
Motor and controller ambient operating temperature	-30°C to 40°C
Motor and controller storage temperature	-40°C to 85°C

*See section "10.4 - Recommended Fluids" for correct oil types required for the climate the Trackpack is being used in. The hydraulic and engine oil mentioned in this specification table are the type recommended for use in typical Australian climate. Winter fuel additive may be required in cold climates see section "10.4 - Recommended Fluids".

**Trackpack automatically changes pressure and flow setting based on which work head it is connected to the Trackpack. The operator has fine adjustment of pressure on the control screen but cannot change pressures outside of workable range for work head attached.



8. Operation

8.1. Operating Conditions

The following outlines the duties and conditions for which the equipment is intended to be operated:

- Used on the intended rail line (gauge)
- Used within a possession
- Not to be used on third and/or fourth rail electrification
- Has the ability to be used in all environmental conditions providing the rail is clean and accessible (i.e. snow, extreme heat, etc may be considered hazardous to operation of the equipment)
- Correct engine oil, fuel (diesel) and hydraulic fluid for climate the machine is being used in.
- Ensure operators are using hearing protection when using this machinery that is applicable to industry standards to reduce noise to acceptable levels
- Ensure operators adhere to industry accepted operating times for vibration exposure levels



8.2. Pre-Operation Checks

Overall Inspection

1. Check that the equipment is free from damage or defects
2. If damaged, DO NOT USE. Contact MEC for repairs

Hydraulic Oil

1. Check the level and quality of the hydraulic oil and add if required
2. Fill oil level to the top of oil level gauge. When full oil will reach the bottom of the strainer in the filler breather. The tank can fit 3L above the top of the level gauge (recommended fill level)
3. If contaminated, hydraulic oil will be discoloured
4. If contaminated with water, hydraulic oil will be a milky colour
5. If hydraulic oil contaminated, replace before use

Battery

1. Visually inspect the condition of the battery
2. Ensure there is no damage. Both output wires must read above 42V. Working range is 58.1VDC – 42VDC
This can be tested with a multimeter on the battery plug or can be displayed through the control screen on the Trackpack when connected or on the individual capacity screens on each battery.
Note: If 0VDC is measured on a battery, remove it from any load and re-test, it should return to 42VDC (0% state of charge).
3. If damaged, replace before use. Contact MEC for replacement.
4. Store batteries at 52.0-53.0V for long term storage.

Light (if applicable)

1. Visually inspect condition and leads of light. Ensure there is no damage and leads are free from defects.
2. If damaged, replace before use.

Hydraulic Hoses & Filter

1. Visually inspect the hoses and filter. Look for leaks, tear, swelling & exposed wire.
2. Ensure there is no damage.
3. If damaged, replace before use.



Guards & Stickers/Tags

1. Inspect all guards and stickers/tags are in place and secure – refer to further document drawings for locations.
2. Ensure there is no damage .
3. If damaged, DO NOT use machinery. Contact MEC for repairs.

Wiring

1. Ensure all electrical plugs are connected.
2. Inspect the wiring and ensure free from damage and defects.
3. Ensure all connections are clean and dry.

Braking System

1. Ensure the workhead brake button and deadman lever are free from damage and These functions can be tested through the diagnostics screen on the Trackpack. Refer to section 11.2 - List Of Self-Diagnostic Errors for details.

Emergency Stop

1. Ensure emergency stop plug is electrically connected.
2. Ensure the wires are free from damage and connections are clean and dry.

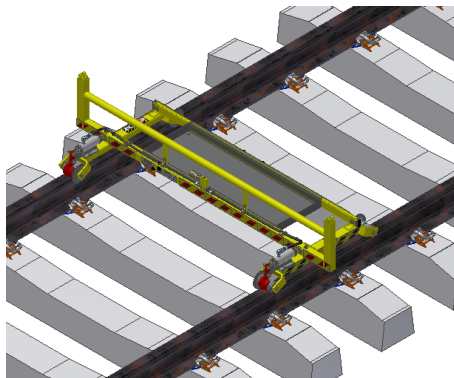


8.3. Assembly Procedures



Before any assembly and/or maintenance are performed, ensure the workhead and engine are off and the system is isolated.

8.3.1. Machine Trolley (Braked and Un-Braked)

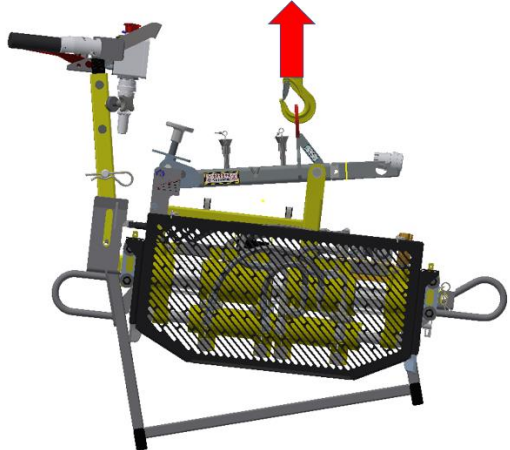
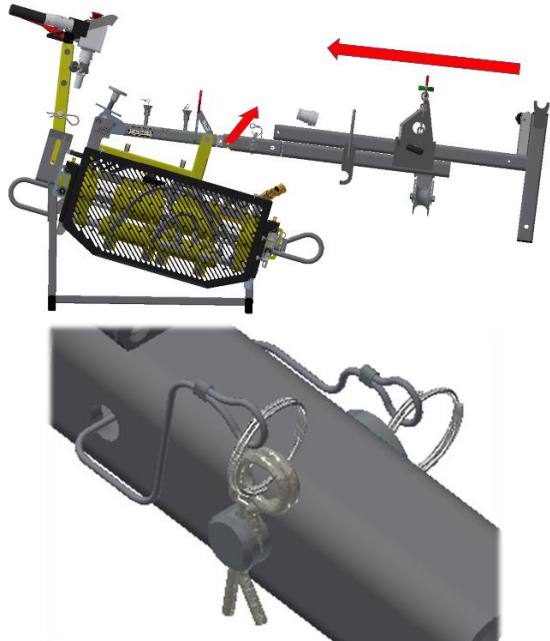
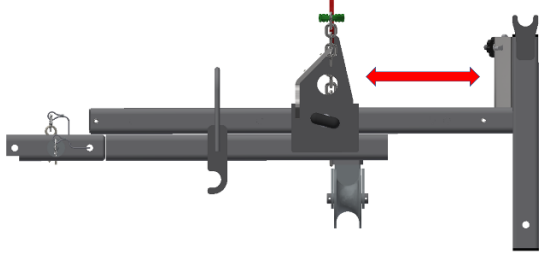
1. Inspect the trolley and ensure it is not damaged and free from defects, and all pre operation checks are done as per section 8.2	
2. The machine trolley weighs approximately 36kg. Using a minimum of 2 people or certified lifting device, lift the trolley onto the rail lines. This can be achieved by lifting from the cross bar (tube).	
3. Ensure the trolley sits stationary before attaching Trackpack and workhead, if using a braked trolley attach brake hydraulic lines (refer to braked machine trolley operation manual for more information)	



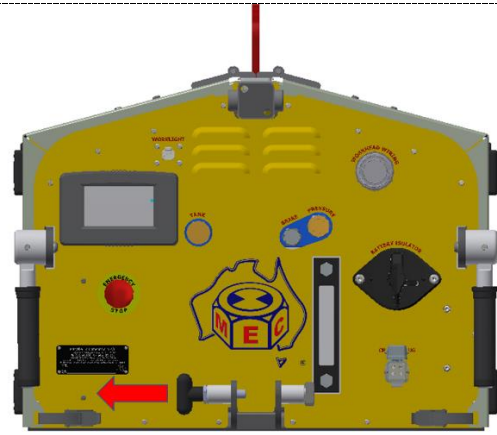
8.3.2. Trackpack Workhead and Power Pack

Note - 190 E-Clip remover shown, however all workheads and Trackpacks are connected in a similar manner, Only Gen 2 Trackpacks have removeable booms

8.3.2.1. Connecting Workhead to Trackpack – Mechanical Lift

1. Observe all safety precautions. Ensure the operation is being performed on safe and steady ground (no excessive slopes or dangerous terrain).	
2. Inspect the workhead and Trackpack and ensure they are not damaged and are free from defects.	
3. By following safe lifting procedures, lift the workhead onto ground. A 190 E-Clip workhead weighs approximately 100 kg. MEC Trackpack workhead range from 40kg to 150kg. *See relevant workhead manual for correct lifting procedure	
4. Insert the removable boom onto the workhead, align the square attachment (hayman-reese style) and slide the items together. Insert the locking pin between the items and lock in position with the R -Clip.	
5. Adjust the pivot position (cross trolley rollers) to the correct position for the machine. For the 190 E-Clipper this is the furthest hole from the engine *see section “12.2 - Trackpack Boom Adjustment” drawing for pin locations.	

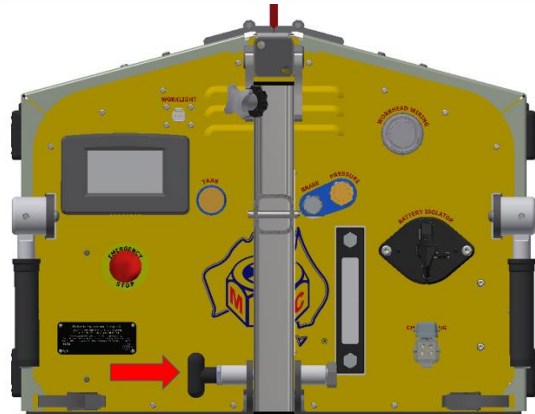
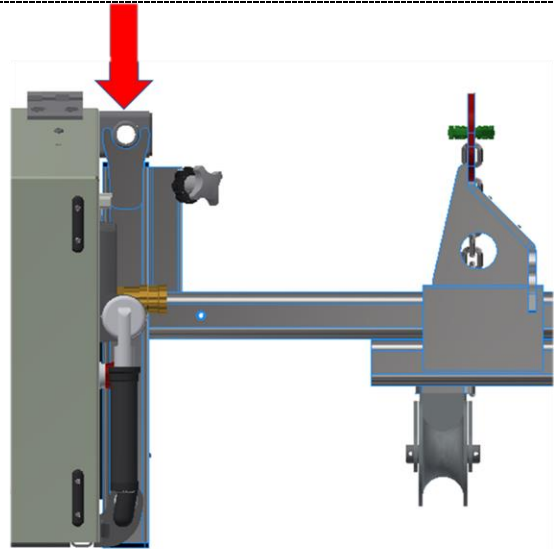
6. Ensure both the boom lock off pin is in the disengaged position.



7. By following safe lifting procedures, lift the Trackpack ensuring it is kept level and easy to move.
A Trackpack weighs approximately 118kg (with batteries), 78kg (with batteries removed)
*See "section 8.5.2.1 - Mechanical lifting of Trackpack" for information on lifting procedure.



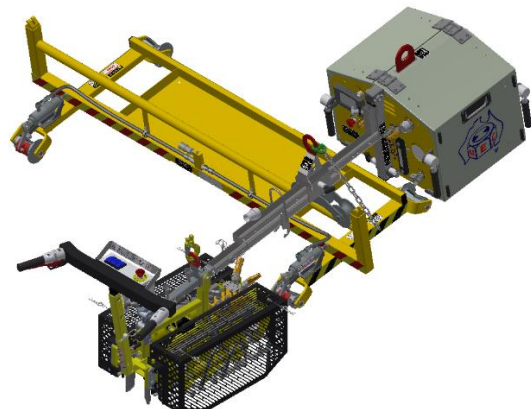
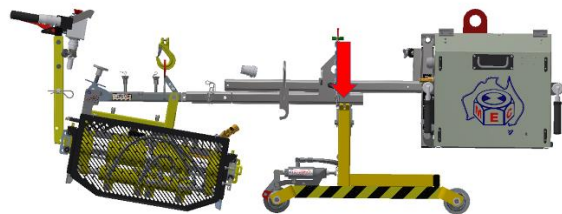
8. Lower the trackpack onto the boom cups.
Once the load of the Trackpack is supported by the boom and workhead, engage the boom lockoff pins.



9. By following safe lifting procedures, lift the workhead and trackpack assembly onto the trolley on track. The cross trolley rollers on the boom will sit onto the cross bar (tube) on the trolley. A Trackpack Boom weighs approximately 22kg.
*See "section 8.5.2.1 - Mechanical lifting of Trackpack" for information on lifting procedure.

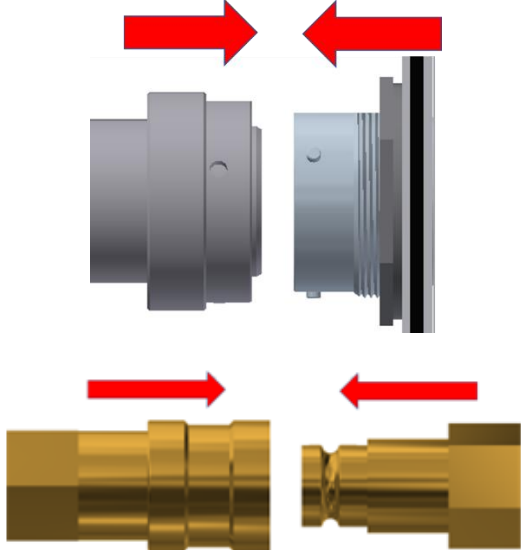
⚠ CAUTION

When placing the machine onto the trolley, ensure hands are clear of the cross trolley rollers and cross bar (tube) as injury to personnel may occur.

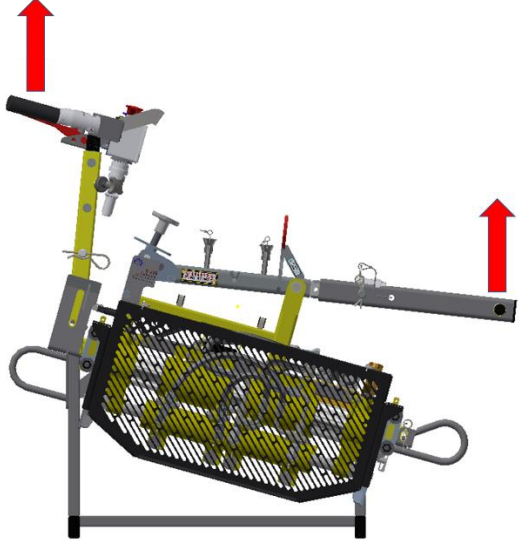
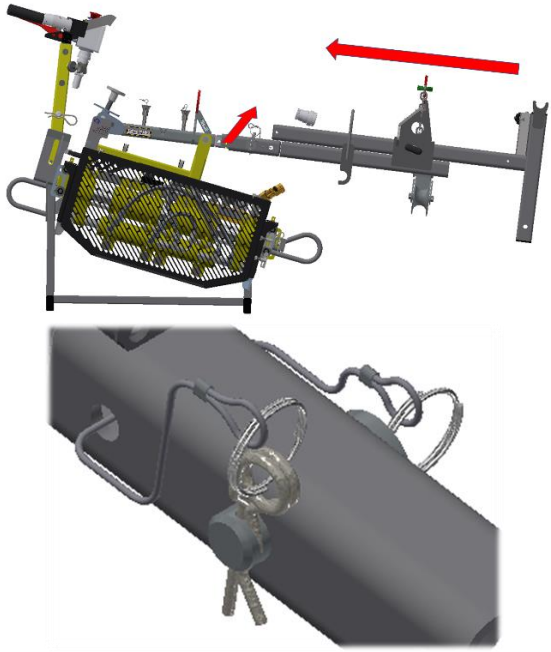
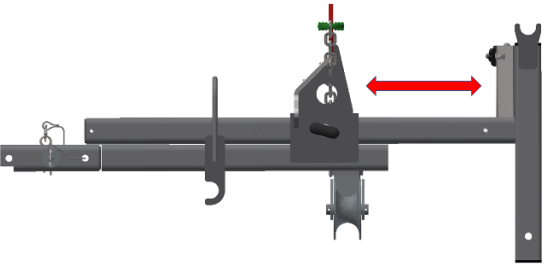


10. Remove the slings and/or hooks. The machine can now be moved to either rail for use. This is achieved by raising the workhead off the ground and sliding across the trolley. A second person may be required to assist and push the Trackpack across the trolley.



11. Attach the chain to the trolley to ensure the machine will not roll during operation.	
12. Connect the wiring harness to the Trackpack control box (screw style HD connector) 13. Connect both the pressure and return hydraulic hose lines to both the Trackpack and workhead 14. Connect the brake hose to the hydraulic fitting on the trolley. 15. The equipment is now ready for use.	

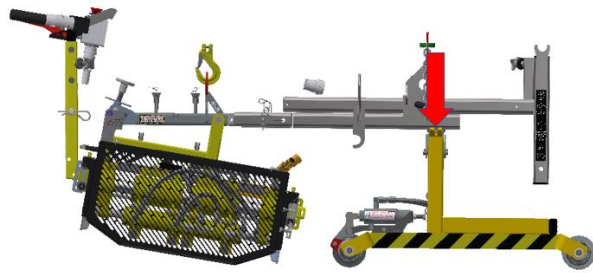
8.3.2.2. Connecting Workhead to Trackpack –Manual Lift

1. Observe all safety precautions. Ensure the operation is being performed on safe and steady ground (no excessive slopes or dangerous terrain).	
2. Inspect the workhead and Trackpack and ensure they are not damaged and are free from defects.	
3. By following safe lifting procedures, lift the workhead onto ground A 190 E-Clip workhead weighs approximately 100 kg. MEC Trackpack workhead range from 40kg to 150kg *See relevant workhead manual for correct lifting procedure	
4. Insert the removable boom onto the workhead, align the square attachment (hayman-reese style) and slide the items together. Insert the locking pin between the items and lock in position with the R -Clip.	
5. Adjust the pivot position (cross trolley rollers) to the correct position for the machine. For the 190 E-Clipper this is the furthest hole from the engine *see section “12.2 - Trackpack Boom Adjustment” drawing for pin locations.	

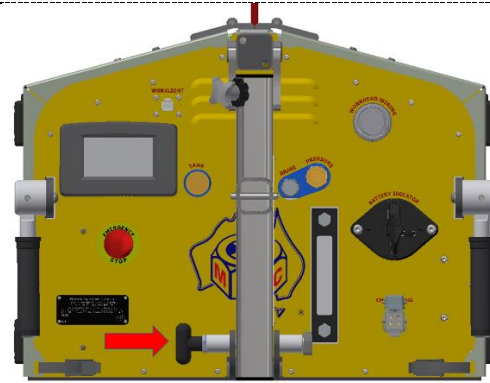
6. By following safe lifting procedures, lift the workhead onto the trolley on track. The cross trolley rollers on the boom will sit onto the cross bar (tube) on the trolley. A Trackpack boom weighs approximately 22kg. This can be performed as a two or four person lift.



When placing the machine onto the trolley, ensure hands are clear of the cross trolley rollers and cross bar (tube) as personal injury may occur.



7. Ensure both the boom lockoff pins are in the dis-engaged position.



8. Fold out all the lifting handles on the side of the Trackpack

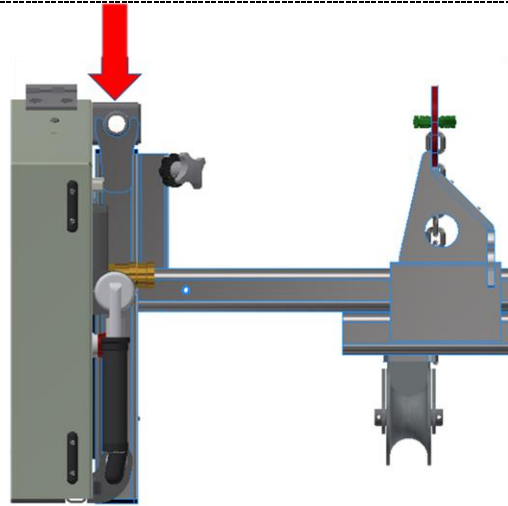


9. By following safe lifting procedures, lift the Trackpack and carry over to the track.

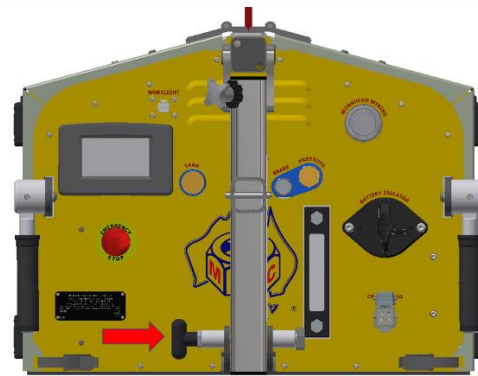
A Trackpack weighs approximately 118kg (with batteries) & 78kg (with batteries removed).

*See section "8.5.2.2 - Manual lifting of Trackpack" for information on lifting procedure.

10. Lower the trackpack onto the boom cups.
Once the load of the Trackpack is supported by the boom and workhead engage the boom lock off pins.



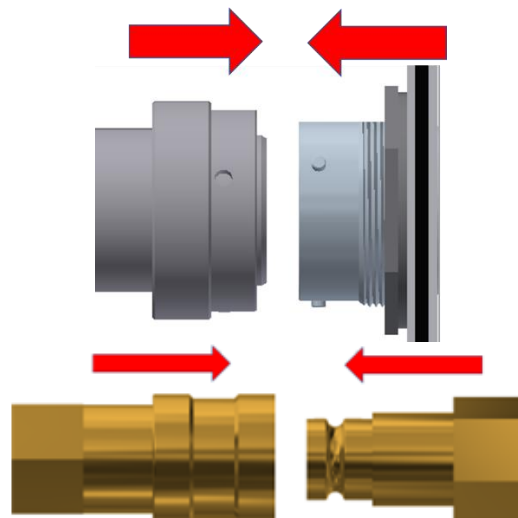
11. The machine can now be moved to either rail for use. This is achieved by raising the head off the ground and sliding across the trolley. A second person may be required to assist and push the Trackpack across the trolley.



12. Attach the chain to the trolley to ensure the machine will not roll during operation.



13. Connect the wiring harness to the Trackpack control box (screw style HD connector).
14. Connect both the pressure and return hydraulic hose lines to both the Trackpack and workhead.
15. Connect the Brake hose to the hydraulic fitting on the trolley.
16. The equipment is now ready for use.



8.4. Operation Procedures



Only authorised personnel shall start, operate or interfere with the normal working of portable machines or trolleys. The user shall be careful to use the machine in the intended way, avoiding over-loading.

8.4.1. Initializing (Boot Up) Of Control System – Workhead Connected

1. Observe all safety precautions
2. Ensure all pre-operation checks have been conducted
3. Ensure the workhead and Trackpack are on safe and steady grounding (no excessive slopes or dangerous terrain conditions)
4. Attach the hoses to the Trackpack and workhead, attach the wiring harness to the Trackpack.
5. Turn battery isolator to the on position. The screen will display which workhead is connected, also please acknowledge no other warnings are present.
6. Power pack and hydraulic circuit are now in operation and tooling is able to be used. Refer to equipment operation for instructions on using tooling connected to the Trackpack.



8.4.2. Initializing (Boot Up) Of Control System – Workhead Not Connected

1. Observe all safety precautions
2. Ensure all pre-operation checks have been conducted
3. Ensure the Trackpack is on safe and steady grounding (no excessive slopes or dangerous terrain conditions)
4. Turn battery isolator to the on position. The screen will display that there is no workhead connected, also please acknowledge no other warnings are present.
Note: If a workhead wiring plug is removed the control system will display a workhead estop error as the system it senses the workhead estop has disappeared, if the plug remains removed you will be able to acknowledge the estop error on screen and continue to navigate the control screen but will not be able to preform any work. If any estop is activated with a workhead connected you will not be able to acknowledge the estop warning screen without deactivating it.
5. Pressure cannot be generated without a workhead connected (no valves will be able to be activated). Monitor system on control panel or connect a workhead to preform work.

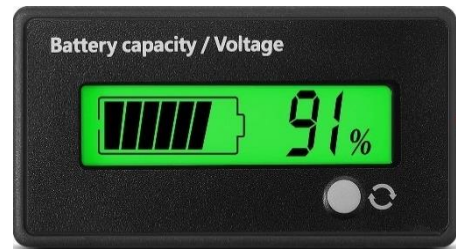


8.4.3. Batteries & Charger

8.4.3.1. Batteries

The Gen 1.2 battery Trackpack contains two 52V (nominal) lithium-ion cell packs. This cell packs have a usable range of 58.8VDC ↔ 42VDC.

All batteries are fitted with a capacity display screen, press the button to display battery voltage, press it a second time to cycle to battery state of charge %, press a third time to cycle off. The screen will automatically turn off after 10 seconds. Please see an image of the capacity display screen fitted to the batteries.



Due to this battery being of a lithium chemistry it is protected through a built in BMS (battery management system). This system monitors the battery and will shut off (open circuit) if anything happens that could cause battery damage. This could be undervoltage, over voltage, short circuit etc.

If the batteries are drained to their minimum safe working voltage the BMS will open circuit to prevent the battery from entering a dangerous low voltage range. Once this happens all controllers on the powerpack will cut out due to the battery now being isolated internally. The BMS will keep the battery isolated internally until all load on the battery is removed. This is achieved by turning off the main isolator or disconnecting the battery.

After the batteries have internally isolated themselves due to reaching their minimum voltage threshold while operating a workhead, you may be able to switch the main isolator (remove the load) off and then switch the Trackpack back on and have the batteries “wake up”. You will then be able to navigate the control screen (low load) but as soon as you go to perform work (high load) the BMS will again internally isolate the batteries due to reaching their minimum voltage threshold. You will be able to use low load until the low load causes the BMS to detect the low voltage cut off threshold.

The batteries will not accept charge if the BMS is open circuit due to reaching the low voltage threshold until the load is removed (switching Isolator).

8.4.3.2. Charger

A MEC compatible charger must be used for charging the batteries. The charger current should not exceed the values in the below table at any point or battery damage and cell degradation could occur.

The battery charger can be attached to the charge plug on the Trackpack or connected directly to the batteries. An unlimited amount of batteries can be connected in parallel being charged by the one charger, charge time will increase as charge current is evenly split and all batteries will balance out to an even charge when in parallel.



