

595SLE/595LSP LOADER BACKHOE SERVICE MANUAL

Product: Case 595SLE 595LSP Backhoe Loader Service Repair Manual 7-22470GB

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Section

1001

STANDARD TORQUE SPECIFICATIONS AND LOCTITE PRODUCT CHART

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TORQUES 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	8 to 11	12 to 15
5/16 inch	17 to 21	23 to 28
3/8 inch	35 to 42	48 to 57
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 inchs	800 to 880	1085 to 1193
1-1/4 inchs	1120 to 1240	1519 to 1681
1-3/8 inchs	1460 to 1680	190 to 2278
1-1/2 inchs	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts and Studs		
		
Size	Pound- inches	Newton metres
1/4 inch	12 to 15	16 to 20
5/16 inch	24 to 29	33 to 39
3/8 inch	45 to 54	61 to 73
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 inchs	1280 to 1440	1736 to 1953
1-1/4 inchs	1820 to 2000	2468 to 2712
1-3/8 inchs	2380 to 2720	3227 to 3688
1-1/2 inchs	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	2 to 3	3 to 4
M5	5 to 6	7 to 8
M6	8 to 9	11 to 12
M8	19 to 23	26 to 31
M10	38 to 45	52 to 61
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	3 to 4	4 to 5
M5	7 to 8	9 to 11
M6	11 to 13	15 to 18
M8	27 to 32	37 to 43
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	6 to 12	8 to 16
5/16 inch/ 7.9 mm	1/2-20	8 to 16	11 to 22
3/8 inch/ 9.5 mm	9/16-18	10 to 25	14 to 34
1/2 inch/ 12.7 mm	3/4-16	15 to 42	20 to 57
5/8 inch/ 15.9	7/8-14	25 to 58	34 to 79
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	12 to 19	16 to 26
5/16 inch/ 7.9 mm	1/2-20	16 to 24	22 to 34
3/8 inch/ 9.5 mm	9/16-18	24 to 40	34 to 54
1/2 inch/ 12.7 mm	3/4-16	42 to 67	57 to 91
5/8 inch/ 15.9	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 screws		
Size	Pound- inches	Newton metres
5/16-18	15 to 20	20 to 27
3/8-16	27 to 40	36 to 53
7/16-14	35 to 45	47 to 61
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	10 to 12	14 to 16	7/16-20	17 to 20	23 to 27
-6	3/8 inch/ 9.5 mm	11/16-16	18 to 20	24 to 27	9/16-18	25 to 30	34 to 41
-8	1/2 inch/ 12.7 mm	13/16-16	32 to 40	43 to 54	3/4-16	45 to 50	61 to 68
-10	5/8 inch/ 15.9 mm	1-14	46 to 56	62 to 76	7/8-14	60 to 65	81 to 88
-12	3/4 inch/ 19.0 mm	1-3/16-12	65 to 80	90 to 110	1-1/16-12	85 to 90	115 to 122
-14	7/8 inch/ 22.2 mm	1-3/16-12	65 to 80	90 to 110	1-3/16-12	95 to 100	129 to 136
-16	1.0 inch/ 25.4 mm	1-7/16-12	92 to 105	125 to 140	1-5/16-12	115 to 125	156 to 169
-20	1-1/4 inch/ 31.8 mm	1-11/16-12	125 to 140	170 to 190	1-5/8-12	150 to 160	203 to 217
-24	1-1/2 inch/ 38.1 mm	2-12	150 to 180	200 to 254	1-7/8-12	190 to 200	258 to 271

LOCTITE PRODUCT CHART

Product	Colour	Similar products	Gap (inches)	Strength (steel/steel)	Working temperature range-fahrenheit	Fixture/full cure (steel/steel) time	Primer	Description
#3	Dark brown					24 h	764	Form a Gasket (works with oil, fuel or greas) Pliable
80	Yellow					Fast	764	Weatherstrip adhesive
123	Clear					-	-	Parts cleaner fluid
220	Blue	290	0.076	65/164 in lbs	-54 to +122	6 min/24 h	747	Wicking threadlocker
221	Purple	222	0.127	86/50 in lbs	-54 to +150	2 min/24 h	747	Low strength threadlocker
222	Purple		0.127	51/28 in lbs	-54 to +150	10 min/24 h	747	Low strength threadlocker (small screws)
225	Brown	222	0.254	51/28 in lbs	-54 to +150	7 min/24 h	747	Low strength threadlocker
242	Blue		0.127	92/57 in lbs	-54 to +150	10 min/24 h	747	Medium strength threadlocker
262	Red	271	0.127	184/218 in lbs	-54 to +150	5 min/24 h	747	High strength threadlocker
270	Green	271	0.177	184/368 in lbs	-54 to +150	3 min/24 h	747	High strength threadlocker
271	Red	262	0.177	184/368 in lbs	-54 to +150	10 min/24 h	747	High strength threadlocker
272	Red	620	0.254	207/311 in lbs	-54 to +234	30 min/24 h	747	High temperature, high strength
275	Green	277	0.254	241/345 in lbs	-54 to +150	3 min/24 h	747	High strength threadlocker
277	Red		0.254	241/345 in lbs	-54 to +150	60 min/24 h	747	High strength threadlocker
290	Green		0.076	97/403 in lbs	-54 to +150	6 min/24 h	747	Wicking threadlocker
*404	Clear	495	0.156	224 psi	-54 to +82	30 sec/24 h	-	Instant adhesive
*406	Clear		0.101	224 psi	-54 to +82	15 sec/24 h	-	Surface insensitive adhesive
*409	Clear	454	0.203	175 psi	-54 to +82	50 sec/24 h	-	Gel instant adhesive
*414	Clear		0.156	175 psi	-54 to +82	30 sec/24 h	-	Instant adhesive
*415	Clear	454	0.254	175 psi	-54 to +82	50 sec/24 h	-	Gap filling instant adhesive (metals)
*416	Clear	454	0.254	175 psi	-54 to +82	50 sec/24 h	-	Gap filling instant adhesive (plastics)
*420	Clear		0.05	175 psi	-54 to +82	15 sec/24 h	-	Wicking instant adhesive
*422	Clear	454	0.05	196 psi	-54 to +82	60 sec/24 h	-	Gap filling instant adhesive
*430	Clear		0.127	175 psi	-54 to +82	20 sec/24 h	-	Metal bonding adhesive

* Products 404-496 (except for #445) are all instant adhesives (super glues) they differ mostly in viscosity.

