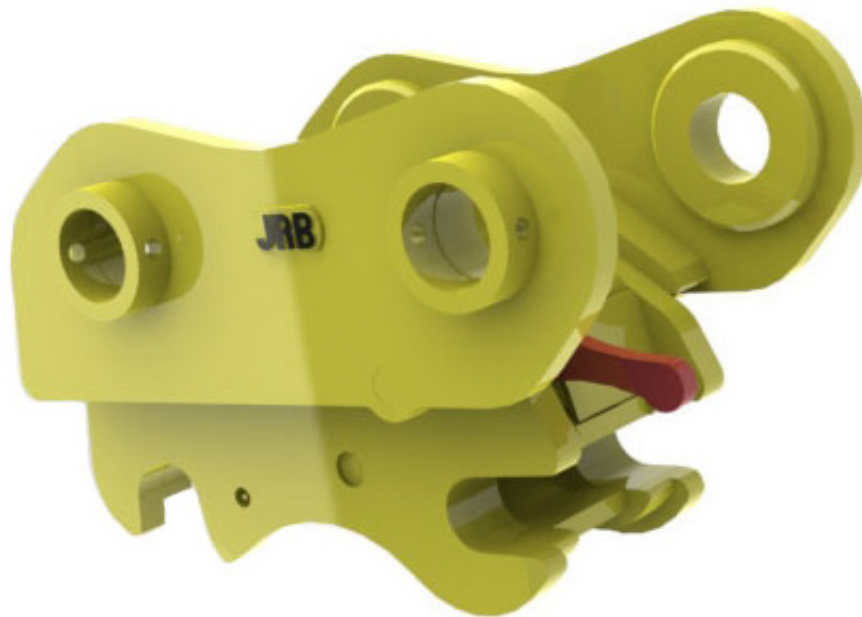




## OPERATOR'S MANUAL

# SMART-LOC® COUPLER PATENTED

**FOR  
EXCAVATORS**



SERIAL NUMBER: \_\_\_\_\_

MODEL NUMBER: \_\_\_\_\_

Manual Number: OM90A  
Date: June 2019  
Rev. 4



# TABLE OF CONTENTS

<b>PREFACE.....</b>	<b>5</b>
<b>SAFETY PRECAUTIONS</b>	
SAFETY STATEMENTS .....	6
GENERAL SAFETY PRECAUTIONS.....	6-8
EQUIPMENT SAFETY PRECAUTIONS .....	9-12
<b>DECALS</b>	
DECAL PLACEMENT .....	13
<b>INSTALLATION</b>	
NOMENCLATURE .....	14
INSTALLATION PROCEDURE.....	15
<b>OPERATION</b>	
INTENDED USE .....	16
LOCKING SYSTEM OPERATION .....	17
COUPLER CONTROL BOX .....	18
HYDRAULIC SCHEMATIC - HIGH PRESSURE SYSTEM .....	19
HYDRAULIC SCHEMATIC - LOW PRESSURE SYSTEM .....	20
LOCKING ATTACHMENT .....	21
UNLOCKING ATTACHMENT.....	22
STORAGE .....	24
LIFT and TIE DOWN POINTS .....	24
TRANSPORTING .....	24
<b>MAINTENANCE &amp; SERVICE</b>	
MAINTENANCE SCHEDULE .....	25
COUPLER GREASING .....	26
COUPLER CYLINDER REMOVAL / REPLACEMENT .....	27
<b>TROUBLESHOOTING .....</b>	<b>28</b>
<b>SPECIFICATIONS</b>	
BOLT TORQUE SPECIFICATIONS.....	29
<b>PARTS / LIMITED WARRANTY .....</b>	<b>31</b>


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# PREFACE

## GENERAL COMMENTS

Congratulations on the purchase of your new JRB 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 the attachment.

**NOTE:** 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. Keep this manual available for reference. Provide this 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 and stress level
- job site organization, working material condition and 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**

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



### **WARNING**

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



### **CAUTION**

THIS SIGNAL WORD 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 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).**



#### **READ AND UNDERSTAND ALL SAFETY STATEMENTS**

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.



#### **KNOW YOUR EQUIPMENT**

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. 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. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

## GENERAL SAFETY PRECAUTIONS

### WARNING!



#### 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.

### WARNING!



#### LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. 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 booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

### WARNING!



#### USE CARE WITH HYDRAULIC FLUID PRESSURE

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 or her 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! SEE ILLUSTRATION.**

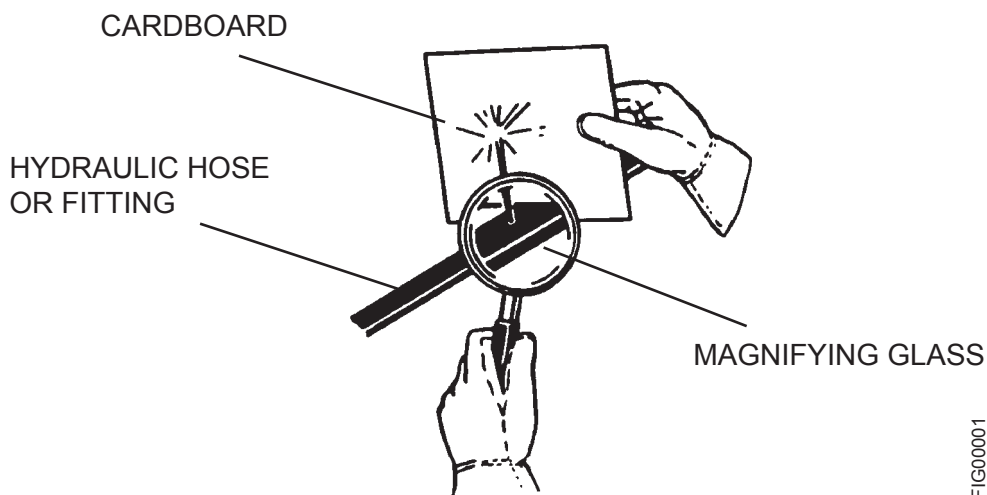


FIG00001

## GENERAL SAFETY PRECAUTIONS

### WARNING!



#### DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protection Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

### WARNING!



#### SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.



#### SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

### WARNING!



#### 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](http://www.P65Warnings.ca.gov)



## EQUIPMENT SAFETY PRECAUTIONS

### WARNING!



#### KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

### WARNING!



#### EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

### 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.

### WARNING!



#### 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.



#### OPERATING THE ATTACHMENT

- Never use your attachment for a work platform or personnel carrier.
- 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.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Never lift, move, or swing a load or attachment over anyone.
- 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.

