2.9 L OEM Diesel Engines (PowerTech)

JOHN DEERE

OPERATOR'S MANUAL

PowerTech 2.9 L OEM Diesel Engines

OMRG27897 ISSUE 14OCT25 (ENGLISH)

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.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

John Deere Power Systems

Worldwide Edition

PRINTED IN U.S.A.

Introduction

Foreword

READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may also be available in other languages. See www.techpubs.deere.com (Ag&Turf/JDPS), www.johndeeretechinfo.com (C&F), or your John Deere dealer to order.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your machine and should remain with the machine when you sell it.

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction of forward travel.

WRITE PRODUCT IDENTIFICATION NUMBERS (PIN) in the Specification or Machine Numbers section. Accurately record all the numbers to help in tracing the machine should it be stolen. PIN information is helpful when ordering parts. File the identification numbers in a secure place off the machine.

WARRANTY is provided as part of John Deere's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate or statement which you should have received at time of purchase.

This warranty provides you the assurance that John Deere will back its products where defects appear within the warranty period. In some circumstances, John Deere also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied. Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

If you are not the original owner of this machine, it is in your interest to contact your local John Deere dealer to inform them of this unit's serial number. This will help John Deere notify you of any issues or product improvements.

DX,IFC1 -19-03APR09-1/1

John Deere Is at Your Service

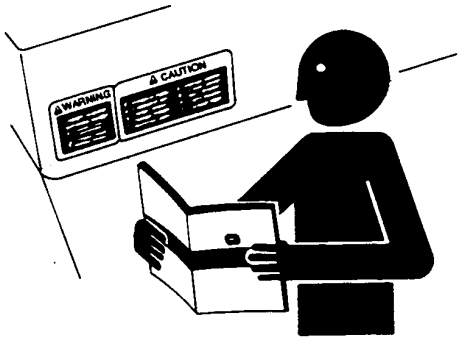
Customer satisfaction is important to John Deere.

Our dealers strive to provide you with prompt, efficient parts, and service:

• Maintenance and service parts to support your equipment.

• Trained service technicians and the necessary diagnostic and repair tools to service your equipment.

• John Deere replacement parts, repair services, and information for maintenance or repair are available. For more information, please visit deere.com or deere.ca.



TS201 —UN—15APR13

DX,IFC,JDS -19-30SEP25-1/1

Required Emission-Related Information

Service Provider

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems with original or equivalent replacement parts. However, warranty, recall, and all other services paid for by John Deere must be performed at an authorized John Deere service center.

DX,EMISSIONS,REQINFO -19-08DEC23-1/1

Emissions Performance and Tampering

Operation and Maintenance

The engine, including the emissions control system, shall be operated, used, and maintained in accordance with the instructions provided in this manual to maintain the emissions performance of the engine within the requirements applicable to the engine's category/certification.

Tampering

No deliberate tampering with or misuse of the engine emissions control system shall take place; in particular with regard to deactivating or not maintaining an exhaust gas recirculation (EGR) or a DEF dosing system. Tampering with an engine’s emissions control system voids the European Union (EU) or other country’s applicable type approval, certification, and emissions-related warranties.

DX,EMISSIONS,PERFORM -19-23DEC21-1/1

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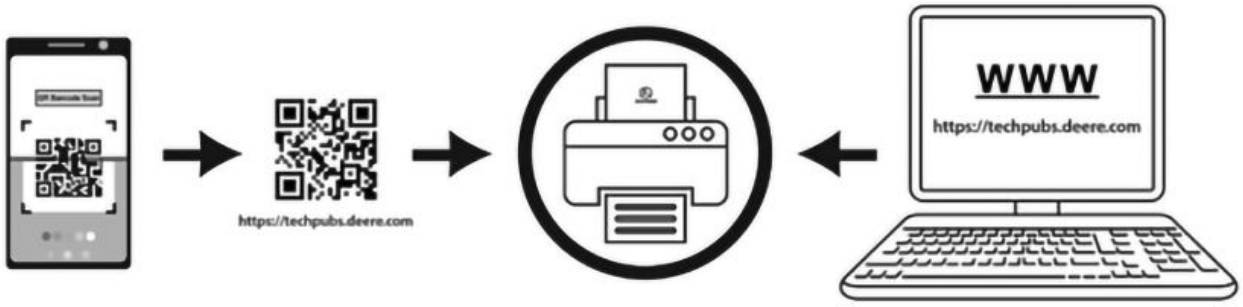

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RG38138 —UN—21FEB24

DX,DOWNLOADINSTRUCTIONS,AT -19-02APR24-1/1

OEM Engine and Drivetrain Warranty Registration

RG37914 —UN—11DEC23

Scan this code to register your OEM engine or drivetrain product online. You can also visit us directly at John Deere Warranty Registration.

Why registering your OEM engine or drivetrain product is a really smart idea:

- **Get faster service.** Registering your engine or drivetrain product gives us the information we need to meet your service needs promptly and completely.
- **Protect your investment.** You'll be kept up-to-date on engine or drivetrain product updates.
- **Extend your warranty.** You'll be given the option to extend your coverage before your standard warranty term expires.
- **Stay informed.** Be the first to know about new products and money-saving offers from John Deere.

You're Covered

When you buy a John Deere engine or drivetrain product you aren't just buying pistons and crankshafts and gear drives. You're buying the ability to get work done. Without downtime, without worries, and without hassles. And you're buying the assurance that if you do need help, a strong support network will be there — ready to step in.

Confidence. That's what John Deere engines, John Deere drivetrains, and John Deere Warranties are all about.

Long durations. Warranties designed to give you confidence in your engine or drivetrain product.

Worldwide support. Get service when and where you need it. John Deere has 4,000+ service locations worldwide.

Genuine John Deere parts and service. Authorized service outlets will use only new or remanufactured parts or components furnished by John Deere.

Warranty Duration

Equipment operators can't afford downtime or unexpected repairs. That's why we offer comprehensive warranties on our OEM industrial engines, marine engines, and drivetrain products.

- **OEM Engines:** 2-year/2,000-hour warranty, with unlimited hours in the first year.
- **Drivetrain Products:** 12-month/2000-hour warranty. In the absence of a functional hour meter, hours of use will be determined on the basis of 12 hours of use per calendar day.

These warranties take effect the date the engine or drivetrain product is delivered to the first retail purchaser. Be sure to register your engine or drivetrain product and take full advantage of the John Deere service and support network.

In addition, engine extended warranties are available under certain conditions. John Deere offers a variety of purchased warranties to extend the warranty period for your engine. You'll be given the option to extend your coverage before your standard warranty term expires.

Obtaining Warranty Service

Warranty service must be requested through an authorized John Deere service outlet before the expiration of the warranty. Evidence of the engine's or drivetrain product's delivery date to the first retail purchaser must be presented when requesting warranty service. Authorized service outlets include:

- John Deere distributor
- John Deere OEM service dealer
- John Deere equipment dealer
- John Deere marine dealer

Worldwide Support Network

Visit Global Dealer Locatorto find the authorized engine or drivetrain service location nearest you. For complete warranty details visit https://www.deere.com/en/parts-and-service/warranty-and-protection-plans/warranties/warranty-statements or https://www.deere.ca/en/parts-and-service/warranty-and-protection-plans/warranties/warranty-statementsto view, download, or print the warranty statement for your engine or drivetrain product.

RG,OEMWarranty,EngineOM -19-12MAY25-1/1

Engine Owner

John Deere Engine Owner:

Don't wait until you need warranty or other service to meet your local John Deere Engine Distributor or Service Dealer. To register your engine for warranty via the Internet, use the following URL: http://www.johndeere.com/enginewarranty

Learn who he is and where he is. At your first convenience, go meet him. He'll want to get to know you and to learn what your needs might be.

Aux Utilisateurs De Moteurs John Deere:

N'attendez pas d'être obligé d'avoir recours à votre concessionnaire John Deere ou au point de service le plus proche pour vous adresser à lui. Pour enregistrer votre moteur pour la garantie via Internet, utilisez l'adresse suivante: http://www.johndeere.com/enginewarranty

Renseignez-vous dès que possible pour l'identifier et le localiser. A la première occasion, prenez contact avec lui et faites-vous connaître. Il sera lui aussi heureux de faire votre connaissance et de vous proposer ses services le moment venu.

An Den Besitzer Des John Deere Motors:

Warten Sie nicht auf einen evt. Reparaturfall, um den nächstgelegenen John Deere Händler kennen zu lernen. Zur Registrierung Ihres Motors für die Garantie dient folgende Internet-Adresse: http://www.johndeere.com/enginewarranty

Machen Sie sich bei ihm bekannt und nutzen Sie sein "Service Angebot".

Proprietario del motore John Deere:

Non aspetti fino al momento di far valere la garanzia o di chiedere assistenza per fare la conoscenza del distributore dei motori John Deere o del concessionario che fornisce l'assistenza tecnica. Per registrare via Internet la garanzia del suo motore, si collegi al seguente sito URL: http://www.johndeere.com/enginewarranty

Lo identifichi e si informi sulla sua ubicazione. Alla prima occasione utile lo contatti. Egli desidera fare la sua conoscenza e capire quali potrebbero essere le sue necessità.

Propietario De Equipo John Deere:

No espere hasta necesitar servicio de garantía o de otro tipo para conocer a su Distribuidor de Motores John Deere o al Concesionario de Servicio. Registre su motor para la garantía en la siguiente dirección de internet: http://www.johndeere.com/enginewarranty

Aprenda quién es su distribuidor y donde él está situado. Cuando tenga un momento, vaya a visitarlo. A él le gustará conocerlo, y saber cuáles podrían ser sus necesidades.

Till ägare av John Deere motorer:

Ta reda på vem din återförsäljare är och besök honom så snart tillfälle ges. Vänta inte tills det är dags för service eller eventuellt garantiarbete. Din motor garantiregistrerar Du via Internet på http://www.johndeere.com/enginewarranty

Din återförsäljare vill mycket gärna träffa dig för att lära känna dina behov och hur bäst han kan hjälpa dig.

OURGP11,0000251 -19-18SEP07-1/1

Additional Information

THIS MANUAL CONTAINS INFORMATION to operate and service Tier III, Tier II, Tier I, and Non-Certified 2.9 L OEM emission-certifed engines.

NOTE: Most recent 3029 engines are now built with metric harware (screws, bolts, threads...).

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Identification Views

NOTE: There are multiple engine configurations.
Base engine models shown.

RG9173 —UN—29NOV00

John Deere 3029 Base Engine

RG9172 —UN—29NOV00

John Deere 3029 Base Engine

RG,RG34710,4501 -19-25JUN21-1/2

RG9175 —UN—29NOV00

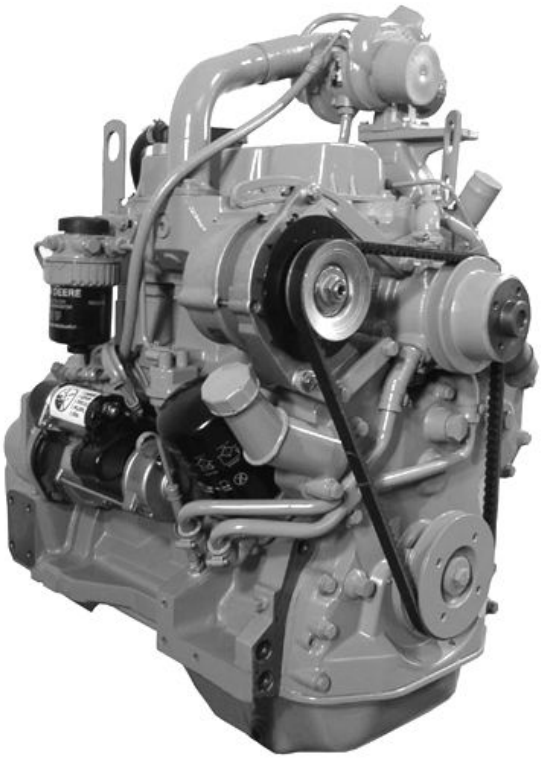
John Deere 3029 Base Engine

RG9174 —UN—29NOV00

John Deere 3029 Base Engine

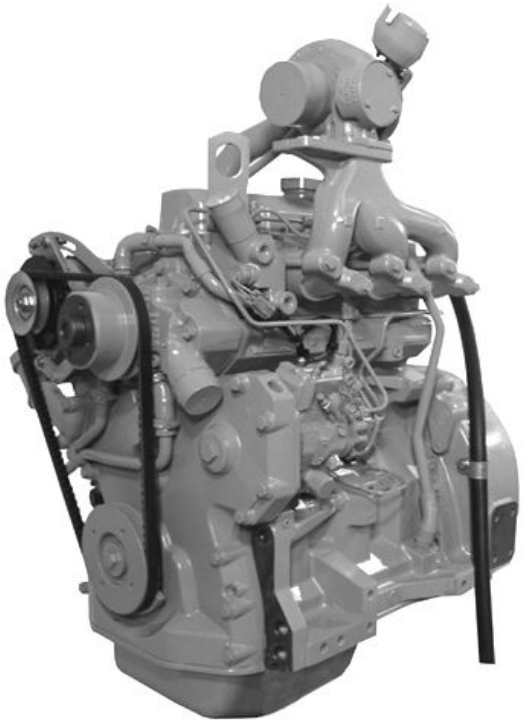
RG,RG34710,4501 -19-25JUN21-2/2

Identification Views—Tier II Emission Certified Engines



RG12834 —UN—05MAR03

3029TF270 Right Front View



RG12835 —UN—05MAR03

3029TF270 Left Front View

OUOD005,00001D6 -19-14FEB03-1/1

Contents

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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.

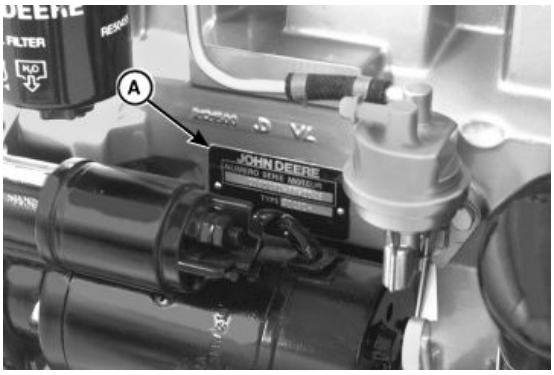
Engine Serial Number Plate

Each engine has a 13-digit John Deere engine serial number. The first two digits identify the factory that produced the engine:

- “CD” indicates the engine was built in Saran, France
- “PE” indicates the engine was built in Torreon, Mexico

Your engine's serial number plate (A) is located on the right-hand side of cylinder block near the starter motor.

A—Serial Number Plate



RG11522 —UN—01DEC00

Engine Serial Number Plate Location

RG,RG34710,5002 -19-30JAN98-1/1

Record Engine Serial and Model Number

Locate and record all of the numbers and letters for engine serial number (A) and model number (B) found on the engine serial number data plate in the spaces provided below.

These two numbers are important for repair parts or warranty information.

For identification of publications specific to engine model refer to the PowerAssist App or John Deere Technical Information Store.

Engine Serial Number (A)

_____

Engine Model Number (B)

_____

RG24249 —UN—18SEP13

Engine Serial Number/Application Data Plate

RG33180 —UN—18NOV20

https://techpubs.deere.com/

A—Engine Serial Number **B—Engine Model Number**

Record Engine Serial Number

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, and a six digit sequential number.

NOTE: Examples below are for reference only. Engine being viewed may be different than example.

RG	6135	U	123456
Manufacturing Factory	**Number of Cylinders and Total Displacement**	**Emissions Certification**	**Engine Serial Number**
CD = Saran, France	6180 = 6 cylinders, 18.0 liters	A, B, D, H, T = Non-emissions regulated	
JX = Rosario	6136 = 6 cylinders, 13.6 liters	A, B, E, F, H, T = Tier 1/Stage I	
RG = Waterloo, IA	6135 = 6 cylinders, 13.5 liters	D, G, H, J, K, T = Tier 2/Stage II	
PE = Torreón, Mexico	6090 = 6 cylinders, 9.0 liters	L, M, N, P = Tier 3/Stage III A	
PY = Pune, India	6068 = 6 cylinders, 6.8 liters	R, U, V, W, X, Y, Z = Interim Tier 4/Stage III B and Final Tier 4/Stage IV/Stage V	
	4045 = 4 cylinders, 4.5 liters		
	3029 = 3 cylinders, 2.9 liters		

Engine Serial Number (RG6135U123456)

Record Engine Model Number (Option A)

6	135	H	F	C	09
Number of Cylinders	**Displacement in Liters**	**Air Intake System**	**User Type**	**Application Type**	**Emissions Certification**
3	2.9	A = Turbocharged and aftercooled, air-to-water	F = OEM (John Deere Power Systems)	C = Industrial	120, 160, 220, 425 = Non-emissions regulated
4	4.5	D = Naturally Aspirated		G = Genset	001, 150, 180, 250 = Tier 1/Stage I
6	6.8	H = Turbocharged and aftercooled, air-to-air		M = Marine	270, 275, 070, 475 = Tier 2/Stage II
	9.0	T = Turbocharged			280, 285, 485 = Tier 3/Stage III A

Continued on next page

RG,SERIALPLATE,ENGINEOM -19-01JUN23-1/3

	13.5				281, 295, 92, 93, 94, 95 = Interim Tier4/Stage III B
					96, 97, 98, 99 = Final Tier 4/Stage IV/Stage V
					New Designation
					04 = EWX
					05 = PWL
					06 = PVL
					07 = PSL
					08 = PVS
					09 = PSS

Engine Model Number (6135HFC09)

Record Engine Model Number (Option B)

6	135	C	I	4	4	0
Number of Cylinders	**Displacement in Liters**	**Aspiration**	**Application Type**	**Emissions Level**	**Aftertreatment/Core Technology**	**Incrementation**
3	029 = 2.9	A = Air-to-coolant cooled	**Configurable**	0 = Tier 0 or equivelant	**Aftertreatment**	0 = Parent
4	040 = 3.9	C = Compound (Series)	I = Industrial	1 = Tier 1 or equivelant	0 = No ATD Mechanical	1—9 = Incremental assignation in case of significant change
6	045 = 4.5	D = Naturally aspirated	G = Generator Drive	2 = Tier 2 or equivelant	1 = No ATD Electrical	
	068 = 6.8	H = Air-to-air cooled	M = Marine	3 = Tier 3 or equivelant	**≥Interim Tier 4**	
	090 = 9.0	T = Turbocharged	P = Gen Set Power Unit	4 = Tier 4 or equivelant	2 = Single fluid no particulate filter	
	135 = 13.5	S = Air-to-sea water cooled	V = Variable Speed Power Unit	5 = Stage V	3 = Single fluid with particulate filter	
	136 = 13.6				4 = Dual fluid no particulate filter	
	180 = 18.0				5 = Dual fluid with particulate filter	
					Core Technology	
					0 = Mechanical	
					1 = Electrical 2V. Fixed turbocharger	
					2 = Electrical 2V. WG or VGT	
					≤Tier 4	
					3 = Electrical 4V. Fixed turbocharger	
					4 = Electrical 4V. WG or VGT	
					5 = Electrical 2V w/EGR. Fixed turbocharger	

Continued on next page

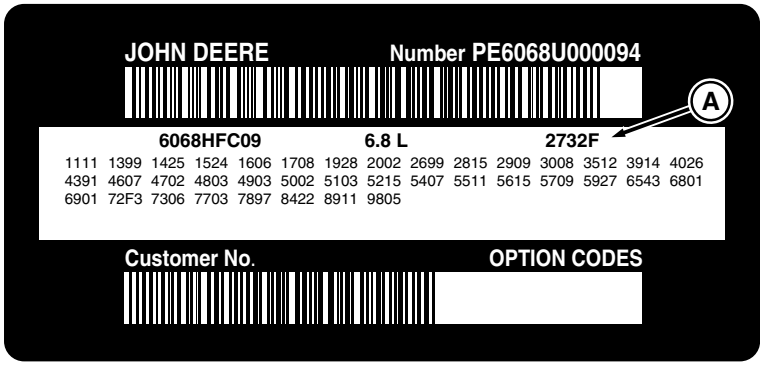
RG,SERIALPLATE,ENGINEOM -19-01JUN23-2/3

					6 = Electrical 2V w/EGR. WG or VGT	
					7 = Electrical 4V w/EGR. Fixed turbocharger	
					8 = Electrical 4V w/EGR. WG or VGT	

Engine Model Number (6135CI440)

RG,SERIALPLATE,ENGINEOM -19-01JUN23-3/3

Engine Option Codes



RG24026 —UN—05AUG13

Option Code Label Example

A—Engine Base Code (example)

OEM engines have an engine option code label affixed to the rocker arm cover. These codes indicate which of the engine options were installed on your engine at the factory. When in need of parts or service, furnish the local John Deere dealer, engine distributor, or other service provider with these numbers.

The engine option code label includes an engine base code (A). This base code must also be recorded along with the option codes. At times it will be necessary to furnish this base code to differentiate two identical option codes for the same engine model.

The first two digits of each code identify a specific group, such as alternators. The last two digits of each code identify one specific option provided on your engine, such as a 24 volt, 120 amp alternator.

If an engine is ordered without a particular component, the last two digits of that functional group option code will be 99, 00, or XX. The following list shows only the first two digits of the code numbers. For future reference such as ordering repair parts, it is important to have these code numbers available. To ensure this availability, enter the third and fourth digits shown on your engine option code label in the spaces provided on the following page.

An additional option code label may also be delivered (in a plastic bag attached to the engine or inserted in the machine documentation). It is recommended to place this label either on this page of the operator's manual or in the Engine Owner's Warranty booklet under Option Codes.

The machine manufacturer may have placed the label in a specific accessible area (inside the enclosure or close to a maintenance area).

The engine option code label may not contain all option codes if an option has been added after the engine left the producing factory.

If option code label is lost or destroyed, contact the local John Deere dealer, engine distributor, or other service provider selling the engine for a replacement.

Record your engine Base Code (A) in the spaces provided below for easy reference.

Engine Base Code (A):

_____

Option Codes	Description	Option Codes	Description
10_____	Paint Protection	56_____	Paint
11_____	Rocker Arm Cover	57_____	Water Pump Inlet
12_____	Oil Filler	58_____	Power Take Off
13_____	Crankshaft Pulley	59_____	Oil Cooler/Oil Filter
14_____	Flywheel Housing	60_____	Add-On Fan Drive Pulley
15_____	Flywheel	61_____	After Treatment Device/Muffler
16_____	Fuel Injection System	62_____	Alternator Mounting
17_____	Air Inlet	63_____	Low-Pressure Fuel Lines
18_____	Air Cleaner	64_____	Exhaust Elbow
19_____	Oil Pan	65_____	Turbocharger
20_____	Water Pump	66_____	Temperature Switch

Continued on next page

RG,RG34710,5004 -19-12MAY25-1/2

Option Codes	Description	Option Codes	Description
21_____	Thermostat Cover	67_____	Engine Sensors
22_____	Thermostat	68_____	Damper
23_____	Fan Drive	69_____	Engine Serial Number Plate
24_____	Fan Belt	70_____	Decomposition Tube (OEM)
25_____	Fan	71_____	SCR (OEM)
26_____	Block Heater	72_____	Performance Software and Labels
27_____	Radiator/Heat Exchanger	7A_____	Performance Software and Labels
28_____	Exhaust Manifold	73_____	After Treatment Dosing System
29_____	Ventilator System	74_____	Air Conditioning
30_____	Starting Motor	75_____	Restriction Indicator
31_____	Alternator	76_____	Oil Pressure Switch
32_____	DEF Lines, Pressure (OEM)	77_____	Timing Gear Cover (S450/S650)
33_____	DEF Lines, Supply/Return to Tank (OEM)	78_____	Air Compressor
34_____	DEF Tank and Header (OEM)	79_____	Certification
35_____	Final Fuel Filter	80_____	Sea Water Pump (Marine)
36_____	Front Plate and Idler Shafts	81_____	Primary Fuel Filter/Water Separator
37_____	Fuel Transfer Pump	82_____	Ignition System (Natural Gas)
38_____	Operator Manual	83_____	Vehicle Performance Software
39_____	Thermostat Housing	84_____	Wiring Harness
40_____	Dipstick and Tube	85_____	Fuel System (Natural Gas)
41_____	Belt Driven Auxiliary Drive (Add-On Crank Pulley)	86_____	Fan Pulley
42_____	DEF Line, Supply Module to Injector (OEM)	87_____	Belt Tensioner
43_____	Starting Aid	88_____	Oil Filter
44_____	Timing Gear Cover (S350)	89_____	EGR System
44_____	Tachometer Drive Sensors (S450/S650)	90_____	Trim Software (OEM)
45_____	Secondary Balancers	91_____	Engine Installation Kit (S350)
46_____	Cylinder Block with Camshaft	92_____	Engine Test Certificate/Engine Accessories (S350)
47_____	Crankshaft/Main Bearings	92_____	Engine Installation Kit (S450)
48_____	Connecting Rods/Pistons/Liners	93_____	Emission Label
49_____	Valve Actuating Mechanism	94_____	Custom Software
50_____	Oil Pump	95_____	Parts Installed at Factory
51_____	Cylinder Head with Valves	96_____	Engine Installation Kit/Ship With (S450/S650)
52_____	Gear Driven Auxiliary Drive	96_____	ECU Wiring Harness (6125/6135)
53_____	Fuel Heater	97_____	Field Installed Items
54_____	Turbo Air Intake	98_____	Engine Lift Strap
55_____	Shipping Stand	99_____	Service Only Parts

NOTE: This is a complete option code list based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice. Your engine will not contain all option codes listed.

RG,RG34710,5004 -19-12MAY25-2/2

Record Fuel Injection Pump Model Number

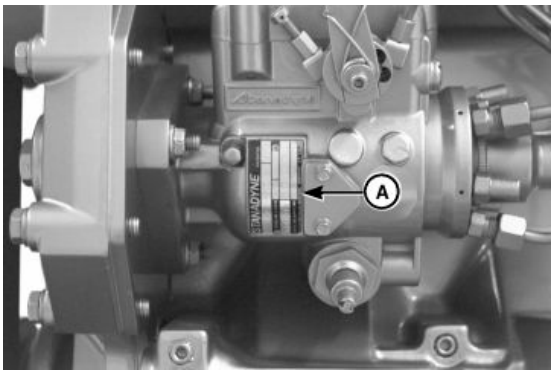
Record the fuel injection pump model and serial information found on the serial number plate (A).

Model No._____ RPM_____

Manufacturer's No._____

Serial No._____

A—Serial Number Plate

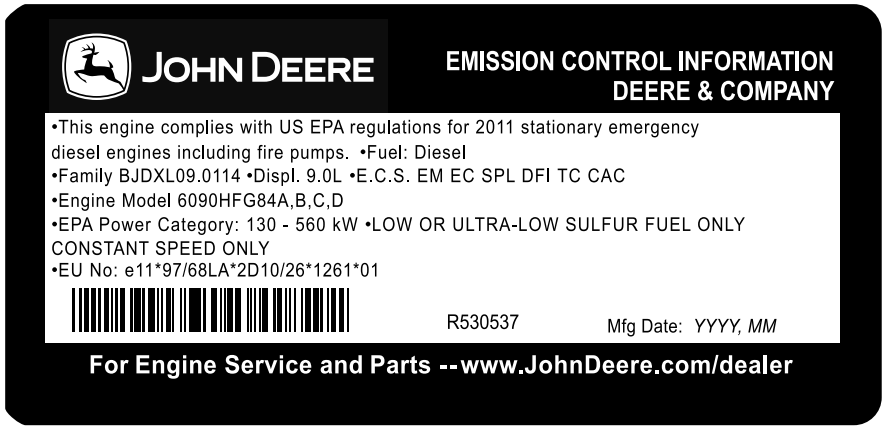


Injection Pump Serial Number Plate

RG11526 —UN—01DEC00

RG,RG34710,5005 -19-30JAN98-1/1

Emergency Stationary Engine Rule



Emissions Label

RG19597 —UN—20OCT10

Emissions Label

After Tier 4 standards take effect, engine manufacturers of emergency stationary engines that do not meet the standards for non-emergency engines must add to each such emergency engine a permanent label (such as the emission label as shown) which states that the engine is limited to stationary emergency use. On John Deere engines this is stated in the EPA emission label on each engine.

Fuel Requirements

Beginning 01 Oct 10, owners and operators of stationary engines that use diesel fuel must only use diesel fuel meeting the requirements of 40 CFR 80.510 (b), which requires that diesel fuel have a maximum sulfur content of 15 PPM and either a minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.

Operation, Maintenance and Testing

The operation of emergency engines is limited to emergency operations and required maintenance and testing.

There is no time limit on the use of emergency stationary engines in emergency situations.

Maintenance and testing is limited to 100 hours per year. The EPA has also included a provision that allows anyone to petition the Administrator for additional hours, beyond the allowed 100 hours per year, if such additional hours should prove to be necessary for maintenance and testing reasons. The EPA will not require a petition for additional hours if the hours beyond 100 hours per year for maintenance and testing purposes are mandated by regulation such as State or Local requirements.

KW40574,0000003 -19-12MAY16-1/1

Recognize Safety Information

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

Follow recommended precautions and safe operating practices.

T81389 —UN—28JUN13

DX,ALERT -19-03OCT22-1/1

Understand Signal Words

DANGER; The signal word DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING; The signal word WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION; The signal word CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices associated with events which could lead to personal injury.

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards. DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

TS187 —19—30SEP88

DX,SIGNAL -19-05OCT16-1/1

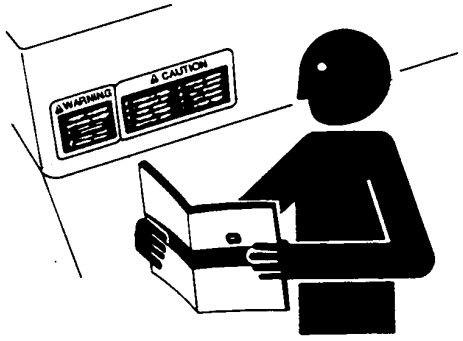
Follow Safety Instructions

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.



TS201 —UN—15APR13

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

DX,READ -19-01AUG22-1/1

Replace Safety Signs

Replace missing or damaged safety signs. Use this operator's manual for correct safety sign placement.

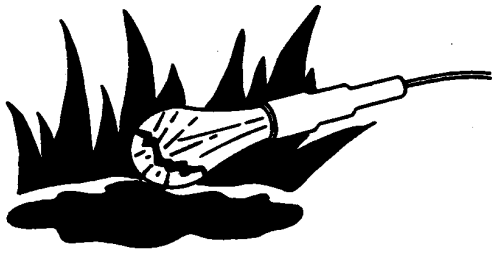
There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

TS201 —UN—15APR13

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

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.



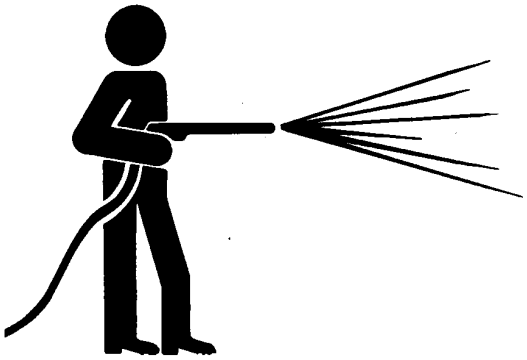
TS223 —UN—23AUG88

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

Work in Clean Area

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ —UN—18OCT88

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

Use Proper Tools

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.

TS779 —UN—08NOV89

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

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

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

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.

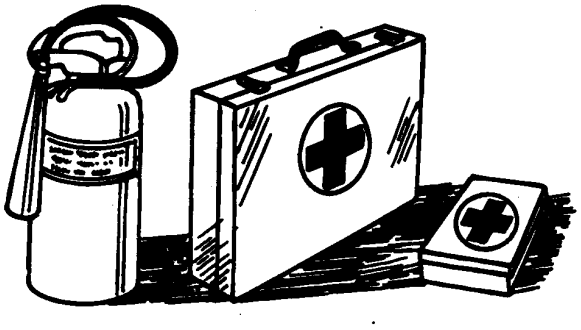
DX,FIRE1 -19-12OCT11-1/1

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

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.

Do not use starting fluid on an engine equipped with glow plugs or an air intake heater.

TS1356 —UN—18MAR92

DX,FIRE3 -19-14MAR14-1/1

In Case of Fire

CAUTION: Avoid personal injury.

Stop machine immediately at the first sign of fire. Fire may be identified by the smell of smoke or sight of flames. Because fire grows and spreads rapidly, get off the machine immediately and move safely away from the fire. Do not return to the machine! The number one priority is safety.

Call the fire department. A portable fire extinguisher can put out a small fire or contain it until the fire department arrives; but portable extinguishers have limitations. Always put the safety of the operator and bystanders first. If attempting to extinguish a fire, keep your back to the wind with an unobstructed escape path so you can move away quickly if the fire cannot be extinguished.

Read the fire extinguisher instructions and become familiar with their location, parts, and operation before a fire starts. Local fire departments or fire equipment distributors may offer fire extinguisher training and recommendations.

If your extinguisher does not have instructions, follow these general guidelines:

TS227 —UN—15APR13

1. Pull the pin. Hold the extinguisher with the nozzle pointing away from you, and release the locking mechanism.
2. Aim low. Point the extinguisher at the base of the fire.
3. Squeeze the lever slowly and evenly.
4. Sweep the nozzle from side-to-side.

DX,FIRE4 -19-22AUG13-1/1

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—15APR13

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

Avoid Static Electricity Risk When Refueling

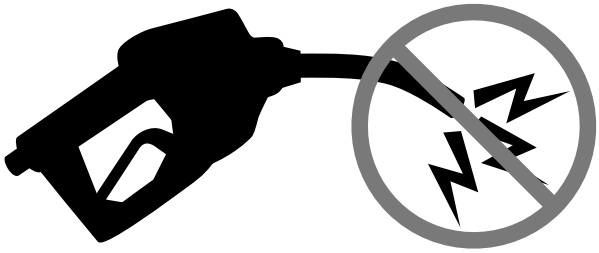
The removal of sulfur and other compounds in Ultra-Low Sulfur Diesel (ULSD) fuel decreases its conductivity and increases its ability to store a static charge.

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



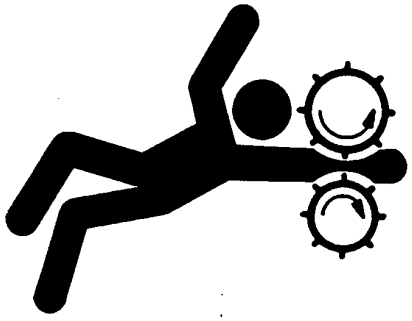
RG21992 —UN—21AUG13

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

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



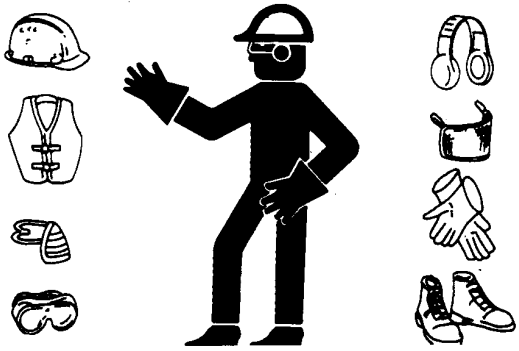
TS228 —UN—23AUG88

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

Wear Protective Clothing

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.



TS206 —UN—15APR13

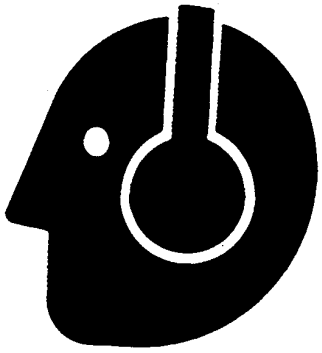
DX,WEAR2 -19-03MAR93-1/1

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

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.

TS204 —UN—15APR13

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.

