GreenMech
The Professionals' Choice

EVO 165 D

EVO 165 DT

OPERATOR'S MANUAL

www.greenmech.co.uk

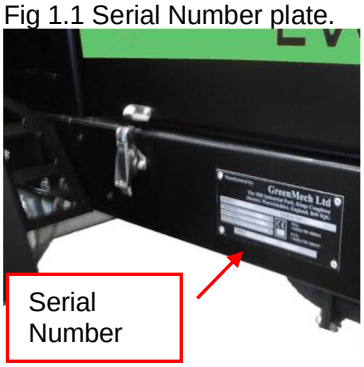
INTRODUCTION

This manual explains the proper operation of your machine. Read these instructions thoroughly before operating and maintaining the machine. Failure to do so could result in personal injury or equipment damage. Consult your GreenMech supplier if you do not understand the instructions in this manual.

CAUTION! This symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury to yourself or others, and carefully read the message that follows.

Keep this manual in the box provided and treat as part of the machine. Locate and note here the serial number and quote it in any communications. This is important when ordering spares. Remember to include all numbers and letters.

Fig 1.1 Serial Number plate.



VIN Number……

Serial Number.....

Write in the number!

This manual covers the following models.
Evo165D Road-Tow chipper, diesel engine
Evo165DT tracked chipper, diesel engine

The information in this manual is correct at the time of publication. However, in the course of development, changes to machine specifications are inevitable. Should you find any information to vary from the machine in your possession please contact your GreenMech dealer for up to date information.
This manual may contain standard and optional features and is not to be used as a machine specification.

PURPOSE

CAUTION! This machine is designed solely to chip wood and must not be used for any other purpose. The machine should only be used by trained operators who are familiar with the content of this instruction manual. It is potentially hazardous to fit or use any parts other than genuine GreenMech parts. The company disclaims all liability for the consequences of such use, which in addition voids the machine warranty.

Fig 2.1 EVO165D Road-Tow Main Features

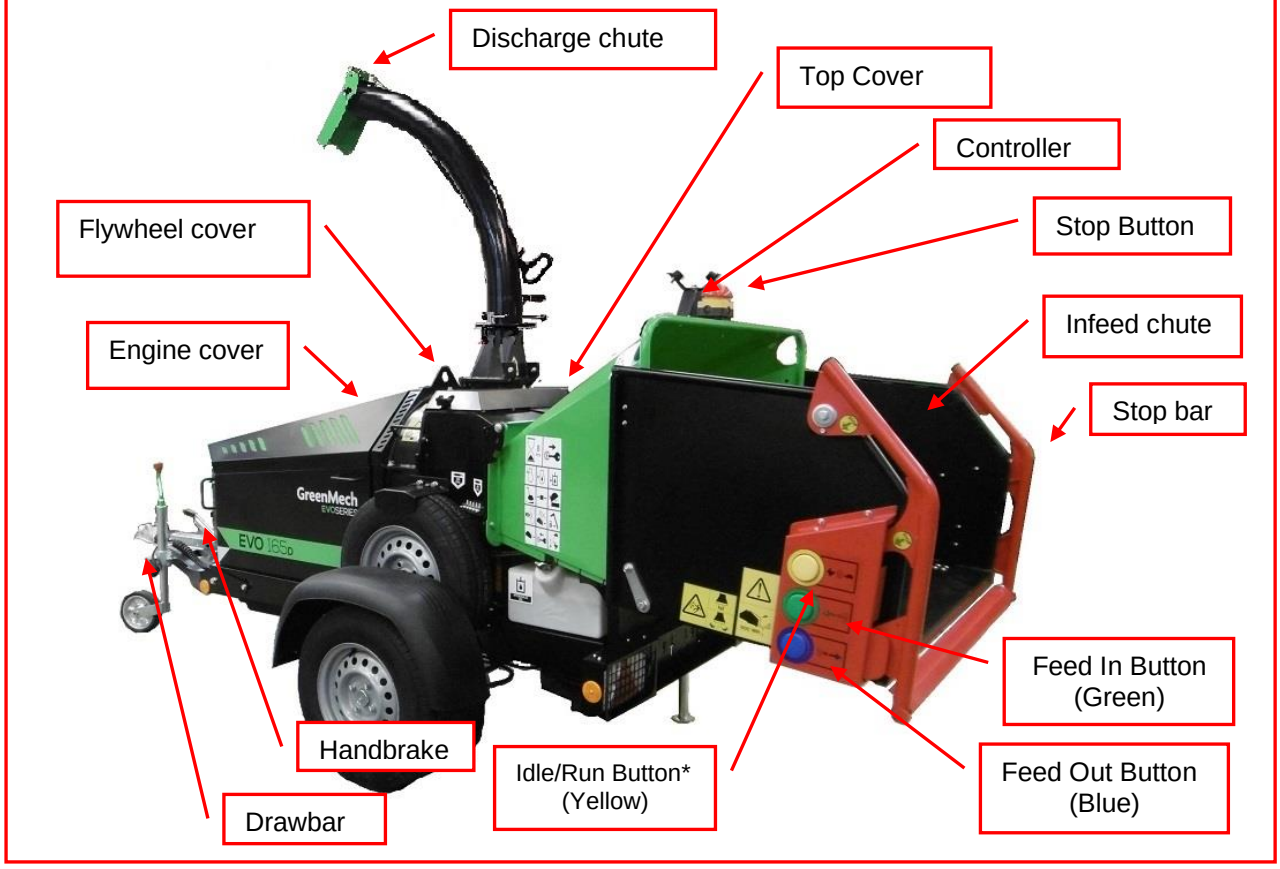
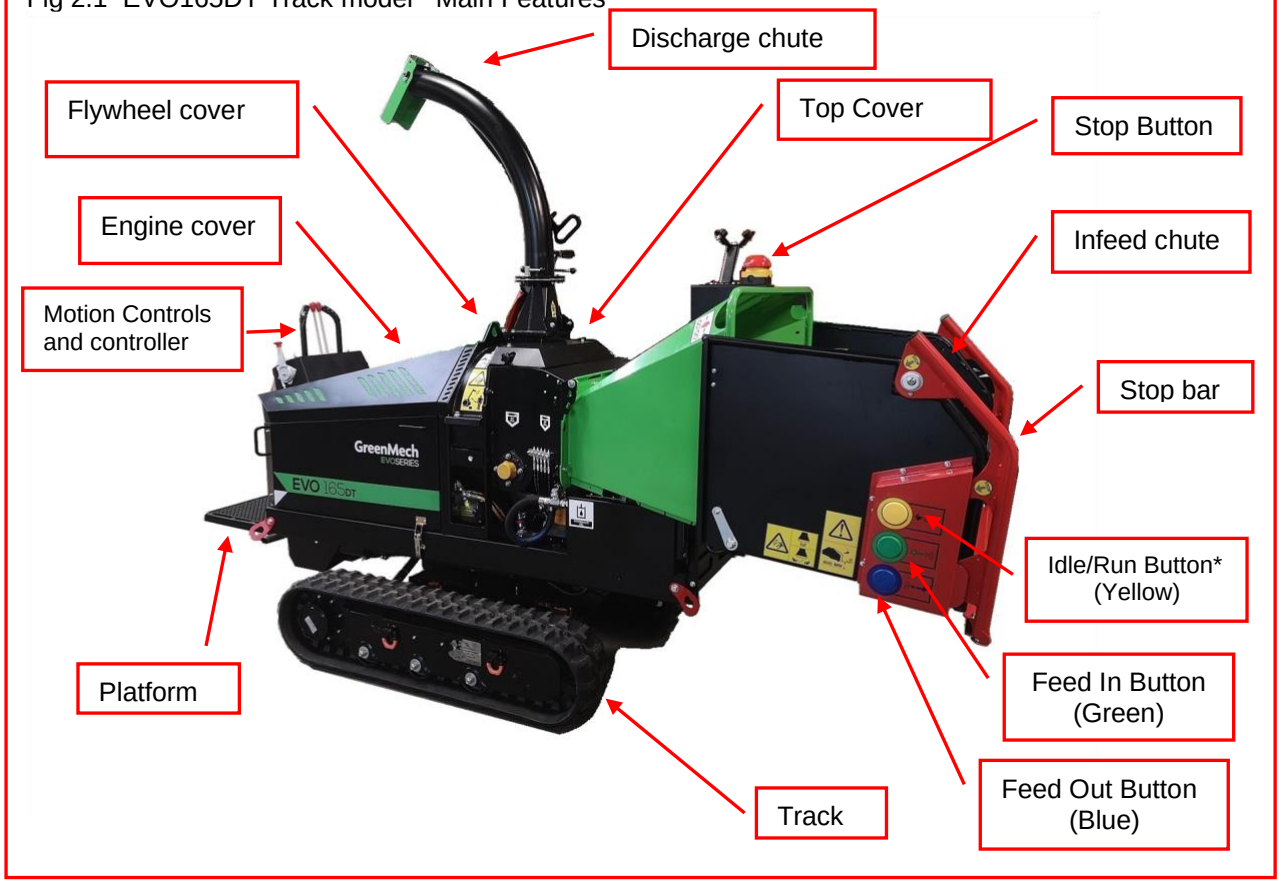


Fig 2.1 EVO165DT Track model Main Features



TECHNICAL SPECIFICATIONS EVO165D and EVO165DT models		
	EVO165D Road Tow	**EVO165DT Tracked**
Max Capacity	165mm X 220mm	
Power Unit	25HP Kubota diesel	
Infeed Chute	1110mm x 700mm	
Hydraulic feed rollers	Twin horizontal	
Chipping Blades	4 disc blades	
Flywheel Speed	1380 rpm	
Feed Rollers	2 x Hydraulic	
Power Control	No-Stress Electronic Feed Roller Controller	
Fuel Capacity	33Lt diesel	
Tyre size	165/80/R13	N/A
Tonnes per Hour	4.25 tonne/hr	
Discharge rotation	280 deg.	
Hydraulic capacity	33Lt	50Lt
Length	3500mm	2540mm
Width (working)	1515mm	1370mm
Width min (track model)	830mm with tracks in and infeed chute removed	
Height (Work)	2600mm	2580mm
Weight	1000kg	1410kg
Sound Power Lwa	114dB(A)	
Sound Pressure LPa	94dB(A)	

Noise
Noise levels vary depending on type of material being processed. Also duration of operation is variable. Noise emission tests have been carried out and the guaranteed sound power level (**Lwa**) is displayed on a decal as follows:
Evo165D and **Evo165DT– 114dB(A)**

Minimise noise by switching to idle or stopping the engine whenever chipping is not in progress.

