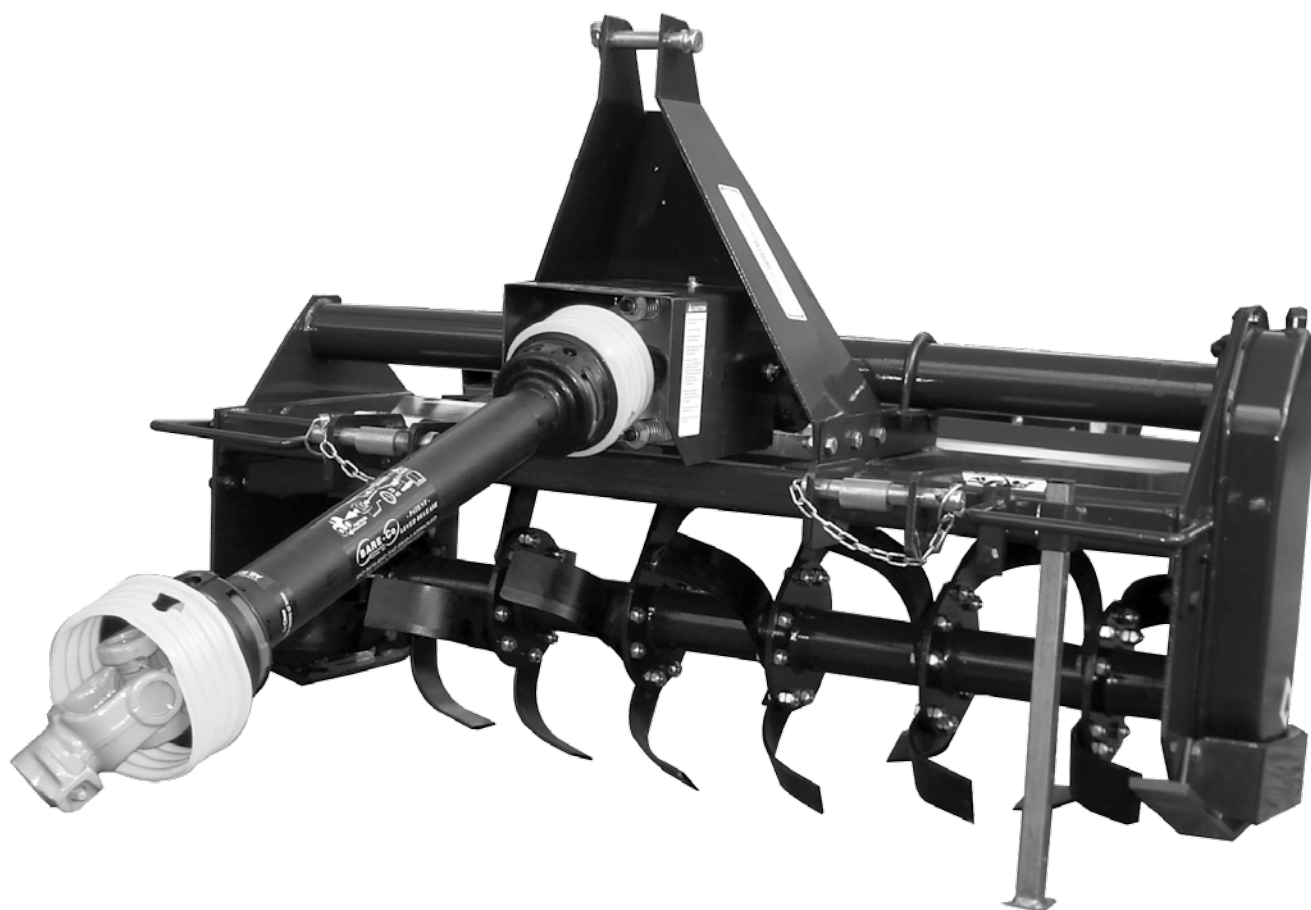




OPERATOR, MAINTENANCE & PARTS MANUAL

Rotary Hoe

RTM120 & RTM 150



* Image depicts 4ft Rotary Hoe RTM120

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Manufacturers statement: Due to continuing improvements Southern Cross Ag Machinery Pty Ltd reserves the right to modify machinery design and specifications provided herein without any preliminary notice. Information provided herein is of descriptive nature.

**WARNING**

READ THE OPERATOR, MAINTENANCE AND PARTS MANUAL
BEFORE USING THE ROTARY HOE.

INTRODUCTION

Southern Cross Ag Machinery Rotary Hoes are available in 4ft (45HP) and 5ft (45HP).

This manual contains valuable information about your new Rotary Hoe. It has been carefully prepared to give you helpful suggestions for operating, adjusting and servicing your Rotary Hoe. Keep this manual handy for frequent reference. All new operators or owners must review the manual before using the equipment and at least annually thereafter.

It is the owner's and/or operator's responsibility to;

- Read and understand the information contained in this manual.
- Operate, lubricate, assemble and maintain the equipment in accordance with all instructions and safety procedures in this manual.
- Inspect the equipment and replace or repair any parts that are damaged or worn which could cause damage, wear to other parts, or cause a safety hazard.

Please contact your Southern Cross Ag Machinery Dealer if you need any further assistance with your Rotary Hoe or additional copies of the manual. Visit our website www.sxm.com.au for a complete list of dealers in your area. You can also download additional copies of this manual from our website.

The directions left, right, front and rear, as mentioned throughout this manual, are seen as facing in the direction of travel of the implement.

SAFETY

Safety Instructions

Southern Cross Ag Machinery encourages good safety practices. Good safety practices not only protect you but also the people around you. Please ensure that everyone using this equipment is familiar with the recommended operating and maintenance procedures, has read and understood the Operators Manual and follows all the safety precautions. Most accidents can be prevented. Do not risk serious injury or death by ignoring good safety practices.

The alert symbol is used throughout this manual and on the product safety decals. This symbol indicates attention is required and identifies hazards concerning your personal safety and the safety of others. Please follow the recommended precautions.



The safety alert symbol means...
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



CAUTION

The Caution Symbol indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



WARNING

The Warning Symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



DANGER

The Danger Symbol indicates an imminently hazardous situation that, if not avoided will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

