990
Excavator

John Deere Dubuque Works
TM-1230 (May-87)
LITHO IN U.S.A.

990 EXCAVATOR TECHNICAL MANUAL TM-1230 (MAY-87)

SECTION AND GROUP CONTENTS

Continued on next page

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.

T28;1230 K1 020787

T33;1230 P01 070787Y

SECTION AND GROUP CONTENTS - CONTINUED

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INTRODUCTION

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

FOS Manuals - for reference

Technical Manuals - for actual 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.

30A;T85958, T28;I II01 130582

FEATURES OF THIS TECHNICAL MANUAL

- John Deere ILLUSTRUCTION format emphasizing detailed pictures and fewer words in easy-to-use modules.
- Removal and installation groups preceding some repair groups.
- A section of system diagnostic testing.
- Table of contents of all sections at the front of the manual and a listing of all groups and headings at the front of each section.
- Special tools and specifications listed at the front of each group they are used in.
- Special tools illustrated in numerical order at end of manual.
- Alphabetical listing of all major components, specifications, and special tools.
- Safety rules, general specifications, and lubrication specifications.

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.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

30A;T85959 T28;I II15 130582

SAFETY AND YOU

CAUTION: This safety symbol is used for important safety messages. When you see this symbol, follow the safety message to avoid personal injury.

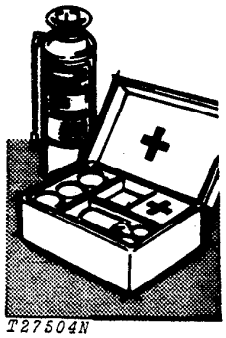
30A;T81389 T28;I H02 260881

Be prepared for an accident or fire.

Know where the first aid kit and fire extinguisher are.

Know how to use them.

Know where to get help.



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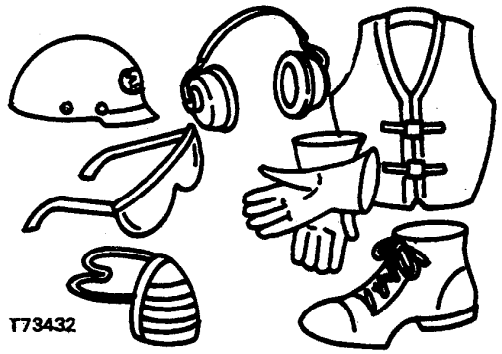
Wear safety equipment.



T73432

30A;T73432 T28;I H04 260881

Wear fairly tight clothing.

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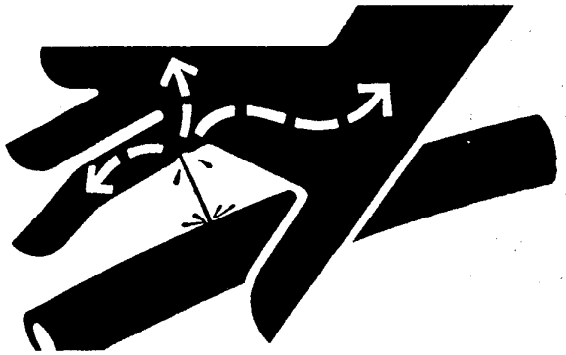
AVOID HIGH PRESSURE-FLUIDS

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. DO NOT use your hand.

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.



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KEEP SHOP AND STORAGE AREA CLEAN

Maintenance area should be well-ventilated.

Keep maintenance area clean and dry.

Store flammable materials in a cool and well-ventilated area out of reach of unauthorized personnel.

30A;T27508 N T28;I 1107 260881

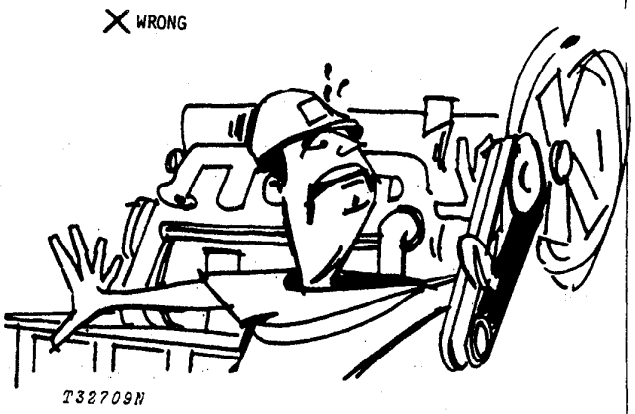
FOLLOW SAFE WORKING CONDITIONS

Do not work on the equipment unless you are approved to do so. Then be sure you know the correct procedure.

Do not work on equipment while it is being operated.

Keep hands away from moving parts.

When the engine is running, do not work on equipment unless the procedure is approved.



If you must work on the machine with the engine running, ALWAYS USE TWO service technicians. One must be at the controls. The other must be within sight of the operator.

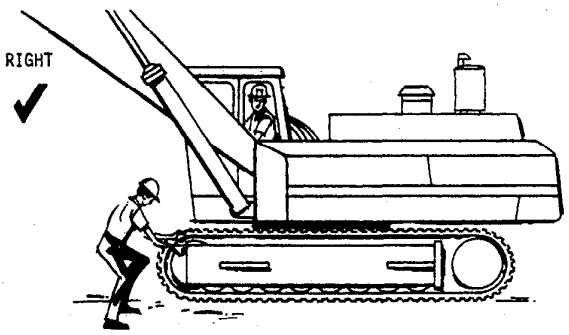
Put a support under all raised equipment.

Park the machine across a slope, or use blocks to hold it in place.

Do not lift heavy parts by yourself. Use a hoist or jack.

TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE AREA.

When you drill, grind or hammer metal, wear safety glasses.



30A;T32709 N, T82412 T28;I 1108 260881

OBSERVE SERVICE PRECAUTIONS

Keep ALL equipment free of dirt and oil.

Clean oil, grease, mud, ice or snow from the operator's station, steps and hand rails.

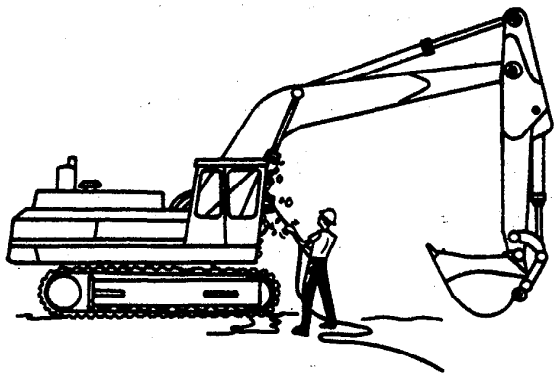
Do not remove the radiator cap unless the engine is cool. First, loosen the cap slowly to the stop. Then release all pressure in the cooling system before you remove the cap.

Check the exhaust system regularly for leaks.

Release hydraulic pressure before you work on the hydraulic system. See page I-I-06.

When you check hydraulic pressure, be sure to use the correct test gauge.

Before you work on the fuel system, close the fuel shutoff valve.



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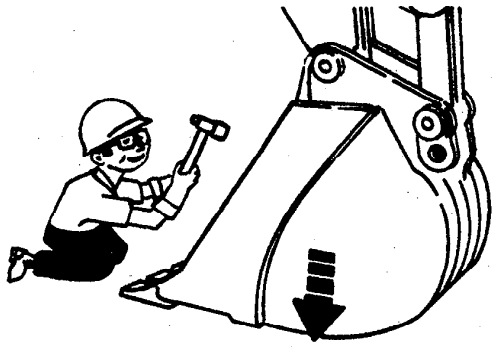
Do not work under a raised bucket. Lower the bucket to the ground, or put blocks under the bucket.



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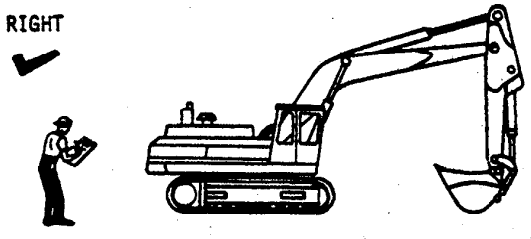
CHECK SAFETY EQUIPMENT ON MACHINE

All protective parts (shields, guards, ROPS, etc.) should be in good condition and fastened in place.

Check for leaks in all systems:
Air intake system
Engine oil system
Hydraulic system
Fuel system
Cooling system



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AVOID EXPLOSIONS OR FIRE

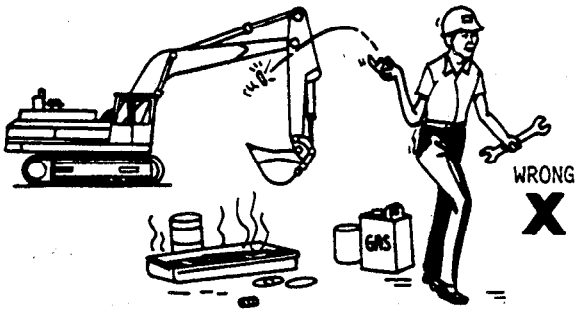
Do not smoke while you fill the fuel tank.

