SASFORKS

engineered tough

SAS™ CLAW ENGINE PICKER™

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OPERATOR MANUAL

========= MANUAL v3.1 ======

THANK YOU FOR CHOOSING SAS FORKS.

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SAS™ CLAW™ ENGINE PICKER

LIMITED INTENDED USE OF THIS EQUIPMENT:

SAS CLAW™ Engine Picker wheel loader attachment is designed break recyclable scrap materials from end of life cars and trucks. Materials removed from cars and trucks will be damaged. Some wheel loaders may require modification to pressures, valves, cylinders, or other modifications for installation and to operate in a desirable manner. This attachment is considered a non-OEM attachment and has not been approved by any specific wheel loader manufacturer. Customer is responsible to read the wheel loader's manual and warranty documents, if any, and identify any impact installation and use of this attachment may have on the wheel loader's warranty. Read this manual completely before installation or use.

INTRODUCTION LETTER (PAGE 4)
SAS™ CLAW™ ENGINE PICKER

TO THE OWNERS, MANAGERS, AND OPERATORS OF LOADERS EQUIPPED WITH SAS™ CLAW™ & SAS FORKS™

Safety is the most important issue in the workplace. Observing safety guidelines, equipment capacities and using common sense will provide a work environment that is safe and efficient for employees, management and customers. It is important that you and your operators read and understand the information included in this manual prior to use of this equipment.

Safety warnings are highlighted through out this manual. Understanding the significance of these symbols is important. The following is a definition of each symbol you will encounter in this manual:

The Caution Symbol is intended to draw your attention to important safety information, hazard or precaution.

The Danger Symbol indicates a hazardous situation that if not avoided will result in serious injury or death

The Warning Symbol indicates a hazardous situation that if not avoided could result in serious injury or death

The Caution Symbol indicates a hazardous situation that if not avoided could result in minor injury or potential property damage

The Notice Symbol indicates worst credible severity of harm is property damage.

The following information presented in this Operator Manual for SAS FORKS™ is intended to be a guide only, and is not meant to encompass all issues that may need to be addressed for your particular type of business operation.

If you encounter any additional information that would be helpful to us, or others, please contact us.

Thank you for your business,

SAS LLC
S.A.S. OF LUXEMBURG, LLC.
133 Center Dr Hwy 54 · PO Box 260
LUXEMBURG, WI 54217 U.S.A.

Phone:
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Outside U.S.A. 00+1+920-845-2198

Email:
buyit@sasforks.com

GENERAL SAFETY GUIDELINES (PAGE 5)
SAS™ CLAW™ ENGINE PICKER

Operation of equipment should only be performed by qualified and trained individuals. All persons operating or working in the area of operation should read this manual and a copy of this manual should be kept with the equipment. To be considered qualified you must:

- Understand the written instructions supplied by the manufacturer of the device (within this manual), the manufacturer of the wheel loader, all company rules and any applicable OSHA regulations.
- Completed training including actual operation, demonstrating competence and safe operation.
- Know and follow the safety rules and regulations of the jobsite.

⚠WARNING Operation of equipment by un-qualified or un-trained individuals can result in serious injury or death. Verify all operators have received proper training on operation of this equipment.

⚠WARNING Not designed to be operated in an explosive environment. Only use this equipment in well ventilated areas, a sufficient distance away from flammable or explosive gases, liquids or other hazards to avoid risk of ignition. Operating this equipment in an explosive environment may cause an explosion and fire resulting in injury, death, and substantial property damage.

⚠WARNING Operation of equipment under the influence of illegal, prescribed or over the counter drugs can result in potential injury or property damage. Consult your physician before operation of this equipment while on medication.

⚠WARNING Inspect the device and perform all preventative maintenance before operation at the start of every shift. Failure to perform inspections or proper maintenance can result in equipment failure resulting in serious injury or property damage.

⚠WARNING Read operators manual and follow all safety procedures for the equipment this device is attached to. Failure to follow Manufacturers recommendations can result in serious injury and property damage.

⚠ DANGER This equipment is operated by high pressure hydraulics. Hydraulics are a stored power source and as such must be treated as energized at all times. Be certain pressure has been relieved prior to handling, inspecting or performing maintenance on this unit. Follow lockout tag out procedures and release all stored energy before servicing equipment. Failure to release energy or disable hydraulic energy can result in serious injury or death. High pressure fluids can also discharge at great velocity. Be certain to wear safety glasses while inspecting, operating and maintaining equipment.

⚠ DANGER This device has numerous moving components. Do not wear loose fitting clothing, rings, jewelry or other items that may become entangled in device. Be aware of resulting pinch points and keep clear during operation, inspection and maintenance. Pinch points exist between moving parts on the device, between device and vehicle, device and wheel loader, failure to keep clear while in operation can result in serious injury or death.

⚠ DANGER Do not exceed posted weight limits on equipment or loader. Exceeding rated load limits will result in equipment damage, loss of steering control, serious injury or death.

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GENERAL SAFETY GUIDELINES (PAGE 6)
SAS™ CLAW™ ENGINE PICKER

PROTECTIVE EQUIPMENT & CLEAR OPERATING SPACE RECOMMENDED

- Safety glasses with side shields
- Leather gloves
- Hard hat
- Fire extinguishing equipment
- Spill kit (i.e. oil dry, absorbent towels, etc. as required by your company)
- Other such safety equipment to protect personnel from injury.
- Clear operating space: All personnel should be at least 50 feet away from operating loader and this SAS™ Forks attachment.

WARNING **Do not work under the fork or any object lifted by this equipment. An unexpected movement, shift in the object, or hydraulic failure may cause the forks and object drop. Serious injury or death may occur.**

PERSONNEL TRAINING & PREPARATION

Prior to installation or use of this equipment all personnel should review the appropriate equipment & safety manuals and be trained by qualified personnel. Hazards, pinch points, and potential injury risks should be thoroughly covered to ensure personnel avoid these hazards at all times. Signed documentation certifying individual training is a must. Periodic refresher training meetings are highly recommended.

SITE PREPARATION RECOMMENDED

- SAS Claw™ Engine Picker should only be used in areas that are equipped with proper fluid containment measures, to ensure capture and containment of residual fluids in accordance with any local, state, federal, building or environmental regulating body.
- No Smoking, Safety Glasses & Hard Hat required signage is recommended.