SAFETY continued

General Safety Guidelines

- Have a first-aid kit available for use and know how to use it.
- Have a fire extinguisher available, stored in a highly visible location and know how to use it.
- Wear appropriate protective gear. This list may include but is not limited to:
 - hard hat
 - protective shoes with slip resistant soles and steel caps
 - protective glasses or goggles
 - heavy gloves
 - wet weather gear
 - hearing protection
 - respirator or filter mask
- Read and understand the Operator's Manual and all safety decals before operating, servicing, adjusting, repairing or hitching the equipment.
- Do not attempt any unauthorised modifications to your Southern Cross Ag Machinery product as this could affect function or safety and could affect the life of the equipment.
- Never start or operate the Rotary Hoe except from the operator's station on the power unit.
- Inspect and clean the working area before operating. Remove all obstructions such as rocks, stumps and wire.
- Keep hands, feet, clothing, and hair away from moving parts.
- Ensure bystanders are clear of the area before operating. A minimum distance of 100 metres should be kept from all bystanders when Rotary Hoe is in operation.
- Never operate this equipment while using alcoholic beverages or drugs that can hinder alertness or coordination. Consult your doctor about operating this machine while taking any medication.
- Under no circumstances should children under the age of 18 be allowed to work with or around this equipment. Do not allow anyone to operate or assemble this equipment until they have read and understood this manual.
- This equipment is dangerous to anyone unfamiliar with its operation. The operator should be responsible, properly qualified and physically able person familiar with farm machinery and competent in this equipment's operation.
- All new operators or owners must review the manual before using the equipment and at least annually thereafter.
- In order to provide a clear view, certain illustrations in this manual may show an assembly with a safety guard removed. Equipment should never be operated in this condition. Keep all guards in place. If guard removal becomes necessary for repairs, reinstall the guards prior to use.
- Replace any safety decal that is not legible or is missing. The locations of such safety decals are indicated in this manual.
- Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question – DON'T TRY IT.
- In addition to the design of this implement, safety decals and safety equipment, accident prevention is dependent upon the awareness, common sense, forethoughts, and proper training of everyone involved in the operation, transport, maintenance and storage of the machine. Also refer to safety messages and operating instructions in each of the appropriate sections of the tractor manual. Pay close attention to the safety decals affixed to the tractor and the Rotary Hoe

SAFETY continued

Employer/Controller Responsibilities

OH&S legislation places obligations on the employer, or the controller of the Rotary Hoe, to identify the hazards and control the risks associated with the use of the Rotary Hoe in their workplace and to do so in accordance with the manufacturer's instructions.

When purchasing a Rotary Hoe:

- Ensure the manufacturer's instructions are provided at the point of purchase.
- Ensure the Rotary Hoe conforms to industry safety standards.
- Discuss your needs with the supplier, to ensure the Rotary Hoe is compatible with the power of your tractor and is appropriate for the intended application – consider the speed of your tractor's PTO and its compatibility with the Rotary Hoe's gearbox. See page 7 for details.
- Seek practical advice and instruction from the supplier on the use and limitations of the Rotary Hoe. If you are hiring, leasing or borrowing a Rotary Hoe on a temporary basis, get safe use instructions from the person supplying it.
- The employer must provide safety instructions to all those involved in using a Rotary Hoe.
- A copy of safety instructions must be kept in good condition with the Rotary Hoe.
- Generally, the safety instructions should be the manufacturer's instructions. Any variations from the manufacturer's instructions must be based on a risk assessment and must not remove any of the safety features nor expose anyone to risks.

Supervision, Instruction and Training

The employer must provide safe systems of work, adequate supervision, instruction and training to all those involved in using a Rotary Hoe. They must be instructed in the safe operation of the Rotary Hoe, including hazards specific to the workplace, including the terrain, stability of the tractor, working environment and the like. The employer should ensure that everyone achieves a level of understanding that enables them to safely and competently operate the Rotary Hoe.

Inspection, Maintenance and Repair

- The Rotary Hoe must be inspected according to the manufacturer's instructions, prior to use. See page 20 for Maintenance Instructions.
- All problems identified must be rectified, prior to use.
- The Rotary Hoe must be maintained according to the manufacturer's instructions.
- Replacement parts must be to the original manufacturer's specifications or their equivalent.
- Safety signs and decals should be legible, maintained and where necessary replaced.
- Repairs should be carried out by a competent person.
- When suspending the Rotary Hoe for maintenance or repair, whether attached to the tractor or suspended in another way, adequate safety stands must be used to prevent inadvertent lowering of the Rotary Hoe.

Service and Maintenance Safety

- Stop engine, set brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Support the equipment with blocks or safety stands before working beneath it.
- Follow good shop practices including:
 - keep service area clean and dry
 - be sure electrical outlets and tools are properly grounded
 - use adequate light for the job.
- Use only tools, jacks and hoists of sufficient capacity for the job.
- Replace and secure all shields removed during servicing before operating.
- Use heavy leather gloves to handle sharp objects.

SAFETY continued

Start-up Safety

- Do not let inexperienced operators or children use this equipment.
- Place all tractor and machine controls in neutral before starting.
- Operate only with Roll Over Protective System (ROPS) and seat belt equipped tractors.
- Do not operate inside a building unless there is adequate ventilation.
- Ensure all shields are in place and in good condition before operating.
- Stay clear of PTO shaft and machine when engaging PTO.

Operation

Prior to use, the Rotary Hoe should be inspected to ensure it is working correctly. All safety features must be included in this inspection. If any safety feature is not working correctly, the Rotary Hoe must not be used. The Rotary Hoe must be operated according to the manufacturer's instructions.

The operator must ensure that no-one is exposed to risks arising from the operation of the Rotary Hoe.

Additional safety controls may be required when operating in the vicinity of people or traffic – e.g. alongside highways, roads or other public areas.

Where adjustable or removable guarding is provided for specific applications, such as vineyards and horticulture, and the guarding has been removed or is no longer effective, appropriate control measures must be implemented. These controls must ensure that the risk of injury is eliminated or controlled. Before using a Rotary Hoe in an application other than that outlined above, the guards must be readjusted or replaced so as to be effective.

Operation Safety

- Do not permit riders.
- Do not wear loose fitting clothing during operation.
- Never operate over 540 PTO rpm speed.
- Never operate the equipment in the raised position.

Personal Protective Equipment (PPE)

Prior to use, a risk assessment must be undertaken to determine the appropriate PPE required. Any identified PPE must be provided by the employer and must be used by those involved in the operation and maintenance of the Rotary Hoe. Examples of PPE are appropriate footwear and hearing & eye protection.

Storage and Transport

When not in use, the Rotary Hoe must be transported and stored according to the manufacturer's instructions. Requirements may differ when transporting a Rotary Hoe within a property and on a public road – you must comply with all statutory requirements.

Storage Safety

- Store the unit in an area away from human activity.
- Do not permit children to play on or around the stored machine.
- Support the frame on stands and blocks to provide a secure base.

Transport Safety

- Review Transport Safety instructions in tractor manual before moving.
- Check with local authorities regarding transport on public roads. Obey all applicable laws and regulations.
- Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean, and can be seen clearly by all overtaking and oncoming traffic.
- Never have the equipment in operation during transport.
- Always travel at a safe speed.

SAFETY continued

Modifications

A Rotary Hoe should not be modified or altered. However, if it is necessary to make modifications, they must be done by a competent person and based on a risk assessment.

Before any modifications are done, contact the manufacturer or supplier.

Anyone who undertakes modifications subsequently assumes the role and responsibilities of the designer and manufacturer. This does not include shortening a PTO shaft and cover when first installing the Rotary Hoe on a tractor (refer to page 09 for details).

The instructions relating to the Rotary Hoe and its use may need to be revised following a modification.

Any modifications made without manufacturers approval will void Warranty.

Safety Signs

- Refer pages 18-19 for the approximate location and detail of safety signs.
- Keep all safety signs clean and legible and replace any that are damaged or missing.
- When original parts are replaced, any safety signs affixed to those parts should be replaced as well. Replacement safety signs are available from your local dealer.

