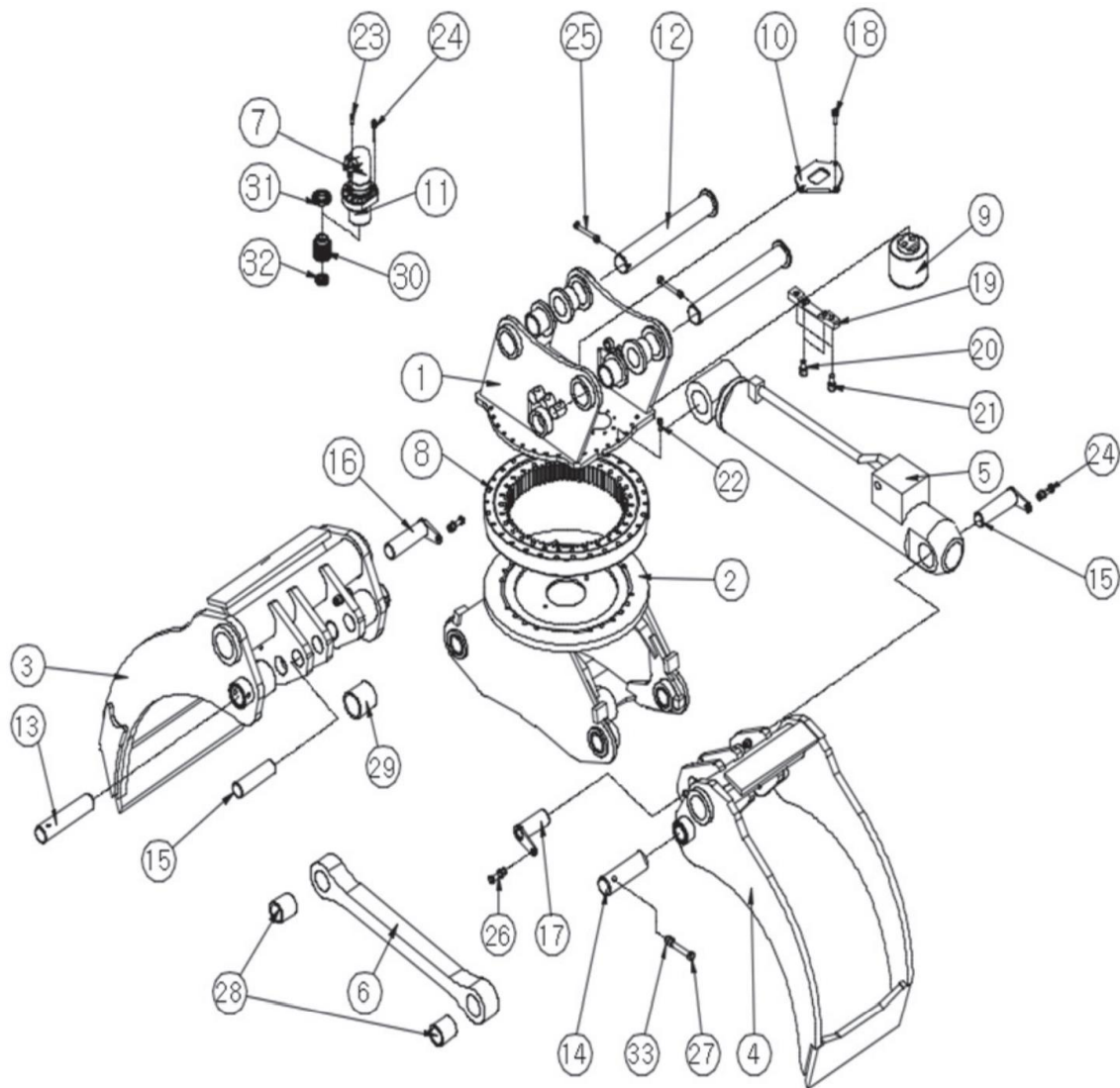




Ryan's Equipment

Grapple Series

Operators / Parts

111 Quicksilver Lane * Edmore, MI 48829, P:(989) 427-2829

10000-088-5, 2022

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INTRODUCTION

Dear Customers,

Thank you for your purchase of a Ryan's Equipment Grapple.

It has been the policy of Ryan's Equipment Inc. to design and build quality and high-performance tree care and forestry attachments.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents. Remember, never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.

Unless noted otherwise, right and left sides are determined from the position of the operator when behind the product facing forward.

To facilitate parts ordering, record the model and serial number of your unit in the spaces provided below.

Model: _____

Serial Number: _____

Date of Purchase: _____

Should the equipment be abused or modified to change its performance beyond the original factory specifications, the warranty will become void.

The copying and/or printing of this manual without prior consent of Ryan's Equipment is prohibited.

HAND OVER DECLARATION

By handing over the instructions for use, the manufacturer has hereby fulfilled its obligation to provide information concerning the operation, safety, and maintenance provisions. Confirmation shall be required to prove that the machine and the instructions for use have been duly handed over. We therefore request that you complete the warranty card, found in the back of this manual, and return it to us.

Please read and apply the instructions for use carefully before using the machine for the first time. In the event of further handover of the machine by the customer, the instructions for use must also be passed on. The new machine operator must be trained with reference to the provisions stated here-in.

We request your understanding that we are not able to accept warranty claims that arise on the basis of improper operation, inadequate maintenance, use of non-approved operating materials or non-compliance with the safety provisions, here-in.

Observance of and compliance with the instructions for use increases the reliability once in use and the service life of your machine and reduces the repair costs and down time.

We reserve the right to make modifications to technical details in the sense of further development with regard to the information and figures contained within this documentation.

All Rights Reserved in accordance with copyright law.

Owner Information

Thank you for your decision to purchase a Ryan's Equipment Grapple. To ensure maximum performance of your machine, it is mandatory that you thoroughly study the owner's manual and follow its recommendations. Proper operation and maintenance are essential to prevent injury or damage and to maximize machine life.

Operate and maintain this machine in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and / or laws, and in compliance with on-product labeling and these instructions.

Make sure all personnel have read this owner's manual and thoroughly understand safe and correct operating, installation, and maintenance procedures.

Continuous improvement and advancement of Ryan's Equipment products may result in changes to your equipment, that may not be reflected in this publication. Ryan's Equipment Inc. reserves the right to make product improvements to the machine at any time. Although great care has been taken to ensure the accuracy of this publication, Ryan's Equipment does not assume any liability for errors or omissions.

Warranty Policy

Be sure to read and understand the Warranty Policy at the beginning of this manual. It is also important that you fill out the Warranty Registration form(s), (in the back of the manual), completely with your dealer so as not to void the warranty.

Serial # Location



The arrows above indicate the location of the serial number tag (1) and the location of the serial number stamped into the unit.

Always use your model and serial number when requesting information or when ordering parts.

Manual Storage

Keep Owner's Manual and the entire documentation packet with the machine. The Owner's Manual must be available for all operators.

Product Features

- Heavy duty, standard pivot bearing
- Premium Strength Steel construction

WARRANTY POLICY

NOTE: THIS IS A LIMITED WARRANTY. PLEASE READ CAREFULLY.

1. Subject to the provisions set forth below, Ryan's Equipment warrants the products it manufactures will be free of defects in materials and workmanship for a **period of six (6) months from date of shipment by Ryan's Equipment or 1,000 hrs.** Warranty period begins with the date of shipment by Ryan's Equipment, regardless of the date of delivery or the date any item is placed in service. **THIS IS THE ONLY WARRANTY DELIVERED BY RYAN'S EQUIPMENT AND IS IN LIEU OF O OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.** Such warranty is further limited as expressed below.

2. In the event of any warranty claim, Ryan's Equipment shall have no obligation other than to either repair or replace any item subject to warranty at its sole and absolute discretion. Place of repair or replacement shall be determined by Ryan's Equipment. Freight and transportation costs to the point of replacement or repair shall be prepaid by claimant. Freight and transportation costs for return to claimant after repair or replacement of any failed items subject to return to warranty repair or replacement shall be paid by Ryan's Equipment. Claimant shall pay freight and transportation costs for return of any items determined not to be defective or not subject to warranty and therefore not subject to repair or replacement. Items replaced shall belong to Ryan's Equipment. In no event shall Ryan's Equipment be responsible for financial obligation or cost under this warranty exceed the market value of the equipment involved at the time of such repair or replacement, as determined by Ryan's Equipment, Inc.

3. This warranty IS VOID AS AGAINST and does NOT cover effects, damage, or failures of or arising from: (1) components or parts supplied to Ryan's Equipment by other manufacturers (such as hydraulic components or bearings), warranties for which will be limited to those given by the suppliers thereof to the extent transferable by Ryan's Equipment; (b) ordinary wear and tear and expenditure of useful life in operation (such as tires, batteries, and other expendable components); (c) use of products manufactured by Ryan's Equipment with parts, equipment, or components not authorized in advance by Ryan's Equipment; (d) failure to operate the equipment in accordance with Ryan's Equipment instructions for use of equipment; (e) failure to properly service the equipment in accordance with Ryan's Equipment recommendations for same; (f) modification in a manner not specifically approved by Ryan's Equipment, or the use or installation in the item of unauthorized parts or components; or (g) negligent or improper use and handling of the equipment in operation or for purposes outside its design specifications.

4. IN NO EVENT SHALL RYAN'S EQUIPMENT BE LIABLE OR RESPONSIBLE FOR ANY SPECIAL CONSEQUENTIAL OR INDIRECT DAMAGES, INCLUDING LOST PROFITS OR LOST COMMERCIAL OPPORTUNITIES, with respect to any item covered by this limited warranty or any action or activity undertaken with the item, or for any damage sustained by any person claiming to be a third-party beneficiary under this limited warranty. This limited warranty shall extend only to the initial purchaser of the Ryan's Equipment product covered by this warranty.

5. This limited warranty covers only new items manufactured by Ryan's Equipment. It does NOT extend to any used or rebuilt item, unless the sale order or contract for such item expressly provides for warranty coverage.

SAFETY INSTRUCTIONS

Safety First

Safety Alert Symbol



THIS SYMBOL MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

This message alert symbol identifies important safety messages on the machine and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

SIGNAL WORDS: note the use of signal words DANGER, WARNING, AND CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result death or serious injury. This signal word is to be limited to the most extreme situations, **typically for machine components which, for functional purposes, cannot be guarded**. The color associated with **DANGER** is **RED**.

WARNING: Indicates a potentially hazardous situation which, 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**. The color associated with **WARNING** is **ORANGE**.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, **may result in minor or moderate injury. It may also be used to alert against unsafe practices**. The color associated with **CAUTION** is **YELLOW**.

Important: Highlights information that Must be Heeded.

Note: A reminder of other related information that needs to be considered.

If Safety Decals on this machine are ISO, two panel pictorials, decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.

Be certain all machine operators are aware of the dangers indicated by safety decals applied to the machine, and be certain they follow all safety decal instructions. Contact Ryan's Equipment for safety decal replacement.

Ryan's Equipment cannot anticipate every possible circumstance that may involve a potential hazard. The warnings in this owner's manual are not all inclusive.

Owner's Responsibility

Due to the potential danger of flying debris, it is the owner's responsibility and is "**ABSOLUTELY MANDATORY** that **IMPACT-RESISTANT SHIELDING**" be installed on the machine to protect the operator.

It is **ABSOLUTELY MANDATORY** that all personnel read and follow all safety precautions before operating the machine and attachment.

Make sure that all personnel have read this owner's manual, and thoroughly understand safe and correct installation, operation, and maintenance procedures.

Operate and maintain this machine in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and/or laws; and in compliance with on-product labeling and this owner's manual instructions.

Make sure that all personnel know how to stop the machine and attachment by disengaging all controls. (See "Mandatory Shut-Down Procedure", below).

Make sure the attachment is installed on the machine correctly before being placed in service. At regular intervals thereafter, the attachment should be serviced in accordance with procedures outlined in this owner's manual.

Mandatory Shut Down Procedure

- Stop the machine and attachment on a level surface and lower the attachment to the ground
- Move throttle to idle position
- Disengage all power to the attachment
- Shut off engine and remove the key

Wait until the unit has stopped completely before inspecting the attachment.

Safety Rules

These are general safety considerations. Additional precautions may be necessary to operate your machine in a safe manner. Be certain you are operating your machine in accordance with all safety codes, OSHA rules and regulations, insurance requirements and local, state, and federal laws.

Operating Safety

- Do not start, operate, or work on this attachment until you have carefully read and thoroughly understand the contents of this manual and the operator's manual for your machine.
- Read and observe all warning decals on the machine before attempting to operate the attachment. Do not attempt to operate this attachment unless all factory devices and decals are in place. Keep all guards, shields and decals in place.
- Become familiar with and know how to operate all safety devices and controls on the machine and attachment before attempting to operate. Know how to stop the machine and attachment before starting it.
- Do not allow anyone to operate the attachment until he or she has read the owner's manual and is completely familiar with all safety precautions and controls. Keep the work area clear of all unauthorized personnel.
- Because of the potential safety hazard to eyes from hydraulic leaks and/or flying debris, use protective **eyewear is absolutely mandatory** for operator and others in the work area.
- Do not wear loose hanging clothes, neckties, or jewelry around rotating parts. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in any moving parts on the machine and or attachment.
- Do wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes and other protective clothing when required.
- Do not allow persons under the influence of alcohol, medications, or other drugs that can impair judgment or cause drowsiness to operate or maintain the machine.
- Never allow children to operate the equipment.
- Keep children, bystanders, and other workers off and away from the machine and attachment during operation. No riders allowed.

- Use handholds and step plates when getting on and off the machine to prevent falls. Keep steps and platforms cleared of mud and debris.
- Always have an operator in the machine while the attachment is in operation. Never leave the machine and attachment running and unattended.
- Keep your feet on the pedals, (floor plates) seat belt fastened snugly and seat bar lowered, (if equipped), when operating the attachment.
- Always use an approved roll bar and seat belt for safe operation. Overturning a machine without a roll bar and seat belt can result in injury or death.
- Operate the attachment only from the operator's seat.
- Before leaving the operator's position for ANY reason or allowing anyone to approach the machine and attachment, always perform the mandatory shutdown procedure.
- Keep hands and feet clear! Never step over or climb over the attachment while the engine is running; entanglement could occur.
- Disengage auxiliary hydraulics and place all machine controls in neutral and engage the parking brake before starting the engine.
- Remove from area of operation all foreign objects such as bottles, rocks, wire, etc., that might become tangled in the disc, causing damage to the machine or be thrown striking other objects.
- Never attempt to make any adjustments while the attachment is running or the key is in the "ON" position in the machine. Before leaving the operator's position, disengage power to the attachment, shut off engine and remove ignition key.
- Should excessive vibration occur, disengage the auxiliary hydraulics immediately and shut off engine. Do not continue to operate the attachment until the problem has been determined and corrected.

Maintenance Safety

- Do not work on this attachment until you have carefully read and thoroughly understand the contents of this manual and the operator's manual for your loader.

- Before inspecting, cleaning, lubricating, adjusting or servicing any part of the attachment, always exercise the Mandatory Shut-Down Procedure. See “Mandatory Shut-Down Procedure”, here in. After service has been performed, be sure to restore all guards, shields and covers to their original position.
- Never attempt to lubricate, or make any adjustments while the attachment is running, or the key is in the “ON” position in the machine. Before leaving the operator’s position, disengage power to the attachment, shut off engine and remove ignition key.
- When performing any maintenance, make sure the area is clear of any distracting objects. Keep work areas clean and free of grease and oil to avoid slipping or falling.
- Before working under the attachment, be certain it is securely blocked!
- Do not smoke while servicing the attachment.
- Do not touch loader or any attachment parts which might be hot from operation. Allow such parts to cool before attempting to maintain, adjust or service.
- Make sure all controls, (levers, pedals, and switches), are in NEUTRAL position before starting the engine.
- Before leaving the operator’s position for ANY reason or allowing anyone to approach the machine and attachment, always perform the mandatory shut-down procedure.
- Periodically check all guards, shields and structural members. Replace or repair anything that could cause a potential hazard.
- Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the machine and/or void the warranty.
- It is the operator’s responsibility to be aware of machine and attachment operation and work area hazards at all times!
- Never operate the attachment without adequate light and visibility.
- Keep hands and feet clear! Never step or climb over the attachment while the disc is engaged or the engine is running; entanglement could occur.

- Operators are responsible to know the location and function of all guards and shields including but not limited to the drive and disc. Operators are responsible to make certain that all guards are in place when operating the machine and attachment.
- Operators are responsible to be aware of safety hazard areas and allow instructions on warning, caution, or danger decals applied to the machine and attachments.
- Know the area before operating the machine. Be aware of power lines or other equipment.

Hydraulic Safety

	Warning: Contact with high pressure fluids may cause fluid penetration and burn hazards. Fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. If fluid is injected into the skin, seek medical attention immediately!
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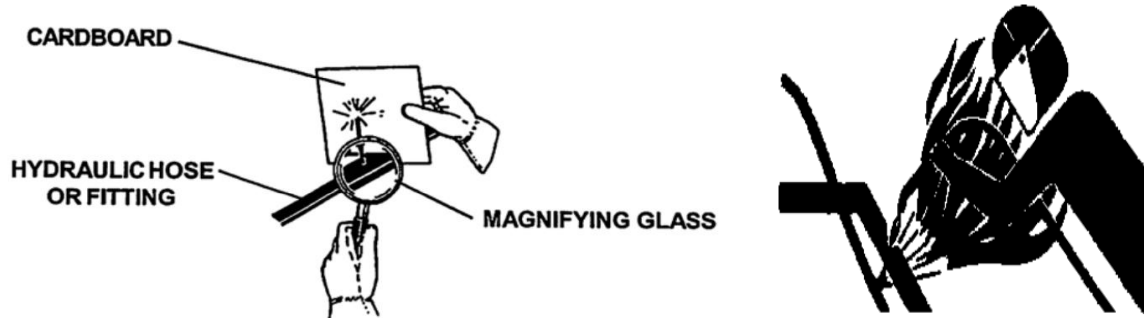
- Always wear safety goggles or glasses when working on hydraulic system to avoid eye injury.
- The hydraulic system is under high pressure. Make sure all lines and fittings are tight and in good condition. These fluids escaping under high pressure can have sufficient force to penetrate skin and cause serious injury.
- Never check for leaks by using any part of your body to feel for escaping fluid.



DON'T

- To prevent serious personal injury from escaping high pressure fluid, never attempt to inspect, service or disassemble any part of the hydraulic system until all pressure has been relieved from the system.

Escaping fluid under pressure can have sufficient force to penetrate the skin causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks. 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.



California Proposition 65 Warning

	Warning: This product may expose you to chemicals that according to the state of California, may cause cancer. For more information, go to www.p65warnings.ca.gov .
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A decal like this warning is adhered to the machine. If the decal should become worn or missing, replace immediately.

Safety Decal Part #'s

<u>Part Number</u>	<u>Description</u>
10100-019	Danger, Flying Material
10100-062	Danger - ROPS... (5 x 7)
10100-064	Danger -Safety Bolts
10100-068	Warning - Safety Bolt, Installation Note
10100-069	Warning - Crush/Pinch Hazard - Keep Away
10100-072	Warning (Do Not Operate...)
10100-076	Warning - PPE
10100-086	Warning (Baltrotors - Don't Bang)
10100-088	Warning - Safety Bolt, Installation Note
10100-001	Caution - Moving Parts
10100-073	Caution (Disengage Winch)
10100-080	Caution - Case Drain

SET-UP INSTRUCTIONS

Before you start:

Visually inspect the unit before starting the machine. Check for loose or missing parts. Check all bolts for tightness.

- Read the entire operator's manual(s) before ever attempting to use the unit. This knowledge is necessary for safe operation.
- Follow all safety decals. Keep them clean, and replace them if they become worn, damaged, or illegible.
- Do Not paint over, remove, or deface any safety signs or warning decals on your equipment.
- Know your equipment inside and out. Know how to operate all controls, and know emergency shutdown procedures.
- Keep all stepping surfaces, pedals, and controls free from dirt, grease, and oil. Keep equipment clean to help avoid injury from a fall when getting on or off the unit.
- Use hand holds and step plates when getting on/off. Failure to do so could cause a slip or fall.
- Be alert to others in the work area. Be sure others know when and where you will be working. Make sure no one is behind the equipment.
- Never take passengers on your equipment. There is **No Safe Place for a Passenger**.
- Never try to board equipment while it is moving.
- Turn off engine before performing maintenance. If lift arms must be left raised for maintenance or any other reason, use a positive lift arm lock to secure the arms in place. Serious damage or personal injury could result from lift arms accidentally lowering.
- Reduce speed when driving over rough terrain, on a slope, or turning to avoid overturning the loader.
- Test all controls before you begin.