### WARNING!



#### KEEP ATTACHMENT CLOSE TO THE GROUND DURING ALL LOCK AND UNLOCK OPERATIONS.

Attachment can drop without warning if not properly secured. Visually check the coupler is securely locked on attachment. Follow procedures described in this manual for checking fit between coupler and attachment. Failure to do so could result in serious injury or death.

## EQUIPMENT SAFETY PRECAUTIONS

### WARNING!



### CLEAR COUPLER OF DEBRIS BEFORE OPERATING

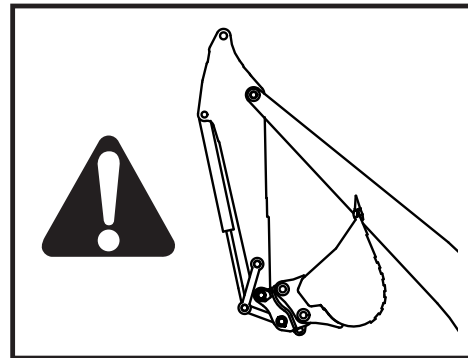
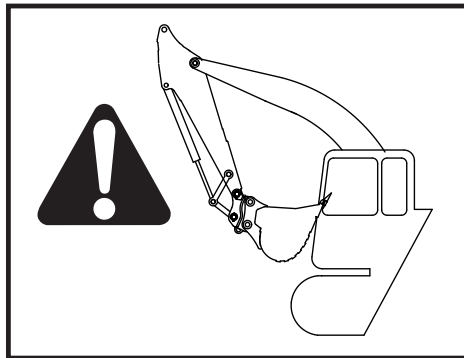
Make sure coupler is free of debris prior to operation. Debris can interfere with the locking mechanism not allowing it to function properly.



### UNDERSTAND EFFECTIVE REACH OF ATTACHMENTS

The coupler increases the distance between the stick and the attachment. The effective “reach” of the attachment will be increased.

Depending on the specific coupler and attachment combination, it may be possible for the attachment to come in contact with the upper structure of the excavator (cab, boom, cylinders, etc.). The operator should familiarize themselves with any potential interference locations prior to use.



### WARNING!



### DO NOT USE BUCKET IN SHOVEL POSITION

Attaching a bucket in a reverse orientation on the coupler is NOT recommended. The lift eye or other portion of the bucket may interfere with the machine stick while in the full curl position. The locking mechanism of the coupler WILL NOT work properly if the bucket is in the reverse orientation.



### MODIFICATIONS TO MACHINE STICK COULD INTERFERE WITH COUPLER OPERATION

Check for modifications to the underside of the machine stick prior to operation. Such modifications including, but not limited to, accepting a grapple, thumb or the addition of a reinforcement plate may cause interference with the locking mechanism of the coupler. **DO NOT** operate the coupler if the possibility of interference exists. Doing so may cause damage to the coupler and will void warranty.

## EQUIPMENT SAFETY PRECAUTIONS

### WARNING!



#### LIFT EYE USAGE

The JRB coupler is designed with a lift eye for lifting and placing material. It is designed for the convenience of the operator. Consult your prime mover manufacturers specifications for lifting procedures and capacities. Incorrect applications and uses and failure to follow these instructions may result in severe injury or death.

In order to use the lift eye correctly and safely the attachment must first be removed from the coupler. Not only is this the safe method, it also increases the lifting capacity of the machine. When an attachment is in use with the coupler, the chain, cable or other lifting device can contact it and may cause interference, damage or potential for unexpected release.

The lifting device must always be removed when changing attachments. If the device is in the area of the coupler or attachment during coupling, it may cause an incomplete locking of the coupler to the attachment or damage to the coupler and/or the attachment.

### WARNING!



#### ONLY USE JRB PROVIDED HYDRAULIC KIT TO OPERATE THE COUPLER

The JRB Coupler has been extensively studied and tested, for both efficiency and safety, using the JRB hydraulic kit.

The JRB Coupler has not been studied or tested using any other hydraulic system. Since hydraulic systems vary in many aspects, JRB cannot know whether the coupler may be operated safely with a hydraulic system that is not its own. Because of the unknown characteristics of any other hydraulic system, JRB takes no responsibility for the safety of a JRB coupler if it is operated with a hydraulic system other than the one provided by JRB.



#### TRANSPORTING THE ATTACHMENT

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough terrain and 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.
- Do not drive close to ditches, excavations, etc., as a cave-in could result.
- Do not smoke when refueling the prime mover. Allow room in the fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.



#### MEASURE TRAVEL HEIGHT AND LENGTH PRIOR TO TRANSPORTING

The overall travel height and/or length of the prime mover will be increased if the coupler and attachment are installed. Do not rely on original prime mover specifications to determine overall dimensions. Actual dimensions will be affected by specific coupler and attachment combination.

# EQUIPMENT SAFETY PRECAUTIONS



## MAINTAINING THE ATTACHMENT

- Before performing maintenance (unless otherwise specified), lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never perform any work on the attachment 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, check for correct functioning of the attachment. If not functioning properly, always 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 your local dealer or the manufacturer.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.



## REMOVE THE ATTACHMENT FROM THE COUPLER AT THE END OF EACH SHIFT.

Failure to do so could cause increasing tightness of the locking mechanism, causing it to become difficult to uncouple.

