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# INTRODUCTION

Thank you for choosing Timberwolf. Timberwolf chippers are designed to give safe and dependable service if operated according to the instructions.

## **IMPORTANT HEALTH AND SAFETY INFORMATION**

**Before using your new chipper, please take time to read this manual. Failure to do so could result in:**

- PERSONAL INJURY
- EQUIPMENT DAMAGE
- DAMAGE TO PROPERTY
- 3RD PARTY INJURIES

This manual covers the operation and maintenance of the Timberwolf TW 190TDHB. All information in this manual is based on the latest product information available at the time of purchase.

All the information you need to operate the machine safely and effectively is contained within pages 2 to 14. Ensure that all operators are **properly trained** for operating this machine, especially **safe working practices**.

Timberwolf's policy of regularly reviewing and improving their products may involve major or minor changes to the chippers or their accessories. Timberwolf reserves the right to make changes at any time without notice and without incurring any obligation.

Due to improvements in design and performance during production there may be, in some cases, minor discrepancies between the actual chipper and the text in this manual.

**The manual should be considered an important part of the machine and should remain with it if the machine is resold.**

***ALWAYS FOLLOW SAFE OPERATING AND MAINTENANCE PRACTICES***



## **CAUTION or WARNING**

***BE AWARE OF THIS SYMBOL AND WHERE SHOWN, CAREFULLY FOLLOW THE INSTRUCTIONS.***

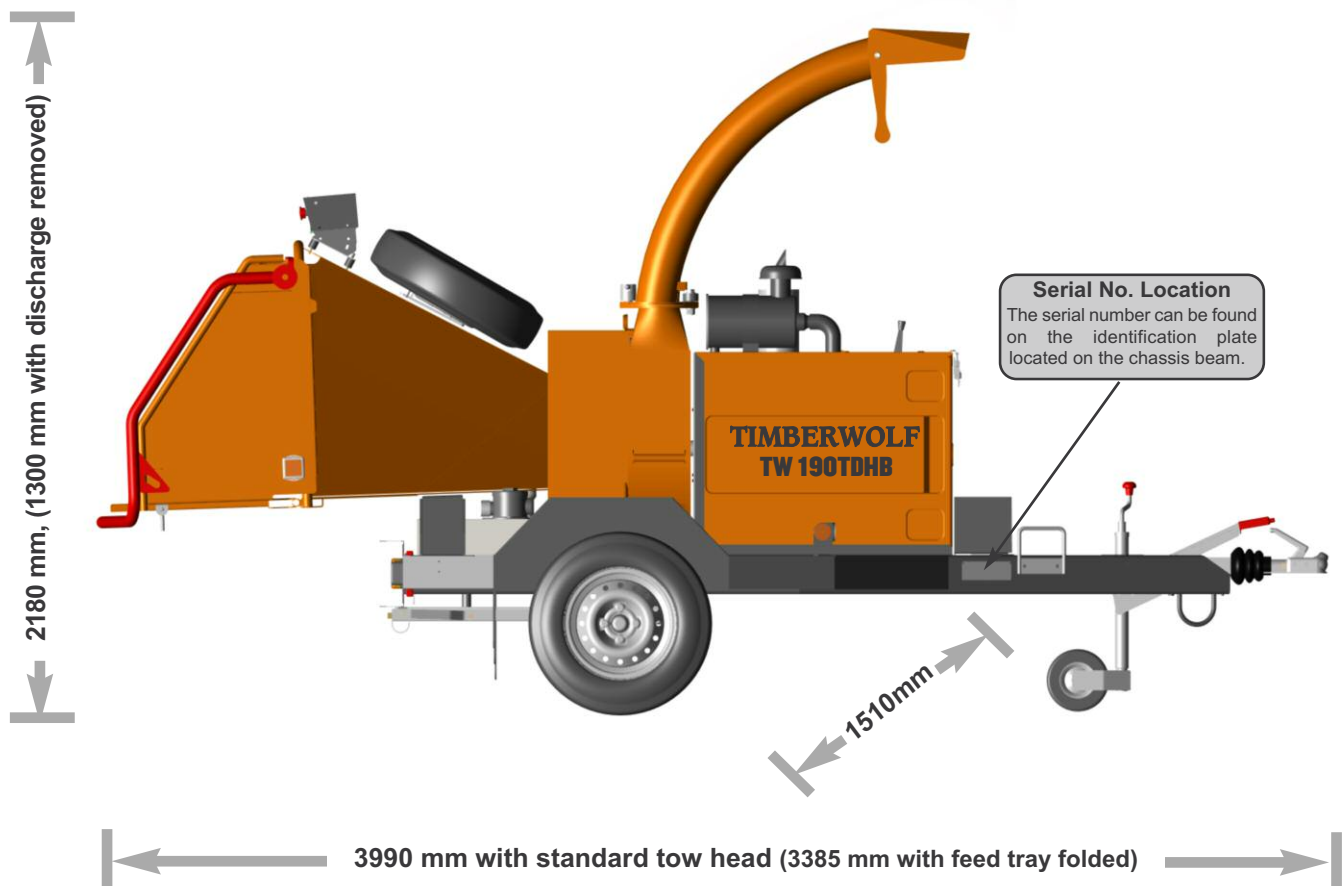
This caution symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury to yourself or others and carefully read the message that follows.



## The Timberwolf TW 190TDHB

*Designed to chip solid wood material up to 190mm in diameter and capable of chipping up to 6.5 tonnes of brushwood per hour.*

### DIMENSIONS - WITH FIXED TOWHEAD

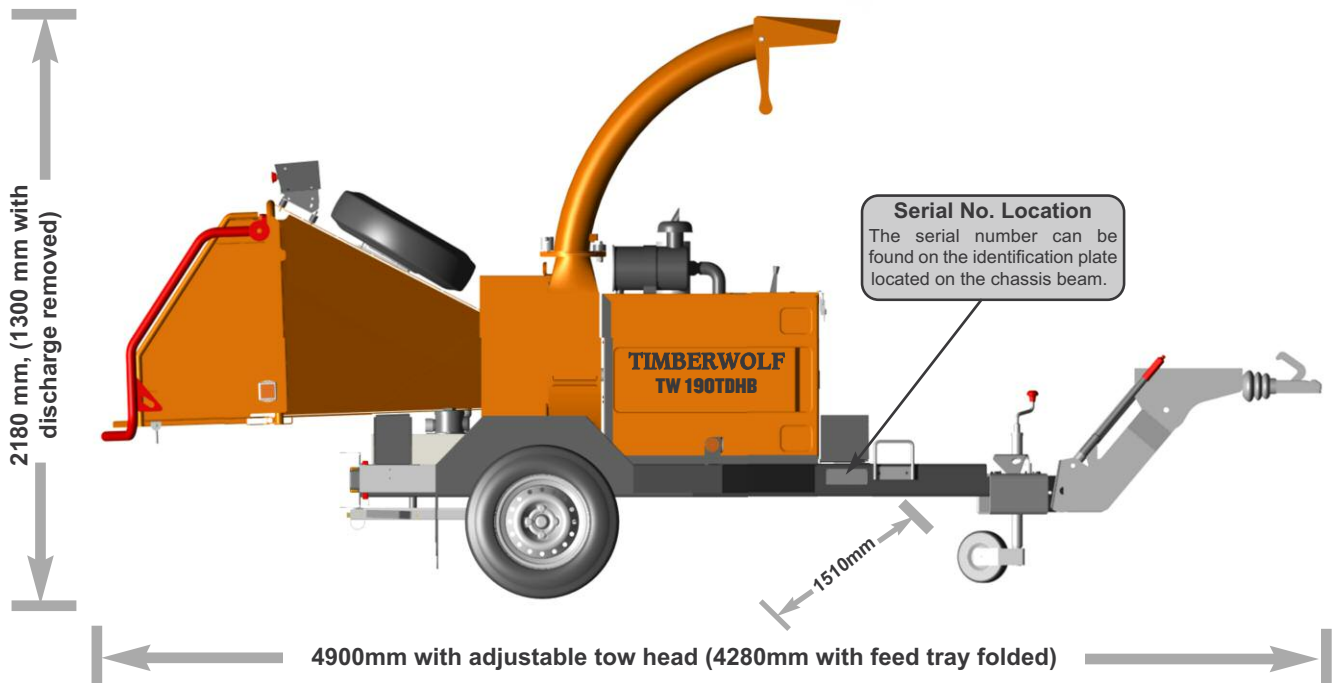


#### TIMBERWOLF TW 190TDHB (FIXED TOWHEAD) SPECIFICATION

Engine type	<i>Kubota 4-cylinder turbo diesel</i>	Maximum diameter material	<i>190mm (7½")</i>
Maximum power	<i>33kW (45hp)</i>	Fuel capacity	<i>50 litres</i>
Cooling method	<i>Water cooled</i>	Hydraulic oil capacity	<i>15 litres</i>
Overall weight	<i>1020kg</i>	Material processing capacity	<i>up to 6.5 tonnes/hr</i>
Starting method	<i>Electric</i>	Fuel type	<i>Diesel</i>
Roller feed	<i>Twin series hydraulic motors</i>		



## DIMENSIONS - WITH ADJUSTABLE TOWHEAD

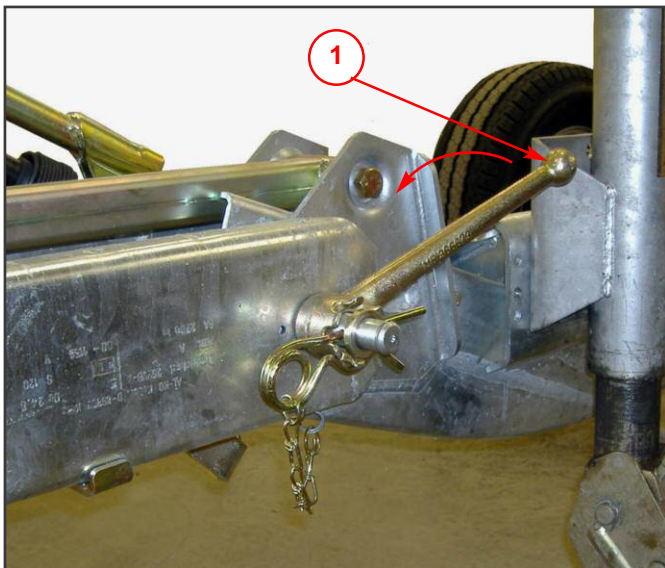


### TIMBERWOLF TW 190TDHBA (ADJUSTABLE TOWHEAD) SPECIFICATION

Engine type	<i>Kubota 4-cylinder turbo diesel</i>	Maximum diameter material	190mm (7½")
Maximum power	33kW (45hp)	Fuel capacity	50 litres
Cooling method	<i>Water cooled</i>	Hydraulic oil capacity	15 litres
Overall weight	1150kg	Material processing capacity	up to 6.5 tonnes/hr
Starting method	<i>Electric</i>	Fuel type	<i>Diesel</i>
Roller feed	<i>Twin series hydraulic motors</i>		

## ADJUSTING THE TOWHEAD HEIGHT

The TW 190TDHBA chipper has the ability to adjust the towhead height to correspond with the vehicles towing point.



The preferred towing angle of any chipper is with the chassis level to the ground. The adjustable head has the ability to move between 300mm from the ground to 875mm giving an overall adjustment of 575mm.

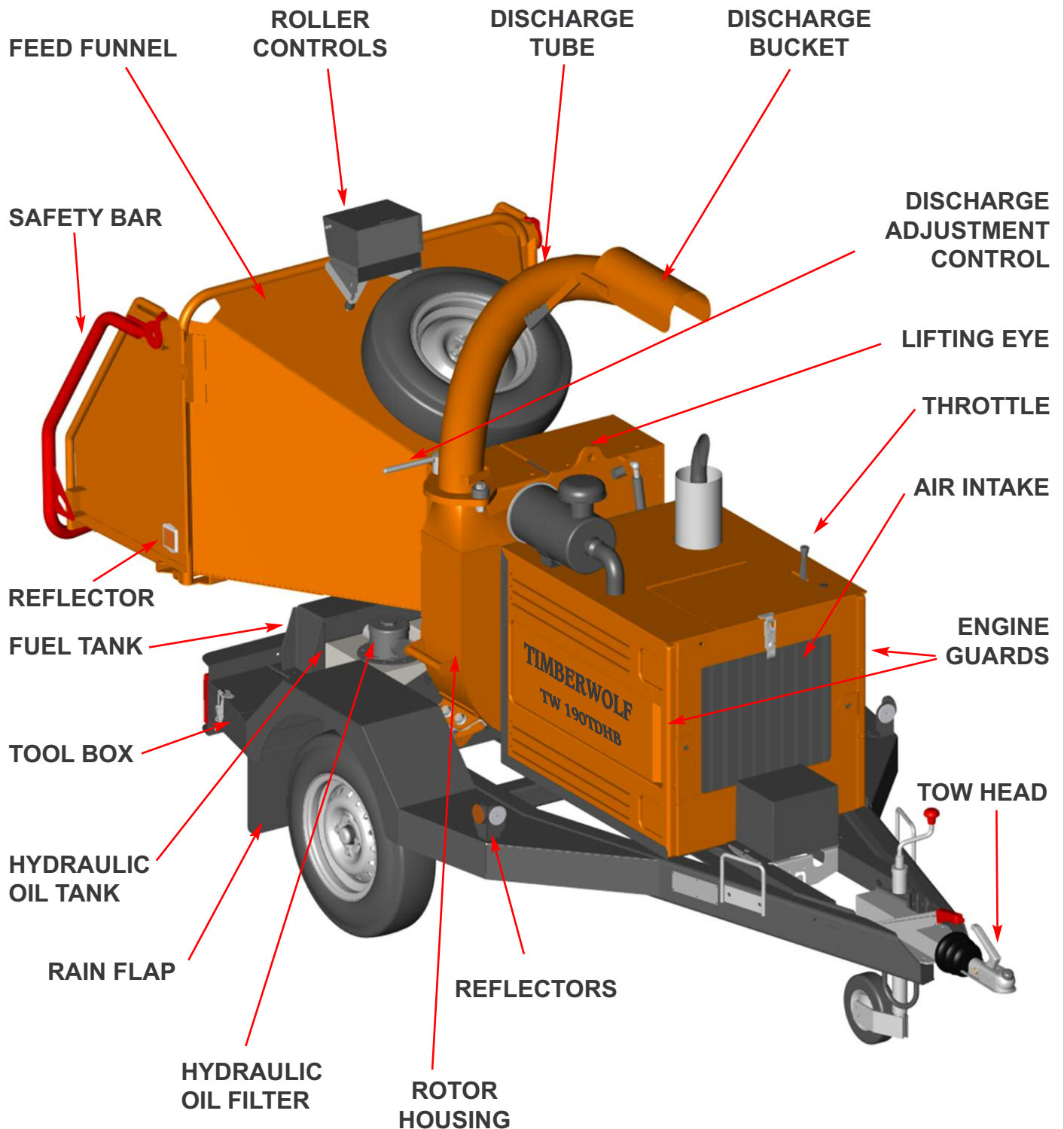
The towhead latch and handbrake fundamentally work the same as a fixed standard towhead, however the front section of the head is retained in position via a locking ring and single clamp handle.

To adjust the height the locking handle located on the side of the head (1) is turned in an anticlockwise direction to allow for the locking ring to disengage from its opposing ring. An internal damper is fitted to support the head's weight allowing both hands free to adjust the height. Once the desired height has been achieved the locking handle is turned clockwise until

tight. The latching of the hitch is as normal as is the fitting of the light plug and breakaway cable as outlined in the 'Hitching onto the tow ball' section on page 9.

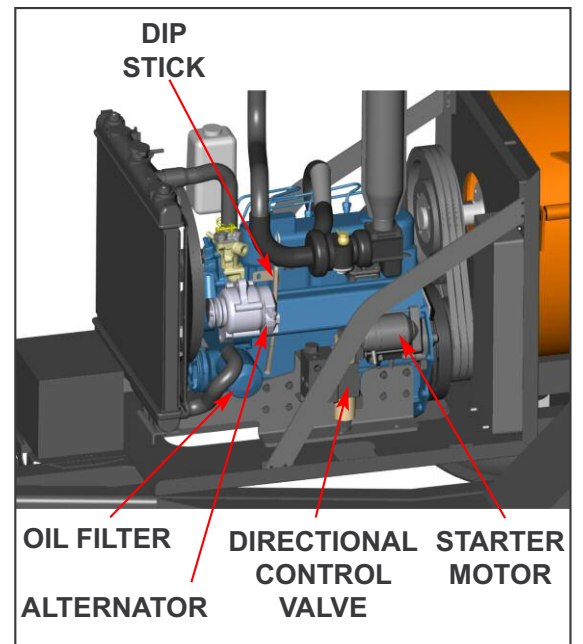
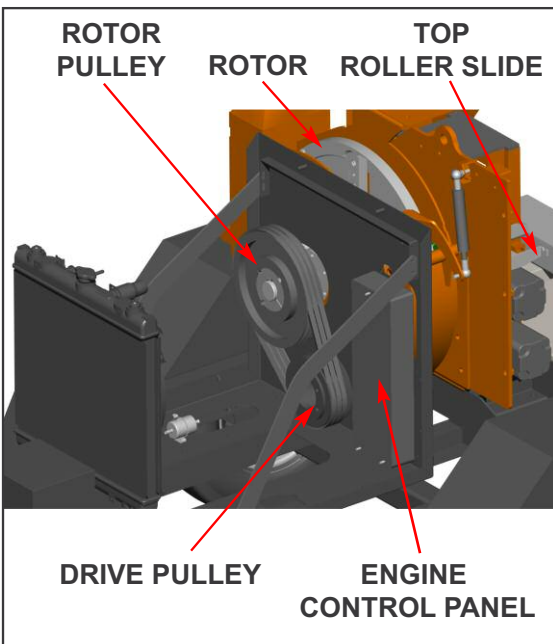
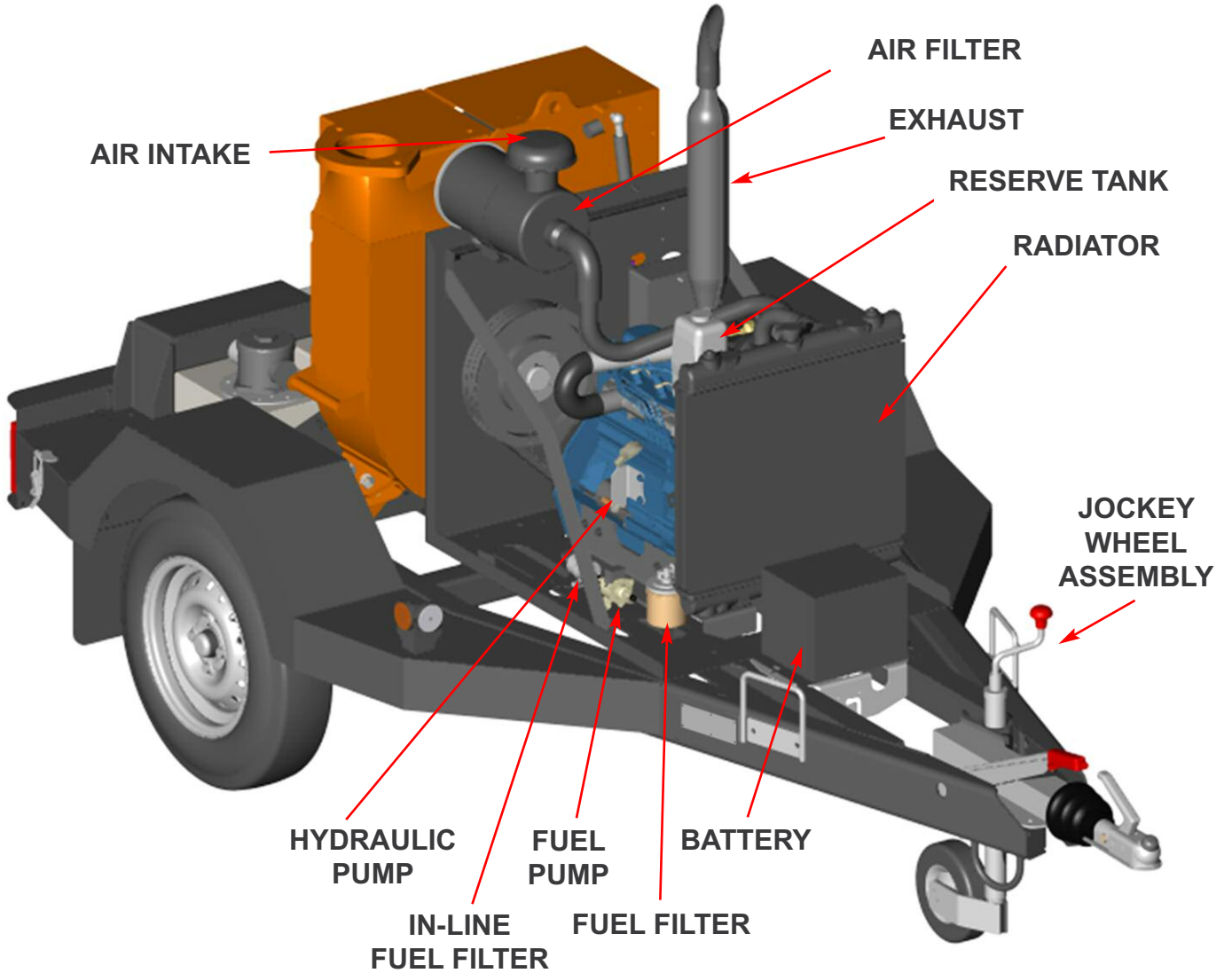


## PARTS LOCATOR





# PARTS LOCATOR





## WARNING

The chipper will feed material through on its own. To do this, it relies on sharp blades both on the feed rollers and the chipper rotor. To keep the blades sharp, only feed the machine with clean brushwood. **DO NOT** put muddy/dirty wood, roots, potted plants, bricks, stones or metal into the chipper.



## OPERATOR'S PERSONAL PROTECTIVE EQUIPMENT REQUIRED



Chainsaw safety helmet fitted with mesh visor and recommended ear defenders to the appropriate specifications.



Close fitting heavy-duty non-snag clothing.



Work gloves with elasticated wrist.



Face mask if appropriate.



Steel toe cap safety boots.



**DO NOT** wear rings, bracelets, watches, jewellery or any other items that could be caught in the material and draw you into the chipper.

