

200CS, 230CS, 300CS, 550CS Chainsaws

TECHNICAL MANUAL

**John Deere
Worldwide Commercial and
Consumer Equipment Division**

TM1750 (1May98)



**200CS & 230CS
Chainsaw**



**300CS
Chainsaw**



**550CS
Chainsaw**

Safety



**Specifications and
Information**

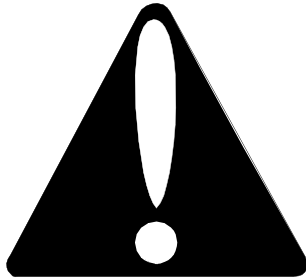


Engine





RECOGNIZE SAFETY INFORMATION



This is the 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 servicing practices.

Understand Signal Words

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.

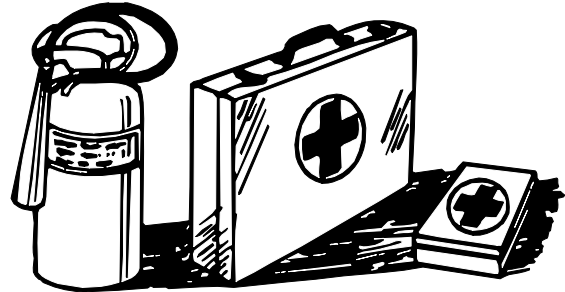
REPLACE SAFETY SIGNS



Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

HANDLE FLUIDS SAFELY-AVOID FIRES

Be Prepared For Emergencies



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.

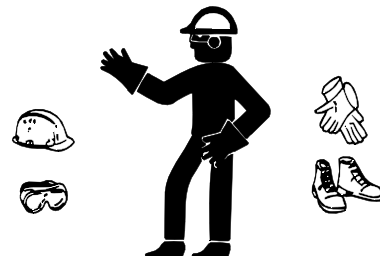
Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

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

USE SAFE SERVICE PROCEDURES

Wear Protective Clothing



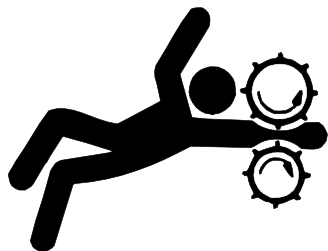
Wear close fitting clothing and safety equipment appropriate to the job.

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.

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.

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.

Work In Clean Area

Before starting a job:

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

Using High Pressure Washers

Directing pressurized water at electronic/electrical components or connectors, bearings, hydraulic seals, fuel injection pumps or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at a 45 to 90 degree angle.

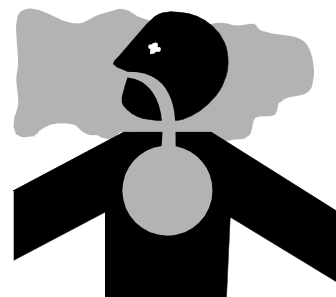
Illuminate Work Area Safely

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.



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.

WARNING: 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.

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

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.

Avoid Harmful Asbestos Dust

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

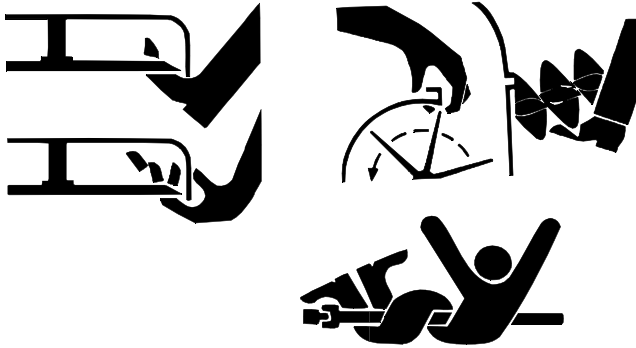
Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing



asbestos is not generated.

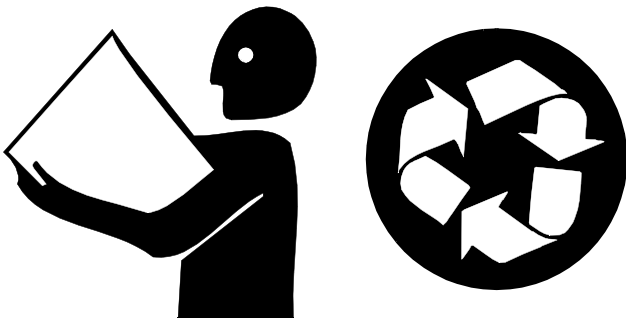
Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.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

AVOID INJURY FROM ROTATING BLADES, AUGERS & PTO SHAFTS



Keep hands and feet away while machine is running. Shut off power to service, lubricate or remove mower blades, augers or PTO shafts.

