Torrent EX30RPM

Owner's Manual

CONTENTS

12 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 SPECIFICALLLY 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.

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.

EX30RPM Operations and Maintenance

The EX30RPM 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 anti-cavitiation protection. 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 to a maximum diameter of 6 inches (15mm) and is to be used only in applications where personnel, property and roadways are greater than 150 meters from where the mulching equipment is being operated.

Audience

This user guide is written for operators who use and maintain the Torrent EX30RPM Forestry Mulching Attachment during **forestland 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 150 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 150 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 EX30RPM 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 EX30RPM must be in a ZERO ENERGY STATE (that is, the drum is stationary, the cutting frame is squarely

on the ground and prime mover (carrier engine) is shut down before being approached for inspection or maintenance).

WARNING: Because of the nature of the protective valve 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 competent, trained, qualified installation personnel. RWI Technical Inc. accepts no responsibility for damage or injury resulting from inadequate or improper installation of its products.

WARNING: This machine must be used only with the debris control guard (guards) in place. RWI Technical Inc. accepts no responsibility for damage or injury resulting from alterations to or removal of components from its products.

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

WARNING: The EX30RPM 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 EX30RPM 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 and roadways are greater than 150 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. It is imperative that the operator remains inside the operator's compartment at all times while the mulcher drum is turning.

For lighter growth, such as bush and smaller trees up to 40 mm, 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 up between the cutters and the frame to be ejected directly downward through the discharge side.

Feed Side

Larger trees, 40-150 mm or 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 practicable (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 tree top 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 away from the machine and operator.
4. Using slight down pressure, in conjunction with short smooth swings over the stem, the tree can be reduced to slightly below grade.
5. Using the feed side, reduce the top in much the same way as described above for lighter growth.

Discharge Side

Maintenance Schedule

Preventive maintenance chart

Checks and Services	Daily	Weekly (50 Hours)	Monthly (200 Hours)	Six Months (1000 Hours)
Check hydraulic conductors for leaks or damage	X			
Inspect hydraulic motor and drum shaft splines for wear				X
Check cutter fasteners torque (55 ft-lb, 75 Nm)		X		
Grease drum shaft bearings (4 shots each twice daily)	X			
Inspect bearings for excessive radial clearance or end play		X		
Inspect cutters for excessive wear or breakage	X			
Inspect hydraulic motor, anticavitation valve and hydraulic hose connections for leaks			X	
Inspect tool Holders for excessive wear or damage	X			
Grease motor/drum shaft spline (4 shots)	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 strongly recommended in Torrent Mulchers. Use of a compatible SPEED RATED alternative should be considered only after consultation with Torrent.

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/dm³]	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:	[mm²/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	

Speed range:	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

EX30RPM Technical Specifications

Operating weight (Standard)	780 lb/348 Kg
Cutting width	30 inches
Rotational speed	3500 RPM (nominal)
Carrier power requirement	50 Hp or 37 Kw (minimum)
Cutter type	Fixed spherical or fixed beaver
Cutter quantity	18
Drive type	Direct
Power transmission type	Hydraulic fluid power
Hydraulic motor type	Fixed axial piston
Maximum hydraulic system pressure	5000 psi/345 bar (maximum continuous)
Hydraulic oil flow requirement	25 usgpm/95 lpm (minimum)

Preventive Maintenance Instructions

This section provides the information necessary to ensure safe and effective maintenance of the EX30RPM 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. These conductors 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 four 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 four shots of grease to the grease fitting located on the idler end of the drum shaft.