VEHICLE PREPARATION PRIOR TO USING SAS™ CLAW™ ENGINE PICKER

- All batteries, mercury switches, air conditioning Freon, engine oil, transmission fluid, antifreeze and other fluids must be removed.
- Engines, transmissions, and other components will be damaged, and only be suitable for metals recycling, not as cores or resalable operable parts.

WARNING Vehicles contain several hazardous elements that pose explosion and fire hazards, such as electric batteries containing battery acid and gasoline. Be sure these are safely removed prior to using the engine puller. Failure to remove may result in explosion, fire hazard & injuries.

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GENERAL SAFETY GUIDELINES (PAGE 7)
SAS™ CLAW™ ENGINE PICKER

CE SPECIFIC NOTICES

EMERGENCY STOP FUNCTION

To immediately stop the motion of this equipment:

1. Operator is to release joystick button(s).

Additional secondary alternative measures to immediately stop the motion include:

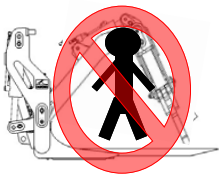
2. Moving wheel loader's auxiliary hydraulic 3rd spool lever to neutral position
3. And/or turning off the ignition key of the wheel loader to shut off the engine

All three emergency stop options above ultimately stop the flow of hydraulic fluid. **Notice:** Even after emergency stop function is followed, there is residual stored hydraulic pressure in the system. See following:

THIS EQUIPMENT IS OPERATED BY HIGH PRESSURE HYDRAULICS

Hydraulics are a stored power source and as such must be treated as energized at all times. Be certain pressure has been relieved prior to handling, inspecting or performing maintenance on this unit. Follow lockout tag out procedures and release all stored energy before servicing equipment. Failure to release energy or disable hydraulic energy can result in serious injury or death. High pressure fluids can also discharge at great velocity. Be certain to wear safety glasses while inspecting, operating and maintaining equipment.

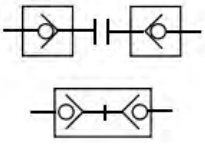
STAY CLEAR



- Do not lift persons with this equipment.
- People should always stand a safe distance away from this equipment.
- Do not go near or under this equipment or any object lifted by this equipment.

ENERGY ISOLATION

Follow Refer to "DISCONNECTION" information within this manual and the machine's OEM manual. Stored energy, such as gravity, hydraulics or other sources pose a risk to anyone near or servicing this equipment. Be sure release and remove all stored energy sources before servicing.



The symbol at the left indicates hydraulic hose coupling quick release self sealing. It is recommended to be installed by the customer at the time this equipment is initially attached to the wheel loader.

POWER FAILURE

In the event of electrical or hydraulic supply failure from the wheel loader occurs, the equipment will stop further motion. Under normal circumstances the equipment is not expected to drop a load. *The symbol at the left indicates the hydraulic controls on this equipment are normally closed.* Thus without electrical power the gate valves are closed, in essence halting further movement.

SOUND

This equipment does not emit more than 70dba.

VIBRATIONS

This equipment does not transfer vibrations in excess of 2.5m/s2.

OPERATING TEMPERATURE

This equipment is best suited to operate in temperatures between 30°F to 90°F with minimum allowable temperature –25°F and maximum temperature 150°F

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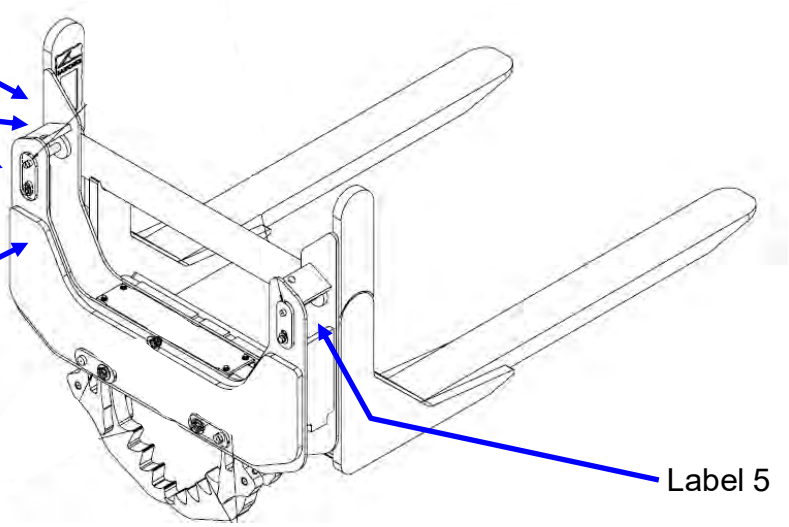
GENERAL SAFETY LABELING (PAGE 8)
SAS™ CLAW™ ENGINE PICKER

Serial Number Locations:
-Stamped in steel on left side
-Stamped in aluminum id plate
Label 4

Serial Number Format:
SAS F____

Label 5

Labels 1,2,3



Label 5

LABEL 1: KEEP AWAY FROM MOVING PARTS
Label reorder # W-LAB-WARNING-PINCH

LABEL 2: HIGH PRESSURE HYDRAULICS
Label reorder # W-LAB-PRES-503600

LABEL 3: READ EQUIPMENT MANUALS
Label reorder # W-LAB-READ-504060

LABEL 4: PRODUCT IDENTIFICATION (Aluminum ID plate)
SERIAL NUMBER, MODEL, LIFT CAPACITIES
Label reorder # ID_PLATE-CE

LABEL 5: KEEP BACK 15 METERS (50 FEET)
Label reorder # W-LAB-STAYBACK50FT
Quantity 2 (one for each side)

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INSTALLATION (PAGE 9)
ADVANCE PREPARATION

GET UP & RUNNING QUICKER WHEN YOUR SAS™ CLAW™ ENGINE PICKER ARRIVES:

- Review this operator manual.
- Review your wheel loader manufacturer's manual & warranty document, if any.
- Installation of this attachment may void machine manufacturer warranty, if any.
- If you've optionally opted for SAS™ to be onsite to assist your mechanic with installation and provide training, please be sure the following items are completed:

Items you need to obtain before arrival of SAS Claw Engine Picker:

- 2 Gallons of hydraulic fluid (specific for your machine)
- Identify hydraulic hose quick connections on your machine. Check with machine manufacturer, and obtain the heaviest duty, highest volume male & female quick connections
- Locate a local hydraulic hose supplier who can make (2) 3/4" diameter 4,000 PSI hoses with heavy duty quick connection fittings same day once proper length is determined during installation

Tools your mechanic will need for installation:

- (2) large adjustable wrenches or large wrench set
- Teflon tape or thread sealer (if permitted by wheel loader OEM for hose fitting installation)

Service to do on your loader in advance:

- Have the maintenance personnel replace the hydraulic system filters & fluid
- Pressure and flow test (recommend but not required)
- Inspect lift arm pins & bushings for wear (replace as needed)

Available for training:

- At least (20) vehicles available with fluids, AC Freon drained and batteries removed.
- Designate an area where it is safe to operate SAS Claw Engine Picker
- An employee to operate unit. (person who can have conversation in English). Thank you.

