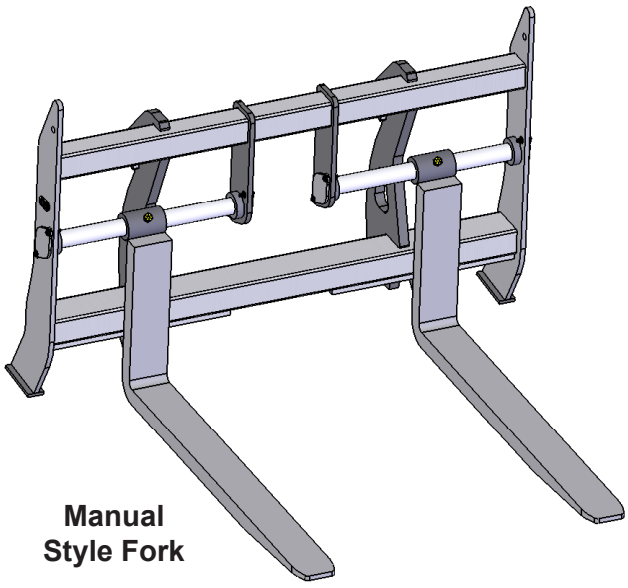
PALADIN
JRB

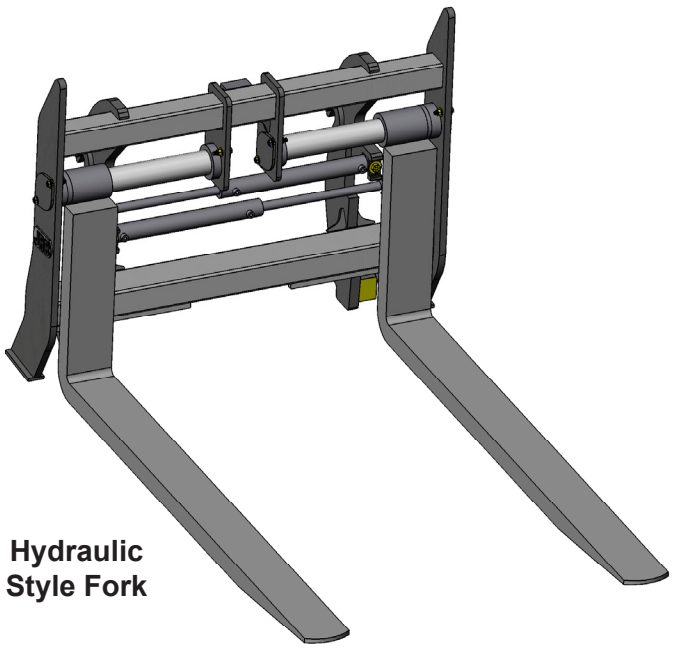
OPERATOR'S MANUAL

CONSTRUCTION UTILITY FORK

FOR LOADERS



Manual
Style Fork



Hydraulic
Style Fork

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM90K
Date: August 2018
Rev. 1

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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

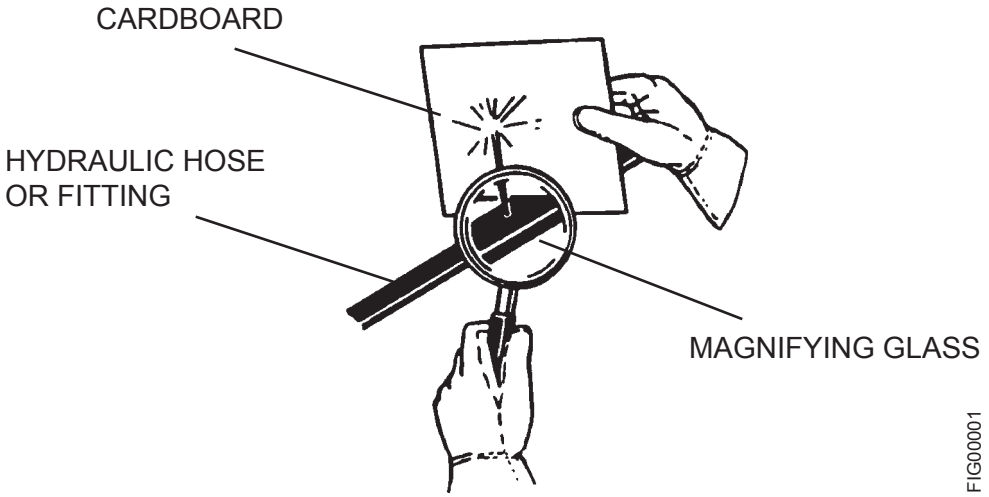
Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground 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.**



