



TIMBERWOLF®
Lead the pack

TW 230VTR WOOD CHIPPER

UK INSTRUCTION MANUAL



timberwolf-uk.com

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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 230VTR. 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 3 to 12. Ensure that all operators are **properly trained** for operating this machine, especially in **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.



CAUTION or WARNING

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

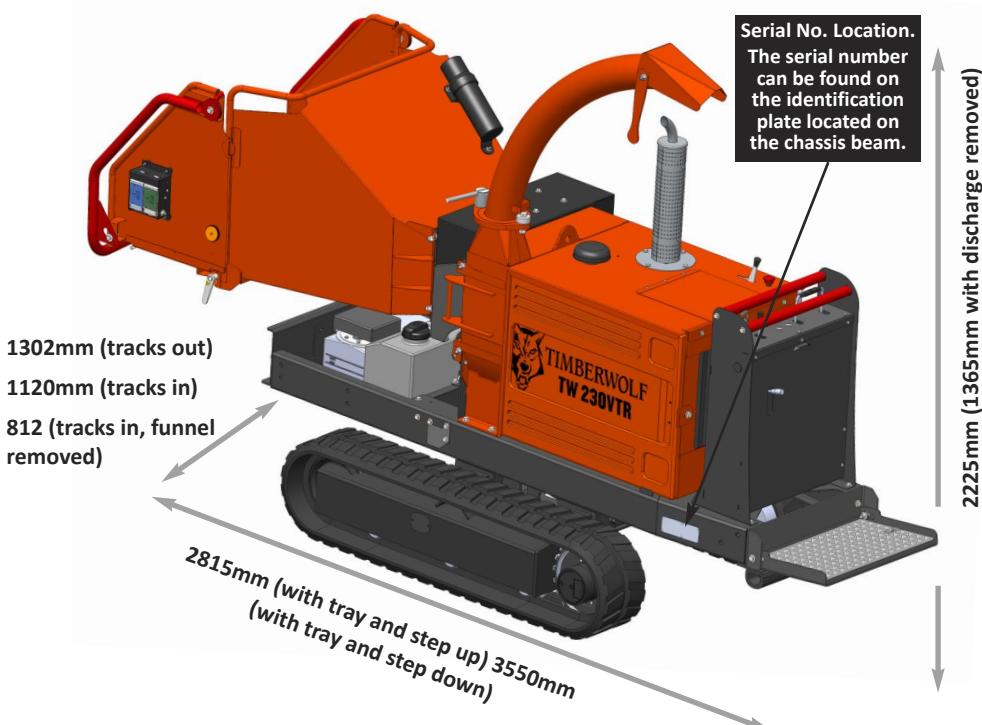
**THIS SYMBOL INDICATES
IMPORTANT SAFETY
MESSAGES IN THIS MANUAL.
WHEN YOU SEE THIS
SYMBOL, BE ALERT TO THE
POSSIBILITY OF INJURY TO
YOURSELF OR OTHERS AND
CAREFULLY READ THE
MESSAGE THAT FOLLOWS.**

**ALWAYS FOLLOW SAFE
OPERATING AND
MAINTENANCE PRACTICES**

PURPOSE

The Timberwolf TW 230VTR is designed to chip solid wood material up to 160mm in diameter and capable of chipping over 5 tonnes of brushwood per hour.

DIMENSIONS



SPECIFICATION

Engine type:
Kubota 4-cylinder diesel

Maximum power:
26kW (35hp)

Cooling method:
Water cooled

Overall weight:
1280kg (without winch)

Starting method:
Electric

Roller feed:
Twin hydraulic motors

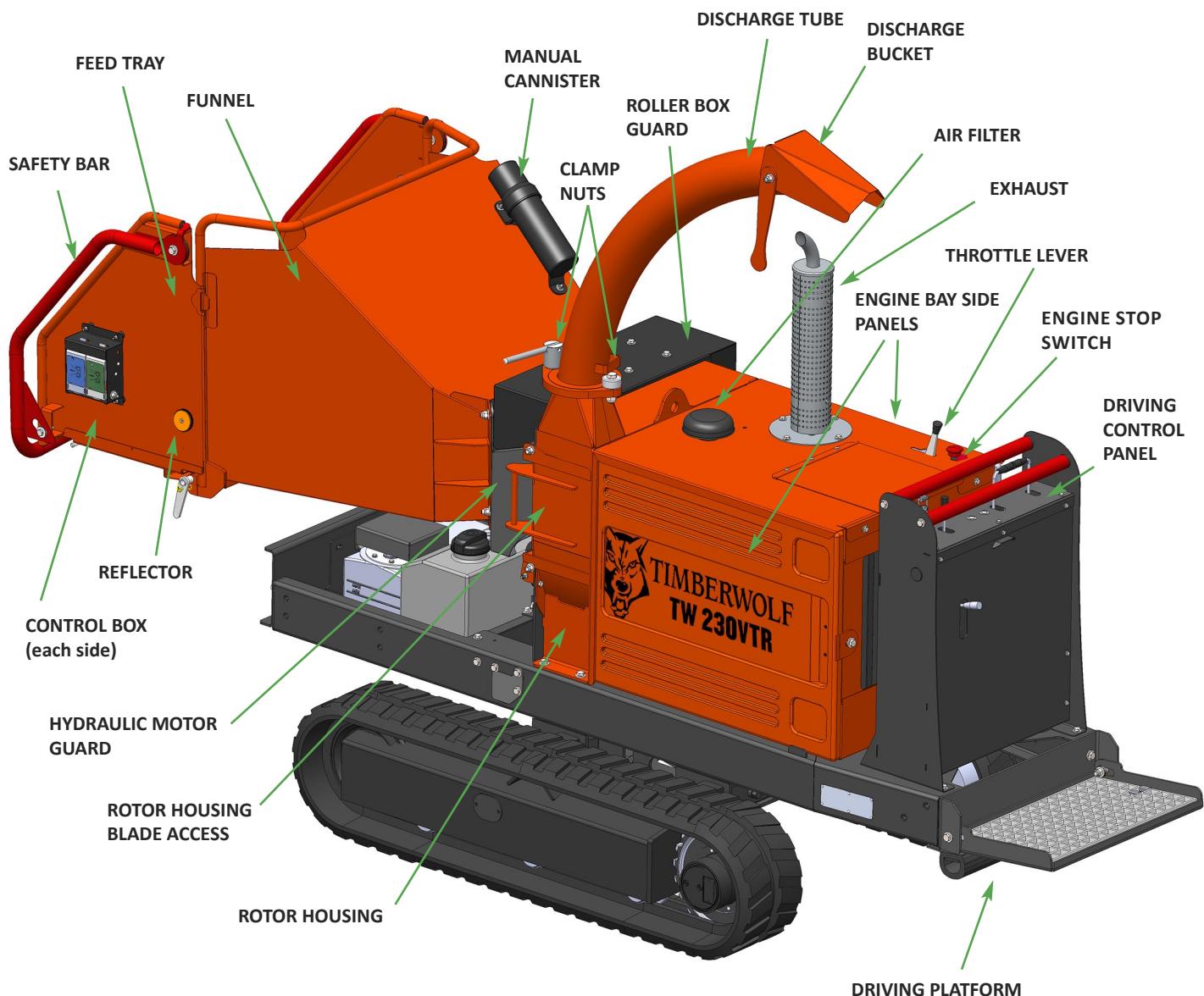
Maximum diameter material:
160mm (6 $\frac{1}{3}$ ")

Fuel capacity:
36 litres

Hydraulic oil capacity:
15 litres

Material processing capacity:
Up to 5 tonnes/hr

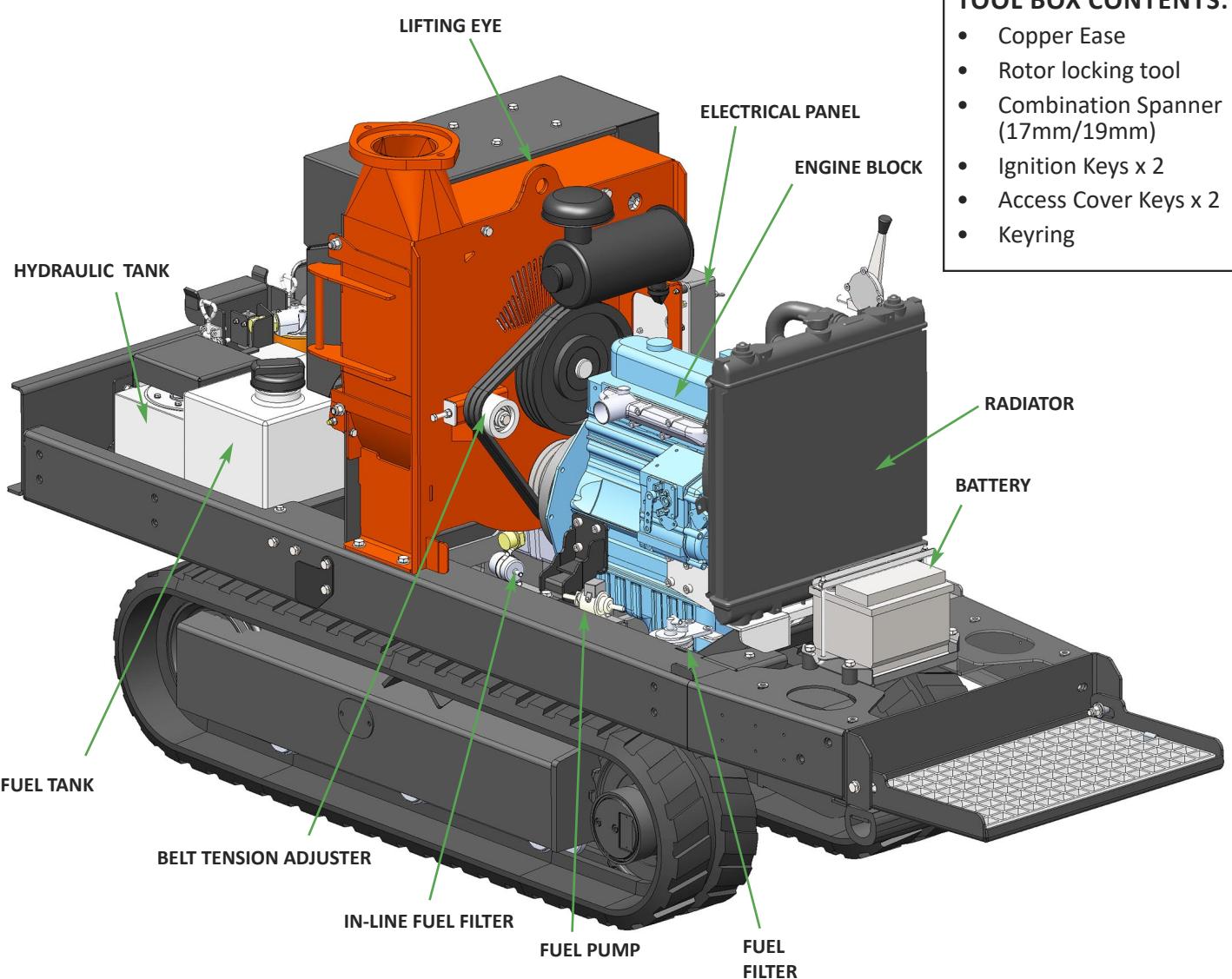
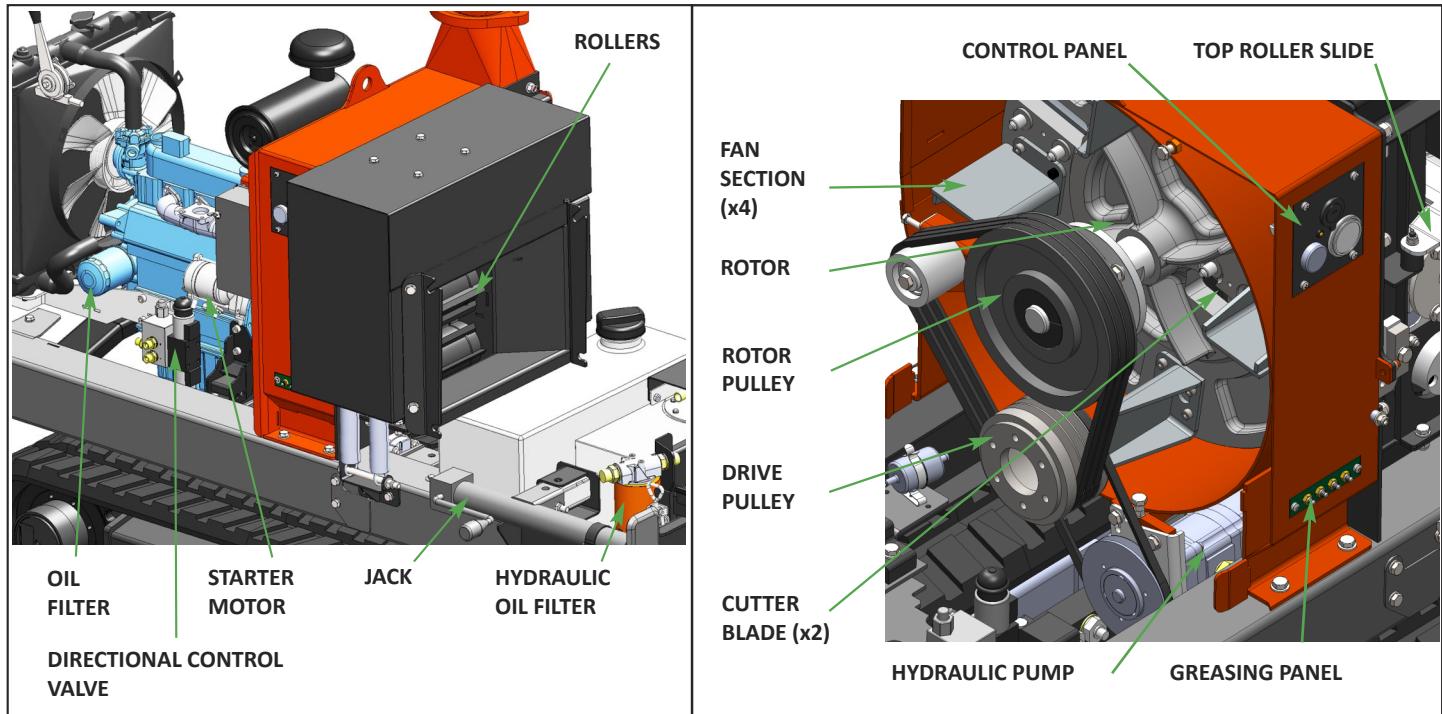
Fuel type:
Diesel



THE TW 230VTR HAS THE FOLLOWING FIXED GUARDS FOR PROTECTION OF THE OPERATOR, CHIPPER AND ENVIRONMENT:

- Roller Box Guard:** Protects rotor housing from damage or foreign matter. Protects the user from injuries from moving rollers and ejected material during operation.
- Hydraulic Motors Guard:** Protects hydraulic motors from damage. Protects the user from injuries from heat and movement of motor.
- Rotor Housing Blade Access:** Protects user from rotational parts e.g. cutting blades. The interlocking switch disengages the engine when the hatch is opened to stop the chipper running.
- Engine Bay Side Panels:** Protects the user from rotational parts e.g. belts and pulleys, hot surfaces, and engine fluids. Protects machine from ingress of environmental debris.

Guards may be removed for maintenance only, as described in the Service Instruction pages of this manual. **Ensure guards remain in place throughout operation.**

**TOOL BOX CONTENTS:**

- Copper Ease
- Rotor locking tool
- Combination Spanner (17mm/19mm)
- Ignition Keys x 2
- Access Cover Keys x 2
- Keyring

OPERATOR'S PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Chainsaw safety helmet (EN 397) fitted with mesh visor (EN 1731) and ear defenders (EN 352).
- Work gloves with elasticated wrist.
- Steel toe cap safety boots (EN 345-1).
- Close fitting heavy-duty non-snag clothing. High-visibility clothing (EN 471) if risk assessment identifies the need.
- Face mask if appropriate.
- DO NOT wear rings, bracelets, watches, jewellery or any other items that could be caught in the material and draw you into the chipper.



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.

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 face mask 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 brash may push you to one side causing danger. Badly twisted brash 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.
- Never leave the chipper unattended when running. Machines must be supervised at all times when in use.
- In the event of an accident, stop the machine, remove the key and call the emergency services immediately.

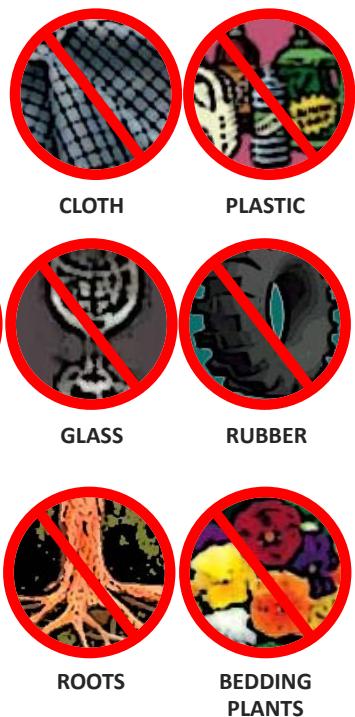
GENERAL SAFETY MATTERS

- Always stop the chipper engine before making any adjustments, refuelling or cleaning.
- Always check the rotor has stopped rotating and remove the chipper ignition key before maintenance of any kind, or whenever the machine is to be left unattended. If in doubt, look through the in-feed funnel to see if rotor is still moving.
- Always check the machine is well supported and cannot move. If working on an incline, position on solid ground, across the slope.
- Always operate the chipper with the engine set to maximum speed when chipping.
- Always check (visually) for fluid leaks. If found, resolve the leak before operating the chipper.
- 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.
- Ensure a fire extinguisher is available on site.
- Ensure a personal first aid kit and hand cleaning materials are available (e.g. waterless skin cleanser).



GENERAL SAFETY MATTERS

- 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 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 the machine is running.
- Do not use the chipper inside buildings.



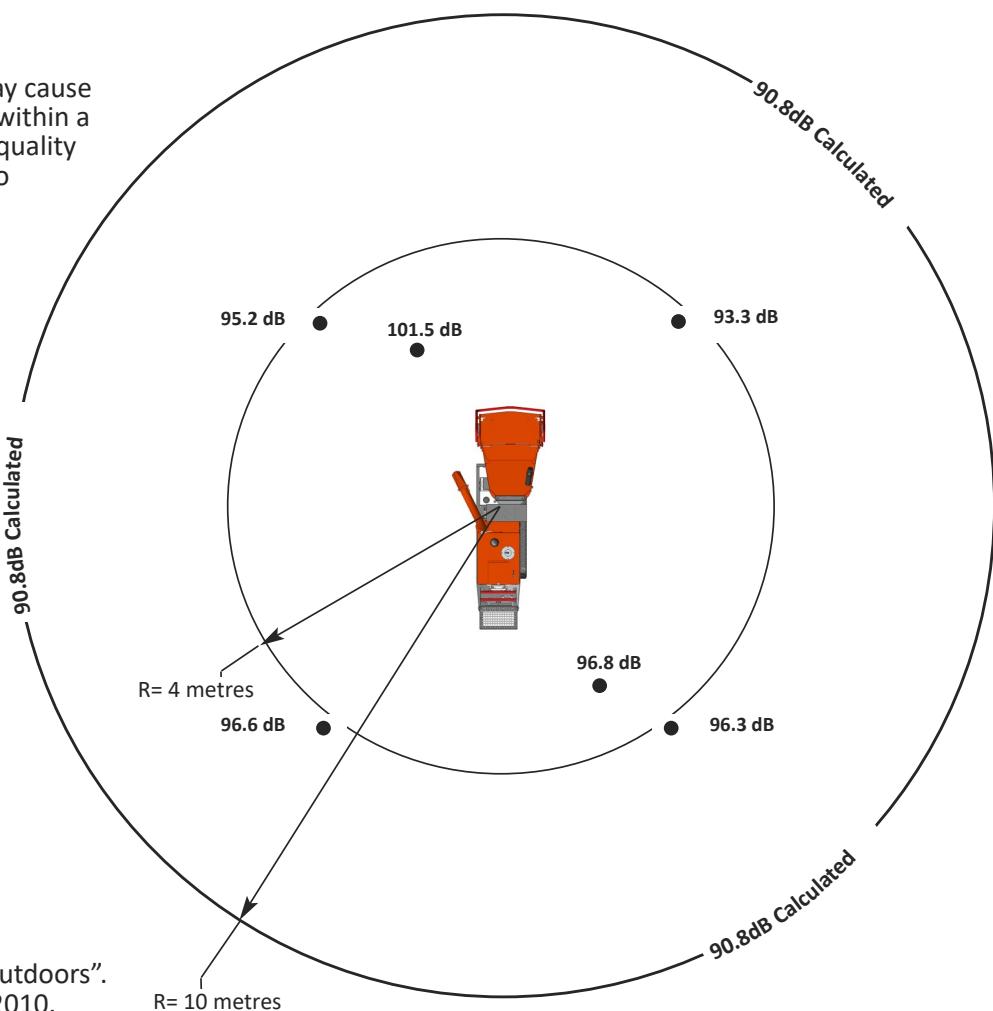
NOISE TEST

Machine: TW 230VTR

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

Noise levels above 80dB (A) will be experienced at the working position. Prolonged exposure to loud noise may cause permanent hearing loss. All persons within a 4 metre radius must also wear good quality ear protection (EN 352) at all times to prevent possible damage to hearing.

Guaranteed Sound Power: 120dB (A)



As required by Annex III of Directive 2000/14/EC "Noise Emission in the environment by equipment for use outdoors".
Tested according to BS EN ISO 3744:2010.

STORING THE CHIPPER

Perform the following tasks at the storage intervals indicated, following procedures described within this manual.

Maintenance Tasks	Storage time			
	<1 month	1-6 months	6-12 months	>12 months
Allow the engine to cool down.	✓	✓	✓	✓
Clean the chipper, removing all woodchips.	✓	✓	✓	✓
Perform routine maintenance.	✓	✓	✓	✓
Check all fasteners and retighten.	✓	✓	✓	✓
Remove all fuel from the tank. NOTE: Either allow the machine to run until all fuel has been used, or drain from the plug provided. If necessary, siphon the fuel into an approved storage container (refer to re-fuelling section). Drain prior to moving machinery, to prevent spillage.	✓	✓	✓	✓
Disassemble the spark plug (petrol machines) or remove battery cables (diesel machines).	✓	✓	✓	✓
Where paint is damaged, touch up paint or treat with a lubricant. NOTE: Original paint colours are available from Timberwolf dealers.	✓	✓	✓	✓
Store the chipper in a dry place at +5°C to +40°C. NOTE: Timberwolf strongly recommends the machine is stored in a sheltered location, protected from rain. If the machine is stored outside, it must be well protected with tarpaulin.	X	✓	✓	✓
If relative humidity of the storage environment is > 60%, the shaft of the engine must be rotated by hand 1-2 revolutions bi-weekly. Prior to rotating the shaft, 20 to 30 ml of engine oil should be poured onto the bearing liner.	X	✓	✓	✓
Every 3 months, inspect the machine as per <1 month column.	X	X	✓	✓
Clean out and drain all lubrication lines, including grease pipes, coolant reservoirs, fuel lines, oil reservoirs. Replace with new lubricants. NOTE: This should be performed at 6 month intervals (months 6 & 12) until re-commissioned. Drain prior to moving machinery, to prevent spillage.	X	X	✓	✓
Keep machine in original container/packaging or equivalent protection and store in a location free from extremes in temperature, at a min. temp. of +5°C and max. +40°C, humidity and corrosive environments. NOTE: If the storage location is cold, damp or severe humidity changes exist, adequate action should be taken to safeguard machinery.	X	X	X	✓
If machine is exposed to environmental conditions such as humidity during storage, inspect bearing lubrication system for presence of water. If water is detected in the lubricant, flush out the bearing housing and re-lubricate immediately.	X	X	X	✓
All breathers and drains are to be operable while in storage and/or the moisture drain plugs removed. The machinery must be stored so the drain(s) are at the lowest point, while the machine is in its stable position.	X	X	X	✓
Follow the recommissioning process before operation.	X	✓	✓	✓

NOTE:

Regardless of storage time, all Timberwolf machines must be in a stable, level position with the discharge tube pointing away from the driver's platform.

RECOMMISSIONING AFTER STORAGE

- Ensure machine is stable.
- Remove all guards and check all fasteners. If necessary, retighten as described within this manual.
- Ensure discharge tube is correctly fastened, free of objects or blockages and rotates around its pivot without being directed to face the point of operation (danger zone).
- Ensure feed funnel is free from foreign objects e.g. tools and clothing.
- Lower and raise feed funnel into its open and closed positions to confirm functionality.
- Check fuel and hydraulic fluid levels within engine and reservoir and top up accordingly. *
- Inspect all internal parts e.g. drive belts, taper locks and shaft keyways.
- Check belt tension as described within this manual.

- Inspect cutting blades to confirm they are sharp and suitable for use.
- Re-connect the battery to its positive and negative terminals.
- Undertake electrical diagnostic continuity check, to confirm circuit is complete.
- Re-lubricate all grease pipes. Remove pipes and bleed the system prior to use, if necessary. *
- Follow daily checks before starting, as described within this manual.
- Start the machine.
- Run for 15 minutes at half throttle, prior to any cutting activity, to clear the combustion engine. Once complete, bring the machine onto full throttle for a further 5 minutes.

*Storage fluids should be replaced, DO NOT USE old stagnate fluids.

VIBRATION DATA

This data is provided to enable assessment of vibration exposure, when the machine is operated in the modes described. Please refer to local Health & Safety Regulations to determine the daily exposure action and limit values.

TW 230VTR, Tracked Hydraulic Fed Chipper, 35hp 1498cc Diesel Engine				
Declared vibration emission value in accordance with BS EN 12096:1997				
	Whole Body Vibrations (m/s ²)		Hand Arm Vibrations (m/s ²)	
	Speed 1 (2.5 kph)	Speed 2 (5 kph)	Speed 1 (2.5 kph)	Speed 2 (5 kph)
Measured vibration emission value a	2.14	2.39	4.77	5.89
Uncertainty K^*	0.85	0.96	2.38	2.36
Values determined when standing on driver's platform tracking over soft grassy ground.				
Measured vibration emission value a	2.71	2.92	5.45	6.82
Uncertainty K^*	1.09	1.17	2.18	2.73
Values determined when standing on driver's platform tracking over hard paved ground.				
K^* value calculated according to provisions in BS EN 12096:1997				

DELIVERY

All Timberwolf TW 230VTR 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 5-6 which contain important health and safety information and advice.

MANUAL CONTROLS

Roller control boxes: a control box is located on either side of the feed funnel. Their function is to control the feed roller whilst processing material. They do 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** feed control.

Red Safety Bar Test

To ensure the safety bar is always operational it must be activated once before each work session.

GREEN FEED CONTROL: forward feed - push the feed control once - this activates the rollers and will allow you to start chipping (if the rotor speed is high enough).

BLUE FEED CONTROL: 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 feed control.



Control Box Diagram

There are two control boxes, located on either side of the feed tray.



BLUE
REVERSE
FEED
CONTROL



GREEN
FORWARD
FEED
CONTROL

RED SAFETY BAR

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

AUTO CONTROLS

The no stress unit controls the feed rate of the material going into the chipping chamber. When the rotor speed is below the predetermined level the no stress unit will not allow the feed rollers to work in the forward direction. When the rotor speed rises above the predetermined level the feed rollers will start turning without warning.

EMERGENCY STOPPING

There are two ways of stopping the TW 230VTR 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** or **blue reverse** feed control.

Stopping the Engine

Should the entire machine need to be stopped in an emergency, the engine stop switch located on top of the engine bay should be pushed. This will shut down the engine in the shortest possible time. The engine cannot be restarted until the engine stop switch is pulled out and the main ignition switch is turned off to reset the machine.

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 next to the engine stop switch (see parts locator on page 3).



CRAWLER TRACK CONTROLS

The chipper is designed to operate in either chipper or crawler mode, but not both at the same time.

Chipping Mode

Power is available to the feed rollers. The cutting disc is rotating but the unit is stationary.

Crawler Track Mode

Power is available to the crawler tracks. The cutting disc is rotating but the feed rollers are stationary.

To switch between modes, a lever is operated (see diagram below). This is located on the driving control panel (see parts locator on page 3). It is clearly marked.

When Track mode is selected the two track control valves may be operated. These have direct control over the track relevant to each side of the machine. They are proportional valves, so increased movement will result in increased track speed.



NOTE: ENSURE TRAY IS ROTATED INTO THE UP/CLOSED POSITION PRIOR TO TRACKING TO AVOID DAMAGE.

Track width adjustment is only possible with the track/chip control in the chip position. The track adjust handle is spring loaded to the middle (see diagram, right). The more you move the handle, the more the tracks adjust. To move the tracks outward, move the track adjust handle up. To bring tracks inward, move the track adjust handle down.