## BASIC WOODCHIPPING SAFETY

*The operator should be aware of the following points:*

- **MAINTAIN A SAFETY EXCLUSION ZONE** around the chipper of at least 10 metres for the general public or employees without adequate protection. Use hazard tape to identify this working area and keep it clear from debris build up. Chips should be ejected away from any area the general public have access to.
- **HAZARDOUS MATERIAL** - Some species of trees and bushes are poisonous. The chipping action can produce vapour, spray and dust that can irritate the skin. This may lead to respiratory problems or even cause serious poisoning. Check the material to be chipped before you start. Avoid confined spaces and use a facemask if necessary.
- **BE AWARE** when the chipper is processing material that is an awkward shape. The material can move from side to side in the funnel with great force. If the material extends beyond the funnel, the brush may push you to one side causing danger. Badly twisted brush should be trimmed before being chipped to avoid thrashing in the feed funnel.
- **BE AWARE** that the chipper can eject chips out of the feed funnel with considerable force. Always wear full head and face protection.
- **ALWAYS** work on the side of the machine furthest from any local danger, e.g. not road side.



## GENERAL SAFETY MATTERS



### DO'S AND DON'TS



ALWAYS stop the chipper engine before making any adjustments, refuelling or cleaning.

ALWAYS check rotor has stopped rotating and remove chipper ignition key before maintenance of any kind, or whenever the machine is to be left unattended.

ALWAYS check the machine is well supported and cannot move.

ALWAYS operate the chipper with the engine set to maximum speed when chipping.

ALWAYS check (visually) for fluid leaks.

ALWAYS take regular breaks. Wearing personal protective equipment for long periods can be tiring and hot.

ALWAYS keep hands, feet and clothing out of feed opening, discharge and moving parts.

ALWAYS use the next piece of material or a push stick to push in short pieces. Under no circumstances should you reach into the funnel.



ALWAYS keep the operating area clear of people, animals and children.

ALWAYS keep the operating area clear from debris build up.

ALWAYS keep clear of the chip discharge tube. Foreign objects may be ejected with great force.

ALWAYS ensure protective guarding is in place before commencing work. Failure to do so may result in personal injury or loss of life.

ALWAYS operate the chipper in a well ventilated area - exhaust fumes are dangerous.

DO NOT operate chipper unless available light is sufficient to see clearly.

DO NOT use or attempt to start the chipper without the feed funnel, guards and discharge unit securely in place.

DO NOT stand directly in front of the feed funnel when using the chipper. Stand to one side.

DO NOT allow -



BRICKS STRING CLOTH PLASTIC STONES



METAL GLASS RUBBER ROOTS BEDDING PLANTS

- to enter the machine, as damage is likely.

DO NOT smoke when refuelling.



DO NOT let anyone who has not received instruction operate the machine.

DO NOT climb on the machine at any time.

DO NOT handle material that is partially engaged in the machine.

DO NOT touch any exposed wiring while machine is running.

DO NOT use the chipper inside buildings.



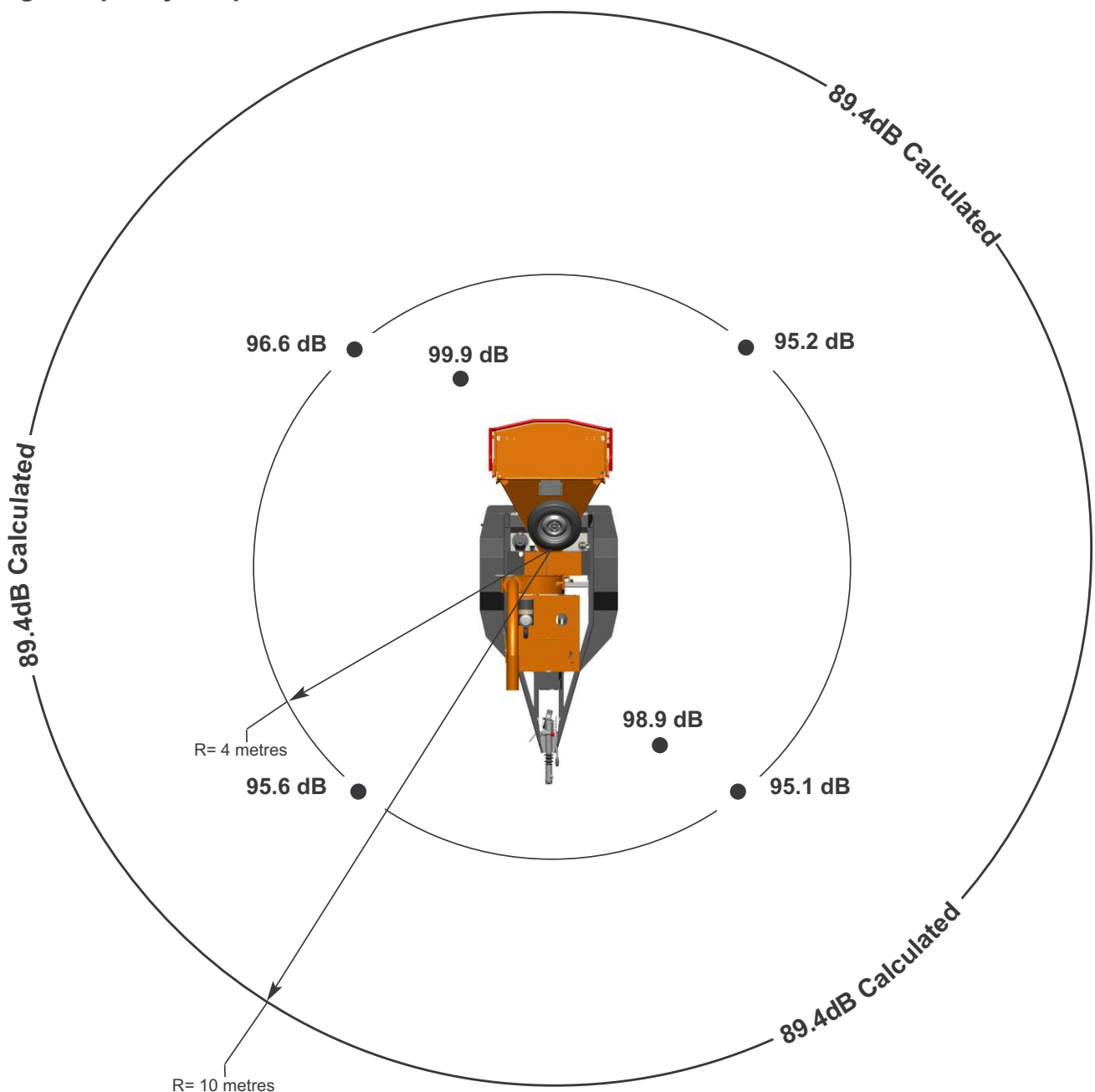


## NOISE TEST

**MACHINE:** TW 190TDHB

**NOTES:** Tested chipping 120mm x 120mm corsican pine 1.5m in length

Noise levels above 80dB (A) will be experienced at the working position. Wear ear protection at all times to prevent possible damage to hearing. All persons within a 4 metre radius must also wear good quality ear protection.



**Guaranteed Sound Power: 119dB (A)**

As required by Annex III of Directive 2000/14/EC "Noise Emission in the environment by equipment for use outdoors".

# 9 OPERATING INSTRUCTIONS



**TIMBERWOLF**  
**TW 190TDHB**

## SAFE TRANSPORTATION

- WHEN towing a chipper the maximum speed limit is 60 mph.
- ON rough or bumpy road surfaces reduce speed accordingly to protect your machine from unnecessary vibration.
- WHEN towing off road be aware of objects that may catch the chipper undergear.
- WHEN towing off road ensure inclination is not excessive.
- AVOID excessively pot holed ground.

## WARNING

DO NOT RIDE ON THE CHIPPER WHEN IT IS BEING TOWED.



- WHEN reversing the chipper the short wheel base will react quickly to steering.
- ALWAYS check the discharge is tight before moving.
- KEEP tyre pressures inflated to 2.9 bar or 42 psi.
- CHECK wheel nuts are tightened to 90Nm or 65 lbs ft.
- CLEAR loose chippings and debris from the machine before departing.
- ENSURE feed funnel is closed and the catch is properly engaged before departing.

## HITCHING ONTO THE TOW BALL

- CHECK ball head is well greased.
- WIND jockey wheel assembly anticlockwise until the tow head is above the height of the ball hitch on the vehicle.
- REVERSE vehicle so the ball hitch is directly below the tow head.
- ATTACH breakaway cable to a strong point on the vehicle, not the ball hitch.
- GRASP handle on tow head and push back catch with thumb.
- WIND jockey wheel assembly clockwise, to lower the tow head onto the ball hitch.
- RELEASE handle and continue to wind jockey

wheel clockwise. The tow head should snap into place on the ball hitch. If it doesn't, repeat previous 2 steps.

- WIND jockey wheel up until fully retracted and the jockey wheel frame is seated in its notch on the stem. The chipper weight should be fully on the vehicle.
- RELEASE jockey wheel clamp and slide the jockey wheel assembly fully up.
- TIGHTEN clamp on jockey wheel assembly.
- CONNECT electrical plug to socket on rear of towing vehicle and check operation of all the trailer and vehicle lights.
- THE chipper is now properly attached to the vehicle.

## UNHITCHING THE CHIPPER

- ENSURE the chipper will not roll away after being disconnected from the vehicle.
- DISCONNECT the electrical cable from the vehicle socket.
- RELEASE breakaway cable.
- RELEASE the jockey wheel assembly clamp.
- LOWER the jockey wheel assembly fully.
- RETIGHTEN the jockey wheel assembly clamp.
- WIND the jockey wheel assembly anticlockwise until it

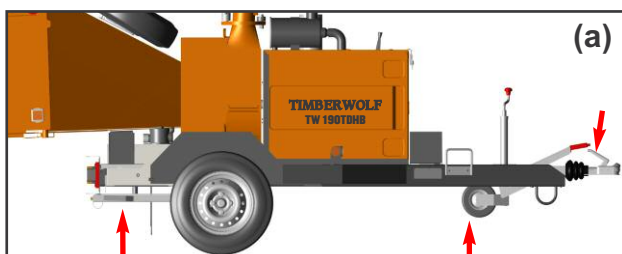
starts to take the weight of the chipper.

- GRASP the handle and release the catch with your thumb.
- CONTINUE to wind the jockey wheel anticlockwise. This should lift the tow head clear of the ball hitch.
- DRIVE the vehicle clear of the chipper.
- WIND the jockey wheel assembly to a suitable point where the chipper is level.
- THE chipper is now fully detached from the vehicle.

## STABILISING THE CHIPPER

When hitched to a vehicle the chipper handbrake should be released and the jack stand and jockey wheel stored in the towing position (a).

When the chipper is unhitched it should be made secure before starting work by applying the handbrake and lowering the jack stand and jockey wheel (b).





## DELIVERY

All Timberwolf TW 190TDHB machines have a full pre - delivery inspection before leaving the factory and are ready to use. Read and understand this instruction manual before attempting to operate the chipper. In particular, read pages 6-8 which contain important health and safety information and advice.

## OPERATOR'S PERSONAL PROTECTIVE EQUIPMENT REQUIRED

- CHAINSAW safety helmet fitted with visor and recommended ear defenders to an appropriate specification.
- HEAVY-DUTY gloves with elasticated wrist area.
- CLOSE - FITTING heavy-duty non-snag clothing.
- SAFETY footwear.
- FACE MASK (if appropriate).

See page 6 for more detailed information.

## MANUAL CONTROLS

Roller control box - is the control box above the feed opening of the chipper funnel. Its function is to control the feed rollers. The feed rollers draw material into the machine. **It does not control the main rotor.**

**RED SAFETY BAR** = This is the large red bar that surrounds the feed tray and side of the feed funnel. The bar is spring loaded and connected to a switch that will interrupt the power to the rollers. The switch is designed so that it only activates if the bar is pushed to the limit of its travel. The rollers stop instantly, but can be made to turn again by pressing either the **GREEN FEED** or **BLUE REVERSE** control buttons.

### RED SAFETY BAR TEST

To ensure the safety bar is always operational it must be activated once before each work session. The rollers will not function until the bar is activated. This procedure must be repeated each time the ignition is switched off.

## WARNING

DO NOT remove, jam, disable, bypass, override or otherwise impede the effectiveness of the red safety bar.

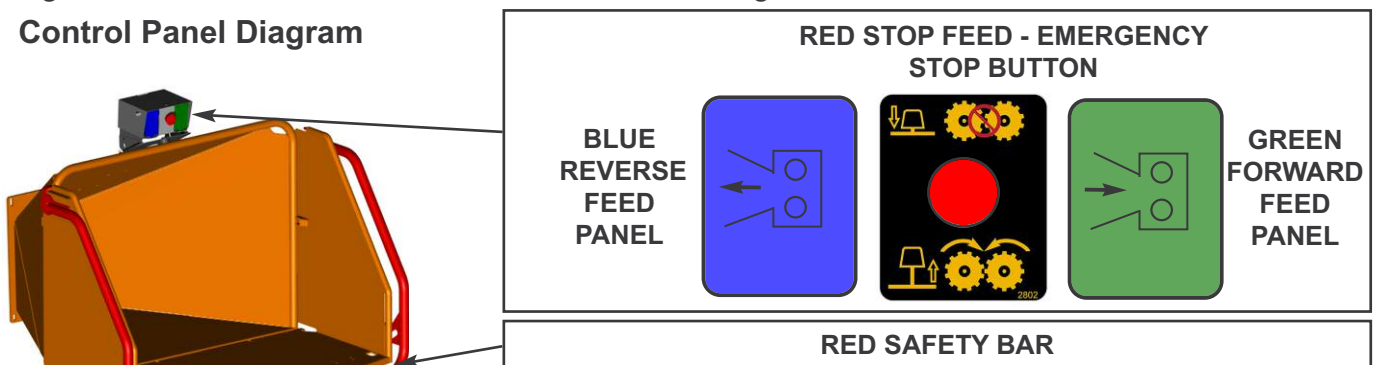


**GREEN BUTTON** = Forward feed - Push the button once - this activates the rollers and will allow you to start chipping (if the rotor speed is high enough).

**RED BUTTON** = Emergency stop - This button stops the rollers from feeding. It overrides all other buttons or bars and will not allow the other buttons to function until it has been reset. To reset, pull out until it returns to its original position. The forward and reverse buttons will now function.

**BLUE BUTTON** = Reverse feed - allows you to back material out of the rollers. The rollers will only turn in reverse as long as you keep pressing the button. You do not have to press the STOP button before pressing the GREEN FEED button to recommence feeding.

Control Panel Diagram



Do not rely on the red bar to keep the rollers stationary if it is necessary to clear or touch the rollers. Always switch off the machine and remove ignition key before approaching the rollers.



## AUTO CONTROLS

The engine management unit controls the feed rate of the material going into the chipping chamber. If the engine speed is below the predetermined level, the engine management unit will not allow the feed rollers to work in the forward “infeed” direction, until the rotor speed rises above the predetermined level. At this point, the feed rollers will start turning without warning. The reverse function will work at any engine speed.

## EMERGENCY STOPPING

There are two ways of stopping the TW 190TDHB (Turbo) chipper in the event of an emergency.

### STOPPING THE ROLLERS

-Activating the red safety bar will stop the rollers immediately. To restart the rollers, just push the green forward button or blue reverse button.

-Pushing the red Emergency button on the roller control box will also stop the rollers immediately. The button will stay in the “pushed in” position, and will require resetting (pulling out) before being able to restart the roller functions.

## ENGINE CONTROLS

The engine controls are in two locations. The engine ignition is on the control panel in the centre of the machine, and the throttle lever is on the bonnet (see parts locator on pg. 3).

## HYDRAULIC OIL LEVEL INDICATOR

This can be viewed through the wall of the tank. Maximum and minimum marks are provided.

## FUEL LEVEL INDICATOR

The fuel level can be seen through the wall of the fuel tank.

## DAILY CHECKS BEFORE STARTING

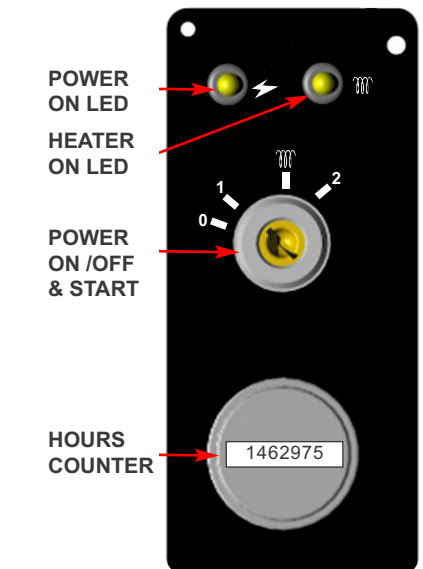
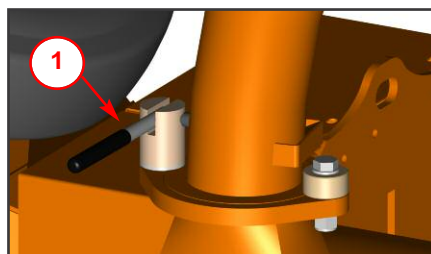
- LOCATE the machine on firm level ground.
  - CHECK machine is well supported and cannot move.
  - CHECK jack stand is lowered and secure.
  - CHECK all guards are fitted and secure.
  - CHECK the discharge unit is in place and fastened securely.
  - CHECK discharge tube is pointing in a safe direction.
  - CHECK the feed funnel to ensure no objects are inside.
  - CHECK feed tray is in up position - to prevent people reaching rollers.
  - CHECK controls as described on page 12.
  - CHECK (visually) for fluid leaks.
  - CHECK fuel and hydraulic oil levels.
- For parts location see diagrams on pages 4 & 5.*

## DISCHARGE CONTROLS

Controlling the discharge is an essential part of safe working.

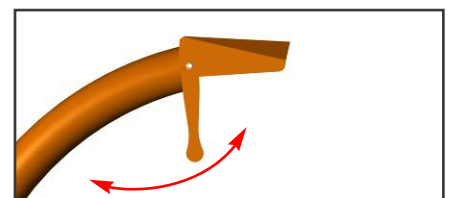
### ROTATION

1. Slacken nut using integral handle.
2. Rotate tube.
3. Retighten nut.



### BUCKET ANGLE

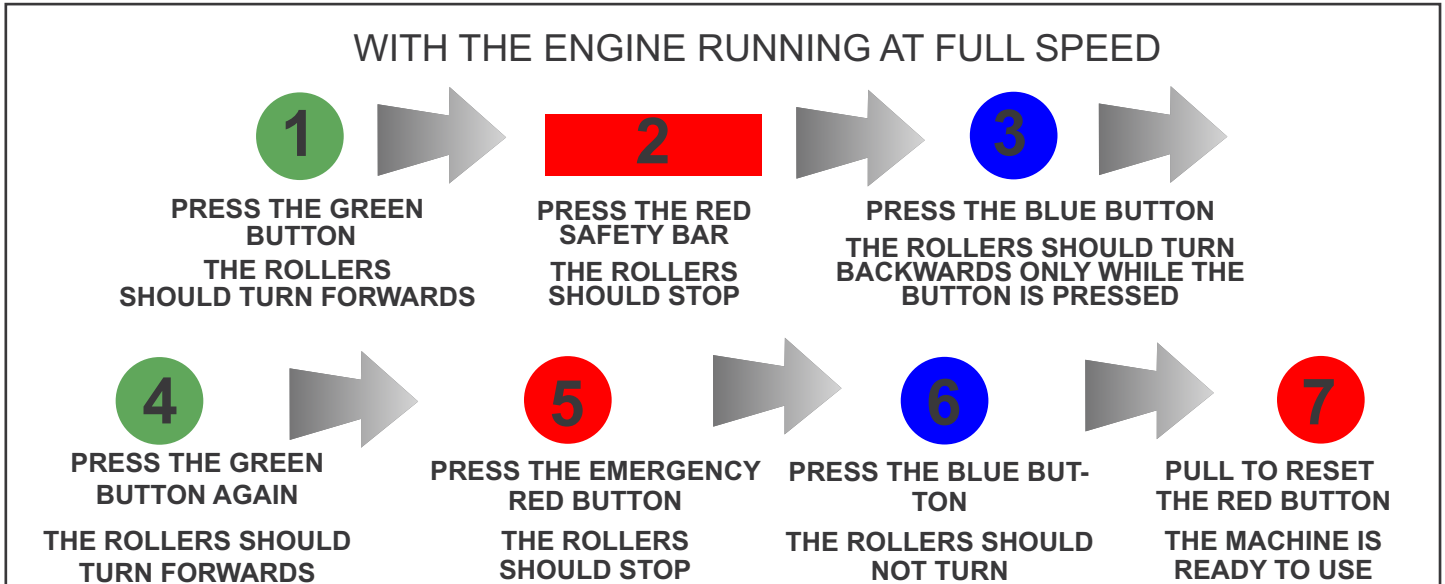
4. Adjust the bucket to the desired angle using the handle provided.





## BEFORE USING THE CHIPPER

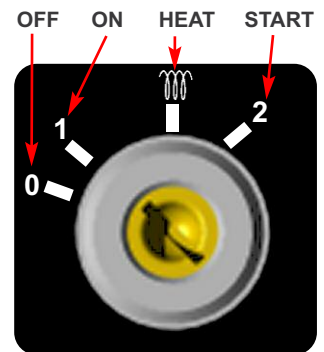
IT IS ESSENTIAL TO CARRY OUT THE FOLLOWING TESTS to check safety equipment - this sequence of tests will only take a few seconds to carry out. We recommend that these tests are carried out daily. Observing the function as described will confirm that the safety circuits are working correctly. This is also a good opportunity to remind all operators of the control and emergency stop systems.



## STARTING THE ENGINE

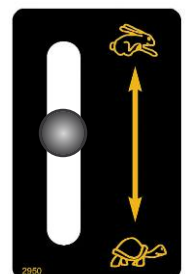
- ENSURE throttle lever is in the slow (tortoise) position.
- INSERT key. Turn to heat.
- HEATER LED comes on.
- WAIT FOR HEATER LED TO GO OUT.
- TURN key to engage starter motor.
- RELEASE key once engine starts.

*Do not engage starter motor for more than 20 seconds - allow one minute before attempting to start. Investigate reasons for failure to start.*



## CONTROLLING THE ENGINE SPEED

The engine has two throttle settings, idle and fast. These are controlled by the throttle lever on the bonnet. Moving the lever towards the 'Hare' on the pictogram will increase engine speed while moving it towards the 'Tortoise' will decrease engine speed.



## STOPPING THE ENGINE

- MOVE the throttle lever to the 'Tortoise' to reduce the engine speed to idle.
- LEAVE the engine running for 1 minute.
- TURN the power switch to position 0. The engine should stop after a few seconds.
- REMOVE the ignition key.