Installation of Safety Signs

- To install safety signs, ensure the installation area is clean and dry. Decide on the exact position before you remove the backing paper. Remove the smallest portion of the split backing paper and align over the specified area. Carefully press in place.
- Slowly peel back the remaining paper and smooth the remaining portion in place. Small air pockets can be pierced with a pin and smoothed out.

TECHNICAL SPECIFICATIONS

MODEL	RTM120	RTM150
Working Width (cm)	120	150
Blades Shaft Speed (rpm)	210	210
Number of Blades	24	32
Tilling Depth (cm)	8-12	8-12
Tractor Power Range	20-45	35-45
Gross Weight (kg)	175	210

ASSEMBLY INSTRUCTIONS

Install gearbox safety guard backing plate to gearbox using the four supplied alan bolts.

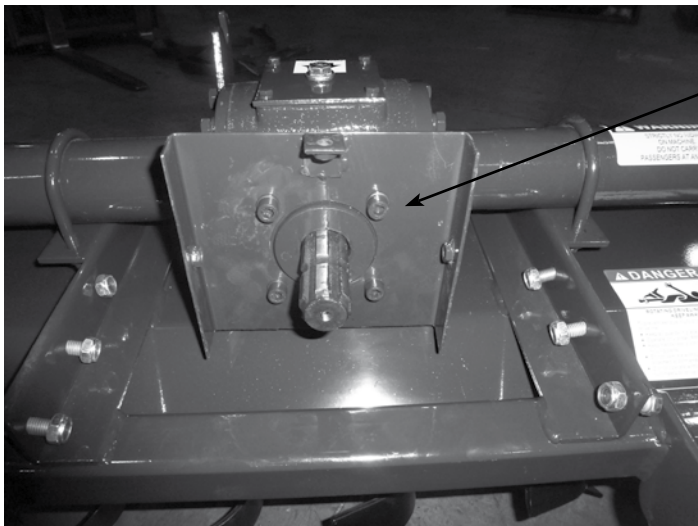


FIGURE 1

Install slip clutch (Figure 2) to gearbox input shaft and insert 2 x high tensile retainer bolts to clutch ensuring they pass through the groove of the gearbox input shaft. Tighten to 150ft / lb.

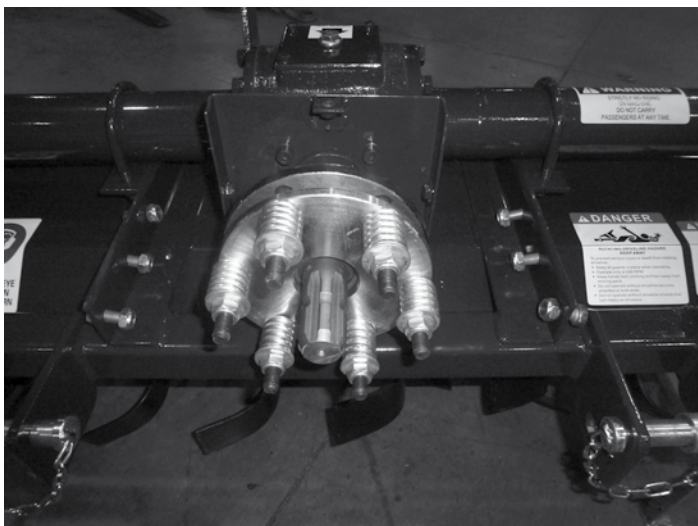


FIGURE 2



ASSEMBLY INSTRUCTIONS continued

Install clutch safety guard to backing plate using the three supplied bolts, flat and spring washers as per Figure 3.



FIGURE 3



FIGURE 4

Install three point linkage A frame to main body of Rotary Hoe using the six supplied high tensile bolts and nylock nuts see Figure 4.

The machine is shipped with the PTO shaft not installed. To install the PTO driveline on the machine, follow this procedure.

1. Clear the area of bystanders, especially small children.
2. Clean the splines on the yoke and the input shaft.
3. Align the splines on the yoke and the shaft.
4. Attach the driveline to the Rotary Hoe by depressing the tapered pin and sliding the yoke onto the slip clutch input shaft. Line up the pin with the groove in the slip clutch input shaft and fasten with the tapered pin by releasing when in correct position.
5. Be sure the yoke is locked in position. Pull on the yoke to be sure the pin clicks into position.
6. Be sure that the PTO shaft is the appropriate length for the tractor / Rotary Hoe combination. Refer to Driveline Dimensions Section for details. See page 09 for details.

ASSEMBLY INSTRUCTIONS continued

STEP 8 – PTO SHAFT FIRST FITTING

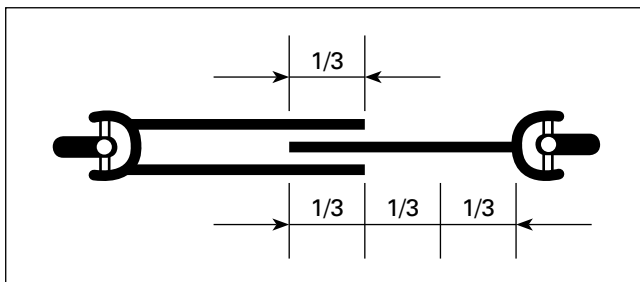
If tractor and Rotary Hoe have never been used together before, please follow the instructions below:

- Separate the inner and outer halves of the drive shaft.
- Attach the tractor end of the drive shaft to the tractor PTO output shaft and the Rotary Hoe half to the gearbox input shaft or slip clutch.
- With the Rotary Hoe in the operating position hold the shaft halves parallel to each other to check that the two sections of the drive shaft do not close completely nor extend to a point less than one third of the sliding section.
- Repeat Step (c) with Rotary Hoe in fully raised position.



WARNING!

Refer to *Maintenance Safety* (pg. 17) regarding working on or maintaining a Rotary Hoe when raised using the tractor three point linkage.



The diagram featured left shows the minimum engaged length for tri-lobal and 4-tooth style PTO shafts.

Note: Drawing unguarded schematic only. Never use a PTO shaft without approved safety guarding.

- If the PTO shaft is determined to be too long, cut equal amounts from both inner and outer half shafts and safety guards using a drop-saw or hacksaw. Remove any residual burrs or fillings from cutting and apply grease to both inner and outer shafts.
- If the PTO shaft is less than one third of the length of the engaged sliding section, please contact your dealer, as it may be necessary to replace with a longer drive shaft.



PRIOR TO OPERATION

BEFORE PUTTING ROTARY HOE INTO SERVICE IMPORTANT INSTRUCTIONS PRIOR TO OPERATING MUST BE FOLLOWED.

ROTARY HOE SHIPPED WITHOUT OIL IN GEAR BOX AND WITHOUT GREASE IN GREASE FITTINGS. UNIT MUST BE SERVICED BEFORE USING.

Fill Gearbox and chain drive housing using Multipurpose Gear Oil (85/140). For all Grease Fittings use a high-temp / multipurpose grease.

STEP 1

Place Rotary Hoe so that the machine is secure and level.

STEP 2

Remove the plug located at top of gearbox .