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

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 locqtion 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 FORK

- Never use your attachment for a work platform or personnel carrier.
- Do not exceed the lifting capacity of any approved fork tines or prime mover.
- Operate only from the operator’s station.
- Do not use the fork tines for prying or any other purpose other than lifting.
- 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.
- Always space forks correctly for the load. Loads can fall off incorrectly spaced forks. Make sure the forks are completely under the load before lifting.
- Never stack loads on uneven ground. Loads stacked on uneven ground can topple.
- Never lift a load with one fork. A load lifted with one fork can slip off and cause injury.
- Don’t obstruct you vision when traveling or working. Carry the forks low for maximum stability and visibility.
- 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.

EQUIPMENT SAFETY PRECAUTIONS

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.

MAINTAINING THE ATTACHMENT

- Before performing maintenance (unless otherwise specified), lower the attachment to the ground, apply the brakes, turn off the engine and remove 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.

INSTALLATION

QUICK COUPLE ATTACHMENTS

HOSE REQUIREMENTS

JRB hydraulic attachments operate using the third function (auxiliary) hydraulic circuit of the prime mover. Hoses are required and supplied, with most attachments, for installation to the bulkhead connection on your particular coupler.

A third function hose kit is required to complete the installation of the hydraulic attachment. These kits can be purchased through your local dealer, for your specific prime mover, and contain all parts necessary to connect from the prime mover third function lines to the coupler.

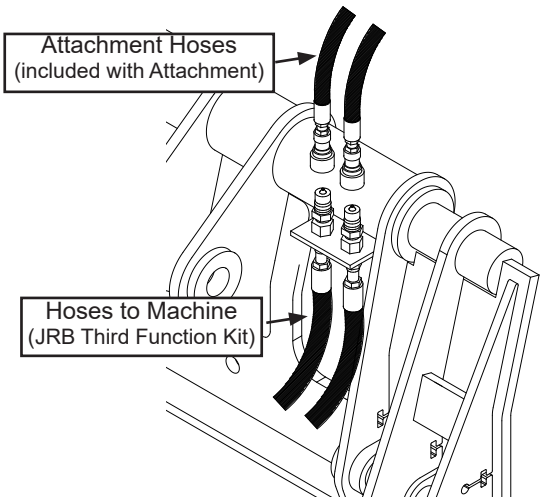
NOTE: The installation of an attachment which uses the prime mover's third function circuit to operate may lower the level of hydraulic fluid. Check the hydraulic fluid level of the prime mover after installing the attachment.

WARNING!

To Avoid Serious Injury, make sure the attachment is securely attached to the coupler or prime mover. Failure to do so could result in separation of the bucket from the coupler or prime mover. Always keep attachment as close to the ground as possible during installation.

INSTALLING THE ATTACHMENT

- Reference the operator's manual for your coupler and/ or prime mover for additional instruction on installing the attachment.
- Lower the attachment to the ground and turn off engine of the prime mover.
- Connect attachment hoses to the quick connect fittings on the coupler.
- Start engine and slowly cycle attachment cylinders several times to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length. Check the attachment for proper assembly, installation and hydraulic leaks.



Typical arrangement shown. Actual coupler bulkhead arrangement will vary.

UNINSTALLING THE ATTACHMENT

- Close the attachment and lower it to level ground.
- Turn off engine of the prime mover. Work controls to relieve pressure in the hydraulic lines.
- Disconnect attachment hoses from coupler. Cap or plug hoses to prevent contaminants from entering the hydraulic system.
- Reference the operator's manual for your coupler and/or prime mover for additional instruction on uninstalling the attachment.

INSTALLATION

PIN-ON ATTACHMENTS

HOSE REQUIREMENTS

JRB hydraulic attachments operate using the third function (auxiliary) hydraulic circuit of the prime mover. Hoses are required and supplied, with most attachments, for installation to the third function hydraulic lines of the prime mover.

