

RC3000

Rotavator

Service Notes

Servicing Recommendations

- These servicing recommendations are minimum requirements.
- Experience indicates that some operating conditions require additional and/or more frequent inspections.
- DAILY and WEEKLY SERVICE SCHEDULES are detailed as to the checks required but typically documented records of such checks would not be expected.
- 250 HR / YEARLY and 500 HR / BI-YEARLY SERVICE SCHEDULES have been detailed in a checklist format. These should be photocopied, completed and retained as a record of the machines maintenance history.
- For recommended grease and oil lubricants refer to Service Bulletins 32 and 40.
- Comments and requests for changes are appreciated.
- These forms (MS Word format) can be emailed or posted for your modification if required.
- Please contact Howard Australia if required:
 - Phone (02) 9674 2133
 - Fax (02) 9674 6263
 - Email Engineering@howard-australia.com
 - Post Private Bag 5, Post Office, SEVEN HILLS NSW 1730.

Misc Notes

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RC3000 DAILY SERVICE SCHEDULE

Universal Drive Shaft

Universal crosses - check for movement/wear.

Grease - While warm / after use. [Check all caps receive grease.]

Refer to Service Bulletin 32 for recommended greases.

Primary Gearbox

Check oil level.

Clean oil circuit strainer / Check for debris.

Side Drives

Check for oil leaks from rotor drive seals.

Check oil levels.

Rotor

Check for / replace broken, bent or excessively worn blades.

Centre Bearing

Check for oil leaks from rotor drive seals.

General

Overall check of fasteners, hitch pins, adjusting pins.

RC3000 WEEKLY / 50 HR SERVICE SCHEDULE

Universal Drive Shaft

Universal crosses - check for movement/wear.

Grease - While warm / after use. [Check all caps receive grease]

Sliding members - clean, check for wear, regrease.

Refer to Service Bulletin 32 for recommended greases.

Universal drive shaft guarding and safety decal.

Primary Gearbox

Check oil level.

Clean oil circuit strainer & filter. Check for debris.

Remove and clean breather.

Lateral Drive Shafts

Universal crosses - check for movement / wear.

Grease - While warm / after use. [Check all caps receive grease]

Side Drives

Check chain adjustment.

Check for oil leaks from rotor drive seals.

Remove breathers and clean.

Check oil level.

Check wear on side drive protection skid.

Rotor

Check for / replace broken, bent or excessively worn blades.

Centre Bearing

Check for oil leaks from rotor drive seals.

Check oil level.

Check wear on protection skid.

General

Overall check of fasteners, hitch pins, adjusting pins.

Safety guarding and decals are in place and functional.

RC3000 250 HR / YEARLY SERVICE SCHEDULE (& 1st 50 HRs)

Estimated actual hours worked _____ Service Date: _____

Universal Drive Shaft

- Universal crosses - check for movement / wear (replace if worn).
- Grease - While warm / after use. [Check that all caps receive grease]
- Sliding members - clean, check for wear (replace if worn), regrease.
- Refer to Service Bulletin 32 for recommended greases.
- PTO yoke - check lock pins for wear and function, lubricate with oil.
- (Lock pin damage can be caused by dirt or shaft members not sliding freely.)
- Universal drive shaft guarding and safety decal.

Primary Gearbox

- Clean oil circuit strainer & filter. Check for debris.
- Remove breather and clean.
- Remove gearbox rear cover and examine inside gearbox. Check:
 - Gears - markings indicate correct mesh and no pitting is evident.
 - Shafts - for excessive bearing endfloat, indicating wear or damage.
 - Oil condition - drain and refill if degraded (burnt / contaminated) or suspect.
- NOTE: Refer also to Rotavator Notes page 11 – 'Oil Change Interval'.**

Lateral Transmission

- Universal crosses - check for movement / wear (replace if worn).
- Inner transmission bearing - Grease 2 - 3 pumps maximum.

Side Drives

- Check input shaft seal for leaks.
- Check for oil leaks from rotor drive seals.
- Drain oil and remove covers. Check for debris.
- Sprockets, Chain, Adjuster skid and Bearings; Check for excessive wear or damage.
- Check wear on side drive protection skid.
- Remove breathers and clean.
- Reassemble covers and refill side drives with new oil.
- Refer to Service Bulletin 32 for recommended greases.

