



Tug Evo 1T/2T

Operating Manual

Tug Evo 1T and 2T Operating Manual—OM0013E/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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Contents

Introduction	5
Features	5
Controls	6
Operating instructions	6
Controls	7
Driving instructions	9
Safety Check	9
Hitching to a trolley	9
Steering.....	9
Unhitching.....	9
Charging	10
Maintenance	11
Batteries.....	11
Tyres.....	11
Motor and transmission.....	11
Brakes.....	11
Motor controller	11
Throttle lever	11
Fuses	11
Self-resetting circuit breaker.....	12
Warranty	13
Unauthorised maintenance.....	13
Misuse	13
General wear items not covered under warranty.....	13
Appendix 1: Machine rating conditions	14
Appendix 2: Fault codes	15
Appendix 3: Wiring diagram	16

Appendix 4: Charging procedures for SLA batteries	18
Charging setup	18
During charging	18
Charger manual	18
Appendix 5: Spare parts list.....	19
Service log	20

Introduction

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

The Tug Evo simply hooks on to your existing trolley with a simple 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.

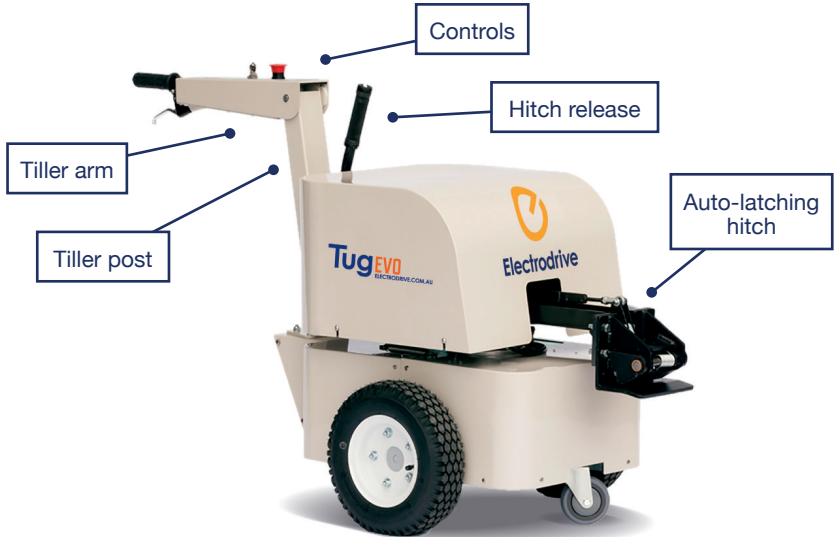
The Tug Evo allows an operator to effortlessly move heavy trolleys:

- Through long corridors, factory aisles, round tight corners.
- Up and down ramps,
- On and off lifts.

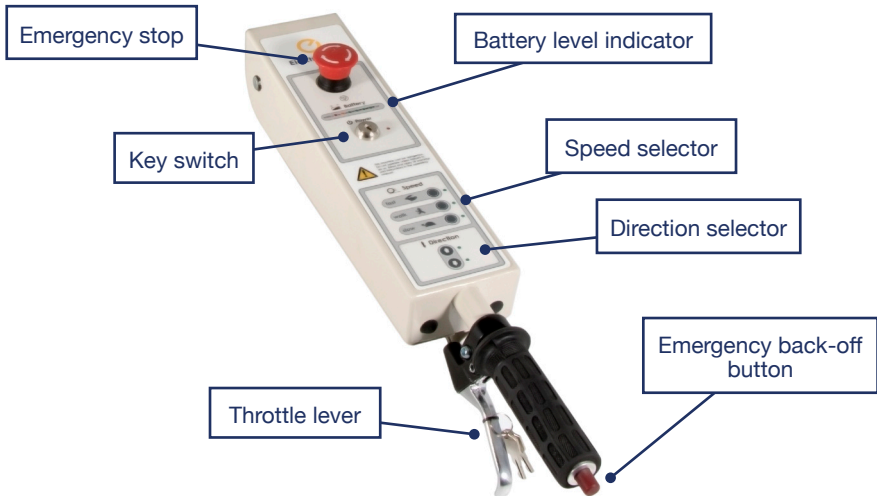
Features

- Rated to tow up to 1000 kg (1T) or 2000 kg (2T)
- 24 Volt DC power.
- Variable speed drive unit.
- Electro-magnetic park brake.
- Travel speed—up to 5 kph.
- Robust steel chassis.
- Tiller handle steering that folds up to reduce space when not in use.
- 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. If a fault occurs with the electronics, this LED light will flash an error code (refer to Appendix 2). 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 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 unit will travel backwards until released, to avoid pinning the operator against an obstacle.