NOTE: The installation of an attachment which uses the prime mover's third function circuit to operate may lower the level of hydraulic fluid. Check the hydraulic fluid level of the prime mover after installing the attachment.

WARNING!

To Avoid Serious Injury, make sure the attachment is securely attached to the coupler or prime mover. Failure to do so could result in separation of the bucket from the coupler or prime mover. Always keep attachment as close to the ground as possible during installation.

INSTALLING THE ATTACHMENT

- Lower loader arms to the ground and turn off engine of the prime mover. Reference the operator's manual for the prime mover for additional instructions on installing the attachment.
- Make sure pin bores are free from burrs and test fit pins. Remove pins and apply anti-sieze to pins and pin bores.
- Pin attachment to the loader arms and tilt link using pins and pin retaining hardware. Use OEM shims as needed to center attachment on loader arms and tilt link.
- Lower attachment to the ground.
- Connect attachment hoses to the third function hydraulic lines of the prime mover.
- Start engine and slowly cycle attachment cylinders several times to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length. Check the attachment for proper assembly, installation and hydraulic leaks.
- Check and adjust rollback/dump stops as needed before using attachment. See following pages for instructions on checking and setting stops.

NOTE: Some attachments will have stop blocks shipped loose or just tack welded in place. Verify stop blocks are installed and fully welded before use. See following pages for stop installation instructions.

UNINSTALLING THE ATTACHMENT

- Close the attachment and lower it to level ground.
- Turn off engine of the prime mover. Work controls to relieve pressure in the hydraulic lines. Disconnect attachment hoses from the third function hydraulic lines of the prime mover.
  NOTE: Cap or plug hoses to prevent contaminants from entering the hydraulic system.
- Follow your prime mover operator's manual for detaching (removing) an attachment.

INSTALLATION

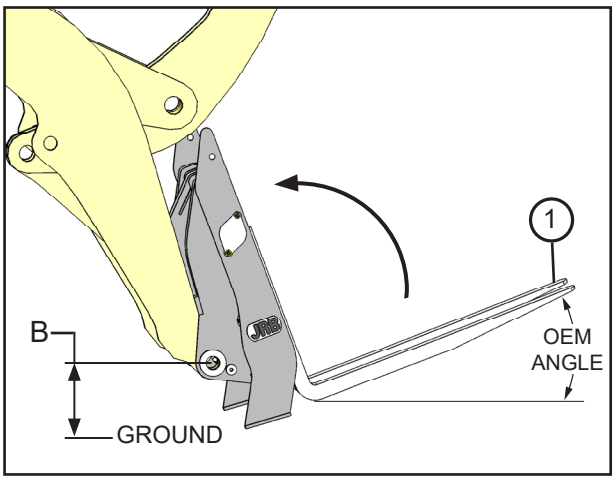
CHECKING / INSTALLING STOP BLOCKS

ROLLBACK STOPS

WARNING! **KEEP ALL UNNECESSARY PERSONNEL AWAY FROM PRIME MOVER DURING INSTALLATION**
Never leave equipment unattended with the engine running or with attachment in a raised position.

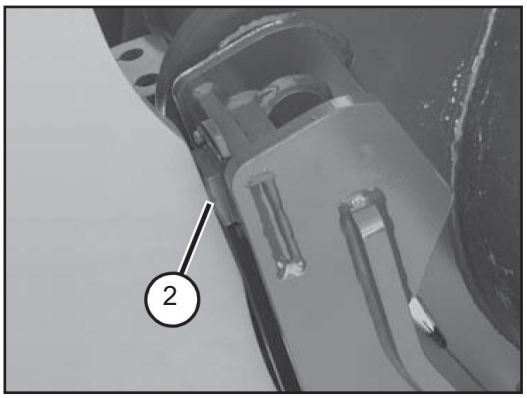
NOTE: Verify tires are inflated to the correct pressure prior to checking or installing stops.