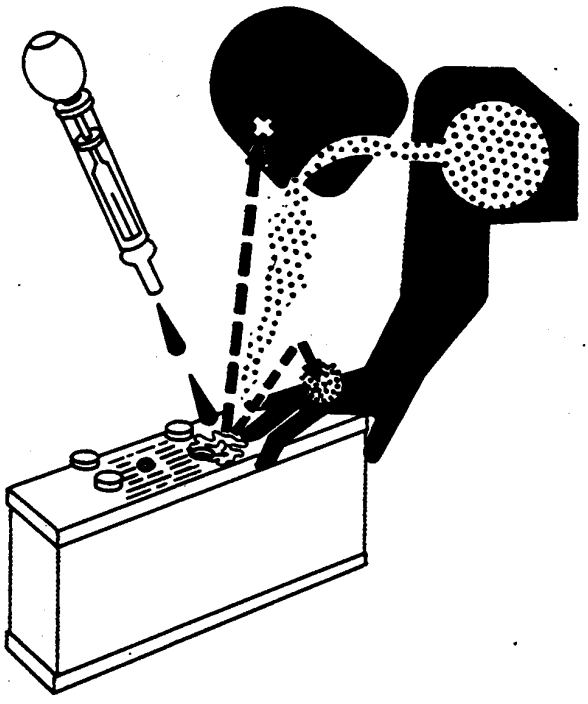
If acid is spilled on skin or in eyes:

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.**



TS203 —UN—23AUG88

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

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:

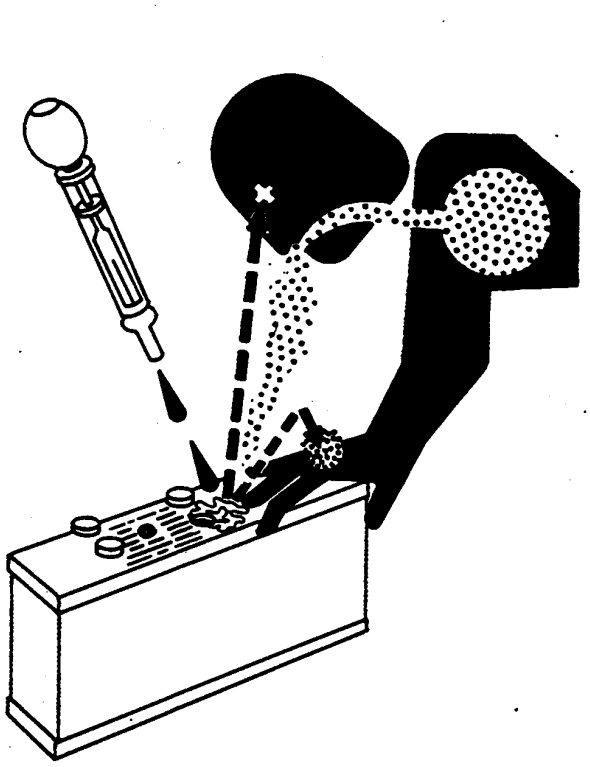
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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

Stay Clear of Rotating Drivelines

Entanglement in rotating driveline can cause serious injury or death.

Keep all shields in place at all times. Make sure rotating shields turn freely.

Wear close-fitting clothing. Stop the engine and be sure that all rotating parts and drivelines are stopped before making adjustments, connections, or performing any type of service on engine or machine driven equipment.

TS1644 —UN—22AUG95

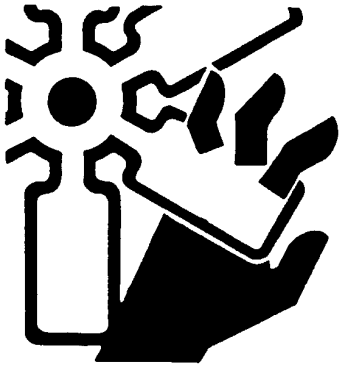
DX,ROTATING -19-18AUG09-1/1

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

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 away 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.

Falling while cleaning or working at height can cause serious injury. Use a ladder or platform to easily reach each location. Use sturdy and secure footholds and handholds.

TS218 —UN—23AUG88

DX,SERV -19-28FEB17-1/1

Remove Paint Before Welding or Heating

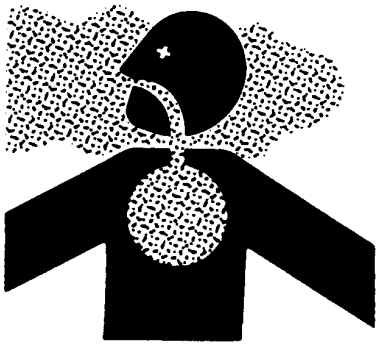
Avoid potentially toxic fumes and dust.

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.



TS220 —UN—15APR13

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

Dispose of paint and solvent properly.

DX,PAINT -19-24JUL02-1/1

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.

TS953 —UN—15MAY90

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

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.

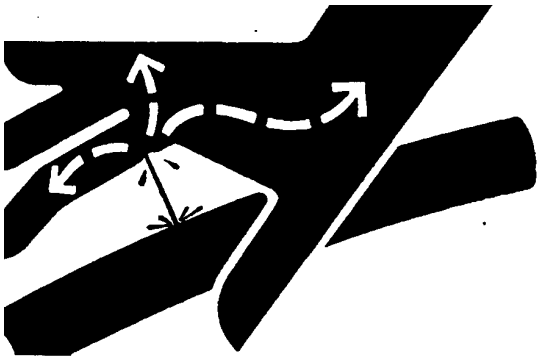
Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

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.



X9811 —UN—23AUG88

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

Do Not Open High-Pressure Fuel System

High-pressure fluid remaining in fuel lines can cause serious injury. Only technicians familiar with this type of system should perform repairs. Do not disconnect or attempt repair of fuel lines, sensors, or any other components between the high-pressure fuel pump and nozzles on engines with High Pressure Common Rail (HPCR) fuel system.

TS1343 —UN—18MAR92

DX,WW,HPCR1 -19-07JAN03-1/1

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

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).

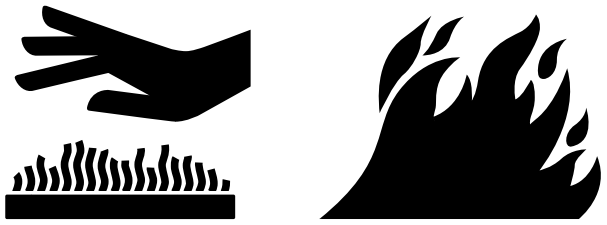
TS204 —UN—15APR13

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

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.



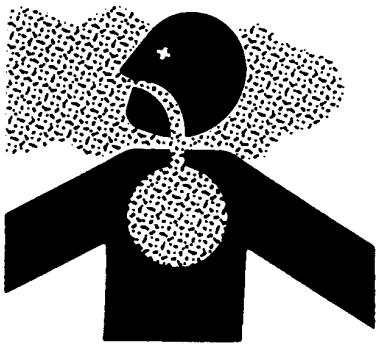
RG17488 —UN—21AUG09

DX,EXHAUST -19-20AUG09-1/1

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.



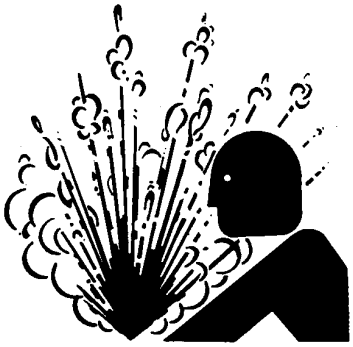
TS220 —UN—15APR13

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

Service Cooling System Safely

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.



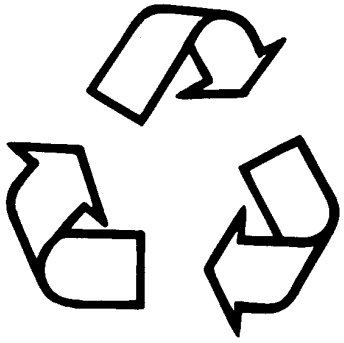
TS281 —UN—15APR13

DX,WW,COOLING -19-19AUG09-1/1

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); 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.



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

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended. Renewable diesel fuel produced by hydrotreating animal fats and vegetable oils is basically identical to petroleum diesel fuel. Renewable diesel that meets EN 590, ASTM D975, or EN 15940 is acceptable for use at all percentage mixture levels.

Required Fuel Properties

In all cases, the fuel shall meet the following properties:

Cetane number of 40 minimum. Cetane number greater than 47 is preferred, especially for temperatures below –20 °C (–4 °F) or elevations above 1675 m (5500 ft.).

Cloud Point should be below the expected lowest ambient temperature or **Cold Filter Plugging Point** (CFPP) should be a maximum 10°C (18°F) below the fuel cloud point.

Fuel lubricity should pass a maximum scar diameter of 0.52 mm as measured by ASTM D6079 or ISO 12156-1. A maximum scar diameter of 0.45 mm is preferred.

Diesel fuel quality and sulfur content shall comply with all existing emissions regulations for the area in which the engine operates. DO NOT use diesel fuel with sulfur content greater than 10 000 mg/kg (10 000 ppm).

Materials such as copper, lead, zinc, tin, brass and bronze should be avoided in fuel handling, distribution and storage equipment as these metals can catalyze fuel oxidation reactions which can lead to fuel system deposits and plugged fuel filters.

E-Diesel fuel

DO NOT use E-Diesel (Diesel fuel and ethanol blend). Use of E-Diesel fuel in any John Deere machine may void the machine warranty.

CAUTION: Avoid severe injury or death due to the fire and explosion risk from using E-Diesel fuel.

[1]See DX,ENOIL12,OEM, DX,ENOIL12,T2,STD, or DX,ENOIL12,T2,EXT for more information on Engine Oil and Filter Service Intervals.

Sulfur Content for Interim Tier 4, Final Tier 4, Stage III B, Stage IV, and Stage V Engines Above 560 kW

- Use ONLY diesel fuel with a maximum of 500 mg/kg (500 ppm) sulfur content.

Sulfur Content for Interim Tier 4, Final Tier 4, Stage III B, Stage IV Engines, and Stage V Engines

- Use ONLY ultra low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content.

Sulfur Content for Tier 3 and Stage III A Engines

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content 1000—2000 mg/kg (1000—2000 ppm) REDUCES the oil and filter change interval.
- BEFORE using diesel fuel with sulfur content greater than 2000 mg/kg (2000 ppm), contact your John Deere dealer.

Sulfur Content for Tier 2 and Stage II Engines

- Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content 2000—5000 mg/kg (2000—5000 ppm) REDUCES the oil and filter change interval.[1]
- BEFORE using diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm), contact your John Deere dealer.

Sulfur Content for Other Engines

- Use of diesel fuel with sulfur content less than 5000 mg/kg (5000 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm) REDUCES the oil and filter change interval.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

DX,FUEL1 -19-28AUG25-1/1

Supplemental Diesel Fuel Additives

Diesel fuel can be the source of performance or other operational problems for many reasons. Some causes include poor lubricity, contaminants, low cetane number, and a variety of properties that cause fuel system deposits. These and others are referenced in other sections of this Operator's Manual.

To optimize engine performance and reliability, closely follow recommendations on fuel quality, storage, and handling, which are found elsewhere in this Operator's Manual.

To further aid in maintaining performance and reliability of the engine's fuel system, John Deere has developed a family of fuel additive products for most global markets. The primary products include Fuel-Protect Diesel Fuel Conditioner (full feature conditioner in winter and summer formulas) and Fuel-Protect Keep Clean (fuel injector deposit removal and prevention). Availability of these and other products varies by market. See your local John Deere dealer for availability and additional information about fuel additives that might be right for your needs.

DX,FUEL13 -19-07FEB14-1/1

Lubricity of Diesel Fuel

Most diesel fuels manufactured in the United States, Canada, and the European Union have adequate lubricity to ensure proper operation and durability of fuel injection system components. However, diesel fuels manufactured in some areas of the world may lack the necessary lubricity.

IMPORTANT: Make sure the diesel fuel used in your machine demonstrates good lubricity characteristics.

Fuel lubricity should pass a maximum scar diameter of 0.52 mm as measured by ASTM D6079 or ISO 12156-1. A maximum scar diameter of 0.45 mm is preferred.

If fuel of low or unknown lubricity is used, add John Deere Fuel-Protect Diesel Fuel Conditioner (or equivalent) at the specified concentration.

Lubricity of Biodiesel Fuel

Fuel lubricity can improve significantly with biodiesel blends up to B30 (30% biodiesel). Further increase in lubricity is limited for biodiesel blends greater than B30.

DX,FUEL5 -19-28AUG25-1/1

Handling and Storing Diesel Fuel

CAUTION: Reduce the risk of fire. Handle fuel carefully. DO NOT fill the fuel tank when engine is running. DO NOT smoke while you fill the fuel tank or service the fuel system.

Fill the fuel tank at the end of each day's operation to prevent water condensation and freezing during cold weather.

Keep all storage tanks as full as practical to minimize condensation.

Ensure that all fuel tank caps and covers are installed properly to prevent moisture from entering. Monitor water content of the fuel regularly.

When using biodiesel fuel, the fuel filter may require more frequent replacement due to premature plugging.

Check engine oil level daily prior to starting engine. A rising oil level may indicate fuel dilution of the engine oil.

IMPORTANT: The fuel tank is vented through the filler cap. If a new filler cap is required, always replace it with an original vented cap.

When fuel is stored for an extended period or if there is a slow turnover of fuel, add a fuel conditioner to stabilize the fuel. Keeping the free water drained and treating the bulk fuel storage tank quarterly with a maintenance dose of a biocide will prevent microbial growth.

DX,FUEL4 -19-01MAR25-1/1

Biodiesel Fuel

Biodiesel fuel is comprised of monoalkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis.

Before using fuel containing biodiesel, review the Biodiesel Use Requirements and Recommendations in this Operator's Manual.

Environmental laws and regulations can encourage or prohibit the use of biofuels. Operators should consult with appropriate governmental authorities prior to using biofuels.

John Deere Stage V Engines Operating in the European Union

Where the engine is to be operated within the Union on diesel or non-road gasoil, a fuel with a FAME content not greater than 8% volume/volume (B8) shall be used.

John Deere Engines with Exhaust Filter Except Stage V Engines Operating in the European Union

Biodiesel blends up to B30 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751, EN 14214, or equivalent specification. Expect a 2% reduction in power and a 5% reduction in fuel economy when using B30.

Biodiesel concentrations above B30 can harm the engine's emission control systems and should not be used. Risks include, but are not limited to, more frequent stationary regeneration, soot accumulation, and increased intervals for ash removal.

John Deere Fuel conditioners or equivalents, which contain detergent and dispersant additives, are required when using biodiesel blends from B10 to B30, and are recommended when using lower biodiesel blends.

John Deere Engines Without Exhaust Filter

Biodiesel blends up to B30 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751, EN 14214, or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B30.

These John Deere engines can operate on biodiesel blends above B30 (up to 100% biodiesel). Operate at levels above B30 ONLY if the biodiesel is permitted by law and meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B30 might not fully comply with or be permitted by all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel.

John Deere fuel conditioners or equivalents, which contain detergent and dispersant additives, are required when using biodiesel blends from B10 to B100, and are recommended when using lower biodiesel blends.

Biodiesel Use Requirements and Recommendations

The petroleum diesel portion of all biodiesel blends shall meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standard.

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 Accredited Producer (as certified by the National biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website: http://www.bq9000.org.

Biodiesel contains residual ash. Ash levels exceeding the maximums allowed in either ASTM D6751 or EN14214 can result in more rapid ash loading and require more frequent cleaning of the Exhaust Filter (if present).

The fuel filter can require more frequent replacement when using biodiesel fuel, particularly if switching from diesel. Check engine oil level daily prior to starting engine. A rising oil level can indicate fuel dilution of the engine oil. Biodiesel blends up to B30 shall be used within 90 days of the date of biodiesel manufacture. Biodiesel blends above B30 shall be used within 45 days from the date of biodiesel manufacture.

When using biodiesel blends up to B30, the following shall be considered:

- Cold-weather flow degradation
- Stability and storage issues (moisture absorption, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to biodiesel on used engines)
- Possible fuel leakage through seals and hoses (primarily an issue with older engines)
- Possible reduction of service life of engine components

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the specifications provided in this Operator's Manual.

Consult your John Deere dealer for John Deere fuel products to improve storage and performance with biodiesel fuels.

The following shall also be considered if using biodiesel blends above B30:

- Possible coking or blocked injector nozzles, resulting in power loss and engine misfire if John Deere fuel additives and conditioners or equivalent containing detergent/dispersants are not used
- Possible crankcase oil dilution (requiring more frequent oil changes)
- Possible lacquering or seizure of internal components
- Possible formation of sludge and sediments
- Possible thermal oxidation of fuel at elevated temperatures

Continued on next page

DX,FUEL7 -19-11SEP25-1/2

- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel handling, distribution, and storage equipment
- Possible reduction in water separator efficiency
- Possible damage to paint if exposed to biodiesel
- Possible corrosion of fuel injection equipment
- Possible elastomeric seal and gasket material degradation (primarily an issue with older engines)
- Possible high acid levels within fuel system
- Because biodiesel blends above B30 contain more ash, using blends above B30 can result in more rapid ash loading and require more frequent cleaning of the Exhaust Filter (if present)

IMPORTANT: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

DX,FUEL7 -19-11SEP25-2/2

Testing Diesel Fuel

A fuel analysis program can help to monitor the quality of diesel fuel. The fuel analysis can provide critical data such as calculated cetane index, fuel type, sulfur content, water content, appearance, suitability for cold weather operations, bacteria, cloud point, acid number, particulate contamination, and whether the fuel meets ASTM D975 or equivalent specification.

Contact your John Deere dealer or other service provider for diesel fuel analysis.

DX,FUEL6 -19-01MAR25-1/1

Aviation (Jet) Fuels

IMPORTANT: Not all fuels should be considered for regular use. Some fuels that can be used in this engine are for emergency only and can cause premature engine and component wear if used long term. Unless your engine has been specifically designed for prolonged use of aviation fuel, the following fuels should be used for an emergency only fuel alternative.

Aviation (jet) fuels may be used with the following restrictions.

Type	Comments
Jet A	**Not Recommended.**Lower viscosity and density than base No. 2-D diesel fuel. Power loss up to 10% can be expected.
Jet A-1	**Not Recommended.**Lower viscosity and density than base No. 2-D diesel fuel. Power loss up to 10% can be expected. May be used as an emergency fuel only, with the addition of John Deere PREMIUM DIESEL FUEL CONDITIONER (or equivalent) at the specified concentration.
Jet B	**Not Recommended.**Lower density and extremely low viscosity compared to base No. 2-D diesel fuel. Power loss up to 14% can be expected. May be used as an emergency fuel only, with the addition of John Deere PREMIUM DIESEL FUEL CONDITIONER (or equivalent) at the specified concentration.
JP-4	**Not Recommended.**Lower density and extremely low viscosity compared to base No. 2-D diesel fuel. Power loss up to 14% can be expected. May be used as an emergency fuel only, with the addition of John Deere PREMIUM DIESEL FUEL CONDITIONER (or equivalent) at the specified concentration.
JP-5	**Not Recommended.**Lower viscosity and density than base No. 2-D diesel fuel. Power loss up to 10% can be expected.
JP-7	**Not Recommended.**Lower viscosity and density than base No. 2-D diesel fuel. Power loss up to 10% can be expected.
JP-8	**Not Recommended.**Lower viscosity and density than base No. 2-D diesel fuel. Power loss up to 10% can be expected.

OURGP12,000003F -19-16AUG11-1/1

Burner Fuels

Burner fuels, like kerosene, may be used with the following restrictions.

Type	Comments
No.2	Higher density and specific gravity than base No. 2-D diesel fuel. Power increase up to 3% can be expected.
No.1	Lower viscosity than base No. 2-D diesel fuel. Power loss up to 2% can be expected.

OURGP12,0000040 -19-07JUL04-1/1

Fuel Filters

The importance of fuel filtration cannot be overemphasized with modern fuel systems. The combination of increasingly restrictive emission regulations and more efficient engines requires fuel system to operate at much higher pressures. Higher pressures can only be achieved using fuel injection components with very close tolerances. These close manufacturing tolerances have significantly reduced capacities for debris and water.

John Deere brand fuel filters have been designed and produced specifically for John Deere engines.

To protect the engine from debris and water, always change engine fuel filters as specified in this manual.

DX,FILT2 -19-14APR11-1/1

Minimizing the Effect of Cold Weather on Diesel Engines

John Deere diesel engines are designed to operate effectively in cold weather.

However, for effective starting and cold-weather operation, a little extra care is necessary. The following information outlines steps that can minimize the effect that cold weather may have on starting and operation of your engine. See your John Deere or other service provider for additional information and local availability of cold-weather aids.

Use Winter Grade Fuel

When temperatures fall below 0°C (32°F), winter grade fuel (No. 1-D in North America) is best suited for cold-weather operation. Winter grade fuel has a lower cloud point and a lower pour point.

Cloud point is the temperature at which wax begins to form in the fuel. This wax causes fuel filters to plug. **Pour point** is the lowest temperature at which movement of the fuel is observed.

NOTE: On average, winter grade diesel fuel has a lower Btu (heat content) rating. Using winter grade fuel may reduce power and fuel efficiency, but should not cause any other engine performance effects. Check the grade of fuel being used before troubleshooting for low-power complaints in cold-weather operation.

Air Intake Heater

An air intake heater is an available option for some engines to aid cold weather starting.

Coolant Heater

An engine block heater (coolant heater) is an available option to aid cold weather starting.

Seasonal Viscosity Oil and Proper Coolant Concentration

Use seasonal grade viscosity engine oil based on the expected air temperature range between oil changes and a proper concentration of low silicate antifreeze as recommended. (See DIESEL ENGINE OIL and ENGINE COOLANT requirements in this section.)

Diesel Fuel Cold Flow Additive

Use John Deere Fuel-Protect Diesel Fuel Conditioner (winter formula), which contains anti-gel chemistry, or equivalent fuel conditioner to treat non-winter grade fuel (No. 2-D in North America) during the cold-weather season. This generally extends operability to about 10°C (18°F) below the fuel cloud point. For operability at even lower temperatures, use winter grade fuel.

IMPORTANT: Treat fuel when outside temperature drops below 0°C (32°F). For best results, use with untreated fuel. Follow all recommended instructions on label.

Biodiesel

When operating with biodiesel blends, wax formation can occur at warmer temperatures. Begin using John Deere Fuel-Protect Diesel Fuel Conditioner (winter formula) or equivalent at 5°C (41°F) to treat biodiesel fuels during the cold-weather season. Use B5 or lower blends at temperatures below 0°C (32°F). Use only winter grade petroleum diesel fuel at temperatures below -10°C (14°F).

Winterfronts

Use of fabric, cardboard, or solid winterfronts is not recommended with any John Deere engine. Their use can result in excessive engine coolant, oil, and charge air temperatures. This can lead to reduced engine life, loss of power and poor fuel economy. Winterfronts may also put abnormal stress on fan and fan drive components potentially causing premature failures.

If winterfronts are used, they should never totally close off the grill frontal area. Approximately 25% area in the center of the grill should remain open at all times. At no time should the air blockage device be applied directly to the radiator core.

Radiator Shutters

If equipped with a thermostatically controlled radiator shutter system, this system should be regulated in such a way that the shutters are completely open by the time the coolant reaches 93°C (200°F) to prevent excessive intake manifold temperatures. Manually controlled systems are not recommended.

If air-to-air aftercooling is used, the shutters shall be completely open by the time the intake manifold air temperature reaches the maximum allowable temperature out of the charge air cooler.

DX,FUEL10 -19-28AUG25-1/1

Diesel Engine Break-In Oil — Non-Emissions Certified and Certified Tier 1, Tier 2, Tier 3, Stage I, Stage II, and Stage III

New engines are filled at the factory with either John Deere Break-In™ or John Deere Break-In Plus™ Engine Oil. During the break-in period, add John Deere Break-In™ or Break-In Plus™ Engine Oil, respectively, as needed to maintain the specified oil level.

Operate the engine under various conditions, particularly heavy loads with minimal idling, to help seat engine components properly.

If John Deere Break-In™ Engine Oil is used during the initial operation of a new or rebuilt engine, change the oil and filter at a maximum of 100 hours.

If John Deere Break-In Plus™ Engine Oil is used, change the oil and filter at a minimum of 100 hours and a maximum equal to the interval specified for John Deere Plus-50™ II or Plus-50™ oil.

After engine overhaul, fill the engine with either John Deere Break-In™ or Break-In Plus™ Engine Oil.

If John Deere Break-In™ or Break-In Plus™ Engine Oil is not available, use an SAE 10W-30 viscosity grade diesel engine oil meeting one of the following and change the oil and filter at a maximum of 100 hours of operation:

- API Service Classification CE
- API Service Classification CD
- API Service Classification CC
- ACEA Oil Sequence E2

Break-In is a trademark of Deere & Company.
Break-In Plus is a trademark of Deere & Company
Plus-50 is a trademark of Deere & Company.

- ACEA Oil Sequence E1

IMPORTANT: Do not use Plus-50™ II, Plus-50™, or engine oils meeting any of the following for the initial break-in of a new or rebuilt engine:

API CK-4	**ACEA E9**
API CJ-4	**ACEA E7**
API CI-4 PLUS	**ACEA E6**
API CI-4	**ACEA E5**
API CH-4	**ACEA E4**
API CG-4	**ACEA E3**
API CF-4	
API CF-2	
API CF	

These oils do not allow the engine to break in properly.

John Deere Break-In Plus™ Engine Oil can be used for all John Deere diesel engines at all emission certification levels.

After the break-in period, use John Deere Plus-50™ II, John Deere Plus-50™, or other diesel engine oil as recommended in this manual.

DX,ENOIL4 -19-02NOV16-1/1

Diesel Engine Oil — Tier 3 and Stage IIIA

Failure to follow applicable oil standards and drain intervals can result in severe engine damage that might not be covered under warranty. Warranties, including the emissions warranty, are not conditioned on the use of John Deere oils, parts, or service.

Use oil viscosity based on the expected air temperature range during the period between oil changes.

John Deere Plus-50™ II oil is preferred.

John Deere Plus-50™ is also recommended.

John Deere Torq-Gard™ is also allowed.

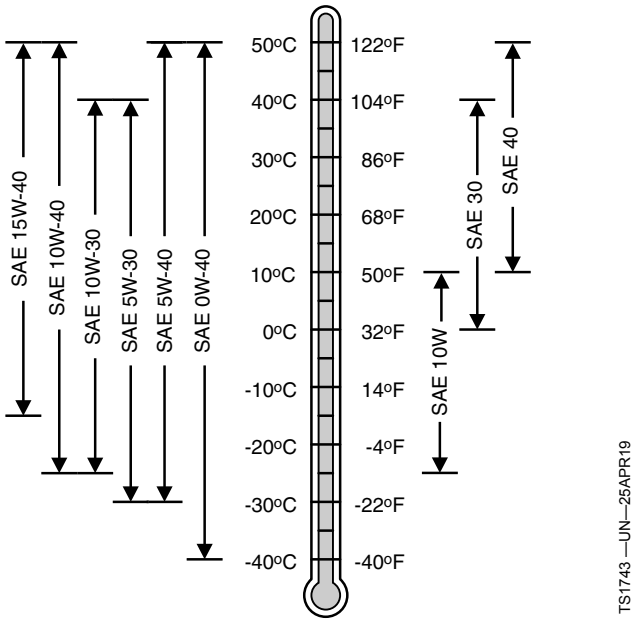
Other oils may be used if they meet one or more of the following standards:

- API Service Category CK-4
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- ACEA Oil Sequence E9
- ACEA Oil Sequence E7
- ACEA Oil Sequence E6
- ACEA Oil Sequence E5
- ACEA Oil Sequence E4

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

Plus-50 is a trademark of Deere & Company
Torq-Gard is a trademark of Deere & Company



Oil Viscosities for Air Temperature Ranges

DO NOT use diesel fuel with sulfur content greater than 10 000 mg/kg (10 000 ppm).

DX,ENOIL11 -19-23APR19-1/1

Engine Oil and Filter Service Intervals — Tier 3 and Stage IIIA — OEM Applications

Recommended oil and filter service intervals are based on a combination of oil pan capacity, type of engine oil and filter used, and sulfur content of the diesel fuel. Actual service intervals also depend on operation and maintenance practices.

Approved Oil Types:

- "Plus-50 Oils" include John Deere Plus-50™ II and John Deere Plus-50™
- "Other Oils" include John Deere Torq-Gard™, API CK-4, API CJ-4, API CI-4 PLUS, API CI-4, ACEA E9, ACEA E7, ACEA E6, ACEA E5, and ACEA E4

Use oil analysis to evaluate the condition of the oil and to aid in selection of the proper oil and filter service interval. Contact your John Deere dealer or other qualified service provider for more information on engine oil analysis.

Change the oil and oil filter at least once every 12 months even if the hours of operation are fewer than the otherwise recommended service interval.

Diesel fuel sulfur content affects engine oil and filter service intervals.

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED
- Use of diesel fuel with sulfur content 1000—2000 mg/kg (1000—2000 ppm) REDUCES the oil and filter service interval
- BEFORE using diesel fuel with sulfur content greater than 2000 mg/kg (2000 ppm), contact your John Deere dealer or qualified service provider
- DO NOT use diesel fuel with sulfur content greater than 10 000 mg/kg (10 000 ppm)

NOTE: The 500-hour extended oil and filter change interval is only allowed if all of the following conditions are met:

- *Engine equipped with an extended drain interval oil pan*
- *Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) for PowerTech™ Plus engines or 5000 mg/kg (5000 ppm) for PowerTech™ engine*
- *Use of John Deere Plus-50™ II or John Deere Plus-50™ oil*
- *Use of an approved John Deere oil filter*

IMPORTANT: To avoid engine damage:

- **Reduce oil and filter service intervals by 50% when using biodiesel blends greater than B20. Oil analysis may allow longer service intervals**
- **Use only approved oil types**

	Tier 3 and Stage IIIA —PowerTech™ Plus				**Tier 3 and Stage IIIA —PowerTech™**		
	Oil Pan Size (L/kW)				Oil Pan Size (L/kW)		
Oil pan capacity	Greater than or equal to 0.10	Greater than or equal to 0.12	Greater than or equal to 0.14	Greater than or equal to 0.22	Greater than or equal to 0.10	Greater than or equal to 0.12	Greater than or equal to 0.14
Fuel Sulfur	Less than 1000 mg/kg (1000 ppm)				Less than 1000 mg/kg (1000 ppm)		
Plus-50 Oils	375 hours	500 hours	500 hours	500 hours	375 hours	500 hours	500 hours
Other Oils	250 hours	250 hours	250 hours	250 hours	250 hours	250 hours	250 hours
Fuel Sulfur	1000—2000 mg/kg (1000—2000 ppm)				1000—2000 mg/kg (1000—2000 ppm)		
Plus-50 Oils	300 hours	300 hours	500 hours	500 hours	300 hours	400 hours	500 hours
Other Oils	200 hours	200 hours	250 hours	250 hours	200 hours	200 hours	250 hours
Fuel Sulfur	2000—5000 mg/kg (2000—5000 ppm)				2000—5000 mg/kg (2000—5000 ppm)		
Plus-50 Oils	Not Recommended Contact John Deere dealer (dealer refers to DTAC solution)				275 hours	350 hours	500 hours
Other Oils	Not Recommended Contact John Deere dealer (dealer refers to DTAC solution)				150 hours	175 hours	250 hours
Fuel Sulfur	5000—10 000 mg/kg (5000—10 000 ppm)				5000—10 000 mg/kg (5000—10000 ppm)		
Plus-50 Oils	Not Recommended Contact John Deere dealer (dealer refers to DTAC solution)				187 hours	250 hours	250 hours
Other Oils	Not Recommended Contact John Deere dealer (dealer refers to DTAC solution)				125 hours	125 hours	125 hours
Oil analysis may extend the service interval of "Other Oils", to a maximum not to exceed the interval for Plus-50 Oils. Oil analysis means taking a series of oil samples at 50-hour increments beyond the normal service interval until either the data indicates the end of useful oil life or the maximum service interval of John Deere Plus-50 oils is reached.							

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DX,ENOIL13,T3,OEM -19-13JAN18-1/2

Torq-Gard is a trademark of Deere & Company
PowerTech is a trademark of Deere & Company

DX,ENOIL13,T3,OEM -19-13JAN18-2/2

Mixing of Lubricants

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements.

Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

DX,LUBMIX -19-18MAR96-1/1

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to John Deere branded fluids or fluids that have been tested and/or approved for use in John Deere equipment.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

DX,ALTER -19-13JAN18-1/1

Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

DX,LUBST -19-11APR11-1/1

Oil Filters

Filtration of oils is critically important for proper operation and lubrication. John Deere brand oil filters have been designed and produced specifically for John Deere applications.

John Deere filters adhere to engineering specifications for quality of the filter media, filter efficiency rating, strength of the bond between the filter media and the element end cap, fatigue life of the canister (if applicable), and pressure capability of the filter seal. Non-John Deere branded oil filters might not meet these key John Deere specifications.

Always change oil filters regularly as specified in this manual.

DX,FILT1 -19-11APR11-1/1

Diesel Engine Coolant (engine with wet sleeve cylinder liners)

Failure to follow applicable coolant standards and drain intervals can result in severe engine damage that may not be covered under warranty. Warranties, including the emissions warranty, are not conditioned on the use of John Deere coolants, parts, or service.

Preferred Coolants

The following pre-mix engine coolants are preferred:

- **John Deere COOL-GARD™II**
- **John Deere COOL-GARD II PG**

COOL-GARD II pre-mix coolant is available in several concentrations with different freeze protection limits as shown in the following table.

COOL-GARD II Pre-Mix	Freeze Protection Limit
COOL-GARD II 20/80	-9°C (16°F)
COOL-GARD II 30/70	-16°C (3°F)
COOL-GARD II 50/50	-37°C (-34°F)
COOL-GARD II 55/45	-45°C (-49°F)
COOL-GARD II PG 60/40	-49°C (-56°F)
COOL-GARD II 60/40	-52°C (-62°F)

Not all COOL-GARD II pre-mix products are available in all countries.

Use COOL-GARD II PG when a non-toxic coolant formulation is required.

Additional Recommended Coolants

The following engine coolant is also recommended:

- John Deere COOL-GARD II Concentrate in a 40—60% mixture of concentrate with quality water.

IMPORTANT: When mixing coolant concentrate with water, do not use less than 40% or greater than 60% concentration of coolant. Less than 40% gives inadequate additives for corrosion protection. Greater than 60% can result in coolant gelation and cooling system problems.

Other Coolants

Other ethylene glycol or propylene glycol base coolants may be used if they meet the following specification:

- Pre-mix coolant meeting ASTM D6210 requirements
- Is formulated with a 2-ethylhexanoic acid (2-EHA) free additive package
- Coolant concentrate meeting ASTM D6210 requirements in a 40—60% mixture of concentrate with quality water

If coolant meeting one of these specifications is unavailable, use a coolant concentrate or pre-mix coolant that has a minimum of the following chemical and physical properties:

- Provides cylinder liner cavitation protection according to either the John Deere Cavitation Test Method or a fleet study run at or above 60% load capacity
- Is formulated with a nitrite-free additive package
- Is formulated with a 2-ethylhexanoic acid (2-EHA) free additive package
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion

Water Quality

Water quality is important to the performance of the cooling system. Deionized or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

Coolant Drain Intervals

Drain and flush the cooling system and refill with fresh coolant at the indicated interval, which varies with the coolant used.

When COOL-GARD II or COOL-GARD II PG is used, the drain interval is 6 years or 6000 hours of operation.

If a coolant other than COOL-GARD II or COOL-GARD II PG is used, reduce the drain interval to 2 years or 2000 hours of operation.[1]

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

Do not mix ethylene glycol and propylene glycol base coolants.

Do not use coolants that contain nitrites.

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[1]Coolant analysis may extend the service interval of other "Coolants" to a maximum not to exceed the interval of Cool-Gard II coolants. Coolant analysis means taking a series of coolant samples at 1000 hour increments beyond the normal service interval until either the data indicate the end of useful coolant life or the maximum service interval of Cool-Gard II is reached.

DX,COOL3 -19-25AUG20-1/1

Water Quality for Mixing with Coolant Concentrate

Engine coolants are a combination of three chemical components: ethylene glycol (EG) or propylene glycol (PG) antifreeze, inhibiting coolant additives, and quality water.

Water quality is important to the performance of the cooling system. Deionized or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total solids	<340 mg/L
Total dissolved I hardness	<170 mg/L
pH	5.5—9.0

IMPORTANT: Do not use bottled drinking water because it often contains higher concentrations of total dissolved solids.

Freeze Protection

The relative concentrations of glycol and water in the engine coolant determine its freeze protection limit.

Ethylene Glycol	Freeze Protection Limit
40%	-24°C (-12°F)
50%	-37°C (-34°F)
60%	-52°C (-62°F)
Propylene Glycol	**Freeze Protection Limit**
40%	-21°C (-6°F)
50%	-33°C (-27°F)
60%	-49°C (-56°F)

DO NOT use a coolant-water mixture greater than 60% ethylene glycol or 60% propylene glycol.