Do not smoke while you work with material that will start on fire easily.

Stop the engine before you fill the fuel tank.

Do not fill fuel tank if engine is hot.

Do not use gasoline or diesel fuel for cleaning parts. Use solvents that will not start on fire.



30A;T82411 T28;I 1112 260881

OBSERVE BATTERY PRECAUTIONS

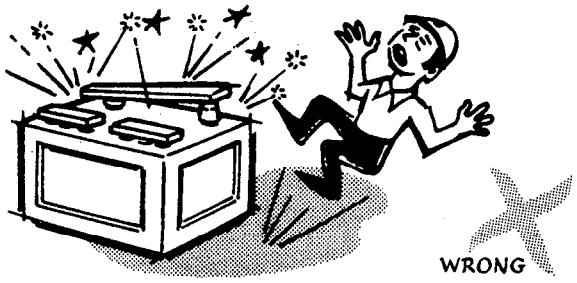
Do not put metal objects across terminals to check the battery charge.

When you charge a battery, be sure there is enough ventilation.

Keep sparks and flames away from batteries.

Do not smoke near battery.

Before you work on the electrical system, or make major repairs, turn off the battery disconnect switch.



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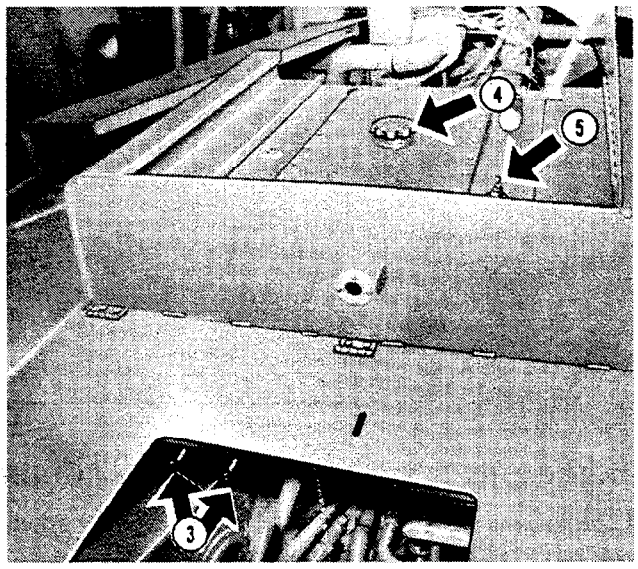
BEFORE YOU WORK ON THE HYDRAULIC SYSTEM

Follow these steps before you work on any part of the hydraulic system:

1. Park the excavator on level ground.
2. Lower hydraulic pressure:
   - •Lower bucket to ground.
   - •Stop engine.
   - •Move control levers until boom and bucket do not move.
3. Push valve levers in all the way to stop oil flow.
4. Loosen the reservoir filler cap slowly to release pressure.
5. Open the diffuser vent. Turn it counterclockwise.

IMPORTANT: After you finish:
- **•Close diffuser vent.**
- **•Pull levers out.**

CAUTION: Do not walk or stand on sloping fenders or other sheet metal to service the excavator.



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990 EXCAVATOR

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE Standards. Except where otherwise noted, these specifications are based on a unit equipped with 140-in. (3.56 m) arm, 45-in. (1143 mm) bucket, 30-in. (750 mm) track shoes, and standard equipment.)

Power (@2100 engine rpm): **SAE** **DIN**
Gross .....290 hp(216 kW)
Net .....260 hp(194 kW) 264 PS

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, alternator, and muffler. Gross engine power is without fan. Power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29.5°C) temperature, and DIN 6270 conditions (non-corrected). No derating is required up to 7,500 ft. (2286 m) altitude.

Engine: John Deere turbocharged V-8 diesel, valve-in-head, 4-stroke cycle.
Bore and stroke .....5.5 x 5.00 in. (140 x 127 mm)
Piston displacement ..... 955 cu. in. (15.652 L)
Compression ratio 15.5:1
Max. torque @ 1300 rpm .....858 lb-ft (1163 N·m) (118.6 kg-m)
Lubrication ..... Pressure system w/full-flow filter
Cooling Pressurized w/thermostat and fixed bypass
Air cleaner w/restriction indicator .....Dry
Electrical system .....24 volts w/alternator
Batteries (4) 12-volt .Reserve capacity:420 minutes each

Hydraulic System:
Three open-center pumps mounted in line are coupled directly to the flywheel. The total flow is 170 gpm (10.72 L/s) at rated engine rpm. System operating pressure is 2800 psi (19 306 kPa)(196.8 kg/cm²) for the propel circuit and 2700 psi (18 616 kPa) (190 kg/cm²) for the digging circuit.
Relief valves:
Boom (2) ...3000 psi (20 685 kPa) (210.9 kg/cm²)
Arm (2) ....3000 psi (20 685 kPa) (210.9 kg/cm²)
Bucket (2) ..3000 psi (20 685 kPa) (210.9 kg/cm²)
Oil filtration:
Two 149-micron suction screens
Two 10-micron filters in return lines
Three 40-micron high pressure filters

Cylinders: **Bore** **Stroke**
Boom (2) ... 7.50 in. (190 mm) 62.87 in. (1597 mm)
Arm ..... 7.50 in. (190 mm) 78.17 in. (1986 mm)
Bucket ..... 7.50 in. (190 mm) 40.51 in. (1029 mm)
Boom cylinder rods ....3.75 in. (95 mm dia.)
Arm and bucket cylinder rods ....4.50 in. (114 mm dia.)
All cylinders have phenolic wear rings. Boom, arm and bucket cylinders have a built-in hydraulic cushion at each end of the stroke. Full-width hydraulic oil cooler matched with engine coolant radiator.

Operating Information:
Swing speed .....5.8 rpm
Bucket tangential digging force:
39, 45, or 51-in. (990, 1143, or 1295 mm) bucket . 42,500 lb. (190 kN)(19 278 kg)
33 or 39-in. (838 or 990 mm) heavy-duty bucket . 41,000 lb. (184 kN)(18 598 kg)
45-in. (1143 mm) heavy-duty bucket ..... 42,500 lb. (190 kN)(19 278 kg)
Gradability .....90 percent
Travel .....0 to 2.1 mph (3.38 km/h)
Locked in low .....0 to 0.9 mph (1.45 km/h)

	Arm	
	140 in. (3.56 m)	**108 in. (2.74 m)**
Digging depth	27 ft. 8 in. (8.43 m)	25 ft. (7.62 m)
Reach at ground level from center of rotation	39 ft. 11 in. (12.17 m)	36 ft. 9 in. (11.2 m)
Dumping height	21 ft. 5 in. (6.53 m)	19 ft. 9 in. (6.02 m)

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Swing mechanism:
Swing ..... 360-degree, internal drive, continuous
Turntable bearing ..... Single row, ball
Case-hardened ring and pinion gears run in lubricant.

Undercarriage:
Propel motors (one for each track) . High-torque axial-piston hydraulic motors with planetary drive. Multiple-disk brakes automatically release while propelling, and apply when stationary. Independent drive to each track permits counterrotation.

Undercarriage, car body, and track frame .... Each track frame is a formed, reinforced U-channel. Track frames are joined by reinforced boxed car body with swing bearing mount.

Track Chain ..... Sealed track chain

Track Adjustment ..... Hydraulic

Cab:
Steel, with urethane sound-proofing on ceiling and side walls, and cushioned neoprene floor mat. Safety glass on all sides and top. Front and rear windows open. Front window can be stored overhead.

Seat:
Fully adjustable heavy-duty cloth, foam-rubber cushioned seat.

Controls:
Pilot-operated two-lever for boom, arm, bucket, and swing. Pilot-operated right and left pedals control forward and rearward movement of right and left tracks respectively.

Buckets: High-strength steel, ribbed and plated bottom section.

		Capacity		
Nominal Width	Bite Width	SAE	Struck	Weight
39 in. (991 mm)	42 in. (1067 mm)	1½ cu. yd.(1.15 m³)	1¼ cu. yd. (0.96 m³)	2550 lb. (1157 kg)
45 in. (1143 mm)	47 in. (1194 mm)	1⅞ cu. yd. (1.43 m³)	1½ cu. yd. (1.15 m³)	2670 lb. (1211 kg)
51 in. (1295 mm)	54 in. (1372 mm)	2⅛ cu. yd. (1.62 m³)	1¾ cu. yd. (1.34 m³)	2820 lb. (1279 kg)
Heavy-duty				
33 in. (838 mm)	37 in. (940 mm)	1½ cu. yd. (1.15 m³)	1¼ cu. yd. (0.96 m³)	3050 lb. (1383 kg)
39 in. (991 mm)	44 in. (1118 mm)	1⅞ cu. yd. (1.43 m³)	1½ cu. yd. (1.15 m³)	3575 lb. (1622 kg)
45 in. (1143 mm)	50 in. (1270 mm)	2 cu. yd. (1.53 m³)	1½ cu. yd. (1.15 m³)	3660 lb. (1660 kg)

Track Shoes: Width	Shoes	Ground Contact	Ground Pressure
30 in. (750 mm)	Triple-bar semigrousers	9723 sq. in. (62 731 cm²)	9.18 psi (63.3 kPa) (0.65 kg/cm²)
36 in. (900 mm) (optional)	Triple-bar semigrousers	11,668 sq. in. (75 278 cm²)	7.85 psi (54.1 kPa) (0.55 kg/cm²)

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Boom and Arm:
Internally reinforced tapered box construction with heat-treated steel bushings. Machined and bored after welding for accurate alignment. All pivot points are sealed to allow extended lubrication intervals.

