

**Spearhead Machinery  
Operator Instruction Manual For**

**WEED BRUSH**

**90cm cut width**

Vegetation control hydraulic drive weed brush attachment

**8999171EN v1.0**

# IMPORTANT

## Verification Of Warranty Registration

### Dealer Warranty Information & Registration Verification

It is imperative that the selling dealer registers this machine with Spearhead 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:

<https://my.spearheadmachinery.com/warranty/machine-registration/>

Should you experience any problems registering a machine in this manner please contact the Spearhead Service Department on 01789 491860.

Confirm to the customer that the machine has been registered in the section below.

### Registration Verification

<b>Model Type:</b>		<b>Weed Brush</b>
<b>Model Number:</b>		<b>9995090</b>
<b>Serial Numbers:</b>	<b>Machine:</b>	<b>S</b> _____
	<b>Cutting Implement:</b>	<b>S</b> _____
	<b>Other:</b>	
<b>Name Of Owner:</b>		
<b>Name Of Installing Dealer:</b>		
<b>Dealer Address:</b>		
<b>Dealer Signature:</b>		
<b>Date Of Delivery / Installation:</b>		
<b>Date Of Warranty Registration:</b>		

#### IMPORTANT

At the point of transfer of ownership record the above information. Note the serial number of your machine and always quote it in any communication with us or your dealer. (The serial number plate is located on the machine mainframe.) This is particularly important when ordering spares. Remember to include all numbers and letters.

The information given throughout this manual is correct at the time of publication. However, in the course of constant development of Spearhead machines, changes in specification are inevitable. Should you find the information given in this book to be at variance with the machine in your possession, you are advised to contact the Spearhead Service department where up-to-date information will be provided.

The manual can contain standard and optional features and is not to be used as a machine specification. The machine has been tested and is considered safe if carefully used. Ensure your operator is properly trained in its use and maintenance.

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## Weed Brush

Spearhead weed brushes are hydraulic arm mounted rotary brush attachments designed for removing dirt, sludge and weeds from streets, gutters and roads. The brush attachment rotates around itself via a hydraulically driven motor and provide a nice finish to tiles and paving stones by removing weeds and moss between surfaces through the use of its hard steel brushes.

Spearhead weed brushes has a brush diameter of 90cm. This machine can be mounted on Spearhead's Twiga Classic, Mid, Pro, Flex and Orbital reach arm ranges.

**IMPORTANT:** This machine must only be used to perform the tasks for which it was designed. Use for any other purpose may be dangerous to persons and damaging to the machine.

### **IMPORTANT**

This operator's manual should be regarded as part of the machine. Suppliers of both new and second-hand machines are advised to retain documentary evidence that this manual was provided with the machine.

This machine is designed solely for ground vegetation control and must not be used for any other purpose. Use in any other way is considered as contrary to the intended use. Compliance with, and strict adherence to, the conditions of operation, service, and repair, as specified by the manufacturer, also constitute essential elements of the intended use.

This machine should be operated, serviced, and repaired only by persons who are familiar with its characteristics and who are acquainted with the relevant safety procedures.

Accident prevention regulations, all other generally recognised regulations on safety and occupational medicine, and all road traffic regulations must always be observed.

Any arbitrary modifications carried out to this machine may relieve the manufacturer of liability for any resulting damage or injury.

It is potentially hazardous to fit or use any parts other than genuine **Spearhead** parts.

The company disclaims all liability for the consequences of such use which, in addition, voids the machine warranty.

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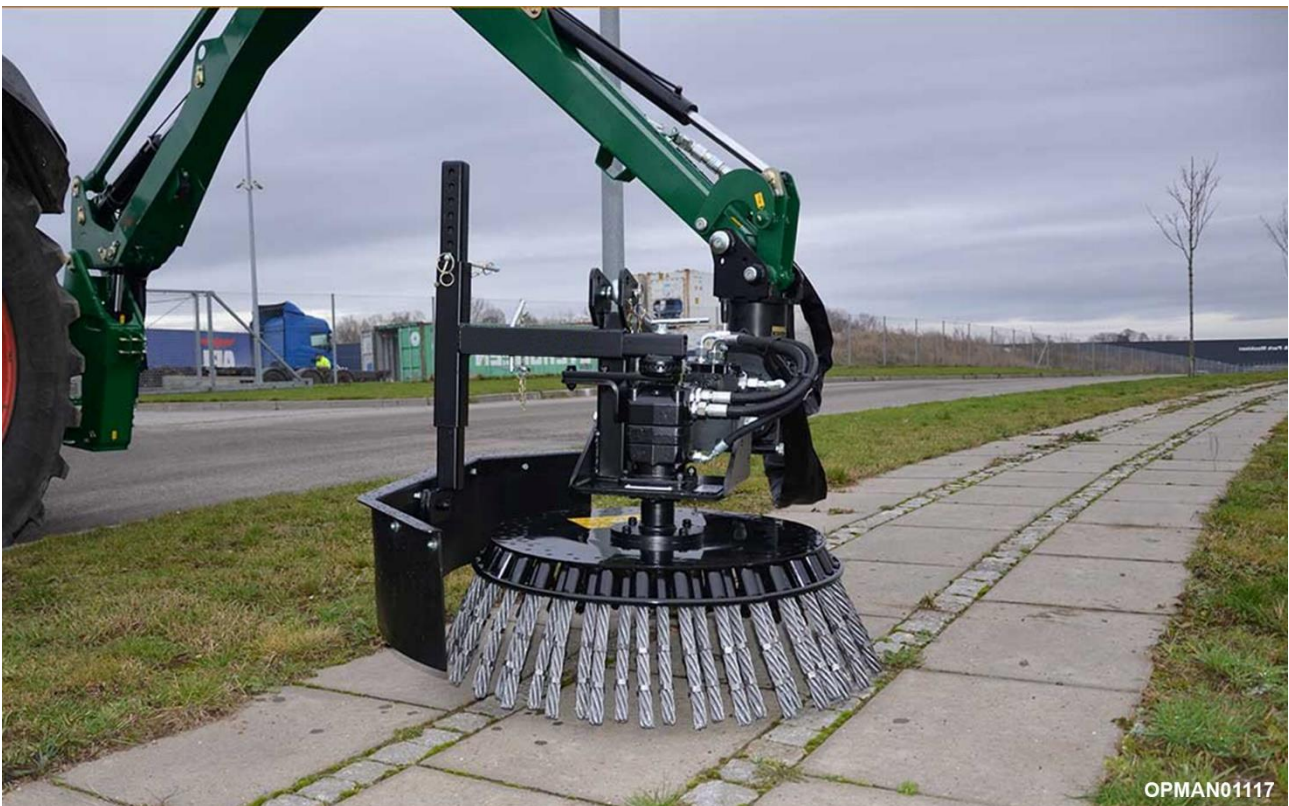
# 1 Machine Description

## 1.1 Intended Usage

Spearhead weed brushes are hydraulic arm mounted rotary brush attachments designed for removing dirt, sludge and weeds from streets, gutters and roads. The brush attachment rotates around itself via a hydraulically driven motor and provide a nice finish to tiles and paving stones by removing weeds and moss between surfaces through the use of its hard steel brushes.

Spearhead weed brushes has a brush diameter of 90cm. This machine can be mounted on Spearhead's Twiga Classic, Mid, Pro, Flex and Orbital reach arm ranges.

**IMPORTANT:** This machine must only be used to perform the tasks for which it was designed. Use for any other purpose may be dangerous to persons and damaging to the machine.

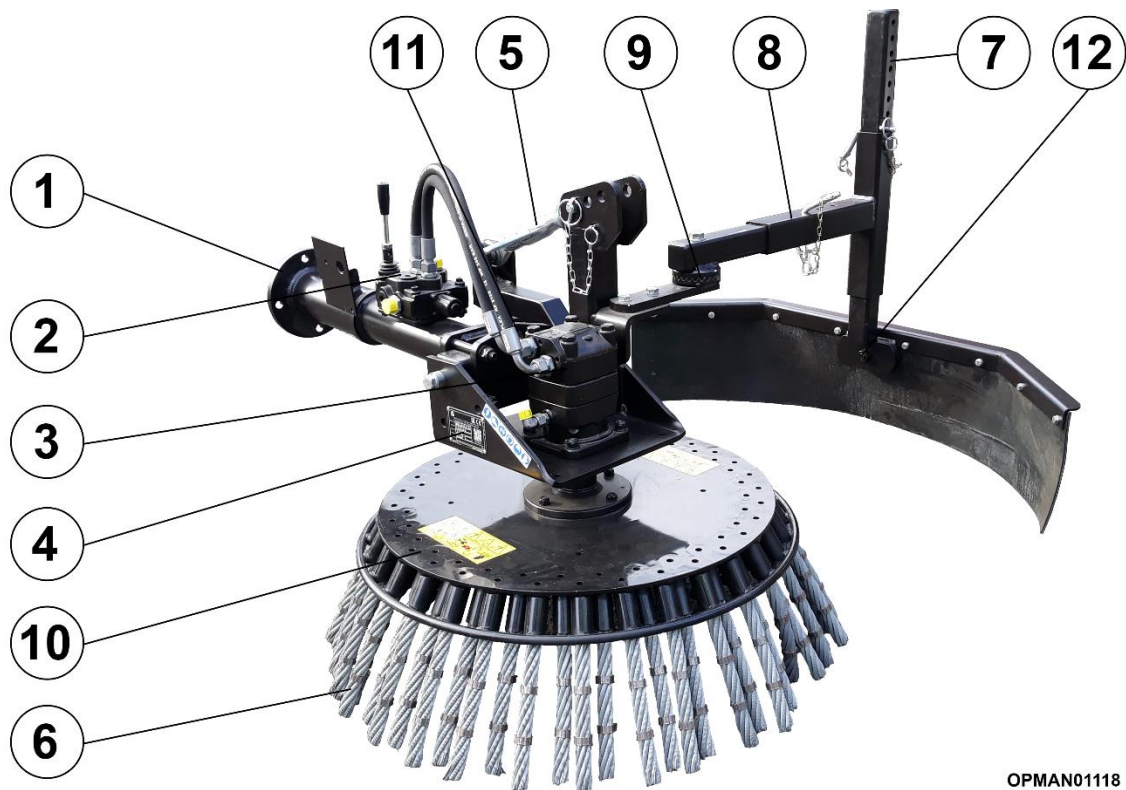


**Figure 1.1**  
**Weed Brush**



## 1.2 General Arrangement

The layout and naming convention used throughout this manual are shown in Figure 1.2 below



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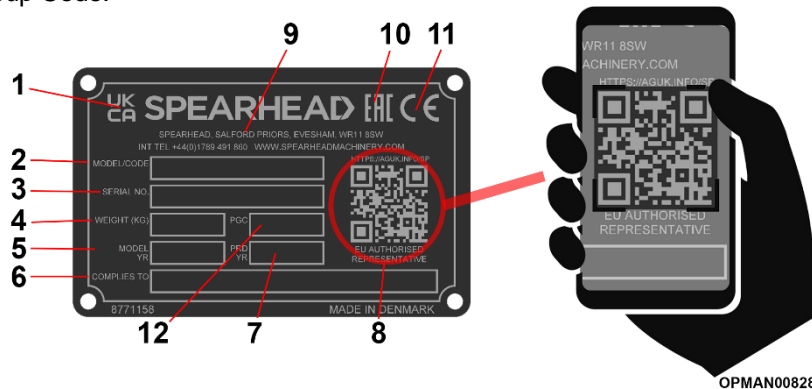
Item No	Description
1	Reach Arm Mount Interface
2	Rotor Direction Valve + Control Handle
3	Motor
4	Serial Plate
5	Pitch Angle Linkage
6	Steel Brush Bundle
7	Rubber Safety Guard Height Adjustment
8	Rubber Safety Guard Offset Adjustment
9	Rubber Safety Guard Radial Adjustment
10	Brush Carrier
11	Lifting Point
12	Rubber Safety Guard Angle Adjustment

**Figure 1.2**

## 1.3 Machine Identification

Each machine is equipped with a serial plate; see Figure 1.3 that includes the following data in this order:

1. UKCA Conformity Marking.
2. Machine Whole Goods Code (WGC).
3. Serial number of the machine.
4. Mass in kg.
5. Production Year (year of construction).
6. Design conformity standard.
7. Machine Product Group Code.
8. EU Authorised Representative QR scan code.
9. Manufacturer marking with name and address.
10. EAC Eurasian/Russian Conformity Marking.
11. EC European Conformity Marking.
12. Product Group Code.



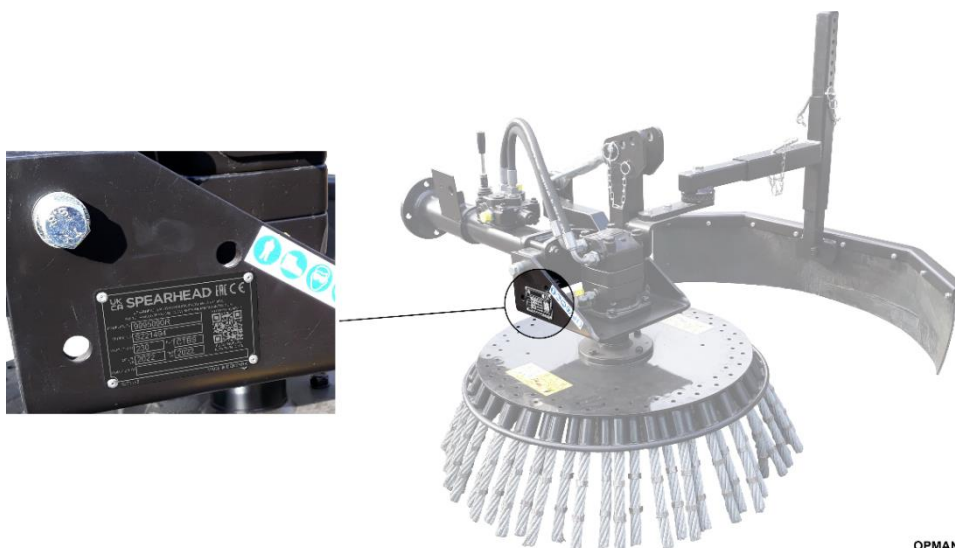
**Figure 1.3 – Serial Plate**

Data on the Spearhead manufacturer's plate should always be referred to when requesting assistance and/or requiring replacement spare parts.

This data can identify the machine and its characteristics and specification for its particular time of manufacture, certifying that it responds to current regulations. For this reason, the plate should never therefore be removed nor be used for other purposes; if the machine is dismantled, it should be destroyed to prevent any form of abuse.

By utilising a smart phone and scanning the Authorised Representative QR scan code found on the right-hand side of the serial plate (ref 8, Figure 1.3) using a suitable QR scanning App, you can find details for Spearhead Machinery authorised representatives for its various territories.

The serial plate is located near the motor mounting point of the machine; see Figure 1.4.



**Figure 1.4 – Serial Plate Location**

## 1.4 Machine General Specification.

### 1.4.1 Standard Specification

Model	90cm
Weight (1)	230kg (507lbs)
Working Width (2)	90cm (2' 11")
Safety Guarding	Rubber safety guard
Mounting Attachment	4 x M16 bolts mounting through a flange plate
Hydraulic Connection Requirements	1 x double acting + case drain
Hydraulic Flow	50 l/min
Max Pressure	190bar (2755psi)
Max Operating Speed	0.62mph (1 km/h)

**Table 1.1**

**Notes:**

- (1) Spearhead constantly reviews and improves product designs and reserve the right to change this information. Actual machines may vary from the above specification. Contact your Spearhead Sales representative if you have any queries.
- (2) All dimensions are determined from computer models, so actual measurements may vary slightly.

## 2 Safety

### 2.1 Safety Warnings

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;



**DANGER!** Level 1; alerts for imminent death or critical injury.



**WARNING!** Level 2; warns of serious injury or possible death.



**CAUTION!** Level 3; indicates possible injury.

**IMPORTANT:** Special instruction related to either the machine, tractor or the working environment

**NOTE:** Special instruction related to either the machine, tractor or the working environment

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 machine attachment.

