



# Tug Rise

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## Operating Manual

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## **Tug Rise Operating Manual—OM0030E**

This manual contains important safety, installation and operating instructions for this unit. Read this manual thoroughly and completely, and retain for future reference. This unit can cause serious injury to personnel or damage to property if used incorrectly, therefore do not use this machine for any other purpose apart from its intended use. Using this unit incorrectly may void warranty.

Any damage audible or visible to this unit should be addressed at the time of discovery. Electrodrive Pty Ltd can provide parts and service support on request through its service partner company:

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# Introduction

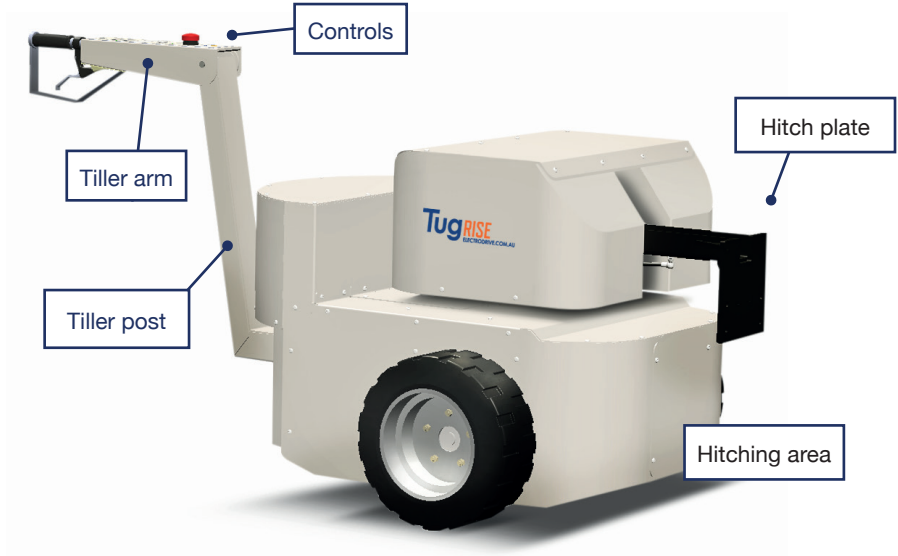
## **Move your existing manual trolleys with the battery powered Tug Rise.**

The Tug Rise simply hooks on to your existing trolley with your chosen hitch. This converts your heavy trolley into a powerful, easy to move motorised unit. Productivity is greatly increased, and back or shoulder strain is eliminated.

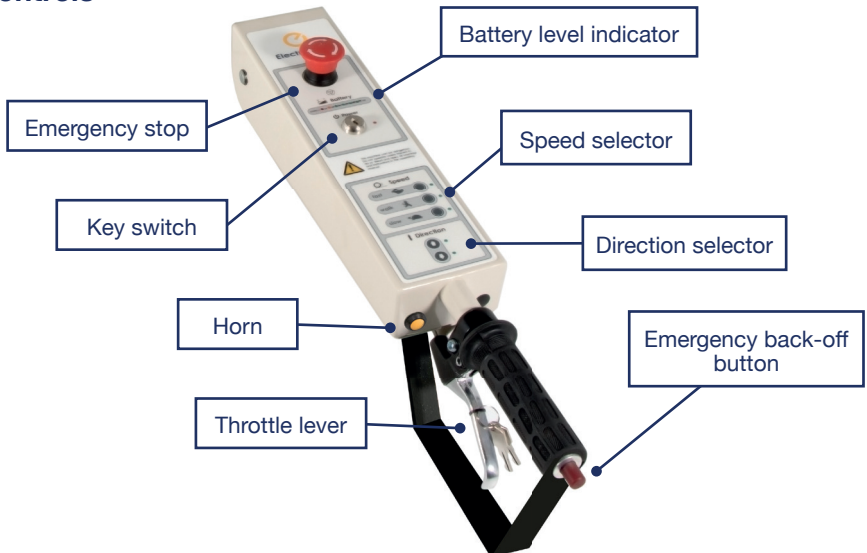
## **Features**

- Rated to tow up to 1000 kg on 15 degree slope, or 5000 kg on flat ground.
- 24 Volt DC power.
- Variable speed drive unit.
- Electro-magnetic park brake.
- Travel speed—up to 3 km/h.
- Robust steel chassis.
- Tiller handle steering that folds up to reduce space when not in use.
- Programmable motor controller.
- Automatic charger.
- Optional strobe light.
- Optional safety lights.

