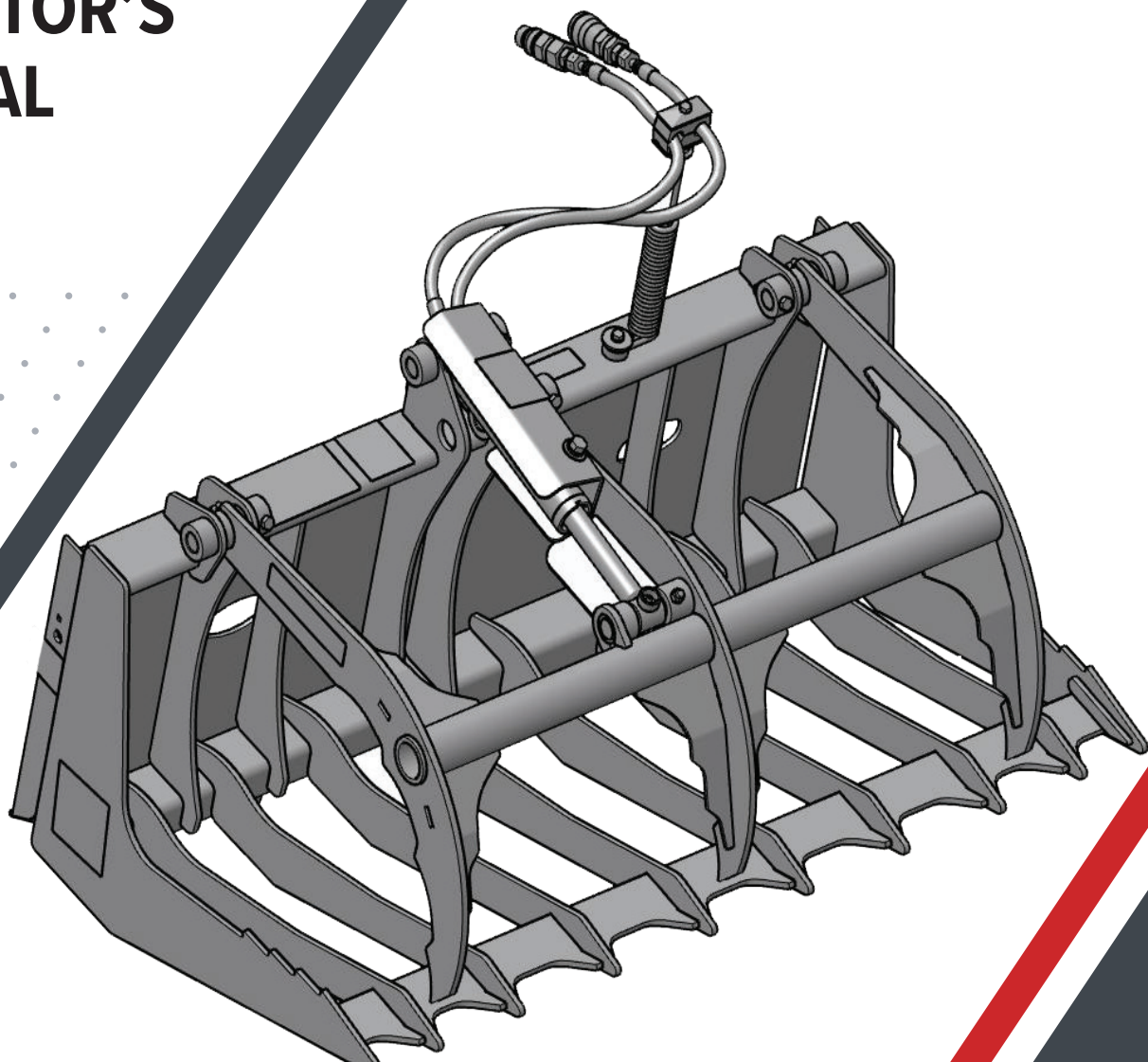




OPERATOR'S MANUAL



BRUSH & SCRAP GRAPPLES

36", 42", 48", 54"

for Compact Tool Carriers

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 75606

Date: February 2024

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Preface



General Comments

Congratulations on the purchase of your new product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.



WARNING!

Never let anyone operate this unit without reading the “Safety Precautions” and “Operating Instructions” sections of this manual.

Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator’s control position when facing forward.

IMPORTANT

The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

Before Operation

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.



Safety Alert Symbol

This is the “Safety Alert Symbol” used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

Service

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

Sound And Vibration

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- ▶ prime mover type, age, condition, with or without cab enclosure and configuration
- ▶ operator training, behavior, stress level
- ▶ job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

NOTE

A list of all Paladin Patents can be found at <http://www.paladinattachments.com/patents.asp>.

Safety Statements



THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



DANGER!

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY



WARNING!

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY



CAUTION!

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY

NOTICE

NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.

General Safety Precautions



WARNING!



READ AND UNDERSTAND MANUAL

- ▶ Read and understand this manual and other safety information provided with this equipment and base machine (prime mover) and be sure all controls and instructions are understood before attempting to install, operate or maintain this equipment.
- ▶ Read and follow all safety warnings and instructions.
- ▶ Do not discard safety instructions. Give to the operator.
- ▶ Improper installation, operation or maintenance of this equipment could result in serious injury, death or property damage.

READ AND UNDERSTAND ALL SAFETY STATEMENTS

- ▶ Read all safety statements in this manual and on your equipment safety decals.
- ▶ Keep safety decals in good condition. Replace missing or damaged safety decals.
- ▶ Because the manufacturer cannot foresee all hazardous circumstances, the precautions listed in this manual and on the equipment are not all-inclusive. If a procedure, method, tool or part is not specifically recommended by the manufacturer, determine whether it is safe for you and others, and that the equipment will not be damaged or made unsafe as a result of your decision to implement it.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

- ▶ Always wear personal protective equipment (PPE) appropriate for the job, such as eye protection, ear protection, gloves, head protection, breathing protection and safety shoes. PPE should be worn at all times when operating, maintaining or observing the tool.
- ▶ Use PPE that conforms to standards ANSI Z87.1 (Eye and Face Protection), ANSI Z89.1 (Head Protection), ANSI Z41.1 (Foot Protection) and ANSI S12.6 (S3.19) (Hearing Protection).
- ▶ Do not wear loose fitting clothing, jewelry, long hair or gloves with cut or frayed fingers. These items can become entangled in the equipment causing hazards such as choking, scalping, lacerations, severed or broken appendages.