# DECALS

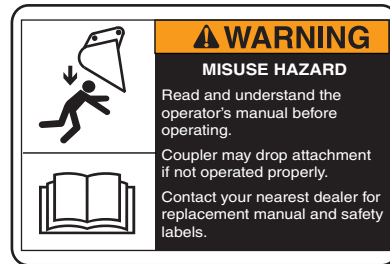
## DECAL PLACEMENT

### GENERAL INFORMATION

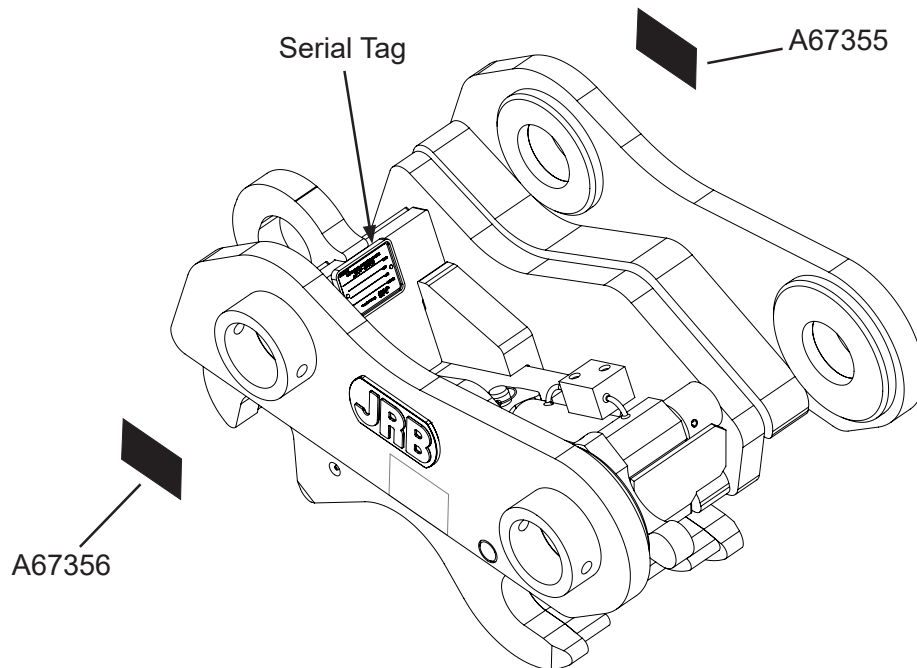
The following diagram(s) show the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals shown on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all the decals before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



ITEM# A67355  
WARNING! HIGH PRESSURE FLUID



ITEM# A67356  
WARNING! MISUSE HAZARD



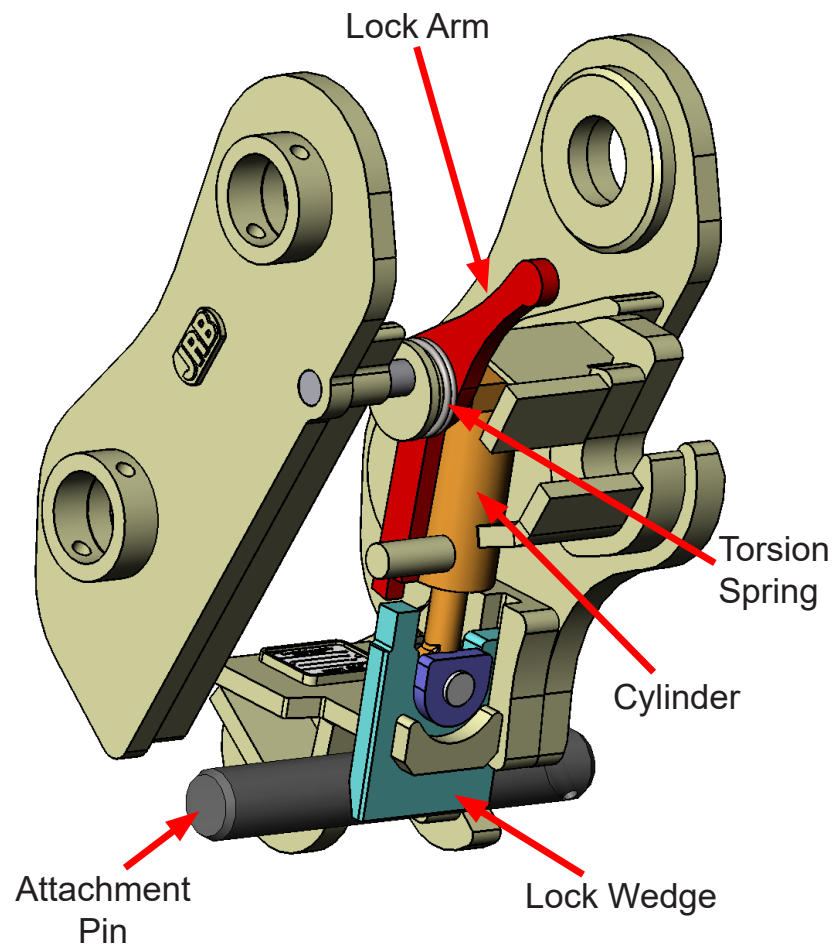
**IMPORTANT:** Keep all safety decals clean and legible. Replace all missing, illegible or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced.

**REPLACING SAFETY DECALS:** Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow 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.

# INSTALLATION

## NOMENCLATURE

Throughout this manual reference is made to various components. The purpose of this section is to help you become familiar with the names of these components. This knowledge will be helpful when reading through this manual.



# INSTALLATION

Remove attachment from machine and set aside the OEM pins and pin locking hardware. The OEM pins will be used to install the coupler to the machine.

The pins and pin locking hardware provided with the coupler are to be used in the attachment.

Install coupler hydraulic kit onto machine. Refer to the JRB Hydraulic Kit Manual for your specific machine for installation instructions.

## STEP 1



With coupler sitting on the ground and positioned as shown, align the end of the machine stick.

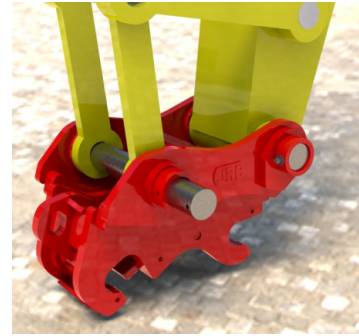
## STEP 2



Slowly lower machine stick into place until the pin holes of the stick and coupler are aligned. Make sure any OEM o-rings are reinstalled as required.

Install OEM pin and secure with locking hardware.

## STEP 3



Slowly lower machine link into place until the pin holes of the link and coupler are aligned.

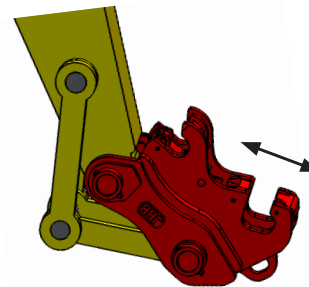
Install OEM pin.

## STEP 4



Secure pin using locking hardware.

## STEP 5



Connect hydraulic hoses from the machine to the coupler cylinder.

Start engine and rotate coupler to full curl position.

Cycle coupler cylinder several times to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length. Check for proper assembly, installation and hydraulic leaks.



