

# TRACKED CARRIERS

## Operating and Service Manual

v1.3 English

700 R	700 PRO
1200 R	1200 PRO
2200 R	2200 PRO





## Contents

Introduction.....	3
Technical Specifications.....	4
Main Components Illustration.....	6
Identification Plate.....	7
Noise Statement.....	7
Modifications Prohibition.....	7
Restrictions & Warnings.....	8
Regular Maintenance.....	9
Battery Charger.....	13
Remote Control.....	14
Operating Instructions.....	16
Auxiliary Output.....	18
Transporting & Lifting.....	19
Load Capacities.....	20
Stability.....	21
Centre of Gravity Guidelines.....	22
Fault Codes.....	24
Parts.....	25
Schematics.....	26



## Introduction

Tracked Carriers **R** and **PRO** models are designed to be easy to use, compact, efficient and dynamic to make them the ideal work companion for a variety of tasks. Having high carrying capacities and the ability to work inside and out, they are an ideal way to reduce the risk of injury and the amount of people required to perform heavy tasks. Tracked Carriers models are designed to require a minimal amount of maintenance and with a wide range of uses and the ability to carry attachments, have the potential to save time and money over traditional methods of dealing with heavy and awkward loads.

The model numbers correspond to the maximum capacity of each machine in kg, each is available in either **R** or **PRO** specification. The maximum capacities stated are dependent upon the gradient and ground conditions which are described in this manual.

Tracked Carriers **R** models use modern technology whilst being simple to operate, reliable and easy to maintain. Maintenance free batteries and AC motors are standard, along with fully proportional wireless remote controls and a built-in charger. **PRO** models offer additional features such as gradient-monitoring, information feedback and a smart auxiliary output, ideal when increased safety measures are required or powered attachments make the job easier. Both models feature hazard lights and switchable motion alarms.

It is recommended that users and people in the vicinity of any Tracked Carrier are over the age of 18, wearing safety footwear and high visibility clothing, and not under the influence of alcohol or drugs. Previous experience of operating powered equipment and machinery is thoroughly recommended. The performance and safety of the machine are dependent upon the person in control, the site conditions, and the load itself.

This manual is to accompany the Tracked Carriers 700, 1200 and 2200 models and assist the user in the safe use and application of the machine. Ensure the machine operator has read and is familiar with this manual before starting work, and that the machine has been charged and checked before use as detailed in this manual. Any repairs or modifications required, or doubts over points in the manual should be discussed with and confirmed by Tracked Carriers Ltd.

At the time of going to press, all information, specifications, procedures and illustrations within this manual are correct. Tracked Carriers Ltd reserves the right to change, alter, modify or improve its products without any obligations to install them on previously manufactured machines.

## Technical Specifications

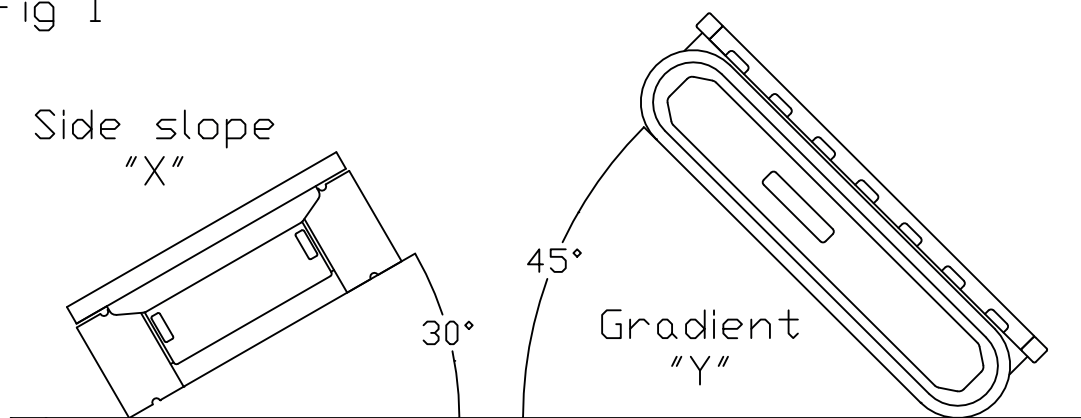
Manufacturer	Tracked Carriers
Model	700 R / 700 PRO
Max capacity on flat ground	700kg
Max capacity at max gradient	175kg
Stowed length	1050mm
Extended length	1600mm
Width	600mm
Height	355mm
Track width	130mm
Max gradient (Y) *	45°
Max side slope (X) *	30°
Weight	250kg
Max speed	3.5 km/h
Operating voltage	24v
Battery capacity	95AH
Electric motors	2x 1.2kW
Remote control	Wireless proportional push button system
Range	10m

Manufacturer	Tracked Carriers
Model	1200 R / 1200 PRO
Max capacity on flat ground	1200kg
Max capacity at max gradient	300kg
Stowed length	1120mm
Extended length	1700mm
Width	750mm
Height	360mm
Track width	150mm
Max gradient (Y) *	45°
Max side slope (X) *	30°
Weight	340kg
Max speed	3 km/h
Operating voltage	24v
Battery capacity	115AH
Electric motors	2x 1.2kW
Remote control	Wireless proportional push button system
Range	10m

Manufacturer	Tracked Carriers
Model	2200 R / 2200 PRO
Max capacity on flat ground	2200kg
Max capacity at max gradient	550kg
Stowed length	1260mm
Extended length	1910mm
Width	950mm
Height	365mm
Track width	180mm
Max gradient (Y) *	45°
Max side slope (X) *	30°
Weight	500kg
Max speed	3 km/h
Operating voltage	24v
Battery capacity	200AH
Electric motors	2x 1.7kW
Remote control	Wireless proportional push button system
Range	10m

\* The diagram below explains the side slope (X) and gradient (Y).

Fig 1



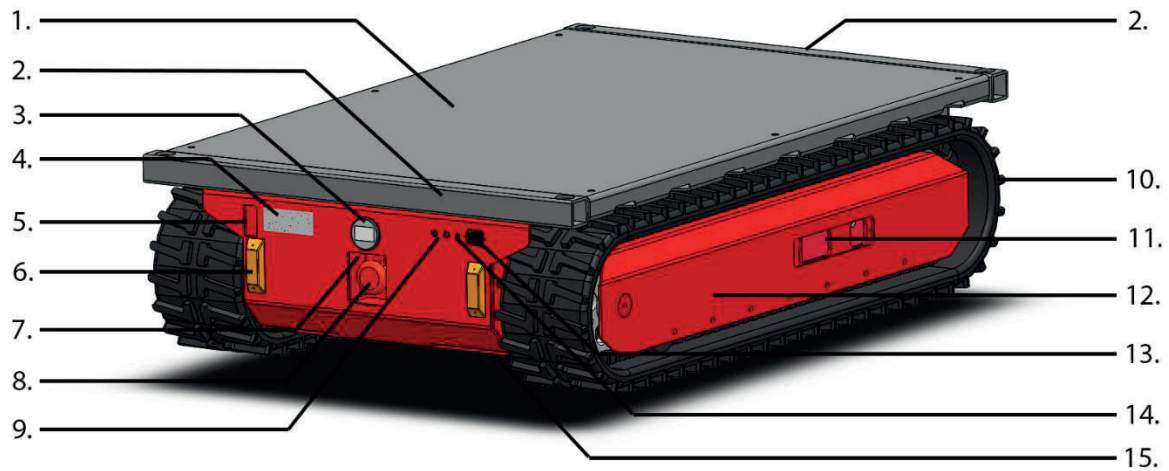
The value of the side slope (X) that the machine can operate on safely is not affected by the load weight, but the centre of gravity and ground conditions must be taken into account.

