9540i, 9560i, 9580i, 9640i, 9660i, 9680i and 9780i CTS including Hillmaster Combines Repair

DCG

TECHNICAL MANUAL

9540i, 9640i, 9560i, 9660i, 9580i, 9680i and 9780i CTS including Hillmaster Combines

TM8090 01MAR07 (ENGLISCH)

For complete service information also see:

John Deere Werke Zweibrücken

Worldwide Version

Printed in Germany

TM8090

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.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. 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.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

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,TMIFC –19–29SEP98–1/1

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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.

Section 10
General

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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–07DEC88

DX,ALERT –19–29SEP98–1/1

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.

TS187 –19–30SEP88

DX,SIGNAL –19–03MAR93–1/1

Prevent Battery Explosions

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

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

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

TS204 –UN–23AUG88

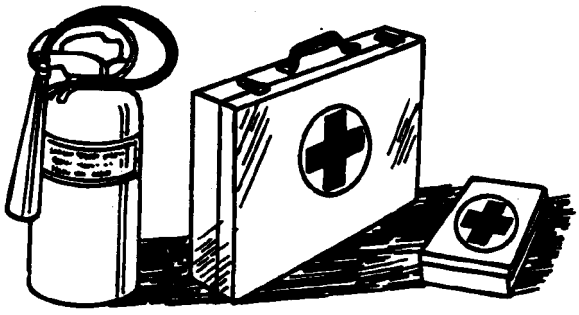
DX,SPARKS –19–03MAR93–1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

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



TS291 –UN–23AUG88

DX,FIRE2 –19–03MAR93–1/1

Handle Fluids Safely—Avoid Fires

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

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

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

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

TS227 –UN–23AUG88

DX,FLAME –19–29SEP98–1/1

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:

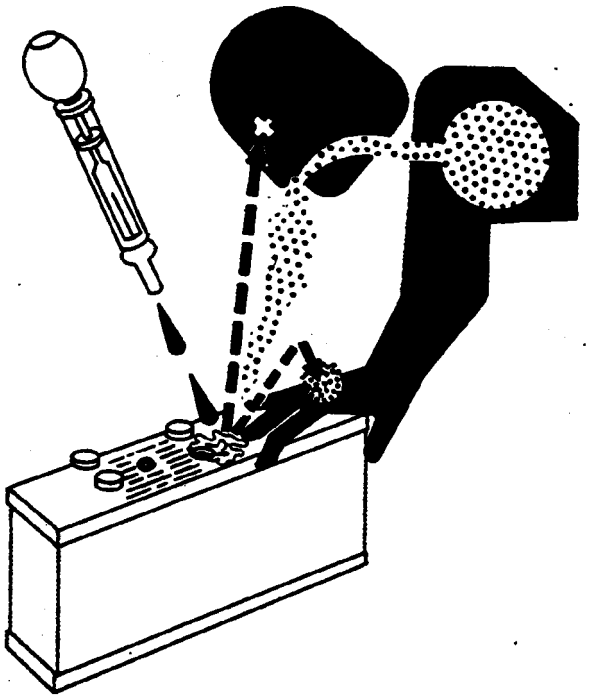
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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:

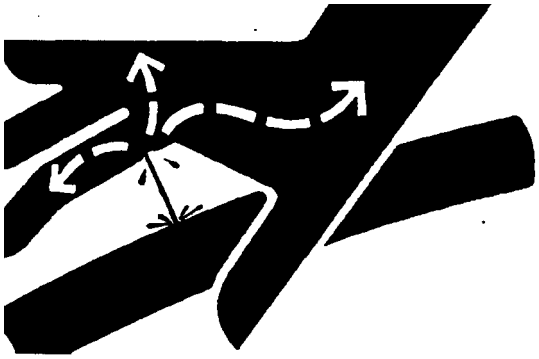
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 –UN–23AUG88

DX,POISON –19–21APR93–1/1

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.

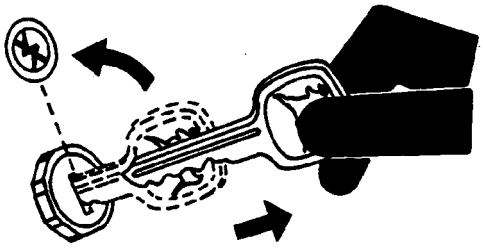
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical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

DX,FLUID –19–03MAR93–1/1

Park Machine Safely

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.



TS230 –UN–24MAY89

DX,PARK –19–04JUN90–1/1

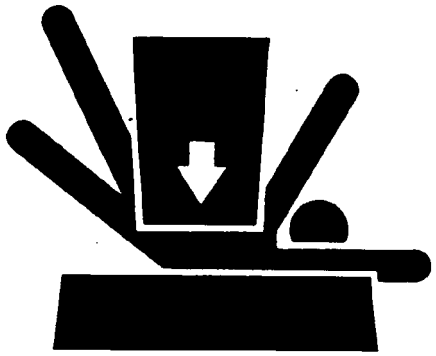
Live With Safety

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

Support Machine Properly



TS229 –UN–23AUG88

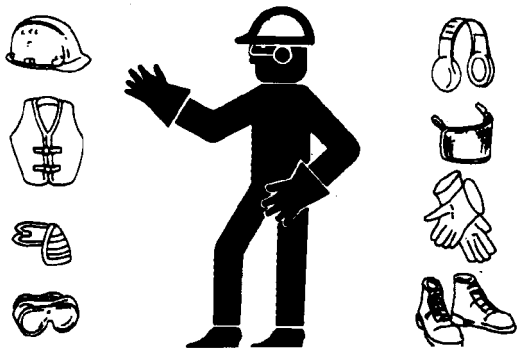
Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.

DX,LOWER –19–24FEB00–1/1

Wear Protective Clothing



TS206 –UN–23AUG88

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

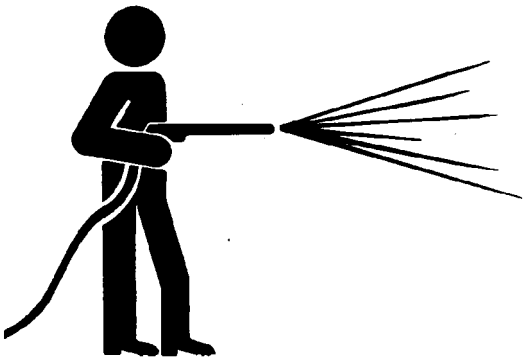
Prolonged exposure to loud noise can cause impairment or loss of hearing.

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 –19–10SEP90–1/1

Work in Clean Area



T6642EJ –UN–18OCT88

Before starting a job:

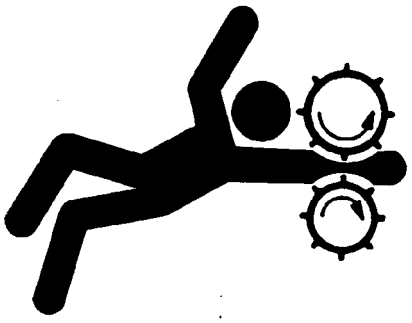
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.

DX,CLEAN –19–04JUN90–1/1

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.



