310SL HL and 410L Backhoe Loader Repair

(PIN: 1T0310HL_ _F273920—)

(PIN: 1T0410LX_ _F273920—)

REPAIR TECHNICAL MANUAL

310SL HL and 410L Backhoe Loader

TM13300X19 07MAY19 (ENGLISH)

Worldwide Construction And Forestry Division
PRINTED IN U.S.A.

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.

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

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and test sections help to quickly 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.

MM16284,00026ED -19-17SEP18-1/1

Manual Identification—READ THIS FIRST!

IMPORTANT: Use only supporting manuals designated for your specific machine. If incorrect manual is chosen, improper service may occur. Verify product identification number (PIN) when choosing the correct manual.

Choosing the Correct Supporting Manuals

John Deere backhoe loaders are available in different machine configurations based on the various markets into which they are sold. Different supporting manuals exist for different machine configurations.

When necessary, product identification numbers are listed on the front covers of backhoe loader manuals. These numbers are used to identify the correct supporting manual for your machine.

Product Identification Number

The product identification number (PIN) plate (1) is located on left side of machine on the loader frame. Each machine has a 17-character PIN (2) shown on PIN plate.



TX1171862 —UN—17DEC14

PIN Plate Location



TX1171648 —UN—11SEP14

Example of PIN Plate

1— PIN Plate **2— 17-Character PIN**

Continued on next page

The PIN identifies the producing factory, machine model number, machine option, year of manufacture, engine emission level, and machine serial number.

The following is an example for a machine that meets Final Tier 4 and Stage IV emission levels:

17-Character PIN Examples																
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
1	T	0	4	1	0	L	X	_	_	F	1	2	3	4	5	6

- **(1—3) World Code:** Identifies location where machine is manufactured.

1T0 ..... **World Code** (manufacturing location)
1DW ..... Davenport Works
1T8 ..... Thibodaux Works
1T0 ..... Dubuque Works

- **(4—8) Machine Model and Series Identifier:** Identifies model number and series.

410L ..... **Machine Model and Series Identifier**
310SL ..... **Machine Model and Series Identifier**

NOTE: Characters 7—8 identify series and major machine configuration options. These characters will change from one machine to another.

X ..... **Machine Option Code**
X ..... Base Machine

- **(9) Check Letter:** This is a random character assigned by the factory. This is not used in machine identification.

_ ..... **Check Letter** (variable)

- **(10) Manufacturing Year Code:** Identifies year of machine manufacture.

_ ..... **Manufacturing Year Code** (variable)
E 2014
F 2015
G 2016
H 2017

- **(11) Engine Emission Code:** Represents engine emission certification.

F ..... **Engine Emission Code**
C ..... Tier 2 and Stage II
D ..... Tier 3 and Stage III A
E ..... Interim Tier 4 and Stage III B
F ..... Final Tier 4 and Stage IV

- **(12—17) Machine Serial Number:** Identifies machine serial number. This character will change from one machine to another.

123456 ..... **Machine Serial Number**

JG33441,000003A -19-22DEC16-2/2

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Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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Previous Editions
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General Information

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Recognize Safety Information

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.



T133555 —UN—15APR13

T133588 —19—28AUG00

TX,RECOGNIZE -19-28JUN10-1/1

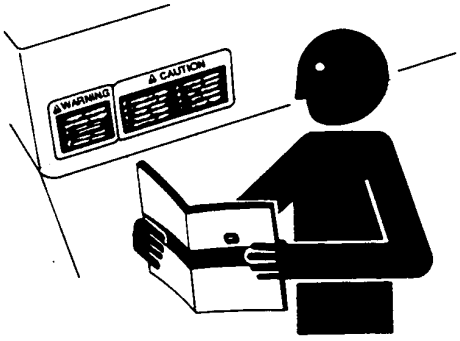
Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Use this operator's manual for correct safety sign placement. Be sure that new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine could impair the function or safety and affect machine life.



TS201 —UN—15APR13

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

TX,FOLLOW -19-20JAN11-1/1

Operate Only If Qualified

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

Operator should be familiar with the job site and 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 every work situation and work site.