### 2.2 Terminology

The indicated levels of danger refer to specific risk situation that may occur during machine use and may involve the same machine, the operator and any exposed. With the purpose of highlighting situations or operations that may result in risks, the meanings of terms used in this manual are indicated here:

- **WORKING ZONE:** Any area in and/or around a machine where the presence of an exposed person constitutes a risk to the health and safety of said person.
- **BYSTANDER:** A person fully or partly in a hazardous area.
- **OPERATOR:** The person or personnel in charge of the installation, the operation, the adjusting, the cleaning, the repairing and the moving of the machine.
- **USER:** the person, entity or company, who purchased or rented the machine and intends to use it according to the intended use foreseen by the manufacturer.
- **SPECIALISED PERSONNEL:** any person specifically trained and approved to carry out maintenance or repair interventions that require particular knowledge of the machine, its operation, the installed safety devices, intervention modes. It must be capable of recognising danger present on the actual machine, therefore avoiding at risk situations.
- **RISK:** a combination of the probability and seriousness of injury or damage to health which can arise in a dangerous situation.
- **GUARD:** a part of the machine that is used to specifically guarantee protection by way of a material barrier.
- **PROTECTION DEVICE:** a device that reduces risk (unlike the guard) either on its own or together with the guard.
- **INTENDED USE:** the use of the machine in accordance with the information provided in the operators manual.
- **REASONABLE FORESEEABLE MISUSE:** the use of the machine different to the information provided in the operator's instructions, which may be the result of readily predictable human behaviour.
- **GENUINE SPEARHEAD DEALER/ AUTHORIZED TRACTOR DEALER:** The Genuine Spearhead Dealer/ Authorized Tractor Dealer, legally authorised by the Manufacturer, is formed by specialised staff able to carry out all types of assistance, maintenance and repair work, even of a certain complexity, required to maintain the machine in perfect working order.

## 2.3 Unauthorized Conversions And Modifications Are Prohibited



2.3.1.1 **IMPORTANT:** Do not make any unauthorized conversions or modifications to the weed brush.



2.3.1.2 **IMPORTANT:** Conversions or modifications are prohibited without the written permission of the manufacturer and exclude liability for resulting damages.

## 2.4 Personnel Qualification And Training



2.4.1.1 **IMPORTANT:** The weed brush should be used, maintained and repaired only by specialised personnel who are familiar with the system and have been instructed about the dangers.



2.4.1.2 **IMPORTANT:** The area of responsibility, competence and supervision of personnel must be exactly defined by the operator.



2.4.1.3 **IMPORTANT:** If the personnel do not have sufficient skills, they must be trained and instructed.



2.4.1.4 **IMPORTANT:** The operator must ensure that personnel have read and understood the contents of this operating manual.



2.4.1.5 **IMPORTANT:** Repairs that are not described in this operating manual may be carried out only by a genuine Spearhead dealer.

## 2.5 General Safety Information



2.5.1.1 **IMPORTANT:** The operator must follow the safety instructions described here, abide by the national regulations regarding general safety. The responsibility for this rests with the user.



2.5.1.2 **IMPORTANT:** The relevant safety regulations and the generally accepted rules on safety technology and occupational health, as well as the Road Traffic Act, must be complied with.



2.5.1.3 **IMPORTANT:** The safety instructions of the manufacturer of the tractor or tool carrier must be followed.



2.5.1.4 **IMPORTANT:** At each start-up, the weed brush must be checked for operational safety, for damaged, missing or worn parts. Any defects identified must be rectified promptly before the weed brush begins work.



2.5.1.5 **IMPORTANT:** Safe operation of the weed brush is only ensured if the steel brushes are properly installed. Use suitable tools for the installation.



2.5.1.6 **IMPORTANT:** The protective devices must be checked regularly, and damaged protective devices must be replaced.



2.5.1.7 **IMPORTANT:** Only spare parts that are supplied by or have the explicit approval of the manufacturer must be used. The manufacturer accepts no liability and provides no guarantee in the event of damage or injury caused by the use of non-original/genuine Spearhead parts.





















## 2.6 Safety Information For Operation



2.6.1.1 **IMPORTANT:** Familiarise yourself with all devices and operating components, as well as their function, before starting the work.



2.6.1.2 **IMPORTANT:** Wear close-fitting clothes and use the necessary personal protective equipment.

-  2.6.1.3 **IMPORTANT:** Check all mechanical and hydraulic connections and all installed safety devices for their functionality before using the machine.
-  2.6.1.4 **CAUTION!** Check that the hydraulic hoses are correctly positioned. Hydraulic hoses that get caught up or crushed may cause personal injury (e.g. as a result of seeping hydraulic oil) or damage to the machine.
-  2.6.1.5 **IMPORTANT:** Ensure all supporting devices are in the right position before mounting or demounting.
-  2.6.1.6 **IMPORTANT:** Always place counter-weights on the mounting points provided for this purpose.
-  2.6.1.7 **IMPORTANT:** Observe the limits for axle load, total weight and transport objective.
-  2.6.1.8 **IMPORTANT:** Install and check the transport fittings such as lights and warning and protective devices.
-  2.6.1.9 **IMPORTANT:** Install extra lighting if the lights fitted to the tractor or tool carrier as standard are hidden by the equipment when it is in transport mode.
-  2.6.1.10 **WARNING!** Check the immediate surroundings for persons, especially children, and animals and obstructions before start-up and before you start driving. You must be sure that you have ample vision and a sufficient safety distance.
-  2.6.1.11 **WARNING!** The weed brush's working area must be clear of persons when the engine is running.
-  2.6.1.12 **WARNING!** Other persons are not allowed to drive the tractor or tool carrier during operation or transport.
-  2.6.1.13 **IMPORTANT:** Fold the reach arm on the tractor or tool carrier together in transport mode.
-  2.6.1.14 **WARNING!** Before transport, you must secure the controls on the reach arm in the tractor against unintentional activation. Ensure the PTO is disengaged.
-  2.6.1.15 **WARNING!** Never leave the driver's seat during transport.
-  2.6.1.16 **IMPORTANT:** Adjust the speed to the current local road and traffic conditions. Avoid sudden changes of direction when travelling up or down hill and when travelling across an incline.
-  2.6.1.17 **IMPORTANT:** Beware of the effects the mounted reach arm and weed brush have on the driving behaviour and the steering and braking ability.
-  2.6.1.18 **WARNING!** Only start the weed brush up when the machine is correctly unfolded.
-  2.6.1.19 **DANGER!** Be particularly careful when working under high voltage cables. Keep a distance of at least 10 m from high voltage cables.
-  2.6.1.20 **DANGER!** If you run into an obstruction, you must stop the weed brush immediately and check it for damage.
-  2.6.1.21 **DANGER!** Before getting down from the tractor or tool carrier, you must place the reach arm and weed brush on the ground, remove the ignition key and secure the vehicle, to prevent it from rolling.
-  2.6.1.22 **DANGER!** The weed brush may carry on running after it is switched off. Wait until it has stopped entirely.





2.6.1.23 **WARNING!** During work breaks you should place the weed brush on the ground.



2.6.1.24 **DANGER!** With hydraulically activated parts there is a risk of body parts becoming crushed and detached. The hydraulic installation may be under pressure.



2.6.1.25 **WARNING!** Liquids (hydraulic oil) that are under great pressure and seep out may penetrate the skin and cause serious personal injury. In the event of personal injury, you should seek the help of a doctor immediately, as there is a risk of infection.



2.6.1.26 **IMPORTANT:** Only connect hydraulic hoses when the hydraulic installation is free of pressure.



2.6.1.27 **IMPORTANT:** Check the hydraulic hoses regularly for leakage, damage and ageing. Damaged hydraulic hoses must be replaced promptly. The new hydraulic hoses must meet the manufacturer's technical requirements.



2.6.1.28 **IMPORTANT:** Oil leaks pose a hazard to the environment. Hydraulic oil seepage must be collected and disposed of in the proper manner.



2.6.1.29 **WARNING!** Use protective goggles when looking for leakages.

## 2.7 Safety Information For Assembly, Maintenance And Repair Work



2.7.1.1 **IMPORTANT:** Mounting, maintenance and repairs must be carried out exclusively by authorised and qualified specialists.



2.7.1.2 **IMPORTANT:** Work on the machine may only be carried out when the machine is stationary.



2.7.1.3 **IMPORTANT:** Always follow the procedure for stopping that is described in the manufacturer's instruction book.



2.7.1.4 **IMPORTANT:** Wear close-fitting clothes and use the necessary personal protective equipment.



2.7.1.5 **WARNING!** If you have to carry out maintenance on the weed brush while it is raised, it must be secured with a suitable support.



2.7.1.6 **WARNING!** Release the pressure in the hydraulic installation before starting any works on the weed brush.



2.7.1.7 **WARNING!** Some of the weed brush parts may be very hot. Allow the weed brush to cool off.



2.7.1.8 **IMPORTANT:** Handle and dispose of oils and grease in accordance with the rules.



2.7.1.9 **WARNING!** All safety and protective devices must be installed or activated again immediately after a work session is finished.



2.7.1.10 **IMPORTANT:** When starting up the machine again, you must follow the instruction book from the tool carrier or tractor manufacturer.

## 2.8 Dangers Due To Overhead Power Lines

There are significant dangers involved when working in the vicinity of Overhead Power Lines (OHPL's). Be aware that some Spearhead machines are capable of reaches in excess of 8 metres (26') and 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, see Figure 2.1.



**DANGER!** 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 (OHPL's).



**WARNING!** Fatal electrocution can occur without contacting a power line. Due to the high electrical potential between the conductors and the ground a flash over can occur from the power line to any conducting medium within range. Steel cutting machines are ideal conductors.

Wherever possible the safest option is always to avoid working in areas close to OHPL's. Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work, see Section 2.8.1 below.

All operators should perform a risk assessment before operating any reach arm mower within 10m horizontal distance of any OHPL's. If you are unsure do not work in the area. Never put yourself or others at risk.

### 2.8.1 Risk Assessment

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

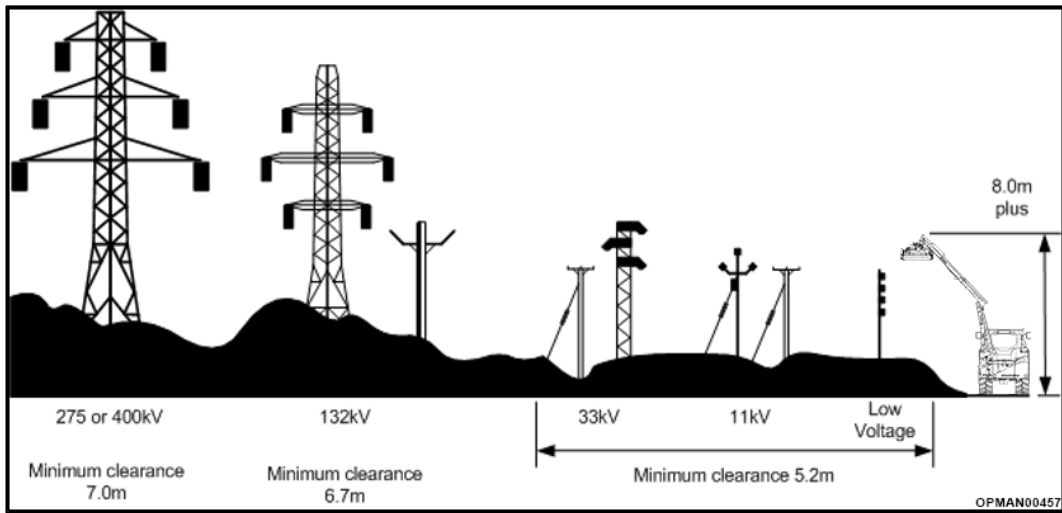
- **Know** the risks of contacting OHPLs and the risk of flashover.
- Always **find out** the maximum reach height for your machine mounted on the tractor.
- Always **find out** the location and route of all Power Lines within the work area.
- Always **find out** the operating voltage of all Power Lines within the work area.
- Always **contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, exclusion zones, the minimum safe working distance and any additional precautions required.
- **Never** attempt to operate the machine within an exclusion zone.
- 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

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)

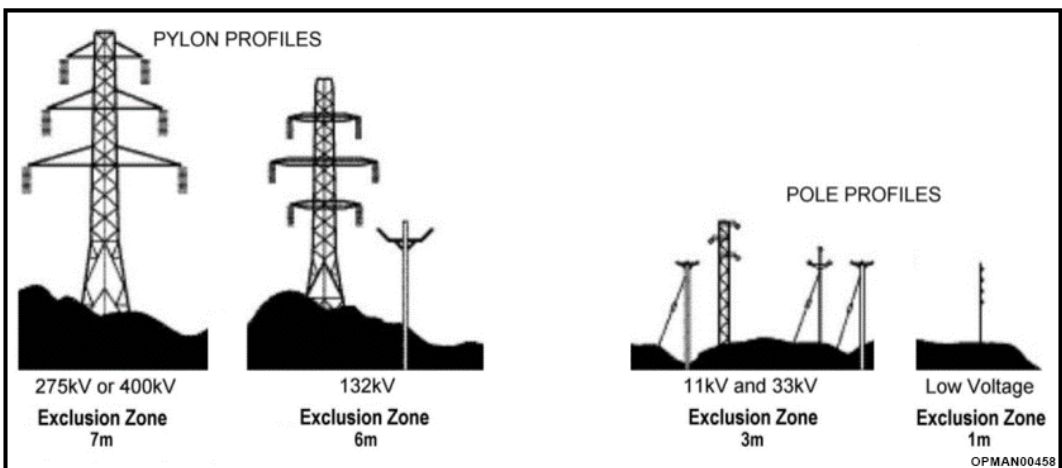
### 2.8.2 Emergency Action for Accidents Involving Electricity

- 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

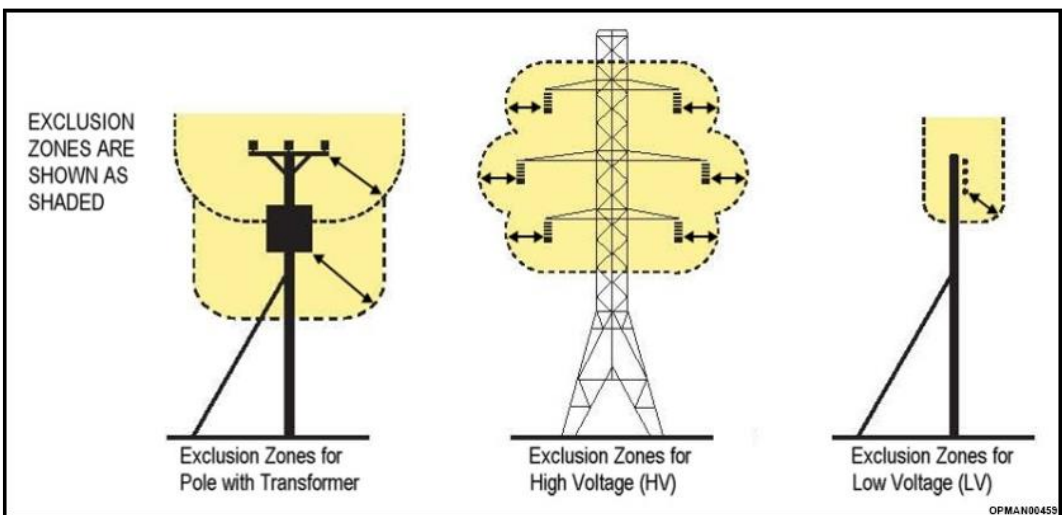




**Figure 2.1 - Minimum Heights For Overhead Power Lines**



**Figure 2.2 - Absolute Minimum Exclusion Zones For Specific Overhead Power Lines**



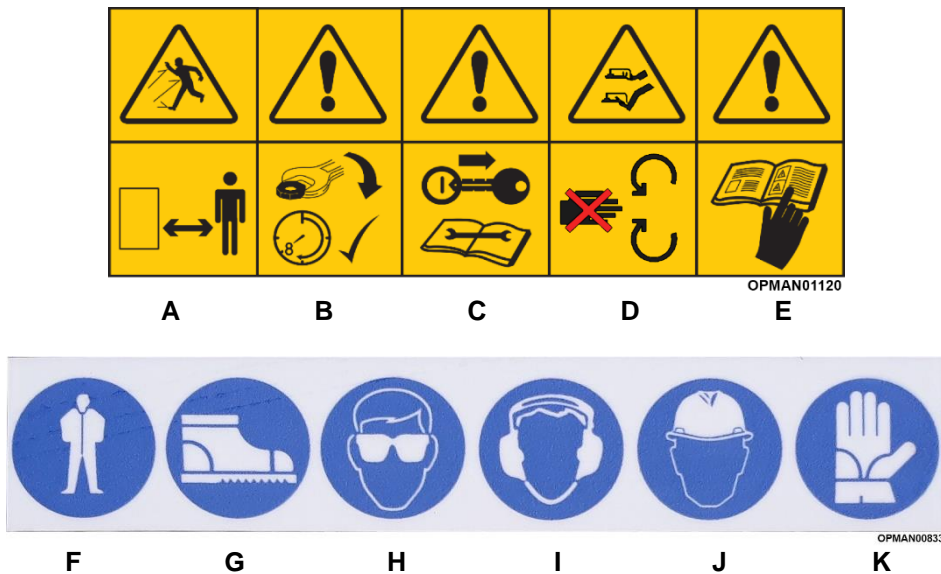
**Figure 2.3 - Definitions Of Exclusion Zones**

## 2.9 Safety Decals

Machine safety decals are located in various points on the machine; see Figure 2.4. They can be identified in yellow with the upper panel depicting the hazard, and the lower panel indicating means of avoidance or precautions to be taken. There are also personal protection equipment decals located on the machine advising the correct clothing to wear whilst using the machine. These can be identified in blue and white indicating the equipment required. These decals have no text. It is essential that all operators and personnel associated with the machine fully understand their meanings.

