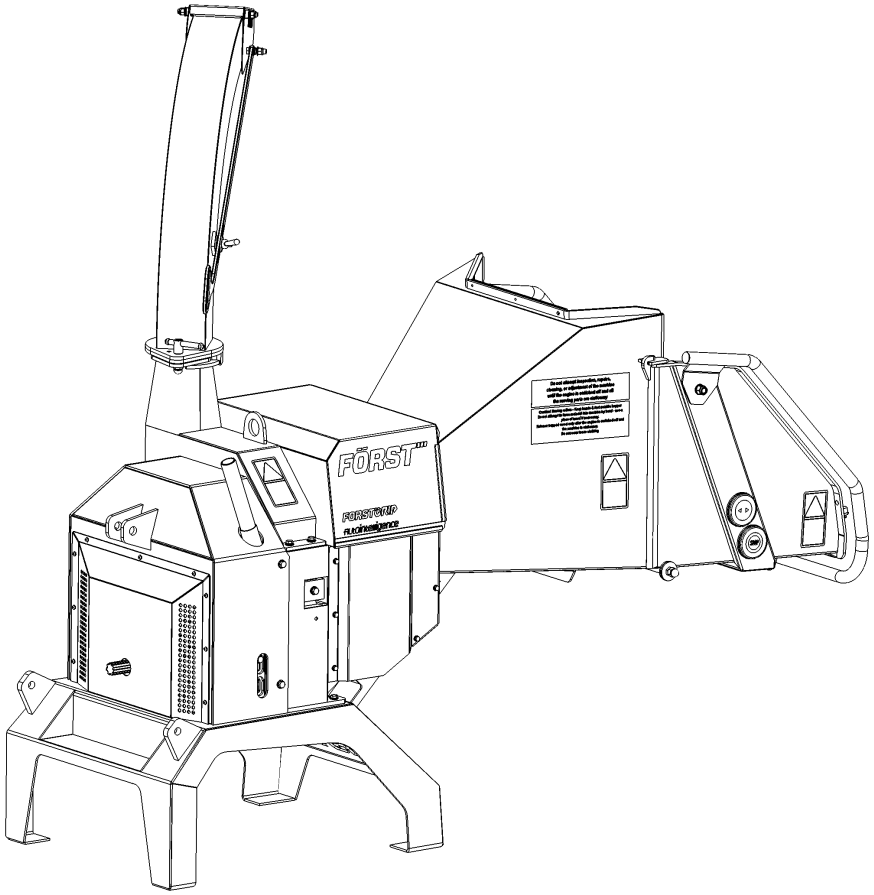
FÖRST™

PT6 Woodchipper

USER MANUAL

ENGLISH



21/11/2018 Revision 1

Redwood Global Ltd,
Unit 86, Livingstone Road, Walworth Business Park, Andover,
Hampshire. SP10 5NS. United Kingdom

Table of Contents

Introduction

Thank you for becoming the owner of this Redwood Global Ltd, Forst PT6 woodchipping machine. By observing the contents of this manual, we hope the machine gives safe and productive service. This user manual is intended for the owner/operator to safely and effectively operate this machine and carry out routine maintenance between services. This is not a comprehensive service manual. See Service Schedule for routine maintenance and when to take the machine to a service specialist. For engine maintenance, please refer to the engine manual supplied with this machine.

This machine has been through a pre-delivery inspection before leaving the factory and is ready to use.

Before use and as a minimum, the safety and machine operation sections covered on pages 4 to 18 must be read and understood. Failure to do so could result in serious injury or loss of life to the operator and others nearby. Also, damage to property and this machine may occur. Please observe and obey all warning signs (decals) located on the machine. Their meaning is covered in this manual under decals.

All personnel working with this machine must be adequately trained in its use and most importantly, follow the advice on safe working practices.

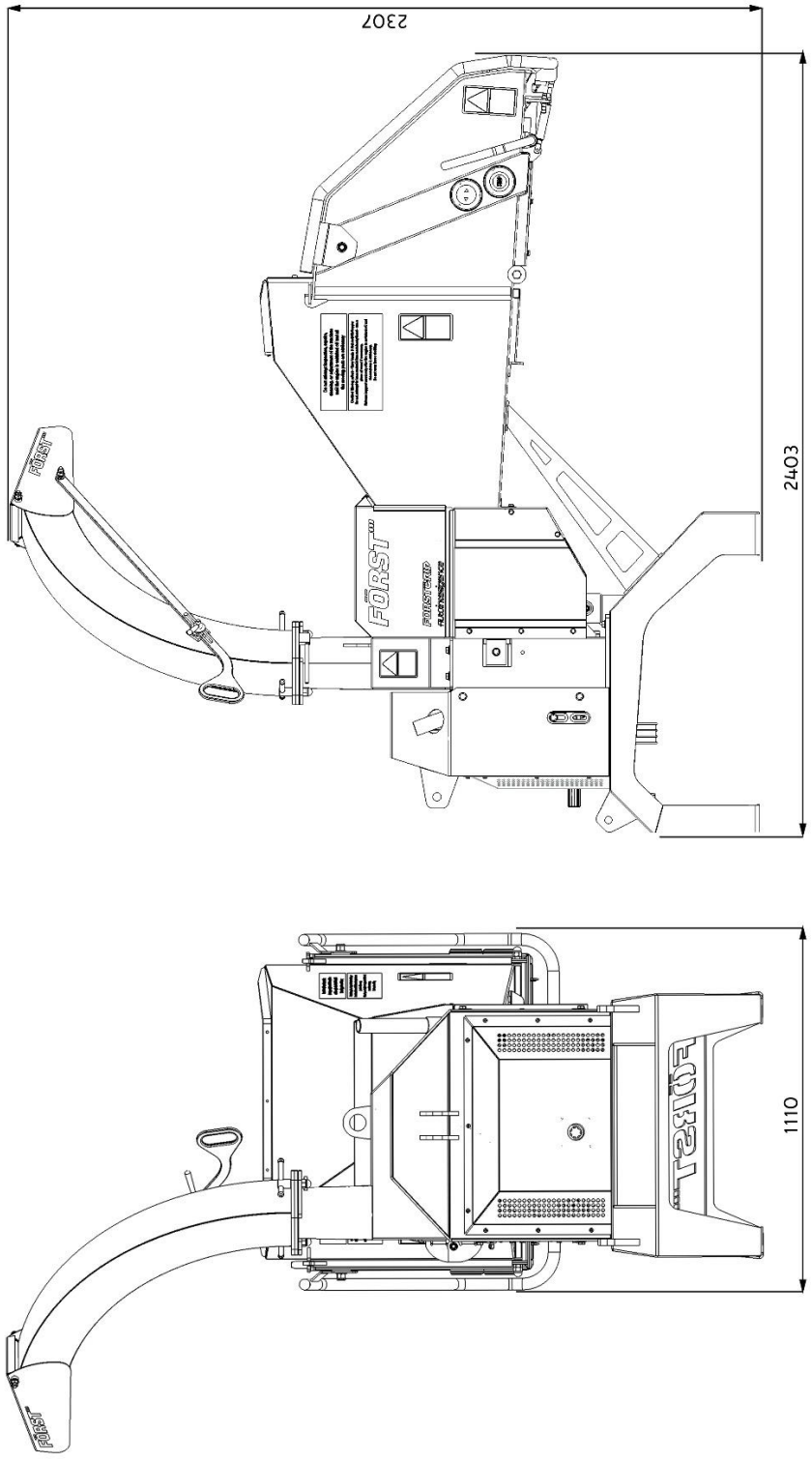
Redwood Global Ltd endeavour to continuously develop and improve its products. They reserve the right to make changes at any time, without notice or incurring any obligation.

Continuous improvement will affect machine design and production so there may be minor discrepancies between the actual product and this manual.

This manual must remain with the machine for reference by operators and includes hiring or if the machine is resold.

Purpose of machine

The Forst PT6 is designed to reduce wood material up to 150mm diameter to woodchip. This machine is capable of processing up to 5 tonnes of wood per hour.



Power source	Tractor PTO	Roller feed	Twin series hydraulic motors
PTO speed	540rpm	Maximum material diameter	150mm
Required engine hp	25-50hp	Hydraulic oil capacity	20 litres
Overall weight	630kg	Material processing capacity	5 Tonnes/Hr
3 Point Mounting	CAT. 1 / 2		

Exterior component identification

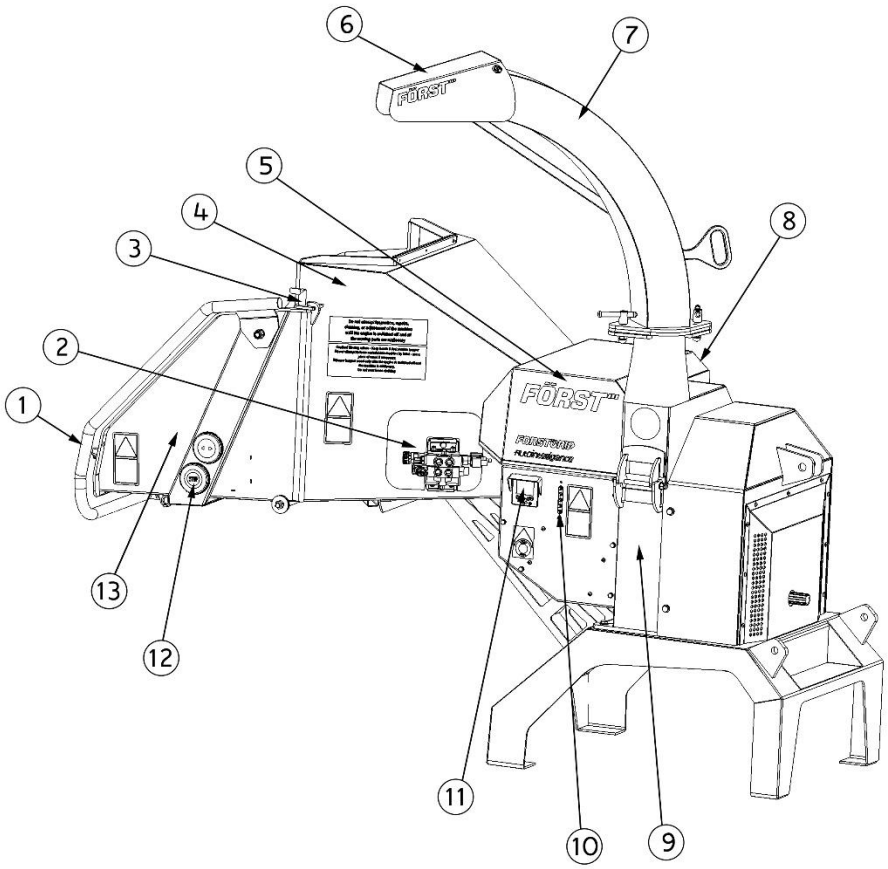


Figure 1

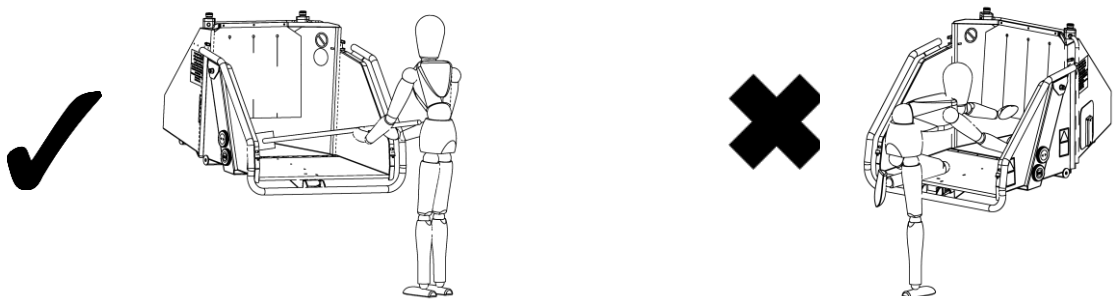
ITEM NO.	PART DESCRIPTION
1	Trip Bar
2	Control Valve Feed Speed Adjustment
3	Hopper Tray latch
4	Hopper
5	Chipping Chamber Cover
6	Chute Hood
7	Chute Chamber Cover
8	Machine Lifting Eye
9	Chipping Chamber
10	Grease Point
11	Control Panel
12	Feed Start/Stop Touch Sensors
13	Hopper Tray

Safety

Safe working

Before using this machine, make sure that you are trained and fluent in its operation. Know the location of and how to use all the safety features. Know how to control the feed and stop the machine in an emergency. Be familiar with the hazards and safe working practices to prevent injury and damage to property and machine. Also be aware of the legal restrictions for personnel and towing with vehicles.

1. The minimum age for service personnel is 18 years. Personnel aged 16 can use the machine for training under supervision by a suitably trained person of 18 years or over.
2. Operators and personnel working with this machine must not be under the influence of alcohol, drugs or medication that would impair judgement, concentration or reaction times. Excessive tiredness is also a risk.
3. In use, woodchip and debris are ejected with considerable force from the chute and can travel up to 10m. Make sure the chute directs woodchip to a safe location so that no one can be harmed or property damaged. Do not allow discharge to be directed onto roads or public rights of way.
4. Maintain a 10m exclusion zone around the machine and clearly mark if in a public area. Keep this area free of material build up.
5. Make sure the machine is on even, level and stable ground and cannot move or topple when in use. Use wheel chocks if necessary.
6. Keep children and animals well away from the working area.
7. The machine operator must wear protective equipment:
    a. Chainsaw safety helmet (EN 397) with mesh visor (EN 1731)
    b. Correctly rated ear defenders (EN 352)
    c. Work gloves with elasticated wrist bands.
    d. Steel toe cap boots (EN345-1)
    e. Close fitting heavy duty non-snag clothing. Hi-viz clothing (EN 471) if needed.
    f. Protect breathing with a face mask if appropriate. Some plant material can give off harmful dust and poisonous vapours. This may cause respiratory problems or serious poisoning. Check the material to be processed before starting.
    g. **DO NOT** wear rings, bracelets, watches, jewellery or anything that could be caught on the material being fed and draw you into the machine.



8. All personnel operating or feeding material into the machine must wear heavy duty non-snag clothing to help prevent being caught on material and drawn into the machine. The feed mechanism of this machine uses high powered hydraulic motors to drive sharp toothed rollers that feed material into the cutting blades. **DO NOT** take risks with it. **NEVER ASSIST ANY MATERIAL INTO THE FEED ROLLERS WITH HANDS OR FEET**. Use a push stick or further long material if necessary.
9. Never climb onto the hopper area while the machine is in operation.
10. **CAUTION!** – Keep hand and feet outside hopper. Do not attempt to force material into the machine by hand – use a piece of wood if necessary.
11. Material can be forcibly ejected from the hopper towards the operator. Ensure full head and face protection is worn.
12. Very twisted material should be trimmed into manageable pieces. Failure to do this can result in material extending outside the hopper, moving aggressively side-to-side creating a hazard to the operator.
13. Do not try to force material over 150mm in diameter into the machine.
14. Carefully site the machine so operators can work furthest from any local danger. For example, on a road side, place machine so operators work on the verge and not in the road exposed to traffic.

Machine lifting

The lifting eye is designed for securely holding the machine's weight only. Do not use hoist hook directly on the lifting eye. Use a correctly rated safety shackle. Inspect lifting eye before each use and do not use if damaged.

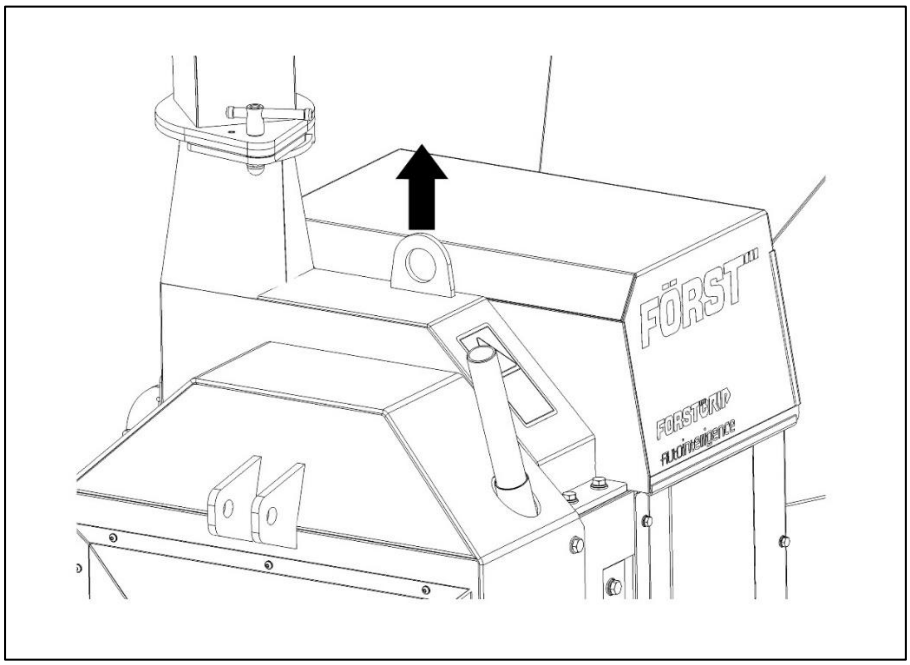


Figure 2

DOs and DON'Ts

DO stop the machine before making any adjustments, refuelling or cleaning.

DO make sure the machine has stopped rotating and remove the ignition key before any maintenance or the machine is left unattended.