OPERATING INSTRUCTIONS

WORKING WITH THE ATTACHMENT

Visually inspect the unit before starting the machine. Check for loose or missing parts. Check all bolts for tightness.

For first time users, start the machine in a clear, open area and become familiar with the controls. Run the throttle at half speed and travel at a low speed. Raise the grapple slightly until comfortable with the controls.



- Never operate the unit without first reading and understanding the operator's manual.
- Operate the attachment only in daylight or sufficient artificial light.
- Do Not carry load with arms in the raised position. Always carry loads close to the ground. Do Not step off platform with load raised.
- Check your work area and know where all utility lines are. Avoid hitting underground electrical wires, cables, pipes, fence posts, gas lines, uneven sidewalk edges, large rocks, etc.
- Never operate equipment while under the influence of alcohol, or prescription drugs which could inhibit physical and/or mental capacity.
- Do Not exceed rated operating capacity, as machine may become unstable, which may result in loss of control.
- Slow down before turning. Sharp turns on any terrain may cause loss of control.
- Always lower the loader arms to the ground, shut off the engine and remove the key before getting off the unit.

1. Foreword

This manual focuses on;

- Increase safety, right application and economical benefit.
- Prevent and avoid operator's danger.
- Minimize the repair cost and equipment down-time.
- Maximize the efficiency and equipment durability.

This manual should be protected by the rules and regulations of the relevant country and supplemented by the concerned local regulations.

It is the user's responsibility to confirm the applicable safety regulations to follow where the equipment is used.

Operators must thoroughly understand the manuals provided by the manufacturer and the manuals should always be kept near the equipment whenever in use.

The users of the equipment must fully understand the general safety instructions as well as operational instructions and should strictly adhere to such instructions in all working conditions and situations.

- During operation/work preparation/ repairs/ equipment cleaning/ parts changes
- After services/periodical inspection & maintenance
- During equipment transportation.

For the safe operation, it is very important to abide with the instructions in the manuals and to use the equipment for the works originally intended to use.

The equipment is designed and manufactured for the specific application and performance. When the equipment is used other than designated application or used excessively over the designed capacity, the equipment will not perform properly.

In such cases, the manufacturer and supplier shall not bear the responsibility forth defects caused by such inappropriate use.

The manufacturer shall not be responsible for any problem caused by unauthorized structural modifications or changes of the equipment.

Due to the continuous development of the equipment, the design and configuration may change without prior notice.

Cautions:

Use the equipment only after fully understanding the safety instructions described hereunder. Operator should understand operation instruction, equipment manual and working procedures and regulations.

Please ensure to be familiarized with the installation of, inspection of, operation of the equipment before the start of operation.

1. During the work, using the equipment, cautions are required to avoid injuries from debris, loose scrap or flying materials from such works. Operator should wear protective gears before starting to work.
2. During the operation, dismantling and assembly, broken scrap or pins may fly and injure people around. Therefore, precaution is required to keep the people properly away from the jobsite.
3. Before taking seat in the vehicle installed with the equipment, operator should check his position and fix the position of the equipment for safety. Operator's compartment should be protected with the reenforced protective shield and the operator should fully understand the type and shape of the attachment.
4. The equipment without the stickers, sketches, decals in each respective position as described in this manual may not be genuine and should not be used for the work. Each decal should be adhered to the correct location and should regularly be inspected to ensure that the contents are readable. When the decal is severely damaged and unreadable, it should immediately be replaced with new one. Decals are available from the authorized dealers and sellers.
5. During the use of the equipment, operator's eyes, ears and respiratory organs should be protected. Working uniform should fit to the operator, otherwise it can cause accident or injury to the operator.
6. Once the equipment is started to operate, it will generate heat and the equipment will get hot. Please wait long enough and touch the equipment after it becomes cooled.

When transferring the equipment, be sure to give this manual as well.

2. Safety Information

Most of the accident at the jobsite is coming from the lack of understanding of the basic operation method and inadequate repair or maintenance services. Accidents mostly happen from the place where the user believes to be possibly dangerous.

Therefore, before operating the equipment, through inspection and repair, if necessary, should be undertaken. The operator should have the enough experiences of operating the equipment and should fully understand the manuals in order to operate the equipment as instructed in the manual. If still unfamiliar with the manual, please consult with the other expert to learn the operation, repair and inspection.

Prior to inspection, repair and operation, please read and fully understand this manual and safety information thereof.

For better understanding of this manual and warning plates of the equipment, safety related messages are classified as hereunder.

Safety level and its meaning can be classified as the following:
Users are requested to fully understand the contents and their meaning.

 DANGER	Indicate a pressing danger that may result in death or serious injury if not avoided. However, this mark is issued only on extremely dangerous situation. (Indicate danger of death or serious injury)
 WARNING	Indicates a danger which is highly probable to result in death or serious injury if not avoided. (Indicate probable danger of death or serious injury)
 CAUTION	Indicate danger where it may result in light to medium injury. (Indicate light wound or injury)
 NOTES	Indicate the direct or indirect status which requires attention for personal safety and property protection. (Indicate company regulations or personal safety rules)

This manual and every sticker, warning plates are all very important for the safety and therefore should always be kept clean and discernable and also should be replaced with new one when damaged.

In order to avoid and prevent the dangers, please follow the Safety instruction.

The manufacturer is not able to presume all the dangerous cases in advance, any rule shown in this manual or on the warning plates does not cover every situation relevant to safety.

In carrying out any operation, inspection or maintenance services not described in this safety instruction, it is to be understood that necessary measures for safety shall be taken under the sole responsibility of the user himself.

Ryan's Equipment Inc. is not able to presume all the probable danger(s) which may arise during the operation, assembly or repair services of our equipment and the working conditions where the equipment will be used.

Accordingly, this manual does not cover any particular warning item or every situation relevant to safety.

For the operation, assembly or repair service which are not described in this manual, the user should take whatever necessary safety measures.

3. Specifications

Before Operation (Safety Information)



DANGER

Do not start operating the grapple until this manual is thoroughly read and completely understood.

Be sure to clearly understand safe operation and correct maintenance services described in this operation manual so that the performance of the grapple can continuously be maintained.

Observe the safety instruction described in this manual and also observe the safety regulations inside the jobsite.

Working area should be decided in a manner not to expose the personnel from any probable dangers and excavator should be moved in very careful manner.

During operation, make sure that nobody is inside the designated safety distance from the excavator working area.

During any type of operation, make sure to wear working uniform, safety glasses, helmet, groves and other protective tools required. When installing the grapple to the excavator, the grapple may hit the operator cabin. Be careful when operating the equipment near to the operator cabin.

When the grapple is lifted, do not enter underneath the grapple body.

If any problem is found during operation, immediately stop the operation and remove the cause of the problem before start operating again.

For the regular inspection of the equipment, check the parts in accordance with this manual.

Hydraulic instruments are all correctly adjusted in the factory before shipment, therefore should not be changed at user disposal.

If any problem is found in the key instrument, do not disassemble the instrument and contact the manufacturer or the designated after service center.

****Read warning items and observe the safety prevention instruction.***

1. Before starting the operation, be sure to understand the described regulations, warnings and working procedures and strictly observe the instructions.
2. Be sure to wear operator's personal protection gear inclusive helmet, work shoes, work uniform, etc.. When required, also use safety glasses, ear plug, safety gloves and other protective gear.

3. The manufacturer shall not take any responsibility for any accident or damage caused by the modification or partial change of the equipment by the user without obtaining prior approval of the manufacturer and shall not compensate any 2nd, 3rd indirect consequential damage.
4. After starting the operation of the equipment, the equipment will be heated to very high temperature and can burn the hands when contact is made to the surface without wearing protective gear. Therefore, be sure to check the temperature returned to normal before the inspection of oil lines, system or repair or change of the oil, oil filter and coolant.
5. The ground conditions, geography of the working area, should be fully understood by means of visual inspection or photograph. Be sure to eliminate all the factors which may cause the danger and clean the working area in orderly manner.
6. Inside the working area, other than the authorized personnel are not allowed to enter.
7. Before starting the operation, the equipment and the excavator should remain at stop mode and no other personnel are allowed in the working area.
8. If the operator or his hand/foot are trapped in the moving equipment, it can cause critical accident. operator's careful attention is required.
9. When defects or problem arise during the operation, this should immediately be reported to the supervisor and shall not operate the equipment again until necessary repairs are completed in full.
10. The owner of the equipment should regularly inspect the equipment for safe operation.
11. The parts and material used in the equipment may wear or change along with the operating hours. However, if defects are found even before the lapse of operating hours, such parts should either be repaired or replaced.
12. Unauthorized personnel of this equipment are not allowed to enter the working area.
13. Internal pressure of the equipment is normally controlled by the hydraulic system. In order to supply or remove the oil from hydraulic system, stop the engine and wait until the oil is cooled enough.
14. Do not operate the equipment when you under the influence of drugs or alcohol.
15. Warning Decals;
 - (a) Use Hearing Protection
 - (b) Use Safety Glasses
 - (c) Use Gas Masks
 - (d) Be sure to understand the manual before operating the equipment.



(a)



(b)

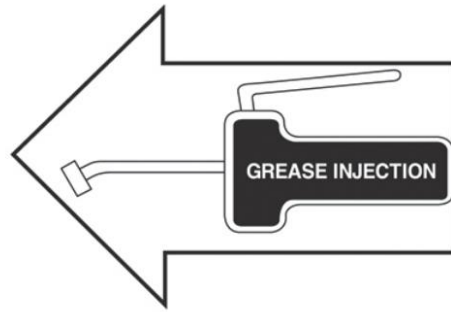


(c)



(d)

16. Grease injection sticker:



17. Be sure to inspect the hydraulic system for any possible oil leakage. Before operating the equipment, oil leakage should be repaired, and twisted hoses should be straightened. Inspect all the plugs, caps and injection caps are all in correct position and also inspect that the pressure valves, gauges are at right place and operating normally.

18. Visual inspection of the external appearance is required to check any sign of physical damage like crack of weld part, coating, bending or twisting of the grapple. Since any sign of crack or peeling of paint may indicate structural damage. Detail inspection of the area is necessary. Stop using the equipment until necessary repair is completed.

19. For carrying out the works which are not allowed by this manual or excessive use beyond the range of use are wrong way of using the equipment. Accordingly, the manufacturer and supplier shall not take any responsibility for the damages caused by such wrong uses. The appropriate use of the equipment is described in the operation and maintenance manuals.



WARNING

The repair or maintenance undertaken inadequately may cause death or serious injury.

Accordingly, the repair or maintenance should be undertaken only by the authorized personnel qualified by the Ryan's Equipment, Inc.

*Thoroughly read the manual and follow the instruction described therein for all the maintenance, repair or cleanings.

*Maintenance, repair or cleaning should be undertaken in a secluded, hard ground area, and away from other workers.

*Do Not make modification or change which will affect the structural configuration or performance. Also use the genuine parts available from Ryan's Equipment, Inc.

4. Inspection Points Before Operation

Make sure to observe the safety prevention described below before operating the grapple.

Make sure that the personnel in the working area leave to the outside of the dangerous area.

Close of front shield of the operator cabin to protect from the flying objects or debris. Operate the grapple only from the operating cabin.

4.1 Test Operation

Adjust the grapple to vertical position of the excavator boom.

4.1.1 Test Operation

Use the operating lever in the cabin to check the grapple tines.

4.1.2 Checking the rotation to left and right.

- Grapple will be rotating by means of the function of the carrier vehicle. When rotating, the unused port should be closed by the nut plugs.
- Connection of the grapple rotation.

Make sure the hoses are correctly connected.

Grapple is rotatable clockwise and anti-clockwise

OPERATION

Initial Operation



WARNING

Make sure to observe instructions from each manufacturer.

- Make sure to understand thoroughly the manuals and the relevant rules supplied by the manufacturer.
- Inspect the safety instrument of the carrier vehicle before starting.
- For the travel of the carrier vehicle, observe the safety instruction of the manufacturer.

The equipment passed necessary tests before shipment. However, the excessive use of the machine from the beginning may shorten the durability. Therefore, initial operation shall be carried out with following the following in mind.

- After starting the engine, keep the idle run for some 5 minutes.
- The optimum temperature of the operation fluid is 40C-60C. Accordingly, when the temperature is lower than the optimum temperature, heat the fluid before operating the equipment.

Grapple Installation



WARNING

Unauthorized personnel are not allowed access to the jobsite while the equipment is in operation.

Make sure to observe all the instructions requested by the manufacturers.

- After installation of the grapple, the excavator operation should follow its manufacturer's guidelines.
- Grapple should be used within the range of its application.
- All the equipment should be regularly inspected, to check the wear, loosening and damage.
- Make sure to replace consumable parts like pins or hoses in time.
- Make sure to close the front shield or windows when operating to protect the operator from flying debris.
- Grapple should always be operated from the operator's cabin
- The excavator upper structure equipped with the grapple is very heavy. Therefore, the excavator should be operated at minimum turning radius and rotating speed as much as possible.
- Make sure to immediately stop the operation if unauthorized personnel approach the dangerous working area.
- Make sure to strictly observe the safety regulations of the working area.
- The operating levers should be handled after checking that no personnel are around.
- When the excavator is in travel, make sure to lower the equipment as much as possible and always keep the equipment in a stable position. Particularly, when climbing the slope or on the uneven ground, the stability should be maintained. Make sure Not to work above or under a cliff where there are dangers of falling rocks or landslide.
- Hydraulic fluid temperature should never exceed 80C. Make sure to check the temperature all the time. The excessively heated fluid oil may cause fire.
- When the temperature of the fluid is below 20c, any abrupt operation of the lever might damage the hydraulic instruments.

Installation

- Before assembly of the grapple, put it on the wood block or another platform on the flat ground to avoid damage of the main body.
- Assemble top bracket on the grapple (except if the top bracket is already assembled)
- Make sure pins are correctly in place.
- Inject grease to the pin installed. (Refer excavator manual for grease injection.)
- Remove the bucket from the excavator and carefully follow the guidelines from the manufacturer and the operator in advance. Make sure to prevent contamination of hydraulic hoses of the hydraulic system.
- Put the excavator to the right position and slide the 2nd arm of the excavator toward the top bracket.
- Connect the top bracket of the grapple to the excavator arm, where the bucket has been removed, using the pin. In this process, the bucket hole and bucket cylinder should be consistent.
- Move the bucket cylinder and check the grapple is operating smoothly. After checking the bucket hole and the bucket cylinder are well connected, install supplement pin, additionally.
- Connect the hydraulic line. Connection hose should be long enough in consideration of the moving distance of the excavator and the grapple.
- Remove the remaining air in the hydraulic system after assembly of the grapple to the excavator or after work using the grapple. If the air remains in the cylinder, the air can mix with the oil and become compressed together to cause spontaneous combustion. Make sure to take confirmation procedure.

(If this situation happens, it will damage the cylinder. To remove the remaining air, slowly move the grapple arm 3-4 times. At this time, slowly move the arm in low pressure instead of the high pressure. Thus, the remaining air will be removed.)

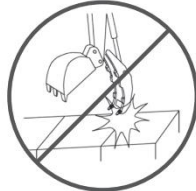
Operational Cautions

Cuations when using the grapple

- Do Not continuously press operating switch during the use of grapple holding something
(Prohibited to press operating switch or pedal more than 3 seconds in this case)
- Do Not lift the excavator by pushing the grapple into the ground.
- Do Not use the grapple as the purpose of using the lever.
- Do Not pull the bucket only during the use of grapple holding something
(Both bucket and grapple must be used together in this case)

*Damaged Cylinder / Welding crack / Structural deformation may be caused with the ignorance in these above cautions.

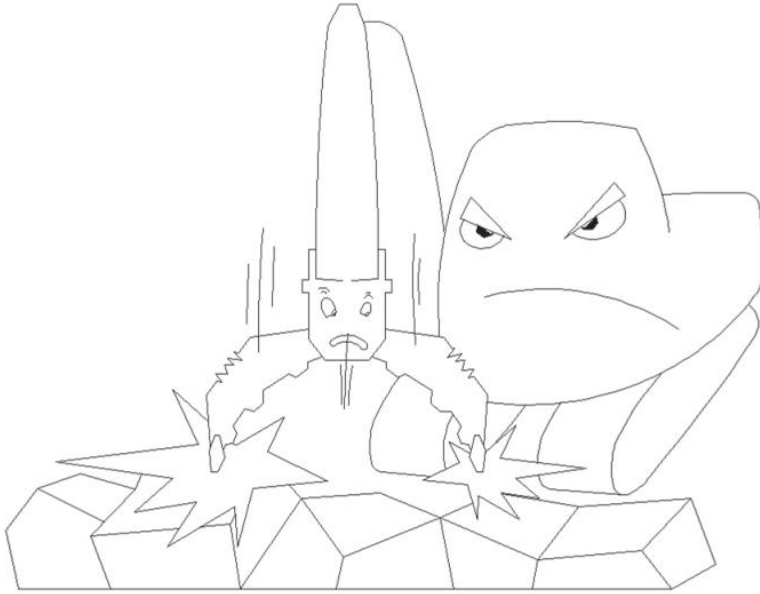
If this is the case, After Sales Service will be charged with regardless of warranty period.



WARNING

- Do Not push or pull and rotate the buried over-weight material
(Damage the hydraulic cylinder, swing reduction gear and motor.)
- In stone embankment and landscaping works, pounding such material with the grapple is prohibited.
(Cause pincher deformation, cracks of the welding and cylinder damage.)

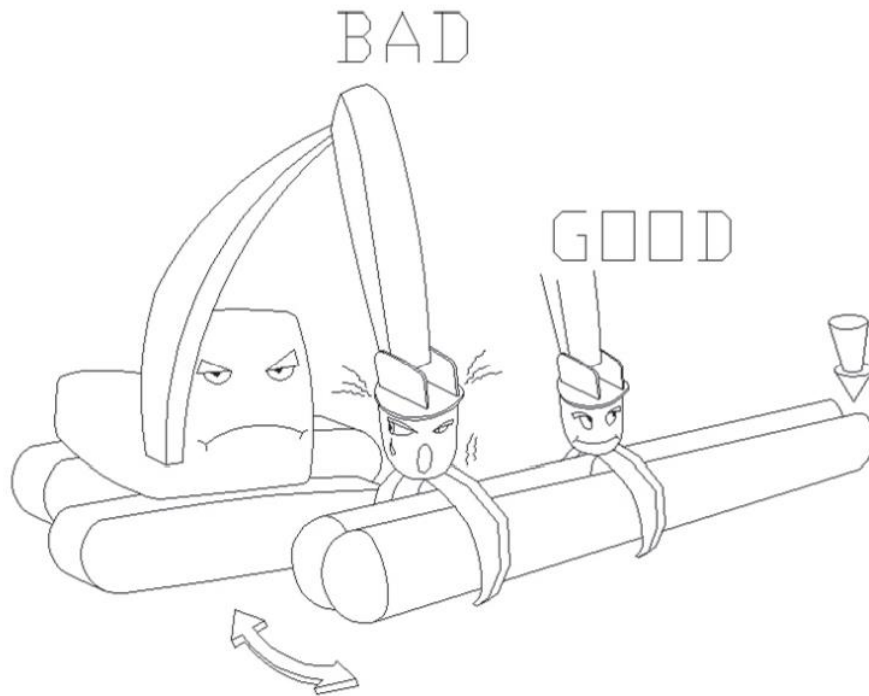
- **Do Not pound the stone or materials with the grapple**
(it is wrong usage and can cause bondy & pincer deformation, cracks of the welding and cylinder damage.)



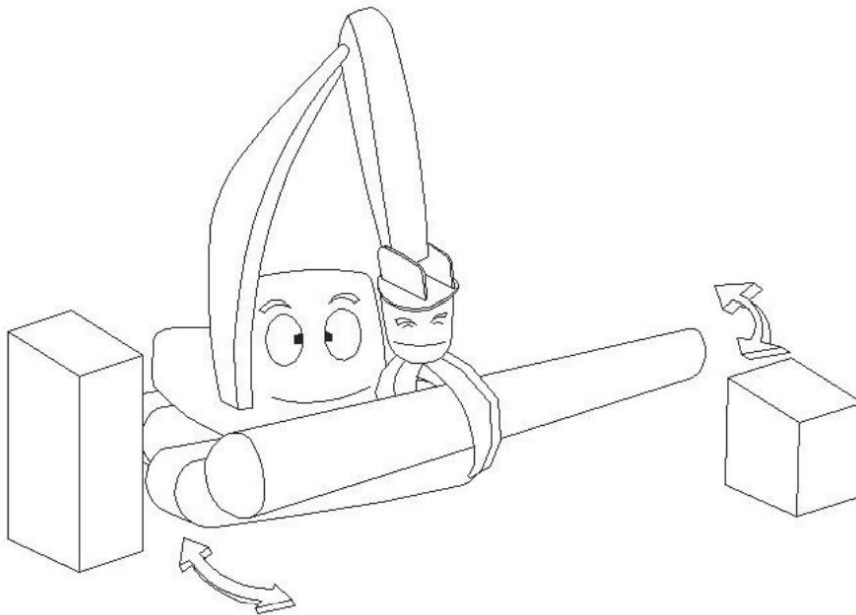
- **Do Not use grapple as leverage in any case!**
(It will deform the cylinder tube or seriously damage the grapple.)