# OPERATION

## INTENDED USE

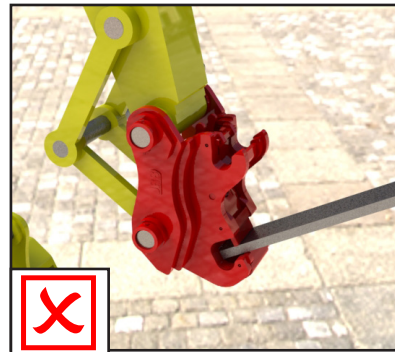
The JRB Smart-Loc® Coupler is designed as a tool to provide an efficient way for the operator to attach, detach and interchange between different attachments with ease. It can accommodate a variety of attachments, including demolition attachments, rippers and hammers. Use in any other way is considered contrary to the intended use.

***NOTICE: Do not use coupler with a mechanical style pulverizer. Damage to the coupler may result which will void warranty. Mount pulverizer directly to the prime mover.***

Some examples of misuse include, but are not limited to, the following:



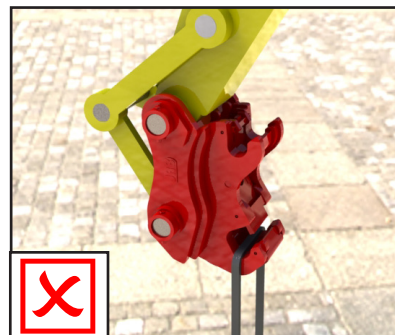
Moving or lifting attachments by front pin only



Using hooks and locking plate to lift or move objects



Using coupler to position or hammer objects into the ground



Using any part of coupler, other than lift eye, to lift objects with chain or sling



# OPERATION

The JRB Smart-Loc® Coupler places a heavy emphasis on safety with a unique locking mechanism. A pilot operated check valve assures the hydraulic cylinder is locked in case of hydraulic pressure loss. A primary wedge locking system which adjusts for wear, keeping a tight connection on the attachment pin. Furthermore, a secondary lock which consists of a mechanical lock arm that prevents the lock wedge from accidentally being retracted or retracting in case of loss of cylinder force.

**NOTE: This coupler can be operated with the JRB designed high or low pressure hydraulic system.**



**JRB excavator couplers are powered using hydraulic fluid diverted from the machine bucket cylinder circuit by an electric solenoid valve. The coupler is locked by default and the solenoid is energized only during the unlock sequence.**

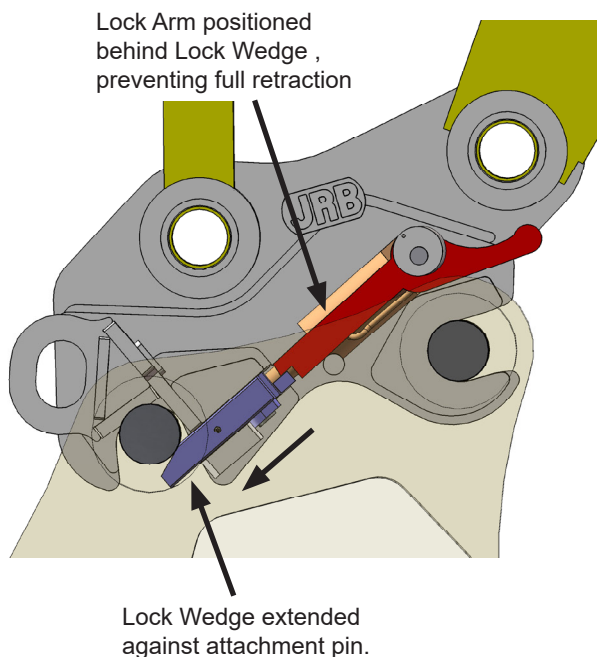
The diagrams on this page illustrate the function of the coupler's locking system during lock and unlock operations. Refer to the Operation Section of this manual for lock and unlock procedure of the coupler.

## LOCKED:

The coupler shown is in the correct lock position.

The lock wedge is extended over the back attachment pin and the secondary lock arm is in position behind the lock wedge. In this position the lock wedge can not retract far enough to release the pin in the event of a hydraulic failure.

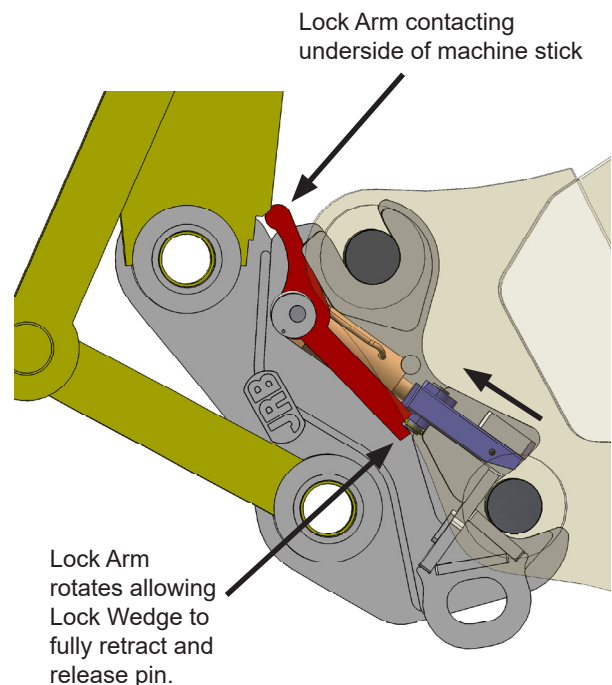
**THE SECONDARY LOCK IS NOT INTENDED TO BE USED AS THE PRIMARY LOCKING SYSTEM FOR THE COUPLER.**



## UNLOCKED:

When the coupler is rotated to the full curl position, the secondary lock arm contacts the underside of the machine stick. This rotates the lock arm from its position behind the lock wedge. The lock wedge can now fully retract and disengage the attachment pin.

**NOTE: Modifications to the underside of the machine stick may interfere with the proper operation of the coupler locking mechanism. DO NOT operate the coupler if the possibility of interference exists. Doing so may cause damage to the coupler and will void warranty.**



## OPERATION

**NOTE:** Some prime movers will require a different style control switch for operating the coupler. Refer to the instructions included with your hydraulic kit for details.

