

4045 PowerTech™ OEM Diesel Engines Below 130kW (174 hp) (Interim Tier 4/Stage III B platform)

COMPONENT TECHNICAL MANUAL

4.5 L OEM Diesel Engines Below 130kW (174 hp) — Interim Tier 4/Stage III B platform

CTM114619 16AUG12 (ENGLISH)

For complete service information also see:

| | |
|------------------------------|-----------|
| OEM Engine Accessories | CTM67 |
| JDPS Master Tool Manual..... | TM111119 |
| Application List..... | CTM106819 |

John Deere Power Systems
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Introduction

Foreword

This repair manual covers the 4045 <130kW PowerTech™ engines for Interim Tier 4/Stage III B platform.

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

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.

Information in this manual is organized in sections and sub divided into groups.

Section 01 covers the safety measures to follow while repairing the engine; engine identification features, engine emission and application details, and information about the fuels, lubricants, and coolants.

Section 02 covers the repair and adjustment procedures.

Section 03 explains the theory of operation of each system.

Section 04 is the diagnostics section that provides troubleshooting procedures to find problems.

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Section 05 covers other materials needed to do the job.

Section 06 details all specifications, wear tolerances, torque values, and contains the wiring diagrams.

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines is metric sized.

Read each block of material completely before performing service to check for differences in procedures or specifications. Follow only the procedures that apply to the component you are working on.

Component Technical Manuals are concise service guides for specific components. Component Technical Manuals are written as stand-alone manuals covering multiple machine applications.

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.

CALIFORNIA PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

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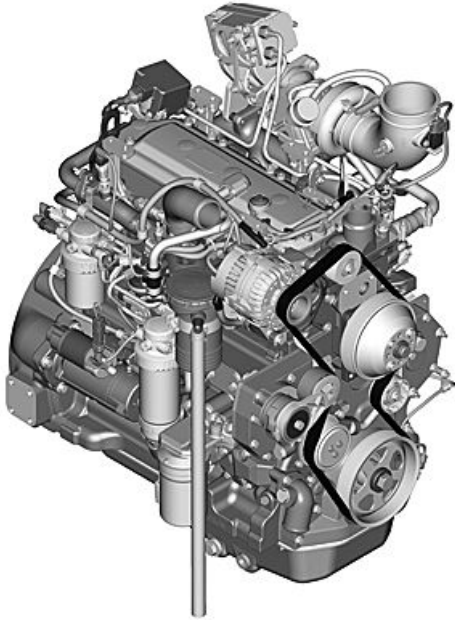
Record of Changes

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| | | New manual | |

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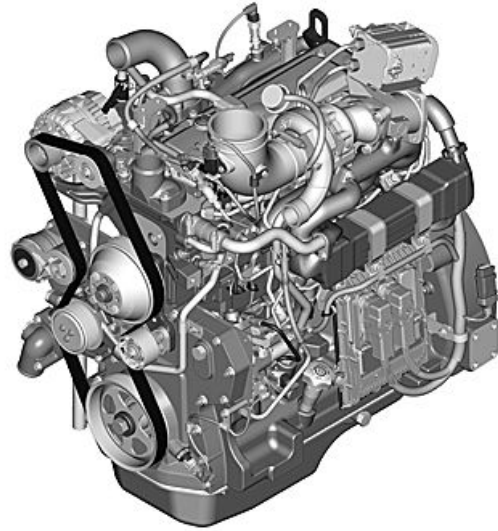
Identification Views