- With prime mover on a level surface, place attachment in the carry position. Check the vertical measurement from the ground to the center of the boom attaching pins (dimension B). Refer to OEM specifications for correct dimension.
- Place a magnetic protractor on leading edge of the attachment (1) and read starting angle.
- Roll attachment back to OEM specified angle making sure stops contact both boom arms evenly.
- If installing stops for first time, roll attachment back to OEM specified angle and then back coupler off slightly so an additional 1/8” (3.175mm) of stroke is left in the bucket cylinder rod. Hold stop blocks in position (2) and mark areas on attachment where stops are to be installed.
- Lower attachment to the ground and remove paint from marked areas.



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.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator.



- Tack weld stops into place.
- Repeat steps to roll attachment back to proper angle and verify stop blocks contact boom arms correctly.
- Lower attachment to the ground and final weld stops in place. It may be necessary to remove the attachment from the prime mover before welding. Use a E7018 weld rod or equivalent. All welding must be performed by qualified personnel.
- Allow areas to cool and touch up with paint.

INSTALLATION

CHECKING / INSTALLING STOP BLOCKS

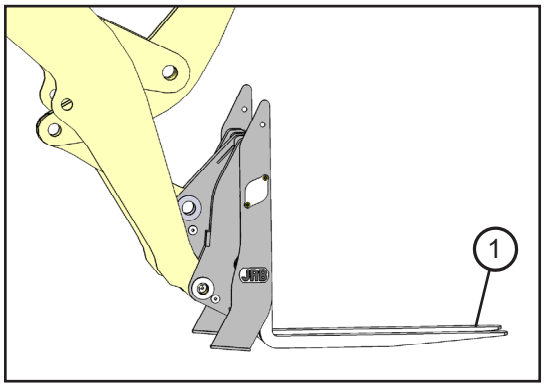
DUMP STOPS

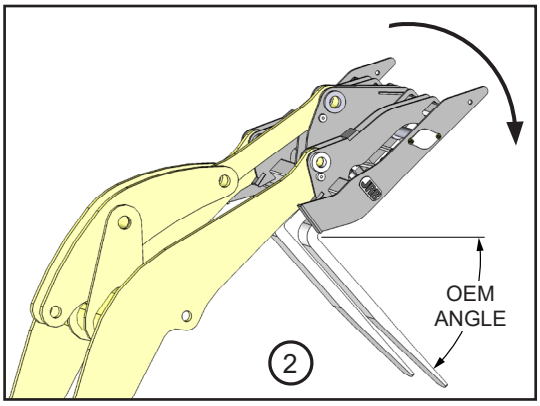
WARNING! **KEEP ALL UNNECESSARY PERSONNEL AWAY FROM PRIME MOVER DURING INSTALLATION**

Never leave equipment unattended with the engine running or with attachment in a raised position.

NOTE: Verify tires are inflated to the correct pressure prior to performing this procedure.

- Park prime mover on a firm and level surface.
- Place magnetic protractor on leading edge of the attachment (1).
- Raise prime mover arms to full dump height and carefully roll attachment forward to OEM specified angle (2) making sure stops contact both boom arms evenly (3).
- If installing stops for first time, roll attachment forward to OEM specified angle and then back attachment off slightly, leaving approx. 1/8” (3.175mm) gap between stop and boom arm stop surface. Hold stop blocks in position and mark areas on attachment where stops are to be installed.
- Lower attachment to the ground and remove paint from marked areas.





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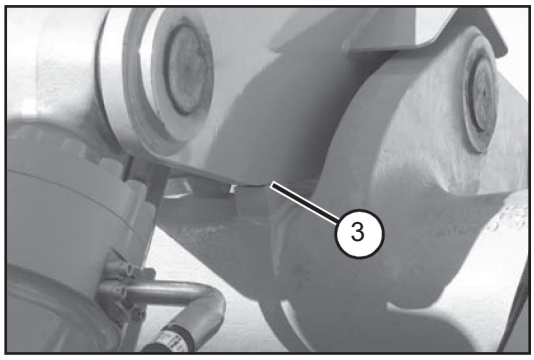
When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator.

- Tack weld stops into place.
- Raise prime mover arms again and set attachment to proper angle. Verify stop blocks contact boom arms correctly.
- Lower attachment to the ground and final weld stops in place. It may be necessary to remove the attachment from the prime mover before welding. Use a E7018 weld rod or equivalent. All welding must be performed by qualified personnel.
- Allow areas to cool and touch up with paint.



