

# 7100 and 7200 Series Magnum Tractor

## Service Manual

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\* Schematic set Sections.

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# Section 1001

## GENERAL INFORMATION

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## CONVERSION FACTORS

### U.S. Customary to SI (Metric) Units








### SI (Metric) Units to U.S. Customary

	Multiply	By	To Obtain: Multiply	By	To Obtain
Area:	square foot (ft <sup>2</sup> ) acre	0.092 903 0.404 686	square meter (m <sup>2</sup> ) hectar (ha)	10.763 91 2.471 05	square foot (ft <sup>2</sup> ) acre
Force:	ounce force (ozf) pound force (lbf)	0.278 014 4.448 222	newton (N) newton (N)	3.596 942 0.224 809	ounce force (ozf) pound force (lbf)
Length:	inch (in) foot (ft) mile	25.4 0.304 8 1.609 344	millimeter (mm) meter (m) kilometer (km)	0.039 370 3.280 804 0.621 371	inch (in) foot (ft) mile
Mass:	pound (lb)	0.453 592	kilogram (kg)	2.204 622	pound (lb)
Mass/Area:	ton/acre	2241.702	kilogram per hectare (kg/ha)	0.000 446	ton/acre
Mass/Energy: (Fuel Consumption)	pound per brake horsepower- hour (lb/bhp-h)	608.277 4	gram per kilowatt hour (g/kwh)	0.001 644	pound per brake horsepower- hour (lb/bhp-h)
Mass/Volume: (Density)	pound per cubic yard (lb/yd <sup>3</sup> ) 0.593276	0.593 276	kilogram per cubic meter (kg/m <sup>3</sup> )	1.685 555	pound per cubic yard (lb/yd <sup>3</sup> )
Power:	horsepower - U.S. customary (hp - U.S. customary)	0.745 700	kilowatt (kw)	1.341 02	horsepower - U.S. customary (hp-U.S. customary)
Pressure:	pound per square inch (psi)	6.894 757	kilopascal (kPa)	0.145 038	pound per square inch (psi)
Temperature:	degrees Fahrenheit (°F)	TC = 5/9 (TF-32)	degree Celsius (°C)	TF = 1.8 TC + 32	degree Fahrenheit (°F)
Torque:	pound inch (lb in) pound foot (lb ft)	0.112 985 1.355 818	newton meter (Nm) newton meter (Nm)	8.850 748 0.737 562	pound inch (lb in) pound foot (lb ft)
Velocity (Speed):	miles per hour (mph)	1.609 344	kilometer per hour (km/h)	0.621 371	miles per hour (mph)
Volume:	cubic inch (in <sup>3</sup> ) cubic foot (ft <sup>3</sup> ) cubic yard (yd <sup>3</sup> ) ounce-U.S. fluid (oz) quart-U.S. liquid (qt) quart-Imperial (qt) gallon-U.S. liquid (gal) gallon-Imperial (gal)	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 (cm <sup>3</sup> ) cubic meter (m <sup>3</sup> ) cubic meter (m <sup>3</sup> ) milliliter (ml) liter (l) liter (l) liter (l) liter (l)	0.061 024 35.314 66 1.307 950 0.033 814 1.056 688 0.879 877 0.264 172 0.219 969	cubic inch (in <sup>3</sup> ) cubic foot (ft <sup>3</sup> ) cubic yard (yd <sup>3</sup> ) ounce-U.S. fluid (oz) quart-U.S. liquid (qt) quart-Imperial (qt) gallon-U.S. liquid (gal) gallon-Imperial (gal)
Volume/Area:	bushel (U.S.) per acre	0.087 078	cubic meter per hectare (m <sup>3</sup> /ha)	11.484 000	bushel (U.S.) per acre
Volume/Time: (Flow)	gallon per minute (U.S.) (gpm U.S.) gallon per minute (Imperial) (gpm Imp.)	3.785 412 4.546 092	liter per minute (l/m) liter per minute (l/m)	0.264 172 0.219 969	gallon per minute (U.S.) (gpm U.S.) gallon per minute (Imperial) (gpm Imp.)
Horsepower:	U.S. customary hp net engine hp net engine hp	1.014 0.815* 0.70*	metric horsepower P.T.O. observed hp mox drawbar hp	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	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			
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				

**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				
SIZE	TUBING O.D.		THREAD SIZE	LB FT		Nm		LB FT		Nm	
	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.

# Section 2002

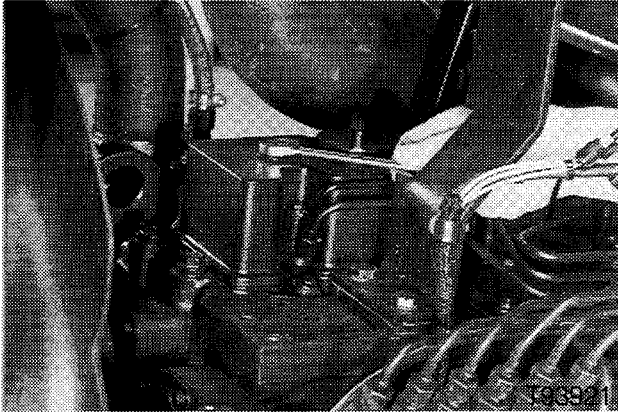
2002

## 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.

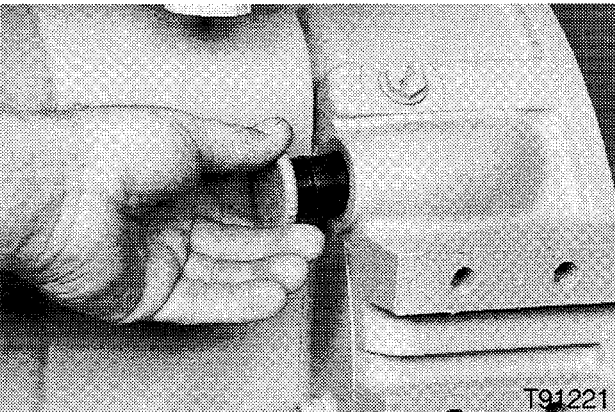
# ADJUSTING ROCKER ARM TO VALVE CLEARANCE Cold Setting