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INSTALLATION (PAGE 10)
SAS™ CLAW™ ENGINE PICKER

⚠WARNING

►Installation of the Claw Engine Picker on a wheel loader requires interfacing with high pressure hydraulic systems. Installation should only be performed by qualified individuals. Failure to follow these instructions and precautions noted in the wheel loader manufacturer's service manual can result in serious damage to equipment and/or result in injury or death.

►Failure of hydraulic system can result in serious injury and property damage

►Use caution while testing and operating this unit. Be aware of and avoid:
-Pinch Points, -High Pressure hydraulic fluids or stored energy,
-Location of other individuals in the work area

NOTICE **Installation of purchased attachment may void machine manufacturer warranty, if any.**

STEP 1 - ATTACH SAS™ CLAW™ ENGINE PICKER TO WHEEL LOADER:

- **Quick Coupler Attachments:**
  Be sure lower locking pins fully extend to lock in coupler & SAS™ CLAW™ Engine Picker. This may require you to slightly lift or tilt the coupler to lock in. We recommend operator actually inspect each pin to be sure pins are fully locked in.
- **Direct Pin Mounting:**
  Remove existing pin attachment, align arms to Scorpion™, insert and fasten pins in place. Apply ample grease to all pins.

⚠WARNING **Quick coupler locking pins are what fastens attachment to wheel loader. Verify pins are locked in fully prior to lifting unit or using SAS CLAW™ Engine Picker. Failing to verify proper engagement may cause SAS CLAW™ Engine Picker falling off loader resulting in property damage, injury or death.**

STEP 2 - TEST LIFT / TILT SAS FORKS (SAS™ CLAW™ Engine Picker)**:**

- Begin testing by moving control levers slowly:
  A. With carriage on the ground, fully roll back (fork tips up)
  B. With carriage lifted high, fully rotate to the dump position (for tips down)
- Ensure smooth lifting & tilting of forks. Watch for undesirable contact between wheel loader lift arms and SAS CLAW Engine Picker. Also watch for hose pinch points.
- Pin attach units may require addition of mechanical stops.
- If you experience interference you may need to install special roll back or dump stops.
- Contact SAS FORKS™ if you experience interference issues to discuss stop options.

STEP 3 - HYDRAULIC LINES:

- Determine adequate length of lines needed from existing third function connections on loader arms to bulkhead lines on SAS™ CLAW™ Engine Picker.
- To decide length of line; raise unit, tilt unit full down; then measure distance required from bulkhead on SAS™ CLAW™ Engine Picker to loader connection. Make a loop in line to have sufficient length in hose to avoid creating tension in all positions.
- Use 4,000 PSI minimum hoses & high volume, heavy duty self sealing hydraulic quick coupler fittings on machine & ¾" (#12) male JIC fittings to SAS™ CLAW™ Engine Picker.

STEP 4 - LIFT SAS FORKS (SAS™ CLAW™ Engine Picker) **TEST CLAW MOTION:**

- Lift forks off ground, activate 3rd spool lever in cab, move claws open/close several times.
- Open claws wide before lowering forks back to ground level.

STEP 5 - CHECK & FILL HYDRAULIC FLUID:

- After installation test, check wheel loader hydraulic fluid level and fill as needed.

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DAILY PRE-OPERATION INSPECTION (PAGE 11) GUIDELINES

Daily, pre-operation inspection is recommended to help operator safely use SAS FORKS™. The list below is a general summary. This is not meant to be an exhaustive list of items to inspect. Refer to machine manufacturer's operator manual for additional items that may need to be inspected prior to machine operation. It is responsibility of Owners and Operators to ensure safe operation of equipment in the field. Any unsafe items should be professionally repaired prior to operation of machine. This pre-operation inspection should be done on level ground, with the parking brake on.

1) CHECK HYDRAULIC FITTINGS AND HOSES.

Inspect each hydraulic fitting & hose to ensure it is not worn, kinked, cracked, swelling, or leaking.
Have any damaged part(s) replaced immediately.
Do not operate machine if damage is found.

2) GREASE AND INSPECT ALL LINKAGE PINS.

Inspect each linkage pin to ensure properly fastened and the condition.
Grease each linkage pin and joint to ensure smooth operation and to reduce wear.
Do not operate machine if linkage pin or retaining plate of bolt is worn, loose or missing.

3) CHECK WELDS ATTACHING BLADES TO CARRIAGE.

Four welds attach each blade to carriage (two on each side of each blade).
Each weld should be smooth with no cracks. Do not operate machine if a weld is showing any signs of cracking. Refer to this manual for repair instructions.

4) CHECK SKID PLATES ON BOTTOM OF SAS FORKS™ CARRIAGE.

Please see 'Skid Plate Inspection' page for details.
Replace if less than 1/8" thick.
Order replacement skid plates contact SAS Forks:
U.S.A. Phone: 920-845-2198 or 1-877-SAS-FORK.

5) CHECK ROCKER PANEL BUMPER PADS ON THE SAS CRUSHING FORKS.™

IF SO EQUIPPED.
Replace if severely cracked, torn or missing.
Order replacement rubber pads contact SAS Forks
USA Phone :920-845-2307 or 1-877-SAS-FORKS

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DAILY PRE-OPERATION INSPECTION (PAGE 12)
(SUGGESTED MINIMUM INSPECTION GUIDELINES)

> Inspection Required at start of each shift.
> Responsible Person: First employee to use this piece of equipment on each shift, each day.
> If you find any safety problems fix them immediately or tag and lock out this unit so no one uses it.
> Notify your supervisor about any problems and arrange for immdiate service.
> A record of repairs made should be attached to this sheet for proof of safe operating condition
> Park safely. Do not obstruct exit. set parking brake, lower forks with tips on ground, shut off lights.
> When this page is full, turn page into office for filing request a blank form.
> Office / Supervisor: Keep this completed sheet and associated records of repairs on file.