The maximum gradient (Y) is affected by the weight of the load, a chart is displayed on the rear of the machine and on page 19 in this manual. The centre of gravity and ground conditions must be taken into account.

**IMPORTANT- ENSURE YOU READ THE SECTIONS ON LOAD CAPACITIES (PAGE 19) AND STABILITY (PAGE 20) BEFORE OPERATING.**

## Main Components Illustration

Fig 2



1. Platform
2. Extending frames
3. Display screen
4. Identification plate
5. Auxiliary output socket (PRO models)
6. LED hazard light
7. Motion alarm switch
8. Emergency stop/isolator
9. 10A circuit breakers
10. Track
11. Track tensioner
12. Chassis
13. Charger socket
14. Charger status light
15. Chassis drain hole



## Identification Plate

Each machine has an identification plate fitted to the rear panel stamped during manufacture. Please ensure each section has been stamped and is legible prior to first use.

Example.

Fig 3

<b>TRACKED CARRIERS</b>	<b>TRACKED CARRIERS LTD</b> THE FORGE, MALDON ROAD, TIPTREE, ESSEX, UNITED KINGDOM, CO5 0PH WWW.TRACKED CARRIERS.CO.UK	<b>CE</b>
MODEL	<input type="text"/>	WEIGHT <input type="text"/> KG
SERIAL #	<input type="text"/>	YEAR OF MANUFACTURE <input type="text"/>
MAX S.W.L <input type="text"/> KG	NOMINAL POWER <input type="text"/> KW	

## Noise Statement

The sound pressure level at the operators' position does not exceed 70dB (A).

## Modification Prohibition

No modifications or alternations to the Tracked Carrier which may affect, for example, capacity, stability or safety requirements of the Tracked Carrier shall be made without the prior written approval of the manufacturer.

## Restrictions & Warnings

- **DO NOT** operate the Tracked Carrier until you have had training or are completely familiar with the operators manual, nor if you are under 18 or under the influence of drugs or alcohol.
  - **DO NOT** overload the Tracked Carrier \*check the maximum permissible load against the load vs gradient chart prior to use. \*
  - **DO NOT** climb on or ride on the Tracked Carrier.
  - **DO NOT** lift the Tracked Carrier whilst it is loaded.
  - **DO NOT** continue to operate the Tracked Carrier when the battery is low.
  - **DO NOT** drive through water deeper than 50mm unless bungs are fitted to the drainage holes. It is then possible to wade through water up to 100mm deep, the bungs **MUST** be removed immediately afterwards.
  - **DO NOT** use the Tracked Carrier on public highways.
  - **DO NOT** attempt to use the Tracked Carrier in poor or abnormal weather conditions (including thunderstorms, heavy rain or snow etc.), through tall or wet undergrowth, or in water deeper than specified in this manual.
  - **DO NOT** modify or alter the Tracked Carrier without the prior written approval of the manufacturer
- 
- **DO** ensure the load is lifted and placed in a safe and secure manner onto the carrier.
  - **DO** secure all loads before moving the Tracked Carrier.
  - **DO** enforce a safe distance between the Tracked Carrier and any personnel in the vicinity.
  - **DO** push the function buttons slowly to regulate the movement of the Tracked Carrier in a controlled manner so as not to upset the load or stability.
  - **DO** ensure the Tracked Carrier is turned off and isolated before working on, lifting, or securing the load.
  - **DO** ensure the extending arms are locked in place by the spring-loaded pins at all times.
  - **DO** keep the Tracked Carrier clean. The tracks may be cleaned with low pressure water however the rear panel and underneath the platform must **NOT** be washed by a water jet.
  - **DO** ensure the work area is adequately lit. Do not attempt to operate the Tracked Carrier in poorly lit areas. Artificial light may be used to improve visibility for safe operation.
  - **DO** lift the Tracked Carrier using the lifting eyes as described in this manual.

**IMPORTANT- CONTACT THE MANUFACTURER SHOULD YOU HAVE ANY QUESTIONS REGARDING THE OPERATION OF THE CARRIER**

## Regular Maintenance

Maintenance of the Tracked Carrier is essential to keep the performance, reliability and safety as high as possible. The **R** and **PRO** models have been designed to be simple to maintain but still require basic checks. They are completely free from battery and oil maintenance and have no hydraulic components.

The following checks/procedures are described in more detail over the following pages, and must be carried out on clean, flat and level ground.

### **Daily/Pre-operation checks (page 10):**

- Ensure the machine is clean
- Check that all visible bolts are tight and secure
- Check the tracks for damage and tension
- Check the emergency stop switch works
- Check the level sensor reads zero on flat ground (**PRO** models)
- Check the batteries are charged
- Check the remote control for damage, battery level, and operation
- Check drain holes are clear

### **Post-operation:**

After each days use the machine must be isolated by pushing in the emergency stop switch on the unit, and put on charge to top up the batteries if required. The remote control unit must be switched off and kept in a dry and secure place. Any wading plugs fitted to chassis drain holes must be removed.

### **Platform removal (page 11):**

- Removing and refitting the platform

### **Annual maintenance (pages 11):**

- Check the connection security of the battery cables
- Check the track roller and driveshaft retainer bolts are torqued
- Check or replace the main fuse
- Check or replace the contactor tips
- Remove tracks to clean the front idler wheel tensioners
- Check the drive sprocket and gearbox bolts are torqued
- Check all bearings for play

### **Battery replacement (page 13):**

- Replacement of batteries

### **Torque settings:**

Recommended torque settings for all Tracked Carrier fixings

<b>Size</b>	<b>Metric</b>	<b>Imperial</b>
M6	10Nm	7.5ft/lb
M8	25Nm	18ft/lb
M10	50Nm	37ft/lb
M12	85Nm	63ft/lb

### **Cleaning:**

The inside of the tracks may be hosed off with low pressure water to remove dirt and debris, the rear panel must be hand wiped only to protect the electronic components from water ingress. **Do not hose or pressure wash between the top of the tracks and the underside of the platform.**

### **Checking bolt tightness:**

All bolts and fasteners should be checked daily with particular attention paid to the platform retaining bolts which must also be checked immediately before lifting the machine. These are found at each end of the platform.

