



TW 150VTR/FTR INSTRUCTION MANUAL



timberwolf-uk.com

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INTRODUCTION

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

IMPORTANT HEALTH AND SAFETY INFORMATION

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

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

This manual covers the operation and maintenance of the Timberwolf TW 150VTR/FTR. 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. Ensure that all operators are **properly trained** for operating this machine, especially **safe working practices**.

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

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

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

ALWAYS FOLLOW SAFE OPERATING AND MAINTENANCE PRACTICES



CAUTION or WARNING

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

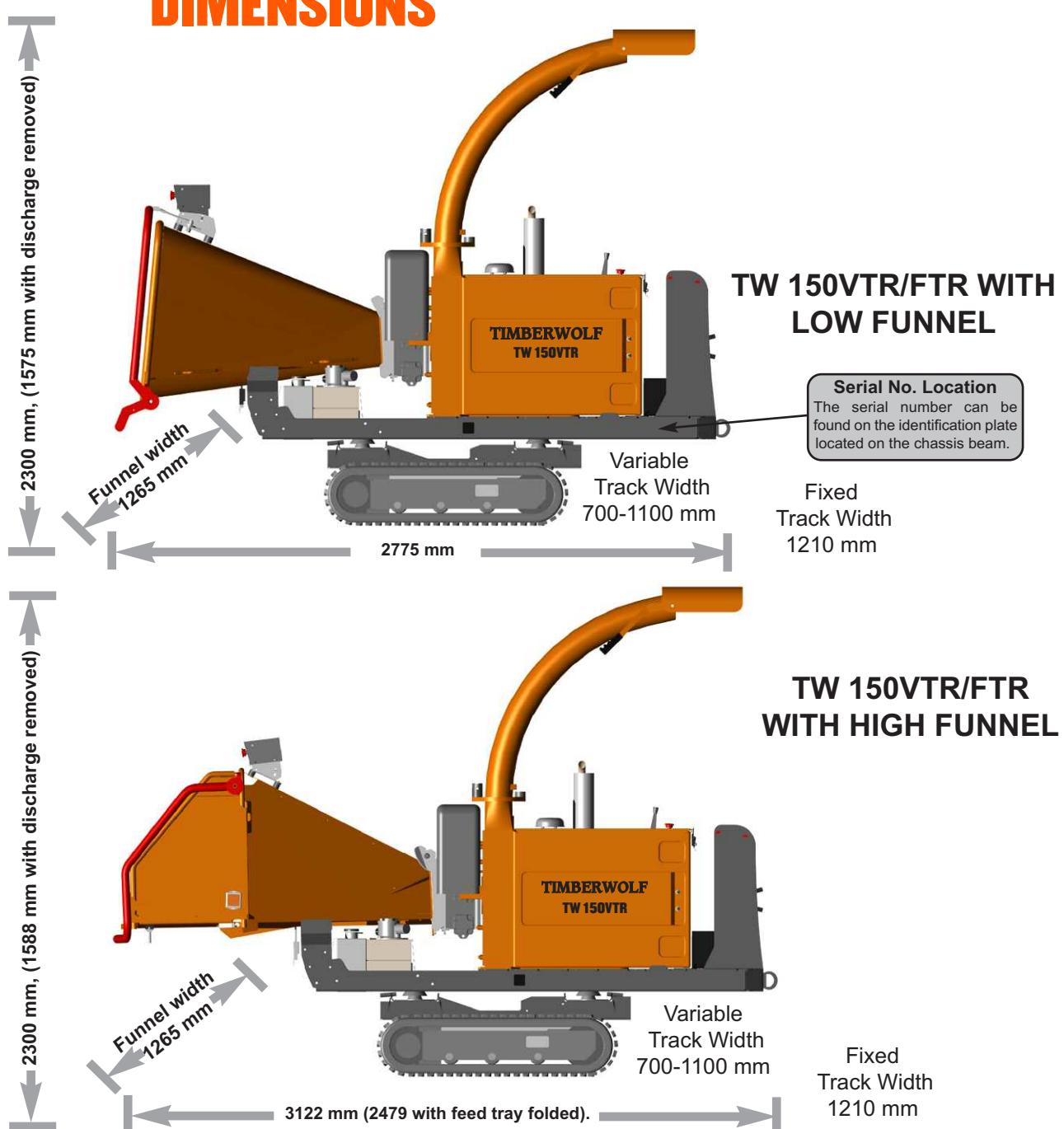
This caution symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury to yourself or others and carefully read the message that follows.



The Timberwolf TW 150VTR/FTR

Designed to chip solid wood material up to 150mm in diameter and capable of chipping up to 4 tonnes of brushwood per hour.

DIMENSIONS

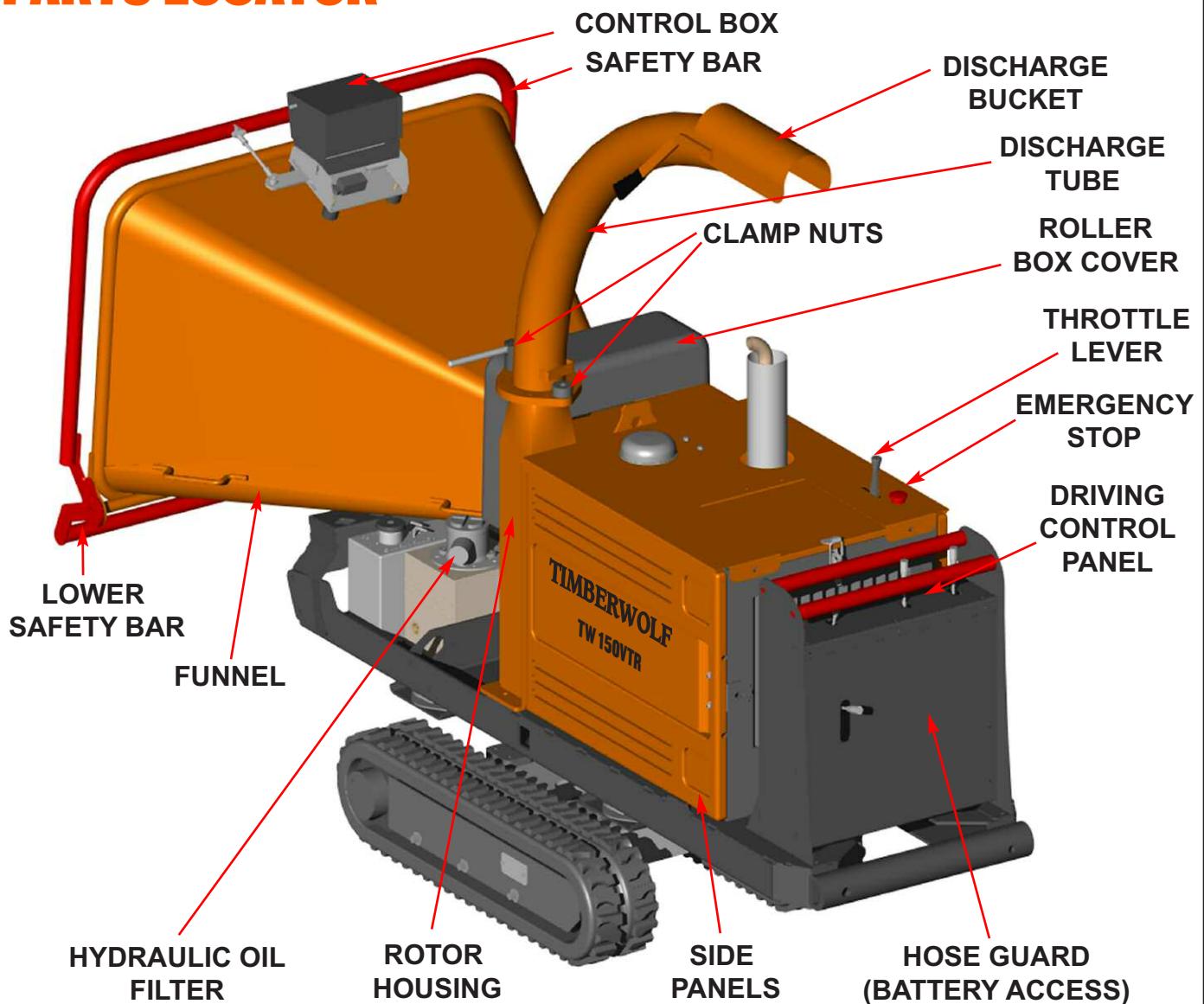


TIMBERWOLF TW 150VTR/FTR SPECIFICATION

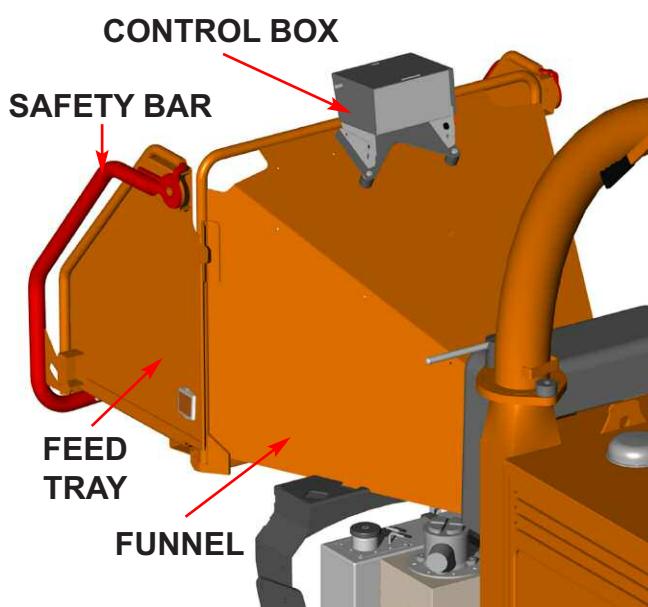
| | | | |
|-----------------|------------------------------|------------------------------|-------------|
| Engine type | Kubota 4-cylinder diesel | Maximum diameter material | 150 mm (6") |
| Maximum power | 26kW (35hp) | Fuel capacity | 18 litres |
| Cooling method | Water cooled | Hydraulic oil capacity | 15 litres |
| Overall weight | 1080kg(VTR) 1120kg (FTR) | Material processing capacity | 4 tonnes/hr |
| Starting method | Electric | Fuel type | Diesel |
| Roller feed | Twin series hydraulic motors | | |



PARTS LOCATOR

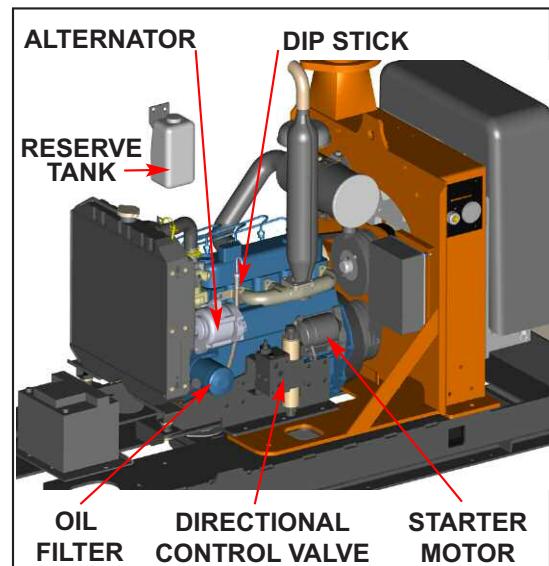
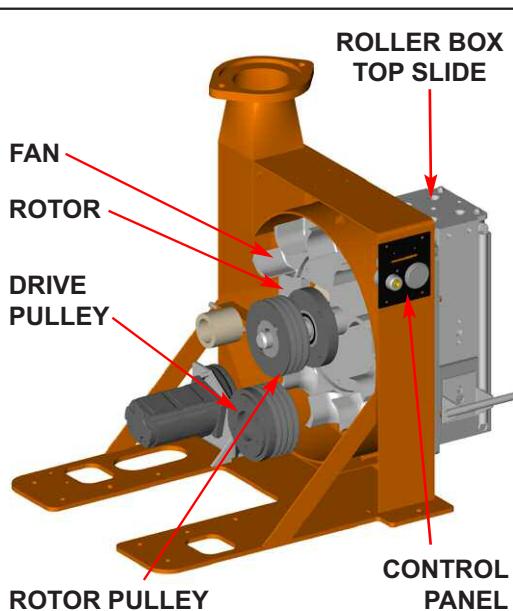
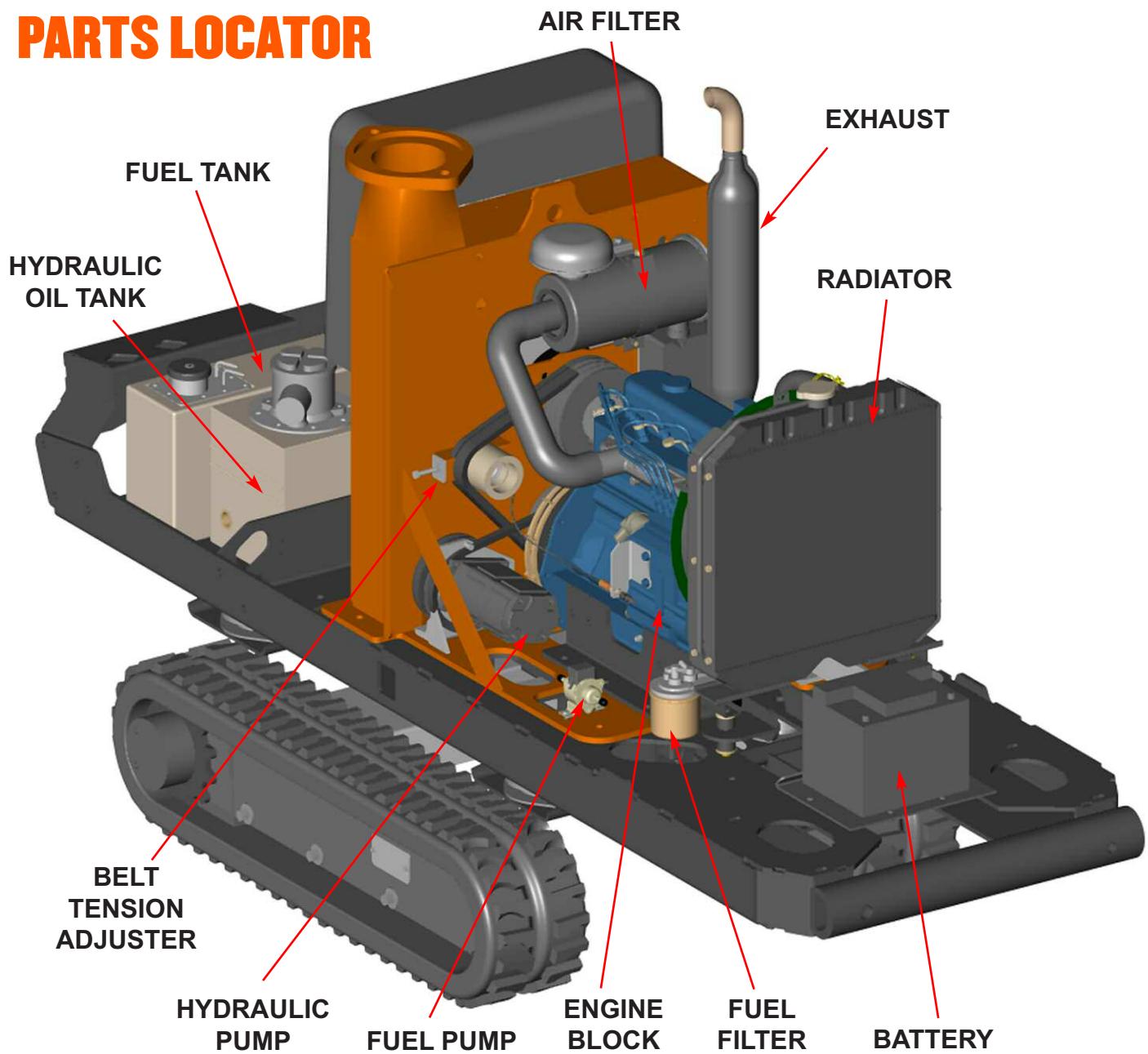


TW 150VTR/FTR WITH HIGH FUNNEL





PARTS LOCATOR





WARNING

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



OPERATOR'S PERSONAL PROTECTIVE EQUIPMENT REQUIRED



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



Close fitting heavy-duty non-snag clothing.



Work gloves with elasticated wrist.



Face mask if appropriate.



Steel toe cap safety boots.



DO NOT

wear rings, bracelets, watches, jewellery or any other items that could be caught in the material and draw you into the chipper.

BASIC WOODCHIPPING SAFETY

The operator should be aware of the following points:

- MAINTAIN A SAFETY EXCLUSION ZONE around the chipper of at least 10 metres for the general public or employees without adequate protection. Use hazard tape to identify this working area and keep it clear from debris build up. Chips should be ejected away from any area the general public have access to.
- HAZARDOUS MATERIAL - Some species of trees and bushes are poisonous. The chipping action can produce vapour, spray and dust that can irritate the skin. This may lead to respiratory problems or even cause serious poisoning. Check the material to be chipped before you start. Avoid confined spaces and use a facemask if necessary.
- BE AWARE when the chipper is processing material that is an awkward shape. The material can move from side to side in the funnel with great force. If the material extends beyond the funnel, the 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.



GENERAL SAFETY MATTERS



DO'S AND DON'TS



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

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

ALWAYS check the machine is well supported and cannot move.

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

ALWAYS check (visually) for fluid leaks.

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

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

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



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

ALWAYS keep the operating area clear from debris build up.

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

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

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

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

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

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

DO NOT allow -



- to enter the machine, as damage is likely.

DO NOT smoke when refuelling.



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

DO NOT climb on the machine at any time.

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

DO NOT touch any exposed wiring while machine is running.

DO NOT use the chipper inside buildings.

WARNING

NEVER LEAVE THE CHIPPER ON A SLOPE UNATTENDED.



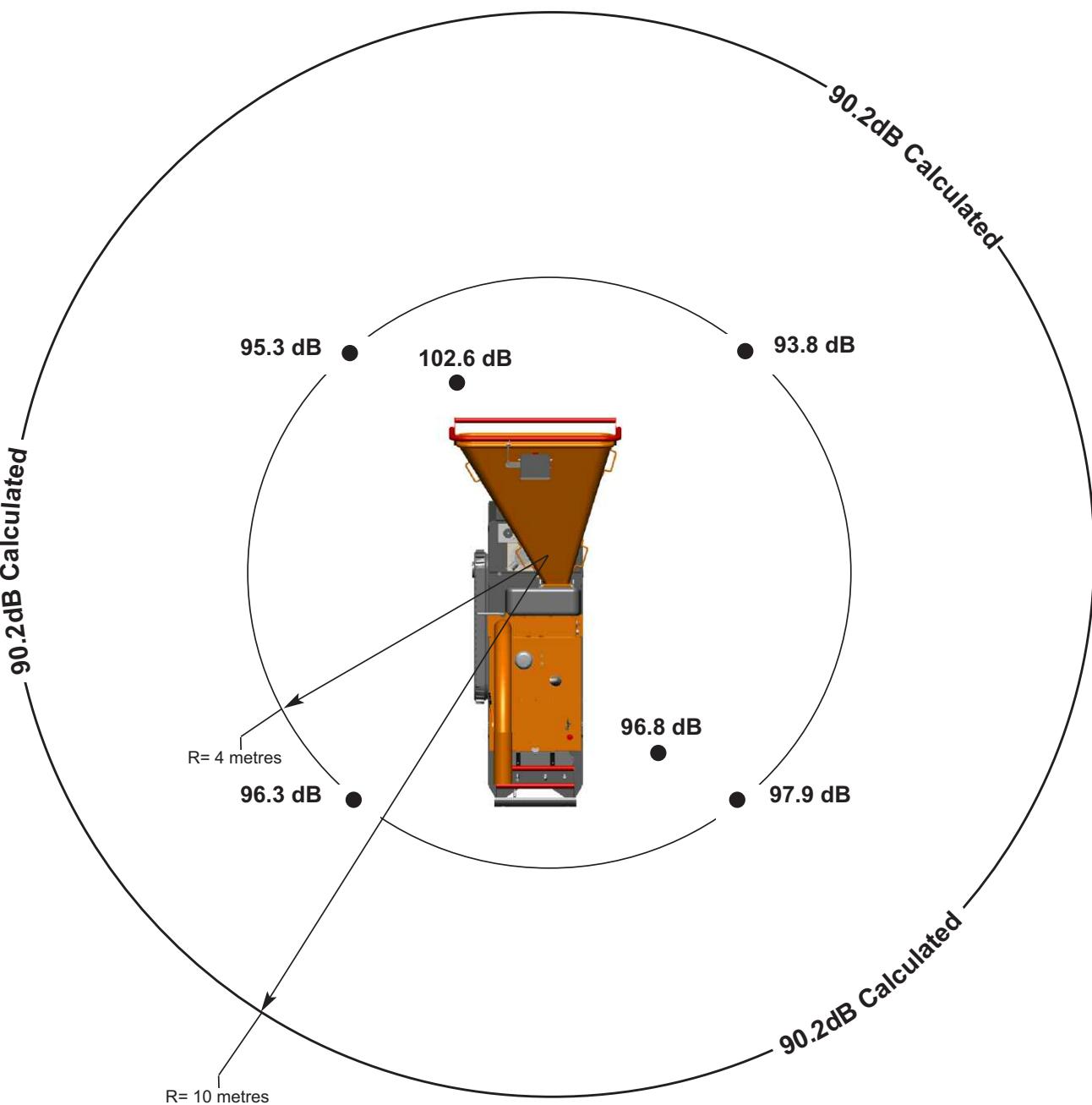


NOISE TEST

MACHINE: TW 150VTR/FTR

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

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



Guaranteed Sound Power: 119dB (A)

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



DELIVERY

All Timberwolf TW 150VTR/FTR 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 5-7 which contain important health and safety information and advice.

OPERATOR'S PERSONAL PROTECTIVE EQUIPMENT REQUIRED

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

See page 5 for more detailed information.

MANUAL CONTROLS

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

RED SAFETY BAR = This is the large red bar that surrounds the sides and top of the feed funnel (sides and bottom on high 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 (pushed or pulled...low funnel only) to the limit of its travel. The rollers stop instantly, but can be made to turn again by pressing either the **GREEN FEED** or **BLUE REVERSE** control buttons.

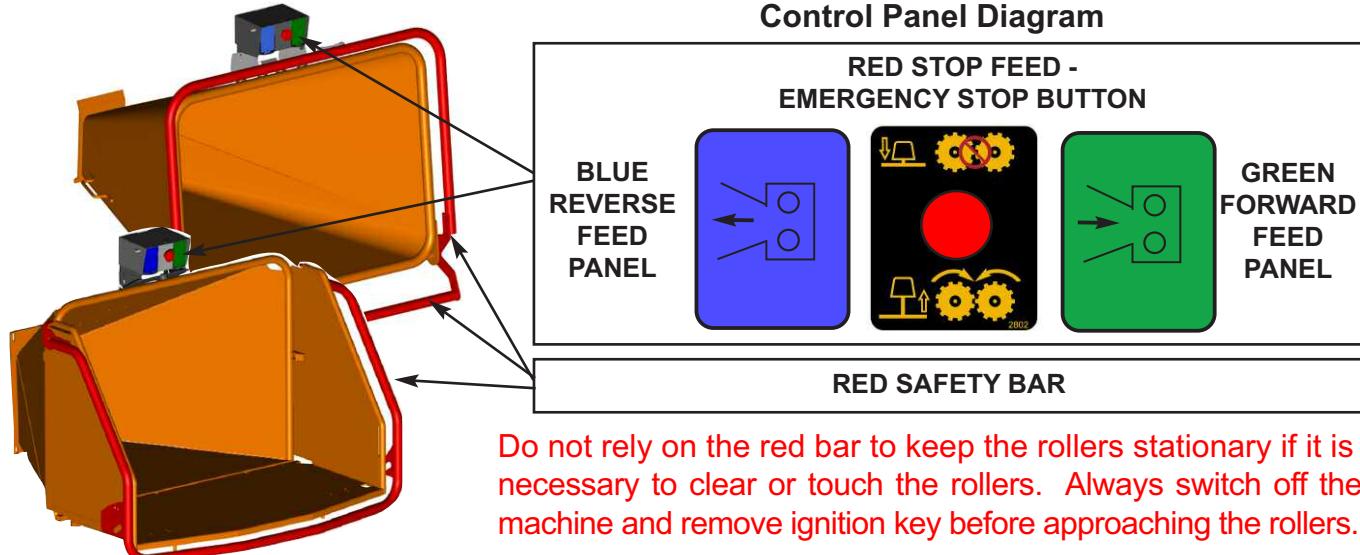
LOW SAFETY BAR = An additional safety bar is located along the bottom of the low funnel. This is linked directly to the main bar, and will stop the rollers if pushed *only*. Pulling this bar will only move it into its 'stowed' (up) position.

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

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

BLUE BUTTON = Reverse feed - allows you to back material out of the rollers. The rollers will only turn in reverse as long as you keep pressing the button. You do not have to press the STOP button before pressing the **GREEN FEED** button to recommence feeding. **NOTE: This reverse function will work even if the safety bar is pushed or pulled.**

Control Panel Diagram





CRAWLER TRACK CONTROLS

WARNING

NEVER LEAVE THE CHIPPER ON A SLOPE UNATTENDED.