STEP 3

Fill gearbox using 1000ml of multipurpose gear oil.

STEP 4

Replace plug (located at top of gear box) and clean off any excess oil.

STEP 5

Remove plug located at the top of the chain drive housing.

STEP 6

Remove drain plug located at the bottom of the chain drive housing.

STEP 7

Fill chain drive housing with 2000ml of multipurpose gear oil or until oil leaks from bottom plug.

STEP 8

Grease the following points:

- *Both Universal Joints and Safety Guard grease points on the PTO Shaft.
- * Main bearing located on right side of machine

STEP 9

Inspect all guards to insure they are in good working order and properly secured. If not replace before using.

STEP 10

Check all bolts and nuts to insure they are tight and secure.

STEP 11

Set cutting depth of Rotary Hoe equally on each side using depth gauge skids.



CAUTION

DO NOT overfill gearbox. This could cause damage to oil seals and can cause permanent damage to the gearbox. Any defects or failures caused by overfilling will not be covered under warranty

PREPARATION



Never operate the tractor and Rotary Hoe until you have read and completely understand this manual, the Tractor Operator's Manual and each of the messages found on the safety decals on the tractor and Rotary Hoe.

Personal protection equipment including hard hat, safety glasses, safety shoes, hearing protection and gloves are recommended during assembly, installation, operation, adjustment, maintenance, repairing, removal, or moving the implement. Do not wear loose fitting clothing or jewellery and be sure to contain long hair around equipment.

PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without Rotary Hoes attached can often create enough noise to cause permanent hearing loss. We recommend that you use hearing protection at all times. Long-term exposure to noise levels over 80db can cause severe hearing loss.

NOTE: Hearing loss from loud noises (from tractors, chain-saws, radios, and other sources close to the ear) is cumulative over a lifetime, with no chance of natural recovery.

Always wear your seat belt. Serious injury or even death could result from falling off the tractor particularly during a rollover when the operator could be trapped under the ROPS or the tractor.

Clear area to be cut of stones, branches and other debris that might be thrown causing injury or damage.

Operate only in daylight.

Ensure Rotary Hoe is properly mounted, adjusted and in good operating condition.

Ensure that all safety guards and safety decals are properly installed and in good condition.

STARTING AND STOPPING SAFETY



Check the tractor master guard over the PTO shaft. Make sure it is in good condition and fastened securely to the tractor. Purchase a new guard if old guard is damaged or missing.

All tractors that are not equipped with a "live" Power Take Off (PTO) need to be equipped with an over-running PTO clutch. These are available through most farm machinery dealers.

NOTE: The addition of an over-running PTO clutch may change the length of the PTO driveline required. Pay extra attention to the instructions on the PTO driveline installation refer page 09. Be sure that the driveline system guarding is sufficient.

Rotary Hoe operating power is supplied from the tractor PTO. Refer to your tractor manual for PTO engagement and disengagement instructions. Know how to stop the tractor and Rotary Hoe quickly in case of an emergency.

The engine RPM should always be at idle speed when engaging the PTO. Once engaged and you are ready to start operating, increase the PTO speed to approximately 540RPM and maintain throughout the operation of the machine.

The use of this equipment is susceptible to certain hazards that cannot be protected against by mechanical means or product design. All operators of this equipment must read and understand this entire manual, paying particular attention to safety and operating instructions, prior to using.

Most accidents occur because of neglect or carelessness. Keep all assistants and bystanders one hundred metres from the operating Rotary Hoe. When machine is operated in populated areas where thrown objects could injure persons or property, operation must be stopped if anyone comes within one hundred metres.

The Rotary Hoe is designed for the use on tractors with 540-RPM power take off.

STARTING AND STOPPING SAFETY *continued*



Install and secure all guards and shields before starting or operating. The discharge guard, driveline guards including slip clutch safety guard and tractor guards should be used and maintained in good working condition. They should be inspected carefully daily for missing or broken cables, chain links, shields and guards. Worn items must be replaced at once to reduce the possibility of injury.

Disengage Power Take Off (PTO) and place tractor transmission in neutral before attempting to start engine.

Many varied objects, such as wire, cable, rope or chains can become entangled in the working parts of the Rotary Hoe. These objects could then swing outside the housing at a greater velocity than the blades. Such an occurrence is extremely hazardous. Inspect the area for such objects before operating. Remove any objects from the site.

Never allow the cutting blade to contact objects. Cut higher first, allowing Rotary Hoe to clear such hidden objects. Never assume an area is clear. Always check!

Always stop the tractor, disengage PTO, allow cutter blades to come to a complete stop, lower implement to the ground, set park brake, shut off the tractor engine and remove the ignition key before dismounting tractor. Never leave equipment unattended while the tractor is running.

Never place hands or feet in Rotary Hoe. Stay clear of all moving parts.

Do not reach or place any part of your body under the equipment until it is blocked securely.

Do not allow riders on the Rotary Hoe or tractor at any time. There is no safe place for riders.

Do not operate unless all personnel, livestock and pets are at least one hundred metres away to prevent injury by thrown objects. Never direct the discharge chute towards anyone.

Never operate tractor and Rotary Hoe under trees with low hanging limbs. Operators can be knocked off the tractor and then be run over by the Rotary Hoe.

The rotating parts of this machine have been designed and tested for rugged use. However, they could fail upon impact with heavy, solid objects such as steel, concrete, rocks or stumps. To reduce the possibility of property damage, serious injury or even death never allow the cutting blades to come in contact with such objects.

Stop Rotary Hoe and tractor immediately upon striking an obstruction. Turn engine off, remove key, engage park brake then inspect and repair any damage before resuming operation.

Stay alert for uneven terrain, holes, roots and other hidden hazards. Keep away from drop-offs and hazards that could cause roll-over. Use extreme caution and maintain minimum ground speed when transporting or operating on hillsides, over rough ground and when operating close to ditches or fences. Be careful and slow down when turning sharp corners and changing direction on slopes. Do not start or stop suddenly on slopes and avoid operating on steep slopes. In extremely uneven terrain, rear wheel weights, front tractor weights and / or tire ballast should be used to improve stability.

TRANSPORT SAFETY



Always observe state and local laws governing highway safety and the travel of farm machinery on public roads.

When driving the tractor and equipment on roads or highways use flashing amber warning lights and a slow moving vehicle (SMV) identification emblem. Do not exceed 20kph. Reduce speed on rough roads and surfaces.

Plan your route to avoid heavy traffic.

Always install transport locks, pins or brackets before transporting.

Do not drink and drive.

Be a safe and courteous driver. Always yield to oncoming traffic in all circumstances, including narrow bridges, intersections etc. Watch for traffic when crossing or operating in close proximity to roadways.

Use extreme care and maintain minimum ground speed when operating close to ditches and or fences. Be careful when turning sharp corners.

Never allow riders on either tractor or Rotary Hoe.

ATTACHING TO TRACTOR



WARNING

Never stand between tractor and Rotary Hoe while backing the tractor up to the hitch



STEP 1

Attach to tractor's three point hitch as described in the Tractor's Operator's Manual.