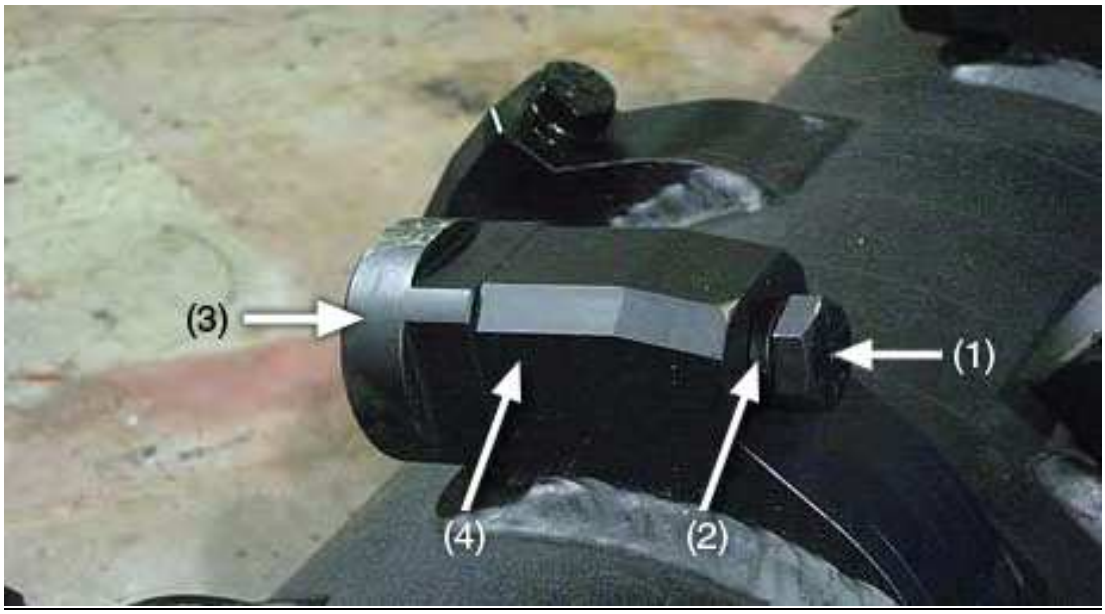
Inspect Cutters for Excessive Wear or Breakage

Inspect cutters for excessive wear or breakage. As cutters wear they become less efficient. Rotate cutters as required.

To rotate, or remove, a cutter perform the following steps:

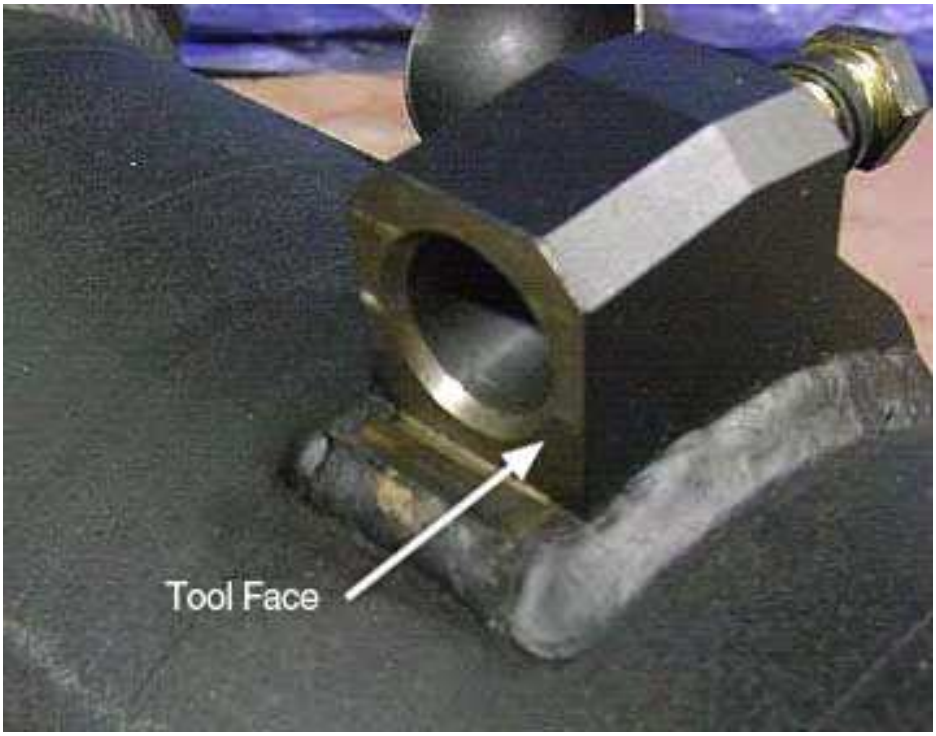
1. Remove the cutter fastener (1) and lock washer (2).
2. Remove the cutter (3) from the tool holder (4).
3. Turn 90 degrees, or as required, to expose a new cutting edge – if no new edges remain, replace the cutter with a new one.
4. Replace the cutter fastener and lock washer and torque to 75 Nm.

Do not use an impact wrench to tighten the cutters.



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.