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

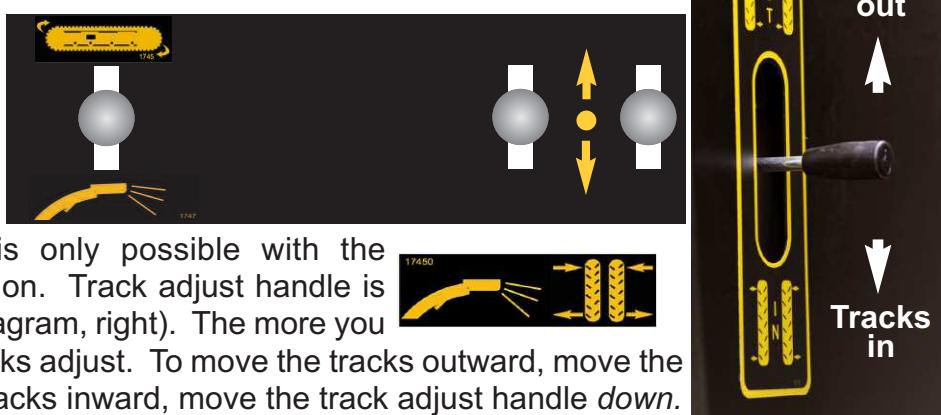
Power is available to the crawler tracks. The cutting disc is rotating but the feed rollers are stationary.

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.

Tracking may be done at either high or low engine speed. Manoeuvring the machine in tight spaces and while loading and unloading should be done with the engine on low speed.

NOTE: *Ensure low safety bar on low funnel is rotated into the 'stowed' (up) position prior to tracking to avoid damage to the bar.*



For machines fitted with variable tracks, track width adjustment is only possible with the track/chip control in the chip position. 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*.

AUTO CONTROLS

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

EMERGENCY STOPPING

There are three ways of stopping the TW 150VTR/FTR chipper in the event of an emergency.

STOPPING THE ROLLERS

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

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

STOPPING THE ENGINE

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



DAILY CHECKS BEFORE STARTING

- LOCATE the machine on firm level ground.
- CHECK machine is well supported and cannot move.
- CHECK jack stand is lowered and secure.
- CHECK all guards are fitted and secure.
- CHECK the discharge unit is in place and fastened securely.
- CHECK discharge tube is pointing in a safe direction.

- CHECK the feed funnel to ensure no objects are inside.
- CHECK feed tray is in up position - to prevent people reaching rollers.
- CHECK controls as described on page 11.
- CHECK (visually) for fluid leaks.
- CHECK fuel and hydraulic oil levels.

For parts location see diagrams on pages 3 & 4.

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 emergency stop switch (see parts locator on page 4).

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.

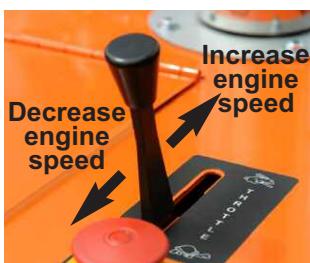
*Do not engage starter motor for more than 20 seconds
- allow one minute before attempting to start.*

Investigate reasons for failure to start.



HOURS COUNTER

When the emergency 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.

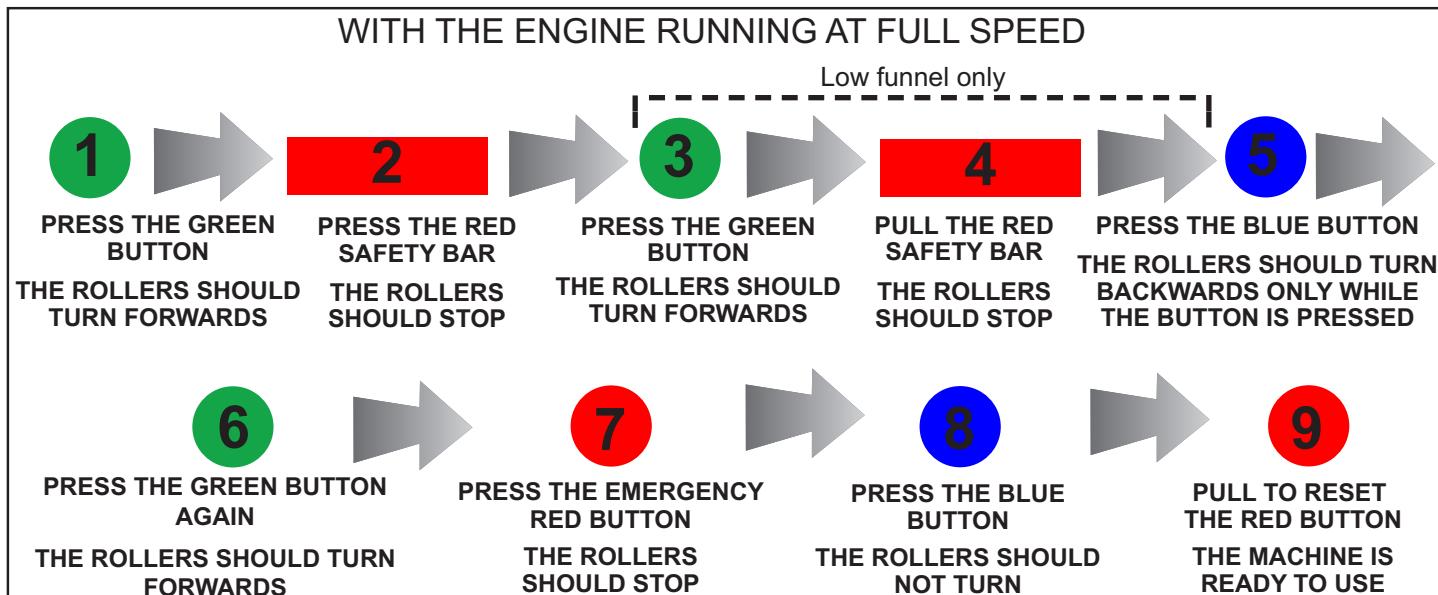
FUEL LEVEL INDICATOR

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



BEFORE USING THE CHIPPER

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



STARTING TO CHIP

WARNING

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



- CHECK that chipper is running smoothly.
- PULL to release the red emergency stop button.
- PRESS the green control button. The rollers will commence turning.
- STAND to one side of the feed funnel.
- PROCEED to feed material into the feed funnel.

CHIPPING

Wood up to the recommended diameter can be fed into the feed funnel. Put the butt end in first and engage it with the feed 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** button until the material has been released. Pull the material out of the feed funnel and trim it so the chipper can handle it.

Both feed rollers should always turn at the same speed. If one or both rollers stop or suddenly slow down it may be that a piece of wood has become stuck behind one of the rollers. If this occurs, press the **BLUE REVERSE** button and hold for 2 seconds - then repress **GREEN FEED** button. This should enable the rollers to free the offending piece of material and continue 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 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.

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.

WARNING

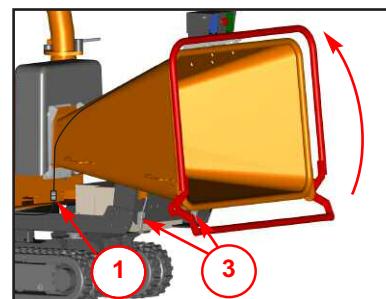
Do not reach into the rotor housing with unprotected hands. There are sharp blades and any small movement of the rotor may cause serious injury.



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

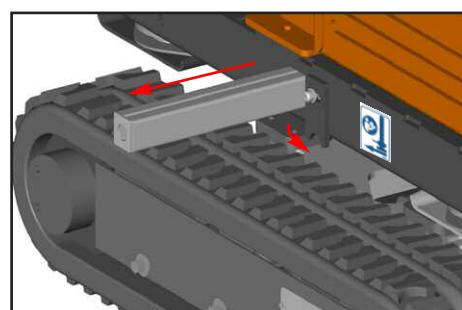
REMOVING THE FUNNEL

1. DISCONNECT the control box loom from the engine loom at the connection point location under the near side of the funnel.
- 2a. ON the high funnel / tray, ensure tray is closed and catches are latched.
2b. ON the low funnel, rotate low safety bar into its 'stowed' (up) position.
3. RELEASE the two catches that secure the funnel to the chassis, located underneath funnel. (Only one catch on high funnel).
4. WITH two people in position, lift the funnel by the handles (if fitted), ensure the wide end is lifted first then release the narrow end from the roller box assembly.



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.



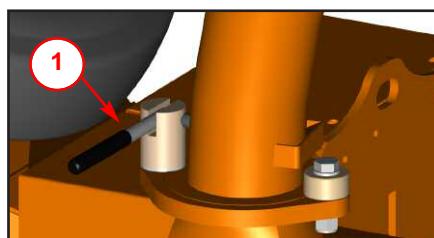


DISCHARGE CONTROLS

Controlling the discharge is an essential part of safe working.

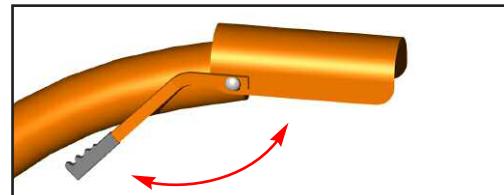
ROTATION

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



BUCKET ANGLE

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



HYDRAULIC OIL LEVEL INDICATOR

The oil level will be visible through the tank wall. It should be within the upper and lower level marks.



FUEL LEVEL INDICATOR

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

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 150VTR/FTR is fitted with 2 blades 101mm (4") long. They are 44 mm wide when new. A new blade should chip for up to 25 hours before it requires sharpening. This figure will be drastically reduced by feeding the machine with stony, sandy or muddy material.

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

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



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

THIS IS NOT A WORKSHOP MANUAL.

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

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

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

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

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



SERVICE SCHEDULE

WARNING

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



| SERVICE SCHEDULE | Daily Check | 50 Hours | 100 Hours | 500 Hours | 1 Year |
|--|--|----------|------------------------------|-----------|--------|
| Check water | ✓ | | | | |
| Check 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. | ✓ | | | | |
| Check radiator is clear. | ✓ | | | | |
| Check air intake is clear. | ✓ | | | | |
| Clean air filter element. | DEPENDING ON WORKING ENVIRONMENT | | | | |
| Lubricate variable track base slides (VTR only). | WEEKLY, DEPENDING ON WORKING ENVIRONMENT | | | | |
| 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 22 | | |
| Grease the roller spline and bearing. | | ✓ | OR AS REQUIRED - SEE PAGE 21 | | |
| Check anvils for wear. | | ✓ | | | |
| Check safety bar mechanism. | | ✓ | | | |
| Check fuel pipes and clamp bands. | | ✓ | | | |
| Check battery electrolyte level. | | ✓ | | | |
| Check for loose electrical wiring. | | ✓ | | | |
| Replace track drive unit oil. | (1ST TIME) | ✓ | THEN | ✓ | OR |
| 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 DEALER FOR ANVIL CHANGE | | | | |
| Replace engine oil filter cartridge. | REFER TO DEALER FOR ANVIL CHANGE | | | | |
| Check valve clearance. | REFER TO DEALER FOR ANVIL CHANGE | | | | |
| Replace anvils when worn. | REFER TO DEALER FOR ANVIL CHANGE | | | | |
| Grease tandem pump spline drive. | ✓ | | | | |

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



SAFE MAINTENANCE

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

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

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.**

SPARES

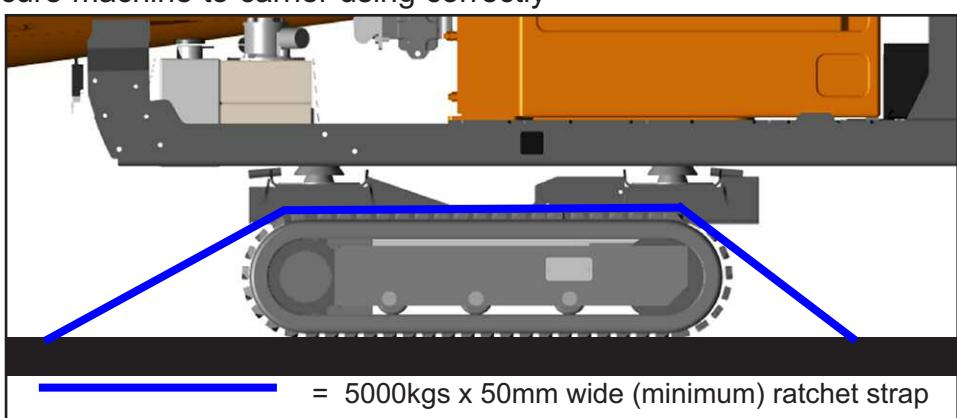
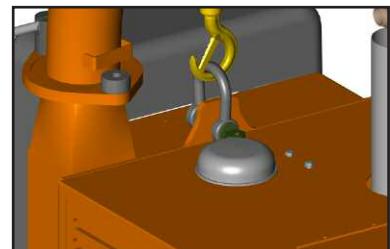
Only fit genuine Timberwolf replacement blades, screws and chipper spares. Failure to do so will result in the invalidation of the warranty and may result in damage to the chipper, personal injury or even loss of life.

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.

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 over the full length of both rubber tracks.

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.



BATTERY REMOVAL AND MAINTENANCE

WARNING

Refer to the battery safety section on pages 17-18.



1. Remove the seven M6 bolts securing the tracking controls front guard.
2. Remove the two M10 bolts securing the battery clamp.
3. Remove the negative battery lead.
4. Remove the positive battery lead.
5. Refitting is the reverse of removal. Apply a smear of vaseline to the terminals to prevent corrosion.



COPPER EASE SAFETY INFORMATION

Product name: Copper Ease.

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

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

FIRST AID

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

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

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

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

BATTERY SAFETY INFORMATION

WARNING NOTES AND SAFETY REGULATIONS FOR FILLED LEAD-ACID BATTERIES



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



Keep children away from acid and batteries.



Fires, sparks, naked flames and smoking are prohibited.

- Avoid causing sparks when dealing with cables and electrical equipment, and beware of electrostatic discharges.
- Avoid short circuits.



Explosion hazard:

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



Corrosive hazard:

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



First aid:

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

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



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



Disposal:

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





BATTERY SAFETY INFORMATION...cont.

1. Storage and transport

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

2. Initial operation

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

3. Installation in the vehicle and removal from the vehicle

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

4. Charging

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

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

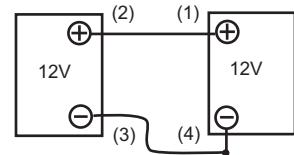
- Switch on the charger only after the battery has been connected, and switch off the charger first after charging has been completed.
- Charging current-recommendation: 1/10 ampere of the battery capacity Ah.
- Use a charger with a constant charging voltage of 14.4V for re-charging.
- If the acid temperature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

5. Maintenance

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

6. Jump Starting

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



7. Taking the battery out of service

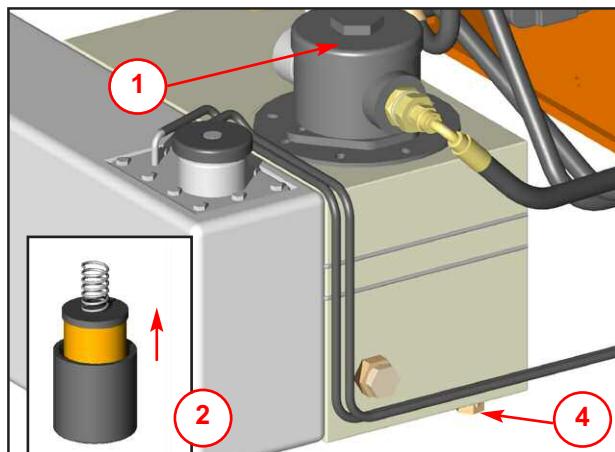
- Charge the battery; store in a cool place or in the vehicle with the negative terminal disconnected.
- Check the battery state of charge at regular intervals, and correct by recharging when necessary (cf. section 4).



CHANGE HYDRAULIC OIL AND FILTER

WARNING

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



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

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

CHECK FITTINGS

The Timberwolf TW 150VTR/FTR 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 lbft | Torque Nm |
|---------------------------|----------|----------|-----------|-------------|-----------|
| Blade Bolts | M10 | Standard | T50 Torx | 45 | 61 |
| Hyd Motor Retaining Bolts | M10 | Standard | 17mm Hex | 34 | 46 |
| Funnel Retaining Nuts | M12 | Standard | 17mm Hex | 38 | 51 |
| General | M8 | Standard | 13 mm Hex | 17 | 23 |
| General | M10 | Standard | 17 mm Hex | 34 | 46 |
| General | M12 | Standard | 19 mm Hex | 60 | 80 |
| Drain Bung in Fuel Tank | 3/8" BSP | - | 22 mm Hex | 25 | 33.8 |

CHECK HOSES

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

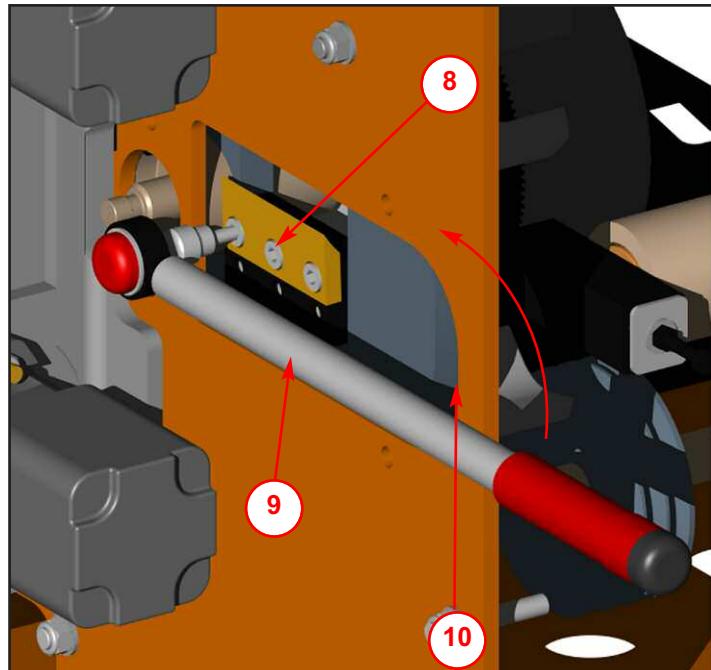
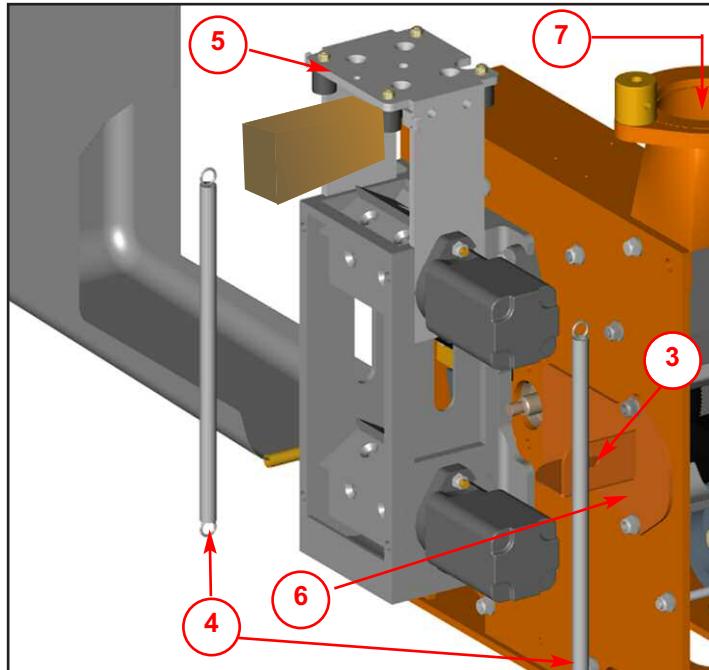
Identify the hoses that run to the top motor. These have the highest chance of damage as they are constantly moving. If any hydraulic components are changed new seals should be installed during reassembly. Fittings should then be retightened.



CHANGE 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 bolt and washer retaining roller box guard and lift guard.
4. Remove the two springs on the roller box slide.
5. **NOTE: Rollerbox slide weighs in excess of 20kg.** Lift the roller box slide and wedge a suitably sized piece of wood to hold in place.
6. Remove blade access cover.
7. Remove discharge tube. Turn the rotor by hand by grasping fan section on rear of rotor disc until blade is visible through aperture.
8. Use a small screwdriver to remove sap and debris from Torx socket in screw - be particularly careful to ensure every last piece has been removed.
9. Undo blade screws using Torx socket drive provided. Rotor will turn until Torx socket has located on machine.
10. **Before fitting replacement blades carefully clean blade recess in rotor so that no debris is trapped between blade and rotor.**
11. When fitting blades replace any damaged screws with new and coat each screw with copperslip over the whole of the thread.
12. **Retighten each screw to 60Nm (45lbs ft).**
NOTE: This torque setting is vitally important to ensure your bolts come out at a later date and Timberwolf recommend you purchase a torque wrench for this and other jobs on the chipper.
13. Grease all surfaces of the roller box sliding mechanism (see diagram on page 20).
14. Replace blade access cover.
15. **NOTE: Rollerbox slide weighs in excess of 20kg.** Remove wedge, lower roller box slide and replace springs.
16. Close roller box guard making sure that it is located over the retaining bracket, and ensure bolt and washer (as note 3) are tightened.
17. Refit battery leads.

WARNING

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





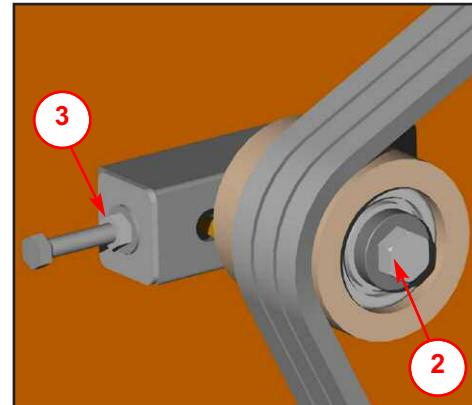
TENSION DRIVE BELTS

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

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

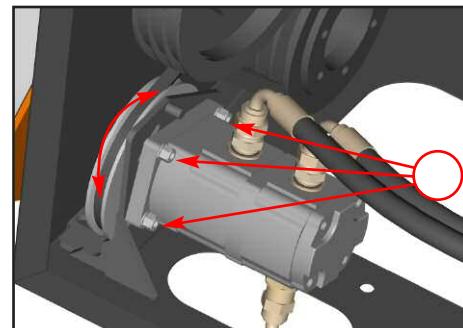
TENSION DRIVE BELTS

1. Remove 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 (pg. 56).
5. Re-tighten bolt in centre of tensioner pulley.
6. Run machine and test, recheck belt tension.
7. NOTE: Slack drive belts will cause poor performance and excess belt and pulley wear.



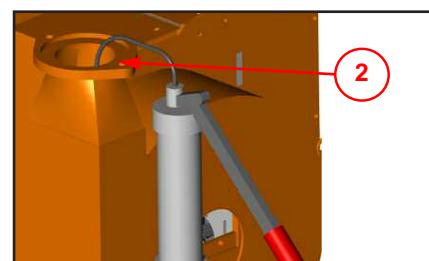
TENSION HYDRAULIC PUMP BELT

1. Loosen the three outermost M8 nuts and bolts.
2. Pivot pump assembly up or down to achieve the correct belt tension. For instructions on checking belt tension & correct belt tension values, please refer to the Timberwolf V-Belt Tensioning Data Table (pg. 56).
3. Hold assembly at this position while tightening the three M8 nuts and bolts.



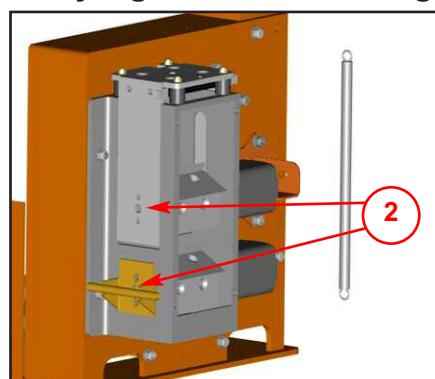
GREASE THE DISCHARGE FLANGE

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



GREASE THE ROLLER SPLINE AND BEARING

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



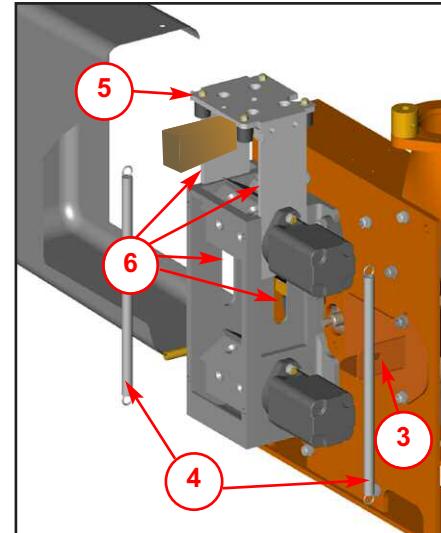
1. Remove bolt and washer retaining roller box guard and lift guard (see diagram on page 18).
2. Locate two grease nipples; one in the centre of each roller shaft.
3. Use a pump action grease gun to apply a generous amount of grease to each roller drive. **DO NOT USE GRAPHITE BASED GREASE.** After applying grease, to penetrate all the bearing surfaces thoroughly, start the machine and operate the rollers for 20 seconds. Switch off the machine. Repeat this greasing/running procedure a further 3 times.
4. Close roller box guard making sure that it is located over the retaining bracket, and ensure bolt and washer are tightened.



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 bolt and washer retaining roller box guard and lift guard.
4. Remove the two springs on the roller box slide.
5. **NOTE: Rollerbox slide weighs in excess of 20kg.** Lift the top roller and wedge a suitably sized piece of wood to hold in place.
6. Apply thin grease with a brush to each slide on roller box and on inner cheeks of slider. **DO NOT USE GRAPHITE BASED GREASE.**
7. **NOTE: Rollerbox slide weighs in excess of 20kg.** Remove wedge, lower roller box slide and replace springs.
8. Close roller box guard making sure that it is located over the retaining bracket, and ensure bolt and washer (as note 3) are tightened.
9. Refit battery leads.



GREASING ROTOR BEARINGS

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

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 12).
- Hydraulic systems may get very hot after working.
- Keep all components in good condition as they are exposed to high pressures.
- 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.

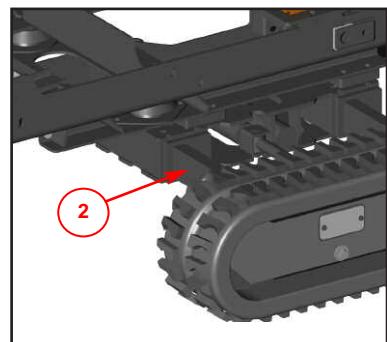
Immediately repair damage and replace worn or broken items.

