TM

Technical Manual

John Deere 450E Crawler Bulldozer 455E Crawler Loader Operation & Tests

TM1330 (01OCT87)
LITHO IN U.S.A. (REVISED)

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450E CRAWLER BULLDOZER AND 455E CRAWLER LOADER TECHNICAL MANUAL TM-1330 (OCT-87)

SECTION AND GROUP CONTENTS

All information, illustrations and specifications contained in this technical 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.

T64;1330 15 211087

INTRODUCTION

This technical manual is part of a twin concept of service.

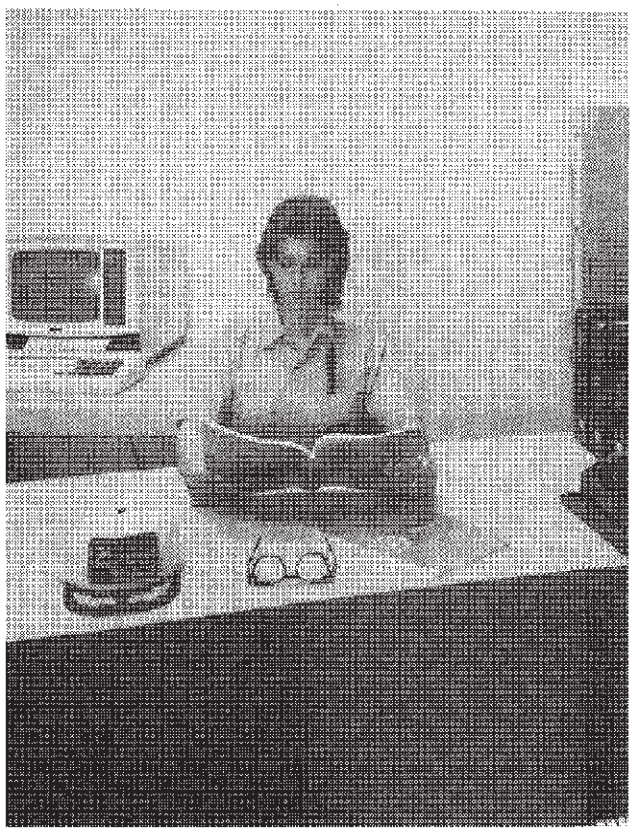
FOS Manuals - for reference

Technical Manuals - for machine service

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise service guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.



018;T5864BB T82;FLPD G 310785

FEATURES OF THIS TECHNICAL MANUAL

John Deere ILLUSTRUCTION format emphasizing illustrations and concise instructions in easy-to-use modules.

Emphasis on diagnosis, analysis, and testing so you can understand the problem and correct it.

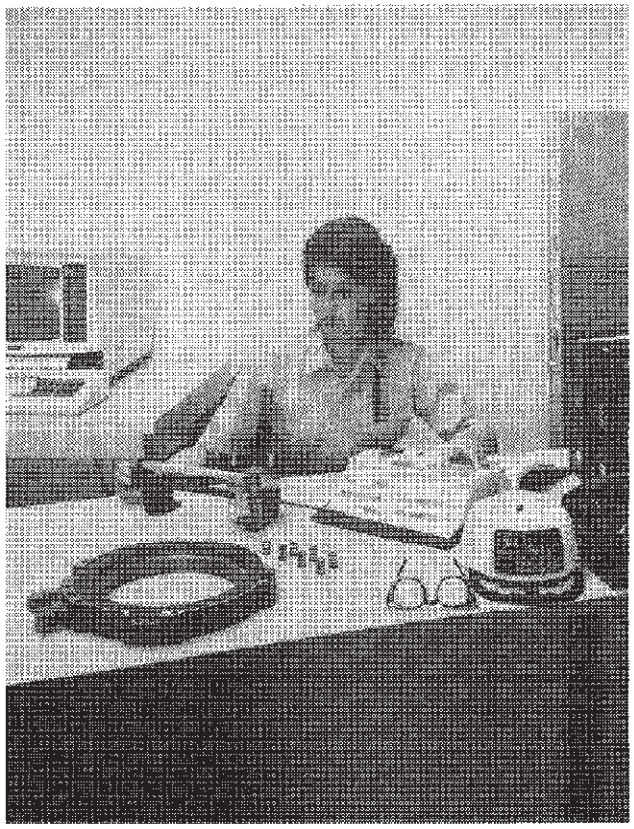
Diagnostic information presented with the most logical and easiest to isolate problems first to help you identify the majority of routine failures quickly.

Step-by-step instructions for teardown and assembly.

Summary listing at the beginning of each group of all applicable specifications, wear tolerances, torque values, essential tools, and materials needed to do the job.

An emphasis throughout on safety—so you do the job right without getting hurt.

This technical manual was planned and written for you - an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it when you need to know correct service procedures or specifications.



018;T5884BC T82;FLPD H 310785

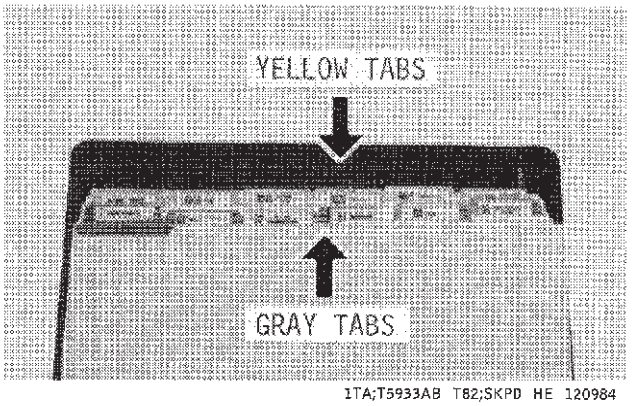
T96;001001 01 221087Y

USING TABS

To fully utilize this technical manual, you must understand how it is organized.

Only two tab colors are used—gray and yellow. Each color represents a different type of information.

Spend a minute reading this now and save many minutes of searching later.



1TA;T5933AB T82;SKPD HE 120984

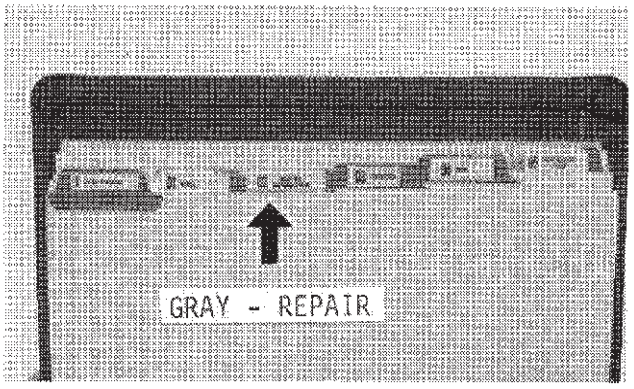
GRAY TAB SECTIONS

The gray tab sections are repair sections that tell how to repair the components of the various systems.

Repair of a component includes:

- Removal from machine (when necessary)
- Disassembly
- Inspection
- Replacement of parts
- Assembly
- Adjustment
- Installation on machine (when necessary)

The numbers used for the repair (gray tab) sections are part of an overall service publication numbering system. The numbers identify the same sections in the parts catalog, flat rate manual, service information bulletins, and service training courses.