HANDLE CHEMICAL PRODUCTS SAFELY



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

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

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

LIVE WITH SAFETY



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

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GENERAL SPECIFICATIONS

	200CS	230CS	300CS	550CS
Engine Type	2 - Cycle, Single Cylinder, Air Cooled			
Displacement	33.0 cm ³ (2.0 cu in.)	38.0 cm ³ (2.3 cu in.)	49.0 cm ³ (3.0 cu in.)	88.0 cm ³ (5.45 cu in.)
Bore	36.5 mm (1.437 in.)	39.68 mm (1.562 in.)	43.58 mm (1.715 in.)	54 mm (2.126 in.)
Stroke	32.0 mm (1.220 in.)	32.0 mm (1.220 in.)	32.51 mm (1.280 in.)	38.86 mm (1.530 in.)
Intake	Piston Port Induction			
Throttle Control	Trigger Type With Safety Interlock, Throttle Latch For Starting.			
Air Filter	Nylon Mesh/Wash in Soap And Water			
Fuel Capacity	350 mL (11.8 fl oz)		659 mL (22.3 fl oz)	813 mL (27.5 fl oz)
Fuel Mix Ratio	32:1 or Exact Mix®			
Run Time	25 Minutes			
Bar Lubricant Capacity	350 mL (11.8 fl oz)		360 mL (12.2 fl oz)	503 mL (17 fl oz)
Carburetion	All Position Diaphragm With Remote Primer Bulb			All Position Diaphragm
Ignition	One Piece Capacitor Discharge			
Spark Plug Type	Champion CJ6Y		Champion RCJ6Y	Champion RCJ6Y
Engine Shut Off	Rocker Switch Ignition To Ground			
Muffler	Dual Chamber Soft - Tone			
Vibration Isolation	Three Point, Spring Type			Six Point, Rubber Mount
Guide Bar Length	12 in. - 16 in. Power Tip®	14 in. - 18 in. Power Tip®	14 in. - 18 in. Power Tip®	14 in. - 24 in. Power Tip®
Saw Chain Type	3/8 in. Low Profile		0.325 in. Semi-Chisel	3/8 in. Semi-Chisel
Weight (Power head Only)	4.5 kg (10 lb)			8.2 kg (18.3 lb)

METRIC FASTENER TORQUE VALUES

Property Class and Head Markings	4.8	8.8	9.8	10.9	12.9
Property Class and Nut Markings	5	10	10	12	

TS1163

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	109
M16	100	73	125	92	190	140	240	175	275	200	350	225	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 hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

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

Fasteners should be replaced with the same class. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of the bolt head.

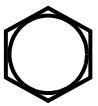


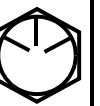







Tighten toothed or serrated-type lock nuts to the full torque value.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated (yellow dichromate - Specification JDS117) without any lubrication.

Reference: JDS—G200.

INCH FASTENER TORQUE VALUES



SAE Grade and Head Markings	1 or 2 ^b No Marks 	5  5.1  5.2 	8  8.2 
SAE Grade and Nut Markings	2 	5  	8   TS1162

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	215	160	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	470	300	510	375	470	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 hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

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

Fasteners should be replaced with the same grade. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of 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 (yellow dichromate - Specification JDS117) 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.

Reference: JDS—G200.

GASOLINE

2-CYCLE ENGINES - NORTH AMERICA


CAUTION

Gasoline is **HIGHLY FLAMMABLE**, handle it with care.

DO NOT refuel machine while:

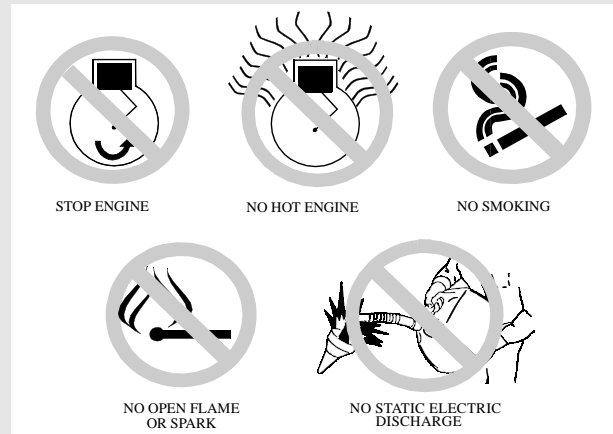
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
- engine is hot, allow it to cool sufficiently first;
- smoking.

