710G Backhoe Loader Diagnostic

OPERATION AND TEST MANUAL

Backhoe Loaders models 710G

TM2060 22 DEC 15 (ENGLISH)

For complete service information also see:

710G Backhoe Loader Repair	**TM2061**
Alternators and Starting Motors	**CTM77**
Front Wheel Drive Axles, AS and MS-Series	**CTM4687**
PowerTech 4.5L & 6.8L Diesel Engines Level 12 Electronic Fuel System With Stanadyne DE10 Pump	**CTM331**
Super Caddy Oil Cleanup Procedure	**CTM310**
120 Series Hydraulic Cylinders	**CTM114319**
125 Series Hydraulic Cylinders	**CTM109319**
PowerTech 4.5L & 6.8L Diesel Engines Tier 1/Stage I, Tier 2/Stage II, Tier 3/Stage IIIA, Tier 3/Stage IIA Tier 3/Stage III, (Base Engine)	**CTM104**

John Deere Construction and Forestry
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TM2060

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Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

CAUTION:

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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THANK YOU!

Section 9000 - GENERAL INFORMATION

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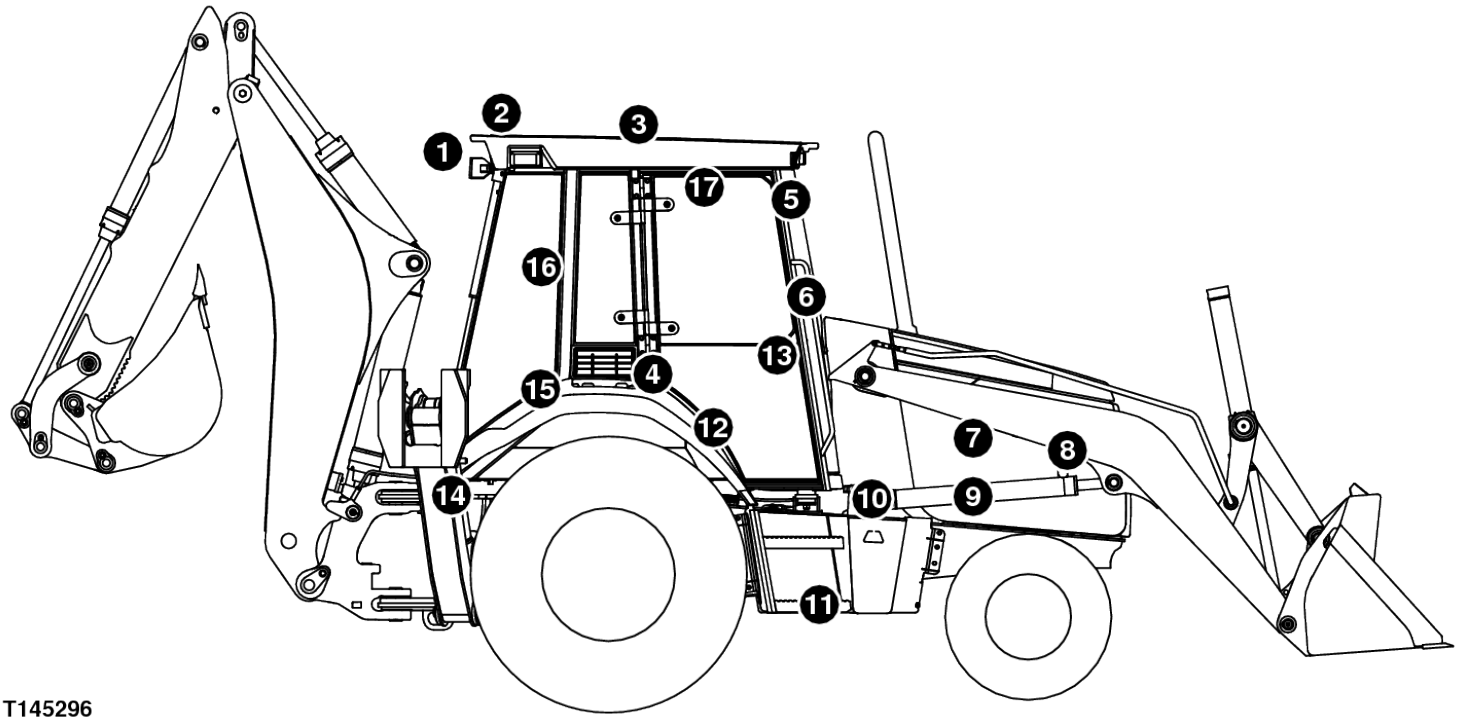
Group 01 - Safety Information

Safety Features



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Safety Features

Please remember, the **operator** is the key to preventing accidents.

1. **Headlights/Taillights.** Two front halogen driving/work lights and two rear halogen work lights.
2. **Signal/Warning Lights.** Roof mounted turning signal lights and warning lights for on-road use.
3. **ROPS Protection.** Certified rollover protection structure surrounds the operator. Integral roof provides overhead protection.
4. **Seat Position Sensor.** An audio/visual warning alerts operator when FNR is in forward/reverse and the seat turned toward the backhoe position.
5. **Interior Rearview Mirror.** Offers the operator a view of activity behind him.
6. **Handholds.** Large and conveniently placed, make it easy to enter or exit the operator′s station.
7. **Loader Boom Service Lock.** Provided for working on or around this machine with the boom raised.
8. **Engine Fan Guard.** A secondary engine fan guard inside engine compartment encloses rotating fan blades.
9. **Bypass Start Protection.** Shielding over the starter solenoid helps prevent dangerous bypass starting.
10. **Ground-Level Fueling, Daily Service Checks.** Ground-level fueling feature eliminates the need to climb on the machine to fuel it.
11. **Steps.** Wide, skid-resistant steps provide excellent footing for getting in/out of operator′s station.
12. **Independent Parking/Secondary Brake.** Independent, electrically controlled, parking brake electrically engages when the engine is stopped.
13. **Neutral Start.** Prevents the engine from being started unless FNR control is in neutral.
14. **Backup Alarm.** Alerts bystanders when the machine is shifted into reverse.
15. **Seat Belt Retractors.** Seatbelt retractors help keep belts clean and convenient to use.
16. **Exceptional Visibility.** Views to either side and front or rear working tools are unrestricted.
17. **Operator Manual Holder.** A sealed manual holder keeps manual clean and dry.

Recognize Safety Information

Safety Alert Symbols

Safety Alert Symbols

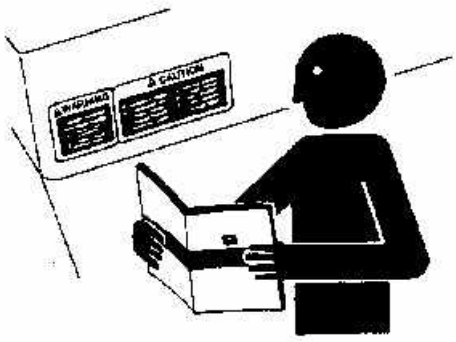
This is the safety alert symbol. When you see this symbol on your machine or in this manual, be alert for the potential of personal injury.

Follow the precautions and safe operating practices highlighted by this symbol.

A signal word — DANGER, WARNING, or CAUTION — is used with the safety alert symbol. DANGER identifies the most serious hazards.

On your machine, DANGER signs are red in color, WARNING signs are orange, and CAUTION signs are yellow. DANGER and WARNING signs are located near specific hazards. General precautions are on CAUTION labels.

Follow Safety Instructions



Follow Safety Instructions

Read the safety messages in this manual and on the machine. Follow these warnings and instructions carefully. Review them frequently. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your authorized John Deere dealer.

Be sure all operators of this machine understand every safety message. Replace operator′s manual and safety labels immediately if missing or damaged.

