Series 300 3179, 4239, 6359, 4276, and 6414 Diesel Engines

Deere Power Systems Group
CTM4 (28OCT95)
LITHO IN U.S.A.
ENGLISH

Series 300
3179, 4239, 6359, 4276,
and 6414 Diesel Engines

CTM4 (28OCT95)

Introduction

FOREWORD

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

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

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

Use this component technical manual in conjunction with the machine technical manual. An application listing in the introduction identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

This manual is divided in two parts: repair and operation and tests. Repair sections contain necessary instructions to repair the component. Operation and tests sections help you identify the majority of routine failures quickly.

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

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

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

DX,CTMIFC -19-22MAY92

JOHN DEERE DEALERS

IMPORTANT: The changes listed below make your current CTM obsolete. Discard CTM4, dated 24 Jan 90. Please copy this page and route through your service department.

• Specifications listed at the beginning of each group have been updated.

• Engine model designation and application charts have been updated to include the latest product models. (Group 01.)

• Engine break-in oil information has been added. Engine coolant requirements and specifications have been revised. (Group 02.)

• Methods for properly lifting of engines have been revised and added. (Group 03.)

• Valve clearance checking and adjustment procedure revised to show that these procedures MUST BE done with engine COLD. Cylinder head removal, inspection, and installation procedures have been revised. (Group 05.)

• Main thrust bearing, compression ring, piston pin length and crankshaft rod journal specifications have been added. Tools required for piston and rod assembly have been updated. Procedures for measuring piston skirt, piston pin bore and piston-to-liner clearance have been revised. (Group 10.)

• Specifications for six-piece thrust bearing and main bearing cap screw torque for Dubuque and Saran-built engines have been added. (Group 15.)

• Crankshaft gear removal and installation procedures, crankshaft grinding guidelines and specifications chart have been revised. (Group 15.)

• Procedures for installing upper idler shaft for Saran engines requiring a special washer has been added. (Group 16.)

• Procedures for both aluminum and composite material timing gear covers have been added. (Group 16.)

• Description of standard-flow and high-flow oil coolers have been added. (Group 20.)

• Procedures for identifying and installing the oil bypass valve, which reflect a new design configuration have been added. (Group 20.)

• Water pump procedures have been revised to reflect a unitized (one-piece) water seal. (Group 25.)

• Checking Water Pump Cap Screw Protrusion procedure has been added for Saran 4-and 6-cylinder OEM engines. (Group 25.)

• Removal and installation procedures for the aftercooler have been added. (Group 30.)

• Turbocharger radial bearing clearance and axial bearing endplay procedures have been revised. (Group 30.)

• Engine break-in procedures have been revised. (Group 100.)

• Removal and installation procedures for the fuel shut-off solenoid have been added. Procedures for the removal, repair, and installation of the fuel injection pumps have been revised. (Group 35.)

• Fuel injection pump specifications chart has been updated to include dynamic timing values for all engine models. Procedures for dynamic timing using TIME TRAC® Kit has been added. Check and Adjust Engine Speed procedure for Lucas CAV and Stanadyne pumps have been added. (Group 115.)

RG,CTM4,DW815 -19-01NOV95

ABOUT THIS MANUAL

This Component Technical Manual (CTM4) covers the recommended repair procedures for the following engines:

• All 179 cu. in. (2.9 L), 239 cu. in. (3.9 L), and 359 cu. in. (5.9 L) produced in Saran, France having Engine Serial No. (CD394145—).

• All 239 cu. in. (3.9 L) and 359 cu. in. (5.9 L) produced in Dubuque, Iowa having Engine Serial No. (T0100001—300000).

• All 276 cu. in. (4.5 L) and 414 cu. in. (6.8 L) produced in Dubuque, Iowa having Engine Serial No. (T0100001—300000). These engines have serial number plates with raised letters and numbers, and were manufactured November 1983 or later.

Before beginning repair of an engine, clean the engine and mount on a repair stand. (See Group 03 - Engine Mounting.)

This manual contains SI Metric units of measure, followed immediately by the U.S. customary units of measure.