A. WHEEL LOADER GENERAL PRE-OPERATION INSPECTION

Think Safety First
Unit #.....
X=item OK .....
S=needs Service
.....
-- Inspection ----
Date By Who

Week ____ Day #	Hour Meter	Engine Off & Keys Out	Parking Brake Set	Engine Oil Level	Hydraulic Fluid Level	Antifreeze Level	Fan / Alternator Belts	Fuel System Leaks	Tire Condition	Tire Pressure	Tire Lug Bolts Tight	Hydraulic Hoses	Lift Arms / Chains	Grease Lifting Pins	Forks Secure	Seat Belt Operation	Fire Ext. Charged	Parking Brake	Dash Warning Lights	Fuel Level	Engine - No Noises	Horn	Lift operation	Steering System	Brake System	Reverse Warning
1																										
2																										
3																										
4																										
5																										
6																										
7																										

B. SAS™ CLAW ENGINE PICKER PRE-OPERATION INSPECTION

Think Safety First
Unit #.....
X=item OK .....
S=needs Service
.....
-- Inspection ----
Date By Who

Week ____ Day #	Hour Meter	Engine Off & Keys Out	Parking Brake Set	Forks on the ground	Claws in upward (open) position	Quick coupler free of cracks		Claw forks mounted securely to loader	Hoses in good condition	Left upper cylinder pin	Left upper cylinder pin bolts	Left cylinder	Left claw pivot pin	Left lower cylinder pin	Left lower cylinder pin bolts		Right upper cylinder pin	Right upper cylinder pin bolts	Right cylinder	Right claw pivot pin	Right lower cylinder pin	Right lower cylinder pin bolts	Blade welds cracks?	Skid plate condition
1																								
2																								
3																								
4																								
5																								
6																								
7																								

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PULLING ENGINES (PAGE 13)
SAS™ CLAW™ ENGINE PICKER

- Read this manual
- Grease daily
- Video of use see: https://www.sasforks.com/product/sas-claw-engine-picker/
- Summary:
    1. Car is drained of all fluids, freon and batteries are removed.
    2. Position car on flat concrete surface with protective measures for any incidental residual fluids. Optimally the work area location of car placement will have a solid concrete or steel wall or stack of cars to hold car in position, to prevent car from sliding away while prying out engine
    3. Use on fork to pry hood open and bend back
    4. Poke one fork blade into engine compartment, between the lower frame and engine.

    5. Pry fork tip up, forcing engine mounts to break.
    6. Position claws over engine, securely clamp claws on engine.

    7. Lift rear SAS Forks carriage up, while pressing tips down on to the roof of the car. This will help restrain the car down while picking engine out.

    8. Transport engine to drain table or dumpster for recycling.
    9. Open jaws to release engine. Fully open jaws wide prior to using forks to slide under a car to move it, to avoid jaw damage.

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CONNECTING / DISCONNECTING (PAGE 14)
SAS™ CLAW™ ENGINE PICKER

⚠WARNING

►Hydraulic system may have unexpected pressure.
►Always train operators on proper procedures.
►Set forks on the ground, depressurize hydraulic system, wear safety glasses, gloves and other personal protective equipment required by your workplace before attempting to disconnect hydraulic hoses.
►Practice lockout tagout procedures to prevent operation of equipment while servicing.

DISCONNECTING

When disconnecting from SAS™ Engine Picker:

A. Open Claws (jaws), to permit fork carriage to lower flat on level ground.
B. Lower entire fork assembly (SAS Claw Engine Picker) flat on level ground.
C. Set the loader's parking brake.
D. Turn off the loader.
E. Turn the key of the loader back on without starting the engine.
F. Cycle joystick and 3rd spool joystick (lever and buttons) moving the joystick forward and back several times while pressing & holding each button, to relieve all the hydraulic pressure in the lines.
G. Turn the key back off.
H. Disconnect hydraulic hoses at quick release, self sealing fittings only. Carefully place hoses where they will not be damaged or get soiled.
I. Disengage the quick coupler and drive away.

NOTICE

Do not allow the hydraulic connections to get dirty. Allowing dirt into the hydraulics will damage the SAS Claw Engine Picker hydraulics and may cause catastrophic failure of the wheel loader's hydraulic pump.

CONNECTING

To re-connect to the SAS™ Claw Engine Picker:

A. Drive straight up to the SAS™ Claw Engine Picker avoid contact with hydraulic lines.
B. Engage quick coupler. Visually verify quick coupler locking pins are fully engaged.
C. Turn off loader.
D. Cycle joystick and other lift levers in cab to relieve pressure in hydraulic lines.
E. Connect hydraulic lines.
F. Start loader and ensure proper operation.
G. Check hydraulic fluid level on loader. Add fluid as required to maintain adequate level.

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REGULAR PREVENTIVE MAINTENANCE (PAGE 15)
SAS™ CLAW™ ENGINE PICKER

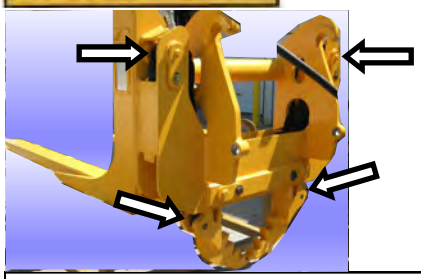
Daily maintenance will help ensure long term performance and prevent failures. Failure to follow preventive maintenance guidelines can result in equipment failure resulting in injury or property damage.

A. Daily: Grease all 6 points;
4 Cylinder Grease Points (two cylinders x 2 points each)
2 Pivot Pin Grease Points (two claws x 2 points each)

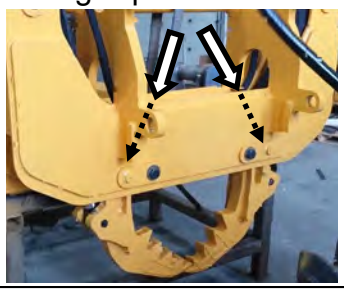
B. Daily: Inspect all pivot point pins and retaining bolts to be sure properly secured.
C. Daily: Visually inspect pins and fastening bolts
D. Daily: Inspect forks & carriage for cracking or damage.
E. Daily: Check loader hydraulic fluid level. Add fluid as required to proper level.
F. Weekly: Inspect hose fittings to be sure they are tight.
G. Weekly: Inspect hoses for pinching or rubbing and correct or replace as needed.
H. Monthly: Inspect skid plates under the carriage. See page on "SKID PLATES"

New style claws grease points:

WARNING Safely secure & support forks to avoid crushing & pinch hazards!