There are two tracking speeds which can be selected via the speed selection switch on the control panel (5 kph or 2.5 kph). Speed can be further controlled with the throttle. It is recommended that manoeuvring in tight spaces, loading, unloading and tracking up gradients should be performed in speed one. Speed two should only be selected for tracking on level ground. The chipper can operate continuously at a 20° incline and up to 10 minutes at 30° incline.



DAILY CHECKS BEFORE STARTING

- Locate the machine on firm level ground.
- Check machine is well supported and cannot move.
- 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 11.
- Check (visually) for fluid leaks.
- Check fuel and hydraulic oil levels.

For parts location see diagrams on pages 3 & 4.

BEFORE USING THE CHIPPER

WITH THE ENGINE RUNNING AT FULL SPEED

1



PRESS THE GREEN FEED CONTROL
THE IN-FEED SHOULD TURN
FORWARDS

2



PRESS THE RED SAFETY
BAR
THE IN-FEED SHOULD STOP

3



PRESS THE BLUE FEED CONTROL
THE IN-FEED SHOULD TURN BACKWARDS ONLY
WHILE THE FEED CONTROL IS PRESSED

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. Refer to Troubleshooting.

THROTTLE LEVER



HEAT START



When the engine stop button is pressed it must be pulled out again and the ignition switch turned off to reset the machine before attempting to restart.

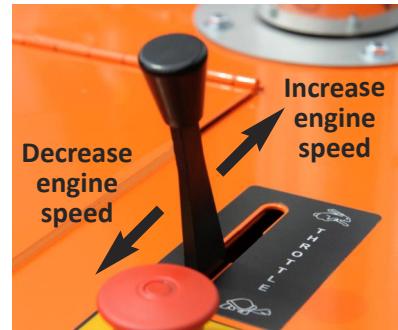
CONTROLLING ENGINE SPEED

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 the 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.

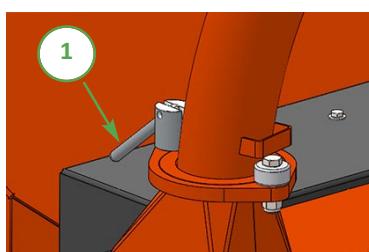


DISCHARGE CONTROLS

Controlling the discharge is an essential part of safe working.

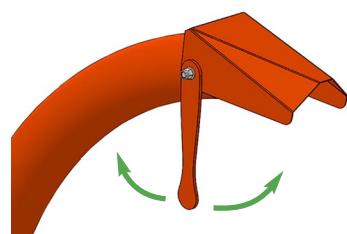
ROTATION

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



BUCKET ANGLE

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



STARTING TO CHIP

- Check that the chipper is level and running smoothly.
- Release the catches on the feed tray and lower.
- Perform the “before using the chipper” tests (see page 11).
- Press the green feed control. 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 rollers. 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 no stress 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** feed control 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** feed control and hold for 2 seconds - then repress the **green forward** feed control. This should enable the rollers to free the offending piece of material and continue rotating at the correct speed. If the rollers continue to stall in the 'forward feed' or 'reverse feed' position push the red stop button, turn the engine off, remove the 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 ignition keys.
- Remove the discharge tube. Check that it is clear.
- Wearing gloves, reach into the rotor housing and scoop out the majority of the debris causing the blockage.
- Replace the discharge tube.
- Restart the engine and increase to full speed.



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.

BLADE WEAR

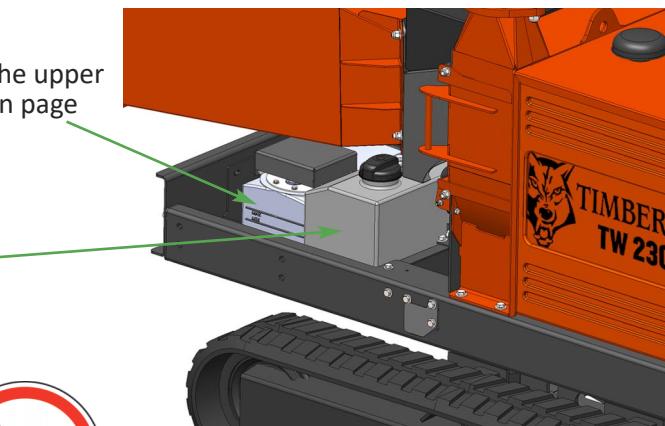
The most important part of using a wood chipper is keeping the cutter blades sharp. Timberwolf chipper blades are hollow ground to an angle of 40 degrees. When performing daily blade checks ensure blade edge is sharp and free from chips, if there is any evidence of damage, or the edge is "dull" change the blade(s). The TW 230VTR is fitted with 2 blades 135mm (5") long. They are 100mm 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 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.

HYDRAULIC OIL LEVEL INDICATOR

The oil level is visible through the tank wall. It should be within the upper and lower level marks. Refer to filling and draining instructions on page 22.



FUEL LEVEL INDICATOR

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

REFUELING

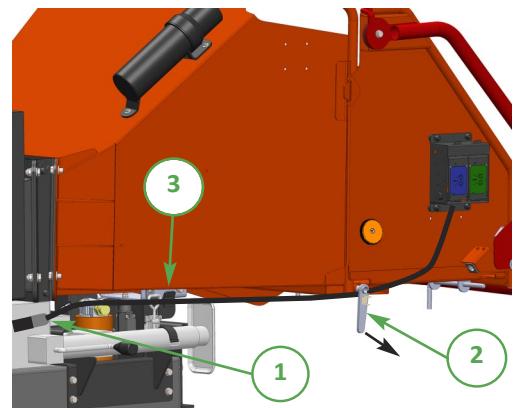
When refuelling, follow standard Health & Safety practices:

- Stop the engine and allow to cool before refuelling.
- Never smoke or allow naked flames nearby while refuelling.
- Store fuel away from vapour ignition sources such as fires and people smoking.
- Never refuel at operating location, keep a distance of > 10 m to avoid creating fire hazards.
- Fuel storage containers must be approved for diesel fuel storage and clearly labelled with securely fitting caps.
- Clean area around fuel cap and use a funnel for refuelling. Replace the fuel cap securely. Do not fill the tank beyond the max. fill indicator.
- Avoid skin contact with fuel. If it gets into eyes wash out with sterile water immediately and seek medical advice as soon as possible.
- Always clean spillages quickly and change clothes before re-entering the work area if fuel is spilled onto garments.



REMOVING THE FUNNEL

- 1 Disconnect the control box loom from the engine loom at the connection point location under the near side of the funnel.
- 2 Remove the locking pins each side (hook back onto hinge to avoid misplacing them). Withdraw both hinges and with two people, remove the tray.
- 3 Release the two catches that secure the funnel to the chassis, located underneath funnel.
- 4 With two people in position, lift the funnel ensuring the wide end is lifted first then release the narrow end from the roller box assembly.



WINCH OPERATION

Where a winch is factory fitted, it is for **recovery purposes only**. Always follow the winch manufacturer's instruction manual provided with the machine.

TROUBLESHOOTING

This table is a troubleshooting guide to common problems.

If your problem is not listed below, or is unresolved after following the guide, please contact your Timberwolf service agent, whose Timberwolf trained engineers can perform further fault finding. Before you call, please have this operating manual and the machine serial number ready.

Problem	Cause	Solution	Caution - Always ensure appropriate PPE is worn.	
Wood chip ejection stopped / limited	Obstructed discharge	Clear debris from discharge chute.		Ensure machine is off and keys removed.
	Loose drive belts	Refer to manual & tension belts guidelines.		Ensure machine is off and keys removed.
	Broken rotor paddles	Inspect paddles, replace broken / missing paddle.		Ensure machine is off and keys removed. Call engineer for repair.
Rotor does not turn	Obstructed discharge	Clear debris from discharge chute.		Ensure machine is off and keys removed.
	Rotor jammed	Inspect & clear infeed funnel, roller box and rotor housing.		Ensure machine is off and keys removed.
	Drive belt issue	Inspect drive belts, replace if required. Refer to manual & tension belts guidelines.		Ensure machine is off and keys removed.
Slow or not feeding	Low engine speed	Check & inspect throttle and cable. Check throttle is set to specified speed.		Ensure machine is off and keys removed.
	Infeed rollers jammed	Inspect & clear infeed funnel, roller box and rotor housing.		Ensure machine is off and keys removed.
	Hydraulic oil	Check hydraulic oil level, top up if necessary.		Ensure machine is off, cool & pressure isn't present within the system.
	Blades dull	Rotate, sharpen or replace blades.		Ensure machine is off and keys removed.
	Anvils dull	Check anvil has sharp edge, rotate, sharpen or replace if necessary.		Ensure machine is off and keys removed.
	Obstructed discharge	Clear debris from discharge chute.		Ensure machine is off and keys removed.



**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 or modifications, may invalidate warranty and/or regulatory compliance, 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.	DEPENDING ON WORKING ENVIRONMENT				
Lubricate variable track base slides.	WEEKLY, DEPENDING ON WORKING ENVIRONMENT				
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.	✓	OR AS REQUIRED - SEE PAGE 21			
Grease the roller spline and bearing.	✓	OR AS REQUIRED - SEE PAGE 21			
Check anvils for wear.		✓			
Check fuel pipes and clamp bands.			✓		
Check battery electrolyte level.			✓		
Check for loose electrical wiring.			✓		
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.	REFER TO YOUR ENGINE SUPPLIERS MANUAL				
Check coolant.	REFER TO YOUR ENGINE SUPPLIERS MANUAL				
Change engine oil.	REFER TO YOUR ENGINE SUPPLIERS MANUAL				
Replace engine oil filter cartridge.	REFER TO YOUR ENGINE SUPPLIERS MANUAL				
Check valve clearance.	REFER TO YOUR ENGINE SUPPLIERS MANUAL				
Replace anvils when worn.	RETURN TO DEALER FOR ANVIL CHANGE				

SAFE MAINTENANCE

- 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 hazardous materials.



WARNING

ALWAYS IMMOBILISE THE ENGINE BEFORE UNDERTAKING ANY MAINTENANCE WORK ON THE CHIPPER BY REMOVING THE KEY AND DISCONNECTING THE BATTERY. ENSURE THE CHIPPER IS STABLE BEFORE PERFORMING ANY MAINTENANCE.

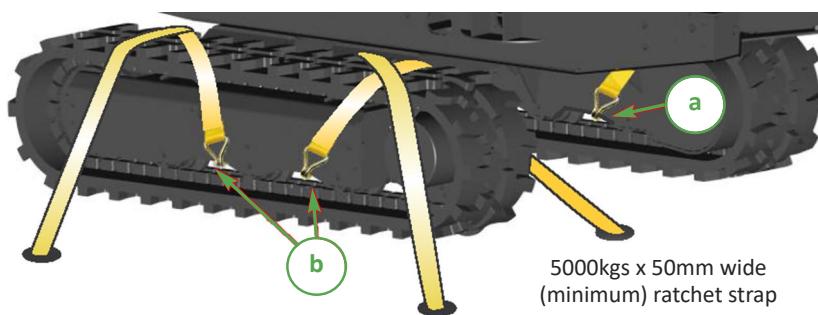
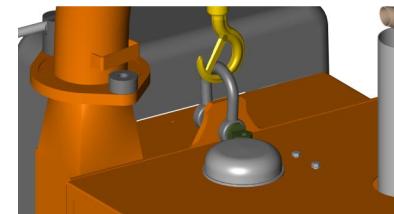
SAFE LIFTING & SECURING DOWN OF THE CHIPPER

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**. Maximum lift weight is 1350kg, as indicated on the machine.

The method of securing the chipper can vary depending on the type of carrier and position of tie down points available on the carrier.

Timberwolf recommend where possible to secure machine to carrier using correctly rated ratchet straps directly lashing from 4 points on the inner (a) or outer (b) track frame and over the tracks to the carrier lashing points as shown.

Securing a Timberwolf chipper ready for transport must be carried out by competent qualified personnel. Failure to observe this procedure could result in chassis and/or undercarriage damage.



5000kgs x 50mm wide
(minimum) ratchet strap

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

- The battery is located in the control tower.
- Remove the negative lead first and then the positive lead.
- Clean, charge and/or top up the battery as required.
- Refitting is the reverse of removal. Apply a smear of vaseline to the terminals to prevent corrosion.



WARNING

REFER TO THE BATTERY SAFETY SECTION ON PAGES 18.

CHECK FITTINGS

The Timberwolf TW 230VTR 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 lb ft	Torque Nm
Blade Bolts	M16	Standard	24mm Hex	125	170
Anvil Bolts	M12	Standard	M12 Cap	65	88
General	M8	Standard	13 mm Hex	20	27
General	M10	Standard	17 mm Hex	45	61
General	M12	Standard	19 mm Hex	65	88
Bung in Fuel Tank	3/8" BSP	-	22 mm Hex	15	20

HAZARDOUS MATERIALS & END OF MACHINE LIFE

During Machine Life

The following hazardous materials are supplied within Timberwolf machines:

- Engine oil
- Coolant
- Battery acid
- Hydraulic oil
- Diesel
- Copper Ease

MATERIAL SAFETY DATA SHEETS FOR HAZARDOUS MATERIALS SUPPLIED WITHIN TIMBERWOLF MACHINES ARE AVAILABLE ON REQUEST. REFER TO THESE FOR FIRST AID AND FIRE PROTECTION MEASURES.

Always follow recommended procedures for safe handling, removal and disposal of hazardous materials. Safety precautions should be taken when handling hazardous materials (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. Ensure hazardous spillages do not flow into the ground or drainage system and ensure potential environmental damage is controlled safely, according to local laws.

End of Machine Life

Follow these guidelines using approved local waste and disposal agencies for recycled materials, according to applicable Health, Safety and Environmental laws.

- Position the machine within reach of all necessary lifting equipment.
- Use tools and PPE detailed within maintenance instructions.
- Remove all hazardous materials and battery and store safely before disposal.
- Disassemble the machine structure, referring to the maintenance instructions. Pay attention to parts with mechanical pressure or tension applied, including springs.
- Separate items that continue to have a service life.
- Separate worn items into material groups and where possible, recycle using available agencies for recycled materials. Common types are:

Steel	Plastic materials
Non-ferrous metals	Rubber
Aluminium	Electrical and Electronic Components
Brass	Other materials that can be recycled
Copper	Other materials that cannot be recycled

- If a part is not easily separated into different material groups, it must be added to "general discarded materials".
- Do not burn discarded materials.
- Change the machinery records to show that the machine is out of service and discarded. Supply this serial number to Timberwolf to close their records.

BATTERY SAFETY INFORMATION

WARNING NOTES AND SAFETY REGULATIONS FOR FILLED LEAD-ACID BATTERIES



- For safety reasons, wear eye protection when handling a battery.
- Keep out of reach of children.
- 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.



Warning notes:



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! Remove contact lenses if worn and continue rinsing. 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.

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.

- 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.

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 (see no. 4).

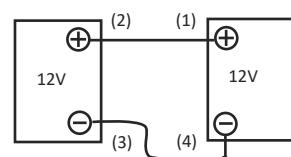
3. Installation in the vehicle and removal from the vehicle

- 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.

- 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 (see no. 4).

6. Jump Starting

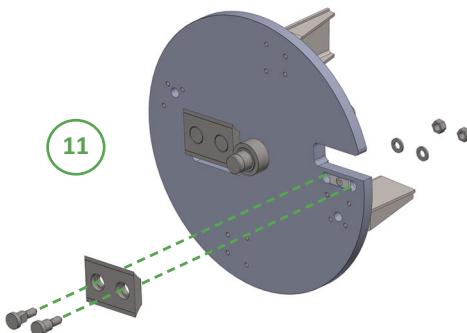
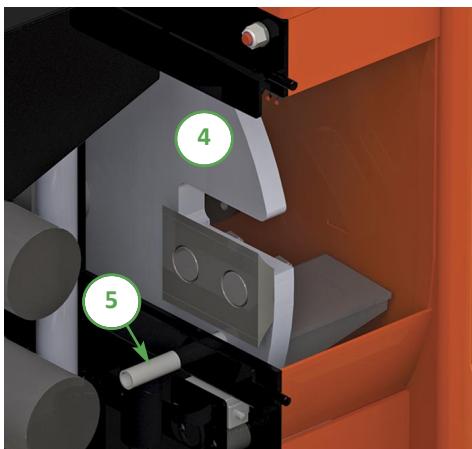
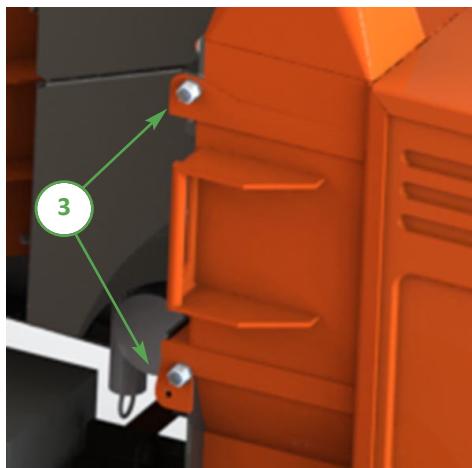
- Use the standardised jumper cable in compliance with DIN 72553 only, and follow the operating instructions.
- Use batteries of the same nominal voltage only.
- Switch off the engines of both vehicles.
- First connect the two positive terminals (1) and (2), then connect the negative terminal of the 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).



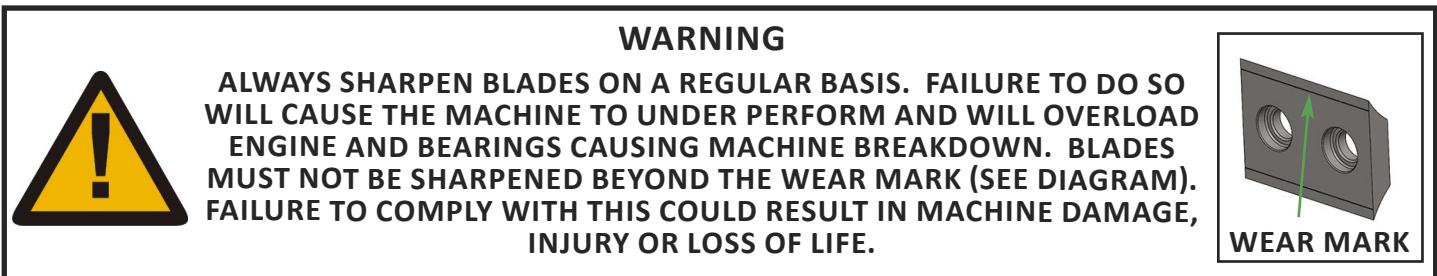
7. Taking the battery out of service

- 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 (see no. 4).

CHANGE BLADES



- WARNING**
WEAR RIGGERS GLOVES FOR THE BLADE CHANGING OPERATION.
- 1 Turn the chipper off and remove the ignition keys.
 - 2 Remove battery leads.
 - 3 Remove the 2 nuts retaining the rotor housing blade access hatch, slide hatch clear of rotor housing.
 - 4 Turn rotor to blade change position.
 - 5 Insert locking bar into rotor housing and rotor.
 - 6 Brush away all dirt and debris from the rotor and blades.
 - 7 With a 24mm spanner/socket undo the two nyloc nuts and washers that are holding the blade in place. Remove both blade bolts from the blade.
 - 8 Grasp the blade by the flat edges while wearing heavy duty gloves.
 - 9 Withdraw the blade from the rotor.
 - 10 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 very quickly.**
 - 11 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.
 - 12 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.
 - 13 **A calibrated torque wrench must be used to tighten the bolts to a torque setting of 125 lbs ft (170 Nm).**
 - 14 Remove lock pin, rotate rotor to next blade then replace lock pin and repeat steps 6 - 13.
 - 15 Refit rotor housing blade access hatch.
 - 16 Refit the nuts and tighten to 40 lbs ft (54 Nm).
 - 17 Refit battery leads.

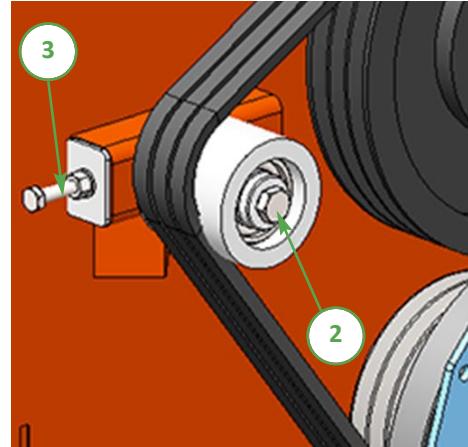


TENSION DRIVE BELTS

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.

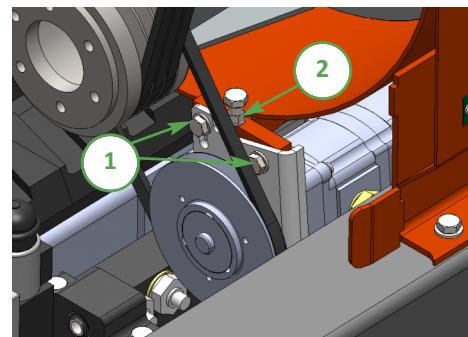
- 1 Remove engine bay side panel.
- 2 Loosen bolt in centre of tensioner pulley with a 19 mm spanner so that pulley is able to slide with minimal wobble.
- 3 Turn nut in end of tensioner pulley slider until correct belt tension is achieved. For instructions on checking belt tension & correct belt tension values, please refer to the Timberwolf V-Belt Tensioning Data Table (page 34).
- 4 Re-tighten bolt in centre of tensioner pulley.
- 5 Run machine and test, recheck belt tension.

NOTE: Slack drive belts will cause poor performance and excess belt and pulley wear.



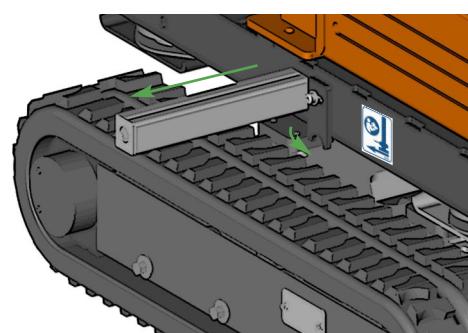
TENSION HYDRAULIC PUMP BELT

- 1 Loosen the 2 M10 bolts on the mounting pad.
- 2 Loosen the M8 lock nut.
- 3 Adjust M8 bolt to tension/slacken drive belt. For instructions on checking belt tension & correct belt tension values, please refer to the Timberwolf V-Belt Tensioning Data Table (page 34).
- 4 Re-tighten lock nut and M10 bolts.



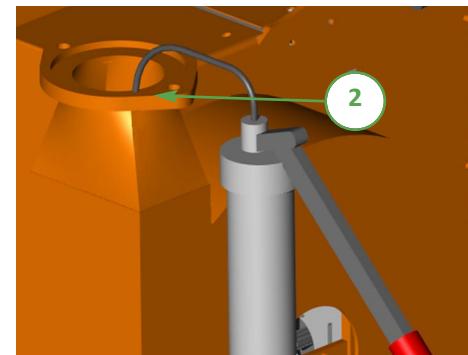
CHASSIS JACKING POINT

- 1 Loosen the cover plate bolt on the appropriate side of the chipper.
- 2 Rotate cover plate, allowing it to remain attached to the chassis.
- 3 Pull the jacking beam from the access hole to its fullest extent (approx 300 mm).
- 4 After use, push beam back into access hole and secure cover plate.



GREASE THE DISCHARGE FLANGE

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



GREASE THE ROLLER SPLINE AND ROTOR BEARINGS

NOTE: This should be done regularly. In dirty and dusty conditions or during periods of hard work it should be daily. 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.

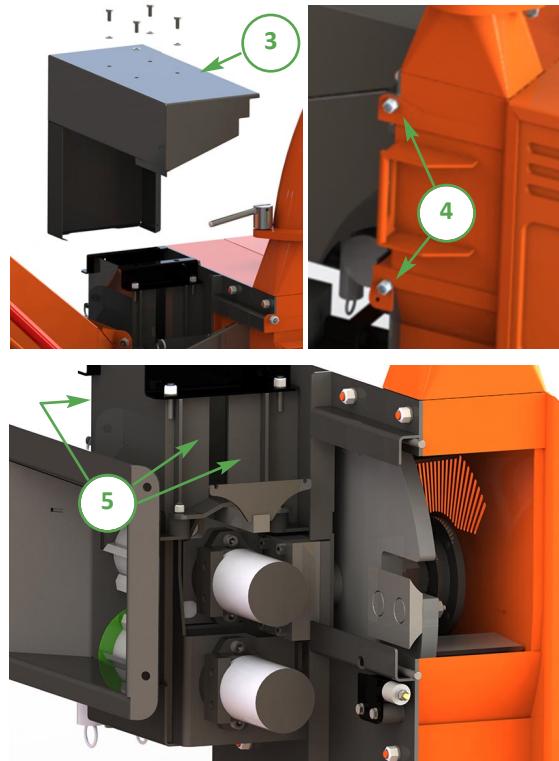
- 1 Locate the greasing panel.
- 2 Apply 4+ pumps of grease to each nipple.
- 3 It is recommended to grease all the nipples whilst the engine is running and rollers are turning to distribute the grease evenly. DO NOT USE GRAPHITE BASED GREASE.
- 4 Both front and rear bearings are greased by nipples A and B. The top and bottom roller splines are greased by nipples C and D.



GREASE THE ROLLER BOX SLIDES

NOTE: This should be done regularly. In dirty or dusty conditions or during periods of hard work it should be done weekly. 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 Turn the chipper off and remove the ignition keys.
- 2 Ensure machine has come to a complete stop - remove battery leads.
- 3 Remove the 4 nuts and washers retaining the roller box guard and remove guard.
- 4 Remove the rotor housing blade access hatch as blade change procedure.
- 5 Apply thin grease with a brush directly to the slide surfaces indicated, including inner cheeks of slider. DO NOT USE GRAPHITE BASED GREASE.
- 6 Replace rotor housing blade access hatch then top guard. Refit nuts and washers.
- 7 Refit battery leads.



ENGINE SERVICING

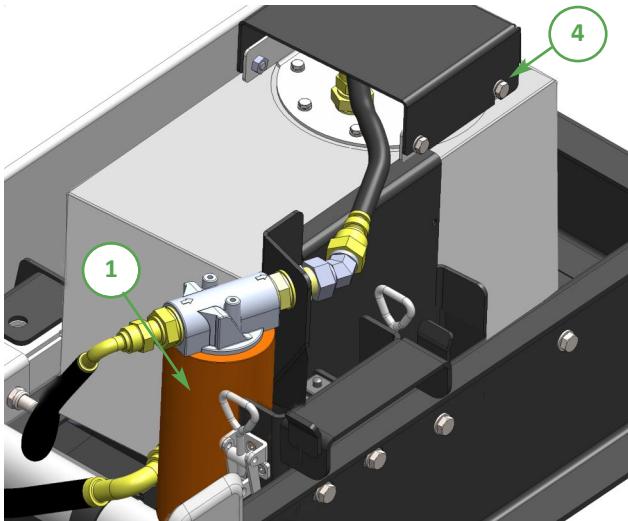
All engine servicing must be performed in accordance with the Engine Manufacturer's Handbook provided with the machine. **Failure to adhere to this may invalidate warranty and/or shorten engine life.**

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.

CHANGE HYDRAULIC OIL AND FILTER



NOTE: This is a non-adjustable air breather filter.

- 1 Locate the oil filter cartridge and unscrew (a filter strap or similar tool may be required to loosen the filter).
- 2 Apply a smear of oil onto the seal of the new filter.
- 3 Screw new filter on. Hand tighten only.
- 4 Loosen the four M8 bolts and remove the hydraulic tank cover.
- 5 Remove filler cap from tank.

TRACK BASE MAINTENANCE

Safe Maintenance

- Solidly support the under carriage if it needs to be lifted up for maintenance (see Chassis Jacking Point section on page 20).
- Hydraulic systems may get very hot after working.
- Keep all components in good condition as they are exposed to high pressures.
- Immediately repair damage and replace worn or broken items.

Maintenance intervals are only guidelines. The amount of times maintenance is conducted should be increased beyond recommended guidelines if severe conditions are encountered.

LUBRICATE VARIABLE TRACK BASE SLIDES

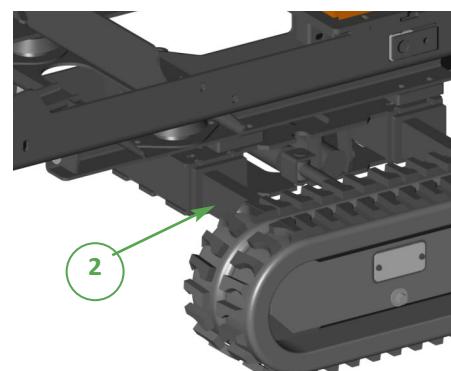
The variable track base slides must be lubricated weekly or more often depending working conditions to prevent jamming.

- 1 Extend tracks fully.
- 2 Using a brush, generously coat all surfaces of the four slider bars with general purpose grease. **DO NOT USE GRAPHITE BASED GREASE.**
- 3 Retract the tracks fully.
- 4 Cycle tracks in and out two more times.



- 6 Remove drain plug from the hydraulic oil tank and drain oil into a suitable container.
- 7 Replace drain plug.
- 8 Refill with VG 32 hydraulic oil until the level is between the min and max lines on the tank (about 15 litres).
- 9 Refit filler cap and hydraulic tank cover.