Safety decals should be kept clean and legible at all times. Any safety decals which are found to be missing or illegible should be replaced.

### 2.9.1 Definitions



**Figure 2.4 – Weed Brush Safety Decal**

a	Danger: - Flying debris	Flying objects. Be sure to keep a distance to the machine when it is operating.
b	Instruction: - Check the tightness of fasteners	Check every 8 hours that all fasteners are tightened.
c	Warning: - Remove key, before carrying out maintenance	Switch off the engine, remove the key and pull the handbrake before carrying out any maintenance or repairs on the machine.
d	Danger: - Cutting hazard from rotating brushes	Personnel should keep at distance from the machine when the machine is operating.
e	Warning: - Read operators manual, before using the machine	Read the instructions manual carefully before using this machine. Follow all instructions and safety precautions when using the machine.
f	Warning: - Personal protection equipment required	Reflective and clear to see clothing must be worn when operating or near the machine
g	Warning: - Personal protection equipment required	Protective safety shoes must be worn when operating, servicing or being near the machine
h	Warning: - Personal protection equipment required	Protective eye protection must be worn when operating, servicing or being near the machine
i	Warning: - Personal protection equipment required	Hearing protection must be worn when operating or near the machine
j	Warning: - Personal protection equipment required	Head protection must be worn when operating, servicing or being near the machine
K	Warning: - Personal protection equipment required	Protective gloves must be worn when operating, servicing or being near the machine

**Table 2.1 – Weed Brush Safety Decal Definitions**

For the placement of these decals on each of these machines, please refer to Section 2.9.2.

## 2.9.2 Placement

Figure 2.5 states the particular positions safety and instruction decals are placed on each of the weed brush models.

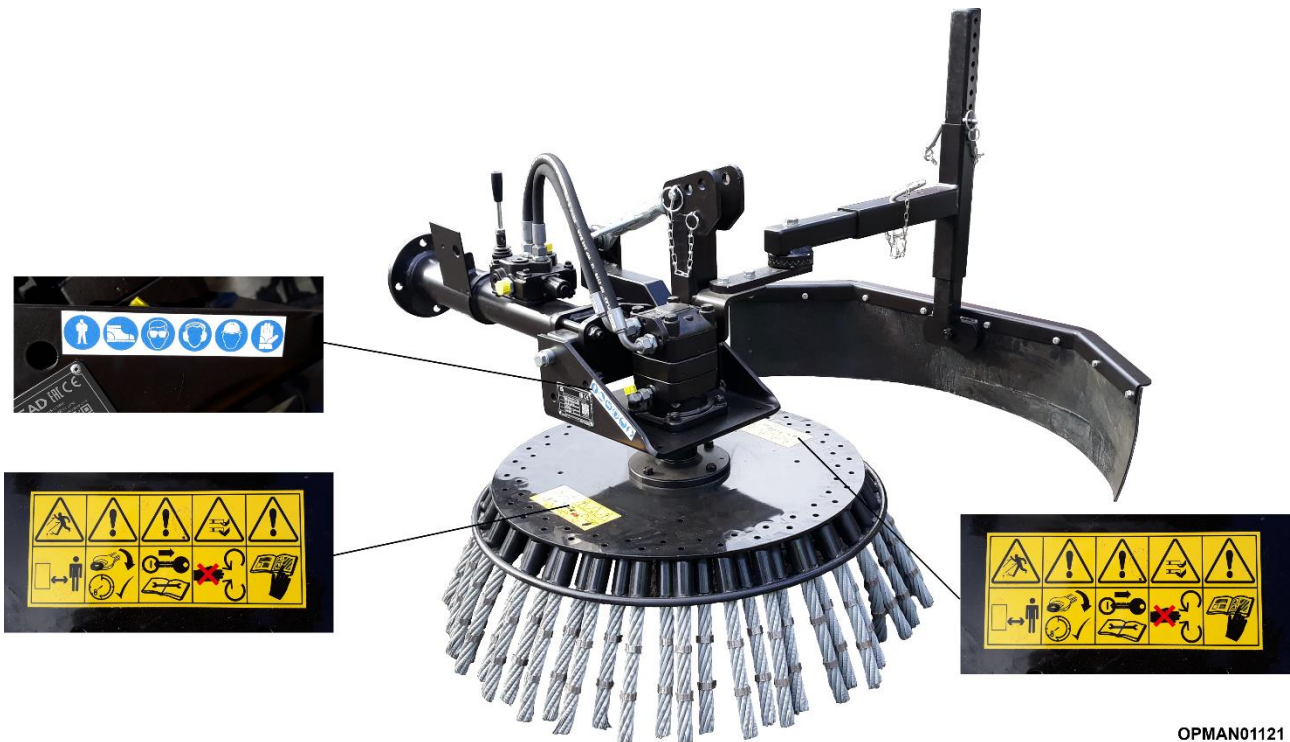


Figure 2.5

OPMAN01121

## 2.9.3 Replacement

It is of utmost importance that safety decals are kept clean and replaced if they are no longer legible, damaged or lost completely. Safety decals can be purchased readily from a local Spearhead dealer.

For more extensive guidance on ordering spare parts and how to go about finding the correct part number; see Section 7.

## 2.10 Guarding



**DANGER!** For safe operation it is essential that that all guards must be kept in position on the machine whenever the machine is running. Spearhead Machinery disclaim all responsibility for any damage or injury arising as a result of guards being removed, or of guards other than of Spearhead manufacture having been fitted, or of operation of the machine other than in accordance with these instructions.



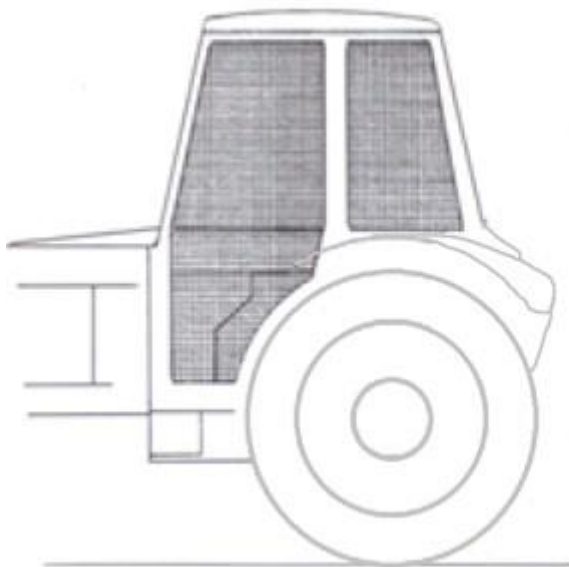
**DANGER!** When hedge cutting a mesh guard must be fitted to the side window of the tractor cab. Cabs without laminated or toughened glass must also be fitted with a laminated glass or polycarbonate shield in addition to the welded mesh guard.



**WARNING!** Inspect guards twice daily or immediately damage is suspected.

Always replace guards that have damage or wear which could impair their performance.

When using the machine on a forward reach reach arm, the machine attachment is in front and above the driver's cab. This makes it necessary to always work with guarding fixed around the front and side of the cab, a typical installation is shown below.



**Figure 2.6**

A brush rubber safety guard shields the expelled brushed material from being flung great distance and must be kept in position when the machine is being operated. It is an essential part of the machines guarding. The machine must not be operated with this rubber safety guard missing.

<b>Brush Rubber Safety Guard</b>	Distorted, sections missing or insecure.
----------------------------------	--

**Table 2.2 – Permanent Protection Guard Damages**

Ensure that all parts are replaced if required with genuine Spearhead parts.

## 2.11 Personal Protective Equipment

Operators should be wearing sufficient personal protection equipment (PPE) to protect them from hearing, respiratory and impact damages.

When working in an unsealed cab or where windows and apertures are open to the environment, operators are advised to wear suitable eye and ear protection, a facemask (depending on conditions) and head protection.

When handling cutting surfaces or hydraulic equipment, operators are advised to wear suitable gloves.

When clearing blockages, clearing wire, or working with pressurised hydraulic components, operators are advised to wear suitable eye protection and suitable gloves.

Ensure that non-baggy clothing is worn to reduce the chance of entanglement and snagging on components.



OPMAN00161

**Figure 2.7- PPE Items**

When working at the work site, but off the tractor unit, operators are advised to wear a 'high-viz' garment.

## 2.12 Stability

Due to the design of the reach arm and the work they undertake, it is essential to ensure that the tractor is stable during work and transport in order to eliminate any risk of loss of directional control, imbalance or overturning.

Before work, extend the arms to full reach slowly and ensure that at full reach the rear wheel on the opposite side to the extended arms is still on the ground. It is advisable to have a helper to check this. Check that the tyre shows evidence of bearing some load.

### Factors That Effect Stability

- Centre of gravity of the tractor/machine combination
- Geometric conditions for example:
  - Position of the attachment
  - Position of any ballast weights
- Tractor characteristics
  - Weight of the tractor
  - Track width of the tractor
  - Wheelbase of the tractor
  - Tyre pressures
- Ground Conditions
  - Slope
  - Grip
  - Load capabilities of the ground
- Rigidity of attachment mounting

If the tyre lifts, then add ballast in the form of wheel weights to the rear wheel of the tractor opposite to the extended arms until the tyre shows evidence of bearing some load.



### Factors That Increase Stability

- Increase tractor rear wheel track
- Increase tyre pressures ensuring it is within the tractors manufacturers safe use figures
- Wheel weights placed where they will be of greatest advantage
- Front axle locking if available

Before driving in transport, place the reach arm in the transport position and again check that all wheels of the tractor are both on the ground. Again, it is advisable to have a helper to check this. Check that the tyre shows evidence of bearing load. This is especially important to ensure forward directional control at speed on an undulating terrain.

If the front tyres lifts, add ballast weights to the front of the tractor.



**WARNING!** Failure to have sufficient load over the front axle or to drive at inappropriate speeds on undulating terrain may result in a loss of directional control.

If ballast weights have been added to the tractor, check that the plated tractor axle loads have not been exceeded.

**IMPORTANT:** When transporting on the highway, it is the responsibility of the operator to obey all relevant local highway laws.

## 2.13 Working On Inclined Ground

The ballast instructions in Section 2.12 are sufficient for level ground operation.

Be aware that when working on inclined ground changes in the tractor centre of gravity can adversely affect the overall stability. As the attachment is extended with the reach arm deployed downhill additional ballast will be required on the rear offside wheel to compensate.

There is naturally a limit to a safe amount of ballast compensation that can be applied for a given tractor unit and a given incline. If compensating ballast is applied and the compensated axle must be driven on the public highway to reach the work site, the operator should ensure that the plated axle load is not exceeded.

Remember, a reach arm with machine attachment represents a significant mass which can generate a significant amount of inertia when moved at speed. Stopping this inertia suddenly can induce overturning reactions.



**DANGER!** When working on inclined ground avoid high speed hydraulic movements which could cause overturning.

## 2.14 Working On Embankments

Sudden potholes at speed can quickly cause the tractor to change direction. At the same time the weight of the attachments may try to lift the front axle. This is a potentially lethal combination when working along narrow embankments or dikes and can lead to overturning and potential drowning.

When working on top of embankments it is very important to have sufficient forward stability to ensure rapid steering control. Spearhead recommend 20% forward stability. This means that at least 20% of the total vehicle weight is acting on the steering axle under normal level conditions.



**DANGER!** When working on raised embankments ensure sufficient weight is on the steering wheels.

## 2.15 Attachment And Removal From The Reach Arm



**DANGER!** Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.



**DANGER!** Always disengage the machine, kill the tractor engine, remove and pocket the key before dismantling for any reason.



**DANGER!** Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props if provided and secured.



**DANGER!** Never operate the tractor or machine controls from any position other than from the driving seat.



**DANGER!** Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.



**DANGER!** Never leave a tractor with the key in or the engine running.



**DANGER!** Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.

## 2.16 Working In Public Places

When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.



**DANGER!** Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.



**DANGER!** Never use a machine that is poorly maintained.



**DANGER!** Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).



**DANGER!** Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing.



**WARNING!** Some cutting heads may continue to 'freewheel' for up to 40 seconds or more after being stopped.



**DANGER!** Never allow children near to, or play on, a tractor or machine under any circumstances.



**DANGER!** Never use a machine on which the hydraulic system shows signs of wear or damage.



**DANGER!** Always clear up all debris left at the work area; it may cause hazard to others.



**DANGER!** Never allow any bystanders within a 90 metre radius of the machine when operating. Stop the machine immediately if this safety area is entered and do not restart the machine until the bystanders have escaped the area sufficiently.

## 2.17 Safety Distances

Never allow any bystanders within a 90 metre radius of the machine when operating. Stop the machine immediately if this safety area is entered and do not restart the machine until the bystanders have escaped the area sufficiently and the working area has been reassessed.

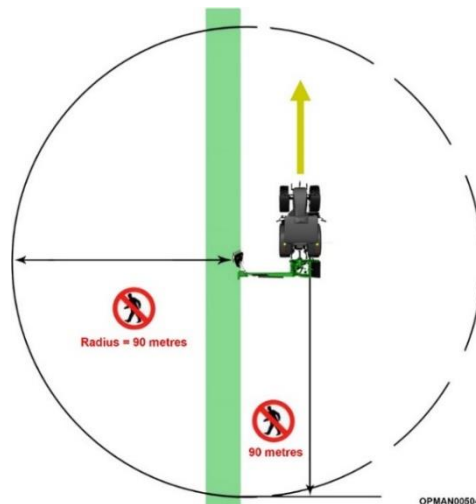


Figure 2.8

## 2.18 Warning Signs

It is advisable that any working area be covered by suitable warning signs in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – ‘Non-authorized placement of road signs may create offences under the Highways Act’.

