

ROTOBEC

LOG GRAPPLES MEDIUM DUTY



OPERATOR'S MANUAL

Rotobec is proud to offer our customers a toll-free service and technical support line. You will be directed to your designated branch with service reps ready to assist. Our expert technical staff is available for all of your questions relating to installations, operation and maintenance.

CALL US TOLL FREE 1 855 383.3002



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Labels



This label points out a useful fact.



DANGER. This label identifies a hazard or unsafe practice that will result in severe personal injury or death.



WARNING. This label identifies a hazard or unsafe practice that could result in severe personal injury or death.



CAUTION. This label denotes an instruction which, if not followed, could severely damage components.

Table of Contents

Safety Guidelines	7
General Guidelines.....	7
Service and maintenance guidelines	8
Product Description	11
Functional Description	11
Product Identification	12
ID Plate	13
Technical Data	14
Storage	17
After Storage	18
Maintenance	19
Cylinder Maintenance	21
Handling of the Attachment	24
Troubleshooting	25

About This Manual

This manual contains instructions for the operation, maintenance and installation of your Rotobec attachment. The parts and components used in Rotobec products are specifically designed and manufactured to ensure the highest standards of performance and durability.

The illustrations, technical information and specifications within this manual were accurate at the time of printing. However, we reserve the right to revise specifications, instructions, and design.

All service and repairs should be carried out by qualified service personnel or an authorized repair shop with suitable tools and lifting devices.

If you have questions about information in the manual, please consult the nearest Rotobec branch (for a list of branches, see the back cover).



WARNING Rotobec assumes no liability or responsibility for the damages or injury that may arise as a result of **not** following the instructions in this manual or for the improper use of the Rotobec attachment.



IMPORTANT Before operating, servicing or performing any maintenance on this product, Rotobec recommends that you always refer to and follow the standard *ASMEB30.20-2010 "Below the hook lifting devices"* to maximize the safety of your operations.

Safety Guidelines



WARNING! This section provides guidelines to help provide for the safety of the people working with and around the grapple and to prevent damage to the grapple. You should read and understand these guidelines and warnings of the potential for serious personal injury or death. Rotobec assumes no liability or responsibility for injury or damages that may arise if these guidelines are not followed.

General Guidelines

- Follow all federal and state or provincial safety regulations for hydraulic mechanisms, lifting devices, grapples, spillage, and disposal of hydraulic oil.
- This manual should be stored in an area so that all personnel have ready access to these safety and maintenance guidelines at all times.
- Rotobec attachments should be operated only by qualified knowledgeable personnel.
- Whenever conditions, environment or circumstances cause there to be any doubt to safety, operators should refrain from handling a load and consult a designated person.
- After installing the attachment on the loader/carrier, at the beginning of each shift, or following maintenance, always test all functions of the attachment before starting to work.
- Operators must be aware that a load or partial load could fall at any time due to inadvertent activation of controls or otherwise.
- An attachment should never be loaded in excess of its listed capacity or used to handle any load for which it is not designed.
- Loads must be appropriate for the attachment and carefully distributed.
- The operator shall not ride, nor shall he allow others to ride any attachment.
- Do not allow the attachment or load to come into contact with any obstruction.
- Never leave a suspended load unattended.
- Before leaving, attempting to lock out, turning off or otherwise stop use of the machine, the operator should land any attached load and place it on a firm base.

Service and maintenance guidelines

- Installation, removal, service and repair of all attachments and other components must be performed only by qualified personnel, wearing appropriate personal protective equipment (including safety glasses).
- Welding on the grapple can cause structural damage. Before welding on the grapple:
 - Contact your Rotobec representative for authorization.
 - Clean the area around the welding area to eliminate any fire hazard and make sure fire-extinguishing equipment is available.
 - Disconnect the ECU power plug, both battery cables, radio, and all electric throttle and alternator connection of the carrier.
 - Place the ground wire as close to the welding area as possible and make sure the ground wire does not make contact with a moving part of the grapple, loader or excavator (slewing ring, bearings, bushings, hydraulic swivel joint, etc.
 - When welding close to bushings, disassemble them and remove the Nitrile seals. When reassembling the bushings replace the nitrile seals with new ones, if necessary.
- Loose or over-torqued bolts can cause parts to separate which can result in property damage, severe injury or death. Keep the bolts correctly torqued by inspecting the nuts and bolts regularly according to the maintenance Section. Refer to your *Parts Manual* for torque specifications.



CAUTION!

- The owner and the operator are responsible for following all safety regulations and that the machine is appropriately equipped and in safe operating condition.
 - Appropriate personal protective equipment should be worn at all times when working on or around the grapple.
 - Check the machine for damages at the beginning of each shift.
 - Make sure that the hydraulic pressure and flow in the grapple cylinder is adjusted according to specifications. If the pressure is too low, the grapple will not be able to carry its load. If the pressure is too high, the grapple will be overloaded, which could result in structural failures, personal injuries and also void the warranty of the equipment.
 - All service and repairs must be performed by qualified personnel with suitable tools and lifting devices at an appropriate service facility location.
-



DANGER! Hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness, gangrene or death. Fluid leaks under pressure may not be visible. **Wear gloves and a face shield or safety goggles. Use a piece of cardboard or wood to find leaks.** Do not use your hand. If any fluid is injected into the skin, it must be surgically removed within a few hours by medical personnel familiar with this type of injury.