### **Checking the tracks:**

It is essential the tracks are checked for damage to prevent them becoming detached and damaging or destabilising the machine. Tension is checked by lifting the machine into the air or reversing the rear sprockets onto blocks and observing the slack in the lower section. There should be no less than 5mm but no more than 10mm of “droop” between the track and the bottom of the middle track roller. If there is more than 10mm then the track must be tensioned by removing the cover plate and turning the 24mm bolt head clockwise with a suitable socket until the slack is within tolerance. If there is less than 5mm of “droop”, the tensioning process is reversed. Tighten the lock nut after adjustment. Once the slack is acceptable, replace the cover plate. **Do not work underneath the machine if suspended.**

### **Checking the emergency stop switch:**

The emergency stop switch is checked by pushing it in and observing the rear display gauge. It should turn off with the switch pushed in and on again once pulled outwards. All controls should be inoperable with the stop switch depressed.

### **Checking the battery charge:**

The display gauge shows the state of charge in numerical form as a percentage between 0% and 100%. The gauge also shows the total hours the machine has worked, and will display faults as a code (see fault codes section of manual). Note- the battery level display will not reset to 100% following a charge unless it was already below 75% prior to charging.

### **Checking the level sensor (PRO models):**

The internal level sensor is displayed as X and Y on the screen of the remote control. On level ground both X and Y values should read zero, whilst driving up or down a gradient the Y value will change, and the X value will display the side slope.

### **Checking the remote control emergency stop:**

The remote control emergency stop is checked by pushing in the red stop button, the screen should turn off. When turned clockwise the stop switch should pop out and the screen should light up once the key switch is also turned on.

### **Checking the drain holes are clear:**

The drain holes in the bottom corners of the chassis (4 in total) must be clear so that any trapped water may run out of the chassis to prevent corrosion and electrical damage. Make sure they are not clogged and that any plugs have been removed.

### **Removing the platform:**

This must be done in the dry with the machine on firm level ground and requires lifting equipment or two strong people \*providing manual handling procedures allow\*. Isolate the machine by pushing in the emergency stop switch. Undo and remove the bolts at each end of the platform (there are 3 at each end of 700 and 1200 models, and 4 at each end of 2200 models). Extend the frames at both ends until they lock into position and use them as handles to lift the platform straight up and place on wooden bearers beside the machine.

To refit, check there are no wires out of place that may be caught in the location slots either side of the chassis, and lift the platform back into place. Refit all of the bolts loosely before tightening. **Platform bolts must be M10x20 else damage can occur.**

### **Checking battery cable security:**

Isolate the machine and remove the platform as previously described, inspect the condition of the battery cables, and the end terminals for corrosion. Using a torque wrench check the tightness of the nuts and bolts that secure each of the battery cable end terminals. If any appear loose or corroded, remove and clean the ends, refit, and coat the terminals with battery terminal spray or petroleum jelly. **Take care not to short across battery terminals.**

### **Checking track roller bolt and driveshaft retainer bolt tightness:**

The M10 track roller bolts and driveshaft retainer bolts must be tight and should be checked by using a torque wrench. The platform must be removed as detailed previously to access the internal bolts.

### **Inspecting and replacing the main fuse:**

Remove the platform as detailed previously. Use full face protection as working with batteries can be dangerous. Inspect the fuse for signs of heat damage. If required, unbolt the fuse from the holder and discard, fit new fuse of the correct type and carefully re-tighten nuts.

### **Checking and replacing the contactor tips:**

Remove the platform as detailed previously. Ensure that the machine is isolated and locate the main contactor (mounted on the rear of the emergency stop assembly). If the tips appear rough or blackened they will require replacing. To replace, first remove the battery link cable, then remove both battery cables from the contactor and remove the assembly by unscrewing the red switch head and removing the screws behind. Lift the assembly out and dismantle, replace the contactor tips and reassemble. Refit the contactor, switch head, battery cables and the battery link cable before function testing.

### **Removing the tracks to clean and inspect the front idler wheel tensioners:**

The idler wheel tensioner blocks must be cleaned and inspected annually to ensure they stay in good working order and do not seize in place. To remove the tracks, first ensure the machine is isolated by pressing in the emergency stop.

Raise the machine and rest the underside of the chassis on 150mm wooden blocks positioned as wide as possible within the tracks. Remove the platform as previously described in the manual. Remove the track tensioner cover plates and wind the tensioner bolts anti-clockwise until the front idler pulley stops retracting. Carefully lift the front of the track over the idler pulley and away from the centre of the machine, then the rear may be lifted away from the drive sprocket. Lay the track down and inspect for damage.

The front idler wheel assembly may be pulled out and should be cleaned, along with the socket in which it resides. Check the bearings in the centre by rocking the wheel and noting any play. If there is any noticeable movement other than smooth rotation, have the bearings replaced. The M16 tensioner bolt should then be coated in a thin layer of grease to resist corrosion, then re-fitted.

### **Checking drive sprocket and gearbox bolt tightness:**

Whilst the tracks are off (as previously detailed), the M12 drive sprocket retaining bolts and M8 gearbox bolts are accessible and should be checked for tightness.

### **Checking bearings for play:**

The bottom rollers, sprocket and front idler wheel should be individually checked for play by rocking side to side. No movement should be present and they should turn freely. Replace any bearings that show signs of wear.

### **Refitting the tracks:**

Refitting the tracks is the reverse of removal. Lift one end over the drive sprocket and push the teeth into position between the links. The other end can then be pulled over the front idler wheel, and the tensioner bolt wound in until there is 5-10mm of droop between the centre bottom roller and the inside of the track. Whilst standing clear, operate the track slowly for 30 seconds then check the tension again and adjust if required. Refit the side cover plates, platform, and lift the machine off the wooden blocks.

**Replacement of batteries:**

When the batteries are no longer performing as they should, replace them with like for like items. Disconnect all wires with care, remove the battery clamp and lift batteries out. When new batteries are fitted ensure they are clamped in place tightly before refitting wires. Old batteries must be disposed of responsibly by the supplier or a recycling centre.

## Battery Charger

**CAUTION! The machine must be charged in a well ventilated area free from sparks, flames or other hazards which may trigger an explosion. Highly explosive hydrogen gas is produced during charging.**

The battery charger is built into the machine and permanently connected to the batteries. It can take up to 8 hours to fully charge the batteries from flat and should be done away from any hot work/sparks/welding etc. A charger lead is required to connect the IEC20 plug into the power supply, which should be either 110v or 230v AC.

When power is connected to the charger, there will be a short delay before the LED starts to light up.

