CASE CONSTRUCTION

SERVICE MANUAL

WHEEL LOADER

521E TIER 3

84243970
(Replaces 87728450)

Revised June 2009
Issued February 2008

Please cut where indicated and place the label on the spine of the binder

WHEEL LOADER SERVICE

521E Tier 3

84243970
(Replaces 87728450)

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521E Wheel Loader
Service Manual
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CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

84243971

(Replaces 5-10820)

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NOTE: *CNH America LLC reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.*

CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

84243971

(Replaces 5-10820)

Issued February, 2008 Revised December 2009

SECTION INDEX

GENERAL

CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

Bur 5-10830

Issued February, 2008

Section 1001

GENERAL TORQUE SPECIFICATIONS

CASE, LLC.
700 State Street
Racine, WI 53404 U.S.A.

Bur 8-71603

Issued April, 2003 Revised April, 2004

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827

NOTE: *Use thick nuts with Grade 8 bolts.*

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used.

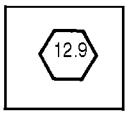
Grade 8.8 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
M4	24 to 36	3 to 4
M5	60 to 72	7 to 8
M6	96 to 108	11 to 12
M8	228 to 276	26 to 31
M10	456 to 540	52 to 61
Size	Pound-Feet	Newton metres
M12	66 to 79	90 to 107
M14	106 to 127	144 to 172
M16	160 to 200	217 to 271
M20	320 to 380	434 to 515
M24	500 to 600	675 to 815
M30	920 to 1100	1250 to 1500
M36	1600 to 1950	2175 to 2600

Grade 10.9 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
M4	36 to 48	4 to 5
M5	84 to 96	9 to 11
M6	132 to 156	15 to 18
M8	324 to 384	37 to 43
Size	Pound-Feet	Newton metres
M10	54 to 64	73 to 87
M12	93 to 112	125 to 150
M14	149 to 179	200 to 245
M16	230 to 280	310 to 380
M20	450 to 540	610 to 730
M24	780 to 940	1050 to 1275
M30	1470 to 1770	2000 to 2400
M36	2580 to 3090	3500 to 4200

Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
37 Degree Flare Fitting			
1/4 inch 6.4 mm	7/16-20	72 to 144	8 to 16
5/16 inch 7.9 mm	1/2-20	96 to 192	11 to 22
3/8 inch 9.5 mm	9/16-18	120 to 300	14 to 34
1/2 inch 12.7 mm	3/4-16	180 to 504	20 to 57
5/8 inch 15.9 mm	7/8-14	300 to 696	34 to 79
Tube OD Hose ID	Thread Size	Pound-Feet	Newton metres
3/4 inch 19.0 mm	1-1/16-12	40 to 80	54 to 108
7/8 inch 22.2 mm	1-3/16-12	60 to 100	81 to 135
1.0 inch 25.4 mm	1-5/16-12	75 to 117	102 to 158
1-1/4 inch 31.8 mm	1-5/8-12	125 to 165	169 to 223
1-1/2 inch 38.1 mm	1-7/8-12	210 to 250	285 to 338

Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
Straight Threads with O-ring			
1/4 inch 6.4 mm	7/16-20	144 to 228	16 to 26
5/16 inch 7.9 mm	1/2-20	192 to 300	22 to 34
3/8 inch 9.5 mm	9/16-18	300 to 480	34 to 54
1/2 inch 12.7 mm	3/4-16	540 to 804	57 to 91
Tube OD Hose ID	Thread Size	Pound-Feet	Newton metres
5/8 inch 15.9 mm	7/8-14	58 to 92	79 to 124
3/4 inch 19.0 mm	1-1/16-12	80 to 128	108 to 174
7/8 inch 22.2 mm	1-3/16-12	100 to 160	136 to 216
1.0 inch 25.4 mm	1-5/16-12	117 to 187	159 to 253
1-1/4 inch 31.8 mm	1-5/8-12	165 to 264	224 to 357
1-1/2 inch 38.1 mm	1-7/8-12	250 to 400	339 to 542