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 (VTR)

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.

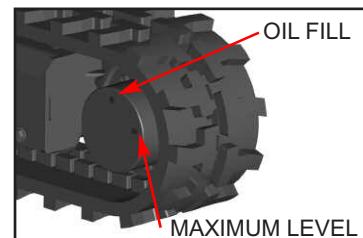
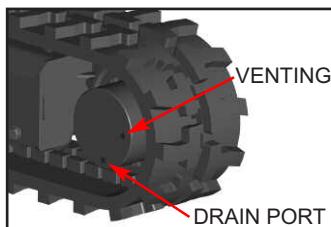




REPLACE OIL IN THE TRACK DRIVE UNIT

To fill with oil, track the machine until the gearbox casing is level with a plug positioned at 12 o'clock as shown. Unscrew the two plugs and fill from the upper hole until oil reaches the level of the lower hole.

NOTE - Ensure the correct grade of oil is used: Gear Oil EP80W-90 GL5



DRAINING THE OIL IN THE TRACK DRIVE UNIT

To drain the oil, track the machine until a plug is at 6 o'clock as shown. Unscrew both plugs and allow oil to discharge into a suitable container. Dispose of waste oil in a safe and approved way.

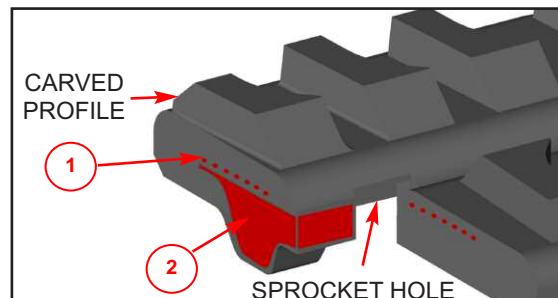
REDUCTION UNIT OIL TYPES

We recommend, for track drive gearboxes, using gear oils with E>P. additives and viscosity to SAE 80W/90 or ISO VG 150. Continuous duty temperature must not exceed 90°C.

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. Excess tension 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 tile 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.

Abrasion 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.

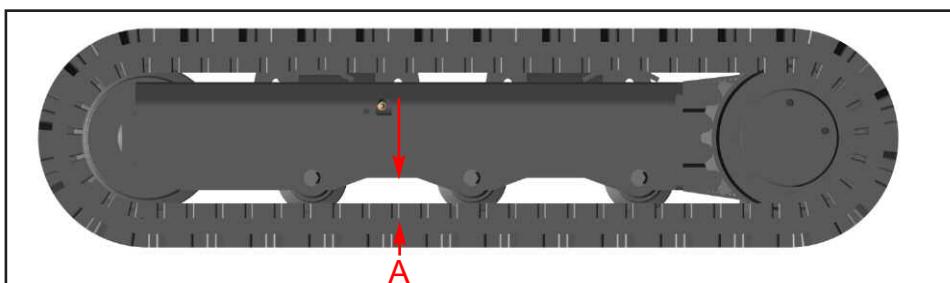
Cracks on the inside surface of the circumference and on the edge of the rubber are caused by contact between track and the undercarriage structure or with sharp concrete edges.

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. Lift it in safe conditions and put stable supports under the undercarriage frame to properly support it.
3. Measure distance A at the central roller of the undercarriage from the bottom of the roller to the rigid inside surface of the rubber track. Track tension is normal if dimension A is between 70 and 75 mm.
4. Adjust tension as described in the following paragraph if track tension does not comply with these dimensions (loose or too tight).

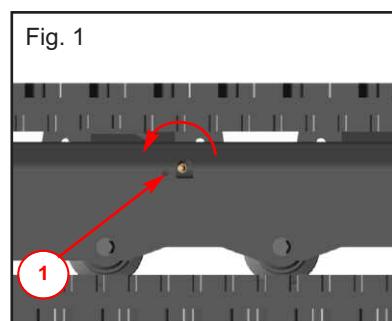


TRACK LOOSENING/TIGHTENING PROCEDURES

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 pressurized. 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 access hole 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.

WARNING

It is not normal for the track to remain too tight after turning the grease nipple counter-clockwise or for it to remain loose after introducing grease into the grease nipple. Never try to remove the tracks or disassemble the track-stretching cylinder since pressure of the grease inside the track is dangerous.

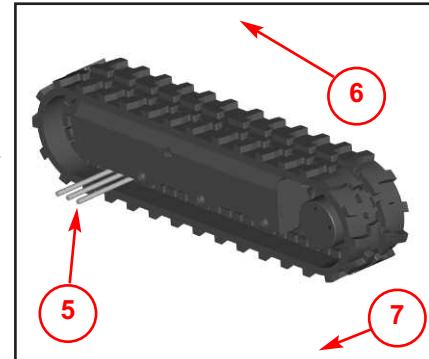




REMOVING THE RUBBER TRACKS

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 access holes in side frame to access to the adjustment system (Fig. 1, page 24).
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. Insert three steel tubes inside the track in the space between the rollers.
6. Rotate the driving gear in reverse so that the steel tubes proceed with the track and engage in the track-stretching wheel.
7. Exercise force sideways to slide the track and lift it off the track-stretching wheel.



WARNING

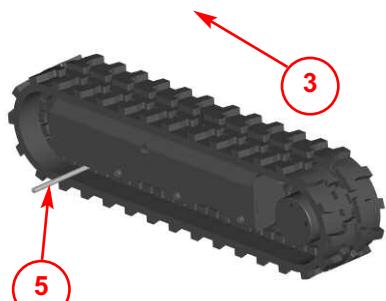
The grease contained in the hydraulic tensioner is under pressure. Never loosen the grease nipple for more than 5 turns. If the grease nipple is loosened too much then pressurized grease may exit and cause injury to the machine operator.



INSTALLING THE RUBBER TRACKS

WARNING

Make sure that you are always in safe conditions with the machine lifted to perform the operation for track installing.



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. Rotate the driving gear in reverse and pull the track soles inside the frame.
4. Position the track using a steel tube and turn the driving gear again.
5. Make sure track links mesh correctly in the sprocket and in the track stretching wheel.
6. Adjust track tension (see track loosening procedures on page 24).
7. Set the tracked undercarriage on the ground.

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.



ENVIRONMENTAL MANUFACTURING LLP 12 MONTH CHIPPER WARRANTY

WARRANTY PERIOD

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

LIABILITY

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

WARRANTY STATEMENT

Environmental Manufacturing LLP warrants to the first end user that;

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

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

Engine units are covered independently by their respective manufacturer warranties.

OWNERS WARRANTY RESPONSIBILITIES

As the owner of an Environmental Manufacturing LLP woodchipper you are responsible for the following;

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

WARRANTY RESTRICTIONS

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

The Environmental Manufacturing LLP warranty may be invalidated if any of the following apply;

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

WARRANTY SERVICE

To obtain warranty service please contact your nearest Environmental Manufacturing LLP approved Timberwolf dealer. To obtain details of the nearest facility please contact Environmental Manufacturing LLP at the address on the front of this manual.

These warranty terms are in addition to and not in substitution for and do not affect any right and remedies which an owner might have under statute or at common law against the seller of the goods under the contract by which the owner acquired the goods.



CERTIFICATE OF CONFORMITY

Environmental Manufacturing LLP

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

Tel: 01449 765800 Fax: 01449 765801

E C Declaration of Conformity



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

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

and the National Laws and Regulations adopting these directives.

Designer/Manufacturer : Environmental Manufacturing LLP

Description of Machinery : Self-powered portable machine intended to chip up tree waste prior to disposal.

Model : TW 150 VTR/FTR

Serial No. Serial Manufacture

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

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

"Responsible" Person empowered to sign: _____  Mr. Jeff Haines
Position in Company: Technical Director

Date: 31 July 2014



IDENTIFICATION PLATE

| | | | |
|------------------|------------|--|------------|
| | | ENVIRONMENTAL MANUFACTURING LLP STOWMARKET, SUFFOLK IP14 5AY UK | |
| MODEL | [Redacted] | | |
| SERIAL NO. | [Redacted] | | |
| CARR. TYP/SN. | [Redacted] | GROSS WEIGHT | [Redacted] |
| NOM. POWER | [Redacted] | DATE | [Redacted] |

EXAMPLE



| Decal | Description | Decal | Description |
|-------|--|----------------------|--|
| | 616 Hot exhaust | | 4099 Danger. Rotating blades. Keep hands and feet out. |
| | 617 High velocity discharge - keep clear | 2800 2801 | Reverse feed Forward feed |
| | 670 Personal Protective Equipment required | | 2802 Push to stop, Pull to reset. (rollers) |
| | 1661 Read the instruction manual for greasing and maintenance information | | 2854 Do not ride on this machine at any time. |
| | 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. |
| | 1745 Track 17450 Chip Select Chip mode when adjusting track width | | 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. |
| | 1747 1747 Chip | | 18438 When re-fitting this guard ensure that steel retaining bracket is on the inside. Damaged guards due to incorrect assembly will not be covered by your Timberwolf warranty. |
| | 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. | | P691 Do not pull here. |
| | 1399 Push to stop. 3054 Push OR pull to stop. (on low funnel only) | | 3059 Jacking point. See manual for instructions. |

DECALS

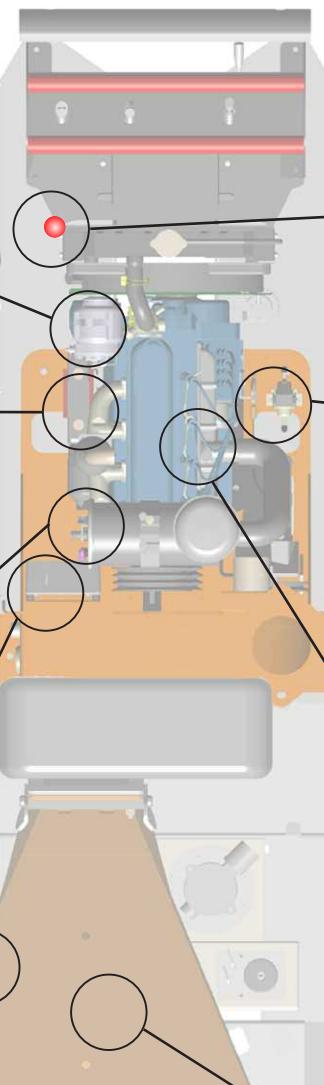
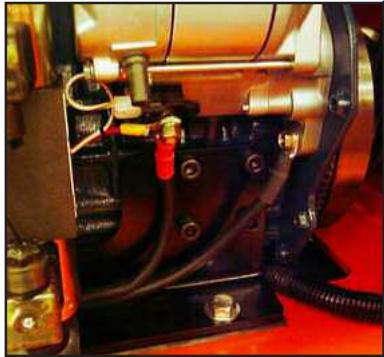
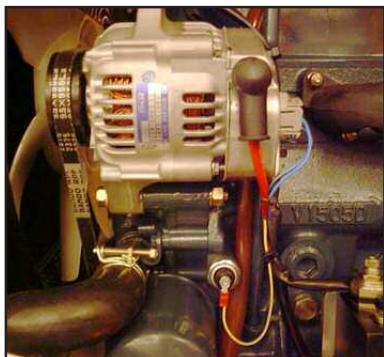


TIMBERWOLF

TW 150VTR/FTR

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| 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. | | | | | | | | |
|  | 18393 New drive belts need re-tensioning. When new belts are fitted check tension every 2-3 hours & adjust until tension remains constant. |  | 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. | | | | | | | | |
|  | 19518 When the emergency stop button is pressed it must be pulled out again and the ignition switch turned off to reset the machine before attempting to restart. |  | P1301 Push to stop, Pull to reset. (engine) | | | | | | | | |
|  | 3004 |  | 2998 |  | 1746 |  | 2950 |  | 18008 |  | 1363 |
|  | 4284 | TIMBERWOLF TW 150VTR | P*158 | 4275 | | | | | | | |



High funnel
versions only

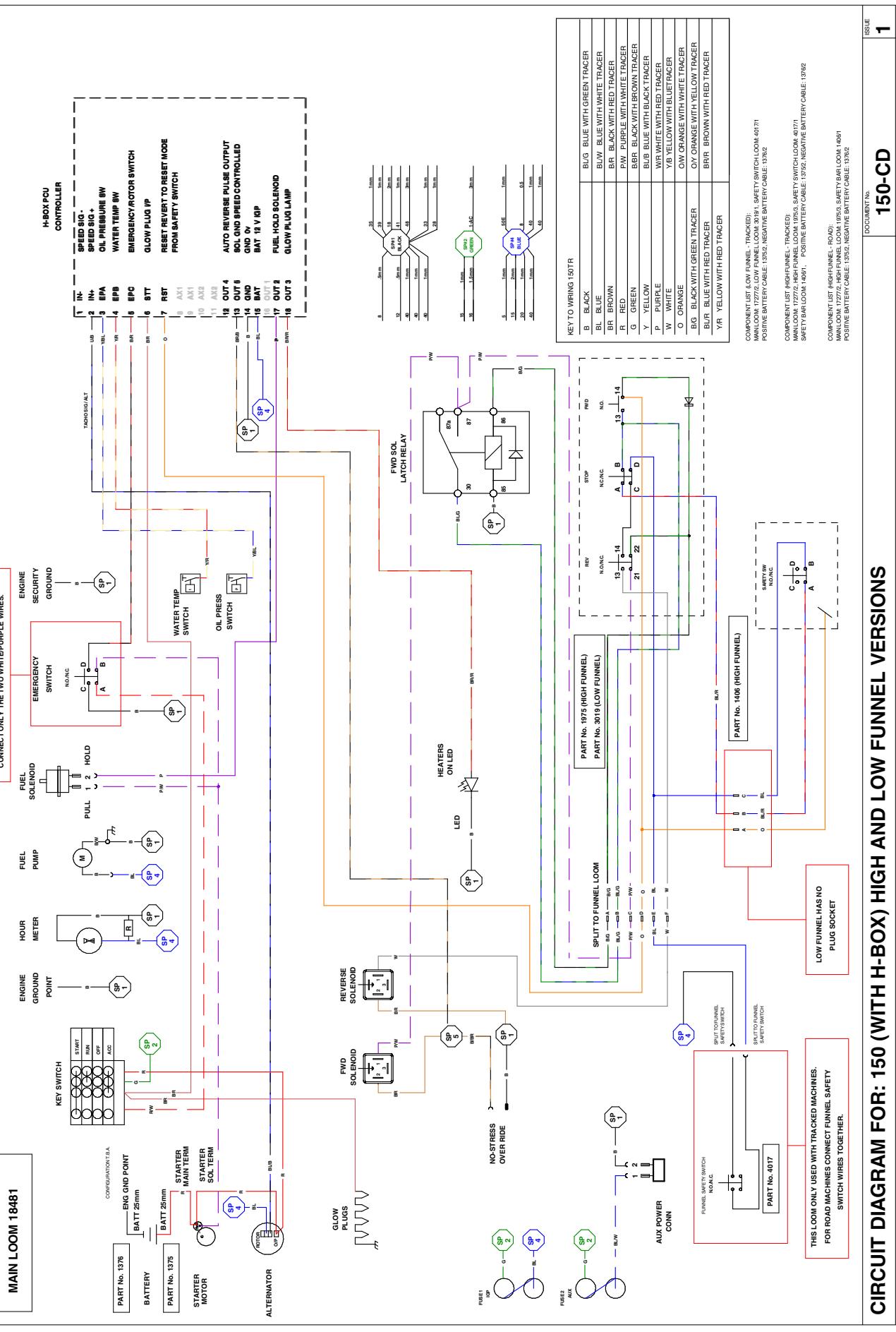
Low funnel
versions only

CIRCUIT DIAGRAM



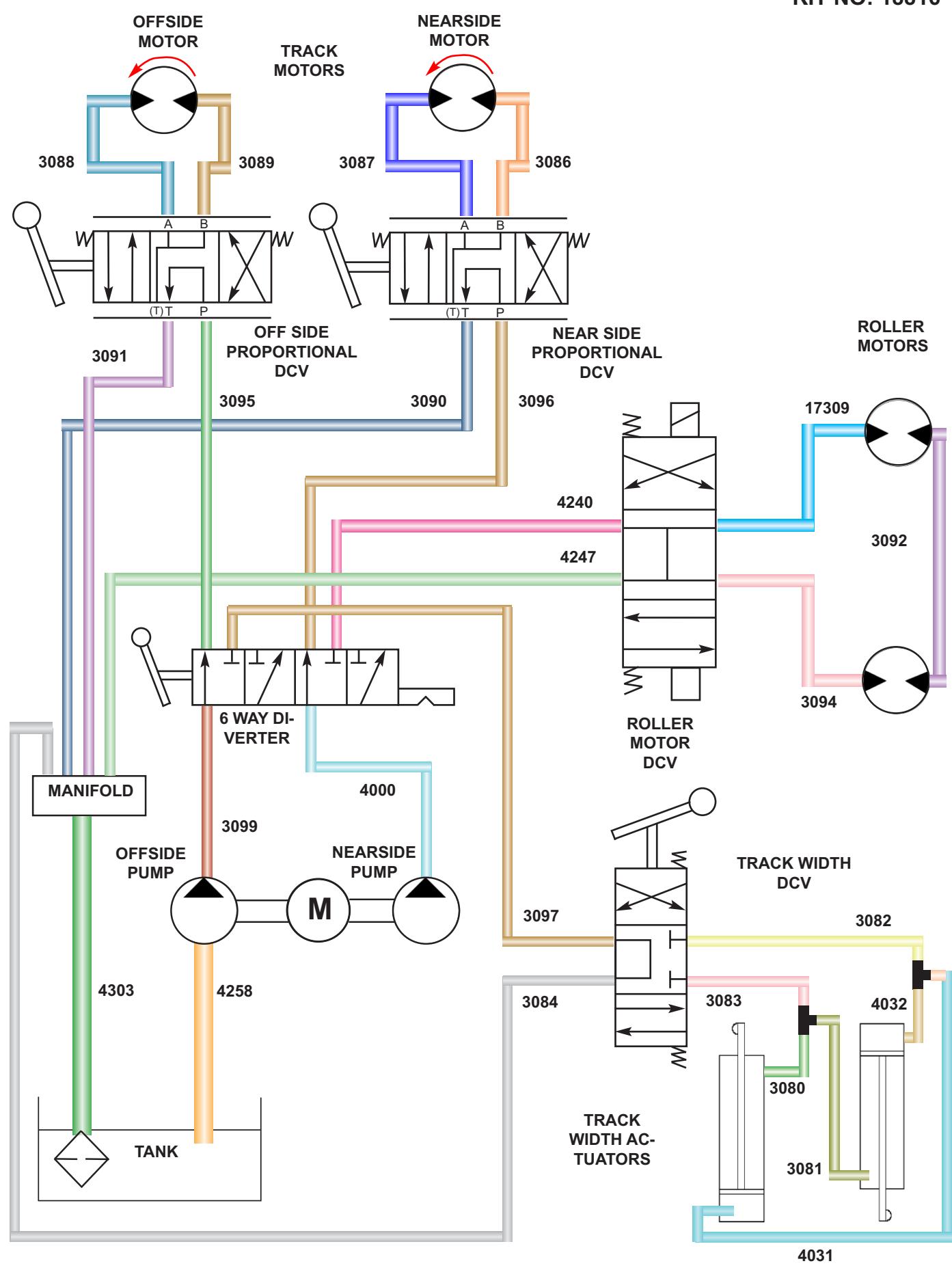
TIMBERWOLF
TW 150VTR/FTR

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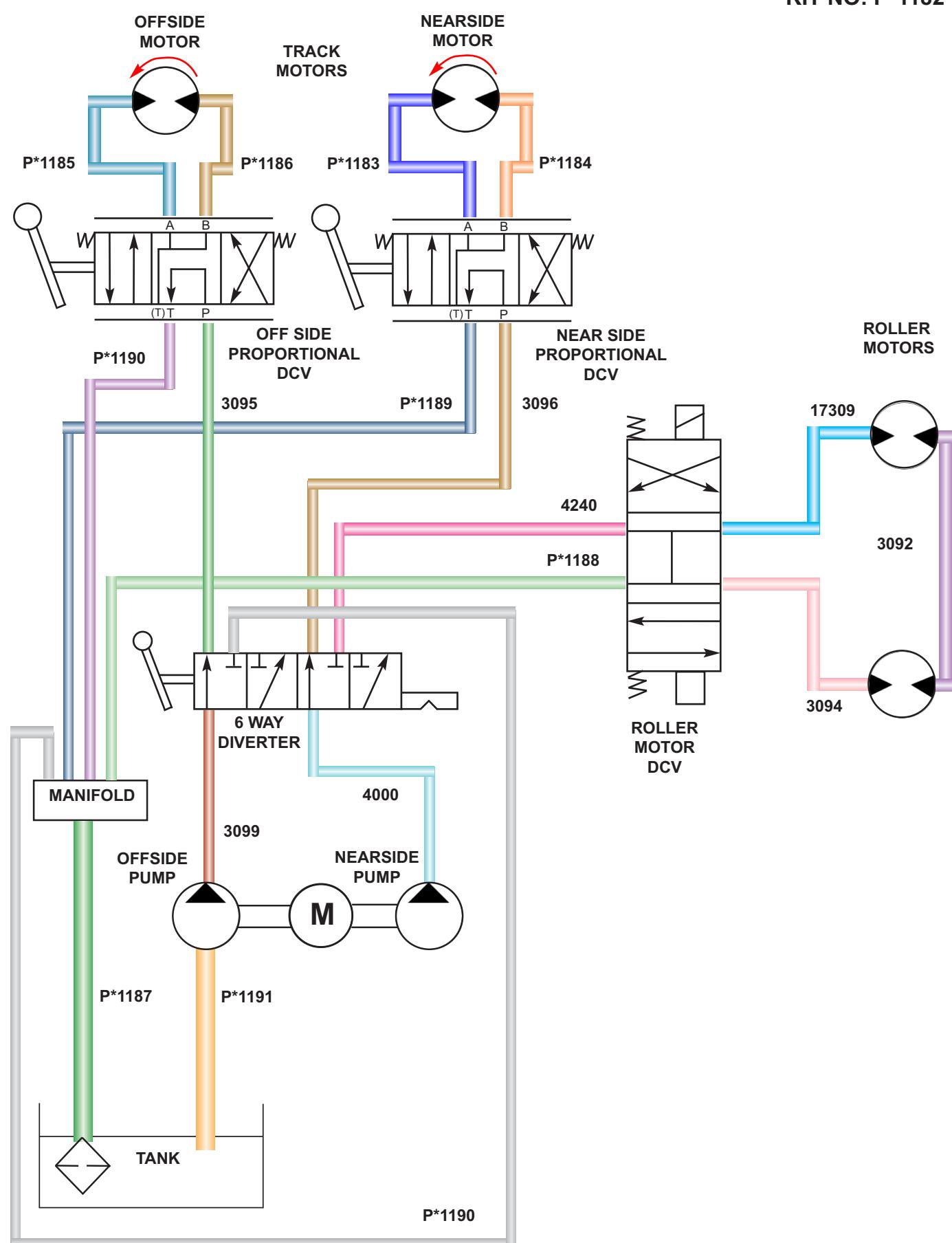