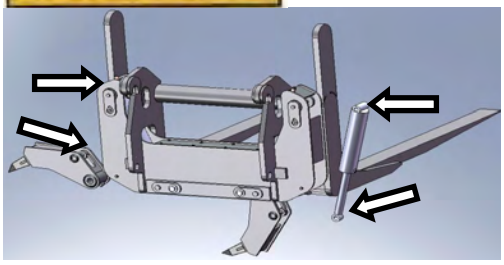
CYLINDER PINS 4 GREASE ZERKS
CLAWS CLOSED (LOWERED POSITION)



CLAW PIVOT PINS 2 GREASE ZERKS,
CLAWS CLOSED (LOWERED POSITION)

Old style claws grease points:

WARNING Safely secure & support forks to avoid crushing & pinch hazards!



CYLINDER PINS 4 GREASE ZERKS
CLAWS CLOSED (LOWERED POSITION)

CLAW PIVOT PINS 2 GREASE ZERKS,
CLAWS OPEN (RAISED POSITION)

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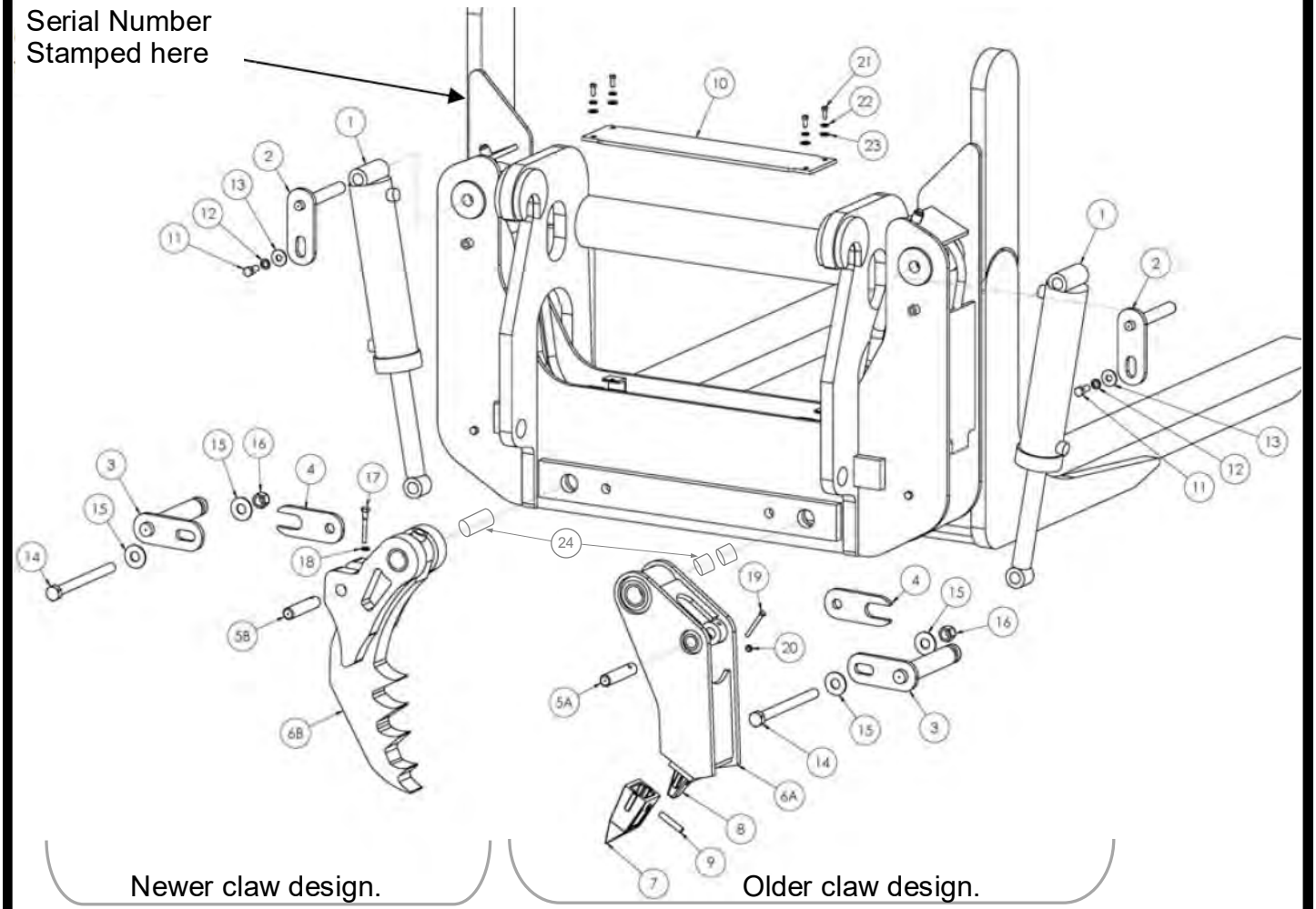
PARTS GUIDE: SERIAL # F3152 & HIGHER (PAGE 16)
SAS™ CLAW™ ENGINE PICKER

For Parts Contact: SAS FORKS Phone: 920-845-2198 Email: parts@sasforks.com



ITEM	DESCRIPTION	QTY	BW PART NUMBER
1	**CYLINDER**	2	
	...S/N SAS F6066 & HIGHER		**HY-CYL-4.5X16.25-4K**
	...S/N SAS F3408 THRU F5727		HY-CYL-4.0X14-4K
	...S/N SAS F3322 THRU F3349		HY-CYL-4.0X14-207496
	...S/N SAS F2942 THRU F3170 REQ INTERNAL STOP: BAILEY ST WX30 3563		HY-CYL-4.0X18-207500
1.1	**CYLINDER INTERNAL SEAL REBUILD KIT**	2	
	...S/N SAS F6066 & HIGHER		**HK-4.50-203-870**
	…S/N SAS F3408 THRU F5727 :CYL# BM320-170		HK-4.00-207-103
	...S/N SAS F3322 THRU F3349 :CYL# BM207-496		HK-4.00-270-103
	...S/N SAS F2942 THRU F3170 :CYL# BM270-500		HK-4.00-207-103
2	**UPPER PIN (CYLINDER BASE END)**	2	
	...S/N SAS F6066 & HIGHER		**1112CARRIAGE ASY**
	...S/N SAS F3322 THRU F5727		1009CARRIAGE-3152ASY
	...S/N SAS F875 THRU F3170		EP-CLAW-CYL PIN UP
3	**MAIN CLAW PIVOT PIN**	2	**1005CARRIAGEPP-3152 ASY**
4	**RETAINING PIN EAR**	2	**1006CARRIAGEPP-3152**