STEP 2

Apply any multipurpose grease to the outside of the male (inner) PTO shaft section.
Assemble PTO shaft and install on Rotary Hoe and tractor.

STEP 3

Pull shaft on the tractor side of the PTO shaft yoke to be sure it has locked in place. Make certain PTO shaft guards are in place and good working condition. Repeat this same process for the PTO shaft connection to the Rotary Hoe.



WARNING

Failure to install the retaining clip or quick coupler on the gearbox input shaft would allow the driveline to swing freely causing possible injury or death.



OPERATING INSTRUCTIONS

This Rotary Hoe has been designed for the cultivation of soft soils or previously prepared soils that are suitable for the operation of a Rotary Hoe. Use of your Rotary Hoe in hard or compacted soils may damage the Rotary Hoe and void your Warranty.

The Southern Cross Ag Machinery Rotary Hoe consists of a rotating drum that is equipped with bent blades for breaking up and levelling soil. The blades are turned through the soil while the machine moves over the working area. A Drag Shield is used to maintain a level seedbed. Rotational power to the drum is provided by the PTO on the tractor. The power is transmitted through the gearbox in the centre of the machine to the chain drive down the side.

The current operating speed is 1.2-1.5 km/hr. Exceeding this operating travel speed may cause irreparable damage and void your Warranty.

EQUIPMENT MATCHING

To insure the safe and reliable operation of the Rotary Tiller, it is necessary to use a tractor with correct specifications. Use the following list as a guide in selecting a tractor to use on the machine.

- Horsepower:** Use Table One as a guide in selecting a tractor horsepower appropriate for your width of machine. Use only small Agricultural tractors on this machine.

TABLE ONE – HORSEPOWER VS. WIDTH

MODEL	WIDTH	HORSEPOWER
RTM120	4ft (1.2m)	20-45
RTM150	5ft (1.5m)	30-45

EQUIPMENT MATCHING continued



ALERT!

Do not exceed the recommended horsepower levels. The use of excessive horsepower will void the Warranty.

2. **Three-Point Hitch:** The Rotary Hoe is equipped with a Category 1, 3-point hitch. Be sure the tractor 3-point hitch is in the Category 1 configuration. Install the lift arm blocks or shorten the stop chains to place the arms into the non-sway configuration. Refer to the tractor manual for details.
3. **Load Sensing Hydraulics:** Many newer tractors are equipped with "Loading Sensing" hydraulics. It is the responsibility of the operator to set the tractor hydraulic system to provide "float" on the 3-point hitch. the float feature will allow the machine to follow the ground contours during operation.
4. **PTO Shaft:** The tractor must have a 1-3/8" 6 spline 540 rpm PTO shaft to fit the driveline shaft supplied with the machine. Do not use shaft adapters or operate at any other speed. It is not recommended that a tractor with variable speed PTO's be used on the Tiller. Operating at speeds faster than 540rpm will overload the drivetrain and lead to early failures.

FIELD OPERATION

Each operator should review this section of the manual annually and as often as required to be familiar with the machine. When using, follow this procedure:

1. Review safety instructions refer page 02.
2. Attach the tractor to the machine.
3. Before going to the field review Transporting Section on page 5 and 13, pull into the field and position the machine in a level area.
4. Lower into working position.
5. Set the machine.
 - Depth: Use the Depth Gauge Shoes on each side to set the operating depth.
 - Drag Shield: Adjust the chain in the Adjustment Bracket to set the heights of the Drag Shield. Set the Drag Shield to just contact the tilled soil when operating.
6. Align the unit with the working area.
7. Starting Machine:
 - Run the engine at low idle
 - Slowly engage the PTO control to start the machine
 - Slowly bring the engine to the rated PTO speed. Never exceed rated speed.
 - Lower the machine to the ground and proceed down the field.
8. Stopping the Machine:
 - Slowly decrease engine speed to low idle
 - Raise machine out of the ground
 - Disengage PTO clutch slowly
9. Ground Speed: Travel can vary between 1.2-1.5km/hr depending on the soil and terrain conditions. It is the responsibility of the operator to note the condition of the job being done and set the speed to obtain a quality tilling job and maintain control of the machine. The speed can be increased to optimise tilling. Decrease speed if you want the soil worked to a finer texture.
10. Operating Hints:
 - Determine the moisture content of the soil before starting. Soil that is too wet will "clog up" on the rotor blades making tilling impossible. Sandy soils normally can be worked better than heavy clay or loam soils. It is the responsibility of the operator to determine the soil type and moisture content before starting. It may be necessary to wait for the soil to dry out before starting to work.
 - Always remove heavy crop cover, all grass and weeds, before starting to prevent rotor clogging.

FIELD OPERATION continued

10. Operating Hints (continued):

- The rotation of the tynes propel the machine in the forward direction. Always use the tractor transmission to control the speed of forward travel.
- Always disengage the PTO control and raise the machine out of the ground before depressing the master clutch on the tractor.
- Use low gear on the tractor to start the job. Increase the speed of forward travel only as the quality of the job and power available will allow.
- If the slip clutch slips, reduce the ground speed or raise the machine slightly out of the ground.

PREOPERATIONAL ADJUSTMENTS

Set tractor's lift control stop at a position that will prevent the PTO shaft from coming in contact with the front edge of the Rotary Hoe when it is at full lift. Consult your tractor manual for instructions.

STORAGE SAFETY



Following use, or when unhooking the Rotary Hoe, disengage the PTO, stop the tractor, set the park brakes, shut off the engine and remove the ignition keys.

Store the unit in an area away from human activity.

Do not park equipment where it can be exposed to direct contact with livestock for long periods of time. Damage to Rotary Hoe and or livestock could result. Make sure all parked machines are on a hard, level surface and that all safety devices are engaged.

MAINTENANCE SAFETY



Good maintenance is your responsibility.

- Follow good shop practices
- Keep service area clean and dry.
- Be sure electrical outlets and tools are properly grounded.
- Use adequate light for the job at hand.

Make sure there is ample ventilation. Never operate tractor engine in a closed building. The exhaust fumes may cause asphyxiation.

Before working on this machine, disengage the PTO, be certain all moving parts on attachments have come to a complete stop, shut off engine, set the park brakes and remove the ignition keys before attempting to perform maintenance.

Do not perform maintenance or work on the Rotary Hoe on uneven or sloping surfaces.

Never work under equipment unless Rotary Hoe is properly supported by blocks or stands under the body with appropriate approved weight capacity.

Always use personal protection devices such as eye, hand and hearing protectors when performing any service or maintenance.

Frequently tighten all bolts, nuts, screws and check to make certain unit is safe to operate.

When completing maintenance or service, make sure all safety guards and devices are installed before using the Rotary Hoe.

After servicing, be sure all tools, parts and service equipment are removed from the Rotary Hoe.

Do not allow debris, grease or oil to build up on any part of the machine.

