



## **30" SHARK**

Owner's Manual



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## Twelve Month Limited Hardware Warranty

THE FOLLOWING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, OR STATUTORY, INCLUDING, BUT NOT BY OF LIMITATION, ANY WARRANTY OR MECHANANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITING THE GENERABILITY OF THE FOREGOING, RWI SPECIFICALLY DISCLAIMS AND EXCLUDES ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE.

Roughwater Industries Ltd.. ("RWI") warrants to the Customer that commencing from the date of delivery to the Customer and continuing for a period of 360 days, the RWI Hardware (i) to be free of defects in material and workmanship under normal use and service, and (ii) to conform in all material respect to the printed specifications for the Equipment which have been delivered to the Customer in connection with the Customer's purchase of the Equipment. This limited warranty covers only the original purchaser of the Equipment. RWI's and its supplier's sole obligation and the Customer's sole remedy for any failure of the Equipment is limited to the repair or replacement of any part of the Equipment at RWI's discretion. RWI's and its supplier's liability is limited to the amount paid for the Equipment. RWI and its suppliers shall not be liable for indirect, special, consequential or liquidated damages or penalties, including claims for lost revenues, profits or business opportunities, even if RWI had or should have had knowledge, actual or constructive, of the possibility of such damages.

Upon notification of possible defect, RWI will provide to the Customer a Return Material Authorization ("RMA"). The customer, at its expense, may then ship the Equipment to RWI (or its authorized representative) for inspection. RWI shall, at its option, repair or replace the applicable part(s) of the Equipment and (RWI) shall, at its expense, return the Equipment to Customer in the same or equivalent manner that the Equipment was delivered to RWI. Part(s) replaced during this Limited Hardware Warranty period, as applicable, will be covered for the remaining term of such period. Such replacement parts may, at RWI's option, be new or equivalent to new.

This warranty shall be void if Customer fails to use or maintain the Hardware in accordance with RWI's specifications or instructions, or if the Hardware or any part thereof have been subject to any unauthorized modifications, improper operation, user negligence, service by unauthorized person, company, association, use with any unauthorized attachment, device or feature, accidental neglect, misuse, tampering, acts of God, or any event other than ordinary use. **Do not immerse in water.**

### Export Law Regulations

You agree that you will not export, either directly or indirectly, any RWI Product, material or data provided in the course of receiving Standard Limited Hardware Warranty services without first obtaining any required license or other approval from the Canadian Department of Consumer and Corporate Affairs or any other agency or department of the Government of Canada. In the event that You export any RWI Product from Canada, or re-export it from a foreign destination, You agree to ensure that the distribution and export/re-export or import of the RWI Product is in compliance with all laws, regulations, orders, or other restrictions of Canadian Export Controls Legislation Regulations and the appropriate foreign government. You agree that neither You nor any of Your subsidiaries will export/ re-export any RWI Product, material or data provided in the course of receiving Standard Limited Hardware Warranty, directly or indirectly, to any country for which the Government of Canada or any agency thereof or the foreign government from where it is shipping required and export license, or other governmental approval, without first obtaining such license or approval

## 30" SHARK Operations and Maintenance

The 30" SHARK is a horizontal shaft type, directly driven, rotary forestry mulching attachment designed for use in conjunction with boom-equipped carriers. The unit is comprised of a cutting frame and cutting drum driven by a hydraulic motor equipped with protective valves and associated hydraulic fittings and conductors. The unit is fitted with guarding to limit access to the cutting drum and designed to limit flying debris that may be ejected during clearing operations.

The unit is designed for use in the safe and efficient reduction (to chips/mulch) of all types of vegetation up to diameter of 180mm and is to be used only in applications where personnel, property and roadways are greater than 100 meters from where the mulching equipment is being operated.

### Audience

This user guide is written for operators who use and maintain the Torrent 30" SHARK Forestry Mulching Attachment during vegetation clearing activities.

