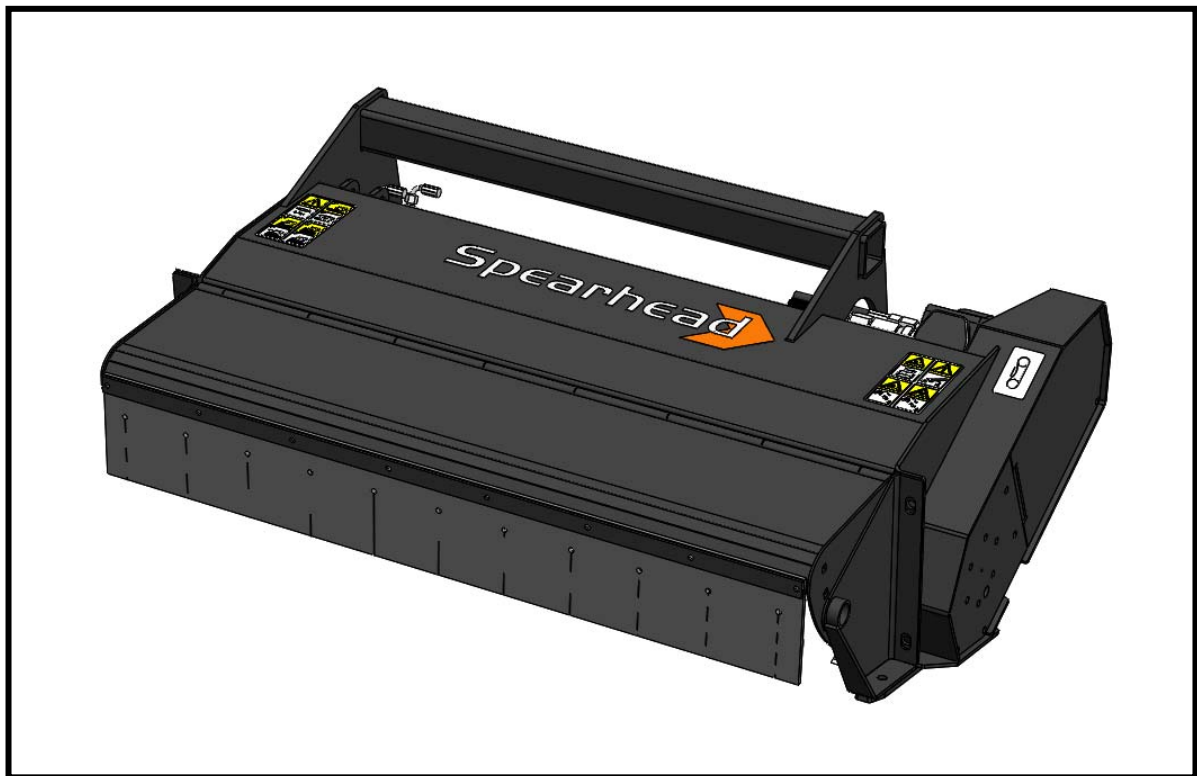


# Spearhead

## Project Black Flail Head 1.2/1.6M



Edition 1.1 – March 2015  
Part No. 8999091

**HANDBOOK & PARTS MANUAL**

# Spearhead Project Black Flail Head

## 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](http://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

## 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 Project Black Flail Head

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## **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 Project Black Flail Head

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## 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 12100 (2010) Safety of Machinery – General principles for design – Risk assessment and risk reduction.
- BS EN 349 (1993) + AI (2008) Safety of Machinery – Minimum Distances to avoid the Entrapment of Human Body Parts.
- BS EN 953 (1997) +AI (2009) Safety of Machinery – Guards General Requirements for the Design and Construction of Fixed and Movable Guards.
- BS EN 4413 (2010) Hydraulic Fluid Power - Safety Requirements for Systems and their Components.

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 Project Black Flail Head

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# Spearhead Project Black Flail Head

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## Introduction

Flail Head range:

- Suitable for contractors requiring high output.
  - 1.2/1.6m

A range of very robust high capacity flail heads to suit many applications that are easy to operate and maintain. To ensure trouble-free operation this manual should be carefully studied.

The term Left and Right hand applies to the machine when coupled to the tractor and viewed from the rear, this also applies to the tractor.

## Important Note

The information contained in this manual is correct at the time of publication. However, in the course of constant development, changes in specification are inevitable. Should you find the information given in this book different to the Machine it relates to please contact the "After Sales Department" for advice.

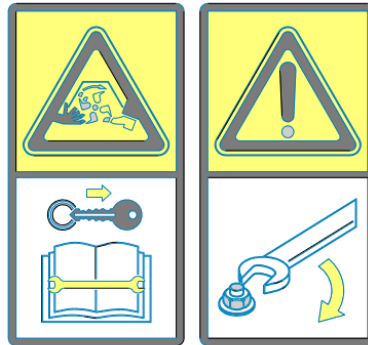
**Please ensure that this manual is handed to the operator before using the machine for the first time. The operator must fully understand the contents of this manual before using this machine. (If the machine is resold the Manual must be given to the new**



# Spearhead Project Black Flail Head

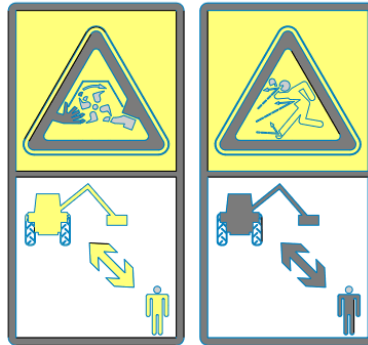
## Machine Safety Stickers

REMOVE KEY  
WHEN WORKING  
ON MACHINE



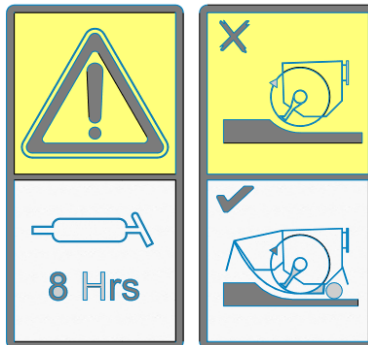
KEEP BOLT TIGHT

KEEP A SAFE  
DISTANCE FROM  
CUTTING BLADES



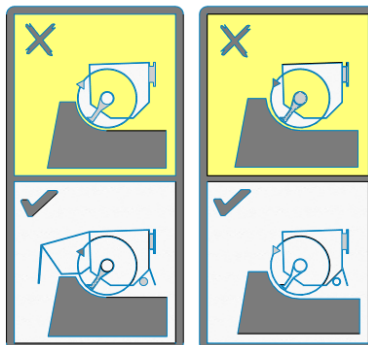
KEEP A SAFE  
DISTANCE FROM  
THROWN OBJECTS

GREASE EVERY 8  
HOURS



USE FRONT HOOD  
DOWN, REAR  
ROLLER DOWN  
AND FLAILS  
CUTTING  
UPWARDS WHEN  
VERGE MOWING

USE FRONT HOOD,  
REAR ROLLER UP  
AND FLAILS  
CUTTING  
UPWARDS WHEN  
HEDGE CUTTING



USE REAR ROLLER  
UP AND ONLY  
REMOVE FRONT  
HOOD WHEN  
CUTTING  
DOWNWARDS

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## Safety Recommendations

**Beware of the following Potential Dangers associated with the use of this machine:**

- Becoming trapped when hitching or unhitching.
- Tractor overbalancing when arm is extended.
- Electrocution due to hitting overhead power lines.
- Getting caught on rotating power take off (PTO).
- Being hit or caught by any moving part, e.g. belts, pulleys, arms, cutting head.
- Being hit by flying debris or machine parts due to machine damage.
- Machine overbalancing when not in use.
- Injection of high pressure oil from damaged couplings or hydraulic hoses.
- Accidents due to collision with other machines, or debris left on road.

### **Always**

- Ensure the operator has read this handbook and has been trained to use the machine.
- Ensure all cab safety guards are in place and all tractor windows closed.
- Before leaving the tractor cab always ensure that the flail head is firmly on the ground, no weight is on the machine's hydraulics and the rotor has stopped spinning.
- Check that all guards are properly fitted and there are no damaged or loose parts. Particular attention should be given to the flails to ensure they are not damaged, cracked or missing.
- Inspect work area for wire, steel posts, large stones and other dangerous materials and remove before starting work.
- Beware of the danger of overhead power cables. The operator must be aware of the maximum height and reach of the machine when working under power cables. The minimum legal height for 11,000 and 22,000-volt cables is 5.2 metres from the ground. When fully extended, the machine may well exceed this height so extreme caution should be practised. For more information see **Overhead Powerlines** Section or contact the Health and Safety Executive or your local power company.
- Ensure that all warning labels are always visible and that they are not damaged, defaced or missing..
- Lower the head to the ground when parking up.
- Fit locking pins to slew and height before transport and before unhitching when applicable.
- Wear ear defenders if operating without a quiet cab or with the cab windows open.
- Ensure tractor guards are fitted correctly and are undamaged.
- Work at a safe speed, taking into account terrain, passing vehicles and obstacles.
- Ensure that the tractor meets the minimum weight recommendations of the machine manufacturer and that ballast is used if necessary.
- Check that machine fittings and couplings are in good condition.
- Follow the manufacturer's instructions for attachment and removal of machine from the tractor.

# Spearhead Project Black Flail Head

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- Use clear warning signs to alert others to the type of machine working in the vicinity. Signs should be placed at both ends of the work site and should be in accordance with Department of Transport recommendations.
- Ensure flails are of the type recommended by the manufacturer, are securely fitted and are undamaged.
- Ensure hydraulic pipes are correctly routed to avoid damage from chafing, stretching, pinching or kinking.
- Disengage the machine, stop the engine and remove the key before leaving the tractor cab for any reason.
- Clean up any debris left at the work site.
- Ensure that when you remove the machine from the tractor it is secured in a safe position using the stands provided.

## NEVER

- Never operate the machine with other people present, as it is possible for debris, including stones, to be discharged from the front and rear of the flail head.
- Never operate the machine until you have read and understood the relevant Handbook and are familiar with the controls.
- Never use a machine that is poorly maintained or has guards that are damaged or missing.
- Never allow an inexperienced person to operate the machine without supervision.
- Never use or fit a machine onto a tractor if it doesn't meet the manufacturer's specification.
- Never use a machine if the hydraulic system shows signs of damage.
- Never attempt to detect a hydraulic leak with your hand, use a piece of card.
- Never allow children to play on or around the machine at any time.
- Never attempt any maintenance or adjustment without first disengaging the PTO, lowering the head to the ground, stopping the tractor engine and applying the tractor parking brake.
- Never leave the cab without removing the ignition key.
- Never operate the tractor or any controls from any position other than from the driving seat.
- Never stop the engine with the PTO engaged.
- Never operate with flails missing.
- Never operate PTO **above** recommended speed, 540 R.P.M.
- Never operate with wire around the rotor. Stop immediately.
- Never use the head at an angle, which may throw debris towards the cab.
- Never attempt to use the machine for any purpose other than that it was designed for.
- Never transport with the PTO engaged.
- Never enter the working area of the machine (risk of injury!).
- Never transport with the controls live, always turn off electrical isolator switch (red) and disconnect supply.

# Spearhead Project Black Flail Head

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## Attaching your head to the machine

Assuming you have followed the instructions in the operators manual you will have mounted the machine to the tractor rear linkage, connected the PTO and an electrical supply, now the machine arms can be operated from the tractor seat.



### **Warning**

**Take care when removing/connecting hydraulic fittings as they may contain high pressure oil!**

1. Place the flail head along the tractor nearside wheel in the work position, about 1 metre away. Use a hydraulic jack and support stands to level the head if required.
2. Start the tractor and select 540 PTO.
3. Switch on machine electrics via the control panel.
4. Operate the joystick lever and slew switch to place the boom fully forward into the work position about ½ metre off the ground and 1 metre away from the tractor wheel. Use the controls move the boom to enable the head to be attached.



5. Disengage the PTO, switch off the electrics, turn off the tractor and remove the key before leaving the cab.
6. Attach the flail head to the boom using clamps and bolts supplied, we would recommend centre mounting at this point.
7. Ensure all connections are clean and free of any contamination before removing any blanking plugs.
8. Identify the pressure hose on the boom and the pressure port of motor (nearest anti-cav valve) also the returns hose and returns port. Using the hoses supplied make the correct connections as identified previously, the small hose is for the motor case drain this is returned separately to top of tank.

# Spearhead Project Black Flail Head

9. Raise boom to lift the flail head clear of the ground before making a test run at low PTO speed, run for 5 minutes, stop and recheck all connections for oil leaks.
10. Restart machine, allow oil to warm before running at full speed too ensure smooth running without any vibration (do not exceed 540 R.P.M.).



## **Warning**

It is most important the operator fully understands the procedure for attaching/un-attaching the flail head to/from the reach mower. The following text must be fully understood before attempting to attach the head. If there is any doubt please contact your supplying dealer or Spearhead Service Department. Failure to follow the correct procedure

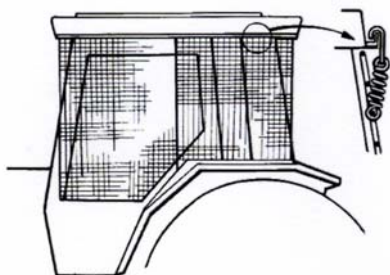
To attach/unattached the head could result in personal injury or machine damage. Any resulting damage to a machine is not covered by warranty.

Always be sure to select a level firm surface, such as concrete before attaching.

When operating the tractor or machine's controls do so only when seated in the tractor cab. Do not allow anyone to stand on or amongst linkage for any reason.



Operate the main arm to bring the frame horizontal by lowering the head weight to the ground.



Use only tractors with safety glass. If windows are not laminated safety glass, polycarbonate glazing must be fitted between operator and cab meshing. Shape mesh to cover all windows that the driver will look through to view flail head in any operating position. Mesh can be retained by springs and clips supplied, but it is the operators responsibility to ensure guarding is firmly in place.

# Spearhead Project Black Flail Head

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## Running Up Your Machine

1. First ensure the rotor is in the 'off' position and PTO drive is disengaged, then start the tractor.
2. Engage PTO into gear and run machine up to low revs, allowing oil to circulate for about 15 minutes before operating arms.
3. Re-check oil level, - check for oil leaks. All Spearhead machines have been run-up and checked thoroughly. However, hose connections can become loose in transit and these should be checked again before the machine is put to work.
4. Operate the arms through the full amount of travel; check all movements are functioning correctly.
5. Place flail head near ground in a safe position and with tractor engine revs low, select 'start' position for the flail motor.
6. Once the rotor is settled, slowly increase speed of PTO to 540 R.P.M. and run for a further 5 minutes. Slowly reduce speed and then disengage PTO.
7. Check all hoses for kinks, pinching, chafing and leaks.
8. Re-check oil level.



### **Warning**

The rotor will take a long time to stop. Never leave the cab until PTO is disengaged, engine stopped and rotor has stopped spinning.

# Spearhead Project Black Flail Head

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## Cutting Head Set-Up

### Cutting Width

Standard 1.2m is suitable for both grass and hedges, and optimises power to weight ratio.

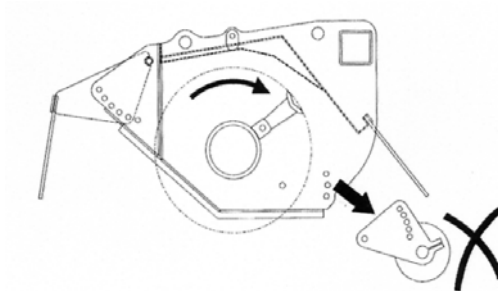
Optional 1.6m is best used for hedge trimming to reduce the number of passes.

However, there is less power per flail, and an increased weight penalty, which is not recommended on long reach machines and especially not for grass cutting.



### **Warning**

Never attempt to operate the machine without the rear roller correctly fitted. The roller performs a key safety function should the rotor shaft pick up wire. It is essential for operator safety that it remains in place. It is also an essential structural part of the cutting head. Removing it will cause premature wear on rotor bearings and will lead to fatigue on the fabrications.

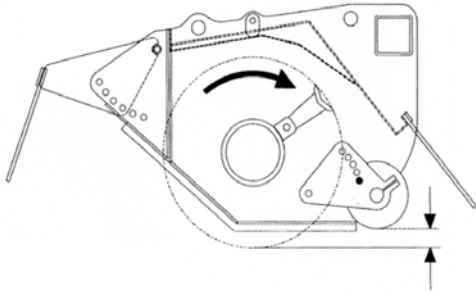


# Spearhead Project Black Flail Head

## Hedge Cutting

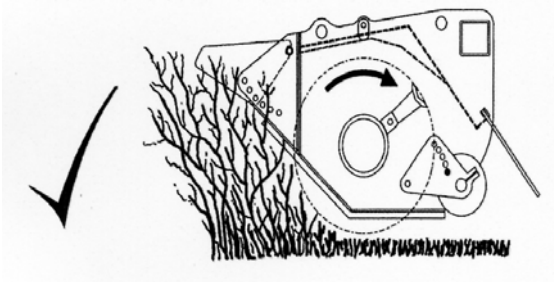
Recommended for hedge cutting

- 1.2m or 1.6m rotor
- T" flails or "Boot" flails
- Rear flap
- Front flap



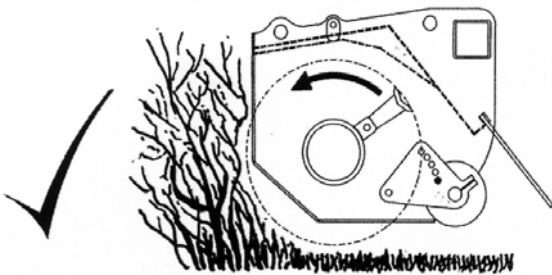
### Roller Set-Up

The roller should be raised so that it is clear of the top of the hedge. The adjustable front guard should be set as low as possible without restricting the ability of the hedge to enter the cutting head.



### Normal Hedge Cutting

Flail is cutting upwards-reducing flying debris to minimum and leaving a tidy finish. Open adjustable front hood as required.



### Rough Cutting

Reverse rotation if necessary. Down cut is not good for the hedge and leaves an untidy finish. Only use this position when rough cutting in heavy growth.



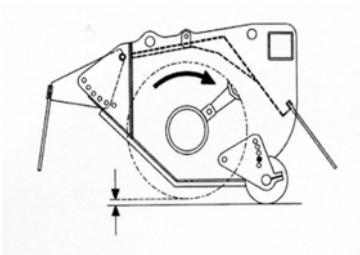
# Spearhead Project Black Flail Head

## Grass Cutting

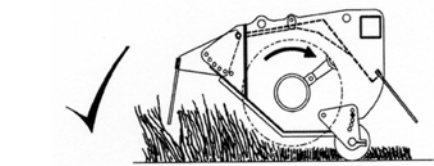
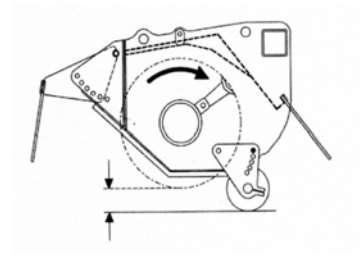
### Recommended for grass cutting

- 1.2 rotor
- Cowl wear plate
- "C" flails or "Back to Back" flails
- Optional - "Boot" flails
- Front and rear flap
- Head float and Angle Float
- Auto-pilot

**Note:** The 1.6m head is not recommended for grass cutting.

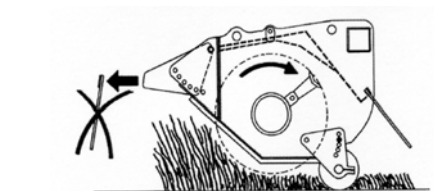
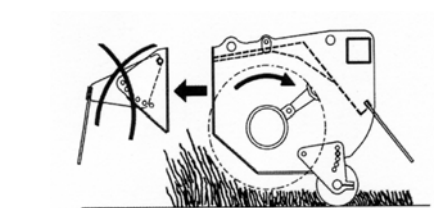


### Cutting Height Adjustment



### Grass Cutting

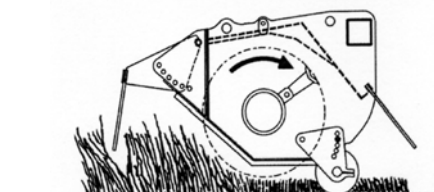
Set rear roller down to control cutting height. Have rubber flap fitted to the front and rear of head and close down the adjustable front hood to reduce flying debris to a minimum.