PARTS GUIDE: SERIAL # F3152 & HIGHER (PAGE 17)
SAS™ CLAW™ ENGINE PICKER

ITEM	DESCRIPTION	QTY	BW PART NUMBER
5	**LOWER PIN (ROD END)**	2	
5 A	...S/N SAS F2942 THRU F3470 (1.25" DIA)		EP-CLAW-CYL PIN LOW
5 B	...S/N SAS F3610 THRU F5727 (1.25" DIA)		1303CLAW-F3453
5 B	**...S/N SAS F6066 & HIGHER** (2.00" DIA)		**1003CLAW-6066**
6	**CLAW ASSEMBLY**	2	
6 A	...S/N SAS F1243 THRU F3470		EP-REAR-CLAW-OLD
6 B	...S/N SAS F3610 THRU F5727		EP-REAR-CLAW
6 B	**...S/N SAS F6066 & HIGHER**		**EP-REAR-CLAW-2.00**
7	CAST TIP S/N SAS F1243 THRU F3470	2	W-EP-FEMALE TOOTH
8	WELD ON FINGER S/N SAS F1243 THRU F3470	2	W-EP-MALE NOSE
9	ROLL PIN S/N S/N SAS F1243 THRU F3470	2	W-EP-TOOTH PIN
10	**COVER PLATE**	1	
	...S/N SAS F5623, F6066 & HIGHER		**1022CARRIAGEPP-3152**
	...S/N SAS F5727 ONLY	2	13" wide 1018CARRIAGEPP-5727
	...S/N SAS F5451 ONLY	2	14" wide 1018CARRIAGEPP-3152
	...S/N SAS F3408 THRU F4530	1	28" wide 1018CARRIAGEPP-3152
	...S/N SAS F3152 THRU F3349	1	30" wide 1018CARRIAGEPP-3152
11	**RETAINING BOLT FOR UPPER PIN**	2	**WBOLT 0.625X1.50 GR8**
12	LOCK WASHER FOR RETAINING BOLT	2	
	...S/N SAS F6066 & HIGHER		NONE
	...S/N SAS F2942 THRU 5727		WASHER-L .625 GR8
13	FLAT WASHER FOR RETAINING BOLT	2	WASHER-F 0.625 GR8
13.1	PIN LOCK SPACER	2	
	...S/N SAS F5451 & HIGHER		SPACER-0625-0000
	...S/N SAS F3152 THRU F4530		102-PINLOCK
14	**RETAINING BOLT FOR MAIN PIVOT PIN**		
	...S/N SAS F2942 & HIGHER	2	WBOLT 1.00X12.00 GR8
	F6066 MANUAL INDICATES INCORRECTLY FOUR 1X3.5 BOLTS, ACTUALLY USED TWO 1X12 BOLTS		
15	FLAT WASHER	2	WASHER-F 1.000 GR8
16	NY-LOCKING NUT	2	WNUT 1.000-8-NY GR8
17	**BOLT & DOWEL LWR PIN** (F3610 & HIGHER)	2	**WPIN-SC CLAW**
18	**LOCK WASHER FOR RETAINING BOLT**	2	**WASHER-L 0.500 GR8**
19	BOLT (F2942 THRU F3470)	2	WBOLT 0.375X3.25 GR8
20 & 22	LOCK WASHER	6	WASHER-L 0.375 GR8
21	COVER PLATE BOLTS	4 OR 8	WBOLT 0.375X1.00 GR8
23	FLAT WASHER FOR COVER PLATE	4 OR 8	WASHER-F 0.375 GR8
24	**CLAW MAIN PIVOT BUSHING**		
	...S/N SAS F3610 & HIGHER (1 REQ PER CLAW)	2	**W-B2.002X2.500X5.875**
	...S/N SAS F2942 THRU F3470 (2 REQ PER CLAW)	4	W-B2.002X2.500X2.750

PARTS GUIDE: SERIAL # F875 TO F2626 (PAGE 18)
SAS™ CLAW™ ENGINE PICKER

PROVIDE YOUR ACTUAL SERIAL NUMBER WITH ALL ORDERS

ITEM	PART # TO ORDER 11/10/2009 B.W.#	ORIGINAL DWG #	QTY	DESCRIPTION
1	754EP-1	754EP-1 3-L-21 6	2	PIN, MAIN CLAW PIVOT W/NUT
2	EP-CLAW-CYL PIN UP	709EP-1 2-L-21 9	2	PIN, UPPER HYD. CYL W/EAR
3	N/A	709EP-2 2-L-21 11	1	MAIN CARRIAGE W/O FORKS
4	EP-CLAW-CYL PIN LOW	709EP-3 2-L-21 20	2	PIN, LOWER HYD. CYL
5	HY-CYL-04X16-207-498	709EP-4 2-L-21 23	2	HYDRAULIC CYLINDER W/ADAPTER HOSE & FITTINGS
6	EP-REAR-CLAW-OLD	754EP-1 4-L-19 31	2	CLAW (INCLUDES ITEMS: 9,10,13,14)
7	BFF-300-08-78-00-12T	- - 32	2	FORK- 3" x 8" x 72" - 12" TAPER
8	N/A	- - 33	2	SAFETY DECAL
9	W-EP-FEMALE TOOTH	753EP-1 4-L-19 34	2	REPLACEABLE FINGER (FEMALE)
10	W-EP-MALE NOSE	753EP-1 4-L-19 35	2	WELDED FINGER (MALE)
11	767EP	754EP 3-L-21 36	2	BOLT LOCK EAR-MAIN PIVOT PIN
12	WBOLT 0.375X5.00	754EP 3-L-21 37	2	BOLT-LOWER HYD. CYL. PIN
13	765EP	765EP 3-L-21 38	4	BUSHING-CLAW MAIN PIVOT
14	W-EP-TOOTH PIN	759EP-1 3-L-21 20	2	1/2" X 3"LG ROLL PIN-FINGER RET.
15	N/A	768EP 3-L-21 -	1	CHAIN GUARD (HOSE COVER)

766EP ENGINE PULLER PARTS LIST-OLD

S.A.S. of Luxemburg, Ltd. 133 Center Drive Hwy 54, PO Box 260, Luxemburg, WI 54217 USA
Phone: 920-845-2198 • 1-877-SAS-FORK • Fax: 920-845-2309 • Web: www.sasforks.com

REPAIR FLOW CHART (PAGE 19)
SAS™ CLAW™ ENGINE PICKER

⚠WARNING Hydraulic system may have stored energy. Electrical system is hazardous.
Be certain to follow all safety procedures and guidelines while trouble shooting.
Only qualified heavy equipment technicians should service this equipment.
Malfunctions of equipment can result in un-expected movements from stored energy.
Failure to follow safe practices can result in property damage, injury or death.