KIT NO: 18816





KIT NO: P*1182

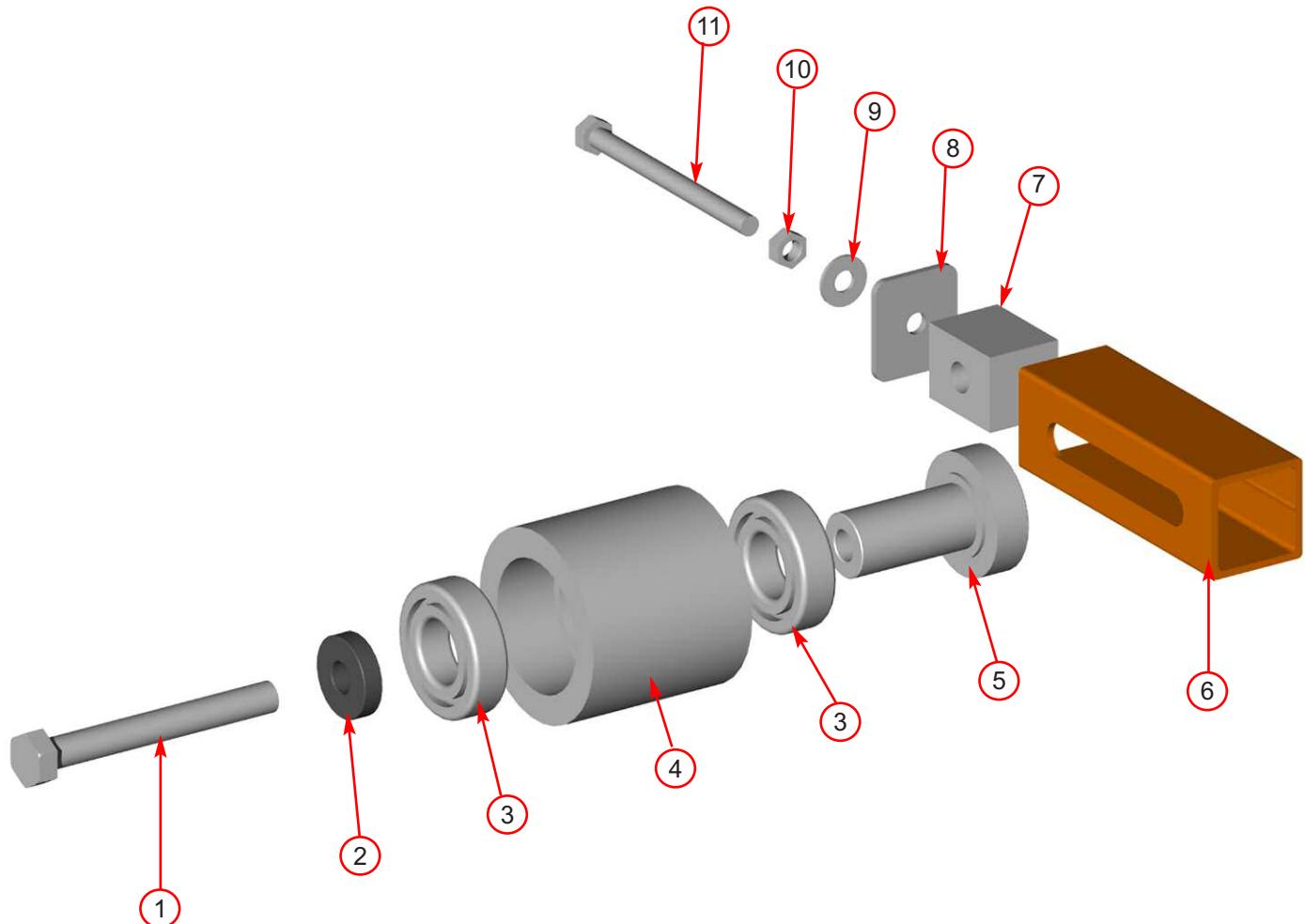




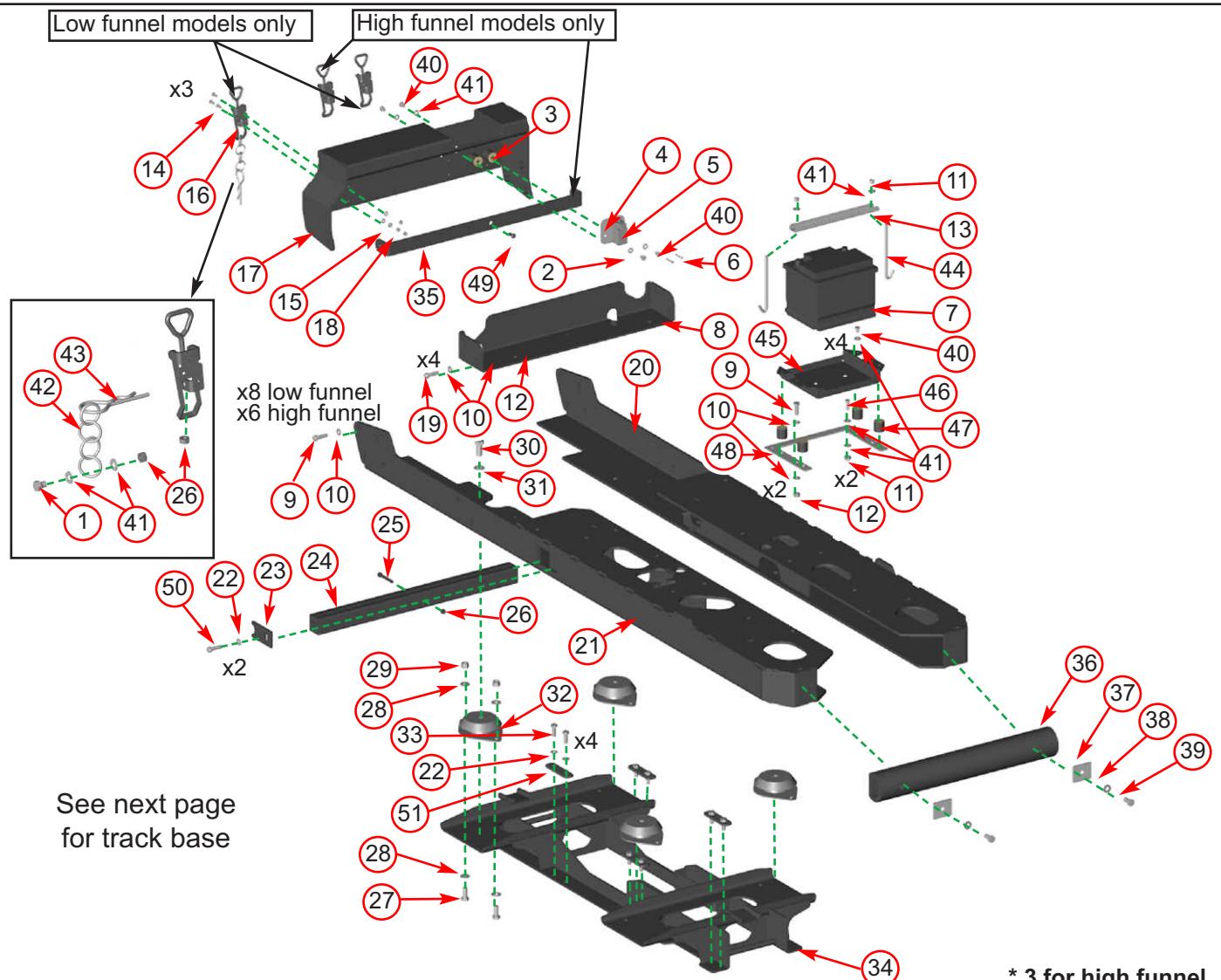
PARTS LISTS

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

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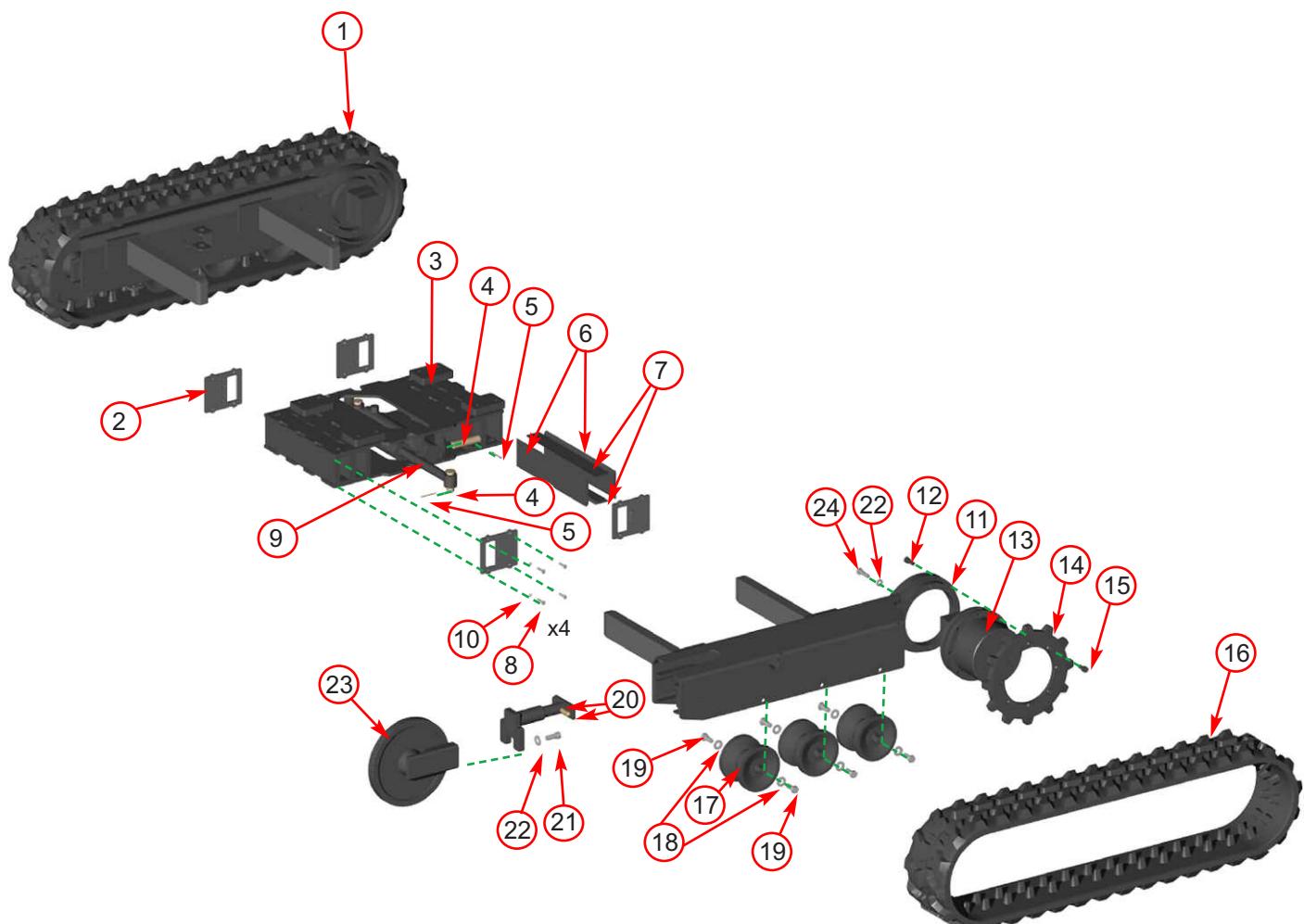


| Item | Part No | Part Name | Q'ty |
|------|--------------------|--------------|------|
| 1 | 0313 | M12/100 Bolt | 1 |
| 2 | 0415 | Heavy Washer | 1 |
| 3 | 0491 | Bearing 6205 | 2 |
| 4 | 0411M | Pulley | 1 |
| 5 | 0472M | Pulley Boss | 1 |
| 6 | N/A to purchase | Slider | 1 |
| 7 | 0469MS | Slider Block | 1 |
| 8 | 1342PS | End Plate | 1 |
| 9 | made in production | Washer | 1 |
| 10 | 0476 | Plain M8 Nut | 1 |
| 11 | 2988 | M8/90 Bolt | 1 |



| Item | Part No | Part Name | Q'ty |
|------|---------|--|------|
| 1 | 0346 | M8/20 Bolt | 2 |
| 2 | 0711 | M8 A Washer | 2 |
| 3 | 1868 | M8 AV Mount | 2 |
| 4 | 1691FS | Switch Back Plate | 1 |
| 5 | 1692 | Limit Switch | 1 |
| 6 | 18168 | M4/35 Pan Pozi | 2 |
| 7 | 4210 | Battery | 1 |
| 8 | 3042FB | Chassis Bridge | 1 |
| 9 | 0360 | M10/25 Bolt | 18 |
| 10 | 0701 | M10 A Washer | 20 |
| 11 | 0479 | M8 P Nyloc Nut | 4 |
| 12 | 0052 | M10 T Nyloc Nut | 4 |
| 13 | 18040FS | Battery Clamp | 1 |
| 14 | 0256 | M5/16 Csk Socket Screw | 6* |
| 15 | 0708 | M5 C Washer | 6* |
| 16 | 4092 | Draw Latch High Funnel 1, Low Funnel 2 | |
| 17 | 3010FB | Funnel Support | 1 |
| 18 | 18102 | M5 T Nyloc Nut | 6* |
| 19 | 1812 | M10/35 Bolt | 4 |
| 20 | 2990FB | Near Side Beam | 1 |
| 21 | 2991FB | Off Side Beam | 1 |
| 22 | 0839 | M10 C Washer | 10 |
| 23 | 4008B | Jacking Beam Cover | 1 |
| 24 | 4007FB | Jacking Beam | 1 |
| 25 | 0354 | M8/60 Bolt | 1 |
| 26 | 0481 | M8 T Nyloc Nut | 3 |

| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------------|------|
| 27 | 0321 | M12/30 Bolt | 8 |
| 28 | 0704 | M12 C Washer | 16 |
| 29 | 0644 | M12 P Nyloc Nut | 8 |
| 30 | 1628 | M16/35 Bolt | 4 |
| 31 | 1143 | M16 A Washer | 4 |
| 32 | 1796 | M16 AV Mount | 4 |
| 33 | 0382 | M10/30 Bolt | 8 |
| 34 | 1869FB | Track Mount Adapter Bracket | 1 |
| 35 | 4106FB | Tank Stop Bar | 1 |
| 36 | 2930 | Rubber Buffer | 1 |
| 37 | 4067S | D Rubber Fixing Plate | 1 |
| 38 | 0702 | M12 A Washer | 2 |
| 39 | 0431 | M12/40 Bolt | 2 |
| 40 | 18037 | M8/12 Bolt | 6 |
| 41 | 0712 | M8 C Washer | 15 |
| 42 | 4105 | Chain 40 x 16 x 3.8 | 2 |
| 43 | 4094 | R Clip 5 mm x 85 | 2 |
| 44 | 18041 | M8 x 170 Hook Bolt | 2 |
| 45 | 18039FB | Battery Tray | 1 |
| 46 | 0350 | M8/25 Bolt | 2 |
| 47 | 1644 | AV Mount | 4 |
| 48 | 18038FS | Battery Base Plate | 1 |
| 49 | 0347 | M8/20 Button Head | 1 |
| 50 | 0382 | M10/30 Bolt | 2 |
| 51 | P*163 | Clamp Plates | 4 |



| Item | Part No | Part Name | Q'ty |
|------|---------|-------------------------------|------|
| 1 | 18952 | Crawler Track Assy | 2 |
| 2 | 3077FB | Slip Retainer | 4 |
| 3 | 3074FB | Variable Track Bridge | 1 |
| 4 | 18014MS | Cylinder Pin | 4 |
| 5 | 1276 | Split Pin | 4 |
| 6 | 4045 | Plastic Strip | 8 |
| 7 | 4044 | Plastic Strip | 8 |
| 8 | 18105 | M5/20 Bolt | 16 |
| 9 | 4046 | Hydraulic Cylinders | 2 |
| 10 | 0708 | M5 C Washer | 16 |
| 11 | 18955 | VTR Track Frame (handed pair) | 1 |
| 12 | 1629 | M10/25 Caphead | 14 |

| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------|------|
| 13 | 18951 | Motor Gear Box | 2 |
| 14 | 19035 | Sprocket | 2 |
| 15 | 0373 | M10/20 Caphead | 16 |
| 16 | 19033 | Rubber Track | 2 |
| 17 | 19034 | Bottom Roller | 6 |
| 18 | 0704 | M12 C Washer | 12 |
| 19 | 0321 | M12/30 Bolt | 12 |
| 20 | 19036 | Adjuster/Tensioner | 2 |
| 21 | 0382 | M10/30 Bolt | 4 |
| 22 | 0701 | M10 A Washer | 4 |
| 23 | 19037 | Idler Wheel | 2 |
| 24 | 4068 | M10/40 Bolt | 2 |

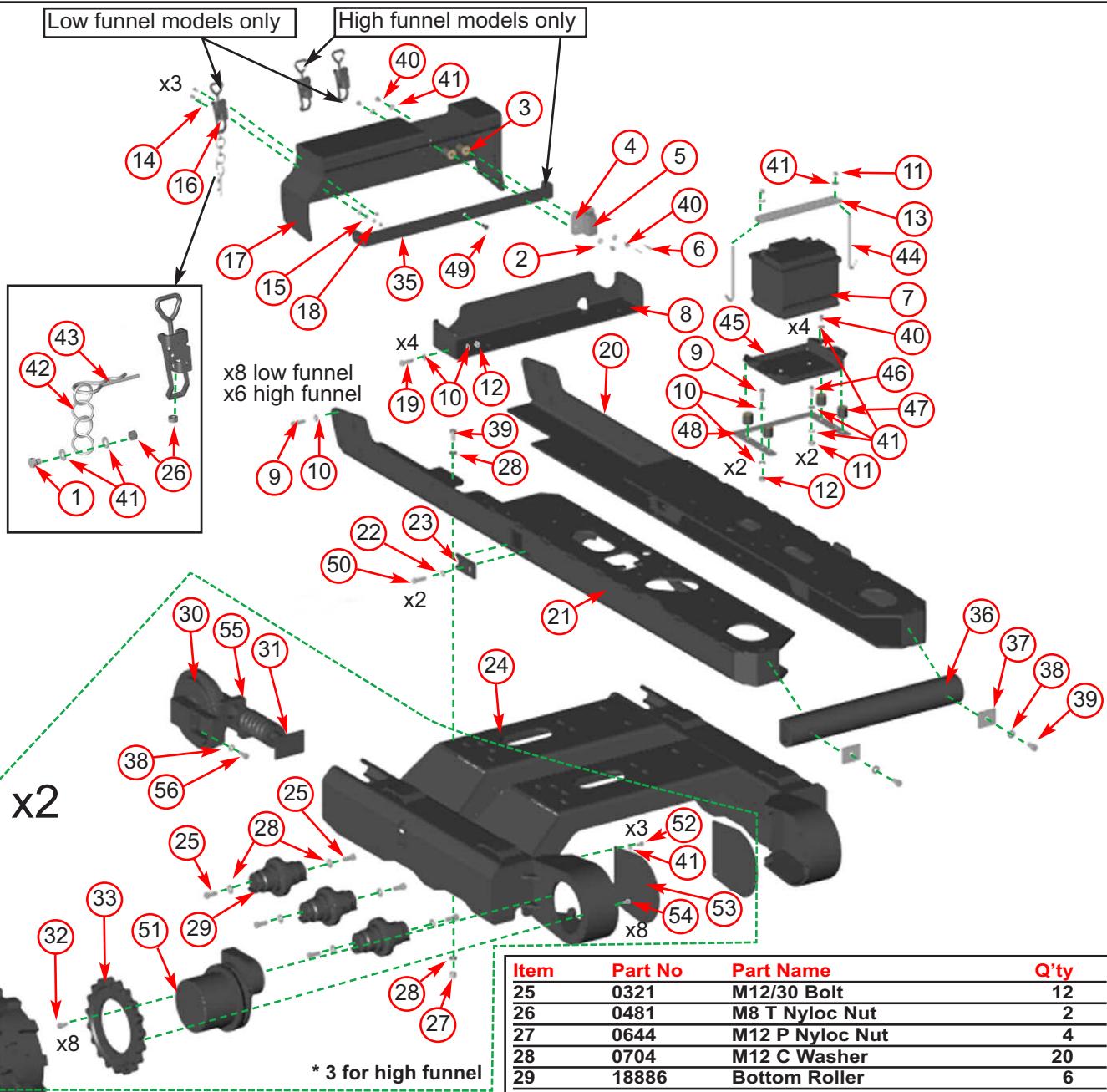
CHASSIS FTR



TIMBERWOLF

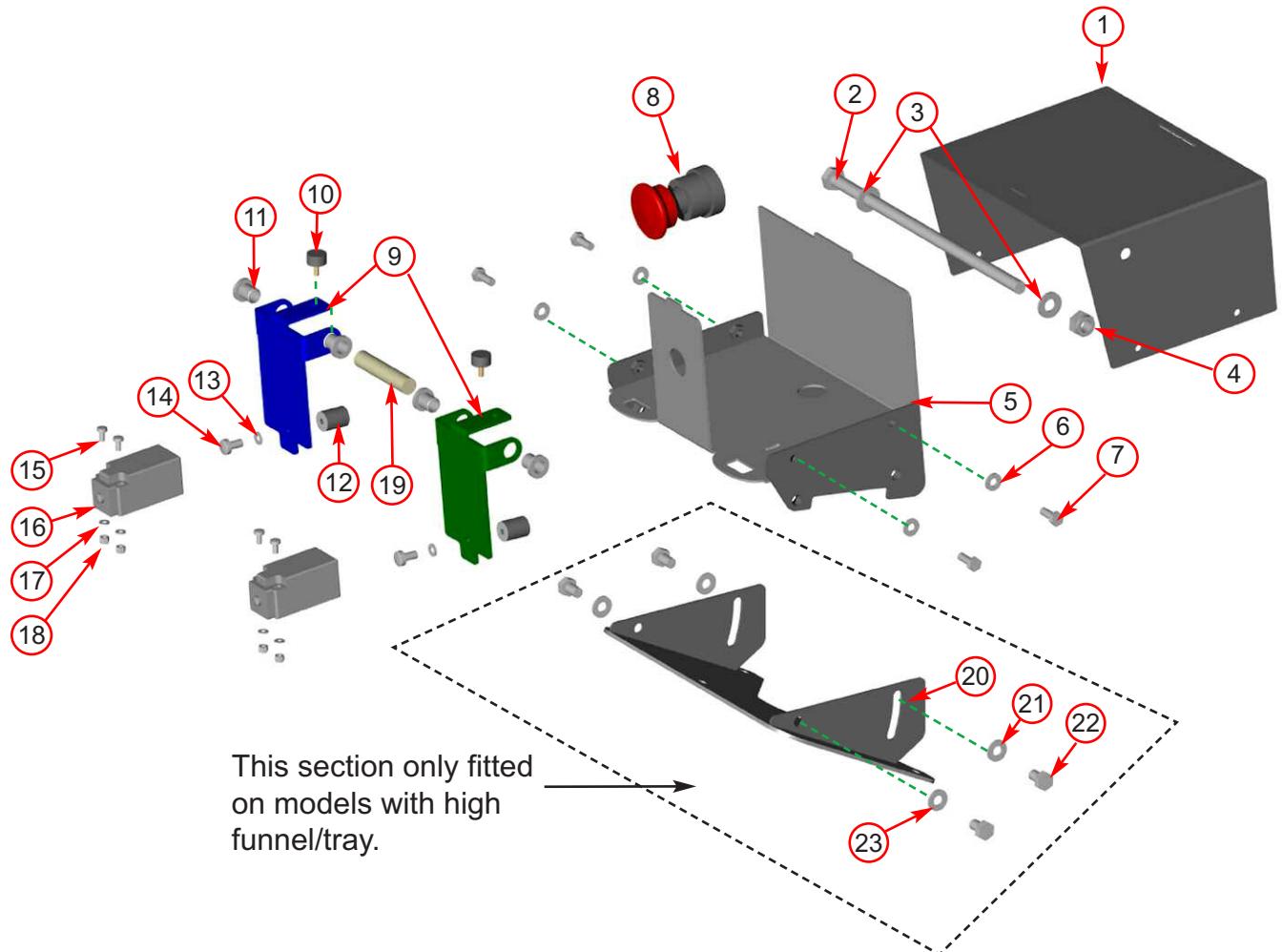
TW 150VTR/FTR

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| Item | Part No | Part Name | Q'ty |
|------|---------|---|------|
| 1 | 0346 | M8/20 Bolt | 2 |
| 2 | 0711 | M8 A Washer | 2 |
| 3 | 1868 | M8 AV Mount | 2 |
| 4 | 1691FS | Switch Back Plate | 1 |
| 5 | 1692 | Limit Switch | 1 |
| 6 | 18168 | M4/35 Pan Pozi | 2 |
| 7 | 4210 | Battery | 1 |
| 8 | 3042FB | Chassis Bridge | 1 |
| 9 | 0360 | M10/25 Bolt | 18 |
| 10 | 0701 | M10 A Washer | 20 |
| 11 | 0479 | M8 P Nyloc Nut | 4 |
| 12 | 0052 | M10 T Nyloc Nut | 4 |
| 13 | 18040FS | Battery Clamp | 1 |
| 14 | 0256 | M5/16 Csk Socket Screw | 6* |
| 15 | 0708 | M5 C Washer | 6* |
| 16 | 4092 | Draw Latch <i>High Funnel 1, Low Funnel 2</i> | |
| 17 | 3010FB | Funnel Support | 1 |
| 18 | 18102 | M5 T Nyloc Nut | 6* |
| 19 | 1812 | M10/35 Bolt | 4 |
| 20 | 2990F | Near Side Beam | 1 |
| 21 | 2991F | Off Side Beam | 1 |
| 22 | 0839 | M10 C Washer | 2 |
| 23 | 4008B | Jacking Beam Cover | 1 |
| 24 | P*799F | Track Bridge | 1 |