*For more detailed information refer to the Engine Owner's Manual*



## BLADE WEAR

The most important part of using a wood chipper is keeping the cutter blades sharp. Timberwolf chipper blades are hollow ground to an angle of 40 degrees. When performing daily blade checks ensure blade edge is sharp and free from chips, if there is any evidence of damage, or the edge is “dull” change the blade(s). The TW 190DHB is fitted with 2 blades 127mm (5") long. It is 100 mm wide when new. A new blade should chip for up to 25 hours before it requires sharpening. This figure will be drastically reduced by feeding the machine with stony, sandy or muddy material.

As the blade becomes blunt, performance is reduced. With increased stress and load on the machine the chips will become more irregular and stringy. At this point the blade should be sent to a reputable blade sharpening company. The blade can be sharpened several times in its life. A wear mark on the reverse side indicates the safe limit of blade wear. Replace when this line is exceeded.

The machine is also fitted with a static blade (anvil). It is important that the anvil is in good condition to allow the cutting blades to function efficiently. Performance will be poor, even with sharp cutter blades, if the anvil is worn.

## STARTING TO CHIP

### WARNING

Do not use or attempt to start the chipper without the protective guarding and discharge unit securely in place. Failure to do so may result in personal injury or loss of life.



- CHECK that the chipper is running smoothly.
- RELEASE the catches on the feed tray and lower. Pull to release the red stop button.
- PERFORM the “before using the chipper” tests (see page 12).
- PRESS the green control button. The rollers will commence turning.
- STAND to one side of the feed funnel.
- PROCEED to feed material into the feed funnel.

## CHIPPING

Wood up to the recommended diameter can be fed into the feed funnel. Put the butt end in first and engage it with the feed roller. The hydraulic feed rollers will pull the branch into the machine quite quickly. Large diameter material will have its feed rate automatically controlled by the engine management unit.

Sometimes a piece of wood that is a particularly awkward shape is too strong for the feed rollers to break. This will cause the top roller to either bounce up and down on the wood or both rollers to stall. If this occurs press the **BLUE REVERSE** button until the material has been released. Pull the material out of the feed funnel and trim it so the chipper can handle it.

Both feed rollers should always turn at the same speed. If one or both rollers stop or suddenly slow down it may be that a piece of wood has become stuck behind one of the rollers. If this occurs press the **BLUE REVERSE** button and hold for 2 seconds - then repress **GREEN FEED** button. This should enable the rollers to free the offending piece of material and continue rotation at the correct speed. If the rollers continue to stall in the 'forward feed' or 'reverse feed' position push the **RED STOP BUTTON**, turn engine off, remove ignition key and investigate.



## BLOCKAGES

Always be aware that what you are putting into the chipper must come out. If the chips stop coming out of the discharge tube but the chipper is taking material in - STOP IMMEDIATELY. Continuing to feed material into a blocked machine may cause damage and will make it difficult to clear.

*If the chipper becomes blocked proceed as follows:*

- STOP the engine and remove the keys.
- REMOVE the two rotor housing bolts.
- OPEN the rotor housing fully.
- THE material causing the blockage should fall clear.

### WARNING

Do not reach into the rotor housing with unprotected hands. There are sharp blades and any small movement of the rotor may cause serious injury.



- EMPTY loose debris from inside the rotor housing.
- CHECK that the discharge tube is clear before continuing.
- THE rotor housing does not have to be completely clear to continue.
- SHUT the rotor housing and replace both bolts securely.
- RESTART the engine.

ALLOW machine time to clear excess chips still remaining in rotor housing before you continue feeding brushwood. Feed in a small piece of wood while watching to make sure that it comes out of the discharge. If this does not clear it, repeat the process and carefully inspect the discharge tube to find any obstruction.

### NOTE

Continuing to feed the chipper with brushwood once it has become blocked will cause the chipper to compact the chips in the rotor housing and it will be difficult and time consuming to clear.

**AVOID THIS SITUATION - WATCH THE DISCHARGE TUBE AT ALL TIMES.**



**THE FOLLOWING PAGES DETAIL ONLY  
BASIC MAINTENANCE GUIDELINES SPECIFIC  
TO YOUR CHIPPER.**



**THIS IS NOT A WORKSHOP MANUAL.**

THE FOLLOWING GUIDELINES ARE NOT EXHAUSTIVE AND DO NOT EXTEND TO GENERALLY ACCEPTED STANDARDS OF ENGINEERING/MECHANICAL MAINTENANCE THAT SHOULD BE APPLIED TO ANY PIECE OF MECHANICAL EQUIPMENT AND THE CHASSIS TO WHICH IT IS MOUNTED.

AUTHORISED TIMBERWOLF SERVICE AGENTS ARE FULLY TRAINED IN ALL ASPECTS OF TOTAL SERVICE AND MAINTENANCE OF TIMBERWOLF WOOD CHIPPERS. YOU ARE STRONGLY ADVISED TO TAKE YOUR CHIPPER TO AN AUTHORISED AGENT FOR ALL BUT THE MOST ROUTINE MAINTENANCE AND CHECKS.

TIMBERWOLF ACCEPTS NO RESPONSIBILITY FOR THE FAILURE OF THE OWNER/USER OF TIMBERWOLF CHIPPERS TO RECOGNISE GENERALLY ACCEPTED STANDARDS OF ENGINEERING/MECHANICAL MAINTENANCE AND APPLY THEM THROUGHOUT THE MACHINE.

**THE FAILURE TO APPLY GENERALLY ACCEPTED  
STANDARDS OF MAINTENANCE, OR THE PERFORMANCE OF  
INAPPROPRIATE MAINTENANCE, MAY INVALIDATE  
WARRANTY IN WHOLE OR IN PART.**

**PLEASE REFER TO YOUR AUTHORISED  
TIMBERWOLF SERVICE AGENT FOR  
SERVICE AND MAINTENANCE.**







## SERVICE SCHEDULE

### WARNING

Always immobilise the machine by stopping the engine, removing the ignition key and disconnecting the battery before undertaking any maintenance work.



SERVICE SCHEDULE	Daily Check	50 Hours	100 Hours	500 Hours	1 Year
Check water.	✓				
Check radiator is clear.	✓				
Check engine oil - top up if necessary (10W-30).	✓				
Check for engine oil / hydraulic oil leaks.	✓				
Check fuel level.	✓				
Check feed funnel, feed roller cover, access covers, engine covers and discharge unit are securely fitted.	✓				
Check blades.	✓				
Clean air filter element.	<b>DEPENDING ON WORKING ENVIRONMENT</b>				
Check tyre pressure is 2.9 Bar (42 psi).	✓				
Check safety bar mechanism.	✓				
Check for tightness all nuts, bolts and fastenings making sure nothing has worked loose.		✓			
Grease discharge flange.		✓			
Check tension of main drive belts (and tension if necessary).		✓			
Grease the roller box slides.		✓	<b>OR AS REQUIRED - SEE PAGE 22</b>		
Grease the roller spline and bearing.		✓	<b>OR AS REQUIRED - SEE PAGE 22</b>		
Check anvils for wear.		✓			
Check fuel pipes and clamp bands.			✓		
Check battery electrolyte level.			✓		
Check for loose electrical wiring.			✓		
Grease jack stand.			✓		
Replace hydraulic oil filter - every year or 100 hours after service or repair work to the hydraulic system.			✓	OR	✓
Replace hydraulic oil.			✓	OR	✓
Replace fuel pipes and clamp bands.	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="text-align: center;"> <p><b>REFER TO YOUR ENGINE</b></p> <p><b>SUPPLIERS MANUAL</b></p> </div> </div>				
Check coolant.					
Change engine oil.					
Replace engine oil filter cartridge.					
Check valve clearance.					
Replace anvils when worn.	<b>RETURN TO DEALER FOR ANVIL CHANGE</b>				
Axle maintenance.	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="text-align: center;"> <p><b>REFER TO SUPPLIERS</b></p> <p><b>INSTRUCTION SHEET</b></p> </div> </div>				
Tow head maintenance.					

**NOTE:** Your Timberwolf woodchipper is covered by a full 12 months parts and labour warranty. Subject to correct maintenance and proper machine usage, the bearings are guaranteed for 12 months regardless of hours worked by the machine. In conditions of 'heavy usage' - i.e. in excess of 500 hours per year - it is recommended that the bearings are changed annually to ensure that the machine retains optimum working performance.



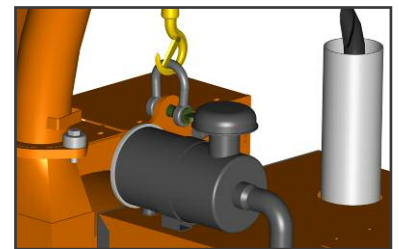
## SAFE MAINTENANCE

**ALWAYS IMMOBILISE THE ENGINE BEFORE UNDERTAKING ANY MAINTENANCE WORK ON THE CHIPPER BY REMOVING THE KEY AND DISCONNECTING THE BATTERY.**

- HANDLE blades with extreme caution to avoid injury. Gloves should always be worn when handling the cutter blades.
- THE drive belts should be connected while changing blades, as this will restrict sudden movement of the rotor.
- THE major components of this machine are heavy. Lifting equipment must be used for disassembly.
- CLEAN machines are safer and easier to service.
- AVOID contact with hydraulic oil.

## SAFE LIFTING OF THE CHIPPER

The lifting eye is designed to lift the machine's weight only. Do not use hoist hook directly on the lifting eye, use a correctly rated safety shackle. Inspect the lifting eye prior to each use - DO NOT USE LIFTING EYE IF DAMAGED.



## SPARES

Only fit genuine Timberwolf replacement blades, screws and chipper spares. Failure to do so will result in the invalidation of the warranty and may result in damage to the chipper, personal injury or even loss of life.

## BATTERY REMOVAL AND MAINTENANCE

### WARNING

Refer to the battery safety section on page 18-19.



### BATTERY MAINTENANCE

1. Undo the two M10 nuts on the battery cover.
2. Remove the battery cover.
3. The battery can be serviced in this position.

### BATTERY REMOVAL

1. Remove the negative battery lead.
2. Remove the positive battery lead.

When reinstalling the battery apply a small smear of Vaseline to the terminals.

## CHECK FITTINGS

The Timberwolf TW 190TDHB is subject to large vibrations during the normal course of operation. Consequently there is always a possibility that nuts and bolts will work themselves loose. It is important that periodic checks are made to ensure the security of all fasteners. Fasteners should be tightened using a torque wrench to the required torque (see below). **Uncalibrated torque wrenches can be inaccurate by as much as 25%. It is therefore essential that a calibrated torque wrench is used to achieve the tightening torques listed below.**

	Size	Pitch	Head	Torque lbs.ft
Blade Bolts	M16	Fine	24 mm Hex	125
Anvil Retaining Bolts	M12	Standard	10 mm Allen Key	65
Rotor Main Shaft Retaining Screws	M12	Standard	10 mm Allen Key	65
Rotor Stub Shaft Retaining Screws	M10	Fine	8 mm Allen Key	45
Large Rotor Shaft Retaining Nut	M39	Nut	60 mm Hex	450
General	M8	Standard	13 mm Hex	20
General	M10	Standard	17 mm Hex	45
General	M12	Standard	19 mm Hex	65
Drain Bung in Fuel Tank	3/8" BSP	-	22 mm Hex	25
Fuel Take-off in Fuel Tank	3/4" BSP	-	32 mm Hex	40



## COPPER EASE SAFETY INFORMATION

**Product name: Copper Ease.**

Copper Ease contains no hazardous ingredients at or above regulatory disclosure limits, however, safety precautions should be taken when handling (use of oil-resistant gloves and safety glasses are recommended - respiratory protection is not required). Avoid direct contact with the substance and store in a cool, well ventilated area avoiding sources of ignition, strong oxidising agents and strong acids. Dispose of as normal industrial waste (be aware of the possible existence of regional or national regulations regarding disposal), do not discharge into drains or rivers.

**In case of fire:** in combustion the product emits toxic fumes, extinguish with alcohol or polymer foam, carbon dioxide or dry chemical powder. Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

### FIRST AID

**Skin contact:** there may be mild irritation at the site of contact, wash immediately with plenty of soap and water.

**Eye contact:** there may be irritation and redness, bathe the eye with running water for 15 minutes.

**Ingestion:** there may be irritation of the throat, do not induce vomiting, wash out mouth with water.

A safety data sheet for this product can be obtained by writing to the manufacturer at the following address: Comma Oil and Chemicals Ltd., Deering Way, Gravesend, Kent DA12 2QX. Tel: 01474 564311, Fax: 01474 333000.

## BATTERY SAFETY INFORMATION

### WARNING NOTES AND SAFETY REGULATIONS FOR FILLED LEAD-ACID BATTERIES



For safety reasons, wear eye protection when handling a battery.



Keep children away from acid and batteries.



Fires, sparks, naked flames and smoking are prohibited.  
-Avoid causing sparks when dealing with cables and electrical equipment, and beware of electrostatic discharges.  
-Avoid short circuits.



Explosion hazard:  
-A highly explosive oxyhydrogen gas mixture is produced when batteries are charged.



Corrosive hazard:  
-Battery acid is highly corrosive, therefore:  
-Wear protective gloves and eye protection.  
-Do not tilt the battery, acid may escape from the vent openings.



First aid:  
-Rinse off acid splashed in the eyes immediately for several minutes with clear water! Then consult a doctor immediately.  
-Neutralise acid splashes on the skin or clothes immediately with acid neutraliser (soda) or soap suds, and rinse with plenty of water.  
-If acid is swallowed, consult a doctor immediately.

*Warning notes: The battery case can become brittle, to avoid this:*



-Do not store batteries in direct sunlight.  
-Discharged batteries may freeze up, therefore store in an area free from frost.



Disposal:

-Dispose of old batteries at an authorised collection point.  
-The notes listed under item 1 are to be followed for transport.  
-Never dispose of old batteries in household waste.





## BATTERY SAFETY INFORMATION...cont.

### 1. Storage and transport

- Batteries are filled with acid.
- Always store and transport batteries upright and prevent from tilting so that no acid can escape.
- Store in a cool and dry place.
- Do not remove the protective cap from the positive terminal.
- Run a FIFO (first in-first out) warehouse management system.

### 2. Initial operation

- The batteries are filled with acid at a density of 1.28g/ml during the manufacturing process and are ready for use.
- Recharge in case of insufficient starting power (cf. section 4).

### 3. Installation in the vehicle and removal from the vehicle

- Switch off the engine and all electrical equipment.
- When removing, disconnect the negative terminal first.
- Avoid short circuits caused by tools, for example.
- Remove any foreign body from the battery tray, and clamp battery tightly after installation.
- Clean the terminals and clamps, and lubricate slightly with battery grease.
- When installing, first connect the positive terminal, and check the terminal clamps for tight fit.
- After having fitted the battery in the vehicle, remove the protective cap from the positive terminal, and place it on the terminal of the replaced battery in order to prevent short circuits and possible sparks.
- Use parts from the replaced battery, such as the terminal covers, elbows, vent pipe connection and terminal holders (where applicable); use available or supplied filler caps.
- Leave at least one vent open, otherwise there is a danger of explosion. This also applies when old batteries are returned.

### 4. Charging

- Remove the battery from the vehicle; disconnect the lead of the negative terminal first.
- Ensure good ventilation.
- Use suitable direct current chargers only.
- Connect the positive terminal of the battery to

the positive output of the charger. Connect the negative terminal accordingly.

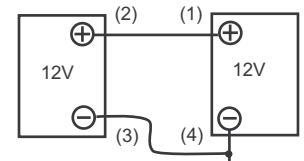
- Switch on the charger only after the battery has been connected, and switch off the charger first after charging has been completed.
- Charging current-recommendation: 1/10 ampere of the battery capacity Ah.
- Use a charger with a constant charging voltage of 14.4V for re-charging.
- If the acid temperature rises above 55° Celsius, stop charging.
- The battery is fully charged when the charging voltage has stopped rising for two hours.

### 5. Maintenance

- Keep the battery clean and dry.
- Use a moist anti-static cloth only to wipe the battery, otherwise there is a danger of explosion.
- Do not open the battery.
- Recharge in case of insufficient starting power (cf. section 4).

### 6. Jump Starting

- Use the standardised jumper cable in compliance with DIN 72553 only, and follow the operating instructions.
- Use batteries of the same nominal voltage only.
- Switch off the engines of both vehicles.
- First connect the two positive terminals (1) and (2), then connect the negative terminal of the charged battery (3) to a metal part (4) of the vehicle requiring assistance away from the battery.
- Start the engine of the vehicle providing assistance, then start the engine of the vehicle requiring assistance for a maximum of 15 seconds.
- Disconnect the cables in reverse sequence (4-3-2-1).



### 7. Taking the battery out of service

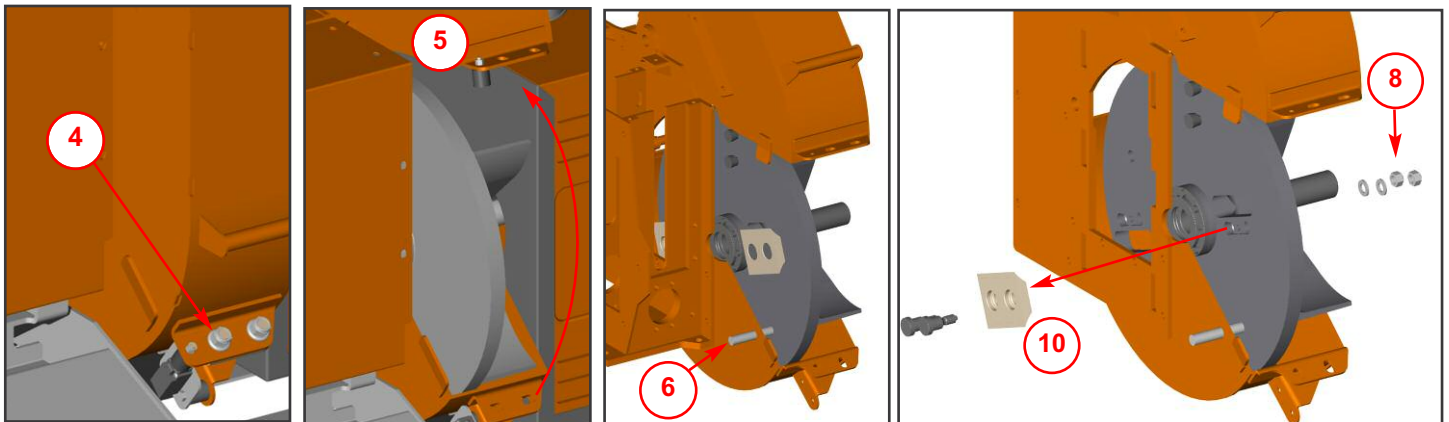
- Charge the battery; store in a cool place or in the vehicle with the negative terminal disconnected.
- Check the battery state of charge at regular intervals, and correct by recharging when necessary (cf. section 4).



## CHANGE BLADES

### WARNING

Wear riggers gloves for the blade changing operation.



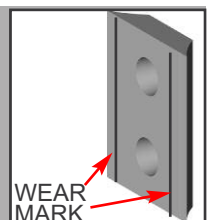
**THIS PROCEDURE SHOULD ONLY BE UNDERTAKEN WITH THE DISCHARGE IN PLACE.**

1. Turn off the chipper and remove the key.
2. Remove the negative battery lead.
3. Turn the discharge tube to point across the machine.
4. Use a 24mm socket with extension bar to remove the two M16 nuts clamping the rotor housing shut.
5. Carefully lift the rotor housing until it rests on its stop.
6. Using the fan blades turn the rotor to blade change position as shown and insert the locking bar through the rotor housing and rotor.
7. Brush away all dirt and debris from the rotor and blades.
8. With a 24mm spanner/socket undo the two nyloc nuts that are holding the blade in place.
9. Grasp the blade by the flat edges while wearing heavy duty gloves.
10. Withdraw the blade from the rotor.
11. If the blades are being rotated and not replaced, do not remove the blade bolts.
12. If the blades are to be renewed, place the blade on a flat surface and tap the top of the blade bolts with a hammer. The bolts are designed for this. They should loosen from the blade. Withdraw them completely.
13. Clean the back surface of the blade, blade bolts and blade area of the rotor before reseating blades. **The blades must not have any material underneath them when tightened. If they are not flat and tight they will become loose quickly.**
14. Reassemble the blades, bolts, washers and nuts in the order shown in the diagram above. Use only genuine Timberwolf nuts and washers, as they are of a higher grade than normally stocked at fastener factories. Failure to use the appropriate grade nuts or washers may result in damage, injury or death. The use of genuine Timberwolf blades and bolts is recommended.
15. Apply a smear of anti seize compound (copper ease) to the bolt threads and back face of the nuts. Do not apply copper grease onto the counter bore faces of the blades or bolts.
16. **A calibrated torque wrench must be used to tighten the bolts to a torque setting of 125 lbs ft (170 Nm).**
18. Remove the locking bar, rotate rotor to the next blade then repeat steps 8-16.
19. Slowly lower the rotor housing to its original position.
20. Refit the two M16 nuts and tighten to 60 lbs ft (80Nm).
21. Re-attach battery lead.

### WARNING



Always sharpen blades on a regular basis. Failure to do so will cause the machine to under perform and will overload engine and bearings causing machine breakdown. Blades must not be sharpened beyond the wear mark (see diagram). Failure to comply with this could result in machine damage, injury or loss of life.

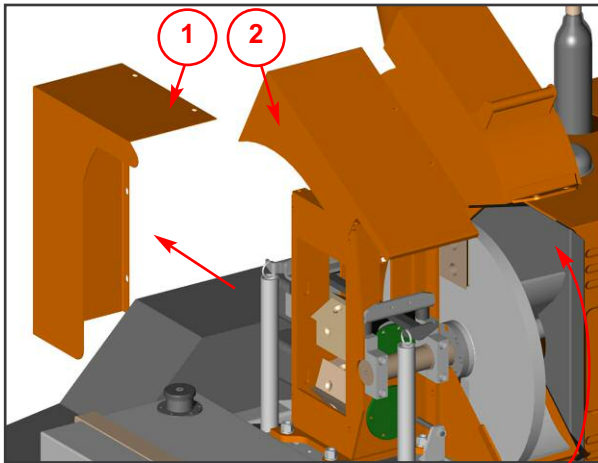




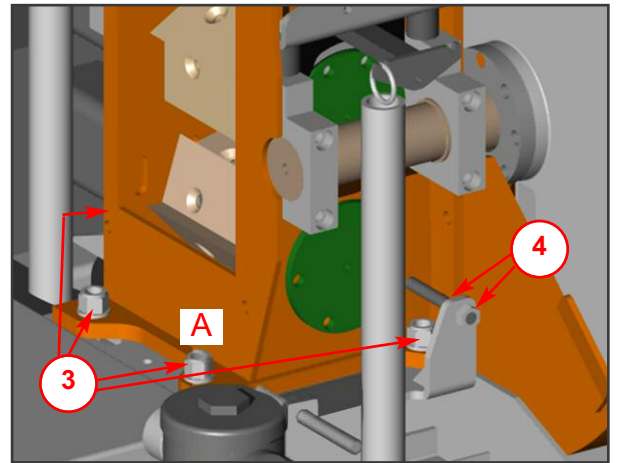
## TENSION DRIVE BELTS

**NOTE:** There will normally be a rapid drop in tension during run-in period for new belts. When new belts are fitted, check the tension every 2 - 3 hours and adjust until the tension remains constant.