- LED flashing green slowly - charging (low battery)
- LED flashing green fast - charging (nearly full)
- LED solid green - fully charged
- LED flashing orange – external fault
- LED solid red - charger fault

It is recommended that the charging cycle is not disturbed and the batteries are fully charged before unplugging or switching off the power to the charger.

Whilst on charge the machine may not be used. When the charger is connected to the mains supply, the control system will automatically become interlocked and will prevent any movements being possible. The functions will return once the power supply to the charger is removed and the remote re-paired.

**Do not leave the machine on charge for more than 24 hours as this may damage the batteries.**

**Note- the battery level display will not reset to 100% following a charge unless it was already below 75% prior to charging.**

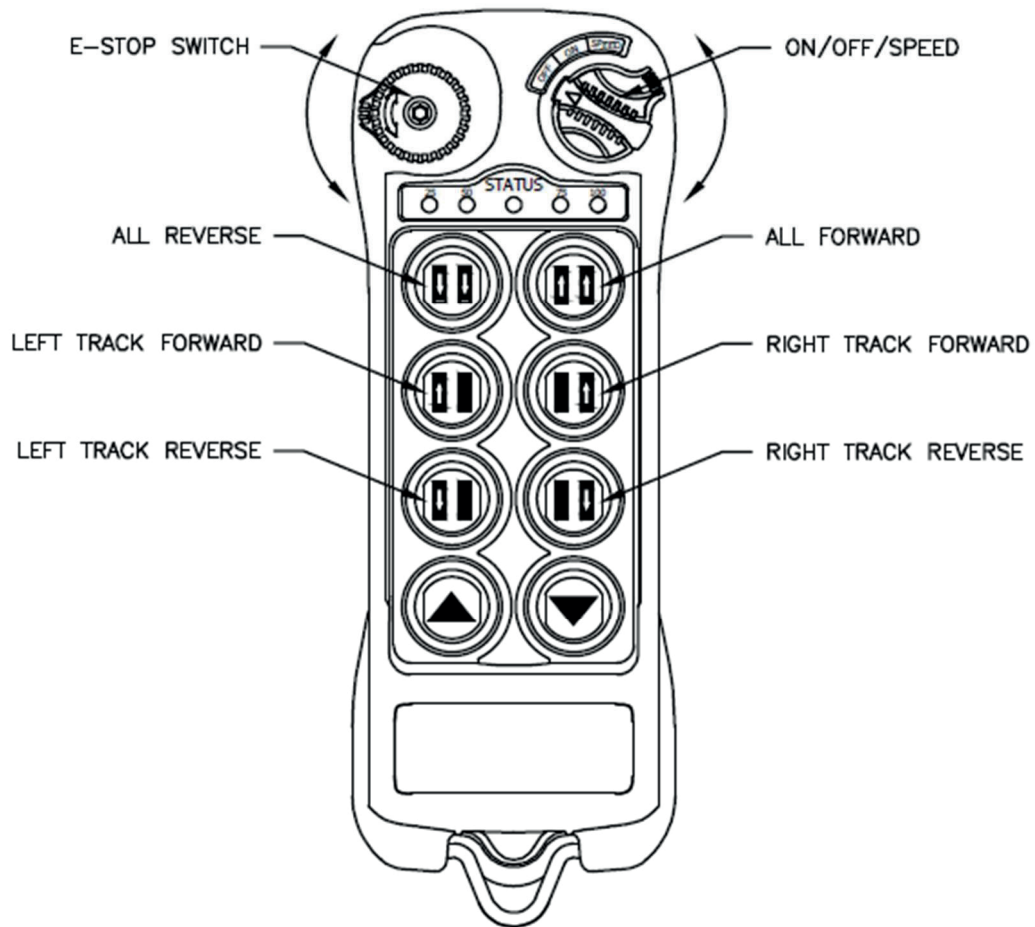


## Remote Control

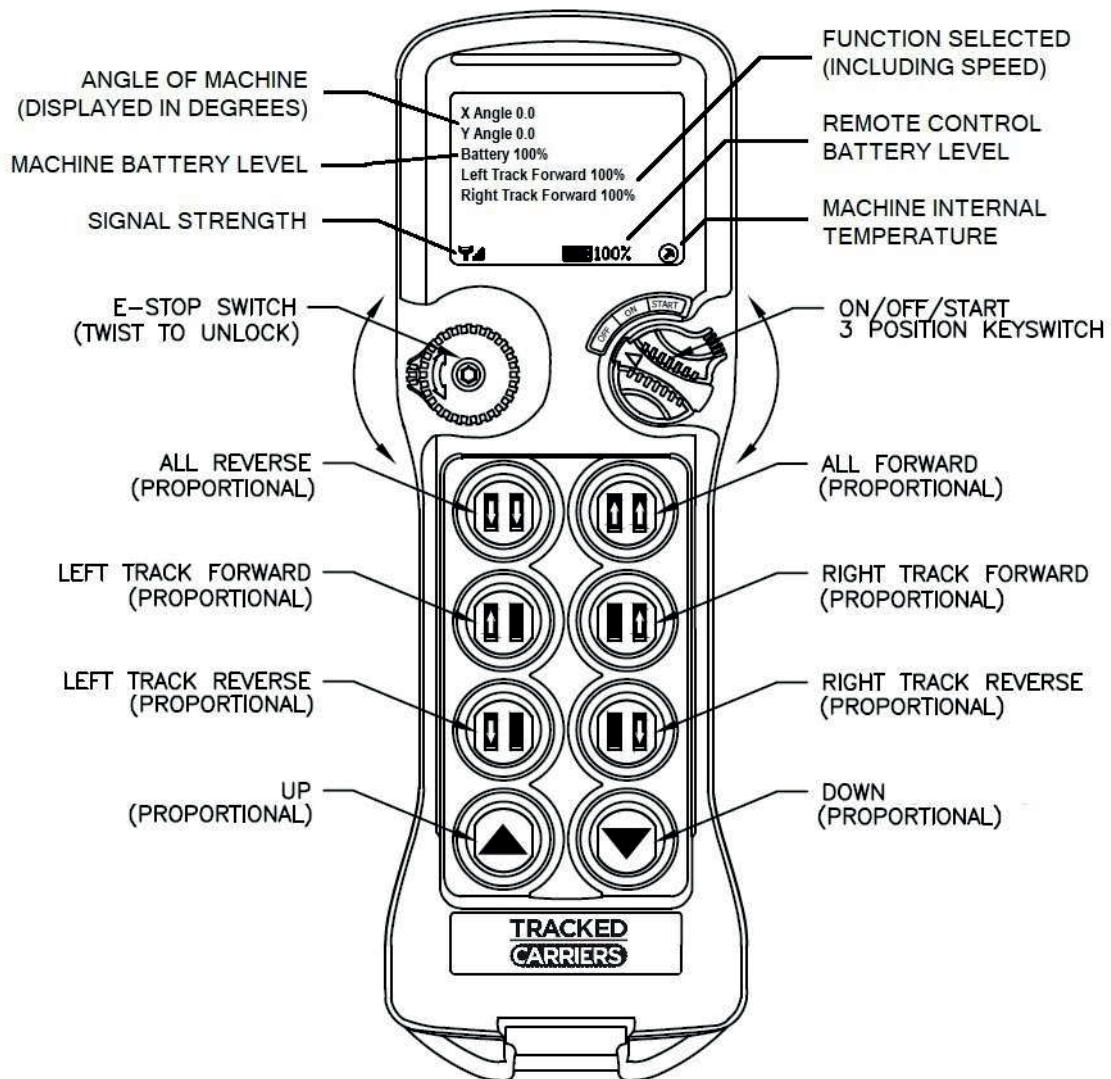
The remote control is rugged and water resistant, but care must still be taken to protect it from damage. Before use the remote control unit should be visually inspected for damage and all switches checked to ensure they move as intended. The separate remote control user manual should also be read carefully.