4045 <130kW PowerTech™ PWX Engine—Interim Tier 4/Stage III B



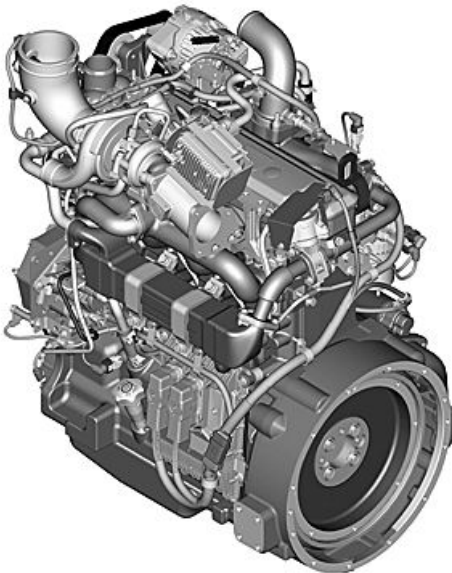
3/4 right front view—4045HFC92 Engine

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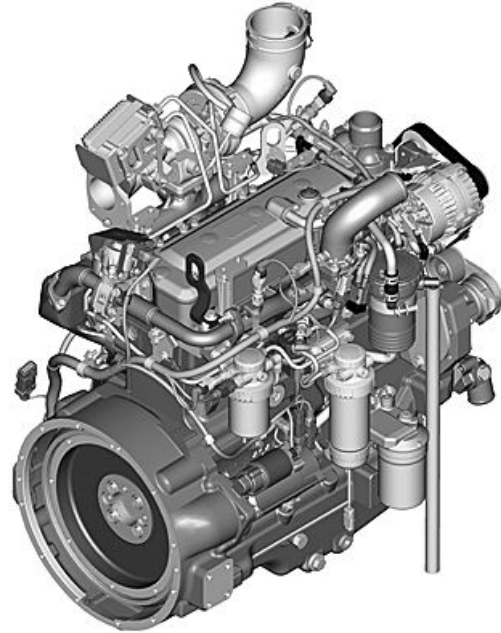
3/4 left front view—4045HFC92 Engine

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3/4 left rear view—4045HFC92 Engine

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3/4 right rear view—4045HFC92 Engine

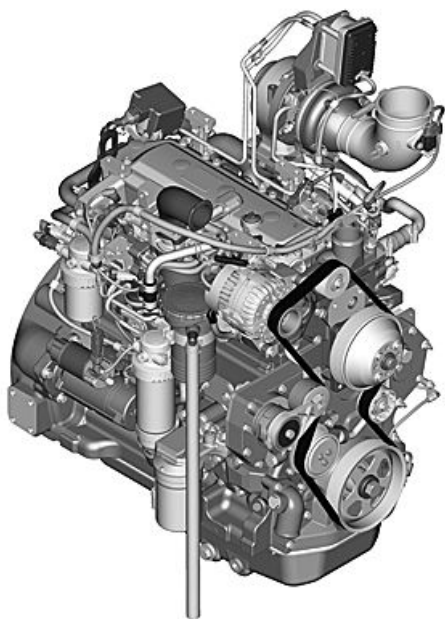
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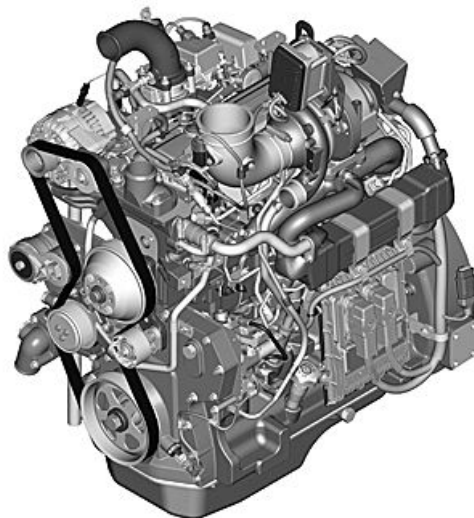
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4045 <130kW PowerTech™ PVX Engine—Interim Tier 4/Stage III B



