7100 and 7200 Series Magnum Tractor

Service Manual

Table of Contents

J I Case

Don 7-35953

Printed in England

June 1994

* Schematic set Sections.

* Schematic set Sections.

Section 1001

GENERAL INFORMATION

J I Case
A Tenneco Company

Rac 8-91581

Printed in U.S.A.
January, 1988 (Revised February, 1991

TABLE OF CONTENTS

CONVERSION FACTORS

U.S. Customary to SI (Metric) Units

	Multiply	By	To Obtain: Multiply
Area:	square foot (ft^2)	0.092 903	square meter (m^2)
	acre	0.404 686	hectar (ha)
Force:	ounce force (ozf)	0.278 014	newton (N)
	pound force (16f)	4.448 222	newton (N)
Length:	inch (in)	25.4	millimetre (mm)
	foot (ft)	0.304 8	meter (m)
	mile	1.609 344	kilometer (km)
Mass:	pound (lb)	0.453 592	kilogram (kg)
Mass/Area:	ton/acre	2241.702	kilogram per hectare (kg/ha)
Mass/Energy: (Fuel Consumption)	pound per brake horsepower-hour (lb/bhp-h)	608.277 4	gram per kilowatt hour (g/kwh)
Mass/Volume: (Density)	pound per cubic yard (lb/yd^3) 0.593276	0.593 276	kilogram per cubic meter (kg/m^3)
Power:	horsepower - U.S. customary (hp - U.S. customary)	0.745 700	kilowatt (kw)
Pressure:	pound per square inch (psi)	6.894 757	kilopascal (kPa)
Temperature:	degrees Fahrenheit (°F)	TC = 5/9 (TF-32)	degree Celsius (°C)
Torque:	pound inch (lb in)	0.112 985	newton meter (Nm)
	pound foot (lb ft)	1.355 818	newton meter (Nm)
Velocity (Speed):	miles per hour (mph)	1.609 344	kilometer per hour (km/h)
Volume:	cubic inch (in^3)	16.387 06	cubic centimeter (cm^3)
	cubic foot (ft^3)	0.028 317	cubic meter (m^3)
	cubic yard (yd^3)	0.764 555	cubic meter (m^3)
	ounce-U.S. fluid (oz)	29.573 53	milliliter (ml)
	quart-U.S. liquid (qt)	0.946 353	liter (1)
	quart-Imperial (qt)	1.136 523	liter (1)
	gallon-U.S. liquid (gal)	3.785 412	liter (1)
	gallon-Imerrial (gal)	4.546 092	liter (1)
Volume/Area:	bushel (U.S.) per acre	0.087 078	cubic meter per hectare (m^3/ha)
Volume/Time: (Flow)	gallon per minute (U.S.) (gpm U.S.)	3.785 412	liter per minute (l/m)
	gallon per minute (Imperial) (gpm Imp.)	4.546 092	liter per minute (l/m)
Horsepower:	U.S. customary hp	1.014	metric horsepower
	net engine hp	0.815*	P.T.O. observed hp
	net engine hp	0.70*	mox drawbar hp

SI (Metric) Units to U.S. Customary

By	To Obtain
10.763 91	square foot (ft^2)
2.471 05	acre
3.596 942	ounce force (ozf)
0.224 809	pound force (lbf)
0.039 370	inch (in)
3.280 804	foot (ft)
0.621 371	mile
2.204 622	pound (lb)
0.000 446	ton/acre
0.001 644	pound per brake horsepower-hour (lb/bhp-h)
1.685 555	pound per cubic yard (lb/yd^3)
1.341 02	horsepower - U.S. customary (hp-U.S. customary)
0.145 038	pound per square inch (psi)
TF = 1.8 TC + 32	degree Fahrenheit (°F)
8.850 748	pound inch (lb in)
0.737 562	pound foot (lb ft)
0.621 371	miles per hour (mph)
0.061 024	cubic inch (in^3)
35.314 66	cubic foot (ft^3)
1.307 950	cubic yard (yd^3)
0.033 814	ounce-U.S. fluid (oz)
1.056 688	quart-U.S. liquid (qt)
0.879 877	quart-Imperial (qt)
0.264 172	gallon-U.S. liquid (gal)
0.219 969	gallon-Imperial (gal)
11.484 000	bushel (U.S.) per acre
0.264 172	gallon per minute (U.S.) (gpm U.S.)
0.219 969	gallon per minute (Imperial) (gpm Imp.)
0.986 3	U.S. customary hp

* Approximation based on observed tests

SAE FASTENER TORQUE CHART

NOTE: Use these torques, unless special torques are specified. Values are for UNC and UNF thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.

SAE Grade No.	2				5				8*			
Bolt head identification (See Note 1)												
Bolt Size	LB FT		Nm		LB FT		Nm		LB FT		Nm	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	5	6	7	8	9	11	12	15	12	15	16	20
5/16	10	12	14	16	17	20.5	23	28	24	29	33	39
3/8	20	23	27	31	35	42	48	57	45	54	61	73
7/16	30	35	41	47	54	64	73	87	70	84	95	114
1/2	45	52	61	70	80	96	109	130	110	132	149	179
9/16	65	75	88	102	110	132	149	179	160	192	217	260
5/8	95	105	129	142	150	180	203	244	220	264	298	358
3/4	150	185	203	251	270	324	366	439	380	456	515	618
7/8	160	200	217	271	400	480	542	651	600	720	814	976
1	250	300	339	406	580	696	787	944	900	1080	1220	1464
1-1/8					800	880	1085	1193	1280	1440	1736	1953
1-1/4					1120	1240	1519	1681	1820	2000	2468	2712
1-3/8					1460	1680	1980	2278	2380	2720	3227	3688
1-1/2					1940	2200	2631	2983	3160	3560	4285	4827

NOTE 1: Bolt head identification marks as per grade. Manufacturing marks will vary. *Thick nuts must be used with Grade 8 bolts

METRIC FASTENER (ISO) TORQUE CHART

NOTE: Use these torques, unless special torques are specified. Values are for course thread fasteners, plated or unplated, as received from supplier. Fasteners can be dry or lubricated with normal engine oil. Values do not apply if graphite, moly-disulphide or other extreme pressure lubricant is used.

ISO Class No.	8.8				10.9				12.9			
Bolt head identification (See Note 1)												
Bolt Size	Nm		LB FT		Nm		LB FT		Nm		LB FT	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
M4	3	4	2	3	4	5	3	4				
M5	6.5	8	5	6	9.5	11	7	8				
M6	10.5	12	8	9	15	17.5	11	13				
M8	26	31	19	23	37	43	27	32				
M10	52	61	38	45	73	87	54	64				
M12	90	107	66	79	125	150	93	112				
*M14	144	172	106	127	200	245	149	179				
M16	217	271	160	200	310	380	230	280				
M20	434	515	320	380	610	730	450	540				
M24	675	815	500	600	1050	1275	780	940				
M30	1250	1500	920	1100	2000	2400	1470	1770				
M36	2175	2600	1600	1950	3500	4200	2580	3090				

Because of the low ductility of these fasteners, the torque range is to be determined individually for each application. As a general rule, the torque ranges specified for grade 10.9 fasteners can be used satisfactorily on 12.9 fasteners.

*M14 is not a preferred size

NOTE 1: Bolt head identification marks as per grade. Manufacturing marks will vary

STANDARD TORQUE DATA FOR HYDRAULIC TUBES AND FITTINGS

TUBE NUTS FOR 37° FLARED FITTINGS							O-RING BOSS PLUGS, ADJUSTABLE FITTING LOCK NUTS, SWIVEL JIC - 37° SEATS			
	TUBING O.D.		THREAD SIZE	LB FT		Nm		LB FT		Nm	
SIZE	Inches	mm		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
4	1/4	6.4	7/16-20	9	12	12	16	6	10	8	14
5	5/16	7.9	1/2-20	12	15	16	20	10	15	14	20
6	3/8	9.5	9/16-18	21	24	29	33	15	20	20	27
8	1/2	12.7	3/4-18	35	40	47	54	25	30	34	41
10	5/8	15.9	7/8-14	53	58	72	79	35	40	47	54
12	3/4	19.1	1-1/16-12	77	82	104	111	60	70	81	95
14	7/8	22.2	1-3/16-12	90	100	122	136	70	80	95	109
16	1	25.4	1-5/16-12	110	120	149	163	80	90	108	122
20	1-1/4	31.8	1-5/8-12	140	150	190	204	95	115	129	156
24	1-1/2	38.1	1-7/8-12	160	175	217	237	120	140	163	190
32	2	50.8	2-1/2-12	225	240	305	325	250	300	339	407

Above torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations and swivel nuts either swaged or brazed. These torques are not recommended for tubes 1/2 inch (12.7 mm) O.D. and larger with wall thickness of 0.035 inch (0.889 mm) or less. The torque is specified for 0.035 inch (0.889 mm) wall tubes on each application individually.

