

Spearhead

OUTFRONT 130/160 FLAIL



Edition 2.0 - April 2016
Part No. 8999090

HANDBOOK & PARTS MANUAL

Spearhead Outfront Flail

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION



DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with Spearhead Machinery Limited before delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register machines go to the Spearhead Machinery Limited web site at www.spearheadmachinery.com, log onto 'Dealer Inside' and select the 'Machine Registration button' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.

Should you experience any problems registering a machine in this manner please contact the Spearhead Service Department on 01789 491867.

Registration Verification

Dealer Name:		
Dealer Address:		
Customer Name:		
Date of Warranty Registration:/...../.....	Dealer Signature:

NOTE TO CUSTOMER / OWNER

Please ensure that the above section has been completed and signed by the selling dealer to verify that your machine has been registered with Spearhead Machinery Limited.

IMPORTANT: During the initial 'bedding in' period of a new machine it is the customer's responsibility to regularly inspect all nuts, bolts and hose connections for tightness and re-tighten if required. New hydraulic connections occasionally weep small amounts of oil as the seals and joints settle in – where this occurs it can be cured by re-tightening the connection – refer to torque settings chart below. The tasks stated above should be performed on an hourly basis during the first day of work and at least daily thereafter as part of the machines general maintenance procedure.

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

TORQUE SETTINGS FOR HYDRAULIC FITTINGS

HYDRAULIC HOSE ENDS		
BSP	Setting	Metric
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

PORT ADAPTORS WITH BONDED SEALS		
BSP	Setting	Metric
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

Spearhead Outfront Flail

WARRANTY POLICY

WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with Spearhead Machinery Ltd, before delivery to the end user. On receipt of the goods it is the buyer's responsibility to check that the Verification of Warranty Registration in the Operator's Manual has been completed by the selling dealer.

1. LIMITED WARRANTIES

- 1.01. All machines supplied by Spearhead Machinery Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.
- 1.02. All spare parts supplied by Spearhead Machinery Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months.
- 1.03. The manufacturer will replace or repair for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined.
- 1.04. This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, flails, bushes, belts, flap kits, skids, shields, guards, wear pads or pneumatic tyres.
- 1.05. Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.
- 1.06. Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.
- 1.07. Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which Spearhead Machinery Ltd cannot be held liable, and may have safety implications.
- 1.08. Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of Spearhead Machinery Ltd.
- 1.09. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:
 - 1.09.1. Hoses, external seals, exposed pipes and hydraulic tank breathers.
 - 1.09.2. Filters
 - 1.09.3. Rubber mountings
 - 1.09.4. External electric wiring.
 - 1.09.5. Labour and mileage costs.
- 1.10. All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.

NB Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. Spearhead Machinery Ltd cannot be held responsible for any failures or safety implications that arise due to the use of non-genuine parts.

Spearhead Outfront Flail

2. REMEDIES AND PROCEDURES

- 2.01. The warranty is not effective unless the Selling Dealer registers the machine, via the Spearhead Machinery web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.
- 2.02. Any fault must be reported to an authorised Spearhead Machinery dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which Spearhead Machinery Ltd cannot be held liable.
- 2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by Spearhead Machinery Ltd.
- 2.04. All claims must be submitted, by an authorised Spearhead Machinery Service Dealer, within 30 days of the date of repair.
- 2.05. Following examination of the claim and parts the manufacturer will pay, at their discretion, for any valid claim the cost of any parts and an appropriate labour allowance if applicable.
- 2.06. The submission of a claim is not a guarantee of payment.
- 2.07. Any decision reached by Spearhead Machinery Ltd is final.

3. LIMITATION OF LIABILITY

- 3.01. The manufacturer disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.
- 3.02. The manufacturer makes no warranty as to the design, capability, capacity or suitability for use of the goods.
- 3.03. Except as provided herein, the manufacturer shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any indirect, special, consequential, or incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.
- 3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.

4. MISCELLANEOUS

- 4.01. The manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
- 4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.
- 4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.

Spearhead Outfront Flail

CE Declaration of Conformity, Conforming to EU Machinery Directive 2006/42/EC

We, Spearhead Machinery Ltd, Green View, Salford Priors, Evesham,
Worcestershire, WR11 8SW hereby declare that:

Product

Product Code.....

Serial No.....

Type.....

Manufactured by: Alamo Manufacturing Services (UK) Limited, Station Road,
Salford Priors, Evesham, Worcestershire, WR11 8SW

Complies with the required provisions of the Machinery Directive 2006/42/EC.
The Machinery Directive is supported by the following harmonized standards:

- BS EN ISO 14121-1 (2007) Safety of Machinery – Risk Assessment, Part 1: Principles Part 2: Practical Guide and Examples of Methods.
- BS EN ISO 12100-1 (2010) Safety of Machinery – Part 1: Basic Terminology and Methodology Part 2: Technical Principles.
- BS EN 349 (1993) + AI (2008) Safety of Machinery – Minimum Distances to avoid the Entrapment of Human Body Parts.
- BS EN 953 (1998) Safety of Machinery – Guards General Requirements for the Design and Construction of Fixed and Movable Guards.
- BS EN 982 (1996) + AI (2008) Safety Requirements for Fluid Power Systems and their Components. Hydraulics.

The EC Declaration only applies if the machine stated above is used in
accordance with the operating instructions.

Signed



(On behalf of Spearhead Machinery Ltd)

Status

General Manager

Date

.....

Spearhead Outfront Flail

Contents

Machine Description.....	7
Safety Information.....	10
Machine Preparation.....	14
Fitting to the Tractor.....	17
General Operation.....	21
Maintenance.....	26
Troubleshooting.....	28
Replacement Parts.....	29
Disposal.....	32
Parts.....	33

Spearhead Outfront Flail

Machine Description

Intended usage.

The Outfront flail was developed to meet the demands of local authorities for parks and municipal areas. The Outfront is provided in optional cutting widths of 1.3m and 1.6m, variable cutting heights from 8mm to 130mm, a mountable kerb height of 355mm, sealed bearings and pressed scoop flails. The 130 model weighs 245Kg and the 160 model weighs 295Kg.

The machine incorporates castor wheels at the front, an adjustable roller at the back, and a rotating flail shaft in between. The rotor is driven via the tractor's (front output) PTO shaft.

The Outfront was designed to be front mounted and for use on level or slightly undulating ground, cutting verges and boundaries with vegetation height of up to 60cm, and thickness up to 10mm.



Spearhead Outfront Flail

Machine layout conventions.

The layout and naming convention used throughout this manual are shown in Figures 1.2.1 and 1.2.2 across.

Spearhead Outfront Flail

Figure 1.2.1 Plan view:

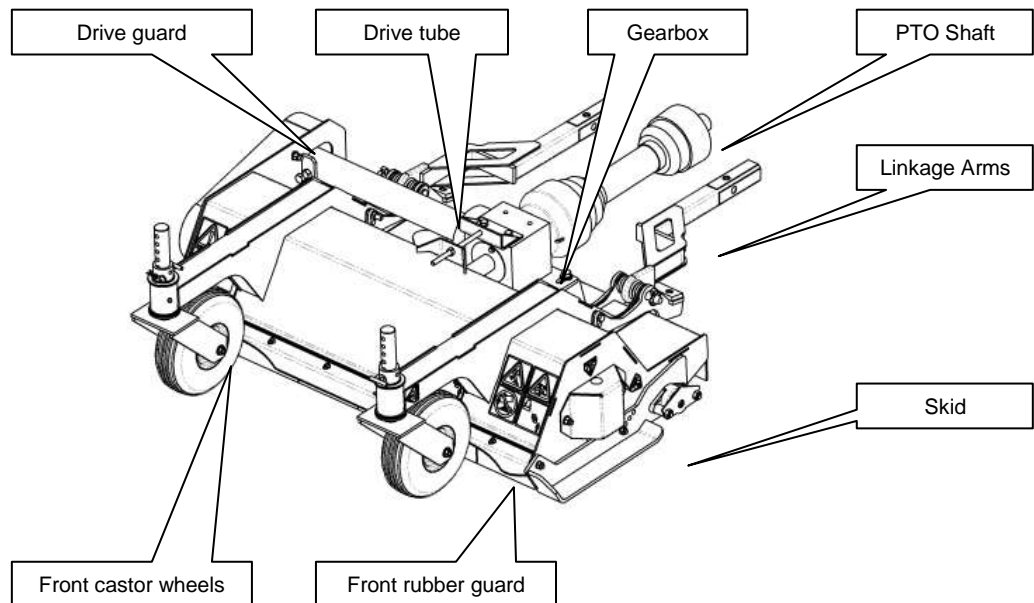
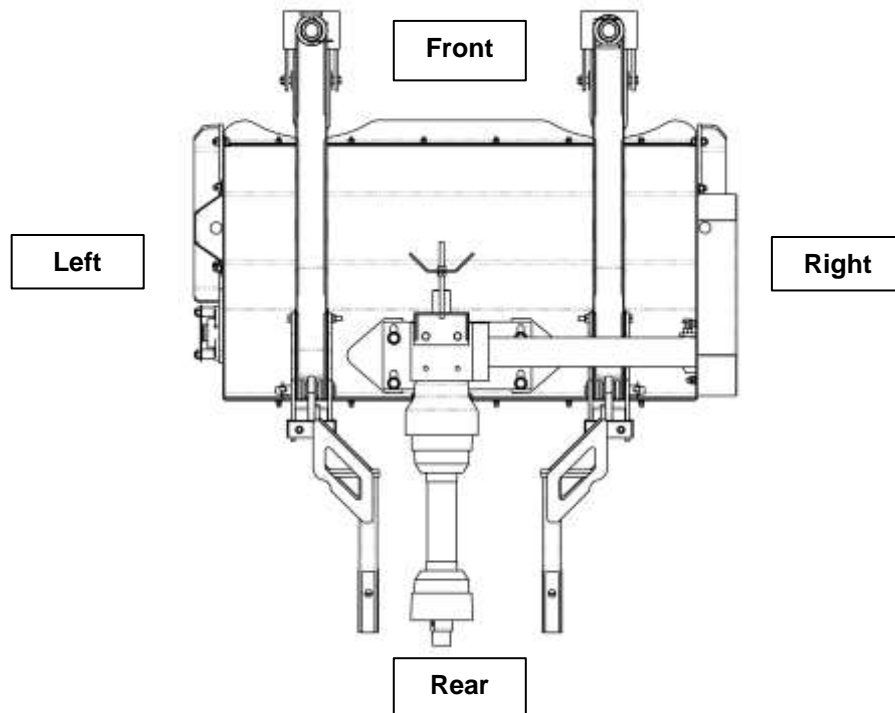


Figure 1.2.2 ISO view:

Machine rotation convention

The term REVERSE rotation in the following notes indicates the direction of the rotation of the rotor shaft in relation to the tractor wheels, assuming that the tractor is moving in a forward direction. The standard build for **grass cutting** is REVERSE rotation with the flexible flap guard fitted at the front of the cutting unit.

Spearhead Outfront Flail

Machine general specification.

General dimensions:

- Cutting width: 1300mm or 1600mm
- Overall width: 1493.5 or 1793.5mm
- Max cutting height: 130mm
- Min cutting height: 8mm
- Weight: 245Kg or 295Kg
- Mountable kerb height: (with NH MC35) 12 inches

Front wheels:

- 300mm diameter
- 105mm width
- Pneumatic tyres on 20mm shaft (solid tyre option available)

Rear roller:

- 115mm diameter
- 35mm sealed bearings

Rotor shaft:

- 102mm diameter
- 40mm sealed bearings
- Scoop type flails (24 off on 1300 and 32 off on 1600)
- 39 metres per second flail tip speed

Gearbox and tube:

- EP90 filled gearbox and drive tube
- Quad bearings
- 2000 rpm nominal PTO input speed – 2250rpm max (different input speeds can be catered for)

Cowl:

- 4mm Domex® sheet (650N/mm² yield strength), 7mm front & rear rubber guarding, heavy duty arms and category 2 pins
- Plastic pads for cowl suspension when fully lifted

Drive:

- Twin vee-belts on cast pulleys, tensioned through gearbox and drive tube mountings

Tractor mounting:

- Through twin linkage arms (bought as separate kit), or direct attachment to tractor's built in arm system.
- Mounting availability – please contact your local Spearhead authorised dealership to check for fitment to your tractor unit. A wide range is currently available, and customized linkages for your specific needs are quickly available through our Parts Department.

Spearhead Outfront Flail

Safety

Safety instructions

The operator must read, understand and follow all of the Safety instructions. Serious injury or death may occur unless care is taken to follow the warnings and instructions provided. The level of safety is indicated in three levels and the following notation is used throughout this operator instruction book;

Level 1	DANGER!	Alerts for imminent death or critical injury.
Level 2	WARNING!	Warns of serious injury or possible death.
Level 3	CAUTION!	Indicates possible injury or damage.

Never operate the tractor or machinery until you have read and completely understand this manual and the tractor operators manual and each of the safety messages found in the manuals and those displayed on the tractor and implement.

DANGER! **DO NOT** attempt any maintenance of or adjustment to the machine while it is running. Before carrying out any work on the machine follow the three safety instructions below:

- Lower the cutting head on to the ground
- Put the PTO out of gear
- Stop the tractor engine

DANGER! At all times ensure that the PTO shaft guard is in position, securely fitted and in good condition and that the tractor PTO shaft shield is fitted.

DANGER! Keep a careful watch for passers-by who may inadvertently get in the way of cut material being thrown from the cutting unit. Flail mowers are capable under adverse conditions of throwing objects great distances at high velocity. Stop the rotor shaft until all people are well clear.

DANGER! **AVOID WIRE.** It can be extremely dangerous if wire catches in the rotor, and every care must be taken to ensure this will not happen. Inspect the working area before commencing. Remove all loose wire and obstructions and clearly mark those that are fixed so that you can avoid them. Any unusual noise from the cutting unit area indicates that the rotor shaft may have been fouled by an obstruction. A visual indication that wire is in contact with the flails may be a sudden movement of the vegetation ahead of the cutting unit. In any such event STOP the tractor engine INSTANTLY. On no account move the cutting unit until the rotor has completely stopped. NEVER UNDER ANY CIRCUMSTANCES run the rotor in reverse to 'clear itself'. When the rotor has stopped, inspect it and remove any obstruction that may be present. If working under a raised machine ensure that it is safely supported. Before working on the rotor always stop the tractor engine and remove the ignition key.

DANGER! Flail mowers are capable under adverse conditions of throwing objects great distances at high velocity. CHECK the flails for wear and the attachment bolts for tightness every day during work .A few moments whenever the machine is stopped, e.g. whenever removing obstructions, will help reduce flail wear or loss.

DANGER! Keep your forward speed to a level appropriate to the operating conditions. High-speed manoeuvres with the machine lifted up are very dangerous, particularly on uneven ground where there is risk of overturning.

Spearhead Outfront Flail

DANGER! When using the machine, the operator must make use of personal protection equipment – at the very least eye protection / goggles, hearing protection / noise defenders, and a hard-hat in case of overturning or travelling under low-hanging branches.

DANGER! Do not operate machinery with guards missing. Ensure that the correct guards are properly fitted to the machine and tractor at all times and that they are in good condition. Refer to section on Guards and Rotation in this manual to ensure you have the correct guards fitted for the type of operation being performed.

