SERVICE MANUAL
Loader / Backhoe
M
Series
2
6-74432

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL
Loader / Backhoe
M
Series
2
6-74432

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL
Loader / Backhoe
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TYPE 1-4

M SERIES 2 LOADER/BACKHOE
Service Manual
Bur 6-74432

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Reprinted

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

Issued January, 2004 Revised July, 2005

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Service Manual
Bur 6-74432

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NOTE: CNH Corporation 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.

SECTION INDEX

GENERAL

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

Bur 6-74450

Issued January, 2004

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.

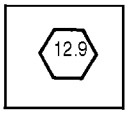
Grade 8.8 Bolts, Nuts, and Studs

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 6-74461

Issued January, 2004 Revised July, 2005

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CAPACITIES AND LUBRICANTS

Engine Crankcase
- All Machines ..... 13.6 litres (14.4 U.S. quarts)
- Specifications ..... Case AKCELA No. 1 15W-40 API CH-4

Fuel Tank
- Capacity, usable (580M and 580SM) ..... 119 litres (31.4 U.S. gallons)
- Capacity, usable (580SM+ and 590SM) ..... 159 litres (42 U.S. gallons)
- Optional tank (580M and 580SM only) ..... 151 litres (40 U.S. gallons) usable
- Specifications ..... See page 6

Cooling System
- Capacity with heater (580M) ..... 16.8 litres (17.8 U.S. quarts)
- Capacity without heater (580M) ..... 16.1 litres (17 U.S. quarts)
- Capacity with heater (580SM, 580SM+ and 590SM) ..... 18 litres (19 U.S. quarts)
- Capacity without heater (580SM, 580SM+ and 590SM) ..... 17.3 litres (18.3 U.S. quarts)
- Specifications ..... 50% water and 50% ethylene glycol

Hydraulic System
- Total System
  - 580M ..... 106 litres (28 U.S. gallons) add 5.7 litres (6 U.S. qts) for extendahoe
  - 580SM and 580SM+ ..... 119 litres (31.5 U.S. gallons) add 5.7 litres (6 U.S. qts) for extendahoe
  - 590SM ..... 130 litres (34.3 U.S. gallons) add 5.7 litres (6 U.S. qts) for extendahoe
- Capacity with filter change ..... 54.9 litres (14.5 U.S. gallons)
- Capacity without filter change ..... 53 litres (14 U.S. gallons)
- Specifications ..... Case AKCELA Hy-Tran® Ultra

Transmission
- Standard Transmission
  - 2 Wheel Drive
    - Total system capacity ..... 18.5 litres (19.5 U.S. quarts)
    - Refill capacity with or without filter change ..... 11.9 litres (12.6 U.S. quarts)
    - Type of Fluid ..... Case AKCELA Hy-Tran® Ultra
  - 4 Wheel Drive
    - Total system capacity ..... 20.8 litres (22 U.S. quarts)
    - Refill capacity with or without filter change ..... 14.4 litres (15.2 U.S. quarts)
    - Type of Fluid ..... Case AKCELA Hy-Tran® Ultra
- Powershift Transmission
  - 4 Wheel Drive
    - Total system capacity ..... 21.0 litres (22.2 U.S. quarts)
    - Refill capacity with filter change ..... 14.4 litres (15.2 U.S. quarts)
    - Refill capacity without filter change ..... 13.4 litres (14.2 U.S. quarts)
    - Type of Fluid ..... Case AKCELA Trans-XHD

Front Drive Axle - 4 Wheel Drive
- 580M and 580SM
  - Capacity - center bowl ..... 5.5 litres (5.8 U.S. quarts)
  - Capacity - each wheel end ..... 0.66 litres (0.7 U.S. quarts)
  - Type of Fluid ..... Case AKCELA Hy-Tran® Ultra
- 580SM+
  - Capacity - center bowl ..... 7.6 litres (8 U.S. quarts)
  - Type of Fluid ..... Case AKCELA Transaxle Fluid MS1317
  - Capacity - each wheel end ..... 0.7 litres (0.74 U.S. quarts)
  - Type of Fluid ..... Case AKCELA Hy-Tran® Ultra
- 590SM
  - Capacity - center bowl ..... 6.5 litres (6.9 U.S. quarts)
  - Capacity - each wheel end ..... 1 liter (1.1 U.S. quarts)
  - Type of Fluid ..... Case AKCELA Hy-Tran® Ultra