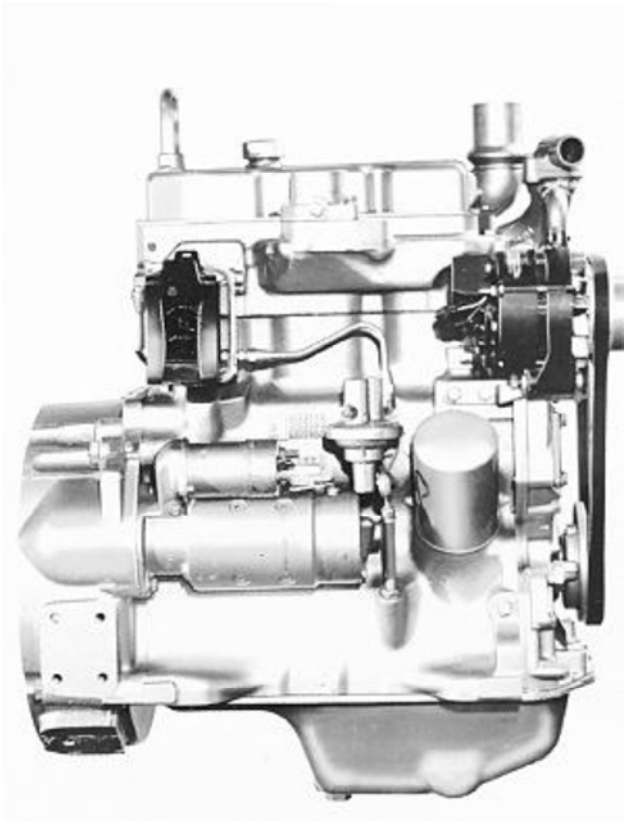
Direction of engine crankshaft rotation in this manual is referenced from facing the flywheel looking toward water pump. Front of engine is water pump end. NORMAL CRANKSHAFT ROTATION IS COUNTERCLOCKWISE.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manuals for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each module completely before performing service to check for differences in procedure or specifications. Follow only the procedures that apply to the engine model number you are working on. If only one procedure is given, that procedure applies to all 300 Series Diesel Engines in this manual.