WARNING! While the tractor is running all personnel should keep well clear of the area around the machine as there are numerous crushing, shearing, impact dangers caused by the machine operation.

WARNING! Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if flails strike a foreign object. Repair all damage and make certain the rotor shaft is still balanced before resuming cutting operations.

WARNING! Transport the machine only at safe speeds. Serious accidents and injuries can result from operating this equipment at unsafe speeds

CAUTION! Replace the PTO shaft guard if any of the following are evident; guard cracked or damaged, any part of the PTO shaft exposed. Ensure the PTO shaft guard is free to rotate and the anti-rotation chains are securely fitted and effective.

CAUTION! Keep the roller in position at all times. It is an essential part of the machines guarding. The machine must not be operated with the roller missing.

Noise

Ear defenders are an essential part of using this flail mower with a compact, “ride on” tractor that has no cab enclosure.

Rapid disengagement

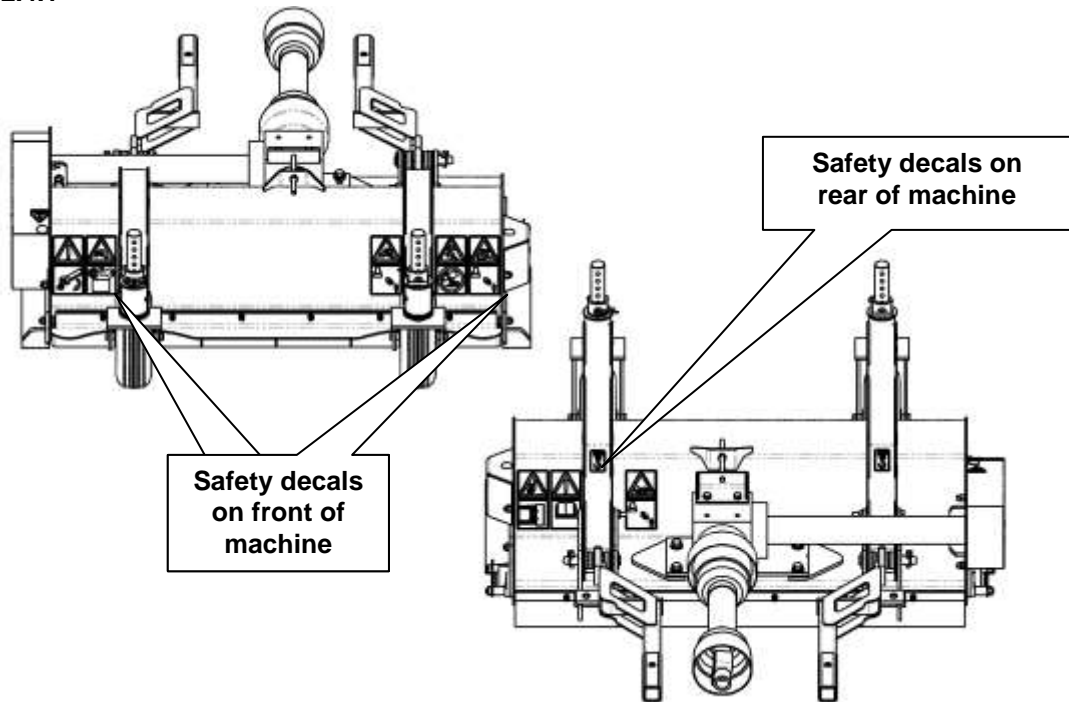
To stop the rotor as quickly as possible, use the tractor PTO engagement control to turn it off. With the tractors that the Outfront is typically fitted to, it is also recommended to apply the brakes immediately. After a rapid disengagement of the rotor; ensure that the PTO lever is set to **OFF** before restarting the tractor.

Spearhead Outfront Flail

Safety Decals

Safety decals are located on various points of the machine see figure 2.4.1. They can be identified by the yellow upper panel depicting the hazard, and the lower white panel indicating means of avoidance or precautions to be taken. These decals have no text and it is essential that all operators and personnel associated with the machine fully understand their meanings, which are shown in figure 2.4.2.

Figure 2.4.1



Spearhead Outfront Flail

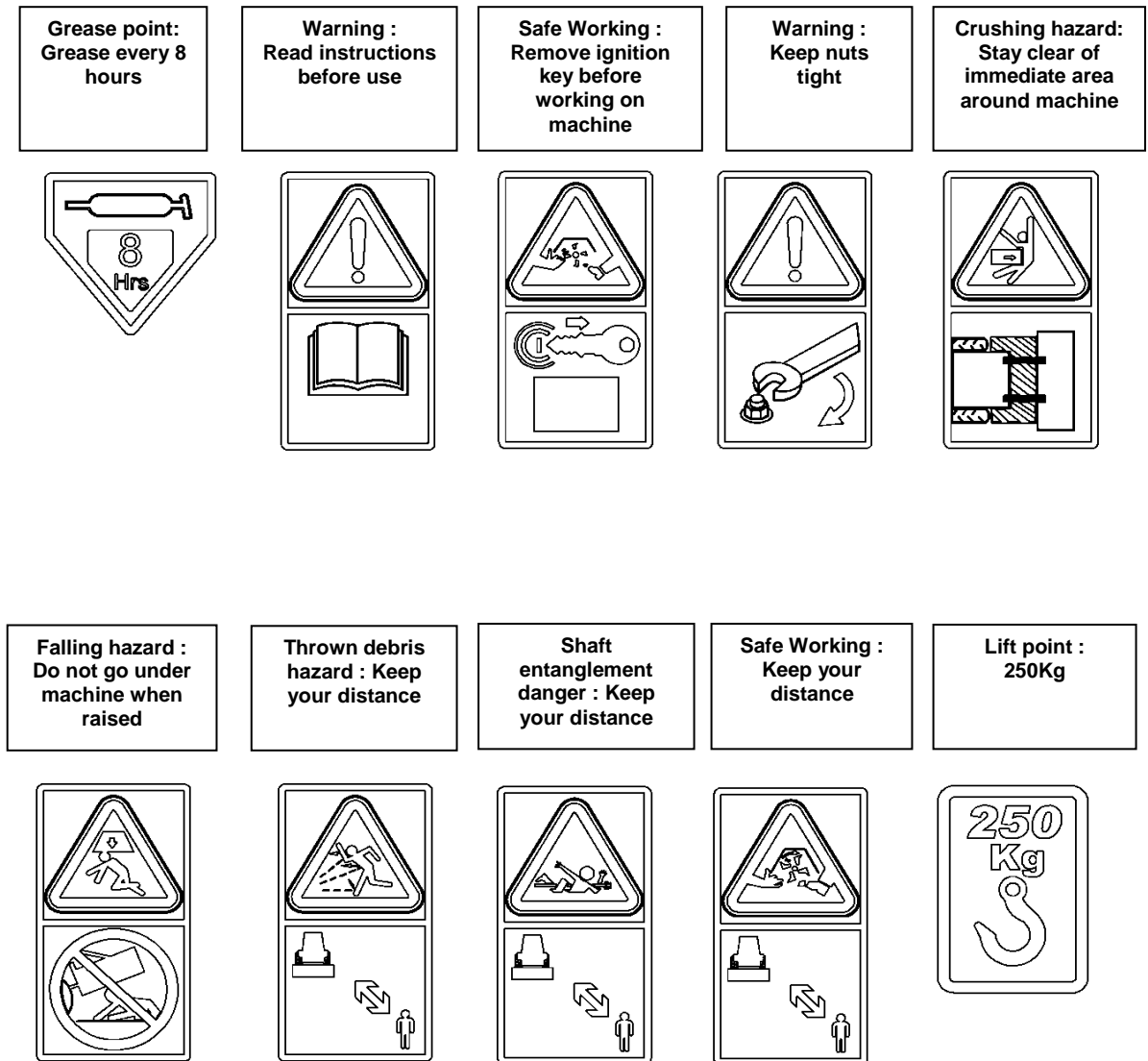


Figure 2.4.2

Any safety decals which are found to be missing should be replaced.

Spearhead Outfront Flail

Machine preparation

Tractor requirements

Before fitting the machine to the tractor ensure that specification of the tractor meets the requirements listed below.

A six spline PTO output with of one and three eighths inch diameter shaft; OR a 15 spline PTO output with a one inch diameter shaft is available at the front of the tractor.

A PTO output speed of 2250 rev/min (max) / 2000 rev/min nominal is available at the front of the tractor.

Hydraulic lift arms at the front of the tractor are available.

To ensure fore / aft stability ballast should be added to the tractor rear weight tray. The amount will vary depending on type of tractor used and prevailing conditions.

Once the machine is mounted to the tractor and the tractor is correctly ballasted ensure that the maximum axle loads for the tractor have not been exceeded. Failure to meet this requirement may render the operator liable for infringement of public highway regulations.

Ensure that the tyres fitted to the tractor are correctly rated.

Spearhead Outfront Flail

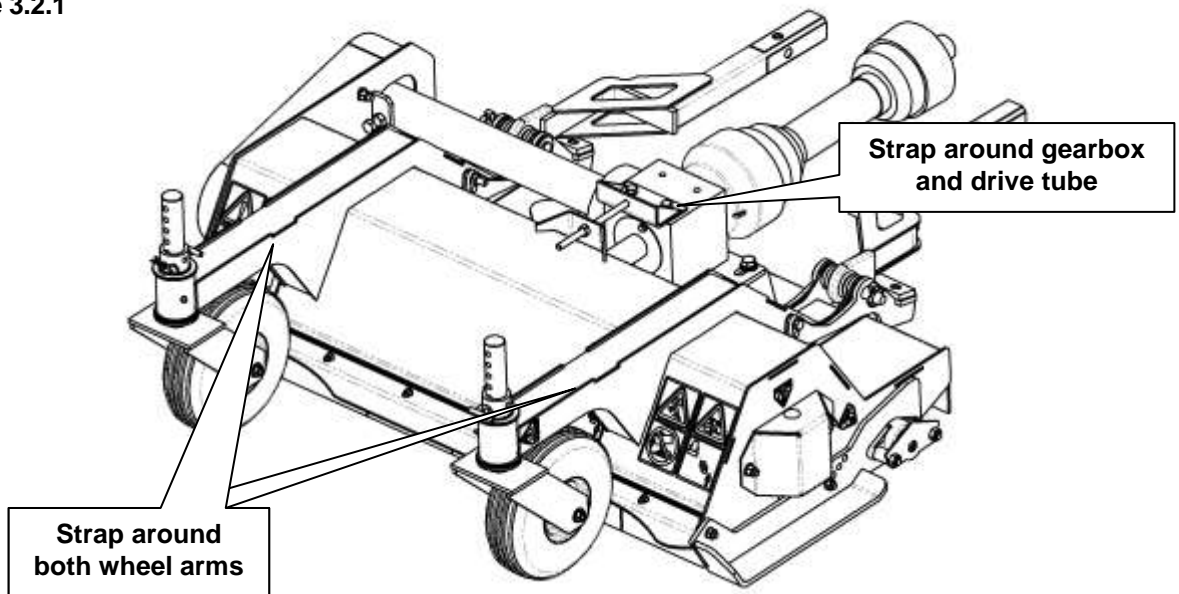
Lifting the machine

The machine will normally be delivered with the linkage arms assembled to the main unit. If this is not the case then specific re-assembly instructions will be provided with the separate link arm kit.

WARNING! Only personnel experienced in lift and hoist operation should be involved in lifting machines.

The lifting points are indicated in Figure 3.2.1. Use lifting slings of the correct rating in the areas indicated. **Note:** the GVW of the 1300 unit is 245Kg whereas the 1600 unit is 295Kg. The centre of gravity is shown in figure 3.2.2. **Exercise caution!**

Figure 3.2.1



Spearhead Outfront Flail

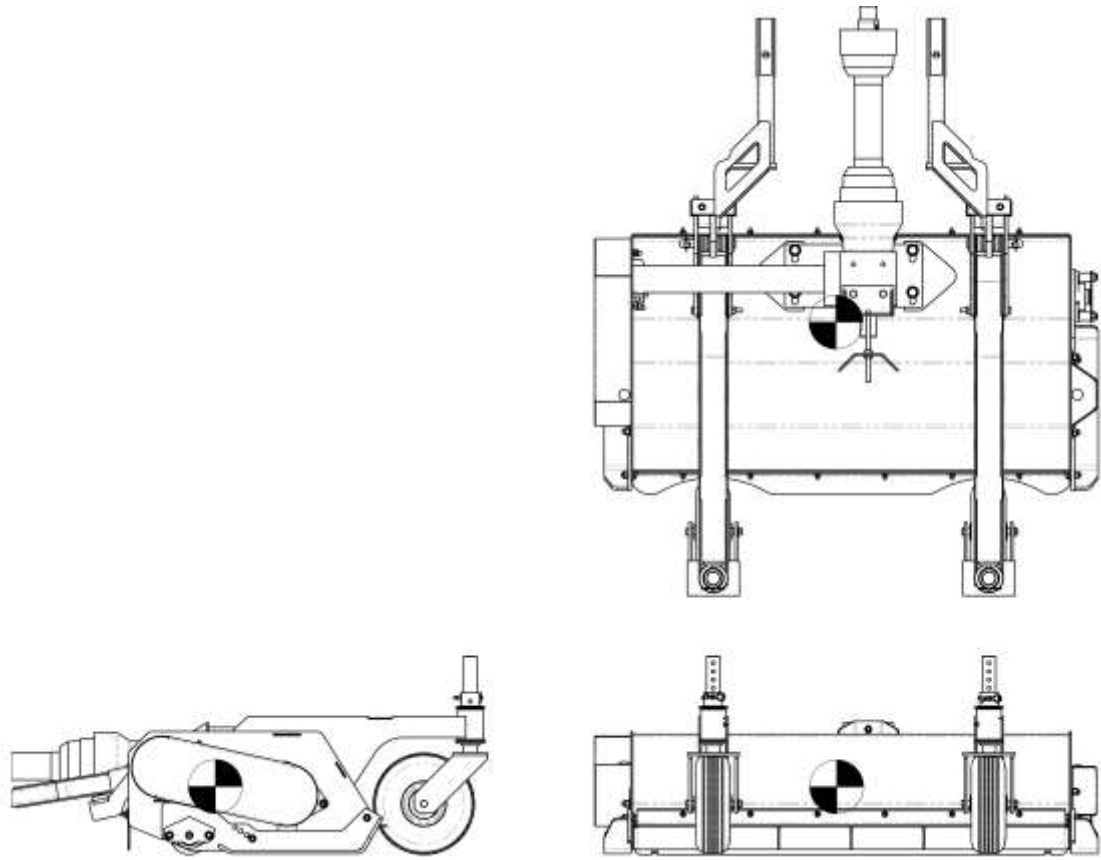


Figure 3.2.2

Spearhead Outfront Flail

Fitting to the tractor

General layout of mounting hardware

The Outfront is mounted to the tractor unit via two linkage arms. These arms normally slot into sockets on the tractor unit, where they are pinned to keep in them in place. Most compact tractors have the ability to raise and lower these arms hydraulically, which in turn raises and lowers the Outfront. This feature allows the tractor and machine to mount kerbs without adversely damaging either unit. The general layout of an Outfront mounted on a New Holland MC35 compact tractor is illustrated in Figure 4.1.1 below. Note: Linkage arms and mounting sequence may change with different tractor units – many other fitments are available, please contact your local Spearhead dealership if other versions are required.