SAS Claw Engine Picker does not work properly or work at all?

1. Are the two hydraulic hoses properly connected?
   - No → Connect 3rd spool hoses
   - Yes ↓
2. Any visible hydraulic leaks on Claw Engine Picker or Loader?
   - Yes → Fix all leaks & start over
   - No ↓
3. Is the hydraulic tank fluid level full?
   - No → Fill with new & clean hydraulic fluid to full mark
   - Yes ↓
4. Is operator engaging 3rd spool lever to allow fluid flow?
   - No → Read wheel loader OEM Manual for 3rd spool operate
   - Yes ↓
5. Does function seem to drift or have low power?
   - Yes → Check each cylinder for that function for seal leak/bypass or rod/piston internal shear.
   - No ↓
6. Are the claws offset?
   - Yes → Reset by opening & closing
   - No ↓
7. When engaging the 3rd spool, does it appear the hoses are jumping or moving, indicating pressure is going to the lines?
   - No → Check the hose connections. Once connections are reset, do hoses jump or move now, indicating pressure?
     - No → loader OEM check 3rd spool
     - Yes → Go to step 8
   - Yes ↓
8. Check for cylinders and pins for breakage. Is there any apparent broken pins or cylinders?
   - Yes → Replace broken parts. Contact SAS Forks with serial number and parts needed.
   - No ↓
9. Is this SAS Claw Engine Picker less than 12 months old? ★
   - Yes → Contact SAS Forks with serial number and explain issue
   - No ↓
10. Contact your local wheel loader OEM service dept.

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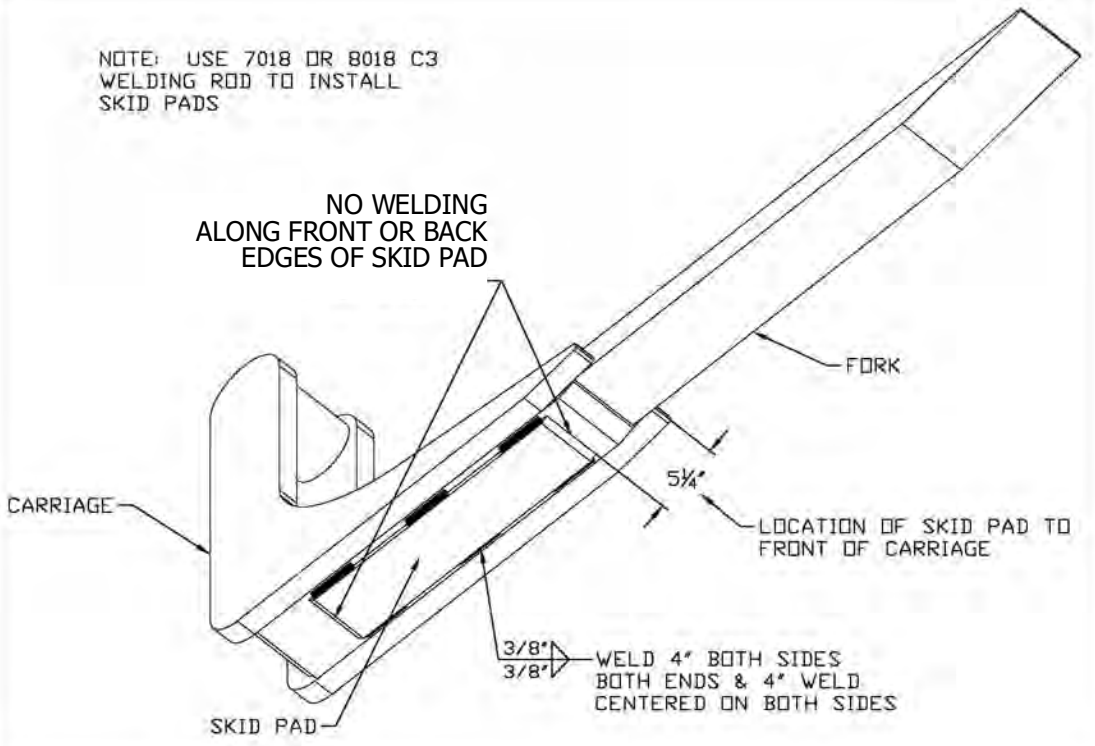
SKID PLATE INSPECTION & WELD NOTICE (PAGE 20)
SAS™ CLAW™ ENGINE PICKER



MAXIMIZE SAS FORKS™ LIFE WITH SKID PLATE MAINTENANCE

To get the maximum life from your SAS FORK™ carriage, the skid plates on the bottom should not wear thinner than 1/8".
Periodic inspection of the skid plates is needed. Order factory replacement skid plates from S.A.S. of Luxemburg, Ltd. when they are worn thin (about 1/8").

⚠WARNING

Carriage Skid Plates: Failure to keep skid plates on the carriage will result in structural damage to the carriage and could result in tearing out one or both blades and necessitating the purchase of a new carriage. Do not use forks without skid plates in place. Skid plate and fork failure can result in equipment damage, injury or death.

DO NOT MAKE UNAUTHORIZED WELDS TO SAS FORKS™

To prolong the life of the SAS FORK™ assembly, do not weld on the forks except as shown in this diagram. Improper welding repairs can result in equipment failure resulting in injury or death.
If you need to make any other repairs on the SAS FORKS™, please contact S.A.S. of Luxemburg, Ltd. Engineering and discuss the situation with them.

RECOMMENDED PRECAUTIONS TO TAKE PRIOR TO WELDING

NOTICE

-Weld repairs should only be performed by qualified individuals.
-Completely disconnect the Scorpion from the wheel loader before welding. Do not weld if connected to wheel loader due to the risk of damage to the loader's electrical system or on board electronics.
-Disconnect hydraulic valve block electrical cord from the loader and carriage.
-Connect the welder ground directly to the part being welded. Avoid attaching ground across any pivot points; this may cause an arc to form damaging the pivot point.