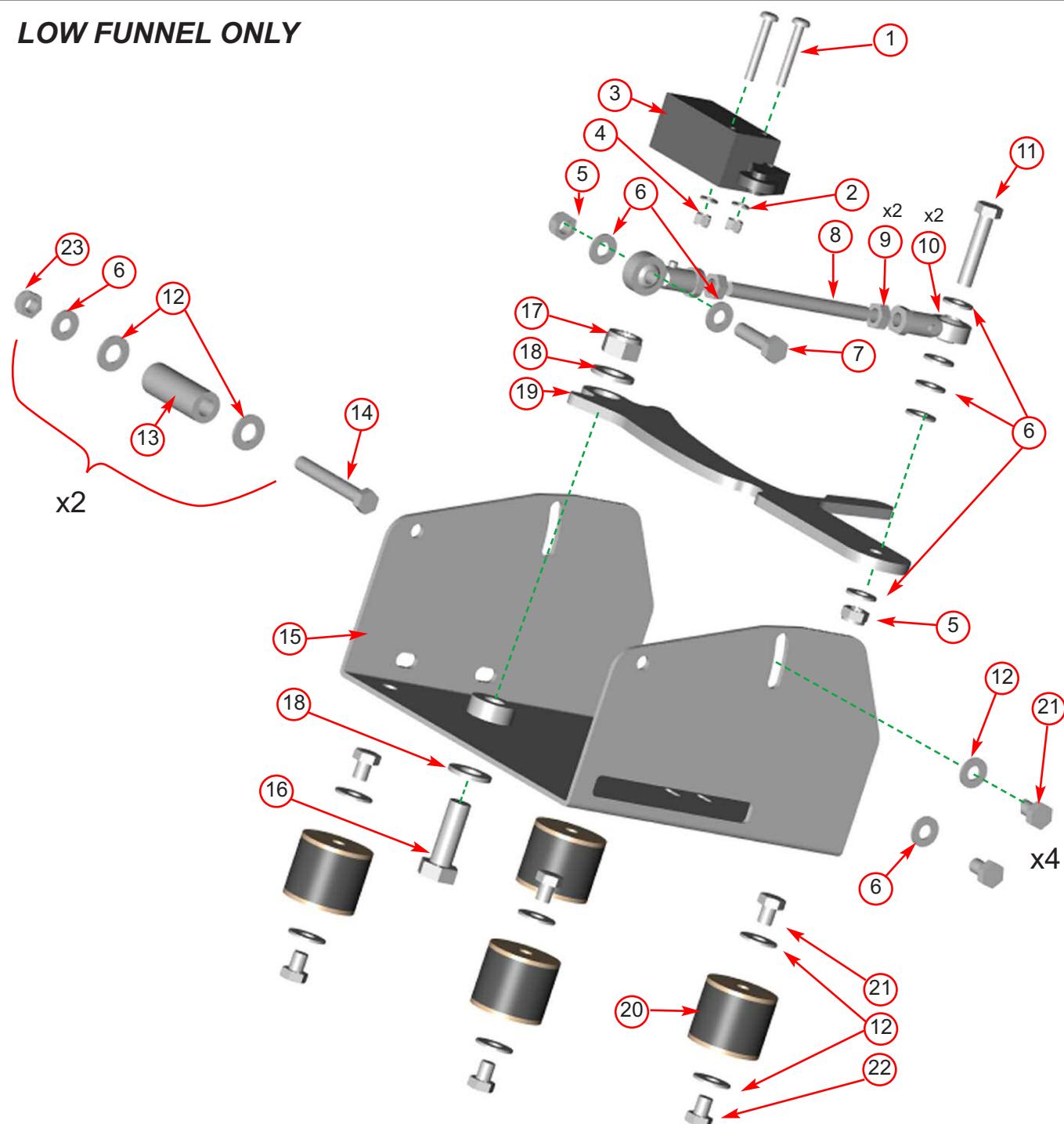
| Item | Part No | Part Name | Q'ty |
|-------------|----------------|-----------------------|-------------|
| 25 | 0321 | M12/30 Bolt | 12 |
| 26 | 0481 | M8 T Nyloc Nut | 2 |
| 27 | 0644 | M12 P Nyloc Nut | 4 |
| 28 | 0704 | M12 C Washer | 20 |
| 29 | 18886 | Bottom Roller | 6 |
| 30 | 18890 | Idler Wheel | 2 |
| 31 | 18889 | Adjuster/Tensioner | 2 |
| 32 | 18124 | M10/20 Caphead | 8 |
| 33 | 18888 | Sprocket | 2 |
| 34 | 18885FB | Rubber Track | 2 |
| 35 | 4106FB | Tank Stop Bar | 1 |
| 36 | 2930 | Rubber Buffer | 1 |
| 37 | 4067S | D Rubber Fixing Plate | 1 |
| 38 | 0702 | M12 A Washer | 4 |
| 39 | 0431 | M12/40 Bolt | 6 |
| 40 | 18037 | M8/12 Bolt | 6 |
| 41 | 0712 | M8 C Washer | 18 |
| 42 | 4105 | Chain 40 x 16 x 3.8 | 2 |
| 43 | 4094 | R Clip 5 mm x 85 | 2 |
| 44 | 18041 | M8 x 170 Hook Bolt | 2 |
| 45 | 18039FB | Battery Tray | 1 |
| 46 | 0350 | M8/25 Bolt | 2 |
| 47 | 1644 | AV Mount | 4 |
| 48 | 18038FS | Battery Base Plate | 1 |
| 49 | 0347 | M8/20 Button Head | 1 |
| 50 | 0382 | M10/30 Bolt | 2 |
| 51 | 18810 | Motor Gear Box | 2 |
| 52 | 0344 | M8/16 Bolt | 3 |
| 53 | P*930 | Guard | 2 |
| 54 | 0305 | M10/25 Caphead | 8 |
| 55 | 18891 | Idler Wheel Bracket | 2 |
| 56 | 1985 | M12/30 Caphead | 2 |



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

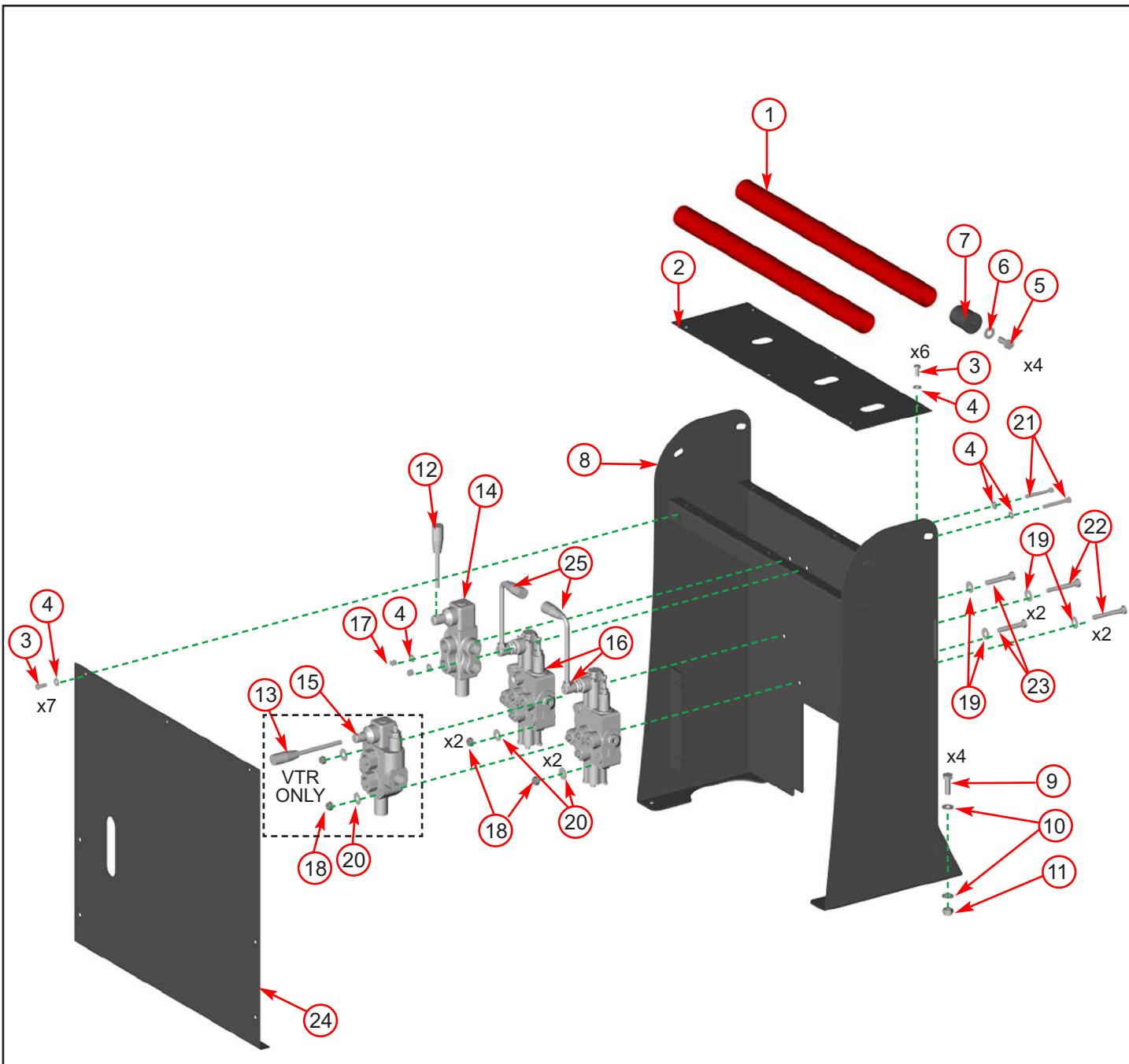


LOW FUNNEL ONLY



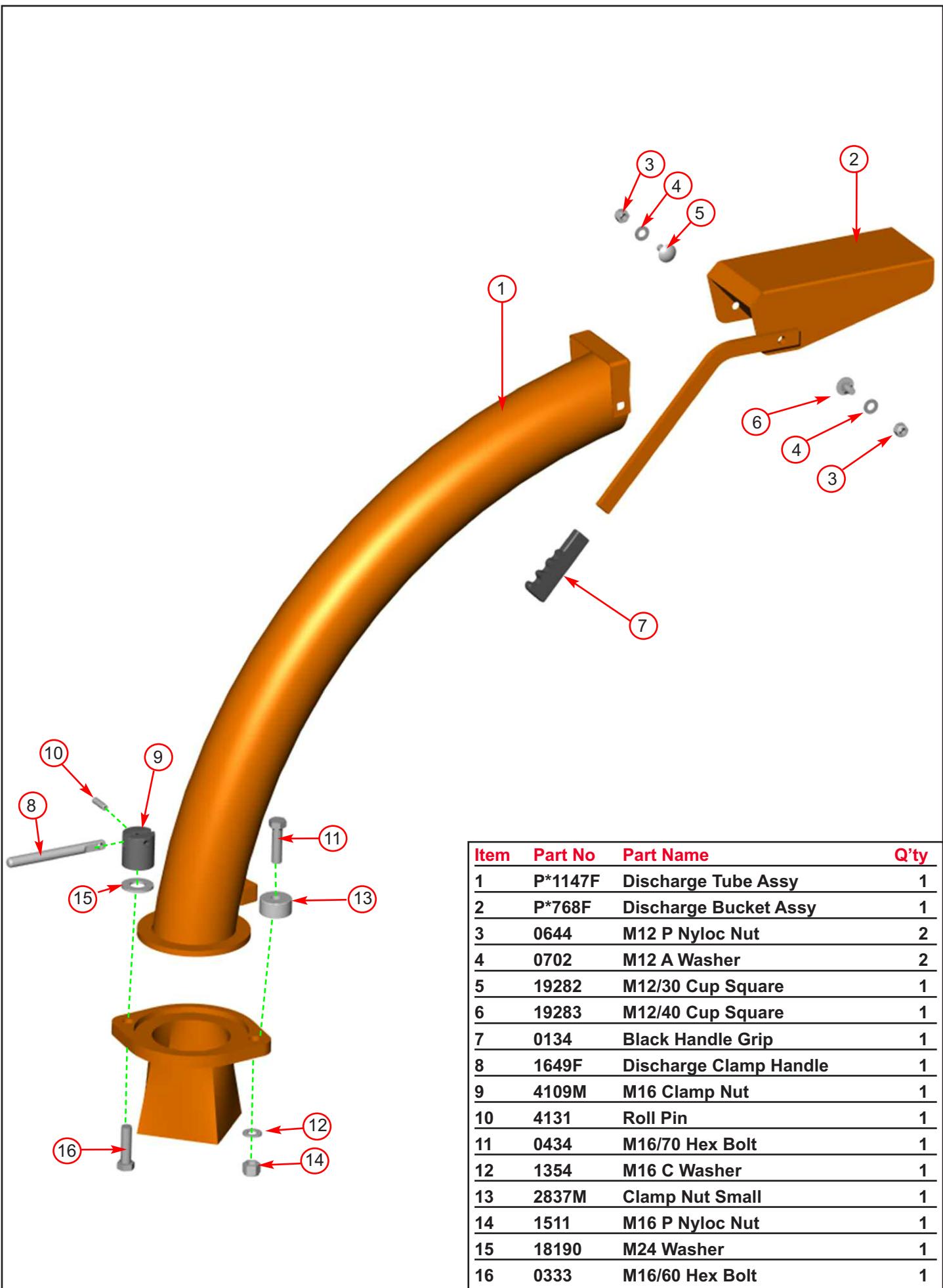
| Item | Part No | Part Name | Q'ty |
|------|--------------------|--------------------|------|
| 1 | 18168 | M4/35 Pan Pozi | 2 |
| 2 | 18100 | M4 A Washer | 2 |
| 3 | 1692 | Limit Switch | 1 |
| 4 | 18235 | M4 P Nyloc Nut | 2 |
| 5 | 0481 | M8 T Nyloc Nut | 2 |
| 6 | 0711 | M8 A Washer | 13 |
| 7 | 0351 | M8/30 Bolt | 1 |
| 8 | made in production | M8 Threaded Rod | 1 |
| 9 | 0476 | M8 Plain Nut | 2 |
| 10 | 0925 | Rose Joint Rod End | 2 |
| 11 | 18117 | M8/35 Bolt | 1 |
| 12 | 0712 | M8 C Washer | 12 |

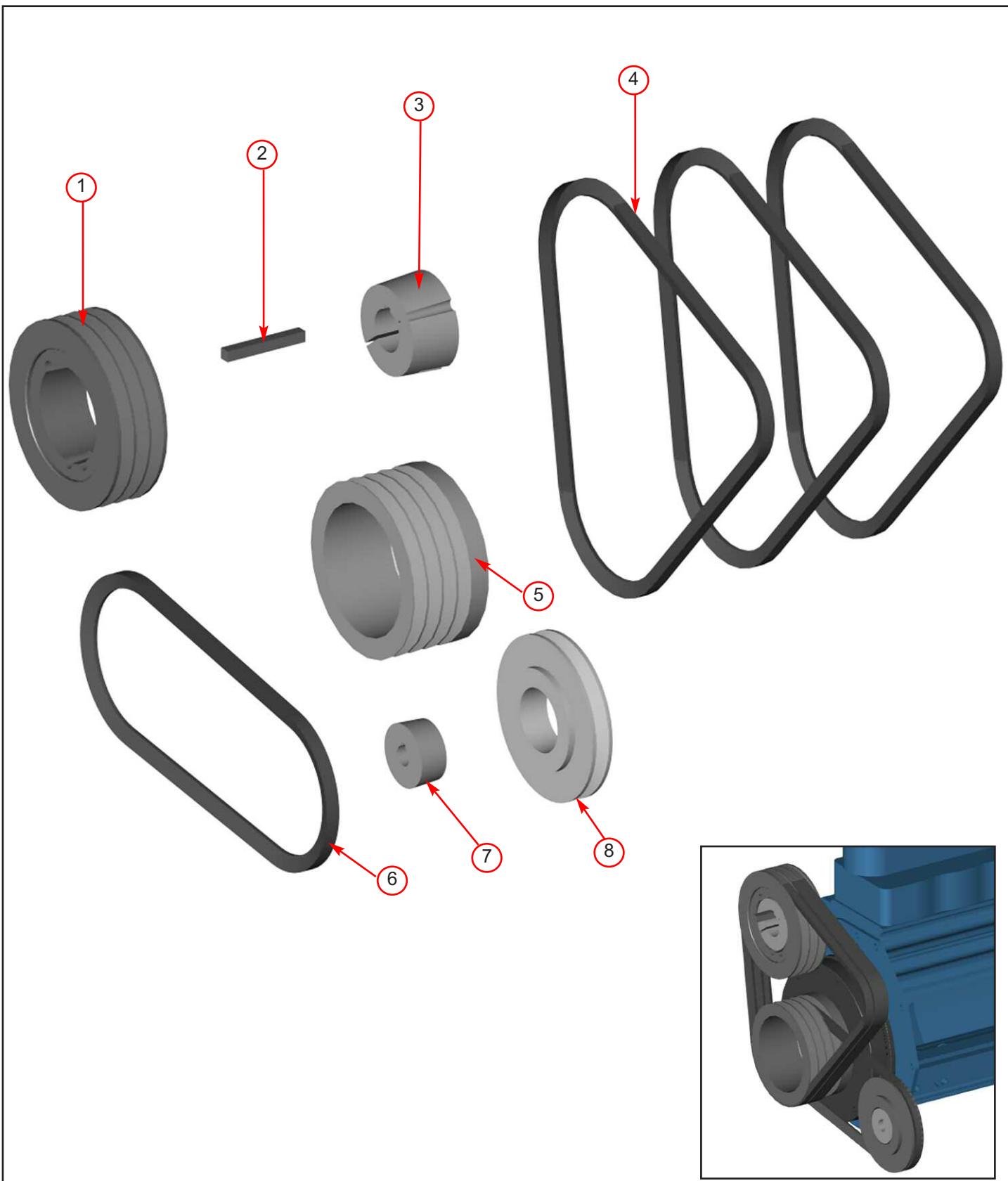
| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------|------|
| 13 | 1603 | Spring | 2 |
| 14 | 18119 | M8/70 Bolt | 2 |
| 15 | 3055FB | Link Mechanism Casing | 1 |
| 16 | 0431 | M12/40 Bolt | 1 |
| 17 | 0045 | M12 T Nyloc Nut | 1 |
| 18 | 0702 | M12 A Washer | 2 |
| 19 | 3058PS | Link Mechanism Arm | 1 |
| 20 | 1868 | AV Mount | 4 |
| 21 | 18037 | M8/12 Bolt | 4 |
| 22 | 1721 | M8/10 Bolt | 8 |
| 23 | 0479 | M8 P Nyloc Nut | 2 |



| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------|------|
| 1 | 1802FR | Cross Bar | 2 |
| 2 | 1879FB | Control Panel Tracked | 1 |
| 3 | 0437 | M6/16 Bolt | 13 |
| 4 | 0709 | M6 C Washer | 17 |
| 5 | 0360 | M10/25 Bolt | 4 |
| 6 | 0701 | M10 A Washer | 4 |
| 7 | 1803P | End Plug | 4 |
| 8 | 1883FB | Control Tower Tracked | 1 |
| 9 | 0382 | M10/30 Bolt | 4 |
| 10 | 0839 | M10 C Washer | 8 |
| 11 | 0052 | M10 T Nyloc Nut | 4 |
| 12 | 1860 | M8 Lever | 1 |
| 13 | 1737 | M8 Lever | 1 |

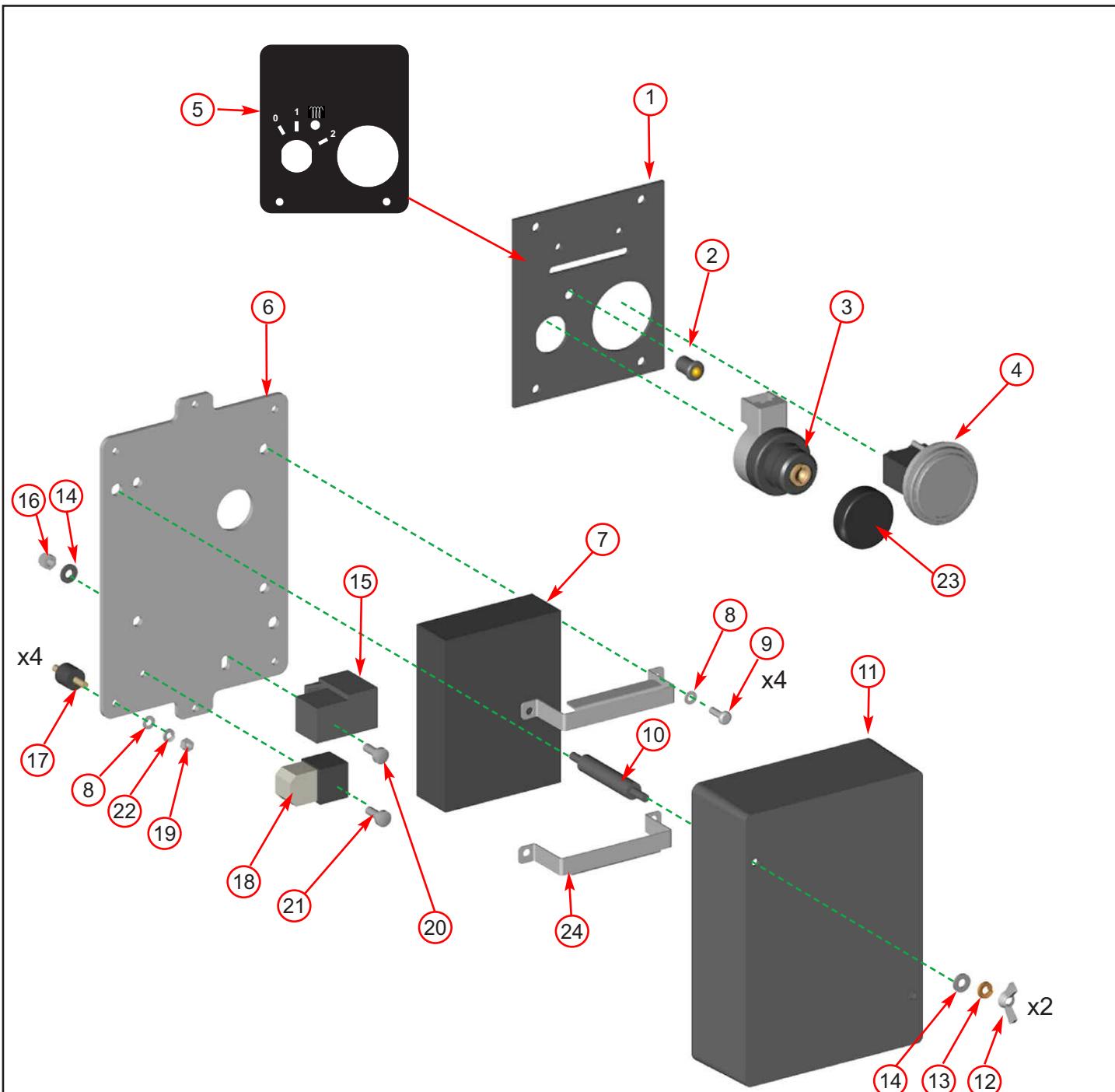
| Item | Part No | Part Name | Q'ty |
|------|---------|------------------------------|------|
| 14 | 1738 | Six Way Diverter Valve | 1 |
| 15 | 3005 | Four Port Valve | 1 |
| 16 | P*24 | Proportional Crossover Valve | 2 |
| 17 | 0142 | M6 P Nyloc Nut | 2 |
| 18 | 0481 | M8 T Nyloc Nut | 6 |
| 19 | 0712 | M8 C Washer | 6 |
| 20 | 0711 | M8 A Washer | 6 |
| 21 | 0341 | M6/50 Bolt | 2 |
| 22 | 0354 | M8/60 Bolt | 4 |
| 23 | 1319 | M8/50 Bolt | 2 |
| 24 | 1882FB | Hose Guard | 1 |
| 25 | 18850F | L-shaped Track Handle | 2 |



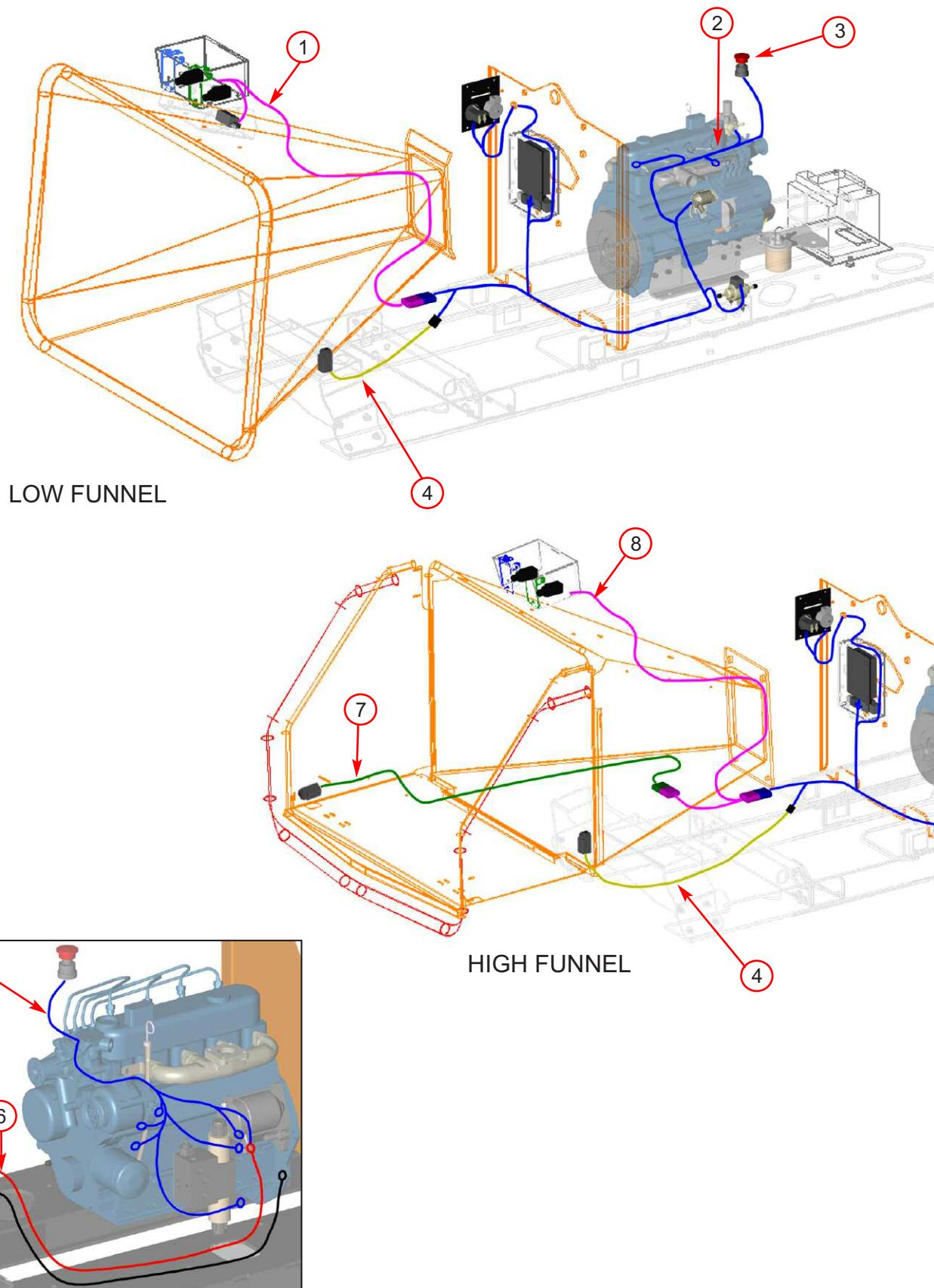


| Item | Part No | Part Name | Q'ty |
|------|---------|----------------------|------|
| 1 | 1175 | Rotor Pulley | 1 |
| 2 | 18961M | Key | 1 |
| 3 | 1410 | Taper Lock Bush 2517 | 1 |
| 4 | 0310 | Belt SPA 1060 | 3 |

| Item | Part No | Part Name | Q'ty |
|------|---------|----------------------------|------|
| 5 | 1170M | Engine Pulley | 1 |
| 6 | 1533 | Vee Belt SPA 900 | 1 |
| 7 | 2975 | Taper Lock Bush 1610 18 mm | 1 |
| 8 | 0949 | Pulley 140 x 1 SPA | 1 |