### 2.18.1 Suggested Warning Signs Required

The reach arm machine must be fitted with a white on blue, 600mm diameter ‘Keep Left’ (\*) direction arrow. A white with red border ‘Hedge Cutting’ warning triangle of at least 750mm tall must be placed at no greater distance than 500m from the tractor at any time. These hedge cutting signs should also be placed at key restricted view areas such as bridges and sharp bends.

\*NOTE – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow depend on the country of use and the Local Highway Authorities regulations in the locality.

### 2.18.2 Use of Warning Signs

- On two-way roads, one set of signs is required to be facing in each direction.
- Work should be carried out within 500m of the signs. The signs will then be required to be moved.
- Work only when visibility is good and at times of flow e.g. NOT during ‘rush-hour’.
- Vehicles should have at least one 360° visible amber flashing beacon (preferably two) or a light bar comprising at least two independent light sources which are clean.
- Ideally, vehicles should be clean and conspicuously coloured with high visibility rear markings.
- Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.
- Collect all road signs promptly when the job is complete.





Figure 2.9

OPMAN00476

## 2.19 The Machine & The Environment

Below are the minimum provisions to be followed in order to reduce the risk of environmental impact connected to the use of the machine:

- If the Country where the machine is used foresees specific sound emission limits, it is best to adapt to the provisions in these standards, if necessary, being supplied with suitable protective equipment (earplugs, muffs, etc.).
- **It is mandatory** to respect current legislation of the Country where the attachment is used, related to use and disposal of lubricants and products used for machine cleaning and maintenance, observing the recommendations of the manufacturer of those products.
- If replacing worn parts or during demolition, one must follow anti-pollution laws foreseen in the country where the attachment is used.
- **It is prohibited** to pour products used for cleaning or polluting substances into the sewerage drain, on the ground, in watercourses, or into the environment.
- **It is mandatory** to collect products used for cleaning and polluting substances in appropriate containers, store them and deliver them to companies authorised for their disposal.

### 2.19.1 Disposal

When Spearhead equipment reaches the end of its economic working life it should be disposed of responsibly, either through an approved recycling centre or by compliance with all regulations in force in the destination territory.

In most instances Spearhead machines can be broken into its constituent parts with the use of basic workshop equipment. Table contains a typical list of constituent materials, together with disposal guidelines.

When undertaking a machine breakdown, take care to ensure that heavy parts are always adequately supported to avoid injury.

To avoid environmental contamination, take containment precautions to retain control of liquids in order.

It is the owner's responsibility to ensure the machine is disposed of in accordance with all applicable regulations.

Material	Typically found in;	Disposal guideline
Steel	Structural components, fixed guards, fasteners and driveline	Can be dismantled and recycled. Take care when handling heavy and/or sharp objects
Aluminium	Pump and gearbox housings, serial number plates	Can be dismantled and recycled. Take care when handling heavy and/or sharp objects. Take appropriate actions for oil contaminated products
Copper	Wiring, electrical components	Can be recycled using appropriate recovery procedures.

Hydraulic oil	Tank, hydraulic components	Dispose of in accordance with all applicable regulations
Rubber	Hoses, flexible guards, seals, 'O' rings	Dispose of in accordance with all applicable regulations
Plastics	Clips, caps, cable ties, decals, filter housings, document holders, bushes, electrical components, plugs, connectors, wire insulation	Dispose of in accordance with all applicable regulations
Filter element	Filter housings	Dispose of in accordance with all applicable regulations
Cork / paper	Gaskets	Dispose of in accordance with all applicable regulations

**Table 2.3 – Machine Breakdown Component Disposal**

## 2.20 Proposition 65



**Figure 2.10**

Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm.

To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves and wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.

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## 3 Machine Preparation

### 3.1 Lifting The Machine



**IMPORTANT:** Operating lifting and moving equipment should only be carried out by operators that are trained and familiar with the use of the machinery and their controls. Refer to each of the relevant operator manuals for guidance or gain professional training before using the equipment. Starting the machine should only be carried out once the machine and work site has been inspected and deemed safe and all other safety cautions have been adhered to.



**DANGER!** Ensure that all bystanders are sufficiently clear of the lifted machine when moving and ensure there is a safety area. Stop the lifting equipment immediately if this safety area is entered and do not restart procedures until the bystanders have escaped the area sufficiently.

#### 3.1.1 Lifting Equipment

Spearhead recommends that the weed brush is stored on a substantial and suitable pallet in good condition when not in use. If it needs to be moved use a pallet lifter or forklift or sufficient capacity to cater for the weight of the weed brush.

Suitable overhead lifting equipment with a minimum Safe Working Load (SWL) in excess of the machine's overall weight can be used as an alternative for handling the machine. Ensure the machine is kept balanced and level at all times during the lifting procedure. All operatives and bystanders must remain at a safe distance from the raised machine.

#### 3.1.2 Lifting Points

Spearhead recommends lifting the machine with an approved sling securely or looped around the designated hole found by the weed brush's motor. The sling should be tightened to ensure the machine is balanced and stable when lifted. Alternatively, a forklift crane jib with hook attachment could be used as shown in Figure 3.1.

Keep clear of the raised machine at all times.

For lifting the machine around on a pallet ensure that the machine is centred and secure from sliding off the pallet during transportation.



Model Weights	
90cm	230kg (507lbs)

Figure 3.1

## 3.2 Post-delivery/First Use Inspection

### 3.2.1 Tractor Requirements

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

### 3.2.2 Tractor Checks

3.2.2.1 Availability of tractor hydraulic service where the available flow is.

- **50 litres per minute at a maximum of 190 bar for 90cm models.**

3.2.2.2 A suitable mounting interface to the tractor is available.

3.2.2.3 Once the attachment is mounted to the reach arm 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.

3.2.2.4 Ensure that the tyres fitted to the tractor are correctly rated for the total working weight.

NOTE: When the attachment is deployed in work at the furthest reach the load on the rear tyre on the cutting side increases significantly.

3.2.2.5 Spearhead does not endorse the use of water ballast within tyres as this can have adverse effects on fore aft stability at speed.

NOTE: The advice above is offered as a guide for stability only and is not a guide to vehicle strength. It is recommended to consult the tractor manufacturer or local dealer to obtain specific advice on this subject, additionally advice should be sought from a tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machines use.

### 3.2.3 Machine Adjustment

The weed brush when received from Spearhead is virtually complete and components are set correctly, requiring minimum time to ready the machine for use. Spearhead machines are tested after manufacture.

It is important to assess the machine to ensure that it is of the correct specification ordered from Spearhead or local Spearhead dealer. Information with regards to the specification of the machine can be found on the serial plate. Guidance to the location of the serial plate can be found in Section 1.3.

Before use it is important to inspect the weed brush following the guidance in this operators manual to ensure it is correctly set-up and is suitable for the attaching reach arm and tractor using the inspection guidance sheet in Section 5.6.

## 4 Usage Instruction

### 4.1 Operator Requirements



**IMPORTANT:** Read, understand and follow the safety messages stated throughout this section and the rest of this operator's manual. Serious injury or death may occur unless care is taken to follow the warnings.

Safe operation of the machine and accompanying reach arm is down to the responsibility of the qualified operator. A qualified operator has thoroughly read and understood the weed brush, reach arm and attaching tractor operator's manuals and is experienced in the correct and safe operation of all machines and all associated safety guidance. In addition to the safety information contained in this manual, warning and operational decals are fixed around the machine; see Section 2.9. The connecting tractor and reach arm will also have them as well with information given in the operator's manual.

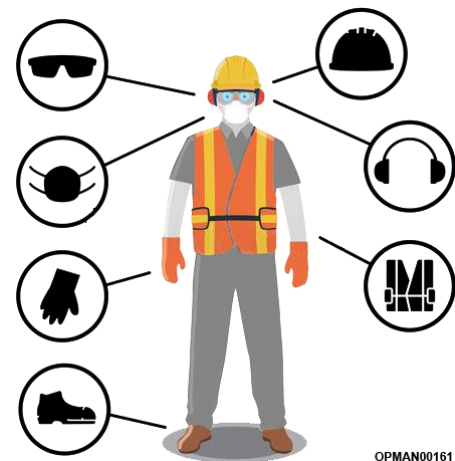
If any part of the operation safe use of the machine is not completely understood, consult a local Spearhead dealer or Spearhead for complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices and operating instructions to the operator.

#### 4.1.1 Personal Protection Equipment (PPE)

See Figure 4.1

- Always wear safety glasses
- Hard hat
- Steel toe safety footwear
- Gloves
- Hearing protection
- Close fitting clothing
- Respiration or filter mask (depending on working conditions)



OPMAN00161

Figure 4.1 - PPE Items



**DANGER!** Do not use drugs or alcohol immediately before or while operating the tractor and accompanying machine attachments. Drugs and alcohol will affect an operator's alertness and concentration and ability to operate the collective machinery safely.

Before operating the collective machinery, a machine operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the equipment safely.

Supervisors must **never** allow anyone to operate the collective machinery when it is known that their alertness or coordination is impaired. Serious injury or death could occur to the operator and/or bystanders if the operator is under the influence of drugs or alcohol.




OPMAN00162

Figure 4.2 – Do Not Use Drugs Or Alcohol

## 4.2 Controls Overview

Your Spearhead machine will be supplied without a control system and will rely on the auxiliary controls available with the tractor and reach arm. The operator must make sure he is familiar with the use of the tractor and reach arm auxiliary controls. Refer to each of the relevant operator manuals for guidance.

## 4.3 Fitting The Machine To The Reach Arm

	<u>Equipment Required</u>
	• 24mm spanner
	• 24mm socket
	• Torque wrench



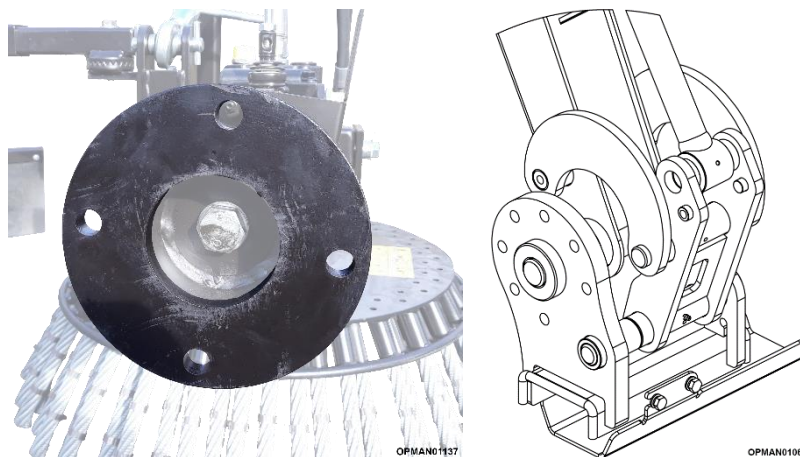
**WARNING!** Attachment of the machine must be performed on a firm level site.

Care should be adopted at all times when handling or manoeuvring the machine during the attachment procedure; ensure all persons remain clear of the machine which possesses the potential to cause injury even when stationary.



**WARNING!** While the tractor and reach arm 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. Do not stand between the mating faces of the reach arm and machine attachment.

The weed brush can be mounted on Spearhead's range of Twiga reach arms; Twiga Classic, Twiga Mid, Twiga Pro and Twiga Flex.



**Figure 4.3**

- 4.3.1.1 Unfold the weed brush following the guidance given in Section 4.6.1.
- 4.3.1.2 In order to fit the weed brush to Spearhead's Twiga reach arm range requires use of the flat mating surface found on the reach arm head crowd bracket; see Figure 4.3.
- 4.3.1.3 With the weed brush located on a firm level site operate the reach arm to position the mating surface adjacent to the mounting flange of the weed brush; adjust angle to align the holes.

**IMPORTANT:** Ensure that all hydraulic hoses are not in between the reach arm and weed brush mating surfaces to ensure they do not become entangled or crushed.

- 4.3.1.4 Fit the 4 bolts and locknuts and torque tight.

- 4.3.1.5 Proceed to fitting the hydraulic hoses to the reach arm and unfolding the machine ready for operation following the guidance given throughout Sections 4.6.1 and 4.7.

## 4.4 Removing The Machine From The Reach Arm



### Equipment Required

- 24mm spanner
- 24mm socket
- Torque wrench



**WARNING!** Detachment of the machine must be performed on a firm level site.

Care should be adopted at all times when handling or manoeuvring the machine during the detachment procedure; ensure all persons remain clear of the machine which possesses the potential to cause injury even when stationary.



**WARNING!** While the tractor and reach arm 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. Do not stand between the mating faces of the reach arm and machine attachment.

- 4.4.1.1 Fold the weed brush into its most compact form following the guidance given in Section 4.6.2 to best protect the machine from damage and for it to take up the least amount of room.
- 4.4.1.2 Determine the removal/storage site is firm and level (e.g. a wooden pallet), operate the reach arm and position the weed brush safely to its removal site ensuring that it will be secure from moving when removed from the reach arm.
- 4.4.1.3 Switch off the tractor and engage the handbrake and safely remove the hydraulic connections in between the reach arm and weed brush using the safe guidance procedure given in Section 4.7.2.
- 4.4.1.4 Ensuring the weed brush will remain stable and secure once unattached from the reach arm, loosen and remove the 4 bolts and locknuts securing the weed brush to the reach arm.
- 4.4.1.5 Return to the tractor and gently reverse the reach arm away from the weed brush.
- 4.4.1.6 If the weed brush is not going to be use for an extended period, consider reading Section 5.7.1 giving guidance on how to preserve and prepare your machine for its next use.

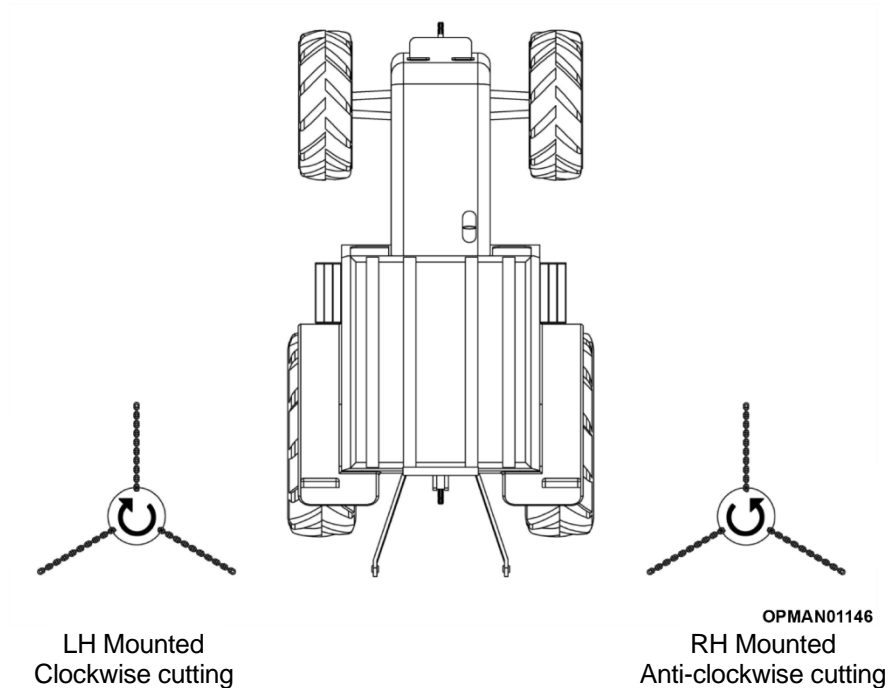


## 4.5 Brush Direction

### 4.5.1 Correct Direction



**DANGER!** Weed brushes are capable under adverse conditions of throwing objects for great distances 90m (300 ft) or more and causing serious injury or death. Follow safety messages carefully.