- Keep the tracks clean, removing excess oil, grease and dirt.
- Check for oil leaks and damaged hoses.
- Only use recommended lubricants. Do not mix different brands.
- Keep track stretcher grease nipples clean.



CHECKING THE RUBBER TRACKS

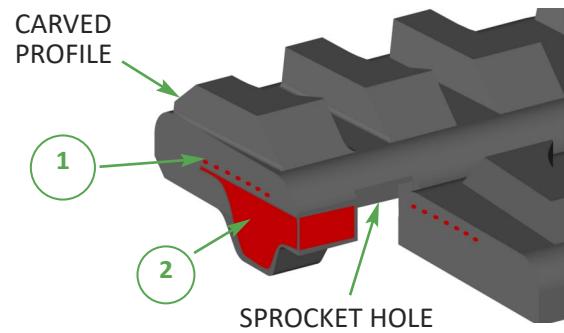
The structure of the rubber track is shown in this diagram. The steel cables (1) and metal core (2) are embedded in the rubber.

There are many ways in which rubber tracks may be damaged. Some of these are terminal for the tracks, others are only cosmetic.

Breakages of steel cables and metal cores

Excess track tension can cause steel cables to break. This may be caused by:

- Stones or foreign matter accumulating between the track and the undercarriage frame.
- The track slipping off its guide system.
- Extreme friction such as rapid changes in direction.
- Improper contact between track and sprocket.
- Operation on sandy terrain.



Fatigue cracks and abrasion

Cracks at the base of the carved profiles are caused by rubber fatigue due to bending.

Cracks and bends on the edge of the rubber are caused by manoeuvring the track on concrete edges and curbs.

Cracks and abrasions in the rubber on the guide roller paths are caused by compression fatigue of the rubber due to the weight of the wheel combined with operation on sandy terrain or repeated sudden changes in direction.

Abrasions of the carved profile may be caused, in particular, by rotation on concrete or gravel surfaces or hard surfaces.

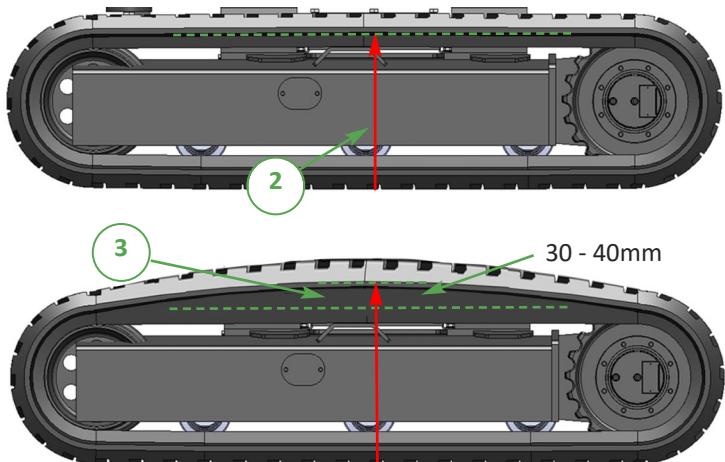
Cracks on the outside surface of the track are often due to contact with gravel, sharp stones and sharp materials such as sheet metal, nails and glass.

Cracks on the inside surface of the circumference and on the edge of the rubber are caused by contact between track and the undercarriage structure or with sharp concrete edges.

These methods of damage are progressive. The track can continue to be used until wear exposes the metal cores. If this exposure extends for more than half of the circumference of the track then it is time to replace the track, even though it can still be used.

CHECKING TRACK TENSION

- 1 Stop your machine on a flat and solid surface.
- 2 Measure from the ground to the inside edge of the track at the top central location.
- 3 Pull the top of the track upwards and measure the deflection.
- 4 The track tension is normal if the deflection is between 30 - 40mm.



TRACK LOOSENING/TIGHTENING PROCEDURES

Track tension is maintained by grease in the adjuster unit. Adding more grease will increase track tension, removing grease will decrease it.

The grease contained in the hydraulic track tensioner ram is pressurised. Never release grease nipple (No. 1, Fig. 1) for more than necessary to slowly release grease to a maximum of five turns. If the valve is loosened too much you risk expelling grease under pressure and possible injury to the machine operator. Remove gravel or mud when they are jammed between the sprocket and the track link before loosening the track.

- 1 Locate grease nipple under coverplate in side frame (Fig. 1) to access the adjustment system.
- 2 To loosen the track turn the grease nipple counter-clockwise slowly, the grease should begin to be expelled after approximately two turns.
- 3 If grease does not start to drain out then slowly rotate the track forward and reverse to free adjuster mechanism - grease may then be expelled under pressure as track tension is relieved.
- 4 When you have obtained correct track tension then turn valve clockwise and tighten it. Clean all traces of extruded grease.
- 5 To stretch the track connect a grease gun to grease nipple and add grease until track tension falls within specified values.

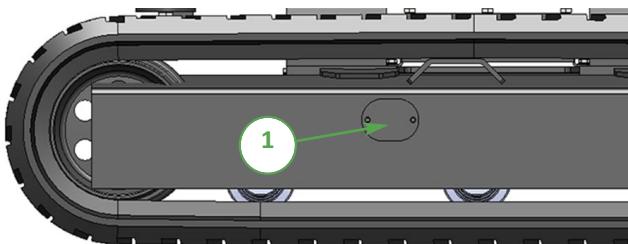
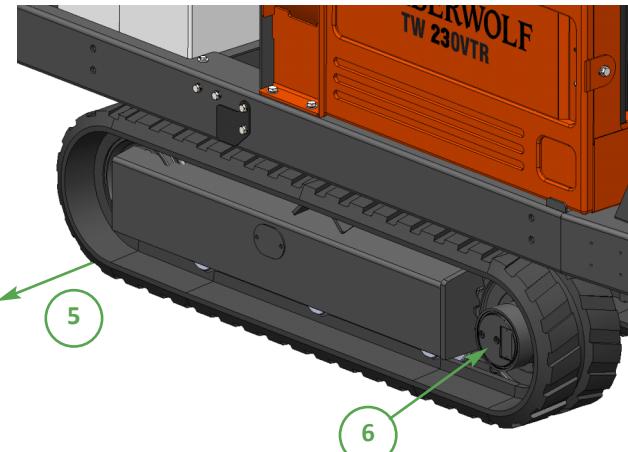


Fig. 1

REMOVING THE RUBBER TRACKS

Remove gravel or mud when they are jammed between the sprocket and the track link before loosening the track.

- 1 Stop your machine on a solid and level surface. Lift it up and support it in safe conditions.
- 2 Locate grease nipple under coverplate in side frame to access to the adjustment system (No. 1, Fig. 1).
- 3 To loosen a track turn the grease nipple counter-clockwise slowly then the grease should begin to be expelled after approximately 2 turns.
- 4 If grease does not start to drain out then slowly rotate the track forward and reverse to free adjuster mechanism.
- 5 Using levers exercise force sideways to slide the track off the track-stretching wheel.
- 6 Remove track from drive sprocket end.



INSTALLING THE RUBBER TRACKS

- 1 Check that the grease contained in the hydraulic cylinder has been removed.
- 2 Mesh the track links in the sprocket and place the other end of the track on the track-stretching wheel.
- 3 Locate the track on the stretching wheel using levers if required.
- 4 Make sure track links mesh correctly in the sprocket and in the track stretching wheel.
- 5 Adjust track tension (see track loosening procedures on page 24).
- 6 Set the tracked undercarriage on the ground.



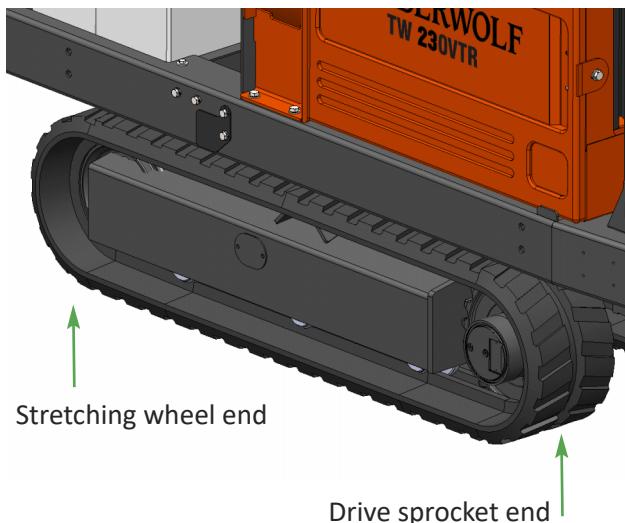
WARNING

MAKE SURE THAT YOU ARE ALWAYS IN
SAFE CONDITIONS WITH THE MACHINE
LIFTED TO PERFORM THE OPERATION
FOR TRACK INSTALLING.

CHECKING SPROCKET WEAR

Measuring wear on sprocket and driving gear teeth is one of the most difficult measurements to be done. You must always consider the point where wear is greatest.

There should always be enough tooth left on the sprocket to engage fully with the rubber track. When the sprocket meshing distance is reduced significantly the sprocket should be changed.



TIMBERWOLF NO-NONSENSE WARRANTY

All new Timberwolf machines come with peace of mind built in. Our no-nonsense warranty is your guarantee of your Timberwolf wood chipper not letting you down.

Your warranty statement is included in your manual pack. Please ensure you register your machine with your dealer to ensure you are eligible for the full Timberwolf warranty period.



Timberwolf Ltd
Entec House, Tomo Industrial Estate, Stowmarket IP14 5AY
Telephone: 01449 765800
Email: sales@timberwolf-uk.com Web site: timberwolf-uk.com



EC Declaration of Conformity



We

Timberwolf Ltd.

of

Entec House,
Tomo Industrial Estate,
Stowmarket,
IP14 5AY
United Kingdom
Tel: 01449 765800
Email: sales@timberwolf-uk.com

Hereby declare that this Declaration of Conformity is issued under our sole responsibility and that the following objects of the declaration:

Product Range: Timberwolf TW 230 Road Tow and Tracked 6" Woodchippers

Model(s): TW 230DHB, TW 230VTR

Type(s): TW 230DHB, TW 230DHB-FR, TW 230DH(a), TW 230DH(a)-FR,
TW 230VTR, TW 230VTR-FR, TW 230VTRWW, TW 230VTRWB

Serial No(s): TW 230DHB: 35A4HS209237 onwards
TW 230VTR: 35A3HS213041 onwards

Comply with all applicable essential health and safety requirements and are in conformity with the following EU Directives and Union harmonised legislation:

2006/42/EC Machinery Directive

2014/30/EU Electromagnetic Compatibility Directive

2000/14/EC Noise Emission in the Environment by Equipment for Use Outdoors
(Guaranteed Sound Power: 120 dB (A); Measured Sound Power Level: 98 dB (A))

The following harmonised standards, including part/clauses of, have been applied:

Machinery Directive: BS EN 13525:2020: Forestry machinery —Wood chippers —Safety, BS EN ISO 12100:2010: Safety of Machinery — General principles for design — Risk assessment and risk reduction.

EMC Directive: BS EN ISO 14982:2009: Agricultural and forestry machinery – Electromagnetic Compatibility – Test methods and acceptance criteria.

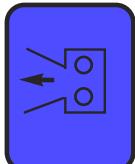
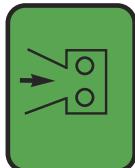
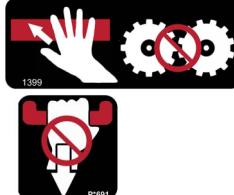
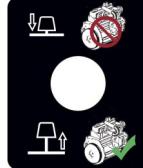
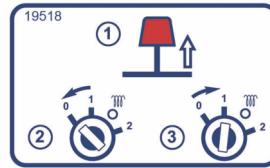
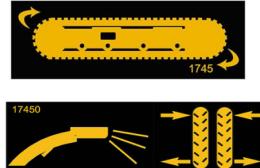
Noise Directive: BS EN ISO 3744:2010: Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane.

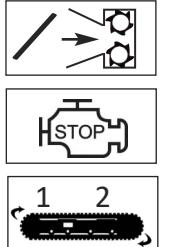
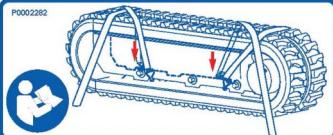
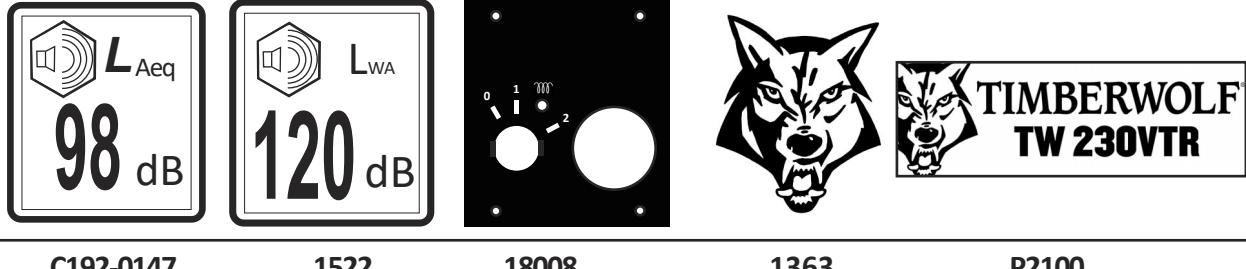
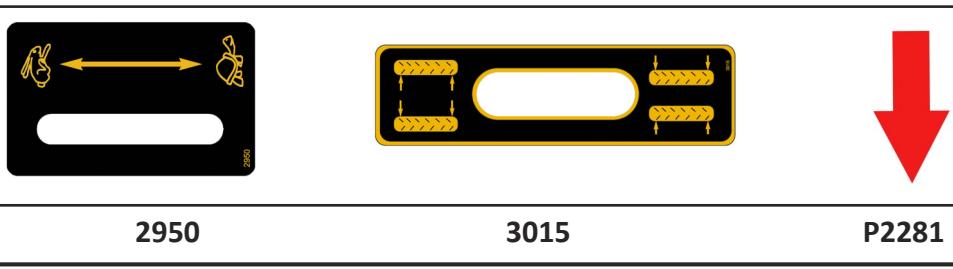
Signed at Entec House, Stowmarket for and on behalf of Timberwolf Ltd by:

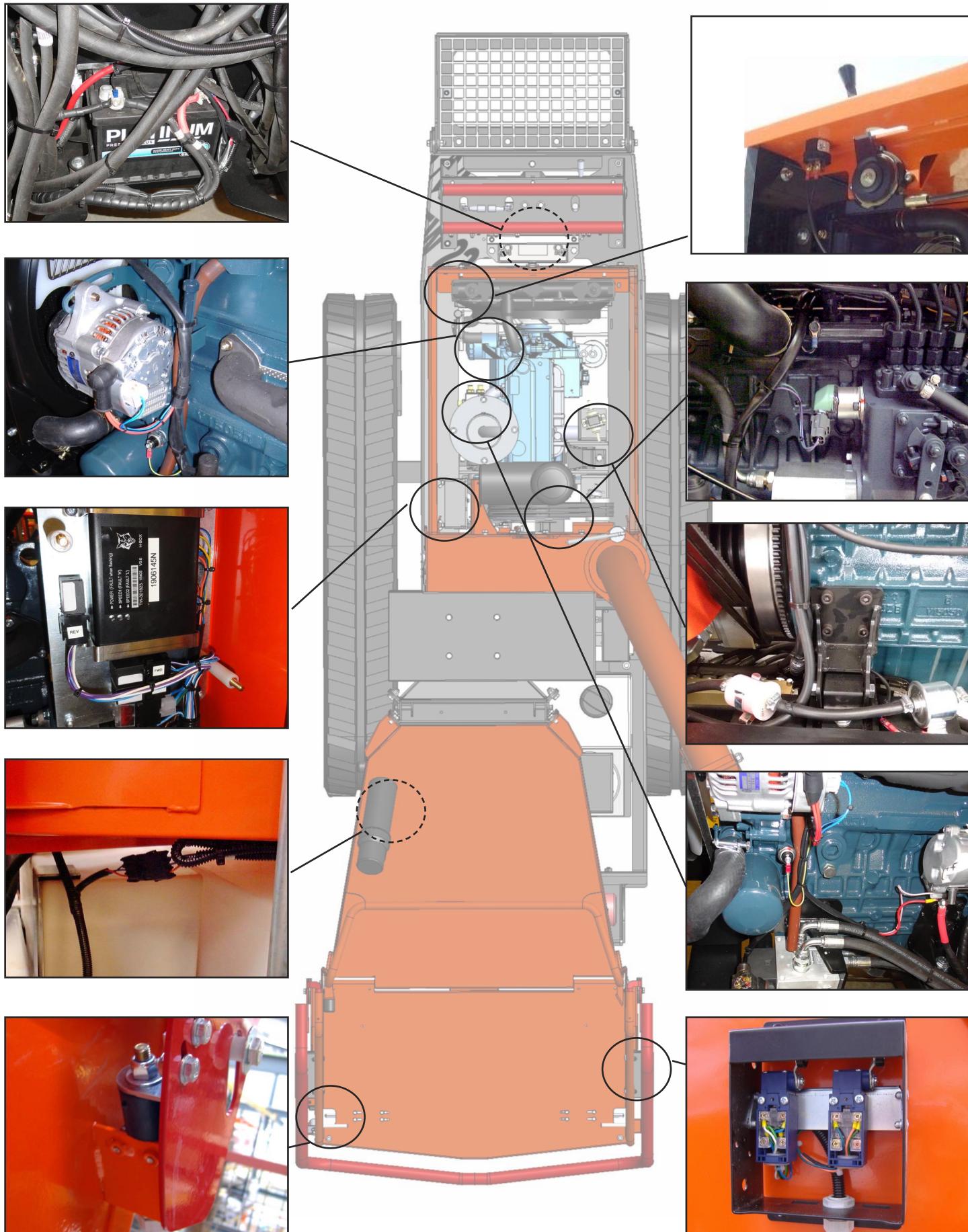
Mr Chris Perry (Managing Director):

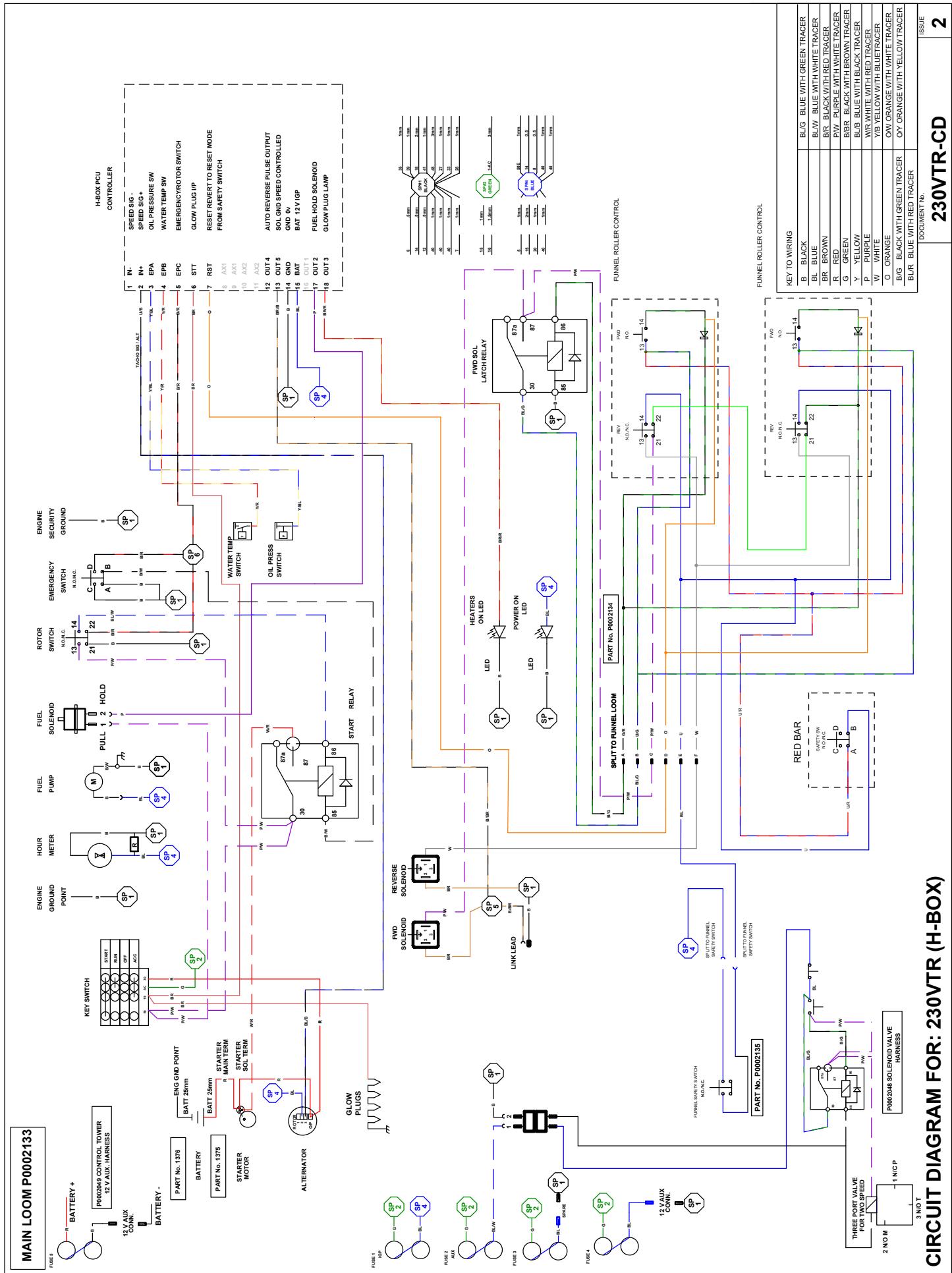
Dated: 14th June 2021

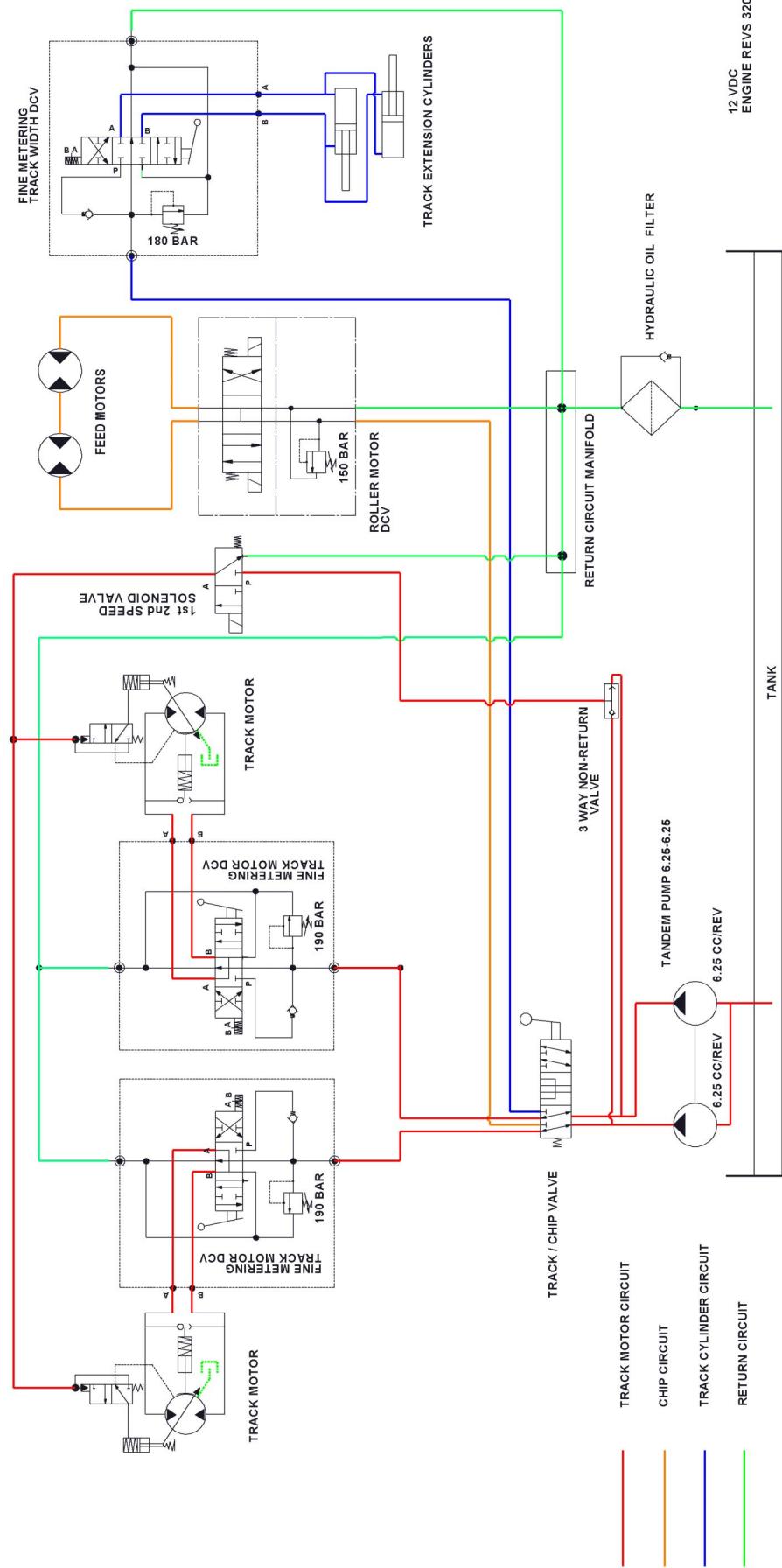


DECAL	DESCRIPTION	DECAL	DESCRIPTION
	616 Warning. Hot exhaust		4099 Danger. Rotating blades. Keep hands and feet out.
	617 Warning. High velocity discharge - keep clear		2800 Reverse feed
	670 Personal Protective Equipment required. See page 5.		2801 Forward feed
	1661 Read the instruction manual for greasing and maintenance information.		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.
	1662 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.		2949 Lifting eye is designed to lift the machine's weight only. 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.
	1399 Push safety bar to stop. 		3022 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.
	C192-0112 Fuel Here. Risk of fire. Allow engine to cool for 1 minute before refuelling. Use diesel fuel only.		18393 New drive belts need re-tensioning. When new belts are fitted check tension every 2-3 hours & adjust until tension remains constant.
	P1301 Push to stop, Pull to reset. (engine)		P1812 Torque blade bolts to 125 lbs ft (170 Nm).
	19518 When the engine stop button is pressed it must be pulled out again and the ignition switch turned off to reset the machine before attempting to restart.		1745 Track 17450 Chip Select Chip mode when adjusting track width.

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.
	P2689 Tracking speeds		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.
	3059 Jacking point. See manual for instructions.		P1810 Forward Latch P1811 Engine Safety P2157 Tracking Speed
	P2282 Read the section in the manual for correct procedure on securing chipper to trailer.		18653 Close bucket and point discharge away from driving position. Protective equipment must be worn when driving machine.
	C192-0147 1522 18008 1363 P2100 1746		2950 3015 P2281



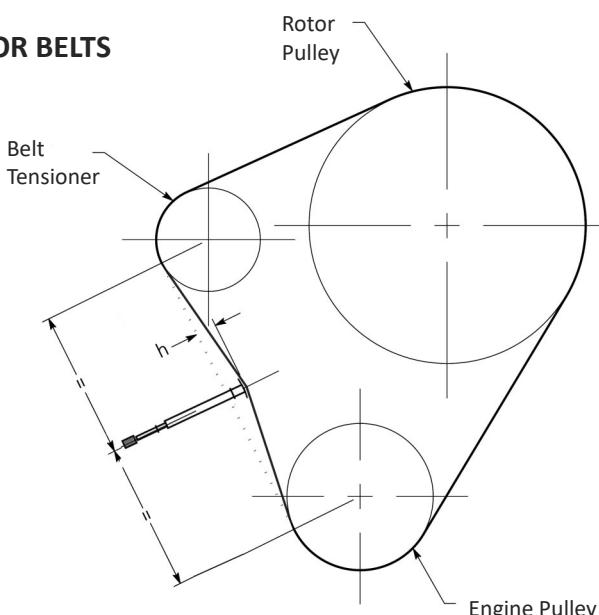
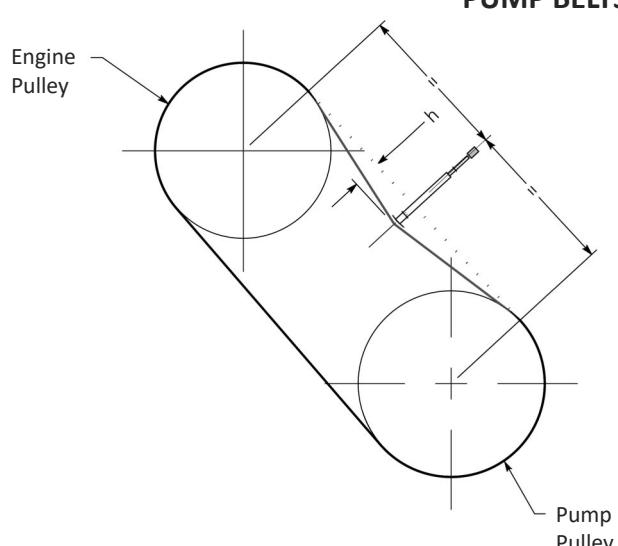




Method:

- 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.
- 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.
- 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.
- 6 Tighten or loosen belts as required following procedure given in this operator's manual.