Rotor Centre Bearing Assembly or Non Drive Bearing

- Check for oil leaks from rotor drive seals.

General

- Overall check of fasteners, hitch pins, adjusting pins.
- Safety guarding and decals in place and functional.

Sign / Date: _____

RC3000 500 HR / BI-YEARLY SERVICE SCHEDULE

Estimated actual hours worked _____ Service Date: _____

Universal Drive Shaft

- Universal crosses - check for movement / wear (replace if worn).
- Grease - While warm / after use. [Check all caps receive grease]
- Sliding members - clean, check for wear (replace if worn), regrease.
- Refer to Service Bulletin 32 for recommended greases.
- PTO yoke - check lock pins for wear and function, lubricate with oil.
- Universal drive shaft guarding and safety decal.

Primary Gearbox

- Drain oil from gearbox and frame tube.
- Remove breather and clean.
- Clean oil circuit strainer & filter. Check for debris.
- Remove gearbox rear cover and examine inside gearbox. Check:
 - Gears - markings indicate correct mesh and no pitting is evident.
 - Shafts - for excessive bearing endfloat, indicating wear or damage.
- Re-fit cover and refill with new oil. Refer to Service Bulletin 40 for recommended oils.

NOTE: Refer also to Rotavator Notes page 11 – ‘Oil Change Interval’.

Shear Bolt Clutches

- Remove Shear bolts, check clutch rotates freely, check shear bush is not damaged at shear face.

Lateral Transmission

- Universal crosses - check for movement / wear (replace if worn).
- Inner transmission bearing - Grease 2 - 3 pumps maximum.

Side Drives

- Clutch assemblies, dismantle and check for worn plates.
- Check input shaft seal for leaks.
- Reassemble clutch. Re-set clutch adjustment just prior to work – especially in tropics.
- Check for oil leaks from rotor drive seals.
- Drain oil and remove covers. Check for debris.
- Sprockets, Chains, Adjuster skid and Bearings; Check for excessive wear or damage.
- Check wear on side drive protection skid.
- Remove breathers and clean.
- Reassemble and refill with new oil. Refer Service Bulletin 40 for recommended oils.

Rotor Centre Bearing

- Drain oil, inspect oil for metal particles or other debris. If oil shows significant metal particles or other contamination dis-assemble further as required. Replace lubricant.

General

- Overall check of fasteners, hitch pins, adjusting pins.
- Safety guarding and decals in place and functional.

Sign / Date: _____

Service Details

STANDARD FASTENER TIGHTENING TORQUES

(Bolts Zinc Plated – torque figures to give 65% of proof load.)

Standard Bolts	M10	M12 (i)	M14	M16	M20	-	-
Torque (Nm)	30	55	85	135	260		
Torque (ftlb)	20	40	65	100	190		

(i) M12 Bolts with nyloc nuts securing rubber shield and trailing boards should be tightened only until there is sufficient clamping force on rubber. DO NOT OVER-TIGHTEN (to the indicated torque) – especially with an impact gun.

SPECIAL FASTENER TIGHTENING TORQUES & TOOLS

Location	Part No.	Details	Tightening Torque	Locking	Tools
Input Shaft Rear Brgs	25658512A	C Nut M65	300 Nm 220 ftlb	Thread locking compound.	C Nut spanner to suit 85 dia
Pinion Shafts	F70-01-04	Hex Nut M55	400 Nm 300 ftlb	Thread locking compound plus deform collar.	65 (2.9/16") AF.
Output Shafts	25658512A	C Nut M65	Brg Adj.	Tab washer.	C Nut spanner to suit 85 dia
Top Side Drive Nut	307140140	Castle Nut M40 x 1.5	300 Nm 220 ftlb	Split Pin.	65 (2.9/16") AF.
Rotor Drive Axle Nut	650 018	Hex Nut M48 x 2	300 Nm 220 ftlb	Bellville Washer + Thread locking compound.	65 (2.9/16") AF.
Rotor Fixings	208056390 301116355	Bolts M16 x 1.5	200 Nm 150 ftlb	Spring Washer.	24 (15/16 ") AF.
Rotor Centre Brg Nut	208109150	C Nut M55	300 Nm 220 ftlb	Thread locking compound.	C Nut spanner to suit 75 dia.
Blade Bolts	762409	Bolt set. M16 x 1.5 Grade 12.9	240 Nm 180 ftlb	Spring Washer.	24 (15/16 ") AF.