## STEP 1



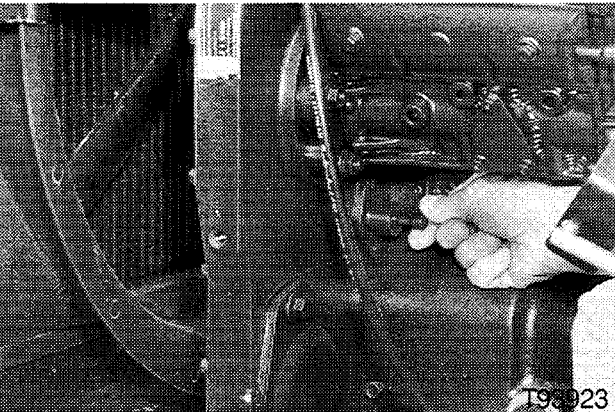
Remove the valve cover from the engine. Discard the gasket.

## STEP 2



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

## STEP 3

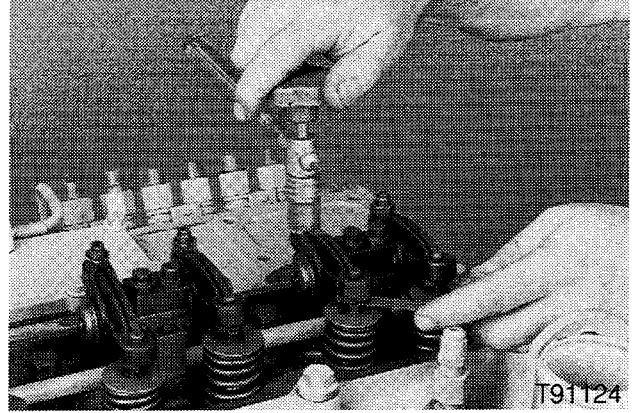


While turning the engine over with the turn over tool, push the lock pin in. When the lock pin moves into the camshaft gear, the engine will be at top center.

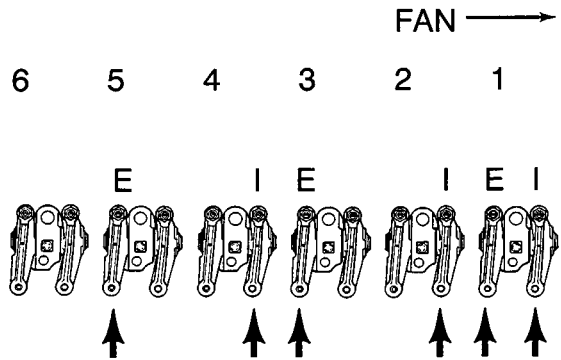
**NOTE:** Use caution when turning the engine to prevent damage to the timing pin.

Rac 8-91611

## STEP 4



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

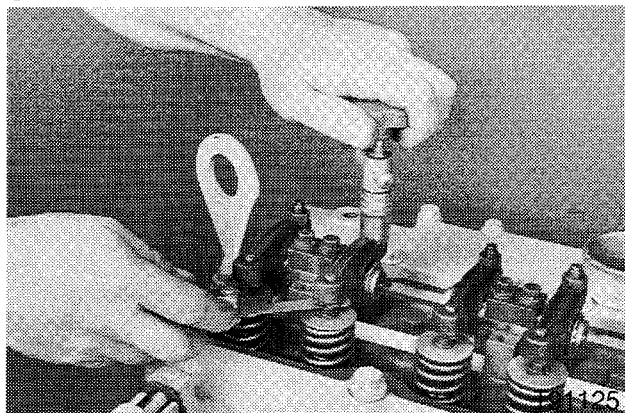


79L91

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

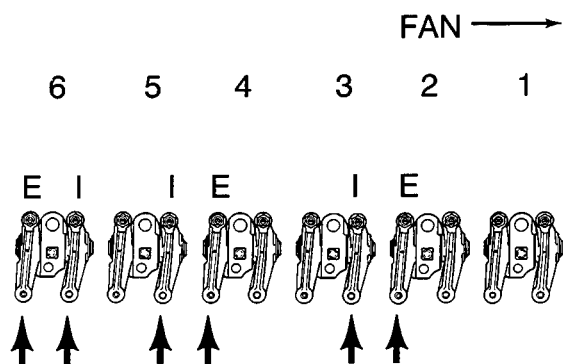
Valve Clearance, Cold - Intake Valves - 0.30 mm  
Exhaust Valves - 0.60 mm

**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.

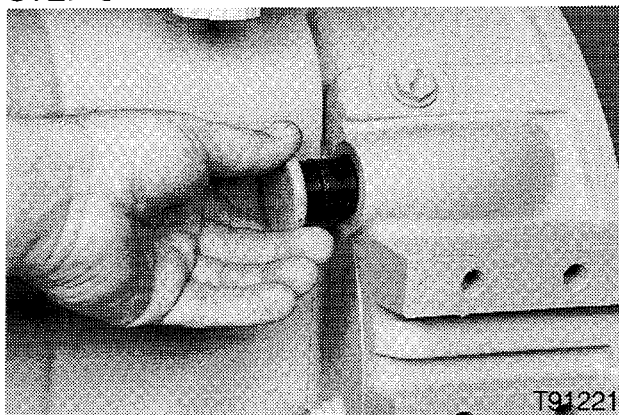


79L91

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

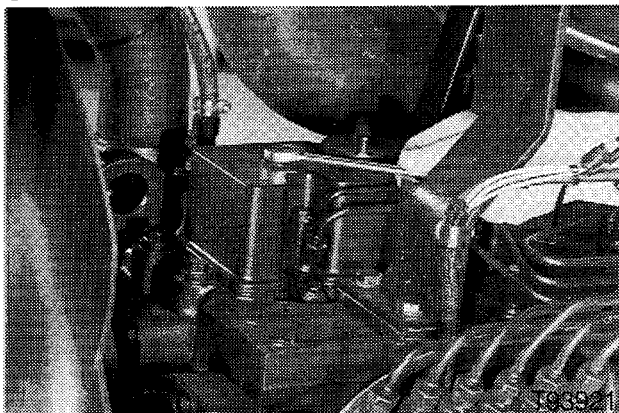
Valve Clearance, Cold - Intake Valves - 0.30 mm  
 Exhaust Valves - 0.60 mm