Tension gauges are available from Timberwolf spares, quoting part no. 18091

ROTOR BELTS**PUMP BELTS**

TW 230VTR		Rotor Belts	Pump Belts
Belt Mfr / Type		Gates Super HC-MN	Quad Power III
Belt Pitch Designation		SPA	XPA
Belt Length in mm		1232	850
Belt Deflection in mm	= h	2.8	2.1
Force Reading (Kg)	New belt	1.9 - 2.1	1.5 - 1.6
	Used Belt	1.7 - 1.8	1.3 - 1.4

Tips on belt tightening:

- 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.
- 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.
- Too much tension shortens belt & bearing life.
- Too little tension will affect the performance of your machine especially in respect of no-stress devices.
- Ensure that belt drives are kept free of any foreign materials.
- If a belt slips - tighten it!

Model number:		Serial number:	
Date of delivery/ handover:		Options/extras:	
Dealer pre delivery check:			
Inspected by:			

50 HOUR WARRANTY SERVICE CHECK

Date:
Hours:
Invoice number:
Signature:
Next service due:

Authorised dealer stamp

11 MONTH WARRANTY SERVICE CHECK

Date:
Hours:
Invoice number:
Signature:
Next service due:

Authorised dealer stamp

23 MONTH WARRANTY SERVICE CHECK

Date:
Hours:
Invoice number:
Signature:
Next service due:

Authorised dealer stamp

Date:	
Hours:	
Invoice number:	
Signature:	
Next service due:	

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Signature:	
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Authorised dealer stamp

PARTS LISTS

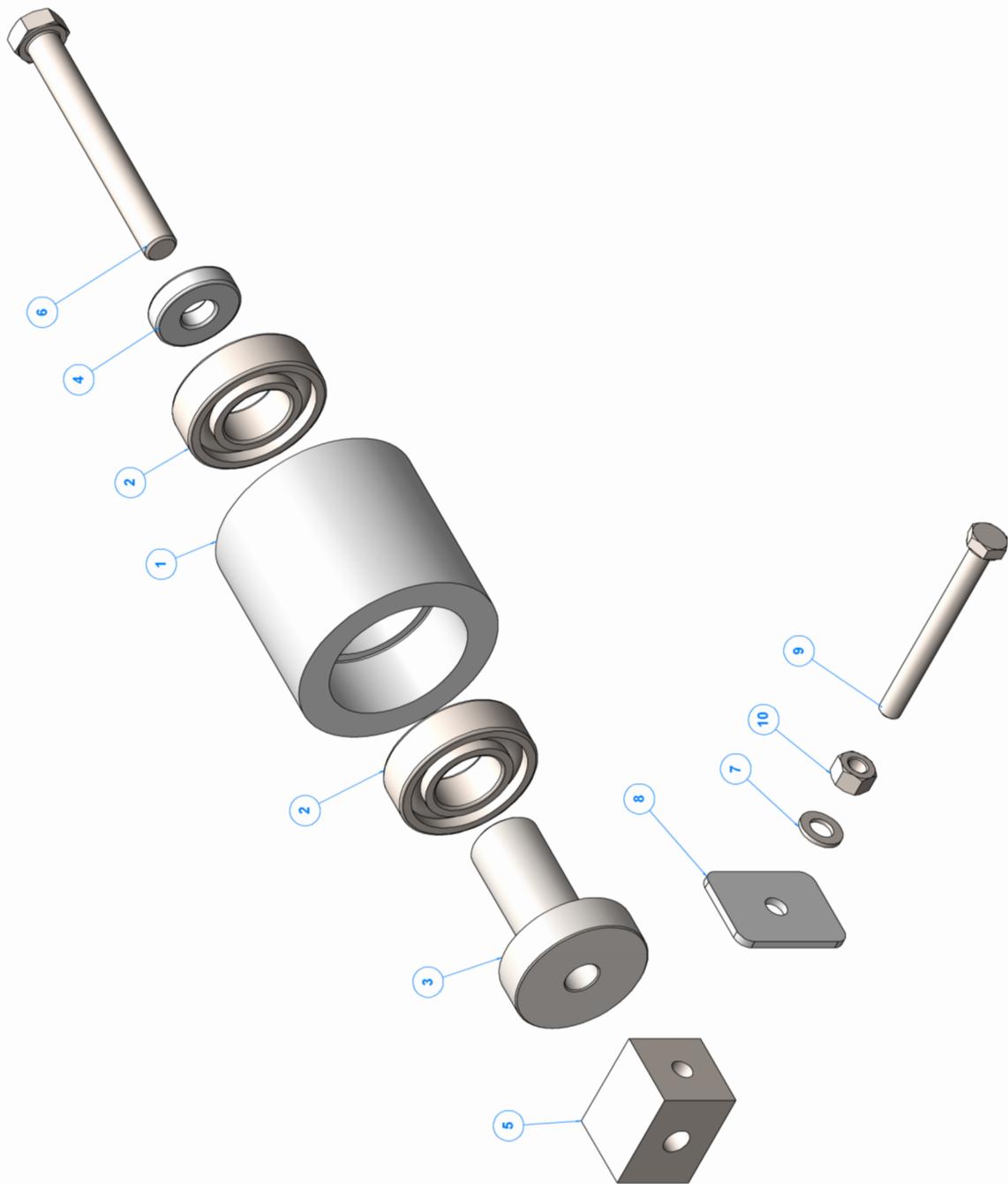
THE FOLLOWING ILLUSTRATIONS ARE FOR PARTS IDENTIFICATION ONLY. THE REMOVAL OR FITTING OF THESE PARTS MAY CAUSE A HAZARD AND SHOULD ONLY BE CARRIED OUT BY TRAINED PERSONNEL.

	Page No.
BELT TENSIONER	38
CHASSIS (1)	39
CHASSIS (2)	40
CHASSIS (3)	41
CHASSIS (4)	42
CONTROL BOX	43
CONTROL PANEL	44
CONTROL TOWER	45
DISCHARGE	46
DRIVE TRAIN	47
ELECTRICAL LAYOUT	48
ELECTRICAL PANEL	49
ENGINE	50
ENGINE BAY	51
FUEL TANK	52
FUNNEL	53
TRAY	54
HYDRAULIC HOSES	55
HYDRAULIC TANK	57
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ROLLER BOX	59
ROLLER SLIDES	60
ROTOR	61
ROTOR HOUSING	62
OPTIONAL WINCH SOCKET AND IN-LINE FILTER ASSEMBLIES	63
DECALS	64

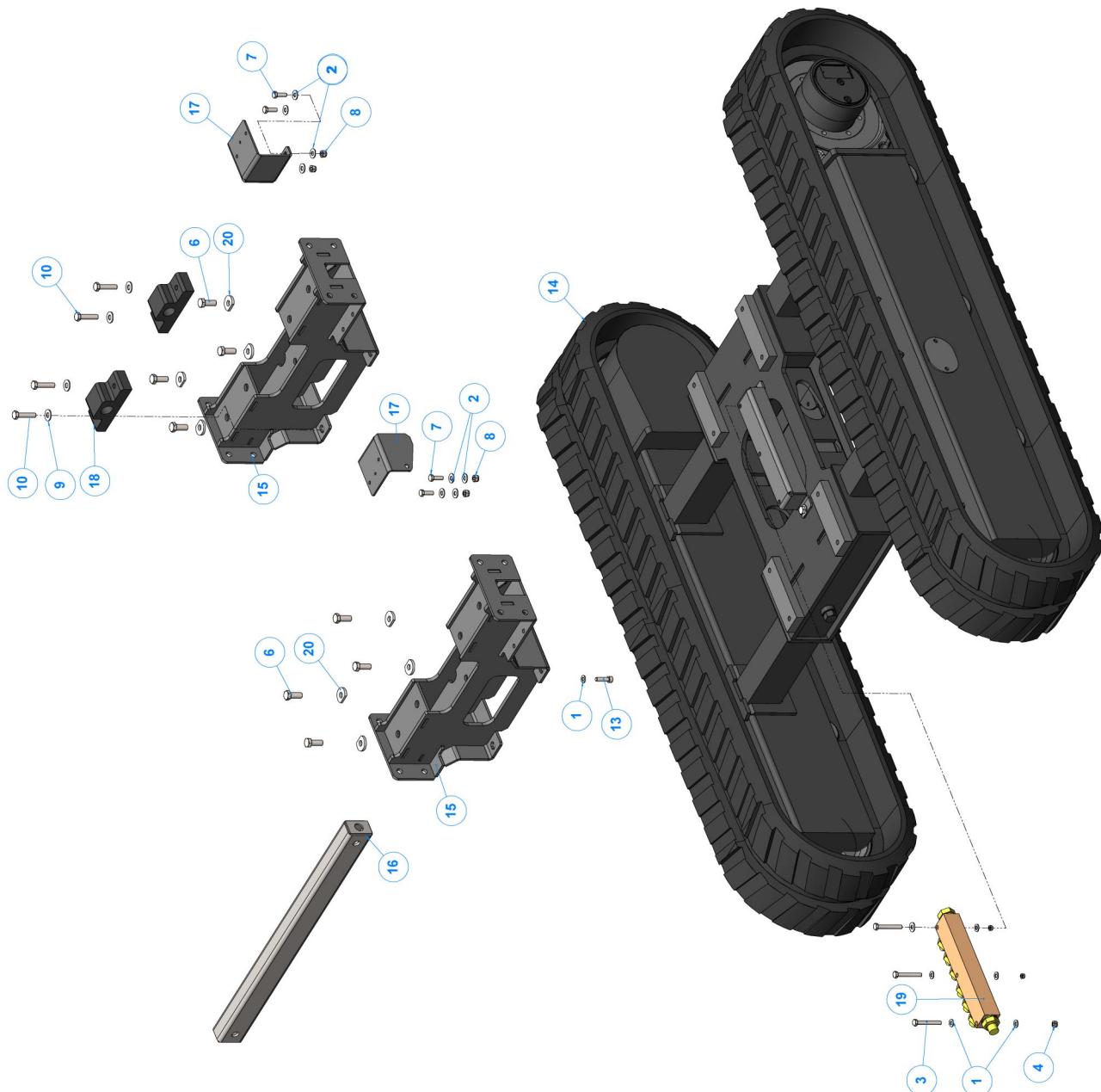
TW 230VTR OPTIONAL ACCESSORIES:

ITEM	PART NUMBER
Extra 12V sockets	P0002041
12v Recovery Winch with synthetic rope	P0002030
Winch Bracket	P0001340
Feed Funnel Curtains	P0003445
Anvil Maintenance Support Bracket	P0002998F x 2

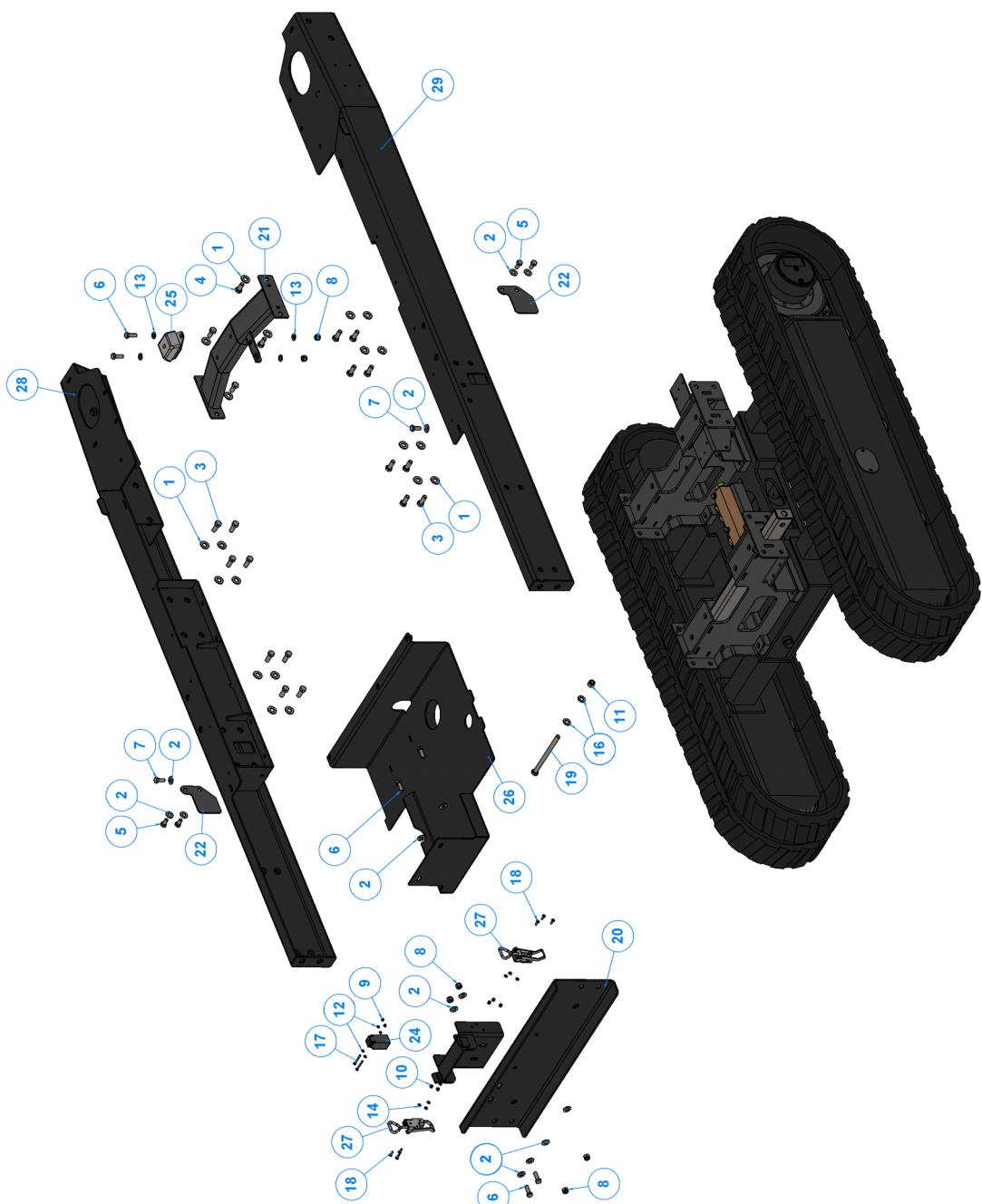
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0411M	Pulley Tension Outer	1
2	BE491	Bearing 6205 2Rs C3	2
3	0472M	Pulley Tension Boss	1
4	WA0415	Washer Heavy M12 32 Belt Tensioner	1
5	0469MS	Block Pulley Tension Adjuster	1
6	BO313	Bolt M12 1.75 100 BZP	1
7	WA712	Washer M8 C BZP	1
8	P0001329	Profile Belt Tensioner	1
9	P0001442	Bolt M8/80 BZP	1
10	NU476	Nut M8 1.75 BZP	1



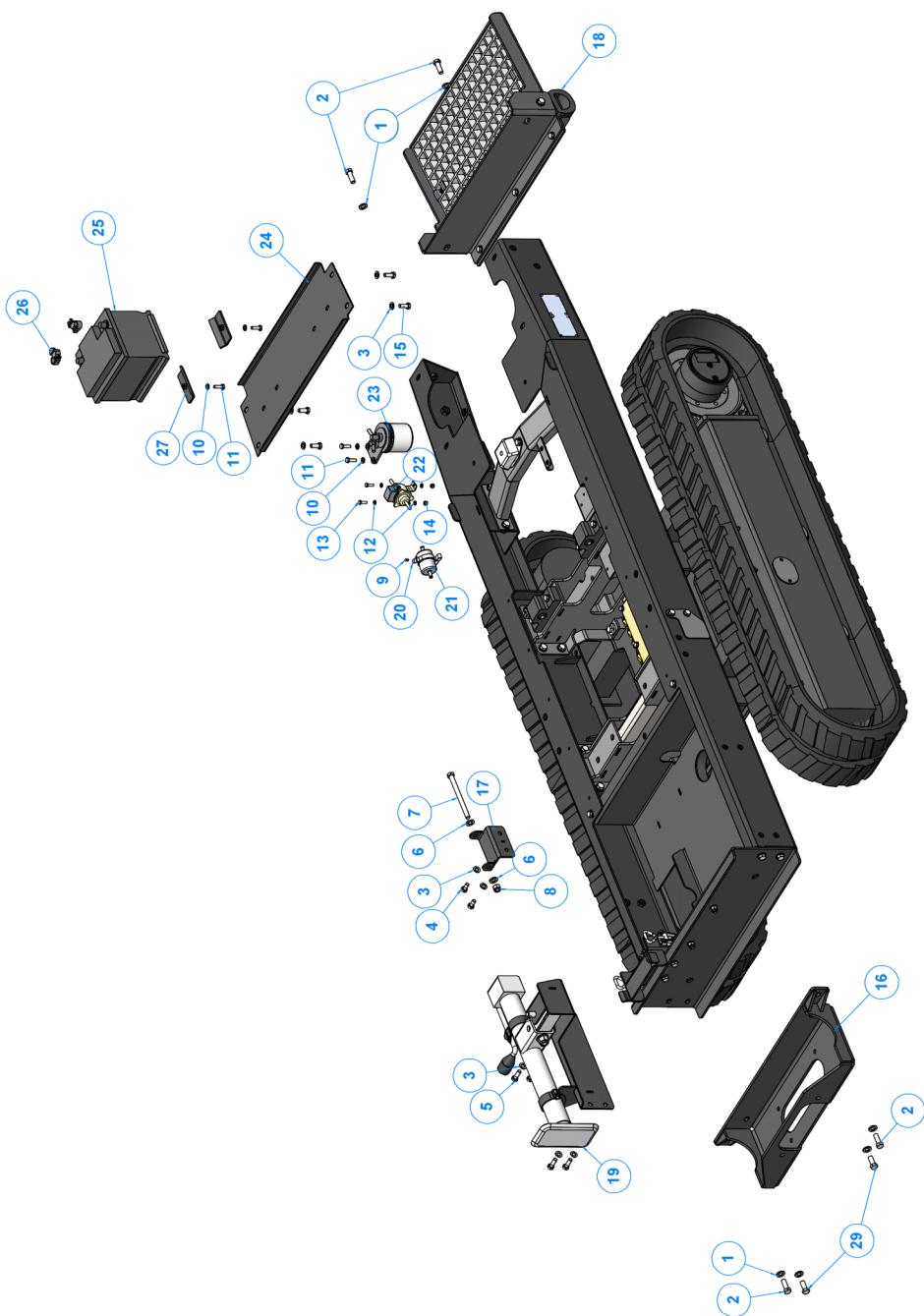
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	WA711	Washer M8 A BZP	6
2	WA712	Washer M8 C BZP	9
3	BO354	Set Screw M8 60 BZP	3
4	NU481	Nut M8 Nyloc T	1
5	NU391	Nut M6 1.0 Nyloc T	2
6	BO321	Set Screw M12 30 BZP	8
7	BO350	Set Screw M8 25 BZP	4
8	NU479	Nut M8 1.25 Nyloc P	4
9	WA839	Washer M10 C BZP	4
10	BO1520	Bolt M10 45 BZP	4
11	BO382	Set Screw M10 30 BZP	2
12	4345	Nut M10 P Nyloc	2
13	P0002059	Socket Head Cap M8 x 30	1
14	P0001666	Tracks Out	1
15	P0001667F	Bracket VTR Chassis Stand Off	2
16	P0001678F	Jacking Beam	1
17	P0001719F	Bracket Fuel Pump	2
18	P0001635M	Square Boss AV Mount Engine	2
19	TW230 VTR Hydraulic Manifold Assembly	TW 230 VTR Hydraulic Manifold Assembly	1
20	C024-0110	M12 VTR Track Base Washer Stainless Steel 316	8



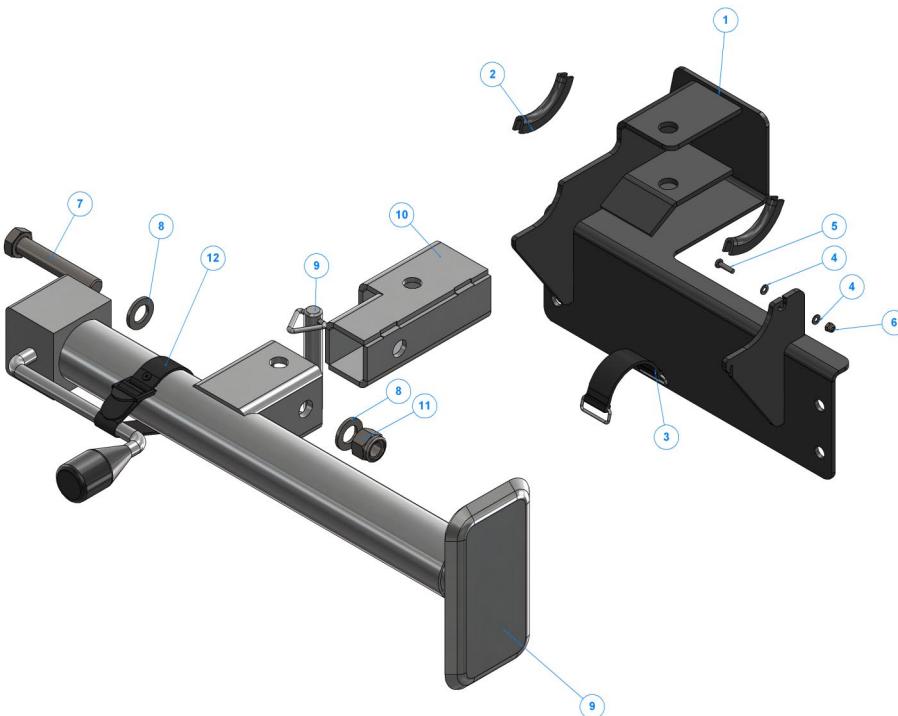
ITEM NO.	PART NUMBER	DESCRIPTION	Stage 2/QTY.
1	WA704	Washer M12 C BZP	20
2	WA839	Washer M10 C BZP	14
3	BO321	Set Screw M12.30 BZP	16
4	BO277	Set Screw M12.1.75.25 BZP	4
5	BO878	Bolt M10 20 BZP	4
6	BO382	Set Screw M10.30 BZP	6
7	BO360	Set Screw M10.25 BZP	2
8	4345	Nut M10 P Nyloc	6
9	18235	Nut M4 0.7 Nyloc P	2
10	NU236	Nut M5 P Nyloc	6
11	NU644	Nut M12 P Nyloc	1
12	18100	Washer M4.4.3 A BZP	4
13	WA701	Washer M10 A BZP	4
14	WA857	Washer M5.5.3 A BZP	6
15	WA711	Washer M8 A BZP	1
16	WA702	Washer M12 A BZP	2
17	18237	Pan Head Poz. M4/40 BZP	2
18	BO256	Hex Socket C/SK M5	6
19	4333	Bolt M12.1.75.170 BZP	1
20	P0001717F	Bracket Chassis Winch	1
21	P0001524F	Bracket Engine Front	1
22	P0001689	Jacking Beam Cover Plate	2
23	P0001676F	Bracket Funnel Support	1
24	EL1348	Switch Limit (Metal Plunger)	1
25	P0000398	Engine AV Mount	1
26	P0001718F	Plate Tank Support Guard	1
27	4092	Over Centre Catch	2
28	P0002274F	Beam Chassis Opp Hand To P0002274F	1
29	P0002275F	fromparent:Beam Chassis Opp Hand To P0002275F	1



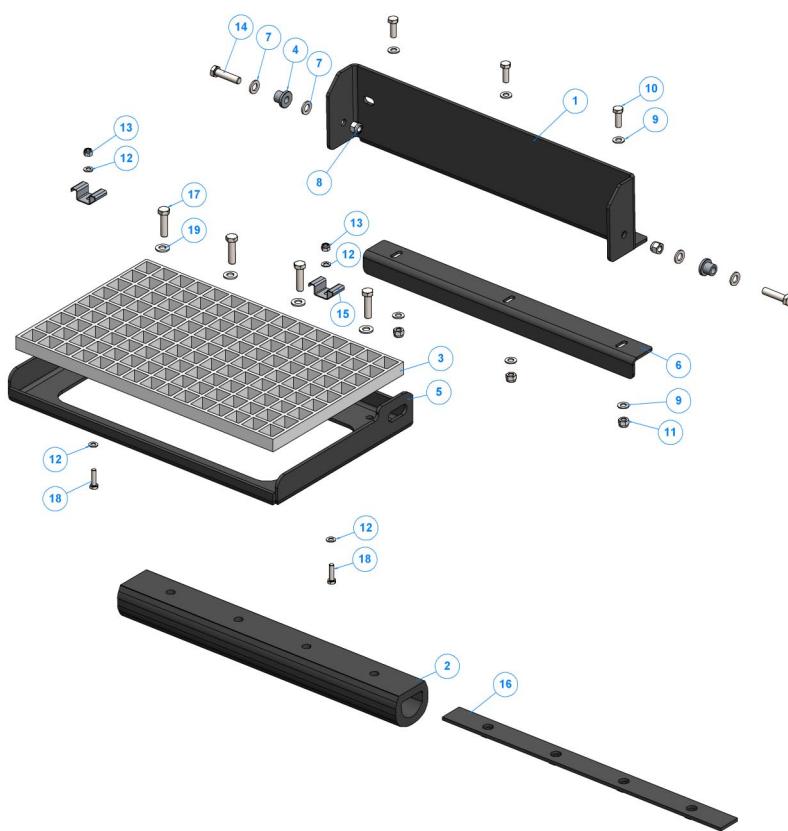
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C021-0127	M12 FORM C WASHER ZP	6
2	C002-0811	M12 x 35 HEX SET ZP 8.8	4
3	C021-0126	M10 FORM C WASHER ZP	10
4	C002-0707	M10 x 20 HEX SET ZP 8.8	2
5	C002-0710	M10 x 30 HEX SET ZP 8.8	4
6	C021-0107	M12 FORM A WASHER ZP	2
7	C008-0829	M12 x 150 HEX BOLT ZP 8.8	1
8	C031-0165	M12 TYPE P NYLOC NUT ZP	1
9	C045-0108	4 x 12 A1/Steel Rivet	1
10	C021-0125	M8 FORM C WASHER ZP	4
11	C002-0609	M8 x 25 HEX SET ZP 8.8	4
12	C021-0123	M6 FORM C WASHER ZP	4
13	C002-0407	M6 x 20 HEX SET ZP 8.8	2
14	C031-0161	M6 TYPE P NYLOC NUT ZP	2
15	C002-0709	M10 x 25 HEX SET ZP 8.8	4
16	P0001340F	Bracket Winch	1
17	P0001788F	Bracket Spring Hanger	1
18	TW230 VTR Step	TW 230 VTR Step	1
19	Bulldog Jack and Bracket Assembly	Bulldog Jack and Bracket Assembly	1
20	18197	Spring Clip	1
21	4315	Pre-Fuel Filter	1
22	0807	Fuel Pump	1
23	0085	Fuel Filter	1
24	C131-0182	BATTERY TRAY	1
25	4210	Battery 12V	1
26	4074	Battery Terminals Kit	1
27	P0002617F	Battery Clamp	2
28	C002-0809	M12 x 25 HEX SET ZP 8.8	1
29	C002-0810	M12 x 30 HEX SET ZP 8.8	2