*Belt failures due to lack of correct tensioning will not be covered under your Timberwolf warranty.*



1. Remove the near side roller box guard.
2. Open the rotor housing.
3. Slacken the four 24 mm nuts that retain the roller box (bolt is retained underneath).
4. Slacken the lock nuts on the belt tension bracket.
5. Turn appropriate lock nut to move roller box in desired direction. Take care to keep roller box square. Slightly tighten nut A (see diagram) when tension is near desired amount. Continue to tension belts until correct tension is achieved.



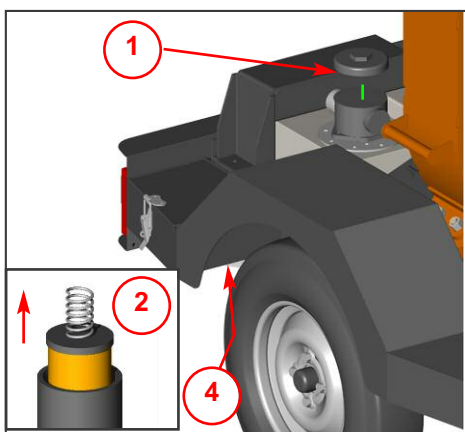
6. When the belt tension is correct tighten the four 24 mm roller box retaining nuts.
7. Tighten the lock nuts.
8. Grease the roller box slides and rollers.
9. Close the rotor housing and fasten securely.
10. Refit the near side roller box guard.

**For instructions on checking belt tension & correct belt tension values, please refer to the Timberwolf V-Belt Tensioning Data Table at the end of the manual.**

## CHANGE HYDRAULIC OIL AND FILTER

### WARNING

Use plastic gloves to keep oil off skin and dispose of the used oil and filter in an ecologically sound way. The oil and filter should be changed once a year or at any time it becomes contaminated. Before starting check that the chipper is standing level and brush away loose chips.



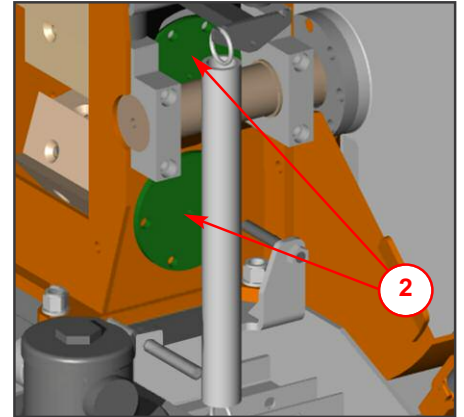
1. Remove the black screw cap from the top of the filter housing.
2. Partially remove filter element from inner cup. Leave filter to drain for 15 minutes.
3. Remove filter element from cup when clear of hydraulic oil.
4. Remove drain plug and drain oil into a suitable container.
5. Replace drain plug.
6. Refill with VG 32 hydraulic oil until the level is between the min and max lines marked on the tank (about 40 litres).
7. Refit the filter cup, install a new filter element and refit the black screw cap, to the filter housing, ensuring o-ring remains in place.



## GREASE THE ROLLER SPLINE AND BEARING

**NOTE:** This should be done regularly. In dirty and dusty conditions or during periods of hard work it should be weekly. If the bearings and splines are allowed to run dry premature wear will occur resulting in a breakdown and the need for replacement parts. This failure is not warranty. Early signs of insufficient grease includes squeaking or knocking rollers.

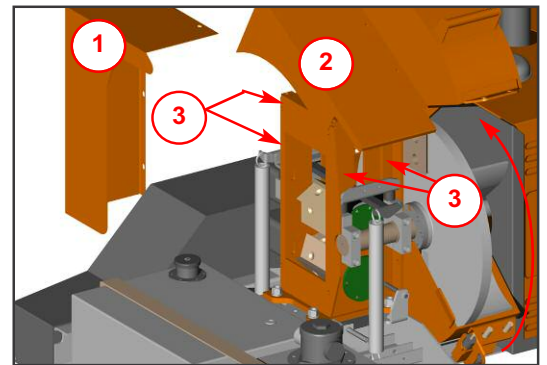
1. Open the rotor housing.
2. Locate two grease nipples; one in the centre of each roller shaft.
3. Use a pump action grease gun to apply a generous amount of grease to each roller drive. **DO NOT USE GRAPHITE BASED GREASE.**
4. Close the rotor housing.
5. To penetrate all the bearing surfaces thoroughly, start the machine and operate the rollers for 20 seconds. Switch off the machine. Repeat this greasing/running procedure a further 3 times.



## GREASE THE ROLLER BOX SLIDES

**NOTE:** This should be done every 50 hours. In dirty or dusty conditions or during periods of hard work it should be done more frequently. If the slides become dry the top roller will tend to hang up and the pulling-in power of the rollers will be much reduced. Excessive wear will ensue.

1. Remove the near side roller box guard.
2. Open the rotor housing.
3. Apply multipurpose grease directly to the slide surfaces indicated. **DO NOT USE GRAPHITE BASED GREASE.**
4. Close the rotor housing.
5. Refit the near side roller box guard.

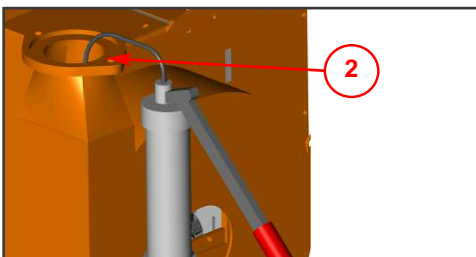


## GREASE THE JACK STAND

The jack stand requires intermittent greasing to maintain a smooth operation.

1. Brush off dirt with a stiff brush.
2. Apply grease liberally to screw thread using a brush.
3. Wind mechanism up and down a couple of times to ensure grease has covered all surfaces.

## GREASE THE DISCHARGE FLANGE



1. Remove the discharge tube.
2. Apply multipurpose grease to surface shown.
3. Refit discharge tube.



## GREASING ROTOR BEARINGS

Both front and rear bearings are sealed and do not need greasing.

## ENGINE SERVICING

All engine servicing must be performed in accordance with the Engine Manufacturer's Handbook provided with the machine. **FAILURE TO ADHERE TO THIS MAY INVALIDATE WARRANTY AND/OR SHORTEN ENGINE LIFE.**

## CHECK HOSES

All the hydraulic hoses should be regularly inspected for chafing and leaks. The hydraulic system is pressurized to 150 Bar (2175 PSI) and thus the equipment containing it must be kept in good condition.

Identify the hoses that run to the top motor. These have the highest chance of damage as they are constantly moving. If any hydraulic components are changed new seals should be installed during reassembly. Fittings should then be retightened.





## **ENTEC INDUSTRIES LTD 12 MONTH CHIPPER WARRANTY**

### **WARRANTY PERIOD**

The warranty period for the woodchipper commences on the date of sale to the first end user and continues for a period of 12 months. This guarantee is to the first end user only and is not transferable except when an authorised Timberwolf Dealer has a woodchipper registered with Entec Industries Ltd as a hire chipper or long term demonstrator – in these situations they are duly authorised to transfer any remaining warranty period to their first end user. Any warranty offered by the Timberwolf Dealer beyond the original 12 month period will be wholly covered by said Dealer.

### **LIABILITY**

Our obligation under this warranty is limited to repair at Entec Industries Ltd premises or at our option an Entec Industries Ltd approved Timberwolf dealer. No liability will be accepted for special, indirect, incidental, or consequential loss or damages of any kind.

### **WARRANTY STATEMENT**

Entec Industries Ltd warrants to the first end user that;

- Your woodchipper shall be designed, built and equipped, at the point of sale, to meet all current applicable regulations.
- Your chipper shall be free from manufacturing defects both in materials and workmanship in normal service for the period mentioned above.

Warranty will not apply to a failure where normal use has exhausted the life of a component.

Engine units are covered independently by their respective manufacturer warranties.

### **OWNERS WARRANTY RESPONSIBILITIES**

As the owner of an Entec Industries Ltd woodchipper you are responsible for the following;

- Operation of the woodchipper in accordance with the Entec Industries Ltd instruction manual.
- Performance of the required maintenance listed in your Entec Industries Ltd instruction manual.
- In the event of a failure the Entec Industries Ltd authorised Timberwolf dealer is to be notified within 10 days of failure and the equipment is to be made available for unmolested inspection by the dealer technician.

### **WARRANTY RESTRICTIONS**

The Entec Industries Ltd warranty is restricted to the first end user only and is not transferable except when an authorised Timberwolf Dealer has a woodchipper registered with Entec Industries Ltd as a hire chipper or long term demonstrator – in these situations they are duly authorised to transfer any remaining warranty period to their first end user.

The Entec Industries Ltd warranty may be invalidated if any of the following apply;

- The failed parts or assembly is interfered with in any way.
- Normal maintenance has not been performed.
- Incorrect reassembly of components.
- The machine has undergone modifications not approved in writing by Entec Industries Ltd.
- In the case of tractor driven equipment, use has been on an unapproved tractor.
- Conditions of use can be deemed abnormal.
- The machine has been used to perform tasks contrary to those stated in the Entec Industries Ltd instruction manual.

### **WARRANTY SERVICE**

To obtain warranty service please contact your nearest Entec Industries Ltd approved Timberwolf dealer. To obtain details of the nearest facility please contact Entec Industries Ltd at the address on the back of this manual. These warranty terms are in addition to and not in substitution for and do not affect any right and remedies which an owner might have under statute or at common law against the seller of the goods under the contract by which the owner acquired the goods.



# CERTIFICATE OF CONFORMITY

## Environmental Manufacturing LLP

Entec House,  
Tomo Industrial Estate,  
Stowmarket,  
Suffolk IP14 5AY

Tel: 01449 765800 Fax: 01449 765801

### E C Declaration of Conformity



Environmental Manufacturing LLP as the designer and manufacturer, certifies that the machine stipulated below complies with all the relevant provisions of the:


### Machinery Directive; 2006/42/EC ( & other relevant directives )

and the National Laws and Regulations adopting these directives.

<b>Designer/Manufacturer</b>	:	Environmental Manufacturing LLP
<b>Description of Machinery</b>	:	Self-powered portable machine intended to chip up tree waste prior to disposal.
<b>Model</b>	:	TW 190TDHB & TDHBA
<b>Serial No.</b>	:	<i>Serial Manufacture</i>

BSI Transposed Harmonised Standards applied: (including parts/clauses of):



BS EN 12100-1: 2010 Safety of Machinery- Basic concepts, BS EN 13857-1: 2008 Safety of Machinery-Safety distances to danger zones, BS EN 60204-1: 2006 +A1 2009 Safe electrical practices, BS EN 13732-1:2008 Safety of Machinery – Temperatures of touchable surfaces, BS EN 13849-1: 2008 – Safety of Machinery – Safety related parts of control systems, BS13850:2008 safety of Machinery Emergency stop BS EN 982: 1996 + A1 2005 – Safety of Machinery – Hydraulics, BS EN 1088: 1995 + A2 2008 – Safety of Machinery – Interlocking devices, BS EN 13525: 2005 + A2 2009 – Forestry Machinery – Wood chippers – Safety. BS EN 953:1997+A1:2009

“Responsible” Person empowered to sign:  Mr. Jeff Haines  
Position in Company: Technical Director

Date: 31 July 2014



# IDENTIFICATION PLATE

		<b>TIMBERWOLF</b> ENVIRONMENTAL MANUFACTURING LLP Entec House, Tomo Industrial Estate, Stowmarket, Suffolk IP14 5AY - UK	
MODEL			
SERIAL NO.			
CARR. TYP/SN.		GROSS WEIGHT	
NOM. PWR		DATE	
			<b>ENVIRONMENTAL MANUFACTURING LLP</b>
			KG
			0 - KG
			1 - KG
			2 - KG



Decal	Description	Decal	Description
<p>616</p>	Hot exhaust	<p>2440</p>	Danger - beware of sharp blades when the rotor housing is open.
<p>617</p>	High velocity discharge - keep clear	<p>2800</p> <p>2801</p>	Reverse feed Forward feed
<p>670</p> <p>4099</p>	Personal Protective Equipment required  Danger. Rotating blades. Keep hands and feet out.	<p>2802</p>	Push to stop, Pull to reset.
<p>1661</p>	Read the instruction manual for greasing and maintenance information	<p>1258</p>	Warning. Failure to maintain brake adjustment will result in damper failure. No warranty liability will be accepted on this item.
<p>1662</p>	The instruction manual with this machine contains important operating, maintenance and health and safety information. Failure to follow the information contained in the instruction manual may lead to death or serious injury.	<p>2949</p>	<b>Lifting eye is designed to lift the machine's weight only.</b> Do not use hoist hook directly on lifting eye. Use correctly rated safety shackle only through lifting eye. Lifting eye to be inspected every 6 months or before each use. Always visually inspect lifting eye prior to each use. Do not use lifting eye if damaged.
<p>3022</p>	Clean under blades before refitting or turning.  Failure to do so may result in blade(s) coming loose and damage being caused to the rotor housing.	<p>18393</p>	New drive belts need re-tensioning. When new belts are fitted check tension every 2-3 hours & adjust until tension remains constant.



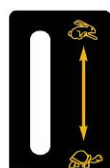
Decal	Description	Decal	Description
 P637	Danger. Do not operate without this cover in place.	 P653	Danger. Rotating blades inside. Stop engine and remove key before removing discharge unit.
 P652	Caution. Do not put road sweepings in machine as grit will damage blades.	 P654	Caution. When transporting, discharge clamps may work loose. Check frequently.
 P655	Caution. Avoid standing directly in front of feed funnel to reduce exposure to noise, dust and risk from ejected particles.	 P656	Danger. Do not use this machine without the discharge unit fitted. Failure to comply may result in serious injury or damage.
 P650	Danger. Autofeed system fitted. Rollers may turn without warning! When the engine is switched off the rollers will turn during the run down period.	 P1811   P1810	Engine safety Forward latch
 1399   P691	Push to stop  Do not pull here.	 19517	Warning. Do not engage starter motor for more than 20 seconds. Allow one minute before attempting to start. Investigate reasons for failure to start. Excessive cranking will result in starter motor failure. This will not be covered under warranty.



2998



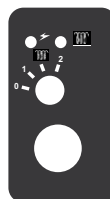
3004



2950



1363



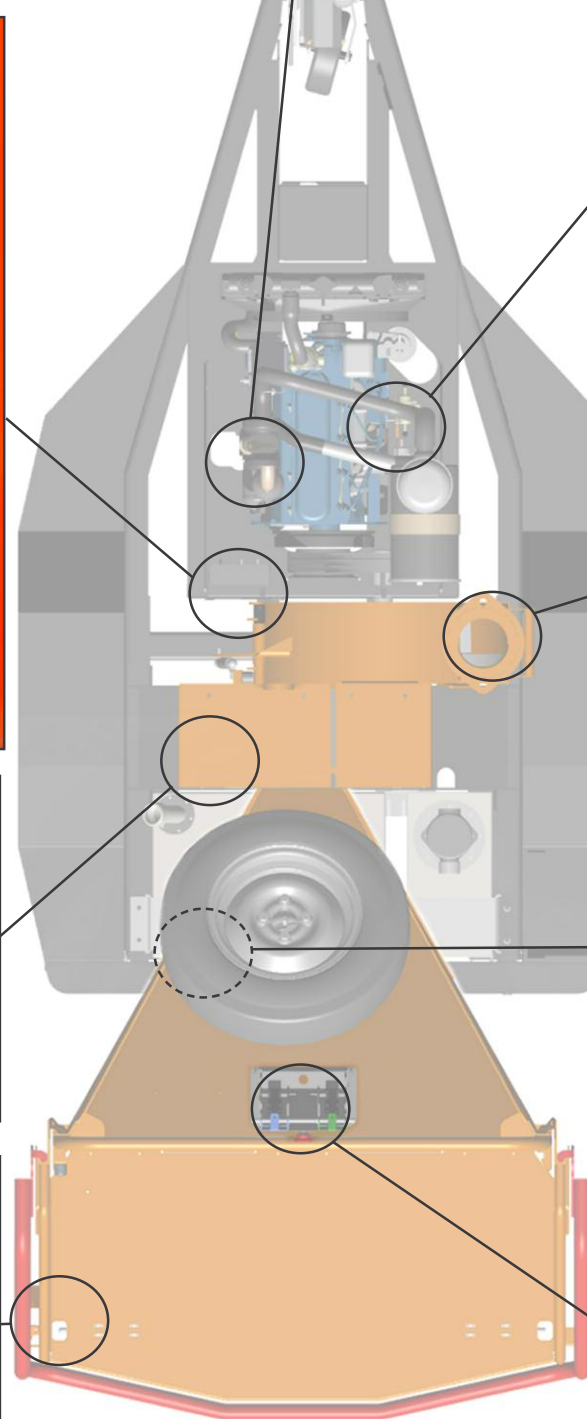
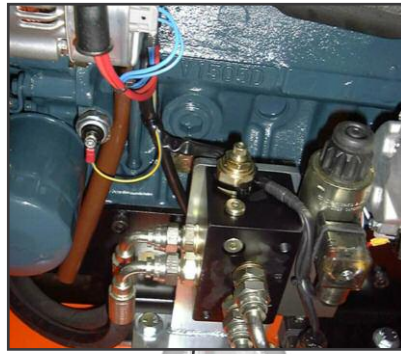
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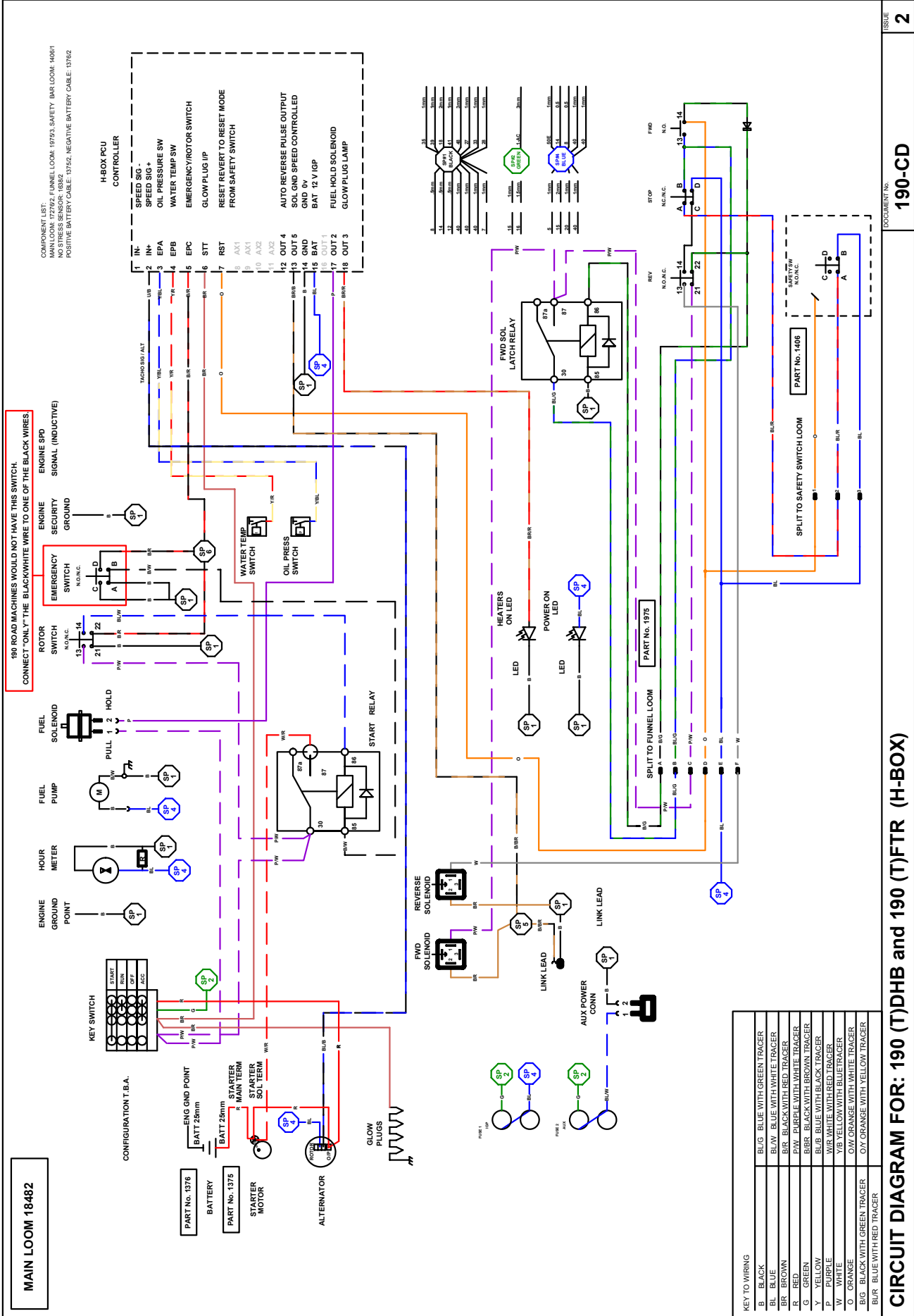
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TIMBERWOLF  
TW 190TDHB