Product	Colour	Similar products	Gap (inches)	Strength (steel/steel)	Working temperature range-fahrenheit	Fixture/full cure (steel/steel) time	Primer	Description
*445	White/Black		6.35	140 psi	-54 to +82	5 min/24 h	-	Fast setting 2 part epoxy
*454	Clear		0.254	224 psi	-54 to +82	15 sec/24 h	-	Surface insensitive gel instant adhesive
*495	Clear		0.101	175 psi	-54 to +82	20 sec/24 h	-	General purpose instant adhesive
*496	Clear		0.127	175 psi	-54 to +82	20 sec/24 h	-	Metal bonding adhesive
504	Brn orange	515	0.076	52 psi	-54 to +150	90 sec/24 h	None	Rigid gasket eliminator
510	Red		0.05	70 psi	-54 to +206	30 min/24 h	764	High temperature, gasket eliminator
515	Purple		0.254	52 psi	-54 to +150	1 hr/24 h	764	Gasket eliminator 515
518	Red	515	0.076	35 psi	-54 to +150	1 hr/24 h	764	Gasket eliminator 578 for aluminum
542	Brown	569	-	152/106 in lbs	-54 to +150	2 hr/24 h	747	Hydraulic sealant
545	Purple		-	28/23 in lbs	-54 to +150	4 hr/24 h	747	Low strength pneumatic/hydraulic sealant
549	Red	504	0.05	175 psi	-54 to +150	2 hr/24 h	747	Instant seal plastic gasket
554	White	277	0.381	276/240 in lbs	-54 to +150	2 to 4 hr/24 h	764	Refrigerant sealant
567	Orange	592	-	35 psi	-54 to +206	4 hr/24 h	764	Pipe sealant for stainless steel
568	Brown	277	0.381	175 psi	-54 to +150	12 hr/24 h	764	Plastic gasket
569	Brown	545	0.254	28/46 in lbs	-54 to +150	1 hr/24 h	764	Hydraulic sealant
570	Brown	592	-	28/46 in lbs	-54 to +150	6 hr/24 h	764	Steam sealant
571	White	592	0.381	46/23 in lbs	-54 to +150	2 to 4 hr/24 h	764	Pipe sealant
572	White	578, 575	-	92/31 in lbs	-54 to +150	24 hr/24 h	None	Gasketing
592	Black	-	0.05	35 psi	-54 to +206	4 hr/24 h	736	Pipe sealant with teflon
593	Green	-	6.35	28 psi	-54 to +206	30 min/24 h	-	RTV silicone
601	Green	609	0.127	210 psi	-54 to +150	10 min/24 h	747	Current PIN #609
609	Green	-	0.127	210 psi	-54 to +150	10 min/24 h	747	General purpose retaining compound
620	Green	640	0.381	210 psi	-54 to +234	30 min/24 h	747	High temperature. Retaining compound
635	Green	680	0.254	280 psi	-54 to +150	1 hr/24 h	747	High strength retaining compound
638	Green	680	0.381	287 psi	-54 to +150	10 min/24 h	747	High strength retaining compound
640	Green	620	0.177	210 psi	-54 to +206	1 hr/24 h	747	High temperature retaining compound
660	Silver	-	0.05	210 psi	-54 to +150	20 min/24 h	764	Quick metal
675	Green	609	0.127	210 psi	-54 to +150	20 min/24 h	747	General purpose retaining compound
680	Green	635	0.381	280 psi	-54 to +150	10 min/24 h	747	High strength retaining compound
706	Clear	755	-	-	-	-	-	Cleaning solvent
707	Amber	-	-	-	-	-	-	Activator for structural adhesives
736	Amber	-	-	-	-	-	-	Primer NF
738	Amber	-	-	-	-	-	-	Depend activator

Product	Colour	Similar products	Gap (inches)	Strength (steel/steel)	Working temperature range-fahrenheit	Fixture/full cure (steel/steel) time	Primer	Description
747	Yellow	-	-	-	-	-	-	Primer T
751	Clear	-	-	-	-	-	-	Activator for structural adhesives
755	Clear	-	-	-	-	-	-	Cleaning solvent
764	Green	-	-	-	-	-	-	Primer N
767	Silver	-	-	-	-54 to +878	-	-	Anti-seize lubricant

Section 1002

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FLUIDS AND LUBRICANTS

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CAPACITIES AND LUBRICANTS

Engine Oil	
Capacity with filter replacement	10.7 litres
Type of oil	refer to "Engine oil recommendations"
Engine cooling system	
Capacity	16.5 litres
Type of collant solution	refer to "Fluids and lubricants"
Fuel tank	
Capacity	120 litres
Type of fuel.....	refer to "Fluids and lubricants"
Hydraulic system	
Total hydraulic system capacity	90 litres
Hydraulic reservoir filling capacity with filter replacement	45 litres
Hydraulic reservoir filling capacity without filter replacement	43 litres
Type of fluid	refer to "Fluids and lubricants"
Transmission	
Total system	19 litres
Filling with or without filter replacement	15 litres
Type of oil	API cd/se grade 10W30
Front and rear Axle	
Axle center housing	8 litres
Axle hubs (each)	4.5 litres
Type of oil	API GL5 grade EP 85 w 140
Brake fluid	
Fluid type	LHM brake fluid

ENGINE OIL RECOMMENDATIONS

The engine oil to be used depends on the ambient temperature.

Use only oil of the API/CD category.

NOTE : Do not put any performance additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out on lubricants.

Temperate climates

-15°C to +30°C
Oil type SAE 10 w 30

Hot climates

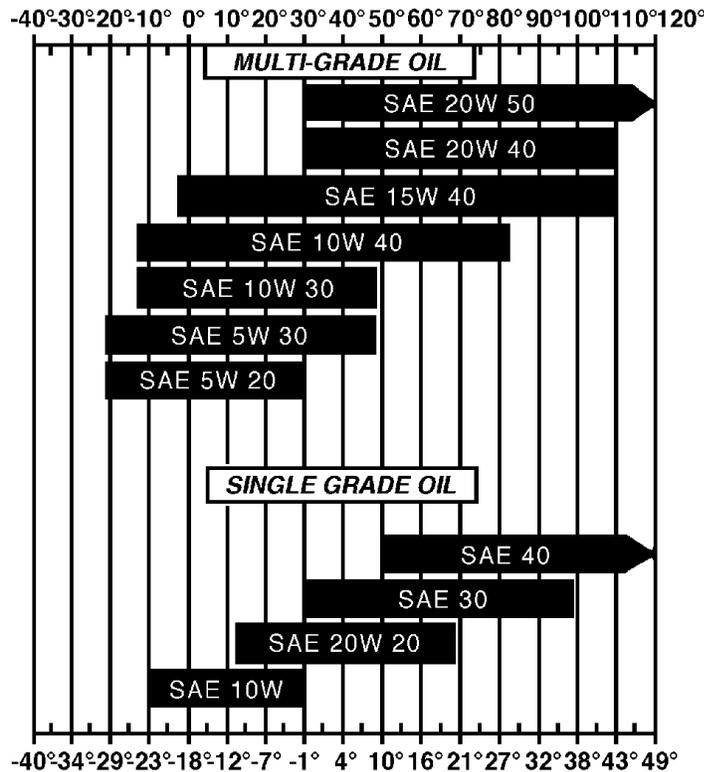
30°C and over
Oil type SAE 20 w 50

Cold climates

Below - 15°C
Oil type SAE 10W

Oil viscosity/Oil operating range

A



B

- (A) Fahrenheit temperature
- (B) Centigrade temperature

IO36LO

FLUIDS AND LUBRICANTS

Fluids and lubricants must have the correct properties for each application.



WARNING : *The condition of use for individual fluids and lubricants must be respected.*

Hydraulic fluid

Hydraulic fluid is specially designed for the high pressure and the hydraulic system used on machines. The type of fluid to be used depends on the ambient temperature.

Temperate climates

Below + 30°C
Fluid type : ISO VG 46

Hot climates

30°C and over
Fluid type : ISO VG 68

Transmission component oil

Extreme pressure oil is used for all cased transmission components.
Extreme pressure oil type API CD/SE.
Grade 10W30

Grease

The type of grease to be used depends on the ambient temperature.

Temperate and hot climates

-5°C to + 55 °C
Extreme pressure grease EP NLGI.
Grade 2 with molybdenum disulphide.