DX,COOL19 -19-13JAN18-1/1

Operating in Warm Temperature Climates

John Deere engines are designed to operate using recommended engine coolants.

Always use a recommended engine coolant, even when operating in geographical areas where freeze protection is not required.

IMPORTANT: Water may be used as coolant *in emergency situations only.*

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended engine coolant as soon as possible.

DX,COOL6 -19-17FEB20-1/1

Testing Coolant Freeze Point

The use of a handheld coolant refractometer is the quickest, easiest, and most accurate method to determine coolant freeze point. This method is more accurate than a test strip or a float-type hydrometer which can produce poor results.

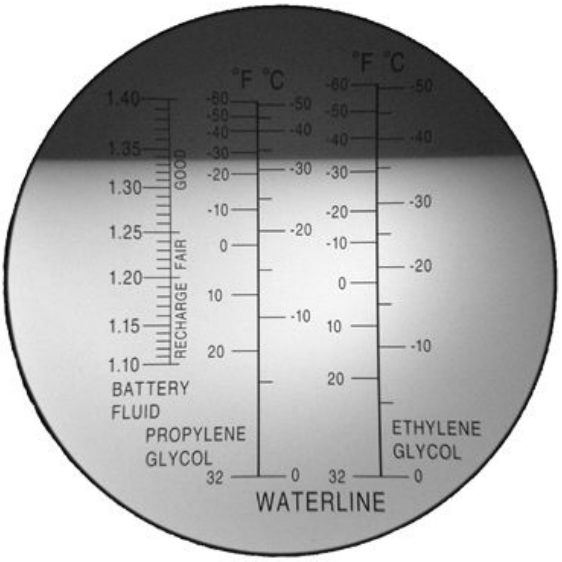
A coolant refractometer is available through your John Deere dealer under the SERVICEGARD™ tool program. Part number 75240 provides an economical solution to accurate freeze point determination in the field.

To use this tool:

1. Allow cooling system to cool to ambient temperatures.
2. Open radiator cap to expose coolant.
3. With the included dropper, collect a small coolant sample.
4. Open the lid of the refractometer, place one drop of coolant on the window and close the lid.
5. Look through the eyepiece and focus as necessary.
6. Record the listed freeze point for the type of coolant (ethylene glycol coolant or propylene glycol) being tested.

TS1732 —UN—04SEP13

SERVICEGARD™ Part Number 75240



TS1733 —UN—04SEP13

Image with a Drop of 50/50 Coolant Placed on the Refractometer Window

SERVICEGARD is a trademark of Deere & Company

DX,COOL,TEST -19-13JUN13-1/1

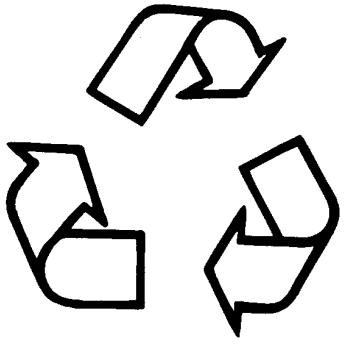
Disposing of Coolant

Improperly disposing of engine coolant can threaten the environment and ecology.

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.

Inquire on the proper way to recycle or dispose of waste from the local environmental or recycling center, or from the local John Deere dealer, engine distributor, or other service provider.



TS1133 —UN—15APR13

Recycle Waste

RG,RG34710,7543 -19-10OCT25-1/1

Instrument (Gauge) Panels

IMPORTANT: Any time an electric gauge or meter does not register correctly, replace it with a new one. Do not attempt to repair it.

All controls and gauges covered in this manual are optional equipment for John Deere OEM Engines. They may be provided by the equipment manufacturer instead of John Deere. The following information applies only to those controls and gauges provided by John Deere.

Earlier Instrument (Gauge) Panel (North America)

Following is a brief description of the components on the John Deere instrument (gauge) panel:

A—Oil Pressure Gauge - Indicates engine oil pressure.

B—Coolant Temperature Gauge - Indicates the engine coolant temperature.

C—Key Switch - The four position key switch controls the electrical system.

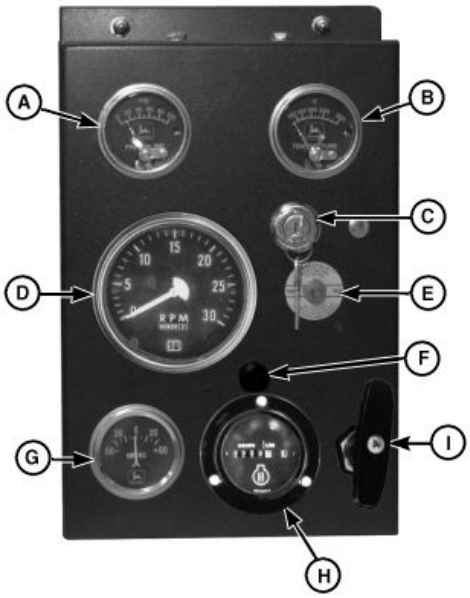
D—Tachometer (optional) - Indicates engine speed in revolutions per minute (rpm).

E—Reset (Safety) Switch - Overrides safety shutdown switch when depressed and held in during engine start-up. Hold button in until engine oil pressure is at a safe operating level.

F—Fuse Holder - Contains 14 amp fuse.

G—Ammeter - Indicates charging current within electrical system.

H—Hour Meter (optional) - Indicates the operating hours of the engine while key switch is in the “ON” position. The hour meter should be used as a guide for scheduling periodic service.



RG11527 —UN—01DEC00

North American Instrument Panel (Earlier Engines)

A—Oil Pressure Gauge
B—Coolant Temperature Gauge
C—Key Switch
D—Tachometer
E—Reset (Safety) Switch
F—Fuse Holder
G—Ammeter
H—Hour Meter
I— Hand Throttle

I—Hand Throttle (optional) - Controls engine speed.

Continued on next page

Later Instrument (Gauge) Panel (North America)

IMPORTANT: Any time an electric gauge or meter does not register correctly, replace it with a new one. Do not attempt to repair it.

Following is a brief description of the components on instrument (gauge) panel:

A—Tachometer with Hourmeter (Optional) - The tachometer with hourmeter indicates engine speed in revolutions per minute (rpm) and shows the operating hours of the engine while key switch is in the “ON” position. The hour meter should be used as a guide for scheduling periodic service.

B—Oil Pressure Gauge - The oil pressure gauge indicates engine oil pressure. If the engine oil pressure falls below a safe operating pressure, the engine will shut down.

C—Voltmeter Gauge - The voltmeter indicates system battery voltage.

D—Coolant Temperature Gauge - The coolant temperature gauge indicates the engine coolant temperature. If coolant temperature rises above the preset, safe operating temperature, the engine will shut down.

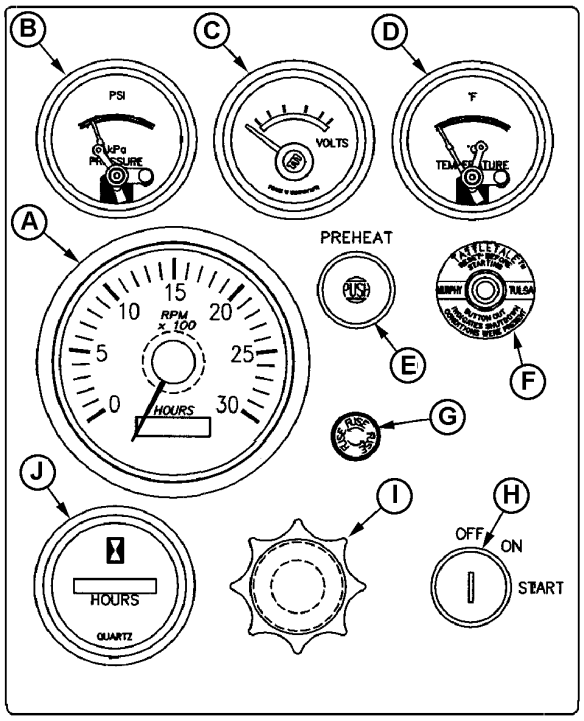
E—Pre-Heat Button - Press button to activate the preheater for cold weather starting.

F—Reset (Safety) Switch- Reset button will pop out and shut down the engine if the coolant temperature is too high or oil pressure is too low. Press in and hold while starting engine until oil pressure is at a safe operating level.

G—Fuse Holder - Contains 14 amp fuse.

H—Key Switch - The key switch controls the electrical system. Positions of key switch are marked as follows: OFF, ON, and START.

I—Throttle (Optional) - The throttle control is used to control engine speed.



Instrument Panel and Gauges (Later Engines)

A—Tachometer with Hourmeter (Optional)
B—Oil Pressure Gauge
C—Voltmeter Gauge
D—Coolant Temperature Gauge
E—Preheat Button
F— Reset (Safety) Switch
G—Fuse Holder
H—Key Switch
I— Throttle (Optional)
J— Hourmeter (Optional)

J—Hourmeter (Optional) - The hourmeter indicates the operating hours of the engine while key switch is in the “ON” position. The hour meter should be used as a guide for scheduling periodic service.

Continued on next page

OUOD006,0000001 -19-26MAY06-2/4

AEZ Instrument (Gauge) Panel (Except North America)

A—Oil Pressure Gauge - The oil pressure gauge indicates engine oil pressure.

B—Coolant Temperature Gauge - The coolant temperature gauge indicates the engine coolant temperature.

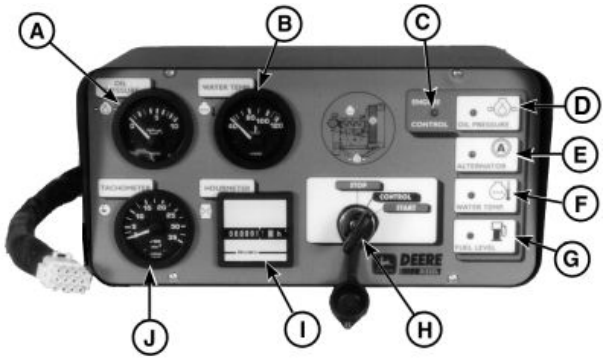
C—Engine Control Light - The engine control light indicates that the engine protection is activated.

D—Oil Pressure Light - The oil pressure light illuminates when the key switch is turned to the CONTROL position. The light will remain on until the engine is started and the specified oil pressure is reached. If oil pressure is lost during engine operation, the light will illuminate and protection circuitry will stop the engine. The oil pressure light will remain on, indicating that the engine was stopped due to a low oil pressure condition.

E—Alternator Light - The alternator light illuminates when the key is turned to the CONTROL position. The light will remain on until the engine is started. After the engine is running, if the alternator stops charging, the light will illuminate and protection circuitry will stop the engine. The alternator light will remain on indicating the engine was stopped due to the alternator not charging.

F—Coolant Temperature Light - The coolant temperature light illuminates only if the engine has overheated. After the engine is running, if the engine overheats, the light will illuminate and protection circuitry will stop the engine. The coolant temperature light will remain on indicating the engine was stopped due to the engine overheating.

G—Fuel Level Light - The fuel level light illuminates only if the engine has stopped due to fuel tank being empty. After the engine is running, if the engine runs out of fuel, the light will illuminate. The fuel level light will remain on indicating the engine was stopped due to the fuel tank being empty.



RG11590 —UN—08DEC00

AEZ Instrument Panel

A—Oil Pressure Gauge
B—Coolant Temperature Gauge
C—Engine Control Light
D—Oil Pressure Light
E—Alternator Light
F—Coolant Temperature Light
G—Fuel Level Light
H—Key Switch
I—Hour Meter
J—Tachometer

H—Key Switch - The key switch controls the electrical system.

I—Hour Meter - Indicates the operating hours of the engine while key switch is in the “ON” position. The hour meter should be used as a guide for scheduling periodic service.

J—Tachometer - Indicates engine speed in revolutions per minute (rpm).

Continued on next page

OUOD006,0000001 -19-26MAY06-3/4

VDO Instrument (Gauge) Panel (Except North America)

A—Oil Pressure Gauge - The oil pressure gauge indicates engine oil pressure.

B—Coolant Temperature Gauge - The coolant temperature gauge indicates coolant temperature.

C—Tachometer - The tachometer indicates engine speed in hundreds of revolutions per minute (rpm).

The engine control system consists of the following:

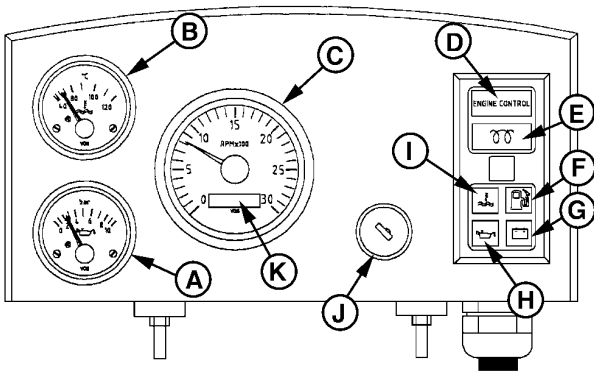
D—Engine Control Light - The engine control light illuminates after the engine has started and oil pressure is up to specification. The light indicates that the engine protection circuitry is activated.

E—Preheater Light - The preheater light illuminates when the key is turned to the bulb test position (position I). It should go off after approximately five seconds. When the key switch is held in position II, the engine preheater is energized and the preheater light illuminates.

F—Fuel Level Light - The fuel level light illuminates when the key is turned to the bulb test position (position I). It should go off after approximately five seconds. After the engine is running, if the engine runs out of fuel, the light will illuminate. The fuel level light will remain on indicating the engine was stopped due to the fuel tank being empty.

G—Battery Light - The battery light illuminates when the key is turned to the bulb test position (position I). It should go off after approximately five seconds. After the engine is running, if the alternator stops charging, the light will illuminate and protection circuitry will stop the engine. The battery light will remain on indicating the engine was stopped due to the alternator not charging.

H—Oil Pressure Light - The oil pressure light illuminates when the key switch is turned to the bulb test position (position I). The light will remain on until the engine is started and the specified oil pressure is reached. If oil pressure is lost during engine operation, the light will illuminate and protection circuitry will stop the engine. The oil pressure light will remain on, indicating that the engine was stopped due to a low oil pressure condition.



RG10606B —UN—20OCT99

A—Oil Pressure Gauge
B—Coolant Temperature Gauge
C—Tachometer
D—Engine Control Light
E—Preheater Light
F—Fuel Level Light
G—Battery Light
H—Oil Pressure Light
I— Coolant Temperature Light
J— Key/Start Switch
K—Hour Meter

I—Coolant Temperature Light - The coolant temperature light illuminates when the key is turned to the bulb test position (position I). It should go off after approximately five seconds. After the engine is running, if the engine overheats, the light will illuminate and protection circuitry will stop the engine. The coolant temperature light will remain on indicating the engine was stopped due to the engine overheating.

Other components on the instrument panel:

J—Key/Start Switch - The four-position key start switch controls the electrical system.

K—Hour Meter - The hour meter is an integral part of the tachometer. It shows the accumulated hours of engine service. The hour meter operates when the engine is running and accumulated hours are displayed in hours and tenths of hours.

OUOD006,0000001 -19-26MAY06-4/4

Auxiliary Gear Drive Limitations

IMPORTANT: When attaching an air compressor, hydraulic pump, or other accessory to be driven by the auxiliary gear drive (engine timing gear train at front of engine), power requirements of the accessory must be limited to values listed below:

Power Levels For Right-Hand Auxiliary Gear Drive:
- 16 kW (22 hp) Continuous Operation[1]
- 28 kW (37.5 hp) Intermittent Operation[1]

CD30354 —UN—03FEB93

Auxiliary Gear Drive

[1]At 2400 engine rpm.

RG,RG34710,5047 -19-30JAN98-1/1

Generator Set (Standby) Applications

To assure that your engine will deliver efficient standby operation when needed, start engine and run at rated speed (with 50%—70% load) for 30 minutes every 2 weeks. DO NOT allow engine to run extended period of time with no load.

RG,RG34710,5048 -19-30JAN98-1/1

Starting The Engine

The following instructions apply to the optional controls and instruments available through the John Deere Parts Distribution Network. The controls and instruments for your engine may be different from those shown here; always follow manufacturer's instructions.

CAUTION: Before starting engine in a confined building, install proper outlet exhaust ventilation equipment. Always use safety approved fuel storage and piping.

NOTE: If temperature is below 0 °C (32 °F), it may be necessary to use cold weather starting aids (See COLD WEATHER OPERATION, later in this section).

1. Perform all prestarting checks outlined in Lubrication & Maintenance/Daily Section later in this manual.

TS220 —UN—15APR13

Avoid Toxic Fumes

2. Open the fuel supply shut-off valve, if equipped.

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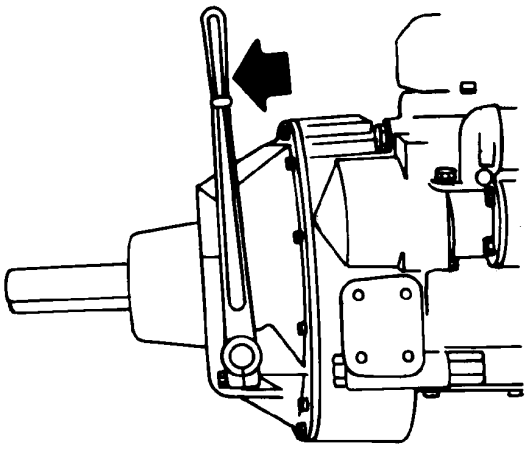
RG,RG34710,5049 -19-30JAN98-1/3

3. If equipped with PTO clutch, pull lever (arrow) rearward (away from engine) to disengage PTO clutch.



RG5602 —UN—16JUN00

PTO Clutch Lever

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RG,RG34710,5049 -19-30JAN98-2/3

4. Pull hand throttle (A) 1/3 of the way out. Turn the handle in either direction to lock it in place.
5. If equipped, depress and hold reset button (B) while starting.

IMPORTANT: Do not operate the starter for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait at least 2 minutes before trying again. If engine does not start after four attempts, see Troubleshooting Section.

6. Turn the key switch (C) clockwise to crank the engine. When the engine starts, release the key so that it returns to the “ON” position.

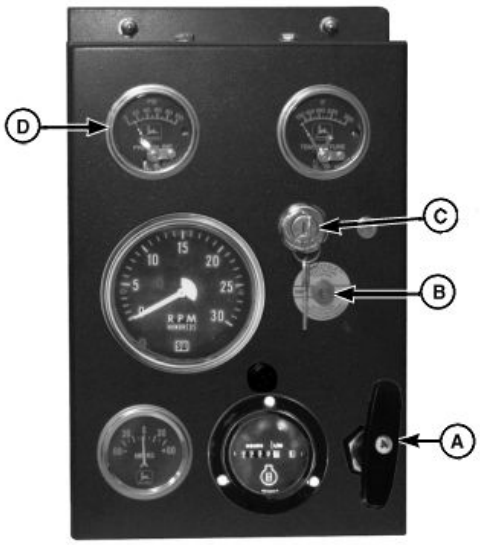
IMPORTANT: If the key switch is released before the engine starts, wait until the starter and the engine stop turning before trying again. This will prevent possible damage to the starter and/or flywheel.

7. After the engine starts, continue to hold the reset button in until the oil pressure gauge (D) reads at least 105 kPa (1.05 bar) (15 psi). The safety controls will not allow the engine to run at a lower oil pressure unless the reset button is held in.

IMPORTANT: Should the engine die while operating under load, immediately disengage PTO clutch and restart the engine. Overheating of turbocharger parts may occur when oil flow is stopped.

8. Check all gauges for normal engine operation. If operation is not normal, stop the engine and determine the cause.

A—Hand Throttle
B—Reset Button
C—Key Switch
D—Oil Pressure Gauge

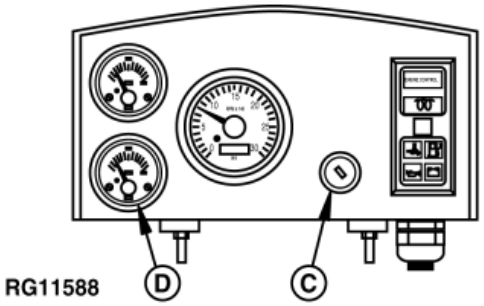


RG11532 —UN—01DEC00

North American Instrument Panel

RG11592 —UN—17JAN01

AEZ Instrument Panel (Except North America)

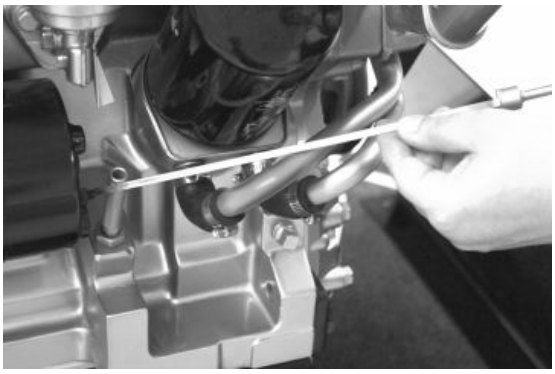


RG11588 —UN—08DEC00

VDO Instrument Panel (Except North America)

RG,RG34710,5049 -19-30JAN98-3/3

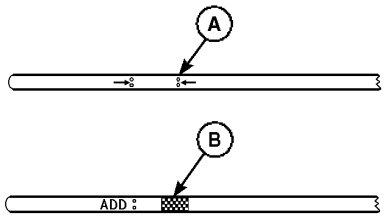
Break-In Service



RG7314 —UN—29NOV00

Check Engine Oil Level

A—Full Mark **B—Crosshatch**



RG11528 —UN—01DEC00

Dipstick Markings

The engine is ready for normal operation. However, extra care during the first 100 hours of operation will result in more satisfactory long-term engine performance and life. DO NOT exceed 100 hours of operation with break-in oil.

1. This engine is factory-filled with a special break-in oil. Operate the engine at heavy loads with minimal idling during the break-in period.

IMPORTANT: Do not add makeup oil until the level is BELOW the ADD mark or lower arrow on dipstick. If make-up oil is required during the break-in period, an additional 100 hour break-in period is required. John Deere Engine Break-In Oil (TY22041) should be used to make up any oil consumed during the break-in period.

DO NOT fill above the top of the mark (A) or crosshatch pattern (B), whichever is present. Oil levels anywhere within arrows or crosshatch are considered in the acceptable operating range.

2. Check engine oil level more frequently. If oil must be added, John Deere Engine Break-In Oil is preferred. See ENGINE BREAK-IN OIL, in Fuels, Lubricants, and Coolant Section.

3. Check oil pressure and coolant temperature while engine is operating. See specification.

Specification

Engine [1]—Oil Pressure at	
Full Load Rated Speed	345 ± 103 kPa (3.45 ± 1.03 bar) (50 ± 15 psi)
Minimum Oil Pressure at	
Rated Speed	275 (2.75 bar) (40 psi)
Minimum Oil Pressure at	
850 rpm	105 kPa (1.05 bar) (15 psi)
Coolant Temperature	
Range	82°—94°C (180°—202°F)

4. During the first 20 hours, avoid prolonged periods of engine idling or sustained maximum load operation. Vary the engine speed throughout this period. If engine will idle longer than 5 minutes, stop engine.

[1] *At normal operating temperature of 115 °C (240 °F) sump.*

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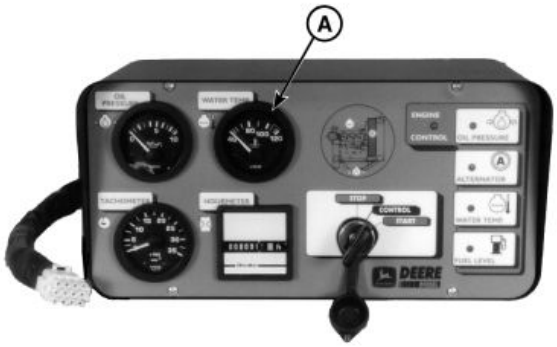
RG,RG34710,5046 -19-11FEB03-1/2

RG11531 —UN—01DEC00

North American Instrument Panel



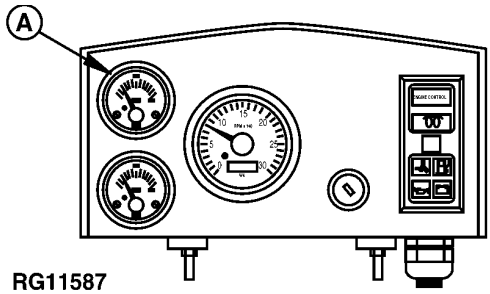
RG11591 —UN—08DEC00

AEZ Instrument Panel (Except North America)

5. Watch coolant temperature gauge (A) closely. If coolant temperature rises above 112°C (234°F), reduce load on engine. Unless temperature drops quickly, stop the engine and determine the cause before resuming operation.

NOTE: When the coolant temperature gauge reads approximately 115°C (239°F), the engine will shutdown automatically, if equipped with safety controls.

6. The tension on newly installed belts should be checked daily for the first few days of operation because of the initial stretching. Also, check belts for proper seating in pulley grooves.



RG11587

RG11587 —UN—07DEC00

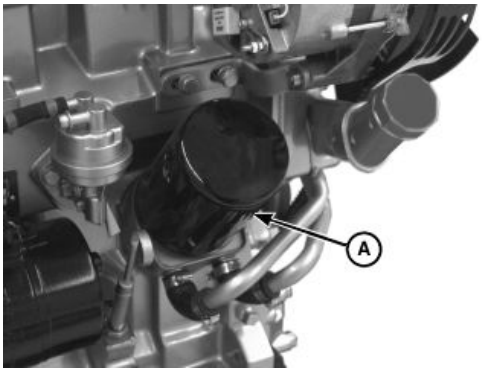
VDO Instrument Panel (Except North America)

A—Coolant Temperature Gauge

RG,RG34710,5046 -19-11FEB03-2/2

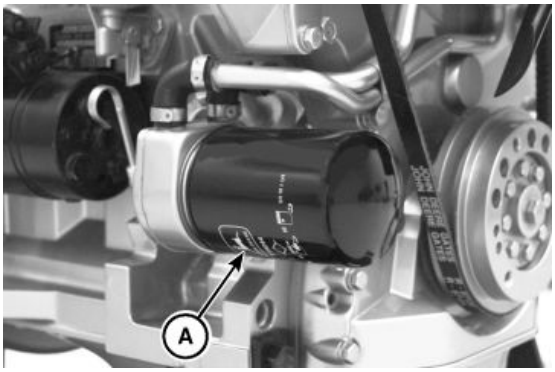
After Break-In Service

NOTE: If the engine has significant operating time at idle, constant speeds, and/or light load usage, or make-up oil is required in the first 100 hour period, a longer break-in period may be required. In these situations, an additional 100 hour break-in period is recommended using a new change of John Deere Engine Break-In Oil and new John Deere oil filter.



RG11529 —UN—01DEC00

Engine Mounted Oil Filter



RG11530 —UN—01DEC00

Engine Mounted Oil Filter

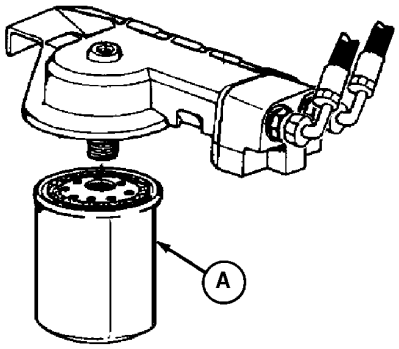
After break-in service, change engine oil and oil filter (A) according to maintenance interval indicated below.

All except 3029TF270 Engines: See CHANGING ENGINE OIL AND REPLACING OIL FILTER in Lubrication and Maintenance/250 Hour Section.

3029TF270 Engines: (See CHANGING ENGINE OIL AND REPLACING OIL FILTER in Lubrication and Maintenance/500 Hour Section.

Fill crankcase with seasonal viscosity grade oil. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant Section.)

A—Oil Filter



RG11549 —UN—06DEC00

3029 Engines with Remote Oil Filter

OURGP12,00001E3 -19-04MAR03-1/1

Normal Engine Operation

Observe engine coolant temperature and engine oil pressure. Temperatures and pressures will vary between engines and with changing operating conditions, temperatures, and loads.

Normal engine coolant operating temperature range is 82°–94°C (180°–202°F). If coolant temperature rises above 112°C (234°F), reduce load on engine. Unless temperature drops quickly, stop engine and determine cause before resuming operation.

Operate the engine under a lighter load and at slower than normal speed for first 15 minutes after start-up. DO NOT run engine at slow idle.

IMPORTANT: Should the engine die while operating under load, immediately remove load and restart the engine. Overheating of the turbocharger parts may occur when oil flow is stopped.

Stop engine immediately if there are any signs of part failure. Symptoms that may be early signs of engine problems are:

- Sudden drop in oil pressure
- Abnormal coolant temperatures
- Unusual noise or vibration
- Sudden loss of power
- Excessive black exhaust
- Excessive fuel consumption
- Excessive oil consumption
- Fluid leaks

RG,RG34710,5045 -19-30JAN98-1/1

Cold Weather Operation

CAUTION: Ether injector starting fluid is highly flammable. DO NOT use starting fluid on engines equipped with air intake heaters.

DO NOT use starting fluid near fire, sparks, or flames. DO NOT incinerate or puncture a starting fluid container.

Engines may be equipped with intake air heaters, coolant heaters, or ether injectors as a cold weather starting aid.

Starting aids are required below 0°C (32°F). They will enhance starting performance above these temperatures and may be needed to start applications that have high parasitic loads during cranking and/or start acceleration to idle.

Using correct grade of oil (per engine and machine operator's manual) is critical to achieving adequate cold weather cranking speed.

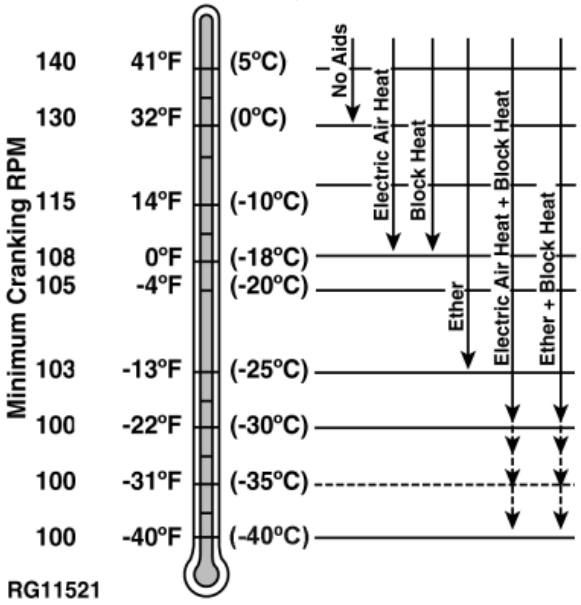
Other cold weather starting aids are required at temperatures below -30°C (-22°F) or at altitudes above 1500 m (5000 ft).

1. Follow steps 1—4 as listed under "STARTING THE ENGINE", then proceed as follows according to the instrument (control) panel on your engine.
2. Switch on the air intake heater for 30 seconds or activate ether injector by following suppliers instructions.
3. Follow remaining steps 5—8 as listed under "STARTING THE ENGINE" earlier in this section.

   Contact the local John Deere dealer, engine distributer, or other service provider for additional information on cold weather operation.

Handle Starting Fluid with Care

TS1356 —UN—18MAR92



Cold Weather Starting Guidelines

RG11521 —19—10JAN01

RG,RG34710,5050 -19-08MAY25-1/1

Warming Engine

IMPORTANT: To assure proper lubrication, operate engine at or below 1200 rpm with no load for 1–2 minutes. Extend this period 2–4 minutes when operating at temperatures below freezing.

Engines used in generator set applications where the governor is locked at a specified speed may not have a slow idle function. Operate these engines at high idle for 1 to 2 minutes before applying the load. This procedure does not apply to standby generator sets where the engine is loaded immediately upon reaching rated speed.

1. Check oil pressure gauge (A) as soon as engine starts. If gauge needle does not rise above minimum oil pressure specification of 105 kPa (1.05 bar) (15.0 psi) within 5 seconds, stop the engine and determine the cause. Normal engine oil pressure is 345 ±103 kPa (3.45 bar ± 1.03 bar) (50 ±15 psi) at rated full load speed (1800–2500 rpm) with oil at normal operating temperature of 105°C (221°F).
2. Watch coolant temperature gauge (B). Do not place engine under full load until it is properly warmed up. The normal engine coolant temperature range is 82°–94°C (180°–202°F).

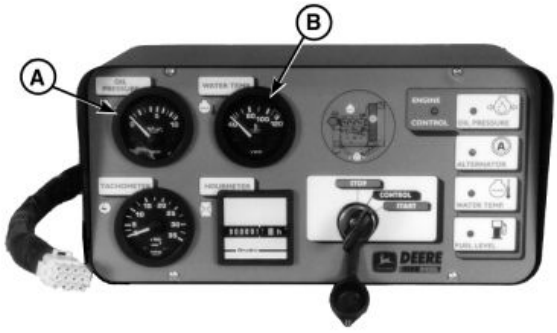
NOTE: It is a good practice to operate the engine under a lighter load and at lower speeds than normal for the first few minutes after start-up.

A—Oil Pressure Gauge

B—Coolant Temperature Gauge

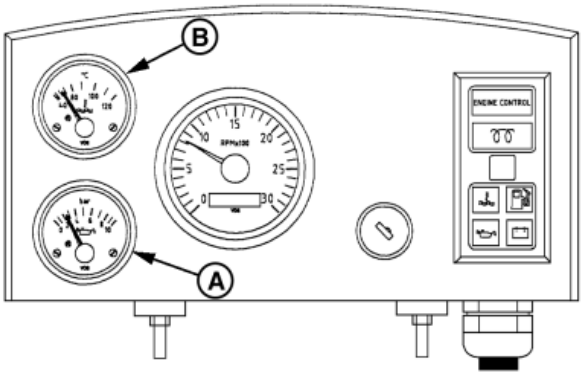
RG11533 —UN—01DEC00

North American Instrument Panel



RG11593 —UN—08DEC00

AEZ Instrument Panel (Except North America)



RG10613 —UN—21OCT99

VDO Instrument Panel (Except North America)

RG,RG34710,5051 -19-30JAN98-1/1

Changing Engine Speed-Standard (Mechanical) Governor

NOTE: Throttle levers are usually supplied by OEM manufacturer. Consult supplier literature to familiarize yourself with throttle lever used on your engine.

To increase engine speed, turn throttle handle (A) to the horizontal position and pull out until desired engine speed is obtained. Turn the handle in either direction to lock throttle position. The handle is pushed inward to decrease engine speed.

A—Throttle Handle

RG11534 —UN—01DEC00

Throttle Handle on North American Instrument Panel

RG,RG34710,5052 -19-30JAN98-1/1

Idling Engine

Avoid excessive engine idling. Prolonged idling may cause the engine coolant temperature to fall below its normal range. This, in turn, causes crankcase oil dilution, due to incomplete fuel combustion, and permits formation of gummy deposits on valves, pistons, and piston rings. It also promotes rapid accumulation of engine sludge and unburned fuel in the exhaust system.

Once an engine is warmed to normal operating temperatures, engine should be idled at slow idle speed.

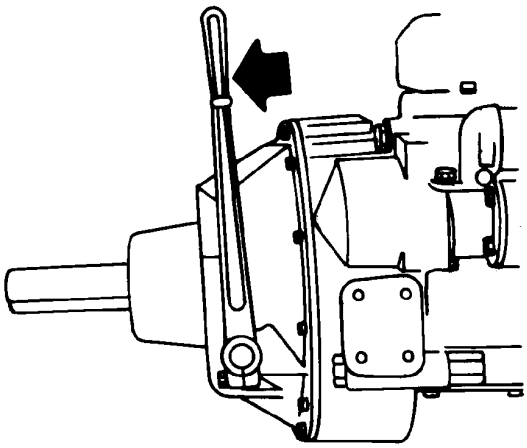
Slow idle speed for this engine is 850 rpm at factory. If an engine will be idling for more than 5 minutes, stop and restart later, or set engine speed at 1200 rpm.

NOTE: Generator set applications where the governor is locked at a specified speed may not have a slow idle function. These engines will idle at no load governed speed (high idle).