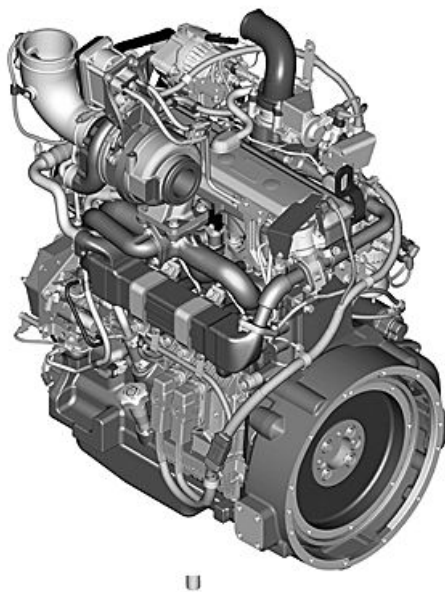
3/4 right front view—4045HFC93 Engine

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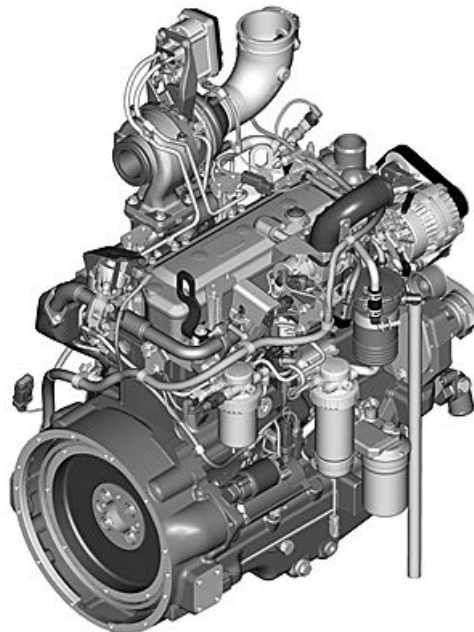
3/4 left front view—4045HFC93 Engine

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3/4 left rear view—4045HFC93 Engine

RG19916 —UN—28JAN11



3/4 right rear view—4045HFC93 Engine

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Related Manuals

Tool Manual

When working through the instructions in this manual, you may require the use of special tools. For a complete listing of John Deere approved essential and dealer fabricated engine tools, please refer to the JDPS Master Tool Manual Technical Manual (TM).

Application List Manual

For more information on which engine manuals should be referred to for a specific machine or engine, please refer to the Application List Manual Component Technical Manual (CTM). This manual provides a listing of machine and engine models, and their appropriate base engine and fuel system manual numbers. For OEM applications, the operators manual number for the engine is also included.

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Training Information

John Deere University offers the following related training for the engine covered in this manual. More

information on each of these courses can be found online on the John Deere University website (example: <https://jdu.deere.com/>).

| Course Title |
|---|
| Service ADVISOR Overview |
| Diesel Engine Systems I |
| Diesel Engine Systems II |
| Electrical Systems I |
| Electrical Systems II |
| Electrical Methods and Techniques |
| Hydraulic – Systems I |
| Hydraulic – Systems II |
| Hydraulic Methods and Techniques |
| Service ADVISOR Methods and Techniques |
| John Deere Custom Performance |
| Engine - Introduction to Tier 3/Stage III A |
| Engine - Introduction to Interim Tier 4/Stage III B |
| Engine - Technical Qualification - PowerTech E and PowerTech Plus 4045 and 6068 / 4.5 L and 6.8 L (Tier 3/Stage III A) |
| Engine - Adjustments and Diagnostics - PowerTech Plus 4045, 6068, and 6090 / 4.5 L, 6.8 L, and 9.0 L (Tier 3/Stage III A) (ILT) |
| Engine - Teardown - PowerTech E and Plus 4045/6068 4.5L/6.8L (Tier 3/Stage III A) |
| Engine - 4.5 L (below 130kW) IT4 Base Engine Overview Qualification |
| Diesel Fuel Fundamentals |
| John Deere Plus 50™ II and COOL-GARD™ II |
| Aftertreatment System Overview |

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**Thanks very much for your reading,
Want to get more information,
Please click here, Then get the complete
manual**

JustClickHere 

NOTE:

**If there is no response to click on the link above,
please download the PDF document first, and then
click on it.**

**Have any questions please write to me:
admin@servicemanualperfect.com**

Definition of Terms

| | |
|-----------------------------------|---|
| Actuator | A device controlled by the ECU to perform a certain function. |
| Analog | Signal which has a continuous range of possible voltages, usually 0 V (low) to 24 V (high). |
| Application | Either a movable or stationary piece of equipment that the engine is placed in. Applications include, Tractors, Harvesters, Loaders, Irrigation Pumps, Generator Sets, and others. |
| BAP | Barometric Air Pressure. Pressure of the atmosphere (atmospheric pressure). |
| Boost | Pressurized air in the intake manifold. |
| CAC | Charge Air Cooler. Cools the compressed air from the turbine before it enters the intake manifold. |
| CAN | Controller Area Network. The network on applications that allows communication between the engine control unit and some components. |
| Circuit Power | Power supplied to a device for use by its internal component circuits. |
| Crankshaft Position Sensor | Used to determine the angular position and velocity of the crankshaft in the 360° field of rotation. |
| Digital | A signal which consists of only two levels of voltage — usually 0 V (low) to 24 V (high). |
| DOC | Diesel Oxidation Catalyst. Part of the exhaust filter or aftertreatment device. Used to help reduce emissions. |
| DPF | Diesel Particulate Filter. Part of the exhaust filter or aftertreatment device. Used to help reduce emissions. |
| DTC | Diagnostic Trouble Code. A code that is stored in ECU memory when it detects a problem in the electronic control system. There are two types of codes: Active and Stored. These codes are displayed on monitor panels and can be recalled by the service tool. |
| ECT | Engine Coolant Temperature. The temperature of the engine coolant. |
| ECU | Engine Control Unit. Computer that controls the fuel, air, and ignition systems on the engine. |
| EGR | Exhaust Gas Recirculation. Used to help reduce emissions. |
| EI | An Electronic Injector that is regulated by the ECU to control the proper amount of fuel on High-Pressure Common-Rail fuel systems. |
| EOL | This is the abbreviation for End of Line which is where the ECU gets programmed at the factory. |
| EUI | An Electronic Unit Injector that is regulated by the ECU to control the proper amount of fuel on non-High-Pressure Common-Rail fuel systems. |
| FMI | Failure Mode Identifier. The second part of a two-part code that identifies control system fault codes according to the J1939 standard. This two-digit code identifies the type of failure that has occurred. The first half of the code is the Suspect Parameter Number (SPN). |
| H-Bridge | Circuits in the ECU set up in an H-configuration. This allows for current to be reversed to drive DC motors forward and reverse. |
| HPCR | High-Pressure Common-Rail. A device that distributes high-pressure fuel to the injectors. |
| Input | This identifies a signal as an input to a device or control unit. |
| J1939 | The Society of Automotive Engineers (SAE) standard for communication between the electronic control units on heavy-duty vehicles, both on- and off-highway. |