Wheels to the front and a roller at the rear give height-cut adjustment, allowing the Outfront to cope with many different ground and material conditions.

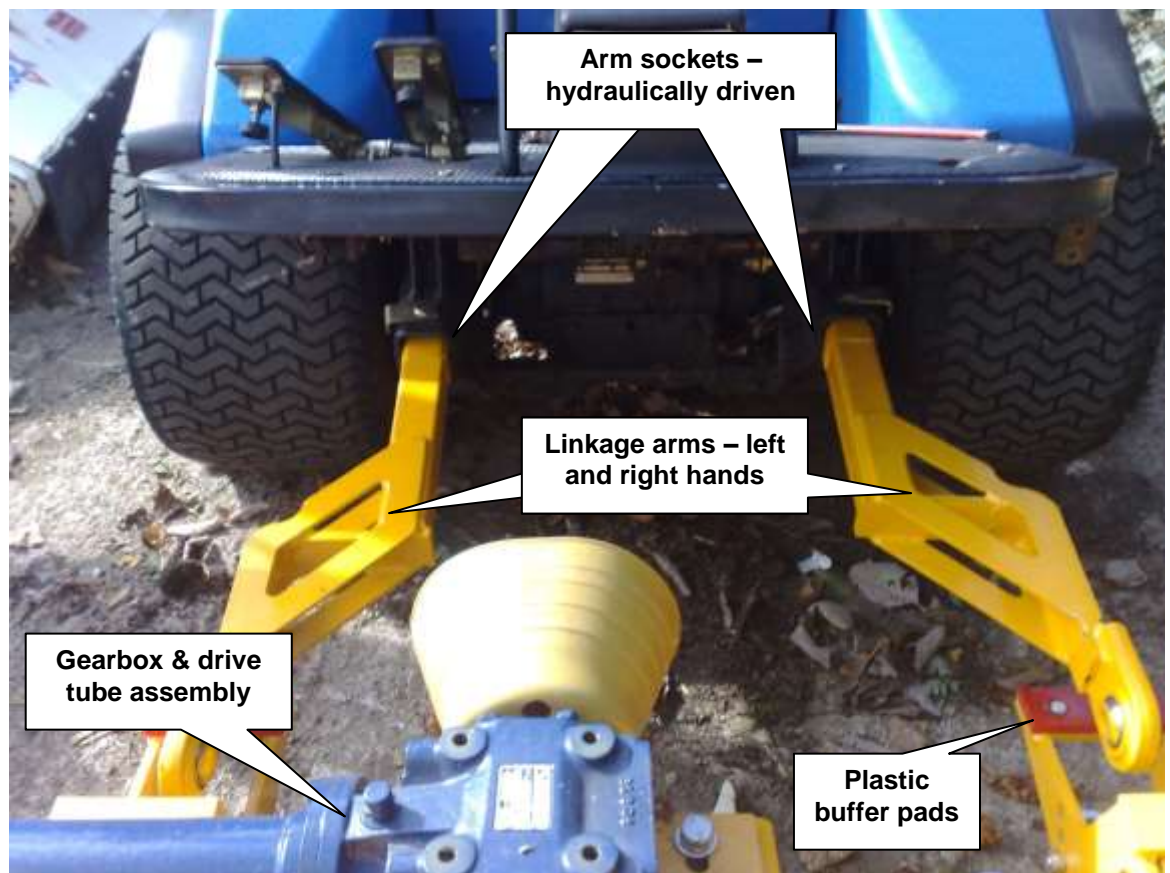


Figure 4.1.1

Spearhead Outfront Flail

Mounting the Outfront

The mounting process is quite straightforward, and with practice and accurate driving, will take only a few moments.

Start with the tractor unit engine off, PTO disengaged, and handbrake on. The tractor should be lined up with the back of the Outfront, and about 2 metres behind it. Check your tractor manufacturer's handbook for any further information regarding safety whilst mounting machinery. Locate the lift-arm sockets on the front of the machine, and remove the locking pin. If the linkage arms are mounted to the Outfront, remove the mounting pins and remove the arms.

Insert the linkage arm into the socket, noting the "handedness" of said arms (Figure 4.1.1), and secure them with the locking pin provided with the tractor unit. Some tractor manufacturers supply an "r-clip" or lynch pin to ensure the locking pin is retained – if one is supplied, use it. See Figure 4.2.2 which shows a mounting arm in tractor socket.

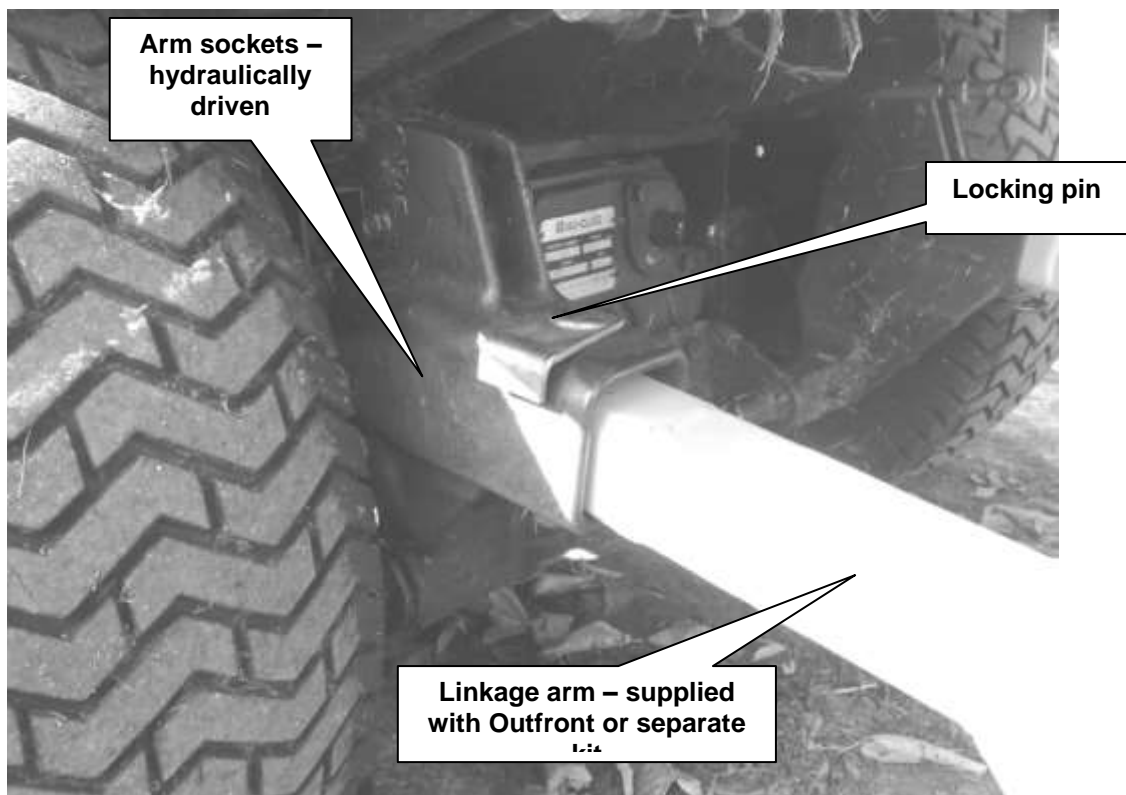


Figure 4.2.2

Spearhead Outfront Flail

Remove the mounting pins from the Outfront, along with the spacers, ready to receive the linkage arms. Upon first use, the ball-sockets on the end of the linkage arms may need to be manipulated to gain free movement – sometimes there will be paint residue on the ball which is best cleaned off with some rough sandpaper. Give a light coating of grease to the ball to ensure ease of movement in the future. See figure 4.2.3 below for general arrangement.

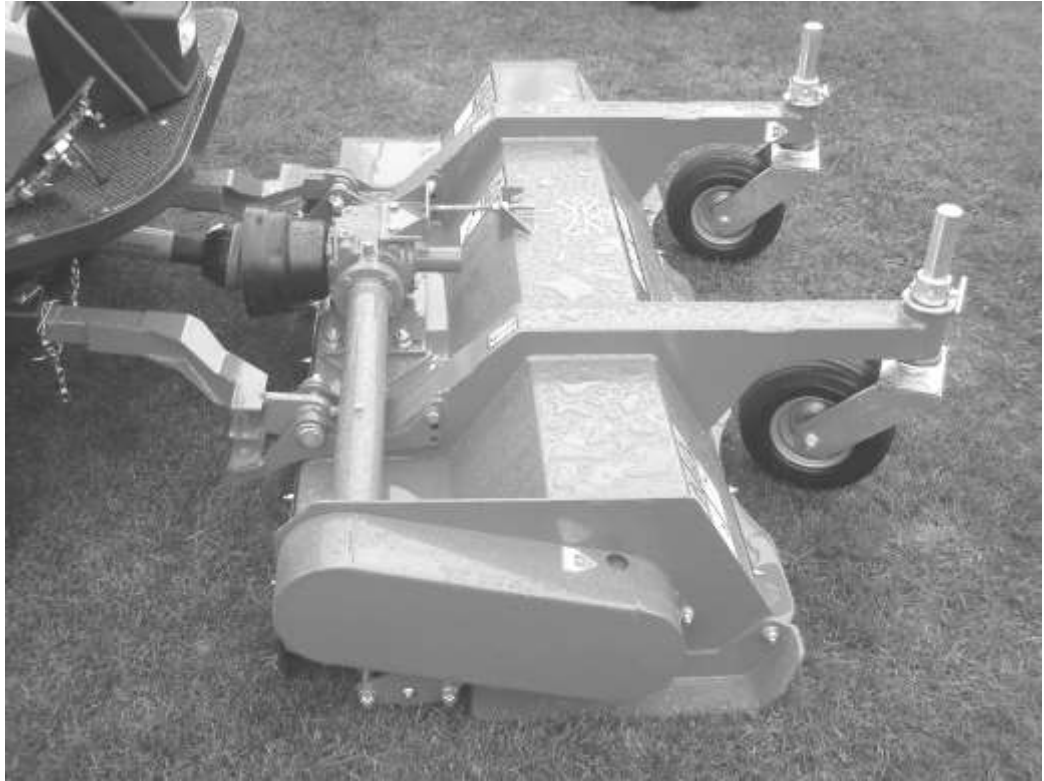


Figure 4.2.3

Start the tractor unit, and without moving forwards, raise the linkage arms to an appropriate height to line up with the mounting pin holes.

Slowly move the tractor forward, so that the ball sockets are lined up to the mounting pin holes as close as possible.

CAUTION! Approach the Outfront at a dead-slow speed. Do not allow the linkage arms to push the Outfront on the ground. Be careful to avoid a collision with the Outfront otherwise damage to the unit, the tractor, or personal injury may occur.

Turn off the tractor engine, and ensure the linkage arms are in “float” mode, so that they may be manipulated up and down by hand.

CAUTION! Take great care whilst manipulating the linkage arms by hand, as there are many pinch points and finger traps that may open or close during this operation.

Spearhead Outfront Flail

Push the mounting pin through its hole firmly, and through the ball socket fully. If the pin is at a slight angle through the holes, a soft-faced mallet may be used to tap the pin home. Ensure that the pin comes all the way through the plates, and its lynch pin hole is exposed.

Insert the lynch pin through the mounting pin hole, securing it to the Outfront.

Repeat for the other hand linkage arm.

Connect the PTO shaft to the tractor PTO output, close the shaft up fully, then extend to the gearbox PTO input shaft. Pull back the collar, and slide the PTO onto the gearbox, then release collar. Give the PTO shaft a pull, forwards and backwards on both yokes, to ensure the PTO has fully engaged. Connect the anti-rotation chains to any suitable hard points on the linkage arms and tractor unit. See figure 4.2.10 below.



Figure 4.2.10 - Outfront mounted on a New Holland MC35

Note that depending on the tractor unit, spacers may be required to be inserted on the pin, either side of the ball socket. These will centralize the Outfront on the tractor unit and take out any slack in the mounting system.

Spearhead Outfront Flail

General Operation

Lift buffer adjustment

The lift buffers allow a range of up and down angles to be achieved with the Outfront, to cater for different terrain and operation conditions. See the figure 5.1.1 for general arrangement of lift buffers.

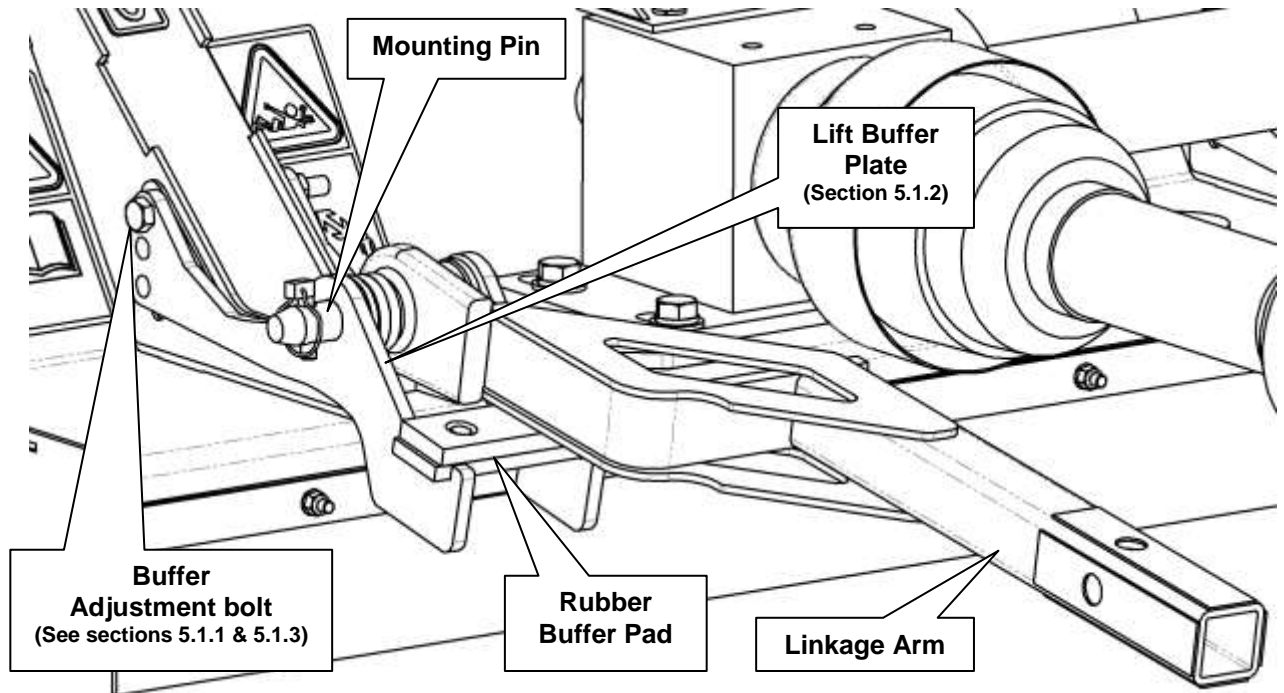


Figure 5.1.1

To adjust the lift height:

Undo the nut, and remove the buffer adjustment bolt

Rotate the lift buffer plate on the mounting pin until the required hole lines up through the plates.

Re-insert the bolt, add nut, tighten up to secure.