**STEP 6**



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

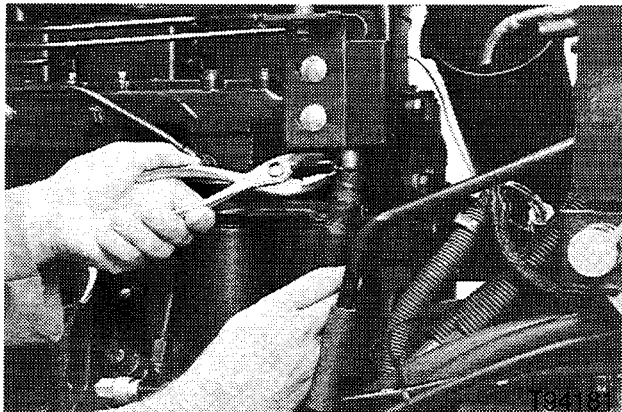
**STEP 7**



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.

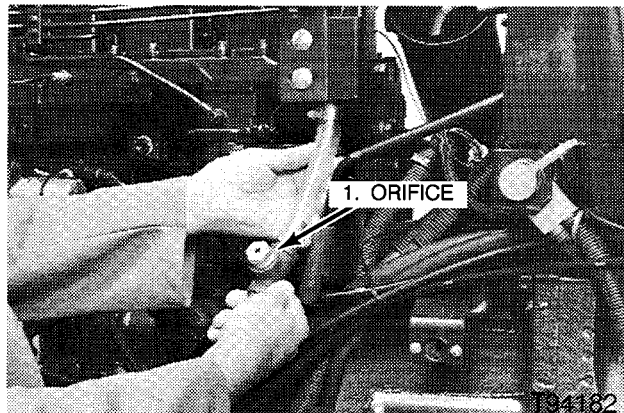
## CRANKCASE PRESSURE CHECK (BLOW BY) Manometer Installation

### STEP 8



Remove the breather hose.

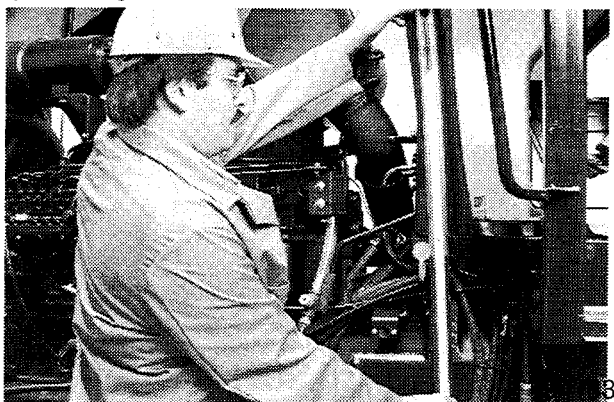
### STEP 9



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

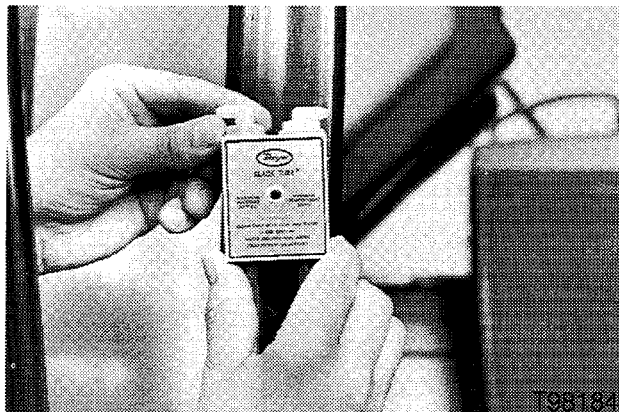
**NOTE:** Use the orifice for six cylinder engines, marked 6 cyl.

### STEP 10



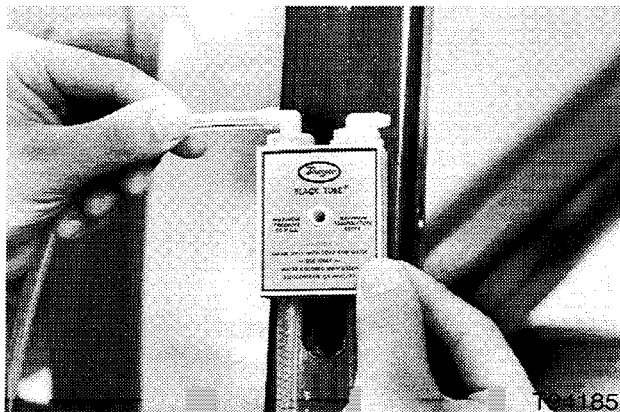
Install the manometer on the tractor.

### STEP 11



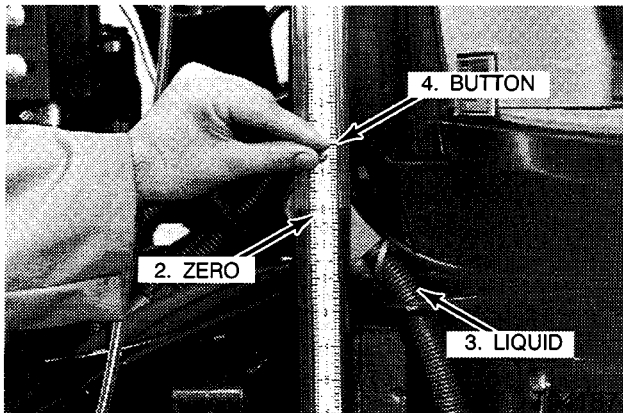
Turn each connector on the manometer one turn counterclockwise to open the check valves.