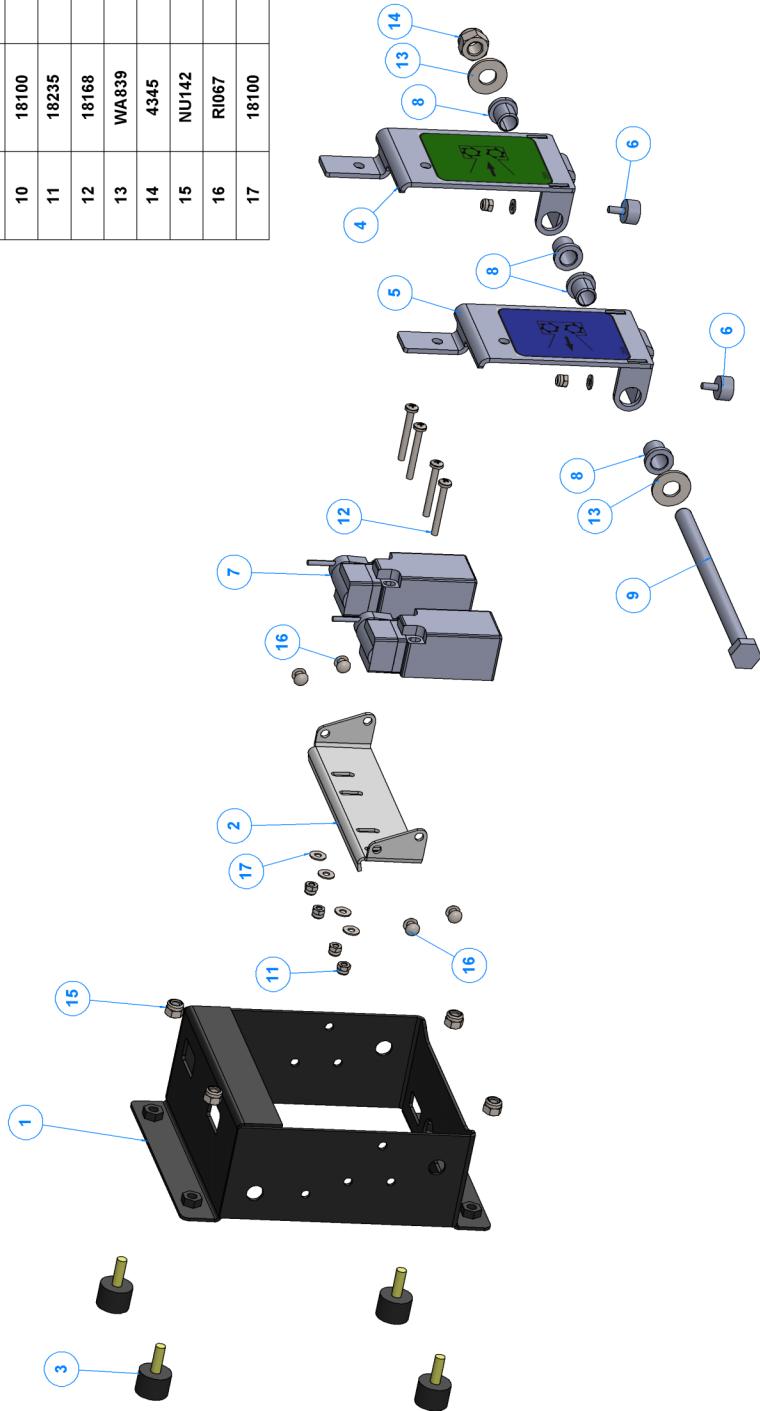
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0001880F	Bracket Bulldog Jack Assembly	1
2	Edging Strip		2
3	P0002046	Butser Rubber 125mm Strap	1
4	18100	Washer M4 4.3 A BZP	2
5	P0002075	Pan Head Pozi M4 0.7 16 BZP	1
6	18235	Nut M4 0.7 Nyloc P	1
7	19723	M16 90 38 BZP	1
8	WA1354	Washer M16 C BZP	2
9	P0001882	Bulldog 5000 LBS Jack 620312	1
10	P0001804F	Jack Adapter TW230VTR	1
11	NU1511	Nut M16 P Nyloc	1
12	P0002160	Rubber Tree Strap 24 x 380 long	1



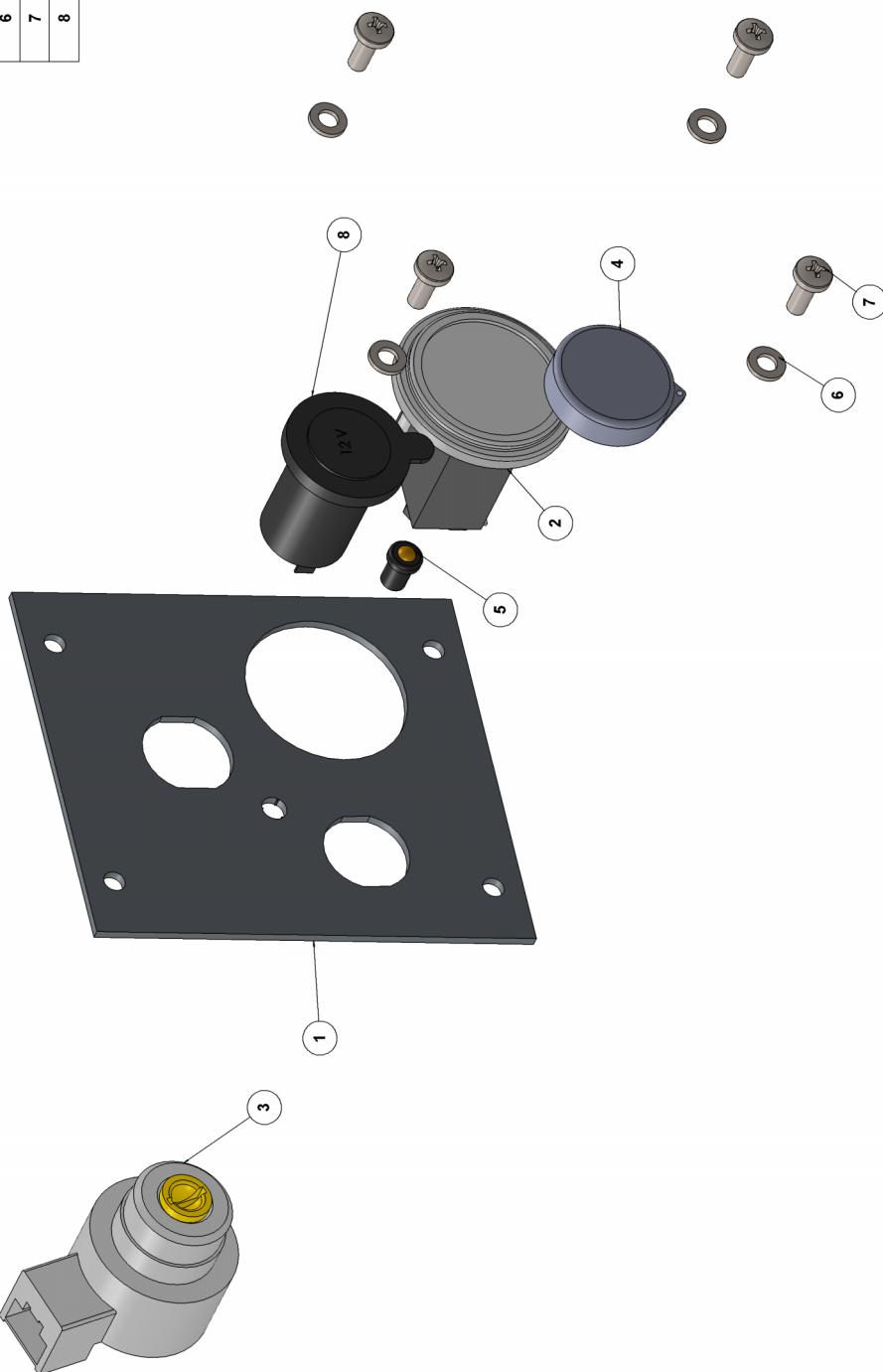
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0001855F	Bracket Step	1
2	P0001814	Rubber Buffer	1
3	P0001857	Step Grating	1
4	P0001859M	Step Pivot Boss	2
5	P0001856F	Step	1
6	P0001858F	Bracket Step Stop	1
7	WA704	Washer M12 C BZP	4
8	NU644	Nut M12 P Nyloc	2
9	WA839	Washer M10 C BZP	6
10	BO382	Set Screw M10 30 BZP	3
11	3435	Nut M10 P Nyloc	3
12	WA712	Washer M8 16 C BZP	4
13	NU0479	Nut M8 1.25 Nyloc P	2
14	BO432	Set Screw M12 1.75 50 BZP	2
15	P0001865F	Bracket Step Grating Clamp	2
16	P0001864F	Bracket Step Buffer	1
17	18172	M12 X 45 Ht Set Z/P	4
18	BO351	Set Screw M8 30 BZP	2
19	WA702	Washer M12 A BZP	4



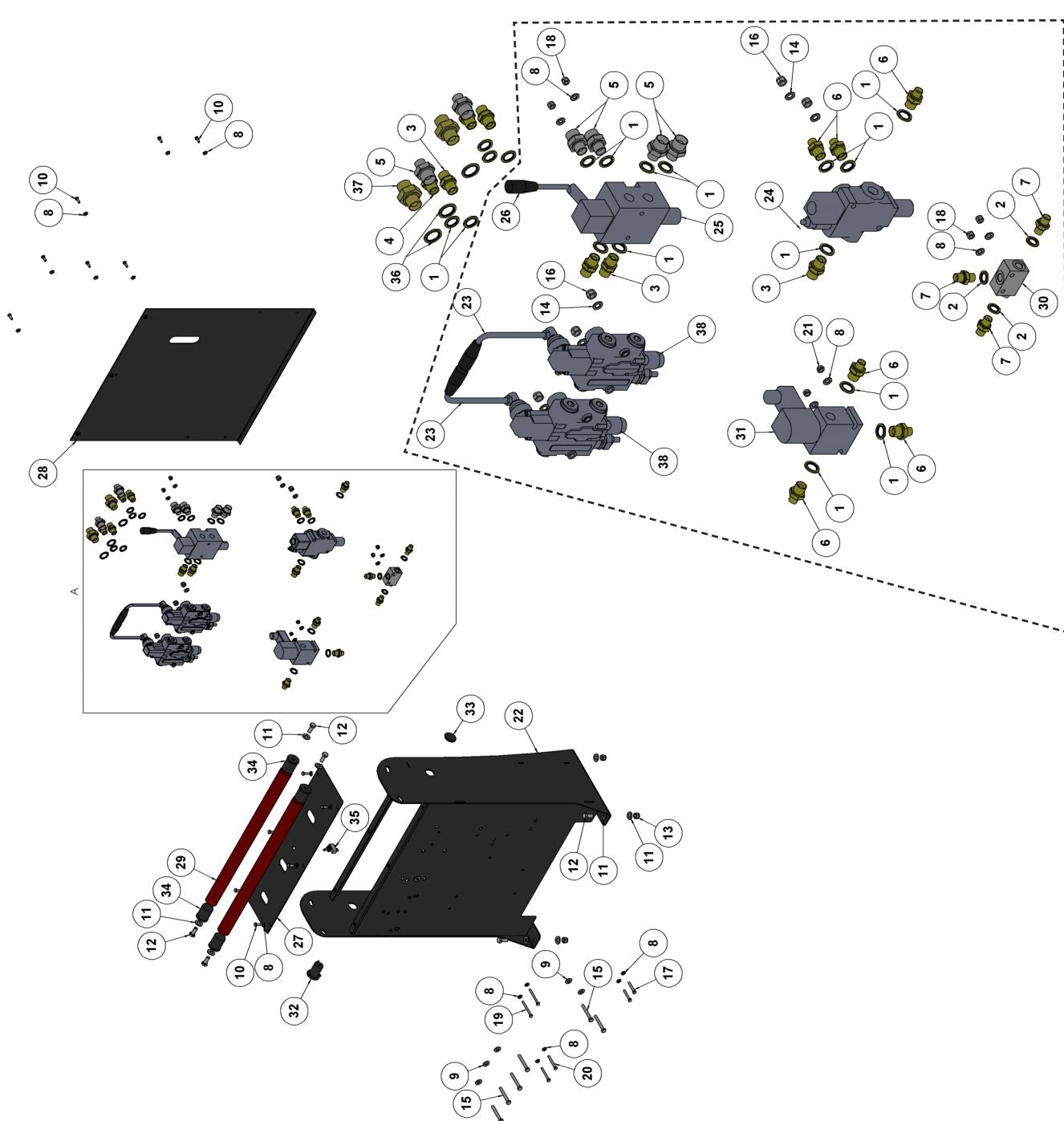
ITEM NO.	PART NUMBER	DESCRIPTION	Manual Page QTY
1	17802F	Control Box Cover	1
2	17805F	Switch Mounting Plate	1
3	18000	AV Mount M6 MF 20 14.5	4
4	17803F	Finger Plate	1
5	17803F	Finger Plate	1
6	2834	AV Mount VE Type	2
7	17927	Limit Switch	2
8	2804	Bush M10 Top Hat	4
9	17963	Bolt M10/160	1
10	18100	Washer M4 4.3 A BZP	2
11	18235	Nut M4 0.7 Nyloc P	6
12	18168	Pan Head Pozi M4/35 BZP	4
13	WA839	Washer M10 C BZP	2
14	4345	Nut M10 P Nyloc	1
15	NU142	Nut M6 P Nyloc	4
16	R1067	Rivet M5 12 Ali Pop	4
17	18100	Washer M4 C BZP	4



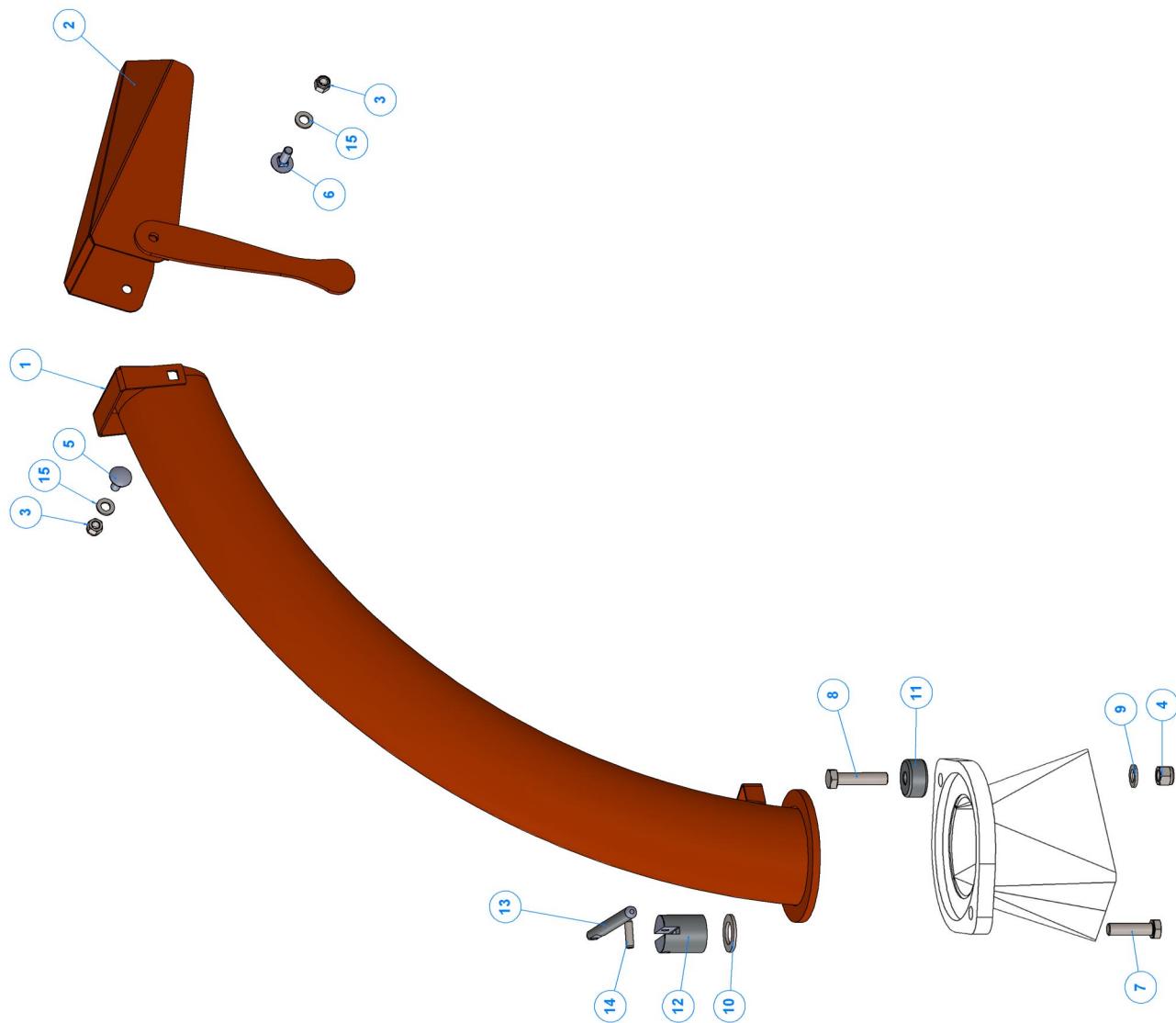
ITEM NO.	PART NUMBER	DESCRIPTION	Manual Page/QTY
1	P0001892	Profile Control Panel With 12 Volt Cut-Out	1
2	0327	Hours Counter	1
3	Kubota Ignition Switch	Supp'd with engine	1
4	1470	Rubber Protector	1
5	1757	Amber LED	1
6	WA709	Washer M6 13.9 C BZP	4
7	BO438	Pan Head Pozi M6 1.0 16 BZP	4
8	P0002041	Durite 12 Volt Socket 0-601-07	1



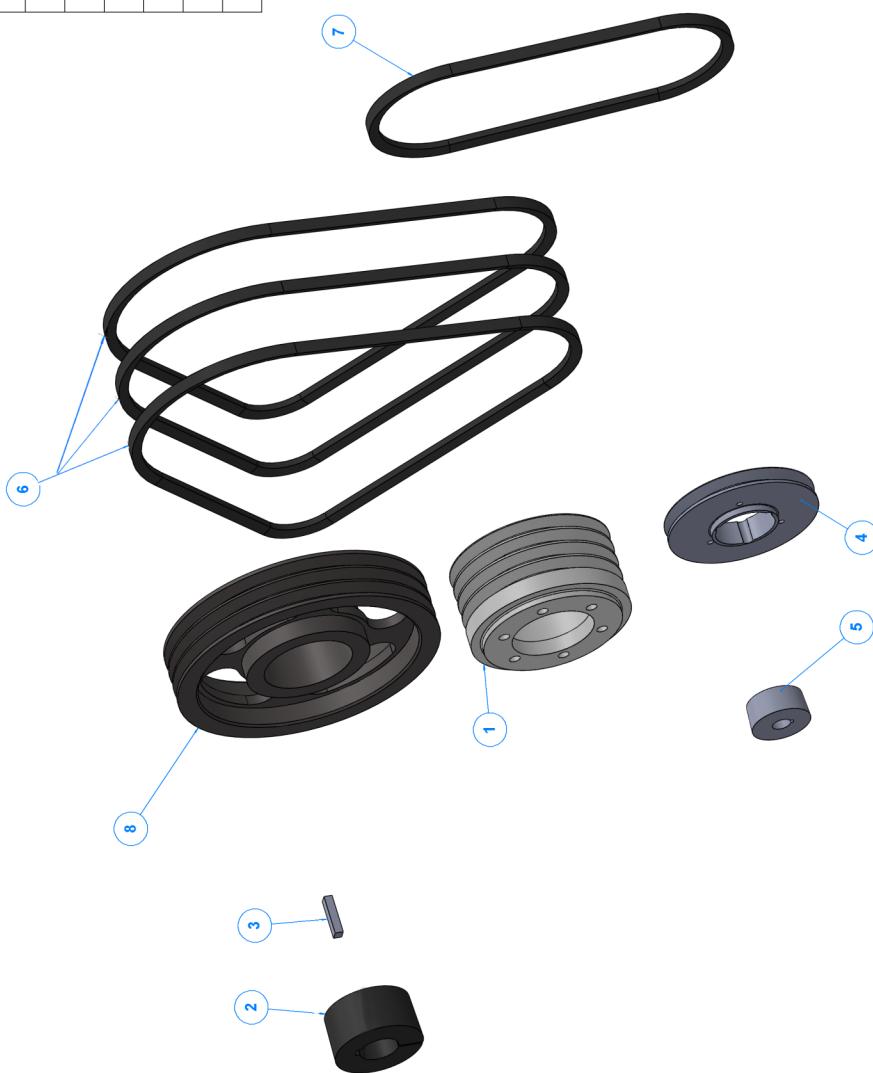
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HY396	Washer Dowty 3/8"	18
2	HY395	1/4" Dowty Washer	3
3	HY161	Adaptor Mm 3/8 - 3/8	5
4	HY828	Fitting 3/8 to 3/8 Bulkhead	2
5	HY026	Adapter 3/8 - 1/2	6
6	HY033	Fitting 3/8 to 1/4	6
7	18883	1/4"-1/4" Adapter	3
8	C021-0123	M6 STD C WASHER Z/P 8.8	25
9	C021-0125	M8 STD C WASHER Z/P 8.8	6
10	C002-0405	M6 x 16 Hex Set Z/P 8.8	13
11	C021-0126	M10 STD C WASHER Z/P	12
12	C002-0709	M10 x 25 Hex Set Z/P 8.8	8
13	C031-0164	M10 TYPE P NYLOC NUT Z/P	4
14	C021-0105	M8 STD A WASHER Z/P 8.8	6
15	C002-0616	M8 x 60 Hex Set Z/P 8.8	6
16	C031-0163	M8 TYPE P NYLOC NUT Z/P	6
17	C002-0412	M6 x 40 Hex Set Z/P 8.8	2
18	C031-0161	M6 TYPE P NYLOC NUT Z/P	4
19	C002-0416	M6 x 60 Hex Set Z/P 8.8	2
20	C002-0414	M6 x 50 Hex Set Z/P 8.8	2
21	C031-0121	M6 TYPE T NYLOC NUT Z/P	2
22	C133-0102	TW230 VTR CONTROL TOWER (NEW BATTERY TRAY)	1
23	18850F	L-Shaped Track Handle	2
24	3005	Four Port Valve	1
25	1738	Six Way Diverter Valve	1
26	1860	M8 Lever	1
27	P0002628	Profile Control Tower Panel	1
28	P0001872F	Front Valve Cover	1
29	1802FR	Handle Driving Main Tower	2
30	P0001896	Valve Check 3-way 2F&1M 1/4"	1
31	P0001895	Solenoid Valve with Ports	1
32	P0002041	Durite 12 Volt Socket 0-601-07	1
33	P0002159	28mm Dia Rubber Blanking Grommet	1
34	1803P	Threaded Insert M10	4
35		Toggle Switch Non Latching Part Of P0002577	1
36	HY398	Washer Dowty 1/2"	3
37	HY027	Adaptor 1/2" - 1/2" BSP	2
38	P0002283 - A	Proportional Control Valve	2

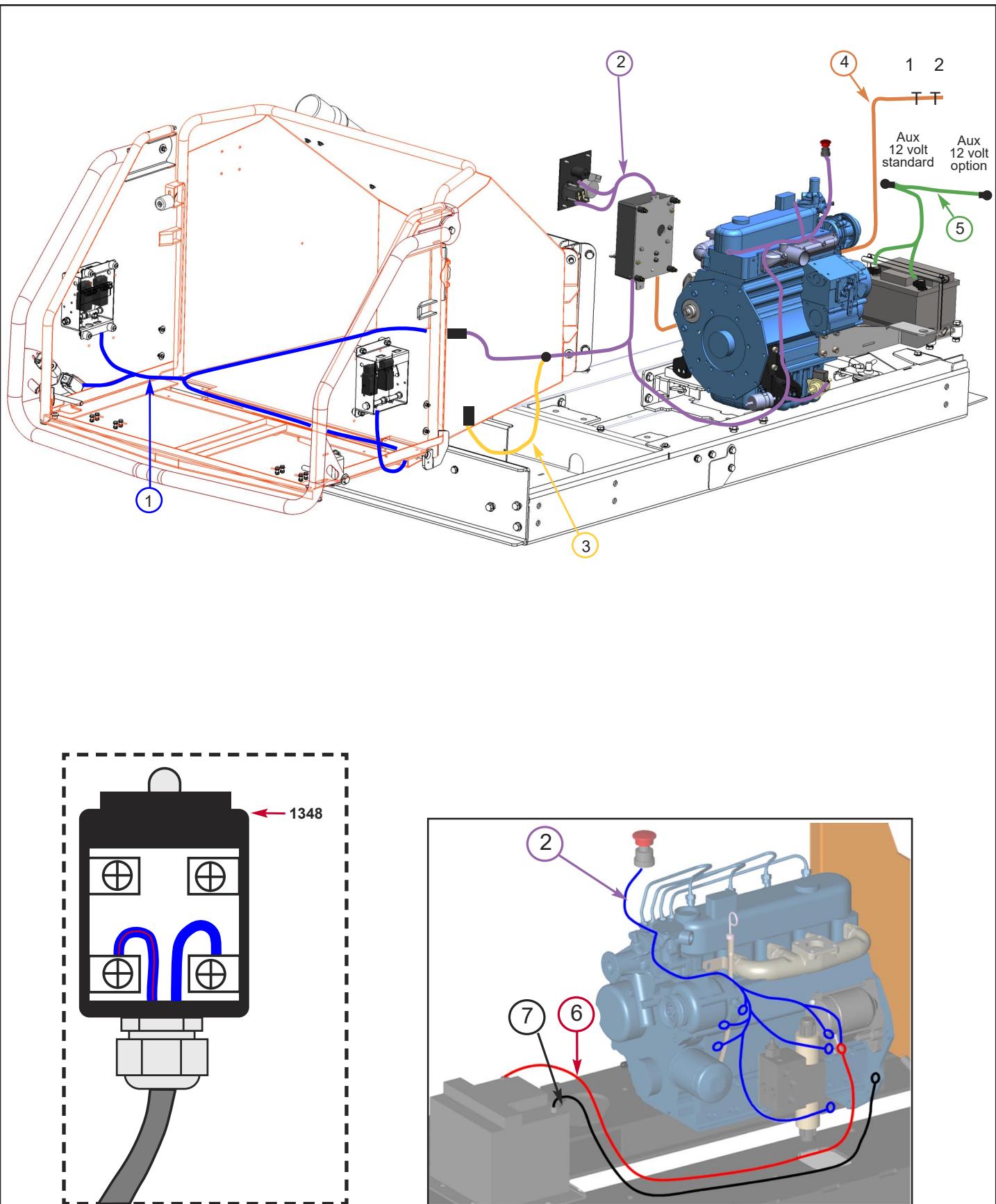


ITEM NO.	PART NUMBER	DESCRIPTION	Manual page/QTY.
1	P0001147	Discharge Tube Assy	1
2	P0001411	Bucket Discharge Tube Assy	1
3	NU644	Nut M12 P Nyloc	2
4	NU1511	Nut M16 P Nyloc	1
5	19282	M12/30 Cup Square	1
6	BO430	Bolt M12/35 Cup Square BzP	1
7	BO333	M16 60 BzP	1
8	BO434	Bolt M16/70	1
9	WA1354	Washer M16 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 NO.	PART NUMBER	DESCRIPTION	QTY.
1	PU1170	Pulley SPA 4 150 Z	1
2	PU410	Taper Lock 2517 38	1
3	P0001412	Key 10x8x40	1
4	0949M	PULLEY 140 X 1 SPA MACHINED	1
5	2975	Taper Lock Bush 1610 18mm	1
6	17322	Belt SPA 1232	3
7	C124-A307	XPA857 BELT	1
8	C120-A250.3	PULLEY 250 x 3 SPA	1