M003
Wear Ear
Protection



M004
Wear Eye
Protection



M016
Wear a Mask

KNOW YOUR EQUIPMENT

- ▶ Know your equipment's capabilities, dimensions, and controls before operating.
- ▶ Do not operate a damaged, improperly adjusted, modified or incompletely assembled tool.
- ▶ Make sure all safety guards and devices are installed.
- ▶ Check all hardware to ensure it is tight.
- ▶ Make certain that all locking pins, latches, and connection devices are properly installed and secured.
- ▶ Remove and replace any damaged, fatigued, or excessively worn parts.
- ▶ Inspect the tool before each use and ensure all safety decals are in place and legible. Contact manufacturer if replacement decals are needed.
- ▶ Know and follow good work practices when assembling, maintaining, repairing, mounting, removing or operating this equipment.

SAFELY OPERATE EQUIPMENT

- ▶ Establish a training program for all operators to ensure safe operation.
- ▶ Do not operate the tool unless thoroughly trained or under the supervision of a qualified operator or instructor.
- ▶ Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation.
- ▶ Know your work site safety rules. When in doubt on any safety issue, contact your supervisor or safety coordinator.
- ▶ Assess hazards to yourself and others around you before operating the tool. Start in a work area without bystanders. A hazard to bystanders can include, but is not limited to, the risk of serious injury or death caused by the tool or accessories being dropped from an elevated height. Keep children out of the work area.
- ▶ Do not operate the equipment from anywhere other than the correct operator's position.
- ▶ Do not alter or remove any safety feature from the prime mover or tool.
- ▶ Stay alert, watch what you are doing and use common sense when operating the tool. Do not operate the tool if you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating the tool may result in serious

General Safety Precautions



injury.

CALIFORNIA PROPOSITION 65 WARNING

- ▶ This product may contain a chemical known to the State of California to cause cancer, or birth defects or other reproductive harm. www.P65Warnings.ca.gov

DUST AND FUMES

- ▶ **WARNING:** Dust created by power sanding, sawing, grinding, drilling, and other job site activities may contain chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - Lead from lead-based paints
 - Crystalline silica from quartz, bricks, cement and other masonry products
 - Arsenic and chromium from chemically-treated lumber
- ▶ To reduce your exposure to these chemicals: work in a well ventilated area and work with approved safety equipment, such as dust masks that are specially designed to filter out microscopic particles. Protect yourself and those around you.
- ▶ Research and understand materials you are working with.
- ▶ Follow correct safety procedures and comply with all applicable national, state or provisional health and safety regulations relating to them, including, if appropriate, arranging for the safe disposal of the materials by a qualified person.
- ▶ Use dust suppression or dust collection methods when using a tool that may cause high levels of dust.
 - Control dust or fumes at the point of emission.
 - Direct tool exhaust to minimize disturbance of dust.
 - Operate and maintain the tool as recommended in this manual to minimize dust.
 - Use respiratory protection in accordance with employers instruction or as required by occupational health and safety regulations.
 - Avoid prolonged contact with dust. Allowing dust to get into your mouth, eyes or on the skin may promote absorption of harmful chemicals.



SAFELY MAINTAIN AND REPAIR EQUIPMENT

- ▶ Work in a clean and dry area.
- ▶ Keep the work area well lit.
- ▶ Work on a level surface.
- ▶ Use properly grounded electrical outlets and tools.
- ▶ Use the correct tools for the job at hand.
- ▶ Ensure tools are working properly and safely by performing preventative maintenance procedures.
- ▶ Wear protective equipment specified by the tool manufacturer.
- ▶ Do not perform any work on the tool unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made.



- ▶ After completing maintenance or repair, remove all maintenance tools and unused parts from equipment.
- ▶ Check for correct operation of the tool. If not operating properly, shut down the prime mover, follow proper Lock-Out / Tag-Out procedures and tag “DO NOT OPERATE” until all problems are corrected.

USE CARE WITH HYDRAULIC FLUID PRESSURE

- ▶ **DO NOT** attempt to make repairs to hydraulic lines or components while the system is pressurized. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Follow proper procedures for relieving pressure from hydraulic system before connecting or disconnecting hydraulic lines or components.
- ▶ Wear personal protective equipment (PPE) such as safety glasses, gloves and protective clothing at all times.
- ▶ Hydraulic leaks under pressure may not be easily visible. Keep hands and other body parts away from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities. Use a piece of cardboard or wood when searching for hydraulic leaks.
- ▶ If injured by injected fluid, seek immediate medical attention.
- ▶ Hydraulic fluid can become hot during operation. **DO NOT** come in contact with hot hydraulic fluid as it could cause severe burns.
- ▶ If exposed to hydraulic fluid, wash hands immediately.
- ▶ Inspect and clean couplers before use. Replace damaged couplers immediately.
- ▶ Ensure the couplers are properly connected and are tight.
- ▶ Do not smoke while working on the hydraulic system.



DO NOT MISUSE OR MODIFY EQUIPMENT

- ▶ Use and maintain the tool as stated in this manual. Misuse of the tool can cause serious injury.
- ▶ Do not modify the tool in any way. Modifications may weaken its integrity and may impair its function, safety, life and performance. When making repairs use only factory recommended replacement parts, following authorized instructions. Use of parts that are not factory approved may be substandard in fit and quality and may cause damage and void the warranty.
- ▶ Do not modify any ROPS (Roll Over Protective Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

END OF LIFE DISPOSAL

- ▶ At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.

Equipment Safety

Precautions



WARNING!

READ THE ATTACHMENT MANUAL



- ▶ **WARNING:** Read all safety warnings and instructions. Failure to follow warnings and instructions may result in attachment damage and/or serious injury.
- ▶ Always observe safety symbols. They are included for your safety and for the protection of the tool.
- ▶ **WARNING:** To reduce the risk of injury, read the instruction manual.

This attachment will provide dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the tool and hoses before operation. Failure to do so could result in personal injury or equipment damage.



WARNING!

REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised attachments. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower attachments to ground level or on blocks. Lower attachments to the ground before leaving the cab or operator's station.

OPERATING THE ATTACHMENT

- ▶ When using the grapple, lift the load slightly and make sure that the load is secure. If the load appears to be unstable, lower the load, open the grapple and reposition the load to attain full stability.
- ▶ Be sure the load does not stick out too far in front of the grapple. A light load sticking out too far can have the same tipping effect as a heavy load carried in close.
- ▶ Use extreme caution when operating on or crossing gravel drives, walkways, or roads.
- ▶ Do not operate without good visibility or light.





WARNING!