S11,2000,DF -19-28SEP95

3179D ENGINE IDENTIFICATION



3179D Engine

RG,CTM4,DW610 -19-01NOV95

4276D ENGINE IDENTIFICATION

4276D Engine

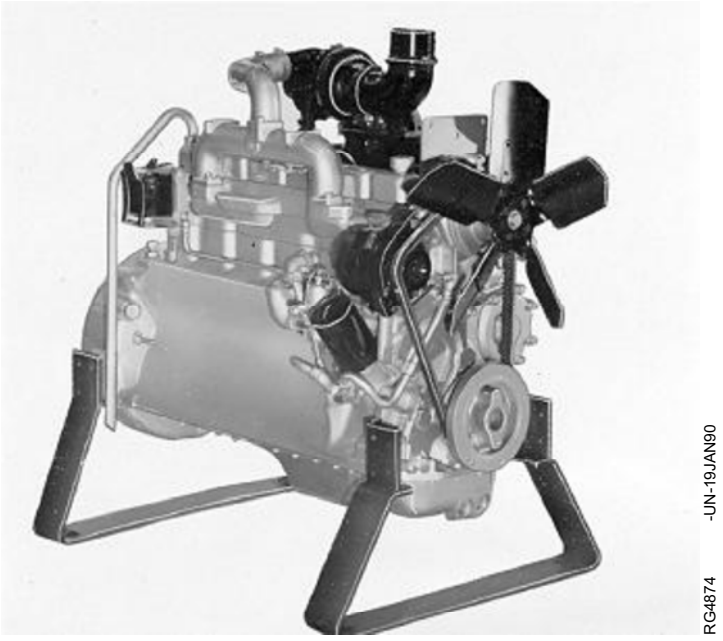
RG,CTM4,DW611 -19-28SEP95

6359A ENGINE IDENTIFICATION

6359A Engine

RG,CTM4,DW612 -19-28SEP95

6359T ENGINE IDENTIFICATION



6359T Engine

RG,CTM4,DW613 -19-28SEP95

HANDLE FLUIDS SAFELY—AVOID FIRES

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

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

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

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

TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

PREVENT BATTERY EXPLOSIONS

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

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

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

TS204 -UN-23AUG88

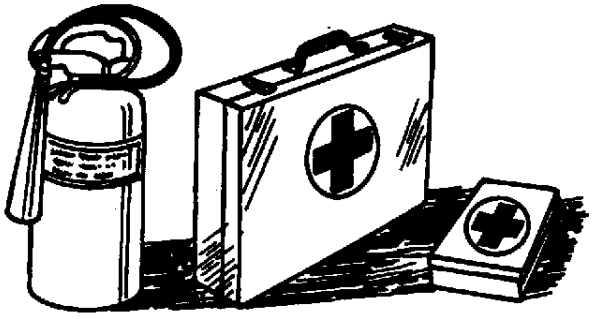
DX,SPARKS -19-03MAR93

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

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



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93

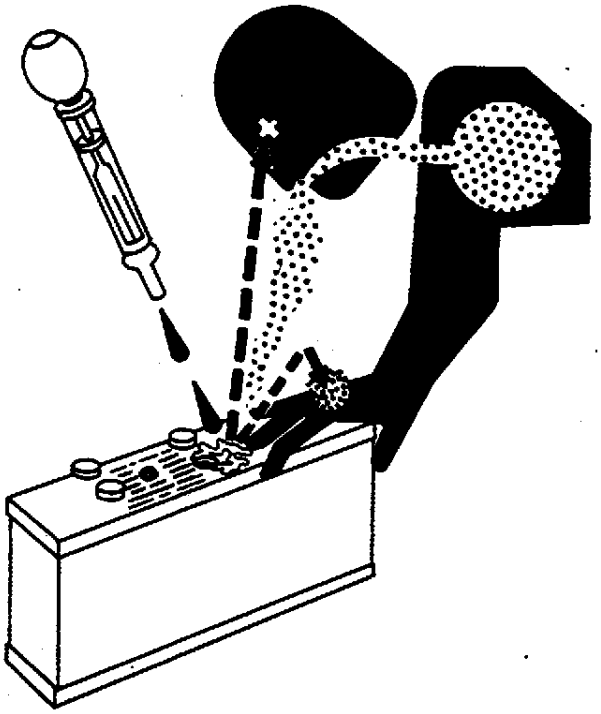
PREVENT ACID BURNS

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.

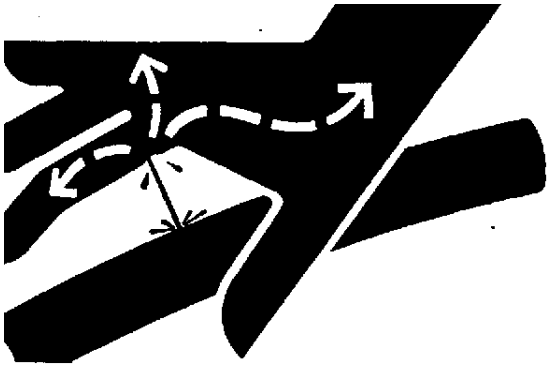
If acid is swallowed:
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 -UN-23AUG88

DX,POISON -19-21APR93

AVOID HIGH-PRESSURE FLUIDS



X9811 -UN-23AUG88

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

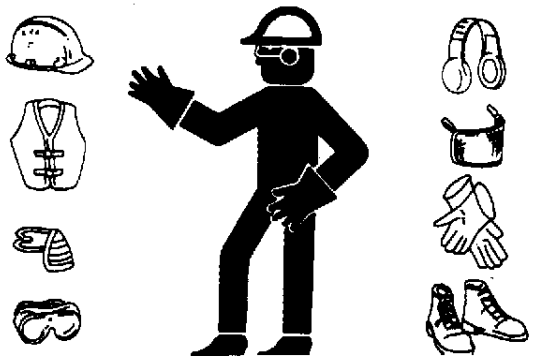
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

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

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

DX,FLUID -19-03MAR93

WEAR PROTECTIVE CLOTHING



TS206 -UN-23AUG88

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

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

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

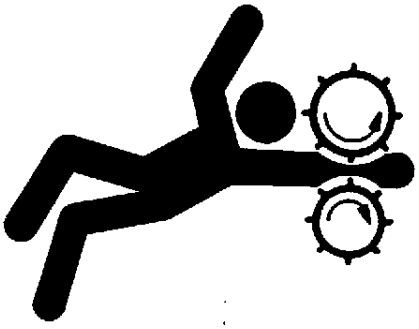
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

DX,WEAR -19-10SEP90

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.