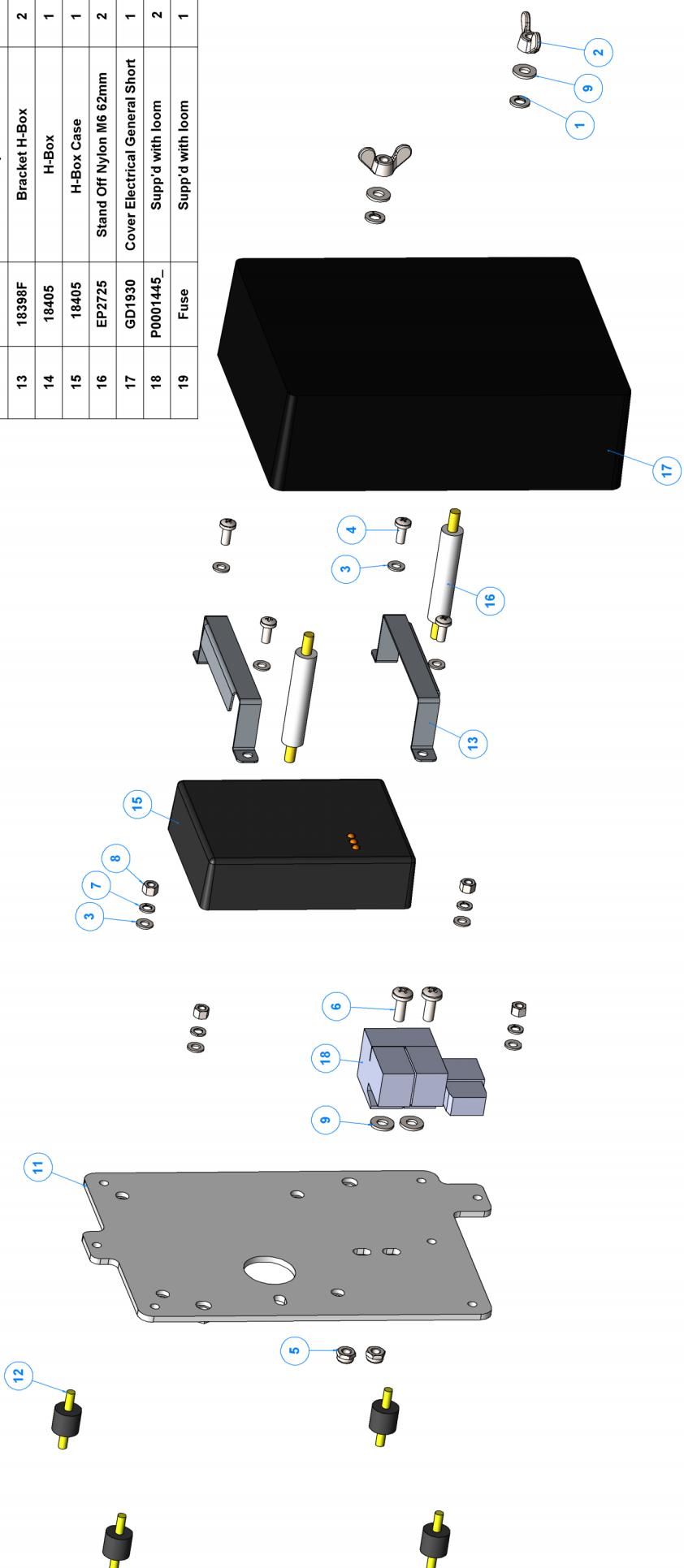




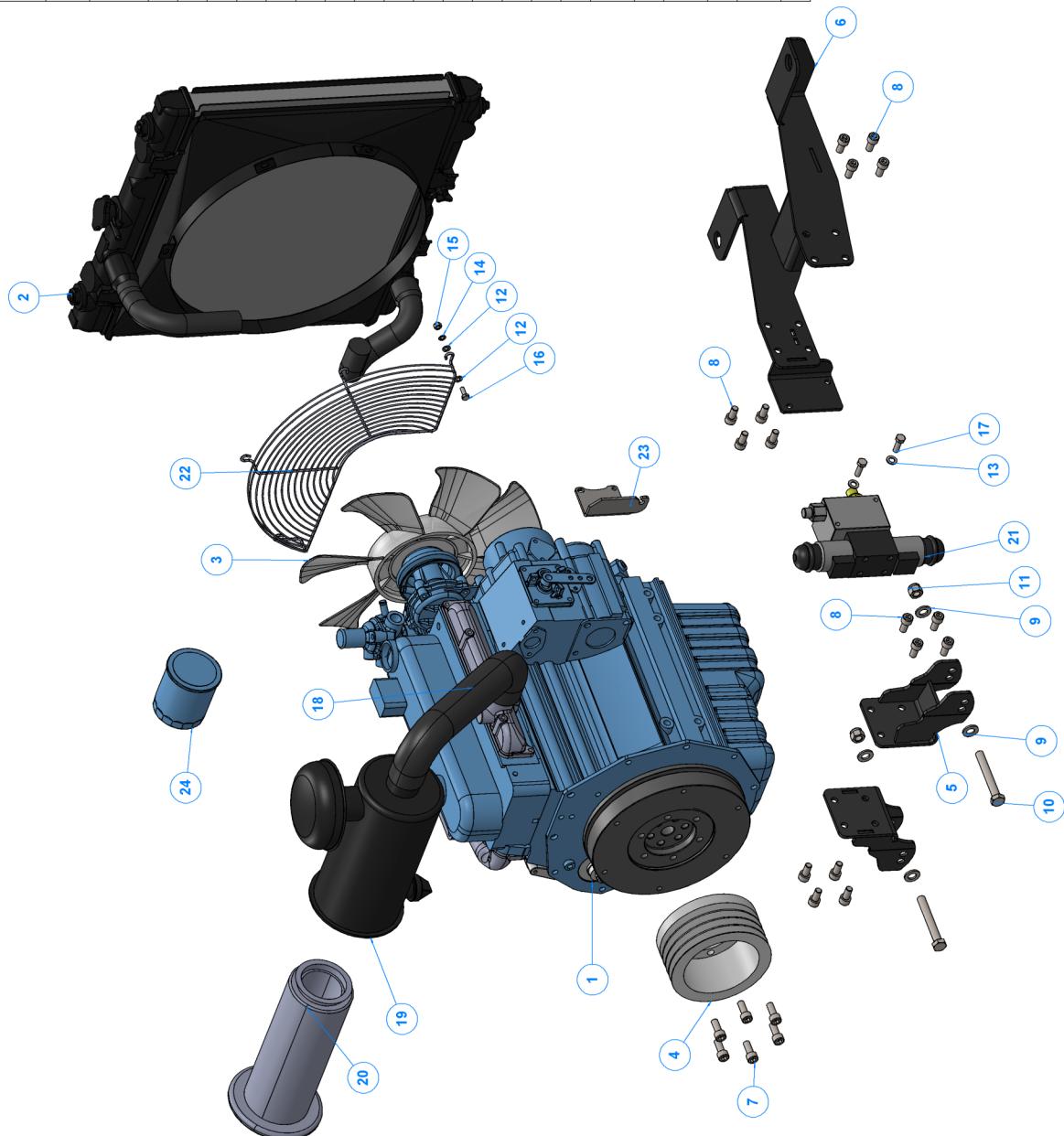
Item	Part No	Part Name	Q'ty
1	P*2134	Funnel Loom	1
2	P*2133	Main Engine Loom	1
3	P*2135	Funnel Safety Switch Loom	1
4	P*2048	1 & 2 Speed Loom	1

Item	Part No	Part Name	Q'ty
5	P*2049	Control Tower 12 Volt Aux Power Loom	1
6	1375	+VEBattery Cable	1
7	1376	-VEBattery Cable	1

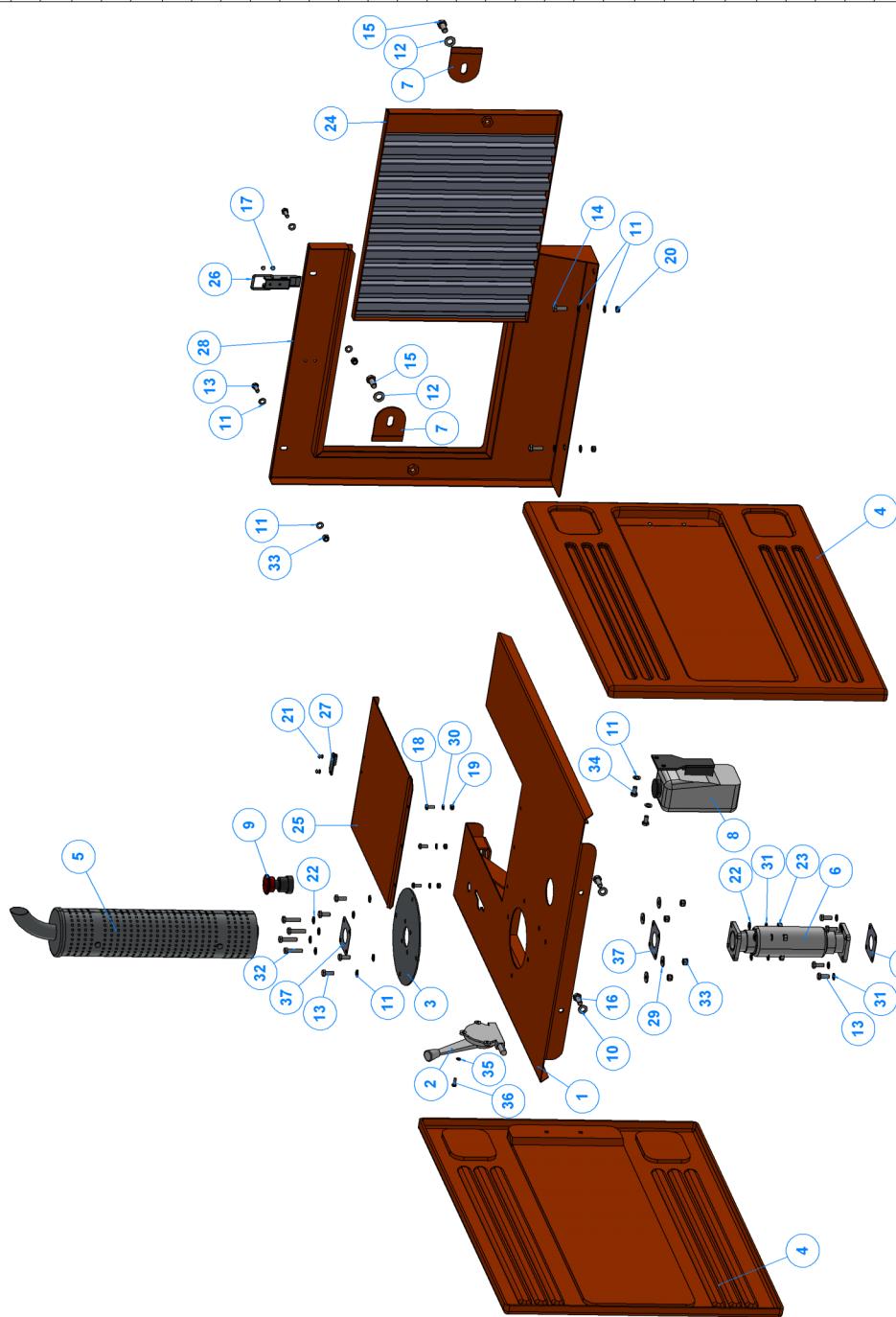
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	18106	Washer M6 Spring BZP	2
2	18107	M6 Wing Nut	2
3	WA857	Washer M5 5.3 A BZP	8
4	18104	Pan Head Pozidriv M5 0.8 12 BZP	4
5	NU391	Nut M6 1.0 Nyloc T	2
6	BO438	Pan Head Pozidriv M6 1.0 16 BZP	2
7	3024	Washer M5 Spring BZP	4
8	18291	Nut M5 0.8 Plain BZP	4
9	WA709	Washer M6 C BZP	4
10	1151	Countersunk Pop Rivet	1
11	P0000856F	Plate H-Box Assy	1
12	4033	AV Mount M5 x 13mm Green Spot	4
13	18398F	Bracket H-Box	2
14	18405	H-Box	1
15	18405	H-Box Case	1
16	EP2725	Stand Off Nylon M6 62mm	2
17	GD1930	Cover Electrical General Short	1
18	P0001445_-	Supp'd with loom	2
19	Fuse	Supp'd with loom	1



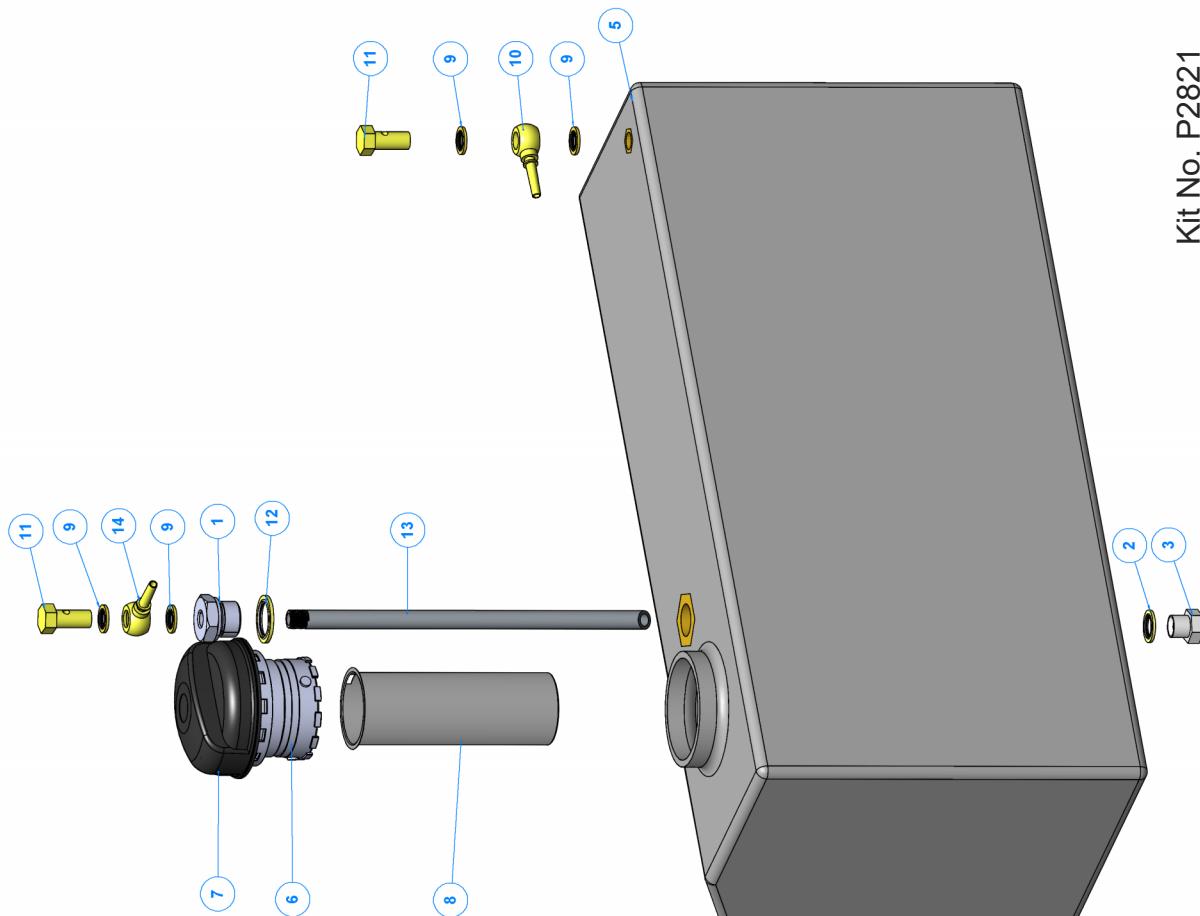
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Kubota 1505 Naturally Aspirated		1
2	4319	Radiator Kit (IG666-72001)	1
3	16285-7411 Fan Saver Blade		1
4	PU1170	Pulley SPA A 156	1
5	P0001636F	Bracket Engine Rear Upper	2
6	P0001686F	Bracket Engine Front Upper	1
7	BO1629	Socket Head Cap M10 1.25 25	6
8	P0000369	Socket Head Cap M10 1.25 20	16
9	WA702	Washer M12 A BZP	4
10	BO332	Bolt M12 1.75 90 BZP	2
11	NU644	Nut M12 P Nyloc	2
12	WA709	Washer M6 13.9 C BZP	8
13	WA712	Washer M8 C BZP	2
14	18106	M6 Spring Washer BZP	4
15	NU392	Nut M6 1 Plain BZP	4
16	BO347	Set Screw M6 16 BZP	4
17	BO350	Set Screw M8 25 BZP	2
18	Air Filter Hose	Supplied With Engine	1
19	1661611013_M	Air Filter Housing	1
20	0086	Air Filter	1
21	P0002047	193369 Directional Control Valve And Fittings	1
22	4335	Radiator Fan Guard	1
23	2954FS	Bracket Throttle Cable	1
24	0095	Oil Filter 1505	1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0002024F	Top Bonnet	1
2	2946	Throttle Cable	1
3	P0002026	Muffler Plate	1
4	0765	Panel Side Plastic	2
5	18915F	S SH Exhaust Muffler - Track (Iss 2)	1
6	19092F	Flexi-Exhaust Adaptor (Iss 1)	1
7	2836F	Bracket Guard Retainer	2
8	4320	Reserve Tank Radiator	1
9	2627	Emergency Stop Switch	1
10	C021-0126	M10 FORM C WASHER Z/P	2
11	C021-0125	M8 FORM C WASHER Z/P	14
12	C021-0127	M12 FORM C WASHER Z/P	2
13	C002-0607	M8 x 20 HEX SET Z/P 8.8	10
14	C002-0609	M8 x 25 HEX SET Z/P 8.8	2
15	C002-0809	M12 x 25 HEX SET Z/P 8.8	2
16	C002-0709	M10 x 25 HEX SET Z/P 8.8	2
17	C045-0101	4.8 x 8 Alu/Steel Rivet	2
18	C013-0405	M6 x 16 PAN POZI Z/P	3
19	C031-0121	M6 TYPE T NYLOC NUT Z/P	3
20	C031-0123	M8 TYPE T NYLOC NUT Z/P	2
21	C045-0105	4.8 x 12 Alu/Steel Rivet	2
22	C021-0105	M8 FORM A WASHER Z/P	8
23	C030-0123	M8 HEX NUT -ZP - GRADE 10	4
24	18581F	Guard Filter Grille	1
25	0607F	Engine Access Cover	1
26	0235	Catch	1
27	4088	Catch Plate	1
28	18580F	Guard Front Engine Bay	1
29	C024-0103	Large Washer M8 B2P	4
30	C021-0123	M6 FORM C WASHER Z/P	3
31	C023-0105	M8 SPRING WASHER -ZP	8
32	C002-0611	M8 x 35 HEX SET Z/P 8.8	4
33	C031-0163	M8 TYPE P NYLOC NUT Z/P	6
34	C002-0605	M8 x 16 HEX SET Z/P 8.8	2
35	C021-0102	M5 FORM A WASHER Z/P	3
36	C013-0305	M5 x 16 PAN POZI Z/P	3
37	17988	Gasket Muffler	3

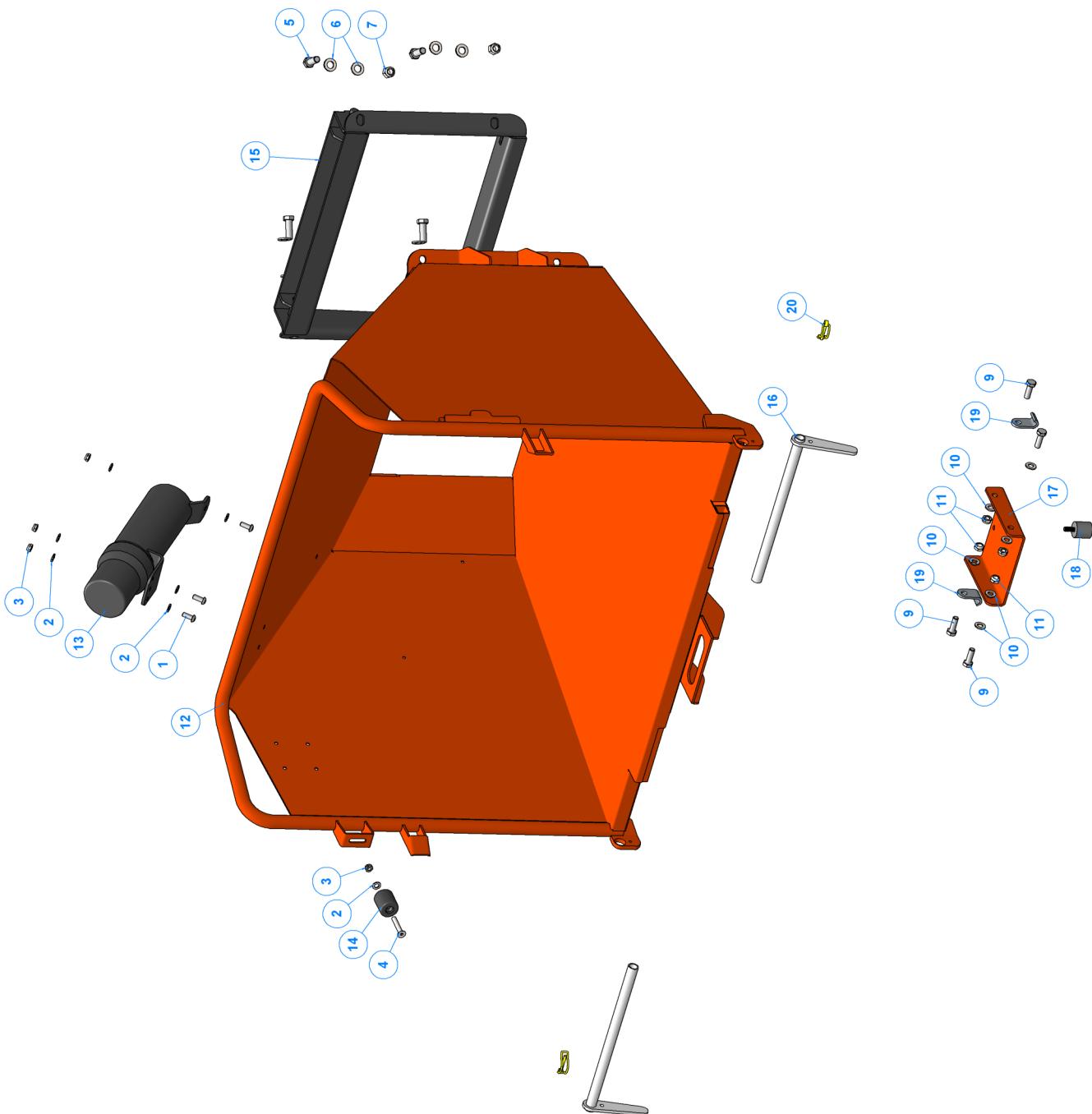


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	18568	18568 Reducer Bush (Dowty) 3-4M x 1-4F	1
2	HY396	Washer Dowty 3/8"	1
3	HY211	3/8" Drain Plug	1
4	P0001710F	Tank Fuel 38 Litre with Fittings	1
5	P0001710	Tank Fuel 38 Litre	1
6	P0001815	Threaded Filler Neck OD65	1
7	P0001817	P0001817 Fuel Tank Cap	1
8	P0001816	SS Strain for Tanks with Reinforcement Ring	1
9	HY395	1/4" Dowty Washer	4
10	17998	Quarter Inch Banjo Fitting No Bolt	1
11	4059	Quarter Inch Banjo Bolt	2
12	HY152	Washer Dowty 3/4"	1
13	C172-0101	Threaded Fuel Pick Up 280mm	1
14	C070-0104	1/4" Banjo to suit 5/16" Hosetail	1

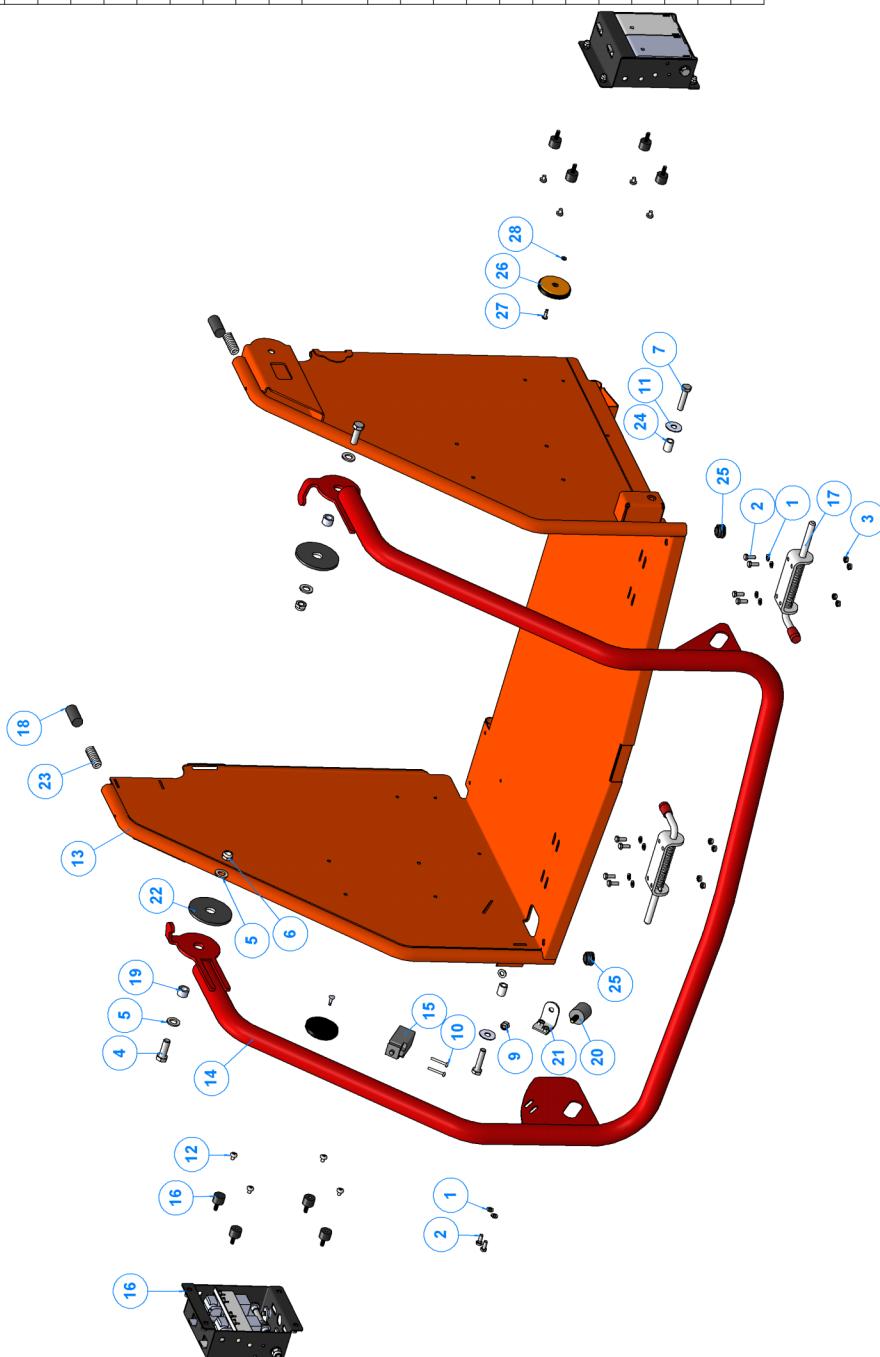


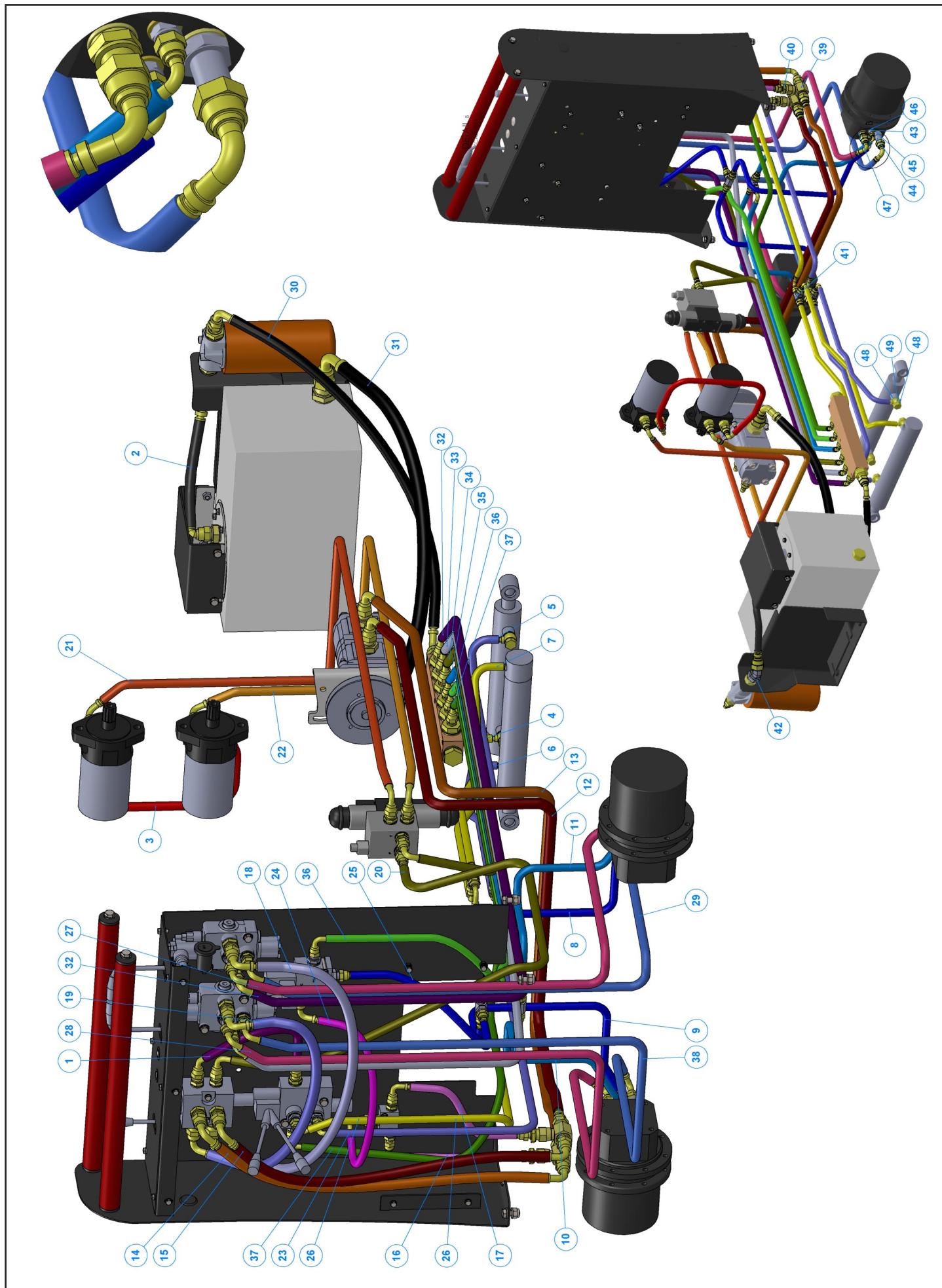
Kit No. P2821

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C010-0607	M8 x 20 SKT BUTTON SET SIC 10.9	3
2	C021-0125	M8 FORM C WASHER Z/P	7
3	C031-0123	M8 TYPE T NYLOC NUT Z/P	5
4	C015-0614	M8 x 50 SKT CSK SET Z/P 10.9	1
5	C002-0811	M12 x 35 HEX SET Z/P 8.8	4
6	C021-0127	M12 FORM C WASHER Z/P	8
7	C031-0165	M12 TYPE P NYLOC NUT Z/P	4
8	C021-0105	M8 FORM A WASHER Z/P	1
9	C002-0710	M10 x 30 HEX SET Z/P 8.8	4
10	C021-0106	M10 FORM A WASHER Z/P	6
11	C031-0124	M10 TYPE T NYLOC NUT Z/P	4
12	P0000803F	Funnel	1
13	P0000144	Operator's Manual Canister	1
14	4206	Nylon Bush	1
15	P0001694F	Funnel Quick Release Adapter	1
16	P0001712F	Hinge Pin Tray	2
17	P0001677F	Bracket Funnel Support Funnel	1
18	CO178	Buffer Rubber	1
19	P0001705F	Bracket Funnel Catch	2
20	P0002051	Shaft Lock Pin	2