Lift adjustment effects. When the lower bolt hole is used (illustrated Figure 5.1.1), the machine will have limited "float" ability over rough ground, but the cowl height and angle is greater when lifted off of the ground i.e. to raise the machine over a kerb or obstacle. The opposite is true for the upper hole – less lift but greater float. This is to allow the user to fine tune the machine setup for the working conditions as required.

Spearhead Outfront Flail

Cut height adjustment

The Outfront can cut material at differing heights through adjustment of the roller height, and the castor wheel height. The unit's front and rear guarding will protect the operator and bystanders from thrown objects, but due to the nature of such guarding - less protection is offered at greater cut heights. See the figure 5.2.1 for general arrangement of cut height adjustment.

DANGER! **NEVER**, through adjustment, allow the front of the machine to point upwards when in work. **NEVER**, have the wheels at a greater height than the roller, as this will cause debris to be thrown forward at great speed. **ALWAYS** have the skids parallel with the ground, or pointing downwards at the front.

To adjust the cutting height

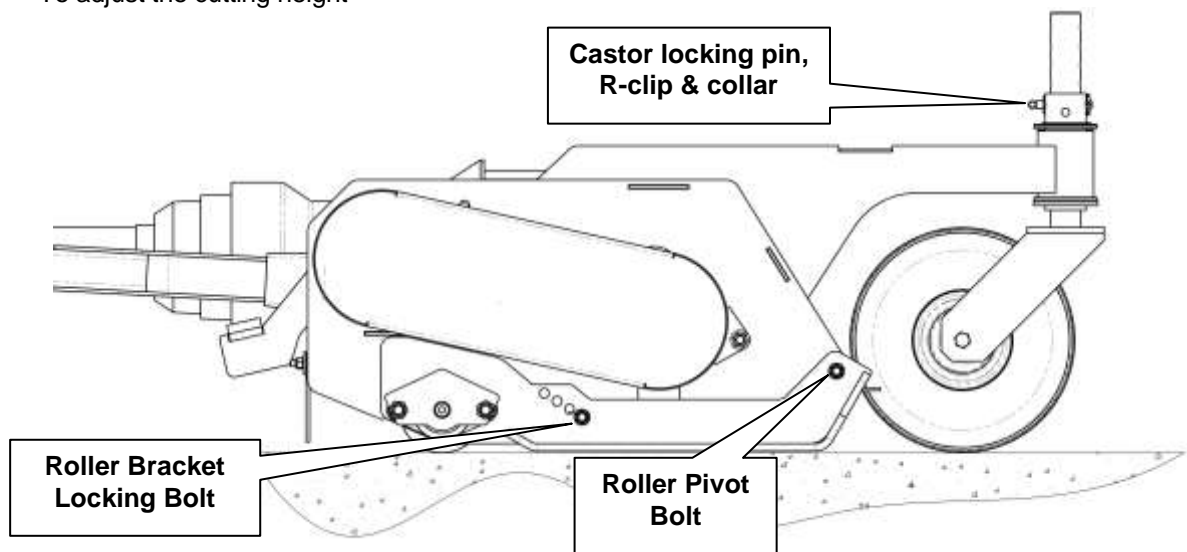


Figure 5.2.1

Roller Adjustment : Ensure that the tractor PTO and engine are turned off. Slacken the roller pivot bolt 1 turn, and remove roller bracket lock bolt at the back of the machine. Repeat for other side of machine.

Start tractor engine, ensure PTO is disengaged, and raise the hydraulic lift arms. Move the lift arm lever into "lock" position. Stop engine.

Adjust the roller by pulling it downwards or lifting it upwards until the required roller height is achieved.

Re-insert roller bracket lock bolt, attach nut, and tighten. Re-tighten roller pivot bolt. Repeat for other side of machine.

Castor Wheel Adjustment : With the machine still raised from the floor, remove the r-clip from the locking pin, then before removing the locking pin, take the weight of the wheel / castor assembly. Remove the pin.

Raise or lower the castor assembly, until the desired cut height is achieved.

Spearhead Outfront Flail

DANGER! **NEVER**, through adjustment, allow the front of the machine to point upwards when in work. **NEVER**, have the wheels at a greater height than the roller, as this will cause debris to be thrown forward at great speed.
ALWAYS have the skids parallel with the ground, or pointing downwards at the front.

Re-insert pin through the collar, and secure with r-clip. Repeat for other side of machine.

Note that if a fine adjustment of the castor height is required, the collar may be rotated 90 degrees around its axis, where another set of holes that are slightly offset exist. The pin may be inserted in either set of holes to gain steps of adjustment in between the coarse settings in the castor's vertical rod.

Start the tractor, lower the machine to the ground, and then check that the machine is level or nose down, and that the same adjustment holes on either left or right side have been used. Failure to do so may reduce the life of the roller and / or the rotor shaft bearings.

Ensure all nuts and bolts are tight, all lynch pins and r-clips are inserted fully, and all guarding is in good condition.

Starting Work

Once the Outfront has been correctly mounted to the tractor and setup for cutting height and the cutting conditions work may commence.

DANGER! **Do not operate machinery with guards missing. Ensure that the correct guards are properly fitted to the machine and tractor at all times and that they are in good condition. Refer to section on Guards and Rotation in this manual to ensure you have the correct guards fitted for the type of operation being performed.**

To commence work;

Start the engine, and with the engine RPM suitable high, engage the PTO drive. Allow the Outfront's rotor shaft to spin up to working speed.

Advance the hand throttle system so that PTO output is no more than 2000 rpm

Release the tractor handbrake, and engage the drive.

The Outfront can cope with a great deal of material coming through the front (up to 60cm height in testing), but if the tractor unit starts to bog down or stall, it is best to limit forward speed. If a greater forward speed is required, consider raising the cut height.

If the ground being worked on is rough and undulating, then the Outfront may "scalp" the turf momentarily. If this occurs, then consider raising the cut height.

ALWAYS be aware of bystanders and property around you when using any agricultural equipment. Thrown debris can cause damage, serious injury or death.

If any sudden bangs or other noises emanate from the rotor shaft or gear train whilst working, disengage the PTO immediately and, when the rotor shaft has stopped turning, raise the linkage arms and carry out an inspection. If a flail is missing, then do not use the machine until it has been repaired. (See section 8 for troubleshooting advice.)

Spearhead Outfront Flail

Machine Guarding

Machinery guarding must always be kept attached to the machine, and in a good, workable condition. Failure to ensure this, may result in serious injury or even death to either bystanders, or the operator.

See the figures 5.4.1 and 5.4.2 below for details on machine guarding.

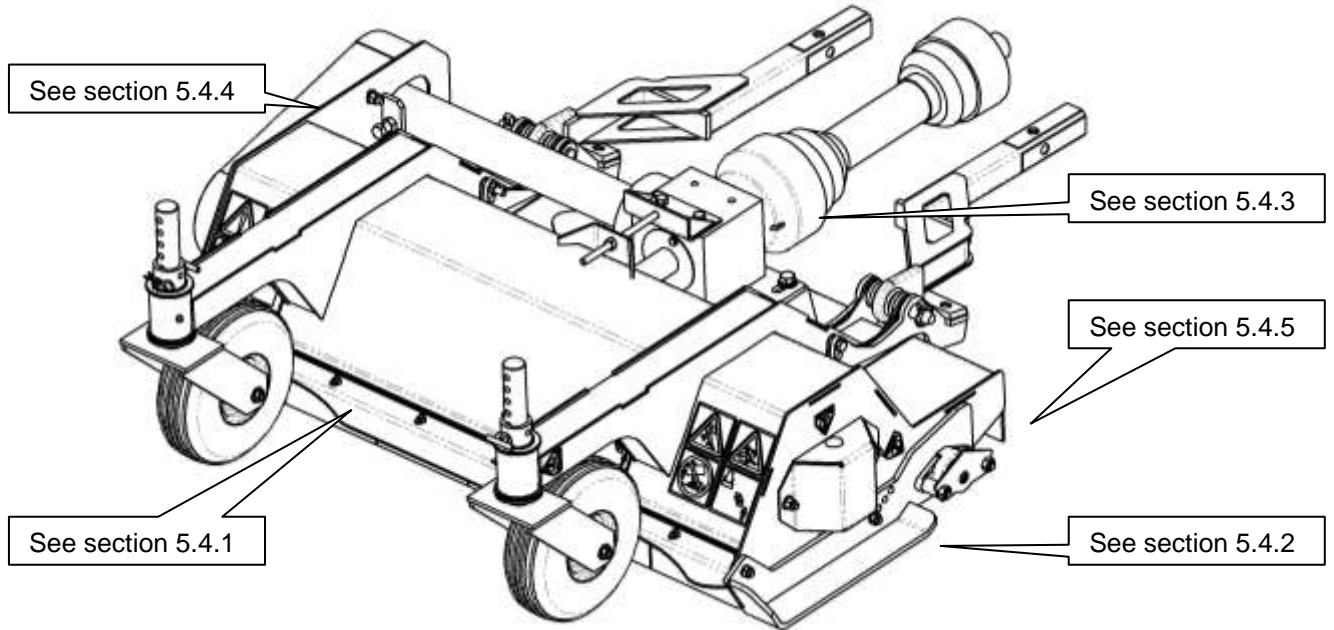


Figure 5.4.1

Spearhead Outfront Flail

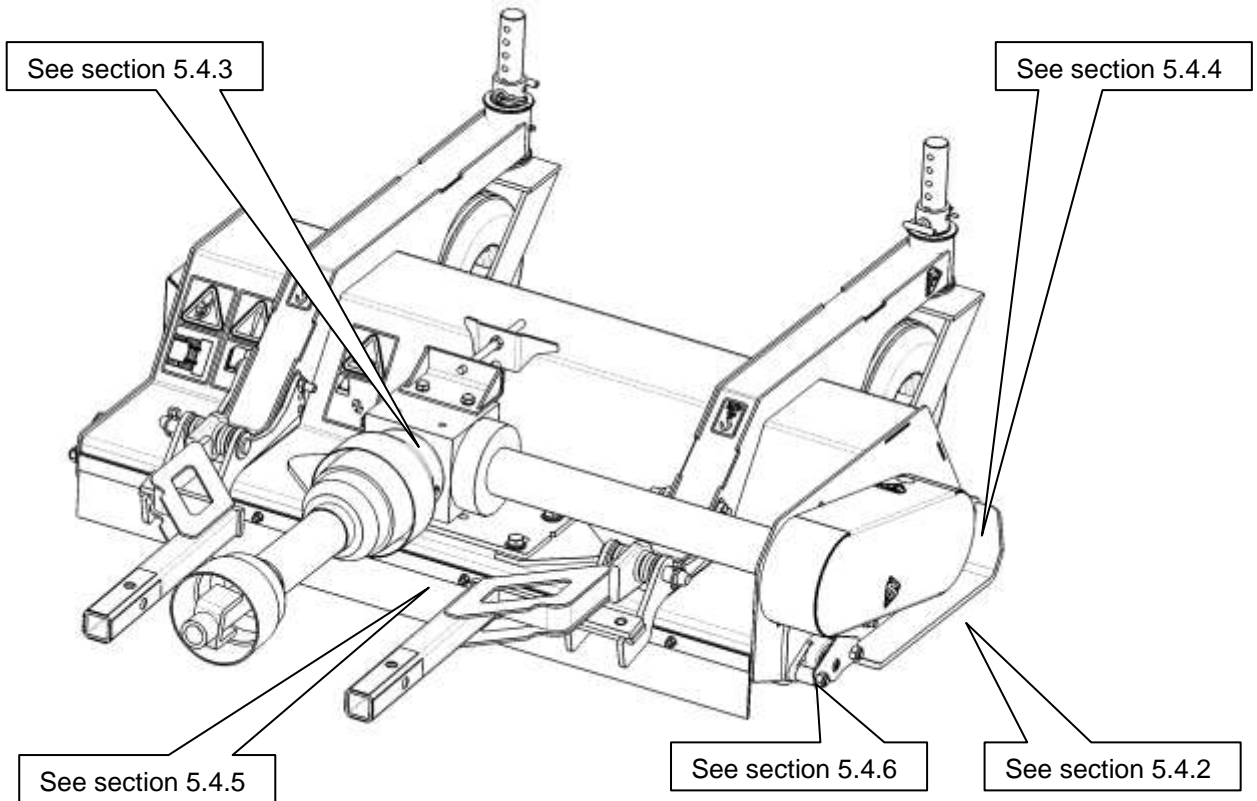


Figure 5.4.2

- | | |
|-------------------------------|--|
| 5.4.1 Front Guard. | Rubber flap with steel mounting guard. |
| 5.4.2 Side Skid. | Thick steel. Also carries roller assembly. |
| 5.4.3 PTO Cup. | Plastic cup protects users from PTO yoke. |
| 5.4.4 Drive Guard. | Thick steel. Covers pulleys and drive belts. |
| 5.4.5 Rear Guard. | Rubber flap with steel mounting strip. |
| 5.4.6 Roller Assembly. | Tubular steel also acts as guarding. |

Spearhead Outfront Flail

Maintenance

All maintenance, cleaning and repair operations must be carried out with the Outfront firmly lowered to the ground and detached from the tractor, or with disconnected PTO, engine off and starting key out.

Use grease classification DIN 51825 (KP 2 K) - For gearbox use compatible oils – classification ISO VG 220.

Maintenance schedule

After the first two hours' operation from new (or after fitting new belts) check belt tension.

Subsequently and regularly after every 8 hours' operation:

- a) Check and if necessary tighten all nuts and bolts,
- b) Check for wear and the condition of all flails.
- c) Check the condition of the safety guards.
- d) Check the condition and tightness of the drive belts
- e) Visually check the cowl and linkage to detect any possible damage caused by earlier work.
- f) Check gearbox and drive tube lubricating levels.
- g) Grease the locations shown in figure 6.1.1. (Greasing decals not illustrated)

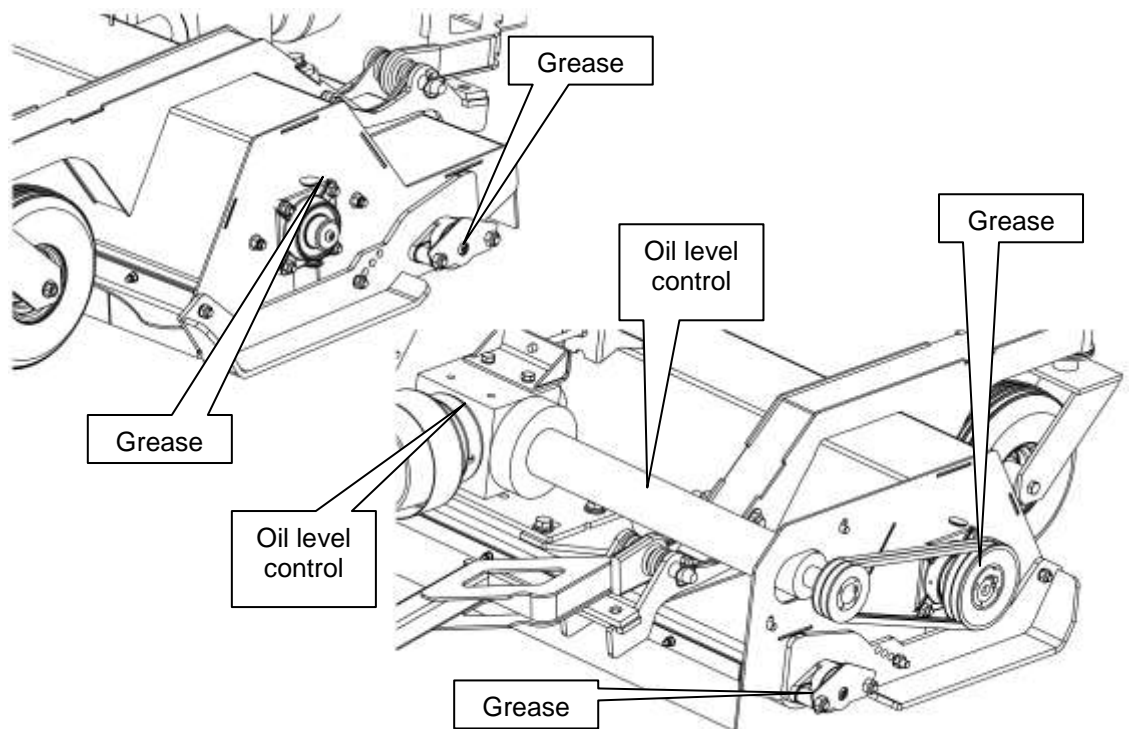


Figure 6.1.1 – Guards are removed for clarity

These operations must always be carried out at the end of each working day. This facilitates the removal of mud or other material from the rotating parts (bearing, pins etc.) in order to avoid rust and possible seizure.