Split Flange Mounting Bolts		
Size	Pound-Inches	Newton metres
5/16-18	180 to 240	20 to 27
3/8-16	240 to 300	27 to 34
7/16-14	420 to 540	47 to 61
Size	Pound-Feet	Newton metres
1/2-13	55 to 65	74 to 88
5/8-11	140 to 150	190 to 203

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Inches	Newton metres	Thread Size	Pound-Inches	Newton metres
O-ring Face Seal End					**O-ring Boss End Fitting or Lock Nut**		
-4	1/4 inch 6.4 mm	9/16-18	120 to 144	14 to 16	7/16-20	204 to 240	23 to 27
-6	3/8 inch 9.5 mm	11/16-16	216 to 240	24 to 27	9/16-18	300 to 360	34 to 41
-8	1/2 inch 12.7 mm	13/16-16	384 to 480	43 to 54	3/4-16	540 to 600	61 to 68
					Thread Size	Pound-Feet	Newton metres
-10	5/8 inch 15.9 mm	1-14	552 to 672	62 to 76	7/8-14	60 to 65	81 to 88
Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Feet	Newton metres	1-1/16-12	85 to 90	115 to 122
					1-3/16-12	95 to 100	129 to 136
-12	3/4 inch 19.0 mm	1-3/16-12	65 to 80	90 to 110	1-5/16-12	115 to 125	156 to 169
-14	7/8 inch 22.2 mm	1-3/16-12	65 to 80	90 to 110	1-5/8-12	150 to 160	203 to 217
-16	1.0 inch 25.4 mm	1-7/16-12	92 to 105	125 to 140	1-7/8-12	190 to 200	258 to 271
-20	1-1/4 inch 31.8 mm	1-11/16-12	125 to 140	170 to 190			
-24	1-1/2 inch 38.1 mm	2-12	150 to 180	200 to 254			

Section 1002

FLUIDS AND LUBRICANTS

CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

Bur 5-10840

Printed in U.S.A.
Issued February, 2008

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CAPACITIES AND LUBRICANTS

Engine Oil
- Capacity ..... 10.9 liters (11.5 U.S. Quarts)
- Capacity with Filter Change ..... 11.8 liters (12.5 U.S. Quarts)
- Type of oil ..... Case AKCELA (SAE 15W-40)

Engine Cooling System
- Capacity ..... 22 liters (23.2 U.S. Quarts)
- Type of Coolant ..... 50% water and 50% Ethylene Glycol

Fuel Tank
- Capacity ..... 189.3 liters (50 U.S. Gallons)
- Type of Fuel ..... See Diesel fuel specifications on page 6

Hydraulic System
- Hydraulic Reservoir Refill Capacity ..... 56.8 liters (15.0 U.S. Gallons)
- Total System Capacity ..... 113.6 liters (30.0 U.S. Gallons)
- Type of Oil ..... Case AKCELA Hy-Tran Ultra®

Transmission
- Refill Capacity with Filter Change ..... 18.9 liters (20 U.S. Quarts)
- Total System Capacity ..... 26 liters (27.5 U.S. Quarts)
- Type of Oil ..... Case AKCELA (SAE 15W-40)

Axles
- Capacity
  - Front ..... 22.0 liters (23.2 U.S. Quarts)
  - Rear ..... 22.0 liters (23.2 U.S. Quarts)
- Type of Lubricant ..... Case AKCELA Transaxle Fluid (SAE 80W-140)

NOTE: *DO NOT use an alternate oil in the axles. The brake components in the axles could be damaged as a result of using an alternate oil. Machines are shipped from the factory with break-in oil.*

Brake System
Type of Fluid (Same as Hydraulic System) ..... Case AKCELA Hy-Tran Ultra®