8.4.3.3. Long term storage

For long periods of storage the Trackpack can be left on a storage charge “trickle” battery charger connected directly to the batteries either inside or outside of the Trackpack with the main isolator off (control system will not be active).

For long term storage MEC Gen 1.2 cell packs should be stored between 52↔53VDC (50↔60% SOC) and -20 ↔ 45°C. this is to prevent accelerated cell degradation causing a reduction in battery capacity over time.

If batteries are not being used for a long period (greater than 3 months) they should be placed on a storage charge “trickle”.

Standard MEC gen 1.2 chargers are 58.1VDC, long term storage chargers are available from MEC.

8.4.3.4. Capacity testing

Battery modules may be returned to MEC for capacity testing. If testing batteries on-site, the following discharge specifications are recommended: charge to 58.1VDC, rest for 10 minutes before recording discharge. Test up to maximum discharge current for ambient temperature as per table above. Record battery capacity (Ah) and compare with original as well as previous tests. MEC recommends capacity testing once per year after 3 years of age (battery capacity degrades slowly so very minimal degradation will occur in first 3 years. Capacity tests can be preformed more frequently under heavy use. Battery to be replaced once capacity no longer meets network requirements for work required. MEC recommends replacement once capacity falls below 75% of original capacity.



8.4.3.5. Battery Prefomace

Max Voltage	58.8VDC
Min Voltage	42VDC
Charge Voltage	58.1VDC
Capacity	62.4Ah (58.8VDC ↔ 42VDC)
Weight	20kg

Maximum discharge current for MEC Gen 1.2 cells packs		
Temperature range	1 Battery connected	2 Battery connected
-10°C ≥ T < 0°C	60A	120A
0°C ≥ T < 20°C	168A	336A*
20°C ≥ T < 60°C	312A*	624A*

*Battery Trackpack system has a maximum peak current draw of 200A (125A using 1 battery)

**Typical MEC workheads use 0-80A under normal operation

Maximum charge current for MEC Gen 1.2 cells packs		
Temperature range	1 Battery connected	2 Battery connected
0°C ≥ T < 15°C	31.2A	62.4A
15°C ≥ T < 45°C	62.4A	124.8A

*MEC charger has a maximum output current of 30A (15A per battery if connected to two batteries)

Reduction in battery capacity at high load for MEC Gen 1.2 cells packs		
% of original capacity	1 Battery connected	2 Battery connected
100%	≥ 31.2A	≥ 62.4A
97%	≥ 62.4A	≥ 187.2A
95%	≥ 187.2A	≥ 312A*
90%	≥ 312A*	≥ 624A*

*Battery Trackpack system has a maximum peak current draw of 200A (125A using 1 battery)

Reduction in battery capacity at reduced temperatures for MEC Gen 1.2 cells packs	
Temperature range	% Capacity of original
-10°C ≥ T < 0°C	60%
0°C ≥ T < 25°C	80%
T ≥ 25°C	100%

8.4.3.6. Disposal

The lithium-ion batteries used in the battery Trackpack should not be disposed into general waste bins or recycling bins. This can result in fire and chemical contamination. When decommissioning, either return batteries to MEC or an authorised battery recycling centre.



8.4.4. Equipment Operation

As the Trackpack is used as a means of providing power to the coupled workheads, the operating instructions of each workhead are detailed in their relevant manuals. Only assembly and screen navigation are covered in this manual.

8.4.5. Control Screen Interface (Buttons & LEDs)

The Trackpack is fitted with a control panel for monitoring the entire system in a variety of aspects. Shown below is how to use the control screen interface.

<i>Interface</i>	<i>Action Performed</i>
HOME BUTTON - 	Returns to main “home” screen whenever it is pressed.

SIDE BUTTONS – Side arrow buttons



Used to enter
relent screens or
turn outputs on or
off.
The icon or menu
next to the button
is activated when
pressed.

+ & - BUTTONS – Plus and Subtract



Used to increase or
decrease settings.
(Password
Protected)

INDICATOR LEDS – Top interaction LEDS



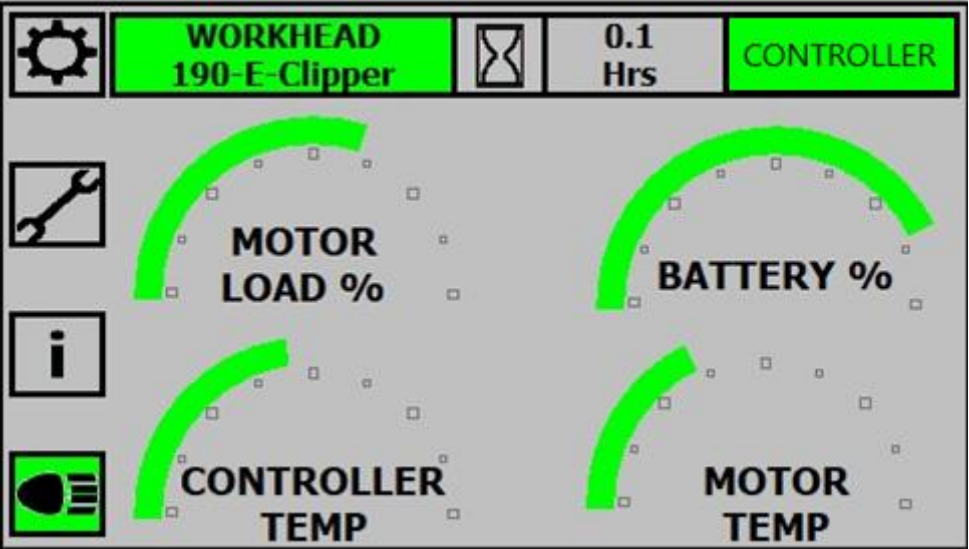
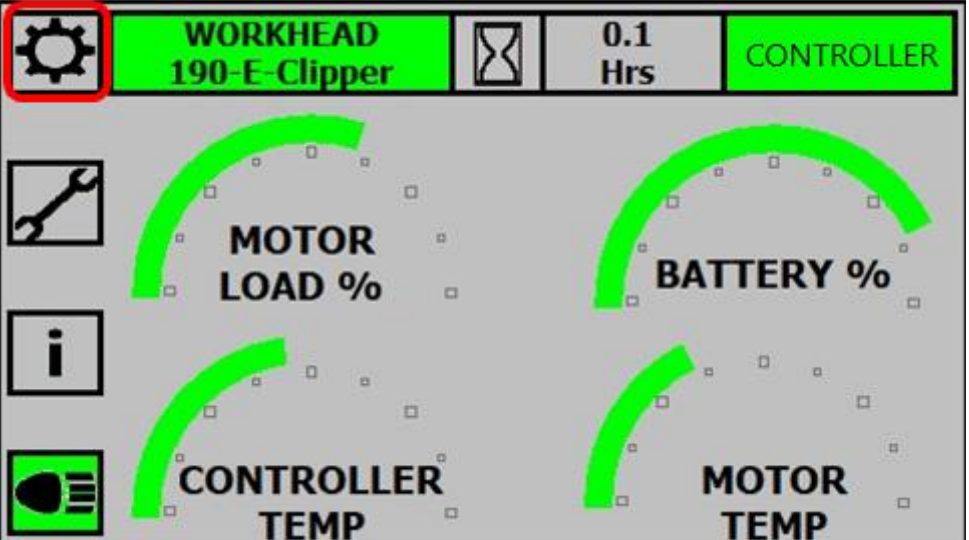
Indicates current status.
PWR – ilumates when control systems is powered up

8.4.6. Control Screen Navigation

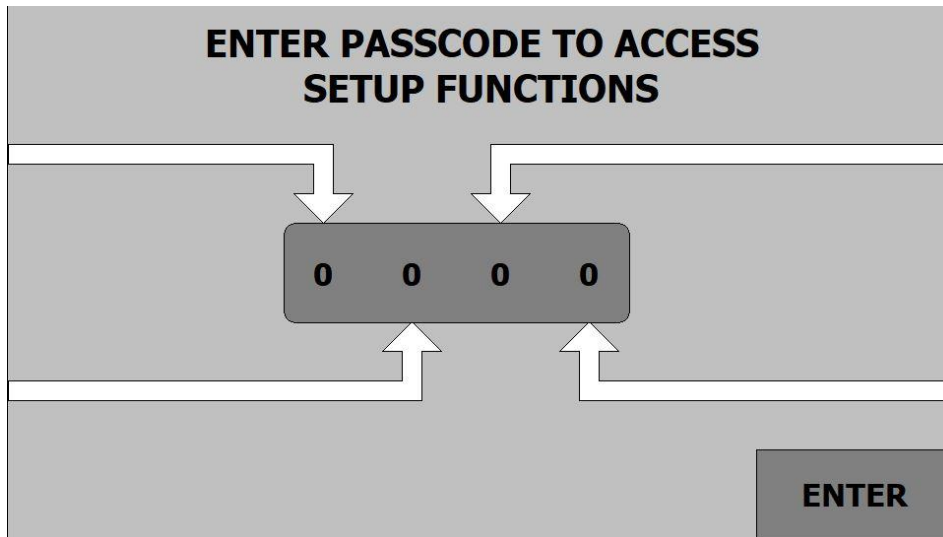
The Trackpack is fitted with a control panel for monitoring the entire system in a variety of aspects. Shown below is how to navigate the various screens.

There is further information on all error icons and display windows are in section 11.2 - List Of Self-Diagnostic Errors

Refer to section 11.2 - List Of Self-Diagnostic Errors for further screen detail

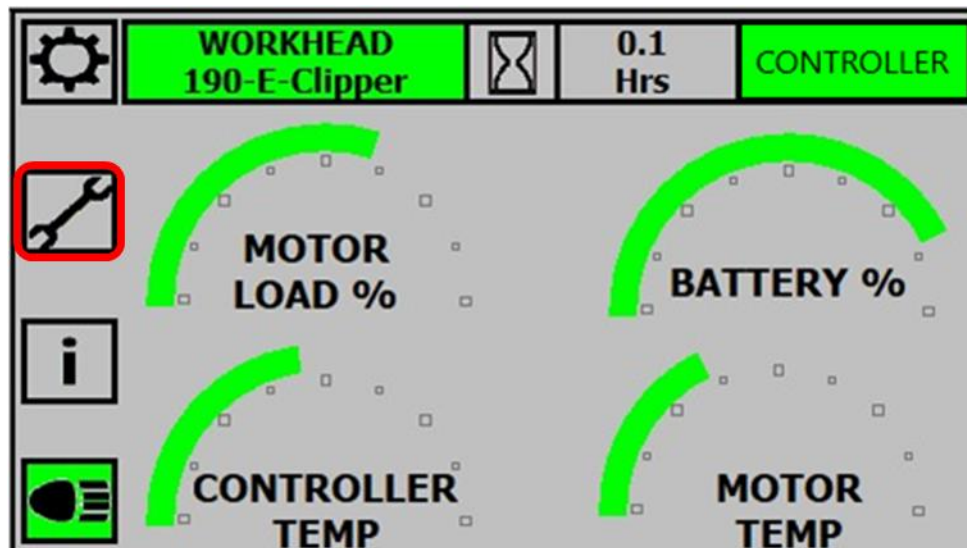
<i>Display Windows</i>	<i>Action Performed</i>
MAIN SYSTEM SCREEN 	None required Contains all
SETTINGS MENU – Icon Selection, Main Menu 	Press this icon to open up the settings menu In this menu all system adjustable parameters be adjusted. E.g machine pressures, max RPM This menu requires a code to enter This menu can only be accessed by MEC or authorised MEC representatives.

SETTING MENU ENTRY – Password Entry



A password is required to enter settings to edit system parameters. These modifications can only be accessed by MEC or authorised MEC representatives.

SERVICE MENU – Icon Selection, Main Menu



Press this icon to open up the service menu
This menu is to

SERVICE MENU – Menu Navigation

SERVICE MENU	
TOTAL RUNTIME	0.0 Hrs
MOTOR HOURS	20.0 Hrs
TIME UNTIL NEXT SERVICE	485.0 Hrs
MAX MOTOR TEMP RECORDED	0 °C
MAX CONTROLLER TEMP RECORDED	0 °C

FUNCTION TEST

BUZZER

FAN

PRESS AND HOLD TO CONFIRM SERVICE

Service information and testing is available here.
See section ??? for further detail

INFORMATION MENU – Icon, Main screen navigation



WORKHEAD
190-E-Clipper



0.1
Hrs

CONTROLLER



MOTOR
LOAD %





CONTROLLER
TEMP

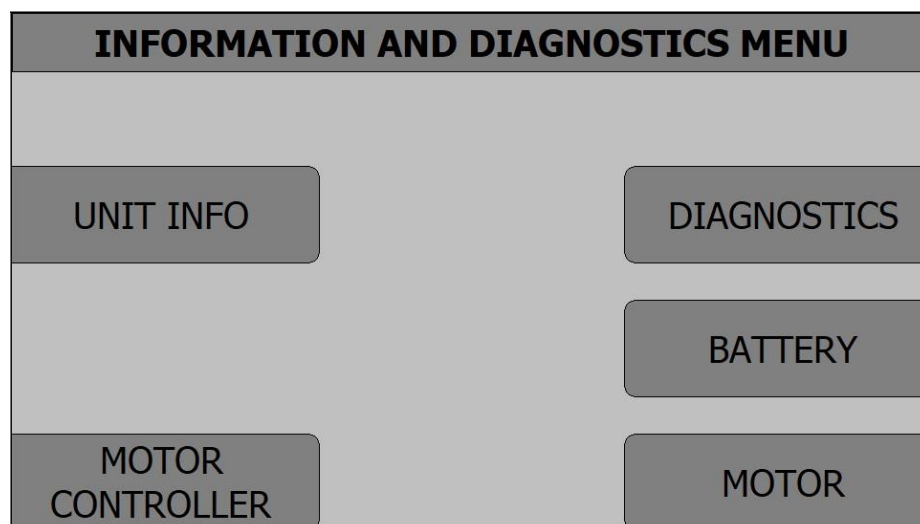
BATTERY %

MOTOR
TEMP

Press this icon to enter the information menu.



INFORMATION MENU – Sub screen navigation



Select any of the 5 options to open the relevant information sub screen.

Press "UNIT INFO" to open the machine details screen.

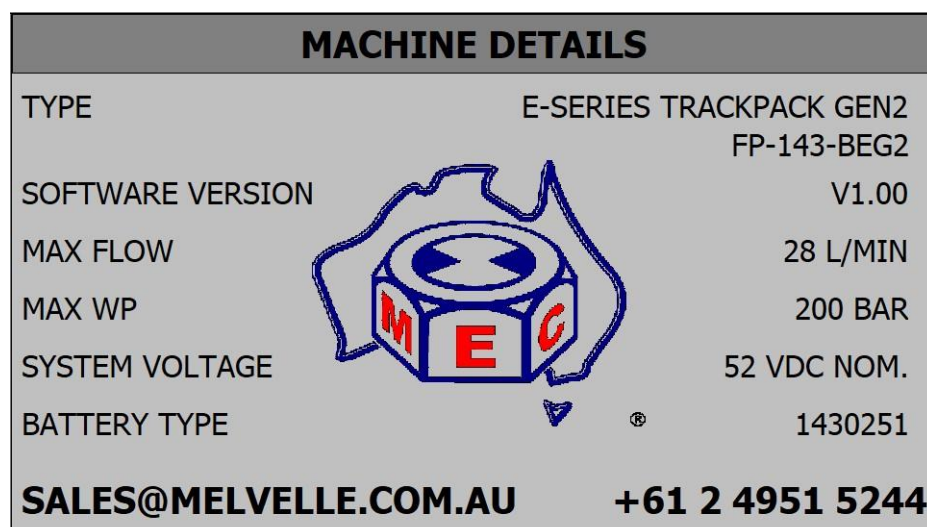
Press "DIAGNOSTICS" to open the system diagnostics screen.

Press "BATTERY" to open the battery info screen.

Press "MOTOR CONTROLLER" to open the motor controller information screen.

Press "MOTOR" to open the motor information screen.

MACHINE DETAILS – Unit info screen



Displays overall information on the powerpack



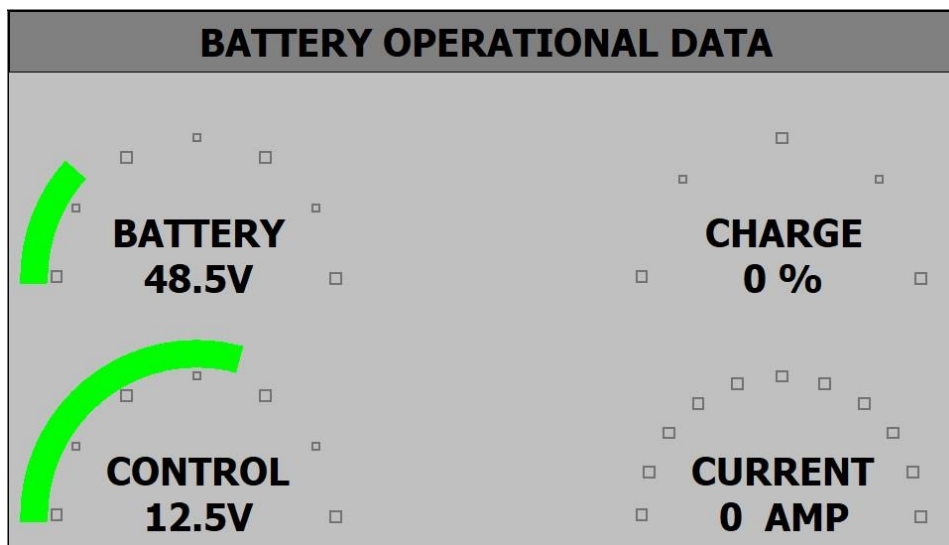
DIAGNOSTICS – Input & output display

INPUTS	OUTPUTS
BRAKE BUTTON	BRAKE RELEASE SOLENOID
FUNCTION BUTTON	WORKHEAD SOLENOID #1
ENABLE LEVER	WORKHEAD SOLENOID #2
BRAKE BYPASS SWITCH	WORKHEAD SOLENOID #3
WH ID #1	WORKHEAD SOLENOID #4
WH ID #2	COOLING FAN
WH ID #3	
WH ID #4	
WH SENSOR #1	
WH SENSOR #2	
WH SENSOR #3	
WH SENSOR #4	

All input and outputs on the controller are monitored here

Refer to section 11.2 - List Of Self-Diagnostic Errors for further information

BATTERY INFO – Battery and control information



Battery information such as battery voltage, state of charge and output current are displayed

The battery Trackpack has two identical batteries, as these are not smart batteries the system sees them as one larger battery and so voltage, current and state of charge are an average of the two batteries if both batteries are connected.

Control voltage is also displayed, this is a fixed voltage from the DCDC converter and is for the control system and accessories

See section 11.2 - List Of Self-Diagnostic Errors for further information



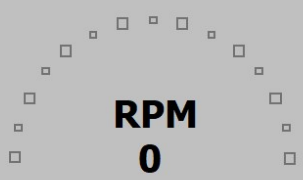
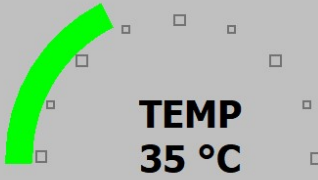
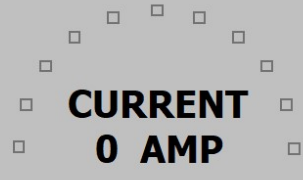
MOTOR CONTROLLER INFO – Motor controller operation information

Displays information on the motor controller.

MOTOR CONTROLLER					
FAULT CODE			CAN CODE 0		
TEMPERATURE			35 °C		
COOLING FAN STATUS			ON		
RX MESSAGES	0	0	0	0	0
FAULT RESET					

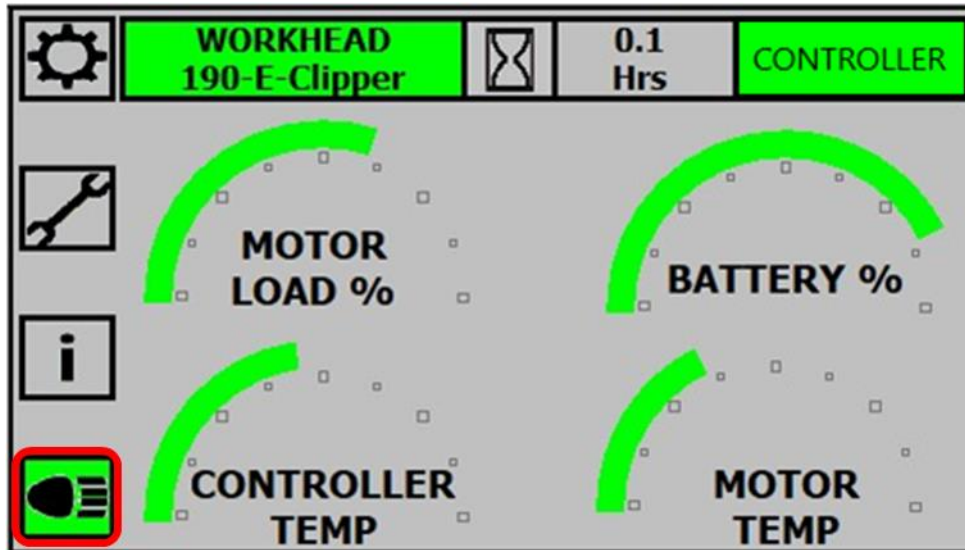
MOTOR INFO – Motor operation information

Motor information such as RPM, motor temperature and motor current are displayed
The temperature is also the same as the hydraulic oil temperature as the motor is submerged in oil. The motor current is the AC current delivered by the motor controller.

MOTOR OPERATIONAL DATA	
 RPM 0	 TEMP 35 °C
 CURRENT 0 AMP	



LIGHTS MASTER SWITCH – Lights on off switch



This button switches all worklights on both the trackpack and workhead off and on.

This will turn all lights off even if they are switched on at the workhead or light post.

This will be disabled during power saving mode.

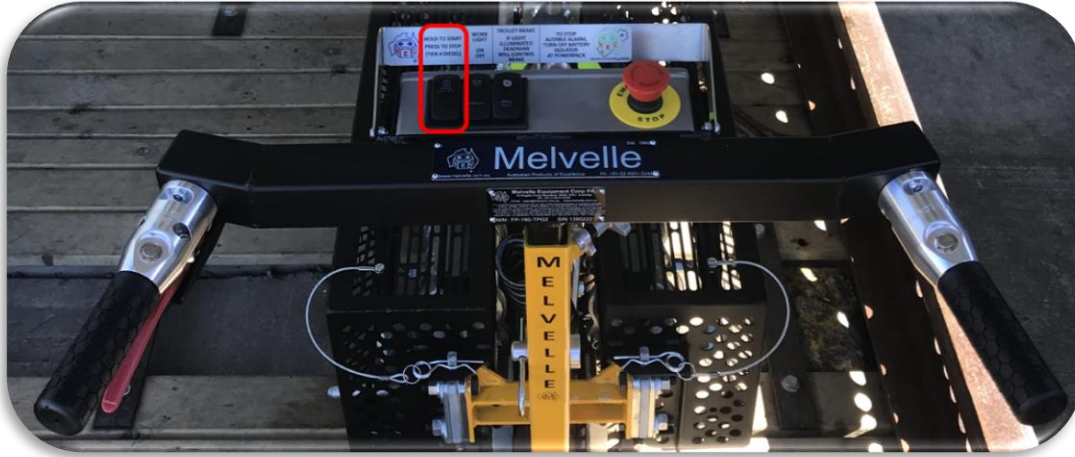
Power saving mode is triggered once the inactive timer threshold is reached. See section “11.2 - List Of Self-Diagnostic Errors” for information on inactive timer and how to override.

The icon will illuminate green when lights are active and will be grey when they are inactive.



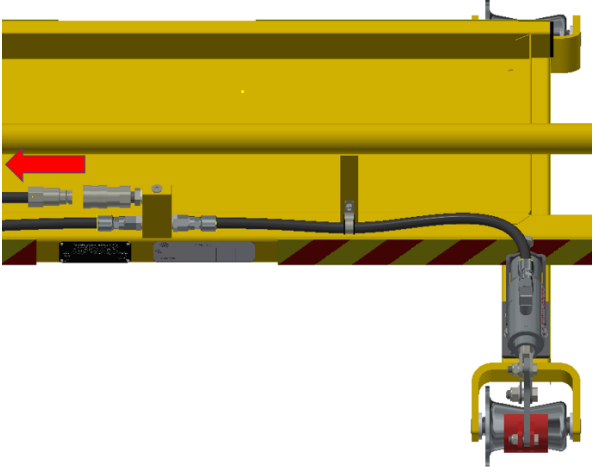
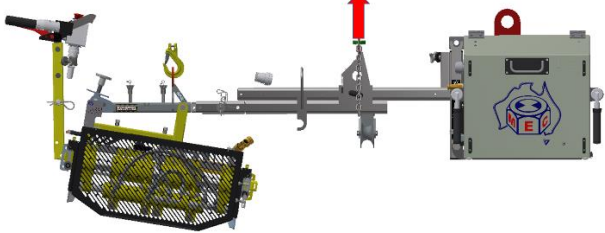
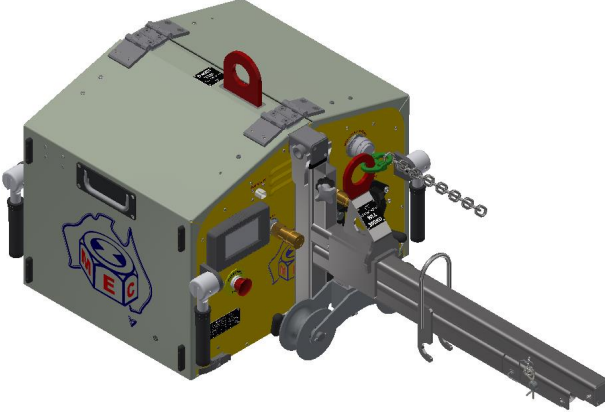
8.4.7. Engine start/stop

All Gen 2 workheads are fitted with an “engine start/stop” button. This button does not perform any action on the battery Trackpack as there is no engine. This is for all emission control models which are interchangeable with battery Trackpack models, i.e all Gen 2 workhead can be powered by both battery Trackpacks and emission control Trackpacks.