### COUPLER CONTROL BOX

#### UNLOCKING PROCEDURE:

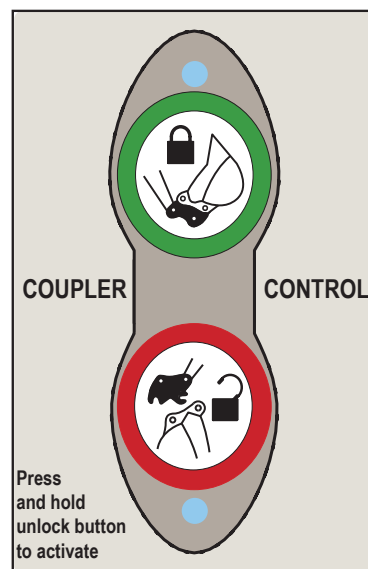
Rotate machine stick in toward machine cab. With coupler in full curl position and held over relief, activate the unlock sequence by pressing and holding the UNLOCK button on the control box (approx. two to three seconds). This is to prevent accidental unlocking of the coupler if the switch is inadvertently hit.

The UNLOCK button will light up and stay on. An internal buzzer will sound and remain on as long as the control box is in UNLOCK mode.

#### LOCKING PROCEDURE:

To activate the lock sequence, press the LOCK button. The LOCK button will light up and blink for five seconds followed by an audible beep. The green LED will then remain on.

**NOTE:** The LOCK button can be pressed at any time to trigger the lock sequence.



### TROUBLESHOOTING CONTROL BOX

If an error occurs in the control box circuit, a continuous audible alarm will sound and signal lights will either flash or remain on. To determine the cause of the error, perform the following steps

1. Check the control box for damage. If any part of the control box is cracked or broken, it will need replaced.
2. Check wire harness for damage. Damage to the wire harness may cause a shorted or open circuit. Repair or replace if necessary.
3. If the problem was able to be repaired, the box will need reset to remove the error condition.
4. If the alarm continues after resetting the control box, call Paladin Customer Service.

### RESETTING CONTROL BOX

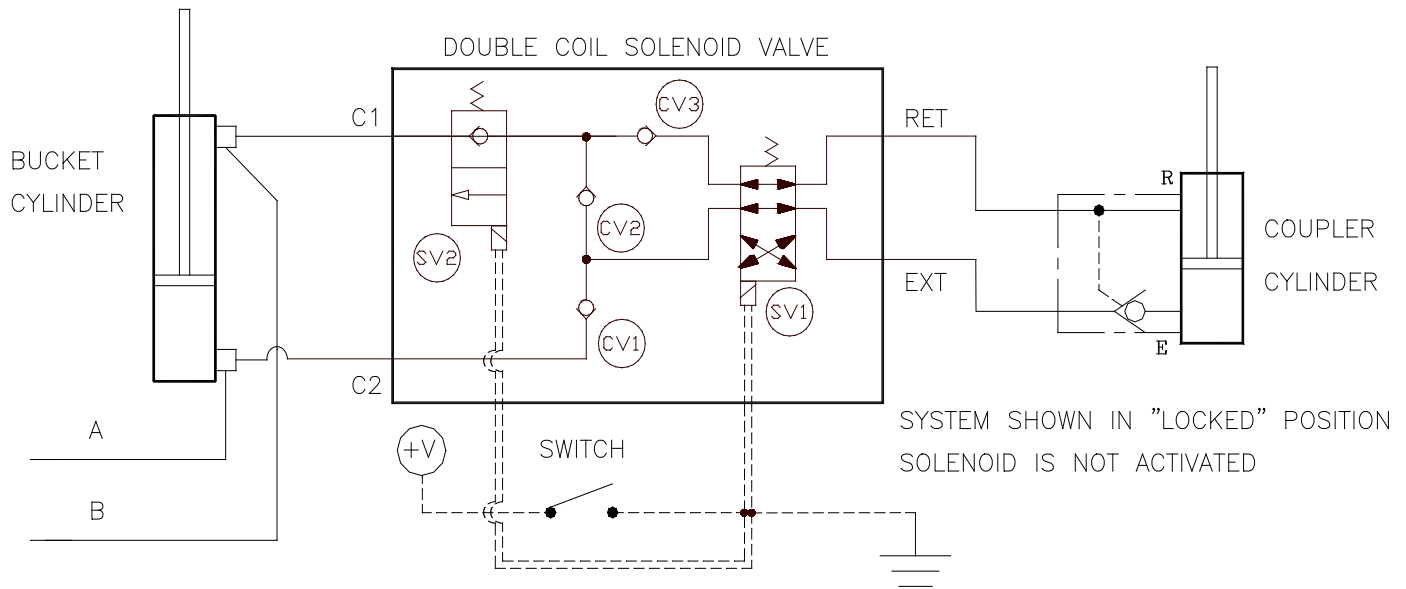
To reset the control box do the following:

1. Turn the machine ignition to OFF.
2. Make sure control box is completely powered down (no buzzer and no lights).
3. While pressing both the LOCK and UNLOCK buttons, turn the machine ignition ON.

**NOTICE! DO NOT try to override the control box and connect the valve coils directly to voltage. Doing so may cause damage to the control box.**