### Precautions

Failure to follow and respect the following **WARNINGS** can result in damage to the mulcher, the carrier, other property or injury or death of operation personnel or pedestrians. This unit must not be used within 100 meters of objects, other machinery, livestock, pedestrians, or personnel (other than the operator)

**WARNING:** This machine must be operated only by qualified equipment operators with thorough knowledge and understanding of the contents of this manual. RWI accepts no responsibility for damage or injury resulting from inappropriate or misuse of its products.

**WARNING:** Before starting the supply of hydraulic oil to the mulcher the operator must verify that equipment, personnel, property, and roadways are greater than 100 meters from where the mulching equipment is being operated. As well, the operator must be inside the operator's compartment of the machine with the doors and windows closed.

**WARNING:** The 30" SHARK must not be approached by persons (including the operator) or by other equipment while the cutting drum is turning. Because of the risk of entanglement or debris that may be ejected from the unit, the 30" SHARK must be in a ZERO ENERGY STATE (that is, the drum is stationary, the cutting frame is squarely on the ground and excavator engine is shut down) before being approached for inspection or maintenance.

**WARNING:** The 30" SHARK must not be used in water.

**WARNING:** Because of the nature of the hydraulic motor protective valving supplied on the mulching unit, the cutting drum will continue to rotate after the unit is shut down until all inertial energy is expended from the cutting drum. Always allow the unit at least two minutes to "run-down" after the carrier has been shut down before approaching the unit for any reason.

**WARNING:** This machine must be installed according to the product technical specifications contained herein by qualified technical personnel only. RWI Ltd. accepts no responsibility for damage or injury resulting from inadequate or improper installation of its products.

**WARNING:** When servicing cutters, the cutting drum must be mechanically prevented from turning (that is, wedged or blocked) to minimize the risk of injury to the maintainer.

**WARNING:** The 30" SHARK is manufactured from metal components and, as such, is a highly efficient electrical conductor. Extreme caution must be used when working around electric power transmission lines whether above or belowground!

**WARNING:** This machine must be installed and used in observance of all laws, rules and regulations as laid out by local regulatory bodies in the country/region in which it is being used.

## Operation

Clearing operations should be carried out only by a competent equipment operator familiar with the safe operation of the 30" SHARK when installed to the applicable carrier. The operator must understand the contents of this manual.

Before starting the supply of hydraulic oil to the mulcher the operator must verify that equipment, personnel, property, livestock and roadways are greater than 100 meters from where the mulching equipment is being operated. The operator must always remain inside the operator's compartment while the mulcher drum is turning.

For lighter growth, such as bush and smaller trees up to 2" (50mm), material is most efficiently reduced by approaching the work from the left, such that material is introduced into the "feed side" or left side of the mulcher. This allows the cutting drum assembly to pull the material in to be reduced and then ejected downward from the discharge side of the mulcher.



Figure 1. Discharge Side

Vegetation 2" (50 mm) and larger in diameter, often require that the top be cut off and mulched separately on the ground. In addition, with respect to larger growth it is faster and more efficient to chip/mulch as much of the tree as possible while it is standing (still on the stump). For efficient mulching of larger trees, the steps to remember are as follows:

1. Reach as high as safely possible (that is, boom highest position with mulching head horizontal) toward the right side of the tree.
2. Using the left or "discharge" side of the mulching drum, slowly cut into the right portion of the treetop being careful not to cut the top off completely.
3. As the top weakens, apply increasing left swing pressure until the combination of cutting and swing forces cause the top to fall .
4. Using slight down pressure, trees 3" (75mm) and smaller may be reduced using the guard to direct the stem into cutting drum continuing to mulch the stem down to grade.
5. Swinging from left to right introduce any material on ground into the feed side, to be reduced and ejected from the unit



Figure 2. Feed Side

## Maintenance Schedule

Checks & Services	Daily	Weekly (50 Hours)
Check hydraulic conductors for leaks or damage	X	
Lubricate drum shaft bearings with FAG Arcanol Multitop rolling bearing grease (1 shot each)	X	
Lubricate drive coupling with multipurpose EP grease (2 shots)	X	
Inspect cutters for excessive wear or breakage	X	
Inspect tool Holders for excessive wear or damage		X
Inspect bearings for excessive radial clearance or end play		X
Verify cutter fasteners torqued to 55 ft-lb (75nm)		X
Inspect hydraulic motor, protective valves and hydraulic hoses and fittings for leaks		X



## Lubrication

**WARNING:** 33 percent of premature bearing failures are caused by incorrect specification and inadequate application of the lubricant.