⚠ CAUTION! Operators must wear appropriate ear protection. Bystanders must be kept away from proximity of machine.

Lifting Points
There is a single central lifting point by the base of the discharge chute.

⚠ CAUTION! Lift with extreme care. The machine may tilt because the single lifting point may not be directly over the centre of gravity.

Drawbar and hitch - Road Tow models
Ball type hitch with overrun brake and safety cable.

⚠ CAUTION! Ensure that the towing vehicle is correctly suited to the trailer weight and drawbar (nose) loading. If necessary check with national vehicle legislation.

ENSURE! :

All Operators must be fully trained in the use of their machine.
(Certificated Operator training courses are available on request.)
Operators Manual is read and understood.
Enclosed HSE guidance notes are read and understood.
Appropriate Personal Protective Equipment (PPE) is worn, including non-snag clothing, gloves, eye and hearing protection.
Machine is positioned on level ground and machine is level with infeed chute at not less than 600mm (23.62 inches) above ground level (fig 3.4.3).
Handbrake is applied and if necessary, wheels are chocked, when machine is detached from towing vehicle.
All guards are fitted and in good condition.
Blades are in good condition and secure.
All blades are sharpened or replaced in “Sets”.
All fasteners are checked regularly for tightness.
Only “WOODEN” materials free of nails etc., are fed into machine.
Correct First Aid Kit including large wound dressing is available on site.
Fire extinguisher is available on site.

NEVER! :

Work on machine until chipper flywheel is stationary and engine or PTO has stopped.
Operate machine without protective clothing (Eye protection, Earmuffs, and Gloves), or high visibility clothing when working on roadside.
Operate with loose articles of clothing, including loose cuffs on gloves.
Work under a raised component without adequate safety support.
Operate machine with untrained personnel or with individuals present who are not involved in chipping work operation.
Leave machine unattended with engine running at full operating speed. (See section 4)
Put any part of your body into infeed chute while machine is running.
Operate machine whilst under the influence of alcohol or drugs.
Stand between the tracks (if applicable) and the chipper body.
Stand within 2 metres of the tracks (if applicable) when the legs are being extended.
Stop the engine or operate the chipper when moving directly up or down a slope.
Operate machine inside a building or confined space.
Climb on infeed chute.
Impede or obstruct Stop control.

ALWAYS! :

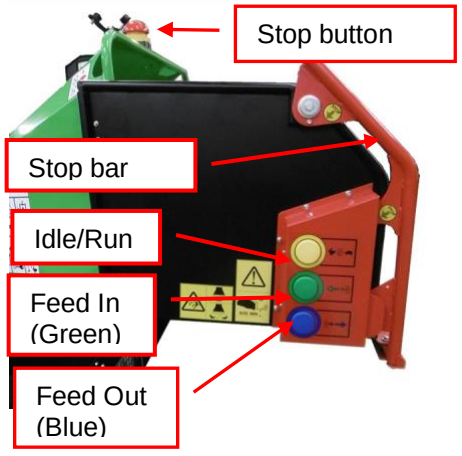
Check machine before starting (see Section 4 Preparation and Section 5.1 Operation: Pre-work checks).
Be aware of potential hazards in work area, i.e. uneven ground, tree roots, trip/slip hazards, obstructions and type of materials being fed into machine.
Feed from a side.
Keep clear of discharge area.
Have a second trained operator within easy reach of machine.
Maintain strict discipline at all times.
Service machine at specified periods. (see Section 6: Routine Maintenance).
Note direction of discharge chute and if necessary, note wind direction to prevent debris from being blown into highway or where it could affect members of the public.
Keep machine level.
Check route to worksite for gradients, undulations and obstructions.
Remove key before doing any maintenance.

3.4 Safety Controls and Switches

3.4.1 Emergency Stop Bar and buttons (fig 3.4.1)
In the event of an emergency, push stop bar right in or press stop button to STOP feed rollers.

Once the emergency has been rectified, pull Red stop button back up if down.
Press Green button to restart rollers to continue Feed In, or press and hold Blue button to Feed Out to eject material. Stop bar returns to work position but does not restart feed rollers.
If stop be tripped accidentally in normal working conditions, i.e. NOT an emergency, then Feed In can be recovered by pressing Green button.
To reverse feed rollers (Feed Out) press and hold Blue button. To regain Feed In press Green button.

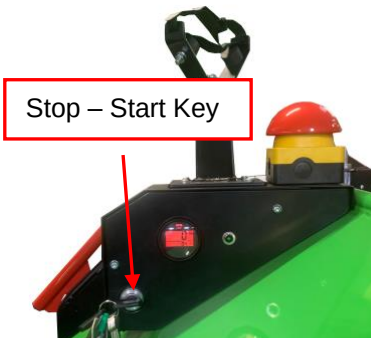
Fig 3.4.1 Control Bar and Reset Button



3.4.2 Engine Stop button (fig 3.4.2).
To stop engine, press red stop button on control unit, and/or turn key anticlockwise to '**0**' position.
To restart, reset key clockwise to **1**.
To disable machine, remove key.

⚠ CAUTION! Do not restart engine until hazard has been removed.

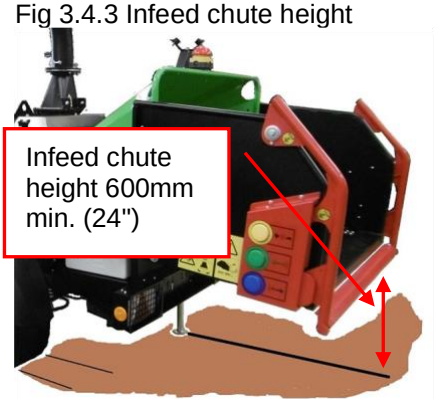
Fig 3.4.2 Engine Stop/Start)



3.5 Control cut-outs

Cut-out switch under engine cover prevents starting with covers removed.
Engine overheating is protected by thermal cut-out switch in coolant circuit.
Low engine oil pressure is protected by pressure switch in engine oil pump.

Fig 3.4.3 Infeed chute height



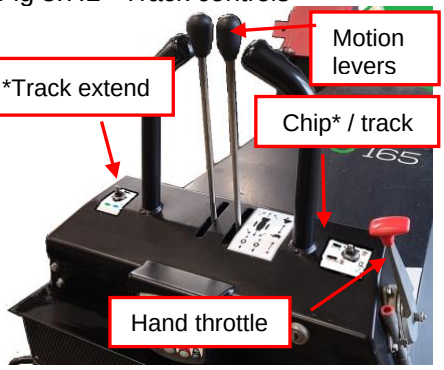
3.6 No Stress system

Speed sensor disables feed roller FEED IN or FEED OUT mode when engine speed is below factory pre-set value.
Overload sensor stops and restarts rollers during Feed In.

3.7 Tracking Controls (Track version)

A two position toggle switch selects either tracking or chipping. In track mode No Stress system will not allow feed rollers to operate.
Select Track for tracking motion (Fig 3.7.1) Lever controls operate drives to tracks. (Fig 3.7.2) Push for forward motion. Pull for reverse motion. Use hand throttle (fig 3.7.2) to control travelling speed.
Note: Chipper flywheel runs whenever engine is running, unless drive belt clutch is released. (See 5.9)
To extend or retract track legs.
1) *Select chip at chip/track to operate.
2) Press right to extend legs outwards, left to retract.
3) Re-select track at chip/track for motion.

Fig 3.7.2 Track controls



3.8 SYMBOLS on the MACHINE

These relate to operator safety, correct use and maintenance of machine. Check that all personnel understand and are familiar with meanings before using machine.

Important Safety symbols

Take correct action shown on display box below stated hazard box (see table)

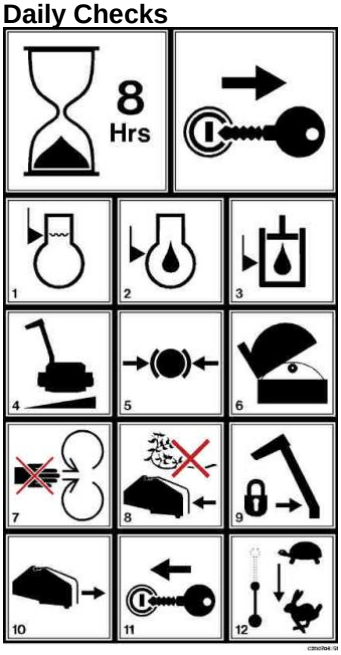
General Safety

Caution!		**Remove Key**		**Do NOT start engine**
Caution!	**Beware flying object hazard**	**Beware noise hazard**	**Beware trapping hazard**	**Brakes off -incorrect**
Read instruction manual	**Wear helmet & visor**	**Wear ear protectors**	**Wear proper clothes**	**Brakes on -correct**
Machine not level -incorrect	**Beware flying object hazard**	**Beware flying object hazard**	**Beware exposed drives hazard**	**Caution!**
Machine level -correct	**Keep bystanders away**	**Position and lock discharge chute**	**Fit all guards**	**Keep nuts tight**

Important Operating Checks Notice

Before use carry out daily stated checks in order shown (see table)

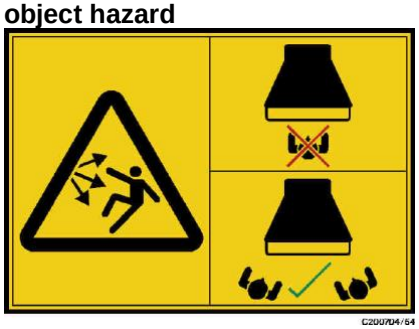
Daily Checks



Every 8 Hours – Daily checks		Remove key stop engine
1. Check coolant level	2. Check engine oil level	3. Check hydraulic oil level
4. Check machine is level	5. Check brakes are on	6. Check chipper flywheel is clear of debris
7. Check all guards are in place	8. Check infeed chute is clear of debris	9. Lock discharge chute
10. Check stop bar	11. Start engine	12. Increase from Idle to Run

Important Safety Information

Caution! Beware of thrown object hazard



Action: Stand to side of infeed chute, NOT in centre.