8.5. Disassembly Procedures

8.5.1. Removal of Trackpack from Track

1. Observe all safety precautions 2. Ensure engine is off and no hydraulic flow is operating to cylinder 3. Disconnect the brake hose from the hydraulic fitting.	
4. Disconnect the chain from the retaining profile to release the machine from the trolley	
5. Lift and remove the workhead and Trackpack from the trolley using a certified lifting device (>250kg)	
6. The Trackpack is now able to be placed onto transport or in storage. For a Trackpack and workhead, these can be stored and/or transported coupled together or separated. *Expected time for removal of trolley with workhead assembled is approximately five (5) minutes (using certified lifting devices). These times may increase or decrease depending on location, conditions, etc.	

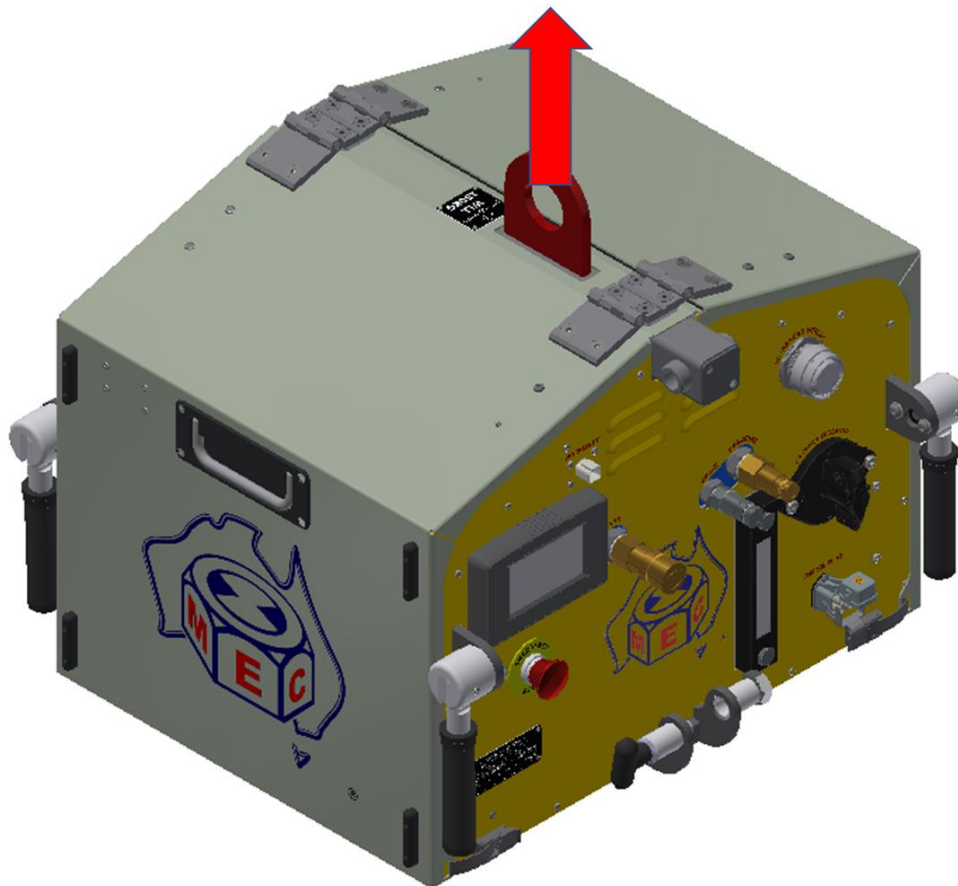


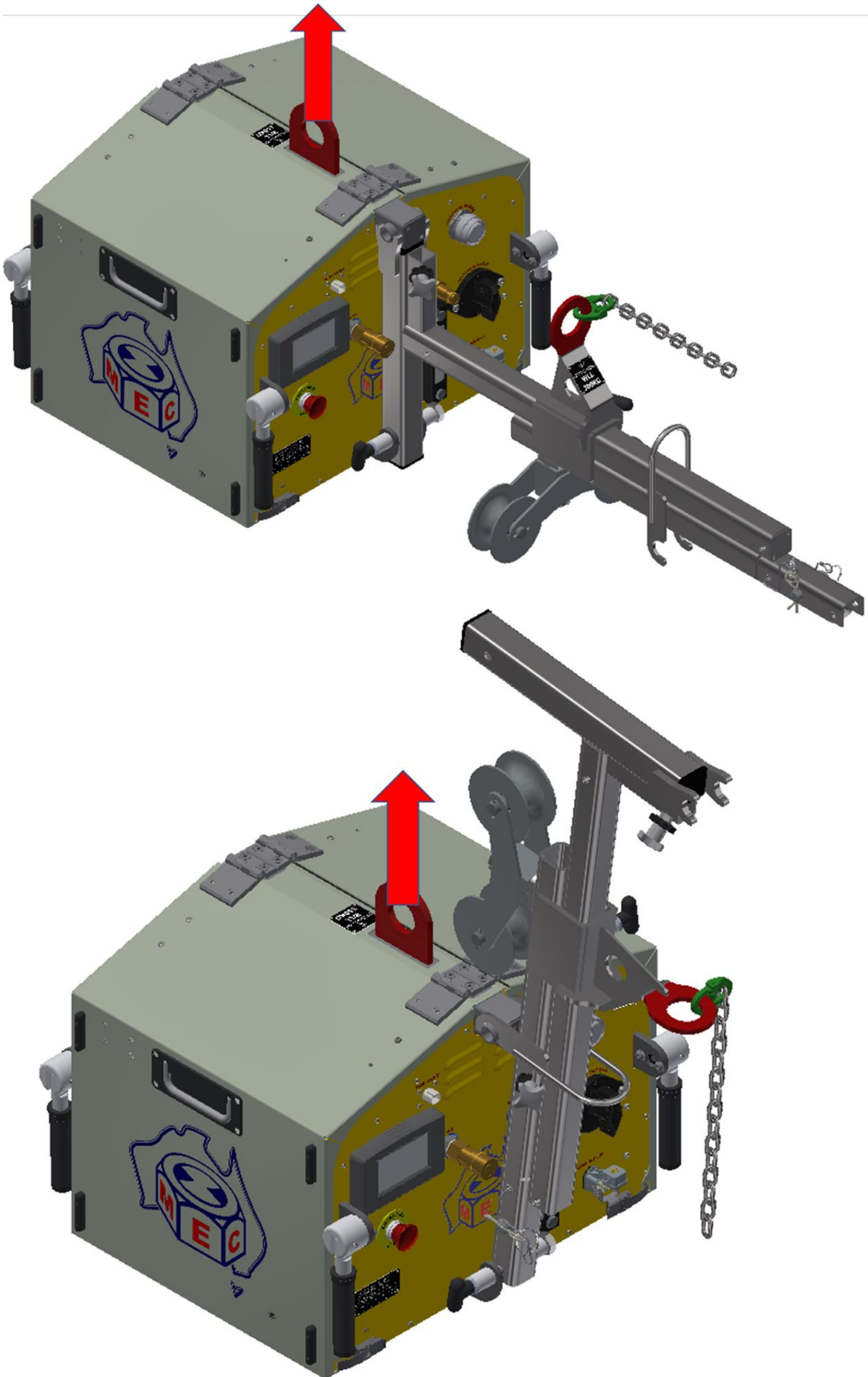
8.5.2. Lifting the Machinery

8.5.2.1. Mechanical lifting of Trackpack

1. Observe all safety precautions
2. Ensure all pre-operation checks have been conducted
3. Attach slings or hooks into lifting points on the machinery – see below
4. Using a certified lifting device to >250kg, lift the machinery to required position

Lifting Diagrams on this page and the next two pages:



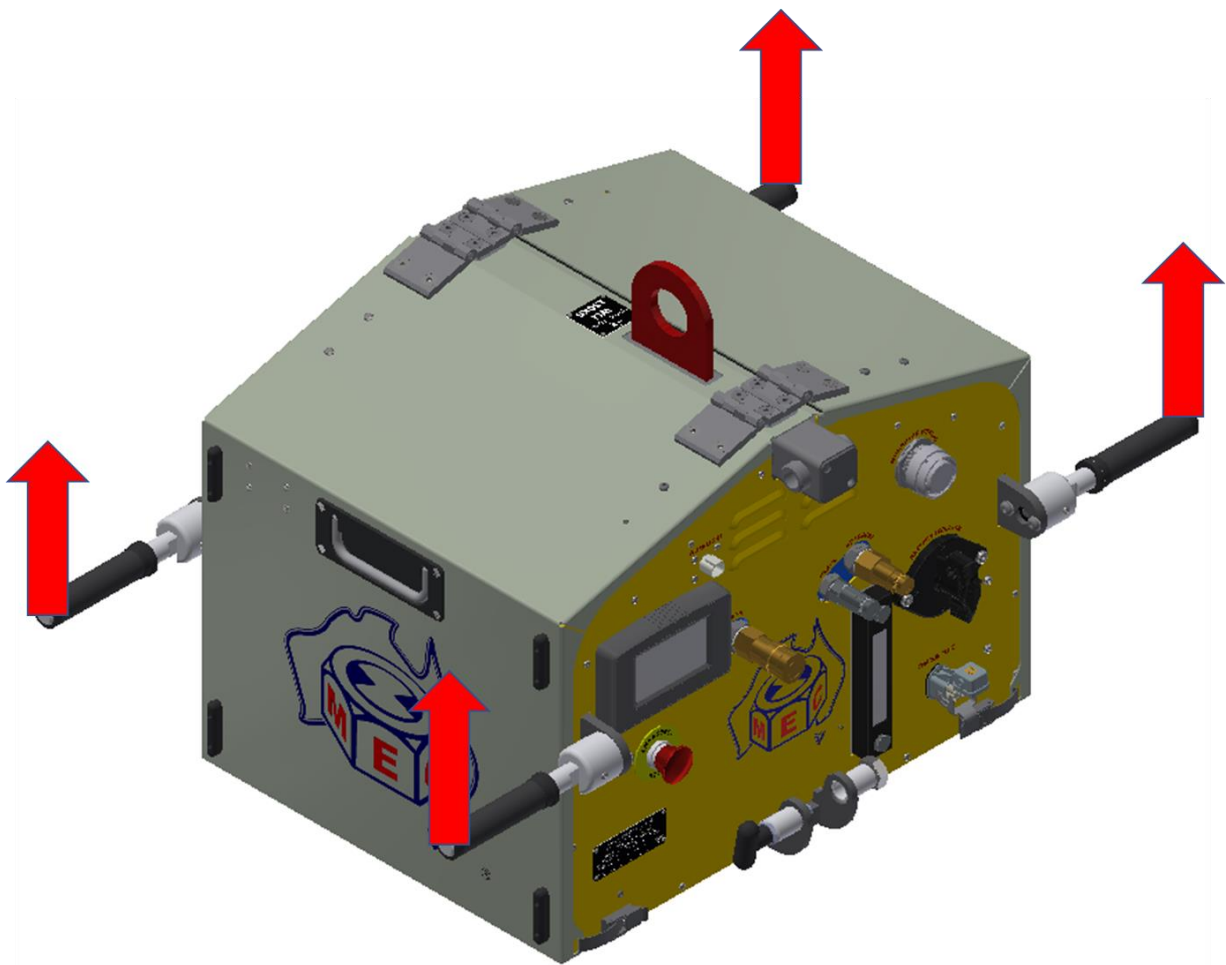


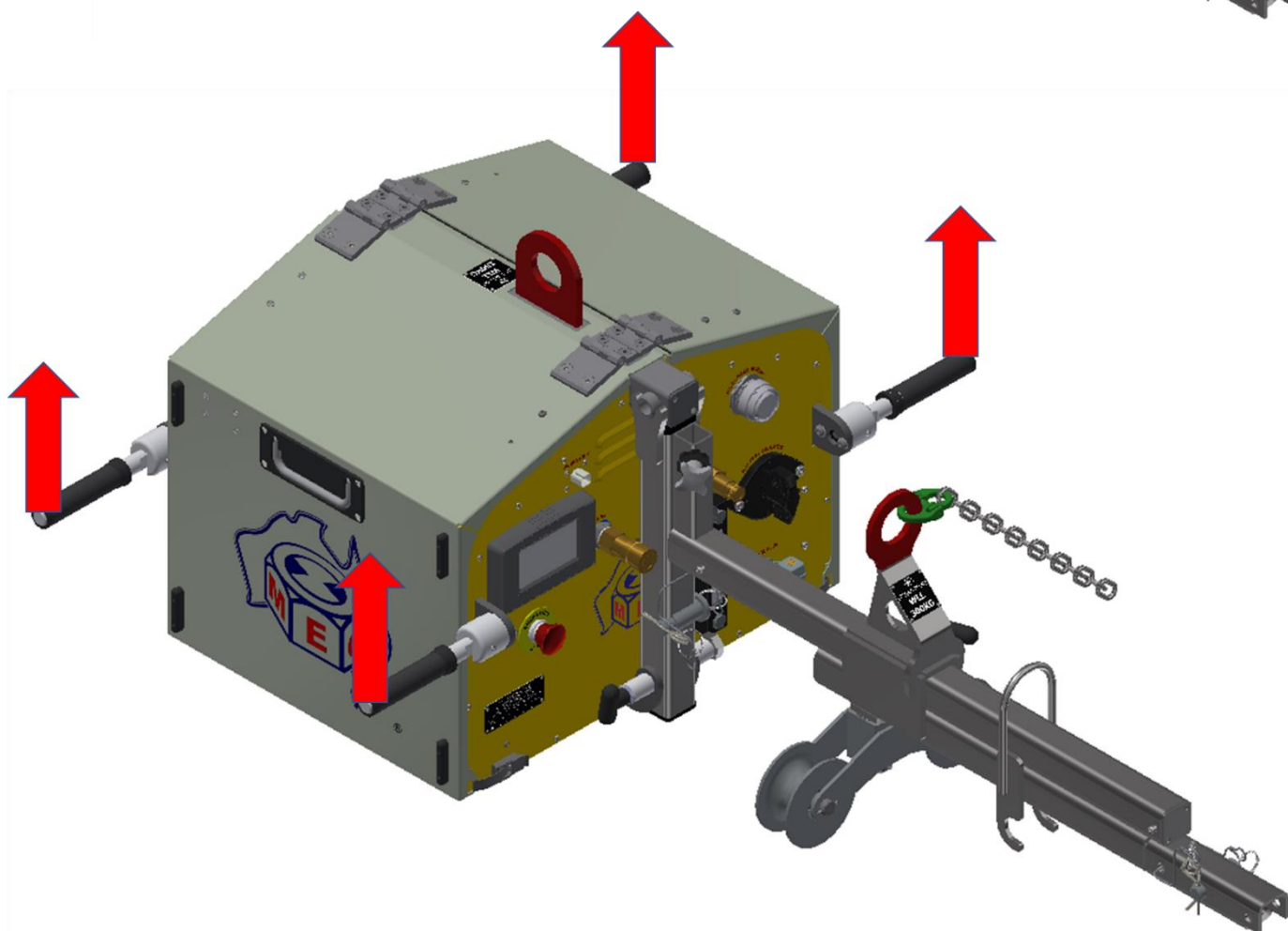
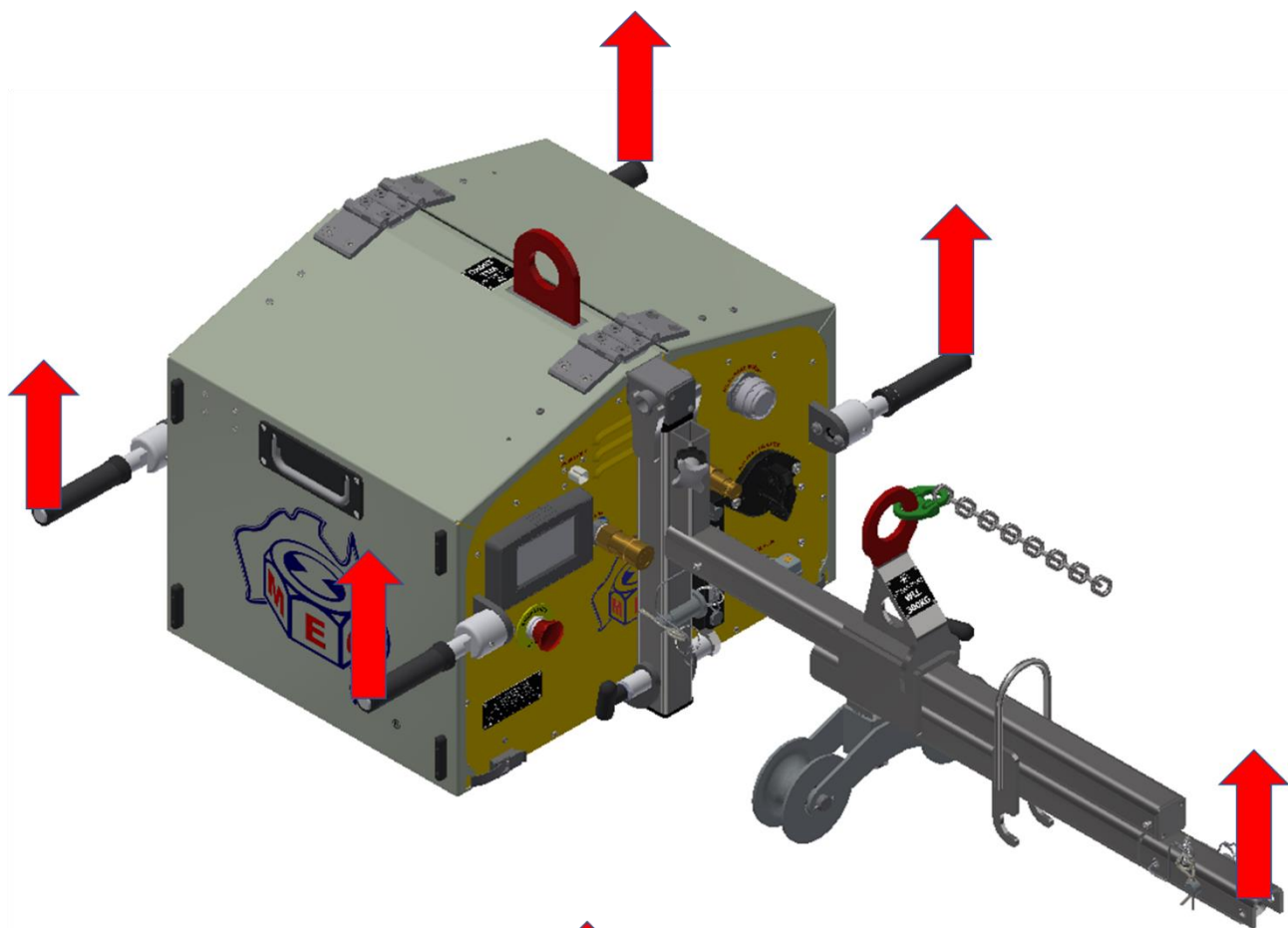
8.5.2.2. Manual lifting of Trackpack

1. Manual lifting of this Tracking should only be used if mechanical lifting is not possible, MEC recommends using mechanical lifting only.
2. Observe all safety precautions.
3. Ensure all pre-operation checks have been conducted.
4. Lift from the carry handles as shown below – See table for estimated lifting load per handle.

Manual Lifting Approximate Mass Per Person	
Number of Persons lifting	Mass per person
4 Persons (boom attached)	35kg
5 Persons (boom attached)	28kg
4 Persons (boom removed)	29.5kg
4 Persons (boom & batteries removed)	19.5kg
Boom only	22kg

Lifting Diagrams are on this and the next page:





8.6. Storage & Transport

8.6.1. Storage of Trackpack

MEC equipment should be stored in a secure, safe, dry location to ensure the equipment is not damaged and maintained in good working order.

If possible, machines may be placed onto racks or placed on the ground for storage. Storing the machines in the storage/transport frames will also help to keep the equipment free from damage and allow it to sit level.

Recommended storage temperature range -20°C to 40°C

Equipment must be stored out of direct sun light.

Batteries must be stored with safe storage methods of lithium batteries.

If batteries are not being used for a long period (greater than 3 months) they should be placed on a storage charge “trickle”.

For long term storage MEC Gen 1.2 cell packs should be stored between 52↔53VDC (50↔60% SOC) and -20 ↔ 45°C. this is to prevent accelerated cell degradation causing a reduction in battery capacity over time.

Standard MEC gen 1.2 changers are 58.1VDC, long term storage changers are available from MEC.

8.6.2. Transport of Trolley

Place the Trackpack onto a flat surface (truck or trailer) and strap down ensuring the equipment is unable to move. By utilising the storage/transport frames it will help to reduce damage and make it easier to store/transport. See the below sections for possible recommended lashing points.

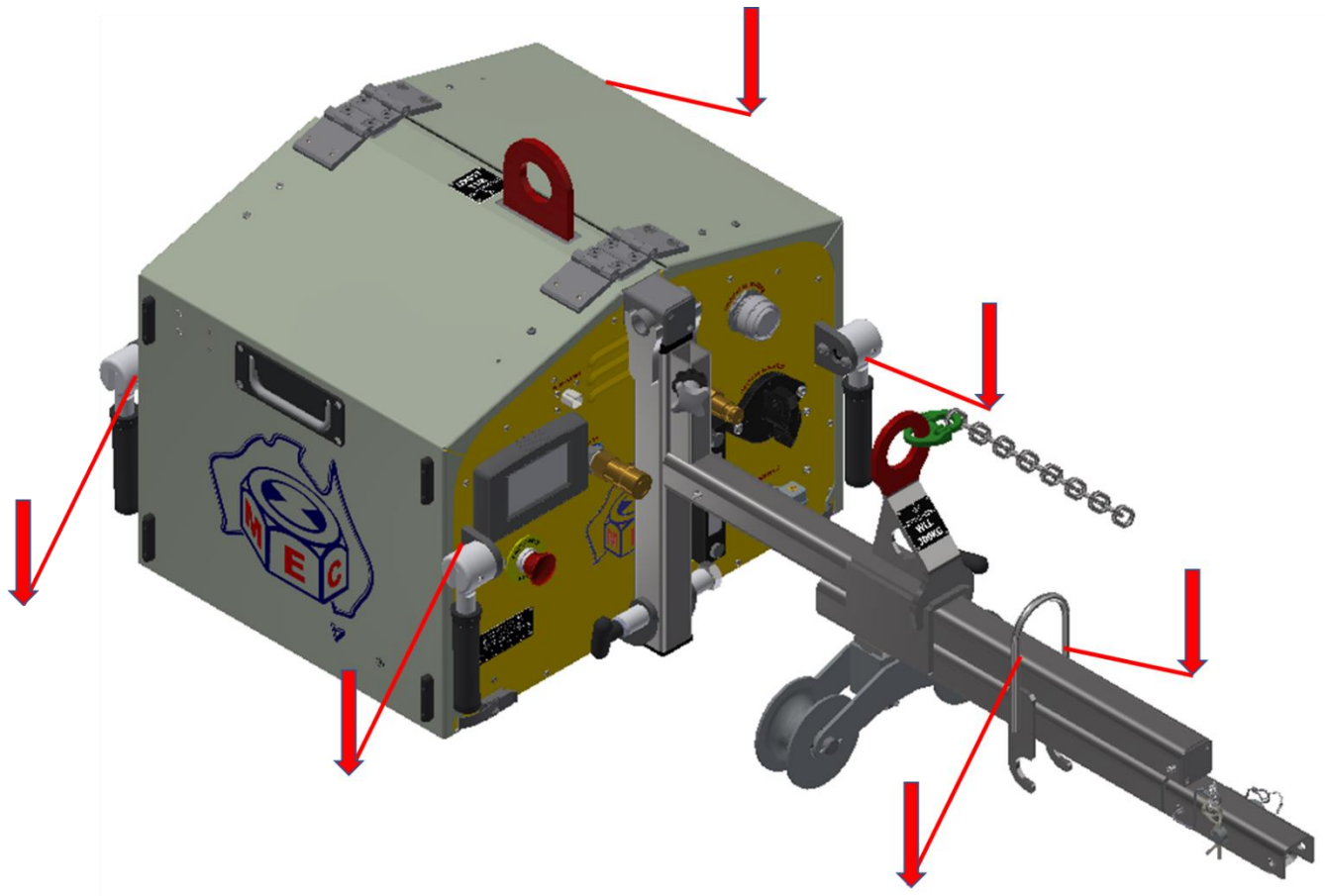
When strapping the equipment down, ensure that the straps are used on the main frames of the equipment to avoid damage. Ensure hoses/cables and other lighter parts of the machinery are not used to secure the equipment during transport.

The boom on the Gen 2 powerpacks are removable. This allows for a smaller freight footprint on a track or transportation crate. The following three sections on the next page show the different possible transportation options.