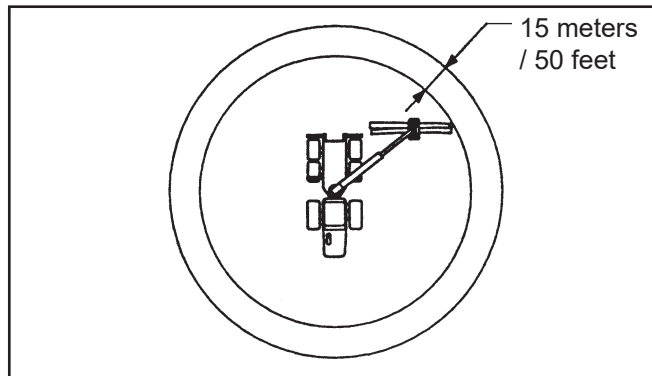


WARNING! Hot hydraulic oil can cause severe burns. **DO NOT** work on the hydraulic system if oil temperature exceeds 120°F (49°C).



DANGER!

- When operating this equipment ensure all other personnel remain outside the danger zone, which means at least 50 feet / 15 meters from the work zone. See figure below “work zone”.
- The operator must be aware that a load or partial load could fall at any time due to an inadvertent activation of the controls or otherwise.
- Stop all operations immediately if any bystanders enter the work zone.



Work Zone

Power Line Guidelines

To prevent the loader from contacting a power line, do the following:

- Before starting the loader, inspect the work area for power lines that you might have to work under.
- If necessary, contact the utility company responsible for electricity in the work area and request that the power in that area be disconnected.
- Treat all power lines as live and dangerous.



WARNING! Keep a distance between power lines and all parts of the loader, the load, and the carrier according to this formula: twice the line insulator length plus 10 feet (3 m).

For example: if the line insulator is 6 inches (0.15 m) long, the distance to keep away is $2 \times 6 \text{ inches (0.25 m)} = 12 \text{ inches (0.30 m)}$ (1 foot) plus 10 feet (3 m), which equals 11 feet (3.35 m). You must stay at least 11 feet (3.35 m) from the power line (see *Figure 3*).

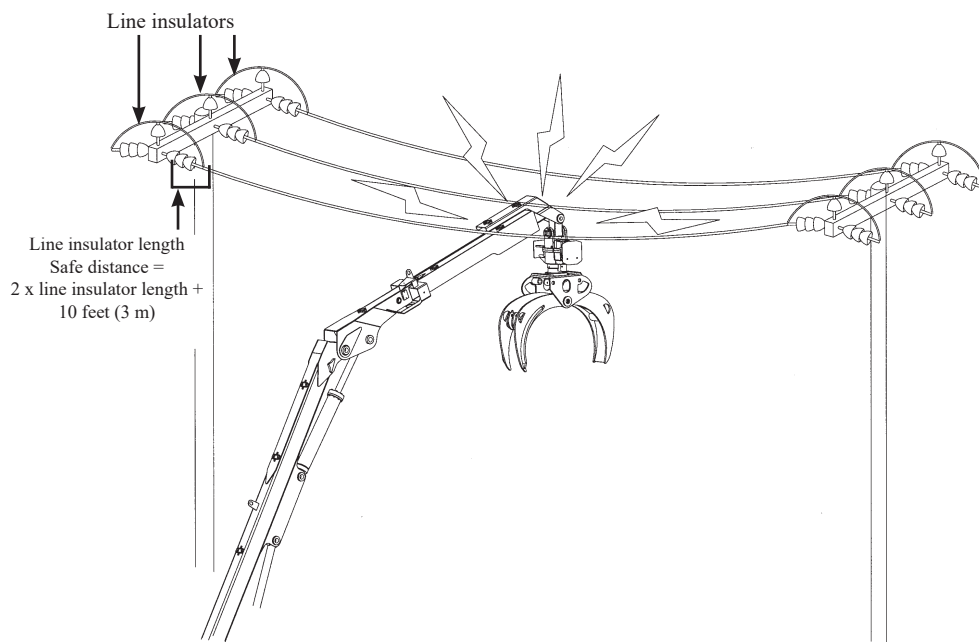


Figure 1 - Power line safety guidelines

If the loader or carrier touches a power line, do the following:

- Stay in the loader.
- Do not let anyone touch the loader, the load, or the carrier.
- Do not let anyone touch anything that might have directly or indirectly had contact with the power line or something else that touched it. Even a brief contact can create a charge.
- If you think you can move the loader, or load away from the line without pulling the line down, move away slowly and smoothly.

Or

- If you think you **will** pull the line down if you move away, have someone contact the utility company to disconnect power from the line.

Or

- If it is not possible to disconnect the power or if the loader or the load begins to burn, jump away from the loader in this way:
 1. Your whole body must leave the loader at the same time. If part of your body touches the ground while another part is still in contact with the loader, the electricity in the line will go through your body.
 2. Hold both arms in front and close to your body and both legs and feet together.
 3. Jump with your body forward so that you will not fall back towards the loader when you have landed.
- Jump as far away from the loader as you can without falling. The charge is less the farther away you are.
- Once you have landed, quickly shuffle away from the loader (with your arms still close to you body) to at least the same distance as determined by the formula given on *Page 10* of this document. Lifting a foot or placing one foot more than an inch from the other foot can change the charge in your body considerably and increase the chances of the electricity running through you.



DANGER! Do not directly or indirectly touch someone who is being electrocuted. The current will run through you as well. Call 9-1-1 or the emergency number of the power company for the area for information on the safe handling of the situation.

- Notify the utility company immediately about the situation, whether the loader or the load is still touching the power line or not.

Product Description

Standard duty log grapples are designed for medium service such as tree length wood handling.

