# Series 400
# 6076AFD
# Dual Fuel Engines

JOHN DEERE

## COMPONENT TECHNICAL MANUAL

Series 400 6076AFD
Dual Fuel Engines

CTM93 (26SEP94) English

**Deere Power Systems Group**
**CTM93 (26SEP94)**

LITHO IN U.S.A.
ENGLISH

# 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

## ABOUT THIS MANUAL

This component technical manual covers the recommended repair procedure for 6076, 7.6 L (466 cu. in.) dual fuel engines produced in Waterloo, Iowa.

This manual contains the necessary instructions to diagnose the electrical and natural gas/diesel fuel portions of the Dual Fuel System.

Use this information in conjunction with the following CTMs:

- CTM6 — For general engine repair
- CTM68 — For electronic fuel injection diagnostics and repair
- CTM77 — For charging and starter systems diagnostics and repair

Before beginning repair of an engine, clean the engine and mount on a repair stand. (See Group 03 - Engine Mounting in CTM6.)

Direction of engine crankshaft rotation in this manual is referenced from the flywheel end looking toward the front. Front of engine is fan drive end.

Read each module completely before performing any service.

RG,CTM93,G0,1 -19-13SEP94

# Contents



**Continued on next page**

*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.*

CTM93-19-26SEP94

## 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

## HANDLE NATURAL GAS SAFELY

Handle natural gas with care: it is highly flammable. Do NOT smoke while working on or around natural gas equipment.

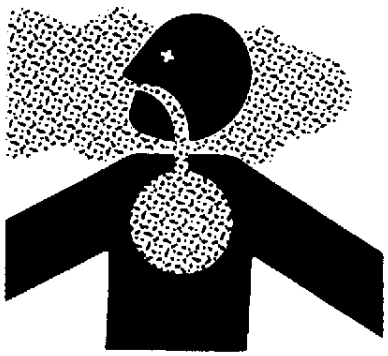
Natural gas fumes may cause sickness or death. Work in well ventilated area.

Shut off natural gas supply before servicing equipment.

Have a manual valve installed away from the engine to shut off gas supply in case of an emergency.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris.

TS227 -UN-23AUG88



TS220 -UN-23AUG88

RG,NATGAS,SFTY -19-26FEB93

## 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

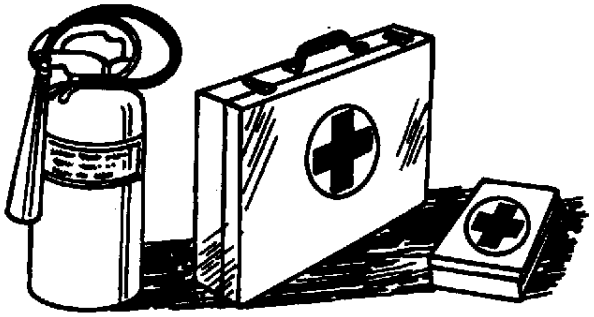
DX,SPARKS -19-03MAR93

## 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

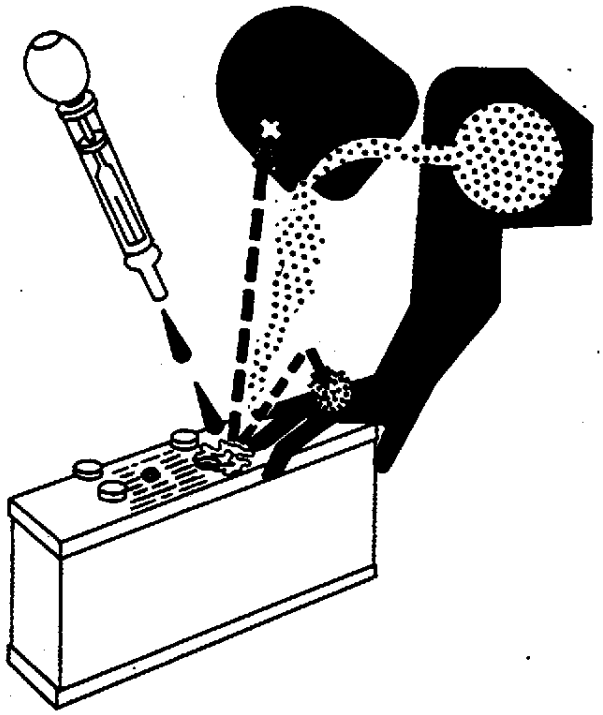
## PREVENT ACID BURNS

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.