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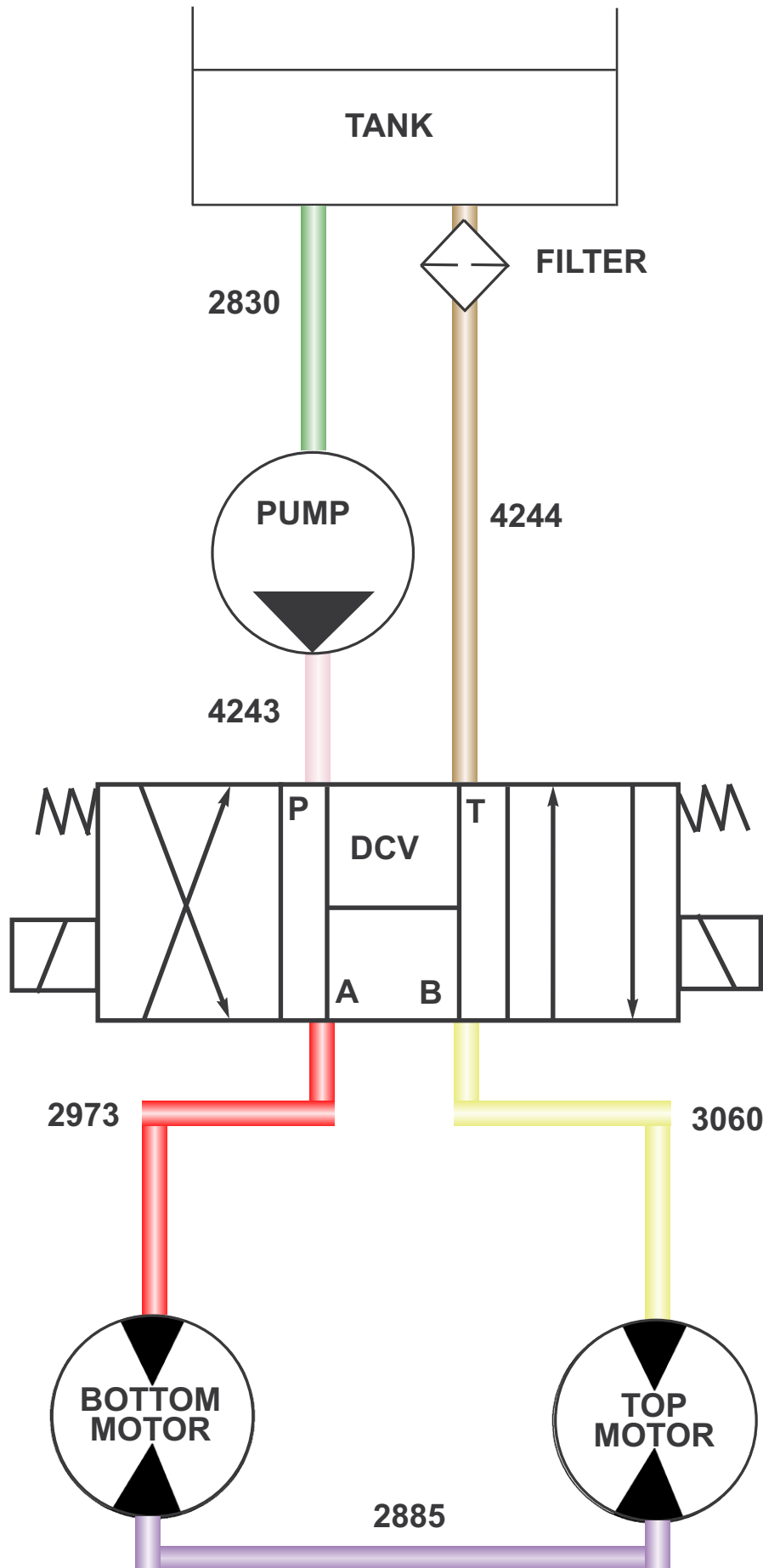


Date Last Modified: 19th Sept 05





KIT NO: 4245







# PARTS LISTS

*The following illustrations are for parts identification only. The removal or fitting of these parts may cause a hazard and should only be carried out by trained personnel.*

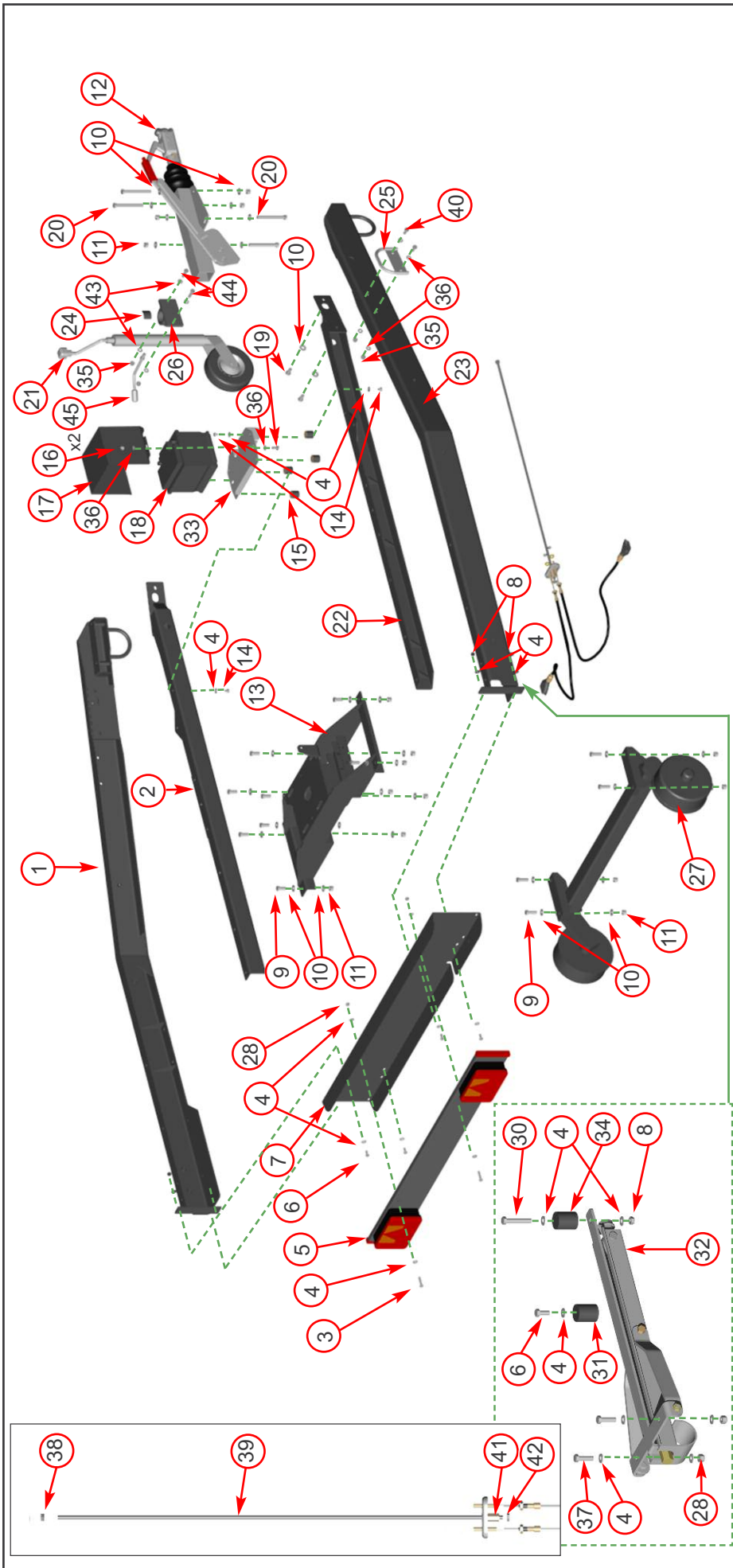
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CONTROL BOX	37
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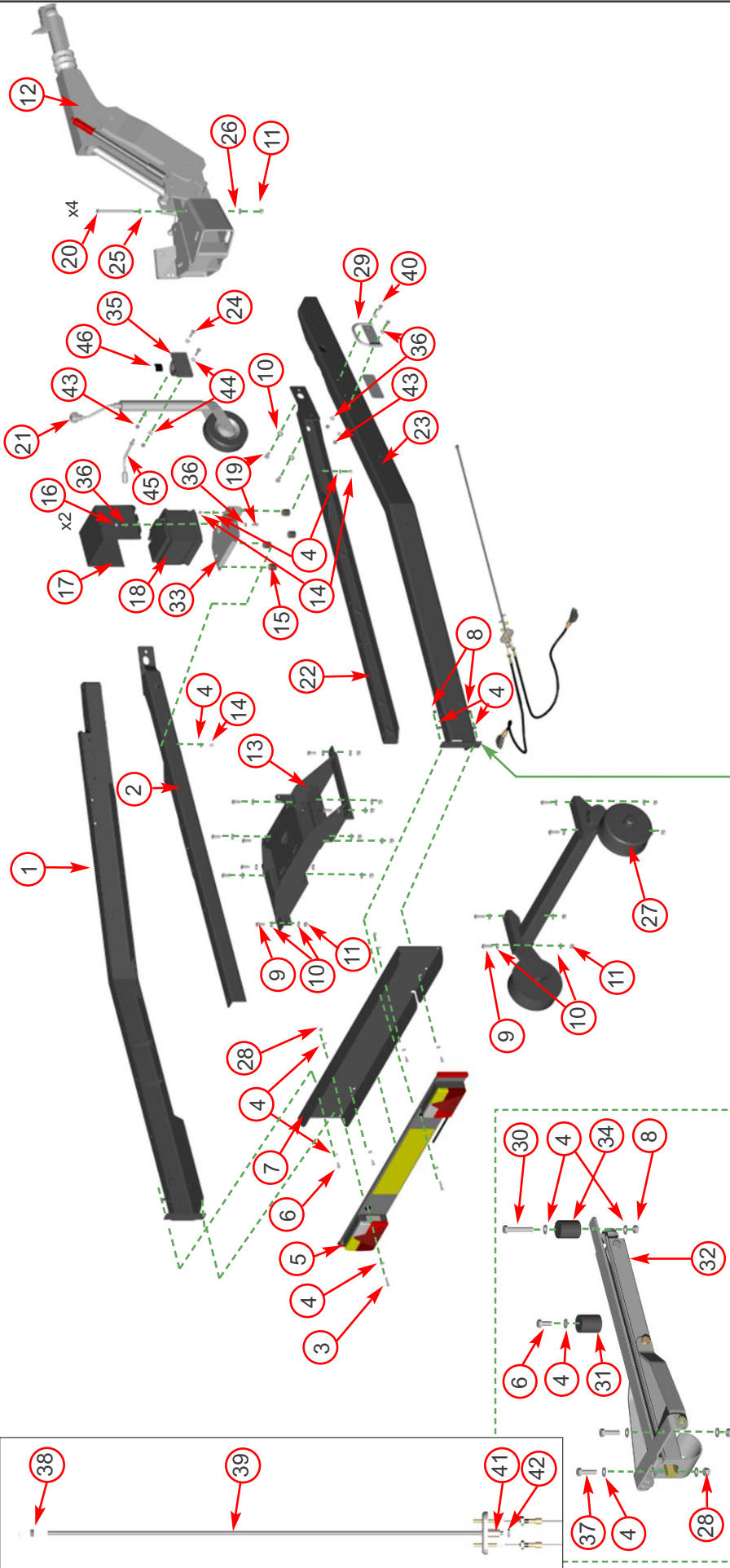
# CHASSIS (FIXED TOWHEAD)



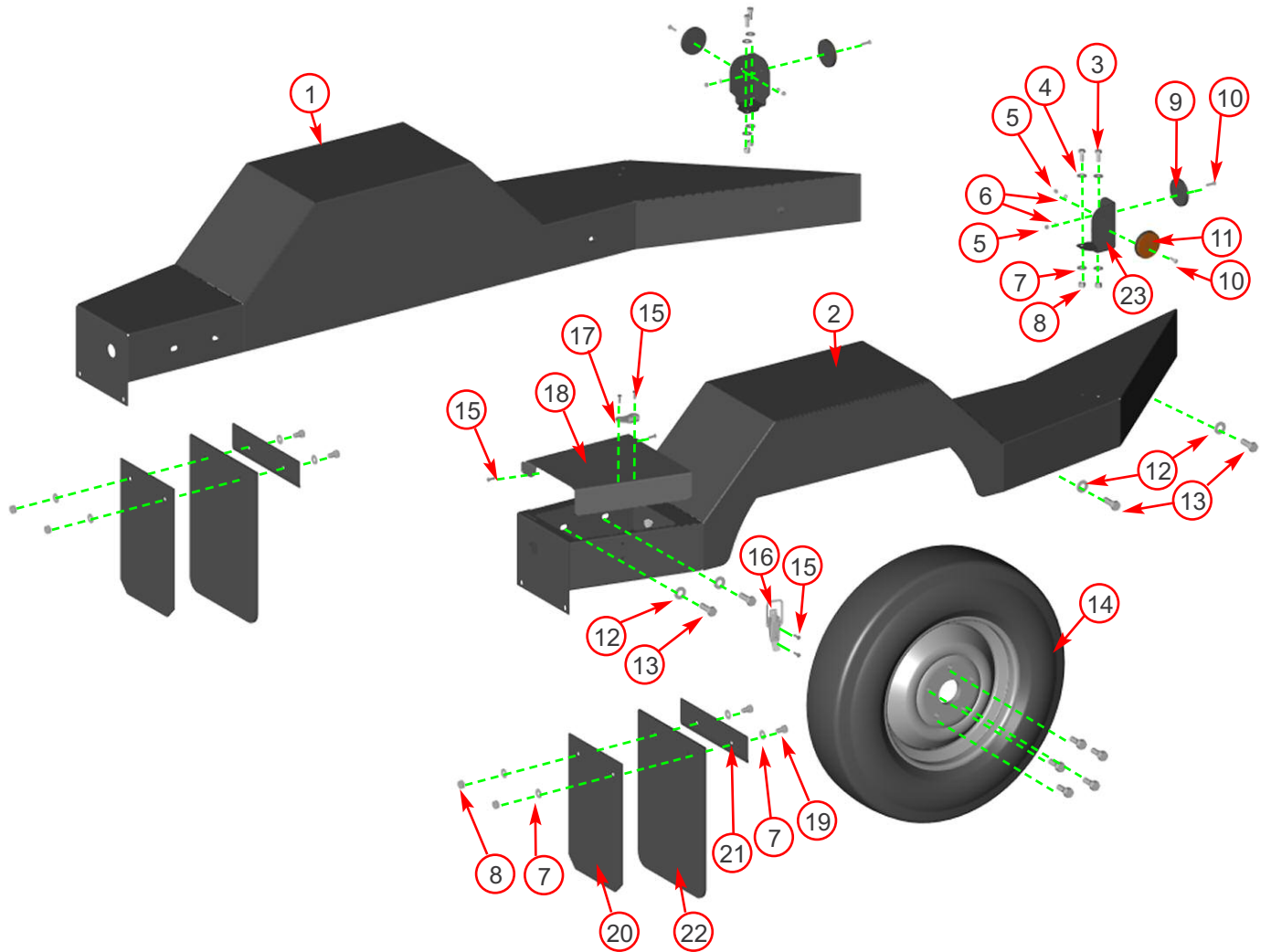
TIMBERWOLF  
TW 190TDHB



Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	19075FB	Outer Chassis Beam N/S	1	17	18036FB	Battery Cover	1	33	18035FS	Battery Support Bracket	1
2	17475FB	Inner Chassis Beam N/S	1	18	4210	Battery	1	34	1683M	Plain Stand Off	1
3	0352	M8/40 Bolt	2	19	0360	M10/25 Bolt	6	35	4345	M10 P Nyloc Nut	6
4	0712	M8 C Washer	24	20	0313	M12/100	4	36	0839	M10 C Washer	10
5	19619	Lightboard	1	21	17478	Jockey Wheel	1	37	0350	M8/25 Bolt	2
6	0346	M8/20 Bolt	5	22	17474FB	Inner Chassis Beam O/S	1	38	1036	M10 Brake Adjuster Nut	1
7	19074FB	Lightboard Bracket	1	23	19076FB	Outer Chassis Beam O/S	1	39	1054	Brake Rod	1
8	0481	M8 T Nyloc Nut	3	24	P*1402	Pressure Pad	1	40	0382	M10/30 Bolt	4
9	0429	M12/35 Bolt	12	25	3043FS	Outer Beam Handle	2	41	079F	Nut Ball	1
10	0704	M12 C Washer	40	26	P*1400	Jockey Wheel Clamp	1	42	1501	M10 Plain 1/2 Nut	1
11	0644	M12 P Nyloc Nut	12	27	17494	Axle	1	43	0701	M10 A Washer	4
12	17493	Tow Head	1	28	0479	M8 P Nyloc Nut	4	44	1252	M10/50 Bolt	2
13	1830FB	Cross Beam	1	29	0878	M10/20 Bolt	4	45	P*1399	Clamp Handle	1
14	18037	M8/12 Bolt	8	30	0354	M8/60 Bolt	1				
15	1644	AV Mount	4	31	1682	Threaded Stand Off	1				
16	0052	M10 T Nyloc Nut	2	32	2633	Wind Down Jack Stand	1				

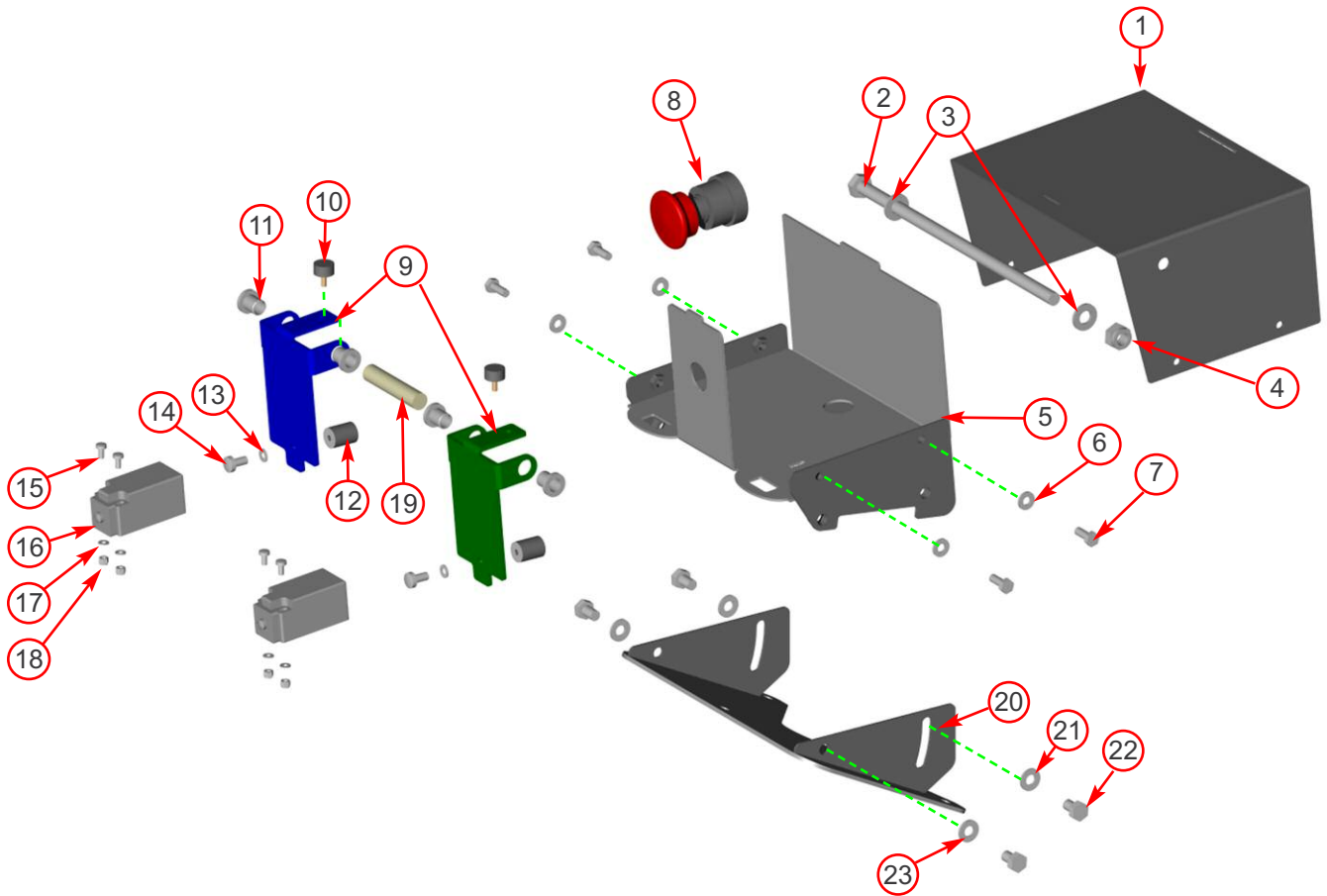


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	19571FB	Outer Chassis Beam N/S	1	17	18036FB	Battery Cover	1	33	18035FS	Battery Support Bracket	1
2	17475FB	Inner Chassis Beam N/S	1	18	4210	Battery	1	34	1683M	Plain Stand Off	1
3	0352	M8/40 Bolt	2	19	0360	M10/25 Bolt	6	35	P*1400	Jockey Wheel Clamp	1
4	0712	M8 C Washer	24	20	1518	M12/130	4	36	0839	M10 C Washer	6
5	19619	Lightboard	1	21	17478	Jockey Wheel	1	37	0350	M8/25 Bolt	2
6	0346	M8/20 Bolt	5	22	17474FB	Inner Chassis Beam O/S	1	38	1036	M10 Brake Adjuster Nut	1
7	19074FB	Lightboard Bracket	1	23	19572FB	Outer Chassis Beam O/S	1	39	19585	Brake Rod	1
8	0481	M8 T Nyloc Nut	3	24	1252	M10/50 Bolt	2	40	0382	M10/30 Bolt	4
9	0429	M12/35 Bolt	12	25	0415	Heavy Washer	4	41	079F	Nut Ball	1
10	0704	M12 C Washer	34	26	0702	M12 A Washer	4	42	1501	M10 Plain 1/2 Nut	1
11	0644	M12 P Nyloc Nut	12	27	17494	Axle	1	43	4345	M10 P Nyloc Nut	6
12	19583	Tow Head	1	28	0479	M8 P Nyloc Nut	4	44	0701	M10 A Washer	4
13	1830FB	Cross Beam	1	29	3043FS	Outer Beam Handle	2	45	P*1399	Clamp Handle	1
14	18037	M8/12 Bolt	8	30	0354	M8/60 Bolt	1	46	P*1402	Pressure Pad	1
15	1644	AV Mount	4	31	1682	Threaded Stand Off	1				
16	0052	M10 T Nyloc Nut	2	32	2633	Wind Down Jack Stand	1				