# Operating instructions



## Controls



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## Controls

### Key switch

The key switch must be turned clockwise to switch the unit on. When the unit is on, the strobe light will flash. It is important to note that the unit should be switched off and the key removed, whenever it is not in use. This eliminates the risk of unauthorised movement and also prevents an unnecessary use of battery power.

### Emergency stop and Emergency back-off button

The controls have two emergency buttons.

1. Emergency stop button: In an emergency, push this button to stop the unit. To release, slightly twist the button and it will pop back up.
2. Emergency back-off button: When pressed, the Tug Rise will momentarily travel backwards (as a safety mechanism) to avoid pinning the operator against an obstacle, and then stop. This will occur whether the throttle is triggered or released. To reset the back-off function, use the key switch to power the Tug Rise off, then back on again.



**Only use the emergency buttons in an emergency.**

### Battery level indicator

The battery level indicator indicates the amount of charge left in the batteries. When it appears to be running low, return the unit to the closest charging station to charge the batteries. Being aware of the level of charge of the batteries will eliminate the possibility of running low on power whilst away from the charging station.

### Direction selector

Toggle the switch to select the desired direction of travel (forward/reverse).

### Horn

Push to sound the horn, release to turn off.

### Throttle lever

This lever provides variable speed control from zero up to 100%. Releasing the lever will cause the Tug Rise to decelerate and stop.

### Charger socket

The charger socket is located on top of the machine.



### **Brakes**

When the throttle lever is released, the unit is slowed electrically by dynamic braking until the machine and load comes to a complete stop.

### **Capacity**

Refer to the serial plate for the unit's working load limit, located on the body adjacent to the tiller post.

### **Optional walking lights**

Positioned at the bottom, front of the unit.

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# Driving instructions

## Safety check

Before using the Tug Rise the operator should complete the following check:

1. The battery charger is not connected.
2. The direction selector works.
3. The emergency stop button is released.
4. The brakes operate correctly when the throttle lever is released.
5. The battery indicator shows adequate charge.
6. There is no visible damage to the unit.
7. Back-off button works correctly.

## Hitching to a trolley

The Tug Rise has a variety of hitches available.

Ensure that the trolley being attached to has its brakes engaged (or chocked) and is free from obstruction. Inspect the trolley and ensure that the trolley castors are in good condition.



**Towing a trolley with castors in poor condition can overload the Tug Rise, and cause damage not covered under warranty.**



**Contact Electrodrive for further information on rated loads for hitches.**



**Contact Electrodrive for advice on maximum loads when towing on ramps and slopes.**



**It is STRONGLY RECOMMENDED that the operator lead the Tug Rise and trolley, rather than using the tug to “push” the trolley.** This will ensure that the operator has a safe unobstructed view ahead, and ensures the Tug Rise and trolley are easy to manoeuvre.



## Steering

The tiller arm provides easy steering. The Tug Rise with an attached trolley can be manoeuvred through tight areas.



**This unit's power transmission system is a transaxle arrangement.**

Obstruction or resistance to one wheel will cause driving power to be transmitted through to the wheel that is free. This may cause the Tug Rise to spin out of control. Please ensure a clear and clean path ahead when operating the Tug Rise.

## Charging

Ensure regular recharging of batteries (charging overnight after a day's usage is recommended). Irregular charging may cause the batteries to prematurely fail.

Leaving a machine in storage without charge for periods greater than a month can also lead to premature battery failure. This is not covered under warranty.

For detailed charging procedures refer to Appendix 4. Misuse of the battery will void warranty.



**Only use the battery charger supplied with this Tug Rise.**

The automatic features of the supplied charger ensures that the sealed gel batteries are not overcharged, and only a minimum amount of gas, if any at all, are expelled during charging.

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# Maintenance

## Batteries

If this unit is not being used for an extended period of time, it should be connected to the battery charger to check the battery level on a regular basis, and placed on charge overnight if required. This will ensure the batteries are kept in good condition.

The batteries are sealed and maintenance free. DO NOT attempt to open these batteries. If the unit is not charged as above, the batteries may be exhausted and have dropped below the charging threshold of the battery charger. The supplied charger cannot begin to charge the batteries unless they have a small amount of charge. If this occurs, contact Electrodrive or your local service agent.

A sign that the batteries need replacing is when they no longer hold charge.

## Tyres

The tyres are rubber, giving it puncture-proof characteristics. For replacement tyres, please refer to the spare parts section in this document or contact Electrodrive.

## Motor and transmission

The transaxle is a sealed unit and does not require regular maintenance.

## Transmission

The tension in the transmission chain should be checked every 3 months. Ensure that the chain has no more than  $\pm 10$  mm deflection. Light lubrication can also be applied in 3 month intervals.