**Do not** operate without front and rear flap.

**Do not** verge mow without a rear roller.

**Do not** verge mow with rear roller set too high; remember the rear roller is used to control the cutting height.



# Spearhead Project Black Flail Head

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## Operation Warnings



### Warning

Please read all the following operation warnings carefully

- Never drive the tractor with arm out-stretched (except when cutting). When moving from work always first retract arms. Transport with care, metal fatigue is always caused by careless transportation and misuse. If the ground is uneven or bumpy, **slow** down.
- Read this manual and be fully familiar with all operational maintenance and safety procedures.
- Practice in open space without rotor running until familiar with controls. **Take care working the head close to the tractor as it may be possible to strike the tractor**
- Remember one of the clever features of the Twiga range is its ability to operate within a very narrow space, often within the tractor's width. This will mean it is quite possible for the flail head to foul the tractor. When in confined space the main arm will need to be slightly slewed backwards from normal working position. Practice all these positions and be very familiar with your machine before ever attempting work.
- Never operate above the recommended PTO speed of 540 R.P.M. Failure to heed this warning will result in severe damage i.e. reduced belt and pulley life (when fitted); **greatly increased oil temperature**; risk of rotor going out of balance, as well as reduced machine life, and may cause expensive repairs.
- Failure to start and stop the rotor at a low PTO speed or to operate at the correct speed will result very quickly in severe motor and/or pump damage.
- Never attempt to slew arms when fully out stretched - always retract before operating the slew. Be very careful when operating on sloping ground.
- Never attempt to slew arms with the head on the ground, always raise the head before slewing.
- Never attempt to operate the machine while going backwards. It will immediately damage the arms and possibly the flail head. Remember, before selecting reverse gear always lift the flail head out of work and retract the arms towards the tractor.
- Never change/reverse the rotor rotation until it has come to a standstill, serious damage will occur leading to premature pump and/or motor failure.

# Spearhead Project Black Flail Head

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## Transport to work position

- Remove locking pin from slew post.
- Ensure rotor/motor switch is off.
- Engage PTO low revolutions.
- Lower main lift ram only, until main arm is vertical.
- Extend dipper arm outward.
- Slew arm forward through 90°.
- Position head till horizontal, just above ground.



### **Warning**

Ensure slew locking pin is removed, or machine damage will occur.

## Engaging Head Drive

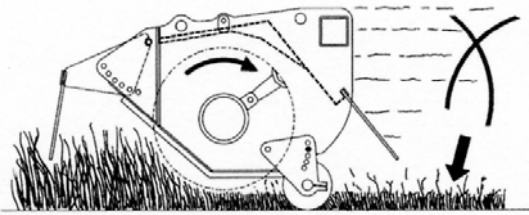
- Select 540 rpm PTO and run with low engine revs.
- With flail head in safe position move rotor control lever (5) to 'ON'.
- **Cold start** - it is important not to run at full speed with cold oil. Run at low speed for at least 15 minutes to allow oil to warm up.
- Afterwards slowly increase engine revs to obtain correct PTO speed, 540rpm.
- Never attempt to start rotor while under load.

## Disengage Head Drive

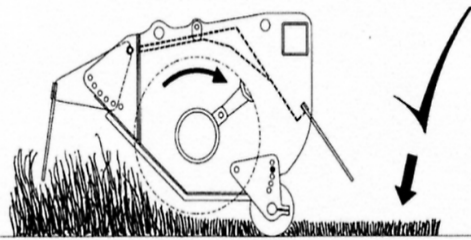
- Slowly decrease engine revolutions to a fast idle.
- Move rotor control lever (5) to 'OFF'.
- Never increase or decrease PTO speed rapidly, this could seriously damage pumps and motor.

# Spearhead Project Black Flail Head

## Tractor Forward Speed

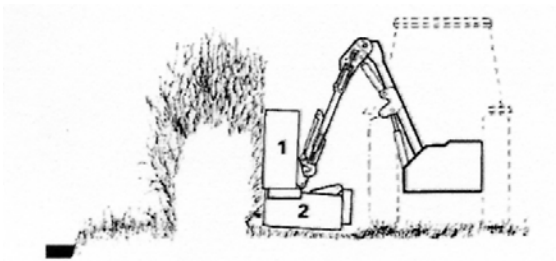


Too high a forward speed will impair the finish, leaving it looking ragged, and cause over frequent use of the break back, which will overheat the oil.

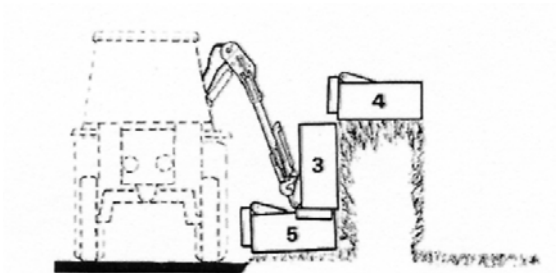


A slower forward speed improves the standard of the finish.

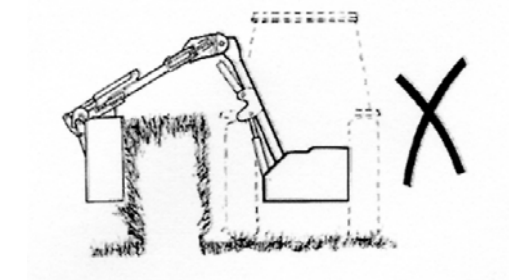
## Cutting Sequence



Cut field side and bottom of hedge first.



Cutting hedge from roadside



### **Warning**

Never operate with flail rotor facing towards the tractor. This is potentially dangerous with debris being thrown towards the tractor, and unseen hazards may cause damage as the break-back cannot function.

# Spearhead Project Black Flail Head

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## Wire Trap

This is located under the front hood. It must not be interfered with in any way  
Any wire must be removed immediately.

Lower rotor to ground, select rotor control lever to 'off' and wait until rotor stops  
spinning. Disengage P.T.O. and stop engine before leaving cab.



### **Warning**

Wire is extremely dangerous and must be avoided at all times. Inspect work area before commencing, removing all loose wire and clearly marking fixed wire



# Spearhead Project Black Flail Head

## Overhead Power Lines

It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). Some of our machines are capable of reach in excess of 8 metres (26'); they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines.

Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.



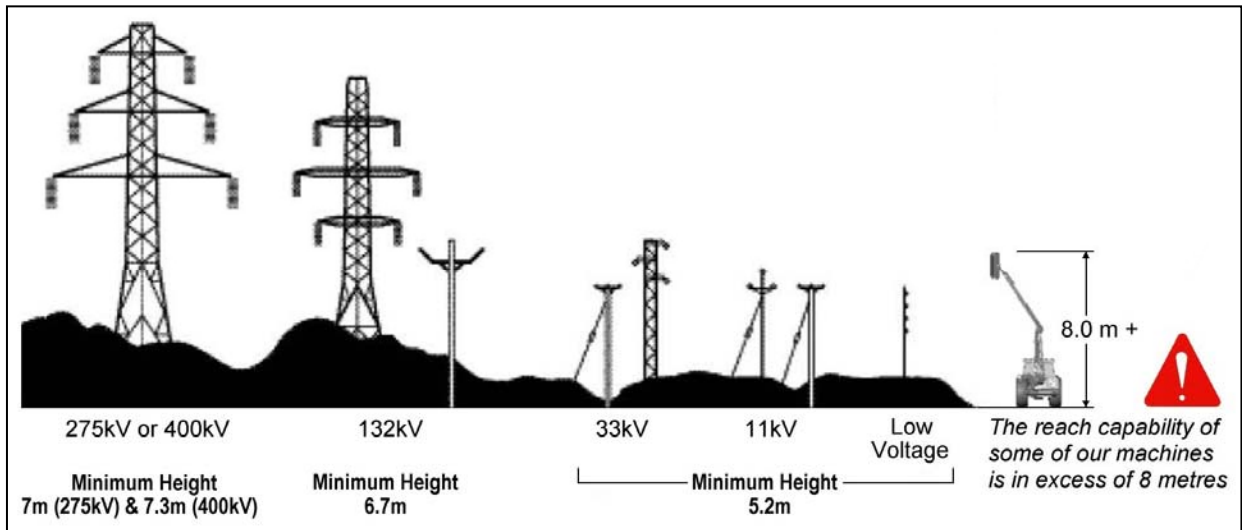
**WARNING: All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).**

Wherever possible the safest option is always to avoid working in areas close to OHPLs.

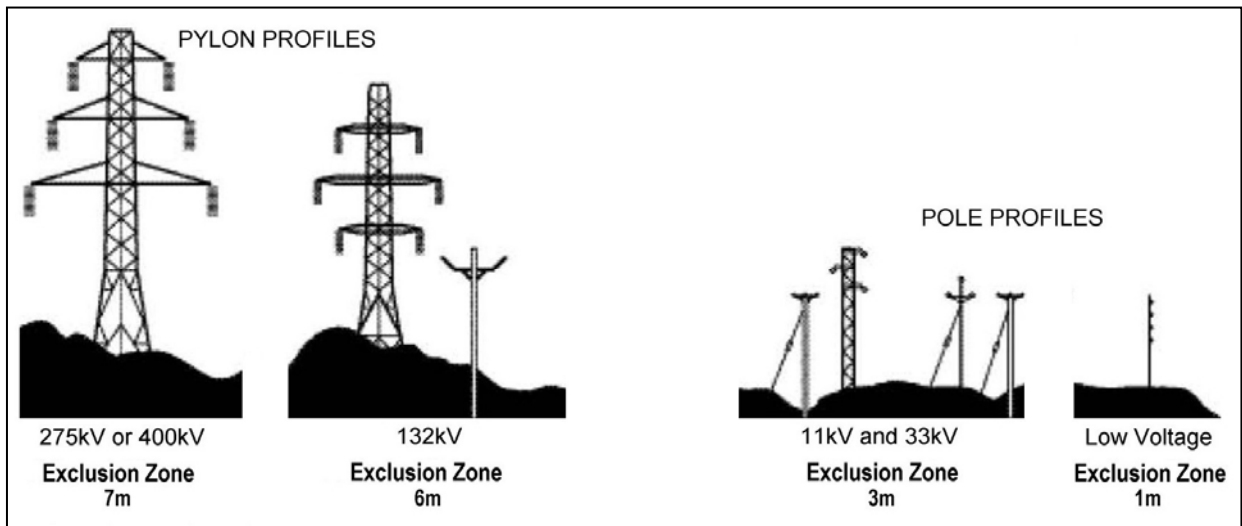
Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work – see following page for details.

All operators should perform a risk assessment before operating the machine within 10m horizontal distance of any OHPLs.

### Minimum Heights for Overhead Power Lines



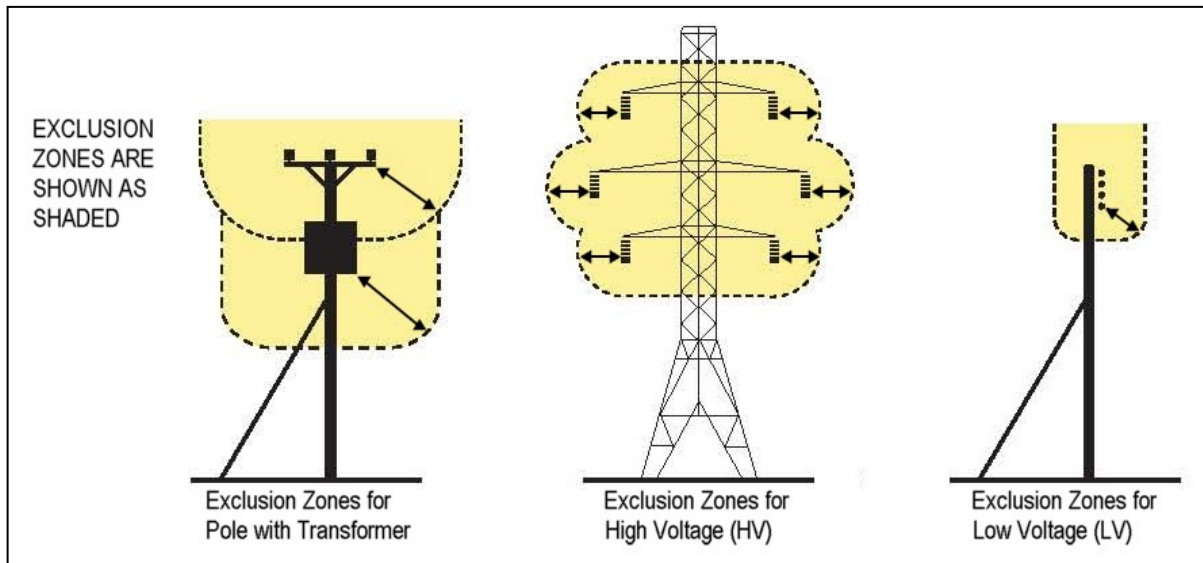
### Absolute Minimum Exclusion Zones for Specific Overhead Power Lines





# Spearhead Project Black Flail Head

## Definitions of Exclusion Zones



### Risk Assessment

Before starting to work near OHPLs you should always assess the risks. The following points should be observed;

**Know** the risks of contacting OHPLs and the risk of flashover.

**Find out** the maximum height and maximum vertical reach of your machine.

**Find out** the location and route of all Power Lines within the work area.

**Find out** the operating voltage of all Power Lines within the work area.

**Contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working and additional precautions required.

**Never** attempt operate the machine in an exclusion zones.

**Always** work with extreme caution and plan your work ahead to avoid high risk areas.

**If doubt exists** do not work in the area – never risk the safety of yourself or others.

### Emergency Action for Accidents Involving Electricity

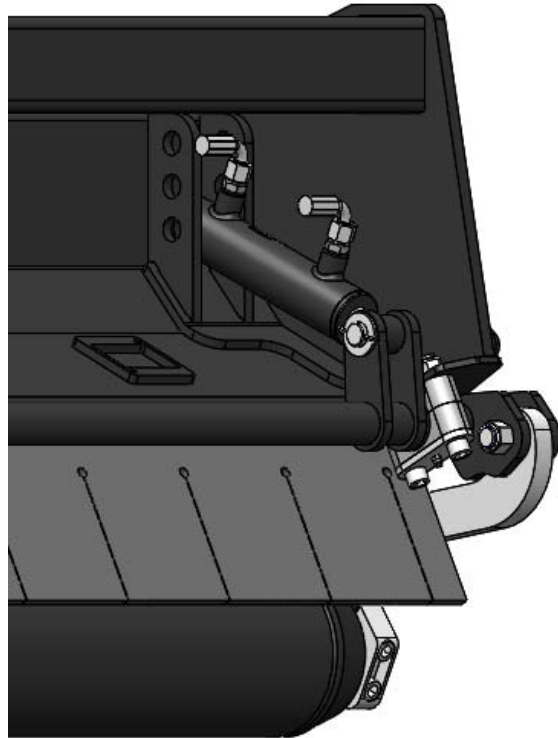
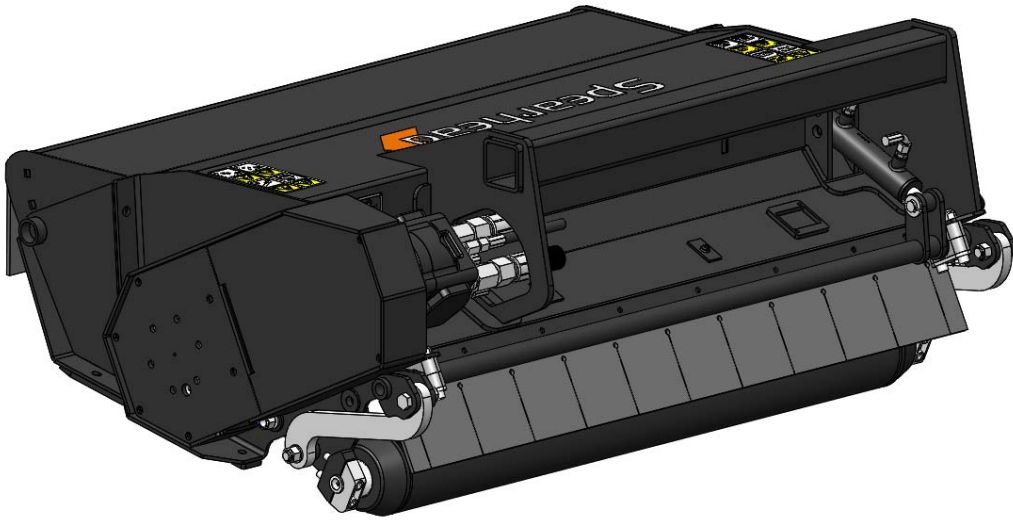
- Never touch an overhead line - even if it has been brought down by machinery, or has fallen. Never assume lines are dead.
- When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground. Stay in the machine and lower any raised parts in contact or drive the machine out of the lines if you can.
- If you need to get out to summon help or because of fire, jump out as far as you can without touching any wires or the machine - keep upright and away.
- Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect the power.

Further information and leaflets on this and other agricultural safety subjects are available on the 'Health & Safety Executive' website at the following address: [www.hse.gov.uk/pubns/agindex.htm](http://www.hse.gov.uk/pubns/agindex.htm)

# Spearhead Project Black Flail Head

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## Hydraulic Rear Roller



The hydraulic rear roller is controlled by a switch on the control panel. The control of the rear roller is either raised or lowered, there is no in-between height control.

Hydraulic rear roller control switch. Positions depend on machine options specified.

### **Note**

To ensure the roller moves freely it's important to keep the roller Side plates and head cowl clean and lubricated.



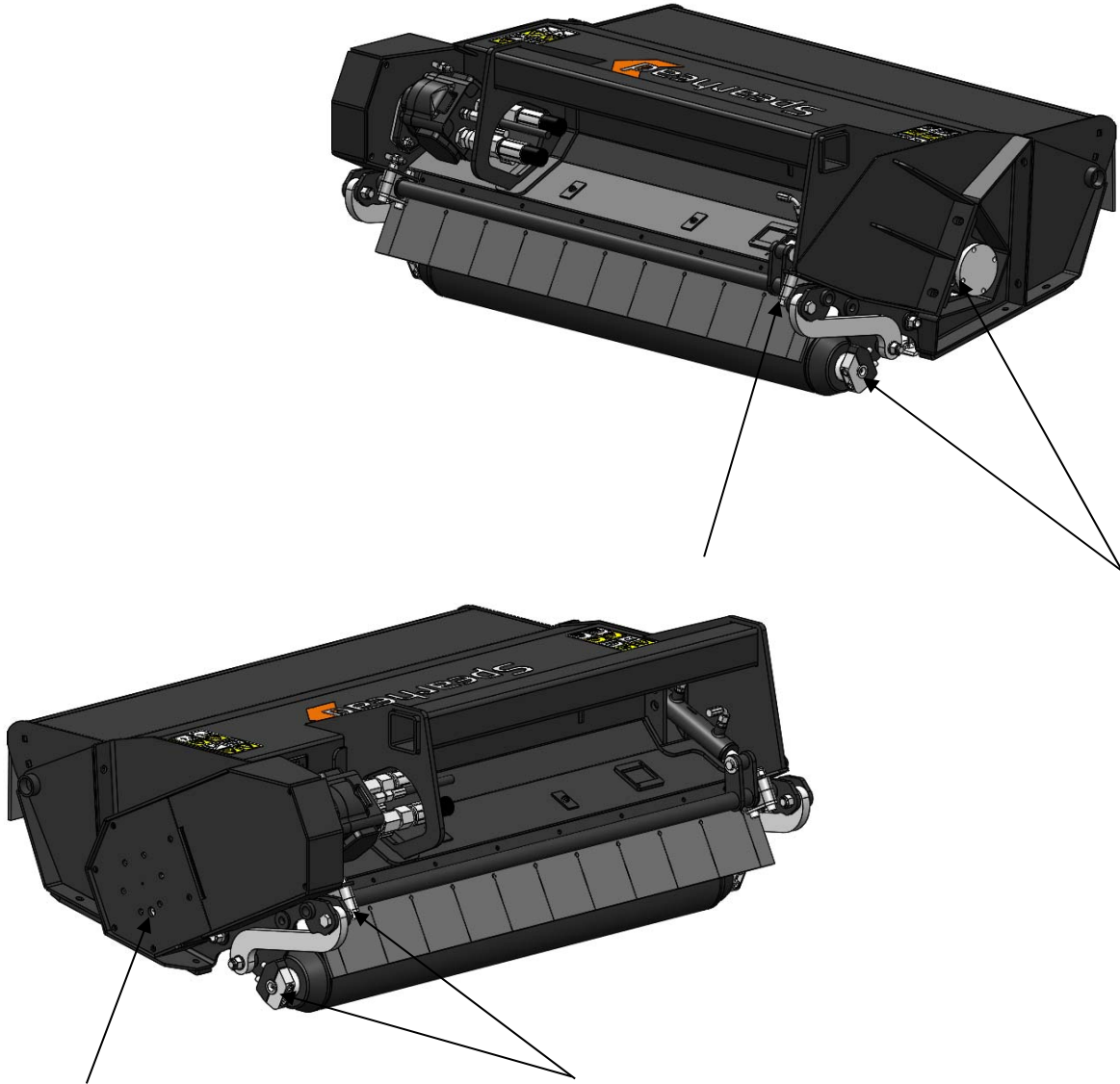
# Spearhead Project Black Flail Head

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## Service & Maintenance

### Greasing/Lubrication Points

All the following grease points need to be greased daily



Head Rotor & Roller  
Grease every 8 hours (5-10 pumps)

### Greasing/Lubrication

#### Washing your machine

Grease all your machine and optional parts after each time you wash your machine.