2002

Section 2002

ENGINE TUNE UP

IMPORTANT: This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.

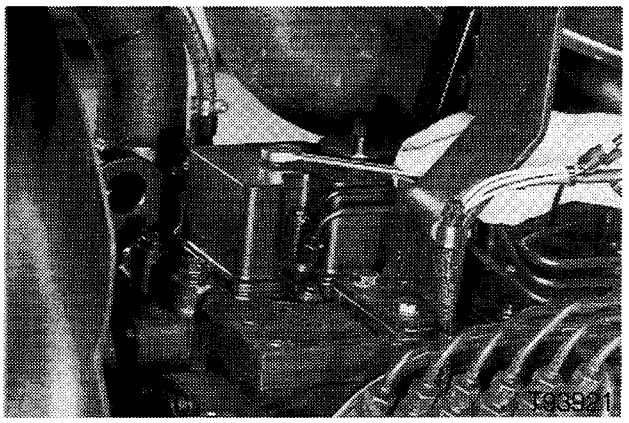
J I Case

Rac 8-91611

January, 1988 (Revised February, 1991)

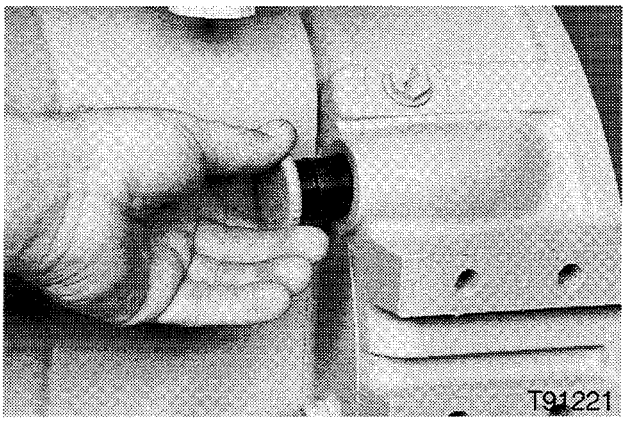
ADJUSTING ROCKER ARM TO VALVE CLEARANCE
Cold Setting

STEP 1



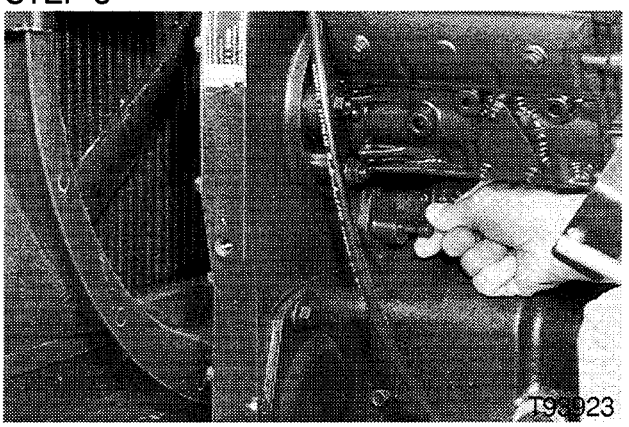
Remove the valve cover from the engine. Discard the gasket.

STEP 2



Remove the plug in the flywheel housing (if equipped) and install the engine turnover tool, CAS-1690.

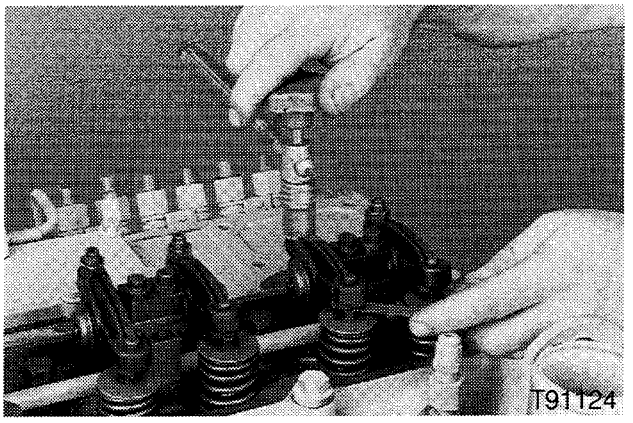
STEP 3



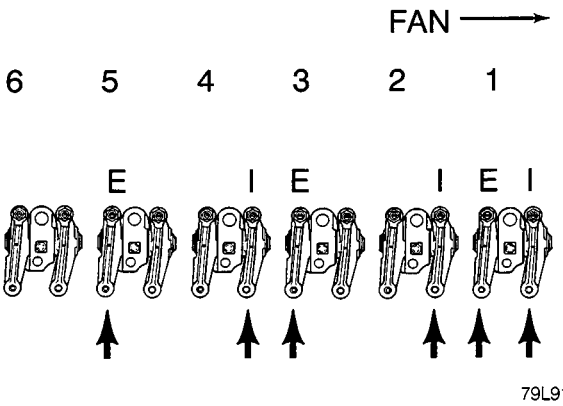
While turning the engine over with the turn over tool, push the lock pin in. When the lock pin moves into the camshaft gear, the engine will be at top center.

NOTE: *Use caution when turning the engine to prevent damage to the timing pin.*

STEP 4



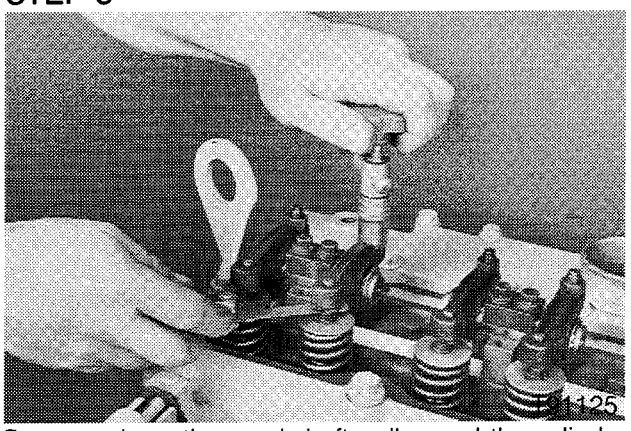
Check and adjust the intake and exhaust valves indicated by the arrows shown below.



Number one cylinder will be at top center of the compression stroke.

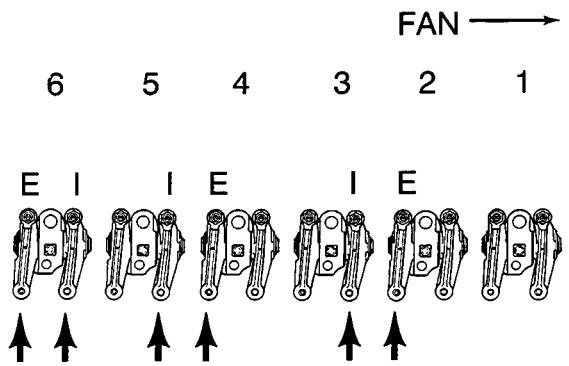
Valve Clearance, Cold - Intake Valves - 0.30 mm
Exhaust Valves - 0.60 mm

STEP 5



Put a mark on the crankshaft pulley and the cylinder block, in alignment. Pull the lock pin from the cam gear. Turn the engine one complete revolution. Make sure the marks are aligned again.

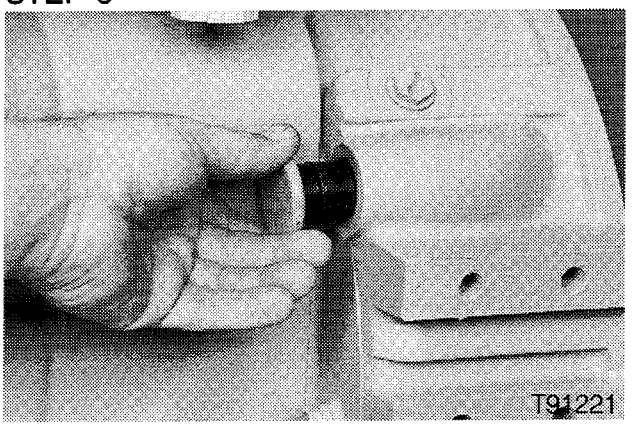
Check and adjust the intake and exhaust valves indicated by the arrows shown below.



Number six cylinder will be at top center of the compression stroke

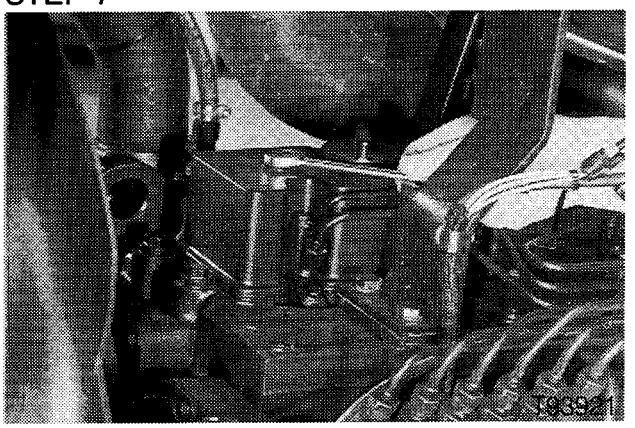
Valve Clearance, Cold - Intake Valves - 0.30 mm
Exhaust Valves - 0.60 mm

STEP 6



Remove the engine turn over tool and install the plug in the flywheel housing (if equipped).