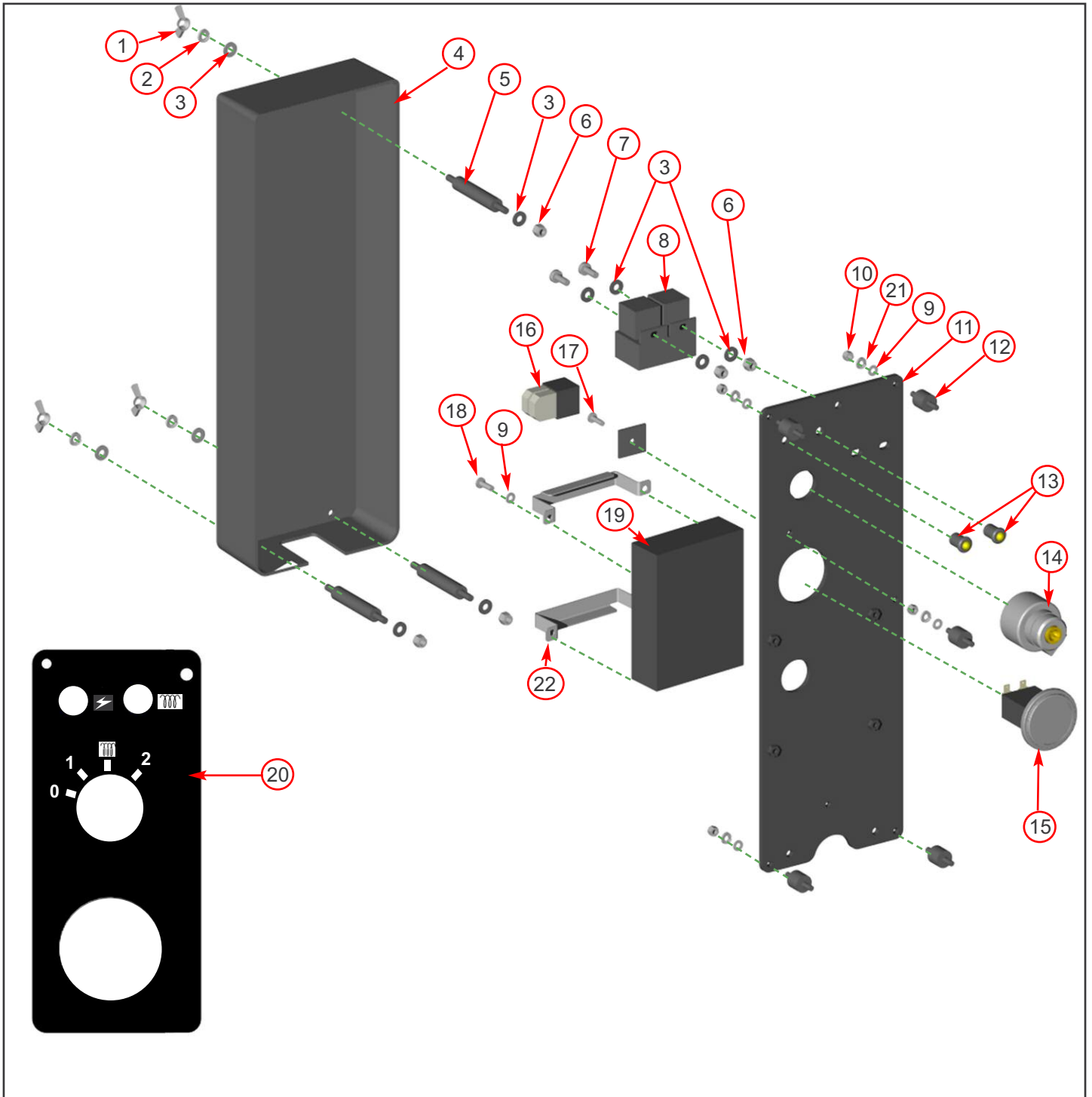


Item	Part No	Part Name	Q'ty
1	19077FB	Nearside Mudguard	1
2	19078F	Offside Mudguard	1
3	0346	M8/20 Bolt	4
4	0711	M8 A Washer	4
5	0236	M5 P Nyloc Nut	4
6	0857	M5 A Washer	4
7	0712	M8 C Washer	12
8	0481	M8 P Nyloc Nut	8
9	18922	Reflector Clear	2
10	0856	M5/20 Pan Pozi	4
11	18923	Reflector Amber	1
12	0839	M10 C Washer	8

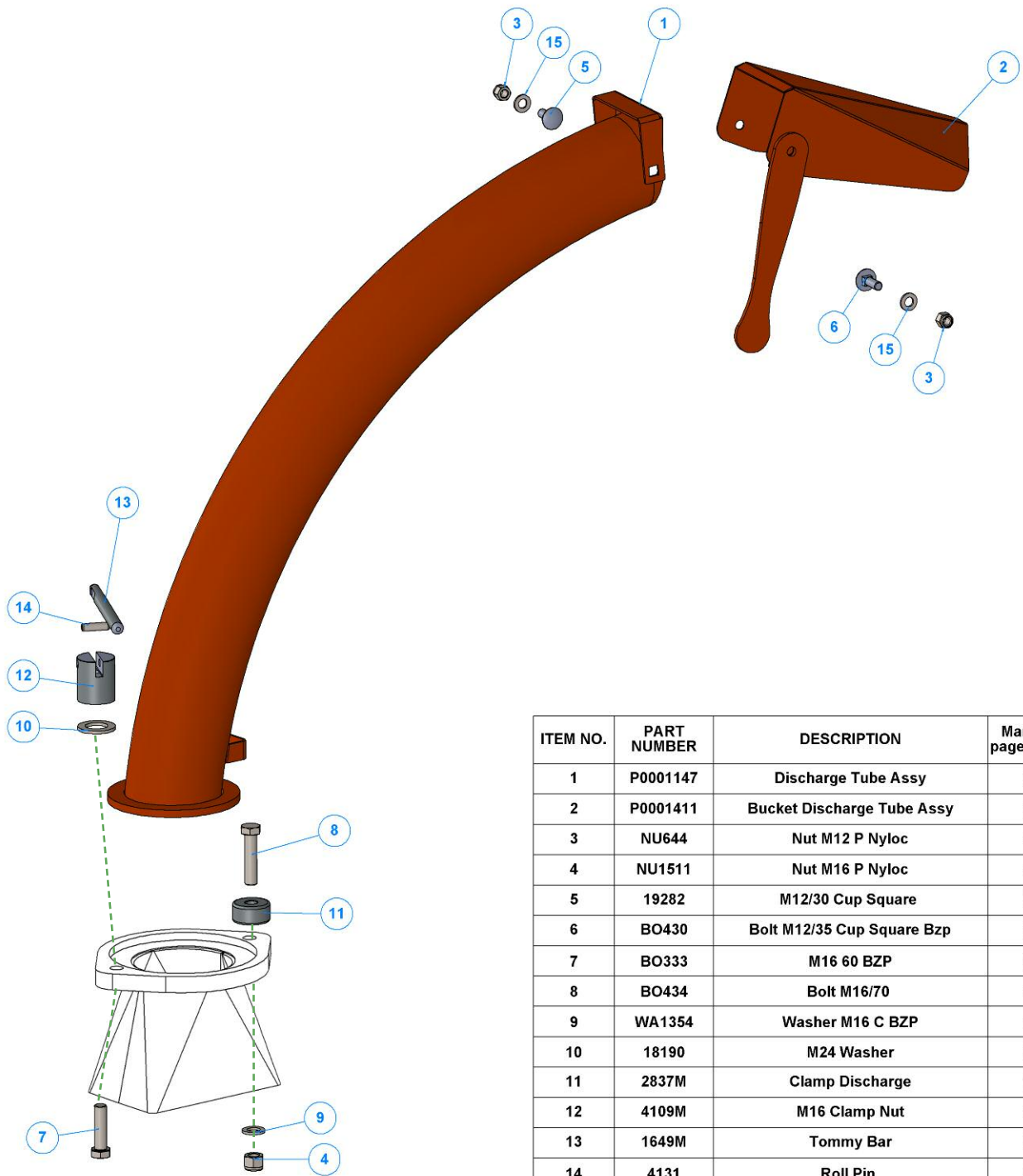
Item	Part No	Part Name	Q'ty
13	0360	M10/25 Bolt	8
14	1932	Wheel (inc. spare)	3
15	0067	Pop Rivet	6
16	2963	Catch	1
17	0358	Catch Plate	1
18	17522FB	Tool Box Lid	1
19	0351	M8/30 Bolt	4
20	19625	Rainflap Supports	2
21	19626	Rainflap Clamp	2
22	19603	Rainflap	2
23	18919	Reflector Support Bracket	2



Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	2794FB	Control Box Cover	1	13	0857	M5 A Washer	2
2	2803	M10/240 Bolt	1	14	18103	M5/8 Pan Pozi	2
3	0839	M10 C Washer	2	15	18168	M4/35 Pan Pozi	4
4	4345	M10 P Nyloc Nut	1	16	1348	Limit Switch	2
5	2795FB	Control Box Base	1	17	18100	M4 Washer	6
6	0709	M6 C Washer	4	18	18235	M4 P Nyloc Nut	6
7	1658	M6/12 Bolt	4	19	made in production	65mm Spacer	1
8	2853	Stop Switch	1	20	2793FB	Bracket Mounting Control Box	1
9	2796FS	Finger Plate	2	21	0712	M8 C Washer	2
10	2834	AV Mount	2	22	0344	M8/16 Bolt	4
11	2804	Bush M10 Top Hat	4	23	0711	M8 A Washer	2
12	2807	AV Mount 20 x 16	2				

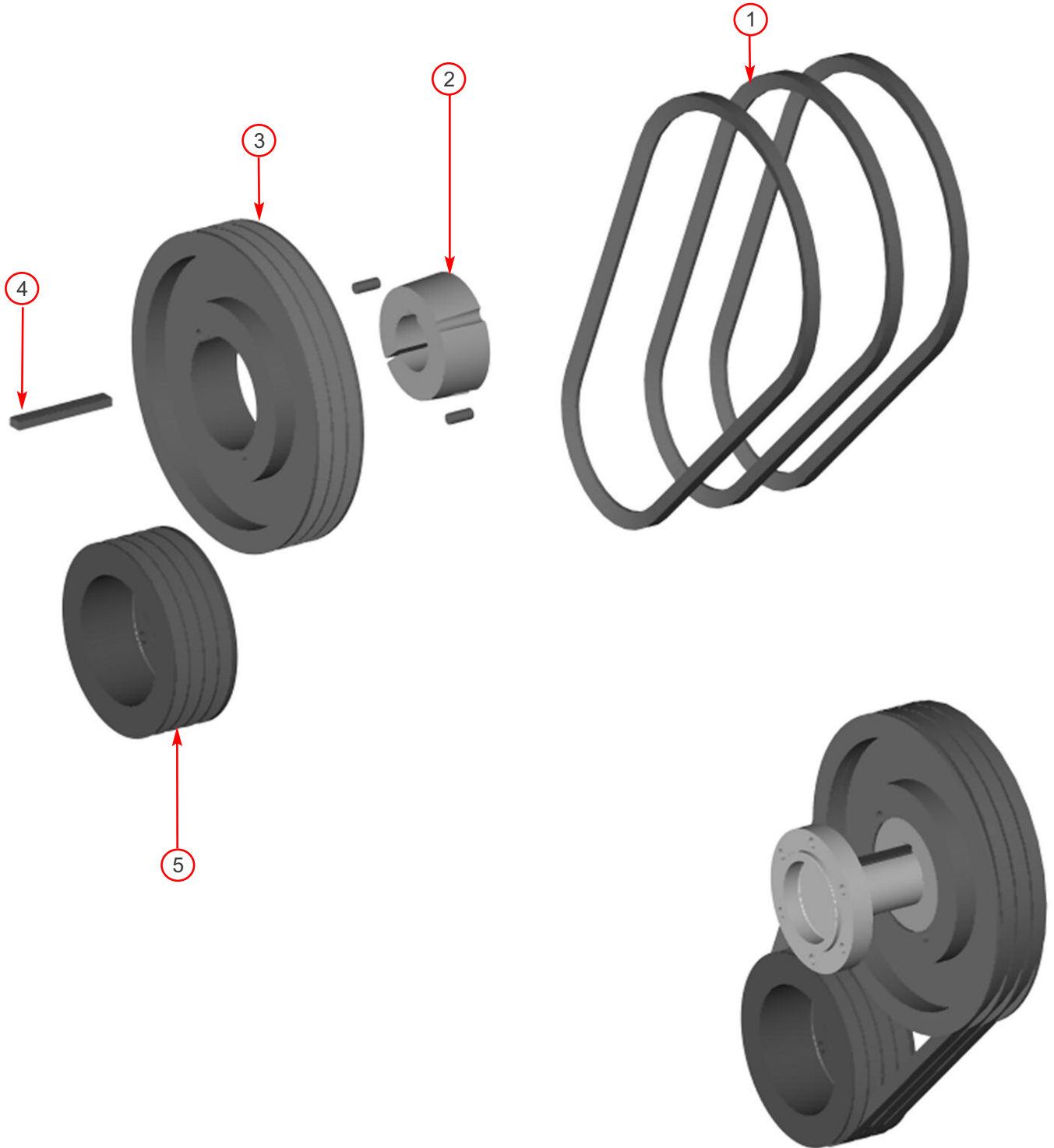


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	18107	M6 Wing Nut	3	12	4033	M5 AV Mount	5
2	18106	M6 Split Washer	3	13	Supp'd with loom	LED	2
3	0709	M6 C Washer	11	14	Supp'd with engine	Ignition Switch	1
4	1972	Electrical Cover	1	15	0327	Hours Counter	1
5	2725	Electrical Cover Stand Off	3	16	Supp'd with loom	Fuse	2
6	0391	M6 T Nyloc Nut	5	17	1151	Countersunk Pop Rivet	1
7	0438	M6/16 Pan Pozi	3	18	0435	M5/16 Pan Pozi	4
8	Supp'd with loom	Relay	2	19	18405	H-Box	1
9	0857	M5 A Washer	9	20	2951	Control Panel Decal	1
10	0236	M5 P Nyloc Nut	5	21	3024	M5 Spring Washer	5
11	2958FS	Electrical Panel	1	22	18398	Mounting Bracket	2

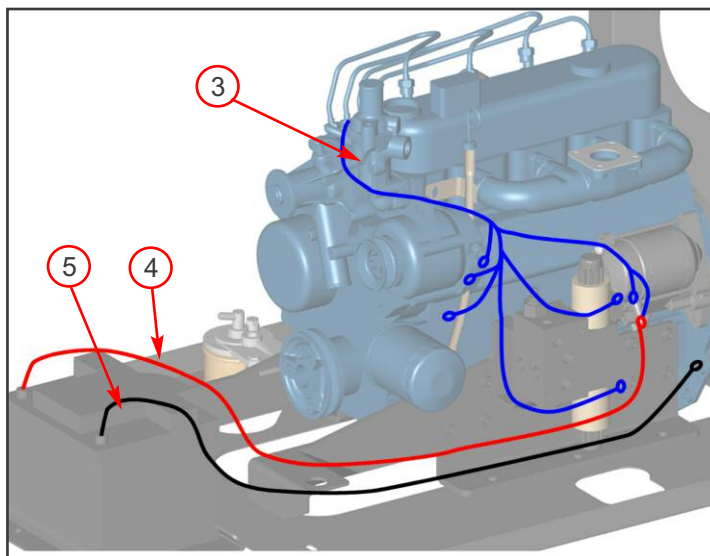
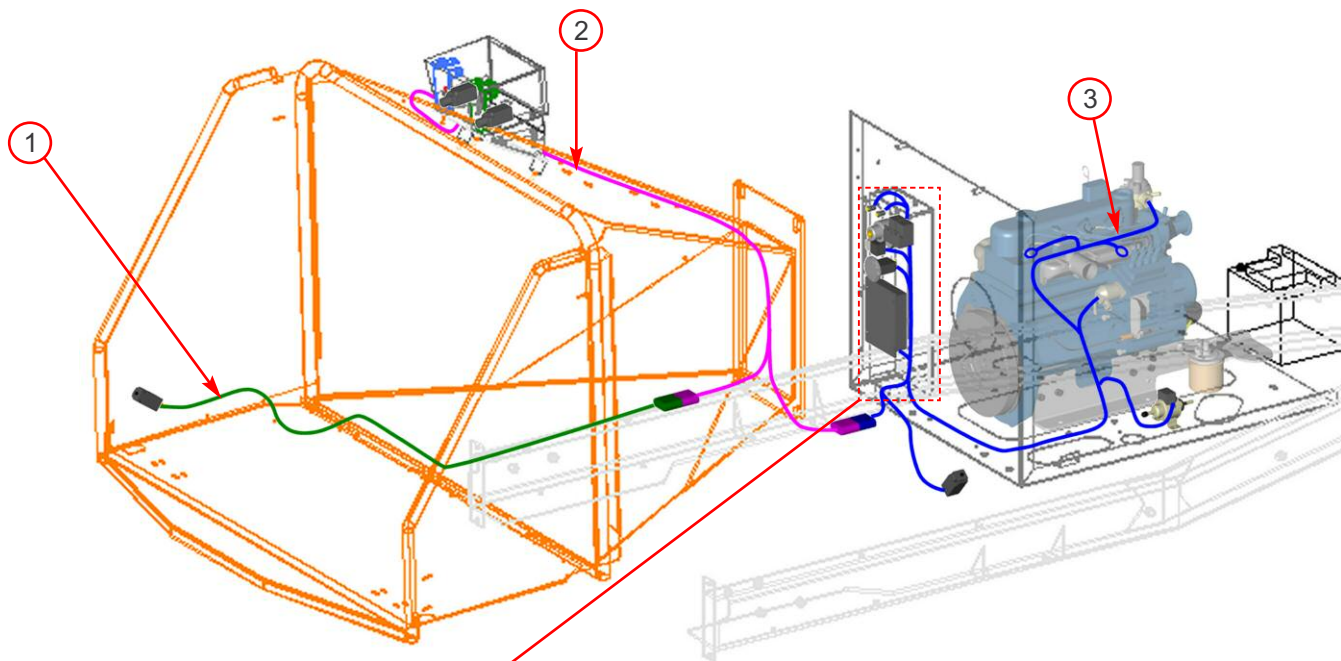


ITEM NO.	PART NUMBER	DESCRIPTION	Manual page/QTY.
1	P0001147	Discharge Tube Assy	1
2	P0001411	Bucket Discharge Tube Assy	1
3	NU644	Nut M12 P Nyloc	2
4	NU1511	Nut M16 P Nyloc	1
5	19282	M12/30 Cup Square	1
6	BO430	Bolt M12/35 Cup Square Bzp	1
7	BO333	M16 60 BZP	1
8	BO434	Bolt M16/70	1
9	WA1354	Washer M16 C BZP	1
10	18190	M24 Washer	1
11	2837M	Clamp Discharge	1
12	4109M	M16 Clamp Nut	1
13	1649M	Tommy Bar	1
14	4131	Roll Pin	1
15	WA702	Washer M12 A BZP	2

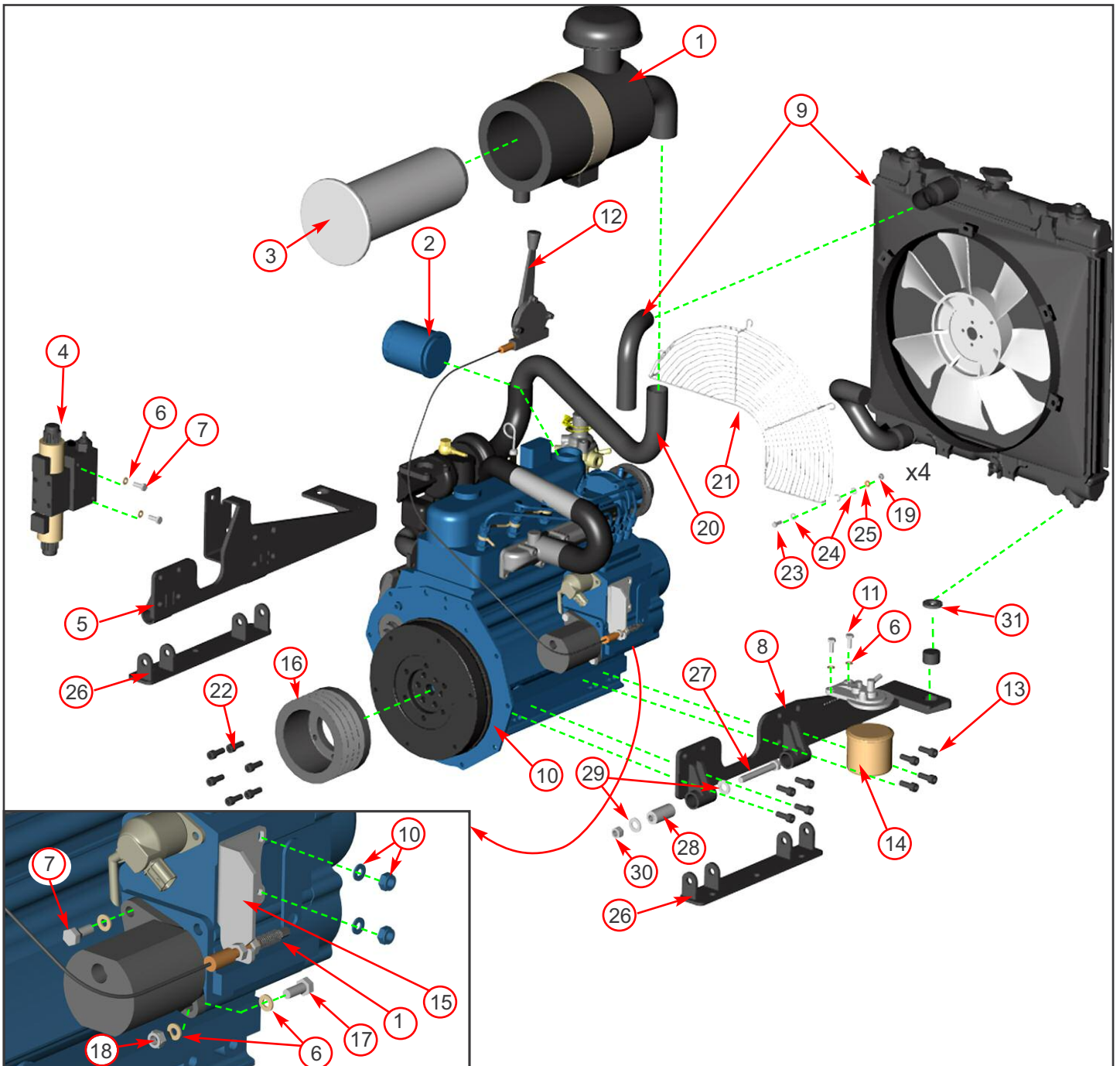




Item	Part No	Part Name	Q'ty
1	17322	Vee Belt 1232 SPA	3
2	4327	Taper Lock Bush 2517 50 mm	1
3	17321	Pulley 280 x 3	1
4	2984M	Key 54 x 14 x 9	1
5	17314	Pulley Engine 168 x 4	1