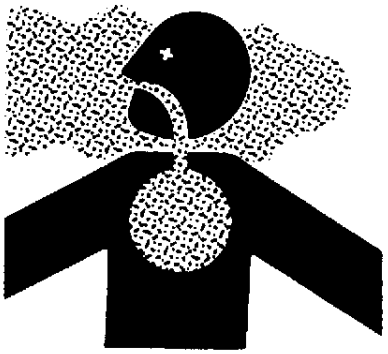
TS228 -UN-23AUG88

DX,LOOSE -19-04JUN90

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-23AUG88

DX,AIR -19-04JUN90

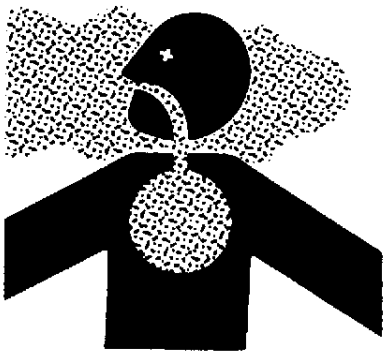
ILLUMINATE WORK AREA SAFELY

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

REMOVE PAINT BEFORE WELDING OR HEATING



TS220 -UN-23AUG88

Avoid potentially toxic fumes and dust.

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

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

• 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.

DX,PAINT -19-03MAR93

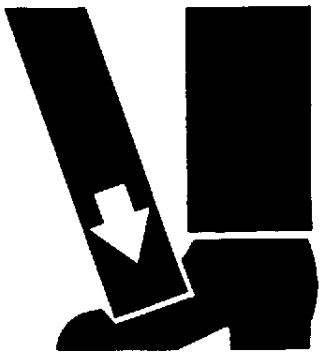
AVOID HEATING NEAR PRESSURIZED FLUID LINES

TS953 -UN-15MAY90

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 be accidentally cut when heat goes beyond the immediate flame area.

DX,TORCH -19-03MAR93

USE PROPER LIFTING EQUIPMENT



TS226 -UN-23AUG88

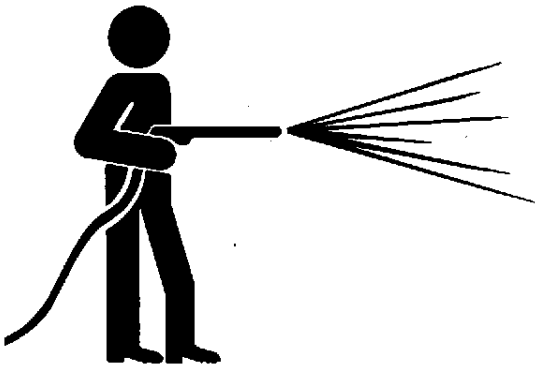
Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.

DX,LIFT -19-04JUN90

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

PRACTICE SAFE MAINTENANCE

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

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

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

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

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

TS218 -UN-23AUG88

DX,SERV -19-03MAR93

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 -19-04JUN90

DISPOSE OF WASTE PROPERLY

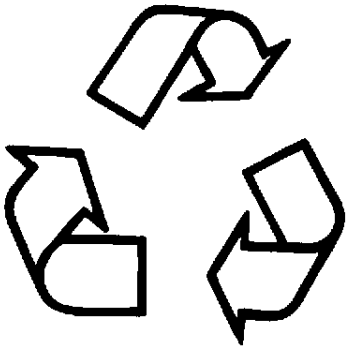
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