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Introduction

| | |
|------------------------------|--|
| JDCP | John Deere Custom Performance Program allows the customer to select software features and feature combinations prior to loading the software into the ECU. It is also one way by which embedded software is managed and updated in control units without removal of the control unit from the machine. |
| JDPS | John Deere Power Systems. |
| MAP | Manifold Air Pressure. The pressure of the air in the intake manifold, sometimes referred to as "boost" pressure. |
| MAT | Manifold Air Temperature. The temperature of the air in the intake manifold. |
| Meter Zero | This is the value the multimeter reads in the ohm position, when the meter lead tips are held together. |
| Mis-pin | An incorrect placement of male pins or female sockets within an electrical connector. Also known as an incorrect swapping of wires and terminals. |
| OOR | Out-of-Range. The signal received by the ECU is out of the expected range of the device. |
| OORH | Out-of-Range High. Signal sensed by the ECU is higher than the component can produce (outside of acceptable limit). For some circuit types, this could be caused by an open input wire, an open ground wire, or an input wire shorted to a voltage higher than the ECU expects (+ battery). |
| OORL | Out-of-Range Low. Signal sensed by the ECU is lower than the component can produce (outside of acceptable limits). For some circuit types, this could be caused by an input wire or circuit power wire shorted to ground. |
| Output | This identifies a signal as an output from a device or control unit. |
| Pin | A style of terminal that makes the electrical connection to a connector. Also called a male terminal. |
| PWM | Pulse Width Modulation. A digital electronic signal of a fixed frequency. The on-time of the signal is increased or decreased (modulated) to indicate a change in condition. |
| RAM | Random Access Memory. The portion of the computer memory within the ECU that is used when the ECU is running. All data in this memory is lost when the ECU is "OFF". |
| Socket | A style of terminal that makes the electrical connection to a connector. Also called a female terminal or receptacle. |
| Suction Control Valve | Suction Control Valve regulates the amount of fuel that the high-pressure fuel pump supplies the HPCR. |
| SDS | Software Delivery System. Used by JDPS to maintain software and programming records. |
| Sensor | Device used by the ECU to monitor various engine parameters. |
| SPN | Suspect Parameter Number. The first half of a two-part code that identifies control system fault codes according to the J1939 Standard. The SPN identifies the system or component that has the failure. The second half of the code is the Failure Mode Identifier (FMI). |
| TDC | Top Dead Center. Point of uppermost piston travel. |
| Throttle Rate | How quickly the ECU changes the engine fuel rate in response to a throttle signal. Acceleration and deceleration rates are adjustable. Availability of throttle rates may vary, depending on engine model. |
| Trim Options | Options that can be enabled or disabled in the ECU programming, such as throttle selection, torque adjustment, governor gains, derates, and shutdowns, and others. |
| TWV | Two-Way Valve. A component in the Electronic Injector (EI). |
| VGT | Variable Geometry Turbo. Used to reduce emissions. |
| WIF | Water-In-Fuel. The WIF sensor sends a signal to the ECU when water is detected in the fuel. |

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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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Section 01 General Information

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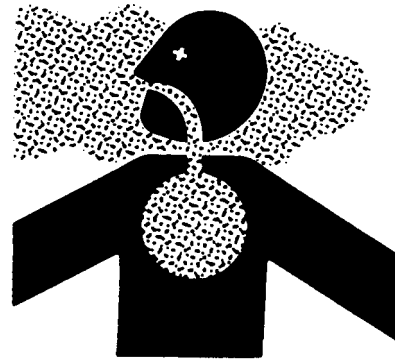
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Avoid Harmful Asbestos Dust

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.



Keep bystanders away from the area.

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Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.



DX,TORCH -19-10DEC04-1/1

TS953 —UN—15MAY90

Avoid High-Pressure Fluids

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

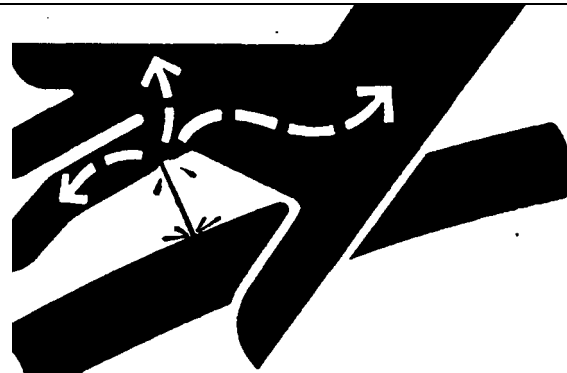
Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

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 in English from Deere & Company Medical Department in Moline, Illinois, U.S.A., by calling 1-800-822-8262 or +1 309-748-5636.

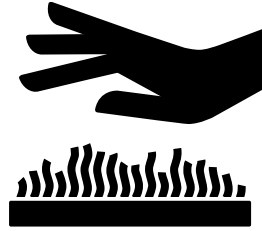
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Avoid Hot Exhaust

Servicing machine or attachments with engine running can result in serious personal injury. Avoid exposure and skin contact with hot exhaust gases and components.

Exhaust parts and streams become very hot during operation. Exhaust gases and components reach temperatures hot enough to burn people, ignite, or melt common materials.