Every 100 hours' operation grease the moving parts of the PTO shaft, extracting the two parts of the shaft.

After long inactivity, repeat the operation before re-using the machine.

Spearhead Outfront Flail

Belt tensioning

Inspect the belts, to ensure there are no scorch marks, nicks, or frayed areas on the belts themselves. If replacement is needed, see section 8.2. To tighten a belt, refer to figure 6.2.1, and perform the following actions;

- 6.2.1 Slacken the four gearbox mounting bolts
- 6.2.2 Slacken the locknut on the drive tube tension bolt
- 6.2.3 Slacken the locknut on the gearbox tension bolt
- 6.2.4 Tighten the drive tube tension bolt and the gearbox tension bolt – 1 turn each at a time - until you are able to only just rotate the centre section of the belt by 90 degrees
- 6.2.5 Tighten up both lock nuts
- 6.2.6 Tighten up the four gearbox mounting bolts.

IMPORTANT: more complex operations must be carried out in authorised workshops.

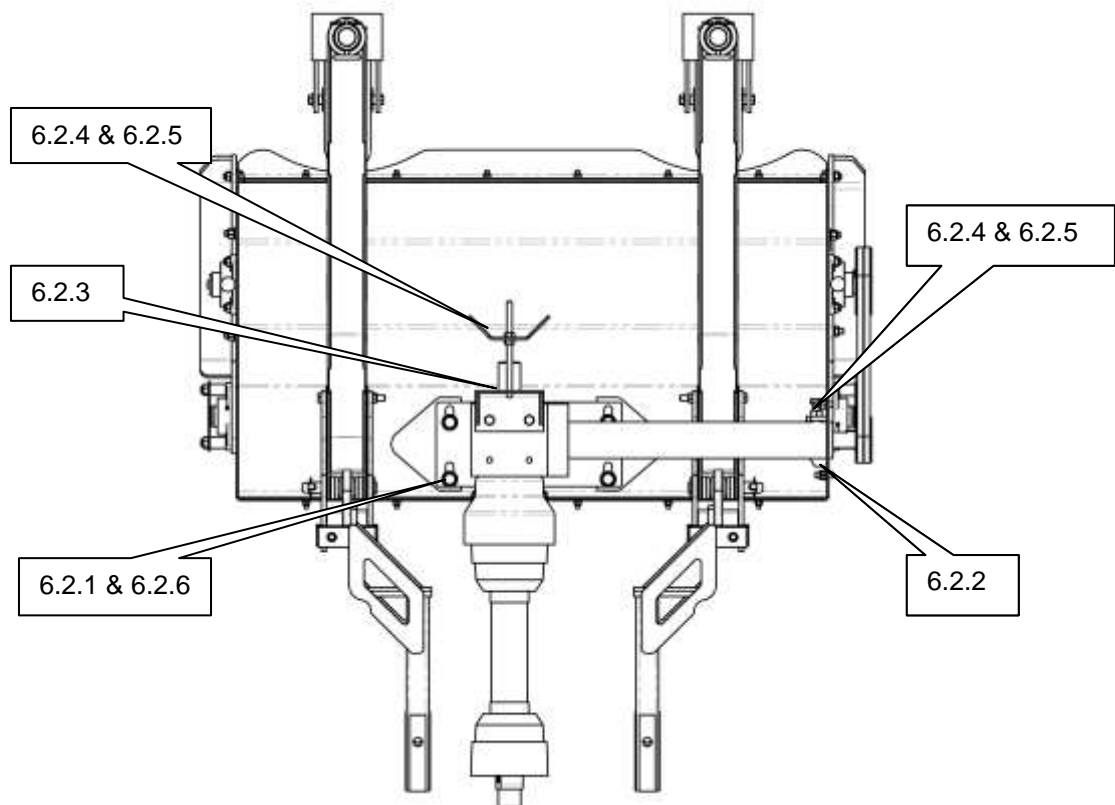


Figure 6.2.1

Spearhead Outfront Flail

Troubleshooting

PROBLEM	CAUSES	REMEDIES
Irregular Cut	<ul style="list-style-type: none"> • Worn, bent or broken flails • Machine is not level with the ground • Material blockage due to speed 	<ul style="list-style-type: none"> • Replace it / them • Level the machine • Reduce working speed
Machine Noise	<ul style="list-style-type: none"> • Loose bolts • Cracks or initiation of cracks in flail head 	<ul style="list-style-type: none"> • Tighten Bolts • Have it repaired in specialised workshop, or replaced through an authorised dealer
Gearbox noise	<ul style="list-style-type: none"> • Lack of oil • Worn bearings • Worn gears 	<ul style="list-style-type: none"> • Fill to level • Replace • Replace
Vibration	<ul style="list-style-type: none"> • Broken or worn flails • Unbalanced rotor • Worn rotor bearings 	<ul style="list-style-type: none"> • Replace • Replace in authorised workshop • Replace in authorised workshop
Premature flail wear	<ul style="list-style-type: none"> • Flails touching the ground 	<ul style="list-style-type: none"> • Adjust the height of cut
Excessive backlash in joints	<ul style="list-style-type: none"> • Worn pins 	<ul style="list-style-type: none"> • Replace
Breakage of roller bearings	<ul style="list-style-type: none"> • Violent impact on ground when the machine is lowered • Dirty or ungreased bearings 	<ul style="list-style-type: none"> • Lower it gently • Clean and grease
Belts overheating / smoking	<ul style="list-style-type: none"> • Flails touching the ground • Working speed unsuitable to the amount of the material being cut 	<ul style="list-style-type: none"> • Adjust the height of cut • Reduce speed

Spearhead Outfront Flail

Replacement Parts

Should you require replacement parts, these are detailed in the Outfront parts book accompanying the machine. Alternatively, these are available online to your local Spearhead dealer providing you stipulate the machine serial number. This will identify the specific build of your machine.

Before carrying out any work, it is mandatory to:

- a) Lower the machine to the ground
- b) Disconnect the power takeoff, stop the tractor and take out the starting key.
- c) Wear working gloves

Flail replacement

When the flails are worn, they must all be replaced. In case of a partially broken flail it is advisable to replace the broken one and the one diametrically opposite, in order to maintain the balance see figure 8.1.1 below. If excessive vibration is felt after this modification, contact Spearhead after sales support, or the nearest authorised dealer.

A Spearhead Scoop flail is illustrated in figure 8.1.2 across.

Please note that when replacing flails, the user MUST replace the flail and its nut and bolt combination together.

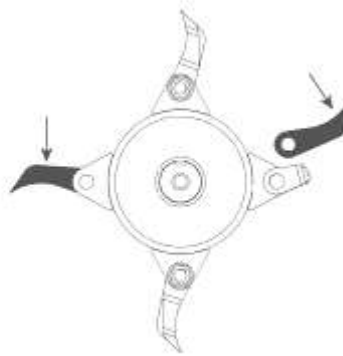


Figure 8.1.1 – Removing flails

Spearhead Outfront Flail



Figure 8.1.2 – Spearhead 'Scoop' flail

Spearhead Outfront Flail

Belt replacement

This operation must be carried out with the machine touching the ground, the power take-off disconnected and the starting key out. To replace a belt, refer to figure 8.2.1 and perform the following actions;

- 8.2.1 Remove the drive belt guarding (not shown in image below)
- 8.2.2 Slacken the four gearbox mounting bolts
- 8.2.3 Slacken the locknut on the drive tube tension bolt
- 8.2.4 Slacken the locknut on the gearbox tension bolt
- 8.2.5 Undo the drive tube tension bolt, until it is clear of the drive tube
- 8.2.6 Push the drive tube forwards (towards the castors), so that the belts fall loose from the pulleys
- 8.2.7 Replace the belts, starting with the inner belt first
- 8.2.8 Reverse the above sequence and follow section 6.2 to re-tighten

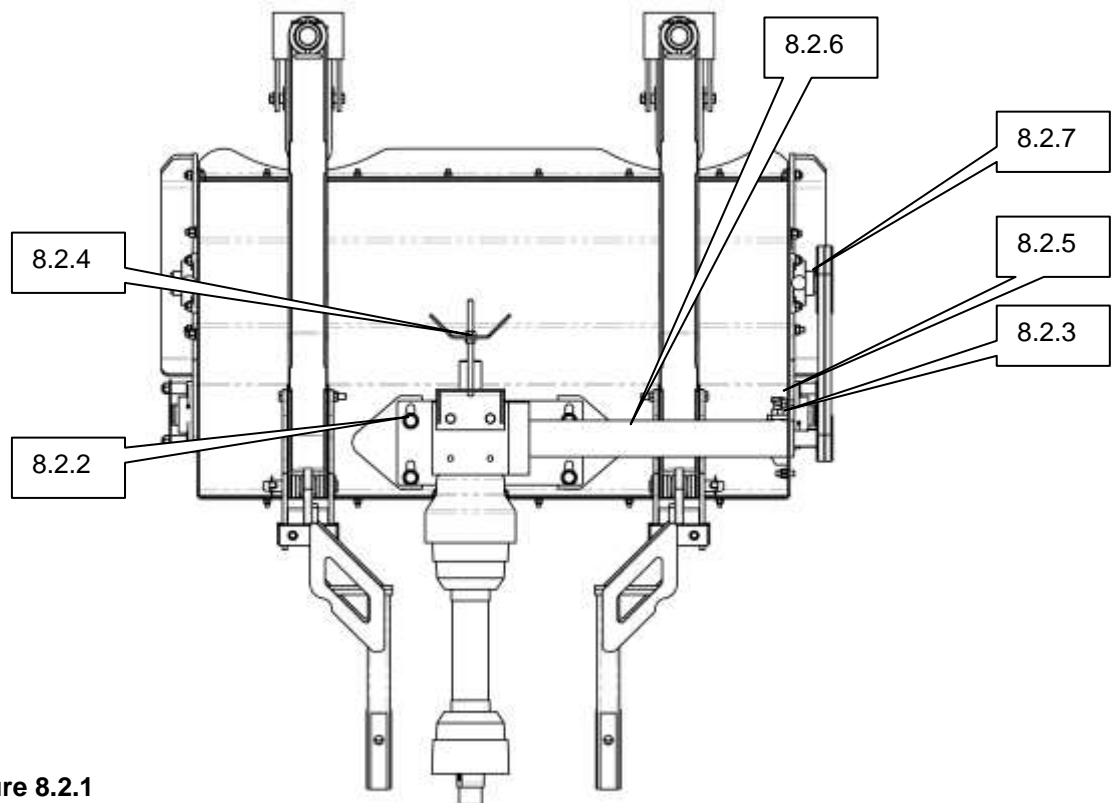


Figure 8.2.1

Spearhead Outfront Flail

Disposal

If the machine becomes un-serviceable and must be disposed of, the materials that make up the machine must be disposed of separately, in order to stop them becoming a hazard to the local environment.

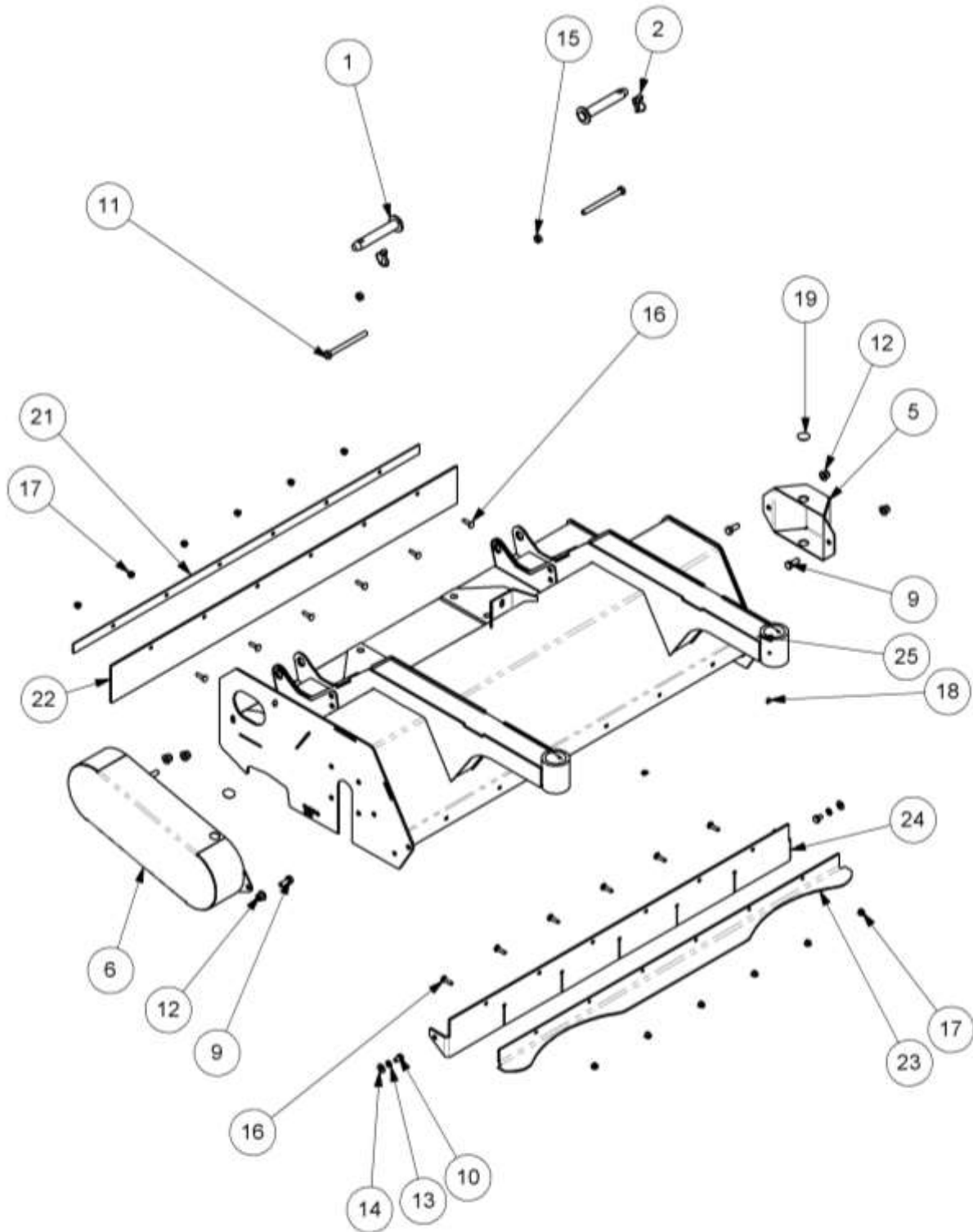
These materials are:

- a) Steel (cowling, linkage arms, rotor shaft, flails etc.)
- b) mineral oil (within drive tube & gearbox)
- c) rubber (rear guarding)
- d) plastic (PTO guarding and buffer pads)

Please ensure all local laws are followed correctly when disposing of these materials.