- **Emergency Stop.** Push to stop all functions, twist clockwise to reset.
- **On/Off/Start Key Switch.** Must be “on” to work, hold in the “start” position to pair with the machine before use. To remove, turn fully left beyond “off” position and pull to remove.
- **Display Screen.** Shows important machine information including Gradient (X and Y), machine battery level, function selected (including speed in percentage), signal strength, remote control battery level, maximum speed selected and temperature inside machine.
- **Forwards Only.** Use to move the machine forwards, no steer functions available.
- **Backwards Only.** Use to move the machine backwards, no steer functions available.
- **Left Track Forward.** Operates left track in a forwards motion (will steer right if pushed alone).
- **Left Track Backward.** Operates left track in a backwards motion (will steer left if pushed alone)
- **Right Track Forward.** Operates right track in a forwards motion (will steer left if pushed alone).
- **Right Track Backward.** Operates right track in a backwards motion (will steer right if pushed alone).
- **Auxiliary Up.** Provides +24v output to the auxiliary plug (**PRO** models only).
- **Auxiliary Down.** Provides -24v output to the auxiliary plug (**PRO** models only).
  
- **Setting the Speed Limiter.** The maximum speed is shown on the display (**PRO** models) and is changeable in 25% increments. To adjust maximum speed setting, hold the key switch in the Start position and use the top buttons (up or down) to increase or decrease the speed limit. **R** models use LEDs to indicate the maximum speed.

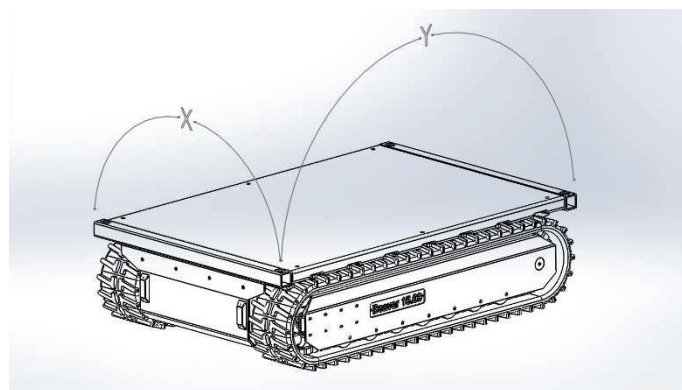
**R remote:**



**PRO remote:**



**X and Y axis:**



## Operating Instructions

The following steps describe how to use the machine in a basic situation and do not take adverse weather, site, or load situations into account. There is a load chart in this manual but it is down to the user to calculate safe working limits etc based on the size, type, weight and centre of gravity of the load being carried.

1. Carry out the daily checks as detailed in this manual.
2. Ensure the machine is free from danger, the load is secure, and there are no persons in the immediate vicinity.
3. Pull out the emergency stop switch to connect the power supply. The display gauge should light up and hazard lights start flashing. If the batteries are low, push the stop button in and charge the machine.
4. Reset the remote control emergency stop by twisting clockwise, and turn the key switch to "On".
5. Turn the key switch to "Start" momentarily. When paired to the machine, you will see the gradient and battery level displayed on the LCD screen (**PRO** models only).

The machine is now ready to use and the directional buttons may be pressed. Please note that the directional buttons are fully proportional, and must be pushed slowly to avoid creating sudden movements that may be dangerous. The built-in motion alarm may be enabled or disabled by pressing the button on the rear panel.

It is recommended to keep the maximum speed setting as low as possible to minimise sensitivity of the drive controls. Change by holding the key switch to "Start" whilst pushing the top left or right buttons to increase or decrease the maximum speed. The maximum speed is indicated by an LED on **R** models and is displayed on the screen with **PRO** models.

With **PRO** models, the speed of the unit will automatically decrease when gradients of 25° are reached and drive will practically cease at 45° and a warning alarm will sound. Drive will return once back below 45°, and full speed will automatically return once the unit is below 25°. The warning angle (default 45°) may be reduced if required via a programming tool.

The remote control will automatically disconnect after 3 minutes of no use and will require re-pairing before use.

After use, turn off the remote control by turning the key switch to "Off" and pushing in the emergency stop button on the machine. The machine should also be cleaned and charged as described in this manual.

### **Extending frames:**

The extending frames may be used to increase stability of longer items that need supporting further out than the platform itself allows, and have a strict weight limit of 200kg each. To extend the frames, pull the spring-loaded locking pins, slightly extend the frame, release the pins and continue to extend the frames until the pins lock back into place. Ensure that the frames are secure before use. Posts may be inserted into the sockets of the extending frames, and the frames may be removed completely to allow the fitment of optional attachments.

### **Wading:**

All models are able to drive through water up to 50mm deep normally, and up to 100mm deep when wading plugs are fitted to the drain holes in each corner of the tub. Silicone bungs are available for this purpose, and must be removed immediately after use to allow any water and condensation to drain out. Mud must also be considered as water and wading plugs fitted if traversing across such ground is necessary.

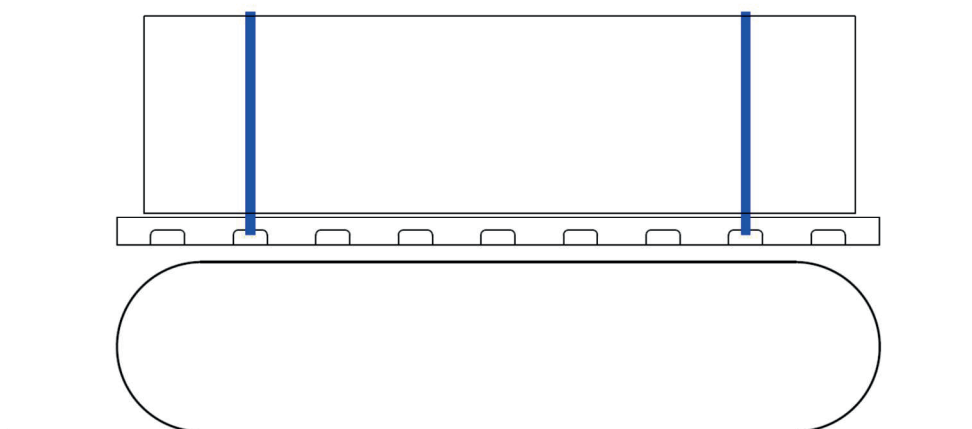
Ensure that the machine is rinsed with low pressure water after wading through mud, clay, sand etc.