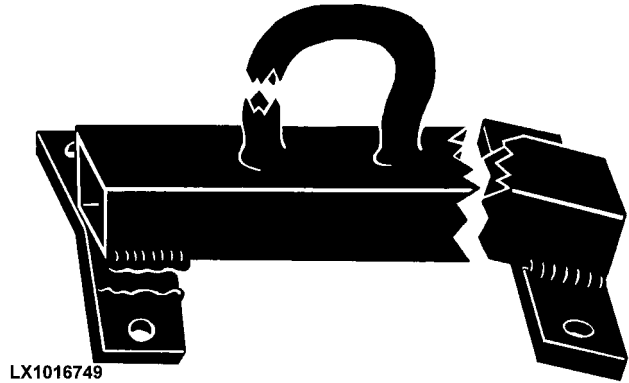
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Construct Dealer-Made Tools Safely

Faulty or broken tools can result in serious injury. When constructing tools, use proper, quality materials, and good workmanship.

Do not weld tools unless you have the proper equipment and experience to perform the job.



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Dispose of Waste Properly

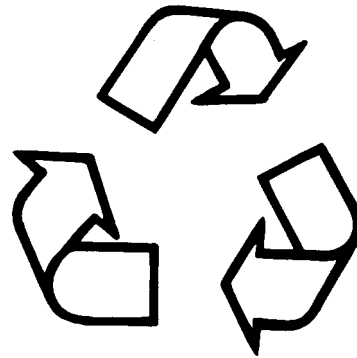
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



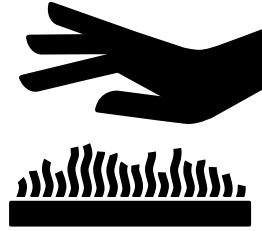
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DX,DRAIN -19-03MAR93-1/1

Exhaust Filter Cleaning

Servicing machine or attachments during exhaust filter cleaning can result in serious personal injury. Avoid exposure and skin contact with hot exhaust gases and components.

During auto or manual/stationary exhaust filter cleaning operations, the engine will run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components reach temperatures hot enough to burn people, or ignite, or melt common materials.



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DX,FILTER -19-20JAN10-1/1

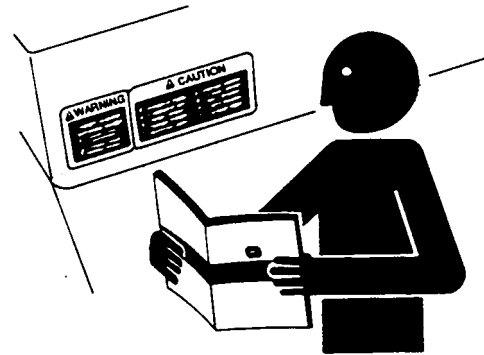
Follow Safety Instructions

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. Be sure 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 may impair the function and/or safety and affect machine life.



T5201—UN—23AUG88

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

DX,READ -19-16JUN09-1/1

Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
 - Chemicals labeled '**Danger**': Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
 - Chemicals labeled '**Warning**': Less toxic. Generally require use of goggles, gloves, and skin protections.
 - Chemicals labeled '**Caution**': Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling vapor, aerosol or dust.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.



A34471

- Store chemicals in a secure, locked area away from human or livestock food. Keep children away.
- Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.

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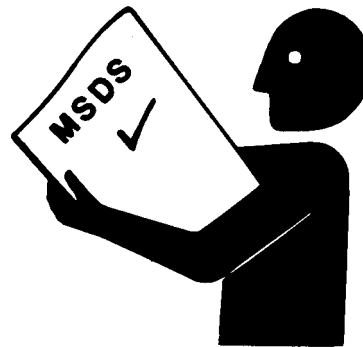
Handle Chemical Products Safely

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.)



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

TS1132—UN—26NOV90

Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227—UN—23AUG88

DX,FLAME -19-29SEP98-1/1

Handle Fuel Safely—Avoid Fires

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.

Use only an approved fuel container for transporting flammable liquids.

Never fill fuel container in pickup truck with plastic bed liner. Always place fuel container on ground before refueling. Touch fuel container with fuel dispenser nozzle before removing can lid. Keep fuel dispenser nozzle in contact with fuel container inlet when filling.