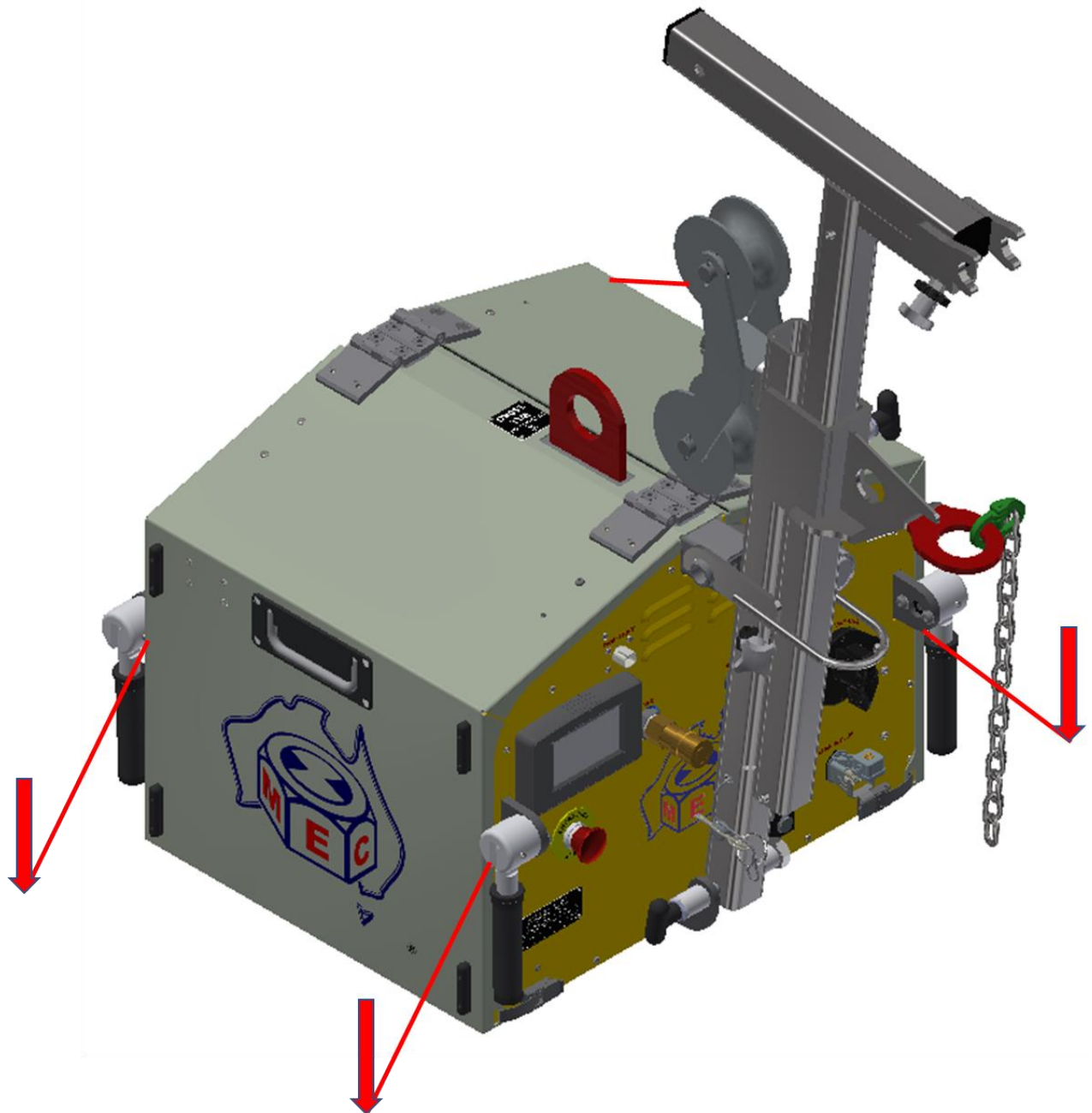
8.6.2.1. *Transport And Stowage Of Trackpack In Operation Position*

The Trackpack can be stored or transported with the boom in the normal operation position. This is how the Trackpack is used with a workhead.



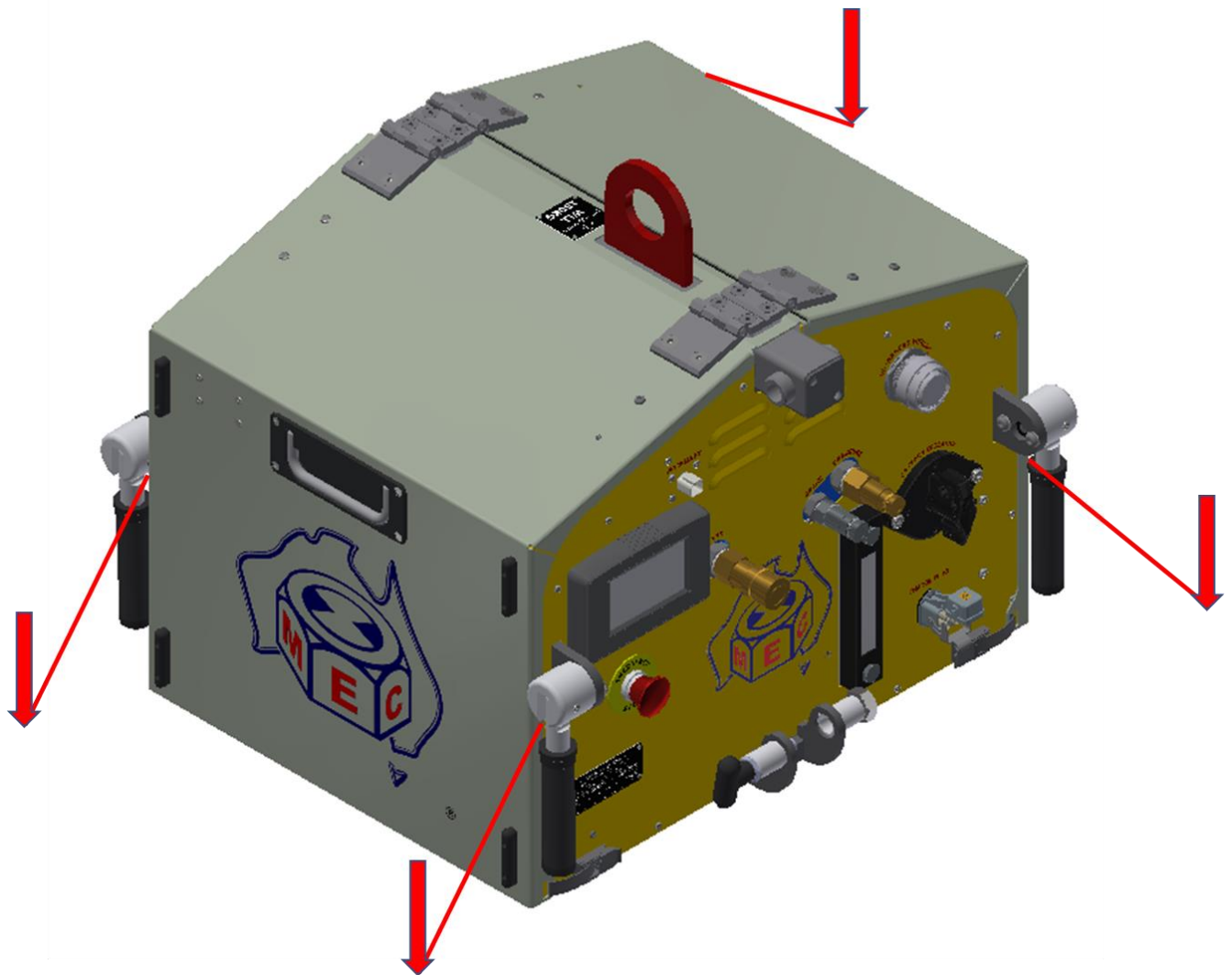
8.6.2.2. *Transport And Stowage Of Trackpack In Stowage Position*

The Trackpack can be stored or transported with the boom in the stowage position. This is with the boom rotated up in the stowage position on the front of the Trackpack. This position reduces the footprint taken up by the Trackpack but increases its height. This position allows the boom to remain attached to the Trackpack during transport or storage.



8.6.2.3. *Transport And Stowage Of Trackpack With Boom Removed*

The Trackpack can be stored or transported with the boom completely removed from the Trackpack. This position reduces the footprint taken up by the Trackpack but the boom must still be transported separately. This position allows for easier storage on racking.



9. Equipment Protection & Care

NOTICE

In addition to the Safety Precautions found in this manual and the supporting tool and engine manuals, observe the following for equipment protection and care

- Make sure all couplers are wiped clean before connection.
- Always store hoses coupled together in a 'loop' to stop hydraulic lock due to the hoses and hydraulic oil heating.
- Always store the Trackpack in a clean dry space, safe from damage or pilferage
- Make sure the power pack hydraulic circuit PRESSURE hose (male quick disconnect) is connected the PRESSURE hose for the tool (female quick disconnect) and vice versa for the RETURN hoses. Do not reverse circuit flow. This can cause damage to the internal seals of the equipment
- Do not connect the pressure port hose from the Trackpack manifold to a support trolley manifold, this could cause catastrophic failure
- Always replace hoses, couplings and other components with replacement parts recommended by MEC. Hydraulic hoses must have a minimum working pressure of 3000psi
- Always keep critical tool markings such as warning stickers and tags legible
- Power pack and tooling repairs and/or service work must only be performed by MEC or certified and authorised dealer
- Do not use the power pack and/or tooling for applications for which it is not intended
- Ensure all bolts are tight and all covers/guards are fitted



10. Maintenance



Before any maintenance of the machine or trolley is performed, ensure the work head and engine are off and secured. Ensure all potential energy is released from the system (springs, cylinders, etc). Ensure maintenance is performed by a competent and authorised person.

10.1. Tools Required to Complete Maintenance

Below are initial tools required to complete general maintenance tasks. Additional tools may be required.

Metric Hex Wrenches (Allen Keys) – 3mm, 4mm, 5mm, 6mm, 10mm	
Combination Wrenches (Spanner) – 8mm, 10mm, 12mm, 13mm, 14mm, 16mm, 17mm, 18mm, 19mm, 22mm, 27mm, 29mm, 7/8", 3/4"	
Adjustable Wrench X2 (Shifter)	
Pin Punch Set – 3/16" (4mm), 8mm	
Metric Socket Set - 8mm, 10mm, 12mm, 13mm, 14mm, 16mm, 17mm, 18mm, 19mm, 22mm, 27mm, 29mm, 7/8", 3/4"	
Ball Pien Hammer	



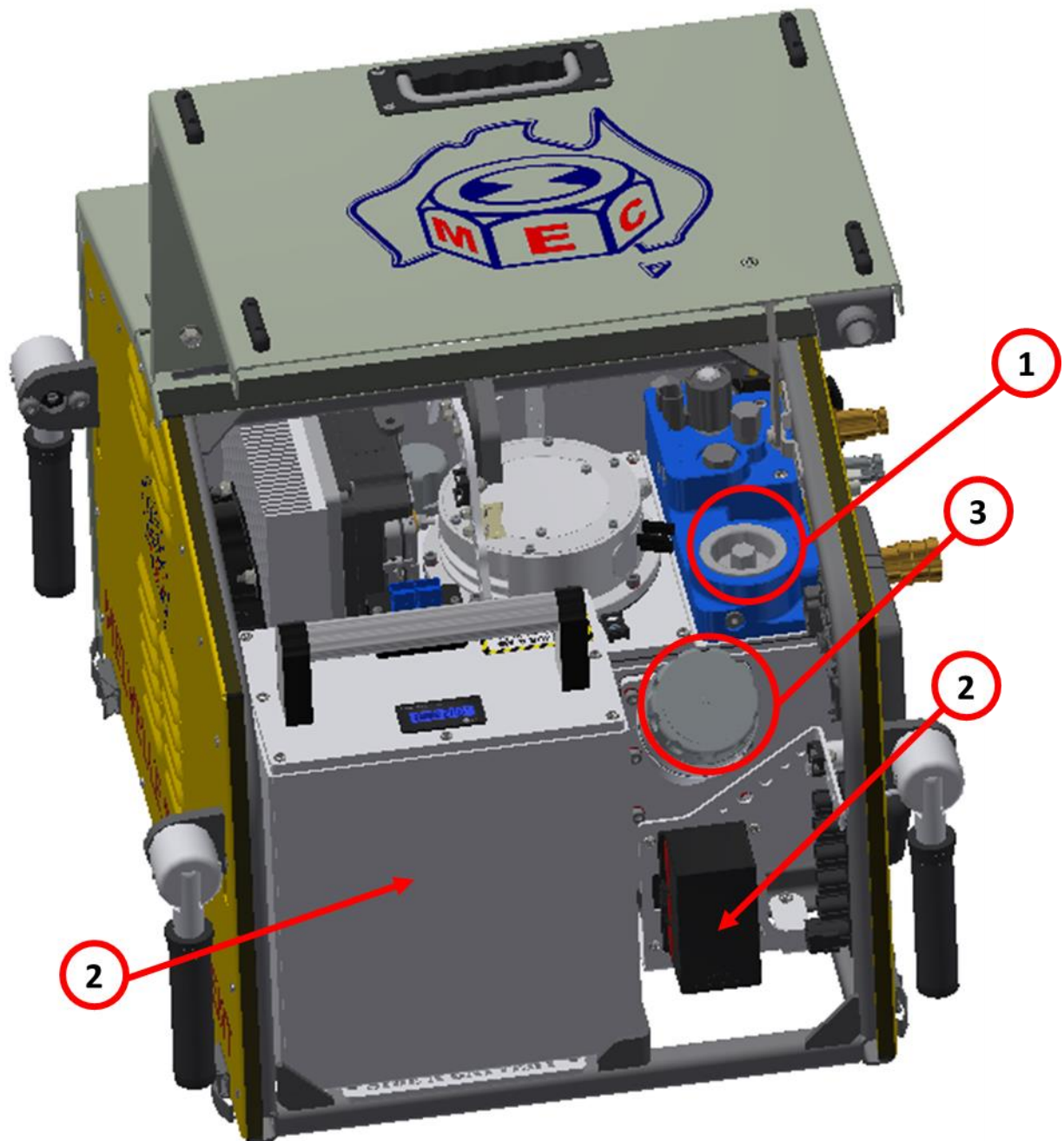
• Soft Face Mallet	
• Phillips Head Screwdriver (various sizes)	
• Flat Blade Screwdriver (various sizes)	
• Multimeter	
• Ruler and/or Verniers	
• Long Nose Pliers	
• Torque Wrench and Sockets	

10.2. Maintenance Spares

143 Gen 1.2 battery Tracpack (FP-143-BEG2 Rev 1) Spares

Below is a list of spares that may be required for general maintenance during the life of the 143 battery Tracpack.

Item	MEC Part Number	Description
1	1430178-FILTER	MANIFOLD HYDRAULIC OIL RETURN FILTER ELEMENT
2	1430251	BATTERY PACK GEN 1.2, LITHIUM ION, 52V, 62Ah, 20KG
3	FILBRE-80-SBP10-B80	FILLER BREATHER STEEL CAP 80mm 10PSI 80mm BASKET
4	VARIOUS FUSES	SEE FUSE TABLE BELOW

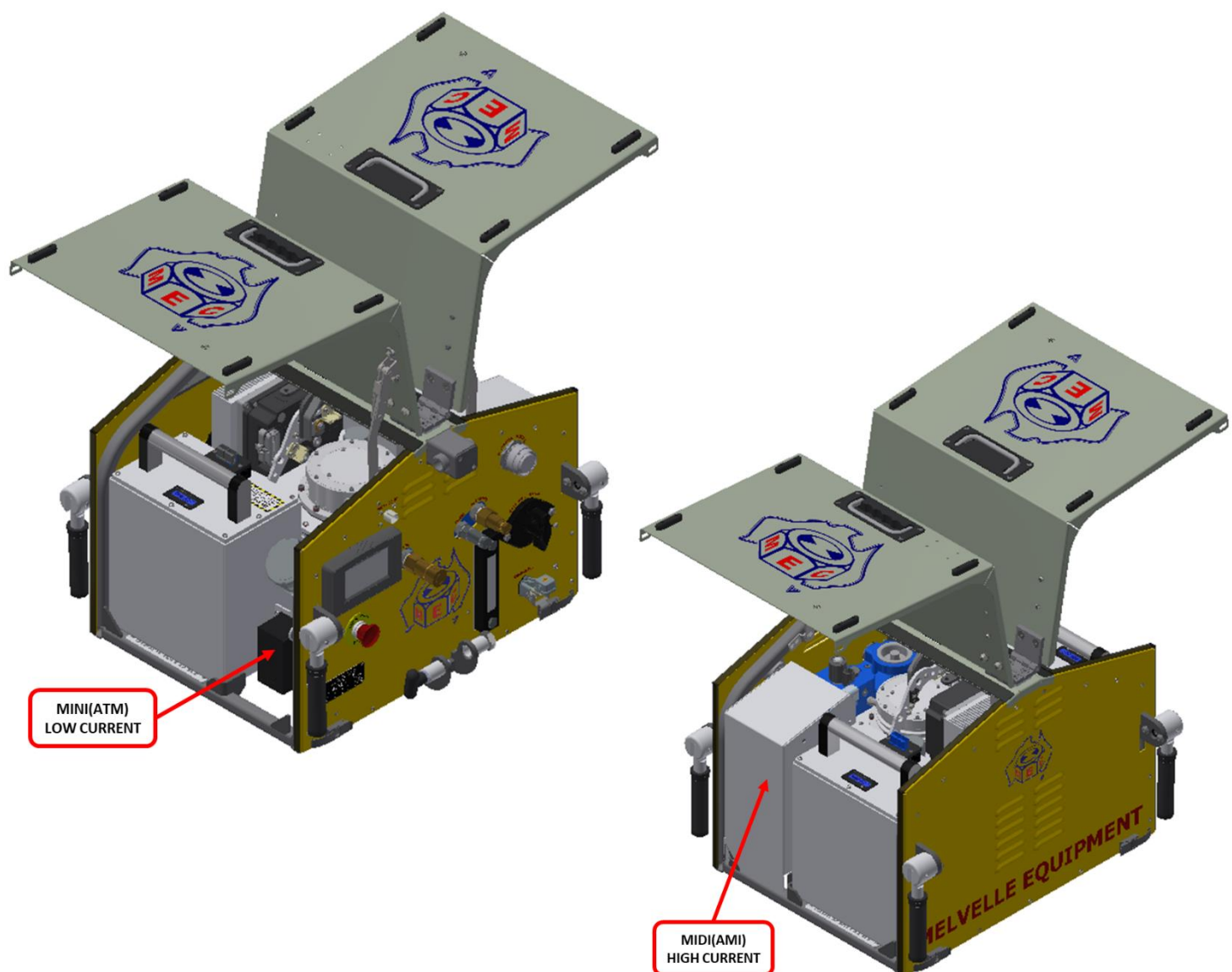


143 Gen 1.2 battery Trackpack (FP-143-BEG2 Rev 1) Fuses

There are various fuses protecting circuits on the battery Trackpack. If a fuse has blown it is because there is a fault on that circuit. Make sure the fault is rectified before fitting a new fuse. The circuit diagram (hybrid schematic) can be found in the ?? section of this manual. Contact MEC if you are unsure on the cause of the fault for advise.

Type	Current rating	Colour	Qty per unit	MEC part #
MIDI (AMI)	125A	Pink	2	ELECT597
MIDI (AMI)	200A	Violet	1	ELECT598
MINI (ATM)	2A	Grey	1	ELECT438
MINI (ATM)	5A	Tan	1	ELECT379
MINI (ATM)	10A	Red	5	ELECT380
MINI (ATM)	15A	Blue	2	ELECT381
MINI (ATM)	25A	Natural	1	ELECT595

All fuses fitted inside the battery Trackpack are 58VDC rated fuses, if replacing any fuses in the Trackpack they must be 58VDC rated or higher, using standard 32VDC fuses on a 58VDC system can result in the fuse blowing but remaining connected. If you are unsure on suitable fuses contact MEC for replacement. **Using an incorrect current or voltage rated fuse can result in a potential fire risk!**



10.3. Maintenance Period¹

REGULAR SERVICE PERIOD*		Each use	Every 1 month or 10hrs	Every 3 months or 25hrs	Every year or 250hrs	500 hrs
Perform at every indicated month or operating hour interval, whichever comes first.						
Item						
Hydraulic Oil Filters (Low Pressure Return In Manifold)	Change			X (1)		X
Hydraulic Oil	Check	X				
	Change					X
Hydraulic Hoses	Check	X				
	Check/Change					X (3)
Hydraulic Pump	Check			X (1) (4)		X (4)
Battery	Check	X				
	Capacity Test				X(5)	
	Change				X(6)	
Emergency Stop	Check	X				
Nuts, Bolts, Screws, Fittings	Check				X	

*If heavy machine use, the service period may be less.

- (1) First 25 hrs of use
- (2) Only to be performed by MEC or certified and authorised dealer.
- (3) A thorough inspection is required. If hoses undamaged they may stay in service. However, replace hoses every 3 years of operation.
- (4) Flow and Pressure Check
- (5) Not required for the first 3 years in normal use (less than 100 discharge cycles per year)
- (6) Replace batteries cells when their capacity no longer meets requirements of work required, MEC recommends replacing if capacity fall below 75% of original (new) capacity

¹Refer to engine manual for detailed engine instructions and requirements

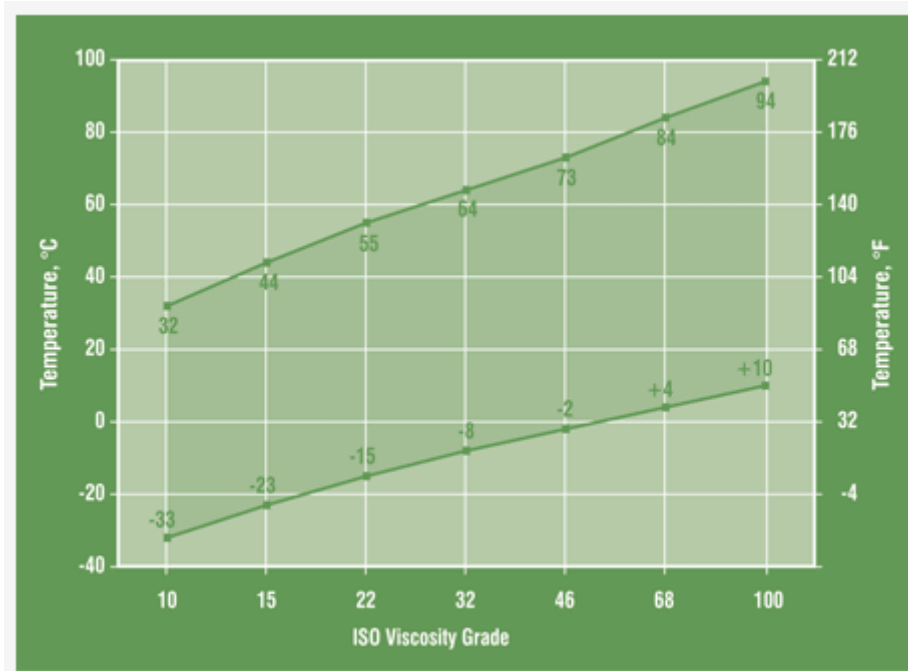


10.4. Recommended Fluids

10.4.1. Hydraulic Oil

Below are all the recommended hydraulic oils viscosities based of ambient temperature.

Unsuitable hydraulic oil or using the wrong viscosity oil can considerably reduce hydraulic component service life and result in poor performance of tools. Only use hydraulic oil that fulfills the specifications stipulated below.



11. Troubleshooting¹

11.1. Table Of Issues

PROBLEM	POSSIBLE CAUSE	CORRECTION
Control panel will not illuminate	Battery charge low BMS lockout	Charge battery through charge plug or directly onto batteries.
	Battery not connected	Check battery connections.
	Isolator off	Check Isolator.
	Fuse blown	Check high & low current fuses.
Control Panel Errors During operation	Error displayed on control screen	See below (section 11.2) for information on all control screen errors.
Control screen active but unable to perform work (no hydraulic power)	Fuse blown	Check high & low current fuses.
	Motor controller fault code	See below (section 11.2) for how to check motor controller errors
	Motor controller connection issue	See below (section 11.2) for how to check motor controller connection issues.
No hydraulic oil flow/little flow	No hydraulic oil	Check hydraulic oil level. Fill if required.
	Pressure and Tank (return) hoses interchanged	Check connection.
	Couplers or hoses blocked	Remove restriction .
	Filter blocked or old	Replace filter.
	Hoses leaking	Check hoses and replace if required.
	Contamination in valves	Check and clean or replace if required.
	Pumps damaged	Perform pump check and replace if required.
Hydraulic oil overheating	Air obstruction	Remove obstruction to ensure sufficient air flow around heat exchanger.
	Incorrect oil for operating temperature	Replace oil with correct grade for operating conditions.
	Dirty/old oil	Replace oil
	Oil temperature and pressure increase in hoses	Allow hoses to cool
Unable to connect hoses	Pressure stored in hoses	Allow hoses to cool down Ensure powerpack and workhead are returning to tank (not in function)
	Operation button in function position	Place workhead in neutral.

¹Refer to engine manual for detailed engine instructions and requirements



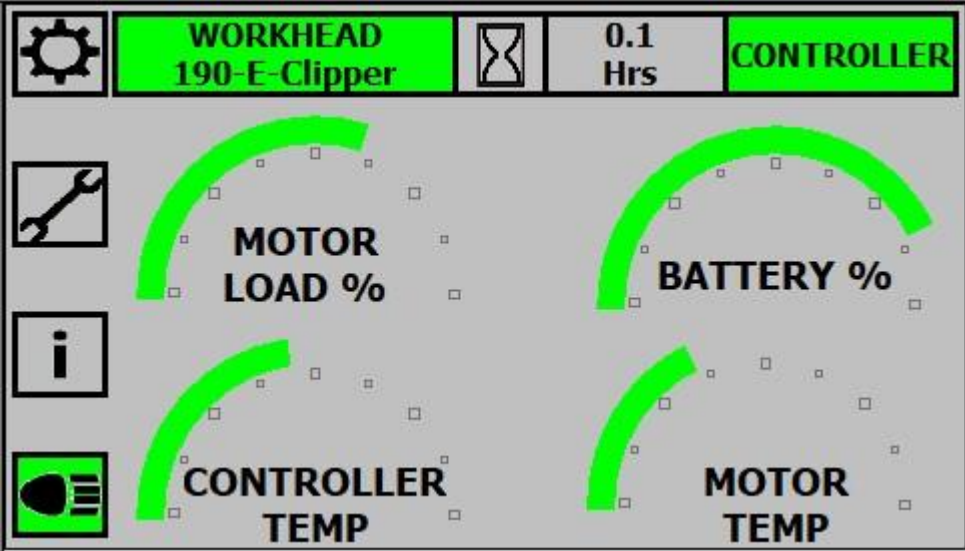
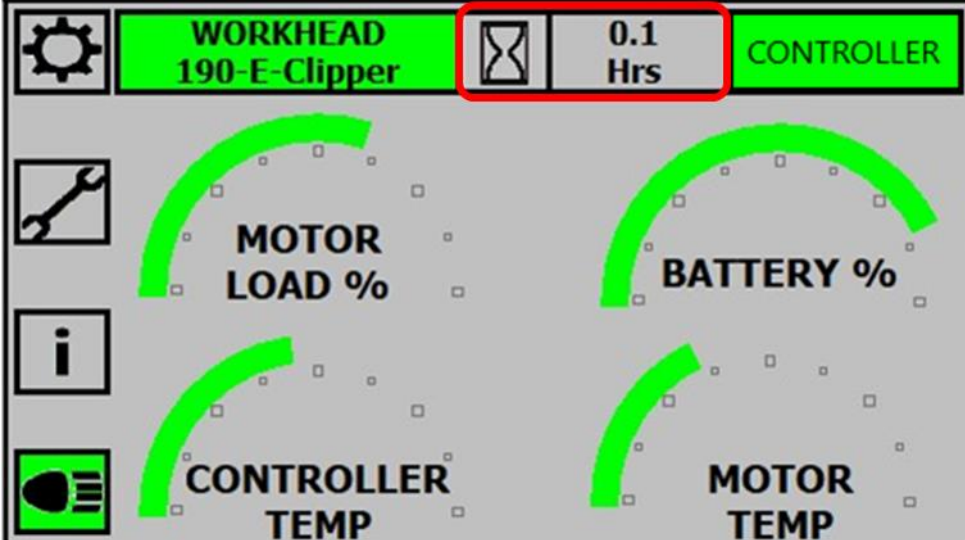
Emergency stop does not work	Wiring and/or connections damaged	Inspect wiring and replace damaged parts.
	Switch Damaged	Check/Replace switch.
Worklights does not turn on	Blown fuse	Check low current fuse panel.
	Defective relay	Check workhead and/or powerpack relays.
	Deflective light	Check light on 12V source. Contact MEC for replacement if faulty.
Control buttons or levers do not preform required task	Fault button	See below (section 11.2) for input/output diagnostics. Replace button or lever. Contact MEC for spares.
	Faulting wiring or plug	See below (section 11.2) for input/output diagnostics. Replace wiring or plug. Contact MEC for spares.