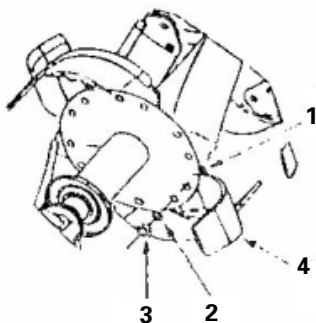
Where replacement parts are necessary for periodic maintenance and servicing, factory replacement parts must be used to restore your equipment to original specifications. Contact your local dealer or Southern Cross Ag Machinery regarding supply or replacement parts.

The manufacturer and / or distributor will not be responsible for injuries or damages caused by the use of unapproved parts and or accessories.

A first aid kit should be kept readily accessible while performing maintenance on this equipment.

CUTTING TOOL REPLACEMENT

1. Before changing the cutting blades, stop the engine of the tractor and after all moving parts have stopped, disconnect the PTO shaft.
2. Check the condition of each blade by carefully rotating the shaft. Screw down all the bolts (1 - refer image below), replace used or damaged cutting tools and bolts making sure of the correct orientation of the blades, install left and right (4) blades carefully, tighten bolts (1) with shim (2) if required and nut (3) and tighten bolt (1).



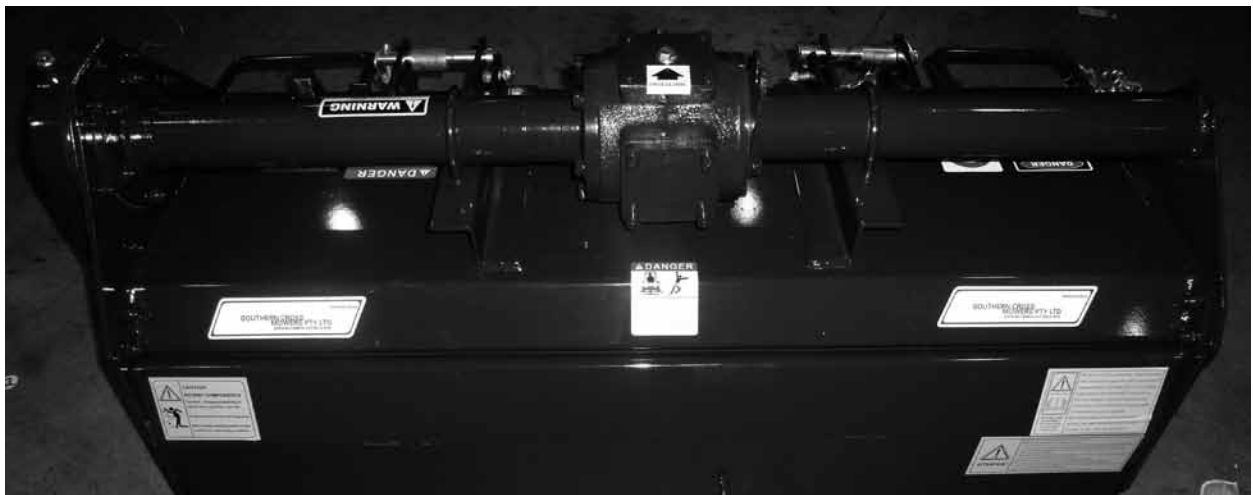
3. For best performance of the implement, use the original cutting tools only.

SLIP CLUTCH MAINTENANCE

To adjust slip clutch compress springs fully then back off two turns. Fine tune so that the clutch slips occasionally. Retention slip clutch clamp bolts after ten hours of use, then every 100 hours of use.

SAFETY DECAL LOCATIONS

The safety decals and their positions are shown on the picture bellow. Good safety requires that you familiarize yourself with the various safety decals, the type of warning and the area or specific function related to that area that requires your SAFETY AWARENESS.

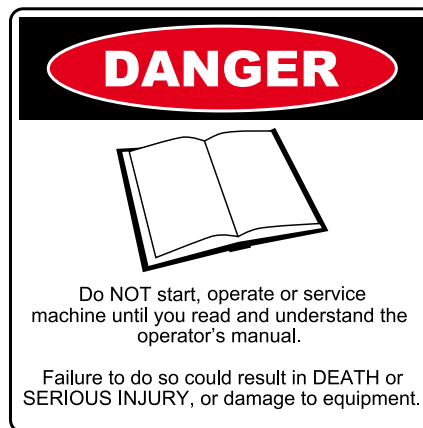


REMEMBER: If the safety decals have been removed or damaged new safety decals must be applied. Please contact Southern Cross Ag Machinery or your local dealer if you require new decals.

ROTARY HOE SAFETY DECALS



1



2



3



4



5



6



7

MAINTENANCE SCHEDULE

Southern Cross Mowers recommends that the following routine service / maintenance schedule be followed to ensure the efficient and safe operation of your Rotary Hoe. If followed this maintenance schedule will maximise the working life of the Rotary Hoe.

PRIOR TO FIRST USE OF ROTARY HOE

1. Check all bolts and nuts are tightened correctly
2. Check all hitch pins are securely locked
3. Ensure Quick Coupler Pins on the PTO shaft are secured correctly to both the Slip Clutch (Rotary Hoe end) and to the tractor PTO output shaft
4. Ensure slip clutch is set correctly
5. Check gearbox and chain drive housing oil level. Add oil if required
6. Check PTO shaft has been greased as per instructions listed on bottom of this page.

AFTER THE FIRST HOUR OF OPERATION

1. Check all bolts and nuts are tightened correctly
2. Check gearbox and chain drive housing oil level. Add oil if required.
3. Check that the blades are in good condition and bolted securely to the rotor.
4. Check that the PTO driveline shield spins freely.
5. Lubricate all the grease points.

AFTER EVERY EIGHT HOURS OF OPERATION

1. Grease PTO shaft as per instructions listed on bottom of this page.
2. Check blades for signs of damage or excessive wear. Replace if necessary
3. Ensure blade retaining bolts and self locking nuts are not damaged and are tight
4. Check Clutch settings and make adjustments if necessary
5. Check for any debris from cutting or items such as wire are not built up around blades and main drive drum.
6. Clean Rotary Hoe and remove any debris that has built up on the Rotary Hoe.

AFTER EVERY 40 HOURS OF OPERATION

1. Complete all processes as per eight hour service
2. Check all bolts and nuts are tightened correctly
3. Check all hitch pins are securely locked
4. Check PTO shaft universal joints for any signs of wear. Replace any worn components if required.

ANNUALLY

1. Replace gearbox and chain drive housing oil.

PTO SHAFT MAINTENANCE

PTO shaft universal joints and telescopic sections should be greased with a good quality high temperature grease similar to (MP) Multipurpose Chassis Grease every 20 hours for average conditions. In severe operating conditions grease should be added every eight hours.

Safety guard bearings should be lubricated by applying general purpose grease to the plastic grease nipples on the bell guards every 20 hours.

REPLACING BLADES

It is recommended that whenever blades require replacing on a Southern Cross Ag Machinery Rotary Hoe the following components also be replaced. Blade retainer bolts and nylock nuts. Bolts must be tightened to 350 ft. /lb. These are listed in the Parts List on page 24 of this Manual. Ensure that blades are installed in the correct orientation. Specifications are also detailed and must be replaced using genuine Southern Cross Ag Machinery parts. Please contact your local dealer or Southern Cross Ag Machinery for any parts required.