# Spearhead Project Black Flail Head

## Service & Maintenance

### Hydraulic Hoses

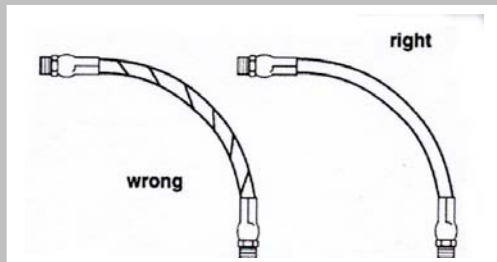
Carefully check condition of all hoses during routine service, paying particular attention to chafed outer casing. Securely wrap with waterproof adhesive tape to stop the metal braid from rusting.

Daily inspect all hydraulic hoses and fittings to be in good order. Any damages or leaks must be rectified immediately, this is part of the daily maintenance and it is your responsibility to help ensure a long reliable working life. Spearhead provide a tool kit to enable hoses to be tightened as part of routine maintenance.

Hoses with damaged metal braid should be replaced.

When replacing hoses, quote number stamped on fitting at one end. The Spearhead hydraulic system works at very high pressure. Use only genuine hoses, a burst hose could be very dangerous.

Always replace hoses in exactly the same way they were removed, and to avoid twisting during fitting use two spanners to slacken and tighten.



#### **Warning**

Hose is weakened when installed in twisted position. Also, pressure pulses in twisted hose tend to fatigue wire and loosen fitting connections. Design so that machine motion produces bending rather than torsion.

Always check the yellow protective sleeving is in good order, replacing sleeving is far cheaper than replacing expensive hoses.

Hose warranty is limited to replacement of hoses due to faulty materials or manufacture. Warranty will not be considered on hoses damaged by chaffing, abrasion, cuts or pinching while in work, or to damaged threads due to over tightening.

#### **Recommended torque settings for nut**

BSP (size)	Tightening (Nm)	Torque (lbs/ft)
1/4 "	24	18
3/8"	33	24
1/2"	44	35
3/4"	84	62
1"	115	85

#### **Recommended torque settings for hose unions in conjunction with bonded seals**

BSP (size)	Tightening (Nm)	Torque (lbs/ft)
1/4"	34	25
3/8"	75	55
1/2"	102	75
3/4"	183	135
1"	203	150

All hose connections are of a "Parker" soft seal type and only need 1/2 a turn more than finger tight to become leak proof. When dismantling, the hose should be manually flexed to relieve any pressure, and the retaining nut slackened before complete disassembly.

# Spearhead Project Black Flail Head

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## Service & Maintenance

### Routine Checks

- Grease all bearings daily.
- Check there is no wrapping of string, plastic, grass or other debris on rotor shaft and rear roller bearings.
- Check the condition of flails and ensure all retaining bolts are tight. When flails are replaced care must be taken to maintain balance of rotor shaft, do not change to a different type.
- Flail retaining bolt and nut torque setting is 203Nm.
- Flail head is supplied centre mounted to get best travel on crowd ram.
- Never operate with any flails missing. This will cause severe vibration and lead to rapid bearing wear and quickly cause the head to crack.
- Blunt flails leave an untidy finish and absorb excessive power, when re-sharpening always wear protective clothing and goggles.
- When flails are showing severe wear, damage or cracking, they must be replaced immediately. Never attempt to weld the flails, as this will make them very brittle and extremely dangerous. Do not take risks with the cutting flails, if in doubt replace.
- When replacing flails always replace bolts, nuts and bushes with new.
- Regularly check that all rotor bearing bolts and hydraulic motor retaining bolts are tight.
- With a new machine or if new bolts have been fitted, particular attention needs to be applied to regular tightening of the new bolts. (1hr - 4hrs then daily).
- Check the condition of drive belt, ensuring they are aligned and properly tensioned to avoid any unnecessary belt wear. Remove guard for access to adjuster when tensioning the belt, and ensure it is running in line after adjustment.



#### **Warning**

When end mounted, head may foul on machine.

Do not slide head mounting bracket past centre stops to extreme end on 1.6 metre head.

# Spearhead Project Black Flail Head

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## Service & Maintenance



### **Warning**

Before you attempt to do any repair, service, maintenance or adjustment on your machine, ensure the engine has stopped and the key is removed. PTO is disengaged, handbrake secure, and the head is firmly on the ground.

### **Storage**

Before storing away, thoroughly wash the machine, removing all traces of grass and dirt.

Great care must be taken when washing with high-pressure hoses, do not hold the water jet close to the paintwork. Use steam cleaners with caution, be sure to remove all detergents to avoid any discolouring or damage to paint. Grease all grease points until fresh grease shows. Slacken rotor drive belts (where fitted).

It is important where possible to store undercover to protect against rain and sunlight. Always ensure a firm level surface.

**Remember: Regular maintenance will greatly increase the life of the machine.**

# Spearhead Project Black Flail Head

## Service & Maintenance

### Torque Settings

The Torque figures given below are recommended maximum settings only.

Size:	Tensile strength:	Description:	Torque setting: Nm:
M8	12.9	Pulley clamps	45
M10	8.8	General fasteners	65
M12	8.8	General fasteners	114
M14	10.9	Flail bolts	200
M16	10.9	Flail bolts	310
M16	8.8	Head bracket bolts	280

### Regular Service Chart

Service Hours	Service points	Grease	Check
8 hrs	Bolts are fully tightened		X
8 hrs	Condition of flails		X
8 hrs	Condition of hoses especially for chafing		X
8 hrs	Flail bolts are fully tightened		X
8 hrs	Flail head retaining bolts are fully tightened		X
8 hrs	Inspect leaks from fittings and pipes		X
8 hrs	Rotor bearing bolts are fully tightened		X
8 hrs	Rotor Bearings	X	
8 hrs	Motor bolts are fully tightened		X
8 hrs	Rear roller	X	
8 hrs	Maintain correct belt tension on head (only with belt drive heads)		X
50 hrs	Motor spline Drive	X	

# Spearhead Project Black Flail Head

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## Trouble Shooting

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Excessive belt wear	Belt and pulley condition	Replace if necessary
	Pulley alignment	Check alignment
	Incorrect belt tension	Tension belts to spec
Cut Quality	Overloading of implement	Reduce forward speed or increase height of cut
	Flails worn	Replace worn flails
	Rotor speed/direction	Check tractor PTO speed
Rotor bearing failure	Crop condition	Look for suitable conditions
	Rotor out of balance	See rotor vibration
	Wire/string in bearing	Remove wire/string
Rotor vibration	Lack of maintenance	Grease bearings to schedule
	Water in bearing	Expel water with grease
	Flails broken or missing	Replace flails
Oil overheating	Bearings worn or damaged	Replace bearings
	Rotor shaft bent	Re-balance/replace rotor
	Build up of debris	Remove debris
Hydraulics not responding	Incorrect speed	Check rotor R.P.M.
	Oil level incorrect	Fill tank to correct level
	Oil grade incorrect	Drain and refill tank with correct grade oil
Drive line broken	PTO speed too fast	Ensure the tractor's PTO speed matches implement
	Ambient temperature too high	Reduce work rate / install oil cooler
	Machine overloaded	Reduce forward speed or increase height of cut
Oil leak in pressure line	Oil level low	Fill oil to correct level
	Oil pump suction filter blocked	Replace filter element
	Oil leak in pressure line	Check machine of leaks
Drive line broken	Drive line broken	Check pump is rotating

# Spearhead Project Black Flail Head

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## Pump & Motor Failure

There are many reasons for pump and motor failure, cavitations (suction of air), peak pressure, contamination. These can be avoided by the following:

- Never run out of oil
- Never run a cold machine straight up to speed, ensure the engine idle speed before engage/disengage the head motor.
- Never increase or decrease engine speed quickly
- Regularly check that suction hose and pump fittings are tight.
- Never stop or start the rotor at 540 R.P.M.
- Never cause sudden movements to the arms via your controls or bumps in the ground as pressure spikes will be transmitted back to the pump, resulting in failure.
- Avoid striking the rotor on obstacles i.e., road gullies as this causes pressure spikes.
- Never transport the machine with the PTO in gear.
- Never select 1000 speed gear for economy start up, speed is too high.
- Never operate above recommended PTO speed 540r.p.m. and risk overheating.

Remember: pump and motor warranty is limited to replacement due to faulty materials or manufacture. Cavitations, contamination and peak pressures are easily detected on inspection, warranty will not be considered if failure is due to misuse.

# Spearhead Project Black Flail Head

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## Ordering Your Part's

When ordering parts please refer to your parts list to help your dealer with your order.

- Part number and quantity
- Description
- Machine model number
- Serial number of the machine
- Delivery instructions (e.g. next day).

Delivery is normally via carrier direct to your dealer. Please check with your dealer for stock availability and arrangement of dispatch. Ensure you or your dealer has sufficient cover for parts requirement outside factory hours.

When ordering your seal kits please quote both codes stamped on the base of the cylinder.

### Important Note

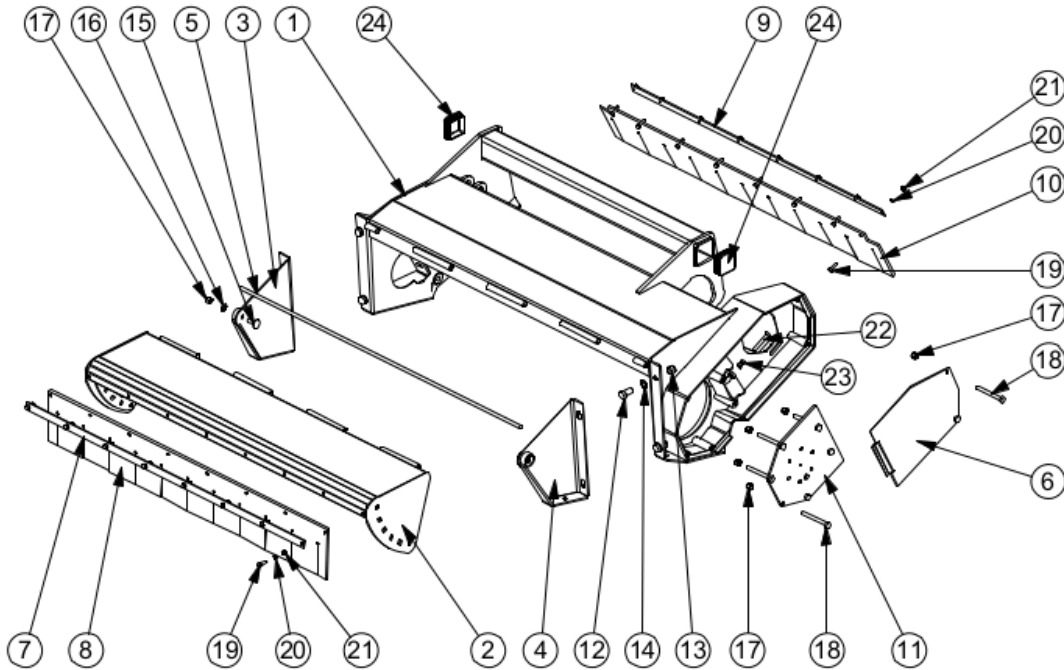
The information contained in this manual is correct at the time of publication. However, in the course of constant development, changes in specification are inevitable. Should you find the information given in this book different to the machine it relates to, please contact the "After Sales Department" for advice.

### Key:

- (LH) = Left hand
- (RH) = Right hand

# Spearhead Project Black Flail Head

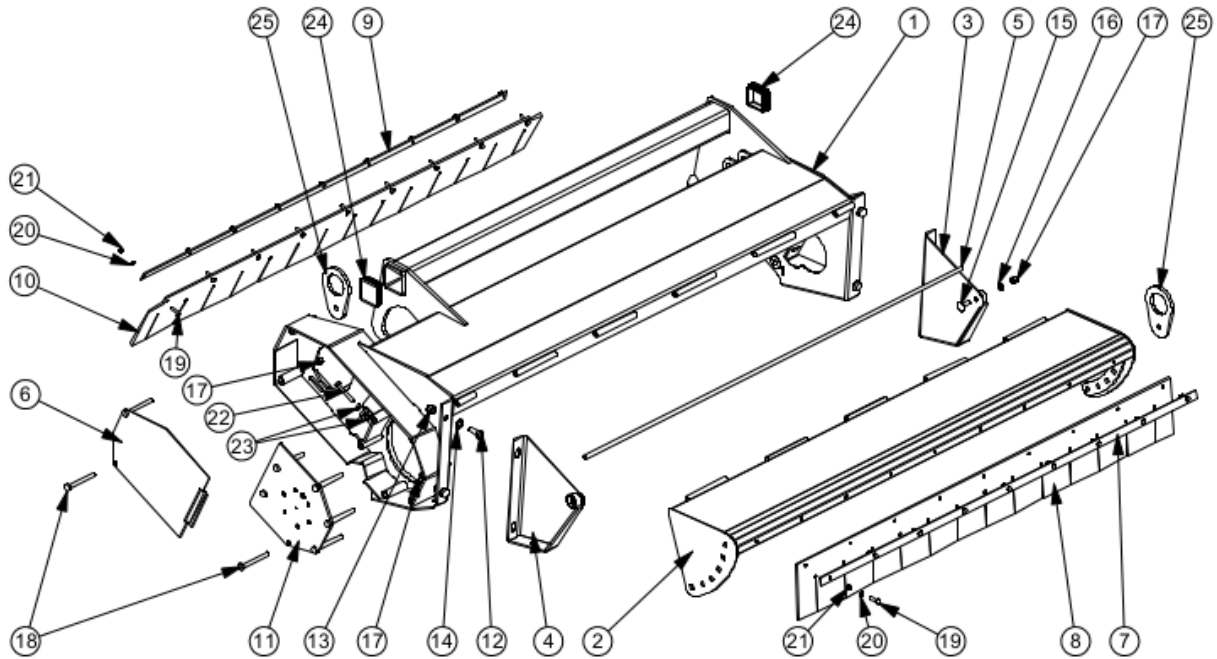
## SI80039.20 - 1.2M LH CASING SCHEDULE



ITEM NO.	PART NO -1.2M	DESCRIPTION.	QTY.
1	181430	CASING – 1.2M LH	1
2	181496	FRONT HOOD	1
3	181494	LH HOOD SIDE W/A	1
4	181495	RH HOOD SIDE W/A	1
5	181209	HOOD PIVOT PIN	1
6	181257	COVER	1
7	184.617A	RETAINING STRIP	1
8	1840476F	RUBBER FLAP	1
9	181441	RETAINING STRIP - REAR	1
10	8400266	RUBBER FLAP – REAR	1
11	184.708	ROTOR MOUNT PLATE	1
12	05.264.34	SETSCREW	4
13	2770447	NYLOCK NUT	4
14	2770454	WASHER	4
15	2770258	COACH BOLT	2
16	2770436	WASHER	2
17	2770417	NYLOCK NUT	10
18	05.292.24	BOLT	8
19	05.264.03	SETSCREW	18
20	2770432	WASHER	18
21	2770416	NYLOCK NUT	18
22	05.291.19	BOLT	1
23	2770438	FULL NUT	2
24	41580.01	PLASTIC CAP	2

# Spearhead Project Black Flail Head

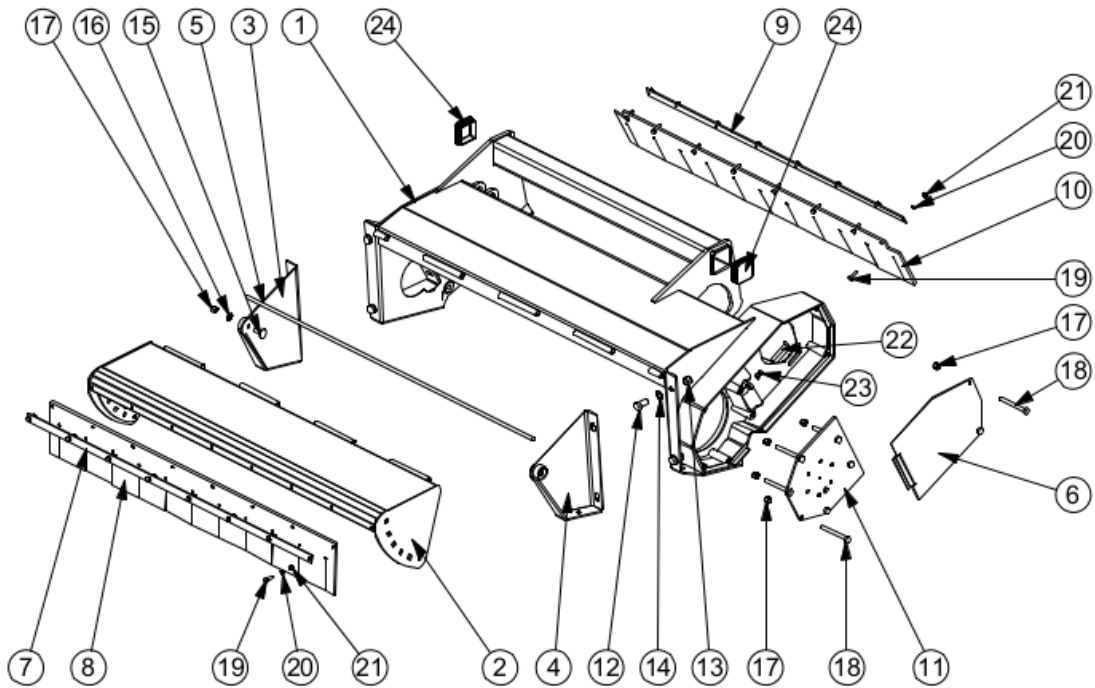
## SI80039.2I - 1.2M RH CASING SCHEDULE



ITEM NO.	PART NO -1.2M	DESCRIPTION.	QTY.
1	181431	CASING – 1.2M RH	1
2	181496	FRONT HOOD	1
3	181494	LH HOOD SIDE W/A	1
4	181495	RH HOOD SIDE W/A	1
5	181209	HOOD PIVOT PIN	1
6	181446	COVER	1
7	184.617A	RETAINING STRIP	1
8	1840476F	RUBBER FLAP	1
9	181441	RETAINING STRIP - REAR	1
10	8400266	RUBBER FLAP – REAR	1
11	184.708	ROTOR MOUNT PLATE	1
12	05.264.34	SETSCREW	4
13	2770447	NYLOCK NUT	4
14	2770454	WASHER	4
15	2770258	COACH BOLT	2
16	2770436	WASHER	2
17	2770417	NYLOCK NUT	10
18	05.292.24	BOLT	8
19	05.264.03	SETSCREW	18
20	2770432	WASHER	18
21	2770416	NYLOCK NUT	18
22	05.291.19	BOLT	1
23	2770438	FULL NUT	2
24	41580.01	PLASTIC CAP	2