Fittings
- Grease as required ..... Case AKCELA Molydisulfide

ENGINE OIL RECOMMENDATIONS

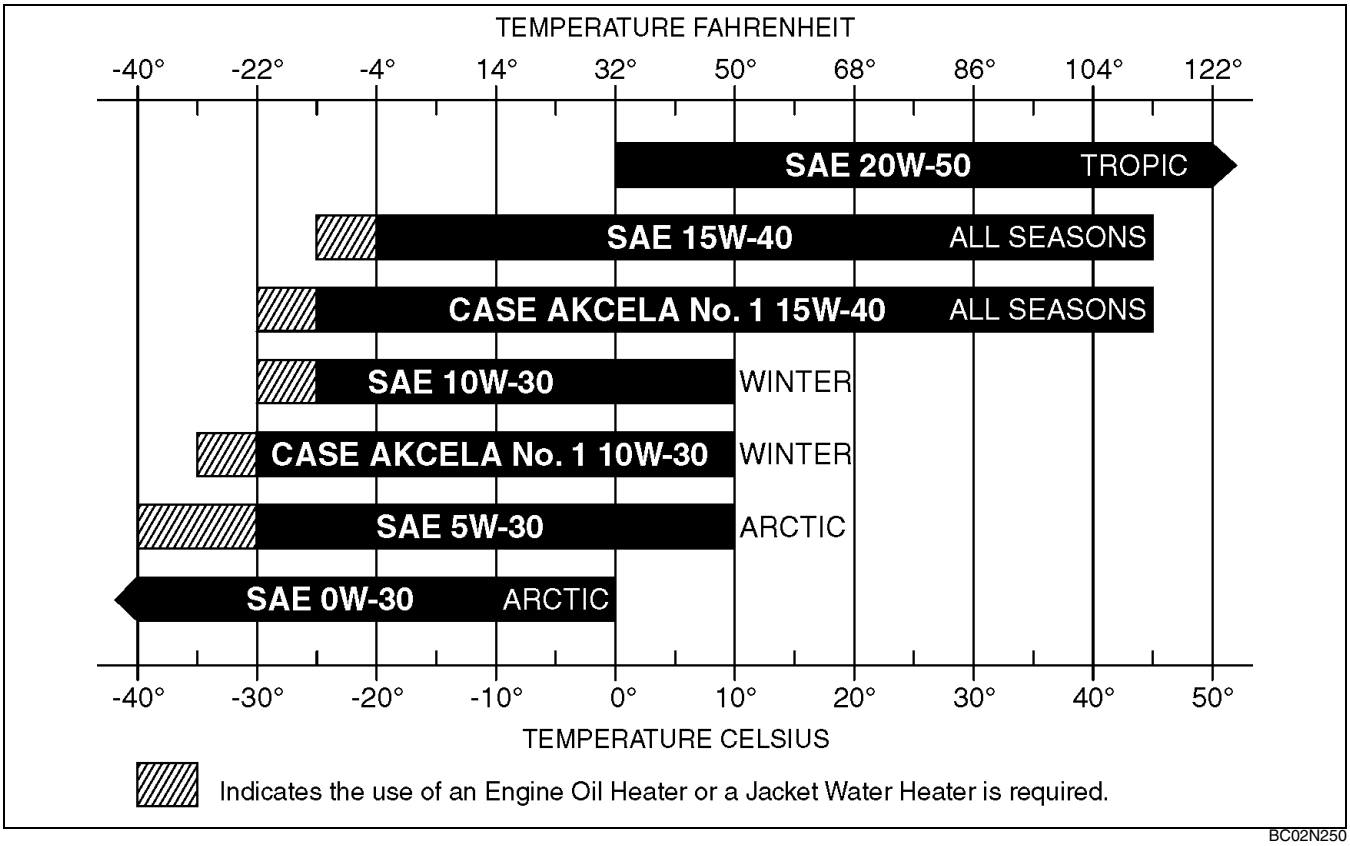
Case AKCELA No. 1 Engine oil is recommended for use in your Case engine. Case AKCELA No. 1 Engine Oil will lubricate your engine correctly under all operating conditions.

If Case AKCELA No. 1 Multi-Viscosity Oil is not available, use only oil meeting API engine oil service category CI-4.

See the chart below for recommended viscosity at ambient air temperature ranges.