- **Focus on the CENTER of GRAVITY while grappling.**
(Cause the hydraulic motor & swing bearing damages.)

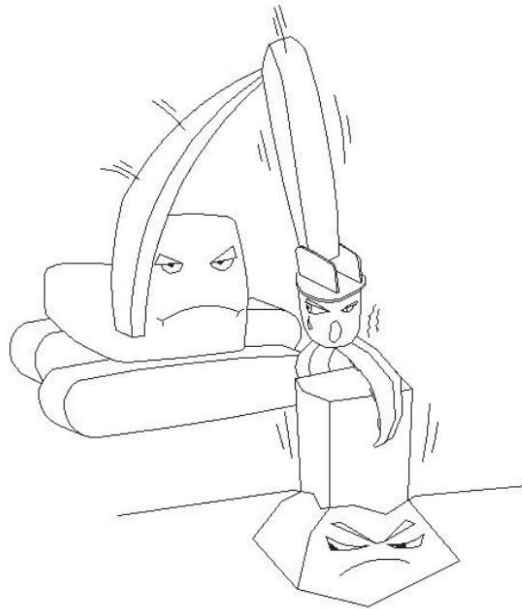


- **Please, be careful of clashing between materials, the grapple holds and others in the job site.**
(Cause the hydraulic motor & swing bearing damages.)



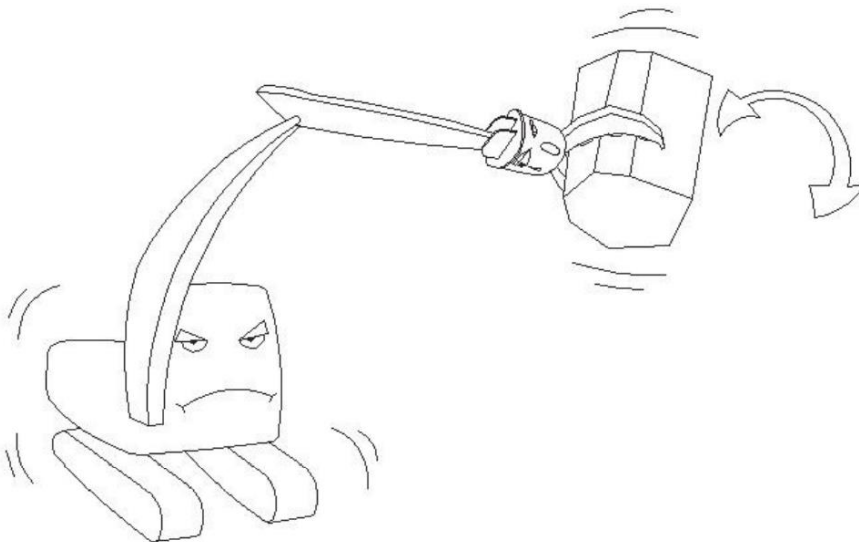
- **Do Not use grapple to push or pull out the embedded column.**

(It will cause serious damage to the grapple and excavator tripping-over accident can be happen, because of the unstable balance.)

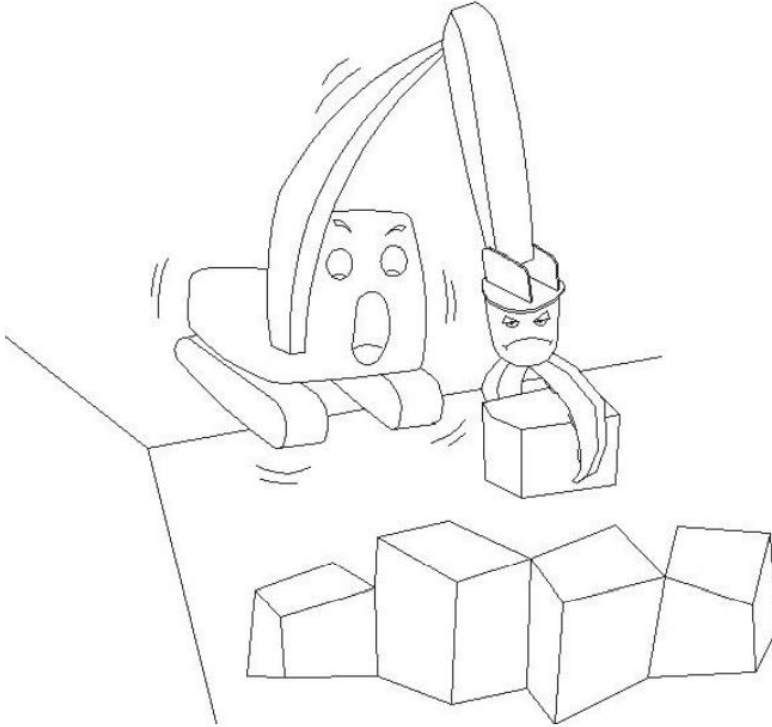


- **Do Not lift the material which is over the weight than specified.**

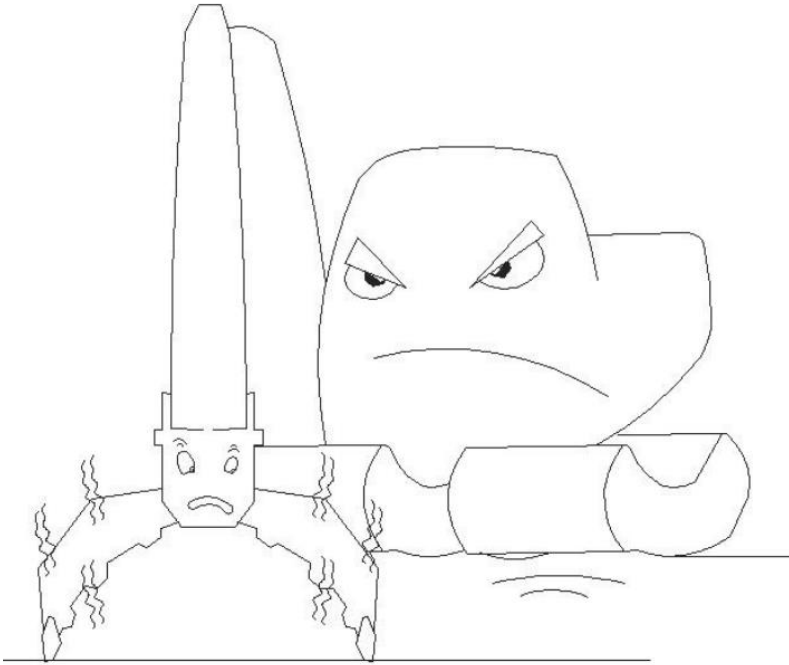
(It will deform the grapple body and excavator tripping-over accident can happen, because of unstable balance.)



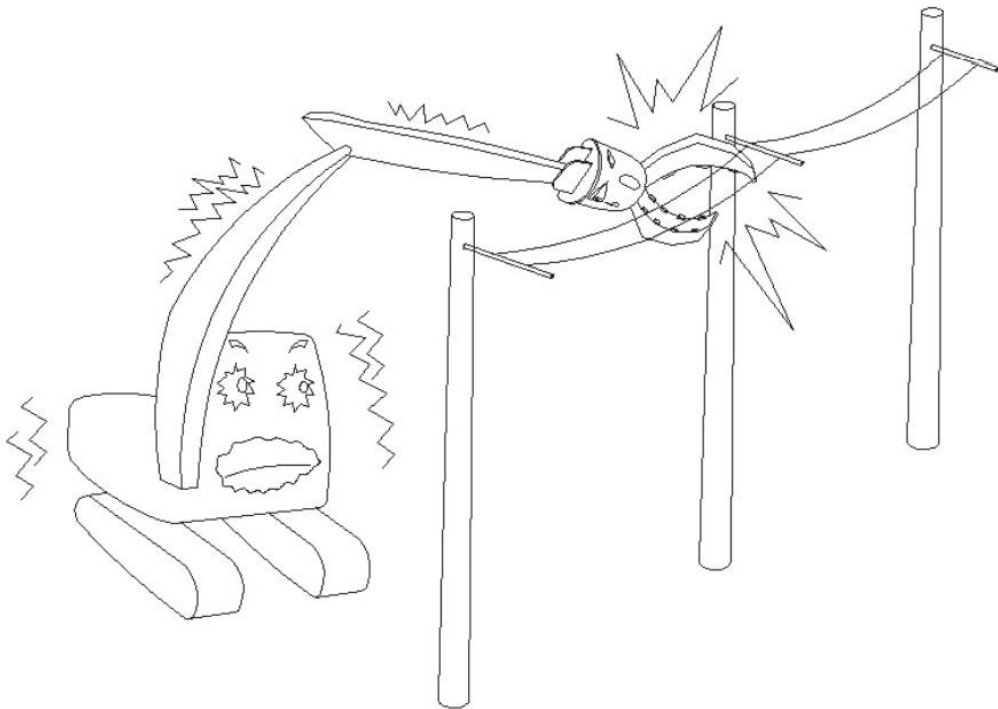
- **Make sure that the grapple and excavator is positioned safe and stable on the job site.**
(The excavator tipping-over accident can happen because of the unstable balance.)



- **Do Not push or change the excavator's direction as the grapple is on the ground.**
(It will deform the grapple body.)



- **Make sure that NO High Voltage transmission lines exist and do Not get near to the electricity pole or other electrical lines.**



Grapple Storage



WARNING

After operating the grapple is finished, Hydraulic oil and some part can be Very Hot. Be careful.

When storing the grapple, inject enough greases through the grease injection port and store it in a dry place. Also apply grease on the rusting areas. Humidity and temperature change can cause rusting and corrosion.

When storing with hoses attached, seal the hose tip with a plug. When storing without hoses, seal the port with a cap, in order to prevent oil leakage or inflow of other materials.

Store the grapple on a wood block, large and strong enough to support the grapple.

When disconnecting the hydraulic hoses, check for leaking oil and treat it according to the relevant waste treatment regulation.

When storing the equipment for a longer term:

- (1) Clean and dry all the parts and store them inside a building with adequate ventilation
- (2) Operate at least once a month and lubricate the functional parts.
- (3) Apply grease on the cylinder rod and other areas where rusting is concerned.

Transportation & Lifting

The use of the equipment should follow the rules and regulation of the relevant authorities governing safety, working area and jobsite.



DANGER

- When transporting the equipment, use transport vehicle having enough payload and tying hook.
- This manual should be used by everyone related to the equipment.
- The operator of the carrier vehicle and the assistant should use hand signals to fully coordinate and agree.
- Do Not use the hand to check the connection holes to plug-in the pin or while plugging the pin.

Transportation

Make sure to tightly fix the equipment by using chains or ropes before transportation to avoid looseness.

Make sure to use platform with enough width, length and strength to safely load and unload the equipment.



DANGER

- 5.1.1 Make sure in advance that the lifting tool and the chains are strong enough and in good condition to lift the equipment.
- 5.1.2 Make sure to use relatively short lifting chains to avoid excessive sway.
- 5.1.3 Make sure there is no operator or obstacle nearby before the lifting work.

Lifting

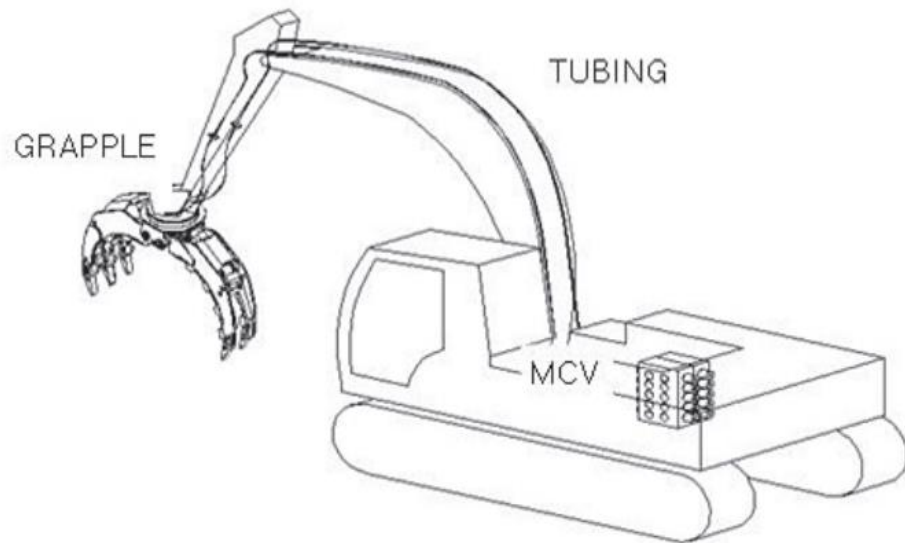
To lift the grapple, use the lifting hook on the upper plate or lifting point on the top bracket.
Can lift using legs of the forklift.

Be sure to maintain the stable condition of lifting.

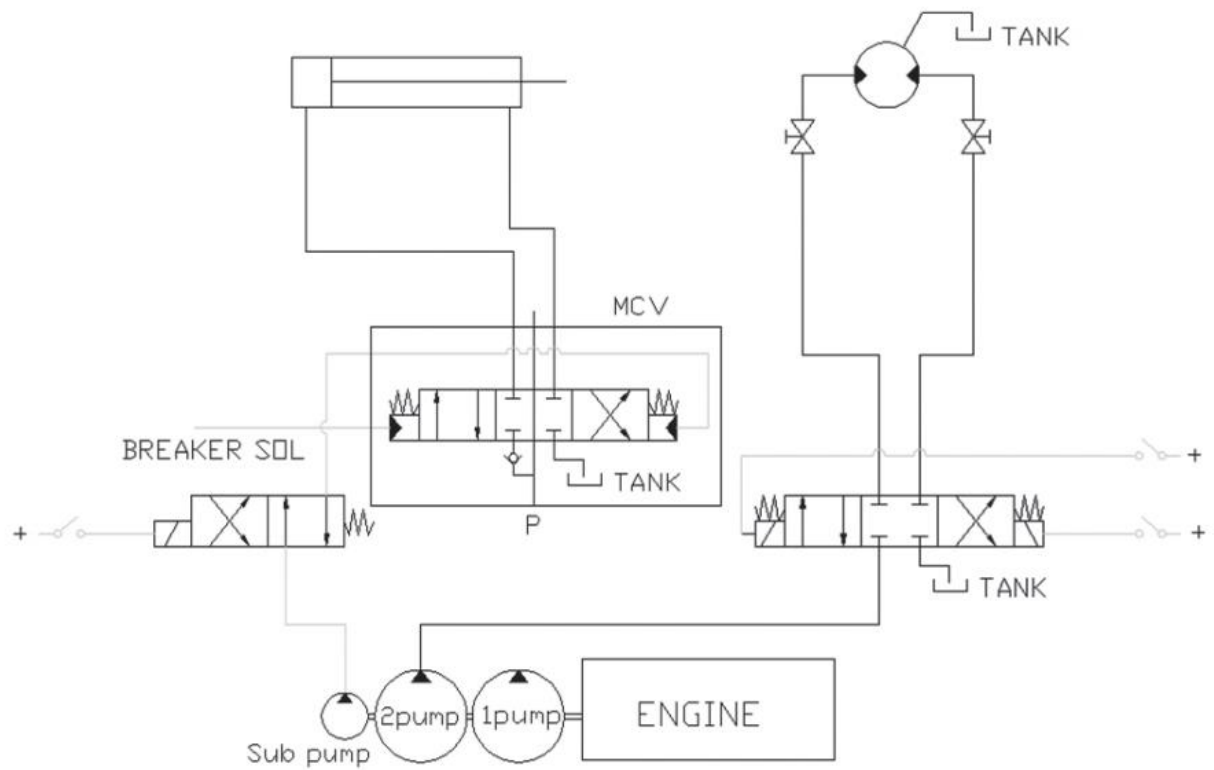
Make sure to understand the weight and the dimension of the equipment described in the manual in detail when lifting the equipment.

External view & Hydraulic / Electric Drawings

Basic Circuit Diagram



External View



Hydraulic / Electric Drawing

MAINTENANCE

Service and Repair

Important: Refer to “Maintenance Safety”, here in, and become familiar with the safety rules before performing any maintenance or service on the grapple.

To ensure efficient operation, you should inspect, lubricate, and make necessary adjustments and repairs at regular intervals. Parts that are starting to show wear should be ordered ahead of time, before a costly breakdown occurs, and you have to wait for replacement parts. Keep good maintenance records, and adequately clean your unit after each use.

Proper lubrication is important. Too little lubricant will cause premature failure of a bearing. Too much lubrication usually causes high operating temperature and early failure of seals. Follow all lubrication instructions and schedules included in this section.

Break-In Schedule

Inspect and service after one (1) hour of operation, all pivot and connection points.

Regular maintenance should then be followed thereafter.

Refer to the chart below for the maintenance schedule.

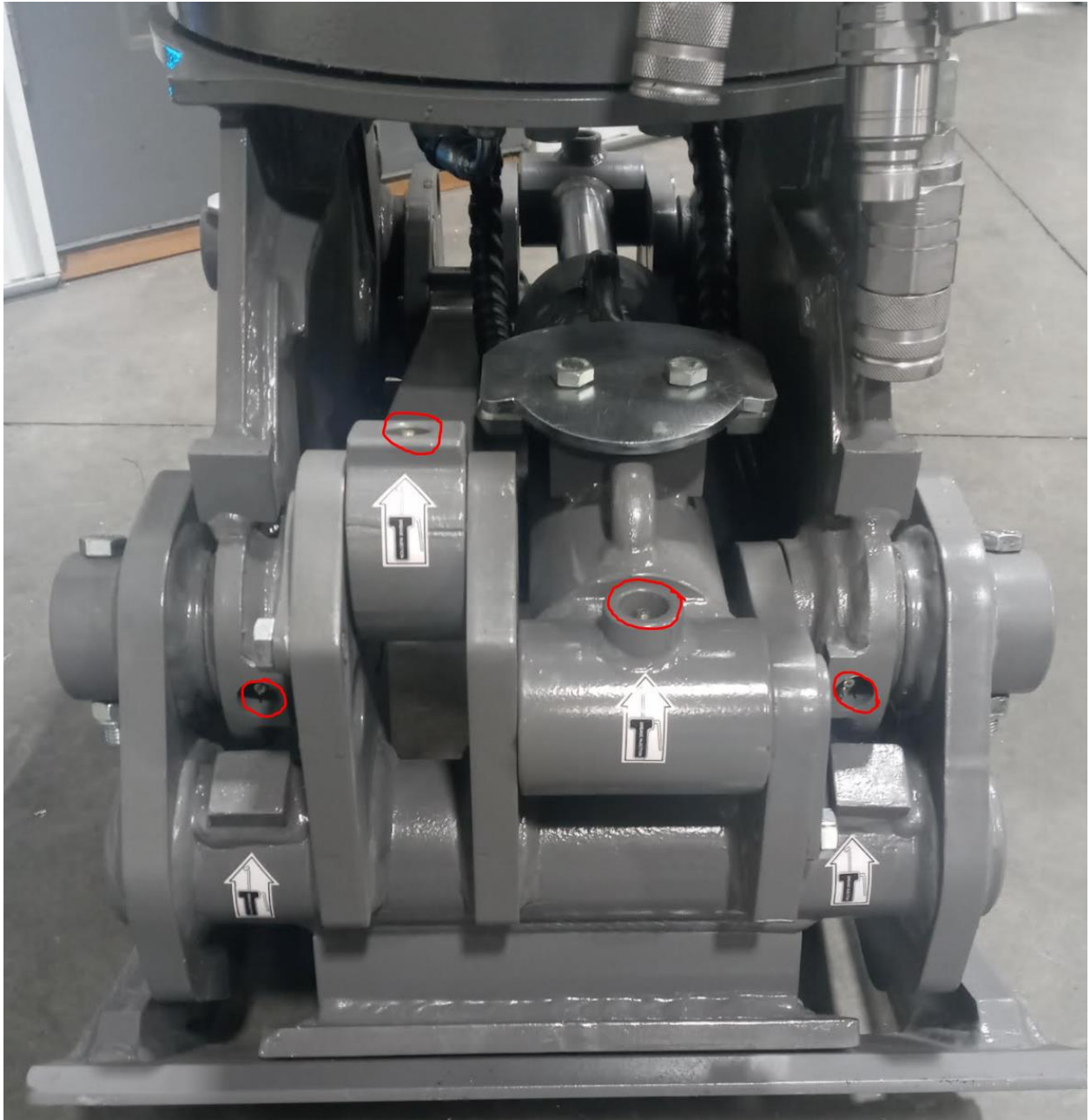
Maintenance Schedule

Hours	Service Points	Service Required					
		Check	Clean	Change	Grease	Adjust	Oil
Every 8	Grapple Pivots		X		X		
	Cylinder		X		X		
	Loose bolts	X				X	
	Hoses	X		X			
	Oil Leaks	X		X			
	Bearings				X		
	Teeth	X					
Every 100	Safety Labels	X					
Every 500	Hydraulic Motor	X					X

Lubrication

Grease Points location







Use a #2 general purpose lithium-based grease unless noted otherwise.