## Brakes

The dynamic braking system does not require regular maintenance.

## Motor

Motor brushes should be inspected every six months and replaced every 2 years. Remove the brush retaining cover for access to the brushes, should they need replacing.

## Motor controller

This unit is not serviceable. Any difficulties experienced with speed control should be referred to Electrodrive.

### Throttle lever

The throttle lever and cable do not require maintenance. Should the lever or cable suffer damage they should be replaced. If the handle loosens with wear, the hinge nut can be gently tightened. However, first confirm that the lever is in the correct position as it may need to be reset. (Test by squeezing the lever slightly. The Tug Rise should slowly move, release and the Tug Rise should completely stop).

### Fuses

The control circuit is protected against inadvertent current over-loads. This fuse is located adjacent to the controller under the top cover.

### Circuit breaker

This Tug Rise is fitted with a circuit breaker in case of momentary over-load. This circuit breaker can be found beneath the top cover on the battery carrier. If the unit repeatedly over-loads, test the machine, as the motor may be damaged, and continued use could damage the unit further.

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# Warranty

Electrodrive Pty Ltd warrants that this product is free from defects in materials and workmanship for a period of 12 months from the date of dispatch from the Electrodrive plant. The battery has a six month warranty.

If a defect is reported, Electrodrive will repair or replace the defective part, at its own discretion. This warranty does not apply if this unit has been misused, damaged, or modified in any way.

Please be aware that modifications and misuse will void your warranty. The following activities (including, but not limited to) are examples of these:

## Unauthorised maintenance

- The machine is re-wired by an unauthorised service agent.
- The motor controller is re-programmed by an unauthorised service agent.
- There are modifications to the body or frame of the machine.
- Use of non-specified parts.
- The machine is serviced by an unauthorised service agent.

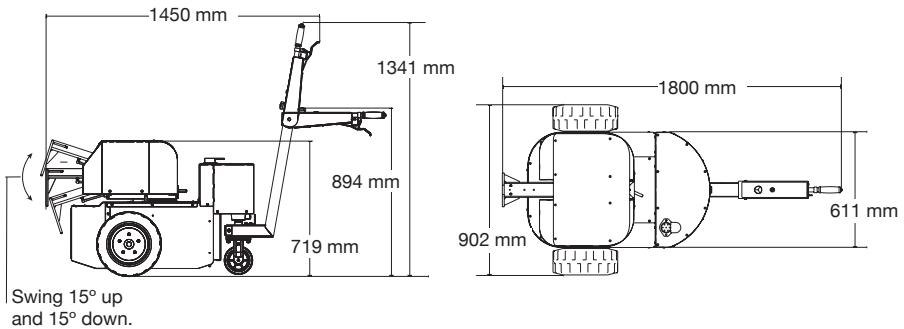
## Misuse

- Shunting loads at speeds in excess of 2 km/h.
- Overloading the unit either during towing or lifting.
- Carrying people or other foreign objects.
- Exposed to rain or other precipitation, unless weatherproof option is installed.
- Using the emergency back-off system to change direction regularly.
- Exposed to a corrosive environment.
- Driven off road—potholes, gravel, etc.
- Driven on slopes which don't comply with Electrodrive's recommendations.
- Not being charged adequately.
- Using the emergency stop button as an ON/OFF button.

## General wear items not covered under warranty

- Tyres and castors.
- Drive wheels and motor brushes.
- Hand grips.

## Appendix 1: Machine rating conditions



Model	Working Load Limit	Max Load
TUGRISE1TNH	1000 kg	1000 kg

The Tug Rise has been designed to move the rated weight capacity on a level firm surface. Variations in the working environment may impede the performance of this unit.

Such parameters include (but are not limited to) the following:

- Ramps and sloped surfaces.
- Soft surfaces (for example carpet).
- Slippery surfaces (gravel, water, oil on the ground, etc).