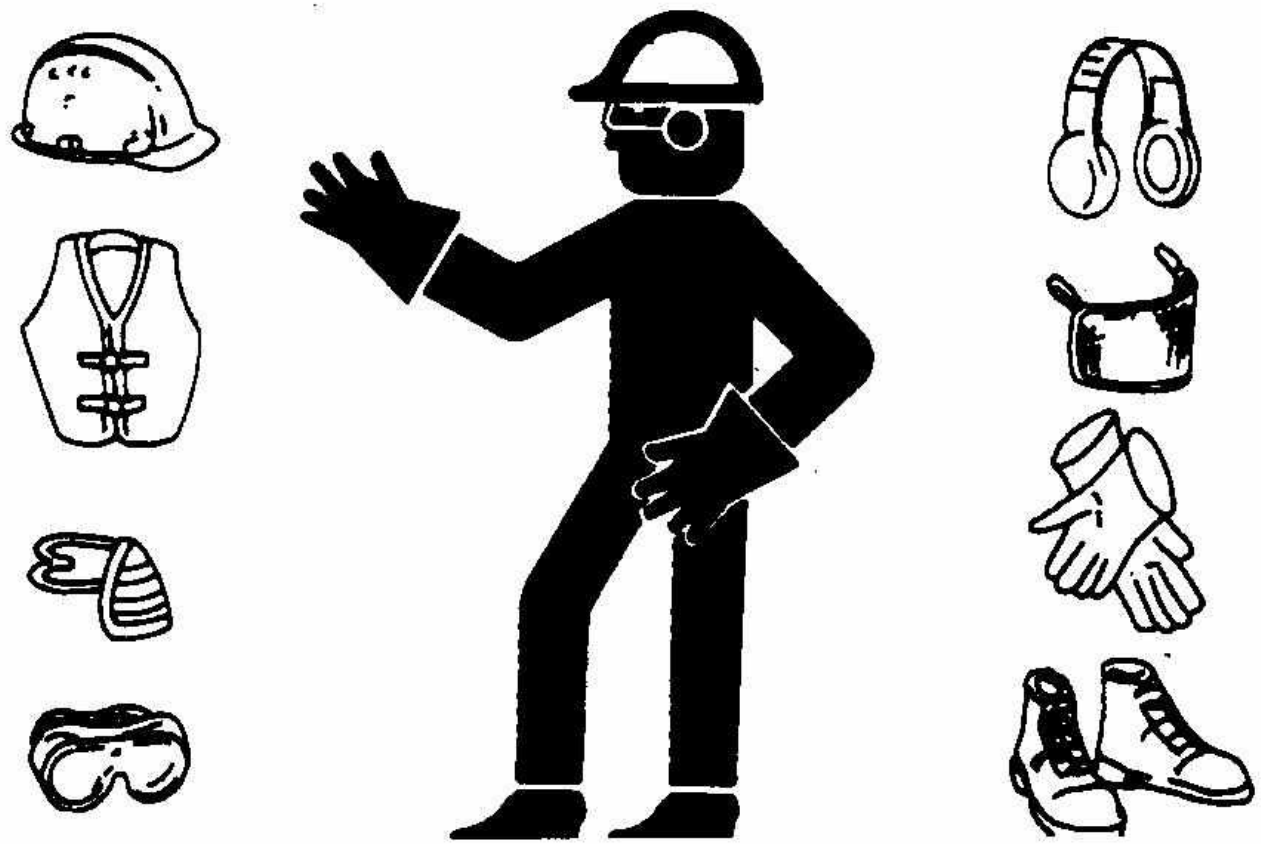
Operate Only If Qualified

Do not operate this machine unless you have read the operator′s manual carefully and you have been qualified by supervised training and instruction.

Familiarize yourself with the job site and your surroundings before operating. Try all controls and machine functions with the machine in an open area before starting to work.

Know and observe all safety rules that may apply to your work situation and your work site.

Wear Protective Equipment



Protective Equipment

Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Avoid Unauthorized Machine Modifications

Modifications of this machine, or addition of unapproved products or attachments, may affect machine stability or reliability, and may create a hazard for the operator or others near the machine.

Always contact an authorized dealer before making machine modifications that change the intended use, weight or balance of the machine, or that alter machine controls, performance or reliability.

Inspect Machine

Inspect Machine

Inspect machine carefully each day by walking around it before starting.

Keep all guards and shields in good condition and properly installed. Fix damage and replace worn or broken parts immediately. Pay special attention to hydraulic hoses and electrical wiring.

Stay Clear Of Moving Parts

Stay Clear Of Moving Parts

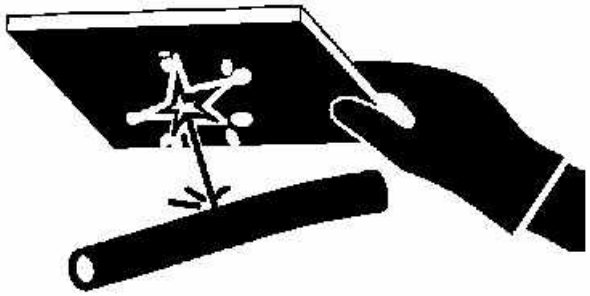
Entanglements in moving parts can cause serious injury.

Stop engine before examining, adjusting or maintaining any part of machine with moving parts.

Keep guards and shields in place. Replace any guard or shield that has been removed for access as soon as service or repair is complete.

Avoid High-Pressure Fluids

Avoid High Pressure Fluids



Avoid High-Pressure Fluids

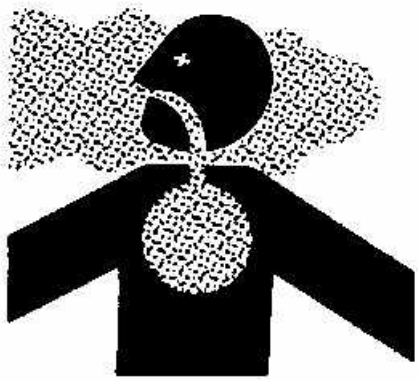
This machine uses a high-pressure hydraulic system. Escaping fluid under pressure can penetrate the skin causing serious injury.

Never search for leaks with your hands. Protect hands. Use a piece of cardboard to find location of escaping fluid. Stop engine and relieve pressure before disconnecting lines or working on hydraulic system.

If hydraulic fluid penetrates your skin, see a doctor immediately. Injected fluid must be removed surgically within hours or gangrene may result. Contact a knowledgeable medical source or the Deere & Company Medical

Department in Moline, Illinois, U.S.A.

Beware Of Exhaust Fumes



Beware Of Exhaust Fumes

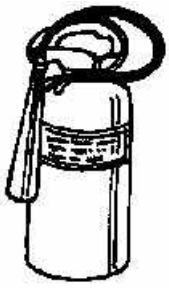
Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, provide adequate ventilation. Use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring outside air into the area.

Prevent Fires

Handle Fuel Safely

Clean Machine Regularly



Carry A Fire Extinguisher

Handle Fuel Safely: Store flammable fluids away from fire hazards. Never refuel machine while smoking or when near sparks or flame.

Clean Machine Regularly: Keep trash, debris, grease and oil from accumulating in engine compartment, around fuel lines, hydraulic lines, electrical wiring and exhaust components. Never store oily rags or flammable materials inside a machine

compartment.

Maintain Hoses and Wiring: Replace hydraulic hoses immediately if they begin to leak, and clean up any oil spills. Examine electrical wiring and connectors frequently for damage.

Keep A Fire Extinguisher Available: Always keep a multi-purpose fire extinguisher on or near the machine. Know how to use extinguisher properly.

Prevent Battery Explosions

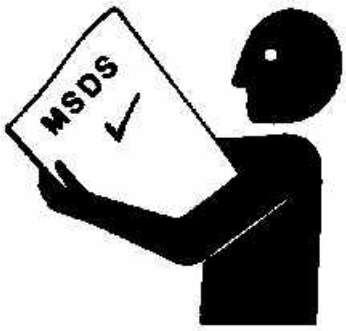
Battery Explosions

Battery gas can explode. Keep sparks, lighted matches, and open flame away from the top of battery.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

Handle Chemical Products Safely

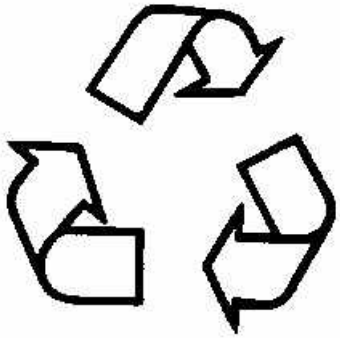


Handle Chemical Products Safely

Exposure to hazardous chemicals can cause serious injury. Under certain conditions, lubricants, coolants, paints and adhesives used with this machine may be hazardous.