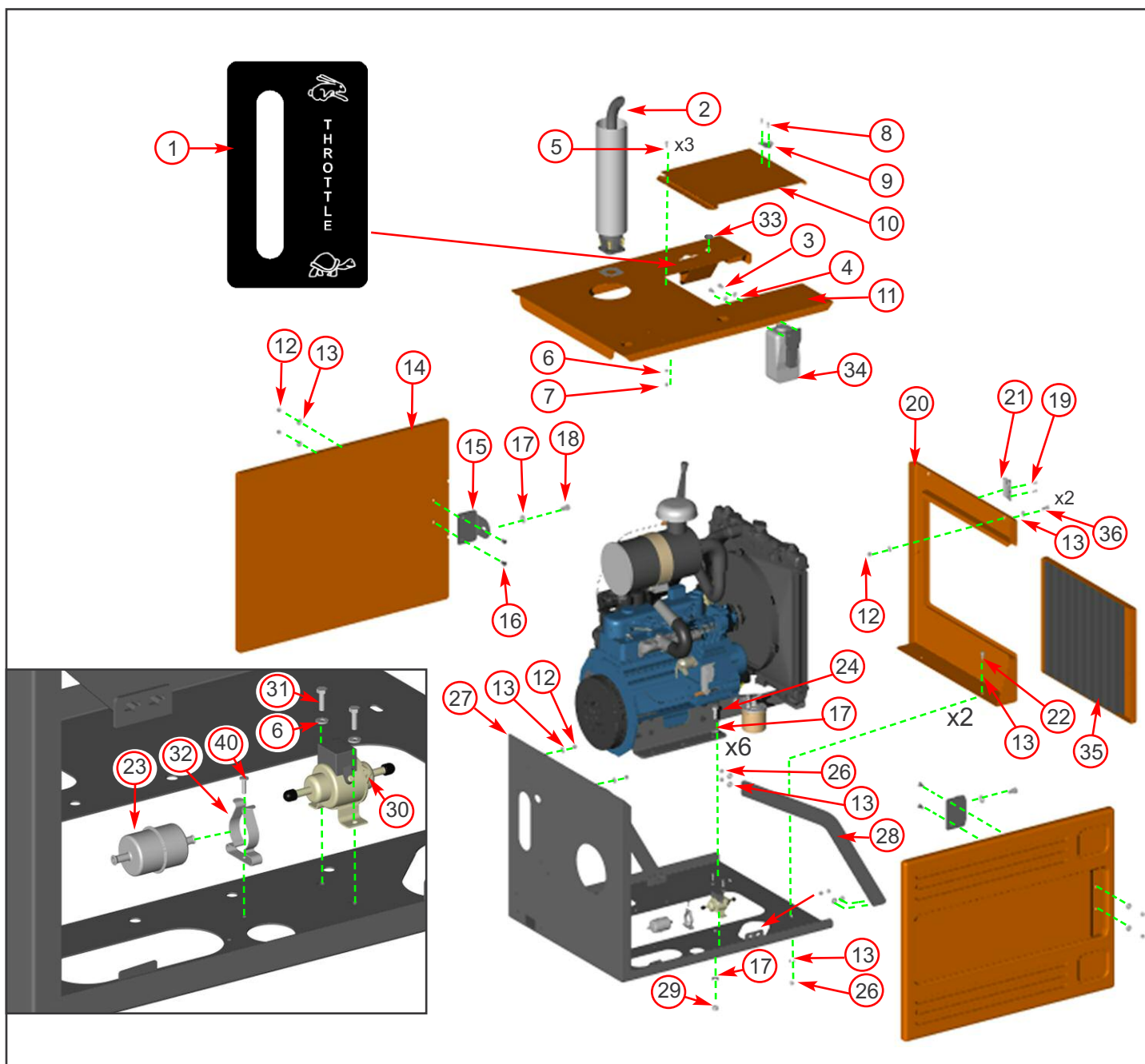


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	1406	Safety Switch Loom	1	4	1375	+VE Battery Cable	1
2	1975	Control Box Loom	1	5	1376	-VE Battery Cable	1
3	18482	Engine Loom	1				



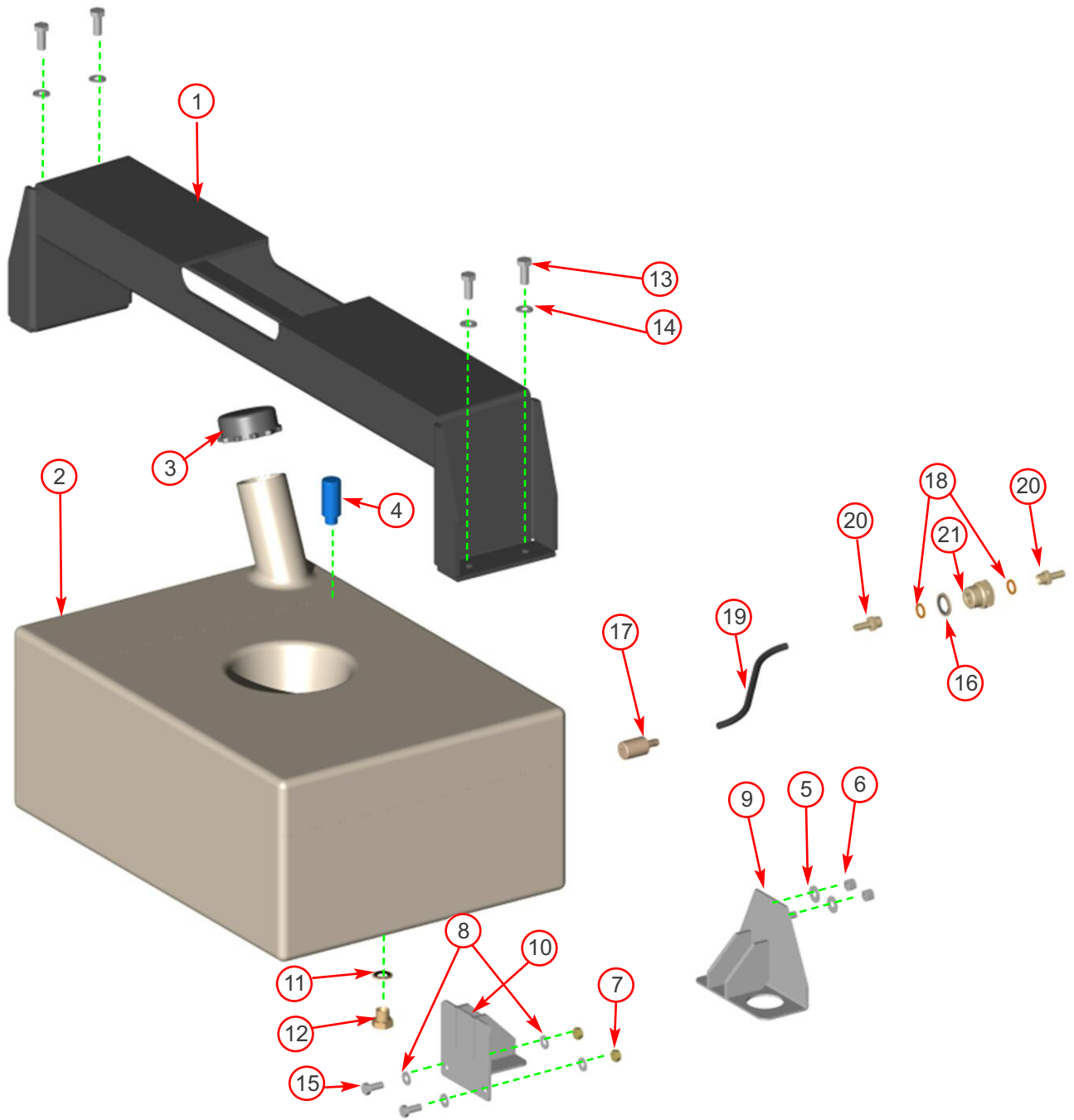
Item	Part No	Part Name	Q'ty
1	4316	Air Cleaner	1
2	0095	Oil Filter	1
3	18345	Air Filter	1
4	4252	Directional Control Valve (DCV)	1
5	19157FB	Engine Bracket Nearside	1
6	0711	M8 A Washer	7
7	0346	M8/20 Bolt	3
8	19157FB	Engine Bracket Offside	1
9	4319	Radiator Kit	1
10	4313	Engine	1
11	0350	M8/25 Bolt	2
12	2946	Throttle Assembly	1
13	0304	M10/25 Fine Thread Socket Cap	16
14	0085	Fuel Filter	1
15	2954FS	Throttle Cable Bracket	1
16	17314	Pulley Engine 168 x 4	1

Item	Part No	Part Name	Q'ty
17	0352	M8/40 Bolt	1
18	0481	M8 T Nyloc Nut	1
19	0392	M6 Plain Nut	4
20	4297FB	Air Intake Tube	1
21	4335	Radiator Fan Guard	1
22	4054	M10/35 Fine Thread Socket Cap	6
23	0437	M6/16 Bolt	4
24	0709	M6 C Washer	8
25	18106	M6 Spring Washer	4
26	18629FB	Engine Bracket Base	2
27	0332	M12/90 Bolt	4
28	18522	AV Mount	4
29	0704	M12 C Washer	4
30	0644	M12 P Nyloc Nut	4
31	17337	Rubber Spacer	2



Item	Part No	Part Name	Q'ty
1	2950	Throttle Decal	1
2	18327FB	Exhaust Muffler Complete	1
3	0344	M8/16 Bolt	2
4	0711	M8 A Washer	2
5	0438	M6/16 Pan Pozi	3
6	0709	M6 C Washer	5
7	0391	M6 T Nyloc Nut	3
8	0066	Pop Rivet 5 x 6	2
9	4088	Catch Plate	1
10	0607FO	Access Cover	1
11	4270FO	Top Bonnet	1
12	1757	M8 P Nyloc Nut	8
13	0769	M8 C Washer	22
14	0765	Side Panel	2
15	0825FS	Side Panel Handle	2
16	0348	M8/20 Skt Csk Bolt	4
17	0704	M12 C Washer	14
18	0318	M12/20 Bolt	2

Item	Part No	Part Name	Q'ty
19	0067	Pop Rivet 4.8 x 12	3
20	18580FO	Radiator Shroud	1
21	0235	Catch	1
22	0350	M8/25 Bolt	2
23	0871	In-Line Fuel Filter	1
24	0429	M12/35 Bolt	6
25	0431	M12/40 Bolt	6
26	0481	M8 T Nyloc Nut	10
27	2955FO	Engine Base Guard	1
28	1984FS	Engine Guard Bracket	2
29	0644	M12 P Nyloc Nut	6
30	4314	Fuel Pump	1
31	0437	M6/16 Bolt	2
32	2851	Clip Fuel Filter	1
33	4253	Domed Blanking Plug	1
34	4320	Reserve Tank	1
35	18581FO	Shroud Radiator with Grille	1
36	0346	M8/20 Bolt	2

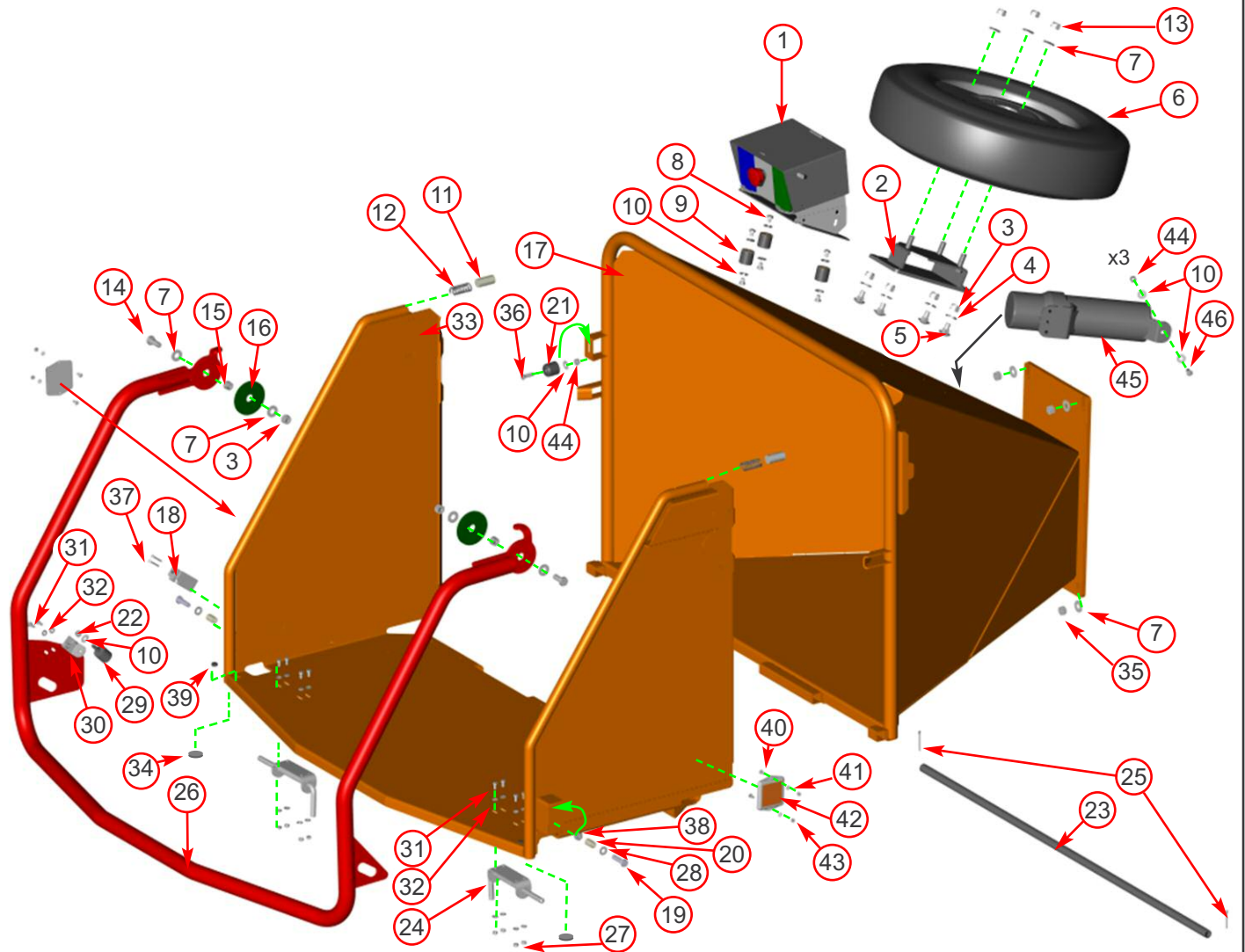


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	2811FB	Funnel Support	1	12	0211	3/8 Drain Plug	1
2	18392K	Fuel Tank Kit (inc. parts 11-12, 16-21)	1	13	0360	M10/25 Bolt	4
3	P*611	Fuel Cap	1	14	0839	M10 C Washer	4
4	P*613	Breather	1	15	0346	M8/20 Bolt	2
5	0711	M8 A Washer	2	16	0152	3/4" Dowty Washer	1
6	0481	M8 T Nyloc Nut	2	17	2897M	Pick Up Weight	1
7	0479	M8 P Nyloc Nut	2	18	2896	Copper Washer	2
8	0712	M8 C Washer	4	19	0389	8 MM Rubber Pipe	1
9	1989FS	Bracket Tank Front	1	20	1992	Tail Hose	2
10	1990FS	Bracket Tank Rear	1	21	18568	Reducer Bush	1
11	0396	3/8 Dowty Washer	1				

# 45 FUNNEL

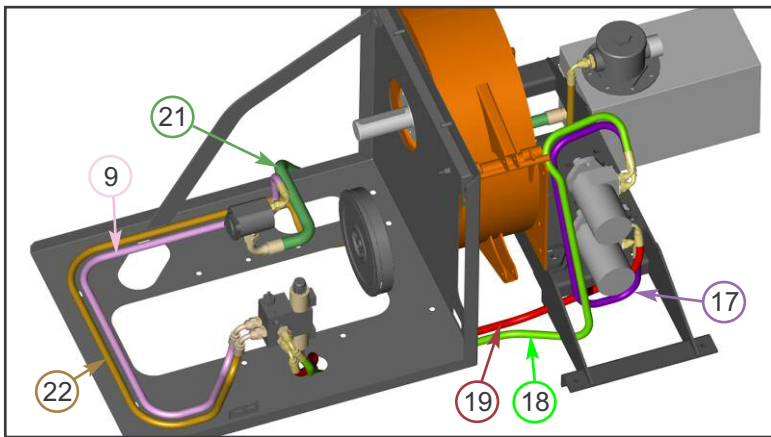
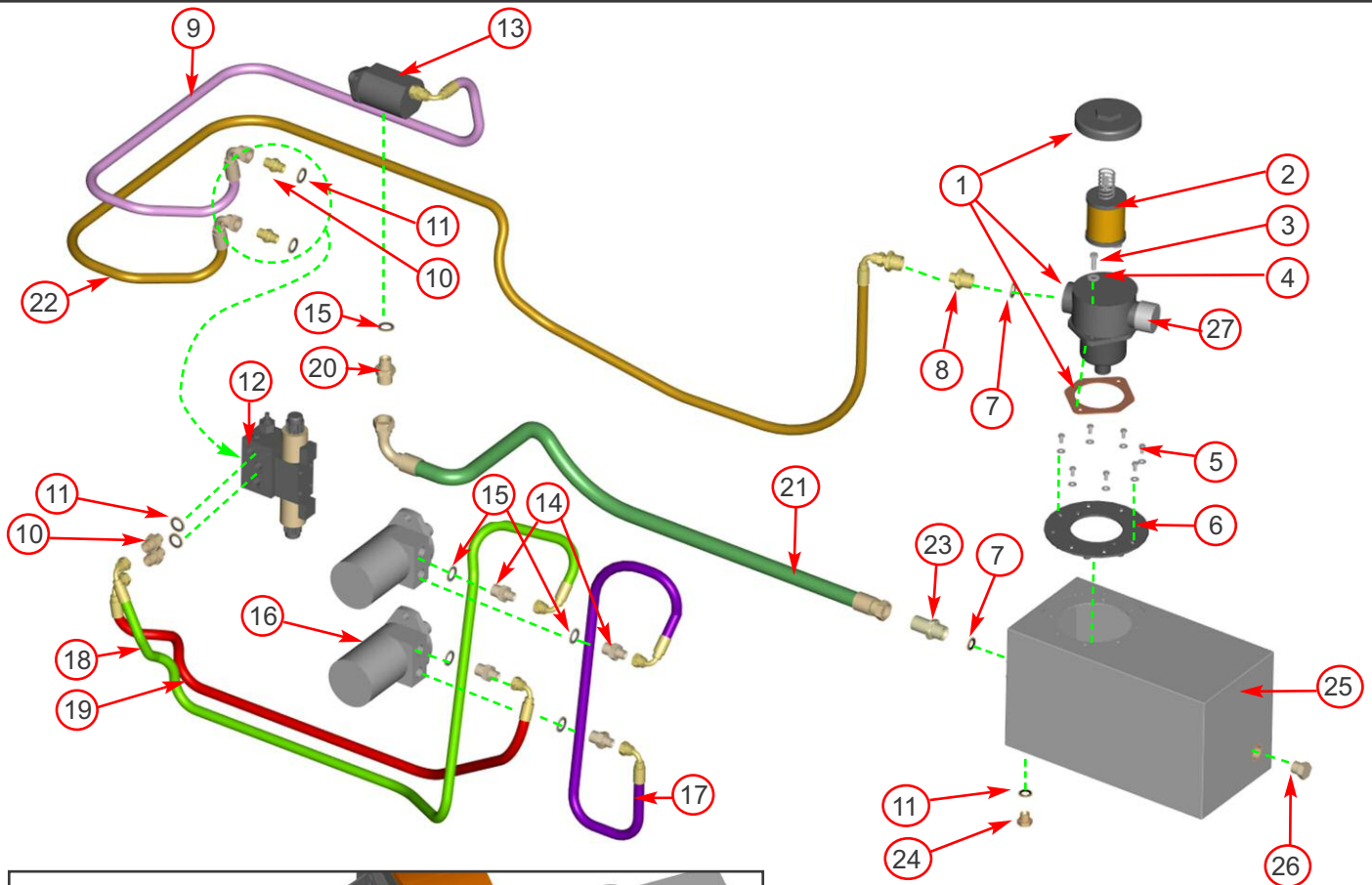