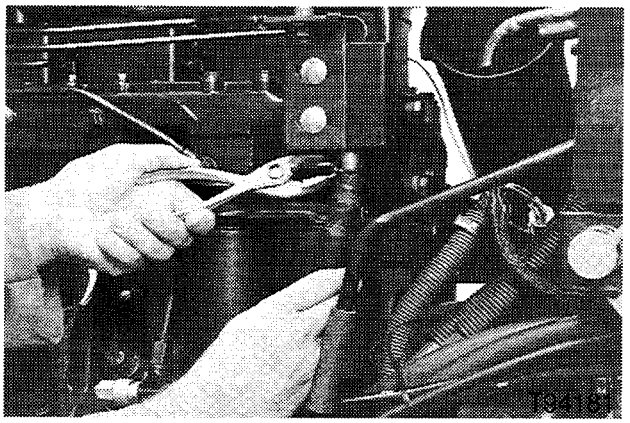
STEP 7



Install a new gasket and the valve cover on the engine. Tighten the valve cover mounting bolts to a torque of 21 to 27 Nm. Install the breather tube on the valve cover.

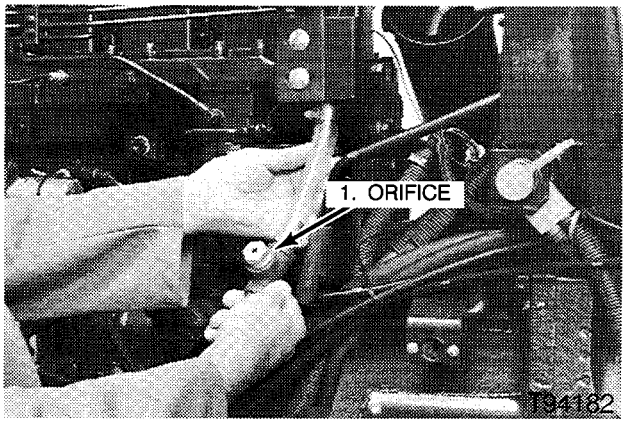
CRANKCASE PRESSURE CHECK (BLOW BY)
Manometer Installation

STEP 8



Remove the breather hose.

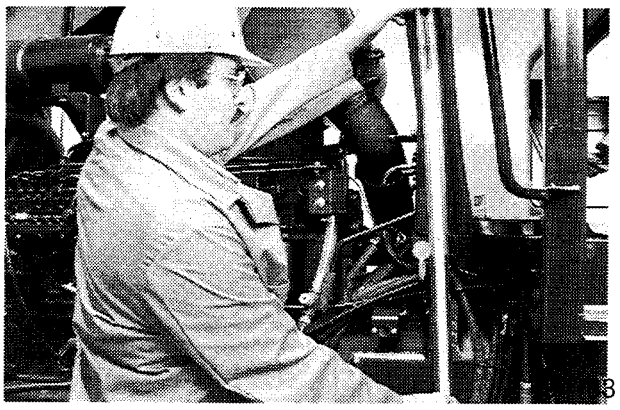
STEP 9



Install the breather adapter with the six cylinder orifice from the CAS-1692 manometer package.

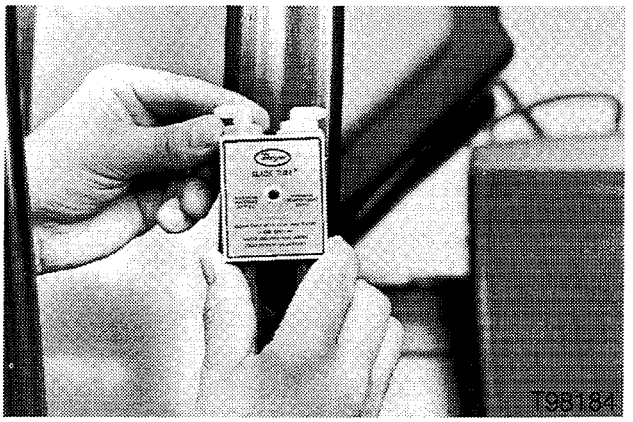
NOTE: *Use the orifice for six cylinder engines, marked 6 cyl.*

STEP 10



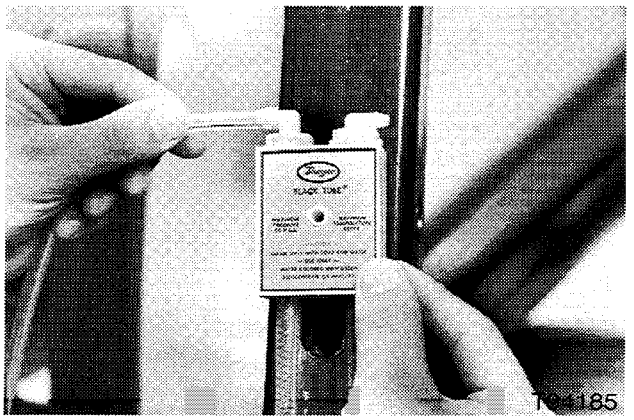
Install the manometer on the tractor.

STEP 11



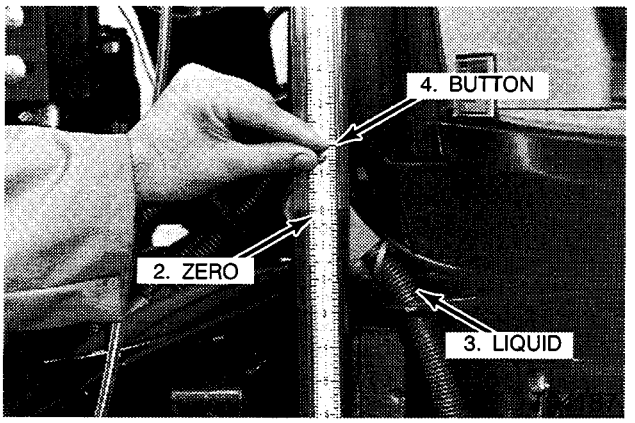
Turn each connector on the manometer one turn counterclockwise to open the check valves.

STEP 12



Connect the tube from the breather adapter to one of the connectors on the manometer.

STEP 13



Push the button on the gauge and move the gauge up or down, until the zero on the gauge and the liquid in the tube are aligned.

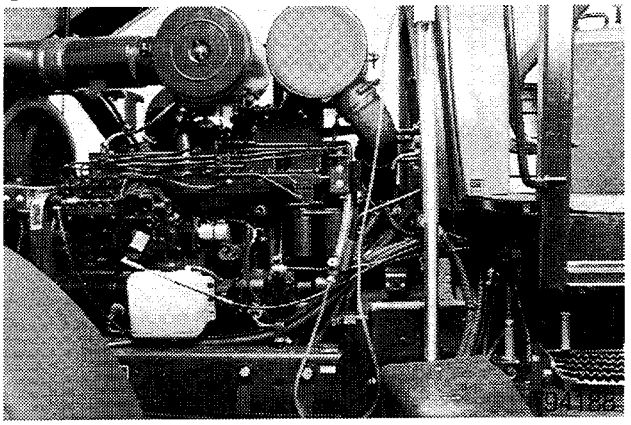
Testing

NOTE: *Do the following steps to get the correct manometer readings.*

Step 1 - Warm the engine to operating temperature.

Step 2 - Operate the engine at the rated speed, under a full load.

STEP 14



Take a manometer reading from the engine. Add the number of lowered inches to the number of raised inches for the correct manometer reading.
See example below.

LOWERED INCHES 1.5
RAISED INCHES +1.5

TOTAL 3.0 INCHES

See the chart for manometer reading and crankcase pressure (Blow By) limits.