Rear Axle

580M, 580SM and 580SM+

- Capacity - center bowl ..... 14.2 litres (15 U.S. quarts)
- Capacity - each wheel end ..... 1.5 litres (1.6 U.S. quarts)
- Type of Fluid..... Case AKCELA Hy-Tran® Ultra
- Center Bowl Oil Additive ..... Case AKCELA Axle Oil Additive

590SM

- Capacity - center bowl ..... 14.2 litres (15 U.S. quarts)
- Capacity - each wheel end ..... 2 litres (2.1 U.S. quarts)
- Type of Fluid..... Case AKCELA Hy-Tran® Ultra
- Center Bowl Oil Additive ..... Case AKCELA Axle Oil Additive

Brake Master Cylinder .....(Brake fluid supplied by hydraulic reservoir, see Hydraulic System.)

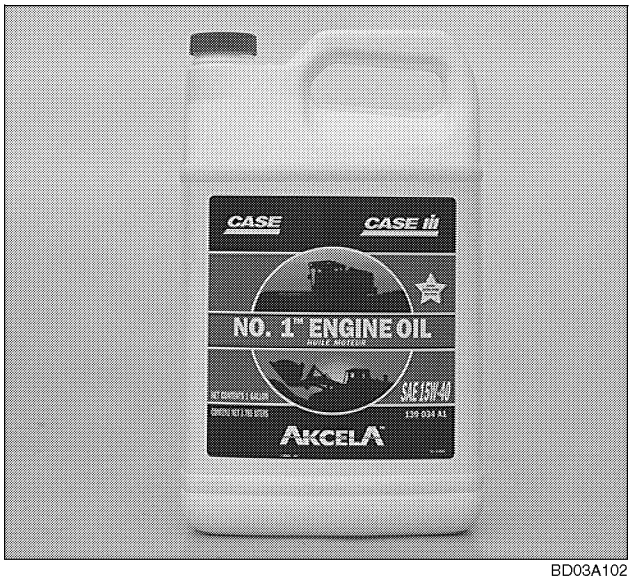
ENGINE OIL RECOMMENDATIONS

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 Engine Oil is not available, Case AKCELA No. 1 Single Grade Engine Oil can be used.