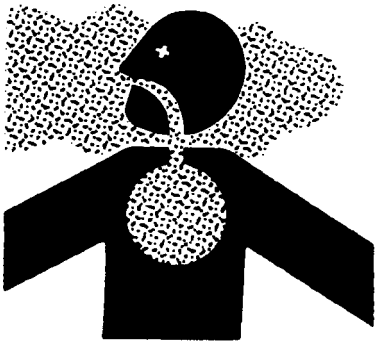
TS228 –UN–23AUG88

DX,LOOSE –19–04JUN90–1/1

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 –19–17FEB99–1/1

Illuminate Work Area Safely

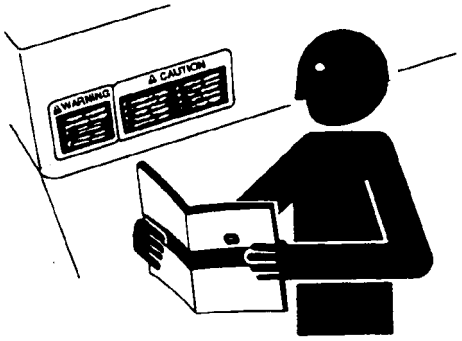
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

TS223 –UN–23AUG88

DX,LIGHT –19–04JUN90–1/1

Replace Safety Signs

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



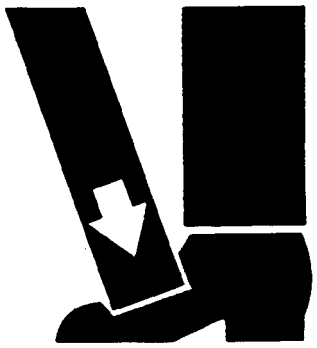
TS201 –UN–23AUG88

DX,SIGNS1 –19–04JUN90–1/1

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 –19–04JUN90–1/1

Service Tires Safely

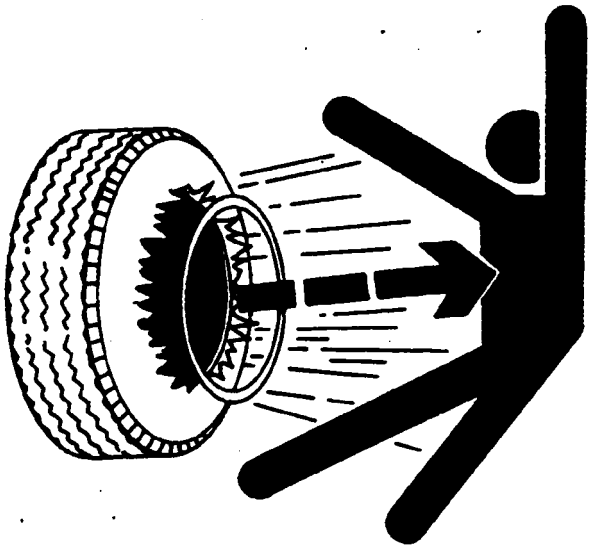
Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



TS211 –UN–23AUG88

DX,RIM –19–24AUG90–1/1

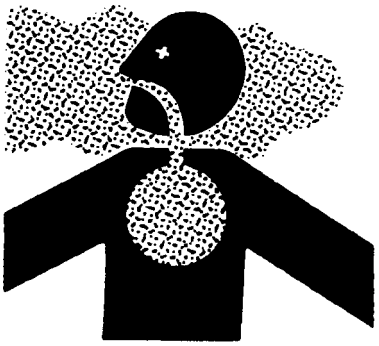
Avoid Heating Near Pressurized Fluid Lines

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

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.

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.

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

Use Proper Tools

TS779 –UN–08NOV89

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.

DX,REPAIR –19–17FEB99–1/1

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Practice Safe Maintenance

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

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

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

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

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

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

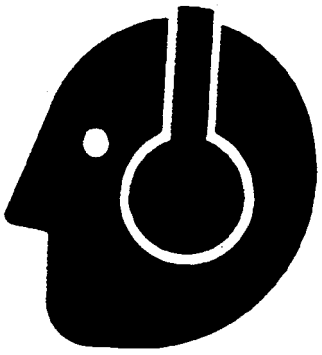
TS218 –UN–23AUG88

DX,SERV –19–17FEB99–1/1

Protect Against Noise

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

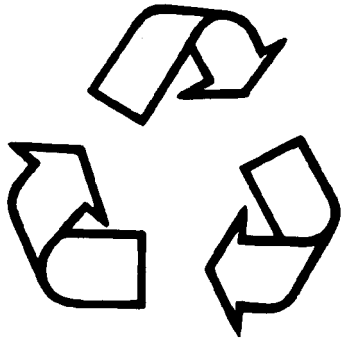
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 –UN–23AUG88

DX,NOISE –19–03MAR93–1/1

Dispose of Waste Properly



TS1133 –UN–26NOV90

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.

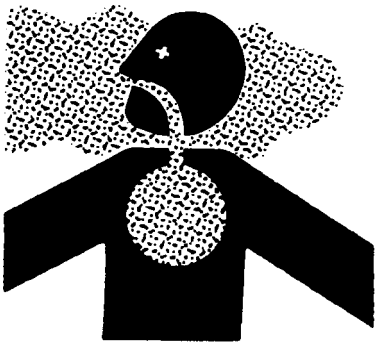
Do not pour waste onto the ground, down a drain, or into any water source.

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.

DX,DRAIN –19–03MAR93–1/1

Avoid Harmful Asbestos Dust



TS220 –UN–23AUG88

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.

DX,DUST –19–15MAR91–1/1

Operating Speeds

Speeds shown are average and can vary from machine to machine. Speeds are rated at high idle with separator engaged, no load.

Cylinder speed:	Speed of rotation	475 - 1030 rpm
Threshing cylinder, drive with reduction gear	High speed	475 - 1030 rpm
	Low speed	240 - 510 rpm
Power separator (WTS)	Speed of rotation	150 rpm
Tine separator (CTS)	High speed	740 rpm
	Low speed	570 rpm
Feeder house lower shaft	Speed of rotation	520 rpm
Cleaning fan	Speed of rotation	750 - 1600 rpm
Clean grain elevator	Speed of rotation	400 rpm
Tailings elevator	Speed of rotation	430 rpm
Straw walkers	Speed of rotation	150 rpm
Straw chopper (basic model)	High speed	3620 rpm
	Mid speed	2720 rpm
	Low speed	1920 rpm
Straw chopper (premium model):	High speed	3600 rpm
	Low speed	1900 rpm
Chaff spreader (basic model)	Speed of rotation	235 rpm
Chaff spreader (premium model):	High speed	700 rpm
	Low speed	400 rpm

ZX08994,00001EB –19–02APR04–1/1

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Specifications - 9540i, 9560i WTS

Engine:	Make:	John Deere
	Type	**9540i**—6068HZ060 **9560i**—6068HZ470
	Power (according to ECE-R24) at 2300 rpm	**9540i**— 158 kW (215 hp) **9560i**— 181 kW (248 hp)
	Displacement	6.8 L (414 cu. in.)
	Air cleaner	Dry type with safety element
	Thermostats (two)	82°C (180°F)
Electrical system:	12 volt, 120-amp alternator	
Transmission:	three speeds	
Brakes:	hydraulic shoe	
Cylinder:	Number of rasp bars	10
Concave:	Type	13 open bar
Beater:	Number of wings	8
Beater grate:	Type	open bars, adjustable to two positions
	Number of grate bars:	10
Finger rake:	Type	adjustable
Separator:	Type	straw walkers
Straw walkers:	Type	universal
	Number of walkers:	5
Power separator:	Type	Retractable
	Number of fingers:	15
Grain tank:	Capacity	7500 L (213 bu.)
	Average unloading rate	4200 L/min. (120 bu./min.)
Weight:	Without header	**9540i**—12720 kg (28,000 lb.) **9560i**—12580 kg (27,700 lb.)

ZX08994,00001EC –19–07APR04–1/1

Specifications - 9580i, 9640i, 9660i, 9680i WTS

Engine:	Make:	John Deere
	Type	**9580i**—6081HZ017 **9640i**—6081HZ017 **9660i**—6081HZ018 **9680i**—6068HZ019
	Power (according to ECE-R24) at 2100 rpm	**9580i**— 217 kW (295 hp) **9640i**— 217 kW (295 hp) **9660i**— 234 kW (320 hp) **9680i**— 260 kW (355 hp)
	Displacement	8.1 L (499 cu. in.)
	Air cleaner	Dry type with safety element
	Thermostats (two)	82°C (180°F)
Electrical system:	12 volt, 120-amp alternator	
Transmission:	three speeds	
Brakes:	hydraulic shoe	
Cylinder:	Number of rasp bars	10
Concave:	Type	13 open bar
Beater:	Number of wings	8
Beater grate:	Type	open bars, adjustable to two positions
Finger rake:	Type	adjustable
Separator:	Type	Straw walkers
Straw walkers:	Type	universal
	Number of walkers (9580i)	5
	Number of walkers (9640i, 9660i, 9680i)	6
Power separator:	Type	Retractable
	Number of fingers: 9580i 9640i, 9660i, 9680i	 15 18
Grain tank:	Capacity (9580i)	8000 L (227 bu.)
	Capacity (9640i)	8000 L (227 bu.)
	Capacity (9660i)	9000 L (255 bu.)
	Capacity (9680i)	11000 L (312 bu.)
	Average unloading rate	4200 L/min. (120 bu./min.)
Weight:	Without header	**9580i**—12890 kg (28,400 lb.) **9640i**—13530 kg (29,800 lb.) **9660i**—13620 kg (30,000 lb.) **9680i**—14330 kg (31,600 lb.)