If uncertain about safe handling or use of these chemical products, contact your authorized dealer for a Material Safety Data Sheet (MSDS) or go to internet website http://www.jdmsds.com. The MSDS describes physical and health hazards, safe use procedures, and emergency response techniques for chemical substances. Follow MSDS recommendations to handle chemical products safely.

Dispose Of Waste Properly



Dispose Of Waste Properly

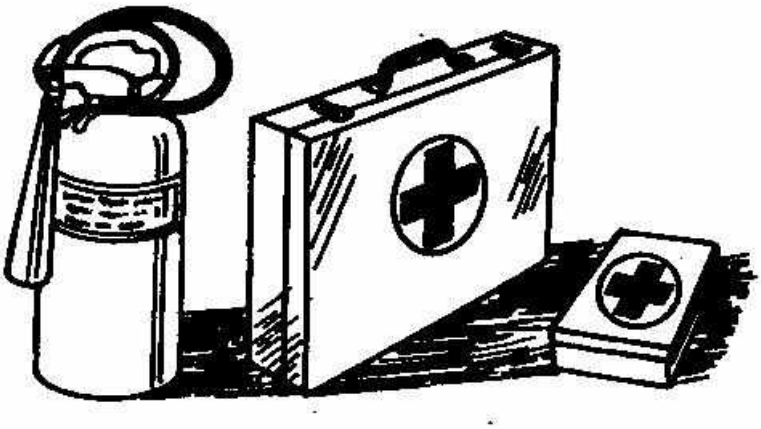
Improper disposal of waste can threaten the environment. Fuel, oils, coolants, filters and batteries used with this machine may be harmful if not disposed of properly.

Never pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants can damage the atmosphere. Government regulations may require using a certified service center to recover and recycle used refrigerants.

If uncertain about the safe disposal of waste, contact your local environmental or recycling center or your authorized dealer for more information.

Prepare For Emergencies



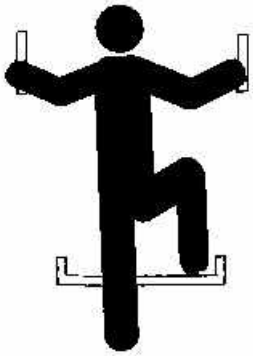
First Aid Kit

Be prepared if an emergency occurs or a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

Use Steps And Handholds Correctly



Use Handholds And Steps

Prevent falls by facing the machine when you get on and off. Maintain 3-point contact with steps and handrails. Never use machine controls as handholds.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.

Start Only From Operator′s Seat

Operate Only From Operators Seat

Avoid unexpected machine movement. Start engine only while sitting in operator′s seat. Ensure all controls and working tools are in proper position for a parked machine.

Never attempt to start engine from the ground. Do not attempt to start engine by shorting across the starter solenoid terminals.

Use And Maintain Seat Belt

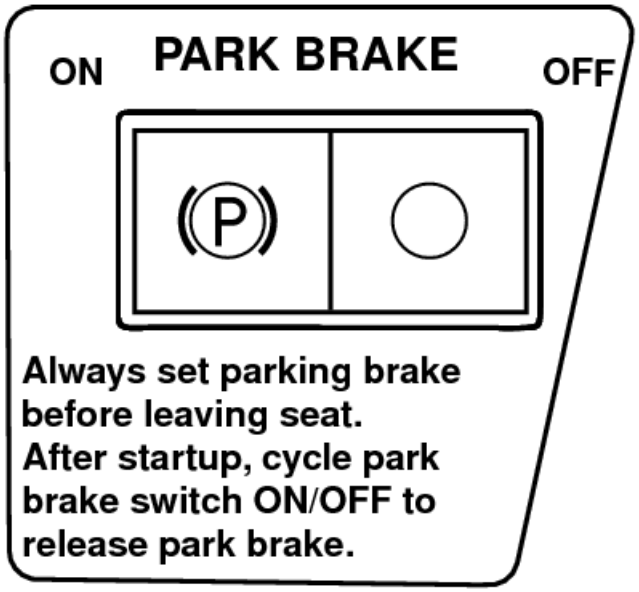
Use and Maintain Seat Belt

Use seat belt when operating machine . Remember to fasten seat belt when loading and unloading from trucks and during other uses.

Examine seat belt frequently. Be sure webbing is not cut or torn. Replace seat belt immediately if any part is damaged or does not function properly.

The complete seat belt assembly should be replaced every three years, regardless of appearance.

Prevent Unintended Machine Movement

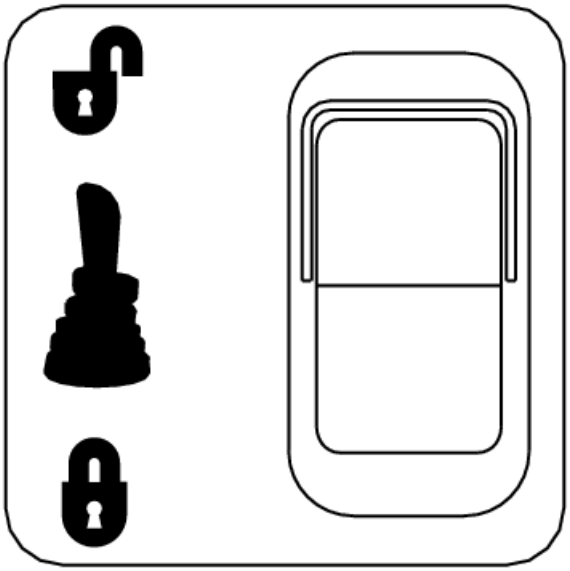


Park Brake Switch

Always set the park lock brake switch to the “ON” position before leaving the operator′s seat for any reason .

Be careful not to accidentally actuate steering, travel or other controls. Engage park brake and lower work equipment to the ground during work interruptions. Stop the engine before allowing anyone to approach the machine. Follow proper parking procedures before leaving the operator′s station.

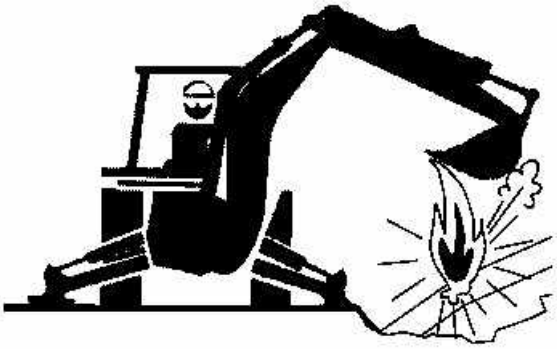
Prevent Unintended Machine Movement—If Equipped With Pilot Controls



Pilot Control Enable/Disable Switch

Be careful not to accidentally actuate control levers when co-workers are present. Always lock hydraulics on backhoe during work interruptions. Lock hydraulics before allowing anyone to approach machine.

Avoid Work Site Hazards



Avoid contact with gas lines

Avoid collapsing banks

Avoid contact with gas lines, buried cables and water lines. Call utility line location services to identify all underground utilities before you dig.

Prepare work site properly . Avoid operating near structures or objects that could fall onto the machine. Clear away debris that could move unexpectedly if run over.

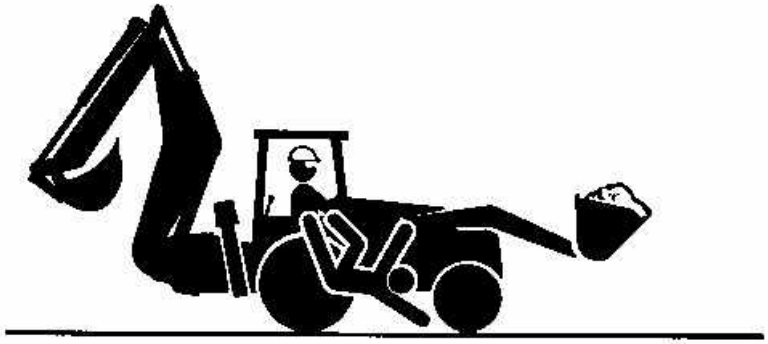
Avoid boom or attachment contact with overhead obstacles or overhead electrical lines. Never move any part of machine or load closer than 3 m (10 ft) plus twice the line insulator length to overhead wires.

Keep bystanders clear at all times. Use barricades or a signal person to keep vehicles and pedestrians away. Use a signal person if moving machine in congested areas or where visibility is restricted. Always keep signal person in view. Coordinate hand signals before starting machine.