- ▶ Do not overload machine capacity by attempting to lifting heavy loads. Do not exceed the lifting capacity of your prime mover.
- ▶ Operate only from the operator's station.
- ▶ When operating on slopes, drive up and down, not across. Avoid steep hillside operation, which could cause the prime mover to overturn. Carry loads as close to the ground as possible.
- ▶ Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the prime mover.
- ▶ Do not operate equipment if tired or under the influence of drugs or alcohol, which can impair alertness or coordination. A person taking prescription or over-the-counter medications should seek medical advice before he or she can seek medical advice before operating operate equipment.
- ▶ Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine and remove the key.

TRANSPORTING THE ATTACHMENT

- ▶ Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- ▶ When transporting on a trailer: Secure attachment at recommended tie down locations using tie down accessories that are capable of maintaining attachment stability.
- ▶ When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.

MAINTAINING THE ATTACHMENT

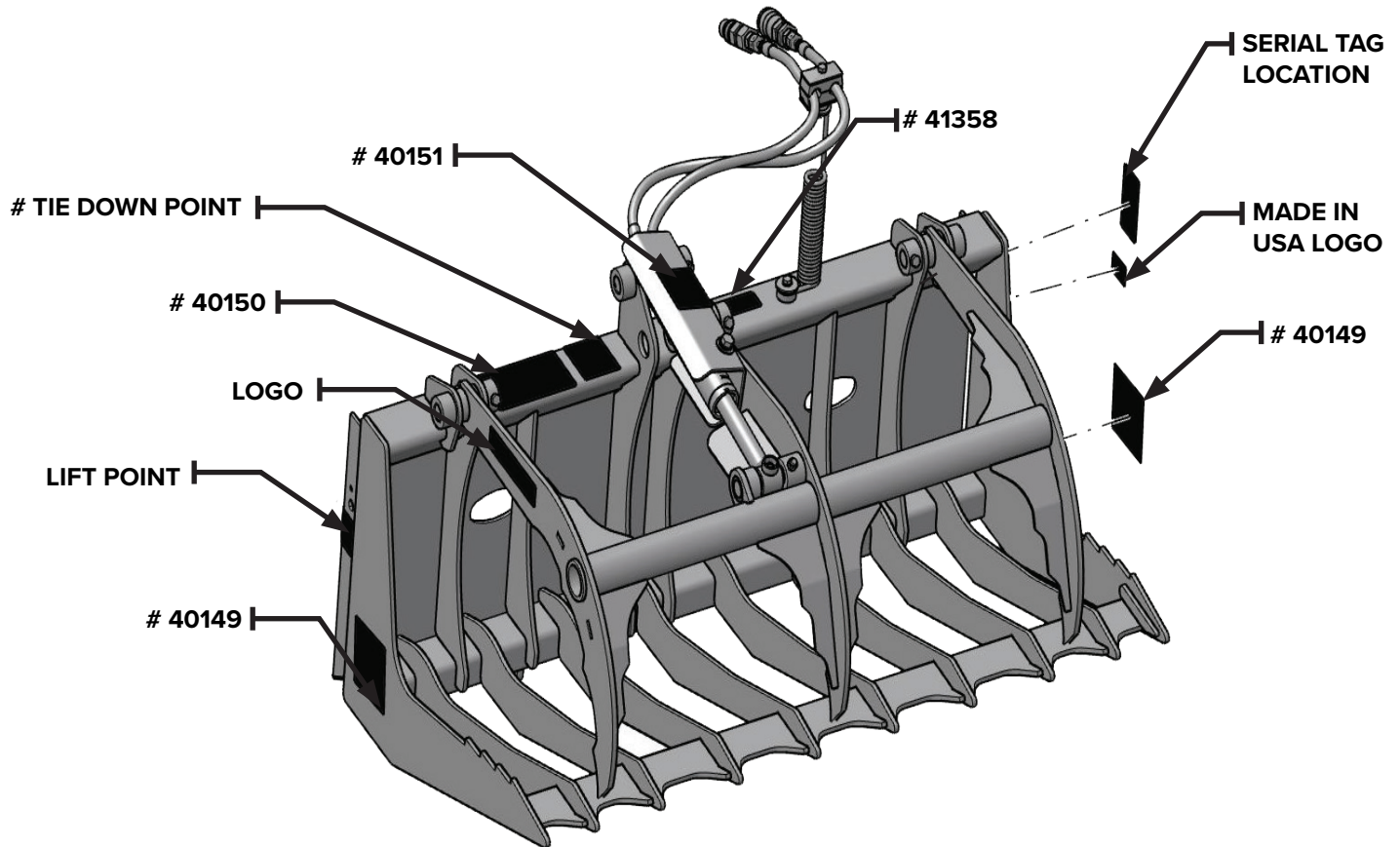
- ▶ Before performing maintenance, apply the brakes and turn off the engine to the prime mover and lower the attachment to the ground.
- ▶ Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the attachment. If the attachment is not functioning properly, shut down the machine, follow proper Lock-Out / Tag-Out procedures and tag "DO NOT OPERATE" until all problems are corrected.
- ▶ Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from Paladin.
- ▶ Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- ▶ Never work under a raised attachment.
- ▶ Stop the prime mover engine and cycle control levers to release hydraulic pressure before servicing or adjusting attachment hydraulic systems.

Decals

Decal Placement

GENERAL INFORMATION

The diagrams on this page show the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and product longevity.



BRUSH GRAPPLE SHOWN

IMPORTANT

Keep all safety decals clean and legible. Replace all missing, illegible, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced. Safety decals are available, free of charge, from your local dealer or Paladin.

REPLACING SAFETY DECALS: Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram above and smooth out any bubbles.

Decals

Decal Placement



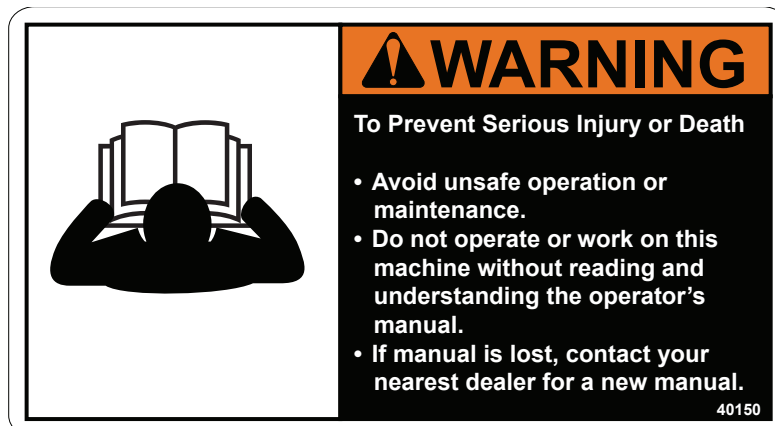
⚠ DANGER!