ZX08994,00001ED –19–21APR04–1/1

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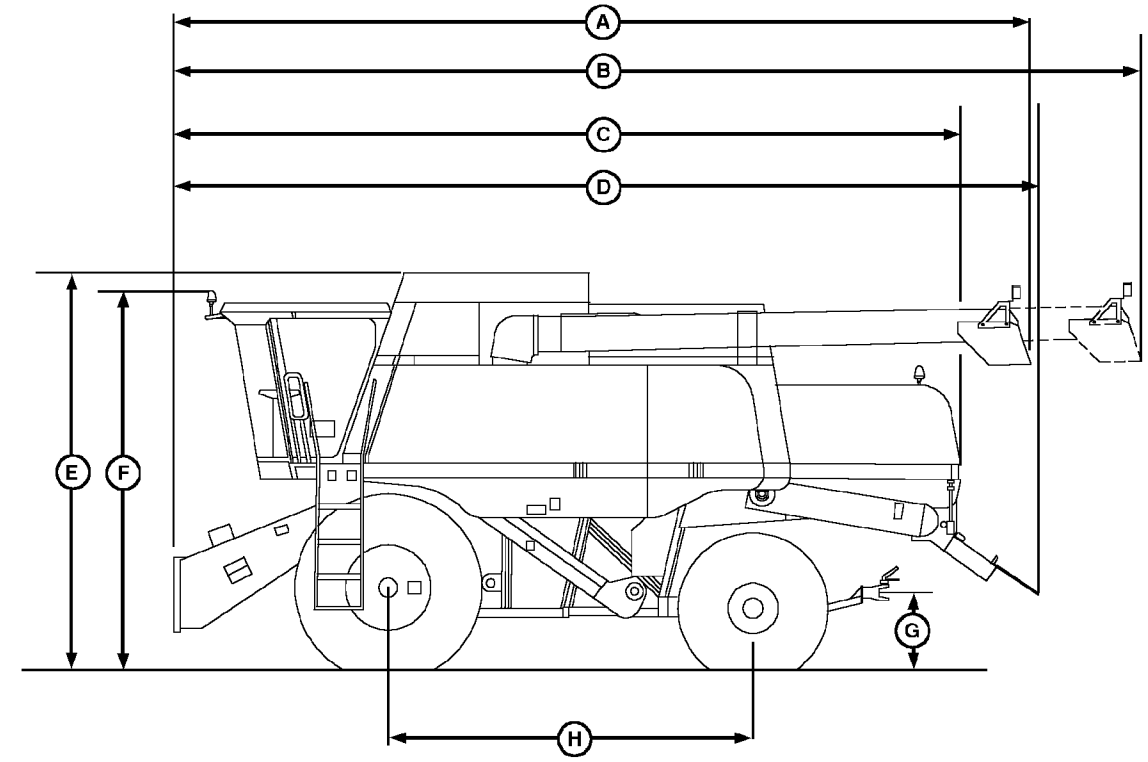
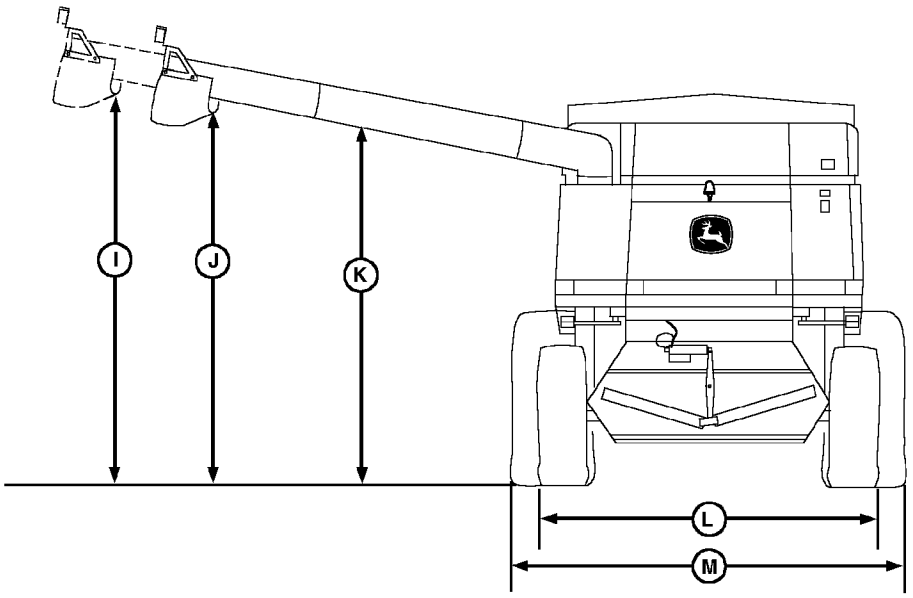
Specifications - 9780i CTS

Engine:	Make:	John Deere
	Type	**9780i**—6068HZ019
	Power (according to ECE-R24) at 2100 rpm	**9780i**— 260 kW (355 hp)
	Displacement	8.1 L (499 cu. in.)
	Air cleaner	Dry type with safety element
	Thermostats (two)	82°C (180°F)
Electrical system:	12 volt, 120-amp alternator	
Transmission:	three speeds	
Brakes:	hydraulic shoe	
Cylinder:	Types	rasp bar or spike tooth
	Number of rasp bars	rasp bar 10 spike tooth 12
Concave:	Types	13/14 open bar or spike tooth
Beater:	Number of wings	8
Separator:	Type	Tine Module
Grain tank:	Capacity	10000 L
	Average unloading rate	4200 L/min. (120 bu./min.)
Weight:	Less header (base equipment)	**9780i**—14750g (32,518 lb.) 14750 kg (32,518 lb.)

ZX08994,0000292 –19–12OCT04–1/1

Dimension Reference Points (WTS)





ZX25212 –UN–29JUN01

ZX08994,0000153 –19–21APR04–1/1

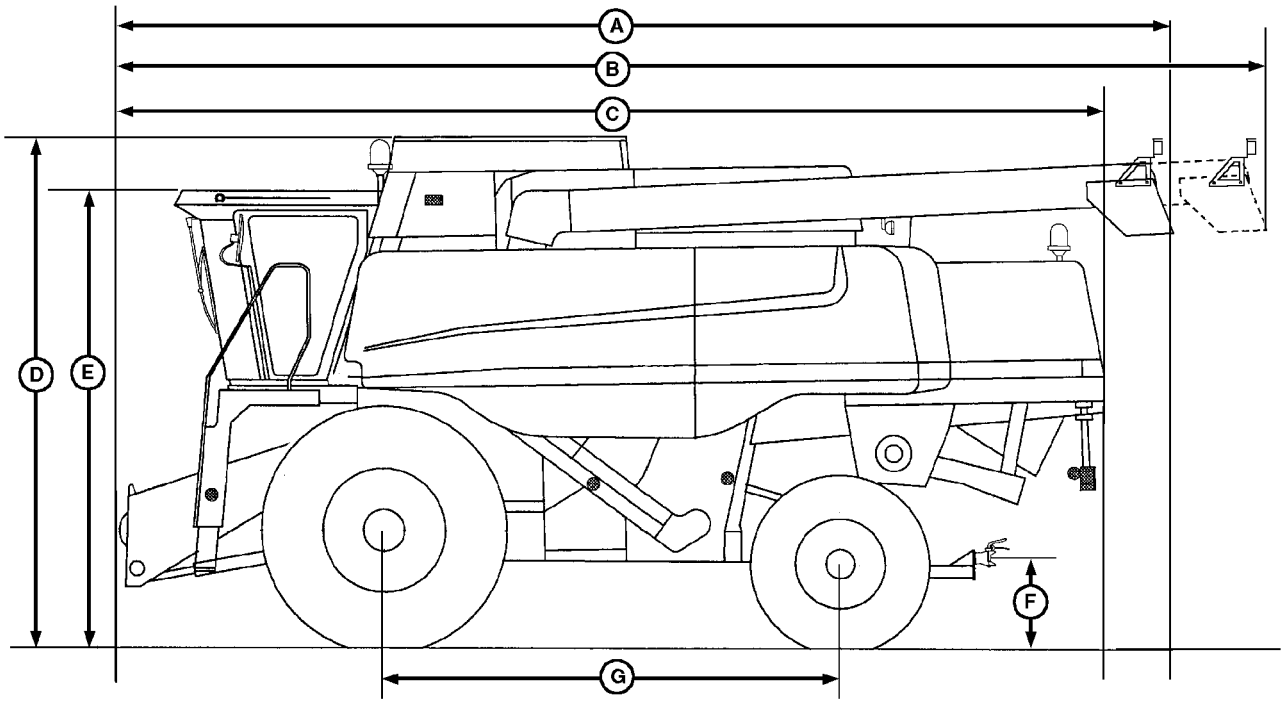
Dimensions (WTS)