Spearhead Outfront Flail

77.021.02 – I30 COWL ASSY



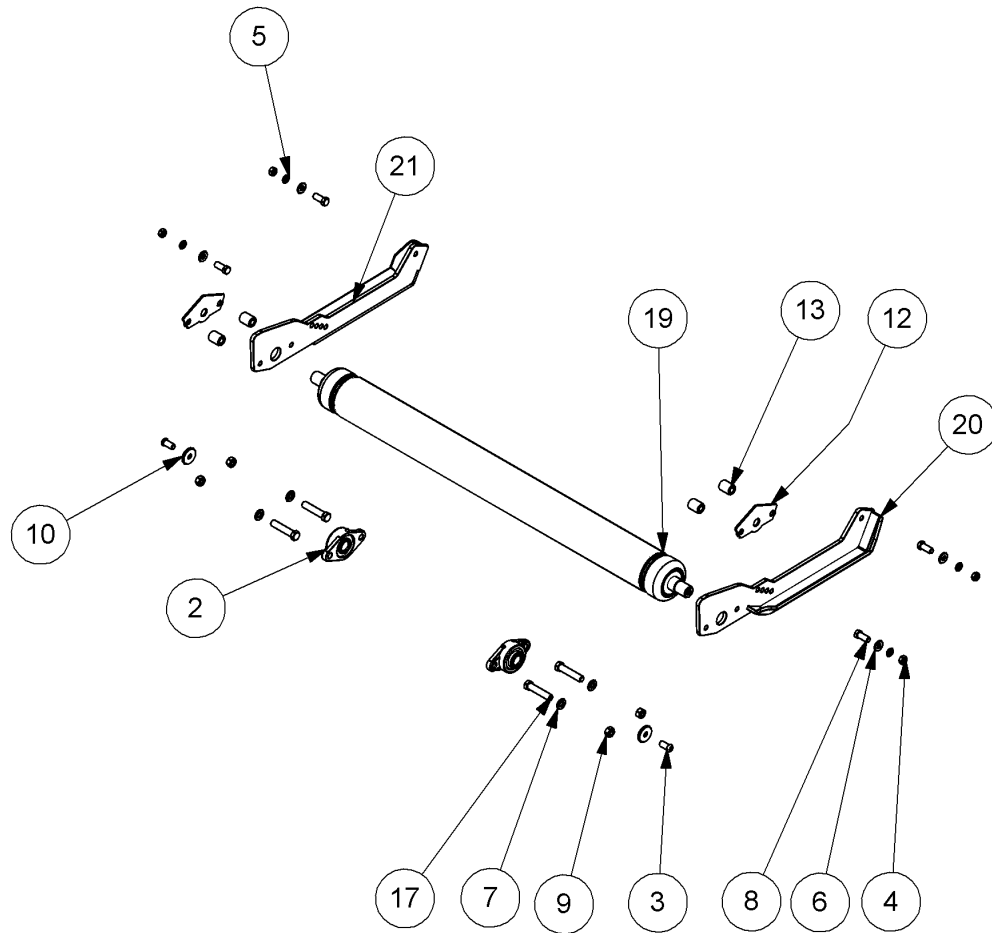
Spearhead Outfront Flail

77.021.02 – 130 COWL ASSY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03.609.01	PIN 25 DIA X 130	2
2	00.372.01	LINCH PIN	2
5	48228.01	GUARD - BEARING	1
6	48232.02	DRIVE GUARD RH	1
9	05.264.23	SETSCREW M12x30	3
10	2770545	SETSCREW M10x16	2
11	05.292.27	BOLT M12x140	2
12	05.287.22	M12 S.LOCK FLANGE NUT	5
13	05.282.02	SPRING WASHER M10	2
14	05.281.02	FLAT WASHER M10	2
15	05.287.03	SELF-LOCKING NUT M12	2
16	9293064	BOLT CUP SQR M8X30	12
17	05.287.20	M8 S.LOCK FLANGE NUT	12
18	05.953.03	GREASE NIPPLE M10xStr	2
19	03.816.01	PLUG RUBBER 25mm DIA.	3
21	48229.02	RETAINER BAR	1
22	48230.02	GUARD REAR FLEXIBLE 1300	1
23	48207.17	FRONT GUARD 1300	1
24	48230.05	FRONT RUBBER GUARD 1300	1
25	48207.16	CTVM 1300 COWL MK2	1

Spearhead Outfront Flail

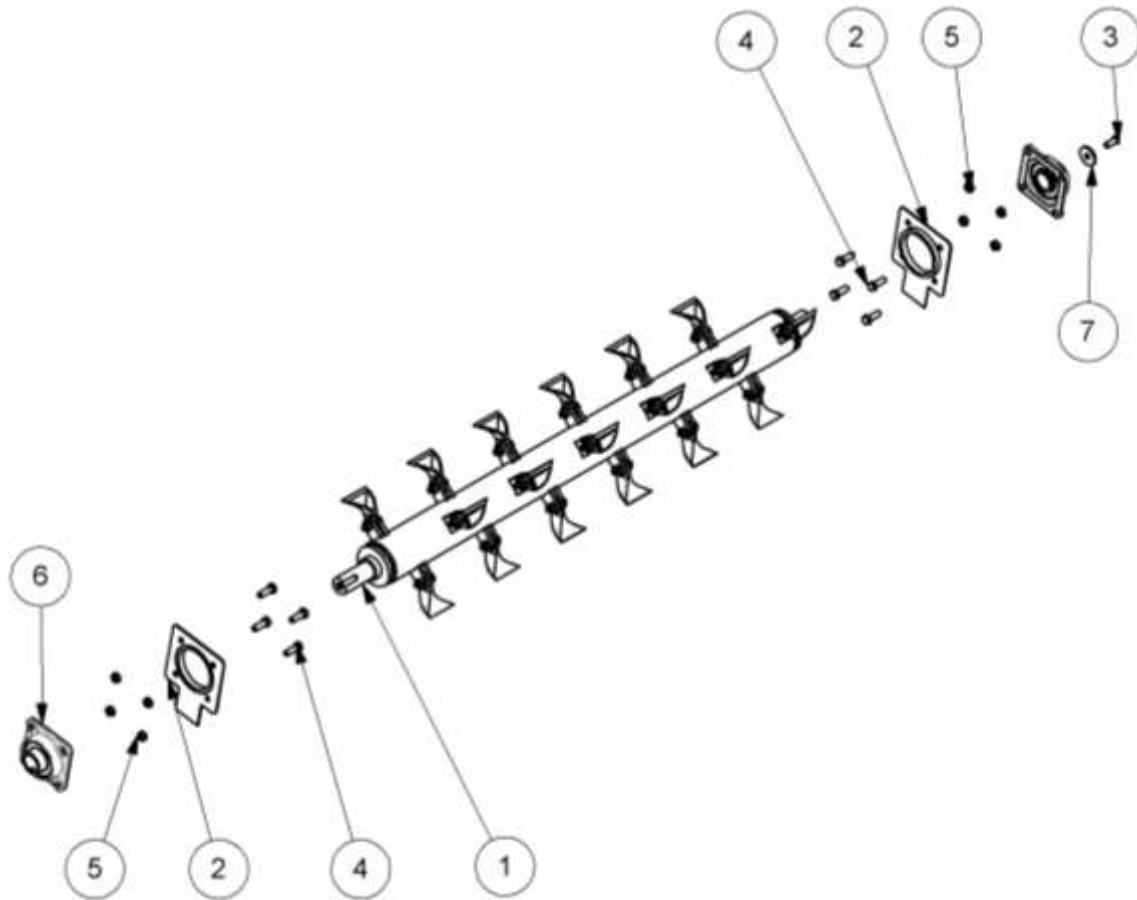
77.022.02 – 130 ROLLER ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2	47142.03	FLANGE BEARING	2
3	05.625.10	SKT CAPSCREW M12x30	2
4	05.287.03	SELF-LOCKING NUT M12	4
5	05.282.03	SPRING WASHER M12	4
6	05.281.03	FLAT WASHER M12	4
7	05.281.14	FLAT WASHER M14	4
8	05.264.24	SETSCREW M12x35	4
9	30.077.57	SELF-LOCKING NUT M14	4
10	05.234.01	WASHER 44.5x13x5 PLATED	2
12	47142.05	COVER PLATE	2
13	47142.06	CDS SPACER	4
20	48223.10	BENT SKID RH	1
21	48223.09	BENT SKID LH	1
17	05.839.48	SETSCREW M14 X 80	4
19	42056.13	ROLLER ASSY 1300 CTVM MK2	1

Spearhead Outfront Flail

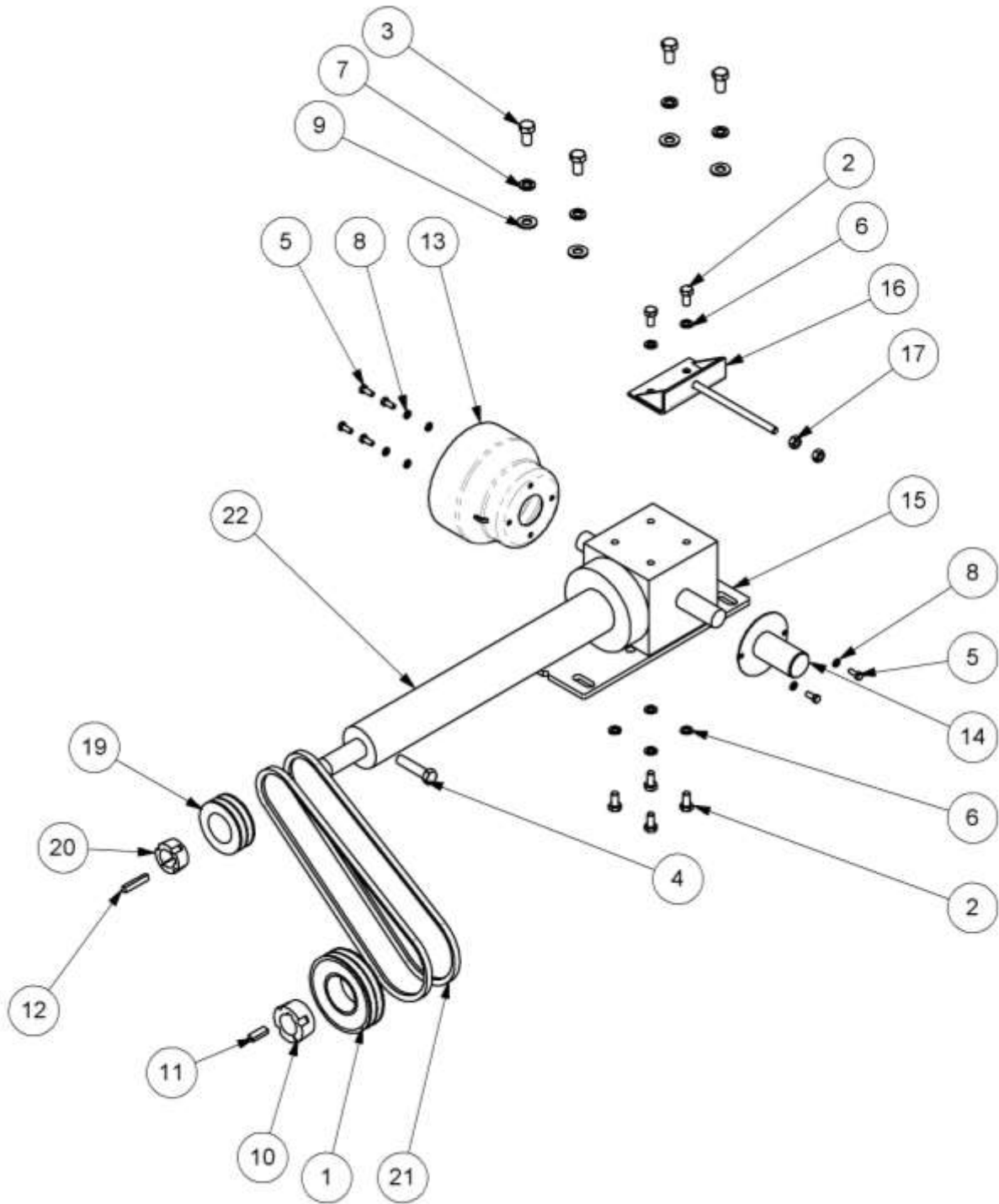
77.023.02 – 130 ROTOR ASSY



ITEM NO.	PART NUMBER.	DESCRIPTION.	QTY.
1	48236.04	ROTOR SH ASSY 130	1
	2770364	BOLT	24
	2770574	NUT	24
	7770714	FLAIL	24
2	48236.15	ANTI-WRAP ASSY	2
3	05.625.10	SKT CAPSCREW M12X30	1
4	05.624.24	SETSCREW M12X35	8
5	05.287.03	SELF-LOCKING NUT M12	8
6	03.008.01	BEARING ASSY – FLANGED	2
7	05.234.01	WASHER 44.5X13X5 PLATED	1