# Spearhead Project Black Flail Head

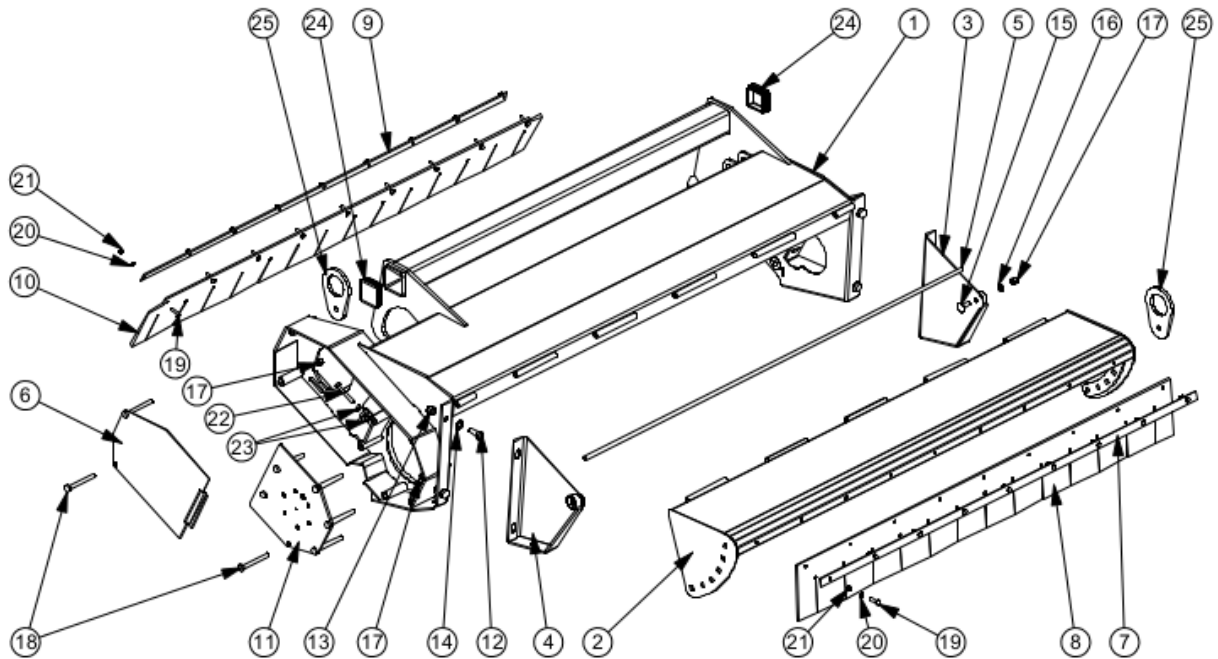
## SI80039.22 - 1.6M LH CASING SCHEDULE



ITEM NO.	PART NO -1.6M	DESCRIPTION.	QTY.
1	181432	CASING – 1.6M LH	1
2	181497	FRONT HOOD	1
3	181494	LH HOOD SIDE W/A	1
4	181495	RH HOOD SIDE W/A	1
5	181669	HOOD PIVOT PIN	1
6	181257	COVER	1
7	184.617B	RETAINING STRIP	1
8	8400281	RUBBER FLAP	1
9	181447	RETAINING STRIP - REAR	1
10	8400267	RUBBER FLAP – REAR	1
11	184.708	ROTOR MOUNT PLATE	1
12	05.264.34	SETSCREW	4
13	2770447	NYLOCK NUT	4
14	2770454	WASHER	4
15	2770258	COACH BOLT	2
16	2770436	WASHER	2
17	2770417	NYLOCK NUT	10
18	05.292.24	BOLT	8
19	05.264.03	SETSCREW	18
20	2770432	WASHER	18
21	2770416	NYLOCK NUT	18
22	05.291.19	BOLT	1
23	2770438	FULL NUT	2
24	41580.01	PLASTIC CAP	2

# Spearhead Project Black Flail Head

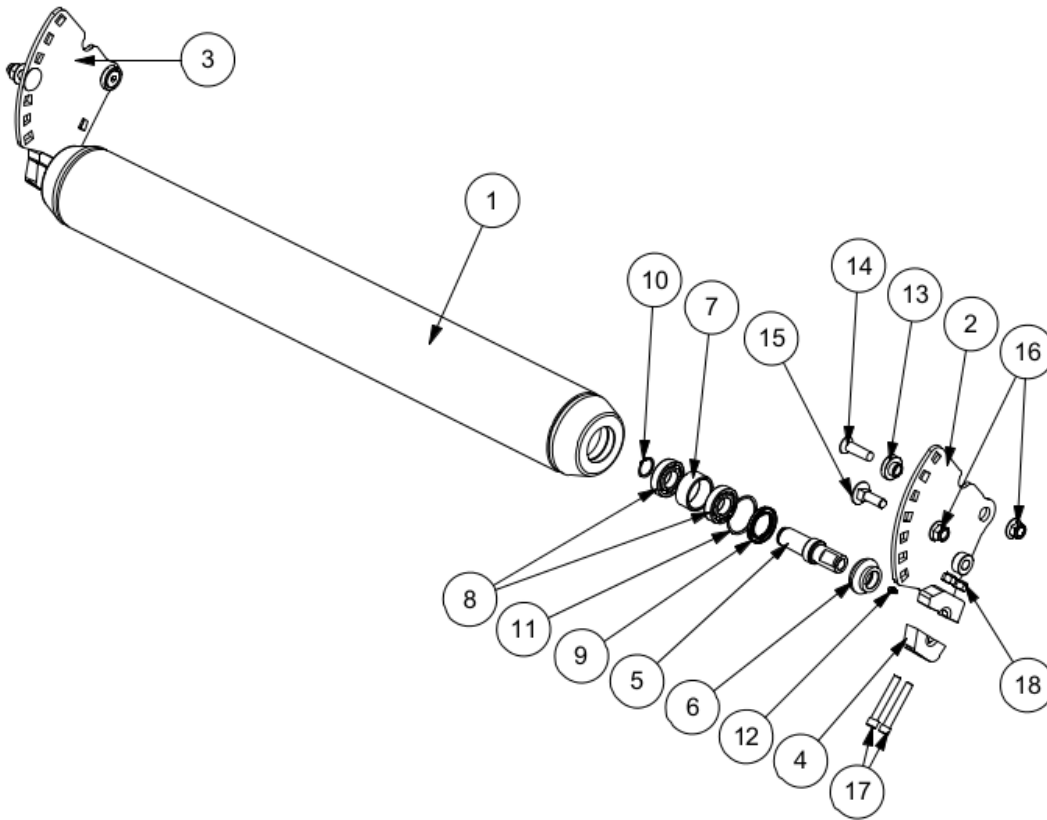
## SI80039.23 - 1.6M RH CASING SCHEDULE



ITEM NO.	PART NO -1.6M	DESCRIPTION.	QTY.
1	181433	CASING – 1.6M RH	1
2	181497	FRONT HOOD	1
3	181494	LH HOOD SIDE W/A	1
4	181495	RH HOOD SIDE W/A	1
5	181669	HOOD PIVOT PIN	1
6	181446	COVER	1
7	184.617B	RETAINING STRIP	1
8	8400281	RUBBER FLAP	1
9	181447	RETAINING STRIP - REAR	1
10	8400267	RUBBER FLAP – REAR	1
11	184.708	ROTOR MOUNT PLATE	1
12	05.264.34	SETSCREW	4
13	2770447	NYLOCK NUT	4
14	2770454	WASHER	4
15	2770258	COACH BOLT	2
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# Spearhead Project Black Flail Head

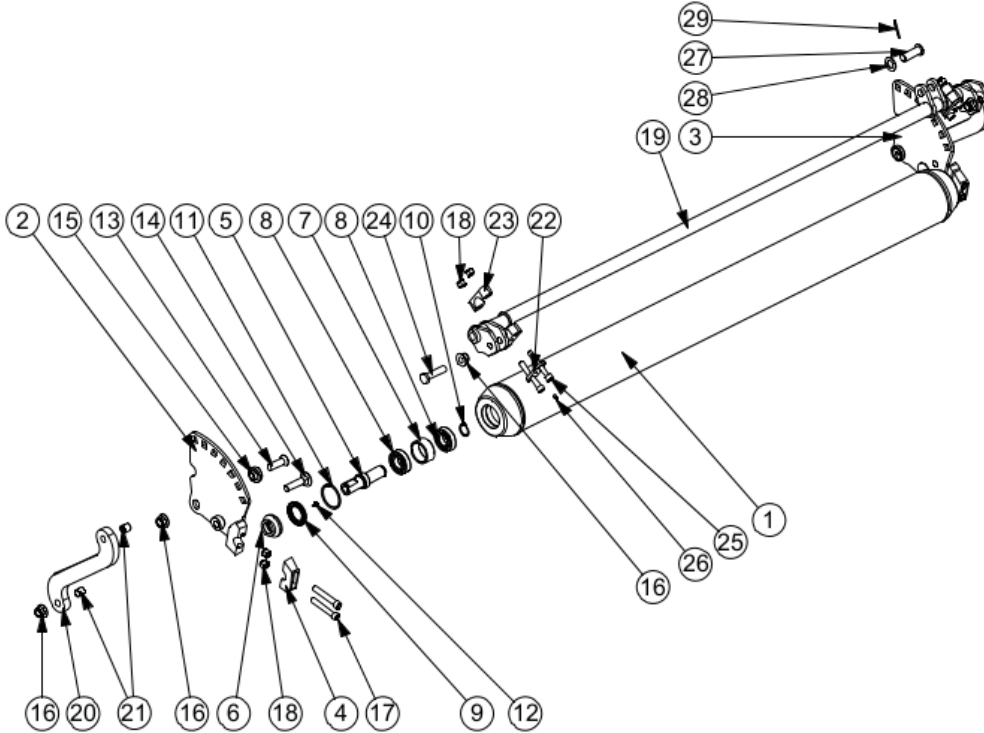
## SI80039.24 - 1.2M STD ROLLER SCHEDULE



ITEM NO.	PART NO. 1.2M	DESCRIPTION.	QTY.
1	181210	ROLLER	1
2	181374	RH ROLLER BRACKET	1
3	181375	LH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	7770596	BUSH	2
14	2770534	SKT CSK SCREW	2
15	2770640	COACH BOLT	2
16	05.287.24	FLANGED NYLOCK NUT	4
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	4

# Spearhead Project Black Flail Head

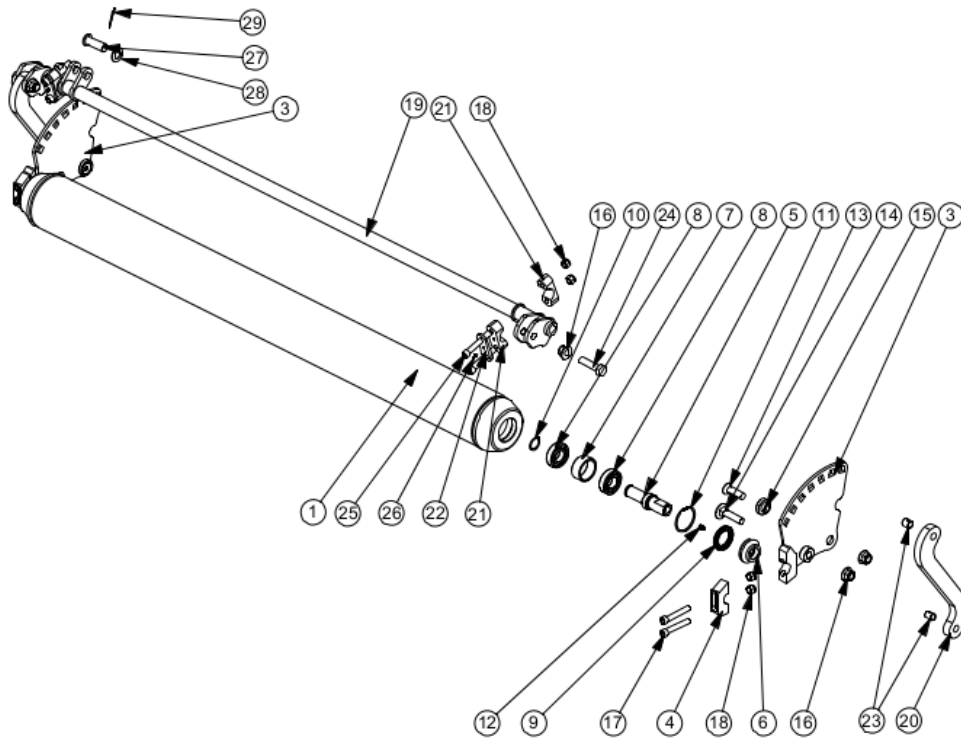
## S180039.25 - 1.2M LH HYD ROLLER SCHEDULE



ITEM NO.	PART NO. 1.2M	DESCRIPTION.	QTY.
1	181210	ROLLER	1
2	181375	LH ROLLER BRACKET	1
3	181374	RH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	2770534	SKT CSK SCREW	2
14	2770648	COACH BOLT	2
15	7770596	BUSH	2
16	05.287.24	FLANGED NYLOCK NUT	6
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	8
19	181434	LH HYD ROLLER SHAFT	1
20	181438	HYD ROLLER LINK	2
21	4600160	BUSH	4
22	181442	CLAMP PLATE	2
23	8400265	HALF CLAMP	4
24	05.291.65	BOLT	2
25	2770347	SKT CAP SCREW	4
26	2770467	GREASE NIPPLE	2
27	181540	PIN	1
28	2770517	FLAT WASHER	1
29	2770238	SPLIT PIN	1

# Spearhead Project Black Flail Head

## SI80039.26 - 1.2M RH HYD ROLLER SCHEDULE

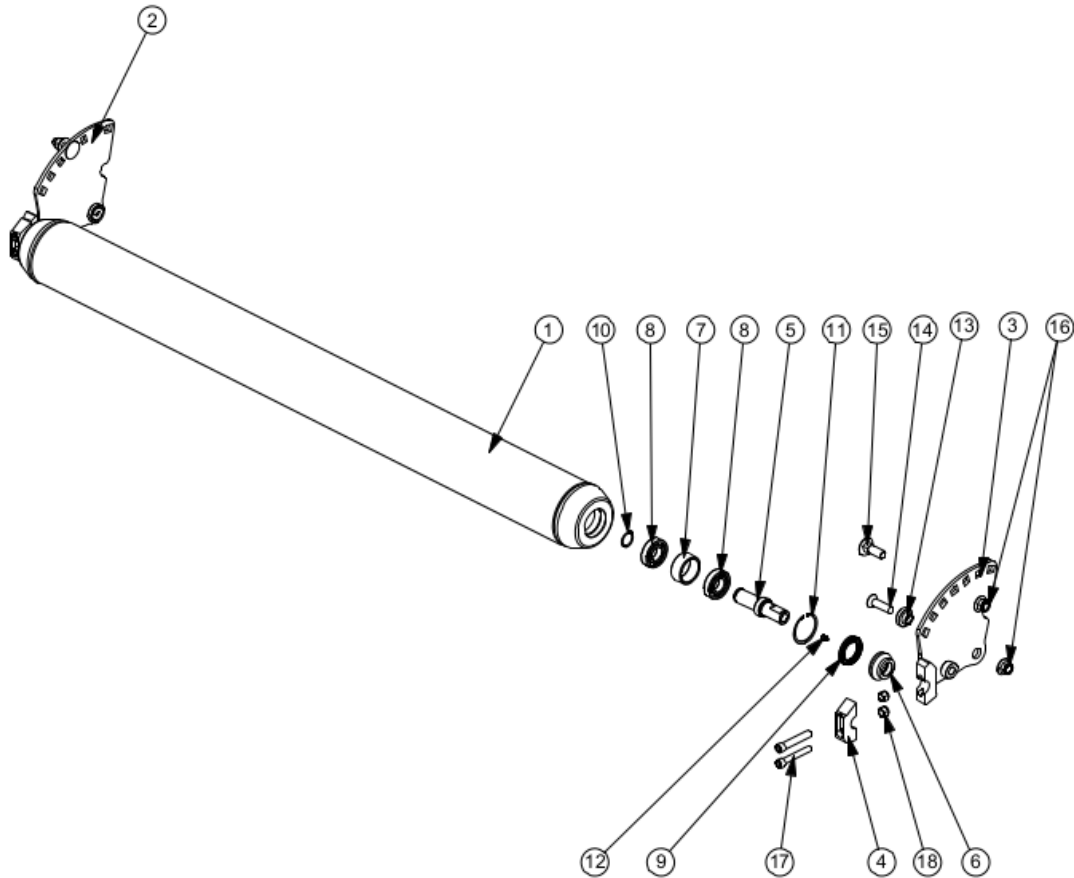


ITEM NO.	PART NO. 1.2M	DESCRIPTION.	QTY.
1	181210	ROLLER	1
2	181374	RH ROLLER BRACKET	1
3	181375	LH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	2770534	SKT CSK SCREW	2
14	2770648	COACH BOLT	2
15	7770596	BUSH	2
16	05.287.24	FLANGED NYLOCK NUT	6
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	8
19	181435	RH HYD ROLLER SHAFT	1
20	181438	HYD ROLLER LINK	2
21	8400265	HALF CLAMP	4
22	181442	CLAMP PLATE	2
23	4600160	BUSH	4
24	05.291.65	BOLT	2
25	2770347	SKT CAP SCREW	4
26	2770467	GREASE NIPPLE	2
27	181540	PIN	1
28	2770517	FLAT WASHER	1
29	2770238	SPLIT PIN	1



# Spearhead Project Black Flail Head

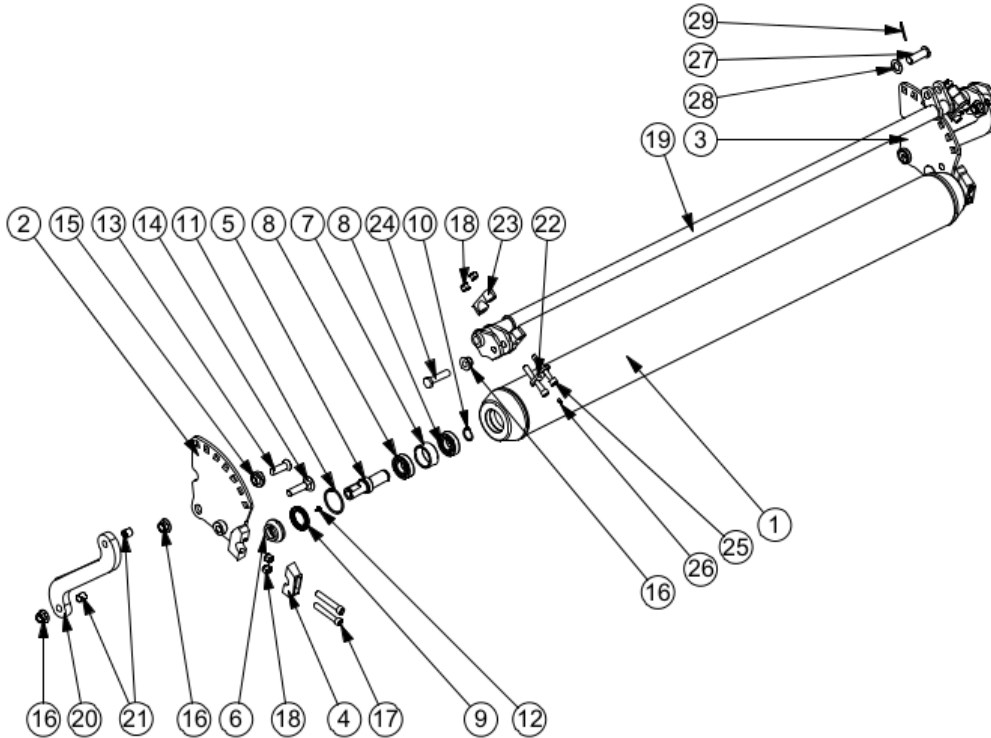
## S180039.27 - 1.6M STD ROLLER SCHEDULE



ITEM NO.	PART NO. 1.6M	DESCRIPTION.	QTY.
1	181499	ROLLER	1
2	181375	LH ROLLER BRACKET	1
3	181374	RH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	7770596	BUSH	2
14	2770534	SKT CSK SCREW	2
15	2770640	COACH BOLT	2
16	05.287.24	FLANGED NYLOCK NUT	4
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	4