# OPERATION

## HYDRAULIC SCHEMATIC - HIGH PRESSURE SYSTEM



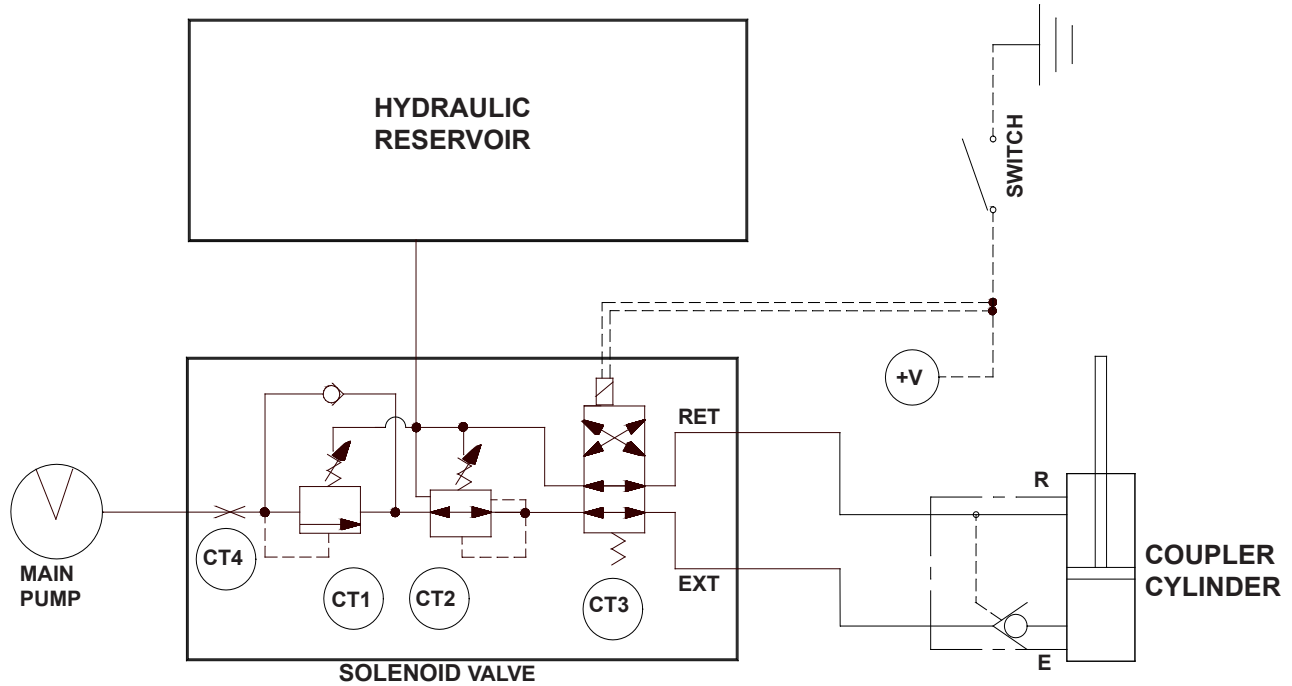
The system shown is in the LOCKED position (no electrical power to solenoid). System pressure applied to bucket cylinder line "A" or "B" is transferred through valve port C2 or C1 respectively. The pressure is then sent through CV1 or SV2/CV2, through solenoid valve SV1 and charges the head end of the coupler cylinder. The system maintains a positive force on the locking plate at all times while the bucket cylinder is pressurized.

With the switch in the UNLOCK position (electrical power applied to both solenoids SV1 and SV2) and line A pressurized; pressure is transferred through CV1 and SV1 and energizes the rod-end of the coupler cylinder to retract the coupler locking plate. Hydraulic fluid from the head end of the coupler cylinder moves through the "EXT" port back through SV1, CV3, and SV2 and drains into line B. When line B is energized, the locking plate can not be retracted.

**Note: The JRB Excavator Coupler is designed to be locked when there is no electrical power. In other words, the coupler is locked by default. Electrical power is required to unlock the coupler.**

# OPERATION

## HYDRAULIC SCHEMATIC - LOW PRESSURE SYSTEM



SYSTEM SHOWN IN "LOCKED" POSITION  
SOLENOID IS NOT ACTIVATED.

The schematic shown is in the **LOCKED** position (no electrical power to solenoid). System pressure is applied to the valve by the main hydraulic pump of the prime mover, the bucket circuit is also pressurized through the main control valve. System pressure is transferred through valve port "P" to sequence valve CT1. CT1 remains closed until the bucket cylinder pressure reaches 4000 PSI or over. At 4000 PSI CT1 opens and allows a maximum of 3250 PSI to be transferred through sequence valve CT2, valve CT3 and charges the head end of the coupler cylinder. The system maintains a positive force on the locking plate at all times while the bucket cylinder is pressurized.

With the switch in the **UNLOCK** position (electrical power applied CT3). Pressure is transferred through CT1, CT2, CT3 and energizes the rod-end of the coupler cylinder to retract the coupler locking plate. Hydraulic fluid from the head end of the coupler cylinder moves through the "EXT" port back through CT3 and drains into the hydraulic reservoir.

**Note:** The JRB Excavator Coupler is designed to be locked when there is no electrical power. In other words, the coupler is locked by default. Electrical power is required to unlock the coupler.

# OPERATION

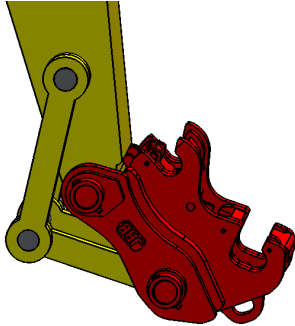
## LOCKING ATTACHMENT

### STEP 1

Read all safety precautions before operating equipment.

Install pins provided with coupler into attachment using locking hardware to secure.

### STEP 2

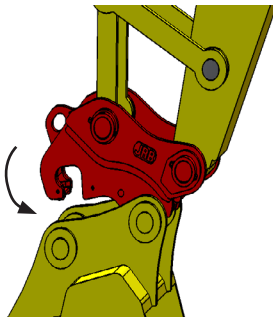


Rotate coupler to full curl position and hold over relief. **Note: The coupler must be held over relief in order to lock / unlock the coupler cylinder.**

With coupler held in this position, press and hold the **UNLOCK** button on the control box (the buzzer will sound).

Visually verify the coupler cylinder and lock wedge have fully retracted.

### STEP 3

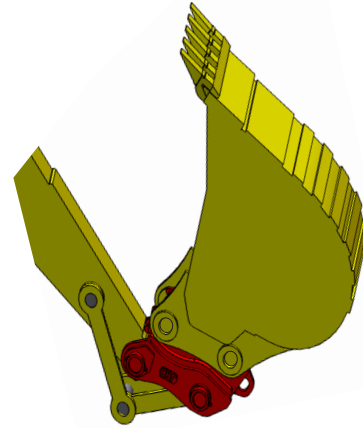


Retract the bucket cylinder and position coupler to pick up attachment.

Engage front pin with hook on coupler.

With coupler hook on pin, curl stick to full extension of bucket cylinder.

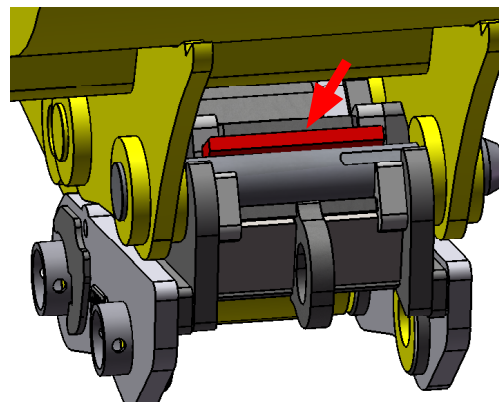
### STEP 4



Rotate coupler and attachment to full curl position and hold over relief.

With coupler held in this position, press the **LOCK** button on the control box (buzzer will stop).

### STEP 5



Visually verify the lock wedge has fully engaged the attachment pin.