Weekly – Every 50 Hours of Operation

Check Cutter Fasteners Torque

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

Inspect Bearings for Excessive Radial Clearance or End Play

With the unit squarely on the ground, or other flat solid surface, and with the carrier in a ZERO ENERGY STATE, place a pry bar between the drum and the surface upon which the unit is sitting. Check for excessive radial clearance. A small amount of clearance is built into the bearings (approximately 0.008" or 0.2mm). An audible clunk, or readily visible movement while moving the pry bar up and down, may indicate worn or damaged bearings.
Excessive end-play 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 is built into the bearing. If total axial play (in excess of 0.060" or 1.5 mm) is detected, bearings may be excessively worn or damaged and further inspection is required.

Monthly – Every 200 Hours of Operation

Inspect Hydraulic Motor and Anti-cavitation Valve 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.

Annually – Every 1000 Hours

Inspect Hydraulic Motor and Drum Shaft Splines for Wear

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, disconnect the hydraulic hoses from the motor, remove the four bolts mounting the hydraulic motor to the motor mount, and slide the hydraulic motor from the unit. Once removed from the unit inspect the hydraulic motor and drum shaft splines for wear and correct as required.

EX30RPM Installation

Installation of the EX30RPM must be carried out by a competent technician with training and experience in heavy equipment or industrial mechanics, with extensive knowledge of hydraulic fluid power systems and components. The technician must possess knowledge and/or documentation specific to the carrier to which the unit is to be fitted and should commence installation of the EX30RPM only after having read and understood the contents of this manual.

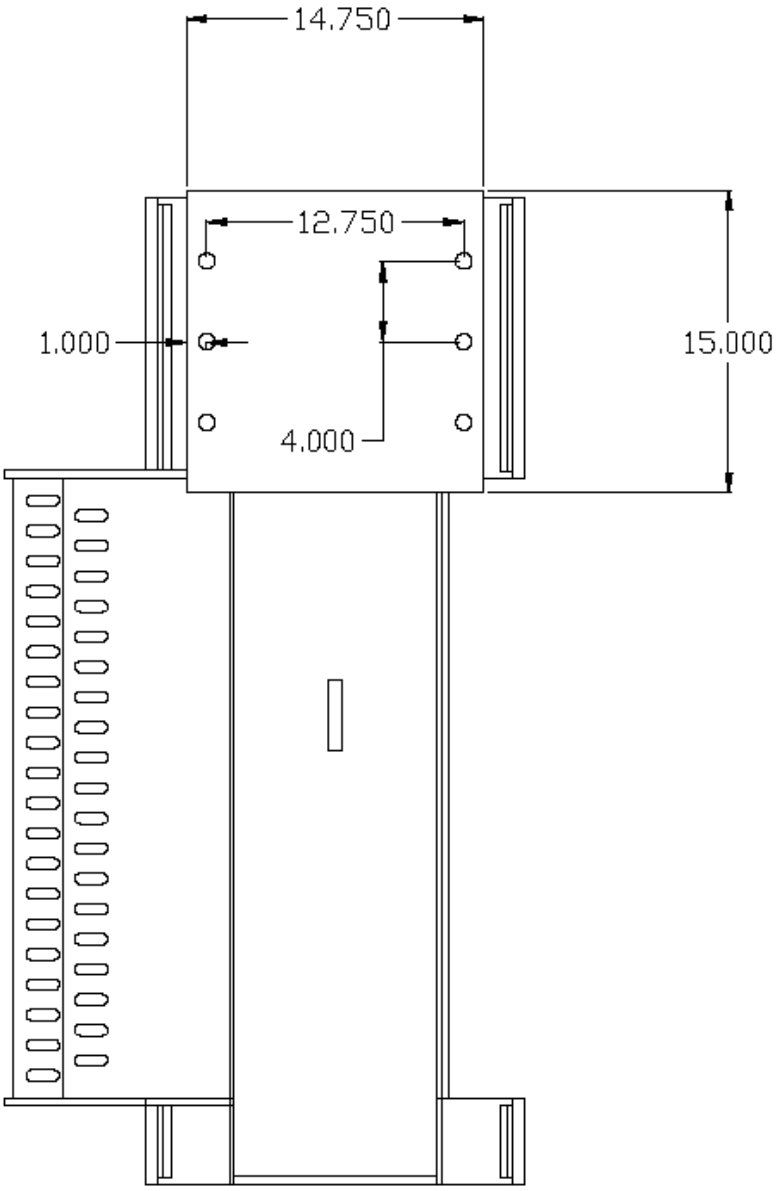
Warning: All installation and any other maintenance or mechanical procedures to be carried out on the EX30RPM must be performed with the unit resting squarely on the ground or other flat solid surface, and with the carrier in a ZERO ENERGY STATE.