Operate only on solid footing with strength sufficient to support machine. Be especially alert working near embankments or excavations.

Avoid working under over-hanging embankments or stockpiles that could collapse on machine.

Keep Riders Off Machine



Keep Riders Off

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator’s view resulting in the machine being operated in an unsafe manner.

Avoid Backover Accidents

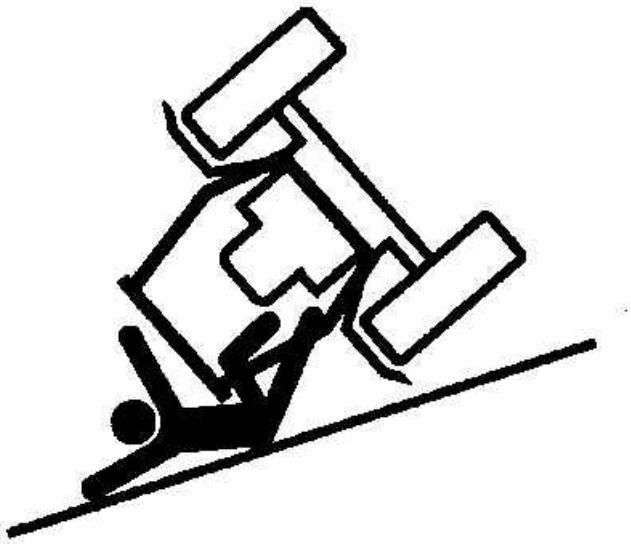
Avoid Backover Accidents

Before moving machine, be sure all persons are clear of the machine travel path. Turn around and look directly for best visibility. Use mirror to assist in checking behind the machine. Keep windows and mirror clean and in good repair.

Be certain backup warning alarm is working properly.

Use a signal person when backing if view is obstructed or when in close quarters. Keep signal person in view at all times. Use prearranged hand signals to communicate.

Avoid Machine Tipover



Avoid Machine Tipover

Use seat belt at all times.

Do not jump if the machine tips. You will be unlikely to jump clear and the machine may crush you.

Load and unload from trucks or trailers carefully. Be sure truck is wide enough and secured on a firm level surface. Use loading ramps and attach them properly to truck bed.

Be careful on slopes. Use extra care on soft, rocky or frozen ground because machine may slip sideways in these conditions.

Ensure solid footing. Use extra care when operating on stockpile materials, or near banks or excavations that may cave-in and cause machine to tip or fall.

Add And Operate Attachments Safely

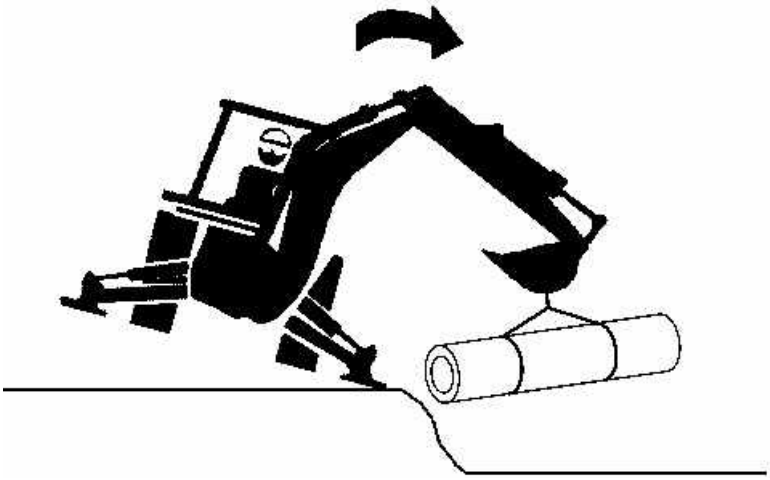
Always verify compatibility of attachments by contacting your authorized dealer. Adding unapproved attachments may affect machine stability or reliability, and may create a hazard for others near the machine.

Ensure that a qualified person is involved in attachment installation. Add guards to machine if operator protection is required or recommended. Verify that all connections are secure and attachment responds properly to controls.

Carefully read attachment manual and follow all instructions and warnings. In an area free of bystanders and obstructions, carefully operate attachment to learn its characteristics and range of motion.

Use Special Care When Operating

Man Falling From Bucket



Tipover

Never use the loader to lift people. Do not allow anyone to ride in the bucket or use the bucket as a work platform.

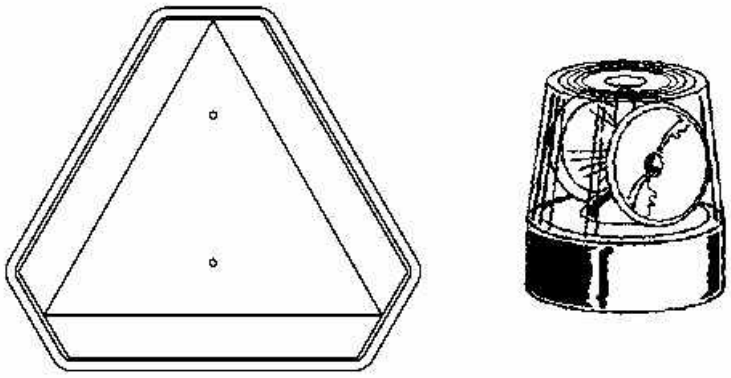
Operate carefully with raised loads. Raising the load reduces machine stability, especially on side slopes on soft terrain. Drive and turn slowly with a raised load.

Ensure that objects in the bucket are secure. Do not attempt to lift or carry objects that are too big or too long to fit inside the bucket unless secured with an adequate chain or other device. Keep bystanders away from raised loads.

Be careful when lifting objects. Never attempt to lift objects too heavy for your machine. Assure machine stability and hydraulic capability with a test lift before attempting other maneuvers. Use an adequate chain or sling and proper rigging techniques to attach and stabilize loads.

Never lift an object above or near another person.

Operating Or Traveling On Public Roads



Operating or Traveling On Public Roads

Machines that work near vehicle traffic or travel slower than normal highway speeds must have proper lighting and markings to

assure they are visible to other drivers.

Install additional lights, beacons, slow moving vehicle (SMV) emblems, or other devices and use as required to make the machine visible and identify it as a work machine. Check state and local regulations to assure compliance. Keep these devices clean and in working condition.

Inspect and Maintain ROPS

A damaged roll-over protective structure (ROPS) should be replaced, not reused.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting.

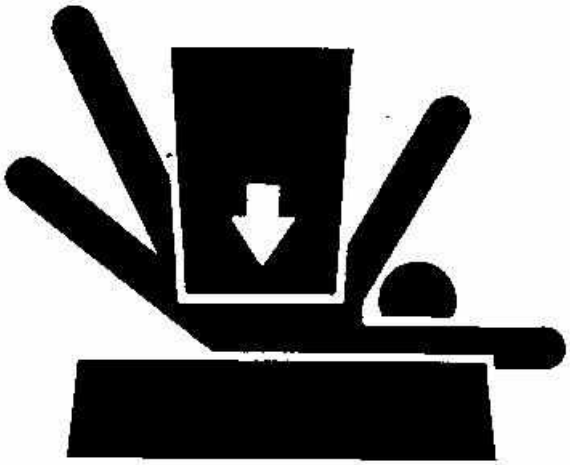
If ROPS was loosened or removed for any reason, inspect it carefully before operating the machine again.

To maintain the ROPS:

- Replace missing hardware using correct grade hardware.
- Check hardware torque.
- Check isolation mounts for damage, looseness or wear; replace them if necessary.
- Check ROPS for cracks or physical damage.

Park And Prepare For Service Safely

Do Not Operate Tag



Support Machine Properly

Warn others of service work. Always park and prepare your machine for service or repair properly.

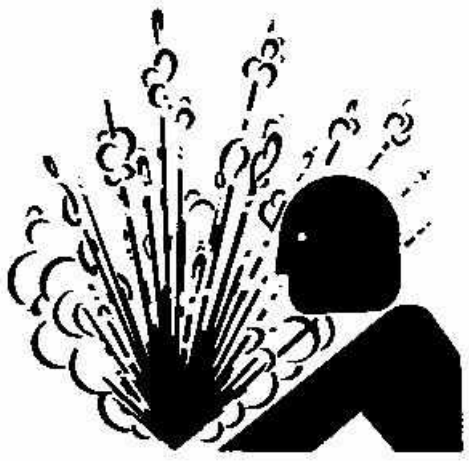
- Park machine on a level surface and lower equipment to the ground.
- Engage park brake.
- Stop engine and remove key.
- Attach a “Do Not Operate” tag in an obvious place in the operator’s station.