RH99K130

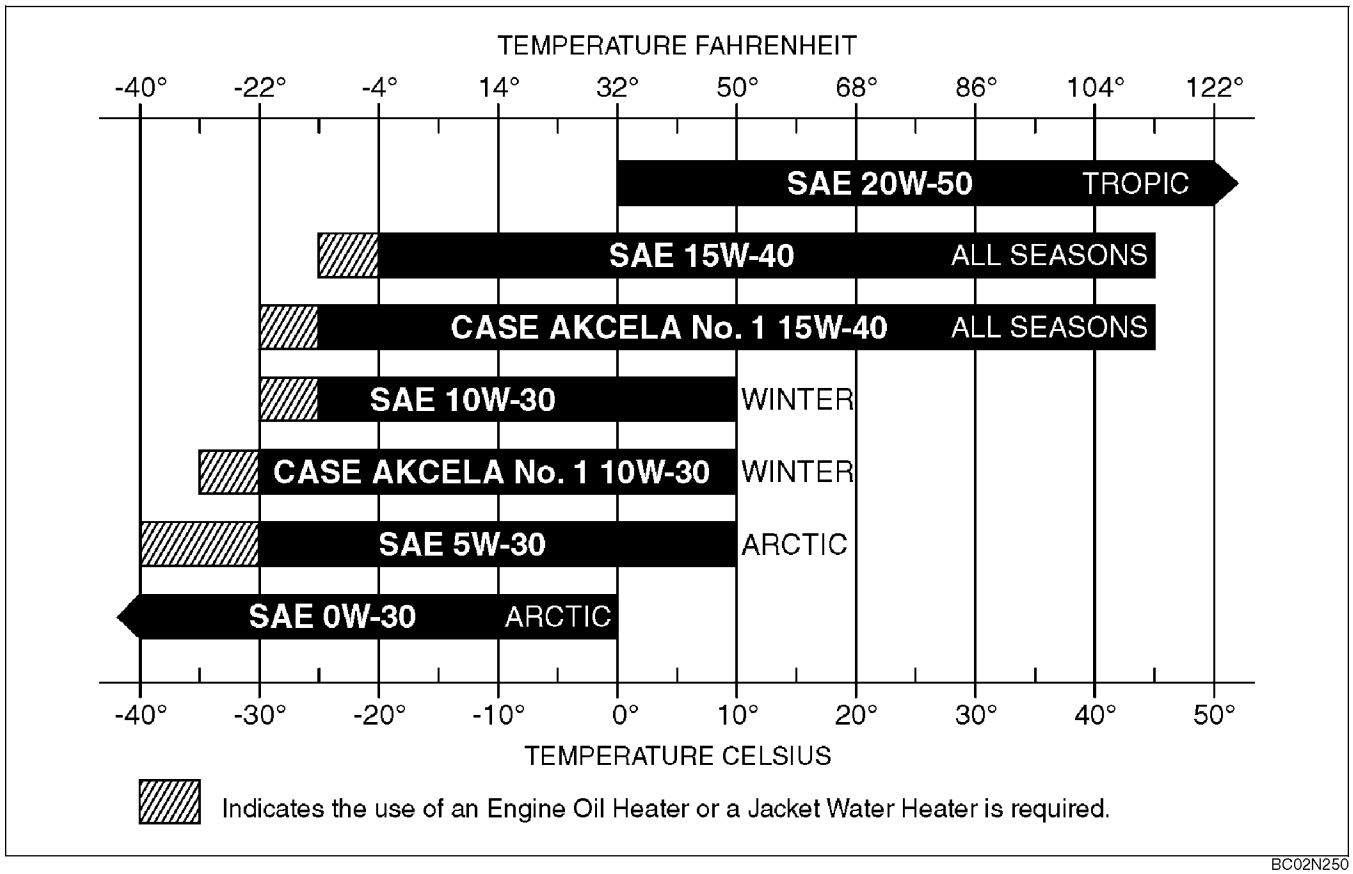
If Case AKCELA No.1 Multi-Viscosity or Single Grade Engine Oil is not available, use only oil meeting API engine oil service category CH-4.

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



BD03A102

NOTE: *Do not put Performance Additives or other oil additive products in the engine crankcase. The oil intervals given in the operators manual and service chart are according to tests with* Case AKCELA *lubricants.*


TEMPERATURE FAHRENHEIT
-40°
-22°
-4°
14°
32°
50°
68°
86°
104°
122°
SAE 20W-50
TROPIC
SAE 15W-40
ALL SEASONS
CASE AKCELA No. 1 15W-40
ALL SEASONS
SAE 10W-30
WINTER
CASE AKCELA No. 1 10W-30
WINTER
SAE 5W-30
ARCTIC
SAE 0W-30
ARCTIC
-40°
-30°
-20°
-10°
0°
10°
20°
30°
40°
50°
TEMPERATURE CELSIUS
Indicates the use of an Engine Oil Heater or a Jacket Water Heater is required.

BC02N250

DIESEL FUEL

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 is below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.*

The diesel fuel used in this machine must meet the specifications in the chart below or Specification D975-81 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.