MANOMETER READING

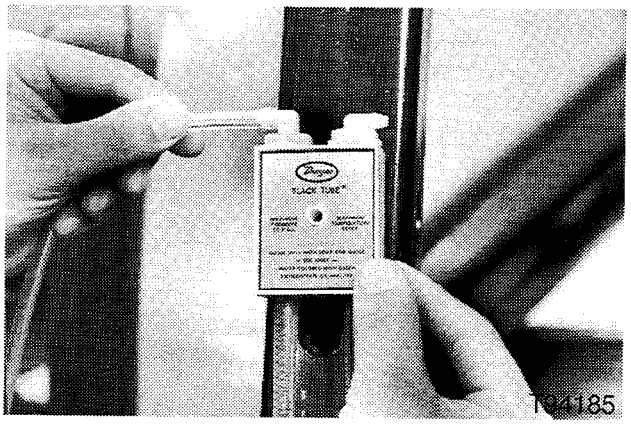
Inches of Water	L/min
1	50
2	84
3	103
4	119
5	133
6	145
7	155
8	164
9	172
10	180
11	187
12	193
13	200
14	206
15	211
16	217
17	222
18	226
19	229
20	232

CRANKCASE PRESSURE
(BLOW BY) LIMITS

Engine Model	Engine Speed	L/min Maximum New	L/min Worn Limit
6T-830	2200	113.0	226.0
6TA-830	2200	113.0	226.0

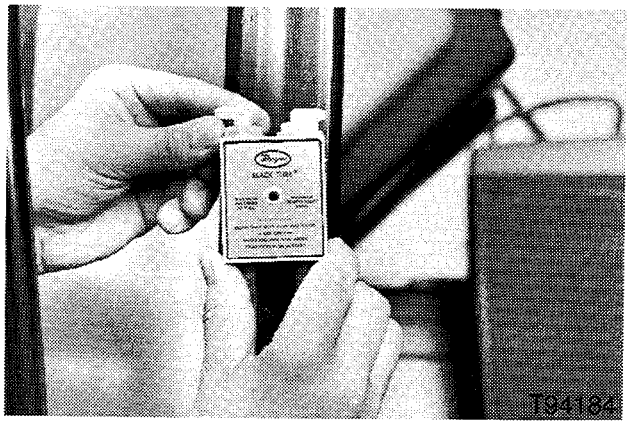
Manometer Removal

STEP 15



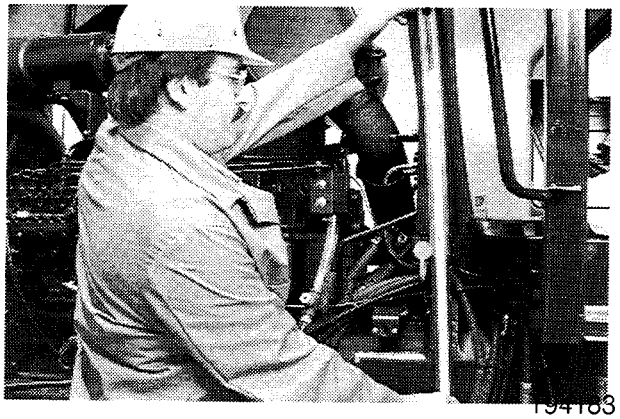
Disconnect the tube from the connector.

STEP 16



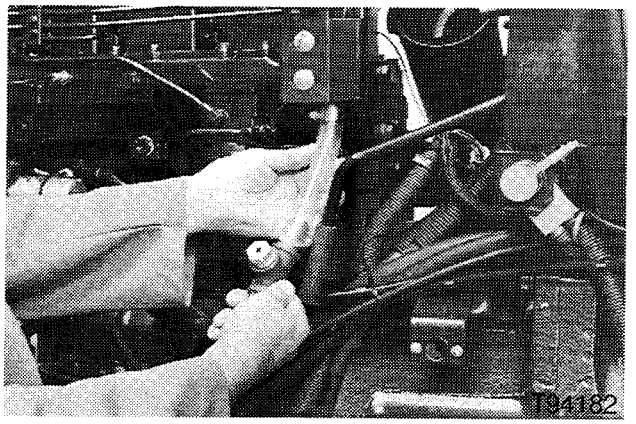
Turn each connector on the manometer one turn clockwise to close the check valve.

STEP 17



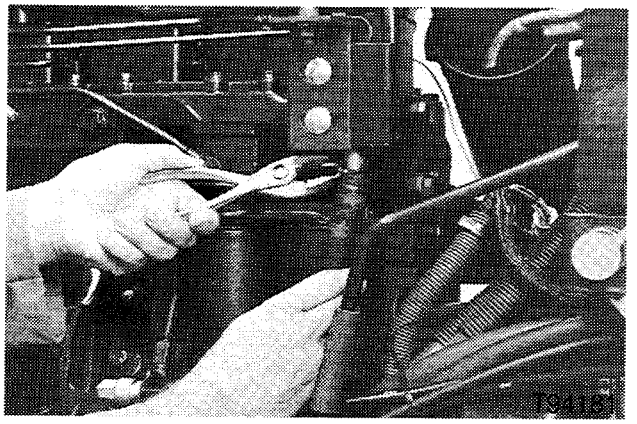
Remove the manometer.

STEP 18



Remove the adapter from the breather tube.

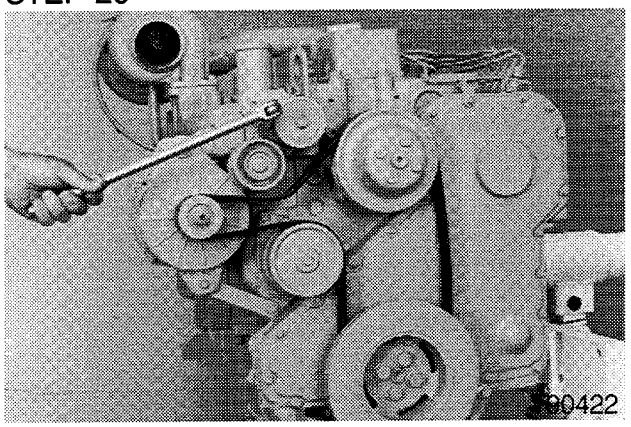
STEP 19



Install breather hose and the hose clamp.

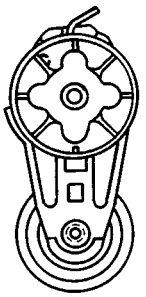
Checking the Fan Belt Tensioner

STEP 20

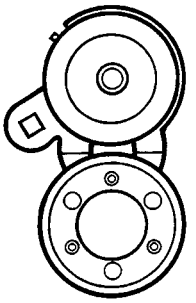


Lift the belt tensioner pulley. If there is tension on the pulley, the tension is good.

If the belt tensioner needs replacement, see Section 2455 in this manual for belt tensioner removal.



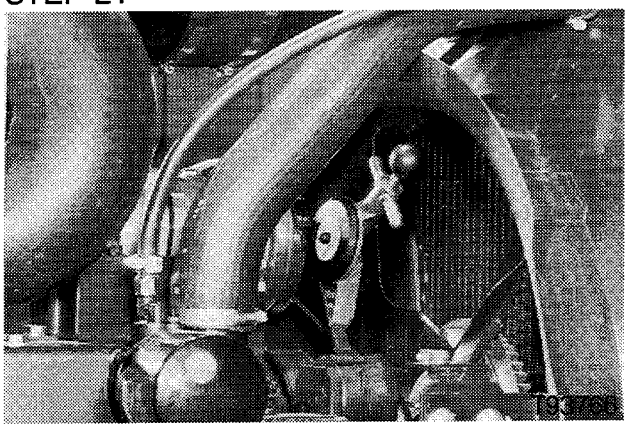
7L91



8-1L91

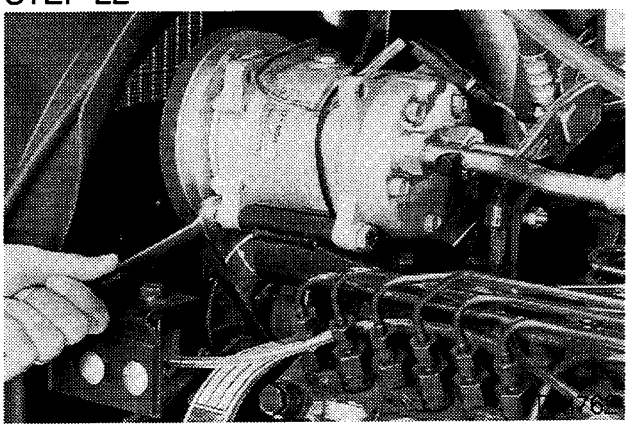
ADJUSTING THE COMPRESSOR BELT

STEP 21



Check the compressor belt for the correct tension using the tension gauge OEM-1294. The belt tension must be 422 to 516 N for a new belt and 400 to 489 N for a used belt. After 10 minutes of run in on a new belt, adjust to used belt specifications.

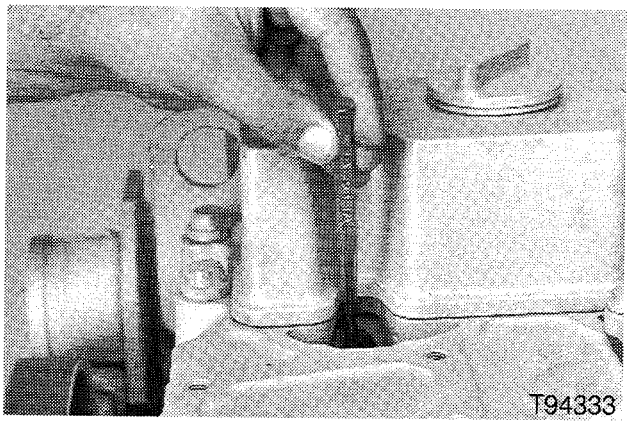
STEP 22



To adjust the compressor belt, loosen the adjusting bolt and pivot bolts. Pull the compressor out from the engine until the correct tension is reached. Tighten the adjusting and pivot bolts.