Grapple head uses interlocked construction for extra rigidity. Two large access doors provide easier serviceability and improved protection. Jaw design provides better cylinder protection. All pins and bushings are sealed.



IMPORTANT! Before operating, servicing or performing any maintenance on this product, Rotobec recommends that you always refer to and follow the standard *ASME B30.20-2010 “Below the hook lifting devices”* to maximize the safety of your operations.

Functional Description

Structure

- Standard duty models are ready for saw-kit mounting, with imbricated head structure for maximum rigidity, hardened wear-resistant tips, integral cylinder protection.
- 165,000 lb (1.1 GPa) tensile strength (65% stronger than T1 steel).

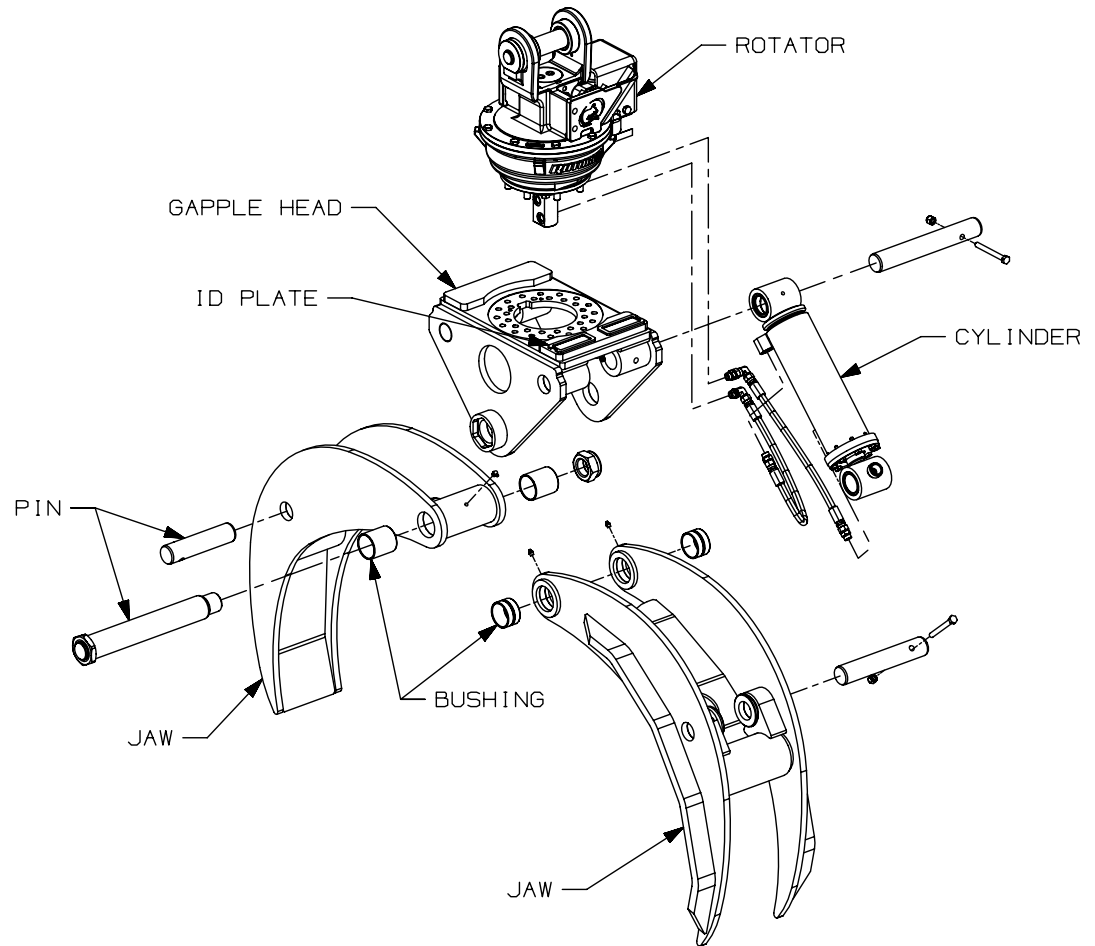
Cylinders

- Bolt on heads for easy and cost effective maintenance
- High pressure piston seals
- Double seals on cylinder rod
- Cylinders designed to match machine operating pressure

Pins

- Pins contribute to structural integrity without adding weight.
- Pins are heat treated and chromed.

Product Identification



ID Plate

The ID plate for the grapple is located inside the grapple head structure (see *Figure 1*, below). The information includes:

- Maximum load
- Company reference
- Cylinder capacity
- Year of manufacture
- Grapple weight
- Model number and serial number