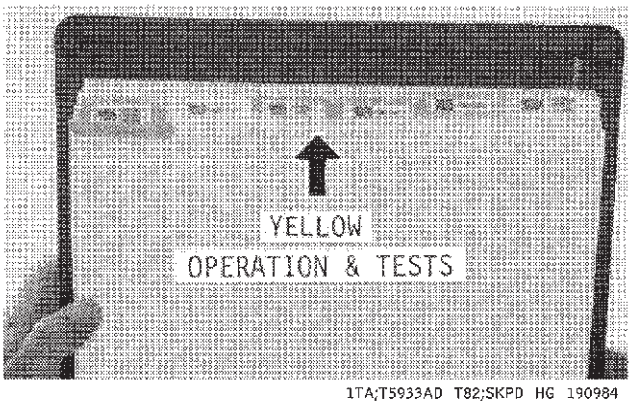


1TA;T5933AC T82;SKPD HF 120984

YELLOW TAB SECTIONS

Each yellow tab section contains information on:

Groups	
05	Theory of Operation
10	System Operational Checks
15	Diagnostic Information
20	Adjustments
25	Tests



1TA;T5933AD T82;SKPD HG 190984

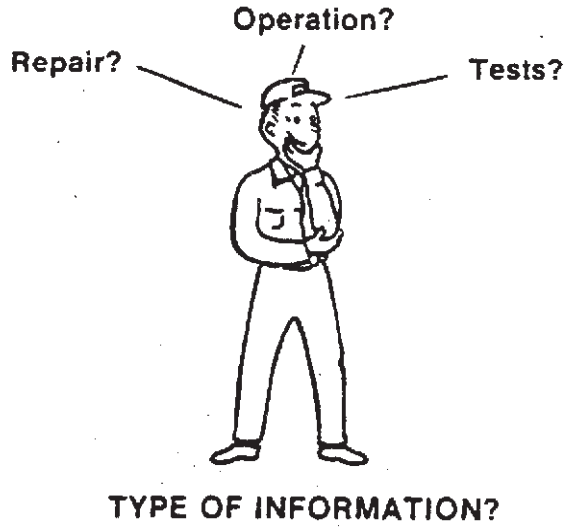
T96;001001 02 221087Y

THREE-STEP PROCEDURE

Use the following three-step procedure to locate the desired information.

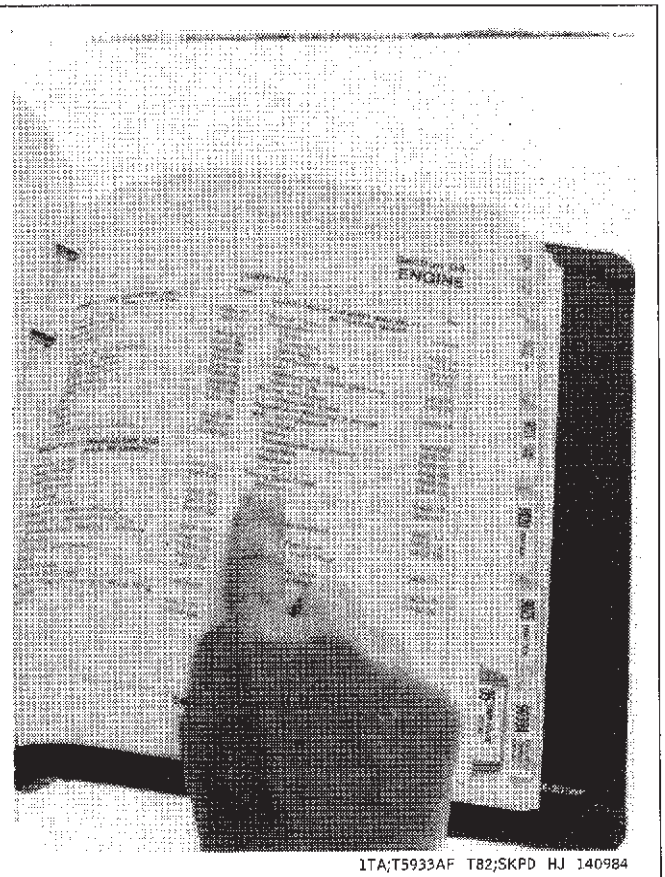
1. Determine the type of information you need. Is it repair, operation, or tests?

2. Go to the appropriate section tab:
   Gray for Repair
   Yellow for Operation or Tests



1TA;T5940AT T82;SKPD HI 120984

3. Use the table of contents on the first page of the section to locate the information.



1TA;T5933AF T82;SKPD HJ 140984

SAFETY AND YOU

This safety-alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

When you see this symbol on your machine or in your manual, be alert to the possibility of personal injury. Follow the instructions in the safety message.

D18;T81389 T82;FLPD N 061186

T96;00I00I 04 221087Y

AVOID FIRE HAZARDS

Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located — know how to use them.

Do not smoke while refueling or handling highly flammable material.

Shut off the engine when refueling.

Use care in refueling if the engine is hot.

Do not use open pans of gasoline or diesel fuel for cleaning parts. Use good commercial, nonflammable solvents.

Provide adequate ventilation when charging batteries.

Do not check battery charge by placing metal objects across the posts.

Do not allow sparks or open flame near batteries.

Do not smoke near battery.

Never check fuel, battery electrolyte, or coolant levels with an open flame.

Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as light anywhere on or around the equipment.

When preparing engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.

Inspect electrical wiring for worn or frayed insulation. Install new wiring if wires are damaged.

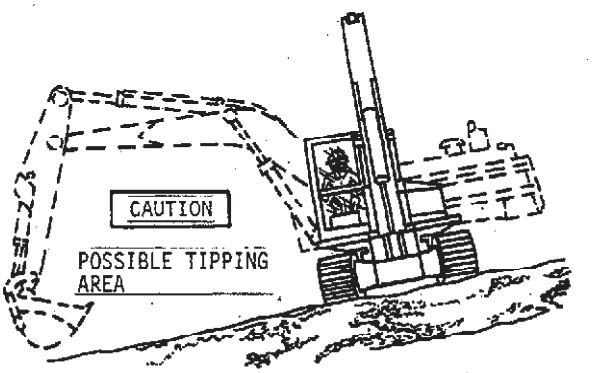
88A;T86875 T82;SKSA L 050984

AVOID TIPPING

When you operate on a slope, do not swing the bucket down-hill if possible.

When you swing heavy loads to the side of the tracks, avoid tipping the excavator.

When the bucket is loaded, be careful when you swing or lift the boom.



44A;T82326 T82;EXSA G 050282

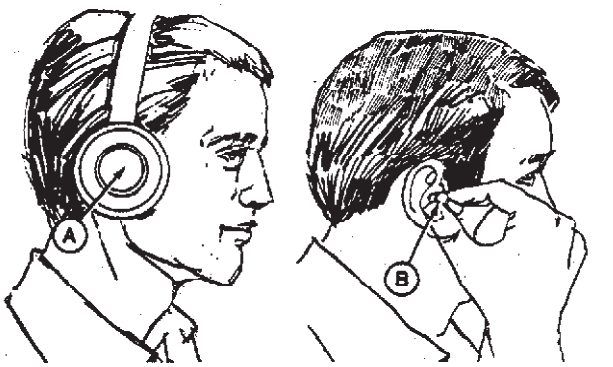
WEAR PROTECTIVE CLOTHING

Wear fairly tight clothing . . . and safety equipment.

44A;T85056 T82;EXSA B 060684

PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs (A) or earplugs (B) to protect against objectionable or uncomfortable loud noise.



88A;X7662 T82;BHSA E 070684

AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.