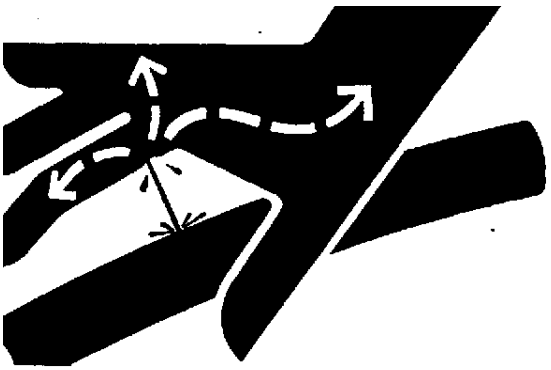
If acid is swallowed:
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



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.

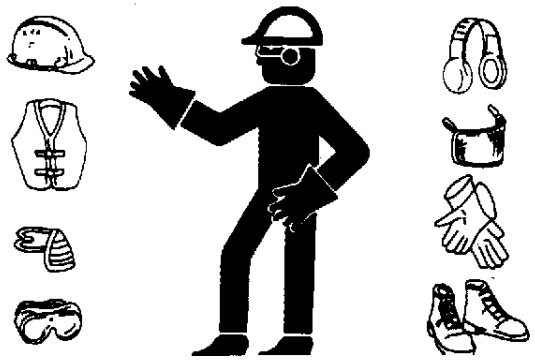
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

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.

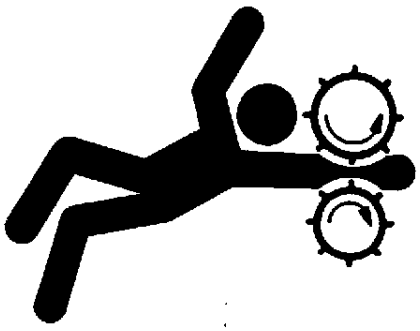
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

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.



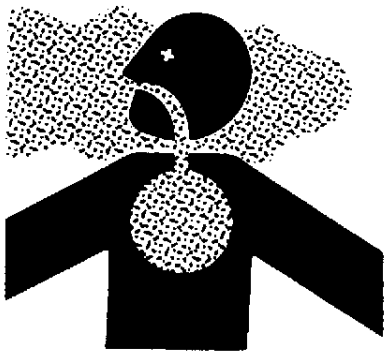
TS228 -UN-23AUG88

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.

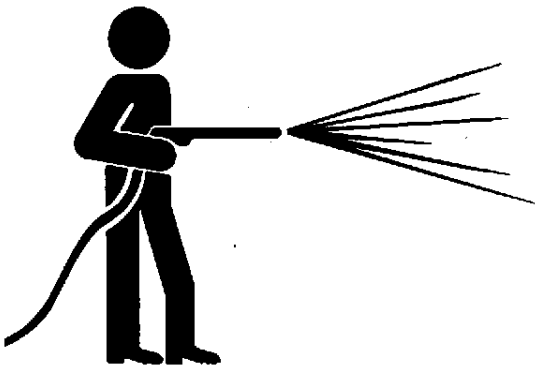


TS220 -UN-23AUG88

DX,AIR -19-04JUN90

## 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

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## REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

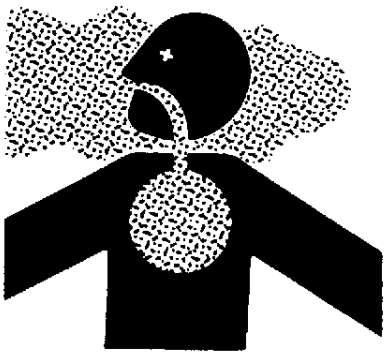
Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

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.



TS220 -UN-23AUG88

DX,PAINT -19-03MAR93

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

TS953 -UN-15MAY90

DX,TORCH -19-03MAR93

## 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.

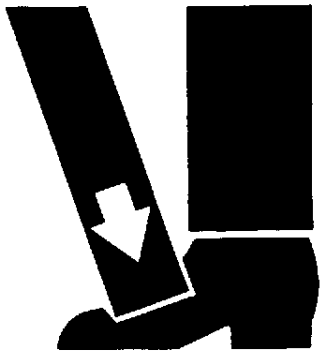
TS223 -UN-23AUG88

DX,LIGHT -19-04JUN90

## USE PROPER LIFTING EQUIPMENT

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

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



TS226 -UN-23AUG88

DX,LIFT -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

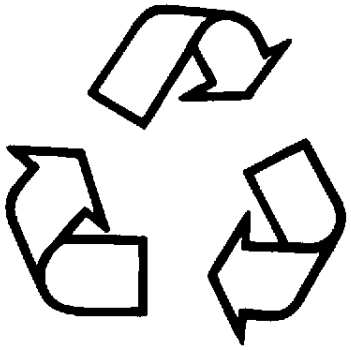
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