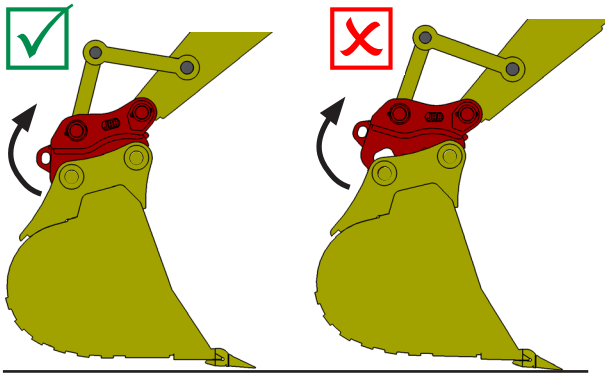
# OPERATION

## STEP 6



In addition to visual checks, perform a ground test to ensure the coupler is properly locked to the attachment. Place attachment flat on the ground.

## STEP 7



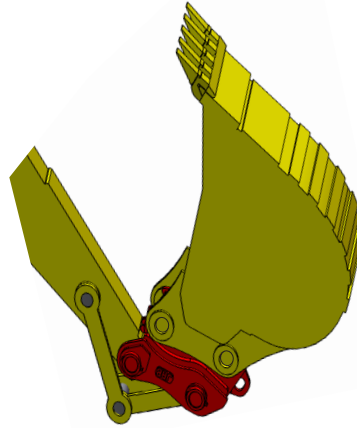
While keeping attachment against the ground, slowly retract the bucket cylinder. Verify there is no movement of the attachment out of the coupler. There should be no movement of the attachment if the coupler is properly attached.

If the coupler is correctly engaged to the attachment, proceed with operation. If the coupler is not properly engaged, place the attachment on the ground and repeat steps 2-7.

**NOTE: A coupler not locking properly could be caused by attachment pin centers that are outside the coupler design. See pin spacing chart provided in this manual.**

## UNLOCKING ATTACHMENT

### STEP 1

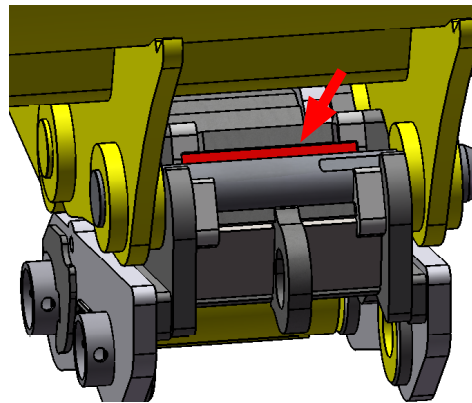


Rotate coupler and attachment to full curl position and hold over relief.

**Note: The coupler must be held over relief in order to lock / unlock the coupler cylinder.**

With coupler held in this position, press and hold the **UNLOCK** button on the control box (buzzer will sound).

### STEP 2



Visually verify the lock wedge has fully retracted.

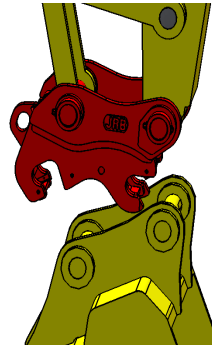
## OPERATION

### STEP 3



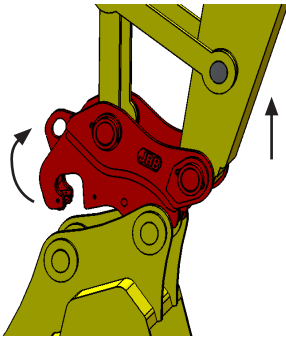
Slowly retract the bucket cylinder and place attachment on the ground.

### STEP 5



Lift coupler clear of attachment.

### STEP 4



Continue to uncurl the coupler from the attachment. Slowly lift machine stick at the same time.

Always make sure attachment is released before lifting coupler more than a few inches.



# OPERATION

## STORAGE:

- Clean the unit thoroughly, removing all 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.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage
- 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:

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

## LIFT POINTS

Lifting points are identified by lifting decals 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 any recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.

### WARNING!



**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.**

## TIE DOWN POINTS

Tiedown points are identified by tiedown decals where required. 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 at any recommended tie down points.
- Check unit stability before transporting.

### WARNING!



**Verify that all tiedown 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.**

## TRANSPORTING

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



# MAINTENANCE & SERVICE

## 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. Read and follow all safety precautions before performing any maintenance or troubleshooting on this equipment.

## MAINTENANCE SCHEDULE

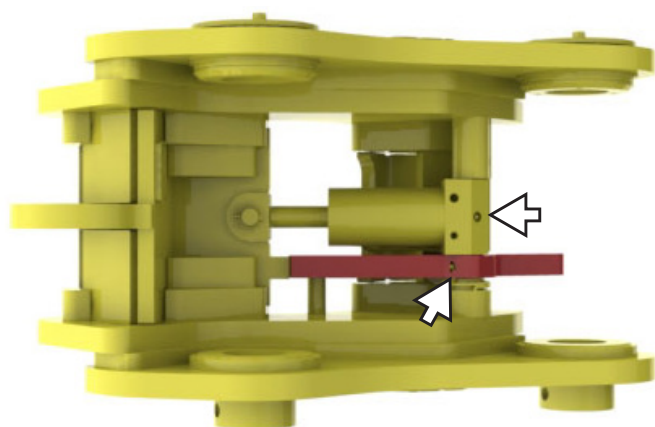
PROCEDURE	AT EACH INTERCHANGE	DAILY	WEEKLY	NOTES
Remove debris from coupler	✓			Primarily in lock area prior to engaging attachment
Inspect locking mechanism	✓			Both primary and supplemental
Check coupler for cracked, bent or broken components, distressed welds, missing parts and oil leaks		✓		Coupler should be cleaned thoroughly before inspection. If a crack is found in either the steel structure or welds, the coupler <b>must</b> be removed from the machine and JRB contacted immediately. Replace broken or missing parts if required.
Lubricate coupler grease points		✓		See below for coupler grease points
Check that mounting pins and pin locking hardware are secure		✓		If bolt is out, the pin can slide out of one side of the coupler and cause the pin-on rib to break.
Check condition of hydraulic hoses, fittings and hydraulic system in general. Replace any damaged parts.		✓		
Cycle locking mechanism to check that it is working correctly		✓		This will also help prevent binding of the coupler locking mechanism.
Check that the switch/buzzer are working		✓		
Ensure daily checks are carried out			✓	
Check the supplemental locking arm for wear			✓	The locking arm "stem" operates against the stick of the machine which may cause excessive wear. Replace locking arm when required.
Check spring tension			✓	DO NOT operate the coupler if broken and replace any broken or damaged parts immediately

## MAINTENANCE & SERVICE

### COUPLER GREASING

To keep the coupler in proper working condition it must be greased on a daily basis. Grease points on the coupler are as shown. If any grease fittings are damaged, replace and grease.

