



Tug Smart

Operating Manual

Tug Smart Operating Manual—OM0025E/1

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

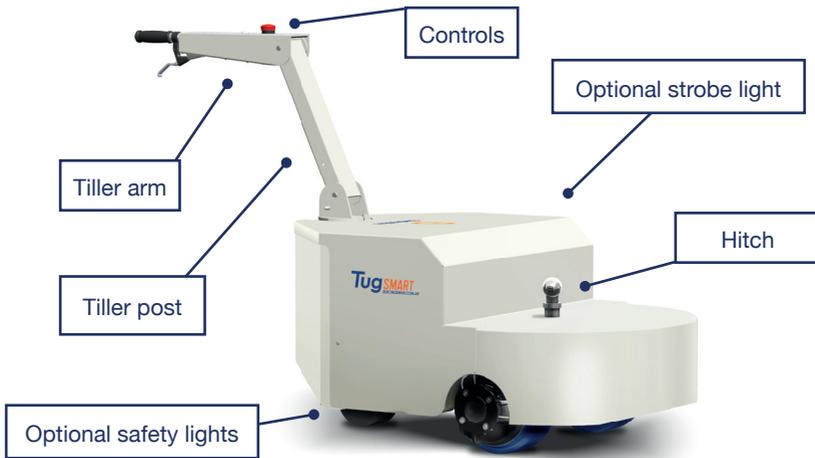
Move your existing manual trolleys with the battery powered Tug Smart.

The Tug Smart 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.

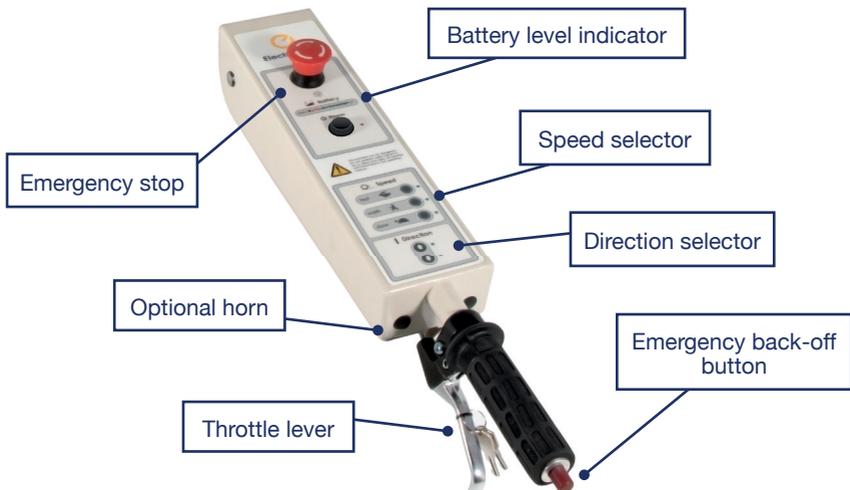
Features

- Rated to tow up to 5000 kg
- Power steering
- 1800 W motor power
- 24 Volt DC power
- Variable speed drive unit
- Electro-magnetic park brake
- Travel speed—up to 5 km/h
- Robust steel chassis
- Programmable motor controller
- Automatic charger

Operating instructions



Controls



Controls

Key switch

The key switch must be turned clockwise to switch the unit on. When ON, the LED status indicator will be illuminated. It is located next to the charger socket on the body of the machine. 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.

Use this key switch to reset the machine by switching it off and on again. Note that upon reset, the machine will always default to slow speed and in the direction of towing.

Emergency stop and back-off button

The controls have two emergency buttons.

1. Emergency stop button—in an emergency, push this button to stop the unit. LED lighting on the tiller handle will blink. The machine must be reset in order to operate after the emergency button has been pressed. To do this, slightly twist the emergency stop button for it to pop back up. Turn the key switch off and on again, and the machine will now be ready again.
2. Emergency back-off button—when pressed, the unit will travel backwards until released, to avoid pinning the operator against an obstacle.



Only use the emergency buttons in an emergency.

Using emergency buttons frequently in unnecessary situations will harm the machine.

Direction selector

This determines the direction of travel. Push the button corresponding to the desired travel direction (forward/reverse).

Throttle lever

This lever provides variable speed control from zero up to 100% of the selected speed. Releasing the lever stops the unit.

Note: As a safety precaution, the throttle lever must be squeezed in order to steer the machine. Moving the tiller handle without throttling will not steer/move the machine.

Speed selector

The speed selector will always start in the SLOW position. Select a speed that you are comfortable using. The speed can be changed whilst driving. It is advisable that you operate this unit at a slow speed when entering a confined area. For safety reasons, the tug will always be in slow speed when travelling in reverse.

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.

Red light only indicates no usable battery power remaining.

The battery level indicator may blink from time to time. This is normal as battery voltage is frequently monitored.

Horn (where fitted)

Push to sound the horn, release to turn off.

Charger socket

The charger socket is located on the body panel of the unit, below the tiller post. The machine is disabled whenever the charger is plugged in.