TS202—UN—23AUG88

Do not store fuel container where there is an open flame, spark, or pilot light such as within a water heater or other appliance.

DX,FIRE1 -19-12OCT11-1/1

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.



TS1356—UN—18MAR92

DX,FIRE3 -19-16APR92-1/1

Handling Batteries Safely

Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

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

Always remove grounded (-) battery clamp first and replace grounded clamp last.

Sulfuric acid in battery electrolyte is poisonous and strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid hazards by:

- Filling batteries in a well-ventilated area
- Wearing eye protection and rubber gloves
- Avoiding use of air pressure to clean batteries
- Avoiding breathing fumes when electrolyte is added
- Avoiding spilling or dripping electrolyte
- Using correct battery booster or charger procedure.

If acid is spilled on skin or in eyes:

1. Flush skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush eyes with water for 15—30 minutes. Get medical attention immediately.

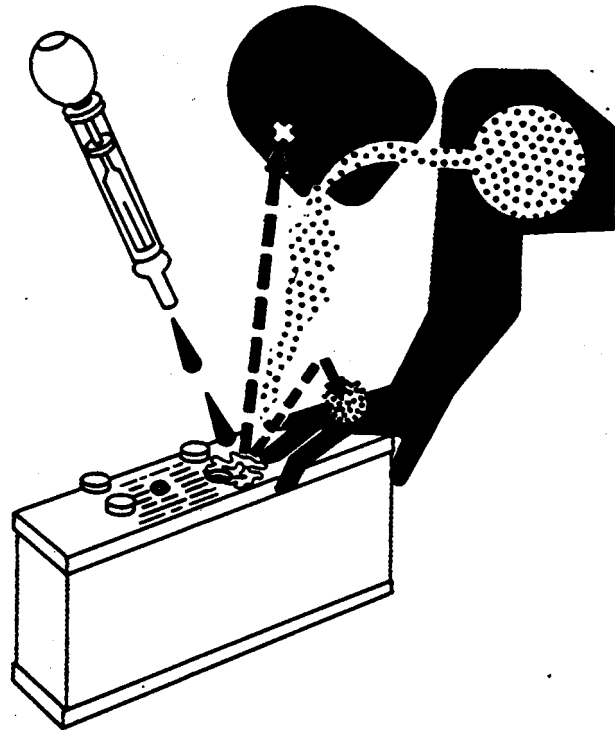
If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 qt.).
3. Get medical attention immediately.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**



TS204—UN—23AUG88

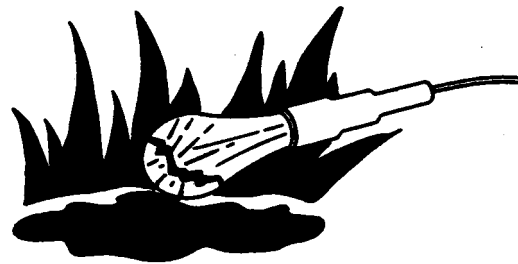


TS203—UN—23AUG88

DX,WW,BATTERIES -19-02DEC10-1/1

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



TS223—UN—23AUG88

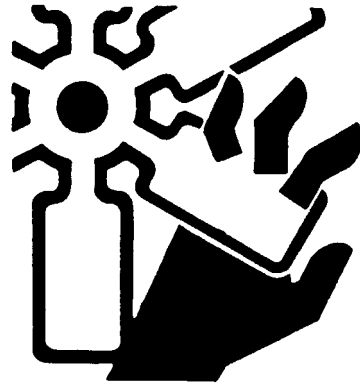
DX,LIGHT -19-04JUN90-1/1

Install All Guards

Rotating cooling system fans, belts, pulleys, and drives can cause serious injury.

Keep all guards in place at all times during engine operation.

Wear close-fitting clothes. Stop the engine and be sure fans, belts, pulleys, and drives are stopped before making adjustments, connections, or cleaning near fans and their drive components.