DO ensure that the machine is level, well supported and cannot move during use.

DO run the machine at full throttle.

DO conduct regular machine checks for visual fluid leaks.

DO take regular breaks. Wearing protective equipment can be hot and tiring leading to a lack of concentration, increasing the risk of having an accident.

DO keep hands, feet and clothing out of feed area, chute and moving parts.

DO NOT use machine in poor visibility or insufficient light to see clearly.

DO NOT use or attempt to start the machine without the discharge chute or guards correctly and securely fitted.

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

DO NOT allow the following to enter the machine as damage is likely:

BRICKS	METAL
STRING	GLASS
CLOTH	RUBBER
PLASTIC	ROOTS
STONES	BEDDING PLANTS

DO NOT stand in front of the chute.

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

DO NOT climb on the machine at any time except for a tracked machine ride-on plate where fitted.

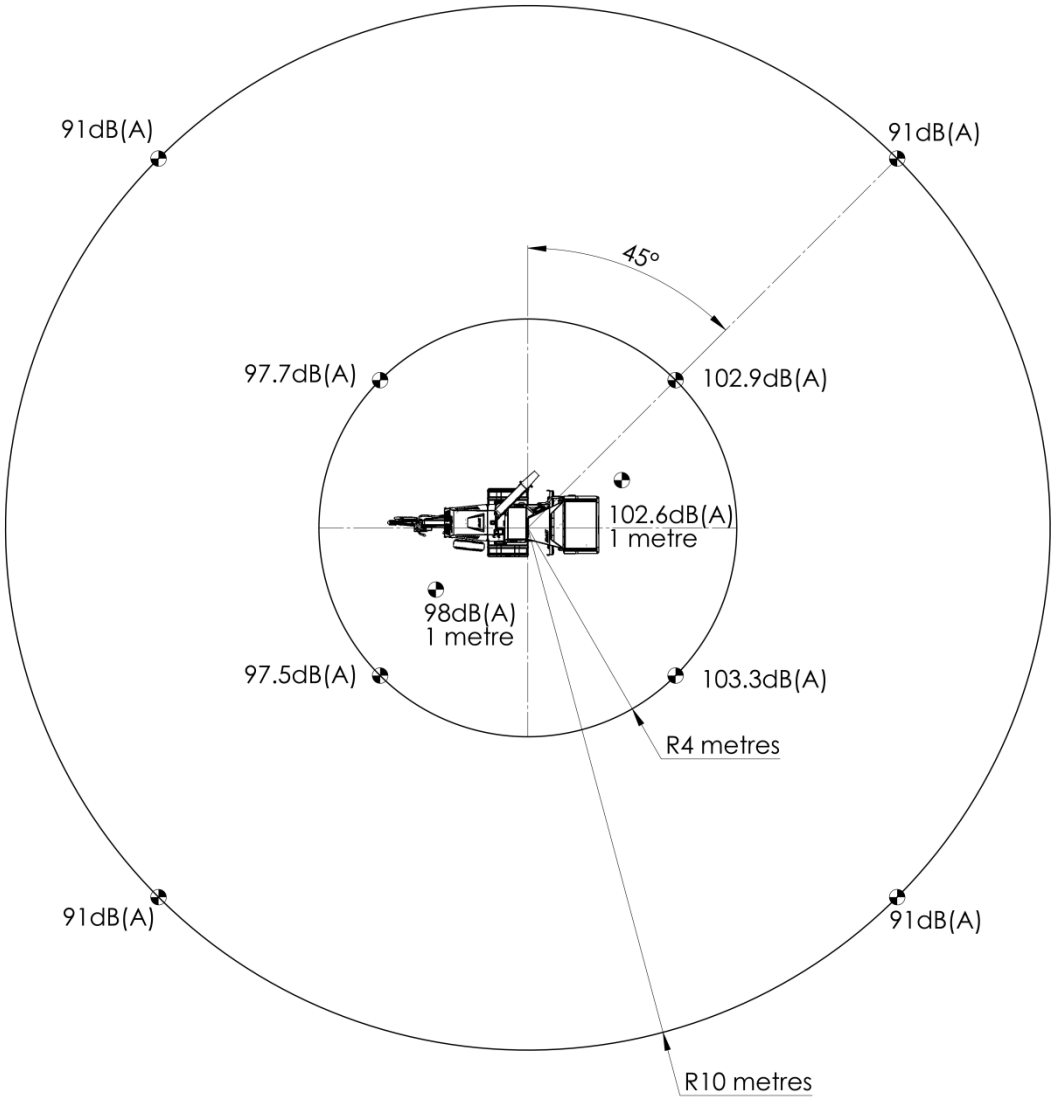
DO NOT handle material partially engaged in the machine while in operation.

DO NOT touch any exposed wiring while the machine is running.

Noise test information

Machine	Forst PT6
Notes	Tested chipping 50 x 50mm sawn pine 4.2m in length.

Noise levels above 85dB (A) will be experienced at the working position and within a 4 metre radius. Operators and personnel within a 4 metre radius must wear appropriate ear protection at all times while machine is in operation to prevent the risk of hearing damage.

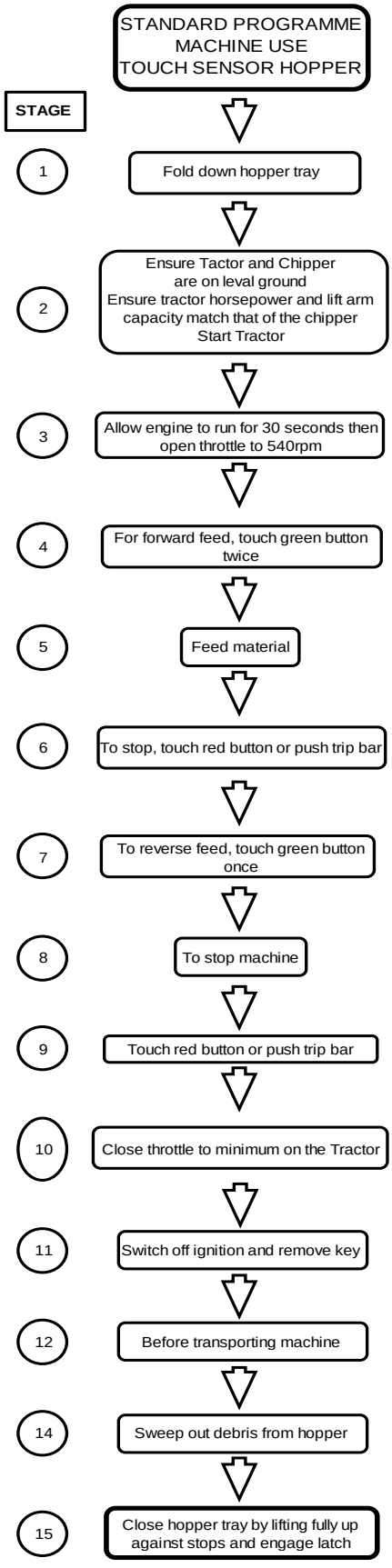


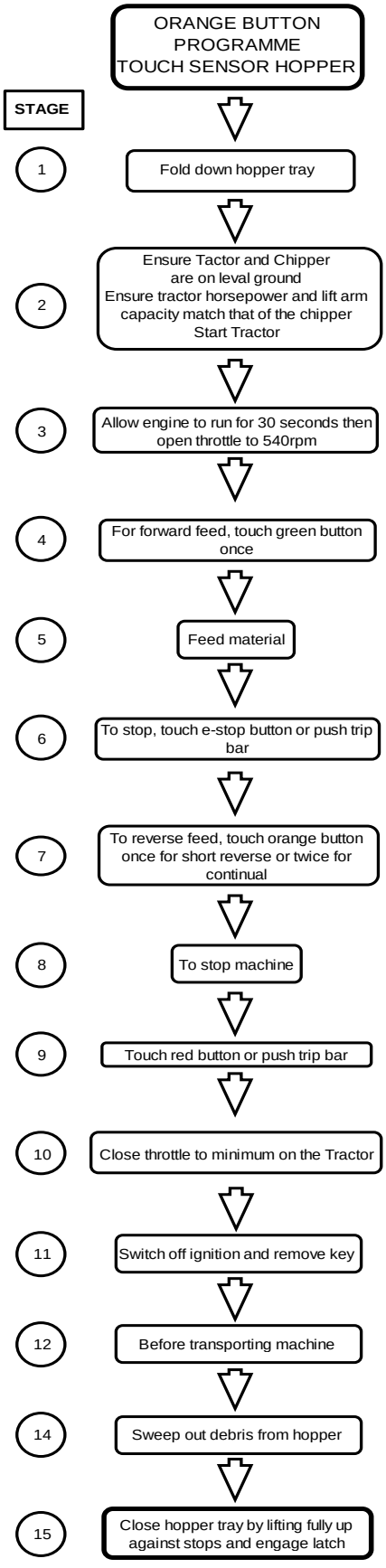
A-weighted emission sound pressure (beside operator's ear) LpA = 111.7dB(A). Peak C-weighted instantaneous sound pressure (beside operator's ear) LCpeak = 136.7dB(C). Results at 10 metre radius are calculated.

Guaranteed sound power: 122dB(A)

As required by Machinery Directive 2006/42/EC "Noise Emission in the environment by equipment for use outdoors."

Machine operation



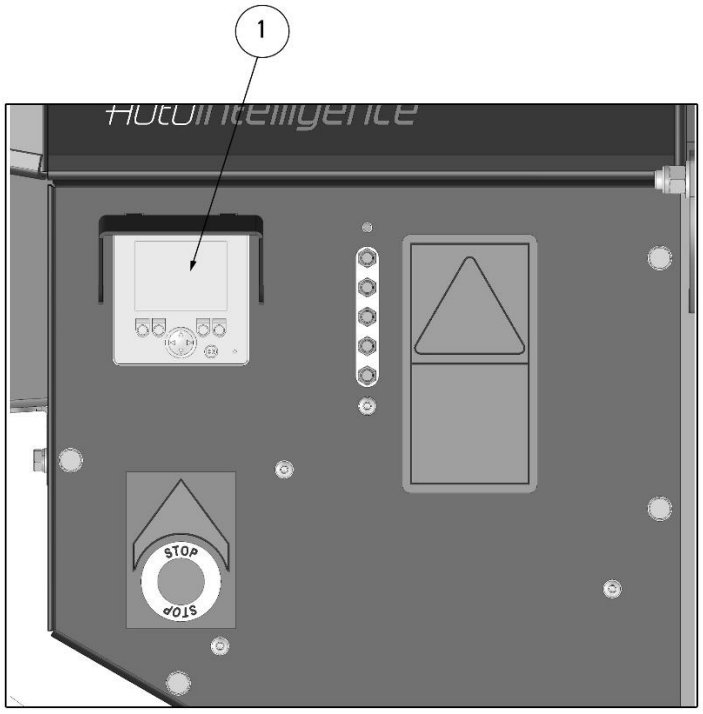


Machine control panel, start/stop & operating settings

This machine is fitted with an engine PLC (Programmable Logic Controller) system that manages the engine, feed and all safety features. The control panel is located on the right side panel (see Figure 1). Feed and engine speed are controlled with a “No Stress” function ensuring that cutting conditions are kept within optimum limits. This maximises throughput while minimising jams and blockages. There will be times when material is being cut and the feed will momentarily stop until engine speed increases. At this point, the feed will start without warning. Service warnings shown below will be displayed at certain intervals. The engine will not start until OK is pressed.

First 20 Hour Warning: "Change Hydraulic Oil Filter"
Every 20 Hour Warning: "Blade and Machine check required see manual"
50 Hour Service Warning: "1st Full Service recommended"
Every 200 Hour Service Warning: "Full Service recommended"

Using the control panel:

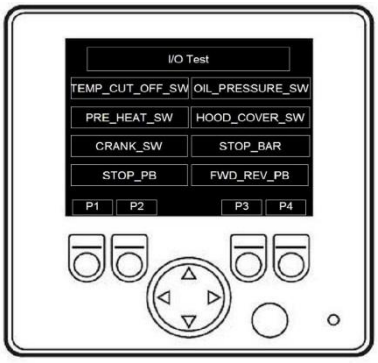


ITEM NO.	PART NO.
1	Display Panel

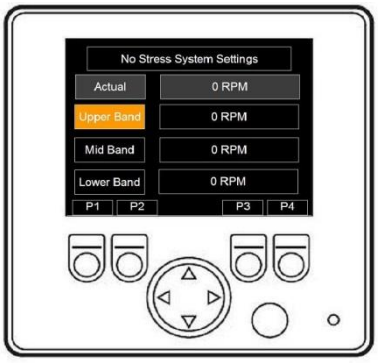
Figure 3

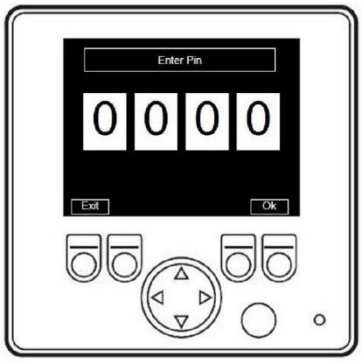
When cable connected to Tractor Display will automatically go to P1

P1 shows Working Hours and charging indicator text at the screen bottom centre.



P2 shows I/O tests. Tests all functions and safety controls.





Pin screen

P3 shows No-Stress Settings

Actual RPM

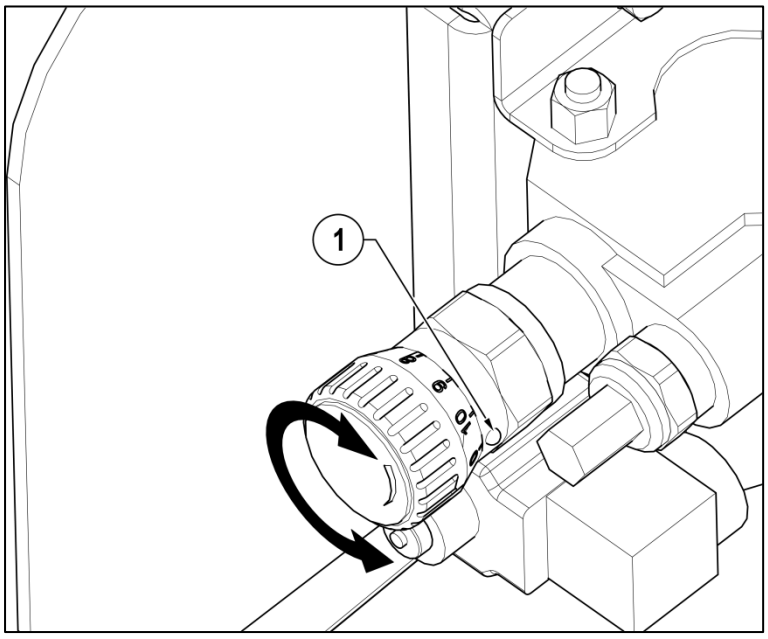
Upper Band - 1400 RPM

Mid Band – 1125 RPM

Lower Band – 925 RPM

Pin screen automatically displays if any setting changes are attempted.

Feed speed adjustment



1	CONTROL VALVE FEED SPEED ADJUSTMENT. POSITION INDICATED BY PIP. 0 = MINIMUM 10 = MAXIMUM

Figure 4

The feed speed can be adjusted to suit the material being chipped see Figure . Turn dial to align number with pip. Set feed speed so that the No-Stress operates as little as possible, this will give the highest throughput. When feeding Leylandii or leafy material, set feed roller speed to 4.5.

Feed jam & blockages

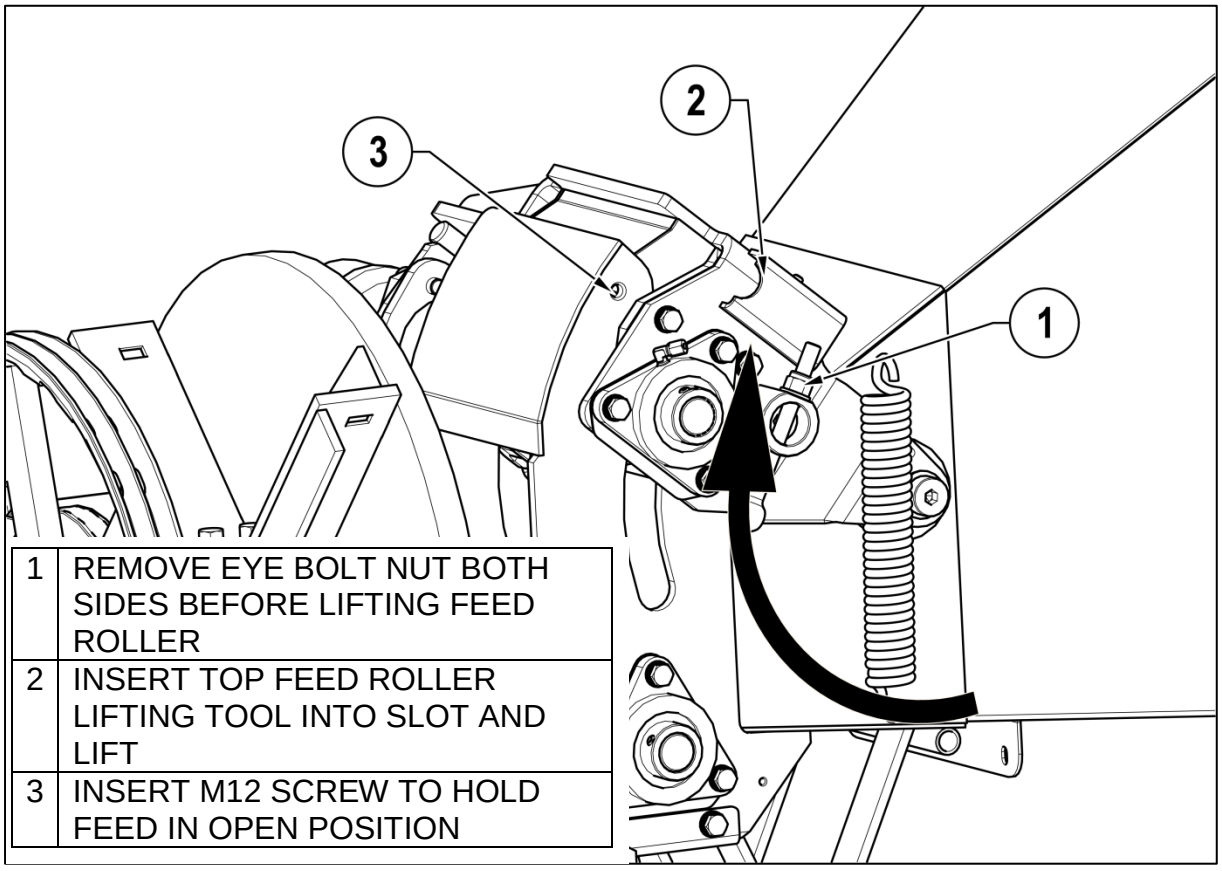
Be aware that whatever is fed into the machine has to come out of the chute. Always monitor the state of chip flow out of the chute. If this stops, **STOP FEEDING MATERIAL IMMEDIATELY**. Continuing to feed material will further compact a blockage and make it more difficult to clear.