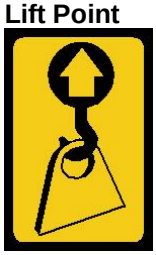
Caution! Beware of thrown object hazard

Action: Keep away from fast discharge chute

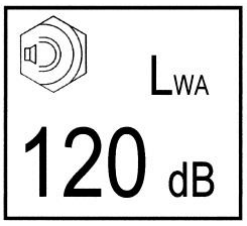
Face shield must be worn

Ear defenders must be worn

Lift Point



Sound level (typical only)



Ear defenders must be worn

Caution!

Do not climb into infeed chute

Caution! Infeed chute trapping hazards

Keep hands clear. Do not climb in

Caution!

Do NOT operate with infeed chute at less than 600mm from ground (bottom stop bar).

Transport Lock

Lock this component before moving machine

Caution! Beware Crushing hazard!

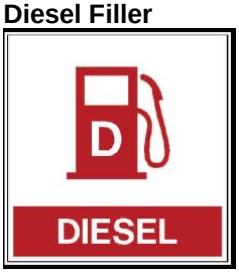
Do NOT work or park directly up or down slope.

Caution!

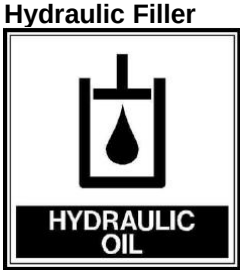
Do NOT drive up or down slopes of more than 20°

Maintenance Information

Diesel Filler



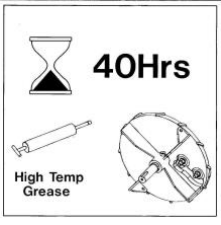
Hydraulic Filler



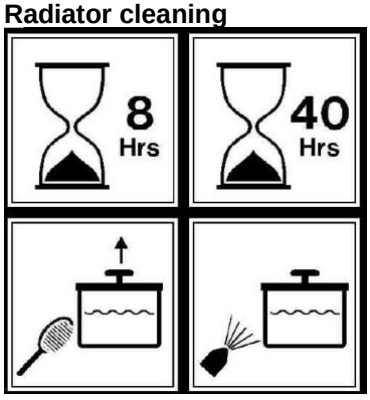
Grease point

40 hours / weekly

High temperature Grease 40 hours



Radiator cleaning



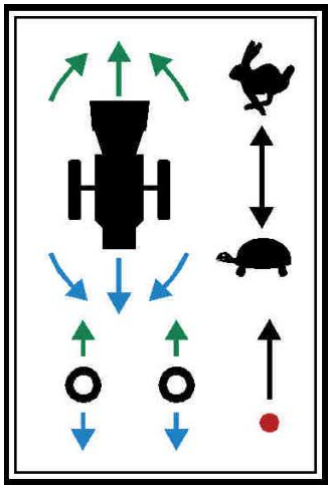
8 Hours	40 Hours
Check radiator screen	Blow out radiator core

Chipper Flywheel cleaning

Caution!	Read Manual!	Remove key
Caution! Sharp edges	1) Wear protective gloves	2) Release cover bolts
3) Open chipper covers	4) Lock / Block flywheel	5) Clean blade nut and bolt recess
6) Remove blade nut	7) Clean blade spigot and flywheel recess	8) Replace and Tighten to 200Nm
9) Replace all covers	10) Secure covers	11) Replace key

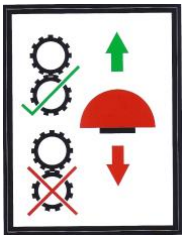
Operating Information

Track drive and idle/run controls



Left lever
LH track: forwards – backwards
Right lever
RH track: forwards – backwards
Lever with red knob
Engine idle/run: slow - fast

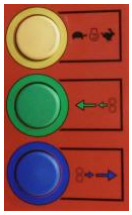
Stop button – Feed Rollers



Up – Run
Down - stop

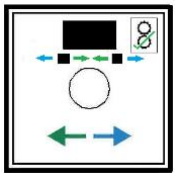
Stop arrow

Feed Roller controls (Left hand shown)

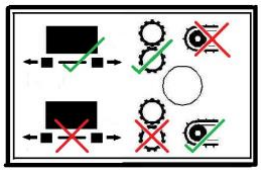


Yellow Idle/Run
Green Feed In
Blue Feed Out

Track extend (select chip)

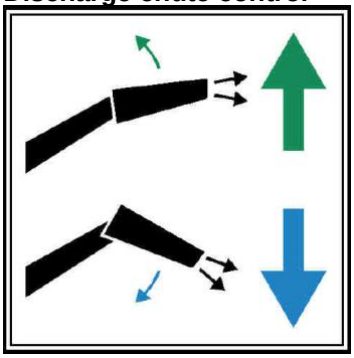


Track / Chip control



Up to chip
Up for track extend
Down for motion

Discharge chute control



Green - UP: Blue - DOWN

4.1 Initial Fuelling and Parking

Fill fuel tank with correct fuel (fig 4.1a or 4.1b).
Top up hydraulic tank if necessary, with correct oil. See Section 6.

Fig 4.1a Fuel tank
Road Tow model

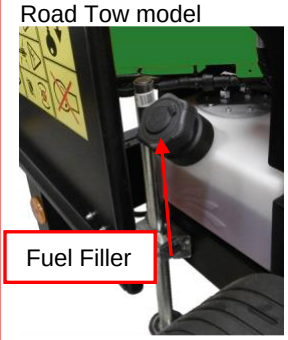


Fig 4.1b Fuel tank
Track model

Road Tow model
Position chipper on firm and level ground.
Apply vehicle handbrake.
If machine is detached from vehicle (fig 4.3), set jockey wheel clamp to allow jack screw to lift drawbar clear of vehicle hitch, apply trailer handbrake and chock wheels.
Set drawbar jockey wheel height to level machine body and set infeed chute height to minimum of 600mm.
Lower and secure rear stand.

Tracked model
Position machine so that body is level.

Fig 4.2 Infeed Chute Catches

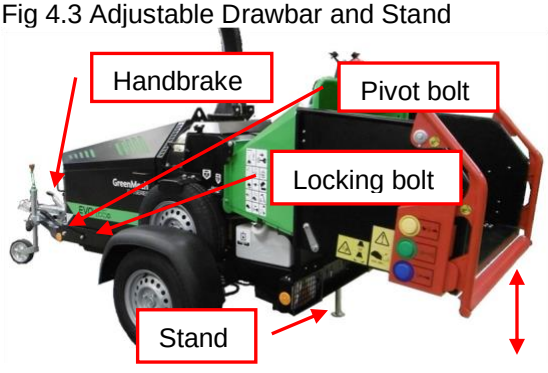
4.2 Infeed Chute

1) Release infeed chute catches (fig 4.2), and gently lower infeed chute to work position.
2) Check height of infeed chute for safe working height (fig 3.4.3)

4.3 Drawbar adjustment (Road Tow)

1) Support front of chipper with suitable jack.
2) Remove height adjustment locking bolts on each side (fig 4.3).
3) Adjust jack until chute correct safe height from ground.
4) Refit bolts in their new position and tighten securely.
5) Remove jack.

Fig 4.3 Adjustable Drawbar and Stand



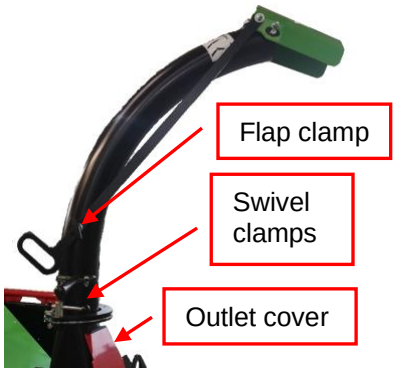
⚠ CAUTION! Infeed chute must not be used at less than 600mm from ground (fig 3.4.3). Adjust drawbar of Road tow models as necessary.

⚠ CAUTION! Before travelling, always fold up and secure infeed chute flap.

4.4 Discharge Chute (fig. 4.4)

1) From storage position remove bolt from sprung outlet cover, hold cover clear, raise chute to work position and secure (2 bolts).
2) Release swivel clamps, point chute in desired direction away from infeed chute and tighten clamps.
3) Set flap at desired height and tighten clamp.

Fig 4.4. Discharge Chute



⚠ CAUTION! Do not point discharge chute towards infeed area.

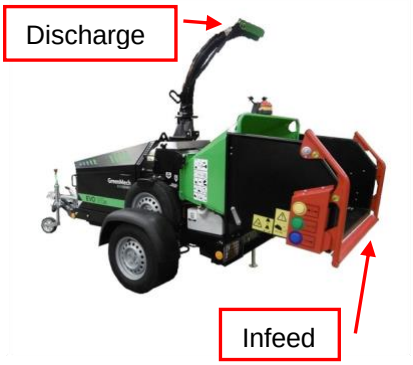
⚠ CAUTION! When **tracked model** is driven on tracks, ensure chute points away from driver.

⚠ CAUTION! Travel with discharge chute down is not recommended, unless restraint is provided.

4.5 Work Position (Typical)

Typical work position (fig 4.5) shown with infeed chute down and discharge chute pointing away from infeed.