Note: Replace any broken or missing grease fittings.

Be sure to clean fittings before greasing.

Lubricated the grease point every

Daily Inspection Points

- Any damage or deformation on the part of the main body and top frame
- Any leakage of hoses and fitting on all the connecting ports
- Damage of the pins and bushings and replacement cycle thereof
- Bolt and nuts tightening status and inspection of looseness
- Grease injection of the fittings inside of the bushing of the motors and greasing inspection in between working days
- Inspection of oil level of the gear
- Check the looseness of the gear and tightening loose bolts

General Inspection Points

- Seals of the hydraulic cylinder and the rotating parts can wear and should be replaced when used over a year.
- When replacing parts, make sure to use the genuine parts only.
- Inspection of the rotating axle.
Rotating axle rotates 360-degree unlimited rotation and facilitate the accurate works from any angle.
Rotating axle performs intended function only at the designated position and do not perform other works like bending or crushing.
It should be noted that the warranty terms and conditions shall not apply for the damages caused by the forced impact on the rotating axle. Adequate bolt tightening and use of lubricants are to be inspected on the rotating axle.
- Bolt tightening status
It is very important to check the bolts connecting the swing bearing. When new bolts are installed, check the bolt after 8 hours use and tighten the bolt if there is any looseness. The bolt worn by the metallic fatigue by over tightening or long use should be replaced. In case of excessively frequent replacement by quick wear, contact supplier or manufacturer. These bolts should be daily inspected and replaced after using approximately 1500 hours or 12 months after the installation.
- Inspection of swing bearing lubrication
For the rotating attachment in storage, make sure to inject anti-corrosive agent every 6 months. In the actual operation of equipment, inject lubricant on every 8 hours of operation. Make sure the grease is not contaminated before injection. In the case of injecting contaminated or validity expired oil, it will deteriorate the performance and will damage the internal parts.
- Oil (Lubricant, grease, anti-corrosion agent) injection procedure.
There are 1-4 fittings, dependent on model of the swing bearing. Grease ports is located either on the outside of the swing bearing or on top of the side plate. Rotate the bearing to spread the grease uniformly and to discharge the used and contaminated

grease. In any case, make sure to rotate the bearing at least two (2) times while injecting grease. Inject enough quantity, so that newly injected grease can flow to the seal part.

Regular Inspections

Caution Regular inspection is essential for the smooth operation of the equipment. For inspection under the optimum condition, it is recommended to rely on the after-service team. All the customers are requested to contact A/S Team for final inspection.

Inspection Cycle of Bolts

The grapples are used under the toughest job conditions. Neglecting even small problems can cause serious damage unexpectedly. Make sure to inspect the following items:



CAUTION

- In order Not to damage the nut thread or bolt, apply specified tightening torque.
- Serious Danger of damage. Immediately replace if bolt / nut threads are damaged.

Defect Repair

Defect	cause	Action required
Cylinder non-operation	short electric power	check battery and wiring
	solenoid valve trap	repair or replace solenoid spool
	oil non-circulation	check pipe status (stop valve "on")
	middle seal damage	replace damaged seal
	cylinder seal damage	replace damaged seal
	overcenter valve damage	replace damaged the valve
Motor non-operation	short electric power	check battery and wiring
	solenoid valve trap	repair or replace solenoid spool
	motor damage	repair or replace motor
	gear & motor damage	replace with new parts
	low pressure	adjust valve pressure
	shaft seal	replace the shaft seal
Cylinder oil leakage	seal damage	replace seal
Rotary joint oil leakage	seal damage	replace seal

Tooth Replacement

- Worn tooth should be replaced in time.
- Damaged bolt and nut may not unscrew due to mechanical reasons.

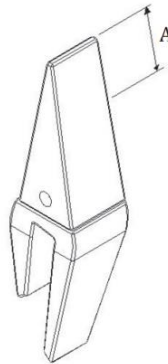


NOTES

- Damaged tooth should be immediately replaced.
- Operation without tooth will seriously damage the tine and take a lot of time and cost to repair.

Recommended replacement of Tooth

Model	Wear Limits (")
39	1.375
51	2.55
55	3.74
70	4.52
78	4.13



Fluid Replacement

(1) Selection of Hydraulic fluid

Oil effects the power & quality of the grapples, so recommended oil is required.

Recommended Oil

Item	Hyd. Oil			Grease
	Summer	Winter	All Season	
Producer	ISO VG46	ISO VG32	ISO VG46	NLGI No 2
MOBIL	MOBIL DTE25	MOBIL DTE24	MOBIL DTE15M	Mobil lucksu 2
	MOBIL SHC 525★			
	MOBIL EAL SYNDRAULIC 46 ★★			
SHELL	TELLUS 46	TELLUS 32	TELLUS 46	Albania Grease 2
S K	ZIC Supervis 46	ZIC Supervis 32	ZIC Supervis 46	Crown Grease No2

★Synthetic oil / ★★Environmental Synthetic oil



CAUTION

- Hydraulic oil temperature and viscosity.
In case oil temperature is between 20C to 80C, stop the operation. In case of operating at high oil temperature, it may damage the quipment and its parts and shortens the life of the equipment.
- Prohibit mixing
Do Not mix hydraulic fluid and motor oil together.
- Periodical oil changing
Oil checking is required on a regular time and while changing, change all oil inside of oil tank and hydraulic lines. Also, while changing, oil filter cleaning or changing is required.

(2) Prevention of contamination

Contaminated oil may create mal-function or damage the parts of the hydraulic components of the grapple as well as the carrier vehicle. Make sure that the operating oil is not contaminated and change oil immediately when contaminated. When changing the oil, change cylinder internal, piping all together. Particularly, check the oil status whenever washing and replacing the oil filters.

(3) Management & standard of oil

Section	standard	cause and effect of over balance
viscosity	±10% (40 C cst)	It is not general case to decrease the Viscosity byitself, but if there mixes other oil, the viscosity may be not good and cause the wrong usage, scratch, parts deform, etc.
acidity	0.3 less (40 C cst)	While long time using or more then 60℃, it will oxidize. Oxidation progresses, the pH of the sludge to increase or malfunctions, metal corrosion causes the aging of materials or seals.
moisture	0.1 less (%)	Contamination of water rust, wear and tear, scratches or seizure will cause Considerable rust and moisture 0.3%, 0.5%, causing damage in excess of the machine.

Relationship between oil color and non-performance

(Classification criteria based on ASTM color code)

In case oil color changes to black color, the optimum operation is not possible. Even after oil change, if the color becomes black again, it is strongly possible that the oil is old, one which expired validity.

Parts Orders



CAUTION

- Inspection support
In order to provide support, it is requested to report the following in writing to Ryan's Equipment.

Part list describes complete break-down of parts of the grapple. In order to place order for a part, it is request to fill-in the blanks.

- 1) **Model Name:**
- 2) **Serial No.:**
- 3) **Part Code No.:**
- 4) **Part Name:**
- 5) **Quantity:**
- 6) **Customer Name:**
- 7) **Customer Address:**

Ryan's Equipment will Not bear the warranty service in case other than genuine parts are used for the replacement of parts.

Troubleshooting

1.1 Not Working

Phenomenon	Cause	Action
Cylinder does not work, move only one side, or move slowly. (Action on carrier)	MCV Stop valve was opened.	Close the Stop Valve.
	Hydraulic pressure becomes low	Set the hydraulic pressure again.
	Hose coupler (if equipped) was faulty.	Check working condition after remove hose coupler.
Even though, performed above actions on carrier, if same trouble still occur	Cylinder Overcenter Valve is NOT working	Re-set the valve OR replace the valve.
	Cylinder Tube Enlargement.	Replace the New Cylinder
	Seal of cylinder piston was broken	Replace the piston with new one.OR Replace the NEW one.

1.2 Lack of Power or Speed

Phenomenon	Cause	Action
Grab force is weak	Low pressure from carrier	Check pressure of carrier, and repair carrier if needed.
	Cylinder Seal kit was broken.	Replace the Seal kit.
Operating speed is slower than normal condition.	Low flow-rate from carrier	Check flow-rate of carrier, and repair carrier if needed.

1.3 Leakage

Parts list describes complete break down of parts for the grapple. In order to place orders for parts, it is requested to fill-in the blanks.

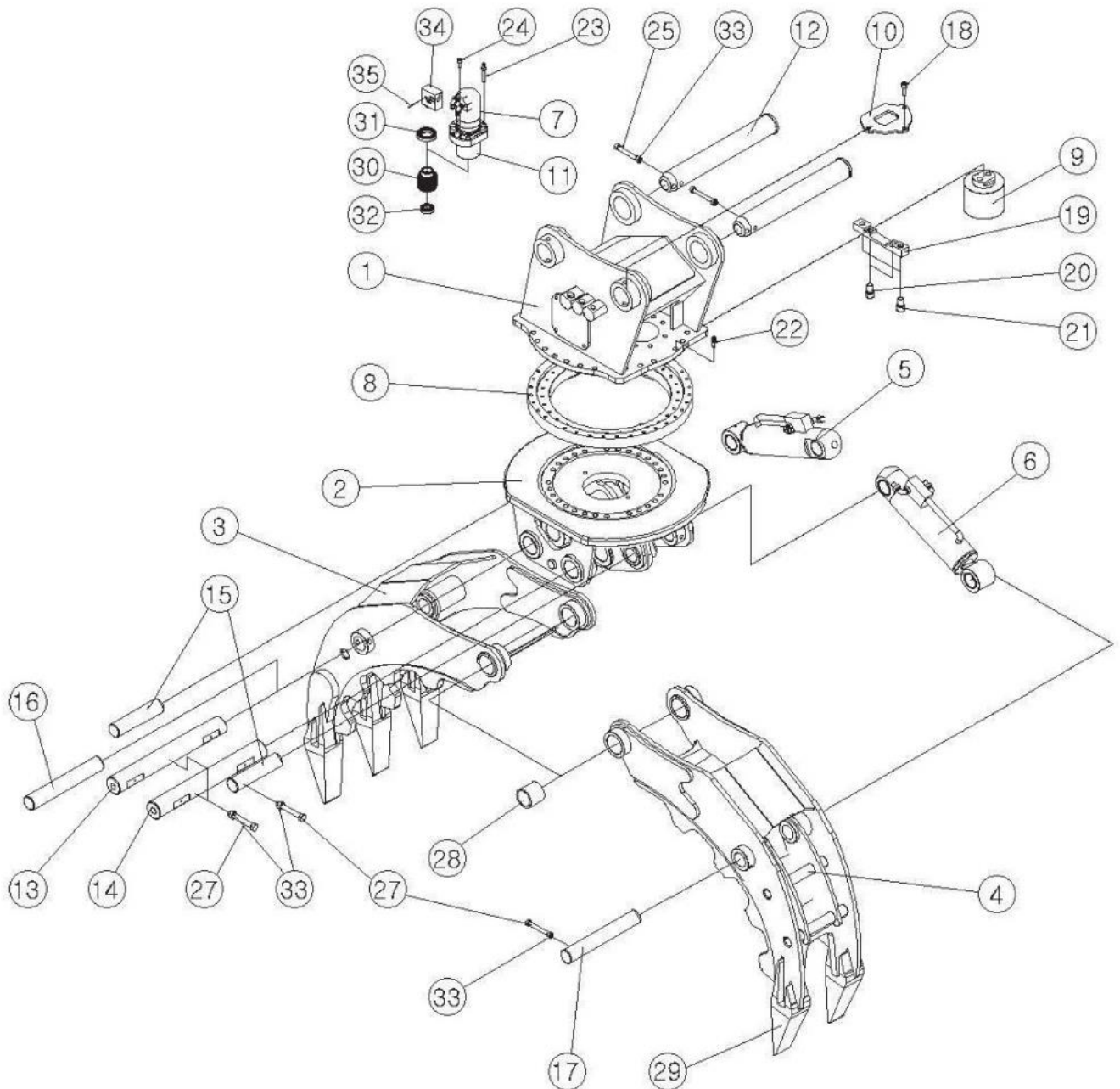
Phenomenon	Cause	Action
Leakage from connector on Rotary joint	Failure of O-ring	Replace the seal O-ring with new one
	Loosen the connector or hoses	Retightening
Leakage on Rotary joint head	upper seal of Rotary joint was worn out	Replace the seal with new one.
Leakage from cylinder connecting hose	Failure of O-ring Failure of Nipple(Adaptor)	Replace the seal O-ring with new one or Replace New Nipple(adaptor).
	Loosen the connector or hoses	Retightening
Leakage of each hoses	Failure of hose	Replace the hose with new one.
Leakage from cylinder grand	Grand seal of turning joint was worn out	Replace the seal with new one.
	Loosen the grand	Retightening
	Worn out of surface or dents on cylinder rod	Repair or replace with new one

1.4 Others

Phenomenon	Cause	Action
Large clearance between head and frame	Loosen of mounting bolts	Retightening
	Worn out of circle plate and shim	Repair or replace with new one
Deformation of cylinder tube	Applied strong external force	Replace with new one
Deformation of frame	Applied strong external force	Repair or replace with new one

PARTS LIST

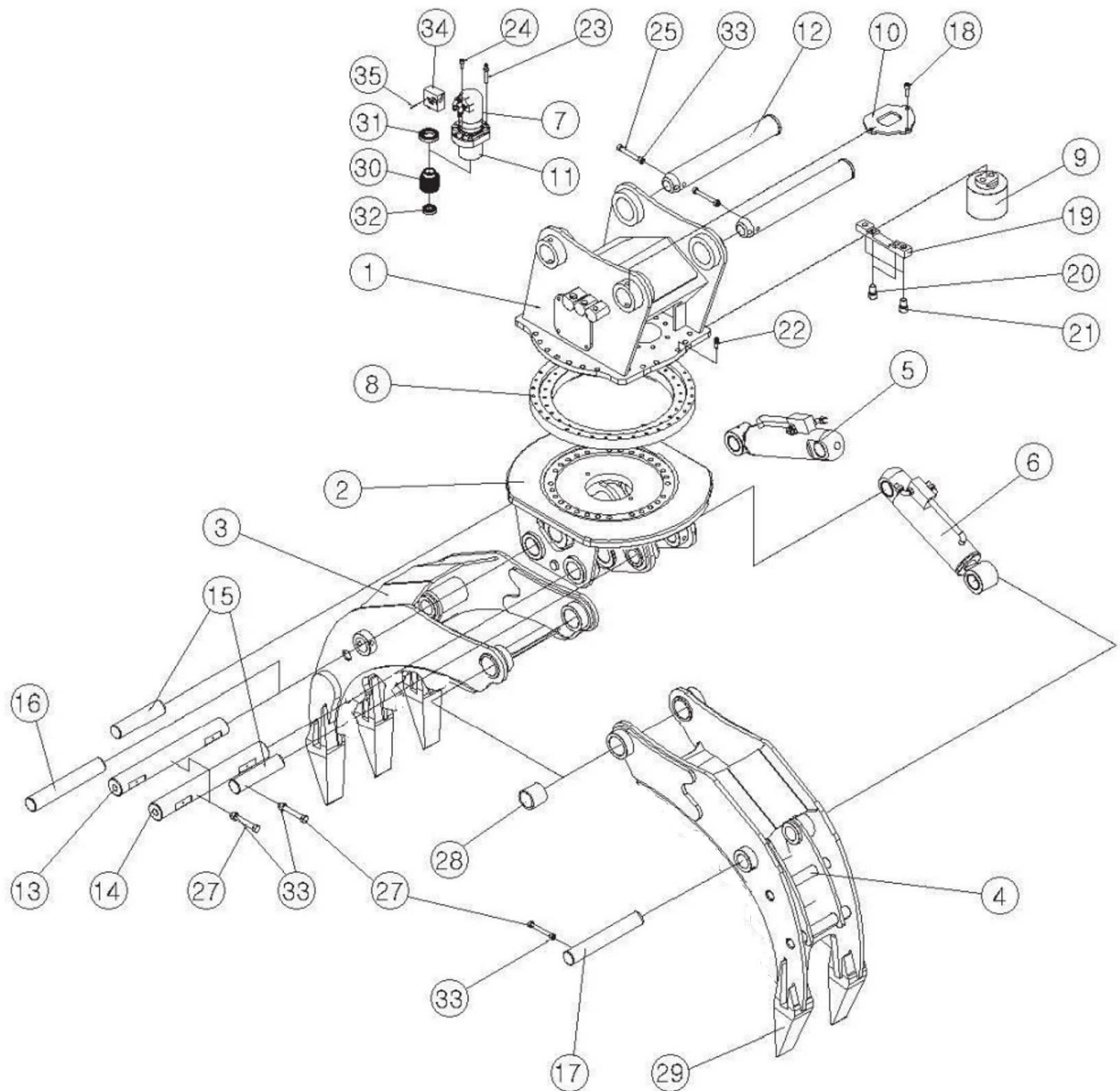
10 Series



10 Series Grapples

No	Name	1039	1051	1055	1070	1078
1	Top Ass'y	40001-041	40001-055	40001-043	40001-044	40001-045
2	Body Ass'y, Complete	40002-041	40002-042	40002-043	40002-044	40002-045
-	Body Ass'y, Weldment	40003-041	40003-042	40003-043	40003-044	40003-045
3	Large Grap Ass'y	40004-041	40004-042	40004-043	40004-044	40004-045
4	Small Grap Ass'y	40005-041	40005-042	40005-043	40005-044	40005-045
5	Large HYD. Cyl. Ass'y	25728-003	25728-003	25728-006	25728-012	25728-015
6	Small HYD. Cyl. Ass'y	25728-004	25728-004	25728-007	25728-013	25728-016
7	Motor Ass'y		25005-000	25005-000	25005-004	25005-004
8	Swing Bearing	21201-000	21201-001	21201-002	21201-003	21201-004
9	Rotary Joint Ass'y	40007-041	40007-055	40007-043	40007-044	40007-044
10	Rotary Joint Plate	30046-041	30046-055	30046-043	30046-044	30046-045
11	Pinion Gear Housing	30047-041	30047-055	30047-043	30047-044	30047-045
12	Top Pin	40008-041	40008-055	40008-043	40008-044	40008-045
13	Body Pin - 1	30001-041	30001-042	30001-043	30001-044	30001-045
14	Body Pin - 2	30002-041	30002-042	30002-043	30002-044	30002-045
15	Body Pin - 3	30003-041	30003-042	30003-043	30003-044	30003-045
16	Large Grapple Pin	30004-041	30004-042	30004-043	30004-044	30004-045
17	Small Grapple Pin	30005-041	30005-042	30005-043	30005-044	30005-045
18	Wrench Bolt - 1	20800-728	20800-728	20800-729	20800-730	20800-730
19	Rotary Joint Bracket	40011-041	40011-055	40011-043	40011-044	40011-044
20	Wrench Bolt - 2	20800-730	20800-730	20800-730	20800-728	20800-728
21	Wrench Bolt - 3	20800-732	20800-732	20800-733	20800-734	20800-735
22	Wrench Bolt - 4	20800-728	20800-728	20800-736	20800-737	20800-737
23	All Bolt	-	-	-	20800-738	20800-738
24	Wrench Bolt - 5	20800-729	20800-729	20800-740	20800-741	20800-741
25	Hex Bolt - 1	20800-742	20800-742	20800-742	20800-743	20800-749
26	Hex Bolt - 2	20800-742	20800-742	20800-742	20800-756	20800-744
27	Hex Bolt - 3	20800-747	20800-747	20800-742	20800-756	20800-744
28	Bush - 1	21408-027	21408-027	21408-028	21408-029	21408-030
29	Tooth	29904-043	29904-043	29904-043	29904-044	29904-045
30	Pinion Gear	23000-046	23000-046	23000-047	23000-048	23000-049
31	Ball Bearing	21201-006	21201-006	21201-006	21201-007	21201-008
32	Ball Bearing	21201-009	21201-009	21201-009	21201-010	21201-011
33	Lock Nut	20800-752	20800-752	20800-752	20800-753	20800-753
34	Brake Valve	-	-	-	25410-000	25410-000
35	Wrench Bolt - 6	-	-	-	20800-755	20800-755