40149 - KEEP ALL PERSONS AND OBJECTS CLEAR.



⚠ WARNING!

40151 - HIGH PRESSURE FLUID



⚠ WARNING!

40150 - READ MANUAL TO PREVENT INJURY OR DEATH



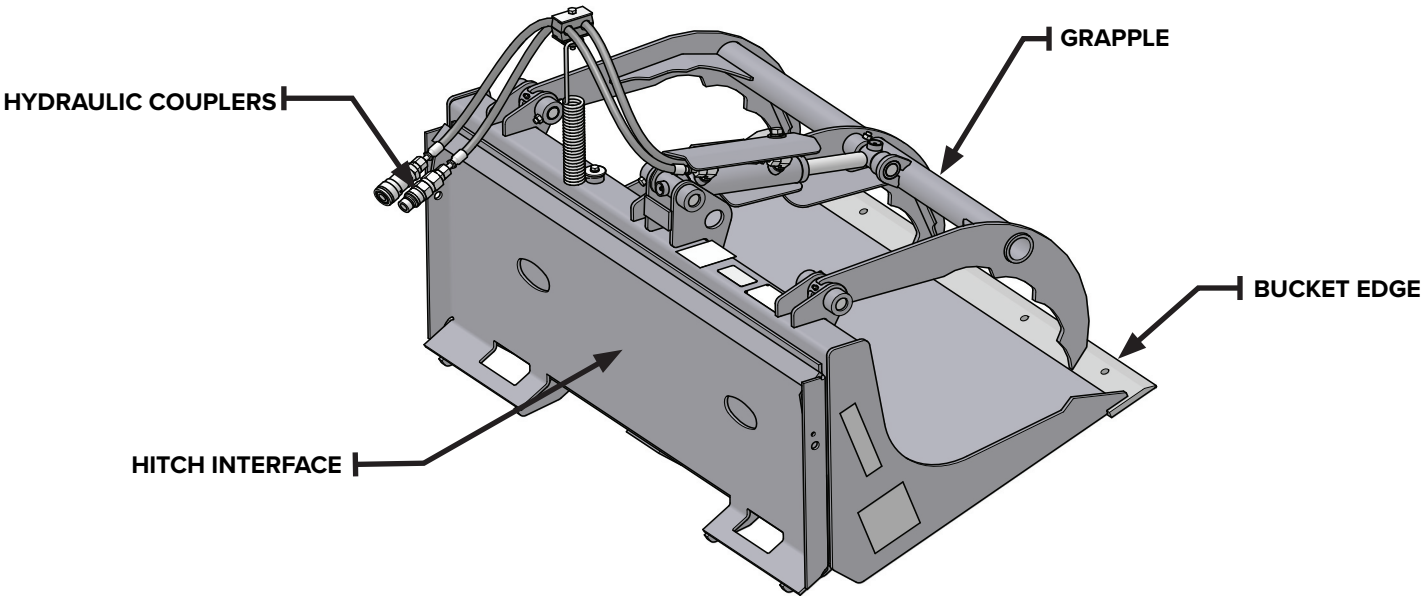
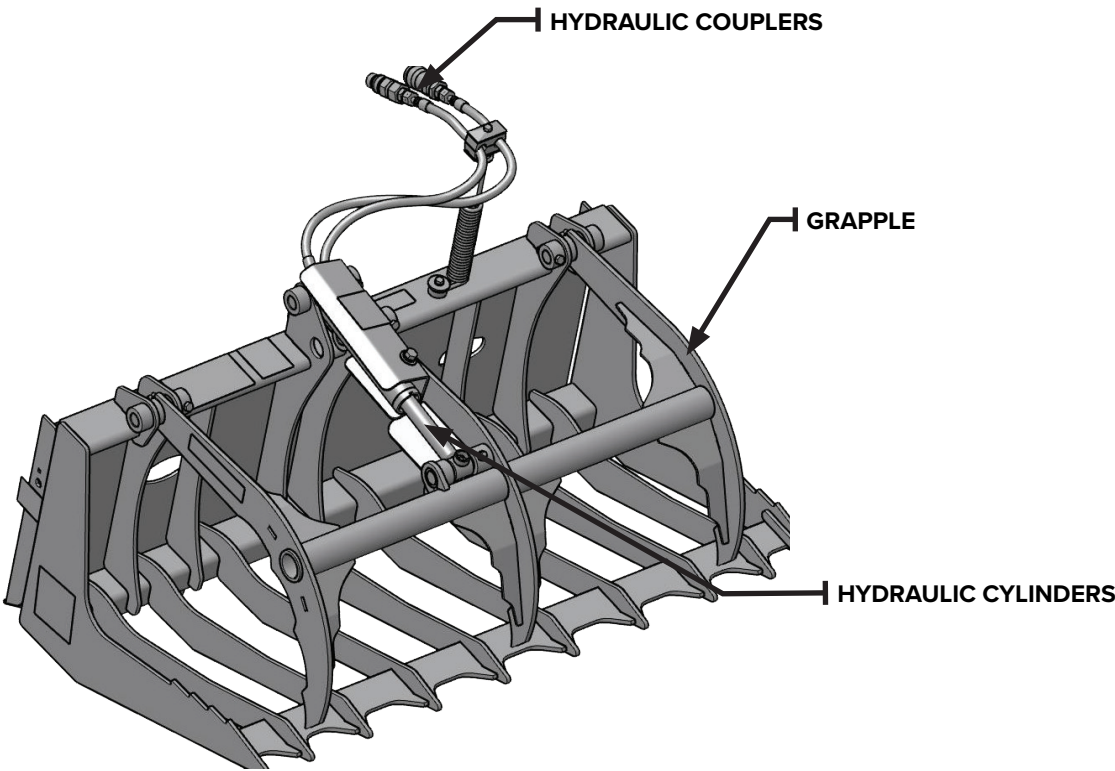
⚠ WARNING!

41358 - CA PROPOSITION 65

NOTE

Contact your local dealer for model number and logo decals

Nomenclature



Installation



GENERAL INFORMATION

The following instructions will help you to mount your grapple onto your prime mover. The grapple uses the quick-attach system for ease of installation. Therefore, if you know how to attach your loader bucket, attaching the attachment should prove no problem.

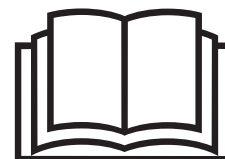
Remember to read all safety warnings, decals and operating instructions before operating the attachment. If there is any portion of this manual that you do not understand, contact your dealer



WARNING!

READ MANUAL PRIOR TO INSTALLATION

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance.



FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).

INSTALLATION

NOTICE!