TX,QUALIFIED -19-18JAN11-1/1

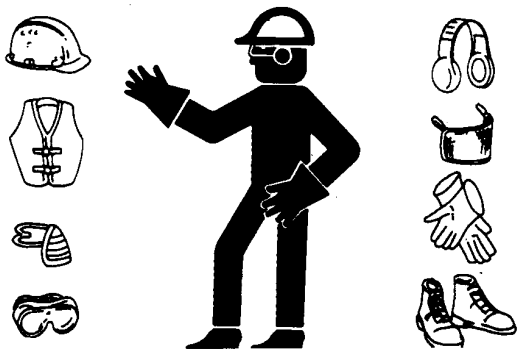
Wear Protective Equipment

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

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

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

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. Radio or music headphones are not suitable to use for hearing protection.



TS206 —UN—15APR13

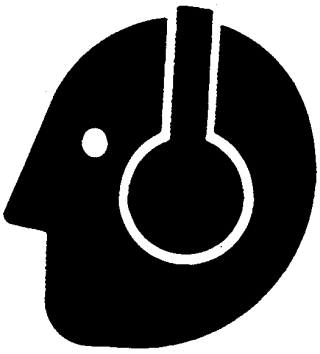
TX,WEAR,PE -19-22SEP10-1/1

Protect Against Noise

There are many variables that affect the sound level range, including machine configuration, condition and maintenance level of the machine, ground surface, operating environmental, duty cycles, ambient noise, and attachments.

Exposure to loud noise can cause impairment or loss of hearing.

Always wear hearing protection. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 —UN—23AUG88

DX,NOISE -19-03OCT17-1/1

Avoid Unauthorized Machine Modifications

John Deere recommends using only genuine John Deere replacement parts to ensure machine performance. Never substitute genuine John Deere parts with alternate parts not intended for the application as these can create hazardous situations or hazardous performance. Non-John Deere parts, or any damage or malfunctions resulting from their use, are not covered by any John Deere warranty.

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. The installer of any modification which may affect the electronic controls of this machine is responsible for establishing that the modification does not adversely affect the machine or its performance.

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.

AM40430,00000A9 -19-01JUL15-1/1

Control Pattern

The control functions are described as they are arranged when the machine leaves the factory. Some control functions can be changed to suit particular operating situations. Ensure that the operator is aware of all of the functions before operating any of the controls.

OUTJ002,00004CA -19-30JUN16-1/1

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.



T6607AQ —UN—15APR13

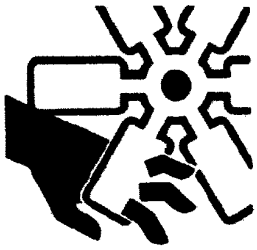
TX,INSPECT -19-08SEP10-1/1

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.



T133592 —UN—15APR13

TX,MOVING,PARTS -19-20JAN11-1/1

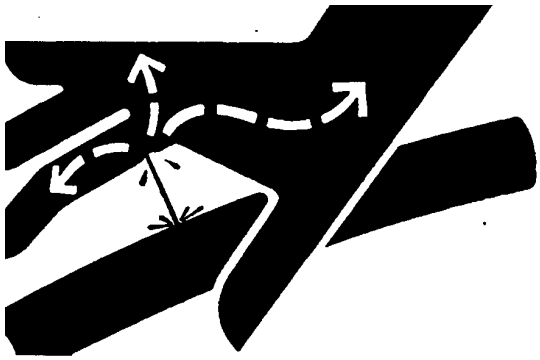
Avoid High-Pressure Fluids

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



X9811 —UN—23AUG88

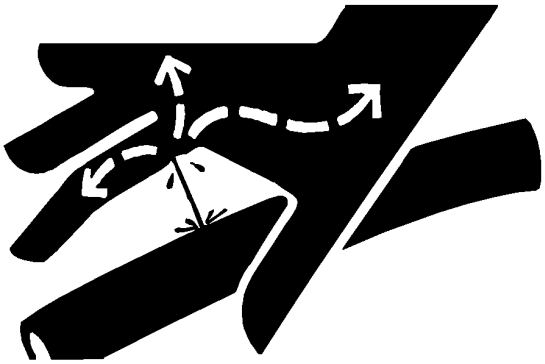
DX,FLUID -19-06OCT16-1/1

Avoid High-Pressure Oils

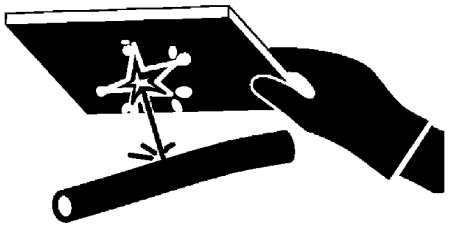
This machine uses a high-pressure hydraulic system. Escaping oil under pressure can penetrate the skin causing serious injury.