INSTALLATION

CHECKING / INSTALLING STOP BLOCKS (continued)

Over time stop surfaces may become worn. Periodically check stops as described on previous pages. If angle is not correct, perform one of the following:

To add stop material - Use a low hydrogen 7018 rod to build up the stop surface of the prime mover and grind smooth. More than one adjustment may be needed to obtain the OEM specified angle.

NOTE: Reference the prime mover's Operation and Maintenance Manual for correct procedure before welding on the prime mover.

To remove stop material - Grind the stop surface of the prime mover until the OEM specified angle is obtained.

BOLT-ON ADJUSTABLE STOPS

If stops fail to contact loader arms, measure the gap between the stop and the loader arm.

Use shims, provided with the attachment, as needed to close the gap. When set properly, the bucket cylinder rod should not travel more than 1/8" (3.175mm) after the attachment stops contact the loader arms.

OPERATION

INTENDED USE

JRB Construction Utility Forks are designed for the purpose of loading, unloading and transporting different materials. Use in any other way is considered contrary to the intended use.

Forks are available with manual tine adjustment or hydraulic actuated tines that can be adjusted from the machine cab.

WARNING!

DO NOT OPERATE FORK IF TINES ARE CRACKED
Replace cracked tines immediately. DO NOT attempt to repair tines by welding. Welding will weaken the strength of the tines, causing potential component failure.

WARNING!

Never exceed the recommended lifting capacity of any approved fork tines or the loader.

NOTE: Fork tines capacities are pounds per pair at a 24” load center. The center of gravity of the allowable loads must be applied within the first 24” of the fork tines when measured from the front face of the vertical section of the fork tine out toward the tip of the horizontal section of the fork tine.

OPERATING THE ATTACHMENT

Read all safety precautions before operating the attachment. Refer to the prime mover’s operator’s manual for additional instruction on attachment operation.

Approach the load in such a fashion that the weight will be centered between the fork tines. The heaviest side should be closest to the fork frame and not near the tips of the fork tines.

- Before lifting, make certain the fork tines are completely under the load and level.
- Raise the attachment to the MINIMUM height required for the terrain. **NOTE: If the load appears to be unstable, lower the attachment to the ground and reposition the load to attain full stability. Repeat until full stability is achieved.**
- During material handling: stop and start the prime mover gradually, slow down before turning and avoid obstacles, bumps or holes.
- Check load frequently to ensure stability.

OPERATION

ADJUSTING THE FORK TINES

MANUAL TINE ADJUSTMENT:

With the loader arms lowered, shut down the prime mover, set the brake and remove the key. **NOTE: If the tines are in contact with the ground, the loader arms may need raised just enough to eliminate contact.**

To adjust tines, loosen lock bolt in tine eyes or tine locks. Slide tines along bar into desired position and re-tighten bolts.

HYDRAULIC TINE ADJUSTMENT:

Lower fork to the ground. **NOTE: If the tines are in contact with the ground, the loader arms may need raised just enough to eliminate contact.**

Hydraulic actuated tines operate using the third function (auxiliary) hydraulic circuit of the prime mover. Work the controls in the machine cab to adjust tines in or out as needed. Both tines will be actuated simultaneously.

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

OPERATION

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.

Keep area around cylinder(s) free of dirt and debris. Build up of dirt and debris will restrict movement of the cylinder(s) which may cause component failure.

MAINTENANCE SCHEDULE

PROCEDURE	DAILY	WEEKLY	NOTES
Remove debris from attachment	✓		Primarily around cylinders
Check for cracked, bent or broken components, distressed welds, missing parts and oil leaks	✓		Attachment should be cleaned thoroughly before inspection. If a crack is found in either the steel structure or welds, the attachment **must** be removed from the machine and JRB contacted immediately. Replace broken or missing parts if required.
Lubricate grease points	✓		Refer to diagram on next page
Grease tine bars (non-hydraulic style forks)	✓		
Check that pins and pin locking hardware are secure	✓		Refer to torque table
Check condition of hydraulic hoses, fittings and hydraulic system in general. Replace any damaged parts.	✓		
Ensure daily checks are carried out		✓	
Inspect rollback and dump stops		✓	see Installation Section