### 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.

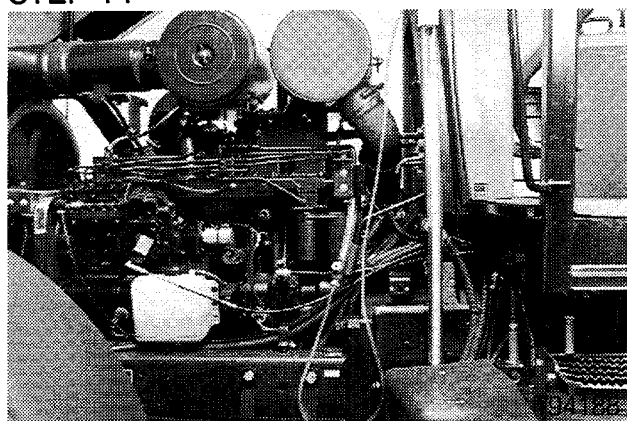
## Testing

**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	
		3.0 INCHES
TOTAL		

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

MANOMETER READING

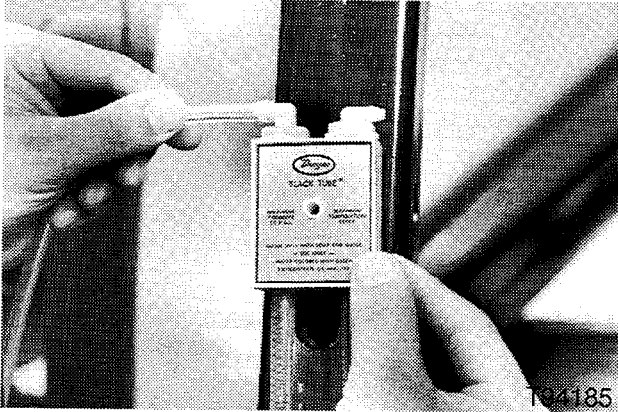
Inches of Water	L/min
1	50
2	84
3	103
4	119
5	133
6	145
7	155
8	164
9	172
10	180
11	187
12	193
13	200
14	206
15	211
16	217
17	222
18	226
19	229
20	232

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

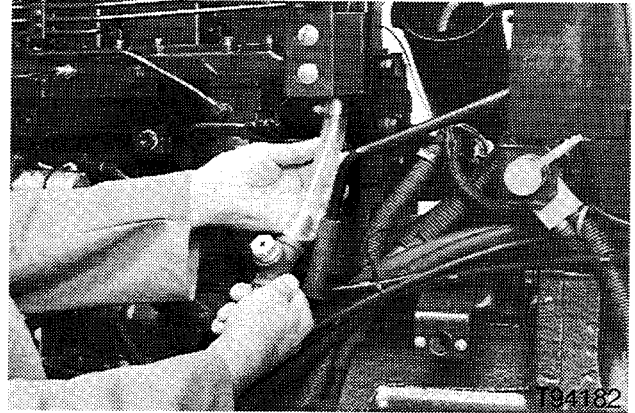
## Manometer Removal

### STEP 15



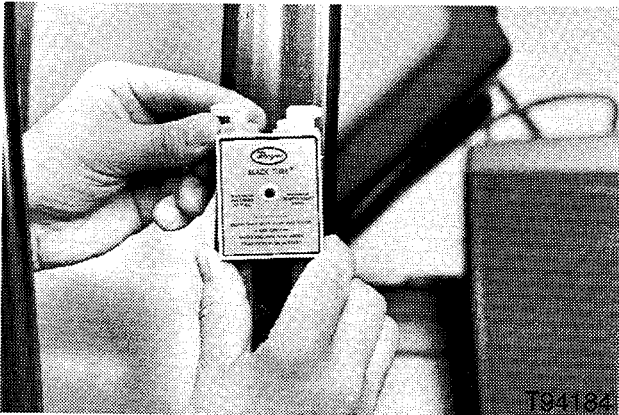
Disconnect the tube from the connector.

### STEP 18



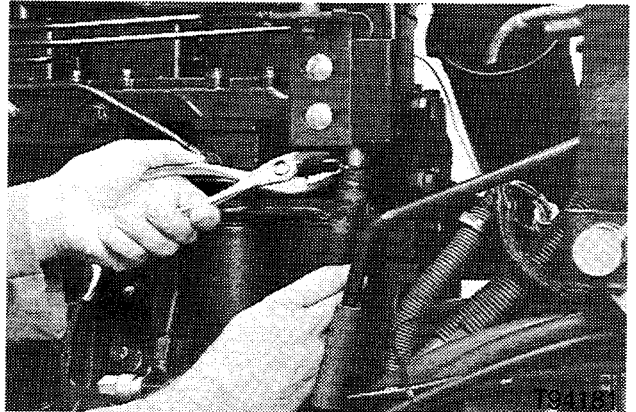
Remove the adapter from the breather tube.

### STEP 16



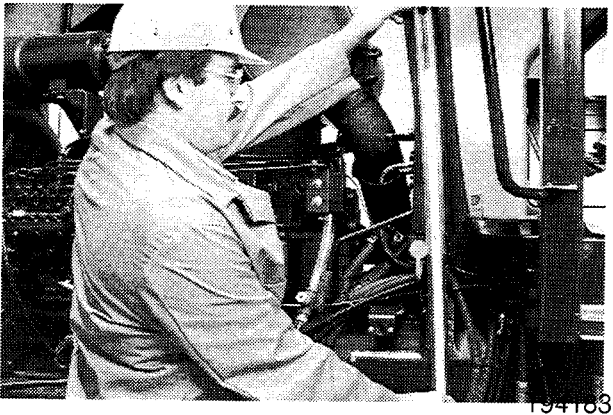
Turn each connector on the manometer one turn clockwise to close the check valve.

### STEP 19



Install breather hose and the hose clamp.

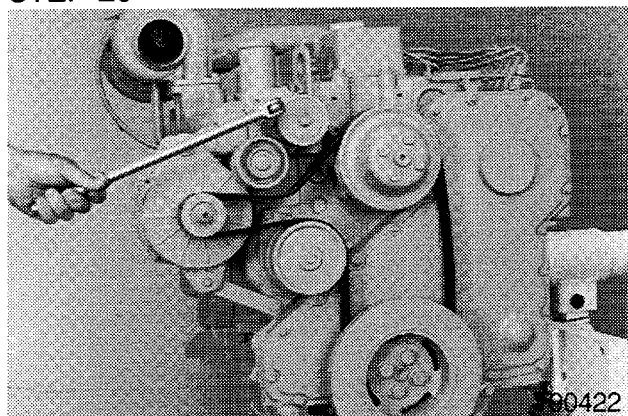
### STEP 17



Remove the manometer.