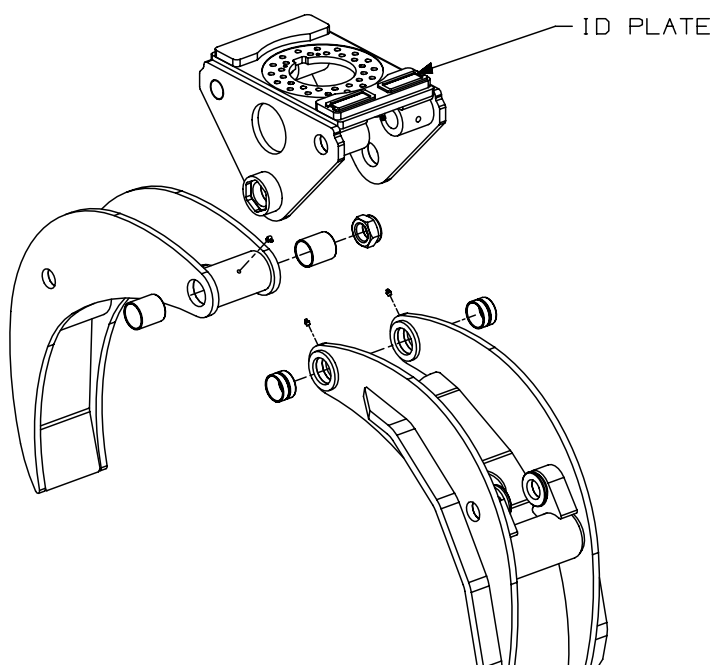


Figure 1 - Location of ID plate

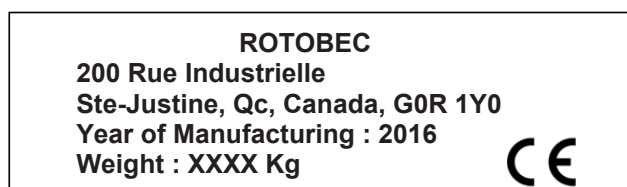


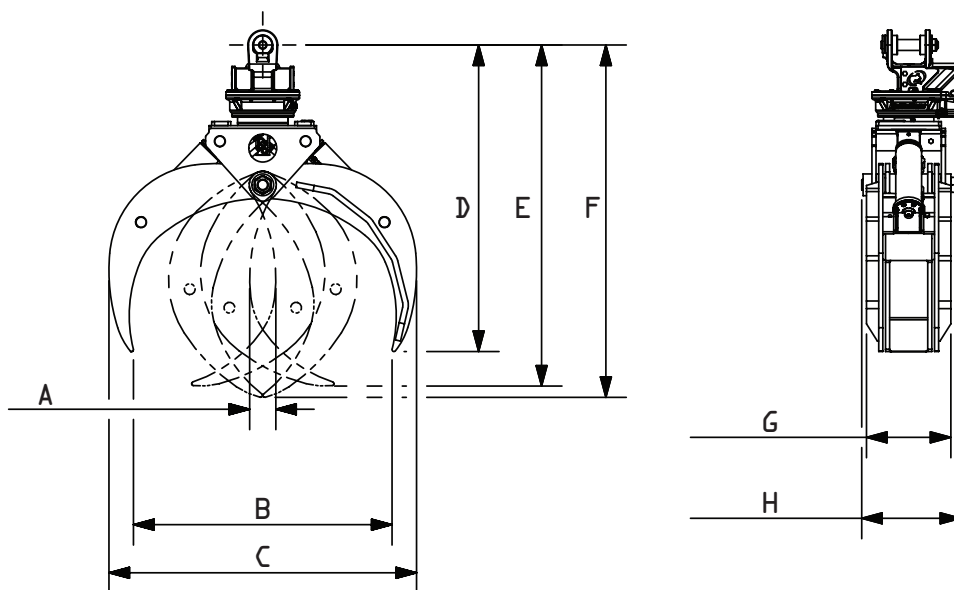
Figure 2 - ID plate example

Technical Data

MODEL			3537	4535	4542	4547	4642	5052
Capacity	In cords of 8' wood M ³		0.6	0.11	0.16	0.19	0.16	0.23
			0.22	0.40	0.58	0.69	0.58	0.83
Max load	lb. kg		7,000	9,000	13,250	14,300	13,250	15,550
			3,200	4,100	6,500	6,500	6,000	7000
Area (when tip to tip)	ft ² m ³		0.97	1.75	2.70	3.06	2.70	0.23
			0.09	0.16	0.25	0.28	0.25	0.83
A	in. mm		3 1/2 89	4 1/2 113	4 3/4 122	4 3/4 122	4 1/2 117	4 3/4 121
B	in. mm		37 1/2 955	35 892	42 1065	47 1/2 1207	42 1065	52 1/2 1336
C	in. mm		41 1040	43 1/2 1106	50 1/4 1274	56 1/2 1435	52 1/4 1328	62 3/4 1592
D with rotator:	R-9150	in. mm	48 3/4 1238	50 1/4 1276	54 1/4 1378	57 7/8 1470	55 1397	61 1/2 1562
	RT-142	in. mm	47 1193	48 1/2 1232	53 1346	/		/
	RT-222	in. mm	47 1/8 1197	48 5/8 1235	53 1/8 1349			
	RT-252	in. mm	46 1/2 1181	48 1219	52 1/2 1334	56 1/4 1429	52 3/4 1339	59 7/8 1521
	RT-322	in. mm	/		/			/
	RT-502	in. mm						
						55 5/8 1413		59 1/4 1505
						57 5/8 1464		61 1/4 1556
E with rotator:	R-9150	in. mm	55 3/4 1416	55 1/4 1403	59 3/4 1518	64 3/8 1635	58 1/4 1480	64 1/2 1638
	RT-142	in. mm	54 1371	53 1/2 1359	58 1473	/		/
	RT-222	in. mm	54 1/8 1375	53 5/8 1362	58 1/8 1476			
	RT-252	in. mm	53 1/2 1359	53 1346	57 1/2 1461	62 3/4 1594	56 1422	62 7/8 1597
	RT-322	in. mm	/		/			/
	RT-502	in. mm						
						62 1/8 1598		62 1/4 1581
						64 1/8 1629		64 1/4 1362
F with rotator:	R-9150	in. mm	56 1/8 1426	56 1/2 1435	60 1524	66 3/8 1686	60 1/2 1537	68 1727
	RT-142	in. mm	54 3/8 1381	54 3/4 1391	60 5/8 1540	/		/
	RT-222	in. mm	54 1/2 1384	54 7/8 1394	60 3/4 1543			
	RT-252	in. mm	53 7/8 1368	54 1/4 1378	60 1/8 1527	64 3/4 1645	58 1/4 1480	66 3/8 1686
	RT-322	in. mm	/		/			/
	RT-502	in. mm						
						64 1/8 1629		65 3/4 1670
						66 1/8 1680		67 3/4 1721