Lubricate all grease fittings before connecting this product to your prime mover's hydraulic system. Refer to "Lubrication" on page 21 and follow the instructions.

1. Remove any attachment from the front of the prime mover.



WARNING!

IMPROPERLY INSTALLED ATTACHMENT CAN DISCONNECT FROM PRIME MOVER DURING OPERATION

Make sure the attachment is securely latched and locked to the prime mover. Failure to do so could result in separation of the attachment from the prime mover.

SERIOUS INJURY OR DEATH CAN OCCUR

2. Attach the grapple to the prime mover and make sure the latch is properly secure.
3. Lower the attachment to the level ground and relieve pressure to the auxiliary hydraulic lines.
4. Following the safety shut down procedure for your prime mover, shut down and exit the prime mover.
5. After making sure that the attachment's hydraulic couplers are free from any foreign material or contaminants, connect the attachment's hydraulic couplers to the auxiliary hydraulic system of your prime mover.

Operation



6. Following the standard start up procedure for your prime mover, start the prime mover and slowly run the attachment to make sure the hoses are long enough.
7. Run all cylinders on the attachment to purge any air from the system.
8. Immediately stop attachment use if there are any oil leaks, unusual noises, or malfunctions and fix the problem.
9. Attachment installation is complete.



WARNING!

CRUSHING HAZARD

Make sure the attachment is securely latched and locked to the prime mover. Failure to do so could result in separation of the attachment from the prime mover.

SERIOUS INJURY OR DEATH CAN OCCUR

DETACHING

1. Before exiting the prime mover, lower the attachment to the level ground, apply the brakes, turn off the prime mover's engine, and remove the key.
2. Follow prime mover operator's manual to relieve pressure in the hydraulic lines.
3. Disconnect power and return hoses from the auxiliary hydraulics.
4. Follow your prime mover operator's manual for detaching (removing) an attachment.
5. Connect hydraulic couplers together or install plastic caps on the coupler ends and secure all hydraulic hoses off the ground to prevent contaminants from entering the hydraulic system and prevent damage.
6. Store hoses off of the ground to help prevent damage.
7. Store the attachment in a safe and designated area when not in use, see "Storage" on page 18.



INTENDED USE

This grapple has been designed and built in conjunction with your Compact Tool Carriers. The grapple is intended to pick up bulky, unusually shaped, or long materials that would not stay in an ordinary bucket. Use in any other way is considered contrary to the intended use. Compliance with and strict adherence to operation, service and repair conditions as specified by the manufacturer, are also essential elements of the intended use.

GRAPPLE OPERATION

1. Approach the load in such a fashion that the weight will be centered on the floor of the bucket. The heaviest side should be closest to the back of the bucket and not near the bucket edge.
2. Before lifting, make sure the bucket is completely under the load and the bucket floor is level.
3. Close the grapples to their fullest extent possible and lift the bucket slightly to be certain that the load is secure.
4. Raise the lift arms of the prime mover, as needed, to lift the material off the ground.



WARNING!

UNSTABLE LOAD DURING TRANSPORTATION

Raise the load height as needed for transport. Keep the load level to prevent shifting. If the load appears unstable, lower and reposition the bucket.

SERIOUS INJURY OR DEATH CAN OCCUR

5. Drive the prime mover to your desired location.
6. Use the prime mover's control system to open the attachment grapple.
7. Tilt the grapple bucket down and dump the material.
8. Lower the lift arms of the prime mover.
9. Continue steps 1 - 8 for additional material, adjusting the grapples for different sizes and types of materials.

NOTE

If the load appears to be unstable, lower the bucket to the ground, open the grapples and reposition the load to attain full stability. Repeat until full stability is achieved.

NOTICE!

Do not use the grapples as a rake to drag material into position for pick up. Applying a raking-type force to open grapples can greatly magnify the fluid pressure in the hydraulic hoses, fittings, and cylinder and may cause component failure.

Operation



STORAGE

- ▶ Clean the unit thoroughly, removing all snow, mud, dirt, and grease.
- ▶ Inspect for visible signs of wear, breakage, or damage. Order any parts required and make the necessary repairs to avoid delays upon removal from storage.
- ▶ Tighten loose nuts, capscrews, and hydraulic connections.
- ▶ Coat exposed portions of the cylinder rods with grease.
- ▶ Lubricate grease fittings, see “Lubrication” on page 21.
- ▶ Seal hydraulic system from contaminants with plastic caps on the coupler ends and secure all hydraulic hoses off the ground to help prevent damage.
- ▶ Replace decals that are damaged or in unreadable condition.
- ▶ Store unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

Additional Precautions for Long Term Storage:

- ▶ Touch up all unpainted surfaces with paint to prevent rust.

REMOVAL FROM STORAGE

- ▶ Wash unit and replace any damaged and/or missing parts.
- ▶ Lubricate grease fittings.
- ▶ Check hydraulic hoses for damage and replace as necessary.

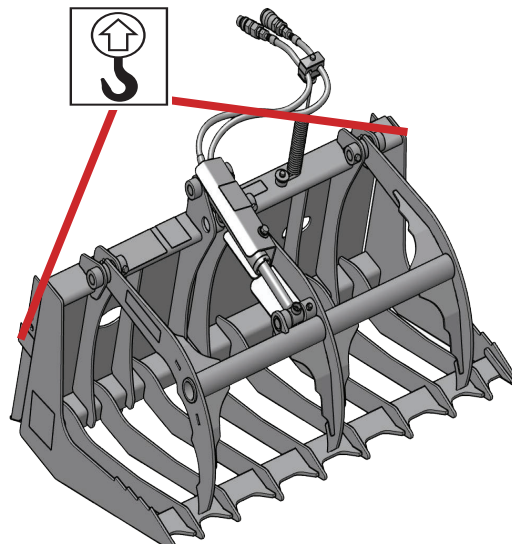
Operation



LIFT POINTS

Lifting points are identified by lifting icons where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components.

- ▶ Attach lifting accessories to unit at recommended lifting points.
- ▶ Bring lifting accessories together to a central lifting point.
- ▶ Lift gradually, maintaining the equilibrium of the unit.



WARNING!

CRUSHING HAZARD

Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.