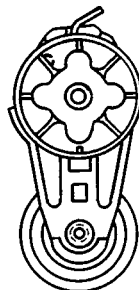
## Checking the Fan Belt Tensioner

### STEP 20

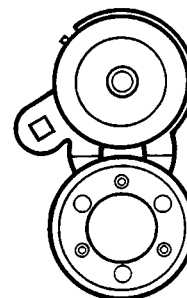


Lift the belt tensioner pulley. If there is tension on the pulley, the tension is good.

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



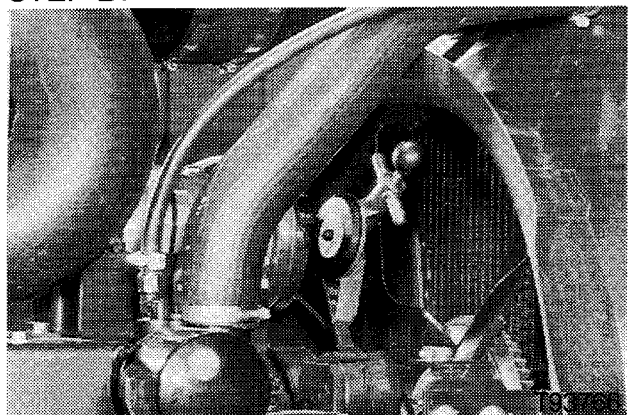
7L91



8-1L91

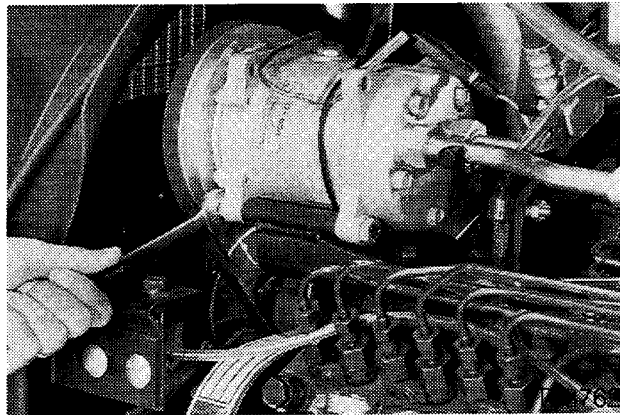
## ADJUSTING THE COMPRESSOR BELT

### 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.

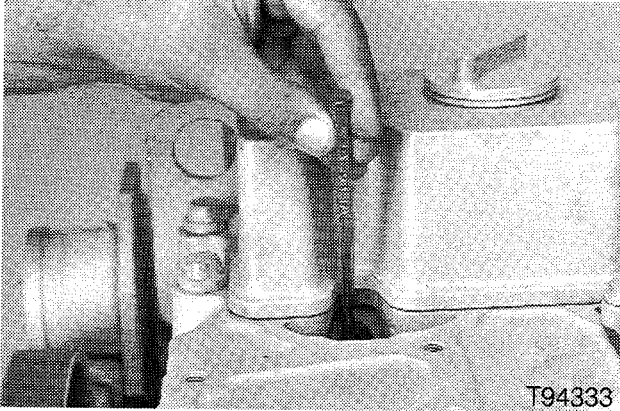
### STEP 22



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.

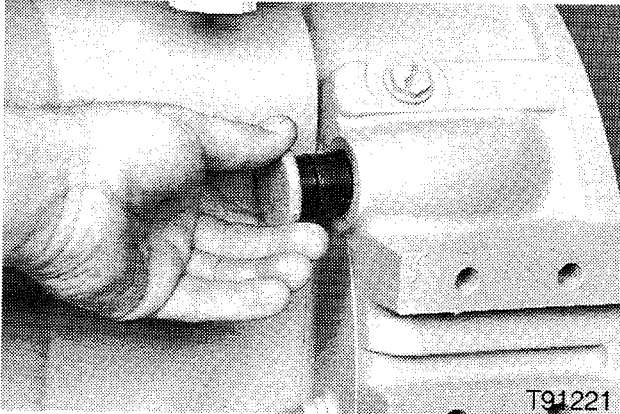
## CHECKING ALIGNMENT BETWEEN CRANKSHAFT AND CAMSHAFT GEARS

### STEP 23



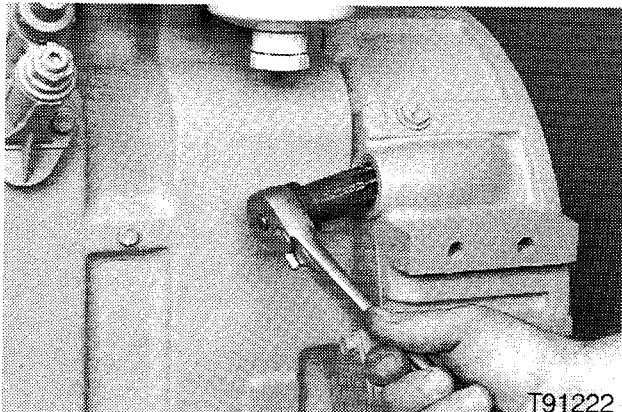
Remove the number one injector. Install a probe (minimum of 250 mm long) in the injector bore so that the probe will touch the top of the piston.

### STEP 24



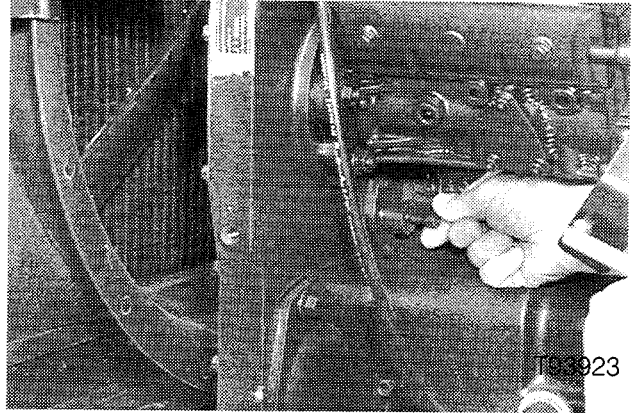
Remove the plug from the flywheel housing (if equipped).