If the chipping chamber or chute become blocked:

1. Stop the engine and remove ignition key.
2. Remove chute and check that it is clear.
3. If the chipping chamber is blocked, open the engine cover, then chipping chamber cover. **DO NOT REACH INTO THE CHIPPING CHAMBER WITH HANDS.** Beware that the flywheel within the chipping chamber has two sharp blades mounted on it and can move causing a serious injury risk. Wearing protective gloves and using a piece of wood, carefully clean out the chipping chamber.

If feed becomes jammed:

1. Stop the engine and remove ignition key.
2. Open engine and chipping chamber covers.
3. Release feed roller spring tension on both sides by slackening off the eye bolt nuts and remove if necessary.
4. Insert feed lift tool and lift top feed roller to fully open.
5. Insert M12 screw into side of feed chamber and screw completely in. Lower top feed roller onto the screw to secure in the open position.
6. There should now be access to the feed chamber. Beware that this is the machines cutting zone. The top and bottom feed rollers have sharp teeth and the flywheel cutting blades are not far from them. **DO NOT PUT HANDS INTO THIS AREA.** Wearing protective gloves and using a piece of wood, carefully clear jammed material inside feed chamber.
7. When clear, lift top feed roller via lifting tool, remove top feed M12 securing screw, lower top feed roller and remove lifting tool.
8. Re-assemble feed tensioner springs and replace covers.

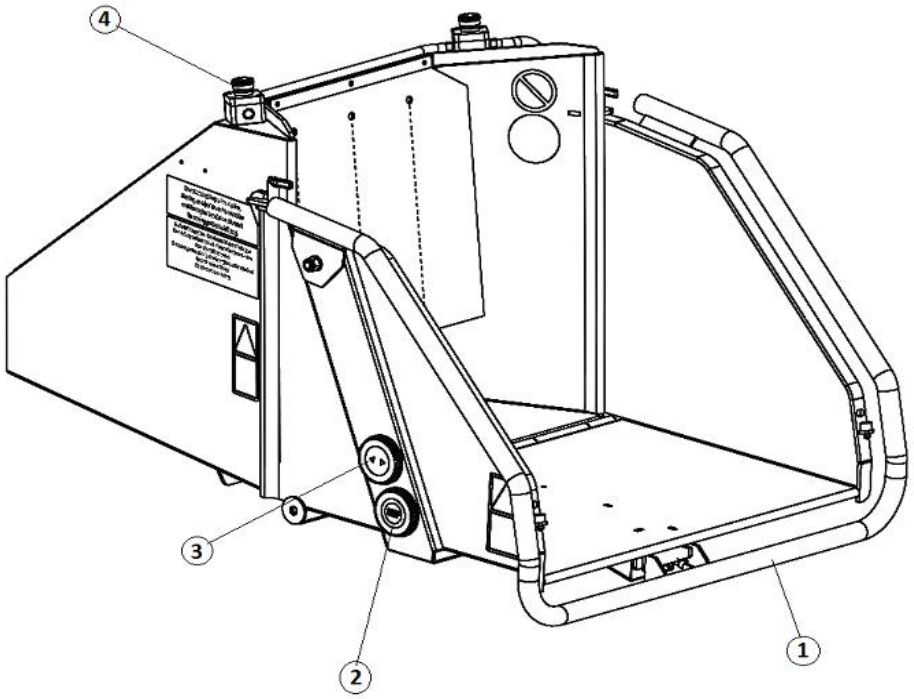


1	REMOVE EYE BOLT NUT BOTH SIDES BEFORE LIFTING FEED ROLLER
2	INSERT TOP FEED ROLLER LIFTING TOOL INTO SLOT AND LIFT
3	INSERT M12 SCREW TO HOLD FEED IN OPEN POSITION

Figure 5

Emergency Stopping – Standard Programme

Push the RED SAFETY BAR. This will stop the feed rollers instantly. The chipper flywheel will still be turning. Turn the throttle lever to idle and switch off the engine with the ignition key.



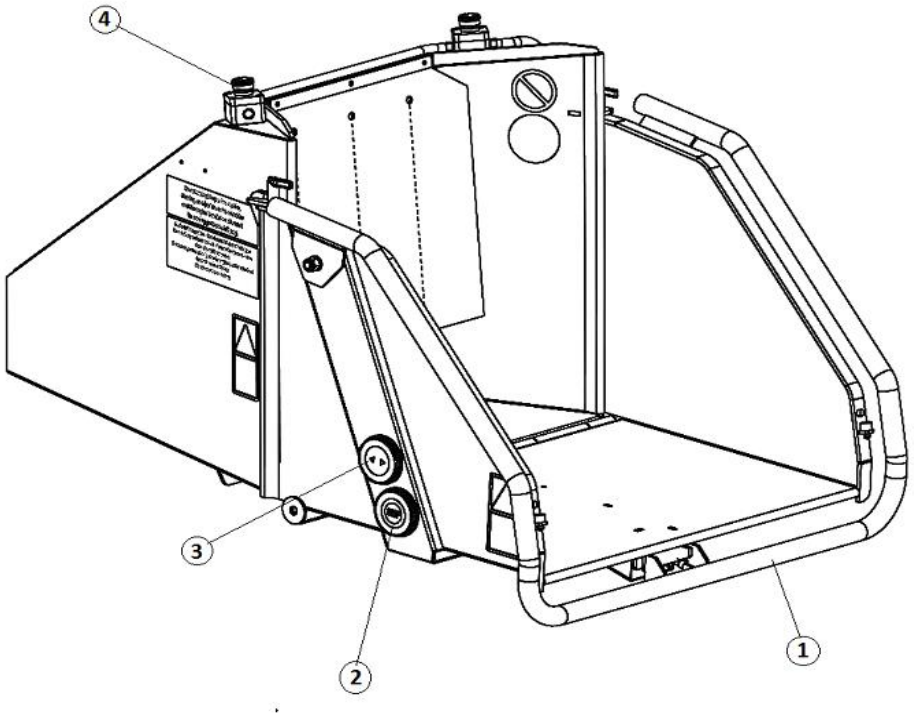
1	Red Stop Bar
2	Red Stop Button
3	Green Forward and Reverse Button
4	E-Stop (if fitted)

Before using the chipper every day

- Start the machine by turning on the PTO on the tractor.
- With the engine running at full speed tap the green button (3) once and the rollers will go into reverse,
- Tap the green button again and rollers will go into forward (chipping mode).
- To stop the feed rollers either tap the red stop button (2) or push the red stop bar (1) and the rollers will stop instantly.
- If any of these functions fail, turn off the PTO and remove the chipper from the tractor and contact Redwood Global and ask for service.

Emergency Stopping – Orange Button Programme

Push the RED SAFETY BAR. This will stop the feed rollers instantly. The chipper flywheel will still be turning. Turn the throttle lever to idle and switch off the engine with the ignition key.



1	Red Stop Bar
2	Orange Reverse Button
3	Green Forward Button
4	E-Stop

Before using the chipper every day

- Start the machine by turning on the PTO on the tractor.
- With the engine running at full speed tap the green button (3) and the rollers will go into forward (chipping mode).
- Tap the orange button and the rollers will go into a short reverse, tap it again and the rollers will continue in reverse.
- To stop the feed rollers push the red stop bar (1) and the rollers will stop instantly and or push the e-stop button and whole machine will shut down.
- If any of these functions fail, turn off the PTO and remove the chipper from the tractor and contact Redwood Global and ask for service

Attaching to the Tractor

- **Ensure** tractor horsepower and lift arm capacity are matched to the chipper and has a PTO speed of 540rpm
- **Ensure** both tractor and chipper are on level ground
- **Attach** chipper to 3 point linkage, making sure lower arms are the same length
- **Attach** and adjust top arm on the tractor making sure the chipper is level
- **Ensure** tractor is turned off, ignition key removed and handbrake applied
- **Connect** PTO shaft to Tractor and chipper
- **Connect** power cable from the chipper to the tractor socket
- **Ensure** all PTO guards on tractor, chipper and PTO shaft are all in place with guard chains attached to prevent rotation.
- **Engage** the PTO shaft on the Tractor and slowly increase the speed to 540 RPM.

Connecting the PTO Shaft

- **Check** the angle of the PTO shaft, never goes beyond 16° when PTO shaft is rotating and when lifted never goes beyond 40°
- **Ensure** that the two halves of the PTO shaft have at least 150mm overlap and when lifted, be of a suitable length so as not to butt up against each other
- **Caution** The PTO shaft is protected with a shear bolt, this end of the shaft must be attached to the tractor PTO.

Transportation

- **Do Not** move the chipper with the PTO engaged
- **Clear** machine of loose woodchip material before departing.
- **Ensure** the chute is securely fixed at the inboard position before departing.
- **Ensure** that the hopper tray is closed in the up position and the locking latch is fully engaged before departing.

Stopping the Chipper

- **Push** rear stop bar or touch red stop button
- **Set** tractor throttle to idle
- **Turn** off Tractor engine and remove ignition key
- When engine stationary disengage PTO shaft
- Warning Never disengage PTO shaft when tractor running as chipper flywheel will continue to run after engine has stopped

Disconnecting from the Tractor

- **Ensure** both tractor and chipper are on level ground
- **Ensure** The tractor PTO is disengaged and handbrake applied
- **Lower** the chipper to the ground, making sure the chipper is stable on the ground
- **Turn** off Tractor engine and remove ignition key
- **Disconnect** the PTO shaft and unplug the power cable from the tractor
- **Uncouple** the chipper from the 3 point linkage on the tractor

Routine maintenance

The following must be checked at least on a daily basis during use (also see Service schedule):

- Check hydraulic oil level. When the machine is new, the oil level may drop during initial use. Regularly check and top-up until level settles. If a top up is required, thoroughly clean around filler cap before removing to help prevent debris falling into oil tank, top up as required and replace filler cap.
- Grease machine. Every 8 hours, one pump of grease to each of the four nipples at the central grease point manifold located near the control panel. See Figure 1.
- Check all fasteners are present and assembled to the correct torque.
- Check proximity sensors on engine cover, removable hopper and trip bar are not damaged and working correctly. The trip bar sensor is the most vulnerable and if severely damaged could result in the trip bar not working.
- Check drive belt tension and adjust as necessary.
- Check pulleys and taper lock on flywheel shaft.
- Check flywheel blades for damage and sharpness. Machine performance is adversely affected if blades are blunt or damaged. Replace and sharpen blades as required. Make sure that the blade seat is clean and free of damage before reassembly. Shims are available to adjust for blade size reduction after sharpening. Please refer to blade sharpening for size limits, adjustment shims and setting. Ensure blade fasteners are correctly installed and tightened to the appropriate torque. Check after 1 hours' work then weekly.
- Anvil and side anvil are replaceable and double sided. Make sure that the anvil seat is clean and free of damage before reassembly.
- Exercise extreme care to avoid injury when removing and replacing blades and anvils. The flywheel can turn creating crush and cutting points in and around the chipping chamber.

- Check all hydraulic hoses and fittings after 5 hours' work. Beware of hydraulic oil leaks, they can cause serious injury while the engine is running and the system is under pressure. A leak can easily inject high pressure oil deep into flesh and blood stream requiring immediate medical attention. **DO NOT CHECK FOR LEAKS WHILE THE PTO IS ENGAGED.** Hoses to the feed roller hydraulic motors are the most likely to become damaged as they are constantly moving during use. If hoses are replaced, all seals must be replaced at the same time.
- Check top and bottom feed motor bracket bolts weekly.

Fastener tightening torques

Tightening torques for class 8.8 and 10.9 fasteners				
	Class 8.8		Class 10.9	
	Nominal torque Nm	Max/Min torque	Nominal torque Nm	Max/Min torque
Size				
M6	10	9.5/10.4	14.5	14/15.3
M8	25	23.1/25.3	35	34/37.2
M10	49	46/51	72	68/75
M12	86	80/87	125	117/128
M12x1.5 wheel screws	95	90/100		
M16	210	194/214	310	285/314
M20	410	392/431	610	558/615
M24	710	675/743	1050	961/1059

All machine fastener torques should be regularly checked to the above table. In particular, those for the flywheel blades, flywheel bearings, axle assembly, hitch, road wheels and engine mounts.

Routine Cleaning

Pressure wash machine on a weekly basis or every 50 hours, making sure there is no build-up of wood chips and debris behind side panels, taking care not to blast the electrical control box.

Service schedule

Service Schedule										
Wood chipper	After first 5 Hrs	Every 8 Hrs (Daily)	After first 10 Hrs	After first 20 Hrs	Every 20 Hrs	After first 50 Hrs	Every 50 Hrs (weekly)	Every 100 Hrs (2 weeks)	Every 200 Hrs (monthly)	Every 250 Hrs (monthly)
Check the 3 point linkage points		●								
Tighten hydraulic fittings	●									
Check fasteners		●								
Visual check for fluid leaks		●								
Check drive belts		●								
Grease via central point on control panel		●								
Grease PTO shaft couplings		●								
Change hydraulic filter cartridge				●						
Check flywheel shaft bearings					●					
Check cutting blade & anvil condition, change if required					●					
Check feed roller tension springs & replace if required							●			

Service schedule

Service Schedule										
Wood chipper	Every 400 Hrs	Every 500 Hrs	Every 800 Hrs	Every 1000 Hrs	Every 1500 Hrs	Every 2000 Hrs	Every 3000 Hrs	Every 12 months	Every 2 years	Every 5 years
Change feed roller bearings on motor side	●									
Change hydraulic filter cartridge		●								
Change hydraulic oil				●						
Get the machine overhauled by a service specialist								●		
Check wiring for damage & loose connections								●		
Change hydraulic hoses										●

Blade Changing

WARNING – Rigger Gloves must be worn whilst changing the blades

WARNING – It is essential that only genuine parts are used guaranteeing the correct grade of Blade, bolt, washer and nut

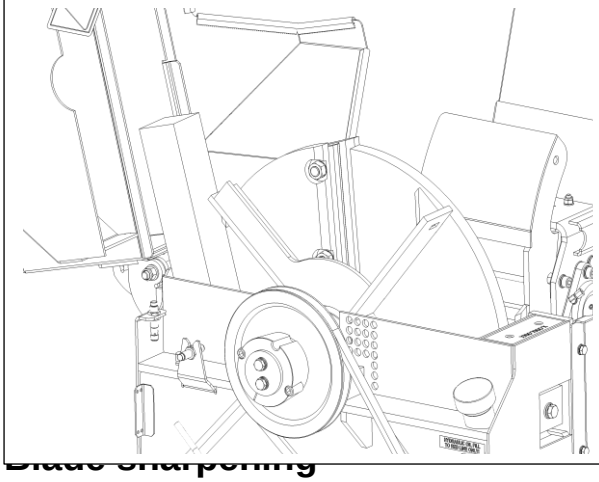
1. Turn off chipper and remove the ignition keys
2. Disconnect battery leads
3. Remove the two bolts holding the chipping chamber lid closed (pic 1)
4. Carefully open the chipping chamber lid from the chute side and let it come to rest on the hinge stops
5. Turn flywheel to blade change position (pic 2)
6. Insert locking timber (pic 2)
7. Clean all debris from around the blade bolt and nut with a metal pick
8. With a 24mm socket undo the two blade bolt nuts and remove both bolts/nuts and washers steadying the blade with the other hand making sure it doesn't fall – WARNING these blades are sharp, rigger gloves must be worn
9. Carefully remove the blade from the flywheel
10. Clean blade seat on the flywheel thoroughly before fitting new or re-sharpened blades WARNING – the blades must not have any debris underneath them when tightened, the smallest amount of debris behind the blade could result in the blade coming loose causing damage to the machine
11. Re-fit blades, with new bolts, washers and nuts in the order shown in (pic 3)

12. Shims may be required to keep the gap between the blade and the anvil on the inner edge (closest to the flywheel shaft) at 1mm – see page 28, Figure 15
13. A calibrated torque wrench must be used to tighten the blade bolts to a torque setting of 310NM
14. Remove locking timber, rotate flywheel to next blade position and repeat 6-13
15. Close chipping chamber lid and re-fit bolts tightening to 86NM
16. Re-fit battery leads

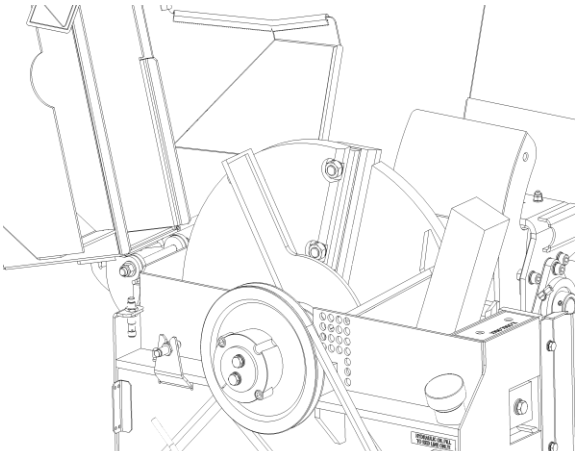
WARNING – Failure to keep blades sharp will overload the engine and bearings which could result in machine breakdown.