Servicing and Vandal Protection:
Swingaway service doors expose built-in platforms for easy access to engine and hydraulic systems. Cab and access covers to fuel tank, radiator, and hydraulic lock with switch key.

Capacities:	**U.S.**	**Imp.**	**Liters**
Fuel tank	143 gal.	119.2 gal.	541.3
Cooling system	17 gal.	14.2 gal.	64.4
Engine lubrication, including filter	38 qt.	31.7 qt.	36.0
Hydraulic system	220 gal.	183.3 gal.	832.8
Planetary propel drive (each)	21 qt.	17.5 qt.	20.0
Swing drive (each)	8 qt.	6.7 qt.	7.5

Weights:	**lb.**	**kg**
Operating weight, excavator less bucket:		
30-in. (750 mm) track shoes	85,700	38 873
36-in. (900 mm) track shoes	89,700	40 688
Upper structure (without counterweight and boom)	22,600	10 251
Undercarriage:		
30-in. (750 mm) track shoes	34,270	15 549
36-in. (900 mm) track shoes	38,270	17 359
One piece mainboom (without hydraulic cylinders)	6,050	2744
Standard arm, 140 in. (3.56 m)	3,900	1769
Optional Arm, 108 in. (2.74 m)	3,600	1633
Main boom lift cylinders (2)	1,434	650
Arm cylinder	1,075	488
Bucket cylinder and bucket linkage	1,375	624
Main counterweight	15,000	6804
Auxiliary counterweight	4,500	2041

Additional Standard Equipment:
Electric hour meter
Alternator charge indicator light
Hydraulic oil filter pressure warning light
Engine overheating warning light
Gauges (internal illuminated):
- Engine coolant temperature
- Hydraulic oil temperature
- Engine oil pressure
- Fuel

Key switch
Cold weather starting aid
Horn
Positive-position hand throttle
15,000 lb. (6804 kg) counterweight
Counterweight removal system
Track guides
Cab with heater
Floor mat
Lifting hook
Tinted roof window

Special Equipment:
36-in. (900 mm) triple-bar semigrouser shoes
Bucket side cutters
Fire extinguisher
Engine water heater
Window protection group
Air conditioner
Auxiliary counterweight
Two electric cab fans
Vandal protection
108-in. (2.74 m) dipperstick

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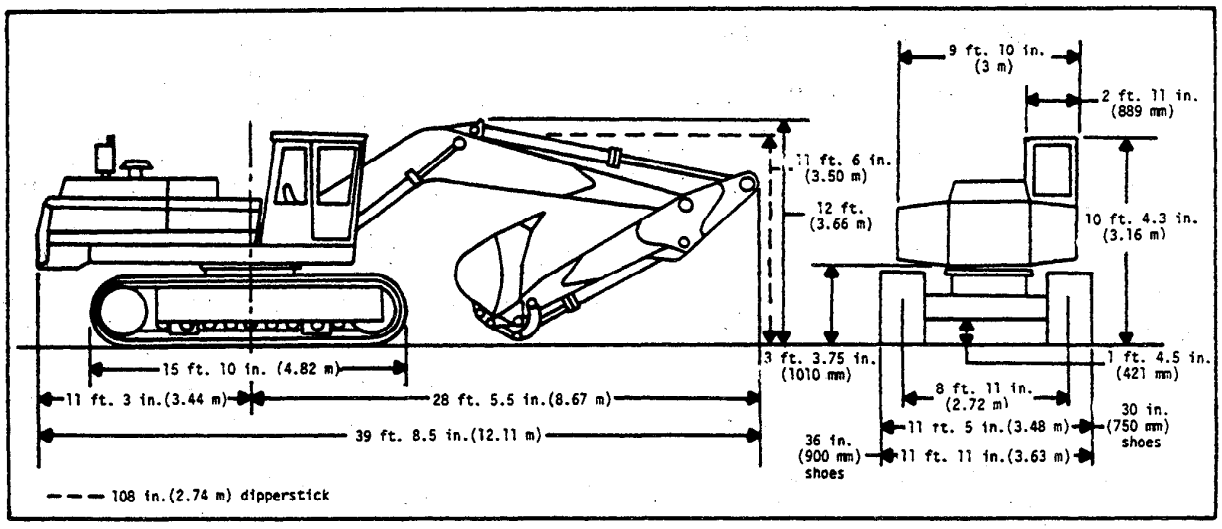
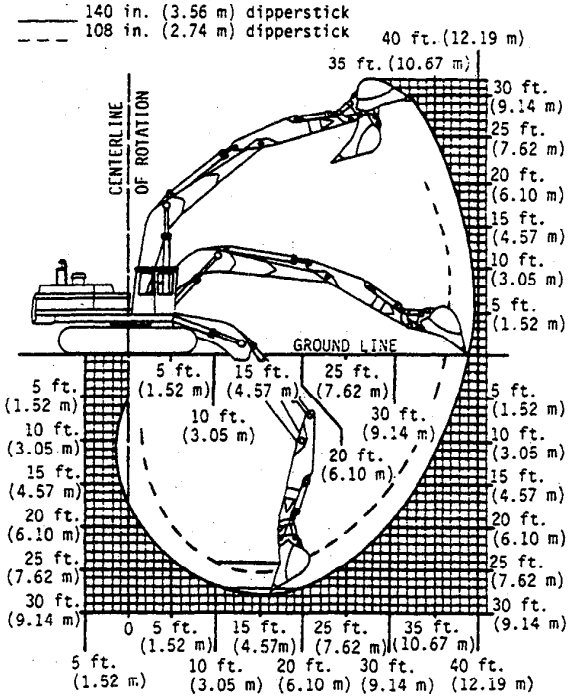


Digging Depth and Lifting Height:



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CUSTOMARY TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is ± 10%.

Cap Screw	Plain Head*		Three Dashes*		Six Dashes*	
In.	(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

All torques are dry torque unless noted.

*Dashes identify the grade of hardware.

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METRIC TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is ±10%.

Cap Screw	Property Class 8.8*		Property Class 10.9*	
Diameter	(lb-ft)	N·m	(lb-ft)	N·m
M5	(4.4)	6.0	(6.3)	8.5
M6	(7.4)	10.0	(10.7)	14.5
M8	(18.1)	24.5	(25.8)	35.0
M10	(36.1)	49.0	(51.6)	70.0
M12	(62.7)	85.0	(89.2)	121.0
M16	(154.9)	210.0	(221.2)	300.0
M20	(265.5)	360.0	(368.7)	500.0
M24	(457.2)	620.0	(634.2)	860.0
M30	(885.0)	1200.0	(1224.2)	1660.0
M36	(1541.3)	2090.0		

All torques are dry torque unless noted.

*Numbers identify the grade of hardware.

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GENERAL INFORMATION

When you service the excavator, check the periodic service chart inside the left, front fender. A copy of this chart is below. The 990 Operator's Manual has details for excavator service.