SERIOUS INJURY OR DEATH CAN OCCUR

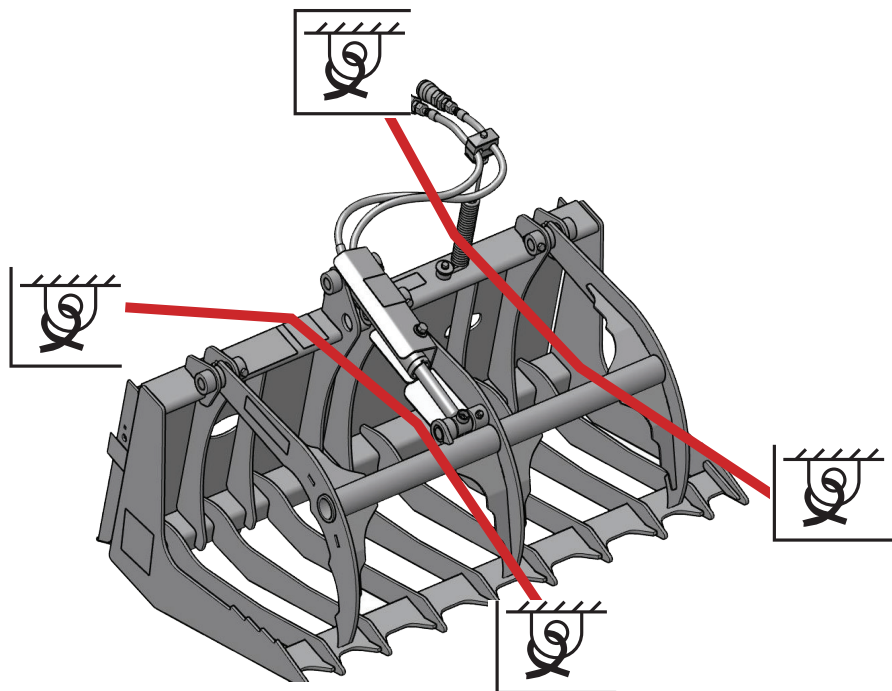
Operation



TIE DOWN POINTS

Tie down points are identified by tie down icons in the Diagram below. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components.

- ▶ Attach tie down accessories to unit as recommended.
- ▶ Check unit stability before transporting.



WARNING!

CRUSHING HAZARD

Verify that all tie down accessories (chains, slings, ropes, shackles and etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.

SEVERE INJURY OR DEATH CAN OCCUR

TRANSPORTING

Follow all local government regulations that may apply along with recommended tie down points and any equipment safety precautions at the front of this handbook when transporting your attachment.



Lubrication

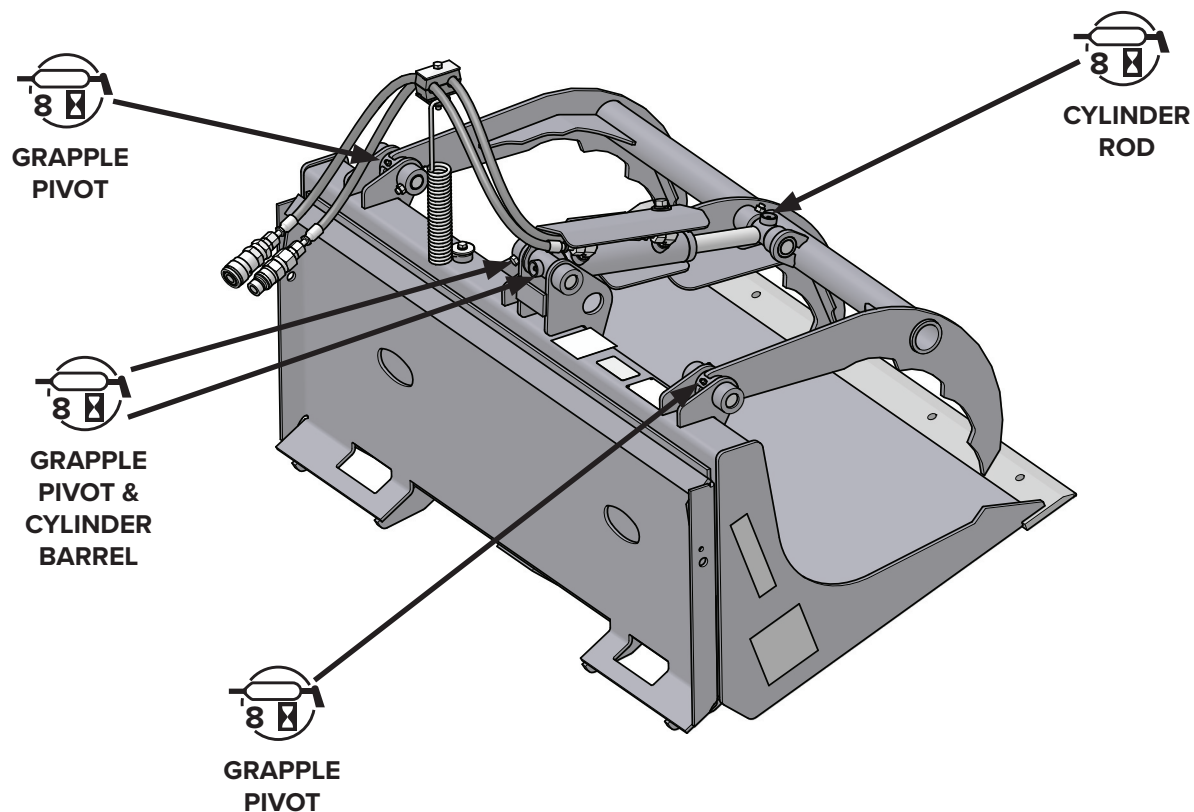


LUBRICATION

All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.



Lubricate daily or every 8 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.



SCRAP GRAPPLE SHOWN

IMPORTANT

Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.

Maintenance

GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However it is very important that these maintenance functions be performed as described below.

PROCEDURE	EVERY 8 HOURS (DAILY)
Check prime mover hydraulic system to ensure an adequate level and cleanliness of hydraulic oil.	✓
Check for missing or loose hardware. Replace or tighten as necessary. See bolt torque specifications	✓
Check hydraulic system for leaks and tighten as necessary. Check for damage and replace as needed.	✓
Check for missing or damaged safety decals and replace as necessary.	✓
Inspect attachment for any worn parts or cracked welds. Repair as required.	✓
Lubricate grease fittings.	✓



WARNING!