Fig 4.5 Work position (typical)

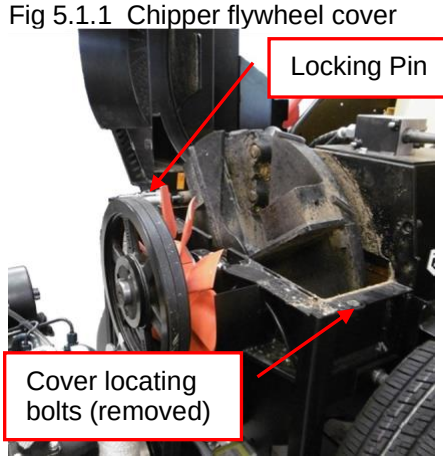


5.1 Pre-Work Checks:

Check machine is stationary, Key in OFF position or removed, and hand brake applied if separated from vehicle.
Check that machine is level and infeed chute is not less than 600mm from ground (fig 3.4.3).
Check engine oil level (See Engine instruction manual).
Check hydraulic oil level (See Section 6).
Check fasteners for tightness and hydraulic connections for leaks.
Check condition of blades as follows:

1) Raise engine cover. Check nothing is rotating.
2) Remove bolts (2) retaining chipper flywheel cover.
3) Using discharge chute handle as a lever, swing back cover onto stop to expose chipper flywheel and blades. (fig 5.1.1)

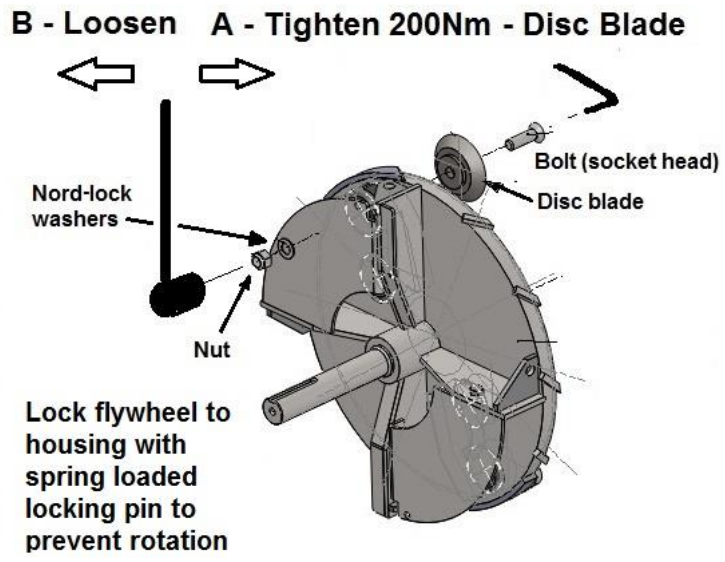
Fig 5.1.1 Chipper flywheel cover



⚠ CAUTION! Beware sharp edges of blades and unexpected movement.

4) Turn flywheel to align locking pin with a mating boss (2) and release pin into boss to prevent flywheel from turning.
5) Remove any loose wood material.
6) Retract locking pin and carefully rotate chipper flywheel to check tightness of blade bolts and condition of blades (fig 5.1.2).
7) If any bolts are loose, refer to Maintenance Section 6.7 for further action.
8) Retract and turn locking pin to prevent it springing back and replace chipper flywheel cover.
9) Tighten all bolts securely.
10) Remove any loose material and dust from radiator and engine bay
11) Replace all covers and secure.
Check discharge chute is in desired position pointing away from infeed and all clamps are tight. (see Section 4.4)
Check work area and erect signs and cone off discharge area if necessary.
Check **ALL** safety procedures have been followed.

Fig 5.1.2. Flywheel and blades



⚠ CAUTION! Always work with chipper level, preferably with the infeed direction slightly down the slope to minimise the risk of material falling back out.

5.2 Starting Machine (Smart Sense controller)

⚠ CAUTION! Beware sharp edges and dust. Wear protective gloves and eye shield!

Check all other personnel are clear of machine.
Check that feed roller stop bar is free to move, and feed roller Stop button in Up (Run) position.

Start engine (Fig 5.2.1 Fig 5.2.2)

1) Turn START - STOP key clockwise and wait 2 seconds while pre-glow green LED flashes.
2) Turn key clockwise to START engine and chipper.
3) Move IDLE/RUN lever to increase speed to operating speed. Green LED becomes on continuously.
4) Press Green FEED IN button when ready to start loading chipper.

Fig 5.2.1 Engine Controls

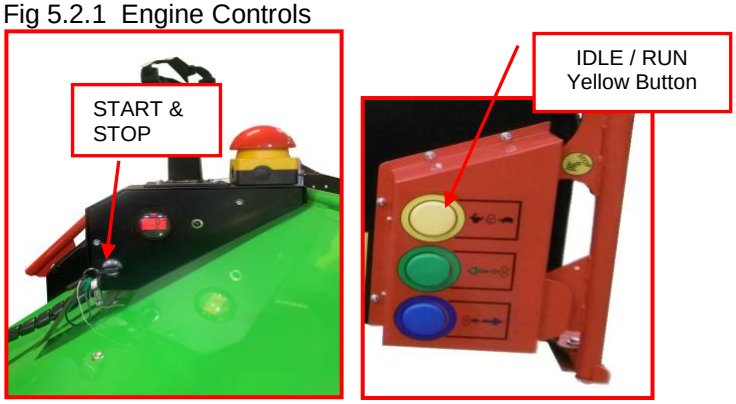
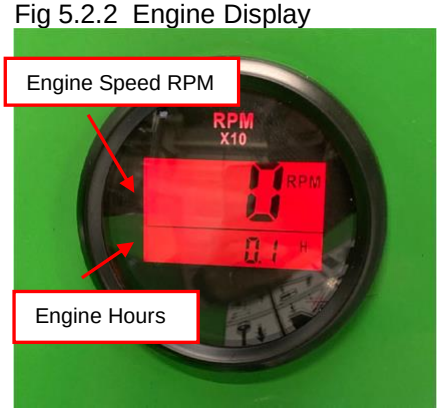


Fig 5.2.2 Engine Display



5.3 Stopping Machine

1) Push stop bar to STOP feed rollers.
2) Set hand lever to IDLE and allow chipper flywheel to slow down.
3) Turn key anticlockwise to stop engine.
5) Wait for chipper flywheel to stop.

⚠ CAUTION! Chipper flywheel will take several seconds to stop due to its inertia.

5.4 Blockages

Stop engine and REMOVE key to secure place.

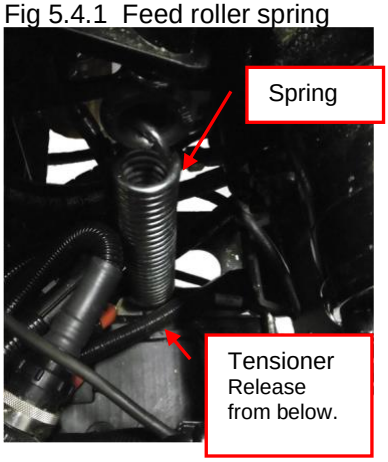
⚠ CAUTION! Chipped material is inflammable. Expect large volume and prevent from falling into engine compartment. All material must be removed.

Open chipper flywheel cover. See 5.1 Pre-work checks.
Look into chamber to identify problem if possible, before reaching in.
Open discharge chute and fold down at hinge to inspect and clear. See 5.6.
Clean out discharge chute thoroughly with a suitable rod to pass around bends as necessary.

⚠ CAUTION! Beware sharp edges of blades and unexpected movement of flywheel due to resistance of engine. Wear protective gloves.

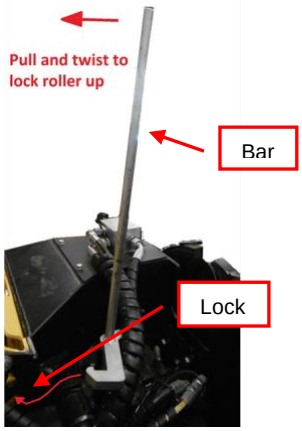
Check if chipper flywheel is free to rotate. Pull top of flywheel in operating direction of rotation. If so proceed to 6 below.
If flywheel does NOT rotate freely, proceed as follows:
1) Release roller spring tension at adjuster under chassis (fig 5.4.1).
2) Using special bar provided, place in socket, pull as shown (fig 5.4.2) and twist to hook and lock roller away from fixed roller.
3) Inspect rollers and blades from infeed chute and carefully clear material.
4) Carefully remove excess loose material from around chipper flywheel and note any obstructions.
5) Carefully rotate chipper flywheel in reverse direction by full revolution to release blocked material. Use bar against paddle blades for aid.
6) Carefully remove all material, checking for obstructions.
Check rotation of chipper Flywheel.
Check condition of blades. See 5.1.6

Fig 5.4.1 Feed roller spring



Note: Always attempt to find reason for blockage. e.g. blunt blades, slack drive belts.
6) Unhook and release lifting bar and stow.
7) Refit and tension spring adjuster under chassis
8) Re-assemble all covers with correct fasteners and check for security.
9) Start machine as 5.2 and check operation.
Note: If machine will not run, repeat process or contact dealer for technical advice.

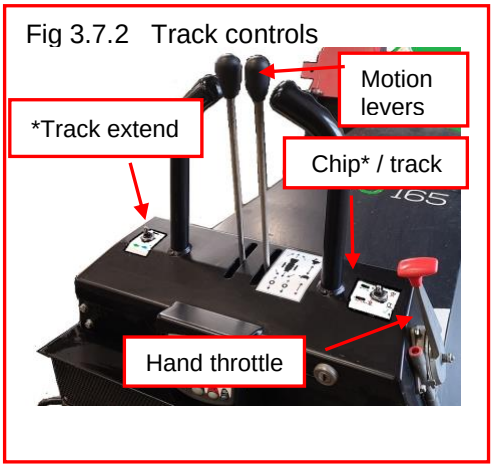
Fig 5.4.2 Feed roller lift



5.5 Moving tracked model

Set Chip / Track to Track (Fig 5.2.1)
Push both motion levers together to start forward movement (Fig 5.5).
Adjust Idle/Run lever to increase speed and decrease speed.
Push left or right lever to steer.
Extend legs as required at switch shown. (fig 5.3.2)
1) Stop motion and select 'chip' at chip/track to operate.
Note: Legs cannot be adjusted when 'track' is selected.
2) Press right to extend legs out, left to retract.
3) Re-select track at chip/track for motion.
At work site ensure body is level.
Adjust Idle/Run to slow engine.

Fig 3.7.2 Track controls



Note: Drive with track motors at rear when possible.

Cautions for tracked model

⚠ CAUTION! Do not leave machine parked directly up or down slope.

⚠ CAUTION! When extending legs, do not force track against solid objects. This may dislodge track.

⚠ CAUTION! Avoid static turns on hard surfaces. This will rapidly wear tracks

⚠ CAUTION! Point discharge chute away from driver. Over long journeys, engage chipper drive to blow out build up of exhaust gas.

⚠ CAUTION! Do not drive directly up slopes exceeding 20 degrees. Slopes up to 30 degrees may be traversed with care.