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
Viscosity, at 100° F (88° C)	
Centistokes	2.0 to 4.3
Saybolt Seconds Universal	32 to 40

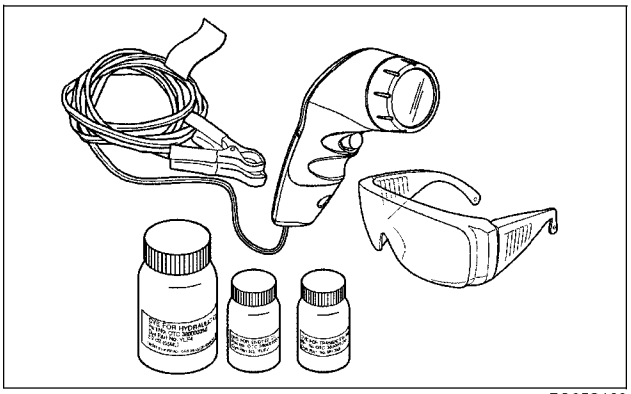
DYE AND BLACK LIGHT PROCEDURE FOR DETECTING OIL LEAKS

Oils and grease have natural phosphors and will illuminate differently under the black light.
Oil, bluish-white, grease, brilliant-white, anti-freeze, greenish-yellow, sealing compounds, red to orange.

Kit part number 380040182 consisting of:

Part Number	Description	U/M	Comments	Usage
380002254	Black Light		12 Volt Ultra Violet Light	
380002357	Dye-uniglow F2HF	10 ML	Glows Green in Black Light	Engine Oil/Crankcase
380002358	Dye-uniglow F4HF	65 ML	Glows Yellow in Black Light	Hydraulic Oil
380002359	Dye-uniglow 1750	10 ML	Glows Purple in Black Light	Trnasmission Oil

NOTE: *Each dye is formulated to work in conjunction with a specific fluid, therefore the dyes are not interchangeable and should only be used as described.*



BC05C168

1. Prior to adding dye, connect the black light to the machines battery and investigate suspected areas.
2. Once suspected leak areas are found, attempt to trace the leak completely to the origin.

   NOTE: *At the origin, the leak should be the brightest in color.*
3. After confirmation of the suspected leak, thoroughly clean the area of the leak to remove any existing fluids. Recheck the area with the black light to assure the area is clean.

   NOTE: *Good cleaning is important for the following reasons.*

   A. Fluids captured by threaded joints or other cavities will continue to show signs of leakage unless completely clean.

   B. Casting surfaces can hold residual oil.
4. Use the entire contents of the bottle of dye in the system/systems of the suspected leak.
5. Run the unit for 5 to 10 minutes and cycle through suspect system functions to ensure that the dye is available to all possible leak points.

   NOTE: *The hydraulic oil should be heated to 160° F (71° C), engine at normal operating temperature, and transmission should be in the normal operating range on the gauge.*
6. Use a clean cloth and wipe the dipstick or the inside surface of the filler tube on each of the 3 sumps.
7. View traces of dyed fluid on the cloth under the black light to ensure good samples.
8. Use these 3 samples as your baseline when inspecting the unit with the black light.

   NOTE: *High hour engine oil can reduce the effectiveness of the dye. In this event change the oil.*
9. Avoid common errors.

   A. Fan airflow blowing leaking fluid.

   B. Gravity pulling leak paths down.

   C. When paint at a joint is not broken, the joint is not leaking.

   NOTE: *It is not necessary to change oils after this check.*

NOTES

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

ENGINE

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

Bur 6-74470

Issued January, 2004

Section 2000

ENGINE AND RADIATOR REMOVAL AND INSTALLATION

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

Bur 6-74481

Issued January, 2004 Revised July, 2005

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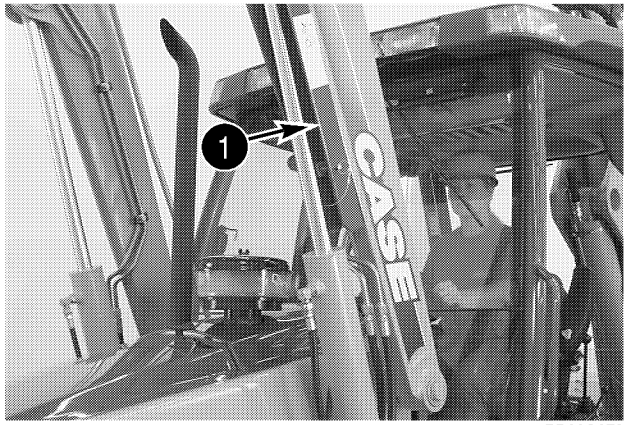
RADIATOR

Put identification tags on all disconnected hoses and wires. Close disconnected hoses and fittings with caps and plugs.