Securely support machine or attachment before working under it.

- Do not support machine with any hydraulically actuated tools or attachments.
- Do not support machine with cinder blocks or wooden pieces that may crumble or crush.
- Do not support machine with a single jack or other devices that may slip out of place.
- Always install boom lock before working on or around this machine with the loader boom raised.

Understand service procedures before beginning repairs. Keep service area clean and dry. Use two people whenever the engine must be running for service work.

Service Cooling System Safely

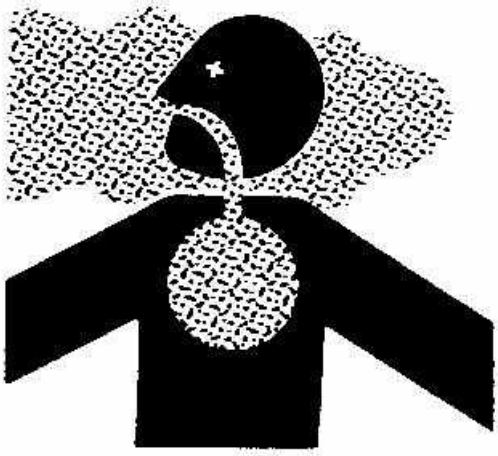


Cooling System

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

Remove Paint Before Welding or Heating



Toxic Fumes

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind 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.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

Make Welding Repairs Safely

Avoid Heating Near Pressurized Fluid Lines

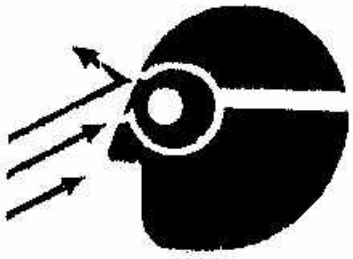
→NOTE:

Disable electrical power before welding. Turn off main battery switch or disconnect positive battery cable. Separate harness connectors to engine and vehicle microprocessors.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines fail as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

Remove paint properly. Do not inhale paint dust or fumes. Use a qualified welding technician for structural repairs. Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

Drive Metal Pins Safely

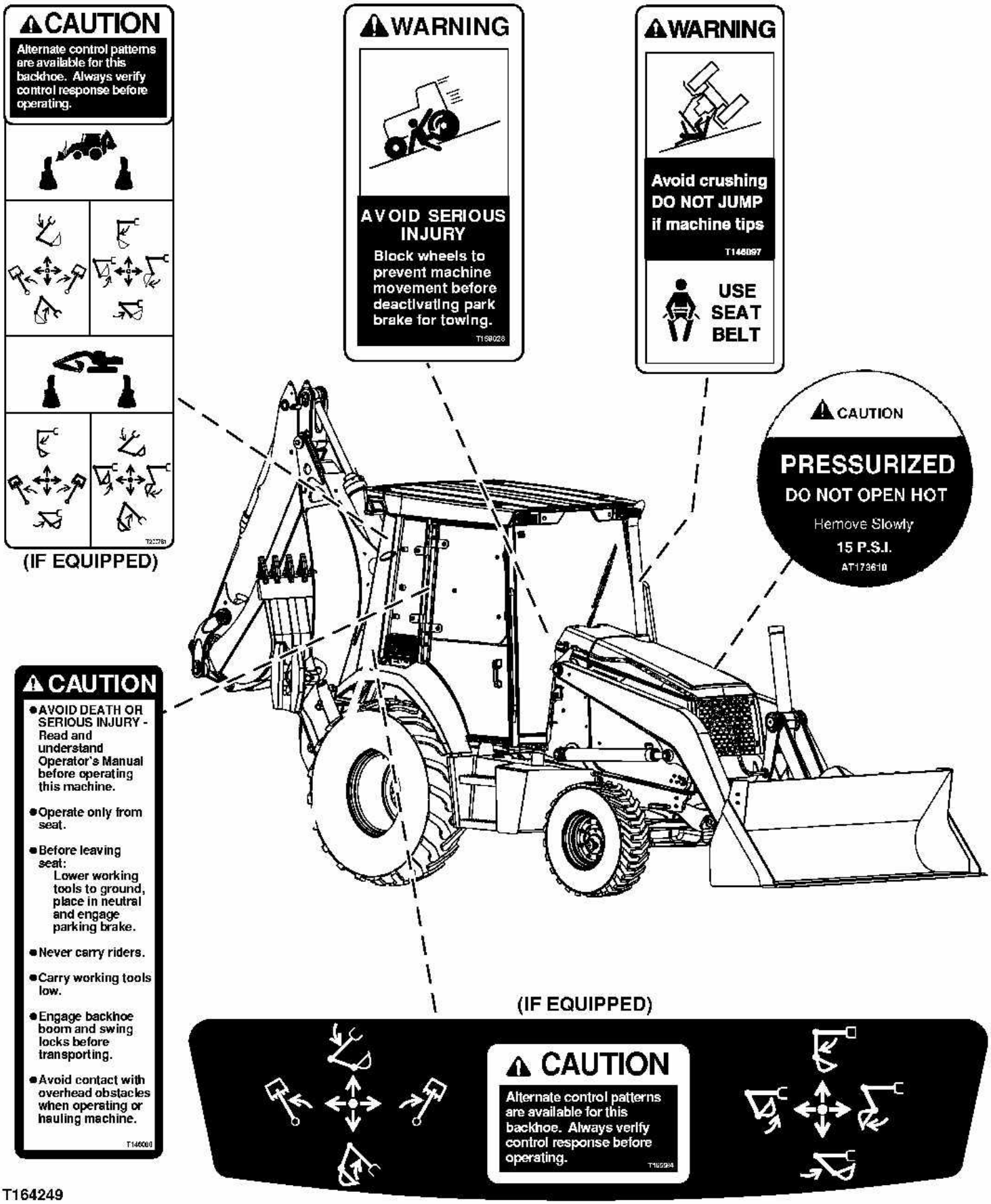


Hardened Metal Parts

Always wear protective goggles or safety glasses and other protective equipment before striking hardened parts. Hammering hardened metal parts such as pins and bucket teeth may dislodge chips at high velocity.

Use a soft hammer or a brass bar between hammer and object to prevent chipping.