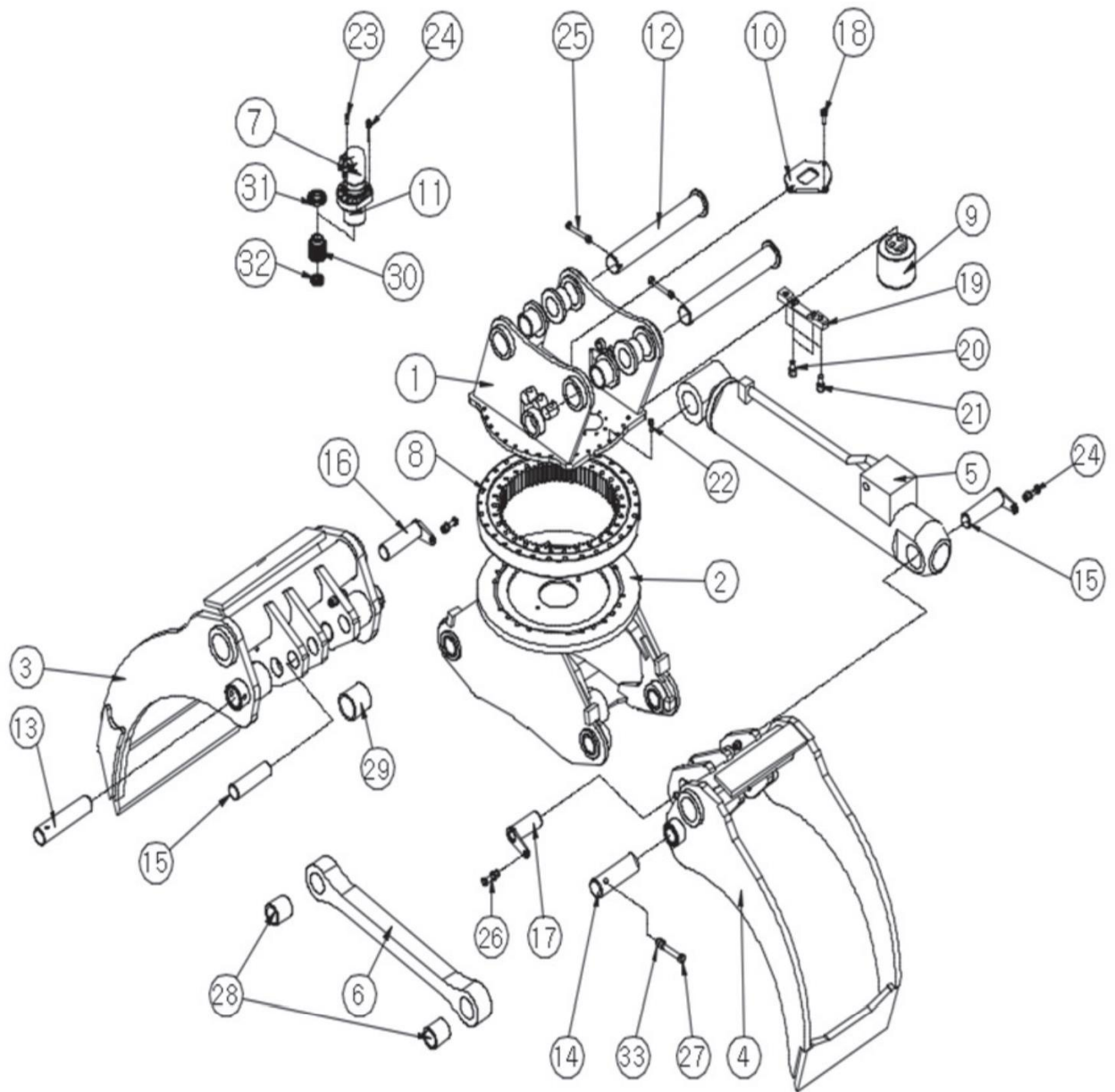
12 Series



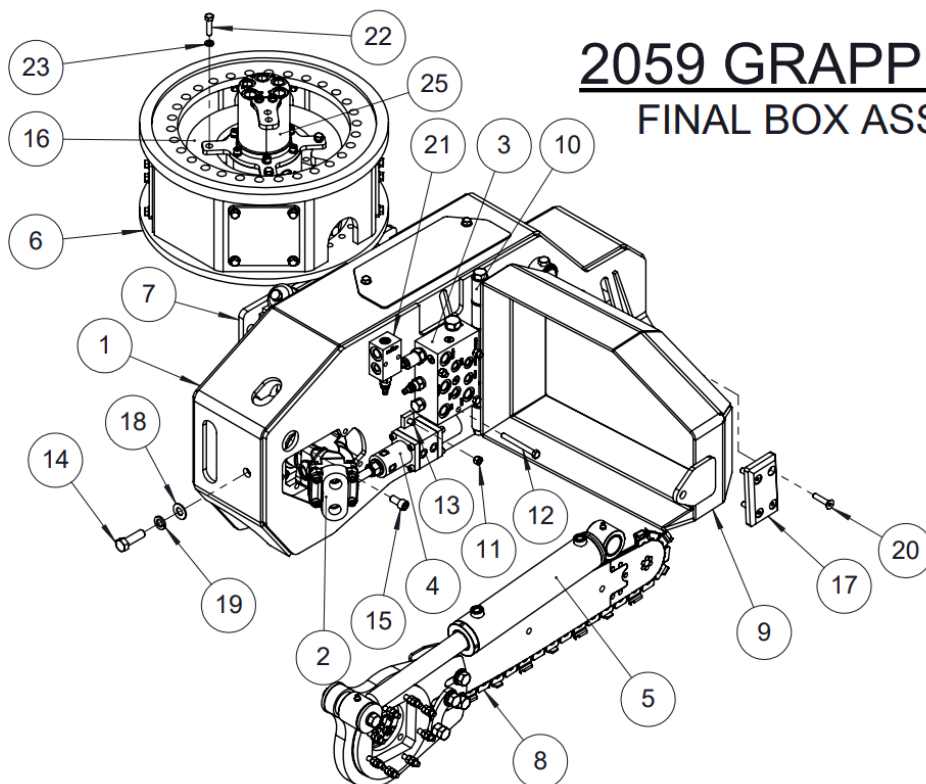
12 Series Grapples

No	Name	<u>1251</u>	<u>1255</u>	<u>1270</u>	<u>1278</u>
1	Top Ass'y	40001-055	40001-043	40001-044	40001-045
2	Body Ass'y, Complete	40002-042	40002-043	40002-044	40002-045
3	Large Grap Ass'y	40004-047	40004-048	40004-049	40004-051
4	Small Grap Ass'y	40005-047	40005-048	40005-049	40005-051
5	Large HYD. Cyl. Ass'y	25728-003	25728-006	25728-012	25728-015
6	Small HYD. Cyl. Ass'y	25728-004	25728-007	25728-013	25728-016
7	Motor Ass'y	25005-000	25005-000	25005-004	25005-004
8	Swing Bearing	21201-001	21201-002	21201-003	21201-004
9	Rotary Joint Ass'y	40007-055	40007-043	40007-044	40007-044
10	Rotary Joint Plate	30046-055	30046-043	30046-044	30046-045
11	Pinion Gear Housing	30047-055	30047-048	30047-044	30047-045
12	Top Pin	40008-055	40008-048	40008-044	40008-045
13	Body Pin - 1	30001-042	30001-043	30001-044	30001-045
14	Body Pin - 2	30002-042	30002-043	30002-044	30002-045
15	Body Pin - 3	30003-042	30003-043	30003-044	30003-045
16	Large Grapple Pin	30004-042	30004-043	30004-044	30004-045
17	Small Grapple Pin	30005-042	30005-043	30005-044	30005-045
18	Wrench Bolt - 1	20800-728	20800-729	20800-730	20800-730
19	Rotary Joint Bracket	40011-055	40011-043	40011-044	40011-044
20	Wrench Bolt - 2	20800-730	20800-730	20800-728	20800-728
21	Wrench Bolt - 3	20800-732	20800-733	20800-734	20800-735
22	Wrench Bolt - 4	20800-728	20800-736	20800-737	20800-737
23	All Bolt	-	-	20800-738	20800-738
24	Wrench Bolt - 5	20800-729	20800-740	20800-741	20800-741
25	Hex Bolt - 1	20800-742	20800-742	20800-743	20800-749
26	Hex Bolt - 2	20800-742	20800-742	20800-756	20800-744
27	Hex Bolt - 3	20800-747	20800-742	20800-756	20800-744
28	Bush - 1	21408-028	21408-029	21408-030	21408-031
29	Tooth	29904-043	29904-043	29904-044	29904-045
30	Pinion Gear	23000-046	23000-047	23000-048	23000-049
31	Ball Bearing	21201-006	21201-006	21201-007	21201-008
32	Ball Bearing	21201-009	21201-009	21201-010	21201-011
33	Lock Nut	20800-752	20800-752	20800-753	20800-753
34	Brake Valve	-	-	25410-000	25410-000
35	Wrench Bolt - 6	-	-	20800-755	20800-755

20 Series

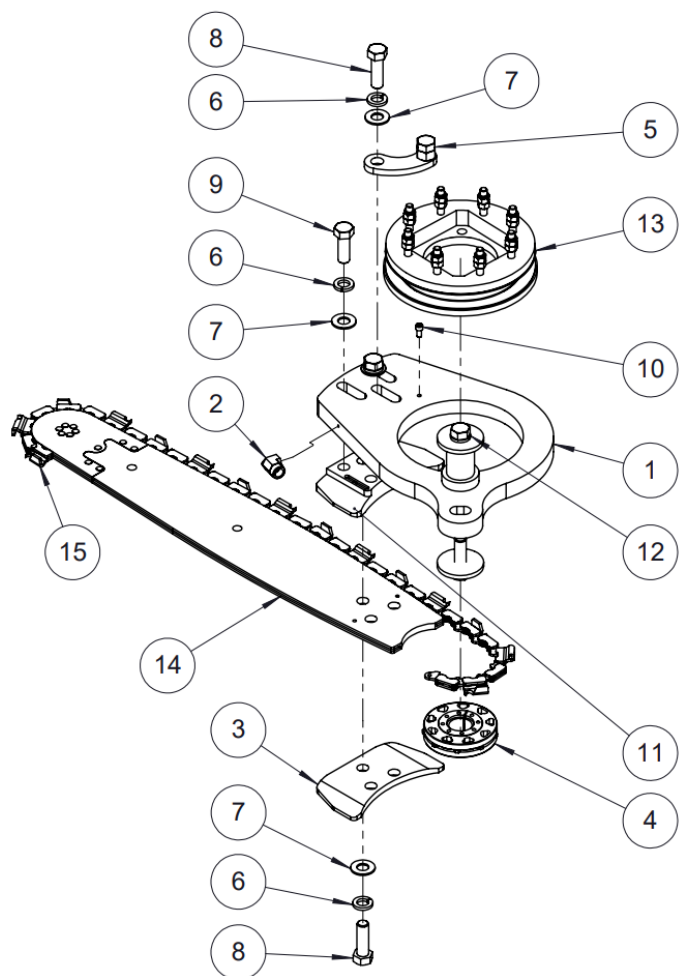


No	Name	<u>2051</u>	<u>2059</u>	<u>2070</u>	<u>2078</u>	<u>2086</u>
1	Top Ass'y	40001-055	40001-043	40001-044	40001-045	40001-059
2	Body Ass'y, Complete	40002-055	40002-056	40002-057	40002-058	40002-059
-	Body Ass'y, Weldment	40003-055	40003-056	40003-057	40003-058	40003-059
3	Small Grap Ass'y	40004-055	40004-056	40004-057	40004-058	40004-059
4	Large Grap Ass'y	40005-055	40005-056	40005-057	40005-058	40005-059
5	Cylinder Ass'y	25728-009	25728-011	25728-012	25728-015	25728-017
6	Link Ass'y	40006-055	40006-056	40006-057	40006-058	40006-059
7	Motor Ass'y	25005-000	25005-000	25005-002	25005-004	25005-004
8	Swing Bearing	21201-001	21201-002	21201-003	21201-004	21201-005
9	Rotary Joint Ass'y	40007-055	40007-043	40007-044	40007-044	40007-044
10	Rotary Joint Plate	30046-055	30046-043	30046-044	30046-045	30046-059
11	Pinion Gear Housing	30047-055	30047-056	30047-044	30047-045	30047-059
12	Top Pin	40008-055	40008-056	40008-044	40008-045	40008-059
13	Body Pin - L	30048-055	30048-056	30048-057	30048-058	30048-059
14	Body Pin - S	30050-055	30050-056	30050-057	30050-058	30050-059
15	Cyl. Head Pin	40009-055	40009-056	40009-057	40009-058	40009-059
16	Cyl. Rod Pin	40010-055	40010-056	40010-057	40010-058	40010-059
17	Link Pin	40010-055	40010-056	40010-057	40010-058	40010-059
18	Wrench Bolt - 1	20800-728	20800-729	20800-730	20800-730	20800-730
19	Rotary Joint Bracket	40011-055	40011-043	40011-044	40011-044	40011-044
20	Wrench Bolt - 2	20800-730	20800-731	20800-728	20800-728	20800-728
21	Wrench Bolt - 3	20800-732	20800-750	20800-734	20800-735	20800-735
22	Wrench Bolt - 4	20800-728	20800-739	20800-737	20800-737	20800-737
23	All Bolt	-	-	20800-738	20800-738	20800-738
24	Wrench Bolt - 5	20800-729	20800-740	20800-741	20800-741	20800-741
25	Hex Bolt - 1	20800-742	20800-742	20800-743	20800-749	20800-745
26	Hex Bolt - 2	20800-746	20800-747	20800-748	20800-749	20800-749
27	Hex Bolt - 3	20800-742	20800-751	20800-743	20800-749	20800-745
28	Bush - 1	21408-017	21408-018	21408-019	21408-020	21408-021
29	Bush - 2	21408-022	21408-023	21408-024	21408-025	21408-026
30	Pinion Gear	23000-046	23000-047	23000-048	23000-049	23000-050
31	Ball Bearing	21201-006	21201-006	21201-007	21201-008	21201-008
32	Ball Bearing	21201-009	21201-009	21201-010	21201-011	21201-011
33	Lock Nut	20800-752	20800-752	20800-753	20800-753	20800-753



2059 GRAPPLE SAW FINAL BOX ASSEMBLY

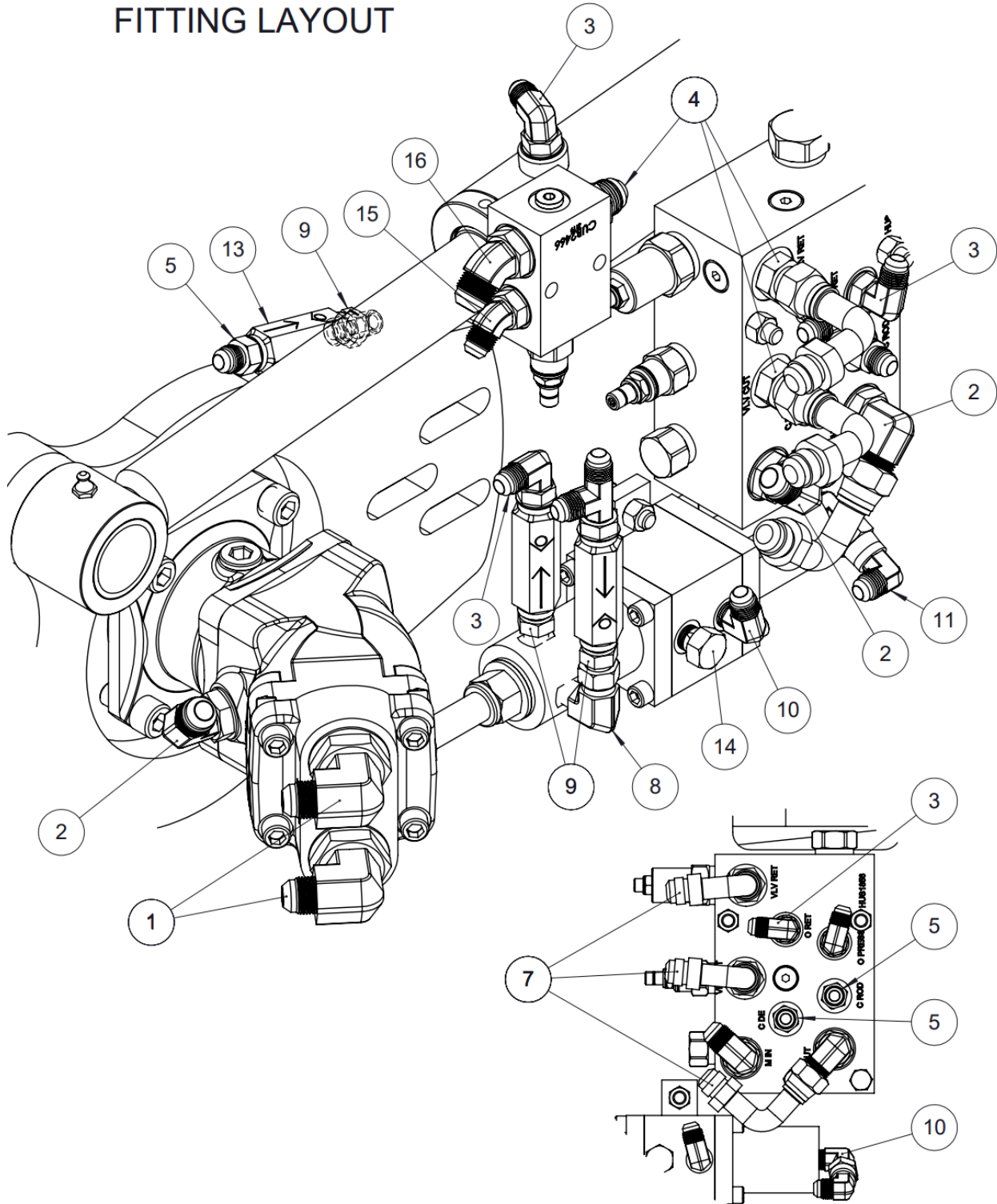
ITEM NO.	QTY.	PARTNO	DESCRIPTION	MATERIAL
1	1	40005-2059	SAW BOX ASSEMBLY	2059 Daehan Grapple Saw
2	1	25000-701	25CC BENT AXIS MOTOR	SUNFAB 1" KEY SHAFT
3	1	25411-214	DS Series Hydraulic Block	HYDROLICO ZUB 2184 PRO
4	1	25715-001	OILER CYLINDER	BEST #40015-050
5	1	25727-113	HYDRAULIC CYLINDER	1 1/2" R X 2 1/2" B X 9 1/2" S
6	1	40001-2059	SPACER RING	2059 DAEHAN GRAPPLE
7	1	40002-2059	OIL TANK ASSEMBLY	2059 Daehan Grapple Saw
8	1	40004-2059	SAW BAR ASSEMBLY	2059 Daehan Grapple Saw
9	1	40048-172	GUARD BOX	172 GRAPPLE SAW
10	2	40222-172	HINGE ASSEMBLY	SAW BOX HINGE
11	5	20701-002	3/8-16 HHNUT	GR8 YELLOW ZINK
12	4	20601-063	3/8-16 X 3 1/2 HHCS	GR8 YELLOW ZINK
13	1	20601-054	3/8-11 X 1 1/4 HHCS	GR8 YELLOW ZINK
14	1	20601-130	5/8-11 X 2 HHCS	GR8 YELLOW ZINK
15	4	20604-076	1/2-13 X 1 SHCS	GR8 BLACK
16	1	41014-030	SWIVEL MOUNT	#12 PORT UEA SWIVEL
17	1	29500-070	GS BUMPER	3/4 DURALITE x 5 1/2 x 3
18	1	20701-080	5/8 SAE FLAT	GR8 YELLOW ZINK
19	1	20570-110	5/8 LOCK WASHER	GR8 YELLOW ZINK
20	4	20603-075	3/8-16 X 1 3/4 FHSCS	GR8 BLACK
21	1	25411-120	EARTH TO ATMOSHERE VENT	HYDRAULICO (CUB2466)
22	4	20601-055	3/8-16 X 1 1/2 HHCS	GR8 YELLOW ZINK
23	4	20570-106	3/8 LOCK WASHER	GR8 YELLOW ZINK
24	1	40055-172	SAW BOX ASSEMBLY	2070 Daehan Grapple Saw
25	1	25411-122	#10 5 PORT SWIVEL-SMALL	UEA (YXEH35REI2)