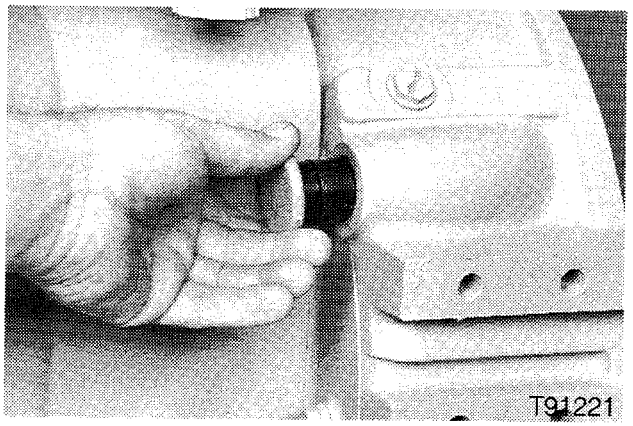
CHECKING ALIGNMENT BETWEEN CRANKSHAFT AND CAMSHAFT GEARS

STEP 23



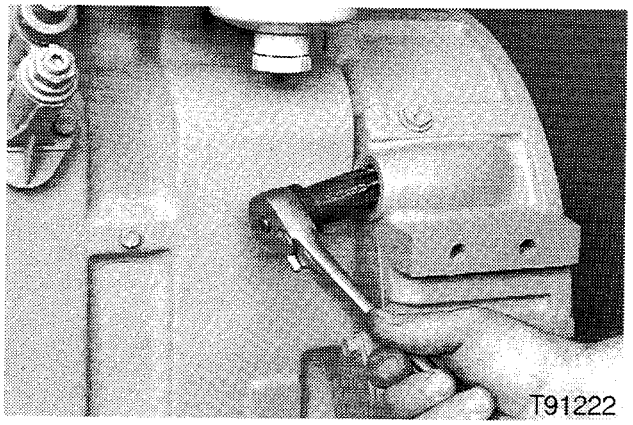
Remove the number one injector. Install a probe (minimum of 250 mm long) in the injector bore so that the probe will touch the top of the piston.

STEP 24



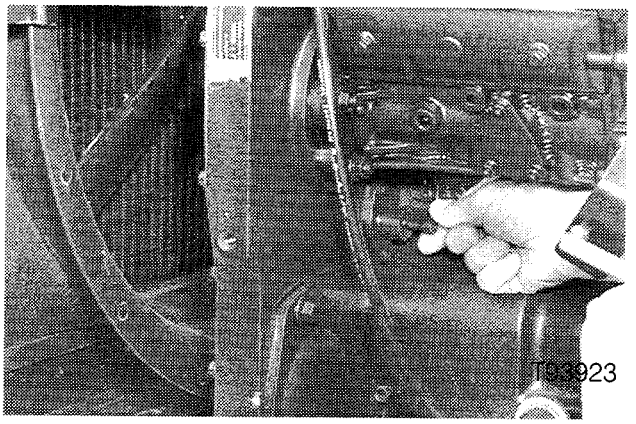
Remove the plug from the flywheel housing (if equipped).

STEP 25



Install the engine turn over tool CAS-1690.

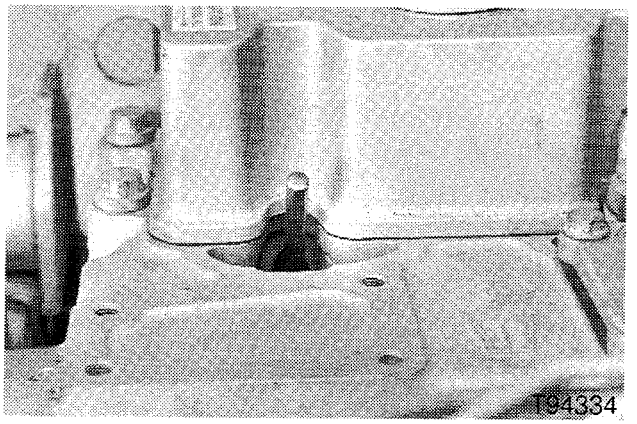
STEP 26



While turning the engine over with the turn over tool, CAS-1690 (if equipped) push the lock pin in. When the lock pin moves into the camshaft gear the engine will be at top center.

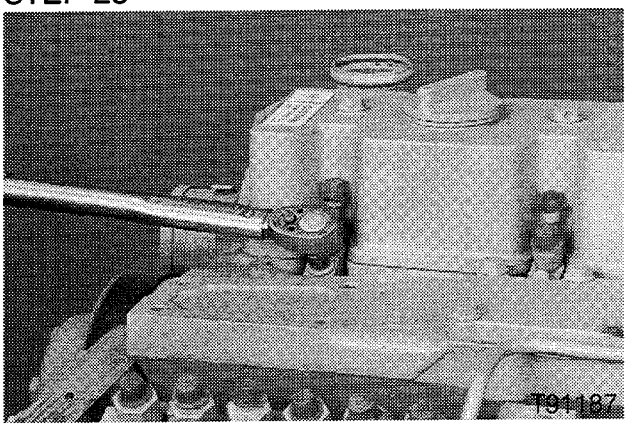
NOTE: *Use caution when turning the engine to prevent damage to the timing pin.*

STEP 27



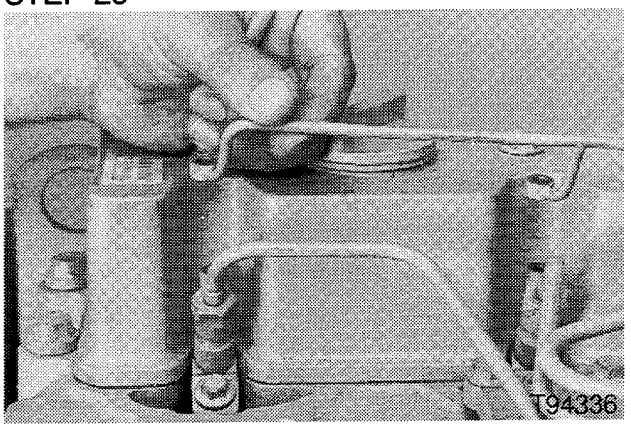
Pull the timing pin from the cam gear. Turn the engine in either direction a small amount. The probe must go down from this position. If the probe goes up when the engine is turned, timing is not correct. See Section 2425 in this manual for alignment of gears.

STEP 28



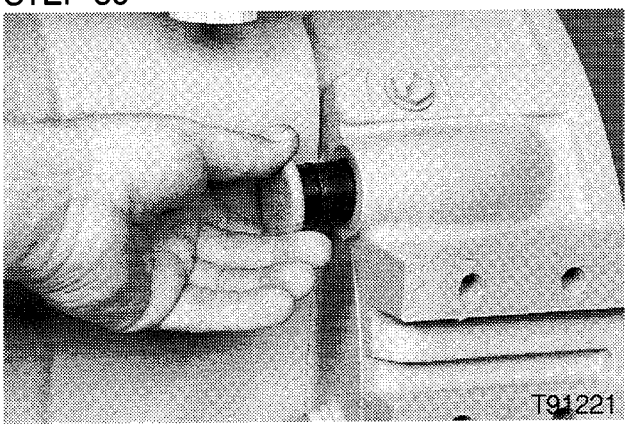
Remove the probe from the injector bore. Install the injector with a new seal. Tighten the retaining bolt to a torque of 21 to 27 Nm.

STEP 29



Install the injection line and leak off line. Tighten the leak off line bolts to a torque of 8 to 10 Nm.

STEP 30



Remove the engine turn over tool and install the plug in the flywheel housing (if equipped).

Section

2003

ENGINE REMOVAL

2003

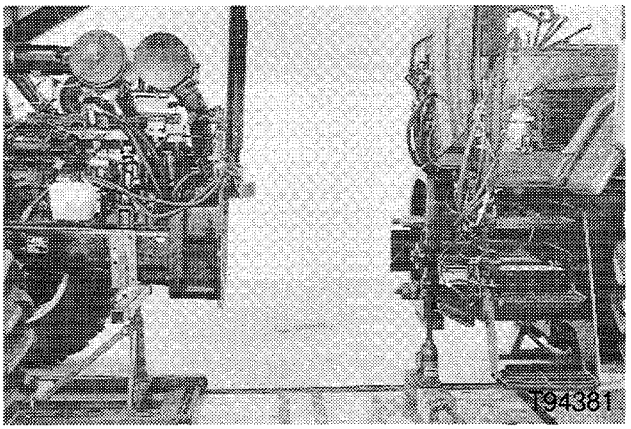
J I Case

Rac 8-91621

Printed in U.S.A.
January, 1988 (Revised February, 1991)

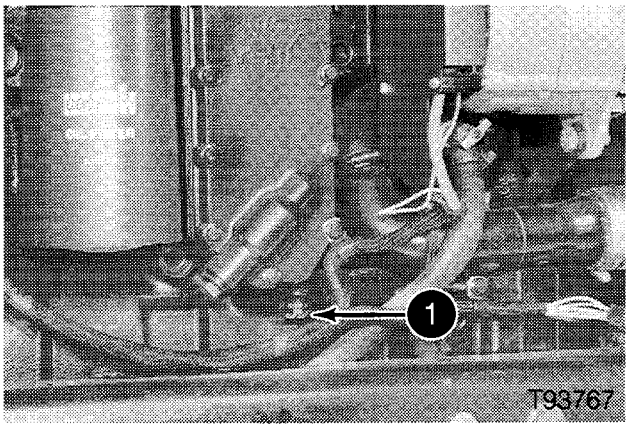
ENGINE REMOVAL

STEP 1



See Section 2004 in this manual and split the tractor between the flywheel housing and the transmission speed housing.