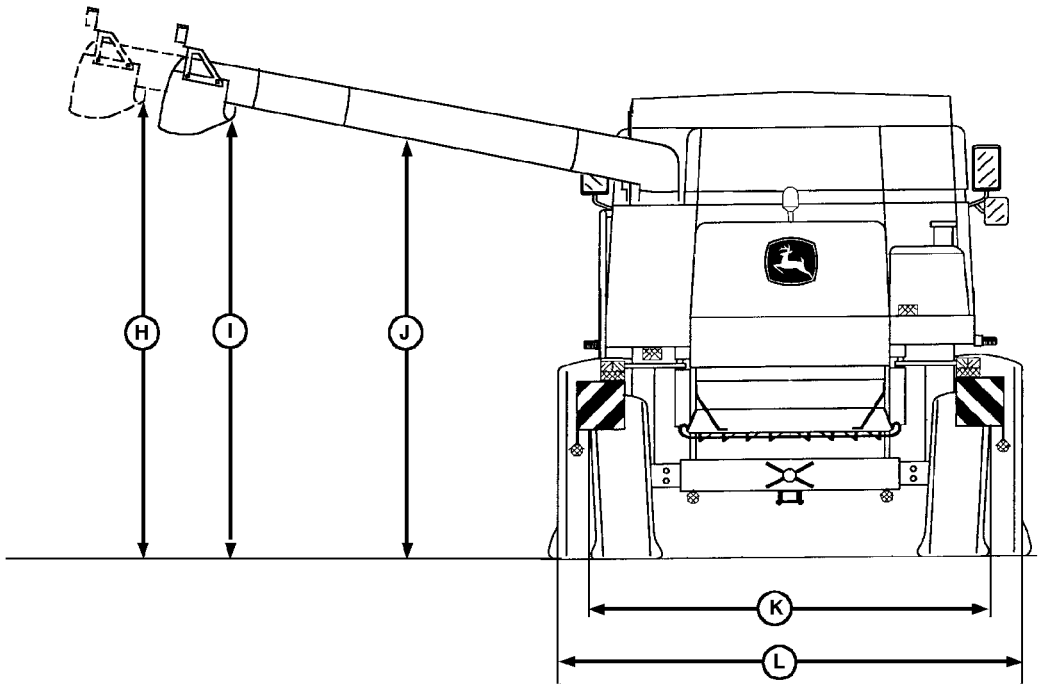
DIMENSION	9540i, 9560i, 9580i, 9640i, 9660i, 9680i	9540iHM, 9560iHM, 9580iHM, 9640iHM, 9660iHM, 9680iHM
A	9.00 m (29 ft. 5 in.) with 5.2 m (17 ft.) unloading auger	9.00 m (29 ft. 5 in.) with 5.2 m (17 ft.) unloading auger
B	9.9 m (32 ft. 5 in.) with 6.10 m (20 ft.) unloading auger	9.9 m (32 ft. 5 in.) with 6.10 m (20 ft.) unloading auger
C	8.45 m (27 ft. 8 in.)	8.53 m (27 ft. 11 in.)
D	9.2 m (29 ft. 10 in.)	9.25 m (29 ft. 11 in.)
E	3.98 m (12 ft. 11 in.)	3.98 m (12 ft. 11 in.)
F	3.95 m (12 ft. 9 in.)	4.00 m (13 ft. 1 in.)
G	0.61 m (2 ft. 0 in.)	0.61 m (2 ft. 0 in.)
H	3.77 m (12 ft. 4 in.)	3.80 m (12 ft. 5 in.)
I	4.20 m (13.8 ft.) with 6.10 m (20 ft.) unloading auger	4.20 m (13.8 ft.) with 6.10 m (20 ft.) unloading auger
J	4.04 m (13.3 ft.) with 5.2 m (17 ft.) unloading auger	4.04 m (13.3 ft.) with 5.2 m (17 ft.) unloading auger
K	3.92 m (12.9 ft.) with 5.2 m (17 ft.) unloading auger 4.07 m (13.4 ft.) with 6.10 m (20 ft.) unloading auger	3.92 m (12.9 ft.) with 5.2 m (17 ft.) unloading auger 4.07 m (13.4 ft.) with 6.10 m (20 ft.) unloading auger
L	3.66 m (11 ft. 11 in.) with 480/80R26 tires[a]	3.66 m (11 ft. 11 in.) with 480/80R26 tires[a]
M	3.77 m (12 ft. 5 in.) with 800/65R32 tires	3.77 m (12 ft. 5 in.) with 800/65R32 tires

[a]Rear axles can be adjusted to various widths.

ZX08994,0000152 –19–21APR04–1/1

Dimension Reference Points (CTS)





ZX25210 –UN–29JUN01

OUZXMAG,00007D8 –19–07APR04–1/1

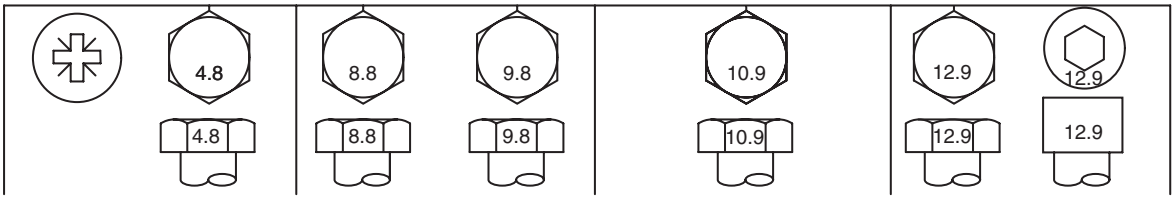
Dimensions (CTS)

DIMENSION	9780i	9780i HILLMASTER II
A	8.98 m (29 ft. 5 in.) with 5.2 m (17 ft.) unloading auger	8.98 m (29 ft. 5 in.) with 5.2 m (17 ft.) unloading auger
B	9.89 m (32 ft. 5 in.) with 6.10 m (20 ft) unloading auger	9.89 m (32 ft. 5 in.) with 6.10 m (20 ft) unloading auger
C	9.10 m (29 ft. 10 in.)	9.14 m (29 ft. 11 in.)
D	4.00 m (13 ft. 1 in.)	4.00 m (13 ft. 1 in.)
E	3.94 m (12 ft. 11 in.)	3.94 m (12 ft. 11 in.)
F	0.61 m (2 ft. 0 in.)	0.61 m (2 ft. 0 in.)
G	3.77 m (12 ft. 4 in.)	3.80 m (12 ft. 5 in.)
H	4.20 m (13.8 ft.) with 6.10 m (20 ft) unloading auger	4.20 m (13.8 ft.) with 6.10 m (20 ft) unloading auger
I	4.04 m (13.3 ft.) with 5.2 m (17 ft.) unloading auger	4.04 m (13.3 ft.) with 5.2 m (17 ft.) unloading auger
J	3.92 m (12.9 ft.) with 5.2 m (17 ft.) unloading auger 4.07 m (13.4 ft.) with 6.10 m (20 ft.) unloading auger	3.92 m (12.9 ft.) with 5.2 m (17 ft.) unloading auger 4.07 m (13.4 ft.) with 6.10 m (20 ft.) unloading auger
K	3.65 m (11 ft. 11 in.) with 480/80R26 tires[a]	3.65 m (11 ft. 11 in.) with 480/80R26 tires[a]
L	3.77 m (12 ft. 5 in.) with 800/65R32 tires	3.77 m (12 ft. 5 in.) with 800/65R32 tires

[a]Rear axles can be adjusted to various widths.