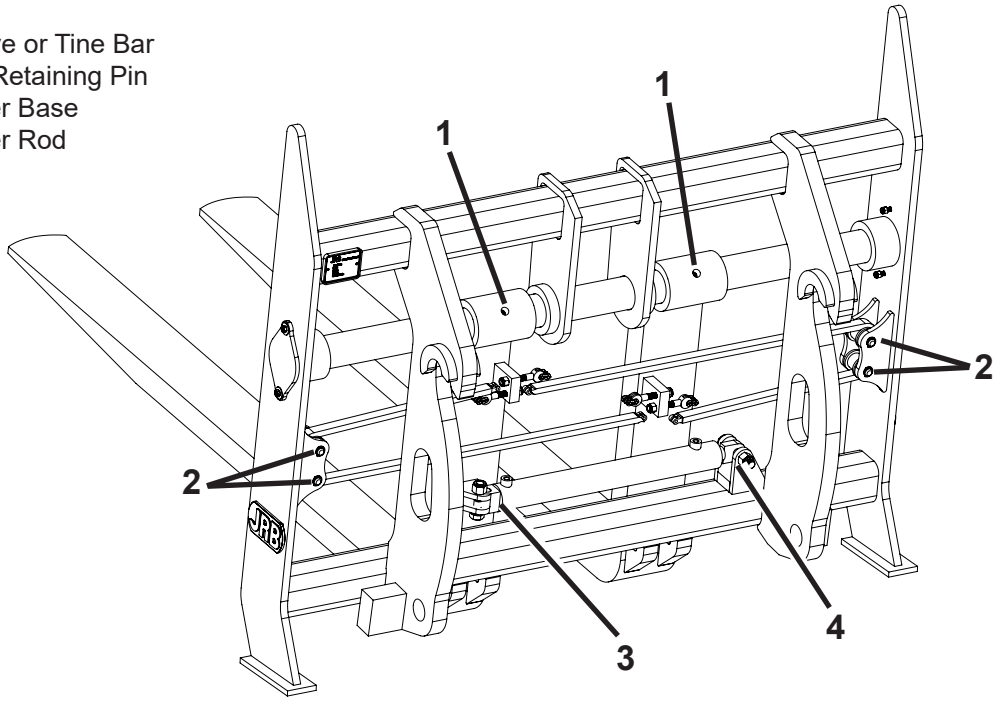
MAINTENANCE & SERVICE

GREASING THE ATTACHMENT

To keep the attachment in proper working condition, it must be greased on a daily basis. Grease points on the attachment are as shown. The grease points will vary depending on style of fork. If any grease zerks are missing or damaged, replace and grease.

NOTE: Cylinders and pins that are supplied without grease zerks DO NOT need to be greased.

1- Tine Eye or Tine Bar
2 - Chain Retaining Pin
3 - Cylinder Base
4 - Cylinder Rod



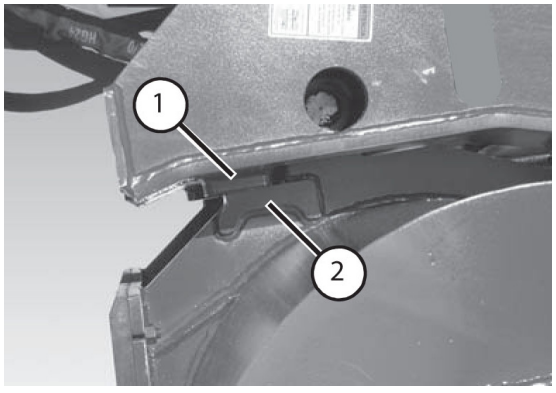
COUPLER TO ATTACHMENT FIT

The fit between the coupler and the attachment is very important and should be checked regularly.

To check the fit:

With the coupler locked to the attachment, roll the attachment forward and measure the gap between the stop block (1) and the rib stop surface (2).

The maximum allowable gap is 0.080” (2.032mm). In theory, the gap can be between .010” - .080” (0.254mm - 2.032mm). A very tight fit may not allow free movement of the plungers. Provide enough clearance to allow the plungers to move freely. The gap can be tightened by weld build up of the rib stop surface. **DO NOT** modify the coupler stop surface.



MAINTENANCE & SERVICE

WELDING GUIDELINES FOR TINE EYES AND KEEPERS

WARNING!