Cold climates

-20 °C to + 30°C
Extreme pressure grease EP NLGI
Grade 0

Anti-freeze/anti-corrosion

Use anti-freeze in all seasons to protect the cooling system from corrosion and all risk of freezing.

For environments with a temperature higher than -36°C, use a mixture of 50% ethylene-glycol based anti-freeze.

For environments with a temperature lower than -36°C, a mixture of 40% water with 60% anti-freeze is recommended.

Fuel

The fuel to be used must be in conformity with the D975 standard of the American Society for Testing and Materials (ASTM).

Use No. 2 type fuel. The use of other fuels may cause a loss of engine power and excessive fuel consumption.

In cold weather, a mixture of No. 1 fuel and No. 2 fuel is temporarily permitted. Consult your fuel supplier.

If the temperature falls below the fuel cloud point (point at which wax appears), wax crystals in the fuel will cause a loss of engine power or make it impossible to start the engine.

IMPORTANT : *In cold weather, fill the fuel tank after each day's work, to prevent the formation of condensation.*

Fuel storage

Prolonged fuel storage causes foreign bodies or condensation water to accumulate in the storage tank. Many engine failures are caused by the presence of water in fuel.

The storage tank should be placed outdoors and the fuel should be kept at as low a temperature as possible. Condensation water should be drained off at regular intervals.

ENVIRONMENT

Before carrying out any maintenance operation on the machine and before disposing of used fluids or lubricants, always think of the environment. Never throw oil or fluid on the ground and never put them in leaky receptacles.

Consult a local recycling or environmental centre, to obtain information on the correct method of disposing of these materials.

PLASTIC AND RESIN PARTS

When cleaning plastic windows, the console, the instrument panel, the gauges, etc, avoid the use of petrol, paraffin, paint solvents, etc. Use only water, soap and a soft cloth.

The use of petrol, paraffin, paint solvents, etc will cause discoloration, cracks or deformation of these parts.

Section

2000

ENGINE AND RADIATOR REMOVAL AND INSTALLATION

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WARNING : *This symbol is used in this manual to indicate important safety messages. When ever you see this symbol, carefully read the message that follows, as there is a risk of serious injury.*

SPECIFICATIONS

Cooling System capacity :

System capacity	9.8 L
Expansion reservoir capacity.....	1 L
Engine/Radiator capacity.....	6.6 L
Coolant solution.....	See section 1002

SPECIAL TORQUE SETTINGS

Torque converter mounting bolts	41 Nm
Engine mounting bolts.....	M16 280 Nm
Engine mounting nuts.....	M10 48 Nm
Transmission mountings.....	M12 140 Nm M20 395 Nm

TOOLS REQUIRED

Engine lifting bracket

RADIATOR REMOVAL

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

STEP 1

Park the machine on a level surface. Raise the loader and install the support strut to hold the loader.

STEP 2

Open the hood.

STEP 3

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

STEP 4

Have another person help with the following procedure :

- A. Remove the retainers from the hood struts and disconnect the hood struts from the stud.
- B. Remove the hood from the machine.

STEP 5

Slowly remove the radiator cap.



WARNING : Do not remove the cap when the engine is hot. The circuit is still under pressure and you could be scalded.

NOTE : During installation, fill the radiator and coolant reservoir completely. See Section 1002 for coolant specifications. Start and run the engine until the coolant is at operating temperature. Stop the engine and check for leakage. When the coolant is cold, check the coolant reservoir level. Add coolant as required. Never remove the radiator cap to check the coolant level in the radiator.

STEP 6

Depressurize the hydraulic system as follows see section 8002.

STEP 7

Disconnect the hoses from the hydraulic filter.

STEP 8

Remove and fit blanks to the expansion reservoir hoses.

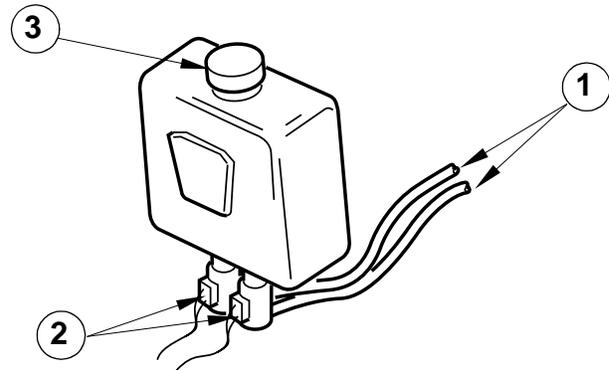
STEP 9

Tag and disconnect the wires on the audible warning device.

STEP 10

Tag and disconnect the wires on the hydraulic filter obstruction indicator.

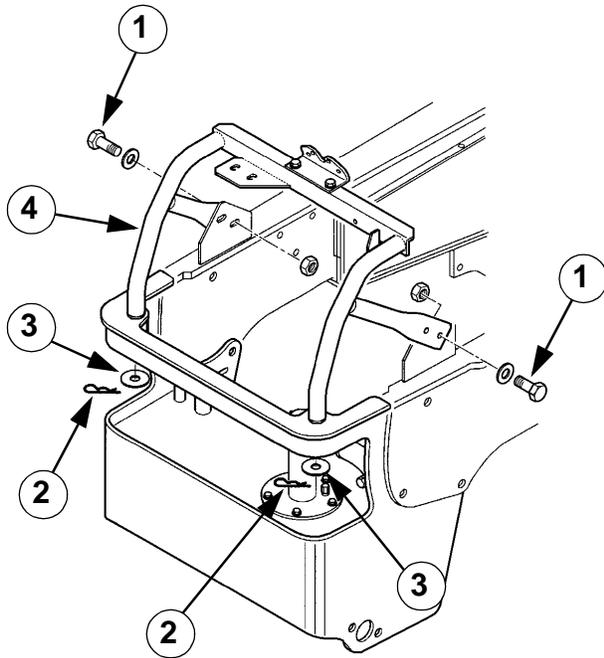
STEP 11



789M250A

Release the fluid pipes (1) and electrical connections (2) to the screen wash bottle (3) and tie back to the chassis.

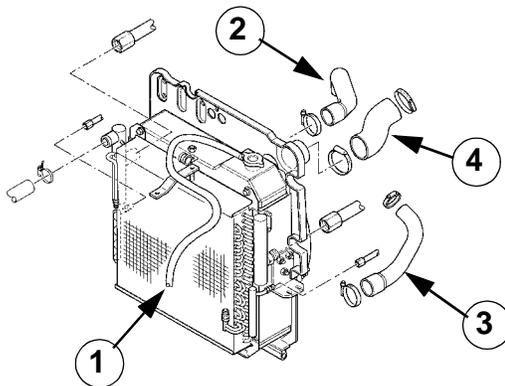
STEP 12



CI98G516

Remove the hardware (1), the retaining pins (2), the washers (3) and support (4).

STEP 13



CI98G517

Disconnect the overflow hose (1) from the radiator neck.

STEP 14

Loosen the clamp and disconnect the upper radiator hose (2).