### **Attachments:**

Approved attachments may be used with all models, and are fixed to the machine by bolting through the dedicated holes in the platform or by the mounting tubes running through the platform sides. Power for certain attachments is provided by the auxiliary output socket (**PRO** models only), which is operated by the lower two buttons on the remote control.

### **Load restraint:**

The sides of the platform have slots cut out along the entire length which are designed to be used to aid load restraint. The use of ratchet straps is highly recommended and can easily be hooked into the slots, or the corners of the extending frames. Ensure that the hooks do not interfere with the operation of the tracks, and do not overtighten.



## Auxiliary output (PRO models)

When an auxiliary output is fitted (standard on **PRO** models) the machine may behave in different ways when coupled to certain attachments.

The output socket provides +/- 24VDC to power external devices, and also enables one of 4 modes depending on the attachment connected and switches made. The different modes are listed below:

- **MODE 0:** Auxiliary outputs are enabled and fully proportional, having no effect on the normal operation of the machine.
- **MODE 1:** Auxiliary outputs are enabled and fully proportional, the machine operates at a reduced speed and the warning alarm will sound at reduced gradients (+/- 5° X and Y) to increase stability.
- **MODE 2:** Auxiliary outputs are enabled and fully proportional, the machine loses all drive functions.
- **MODE 3:** Auxiliary output is a constant +24V, the machine operates as normal.

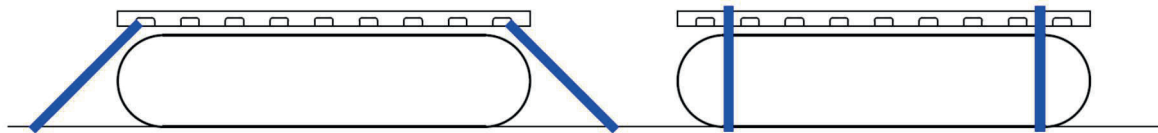
**The auxiliary socket should be kept clean and dry, any non-approved attachments should be checked with Tracked Carriers Ltd before use.**

## Transporting and Lifting

### Transporting:

Before transporting, ensure that the Tracked Carrier is not loaded, and that the extending frames are retracted and secured by means of the spring-loaded locking pins. If loading by ramps, ensure that the ramps are of adequate strength and are locked into place before attempting to drive up them. Make the angle of the ramps as low as possible to reduce the chance of slipping.

Once loaded, the Tracked Carrier must be secured on the delivery vehicle before transporting. The use of ratchet straps is recommended either using two over the top of the platform and vertically down to the floor of the transport vehicle, or by four shorter straps, one in each corner from the slots of the platform diagonally down to the transport vehicle.

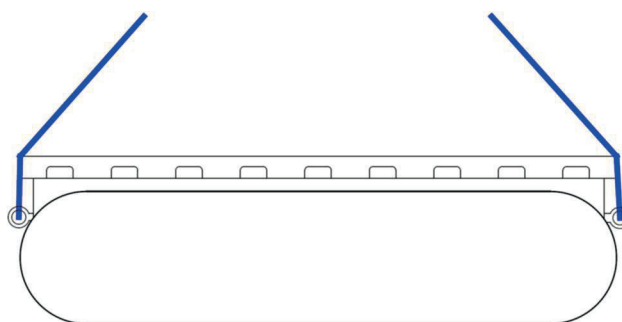


### Lifting:

When using a forklift to lift the machine, ensure that the lifting forks are at least as long as the machine. The forks must be positioned between the tracks as wide as possible so they almost touch the tracks either side, and the ends of the forks must protrude from the far end when inserted. It is imperative that the forks are tilted back slightly so that there is no chance of the machine sliding off.

**Do not use suspended crane forks to lift the machine.**

When slinging by crane, 4 legged chains or slings must be used in conjunction with certified lifting eyes. They must be rated at least 200kg each and fitted with an M10x20 thread to replace the 4 outer platform retaining bolts. Ensure they are torqued to 36 ft/lbs or 49 Nm before lifting. **THREAD LENGTH MUST NOT EXCEED 20MM OR INTERNAL DAMAGE MAY OCCUR.**



## Load Capacities

Maximum load carrying capacities of all Tracked Carriers depend on several factors and may vary between different jobs. Ground conditions, load types, centre and height of gravity variances, slope angles, battery condition, weather and more will affect calculations. Many surface types increase friction under the tracks and reduce the ability to turn the machine. The below chart shows the maximum capacity up to a maximum 45° slope but must not be used without taking stability into account as well (page 23).

700 R / PRO	
Angle	Capacity
≤45°	175kg
≤30°	350kg
≤15°	525kg
0°	700kg

1200 R / PRO	
Angle	Capacity
≤45°	300kg
≤30°	600kg
≤15°	900kg
0°	1,200kg

2200 R / PRO	
Angle	Capacity
≤45°	550kg
≤30°	1,100kg
≤15°	1,650kg
0°	2,200kg

**Always remember to stand well clear and uphill of a machine on a slope, and ensure there are no personnel downhill or in the vicinity in case of overturning.**