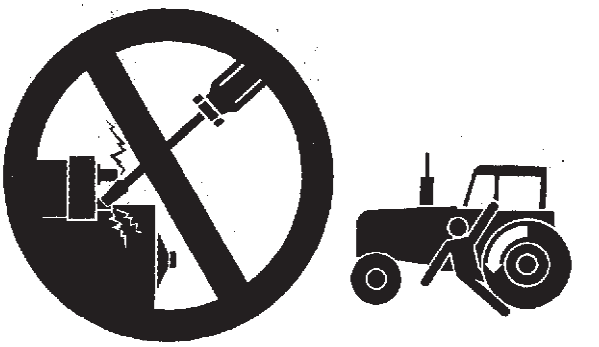
44A;X9811 T82;BHSA F 140984

PREVENT MACHINE RUNAWAY

Avoid possible injury or death from machine runaway.

Do not start engine by shorting across starter terminals. Machine will start in gear and will move if normal circuitry is bypassed.

NEVER start engine while standing on ground. Start engine only from operator's seat, with gear shift lever in neutral position, HLR lever in neutral position and locked, and brake lock lever engaged.



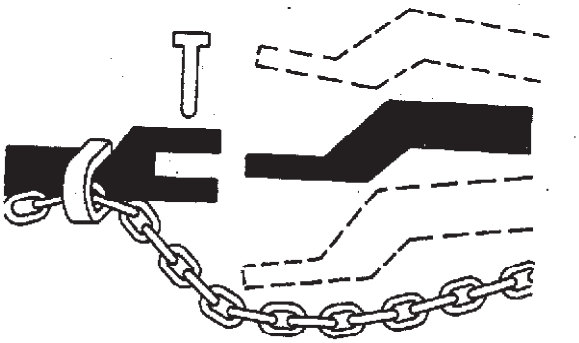
AB6;TS177 T82;CRSA AI 201284

USE A SAFETY CHAIN

A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

See your John Deere dealer for a chain with a strength rating equal to or greater than the gross weight of the towed machine. Do not use safety chain for towing.

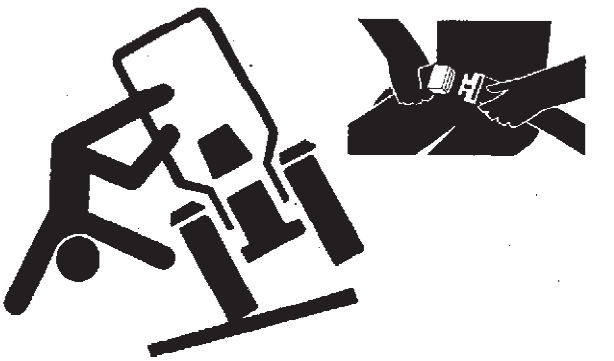


AB6;TS208 053;CHAIN 180987

USE SEAT BELT PROPERLY

Use a seat belt when you operate with a roll-over protective structure (ROPS) to minimize chance of injury from an accident such as an overturn.

Do not use a seat belt if operating without a ROPS.



AB6;TS205 053;ROPS1 230487

KEEP RIDERS OFF MACHINE

Only allow the operator on the machine. Keep riders off.

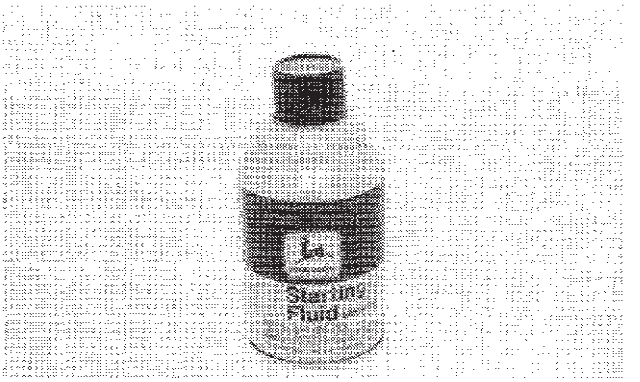
Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.

AB6;TS213 053;RIDER 160687

T96;001001 07 221087Y

HANDLE STARTING FLUID SAFELY

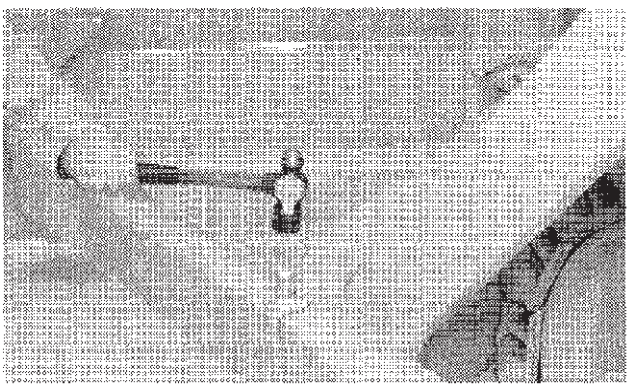
If your machine is equipped with a starting fluid starting aid, remember starting fluid is highly flammable. DO NOT incinerate or puncture a starting fluid container. DO NOT store a starting fluid container in a high-temperature area.



44A;T90207 T82;CRSA G 070684

PROTECT AGAINST FLYING DEBRIS

When you drive connecting pins in or out, guard against injury from flying pieces of metal or debris. Wear goggles or safety glasses and hard hat.



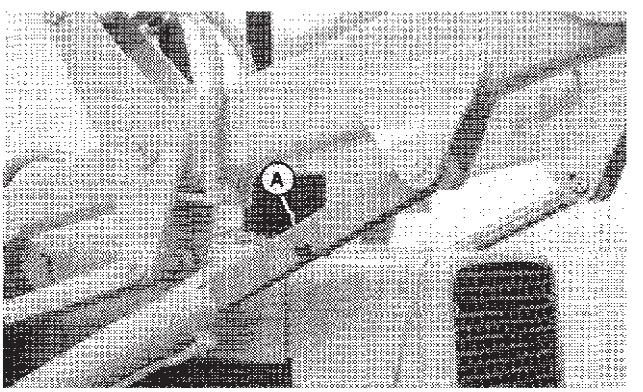
88A;T90211 T82;CRSA K 040984

SUPPORT RAISED EQUIPMENT

Do not work under raised equipment unless it has a support under it.

On crawler loaders, use the boom safety lock bar (A) stored in the battery compartment.

If a support is not available, lower equipment to the ground.

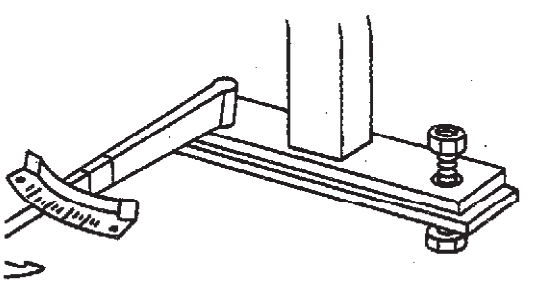


88A;T91444 82;CRSA AQ 051284

KEEP ROPS INSTALLED PROPERLY

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. A damaged ROPS should be replaced, not reused.

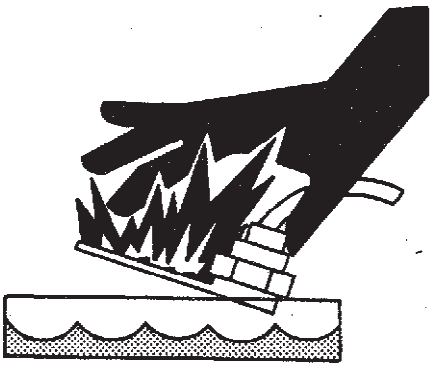


AB6;TS212 053;ROPS3 230487

T96;001001 08 221087Y

CAUTION: Do not plug coolant heater into electrical power unless heating element is immersed in coolant. Sheath could burst and result in personal injury.