**Figure 4.4**

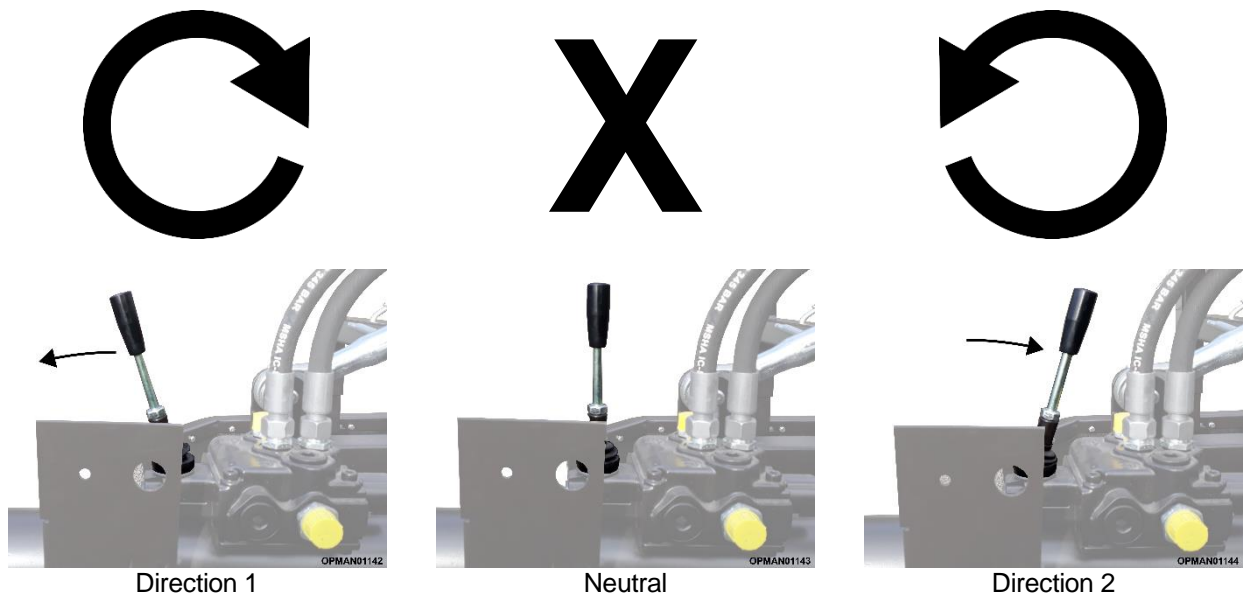
It is recommended that the direction of the brush should always be such that the brushes are brushing behind and away from the direction of travel and ejecting the swept material away from the tractor; i.e. clockwise for left hand mounted machines and anti-clockwise for right hand mounted machines (when viewed from above).



**Figure 4.5**

It is of utmost importance that the tractor and reach arm and attachments are stopped immediately if a bystander comes within 90m (300 ft) while operating. The engine should be idled and the PTO disengaged. Do not restart work until the bystander is well past the 90m (300 ft) and the work zone has been reassessed to ensure there are no external risks.

## 4.5.2 Switching Rotor Direction – Rotor Direction Valve



**Figure 4.6**

The Spearhead weed brush is fitted with a rotor direction valve controlled by a manual control handle found on the top of the valve. This valve allows you to change the direction of the rotor without the need to swap the hydraulic hoses over between the reach arm and weed brush.

Ensure that the tractor is switched off and secured in position on level ground, relieve the hydraulic pressure from the tractor by moving the hydraulic control levers/buttons back and forth several times.

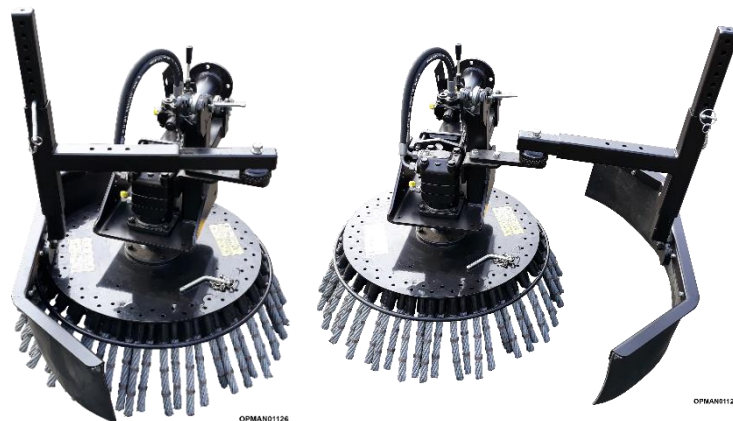
## 4.6 Preparation For Work

The machine when received from Spearhead is virtually complete and components are set correctly, requiring minimum time to ready the machine for use.

The machine does require some manual set-up to ready the machine for work and likewise to place the machine for transportation and storage.

Sections 4.5.1 and 4.5.2 give instructions with how to safely ready and take the weed brush out of work.

### 4.6.1 Unfolding



**Figure 4.7**



**WARNING!** Unfolding of the machine must be performed on a firm level site.

Unfolding of the machine should be carried out on a level and firm ground to prevent the machine from sliding or suddenly falling over.

Care should be adopted at all times when handling or manoeuvring the machine during the unfolding procedure; ensure all persons remain clear of the machine which possess the potential to cause injury even when stationary.

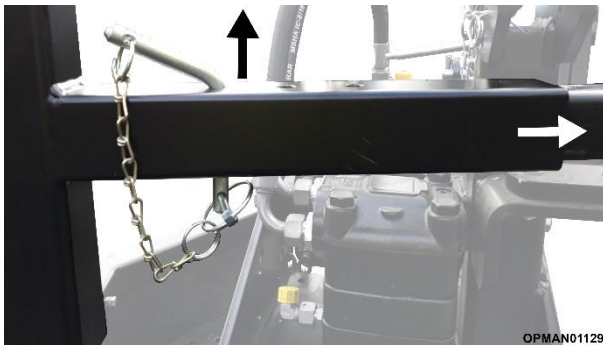
To unfold the machine:

### **Radial Adjustment**



**Figure 4.8**

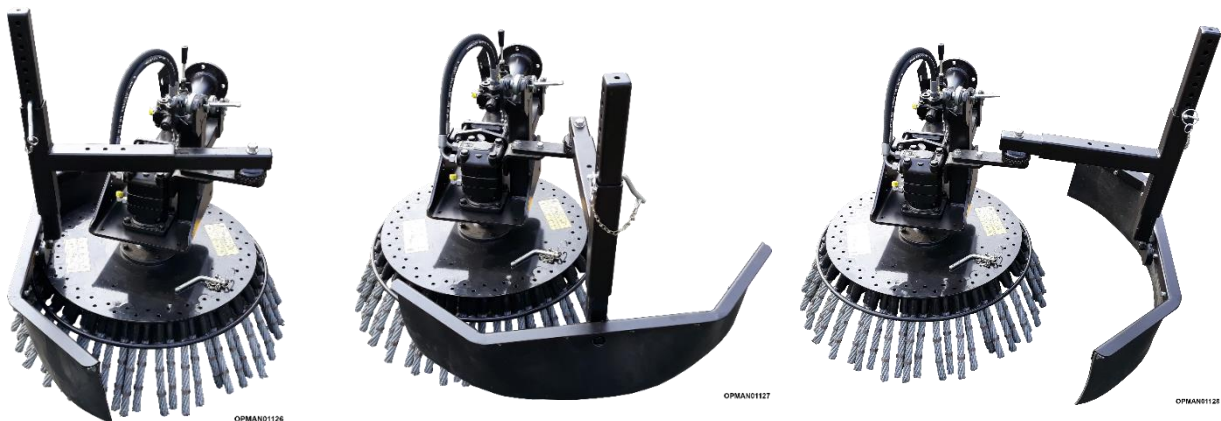
4.6.1.1 Loosen the radial adjustment serrated clamp disengaging the teeth.



**Figure 4.9**

4.6.1.2 Remove the handled pin and lynch pin from the sliding horizontal adjustment and slide the horizontal adjustment bar out in order to allow the rubber safety guard to clear the rotary brush.

4.6.1.3 Replace handled pin and lynch pin into a suitable hole to ensure once the rubber safety guard is cleared of the brush.



**Figure 4.10**

4.6.1.4 Rotate the rubber safety guard arm around into the correct working position.



Figure 4.11

4.6.1.5 Retighten the radial adjustment serrated clamp engaging the teeth and lock arm in its work position.

4.6.1.6 Repeat procedure 4.6.1.2 and re-adjust the sliding horizontal adjustment in order to allow the rubber safety guard to clear the rotary brush yet safely contain the swept material from being ejected.

### Horizontal Adjustment

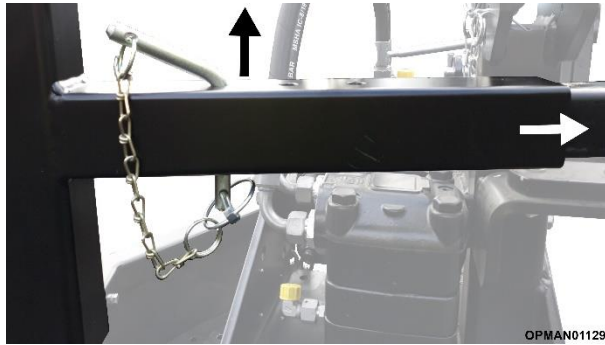


Figure 4.12

4.6.1.7 Remove the handled pin and lynch pin from the sliding horizontal adjustment and slide the horizontal adjustment bar out in order to allow the rubber safety guard to clear the rotary brush.

4.6.1.8 Replace handled pin and lynch pin into a suitable hole to ensure flying debris is not ejected from the confines of the working area of the machine.

### Safety Guard Height Adjustment

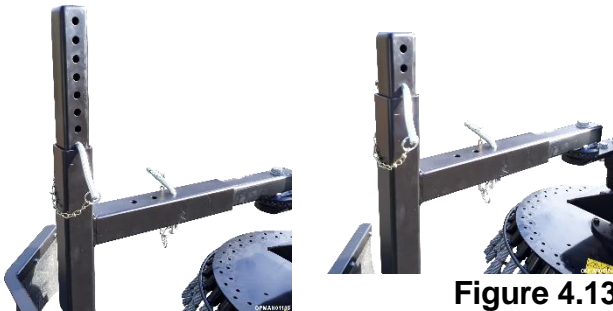


Figure 4.13

4.6.1.9 Remove the pin and lynch pin from the rubber safety guard height adjustment to raise or lower the rubber safety guard into the correct position for work to ensure flying debris is not ejected from the confines of the working area of the machine.

4.6.1.10 Replace the pin and lynch pin once the correct position is achieved.

### Safety Guard Pitch Adjustment



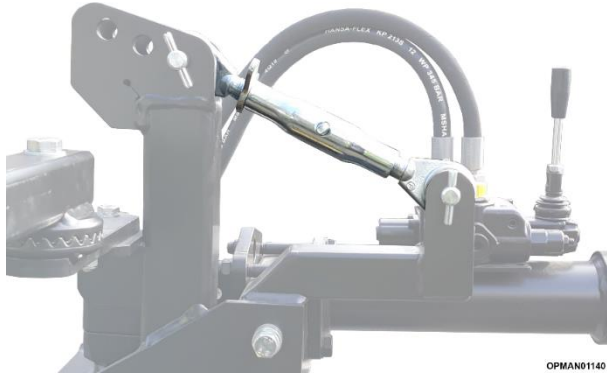
Figure 4.14

4.6.1.11 Loosen the rubber safety guard angle adjustment and adjust the guard to a correct working angle for the work procedure.

4.6.1.12 Retighten the rubber safety guard fastener to lock the guard in position for work.



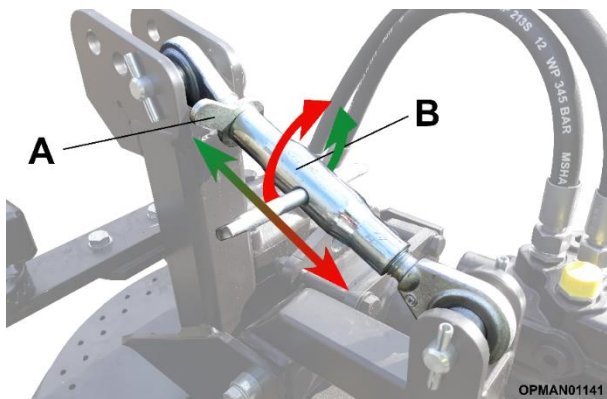
## Rotor Pitch Adjustment



OPMAN01140  
**Figure 4.15**

The pitch angle of the weed brush must be adjusted to fit the ground contours in which it will be working on.

To adjust the pitch angle requires the adjustment of the top link.



OPMAN01141  
**Figure 4.16**

To adjust the pitch of the top link:

4.6.1.13 Loosen the locking collar sufficiently to allow the barrel to be rotated and sufficient adjustments to be made; see Figure 4.16 (A).

4.6.1.14 Turn the barrel of the top link to adjust the pitch of the weed brush; see Figure 4.16 (B).

Turn the barrel clockwise to shorten the top link, which will cause the front of the weed brush to be pitched up.

Turn the barrel anti-clockwise to lengthen the top link, which will cause the front of the weed brush to be pitched down.

4.6.1.15 Retighten the top locking collar to secure the position of the weed brush to ensure it doesn't move during work; see Figure 4.16 (A).

Once unfolded and set correctly for the work requirement, proceed to fit the reach arm and its hydraulic connections to the weed brush following the guidance given in Sections 4.6.1 and 4.7.

## **4.6.2 Folding**

The folding procedure of the weed brush is a reverse action shown of the unfolding procedure.

4.6.2.1 Loosen the locking collar and turn the pitch angle top link to adjust the weed brush into a compact and safe position for transport and uninstalation of the machine. Retighten after.

4.6.2.2 Loosen the rubber safety guard angle adjustment and adjust the guard to a level angle for transport. Retighten after.

4.6.2.3 Remove the pin and lynch pin from the rubber safety guard height adjustment to raise or lower the rubber safety guard into the correct position for transporting the machine out of work.

4.6.2.4 Loosen the radial adjustment serrated clamp disengaging the teeth and rotate the rubber safety guard arm around into the correct transport position. Retighten the radial adjustment serrated clamp engaging the teeth and lock the arm in its transport position.

4.6.2.5 Remove the handled pin and lynch pin from the sliding horizontal adjustment and slide the horizontal adjustment bar in as much as possible in order to make the machine as compact as possible.

4.6.2.6 Replace handled pin and lynch pin into a suitable hole.

Once folded and set correctly for the transport or storage, proceed to safely transport or remove the machine and its hydraulic connections following the guidance given in Sections 4.6.1 and 4.7.

## 4.7 Hydraulic Installation



**CAUTION!** Relieve hydraulic pressure before disconnecting lines or working on the system. This can be done by pushing and pulling the selected tractor lever/button. Only once this has been completed and suitable safety glasses and impenetrable gloves have been put on can the hydraulic hoses be removed from the tractor.

### 4.7.1 Connecting

Manoeuvre the weed brush watching for bystanders and potential dangers in the vicinity to line up the machine for attachment. With the tractor switched off and secured in position on level ground, relieve the hydraulic pressure from the tractor by moving the hydraulic control levers/buttons back and forth several times.

Weed brush machines hydraulic hoses are detachable and when disconnected it is important to keep the ends free of contamination and dirt. Utilise blanking plugs on the open adaptor ends in order to ensure no dirt or contaminants enter the motor. Never disconnect hydraulic hoses and leave ends exposed.

Install and connect hydraulic hoses ensuring the correct cutting direction is achieved. The drain line hose (max.15 bar) must be connected directly back to the oil reservoir.

**IMPORTANT:** Ensure that all the hydraulic hoses are collated together and placed through any hydraulic hose guide on the reach arm. This is to ensure that they do not get pinched or caught in use.