5.6 Preparing For Transport On Completion Of Work (fig 5.6.1)

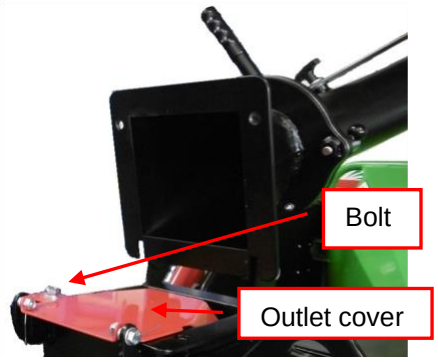
Check that engine has stopped and chipper flywheel is stationary.
Remove surplus material from infeed chute and all machine surfaces.
Fold infeed chute into transport position.
Unlock, lift and secure covers to remove debris.
Replace and secure covers.
Raise rear stand and lock securely.

Road Tow: If detached, re-attach trailer to vehicle, raise jockey wheel, connect safety cable and electric services.

Note: It is not recommended to fold discharge chute down for transport.

Fig 5.6.1 Transport position

Fig 5.6.2 Discharge Chute folded



5.7 Operating Hints

Check that chipper flywheel is at full speed, rpm readout should be above 2450 rpm.
Note: "No Stress" system will only allow FEED IN (Forwards) and FEED OUT operation of feed rollers when machine is running at FULL operating speed and not overloaded.
Reduce chipper speed to IDLE whilst further material is collected for chipping.
Take care when feeding wood into machine to allow for awkward shapes to "KICK" when contacting feed rollers.
Position end of larger sections of wood inside infeed chute and then support other end whilst pushing wood into feed rollers.
Note: If chipper becomes blocked do not continue to feed. It will make removal of blockage more difficult. See 5.4.

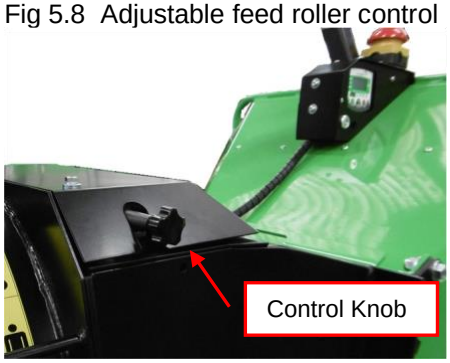
⚠ CAUTION! Do not release discharge chute clamps when chipping is in progress. Elevation of discharge is altered by means of adjustable flap (fig. 4.4).

⚠ CAUTION! Keep working area around the machine clear at all times and check only authorised personnel are present.

5.8 Adjustable Speed Feed Roller Control

When chipping wood sizes larger than 150mm diameter it is necessary to reduce feed roller speed to suit material being chipped.
Turn control knob (fig 5.8) to adjust speed.

Fig 5.8 Adjustable feed roller control



ROUTINE MAINTENANCE SCHEDULE

⚠ CAUTION! Always remove key and check for rotation before carrying out any maintenance.

Note: Covers are bolted and only released by raising engine cover. Replace and secure all covers when task is completed.
Instructions refer to all models except where stated for specific type (e.g. road Tow, Track model).

Action	Section	Page
DAILY		
Check engine oil level and coolant (ref: engine manual)	6.2 – 6.3	6-4
Check hydraulic oil level	6.4	6-4
Check fuel level	6.5	6-4
Check all drive belts	6.6	6-5
Check condition of blades and retaining bolts	6.7	6-5
Note: Special tools may be required		
Clean radiator screen and around radiator	6.8	6-6
Check feed roller stop bar function	3.4	3-2
Check condition of tracks (Track model)	Refer to track manual	
Check track gear, nuts, rollers and bearings (Track model)	Refer to track manual	
First 50 hours		
Check drive belt tensions	6.6 – 6.9	6-5 & 6-6
Check battery levels	6.13	6-7
Check wheel and tyre condition and pressures (Road Tow)	6.14	6-8
Check brake condition and operation (Road Tow)	6.15	6-8
Check hydraulic connections	6.18	6-8
Check all mountings	6.19	6-9
Check feed roller stop bar function	3.4	3-2
Service engine	Refer to engine manual	
Weekly in addition to Daily actions		
Blow out radiator core with air line	6.8	6-6
Check drive belt tension	6.6 – 6.9	6-5 & 6-6
Steam clean machine	6.10	6-6
Clean air cleaner	6.11	6-7
Check electrical connections	6.12	6-7
Check battery levels	6.13	6-7
Check feed roller stop bar function	3.4	3-2
Check wheel and tyre condition and pressures (Road Tow)	6.14	6-7
Check and adjust brakes (Road Tow)	6.15	6-8
Grease all bearings and pivots	6.1, 6.16	6-2 & 6-8
Check hydraulic connections	6.18	6-8
Check all mountings	6.19	6-9
250 hours or 12 months, in addition to Daily and Weekly actions		
Check all fluid levels	6.2, 6.3, 6.4	6-4
Check brake condition and operation (Road-Tow)	6.15	6-8
Check condition of bearings and pivots	6.16	6-8
Service engine	Refer to engine manual	
Check axle mounting bolts for tightness	6.19	6-9
Check track gear units, rollers and bearings (Track model)	Refer to track manual	
Replace return filter element	6.20	6-9

1000 hours in addition to 250 hour actions		
Change hydraulic oil when replacing filter element	6.21	6-9

ENGINE MAINTENANCE **REFER TO ENGINE MANUAL**

WHEELS AND BRAKES **REFER ALSO TO AL-KO CHASSIS MANUAL**
All references to wheels and brakes apply also to optional trailers.

Tyre Pressure **2.7 bar (40 lb/in^2)**

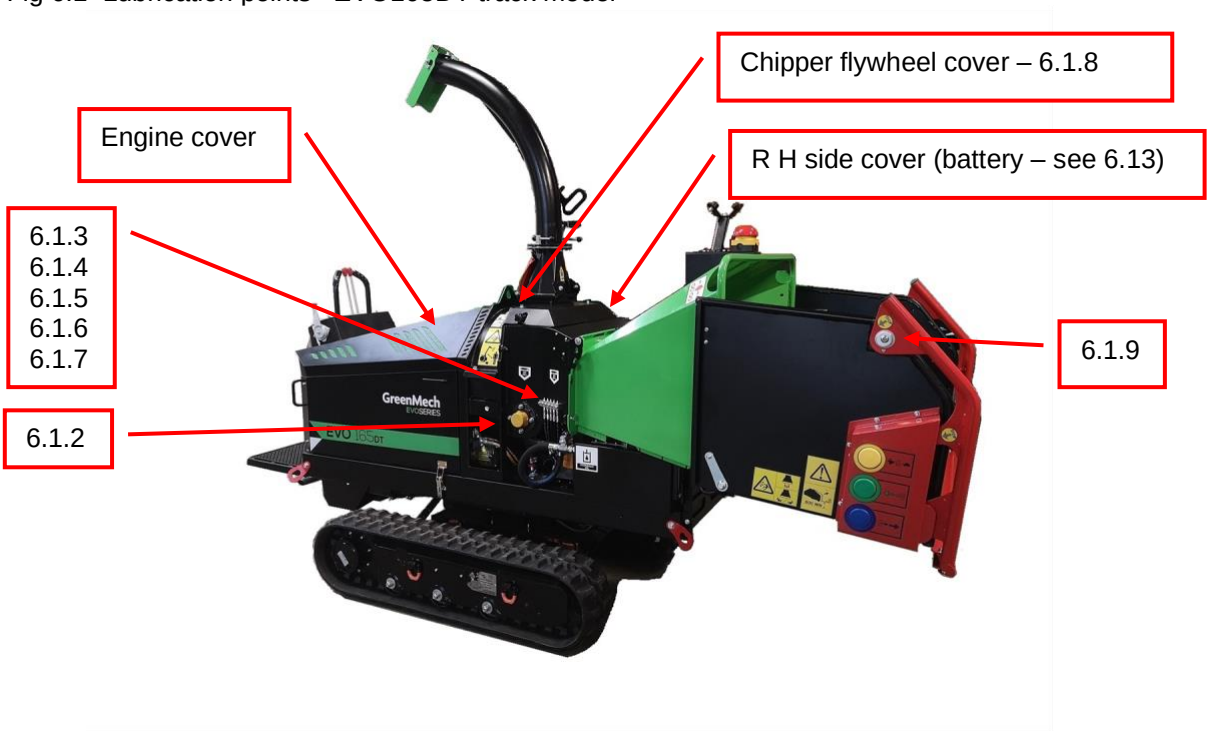
TRACK MAINTENANCE (EVO 165DT) REFER TO TRACK MANUAL

Recommended lubricants	**Specification**	
Hydraulic Oil	ISO 32	
Grease	Complex grease EP2	(high temperature)
Engine	SAE 15W-40 APICD	

6.1 Lubrication Points (see 6.14)

Fig 6.1 Lubrication points EVO165D road-tow model

Fig 6.1 Lubrication points EVO165DT track model



Grease except where stated - All models (except where stated)

6.1.1	Drawbar (Road-Tow)	3 nipples (refer to Alko manual)
6.1.2	Fixed Feed roller bearing	1 nipple behind spare wheel
	Remote nipples on manifold in order from left to right	
6.1.3	Chipper flywheel front bearing	1 nipple on remote manifold
6.1.4	Chipper flywheel rear bearing	1 nipple on remote manifold
6.1.5	Feed roller pivot	1 nipple on remote manifold
6.1.6	Feed roller bearing	1 nipple on remote manifold
6.1.7	Drive belt idler pulley	1 nipple on remote manifold
6.1.8	Chipper flywheel labyrinth seal	1 nipple in flywheel hub (see fig 6.7.1)
6.1.9	Feed Roller stop bar	Clean and grease pivots sparingly

Note 1: Do not over-grease bearings as damage to seals may occur.
40 hours requires only one full pump of hand operated cartridge gun.
Note 2: Use high temperature grease on chipper flywheel bearings.

6.2 Engine Oil (Under engine cover)

Check daily (fig 6.2). Refer to engine manual to refill.