Help prevent fires:

- fill gas tank to bottom of filler neck only;
- be sure fill cap is tight after fueling;
- clean up any gas spills **IMMEDIATELY**;
- keep machine clean and in good repair—free of excess grease, oil, debris, and faulty or damaged parts;
- any storage of machines with gas left in tank should be in an area that is well ventilated to prevent possible igniting of fumes by an open flame or spark, this includes any appliance with a pilot light.

To prevent fire or explosion caused by **STATIC ELECTRIC DISCHARGE** during fueling:

- **ONLY** use a clean, approved **POLYETHYLENE PLASTIC** fuel container and funnel **WITHOUT** any metal screen or filter.



To avoid engine damage:

- **ONLY** use fresh, clean, unleaded gasoline with an octane rating (anti-knock index) of 87 or higher;
- mix in John Deere 2-Cycle Engine Oil or its equivalent using a 50:1 fuel/oil mixture (see 2-Cycle Gasoline Engine Oil in this section);
- if John Deere 2-Cycle Engine Oil or its equivalent IS NOT being used, mix alternative 2-cycle engine oil to a 32:1 fuel/oil mixture (see 2-Cycle Gasoline Engine Oil in this section).

Use of alternative oxygenated, gasohol blended, unleaded gasoline is acceptable as long as:

- the ethyl or grain alcohol blends **DO NOT** exceed 10% by volume or
- methyl tertiary butyl ether (MTBE) blends **DO NOT** exceed 15% by volume.



IMPORTANT: DO NOT use **METHANOL** gasolines because **METHANOL** is harmful to the environment and to your health.


WARNING

California Proposition 65 Warning: Gasoline engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

GASOLINE STORAGE

IMPORTANT: Keep all dirt, scale, water or other foreign material out of gasoline.

Keep gasoline stored in a safe, protected area. Storage of gasoline in a clean, properly marked (“**UNLEADED GASOLINE**”) **POLYETHYLENE PLASTIC** container **WITHOUT** any metal screen or filter is recommended. **DO NOT** use de-icers to attempt to remove water from gasoline or depend on fuel filters to remove water from gasoline. Use a water separator installed in the storage tank outlet. **BE SURE** to properly discard unstable or contaminated gasoline. When storing unit or gasoline, it is recommended that you add **John Deere Gasoline Conditioner and Stabilizer (TY15977)** or an equivalent to the gasoline. **BE SURE** to follow directions on container and to properly discard empty container.

2-CYCLE ENGINES - EUROPE

CAUTION

Gasoline is **HIGHLY FLAMMABLE**, handle it with care.

DO NOT refuel machine while:

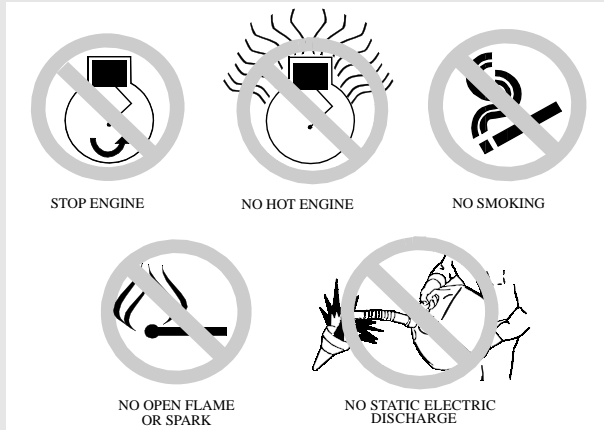
- indoors, always fill gas tank outdoors;
- machine is near an open flame or sparks;
- engine is running, **STOP** engine;
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- smoking.