PERIODIC SERVICES

REFER TO OPERATOR'S MANUAL FOR MORE DETAILED INFORMATION

INTERVAL HOURS	ITEM NO.	COMPONENTS	SERVICE POINTS	DESCRIPTION OF SERVICE	CAPACITY OR MEASUREMENT	APPROVED SERVICE MATERIAL
△ 10 OR DAILY	1	RADIATOR	1	CHECK COOLANT LEVEL	BOTTOM OF TUBE IN NECK	ANTI-FREEZE OR SUMMER COOLANT
	2	HYDRAULIC RESERVOIR	1	CHECK OIL LEVEL	MIDDLE OF WINDOW WITH CYLINDERS HALFWAY EXTENDED	JD HO (15W) OR EQUIVALENT
	3	ENGINE CRANKCASE	1	CHECK OIL LEVEL	TOP MARK ON DIPSTICK	SEE CHART BELOW
	4	AIR CLEANER	1	CHECK RESTRICTION INDICATOR	TOP MARK ON DIPSTICK	SEE CHART BELOW JD FILTERS
	5	BUCKET CYLINDER (ROD)	1	GREASE FITTING	2 SHOTS	SAE MPG
	6	BUCKET LINKAGE	8	GREASE FITTINGS	2 SHOTS	SAE MPG
□ 50	7	BOOM TO MAIN FRAME PIN	4	GREASE FITTINGS	2 SHOTS	SAE MPG
	8	BOOM CYLINDER (HEAD)	2	GREASE FITTINGS	2 SHOTS	SAE MPG
	9	BOOM CYLINDER (ROD)	2	GREASE FITTINGS	2 SHOTS	SAE MPG
	10	CROWD CYLINDER (HEAD)	1	GREASE FITTING	2 SHOTS	SAE MPG
	11	CROWD CYLINDER (ROD)	1	GREASE FITTING	2 SHOTS	SAE MPG
	12	BUCKET CYLINDER (HEAD)	1	GREASE FITTING	2 SHOTS	SAE MPG
	13	BOOM TO DIPPERSTICK PIN	4	GREASE FITTINGS	2 SHOTS	SAE MPG
⌓ 100	14	TRACKS***	2	CHECK SAG	3 IN. 5 IN. (76 mm 127 mm)	
	15	ENGINE BELTS*****	2	CHECK TENSION	90 LB. (400 N) BELT TENSION	
	16	HYDRAULIC RESERVOIR	1	CLEAN BREATHER VALVE		KEROSENE OR SOLVENT
	17	HOUSE BRAKES	1	CHECK OIL LEVEL	BOTTOM OF CHECK HOLE	JD HO (15W) OR EQUIVALENT
	18	SWING GEARBOXES	2	CHECK OIL LEVEL	BOTTOM OF CHECK HOLE	JD GEAR GARD OR EQUIVALENT*
▱ 200	19	ENGINE CRANKCASE******	1	DRAIN AND REFILL	40 QT. (38L)	SEE CHART BELOW
	20	CRANKCASE OIL FILTERS****	3	REPLACE ELEMENTS		JD FILTERS
	21	SWING GEARBOX AND BEARING QUILLS	2	GREASE FITTINGS	2 SHOTS	SAE MPG
	22	TRACK GEARBOXES	2	CHECK OIL LEVEL	BOTTOM OF CHECK HOLE	JD GEAR GARD OR EQUIVALENT*
	23	HYDRAULIC OIL RETURN FILTERS****	4	REPLACE ELEMENT		JD FILTERS
	24	HYDRAULIC OIL HIGH PRESSURE FILTERS****	3	REPLACE ELEMENT		JD FILTERS
	25	HYDRAULIC OIL PILOT CONTROL FILTER	1	REPLACE ELEMENT		JD FILTER
	26	ENGINE COOLANT FILTER********	1	REPLACE CONDITIONER/FILTER		JD CONDITIONER/FILTER
	27	FUEL TANK SUMP	1	DRAIN WATER AND SEDIMENT		
□ 500	28	AIR CLEANER HOSE	1	CHECK HOSE AND CONNECTIONS		
	29	COOLING SYSTEM (SPRING & FALL)********	1	DRAIN, FLUSH AND REFILL WITH ANTI-FREEZE OR WATER, REPLACE CONDITIONER/COOLANT FILTER		JD CONDITIONER/FILTER
	30	FUEL FILTERS	2	REPLACE ELEMENTS		JD FILTERS
	31	SWING BEARING	4	GREASE FITTINGS ROTATE 45°, GREASE AGAIN, REPEAT FOR 360°	4 SHOTS EACH	SHELL "ALVANIA EP 2" OR EQUIVALENT
	32	SWINGING GEAR**	1	ADD 1 LB (0.5 kg)	20 LB. (9 kg)	TEXACO TEXCLAD 2 OR EQUIVALENT
	33	SWING GEARBOXES	2	DRAIN AND REFILL	6 QT. (7.6 L)	JD GEAR GARD OR EQUIVALENT*
	34	TRACK ACCUMULATORS	2	CHECK PRESSURE	SEE CHART BELOW	DRY NITROGEN
⬡ 1000	35	AIR CLEANER	1	REPLACE ELEMENTS		JD FILTERS
	36	TRACK GEARBOXES	4	DRAIN AND REFILL	31 QT (30 L)	JD GEAR GARD OR EQUIVALENT*
	37	HYDRAULIC RESERVOIR	1	DRAIN, FLUSH, CLEAN SUCTION SCREENS AND REFILL	85 GAL (346 L) RESERVOIR (230 GAL (830 L) TOTAL)	JD HO (15W) OR EQUIVALENT
	38	ENGINE CRANKCASE VENT TUBE	1	REMOVE AND CLEAN		
	39	ENGINE VALVE LASH*	16	CHECK AND ADJUST SEE JD DEALER		
	40	ENGINE SPEED	1	CHECK AND ADJUST SEE JD DEALER		
	41	CABLE PULLEY	2	GREASE FITTINGS	2 SHOTS	SAE MPG
	42	BATTERIES	4	ADD WATER AND CHECK TERMINALS		DISTILLED WATER
	43	CAB AIR FILTERS	2	CLEAN OR REPLACE ELEMENTS		JD FILTERS

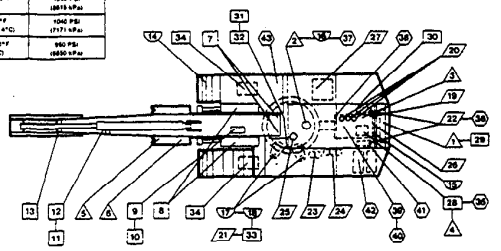
* SAE 80W EP GLS M-1-L-2105C
** DRAIN WATER FROM GREASE SUMP WHEN IN WATER ABOVE TRACKS
*** MEASURE BETWEEN CENTER ROLLER AND CHAIN
**** CHANGE FILTERS AFTER FIRST 50 HOURS AND 50 HOURS AFTER EACH MINOR HYDRAULIC SYSTEM REPAIR
***** CHANGE OIL AND FILTERS AFTER FIRST 100 ENGINE HOURS
****** SEE OPERATORS MANUAL FOR ADJUSTING BELT TENSION.
******* CHANGE FILTER AFTER FIRST 100 HOURS OF COOLANT CHANGE

TRACK ACCUMULATOR

AIR TEMP	DRY NITROGEN PRESSURE
ABOVE 40°F (4°C)	1250 PSI (8615 kPa)
0° TO 40°F (-18°C TO 4°C)	1040 PSI (7171 kPa)
BELOW 0°F (-18°C)	950 PSI (6550 kPa)

ENGINE OIL

AIR TEMP	JOHN DEERE TORQ GARD SUPREME OIL	SINGLE VISCOSITY OIL API SERVICE CD/SC	MULTI VISCOSITY OIL API SERVICE CC/SE
ABOVE 32°F (0°C)	SAE 30	SAE 30	NOT RECOMMENDED
32°F TO 10°F (0°C TO -23.3°C)	SAE 10W 30	SAE 10W	SAE 10W 30 SAE 10W 30
BELOW 10°F (-23.3°C)	SAE 5W 30	SAE 5W	SAE 5W 30



30A:T82413 T28;I IV19 280881

Engine Oils

Use John Deere TORQ-GARD SUPREME engine oil in the engine crankcase.

Use John Deere TORQ-GARD SUPREME SAE 10W-20 oil or equivalent during the first 100 hours of operation for break-in.

Oils other than John Deere TORQ-GARD SUPREME must have one of the following specifications:

Single Viscosity Oils	**Multi-Viscosity Oils**
API Service CD/SC	API Service CC/SE
MIL-L-2104C	MIL-L-46152
Series 3	

Oils and Air Temperature

SAE ENGINE OILS			
Air Temperature	John Deere TORQ-GARD SUPREME Oil	Other Oils	
		Single Viscosity Oil	Multi-Viscosity Oil
Above 32°F (0°C)	30	30	Not recommended.
32° to -10°F (0° to -23°C)	10W-30	10W	10W-30
Below -10°F (-23°C)	5W-20	5W	5W-20

If you use SAE 5W-20 or SAE 5W oil, your engine may use more oil. Check the oil level often.

Storing and Handling Lubricants

Store lubricants in clean containers in an area protected from dust, moisture, and other contamination.

When you handle lubricants, use clean containers.

Hydraulic Oils

If you operate excavator at air temperatures above −13°F (25°C), use John Deere Hydauic Oil (J14C) or equivalent.

For air temperatures between −31°F (−35°C) and 77°F (25°C), use SAE 5W-20 engine oil, CC/SE, MIL-L-46152.

NOTE: See your John Deere dealer for special arctic lubricants.

Track Rollers and Idlers, Swing and Track Gearboxes

Use a multi-purpose GL-5 gear oil, SAE 80W-90, MIL-L-2105C.

Greases

Use John Deere Multi-Purpose Grease or an equivalent for all grease fittings except where noted.

Swing Bearing

Use Shell Alvania EP-2 or one of the following or an equivalent:

- Sunoco 742 EP grease
- Esso Unirex EP2 grease
- American Amolith 2EP grease
- Conoco Super Stay Conolith EP2 grease
- Gulf Crown EP2 grease
- Mobil Mobilux EP2 grease
- Phillips Philube EP2 grease
- Texaco Multifax EP2 grease
- Standard Dura-Lith EP2 grease

Swinging Gear

Use Texaco Texclad 2 or equivalent.