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LIMITED WARRANTY (PAGE 21)
SAS™ CLAW™ ENGINE PICKER

SAFETY
Buyer accepts responsibility to; (1) Ensure that all personnel that will use and/or work in area of purchased product will read safety ID plate and Operators Manual For SAS (product) FORKS™ and the Machine Manufacturer's Operators Manual, prior to use; and (2) Ensure that all personnel follow the safety guidelines outlined on these materials. (3) To determine and compare the weight of the original machine's attachment, to the new SAS FORKS™ or other attachment purchased herein, and reduce the lift capacity as needed to accommodate the increase in the attachment weight if any. (4) Observe the most restrictive weight capacity specified on any machine and/or attachment. (5) Buyer has duty to inspect equipment & attachment regularly.
S.A.S. OF LUXEMBURG, LLC. IS NOT RESPONSIBLE FOR SAFETY IN THE FIELD.

GOALS OF THE S.A.S. OF LUXEMBURG, LTD. LIMITED WARRANTY PROCEDURE
·ASSURE MINIMUM CUSTOMER DOWNTIME by resolving the problem correctly on a timely basis.
·ASSURE END-USER CONFIDENCE while maintaining an equitable Warranty expense for both your company and SAS.
·PRODUCT IMPROVEMENT. We have an engineering staff ready to assist you. Call us at 1-877-SAS-FORK (1-877-727-3675)
Please call SAS before attempting any repair, modification, or questionable job applications.

LIMITED WARRANTY FOR SAS FORKS™

For products that S.A.S. of Luxemburg, LLC. (SAS) manufactures, SAS warrants that such products conform to all specifications for materials and workmanship for the period of time indicated below, after delivery, when used in compliance with the SAS FORKS™ Operator Manual.

PRODUCT	LIMITED WARRANTY PERIOD	ITEM	COVERED
CLAW Engine Picker	1 year from original ship date	CARRIAGE & FRAME	DEFECTS IN MATERIALS & WORKMANSHIP
CLAW Engine Picker	1 year from original ship date	Hydraulic cylinders	DEFECTS IN MATERIALS

No warranty on other products not listed above, unless specified on the face of the original invoice.
No warranty against abrasion wear, claw chip wear, fork tip damage, blade bending, fusible link separation, bent fork mounting shafts, hoses, cables, or wires.

SAS does not warrant the products that it does not manufacture. Rather, all warranties, if any, for these products are supplied by the manufacture. SELLER EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

CALL FOR WARRANTY CONSIDERATION: To be considered for warranty repairs or replacement buyer must notify SAS of any warranty claim within 10 days after such claim arises, and prior to expiration of the warranty period and prior to the performance of any repairs being done, otherwise buyer waives all rights to such claim.
· Obtain the SAS Fork serial number & call SAS at 920-845-2198. Clearly describe the problem and the operation that was taking place when it occurred.
· Buyer is to return defective assembly, freight prepaid, or photographic evidence clearly showing the problem area and details of failure to SAS for review. When necessary, a factory representative may evaluate the problem in the field.

WHAT SAS WILL DO: SAS will examine the defective product, and the details of the failure. If SAS determines that the failure of materials or workmanship was proven to be within the terms of this limited warranty, SAS will, at it's option, repair or replace, FOB the factory, in Luxemburg, WI, USA, the defective product. If the product cannot be returned to the factory, SAS may approve field repair of defective product. SAS will approve an appropriate amount of hours and cost for the repair before authorizing repairs to begin. No provisions will be made for incidental damages, mileage, travel time, overtime, downtime, or special freight charges.

CONDITIONS THAT WILL VOID YOUR WARRANTY: Failures, which in our determination were the result of:
· Improper installation.
· Misapplication - See SAS FORKS™ Operator Manual.
· Misuse or Improper operation – See SAS FORKS™ Operator Manual.
· Exceeding the weight and/or lift limitation posted on the Identification Plate attached the SAS FORKS™.
· Negligence or Failure to perform routine inspection and/or maintenance as outlined in the SAS FORKS™ Operator Manual.
· Unauthorized modification, welding, burning, grinding, installation of non-factory skid plates, etc. (unless otherwise specified in the SAS FORKS™ Operator Manual or as provided in a written authorization directly from SAS factory Engineers.).
· Continued use after a malfunction of the hydraulic system in the forklift or loader.
· Accidental damage.

LIMITED WARRANTY REMEDIES: Buyer must notify SAS of any warranty claim within 10 days after such claim arises; otherwise buyer waves all rights to such claim. Unless agreed otherwise in writing. Buyer's sole remedy for breach of warranty is, at seller's option, the repair of the defect, or the providing of a replacement part F.O.B. seller's office. **Seller will not be responsible for costs of shipping, travel time, travel expense, dismantling or reassembling the product**. Further, seller will not be liable for any direct, indirect, consequential, incidental, or special damages arising out of a breach of warranty. These remedies are exclusive, and all other warranty remedies are excluded.

PROPRIETARY RIGHTS: All designs and other proprietary rights provided by SAS to Buyer are to remain the property of S.A.S., and Buyer shall honor all proprietary legends. Buyer agrees not to copy the design of S.A.S.™ Forks & SAS Scorpion or hire a third party to copy. S.A.S. may use product modification ideas suggested by user, without any obligation to originator of modification suggestion. If S.A.S. chooses to implement such product modification such becomes property of S.A.S. of Luxemburg, Ltd.

LIMITATION OF LIABILITY: The seller's price is based on the enforceability of this limitation of liability, and the buyer understands that the price would be substantially higher without this limitation. Seller shall have no liability to buyer for lost profits or for special, consequential, exemplary, or incidental damages of any kind, whether arising in contract, tort, product-liability, or otherwise, even if advised of the potential damages in advance.
· In no event shall seller be liable to buyer for any damages whatsoever in excess of the contract price.
· In the event that any warranty or warranty remedy fails of its essential purpose, or is held to be invalid or unenforceable for any reason, in consideration of the other provisions of this agreement, the parties understand and agree that all limitations of liability under this provision will nevertheless remain in effect.

SEVERABILITY: Any legally unenforceable provision may be severed from this agreement, and the remaining terms and conditions will be enforced as a whole.

SALES TERMS: SAS FORKS SALES TERMS document is included as part of this document. See www.sasforks.com/SalesTerms.pdf