Help prevent fires:

- fill gas tank to bottom of filler neck only;
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- keep machine clean and in good repair—free of excess grease, oil, debris, and faulty or damaged parts;
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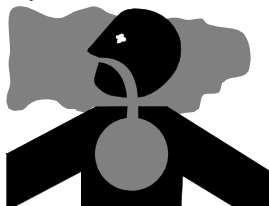


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2-CYCLE GASOLINE ENGINE OIL - NORTH AMERICA

IMPORTANT: Mix unleaded gasoline (87 octane or higher) and John Deere 2-Cycle Engine Oil to a 50:1 ratio (3.8 L [1 U.S. gal] gasoline to 76 ml [2.6 oz.] oil or 4.5 L [1 Imperial gal] gasoline to 90 ml [3.0 oz.] oil).

If John Deere 2-Cycle Engine Oil or its equivalent IS NOT being used mix unleaded gasoline and alternative 2-cycle engine oil to a 32:1 ratio (3.8 L [1 U.S. gal] gasoline to 119 ml [4.0 oz.] oil or 4.5 L [1 Imperial gal] gasoline to 141 ml [4.8 oz.] oil).

The following John Deere oil is **PREFERRED**:

- **2-CYCLE ENGINE OIL.**

Other oils may be used if above preferred John Deere oil is not available, provided they meet one of the following specifications:

- SAE Standard J2116 or Classifications TA, TB, TC, or TD;
- API Classification TC or higher;
- NMMA Classifications TC-W or TC-WII or higher;
- JASO Classifications FA, FB, or FC or higher.

John Deere Dealers: You may want to cross-reference the following publications to recommend the proper oil for your customers:

- Module DX,GAS2 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lubrication Sales Manual PI7032.

2-CYCLE GASOLINE ENGINE OIL - EUROPE

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- CEC Standard L-19-T-77.

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- Module DX,GAS2 in JDS-G135;
- Section 530, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide.



ALTERNATIVE LUBRICANTS- NORTH AMERICA



Conditions in certain geographical areas outside the United States and Canada may require different lubricant recommendations than the ones printed in this technical manual or the operator's manual. Consult with your John Deere Dealer, or Sales Branch, to obtain the alternative lubricant recommendations.

IMPORTANT: Use of alternative lubricants could cause reduced life of the component.

If alternative lubricants are to be used, it is recommended that the factory fill be thoroughly removed before switching to any alternative lubricant.

SYNTHETIC LUBRICANTS

Synthetic lubricants may be used in John Deere equipment if they meet the applicable performance requirements (industry classification and/or military specification) as shown in this manual.

The recommended air temperature limits and service or lubricant change intervals should be maintained as shown in the operator's manual, unless otherwise stated on lubricant label.

Avoid mixing different brands, grades, 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.

LUBRICANT STORAGE

All machines operate at top efficiency only when clean lubricants are used. Use clean storage containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination. Store drums on their sides. Make sure all containers are properly marked as to their contents. Dispose of all old, used containers and their contents properly.

MIXING OF LUBRICANTS

In general, avoid mixing different brands or types of lubricants. Manufacturers blend additives in their lubricants to meet certain specifications and performance requirements. Mixing different lubricants can interfere with the proper functioning of these additives and lubricant properties which will downgrade their intended specified performance.

John Deere Dealers: You may want to cross-reference the following publications to recommend the proper oil filter for your customers:

- Module DX,FILT in JDS-G135;
- Section 540, Lubricants & Hydraulics, of the John Deere Merchandise Sales Guide;
- Lawn & Grounds Care Tune-Up Guide PI672.

ALTERNATIVE LUBRICANTS - EUROPE

Conditions in certain geographical areas outside the United States and Canada may require different lubricant recommendations than the ones printed in this technical manual or the operator's manual. Consult with your John Deere Dealer, or Sales Branch, to obtain the alternative lubricant recommendations.

IMPORTANT: Use of alternative lubricants could cause reduced life of the component.

If alternative lubricants are to be used, it is recommended that the factory fill be thoroughly removed before switching to any alternative lubricant.

PRODUCT IDENTIFICATION NUMBERS

MODEL 200CS & 230CS



Product Identification Data Plate

Product identification plate is located under the handle near the start switch on the rear of the main case.

MODEL 300CS



Product Identification Data Plate

Product identification plate is located under the handle near the start switch on the rear of the main case.

MODEL 500CS



Product Identification Data Plate

Product identification plate is located on the rear of the main case.