MODEL			3537	4535	4542	4547	4642	5052
G		in.	14 1/2	14 1/2	14 3/4	15 1/2	14 3/4	15 1/2
		mm	368	368	375	394	375	394
H		in.	16 1/2	16 1/2	16 1/2	18 1/4	16 1/2	18 1/4
		mm	419	419	419	462	419	462
Weight with rotor:	R-9150	lb.	695	705	810	870	820	1180
		kg	315	320	367	395	972	535
	RT-142	lb.	675	685	790		800	
		kg	306	311	358		363	
	RT-222	lb.	695	705	810	850	820	1160
		kg	315	320	367	386	972	526
	RT-252	lb.	740	750	855	870	865	1180
		kg	336	340	388	395	392	535
	RT-322	lb.				915		1225
		kg				415		556
	RT-502	lb.				1100		1410
		kg				499		640

We reserve the right to change specifications and improve our products without notice or obligation.



Cylinder Flow and Pressure Settings

Model	Cylinder Diameter	Maximum flow		Maximum pressure	
		gpm	l/min	psi	bars
3537	3"	13	49	3700	255
3537	3.5	19	72	2700	186
4535	3"	13	49	3700	255
4535	3.5"	19	72	2700	186
4547	4"	29	110	3000	207
4547	3"	14	53	4500	310
4542/4642	3"	15	57	4500	310
4542/4642	3.5"	22	83	3000	207
4542/4642	4"	30	114	2500	172
5052	3.5"	16	61	4500	310
5052	4"	23	87	3000	207
5052	4.5"	30	114	3000	207

Rotator Lifting Capacity

ROTATOR LIFTING CAPACITY							
MODEL	R-9150	RT-142	RT-222	RT-252	RT-322	RT-504	RT-1004
pound (lb)	18,000	14,000	22,000	25,000	32,000	50,000	100,000
kilogram (kg)	8,165	6,350	9,979	11,340	14,515	22,680	45,359

Storage

The following information explains how to store the grapple. Proper storage ensures the safety of personnel and prolongs the grapple's working life.

Before storing the grapple, do the following:

1. To prevent the grapple from falling over while in storage, sit it on a flat and stable surface with the jaws in the opened position.
2. To prevent rust from forming on the cylinder rods, sit the grapple in the opened position, the cylinder rods will be protected inside the cylinder tubings.
3. With a rag and solvent, remove remaining dirt, oil and grease from the grapple. Debris can hide cracks, leaks, loose bolts and other problems.
4. Repair any damage found during the inspection before storing the grapple.
5. Lubricate the grapple according to its next required lubrication as determined by the *Maintenance Section*.
6. Apply Loctite (if indicated in the *Parts Manual*) to loose bolts and tighten them to their proper torque value.
7. The hydraulic system must be full of oil when storing the grapple. Make sure that all hoses and orifices are plugged or capped to prevent contamination from getting into the hydraulic circuit.

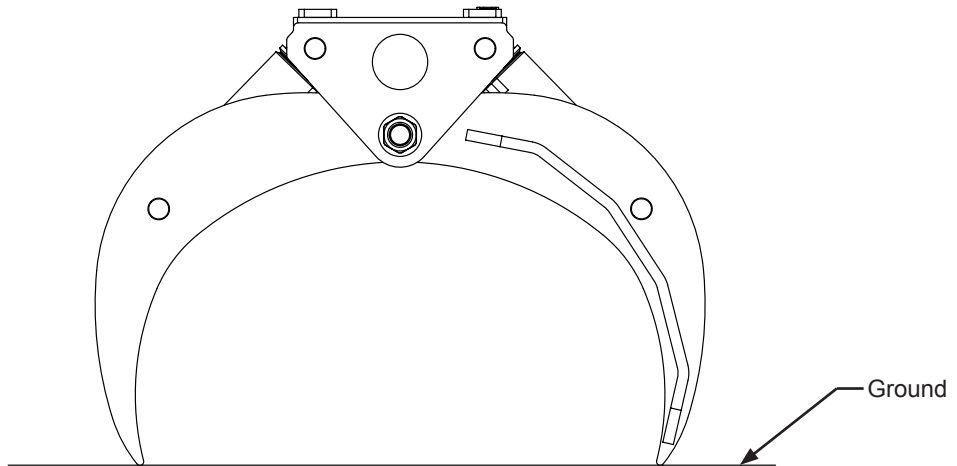


Figure 3 - Storage position

After Storage

After storage and before operating the grapple again, follow these procedures:

If the grapple has been in storage for three months or more, inspect the grapple and lubricate it according to the daily lubrication chart (see *Maintenance Section*).

Maintenance

To keep your Rotobec grapple in peak working condition and to ensure the safety of personnel, follow the daily maintenance schedule given in this section.

If your grapple is used in extreme temperatures (either below 0°F/-20°C or above 100°F/40°C), difficult conditions, or works more than 50 hours a week, inspect and lubricate the grapple at shorter intervals than those given in this *Maintenance section*.

Thoroughly clean the grapple before each inspection in the following ways:

- Be careful to place the grapple safely on the ground and shut off any source of power that operates the grapple before beginning to work on it.
- Remove remaining dirt, excess oil, and grease that may hide cracks, leaks, loose bolts, or other problems.