Safety Signs



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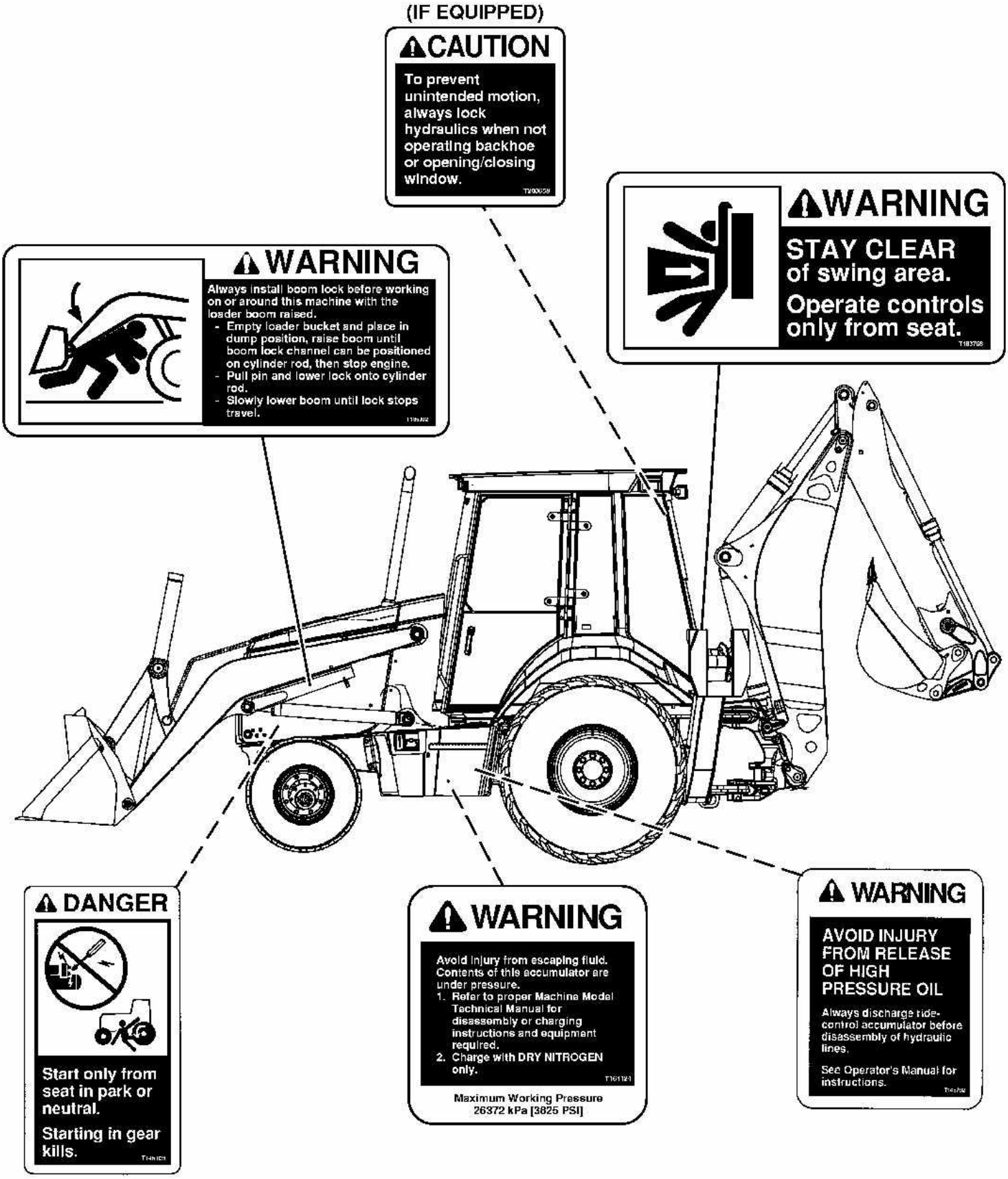
Safety Signs



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Safety Signs

Section 9005 - OPERATIONAL CHECKOUT PROCEDURE

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Group 10 - Operational Checkout Procedure

Operational Checkout Procedure

Use this procedure to check all systems and functions on the machine. It is designed so you can make a quick check of machine operation while doing both a walk around inspection and performing specific checks from the operator's seat.

Should you experience a problem with your machine, you will find helpful diagnostic information in this checkout that will pinpoint the cause. Use the table of contents to help find adjustment procedures. This information may allow you to perform simple repairs yourself, reducing machine down time.

The information obtained after completing the operational checkout will allow you or your authorized dealer to pinpoint a specific test or repair needed to restore the machine to specifications.

A location will be required which is level and has adequate space to complete the checks. No tools or equipment are needed to perform this checkout.

Complete the necessary visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) prior to doing the checkout. The machine must be at operating temperature for many of the checks.

Locate the check to be performed at the top of the left column and read completely down the column before performing the check. Follow this sequence from left to right. In the far right column, if no problem is found, you will be instructed to go to next check. If a problem is indicated, you will be referred to either a group in this manual or to your authorized dealer for repair.

Gauge and Indicator Check With Engine Off

(1) Check for Stored Diagnostic Trouble Codes (DTCs)

Action:

→NOTE:

A Diagnostic Trouble Code (DTC) is the same as a Service Code. The term DTC conforms with the standards set by the Society of Automotive Engineers (SAE).

Turn key switch to ON position and hold. Check for any active or stored DTCs.

Result:

OK: If no DTCs exist, proceed to the next check.

NO: If DTCs exist. See Display Monitor Diagnostic Trouble Codes (S.N. —951374) (Group 9015A-20) or See Monitor Display Unit (MDU) Diagnostic Trouble Codes (S.N. 951375—) . (Group 9015B-20)

(2) Monitor Indicator Lights and Alarm Checks

Action:

Turn key switch to ON position and hold.

sss:

Are all monitor indicator lights on? Is STOP light ON and does alarm sound?

→NOTE:

Starting motor MUST NOT operate.

Result:

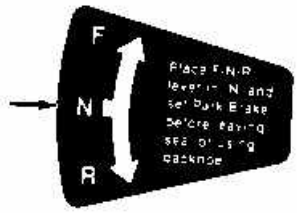
YES: Go to next check.

NO: Check monitor/gauge fuse. See Fuse and Relay Specifications (S.N. —913488) or See Fuse and Relay Specifications (S.N. 913489—951374) (Group 9015A-10) or See Fuse and Relay Specifications (S.N. 951375—) . (Group 9015B-10). If motor starts and bulb check position is OK, key switch is failed or there is a short in wiring. See System Functional Schematic And Section Legend (S.N. —951374) (Group 9015A-10) or See Start Circuit Theory Of Operation (S.N. —951374) (Group 9015A-15) or See System Functional Schematic And Section Legend (S.N. 951375—) (Group 9015B-10) or See Start And Charging Circuit Theory Of Operation (S.N. 951375—) . (Group 9015B-15)

FNR, Neutral Start Circuit and Reverse Warning Alarm Checks

(1) FNR Switch Check

Action:



FNR Switch

Engine off.

Move FNR lever to forward (F), reverse (R), then neutral (N) position.

sss:

Observe and feel forward, neutral and reverse detents.

Turn key switch to ON position. Move FNR lever into forward and reverse.

sss:

Did you hear a "click" from the front console neutral start relay when the key switch was turned ON?

Result:

YES: Go to next check.

NO: If no "click", inspect neutral start relay. See System Functional Schematic And Section Legend (S.N. —951374) (Group 9015A-10) or See Start Circuit Theory Of Operation (S.N. —951374) (Group 9015A-15) or See System Functional Schematic And Section Legend (S.N. 951375—) (Group 9015B-10) or See Start And Charging Circuit Theory Of Operation (S.N. 951375—) . (Group 9015B-15)

(2) Neutral Start Check

Action:

Move FNR lever to forward (F) position and turn key switch to start position.

Move FNR lever to reverse (R) position and turn key switch to start position.

sss:

Did starting motor operate?

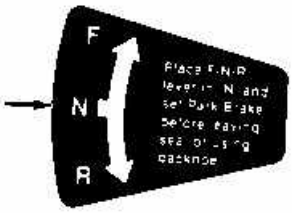
Result:

YES: Check starting circuit. See Start Circuit Schematic (— S.N. 95124) (Go to Group 9015A-15) or See Starting and Charging Circuit Theory of Operation (S.N. 951255—) . (Group 9015B-15.).

NO: Go to next check.

(3) Start Circuit Check

Action:



Start Circuit

Move FNR lever to neutral (N) position and turn key switch to START position.

Observe and listen to monitor as engine is cranking.

sss:

Did starting motor operate?

sss:

Did alarm sound?

sss:

During engine cranking, were all indicator lights ON? Is STOP indicator ON?

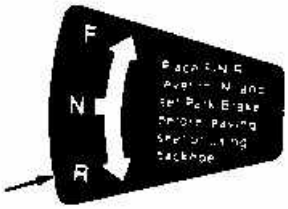
Result:

YES: Go to next check.

NO: If engine turns but does not start, check fuel shut-off/start aid/reverse alarm fuse. If starting motor does not operate check start fuse. If indicator lights are NOT ON, check monitor/gauge fuse. See Fuse and Relay Specifications (S.N. —913488) or See Fuse and Relay Specifications (S.N. 913489—951374) (Group 9015A-10) or See Fuse and Relay Specifications (S.N. 951375—) . (Group 9015B-10)

(4) Reverse Warning Alarm Check

Action:



Reverse Warning Alarm

Key switch ON.

Move FNR lever to reverse (R) position.

sss:

Does reverse warning alarm sound?

Result:

YES: Go to next check.

NO: Check reverse warning alarm. See Engine/Transmission Harness (W7) Wiring Diagram (S.N. —951374) (Group 9015A-10) or See Chassis Harness (W7) Wiring Diagram (S.N. 951375—) . (Group 9015B-10.)