Section 01
TRACKS

CONTENTS

T28;0100 01 291182

SPECIAL TOOLS

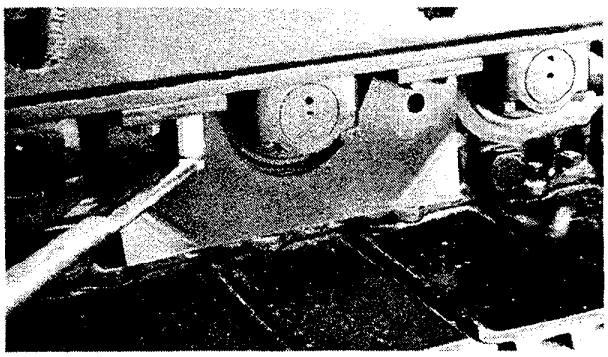
NOTE: Order tools from your SERVICE-GARD™ Catalog, unless otherwise indicated.

Number	Name	Use
D-01031AA	200-Ton Track Press	Disassemble and assemble track chain.
D-01043AA	Load Positioning Sling	Used With Master Pin Pusher to remove master pin.
D-01047AA	17½ and 30-Ton Puller Set	Remove and install bushings, seals and roller end brackets.
D-01063AA	100-Ton Master Pin Pusher	Remove and install master pin.
D-01065AA	Tooling Set for 200-Ton Track Press	Disassemble and assemble track chain.
D-01087AA	Master Accessory Kit for Hydraulic Analyzer	Fittings for adjusting track adjuster relief valve.
D-01168AA	Spring Compression Tester	Test track adjuster relief valve spring.
D-01182AA	20-Ton Floor Stands	Supports the unit.
D-05227ST	Undercarriage Inspection Service Tool	Measure wear on undercarriage components.
D-15028NU	Universal Pressure Test Kit	Test oil leakage of roller and idler.
D-15041NU	Nitrogen Accumulator Charging Kit	To charge accumulator.
JD-342	Idler Bushing Plate	Remove and install bushings in rollers and idlers.
JD-345	Zerk Adapter	To adjust track adjuster relief valve.
JDG-69	Nitrogen Accumulator Holding Tool	Remove and install accumulator.
JDG-127	O-Ring Seal Tool Set	To remove O-rings.
JDG-206	Seal Installation Tool	To install metal face seals.

T28;0130 86 090382

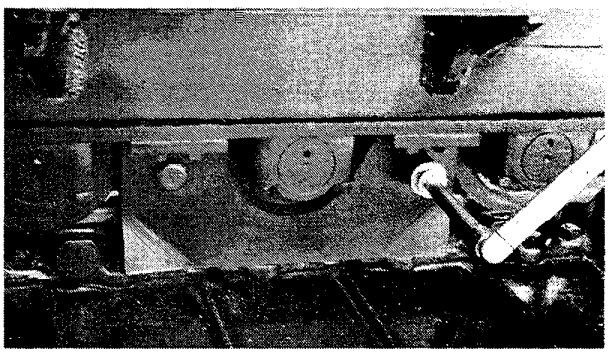
GUIDE SPECIFICATIONS

Cap screws torque .....(407 N·m) 300 lb-ft



31A;T82824 T28;0130 206 121083

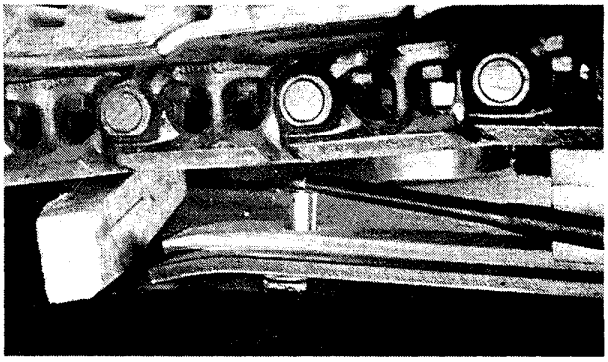
2. Cap screws torque .....(908 N·m) 670 lb-ft



31A;T82825 T28;0130 207 121081

GUIDE AND SLIDE SPECIFICATION

Cap screws torque .....(325 N·m) 240 lb-ft

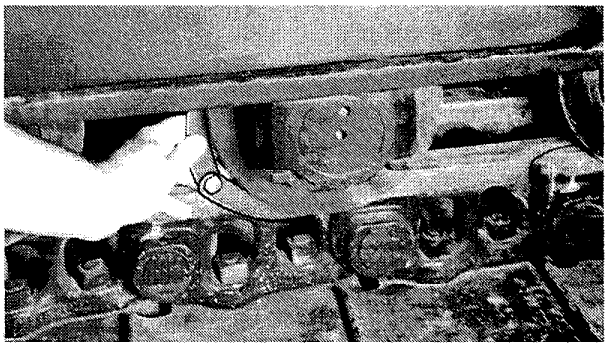


31A;T82829 T28;0130 208 121081

ROLLER SPECIFICATIONS

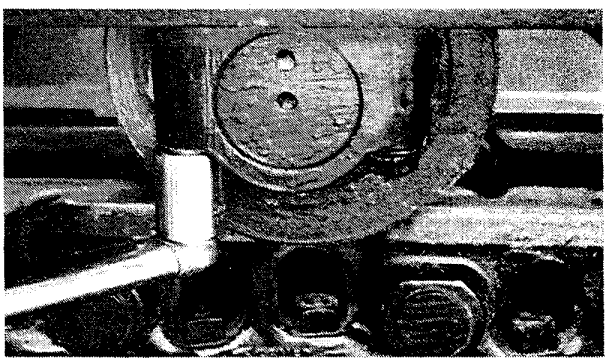
1. Outside contact surface of new roller .....185 mm (7.28 in.)

Minimum roller outside surface .....175 mm (6.88 in.)



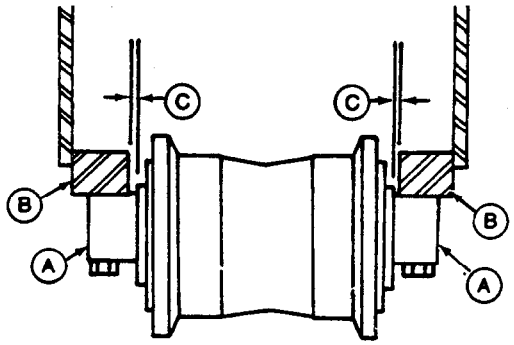
31A;T87973 T28;0130 209 171182

2. Cap screws torque .....(576 N·m) 425 lb-ft



31A;T82858 T28;0130 210 121081

3. Gap between roller bracket and inside of track frame ..... (0.25 mm) 0.010 in.

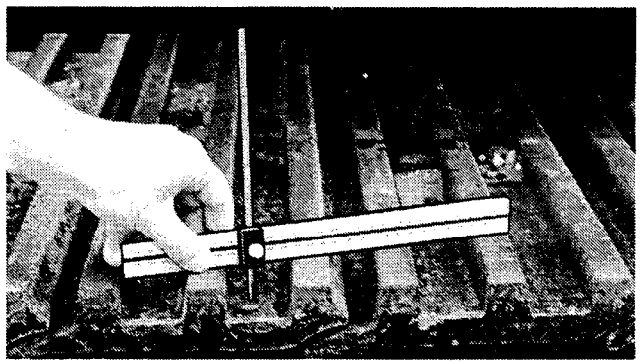


31A;T82513 T28;0130 211 121081

TRACK SHOE SPECIFICATIONS

1. Grouser bar height of new shoe ..... (26.5 mm) 1.04 in.

Minimum grouser bar height ..... (12.5 mm) 0.49 in.



31A;T87971 T28;0130 212 171182

2. Track shoe cap screws torque (lubricated) ..... (300 ± 30 N·m) 220 ± 22 lb-ft plus an additional 1/3 turn.

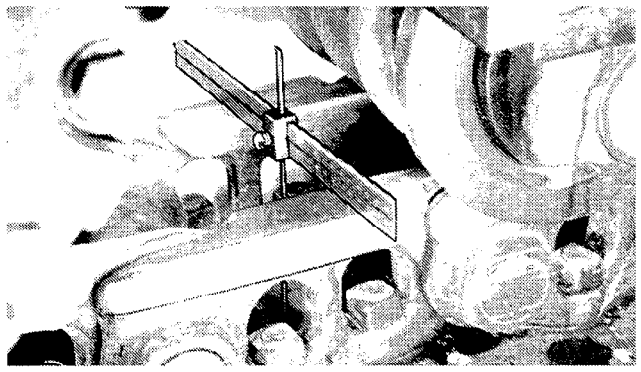
After 75 hours of operation .....(569 N·m) 420 lb-ft minimum

31A;T83549 T28;0130 213 121081

TRACK CHAIN SPECIFICATIONS

1. Track link height of new chain ..... (125.5 mm) 4.94 in.

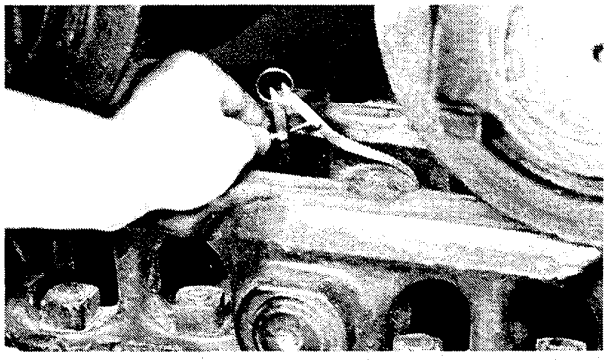
Minimum link height ..... (114.3 mm) 4.50 in.