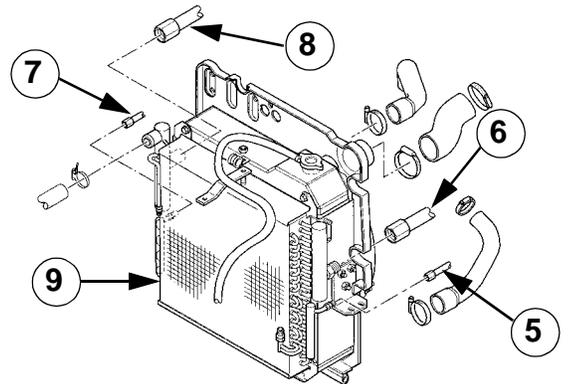
STEP 15

Loosen the clamp and disconnect the lower radiator hose (3).

STEP 16

Loosen the clamp and disconnect the air cleaner hose (4).

STEP 17



CI98G517

Position a suitable drainage container beneath the hydraulic hose (5) and disconnect the hose from the oil cooler (9).

NOTE : Fit blanks to the hose and the oil cooler connection.

STEP 18

Repeat step (5) for the remaining hydraulic hoses (6), (7) and (8).

STEP 19

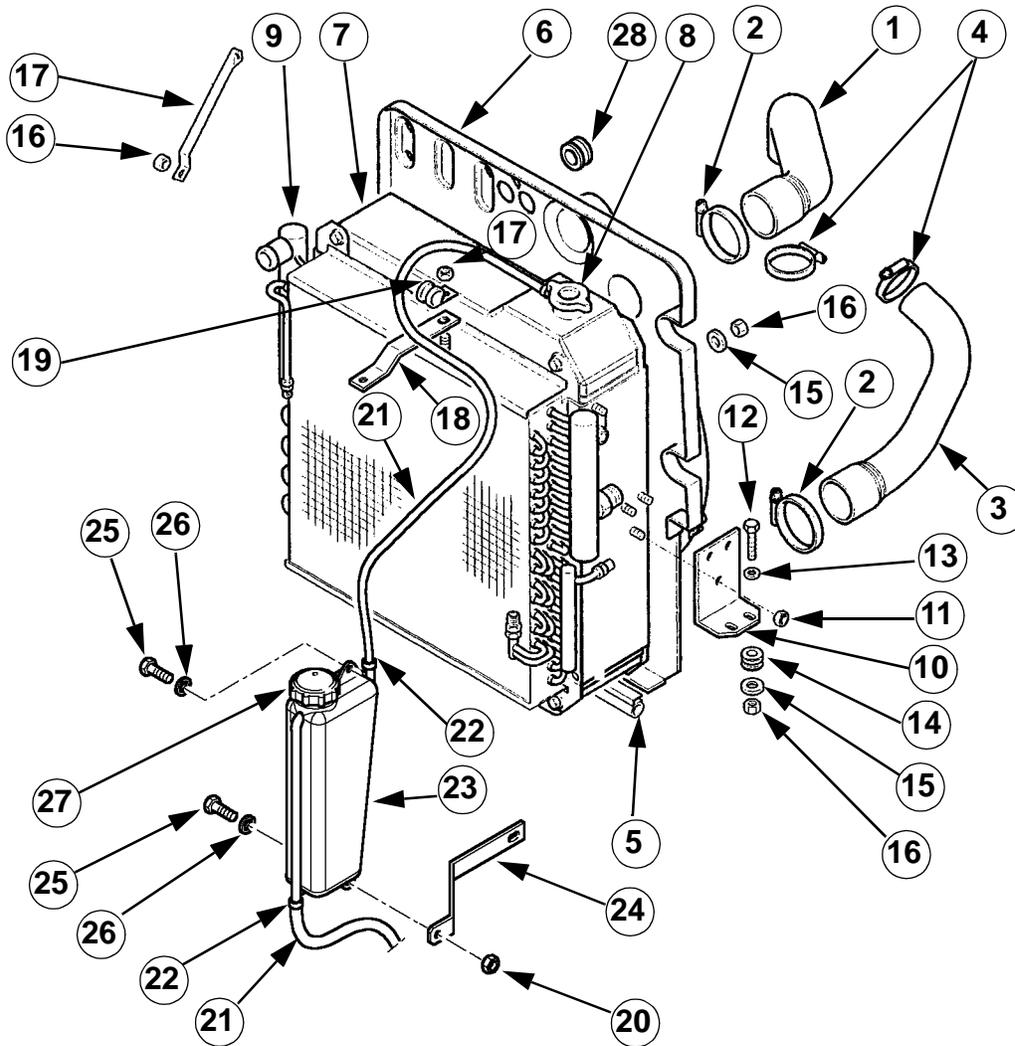
Remove the for radiator retaining screw.

STEP 20

Install a suitable sling around the radiator and remove the radiator.

NOTE : Installation of the radiator is the reverse of removal.

PERSPECTIVE VIEW



- | | |
|----------------|---------------------|
| 1. Hose | 15. Washer |
| 2. Collar | 16. Nut |
| 3. Hose | 17. Bracket |
| 4. Collar | 18. Bracket |
| 5. Seal | 19. Collar |
| 6. Shroud | 20. Nut |
| 7. Radiator | 21. Hose |
| 8. Cap, filler | 22. Clamp |
| 9. Cooler, oil | 23. Tank, expansion |
| 10. Bracket | 24. Bracket |
| 11. Nut | 25. Screw |
| 12. Screw | 26. Washer |
| 13. Washer | 27. Plug |
| 14. Stanchion | 28. Grommet |

C198G505

ENGINE REMOVAL

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

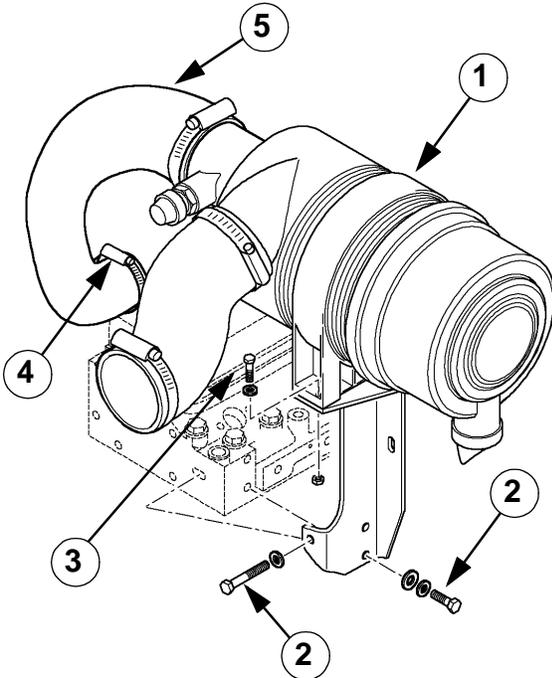
STEP 1

Remove the radiator see page 4.

STEP 2

Disconnect the battery.

STEP 3



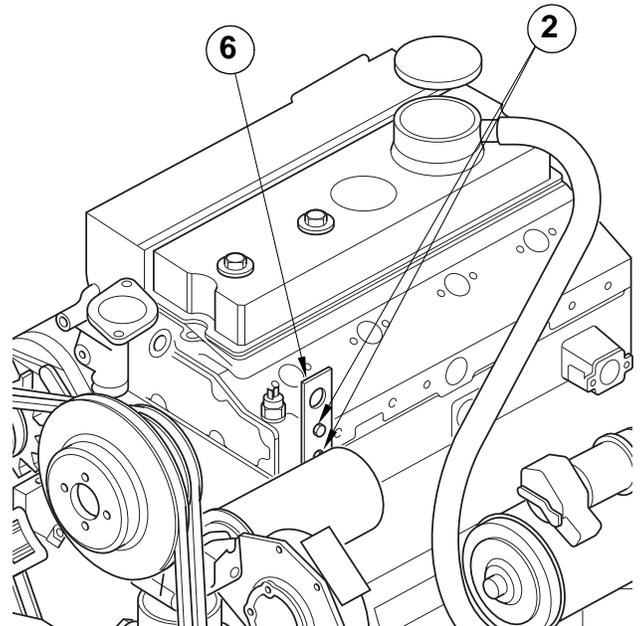
CI98G518

Remove the hose clip (4) from the air filter hose (5) at the turbocharger inlet.