Spearhead Outfront Flail

77.563.09 – I30 DRIVE ASSY



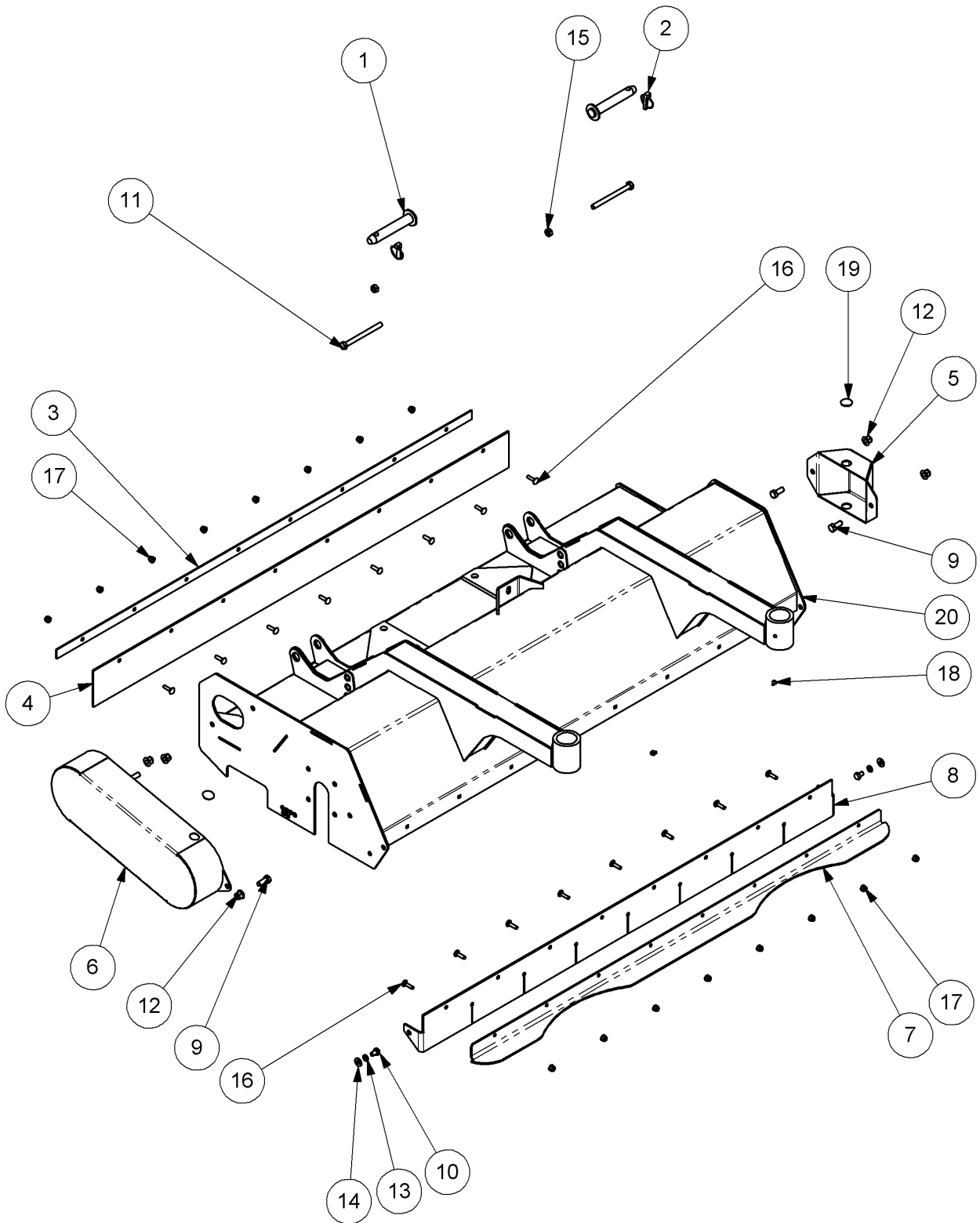
Spearhead Outfront Flail

77.563.09 – I30 DRIVE ASSY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03.795.06	PULLEY-VEE 140 PCD 2SPA	1
2	05.264.22	SETSCREW M12x25	6
3	05.264.33	SETSCREW M16x30	4
4	05.264.40	SETSCREW M16x70	1
5	05.264.01	SETSCREW M8x20	6
6	05.282.03	SPRING WASHER M12	6
7	05.282.04	SPRING WASHER M16	4
8	05.282.01	SPRING WASHER M8	6
9	05.281.04	FLAT WASHER M16	4
10	05.424.40	TAPER LOCK 2012 X 40 BORE	1
11	05.960.29	KEY S/REP 12X8X37	1
12	05.960.04	KEY S/REP 10X8X56	1
13	08.548.08	PTO CUP	1
14	42668.02	GUARD - GEARBOX SHAFT	1
15	48225.06	GBOX PLATE	1
16	48225.07	TENSION BRKT	1
17	05.286.03	NUT M12	2
19	03.795.15	PULLEY 90 PCD	1
20	05.424.43	TAPER LOCK 1610	1
21	05.299.69	VEE BELT	2
22	48195.09	GEARBOX - TEE INC. DRIVETUBE	1

Spearhead Outfront Flail

77.563.08 - I60 COWL ASSY



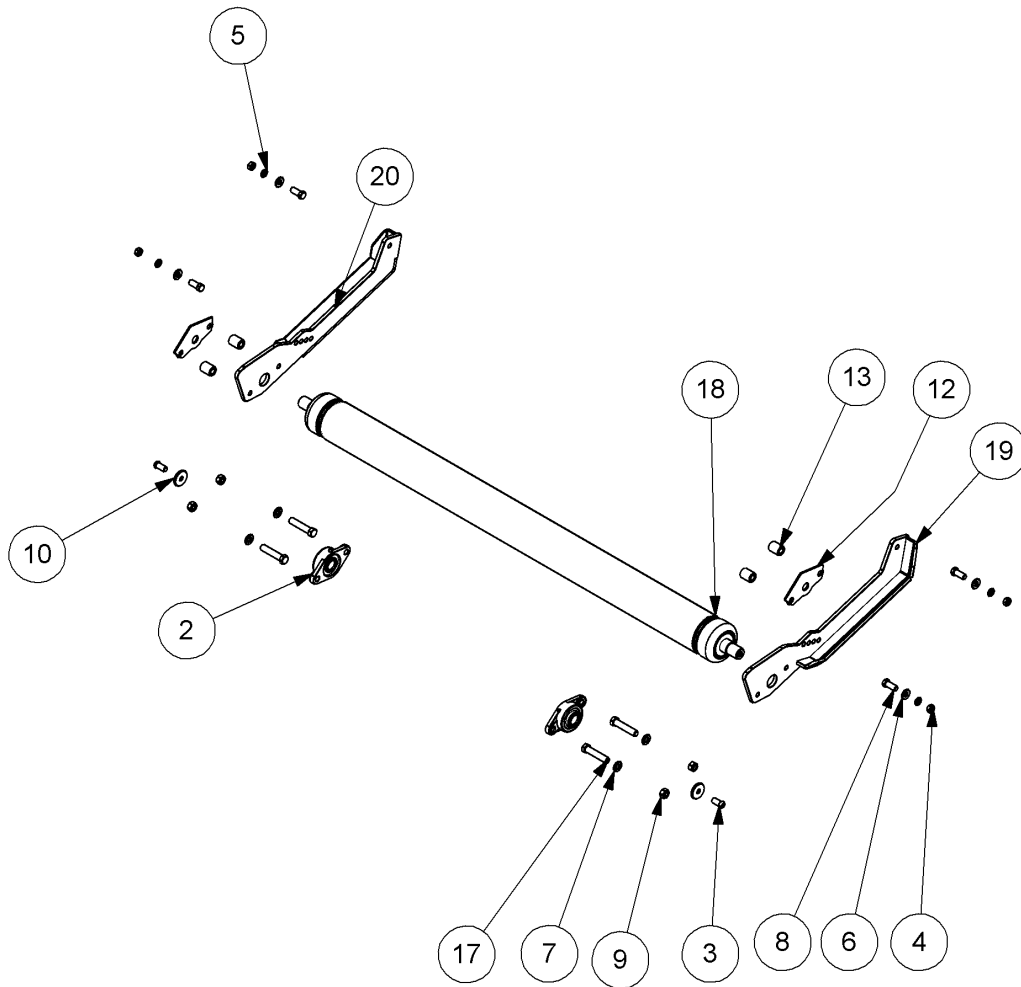
Spearhead Outfront Flail

77.563.08 – I60 COWL ASSY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03.609.01	PIN 25 DIA X 130	2
2	00.372.01	LINCH PIN	2
3	48229.01	BACKING STRIP	1
4	48230.01	GUARD - FLEXIBLE	1
5	48228.01	GUARD - BEARING	1
6	48232.02	DRIVE GUARD RH	1
7	48207.13	FRONT GUARD	1
8	48230.04	RUBBER -GUARD	1
9	05.264.23	SETSCREW M12x30	3
10	2770545	SETSCREW M10x16	2
11	05.292.27	BOLT M12x140	2
12	05.287.22	M12 S.LOCK FLANGE NUT	5
13	05.282.02	SPRING WASHER M10	2
14	05.281.02	FLAT WASHER M10	2
15	05.287.03	SELF-LOCKING NUT M12	2
16	9293064	BOLT CUP SQR M8X30	16
17	05.287.20	M8 S.LOCK FLANGE NUT	16
18	05.953.03	GREASE NIPPLE M10xStr	2
19	03.816.01	PLUG RUBBER 25mm DIA.	3
20	48207.14	CTVM 1600 COWL	1

Spearhead Outfront Flail

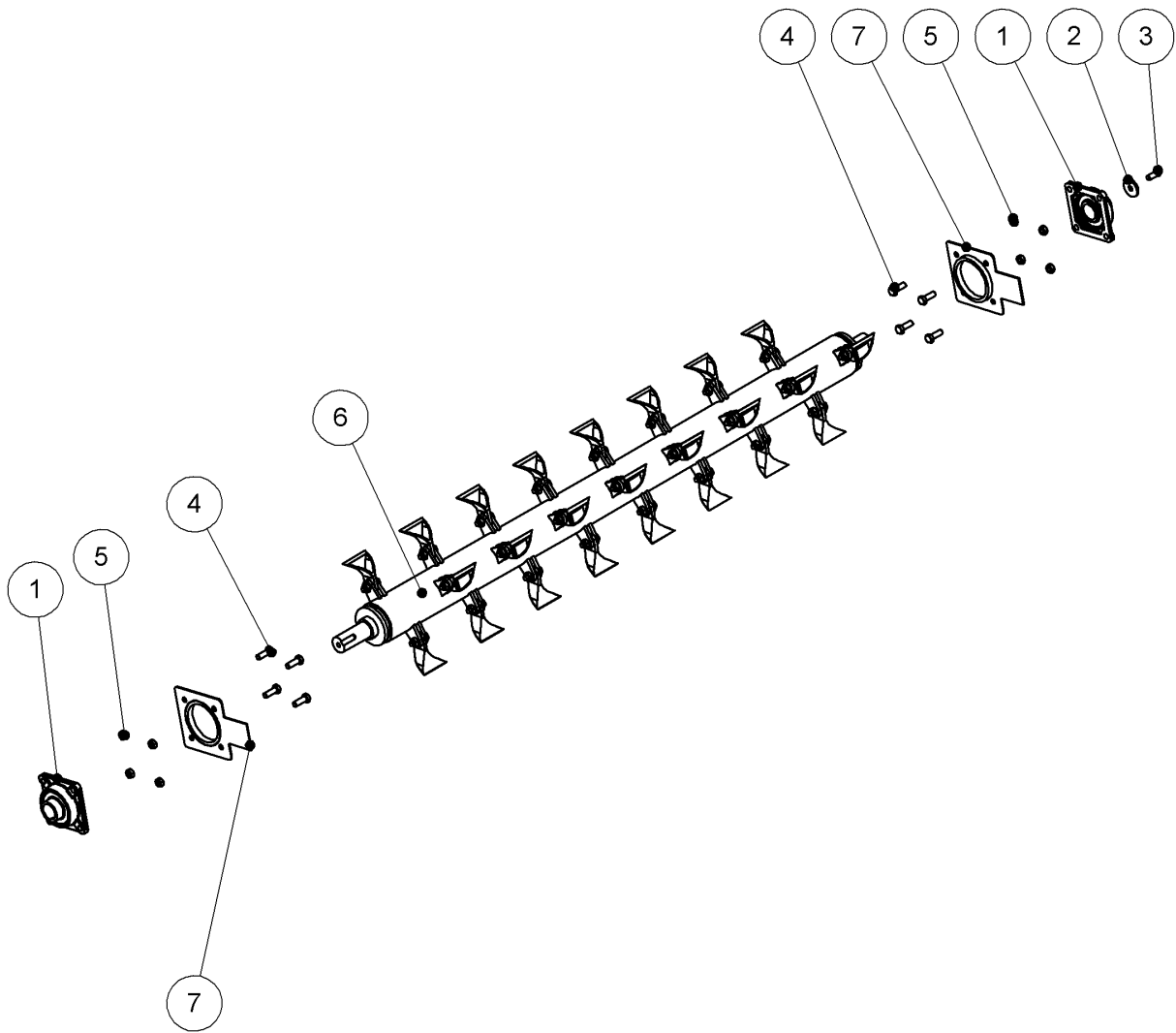
72.I2I.22 - 160 ROLLER ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
18	42056.12	ROLLER ASSY 1600 CTVM	1
2	47142.03	FLANGE BEARING	2
3	05.625.10	SKT CAPSCREW M12x30	2
4	05.287.03	SELF-LOCKING NUT M12	4
5	05.282.03	SPRING WASHER M12	4
6	05.281.03	FLAT WASHER M12	4
7	05.281.14	FLAT WASHER M14	4
8	05.264.24	SETSCREW M12x35	4
9	30.077.57	SELF-LOCKING NUT M14	4
10	05.234.01	WASHER 44.5x13x5 PLATED	2
12	47142.05	COVER PLATE	2
13	47142.06	CDS SPACER	4
19	48223.10	BENT SKID RH	1
20	48223.09	BENT SKID LH	1
17	05.839.48	SETSCREW M14 X 80	4

Spearhead Outfront Flail

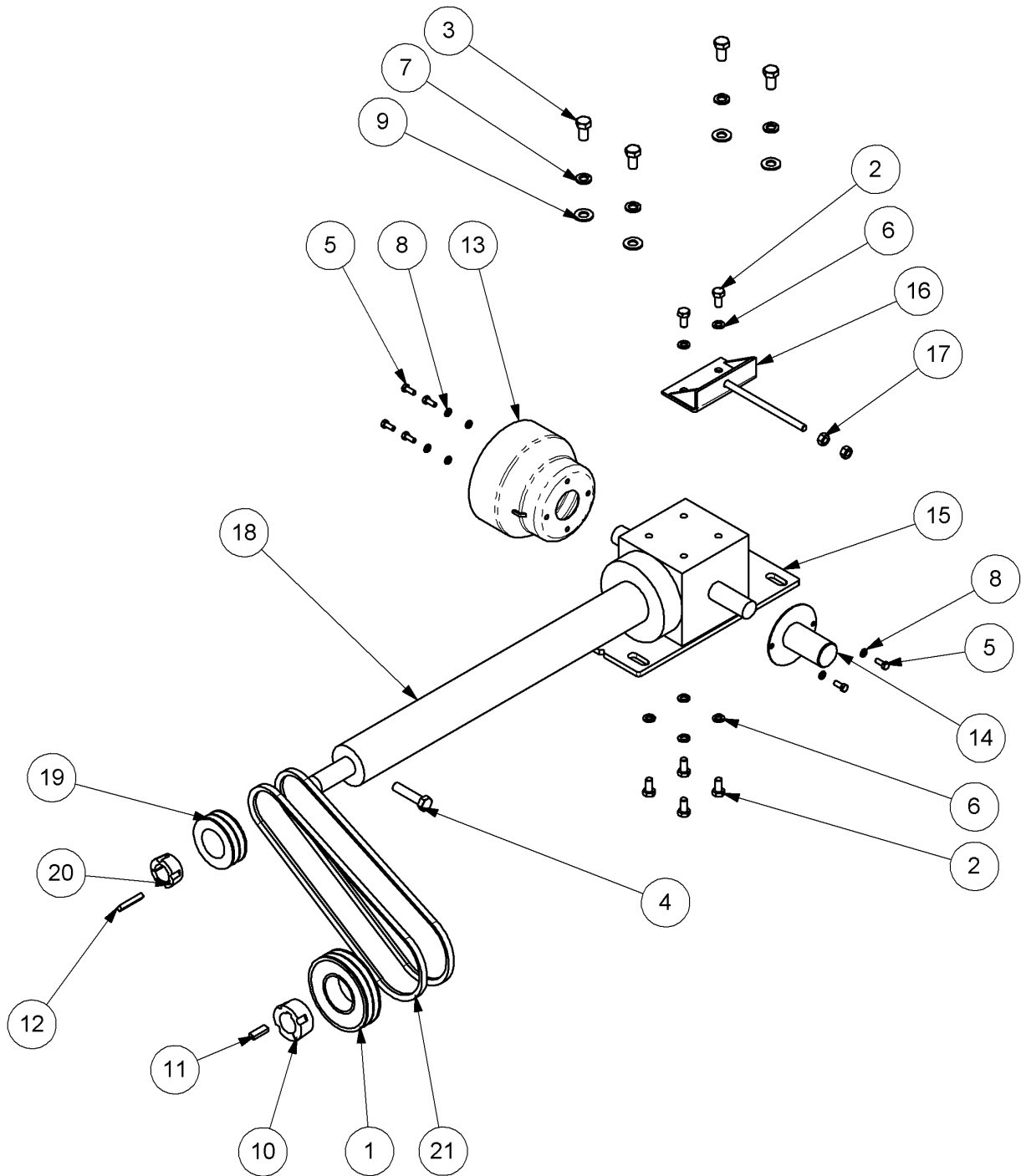
77.564.02 – 160 ROTOR ASSY



ITEM NO.	PART NUMBER.	DESCRIPTION.	QTY.
1	03.008.01	BEARING ASSY – FLANGED	2
2	05.234.01	WASHER 44.5X13X5 PLATED	1
3	05.625.10	SKT CAPSCREW M12X30	1
4	05.264.24	SETSCREW M12X35	8
5	05.287.03	SELF-LOCKING NUT M12	8
6	48236.03	ROTOR SHAFT ASSY 160	1
	2770364	BOLT	32
	2770574	NUT	32
	7770714	FLAIL	32
7	48236.16	ANTI WRAP ASSY – LONG	2