31A;T87970 T28;0130 214 171182

2. Track bushing outer surface
(new bushing) ..... (71.4 mm) 2.81 in.

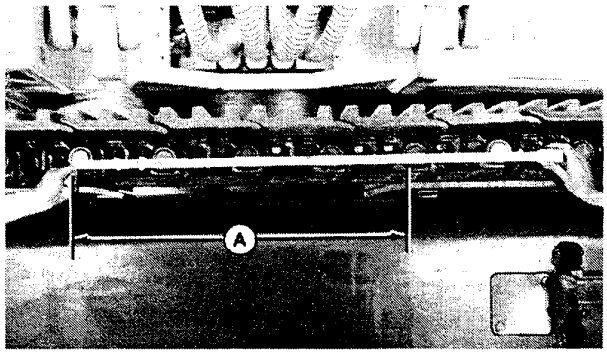
Minimum bushing outer surface before
turning bushings ..... (68.3 mm) 2.69 in.



31A;T82865 T28;0130 215 121081

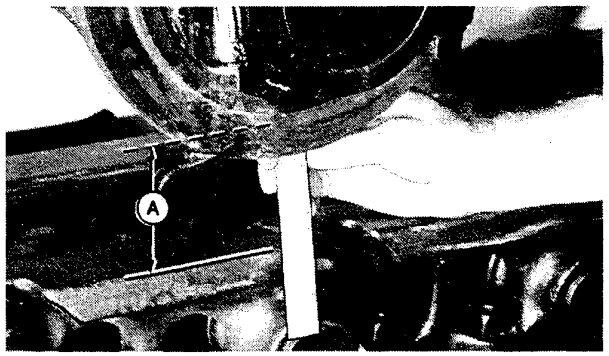
3. Track pitch of new chain (A) ..... (864.8 mm)
34.05 in.

Maximum track pitch before turning
pins and bushings ..... (877.5 mm)
34.55 in.



31A;T82866 T28;0130 216 121081

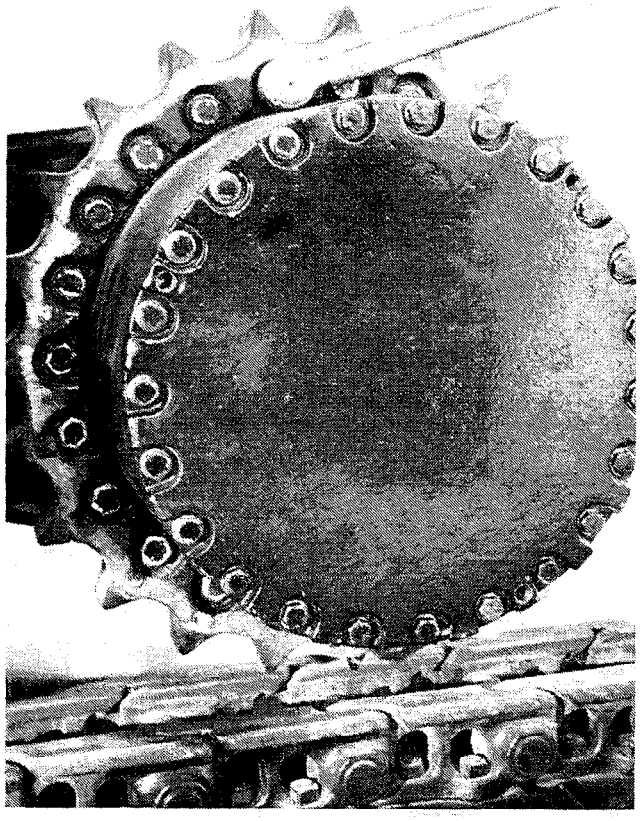
4. Track tension sag (A) .....(76 to 127 mm)
3.00 to 5.00 in.



31A;T82919 T28;0130 217 121081

SPROCKET SPECIFICATION

Cap screws torque ..... (929 ± 93 N·m)
685 ± 68 lb-ft

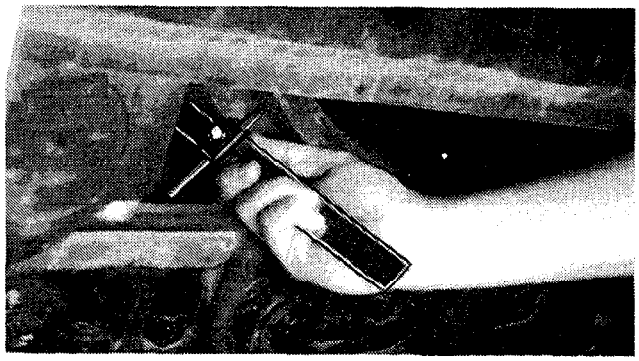


31A;T82561 T28;0130 218 121081

IDLER SPECIFICATION

Flange height of new idler ..... (23.0 mm)
0.91 in.

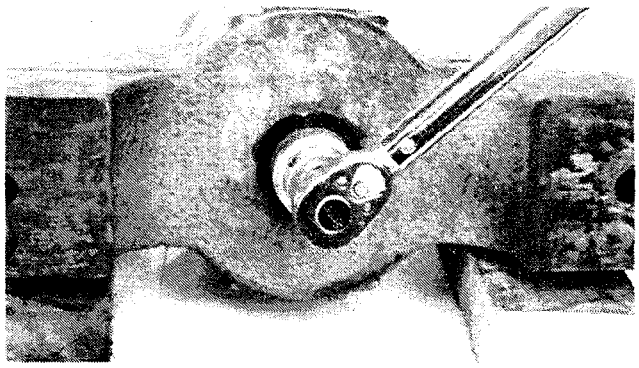
Maximum flange height ..... (32.8 mm)
1.29 in.



31A;T87972 T28;0130 219 171182

TRACK ADJUSTER SPECIFICATIONS

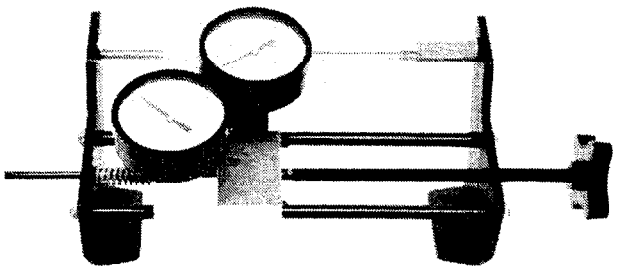
1. Plug torque ..... (81 ± 8 N·m)
60 ± 6 lb-ft



31A;T82955 T28;0130 220 090382

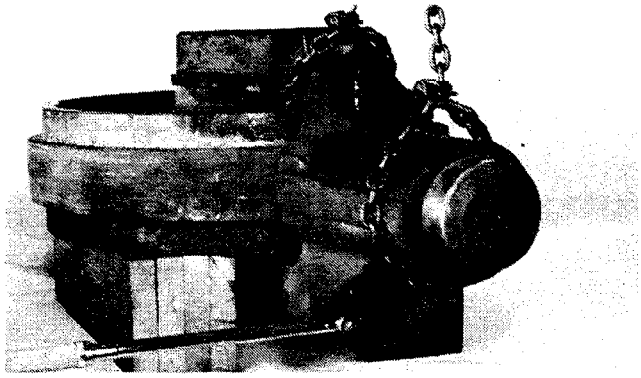
2. Track adjuster relief valve spring
free length ..... (46.33 ± 0.25 mm)
1.824 ± 0.010 in.

Test length at (387 ± 20 N ..... 38.56 mm)
87 ± 4.4 lb. force ..... 1.518 in.