Blades must not be used beyond the wear mark (pic 4) failure to comply with this could result in damaging the machine, injury or loss of life

Pic 1



Pic 2



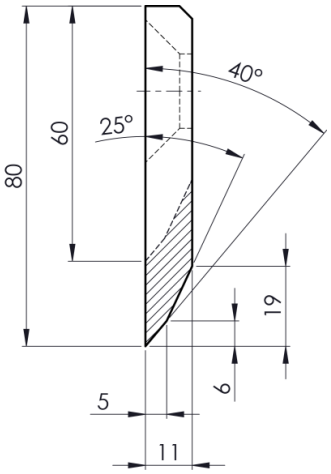
Blade sharpening

For optimum performance, blades need to be kept sharp. Minimum safe blade size after sharpening as shown. After sharpening, the blade gap must be re-set by using a blade shim as shown. Shims are available in thicknesses of 0.5, 1, 1.5, 2 & 2.5mm as part number 12-03-093. On no occasion must more than one shim be fitted under each blade at any time. A gap of 1mm must be set from the inner blade tip to anvil after sharpening by placing an appropriate shim under the blade (also see flywheel assembly). The outer blade tip is automatically set due to the anvil being set at an angle to the blade. With 1mm at the inner blade tip, the outer blade tip should be 3mm from the anvil as shown.

The complete blade fastener set must be replaced every time blades are changed.

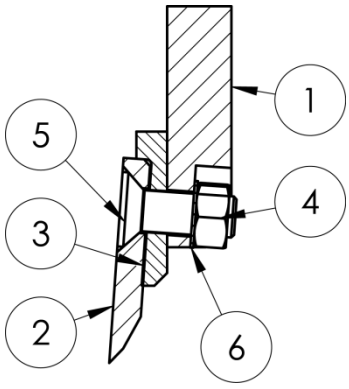
DO NOT Lubricate the Bolts when fitting.

Figure 6

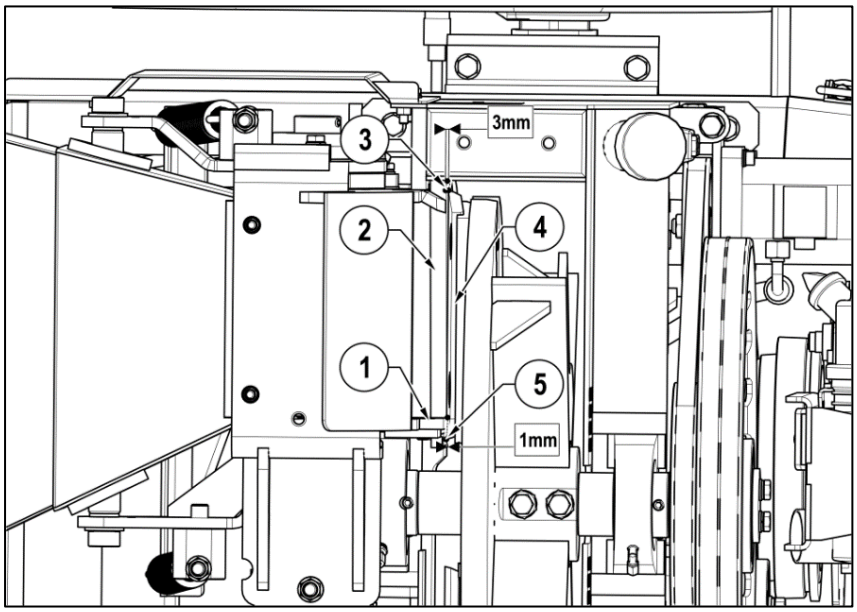


Blade sharpening limit
80mm to 60mm

Figure 7



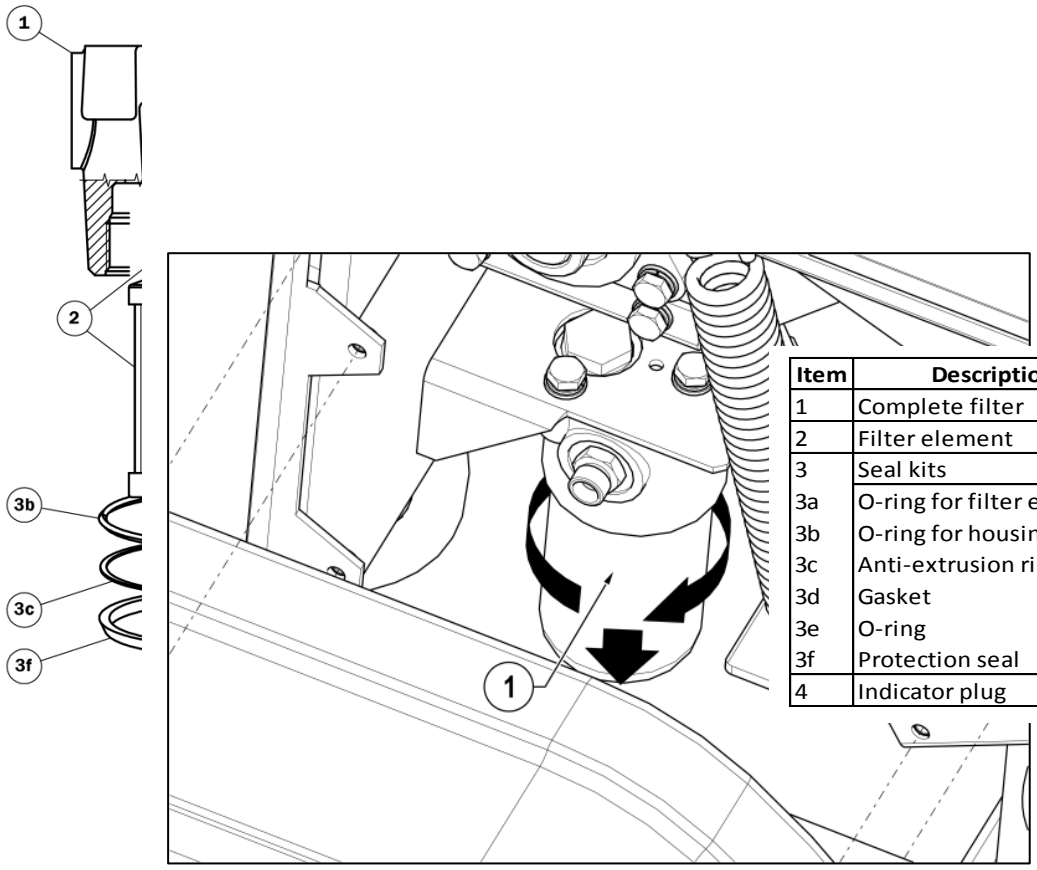
1	Flywheel
2	Flywheel blade
3	Blade shim
4	M16 10.9 hex nut
5	M16 x 45Lg 10.9 CSK hex socket screw
6	M16 serrated lock washer



1	SIDE ANVIL
2	ANVIL
3	OUTSIDE BLADE GAP
4	FLYWHEEL BLADE
5	INSIDE BLADE GAP

Figure 8

Hydraulic oil filter



Item	Description	Quantity
1	Complete filter	1
2	Filter element	1
3	Seal kits	1
3a	O-ring for filter element	1
3b	O-ring for housing	1
3c	Anti-extrusion ring	1
3d	Gasket	1
3e	O-ring	1
3f	Protection seal	1
4	Indicator plug	1

Use protective plastic gloves to keep oil off skin, dispose of oil and filter in an environmentally responsible manner.

1. The filter housing is accessed via the left side panel. Thoroughly clean around filler housing before removing to help prevent debris getting into oil.
2. Unscrew filter housing body, remove filter element and allow to drain for 15 minutes before disposal.
3. Screw on and tighten filter body with new filter into filter housing.

1	UNSCREW FILTER BODY TO REPLACE FILTER ELEMENT

Oils, Fluids and Lubricants.

Hydraulic Oil: ISO VG 46.

It is advised that the oil is checked and topped up to the RED LINE on the sight glass, when the machine is cold and on a flat surface.

Gearbox Oil: SAE90 – 0.75 Litre

Grease: Lithium EP2 General Purpose. The greasing points can be found on the control panel. Please do not over grease 2 x pumps per grease nipple per week is sufficient.

Drive belt tension

Both Hydraulic pump and flywheel V belts must be checked for tension and condition. If any belt shows signs of wear, surface damage, shredding, excessive glazing, or have been stretched to their limit, they must be replaced. Multiple belt drives must have all belts replaced at the same time. Belts that are too slack will cause poor cutting performance, excessive belt and pulley wear.

All drive belts are located under the engine cover as shown in and tension checked at arrows as shown. Check and set tension as follows:

1. Slacken clamp screw(s) or nut.
2. Hydraulic pump adjuster screw requires its lock nut to be slackened.
3. Turn adjuster nut or screw to tension belt until 4.5Kg force at the belt longest centre span deflects by 6mm. Can be approximated by firmly gripping belt between finger and thumb and twisting. The belt should not be able to be rotated more than 90°.
4. Tighten all lock nuts, nuts and clamp screws.
5. Run machine and test.
6. Check belt tension.

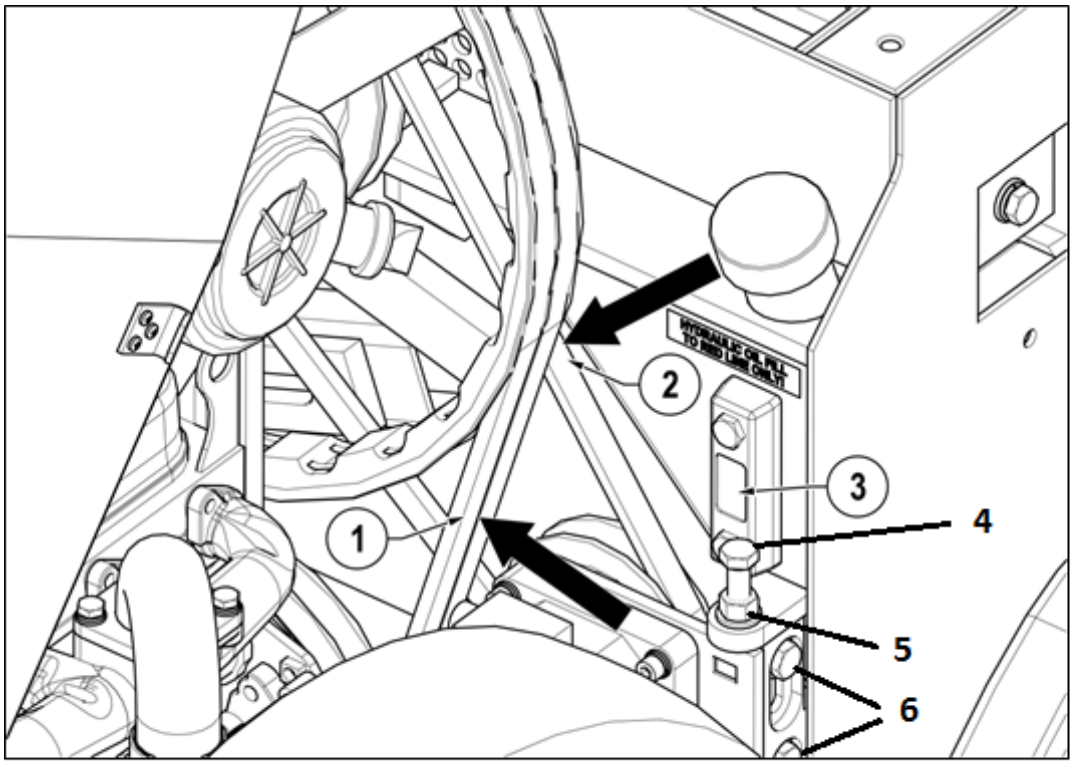
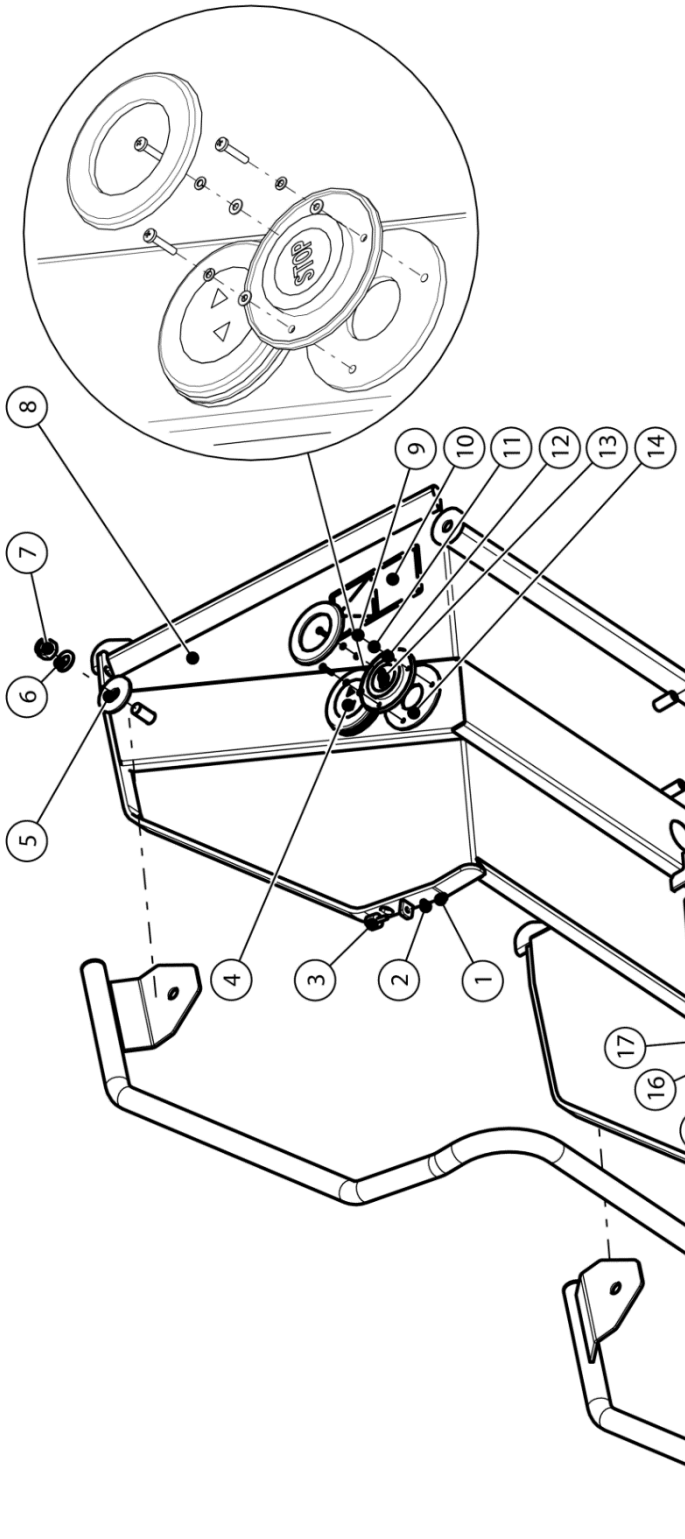


Figure 9

1	FLYWHEEL DRIVE BELTS. CHECK TENSION HERE
2	HYDRAULIC PUMP DRIVE BELT. CHECK TENSION HERE
3	HYDRAULIC OIL LEVEL IN SIGHT GLASS