Use of **FAG Arcanol Multitop Rolling Bearing Lubricant** is recommended for use in the lubrication of all Torrent Shark series drum shaft bearings. Use of multipurpose extreme pressure grease is recommended for lubrication of drive coupling components

SCHAEFFLER GROUP  
INDUSTRIAL

**FAG**

## FAG Rolling Bearing Grease Arcanol MULTITOP

Properties, applications: Bearing grease for high loads, low and high speeds, low and high temperatures, low noise, low friction

Characteristics	Unit	Value	Test method
Marking:		KP2N-40	DIN 51825
Density:	[kg/dm <sup>3</sup> ]	ca. 0,9	
Specifications:			
Thickener:		lithium soap	
Type of base oil:		part synth oil	
Temperature range:	[°C]	-40 to 140	DIN 51825
Longtime limit temperature:	[°C]	80	
Base oil viscosity at 40°C:	[mm <sup>2</sup> /s]	≥ ISO VG 68	DIN 51562 - 1
Worked penetration:	[0,1 mm]	265-295	DIN ISO 2137
Drop point:	[°C]	≥ 190	DIN ISO 2176
Water resistance:	[Range]	≤ 1-90	DIN 51807 - 1
Corrosion Emcor Test:	[Corr.Grad]	0/0	DIN 51802
1% NaCl:	[Corr.Grad]	≤ 1/1	
Copper corrosion after 24 h/120 °C:	[Corr.Grad]	≤ 1	DIN 51811
FE8 tests run Wear behaviour Running time 500 hours, no failure			
536048 - 3000/10-RT	[mg]	vWk50 ≤ 35mg	DIN 51819
536048 - 75/80-RT	[mg]	vWk50 ≤ 35mg	DIN 51819
536050MP - 7,5/80-120	[mg]	vWk50 ≤ 35mg	DIN 51819
FE9 tests run (grease service lifetime)			
A/1500/6000-130	[h]	F50 ≥ 200 h	DIN 51821-02
	[h]	no failure < 100h	
<b>Speed range:</b>	Unit	Ball bearings and cylindrical roller bearings	Other roller bearings*)
Speed limit n*dm	[mm/min]	800.000	350.000

\*) not cylindrical roller thrust bearings and spherical roller thrust bearings

## 30" SHARK Technical Specifications

Operating weight (Standard)	680 lb/330 Kg
Cutting width	30 inches
Rotational speed (RPM)	2800 (minimum) 3200 (max. continuous)
Carrier power requirement	40 Hp or 28 Kw (minimum)
Cutter type	Fixed round or square
Cutter quantity	24
Drive type	Direct
Power transmission type	Hydraulic fluid power
Hydraulic motor type	Fixed axial piston
Maximum hydraulic system pressure	5000 psi/345 bar (max. continuous)
Hydraulic oil flow requirement	20 usgpm/75 lpm (minimum)

## **Preventive Maintenance Instructions**

This section provides the information necessary to ensure safe and effective maintenance of the 30" SHARK forestry mulching attachment. Periodic checks and lubrication requirements are described in detail.

### ***DAILY***

#### ***Check Hydraulic Conductors for Leaks or Damage***

The hydraulic hose assemblies connecting the mulching unit to the boom of the carrier are exposed to impact and abrasion as a normal course of operation.

Hydraulic hoses and fittings must be checked regularly in order to avoid any soil contamination due to leakage of hydraulic fluid and to maintain the proper level of oil in the hydraulic system. Restrictions in the hydraulic conductors can adversely affect the performance of the mulcher and, in some cases, cause damage to the hydraulic motor.