Only use the emergency buttons in an emergency.

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 governed speed. Releasing the lever stops the unit.

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.

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.

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, next to the tiller post.

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.

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 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.

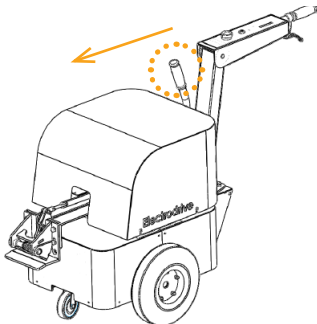
Hitching to a trolley

This Tug is fitted with an auto-latching hitch (HT1810-024). Other hitches are also available.

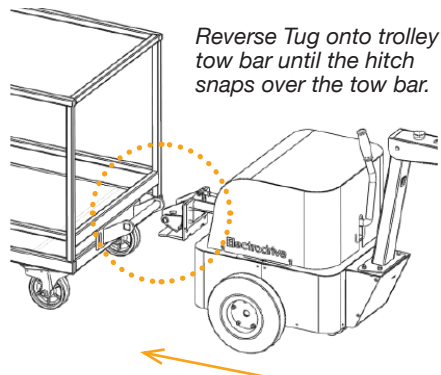
1. Ensure that the hitch release handle is pushed forward to allow the hitch to lock.
2. Carefully reverse the Tug back onto the trolley's tow bar.
3. Once aligned, the hitch will automatically 'snap' over the tow bar. If it doesn't snap, check that the Tug is parallel to the trolley.

In all cases, 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.

Push hitch release handle forward.



Reverse Tug onto trolley's tow bar until the hitch snaps over the tow bar.





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

Unhitching

Always make sure the trolley is on a flat level surface.

1. Apply the castor brakes (if fitted) or chock the wheels of the trolley.
2. Pull the hitch release toward the tiller to open the hitch.
3. Carefully drive the Tug forward away from the trolley.

Steering

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



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

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 1.



Only use the battery charger supplied with this Tug.

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 should be maintained at a pressure of 40 psi. For replacement tyres, please contact an authorised Electrodrive technician.

Motor and transmission

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

Brakes

The dynamic braking system does not require regular maintenance.

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 should slowly move, release and the Tug 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.

Self-resetting circuit breaker

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

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.

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

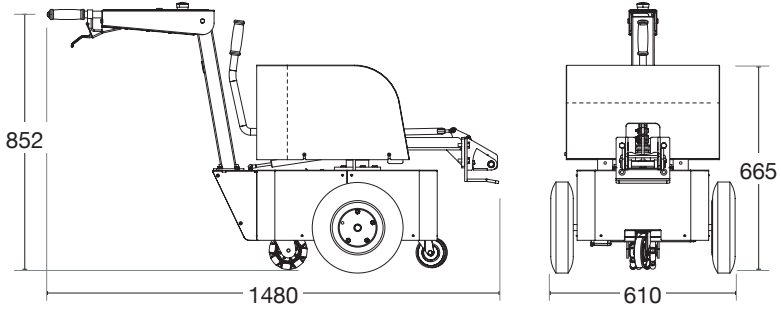
Misuse

- 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 with a steeper gradient than 1:12
- 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	Safe Working Load	Max Load
TUGEVO1TNH	1000 kg	1000 kg
TUGEVO2TNH	2000 kg	2000 kg

The Tug Evo 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)