The EX30RPM 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 motor is fitted with an anti-cavitation check valve. The motor/check valve assembly is located on the drive end of the unit and accessible only after removing the drive end compartment cover.

The unit's main shaft is fitted with a set of two double row spherical roller bearings rated for a total basic dynamic radial load of 9 tonnes. Limited by the bearing sealing system, the maximum continuous rotational speed of the EX30RPM cutting drum is 3500 rpm.

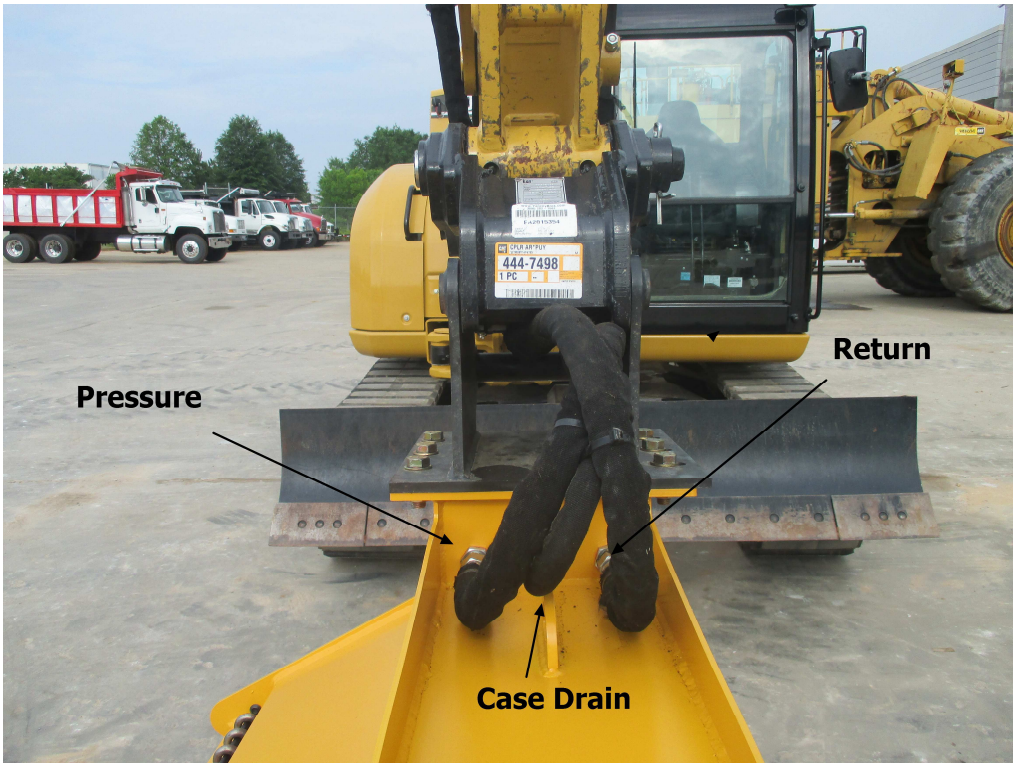
Mounting

The EX30RPM is shipped standard with a deck plate featuring a six bolt pattern for the purpose of anchoring a cap plate suited to the coupling system utilized by the carrier to which the unit is to be installed. The dimensions of the deck plate and the bolting pattern are supplied in the following diagram of the EX30RPM as viewed from the top of the unit.



Hydraulic Connections

The hydraulic conductor connecting points are accessible by removing the cover from the drive end compartment of the unit. Referring to the following figure the connection points are supply pressure, main return and case drain.



Pressure Oil

Main pressure oil should be supplied to the unit at a value as close to 5000 psi (345 bar) as possible for optimum performance. Motor torque is directly proportional to the value of the supplied pressure and so lower supplied pressure translates into decreased performance.

Main Return Oil

The main return oil line should ideally be connected to the main return header up stream of the hydraulic cooler. Alternatively the main return oil may routed directly to the hydraulic reservoir via a suitably sized auxiliary hydraulic oil filter system. Main returns are commonly allowed to return to tank through the directional control valve from which the pressure oil is supplied although this is the least efficient configuration due to increased back pressure and heat generated due to throttling losses through the directional control valve.

Case Drain Oil

Under normal operating conditions, motor case drain oil line pressure must not exceed 44 psi (3 bar). Momentary case pressure is acceptable under cold start conditions but must not exceed 73 psi (5 bar). Operation with case drain pressure in excess of the specified limits mat result in external leakage due to damage to motor seals, gaskets or housing.