Park Brake, Indicator Light, and Engine Speed Control Linkage Checks

(1) Park Brake Indicator Check

Action:

Park Brake Indicator

IMPORTANT:

If engine oil pressure indicator light stays ON, STOP ENGINE IMMEDIATELY, check oil level.

Engage park brake.

Put FNR lever in neutral (N) and start the engine.

Put FNR lever in forward (F) position.

sss:

Is STOP indicator ON? Does alarm sound? Are all other indicator lights out?

Release park brake.

sss:

Is park brake indicator and STOP light out? Alarm will not sound.

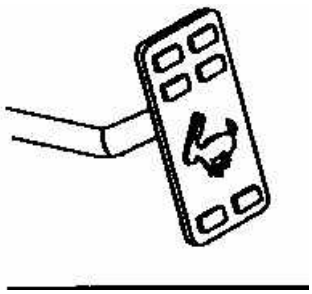
Result:

YES: Go to next check.

NO: If engine low oil pressure indicator light stays ON, STOP ENGINE IMMEDIATELY and check oil level. If alternator indicator light is ON, increase engine speed to 1200 rpm and alternator light MUST go out.

(2) Engine Speed Control Pedal Linkage Check

Action:



Engine Speed Control Pedal Linkage

Depress speed control pedal.

sss:

Does engine speed stay the same as with speed control lever in fast idle position?

Result:

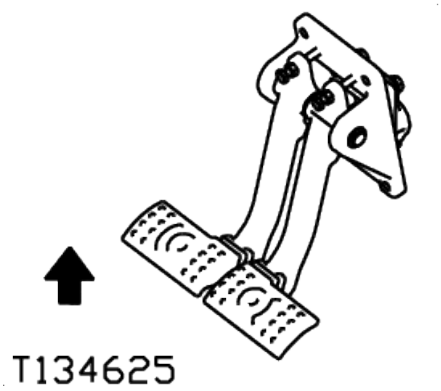
YES: Go to next check.

NO: Adjust speed control linkage. See Engine Speed Control Linkage . (Group 9010-20)

Brake System Checks

(1) Pedal Stop Check

Action:



Pedal Stop

Lift left and right brake pedals.

sss:

Are brake pedals against pedal stop screws?

→NOTE:

This ensures that brake check valves are opened and brakes released.

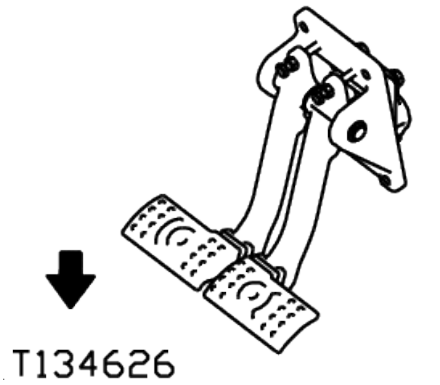
Result:

YES: Go to next check.

NO: Check service brake valve and pedal adjustment Perform Service Brake Valve And Pedal Adjustment . (Group 9020-20)

(2) Brake System Leakage Check

Action:



Brake System Leakage

Depress and hold left brake pedal, then right brake pedal using approximately 267 N (60 lb. force).

sss:

Brake pedal must NOT feel spongy (caused by air in system). Does pedal settle more than 25 mm (1.0 in.) per minute?

Item	Measurement	Specification
Brake System	Maximum Leakage	25 mm (1.0 in.) per minute with approximately 267 N (60 lb. force) applied

Result:

NO: Go to next check.

YES: Bleed brakes. See Bleed Brakes . (Group 9020-20)

(3) Park Brake Function Check

Action:

Start machine, move throttle to 1200 rpm.

Leave park brake ON.

Put FNR lever in forward position.

Shift transmission starting with 1st. gear through 4th. gear, pausing for 5 seconds in each gear.

Move FNR lever to reverse position.

Shift transmission starting with 1st. gear through 4th. gear, pausing for 5 seconds in each gear.

Move FNR lever back to neutral position.

Move throttle back to slow idle and shut the machine off.

sss:

The machine MUST NOT move in any gear.

sss:

Park Brake indicators MUST be lit.

sss:

Stop light MUST be flashing.

sss:

An audible beeping alarm MUST be heard.

sss:

With the FNR In the reverse position, the reverse audible alarm MUST be heard.

Result:

YES: If the machine moves in any gear, Perform Park Brake Release Pressure Test . (Group 9020-25)

YES: If the indicators do not work, Perform Park Brake and FNR Circuit Theory Of Operation (S.N. —951374) . (Group 9015A-15) or See Flex Load Controller (FLC) Circuit Theory Of Operation (S.N. 951375—) . (Group 9015B-15)

NO: Go to next check.

Steering System Checks

(1) Steering Check

Action:

Raise loader bucket above ground level.

Raise rear of machine off ground using stabilizers.

Operate engine at approximately 1000 rpm.

Item	Measurement	Specification
Steering Check	Approximate Engine Speed	1000 rpm

Turn steering wheel from full left to full right several times.

sss:

Did front wheels move smoothly in both directions?

sss:

When steering wheel was stopped, did front wheels stop moving?

→NOTE:

Internal leakage or a sticking steering valve spool can cause wheels to continue to move after steering wheel is stopped.

Result:

YES: Go to next check.

NO: Check steering system leakage. Perform Steering System Leakage Test . (Group 9025-25)

Hydraulic System Checks

(1) Hydraulic Pump Performance Check

Action:

→NOTE:

If hydraulic oil is not at operating temperature, heat oil to 38—52° C (100—125°F).

Put loader bucket flat on ground.

Item	Measurement	Specification
Hydraulic Oil	Temperature	38—52° C (100—125°F)

Transmission in neutral, FNR in Forward.

Run engine at slow idle.

Item	Measurement	Specification
Main Hydraulic Pump Performance Check	Engine Speed	Slow idle

Measure cycle time of loader raise to maximum height (including bucket leveling).

SSS:

Does loader raise to maximum height in 15 seconds or less?

Item	Measurement	Specification
Loader Raise to Maximum Height (Including Bucket Leveling)	Maximum Cycle Time	15 seconds

→NOTE:

Take the average cycle time for at least three cycles. This time will give a general indication of main hydraulic pump performance.

Result:

YES: Go to next check.

NO: If cycle time is slow, check hydraulic functions.

(2) Cylinder Cushion Check

Action:

Raise wheels off ground with stabilizers.

Boom MUST be lowered from the transport position.

Run engine at high idle.

Item	Measurement	Specification
Cylinder Cushion Check	Engine Speed	High idle

Activate backhoe swing left and right.

Note sound and speed as cylinders near end of their stroke.

SSS:

Does speed of cylinder rod decrease near the end of its stroke?

SSS:

Can hydraulic oil be heard flowing through orifice as cylinder rod nears the end of its stroke?

Repeat check using backhoe boom raise function.

→NOTE:

Crowd cylinder does not have cylinder cushion.

Result:

YES: Go to next check.

NO: Remove and repair cylinder cushion. Go to repair manual.

(3) Stabilizer Cylinder and Valve Check

Action:

Operate machine at approximately 1500 rpm.

Item	Measurement	Specification
Stabilizer Cylinder and Valve Check	Approximate Engine Speed	1500 rpm

Position loader bucket above ground.

Lower each stabilizer cylinder and raise rear of machine off ground.

sss:

Do cylinders extend smoothly and hold machine up?

Retract each stabilizer cylinder.

sss:

Do cylinders retract smoothly and remain up?

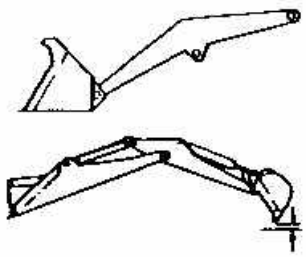
Result:

YES: Go to next check.

NO: Cylinders drift up or down. See Cylinder Leakage Test. (Go to Group 9025-25).

(4) Backhoe and Loader Function Drift Check

Action:



Backhoe and Loader Function Drift

→NOTE:

Feel backhoe cylinders. Cylinder must be warm to touch (38—52° C [100—125° F). If cylinders are not warm, heat oil to specifications.

With backhoe fully extended, put backhoe bucket at a 45° angle to ground.

Item	Measurement	Specification
Hydraulic Oil	Temperature	38—52° C (100—125° F) (Cylinders warm to touch)

Lower boom until bucket cutting edge is 50 mm (2.0 in.) off the ground.