DRIVE-SHAFT Drg Ref 613604		
Universal Crosses	<p>Check universals for wear / play.</p> <p>All caps must receive grease when lubricated - if one does not - investigate, clean or replace cross.</p>	Refer to Service Bulletin 32 for recommended greases.
Sliding Sections	Clean, check for play / damage and regrease.	Refer to Service Bulletin 32 for recommended greases.
End Yokes	Check lock pins are free and functional and are not damaged by shaft spline.	

GEARBOX Drg Ref 614300		
Gearbox Reassembly	<p>Refer Parts List pages for details.</p> <p>Backlash: 0.3 - .6mm (0.012" – 0.024")</p>	Refer to Service Bulletin 40 for recommended oils.

LATERAL TRANSMISSION & SIDE DRIVE Drg Ref 614258		
Jackshaft or Lateral Shaft	Nut securing top side-drive sprocket (307140140) holds sprocket, spacer, bearing and seal journal in axial position on shaft only. No adjustment of bearing preload is performed.	
Rotor Drive Axle	Removing and refitting rotor drive axle is best done by removing side drive back-plate from the machine and pressed in / out in a suitable press.	
Face Seal Fitting	<p>Clean rubber rings, seal seat and metal face seal with meths or alcohol.</p> <p>Position back-plate half of face seal into housing and apply a film of oil to working face.</p> <p>Position other half of face seal into axle and place axle gently into position and press through bearing – check that face seal does not fall from its seat in process.</p>	
Lubricant	<p>Regular lubrication changes are recommended as any wear metal and other debris in oil settles in the bottom where bearing and rotor seal are located.</p> <p>A basic ISO 460 or SAE 140 EP oil is adequate lubricant.</p>	

CENTRE BEARING Drg Ref 79107		
Oil Level / Drain Plugs	Note: Both level plugs (1 at front on LHS, 1 at rear on RHS) and drain plugs access the same oil cavity.	
Face Seal Fitting	<p>Clean rubber rings, seal seat and metal face seal seat with meths or alcohol.</p> <p>Position / press each half of face seal into housing.</p> <p>NOTE: The rubber ring of this face seal system can be difficult to get into seat as the seat profile with lip is prone to causing ring to extrude out rather than push into correct seated location. Press gently on seal working face, being careful not to damage or scratch it. A press ring design exists if required (202078070-FT) – the tapered bore constrains seal rubber ring and guides it past lip in seal seat.</p> <p>Seal halves, once in position are very secure and unlikely to fall out in process of pressing axle into housing.</p> <p>After positioning seal halves clean mating faces of steel seal face with meths or alcohol and apply a film of oil to face prior to final assembly.</p>	Do not use grease or oil on rubber rings for lubricant to help with pressing – meths or alcohol is suitable.

ROTORS Drg Ref 614252		
Refitting Rotors	<ol style="list-style-type: none"> 1. Ensure centre bearing assembly and mounting is secured. 2. Fix side drive back-plate c/w rotor drive axle to frame and lightly tighten. 3. Measure Rotor length. 4. Measure distance from Side Drive axle to centre bearing axle - ie where rotor fits between. 5. Shim back-plate out from frame with suitable flat washers or space rotor with P/N 109 317 as required. <p>Axial difference should be less than 1mm to prevent lateral loads being imposed on rotor support bearings.</p>	
Bends in Rotor	<p>Max. allowed = 6mm TIR.</p> <p>Smooth shallow bends - can be straightened by heating (use oxy-acetylene torch) tube at centre of bend on the outside of the curve then cool with water soaked sack. Repeat as required.</p>	