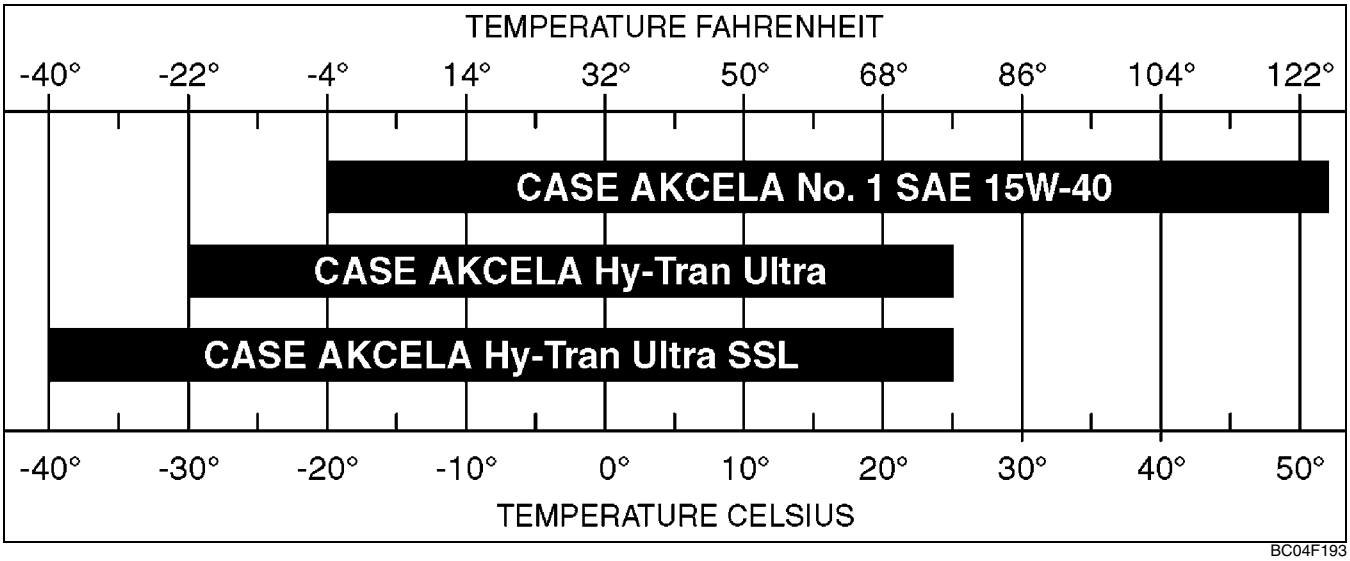
NOTE: *Do not put performance additives or other oil additive products in the engine crankcase. The oil change intervals given in this manual are according to tests with Case AKCELA lubricants.*