TROUBLE SHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Gearbox overheating	1. Low on lubricant	Fill to proper level
	2. Improper type of lubricant	Replace with proper lubricant
	3. Excessive debris build-up	Remove debris around gearbox
Rotary Hoe will not cut all the time	Slip clutch is slipping	Adjust slip clutch according to instructions
Rotary Hoe moves from side to side when cutting	Loose tractor sway chains, bars or sway blocks improperly installed	Adjust sway chains, bars or sway blocks
PTO contacts Rotary Hoe front frame when raised	Raising Rotary Hoe too high or incorrect adjustment of tractor top link	Adjust top link or tractor lift stops
Blade bolts come loose	1. Bolts not tightened	Tighten bolts to 350 ft. /lb
	2. Blade bolt threads are worn or damaged.	Replace blade bolt, washer, nylock nut
Blade wears too fast	1. Cutting in sandy conditions	Increase cutting height
	2. Cutting in rocky conditions	Increase cutting height
Rotary Hoe seems to require excessive power	1. Advancing into grass or bush too rapidly	Reduce forward travel speed
	2. Worn or dull blades	Replace blades
	3. Tractor not large enough	Use higher HP tractor (45HP max)
Excessive vibration	1. Check gearbox bolts	Tighten if loose
	2. Check for loose nuts on all components	Tighten if loose
	3. Check to see if blades are tight	Bolts and tighten retainer nylock nuts to 350 ft. / LB
	4. Blade broken	Replace blades in sets
	5. New blade or bolts matched with worn blade or bolts.	Replace blades and bolts in sets
	6. Wire or rope wrapped around blade drum.	Remove wire or rope
	7. Blades worn and are out of balance.	Replace blades in sets
Gearbox noisy	1. Rough gears	Run in or change gears
	2. Worn bearings	Replace bearing
	3. Low oil in gearbox	Check level and add oil.
Gearbox leaking	1. Damaged oil seal	Replace seal
	2. Bent shaft	Replace oil seal and shaft
	3. Shaft rough on oil seal area	Replace or repair shaft
	4. Oil seal installed incorrectly	Replace seal and install correctly
	5. Oil seal not sealing in the housing	Replace seal or use a sealant on outside diameter of seal
	6. Oil level too high	Drain oil to proper level
	7. Hole in gearbox	Replace gearbox
	8. Gasket damaged	Replace gasket
	9. Bolts loose	Tighten bolts



FOR FURTHER INFORMATION

WorkCover NSW

Visit www.workcover.nsw.gov.au

Call the WorkCover Assistance Service on **13 10 50**

Call the WorkCover Publications Hotline on **1300 799 003**

Visit your nearest WorkCover office.

For technical specifications on Rotary Hoes, contact your local manufacturer.

SafeWork South Australia

GPO Box 465

Adelaide SA 5001

Help Centre: **1300 365 255**

Website: www.safework.sa.gov.au

Workplace Health and Safety Queensland, Department of Justice and Attorney-General