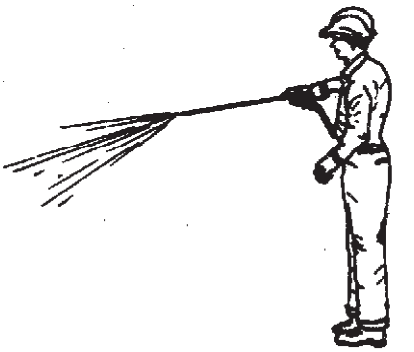
Use a heavy-duty grounded cord to connect coolant heater to electrical power.



AB6;TS210 02T;05 K53 221087

CLEAN THE MACHINE REGULARLY

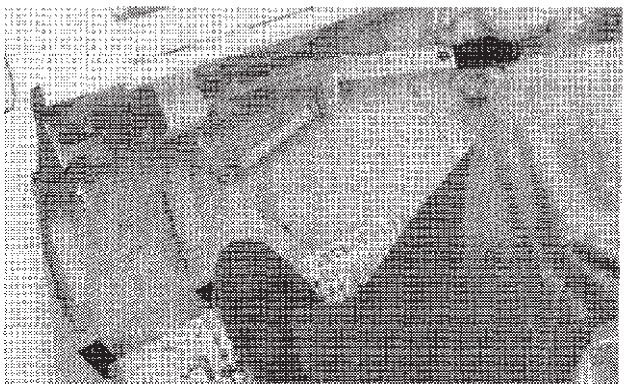
Remove any grease, oil or debris build-up to avoid possible injury or machine damage.



000;T5813AM T82;CRSA AH 051284

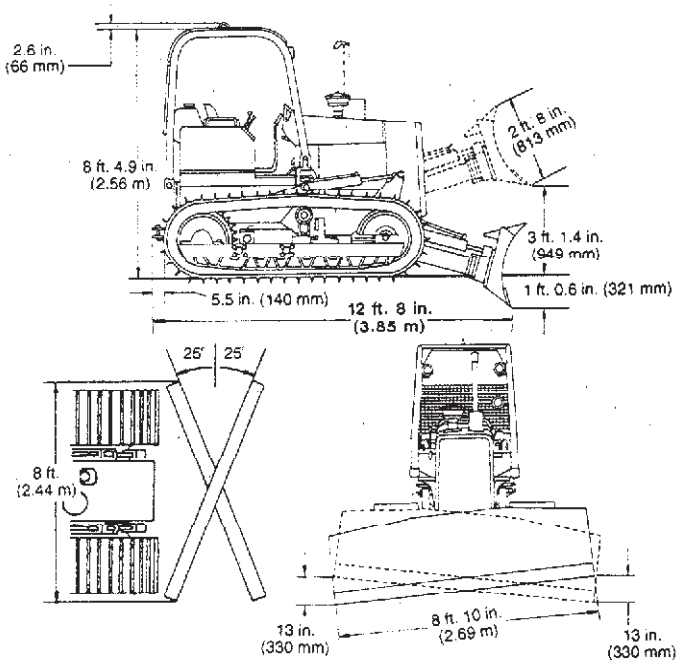
PREPARE MACHINE FOR REPAIR

1. Lower all equipment to the ground.
2. Move HLR lever to neutral "N" position.
3. Turn HLR neutral-lock lever to lock position.
4. Move gear shift lever to the neutral "N" position.
5. Apply and lock foot brake.
6. Stop the engine.
7. Operate all hydraulic control levers to release hydraulic pressure in the system.
8. Disconnect negative (-) battery cable.