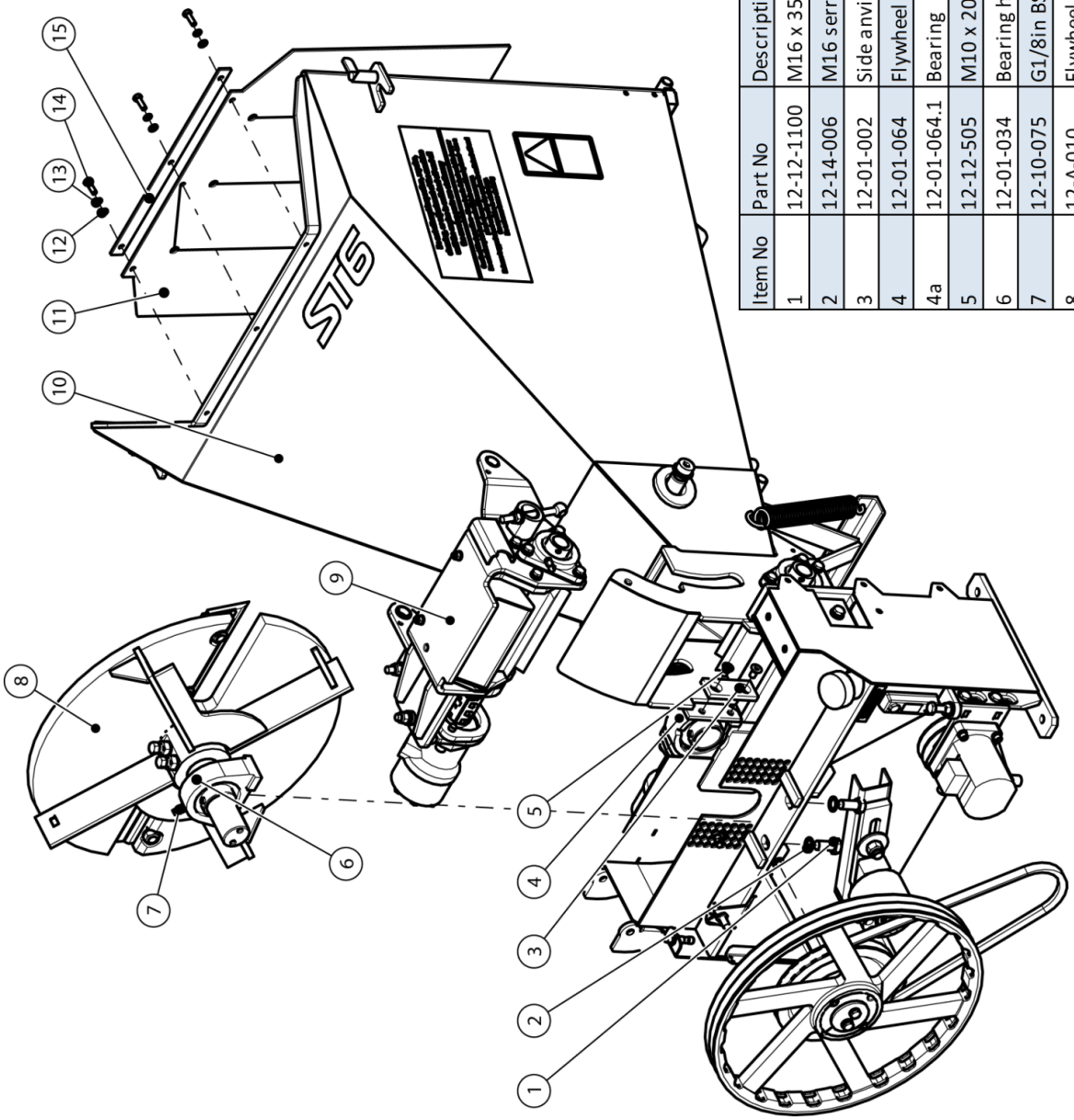
Parts lists

Hopper tray touch sensor



Item No	Part No	Description	Quantity
1	12-13-015	M6 nyloc nut ISO 7040	2
2	12-14-017	M6 washer ISO 7089	2
3	12-10-090	Buffer 15 x 20 M6	2
4	12-10-083	Forward/reverse touch sensor assy Green)	2
5	12-14-002	M16 Nylon Washer extra large OD 56 x 5 THK ISO 7094	2
6	12-14-005	M16 Washer ISO 7089	2
7	12-13-005	M16 nyloc nut ISO 7040	2
8	12-19-114	Sensor hopper tray fab assy	1
9	12-12-101	M4 x 20 Pan Head Pozi Screw	12
10	12-30-016	Rotating machine parts decal	2
11	12-14-027	M4 Serrated washer DIN 128	12
12	12-14-020	M4 washer ISO 7089	12
13	12-10-080	Stop touch sensor assy (Red)	2
14	12-05-044	Touch sensor gasket	4
15	12-12-404	M8 x 16 Lg 8.8 Hex Head screw	2
16	12-14-024	M8 Serrated washer DIN 128	3
17	12-14-013	M8 washer ISO 7089	3
18	12-03-083	Cable cover	1
19	12-03-104	Trip mech guard fab assy	1
20	12-10-084	Gas spring 22 DIA 50 stroke	1
21	12-10-071	Inductive proximity sensor kit (white tip)	1
21a	12-10-072	Inductive proximity sensor kit (orange tip)	1
23	12-19-117	Sensor trip bar fab assy	1
24	12-30-017	Push to stop decal	1
25	12-12-401	M8 x 25 Lg 8.8 Hex Head screw	1

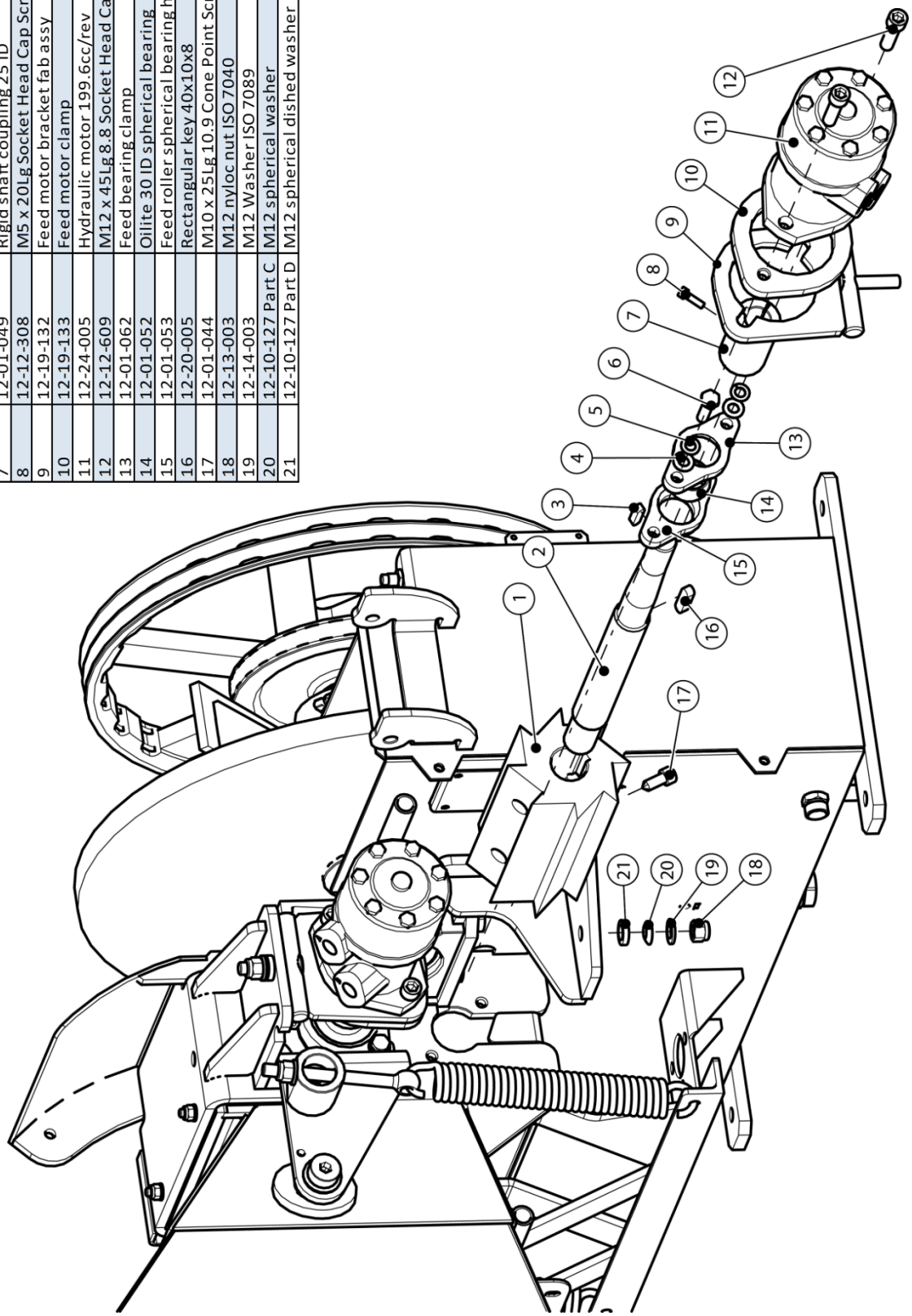
Chipping chamber assembly



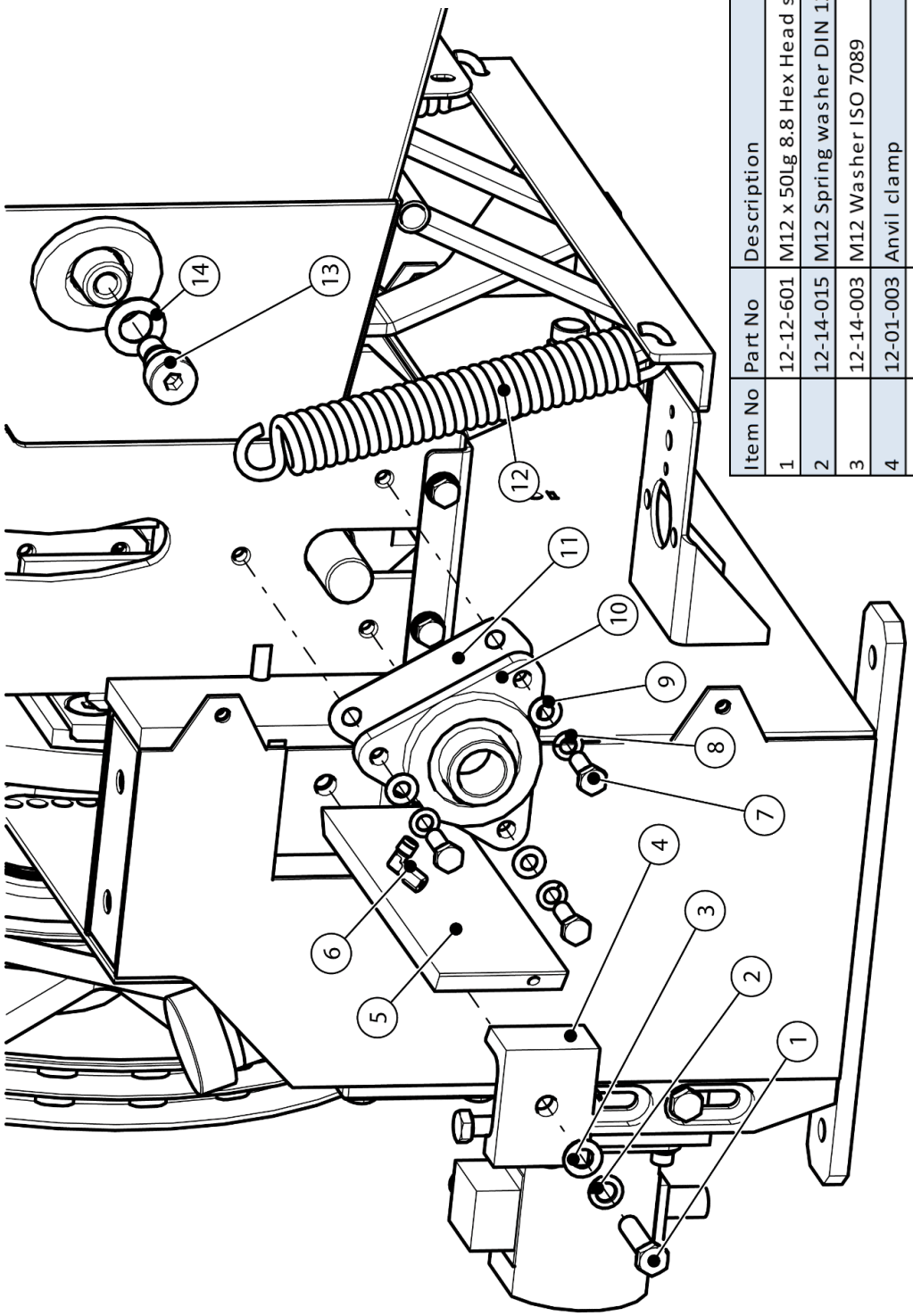
Item No	Part No	Description	Quantity
1	12-12-1100	M16 x 35Lg 10.9 Hex Head screw	4
2	12-14-006	M16 serrated lock washer DIN 6798-A17	4
3	12-01-002	Side anvil	1
4	12-01-064	Flywheel bearing housing	1
4a	12-01-064.1	Bearing	1
5	12-12-505	M10 x 20Lg 10.9 CSK hex socket screw ISO 10642	2
6	12-01-034	Bearing housing & bearing	1
7	12-10-075	G1/8in BSPP 4mm male stud coupling	1
8	12-A-010	Flywheel assy	1
9	12-19-080	Top feed roller housing	1
10	12-19-029	Chipping chamber with hopper	1
11	12-05-017	Safety curtain	1
12	12-14-013	M8 washer ISO 7089	2
13	12-14-014	M8 Spring washer DIN 128	2
14	12-12-401	M8 x 25 Lg 8.8 Hex Head screw	3
15	12-05-016	Curtain clamp	1

Chipping chamber assembly - Bottom feed.

Item No	Part No	Description	Quantity
1	12-01-014	Feed roller	1
2	12-01-016E	Bottom feed roller shaft	1
3	12-20-004	Rectangular key 30x8x7	1
4	12-14-009	M10 Washer ISO 7089	2
5	12-14-010	M10 Spring Washer DIN 128	2
6	12-12-509	M10 x 35Lg 8.8 Hex Head screw	2
7	12-01-049	Rigid shaft coupling 25 ID	1
8	12-12-308	M5 x 20Lg Socket Head Cap Screw	4
9	12-19-132	Feed motor bracket fab assy	1
10	12-19-133	Feed motor clamp	1
11	12-24-005	Hydraulic motor 199.6cc/rev	1
12	12-12-609	M12 x 45Lg 8.8 Socket Head Cap Screw	2
13	12-01-062	Feed bearing clamp	1
14	12-01-052	Oilite 30 ID spherical bearing	1
15	12-01-053	Feed roller spherical bearing housing	1
16	12-20-005	Rectangular key 40x10x8	1
17	12-01-044	M10 x 25Lg 10.9 Cone Point Screw	1
18	12-13-003	M12 nyloc nut ISO 7040	1
19	12-14-003	M12 Washer ISO 7089	1
20	12-10-127 Part C	M12 spherical washer	1
21	12-10-127 Part D	M12 spherical dished washer	1

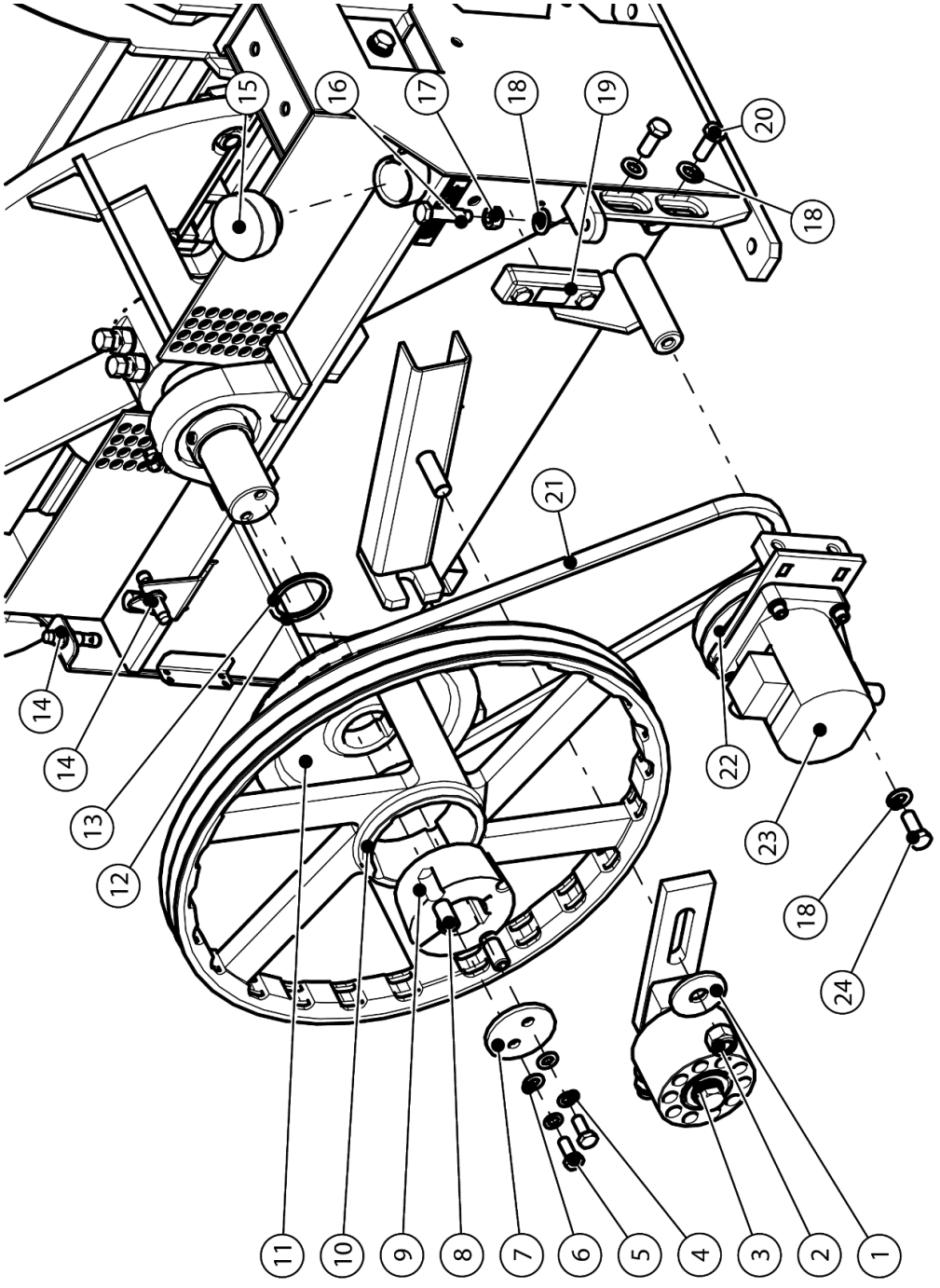


Chipping chamber assembly - Bottom feed & anvil.