READ MANUAL PRIOR TO INSTALLATION

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- ▶ Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- ▶ If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- ▶ Wear safety glasses, protective clothing and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS!**



SEVERE INJURY OR DEATH CAN OCCUR



CYLINDER SEAL REPLACEMENT

The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

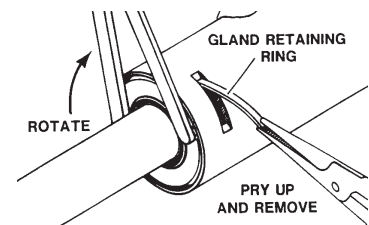
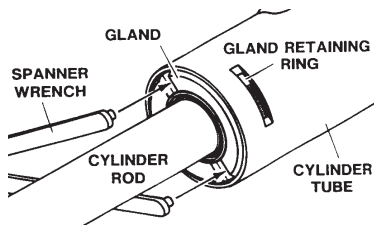
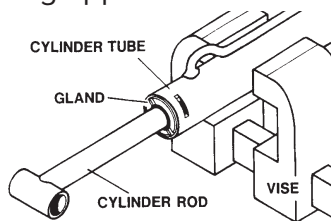
DISASSEMBLY PROCEDURE

IMPORTANT

Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

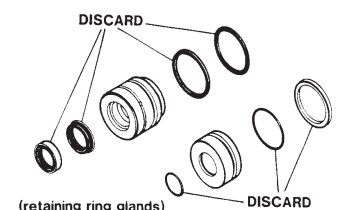
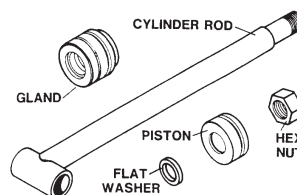
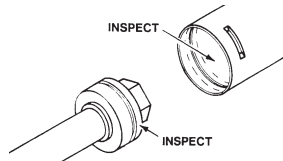
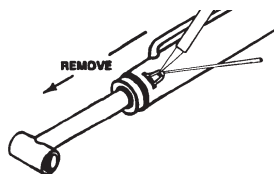
RETAINING RING TYPE GLAND

1. Mount the cylinder tube securely in a vise. **NOTICE: Do not clamp too tight and distort the tube.**
2. Rotate the gland with a spanner wrench (available from your dealer), until the gland retaining ring appears in the milled slot.



Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE: The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled slot.**

3. Pull the cylinder rod from the cylinder tube.



4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
6. Remove and discard all old seals.

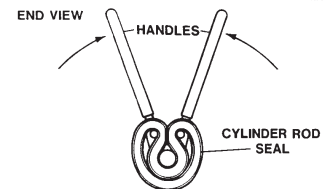
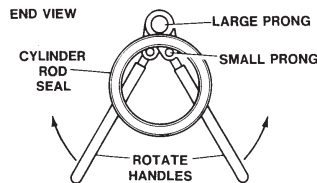
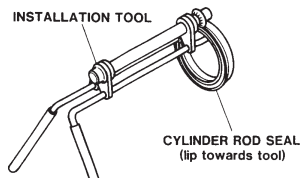
Maintenance

ASSEMBLY PROCEDURE

IMPORTANT

Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure.

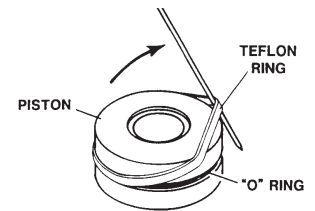
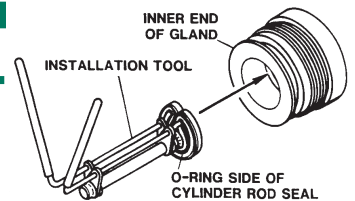
7. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process as it is somewhat difficult to install. A special installation tool is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool. Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.



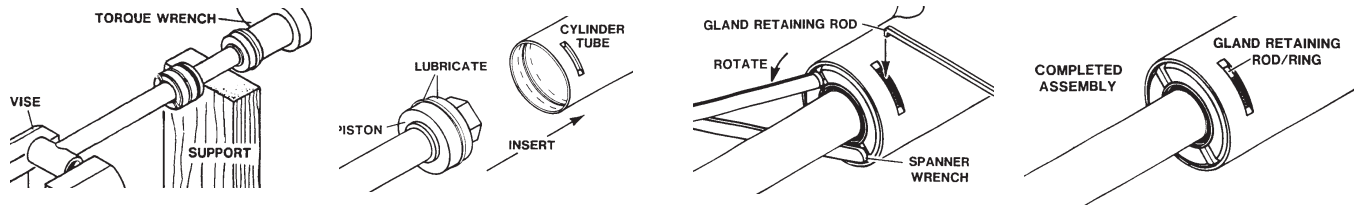
NOTE

Threaded gland is shown in diagram for reference only.

8. Install the new piston ring, rod wiper, O-rings, and backup washers, if applicable, on the piston. Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.
9. Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small O-ring, piston, and hex nut onto the end of the cylinder rod.
10. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.



THREAD DIAMETER	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900
* 1" THREAD DIAMETER WITH 1.25" ROD DIAMETER MIN. 230 FT. LBS. MAX. 250 FT. LBS.	



IMPORTANT

Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

11. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.
12. Rotate the gland with a spanner wrench until the hole (drilled into the retaining slot of the gland) appears in the milled slot of the cylinder tube. Insert the hooked end of the gland retaining rod into the hole.

Rotate the gland until the gland retaining rod forms a ring between the gland and the cylinder tube. When complete, the bent end of the gland retainer ring should be hidden (not turned so it is exposed in the slot) to prevent it from popping out.



WARNING!

CYLINDER LEAK

Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, causing severe personal injury or even death.

SEVERE INJURY OR DEATH CAN OCCUR

Tool Disposal



Hydraulic Oil

Hydraulic oil can contaminate the air, ground and water if not properly recycled. Recycle hydraulic oil in accordance with all State, Federal and local laws, at your local oil recycling facility.

Hydraulic Hoses

Hang hydraulic hoses to drain. Collect the oil for recycling. Contact your local municipal recycling authorities for an approved hydraulic hose recycling site.