31A;T83550 T28;0130 221 131081

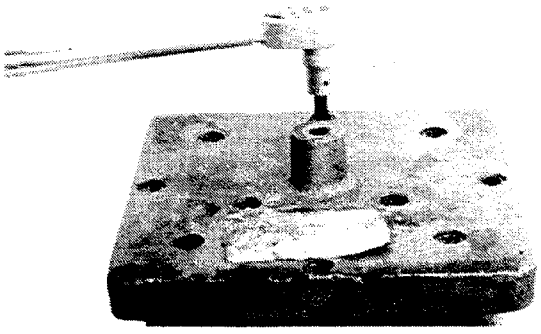
3. Cap screws torque .....(407 N·m)
300 lb-ft



31A;T83551 T28;0130 222 131081

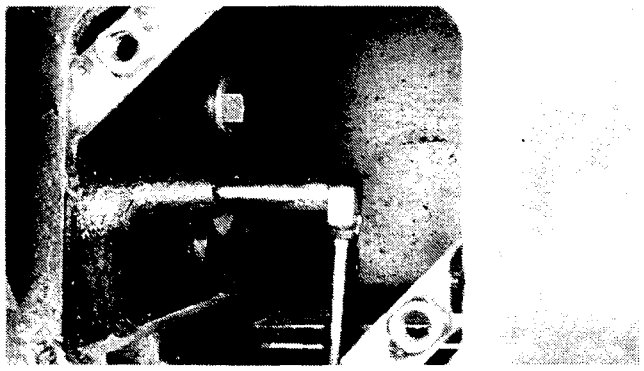
ACCUMULATOR SPECIFICATIONS

1. Socket head cap screws torque ..... (88 ± 7 N·m)
65 ± 5 lb-ft



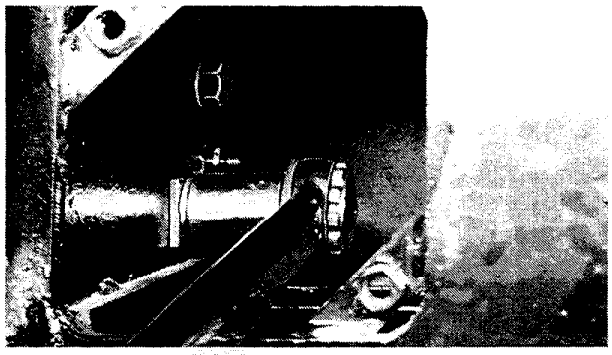
31A;T82994 T28;0130 223 131081

2. Valve torque .....(68 N·m) 50 lb-ft



31A;T82995 T28;0130 224 131081

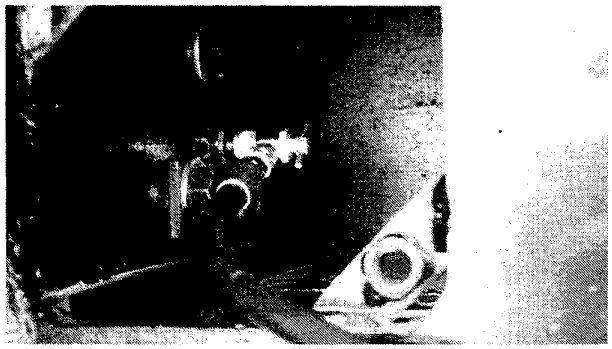
3. Cap screws torque .....(407 N·m) 300 lb-ft



31A;T83007 T28;0130 225 191081

CAUTION: When charging accumulator, use extreme handling care and proper equipment. Follow the steps for charging accumulator used in this group.

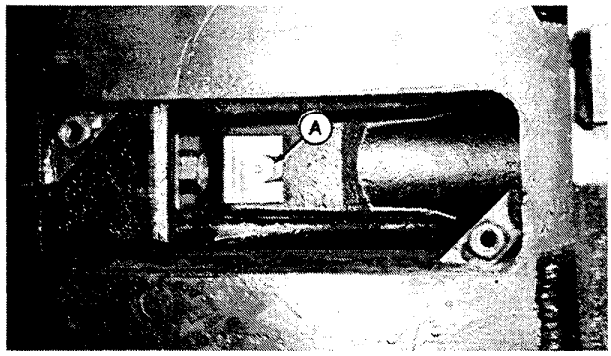
4. The accumulator is charged with dry nitrogen gas to (8618 ± 172 kPa) (86 ± 1.7 bar) 1250 ± 25 psi at (20°C) 68°F.



31A;T83008 T28;0130 226 090382

CAUTION: Grease in track adjuster is under extreme pressure.

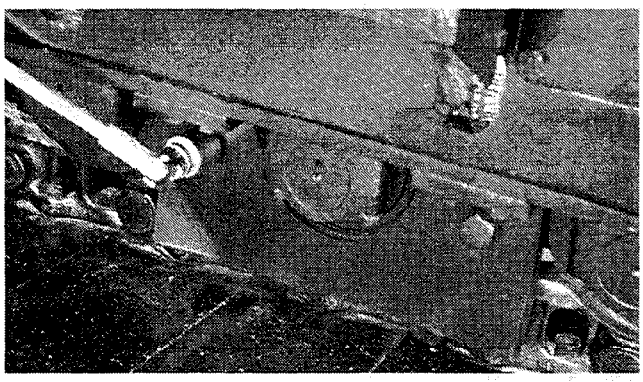
6. To loosen track chain, turn ball check valve (A) one to three turns counterclockwise. DO NOT turn grease fitting to release track tension. Tighten valve when tension is adjusted properly.