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

If hydraulic oil penetrates your skin, see a doctor immediately. Injected oil must be removed surgically within hours or gangrene could result. Contact a knowledgeable medical source or the Deere & Company Medical Department in Moline, Illinois, U.S.A.



T133509 —UN—15APR13



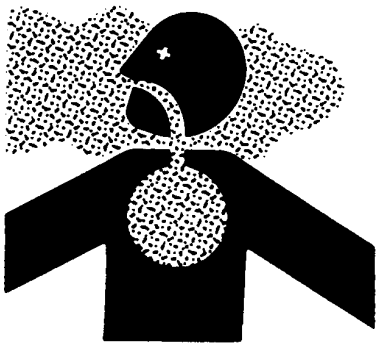
T133840 —UN—20SEP00

TX,HPOILS -19-20JAN11-1/1

Work In Ventilated Area

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area.



TS220 —UN—15APR13

DX,AIR -19-17FEB99-1/1

Avoid Static Electricity Risk When Refueling

The removal of sulfur and other compounds in Ultra-Low Sulfur Diesel (ULSD) fuel decreases its conductivity and increases its ability to store a static charge.

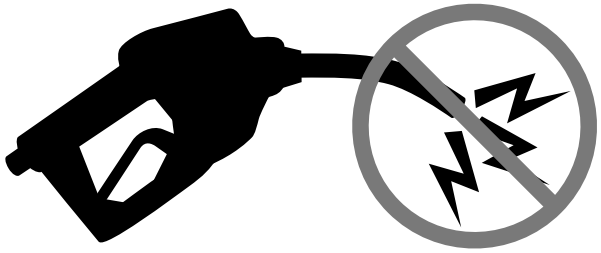
Refineries may have treated the fuel with a static dissipating additive. However, there are many factors that can reduce the effectiveness of the additive over time.

Static charges can build up in ULSD fuel while it is flowing through fuel delivery systems. Static electricity discharge when combustible vapors are present could result in a fire or explosion.

Therefore, it is important to ensure that the entire system used to refuel your machine (fuel supply tank, transfer pump, transfer hose, nozzle, and others) is properly grounded and bonded. Consult with your fuel or fuel system supplier to ensure that the delivery system is in compliance with fueling standards for proper grounding and bonding practices.



RG22142 —UN—17MAR14



RG21992 —UN—21AUG13

DX,FUEL,STATIC,ELEC -19-12JUL13-1/1

High Debris Applications

Many operations create flammable debris such as mulching, shredding, recycling, and agricultural applications. Operating in such environments may require frequent cleaning of the machine and attachments. Frequency of cleaning will vary depending on a number of factors, including operating conditions and weather.



T133552 —UN—15APR13

Flammable Debris

MB60223,0005003 -19-29JUN16-1/1

Prevent Fires

Handle Fluids Safely: All fuels, most lubricants, and some coolant mixtures are flammable. Store flammable fluids away from fire hazards. Never refuel machine while smoking or when near sparks or flame.

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

Maintain Hoses, Tubes, and Wiring: Replace hoses and tubes 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 multipurpose fire extinguisher on or near the machine. Know how to use an extinguisher properly.

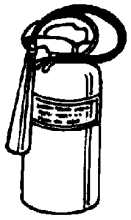
Be Aware of the Operating Environment: Airborne debris may contain sparks or embers. Do not operate near any flame.



T133553 —UN—07SEP00



T133554 —UN—07SEP00



T133552 —UN—15APR13

TX,PREVENT,FIRE -19-09JUN16-1/1

In Case of Machine Fire

⚠ CAUTION: Avoid personal injury from exposed flames. Maintain safe distance.