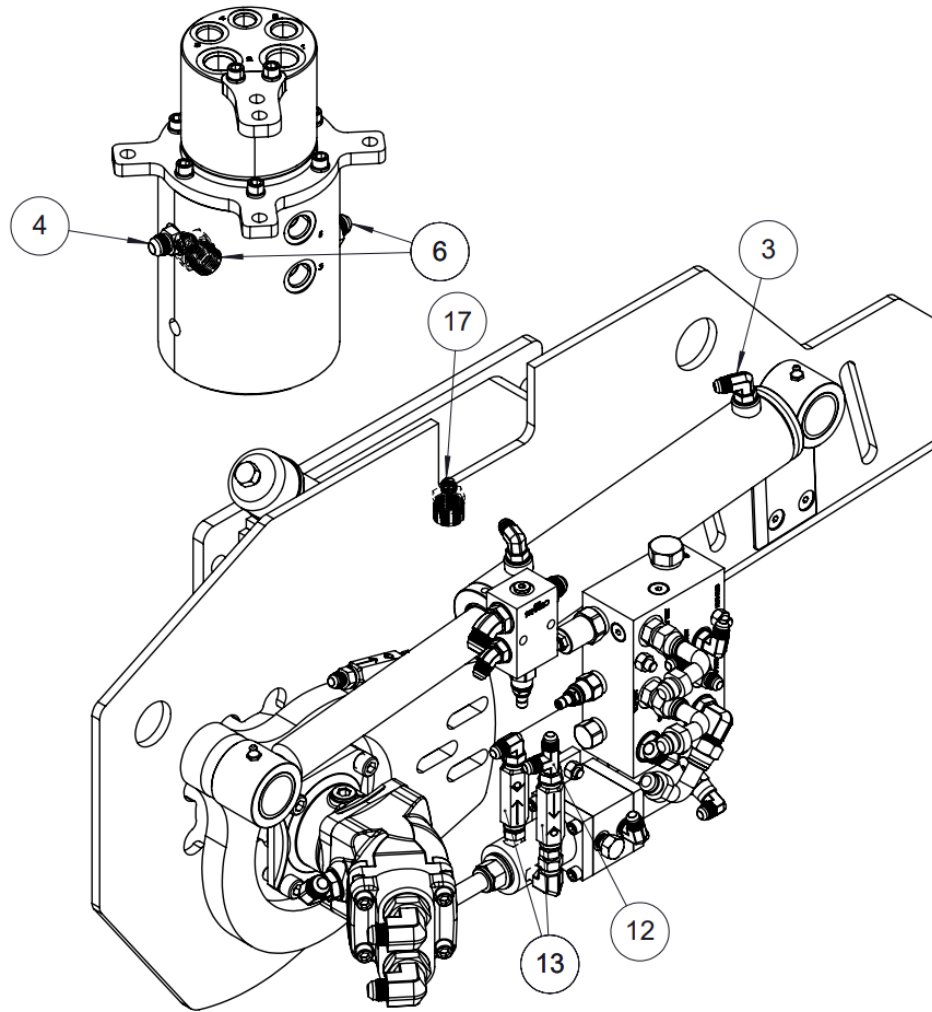


ITEM NO.	QTY.	PARTNO	DESCRIPTION	MATERIAL
1	1	30188-172	BAR PIVOT (82)	1" T-1 X 11 1/16" X 14 9/16"
2	1	28304-041	4MP-4FP 90	HYDRAULIC FITTING
3	1	30759-118	BAR CLAMP (26)	3/8" T-1 X 3 11/16" X 7"
4	1	29500-033	9 TOOTH W/1 1/4 B-LOCK HUB	9TR-BL-20
5	1	40128-118	DS28	CHAIN CAM TIGHTENER
6	6	20570-110	5/8 LOCK WASHER	GR8 YELLOW ZINK
7	6	20701-080	5/8 SAE FLAT	GR8 YELLOW ZINK
8	4	20601-130	5/8-11 X 2 HHCS	GR8 YELLOW ZINK
9	2	20601-129	5/8-11 X 1 3/4 HHCS	GR8 YELLOW ZINK
10	1	20604-001	1/4-20 X 1/2 SHCS	SHCS GR8 YELLOW
11	1	30758-118	BAR MT. SLIDE (29)	1" T-1 X 3 11/16" X 7"
12	1	40025-172	CYL MOUNT (ROD END)	GS-30
13	1	40033-120	MOTOR MOUNT	DS20 SAW
14	1	29500-073	3/4 PITCH 28" SAW BAR W/ NOSE	GEM BAR
15	1	29500-039	OREGON CHAIN (11H046E)	3/4" PITCH W/ 46 DRIVERS

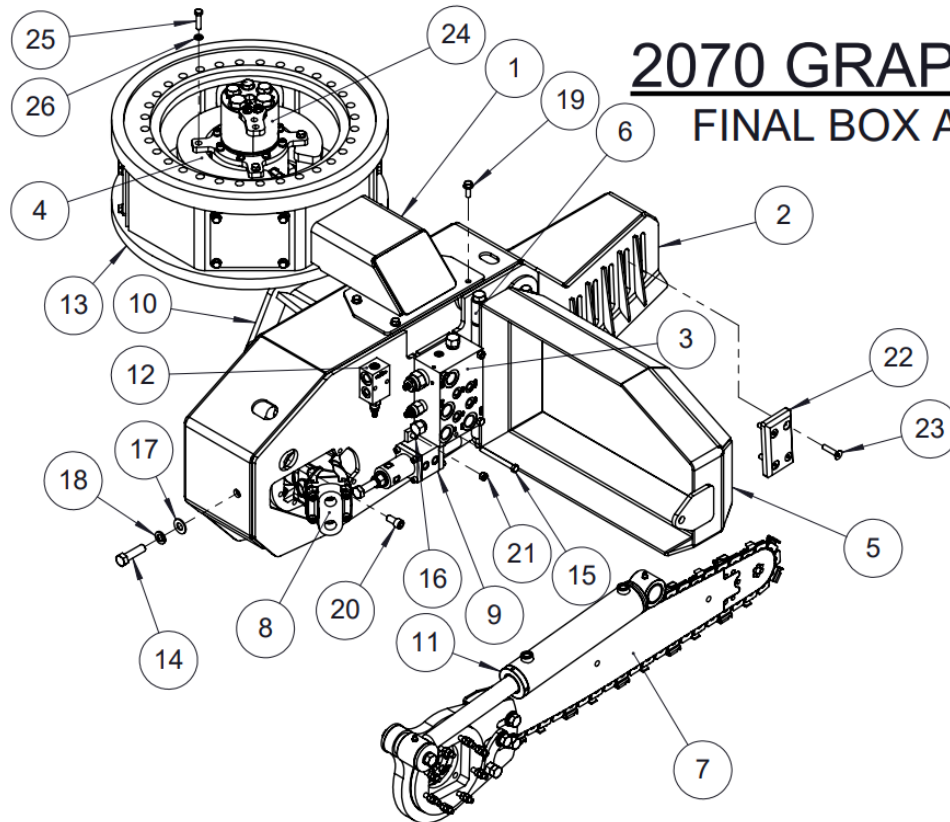
2059 GRAPPLE SAW

FITTING LAYOUT





ITEM NO.	QTY.	PARTNO	DESCRIPTION	MATERIAL
1	2	28300-822	HYDRAULIC FITTING	08MJ 12MB 90
2	3	28300-809	HYDRAULIC FITTING	08MJ 08MB 90
3	5	28300-805	HYDRAULIC FITTING	06MJ 06MB 90
4	4	28300-842	HYDRAULIC FITTING	08MJ 08MB STR
5	3	28300-838	HYDRAULIC FITTING	06MJ 06MB STR
6	2	28300-844	HYDRAULIC FITTING	08MJ 12MB STR
7	3	28301-786	HYDRAULIC FITTING	8MJ 8FJX BT90
8	1	28301-652	HYDRAULIC FITTING	04MP 04FPX 90
9	3	28300-396	HYDRAULIC FITTING	06MB 04MP STR
10	2	28300-069	HYDRAULIC FITTING	04MP 06MJ 90
11	1	28300-762	HYDRAULIC FITTING	06MJ 06FJX 90
12	1	28300-883	HYDRAULIC FITTING	06MJ 06MB 06MJ TEE
13	3	25410-005	CHECK VALVE	6 SAE, 5 PSI
14	1	25902-013	BREATHER VENT	HCBP-4, 1/4" NPT
15	1	28300-744	HYDRAULIC FITTING	06MJ 06MB 45
16	1	28300-851	HYDRAULIC FITTING	08MJ 08MB 45
17	1	28300-041	HYDRAULIC FITTING	06MJ 12MP STR

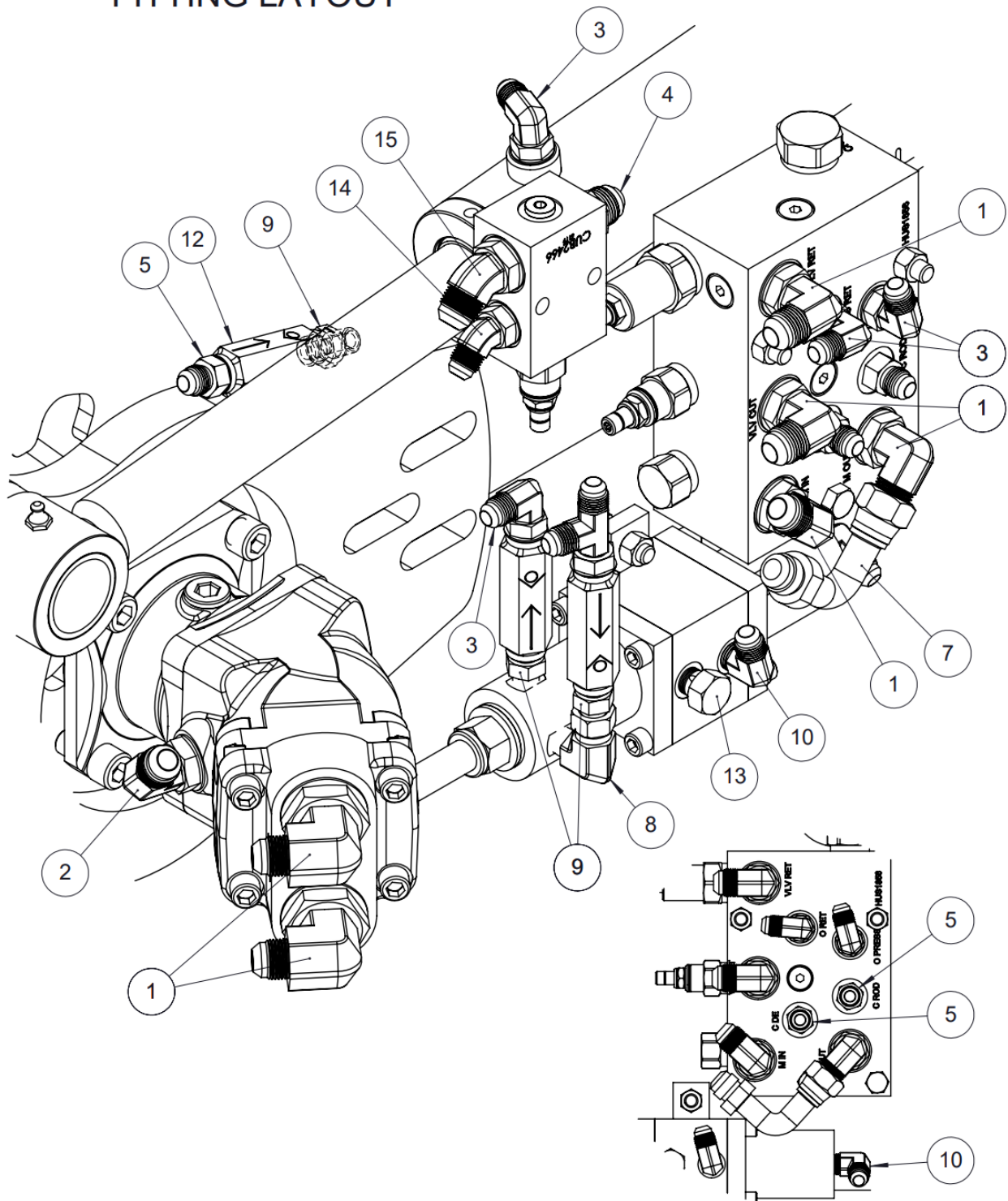


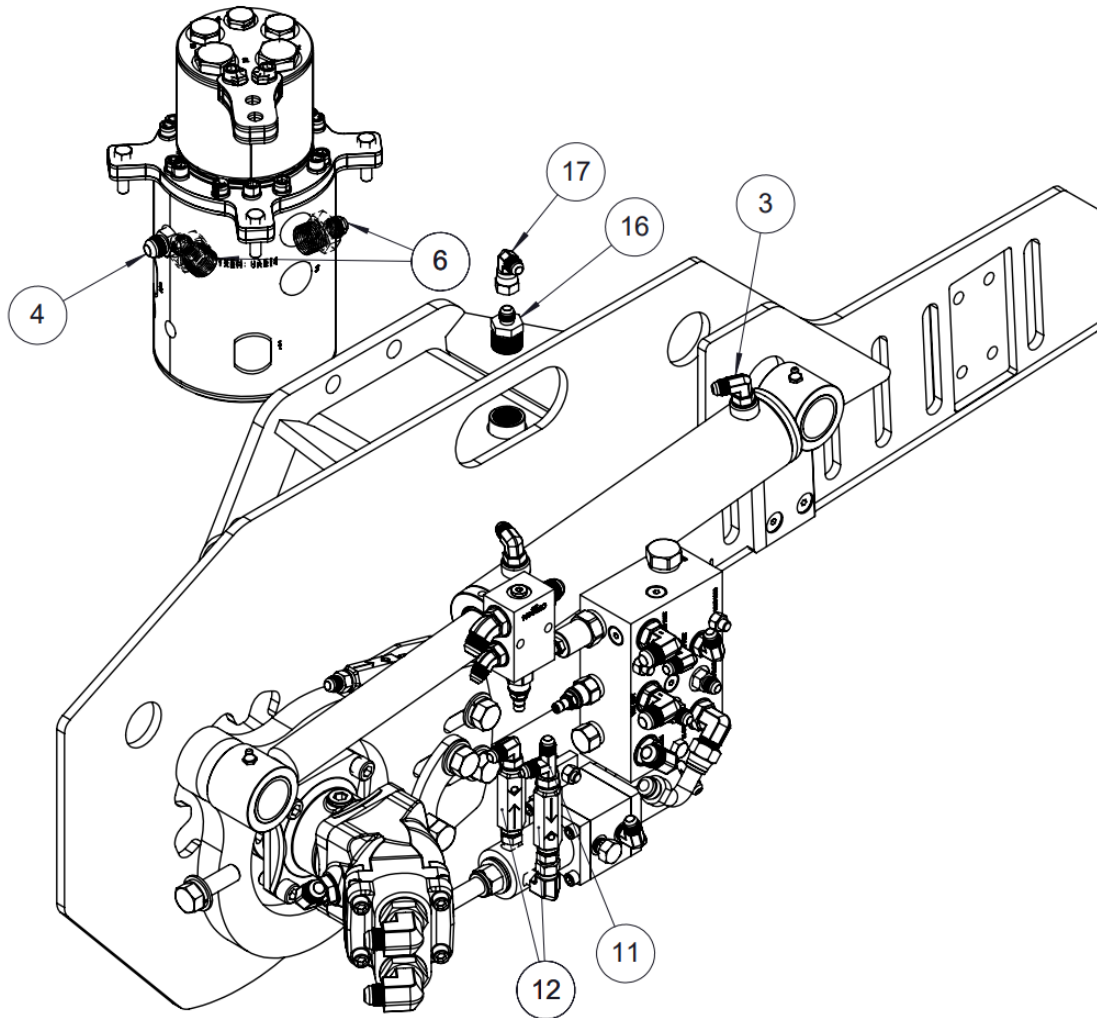
2070 GRAPPLE SAW FINAL BOX ASSEMBLY

ITEM NO.	QTY.	PARTNO	DESCRIPTION	MATERIAL
1	1	41015-030	HOSE GUARD	2070 Daehan Grapple Saw
2	1	40055-172	SAW BOX ASSEMBLY	2070 Daehan Grapple Saw
3	1	25900-214	HYDRAULIC BLOCK	HYDROLICO-HPJ1895
4	1	41014-030	SWIVEL MOUNT	#12 PORT UEA SWIVEL
5	1	40233-172	COVER	2070 Daehan Grapple Saw
6	2	40222-172	HINGE ASSEMBLY	SAW BOX HINGE
7	1	40046-172	SAW BAR ASSEMBLY	172 GRAPPLE SAW
8	1	25000-702	34CC BENT AXIS MOTOR	SUNFAB 1" KEY SHAFT
9	1	25715-001	OILER CYLINDER	BEST #40015-050
10	1	40231-172	OIL TANK ASSEMBLY	2070 Daehan Grapple Saw
11	1	25727-113	HYDRAULIC CYLINDER	1 1/2" R X 2 1/2" B X 9 1/2" S
12	1	25411-120	EARTH TO ATMOSPHERE VENT	HYDRAULICO (CUB2466)
13	1	41016-030	FIXED GRAPPLE SAW (2070/2578)	SPACER RING (SLIM)
14	1	20601-131	5/8-11 X 2 1/4 HHCS	GR8 YELLOW ZINK
15	4	20601-138	3/8-16 X 3 3/4 HHCS	GR8 YELLOW ZINK
16	1	20601-054	3/8-11 X 1 1/4 HHCS	GR8 YELLOW ZINK
17	1	20701-080	5/8 SAE FLAT	GR8 YELLOW ZINK
18	1	20570-110	5/8 LOCK WASHER	GR8 YELLOW ZINK
19	4	20041-053	3/8-16 X 1 SLBOLT	SPIN LOCK BOLT GR5
20	4	20604-076	1/2-13 X 1 SHCS	GR8 BLACK
21	5	20701-002	3/8-16 HHNUT	GR8 YELLOW ZINK
22	1	29500-070	GS BUMPER	3/4 DURALITE x 5 1/2 x 3
23	4	20603-075	3/8-16 1 3/4 FHSCS	GR8 BLACK
24	1	25411-123	#12 5 PORT SWIVEL-LARGE	UEA (YXEH40REI4)
25	4	20601-055	3/8-16 X 1 1/2 HHCS	GR8 YELLOW ZINK
26	4	20570-106	3/8 LOCK WASHER	GR8 YELLOW ZINK