NOTE: ***The photos in this procedure may be different from your machine and are for reference only.***

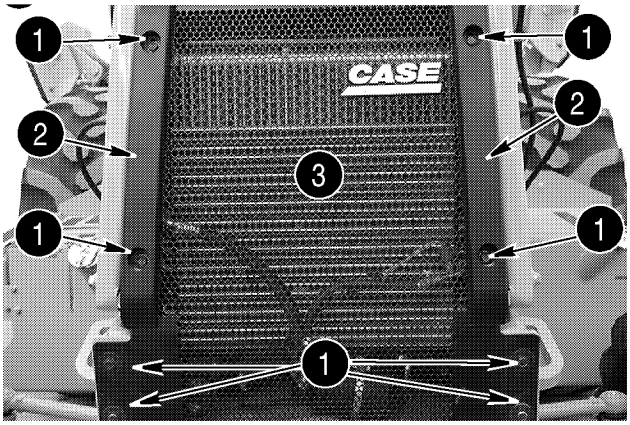
STEP 1



BD00G073

Park the machine on a level surface. Raise the loader and lock the support strut (1) to hold the loader. Stop the engine and apply the parking brake.

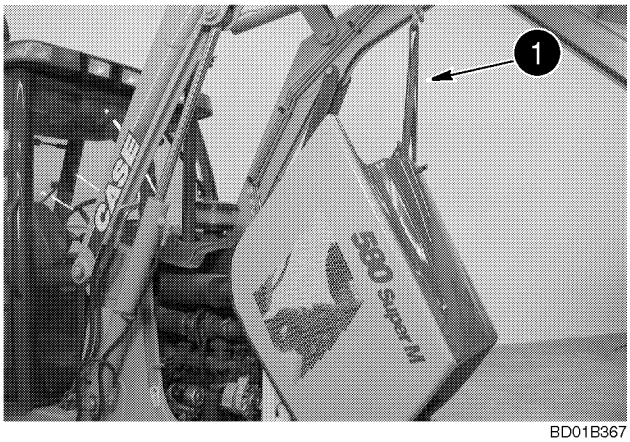
STEP 2



BD03K036

Remove the caps screws (1), bumpers (2), and the grille (3) from the front of the machine.

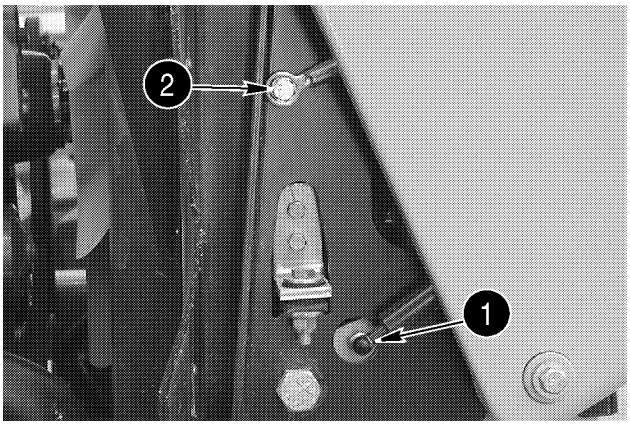
STEP 3



BD01B367

Open the hood. Connect acceptable lifting equipment to the hood (1).

STEP 4



BD03K037

Do the following procedure to remove the hood.

A. Remove the retainers from the hood struts (1) and disconnect the hood struts from the stud.

B. Disconnect the hood cable (2) from the radiator shroud.

C. Carefully lower the hood back to the closed position.

STEP 5

Remove the bolts, washers, and nuts from the pivot point on the hood.