RG,RG34710,5053 -19-11FEB03-1/1

Stopping The Engine

1. Pull PTO clutch lever (arrow) rearward (away from engine) to disengage clutch, if equipped.



RG5602 —UN—16JUN00

PTO Clutch Lever

Continued on next page

RG,RG34710,5054 -19-30JAN98-1/2

2. Move the throttle handle (A) to slow idle on standard (mechanical) governor engines.

IMPORTANT: Before stopping an engine that has been operating at working load, idle engine at least 2 minutes at 1000–1200 rpm to cool hot engine parts.

Engines in generator set applications, where the governor is locked at a specified speed and no slow idle function is available, run engine for at least 2 minutes at fast idle and no load.

3. Turn key switch to “OFF” position. Remove ignition key.

IMPORTANT: Make sure that exhaust stack cap (rain cap) is installed when engine is not running. This will prevent water and dirt from entering engine.

A—Throttle Handle

RG11534 —UN—01DEC00

Throttle Handle on North American Instrument Panel

RG10616 —UN—16JUN00

Rain Cap

RG,RG34710,5054 -19-30JAN98-2/2

Using A Booster Battery Or Charger

CAUTION: Gas given off by battery is explosive. Keep sparks and flames away from battery. Before connecting or disconnecting a battery charger, turn charger off. Make last connection and first disconnection at a point away from battery. Always connect NEGATIVE (–) cable last and disconnect this cable first.

IMPORTANT: Be sure that polarity is correct before making connections. Reversed polarity will damage electrical system. Always connect positive to positive and negative to ground. Always use 12 volt booster battery for 12 volt electrical systems and 24 volt booster battery(ies) for 24 volt electrical systems.

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.**

A 12 volt booster battery can be connected in parallel (B) with battery(ies) on the unit to aid in cold weather starting. ALWAYS use heavy-duty jumper cables.

Series:

- Amps = Same as single battery
- Volts = Twice as a single battery

Parallel:

- Amps = Twice as a single battery
- Volts = Same as a single battery

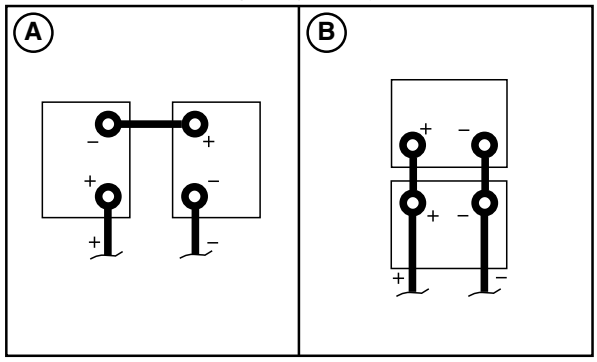
1. Connect booster battery or batteries to produce the required system voltage for your engine application.

NOTE: To avoid sparks, DO NOT allow the free ends of jumper cables to touch the engine.

2. Connect one end of jumper cable to the POSITIVE (+) post of the booster battery.
3. Connect the other end of the jumper cable to the POSITIVE (+) post of battery connected to starter.

Exploding Battery

TS204 —UN—15APR13



RG24885 —UN—17DEC13

A—Series **B—Parallel**

4. Connect one end of the other jumper cable to the NEGATIVE (–) post of the booster battery.
5. ALWAYS complete the hookup by making the last connection of the NEGATIVE (–) cable to a good ground on the engine frame and away from the battery(ies).
6. Start the engine. Disconnect jumper cables immediately after engine starts. Always disconnect NEGATIVE (–) cable first.

RG,RG34710,4060 -19-17DEC13-1/1

Required Emission-Related Information

Service Provider

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems with original or equivalent replacement parts. However, warranty, recall, and all other services paid for by John Deere must be performed at an authorized John Deere service center.

DX,EMISSIONS,REQINFO -19-08DEC23-1/1

Observe Service Intervals

RG11589 —UN—08DEC00

North American Instrument Panel Hour Meter

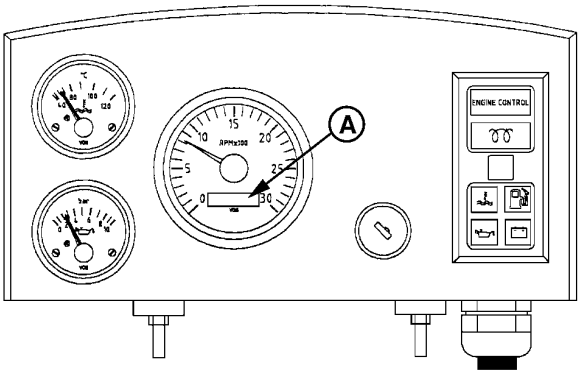
RG11594 —UN—08DEC00

AEZ Instrument Panel Hour Meter

Using hour meter (A) as a guide, perform all services at the hourly intervals indicated on following pages. At each scheduled maintenance interval, perform all previous maintenance operations in addition to the ones specified. Keep a record of hourly intervals and services performed using charts provided in Lubrication and Maintenance Records Section.

IMPORTANT: Recommended service intervals are for normal operating conditions. Service MORE OFTEN if engine is operated under adverse conditions. Neglecting maintenance can result in failures or permanent damage to the engine.

A—Hour Meter



RG10618 —UN—21OCT99

VDO Instrument Panel Hour Meter

RG,RG34710,5056 -19-30JAN98-1/1

Use Correct Fuels, Lubricants, And Coolant

IMPORTANT: Use only fuels, lubricants, and coolants meeting specifications outlined in Fuels, Lubricants, and Coolant Section when servicing your John Deere Engine.

Consult your John Deere Servicing Distributor or your nearest John Deere Parts Network for recommended fuels, lubricants, and coolant. Also available are necessary additives for use when operating engines in tropical, arctic, or any other adverse conditions.

TS100 —UN—23AUG88

John Deere Parts

RG,RG34710,5057 -19-30JAN98-1/1

Lubrication And Maintenance Service Interval Chart

	Lubrication and Maintenance Service Intervals					
Item	Daily[a]	250 Hour or 6 Month	500 Hour or 12 Month	600 Hours of Operation	2000 Hour or 24 Month	As Required
Check Engine Oil and Coolant Level	•					
Lubricate PTO Release Bearing	•					
Check Air Cleaner Dust Unloader Valve and Restriction Indicator[b]	•					
Visual Walk Around Inspection	•					
Check Fuel Filter	•					
Service Fire Extinguisher		•				
Lubricate PTO Clutch Shaft Bearing		•				
Service Battery		•				
Check Fan and Alternator Belt Tension		•				
Check PTO Clutch Adjustment		•				
Check Engine Mounts		•				
Change Engine Oil and Filter — All except 3029TF270 and 3029HF270 Engines[c ,d]		•				
Change Engine Oil and Filter — 3029TF270 and 3029HF270 Engines			•			
Check Engine Ground Connection			•			
Lubricate PTO Clutch Levers and Linkage (If Equipped)			•			
Clean Crankcase Vent Tube			•			
Check Air Intake Hoses, Connections, and System			•			
Replace Fuel Filter / Bleed System			•			
Coolant Solution Analysis — Add SCAs as needed			•			
Pressure Test Cooling System			•			
Check Engine Speeds			•			
Check Cooling System			•			
Test Thermostats					•	
Adjust Variable Speed (Droop) (Genset Only)					•	
Check and Adjust Valve Clearance				•		
Flush and Refill Cooling System[e]					•	
Add Coolant						•
Bleed Fuel System						•
Replace Air Cleaner Elements						•
Replace Belts						•
Inspect PTO Clutch (If Equipped)						•
Check Fuses						•

[a]Standby generator applications may allow intervals up to every 2 weeks.
[b]Replace primary air cleaner element when restriction indicator shows a vacuum of 625 mm (25 in) H2O.
[c]During engine break-in, change the oil and filter for the first time before 100 hours of operation.
[d]Service intervals depend on sulfur content of the diesel fuel, oil pan capacity, and the oil and filter used, which means that intervals may be REDUCED. (See DIESEL ENGINE OIL AND FILTER SERVICE INTERVALS in Fuels, Lubricants, and Coolant Section.)

Continued on next page

RG,RG34710,5058 -19-25JUN18-1/2

[e]*If John Deere COOL-GARD is used, the flushing and refilling interval may be extended to 3000 hours or 36 months. If John Deere COOL-GARD is used and the coolant is tested annually AND additives are replenished by adding supplemental coolant additive, the flushing and refilling interval may be extended to 5000 hours or 60 months, whichever occurs first.*

RG,RG34710,5058 -19-25JUN18-2/2

Daily Prestarting Checks

Do the following BEFORE STARTING THE ENGINE for the first time each day:

Check Engine Oil Level

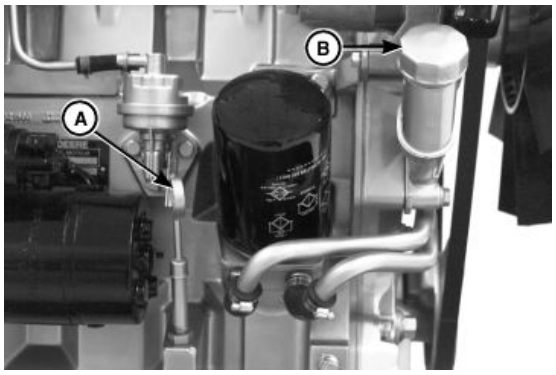
IMPORTANT: There is no need to add makeup oil until the oil level is BELOW the add mark.

DO NOT fill above the top mark on the dipstick. Oil levels anywhere within arrows (C) or crosshatch (D), whichever is present, are considered in the acceptable operating range.

1. Check engine oil level on dipstick (A). Oil level on dipstick should be within arrows (C) or crosshatch (D). Add oil at filler cap (B) as required, using seasonal viscosity grade oil. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant Section for oil specifications.)

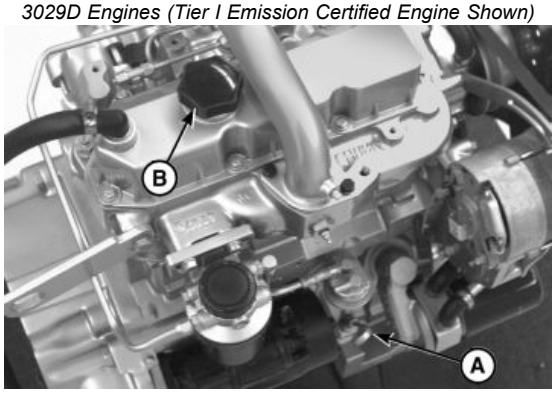
Some engines may have the oil filler cap on rocker arm cover, while others will have the filler cap on the timing gear cover.

A—Dipstick
B—Oil Filler Cap
C—Arrows
D—Crosshatch



3029D Engines (Tier I Emission Certified Engine Shown)

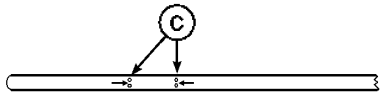
RG11536 —UN—01DEC00



3029T Engines (Tier I Emission Certified Engine Shown)

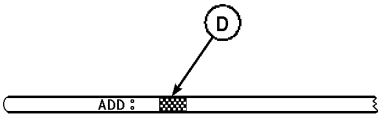
RG11595 —UN—08DEC00

RG11537 —UN—01DEC00



Correct Oil Level Within Arrows

RG11538 —UN—01DEC00



Correct Oil Level Within Crosshatch

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RG,RG34710,5059 -19-07MAY25-1/5

Check Coolant Level

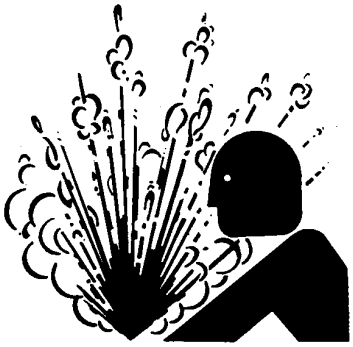
CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

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

1. Check the coolant level when engine is cold. Coolant level should be at bottom of filler neck. Fill radiator (A) with proper coolant solution if level is low. (See ADDING COOLANT in Service As Required Section.) Check overall cooling system for leaks.

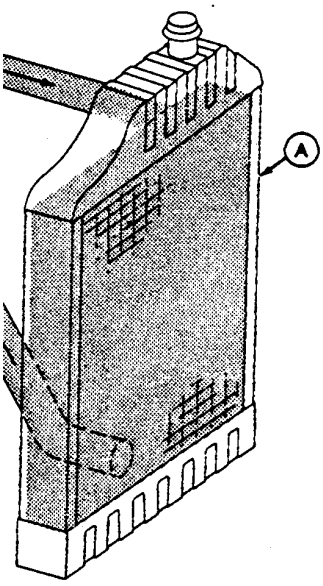
Refer to your vehicle's operator's manual for recommendations for non-John Deere supplied accessories.

A—Radiator



TS281 —UN—15APR13

Beware of Hot Fluids Under Pressure



RG4675 —UN—14DEC88

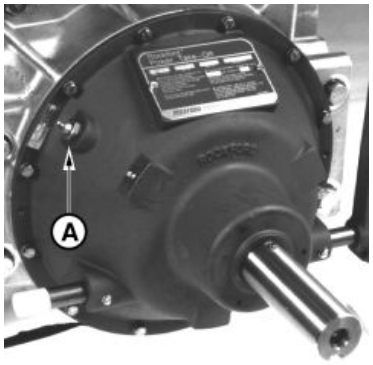
Coolant Level in Radiator

RG,RG34710,5059 -19-07MAY25-2/5

Lubricate PTO Bearing

1. Apply one shot of John Deere Multi-Purpose Lubricant or equivalent at PTO release bearing grease fitting (A). DO NOT over lubricate.

A—Grease Fitting



RG7331 —UN—20JUN00

PTO Release Bearing

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RG,RG34710,5059 -19-07MAY25-3/5

Check Air Cleaner

IMPORTANT: Maximum air intake restriction is 3.5 kPa (0.03 bar) (0.5 psi) (14 in.) H_2O. A clogged air cleaner element will cause excessive intake restriction and a reduced air supply to the engine.

1. Squeeze dust unloader valve (A) on air cleaner assembly to remove dust deposits. If clogged, remove and clean the dust unloader valve. Replace if damaged.

IMPORTANT: Do not operate engine without the dust unloader valve.

If equipped with air intake restriction indicator gauge (B), check gauge. Service air cleaner when indicator is red.

Inspect Engine Compartment

1. Make a thorough inspection of the engine compartment. Look for oil or coolant leaks, worn fan and accessory drive belts, loose connections and trash build-up. Remove trash build-up and have repairs made as needed if leaks are found.

NOTE: Wipe all fittings, caps, and plugs before performing any maintenance to reduce the chance of system contamination.

Inspect:
- Radiator for leaks and trash build-up.
- Air intake system hoses and connections for cracks and loose clamps.
- Fan, alternator, and accessory drive belts for cracks, breaks or other damage.
- Water pump for coolant leaks.

NOTE: It is normal for a small amount of leakage to occur as the engine cools down and parts contract. Excessive coolant leakage may indicated the need to replace the water pump seal. Contact the local John Deere dealer, engine distributor, or other servicing dealer for repairs.

RG11535 —UN—01DEC00

European Air Cleaner

RG7332 —UN—06JAN99

North American Air Cleaner

A—Dust Unloader Valve **B—Restriction Indicator Gauge**

Continued on next page

RG,RG34710,5059 -19-07MAY25-4/5

Checking Fuel Filter

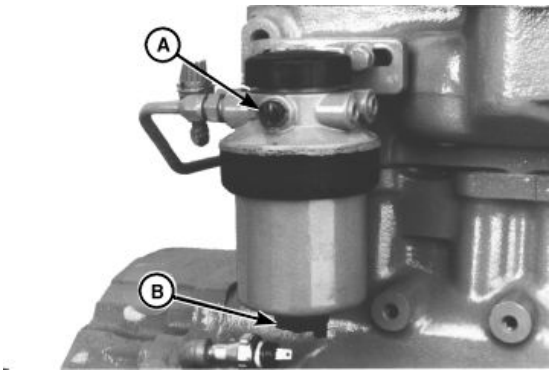
Check the fuel filter daily for water or debris and drain as necessary.

IMPORTANT: Drain water into a suitable container and dispose of properly.

1. Loosen drain plug (B) at bottom of fuel filter two or three turns.
2. Loosen air bleed plug (A) two full turns on fuel filter base and drain water from bottom until fuel starts to drain out.
3. When fuel starts to drain out, hand tighten drain plug.

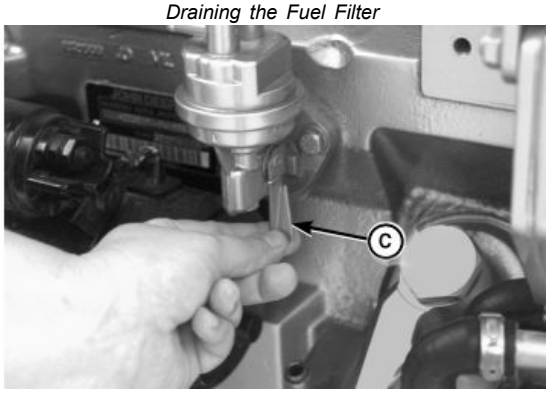
   After draining water from the fuel filter, the filter must be primed by bleeding all air from the fuel system.
4. Operate primer lever (C) of the fuel supply pump until fuel flow is free from air bubbles.
5. Tighten bleed plug (A) securely by hand. Continue operating hand primer until pumping action is not felt. When finished, pull hand primer outward (away from engine) as far as it will go.

   If the fuel system needs further bleeding of air, see BLEED FUEL SYSTEM in Service As Required Section, later in this manual.



Draining the Fuel Filter

RG11539 —UN—01DEC00



Fuel Supply Pump Primer Lever

RG11540 —UN—01DEC00

A—Bleed Plug
B—Drain Plug
C—Primer Lever

RG,RG34710,5059 -19-07MAY25-5/5

Servicing Fire Extinguisher

A fire extinguisher (A) is available from the local John Deere dealer, engine distributor, or other service provider.

Read and follow the instructions which are packaged with it. The extinguisher should be inspected at least every 250 hours of engine operation or once a month. Once extinguisher is operated, no matter how long, it must be recharged. Keep record of inspections on the tag which comes with the extinguisher instruction booklet.

A—Fire Extinguisher

RW4918 —UN—15DEC88

Service Fire Extinguisher

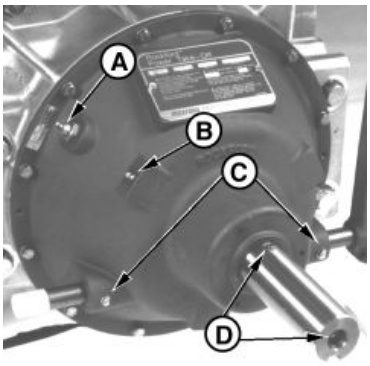
RG,RG34710,5062 -19-07MAY25-1/1

Lubricating PTO Clutch Shaft Bearings

Apply one or two shots of John Deere Multipurpose Lubricant or equivalent at clutch drive shaft bearing fitting (B) and pilot bearing fittings (D). DO NOT over-lubricate to avoid getting oil on clutch facings.

NOTE: Location of pilot bearing fitting will depend on application. Only one fitting will be used.

A—Release Bearing Grease Fitting
B—Drive Shaft Bearing Fitting
C—Lever Cross Shaft Fittings
D—Pilot Bearing Fitting



RG7331C —UN—26JUN00

Lubricate PTO Clutch

RG,RG34710,5061 -19-30JAN98-1/1

Servicing Battery

CAUTION: 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 NEGATIVE (—) battery clamp first and replace it last.

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.**

1. On regular batteries, check electrolyte level. Fill each cell to bottom of filler neck with distilled water.

NOTE: Low-maintenance or maintenance-free batteries should require little additional service. However, electrolyte level can be checked by cutting the center section of decal on dash-line, and removing cell plugs. If necessary, add clean, soft water to bring level to bottom of filler neck.

2. Keep batteries clean by wiping them with a damp cloth. Keep all connections clean and tight. Remove any corrosion, and wash terminals with a solution of 1 part baking soda and 4 parts water. Tighten all connections securely.

TS204 —UN—15APR13

Exploding Battery

NOTE: Coat battery terminals and connectors with a mixture of petroleum jelly and baking soda to retard corrosion.

3. Keep battery fully charged, especially during cold weather. If a battery charger is used, turn charger off before connecting charger to battery(ies). Attach POSITIVE (+) battery charger lead to POSITIVE (+) battery post. Then attach NEGATIVE (—) battery charger lead to a good ground.

Continued on next page

RG,RG34710,7563 -19-13FEB03-1/2

CAUTION: 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. **Using 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 10—15 minutes. Get medical attention immediately.**

If acid is swallowed:

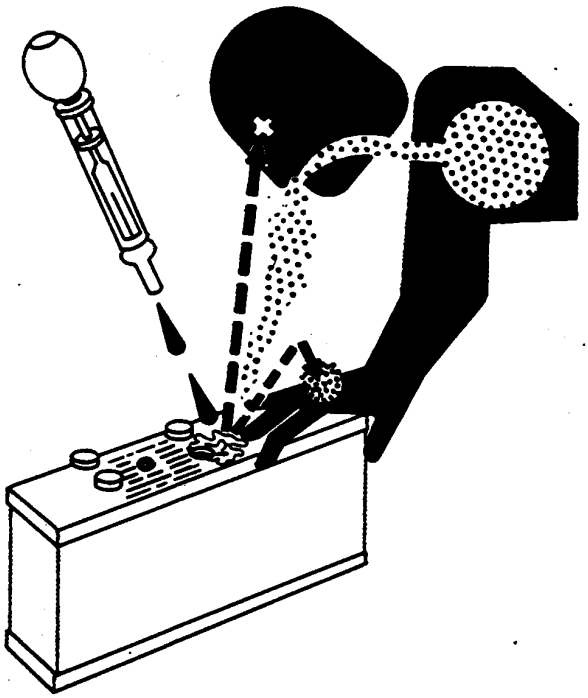
1. **Drink large amounts of water or milk.**
2. **Then drink milk of magnesia, beaten eggs, or vegetable oil.**
3. **Get medical attention immediately.**

In freezing weather, run engine at least 30 minutes to ensure thorough mixing after adding water to battery.

Replacement battery(ies) must meet or exceed the following recommended capacities[1] at —18°C (0°F):

	Specification
12-Volt System—Minimum Battery Capacity—Cold Cranking Amps	640 Minimum
24-Volt System—Minimum Battery Capacity—Cold Cranking Amps	570 Minimum

[1] Total recommended capacity based on batteries connected in series or parallel.



TS203 —UN—23AUG88

Sulfuric Acid

RG,RG34710,7563 -19-13FEB03-2/2

Changing Engine Oil And Replacing Oil Filter-All Except 3029TF270 Engines

NOTE: Change engine oil and filter for the first time after 100 hours maximum of operation, then every 250 hours thereafter.

If John Deere PLUS-50 engine oil **and** the specified John Deere oil filter are used, the oil and filter change interval may be increased by 50% to 375 hours.

OILSCAN is a John Deere sampling program to help monitor machine performance and identify potential problems before they cause serious damage. OILSCAN kits are available from the local John Deere dealer or other service provider. Oil samples should be taken prior to the oil change. Refer to instructions provided with kit.

To change engine oil and filter:

1. Run engine approximately 5 minutes to warm up oil. Shut engine off.
2. Remove oil pan drain plug (arrow).

RG4881 —UN—29NOV88

Oil Pan Drain Plug

NOTE: Drain plug location may vary, depending on the application.

3. Drain crankcase oil from engine while warm.

Continued on next page

RG,RG34710,5064 -19-07MAY25-1/3

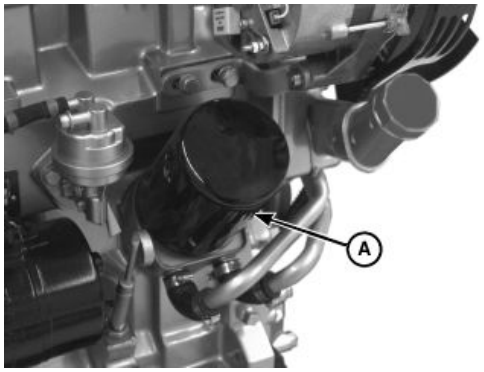
4. Remove and discard oil filter (A) using a suitable filter wrench.

NOTE: Depending on engine application, oil filter may be either vertical or horizontal on either engine model.

5. Remove oil filter packing and clean filter mounting pad.
6. Oil new packing and install new filter element. Hand tighten element according to values printed on filter element. If values are not provided, tighten element approximately 3/4—1-1/4 turn after packing contacts filter housing. DO NOT overtighten filter element.
7. Install oil pan drain plug with a new seal when equipped and tighten using the following specifications.

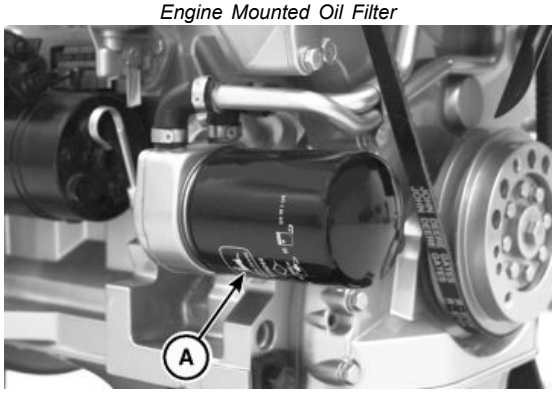
Conical Plug	55 Ṅm (41 lb-ft)
Cylindrical Plug W/Copper Washer	70 Ṅm (52 lb-ft)
Cylindrical Plug W/O-Ring	50 Ṅm (37 lb-ft)

A—Oil Filter



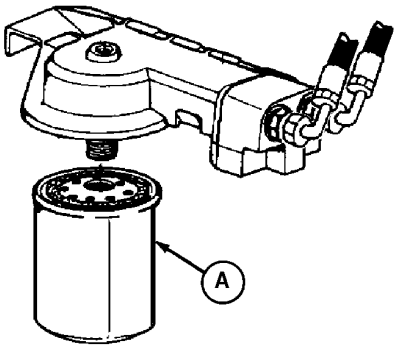
RG11529 —UN—01DEC00

Engine Mounted Oil Filter



RG11530 —UN—01DEC00

Engine Mounted Oil Filter



RG11549 —UN—06DEC00

Engines W/Remote Oil Filter

Continued on next page

RG,RG34710,5064 -19-07MAY25-2/3

8. Fill engine crankcase with correct John Deere engine oil through timing gear cover opening (A) or rocker arm cover opening (B), depending on engine application. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant Section for determining correct engine oil.)

NOTE: Crankcase oil capacity may vary slightly. ALWAYS fill crankcase to top arrow or within crosshatch on dipstick, whichever is present. This should be checked after engine has run and oil has drained back into crankcase. DO NOT overfill.

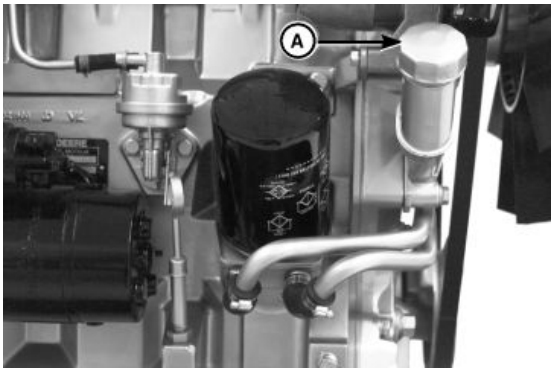
To determine the correct oil fill quantity for your engine, see ENGINE CRANKCASE OIL FILL QUANTITIES in the Specifications Section.

IMPORTANT: Immediately after completing any oil change, crank engine for 30 seconds without permitting engine to start. This will help insure adequate lubrication to engine components before engine starts.

9. Start engine and run to check for possible leaks.

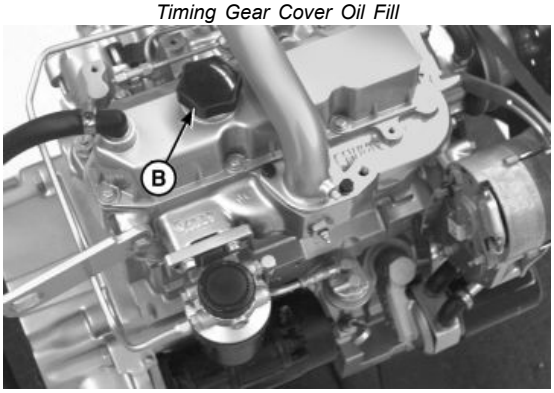
10. Stop engine and check oil level after 10 minutes. Oil level reading should be between arrows (C) or within crosshatch (D) of dipstick.

A—Timing Gear Cover Opening
B—Rocker Arm Cover Opening
C—Arrows
D—Crosshatch



Timing Gear Cover Oil Fill

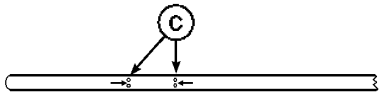
RG11541 —UN—01DEC00



Rocker Arm Cover Oil Fill

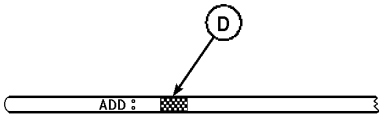
RG11596 —UN—08DEC00

RG11537 —UN—01DEC00



Correct Oil Level Within Arrows

RG11538 —UN—01DEC00



Correct Oil Level Within Crosshatch

RG,RG34710,5064 -19-07MAY25-3/3

Checking Fan And Alternator V-Belt Tension

Low belt tension causes slippage resulting in excessive cover wear, burn spots, overheating, or "slip and grab", causing belt breakage.

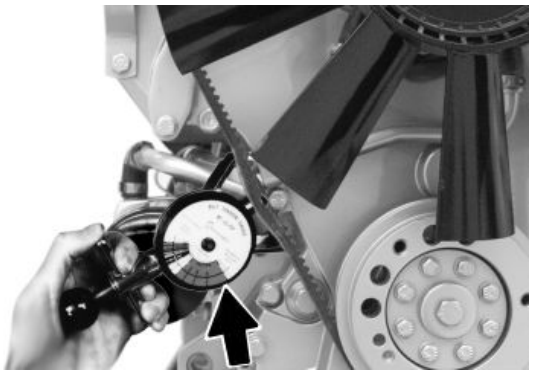
High belt tension causes belt heating and excessive stretch, as well as damage to drive components such as pulleys and shafts. V-belts should ride on the sides of standard pulleys not on the bottom of the groove.

Standard V-belt tension can be checked with JDG529 Tension Gauge (bold arrow) or equivalent gauge. (Gauge is available from a John Deere dealer, distributor, or other service provider.)

NOTE: On engines with dual belts, check tension of front belt only.

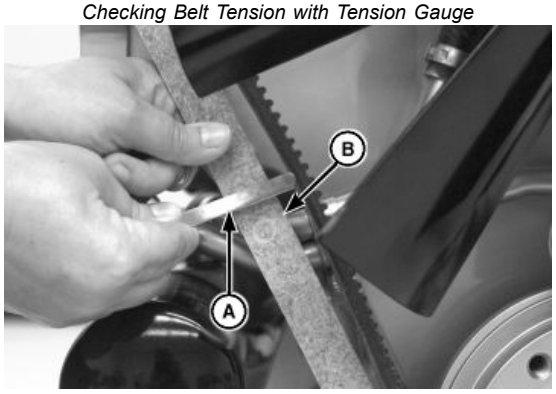
1. Inspect belts for cracks, fraying, or stretched out areas. Replace if necessary.
2. Using JDG529 Belt Tension Gauge, or belt tension tester (A) and straightedge (B), check tension of warm belts:
   a. When using JDG529 Belt Tension Gauge, measure belt tension and compare with specifications on next page.
   b. Belt deflection when using belt tension tester (A) with straightedge (B), with force applied halfway between pulleys.

Specification	
Standard V-Belt with 89 N (20 lb) force—Deflection	19 mm (3/4 in.)



RG7333 —UN—01DEC00

Checking Belt Tension with Tension Gauge



RG7334 —UN—01DEC00

Checking Belt Tension with Straightedge

A—Tension Tester **B—Straightedge**

RG,RG34710,5065 -19-07MAY25-1/2

3. If adjustment is necessary, loosen alternator bracket cap screw (C) and nut (D) on mounting bolt. Pull alternator frame outward until belts are correctly tensioned.

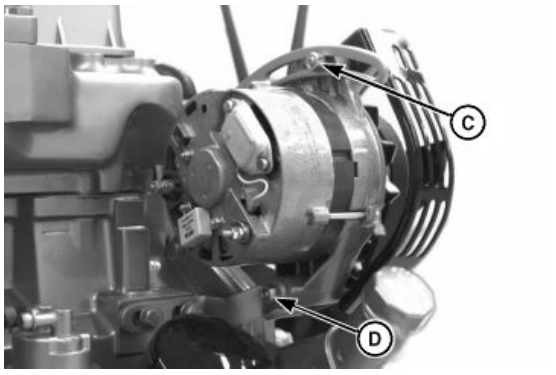
IMPORTANT: Do not pry against the alternator rear frame. Do not tighten or loosen belts while they are hot.

4. Tighten alternator bracket cap screw and nut firmly.
5. After a new or used belt has run for 10 minutes, recheck belt tension.

STANDARD V-BELTS

	New Belt Tension	Used Belt Tension[a]
Single Belt	578—623 N (130—140 lb force)	378—423 N (85—95 lb force)
Dual Belts	423—463 N (95—104 lb force)	378—423 N (85—95 lb force)

[a] *Belts are considered used after 10 minutes of operation.*



RG7329 —UN—01DEC00

Alternator Mounting Brackets

C—Cap Screw **D—Nut**

RG,RG34710,5065 -19-07MAY25-2/2

Checking PTO Clutch Adjustment

CAUTION: Never attempt to service the PTO while it is in operation. Loose clothing could get caught in moving parts; keep clothing tight against body. Use extreme care when working around the PTO.

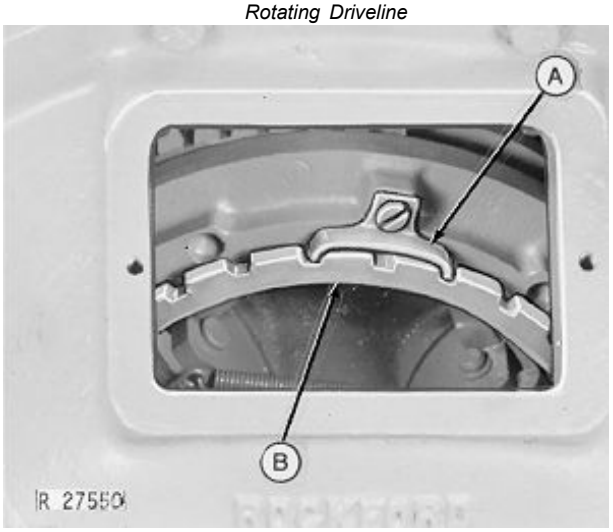
1. Measure clutch engagement force at handle grip using a spring scale. The engagement force should be 267–311 N (60–70 lb force).

IMPORTANT: Improper adjustments of the PTO clutch may shorten clutch life. Make sure adjustments are made properly.

2. If adjustments are needed, disengage clutch and stop engine. Remove cover plate from clutch housing (shown removed).
3. Remove adjusting lock (A).
4. Turn adjusting ring (B) to adjust clutch engagement pressure.
5. Measure engagement force at clutch handle with spring scale.
6. Install lock screw and adjusting lock in clutch body splines when specified engagement pressure is achieved.
7. Tighten screw securely.
8. Recheck clutch engagement force with spring scale. Install cover plate. Disengage clutch.

TS198 —UN—23AUG88

Rotating Driveline



R27550 —UN—14DEC88

PTO Clutch Adjustment

A—Adjusting Lock **B—Adjusting Ring**

RG,RG34710,4068 -19-01JAN96-1/1

Checking Engine Mounts

Engine mounting is the responsibility of the vehicle or generator manufacturer. Follow manufacturer's guidelines for mounting specifications.

IMPORTANT: Use only Grade SAE 8 or higher grade of hardware for engine mounting.

1. Check the engine mounting bracket, vibration isolators, and mounting bolts on support frame and engine block for tightness. Tighten as necessary.
2. Inspect overall condition of vibration isolators, if equipped. Replace isolators if rubber has deteriorated or mounts have collapsed, as necessary.

DPSG,RG34710,111 -19-07JAN02-1/1

Changing Engine Oil And Replacing Oil Filter—3029TF270 Engines Only

Your engine is equipped with a special oil filter (A).