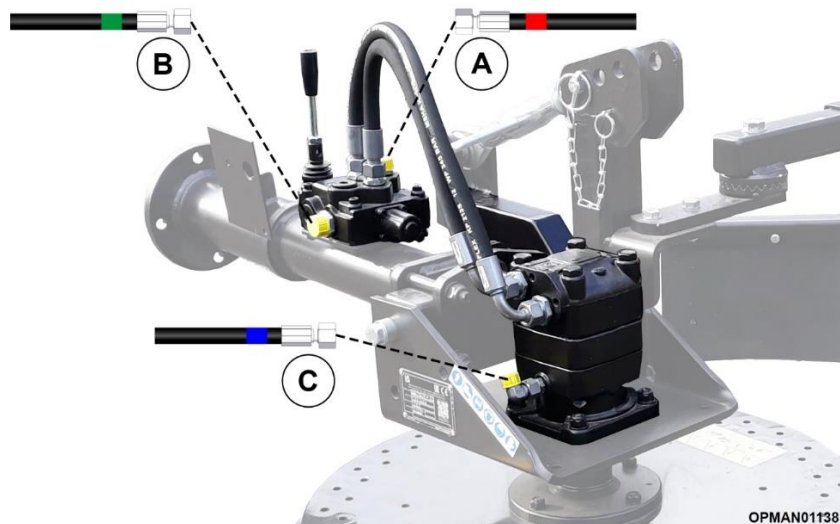


Figure 4.17

No.	Hose
A	Pressure
B	Return
C	Drain Line

Table 4.1

The weed brush requires three hydraulic hoses to be fitted between the reach arm and the machine. Install and connect the hydraulic hoses in the following manner:

#### 4.7.1.1 Red Hose

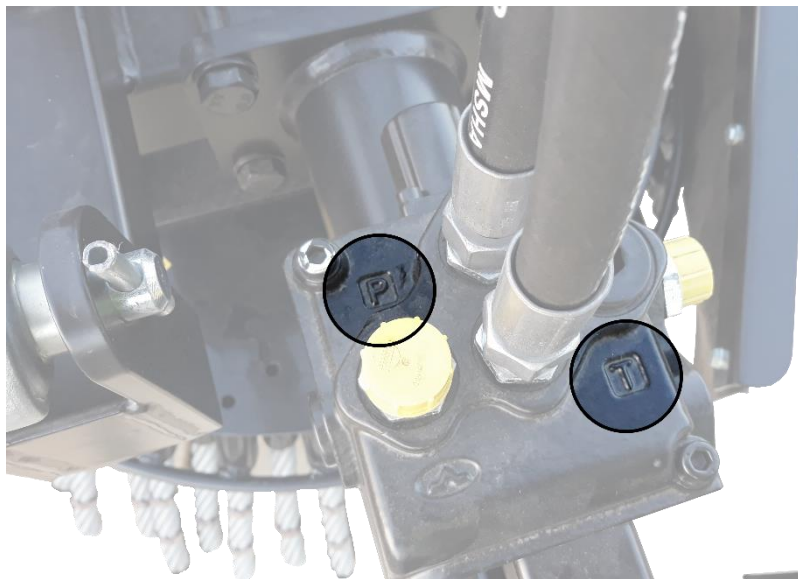
With reference to Figure 4.17 (A), the red hose is the pressure hydraulic oil feed to the machine. This is the middle sized hose and must not be operated at any higher than 200 bar pressure.

#### 4.7.1.2 Green Hose

With reference to Figure 4.17 (B), the green hose is the return hydraulic oil back from the machine. This is the largest sized hose and must not be operated at any higher than 15 bar pressure.

#### 4.7.1.3 Blue Hose

With reference to Figure 4.17 (C), the blue hose is the drain line hydraulic oil back from the machine. This is the smallest sized hose. This hydraulic hose must be fitted as a free-flow return directly back to the tank of the reach arm with no hydraulic restrictions. This hydraulic hose must never be connected to the return line on the reach arm.



**Figure 4.18**

Further indication as to the location of the pressure and return hose fitting requirements is given in the casting on the top of the rotor direction switch. "P" is for pressure from the reach arm and "T" is for tank/return to the reach arm; see Figure 4.18.

Ensure the weed brush is correctly unfolded following the guidance in Section 4.6.1, the machine can be prepared to operate.

## 4.7.2 Disconnecting

**IMPORTANT:** The machine should be secure at all times when left unattended so it doesn't move. Ensure that the machine is stored off the ground, preferably in a dry location to preserve its condition; for example on a pallet.

Manoeuvre the weed brush watching for bystanders and potential dangers in the vicinity to place the machine in a suitable location for detachment. With the tractor switched off and secured in position on level ground, relieve the hydraulic pressure from the tractor by moving the hydraulic control levers/buttons back and forth several times.

When disconnecting the hoses to the reach arm it is important to keep the hoses, and end couplings free of contamination and dirt. Never disconnect a hydraulic hose and leave the coupling end exposed. Utilise blanking plugs to keep them contaminant free. If any component is deemed dirty ensure that it is cleaned with some clean rag.

## 4.8 Hydraulic Hose Checks

It is important that hoses are fitted correctly. Always check all hoses to ensure that there are no kinks or sharp bends, and that the hoses do not chafe against sharp edges. The following guidelines should be used when checking the hosing of the machine prior to work;

### 4.8.1 Twists

Hoses should never be twisted or kinked. On most hoses there is a line which runs the full length of the hose acting as a useful guide. If a visual check reveals that no guideline is present along a hose, refer to Figure 4.19 and conduct the following check;

4.8.1.1 Loosen any clamps.

4.8.1.2 Attach one end of the hose to its coupling, but do not tighten.

4.8.1.3 Place the hose in its required position.

4.8.1.4 Connect the other end loosely to its union.

4.8.1.5 Tighten the end of any angled fittings first ensuring it is in the right position for its intended run.

4.8.1.6 Now tighten the straight end. It is possible that as the nut is tightened the hose may twist slightly.

4.8.1.7 If this happens, slacken off the nut and turn the hose in the opposite direction to that caused by tightening. Then, re-tighten the nut bringing the hose back to the central position.

4.8.1.8 Otherwise tighten the fitting fully. Torque settings for both BSP and Metric hose fittings are shown in Section 5.5.2.

4.8.1.9 Tighten any clamps.

4.8.1.10 Finally, re-bleed the rams and operate the arms in all positions whilst carefully checking for any twists and obstructions.

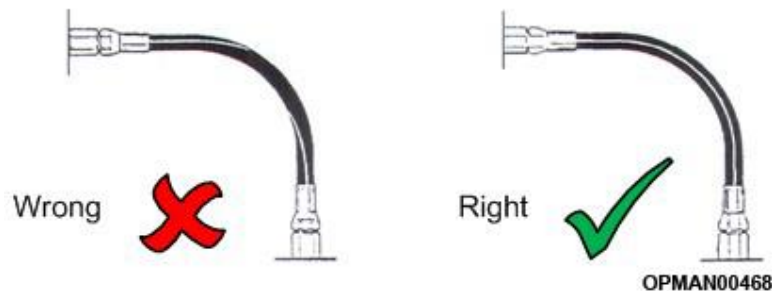


Figure 4.19



## 4.8.2 Sharp Bends

Hoses should always be fitted to allow enough hose radius for free movement, see Figure 4.20. It is also important to avoid sharp bends in hoses. As a general guideline hoses should not be bent round a radius smaller than ten times the hose diameter. This will vary with hose construction and any queries about specific hoses should be addressed to the Spearhead Machinery service department.

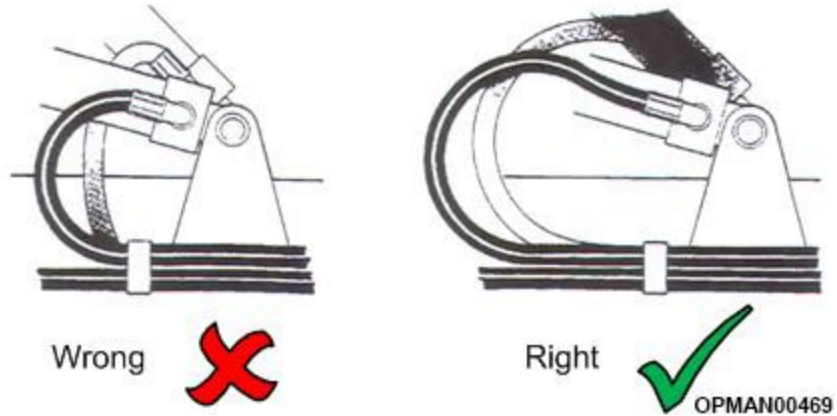


Figure 4.20

## 4.8.3 Chafing Hoses

It is important that hoses are fitted and clamped so that hose chafing is avoided. Always give plenty of clearance around sharp edges see Figure 4.21.



Figure 4.21

## 4.9 Work Site Assessment

### 4.9.1 Foreign Debris Hazards

The destined work site to use the machine should be thoroughly checked and familiarised following the guidance given in Section 2.1 to assess the working area for hazards; removable and fixed.

Items should be assessed, removed or clearly marked (e.g. if too heavy to move) before cutting:

- Items and ground characteristics which could cause a reduction in the tractors stability and traction and operator safety and ease of control in operation
- Insufficient lighting
- Foreign objects which could be picked up and then flung by the machine damaging and causing risk to bystanders, operator, tractor or the nearby environment.
- Foreign objects which could be picked up and then damage the machine; for example wire.
- Items which could create a fire risk

In overgrown areas which could potentially hide debris that could be struck by the brushes, the area should be inspected, and large debris removed before beginning brushing.

Initially brush at a slow rotor and advancing speed and then re-inspect the area closely and remove any remaining debris. The brushing procedure can then be repeated at full operating speed.

Always wear your seat belt securely fastened and only operate the tractor and reach arm with the Roll-over Protection Structure (ROPS) in the raised position. If the tractor or reach arm hits a solid item, a sudden movement could throw you off of the seat and under the tractor and machine. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over. Cab guarding should be mandatory fitted to the tractor.



Figure 4.22 – Inspect The Work Site

It is important to inspect the reach arm and weed brush to ensure all mandatory fixed and removable guarding is in position and in correct working order before proceeding to begin work.



**WARNING!** Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before brushing. 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 brushing immediately if brushes strike a foreign object.

**IMPORTANT:** Repair all damage and make certain the brush carrier assembly is balanced and all individual brushes are present before resuming brushing.



**WARNING!** Many varied objects, such as wire, cable, rope, or chains, can become entangled in the machine. These items can swing outside the confines of the safe brushing area of the machine at greater velocities than the brushes. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the brushing area for such objects before brushing. Remove any like object from the site. Never allow the brushes to contact such items.

### 4.9.2 Bystanders



**DANGER!** Weed brushes are capable under adverse conditions of throwing objects for great distances 90m (300 ft) or more and causing serious injury or death. Follow safety messages carefully.

It is of utmost importance that the tractor and reach arm and weed brush are stopped immediately if a bystander comes within 90m (300 ft) while operating. The engine should be idled and the PTO disengaged. Do not restart work until the bystander is well past the 90m (300 ft) and the work zone has been reassessed to ensure there are no external risks.



OPMAN01148

**Figure 4.23 –Bystanders Out Of Working Area**

### 4.9.3 Weather

**Mow only in conditions where you have clear visibility** in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see **at least 90m (300 feet)** in front and to the sides of the tractor and reach arm. Make sure that you can clearly see and identify passers-by, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects.

If you are unable to clearly see these types of items do not begin cutting.

### 4.9.4 Fire

Follow the following guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the machine:

- Ensure the **tractor is equipped with a fire extinguisher** in an easy to access location
- **Do not** operate the reach arm and machine on a tractor with an underframe exhaust
- **Do not** smoke or have an open flame near the machine
- **Do not** drive into burning debris or freshly burnt areas
- Never allow clippings or debris to collect on top of the machine
- Periodically shut down the tractor and machine and clean clippings and collected debris from the cowl

## 4.10 Using The Weed Brush

### 4.10.1 Pre-start Checks

Only operate the reach arm with weed brush attachment from the tractor operator's seat with the seatbelt securely fastened. The tractor must be equipped with a ROPS cab and cab guarding.



**WARNING!** Do not put hands or feet near any of the brushes during operation or when the machine is static. Brush contact can result in serious injury or even death. Stay away until all motion has stopped and the hydraulic pressure in the system has been successfully relieved.



**WARNING!** Never use the machine with broken or missing bundles.



**WARNING!** Great care must be taken when attempting to clear debris from the brush bundle area of the machine; sharp components and numerous pinch risk points exist in these locations. Safety gloves and safety eyewear should be worn and wherever possible the use of a suitable tool should be used to remove any debris to ensure hands and fingers are kept clear of any risk areas.

Ensure you wear all Personal Protection Equipment (PPE) as stated in Section 4.1.1

4.10.1.1 Safely turn the reach arm into work position and gently place the weed brush on the floor.

- 4.10.1.2 Switch off the tractor and leave the tractor and proceed to unfold the weed brush following the guidance in Section 4.6.1.
- 4.10.1.3 The machine is designed to work horizontally in line with the working surface and can be adjusted using the adjustable link as described in Section 4.6.1. The position should be considered in order to make sure debris doesn't hit the tractor or gets ejected into a path outside of confines of the rubber protection guard, along with being angled to cause the brush bundles to distort or break.

Never angle the weed brush to such an extent that swept material is ejected outside of the confines of the machine.

The machine should NEVER cut in the incorrect direction. Debris and items will get thrown towards the tractor.

The machine should NEVER be used to cut grass.

The machine should NEVER be used at angles which could cause debris to get thrown towards the tractor or other bystanders, vehicles or buildings.

- 4.10.1.4 Inspect the rotor direction valve handle to ensure the rotor is going to rotate in the right direction as described in Section 4.5.
- 4.10.1.5 Inspect the work site to ensure that all hazards correctly made aware of and averted following the guidance given in Section 4.9.

**IMPORTANT:** Starting the machine should only be carried out once the machine and work site has been inspected and deemed safe and all other safety cautions have been adhered to.

At every opportunity and before getting into the cab and starting the engine perform the following inspections on the weed brush;

- 4.10.1.6 Check that the attachment is free from obstructions especially pieces of wire.
- 4.10.1.7 Check that all brush bundles are in good condition and securely attached.
- 4.10.1.8 Check that the rubber protection guard is in its correct position, secure and in good condition.
- 4.10.1.9 Check that the tractor is equipped to deliver the correct hydraulic flow and pressure for the attachment. Refer to the operator manuals for the tractor and reach arm.

## 4.10.2 Starting The Weed Brush

Once pre-start checks have been carried out, the machine can then be started.

- 4.10.2.1 Manoeuvre the weed brush using the reach arm controls to the work area and place the brush gently on the floor.
- 4.10.2.2 When the weed brush is working on the ground requires the reach arm to be placed into its float setting in order to allow the weed brush to raise and fall with the contours in which it is working.
- 4.10.2.3 Start the machine at low oil flow (low rpm). If the machine is starting from cold, warm the machine up for approximately 15 minutes to heat up the oil.

Ensure that the machine is never started in material where it will have to work under load.

- 4.10.2.4 Inspect the rotor to ensure it is rotating in the correct direction as described in Section 4.5.1.

If the rotation is deemed incorrect; stop the machine. Relieve hydraulic pressure in the system. This can be done by pulling/pushing the selected tractor lever/button. Move the handle to the opposite direction following the guidance given in Section 4.5.2.

- 4.10.2.5 Slowly increase rpm until the correct oil amount is reached.

- 4.10.2.6 Slowly advance the tractor forward and observe the machine and rubber protection guard to ensure that swept material is being contained and swept away safely.

If there are issues; stop the machine. Relieve hydraulic pressure in the system. This can be done by pulling/pushing the selected tractor lever/button. Proceed to make adjustments before restarting the machine.

- 4.10.2.7 If the weed brush comes across an obstruction, the weed brush should be stopped from working, the reach arm should be removed out of its float setting and raised so the weed brush can clear the obstruction.

The reach arm and weed brush should then be gently lowered again and restarted in a safe manner.

- 4.10.2.8 Never attempt to restart the weed brushes if there is something strained/wedged in the machine. Stop the machine and the vehicle engine. Relieve hydraulic pressure before inspecting or trying to address the problem. Remove the ignition key and engage the handbrake. Only then it is safe to remove the wedged in material. Always wear safety glasses and work gloves.