Fig. 6.2 Engine

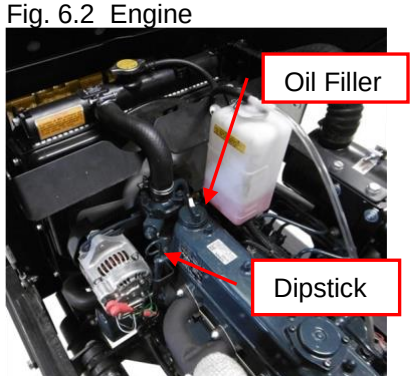
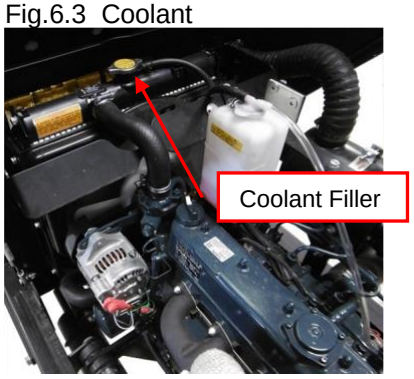


Fig.6.3 Coolant



6.3 Coolant (under Engine cover)

Check daily, both radiator and overflow tank (fig 6.3). Refill as required. Check antifreeze.

⚠ CAUTION! Do not remove cap when engine is hot.

6.4 Hydraulic Oil

Check daily (fig 6.4). If below mark check for leaks and refill to correct level.

Fig. 6.4 Hydraulic Oil (Road Tow)

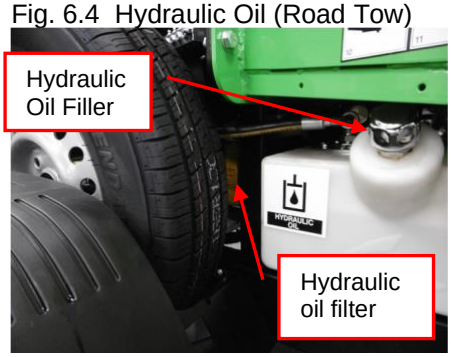
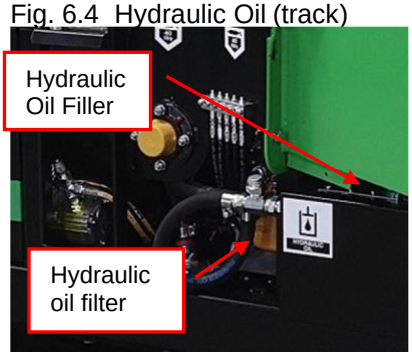


Fig. 6.4 Hydraulic Oil (track)



1000 hours. Change oil (see 6.21). Replace filter (6.18).

6.5 Fuel Level (Section 4.1)

Check daily before work and fill as required.

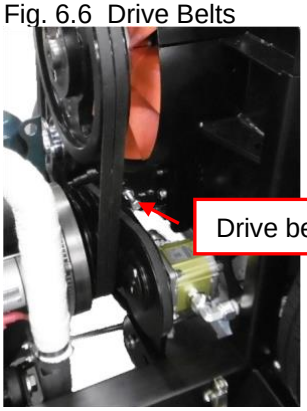
⚠ CAUTION! Use clean fuel only. If in doubt, use a funnel with a filter.

⚠ CAUTION! Do not use any form of synthetic fuel.

6.6 Drive Belts (under engine cover)

Check daily before work (Fig 6.6) condition of all drive belts and replace if worn.
See section 6.9 for adjustment and replacement instructions.

Fig. 6.6 Drive Belts



6.7 Disc Blade Cleaning - Replacement

Blade design permits relocation in at least two rotated positions before regrinding or replacement is required.

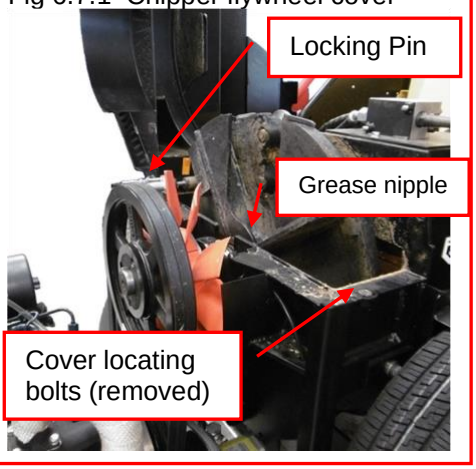
1 Check engine is switched off, and start key removed.

2 Raise engine cover, and check any rotation has stopped.

⚠ CAUTIONS for Blade cleaning

- Blades have sharp edges. Wear protective gloves.
- Flywheel paddles and vanes create shearing and trapping points at edges of exposed housing. Do not place hands or fingers on or near flywheel and housing edges.
- Flywheel rotation is resisted by engine compression in either direction. Beware unexpected movement when manually rotating flywheel between blade positions.
- Tools can slip if not fully engaged. Clean fasteners thoroughly before applying tools.
- Ensure flywheel is prevented from rotating when applying force to tools on blade fasteners.

Fig 6.7.1 Chipper flywheel cover



Follow procedure as on symbol instructions on machine (Section 3.8):

1) Wear protective gloves.

2) Remove flywheel cover bolts.

3) Using discharge chute handle as a lever, swing back cover on to stop to expose flywheel and blades. (fig 5.1.1 and fig 6.7.1).

4) Locate and retract flywheel locking pin, and carefully turn flywheel until locking pin engages hole (2 positions) in flywheel to prevent movement).

5) Thoroughly clean debris from nut faces and bolt head socket.

6) Using socket tool, loosen nut anticlockwise. Support blade bolt with hexagon key as required and remove blade and fasteners (fig 6.7.2).

7) Thoroughly clean debris from flywheel blade housing and all components to be replaced. Inspect condition of nuts and bolts and replace if any signs of wear. (Fig 6.7.3 and fig 6.7.4)

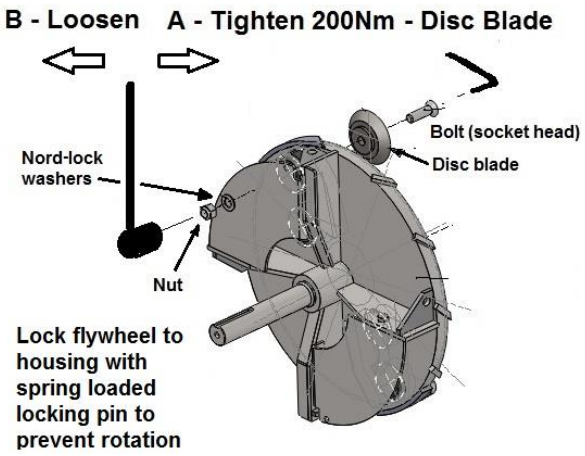
8) Replace blade with Nord-Lock washers ensuring that flywheel is blocked for opposite rotation. Tighten to correct torque: 200Nm.
Retract locking pin and carefully rotate to next blade and repeat next blade removal (from 4 above) until all blades cleaned and replaced securely.

9) Replace all covers.

10) Check all covers are secure.

11) Replace key to start machine.

Fig 6.7.2. Flywheel and blades



⚠ CAUTION! Blades must only be sharpened by grinding angled back face on a bench grinder. Grinding of front face will upset gap, which is factory set. Do not sharpen with hand held equipment.

All blades must be sharpened in “sets” with equal amounts removed to maintain balance. See 6.24

Note. If any blades are worn below flat annular section a complete set should be replaced.

Fig 6.7.3 Blade fastening assembly

Fig 6.7.4 Nord-Lock washer pair

Note fewer teeth facing each other

6.8 Radiator)

Daily

Check radiator for debris. (fig.6.8)

Lift out guard and clean.

50 hours or weekly

In addition to above, blow out radiator core from back with suitable airline, lift up front grille and clear from front.

⚠ CAUTION! A build up of debris risks overheating of engine and a risk of fire.

Fig.6.8 Radiator guard

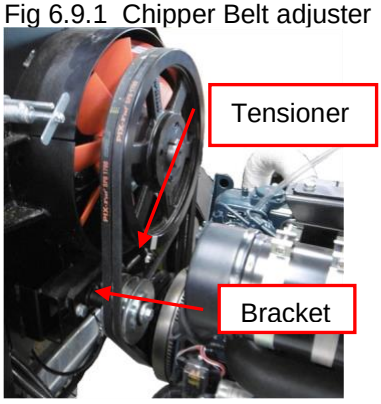
6.9 Drive belts

Belt Adjustment and Replacement

Remove engine cover.

Note: Requires removal of pump belt (6.9.2) to enable removal of chipper belts.

Fig 6.9.1 Chipper Belt adjuster



6.9.1 Chipper flywheel drive

1) Release bracket bolts and tensioner (fig 6.9.1) to adjust or remove belts.
2) Re-tension belts and tighten bracket bolts to secure.

Replace worn belts with new set, ensuring bedded in pulley grooves, and reset tension.

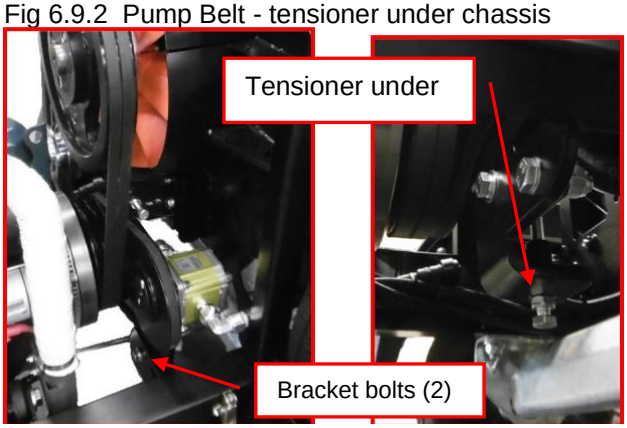
Check alignment and tension before starting chipper.

6.9.2 Feed Roller Pump drive

1) Identify and release 2 bolts in slotted pump mounting plate to adjust or remove belts (fig 6.9.2).
2) Tension belt using tensioner under chassis.
3) Tighten mounting bolts.
4) Replace all covers and secure.

Replace worn belt with new, ensuring bedded in pulley groove, and reset tension.

Fig 6.9.2 Pump Belt - tensioner under chassis



6.10 Steam Cleaning

Weekly and every 250 hours or 12 months

1) Check all covers are fitted and closed.
2) Steam clean machine surfaces.
3) Clean electrical components with a damp rag, spray with WD40 and then wipe with dry rag.

⚠ CAUTION! Do not steam clean directly on to electrical components, e.g. control boxes.