BD03A102



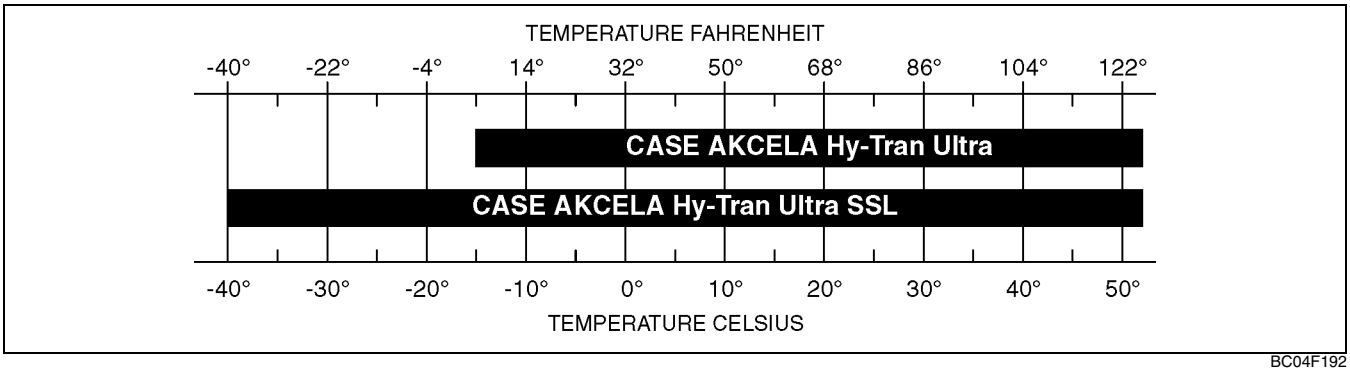
BC02N250

TRANMISSION TEMPERATURE CHART



BC04F193

HYDRAULIC/BRAKE SYSTEM TEMPERATURE CHART



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DIESEL FUEL SYSTEM

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No. 1 and No. 2 diesel fuels is temporarily permitted. See the following Note.

NOTE: *See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel lowers below the cloud point (wax appearance point), wax crystals in the fuel will restrict the fuel filter and cause the engine to lose power or not start.*

The diesel fuel used in this machine must meet the specifications as shown below in, “Specifications for Acceptable No. 2 Diesel Fuel”, or Specification (ASTM-D-975) of the American Society for Testing and Materials.

Fuel Storage

If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

Fill the fuel tank at the end of the daily operating period to prevent condensation in the fuel tank.

Specifications for Acceptable No. 2 Diesel Fuel

API gravity, minimum	34
Flash point, minimum	60°C (140°F)
Cloud point (wax appearance point), maximum	-20°C (-5°F) See Note above
Pour point, maximum	-26°C (-15°F) See Note above
Distillation temperature, 90% point	282 to 338°C (540 to 640°F)
Viscosity, at 38°C (100°F)	
Centistokes	2.0 to 4.3
Cetane number, minimum	43 (45 to 55 for winter or high altitudes)
Water and sediment, by volume, maximum	0.05%