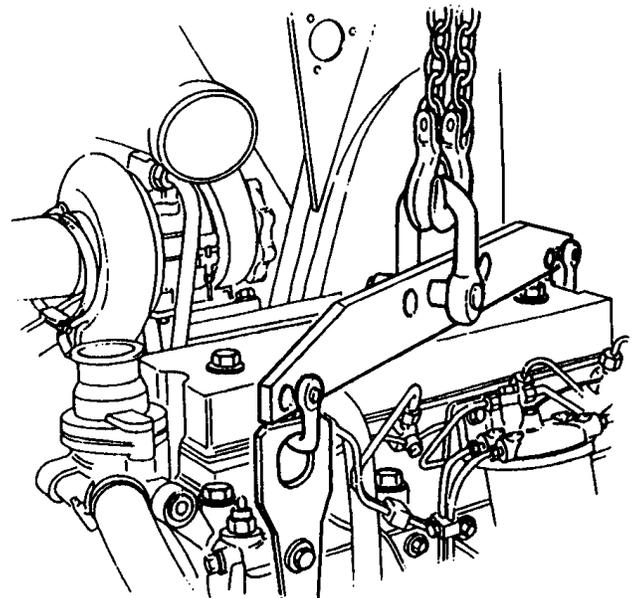
STEP 4

Support the air filter assembly (1) and remove the three bolts (2) from the cylinder head and two bolts (3) from the exhaust bracket. Remove the air filter assembly.

STEP 5

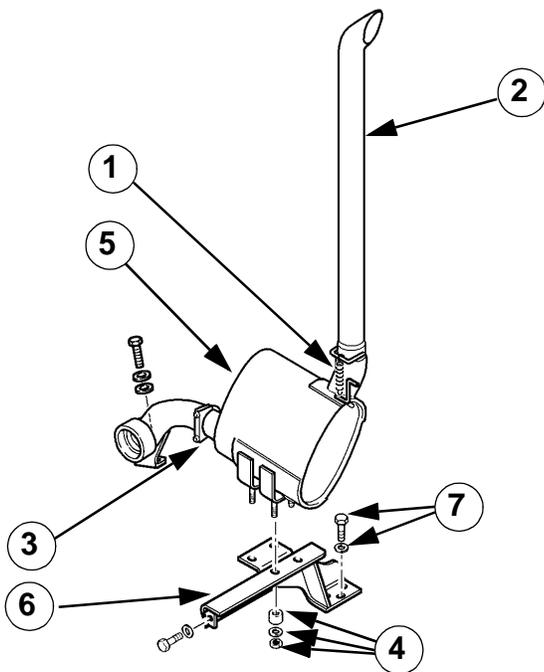


789M257A



789M256A

Install the engine lifting bracket (6) using two of the bolts (2) from the air filter bracket. The bracket is part of the machine tool kit.

STEP 6

CI98G519

Release the spring (1) and remove the exhaust pipe (2).

STEP 7

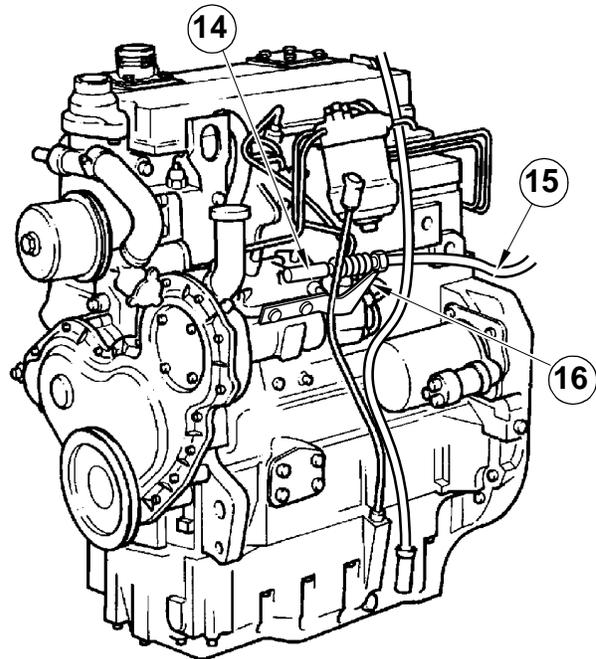
Release the clip (3) on the silencer to turbocharger connection and remove the nuts, washers and spacers (4). Remove the silencer (5) from the bracket (6).

STEP 8

Remove the three bolts and washers (7) from the exhaust bracket and remove the bracket.

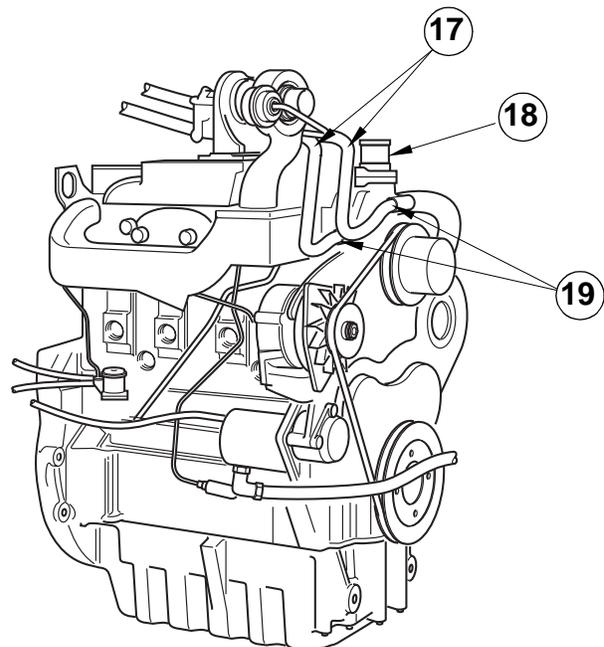
STEP 9

Remove the hydraulic oil pump drive shaft (see section 8004).

STEP 10

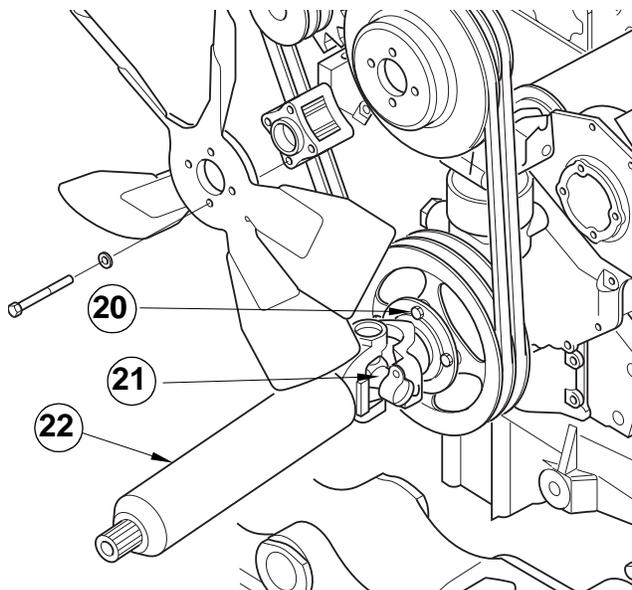
789M259A

Disconnect the throttle cable (15) from the fuel injection pump lever (14) and the bracket (16).