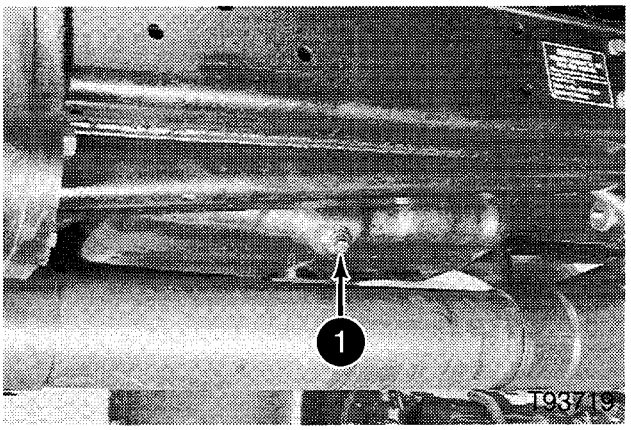
STEP 2



1. Block Drain Valve

Open the valve on the engine oil cooler and drain the coolant from the engine block.

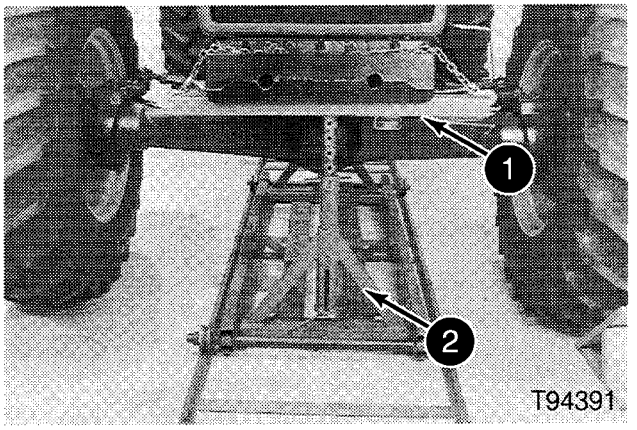
STEP 3



1. Drain Plug

Remove the oil pan drain plug and drain the engine oil.

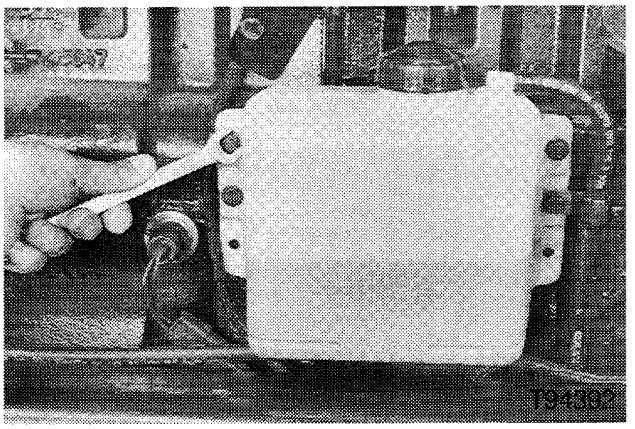
STEP 4



1. Adapter Bar 17-526-4A
2. Support 17-526-5 and Brace 17-526-14

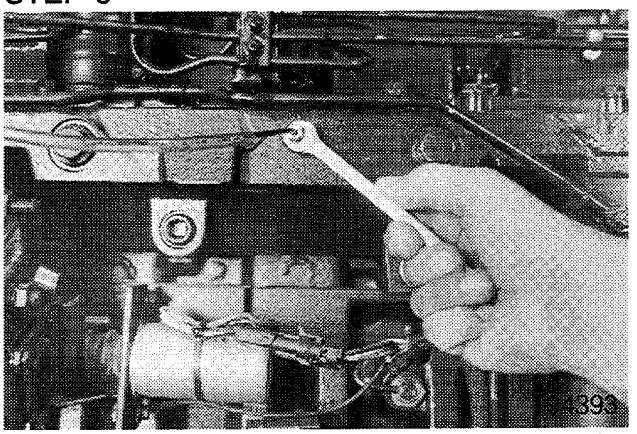
Install a support 17-526-5, brace 17-526-14 and adapter bar from 17-526-4A under the weight carrier. Secure the weight carrier to the support.

STEP 5



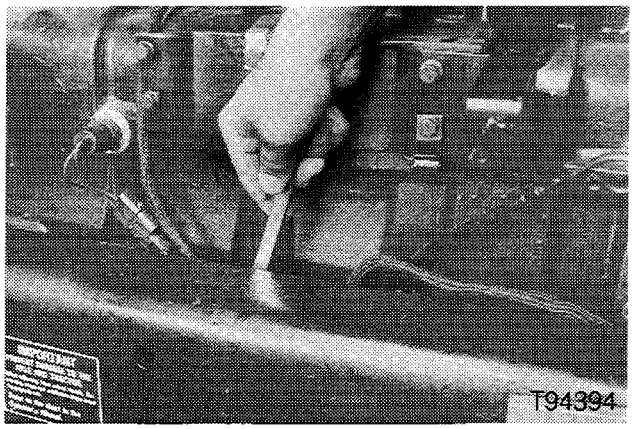
Remove the radiator reservoir from the bracket on the LH side of the engine.

STEP 6



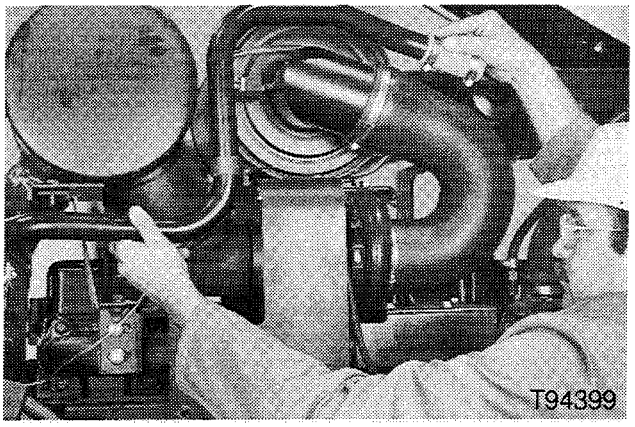
Remove the ether start hose from the fitting on the intake manifold.

STEP 7



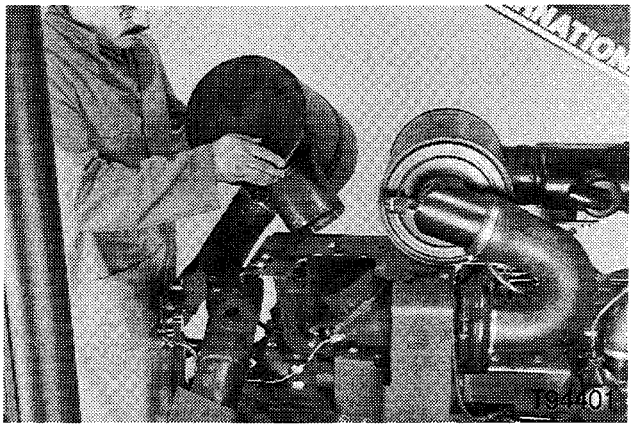
Remove the wiring harness clamp from the inside of the LH side frame.

STEP 8



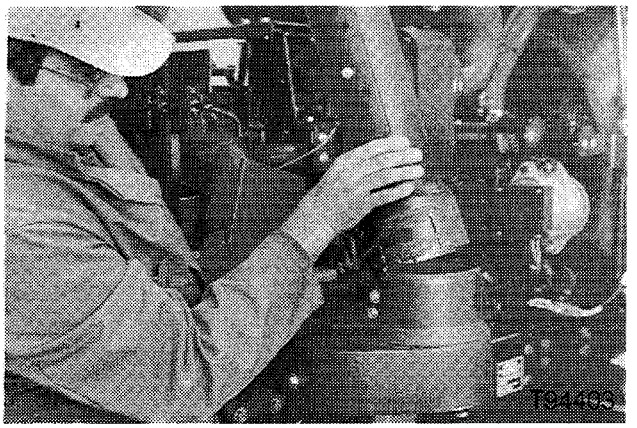
Remove the aspirator tube.