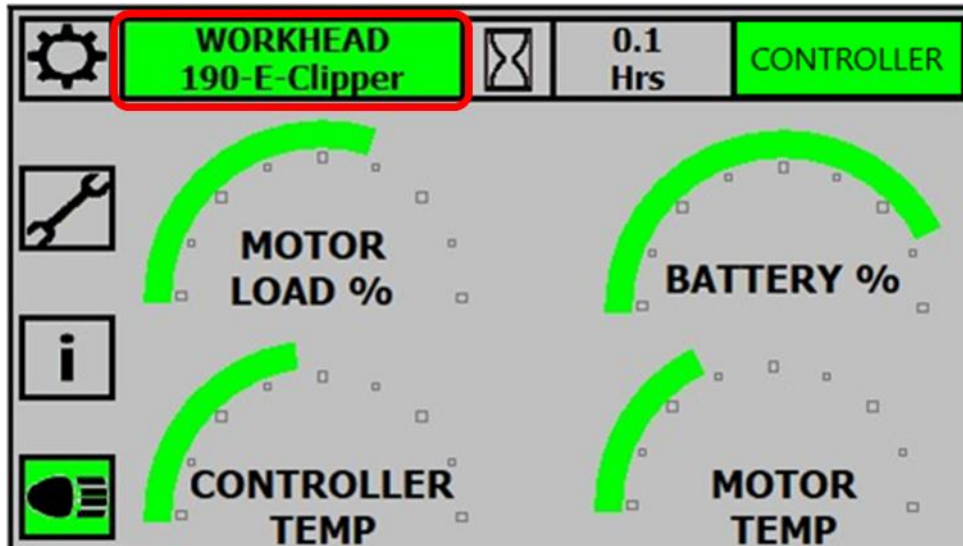
11.2. List Of Self-Diagnostic Errors

The Power pack is fitted with a control panel for monitoring engine and is used for fault finding and showing system errors.

Below is a list of errors (display screens and icons) that can appear on the diagnostics screen, and a potential solution.

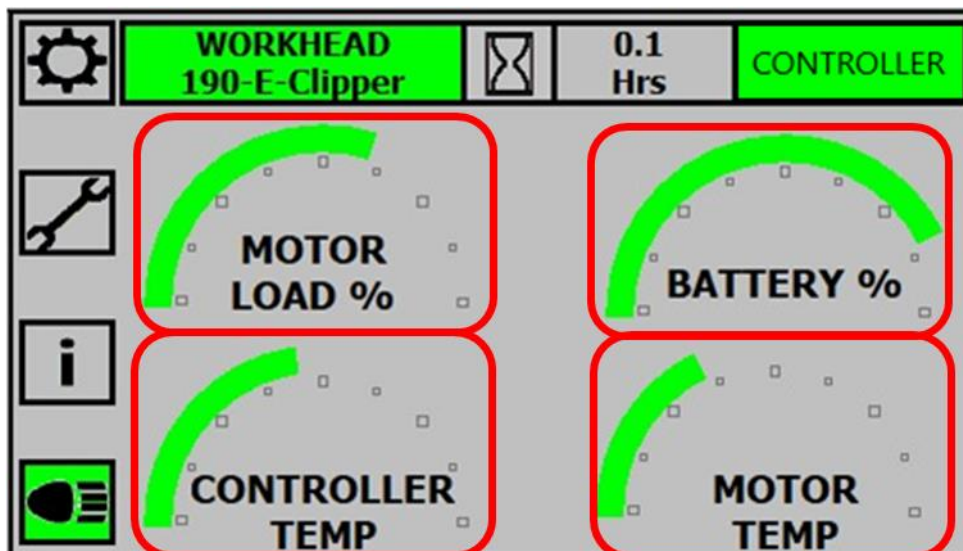
<u>Error Messages and Display Windows</u>	<u>Solution</u>
SYSTEM ONLINE: NO FAULTS – there are no faults on the system and the system is ready to function. 	None required
MOTOR RUN HOURS – Hours motor has been actively running 	Quick home menu view of motor run hours. Motor run hours only of

WORKHEAD IDENTIFICATION – Current workhead connected to the Trackpack



This will display the workhead currently connected to the Trackpack. Each workhead has a unique identification plug that the system will automatically configure all the control setting to. If no workhead is connected this will display “NO WORKHEAD CONNECTED”

HOME SCREEN DIALS



The home screen contains 4x dials.

Motor load:
Displays the current load on the motor as a percentage of its maximum allowable load.

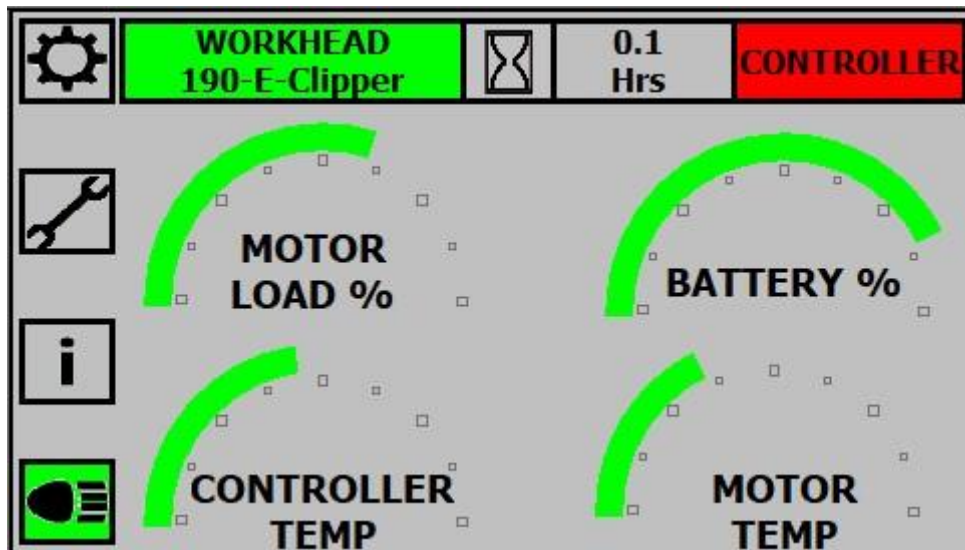
Battery %:
Displays the current battery percentage. Note if two batteries are connected this will be an average of the two batteries.

Controller temp:
Displays the motor controller temperature as a percentage of its maximum operating temperature.

Motor temp:
Displays the motor controller temperature as a percentage of its maximum operating temperature.



CONTROLLER ERROR – the connection to the motor controller has been lost or broken.



Check plug and wiring from System controller (control screen) to motor controller.

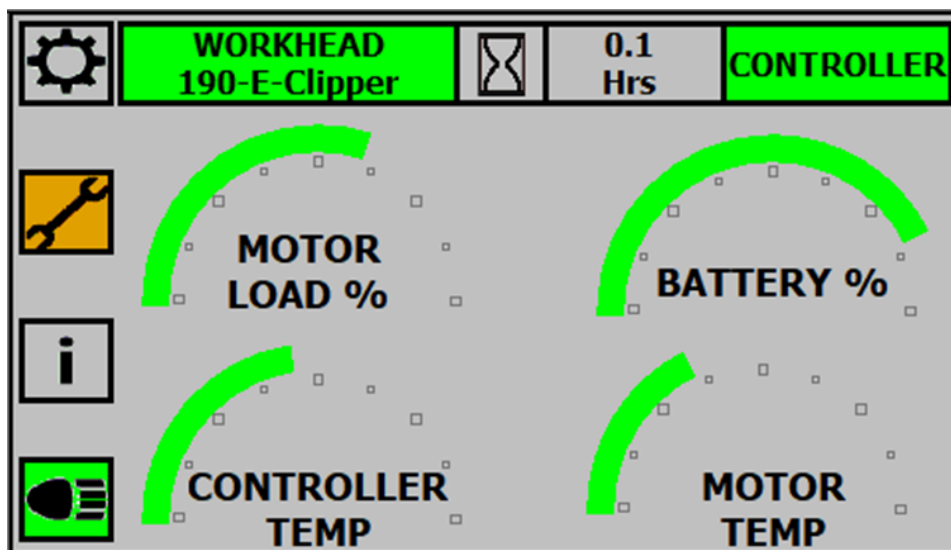
EMERGENCY STOP PRESSED – the estop on the Trackpack or the workhead has been pressed.



Reset all pressed emergency stop and acknowledge error on screen (press and hold reset button). Trackpack, workhead or a combination of both estops will be displayed on the screen depending on what has been activated. Emergency stops must be release and the error acknowledged on screen before operation can continue. System acknowledgment will take a button hold of 3 seconds to reset, this hold time is displayed via the bottom load bar.



SERVICE MENU ICON ILLUMINATED – The remaining time until the next required service is low.



Once the “TIME UNTIL NEXT SERVICE” goes below 10 hours the service icon will illuminate orange. Icon will remain orange until service is complete and service counter reset. Please see the next page for resetting service timer.

SERVICE MENU – Service information and test screen.

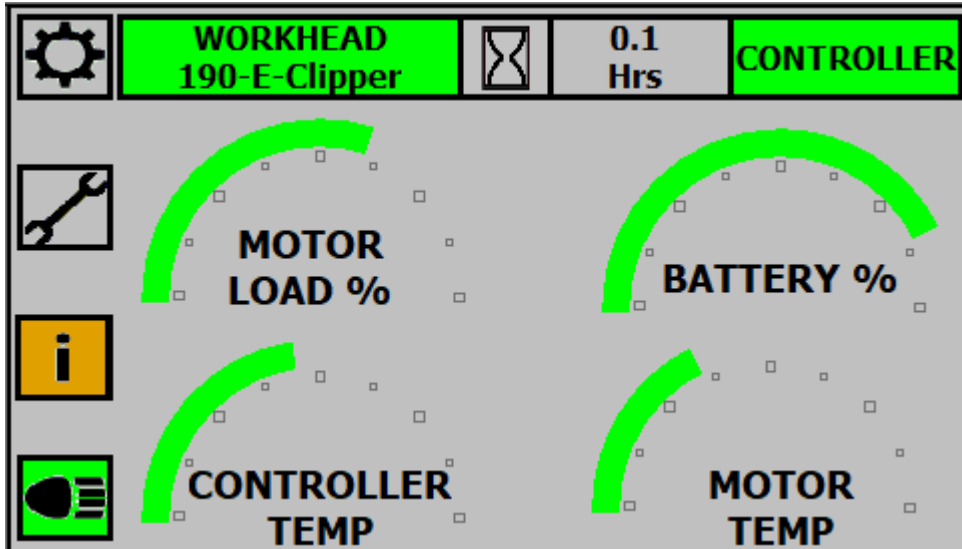
SERVICE MENU	
TOTAL RUNTIME	0.0 Hrs
MOTOR HOURS	20.0 Hrs
TIME UNTIL NEXT SERVICE	485.0 Hrs
MAX MOTOR TEMP RECORDED	0 °C
MAX CONTROLLER TEMP RECORDED	0 °C
FUNCTION TEST	BUZZER FAN PRESS AND HOLD TO CONFIRM SERVICE

TOTAL RUNTIME	The total runtime is the amount of hours the Trackpack has been on since manufacture.
MOTOR HOURS	The total amount of hours the Trackpack motor was been actively moving since manufacture.
TIME UNTIL NEXT SERVICE	Current remaining time until next required service.
MAX MOTOR TEMP RECORDED	The maximum temperature recorded by the motor since manufacture.
MAX CONTROLLER TEMP RECORDED	The maximum temperature recorded by the motor controller since manufacture.

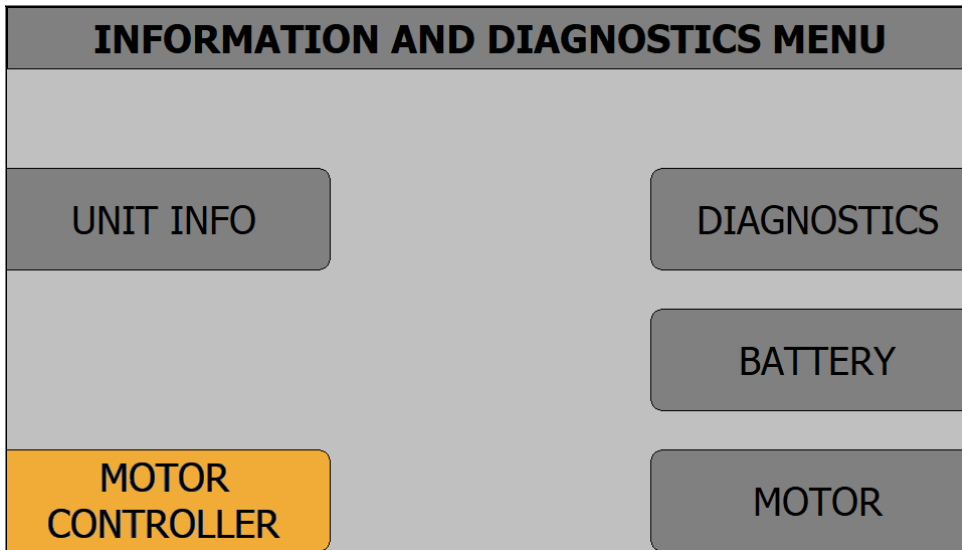
Once a routine service as per section “10.3 - Maintenance Period” has been complete the service interval counter can be reset. To reset the service interval press and hold “PRESS AND HOLD TO CONFIRM SERVICE” The service interval will now be reset to the recommended time until next service. The “FUNCTION TEST” button will cycle through “BUZZER”, “FAN” and off. This is to test the fan and buzzer are working without reaching their initialisation requirements. Data from the service screen can be used to see if motors or motor controllers need to be replaced.



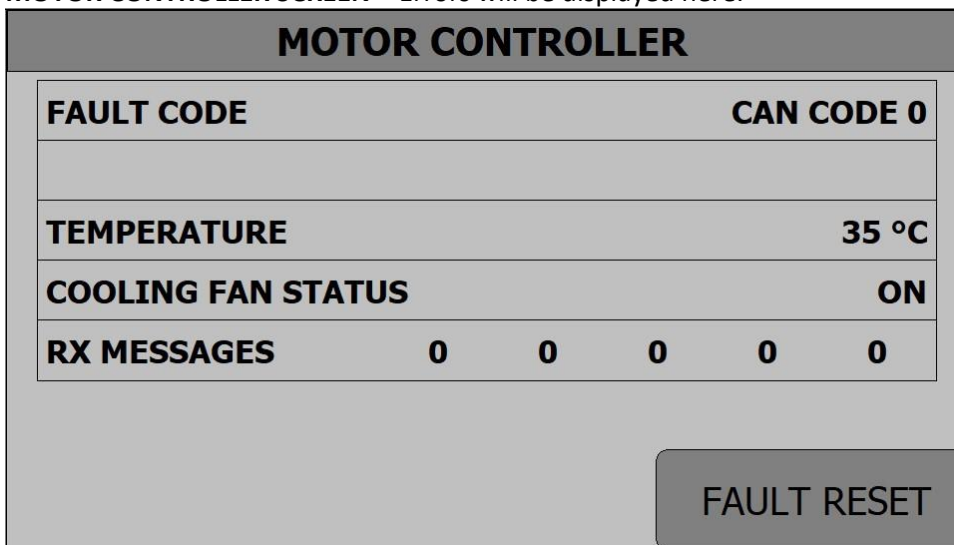
INFO MENU ICON ILLUMINATED – Motor controller error.



INFORMATION SCREEN – Motor controller sub menu illuminated.



MOTOR CONTROLLER SCREEN – Errors will be displayed here.



The information icon will illuminate orange when there is a motor controller error. Once entering the information sub menu the motor controller button will also be illuminated orange. Opening the motor controller information screen will display all current motor controller fault codes. Contact MEC with fault codes for diagnostics on rectifying issues.

Motor controller info

Displays information on the motor controller.

“FAULT CODE” if the motor controller is in error state an error code will display here, refer to MEC for diagnostics.

“TEMPERATURE” this is the current temperature of the motor controller.

“COOLING FAN STATUS” will display if the fan is on or off.

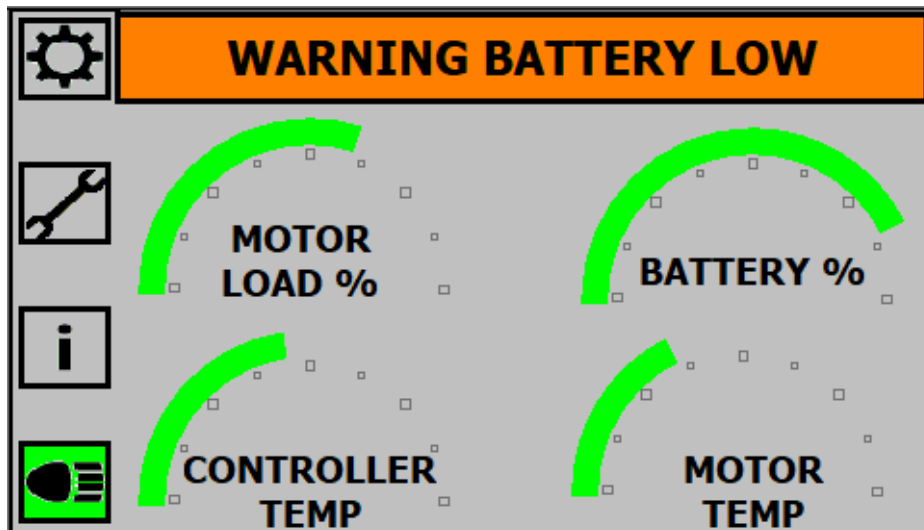
“RX MESSAGE” can be used to see if the CANBUS is active, refer to MEC FOR diagnostics.

The fault reset can be used to reset an error code on the motor controller if the issue causing the fault has been fixed.

INACTIVE TIMER ACTIVATED – 10 MINUTES – If	Once power saving mode starts the screen with display “START ENGINE”, the white noise buzzer will start, all worklights will turn off and be locked out. These features of the power saving mode will stay in effect until the engine is started or the unit switched off. This is to prevent running batteries flat.
Inactive timer override –	Once screen power saving mode starts the screen with display “INACTIVE TIMER” message dim the screen and stop all non-critical processes unit. When in this mode all features of the 5 minutes power saver mode will still continue. This mode is to further reduce battery draw and try prevent the batteries running flat.

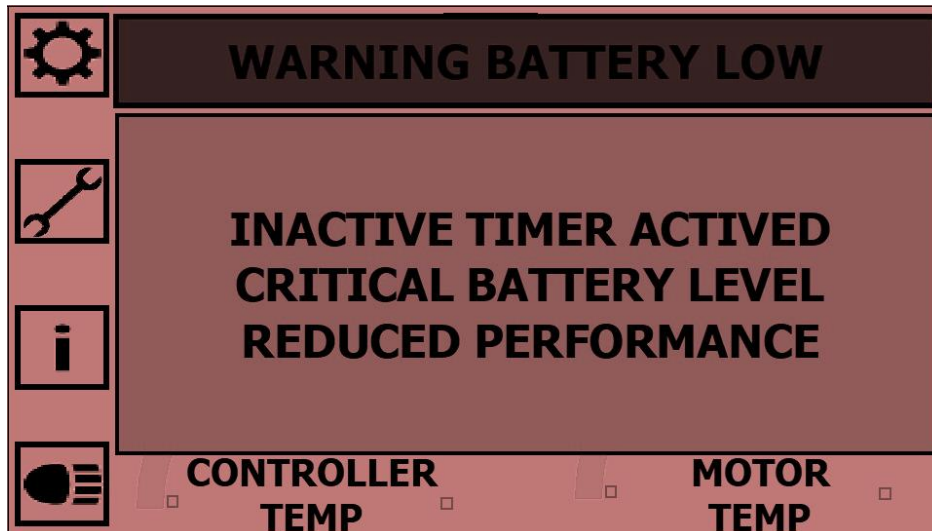


LOW BATTERY WARNING



This top battery warning banner will appear when the battery is low. This warning will appear when the battery reaches **?%** and will remain until the batteries are charged above this threshold.

CRITICAL BATTERY WARNING



These warnings will appear when the battery reaches a critical level, the Trackpack is likely to experience reduced performance and will shut off without notice. Charge batteries or swap for a fully charged set as soon as possible. The top red banner "WARNING BATTERY LOW" will remain displayed and the centre **???** warning will flash on and off until the batteries are charged above the critical threshold.



DIAGNOSTICS SCREEN – All input and outputs active screen

INPUTS	OUTPUTS
BRAKE BUTTON	BRAKE RELEASE SOLENOID
FUNCTION BUTTON	WORKHEAD SOLENOID #1
ENABLE LEVER	WORKHEAD SOLENOID #2
BRAKE BYPASS SWITCH	WORKHEAD SOLENOID #3
WH ID #1	WORKHEAD SOLENOID #4
WH ID #2	COOLING FAN
WH ID #3	
WH ID #4	
WH SENSOR #1	
WH SENSOR #2	
WH SENSOR #3	
WH SENSOR #4	

This screen has all the inputs and outputs of the controller. When an input or output is activated, it will illuminate in this diagnostics. You can use this screen to see if there is a fault with any functions of the Trackpack and workhead. If an input or output does not illuminate when it is suppose it there is likely a wiring, plug or switch fault.



SCREEN INDICATION LEDs



At the top of the screen there are a series of indicator LEDs
Please see the table below of what each of the LEDs indicate of the system when illuminated.

Symbol	Designation	Description of LED indication
PWR	Power LED	This led will illuminates when the control screen is powered up
1	Master light switch	If this LED is on the worklights are active, if the LED is off the worklights are off, if the LED is flashing the worklights are on and the inactive timer has been overridden (see above for information on in active timer)
2	-	This LED does not illuminate
ALM	System healthy status	Illuminates if any essential system parameter thresholds are reach (system will still function until any one of these parameter reach the critical threshold at which point the stem will shut down) Below are the parameter triggers: Motor controller temperature > 65°C Motor temperature > 90°C Battery voltage < 40VDC Control voltage (DCD output) <12VDC or >15VDC
FLT	CAN heartbeat	Illuminates if there is a communication fault between the control screen and the motor controller (wiring disconnect or major internal motor controller failure)



12. Further Documents

Please refer to the further documents within for drawing, risk assessment and other related information.

Further documents for the 143 Trackpack:

Document No.	Description	Type	Page
108-215	Trolley to Power Pack Attachment	Drawing	79
143-48	Trackpack Boom Adjustment	Drawing	80
143-302	Battery Trackpack Gen 1.2 General Assembly	Drawing	81
143-314	Gen 1.2 Electrical Circuit Diagram – Component (Hybrid) Schematic	Drawing	89
143-322	Battery Trackpack Gen 1.2 Hydraulic Circuit Diagram	Drawing	90
143-323	Battery Trackpack Gen 1.2 Hydraulic Manifold Drawing	Drawing	91
143-OPRA	Operational Risk Assessment	Document	92



12.1. Trolley to Power Pack Attachment

1. PLACE TROLLEY ONTO RAIL

2. LIFT POWERPACK AND WORKHEAD BY LIFTING EYE AS SHOWN

3. ROTATE CROSS TROLLEY UNTIL SQUARE WITH BOOM

4. SLOWLY LOWER THE ASSEMBLY DOWN AND MOVE THE BASE

TROLLEY TO LINE UP WITH THE CROSS TROLLEY.

NOTE: DO NOT ATTEMPT TO ROTATE THE CROSS TROLLEY WHILE

MACHINE IS BEING LOWERED.