Spearhead Outfront Flail

77.563.07 - I60 DRIVE ASSY



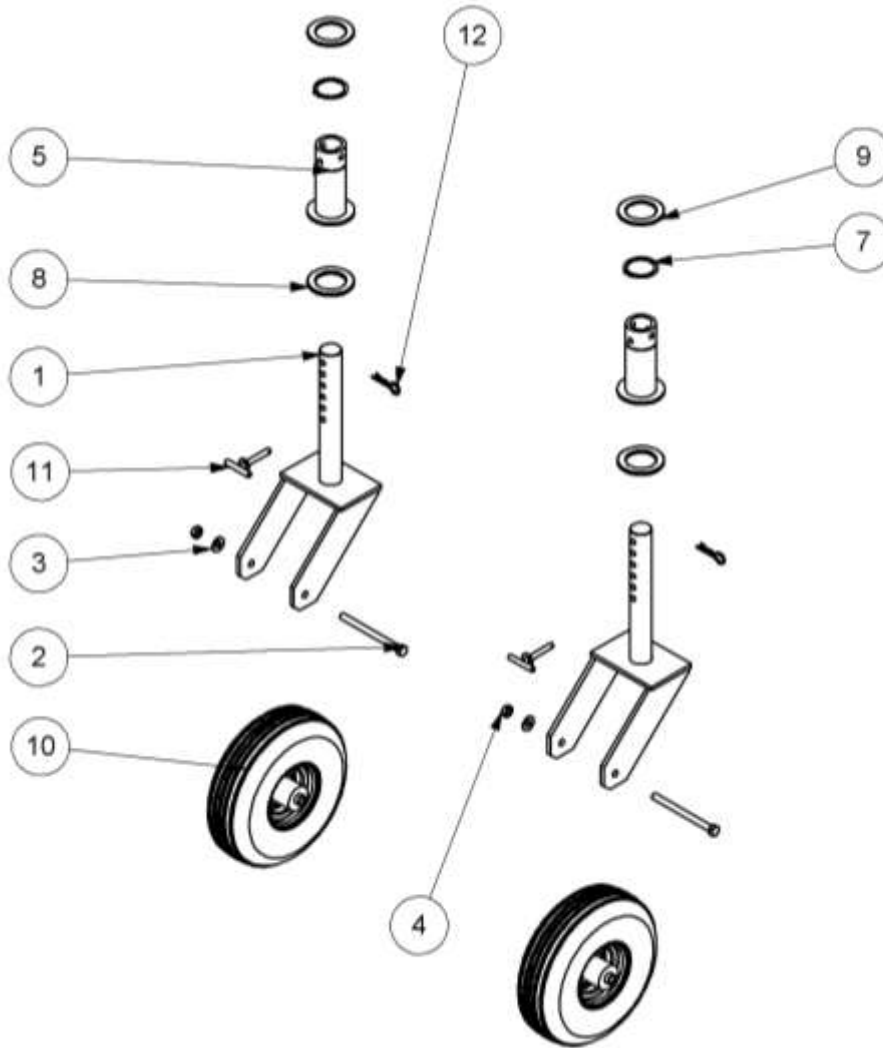
Spearhead Outfront Flail

77.563.07 – I60 DRIVE ASSY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03.795.06	PULLEY-VEE 140 PCD 2SPA	1
2	05.264.22	SETSCREW M12x25	6
3	05.264.33	SETSCREW M16x30	4
4	05.264.40	SETSCREW M16x70	1
5	05.264.01	SETSCREW M8x20	6
6	05.282.03	SPRING WASHER M12	6
7	05.282.04	SPRING WASHER M16	4
8	05.282.01	SPRING WASHER M8	6
9	05.281.04	FLAT WASHER M16	4
10	05.424.40	TAPER LOCK 2012 X 40 BORE	1
11	05.960.29	KEY S/REP 12X8X37	1
12	05.960.04	KEY S/REP 10X8X56	1
13	08.548.08	PTO CUP	1
14	42668.02	GUARD - GEARBOX SHAFT	1
15	48225.06	GBOX PLATE	1
16	48225.07	TENSION BRKT	1
17	05.286.03	NUT M12	2
18	48195.07	GEARBOX - TEE	1
19	03.795.15	PULLEY 90 PCD	1
20	05.424.43	TAPER LOCK 1610	1
21	05.299.69	VEE BELT	2

Spearhead Outfront Flail

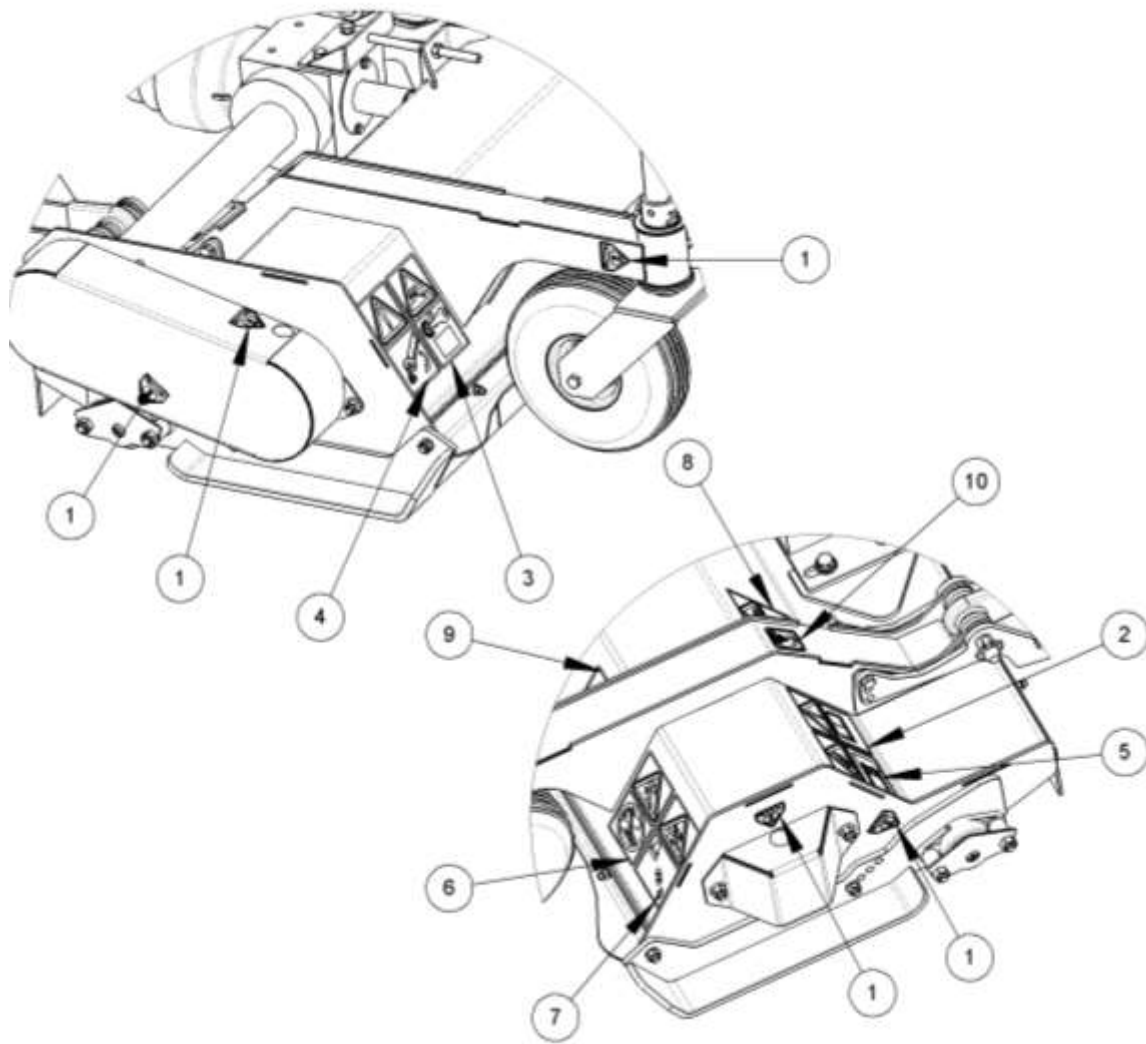
77.560.01 – CASTOR WHEELS ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	cut height low/QTY.
1	48233.01	WHEEL BRACKET	2
2	05.292.28	BOLT M12x150	2
3	05.281.03	FLAT WASHER M12	2
4	05.287.03	SELF-LOCKING NUT M12	2
5	48234.01	WHEEL PIVOT	2
7	05.959.30	CIRCLIP - EXTERNAL	2
8	48226.01	THRUST WASHER	2
9	48227.01	WASHER - STEEL	2
10	48237.01	CASTER WHEEL	2
11	48234.02	PIN ASSY - WHEEL	2
12	T6573	R CLIP S12	2

Spearhead Outfront Flail

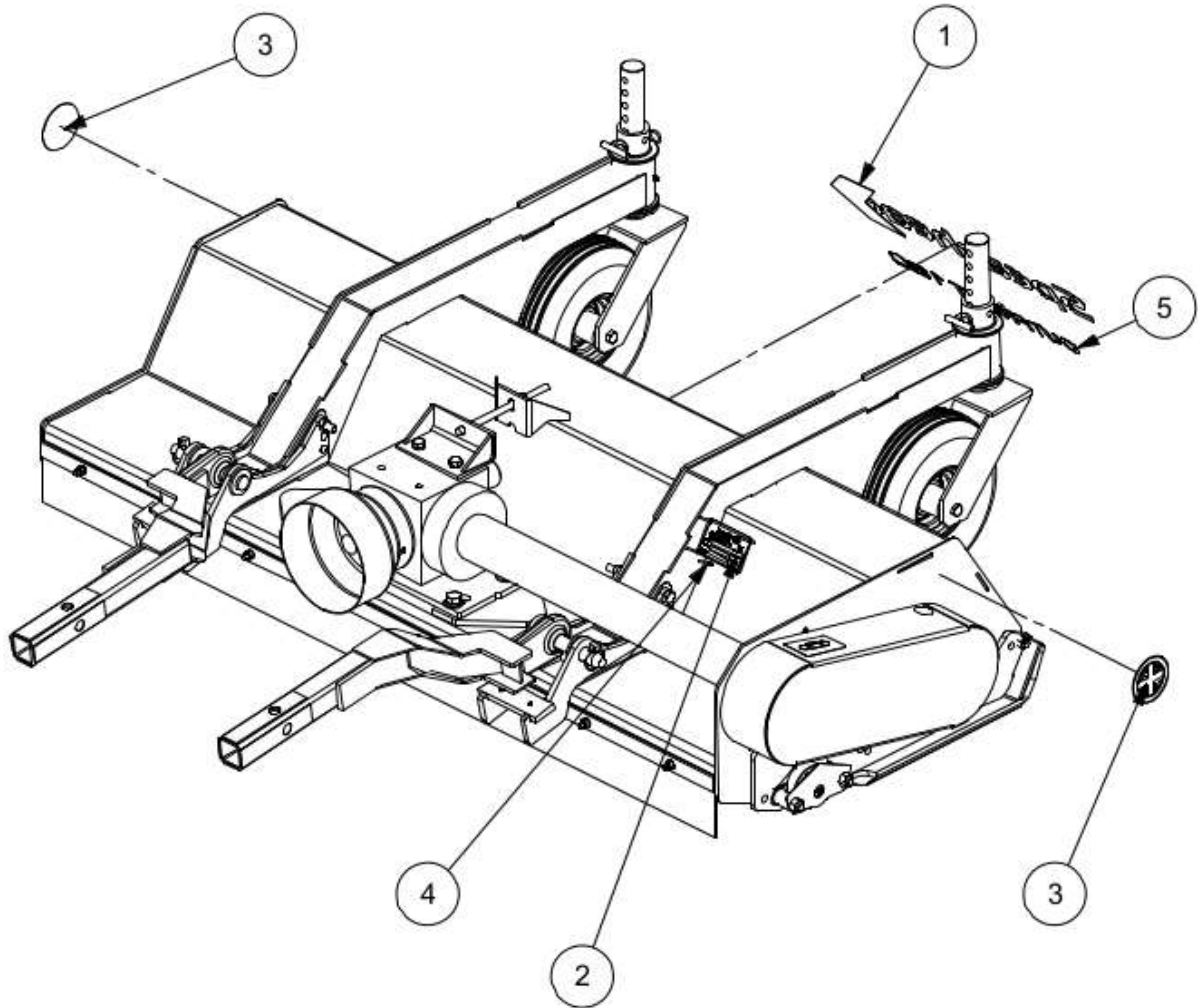
77.567.01 – DECALS - ENGINEERING



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	09.810.01	DECALS - GREASE	6
2	09.821.01	DECAL - READ INSTRUCTIONS	1
3	09.821.08	DECAL	1
4	09.821.10	DECAL - KEEP NUTS TIGHT	1
5	09.821.16	DECAL - KEEP OUT ZONE	1
6	09.821.17	DECAL - UNSUPPORTED MACHINE	1
7	09.821.18	DECAL - THROWN DEBRIS	1
8	09.821.20	DECAL - SHAFT ENTANGLEMENT	1
9	09.821.24	DECAL - FLAIL HEAD DANGER	1
10	09.843.01	DECAL - LIFT POINT 250 KG	2

Spearhead Outfront Flail

SIB1013.01 – DECALS - SPEARHEAD



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	8770373	SPEARHEAD DECAL - 615MM	1
2	8770330	SERIAL PLATE	1
3	8770307	MADE IN GB DECAL	2
4	7103230	POP RIVET	4
5	8770593	OUTFRONT DECAL	1

Spearhead Outfront Flail

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