### STEP 25



Install the engine turn over tool CAS-1690.

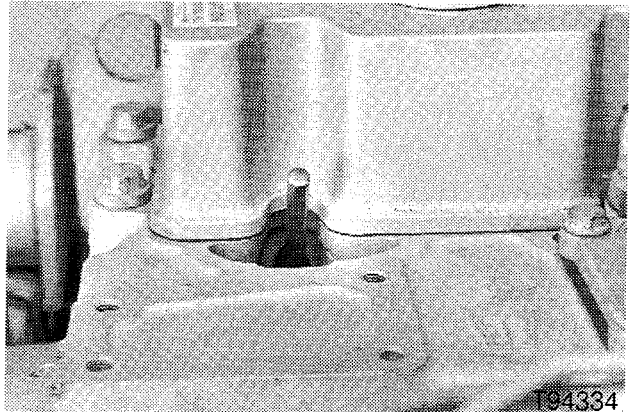
### STEP 26



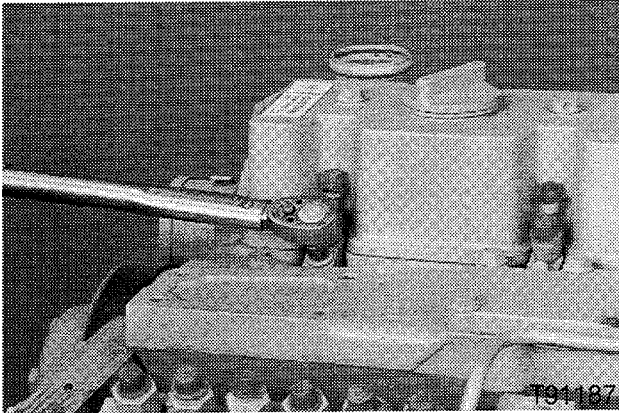
While turning the engine over with the turn over tool, CAS-1690 (if equipped) push the lock pin in. When the lock pin moves into the camshaft gear the engine will be at top center.

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

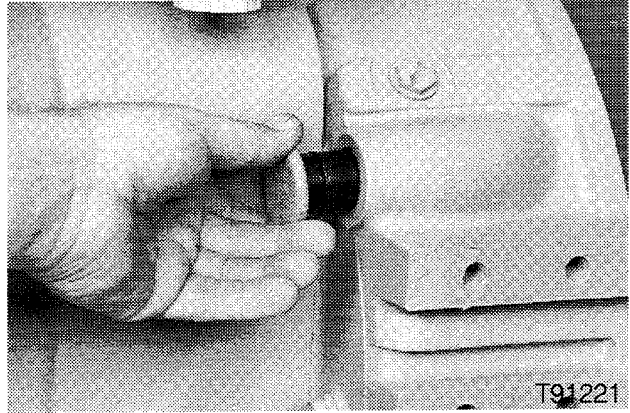
### STEP 27



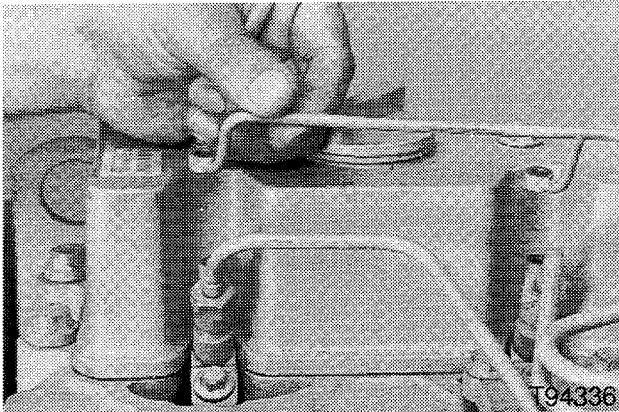
Pull the timing pin from the cam gear. Turn the engine in either direction a small amount. The probe must go down from this position. If the probe goes up when the engine is turned, timing is not correct. See Section 2425 in this manual for alignment of gears.