NOTE

*SAME LIFTING PROCEDURE USED

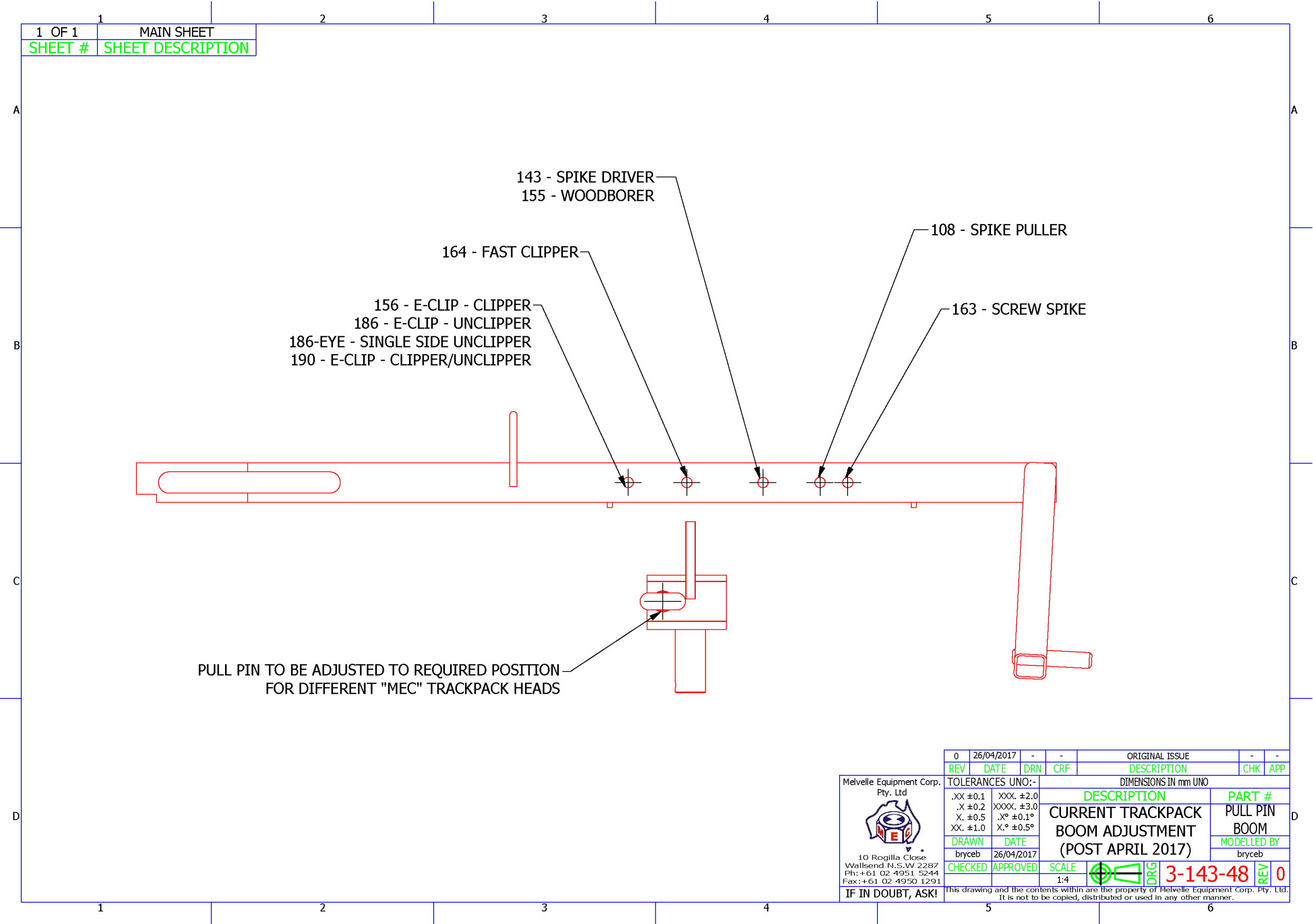
REGARDLESS OF WORKHEAD BEING USED

* WHEN LIFTING COMBINE WORKHEAD

AND TRACKPACK LIFT FROM CENTER EYE

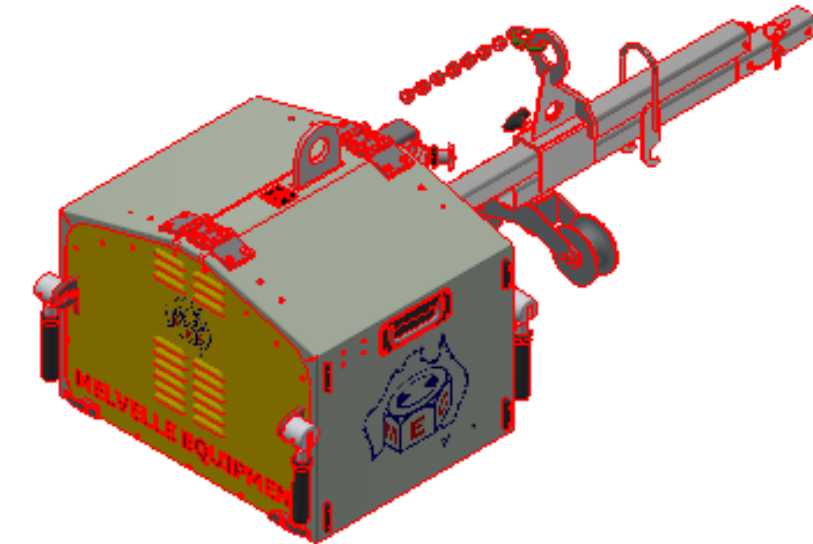
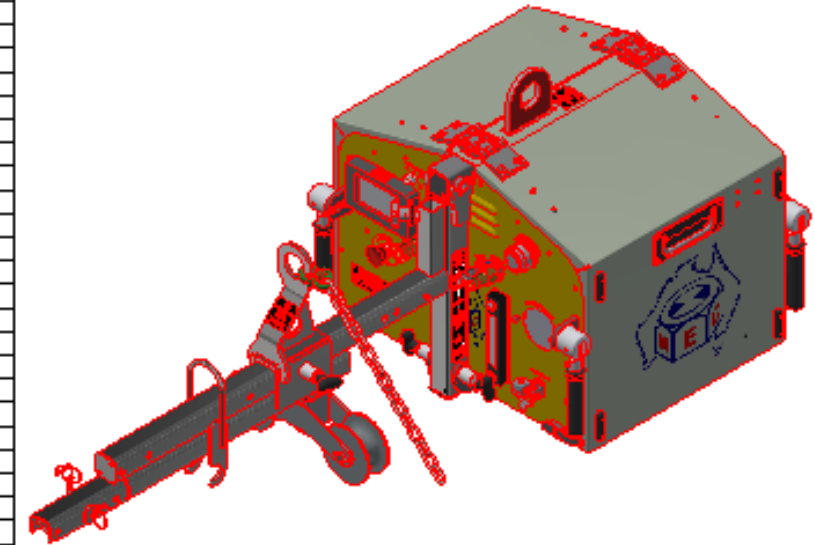
ONLY (ENSURE BOOM PIN IS SECURED)

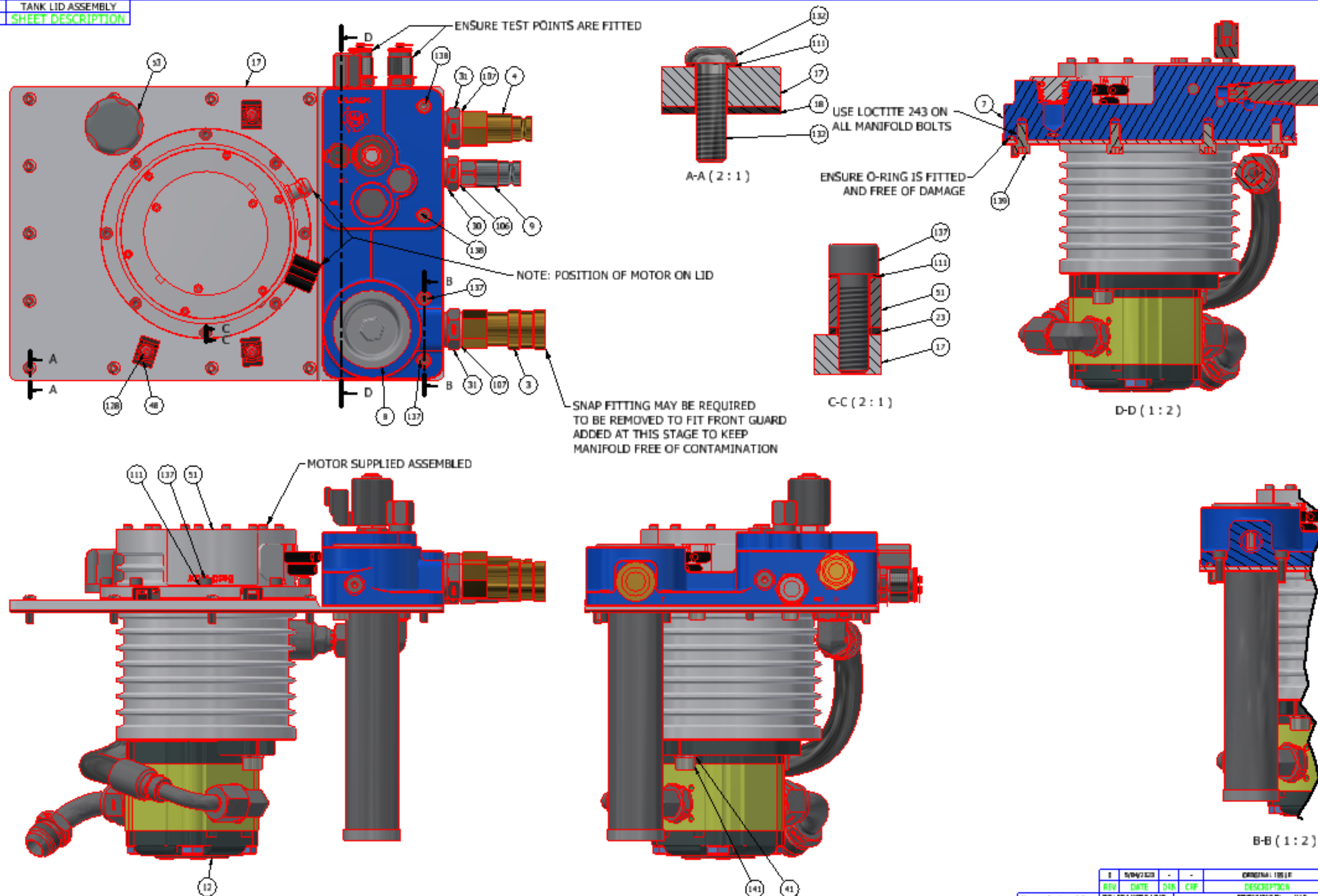
12.2. Trackpack Boom Adjustment



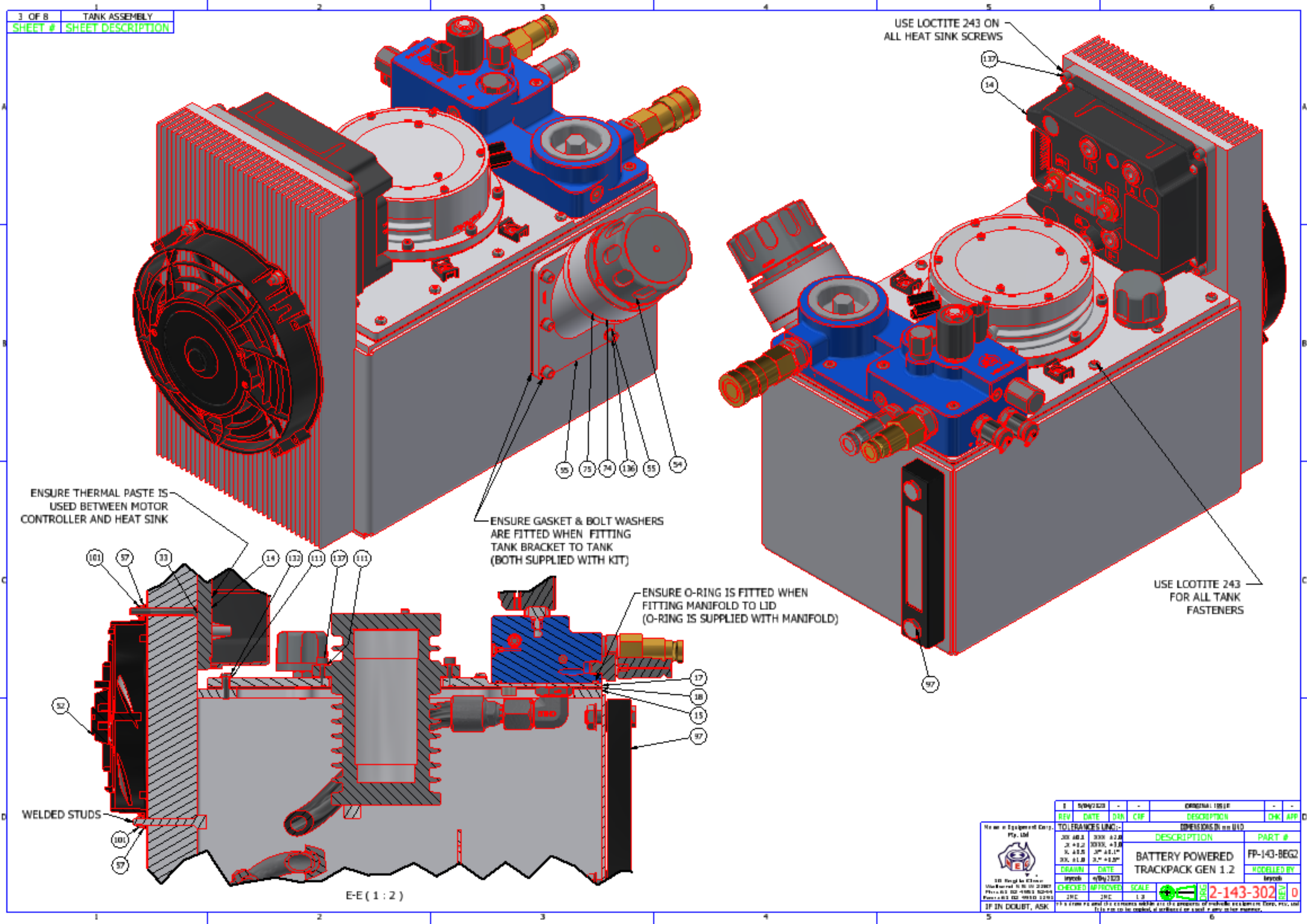
12.3. Battery Trackpack Gen 1.2 General Assembly

1 OF 8 ASSEMBLY BOM					147 WHITE NOISE BUZZER 8744A					WNB-88887					
SHEET # SHEET DESCRIPTION															
72	NIPPLE 3/4" BSP X 1-1/16" IIC			CP2-1217	1	-	147	U DRIVE SCREW			UDSCREW	13	-		
71	TUBE ASS SHORT 90 F/M 1-1/16" IIC			C93 1717	1	-	146	FOAM TAPE EPDM 24MM WIDE 3MM THICK			TAPE-EPDM-24-3	2	475		
70	TRACKPACK GEN 1.2 INTERNAL WIRING GUARD			1430253	1	-	144	FOAM TAPE EPDM 12MM WIDE 3MM THICK			TAPE-EPDM-12-3	4	260		
69	LIFTING POINT WLL 150kg Tag			1DTAG08	1	-	143	FOAM TAPE EPDM 12MM WIDE 3MM THICK			TAPE EPDM 12 3	4	390		
68	MELVILLE MODEL & SERIAL N-O AL TAG			1DTAG02	1	-	142	8MM SPRING WASHERS			SWH08	4	-		
67	EXTENDED HINGE ZINC CAST HOLES 36W 1851 4552			HNGE-36-18-45-25	4	-	141	SOCKET HEAD CAP SCREW M10 X 25			SHM1025	2	-		
66	PANEL MOUNT FOLDING PULL SS HANDLE BLACK TRAY			HANDLE-PNH F58L	2	-	140	SOCKET HEAD CAP SCREW M8x25, SS A480			SHM0825-SSA480	4	-		
65	HANDLE GRIPS FLANGELESS SOFT BLACK 7/8" ID X 127mm			HANDLE-NF-S-B	4	-	139	SOCKET HEAD CAP SCREW M8 X 16, A270 (304)			SHM0816-SSA270	4	-		
64	GRUB SCREW M10 SPRING PLUNGER KN SPRING 6mm BALL			GRSM10-SS PLUNG SLOT	4	-	138	SOCKET HEAD CAP SCREW M6 X 50, A270 (304)			SHM0650-SSA270	2	-		
63	FLAT ROUND WASHER M8 x 17 x 1.2mm 304SS			PWM08304	10	-	137	SOCKET HEAD CAP SCREW M6 X 20, A270 (304)			SHM0620-SSA270	14	-		
62	FLAT ROUND WASHER M6 x 12.5 x 1.2mm 304SS			PWM06304	2	-	136	SOCKET HEAD CAP SCREW M6x16, A270 (304)			SHM0616-SSA270	6	-		
61	FLAT ROUND WASHER M3 x 6 x 0.5mm, 304 SS			PWM03304	2	-	135	SOCKET HEAD BUTTON M8 X 25 STAINLESS 316 A470			SHBM0825-A470SS	9	-		
60	WASHER HUDGUARD - M6 X 18 X 1.6mm - STAINLESS A470			PWM0618	5	-	134	SOCKET HEAD BUTTON M8 X 20 STAINLESS 316 A470			SHBM0820-A470SS	4	-		
59	FLAT WASHER - ENGINEERS - M5			PWM05	5	-	133	SOCKET HEAD BUTTON SCREW M6 X 25 STAINLESS 316 A470			SHBM0625-316SS	1	-		
58	FLAT WASHER - ENGINEERS - M4			PWM04	8	-	132	SOCKET HEAD BUTTON SCREW M6 X 20 STAINLESS 304 A270			SHBM0620-304SS	11	-		
57	FLAT WASHER - ENGINEERS 1/4" X 1/2" ZINC			PW0408	6	-	131	SOCKET HEAD BUTTON M6 X 16 STAINLESS 304 A270			SHBM0616-304SS	7	-		
56	FLAT WASHER - ENGINEERS - 5/16" X 5/8" ZINC			PW05	8	-	130	SOCKET HEAD BUTTON M6 X 12 STAINLESS 304 A270			SHBM0612-304SS	5	-		
55	ALUMINIUM FILLER-BREATHER TANK SIDE MOUNT BRACKET			FILBRE-SMBA-80	1	-	129	SOCKET HEAD BUTTON SCREW M6x8 STAINLESS 304 A270			SHBM0608-304SS	2	-		
54	FILLER BREATHER STEEL CAP 80mm IDPSI 80mm BASKET			FILBRE-80-SEP10-B80	1	-	128	SOCKET HEAD BUTTON SCREW M6 X 6 12.9 ZINC			SHBM0606-129Z	3	-		
53	FILLER BREATHER STEEL CAP 80mm IDPSI 80mm BASKET			FILBRE-07-ST-G04	1	-	127	SOCKET HEAD BUTTON SCREW M5 X 30 STAINLESS 316 A470			SHBM0530-316SS	2	-		
52	DAVIES CRAIG BSN THERMO FAN 24V 400 CFM			FAN 24V BSN DC	1	-	126	SOCKET HEAD BUTTON SCREW M5X16 STAINLESS 316 A470			SHBM0516-316SS	7	-		
51	ELECTRIC MOTOR 3.5KW 48V NOM. OIL COOLED SAE PUMP			EM-OC-3.5-SAE9	1	-	125	SOCKET HEAD BUTTON SCREW M5 X 12 STAINLESS 304 A270			SHBM0512-304SS	4	-		
50	DC-DC CONVERTER, 30-60V INPUT, 13.8V 30A OUTPUT			ELECT576	1	-	124	SOCKET HEAD BUTTON SCREW M4 X 8 STAINLESS 304 A270			SHBM0408-304SS	6	-		
49	CABLE TIE MOUNT, 2x 5mm HOLE, 7.6mm MAX TIE WIDTH			ELECT578	3	-	123	SOCKET HEAD BUTTON SCREW M4X12 STAINLESS 304 A270			SHBM0412-304SS	6	-		
48	CABLE TIE MOUNT, 6mm (1/4") HOLE, 4.8mm MAX TIE WIDTH			ELECT577	8	-	122	SOCKET HEAD BUTTON SCREW M4 X 8 STAINLESS 304 A270			SHBM0408-304SS	4	-		
47	HARTING FEMALE PLASTIC INSERT 40A 4 PIN 830V			ELECT453	1	-	121	SOCKET HEAD BUTTON SCREW M3x16LG STAINLESS 304			SHBM0316-304SS	2	-		
46	HARTING METAL BULKHEAD HOUSING WITH SPRING LID			ELECT449	1	-	120	SEL LOCK PIN M8 X 50 ZINC			RN080050-Z	4	-		
45	FUSE BOX BUSSMAN ENCLOSURE			ELECT401	1	-	119	RIVET ALUM. TRUSS HD 3/16" DIA 1/16" - 1/8" GRIP			RV-73AS-6-2-4	4	-		
44	LEV200 CONTACTOR, 12-900 VDC, MAX 500A, 12V COIL			ELECT367	1	-	118	RIVET ALUM. TRUSS HD 5/32" DIA 1/4" - 5/16" GRIP			RV-73AS-5-8-10	8	-		
43	DUAL POLE RED ISOLATOR MAX 48VDC 500A EACH POLE			ELECT363	1	-	117	RIVET ALUM. TRUSS HD 3/32" DIA 3/16" - 1/4" GRIP			RV-73AS-5-6-8	47	-		
42	EMERGENCY STOP BUTTON, TWIST TO RESET PANEL MOUNT			ELECT177	1	-	116	RIVET ALUM. TRUSS HD 1/8" DIA 1/4" - 5/16" GRIP			RV-73AS-4-8-10	16	-		
41	DISK LOCK WASHER 10mm ZINC PLATED			DLC10	2	-	115	RIVET ALUM TRUSS HD 3/32" DIA 1/16" - 1/8" GRIP			RV-73AS-3-2-4	4	-		
40	DEUTSCH HD30 COVER, SIZE 24, SUITS RECEPTACLE			D-HDC36-24	1	-	114	RIVET ALUM. TRUSS HD 5/32" DIA 1/8" - 3/16" GRIP			RV-73AS-5-4-6	8	-		
39	HD34 SIZE 24 PANEL NUT			D-HD34-PN-24	1	-	113	RIVET ALUM. CNTSUNK HD 5/32 DIA 1 4 5 16 GRIP			RV-72AS-5 8 10	4	-		
38	HD34 SIZE 24 LOCKWASHER SPRING			D-HD34-LCKWAS-24	1	-	112	RIVET ALUM. CNTSUNK HD 5/32" DIA 3/16" - 1/4" GRIP			RV-72AS-5-6-8	8	-		
37	DEUTSCH HD30 BULKHEAD 29 PIN			D HD34 24 28PE	1	-	111	RIVET ALUM. CNTSUNK HD 5/32" DIA 1/8" - 3/16" GRIP			RV-72AS-5-4-6	8	-		
36	RECEPTACLE, DEUTSCH, DT, 2-WAY, FLANGE MOUNT			D-DT04-2P-L012	1	-	110	RED FIBRE WASHER M8 ID X 10 OD			RFWH0810	23	-		
35	COUNTER SUNK CAP SCREWS M8x30, A270 SS (304)			CSM08206304	8	-	109	R CLIP DOUBLE COIL 4mm ZINC PL			RCL3PD04	1	-		
34	COUNTER SUNK CAP SCREW M8 X 20 A470			CSM08206316	8	-	108	SEL LOCK PIN 3/16in x 1 3/4in			R18732	1	-		
33	COUNTERSUNK CAP SCREW M6 X 60 STAINLESS A270			CSM0660-SSA270	2	-	107	SEL LOCK PIN 1/4" X 2"			R0432	1	-		
32	ELBOW 90 MM 1/2" BSP X 7/8" IIC			CP56 0814	2	-	106	ODWTY SEAL 1/2" BSP STD			R048-08	2	-		
31	NIPPLE M/M 1/2" X 1/2" BSP			CP1-0808	2	-	105	ODWTY SEAL 1/4" BSP STD			R048-04	1	-		
30	NIPPLE 3/8" BSP X 1/4" BSP			CP1-0604	1	-	104	M8 LARGE FLANGE NUTSERT			NSM08L	8	-		
29	LIFTING CHAIN CONNECTION LINK GR T80 WLL 2.0T - 9mm			CHALJ08-T80	1	-	103	M6 LARGE FLANGE NUTSERT			NSM06L	1	-		
28	REGULAR PROOF COIL CHAIN SIZE 6mm			CHAIN06	1	410 (15 LINKS)	102	NUT M10 x 1.5 METRIC COARSE HALF NUT 316 STAINLESS			NM10H-316	4	-		
							101	NUT M8 NYLOC			NM08N	11	-		
							100	NUT M6 NYLOC			NM06N	22	-		
							99	NUT M5 NYLOC			NM05N	11	-		
							98	NUT M4 NYLOC ZINC			NM04N8Z	10	-		
							97	NUT M3 NYLOC ZINC			NM03N	2	-		
27	BUFFER RUBBER ROUND DIA. 20 X 8 THK - 5/32" RIVET			BUFRUB-D20T08-42	4	-	96	LEVEL GAUGE 182 LG 34.5 W 27 THK BOLTS M12 150 CHS			LEVGAU-182-345-27	1	-		
26	BUFFER RUBBER STRIP 60X12mm - 1/8" RIVET			BUFRUB-60I2-2	8	-	95	OVER CENTER LATCH MEDIUM SIZE LIGHT DUTY STAINLESS			LATCH-OCML-SS	4	-		
25	BOLT M5 x 20 GR8.8 ZINC			BM0520-88Z	2	-	94	LANYARD 1.5mm 7X7 SOFT LOOP BOTH ENDS 300mm DAL			LANYARD0150300-SLSL	1	-		
24	MULTILINK CANBUS MODULE			1920086	1	-	93	E STOP ROUND LABEL 60MM			LAB033	1	-		
23	MOTOR TO TANK GASKET			1430246	1	-	92	ROUND POLYAMIDE KNOB M10X10 BRASS THREAD			KNOB-PA-RND-M10X10	1	-		
22	DCDC & CONTACTOR MOUNT PLATE			1430245	1	-	91	STAR ALUMINIUM KNOB M10X30 SS THREAD			KNOB-AL-ST-M10X30	1	-		
21	BATTERY UPPER STOP			1430244	1	-	90	KEY RING 35mm OD x 1.85mm CS NICKEL PLATED COPPER			KEYRING35185-CN	2	-		
20	CONTROL BOX MOUNT BRACKET PROFILE			1430243	1	-	89	TRACKPACK SIDE DOOR HINGE SPACER			T0850-PART234	2	-		
19	BATTERY DOOR CLAMP			1430242	2	-	88	ROLLBAR SIDE B BATTERY TAG			J0850-ASSY051	1	-		
18	HYDRAULIC TANK GASKET GEN 1.2			1430241	1	-	87	ROLLBAR SIDE A BATTERY TAG			J0850-ASSY050	1	-		
17	TANK LID GEN 1.2			1430240	1	-	86	TRACKPACK HOOF MIDDLE GUARD			J0850-ASSY046	1	-		
16	TRACKPACK FRONT GUARD GEN 1.2			1430239	1	-	85	TRACKPACK SIDE GUARD			J0850-ASSY045	2	-		
15	TANK ASSEMBLY GEN 1.2			1430238	1	-	84	TRACKPACK REAR GUARD			J0850-ASSY044	1	-		
14	BATTERY TRACKPACK MOTOR CONTROLLER 12V/48V			1430226	1	-	83	BATTERY BOX SIDE B, LITHIUM 30L, 52V, 63AH			J0850-ASSY040	1	-		
13	BATTERY TRACKPACK 4.3" COLOUR SCREEN & CONTROLLER			1430225	1	-	82	BATTERY BOX SIDE A, LITHIUM 30L, 52V, 63AH			J0850-ASSY039	1	-		
12	GEAR PUMP 8.4cc SAE A FLANGE 9T SHAFT			1430224	1	-	81	BATTERY TRACKPACK ROLLBAR			J0850-ASSY032	1	-		
11	TRACKPACK HANDLE PIVOT MOUNT			1430202	4	-	80	BATTERY TRACKPACK ADJUSTABLE BOOM			J0850-ASSY031	1	-		
10	TRACKPACK CARRY HANDLE			1430201	4	-	79	MODIFIED RIGHT HAND DOOR HOLDER LATCH LOCKABLE			J0850-ASSY024	1	-		
9	SNAP CONNECTOR FLUSH FACED 1/4" BSP MALE			1430187	1	-	78	MODIFIED LEFT HAND DOOR HOLDER LATCH LOCKABLE			J0850-ASSY023	1	-		
8	BATTERY TRACKPACK MANIFOLD HYDRAULIC OIL FILTER			1430178-FILTER	1	-	77	ELECTRIC TRACKPACK PIVOT POSITIONS			1DTAG21	1	-		
7	BATTERY TRACKPACK MANIFOLD			1430178-B	1	-	76	Lifting Point WLL 300kg Tag			1DTAG10	1	-		
6	CROSS TROLLEY FRAME LIGHT DUTY (PIVOT PIN VERSION)			1430149	1	-	75	H082 + MCF-1408 + 00030 + MCF905-1408 SUCTION			H082-00450-004-5	1	-		
5	BOOM QUICK CHANGE ADAPTOR RETAINING PIN			1430047	1	-	74	FILLER BREATHER GASKET SUITS 80mm CAP			FILBRE-GAS 80	1	-		
4	SNAP CONNECTOR FLUSH FACED 1/2 BSP MALE			1430005	1	-		ALUMINIUM FILLER-BREATHER STRAIGHT CAP EXTENSION			FILBRE-ESF-30	1	-		
3	SNAP CONNECTOR FLUSH FACED 1/2 BSP FEMALE			1430004	1	-									
2	CROSS TROLLEY AXLE			1081108	2	-									
1	CROSS TROLLEY ROLLERS			1081103	2	-									
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PARTS LIST							PARTS LIST								