NOTE: During break-in, change engine oil and filter for the first time before 100 hours maximum of operation.

After break-in, if John Deere PLUS-50™ or ACEA-E7/E6/E5/E4 engine oil **and** a John Deere special oil filter are used, the oil and filter change interval is 500 hours or every 12 months, whichever comes first.

NOTE: If the above recommendations are not followed, the oil and filter change interval is every 250 hours/ or 6 months. If diesel fuel with a high sulfur content is used, the oil and filter change interval is also reduced. (See DIESEL ENGINE OIL in the "Fuels, Lubricants, and Coolant" Section.)

OILSCAN™ or OILSCAN PLUS™ is a John Deere sampling program to help monitor machine performance and identify potential problems before they cause serious damage. OILSCAN™ and OILSCAN PLUS™ kits are available from a John Deere dealer, engine distributor, or other servicing dealer. Oil samples should be taken prior to the oil change. Refer to instructions provided with kit.

To change engine oil and oil filter:

1. Run engine approximately 5 minutes to warm up oil. Shut engine off.
2. Remove oil pan drain plug (arrow).

NOTE: Drain plug location may vary, depending on the application.

RG11616 —UN—24OCT01

Special Oil Filter

RG4881 —UN—29NOV88

Oil Pan Drain Plug

A—Oil Filter Element

3. Drain crankcase oil from engine while warm.

PLUS-50 is a trademark of Deere & Company.
OILSCAN is a trademark of Deere & Company.
OILSCAN PLUS is a trademark of Deere & Company.

Continued on next page

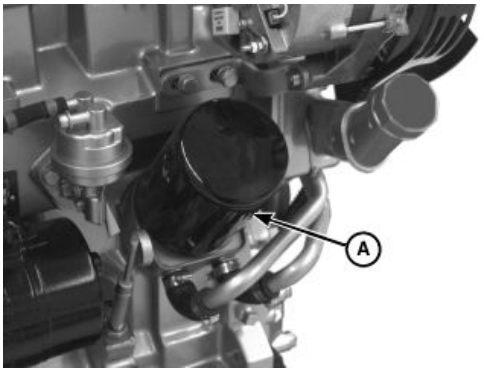
4. Remove and discard oil filter (A) using a suitable filter wrench.

NOTE: Depending on engine application, oil filter may be either vertical or horizontal on either engine model.

5. Remove oil filter packing and clean filter mounting pad.
6. Oil new packing and install new filter element. Hand tighten element according to values printed on filter element. If values are not provided, tighten element approximately 3/4—1-1/4 turn after packing contacts filter housing. DO NOT overtighten filter element.
7. Install oil pan drain plug with a new seal when equipped and tighten using the following specifications.

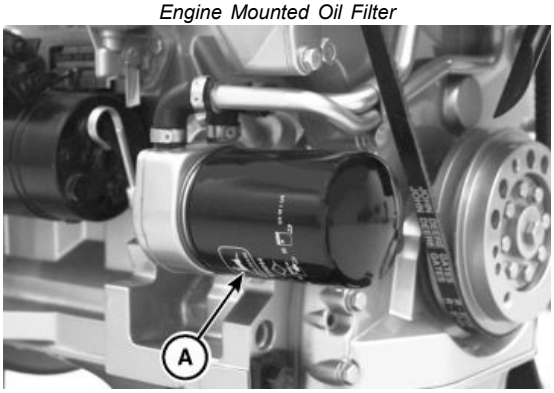
Conical Plug	55 Ṅm (41 lb-ft)
Cylindrical Plug W/Copper ..... Washer	70 Ṅm (52 lb-ft)
Cylindrical Plug W/O-Ring	50 Ṅm (37 lb-ft)

A—Oil Filter



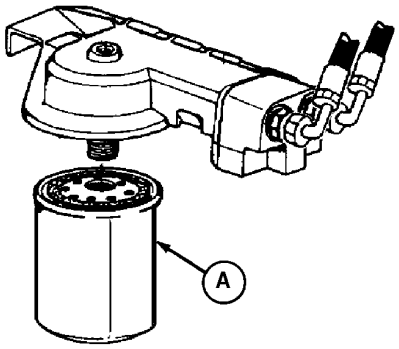
RG11529 —UN—01DEC00

Engine Mounted Oil Filter



RG11530 —UN—01DEC00

Engine Mounted Oil Filter



RG11549 —UN—06DEC00

Engines W/Remote Oil Filter

Continued on next page

8. Fill engine crankcase with correct John Deere engine oil through timing gear cover opening (A) or rocker arm cover opening (B), depending on engine application. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant Section for determining correct engine oil.)

NOTE: Crankcase oil capacity may vary slightly. ALWAYS fill crankcase to top arrow or within crosshatch on dipstick, whichever is present. This should be checked after engine has run and oil has drained back into crankcase. DO NOT overfill.

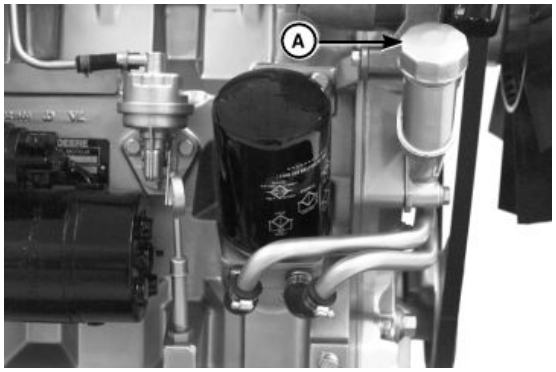
To determine the correct oil fill quantity for your engine, see ENGINE CRANKCASE OIL FILL QUANTITIES in the Specifications Section.

IMPORTANT: Immediately after completing any oil change, crank engine for 30 seconds without permitting engine to start. This will help insure adequate lubrication to engine components before engine starts.

9. Start engine and run to check for possible leaks.

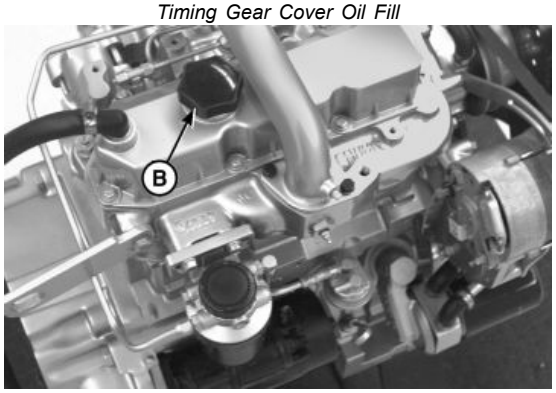
10. Stop engine and check oil level after 10 minutes. Oil level reading should be between arrows (C) or within crosshatch (D) of dipstick.

A—Timing Gear Cover Opening
B—Rocker Arm Cover Opening
C—Arrows
D—Crosshatch



RG11541 —UN—01DEC00

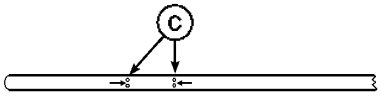
Timing Gear Cover Oil Fill



RG11596 —UN—08DEC00

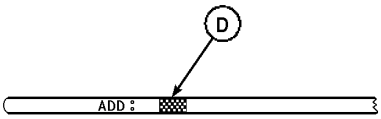
Rocker Arm Cover Oil Fill

RG11537 —UN—01DEC00



Correct Oil Level Within Arrows

RG11538 —UN—01DEC00



Correct Oil Level Within Crosshatch

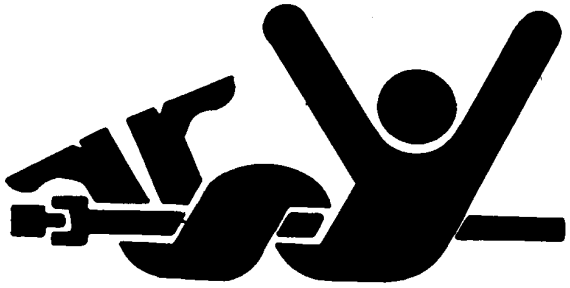
OUOD005,00001D7 -19-07MAY25-3/3

Lubricating PTO Clutch Internal Levers And Linkage

CAUTION: Never attempt to service the PTO while it is in operation. Loose clothing could get caught in moving parts; keep clothing tight against body. Use extreme care when working around the PTO.

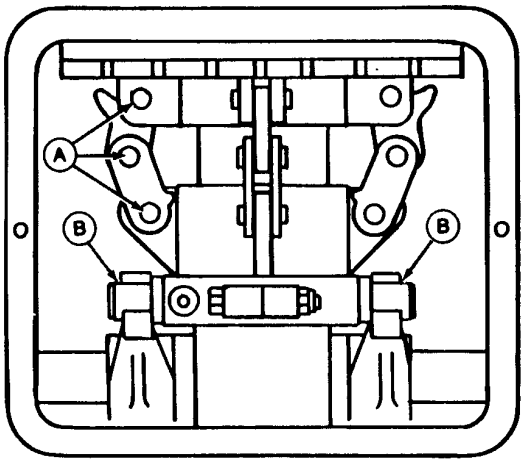
1. Remove the PTO housing cover and apply one shot of John Deere Multipurpose Lubricant or equivalent (See FUELS, LUBRICANTS, and COOLANT Section) to the pivot points (A) of each clutch linkage.
2. Apply one shot of John Deere Multipurpose Lubricant or equivalent to the two PTO release lever shaft fittings (B).

A—Pivot Points **B—Fittings**



TS198 —UN—23AUG88

Use Extreme Care When Working Around the PTO



RG6641 —UN—18FEB93

Lubrication Internal Parts of PTO Clutch

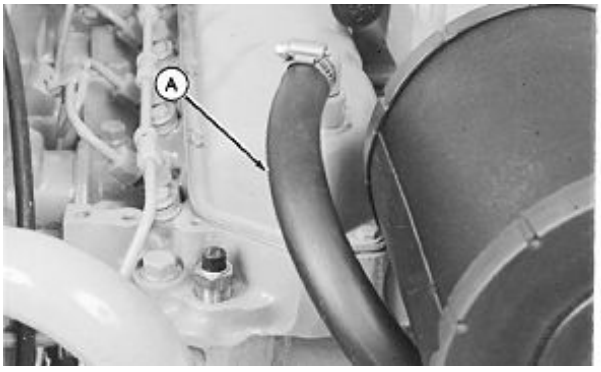
RG,RG34710,5068 -19-30JAN98-1/1

Cleaning Crankcase Vent Tube

If you operate the engine in dusty conditions, clean the tube at shorter intervals.

1. Remove and clean crankcase vent tube (A).
2. Install the vent tube. Be sure the tube is not pinched and O-ring fits correctly in the rocker arm cover for elbow adapter. Tighten hose clamp securely.

A—Vent Tube



RG6005 —UN—27JAN92

Crankcase Vent Tube

RG,RG34710,5069 -19-30JAN98-1/1

Checking Air Intake System

IMPORTANT: The air intake system must not leak. Any leak, no matter how small, may result in engine failure due to abrasive dirt and dust entering the intake system.

1. Inspect all intake hoses (piping) for cracks. Replace as necessary.
2. Check clamps (A) on piping which connect the air cleaner, engine, and, if present, turbocharger. Tighten clamps as necessary. This will help prevent dirt from entering the air intake system through loose connections causing internal engine damage.
3. If engine has a rubber dust unloader valve (B), inspect the valve on bottom of air cleaner for cracks or plugging. Replace as necessary.

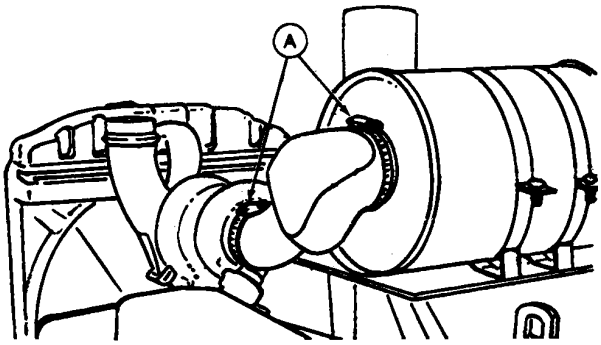
IMPORTANT: ALWAYS REPLACE primary air cleaner element when air restriction indicator is red or shows a vacuum of at least 3.5 kPa (14 in.) H_2O, is torn, or visibly dirty.

4. Test air restriction indicator (C) for proper operation. Replace indicator as necessary.

IMPORTANT: If not equipped with air restriction indicator, replace air cleaner elements at 500 Hours or 12 Months, whichever occurs first.

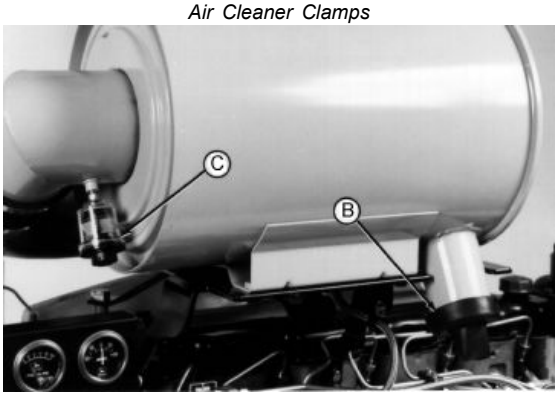
5. Remove and inspect primary air cleaner element. Service as necessary. (See INSPECTING PRIMARY FILTER ELEMENTand REPLACING AIR CLEANER ELEMENTS in Service As Required Section.)

A—Clamps
B—Unloader Valve
C—Restriction Indicator



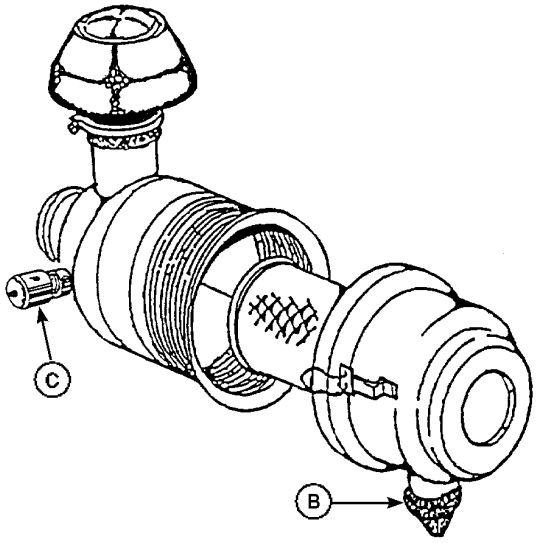
RG4689 —UN—20DEC88

Air Cleaner Clamps



RG11067 —UN—05JUN00

North American Air Cleaner



RG11542 —UN—01DEC00

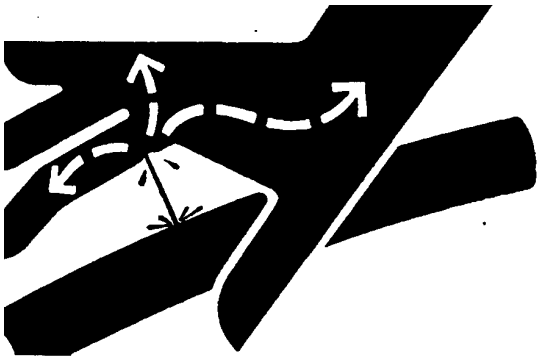
European Air Cleaner

RG,RG34710,5070 -19-11FEB03-1/1

Replacing Fuel Filter/Bleeding System

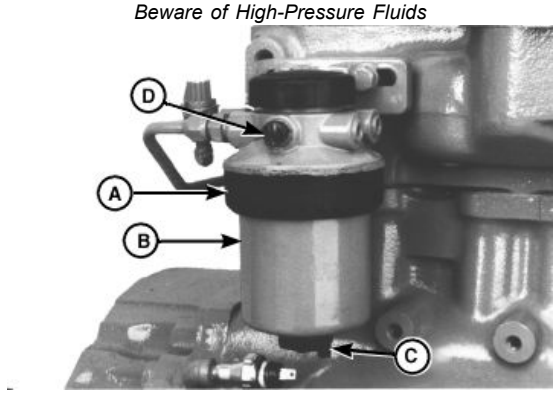
CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



X9811 —UN—23AUG88

Beware of High-Pressure Fluids



RG11543 —UN—01DEC00

Fuel Filter

A—Retaining Ring
B—Filter Element
C—Filter Drain Plug
D—Air Bleed Plug

1. Close fuel shut-off valve at tank, if equipped.
2. Thoroughly clean fuel filter assembly and surrounding area.
3. Loosen filter drain plug (C) and air bleed plug (D). Drain fuel into a suitable container. Dispose of fuel in an environmentally safe manner.

NOTE: Lifting up on retaining ring as it is rotated helps to get it past raised locators.

4. Firmly grasp the retaining ring (A), lift up and rotate it clockwise 1/4 turn. Remove ring with filter element (B).
5. Save retaining ring and (if equipped) water separator bowl for reuse.
6. Remove red plug from new filter and install into removed filter to protect the environment from leaking fuel.
7. Inspect filter mounting base for cleanliness. Clean as required.

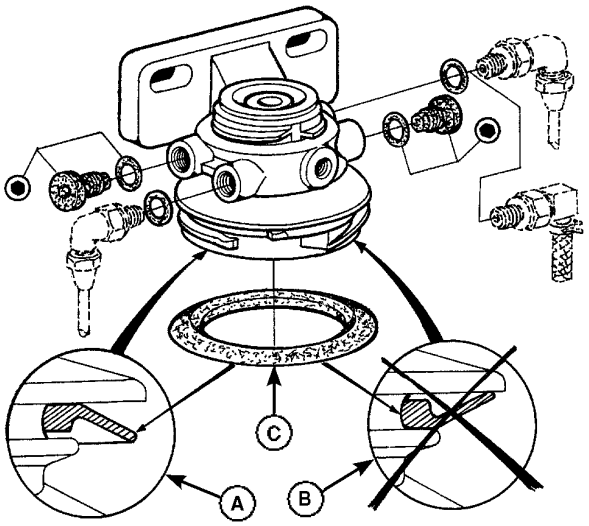
Continued on next page

RG,RG34710,5071 -19-13FEB03-1/2

8. Inspect condition of dust seal (C). Replace if necessary. Install dust seal as shown.

NOTE: Proper installation is indicated when a "click" is heard and a release of pressure on the ring is felt.

9. Align keys on filter element with slots in filter base, then tighten retaining ring counterclockwise 1/4 turn until it "snaps" into the detent. DO NOT overtighten.
10. If equipped with water separator, remove water separator bowl from removed filter element. Drain and clean separator bowl. Dry with compressed air. Install water separator bowl onto new element. Tighten securely.
11. Leave fuel shut-off valve open and bleed the fuel system. (See BLEED FUEL SYSTEM in Service As Required Section.) Tighten bleed plug.



RG9187 —UN—01DEC00

A—Correct Installation
B—Incorrect Installation
C—Seal

Fuel Filter Dust Seal Installation

RG,RG34710,5071 -19-13FEB03-2/2

Checking Cooling System

CAUTION: 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.

IMPORTANT: Air must be expelled from cooling system when system is refilled. Loosen temperature sending unit fitting at rear of cylinder head to allow air to escape when filling system. Retighten fitting when all the air has been expelled.

1. Check entire cooling system for leaks. Tighten all clamps securely.
2. Thoroughly inspect all cooling system hoses. Replace hoses when hardened, softened, or cracked.

TS281 —UN—15APR13

Beware of Pressurized Fluids

3. If coolant must be added, use mixture as recommended in Fuels, Lubricants and Coolant section.

RG,RG34710,5073 -19-30JAN98-1/1

Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant Test Strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective method to check the freeze point and additive levels of your engine coolant.

When Using John Deere COOL-GARD II

John Deere COOL-GARD II Premix™ , COOL-GARD II PG Premix and COOL-GARD II Concentrate are maintenance free coolants for up to six years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix or COOL-GARD II PG premix. Test the coolant condition annually with coolant test strips designed for use with John Deere COOL-GARD II coolants. If the test strip chart indicates that additive is required, add John Deere COOL-GARD II Coolant Extender as directed.

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Add only the recommended concentration of John Deere COOL-GARD II Coolant Extender. DO NOT add more than the recommended amount.

When Using Nitrite-Containing Coolants

Compare the test strip results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere Liquid Coolant Conditioner should be added.

Add only the recommended concentration of John Deere Liquid Coolant Conditioner. DO NOT add more than the recommended amount.

Coolant Analysis

For a more thorough evaluation of your coolant, perform a coolant analysis. The coolant analysis can provide critical data such as freezing point, antifreeze level, pH, alkalinity, nitrite content (cavitation control additive), molybdate content (rust inhibitor additive), silicate content, corrosion metals, and visual assessment.

Contact your John Deere dealer for more information on coolant analysis.

DX,COOL9 -19-11APR11-1/1

Replenishing Supplemental Coolant Additives (SCAs) Between Coolant Changes

IMPORTANT: Do not add supplemental coolant additives when the cooling system is drained and refilled with John Deere ANTIFREEZE/SUMMER COOLANT or COOL-GARD™.

NOTE: If system is to be filled with coolant that does not contain SCAs, the coolant must be precharged. Determine the total system capacity and premix with 3% John Deere Coolant Conditioner.

Through time and use, the concentration of coolant additives is gradually depleted during engine operation. Periodic replenishment of inhibitors is required, even when John Deere ANTIFREEZE/SUMMER COOLANT is used. The cooling system must be recharged with additional supplemental coolant additives available in the form of liquid coolant conditioner.

Maintaining the correct coolant conditioner concentration (SCAs) and freeze point is essential in your cooling system to protect against rust, liner pitting and corrosion, and freeze-ups due to incorrect coolant dilution.

John Deere LIQUID COOLANT CONDITIONER is recommended as a supplemental coolant additive in John Deere engines.

DO NOT mix one brand of SCA with a different brand.

Test the coolant solution at 500 hours or 12 months of operation using either John Deere coolant test strips or a COOLSCAN™ analysis. If a COOLSCAN™ analysis is not available, recharge the system per instructions printed on label of John Deere Liquid Coolant Conditioner.

IMPORTANT: ALWAYS maintain coolant at correct level and concentration. DO NOT operate engine without coolant even for a few minutes.

If frequent coolant makeup is required, the glycol concentration should be checked with JTO7298 Coolant/Battery Tester to ensure that the desired freeze point is maintained. Follow manufacturer's instructions provided with Coolant/Battery Tester.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

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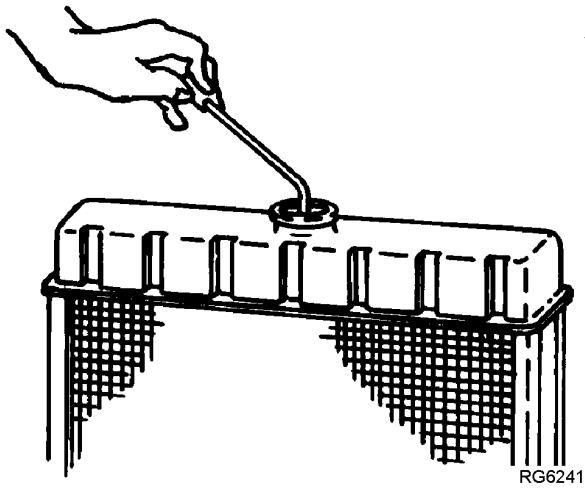
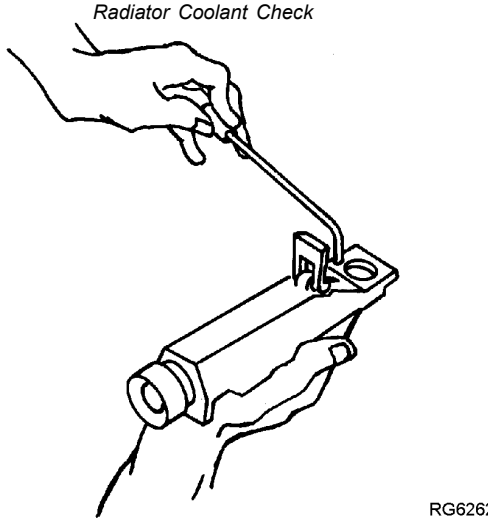
COOLSCAN is a trademark of Deere & Company



Radiator Coolant Check



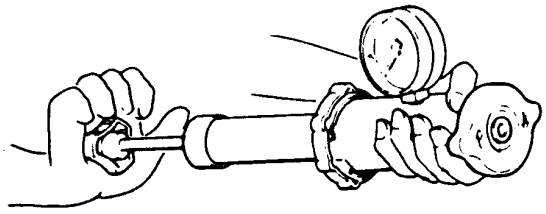
JTO7298 Coolant/Battery Tester

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

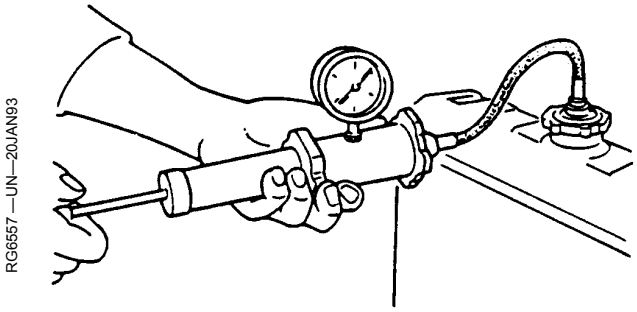
See DIESEL ENGINE COOLANTS AND SUPPLEMENTAL ADDITIVE INFORMATION for proper mixing of coolant ingredients before adding to the cooling system.

DPSG,OUOD002,1921 -19-09OCT02-1/1

Pressure Testing Cooling System



Pressure Testing Radiator Cap



RG6557 —UN—20JAN93

RG6558 —UN—20JAN93

Pressure Testing Cooling System

⚠ CAUTION: 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.

Test Radiator Cap

1. Remove radiator cap and attach to D05104ST Tester as shown.
2. Pressurize cap to following specifications.[1] Gauge should hold pressure for 10 seconds within the normal range if cap is acceptable.

Specification	
Radiator Cap—Test Pressure	70 kPa (0.7 bar (10 psi)

If gauge does not hold pressure, replace radiator cap.

3. Remove the cap from gauge, turn it 180°, and retest cap. This will verify that the first measurement was accurate.

Test Cooling System

NOTE: Engine should be warmed up to test overall cooling system.

[1]Test pressures recommended are for all Deere OEM cooling systems. On specific vehicle applications, test cooling system and pressure cap according to the recommended pressure for that vehicle.

1. Allow engine to cool, then carefully remove radiator cap.
2. Fill radiator with coolant to the normal operating level.

IMPORTANT: DO NOT apply excessive pressure to cooling system, doing so may damage radiator and hoses.

3. Connect gauge and adapter to radiator filler neck. Pressurize cooling system to the following specifications[1].

Specification	
Cooling System—Test Pressure	70 kPa (0.7 bar (10 psi)

4. With pressure applied, check all cooling system hose connections, radiator, and overall engine for leaks.

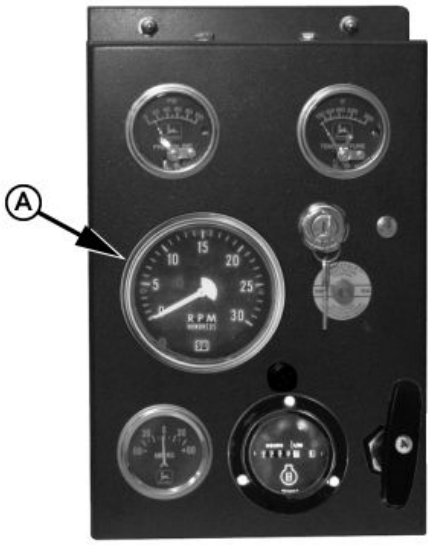
   If leakage is detected, correct as necessary and pressure test system again.

   If no leakage is detected, but the gauge indicated a drop in pressure, coolant may be leaking internally within the system or at the block-to-head gasket. Have the local John Deere dealer, engine distributor, or other servicing dealer correct this problem immediately.

RG,RG34710,5078 -19-07MAY25-1/1

Checking and Adjusting Engine Speeds

Observe tachometer reading (A) on the instrument panel to verify engine speeds. (Refer to ENGINE POWER AND SPEED SPECIFICATIONS in Specifications Section later in this manual for engine speed specifications.)

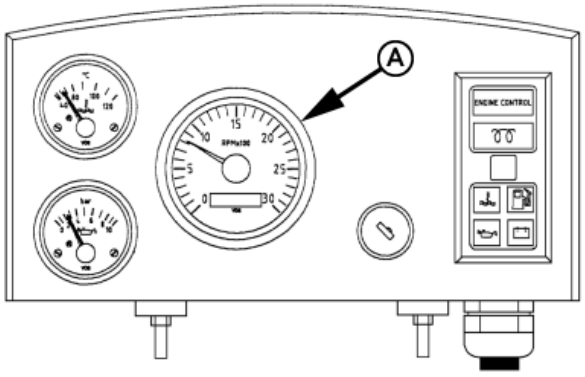


RG12831 —UN—13FEB03

North American Instrument Panel Tachometer

RG12832 —UN—13FEB03

AEZ Instrument Panel Tachometer



RG12830 —UN—13FEB03

VDO Instrument Panel Tachometer

OUOD005,00001D8 -19-20FEB03-1/1

Checking And Adjusting Engine Valve Clearance

CAUTION: To prevent accidental starting of engine while performing valve adjustments, always disconnect NEGATIVE (–) battery terminal.

IMPORTANT: Engine valve clearance MUST BE checked and adjusted with engine COLD.

1. Remove rocker arm cover and crankcase ventilator tube.

IMPORTANT: Visually inspect contact surfaces of wear caps and rocker arm wear pads. Check all parts for excessive wear, breakage, or cracks. Replace parts that show visible damage.

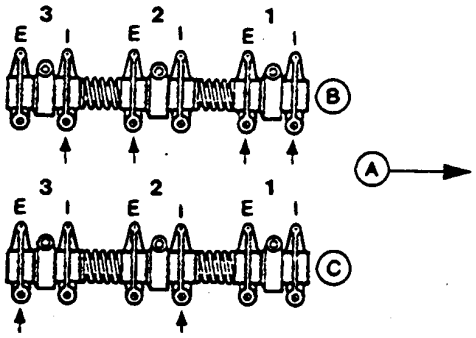
Rocker arms with excessive valve clearance should be inspected more thoroughly to identify damaged parts.

2. Using JDE83 or JDG820 Flywheel Turning Tool, rotate engine flywheel in running direction (clockwise viewed from front of engine) until JDG1571 (or JDE81-4) timing pin goes into flywheel hole. Check if Number 1 is at compression stroke (B). (No. 1 rocker arms should be loose.) If not, rotate engine one full revolution (360°) until timing pin goes into flywheel hole.

NOTE: Firing order is 1-2-3.

Checking Valve Clearance

T81224 —UN—07NOV88



Valve Adjusting Order

RG47775 —UN—06DEC88

A—Front of Engine
B—Number 1Piston at TDC Compression Stroke
C—Number 1 Piston at TDC Exhaust Stroke
E—Exhaust Valve
I— Intake Valve

Continued on next page

RE42287,000010F -19-03AUG18-1/2

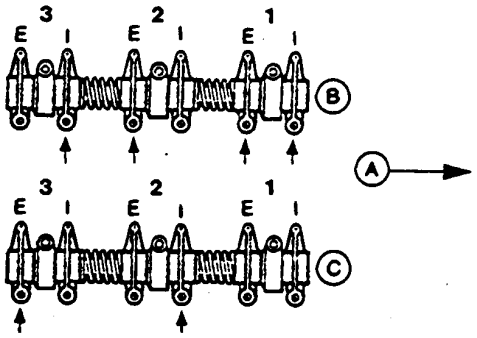
3. Check and adjust valve clearance using a feeler gauge on No. 1 and 2 exhaust valves and No. 1 and 3 intake valves.

Specification	
Valve Clearance (Engine Cold)—Specification—Intake	0.35 mm (0.014 in.)
Exhaust	0.45 mm (0.018 in.)

NOTE: If rocker arm is equipped with adjusting screw and lock nut, tighten lock nut to specification after adjusting valve clearance.

Specification	
Rocker Arm Adjusting Screw Lock Nut—Specification—Torque	27 Ṅm (20 lb-ft)

4. Rotate flywheel 360° and lock No. 1 piston at “TDC” exhaust stroke (C).
5. Check and adjust valve clearance on No. 3 exhaust valve and No. 2 intake valve.
6. Reinstall rocker arm cover and crankcase vent tube.



RG4775 —UN—06DEC88

Valve Adjusting Order

A—Front of Engine
B—Number 1Piston at TDC Compression Stroke
C—Number 1 Piston at TDC Exhaust Stroke
E—Exhaust Valve
I— Intake Valve

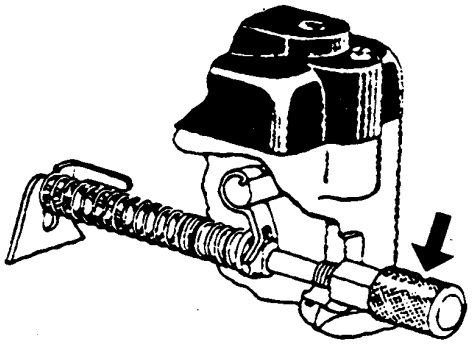
RE42287,000010F -19-03AUG18-2/2

Adjusting Variable Speed (Droop) On Generator Set Engines (Stanadyne Injection Pumps Only)

CAUTION: Statutes providing severe penalties for tampering with emissions controls may apply at the user's location.

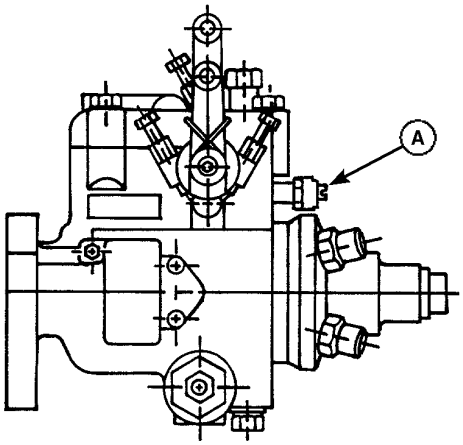
1. Warm engine to normal operating temperature.
2. If necessary, disconnect throttle linkage or cable.
3. Run engine at fast idle. Check and adjust fast idle speed when necessary.
4. Apply full load.
5. Check power. Adjust with knob or screw (A) if needed.
6. Remove load.
7. Check and adjust fast idle if knob or screw (A) has been turned.
8. Repeat procedure until both the engine power and fast idle speed are correct.
9. Connect throttle linkage if previously removed.

A—Screw



T86735 —UN—23FEB89

Droop Adjusting Knob



RG8418 —UN—01DEC00

Droop Adjusting Screw

RG,RG34710,5076 -19-30JAN98-1/1

Flushing And Refilling Cooling System

CAUTION: 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.

NOTE: Drain the initial factory fill engine coolant after the first 2000 hours or 24 months of operation. Subsequent drain intervals are determined by the coolant used for service.

When John Deere COOL-GARD™ is used, the drain interval is 3000 hours or 36 months. The drain interval may be extended to 5000 hours or 60 months of operation **provided that the coolant is tested annually AND additives are replenished as needed, by adding a supplemental cooling additive (SCA).**

If COOL-GARD™ is not used, the drain interval is reduced to 2000 hours or 24 months of operation.

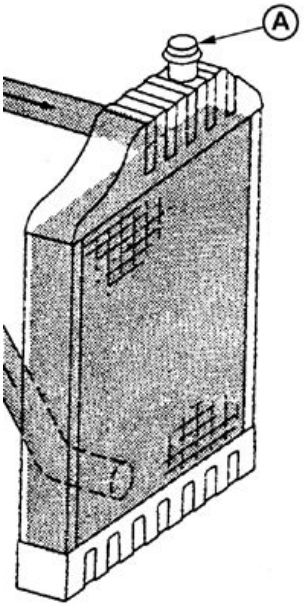
Drain old coolant, remove thermostat, flush the entire cooling system, install thermostat, and fill with recommended clean coolant. For correct coolant mixture, refer to Fuels, Lubricants and Coolant section.

Perform these procedures as follows:

1. Pressure test entire cooling system and pressure cap if not previously done. (See PRESSURE TESTING COOLING SYSTEM, earlier in this section.)
2. Slowly open the engine cooling system filler cap or radiator cap (A) to relieve pressure and allow coolant to drain faster.