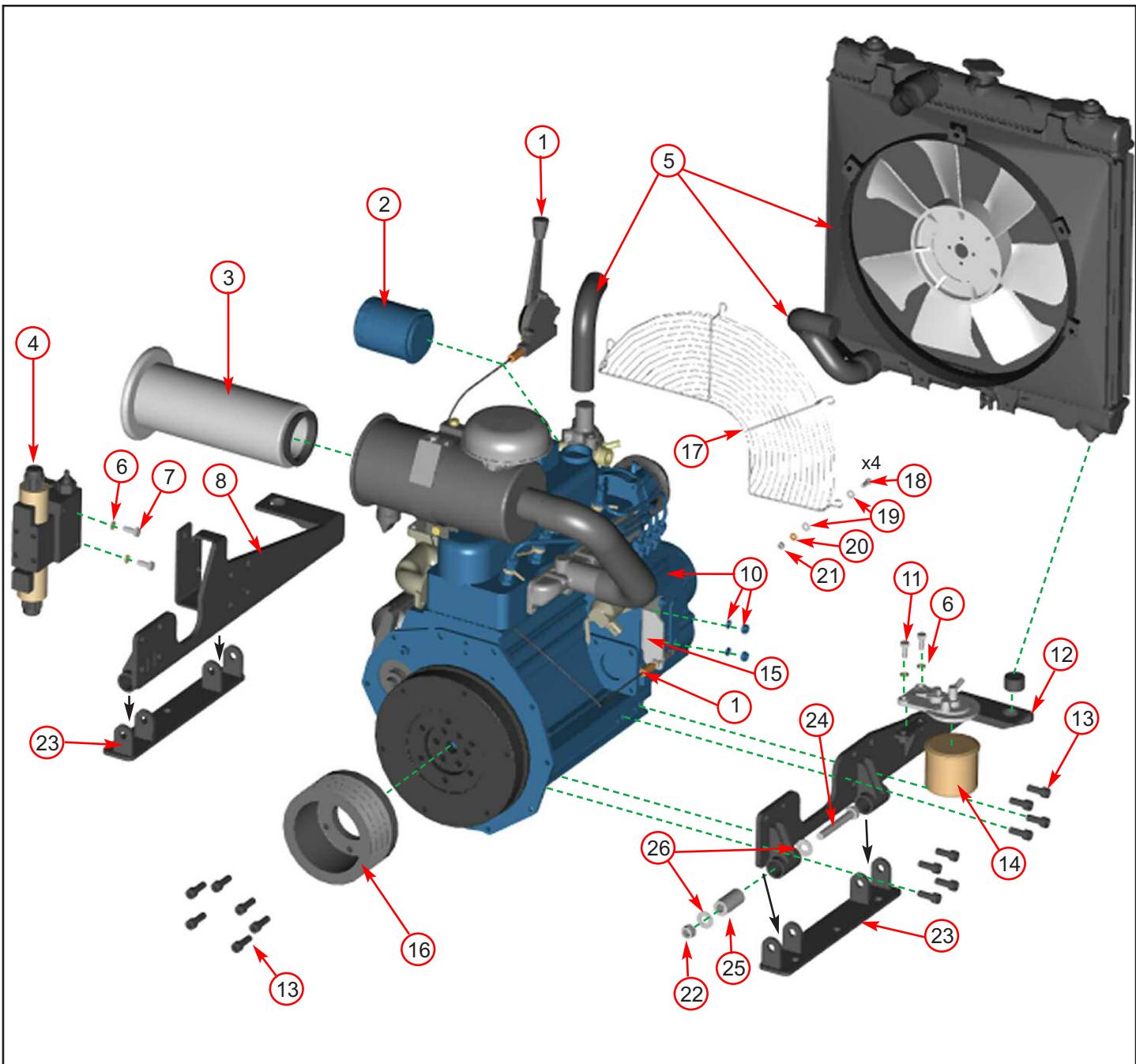


| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|--------------------|----------------------------|------|------|------------------|-----------------------|------|
| 1 | 1758S | Control Panel | 1 | 13 | 18106 | M6 Spring Washer | 2 |
| 2 | 1757 | Amber LED | 1 | 14 | 0709 | M6 C Washer | 4 |
| 3 | Supp'd with engine | Ignition Switch | 1 | 15 | Supp'd with loom | Relay | 1 |
| 4 | 0327 | Hours Counter | 1 | 16 | 0391 | M6 T Nyloc Nut | 2 |
| 5 | 18008 | Control Panel Decal | 1 | 17 | 4033 | M5 AV Mount | 4 |
| 6 | 3038FS | Electrical Panel | 1 | 18 | Supp'd with loom | Fuse | 2 |
| 7 | 18405 | H-Box | 1 | 19 | 0236 | M5 P Nyloc Nut | 4 |
| 8 | 0857 | M5 A Washer | 8 | 20 | 0438 | M6/16 Pan Pozi | 1 |
| 9 | 0435 | M5/16 Pan Pozi | 4 | 21 | 1151 | Countersunk Pop Rivet | 1 |
| 10 | 2725 | Electrical Cover Stand Off | 2 | 22 | 3024 | M5 Spring Washer | 4 |
| 11 | 1930 | Electrical Cover | 1 | 23 | 1470 | Rubber Protector | 1 |
| 12 | 18107 | M6 Wing Nut | 2 | 24 | 18398 | Mounting Bracket | 4 |

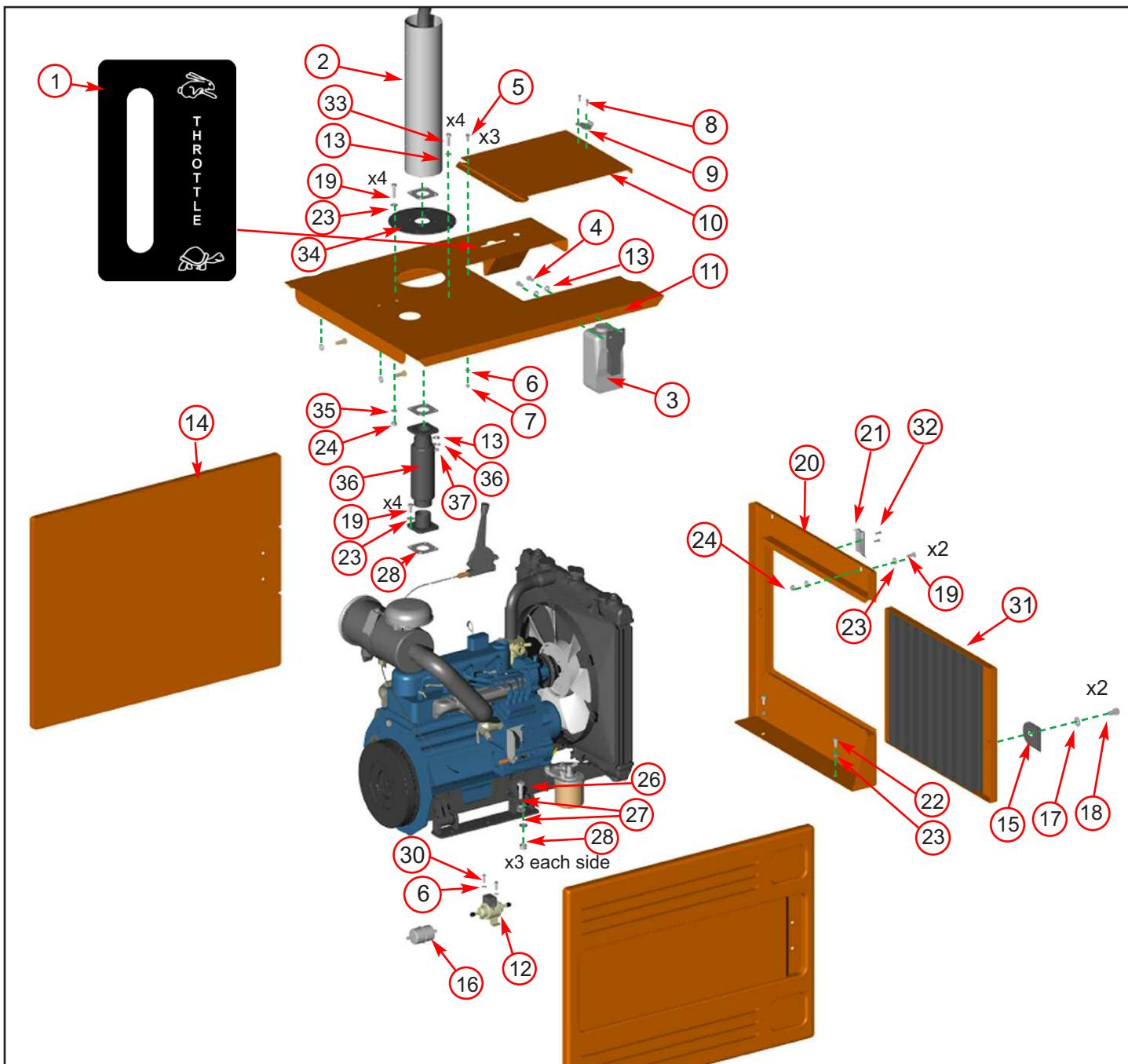


| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------|------|
| 1 | 3019 | Control Box Loom | 1 |
| 2 | 18481 | Engine Loom | 1 |
| 3 | 2627 | Emergency Stop Switch | 1 |
| 4 | 4017 | Safety Switch Loom | 1 |

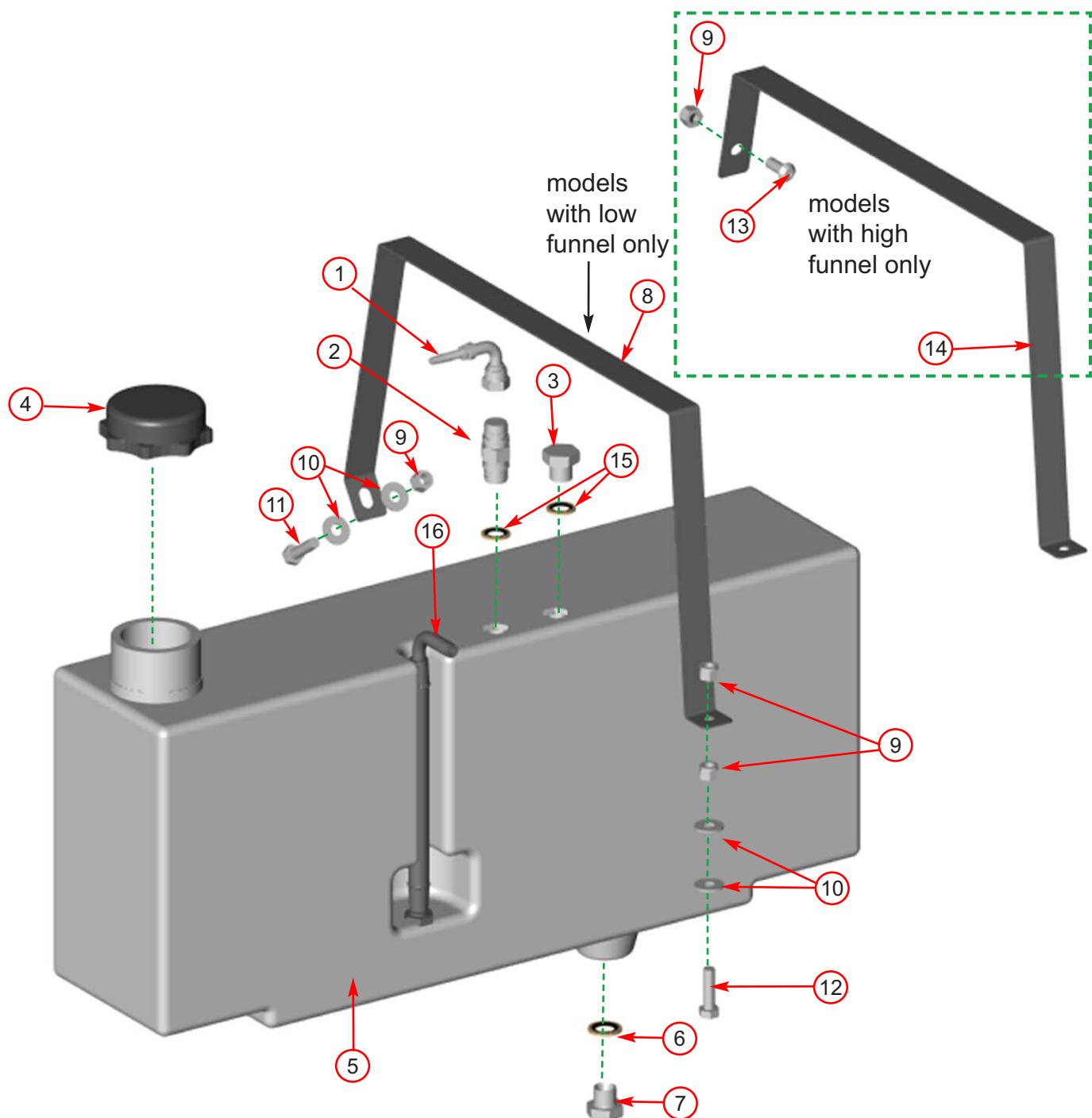
| Item | Part No | Part Name | Q'ty |
|------|---------|-------------------|------|
| 5 | 1376 | -VE Battery Cable | 1 |
| 6 | 1375 | +VE Battery Cable | 1 |
| 7 | 1406 | Safety Bar Loom | 1 |
| 8 | 1975 | Control Box Loom | 1 |



| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|---------|-------------------------------|------|------|---------|------------------------|------|
| 1 | 2946 | Throttle Cable | 1 | 14 | 0085 | Fuel Filter | 1 |
| 2 | 0095 | Oil Filter | 1 | 15 | 2954 | Throttle Cable Bracket | 1 |
| 3 | 0086 | Air Filter | 1 | 16 | 1170M | Pulley Engine 168 x 4 | 1 |
| 4 | 4252 | Directional Control Valve | 1 | 17 | 4335 | Radiator Fan Guard | 1 |
| 5 | 4319 | Radiator Kit | 1 | 18 | 0437 | M6/16 Bolt | 4 |
| 6 | 0711 | M8 A Washer | 4 | 19 | 0709 | M6 C Washer | 8 |
| 7 | 0346 | M8/20 Bolt | 2 | 20 | 18106 | M6 Spring Washer | 4 |
| 8 | 19156FB | Engine Bracket Nearside | 1 | 21 | 0392 | M6 Plain Nut | 4 |
| 9 | 1170 | Pulley Engine 150 x 4 | 1 | 22 | 0644 | M12 P Nyloc Nut | 4 |
| 10 | 0879 | Engine | 1 | 23 | 18338FS | Engine Bracket Base | 2 |
| 11 | 0350 | M8/25 Bolt | 2 | 24 | 0332 | M12/90 Bolt | 4 |
| 12 | 19155FB | Engine Bracket Offside | 1 | 25 | 18332 | AV Mount | 4 |
| 13 | 0304 | M10/25 Fine Thread Socket Cap | 22 | 26 | 0704 | M12 C Washer | 4 |



| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|---------|--------------------------|------|------|---------|-----------------------------|------|
| 1 | 2950 | Throttle Decal | 1 | 19 | 0346 | M8/20 Bolt | 10 |
| 2 | 18915F | Exhaust Muffler Complete | 1 | 20 | 18580FO | Front Engine Bay Guard | 1 |
| 3 | 4320 | Reserve Tank | 1 | 21 | 0235 | Catch | 1 |
| 4 | 0344 | M8/16 Bolt | 2 | 22 | 0350 | M8/25 Bolt | 2 |
| 5 | 0438 | M6/16 Pan Pozi | 3 | 23 | 0712 | M8 C Washer | 12 |
| 6 | 0709 | M6 C Washer | 5 | 24 | 1757 | M8 P Nyloc Nut | 6 |
| 7 | 0142 | M6 P Nyloc Nut | 3 | 25 | 0431 | M12/40 Bolt | 6 |
| 8 | 0066 | Pop Rivet 5 x 6 | 2 | 26 | 1008 | Spring Washer | 4 |
| 9 | 4088 | Catch Plate | 1 | 27 | 0476 | M8 Plain Nut | 4 |
| 10 | 0607FO | Access Cover | 1 | 28 | 17988 | Gasket | 3 |
| 11 | 17292FO | Top Bonnet | 1 | 29 | 0644 | M12 P Nyloc Nut | 6 |
| 12 | 0807 | Fuel Pump | 1 | 30 | 0437 | M6/16 Bolt | 2 |
| 13 | 0711 | M8 A Washer | 10 | 31 | 18581FO | Shroud Radiator with Grille | 1 |
| 14 | 0765O | Side Panel | 2 | 32 | 0067 | Pop Rivet 4.8 x 12 | 2 |
| 15 | 2836FO | Engine Guard Retainer | 2 | 33 | 18117 | M8/35 Bolt | 4 |
| 16 | 4315 | In-Line Fuel Filter | 1 | 34 | 18851 | Muffler Plate | 1 |
| 17 | 0704 | M12 C Washer | 14 | 35 | 19092 | Flexi Adaptor | 1 |
| 18 | 0318 | M12/20 Bolt | 2 | 36 | 0714 | M8 Mudguard Washer | |



| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------|------|
| 1 | 19430 | 1/4" BSP tail | 1 |
| 2 | 18883 | 1/4" MM Adapter | 1 |
| 3 | 0296 | 1/4" Blanking Plug | 1 |
| 4 | | Locking Tank Cap | 1 |
| 5 | P*814 | Fuel Tank Kit | 1 |
| 6 | 0396 | 3/8" Dowty Washer | 1 |
| 7 | 0211 | 3/8" Drain Plug | 1 |
| 8 | 4087F | Tank Strap | 1 |

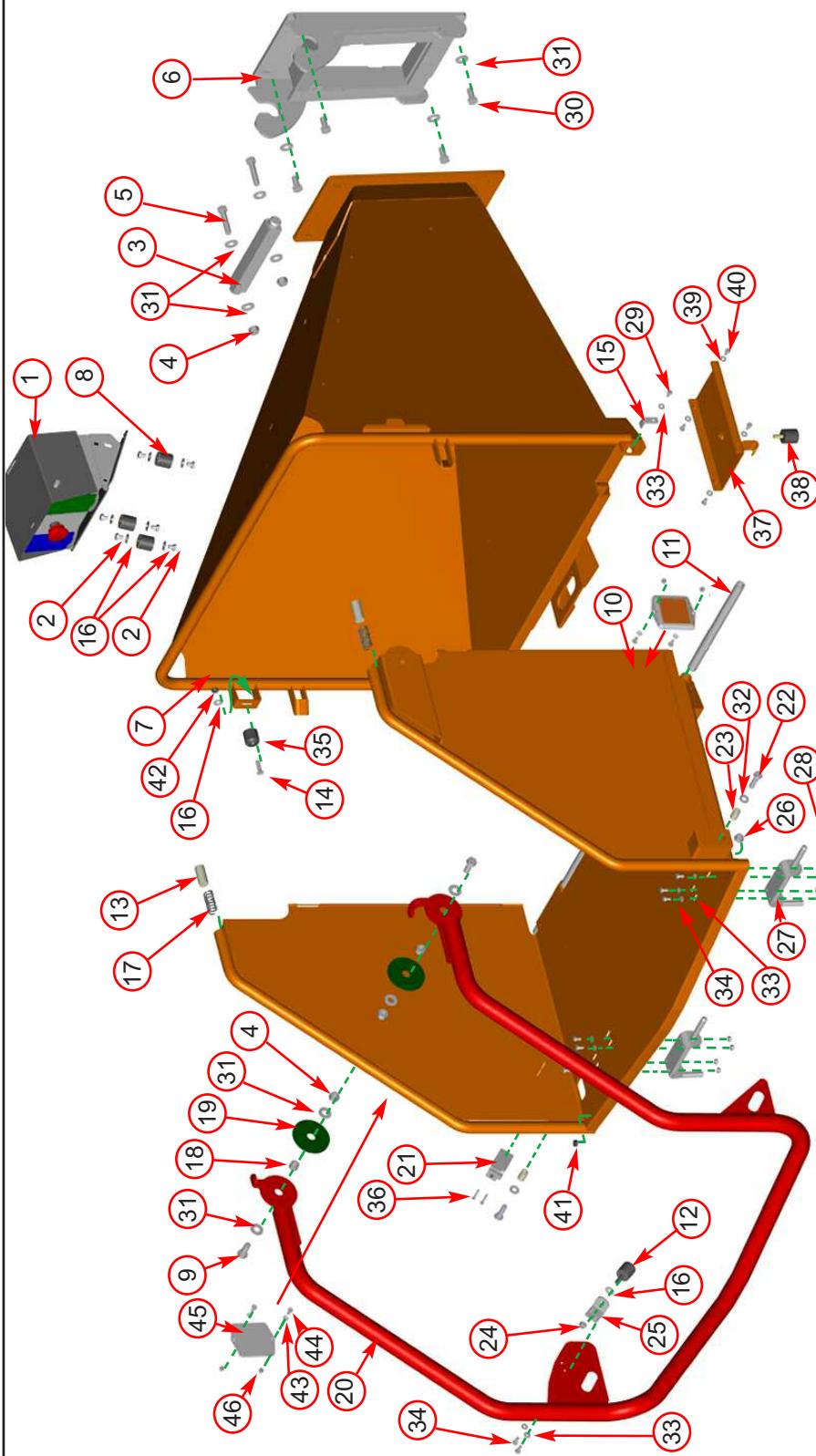
| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------|------|
| 9 | 1757 | M8 P Nyloc Nut | 4 |
| 10 | 0712 | M8 C Washer | 4 |
| 11 | 0346 | M8/20 Bolt | 1 |
| 12 | 0351 | M8/30 Bolt | 1 |
| 13 | 0347 | M8/20 Button Head | 1 |
| 14 | 18042F | Tank Strap (short) | 1 |
| 15 | 0795 | 1/4" Dowty Washer | 2 |
| 16 | P*815 | Hose Fuel Pick Up | 1 |

FUNNEL (HIGH)