Daily Maintenance

Inspect the grapple every 12 hours of service to make sure:

- That no damage is present on the seals and the hydraulic hoses.
- That there are no cracks or excessive wear on the grapple.
- That the hydraulic system and the cylinders are not leaking.
- Retighten all loose fittings and bolts and repair all damage that has occurred to the grapple. The information concerning torque values can be found in your parts manual.



See the *Rotobec RT Series Rotators Service Manual* to know the steps to follow for the maintenance of your rotator.

Lubricating the grapple

Lubricate the grapple after it has been working for several hours because the new grease penetrates more easily when the old grease is hot.

If the working environment contains a high percentage of dirt and/or humidity, the lubrication period must be shortened.

Grease all pivot points until you see the old grease coming out of the seals. With a rag, clean the extra amount of grease. At the same operating hours intervals, grease both ends of the yoke between the loader boom and grapple rotator.

Rotator maintenance: see *Rotobec Rotators RT Series Service Manual* for greasing intervals.

Materials needed

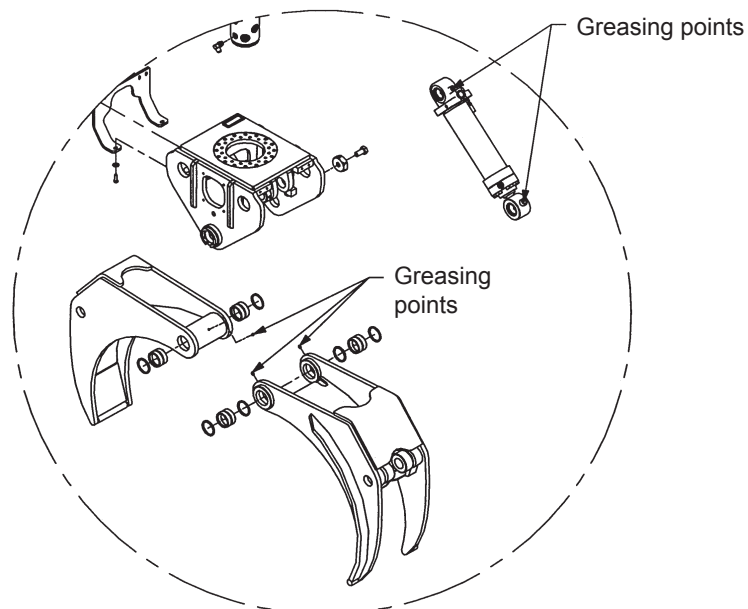
- Use EP2 grease type or equivalent to grease your grapple. This grease can also be used in winter conditions. Avoid mixing different types of grease. The grease should have excellent water-repulsion durability, antirust capabilities, adhesive abilities and mechanical stability.

Procedures

- Shut down the loader or carrier so working around the grapple is safe. The grapple should be placed on a stable surface.

Daily lubrication chart

Grapple Base	Quantity of nipples	Pumps of grease gun per interval of 12 operating hours
Grapple jaw pivots	4	2
Cylinder pivots	4	2



Cylinder Maintenance

Replacing cylinder seals

Disassembly

Follow the procedure below to replace the cylinder seals:

1. Close the grapple completely.
2. Place the grapple in the maintenance position as shown in *Figure 6*.
3. Shut down the machine or power source.



WARNING! Make sure that there is no hydraulic pressure on the grapple function by removing the hoses, or lowering the machine to atmospheric pressure (refer to the *Carrier's Manual*).

4. Disassemble the hydraulic hoses.
5. Disassemble the pin-joint system.
6. Remove the cylinder.
7. Fasten the cylinder in a vise.
8. Remove all the screws from the head of the cylinder to loosen the head and remove the rod from the barrel.

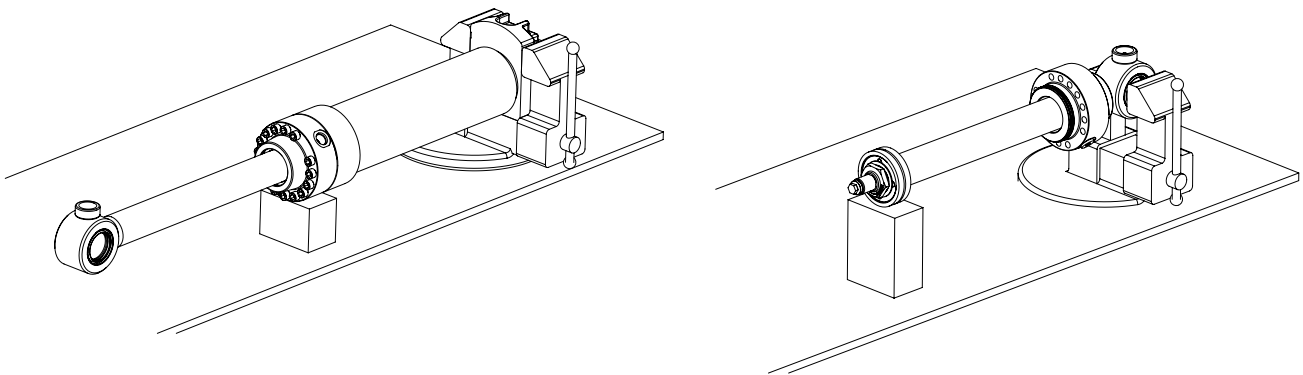


Figure 4 - Cylinder mounted in vise

9. Remove the head bolts, and pull out the piston rod assembly.



NOTE: Always check the head of the nut for an arrow before removing. The piston nut on the end of the cylinder rod could be a left-handed thread. When removing the nut, it is important to remove it by turning the nut clockwise.. For torque information please refer to your parts manual.