[illegible]

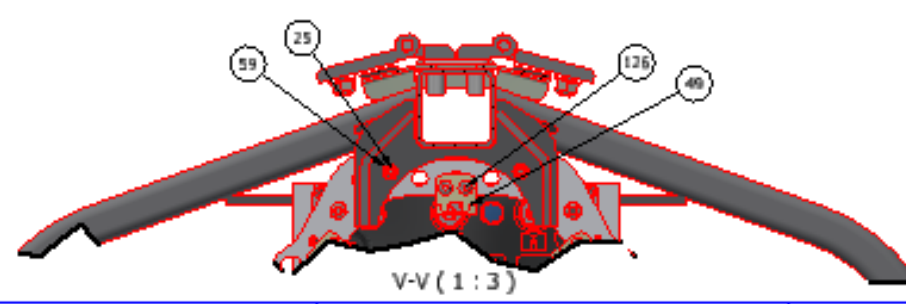
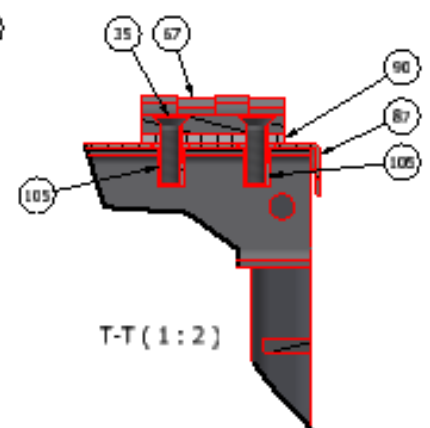
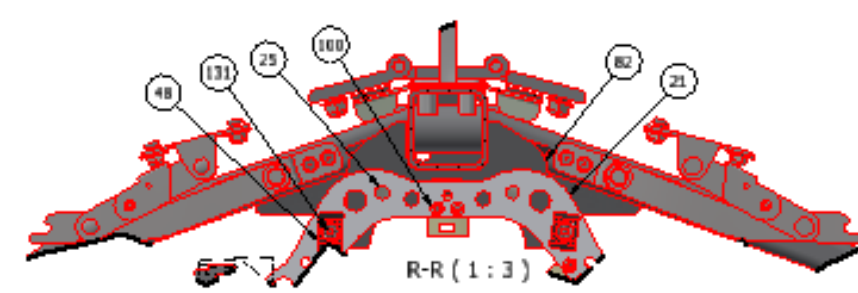
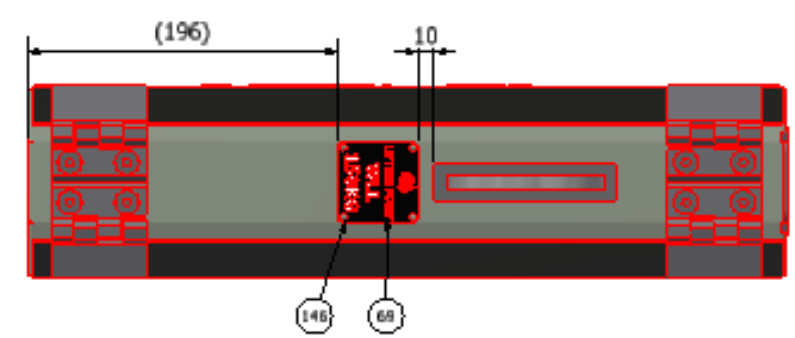
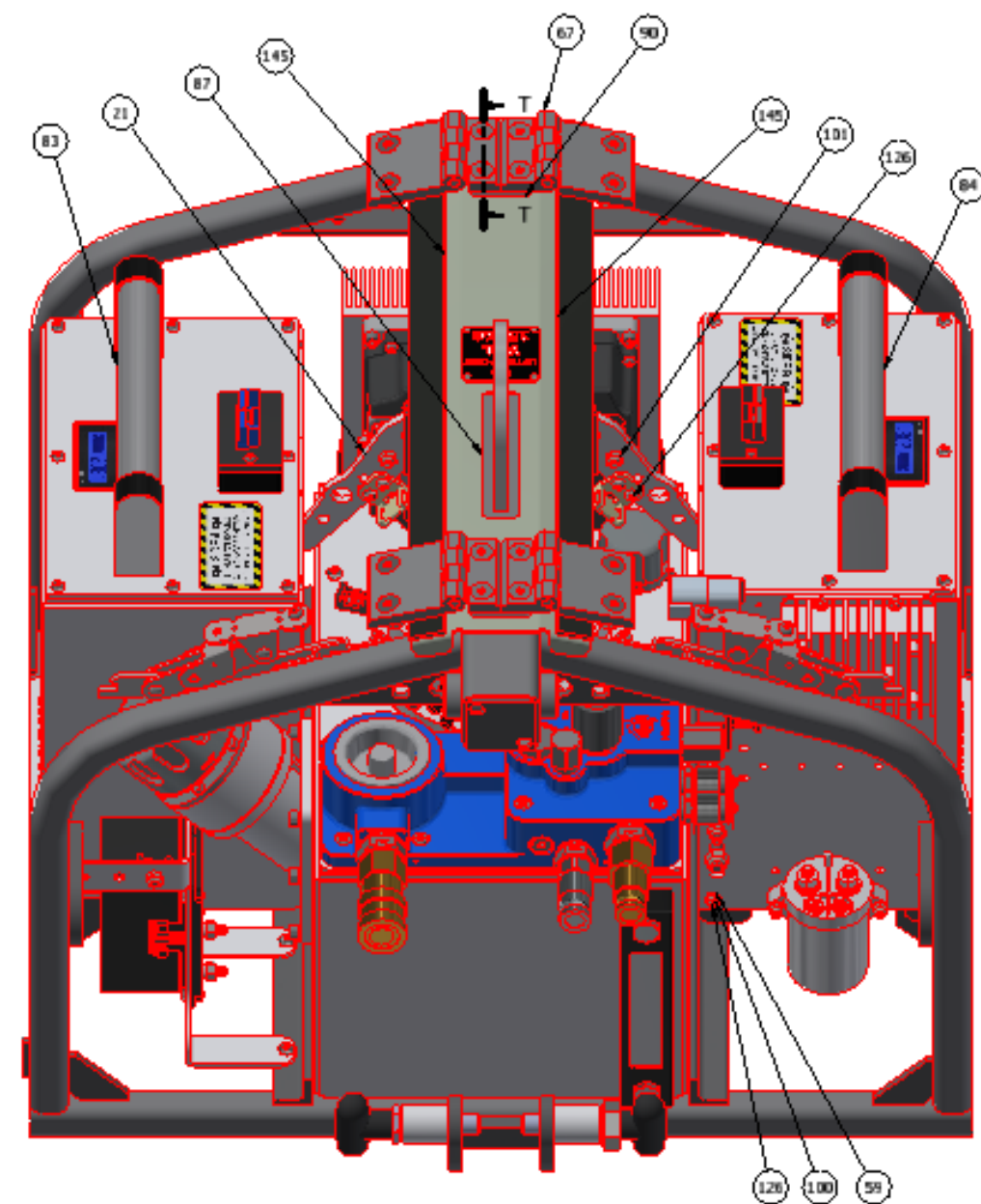
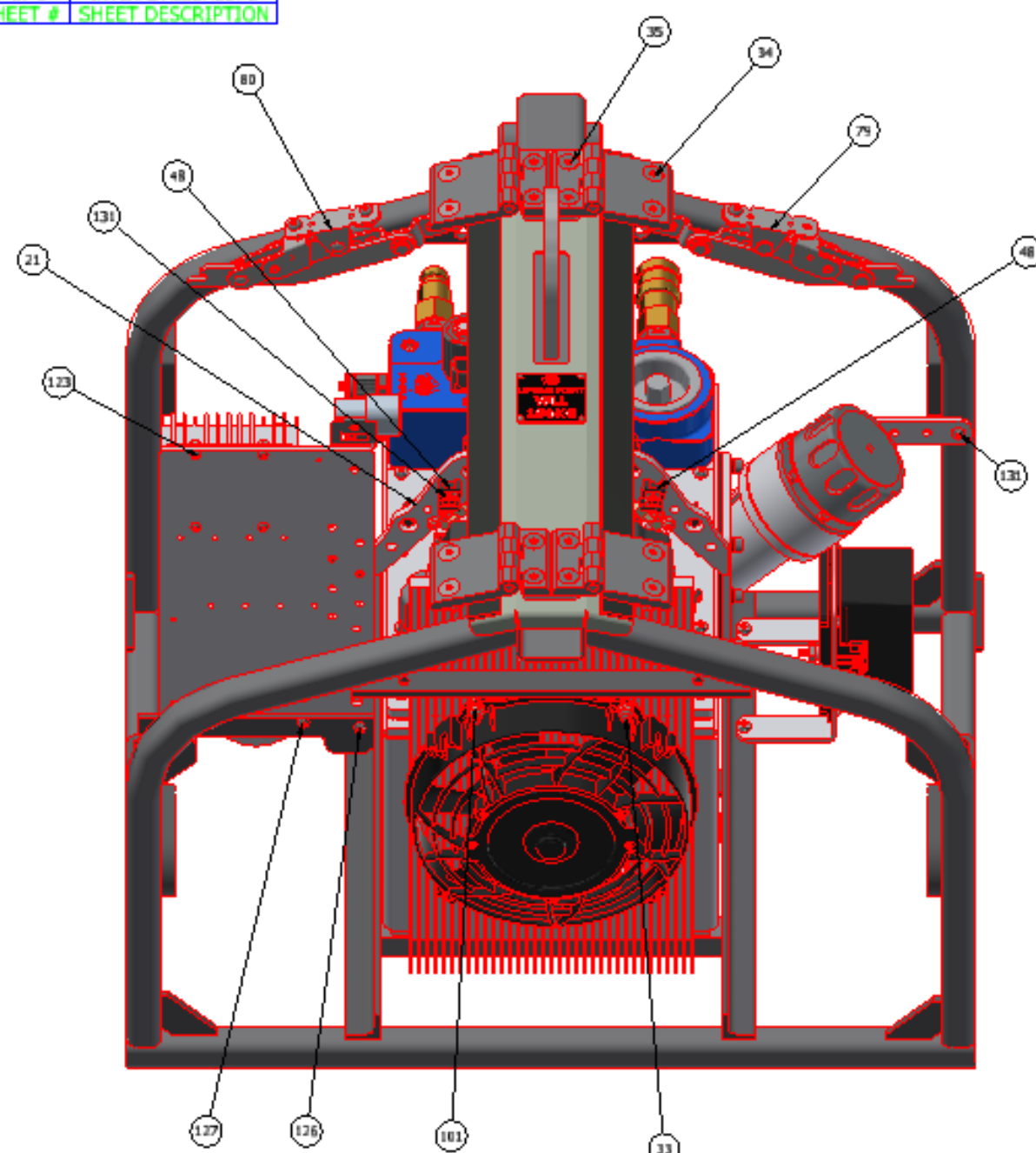


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Name : Equipment Corp. Pty. Ltd				DESCRIPTION		
300 ±0.3				3000 ±0.2		PART #
3 ±0.2				3030 ±0.1		FP-143-BEG2
3 ±0.3				30° ±0.1		
303 ±0.1				3.5° ±0.2		
DRAWN DATE				MODELLED BY		
Imagery				Imagery		
CHECKED				APPROVED		SCALE
2FC				2FC		1:1
2-143-302				2-143-302		
IF IN DOUBT, ASK						



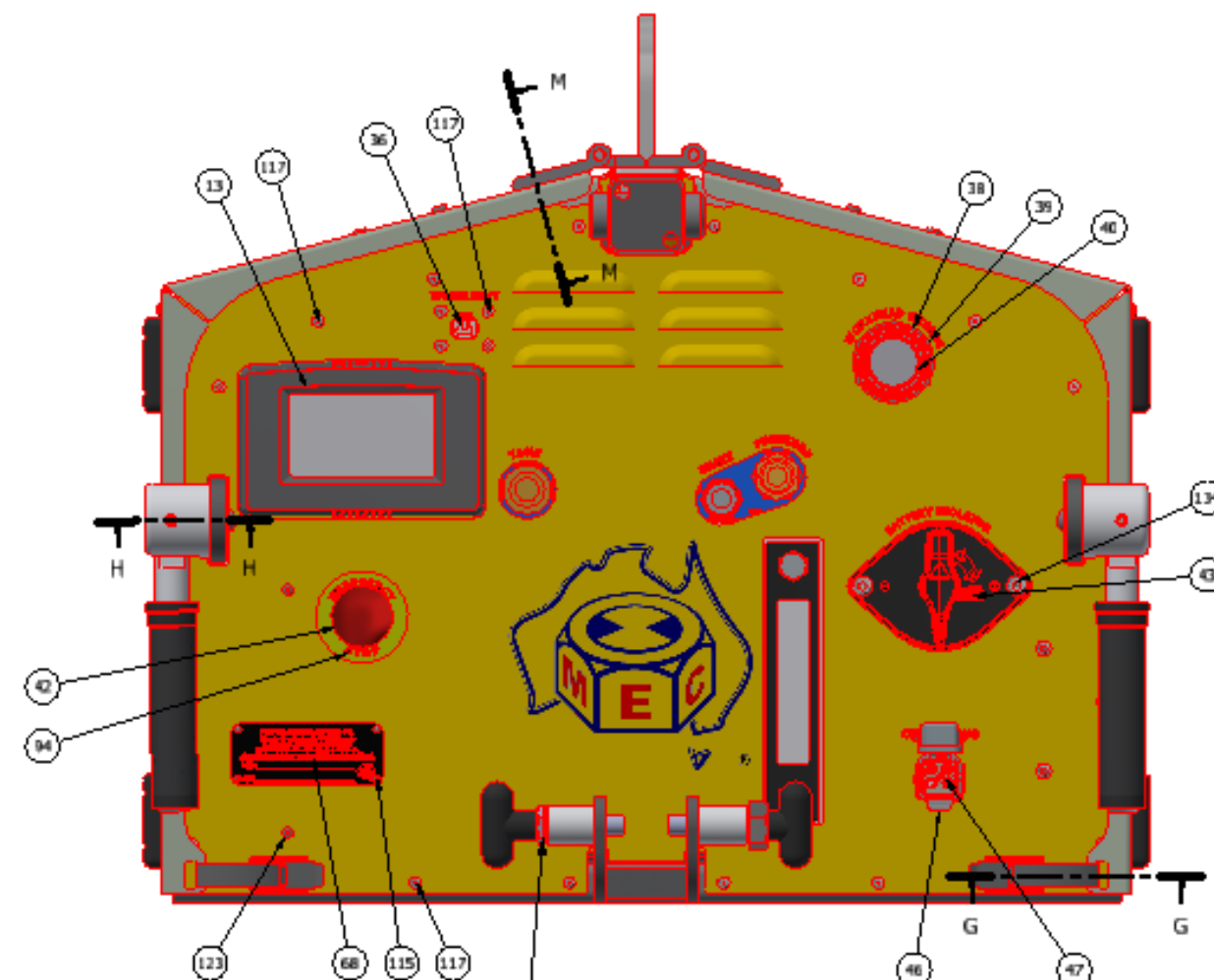
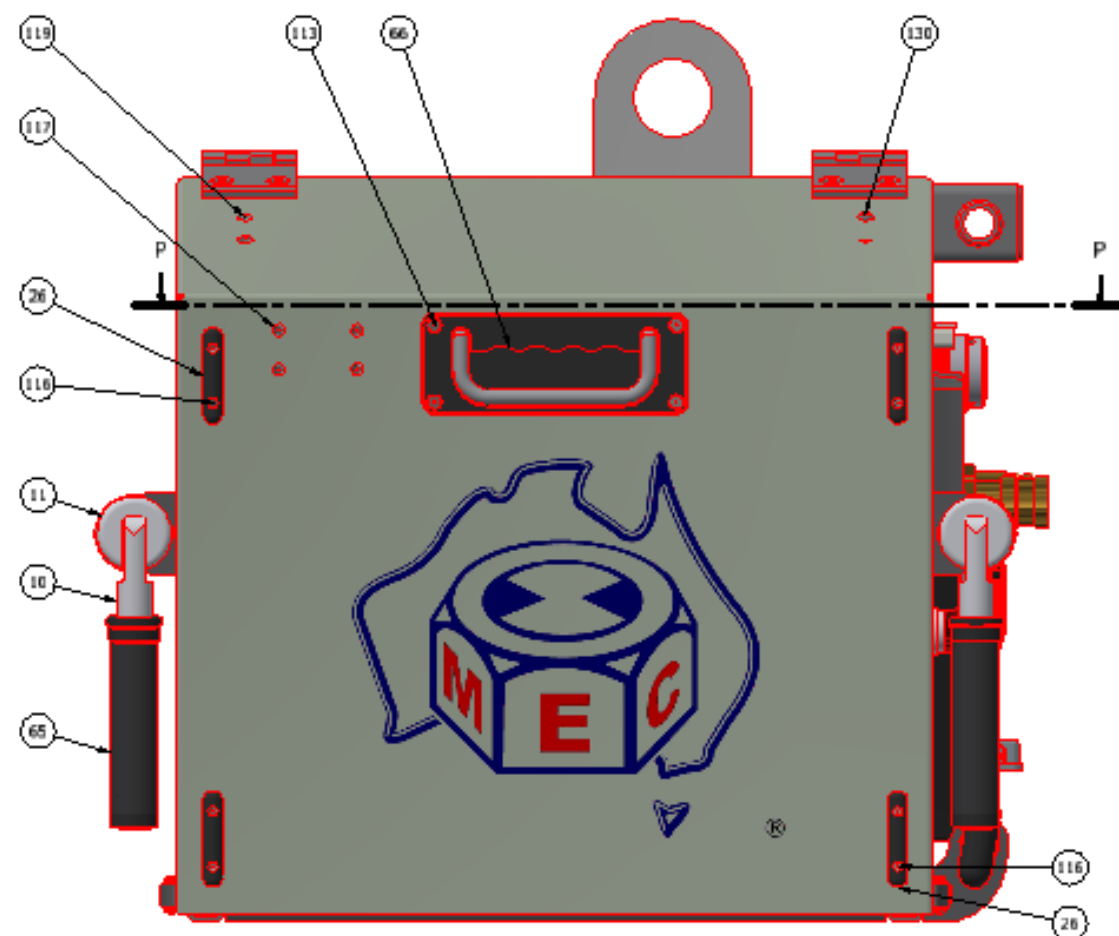
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		REV	DATE	CHK	CRF	DESCRIPTION	CHK	APP
New n Equipment Corp. Pty. Ltd		TOLERANCES UNLESS OTHERWISE SPECIFIED				DESCRIPTION		
		300 ±0.3				3000 ±0.3	PART #	
		2 ±0.2				30330 ±0.3		
		3 ±0.5				300 ±0.1	BATTERY POWERED TRACKPACK GEN 1.2	
		300 ±0.3				3 ±0.2		
		DRAWN				DATE	FP-143-BEG2	
200 Royal B. Ct Melbourne VIC 3000 AU 20207 Ph: 03 922 11111 Fax: 03 922 11111 Email: 03 922 11111		15/04/2023				MODELLED BY		
		15/04/2023				15/04/2023		
		CHECKED				APPROVED	SCALE	
		2ND				2ND	1:1	
								
						2-143-302		
IF IN DOUBT, ASK		2 0						





REV	DATE	BY	CHK	DESCRIPTION	CHK	APP
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2	08/2023	01K	CIF	TO: FRANCES LIND -		
3	08/2023	01K	CIF	DESCRIPTION		
4	08/2023	01K	CIF	PART #		
5	08/2023	01K	CIF	BATTERY POWERED TRACKPACK GEN 1.2		
6	08/2023	01K	CIF	2-143-302		
7	08/2023	01K	CIF	SCALE		
8	08/2023	01K	CIF	2-143-302		
9	08/2023	01K	CIF	2-143-302		
10	08/2023	01K	CIF	2-143-302		

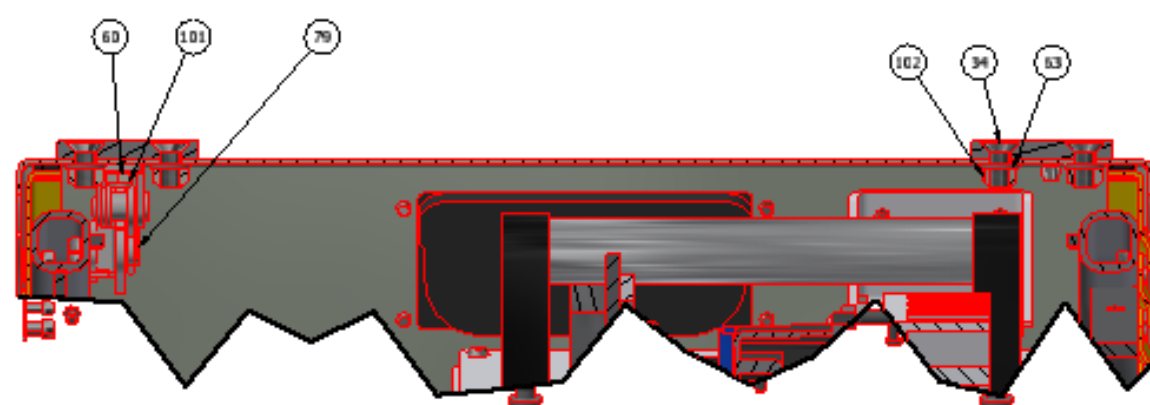




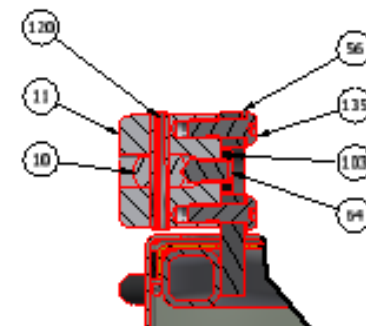
FIT TEE HANDLES TO BOSSES USING LOCTITE 243

FIT OVER CENTER LATCH LOCK TO REAR RIVET

G-G (1:2)