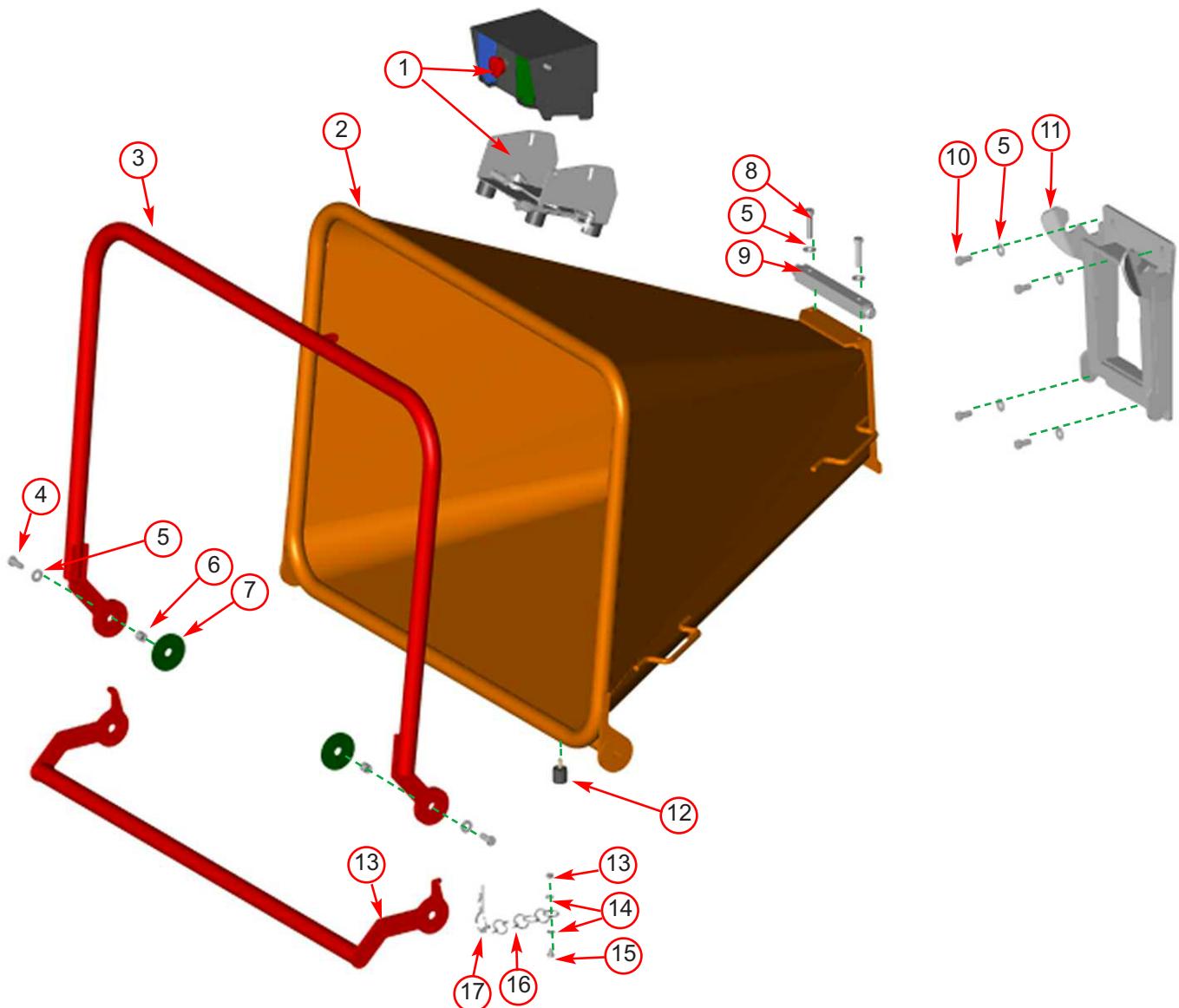


TIMBERWOLF
TW 150VTR/FTR

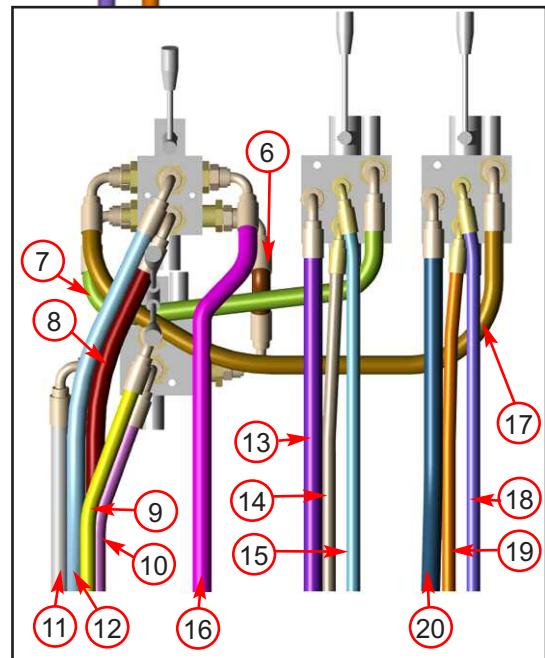
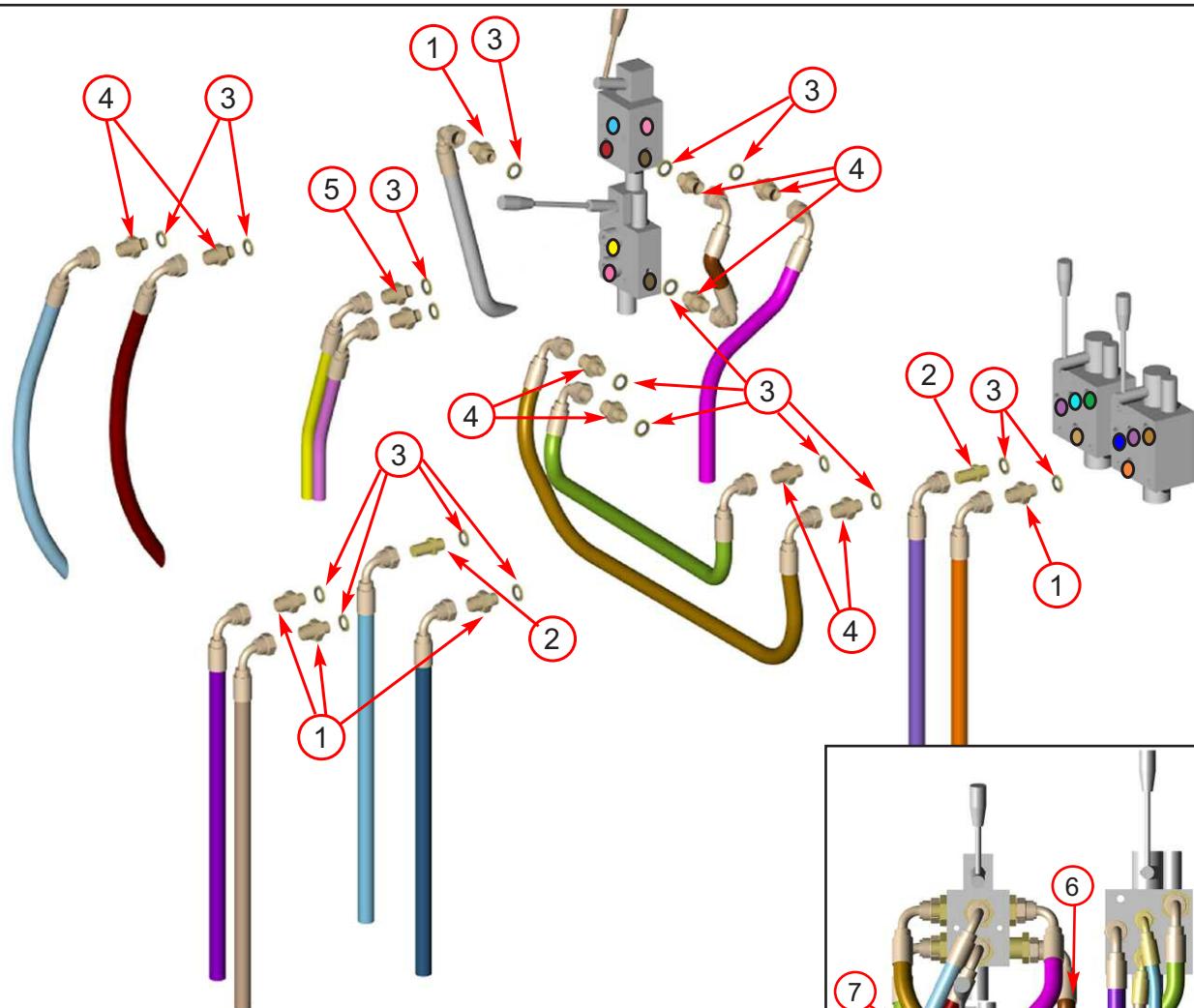
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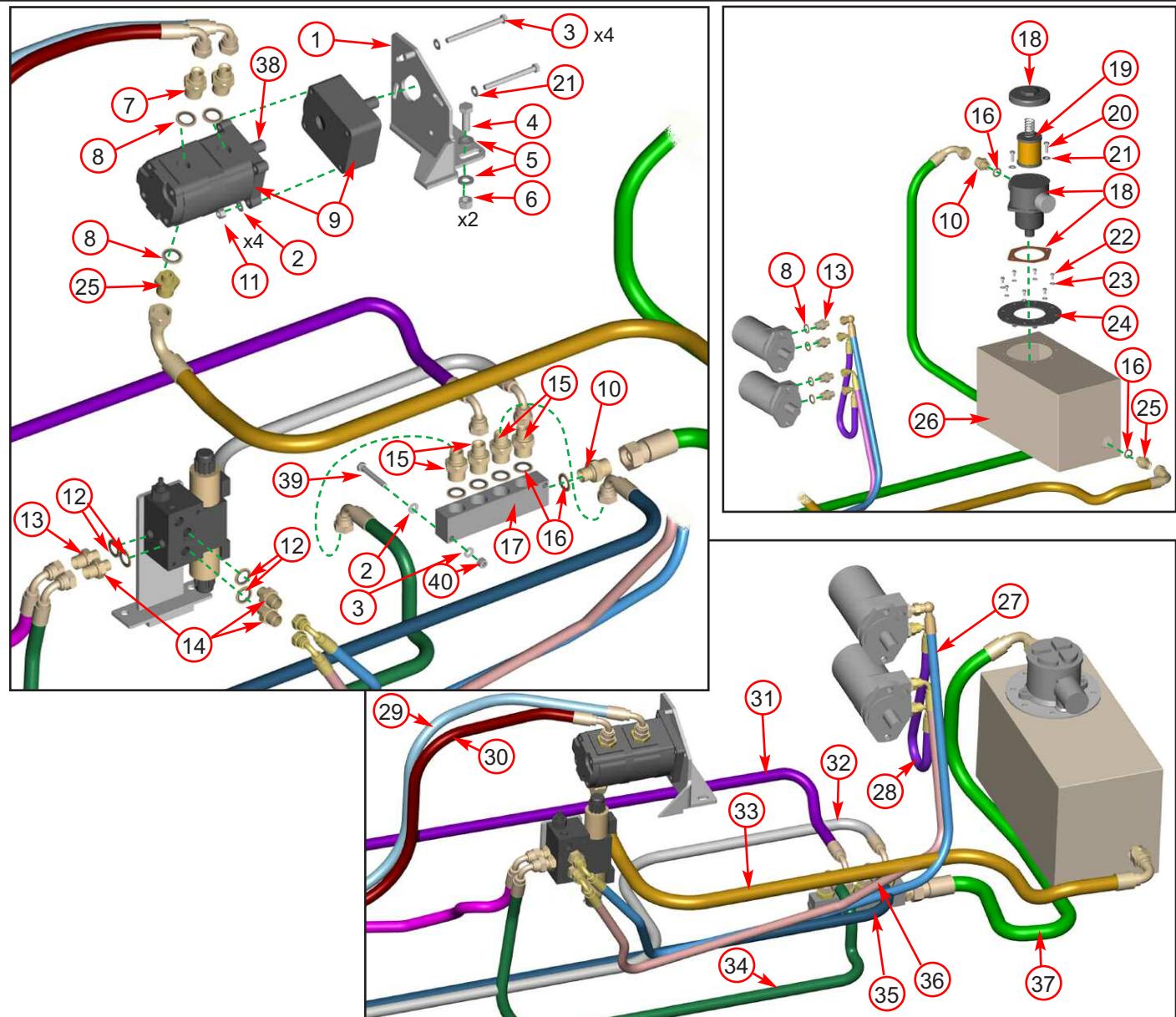
| Item | Part No | Part Name | Qty | Item | Part No | Part Name | Qty |
|------|---------|-------------------------------------|-----|------|---------|-------------------|-----|
| 1 | 2809F | Control Box (detail on pages 39/40) | 1 | 17 | 1603 | Die Springs | 2 |
| 2 | 1721 | M8/10 Bolt | 6 | 18 | 1605M | Stainless Spacer | 2 |
| 3 | 4282MS | Quick Release Pivot Bar | 1 | 19 | 1599 | Bearing Washer | 2 |
| 4 | 0045 | M12 T Nyloc | 4 | 20 | 1570FR | Safety Bar | 1 |
| 5 | 18173 | M12/55 Bolt | 2 | 21 | 1348 | Limit Switch | 1 |
| 6 | 4283F | Quick Release Mechanism | 1 | 22 | 1520 | M10/45 Bolt | 2 |
| 7 | 4238FO | Funnel | 1 | 23 | 1591 | Nylon Spacer | 2 |
| 8 | 1644 | M8 Anti-Vibration Mount | 3 | 24 | 0479 | M8 P Nyloc Nut | 1 |
| 9 | 0429 | M12/35 Bolt | 2 | 25 | 2727FS | Bracket Actuator | 1 |
| 10 | 2919FO | Feed Tray | 1 | 26 | 4345 | M10 P Nyloc Nut | 2 |
| 11 | 2922FS | Hinge Pin | 2 | 27 | 2986 | 1/2" Spring Bolt | 2 |
| 12 | 0178 | Rubber End Stop | 1 | 28 | 0391 | M6 T Nyloc Nut | 8 |
| 13 | 1600 | Nylon Pistons | 2 | 29 | 1236 | M6/20 Bolt | 2 |
| 14 | 4342 | M8/30 Csk Soc. | 1 | 30 | 0321 | M12/30 Bolt | 4 |
| 15 | 4018S | Pin Bracket | 2 | 31 | 0704 | M12 C Washer | 12 |
| 16 | 0712 | M8 C Washer | 8 | 32 | 4344 | M10 Repair Washer | 2 |



| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|-----------------|-------------------------|------|------|---------|-------------------------------|------|
| 1 | See pages 38/39 | Control Box | 1 | 10 | 0277 | M12/25 Bolt | 4 |
| 2 | 3008FO | Funnel | 1 | 11 | 4283FO | Quick Release Mechanism | 1 |
| 3 | 18507FR | Safety Bar | 1 | 12 | 17421 | AV Mount | 1 |
| 4 | 0431 | M12/40 Bolt | 2 | 13 | 18506FR | Underslung Safety Bar | 1 |
| 5 | 0704 | M12 C Washer | 8 | 14 | 0142 | M6 T Nyloc Nut | 1 |
| 6 | 4116M | Spacer Tube | 2 | 15 | 0709 | M6 C Washer | 2 |
| 7 | 1599 | Bearing Washer | 2 | 16 | 1236 | M6/20 Bolt | 1 |
| 8 | 18173 | M12/55 Bolt | 2 | 17 | 4105 | Chain 40 x 16 x 3.8 (7 links) | 1 |
| 9 | 4282MS | Quick Release Pivot Bar | 1 | 18 | 4094 | R Clip | 1 |

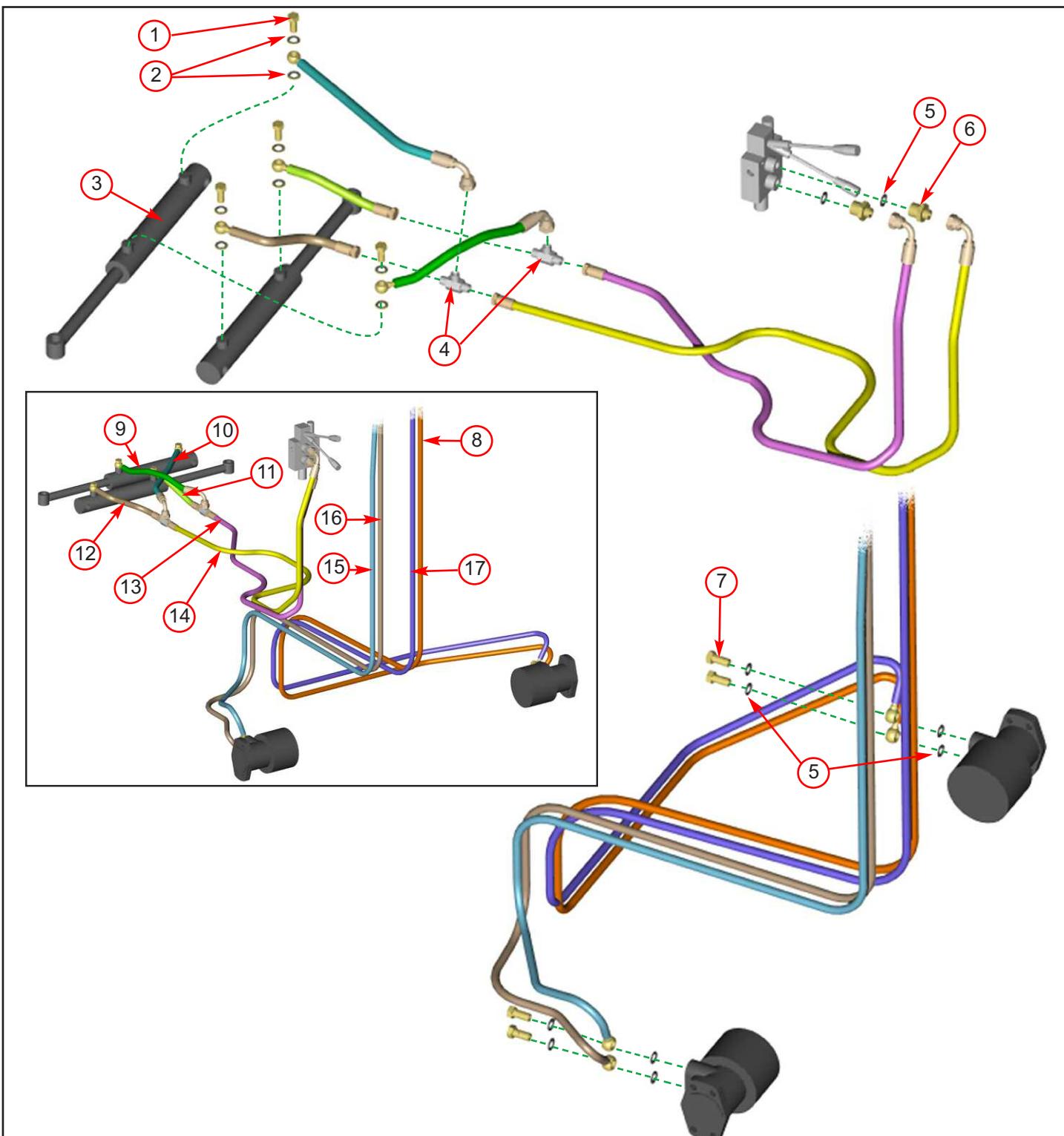


| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|---------|---------------------------------|------|------|---------|------------------------------------|------|
| 1 | 0161 | 3/8" - 3/8" Adapter | 5 | 11 | 3084 | 3/8" Hose to manifold rear | 1 |
| 2 | 0828 | 3/8" Bulk Head Adapter | 2 | 12 | 4000 | 1/2" Hose to pump rear connection | 1 |
| 3 | 0396 | 3/8" Dowty Washer | 18 | 13 | 3091 | 3/8" Hose to manifold | 1 |
| 4 | 0026 | 3/8" - 1/2" Adapter | 9 | 14 | 3089 | 3/8" Hose to bottom of track motor | 1 |
| 5 | 0033 | 1/4" - 3/8" Adapter | 2 | 15 | 3088 | 3/8" Hose to top of track motor | 1 |
| 6 | 3097 | 1/2" Hose, 6-way to 4-way valve | 1 | 16 | 4240 | 1/2" Hose to DCV port 'P' | 1 |
| 7 | 3095 | 1/2" Hose, 6-way to prop. valve | 1 | 17 | 3096 | 1/2" Hose, 6-way to prop. valve | 1 |
| 8 | 3099 | 1/2" Hose to pump front | 1 | 18 | 3087 | 3/8" Hose to top of track motor | 1 |
| 9 | 3082 | 1/4" Hose, cylinder feed | 1 | 19 | 3086 | 3/8" Hose to bottom of track motor | 1 |
| 10 | 3083 | 1/4" Hose, cylinder return | 1 | 20 | 3090 | 3/8" Hose to manifold | 1 |



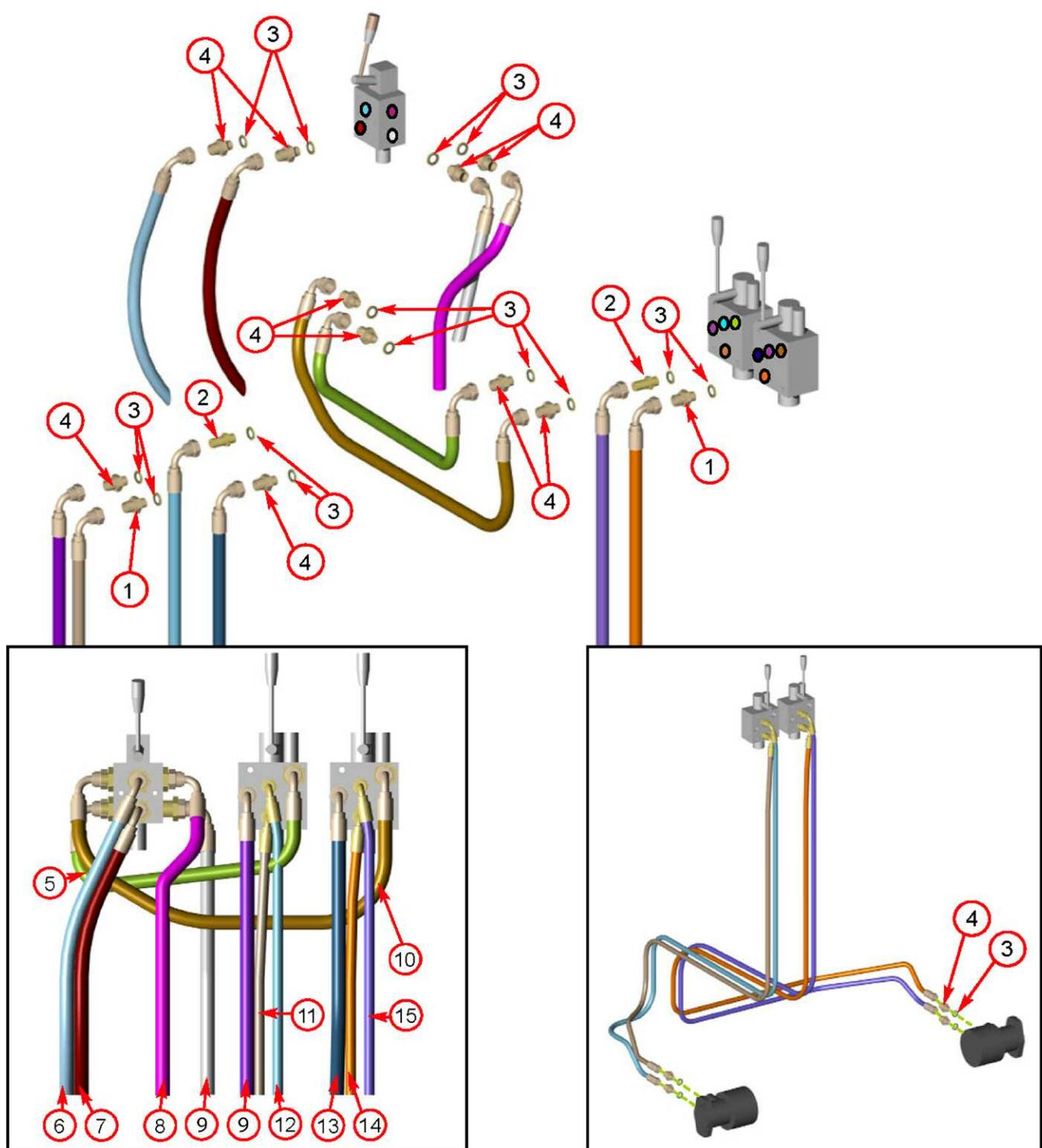
| Item | Part No | Part Name | Q'ty |
|------|---------|---------------------|------|
| 1 | 1913FS | Pump Bracket | 1 |
| 2 | 0711 | M8 A Washer | 6 |
| 3 | 2988 | M8/90 Bolt | 6 |
| 4 | 0429 | M12/35 Bolt | 2 |
| 5 | 0702 | M12 A Washer | 4 |
| 6 | 0479 | M12 P Nyloc Nut | 2 |
| 7 | 0027 | 1/2" - 1/2" Adapter | 2 |
| 8 | 0398 | 1/2" Dowty Seal | 7 |
| 9 | 18893 | Hydraulic Pump | 1 |
| 10 | 0028 | 1/2"- 3/4" Adapter | 2 |
| 11 | 0479 | M8 P Nyloc Nut | 4 |
| 12 | 0396 | 3/8" Dowty Seal | 4 |
| 13 | 0026 | 3/8" - 1/2" Adapter | 5 |
| 14 | 0161 | 3/8" - 3/8" Adapter | 3 |
| 15 | 0225 | 3/4" - 3/8" Adapter | 4 |
| 16 | 0152 | 3/4" Dowty Seal | 7 |
| 17 | 1839MA | Manifold | 1 |
| 18 | 1954 | Tank Top Filter | 1 |
| 19 | 0100 | Filter Element | 1 |
| 20 | 0350 | M8/25 Bolt | 2 |

| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------------------------|------|
| 21 | 0712 | M8 C Washer | 6 |
| 22 | 1658 | M6/12 Bolt | 8 |
| 23 | 0709 | M6 C Washer | 8 |
| 24 | 1702FS | Tank Top Plate | 1 |
| 25 | 2694 | 3/4" - 1" Adapter | 2 |
| 26 | 1703 | Hydraulic Tank | 1 |
| 27 | 17309 | 3/8" Hose, DCV to upper motor | 1 |
| 28 | 3092 | 3/8" Hose, motor to motor | 1 |
| 29 | 4000 | 1/2" Hose, pump rear to 6-way valve | 1 |
| 30 | 3099 | 1/2" Hose, pump front to 6-way valve | 1 |
| 31 | 3091 | 3/8" Hose, manifold to LH valve | 1 |
| 32 | 3084 | 3/8" Hose, manifold to 4-port valve | 1 |
| 33 | 4258 | 1" Hose, tank to pump front | 1 |
| 34 | 4247 | 3/8" Hose, manifold to DCV | 1 |
| 35 | 3090 | 3/8" Hose, manifold to RH valve | 1 |
| 36 | 3094 | 3/8" Hose, DCV to lower motor | 1 |
| 37 | 4303 | 1/2" Hose, manifold to hyd filter | 1 |
| 38 | 18508 | Pump Spline | 1 |
| 39 | 0354 | M8/60 Bolt | 2 |
| 40 | 0479 | M8 P Nyloc Nut | 2 |