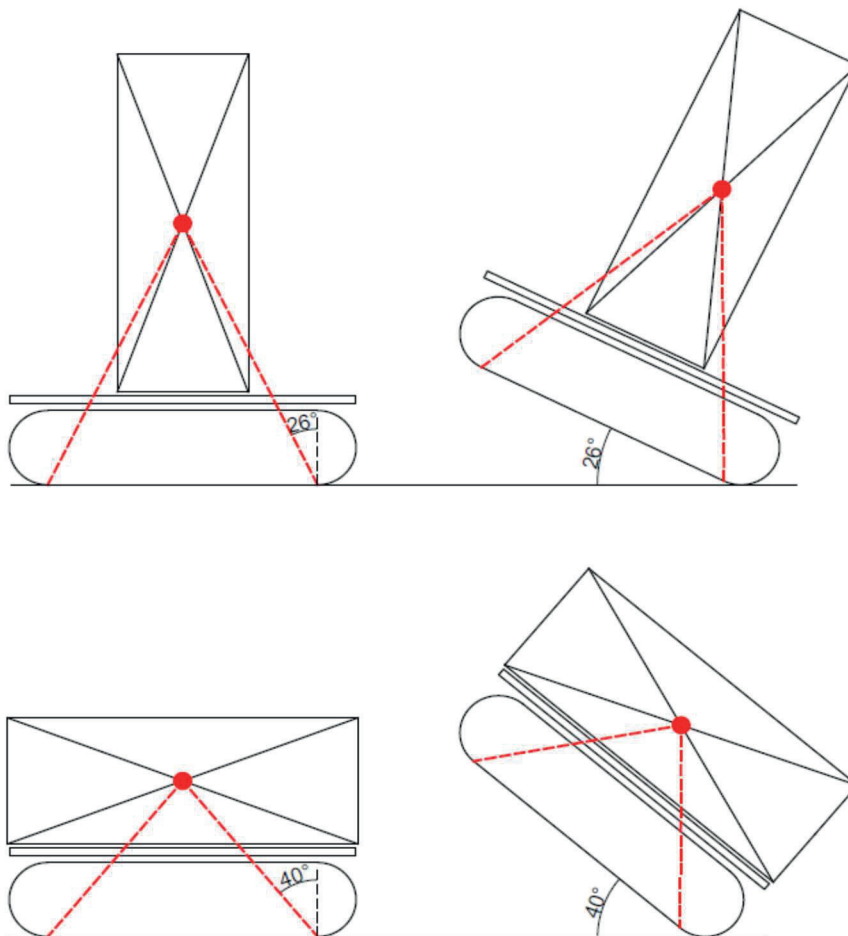
## Stability

Calculating stability is paramount to the safe operation of any Tracked Carrier and is critical when operating on a gradient, steps or when transporting an abnormal load. The diagrams below show a simple calculation required to determine the maximum safe angle which may be traversed (subject to not exceeding the maximum capacity as detailed previously).

A line is drawn from the centre of gravity of the load to the furthest points of ground contact and the angle of the line measured from vertical. This is the maximum angle that may be operated on.

**PRO** models assist the user by displaying the angle of the machine on the remote control display, and the warning alarm (set to 45° Y and 30° X as standard) may be reduced if required using a calibration tool. **PRO** models also aid stability by automatically reducing drive speed on gradients over 25°.

**The centre of gravity (COG) may not always be in the middle of the load.**



## Centre of Gravity General Guidelines:

The centre of gravity of the load, its position on the platform and its height from the ground must be considered. Also, it is advisable to inspect and make yourself and others aware of the ground conditions which may limit traction and/or affect stability.

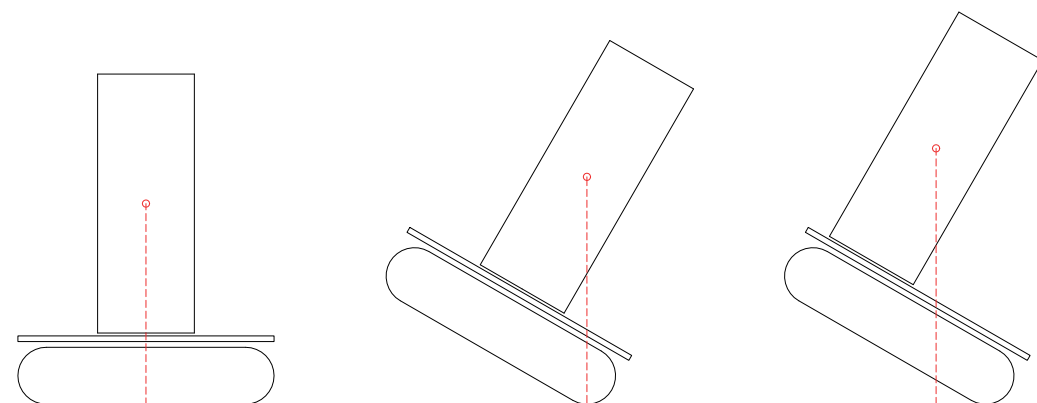


Fig 10.1

Fig 10.2

Fig 10.3

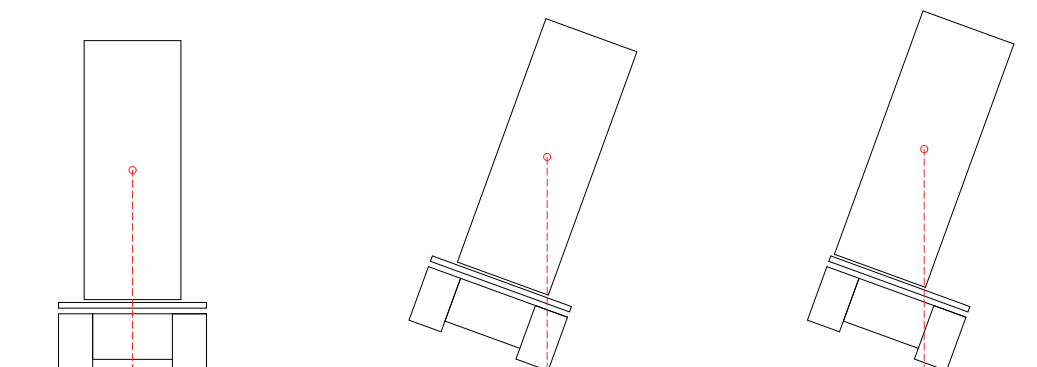


Fig 10.1 - On a flat surface the load should be positioned so the centre of gravity is in the centre of the tracks

Fig 10.2 - Moving from a flat surface to a slope the centre of gravity will change so that is no longer in the centre of the tracks.

Fig 10.3 - It may be advisable to move the load slightly to compensate for the angle of the slope

Gradients (Y) - Move load forward when driving uphill (+ gradient). Move load rearward when driving downhill (- gradient).

Side slope (X) - Move load over to the higher side.

**IF YOU HAVE ANY CONCERNS AND/OR DOUBTS PLEASE SEEK ADVICE FROM A COMPETENT PERSON.**

## **Factors that must be considered before operation on a gradient:**

- The unit is in good working order and all the required checks/inspections have been carried out.
- Batteries are charged.
- The operator has read and fully understands the instructions in the manual
- The load weight and centre of gravity are known values.
- The necessary calculations/assessments have been completed. Load weight vs maximum slope permissible, the route is suitable and gradients are known for centre of gravity load position on carrier.
- The load can be lifted and secured onto the platform in a safe and secure manner.

**THE HEIGHT OF THE CENTRE OF GRAVITY OF THE LOAD MAY LEAD TO THE MACHINE OVERTURNING ON A GRADIENT IF THE CENTRE OF GRAVITY FALLS OUTSIDE OF THE VEHICLE TRACKS.**

**NEVER STAND DOWNHILL OR DOWNSTAIRS OF A MACHINE INCASE OF OVERTURNING OR LOSS OF TRACTION.**

**CARE SHOULD BE TAKEN DURING THE TRANSITION FROM FLAT GROUND TO A GRADIENT AS THE MACHINE MAY BECOME UNSTABLE WHEN LOADED, ANY MOVEMENTS SHOULD BE AS SLOW AS POSSIBLE.**

## Fault Codes:

The following codes may be observed on the display screen on the rear of the machine when an issue is detected. ERM codes relate to the left motor and ERS codes relate to the right motor. A programming tool may be used for further analysis and changing settings.