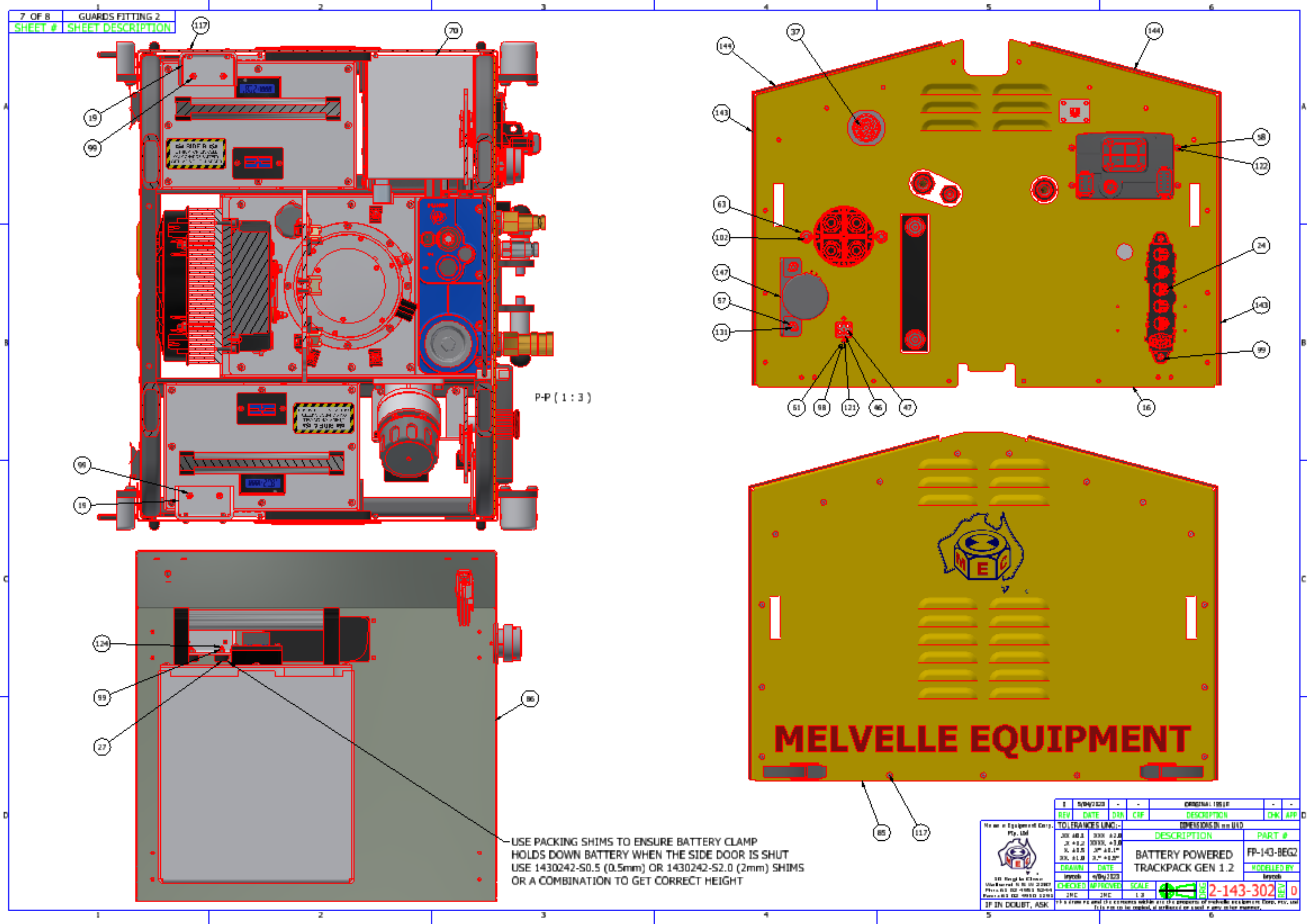


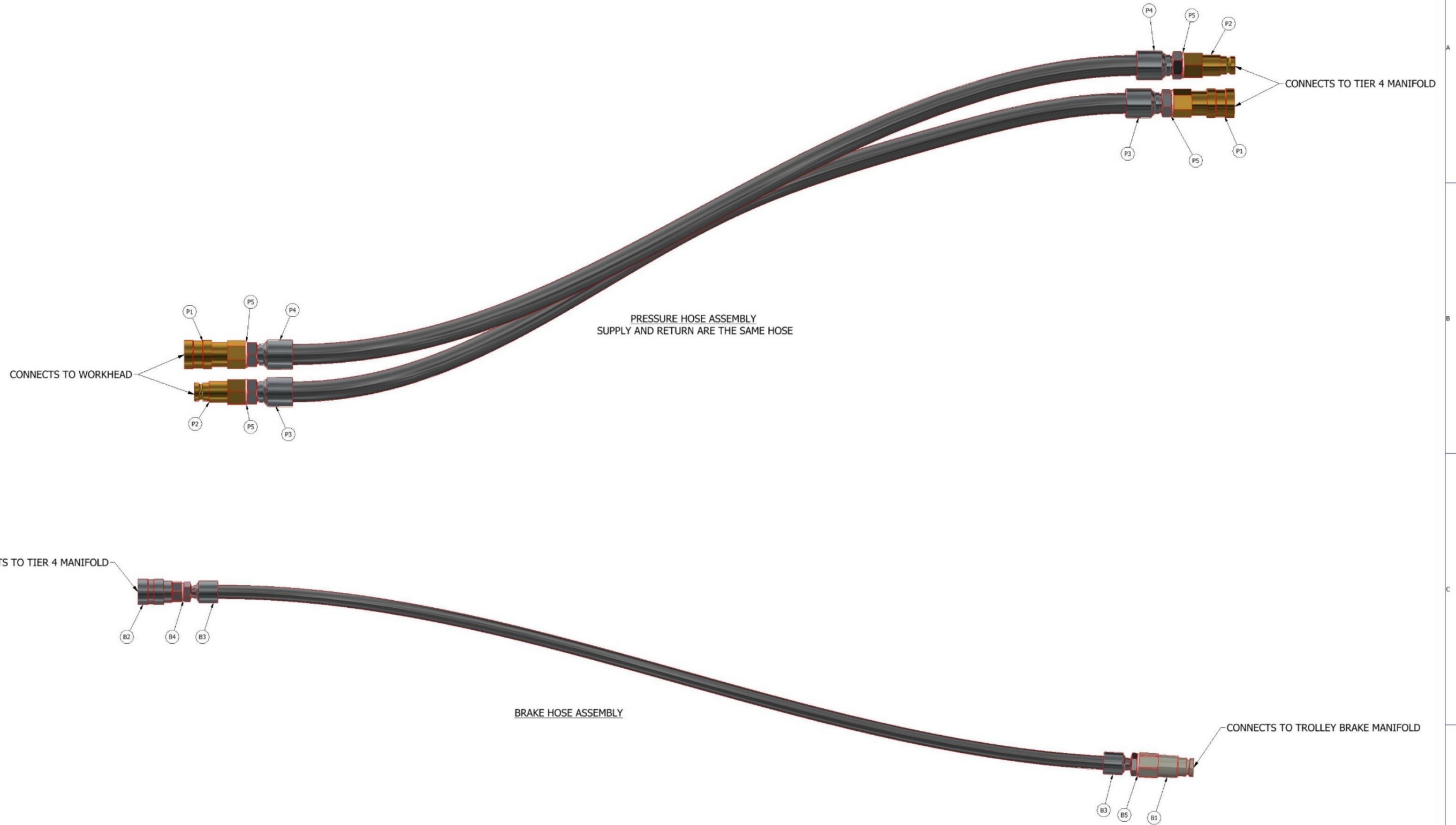
M-M (1:2)



H-H (1:2)

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10	04/02/2020	-	-	-	DESCRIPTION	FP-143-BEG2
11	04/02/2020	-	-	-	DESCRIPTION	FP-143-BEG2
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19	04/02/2020	-	-	-	DESCRIPTION	FP-143-BEG2
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100	04/02/2020	-	-	-	DESCRIPTION	FP-143-BEG2





ITEM	DESCRIPTION	PART NUMBER	ITEM QTY
P5	DOWTY SEAL 1/2"BSPP STD	R04B-08	4
P2	SNAP CONNECTOR FLUSH FACED 1/2 BSPP MALE	1430005	2
P1	SNAP CONNECTOR FLUSH FACED 1/2 BSPP FEMALE	1430004	2
P4, P3	H082 + MCBPM-0808 + 01367 + MCBPM-0808	H082-01450-0915	2

PRESSURE HOSE PARTS LIST

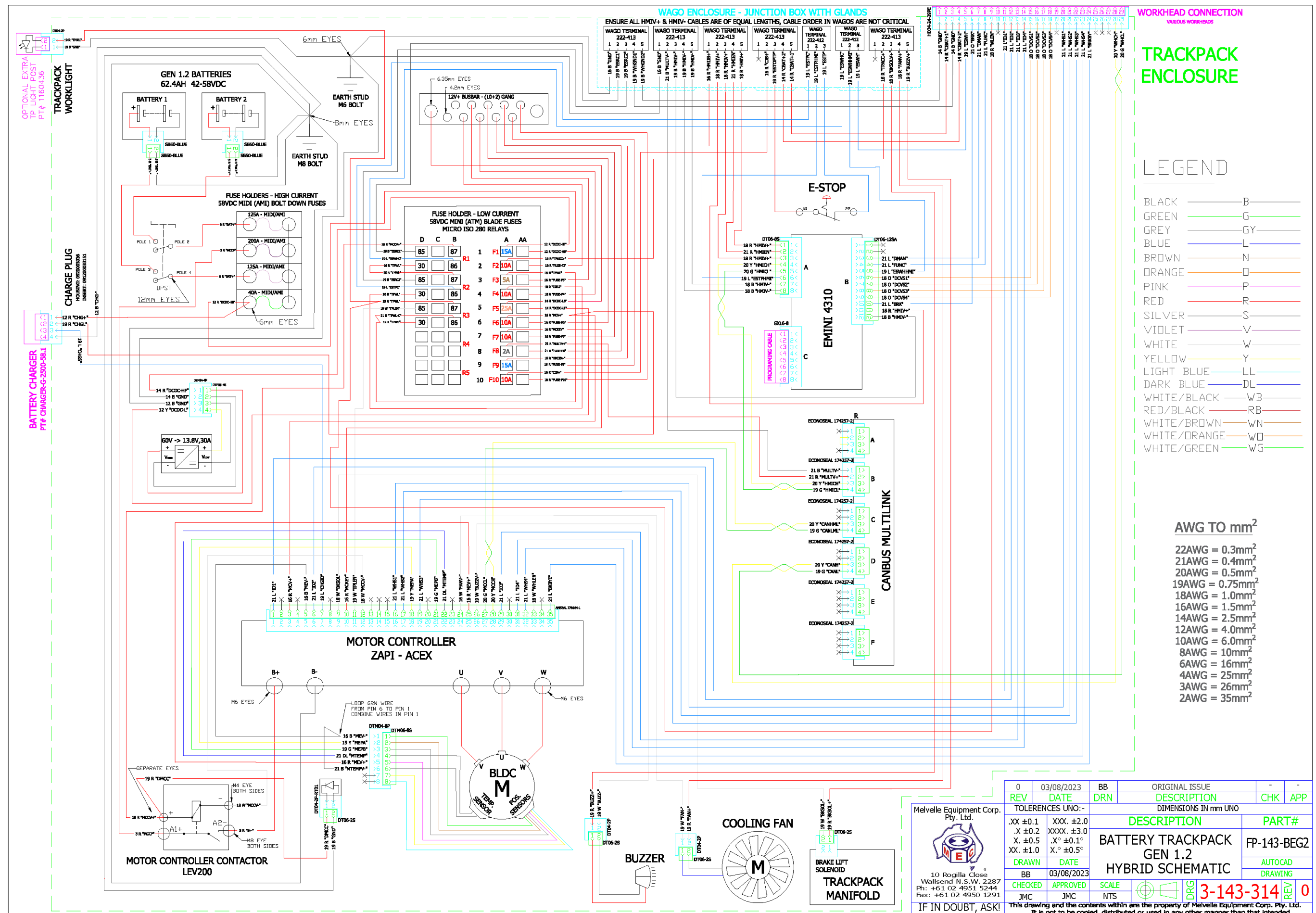
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B5	DOWTY SEAL 3/8" BSPP	R04B-06	1
B4	DOWTY SEAL 1/4"BSPP STD	R04B-04	1
B3	H042 + MCBPM-0404 + 01936 + MCBPM-0604 (BSPP)	H042-02000-0915-0604	1
B2	SNAP CONNECTOR FLUSH FACED 1/4 BSPP FEMALE	1430189	1
B1	MALE 3/8" FLUSH FACED SNAP CONNECTOR	1020342	1

BRAKE HOSE PARTS LIST

REV	DATE	DRN	CRF	DESCRIPTION	CHK	APP
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TOLERANCES UNLESS OTHERWISE SPECIFIED				DESCRIPTION	PART #	
XX	±0.1	XXX	±2.0	GEN 2 BRAKE HOSE ASSEMBLY	1430223	
X	±0.2	XXXX	±3.0	ASSEMBLY	1430223	
X	±0.5	XXXX	±4.0	SCALE	1:1	
XX	±1.0	XXXX	±5.0	SCALE	1:1	
DRAWN DATE				SCALE	1:1	
CHECKED APPROVED				SCALE	1:1	
10 Rogalla Crane				SCALE	1:1	
Wellsville N.S.W 2287				SCALE	1:1	
Ph: +61 02 4995 5244				SCALE	1:1	
Fax: +61 02 4995 1791				SCALE	1:1	
IF IN DOUBT, ASK!				SCALE	1:1	



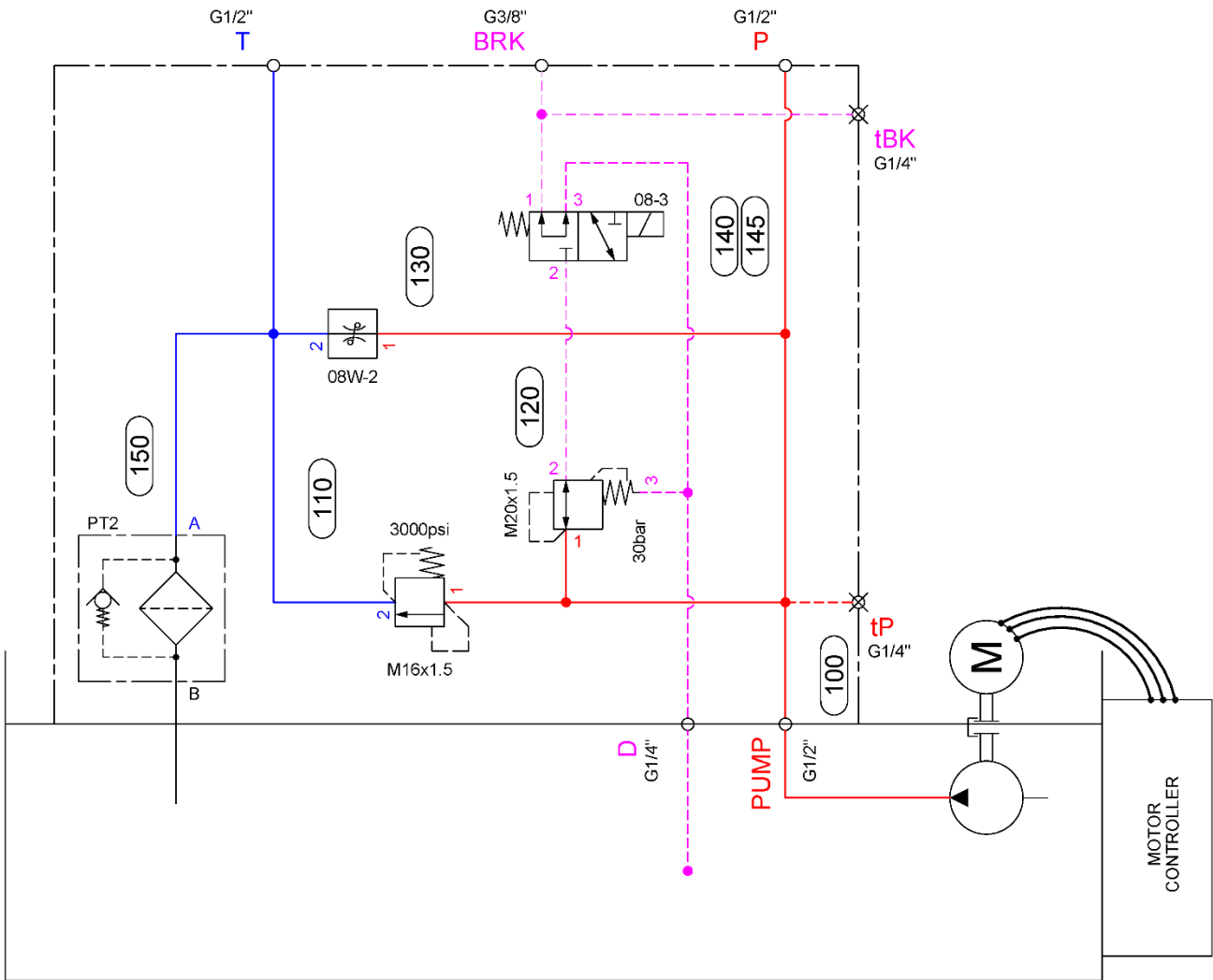
12.4. Gen 1.2 Electrical Circuit Diagram – Component (Hybrid) Schematic



12.5. Battery Trackpack Gen 1.2 Hydraulic Circuit Diagram

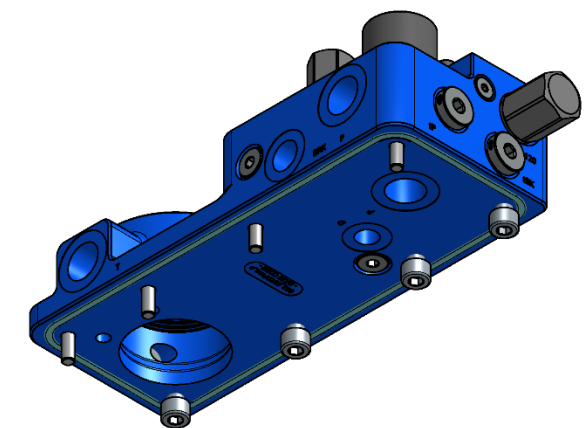
Rev	Date	Drawn	Checked	Description
A	2/11/2022	DD	MLC	RELEASED FOR MANUFACTURE
B	12/12/2022	DD	MLC	ANODISE WAS CLEAR NOW BLUE, 140 WAS ES-08W-3H-13-N-04
B	12/12/2022	DD	MLC	NOW LSV2-08-3C, 145 WAS EC-04H-147-C-E NOW LC2-08-C-1ER
B1	12/01/2023	DD	MLC	M8 were 25mm now 16mm

Pos.	Qty.	Type	Description	Manufacturer	Remark
100	1	002_081DPMk	MANIFOLD BODY KIT	SPICA	
110	1	RD-162A-25-3000-N	Pressure relief valve	Winner	
120	1	PD-11A-30-030-N	Reducing-Relief valve	Winner	
130	1	002_085DPpa	CAVITY PLUG WITH ORIFICE	deltaP	M6x0.3SC
140	1	LSV2-08-3C	3/2 DCV spool sol op	Keta	
145	1	LC2-08-C-1ER	Coil 12VDC DT04-2P	Keta	
150	1	PT2-2-10Q-25	Filter Element	PARKER	SEP SUPPLY



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	10 ROGILLA CLOSE MARYLAND NEW SOUTH WALES 2287 ABN 55123570356 PHONE +61 2 4950 1291		DRAWN : DD	DATE : 21JUN2021	
			CHECKED : SJ	DATE : 21JUN2021	
			APPROVED: MLC	MATERIAL : 6061-T6	
			WEIGHT : 3KG	COATING : ANODIZE	
			STATUS : FOR MANF	COLOR : BLUE	
PAPER SIZE : ISO A3	PAGE : 1	BATTERY TRACK PACK MANF ASSY		CUST.: MELVELLE EQUIPMENT	Revision
SCALE :	PAGES: 1				
		MEC P/N:1430178-B MEC DRG#: 143-322		DRG #: 002_080DPma	B1

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		10 ROGILLA CLOSE MARYLAND NEW SOUTH WALES 2287 ABN 5512370356 PHONE +61 2 4950 1291		DRAWN DD		DATE 16.08.2023			
				CHECKED MLC		DATE 01.07.2021			
				APPROVED		MATERIAL 6061T6			
				WEIGHT 3 KG		COATING ANODISE			
				STATUS IN PROGRESS		COLOR BLUE			
PAPER SIZE: A2		PAGE: 1		PROJECT: MANIFOLD ASSY TYPE: GENERAL ARRANGEMENT DRG# 002_081DP.mxd				REV	
SCALE: 1:2		PAGES: 1							
		MEC P/N: 1430178-B		MEC DRG#: 143-323		B1			



12.7. Operational Risk Assessment

Machine: FP-143-BEG2 Battery Trackpack								Form No.:				
ABN								Issue Date	17/08/2023			
WORKPLACE GENERIC HIRARC FORM								Version:	0			
Company	MELVELLE EQUIPMENT CORP			Department / Workplace:	Melville Offices		Date of Assessment	17/08/2023	Commenced:	9am	Completed:	12noon
Scope of Assessment: Identify the risks and hazards associated with the operation of a rail maintenance machine to remove rusted pandrol e-clips from in situ tracks.												
Names of Risk Assessment Team: Bryce Bower					Names of additional personnel consulted during Risk Assessment:			Identified limitations of risk assessment: Only applies to risks identified as part of the operation of the machine.				
								Information Sources / References: AS4024.1-2006 Safety of Machinery, AS4024-2601-Two Handed Control Device				
RISK ASSESSMENT MATRIX												
Potential Consequences			Likelihood					MANAGEMENT ACTIONS				
			Almost Certain	Likely	Possible	Unlikely	Rare					
Keyword	Description Safety Health & Hygiene	Description Environmental	<i>Expected to occur</i>	<i>Will occur occasionally</i>	<i>May Occur</i>	<i>Not expected to occur</i>	<i>Requires unusual chain of events</i>	Comments				
Minor	First Aid Injury	On-site release immediately contained with business unit resources	Medium 8	Medium 7	Low 3	Low 2	Low 1					
Significant	Medical Treated Injury or illness	On-site release or offsite release immediately contained with smelter resources	High 14	Medium 10	Medium 9	Low 5	Low 4	Risk Assessment Referred to:				
Serious	Lost Time Injury or illness	Off-site release causing nuisance or community complaint. Breach of license condition	High 16	High 15	Medium 12	Medium 11	Low 6					
Severe	Fatality or Permanently disabling injury of illness	Off-site release with detrimental impact to environment or community. Repeated breach of license conditions	Extreme 24	Extreme 22	High 20	High 18	Medium 13	Risk Assessment Accepted by:				
Disastrous	Multiple Fatalities or work-related fatal diseases	Toxic release off-site with detrimental impact to environment or community	Extreme 25	Extreme 23	Extreme 21	High 19	High 17					
LEGEND			ACTION REQUIRED				NOTIFY		Risk Assessment findings recorded in the Project Design Folder			
LOW 1-6			Tolerable - Manage by Routine Procedures									
MEDIUM 7-13			Risk reduction required to "As low as Reasonably Practicable". ALARP				Design Team/Engineer					
HIGH 14-20			Immediate action required to reduce risk. Authorisation required before proceeding on task				CEO					
EXTREME 21-25			Intolerable. Cease activity until controls in place to reduce risk. Immediate & urgent Senior Management Team action required				CEO		Risk Assessment Findings communicated to:			
									Design Team, Melville Equipment Corp.			



		Raw Risk Rating (no controls)					Residual Risk Rating (after controls)				
Ref no	Description / hazard / risk	Consequence (no controls)	Likelihood	Risk Level & Score	Controls	Consequence	Likelihood	Risk Level & Score	Is Risk Tolerable Y/N	Additional Controls Req	Action By / Name & date required
	Battery contains self oxidising electrode. Battery fires cannot be "staved out". Once a lithium fire starts it is extremely hard to extinguish	Severe	Possible	20	Batteries securely mounted. All batteries fitted with a BMS. All batteries are contained in a tough drop resistant enclosure.	Severe	Rare	11	Y	Store batteries following safe lithium battery storage procedures	
	Fire hazard if any circuits short circuit and don't have appropriate protection	Severe	Possible	20	All circuits are protected with appropriate sized fuses in both current (A) and voltage (V), if replacing ensure correct fuses are used.	Severe	Rare	11	Y	Contact MEC if unsure on suitable replacement fuses	
	Manual lifting of machine or segments of machine is dangerous to the operators back, and other areas	Serious	Likely	15	Use of lifting points with machines (crane) to lift Trackpack. If manual lifting machine do not exceed workplace manual lifting limits.	Serious	Rare	6	Y	Document lifting points	
	Electrocution due to touching live wires or electronics	Serious	Likely	15	All wires shielded, all live connections are covered, maximum battery voltage of 58.8VDC(BMS protected)(system maximum 58.1VDC).	Serious	Rare	6	Y	Treat all circuits as live. Remove batteries from Trackpack before touching any electrical items. Farmiraisation with isolator.	
	Crushing injury through falling machine if incorrectly supported	Serious	Likely	15	Correctly secured to rail trolley (if applicable)	Serious	Rare	6	Y		
	Injury through oil injection through hydraulic failure	Serious	Possible	12	Checking of all hydraulics e.g. hose's and fittings for damage.	Serious	Rare	6	Y	Procedure on hose checks	
	Serious burns can occur through the touching of hot surfaces	Significant	Likely	10	Include warning signs. Include warnings in training and operating manuals.	Significant	Unlikely	5	Y	Warning sticker list. Wear gloves. Check temperture on control screen	



		Raw Risk Rating (no controls)				Residual Risk Rating (after controls)					
Ref no	Description / hazard / risk	Consequence (no controls)	Likelihood	Risk Level & Score	Controls	Consequence	Likelihood	Risk Level & Score	Is Risk Tolerable Y/N	Additional Controls Req	Action By / Name & date required
	Pinch points exist through the connection of Trackpack to trolley, Trackpack to work head, boom to Trackpack, fold down handles and guards	Significant	Possible	9	Procedure shown on connection of powerpack, trolley, and work head.	Significant	Unlikely	5	Y	Procedure shown in connection of items. Wear gloves	
	Weight at handles through incorrect Trackpack setup causing strain on operator	Significant	Likely	10	Correctly adjust Trackpack pin location to achieve sufficient counterbalance. Details shown in manual.	Significant	Rare	4	Y	Documented in Trackpack manual	
	Fluid levels too high causing overflow and too low causing machine damage	Significant	Likely	10	Pre-start checklist requiring operator to check fluid levels before operating machine.	Significant	Rare	4	Y	Pre start checklist	
	Exposure to hazardous materials such as oils	Significant	Likely	10	Hazardous material documentation in MSDS.	Significant	Rare	4	Y	MSDS	
	General machine operation injury	Significant	Likely	10	Procedures developed such as prestart checklist.	Significant	Rare	4	Y	Pre start checklist	
	Trip hazard through ballast and loose items on railway	Significant	Likely	10	Correct training in railway safety.	Significant	Rare	4	Y	Railway safety training	
	Pinch or knock from side doors when working down low inside enclosure	Minor	Likely	7	Raise entire Trackpack before opening side doors and working inside.	Minor	Rare	1	Y	Wear safety glasses	
	Injury can occur through connection of quick snap connections	Minor	Possible	3	Must be connected parallel to each other.	Minor	Rare	1	Y	Hydraulic training	