Item No	Part No	Description	Quantity
1	12-12-601	M12 x 50Lg 8.8 Hex Head screw	1
2	12-14-015	M12 Spring washer DIN 128	1
3	12-14-003	M12 Washer ISO 7089	1
4	12-01-003	Anvil clamp	1
5	12-01-013	Anvil	1
6	12-10-094	R1/8in BSPT 4mm male stud elbow	1
7	12-12-502	M10 x 30Lg 8.8 Hex Head screw	3
8	12-99-008	M10 Serrated Washer DIN 128	3
9	12-14-009	M10 Washer (if required)	3
10	12-11-005	Self Aligning Flange Bearing 2Z 30 ID	1
11	12-03-042	Feed roller bearing shim	1
12	12-15-002	Tension spring 7.01 wire 23.98 ID 31 turns	2
13	12-01-008	Shoulder screw M16 x 14Lg	2
14		M20 Nylon Washer (not required)	2

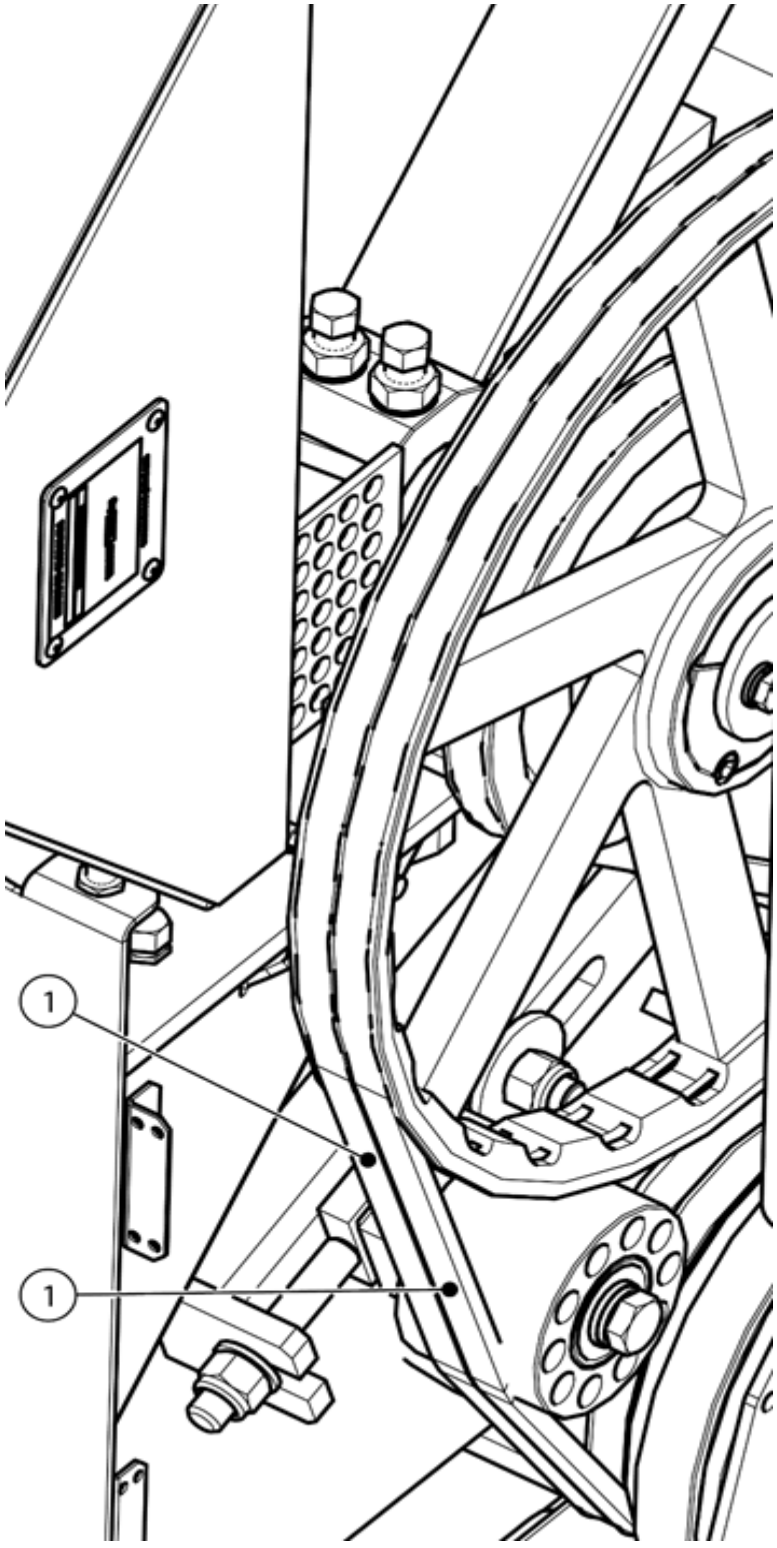
Chipping chamber assembly - Drive



Item No	Part No	Description	Quantity
1	12-14-001	M16 Washer extra large OD 56 x 5 THK ISO 7094	1
2	12-13-005	M16 nyloc nut ISO 7040	1
3	12-A-012	Flywheel belt tensioner assy (see P41)	1
4	12-14-010	M10 Spring Washer DIN 128	2
5	12-12-506	M10 x 25Lg 8.8 Hex Head screw	2
6	12-14-009	M10 Washer ISO 7089	2
7	12-19-063	Pulley retainer	1
8		Comes with taper lock	2
9	12-10-201	Taper lock bush 50 ID	1
10	12-10-200	Pulley 400 OD x 44 wide 3 groove	1
11	12-01-039	Pulley 231 OD x 25 wide 1 groove	1
12	12-10-085	Shim 50 ID x 62 OD x 0.5 THK DIN 988	1

Item No	Part No	Description	Quantity
13	12-10-086	Shim 50 ID x 62 OD x 1 THK DIN 988	1
14	12-10-071	Inductive proximity sensor kit	2
15	12-10-015	Hydraulic oil filler cap - plastic	1
16	12-01-029	M12x50Lg adjuster screw	1
17	12-13-002	M12 Hex nut ISO 4034	1
18	12-14-003	M12 Washer ISO 7089	4
19	12-24-003	Oil level glass	1
20	12-12-603	M12 x 30Lg 8.8 Hex Head screw	2
21	12-10-058	V belt 17 x 1410mm Ld	1
22	12-A-022	Hydraulic pump assy (see P43)	1
23	12-24-004	Hydraulic pump	1
24	12-12-603	M12 x 30Lg 8.8 Hex Head screw	1

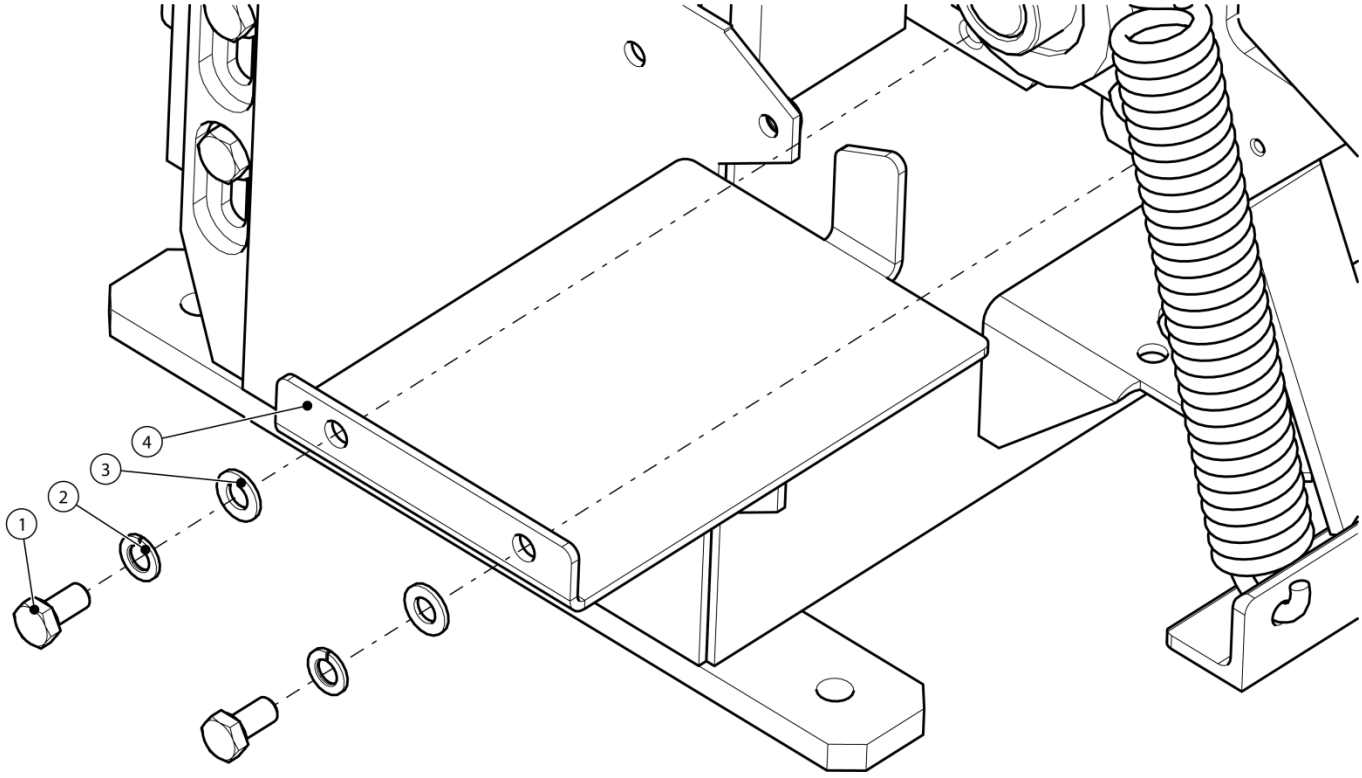
Chipping chamber assembly - Flywheel drive.



Item No	Part No	Description	Quantity
1	12-10-056	V belt 17 x 1975mm Ld	3

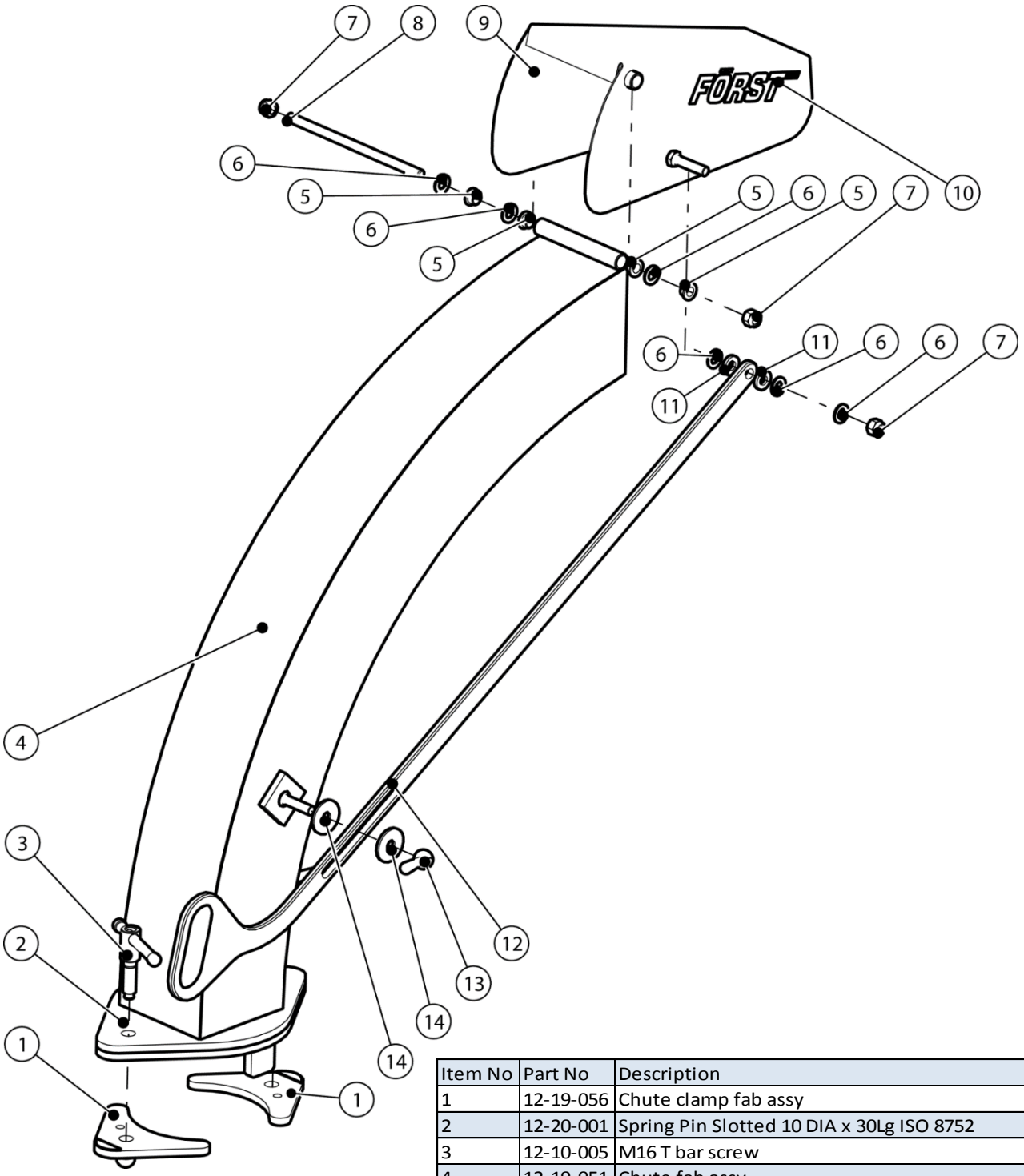
Chipping chamber assembly - Bottom feed roller cover.