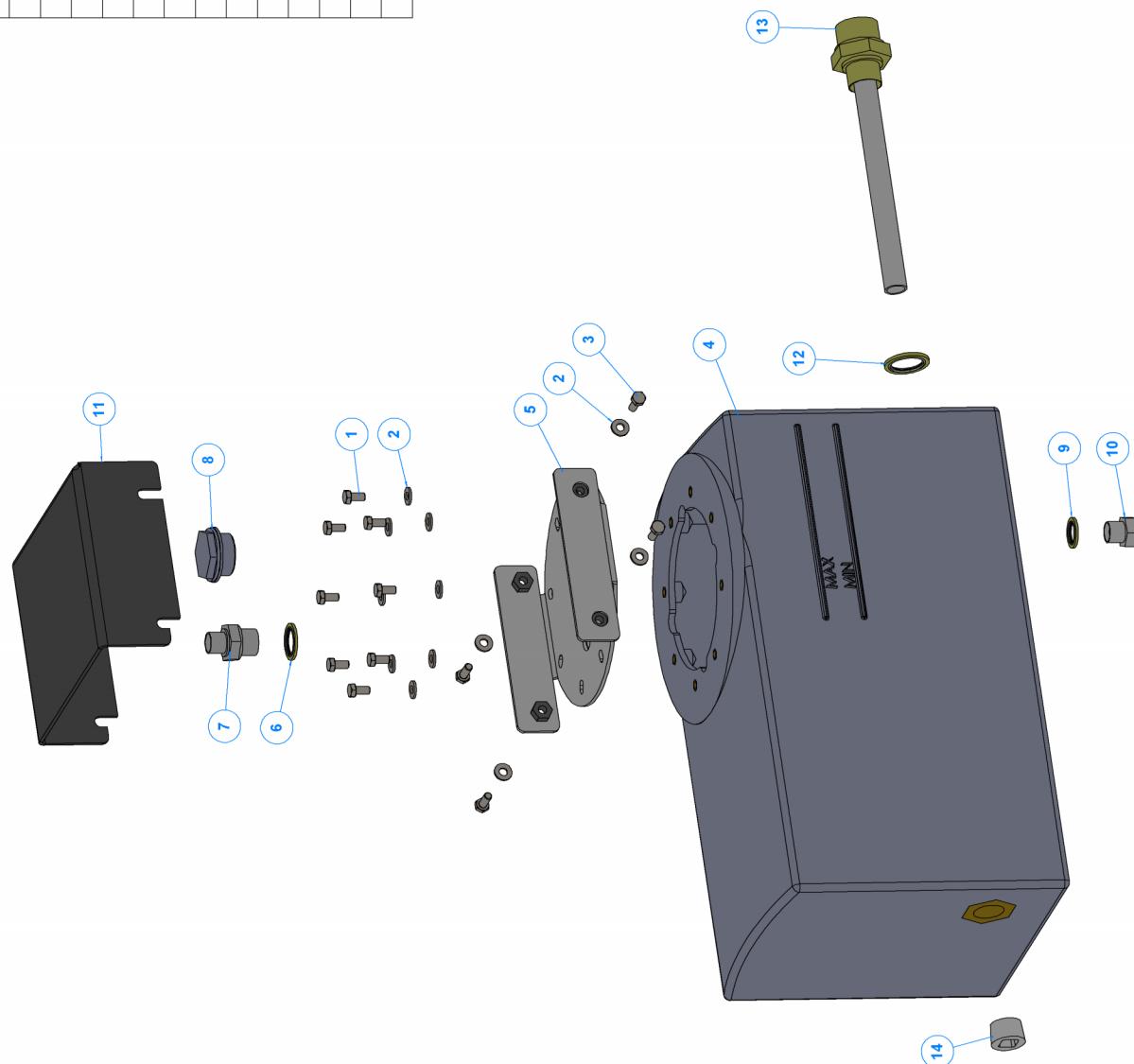
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C021-0123	M6 FORM C WASHER Z/P	10
2	C002-0405	M6 x 16 HEX SET Z/P 8.8	10
3	C031-0121	M6 TYPE T NYLOC NUT Z/P	8
4	C002-0811	M12 x 35 HEX SET Z/P 8.8	2
5	C021-0127	M12 FORM C WASHER Z/P	4
6	C031-0125	M12 TYPE T NYLOC NUT Z/P	2
7	C007-0713	M10 x 45 HEX BOLT S/C 8.8	2
8	C021-0125	M8 FORM C WASHER Z/P	1
9	C031-0163	M8 TYPE P NYLOC NUT Z/P	1
10	C013-0269	M4 x 30 PAN POZI Z/P	2
11	WA4344	M10 x 30 Washer	2
12	C013-0401	M6 x 8 PAN POZI Z/P	8
13	2919FO	Feed Tray Assembly	1
14	1570FR	Control Bar Assembly	1
15	EL1348	Switch Limit (Metal Plunger)	1
16	TW230 VTR Control Box Assembly	Control Box Assembly	2
17	2986	Spring bolt	2
18	1600	Safety Piston	2
19	1605_	Stainless Spacer	2
20	CO178	Buffer Rubber	1
21	2727F	Bracket Actuator Control Bar Assy	1
22	1599_	Bearing Washer	2
23	1603	Spring Die (Stop Bar)	2
24	1591	Spacer 10x15x20	2
25	1337	Rubber Cap	2
26	18923	REFLECTOR AMBER ROUND SIDE	2
27	C045-0109	4.8 x 18 ALU/STEEL RIVET	2
28	C021-0102	M5 FORM A WASHER Z/P	2



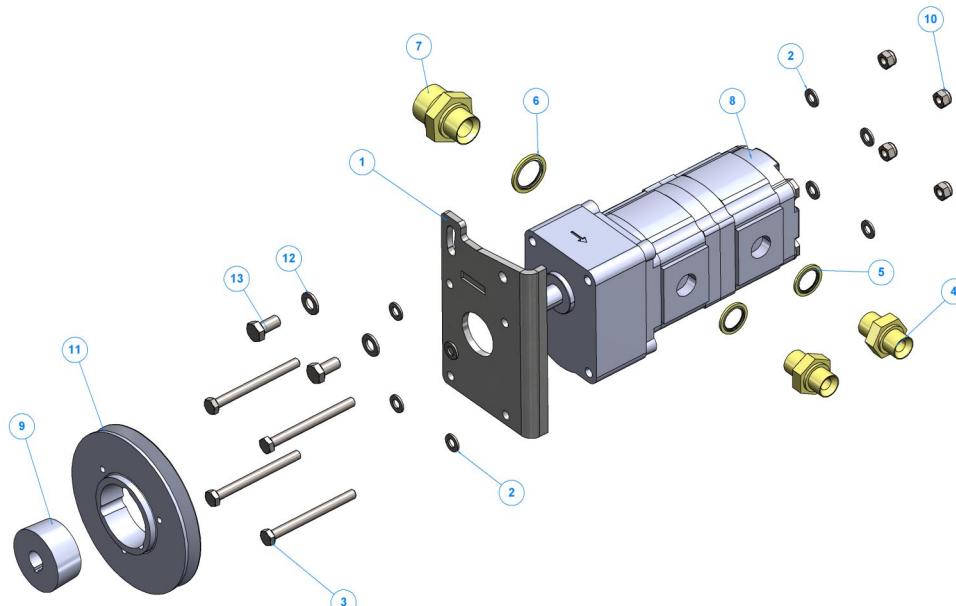


ITEM NO.	PART NUMBER	Description	QTY.
1	P0001906	HOSE 3/8" 465MM 3/8" STRAIGHT FEMALE 3/8" 45 SWEEP FEMALE NO ROTATION	1
2	P0001910	HOSE 1/2" 255MM 1/2" STRAIGHT FEMALE 1/2" COMPACT FEMALE	1
3	P0001918	HOSE 3/8" 250MM 3/8" 90 SWEEP FEMALE 3/8" 90 SWEEP FEMALE 20° ROTATION	1
4	P0001931	HOSE 1/4" 740MM 1/4" STRAIGHT FEMALE 1/4" BANJO NO ROTATION	1
5	P0001929	HOSE 1/4" 590MM 1/4" STRAIGHT FEMALE 1/4" BANJO NO ROTATION	1
6	P0001930	HOSE 1/4" 460MM 1/4" 90 SWEEP FEMALE 1/4" BANJO 90° ROTATION	1
7	P0001932	HOSE 1/4" 460MM 1/4" 90 SWEEP FEMALE 1/4" BANJO NO ROTATION	1
8	P0001923 RIGHT	HOSE 1/4" 585MM 1/8" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE NO ROTATION	1
9	P0001923 LEFT	HOSE 1/4" 585MM 1/8" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE NO ROTATION	1
10	P0001924 LEFT	HOSE 1/4" 585MM 1/8" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE NO ROTATION	1
11	P0001924 RIGHT	HOSE 1/4" 585MM 1/8" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE NO ROTATION	1
12	P0001936	HOSE 1/2" 140MM 1/2" 90 SWEEP FEMALE 1/2" STRAIGHT FEMALE	1
13	P0001937	HOSE 1/2" 1470MM 1/2" 90 SWEEP FEMALE 1/2" STRAIGHT FEMALE	1
14	P0001941	HOSE 1/2" 720MM 1/2" 90 SWEEP FEMALE 1/2" 90 SWEEP FEMALE IN LINE	1
15	P0001942	HOSE 1/2" 700MM 1/2" 90 SWEEP FEMALE 1/2" 90 SWEEP FEMALE IN LINE	1
16	P0001938	HOSE 1/4" 240MM 1/4" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE	1
17	P0001939	HOSE 1/4" 310MM 1/4" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE	1
18	P0001935	HOSE 1/2" 860MM 1/2" 90 SWEEP FEMALE 1/2" 90 SWEEP FEMALE 80° ROTATION	1
19	P0001934	HOSE 1/2" 630MM 1/2" 90 SWEEP FEMALE 1/2" 90 SWEEP FEMALE 60° ROTATION	1
20	P0001913	HOSE 3/8" 1350MM 3/8" 90 SWEEP FEMALE 3/8" STRAIGHT FEMALE NO ROTATION	1
21	P0001119	HOSE 3/8" 1500MM 90 SWEEP FEMALE -90 COMPACT FEMALE 180° ROTATION	1
22	P0001117	HOSE 3/8" 1365MM 90 SWEEP FEMALE -90 SWEEP FEMALE 30° ROTATION	1
23	P0001926	HOSE 1/4" 1210MM 1/4" 90 SWEEP FEMALE 1/4" 90 SWEEP FEMALE 90° ROTATION	1
24	P0001933	HOSE 1/4" 700MM 1/4" 90 SWEEP FEMALE 1/4" 90 SWEEP FEMALE 180° ROTATION	1
25	P0001919	HOSE 1/4" 560MM 1/4" STRAIGHT FEMALE NO ROTATION	1
26	P0001925	HOSE 1/4" 1310MM 1/4" 90 SWEEP FEMALE 1/4" STRAIGHT FEMALE 90° ROTATION	1
27	P0001926	HOSE 3/8" 1400MM 3/8" 90 SWEEP FEMALE 3/8" 90 SWEEP FEMALE 250° ROTATION	1
28	P0001914	HOSE 3/8" 1440MM 3/8" 90 SWEEP FEMALE 3/8" 90 SWEEP FEMALE 180° ROTATION	1
29	P0001916	HOSE 3/8" 1360MM 3/8" 90 SWEEP FEMALE 3/8" 90 SWEEP FEMALE 250° ROTATION	1
30	P0001911	HOSE 1/2" 950MM 1/2" 45 SWEEP FEMALE 1/2" 90 SWEEP FEMALE 180° ROTATION	1
31	P0001912	HOSE 1" 15N 835MM 1" 90 COMPACT FEMALE 1" 90 COMPACT FEMALE 180° ROTATION	1
32	P0001908	HOSE 3/8" 1820mm 3/8" 90 SWEEP FEMALE 3/8 45 SWEEP FEMALE IN LINE	1
33	P0001907	HOSE 3/8" 1750MM 3/8" 90 SWEEP FEMALE 3/8 45 SWEEP FEMALE 90° ROTATION	1
34	P0001909	HOSE 3/8" 720MM 3/8" 90 SWEEP FEMALE 3/8 45 SWEEP FEMALE 135° ROTATION	1
35	P0001922	HOSE 1/4" 585MM 1/4" 90 SWEEP FEMALE 1/4" 45 SWEEP FEMALE NO ROTATION	1
36	P0001927	HOSE 1/4" 1500MM 1/4" 90 SWEEP FEMALE 1/4" 45 SWEEP FEMALE 315° ROTATION	1
37	P0001928	HOSE 1/4" 1570MM 1/4" 90 SWEEP FEMALE 1/4" 45 SWEEP FEMALE 180° ROTATION	1
38	P0001915	HOSE 3/8" 1430MM 3/8" 90 SWEEP FEMALE 3/8" 90 SWEEP FEMALE 180° ROTATION	1
39	P0001949	B08 MALE/MALE/FEMALE TEE	2
40	P0001950	BMBM0408 ADAPTER	2
41	4058	1/4" BSP MALE / MALE / MALE / MALE TEE	4
42	P0001943	3/4" MALE / FEMALE 45 Deg. COMPACT FITTING	1
43	P0001944	BMBM0202 NIPPLE	4
44	328	3/8" BULK HEAD FITTING	2
45	HY396	3/8" DOWTY SEAL	4
46	P0001945	1/8" DOWTY SEAL	4
47	HY161	BMBM0606 NIPPLE	2
48	HY395	1/4" DOWTY	8
49	4059	1/4" BANJO BOLT	4

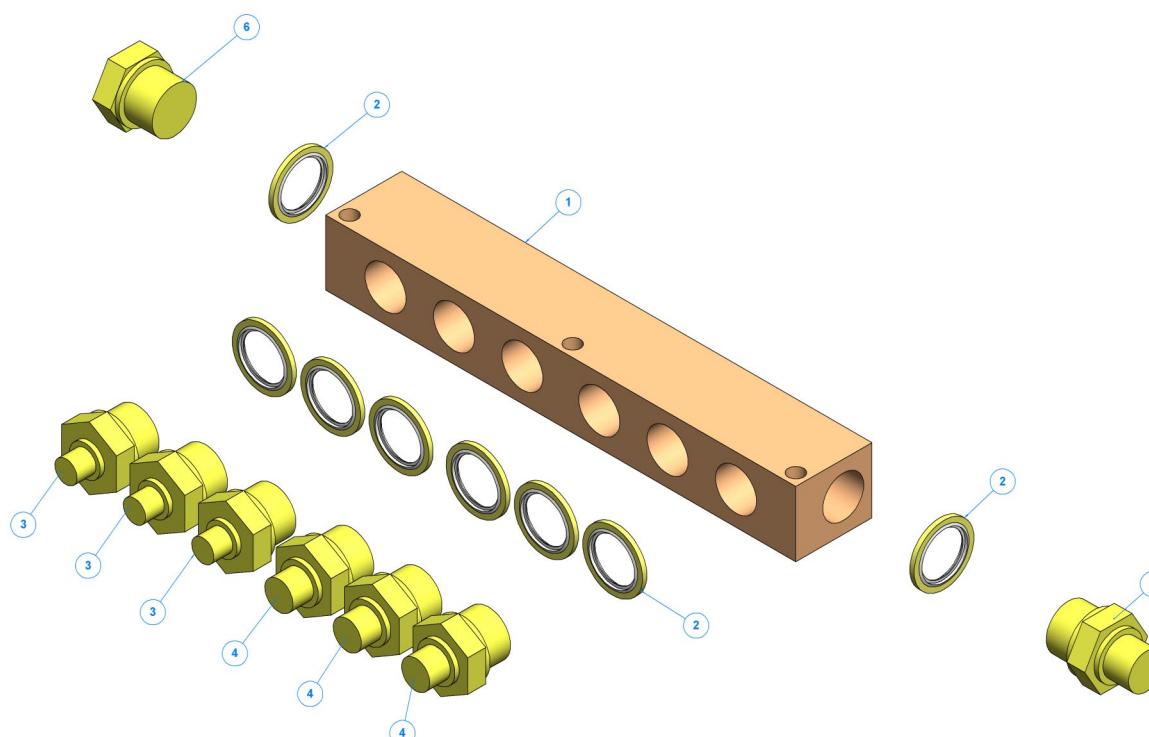
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C002-0403	M6 x 12 HEX SET Z/P 8.8	8
2	WA709	Washer M6 C BZP	12
3	C002-0405	M6 x 16 HEX SET Z/P 8.8	4
4	1703	Hydraulic Oil Tank	1
5	P0001079F	Top Plate Assembly	1
6	HY398	Washer Dowty 1/2"	1
7	HY026	Adapter 3/8 - 1/2	1
8	19272	Breather	1
9	HY396	Washer Dowty 3/8"	1
10	HY211	3/8" Drain Plug	1
11	P0001079F	Cover Hydraulic Tank	1
12	HY152	Washer Dowty 3/4"	1
13	P0002056	Hydraulic Tank Outlet Fitting	1
14	4219	3/4" Tapered Blanking Plug	1



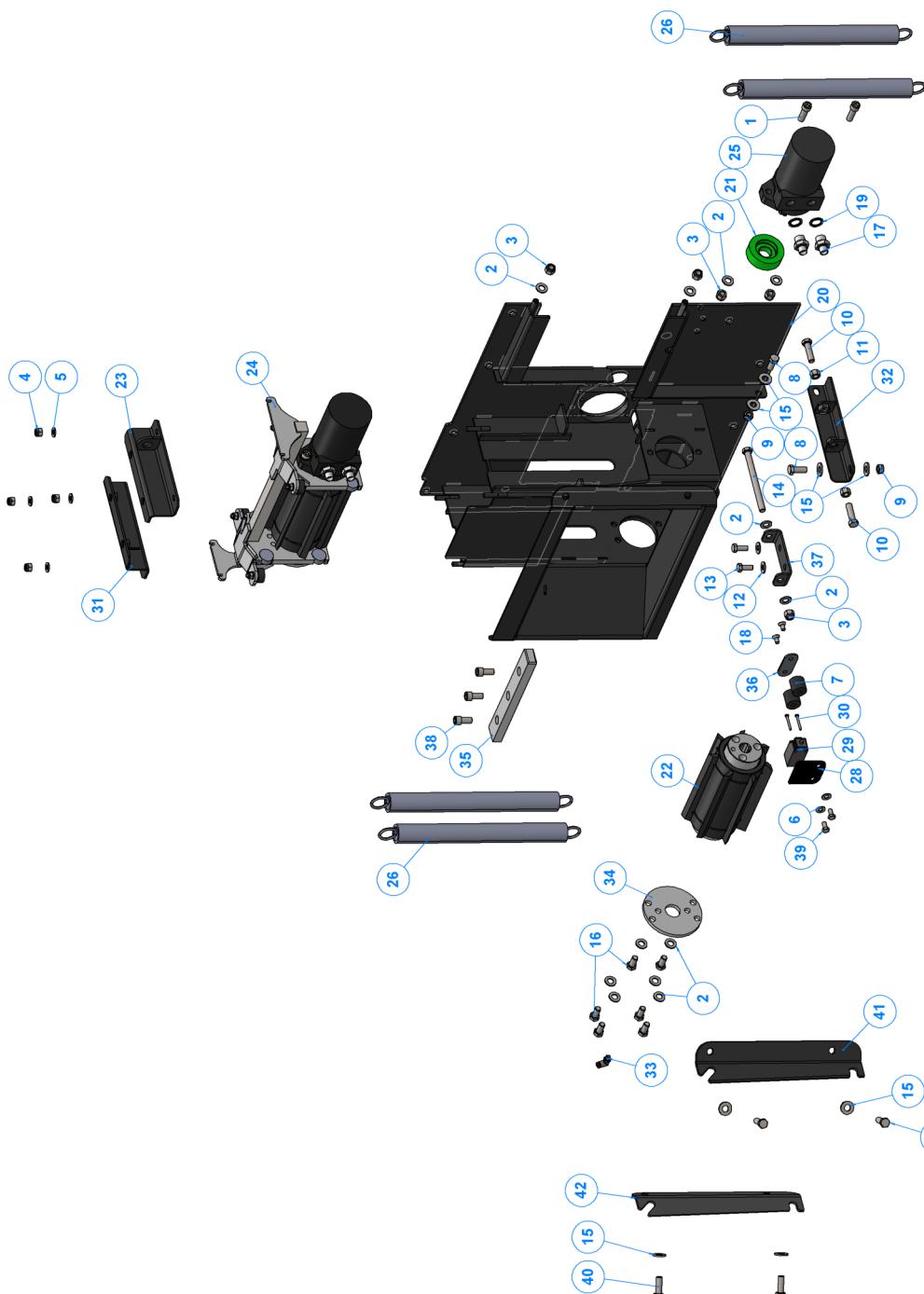
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0001682F	Hydraulic Pump Mounting Bracket	1
2	WA711	Washer M8 A BZP	8
3	18120	Set Screw M8 x 90 BZP	4
4	HY027	Adaptor 1/2" - 1/2" BSP	2
5	HY398	Washer Dowty 12	2
6	HY152	Washer Dowty 3/4"	1
7	2694	Adaptor 1" - 3/4" BSP	1
8	P0002052	Pump Tandem 6.25CC Clockwise	1
9	2975	Taper Lock Bush 1610 18mm	1
10	NU0479	Nut M8 1.25 Nyloc P	4
11	0949	Pulley 140 x 1 SPA	1
12	WA839	Washer M10 C BZP	2
13	BO878	Bolt M10 20 BZP	2

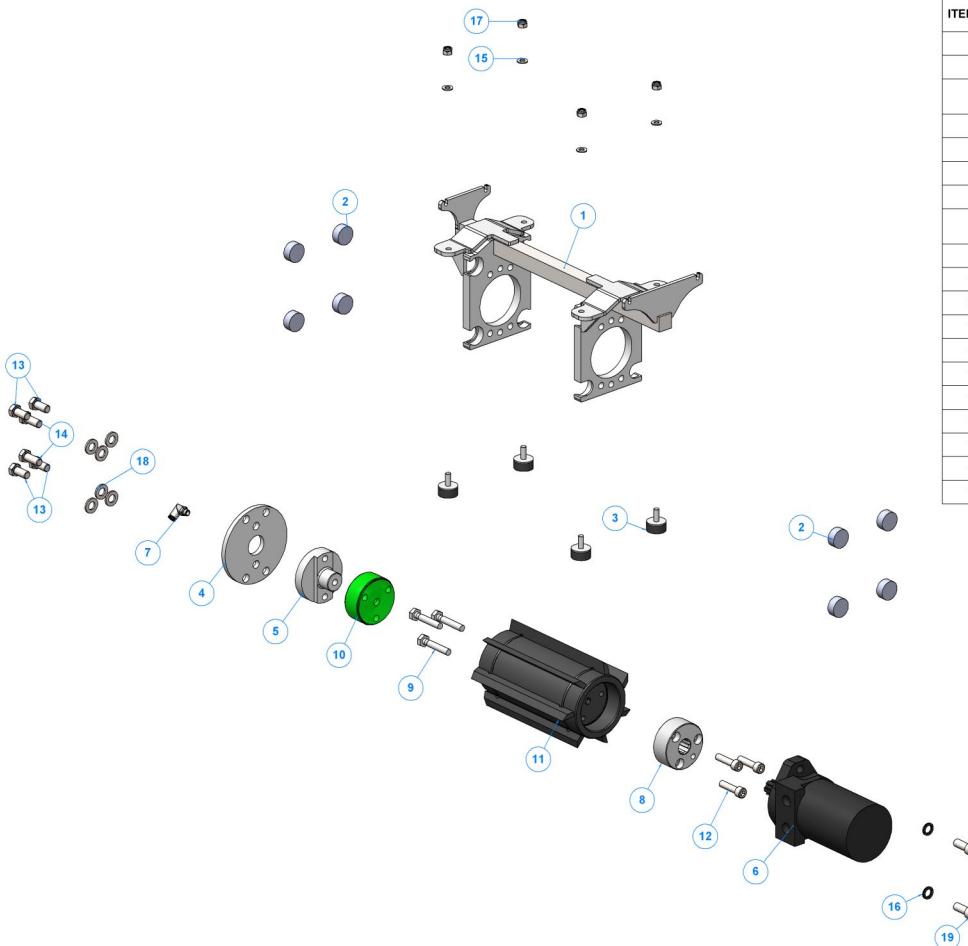


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	18880	8 port manifold	1
2	HY152	Washer Dowty 3/4"	8
3	P0001874	Adaptor 1/4" - 3/4" BSP	3
4	HY225	Adaptor 3/8" - 3/4" BSP	3
5	1583	Adaptor 1/2" - 3/4" BSP	1
6	HY1632	Plug 3/4" BSP	1

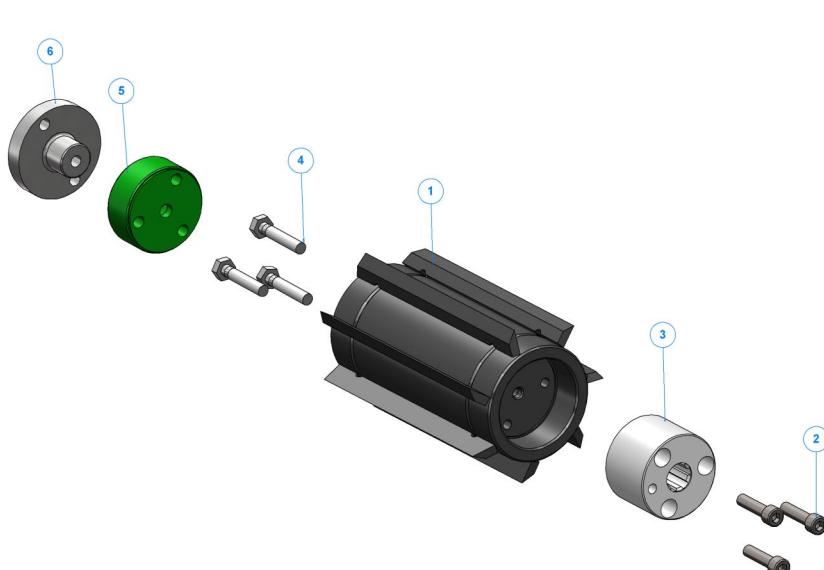


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C005-0812	M12 x 40 SKT CAP SET Z/P 12.9	2
2	C021-0107	M12 FORM A WASHER Z/P	12
3	C031-0165	M12 TYPE P NYLOC NUT Z/P	5
4	C031-0164	M10 TYPE P NYLOC NUT Z/P	4
5	C021-0106	M10 FORM A WASHER Z/P	4
6	C021-0125	M8 FORM C WASHER Z/P	2
7	P0001375	AV Mount M8 FF 30x30 60 (3030D08-60)	2
8	C002-0810	M12 x 30 HEX SET Z/P 8.8	2
9	C031-0125	M12 TYPE T NYLOC NUT Z/P	2
10	C002-0813	M12 x 45 HEX SET Z/P 8.8	2
11	C030-0125	M12 HEX NUT - ZP - GRADE 10	2
12	C021-0126	M10 FORM C WASHER Z/P	2
13	C002-0709	M10 x 25 HEX SET Z/P 8.8	2
14	C008-0829	M12 x 150 HEX BOLT Z/P 8.8	1
15	C021-0127	M12 x 25 HEX SET C WASHER Z/P	8
16	C002-0809	M12 x 25 HEX SET Z/P 8.8	6
17	HY026	Adapter 3/8 - 1/2	4
18	C015-0605	M8 x 16 SKT CSK SET Z/P 109	2
19	HY398	Washer Dowty 1/2"	4
20	P002810F	Roller Box 230 Assembly	1
21	P001042M	Spacer Roller Drive	1
22	TW230 VTR Roller Bottom Sub Assy		1
23	P0001322F	Bracket Roller Box Guard Mount	1
24	TW230 VTR Top Slide Assembly		1
25	2982B	Parker Motor	1
26	19052	Spring	4
27	TW230 VTR Switch Mounting Roller Box Assembly		1
28	P0001080F	Bracket Access Hatch Switch	1
29	EL1348	Switch Limit (Metal Plunger)	1
30	C013-0210	M4 x 35 PAN POZI Z/P	2
31	P0001082F	Bracket Roller Box Guard Mount Assy	1
32	P000886F	Bracket Spring Carrier Roller	1
33	18474	Fitting Grease Point Right Angle	1
34	P0000668	Mounting Plate Stub Shaft	1
35	P0002808M	Hardox Anvil	1
36	P0000993	Profile Roller Box Hatch Switch Mount	1
37	P0001083F	Bracket Spring Carrier Roller	1
38	C005-0809	M12 x 25 SKT CAP SET Z/P 12.9	3
39	C002-0805	M8 x 16 HEX SET Z/P 8.8	2
40	C002-0811	M12 x 35 HEX SET Z/P 8.8	4
41	P0001703F	Funnel Quick Release Angle OS	1
42	P0001704F	Funnel Quick Release Angle NS	1