# Spearhead Project Black Flail Head

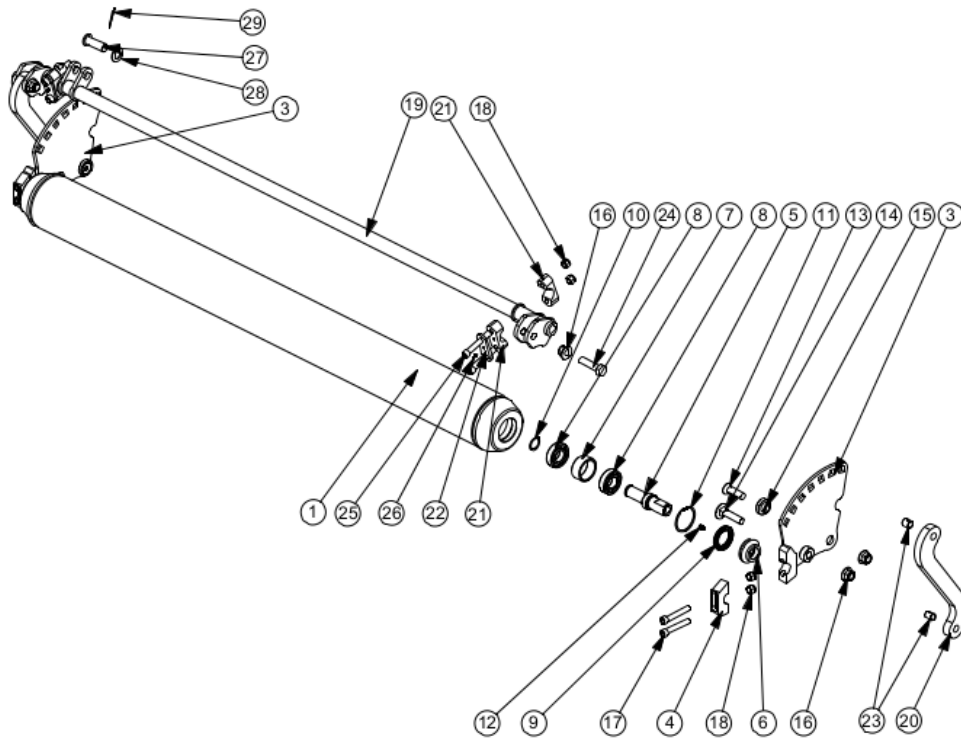
## SI80039.28 - 1.6M LH HYD ROLLER SCHEDULE



ITEM NO.	PART NO. 1.6M	DESCRIPTION.	QTY.
1	181499	ROLLER	1
2	181375	LH ROLLER BRACKET	1
3	181374	RH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	2770534	SKT CSK SCREW	2
14	2770648	COACH BOLT	2
15	7770596	BUSH	2
16	05.287.24	FLANGED NYLOCK NUT	6
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	8
19	181436	LH HYD ROLLER SHAFT	1
20	181438	HYD ROLLER LINK	2
21	4600160	BUSH	4
22	181442	CLAMP PLATE	2
23	8400265	HALF CLAMP	4
24	05.291.65	BOLT	2
25	2770347	SKT CAP SCREW	4
26	2770467	GREASE NIPPLE	2
27	181540	PIN	1
28	2770517	FLAT WASHER	1
29	2770238	SPLIT PIN	1

# Spearhead Project Black Flail Head

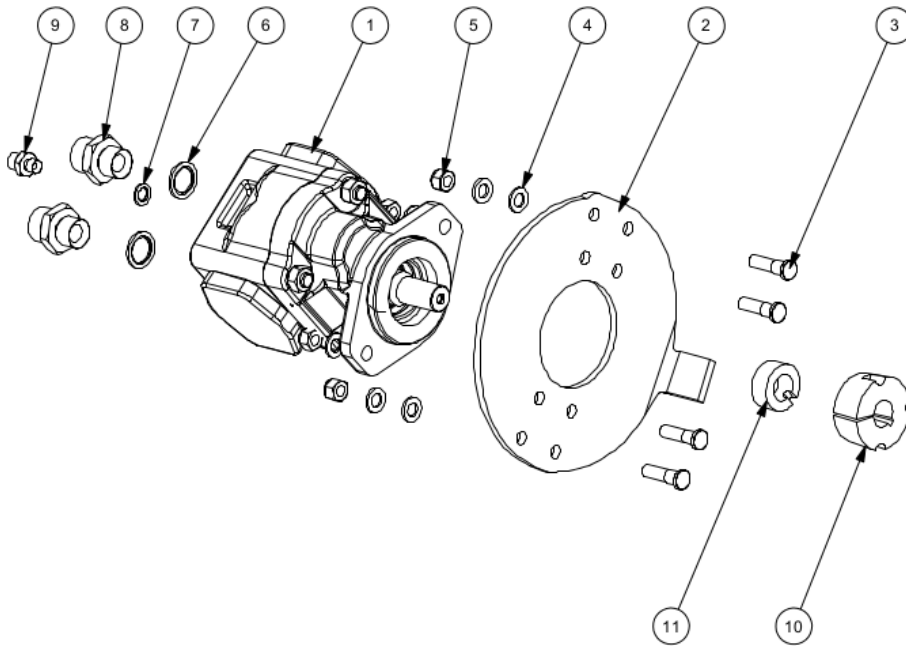
## S180039.29 - 1.6M RH HYD ROLLER SCHEDULE



ITEM NO.	PART NO. 1.6M	DESCRIPTION.	QTY.
1	181499	ROLLER	1
2	181374	RH ROLLER BRACKET	1
3	181375	LH ROLLER BRACKET	1
4	040000D	ROLLER SHAFT CLAMP	2
5	181439	SHAFT	2
6	184.704	SHEILD	2
7	21523.31	SPACER	2
8	0600111	BEARING	4
9	8629254	SEAL	2
10	0401230	CIRCLIP	2
11	0411262	CIRCLIP	2
12	01.070.04	GREASE NIPPLE	2
13	2770534	SKT CSK SCREW	2
14	2770648	COACH BOLT	2
15	7770596	BUSH	2
16	05.287.24	FLANGED NYLOCK NUT	6
17	2770347	SKT CAP SCREW	4
18	2770417	NYLOCK NUT	8
19	181437	RH HYD ROLLER SHAFT	1
20	181438	HYD ROLLER LINK	2
21	8400265	HALF CLAMP	4
22	181442	CLAMP PLATE	2
23	4600160	BUSH	4
24	05.291.65	BOLT	2
25	2770347	SKT CAP SCREW	4
26	2770467	GREASE NIPPLE	2
27	181540	PIN	1
28	2770517	FLAT WASHER	1
29	2770238	SPLIT PIN	1

# Spearhead Project Black Flail Head

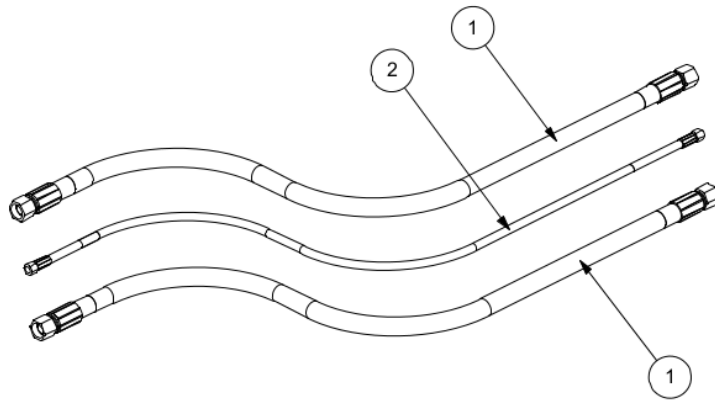
## S180039.30 – STD MOTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	8301315	MOTOR	1
	05.960.27	KEYWAY	1
2	181440	MOTOR PLATE	1
3	181255	STUD	4
4	2770436	WASHER	6
5	181256	NUT	4
6	3260073	SEAL	2
7	3260070	SEAL	1
8	3360091	ADAPTOR	2
9	3360083	ADAPTOR	1
10	05.424.08	TAPERLOCK	1
11	181444	SHAFT SPACER	1

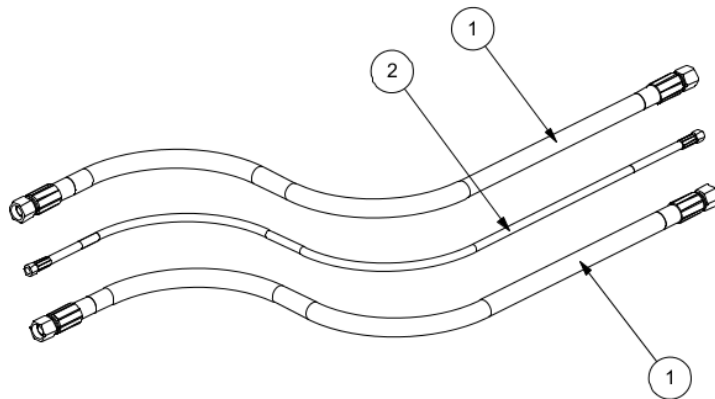
# Spearhead Project Black Flail Head

## S180039.15 – 1.2M STD HEAD HOSES



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	3750626	HOSE KIT	1
	3750626.01	HOSE	2
	3750626.02	HOSE	1
2	05.433.03	PLUG	2
3	3460110	PLUG	1
4	06.023.01	HOSE TIE	4
5	8770768	CABLE TIE	1
6	8770769	CABLE TIE	1
7	43542.07	HOSE SLEEVE	1

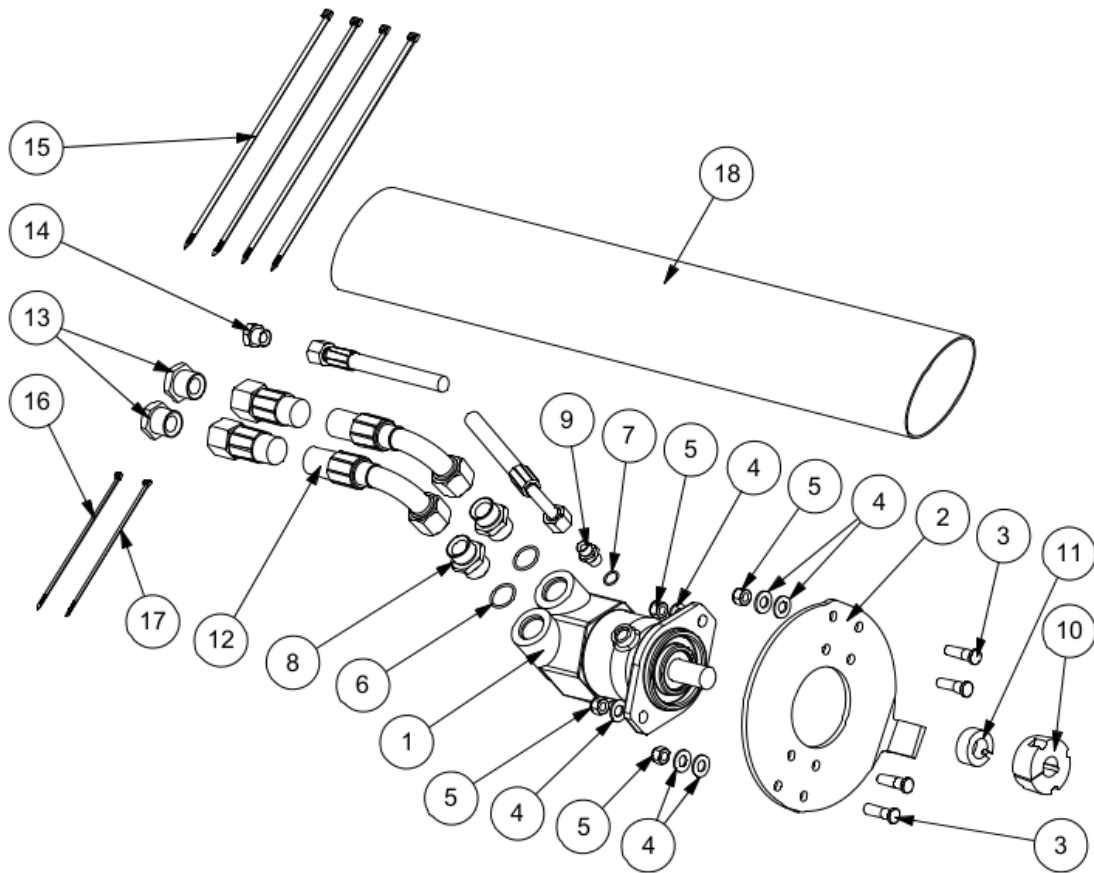
## S180039.16 – 1.6M STD HEAD HOSES



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	3750627	HOSE KIT	1
	3750627.01	HOSE	2
	3750627.02	HOSE	1
2	05.433.03	PLUG	2
3	3460110	PLUG	1
4	06.023.01	HOSE TIE	4
5	8770768	CABLE TIE	1
6	8770769	CABLE TIE	1
7	43542.07	HOSE SLEEVE	1

# Spearhead Project Black Flail Head

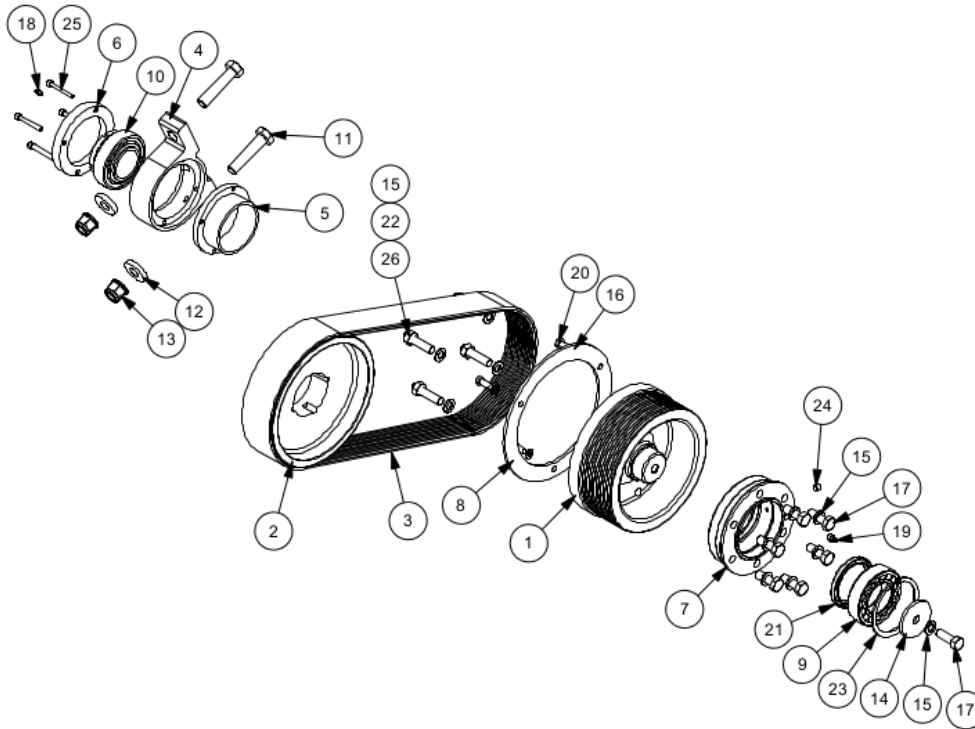
## S180039.3I – PISTON MOTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	8301295	MOTOR	1
2	181440	MOTOR PLATE	1
3	181255	STUD	4
4	2770436	WASHER	6
5	181256	NUT	4
6	8600916	O-RING	2
7	8600908	O-RING	1
8	08.955.25	ADAPTOR	2
9	08.955.12	ADAPTOR	1
10	05.424.04	TAPERLOCK	1
11	181444	SHAFT SPACER	1
12	3750631	HOSE KIT	1
	3750631.01	HOSE	2
	3750631.02	HOSE	1
13	05.433.03	PLUG	2
14	3700214	PLUG	1
15	06.023.01	HOSE TIE	4
16	8770768	CABLE TIE	1
17	8770769	CABLE TIE	1
18	43542.07	HOSE SLEEVE	1

# Spearhead Project Black Flail Head

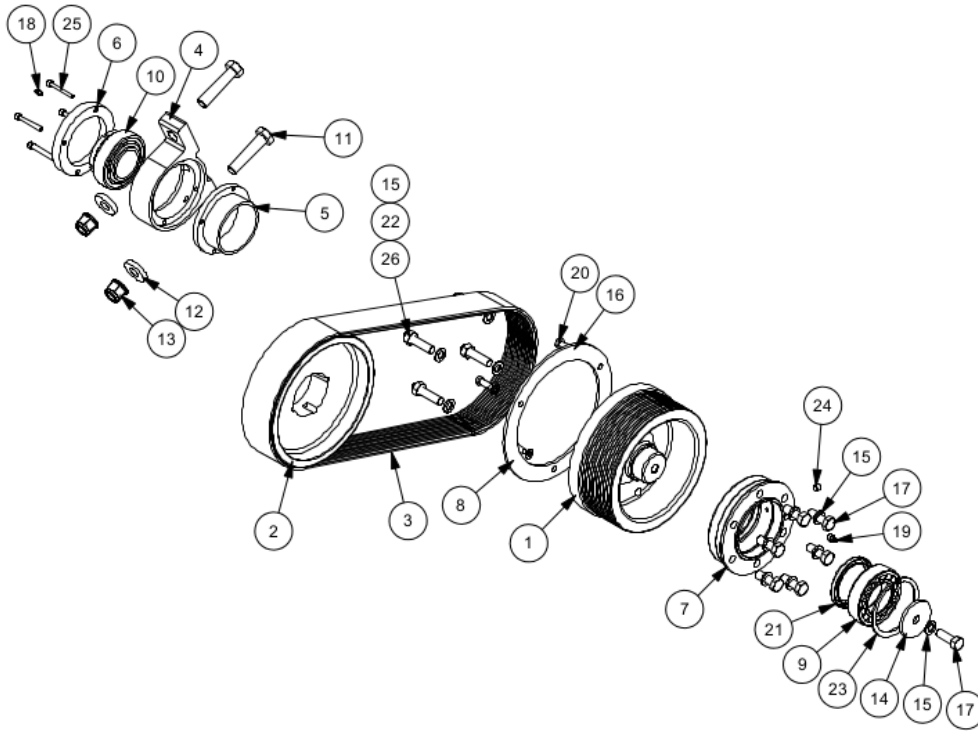
## S180039.05 - DRIVE SCHEDULE (FAST SPEED)



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181222	PULLEY	1
2	181223	PULLEY	1
3	181224	BELT	1
4	192.024	HOUSING	1
5	181671	SHEILD	1
6	192.025	CAP	1
7	184.705	BEARING HOUSING	1
8	184.636	RING	1
9	T7840	BEARING	1
10	T7941	BEARING	1
11	9200070	BOLT	2
12	7390005	SPACER	2
13	9100024	NUT	2
14	184.461	WASHER	1
15	2770442	WASHER	11
16	2770433	WASHER	3
17	T7855	SCREW	7
18	2770467	GREASE NIPPLE	1
19	01.070.04	GREASE NIPPLE	1
20	2770402	SETSCREW	3
21	T7790	SEAL	1
22	04.282.06	STUD	6
23	0411290	CIRCLIP	1
24	8582041	PLUG	1
25	T6985	SCREW	4
26	05.287.03	NUT	6

# Spearhead Project Black Flail Head

## S180039.5I - DRIVE SCHEDULE (SLOW SPEED)

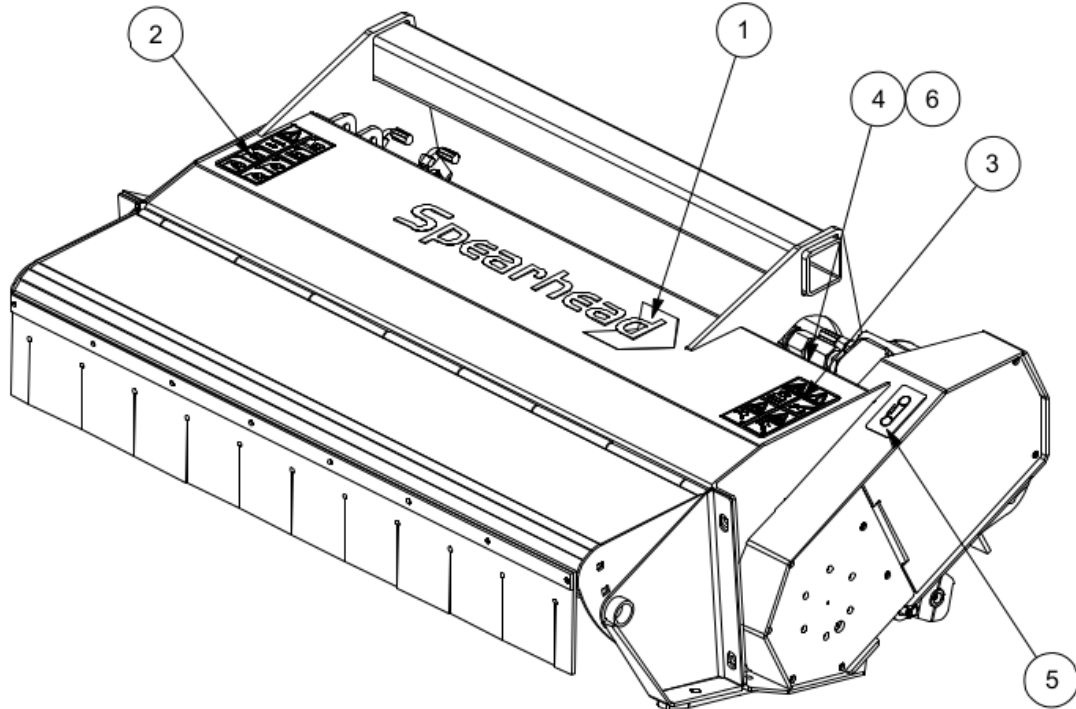


ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181222	PULLEY	1
2	181223X	PULLEY	1
3	4770955	BELT	1
4	192.024	HOUSING	1
5	181671	SHEILD	1
6	192.025	CAP	1
7	184.705	BEARING HOUSING	1
8	184.636	RING	1
9	T7840	BEARING	1
10	T7941	BEARING	1
11	9200070	BOLT	2
12	7390005	SPACER	2
13	9100024	NUT	2
14	184.461	WASHER	1
15	2770442	WASHER	11
16	2770433	WASHER	3
17	T7855	SCREW	7
18	2770467	GREASE NIPPLE	1
19	01.070.04	GREASE NIPPLE	1
20	2770402	SETSCREW	3
21	T7790	SEAL	1
22	04.282.06	STUD	6
23	0411290	CIRCLIP	1
24	8582041	PLUG	1
25	T6985	SCREW	4
26	05.287.03	NUT	6