**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 30**

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

**STEP 29**

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

**NOTE:** The J I Case Company 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.

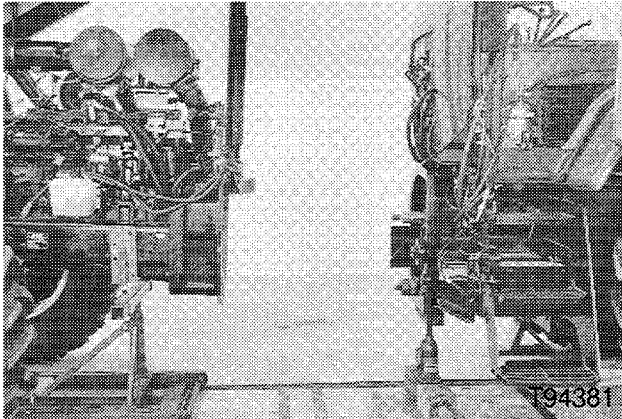
# Section 2003

ENGINE REMOVAL

2003

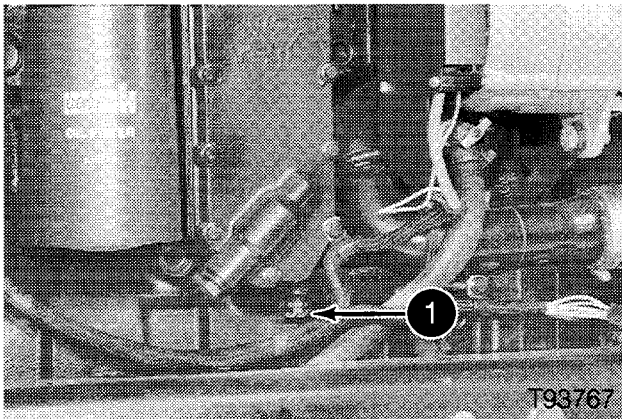
## ENGINE REMOVAL

### STEP 1



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

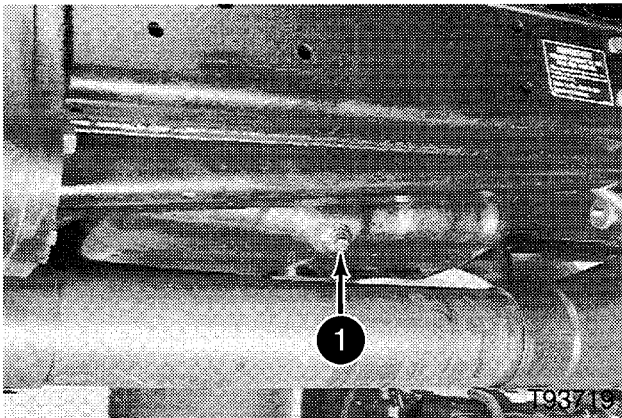
### STEP 2



- 1. Block Drain Valve

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

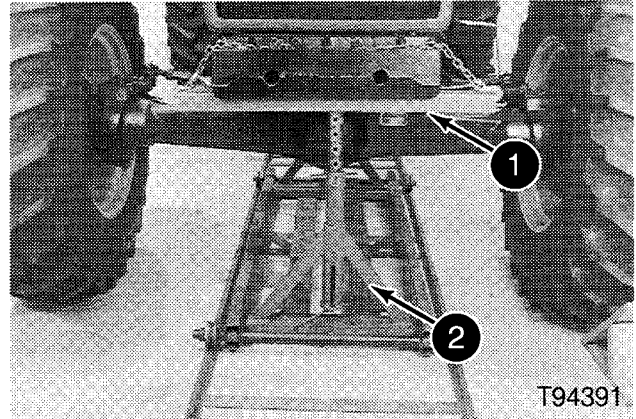
### STEP 3



- 1. Drain Plug

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

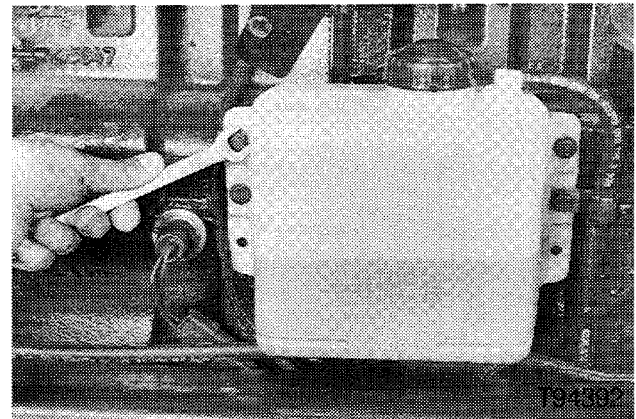
### STEP 4



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

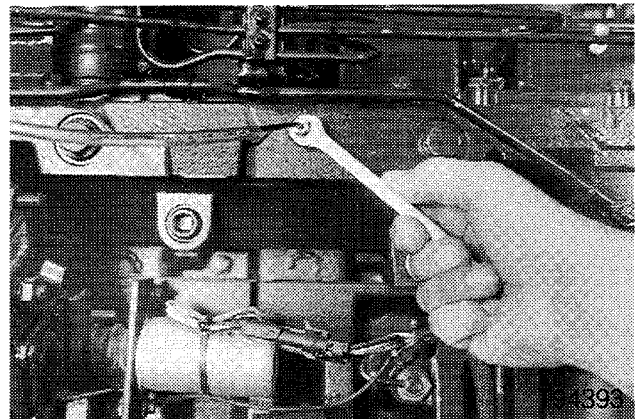
Install a support 17-526-5, brace 17-526-14 and adapter bar from 17-526-4A under the weight carrier. Secure the weight carrier to the support.

### STEP 5



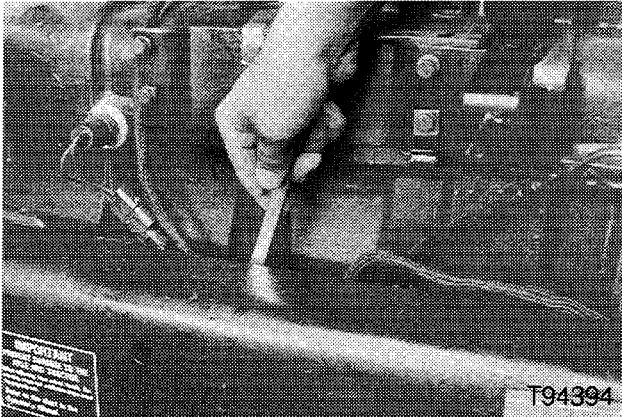
Remove the radiator reservoir from the bracket on the LH side of the engine.

### STEP 6



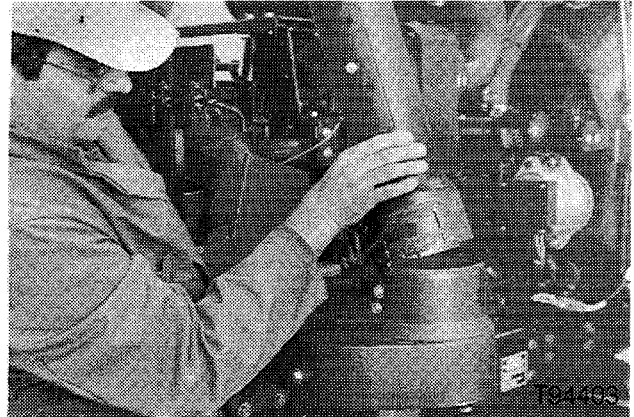
Remove the ether start hose from the fitting on the intake manifold.

**STEP 7**



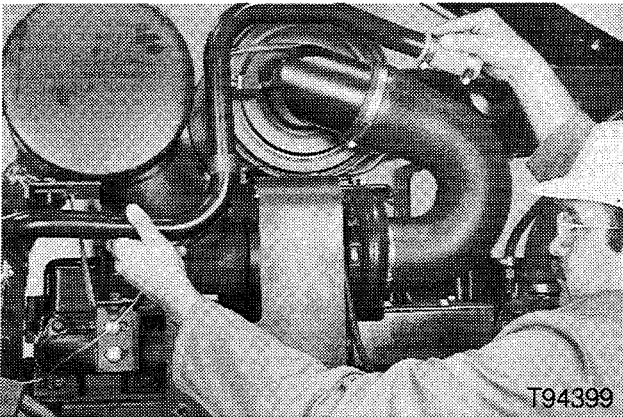
Remove the wiring harness clamp from the inside of the LH side frame.