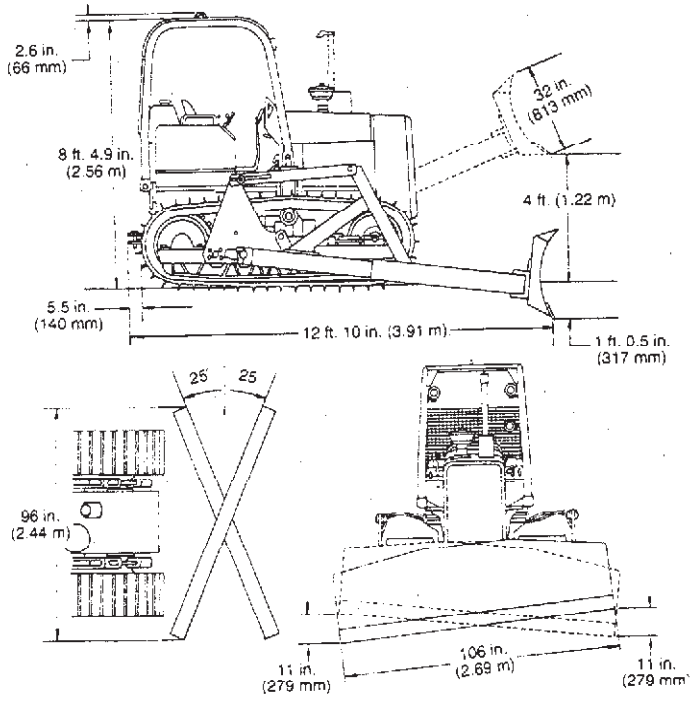
88A;T5933AM T82;CRSA AZ 080185

196;001001 09 221087Y



450E Crawler Tractor With 6405 Blade

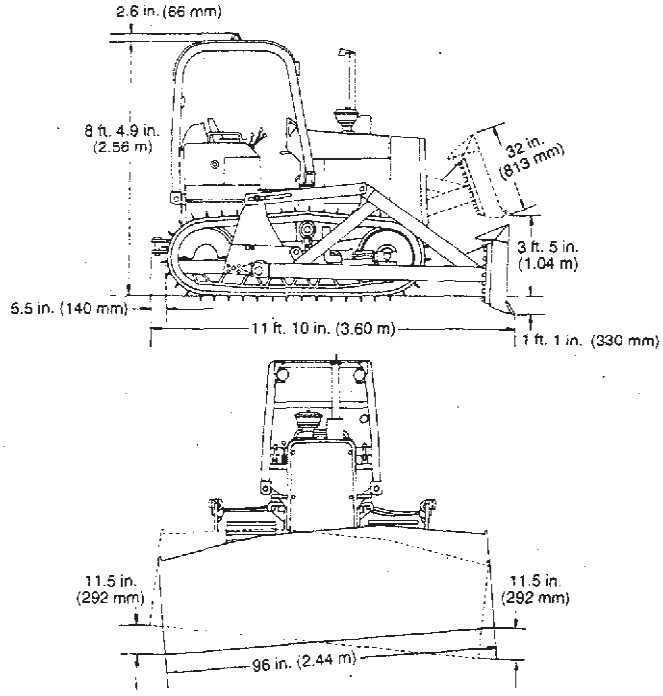
CGD;T6020AN T82;CRSP S 030185



450E Crawler Tractor With 6410 Blade

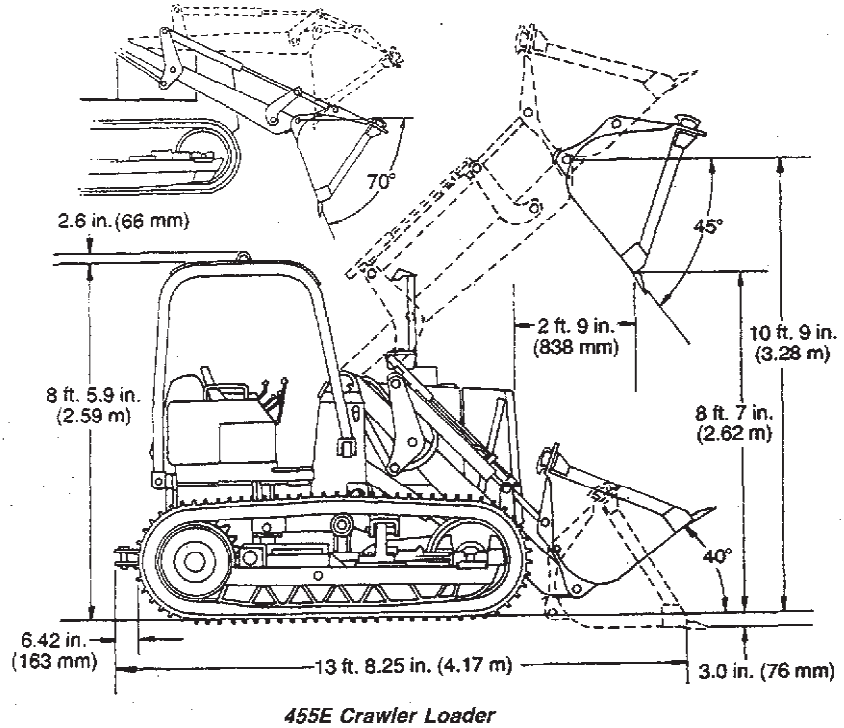
CGD;T6020AM T82;CRSP T 030185

T96;0010II 01 221087Y



450E Crawler Tractor With 6415 Blade

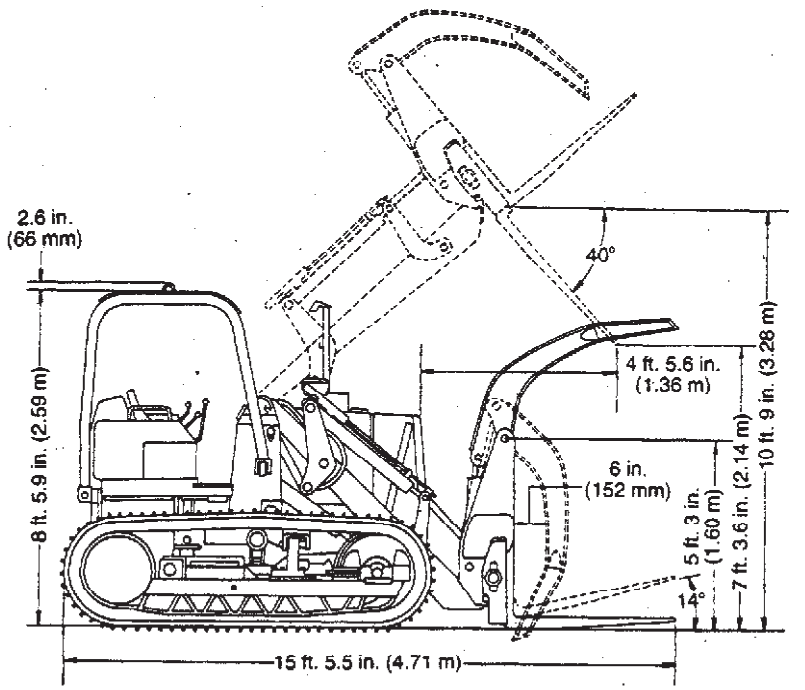
000;T6020AP T82;CRSP U 030185



455E Crawler Loader

88A;T92254 T82;CRSP X 111284

T96;001011 02 221087Y



455E Log and Lumber Loader

88A;T5936AB T82;CRSP Y 111284

GENERAL SPECIFICATIONS

Engine:

John Deere 4-cylinder turbocharged diesel
SAE net horsepower ..... 70 hp (52 kw)
Piston displacement ..... 276 cu. in. (4.524 L)
Fan ..... Blower
Electrical system ..... 12 volt with alternator
Battery (12 volt) . Reserve capacity: 180 minutes

Steering:

Clutches ..... Oil-cooled, hydraulically activated, multiple disk, 11 in. (279 mm) disks; 16 friction surfaces per clutch.

Hydraulic Cylinders

(450E):	Bore	Stroke
Lift (2)	3.5 in. (89 mm)	15 in. (381 mm)
Angle (2)	3.5 in. (89 mm)	13.375 in. (343 mm)
Tilt (1) (6405) ..	3.5 in. (89 mm)	3 in. (76 mm)
Tilt (1) (6415) ..	4.5 in. (114 mm)	3 in. (76 mm)

(455E):	Bore	Stroke
Boom (2) ..	4.25 in. (108 mm)	28.25 in. (718 mm)
Bucket (2)	3.5 in. (89 mm)	31.1 in. (790 mm)

Hydraulic System:

Pressure ..... 2250 psi (15 514 kPa)
Pump flow at 2000 rpm (450E):
Large pump ... New—18.1 gpm (68.4 L/min)
Used—15.3 gpm (57.7 L/min)
Small pump .... New—14.2 gpm (53.7 L/min)
Used—11.2 gpm (42.3 L/min)
Long Track .... New—12.0 gpm (45.4 L/min)
Used—9.4 gpm (35.7 L/min)
Pump flow at 2000 rpm (455E):
Pump ..... New—23.3 gpm (88.3 L/min)
Used—19.7 gpm (74.6 L/min)

Undercarriage:

Track shoes, each side:
450E 36
450ELT 39
455E 37
Track gauge ..... 52 in. (1.27 m)
450ELT ..... 54 in. (1.37 m)
450ELT Wide Track ..... 60 in. (1.52 m)
Clearance at rear crossbar .. 14.25 in. (362 mm)

T82;CRSP AT 200285

T96;00I0II 03 221087Y

Travel Speeds (rated engine speed shown in mph [km/h]):

Gear	High		Low		Reverse	
	450E/455E	450ELT	450E/455E	450ELT	450E/455E	450ELT
1	1.8 (2.9)	1.8 (2.9)	1.3 (2.1)	1.3 (2.1)	1.7 (2.7)	1.7 (2.7)
2	2.9 (4.6)	2.8 (4.5)	2.1 (3.5)	2.0 (3.2)	2.8 (4.5)	2.7 (4.3)
3	4.3 (6.9)	4.2 (6.7)	3.0 (4.8)	2.9 (4.6)	4.1 (6.6)	4.0 (6.4)
4	6.5 (10.4)	6.3 (10.1)	4.6 (7.4)	4.5 (7.2)	6.2 (9.9)	6.1 (9.8)

T82;CRSP AU 150285

CAPACITIES

	U.S.	Metric
Engine coolant (450E and 455E)	4 gal	15.0 L
Engine coolant (450E Long Track)	4.25 gal	16.9 L
Engine oil including filter	9 qt	8.5 L
Transmission	8 gal	30.3 L
Final drive (each side)	6.25 qt	5.9 L
Hydraulic reservoir (450E)	6 gal	22.7 L
Hydraulic reservoir (455E)	7 gal	26.5 L
Hydraulic system (450E):		
(6405 dozer)	9.5 gal	36.0 L
(6410 dozer)	8.5 gal	32.2 L
(6415 dozer)	8.5 gal	32.2 L
Hydraulic system (455E)	13 gal	117.3 L
Steering clutch housing (each side)	3.5 gal	13.2 L
Fuel tank (450E and 455E)	31 gal	117.3 L
Fuel tank (450E Long Track)	36 gal	135.0 L

SAE Operating Weight (450E):	
16 in. (406 mm) grouser shoes	12,260 lb (5560 kg)
6405 dozer and 16 in. (406 mm) grouser shoes	14,640 lb (6640 kg)
6410 dozer and 18 in. (457 mm) grouser shoes	14,830 lb (6727 kg)
6415 dozer and 18 in. (457 mm) grouser shoes	15,240 lb (6913 kg)
SAE Operating Weight (455E)	17,150 lb (7780 kg)

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a unit with roll-over protective structure and standard equipment.)