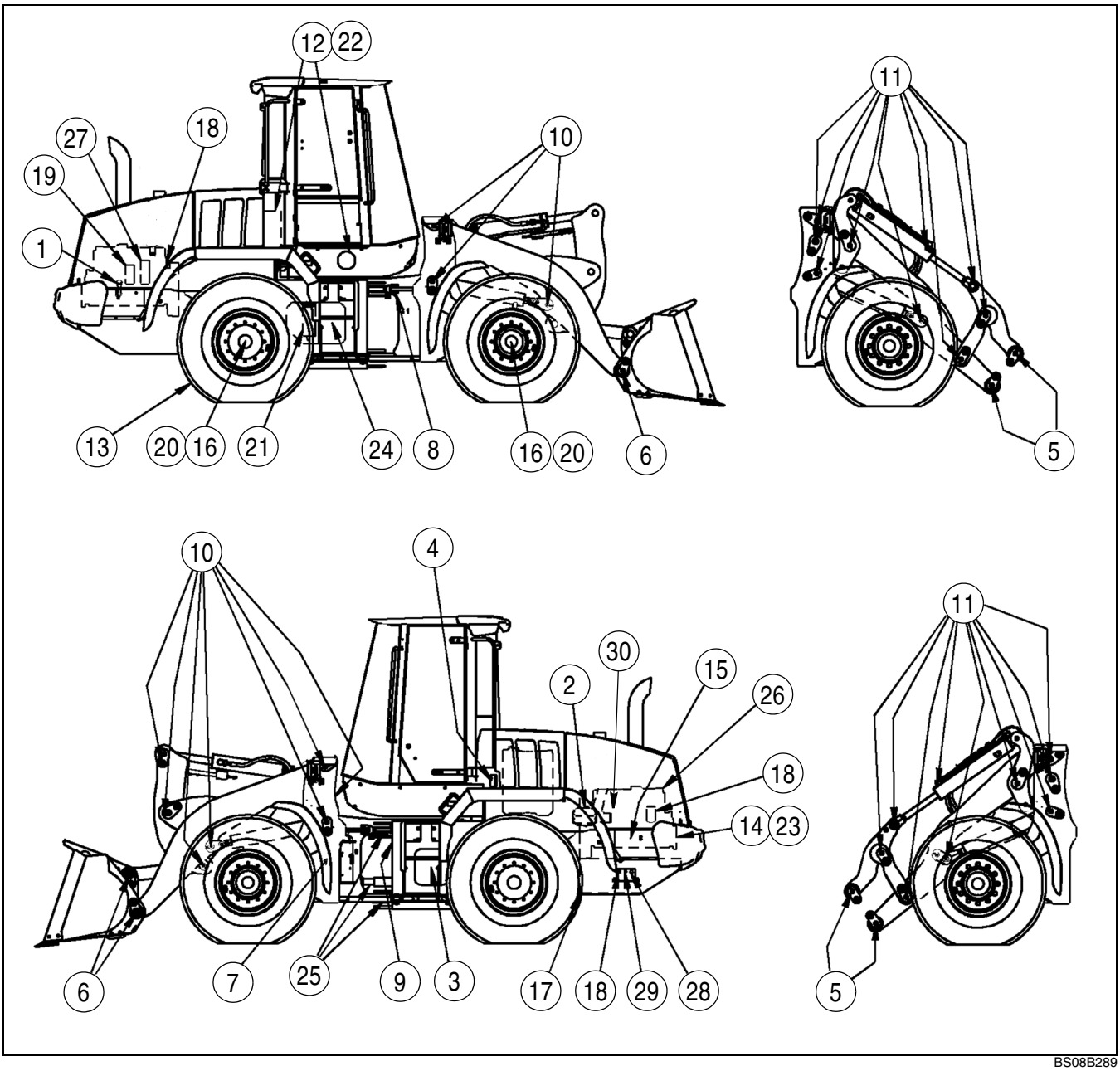
MAINTENANCE SCHEDULE

Model 521E

SERVICE INTERVAL	ITEM NUMBER	SERVICE POINTS	Initial Service	FREQUENCY IN HOURS						
				CHECK	CLEAN	CHANGE	DRAIN	LUBRICATE	REPLACE	ADJUST
Variable Periodic (*)	29	Air cleaner		*		*				
	18	Bleed Fuel Filter of Condensation					*			
	19	Hydraulic Filter		*						
	22	Alternator, AC, Drive Belt		*						
	13	Radiator Coolant Level		*						
	XX	Fire extinguisher		*						
	14	Tires		*						
Every 10 Hours	1	Check Engine Oil Level		10						
Every 50 Hours	2	Check Engine Coolant Level		50						
	3	Check Transmission Oil Level		50						
	4	Check Hydraulic Oil Level		50						
	5 & 6	Grease Bucket Mounting Fittings						50		
Every 100 Hours	7	Grease Front Drive Shaft Support Bearing						100		
	8 & 9	Lubricate The Steering Cylinder Pivots - Rod And Closed End (4 Fittings)						100		
	10	Lubricate Loader Lift & Cylinder Pivots (10) Z-bar						100		
	11	Lubricate Loader Lift & Cylinder Pivots (18) XT						100		
Every 250 Hours	12	Check Cab Air Filter		250						
	13	Check Tire Pressure & Wheel Torque	**100**	250						
	14	Check Drive Belt		250						
Every 500 Hours	15	Check Battery Electrolyte Level		500						
	16	Check Axle Oil Level		500						
	17	Drain Fuel Tank Condensation & Water Separator					500			
	18	Change Engine Oil and Filter	**100**			500				
	18	Change Crankcase Filter				500				
	19 & 27	Replace Fuel Filter	**100**						500	
	XX	ROPS/CSF and seat belt torques		500						
Every 1000 Hours	20	Change Front & Rear Axle Oil	**100**			1000				
	21	Replace Hydraulic Oil filter	**100**						1000	
	22	Replace Cab Air Filter							1000	
	23	Replace Drive Belt							1000	
	24	Change Transmission Oil and Filter	**100**			1000				
	25	Grease Articulation Fittings						1000		
	26	Check Injector Calibration		1000						
	27	Fuel Pre-Filter				1000				
	XX	Drive Shaft Slip Joint						1000		
	XX	Check Valve Adjustment (Engine Manual)		1000						
	XX	Trans Clutch Calibration (See Section 6002)	**250**	1000						
Every 2000 Hours	28	Change Hydraulic Oil				2000				
	29	Change Coolant				2000				
	30	Replace Engine Air Cleaner							2000	
Every 4000 Hours	XX	Valve Clearance (Engine Manual)								4000

MAINTENANCE POINTS

Model 521E



BS08B289

See your Operators manual for maintenance of safety related items and for detailed information of the service items on this chart. Operators and service manuals are available for this machine from your dealer.