Brakes

When the speed control lever is released, the unit is slowed electrically by dynamic braking until the machine and load comes to a complete stop. The electromagnetic brakes (park brakes) will then be applied. These brakes are also applied shortly after the speed control lever is released.

Load capacity

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

Driving instructions

Safety Check

Before using the Tug Smart 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

This Tug Smart is fitted with a tow ball hitch. Other hitches are also 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.

Always ensure you are hitching on level ground.



It is STRONGLY RECOMMENDED that the operator lead the Tug Smart and trolley, rather than using the Tug Smart to “push” the trolley.

This will ensure that the operator has a safe unobstructed view ahead, and ensures the Tug Smart and trolley are easy to manoeuvre.



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



This Tug Smart is not designed for use on inclined surfaces at full load, and doing so may pose a risk of accident or injury.

Use on level ground only, unless assessed by Electrodrive.



Contact Electrodrive for further information on rated loads for hitches.



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

Unhitching

Always make sure the trolley is on a flat level surface and apply the castor brakes (if fitted) or chock the trolley wheels.

Release the hitch and carefully drive the Tug Smart forward away from the trolley.

Steering

The Tug Smart has a dual motor drive system which allows for power steering. Therefore minimal force on the tiller handle is required to steer the tug. To steer, push the tiller handle into the desired direction of travel whilst squeezing the throttle lever. To pivot the tug on its own axis, simply push the tiller handle sideways whilst only slightly squeezing the throttle.

The Tug Smart with an attached trolley can be manoeuvred through tight areas.

Charging

Plugging in the charger cord will disable the machine whether it is turned on or not. If the machine is turned on whilst charging, then the lights on the tiller handle will blink. When disconnecting the charger, the machine must be reset by turning the key off and on.

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 2. Misuse of the battery will void warranty.



Only use the battery charger supplied with this Tug Smart.

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.

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 polyurethane, giving it puncture-proof characteristics. For replacement tyres, contact Electrodrive or your local service agent.

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 Smart should slowly move, release and the Tug Smart should completely stop).

Fuses and circuit breakers

The control circuits and power circuits are protected against inadvertent current overloads. These fuses are located adjacent to the controller under the top cover.

Park brake release switch

In the unlikely event of a failure, the park brake can be disengaged, allowing it to be towed by another machine.

To disengage the park brake, remove maintenance panel take the key from the key switch and insert it into the park brake switch, and turn clock-wise.



The park brake will not release if the battery is flat.

Do not use a duplicate key to unlock the park brake.

You must use the same key from the tiller handle key switch.

Warranty

Electrodrive Pty Ltd warrants that this product is free from defects in materials and workmanship for a period of twelve 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

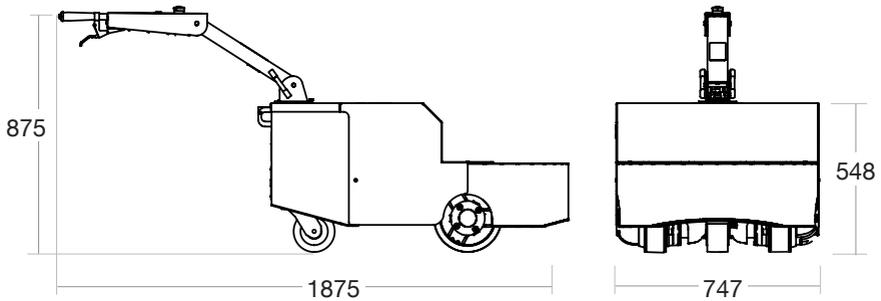
Misuse

- 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, tubes and castors
- Drive wheels and motor brushes
- Hand grips

Appendix 1: Machine rating conditions



Model	Working Load Limit	Max Load
TUGSMART4TNH	4000 kg	4000 kg
TUGSMART5TNH	5000 kg	5000 kg
TUGSMART6TNH	6000 kg	6000 kg

The Tug Smart 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 Smart 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: 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 BA1105—Battery Charger Operating Manual for more information.

Appendix 3: Spare parts list

Part	Description
EDROB2CH120A30V	Motor controller XDC2430
EDMOTHUB900W250	Hub motor 900W
EDBATGEL12V100AH	12V Gel battery 100Ah
EDGSTRUT30X100	Gas strut 100N
EDGSTRUT30X150	Gas strut 150N
EDEL3100	Brake relay
EDREL24V150A	Main contactor
EDWP1890	Tiller handle membrane
EDBATCHA25A	Charger 24V 25A
EDPOT5KOHM	Throttle potentiometer
EDEL3015	Steering potentiometer
EDFUS325A80VDC	Main fuse 325A
EDEL2460	Fuse 1A Blade
EDEL2465	Fuse 3A Blade
EDPCBRUGDUINO	RUGGEDUNO UNO
EDPCBRUGSERIAL	Rugged Serial breakout board
EDSWTESTOP2NCTWIST	Emergency stop button complete
EDLHTAMBER24V	Beacon 24V amber
EDST-CV-W-01	Back cover
EDST-CV-W-02	Front cover
EDST-CV-W-03	Top cover
EDST-CV-L-01	Service cover
EDST-BA-L-02	Top ballast plates

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			

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			

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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