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

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

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

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



TS1133 -UN-26NOV90

DX,DRAIN -19-03MAR93

LIVE WITH SAFETY

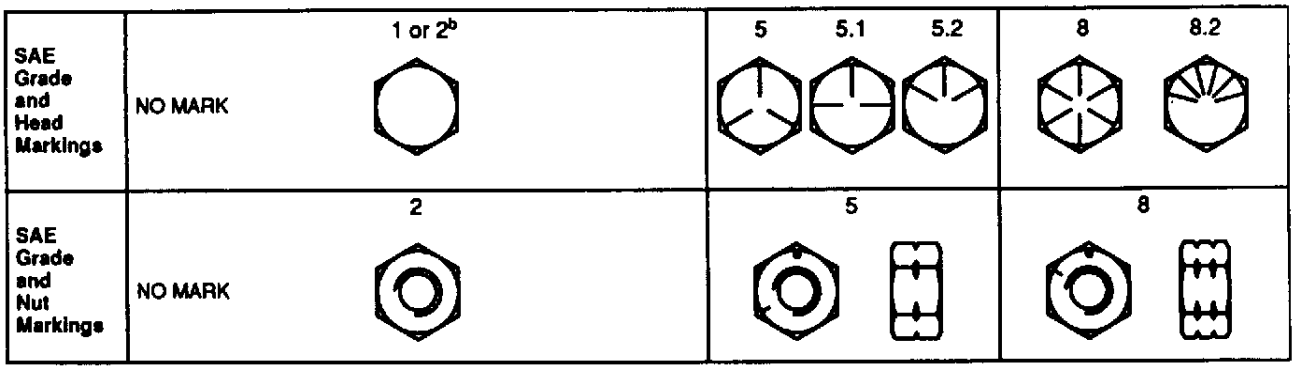
00 8

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

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



TS1162 -19-04MAR91

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

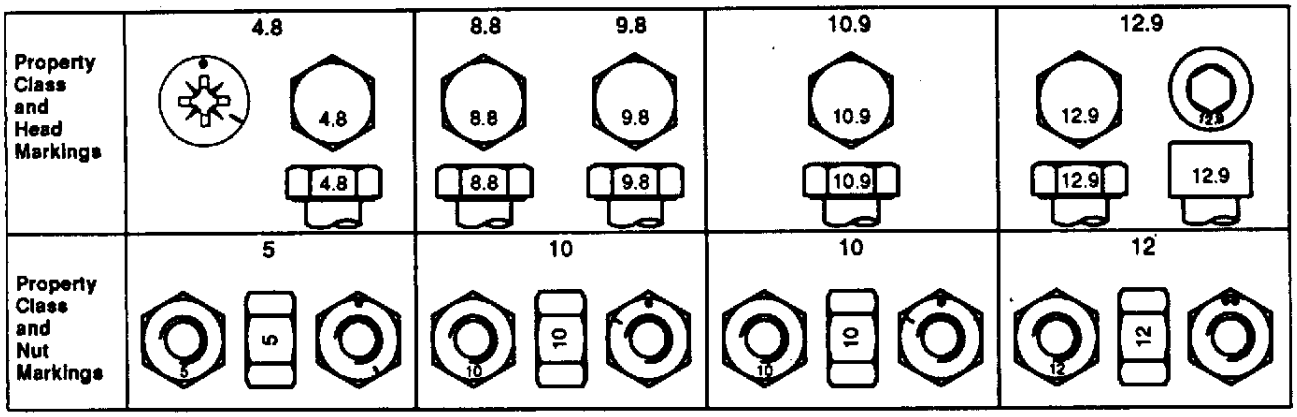
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

DX,TORQ1 -19-20JUL94

METRIC BOLT AND CAP SCREW TORQUE VALUES



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

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Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

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[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

DX,TORQ2 -19-20JUL94

ENGINE MODEL DESIGNATION

1. John Deere Engine Model—3179, 4239, 4276, 6359, and 6414 Engines.

John Deere engine model designation includes number of cylinders, displacement in cubic inches, aspiration, and application code. For example:

4239TF001 Engine

4	Number of cylinders
239	Cubic inch displacement
T	Aspiration code
F0	User factory code* (one or two digits)
01	Application code

*Factories with a one position factory code were formerly designated with a hyphen (-) in the second position (4239TF-01). Later engines are designated with a zero (0) in the second position of the factory code (4239TF001).