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SPECIFICATIONS

ENGINE

	200CS	230CS	300CS	550CS
Engine Type	2 - Cycle, Single Cylinder, Air Cooled			
Displacement	33.0 cm ³ (2.0 cu in.)	38.0 cm ³ (2.3 cu in.)	49.0 cm ³ (3.0 cu in.)	88.0 cm ³ (5.45 cu in.)
Bore	36.5 mm (1.437 in.)	39.68 mm (1.562 in.)	43.58 mm (1.715 in.)	54 mm (2.126 in.)
Stroke	32.0 mm (1.220 in.)	32.0 mm (1.220 in.)	32.51 mm (1.280 in.)	38.86 mm (1.530 in.)
Ignition Module To Rotor Gap	0.20—0.40 mm (0.008—0.015 in.)			
Ignition	One Piece Capacitor Discharge			
Spark Plug Type	Champion CJ6Y		Champion RCJ6Y	Champion RCJ6Y
Spark Plug Gap	0.06 mm (0.025 in.)		0.06 mm (0.025 in.)	0.06 mm (0.025 in.)
Starter Rope Length	1168 mm (46 in.)			





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TIGHTENING TORQUES—200CS AND 230CS

SIZE & TYPE	QTY	APPLICATION	TORQUE LIMITS (lb-in.)	TORQUE LIMITS (N•m)
#10-24 Hex Nut	2	Carburetor Bolts	30-40	3.4-4.5
#10-24 x 0.875 in. Truss Hd. Taptite Screw	2	Carburetor Spacer to Cylinder	45-55	5.4-6.6
#8-16 x 0.625 in. Pan Hd. Plastite Screw	2	Air Filter Top to Base	15-20	1.8-2.4
3/16-18 Hex Nut	2	Drive Case Cover to Unit	90 - 100	10.2-11.3
#10-14 x 0.750 in. Truss Hd. Plastite Screw	1	Chain Stop to Housing	30-50	3.4-5.6
#6-19 x 0.500 in. Pan Hd. Plastite Screw	1	Bar Plate to Housing	8-18	0.9-2.0
#8-32 x 0.625 Allen HD. Machine Screw	1	L. H. & R. H. Pivots to Housing	25-35 ^a	2.8-3.9 ^a
#10-32 Hex Nut	3	Muffler Bolts	50-60 ^c	5.6-6.8 ^c
Clutch	1	Clutch to Clutch Shaft	130-180	14.7-20.3
3/16 -24 Jam Nut	1	Rotor To Clutch Shaft	100-150	11.3-23.0
#8-32 x 0.625 in. Pan Hd. Taptite Screw	2	Ignition Module to Cylinder	30-40 ^a	3.4-4.5 ^a
#10-24 x 2.00 in. Torx HD. Machine Screw	4	Cylinder to Housing	65-75 ^a	7.3-8.5 ^a
#8-16 x 0.630 Pan Hd. Plastite Screw	2	Oil Pump to Clutch Case	15-20	1.8-2.4
#10-14 x 0.750 in. Truss Hd. Plastite Screw	1	Starter Pulley to Starter	30-40	3.4-4.5
#10-14 x 0.625 in. Truss Hd. Plastite Screw	2	Starter Housing to Engine Housing (Top)	30-40	3.4-4.5
#10-14 x 0.875 in. Truss Hd. Plastite Screw	2	Starter Housing to Engine Housing (Bottom)	30-40	3.4-4.5
Spark Plug	1	Spark Plug to Cylinder	120-180	13.6-20.3
#10-14 x 0.750 in. Truss Hd. Plastite Screw	4	Front Handle to Engine Housing	40-50	4.5-5.6
#8-16 x 0.625 in. Plastite Screw	1	Handguard To Housing	25-30	2.8-3.4
#10-14 x 0.750 in. Truss Hd. Plastite Screw	3	Handle Cover to Handle	30-40	3.4-4.5
#10-16 Type "B" Deep Slot Pan Hd. Screw	3	Cylinder Cover to Housing	15-25	1.8-2.8
#10-14 x 0.500 in. Truss Hd. Plastite Screw	1	Bumper Spike to Housing	30-40	3.4-4.5
#10-24 Nut and #10-24 x 0.625 in. Pan Hd. Torx Machine Screw	1	Bumper Spike to Housing	40-50	4.5-5.6

a. Use 242 LOCTITE® Thread Locking Compound

b. Use 290 LOCTITE® High Temperature Thread Locking Compound

c. Use FEL-PRO® C5-A Anti-Seize Or Equivalent On These Fasteners

d. Use 277 LOCTITE® High Strength Thread Locking Compound

e. Use 12666 LOCTITE® Anerobic Sealant And Gasketing Compound