# Spearhead Project Black Flail Head

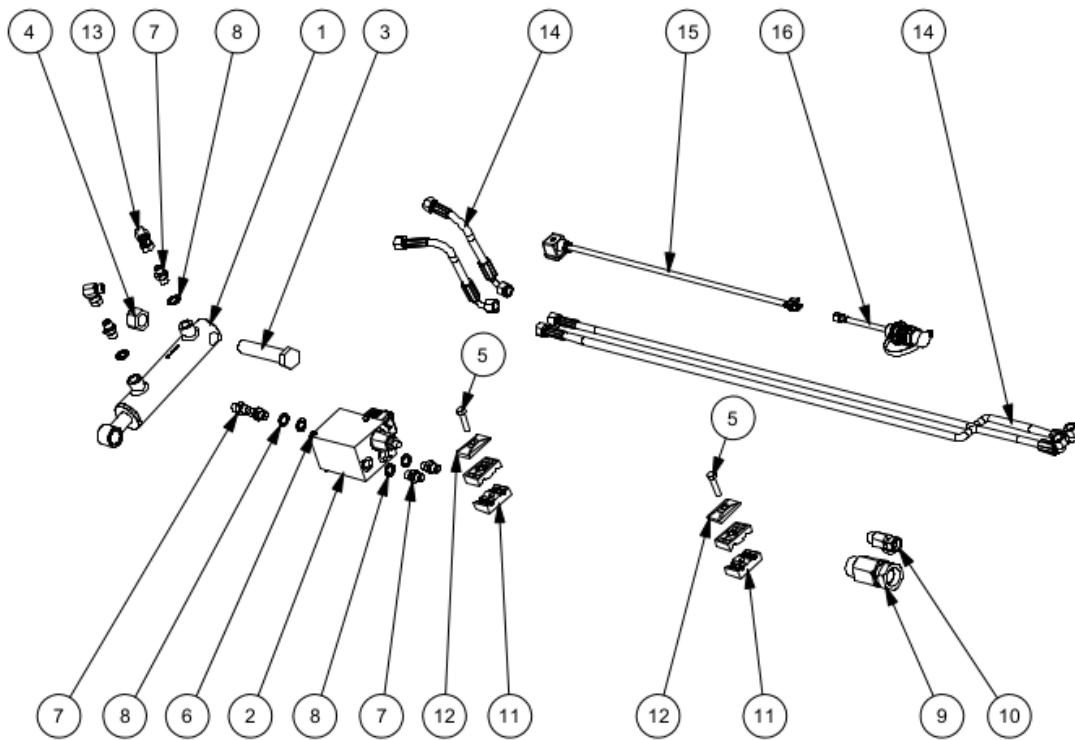
## SI80039.08 - DECAL SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	8770373	SPEARHEAD DECAL	1
2	1290738	SAFETY DECAL	1
3	09.821.35	SAFETY DECAL	1
4	8770330	SERIAL PLATE	1
5	1290070	BELT TENSION DECAL	1
6	7103230	RIVET	4

# Spearhead Project Black Flail Head

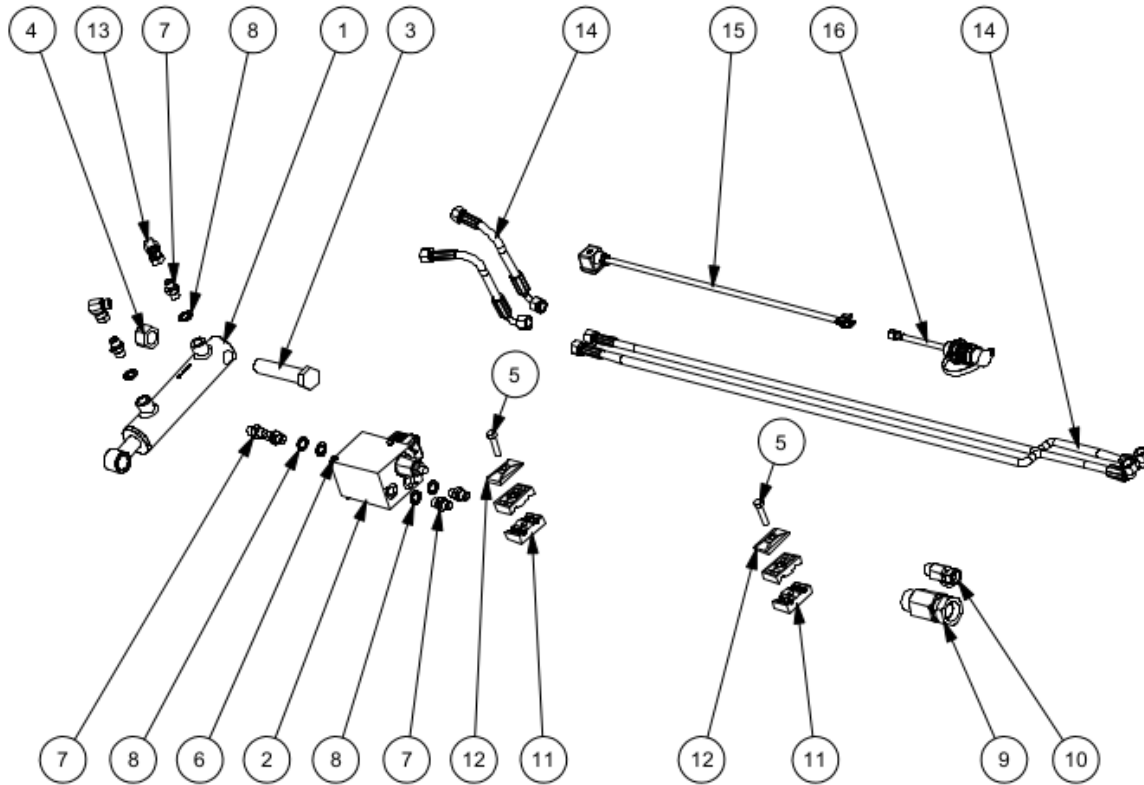
## SI80039.32 - 1.2M ROLLER RAM AND HYD SCHEDULE



ITEM NO.	PART NO. 1.2M.	DESCRIPTION.	QTY.
1	3580664WH	HYD RAM	1
2	3610082	VALVE	1
3	05.292.48	SETSCREW	1
4	2770409	NYLOCK NUT	1
5	05.291.02	BOLT	2
6	30.068.93	BOLT	2
7	05.129.01	ADAPTOR	6
8	3260070	SEAL	6
9	04.056.33	ADAPTOR	1
10	04.056.16	ADAPTOR	1
11	5351.2	CLAMP	4
12	5351.1	CLAMP PLATE	2
13	8581190	ADAPTOR	0
14	3750632	HOSE KIT	1
	3750632.01	HOSE	2
	3750632.02	HOSE	2
15	8770654	LOOM	1
16	8770786	LOOM	1

# Spearhead Project Black Flail Head

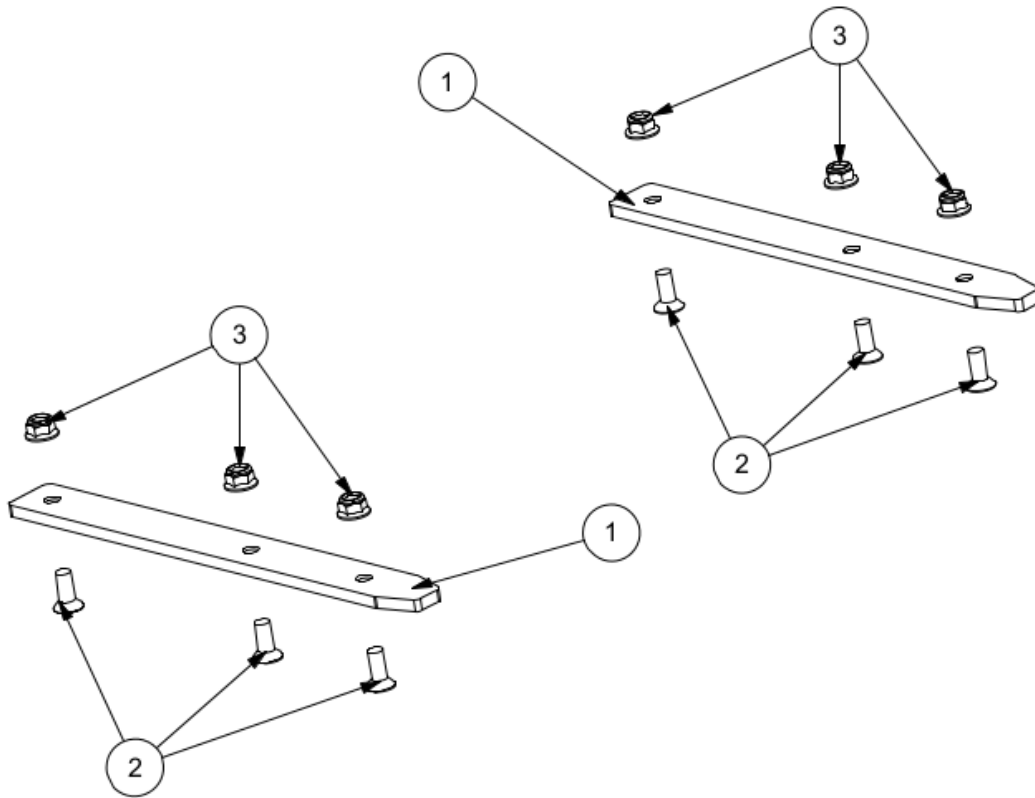
## SI80039.33 - 1.6M ROLLER RAM AND HYD SCHEDULE



ITEM NO.	PART NO. 1.6M.	DESCRIPTION.	QTY.
1	3580664WH	HYD RAM	1
2	3610082	VALVE	1
3	05.292.48	SETScrew	1
4	2770409	NYLOCK NUT	1
5	05.291.02	BOLT	2
6	30.068.93	BOLT	2
7	05.129.01	ADAPTOR	6
8	3260070	SEAL	6
9	04.056.33	ADAPTOR	1
10	04.056.16	ADAPTOR	1
11	5351.2	CLAMP	4
12	5351.1	CLAMP PLATE	2
13	8581190	ADAPTOR	0
14	3750633	HOSE KIT	1
	3750633.01	HOSE	2
	3750633.02	HOSE	2
15	8770654	LOOM	1
16	8770786	LOOM	1

# Spearhead Project Black Flail Head

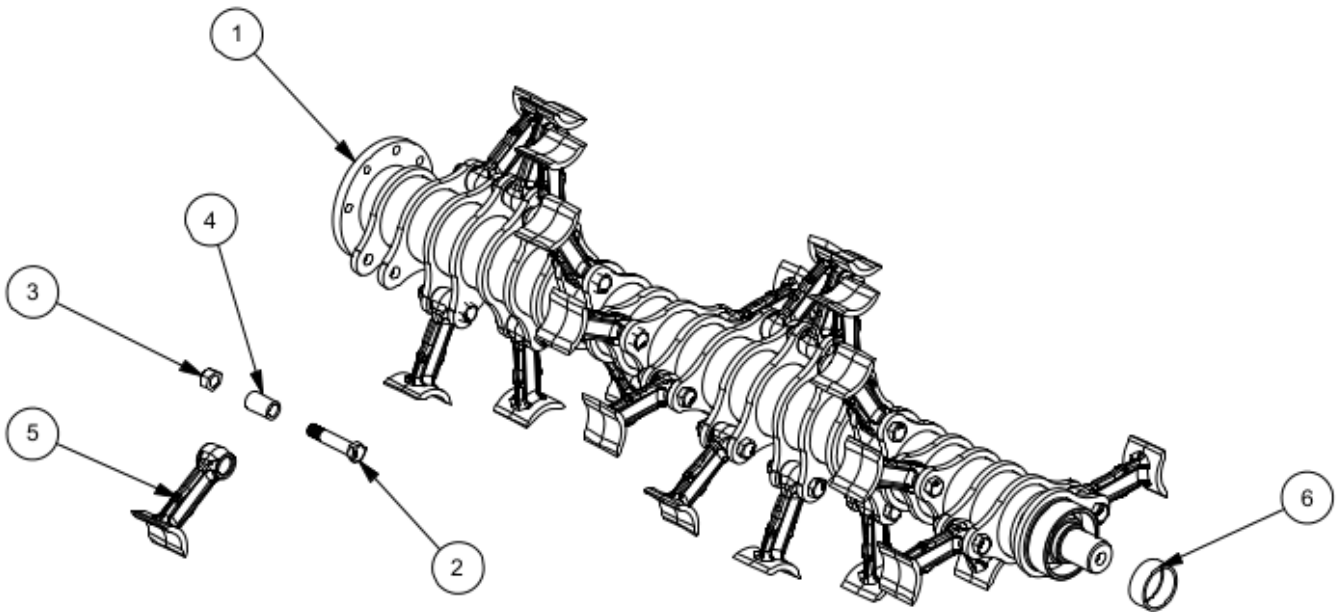
SI80039.34 - STD SKID KIT



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181670	SKID	2
2	2770506	SKT CSK SCREW	6
3	05.287.22	FLANGED NYLOCK NUT	6

# Spearhead Project Black Flail Head

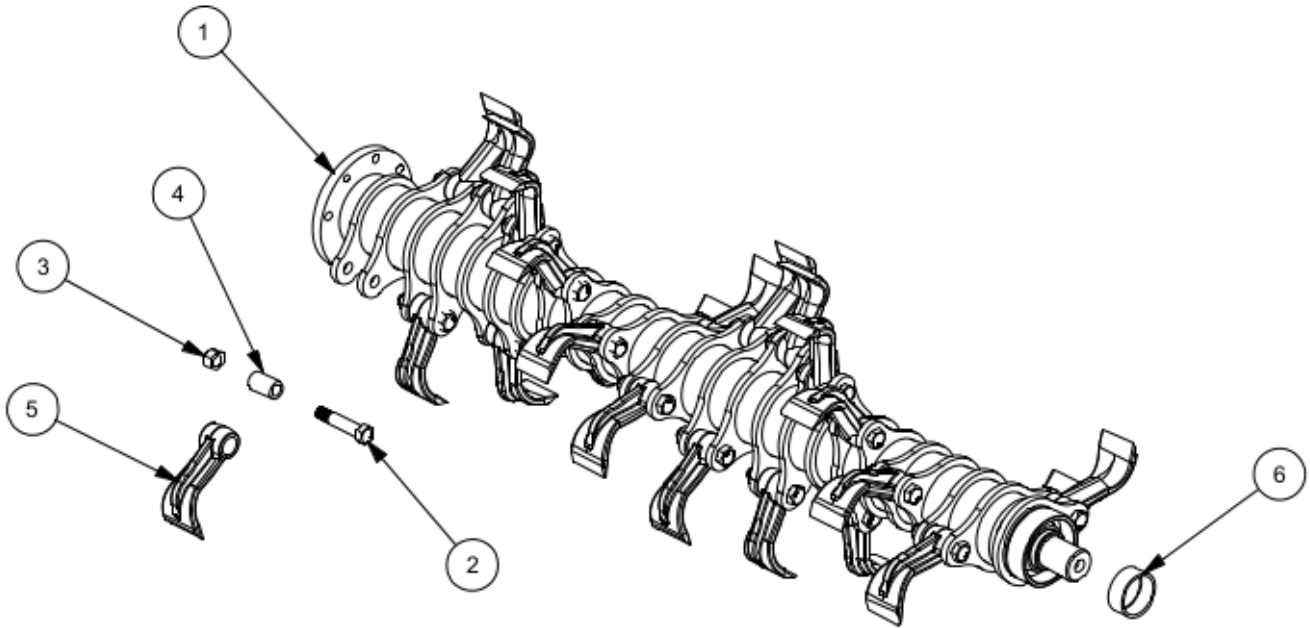
## SI80039.35 - 1.2M T FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181500	1.2M ROTOR ASSY - T FLAILS	
2	T7943	BOLT	24
3	05.968.04	NUT	24
4	184.106	BUSH	24
5	1840093C	T FLAIL	24
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

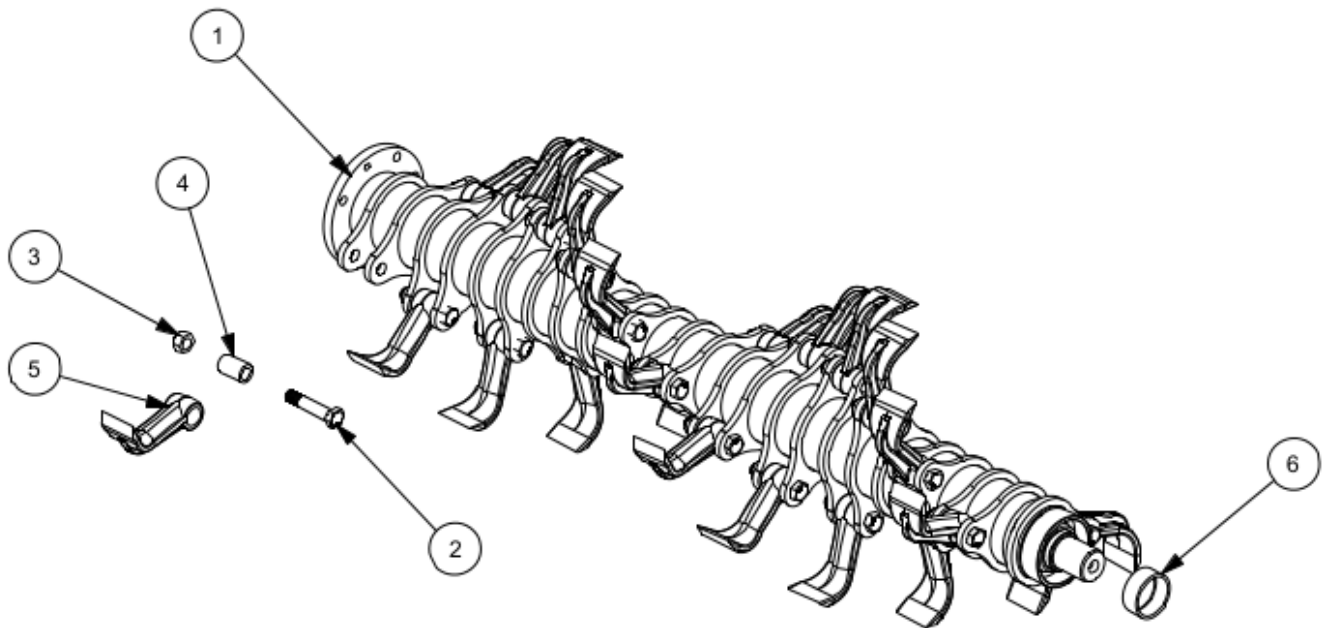
## SI80039.36 - 1.2M LH COMP FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181501	1.2M LH ROTOR ASSY - COMP FLAILS	
2	T7943	BOLT	24
3	05.968.04	NUT	24
4	184.106	BUSH	24
5	7390276	COMP FLAIL	24
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