ZX08994,0000151 –19–07APR04–1/1

Metric Bolt and Screw Torque Values



TS1670 –UN–01MAY03

Bolt or	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
Screw	Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]		Lubricated[a]		Dry[b]	
Size	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	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N•m	lb-ft	N•m	lb-ft	N•m	lb-ft								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N•m	lb-ft														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. 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 fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a]"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C zinc flake coating.

[b]"Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B zinc flake coating.

DX,TORQ2 –19–24APR03–1/1

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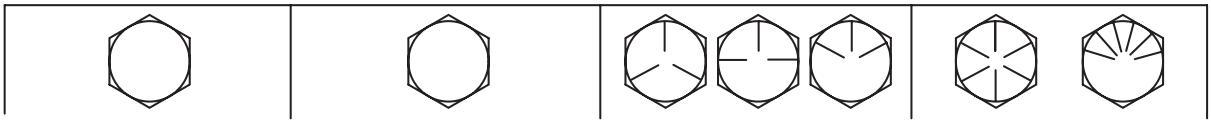
Unified Inch Bolt and Screw Torque Values

TS1671 –UN–01MAY03



Bolt or	SAE Grade 1				SAE Grade 2[a]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
Screw	Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]		Lubricated[b]		Dry[c]	
Size	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	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N•m	lb-ft	N•m	lb-ft
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N•m	lb-ft	N•m	lb-ft				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N•m	lb-ft	N•m	lb-ft	N•m	lb-ft								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N•m	lb-ft														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

[a]Grade 2 applies for hex cap screws (not hex bolts) up to 6. in (152 mm) long. 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]"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C zinc flake coating.

[c]"Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B zinc flake coating.

DX,TORQ1 –19–24APR03–1/1

Flat Face Seal Fittings Assembly and Installation—All Pressure Applications

Flat Face Seal O-Ring to Stud End Installation

1. Inspect the fitting surfaces. They must be free of dirt and/or defects.
2. Inspect the O-ring. It must be free of damage and/or defects.
3. Lubricate O-rings and install into groove using petroleum jelly to hold in place.
4. Push O-ring into groove with petroleum jelly so O-ring is not displaced during assembly.
5. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
6. Tighten fitting or nut to torque value shown on the chart per dash size stamped on the fitting. DO NOT allow hoses to twist when tightening fittings.

Flat Face Seal Adjustable Stud End O-Ring Installation

1. Back off lock nut (jam nut) and washer to full exposed turned down section of the fitting.
2. Install a thimble over the fitting threads to protect the O-ring from nicks.
3. Slide the O-ring over the thimble into the turned down section of the fitting.
4. Remove thimble.

Flat Face Seal Straight Stud End O-Ring Installation

1. Install a thimble over the fitting threads to protect the O-ring from nicks.
2. Slide the O-ring over the thimble into the turned down section of the fitting.
3. Remove thimble.

Fitting Installation

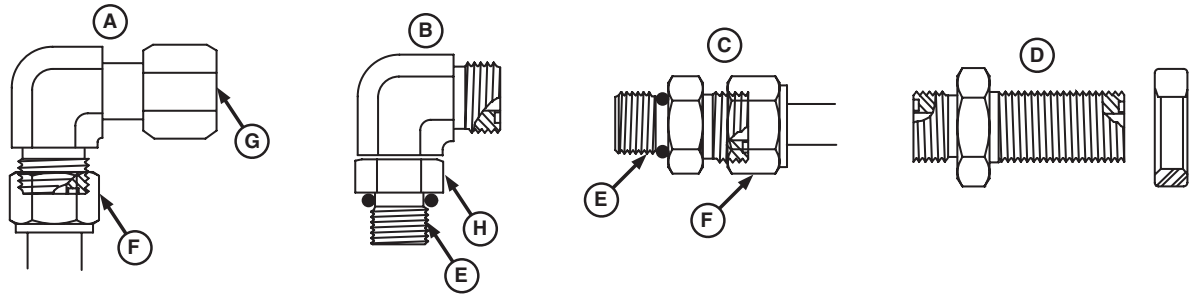
1. Install fitting by hand until snug.
2. Position adjustable fittings by unscrewing the fitting no more than one turn.
3. Apply assembly torque per table.

Assembly Torque

1. Use one wrench to hold the connector body and one wrench to tighten nut.
2. For a hydraulic hose, it may be necessary to use three wrenches to prevent twist; one on the connector body, one on the nut, and one on the body of the hose fitting.

OUO6435,0001557CONV1 –19–17DEC01–1/1

Metric Flat Face Seal Fitting Torque Chart—Standard Pressure Applications



H70406 –UN–12DEC01

A—90° Swivel Elbow and Tube Nut
B—90° Adjustable Stud Elbow
C—Stud Straight and Tube Nut
D—Bulkhead Union and Bulkhead Lock Nut
E—Stud End
F—Tube Nut
G—Swivel Nut
H—Lock Nut

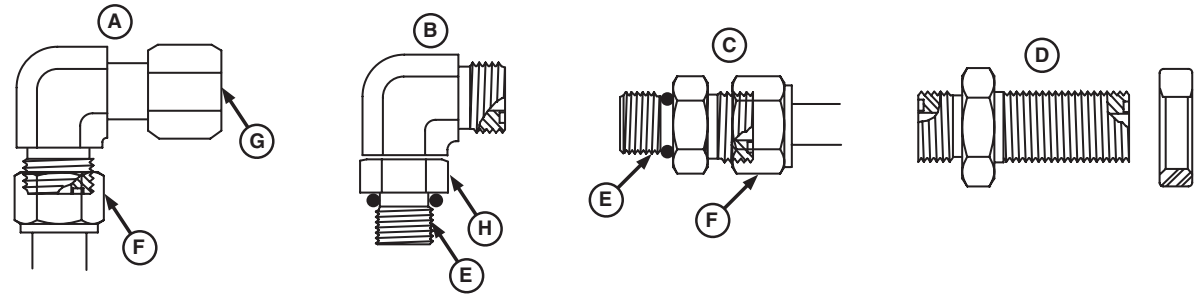
Metric Flat Face Seal Fitting Torque Chart—Standard Pressure—Below 27.6 MPa (4,000 psi), Working Pressure-27.6 MPa (4,000 psi)

Nominal Tube OD/Hose ID			Flat Face Seal Tube/Hose End						O-Ring Stud Ends					
Metric Tube OD	Inch Tube OD		Thread Size	Hex Size	Tube Nut/Swivel Nut Torque[a]		Bulkhead Lock Nut Torque[a]		Thread Size	Hex Size	Steel or Gray Iron Torque[a]		Aluminum Torque[a]	
mm	Dash Size	in.	in.	mm	N•m	lb-ft	N•m	lb-ft	in.	mm	N•m	lb-ft	N•m	lb-ft
6	-4	0.250	9/16-18	17	16	12	12	9	M12 x 1.5	17	21	15.5	9	6.6
8	-5	0.312	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	M14 x 1.5	19	33	24	15	11
10	-6	0.375	11/16-16	22	24	18	24	18	M16 x 1.5	22	41	30	18	13
12	-8	0.500	13/16-16	24	50	37	46	34	M18 x 1.5	24	50	37	21	15
16	-10	0.625	1-14	30	69	51	62	46	M22 x 1.5	27	69	51	28	21
20	-12	0.750	1-3/16-12	36	102	75	102	75	M27 x 2	32	102	75	46	34
22	-14	0.875	1-3/16-12	36	102	75	102	75	M30 x 2	36	Not Established			
25	-16	1.000	1-7/16-12	41	142	105	142	105	M33 x 2	41	158	116	71	52
28	—	—	—	—	—	—	—	—	M38 x 2	46	176	130	79	58
32	-20	1.25	1-11/16-12	50	190	140	190	140	M42 x 2	50	190	140	85	63
38	-24	1.50	2-12	60	217	160	217	160	M48 x 2	55	217	160	98	72

[a]Tolerance is +15%, minus 20% of mean tightening torque unless otherwise specified.