STEP 9



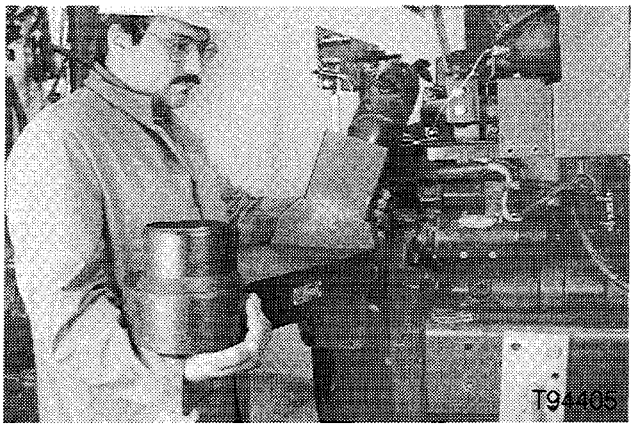
Remove the muffler.

STEP 10



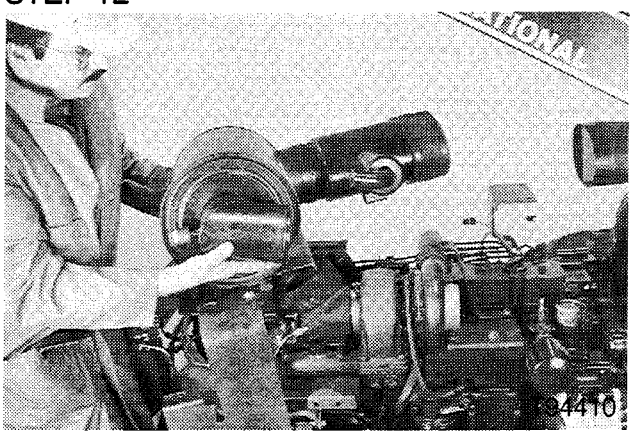
Remove the exhaust pipe.

STEP 11



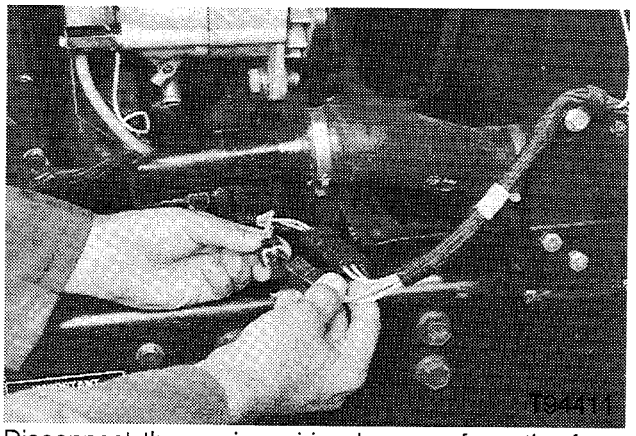
Remove the exhaust elbow and aspirator discharge pipe from the flywheel housing.

STEP 12



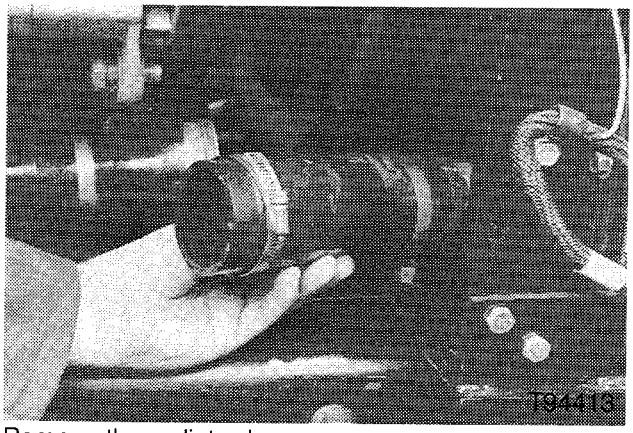
Remove the air cleaner and strata tube from the engine.

STEP 13



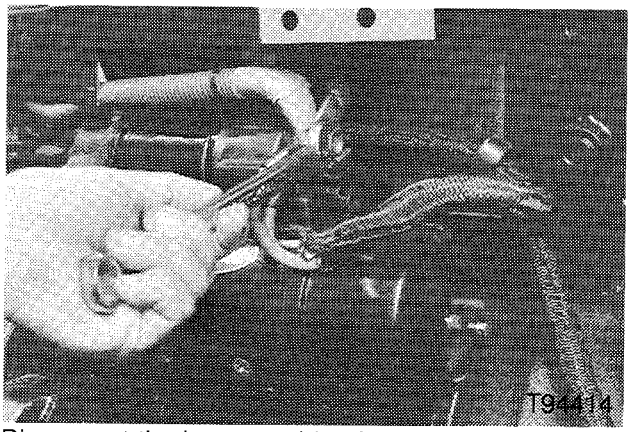
Disconnect the engine wiring harness from the front wiring harness at the RH frame rail.

STEP 14



Remove the radiator hoses.

STEP 15

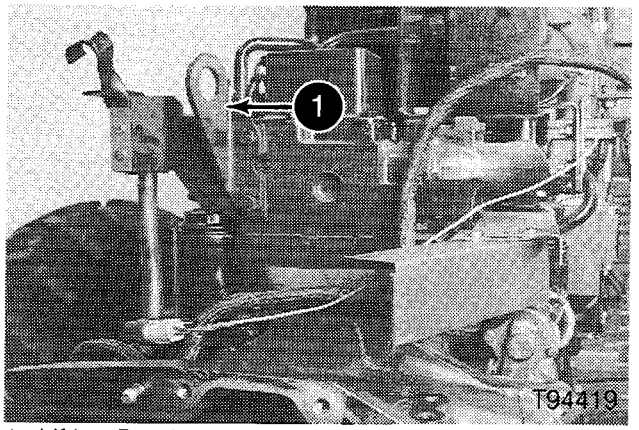


Disconnect the battery cables from the starter.

STEP 16

Remove the hood support and battery cable assembly from the flywheel housing.

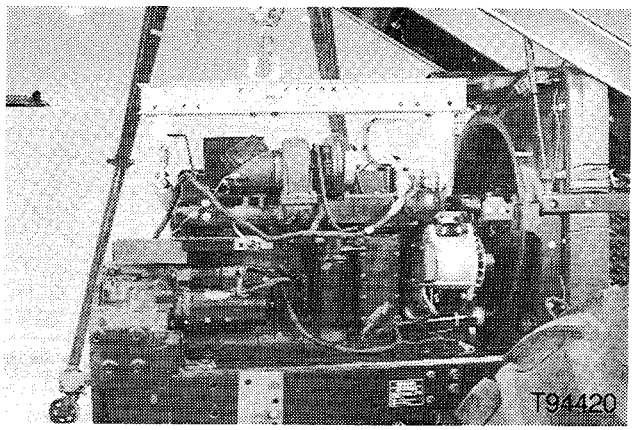
STEP 17



1. Lifting Bracket

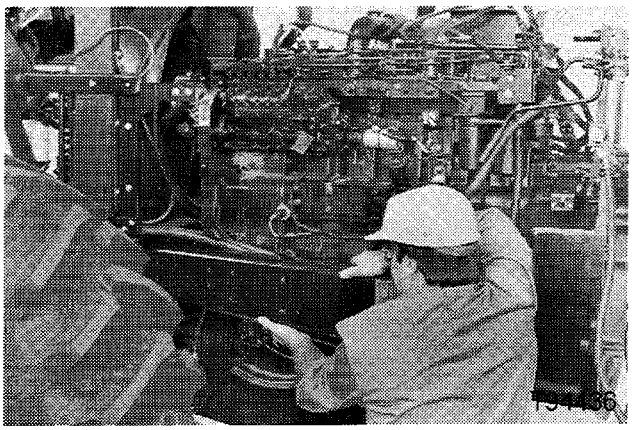
Remove the side panel latch mounting bolt from the back of the engine. Move the engine lifting bracket to a vertical position.

STEP 18



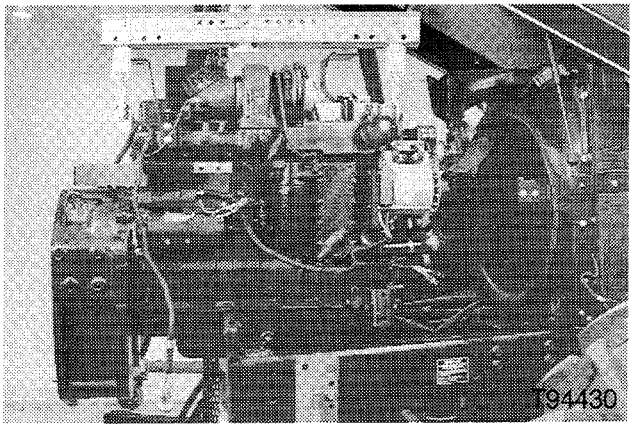
Attach a lifting sling to the engine lifting brackets and support the engine from a hoist.