T82;CRSP Z 260788

T96;00101 04 221087Y

HARDWARE TORQUE SPECIFICATIONS

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten it to torque shown on the following charts unless a special torque is specified.

T82;CRMA EC 260765

NOTE: Torques shown are for dry (no lubrication on threads) hardware.

NOTE: Torque wrench tolerance is ± 10 per cent of specified torque.

Customary Hardware

Cap Screw Size-Inches	Grade B		Grade D		Grade F	
	lb-ft.	(N-m)	lb-ft.	(N-m)	lb-ft.	(N-m)
1/4	----	----	10	(14)	14	(19)
5/16	----	----	20	(27)	30	(41)
3/8	----	----	35	(47)	50	(68)
7/16	35	(47)	55	(75)	80	(108)
1/2	55	(75)	85	(115)	120	(163)
9/16	75	(102)	130	(176)	175	(237)
5/8	105	(142)	170	(230)	240	(325)
3/4	185	(251)	300	(407)	425	(576)
7/8	160	(217)	445	(603)	685	(929)
1	250	(339)	670	(908)	1030	(1396)
1-1/8	330	(447)	910	(1234)	1460	(1979)
1-1/4	480	(651)	1250	(1695)	2060	(2793)

44A;T88884 T82;EXMA S 120684

METRIC HARDWARE TORQUE CHART

NOTE: Torques shown are for hardware with SAE30W oil on threads.

NOTE: Torque wrench tolerance is ± 10 percent of specified torque.

Metric Standard Thread

Thread	8.8		10.9		12.9	
	N·m	(lb-ft)	N·m	(lb-ft)	N·m	(lb-ft)
M5	6	(5)	8	(6)	10	(7)
M6	10	(7)	14	(10)	17	(13)
M8	25	(18)	34	(25)	40	(29)
M10	48	(35)	68	(50)	82	(60)
M12	84	(62)	118	(87)	142	(105)
M14	133	(98)	187	(138)	226	(167)
M16	206	(152)	290	(214)	348	(257)
M18	285	(210)	398	(294)	478	(351)
M20	402	(296)	570	(420)	677	(499)
M22	540	(398)	765	(564)	914	(674)
M24	697	(514)	980	(723)	1180	(870)

Metric Fine Thread

Thread	8.8		10.9		12.9	
	N·m	(lb-ft)	N·m	(lb-ft)	N·m	(lb-ft)
M8 x 1	26	(19)	37	(27)	44	(32)
M10 x 1	47	(35)	69	(51)	82	(60)
M12 x 1.5	88	(66)	123	(91)	147	(106)
M14 x 1.5	147	(108)	206	(152)	246	(181)
M16 x 1.5	221	(163)	309	(228)	373	(275)
M18 x 1.5	319	(235)	451	(333)	540	(398)
M20 x 1.5	451	(333)	628	(463)	755	(557)
M22 x 1.5	599	(442)	845	(623)	1030	(760)
M24 x 2	765	(564)	1080	(796)	1275	(940)
M26 x 2	1130	(833)	1570	(1158)	1915	(1412)

T82;EXMA T. 230387

O-RING BOSS FITTING SERVICE RECOMMENDATIONS

1. Inspect boss O-ring seat. It must be free of dirt and defects. If repeated leaks occur, inspect for defects with a magnifying glass. Some raised defects can be removed with a slip stone.

Occasionally a lower durometer O-ring will seal against a rough seat. If neither of these solutions work, the component must be replaced.

2. Lubricate O-ring using petroleum jelly. Put a thimble over the threads to protect O-ring from nicks. Slide O-ring over the thimble and into the turned down section of fitting.

For angle fittings, loosen special nut and push special washer against threads so O-ring can be installed into the turned down section of fitting.

3. Turn fitting into the boss by hand until special washer or washer face (straight fitting) contacts boss face and O-ring is squeezed into its seat.

4. To position angle fittings, turn the fitting counterclockwise a maximum of one turn.

5. Tighten straight fittings to the torque valve shown in chart. For angle fittings, tighten the special nut to valve shown in the chart while holding body of fitting with a wrench.

STRAIGHT FITTING OR SPECIAL NUT TORQUE (1)

Thread Size	Torque[1] N·m	(lb-ft	Number Of Flats[2]
3/8-24 UNF	8	(6)	2
7/16-20 UNF	12	(9)	2
1/2-20 UNF	16	(12)	2
9/16-18 UNF	24	(18)	2
3/4-16 UNF	46	(34)	2
7/8-14 UNF	62	(46)	1-1/2
1-1/16-12 UN	102	(75)	1
1-3/16-12 UN	122	(90)	1
1-5/16-12 UN	142	(105)	3/4
1-5/8-12 UN	190	(140)	3/4
1-7/8-12 UN	217	(160)	1/2

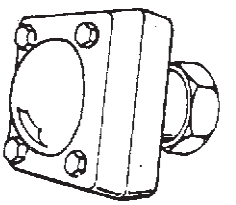
1. Tolerance ± 10%.

2. To be used if a torque wrench cannot be used. After tightening fitting by hand, put a mark on nut and boss; then tighten special nut or straight fitting the number of flats shown.

T82,TLP0 AA D40285

T96;00III 03 221087Y

SAE FOUR BOLT FLANGE FITTING SERVICE RECOMMENDATIONS



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 backup 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.

SAE FOUR BOLT FLANGE FITTING TORQUE

Nominal Flange Size	Cap Screw Size[1]	Torque[2] N·m Min.	N·m Max.	(lb-ft) Min.	(lb-ft) 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	158	264	(117)	(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)

1. SAE Grade 5 or better cap screws with plated hardware.

2. Tolerance ± 10%. The torques given are enough for the given size connection with the recommended working pressure. Torques can be increased to the maximum shown for each cap screw size if desired. Increasing cap screw torque beyond this maximum will result in flange and cap screw bending and connection failures.

D18;T6234AB T82;TLPD AC. 230387

T96;00111 04 221087Y

SERVICE RECOMMENDATIONS FOR FLAT FACE O-RING SEAL FITTINGS

1. Inspect the fitting sealing surfaces. They must be free of dirt or defects.

2. Inspect the O-ring. It must be free of damage or defects.

3. Lubricate O-rings and male threads with petroleum jelly.

4.Push O-ring into the groove.

5. Index angle fittings and tighten by hand.

6. Tighten fitting or nut to torque valve shown on the chart per dash size shown on the chart per dash size stamped on the fitting. Do not allow hoses to twist while tightening fittings.