### 4.10.3 Stopping The Weed Brush

- 4.10.3.1 Reduce engine RPM gradually to idle and stop the machine.

Never increase or reduce the oil amount too fast. This will damage the hydraulic system on a long-term basis.

- 4.10.3.2 When you are finished working, stop the engine, remove the ignition key and engage the handbrake, leaving the machine in a safe and secure position. Always wear safety glasses and work gloves. Beware of sharp parts!

- 4.10.3.3 If the machine is to be transported on the road, follow the machine safely following the guidance in Section 4.12.

- 4.10.3.4 Always show consideration for other road users during transportation.

### 4.10.4 Stopping The Weed Brush In An Emergency



**DANGER!** If the weed brush hits an object, becomes jammed, suddenly develops vibration or any other potentially harmful change happens to the machine.

**Stop the machine immediately!**

If you hit a solid object or foreign debris:

- 4.10.4.1 Return the tractor to idle engine speed immediately.

- 4.10.4.2 Disengage the PTO.

- 4.10.4.3 Wait for the brush to stop rotating, remove the reach arm out of float, then raise the reach arm and move the tractor off the object if safe to do so.

- 4.10.4.4 Relieve hydraulic pressure in the system. This can be done by pulling/pushing the selected tractor lever/button.

- 4.10.4.5 Press the emergency stop bottom on the reach arm controls to stop any potential movements whilst inspecting the machine. Stop the tractor.

- 4.10.4.6 With extreme caution, if a blocked foreign component has caused the machine to suddenly operate incorrectly or altogether ensure that all the correct levels of Personal Protection Equipment (PPE) is worn for safety purposes. Consider gaining extra personnel for assistance.

- 4.10.4.7 If the cause of sudden incorrect running of the machine is due to the machine colliding or hitting a foreign object, inspect the area and remove, or mark the location of the debris so it's not hit again.
- 4.10.4.8 Inspect the condition of the machine, reach arm and tractor and make any needed repairs before proceeding to use the machine again. Make sure the brush bundles are not damaged or broken and the machine is intact and undamaged before resuming operation. If in doubt; do not restart.



**DANGER!** Never attempt to disentangle the machine by using the rotor direction valve to change the direction of the brushes and start up the weed brush!

## 4.11 Brushing Hints

- 4.11.1.1 **DO NOT** angle the weed brush in such a way as to throw brushed material towards the tractor.
- 4.11.1.2 Place the reach arm into float when the machine is running on the floor. This allows the weed brush to raise and fall with the contours in which it is working and put the least amount of strain on the machine or operator.
- 4.11.1.3 Always run the machine working horizontally in line with the surface. This lets the machine work most efficiently under the least amount of strain and makes full use of all the brushes and puts the least amount of strain upon them. It also ensures on the provisions that the rubber protection guard has been positioned correctly of the least chance of debris getting thrown towards the tractor or getting ejected into a path outside of confines of the rubber protection guard.
- 4.11.1.4 Avoid rushing into the work and maintain an even, steady speed to ensure a consistent finish. Do not use excessive force when placing the weed brush on the floor. Damage to the machine may result. It is best to let the weed brush 'eat away' slowly at densely overgrown areas.

\*NOTE\* Working speed will be dependent on the particular machine and model that this accessory is being operated on; refer to the operation manual for that machine for details.

- 4.11.1.5 When using the weed brush, let the brush 'brush' over the objects. Do not lower the brush down directly onto a work area. The brushes are designed to brush with the end, any misuse can cause damage to the brushes and risks foreign objects, or brushes and other parts being ejected from the machine causing risk to bystanders, operator, tractor or the nearby environment.

## 4.12 Transporting The Weed Brush

In order to safely transport the reach arm mower and weed brush when not in work with the tractor requires the operator to have a thorough knowledge and experience of the tractor they're using and safety precautions they should take.



Figure 4.24

After finishing work, the reach arm with the weed brush needs to be pulled close to the vehicle where it takes up the least room.



Use the guidance given in Section 4.6.2 to safely fold up the weed brush into its most compact position to make it the safest for transporting on the public highway.

Once the reach arm is placed in the transport position:

- 4.12.1.1 Close the outer arm in fully to the inner arm and slew the arm from work position into transport position.
- 4.12.1.2 The inner arm needs to be lifted until the transportation stop is met or close to the vehicle.
- 4.12.1.3 Angle the attachment in order to take up the least amount of space.
- 4.12.1.4 For Spearhead machines with slewing ability the reach arm should be slewed behind the tractor. Be mindful, if the reach arm is lifted to the transportation stop that it doesn't hit the cab of the vehicle or will hit the cab during transportation.
- 4.12.1.5 All hoses are sufficiently clear of the tyres to prevent contact during bounce and sway on braking, turning and undulating ground.
- 4.12.1.6 It is an essential requirement that when the machine is in the transport position all the isolator valves are closed.

Otherwise:

- 4.12.1.7 Ensure the tractor has been properly serviced and maintained. Do not operate the tractor with weak/faulty brakes or worn tyres.
- 4.12.1.8 Ensure the tractor has the capacity to handle the weight of the reach arm and attachment.

Failure to have at least 20% sufficient load over the front axle or to drive at inappropriate speeds on undulating terrain may result in a loss of directional control.

- 4.12.1.9 Ensure the tractor operating and reach arm controls are set for safe transport. Consult the tractor and reach arm manufacturers operators manual.



**WARNING!** Transport only at speeds where the reach arm and attachment and tractor can be maintained in control. Drive **conservatively**. Serious accidents and injuries can result from operating this equipment at high speeds.

- 4.12.1.10 Before using the tractor and reach arm and attachment ensure that the machine is only operated at safe speeds; on and off road (including work).



**DANGER!** Steering should be taken at slow speeds to maintain machine stability. Violently changing direction will greatly reduce machine stability resulting in loss of steering control, potentially turning over the machine and/or tractor causing serious injury, or even death

- 4.12.1.11 The operator should start at slow speeds and familiarise themselves of the operating and handling characteristics of the tractor in combination with the reach arm and attachment off road before proceeding to drive the machine onto the public highway. Gentle steering and braking should be adhered to maintain control and overall stability

- 4.12.1.12 Tractor independent brakes should be locked together, and the differential lock should be disengaged.

- 4.12.1.13 Before transporting the tractor, reach arm and attachment, determine the legal maximum transport speeds for the equipment conforming to local jurisdictions and comfortable transport speeds for the operator. Only increase speeds safely when conditions allow, or the operator is comfortable to do so.



**Figure 4.25 – Follow Safe Driving Practices**



Transport the machine only at safe speeds which allow you to properly control the machine and at a **maximum** speed of 20 mph (32 kph). Drive for the conditions and reduce speed if required. Increasing speeds, operating down a hill or on wet or rain slick roads; increases stopping distances.

- 4.12.1.14 Make certain that the local jurisdiction legal safety requirement items are fitted. For example, a “Slow Moving Vehicle” (SMV) sign is installed and tractor flashing warning lights. Check the local jurisdiction to determine whether the flashing warning beacons are required to be switched on when the machine is working.

Make sure all these safety awareness items are clearly visible and legible and follow all local traffic regulations. If the item is in anyway not working correctly or is faded; replace.



**DANGER!** The reach arm may be taller and wider than the tractor. Be careful when operating or transporting the reach arm and attachment to prevent the machine from running into or striking signposts, barriers, walls, cars or any other solid objects. Such an impact could cause the tractor and reach arm to violently change direction or balance resulting in loss of steering control, serious injury, or even death.

- 4.12.1.15 Be aware of other road users and bystanders and make the machine aware to other users. Check your side view mirrors frequently and remember vehicles will approach quickly because of the tractor's slower speed. Gain eye contact with other people to gauge they've seen the tractors presence.
- 4.12.1.16 When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your local jurisdiction for agricultural tractors. Always stay alert when transporting the tractor and reach arm on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area.
- 4.12.1.17 Make sure all tractor and reach arm lighting are functioning correctly. Older tractors may not feature as many/bright lights as modern tractors. Consider upgrading the lights by consulting your authorized tractor dealer to ensure that the tractor and machine presence is seen.
- 4.12.1.18 It is of utmost importance that safety decals are kept clean and replaced if they are no longer legible, damaged or lost completely. Safety decals can be purchased readily from a local Spearhead dealer.
- 4.12.1.19 After work and all debris is swept away from footpaths and highways ensure that the work site is tidied. The operator is liable for any resulting damage or injury.

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## 5 Maintenance



**WARNING!** Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 2.3 “Safe Maintenance” with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself.

### 5.1 Periodic Maintenance

Perform service, repairs, lubrication and maintenance procedures outlined throughout Section 5 to ensure the longevity and reliability of the weed brush.

In general:

- 5.1.1.1 Inspect for loose or missing fasteners, worn or broken parts, leaky or loose fittings, worn bushes and any other moving parts which are worn or missing.
- 5.1.1.2 Replace any worn or broken parts with genuine Spearhead parts under the guidance of the specific section stated in Section 5.
- 5.1.1.3 Lubricate the weed brush specified by the lubrication schedule.
- 5.1.1.4 **Never** lubricate, adjust or remove material while it is running or in motion.
- 5.1.1.5 Torque all bolts and nuts to the settings specified.

### 5.2 Brushes



**WARNING!** Checking or replacement of brush components should only be carried out with the tractor's engine switched off, starting key removed and the PTO shaft disconnected. Do not restart the machine until all personnel and bystanders have escaped the 90m exclusion area sufficiently and the working area has been reassessed



**WARNING!** Avoid personal injury. Never work under the weed brush without fixed supports to ensure that the brush does not fall. This applies if the brush is attached to the reach arm or is detached.

#### 5.2.1 Inspection

Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 “Maintenance” and Section 2.3 “Safe Maintenance with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself.

Brushes should be replaced if they are:

- Frayed
- Short
- Excessively worn
- Missing

For safety and performance only use genuine Spearhead brush and brush components.

Inspect the brushes before each use to determine that they are properly installed, secure and in good condition. Brushes that are missing, frayed, short, excessively worn or have any other damage should be replaced. Failure to replace such abnormally damaged brushes may lead to catastrophic failure of the brush and ejection of the broken part which may cause bodily injury or death.

## 5.2.2 Brush Removal & Replacement

Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 "Maintenance" and Section 2.3 "Safe Maintenance with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself.



**WARNING!** Always check tightness of brush bolts prior to using the machine.

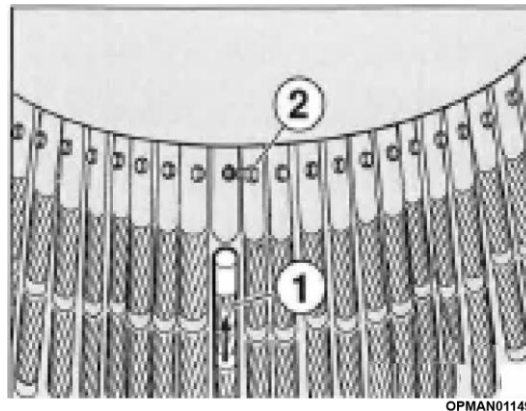


Figure 5.1

In order to remove and replace the brushes:

- 5.2.2.1 Ensure that the machine is disconnected from the tractor and reach arm hydraulic supply to ensure that the brushes do not move during maintenance. Support the machine with fixed supports.
- 5.2.2.2 Loosen the brush fasteners and pull out the wire bundle.
- 5.2.2.3 Fit a new wire bundle and tighten the brush fasteners.
- 5.2.2.4 Repeat procedure on the other brushes which require replacement.

## 5.3 Hydraulic Components

Before proceeding to carry out any maintenance requirements on the hydraulic system, ensure that you have thoroughly read and understood Section 2.3 on how to safely go about carrying out maintenance requirements to the head, including how to approach the hydraulic system and its components. Section 2.1 should also be read to understand how to safely operate and use the machine in general.



**CAUTION!** Relieve hydraulic pressure before disconnecting the hydraulic hoses or working on the system. This can be done by pulling/pushing the selected tractor lever/button. Only once this has been completed and then suitable safety glasses and impenetrable gloves have been put on can the hydraulic hoses be removed from the tractor.



**CAUTION!** When working with/checking the hydraulic system on the weed brush or reach arm always wear safety glasses and impenetrable gloves. This also applies when working with motor and motor oil. Use paper or cardboard to search for leaks and not hands or any other body parts.



**CAUTION!** Keep hands and body away from pin holes and nozzles ejecting hydraulic fluid. Ingested or penetrated hydraulic fluid in the body can become gangrenous. Removal must be carried out professionally by a suitable Doctor.



**CAUTION!** Ensure all hydraulic hoses, lines and connections in good condition and tight before applying pressure.



**CAUTION!** Do not change any factory-set hydraulic settings to avoid component or equipment failures.



**CAUTION!** Ensure maintenance personnel wear suitable PPE clothing when maintaining the machine to ensure risk of impact or skin injuries. Suitable footwear and gloves are an example. For example, frequent or prolonged contact with hydraulic oil may cause dermatitis and other skin disorders including (more rarely) skin cancer when not wear impenetrable gloves. Worn parts may have sharp edges.



**CAUTION!** Follow the guidance of the lubricant manufacturer with regards to handling oils, solvents, cleansers and other chemical agents.

### 5.3.1 Hoses



**WARNING!** Relieve hydraulic pressure before disconnecting lines or working on the machine. This can be done by pulling/pushing the selected tractor lever/button.

It is false economy to try and make a damaged hose last a bit longer, because a failure can spill a lot of oil on the road endangering traffic, the environment and costing money. To reduce the risk of this happening and ensure a long life from the hoses, follow the guidelines below. On a weekly basis:

- 5.3.1.1 Check that all hoses and their connections are in good condition and that there are no leaks or damage. Replace any hose that is leaking or damaged.
- 5.3.1.2 Check to see that hoses are not and have not been chafing against sharp edges. If evidence of chafing is found, then inspect for damage and if found replace. Re-route any hose that has been chafing using the guidance given in Section 4.8.3.
- 5.3.1.3 Check to ensure that hoses are fitted without kinks or sharp bends using the guidance given in Section 4.8.
- 5.3.1.4 If in doubt about the condition of any hose replace. When replacing hoses, be sure to tighten to the correct torque setting, see Section 5.5.

### 5.3.2 Hydraulic Diagram

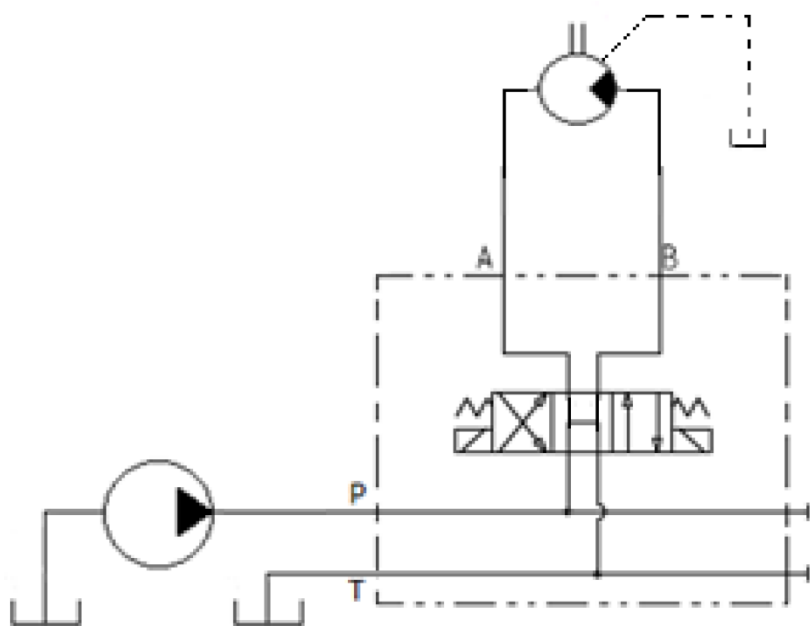


Figure 5.2 - Weed Brush Hydraulics Diagram

## 5.4 Lubrication & Greasing



**CAUTION!** When working with/checking the hydraulic system on the head always wear safety glasses and impenetrable gloves. This also applies when working with gearboxes and gearbox oil. Use paper or cardboard to search for leaks and not hands or any other body parts.