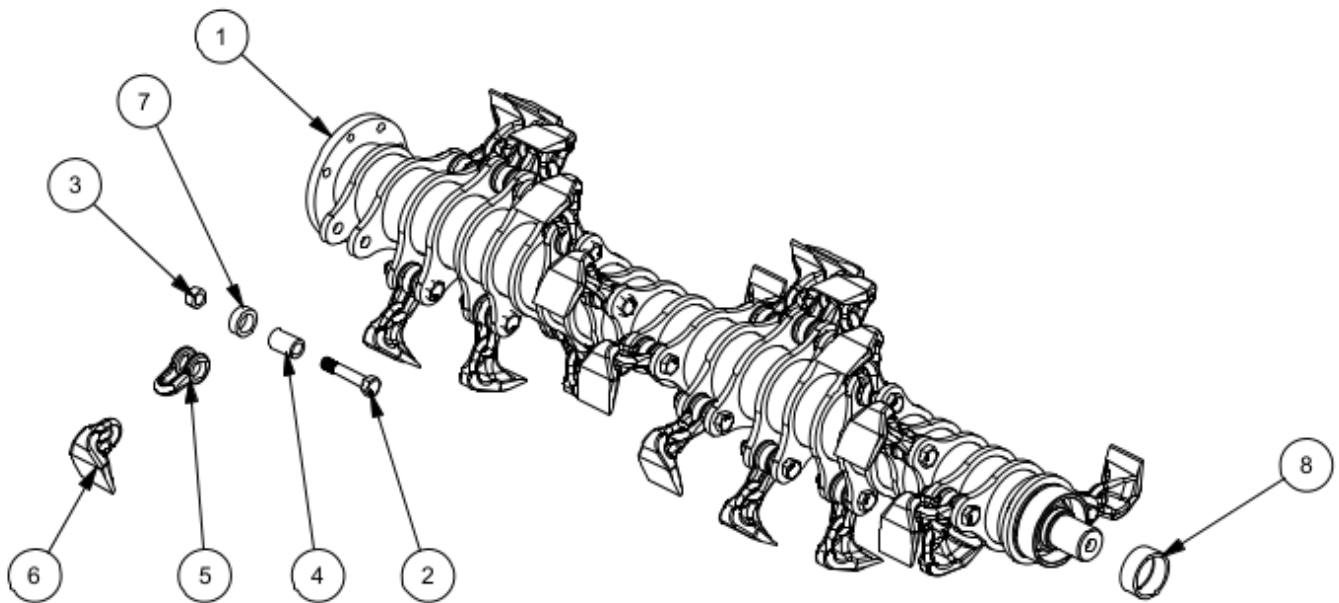
## S180039.37 - 1.2M RH COMP FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181502	1.2M RH ROTOR ASSY - COMP FLAILS	
2	T7943	BOLT	24
3	05.968.04	NUT	24
4	184.106	BUSH	24
5	7390276	COMP FLAIL	24
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

## S180039.38 - 1.2M LH BOOT FLAIL ROTOR SCHEDULE

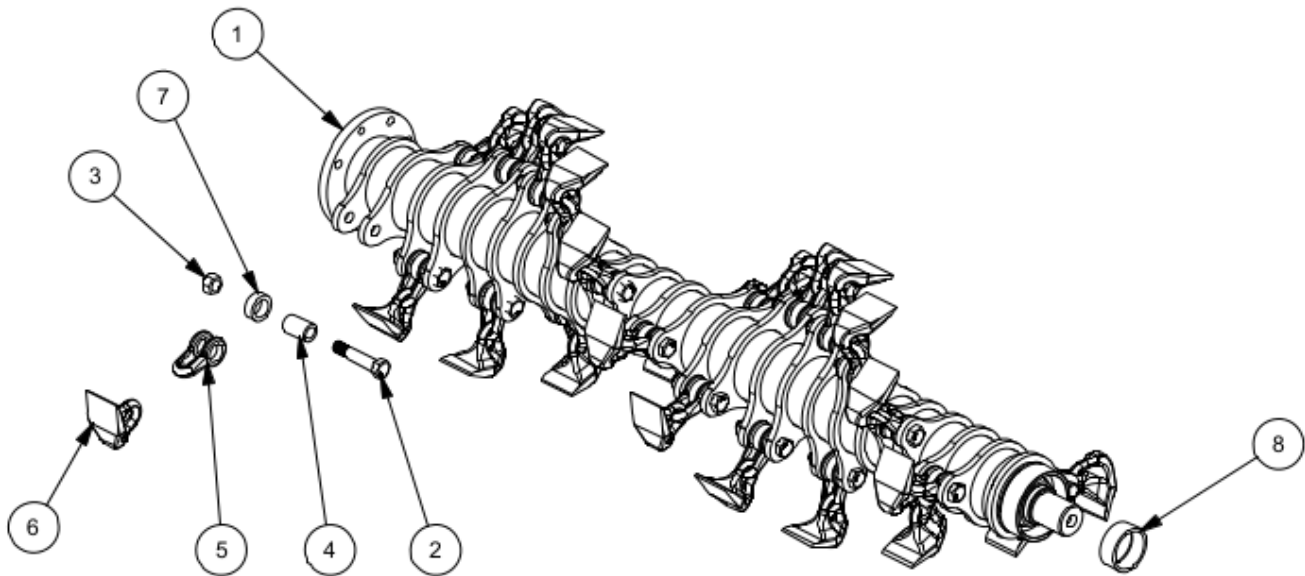


ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181503	1.2M LH ROTOR ASSY - BOOT FLAILS	
2	T7943	BOLT	24
3	05.968.04	NUT	24
4	184.106	SPACER	24
5	7190175	SHACKLE	24
6	09.902.01	BOOT FLAIL	24
7	7190172	SHACKLE SPACER	24
8	184.729	SPACER	1



# Spearhead Project Black Flail Head

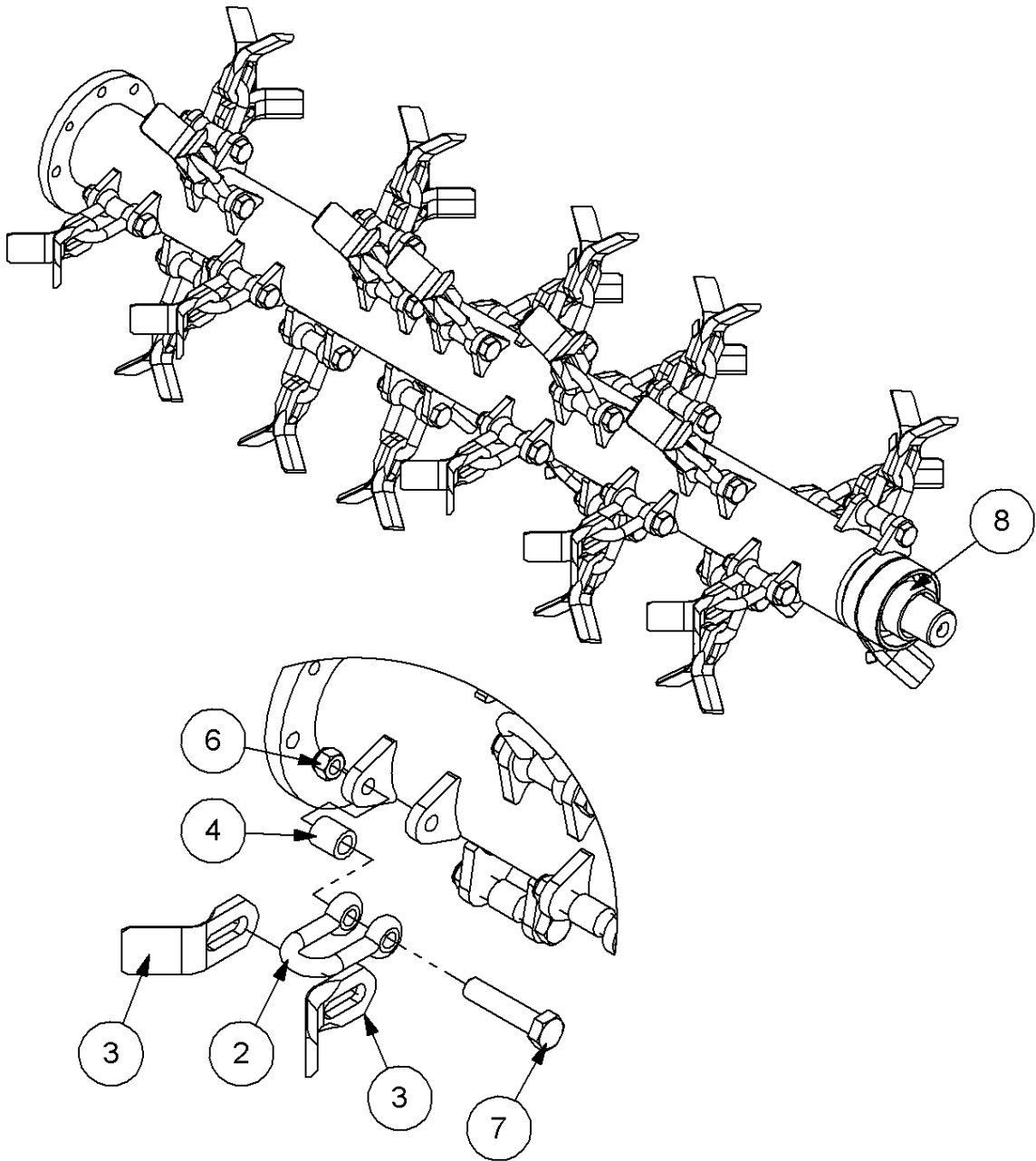
## S180039.39 - 1.2M RH BOOT FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181504	1.2M RH ROTOR ASSY - BOOT FLAILS	
2	T7943	BOLT	24
3	05.968.04	NUT	24
4	184.106	SPACER	24
5	7190175	SHACKLE	24
6	09.902.01	BOOT FLAIL	24
7	7190172	SHACKLE SPACER	24
8	184.729	SPACER	1

# Spearhead Project Black Flail Head

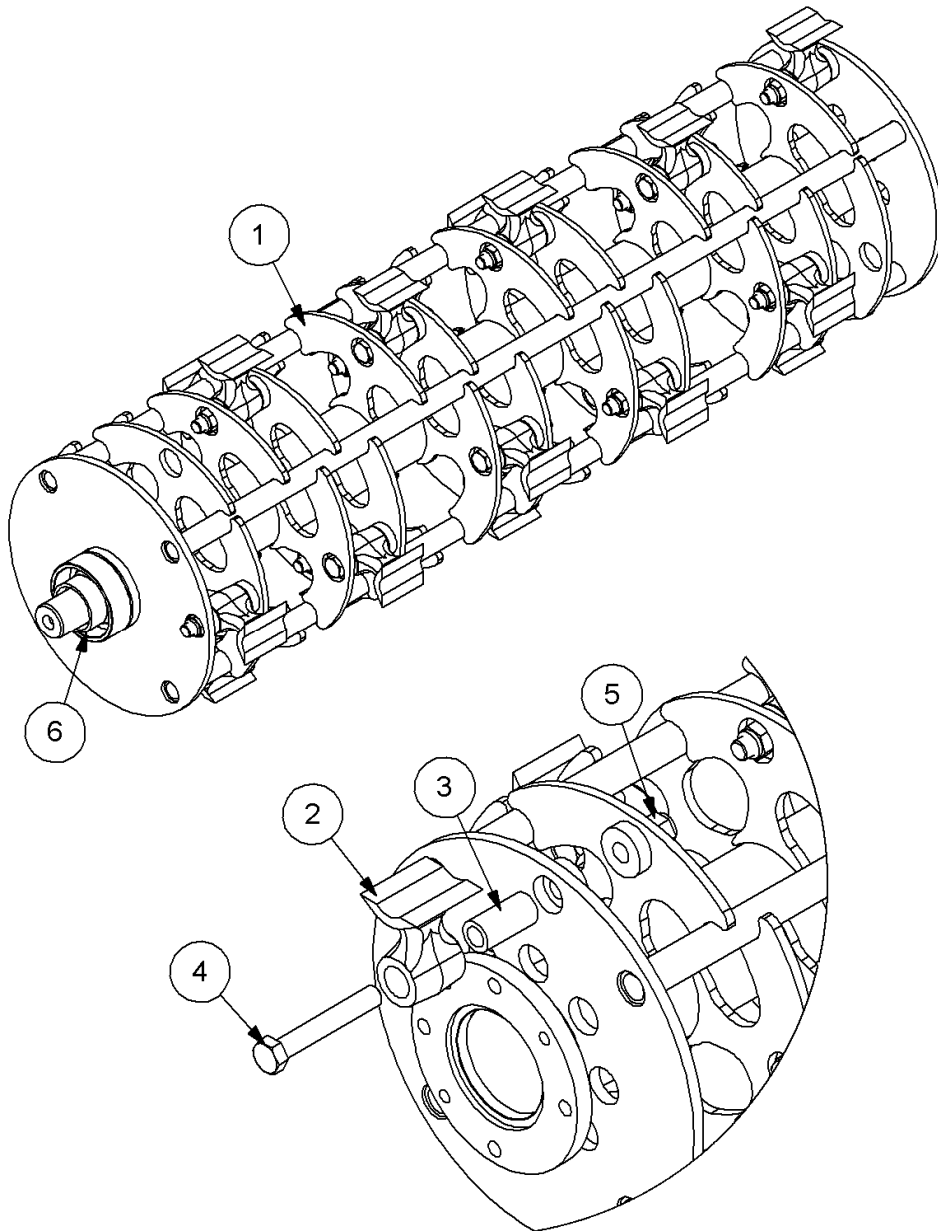
## SI84.732 - 1.2M B2B FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	184.733	1.2M ROTOR ASSY - BACK TO BACK FLAILS	
2	T1920052	SHACKLE	30
3	199.999	BACK TO BACK FLAIL	60
4	192.053	SPACER	30
5	T1920069	BOLT	30
6	T8095	NUT	30
7	184.729	SPACER	1

# Spearhead Project Black Flail Head

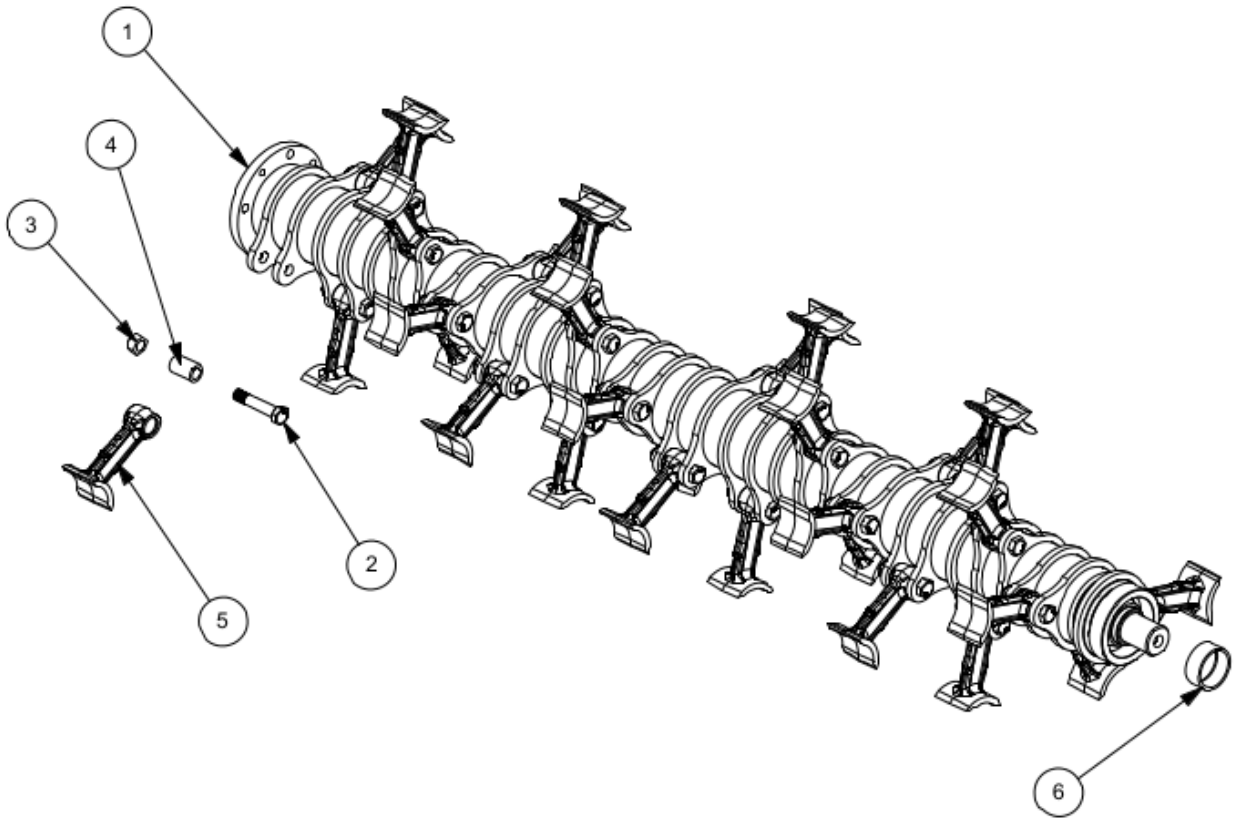
## S180039.45 - 1.2M ROLLI COUP FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181617	1.2M ROTOR ASSY - ROLLI COUP	
2	T1840572	HAMMER FLAIL	20
3	181589	FLAIL BUSH	20
4	7390006	BOLT	20
5	0141006	NUT	20
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

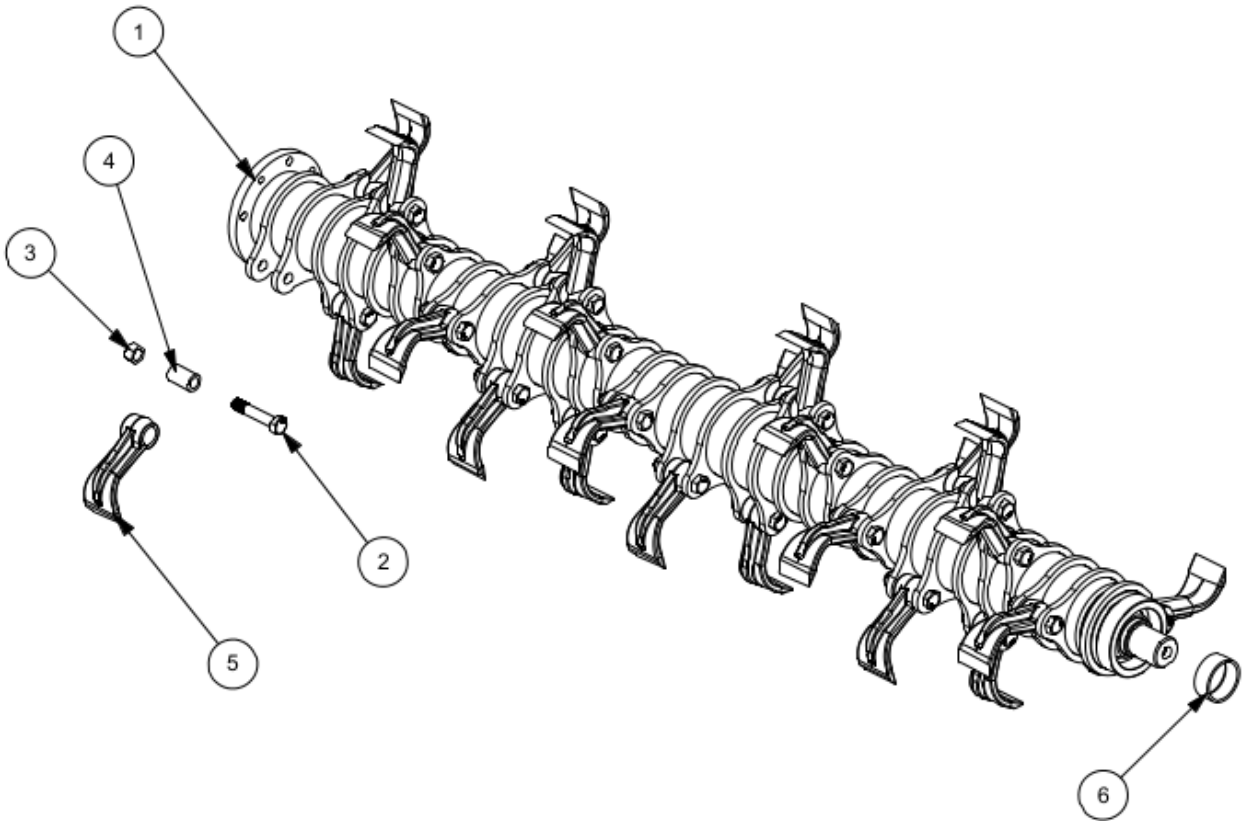
## SI80039.40 - 1.6M T FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181505	1.6M ROTOR ASSY - T FLAILS	
2	T7943	BOLT	32
3	05.968.04	NUT	32
4	184.106	BUSH	32
5	1840093C	T FLAIL	32
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