These instructions are for replacing tine eyes and keepers ONLY! DO NOT attempt to repair cracked or broken tines by welding. Welding will weaken the strength of the tines, causing potential component failure. REPLACE CRACKED TINES IMMEDIATELY.

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.

Welding GuideLines:

- Preheat surface to 600º to 625º degrees F before welding.
- Maintain the preheating temperature during the welding process.
- If wire weld cannot be used, the use of the electrode AWS-E7018, diameter of 5/32” is recommended.
- Field work in the open on cold days without wind protection is not recommended.
- Weld at least 6” from heel. Horizontal welds in this area are to be avoided.

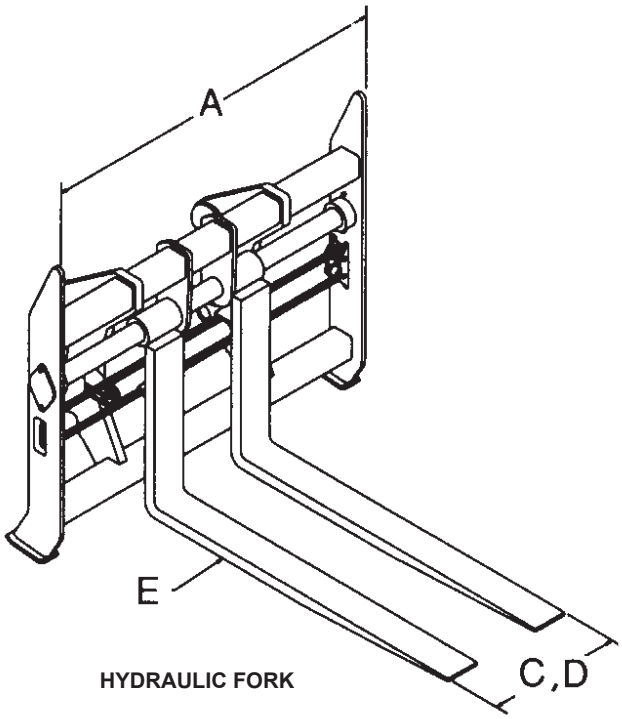
Welding characteristics:

Wire = 0.047
Wire Type = ER70-S6
Voltage = 29V - 30V
Wire Speed - 440” to 460” per minute
Polarity = +
Gas = C25 _ (25% of C0” + 75% of argon)
Flow - 0.42 to 0.53 cu ft/min

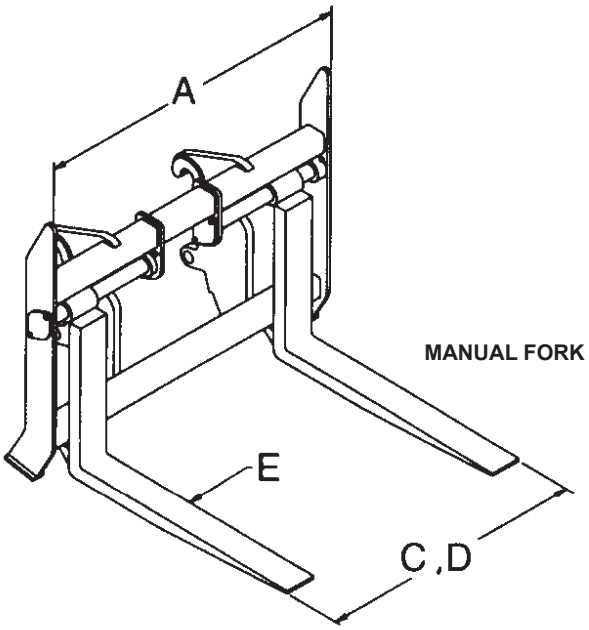
FOR ADDITIONAL ASSISTANCE REFER TO ANSI/AWS D14.3-94.