TS281 —UN—15APR13

Beware of High Pressure Fluids



RG12833 —UN—13FEB03

Radiator Cap

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RG,RG34710,5079 -19-11FEB03-1/3

3. Open engine block drain valve or plug (A) on left side of engine. Drain all coolant from engine block.
4. Open radiator drain valve. Drain all coolant from radiator.
5. Remove thermostat at this time, if not previously done. Install cover (B) (without thermostat) and tighten cap screws to specification.

Specification

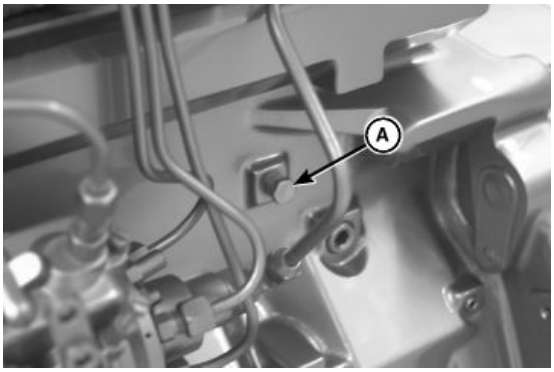
Capscrews—Torque.....47 N˙m (35 lb ft)

6. Test thermostat opening temperature. (See TESTING THERMOSTAT OPENING TEMPERATURE following in this Section.)
7. Close all drain valves after coolant has drained.

CAUTION: Do not run engine longer than 5 minutes (at low idle) with water as coolant. Doing so may cause engine to overheat which may cause burns when water is draining.

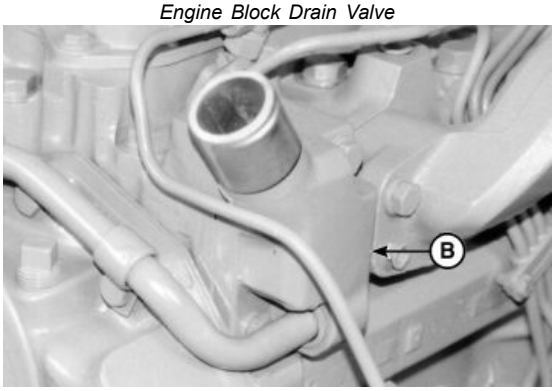
8. Fill the cooling system with clean water. Run the engine about 5 minutes at low idle to stir up possible rust or sediment.
9. Stop engine, pull off lower radiator hose and remove radiator cap to immediately drain the water from the system before rust and sediment settle.
10. After draining water, close drain valves. Install radiator cap, radiator hose and clamp. Fill the cooling system with clean water and a heavy duty cooling system cleaner such as FLEETGUARD® RESTORE™ or RESTORE PLUS™. Follow manufacturer's directions on label.

FLEETGUARD is a trademark of Cummins Engine Company, Inc.
RESTORE is a trademark of Fleetguard Inc.
RESTORE PLUS is a trademark of Fleetguard Inc.



Engine Block Drain Valve

RG7315 —UN—01DEC00



Thermostat Housing

RG11597 —UN—08DEC00

A—Plug **B—Cover**

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RG,RG34710,5079 -19-11FEB03-2/3

11. After cleaning the cooling system, drain cleaner and fill with water to flush the system. Run the engine about 5 minutes, remove radiator cap and pull off lower radiator hose, immediately draining out flushing water.

IMPORTANT: Air must be expelled from cooling system when system is refilled. Loosen temperature sending unit fitting at rear of cylinder head to allow air to escape when filling system. Retighten fitting when all the air has been expelled.

12. Close all drain valves on engine and radiator. Install lower radiator hose and tighten clamp.

NOTE: Install thermostat with jiggle wire (A) at top position.

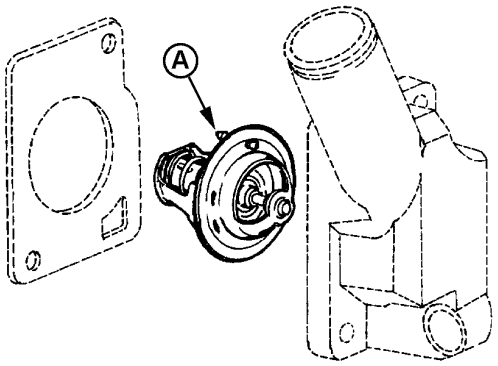
13. Install thermostat and cover using a new gasket. Tighten cap screws to specification.

Specification

Capscrews—Torque.....47 N˙m (35 lb ft)

14. Refill system with fresh coolant at radiator until coolant touches bottom of filler neck[1]. (See ADDING COOLANT in Service As Required Section.)

[1]Cooling system capacity for the Saran-sourced 3029 L engine factory generator set package is 12 L (11.5 qt). Refer to OEM manufacturer for capacities of cooling systems not supplied by John Deere.



RG11605 —UN—24JAN01

Jiggle Wire

A—Jiggle Wire

15. Run engine until it reaches operating temperature. This mixes the solution uniformly and circulates it through the entire system. The normal engine coolant temperature range is 82°–94°C (180°–202°F).

16. After running engine, check coolant level and entire cooling system for leaks.

RG,RG34710,5079 -19-11FEB03-3/3

Testing Thermostat Opening Temperature

1. Remove thermostat.
2. Visually inspect thermostat for corrosion or damage.

⚠ CAUTION: DO NOT allow thermostat or thermometer to rest against the side or bottom of container when heating water. Either may rupture if overheated.

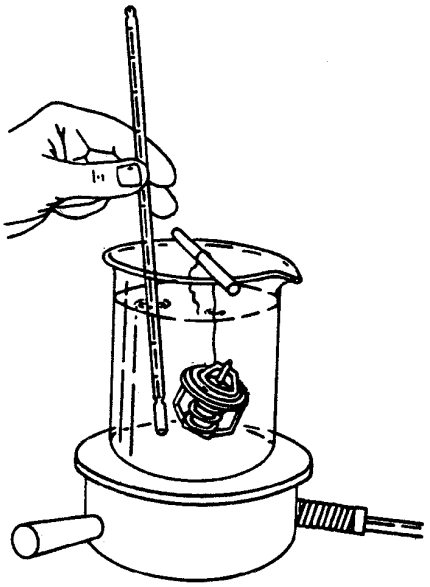
3. Suspend thermostat and a thermometer in a container of water.
4. Stir the water as it heats. Observe opening action of thermostat and compare temperatures with specification given in chart below.

NOTE: Due to varying tolerances of different suppliers, initial opening and full open temperatures may vary slightly from specified temperatures.

THERMOSTAT TEST SPECIFICATIONS

Rating	Initial Opening (Range)	Full Open (Nominal)
82°C (180°F)	80-84°C (175-182°F)	94°C (202°F)

5. Remove thermostat and observe its closing action as it cools. In ambient air the thermostat should close completely. Closing action should be smooth and slow.



RG5971 —UN—23NOV97

Testing Thermostats

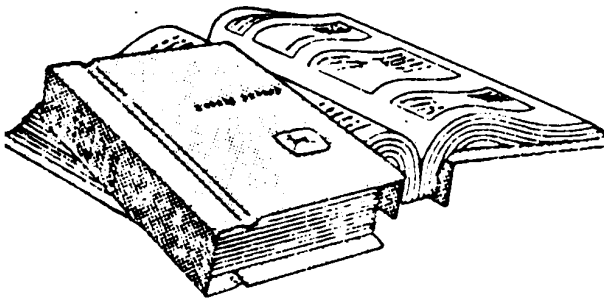
6. Replace thermostat if opening temperature is not within specification.

RG,RG34710,5083 -19-30JAN98-1/1

Service As Required

Additional Service Information

This is not a detailed service manual. If you want more detailed service information, see John Deere Service Literature Available later in this manual to order the Component Technical Manuals for “Repair” and “Operation and Diagnosis”.



RG4624 —UN—15DEC88

John Deere Service Manuals

RG,RG34710,5080 -19-30JAN98-1/1

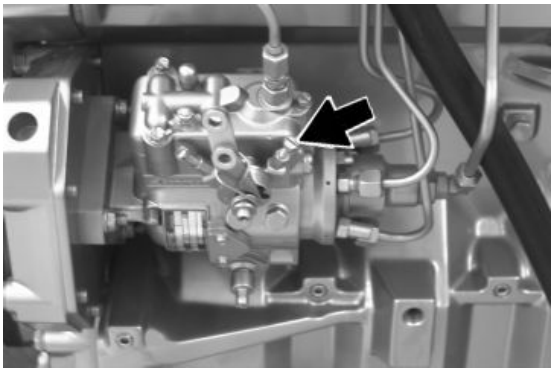
Do Not Modify Fuel System

IMPORTANT: Modification or alteration of the injection pump, the injection pump timing, or the fuel injectors in ways not recommended by the manufacturer will terminate the warranty obligation to the purchaser.

In addition, tampering with fuel system which alters emission-related equipment on engines may result in fines or other penalties, per EPA regulations or other local emission laws.

Do not attempt to service injection pump or fuel injectors yourself. Special training and special tools are required. (See the local John Deere dealer, engine distributor, or other service provider.)

T81389 —UN—28JUN13



RG11546 —UN—01DEC00

Fuel Injection Pump

RG,RG34710,5081 -19-07MAY25-1/1

Adding Coolant

CAUTION: 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.

IMPORTANT: Never pour cold liquid into a hot engine, as it may crack cylinder head or block. NEVER operate engine without coolant.

John Deere TY15161 Cooling System Sealer may be added to the radiator to stop leaks on a temporary or emergency basis only. DO NOT use any other stop-leak additives in the cooling system. Leaks should be permanently repaired as quickly as possible.

Air must be expelled from cooling system when coolant is added.

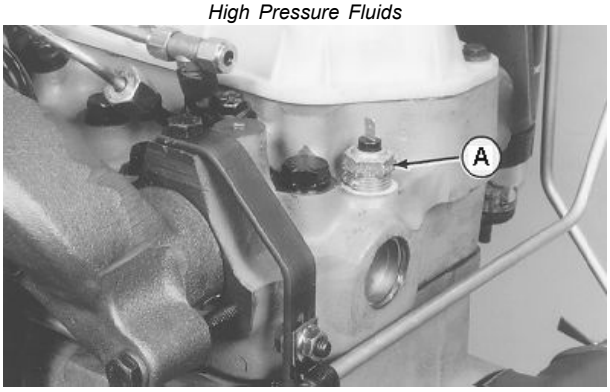
1. Loosen temperature sending unit fitting (A) at rear of cylinder head to allow air to escape when filling system.

IMPORTANT: When adding coolant to the system, use the appropriate coolant solution. (See ENGINE COOLANT SPECIFICATIONS in Fuels, Lubricants, and Coolant Section for mixing of coolant ingredients before adding to cooling system.)

Do not overfill cooling system. A pressurized system needs space for heat expansion without overflowing at top of radiator.

High Pressure Fluids

TS281 —UN—15APR13



Coolant Temperature Sending Unit Fitting

RG11607 —UN—25JAN01

A—Sending Unit Fitting

2. Fill until coolant level touches bottom of radiator filler neck.
3. Tighten fitting when air has been expelled from system.

RG,RG34710,3593 -19-11FEB03-1/1

Pre-Start Cleaning Guide

CAUTION: Avoid injury. Before cleaning machine, allow ample time for hot surfaces to cool.

IMPORTANT: Avoid machine damage. Do not direct high-pressure spray from hose output directly at or close to electrical connections and sensors.

Cleaning as needed is recommended. Clean more frequently during heavy machine use, and when weather conditions are dry.

- Check enclosed areas daily. Clean the engine and other enclosed areas of equipment to remove debris and any buildup of oil and grease. Keep the engine and engine compartment free of combustible material.
- Check for debris buildup daily on and around intake systems, exhaust systems, and intercooler piping systems. Verify that there are no holes or leaks in intake or exhaust systems. Do not allow debris to build up near hot exhaust components. Verify that hot exhaust components are cleaned as often as environmental conditions require.
- Inspect cooling system daily to determine whether cooling system needs cleaning. Visible buildup of residue that blocks airflow may degrade machine performance and requires more frequent cleaning depending on environmental conditions.
- Inspect difficult to observe areas daily as conditions may require additional cleaning care to remove debris.
- Check for oil and fuel leaks daily. Replace or repair sources of leaks, including gaskets, seals, breather tubes, fittings, and fluid lines.

Maintenance and Service Reminders

- Keep surfaces free of grease and oil.
- Clean up hydraulic and other fluid leaks.
- Fuel Lines — Check for leaks, cracks, and kinks.
- Fuel Pumps — Check fittings, especially compression ring couplings, for cracks and leaks.
- Fuel Injectors — Check pressure and return lines for signs of leaks.
- When servicing fuel filter or draining water separator, avoid fuel spills. Immediately clean up any fuel spill.
- Check for transmission case venting system seepage, transmission case leakage, power steering cylinder leakage, or power steering line leakage.
- Check for loose electrical connectors, damaged wiring, corrosion, or poor connections.

ZE59858,0000009 -19-07JUL20-1/1

Bleeding The Fuel System

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

IMPORTANT: Do not operate the engine at high speeds or full loads just before bleeding the fuel system as this may cause fuel injection pump failure.

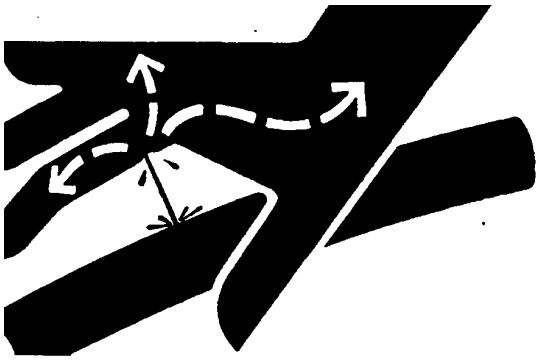
Bleed the fuel system anytime the fuel system has been opened up. This includes:

- After fuel filter changes.
- After pump or nozzle replacement.
- Anytime fuel lines have been disconnected.
- After engine has runout of fuel.

Bleed the fuel system using the following procedure:

1. Loosen the air bleed vent screw (A) two full turns.
2. On mechanical supply pumps, operate supply pump primer lever (B) until fuel flow is free from air bubbles.
3. On electric supply pumps, turn key switch to “ON” position until fuel flow is free from air bubbles.
4. Tighten bleed plug securely by hand. Continue operating hand primer until pumping action is not felt. When finished, pull hand primer outward (away from engine) as far as it will go.
5. Start engine and check for leaks.

   If engine will not start, it may be necessary to bleed air from fuel system at fuel injection pump or injection nozzles as explained next.

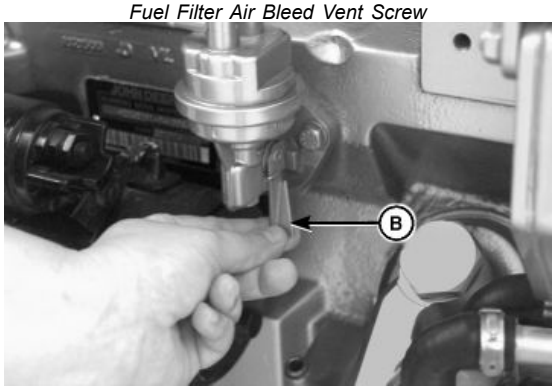


X9811 —UN—23AUG88

Keep Skin Away from High Pressure Fluids

RG11544 —UN—01DEC00

Fuel Filter Air Bleed Vent Screw



RG11545 —UN—01DEC00

Fuel Supply Pump Primer Lever

A—Vent Screw **B—Primer Lever**

Continued on next page

RG,RG34710,5084 -19-07MAY25-1/3

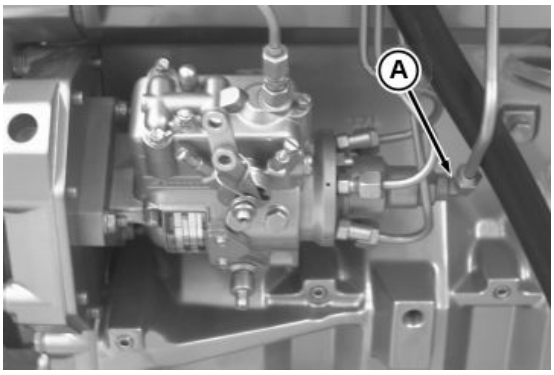
At Fuel Injection Pump

1. Slightly loosen fuel supply line connector (A) at injection pump.
2. On mechanical supply pumps, operate fuel supply pump primer lever until fuel, without air bubbles, flows from fuel line connection.
3. On electric supply pumps, turn key switch to “ON” position until fuel, without air bubbles, flows from fuel line connection.
4. Tighten fuel supply line connector to specification.

Specification

Connector—Torque..... 16 N·m (12 lb.-ft.)

5. Leave hand primer in the outward position away from cylinder block.



RG24247 —UN—28AUG13

Fuel Supply Line Connector at Injection Pump

A—Connector

RG,RG34710,5084 -19-07MAY25-2/3

At Fuel Injection Nozzles

1. Move the speed control lever to half throttle position. On engines equipped with electronic fuel shutoff solenoid, energize solenoid.
2. Using two open-end wrenches, loosen fuel line connection at injection nozzle.
3. Crank engine over with starting motor, (but do not start engine), until fuel free from air bubbles flows out of loosened connection. Tighten connection to specification.

Specification

Connection—Torque..... 27 N·m (20 lb.-ft.)

4. Repeat procedure for remaining injection nozzles (if necessary) until all air has been removed from fuel system.

T92924 —UN—01NOV88

Bleeding Fuel System at Injection Nozzle

If engine still will not start, contact the local John Deere dealer, engine distributor, or other service provider.

RG,RG34710,5084 -19-07MAY25-3/3

Replacing Air Cleaner Filter Elements

IMPORTANT: ALWAYS REPLACE primary air cleaner element when air restriction indicator shows a vacuum of at least 3.5 kPa (14 in.) of H_2O, is torn, or visibly dirty.

NOTE: This procedure applies to John Deere air cleaner kits. Refer to manufacturers' instructions for servicing air cleaners not supplied by John Deere.

North American Air Cleaners

1. Remove wing nut and remove canister cover shown in small illustration inset.

2. Remove wing nut (A) and remove primary element (B) from canister.

3. Thoroughly clean all dirt from inside canister.

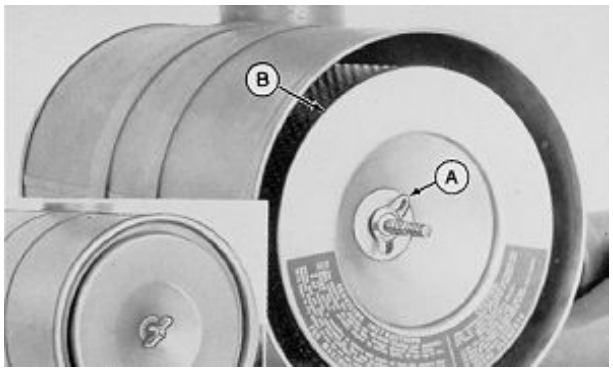
NOTE: Some engines may have a dust unloader valve (C) on the air cleaner. If equipped, squeeze valve tip to release any trapped dirt particles.

IMPORTANT: Remove secondary (safety) element (E) ONLY for replacement. DO NOT attempt to clean, wash, or reuse secondary element. Replacement of secondary element is usually necessary ONLY when primary element has a hole in it.

4. To replace secondary element, remove retaining nut (D) and secondary element (E). Immediately replace secondary element with new element to prevent dust from entering air intake system.

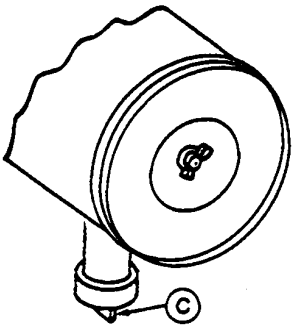
5. Install new primary element and tighten wing nut securely. Install cover assembly and tighten retaining wing nut securely.

A—Wing Nut
B—Primary Element
C—Unloader Valve
D—Retaining Nut
E—Secondary Element



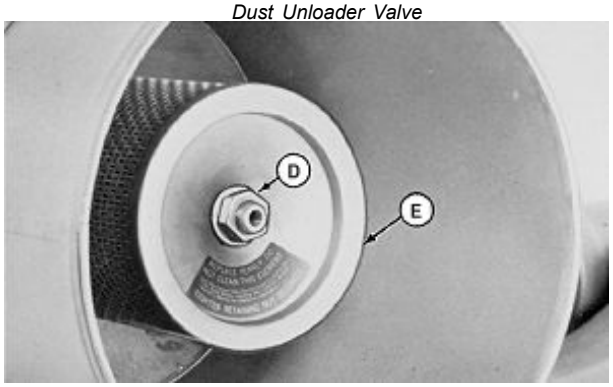
Air Cleaner Primary Element (North American)

RG4686 —UN—20DEC88



Dust Unloader Valve

RG4687 —UN—20DEC88



Air Cleaner Secondary Element

RG11068 —UN—26JUN00

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DPSG,OUOD002,1580 -19-30MAY06-1/2

IMPORTANT: Whenever the air cleaner has been serviced or had cover removed, ALWAYS fully depress the air restriction indicator reset button (if equipped) to assure accurate readings.

6. If equipped, fully depress air restriction indicator reset button and release to reset indicator.

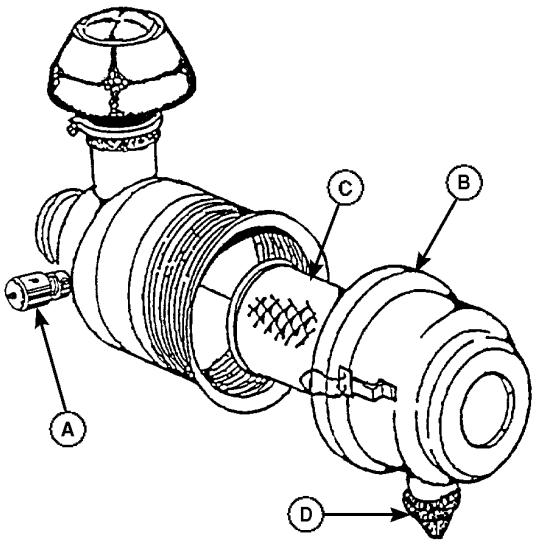
On European Sourced Air Cleaner Kits:

Clean filter element when air restriction indicator (A) or (G) is red. Replace filter element every 6 cleanings or once every 12 months.

NOTE: On light-duty air cleaner, loosen clamp (F) and remove light-duty filter element (E).

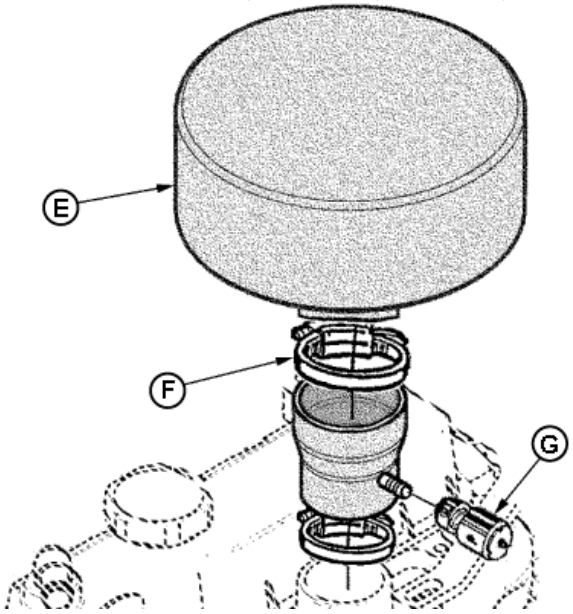
1. Remove cover (B).
2. Remove filter element (C).
3. Thoroughly clean all dirt from inside filter housing.
4. Squeeze dust unloader valve (D) to remove dust deposits. If clogged, remove and clean the dust unloader valve. Replace if damaged.
5. Clean filter element using compressed air.
6. Reinstall the filter element and cover.
7. Depress air restriction indicator (A) button and release to reset indicator.

A—Restriction Indicator
B—Cover
C—Filter Element
D—Dust Unloader Valve
E—Light-Duty Filter Element
F—Clamp
G—Restriction Indicator



RG11547 —UN—01DEC00

Air Cleaner Components (European Sourced)



RG14644 —UN—30MAY06

Light-Duty Air Cleaner

DPSG,OUOD002,1580 -19-30MAY06-2/2

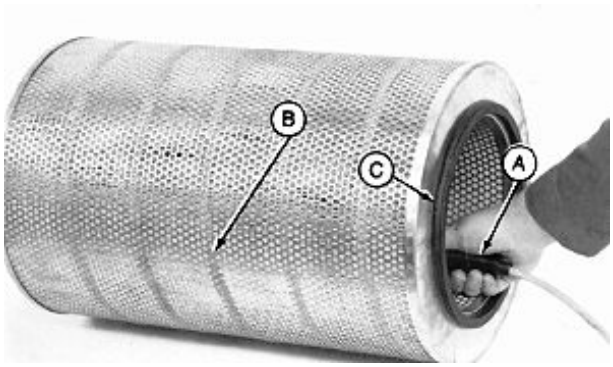
Inspecting Primary Filter Element

Inspect filter to determine if it is practical to clean or for damage after cleaning filter.

1. Hold a bright light (A) inside element and check carefully for holes. Discard any element which shows the smallest hole or rupture.
2. Be sure outer screen (B) is not dented. Vibration would quickly wear a hole in filter.
3. Be sure filter gasket (C) is in good condition. If gasket is damaged or missing, replace element.

IMPORTANT: Air cleaner MUST BE DRY before storing in plastic bag.

If the filter is to be stored for later use, place it in a plastic bag to protect it from dust and damage.



RW4768 —UN—15DEC88

Inspecting Primary Air Filter Element

A—Light
B—Outer Screen
C—Gasket

RG,RG34710,3598 -19-30AUG96-1/1

Cleaning Primary Filter Element

IMPORTANT: Always replace secondary (safety) filter elements. DO NOT attempt to clean them.

Do not blow air from outside portion of filter with air nozzle. Wear safety glasses and remove bystanders.

1. Gently pat sides of element with palm of hand to loosen dirt. DO NOT tap element against a hard surface.

CAUTION: Only a special air cleaning gun (A) should be used. Concentrated air pressure from an ordinary air nozzle may severely damage filter element. Do not exceed 210 kPa (2.1 bar) (30 psi) when cleaning filter element.

2. Insert the cleaning gun into element, hold air nozzle about 25.4 mm (1.0 in.) from perforated metal retainer. Force air through filter from inside to outside and move air gun up and down pleats to remove as much dirt as possible.

RG11065 —UN—26JUN00

Cleaning Primary Element

A—Air Cleaning Gun

3. Repeat steps 1 and 2 to remove additional dirt.
4. Inspect element for damage after cleaning. Replace element if any damage is found.

RG,RG34710,3599 -19-30AUG96-1/1

Element Storage

IMPORTANT: Air cleaner element MUST BE DRY before storing in plastic bag.

Seal element in a plastic bag and store in shipping container to protect against dust and damage.

RG,RG34710,3601 -19-30AUG96-1/1

Replace Fan And Alternator Belts

Inspect belts for cracks, fraying, or stretched out areas. Replace if necessary. (See CHECKING FAN AND ALTERNATOR V-BELT TENSION in Lubrication and Maintenance/250 Hour Section.)

RG,RG34710,5086 -19-30JAN98-1/1

Inspecting Power Take-Off (PTO) Clutch

CAUTION: Entanglement in rotating driveline can cause serious injury or death. Keep shield on PTO drive shaft (A) between the clutch housing and the engine driven equipment at all times during engine operation. Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before making adjustments.

Proper performance of the power take-off unit will be related to the care it is given. Lubricate it periodically and keep the clutch properly adjusted. (See LUBRICATION AND MAINTENANCE/250 HOUR Section.)

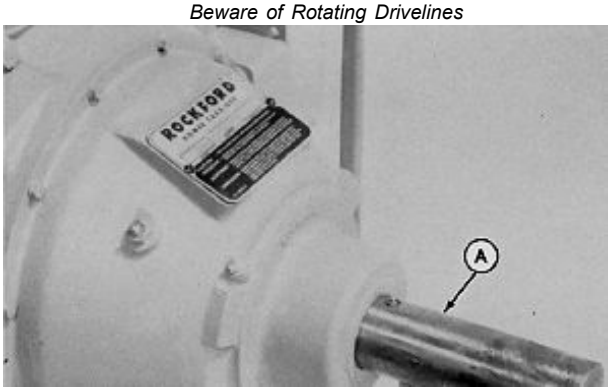
NOTE: For standard 500 rpm PTO operation, run engine at 2400 rpm.

If the power take-off does not work properly after adjustment and lubrication, contact the local John Deere dealer, engine distributor, or other service provider.

A—PTO Driveshaft

Beware of Rotating Drivelines

TS198 —UN—23AUG88



PTO Drive Shaft

RG4693 —UN—14DEC88

RG,RG34710,5087 -19-07MAY25-1/1

Checking Fuses

The following instructions apply to engines equipped with a John Deere instrument panel.

On North American Instrument Panels:

1. Check the fuse (A) and replace as necessary with an equivalent 14-amp fuse.

North American Instrument Panel

RG11548 —UN—01DEC00

Continued on next page

OUOD013,0000003 -19-28NOV00-1/3

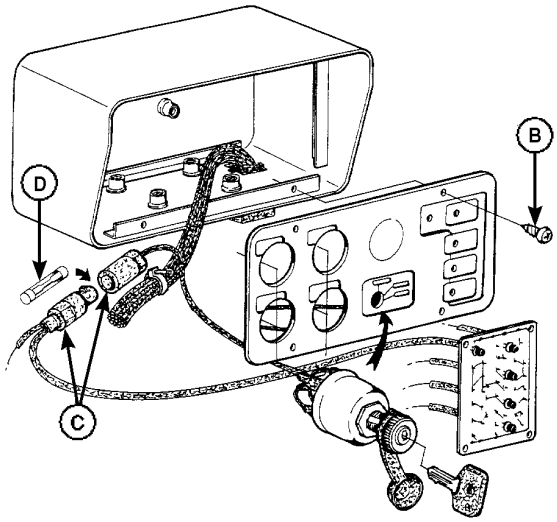
On AEZ Instrument Panels (Except North America):

1. Remove the four cap screws (B) holding the instrument panel board.
2. Open fuse holder (C).
3. Replace as necessary with an equivalent 16-amp fuse (D).

IMPORTANT: Always replace a blown fuse with a fuse of the same amperage.

4. Reinstall the instrument panel board.

B—Cap Screws
C—Fuse Holder
D—16-Amp Fuse



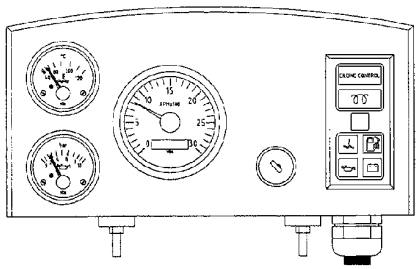
RG8149 —UN—01DEC00

AEZ Instrument Panel (Except North America)

OUOD013,0000003 -19-28NOV00-2/3

On VDO Instrument Panels (Except North America):

5. The fuse is located on the electronic control card inside the panel's rear access cover. Remove cover and check fuse. If defective, replace with a 10 amp fuse. There is a spare fuse available on the card in the “SPARE” terminal.



RG10606A —UN—19JUN00

VDO Instrument Panel (Except North America)

OUOD013,0000003 -19-28NOV00-3/3

Troubleshooting

General Troubleshooting Information

Troubleshooting engine problems can be difficult. An engine wiring diagram is provided in this section to help isolate electrical problems on power units using John Deere wiring harness and instrument (gauge) panel.

Later in this section is a list of possible engine problems that may be encountered accompanied by possible causes and corrections. The illustrated diagrams and troubleshooting information are of a general nature, final design of the overall system for your engine application may be different. Contact the local John Deere dealer, engine distributor, or other service provider for more information on troubleshooting.

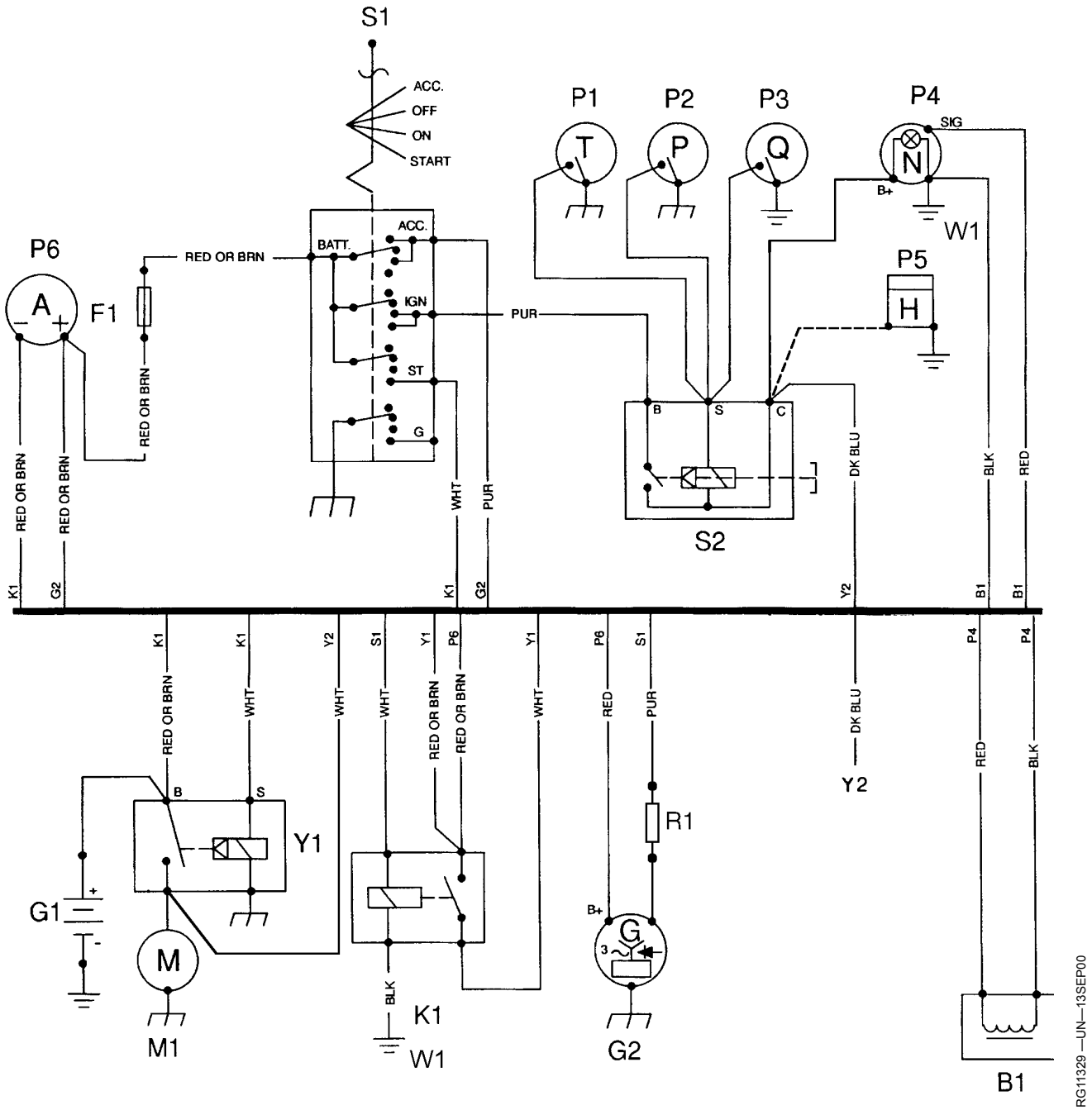
A reliable program for troubleshooting engine problems should include the following basic diagnostic thought process:

- Know the engine and all related systems.
- Study the problem thoroughly.
- Relate the symptoms to your knowledge of engine and systems.
- Diagnose the problem starting with the easiest things first.
- Double-check before beginning the disassembly.
- Determine cause and make a thorough repair.
- After making repairs, operate the engine under normal conditions to verify that the problem and cause were corrected.