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

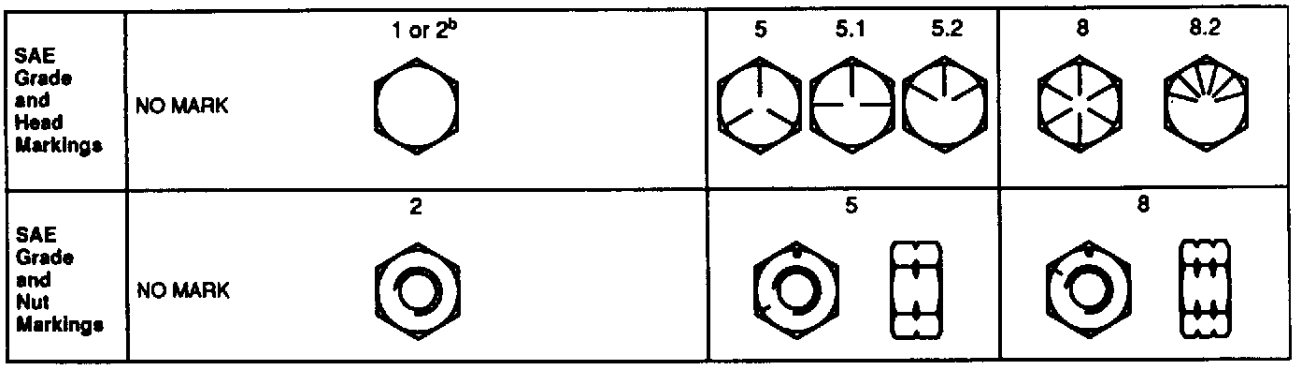
## LIVE WITH SAFETY

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.

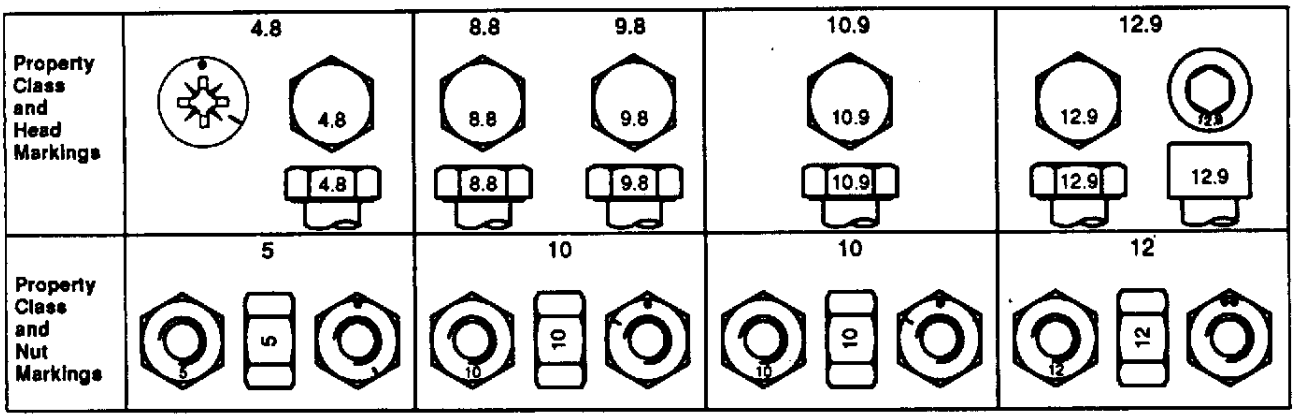
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

*[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 |

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 property class.

Fasteners should be replaced with the same or higher property class. If higher property class 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.*

DX,TORQ2 -19-20JUL94

## ENGINE MODEL DESIGNATION

JOHN DEERE ENGINE MODEL—6076

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



**6076AFD00 Engine**

6 . . . . . Number of cylinders
07.6 . . . . . Liter displacement
A . . . . . Aspiration code
FD . . . . . User code
00 . . . . . Application code

**Aspiration Code**

A . . . . . Turbocharged and aftercooled

**User Code**

FD . . . . . OEM Dual Fuel

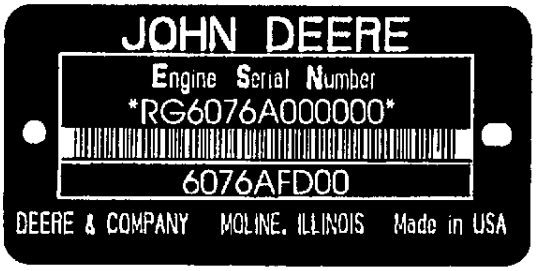
**Application Code**

00

RG,CTM93,G1,1 -19-12SEP94

## ENGINE SERIAL NUMBER PLATE INFORMATION

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




RG7235 -UN-13SEP94

1. Engine Serial Number

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:

**RG6076A000000**

RG . . . . . Factory code producing engine
6076A . . . . . Engine Model Designation
000000 . . . . . Sequential Number

**Factory Code Producing Engine**

RG . . . . . Waterloo Engine Works

**Engine Model Designation**

6076A . . . . . Definition explained previously. (See ENGINE MODEL DESIGNATION.)