TOP



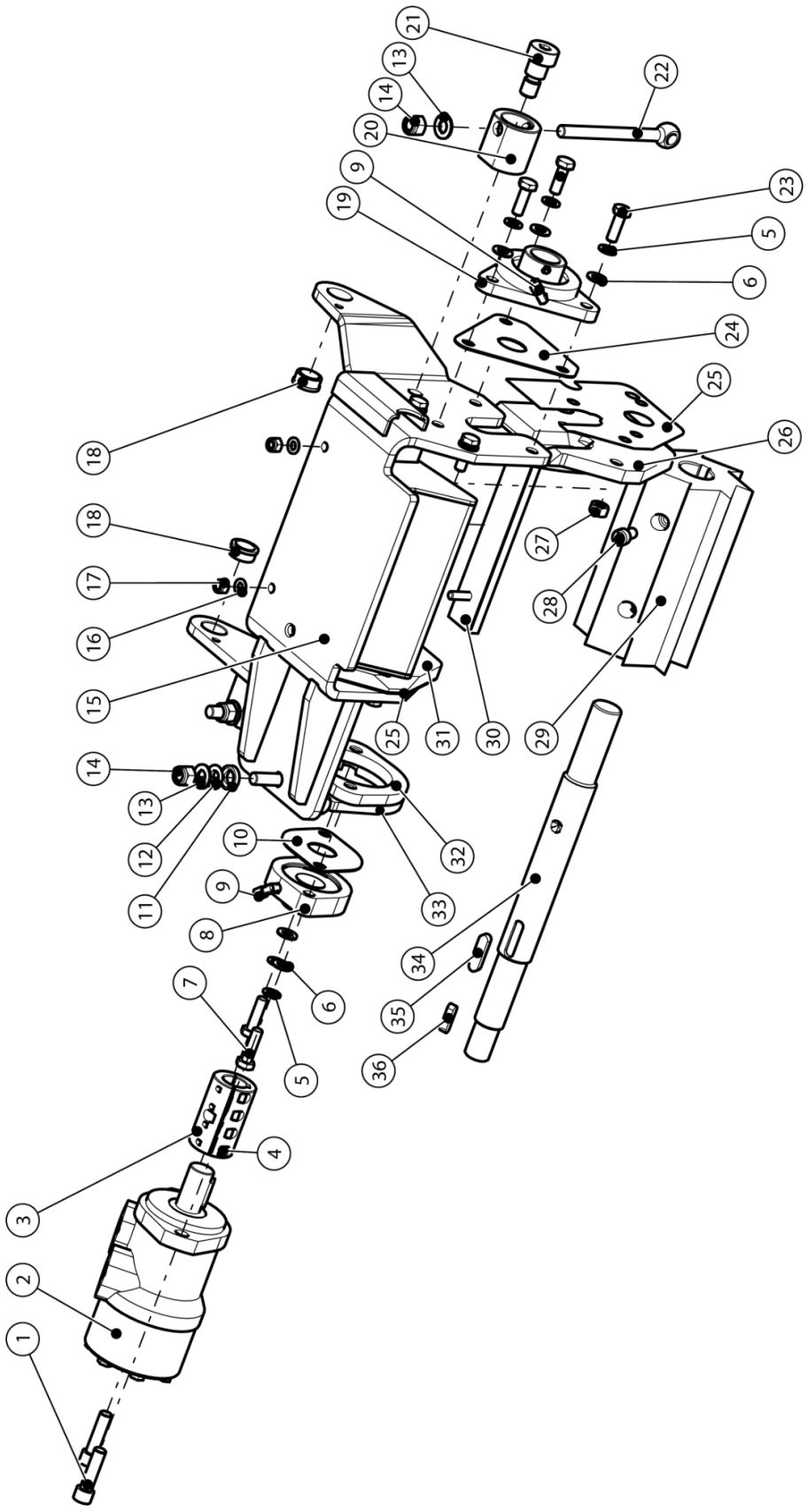
Item No	Part No	Description	Quantity
1	12-12-504	M10 x 20Lg 8.8 Hex Head screw	2
2	12-14-010	M10 Spring Washer DIN 128	2
3	12-14-009	M10 Washer ISO 7089	2
4	12-03-045	Feed roller cover	1

Chute assembly



Item No	Part No	Description	Quantity
1	12-19-056	Chute clamp fab assy	2
2	12-20-001	Spring Pin Slotted 10 DIA x 30Lg ISO 8752	2
3	12-10-005	M16 T bar screw	2
4	12-19-051	Chute fab assy	1
5	12-11-007	Plain bearing 12 ID, 16 OD, 22 flange x 10 Lg	4
6	12-14-003	M12 Washer ISO 7089	6
7	12-13-003	M12 nyloc nut ISO 7040	3
8	12-01-043	Hood hinge stud	1
9	12-19-151	Chute hood fab assy	1
10	12-30-024	Forst small orange decal	2
11	12-15-020	M12 Elastomer washer OD 25-ID 12 x 5 THK	2
12	12-19-055	Chute handle - standard	1
13	12-10-004	M12 female steel handle	1
14	12-14-004	M12 Washer extra large OD 44 x 4 THK ISO 7094	2

Top feed roller assembly



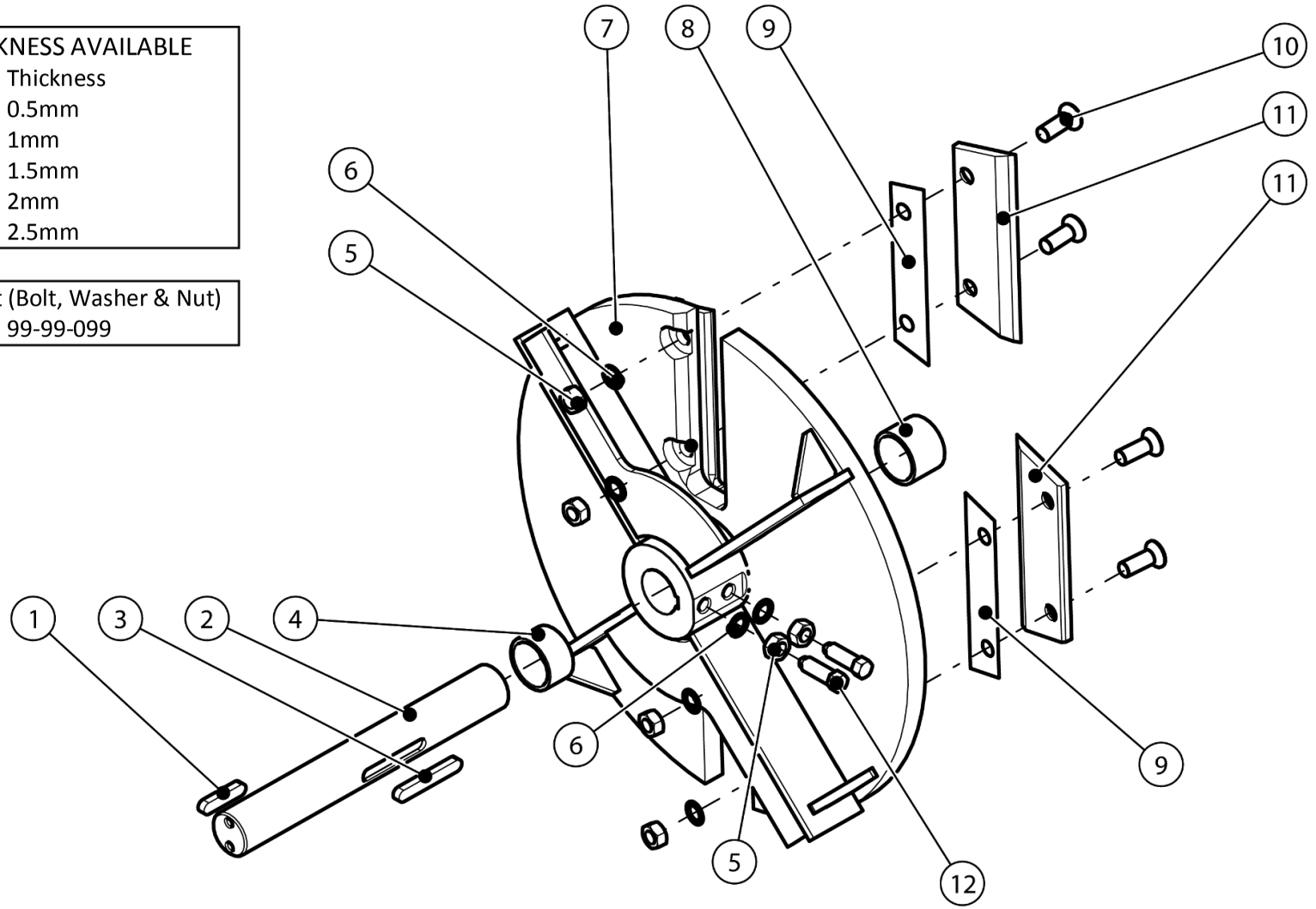
Item No	Part No	Description	Quantity
1	12-12-609	M12 x 45Lg 8.8 Socket Head Cap Screw	2
2	12-24-005	Hydraulic motor 199.6cc/rev	1
3	12-01-049	Rigid shaft coupling 25 ID	1
4	12-12-308	M5x20Lg Socket Head Cap Screw	4
5	12-14-010	M10 Spring Washer DIN 128	9
6	12-14-009	M10 Washer ISO 7089	9
7	12-12-509	M10 x 35Lg 8.8 Hex Head screw	2
8	12-11-013	Self aligning flange bearing 2 hole 30 ID	1
9	12-10-094	R1/8in BSPT 4mm male stud elbow	2
10	12-03-102	Feed roller 2 hole bearing shim	1
11	12-10-127 Part D	M12 spherical dished washer	1
12	12-10-127 Part C	M12 spherical washer	1
13	12-14-003	M12 Washer ISO 7089	3
14	12-13-003	M12 nyloc nut ISO 7040	3
15	12-19-080	Top feed housing fab assy	1
16	12-14-013	M8 washer ISO 7089	2
17	12-13-011	M8 nyloc nut ISO 7040	2
18	12-11-004	Plain bearing 20 ID, 26 OD, 28 flange x 12 Lg	2

Item No	Part No	Description	Quantity
19	12-11-005	Self Aligning Flange Bearing 2Z 30 ID	1
20	12-01-061	Feed adjuster collar	2
21	12-01-008	Shoulder screw M16 x 14Lg	2
22	12-12-613	M12 x 140 eyebolt DIN 444	2
23	12-12-502	M10 x 30Lg 8.8 Hex Head screw	7
24	12-03-042	Feed roller bearing shim	1
25	12-03-106	Feed cheek shim 30 DIA shaft	2
26	12-01-059	Feed cheek LH 32mm slot	1
27	12-13-006	M10 Hex nut	4
28	12-01-044	M10 x 25Lg 10.9 Cone Point Screw	1
29	12-01-014	Feed roller	1
30	12-02-003	Top feed roller stop	1
31	12-01-060	Feed cheek RH 32mm slot	1
32	12-19-133	Feed motor clamp	1
33	12-19-132	Feed motor bracket fab assy	1
34	12-01-050B	Top feed roller shaft	1
35	12-20-005	Rectangular key 40x10x8	1
36	12-20-004	Rectangular key 30x8x7	1

Flywheel assembly

BLADE SHIM THICKNESS AVAILABLE	
Part No	Thickness
12-03-093.05	0.5mm
12-03-093.10	1mm
12-03-093.15	1.5mm
12-03-093.20	2mm
12-03-093.25	2.5mm

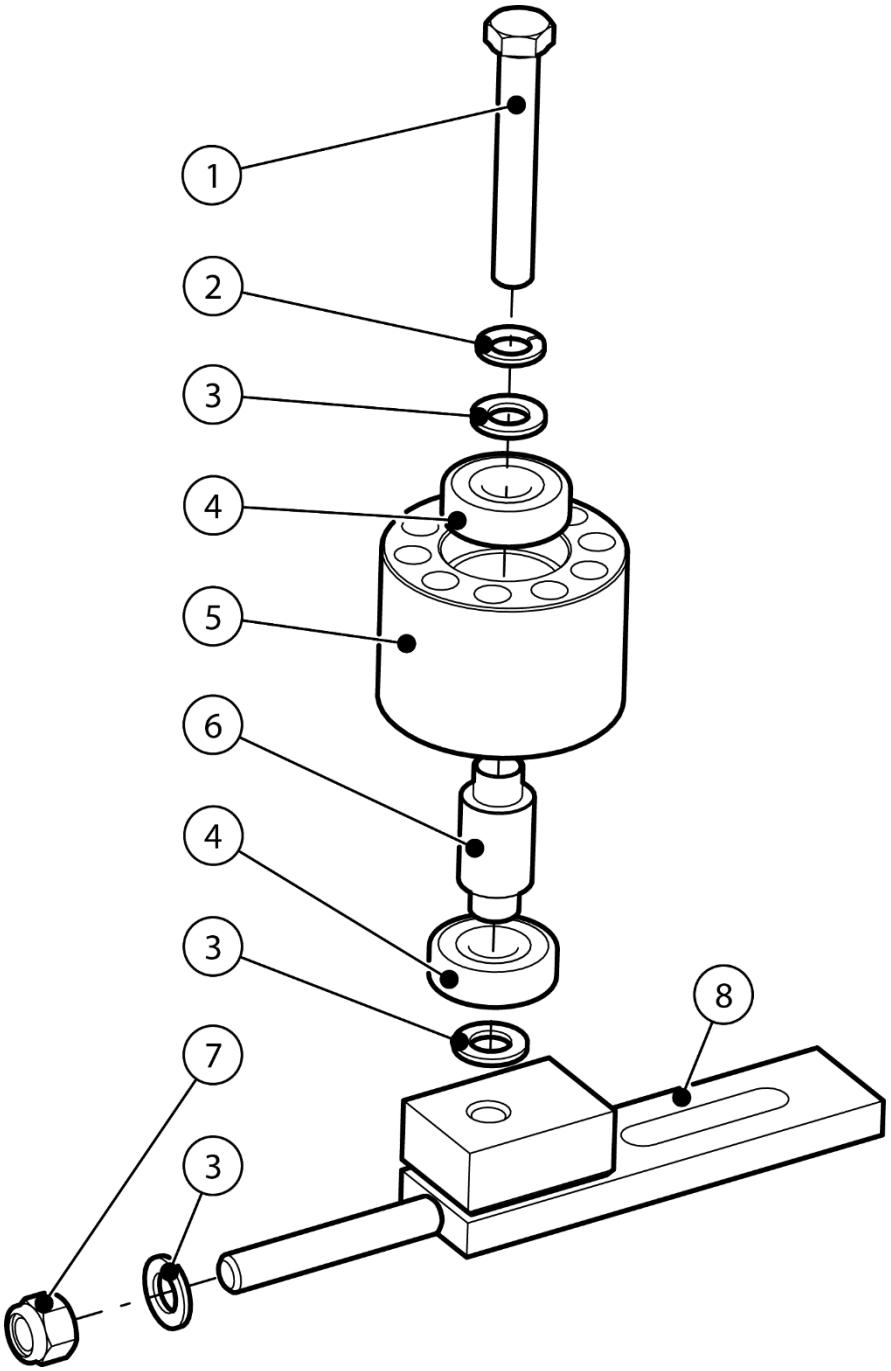
Note: Blade Bolt Set (Bolt, Washer & Nut)	
Part No	99-99-099



Item No	Part No	Description	Quantity
1	12-20-003	Rectangular key 60x14x9	1
2	20-01-010	Flywheel shaft	1
3	12-20-002	Rectangular key 90x14x9	1
4	12-01-046	Flywheel shaft spacer	1
5	12-13-007	M16 10.9 Hex nut ISO 4032	6
6	12-14-006	M16 serrated lock washer DIN 6798-A17	6

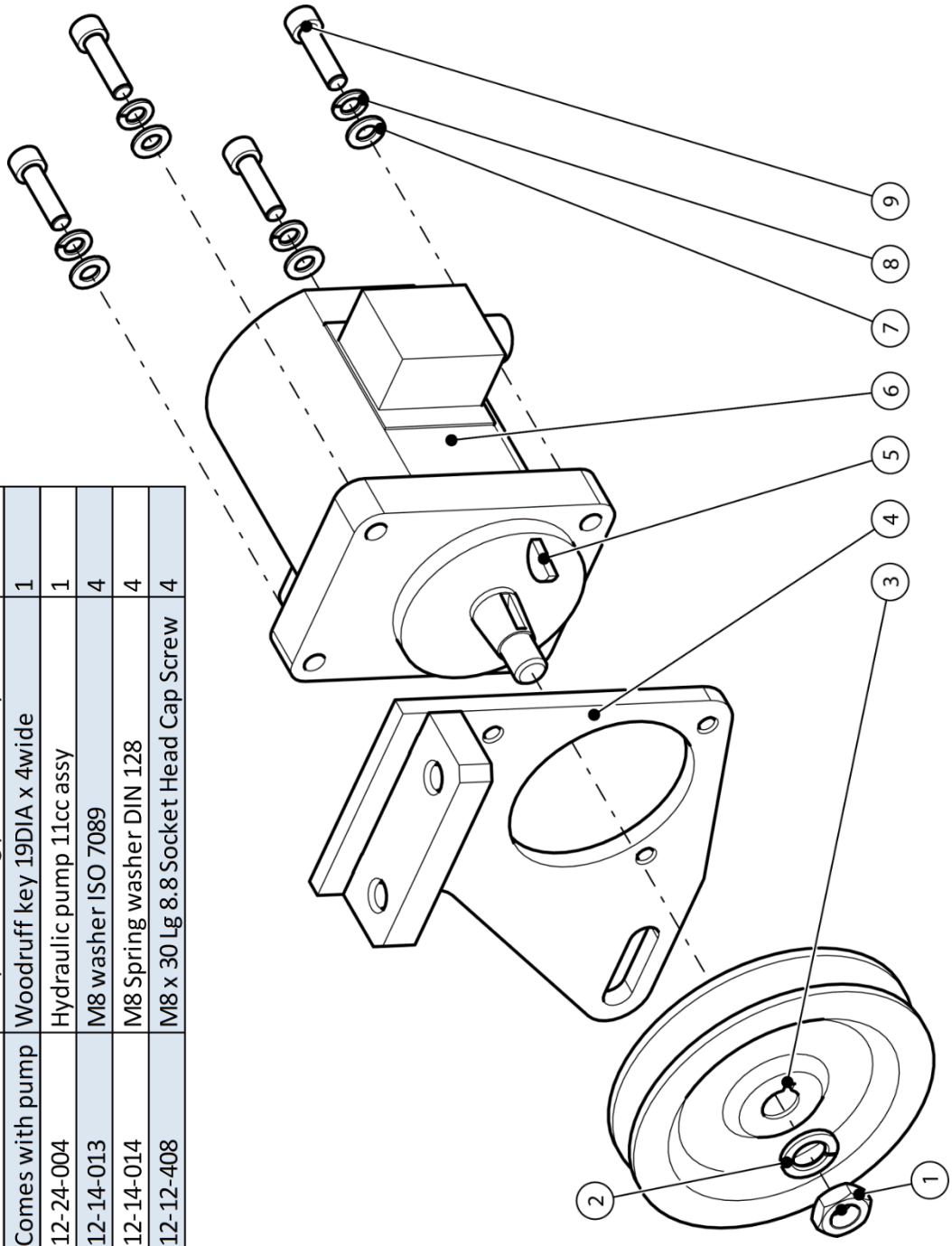
Item No	Part No	Description	Quantity
7	12-01-042	Flywheel machined assy	1
8	12-01-012	Flywheel shaft spacer	1
9	12-03-093.05	Blade shim 0.5mm	2
10	12-12-1102	M16 x 45Lg 10.9 CSK hex socket screw ISO 10642	4
11	12-01-009	Flywheel blade	2
12	12-12-1103	M16 x 50Lg 8.8 Hex Head screw cone point DIN 564	2