6.11 Air Cleaner (under engine cover)

Weekly (Refer to engine manual)

1) Remove cover screw or clips (fig 6.11) and release.
2) Slide out element and either blow out with air-line or gently tap on smooth ground to release debris.
3) Replace cover.

Fig 6.11 Air Cleaner

6.12 Electrical connections

Weekly

Check all wiring loom connections are secure.

⚠ CAUTION! Poor connections will affect engine security cut-outs and may prevent starting.

6.13 Battery

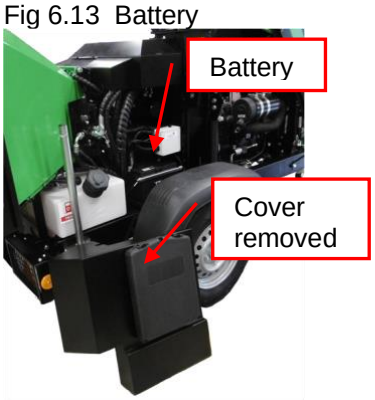
First 50 hours and weekly (Fig 6.13)

1) Remove right hand side cover (above road wheel) to access battery.
2) Release stays if necessary.
3) Check electrolyte level and top up if required.
4) Reposition battery, and secure stays.
5) Refit cover and secure.

Removal

1) First disconnect negative (-) cable (black cap).
2) Disconnect positive (+) cable (red cap).
3) Remove clamp and carefully lift out battery.
4) Replace by connecting positive cable before negative.
5) Secure battery as 6.13.4 above.

Fig 6.13 Battery



⚠ CAUTION! Gases are explosive. Electrolyte is corrosive. Avoid sparks and spillage.

6.14 Tyres and Wheels (Road Tow)

50 hours and 250 hours or 12 months

Check condition of tyres.
Check pressures and inflate to 2.7bar (40lb/in^2) pressure as required.
Check wheel nuts are tight to 110Nm (80lbft) torque.

6.15 Brakes (Road Tow)

50 hours, weekly and 250 hours or 12 months

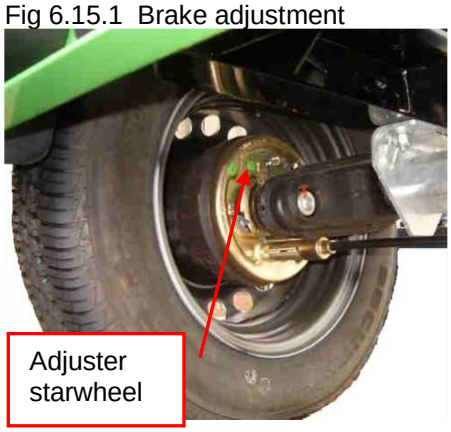
Check operation and effectiveness of overrun and handbrake.

100 hours

Adjust brakes as follows:

1) Chock machine, release handbrake fully off and check drawbar is fully extended.
2) Jack up both wheels and support on axle stands.
3) Remove inner bung (fig 6.15.1) to expose adjuster 'starwheel'.
4) Adjust starwheel with screwdriver until tight whilst rotating each wheel forwards until tight.
5) Slacken until wheel rotates freely in forward direction.

Fig 6.15.1 Brake adjustment



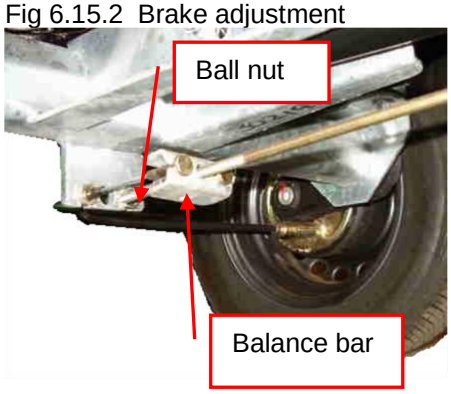
⚠ CAUTION! Reverse rotation of wheel may prevent correct adjustment.

6) Check brake linkage has 4 to 6mm movement at cable.
7) Repeat for opposite wheel.
8) Check balance bar is straight and pulls both cables evenly (fig 6.15.2).
9) Adjust ball nut to remove any slack from brake rod.

Note: Servicing of brakes may be required more often if above average mileage is covered.

Refer to AL-KO brake manual or GreenMech for details for brake shoe replacement and other servicing

Fig 6.15.2 Brake adjustment



6.16 Bearings and Pivots

weekly

See paragraph 6.1 for routine lubrication.

250 hours or 12 months

Check rotating components for excessive movement and noise in operation.
Replace as required.

Note: Wheel bearings are maintenance free and do not require attention.

6.17 *Number not used.*

6.18 Hydraulic connections

50 hours

With circuit diagram to follow hose routings, check all hoses and connections for leaks and damage.
Replace any worn or damaged hoses with correct type and length.
Check routing before removal.
Replace hose free of strains, twists or kinks.

⚠ CAUTION! Ensure any residual pressure is released before dismantling.

⚠ CAUTION! Ensure hoses are refitted free of twists and kinks.

6.19 Mountings

250 hours

Check that all mounting bolts are tight.

6.20 Hydraulic Return Filter
250 hours or 12 months (Fig 6.20)

Fig 6.20a Hydraulic return filter (Road Tow)

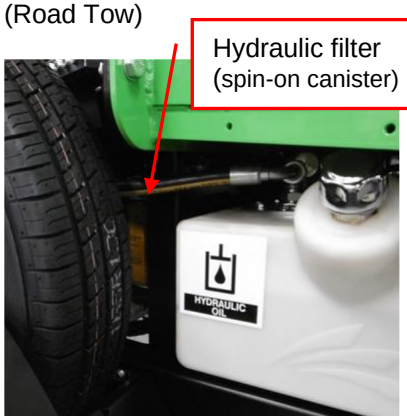
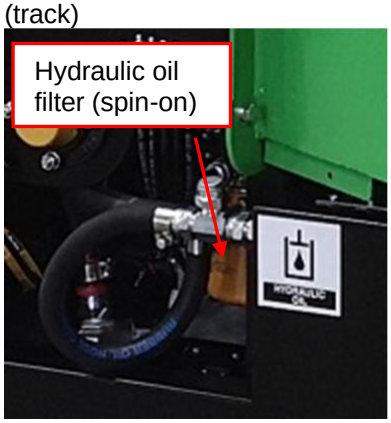


Fig. 6.20b Hydraulic return filter (track)



1) Check oil is cool.
2) Remove spare wheel (Road Tow) to access canister.
3) Unscrew canister and discard safely (fig 6.20).
4) Fit new filter canister.

⚠ CAUTION! Do not overtighten.

5) Refit and secure spare wheel (Road Tow).

6.21 Hydraulic Oil change
1000 hours

Note: Access to hydraulic tank can be aided by lifting up fixed infeed chute at hinge as follows.

1) Remove covers to access and remove bolts.
2) With aid, carefully lift up heavy chute and secure using bar (for feed roller lift) through holes at hinge.

⚠ CAUTION! Complete chute is heavy and requires at least 2 people to lift.

Remove hydraulic oil with suction pump at filler.
Replace suction filter.
Replace with new oil and filter of correct specification.
Refix infeed chute if lifted and replace and secure all covers.
Dispose of waste oil according to local authority environmental procedures.

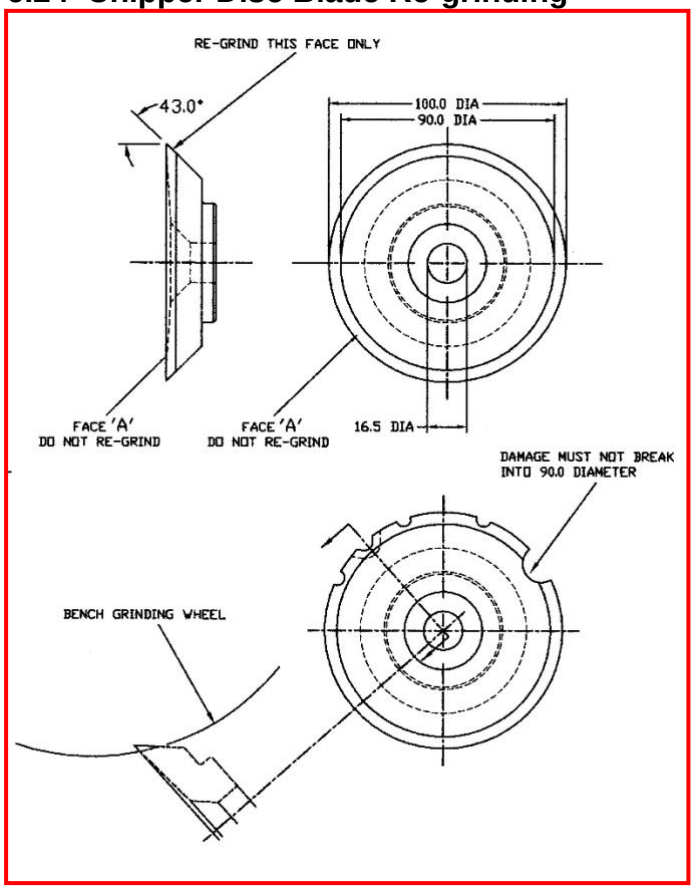
6.22 Fuses and No Stress system

There are two fuses.
A 40 amp in-line fuse protects engine pre-heat and start circuit.
A 20 amp fuse protects No Stress Power Protection System.
Note Operating speeds for No Stress system are factory set for particular machine builds and must not be readjusted.