### ***Grease Drum Shaft Bearings***

Lubricate main shaft bearings twice daily with one shots of special purpose grease suitable for operating conditions (see "Recommended Rolling Bearing Lubricant Specifications" for lubricant requirements).



### ***Grease Drive Coupling***

With the unit squarely on the ground, or other flat solid surface, and with the carrier in a ZERO ENERGY STATE, apply two shots of multipurpose (ie. Pin and bushing grease) to the grease fitting into the side of the cutting drum toward the drive end of the unit (see illustration below).



### ***Inspect Cutters for Excessive Wear or Breakage***

As cutters wear, they become less efficient. Rotate cutters as required.

To rotate, a cutter perform the following steps:

1. Remove cutter fastener and lock washer.
2. Turn 90 degrees, or as required, to expose a new cutting edge. – if no new edges remain, replace the cutter with a new one.
3. Torque to 75 Nm.

Do not use an impact wrench to tighten the cutters. Remove/replace a cutter as follows:

1. Remove cutter bolt and lock washer.
2. Remove cutter from tool holder.
3. Replace exhausted cutter with a new one.
4. Reinstall cutter bolt and lock washer and torque to 55 ft-lb (75 Nm).



## ***WEEKLY – Every 50 Hours of Operation***

### ***Inspect Tool Holders for Excessive Wear or Damage***

In cases of severe damage to cutters involving loss of the entire cutting head, the tool holder tool face may be exposed to impact with potential for damage to the machined surface. Any damage to the machined surface must be corrected. In cases of severe damage, a new tool holder must be installed.

### ***Check Bearings for Excessive Radial clearance or Endplay***

With the unit squarely on the ground, or other flat solid surface, and with the carrier in a ZERO ENERGY STATE, slide a pry bar under the drum ting. Check for excessive radial clearance. Readily visible movement while moving the pry bar up and down, may indicate worn or damaged bearings.

Excessive endplay may be detected by placing a pry bar between the cutting frame and either end of the cutting drum. A small amount of end-play (approximately 1/16" (1.5mm) is built into the bearing. If total axial play (in excess of 1/16") is detected, bearings may have be replaced and further inspection is required.

### ***Verify Cutter Fastener Torque***

Using a torque wrench, check that all cutter bolts are tightened to a value of 55 ft-lb (75Nm).

### ***Inspect Hydraulic Motor, Valving and Hydraulic Hose Connections for Leaks***

Place the unit squarely on the ground, or other flat solid surface, and ensure that the carrier is in a ZERO ENERGY STATE. Allow the unit to cool to ambient temperature. Remove the drive end cover and inspect the hydraulic motor and anti-cavitation valve assembly hose connections for leaks or seepage of hydraulic oil and correct as necessary.



## 30" SHARK Installation

Installation of the 30" SHARK must be carried out by a factory trained technician or with extensive experience in hydraulic fluid power systems and components. The technician must possess knowledge and/or documentation specific to the excavator brand, model and model year to which the unit is to be installed and should commence installation of the 30" SHARK only after having read and understood the contents of this manual.

***Warning: All installation and any other maintenance or mechanical procedures to be carried out on the 30" SHARK must be performed with the unit resting squarely on the ground or other flat solid surface, and with the carrier in a **ZERO ENERGY STATE**.***