TS677 —UN—21SEP89

DX, GUARDS -19-18AUG09-1/1

Live With Safety

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



TS231 —19—07OCT88

DX, LIVE -19-25SEP92-1/1

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



TS218 —UN—23AUG88

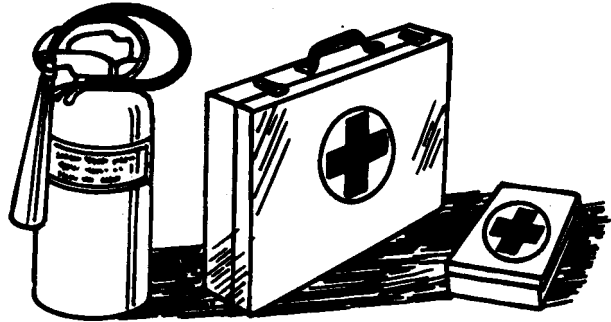
DX,SERV -19-17FEB99-1/1

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—23AUG88

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

Prevent Acid Burns

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

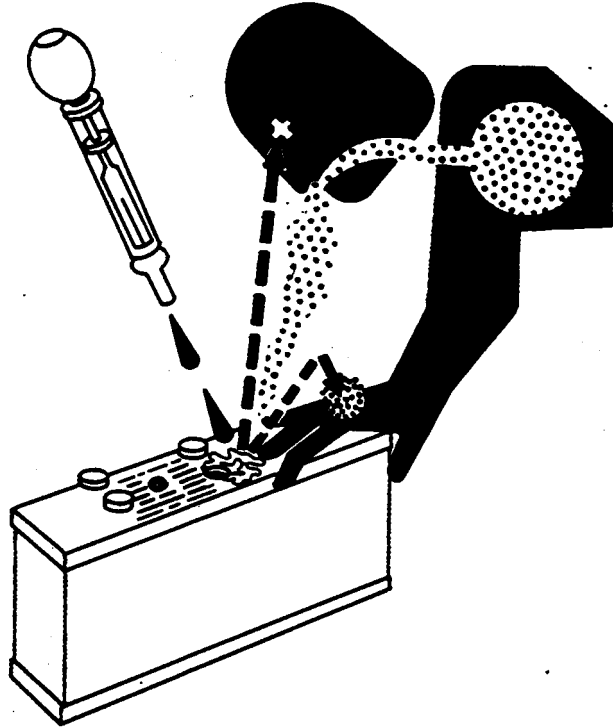
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 —UN—23AUG88

DX,POISON -19-21APR93-1/1

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—23AUG88

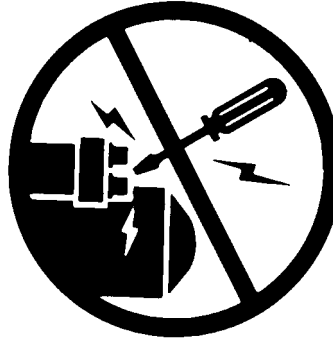
DX,SPARKS -19-03MAR93-1/1

Prevent Machine Runaway

Avoid possible injury or death from machinery runaway.

Do not start engine by shorting across starter terminals. Machine will start in gear if normal circuitry is bypassed.

NEVER start engine while standing on ground. Start engine only from operator's seat, with transmission in neutral or park.



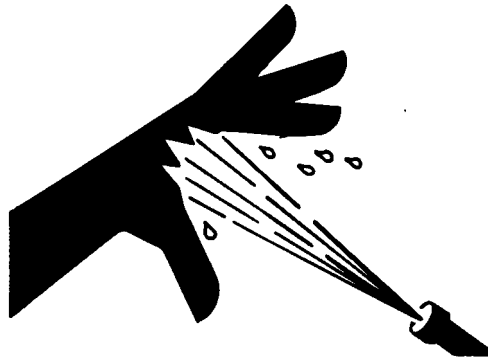
TS177 —UN—11JAN89

DX,BYPAS1 -19-29SEP98-1/1

Protect Against High Pressure Spray

Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.

If an accident occurs, see a doctor immediately. Any high pressure spray 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.



TS1343 —UN—18MAR92

DX,SPRAY -19-16APR92-1/1

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.

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



TS207 —UN—23AUG88

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