**It is important that the Tug Rise IS NOT to be operated outside of the recommended conditions.**



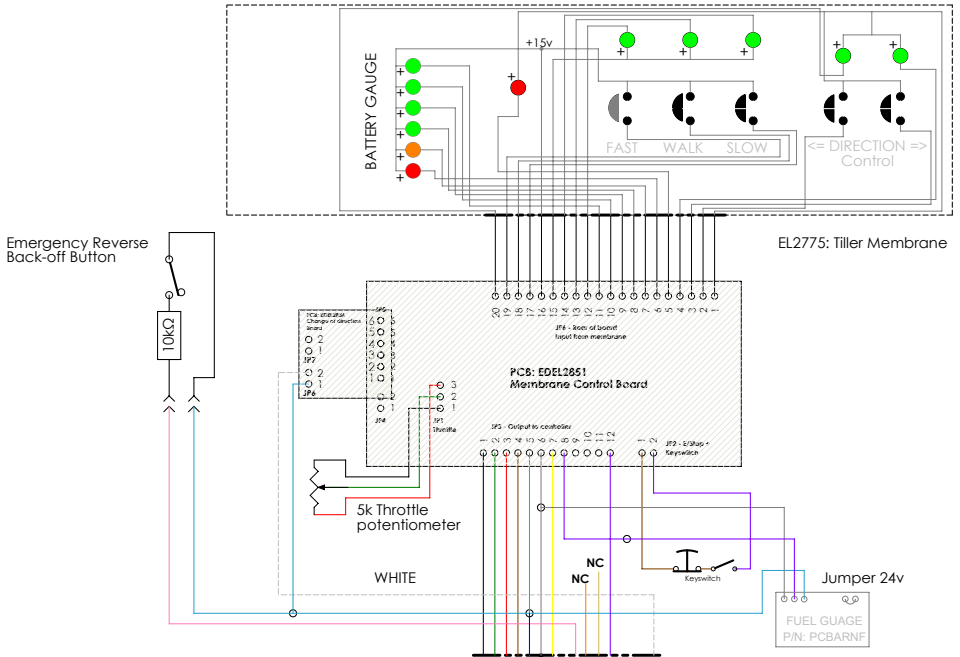
**Contact Electrodrive for advice on maximum loads when towing on ramps and slopes.**

## Appendix 2: Spare parts list

Part	Description
EDWH1186	Rim—8 x 3.3 suit press on tyres
EDWH1463	Tyre press on 13.5 x 5.5 x 8 non-marking grey with tread
EDCONCURTIS-1229	Curtis controller 1229—3201 24-36VDC, 250A, PM DC control
EDMOTTRANS1_3KW24V	24V 1300W 130RPM with 6NM
EDBATCHA24V25A	24V 25A battery charger
EDBATGEL12V100AHRE	TUG 12V 100Ah battery
EDRELSPSTNO24V80A	SPSTNO contactor 24V 80A
EDWP1049F	Tiller handle fully wired membrane
EDWIRTLHND	Loom—tiller membrane loom
EDWIRTHROTTLE	Common throttle loom
EDWIRTLESTOP	Key switch/e-stop loom
EDWIRTLRHND	Tiller handle loom 5 ton
EDEL3100	Relay 24 volt for 48v system
EDCIREXT16	Circlip—external—D1400—0170
EDCIREXT22	22 mm external circlip
EDEL1920	Circuit breaker—80 Amp
EDEL2500	Glass fuse holder
EDEL2515	Fuse holder—maxi blade fuse
EDEL2920	Plug—4 way mini fit
EDGM1487	Circlip external 35mm
EDGM1142	Bearing housing TT10 tow
EDGM1225	Bearing TT10 ton suit 35mm shaft
EDGM1410	Chain 10B1, 5/8" HD 10B, TT10
EDSP1055	Sprocket 15T bossed 10B with pilot hole
EDSP1057	Sprocket 38T bossed 10B with pilot
EDEL2339	Emergency reverse system red

<b>Part</b>	<b>Description</b>
EDEL2380	Emergency stop button complete
EDEL2720	Key switch with key—A126
EDEL2775	Membrane key pad suit tiller handle
EDEL1100	Blanking plug—13mm
EDEL2851	PCB membrane control board
EDEL2856	PCB tiller fwd/rev direction selection
EDEL3010	Potentiometer—5K (internal)
EDGM1810	Handgrip 7/8" x 5"—tiller black
EDGM2051	Tiller pot spring straight leg
EDGM2150	Throttle cable & act arm
EDGM2170	Throttle lever
EDGM2171	Throttle lever guard
EDGM1480	Circlip—tiller hinge 1/2"
EDGM1501	Collar 1"x1/2" zinc plated
EDGM2040	Spring—tiller handle position
EDGM2210	Tiller pin—zinc plated