OUO6435,000154DCONV1 –19–29NOV01–1/1

Metric Flat Face Seal Fitting Torque Chart—High Pressure Applications



H70406 –UN–12DEC01

A—90° Swivel Elbow and Tube Nut
B—90° Adjustable Stud Elbow
C—Stud Straight and Tube Nut
D—Bulkhead Union and Bulkhead Lock Nut
E—Stud End
F—Tube Nut
G—Swivel Nut
H—Lock Nut

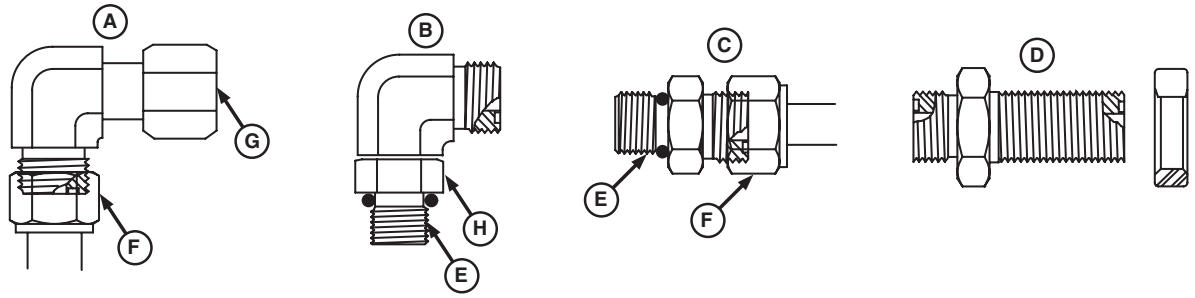
Metric Flat Face Seal Fitting Torque Chart—High Pressure—Above 27.6 MPa (4,000 psi), Working Pressure-41.3 MPa (6,000 psi)

Nominal Tube OD/Hose ID			Flat Face Seal Tube/Hose End						O-Ring Stud Ends			
Metric Tube OD	Inch Tube OD		Thread Size	Hex Size	Tube Nut/Swivel Nut Torque[a]		Bulkhead Lock Nut Torque[a]		Thread Size	Hex Size	Steel or Gray Iron Torque[a]	
mm	Dash Size	in.	in.	mm	N•m	lb-ft	N•m	lb-ft	in.	mm	N•m	lb-ft
6	-4	0.250	9/16-18	17	16	12	12	9	M12 x 1.5	17	35	26
8	-5	0.312	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	M14 x 1.5	19	45	33
10	-6	0.375	11/16-16	22	24	18	24	18	M16 x 1.5	22	55	40
12	-8	0.500	13/16-16	24	50	37	46	34	M18 x 1.5	24	70	50
16	-10	0.625	1-14	30	69	51	62	46	M22 x 1.5	27	100	75
20	-12	0.750	1-3/16-12	36	102	75	102	75	M27 x 2	32	170	125
22	-14	0.875	1-3/16-12	36	102	75	102	75	M30 x 2	36	215	160
25	-16	1.000	1-7/16-12	41	142	105	142	105	M33 x 2	41	310	225
28	—	—	—	—	—	—	—	—	M38 x 2	46	320	235
32	-20	1.25	1-11/16-12	—	—	—	—	—	M42 x 2	50	330	240
38	-24	1.50	2-12	—	—	—	—	—	M48 x 2	55	420	300

[a]Tolerance is +15%, minus 20% of mean tightening torque unless otherwise specified.

OUO6435,000154E –19–29NOV01–1/1

SAE Flat Face Seal Fitting Torque Chart—Standard Pressure Applications



H70406 –UN–12DEC01

A—90° Swivel Elbow and Tube Nut
B—90° Adjustable Stud Elbow
C—Stud Straight and Tube Nut
D—Bulkhead Union and Bulkhead Lock Nut
E—Stud End
F—Tube Nut
G—Swivel Nut
H—Lock Nut

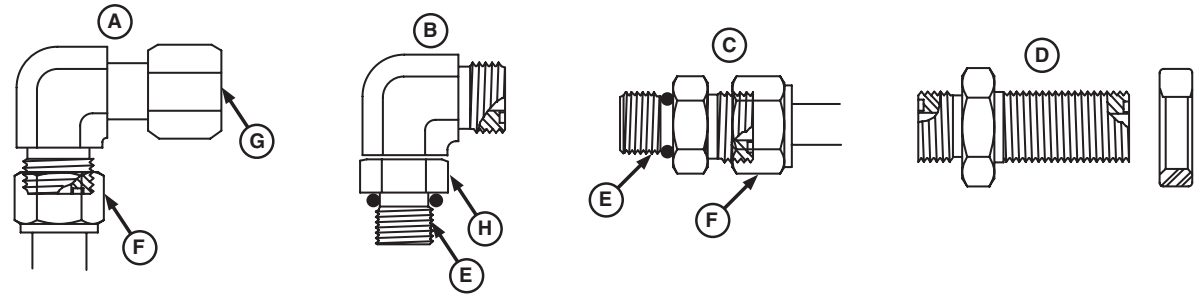
SAE Inch Flat Face Seal Fitting Torque Chart—Standard Pressure-Below 27.6 MPa (4,000 psi), Working Pressure-27.6 MPa (4,000 psi)

Nominal Tube OD/Hose ID				Flat Face Seal Tube/Hose End					O-Ring Stud Ends		
Metric Tube OD	Inch Tube OD			Thread Size	Tube Nut/Swivel Nut Torque[a]		Bulkhead Lock Nut Torque[a]		Thread Size	Straight Fitting or Lock Nut Torque[a]	
mm	Dash Size	in.	mm	in.	N•m	lb-ft	N•m	lb-ft	in.	N•m	lb-ft
5	-3	0.188	4.76	—	—	—	—	—	3/8-24	8	6
6	-4	0.250	6.35	9/16-18	16	12	12	9	7/16-20	12	9
8	-5	0.312	7.94	—	—	—	—	—	1/2-20	16	12
10	-6	0.375	9.52	11/16-16	24	18	24	18	9/16-18	24	18
12	-8	0.500	12.70	13/16-16	50	37	46	34	3/4-16	46	34
16	-10	0.625	15.88	1-14	69	51	62	46	7/8-14	62	46
20	-12	0.750	19.05	1-3/16-12	102	75	102	75	1-1/16-12	102	75
22	-14	0.875	22.22	1-3/16-12	102	75	102	75	1-3/16-12	122	90
25	-16	1.000	25.40	1-7/16-12	142	105	142	105	1-5/16-12	142	105
32	-20	1.25	31.75	1-11/16-12	190	140	190	140	1-5/8-12	190	140
38	-24	1.50	38.10	2-12	217	160	217	160	1-7/8-12	217	160

[a]Tolerance is +15%, minus 20% of mean tightening torque unless otherwise specified.

OUO6435,0001546CONV1 –19–16NOV01–1/1

SAE Flat Face Seal Fitting Torque Chart—High Pressure Applications



H70406 –UN–12DEC01

A—90° Swivel Elbow and Tube Nut
B—90° Adjustable Stud Elbow
C—Stud Straight and Tube Nut
D—Bulkhead Union and Bulkhead Lock Nut
E—Stud End
F—Tube Nut
G—Swivel Nut
H—Lock Nut

SAE Inch Flat Face Seal Fitting Torque Chart—High Pressure—Above 27.6 MPa (4,000 psi), Working Pressure-41.3 MPa (6,000 psi)

Nominal Tube OD/Hose ID				Flat Face Seal Tube/Hose End					O-Ring Stud Ends		
Metric Tube OD	Inch Tube OD			Thread Size	Tube Nut/Swivel Nut Torque[a]		Bulkhead Lock Nut Torque[a]		Thread Size	Straight Fitting or Lock Nut Torque[a]	
mm	Dash Size	in.	mm	in.	N•m	lb-ft	N•m	lb-ft	in.	N•m	lb-ft
5	-3	0.188	3.76	—	—	—	—	—	3/8-24	—	—
6	-4	0.250	6.35	9/16-18	16	12	12	9	7/16-20	21	15
8	-5	0.312	7.94	—	—	—	—	—	1/2-20	—	—
10	-6	0.375	9.52	11/16-16	24	18	24	18	9/16-18	34	25
12	-8	0.500	12.70	13/16-16	50	37	46	34	3/4-16	73	55
16	-10	0.625	15.88	1-14	69	51	62	46	7/8-14	104	76
20	-12	0.750	19.05	1-3/16-12	102	75	102	75	1-1/16-12	176	130
22	-14	0.875	22.22	1-3/16-12	102	75	102	75	1-3/16-12	230	170
25	-16	1.000	25.40	1-7/16-12	142	105	142	105	1-5/16-12	285	210

[a]Tolerance is +15%, minus 20% of mean tightening torque unless otherwise specified.