Tool Body

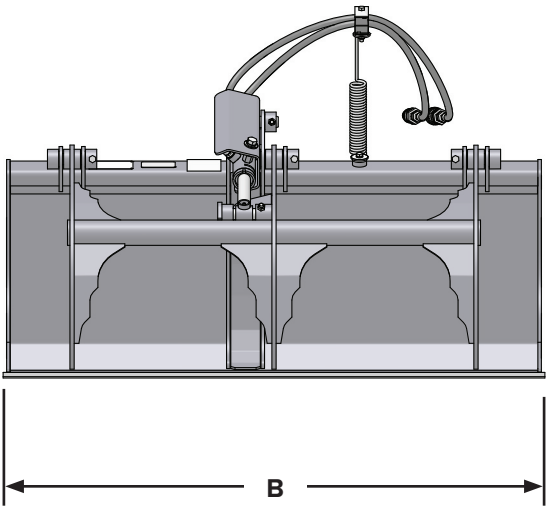
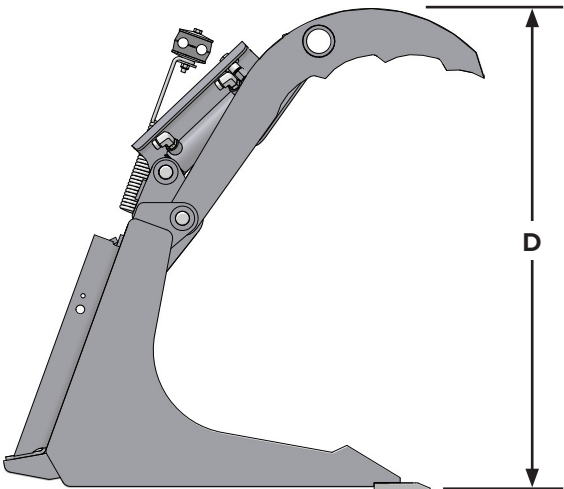
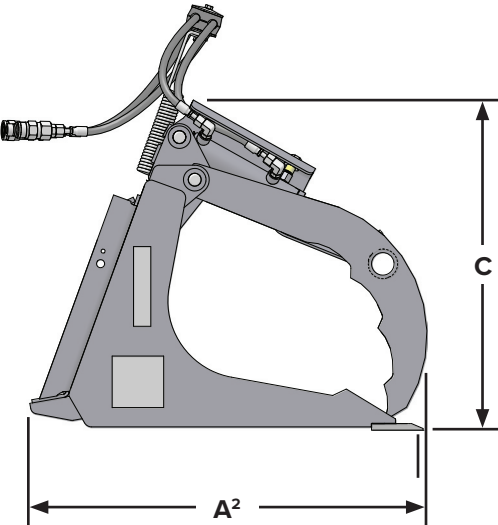
Disassemble the tool and dispose of all non-metal parts. Recycle the metal components. Contact your local municipal recycling authorities for recycling instructions.

Troubleshooting



PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
GRIP ON LOAD NOT MAINTAINED	Leaking cylinder	Repair or replace cylinder
	Improper grip	Lower load and re-grip
	Load shifted	Lower load and re-grip
HYDRAULIC CYLINDER NEITHER EXTENDS NOR RETRACTS	Hoses or fittings loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, remove obstructions inside hoses
HYDRAULIC CYLINDER ONLY EXTENDS OR ONLY RETRACTS	Hoses or fittings loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, remove obstructions inside hoses
HYDRAULIC CYLINDER EXTENDS AND DOES NOT RETRACT	Cylinder piston has become detached from the rod	Repair or replace hydraulic cylinder
EXCESSIVE OIL TEMPERATURE	Hydraulic oil level too low	Refer to your prime mover's operator's manual.
	Obstruction in hydraulic lines	Remove obstruction and replace if necessary.
	Couplers not engaged correctly	Remove and re-engage couplers.
	Hydraulic system overloaded and system relief open	Reduce load

Specifications





SCRAP GRAPPLES				
DESCRIPTION	36"	42"	48"	54"
A. Overall Length ¹	30.61"	31.04"	31.14"	31.15"
B. Overall Width	36.50"	42.12"	48.13"	54.13"
C. Overall Height	25.63"	25.59"	25.63"	25.63"
D. Grapple Opening Height	25.00"	29.84"	29.73"	29.73"
Weight (lbs) ¹	280.51#	305.65#	328.22#	348.56#
Maximum Hydraulic Pressure.....				3000 PSI

BRUSH GRAPPLES			
DESCRIPTION	42"	48"	54"
A. Overall Length ¹	30.86"	30.87"	30.87"
B. Overall Width	42.00"	48.00"	54.00"
C. Overall Height	22.60"	25.43"	22.58"
D. Grapple Opening Height	29.45"	29.43"	29.43"
Weight (lbs) ¹	255.98#	275.17#	283.04#
Hydraulic Pressure			3000 PSI

SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFOR.

¹ Lengths & weight calculated with compact tool carrier mount. Specifications will vary depending on the mount.

Bolt Torque Specifications

GENERAL TORQUE SPECIFICATION TABLES

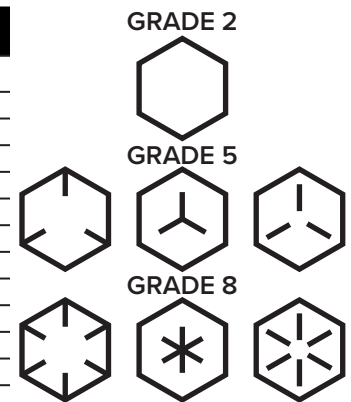
Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

SAE BOLT TORQUE SPECIFICATIONS

IMPORTANT

The following torque values are for use with extreme pressure lubricants, plating or hard washer applications. Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

BOLT SIZE		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE			
		POUNDS FEET		NEWTON-METERS		POUNDS FEET		NEWTON-METERS	
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF
1/4	6.35	8	9	11	12	10	13	14	18
5/16	7.94	14	17	19	23	20	25	27	34
3/8	9.53	30	36	41	49	38	46	52	62
7/16	11.11	46	54	62	73	60	71	81	96
1/2	12.70	68	82	92	111	94	112	127	152
9/16	14.29	94	112	127	152	136	163	184	221
5/8	15.88	128	153	174	207	187	224	254	304
3/4	19.05	230	275	312	373	323	395	438	536
7/8	22.23	340	408	461	553	510	612	691	830
1	25.40	493	592	668	803	765	918	1037	1245
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103



BOLT HEAD IDENTIFICATION MARKS AS PER GRADE. NOTE: MANUFACTURING MARKS WILL VARY

METRIC BOLT TORQUE SPECIFICATIONS

NOTE

The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.



BOLT HEAD IDENTIFICATION MARKS AS PER GRADE.

Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

Parts



In order to provide you with the most UP-TO-DATE part information, all parts for this attachment have been moved to our website at www.paladinattachments.com. Please use these diagrams and parts lists to locate replacement parts.

When servicing your attachment, remember to use only original manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering when contacting the factory, please have the product control number (PCN or C/N) or model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number, model and serial number for your attachment should be recorded in the space provided on the cover of this manual. This information may be obtained from the serial number identification plate located on your attachment.

IMPORTANT

Most daily and emergency parts orders (in stock) received by 10:30 A.M. (Eastern Standard Time) will be shipped UPS Ground the same day received. UPS Next Day orders must be received by 1:30 PM (Eastern Standard Time.)

SERVICE DEPARTMENT

(734) 996-9116

(800) 456-7100

For Fax and E-mail Orders

PLC_Sales@paladinattachments.com

(734) 996-9014

Warranty



In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at www.paladinattachments.com.



INDUSTRIAL TOOLS & ATTACHMENTS

 **PALADIN**  **STANLEY**  **PENGO**  **LABOUNTY**