FLAT FACE O-RING SEAL FITTING TORQUE (1)

Nominal Tube O.D. mm	Nominal Tube O.D. in.	Dash Size	O-Ring Face Seal End: Thread Size in.	O-Ring Face Seal End: Swivel Nut Torque Nm	O-Ring Face Seal End: Swivel Nut Torque lb-ft	O-Ring Boss End: Bulkhead Nut Torque Nm	O-Ring Boss End: Bulkhead Nut Torque lb-ft
4.76	0.188	-3	----------	-----	-----	-----	-----
6.35	0.250	-4	9/16-18	16	12	5.0	3.5
7.94	0.312	-5	----------	-----	-----	-----	-----
9.52	0.375	-6	11/16-16	24	18	9.0	6.5
12.70	0.500	-8	13/16-16	50	37	17.0	12.5
15.88	0.625	-10	1-14	69	51	17.0	12.5
19.05	0.750	-12	1 3/16-12	102	75	17.0	12.5
22.22	0.875	-14	1 3/16-12	102	75	17.0	12.5
25.40	1.000	-16	1 7/16-12	142	105	17.0	12.5
31.75	1.250	-20	1 11/16-12	190	140	17.0	12.5
38.10	1.500	-24	2-12	217	160	17.0	12.5

1. Tolerance: +15 −20%

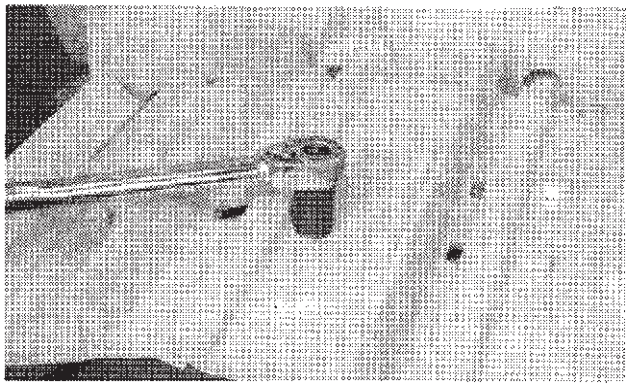
T82;FLSP A

CHECK TRACK SHOE TORQUE

Track shoe cap screws should be checked periodically for tightness.

Tighten cap screws to 120 lb-ft (163 N·m) torque.

NOTE: Replacement hardware should be lubricated and tightened to above specification.



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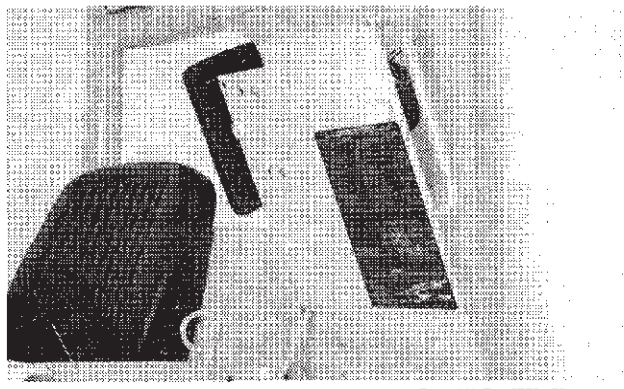
USE PERIODIC MAINTENANCE CHART

The chart and the operator's manual list all the service points and the procedures for maintaining the machine. Use them to check, service, and adjust your customer's machine.



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FUEL SPECIFICATIONS

Use ONLY clean, high-quality fuel.

Use Grade No. 2-D fuel above 4°C (40°F).

Use Grade No. 1-D fuel below 4°C (40°F).

Use Grade No. 1-D fuel for all air temperatures at altitudes above 1 500 m (5000 ft).

IMPORTANT: If fuel sulfur content exceeds 0.5 per cent, the engine oil drain interval must be reduced by 50 per cent (to 125 hours).

Use fuel with less than 1.0 per cent sulfur. If possible, use fuel with less than 0.5 per cent sulfur.

For maximum filter life, sediment and water should not be more than 0.10 per cent.

The cetane number should be 40 minimum. If you operate your machine where air temperatures are normally low or where altitudes are high, you may need fuel with a higher cetane number.

Cloud Point—For cold weather operation, cloud point should be 6°C (10°F) below lowest normal air temperature.

T82;BHFL F. 310186

FUEL STORAGE

NOTE: Diesel fuels stored for a long time may form gum or bacteria and plug filters.

Keep fuel in a clean container in a protected area. Water and sediment must be removed before fuel gets to the engine. Do not use de-icers to remove water from fuel. Do not depend on fuel filters to remove water.

If possible, install a water separator at the storage tank outlet. (See your John Deere dealer).

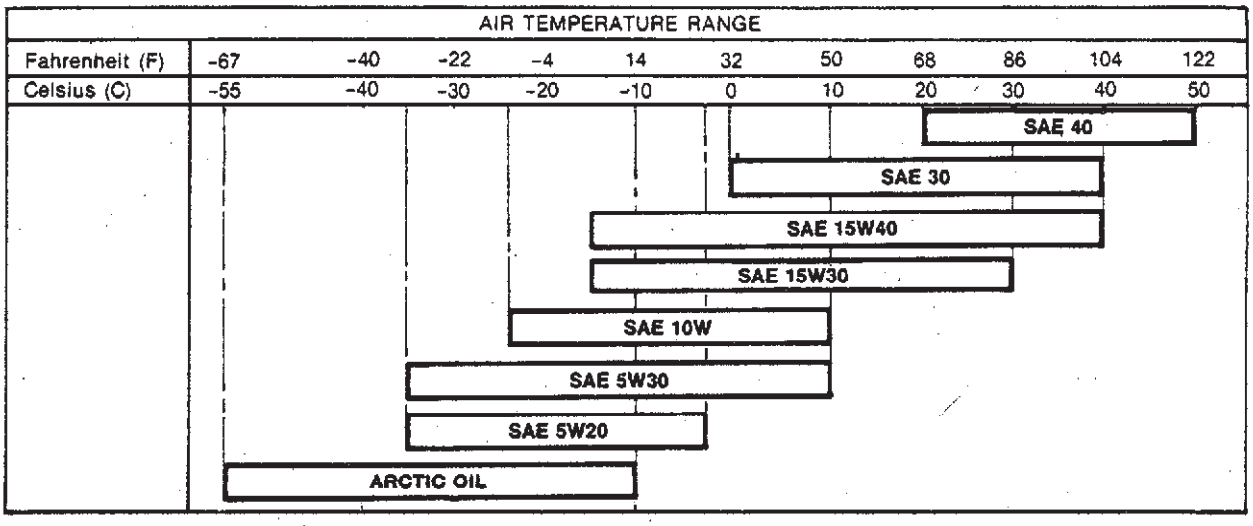
IMPORTANT: Keep all dirt, scale, water or other foreign material out of fuel.

Store fuel drums on their sides with plug up.

T82;BHFL G. 310186

T96;0010IV 02 221087Y

ENGINE OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

Additives are not required nor recommended.