STEP 11

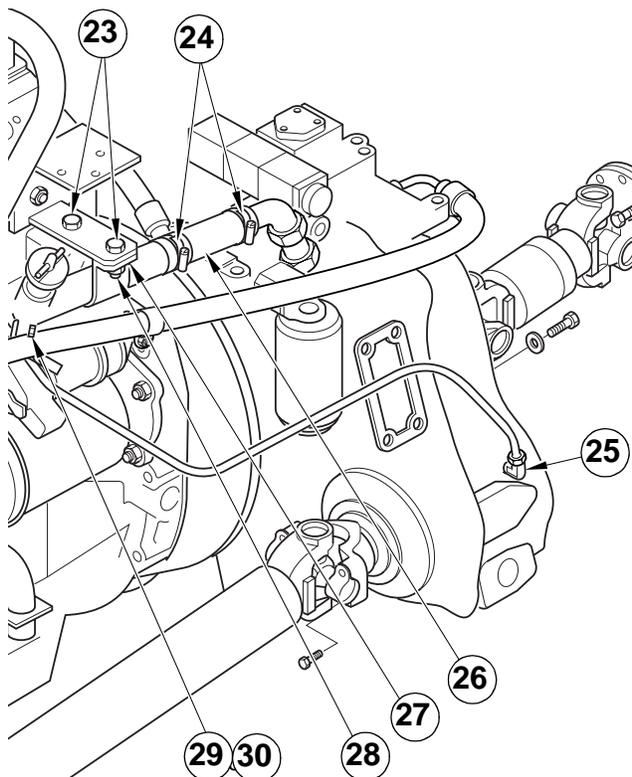
789M287A

Release the hose clips (19) on the heater hoses (17) at the thermostat housing (18). Remove the hoses and tie back under the scuttle.

STEP 12

789M261A

Remove the four bolts (20) in the hydraulic pump drive coupling (21) and remove the drive shaft (22).

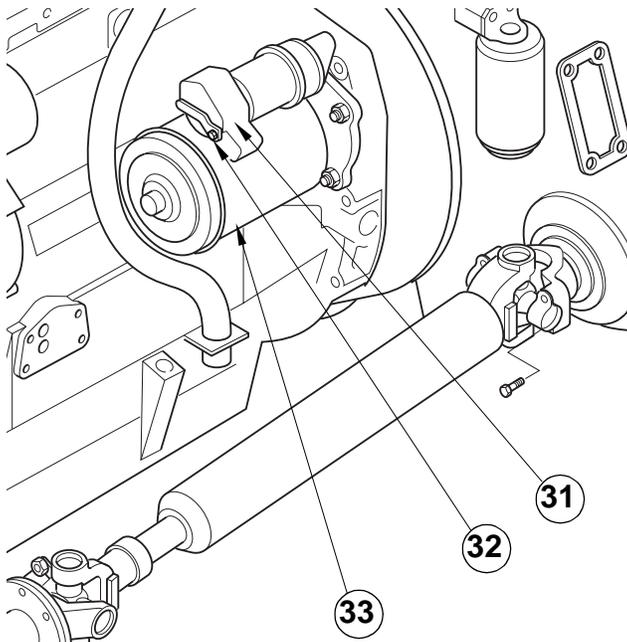
STEP 13

789M262A

Release the hose clips (24) on the transmission filler flexible pipe (26), remove the two bolts and nuts (23) and (28) in the support bracket (27) and the nut and bolt (29) and (30) in the dipstick pipe support.

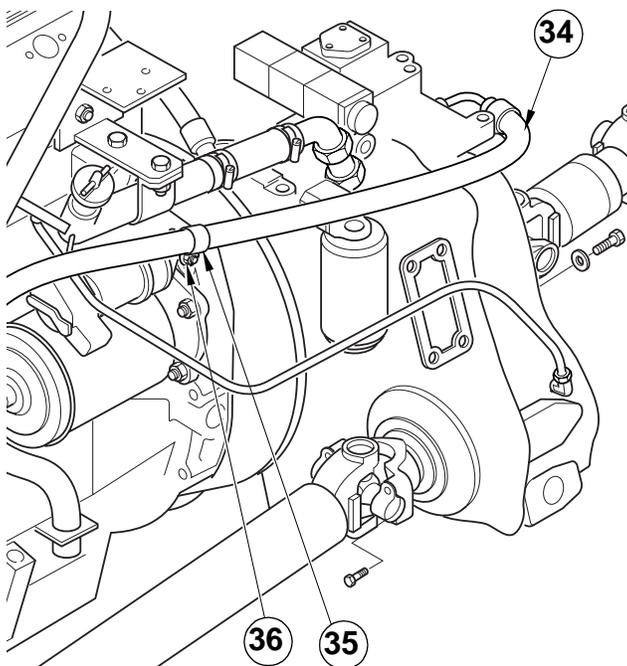
STEP 14

Release the dipstick pipe coupling (25) on the transmission and remove the dipstick assembly.

STEP 15

789M263A

Remove the nut (32) from the wiring cover (31) on the starter motor (33) and remove the cover.

STEP 16

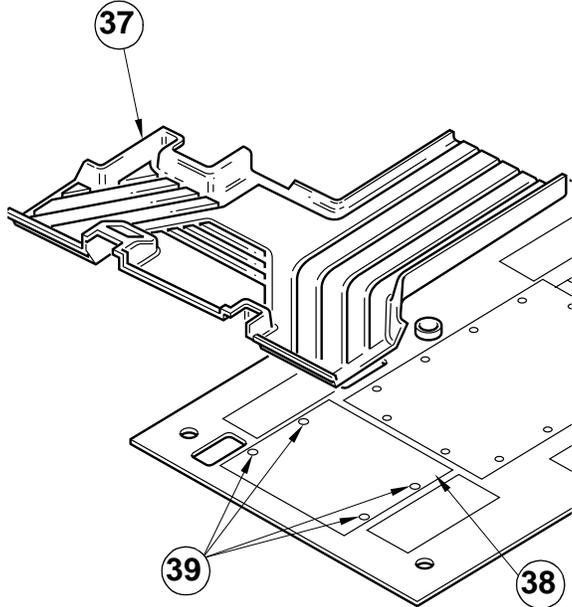
789M264A

Remove the bolt and nut (36) in the clip (35) for the transmission oil cooler pipe (34), and release the pipe.

STEP 17

Disconnect and tag all wiring connections from the engine. These include the starter motor, the alternator, the water temperature switch, the oil pressure switch, the thermostat unit, the air filter restriction switch and the fuel injection pump stop solenoid.