Hose Routing

The EX30RPM is designed such that hydraulic hoses are routed from the connecting points on the cutting frame just below the edge of the deck plate and just behind the lifting lug as in the illustration on the previous page. Hoses can then be routed in a manner that suits the mounting/connection type and in such a way that pinch points are avoided. The following figure illustrates a typical quick attach cap plate and hose routing. Note extra height of quick attack side plates in order to allow passage of hoses beneath quick attach and inside quick attach for added protection.

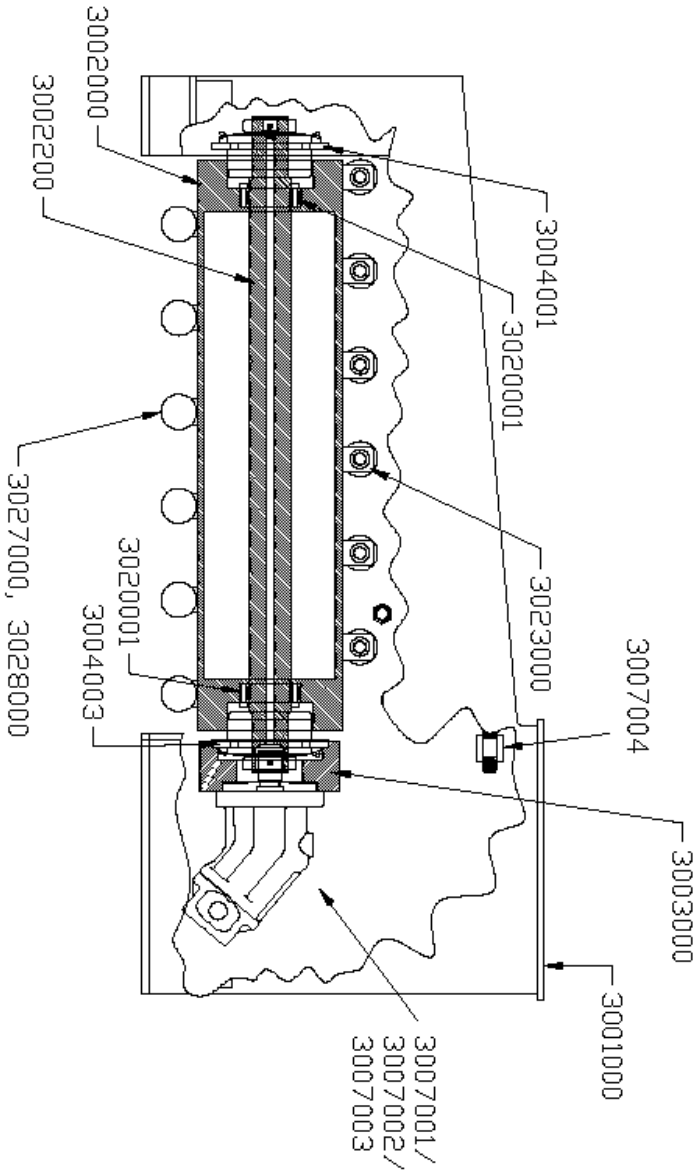
Handling and Storage

The EX30RPM comes standard with a steel lifting lug for ease of handling. When not in use the unit should be stored so that it is not exposed to a standing level of water, snow etc. Covers should be removed and unit drained of any accumulated water. For extended storage (a month or longer) bearings should each be pumped full of grease (20 shots minimum) so as to expel any moisture and reduce the risk of corrosion within the bearing assemblies

Key Components

Referring to the illustration (following page), key components are laid out in the context of the general assembly of the unit. A comprehensive parts listing may be found on the following page organized by assembly with a description, quantity, part number, manufacturer and generic information where applicable.

Part Number	Description
3002000	30" Drum
3020001	Powerlock 2 3/16"
3002200	30" Drum Shaft
4023000	1 1/2" Tool Holder
3027000	1 7/8" Spherical Cutter
3028000	1 7/8" Square Cutter
3001000	Cutting Frame
3004001	1 15/16" Flanged Cartridge Bearing Assembly Idler
3004003	1 15/16" Flanged Cartridge Bearing Assembly Drive
3003000	Motor/Bearing Adapter SAE "C"
3007001	Hydraulic Motor 23 cc
3007002	Hydraulic Motor 28cc
3007003	Hydraulic Motor 32cc
3007004	Check Valve Assembly 5000psi, 5 psi Open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