**Sequential Number**

000000 . . . . . 6-digit sequential number.

The engine serial number plate is located either on the right-hand side of engine between the oil conditioning housing and fuel injection pump (viewed from flywheel end) or on the left-hand side of the block directly above the starting motor.

2. Engine Application Data

The second line of information on the engine serial number plate identifies the engine OEM relationship.

RG,CTM93,G1,2 -19-13SEP94

## ABOUT THE DUAL FUEL SYSTEM

The Dual Fuel System utilizes the 6076AFD engine that is available at two power levels: 112 kW (150 hp) and 150 kW (200 hp) continuous rating at 2200 rpm. The system uses a natural gas regulator that is available in either a 4 psi or 20 psi model. This is to accommodate the range of line pressures supplied by the natural gas companies.

The difference between the 112 kW (150 hp) and 150 kW (200 hp) systems are:

- Programming of Control Units
- External Heat Exchanger and Auxiliary Water [Pump Used on 150 kW (200 hp) engines only]



RG,CTM93,G10,1 -19-12SEP94

## GENERAL DUAL FUEL OEM ENGINE SPECIFICATIONS

| Item | Unit Of Measure | 6076AFD 112kW (150HP) | 6076AFD 150kW (200HP) |
|---|---|---|---|
| Fast Idle Speed | | | |
| Min-Max/Electronic Governor | RPM | 2450 | 2450 |
| Rated Speed | RPM | 2200 | 2200 |
| Industrial power rating @ rated speed without fan | | | |
| Continuous | kW | 112 | 149 |
| | (HP) | (150) | (200) |
| Normal Working Speed Range | RPM | 1400—2200 | 1400—2200 |
| Torque (max) @ RPM without fan | RPM | 1956 | 1956 |
| | N·m (lb-ft) | 547 (403) | 721 (537) |
| Natural Gas Supply Filter Size | micron | 10 | 10 |
| Natural Gas Supply Pressure | | | |
| 138 kPa (20 psi) system | | | |
| Minimum allowable regulator inlet | kPa (psi) | 103 (15)* | 103 (15)* |
| Maximum allowable regulator inlet | kPa (psi) | 207 (30) | 207 (30) |
| 28 kPa (4 psi) system | | | |
| Minimum allowable regulator inlet | kPa (psi) | 14 (2)** | 14 (2)** |
| Maximum allowable regulator inlet | kPa (psi) | 41 (6) | 41 (6) |
| Natural Gas Regulated Pressure (at metering valve) | in. $H_2O$ | 5 | 9.8 |

** Operating pressure only. Must be 131 kPa (19 psi) or higher to change to dual fuel initially.*

*** Operating pressure only. Must be 24 kPa (4 psi) or higher to change to dual fuel initially.*

RG,76AFD,SP1 -19-12SEP94

## NATURAL GAS RECOMMENDATIONS

*NOTE: Dry natural gas is a mixture of methane, ethane, propane, and butane. Dry natural gas is also referred to as Commercial Pipeline Natural Gas.*

Dry natural gas that meets or exceeds the following specifications is recommended for use in John Deere Dual Fuel engines:

10
2

- Maximum Propane content . . . . . 5 percent
- Maximum Butane content . . . . . 1 percent
- Maximum Hydrogen Sulfide ($H_2S$) content . . . . . 10 ppm
- Minimum Octane Rating . . . . . 118
- Nominal Low Heat Value . . . . . 33.72 kJ/L (905 BTU/cu ft)

RG,76AFD,FNG1 -19-12SEP94

## SYSTEM POWER REQUIREMENTS

Nominal System Voltage: 12V
Operating Supply Voltage Range: 9—16V
Supply Voltage Range During Starting: 6—16V
Required current (including actuator solenoid and fuel shut-off solenoid): 17A maximum, 7A nominal

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## ENGINE CONTROLLER ENVIRONMENTAL RESTRICTIONS

Operating Temperature Range -40 to +65˚C (-40˚F to +150˚F)
Storage Temperature Range -50 to +100˚C (-58˚F to +212˚F)
Operating Vibration Range -30m/sec$^2$ max. from 0—2500 Hz

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