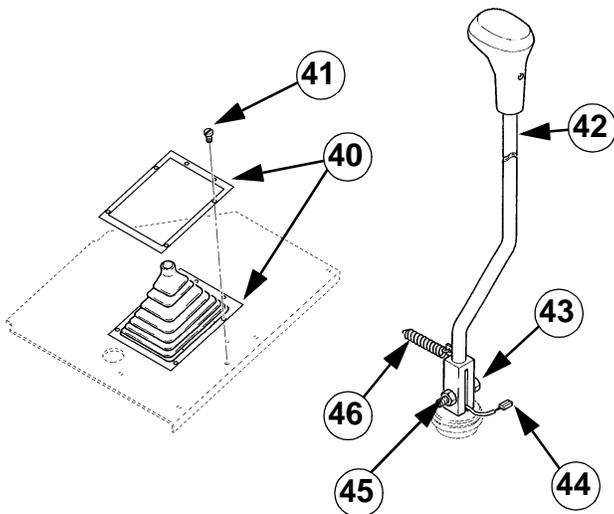
STEP 18



789M265A

Remove the front floor mat (37) in the cab. Remove the four screws (39) from the centre front floor plate (38) and remove the plate.

STEP 19



CI98G501

Remove the six screws (41) from the gear lever tower (40) and slide the tower up the lever (42).

STEP 20

Remove the six screws (41) from the gear lever tower (40) and slide the tower up the lever (42).

STEP 21

Disconnect the clutch switch wiring connection (44) and remove the spring (46) from the shift lever.

STEP 22

Remove the bolt and nut (43) and (45) from the shift lever and remove the lever from the transmission.

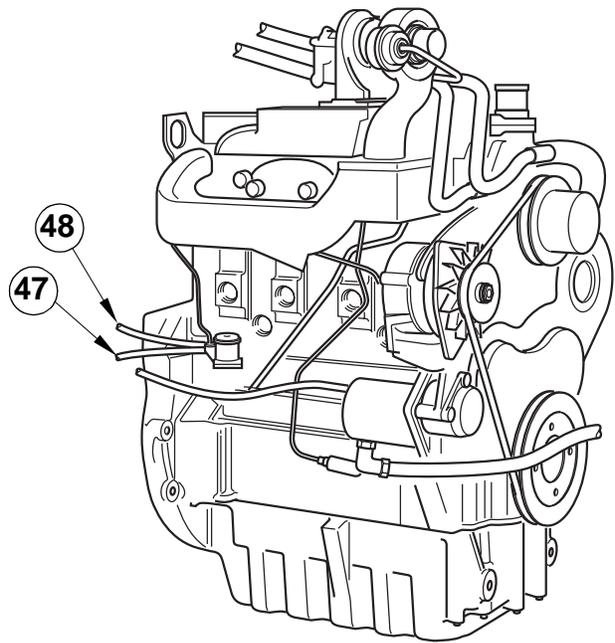
STEP 23

Put the wiring ties which attach the electrical harness to the support rail at the rear of the engine.

STEP 24

Release the oil cooler hose clamp on the right hand side of the chassis.

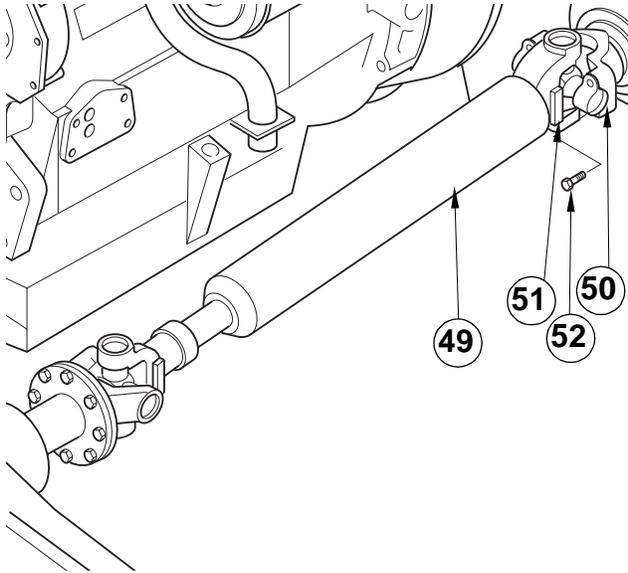
STEP 25



789M288A

Disconnect the fuel inlet and discharge pipe (47) and (48) from the fuel lift pump.

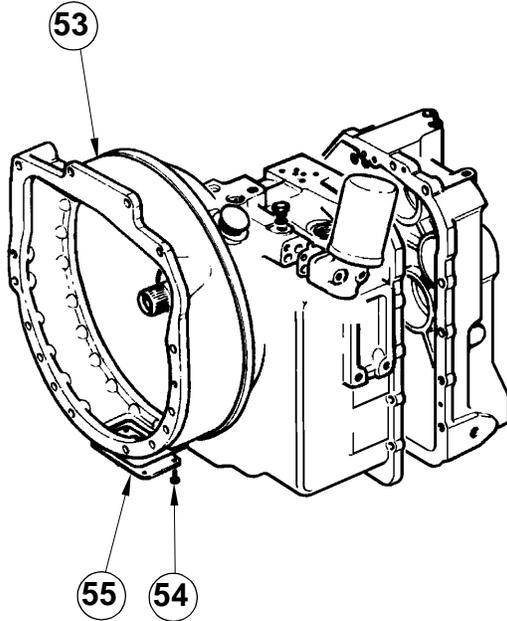
STEP 26



789M270A

Remove the four bolts (52) and the two bearing caps (51) from the rear coupling. Lower the propshaft (49). Make sure that the needle roller bearing cups (50) on the rear coupling are taped to the joint.

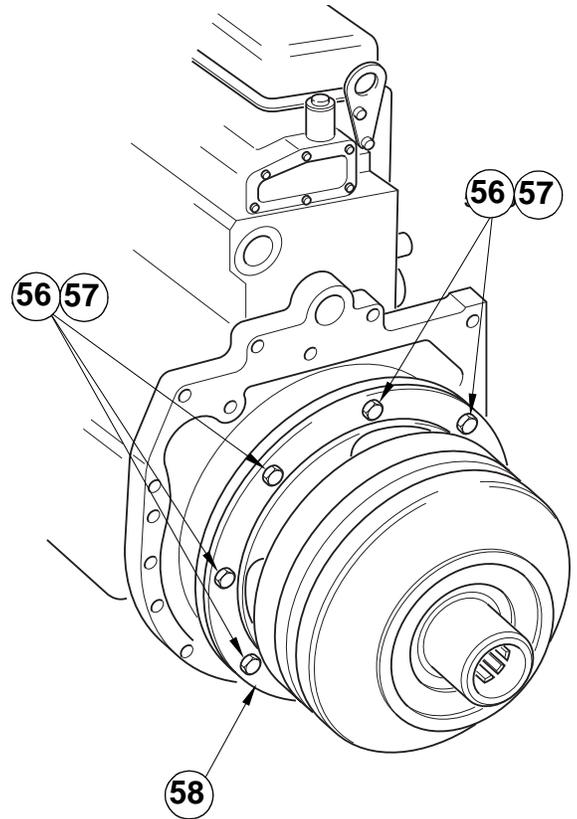
STEP 27



789M271A

Remove the four bolts (54) and the inspection plate (55) from the bottom of the bell housing (53).