2070 GRAPPLE SAW

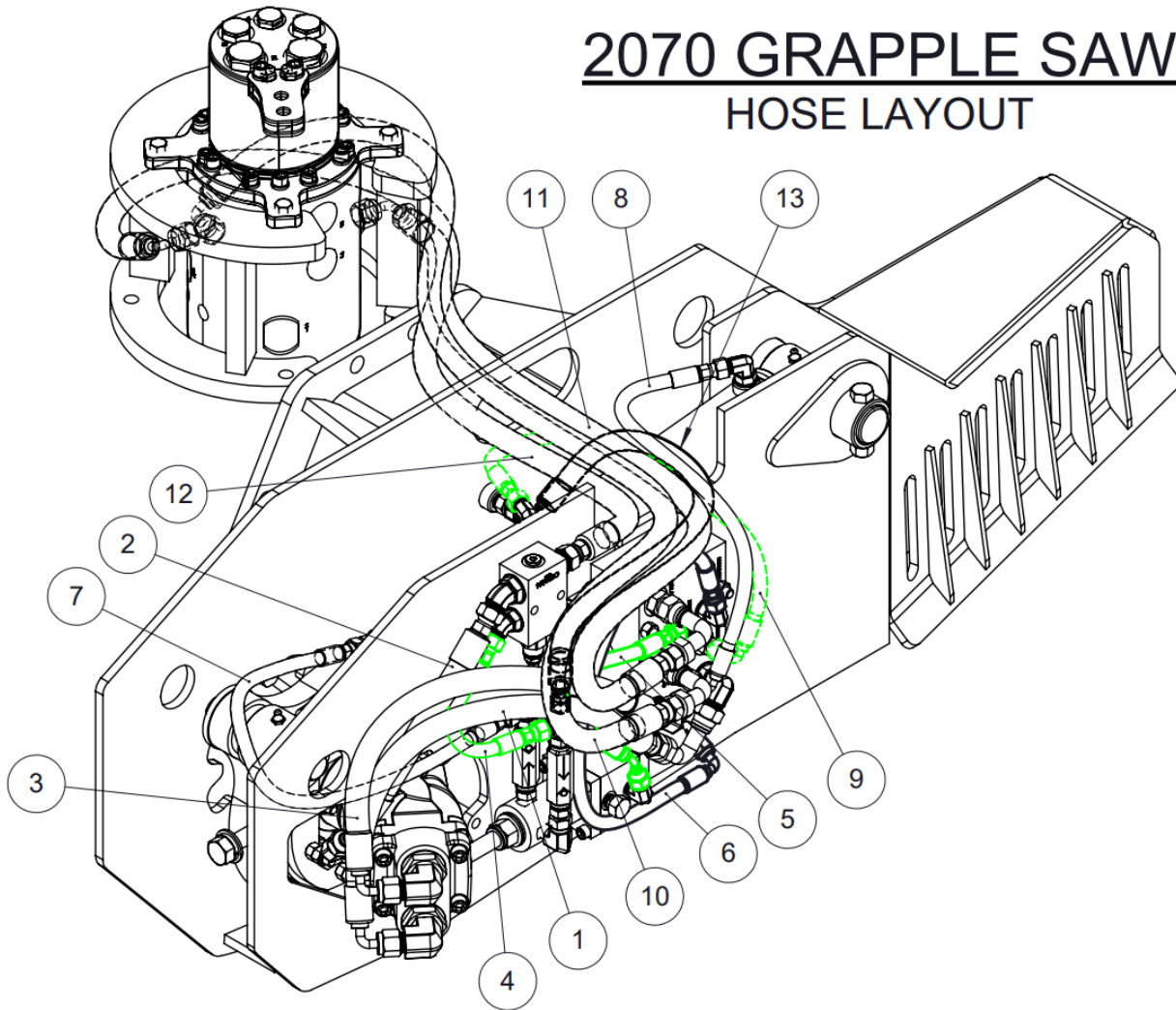
FITTING LAYOUT





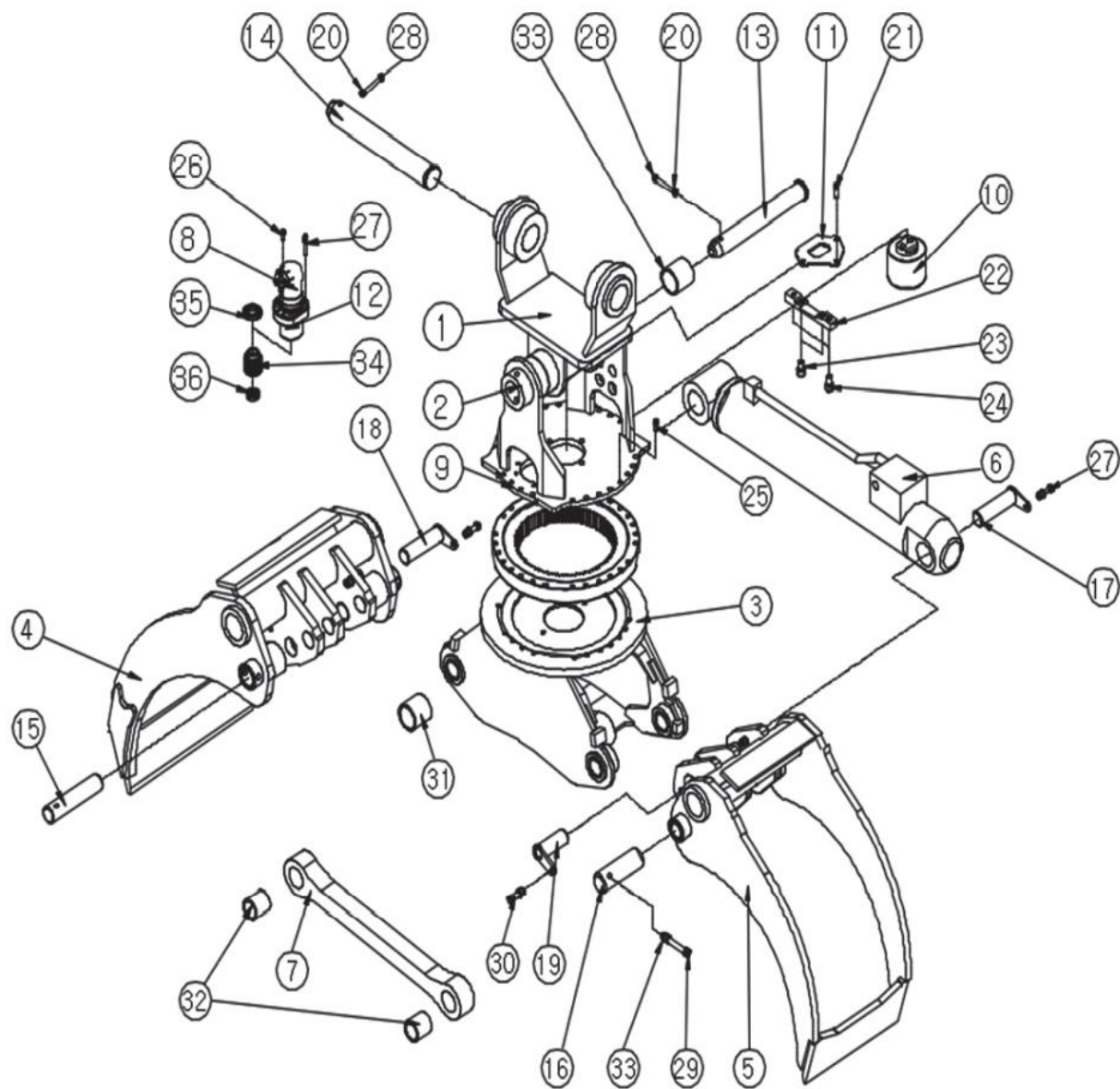
ITEM NO.	QTY.	PARTNO	DESCRIPTION	MATERIAL
1	5	28300-815	HYDRAULIC FITTING	12MJ 12MB 90
2	1	28300-809	HYDRAULIC FITTING	08MJ 08MB 90
3	5	28300-805	HYDRAULIC FITTING	06MJ 06MB 90
4	2	28300-842	HYDRAULIC FITTING	08MJ 08MB STR
5	3	28300-838	HYDRAULIC FITTING	06MJ 06MB STR
6	2	28300-850	HYDRAULIC FITTING	12MJ 12MB STR
7	1	28301-788	HYDRAULIC FITTING	12MJ 12FJX BT 90
8	1	28301-652	HYDRAULIC FITTING	04MP 04FPX 90
9	3	28300-396	HYDRAULIC FITTING	06MB 04MP STR
10	2	28300-069	HYDRAULIC FITTING	4MP 06MJ 90
11	1	28300-883	HYDRAULIC FITTING	06MJ 06MB 06MJ TEE
12	3	25410-005	CHECK VALVE	6 SAE, 5 PSI
13	1	25902-013	BREATHER VENT	HCBP-4, 1/4" NPT
14	1	28300-744	HYDRAULIC FITTING	06MJ 06MB 45
15	1	28300-851	HYDRAULIC FITTING	08MJ 08MB 45
16	1	28300-041	HYDRAULIC FITTING	06MJ 12MP STR
17	1	28300-762	HYDRAULIC FITTING	06MJ 06FJX 90

2070 GRAPPLE SAW HOSE LAYOUT



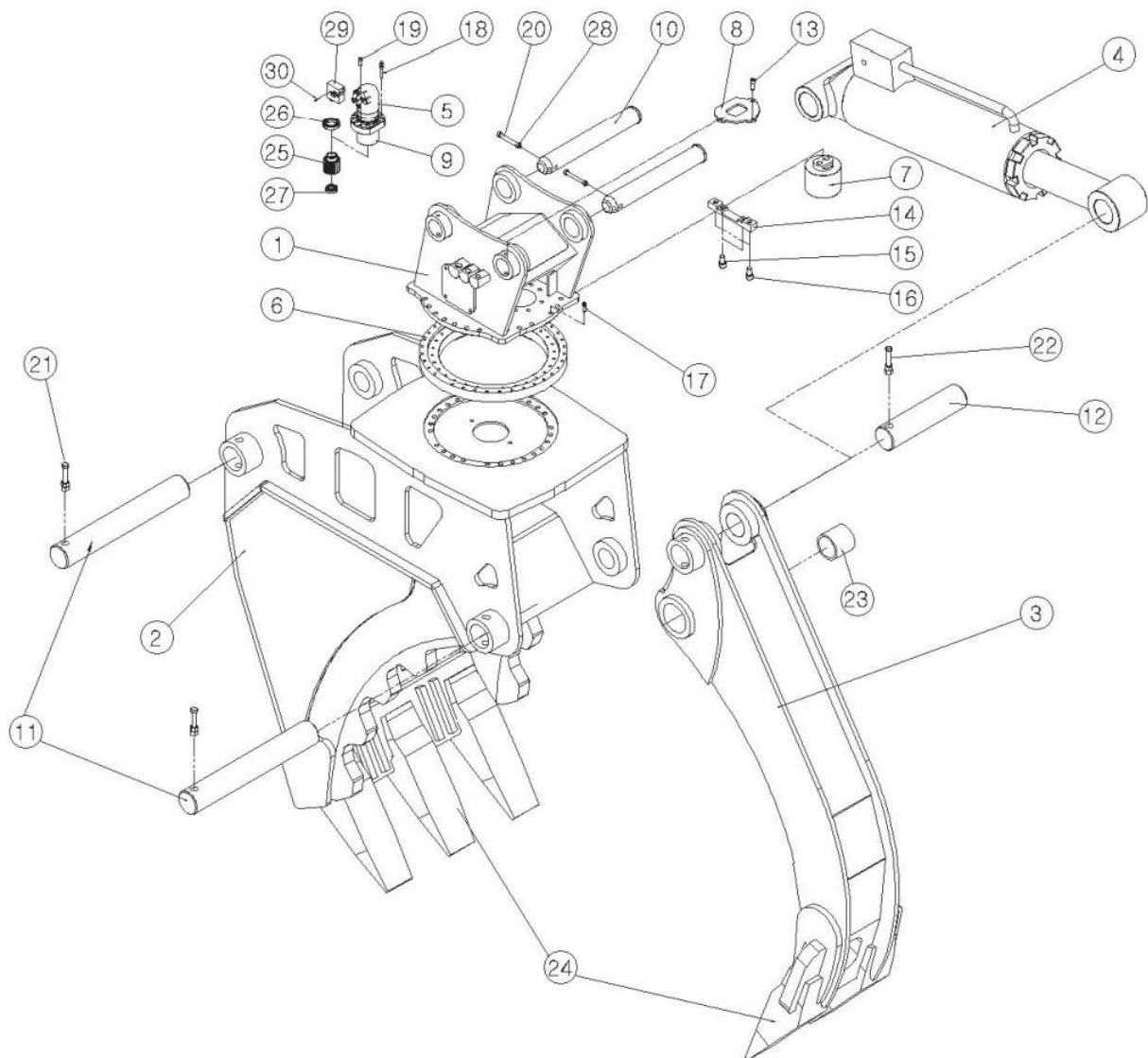
ITEM NO.	QTY.	PARTNO	DESCRIPTION	LOCATION
1	1	27782-520	12FJX 12FJX 90, 3/4 2W, 20"	M OUT to Motor B Port
2	1	27505-008	08FJX 08FJX 45, 3/4 2W, 8"	Motor Case Drain to Drain Valve
3	1	27782-516	12FJX 12FJX 90, 3/4 2W, 16"	M IN to Motor A Port
4	1	27102-008	06FJX 06FJX, 1/4 2W, 8"	Drain VALVE to Tee In Oiler
5	1	27311-313	06FJX 06FJX 45, 3/8 2W, 13"	O RET to 2nd Oiler Port
6	1	27311-218	06FJX 06FJX 90, 3/8 2W, 18"	O PRESS to 1st Oiler Port
7	1	27102-023	06FJX 06FJX, 1/4 2W, 23"	Oiler to Bar Mount
8	1	27103-023	06FJX 06FJX 90, 1/4 2W, 23"	C DE to Cylinder Butt
9	1	27103-018	06FJX 06FJX 90, 1/4 2W, 18"	C ROD to Cylinder Rod
10	1	27782-547	12FJX 12FJX 90, 3/4 2W, 47"	VLV CUT to Swivel Port #1
11	1	27782-536	12FJX 12FJX 90, 3/4 2W, 36"	VLV RET to Swivel Port #2
12	1	27504-047	08FJX 08FJX 90, 1/2 2W, 47"	Drain Valve to Swivel Port #4
13	1	27311-220	06FJX 06FJX 90, 3/8 2W, 20"	Oiler to Oil Tank

25 Series



No	Name	<u>2551</u>	<u>2559</u>	<u>2570</u>	<u>2574</u>	<u>2578</u>
	Complete Ass'y	42551-003	42059-004	42070-006	42078-008	42086-010
1	Top Ass'y	40001-063	40001-064	40001-065	40001-066	40001-067
2	Hanger Bracket Ass'y	40000-063	40000-064	40000-065	40000-066	40000-067
3	Body Ass'y, Complete	40002-063	40002-064	40002-065	40002-066	40002-067
-	Body Ass'y, Weldment	40003-063	40003-064	40003-065	40003-066	40003-067
4	Small Grap Ass'y	40004-063	40004-064	40004-065	40004-066	40004-067
5	Large Grap Ass'y	40005-063	40005-064	40005-065	40005-066	40005-067
6	Cylinder Ass'y	25728-028	25728-030	25728-032	25728-034	25728-036
7	Link Ass'y	40006-063	40006-064	40006-065	40006-066	40006-067
8	Motor Ass'y	25005-000	25005-000	25005-000	25005-000	25005-004
9	Swing Bearing	21201-001	21201-001	21201-002	21201-002	21201-003
10	Rotary Joint Ass'y	40007-055	40007-055	40007-056	40007-056	40007-057
11	Rotary Joint Plate	30046-055	30046-055	30046-056	30046-056	30046-058
12	Pinion Gear Housing	30047-055	30047-055	30047-056	30047-056	30047-058
13	Top Pin	40008-055	40008-056	40008-057	40008-058	40008-059
14	Bracket Pin	30048-063	30048-064	30048-065	30048-066	30048-067
15	Body Pin - L	30050-063	30050-064	30050-065	30050-066	30050-067
16	Body Pin - S	40009-063	40009-064	30050-065	30050-066	30050-067
17	Cyl. Head Pin	40010-063	40012-064	40012-065	40012-066	40010-067
18	Cyl. Rod Pin	40012-063	40012-064	40012-065	40012-066	40012-067
19	Link Pin	40012-063	40012-064	40012-065	40012-066	40012-067
20	Lock Nut	20800-752	20800-752	20800-753	20800-753	20800-753
21	Wrench Bolt - 1	20800-728	20800-728	20800-729	20800-729	20800-729
22	Rotary Joint Bracket	40011-055	40011-055	40011-056	40011-056	40011-057
23	Wrench Bolt - 2	20800-730	20800-730	20800-730	20800-730	20800-728
24	Wrench Bolt - 3	20800-732	20800-732	20800-733	20800-733	20800-734
25	Wrench Bolt - 4	20800-728	20800-728	20800-736	20800-736	20800-737
26	Wrench Bolt - 5	20800-729	20800-729	20800-740	20800-740	20800-741
27	All Bolt	-	-	-	-	20800-738
28	Hex Bolt - 1	20800-742	20800-742	20800-743	20800-744	20800-745
29	Hex Bolt - 2	20800-746	20800-747	20800-748	20800-749	20800-744
30	Hex Bolt - 3	20800-742	20800-751	20800-743	20800-744	20800-745
31	Bush - 1	21408-036	21408-039	21408-042	21408-045	21408-048
32	Bush - 2	21408-037	21408-040	21408-043	21408-046	21408-049
33	Bush - 3	21408-038	21408-041	21408-044	21408-047	21408-050
34	Pinion Gear	23000-046	23000-046	23000-047	23000-047	23000-048
35	Ball Bearing	21201-006	21201-006	21201-007	21201-007	21201-008
36	Ball Bearing	21201-009	21201-009	21201-010	21201-010	21201-011

30 Series



<u>No</u>	<u>Name</u>	<u>3043</u>	<u>3055</u>	<u>3063</u>	<u>3072</u>
1	Top Ass'y	40001-055	40001-056	40001-057	40001-058
2	Bucket Ass'y	40000-071	40000-072	40000-073	40000-074
3	Grapple Ass'y	40002-071	40002-072	40002-073	40002-074
4	Cylinder Ass'y	40004-071	40004-072	40004-073	40004-074
5	Motor Ass'y	25005-000	25005-000	25005-	25005-
6	Swing Bearing	21201-001	21201-002	21201-	21201-
7	Rotary Joint Ass'y	40007-055	40007-056	40007-057	40007-057
8	Rotary Joint Plate	30046-055	30046-056	30046-057	30046-058
9	Pinion Gear Housing	30047-055	30047-056	30047-057	30047-058
10	Top Pin	40008-055	40008-056	40008-057	40008-058
11	Body Pin	30048-071	30048-072	30048-071	30048-071
12	Grapple Pin	30050-071	30050-071	30050-071	30050-071
13	Wrench Bolt - 1	20800-728	20800-729	20800-730	20800-730
14	Rotary Joint BRK	40011-055	40011-056	40011-057	40011-057
15	Wrench Bolt - 2	20800-730	20800-730	20800-728	20800-728
16	Wrench Bolt - 3	20800-732	20800-733	20800-734	20800-735
17	Wrench Bolt - 4	20800-728	20800-736	20800-737	20800-737
18	All Bolt	-	-	20800-738	20800-738
19	Wrench Bolt - 5	20800-729	20800-740	20800-741	20800-741
20	Hex Bolt - 1	20800-742	20800-742	20800-743	20800-744
21	Hex Bolt - 2	20800-747	20800-747	20800-743	20800-749
22	Hex Bolt - 3	20800-746	20800-746	20800-743	20800-744
23	Bushing	21408-032	21408-033	21408-034	21408-035
24	Tooth	29904-043	29904-043	29904-044	29904-045
25	Pinion Gear	23000-046	23000-047	23000-048	23000-049
26	Ball Bearing - 1	21201-006	21201-006	21201-007	21201-008
27	Ball Bearing - 2	21201-009	21201-009	21201-010	21201-011
28	Lock Nut	20800-752	20800-752	20800-753	20800-753
29	Brake Valve	-	-	25410-000	25410-000
30	Wrench Bolt - 6	-	-	20800-755	20800-755

Grapple Decals

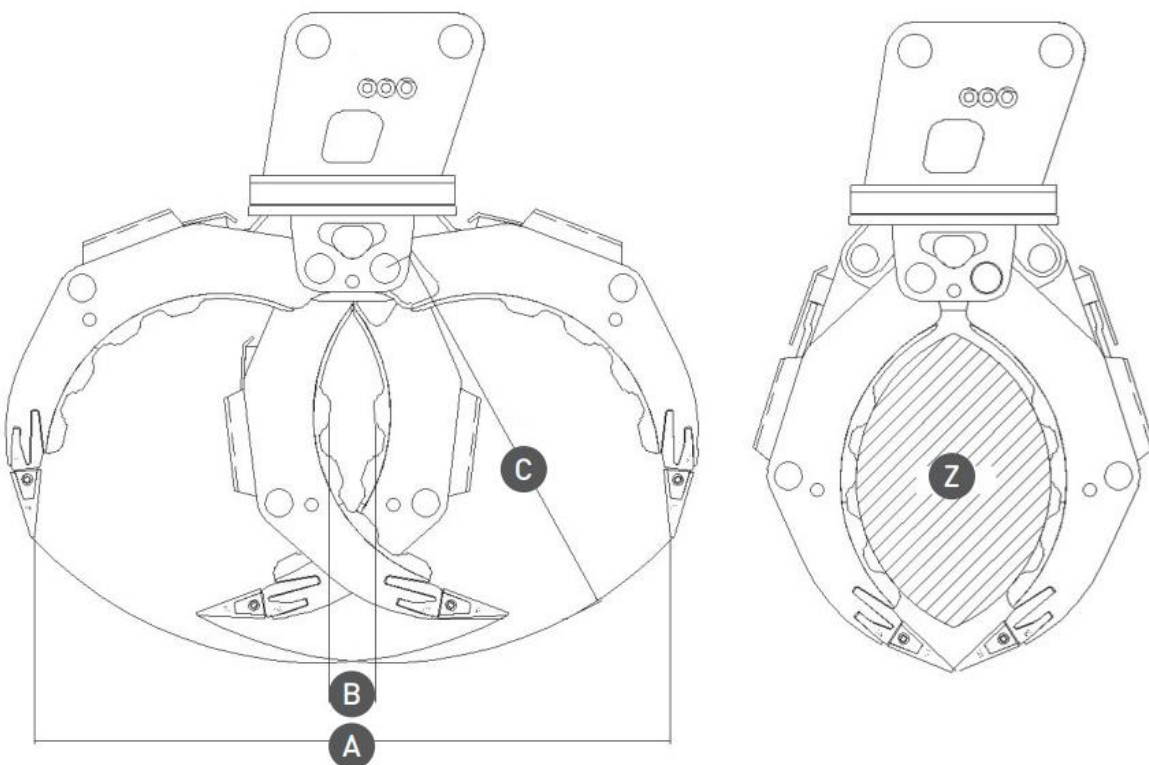
Note: All safety related decals are also shown in the Safety Instructions Section along with their location on the machine. See "Safety Decal Locations"

Check and replace any worn, torn, hard to read or missing decals on your machine.