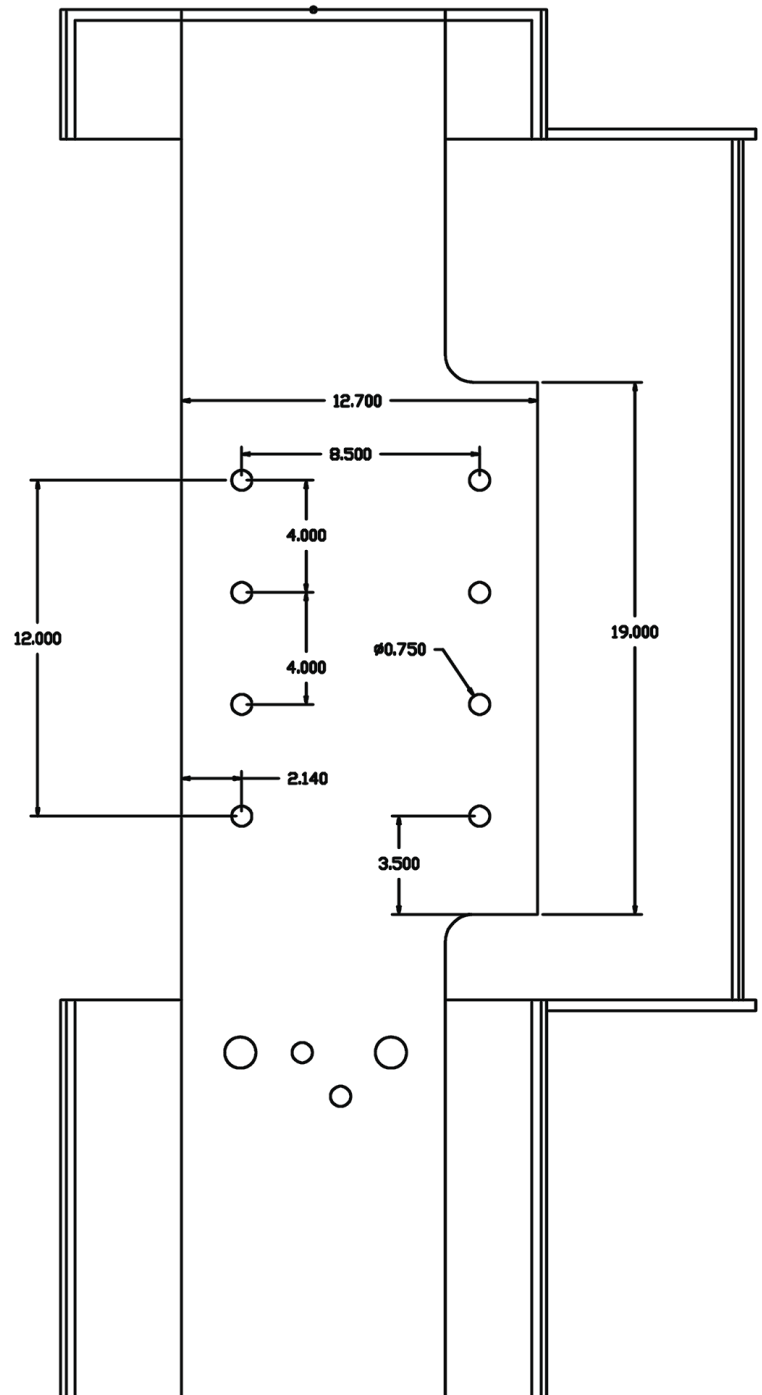
The 30" SHARK is a hydraulically driven, rotary mulching attachment driven by a fixed displacement axial piston hydraulic motor rated for a maximum continuous operating pressure of 5000 psi (345 bar). The hydraulic motor is fitted with case overpressure protection and anti-cavitation valves.