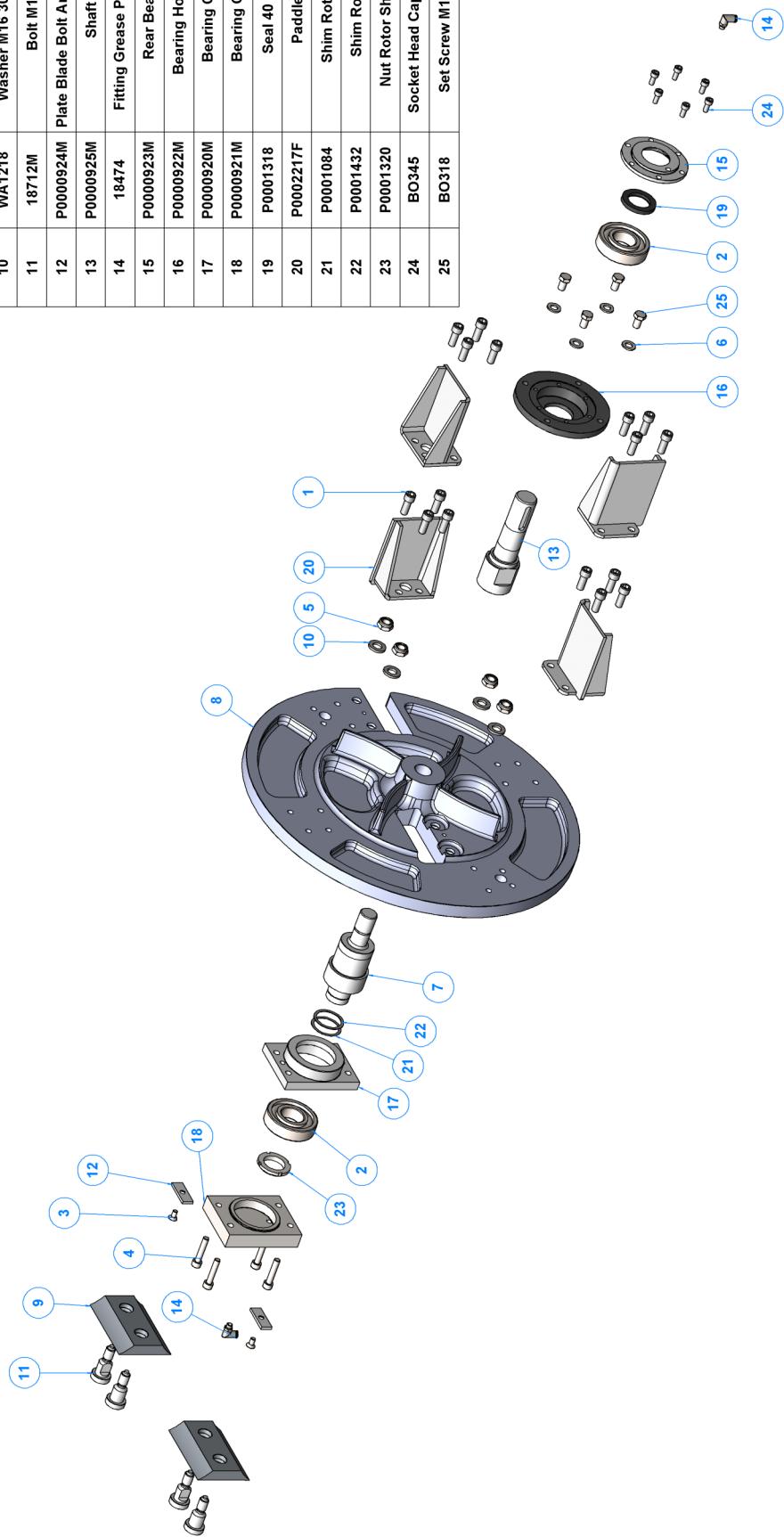


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0000964F	Top Slide Roller Box	1
2	3009	Slide Plug	8
3	P0002613	Male Cylindrical Buffer 3015VE20 70 Shore 30 x 15 - M8 x 20 Stud	4
4	P0000668	Mounting Plate Stub Shaft	1
5	P0000675M	Shaft Roller Stub	1
6	2982B	Parker Motor	1
7	18474	Fitting Grease Point Right Angle	1
8	1361M	Bush Spline Top Roller Drive Ø74.9 - 29.5	1
9	P0001401	Bolt Shear M10 1.5 55 BZP	3
10	P0001327M	Bush Top Roller Ø76 - 30.5	1
11	P0001502F	Roller Infeed	1
12	BO299	Socket Head Cap M10 1.5 40 BZP	3
13	BO277	Set Screw M12 1.75 25 BZP	4
14	BO321	Set Screw M12 30 BZP	2
15	WA711	Washer M8 A BZP	4
16	19259	Nordlock Washer M12	2
17	NU479	Nut M8 1.25 Nyloc P	4
18	WA702	Washer M12 A BZP	6
19	BO1985	Socket Head Cap M12/30	2

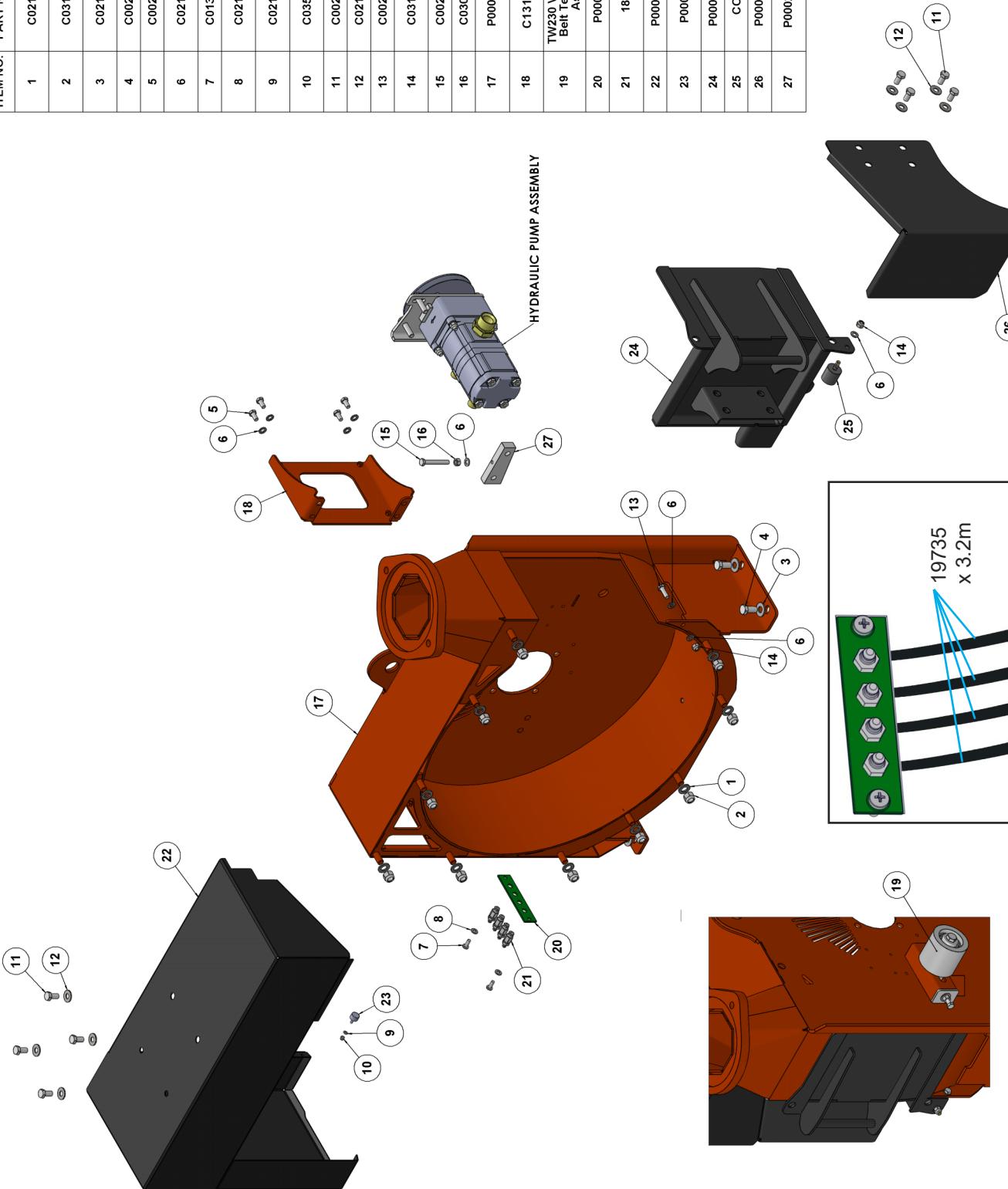


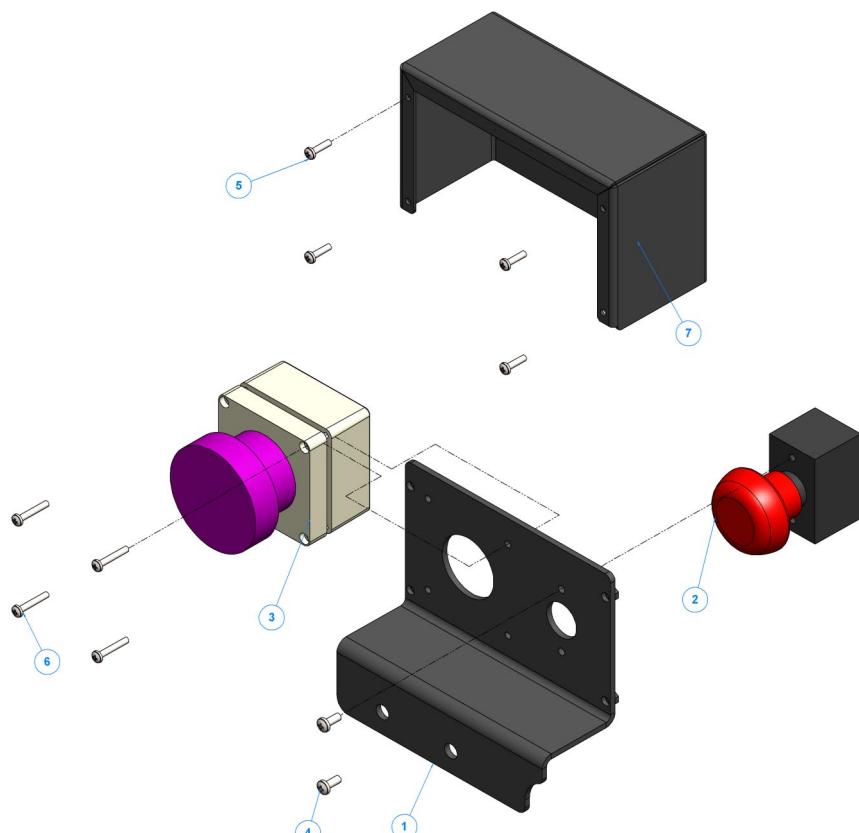
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0001502F	Roller Infeed	1
2	BO299	Socket Head Cap M10 1.5 40 BZP	3
3	2731M	Spline Drive Bottom Roller Ø74.9 - 52	1
4	P0001401	Bolt Shear M10 1.5 55 BZP	3
5	P0001327M	Bush Top Roller Ø76 - 30.5	1
6	P0002175M	Shaft Bottom Roller Stub	1

ITEM NO.	PART NUMBER	DESCRIPTION	Manual Page/CITY
1	BO1985	Socket Head Cap M12/30	16
2	P0001319	Bearing 6308 C3	2
3	BO355	Csk Socket M8 16	2
4	CO18-0714	M10 x 1.25 x 50 Fine Thread SKT Cap	4
5	1284	Nut M16 1.50 Nyloc T	4
6	WA702	Washer M12 A BZP	4
7	P000615M1	Shaft Nose	1
8	P000124AM	Rotor Disc	1
9	P0000763	Blade Cutter 135	2
10	WA1218	Washer M16 30 Hard SLD PRT	4
11	18712M	Bolt M16 Blade	4
12	P0000924M1	Plate Blade Bolt Anti Rotation 52 x 20	2
13	P0000925M1	Shaft Rotor	1
14	18474	Fitting Grease Point Right Angle	2
15	P0000923M1	Rear Bearing Cap	1
16	P0000922M1	Bearing Housing Rear	1
17	P0000920M1	Bearing Cup Front	1
18	P0000921M1	Bearing Cap Front	1
19	P0001318	Seal 40 X 60 X 7	1
20	P0002217F	Paddle Rotor	4
21	P0001084	Shim Rotor 0.5mm	1
22	P0001432	Shim Rotor 1mm	1
23	P0001320	Nut Rotor Shaft M40 x 1.5	1
24	BO345	Socket Head Cap M8 1.25 18 BZP	6
25	BO318	Set Screw M12 1.75 20 BZP	4



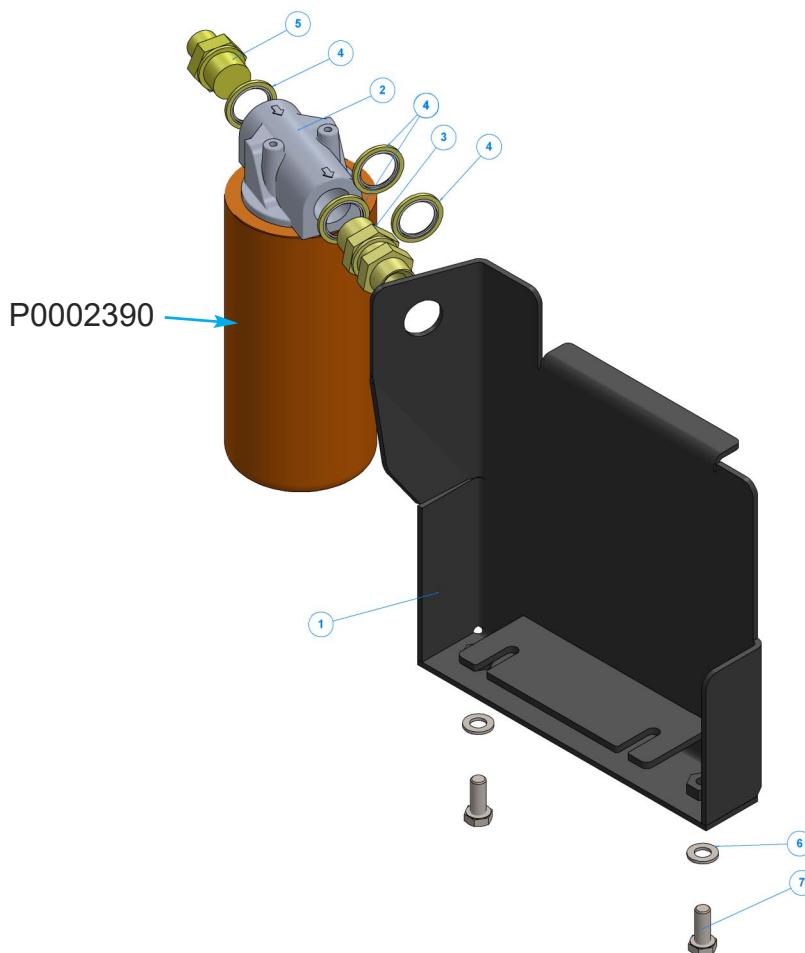
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	C021-0107	M12 STD A WASHER Z/P 8.8	10
2	C031-0165	M12 TYPE P NYLOC NUT Z/P	10
3	C021-0127	M12 STD C WASHER Z/P 8.8	4
4	C002-0809	M12 x 25 Hex Set Z/P 8.8	4
5	C002-0605	M8 x 16 Hex Set Z/P 8.8	4
6	C021-0105	M8 STD A WASHER Z/P 8.8	8
7	C013-0405	M6 x 16 Pozl Pan Z/P 4.8	2
8	C021-0123	M6 STD C WASHER Z/P 8.8	2
9	C021-0101	M4 STD A WASHER Z/P 8.8	1
10	C035-0102	M4 TYPE P NYLOC NUT Z/P	1
11	C002-0707	M10 x 20 HEX SET Z/P 8.8	8
12	C021-0126	M10 STD C WASHER Z/P	8
13	C002-0609	M8 x 25 Hex Set Z/P 8.8	1
14	C031-0163	M6 TYPE P NYLOC NUT Z/P	2
15	C002-0616	M8 x 60 Hex Set Z/P 8.8	1
16	C030-0123	M8 Hex Nut Z/P 10	1
17	P0002317F	Interchangeable Rotor Housing Q593	1
18	C131-0169	Bracket Rotor Housing Electrical Panel Assy	1
19	PW230VTR Steel Belt Tensioner Assy	Steel Belt Tensioner Assy	1
20	P0000684	Grease Point Panel	1
21	18192	Rg06 Do-it Remote Grease Kit	4
22	P0001057F	Guard Roller Box	1
23	P0001253	AV Mount 16 x 10 M4 60 Shore VE	1
24	P0002826F	Access Hatch 230	1
25	CO178	Buffer Rubber	1
26	P0001053F	Guard Roller Box Moving	1
27	P0002607M	Pump Mounting Block	1

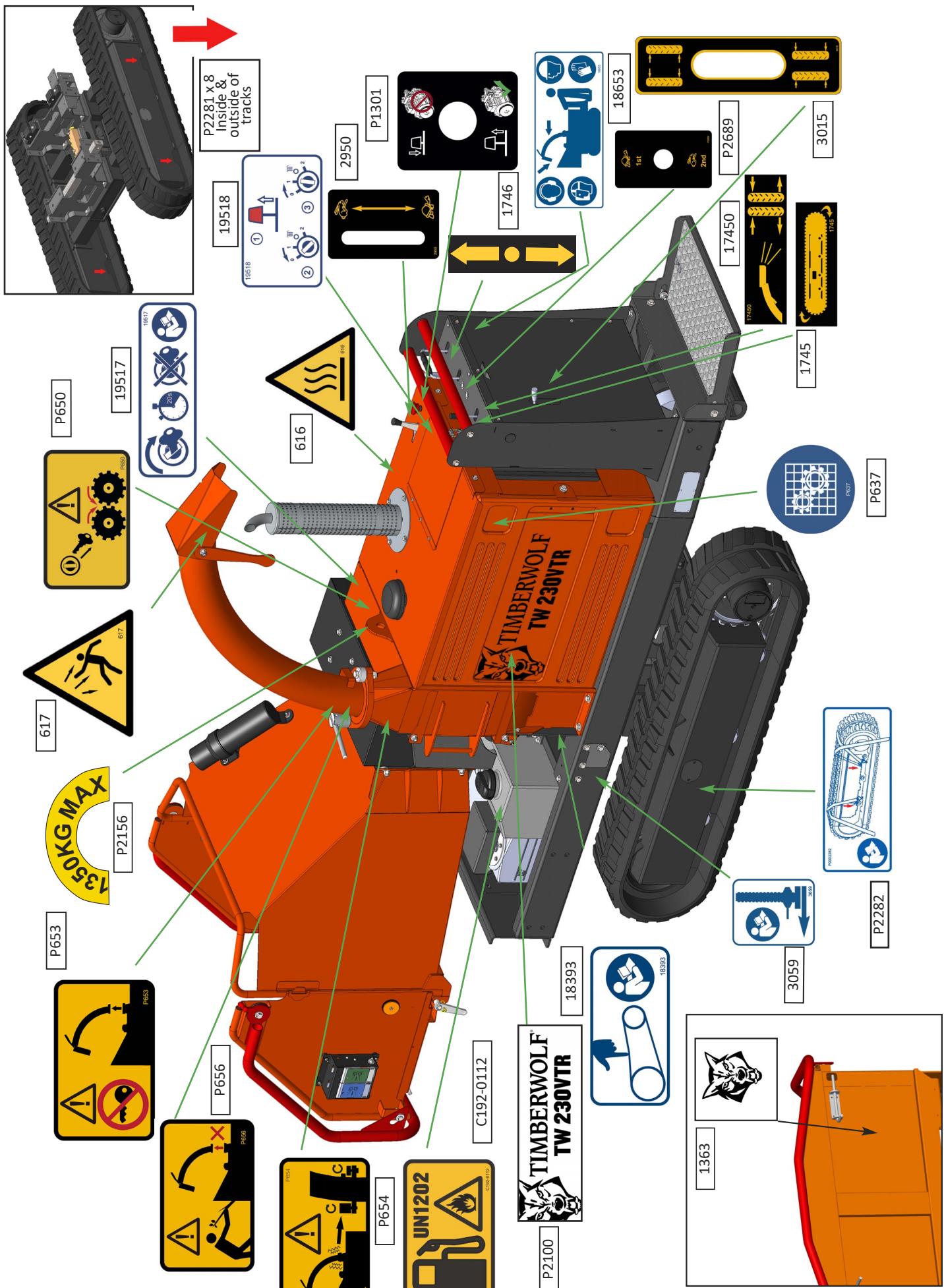


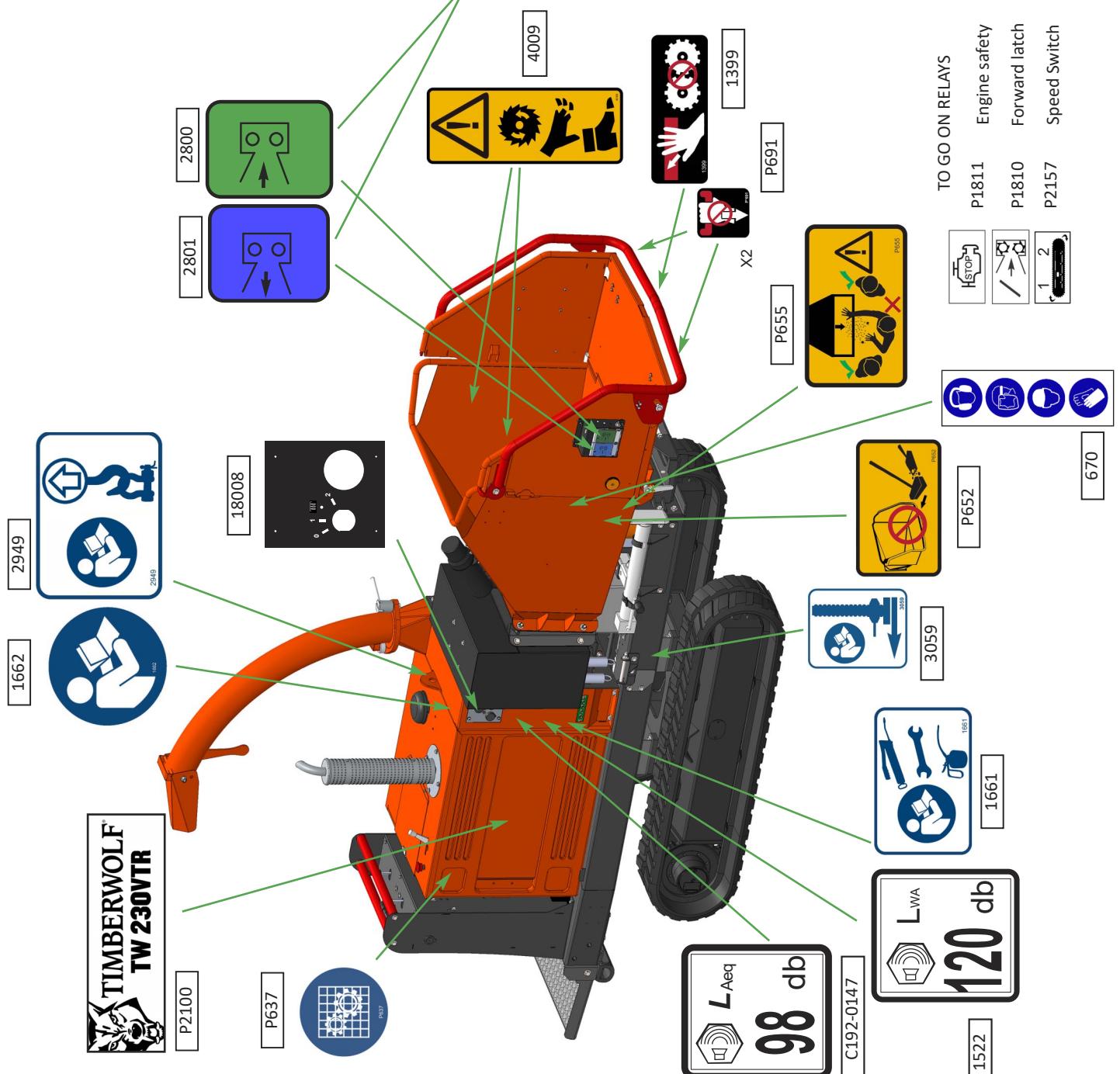
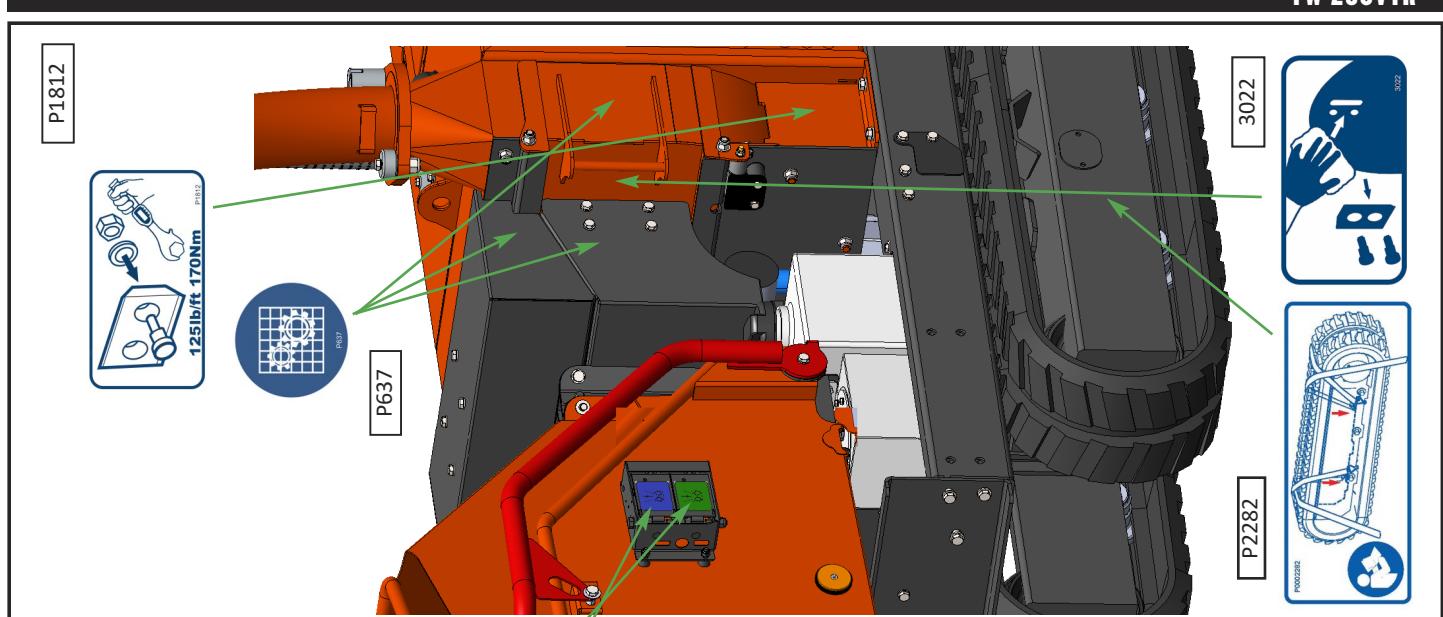


SUPPLIED WITH
WINCH KIT P2030

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P0001785F	Bracket Winch Socket	1
2	P0002035	Main Isolator Switch for P0002030 Kit	1
3	P0002037	Socket Pendant for P0002030 Kit	1
4	18104	Pan Head Pozi M5 0.8 12 BZP	2
5	P0002075	Pan Head Pozi M4 0.7 16 BZP	4
6	P0002076	Pan Head Pozi M4 0.7 25 BZP	4
7	P0001708F	Cover Winch Socket	1









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