OUO6435,000154A –19–20NOV01–1/1

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16

Four Bolt Flange Fittings Assembly and Installation—All Pressure Applications

1. Inspect the sealing surfaces for nicks or scratches, roughness or out-of-flat condition. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If these defects cannot be polished out, replace the component.

2. Install the correct O-ring (and back-up washer if required) into the groove using petroleum jelly to hold it in place.

3. For split flange; loosely assemble split flange halves, being sure that the split is centrally located and perpendicular to the port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring.

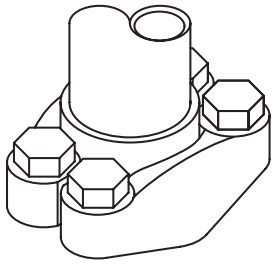
4. For single piece flange; put hydraulic line in the center of the flange and install four cap screws. With the flange centrally located on the port, hand tighten cap screws to hold it in place. Do not pinch O-ring.

5. For both single piece flange and split flange, be sure the components are properly positioned and cap screws are hand tight. Tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten the two remaining cap screws. Tighten all cap screws within the specified limits shown in the chart.

   DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT overtighten.

OUO6435,000189FCONV1 –19–20AUG02–1/1

SAE Four Bolt Flange Cap Screw Torque Values—Standard Pressure Applications

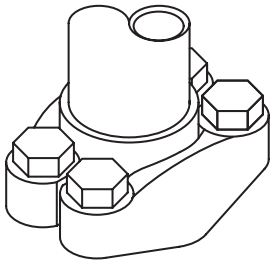


H70423 –UN–30NOV01

SAE Four Bolt Flange Cap Screw Torque Values—27,600 kPa (4,000 psi) Pressure Applications					
		Torque			
		Newton Meters		Foot Pounds	
Nominal Flange Size	Screw Size[a, b]	Min	Max	Min	Max
1/2	5/16-18 UNC	20	31	15	23
3/4	3/8-16 UNC	28	54	21	40
1	3/8-16 UNC	37	54	27	40
1-1/4	7/16-14 UNC	47	85	35	63
1-1/2	1/2-13 UNC	62	131	46	97
2	1/2-13 UNC	73	131	54	97
2-1/2	1/2-13 UNC	107	131	79	97
3	5/8-11 UNC	187	264	138	195
3-1/2	5/8-11 UNC	158	264	117	195
4	5/8-11 UNC	158	264	117	195
5	5/8-11 UNC	158	264	117	195
[a]JDM A17D, SAE Grade 5 or better cap screws with plated hardware.					
[b]1.5.1.2 Lock washers are permissible but not recommended.					

OUO6435,0001549 –19–20NOV01–1/1

SAE Four Bolt Flange Cap Screw Torque Values—High Pressure Applications



H70423 –UN–30NOV01

SAE Four Bolt Flange Cap Screw Torque Values—41,400 kPa (6,000 psi) Pressure Applications					
		Torque			
		Newton Meters		Foot Pounds	
Nominal Flange Size	Screw Size[a, b]	Min	Max	Min	Max
1/2	5/16-18 UNC	20	31	15	23
3/4	3/8-16 UNC	34	54	25	40
1	7/16-14 UNC	57	85	42	63
1-1/4	1/2-13 UNC	85	131	63	63
1-1/2	5/8-11 UNC	159	264	117	195
2	3/4-10 UNC	271	468	200	345
[a]JDM A17D, SAE Grade 5 or better cap screws with plated hardware.					
[b]1.5.1.2 Lock washers are permissible but not recommended.					

OUO6435,000154C –19–29NOV01–1/1

Basic Electrical Component Handling / Precautions For Vehicles Equipped With Computer Controlled Systems

Electrical Precautions To Take:

Never disconnect the batteries while the key switch is on. Why: This can cause electrical voltage spikes that can damage electronic components.

Do not connect jumper cables while the key switch is on. Why: This can cause electrical voltage spikes that can damage electronic components.

Disconnect batteries prior to recharging (if possible). Why: Electrical loads in the combine can slow the recharging process. Battery chargers can cause electrical voltage spikes that can damage electronic components.

Never jump start the machine with a voltage higher than the machine is designed to operate on. Why: This can damage electronic components.

Do not connect or disconnect electrical connectors while the key switch is on or the combine is running. Why: This can cause computer system errors from interrupting a computer program while it is running and electrical voltage spikes that are produced can damage electronic components.

Do not apply power or ground to any component as a test unless specifically instructed to do so. Why: Connecting the wrong voltage to the wrong point of an electronic system can cause electronic component failures.

When welding on the machine, make sure to connect ground lead to the parts being welded. For maximum protection, disconnect all electronic controller connectors before welding. Why: High currents associated with welding can damage wiring harnesses that are involved in the ground path. Welding can also cause electrical voltage spikes that can damage electronic components.

AG,OUO1026,231 –19–06FEB03–1/1

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.

Required fuel properties

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

Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).

Cold Filter Plugging Point (CFPP) below the expected low temperature OR **Cloud Point** at least 5°C (9°F) below the expected low temperature.

Fuel lubricity should pass a minimum level of 3100 grams as measured by ASTM D6078 or maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Sulfur content:

- Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.
- Use of diesel fuel with sulfur content less than 0.10% (1000 ppm) is STRONGLY recommended.
- Use of diesel fuel with sulfur content 0.10% (1000 ppm to 0.50% (5000 ppm) may result in REDUCED oil and filter change intervals.
- BEFORE using diesel fuel with sulfur content greater than 0.50% (5000 ppm), contact your John Deere dealer.
- DO NOT use diesel fuel with sulfur content greater than 1.0%.

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

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

DX,FUEL1 –19–17NOV05–1/1

Storing Fuel

If there is a very slow turnover of fuel in the fuel tank or supply tank, it may be necessary to add a fuel conditioner to prevent water condensation. Contact your John Deere dealer for proper service or maintenance recommendations.

DX,FUEL –19–03MAR93–1/1

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Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

John Deere COOL-GARD™ Prediluted Coolant is preferred for service.

John Deere COOL-GARD Prediluted Coolant is available in a concentration of either 50% ethylene glycol or 55% propylene glycol.

Additional recommended coolants

The following engine coolant is also recommended:

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

John Deere COOL-GARD coolants do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Other fully formulated coolants

Other fully formulated low silicate ethylene or propylene glycol base coolants for heavy-duty engines may be used if they meet one of the following specifications:

- ASTM D6210 prediluted (50%) coolant
- ASTM D6210 coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D6210 do not require use of supplemental coolant additives, except for periodic replenishment of additives during the drain interval.

Coolants requiring supplemental coolant additives

Other low silicate ethylene glycol base coolants for heavy-duty engines may also be used if they meet one of the following specifications:

- ASTM D4985 ethylene glycol base prediluted (50%) coolant
- ASTM D4985 ethylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Coolants meeting ASTM D4985 require an initial charge of supplemental coolant additives, formulated for protection of heavy duty diesel engines against corrosion and cylinder liner erosion and pitting. They also require periodic replenishment of additives during the drain interval.

Other coolants

It is possible that neither John Deere COOL-GARD nor coolants meeting one of the coolant standards listed above is available in the geographical area where service is performed. If these coolants are unavailable, use a coolant concentrate or prediluted coolant with a quality additive package that provides cylinder liner cavitation protection and protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40% to 60%) coolant
- ethylene glycol or propylene glycol base coolant concentrate in a 40% to 60% mixture of concentrate with quality water

Water quality

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DX,COOL3 –19–27OCT05–1/2

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

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

IMPORTANT: Do not mix ethylene glycol and propylene glycol base coolants.