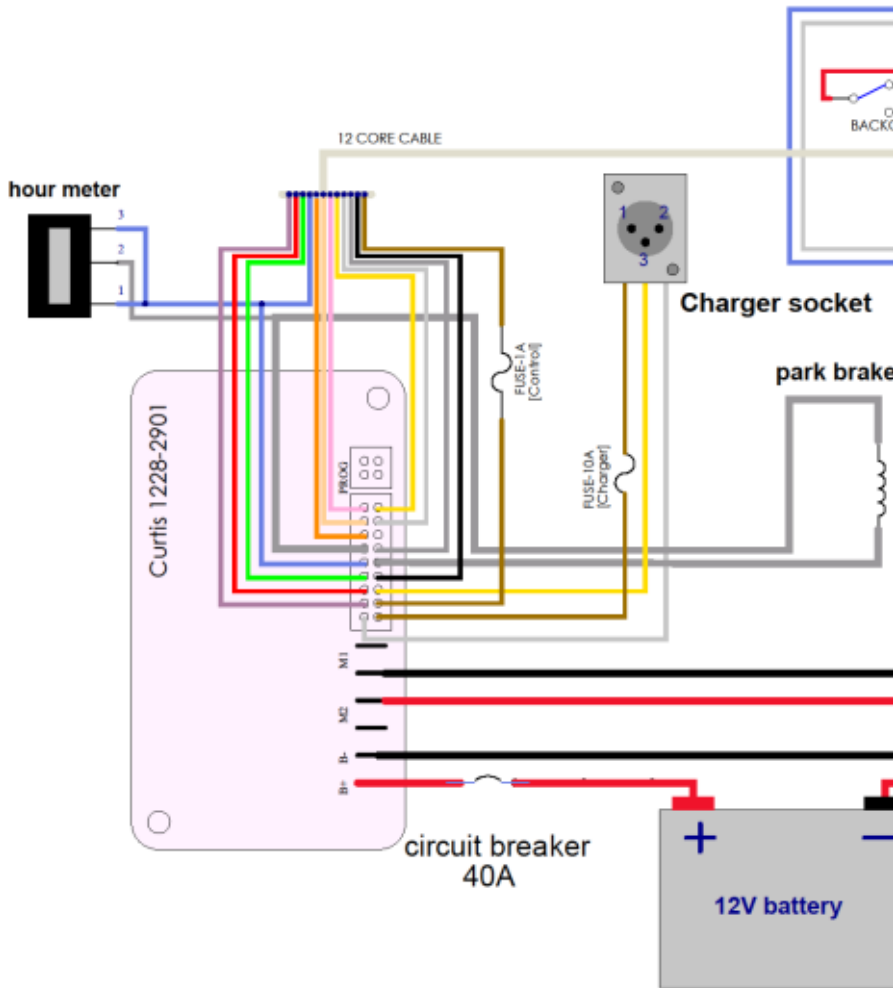


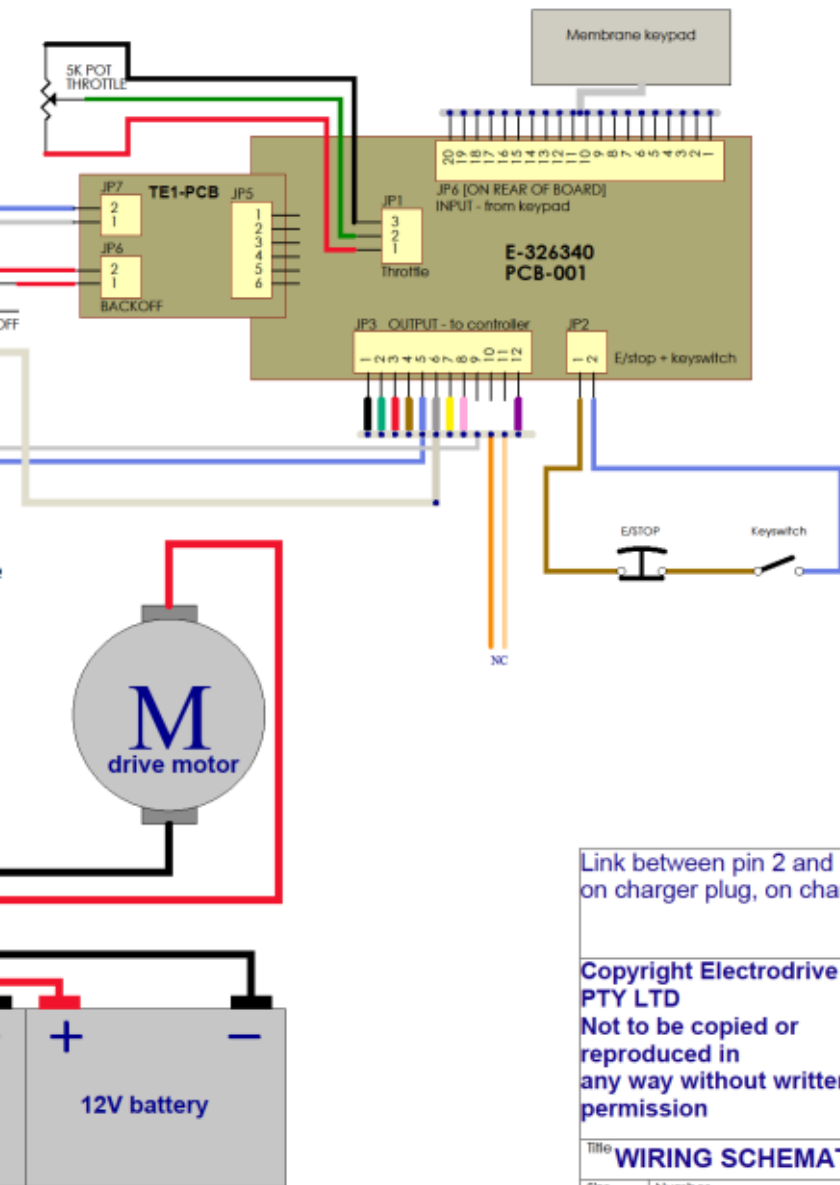
It is important that the Tug Evo IS NOT to be operated outside of the recommended conditions.