Aspiration Code

D	Naturally aspirated
T	Turbocharged
A	Turbocharged and air-to-coolant aftercooled

User Factory Code

J0	Argentina
DW	Davenport (Iowa)
N0	Des Moines (Iowa)
T0	Dubuque (Iowa)
H0	Harvester (Moline, Illinois)
CE	Iberica (Spain)
L0	Mannheim (Germany)
P0	Mexico
F0	OEM
E0	Ottumwa (Iowa)
CD	Saran (France)
R or RW	Waterloo Tractor Works
W0	Welland (Canada)
Z0	Zweibrucken (Germany)

Application Code

00, 01, 02, etc.	Code for specific application

S11,2000,DH -19-22SEP95

2. Detroit Diesel Allison (DDA) Engine Models.

DDA engine model designations cross-reference from John Deere engine models. They include the series, number of cylinders, application type, direction of rotation, aspiration, and application code. Thus, the model 4239TF001 engine discussed on the previous page, becomes DDA model F0439300. For example:

F0439300 Model Designation

F	Engine series
04	Number of cylinders
3	Application type
9	Direction of rotation
3	Aspiration
00	Application code

Application Type

2	Marine
3	Industrial
4	Power Base
5	Generator Set
8	Special

Direction of Rotation

9	Right-Hand (as viewed from FRONT of engine)
0	Left-Hand rotation

Aspiration

1	Naturally aspirated
3	Turbocharged
6	Turbocharged and aftercooled

Application Code

00, 01, 02 etc	Code for each specific application

S11,2000,DI -19-22JUN95

ENGINE SERIAL NUMBER PLATE INFORMATION

IMPORTANT: The engine serial number can be easily destroyed. Before "hot tank" cleaning the block, remove the plate or record the information elsewhere.

• Engine Serial Number (A)

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, and a 6-digit sequential number. The following is an example:

CD6359T000000

CD	Factory producing engine
6359T	Engine model designation
000000.	Sequential serial number

Factory Codes

T0	Dubuque, Iowa
CD	Saran, France

Engine Model Designation

6359T	Definition explained previously. (See "Engine Model Designation".)

Sequential Number*

000000	6-digit sequential serial number

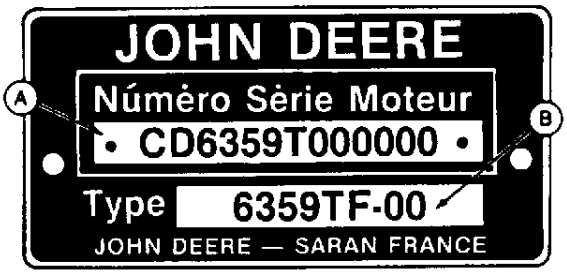
*Numbering sequence differs between factories.

• Engine Application Data (B and C)

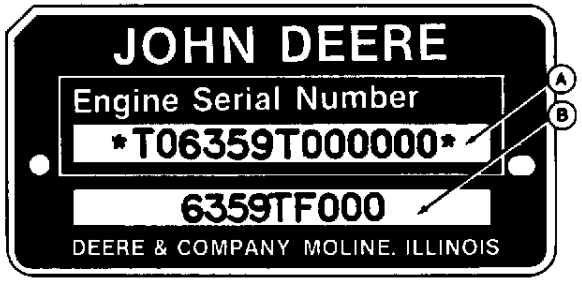
The second line of information on the nameplate identifies the engine/machine or OEM relationship. See ENGINE APPLICATION CHART later in this group.

• Coefficient of Absorption (D)—Saran built engines only

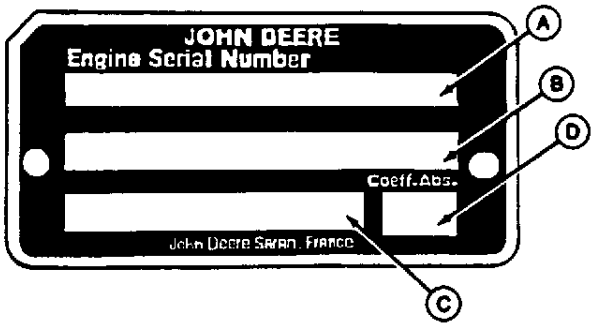
The third line of information on some Saran serial number plates contains the coefficient of absorption value for smoke emissions.



RG4730 -UN-24JAN90



RG4731 -UN-28NOV89



RG5610 -UN-09JAN90

A—Engine Serial Number
B—Engine Application Data
C—Engine Application Data
D—Coefficient of Absorption

S11,2000,DJ -19-25SEP95