DX,COOL3 –19–27OCT05–2/2

Supplemental Coolant Additives

The concentration of coolant additives is gradually depleted during engine operation. For all recommended coolants, replenish additives between drain intervals by adding a supplemental coolant additive every 12 months or as determined necessary by coolant testing.

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

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with John DeereCOOL-GARD™.

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

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

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

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DX,COOL4 –19–07NOV03–1/1

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Liquid Coolant Conditioner

John Deere Liquid Coolant Conditioner TY16004 is recommended for wet-sleeve diesel engines not having a coolant filter option. Other conditioners may be used if it contains non-chromate inhibitors.

IMPORTANT: John Deere Liquid Coolant Conditioner does not protect against freezing.

Various sizes of coolant conditioner are available from your John Deere dealer.

H01,XHXR,K –19–06FEB03–1/1

Diesel Engine Oil

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

John Deere PLUS-50™ oil is preferred.

Oils meeting one of the following specifications are also recommended:

- ACEA Oil Sequence E7
- ACEA Oil Sequence E6
- ACEA Oil Sequence E5
- ACEA Oil Sequence E4

Extended service intervals may apply when John Deere PLUS-50, ACEA E7, ACEA E6, ACEA E5, or ACEA E4 engine oils are used. Consult your John Deere dealer for more information.

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

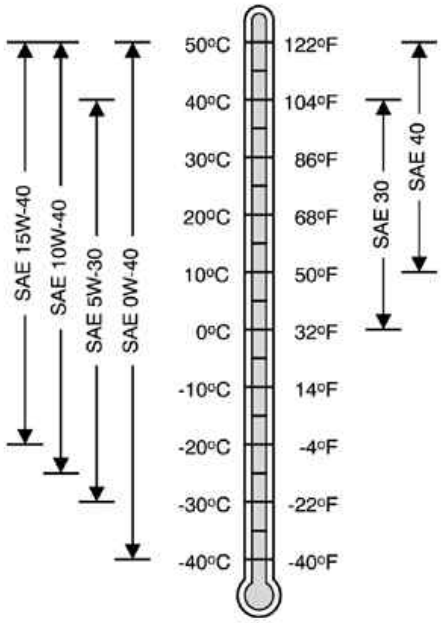
- John Deere TORQ-GARD SUPREME™
- API Service Category CJ-4
- API Service Category CI-4 PLUS
- API Service Category CI-4
- API Service Category CH-4
- API Service Category CG-4
- API Service Category CF-4
- ACEA Oil Sequence E3
- ACEA Oil Sequence E2

If oils meeting API CG-4, API CF-4, or ACEA E2 are used, reduce the service interval by 50%.

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.

If diesel fuel with sulfur content greater than 0.50% (5000 ppm) is used, reduce the service interval by 50%.



TS1681 –UN–09OCT06

Oil Viscosities for Air Temperature Ranges

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TORQ-GARD SUPREME is a trademark of Deere & Company

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DX,ENOIL –19–13SEP06–1/2

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DO NOT use diesel fuel with sulfur content greater than 1.00% (10 000 ppm).

DX,ENOIL –19–13SEP06–2/2

Hydrostatic Drive System, Main Hydraulic System and Main Engine Gear Case Oils

NOTE: Ex factory, the combine is filled with SAE 10W oil. If you change oil, you can use any of the oils listed below.

1. SAE 10W engine oils, if they meet API Service Classification CD or CE.
2. John Deere Low Viscosity HY-GARD™ Transmission/Hydraulic.
3. John Deere All-Weather Hydrostatic Fluid outside of U.S.A. and Canada must meet:
   - Ford M2C33F specification
   - Ford M2C33G specification

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OUO6435,00014B5 –19–20NOV02–1/1

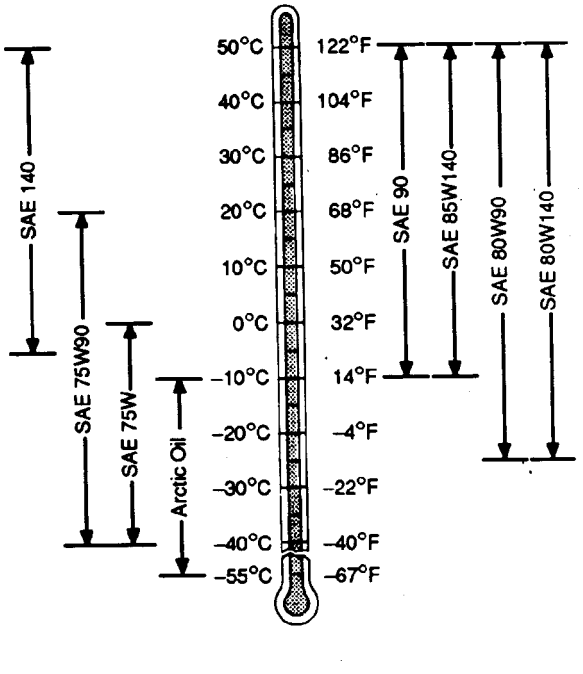
Transmission, Final Drives, Feeder House Reverser, Primary Countershaft, Loading Auger Elevator and Two-Speed Separator Drive Gear Cases

John Deere API GL-5 80W90 Gear Lubricant is recommended. If other oils are used, they must meet requirements of:

- API Service Classification GL-5
- Military Specification MIL-L-2105B
- Military Specification MIL-L-2105C

Depending on the expected prevailing temperature for the fill period, use oil of viscosity as shown in the chart.

Product Number	Description	Size	Pkg. Qty.
TY6252	80W/90 GL5 Gear Lube	16 kg pail (35 lb. pail)	1
TY6296	80W/90 GL5 Gear Lube	0.9L (1 qt.) can	12
TY6256	85W/140 GL5 Gear Lube	16 kg pail (35 lb. pail)	1
TY6345	85W/140 GL5 Gear Lube	0.9L (1 qt.) can	12



OUO6435,00014B7 –19–19NOV02–1/1

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Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

The following grease is recommended:

- John Deere SD POLYUREA GREASE (TY6341)

Other greases may be used if they meet the following:

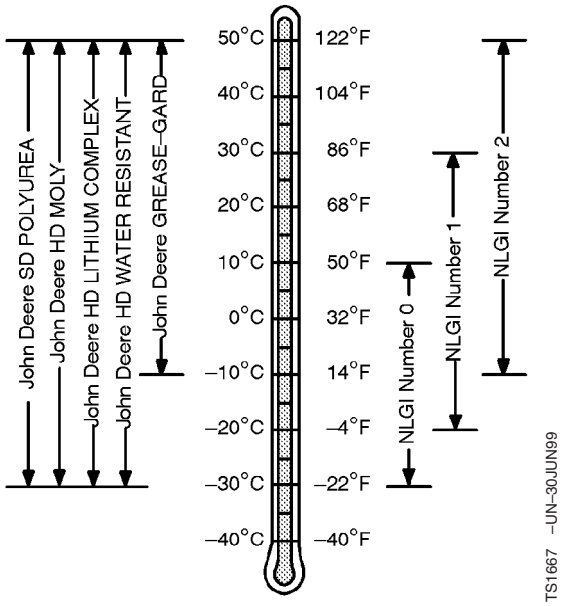
- NLGI Performance Classification GC-LB

IMPORTANT: John Deere SD POLYUREA GREASE (TY6341) is the required grease for the feeder house torque sensing cams.

Some types of grease thickeners are not compatible with others.

If grease fitting is missing, replace immediately. Clean fittings thoroughly before using grease gun.

Product Number	Description
TY6341	Multi-Purpose, High-Temperature Extreme Pressure Grease, especially effective in rolling contact applications.



AG,OUO1035,1175 –19–06FEB03–1/1

Lubricant Storage

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

Use clean containers to handle all lubricants.

Whenever possible, 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 –19–18MAR96–1/1

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 both conventional and synthetic oils.

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

DX,ALTER –19–15JUN00–1/1

Section 20
Engine

Contents