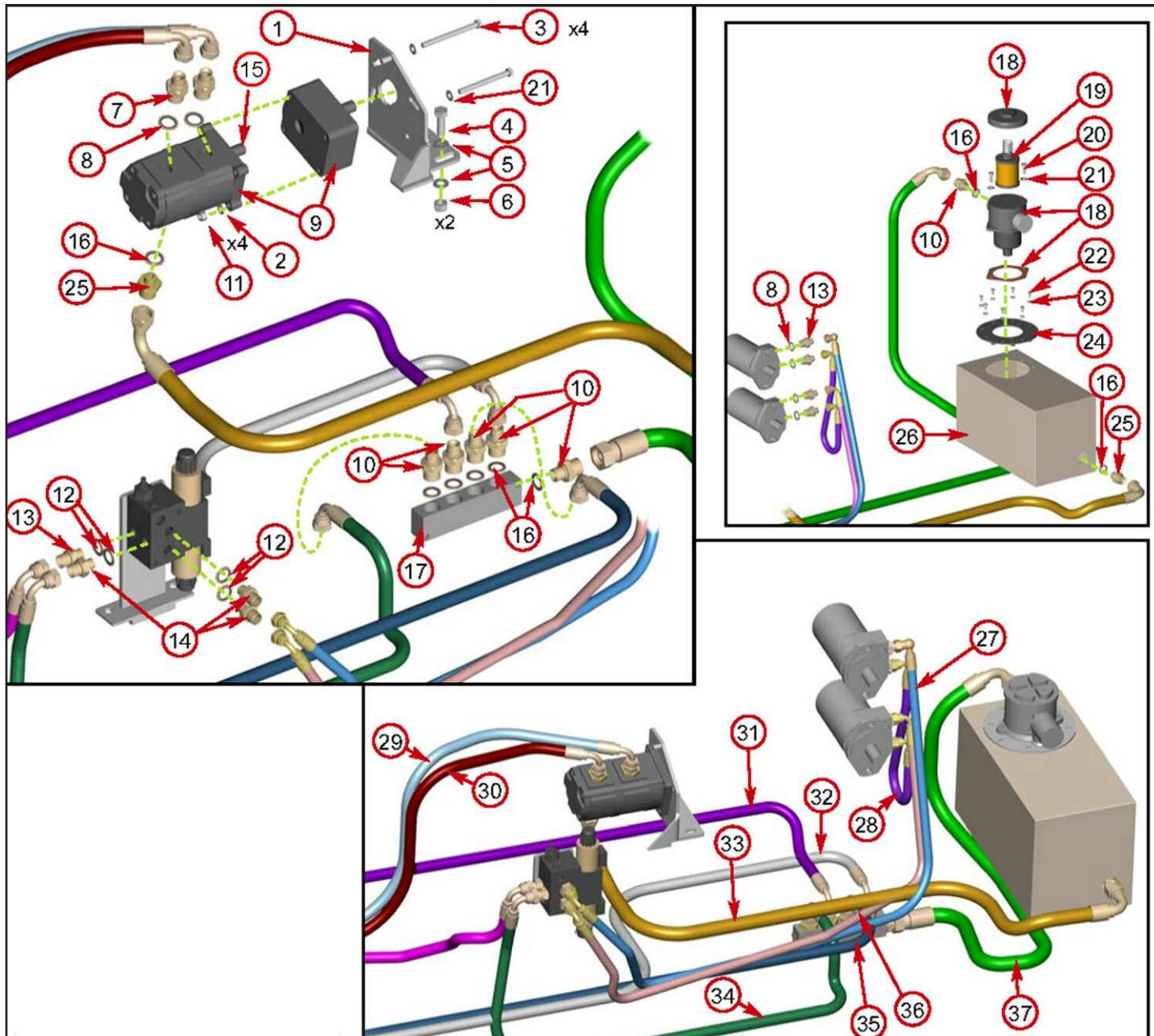
| Item | Part No | Part Name | Q'ty |
|------|---------|---------------------------------------|------|
| 1 | 4059 | 1/4" Banjo Bolt | 4 |
| 2 | 0395 | 1/4" Dowty Washer | 8 |
| 3 | 4046 | Hydraulic Cylinders | 2 |
| 4 | 4058 | 1/4" Tee Adapter | 2 |
| 5 | 0396 | 3/8" Dowty Washer | 10 |
| 6 | 0033 | 1/4" - 3/8" Adapter | 2 |
| 7 | 4060 | 3/8" Banjo Bolt | 2 |
| 8 | 3086 | 3/8" Hose, RH lower trk motor - valve | 1 |
| 9 | 3081 | 1/4" Hose, LH track retract | 1 |

| Item | Part No | Part Name | Q'ty |
|------|---------|---------------------------------------|------|
| 10 | 4031 | 1/4" Hose, LH track extend | 1 |
| 11 | 3080 | 1/4" Hose, RH track retract | 1 |
| 12 | 4032 | 1/4" Hose, RH track extend | 1 |
| 13 | 3083 | 1/4" Hose, trk extend feed | 1 |
| 14 | 3082 | 1/4" Hose, trk retract feed - valve | 1 |
| 15 | 3088 | 3/8" Hose, LH upper trk motor - valve | 1 |
| 16 | 3089 | 3/8" Hose, LH lower trk motor - valve | 1 |
| 17 | 3087 | 3/8" Hose, RH upper trk motor - valve | 1 |



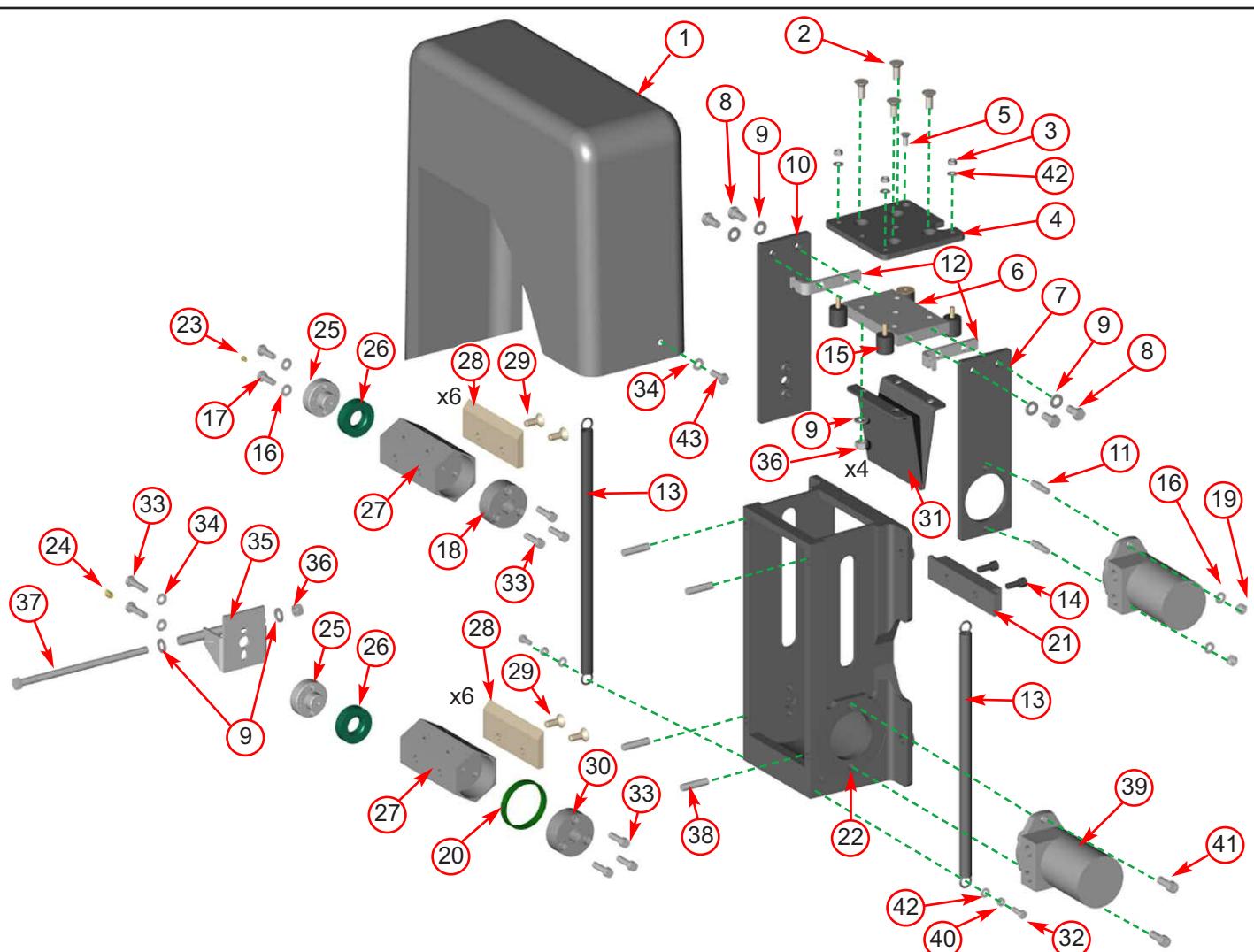
| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------------------|------|
| 1 | 0161 | 3/8" - 3/8" Adapter | 2 |
| 2 | 0212 | 1/2" Bulk Head Adapter | 2 |
| 3 | 0396 | 3/8" Dowty Washer | 18 |
| 4 | 0026 | 3/8" - 1/2" Adapter | 14 |
| 5 | 3095 | 1/2" Hose, 6-way to prop. valve | 1 |
| 6 | 4000 | 1/2" Hose to pump rear connection | 1 |
| 7 | 3099 | 1/2" Hose to pump front | 1 |
| 8 | 4240 | 1/2" Hose to DCV port 'P' | 1 |

| Item | Part No | Part Name | Q'ty |
|------|---------|------------------------------------|------|
| 9 | P*1190 | 1/2" Hose to manifold rear | 2 |
| 10 | 3096 | 1/2" Hose, 6-way to prop. valve | 1 |
| 11 | P*1185 | 1/2" Hose to bottom of track motor | 1 |
| 12 | P*1186 | 1/2" Hose to top of track motor | 1 |
| 13 | P*1189 | 3/8" Hose to manifold | 1 |
| 14 | P*1183 | 1/2" Hose to bottom of track motor | 1 |
| 15 | P*1184 | 1/2" Hose to top of track motor | 1 |



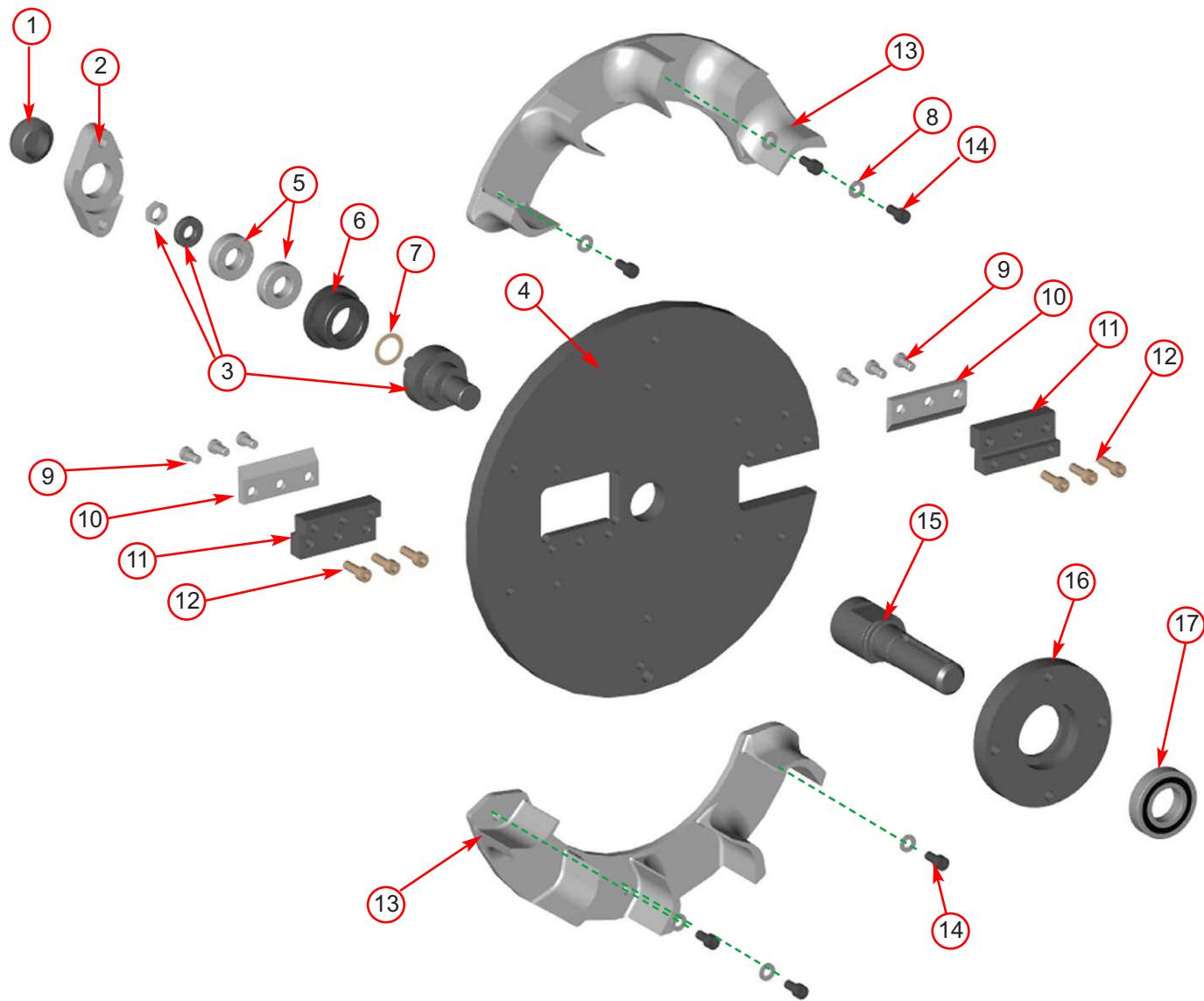
| Item | Part No | Part Name | Q'ty |
|------|---------|---------------------|------|
| 1 | 1913FS | Pump Bracket | 1 |
| 2 | 0711 | M8 A Washer | 4 |
| 3 | 2988 | M8/90 Bolt | 4 |
| 4 | 0429 | M12/35 Bolt | 2 |
| 5 | 0702 | M12 A Washer | 4 |
| 6 | 0479 | M12 P Nyloc Nut | 2 |
| 7 | 0027 | 1/2" - 1/2" Adapter | 2 |
| 8 | 0398 | 1/2" Dowty Seal | 6 |
| 9 | 17344 | Hydraulic Pump | 1 |
| 10 | 0028 | 1/2"- 3/4" Adapter | 6 |
| 11 | 0479 | M8 P Nyloc Nut | 4 |
| 12 | 0396 | 3/8" Dowty Seal | 4 |
| 13 | 0026 | 3/8" - 1/2" Adapter | 5 |
| 14 | 0161 | 3/8" - 3/8" Adapter | 3 |
| 15 | 18508 | Spline for pump | 1 |
| 16 | 0152 | 3/4" Dowty Seal | 8 |
| 17 | 1839MA | Manifold | 1 |
| 18 | 1954 | Tank Top Filter | 1 |
| 19 | 0100 | Filter Element | 1 |

| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------------------------|------|
| 20 | 0350 | M8/25 Bolt | 2 |
| 21 | 0712 | M8 C Washer | 6 |
| 22 | 1658 | M6/12 Bolt | 8 |
| 23 | 0709 | M6 C Washer | 8 |
| 24 | 1702FS | Tank Top Plate | 1 |
| 25 | 2694 | 3/4" - 1" Adapter | 2 |
| 26 | 1703 | Hydraulic Tank | 1 |
| 27 | 17309 | 3/8" Hose, DCV to upper motor | 1 |
| 28 | 3092 | 3/8" Hose, motor to motor | 1 |
| 29 | 4000 | 1/2" Hose, pump rear to 6-way valve | 1 |
| 30 | 3099 | 1/2" Hose, pump front to 6-way valve | 1 |
| 31 | 3091 | 3/8" Hose, manifold to LH valve | 1 |
| 32 | 4302 | 1/2" Hose, manifold to 4-port valve | 1 |
| 33 | P*1191 | 1" Hose, tank to pump front | 1 |
| 34 | P*1188 | 3/8" Hose, manifold to DCV | 1 |
| 35 | 3090 | 3/8" Hose, manifold to RH valve | 1 |
| 36 | 3094 | 3/8" Hose, DCV to lower motor | 1 |
| 37 | P*1187 | 1/2" Hose, manifold to hyd filter | 1 |



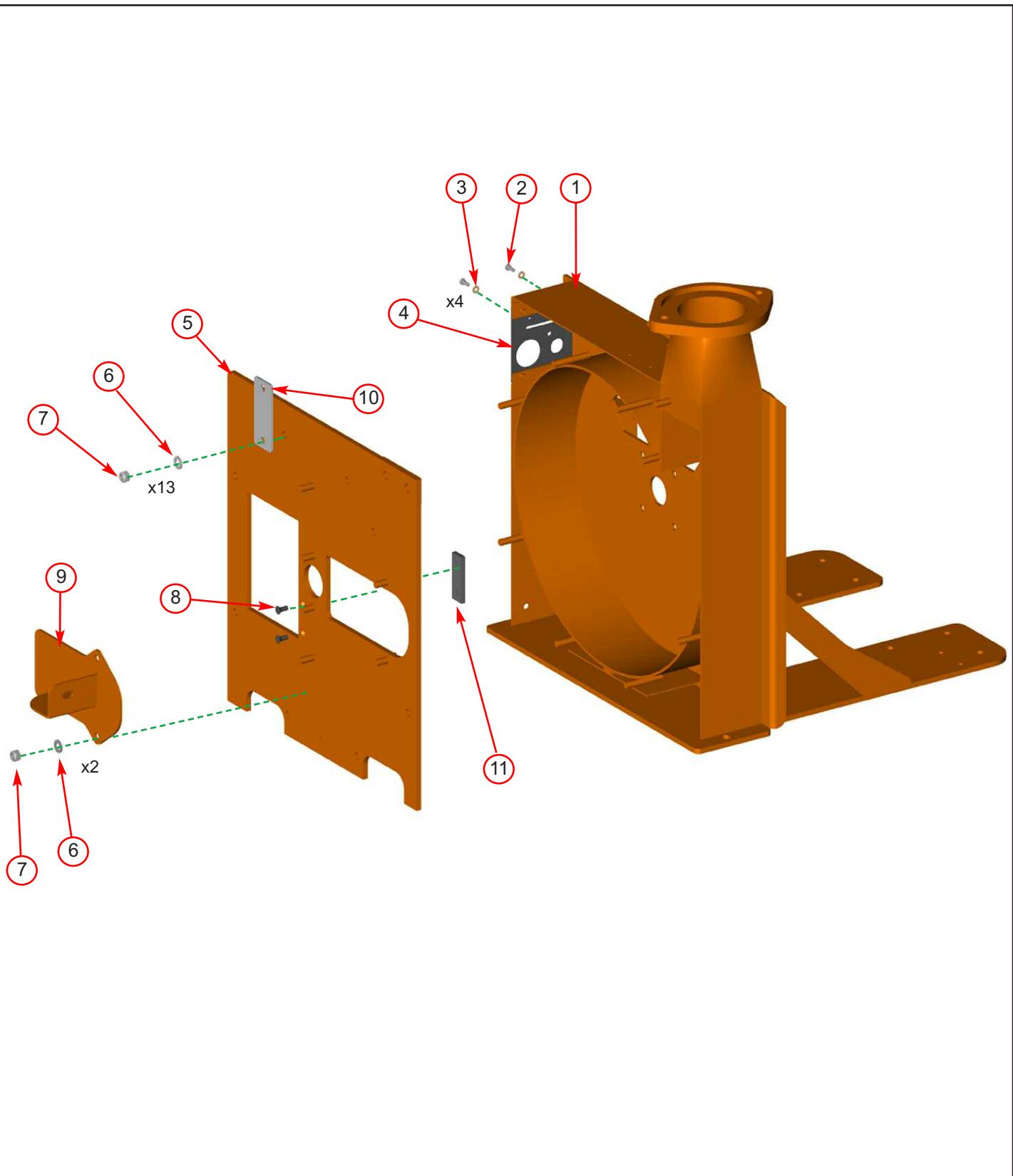
| Item | Part No | Part Name | Q'ty |
|------|---------|--------------------------|------|
| 1 | 0672 | Rollerbox Cover | 1 |
| 2 | 18316 | M12/50 Csk Bolt | 4 |
| 3 | 0481 | M8 T Nyloc Nut | 3 |
| 4 | 18027M | Plate Top Damper Carrier | 1 |
| 5 | 0348 | M8/20 Csk Socket | 1 |
| 6 | 1962FMS | Block Top Damped | 1 |
| 7 | 18024M | Drive Side Plate | 1 |
| 8 | 0429 | M12/35 Bolt | 4 |
| 9 | 0702 | M12 A Washer | 10 |
| 10 | 18025 | Non Drive Side Plate | 1 |
| 11 | 1162 | Motor Studs | 2 |
| 12 | 18028FS | Bracket Spring Hanger | 2 |
| 13 | 18070 | Roller Box Spring | 2 |
| 14 | 0305 | M10/25 Caphead | 2 |
| 15 | 1768 | AV Mount 30x30 | 4 |
| 16 | 0701 | M10 A Washer | 2 |
| 17 | 0382 | M10/30 Bolt | 4 |
| 18 | 1361M | Drive Spline | 1 |
| 19 | 4345 | M10 P Nyloc Nut | 2 |
| 20 | 2757 | Bush Bearing Spline | 1 |
| 21 | 0103MH | Anvil | 1 |
| 22 | 0228M | Roller Box | 1 |

| Item | Part No | Part Name | Q'ty |
|------|---------|------------------------|------|
| 23 | 0985 | Straight Grease Nipple | 1 |
| 24 | 0986 | 45° Grease Nipple | 1 |
| 25 | 0055 | Bearing Boss | 2 |
| 26 | 0788 | Plastic Bush | 2 |
| 27 | 1362M | Roller Body | 2 |
| 28 | 0325M | Roller Blade | 12 |
| 29 | 0428 | M12/30 Csk Soc. | 24 |
| 30 | 4100M | Spline 6B Retro Bottom | 1 |
| 31 | 4013 | Rotor Guard | 1 |
| 32 | 0350 | M8/25 Bolt | 2 |
| 33 | 4068 | M10/40 Cap Head Bolt | 8 |
| 34 | 0839 | M10 C Washer | 3 |
| 35 | 0534FS | Cover Bracket | 1 |
| 36 | 0045 | M12 T Nyloc Nut | 5 |
| 37 | 0319 | M12/220 Bolt | 1 |
| 38 | 0356 | Funnel Studs M12/50 | 4 |
| 39 | 2982B | Motor | 2 |
| 40 | 0476 | M8 Plain Nut | 2 |
| 41 | 1985 | M12/30 Caphead | 2 |
| 42 | 0711 | M8 A Washer | 5 |
| 43 | 0360 | M10/25 Bolt | 1 |



| Item | Part No | Part Name | Q'ty |
|------|---------|-----------------------|----------|
| 1 | 0959 | Plastic Cap | 1 |
| 2 | 0884MS | Bearing Housing Front | 1 |
| 3 | 18479K | Rotor Nose Shaft Kit | 1 |
| 4 | 0880M | Rotor | 1 |
| 5 | 0491 | Bearing 6205 | 2 |
| 6 | 0883MCB | Bearing Cup | 1 |
| 7 | 0796 | 20 Thou Shim | As Req'd |
| 8 | 0701 | M10 A Washer | 6 |
| 9 | 0900 | M10/20 Star Cap Screw | 6 |

| Item | Part No | Part Name | Q'ty |
|------|---------|----------------------|------|
| 10 | 083MH | Cutter Blade 4" | 2 |
| 11 | 18275M | Blade Pocket | 2 |
| 12 | 0386 | M10/30 Cap Screw | 6 |
| 13 | 1571 | Fan Section | 2 |
| 14 | 0386 | M10/30 Caphead | 6 |
| 15 | 18912M | Rear Shaft | 1 |
| 16 | 4063MCB | Bearing Housing Rear | 1 |
| 17 | 0495 | Bearing 6208 | 1 |



| Item | Part No | Part Name | Q'ty | Item | Part No | Part Name | Q'ty |
|------|---------|----------------|------|------|---------|-----------------------|------|
| 1 | 18436FO | Rotor Housing | 1 | 7 | 0045 | M12 T Nyloc Nut | 15 |
| 2 | 0438 | M6/16 Pozi Pan | 4 | 8 | 0355 | M8/16 C/Sunk Bolt | 2 |
| 3 | 0709 | M6 C Washer | 4 | 9 | 1268FO | Access Cover | 1 |
| 4 | 1758S | Control Panel | 1 | 10 | 18023PS | Guard Stand-Off Plate | 1 |
| 5 | 1267FO | Front Plate | 1 | 11 | 0101MH | Anvil Vertical | 1 |
| 6 | 0702 | M12 A Washer | 15 | | | | |

V-BELT TENSIONING TABLE



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TW 150VTR/FTR

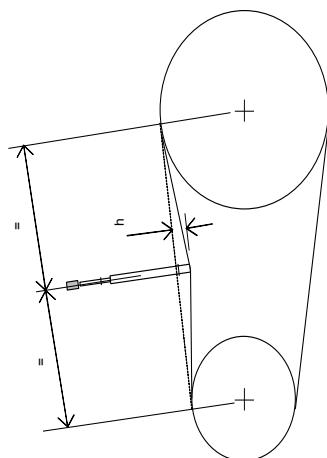
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TIMBERWOLF V-BELT TENSIONING DATA TABLE

METHOD:

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

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



TIPS ON BELT TIGHTENING:

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

| | TW MODEL No.: | 137/76G | 18/100G | 125PH | 160DHB | 160VTR | 190TDHB/ 230DHB | 190TVGTR | 360DHB(t) | 240TDHB(t) | PTO100 | PTO150 | \$426 SHREDDER | \$426TFTR SHREDDER | PTO S426 SHREDDER | SX200 - ALL MODELS |
|--------------------------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|----------------------|-----------------------|
| ROTOR BELTS | Belt Mfr / Type | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | Gates Super HC-MN | |
| Belt Pitch Designation | | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | SPA | |
| Belt Deflection | = h | 4.0 | 3.5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | |
| Force reading (KgF) | New belt | 3.4 - 3.6 | 3.1 - 3.3 | 3.3 - 3.6 | 4.3 - 4.5 | 3.9 - 4.1 | 3.9 - 4.1 | 3.9 - 4.1 | 3.9 - 4.1 | 3.7 - 4.0 | 3.3 - 3.5 | 3.8 - 4.0 | 3.3 - 3.5* | 3.3 - 3.5 | 6.5 - 6.9 | |
| Used belt | | 3.0 - 3.2 | 2.8 - 3.0 | 2.8 - 3.1 | 3.7 - 4.0 | 3.7 - 4.0 | 3.4 - 3.6 | 3.4 - 3.6 | 3.4 - 3.6 | 3.2 - 3.4 | 2.9 - 3.1 | 2.9 - 3.0 | 3.3 - 3.5 | 2.9 - 3.1 | 5.6 - 6.0 | |
| PUMP BELT | Belt Mfr / Type | N/A | N/A | Gates Super HC-MN | N/A | Gates Super HC-MN | N/A | Gates Super HC-MN | N/A | N/A | Gates Super HC-MN | N/A | Gates Super HC-MN | N/A | N/A | |
| Belt Pitch Designation | | | | SPA | | SPA | | SPA | | SPA | | SPA | | SPA | | |
| Belt Deflection | = h | | | 950.0 | | 900.0 | | 925.0 | | 950.0 | | 925.0 | | 4.0 | 4.0 | |
| Force reading (KgF) | New belt | | | 4.0 | | 4.0 | | 4.0 | | 4.0 | | 4.0 | | 2.0 - 2.2 | 2.7 - 2.9 | |
| Used belt | | | | 1.9 - 2.0 | | 2.3 - 2.4 | | 2.3 - 2.4 | | 2.3 - 2.4 | | 2.0 - 2.2 | | 1.8 - 2.0 | 2.3 - 2.5 | |



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