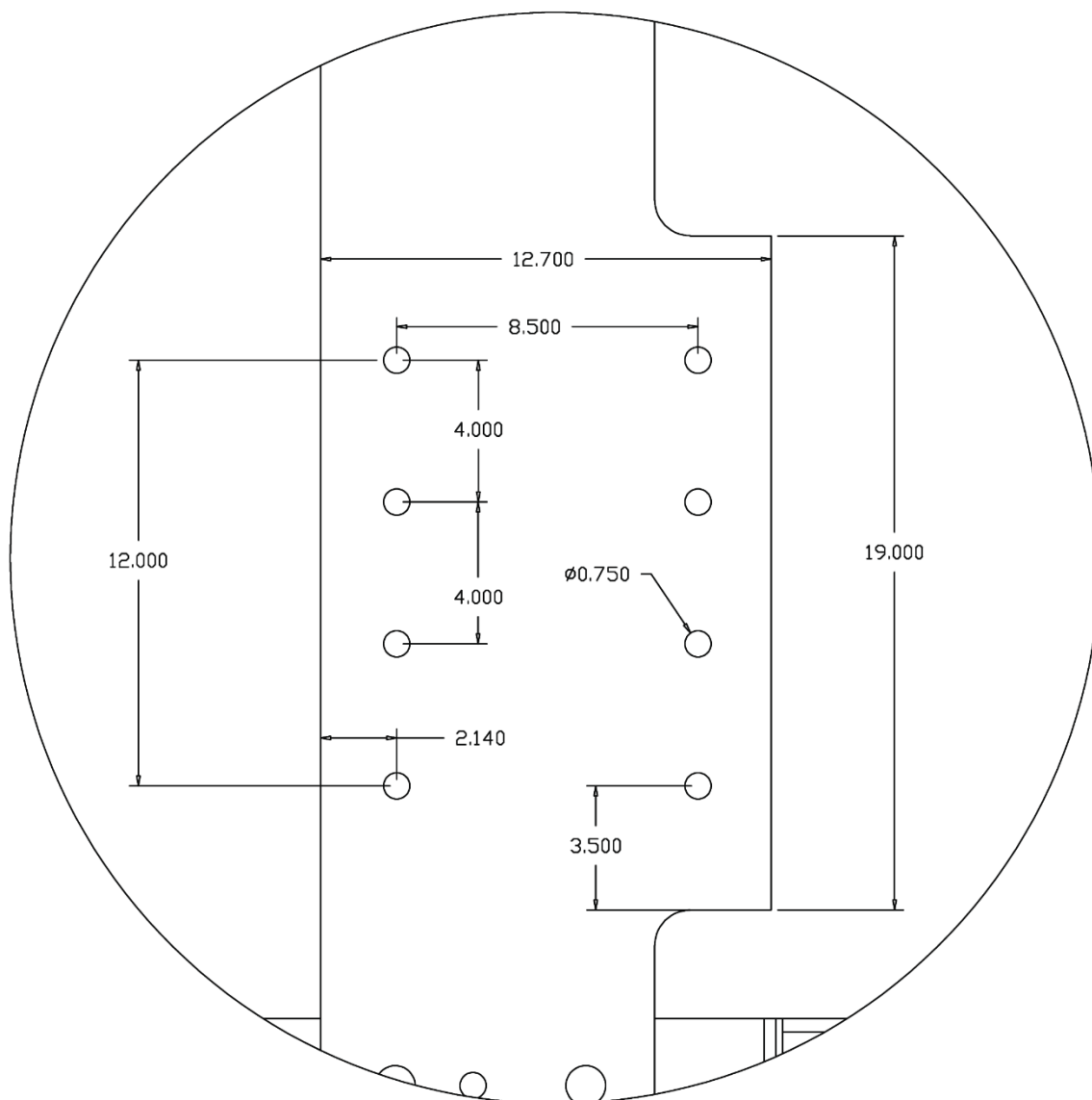
The 30" SHARK cutting drum shaft is supported at either end by flanged cartridge roller bearing assembly. Maximum continuous rotor speed is not to exceed 3200 rpm. Higher intermittent speeds may be permissible after consultation with RWI/Torrent technical support.



## Mounting

The 30" SHARK is designed with an 8-bolt pattern for the purpose of anchoring a quick coupler to match that of recipient excavator. The dimensions of the deck plate and the bolting pattern are supplied in the following diagram of the 30" SHARK as viewed from the top of the unit.





## Hydraulic Connections

### Pressure Oil

The circuit relief setting of the pressure oil supply should be no less than 3000 psi (207 bar) to maximum of 5000 psi (345 bar). Motor torque is directly proportional to the value of the supplied pressure and so higher supplied pressure translates into increased performance and reduced time required to bring the rotor from dead stop to full speed. The minimum recommended pressure supply line size is  $\frac{3}{4}$ " (19mm) inside diameter and capable of withstanding pressure established by the circuit relief setting.