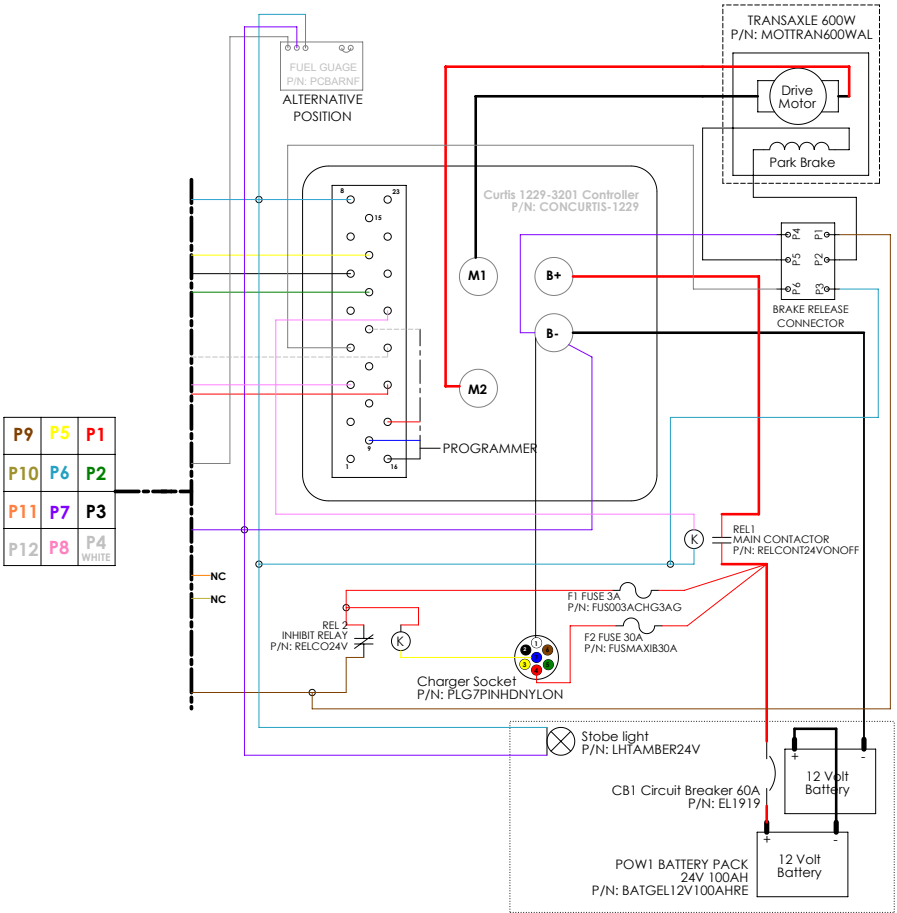
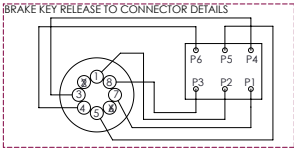
# Appendix 3: Wiring diagram



Drawing Key	
	Cable 192/0.22 6mm2
	Cable 14/.2 1.13mm2
	Cable 7/0.2 0.22mm2
	Black
	Blue
	Brown
	Green
	Grey
	Orange
	Pink
	Purple
	Red
	Tan
	White
	Yellow

P1	P5	P9
P2	P6	P10
P3	P7	P11
P4	P8	P12
WHITE		





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## Appendix 4: Charging procedures for SLA batteries

- Always charge batteries when work is complete and the equipment is not required for use.
- Opportunity charging is NOT recommended. This can also shorten battery life.
- Never leave batteries in a discharged state as this will shorten the batteries life.
- For maximum battery life, a battery must be recharged to 100% capacity. Recharging less than 100% may result in premature battery failure. Batteries are not covered under warranty if they are not recharged properly.
- If batteries are disconnected from the machine and not used for lengthy periods of time, it is recommended to give them a maintenance charge once every two months.

### Charging setup

- Ensure you have the correct charger for the batteries. The correct voltage and current is important to ensure the full life of the batteries.
- Check all connections are tight and in good condition.
- The green charger LED will illuminate to confirm charging is in progress.
- If charger lights do not come on, call your service technician.
- When charger is plugged in, drive function of machine is automatically inhibited.

### During charging

- Ensure there is enough airflow to help keep the batteries as cool as possible.
- If the batteries are swollen turn off immediately and call your service technician.
- Always leave batteries on charge until the charge is COMPLETE. This is indicated when charger LED turns off.

### Charger manual

Please read BATCHA24V25A—Battery Charger Operating Manual for more information.

# Service log

## Service recommendations

To ensure this equipment is kept in a safe and reliable condition, it is important to follow a preventative maintenance program. Maintain a log of the service work on the cards below, and always use an approved Electrodrive service agent to conduct the works. Approved service personnel will be provided with all necessary documents and components in service repair, including but not limited to, circuit diagrams, component part lists, descriptions, service checklists and spare parts.

## 6 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

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## 12 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

## 18 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

### 24 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

### 30 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

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### 36 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

### 42 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

### 48 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

### 54 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			

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## 60 month service

Date of service		Service agent	
Machine serial number			
Summary of works			
Next service due			



# Notes

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# Notes

# Notes

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