6.23 Fault finding

Fault	Check	Action	Page
Engine will not start	Battery	Recharge	6-8
	Fuel	Fill tank	6-5
	Oil pressure	Check Oil level	6-5
	Thermal cut-out	Check operation	6-5
	Fuses	Check	6-11
Engine not at correct speed	Engine control	Check operation	5-2
Chipper flywheel will not start	Drive belts	Replace	6-7
Feed rollers do not turn	Stop bar	Check	3-2
	Chip/Track switch (Track model only)	Select 'Chip'	5.2
	Hydraulics	Check solenoid valve	5-2
Feed will not reverse	Stop bar	Reset and check	3-2
	Hydraulic valve	Check operation	
Discharge does not flow	Discharge chute	Check for blockage	5-3
	Chipper flywheel	Check for blockage	5-3
Unusual noise(s)	Chipper flywheel and bearings	Check and replace	5-3 6-9

6.24 Chipper Disc Blade Re-grinding



Examine set of chipper disc blades for damage. If front face 'A' is worn, blade must be scrapped. If chips have broken off cutting edge they can be re-dressed provided that they do not go inside 90mm diameter area.
Always regrind worst damaged blade first, as this will establish target weight for remaining blades.
If large chips exist over less than 30% of circumference, blade may be re-ground provided large damaged area is not used for chipping.
Chips may be repaired by grinding a cutting edge around damaged area using a bench grinder.
With chipper blade mounted on a mandrel re-grind remainder of cutting edge at 43º as shown
Re-grind in increments of approximately 0.01mm (0.004") until sharp edge is restored.
If re-grinding breaks into 90mm diameter area, blade must be scrapped.
After re-grinding weight of blades within a set must not vary by more than +/- 1gm (0.03oz).
Weight of each blade must not be less than 560gm (20oz)

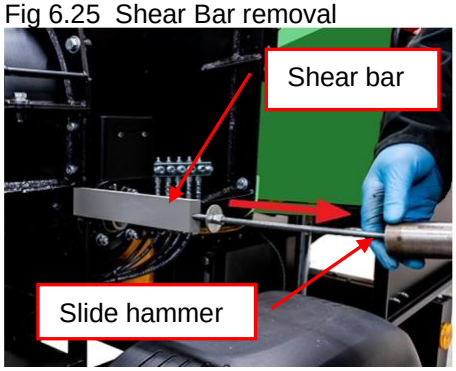
Note: Disc Blades use a patent Nord-Lock washer pair together with a thinner Nyloc type locking nut at an increased torque setting of 200Nm.
See fig 6.7.3 and Fig 6.7.4.
Ensure that both washers are assembled as a pair with faces of fewer teeth facing each other (fig 4).
Thread lubricant is recommended to ensure even torque. Do not use thread adhesive (e.g. Loctite).
Reuse:

Nord-Lock washers can normally be re-used when cleaned and re-lubricated.
Nyloc nuts should always be inspected for damage before reuse.

6.25 Shear Bar removal (with slide hammer) and turning

1) Remove spare wheel and shear bar end cover.
2) Attach slide hammer to exposed thread in shear bar.
3) Carefully ease out bar with hammer (fig 6.25).
4) Turn bar to new cutting edge or replace.
5) Refit bar
6) Replace end cover and spare wheel.

Fig 6.25 Shear Bar removal



7.1 Storage

Thoroughly clean machine and note any replacement parts required.
Carry out 250 hour service if not already done. Refer to Section 6
Fit replacement parts when available.
Remove battery (where fitted) Refer to 6.13
Drain fuel
If machine is to be stored for more than 3 months, place on axle stands to remove weight from wheels*.
Fold down discharge chute if necessary.

7.2 Removal from Storage

Charge battery and refit	Refer to 6.13
Check tyre pressures (as applicable)	Refer to 6.14
Check brake operation (as applicable)	Refer to 6.15
Carry out machine preparation as necessary	Refer to Section 4

8 Disposal

When machine is finally scrapped, the following items should be disposed of only at authorised waste disposal facilities.

Engine oil. Hydraulic oil. Antifreeze. Battery. Tyres. Tracks (as applicable).

If in doubt, consult Local Authority environmental department.

Major non-ferrous items such as covers and hydraulic hoses may also be disposed of separately.

Risk Assessment

Assessment No: G001

GreenMech
The Professionals' Choice

Company Name: **GreenMech Ltd** Activity: EVO 165

Hazard	At Risk	Consequence (C)		Likelihood (L)		Risk Score	Controls	Revised		Final Risk Score
	Those likely to be affected	Likely injury from hazard	Rating	Of incident	Rating			C Rating	L Rating	
ENTANGLEMENT With cutter in base of CHIPPER infeed chute	OPERATOR	FATALITY – LOSS OF LIMB	5	VERY LIKELY	5	25	Reach area safety distance to cutter complies to latest HSE guidelines. Fix safety stop rail to upper and side perimeter on infeed chute. Operation of this emergency stop system should operate as recommended by HSE. Only appointed operators to use machine (competent)	5	2	10
STABBING AND PUNCTURE by projectiles from cutter. Wood, stones, nails rebound back out of infeed chute	OPERATOR	Injuries to face, eyes, head and hands	3	PROBABLE	4	12	Trained Operator. Check only green waste is fed into machine. Safety helmet to BSEN 397 Forestry visor Hard wearing gloves	3	2	6

Key:

Consequence	Score	Likelihood	Score	To find risk Score multiply consequence rating by the likelihood rating
Fatality	5	Very likely	5	Final revised risk score acceptable to the company is 10 or less. If higher, further controls are required. Final revised likelihood score must be 2 or less
Disability	4	Probable	4	
Very serious (broken limbs)	3	Possible	3	
Important (3 day accident)	2	Remotely possible	2	
Noticeable (first aid)	1	Improbable	1	

Signed: ……

Date: ……

Review Date: ……

Risk Assessment

Assessment No: G001-2

GreenMech
The Professionals' Choice

Company Name: **GreenMech Ltd** Activity: EVO 165

Hazard	At Risk	Consequence (C)		Likelihood (L)		Risk Score	Controls	Revised		Final Risk Score
	Those likely to be affected	Likely injury from hazard	Rating	Of incident	Rating			C Rating	L Rating	
NOISE Guaranteed sound pressure level of Lwa 100dB	OPERATOR THIRD PARTY	NOISE INDUCED HEARING LOSS	4	PROBABLE	4	16	Wear hearing protection to BE EN 352-3. Display mandatory 'wear hearing protection' sign	4	2	8
VIBRATION – movement of machine	OPERATOR	BROKEN OR BRUISED LIMB	3	POSSIBLE	3	9	Trained Operator. Lock off handbrake Chock wheels and secure stabiliser in place Stand machine on sound level ground	3	2	6
STABBING – PUNCTURE When operating handle to raise engine – residue from exhaust chutte	OPERATOR THIRD PARTY	EYE INJURIES CUTS TO FACE	2	POSSIBLE	3	6	Cordon off collection point. Operator to wear head and face protection	2	1	2

Key:

Consequence	Score	Likelihood	Score	To find risk Score multiply consequence rating by the likelihood rating
Fatality	5	Very likely	5	Final revised risk score acceptable to the company is 10 or less. If higher, further controls are required. Final revised likelihood score must be 2 or less
Disability	4	Probable	4	
Very serious (broken limbs)	3	Possible	3	
Important (3 day accident)	2	Remotely possible	2	
Noticeable (first aid)	1	Improbable	1	

Signed: ……

Date: ……

Review Date: ……

Risk Assessment

Assessment No: G001-3

GreenMech
The Professionals' Choice

Company Name: **GreenMech Ltd** Activity: EVO 165

Hazard	At Risk	Consequence (C)		Likelihood (L)		Risk Score	Controls	Revised		Final Risk Score
	Those likely to be affected	Likely injury from hazard	Rating	Of incident	Rating			C Rating	L Rating	
ENTANGLEMENT Branches with clothing	OPERATOR	Drawn into cutters – FATALITY – LOSS OF LIMBS	5	POSSIBLE	3	15	Wear snug fitting clothes. No ties, scarves etc. Same controls as for previous hazard of entanglement with cutters. Wear gloves with long cuffs which can be tucked into sleeves	5	2	10
STABBING AND PUNCTURE – Processed green waste	OPERATOR THIRD PARTY	EYE INJURIES, CUTS TO FACE	1	POSSIBLE	3	3	Trained operator Lock off exhaust chute Cordon off collection point	1	1	2
STABBING AND PUNCTURE – Handling branches	OPERATOR	CUTS TO HANDS	2	QUITE POSSIBLE	4	8	Wear hard wearing gloves with long cuffs that can be tucked into sleeves.	2	2	4

Key:

Consequence	Score	Likelihood	Score	To find risk Score multiply consequence rating by the likelihood rating
Fatality	5	Very likely	5	Final revised risk score acceptable to the company is 10 or less. If higher, further controls are required. Final revised likelihood score must be 2 or less
Disability	4	Probable	4	
Very serious (broken limbs)	3	Possible	3	
Important (3 day accident)	2	Remotely possible	2	
Noticeable (first aid)	1	Improbable	1	

Signed: ……

Date: ……

Review Date: ……

Risk Assessment

Assessment No: G001-4

GreenMech
The Professionals' Choice

Company Name: **GreenMech Ltd**

Activity: EVO 165

Hazard	**At Risk**	**Consequence (C)**		**Likelihood (L)**		**Risk Score**	**Controls**	**Revised**		**Final Risk Score**
	Those likely to be affected	Likely injury from hazard	Rating	Of incident	Rating			C Rating	L Rating	
IMPACT Being struck by branch when feeding green waste into cutters	OPERATOR	BROKEN LIMB BRUISES	3	POSSIBLE	3	9	Stand at side of machine. Trained operator	3	2	6
CRUSH Adjusting height of A-frame	OPERATOR	BROKEN LIMB, BRUISES	3	POSSIBLE	3	9	Ensure hand brake is applied and wheels are chocked. Use winding handle to lower jockey wheel. Lower stabiliser and lock off	3	1	3
CRUSH, IMPACT Dropping infeed chute when fixing in working position/ transport position	OPERATOR	BROKEN LIMB, BRUISES	3	Chute handled at start and finish of work	3	9	Trained operator, check hinge points before use. Use fasteners to secure chute.	3	2	6

Key:

Consequence	**Score**	**Likelihood**	**Score**	**To find risk Score multiply consequence rating by the likelihood rating**
Fatality	5	Very likely	5	Final revised risk score acceptable to the company is 10 or less. If higher, further controls are required. Final revised likelihood score must be 2 or less
Disability	4	Probable	4	
Very serious (broken limbs)	3	Possible	3	
Important (3 day accident)	2	Remotely possible	2	
Noticeable (first aid)	1	Improbable	1	

Signed: ……

Date: ……

Review Date: ……

GreenMech
The Professionals' Choice

01789 400 044 support@greenmech.co.uk www.greenmech.co.uk

GreenMech Ltd, The Mill Industrial Park, Kings Coughton,
Alcester, Warwickshire B49 5QG

www.greenmech.co.uk