**Note: Cylinders and Pin Kits that are supplied without grease zerks DO NOT need to be greased.**



Grease points located on both sides of coupler

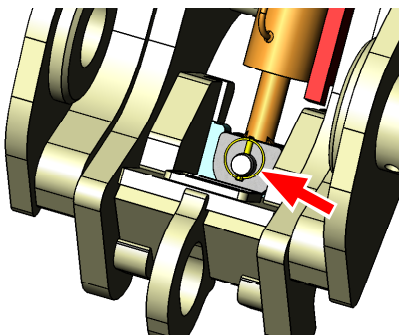
# MAINTENANCE & SERVICE

## HYDRAULIC CYLINDER REMOVAL

### PRE-REMOVAL:

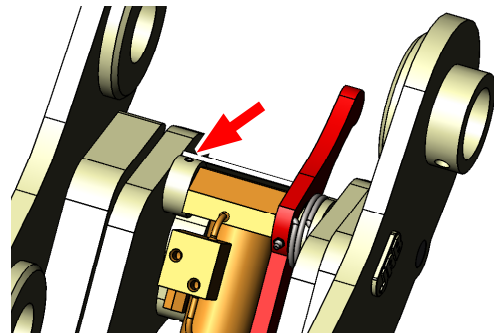
- Uncouple attachment from the coupler. Refer to the Operation section for uncoupling procedure.
- Lower coupler and place it flat on the ground.
- With machine ignition in the ON position (DO NOT start engine), cycle coupler between lock and unlock several times to relieve any residual pressure from the hydraulic system.
- Disconnect hoses from coupler cylinder and remove the coupler from the machine. Plug or cap hoses and cylinder ports to prevent contaminants from entering hydraulic system.

### CYLINDER REMOVAL:



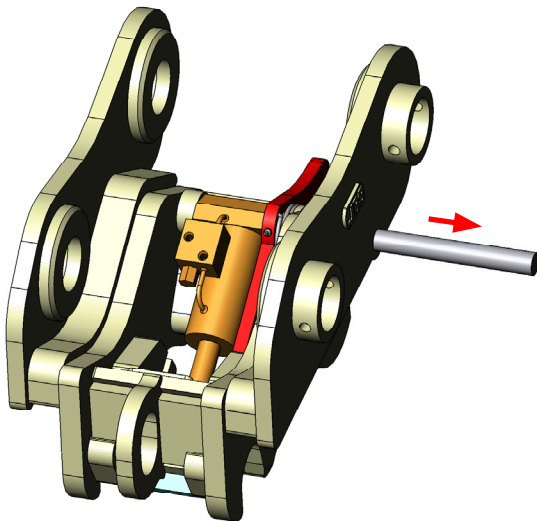
#### STEP 1:

Remove quick pin from cylinder rod pin and remove cylinder rod pin.



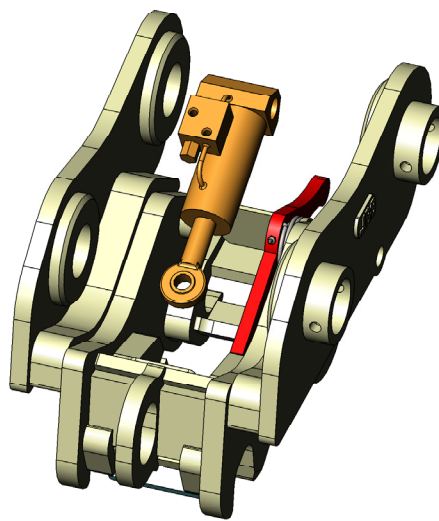
#### STEP 2:

Remove dowel pin or bolts which secures the cylinder pin.



#### STEP 3:

Remove cylinder pin.



#### STEP 4:

Carefully remove hydraulic cylinder. With cylinder removed, the lock arm can also be removed if needed.

## CYLINDER REPLACEMENT

To replace cylinder, perform removal procedure in reverse.

# TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTION
1. Coupler cylinder does not extend	Hoses or valve are plugged by dirt.	Remove hoses and valve and clean. Blow air through valve to check operation.
	Incorrect pressure	Check pressure in coupler cylinder extend "EXT" line. <b>High Pressure System - full system pressure</b> <b>Low Pressure System - 3250 PSI</b>  Check coupler cylinder check valve o-rings for damage. Make sure hoses are not pinched or fittings and/or coupler cylinder tubes are not damaged.
	Locking mechanism is binding.	Remove debris from coupler. Lubricate coupler grease points.
2. Coupler cylinder does not retract	Lack of hydraulic pressure to cylinder or valve.	The bucket cylinder is not being taken over relief.
	Hoses or valve are plugged by dirt.	Remove hoses and valve and clean. Blow air through valve to check operation.
	Incorrect pressure	Check pressure in coupler cylinder retract "RET" line. <b>High Pressure System - full system pressure</b> <b>Low Pressure System - 3250 PSI</b>
	Loss of electrical current to solenoid valve.  Low or not enough voltage to coils.	Check electrical connections and check for primary ground.  Check voltage, 12 volts to 12 volt coils and 24 volts to 24 volt coils.
	Locking mechanism is binding.  Secondary Lock Arm is engaged	Remove debris from coupler. Lubricate coupler grease points.  Make sure coupler is rotated to full curl position prior to attempting to unlock attachment.
3. Secondary Lock Arm does not disengage at full curl	Excessive wear on the lock arm.	Replace Lock Arm.

# 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




**NOTE:** 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				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
		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	




GRADE 2



GRADE 5






GRADE 8



## 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

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# PARTS

In order to provide you with the most UP-TO-DATE part information, parts for this attachment are being moved to our website at [www.paladinattachments.com/Manuals](http://www.paladinattachments.com/Manuals). 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.

**NOTE: Most daily and emergency parts orders (in stock) received by 12:00 P.M. (Eastern Standard Time) will be shipped the same day.**

## SERVICE DEPARTMENT

(330) 734-3000

(800) 428-2538

## For Fax and E-mail Orders

PHASales@paladinattachments.com

(330) 734-3018

# 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](http://www.paladinattachments.com).