Fault Code	Description	Action
ERM15	Severe under-temperature (below -40°C)	Shut down machine, bring ambient temperature up
ERM16	Severe over-temperature (above +95°C)	Shut down machine, bring ambient temperature down
ERM17	Severe under-voltage	Check circuit breakers, check main fuse, check battery connections, check state of charge
ERM18	Severe over-voltage	Check battery wiring, if new batteries check specification
ERM22	Motor controller over-temperature cutback	Check load is within limit, check ambient temperature, reduce working cycle times
ERM23	Under-voltage cutback	Charge batteries, check circuit breakers and main fuse
ERM28 ERS28	Left motor temp cutback Right motor temp cutback	Check load and gradient are within limit, check state of charge reduce working cycle times
ERM31	Contactors fault	Check wiring to contactor coil, check contactor coil resistance
ERM32 ERS32	Left brake fault Right brake fault	Check wiring to brake, check brake coil resistance
ERM36 ERS36	Left motor encoder fault Right motor encoder fault	Check wiring to encoder, check motor speed within range
ERM38	Contactors welded	Replace contactor tips
ERM39	Contactors not closing	Check state of charge, check main fuse, replace contactor tips
ERM51	Inclinometer fault	Check wiring to inclinometer
ERM52/53/56	Radio receiver fault	Check wiring to radio receiver
ERS57	Slave motor controller fault	View additional fault codes
ERM73 ERS73	Left motor stall detected Right motor stall detected	Check load, check machine not restrained, check tracks not jammed

**Parts:**

Parts for all machines are available from Tracked Carriers Ltd, please email [info@trackedcarriers.co.uk](mailto:info@trackedcarriers.co.uk) or contact your local distributor for more information.

## Schematics

**WARNING!** Electrocutation hazard. Unplug machine and isolate before removing top cover.

Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewellery.

- Troubleshooting and repair procedures should only be completed by a person trained and qualified on the repair of this machine.
- Immediately tag and remove from service a damaged or malfunctioning machine.
- Repair any machine damage or malfunction before operating the machine.

### Electrical components:

Batteries 700: 2x Sterling HP95 12v AGM

Batteries 1200: 2x Sterling HPC115 12v AGM

Batteries 2200: 2x Sterling HP200 12v AGM

Main fuse 700 / 1200: 200A Megafuse

Main fuse 2200: 250A Megafuse

Circuit breakers: 10A & 15A

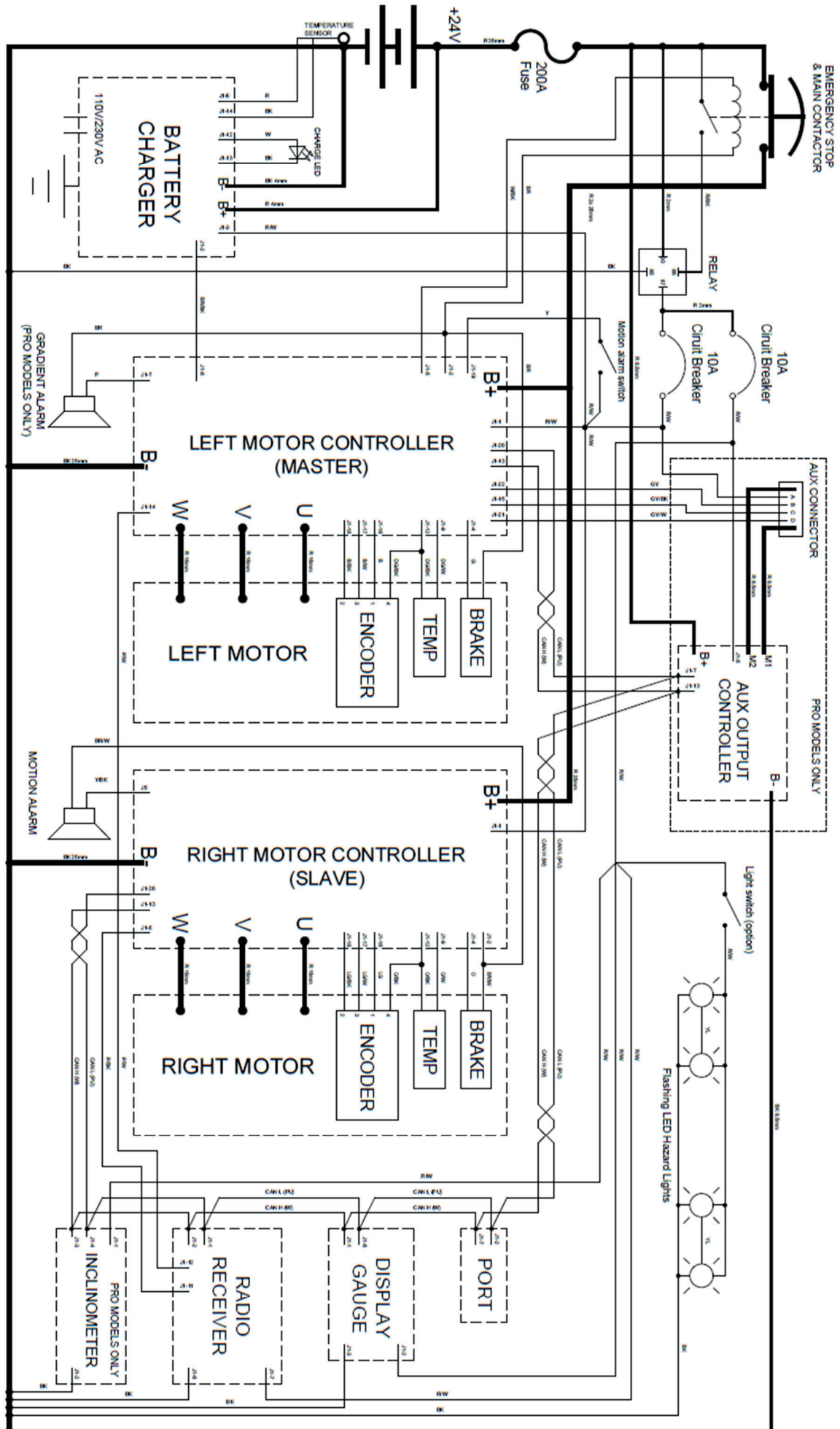
Main contactor/isolator: Albright SD200

Motor controllers: Curtis F2A

Battery charger: Delta Q 1622

Battery/hour meter: Curtis 3140

Remote control system: Magnetek Flex Pro (**R**) / Flex Vue (**PRO**) & CAN2



700 1200 2200 R PRO Wing Diagram v.1.1