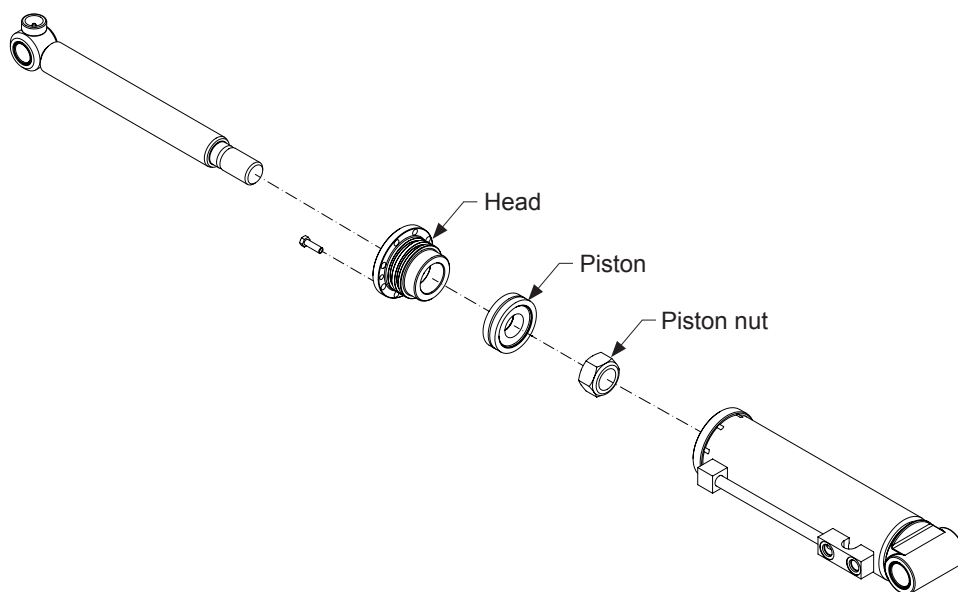


Figure 5 - Removing the piston from the rod

10. Fasten the rod in a vise as shown in the *Figure 5*.
11. Place a support under the rod as shown in *Figure 5*.
12. Remove the piston or the piston seals depending on the cylinder model.
13. Pry up the locking tabs on the piston nut, and remove.
14. Remove the piston.
15. Remove the head and the seals from inside the head.
16. Carefully clean the cylinder surfaces and the threads on the piston and the piston rod.
17. Make sure that there are no damages on the cylinder, the rod, the piston, cylinder head and piston nut.
Exchange worn out or damaged parts.
18. Exchange worn out bushings in the cylinder barrel and the rod (see *Parts Manual* for part numbers).

Assembly

1. Carefully clean all the cylinder components.
2. Install the seals inside/outside the cylinder head and on the piston if necessary (depending on the type of piston your cylinder has, some seal kits come with the complete piston assembled with the seals or will require you to change the seals on the piston).
3. Fasten the cylinder rod in a vise.
4. Grease the inside and outside of the cylinder head seals and slide it onto the cylinder rod.
5. Screw the piston on the rod (refer to the *Parts Manual* for the correct torque value). Use a proper tool to torque the piston.
6. Screw the left-hand threaded nut onto the cylinder rod to the value indicated in the *Parts manual*.
7. Using a punch tool or small pry bar, lock the washer tabs of the nut in two holes opposite of each other on the piston.
8. Put some grease on the piston seals.
9. Remove the cylinder rod assembly from the vise, and secure the cylinder barrel in the vise.
10. Slide the rod assembly inside the cylinder tubing carefully to avoid damaging the seals.
11. Install the bolts of the cylinder head and torque to the value indicated in the *Parts Manual*.
12. Install the cylinder on the grapple.
 - The rod side is mounted on the inner grapple arm
 - The cylinder barrel side is mounted on the outer grapple arm.
13. Assemble the hydraulic hoses.

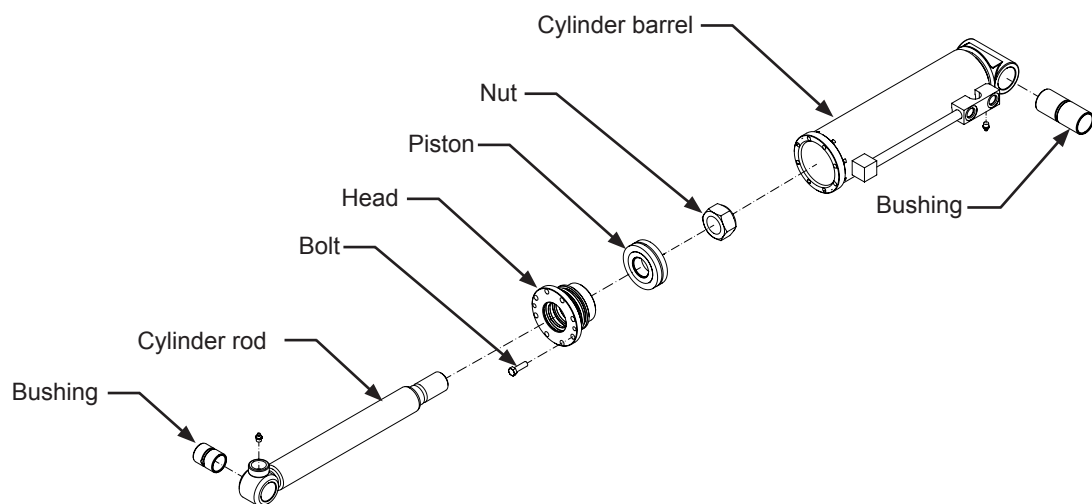


Figure 6 - Cylinder exploded view

Handling of the Attachment

For grapple transportation, secure the grapple to a pallet following as shown in *Figure 7*, below.