If you operate the machine in severe conditions, lubricate and service the machine more frequently.

Section

1003

METRIC CONVERSION CHART

CNH AMERICA LLC
700 State Street
Racine, WI 53404 U.S.A.

Bur 7-52950

Printed in U.S.A.
June, 1997

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CONVERSION FACTORS
Metric to U.S.

	MULTIPLY	BY	TO OBTAIN
Area:	sq. meter hectare	10.763 91 2.471 05	square foot acre
Force:	newton newton	3.596 942 0.224 809	ounce force pound force
Length:	millimeter meter kilometer	0.039 370 3.280 840 0.621 371	inch foot mile
Mass:	kilogram	2.204 622	pound
Mass/Area:	kilogram/hectare	0.000 466	ton/acre
Mass/Energy:	gr/kW/hr.	0.001 644	lbs/hp/hr.
Mass/Volume:	kg/cubic meter	1.685 555	lb/cubic yd.
Power:	kilowatt	1.341 02	horsepower
Pressure:	kilopascal bar	0.145 038 14.50385	lb/sq. inch lb/sq. inch
Temperature:	degree C	1.8 x C +32	degree F
Torque:	newton meter newton meter	8.850 748 0.737 562	lb/inch lb/foot
Velocity:	kilometer/hr.	0.621 371	miles/hr.
Volume:	cubic centimeter cubic meter cubic meter milliliter litre litre litre litre	0.061 024 35.314 66 1.307 950 0.033 814 1.056 814 0.879 877 0.264 172 0.219 969	cubic inch cubic foot cubic yd. ounce (US fluid) quart (US liquid) quart (Imperial) gallon (US liquid) gallon (Imperial)
Volume/Time:	litre/min. litre/min.	0.264 172 0.219 969	gallon/min. (US liquid) gallon/min. (Imperial)

U.S. to Metric

	MULTIPLY	BY	TO OBTAIN
Area:	square foot acre	0.092 903 0.404 686	square meter hectare
Force:	ounce force pound force	0.278 014 4.448 222	newton newton
Length:	inch foot mile	25.4 * 0.304 8 * 1.609 344 *	millimeter meter kilometer
Mass:	pound ounce	0.453 592 28.35	kilogram gram
Mass/Area:	ton/acre	2241 702	kilogram/hectare
Mass/Energy:	lb/hp/hr	608.277 4	gr/kW/hr
Mass/Volume:	lb/cubic yd.	0.593 276	kg/cubic meter
Power:	horsepower	0.745 700	kilowatt
Pressure:	lbs/sq. in. lbs/sq. in. lbs/sq. in.	6.894 757 0.069 0.070 303	kilopascal bar kg/sq. cm
Temperature:	degree F	1.8 F - 32	degree C
Torque:	pound/inch pound/foot	0.112 985 1.355 818	newton meter newton meter
Velocity:	miles/hr.	1.609 344 *	kilometer/hr.
Volume:	cubic inch cubic foot cubic yard ounce (US fluid) quart (US liquid) quart (Imperial) gallon (US) gallons (Imperial)	16.387 06 0.028 317 0.764.555 29.573 53 0.946 353 1.136 523 3.785 412 4.546 092	cubic centimeter cubic meter cubic meter milliliter litre litre litre litre
Volume/Time:	gallon/min.	3.785 412	litre/min.