<u>Part Number</u>	<u>Title</u>	<u>Description</u>
10100-001	Decal	Caution - Moving Parts
10100-006	Decal	Grease Daily
10100-007	Decal	Made w/Pride in the USA
10100-019	Decal	Danger, Flying Material
10100-062	Decal	Danger - ROPS... (5 x 7)
10100-064	Decal	Danger -Safety Bolts
10100-066	Decal	Ryan's Equip. Inc.
10100-067	Decal	Stay Back 300 Feet
10100-068	Decal	Warning - Safety Bolt, Installation Note
10100-069	Decal	Warning - Crush/Pinch Hazard - Keep Away
10100-072	Decal	Warning (Do Not Operate...)
10100-073	Decal	Caution (Disengage Winch)
10100-076	Decal	Warning - PPE
10100-080	Decal	Caution - Case Drain
10100-081	Decal	Dangle Saw - Operation
10100-086	Decal	Warning (Baltrotors - Don't Bang)
10100-088	Decal	Warning - Safety Bolt, Installation Note

APPENDIX

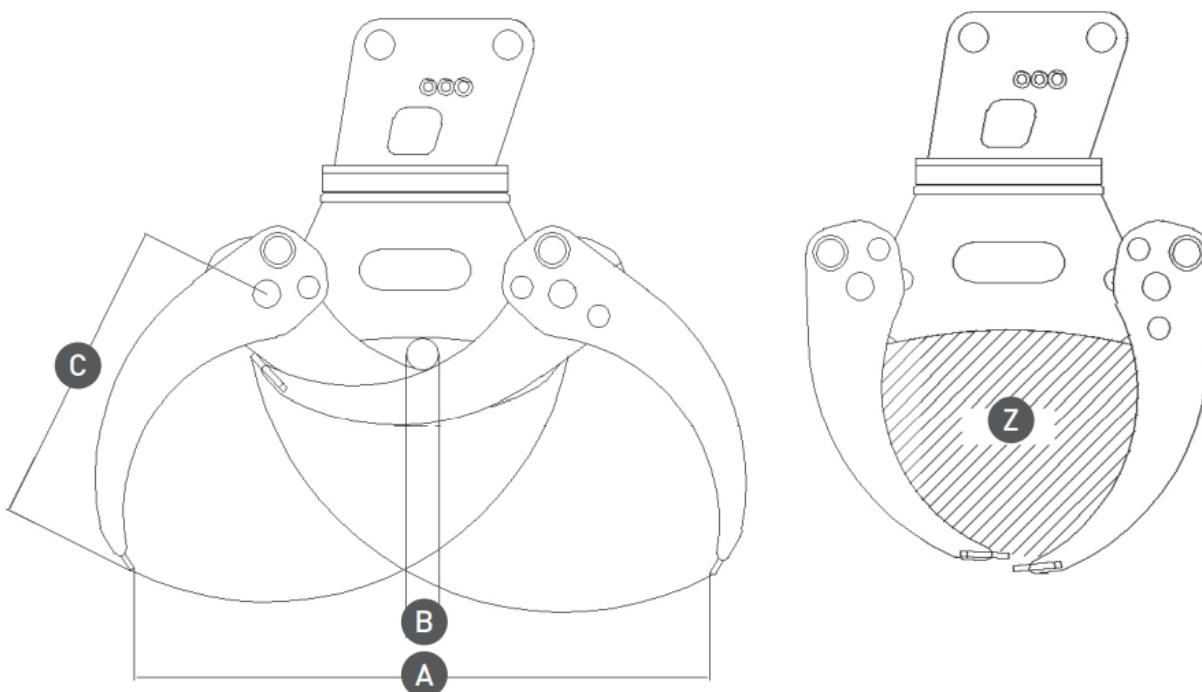
Grapple Specifications:



Rotating Multi Grapple

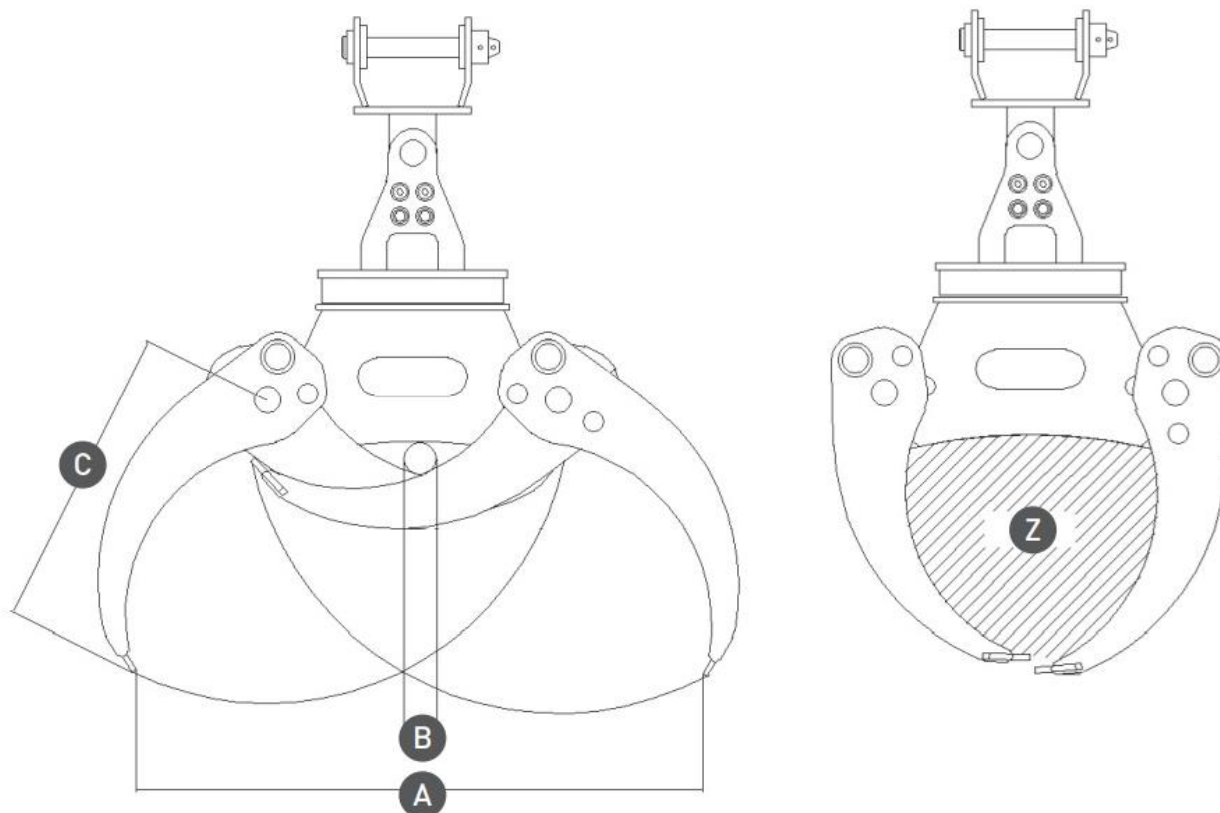
10 & 12 Series

		Unit	1039	1051	1055	1070		1078
	Model							
	Weight	Lbs	441	816	981	1,676	1,874	2,723
Jaw Opening		Inches	39	52	55	71	75	79
A		Inches	39	52	55	71	75	79
B		Inches	4	6	7	7	7	7
C		Inches	26	34	36	44	47	51
Z		Inches						
Pincher	Operating Pressure	PSI	2,466 - 3,626	2,466 - 3,626	2,756 - 4,061	2,901 - 5,076	2,901 - 5,076	3,191 - 5,076
	Recommandable Pressure	PSI	3,046	3,046	3,046	3,626	3,626	3,626
	Required Oil Flow	Gpm	40 - 227	40 - 227	40 - 227	341 - 416	341 - 416	379 - 681
Rotating	Operating Pressure	PSI	1,886 - 2,176	1,886 - 2,176	1,886 - 2,176	2,031 - 2,321	2,031 - 2,321	2,176 - 2,466
	Required Oil Flow	Gpm	114 - 189	114 - 189	114 - 189	151 - 227	151 - 227	151 - 227
Closing Force		Ton	18	22	28	50	50	67
Load Capacity		Lbs	2,205	2,205	2,205	8,820	8,820	13,230
Carrier		Ton	2 - 4	4 - 5	6 - 10	11 - 15	15 - 22	20 - 24



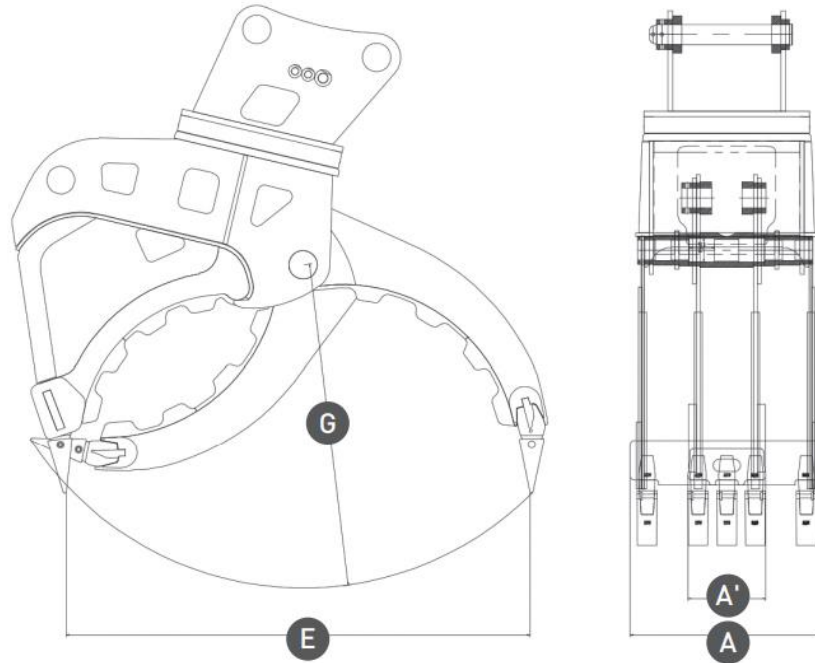
Rotating Multi Grapple

20 Series		Unit	2051	2059	2070	2078	2086
			42051-003	42059-004	42070-006	42078-008	42086-010
	Model						
	Weight	Lbs	728	1,014	1,698	2,337	3,164
	Jaw Opening	Inches	51	59	71	79	87
	A	Inches	51	59	71	79	87
	B	Inches	4	5	6	7	7
	C	Inches	25	29	35	39	43
	Z	Inches					
Pincher	Operating Pressure	PSI	2,466 - 3,626	2,756 - 4,061	2,901 - 5,076	3,191 - 5,076	3,191 - 5,076
	Recommandable Pressure	PSI	3,046	3,046	3,626	3,626	3,626
	Required Oil Flow	Gpm	151 - 227	151 - 227	340 - 416	378 - 681	454 - 757
Rotating	Operating Pressure	PSI	1,886 - 2,176	1,886 - 2,176	2,031 - 2,321	2,176 - 2,466	2,176 - 2,466
	Required Oil Flow	Gpm	113 - 189	113 - 189	151 - 227	151 - 227	151 - 227
	Closing Force	Ton	11	14	25	34	40
	Load Capacity	Lbs	2205	2205	8820	13230	22050
	Carrier	Ton	4 - 5	6 - 10	11 - 18	20 - 24	26 - 32



Rotating Multi Grapple

25 Series		Unit	2551	2559	2570	2574	2578	2582	2586	2590
Model										
Weight		Lbs	860	948	1,389	1,477	2,073	2,205	2,844	3,021
Jaw Opening		Inches	51	55	63	75	61	73	79	83
A		Inches	51	59	61	75	79	83	87	91
B		Inches	4	5	5	6	7	7	7	7
C		Inches	25	29	30	37	39	41	43	45
Z		Inches								
Pincher	Operating Pressure	PSI	2,466 - 3,626	2,756 - 4,061	2,901 - 5,076	2,901 - 5,076	3,191 - 5,076	3,191 - 5,076	3,191 - 5,076	3,191 - 5,076
	Recommandable Pressure	PSI	3,046	3,046	3,626	3,626	3,626	3,626	3,626	3,626
	Required Oil Flow	Gpm	40 - 227	40 - 227	341 - 416	341 - 416	379 - 681	379 - 681	454 - 757	454 - 757
Rotating	Operating Pressure	PSI	1,886 - 2,176	1,886 - 2,176	2,031 - 2,321	2,031 - 2,321	2,176 - 2,466	2,176 - 2,466	2,176 - 2,466	2,176 - 2,466
	Required Oil Flow	Gpm	114 - 189	114 - 189	151 - 227	151 - 227	151 - 227	151 - 227	151 - 227	151 - 227
	Closing Force	Ton	11	14	25	25	34	34	40	40
	Load Capacity	Lbs	2,205	2,205	8,820	8,820	13,230	13,230	22,050	29,768
	Carrier	Ton	4 - 5	6 - 10	11 - 18	15 - 22	20 - 24	24 - 30	26 - 32	33 - 36



Rotating Multi Grapple

30 Series		Unit	3043	3055	3063	3072
Model						
Weight	Lbs		728	970	1,962	3,065
Jaw Opening	Inches		43	55	63	73
A	Inches		18	20	25	30
A'	Inches		9	9	11	12
B	Inches		49	51	63	71
C	Inches		40	44	54	66
D	Inches		20	18	22	29
E	Inches		43	55	63	73
F	Inches		51	49	62	73
G	Inches		31	35	42	51
Pincher	Operating Pressure	PSI	2,466 - 3,626	2,466 - 3,626	2,756 - 4,061	2,901 - 5,076
	Recommmandable Pressure	PSI	3,046	3,046	3,626	3,626
	Required Oil Flow	Gpm	151 - 227	151 - 227	340 - 416	378 - 681
Rotating	Operating Pressure	PSI	1,885 - 2,175	1,885 - 2,175	2,030 - 2,320	2,175 - 2,465
	Required Oil Flow	Gpm	113 - 189	113 - 189	151 - 227	151 - 227
	Closing Force	Ton	11	14	25	34
	Load Capacity	Lbs	2,205	2,205	13,230	13,230
	Carrier	Ton	2 - 4	4 - 5	6 - 10	11 - 15

Bolt Torque Specifications:

Table						
Torque Values for Socket Head and Hex Head Capscrews						
SOCKET HEAD CAP SCREWS						
BOLT SIZE	As Received			Lubricated**		
INCHES	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	13	150	17	10	120	13
5/16	25	305	34	18	244	27
3/8	45	545	62	36	436	49
7/16	70	840	95	56	672	76
1/2	108	1300	147	86	1040	117
9/16	155	1860	210	124	1488	168
5/8	211	2530	286	168	2024	228
3/4	367	4400	497	293	3520	397
7/8	583	7000	791	466	5600	632
1	867	10400	1175	693	8320	940
1 1/8	1242	14900	1684	993	11920	1347
1 1/4	1750	21000	2374	1400	16800	1899
1 3/8	2317	27800	3142	1853	22240	2513
1 1/2	3042	36500	4125	2433	29200	3300
1 3/4	4950	59400	6714	3960	47520	5371
2	7492	89900	10161	5993	71920	8128
HEX HEAD CAP SCREWS - Grade 8						
BOLT SIZE	As Received			Lubricated**		
INCHES	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	8	100	11	6	80	9
5/16	17	200	23	13	160	18
3/8	30	360	41	24	288	32
7/16	48	570	64	38	456	51
1/2	83	990	112	66	792	89
9/16	107	1285	145	85	1028	116
5/8	143	1714	194	114	1371	155
3/4	256	3070	347	204	2456	277
7/8	417	5000	565	333	4000	452
1	625	7500	848	500	6000	678
HEX HEAD CAP SCREWS - Grade 5						
BOLT SIZE	As Received			Lubricated**		
INCHES	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	6	71	8	5	56	6
5/16	12	142	16	9	113	12
3/8	22	260	29	17	208	23
7/16	34	410	46	27	328	36
1/2	53	636	72	42	508	57
9/16	74	890	101	59	712	80
5/8	104	1250	141	83	1000	112
3/4	183	2200	249	146	1760	199
7/8	298	3570	403	238	2856	322
1	440	5280	597	352	4224	477
1 1/8	553	6640	750	442	5312	600
1 1/4	775	9300	1051	620	7440	840
1 3/8	1012	12140	1372	809	9712	1097
1 1/2	1350	16200	1831	1080	12960	1464
** NOTE: For Loctite use lubricated values						

Table -continued-

Caution: Torque values on assembly drawings override torque values on these charts.

Torque Values for Metric Socket Head and Hex Head Capscrews

4.6 Class							8.8 Class						
Bolt Size	Dry			Lubricated**			Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m		lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	1.8	21.2	2.4	1.3	16.8	1.9	5	4.6	54.9	6.2	3.4	40.7	4.6
6	3	36.3	4.1	2.3	29.2	3.3	6	7.7	92.9	10.5	5.8	69.9	7.9
8	7.3	87.6	9.9	5.5	69.9	7.9	8	18.8	226	25.5	14.1	169	19.1
10	14.5	173	19.6	10.8	139	15.7	10	37.2	447	50.5	27.9	335	37.8
12	25.2	302	34.1	18.9	242	27.3	12	64.9	779	88	48.7	584	66
14	40.1	481	54.3	30.1	385	43.5	14	103	1239	140	77.5	929	105
16	62.5	750	84.8	46.9	600	67.8	16	161	1938	219	121	1451	164
18	86.3	1035	117	64.5	826	93.3	18	229	2752	311	172	2062	233
20	122	1460	165	91.5	1168	132	20	325	3903	441	244	2929	331
22	166	1991	225	124	1593	180	22	443	5310	600	332	3983	450
24	211	2531	286	158	2027	229	24	562	6744	762	422	5062	572
27	308	3699	418	231	2965	335	27	823	9868	1115	617	7407	837
30	419	5027	568	314	4018	454	30	1117	13408	1515	838	10054	1136
33	570	6841	773	428	5469	618	33	1520	18240	2061	1140	13682	1546
36	732	8788	993	549	7027	794	36	1952	23426	2647	1464	17567	1985
39	948	11372	1285	711	9098	1028	39	2527	30320	3426	1895	22736	2569

10.9 Class							12.9 Class						
Bolt Size	Dry			Lubricated**			Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m		lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	6.5	77.9	8.8	4.9	58.4	6.6	5	7.6	91.2	10.3	5.7	68.1	7.7
6	11.1	133	15	8.3	100	11.3	6	12.9	155	17.5	9.7	117	13.2
8	26.9	323	36.5	20.2	242	27.3	8	31.4	377	42.6	23.6	283	32
10	53.3	639	72.2	39.9	480	54.2	10	62.2	747	84.4	46.7	560	63.3
12	92.9	1115	126	69.7	836	94.5	12	109	1301	147	81.4	974	110
14	148	1770	200	111	1328	150	14	173	2071	234	130	1558	176
16	231	2770	313	173	2080	235	16	270	3230	365	202	2425	274
18	317	3806	430	238	2859	323	18	371	4452	503	278	3336	377
20	450	5399	610	337	4053	458	20	526	6310	713	394	4735	535
22	612	7346	830	459	5505	622	22	715	8585	970	537	6434	727
24	778	9337	1055	586	7000	791	24	909	10912	1233	682	8186	925
27	1138	13656	1543	854	10239	1157	27	1330	15957	1803	998	11965	1352
30	1546	18541	2095	1159	13912	1572	30	1806	21674	2449	1355	16257	1837
33	2103	25231	2851	1577	18921	2138	33	2458	29488	3332	1843	22116	2499
36	2701	32409	3662	2026	24302	2746	36	3157	37869	4279	2367	28409	3210
39	3495	41940	4739	2622	31453	3554	39	4085	49011	5538	3064	36763	4154

**** NOTE:** For Loctite use lubricated values

NOTES

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WARRANTY CARD



WARRANTY REGISTRATION CERTIFICATE

To be eligible for the warranty conditions specified on your warranty certificate, fill out and return this warranty registration certificate to register your purchase. Please keep a copy for your files.

Dealer Information

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

End-user Information

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Product Information

Serial No. _____ Model No. _____

Purchase Date _____

Please mail or fax this warranty registration certificate to:

Ryan's Equipment, Inc.
111 Quicksilver Lane
Edmore, MI 48829

Fax: 989-427-4008

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COMPANY INFO

Ryan's Equipment

111 Quicksilver Lane * Edmore, MI. 48829

(989) 427-2829