### Main Return Oil

Main return oil may pass back to tank through the directional control valve section from which the pressure oil is supplied. A more efficient configuration is to have the return oil circumvent the control valve directly back to tank thereby avoiding back pressure and heat generated due to throttling losses encountered in the directional control valve.



## Case Drain Oil

Under normal operating conditions, motor case drain circuit pressure should not exceed 10 psi (0.7 bar). Higher case drain pressure may be observed for short periods (i.e. cold start conditions) but should not be sustained. Sustained high case drain pressure will decrease the service life of the axial piston motor. The minimum inside diameter of the circuit connecting the hydraulic motor case drain port to the reservoir must be no less than ½" (12.5mm). Momentary "spikes" in case drain flow result from shock loading of the hydraulic motor when the mulching drum (typically rotating at over 3000 rpm) contacts, hard, immovable objects that are often not visible to the operator.

### *Case Drain Pressure Gauge*

A pressure gauge and "T" assembly is provided on the case drain line of the mulcher for the purpose of measuring drain circuit pressure during start-up. With the case drain line properly sized, routed so as to avoid restriction or pinch points and connected directly to the hydraulic oil reservoir, case drain pressure should not exceed 10 psi (0.7 bar) with the hydraulic system at normal operating temperature. **Filtering of the case drain is not recommended.** After confirming pressure is within specification, remove the "T" fitting with gauge and connect case drain hose directly to mulcher.



### ***Hydraulic Motor Case Over-Pressure Protection***

Hydraulic motor case over-pressure relief protection is standard on Torrent mulching attachments. If for any reason the case drain circuit become restricted due to a pinched case drain hose, blocked due to a disconnected coupling or failure to open an isolation valve, or exposed to excessive pressure due to improper installation, the motor shaft seal and casing are protected from damage by a low pressure relief valve connected to the motor casing. Should pressure in the motor case exceed 55 psi (3.6 bar), hydraulic oil is vented through the case over-pressure relief valve discharging to atmosphere through a port visible to the operator. Should oil be observed issuing from the case over pressure vent, the unit must be shut down and the cause of the over pressure be identified and corrected. Oil issuing from the vent while the excavator is running while the mulching pressure circuit is turned off indicates the pressure is being applied to the case drain circuit by the excavator and indicates that the case drain circuit has been connected to main return or at a point where system back pressure is present.

### **Hose Routing**

Hydraulic hoses must be routed in such a way as to prevent pinch points or excessive strain or tension. Once all three hydraulic hoses are connected between the mulcher and the boom of the excavator it is important to slowly extend/retract the bucket curl function from full curl out to stop and then full curl in to stop making certain that the hoses are clear of pinch points, abrasion or excessive tension. Hoses that are too long when bucket curl out to stop is reached are susceptible to being caught or torn off during mulching operations, the vast majority of which is conducted while the mulching drum is parallel to the ground. A typical routing of the mulcher hose group can be seen in figures # xxxxx

## Handling and Storage

When not in use the mulching unit should be stored so that it is not exposed to a standing level of water, snow etc. Covers should be removed and the unit drained of any accumulated water, hoses should be capped or covered to prevent corrosion or contamination and preservation oil or penetrant applied to internal components and cutter bolts to prevent corrosion and potential seizing.





## Key Components

### Parts List

Referring to the illustration (following page)

#### Part Number Description

3002000	30" Cutting Drum Assembly
2423000	1 1/2" Tool Holder
3027000	1 1/2" Round Cutter
3028000	1 1/2" Square Cutter
3005492	Cutter Hex Bolt ½" x 1 ½" UNF Grade 8 c/w ½" High Collar Lock Washer
3005493	Drum Shaft
3004001	Power Lock Coupling
3004001	Flanged Cartridge Bearing Assembly Idler
3004003	Flanged Cartridge Bearing Assembly Drive
3003000	Motor/Bearing Adapter SAE C
3007xxx	Hydraulic Motor (see Serial #)
3007002	Over-Pressure Protection Valve
3007004	Anti-Cavitation Valve Assembly
3004001	Drive End Cover
3004001	Idler End Cover
3004001	Bolt Kit