31A;T82685 T28;0130 227 220981

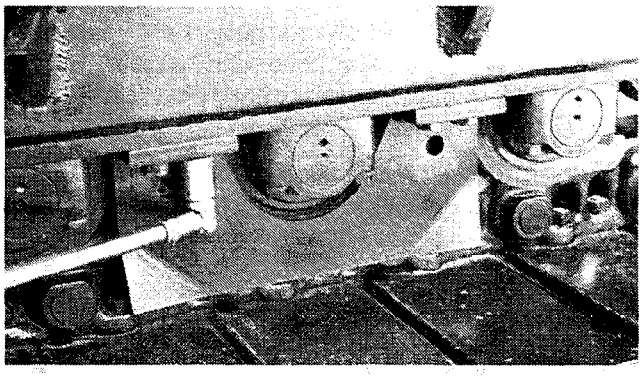
REMOVE AND INSTALL TRACK GUIDES

1. Lower bucket to the ground.
2. Stop the engine.
3. Remove four cap screws, two on each side of track frame.



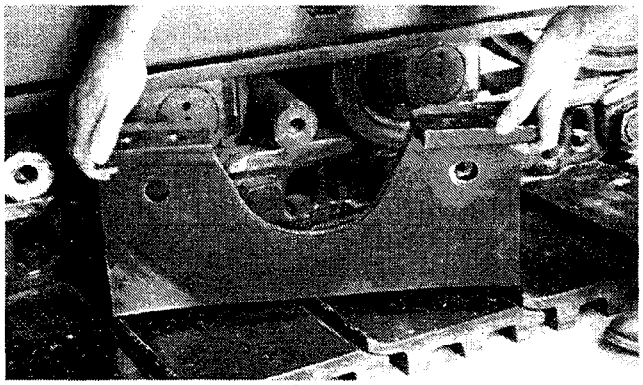
31A;T82818 T28;0130 69 180981

4. Remove eight cap screws, four on each side of track frame.



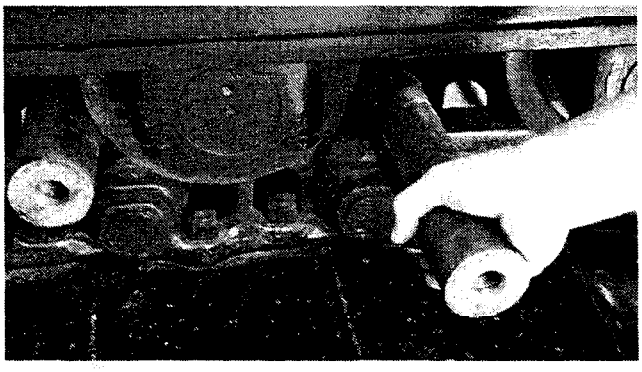
31A;T82821 T28;0130 70 180981

5. Remove inner and outer guides.



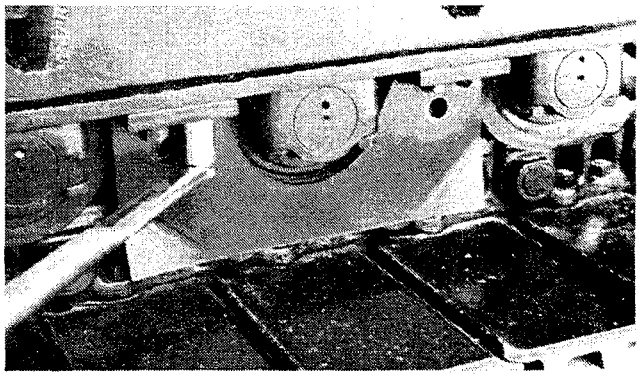
31A;T82822 T28;0130 71 180981

6. Remove two spacers.
7. Inspect parts for wear or damage; replace if necessary.



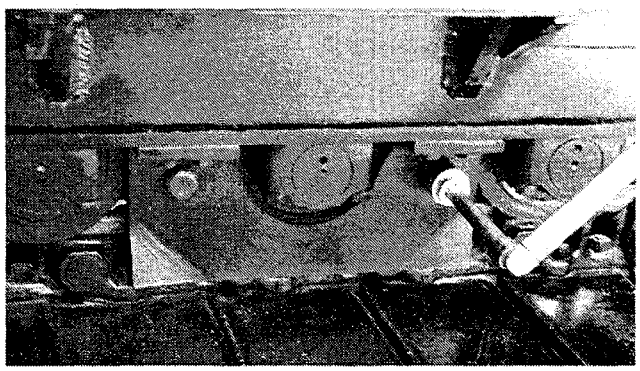
31A;T82823 T28;013 72 180981

8. Install spacers, guides, cap screws, and lock washers. Tighten eight cap screws to (407 N·m) 300 lb-ft.



31A;T82824 T31;0130 73 180981

9. Install and tighten four cap screws and lock washers to (908 N·m) 670 lb-ft.



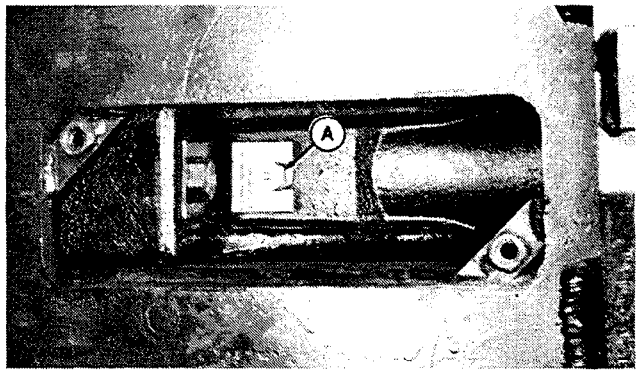
31A;T82825 T28;0130 74 180981

REMOVE AND INSTALL TRACK GUIDES AND SLIDES

1. Turn upper structure to obtain maximum clearance over the guide and slide to be removed.
2. Lower bucket to the ground.
3. Stop the engine.

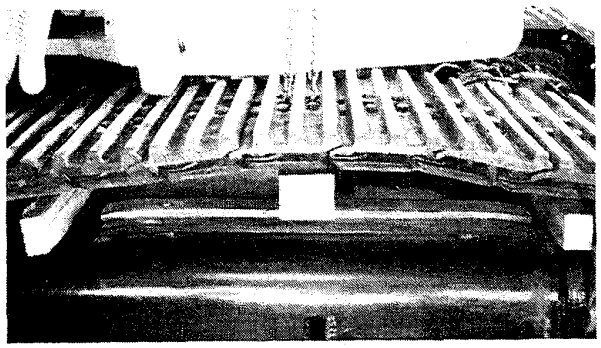
CAUTION: Grease in track adjuster is under extreme pressure.

4. Turn ball check valve assembly (A) one to three turns counterclockwise to release track tension. DO NOT turn grease fitting to release track tension.



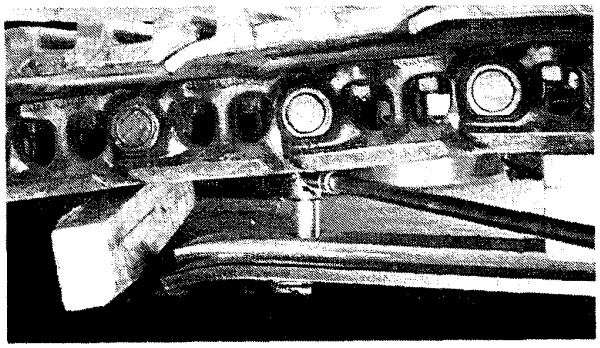
31A;T82685 T28;0130 75 180981

5. Lift track with chain and hoist.
6. Put blocks under track chain.



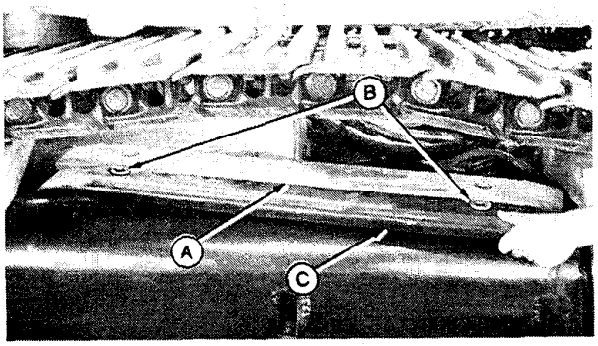
31A;T82826 T28;0130 76 180981

7. Remove two cap screws.



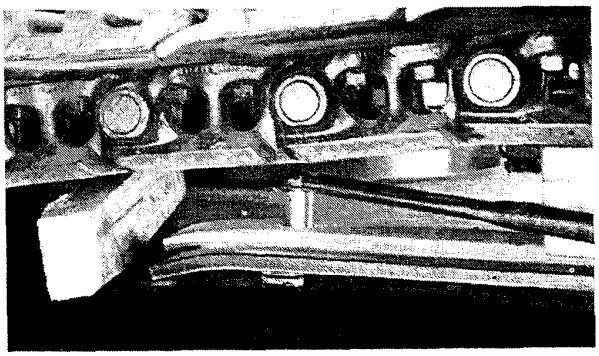
31A;T82827 T31;0130 77 180981

8. Remove middle block
9. Remove guide (A), two washers (B), and slide (C).
10. Inspect guide and slide for wear or damage; replace if necessary. Slide must be replaced when track chain bushings start to touch guide.



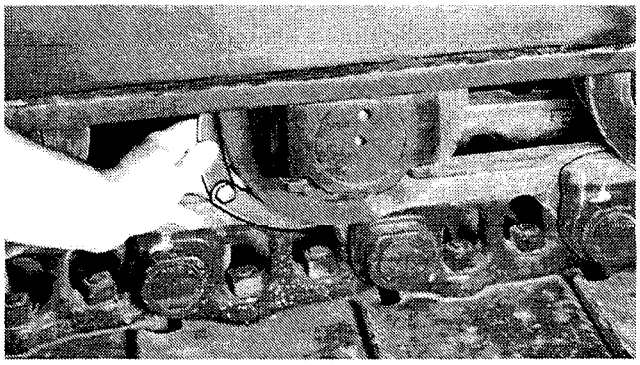
31A;T82828 T28;0130 78 180981

11. Install slide, washers, and guides.
12. Install cap screws and lock washers. Tighten cap screws to (325 N·m) 240 lb-ft.
13. Remove blocks.
14. Adjust track tension.



31A;T82829 T28;0130 79 180981

MEASURE ROLLER WEAR



1. Use D-05229ST (3048 mm) 12 in. Spring Caliper from D-052275T Undercarriage Inspection Service Tool Kit to measure track roller tread diameter.

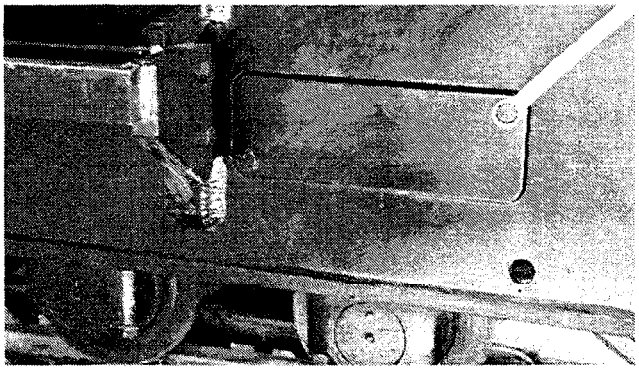
2. Put the caliper around each roller on the tread surface and record each measurement. Roller tread diameter of a new roller is 185 mm (7.28 in.). Minimum recommended roller diameter is 175 mm (6.88 in.).

3. Under some conditions, roller wear is uneven. If this condition exists, the rollers may be exchanged with other rollers providing the sequence of single and double flanges are not changed.

NOTE: For additional information on measuring track roller tread diameter, see the UNDERCARRIAGE APPRAISAL MANUAL SP-236.

31A;T67973 T28;0130 80 171182

REMOVE TRACK ROLLERS



1. Lower bucket to the ground.

2. Stop the engine.

3. Remove two cap screws to remove track adjuster cover on side of unit from which rollers are to be removed.

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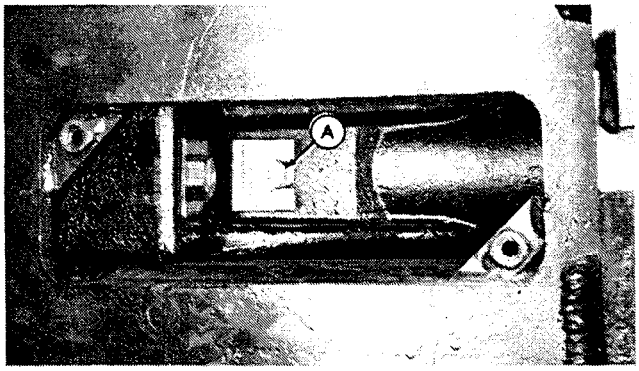
CAUTION: Grease in track adjuster is under extreme pressure.



4. Turn ball check valve assembly (A) one to three turns counterclockwise to release track tension. DO NOT turn grease fitting to release track tension.

31A;T82685 T28;0130 82 180981