* = exact

SECTION INDEX

ENGINES

FOR ENGINE REPAIR, SEE THE ENGINE REPAIR MANUAL 87630273

CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

Bur 5-10850

Issued February, 2008

Section
2000

ENGINE AND RADIATOR REMOVAL AND INSTALLATION

CNH America LLC.
700 State Street
Racine, WI 53404 U.S.A.

Bur 5-10860

Issued February, 2008

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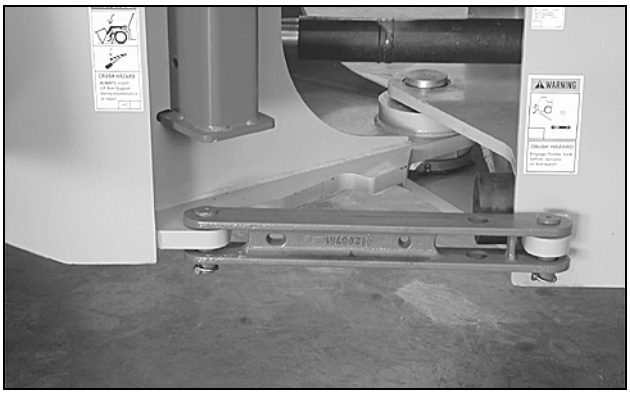
Removal

STEP 1



BD03A040

Park machine on a level surface and lower bucket to ground. Put articulation lock in LOCKED position.

STEP 2

Stop engine. Actuate brake pedal several times to discharge brake accumulators. Put key switch in ON position and move loader control lever back and forth at least 30 times to release any pressure from hydraulic circuit. Put key switch in OFF position.

STEP 3

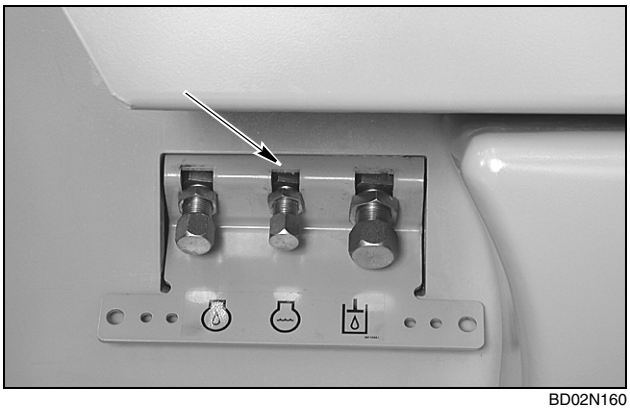
Slowly loosen the filler cap for hydraulic reservoir to release air pressure in hydraulic reservoir.

STEP 4

BD07N563-01

The master disconnect is located under the hood on the left read side of the machine. Raise the hood put master disconnect switch in OFF position. Remove both battery covers and disconnect batteries from the machine.

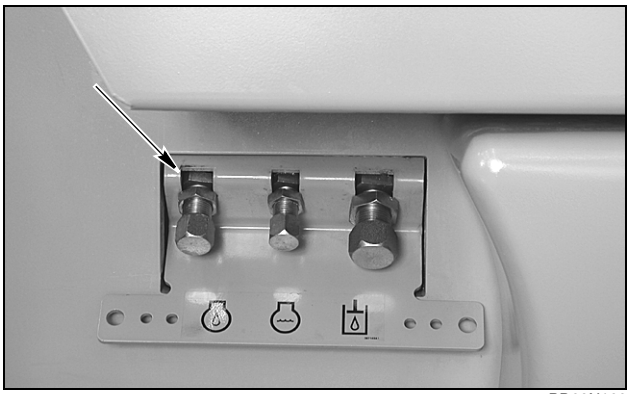
STEP 5



BD02N160

Put a container capable of holding at least 22.7 liter (6.0 gallon) below radiator drain. Remove radiator cap. Remove cap and drain coolant into container. Install cap after coolant has drained. Install radiator cap.

STEP 6



BD02N160

Put a container capable of holding at least 12.3 liter (13 U.S. quarts) below engine oil drain. Remove cap and drain oil into container. Install cap after oil has drained.

NOTE: *After draining oil disconnect drain hose from frame for removal with engine.*