RG,RG34710,5089 -19-07MAY25-1/1

North American Wiring Diagram

S1 KEY SWITCH					
	B	G	ACC.	ON	ST.
OFF					
ACC.	•		•		
ON	•		•	•	
START	•	•		•	•



North American Wiring Diagram

Continued on next page

RG,RG34710,5091 -19-30JAN98-1/2

A1—Speed Control Unit
B1—Magnetic Speed Sensor
B2—Coolant Temperature Sensor
B3—Oil Pressure Sensor
F1—Starting Circuit Fuse (14 Amp)
F3—Fuse (Early Models)[1]
G1—Battery
G2—Alternator
H1—Coolant Temperature Indicator Light
H2—Oil Pressure Indicator Lamp
K1—Starter Relay
M1—Starter Motor
P1—Coolant Temperature Gauge
P2—Oil Pressure Gauge
P3—Crankcase Oil Level Switch/Gauge
P4—Tachometer[1]
P5—Hourmeter[2]
P6—Ammeter
R1—Resistor (48 ohm)
S1—Key Switch
S2—Magnetic Safety Switch—North American, Auto Override Module—European (Saran)
W1—Ground on K1 Starter Relay Mounting Stud
Y1—Starter Solenoid
Y2—Fuel Shut-Off Solenoid
BLK—Black
BLU—Blue
BRN—Brown
DK BLU—Dark Blue
GRN—Green
ORG—Orange
PUR—Purple
RED—Red
YEL—Yellow

[1]P4 tachometer has a built-in hourmeter. On some earlier engines, a separate hourmeter (P5) and fuse (F3) are used.
[2]P4 tachometer has a built-in hourmeter. On some engines, a separate hourmeter (P5) and fuse (F3) are used.

RG,RG34710,5091 -19-30JAN98-2/2

Engine Troubleshooting

Symptom	Problem	Solution
Engine Will Not Crank	Weak battery	Replace battery.
	Corroded or loose battery connections	Clean battery terminals and connections.
	Defective main switch or start safety switch	Repair switch as required.
	Starter solenoid defective	Replace solenoid.
	Starter defective	Replace starter.
Engine cranks but will not start	Incorrect starting procedure.	Verify correct starting procedure.
	No fuel.	Check fuel in tank and manual shut-off valve.
	Exhaust restricted.	Check and correct exhaust restriction.
	Fuel filter plugged or full of water.	Replace fuel filter or drain water from filter.
	Injection pump not getting fuel or air in fuel system.	Check fuel flow at supply pump or bleed fuel system.
	Faulty injection pump or nozzles.	Consult authorized diesel repair station for repair or replacement.
Engine hard to start or will not start	Engine starting under load.	Disengage PTO.
	Improper starting procedure.	Review starting procedure.
	No fuel.	Check fuel tank.
	Air in fuel line.	Bleed fuel line.
	Cold weather.	Use cold weather starting aids.
	Slow starter speed.	See “Starter Cranks Slowly”.
	Crankcase oil too heavy.	Use oil of proper viscosity.
	Improper type of fuel.	Consult fuel supplier; use proper type fuel for operating conditions.
	Water, dirt, or air in fuel system.	Drain, flush, fill, and bleed system.

Continued on next page

RG,RG34710,5092 -19-07MAY25-1/7

Symptom	Problem	Solution
	Clogged fuel filter.	Replace filter element.
	Dirty or faulty injection nozzles.	Contact the local John Deere dealer, engine distributor, or other service provider to check injectors.
	Injection pump shut-off not reset.	Turn key switch to “OFF” then to “ON”.
	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Slow cranking speed	Check for problem in the charging/starting system.
Engine knocks	Low engine oil level.	Add oil to engine crankcase.
	Injection pump out of time.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Low coolant temperature.	Remove and check thermostat.
	Engine overheating.	See “Engine Overheats”.
Engine runs irregularly or stalls frequently	Low coolant temperature.	Remove and check thermostat.
	Clogged fuel filter.	Replace fuel filter element.
	Water, dirt, or air in fuel system.	Drain, flush, fill, and bleed system.
	Dirty or faulty injection nozzles.	Contact the local John Deere dealer, engine distributor, or other service provider to check injectors.
Below normal engine temperature	Defective thermostat.	Remove and check thermostat.
	Defective temperature gauge or sender.	Check gauge, sender, and connections.
Lack of power	Engine overloaded.	Reduce load.
	Intake air restriction.	Service air cleaner.
	Clogged fuel filter.	Replace filter elements.
	Improper type of fuel.	Use proper fuel.

Continued on next page

RG,RG34710,5092 -19-07MAY25-2/7

Symptom	Problem	Solution
	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Overheated engine.	See “Engine Overheats”.
	Below normal engine temperature.	Remove and check thermostat.
	Improper valve clearance.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Dirty or faulty injection nozzles.	Contact the local John Deere dealer, engine distributor, or other service provider to check injectors.
	Injection pump out of time.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Turbocharger not functioning. (Turbocharged engines only.)	Contact the local John Deere dealer, engine distributor, or other service provider.
	Leaking exhaust manifold gasket.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective aneroid control line.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Restricted fuel hose.	Clean or replace fuel hose.
	Low fast idle speed.	Contact the local John Deere dealer, engine distributor, or other service provider.
Engine idles poorly	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Engine out of time	Contact the local John Deere dealer, engine distributor, or other service provider.
	Air leak on suction side of air intake system.	Check hose and pipe connections for tightness; repair as required.
Low oil pressure	Low oil level.	Add oil.

Continued on next page

RG,RG34710,5092 -19-07MAY25-3/7

Symptom	Problem	Solution
	Improper type of oil.	Drain, fill crankcase with oil of proper viscosity and quality.
High oil consumption	Crankcase oil too light.	Use proper viscosity oil.
	Oil leaks.	Check for leaks in lines, gaskets, and drain plug.
	Restricted crankcase vent tube.	Clean vent tube.
	Defective turbocharger.	Contact the local John Deere dealer, engine distributor, or other service provider.
Engine emits white exhaust smoke	Improper type of fuel.	Use proper fuel.
	Low engine temperature.	Warm up engine to normal operating temperature.
	Defective thermostat.	Remove and check thermostat.
	Defective injection nozzles.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Engine out of time (retarded).	Contact the local John Deere dealer, engine distributor, or other service provider.
	Coolant entering combustion chamber (failed cylinder head gasket or cracked cylinder head)	Repair or replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Engine compression too low	Determine cause of low compression and repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Engine emits black or gray exhaust smoke	Improper type of fuel.	Use proper fuel.
	Clogged or dirty air cleaner.	Service air cleaner.
	Engine overloaded.	Reduce load.
	Injection nozzles dirty.	Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

RG,RG34710,5092 -19-07MAY25-4/7

Symptom	Problem	Solution
	Engine out of time.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Turbocharger not functioning.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Engine burning oil	See LUBRICATION SYSTEM TROUBLESHOOTING, later in this section.
	Defective muffler/exhaust piping (causing back-pressure)	Replace muffler or defective piping.
Engine Overheats	Engine overloaded.	Reduce load.
	Low coolant level.	Fill radiator to proper level, check radiator and hoses for loose connections or leaks.
	Faulty radiator cap.	Have technician check.
	Loose or defective fan belts.	Adjust belt tension. Replace as required.
	Low engine oil level.	Check oil level. Add oil as required.
	Cooling system needs flushing.	Flush cooling system.
	Defective thermostat.	Remove and check thermostat.
	Defective temperature gauge or sender.	Check coolant temperature with thermometer and replace, if necessary.
	Incorrect grade of fuel.	Use correct grade of fuel.
High fuel consumption	Improper type of fuel.	Use proper type of fuel.
	Clogged or dirty air cleaner.	Service air cleaner.
	Engine overloaded.	Reduce load.
	Improper valve clearance.	Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

RG,RG34710,5092 -19-07MAY25-5/7

Symptom	Problem	Solution
	Injection nozzles dirty.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Engine out of time.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective turbocharger.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Low engine temperature.	Check thermostat.
	Compression too low.	Determine cause of low compression and repair as needed.
Fuel in Oil	Cracked cylinder head	Locate crack, repair/replace components as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Abnormal Engine Noise	Worn main or connecting rod bearings	Determine bearing clearance. Contact the local John Deere dealer, engine distributor, or other service provider.
	Excessive crankshaft end play	Check crankshaft end play. Contact the local John Deere dealer, engine distributor, or other service provider.
	Loose main bearing caps	Check bearing clearance; replace bearings and bearing cap screws as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Worn connecting rod bushings and piston pins	Inspect piston pins and bushings. Contact the local John Deere dealer, engine distributor, or other service provider.
	Scored pistons	Inspect pistons. See your John Deere engine distributor or servicing dealer.
	Worn timing gears or excess backlash	Check timing gear back lash. Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

RG,RG34710,5092 -19-07MAY25-6/7

Symptom	Problem	Solution
	Excessive valve clearance	Check and adjust valve clearance. Contact the local John Deere dealer, engine distributor, or other service provider.
	Worn camshaft lobes	Inspect camshaft. Contact the local John Deere dealer, engine distributor, or other service provider.
	Worn rocker arm shaft(s)	Inspect rocker arm shafts. Contact the local John Deere dealer, engine distributor, or other service provider.
	Insufficient engine lubrication	See LUBRICATION SYSTEM TROUBLESHOOTING, later in this section.
	Turbocharger noise	See AIR INTAKE SYSTEM TROUBLESHOOTING, later in this section.

RG,RG34710,5092 -19-07MAY25-7/7

Electrical Troubleshooting

Symptom	Problem	Solution
Undercharged system	Excessive electrical load from added accessories.	Remove accessories or install higher output alternator.
	Excessive engine idling.	Increase engine rpm when heavy electrical load is used.
	Poor electrical connections on battery, ground strap, starter, or alternator.	Inspect, clean and tighten as necessary.
	Defective battery.	Test battery.
	Defective alternator.	Test charging system.
Battery used too much water	Cracked battery case.	Check for moisture and replace as necessary.
	Defective battery.	Test battery.
	Battery charging rate too high.	Test charging system.
Batteries will not charge	Loose or corroded connections.	Clean and tighten connections.
	Sulfated or worn-out batteries.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Loose or defective alternator belt.	Adjust belt tension or replace belts.
Starter will not crank	PTO engaged.	Disengage PTO.
	Loose or corroded connections.	Clean and tighten loose connections.
	Low battery output voltage.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Faulty start circuit relay.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Blown fuse.	Replace fuse.
Starter cranks slowly	Low battery output.	Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

Symptom	Problem	Solution
	Crankcase oil too heavy.	Use proper viscosity oil.
	Loose or corroded connections.	Clean and tighten loose connections.
Entire electrical system does not function	Faulty battery connection.	Clean and tighten connections.
	Sulfated or worn-out batteries.	Contact the local John Deere dealer, engine distributor, or other service provider.
	Blown fuse.	Replace fuse.

RG,RG34710,5093 -19-07MAY25-2/2

Lubrication System Troubleshooting

Symptom	Problem	Solution
Low Oil Pressure	Low crankcase oil level	Fill crankcase to proper oil level.
	Clogged oil cooler or filter	Remove and inspect oil cooler. Contact the local John Deere dealer, engine distributor, or other service provider.
	Excessive oil temperature	Remove and inspect oil cooler. Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective oil pump	Remove and inspect oil pump. Contact the local John Deere dealer, engine distributor, or other service provider.
	Incorrect oil	Drain crankcase and refill with correct oil.
	Oil pressure regulating valve failure	Remove and inspect oil pressure regulating valve. Contact the local John Deere dealer, engine distributor, or other service provider.
	Clogged oil pump screen or cracked pick-up tube	Remove oil pan and clean screen/replace pick-up tube.
	Excessive main or connecting rod bearing clearance	Determine bearing clearance. Contact the local John Deere dealer, engine distributor, or other service provider.
High Oil Pressure	Improper oil classification	Drain crankcase and refill with correct oil.
	Oil pressure regulating valve failure	Remove and inspect oil pressure regulating valve. Contact the local John Deere dealer, engine distributor, or other service provider.
	Stuck or damaged filter bypass valve	Remove and inspect filter bypass valve. Contact the local John Deere dealer, engine distributor, or other service provider.
	Stuck or damaged oil cooler bypass valve	Remove and inspect oil cooler bypass valve. Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

RG,RG34710,7600 -19-07MAY25-1/3

Symptom	Problem	Solution
Excessive Oil Consumption	Too low viscosity crankcase oil	Drain crankcase and refill with correct viscosity oil.
	Crankcase oil level too high	Drain oil until oil level is correct.
	External oil leak(s)	Determine source of oil leak(s) and repair as required.
	Oil control rings worn or broken	Replace piston rings. Contact the local John Deere dealer, engine distributor, or other service provider.
	Scored cylinder liners or pistons	Remove and inspect cylinders and liners; replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Worn valve guides or stems	Inspect and measure valve stems and valve guides; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Excessive oil pressure	See High Oil Pressure.
	Piston ring grooves excessively worn	Remove and inspect pistons. Contact the local John Deere dealer, engine distributor, or other service provider.
	Piston rings sticking in ring grooves	Remove and inspect pistons. Contact the local John Deere dealer, engine distributor, or other service provider.
	Insufficient piston ring tension	Remove and inspect pistons. Contact the local John Deere dealer, engine distributor, or other service provider.
	Piston ring gaps not staggered	Remove and inspect pistons. Contact the local John Deere dealer, engine distributor, or other service provider.
	Front and/or rear crankshaft oil seal faulty	Replace oil seals. Contact the local John Deere dealer, engine distributor, or other service provider.
		See LOW PRESSURE SYSTEM-FUEL PRESSURE LOW TROUBLESHOOTING earlier in this section.

Continued on next page

Symptom	Problem	Solution
Fuel in Oil		See FUEL IN OIL TROUBLESHOOTING earlier in this section.
Coolant in Oil		See COOLING SYSTEM TROUBLESHOOTING later in this section.

RG,RG34710,7600 -19-07MAY25-3/3

Cooling System Troubleshooting

Symptom	Problem	Solution
Engine Overheats	Lack of coolant in cooling system	Fill cooling system to proper level.
	Radiator core dirty	Clean radiator as required.
	Engine overloaded	Reduce engine load.
	Too low crankcase oil level	Fill crankcase to proper oil level.
	Loose or defective fan belt	Replace fan belt as required. Check belt tensioner. (See Lubrication and Maintenance 500 Hour/12 Month Section.)
	Defective thermostat	Test thermostat opening temperature; replace thermostat as required.
	Damaged cylinder head gasket	Replace cylinder head gasket. Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective coolant pump	Replace coolant pump. Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective radiator cap	Replace radiator cap as required.
Coolant in Oil	Cylinder head gasket defective	Replace cylinder head gasket. Contact the local John Deere dealer, engine distributor, or other service provider.
	Cylinder head or block cracked	Locate crack, repair/replace components as required.
	Cylinder liner seals leaking	Remove and inspect cylinder liners. Contact the local John Deere dealer, engine distributor, or other service provider.
	Leaking oil cooler	Pressure test oil cooler; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Defective oil cooler O-rings	Remove and inspect oil cooler O-rings; replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.

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RG,RG34710,7601 -19-07MAY25-1/2

Symptom	Problem	Solution
	Faulty coolant pump seal; weep hole plugged; coolant leaking through bearing	Replace coolant pump seals. Contact the local John Deere dealer, engine distributor, or other service provider.
Coolant Temperature Below Normal	Defective thermostat(s)	Test thermostats; replace thermostats as required.

RG,RG34710,7601 -19-07MAY25-2/2

Air Intake System Troubleshooting

If turbocharger requires replacement, determine what caused the failure of the defective unit, and correct the condition. This will prevent an immediate repeat failure of the replacement unit.

NOTE: Turbochargers are equipped on 3029T engines only.

Symptom	Problem	Solution
Hard to Start or Will Not Start		See ENGINE TROUBLESHOOTING earlier in this section.
Engine Misfiring or Runs Irregularly		See ENGINE TROUBLESHOOTING earlier in this section.
Black or Grey Exhaust Smoke		See ENGINE TROUBLESHOOTING earlier in this section.
Lack of Engine Power		See ENGINE TROUBLESHOOTING earlier in this section.
Turbocharger "Screams"	Air leak in intake manifold.	Check intake manifold gasket and manifold; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Turbocharger Noise or Vibration *NOTE: Do not confuse the whine heard during run down with noise which indicates a bearing failure.*	Bearings not lubricated (insufficient oil pressure)	Determine cause of lack of lubrication; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Air leak in engine intake or exhaust manifold	Check intake and exhaust manifold gaskets and manifolds; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Improper clearance between turbine wheel and turbine housing	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Broken blades (or other wheel failures)	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Oil on Turbocharger Compressor Wheel or in Compressor Housing (Oil Being Pushed or Pulled Through Center Housing)	Excessive crankcase pressure.	Determine cause of excessive crankcase pressure; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.

Continued on next page

Symptom	Problem	Solution
	Air intake restriction	Determine cause of intake restriction; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Drain tube restriction	Determine cause of drain tube restriction; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Oil in Intake Manifold or Dripping from Turbocharger Housing	Excessive crankcase pressure	Determine cause of excessive crankcase pressure; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Air intake restriction	Determine cause of intake restriction; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Drain tube restriction	Determine cause of drain tube restriction; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Damaged or worn housing bearings	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Imbalance of rotating assembly	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Damage to turbine or compressor wheel or blade	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Dirt or carbon build-up on wheel or blade	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Bearing wear	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.

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RG,RG34710,7602 -19-07MAY25-2/3

Symptom	Problem	Solution
	Oil starvation or insufficient lubrication	Determine cause of lack of lubrication; repair as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Shaft seals worn	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Turbocharger Turbine Wheel Drag	Carbon build-up behind turbine wheel caused by coked oil or combustion deposits	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Dirt build-up behind compressor wheel caused by air intake leaks.	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
	Bearing seizure or dirty, worn bearings	Inspect turbocharger; repair/replace as required. Contact the local John Deere dealer, engine distributor, or other service provider.
Turbocharger Wastegate Mechanism (If Equipped) Does Not Operate	Pivot shaft or rod linkage seized	Inspect wastegate mechanism. Contact the local John Deere dealer, engine distributor, or other service provider.

RG,RG34710,7602 -19-07MAY25-3/3

Storage

Engine Storage Guidelines

IMPORTANT: Special considerations should be taken prior to storage when using BioDiesel. See BioDiesel Fuel in the Fuels, Lubricants, and Coolant Section.

1. John Deere engines can be stored outside for up to three months with no long-term preparation if covered by a waterproof covering. No outside storage is recommended without a waterproof covering.
2. John Deere engines can be stored in a standard overseas shipping container for up to three months with no long-term preparation.
3. John Deere engines can be stored inside for up to six months with no long-term preparation.
4. John Deere engines expected to be stored more than six months **must** have long-term storage preparation. See Preparing Engine for Long-Term Storage in the Storage Section.

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Preparing Engine for Long Term Storage

IMPORTANT: Any time your engine will not be used for over six months, the following recommendations for storing it and removing it from storage will help to minimize corrosion and deterioration.

IMPORTANT: Long-term storage is not advised when using BioDiesel. For storage longer than one year, use straight hydrocarbon fuel.

If BioDiesel must be used it is recommended the blend not exceed B7 and a high-quality fuel stabilizer be used. Storage should not exceed one year.

For more information see BioDiesel Fuel in the Fuels, Lubricants, and Coolants Section.

NOTE: The following storage preparations are used for long-term engine storage up to one year. After that, the engine should be started, warmed up, and retreated for an extended storage period.

1. Change engine oil and replace filter. (For all except 3029TF270 engines, see CHANGE ENGINE OIL AND FILTER in Lubrication and Maintenance/250 Hour/6 Month Section. For 3029TF270 engines, see the 500 Hour/12 Month section.) Used oil will not give adequate protection. Add one ounce of rust preventive oil to the engine crankcase for every quart of oil. This rust preventive oil should be an SAE 10W oil with 1-4 percent morpholine or equivalent vapor corrosion inhibitor, such as NOX RUST VCI-10 OIL from Daubert Chemical Company, Inc.
2. Service air cleaner. See Replacing Air Cleaner Filter Elements in the Service As Required Section.

IMPORTANT: Avoid damage to the engine cooling system components. Engine cooling system must be drained, flushed, and refilled for prolong storage of more than one year.

3. Draining and flushing of cooling system is not necessary if engine is to be stored only for several months. However, for extended storage periods of a year or longer, it is recommended that the cooling system be drained, flushed, and refilled. Refill with appropriate coolant. See Adding Coolant in the Service As Required Section.
4. Pour three ounces of rust preventive oil into the turbocharger intake. (It may be necessary to temporarily install a short intake elbow on the turbocharger inlet to receive the oil.)
5. Prepare a tank with a solution of diesel fuel and rust preventive oil, at ten ounces of rust preventive oil per gallon of diesel fuel.
6. Remove existing lines/plugs as required, and run a temporary line from the tank to the engine fuel intake, and another temporary line from the fuel return manifold to the tank, so rust preventive oil solution is circulated through the injection system during cranking.
7. Crank the engine several revolutions with starter (do not allow the engine to start). This will allow rust preventive oil solution to circulate.
8. Remove temporary lines installed in Step 6 above, and replace any lines/plugs previously removed.

RG35531 —UN—22MAR22

RG35532 —UN—22MAR22

Effects of Prolong Storage of Coolant — More Than One Year

Continued on next page

NOTE: One gallon of fuel/oil solution can be used to treat 100 engines; two gallons to treat 200 engines, etc. The oil could then be replenished by adding an additional five ounces of rust preventive oil per gallon of solution. However, starting over with a new solution is recommended to dispose of any water or other impurities.

9. Loosen, or remove and store, fan/alternator poly-vee belt.
10. Remove and clean batteries. Store them in a cool, dry place and keep them fully charged.
11. Disengage the clutch for any driveline.
12. Clean the exterior of the engine with salt-free water and touch up any scratched or chipped painted surfaces with a good quality paint.
13. Coat all exposed (machined) metal surfaces with grease or corrosion inhibitor if not feasible to paint.
14. Seal all openings on engine with plastic bags and tape.
15. Store the engine in a dry protected place. If engine must be stored outside, cover it with a waterproof canvas or other suitable protective material and use a strong waterproof tape.

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Removing Engine from Long Term Storage

Refer to the appropriate section for detailed services listed below or contact the local John Deere dealer, engine distributor, or other service provider to perform the appropriate services.

1. Remove all protective coverings from engine. Unseal all openings in engine and remove covering from electrical systems.
2. Remove the batteries from storage. Install batteries (fully charged) and connect the terminals.
3. Install fan/alternator poly-vee belt if removed.
4. Fill fuel tank.
5. Perform all appropriate prestarting checks. (See DAILY PRESTARTING CHECKS in Lubrication and Maintenance/Daily Section.)

IMPORTANT: DO NOT operate starter more than 30 seconds at a time. Wait at least 2 minutes for starter to cool before trying again.

6. Crank engine for 20 seconds with starter (do not allow the engine to start). Wait 2 minutes and crank engine an additional 20 seconds to assure bearing surfaces are adequately lubricated.
7. Start engine and run at low idle and no load for several minutes. Warm up carefully and check all gauges before placing engine under load.
8. On the first day of operation after storage, check overall engine for leaks and check all gauges for correct operation.

NOTE: If using BIODIESEL blends after long term storage, frequency of fuel filter plugging may increase initially.

OUOD006,00000FD -19-15MAY25-1/1

General OEM Engine Specifications

ITEM	3029 (2.9 L) (Naturally Aspirated)	3029 (2.9 L) (Turbocharged)
Number of Cylinders	3	3
Bore	106 mm (4.19 in)	106 mm (4.19 in)
Stroke	110 mm (4.33 in)	110 mm (4.33 in)
Displacement	2.9 L (179 in³)	2.9 L (179 in³)
Compression Ratio	17.8:1	17.8:1 / 17.2:1
Aspiration	Naturally Aspirated	Turbocharged
Engine Firing Order	1-2-3	1-2-3
Valves Per Cylinder	1 Intake 1 Exhaust	1 Intake 1 Exhaust
Valve Clearance (Cold) Intake Valves Exhaust Valves	 0.35 mm (0.014 in) 0.45 mm (0.018 in)	 0.35 mm (0.014 in) 0.45 mm (0.018 in)
Battery Capacities (CCA) 12 - Volt System 24 - Volt System	 640 570	 640 570
Thermostat Start To Open Temperature	82°C (180°F)	82°C (180°F)
Thermostat Fully Open Temperature	94°C (202°F)	94°C (202°F)
Coolant Capacity[a]	5.7 L (6 qt)	5.7 L (6 qt)
Recommended Radiator Pressure Cap	69 kPa (10 psi)	69 kPa (10 psi)
Crankcase Oil Fill Capacity	See “Engine Crankcase Oil Fill Quantities” later in this section.	
Oil Pressure At Rated Speed, Full Load With Oil Warmed to 115°C (240°F)	345 kPa (50 psi)	345 kPa (50 psi)
Oil Pressure At Low Idle (Minimum)	105 kPa (15 psi)	105 kPa (15 psi)
Length[b]	716 mm (28.2 in)	716 mm (28.2 in)
Width[b]	528 mm (20.8 in)	528 mm (20.8 in)
Height[b]	819 mm (32.2 in)	928 mm (36.5 in)
Weight[b]	317 kg (698 lb)	329 kg (724 lb)

[a]Coolant capacity may vary with different engine applications.
[b]Measurement may vary depending on installed options

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Engine Power and Speed Specifications — 3029

OPTION CODES	FUEL INJECTION PUMP PART NUMBER	POWER RATING @RATED SPEED[a] kW (hp)	RATED SPEED[b] (rpm)	SLOW IDLE [c] (rpm)	FAST IDLE[d] (rpm)
1602	RE53783	59 (79)	2500	800	2700
1602	RE53785	43 (58)	2500	850	2700
1602	RE55766				
1603	RE53786	35 (47)	1800	—	1890
1603	RE55764				
1632	RE51940	37 (50)	2200	850	2400
1632	RE58903	59 (79)	2500	850	2700
1633	RE51979	46 (62)	2200	800	2400
1634	RE53783	59 (79)	2500	800	2700
1640	RE53958	59 (79)	2500	850	2700
1641	RE53787	31 (41)	1500	—	1560
1641	RE55765				
1641	RE64241	31 (41)	1500	—	1560
1641	RE64241	43 (58)	2500	850	2700
1642	RE67269				
1642	RE67271	43 (58)	2500	850	2700
1643	RE67271	43 (58)	2500	850	2700
1644	RE41939	35 (47)	1800	—	1890
1644	RE58928				
1648	RE58929				
1648	RE64242	30 (40)	1500	—	1560
1648	RE64272	30 (40)	1500	—	1560
1650	RE58930				
164D	RE518991	48 (64)	2500	850	2700
164D	RE519011	48 (64)	2500	850	2700
164E	RE518992	48 (64)	2500	850	2700
164E	RE518993	48 (64)	2500	850	2700
164E	RE519012	48 (64)	2500	850	2700
164F	RE519013	53 (71)	2500	850	2700
164G	RE518997	48 (64)	2500	850	2700
164G	RE519014	53 (71)	2500	850	2700
164H	RE518995	48 (64)	1800	—	1890
164H	RE519015	48 (64)	1800	—	1890
164I	RE518998	48 (64)	1800	—	1890
164I	RE519016	48 (64)	1800	—	1890
1650	RE41938	43 (58)	2500	850	2700
1654	RE63523	41 (55)	2400	800	2600
1655	RE53785	43 (58)	2500	850	2700
168W	RE22670	53 (71)	2500	850	2700

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168X	RE522671	53 (71)	2500	850	2700
169T	RE523969				
169U	RE523970				
16BJ	RE570228	31 (42)	1500	—	1560
16BR	RE547817	31 (42)	1500	—	1560
16BS	RE53785	43 (58)	2500	800	2700
16BT	RE53783	59 (79)	2500	800	2700
16DE	RE502218	59 (79)	2500	850	2700
16DF	RE502238	52 (70)	2500	850	2700
16DG	RE502218	59 (79)	2500	850	2700
16DH	RE502238	52 (70)	2500	850	2700
16DR	RE502217	43 (58)	2500	850	2700
16DP	RE502217	43 (58)	2500	850	2700
16DV	RE53785	43 (58)	2500	850	2700
16DZ	RE501258	43 (58)	2500	850	2700
16EA	RE501218	59 (79)	2500	850	2700
16EG	RE501983	43 (58)	2500	850	2700
16EH	RE501983	43 (58)	2500	850	2700
16EJ	RE501985	59 (79)	2500	850	2700
16EK	RE502986	52 (70)	2500	850	2700
16EL	RE501985	59 (79)	2500	850	2700
16EM	RE501986	52 (70)	2500	850	2700
16EV	RE53958	59 (79)	2500	800	2700
16EQ	RE502182	43 (58)	2500	850	2700
16EQ	RE502509	43 (58)	2500	1700	2700
16HW	RE501259	36 (49)	2500	850	2700
16K5	RE532980	32 (43)	1500	—	1560
16K6	RE532981	32 (43)	1500	—	1560
16K7	RE532982	43 (58)	1500	—	1560
16K8	RE532983	43 (58)	1500	—	1560
16KZ	RE502217	43 (58)	2500	850	2700
16NP	RE502217	43 (58)	2500	850	2700
16PH	RE501259	36 (49)	2500	850	2700
16PN	RE502217	43 (58)	2500	850	2700
16QN	RE547815	31 (42)	1500	—	1560
16QP	RE547816	31 (42)	1500	—	1560
16RF	RE570228	41 (55)	1500	—	1560
16RG	RE570327	41 (55)	1500	—	1560
16RH	RE570328	46 (62)	1800	—	1890
16RM	RE570329	46 (62)	1800	—	1890
16SV	RE547816	35 (47)	1800	—	1890
16SW	RE547815	35 (47)	1800	—	1890
16TH	RE53785	43 (58)	2500	850	2700

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16TR	RE506877	48 (64)	1800	—	1890
16TR	RE506899	48 (64)	1800	—	1890
16TS	RE506878	48 (64)	1800	—	1890
16TS	RE506901	48 (64)	1800	—	1890
16TT	RE506879	42 (57)	1500	—	1560
16TT	RE506900	42 (57)	1500	—	1560
16TU	RE506880	42 (57)	1500	—	1560
16TU	RE506902	42 (57)	1500	—	1560
16YG	RE51940	37 (50)	2200	800	2400
16ZB	RE502238	52 (70)	2500	850	2700
16ZE	RE523773	53 (71)	2500	850	2700

[a] Power ratings are for a bare engine without the drag effect of accessories like fans, transmission, and auxiliary drives.
[b] Generator set engines (3-5% governor) usually run at 1500 rpm (50 Hz) or 1800 (60 Hz) when operating under load depending on cycles of AC current.
[c] Engine speeds listed are preset to factory specification. Slow idle speed may be reset depending upon specific vehicle application requirements. Refer to your machine operator's manual for engine speeds that are different from those preset at the factory.
[d] For engines with standard governor, fast idle is 7-10% above rated speed. For engines with generator set governors, fast idle is 3-5% above rated speed.

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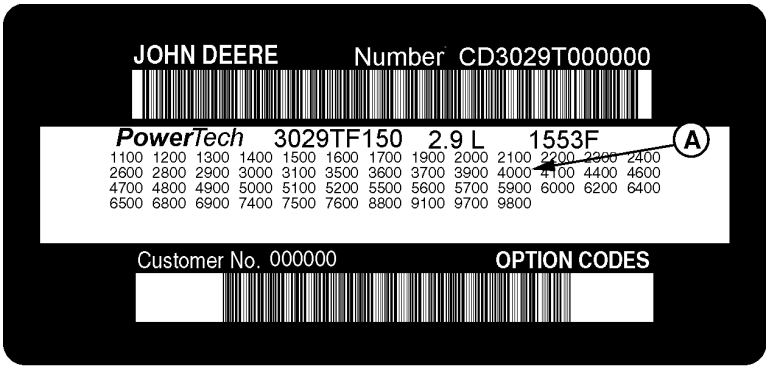
Engine Crankcase Oil Fill Quantities



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Option Code Label

A—Dipstick Tube Option (used to determine crankcase oil fill quantity)

To determine the option code for the oil fill quantity of your engine, refer to the engine option code label affixed to the rocker arm cover (shown above). The first two digits of the code (40) (see A) identify the dipstick tube group. The last two digits of the code identify the specific dipstick and tube assembly on your engine.

The following table lists engine crankcase oil fill quantities:

Engine Model	Dipstick Tube Option Code(s)	Crankcase Oil Capacity L (qt)
3029 (2.9 L)	4004	6.0 (6.3)
	4005	6.0 (6.3)
	4006	8.0 (8.5)
	4022	7.0 (7.4)
	4023	9.0 (9.5)
	4024	6.0 (6.3)
	4025	8.0 (8.5)
	4026	8.5 (9.0)
	4033	8.0 (8.5)
	40AA	6.0 (6.3)

NOTE: Crankcase oil capacity may vary slightly from amount shown. ALWAYS fill crankcase to within crosshatch on dipstick. DO NOT overfill.

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Unified Inch Bolt and Screw Torque Values

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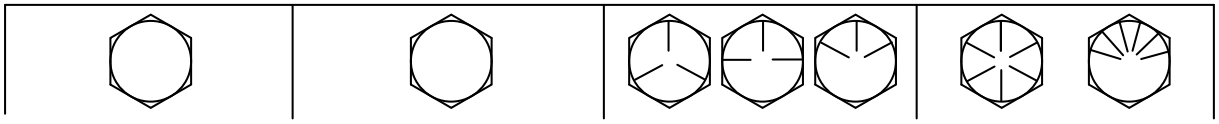


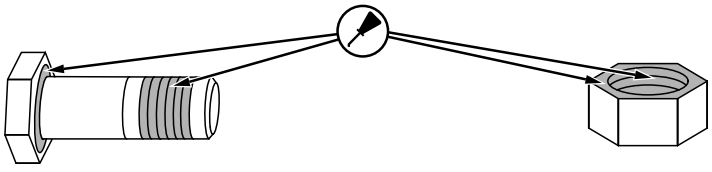
Bolt or Screw Size	SAE Grade 1[a]				SAE Grade 2[b]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]		Hex Head[c]		Flange Head[d]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
1/4	3.1	27.3	3.2	28.4	5.1	45.5	5.3	47.3	7.9	70.2	8.3	73.1	11.2	99.2	11.6	103
													N·m	lb·ft	N·m	lb·ft
5/16	6.1	54.1	6.5	57.7	10.2	90.2	10.9	96.2	15.7	139	16.8	149	22.2	16.4	23.7	17.5
									N·m	lb·ft	N·m	lb·ft				
3/8	10.5	93.6	11.5	102	17.6	156	19.2	170	27.3	20.1	29.7	21.9	38.5	28.4	41.9	30.9
					N·m	lb·ft	N·m	lb·ft								
7/16	16.7	148	18.4	163	27.8	20.5	30.6	22.6	43	31.7	47.3	34.9	60.6	44.7	66.8	49.3
	N·m	lb·ft	N·m	lb·ft												
1/2	25.9	19.1	28.2	20.8	43.1	31.8	47	34.7	66.6	49.1	72.8	53.7	94	69.3	103	75.8
9/16	36.7	27.1	40.5	29.9	61.1	45.1	67.5	49.8	94.6	69.8	104	77	134	98.5	148	109
5/8	51	37.6	55.9	41.2	85	62.7	93.1	68.7	131	96.9	144	106	186	137	203	150
3/4	89.5	66	98	72.3	149	110	164	121	230	170	252	186	325	240	357	263
7/8	144	106	157	116	144	106	157	116	370	273	405	299	522	385	572	422
1	216	159	236	174	216	159	236	174	556	410	609	449	785	579	860	634
1-1/8	305	225	335	247	305	225	335	247	685	505	751	554	1110	819	1218	898
1-1/4	427	315	469	346	427	315	469	346	957	706	1051	775	1552	1145	1703	1256
1-3/8	564	416	618	456	564	416	618	456	1264	932	1386	1022	2050	1512	2248	1658
1-1/2	743	548	815	601	743	548	815	601	1665	1228	1826	1347	2699	1991	2962	2185

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard™ or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.

TS1741 —UN—22MAY18

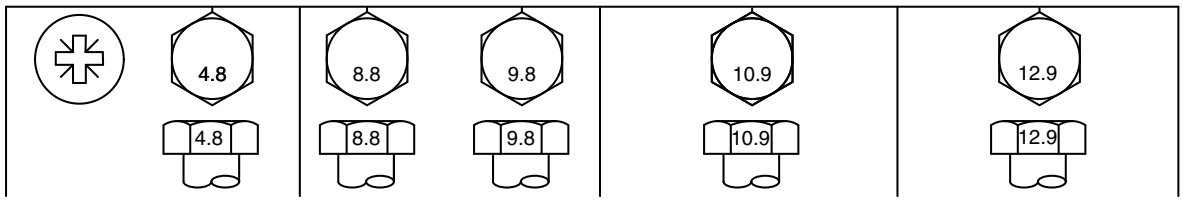


[a]Grade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.
[b]Grade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long.
[c]Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.
[d]Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.