Position loader bucket same distance off ground as backhoe bucket.

Run engine at slow idle and observe bucket cutting edge.

Item	Measurement	Specification
Backhoe and Loader Function Drift Check	Engine Speed	Slow idle

SSS:

Do cutting edges touch ground within one minute?

Item	Measurement	Specification
Backhoe and Loader Function	Maximum Drift	50 mm (2.0 in.) in one minute

Result:

NO: Go to next check.

YES: Verify which function is drifting. See Function Drift Test. (Go to Group 9025-25).

(5) Hydraulic Control Valve Lift Check Test

Action:

→NOTE:

Husco valves have one lift check for both work ports, and therefore only need to be checked in one direction.

Raise loader bucket 1 m (3.0 ft.) off the ground with the bucket level.

Position backhoe at maximum reach with bucket in dump position, 1 m (3.0 ft.) off the ground.

Stop the engine.

Activate each function one at a time.

- Loader boom raise
- Loader bucket rollback
- Backhoe boom up
- Dipperstick extend
- Backhoe bucket dump

SSS:

Do functions move when the control lever is activated?

Result:

NO: Go to next check.

YES: Check cylinder leakage. See Cylinder Leakage Test. (Go to group 9025-25).

(6) Loader Boom Float Check

Action:

Put loader bucket at maximum height position with bucket dumped.

Run engine at approximately 1500 rpm.

Item	Measurement	Specification
Loader Boom Float Check	Approximate Engine Speed	1500 rpm

Move the loader control lever forward into boom float detent position, and at the same time into bucket rollback detent position. Remove hand from control lever.

SSS:

Does loader control lever remain in the boom float detent position?

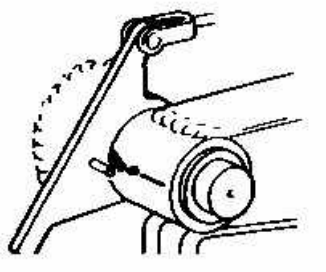
Result:

YES: Go to next check.

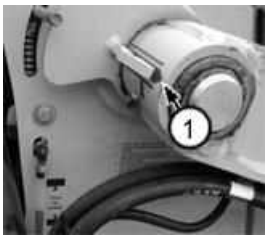
NO: If it jumps out of detent, check detent spring and detent balls. Go to repair manual.

(7) Loader Return-to-Dig Check

Action:



Early Machines



Later Machines

Run engine at approximately 1500 rpm.

Position loader and bucket 2 m (6.0 ft) above ground level with bucket in full dump position.

Move the loader control lever into bucket rollback detent position. Remove hand from control lever.

sss:

Does loader control lever disengage from bucket rollback detent when bucket indicator pointer is aligned with mark (1) on boom pivot?

sss:

When bucket is at ground level, bucket must be level and bucket indicator pointer must be aligned with mark (1) on the boom pivot.

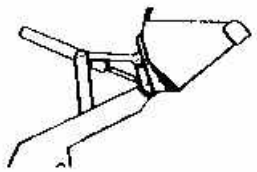
Result:

YES: Go to next check.

NO: Adjust switch until activated in cam. See Loader Bucket Self-Leveling Linkage and Return-to-Dig Switch Adjustment . (Group 9025-20.)

(8) Bucket Leveling Linkage Check

Action:



Bucket Leveling Linkage

→NOTE:

The loader bucket leveling feature functions during the boom raise cycle only. When bucket is lowered, the operator can manually level the bucket or use the return-to-dig.

Put loader bucket in the rollback position with the boom near ground level.

Raise the loader and at the same time hold the control lever in the bucket rollback position.

Observe bucket and loader control lever as the loader raises.

sss:

Does loader control lever move into the bucket dump position and the bucket dump function slowly activate? When the loader control lever moves to activate the bucket dump function, does the bucket position remain stationary the remainder of the loader boom raise cycle?

Result:

YES: Go to next check.

NO: Adjust switch until it is activated in cam. See Loader Bucket Self-Leveling Linkage and Return-to-Dig Switch Adjustment . (Group 9025-20.)

(9) Attachment Coupler Check (Optional)

Action:

CAUTION:

Avoid unexpected movement. Position attachment on ground before releasing pin.

Move coupler switch to disengage position.

sss:

Do coupler pins retract?

sss:

Does chime sound?

sss:

Does coupler indicator light come on?

sss:

Is load sense activated for only five second after switch is moved?

Result:

YES: Go to next check.

NO: See Attachment Coupler Not Working (Hydraulic)(Group 9020-15) or see Attachment Coupler Not Working (Electrical)(Group 9015A-15).

Action:

Move coupler switch to engage position.

sss:

Do coupler pins extend?

sss:

Does chime turn off?

sss:

Does coupler indicator light turn off?

sss:

Is load sense activated for only five second after switch S50 is moved?

Result:

YES: Go to next check.

NO: See Attachment Coupler Not Working (Hydraulic)(Group 9020-15) or see Attachment Coupler Not Working (Electrical)(Group 9015A-15).

Hydraulic System Checks

(1) Stabilizer Cylinder and Valve Check

Action:

Operate machine at approximately 1500 rpm.

Item	Measurement	Specification
Stabilizer Cylinder and Valve Check	Approximate Engine Speed	1500 rpm

Position loader bucket above ground.

Lower each stabilizer cylinder and raise rear of machine off ground.

sss:

Do cylinders extend smoothly and hold machine up?

Retract each stabilizer cylinder.

sss:

Do cylinders retract smoothly and remain up?

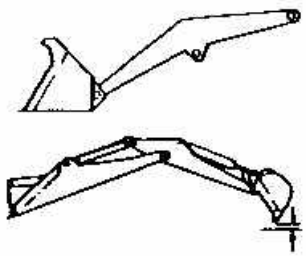
Result:

YES: Go to next check.

NO: Cylinders drift up or down. Perform Stabilizer Valve Lockout Leakage Test . (Group 9025-25)

(2) Backhoe and Loader Function Drift Check

Action:



Backhoe and Loader Function Drift

→NOTE:

Feel backhoe cylinders. Cylinder must be warm to touch (38—52°C [100—125°F]). If cylinders are not warm, heat oil to specifications. See Hydraulic Oil Warm-Up Procedure . (Group 9025-25)

With backhoe fully extended, put backhoe bucket at a 45° angle to ground.

Item	Measurement	Specification
Hydraulic Oil	Temperature	38—52°C (Cylinders warm to touch)
		100—125°F

Lower boom until bucket cutting edge is 50 mm (2.0 in.) off the ground.

Position loader bucket same distance off ground as backhoe bucket.

Run engine at slow idle and observe bucket cutting edge.

Item	Measurement	Specification
Backhoe and Loader Function Drift Check	Engine Speed	Slow idle

SSS:

Do cutting edges touch ground within one minute?

Item	Measurement	Specification
Backhoe and Loader Function	Maximum Drift	50 mm in one minute 2.0 in.

Result:

NO: Go to next check.

YES: Verify which function is drifting. Perform Function Drift Test . (Group 9025-25)

(3) Hydraulic Control Valve Lift Check Test

Action:

→NOTE:

Husco valves have one lift check for both work ports, and therefore only need to be checked in one direction.

Raise loader bucket 1 m (3.0 ft.) off the ground with the bucket level.

Position backhoe at maximum reach with bucket in dump position, 1 m (3.0 ft.) off the ground.

Stop the engine.

Activate each function one at a time.

- Loader boom raise.
- Loader bucket rollback.
- Backhoe boom up.
- Dipperstick extend.
- Backhoe bucket dump.

SSS:

Do functions move when the control lever is activated?

Result:

NO: Go to next check.

YES: Check cylinder leakage. Perform Cylinder Leakage Test . (Group 9025-25)

(4) Loader Boom Float Check

Action:

Put loader bucket at maximum height position with bucket dumped.

Run engine at approximately 1500 rpm.

Item	Measurement	Specification
Loader Boom Float Check	Approximate Engine Speed	1500 rpm

Move the loader control lever forward into boom float detent position, and at the same time into bucket rollback detent position. Remove hand from control lever.

SSS:

Does loader control lever remain in the boom float detent position?

Result:

YES: Go to next check.

NO: If it jumps out of detent, check detent spring and detent balls. Go to repair manual.