SPECIFICATIONS

CONSTRUCTION UTILITY FORK



HYDRAULIC FORK



MANUAL FORK

CLASS	TINE STYLE	"A" FRAME WIDTH	"B" FRAME HEIGHT	"C" MIN. WIDTH	"D" MAX. WIDTH	"E" TINE SIZE	"F" CAPACITY @ 24" LOAD CENTER
100	Manual	61"	48"	10"	59"	2" x 4"	8400 lbs.
	Hydraulic	61"	48"	6-3/4"	56-3/4"		
200	Manual	63-3/4"	52"	28-1/4"	60"	2-1/2" x 6"	19700 lbs.
		96-1/2"	52"	37-1/2"	92-3/4"		
	Hydraulic	63-1/2"	52"	24"	58"		
		97-1/2"	52"	40-1/2"	92"		
300-500	Manual	63-3/4"	52"	28-1/4"	60"	2-1/2" x 6"	19700 lbs.
		96-1/2"	52"	37-1/2"	92-3/4"		
	Hydraulic	63-1/2"	52"	24"	58"		
		97-1/2"	52"	40-1/2"	92"		
600	Manual	108"	60-1/2"	28"	103"	3" x 7"	33250 lbs.
	Hydraulic	98"	53-1/2"	46-1/2"	92"		
700-800	Manual	108"	63-3/25"	38"	103"	3-1/2" x 8"	51700 lbs.
	Hydraulic	108"	63-3/25"	62"	103"		
900	Manual	108"	63-3/25"	40"	103"	4" x 8"	67500 lbs.
	Hydraulic	108"	63-3/25"	64"	103"		

SPECIFICATIONS

TINE CAPACITIES CHART

CAPACITIES SHOWN ARE PER PAIR OF TINES @ 24” LOAD CENTERS

WIDTH/ THICKNESS (INCHES)	BLADE LENGTH (MIN.)	BLADE LENGTH (MAX.)	TAPER	ESTIMATED SAFE LOAD PER PAIR @ 3 TO 1 SAFETY FACTOR
4 x 1.25	30.00"	48.00"	18.00"	3,300#
4 x 1.50	30.00"	60.00"	22.00"	4,750#
4 x 1.75	30.00"	60.00"	26.00"	6,400#
4 x 2.00	30.00"	60.00"	28.00"	8,400#
5 x 1.50	36.00"	60.00"	22.00"	5,900#
5 x 1.75	30.00"	60.00"	26.00"	8,000#
5 x 2.00	36.00"	60.00"	30.00"	10,500#
6 x 2.00	36.00"	96.00"	30.00"	12,600#
6 x 2.25	36.00"	60.00"	30.00"	16,000#
6 x 2.50	36.00"	60.00"	30.00"	19,700#
6 x 2.75	36.00"	60.00"	30.00"	23,900#
6 x 3.00	36.00"	60.00"	30.00"	28,500#
7 x 1.50	36.00"	72.00"	22.00"	8,300#
7 x 1.75	36.00"	72.00"	26.00"	11,300#
7 x 2.00	36.00"	72.00"	30.00"	14,700#
7 x 2.25	36.00"	72.00"	30.00"	18,700#
7 x 2.50	36.00"	72.00"	30.00"	23,000#
7 x 3.00	36.00"	72.00"	30.00"	33,250#
8 x 1.50	36.00"	72.00"	22.00"	9,500#
8 x 1.75	36.00"	72.00"	26.00"	12,900#
8 x 2.00	36.00"	72.00"	30.00"	16,800#
8 x 3.00	36.00"	72.00"	30.00"	38,000#
8 x 3.50	36.00"	72.00"	30.00"	51,700#
8 x 4.00	36.00"	72.00"	30.00"	67,500#

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

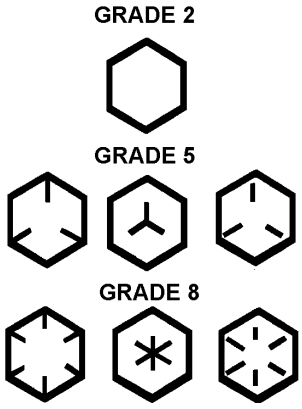
Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

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

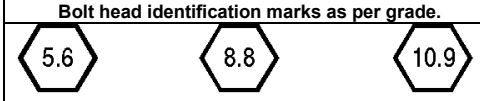
Bolt head identification marks as per grade.
NOTE: Manufacturing Marks Will Vary



METRIC BOLT TORQUE SPECIFICATIONS

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

Bolt head identification marks as per grade.



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

PARTS

In order to provide you with the most UP-TO-DATE part information, parts for this attachment are being moved to our website at ***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***.