- Turn the engine off.
- Turn the battery disconnect switch to the OFF position (if equipped).
- If possible, fight the fire using the portable fire extinguisher or other fire suppression equipment (if equipped).
- Ensure that the fire does not spread to the surrounding area. Do not risk injury. If a fire is too far advanced, do not try to extinguish fire.
- Call for help.



In Case of Machine Fire

TS227 —UN—15APR13

CN93077,00000B2 -19-05FEB19-1/1

Prevent Battery Explosions

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

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

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



TS204 —UN—15APR13

DX,SPARKS -19-03MAR93-1/1

Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



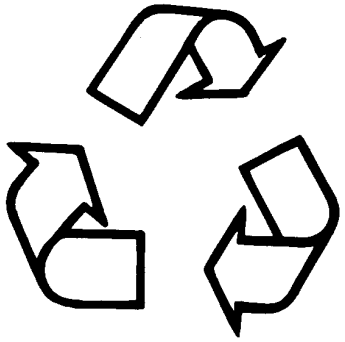
TS1132 —UN—15APR13

DX,MSDS,NA -19-03MAR93-1/1

Decommissioning — Proper Recycling and Disposal of Fluids and Components

Safety and environmental stewardship measures must be taken into account when decommissioning a machine and/or component. These measures include the following:

- Use appropriate tools and personal protective equipment such as clothing, gloves, face shields or glasses, during the removal or handling of objects and materials.
- Follow instructions for specialized components.
- Release stored energy by lowering suspended machine elements, relaxing springs, disconnecting the battery or other electrical power, and releasing pressure in hydraulic components, accumulators, and other similar systems.
- Minimize exposure to components which may have residue from agricultural chemicals, such as fertilizers and pesticides. Handle and dispose of these components appropriately.
- Carefully drain engines, fuel tanks, radiators, hydraulic cylinders, reservoirs, and lines before recycling components. Use leak-proof containers when draining fluids. Do not use food or beverage containers.
- Do not pour waste fluids onto the ground, down a drain, or into any water source.
- Observe all national, state, and local laws, regulations, or ordinances governing the handling or disposal of waste fluids (example: oil, fuel, coolant, brake fluid);



TS1133 —UN—15APR13

filters; batteries; and, other substances or parts. Burning of flammable fluids or components in other than specially designed incinerators may be prohibited by law and could result in exposure to harmful fumes or ashes.
- Service and dispose of air conditioning systems appropriately. Government regulations may require a certified service center to recover and recycle air conditioning refrigerants which could damage the atmosphere if allowed to escape.
- Evaluate recycling options for tires, metal, plastic, glass, rubber, and electronic components which may be recyclable, in part or completely.
- Contact your local environmental or recycling center, or your John Deere dealer for information on the proper way to recycle or dispose of waste.

DX,DRAIN -19-01JUN15-1/1

Exhaust Filter Ash Handling and Disposal

CAUTION: Under federal, state, and local laws or regulations, exhaust filter ash can be classified as a hazardous waste. Hazardous waste must be disposed of in accordance with all applicable federal, state, and local laws or regulations governing hazardous waste disposal. Only a qualified service provider should remove ash from the exhaust filter. Personal protective equipment and clothing, maintained in a sanitary and reliable condition, should be used when handling and cleaning exhaust filter. See your authorized dealer for exhaust filter ash handling and disposal.

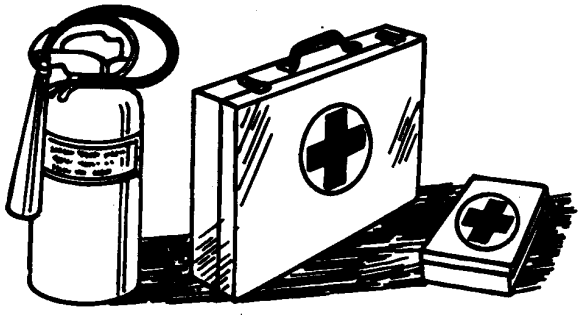
TX,ASH,DISP -19-20JAN11-1/1

Prepare for Emergencies

Be prepared if 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.



TS291 —UN—15APR13

DX,FIRE2 -19-03MAR93-1/1

Click on the image link below for the full version of the service manual