Appendix 2: Fault codes

Fault Code	Explanation	Causes
☼ ☼	Over-temperature cutback	Machine overloaded Park brake not releasing properly Short in motor or wiring High ambient temperature
☼ ☼☼	Throttle pot fault	Throttle pot wires open or shorted Faulty throttle pot
☼ ☼☼☼	Speed governor fault	Speed governor wires open or shorted Faulty speed governor pot
☼ ☼☼☼☼	Battery voltage too low	Battery voltage < 17V
☼ ☼☼☼☼☼	Battery voltage too high	Battery voltage > 36V
☼☼ ☼	Main contactor controller failure	
☼☼ ☼☼	Contactor driver fault	
☼☼☼ ☼	HPD present > 10 seconds	Throttle out of adjustment
☼☼☼ ☼☼	Park brake fault	Park brake coil open circuited Controller failure
☼☼☼ ☼☼☼	Pre-charge fault	Low battery voltage Controller failure
☼☼☼ ☼☼☼☼	Park brake fault	Park brake coil shorted Controller failure
☼☼☼ ☼☼☼☼☼	High pedal disable (HPD)	Throttle not in neutral when key switch turned on
☼☼☼☼ ☼	Current sense fault	Short in motor or wiring Controller failure
☼☼☼☼ ☼☼	Motor voltage fault	Short in motor or wiring Controller failure
☼☼☼☼ ☼☼☼	EEPROM fault	Controller failure
☼☼☼☼ ☼☼☼☼	Output section fault	Short in motor or wiring Controller failure

Appendix 3: Wiring diagram





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 BA1105—Battery Charger Operating Manual for more information.

Appendix 5: Spare parts list

Part	Description	Part	Description
BA1010	Battery—12V 42 Ah	GM2210	Tiller pin—zinc plated
BA1025	Battery—12V 60 Ah (Optional)	TX1010	Transaxle—V24 250W 85 RPM
BA1105	Charger—24V 7 Amp	WH1200	Rim 6" white 5 bolt
CL1052	Tiller handle membrane loom	WH1260	Tube (for 410 x 350-6 Tyre)
CL1130	Loom—charger with socket	WH1390	Tyre 410x350-6 BLK
CL1141	Loom—controller suit tiller	WP1049	Tiller handle—complete
CS1030	Grey PU castor—100 mm	WP1875	Tiller post
CS1202	Single Rotacaster wheel		
EL1041	Battery leads blue/white		
EL1100	Blanking plug—13mm		
EL1910	Circuit breaker—40 Amp		
EL2110	Motor controller—Curtis 1228		
EL2338	Emergency reverse button		
EL2380	Emergency stop button		
EL2450	Fuse 1 Amp (charger) (3AG)		
EL2470	Fuse 10 Amp (control) (3AG)		
EL2500	Fuse holder panel mount		
EL2620	Horn button (optional)		
EL2720	Key switch with key		
EL2775	Membrane key pad		
EL2805	Hour meter 12-48V		
EL3010	Potentiometer—5k (internal)		
GM1810	Handgrip 7/8" x 5" —tiller		
GM2040	Spring—tiller handle position		
GM2051	Tiller pot spring		
GM2107	Spring—compression C315-01		
GM2150	Throttle cable		
GM2170	Throttle lever for tiller handle		

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			

60 month service

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

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