Flywheel belt tensioner assembly



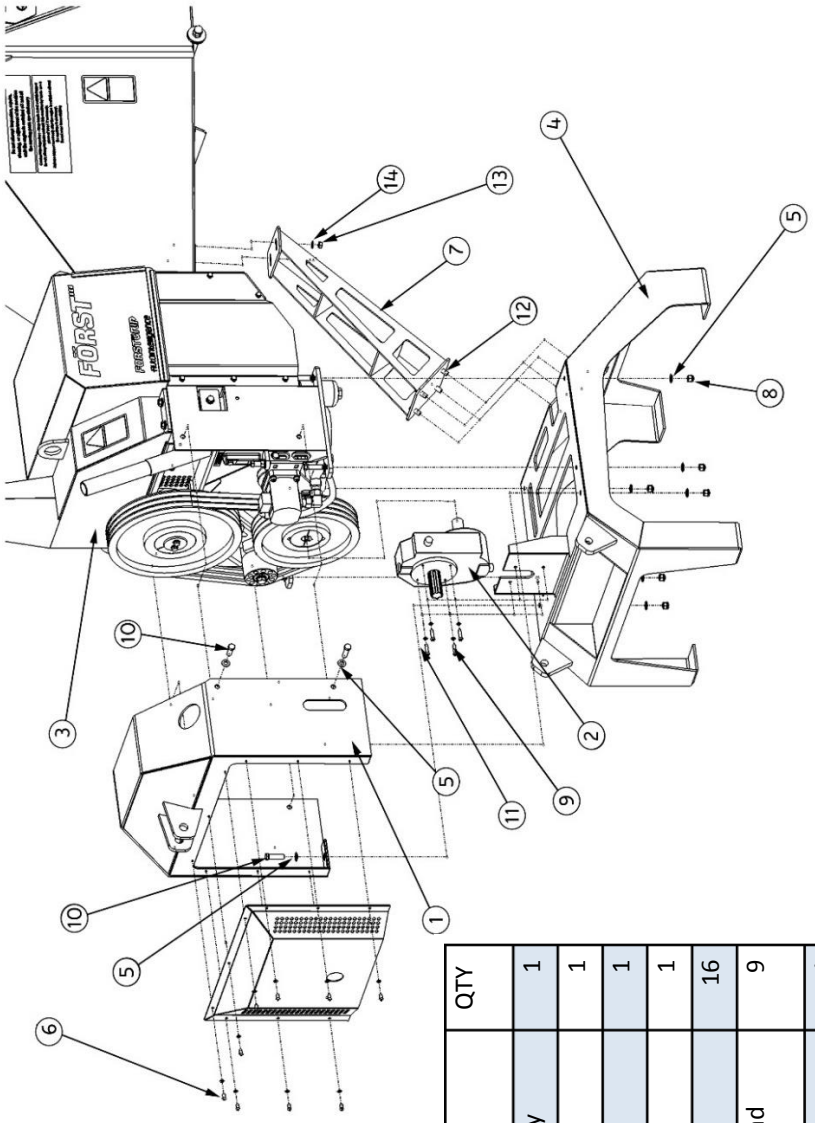
Item No	Part No	Description	Quantity
1	12-12-1104	M16 x 110Lg 8.8 Hex Head bolt	1
2	12-14-019	M16 Spring washer DIN 128	1
3	12-14-005	M16 Washer ISO 7089	3
3a		10mm Spacer between 3 and 8	1
4	12-11-011	6304 2RS Deep groove ball bearing 52 OD, 20 ID, 15 wide	2
5	12-01-036	Flat idler pulley-2x 17 V belt	1
6	12-01-024	Flat idler pulley shaft-2x 17 V belt	1
7	12-13-005	M16 nyloc nut ISO 7040	1
8	12-19-062	Tensioner slide fab assy	1

Hydraulic pump assembly



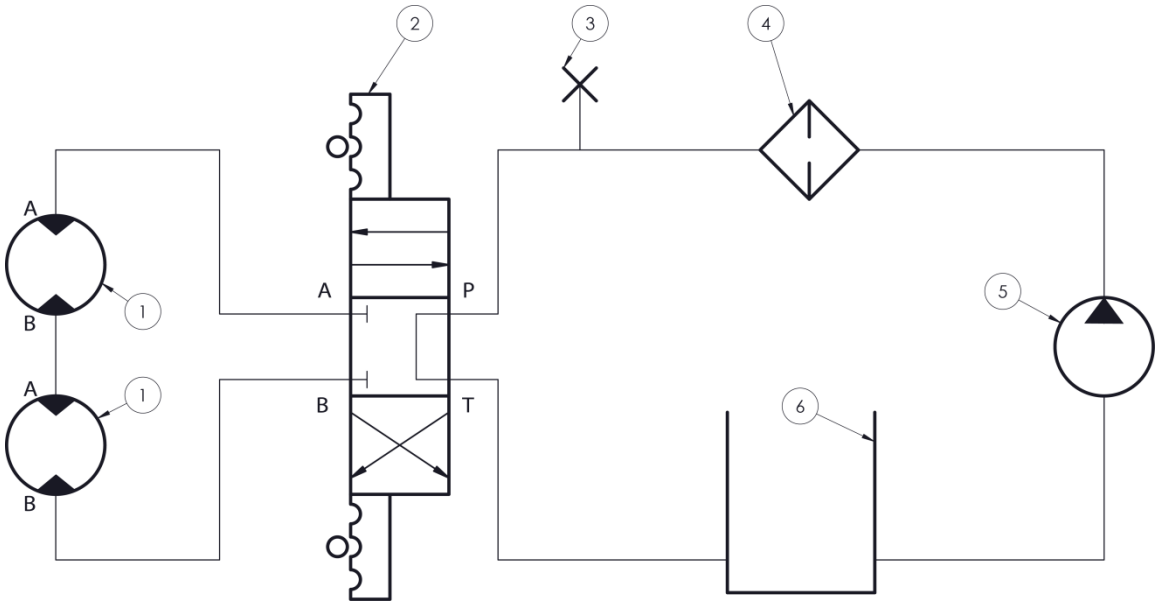
Item No	Part No	Description	Quantity
1	Comes with pump	M14X1.5 Nut	1
2	Comes with pump	M14 Spring washer DIN 128 - A14	1
3	12-01-045	Pump pulley 1	1
4	12-19-069	Pump mounting plate fab assy	1
5	Comes with pump	Woodruff key 19DIA x 4wide	1
6	12-24-004	Hydraulic pump 11cc assy	1
7	12-14-013	M8 washer ISO 7089	4
8	12-14-014	M8 Spring washer DIN 128	4
9	12-12-408	M8 x 30 Lg 8.8 Socket Head Cap Screw	4

PTO Assembly parts drawing



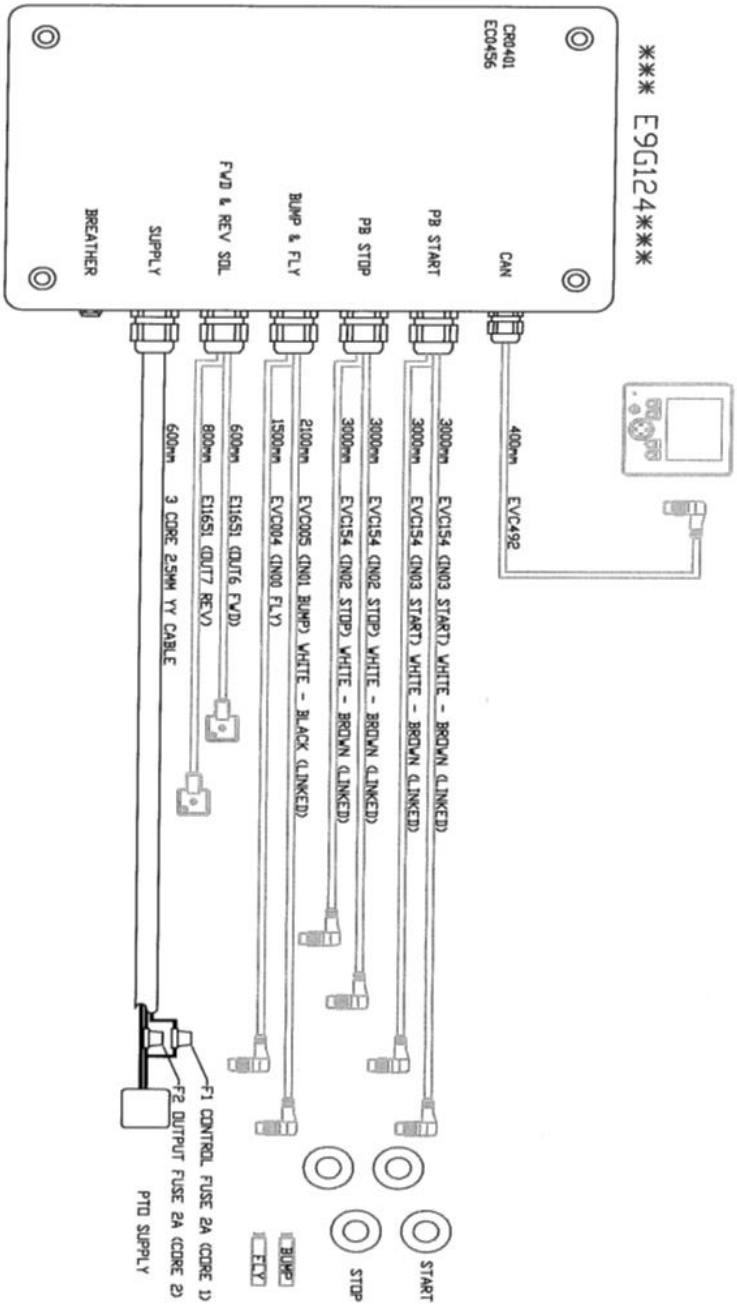
ITEM NO.	PART NO.	PART DESCRIPTION	QTY
1	20-19-006	Structural Top Subassembly	1
2	16-10-010	Gearbox	1
3	20-A-000	Chipper Assembly	1
4	20-19-004	Base Subassembly	1
5	12-14-003	M12 Washer	16
6	12-12-303	M6 x 16 Socket Button Head Screw	9
7	20-19-005	Feed Brace Subassembly	1
8	12-13-003	M12 nyloc nut	6
9	12-12-306	M6x30 Cap Head	4
10	12-12-601	M12 x 50 8.8 Hex Head screw	10
11	12-14-017	M6 Washer	13
12	12-12-506	M10x30 Hex Head	4
13	12-13-010	M10 Nyloc Nut	6
14	12-14-009	M10 Washer	10
15	16-10-011	PTO Shaft	1

Hydraulics circuit diagram

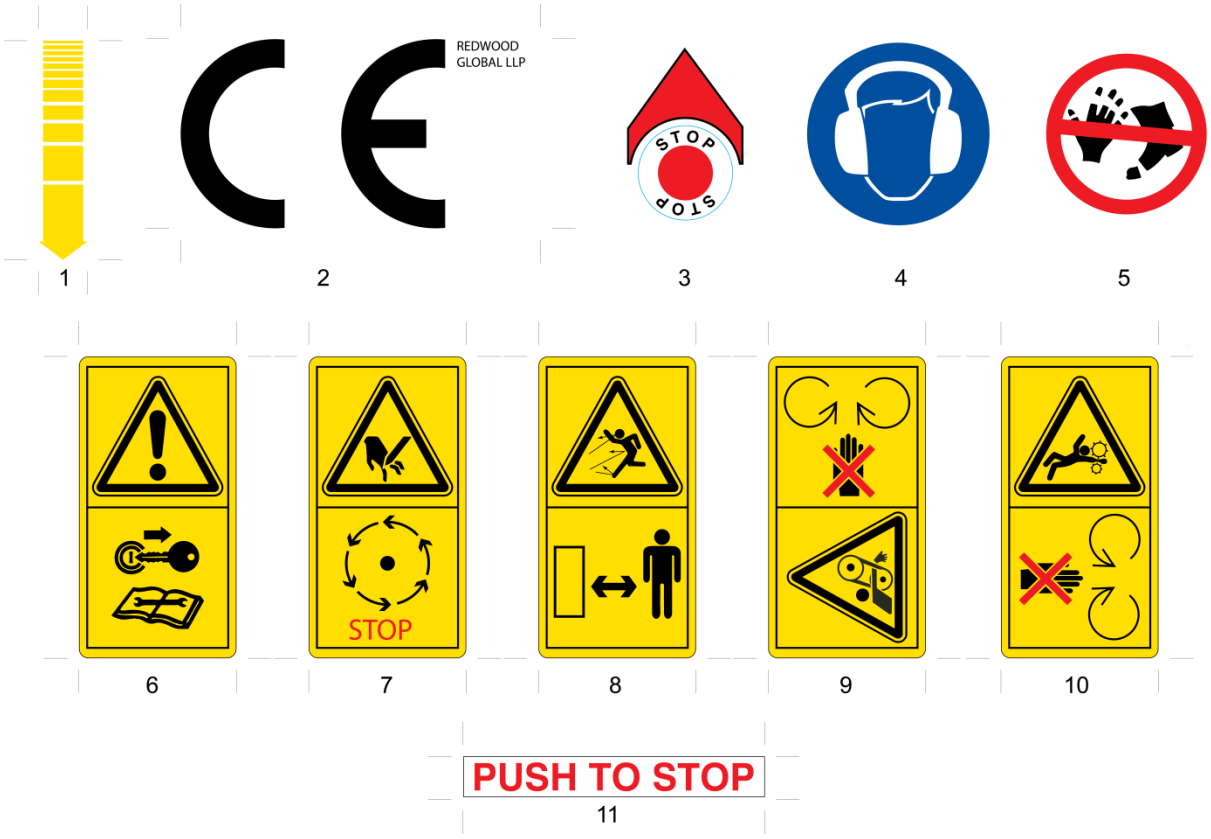


1	Motor
2	Control valve
3	Test point
4	Filter
5	Pump
6	Oil tank

Electrical circuit diagram – PTO touch sensor hopper



Decals



Decal meaning:

1. Throttle movement relation to engine speed.
2. CE (Conformite Europeene or European Conformity) mark. Manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environment protection legislation.
3. Ignition switch stop.
4. Hearing and eye protection of an appropriate specification to be worn.
5. Finger and toe amputation hazard.
6. Refer to user manual.
7. Allow machine to stop before touching.
8. Danger from flying objects.
9. Do not open or remove covers while engine is running.
10. Keep away from rotating machine parts.
11. Push to stop, trip bar operation.

These decals are placed on the machine where the hazard or information applies.

Manufacturer’s Statutory Plate

Information on the Manufacturer’s Statutory Plate in line order from top to bottom is as follows:

1. Manufacturing company.
2. Vehicle type approval number and construction date.
3. 17 digit Vehicle Identification Number (VIN) construction.
4. Gross Vehicle Weight (GVW).

Warranty

Warranty statement

1. Redwood Global Ltd guarantee all Forst equipment supplied by them against any defect in manufacture and assembly – this guarantee is for a period of 12 months commencing on the date of sale to the first end user.
2. The guarantee will not apply to a failure where normal use has exhausted the life of a component.
3. Engine units are covered independently by their respective manufacturer's warranties.
4. Redwood Global Ltd's liability under this guarantee is limited to repair at Redwood Global Ltd's premises or at a selected Forst dealer.
5. No liability will be accepted for consequential lost or damage of any kind.
6. The Redwood Global Ltd guarantee is restricted to the first Redwood Global Ltd user only and is not transferable except when authorized by Redwood Global Ltd.
7. The owner is responsible to make sure the machine is operated at all times in accordance with the user manual.
8. The Redwood Global Ltd guarantee will be invalidated if any of the following points apply:

    - Failure to use genuine Forst parts
    - Failure to perform routine servicing and maintenance
    - Failed parts or assembly have been interfered with
    - Machine has been modified without written approval from Redwood Global Ltd
    - Machine has been used to performed tasks contrary to those stated in the Redwood Global Ltd User Manual
    - Exclusions to the above warranty terms are – fair wear and tear on fuses and bulbs, tyres and brakes, lubrications and filters, blades and anvils, feed rollers and paintwork.
    - Where an extended warranty has been given this will be stated on the original machine invoice and will be subject to further conditions as stated in our supplementary warranty terms

Warranty claims

To obtain warranty service please contact Redwood Global Ltd for the nearest approved Forst Dealer. Your nearest dealer can be obtained from Redwood Global Ltd at the address on the front of the User Manual. In the event of a failure Redwood Global Ltd must be notified within 7 working days.

CE Certificate

FÖRST™

CERTIFICATE & DECLARATION OF CONFORMITY FOR CE MARKING

Company contact details:
Redwood Global Ltd,
Unit 86, Livingstone Road, Walworth Business Park, Andover,
Hampshire. SP10 5NS. United Kingdom

Redwood Global Ltd declares that their:
Wood Chippers listed as the following models
ST6 Towed & TR6 on Tracks
ST8 Towed & TR8 on Tracks
PT6 PTO & PT8 PTO

are classified within the following EU Directives:
Machinery Directive 2006/42/EC
Electromagnetic Compatibility Directive 2004/108/EC

and further conform with the following EU Harmonized Standards:
EN13525:2005 + A2:2009
EN 982:1996+A1:2008
EN ISO 12100:2010
EN ISO 14982:2009

Dated: ……

Position of signatory: Managing Partner
Name of Signatory: Raymond Gardner
Signed below:

……

on behalf of Redwood Global Ltd