STEP 19



Remove the side frames.

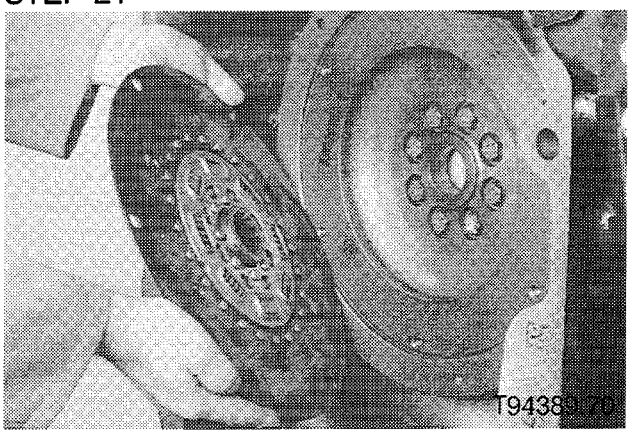
STEP 20



Raise the engine, move the engine to the rear and left to clear the RH side frame.

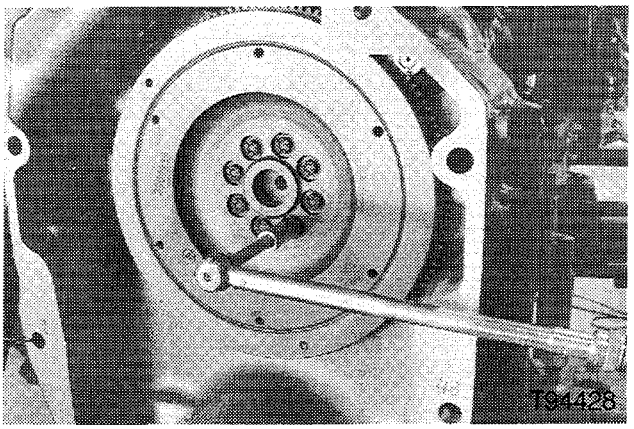
FLYWHEEL HOUSING REMOVAL

STEP 21



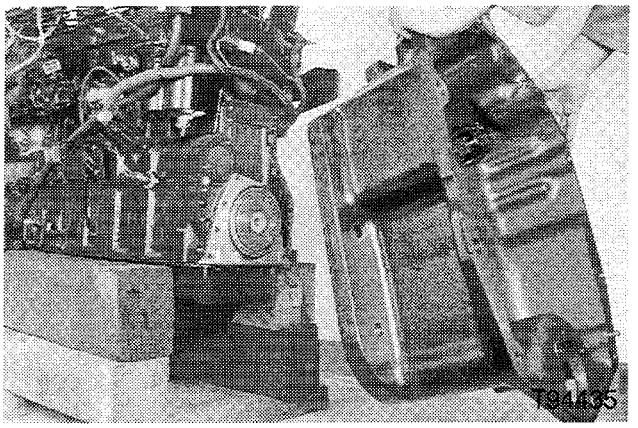
Remove the flex plate from the flywheel. Inspect the flex plate for broken springs or cracks. Replace the flex plate if necessary.

STEP 22



Remove the flywheel from the engine.

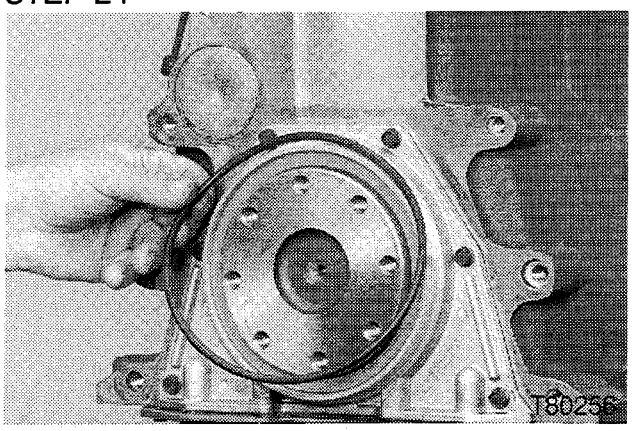
STEP 23



Attach a chain and hoist to the flywheel housing and remove the housing. Install the engine on the engine repair stand.

NOTE: *The starter can remain attached to the flywheel housing. Make sure that the engine wiring harness is removed from the starter.*

STEP 24



Remove and discard the o-ring from the engine rear seal carrier.

Suggest:

If the above button click is invalid.

Please download this document

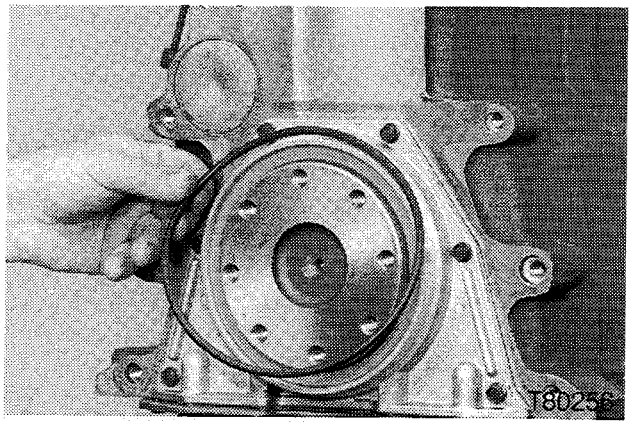
first, and then click the above link

to download the complete manual.

Thank you so much for reading

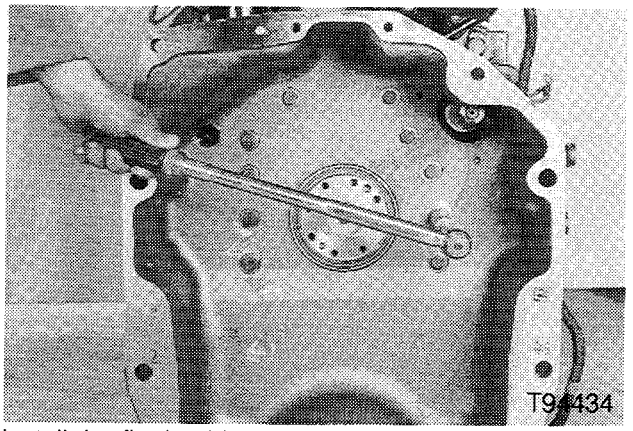
FLYWHEEL HOUSING INSTALLATION

STEP 25



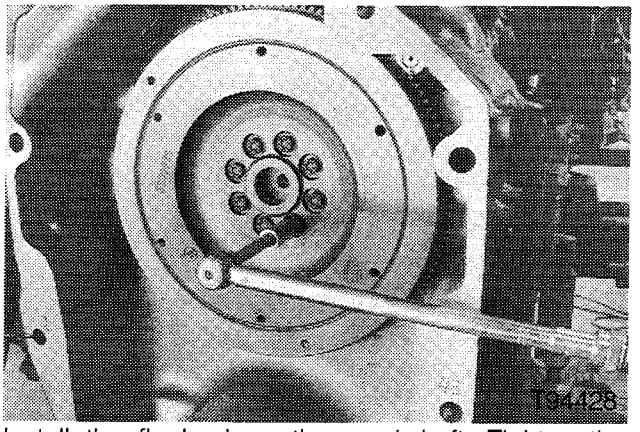
Lubricate a new o-ring with petroleum jelly and install the o-ring on the engine seal carrier.

STEP 26



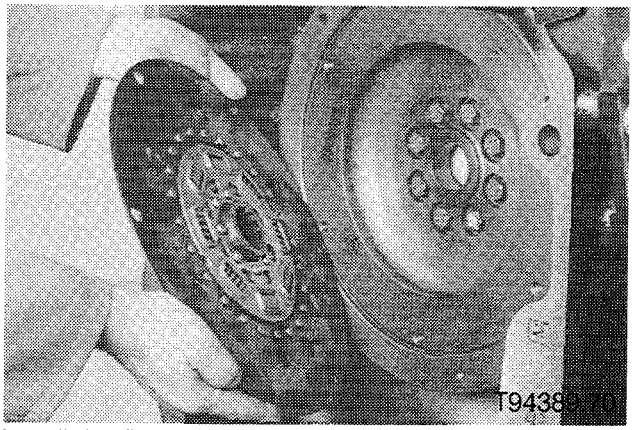
Install the flywheel housing and tighten the bolts to a torque of 60 Nm.

STEP 27



Install the flywheel on the crankshaft. Tighten the mounting bolts to a torque of 137 Nm.

STEP 28



Install the flex plate on the flywheel. The side marked FLYWHEEL SIDE goes toward the flywheel.

Install the flex plate mounting bolts and washers and tighten to a torque of 94 to 106 Nm.