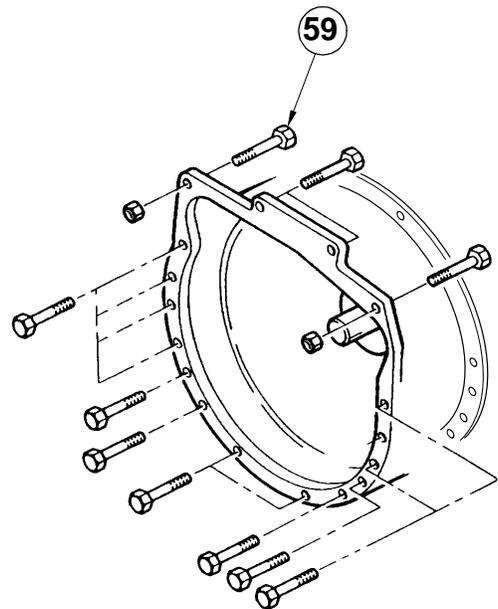
STEP 28



789M272A

Remove the eight flywheel to torque converter bolts (56) and the washers (57) from the flex plate assembly (58).

STEP 29



789M273A

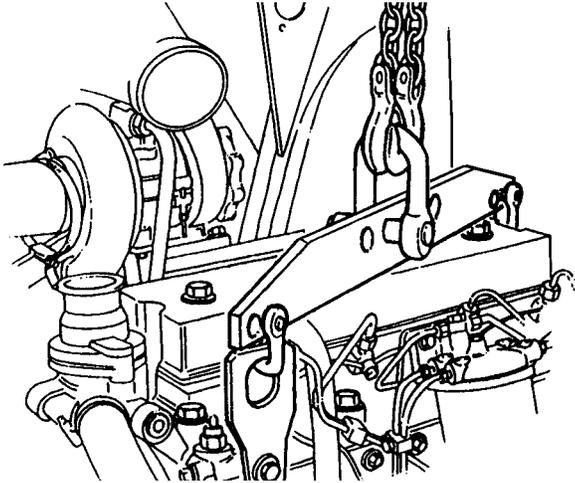
Remove all except two of the spacer housing bolts (59).

STEP 30

Position a trolley jack under the transmission, next to the front axle drive coupling flange. Raise the jack into contact with the transmission but DO NOT lift the transmission.

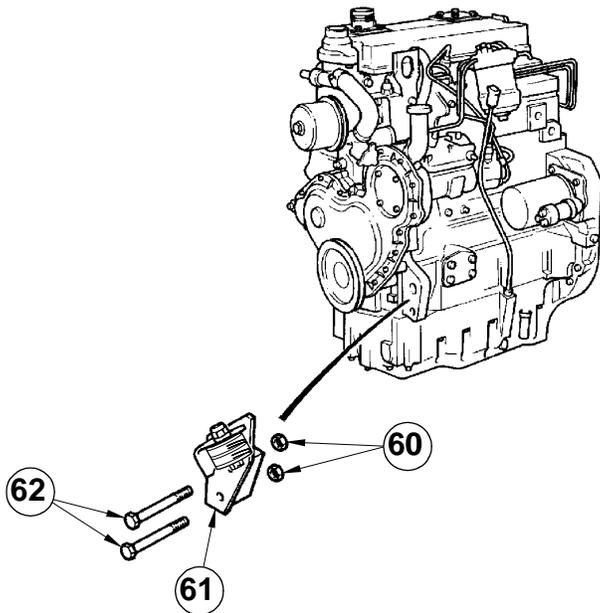
STEP 31

Attach the special lifting bracket to the engine.

STEP 32

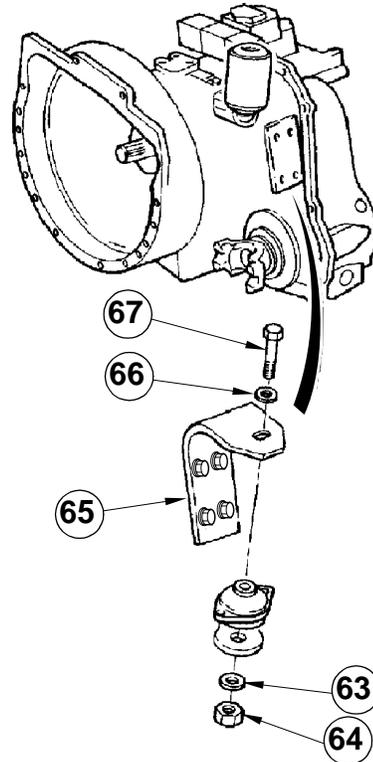
789M256A

Using a suitable hoist attached to the lifting bracket, apply tension to the lift chains. DO NOT raise the engine.

STEP 33

789M257A

Loosen the two bolts (62) and the nuts (60) from each engine bracket (61).

STEP 34

789M276A

Remove the centre bolt (67), the nuts (64) and the washers (63) and (66) from each transmission mounting plate (65).

STEP 35

Remove the rear propshaft.

STEP 36

Using the hoist and trolley jack, raise the engine/transmission unit sufficient to remove the engine mountings. (approximately 40 mm (1.5 in)).

STEP 37

Lower the engine/transmission unit and move it towards the rear of the machine until the rear propshaft slicing joint is completely closed.

STEP 38

Remove the two bolts in the spacer housing.

STEP 39

Hold the transmission to the rear, and move the engine forward on the hoist to disengage the torque converter's spigot. Make sure that the torque converter does not disengage from the transmission input shaft when the engine moves forward.

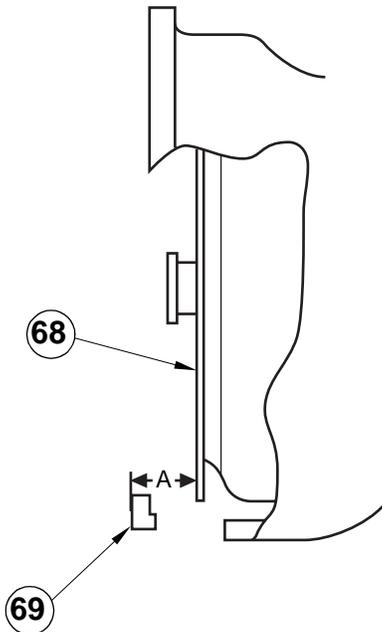
STEP 40

Remove the engine from the machine.

Installation

NOTE : *Install the engine in the reverse order of the removal but note the following :*

1.



789M277A

Before installation of the engine, make sure that the torque converter is correctly installed in the transmission. The flex plate face (68) must be at least 50 mm (2.0 in) from the transmission flywheel cover face (69) (measurement A). If the measurement A is 40 mm (1.5 in) or less, the torque converter is not correctly installed and must be removed and installed correctly.

2. During assembly of the engine to the transmission, make sure that the torque converter spigot enters the fly wheel bush correctly. To check, rotate the torque converter as the engine and transmission come together.

3. Torque tighten attaching parts as follows :
 - Flywheel to torque converter flexible plate bolts.....28 Nm (21 lbf ft)
 - Rear coupling bearing cap bolts 37 Nm (27 lbf ft)
 - Coupling flange bolts..... 48 Nm (35 lbf ft)
 - Starter motor friction nuts.....36 Nm (26 lbf ft)
4. Before starting the engine, do steps 3 through 8.
5. Bleed air from fuel system (see section 3410).
6. Check the transmission oil level (see section 6002).
7. Check the engine oil level.
8. Replenish the radiator and header tank with coolant.
9. Check the hydraulic oil level.
10. Carry out a complete functional test of the machine. Check all connections and joints for leakage. Check all fluid levels with the engine stopped and cold.

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