GPO Box 69

Brisbane QLD 4001

Workplace health and safety infoline: **1300 369 915**

Electrical Safety infoline: **1300 650 622**

Website: www.worksafe.qld.gov.au

WorkSafe Victoria

Advisory Service 222

Exhibition Street

Melbourne VIC 3000

Telephone: **03 9641 1444**

Toll free: **1800 136 089**

Email: info@worksafe.vic.gov.au

Website: www.worksafe.vic.gov.au

WorkSafe Western Australia

1260 Hay Street

West Perth WA 6005

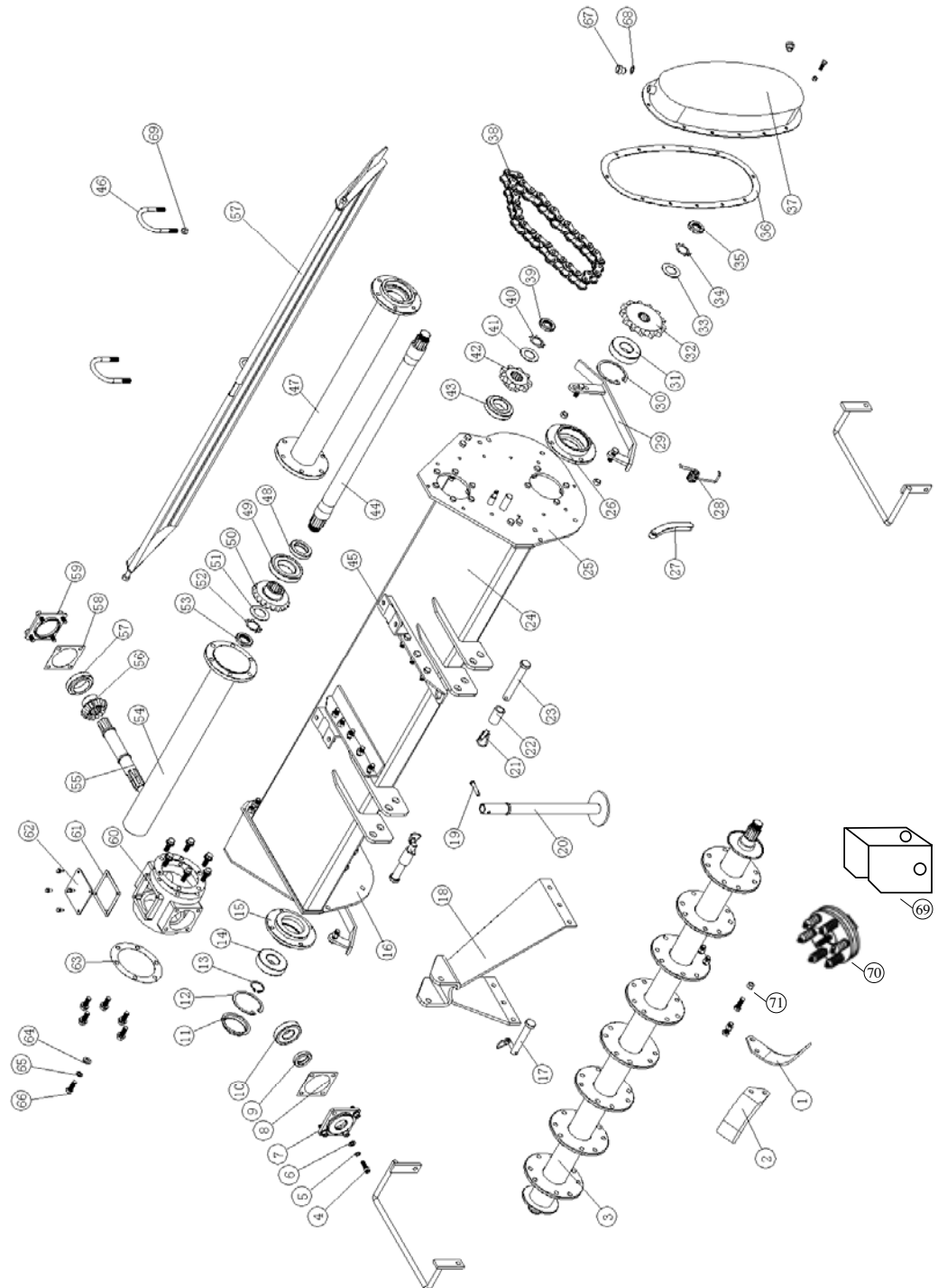
Telephone: **08 9327 8777**

Toll Free: **1300 307 877**

Email: safety@commerce.wa.gov.au

Website: www.worksafe.wa.gov.au

ROTARY HOE PARTS DIAGRAM



ROTARY HOE PARTS LIST

PARTS NUMBER	DESCRIPTION	QUANTITY
1	Left-bent blade	16
2	Right-bent blade	16
3	Blade shaft	1
4	Bolts	8
5	Stop Washer	8
6	Washer	8
7	Cap	1
8	Oil seal ring	2
9	Oil seal	1
10	Bearing	1
11	Cover	1
12	Eyelet washer	1
13	Shaft washer	1
14	Bearing	2
15	Bearing seat	1
16	Side board	1
17	Dowel	1
18	Shield protective cover	1
19	Dower	1
20	Stay bar	1
21	Dower	3
22	Sheath	2
23	Dower	2
24	Cover	1
25	Side Board	1
26	Bearing seat	1
27	Tension plate	1
28	Spring	1
29	Anti-friction plate	2
30	Eyelet washer	1
31	Bearing	1
32	Big sprocket wheel	1
33	Washer	1
34	Stop washer	1
35	Circular nut	1
36	Oil seal ring	1
37	Side chain gearbox	1

ROTARY HOE PARTS LIST continued

PARTS NUMBER	DESCRIPTION	QUANTITY
38	Chain	1
39	Circular nut	1
40	Stop washer	1
41	Washer	1
42	Small sprocket wheel	1
43	Bearing	1
44	Second shaft	1
45	Angle iron	2
46	U-Bolts	2
47	Main frame pipe	1
48	Oil seal	1
49	Bearing	1
50	Big bevel gear	1
51	Washer	1
52	Stop washer	1
53	Circular nut	1
54	Main frame pipe	1
55	First shaft	1
56	Small bevel gear	1
57	Bearing oil sealing	1
58	Oil seal ring	1
59	Cap	1
60	Immediate gearbox	1
61	Oil seal ring	1
62	Cap	1
63	Oil seal ring	1
64	Washer	12
65	Stop washer	12
66	Bolts	2
67	Oil plug	2
68	Oil seal ring	2
69	Slip clutch safety guard	1
70	Slip clutch	2
71	Blade retainer bolts & nylocks 8.8 grade	RTM120 x 48
	Blade retainer bolts & nylocks 8.8 grade	RTM150 x 64



WARRANTY

Southern Cross Ag Machinery warrants all their products against defective workmanship and, or materials for a period of twelve (12) months from the date of purchase. A three-year extended warranty program applies to gearboxes supplied with the following products; Rotary Hoes, finishing mowers and post-hole diggers sold from June 25th 2009. For attachments used in commercial enterprises the Warranty period is six (6) months on all components with the exception of components that are not included as per the detailed listed in the next paragraph. Proof of purchase plus proof of the defect will be required and must be received by Southern Cross Ag Machinery within seven days of product failure and prior to the end of the twelve (12) month period from date of purchase. A *Warranty Claim Form* MUST be lodged through the Dealer where the item was purchased. A *Warranty Claim Number* will be issued. Work commenced without a Claim Number issued and therefore warranty approval will not be covered by Southern Cross Ag Machinery.

Southern Cross Ag Machinery takes no responsibility for the repair of any products rendered defective or damaged through normal wear and tear or incorrect use of the product. Southern Cross Ag Machinery does not provide warranty on any cutting blades, tilling / hoe blades, rippers, scarifiers, tynes, tyres, clutch plates, friction plates, V-belts and Post Hole Digger cutting bits. Southern Cross Ag Machinery does not provide warranty on any products that have undergone modification. Southern Cross Ag Machinery reserves the right to determine whether the product is defective. Southern Cross Ag Machinery does not accept responsibility for any product which is damaged in transit. Faulty parts may need to be returned to Southern Cross Ag Machinery as part of the Warranty process. Freight costs each way will be paid by the owner / purchaser of the product.

Purchasers, dealers or agents of the Southern Cross Ag Machinery product are not authorised to give warranty on behalf of Southern Cross Ag Machinery. Claims will only be recognised, if lodged as outlined on page 29 in the *Warranty Process*. Any work commenced without Southern Cross Ag Machinery approval will not be honoured.

Product specifications are subject to change due to our company's policy of improvement. Design changes and improvements maybe made by Southern Cross Ag Machinery whenever it believes the effectiveness of its products can be improved. Southern Cross Ag Machinery has no obligation to incorporate any improvements to products, which are currently in service or have been supplied.

REGISTER YOUR WARRANTY

To register your Warranty please ensure the dealer from where the product has been purchased completes the *Southern Cross Ag Machinery Installation / Warranty Registration* Form. This triplet document needs to be signed by the purchaser. One copy remains with the Dealer, one copy needs to be mailed to Southern Cross Ag Machinery (Rear 18 Parramatta Road, Homebush NSW 2140) and one copy will remain with the purchaser for your reference.

If you have any queries regarding the warranty of your Southern Cross Ag Machinery product please call our office Tel. (02) 9746 9060 or email sales@sxm.com.au.

WARRANTY PROCESS

1. Contact your dealer or point of purchase who will contact Southern Cross Ag Machinery.
2. Photos and or video footage may be required to process your claim with a short description of the problem. This will be lodged through your dealer or point of purchase by the completion of the Southern Cross Ag Machinery *Warranty Claim Form*.
3. The claim will be assessed by Southern Cross Ag Machinery to determine whether the warranty claim will be approved. This can take up to five working days from when Southern Cross Ag Machinery is first notified of the problem and proof of product failure along with *Warranty Claim Form* is supplied.
4. If the *Warranty Claim* is approved a *Warranty Claim Number* will be issued to the Dealer.
5. Any work commenced without approval from Southern Cross Ag Machinery and without a *Warranty Claim Number* will not be covered by Warranty. Repairs must be made by Southern Cross Ag Machinery or an authorised dealer. Southern Cross Ag Machinery reserves the exclusive right to determine whether it will pay labour costs for warranty repairs or replacements and the amount of such costs that it will pay and the time in which the repairs will be made. Southern Cross Ag Machinery will not approve invoices sent for repairs that Southern Cross Ag Machinery has not previously approved.
6. Travel and freight charges associated with the processing of the *Warranty Claim* will not be covered by the Southern Cross Ag Machinery Warranty and is the responsibility of the owner / purchaser.

DISCLAIMER

Whilst information is true at time of printing actual product may differ slightly from the product described herein due to our company's policy of improvement. Errors and omissions may happen from time to time, we apologise for any inconvenience should this occur. Products may differ slightly in appearance to illustrations / photographs provided.

SOUTHERN CROSS AG MACHINERY
REAR 18 PARRAMATTA ROAD, HOMEBUSH NSW

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WWW.SXM.COM.AU

AUTHORISED SXM DEALER