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**TW 190TDHB**

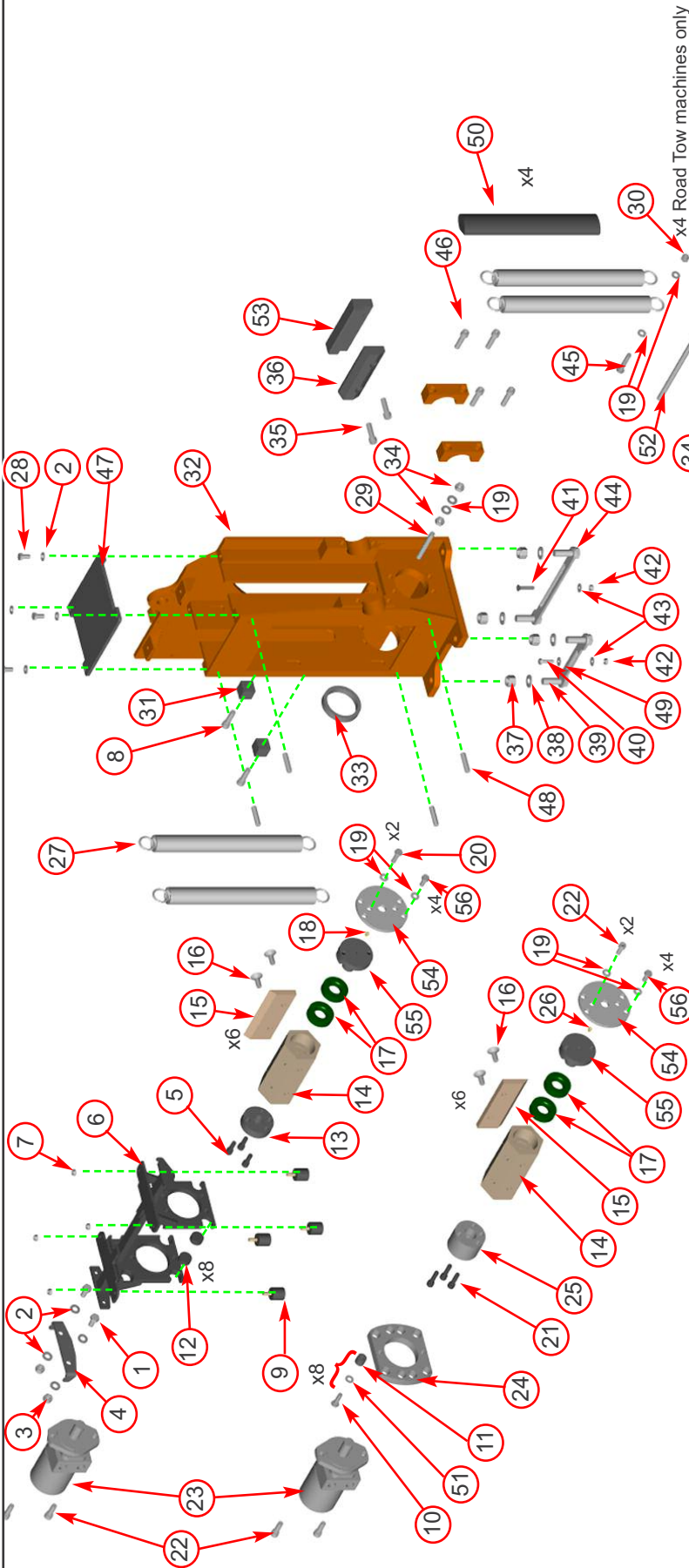


Item	Part No	Part Name	Q'ty
1	2809F	Control Box (detail on page 34)	1
2	1933FS	Spare Wheel Bracket	1
3	0045	M12 T Nyloc Nut	6
4	0702	M12 A Washer	4
5	0320	M12/25 Cup Square	4
6	1932	Spare Wheel	1
7	0704	M12 C Washer	11
8	0342	M8/10 Bolt	6
9	1644	M8 Anti-Vibration Mount	3
10	0712	M8 C Washer	14
11	1601	Nylon Piston	2
12	1603	Die Spring	2
13	0644	M12 P Nyloc Nut	3
14	0429	M12/35 Bolt	2
15	1605M	Stainless Spacer	2
16	1599	Bearing Washer	2
17	2913FO	Funnel	1
18	1348	Limit Switch	1
19	1520	M10/45 Bolt	2
20	1591	Nylon Spacer	2
21	4206	Nylon Bush	1
22	0479	M8 P Nyloc Nut	1
23	2923	Hinge Pin	2

Item	Part No	Part Name	Q'ty
24	2986	1/2" Spring Bolt	2
25	1276	Split Pin	2
26	1598F	Safety Bar	1
27	0391	M6 T Nyloc Nut	8
28	4344	M10 C Repair Washer	2
29	0178	Rubber End Stop	1
30	2727	Actuator Bracket	1
31	0437	M6/16 Bolt	10
32	0709	M6 C Washer	10
33	2914FO	Feed Tray	1
34	1337	Rubber Cap	2
35	0046	M12 Plain Nut	4
36	18115	M8/50 Csk Soc.	1
37	1006	M4/30 Pan Pozi	2
38	4345	M10 P Nyloc Nut	1
39	2493	Rubber Cap	2
40	18104	M5/12 Pan Pozi	4
41	0857	M5 A Washer	4
42	18924	Square Reflector	2
43	18102	M5 T Nyloc Nut	4
44	0481	M8 T Nyloc Nut	4
45	P*144	Operator's Manual Cannister	1
46	0347	M8/20 Button Head	3

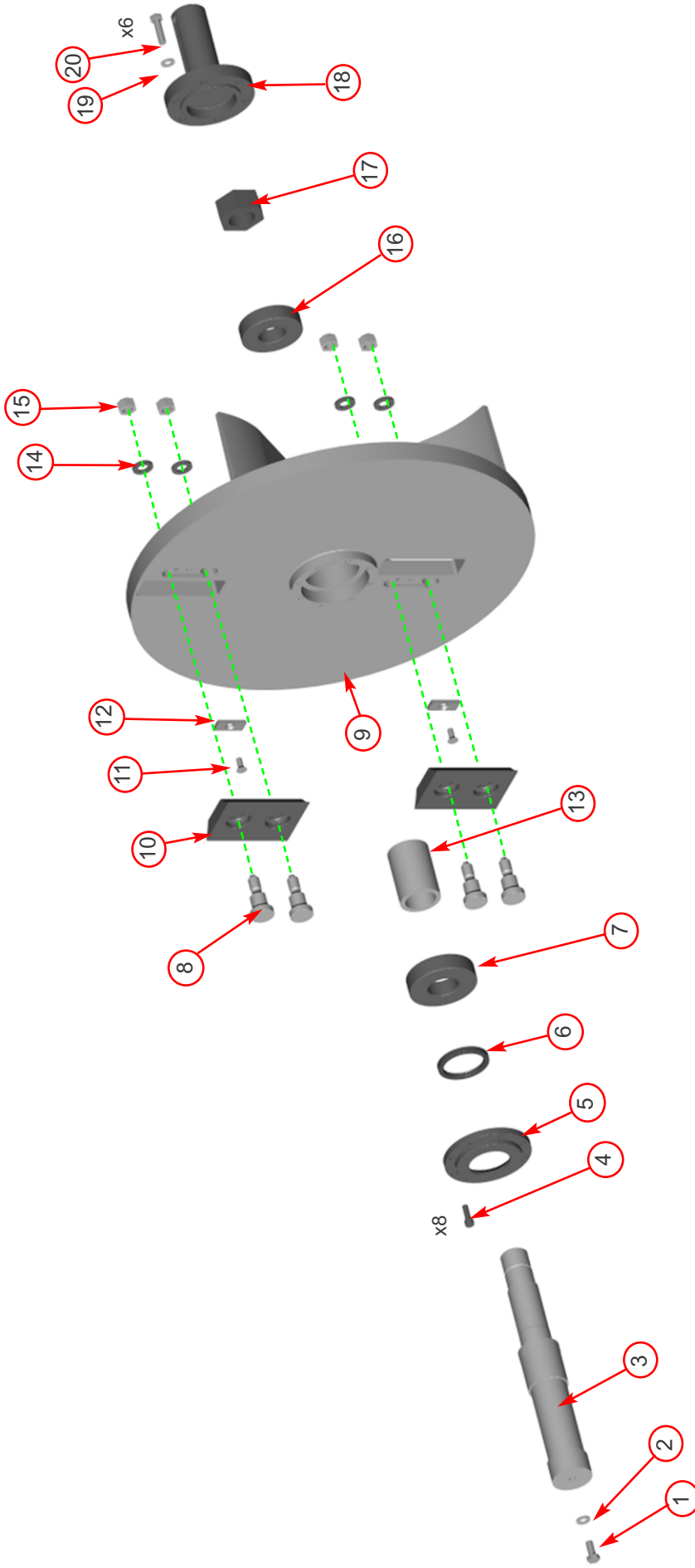


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	1434	Return Filter	1	15	0398	1/2" Dowty Washer	5
2	0100	Filter	1	16	2982B	Motor	2
3	18170	M8/30 Bolt	2	17	2885	3/8" Hose, Top Motor to Btm Motor	1
4	0711	M8 A Washer	2	18	3060	3/8" Hose, Top Motor to DCV	1
5	1658	M6/12 Bolt	8	19	2973	3/8" Hose, Bottom Motor to DCV	1
6	1702FS	Tank Top Plate	1	20	1583	1/2" - 3/4" BSP Adapter	1
7	0152	3/4" Dowty Seal	2	21	2830	3/4" Hose, Hyd Tank to Pump	1
8	0225	3/8" - 3/4" BSP Adapter	1	22	4244	3/8" Hose, Hyd Filter to DCV	1
9	4243	3/8" Hose, Pump to DCV	1	23	1766	3/4" - 3/4" BSP Adapter	1
10	0161	3/8" - 3/8" Adapter	5	24	0211	3/8" BSP Blanking Plug	1
11	0396	3/8" Dowty Seal	6	25	1703	Hydraulic Oil Tank	1
12	4252	Directional Control Valve (DCV)	1	26	4219	3/4" Tapered Blanking Plug	1
13	1660	Pump	1	27	1067	Breather Filter	1
14	0026	1/2" - 3/8" BSP Adapter	4				

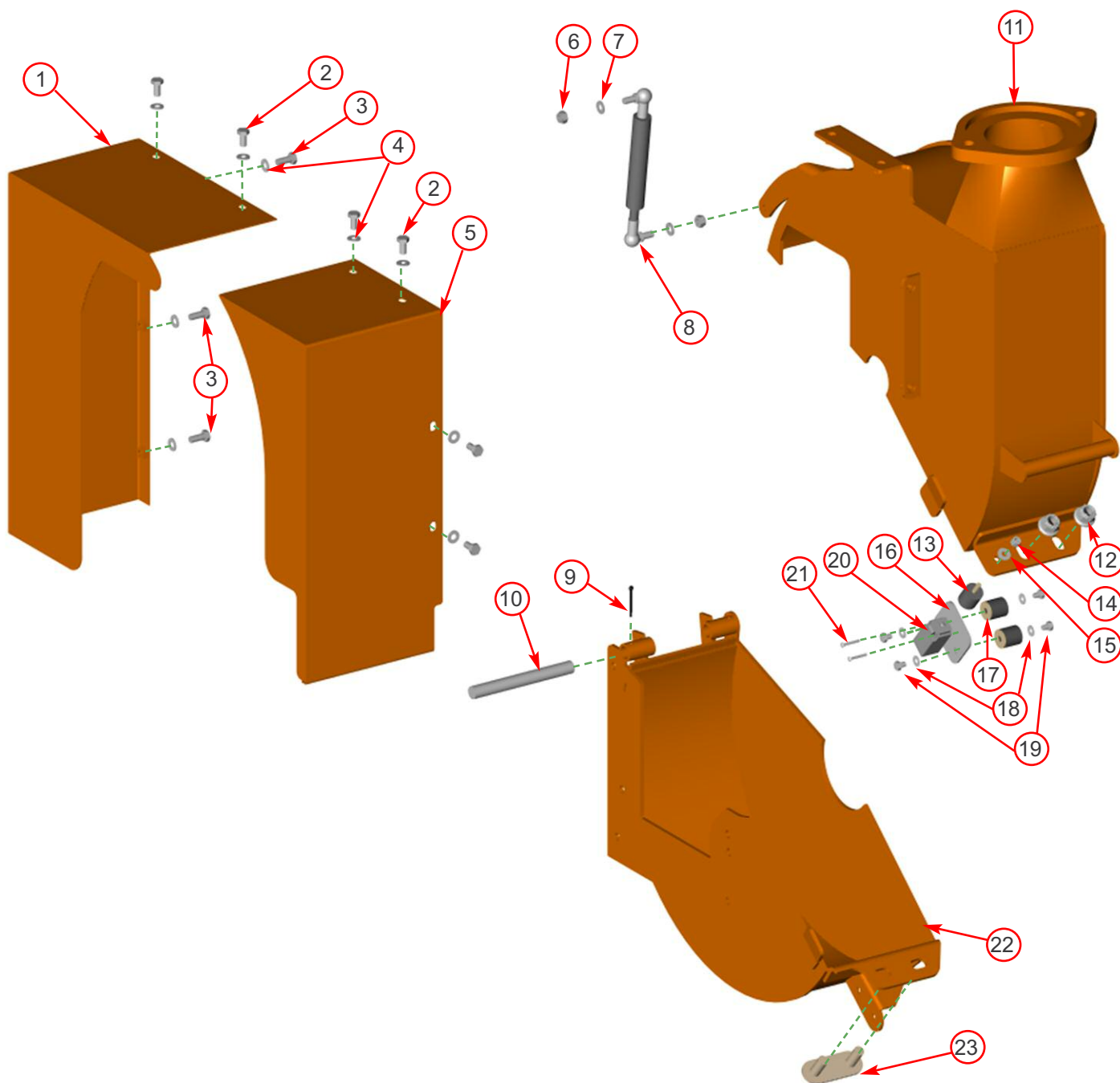


Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty	Item	Part No	Part Name	Q'ty
1	0382	M10/30 Bolt	2	20	0481	M12/30 Bolt	2	39	2733FS	Fitting Bracket Short	4
2	0701	M10 A Washer	8	21	1525	M10/40 Caphead	3	40	0351	M8/30 Bolt	1
3	0052	M10 T Nyloc Nut	2	22	1985	M12/30 Caphead	6	41	4342	M8/30 CSK Screw	1
4	2748FS	Short Spring Hanger	1	23	2982B	Hydraulic Motor	2	42	0479	M8 P Nyloc Nut	2
5	0305	M10/25 Caphead	4	24	3025MS	Bracket Motor AV Mount	1	43	0712	M8 C Washer	2
6	P*200	Top Roller Slide Assembly	1	25	2731M	Adapter Spline	1	44	18268FS	Fitting Bracket Long	1
7	0481	M8 T Nyloc Nut	4	26	0985	Straight Grease Nipple	1	45	0330	M12/70 Bolt	4
8	1526	M12/25 Caphead	2	27	19052	Spring	4	46	4340	M12/50 Caphead	4
9	1768	AV Mount	4	28	0878	M10/20 Bolt	4	47	1840FS	Roller Box Top	1
10	1812	M10/35 Bolt	8	29	4341	M12/150 Threaded Bar	1	48	0356	Roller Box Stud	4
11	3026	AV Bush Concentric	8	30	0045	M12 T Nyloc Nut	4	49	0711	M8 A Washer	1
12	3009	Slide Plug	8	31	1898M	Damper Stop	2	50	2888	Layflat Spring Protector	4
13	2732M	Adapter Spline 6B	1	32	18491FO	Roller Box 190mm	1	51	0839	M10 C Washer	8
14	1947M	Roller Hub 190	2	33	2733M	Bearing Roller Motor Side	1	52	-----	M12/260 Threaded Rod	2
15	1948MH	Roller Blade 190	12	34	0046	M12 Plain Nut	4	53	4224M	Anvil Primary Right Side	1
16	0428	M12/30 CSK Blade Bolts	24	35	1517	M12/40 Caphead	2	54	17374P	Stub Shaft Profile	2
17	0788	Bearing Plastic Bush	4	36	4223M	Anvil Primary Left Side	1	55	17375M	Stub Shaft	2
18	0986	45° Grease Nipple	1	37	1284	M16 T Nyloc Nut	4	56	0429	M12/35 Bolt	8
19	0702	M12 A Washer	31	38	1143	M16 A Washer	4				





Item	Part No	Part Name	Q'ty
1	0360	M10/25 Bolt	1
2	0839	M10 C Washer	1
3	17350M	Rotor Shaft	1
4	1527	M8/25 Caphead	8
5	1937M	Bearing Cap	1
6	2943	Oil Seal	1
7	1939	Bearing 6309	1
8	18712M	Blade Bolt	2
9	18513M	Rotor Disc	1
10	18692MH	5" Blade	2
11	0355	M8/16 CSK Bolt	4
12	2902MS	Bolt Plate	2
13	1940MS	Bearing Spacer	1
14	1218	M16 Hardened Washer	4
15	1284	M16 T Nyloc Nut	4
16	1862	Bearing 6308	1
17	1893	Nut M39/4	1
18	2983MS	Drive Adapter	1
19	0701	M10 A Washer	6
20	4054	M10/35 Finethread Capheads	6

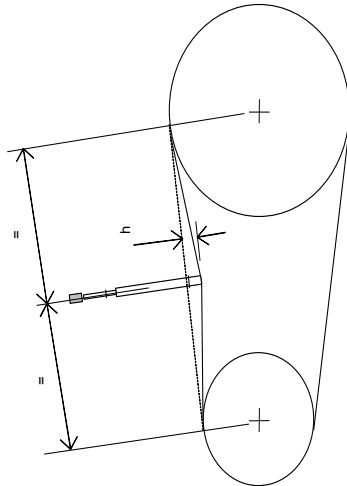


Item	Part No	Part Name	Q'ty
1	1906FO	Guard Roller Box Near Side	1
2	0878	M10/20 Bolt	6
3	0360	M10/25 Bolt	3
4	0839	M10 C Washer	9
5	1907FO	Guard Roller Box Off Side	1
6	0052	M10 T Nyloc Nut	2
7	0701	M10 A Washer	2
8	4066	Gas Spring Compression	1
9	0528	Split Pin	1
10	1943M	Pin Hinge 180 mm	1
11	18443FO	Rotor Housing Opening	1
12	2978S	M16 Flange Nut	2

Item	Part No	Part Name	Q'ty
13	0178	Rubber End Stop	1
14	0479	M8 P Nyloc Nut	1
15	0712	M8 C Washer	2
16	1691FS	Switch Back Plate	1
17	1868	M8 AV Mount	2
18	0711	M8 A Washer	4
19	1721	M8/10 Bolt	4
20	1348	Limit Switch	1
21	18168	M4/35 Pan Pozi	2
22	18442FO	Rotor Housing Fixed	1
23	2819FS	Fitting Bracket	1



# TIMBERWOLF V-BELT TENSIONING DATA TABLE



#### METHOD:

1. SET THE DEFLECTION DISTANCE ON THE LOWER SCALE OF THE TENSION GAUGE SO THAT THE UNDERSIDE OF THE 'O'-RING EQUALS THE 'h' VALUE GIVEN IN THE TABLE BELOW
2. ENSURE THAT THE DEFLECTION FORCE SCALE IS ZERO'D BY PUSHING THE UPPER 'O'-RING ALL THE WAY DOWN
3. PLACE THE TENSION GAUGE IN THE CENTRE OF THE BELT SPAN AS SHOWN IN THE DIAGRAM LEFT
4. PRESS DOWNWARDS ON THE RUBBER BUFFER, DEFLECTING THE BELT UNTIL THE UNDERSIDE OF THE LOWER 'O'-RING IS LEVEL WITH THE BELT BEHIND (USE A STRAIGHT EDGE IF THERE IS ONLY 1 BELT)
5. TAKE THE READING FROM THE DEFLECTION SCALE OF THE TENSION METER (READ AT THE LOWER EDGE OF THE 'O'-RING) & COMPARE THIS VALUE WITH THAT GIVEN IN THE TABLE BELOW
6. TIGHTEN OR LOOSEN BELTS AS REQUIRED FOLLOWING PROCEDURE GIVEN IN THE OPERATOR'S MANUAL

TENSION GAUGES ARE AVAILABLE FROM TIMBERWOLF SPARES, QUOTING PART No. 18091

#### TIPS ON BELT TIGHTENING:

- A) THERE WILL NORMALLY BE A RAPID DROP IN TENSION DURING THE RUN-IN PERIOD FOR NEW BELTS. WHEN NEW BELTS ARE FITTED, CHECK THE TENSION EVERY 2-3 HOURS & ADJUST UNTIL THE TENSION REMAINS CONSTANT
- B) THE BEST TENSION FOR V-BELT DRIVES IS THE LOWEST TENSION AT WHICH THE BELTS DO NOT SLIP OR RATCHET UNDER THE HIGHEST LOAD CONDITION
- C) TOO MUCH TENSION SHORTENS BELT & BEARING LIFE
- D) TOO LITTLE TENSION WILL AFFECT THE PERFORMANCE OF YOUR MACHINE ESPECIALLY IN RESPECT OF NO-STRESS DEVICES
- E) ENSURE THAT BELT DRIVES ARE KEPT FREE OF ANY FOREIGN MATERIALS
- F) IF A BELT SLIPS - TIGHTEN IT!

TW MODEL No.:		13/75G	18/100G	125PH	230DHB	190TDHB	230VTR	190TFTR	190TVGTR	350DHB(t)	PTO100	PTO150	S426 SHREDDER	S426TFTR SHREDDER	PTO S426 SHREDDER	SX200 - ALL MODELS
Belt Mfr. / Type		Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA
Belt Pitch Designation																
Belt Length		900.0	1060.0	1060.0	1232.0	1232.0	1232.0	1232.0	1232.0	2530.0	900.0	900.0	2120.0	2120.0	1700.0	1272.0
<b>Belt deflection</b>	= h	<b>4.0</b>	<b>4.0</b>	<b>3.5</b>	<b>4.0</b>	<b>4.0</b>	<b>4.0</b>	<b>4.0</b>	<b>4.0</b>	<b>8.0</b>	<b>4.0</b>	<b>4.0</b>	<b>8.0</b>	<b>8.0</b>	<b>6.0</b>	<b>5.0</b>
<b>Force reading (Kgf)</b>	New belt	<b>3.4 - 3.6</b>	<b>3.1 - 3.3</b>	<b>3.3 - 3.6</b>	<b>3.9 - 4.1</b>	<b>3.9 - 4.1</b>	<b>3.9 - 4.1</b>	<b>3.9 - 4.1</b>	<b>3.9 - 4.1</b>	<b>3.3 - 3.6</b>	<b>3.3 - 3.5</b>	<b>3.8 - 4.0</b>	<b>3.3 - 3.5*</b>	<b>3.3 - 3.5</b>	<b>6.5 - 6.9</b>	<b>1.9 - 2.1</b>
	Used belt	3.0 - 3.2	2.8 - 3.0	2.8 - 3.1	3.4 - 3.6	3.4 - 3.6	3.4 - 3.6	3.4 - 3.6	3.4 - 3.6	2.9 - 3.1	2.9 - 3.0	3.3 - 3.5	2.9 - 3.1*	2.9 - 3.1	5.6 - 6.0	1.7 - 1.8
Belt Mfr. / Type		N/A	N/A	Gates Super HC-MN SPA	N/A	N/A	Gates Super HC-MN SPA	Gates Super HC-MN SPA	Gates Super HC-MN SPA	N/A	N/A	Gates Super HC-MN SPA	N/A	Gates Super HC-MN SPA	N/A	N/A
Belt Pitch Designation																
Belt Length				950.0			850.0	925.0	950.0					1060.0		
<b>Belt deflection</b>	= h			<b>4.0</b>			<b>4.0</b>	<b>4.0</b>	<b>4.0</b>					<b>4.0</b>		
<b>Force reading (Kgf)</b>	New belt			<b>1.9 - 2.0</b>			<b>2.3 - 2.4</b>	<b>2.3 - 2.4</b>	<b>2.3 - 2.4</b>					<b>2.7 - 2.9</b>		
	Used belt			1.7 - 1.8			2.0 - 2.1	2.0 - 2.2	2.0 - 2.2					2.3 - 2.5		

ROTOR BELTS

PUMP BELT