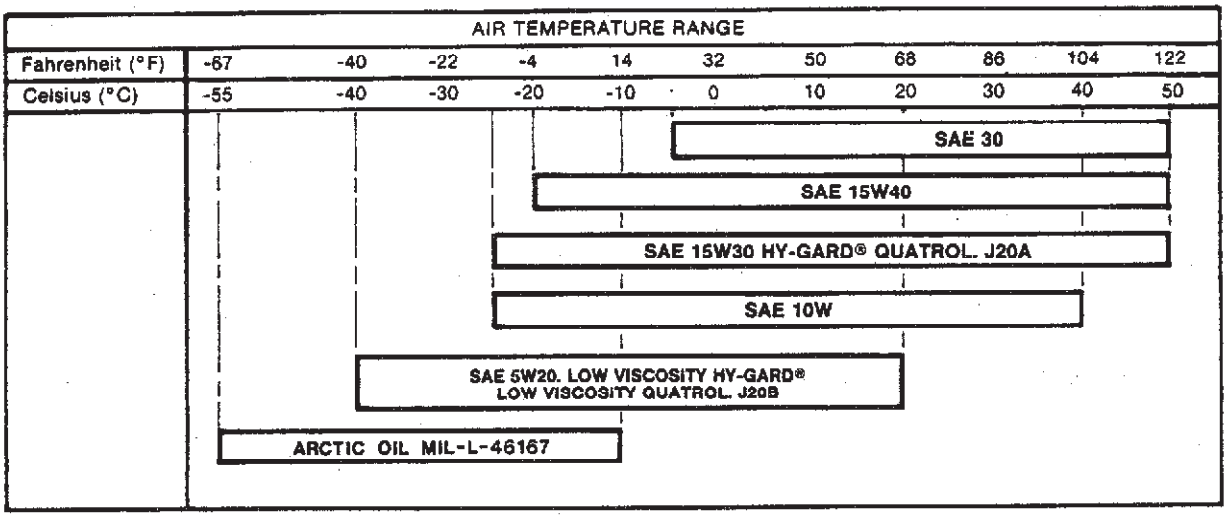
John Deere TORQ-GARD SUPREME® engine oil is recommended. If other oils are used, they must have the following minimum specifications:

Oil Specification	Use
API Service CD/SC (MIL-L-2104C)	Recommended.
API Service CC/SC* or MIL-L-46152*	For SAE 5W20, SAE 5W30 and arctic oil only, use if recommended oil is not available.
MIL-L-46167*	For arctic oil only.

*Change oil at 100 hours, which is half the normal drain interval.

88A;T91372 T82;CRFL E 270483

TRANSMISSION—STEERING CLUTCHES AND HYDRAULIC OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

The following oils are recommended:

John Deere HY-GARD® Transmission and Hydraulic Oils.

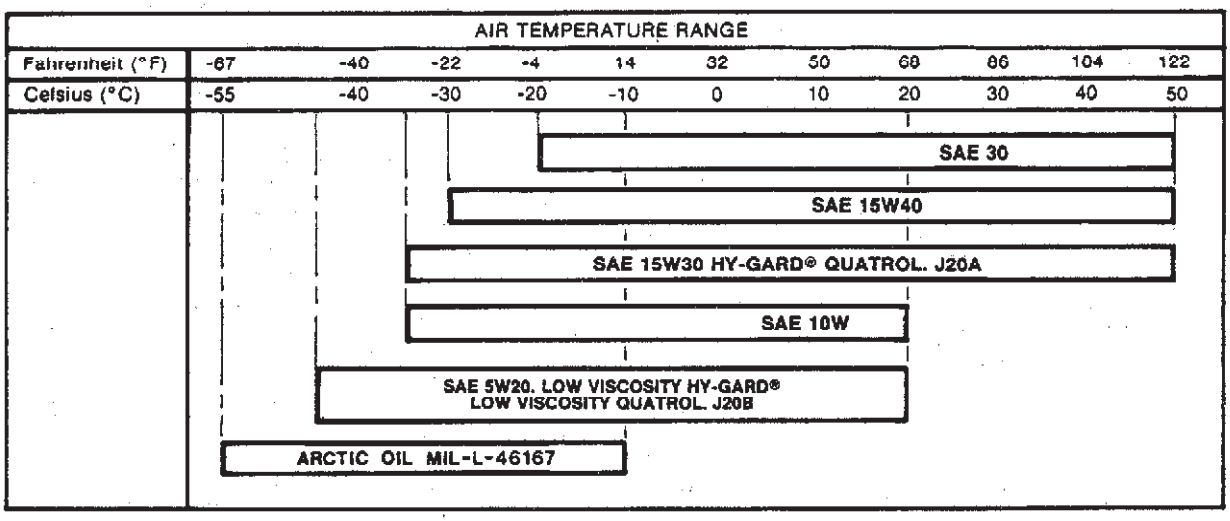
Engine oil meeting API Service CD/SC (MIL-L-2104C), CC/SC, or MIL-L-46152 and T02 oil test.

You may also use QUATROL® oils, which are oils that meet John Deere Standard J20A or J20B.

Oil meeting MIL-L-46167 may be used as an arctic oil.

88A;T5935AX T82;CRFL M 061284

FINAL DRIVE OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

The following oils are recommended:

John Deere HY-GARD® Transmission and Hydraulic Oils.

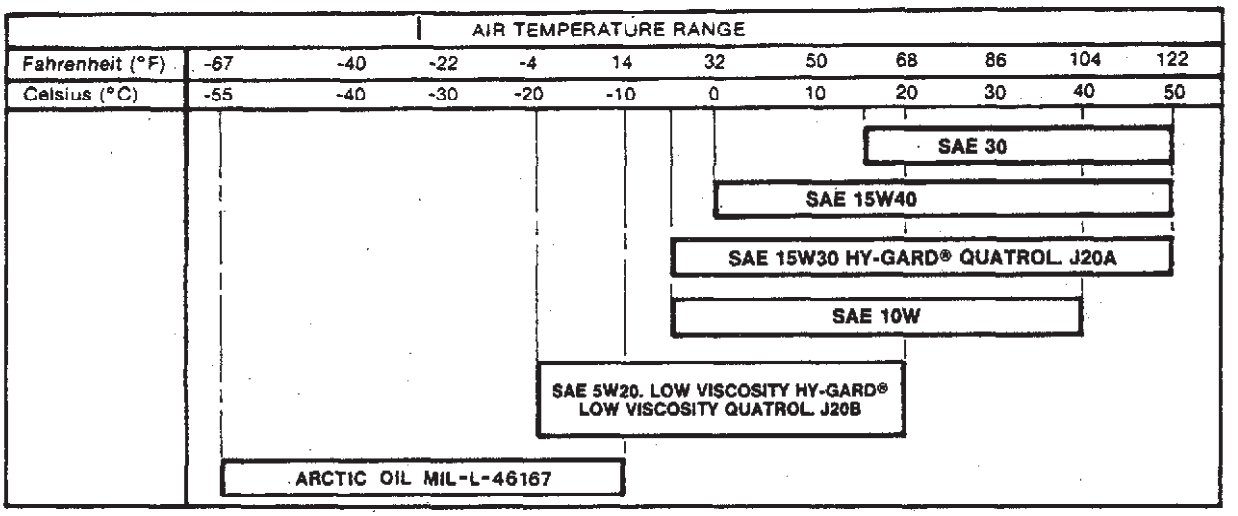
Engine oil meeting API Service CD/SC (MIL-L-2104C), CC/SC, or MIL-L-46152 and T02 oil test.

You may also use QUATROL® oils, which are oils that meet John Deere standards, or other oils meeting John Deere Standard J20A or J20B.

Oil meeting MIL-L-46167 may be used as an arctic oil.

88A;T5935AY T82;CRFL N 130984

WINCH OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

The following oils are recommended:

John Deere HY-GARD® Transmission and Hydraulic Oils.

Engine oil meeting API Service CD/SC (MIL-L-2104C), CC/SC, or MIL-L-46152 and T02 oil test.

You may also use QUATROL® oils, which are oils that meet John Deere standards, or other oils meeting John Deere Standard J20A or J20B.

Oil meeting MIL-H-5606A may be used as an arctic oil.

88A;T5935AZ T82;CRFL 0 130984

TRACK ROLLER, FRONT IDLER, AND CARRIER ROLLER OIL

Use SAE 80W90 gear oil meeting API Service GL-5 (MIL-L-2105B or MIL-L-2105C).

T82;CRFL 0 080483

T96;00IQIV 06 221087Y