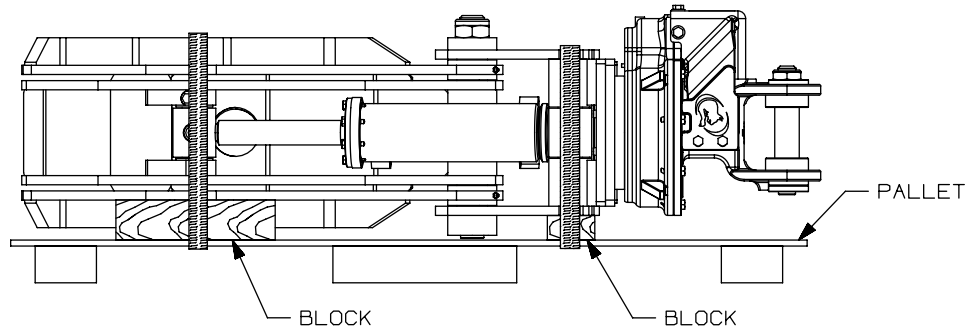


Figure 7 - Transportation position

To lift the grapple, follow the directions of the *Figure 8* below for with and without rotation.

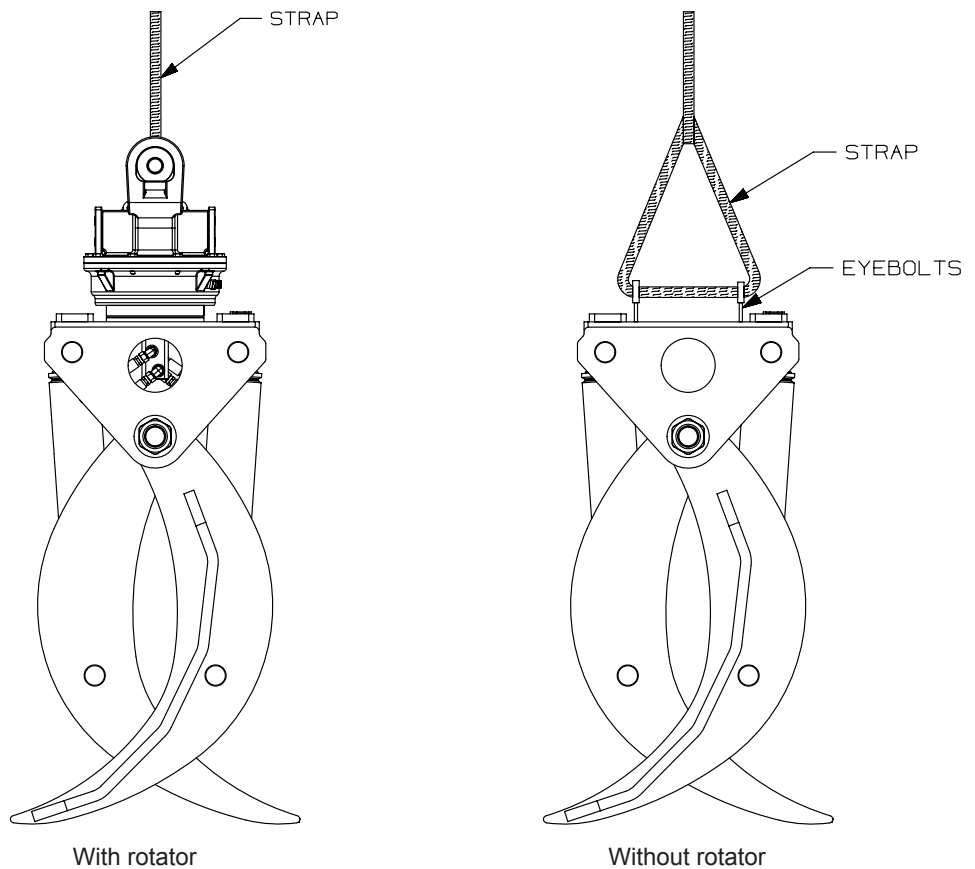


Figure 8 - Location of lifting strap

Troubleshooting

Place the grapple on a firm base and stop the machine before beginning the troubleshooting process.



CAUTION! Always wear safety glasses when troubleshooting.

Problem	Cause	Solution
Doesn't hold its load or stops working	Hydraulic pressure is too low	Check the hydraulic pressure
	Broken hydraulic hoses.	Replace hoses, if needed.
	Control valve problem	Check control valve regarding leakage, according to the supplier's instructions
	Rotator problem	Check rotator regarding internal leakage. • Connect the grapple hoses bypassing the rotator - If the problem is solved, repair the rotator according to <i>Rotobec Rotators RT Series Service Manual</i>. - If the problem continues, check the cylinder
	Cylinder problem	Check piston seal. • Disassemble hydraulic hoses for "grapple close". • Pressurize hydraulic hoses for "grapple open". The grapple must be fully opened to perform this operation. If oil flushes out of the hydraulic hose there is probably a problem with the piston seal. • Replace piston seal, if needed. • Make sure there hasn't been any damage that has occurred inside the cylinder tubing.

ROTOBEC

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