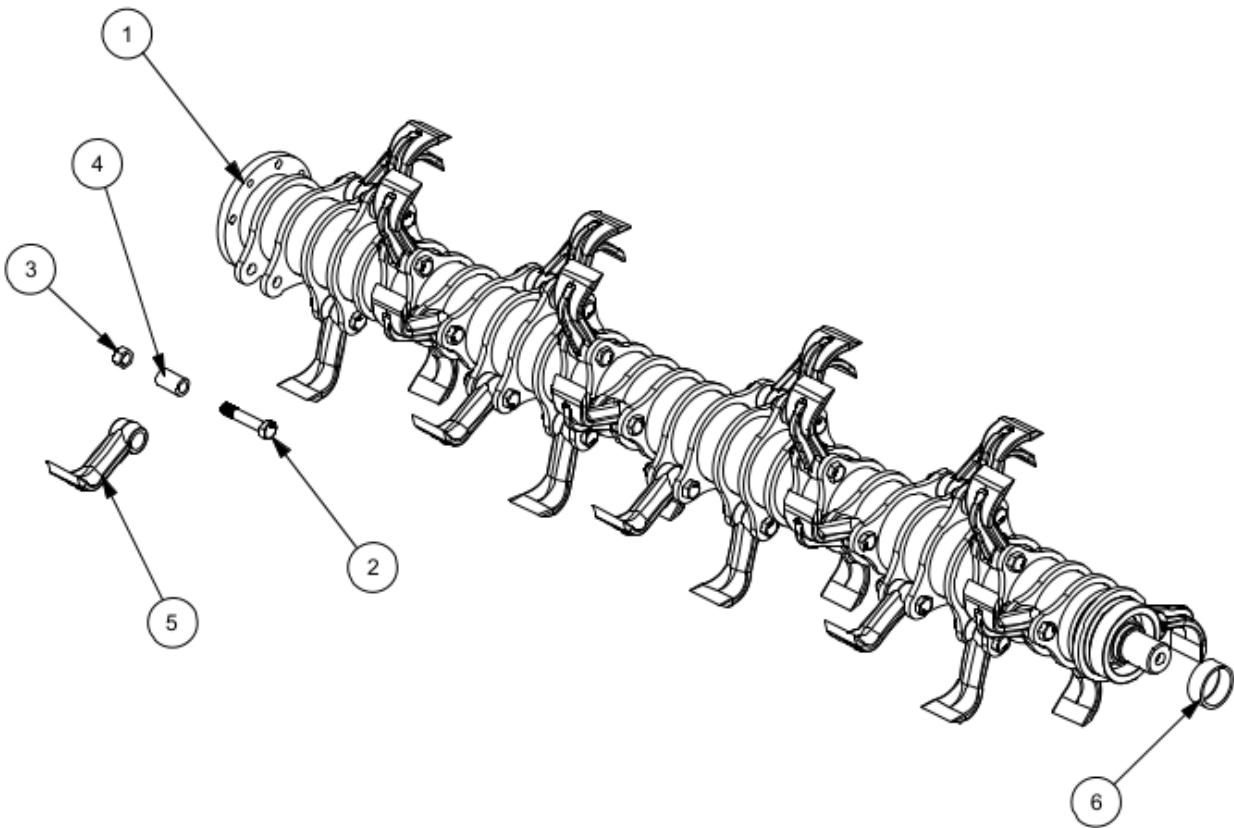
## SI80039.4I - 1.6M LH COMP FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181506	1.6M LH ROTOR ASSY - COMP FLAILS	
2	T7943	BOLT	32
3	05.968.04	NUT	32
4	184.106	BUSH	32
5	7390276	COMP FLAIL	32
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

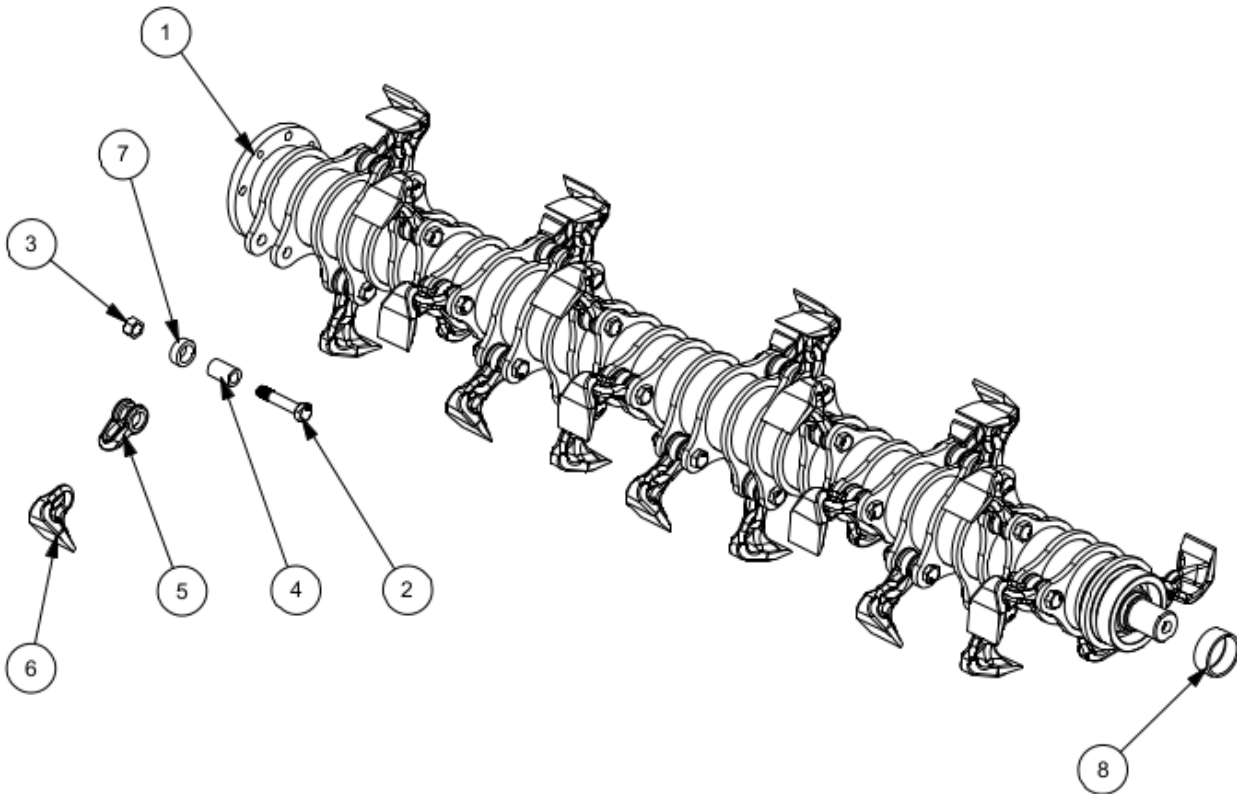
## S180039.42 - 1.6M RH COMP FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181507	1.6M RH ROTOR ASSY - COMP FLAILS	
2	T7943	BOLT	32
3	05.968.04	NUT	32
4	184.106	BUSH	32
5	7390276	COMP FLAIL	32
6	184.729	SPACER	1

# Spearhead Project Black Flail Head

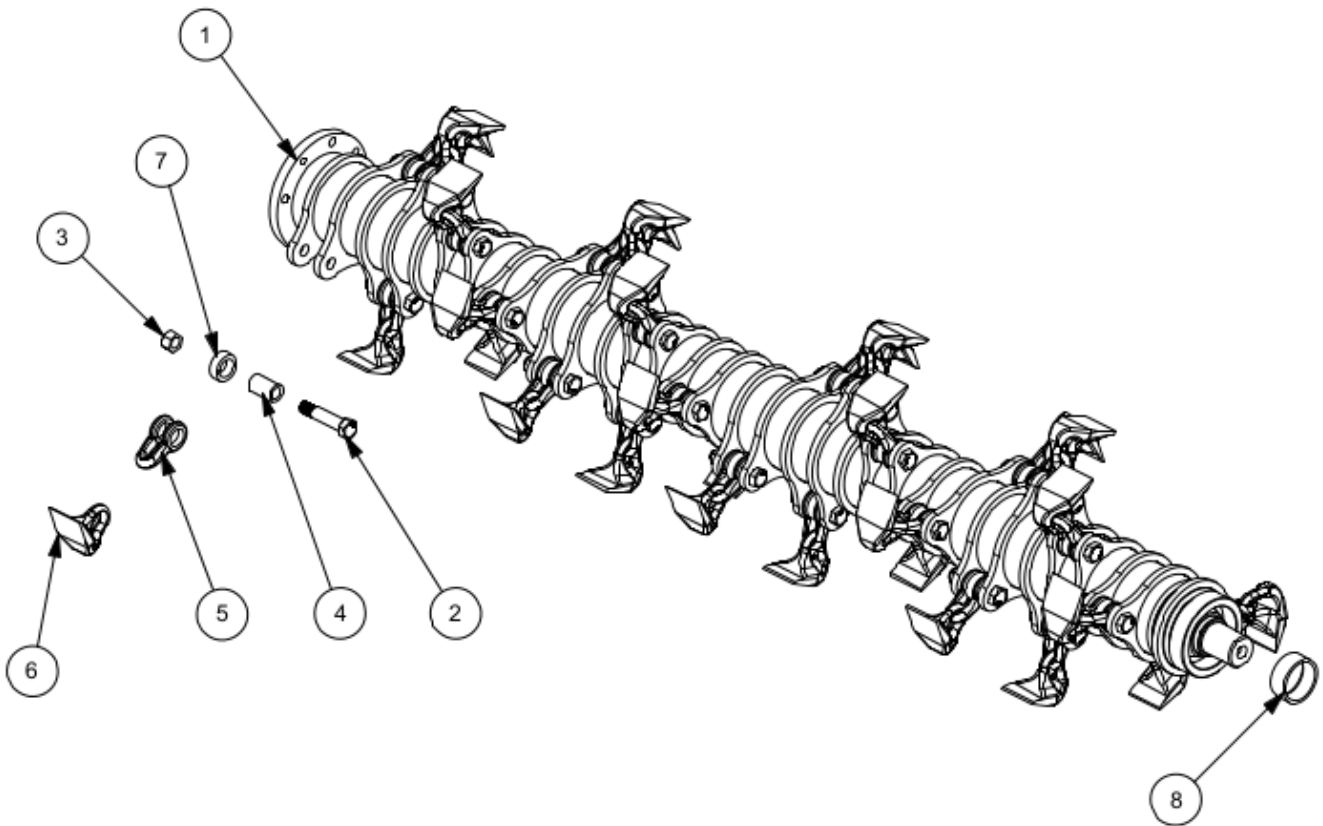
## SI80039.43 - I.6M LH BOOT FLAIL ROTOR SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181508	1.6M LH ROTOR ASSY - BOOT FLAILS	
2	T7943	BOLT	32
3	05.968.04	NUT	32
4	184.106	SPACER	32
5	7190175	SHACKLE	32
6	09.902.01	BOOT FLAIL	32
7	7190172	SHACKLE SPACER	32
8	184.729	SPACER	1

# Spearhead Project Black Flail Head

## S180039.44 - 1.6M RH BOOT FLAIL ROTOR SCHEDULE

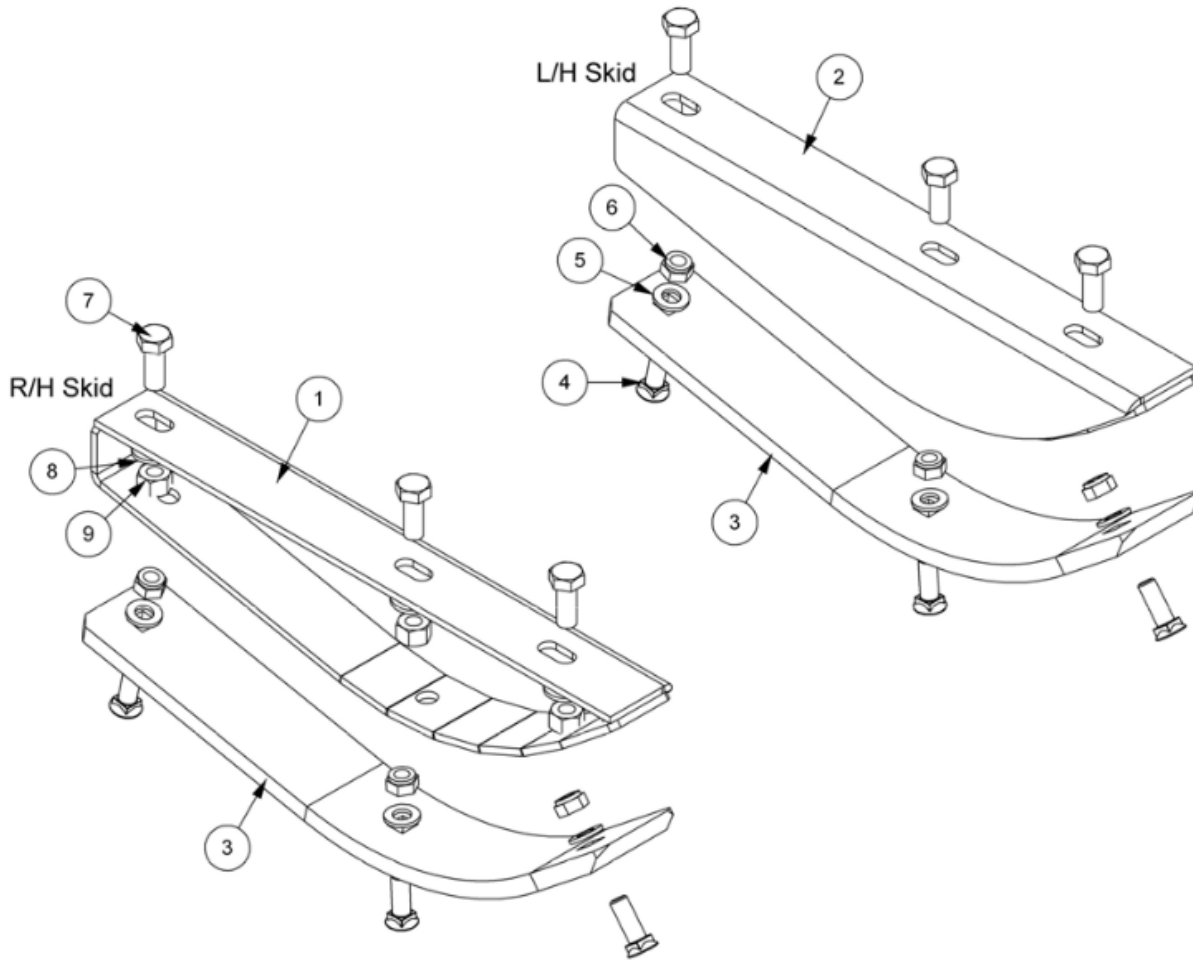


ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	181509	1.6M RH ROTOR ASSY - BOOT FLAILS	
2	T7943	BOLT	32
3	05.968.04	NUT	32
4	184.106	SPACER	32
5	7190175	SHACKLE	32
6	09.902.01	BOOT FLAIL	32
7	7190172	SHACKLE SPACER	32
8	184.729	SPACER	1



# Spearhead Project Black Flail Head

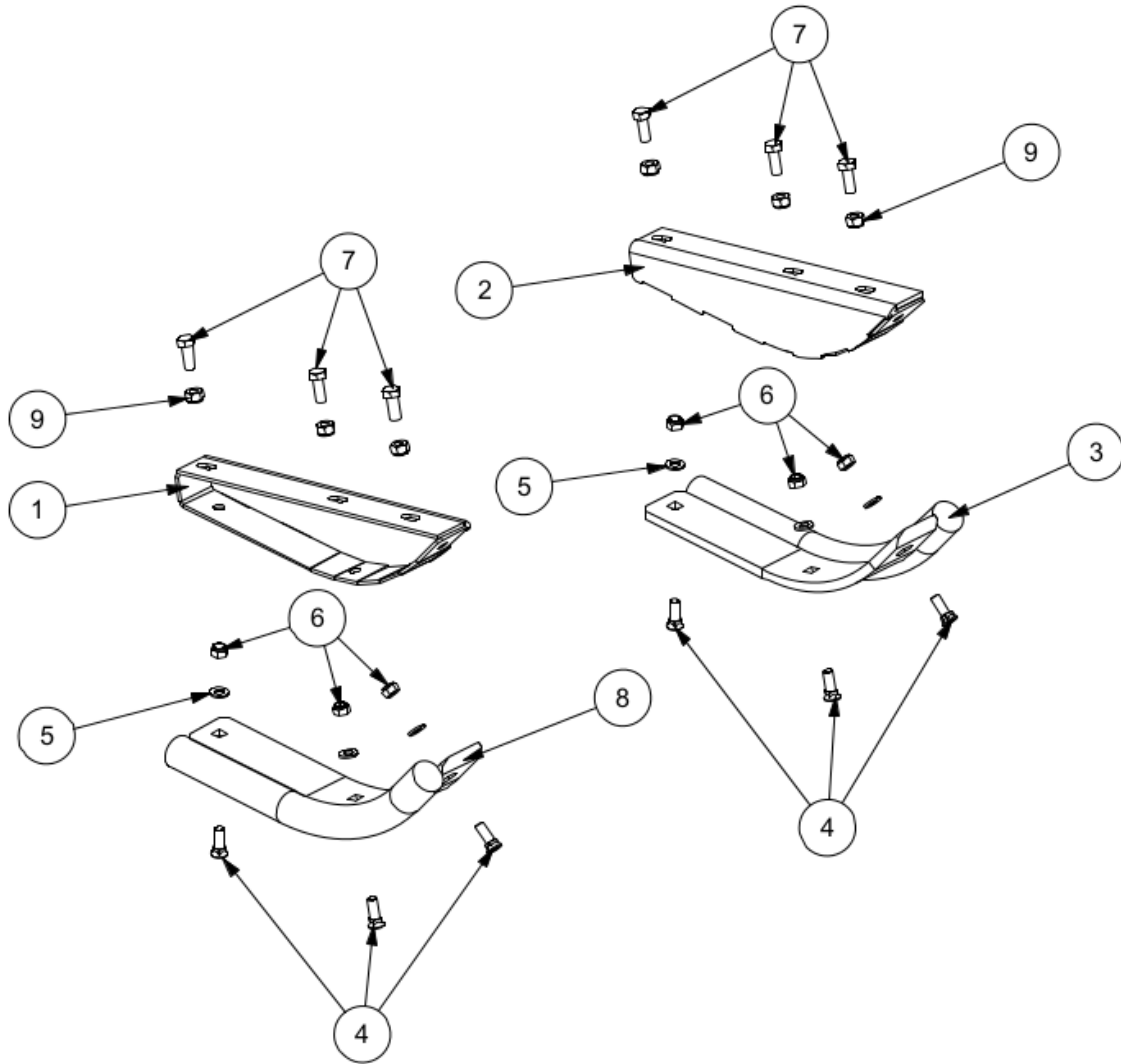
## SI84.717 - SKID KIT SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
	184.717	SKID KIT ASSY	
1	184.709R	RH SKID	1
2	184.709L	LH SKID	1
3	7290391	SKID SHOE	2
4	6012034	BOLT	6
5	0100104	WASHER	6
6	0141004	NUT	6
7	9313066	SETSCREW	6
8	05.281.03	WASHER	6
9	9163006	NUT	6

# Spearhead Project Black Flail Head

## SI80039.46 - SKID KIT C/W WEAR PLATES SCHEDULE



ITEM NO.	PART NO.	DESCRIPTION.	QTY.
1	184.709R	RH SKID	1
2	184.709L	LH SKID	1
3	181655	LH COWL WEAR PLATE	1
4	6012034	BOLT	6
5	0100104	WASHER	6
6	0141004	NUT	6
7	9313066	SETSCREW	6
8	181656	RH COWL WEAR PLATE	1
9	9163006	NUT	6

# Spearhead Project Black Flail Head

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