DX,TORQ1 -19-09MAY22-1/1

Metric Bolt and Screw Torque Values

TS1742 —UN—31MAY18



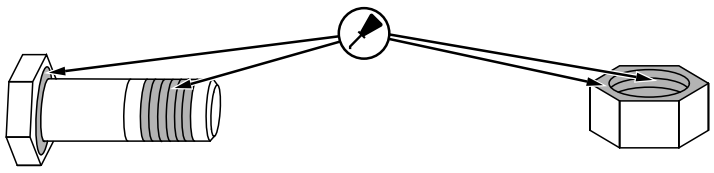
Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
M6	3.6	31.9	3.9	34.5	6.7	59.3	7.3	64.6	9.8	86.7	10.8	95.6	11.5	102	12.6	112
									N·m	lb·ft	N·m	lb·ft	N·m	lb·ft	N·m	lb·ft
M8	8.6	76.1	9.4	83.2	16.2	143	17.6	156	23.8	17.6	25.9	19.1	27.8	20.5	30.3	22.3
			N·m	lb·ft	N·m	lb·ft	N·m	lb·ft								
M10	16.9	150	18.4	13.6	31.9	23.5	34.7	25.6	46.8	34.5	51	37.6	55	40.6	60	44.3
	N·m	lb·ft														
M12	—	—	—	—	55	40.6	61	45	81	59.7	89	65.6	95	70.1	105	77.4
M14	—	—	—	—	87	64.2	96	70.8	128	94.4	141	104	150	111	165	122
M16	—	—	—	—	135	99.6	149	110	198	146	219	162	232	171	257	190
M18	—	—	—	—	193	142	214	158	275	203	304	224	322	245	356	263
M20	—	—	—	—	272	201	301	222	387	285	428	316	453	334	501	370
M22	—	—	—	—	365	263	405	299	520	384	576	425	608	448	674	497
M24	—	—	—	—	468	345	518	382	666	491	738	544	780	575	864	637
M27	—	—	—	—	683	504	758	559	973	718	1080	797	1139	840	1263	932
M30	—	—	—	—	932	687	1029	759	1327	979	1466	1081	1553	1145	1715	1265
M33	—	—	—	—	1258	928	1398	1031	1788	1319	1986	1465	2092	1543	2324	1714
M36	—	—	—	—	1617	1193	1789	1319	2303	1699	2548	1879	2695	1988	2982	2199

The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard™ or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes due to excessive oil.
- Properly start thread engagement.

TS1741 —UN—22MAY18



[a]Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.
[b]Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.

DX,TORQ2 -19-09MAY22-1/1

Lubrication and Maintenance Records

Using Lubrication And Maintenance Records

Refer to specific Lubrication and Maintenance Section for detailed service procedures.

1. Keep a record of the number of hours you operate your engine by regular observation of hour meter.
2. Check your record regularly to learn when your engine needs service.
3. DO ALL the services within an interval section. Write the number of hours (from your service records) and the date in the spaces provided. For a complete listing of all items to be performed and the service intervals required, refer to the quick-reference chart near the front of the Lubrication and Maintenance Section.

IMPORTANT: The service recommendations covered in this manual are for the accessories that are provided by John Deere. Follow manufacturer's service recommendations for servicing engine driven equipment not supplied by Deere.

RG,RG34710,5103 -19-30JAN98-1/1

Daily (Prestarting) Service

Check engine oil level.

Check coolant level.

Lubricate PTO release bearing.

Check air cleaner dust unloader valve and air restriction indicator, if equipped.

Visual walkaround inspection.

Check fuel filter.

RG,RG34710,5104 -19-30JAN98-1/1

250 Hour/6 Month Service

Service fire extinguisher.

Lubricate PTO clutch shaft bearings.

Service battery.

All except 3029TF270 engines: Change engine oil and filter.[1]

Check fan and alternator belt tension.

Check PTO clutch adjustment.

Check engine mounts.

Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									

[1]If John Deere PLUS-50 or E7/E6/E5/E4 oil is used along with the specified John Deere oil filter, the oil change interval may be extended by 50 percent to 375 hours.

RG,RG34710,5105 -19-30MAY06-1/1

500 Hour/12 Month Service

3029TF270 engines only: Change engine oil and filter.[1]

Check engine ground connection.

Lubricate PTO clutch internal levers and linkage.

Clean crankcase vent tube.

Check air intake hoses, connections, and system.

Replace fuel filter/bleed system.

Check cooling system.

Coolant solution analysis - add SCAs as needed.

Pressure test cooling system.

Check and adjust engine speeds.

Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									

[1]If John Deere PLUS-50 or ACEA-E7/E6/E5/E4 oil and the specified John Deere oil filter are NOT used, the oil change interval is reduced to 250 hours.

RG,RG34710,5108 -19-30MAY06-1/1

2000 Hour/24 Month Service

Adjust variable speed (droop) on generator set engines.

Check and adjust engine valve clearance.

Flush and refill cooling system.[1]

Test thermostat opening temperature.

Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									

[1]If John Deere COOL-GARD is used, the flushing interval may be extended to 3000 hours or 36 months. If John Deere COOL-GARD is used, and the coolant is tested annually AND additives are replenished by adding supplemental coolant additives (SCA's), the flushing interval may be extended to 5000 hours or 60 months, whichever occurs first.

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Service As Required

Add coolant.

Bleed fuel system.

Replace air cleaner elements.

Replace belts.

Check fuses.

Inspect PTO clutch. (If equipped.)

Hours									
Date									
Hours									
Date									
Hours									
Date									
Hours									
Date									

RG,RG34710,5110 -19-13FEB03-1/1

John Deere Warranty in OEM Applications

Overview

This section focuses on John Deere engines marketed in products manufactured by companies other than John Deere or its affiliates, and on John Deere repower engines in all applications. Herein appears the original warranty applicable to the engine as delivered to the retail purchaser on or after 1 May 2010. The following is information about the warranty and warranty service.

NOTE: "John Deere" means John Deere Power Systems with respect to users in the United States, John Deere Canada ULC with respect to users in Canada, and Deere & Company or its subsidiary responsible for making John Deere equipment in other countries where the user is located.

Promptly register the engine online at https://warrantyregistration.deere.com/WarrantyReg/web/WarrantyReg.

When Warranty Service Is Needed

The nearest dealer stands ready with genuine parts and trained and equipped personnel should the need arise. If following the Operator's Manual delivered with the engine/machine are not adequate to correct an engine problem, contact the nearest John Deere service dealer for assistance. Authorized engine service dealers can be found at: https://www.deere.com/or https://www.deere.ca/ (click on "Find a Dealer").

NOTE: When requesting warranty service, the purchaser must be prepared to provide proof that the engine is within the warranty period.

The following information is always required: Engine serial number, date of delivery, engine owner, name and location of dealer and specific person contacted, date of contact, nature of engine problem, and outcome of the service dealer contact.

Given that normally it is the dealer contacted who in the end provides the service required, maintaining a purchaser-dealer relationship of mutual respect from the beginning is always helpful.

Privacy Notice

At John Deere privacy is important. We collect, use, and disclose personal information in accordance with the John Deere privacy statement. For instance, we collect, use, and disclose personal information to provide the products and services requested; to communicate with the customer (examples include warranty and product improvement programs) and to meet safety and legal requirements; and for marketing and promotional purposes. Sometimes, we may ask our John Deere affiliates, dealers, or business partners to do work for us, which involves personal information. For complete details on privacy rights and to obtain a copy of the John Deere Privacy Statement, visit our website at https://www.deere.com/or https://www.deere.ca/.

Warranty Duration

Unless otherwise provided in writing, John Deere makes the following warranty to the first retail purchaser and each subsequent purchaser (if purchase is made prior to expiration of applicable warranty) of each John Deere new off-highway engine marketed as part of a product manufactured by a company other than John Deere or its affiliates and on each John Deere engine used in an off-highway repower application:

- 12 months, unlimited hours of use, or
- 24 months and prior to the accumulation of 2000 hours of use

NOTE: In the absence of a functional hour meter, hours of use will be determined on the basis of 12 hours of use per calendar day.

Warranty Coverage

All John Deere-warranted parts and components of John Deere engines which, as delivered to the purchaser, are defective in materials and/or workmanship will be repaired or replaced, as John Deere elects, without charge for parts or engine repair labor, including reasonable costs of labor to remove and reinstall non-engine parts or components of the equipment in which the engine is installed, and, when required, reasonable costs of labor for engine removal and reinstallation, if such defect appears within the warranty period as measured from the date of delivery to the first retail purchaser.

Emissions Warranty

Emissions warranties appear in the Operator's Manual, that is furnished with the engine/machine.

Obtaining Warranty Service

Warranty service is to be performed by a local John Deere engine service outlet before the expiration of the warranty. An authorized service outlet is a John Deere engine distributor, a John Deere engine service dealer, or a John Deere equipment dealer selling and servicing equipment with an engine of the type covered by this warranty. Authorized service outlets will use only new or remanufactured parts or components furnished or approved by John Deere.

Authorized service locations can be found by using the dealer locator on www.johndeere.com, or by calling 1 -800-JDENGINE (800-533-6446).

At the time of requesting warranty service, the purchaser must be prepared to present evidence of the engine's delivery date.

Continued on next page

John Deere reimburses authorized service outlets for limited travel expenses incurred in making warranty service repairs in non-John Deere applications when travel is actually performed. Contact your local authorized service dealer for current travel reimbursement limits. If distances and travel times are greater than reimbursed by John Deere, the service outlet will charge the purchaser for the difference.

Authorized service outlets will use only new or remanufactured parts or components furnished or approved by John Deere.

NOTE: Authorized engine service locations are listed on the Internet at https://www.deere.com/or https://www.deere.ca/ (click on "Find a Dealer").

At the time of requesting warranty service, the purchaser must be prepared to present evidence of the date of delivery of the engine.

John Deere reimburses authorized service outlets for limited travel expenses incurred in making warranty service repairs in non-John Deere applications when travel is performed. The limit, as of the date of publication of this booklet, is US$400.00 (US$500.00 if engine is marine) or equivalent. **If distances and travel times are greater than reimbursed by John Deere, the service outlet will charge the purchaser for the difference.**

Warranty Exclusions

John Deere's obligations will not apply to components and accessories that are not furnished or installed by John Deere, nor to failures caused by such items, except as required by law.

Purchaser's Responsibilities

The cost of normal maintenance and depreciation.

Periodic cleaning of the Diesel Exhaust Filter.

Consequences of negligence, misuse, or accident involving the engine, or improper application, installation, or storage of the engine.

Consequences of service performed by someone other than a party authorized to perform warranty service, if such service, in John Deere's judgment, has adversely affected the performance or reliability of the engine.

Consequences of any modification or alteration of the engine not approved by John Deere, including, but not limited to, tampering with fuel and air delivery systems.

Consequences of fuels, lubricants or coolant that fails to meet the specifications and requirements listed in the Operator's Manual.

The effects of cooling system neglect as manifested in cylinder liner or block cavitation ("pitting", "erosion", "electrolysis").

Any premium for overtime labor requested by the purchaser.

Costs of transporting the engine or the equipment in which it is installed to and from the location at which the warranty service is performed, if such costs are in excess of the maximum amount payable to the service location were the warranty service performed at the engine's location.

Costs incurred in gaining access to the engine; i.e., overcoming physical barriers such as walls, fences, floors, decks or similar structures impeding access to the engine, rental of cranes or similar, or construction of ramps or lifts or protective structures for engine removal and reinstallation.

Incidental travel costs including meals, lodging, and similar.

Service outlet costs incurred in solving or attempting to solve non-warrantable problems.

Services performed by a party other than an authorized John Deere engine service dealer, unless required by law.

Charges by dealers for initial engine start-up and inspection, deemed unnecessary by John Deere when operation and maintenance instructions supplied with the engine are followed.

Costs of interpretation or translation services.

Periodic cleaning of the Diesel Exhaust Filter.

John Deere will not be responsible for the cost of Exhaust Filter or Diesel Particulate Filter (DPF) cleaning unless:

- The need for cleaning resulted from the failure of a part that is covered by the engine's Standard Product Warranty or Extended Warranty, or
- The engine is located in California and the need for cleaning was caused by a failure covered under applicable CARB emissions regulations.

Continued on next page

No Representations or Implied Warranty

Where permitted by law, neither John Deere nor any company affiliated with it makes any guaranties, warranties, conditions, representations or promises, express or implied, oral or written, as to the nonoccurrence of any defect or the quality or performance of its engines other than those set forth herein, and DOES NOT MAKE ANY IMPLIED WARRANTY OR CONDITIONS OF MERCHANTABILITY OR FITNESS otherwise provided for in the Uniform Commercial Code or required by any Sale of Goods Act or any other statute. This exclusion includes fundamental terms. In no event will a John Deere engine distributor or engine service dealer, John Deere equipment dealer, John Deere or any company affiliated with John Deere be liable for incidental or consequential damages or injuries including, but not limited to, loss of profits, loss of crops, rental of substitute equipment or other commercial loss, damage to the equipment in which the engine is installed or for damage suffered by purchaser as a result of fundamental breaches of contract or breach of fundamental terms, unless such damages or injuries are caused by the gross negligence or intentional acts of the foregoing parties.

Remedy Limitation

The remedies set forth in this warranty are the purchaser's exclusive remedies in connection with the performance of, or any breach of guaranty, condition, or warranty in respect of new John Deere engines. In the event the above warranty fails to correct purchaser's performance problems caused by defects in workmanship and/or materials, purchaser's exclusive remedy shall be limited to payment by John Deere of actual damages in an amount not to exceed the depreciated cost of the product.

No Seller's Warranty

No person or entity, other than John Deere, who sells the engine or product in which the engine has been installed makes any guaranty or warranty of its own on any engine warranted by John Deere unless it delivers to the purchaser a separate written guaranty certificate specifically guaranteeing the engine, in which case John Deere shall have no obligation to the purchaser. Neither original equipment manufacturers, engine or equipment distributors, engine or equipment dealers, nor any other person or entity, has any authority to make any representation or promise on behalf of John Deere or to modify the terms or limitations of this warranty in any way.

Replacement Parts Warranty

John Deere and John Deere Reman parts and components (excluding replacement engines) installed during engine warranty service are warranted for the remaining warranty period of the engine or the applicable warranty term for the installed service part, whichever is greater. A new or remanufactured engine replacing a failed engine under warranty is warranted for 90 days or the remaining warranty period of the original engine, whichever is greater.

Warranty Transfer

The remainder of the original engine warranty and the emissions control-related warranty may be transferred to a subsequent owner of the engine. The Engine Warranty Transfer card should be used to report the transfer to John Deere. If a card is not available, contact your Dealer or simply send the following Information to JDPS Warranty Administration at Diesel-US@JohnDeere.com.

1. The complete 13-character engine serial number.
2. The name and mailing address of the original purchaser.
3. Delivery date to the original purchaser.
4. Hours at the time of transfer.
5. Date of transfer to the new owner.
6. Name and mailing address of the new owner.
7. How the engine/drivetrain being used, that is, what equipment it powers, by manufacturer and model.
8. Equipment it powers, by manufacturer and model.

Purchased Extended Warranty

Extended warranty may be purchased on most engines in many areas of the world. John Deere engine distributors and equipment dealers, and dealers of manufacturers using John Deere engines in their products, have details. John Deere may also be contacted at U.S.A. fax number 1-309-749-0816, or in Europe fax number 33.2.38.84.62.66.

Emissions Warranties

Emissions warranties appear in the Operator's Manual furnished with the engine/machine. **(Warning: Statutes providing severe penalties for tampering with emissions controls may apply at the user's location.)** John Deere may also be contacted at U.S.A. fax number 1-309-749-0816; or in Europe fax number 33.2.38.84.62.66.

Local Warranty Requirements

Warranties required by local statutes will be furnished by the seller.

Option Codes (Engine Manufacturing Configuration)

When in need of engine replacement parts, your authorized John Deere service dealer will must know the corresponding "Option Codes" for your engine. The option code label on the engine rocker arm cover may become damaged over time. By recording the four-digit codes when the engine is new, and storing this manual where it can be found when parts are needed, fast, accurate parts ordering and service will be assured. See Engine Option Codes in Section 01.

Continued on next page

Should there be a question about an engine option code, note the engine serial number and call 1-800-JDENGINE from the U.S.A. or Canada, or fax U.S.A. number 1-309-749-0816; or E-mail at diesel-us@johndeere.com, Attention: Warranty Administration; or in Europe fax number 33.2.38.84.62.66, or E-mail at saranservice@johndeere.com.

Registering the Engine for Warranty

Completion and submission of the John Deere Engine Warranty Registration form (cut out sheet found in this manual) is important. John Deere will not deny warranty service on an engine within its warranty period if the engine has not been registered. However, registering your engine will assure your servicing dealer that the engine is within the warranty period.

The easiest way to register your engine is via the Internet. Go to website https://www.johndeere.com/enginewarranty You can use the sheet in this manual to gather the information needed to register the warranty.

NOTE: Information provided on the form must be legible!

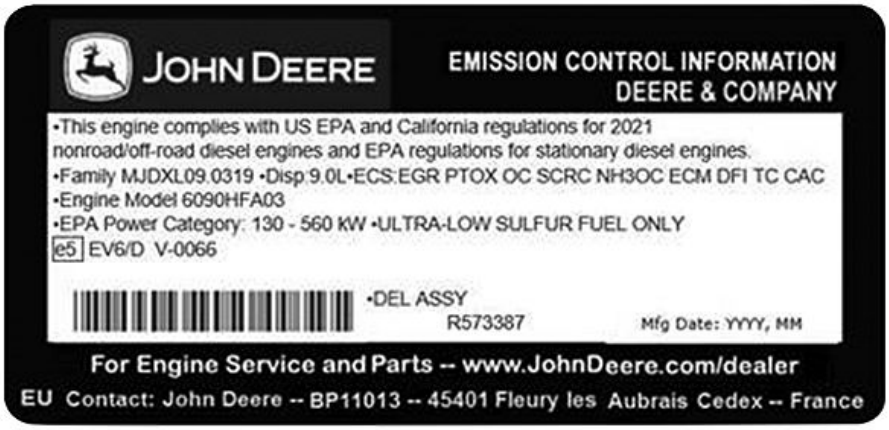
Typing is preferred, but legible handwritten reports are acceptable. “Block” numbers and Roman alphabet letters should be used. For example: 1,2,3,4 and A, B, C, D.

All requested information should be given. Much of it contributes to reports, including those required by governments.

The purchaser’s telephone number or E-mail address allows John Deere to make contact should there be questions concerning the registration. The purchaser should sign and date the form.

CM22194,00011A1 -19-21AUG25-4/4

Emissions Control System Certification Label



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Engine Emissions Label

⚠ CAUTION: Statutes providing severe penalties for tampering with emissions controls may apply to the user or dealer.

The emissions warranty applies to those engines marketed by John Deere that have been certified by the United States Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB); and used in the United States and Canada in Non-road equipment. The presence of an emissions label like the one shown signifies that the engine has been certified with the EPA and/or CARB. The EPA and CARB warranties only apply to new engines having the certification label affixed to the engine and sold as stated above in the geographic areas. The presence of an EU number signifies that the engine has been certified with the European Union countries per Regulation (EU) 2016/1628 and supplementing legislation. The EPA and/or CARB emissions warranties do not apply to the EU countries.

The emissions label has applicable US EPA and/or CARB regulatory year. The regulatory year determines which warranty statement is applicable to engine. See “EPA Non-road Emissions Control Warranty Statement—Compression Ignition” and “CARB Non-road Emissions Control Warranty Statement—Compression Ignition”. For additional regulatory year warranty statements, see www.JohnDeere.com or contact the nearest John Deere service dealer for assistance.

Emission Control System(s) Laws

The U.S. EPA and California ARB prohibit the removal or rendering inoperative of any device or element of design installed on or in engines/equipment in compliance with applicable emission regulations prior to or after the sale and delivery of the engines/equipment to the ultimate purchaser.

DX,EMISSIONS,LABEL -19-05FEB21-1/1

EPA Non-road Emissions Control Warranty Statement—Compression Ignition

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JOHN DEERE

U.S. AND CANADA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emissions Control Information" label located on the engine. If the engine is operated in the United States or Canada and the Emissions Control information label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine conforms to US EPA nonroad compression-ignition regulations", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the label states: "This engine complies with US EPA and CARB regulations for nonroad diesel engines", or "This engine conforms to US EPA and California nonroad compression-ignition emission regulations", also refer to the "California Emission Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emissions-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

JOHN DEERE'S WARRANTY RESPONSIBILITY

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine including all parts of its emission-control system was designed, built and equipped so as to conform at the time of the sale with Section 213 of the Clean Air Act and is free from defects in materials and workmanship which would cause the engine to fail to conform with applicable US EPA regulations for a period of five years from the date the engine is placed into service or 3,000 hours of operation, whichever first occurs.

Where a warrantable condition exists, John Deere will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to you, including expenses related to diagnosing and repairing or replacing emission-related parts. Warranty coverage is subject to the limitations and exclusions set forth herein. Emission- related components include engine parts developed to control emissions related to the following:

Air-Induction System
Fuel System
Ignition System
Exhaust Gas Recirculation Systems
Aftertreatment Devices
Crankcase Ventilation Valves
Sensors
Engine Electronic Control Units

EMISSION WARRANTY EXCLUSIONS

John Deere may deny warranty claims for malfunctions or failures caused by:

- Non-performance of maintenance requirements listed in the Operator's Manual
- The use of the engine/equipment in a manner for which it was not designed
- Abuse, neglect, improper maintenance or unapproved modifications or alterations
- Accidents for which it does not have responsibility or by acts of God

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel can harm the emissions control system of the engine/equipment and is not approved for use.

To the extent permitted by law John Deere is not liable for damage to other engine components caused by a failure of an emission-related part, unless otherwise covered by standard warranty.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISIONS OF MATERIAL AND SERVICES AS SPECIFIED HEREIN. WHERE PERMITTED BY LAW, NEITHER JOHN DEERE NOR ANY AUTHORIZED JOHN DEERE ENGINE DISTRIBUTOR, DEALER, OR REPAIR FACILITY OR ANY COMPANY AFFILIATED WITH JOHN DEERE WILL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Emission_CI_EPA (18Dec09)

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DX,EMISSIONS,EPA -19-12DEC12-1/2

JOHN DEERE

U.S. AND CANADA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emissions Control Information" label located on the engine. If the engine is operated in the United States or Canada and the Emissions Control information label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine conforms to US EPA nonroad compression-ignition regulations", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the label states: "This engine complies with US EPA and CARB regulations for nonroad diesel engines", or "This engine conforms to US EPA and California nonroad compression-ignition emission regulations", also refer to the "California Emission Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emissions-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

JOHN DEERE'S WARRANTY RESPONSIBILITY

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine including all parts of its emission-control system was designed, built and equipped so as to conform at the time of the sale with Section 213 of the Clean Air Act and is free from defects in materials and workmanship which would cause the engine to fail to conform with applicable US EPA regulations for a period of five years from the date the engine is placed into service or 3,000 hours of operation, whichever first occurs.

Where a warrantable condition exists, John Deere will repair or replace, as it elects, any part or component with a defect in materials or workmanship that would increase the engine's emissions of any regulated pollutant within the stated warranty period at no cost to you, including expenses related to diagnosing and repairing or replacing emission-related parts. Warranty coverage is subject to the limitations and exclusions set forth herein. Emission- related components include engine parts developed to control emissions related to the following:

Air-Induction System
Fuel System
Ignition System
Exhaust Gas Recirculation Systems
Aftertreatment Devices
Crankcase Ventilation Valves
Sensors
Engine Electronic Control Units

EMISSION WARRANTY EXCLUSIONS

John Deere may deny warranty claims for malfunctions or failures caused by:

- Non-performance of maintenance requirements listed in the Operator's Manual
- The use of the engine/equipment in a manner for which it was not designed
- Abuse, neglect, improper maintenance or unapproved modifications or alterations
- Accidents for which it does not have responsibility or by acts of God

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel can harm the emissions control system of the engine/equipment and is not approved for use.

To the extent permitted by law John Deere is not liable for damage to other engine components caused by a failure of an emission-related part, unless otherwise covered by standard warranty.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISIONS OF MATERIAL AND SERVICES AS SPECIFIED HEREIN. WHERE PERMITTED BY LAW, NEITHER JOHN DEERE NOR ANY AUTHORIZED JOHN DEERE ENGINE DISTRIBUTOR, DEALER, OR REPAIR FACILITY OR ANY COMPANY AFFILIATED WITH JOHN DEERE WILL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Emission_CI_EPA (18Dec09)

TS1721 —UN—15JUL13

DX,EMISSIONS,EPA -19-12DEC12-2/2

CARB Non-road Emissions Control Warranty Statement—Compression Ignition

Emissions Control Warranty Statement 2022 through 2024

DXLOGOV1 —UN—28APR09

JOHN DEERE

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the “Emission Control Information” label located on the engine. If the engine is operated in the United States or Canada and the engine label states: “This engine complies with US EPA regulations for nonroad and stationary diesel engines”, or “This engine complies with US EPA regulations for stationary emergency diesel engines”, refer to the “U.S. and Canada Emission Control Warranty Statement.” If the engine is operated in California, and the engine label states: “This engine complies with US EPA and California regulations for nonroad/off-road diesel engines” also refer to the “California Emissions Control Warranty Statement.” Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:
The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty on 2022 through 2024 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State’s stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.
Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.
John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB. John Deere warrants that this engine is free from defects in materials and workmanship which would cause the failure of emissions warrantied parts to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. This applies to all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.
EMISSIONS WARRANTY EXCLUSIONS:
John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.
In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

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DX,EMISSIONS,CARB -19-15DEC23-1/7

JOHN DEERE'S WARRANTY RESPONSIBILITY:
Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts or labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

Air Induction System

- Intake manifold
- Turbocharger
- Charge air cooler

Fuel Metering system

- Fuel injection system

Exhaust Gas Recirculation

- EGR valve

Catalyst or Thermal Reactor Systems

- Catalytic converter
- Exhaust manifold

Emission control labels
Particulate Controls

- Any device used to capture particulate emissions
- Any device used in the regeneration of the capturing system
- Enclosures and manifolding
- Smoke Puff Limiters

Positive Crankcase Ventilation (PCV) System

- PCV valve
- Oil filler cap

Advanced Oxides of Nitrogen (NOx) Controls

- NOx absorbers and catalysts

SCR systems and urea containers/dispensing systems
Miscellaneous Items used in Above Systems

- Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER'S WARRANTY RESPONSIBILITIES:
As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator's Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner's failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.
The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.
Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

Emission_CI_CARB (14Apr20)

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DX,EMISSIONS,CARB -19-15DEC23-2/7

Emissions Control Warranty Statement 2022 through 2024

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JOHN DEERE

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emission Control Information" label located on the engine. If the engine is operated in the United States or Canada and the engine label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine complies with US EPA regulations for stationary emergency diesel engines", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the engine label states: "This engine complies with US EPA and California regulations for nonroad/off-road diesel engines" also refer to the "California Emissions Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:

The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty on 2022 through 2024 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB. John Deere warrants that this engine is free from defects in materials and workmanship which would cause the failure of emissions warrantied parts to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. This applies to all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

EMISSIONS WARRANTY EXCLUSIONS:

John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.

In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

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DX,EMISSIONS,CARB -19-15DEC23-3/7

JOHN DEERE'S WARRANTY RESPONSIBILITY:

Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts or labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

Air Induction System

- Intake manifold
- Turbocharger
- Charge air cooler

Fuel Metering system

- Fuel injection system

Exhaust Gas Recirculation

- EGR valve

Catalyst or Thermal Reactor Systems

- Catalytic converter
- Exhaust manifold

Emission control labels

Particulate Controls

- Any device used to capture particulate emissions
- Any device used in the regeneration of the capturing system
- Enclosures and manifolding
- Smoke Puff Limiters

Positive Crankcase Ventilation (PCV) System

- PCV valve
- Oil filler cap

Advanced Oxides of Nitrogen (NOx) Controls

- NOx absorbers and catalysts

SCR systems and urea containers/dispensing systems

Miscellaneous Items used in Above Systems

- Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER'S WARRANTY RESPONSIBILITIES:

As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator's Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner's failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.

The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.

Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

RG32759 —UN—19AUG20

Emission_CI_CARB (14Apr20)

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DX,EMISSIONS,CARB -19-15DEC23-4/7

Emissions Control Warranty Statement 2025 through 2027

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JOHN DEERE

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the “Emission Control Information” label located on the engine. If the engine is operated in the United States or Canada and the engine label states: “This engine complies with US EPA regulations for nonroad and stationary diesel engines”, or “This engine complies with US EPA regulations for stationary emergency diesel engines”, refer to the “U.S. and Canada Emission Control Warranty Statement.” If the engine is operated in California, and the engine label states: “This engine complies with US EPA and California regulations for nonroad/off-road diesel engines” also refer to the “California Emissions Control Warranty Statement.” Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:
The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty in 2025 through 2027 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State’s stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.
Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.
John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB and is free from defects in materials and workmanship which would cause the failure of a warranted part to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first for all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.
EMISSIONS WARRANTY EXCLUSIONS:
John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.
In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

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JOHN DEERE'S WARRANTY RESPONSIBILITY:
Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts and labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

Air Induction System

- Intake manifold
- Turbocharger
- Charge air cooler

Fuel Metering system

- Fuel injection system

Exhaust Gas Recirculation

- EGR valve

Catalyst or Thermal Reactor Systems

- Catalytic converter
- Exhaust manifold

Emission control labels

Particulate Controls

- Any device used to capture particulate emissions
- Any device used in the regeneration of the capturing system
- Enclosures and manifolding
- Smoke Puff Limiters

Positive Crankcase Ventilation (PCV) System

- PCV valve
- Oil filler cap

Advanced Oxides of Nitrogen (NOx) Controls

- NOx absorbers and catalysts

SCR systems and urea containers/dispensing systems

Miscellaneous Items used in Above Systems

- Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER'S WARRANTY RESPONSIBILITIES:
As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator's Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner's failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.
The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.
Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

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DX,EMISSIONS,CARB -19-15DEC23-6/7

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

To determine if the John Deere engine qualifies for the additional warranties set forth below, look for the "Emission Control Information" label located on the engine. If the engine is operated in the United States or Canada and the engine label states: "This engine complies with US EPA regulations for nonroad and stationary diesel engines", or "This engine complies with US EPA regulations for stationary emergency diesel engines", refer to the "U.S. and Canada Emission Control Warranty Statement." If the engine is operated in California, and the engine label states: "This engine complies with US EPA and California regulations for nonroad/off-road diesel engines" also refer to the "California Emissions Control Warranty Statement."

Warranties stated on this certificate refer only to emissions-related parts and components of your engine. The complete engine warranty, less emission-related parts and components, is provided separately. If you have any questions about your warranty rights and responsibilities, you should contact John Deere at 1-319-292-5400.

CALIFORNIA EMISSIONS CONTROL WARRANTY STATEMENT:

The California Air Resources Board (CARB) is pleased to explain the emission-control system warranty in 2025 through 2027 off-road diesel engines. In California, new off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. John Deere must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

John Deere warrants to the ultimate purchaser and each subsequent purchaser that this off-road diesel engine was designed, built, and equipped so as to conform at the time of sale with all applicable regulations adopted by CARB and is free from defects in materials and workmanship which would cause the failure of a warranted part to be identical in all material respects to the part as described in John Deere's application for certification for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first for all engines rated at 19 kW and greater. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

EMISSIONS WARRANTY EXCLUSIONS:

John Deere may deny warranty claims for failures caused by the use of an add-on or modified part which has not been exempted by the CARB. A modified part is an aftermarket part intended to replace an original emission-related part which is not functionally identical in all respects and which in any way affects emissions. An add-on part is any aftermarket part which is not a modified part or a replacement part.

In no event will John Deere, any authorized engine distributor, dealer, or repair facility, or any company affiliated with John Deere be liable for incidental or consequential damage.

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JOHN DEERE'S WARRANTY RESPONSIBILITY:

Where a warrantable condition exists, John Deere will repair or replace, as it elects, your off-road diesel engine at no cost to you, including diagnosis, parts and labor. Warranty coverage is subject to the limitations and exclusions set forth herein. The off-road diesel engine is warranted for a period of five years from the date the engine is delivered to an ultimate purchaser or 3,000 hours of operation, whichever occurs first. The following are emissions-related parts:

- Air Induction System
  - Intake manifold
  - Turbocharger
  - Charge air cooler
- Fuel Metering System
  - Fuel injection system
- Exhaust Gas Recirculation
  - EGR valve
- Catalyst or Thermal Reactor Systems
  - Catalytic converter
  - Exhaust manifold
- Emission control labels
- Particulate Controls
  - Any device used to capture particulate emissions
  - Any device used in the regeneration of the capturing system
  - Enclosures and manifolding
  - Smoke Puff Limiters
- Positive Crankcase Ventilation (PCV) System
  - PCV valve
  - Oil filler cap
- Advanced Oxides of Nitrogen (NOx Controls)
  - NOx absorbers and catalysts
- SCR systems and urea containers / dispensing systems
- Miscellaneous Items used in Above Systems
  - Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps, fittings, gasket, mounting hardware

Any warranted emissions-related part scheduled for replacement as required maintenance is warranted by John Deere for the period of time prior to the first scheduled replacement point for the part. Any warranted emissions-related part not scheduled for replacement as required maintenance or scheduled only for regular inspection is warranted by John Deere for the stated warranty period.

OWNER'S WARRANTY RESPONSIBILIT IES:

As the off-road diesel engine owner you are responsible for the performance of the required maintenance listed in your Operator's Manual. John Deere recommends that the owner retain all receipts covering maintenance on the off-road diesel engine, but John Deere cannot deny warranty solely for the lack of receipts or for the owner's failure to ensure the performance of all scheduled maintenance. However, as the off-road diesel engine owner, you should be aware that John Deere may deny you warranty coverage if your off-road diesel engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

The off-road diesel engine is designed to operate on diesel fuel as specified in the Fuels, Lubricants and Coolants section in the Operators Manual. Use of any other fuel may result in the engine no longer operating in compliance with applicable emissions requirements.

The owner is responsible for initiating the warranty process, and should present the machine to the nearest authorized John Deere dealer as soon as a problem is suspected. The warranty repairs should be completed by the authorized John Deere dealer as quickly as possible.

Emissions regulations require the customer to bring the unit to an authorized servicing dealer when warranty service is required. As a result, John Deere is NOT liable for travel or mileage on emissions warranty service calls.

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DX,EMISSIONS,CARB -19-15DEC23-7/7

John Deere Service Literature Available

Technical Information

Technical information can be purchased from John Deere. Publications are available in print or CD-ROM format.

Orders can be made using one of the following:

- John Deere Technical Information Store: **www.JohnDeere.com/TechInfoStore**
- Call 1-800-522-7448
- Contact your John Deere dealer

Available information includes:

PARTS CATALOGS list service parts available for your machine with exploded view illustrations to help you identify the correct parts. It is also useful in assembling and disassembling.

TS189 —UN—17JAN89

DX,SERVLIT -19-07DEC16-1/4

OPERATOR'S MANUALS providing safety, operating, maintenance, and service information.

TS191 —UN—02DEC88

DX,SERVLIT -19-07DEC16-2/4

TECHNICAL MANUALS outlining service information for your machine. Included are specifications, illustrated assembly and disassembly procedures, hydraulic oil flow diagrams, and wiring diagrams. Some products have separate manuals for repair and diagnostic information. Some components, such as engines, are available in a separate component technical manual.

TS224 —UN—17JAN89

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DX,SERVLIT -19-07DEC16-3/4

EDUCATIONAL CURRICULUM including five comprehensive series of books detailing basic information regardless of manufacturer:

- Agricultural Primer series covers technology in farming and ranching.
- Farm Business Management series examines “real-world” problems and offers practical solutions in the areas of marketing, financing, equipment selection, and compliance.
- Fundamentals of Services manuals show you how to repair and maintain off-road equipment.
- Fundamentals of Machine Operation manuals explain machine capacities and adjustments, how to improve machine performance, and how to eliminate unnecessary field operations.
- Fundamentals of Compact Equipment manuals provide instruction in servicing and maintaining equipment up to 40 PTO horsepower.

TS1663 —UN—10OCT97

DX,SERVLIT -19-07DEC16-4/4

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