**CAUTION!** Keep hands and body away from pin holes and nozzles ejecting hydraulic fluid. Ingested or penetrated hydraulic fluid in the body can become gangrenous. Removal must be carried out professionally by a suitable Doctor.

The mechanical components of the machine in use must be lubricated to avoid wear and heat build-up. Lubrication may be through the use of grease or oil. Oil allows higher relative speeds of items such as gearboxes, whereas grease is generally used to lubricate items such as bearings or bushes. In both cases it is important to ensure lubrication is given to these various items to ensure their longevity and reliability in use.

## 5.5 Torque Settings

### 5.5.1 Nuts & Bolts

#### Specific Fastener Requirements

On weed brushes, there are some special fasteners/components which require specific torque settings to ensure they operate safely.

Use	Size	Grade	Torque Setting	
			Nm	Ft-lb
Brush Carrier	M10	8.8	68	50
Radial Adjustment	M16	8.8	295	218
Motor Shaft Bolt	M12	8.8	119	88
Motor Fixing	M10	8.8	68	50

**Table 5.1 – Weed Brush Specific Fastener Torque Settings**

#### Non-specific Fastener Requirements

The below tables give reference to the **maximum** recommended tightening torques for standard, zinc plated finished bolts on Spearhead machines. **These settings can be applied to hex, socket countersunk and socket button screws.**

Size	Grade					
	8.8		10.9		12.9	
	Nm	Ft-lb	Nm	Ft-lb	Nm	Ft-lb
M5	5	3	7	5	8	6
M6	14	10	12	9	14	10
M8	34	25	29	21	34	25
M10	68	50	57	42	68	50
M12	119	88	99	73	119	88
M14	189	139	158	116	189	139
M16	295	218	246	181	295	218
M18	406	299	338	249	406	299
M20	576	424	480	354	576	424
M22	783	577	652	481	783	577
M24	995	734	829	612	995	734
M30	1977	1458	1647	1215	1977	1458

**Table 5.2 – Standard Fastener Torque Settings**

### 5.5.2 Hydraulic Fittings

Throughout all weed brushes, BSP adaptors and hoses are used. See the relevant headings for adaptors and hoses.

## **Port Adaptors With Bonded Seals**

The below tables give reference to the **maximum** recommended tightening torques for standard, BSP port adaptors found on weed brushes.

Size	Thread	Torque Setting		Spanner Size
		Nm	Ft-lb	
<b>M16</b>	Metric	45	33	16mm
<b>M18</b>	Metric	50	37	18mm
<b>M20</b>	Metric	70	52	20mm
<b>M22</b>	Metric	75	55	22mm
1/2"	BSP	102	75	27mm
3/4"	BSP	149	110	32mm
1"	BSP	203	150	41mm

**Table 5.3 – Weed Brush Adaptor Torque Settings**

## **Hydraulic Hoses**

The below tables give reference to the **maximum** recommended tightening torques for standard, hydraulic hoses on weed brushes.


Size	Thread	Torque Setting		Spanner Size
		Nm	Ft-lb	
3/8"	BSP	31	23	22mm
1/2"	BSP	49	36	27mm
3/4"	BSP	80	59	32mm
1"	BSP	125	92	41mm

**Table 5.4 – Weed Brush Head Hydraulic Hose Torque Settings**



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## 5.6 Machine Inspection Record

	<b>MACHINE INSPECTION RECORD</b> <b>(For Weed Brush)</b>	Pre-delivery inspection:	Select
		Installation inspection:	Select
		Daily pre-work inspection:	Select
Model:	Serial No:		
Inspector name (print):	Inspection date:		
Company/Position:			
Inspector signature:			
Visual Checks		Comments	OK
Check that an operator's instruction manual in the correct language for the working territory is in the machine document holder.			
Check that the serial number printed on the parts manual supplied with the machine matches the serial number of the machine.			
Warning decals are present, clean and in good order			
Check the weed brush mainframe for any structural problems or excessive damage			
Look for any evidence of motor oil leaks			
Inspect the rubber guard is present			
Inspect to see all brushes are present and in good condition			
Check hoses for damage, kinks, twists, chafing or weeping.			
Check that the tractor is equipped to supply the correct hydraulic flow and pressure			
Inspect the rubber safety guard for condition and integrity			
Mechanical Checks		Comments	OK
Inspect to see the pitch top link locking collar is secure against the barrel adjuster to the machine is secure			
Check the rubber safety guard radial adjustment bolt for tightness			
Check the rubber safety guard angle adjustment bolt for tightness			
Check the rubber safety guard offset adjustment is correctly adjusted and the pin is secure			
Check the rubber safety guard height adjustment is correctly adjusted and the pin is secure			
Check the brush fasteners for tightness			
Ensure all machine to reach arm bracket fasteners are secure and tightened			
Check the security of any hose fittings for tightness			
Ensure that the attaching reach arm and tractor meet the requirements of the machine			
Running Checks		Comments	OK
Once you are happy with the above start the tractor and run through the operational checks below			
Ensure that the controls respond as intended with regards to powering the machine			
Run the brushes up to operating speed and check for vibration. If vibrating check with the instruction book for reasons			
Check the operation of the rotor direction valve, ensuring the machine is stopped during the operation of the rotor direction valve to ensure that the rotor is able to rotate in both directions			

Other comments:

*Disclaimer: All guidance and maintenance advise to be carried out on the weed brush as written in this inspection record is deemed on the provision that the operator/maintenance operative has fully read and understood the specific operators manual for the given model of machine and follows the guidance and safety precautions described within it.*

*Spearhead claims no responsibility to any machine and/or physical harm caused by anything other than the practice guidelines stated in its specific machine model operators manual.*

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## 5.7 Machine Storage

Follow the following sections for guidance to correctly storing the weed brush out of working use and preparing back into correct working condition.

### 5.7.1 Preparing The Machine For Storage & Reintroduction Into Work

Following seasonal use, it is important to prepare the machine for storage, thinking of the preservation of parts condition and ease of reintroduction when bringing the machine back into work after periods of no use.

Follow the following points:

- 5.7.1.1 Thoroughly wash the machine removing all traces of grass and dirt.

Great care should be taken when using pressure washers. **Do not** hold the pressure washer lance close to the paintwork and items containing seals as this can cause damage and discolouration.

Spearhead does not recommend using steam cleaners.

- 5.7.1.2 Liberally place oil on each of the brush bundles and any other plated parts to prevent corrosion.

- 5.7.1.3 Tighten all fasteners to the recommended torque.

- 5.7.1.4 Plug all open-ended hydraulic hoses to keep the ends free of contamination and dirt.

- 5.7.1.5 Use touch up paint available from Spearhead where necessary to preserve the appearance of the machine.

- 5.7.1.6 Ideally store the machine in the dry indoors, on a firm surface or a on a pallet, away from the elements. This will greatly preserve the machines physical appearance and condition.

It is also best practice to inspect the machine for worn/damaged items which will be required to be replaced before entering work again in the new season. Consult the maintenance schedule for the machine (Section 5.6) as well as other specific maintenance task sections to see what could be required to be done to the machine.



**Figure 5.3 – Prepare For Storage**

Ordering replacement parts at the beginning of this period with plenty of time will potentially reduce the delays of reintroduction into work with out-of-stock items. Many other local operators will be carrying out the same procedure at the same time.

Where parts are broken, damaged and deemed not fit for use; replace with genuine Spearhead parts using the online Interactive Parts facility at:

<https://my.spearheadmachinery.com/parts/public-interactive-parts-database/>

You will require the machine serial number. Assistance to its location can be found in Section 1.3.

Spearhead weed brushes are designed to withstand the most rigorous conditions and with a little care and attention will give many years of trouble-free service. So as not to invalidate the warranty and to avoid problem, use only genuine Spearhead parts and make sure the machine is not driven at excess speed (3 mph/5 kmh).

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## 6 Troubleshooting

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
<b>The brush is not rotating</b>	Hydraulic connections are incorrect on the motor or rotor direction valve	Check hydraulic connections
	The pump is not activated on the reach arm	Activate the pump
<b>The brush is rotating in the wrong direction</b>	Rotor direction valve is not set correctly	Change the position of the handle on the rotor direction valve
<b>The motor has no power</b>	Rotor direction valve is not set correctly	Contact a genuine Spearhead dealer
<b>Motor oil leak</b>	Case drain is not connected	Connect case drain to tank
	Returns hose is not fitted correctly	Tighten hydraulic fittings
	Gasket is leaking	Contact a genuine Spearhead dealer
<b>The brush moves abruptly</b>	The brush is lying flat on the ground	Set the pitch angle on the top link
<b>Brush bundles loosen</b>	Brush fasteners are loose	Tighten the brush fasteners
<b>The swept material is not being distributed properly</b>	Safety cover	Adjust the safety cover

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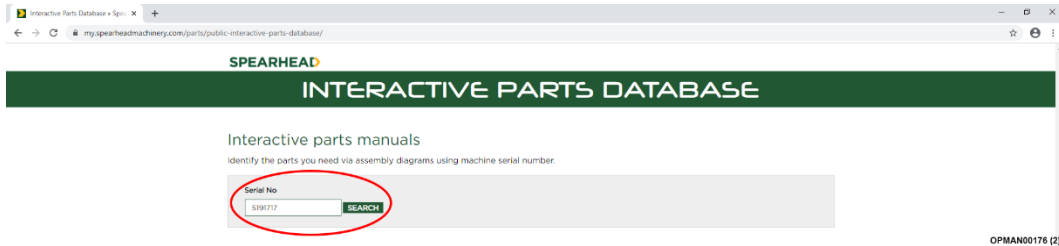


## 7 Spare Parts

### 7.1 How To Obtain The Correct Spare Part Numbers

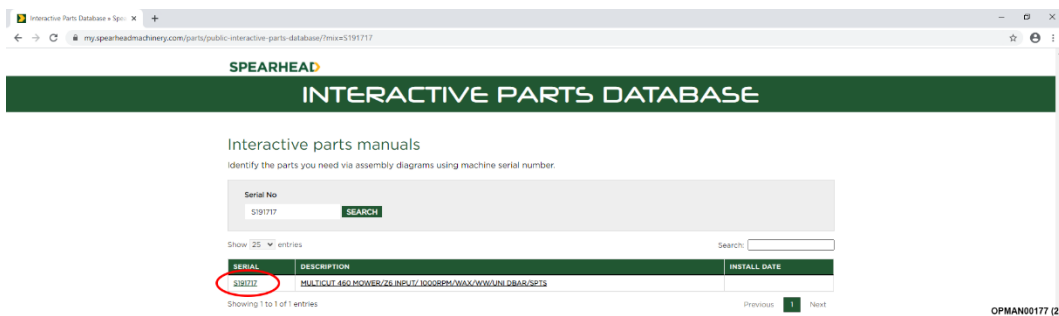
For correct part numbers, use the Spearhead interactive online parts books. These are available at <https://my.spearheadmachinery.com/parts/public-interactive-parts-database/>. You will need to enter the machine serial number; see Figure 1.3.

#### 7.1.1.1 Enter the serial number.



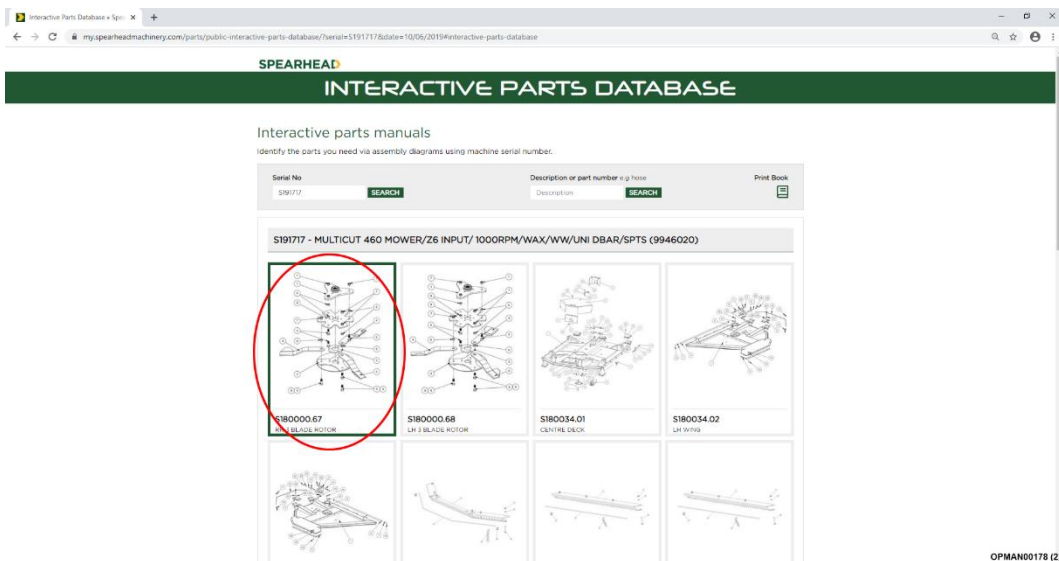
**Figure 7.1 – Type In Serial Number**

#### 7.1.1.2 After entering the serial number, a specification for the machine will appear. Click on the serial number; see Figure 7.2.



**Figure 7.2 – Click On Serial Number**

#### 7.1.1.3 After clicking on the serial number, a full parts breakdown specific to the machine serial number will appear showing the various parts and assemblies of the machine. Click on the specific assembly picture required; see Figure 7.3.



**Figure 7.3 – Click On Assembly**

- 7.1.1.4 You will finally be presented with a full exploded parts breakdown for that particular assembly, giving part numbers and the quantities required; see Figure 7.4.

The screenshot displays the 'INTERACTIVE PARTS DATABASE' interface. It features a search bar with 'Serial No' and 'Description or part number' fields. Below the search bar is a table titled 'Print Part List and Diagram' with the following data:

Ref	Part No	Description	QTY
1	1770602-342	CHIM BLADE CARRIER UPPER (102)	1
2	1770609	LOWER BLADE CARRIER (102)	1
3	1770604-3	SPACER	1
4	7770700	BLADE - RH C/W PIN 25	3
5	277045	BOLT	6
6	7770707	BLADE BUSH	6
7	277044	NUT	6
8	046053	CARRIER	1
9	2770464	WASHER	3

To the right of the table is an exploded view diagram of the assembly, with numbered callouts (1-9) corresponding to the parts in the table. The diagram shows a central carrier assembly with multiple blades and associated hardware.

Figure 7.4 – Exploded Parts Breakdown With Bill Of Materials

## 7.2 Spare Parts Ordering

It is important to note that when it comes to ordering replacement parts, that this can **only** be carried out through a Spearhead dealer. **Spearhead does not accept direct customer parts orders over email, fax or telephone.**

For guidance on finding your local Spearhead dealer; see Section 7.3.

## 7.3 Dealer Network

Spearhead has an extensive dealer network which can offer genuine replacement parts.

In order to make it easier to find your local Spearhead dealer, the Spearhead website has a Dealer Locator facility.

<http://www.spearheadmachinery.com/dealer-locator/>

To find your local Spearhead dealer enter your location or postcode into the “Your location” box and then press “Search”; see Figure 7.5.

The screenshot shows the 'DEALER LOCATOR' page on the Spearhead website. The 'Your location' field is populated with 'Evesham' and circled in red. The search radius is set to '25 mi' and the number of results is '23'. Below the search bar is a map of the United Kingdom and surrounding regions, showing several dealer locations marked with green pins. The map includes labels for major cities and countries like Ireland, United Kingdom, Netherlands, Germany, and Belgium.

Figure 7.5 – Dealer Locator

# Notes

# Notes