**STEP 10**



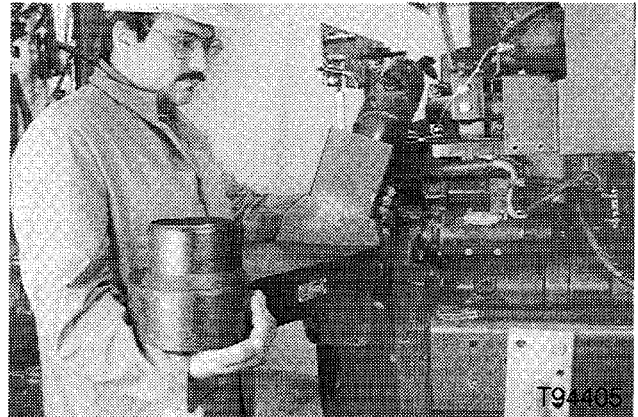
Remove the exhaust pipe.

**STEP 8**



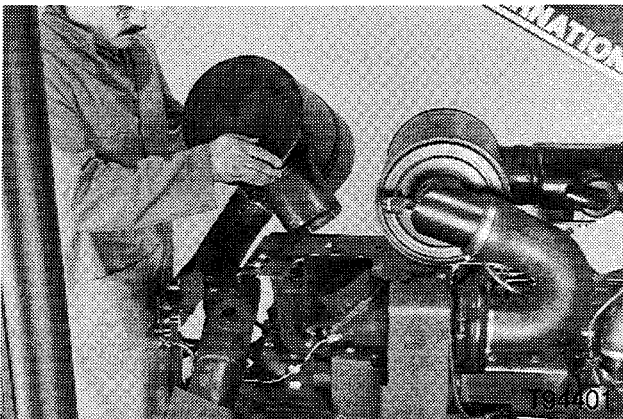
Remove the aspirator tube.

**STEP 11**



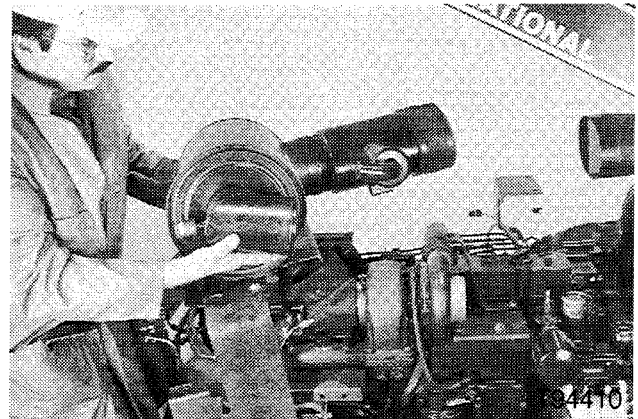
Remove the exhaust elbow and aspirator discharge pipe from the flywheel housing.

**STEP 9**



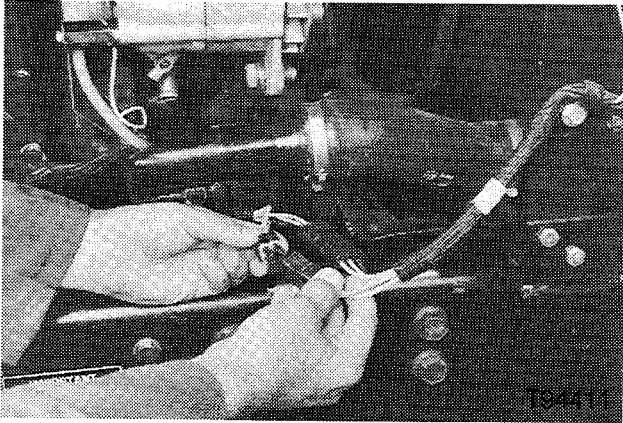
Remove the muffler.

**STEP 12**



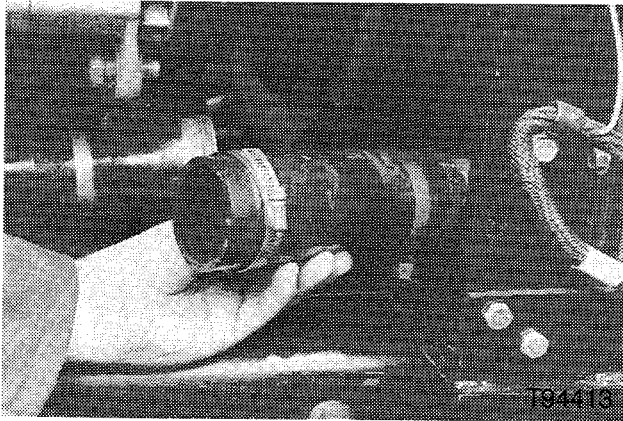
Remove the air cleaner and strata tube from the engine.

**STEP 13**



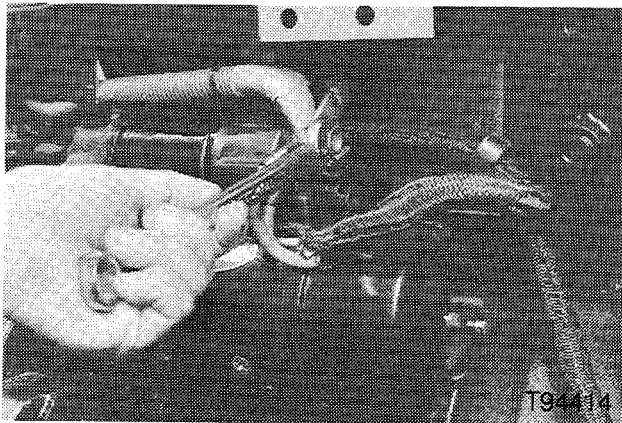
Disconnect the engine wiring harness from the front wiring harness at the RH frame rail.

**STEP 14**



Remove the radiator hoses.

**STEP 15**



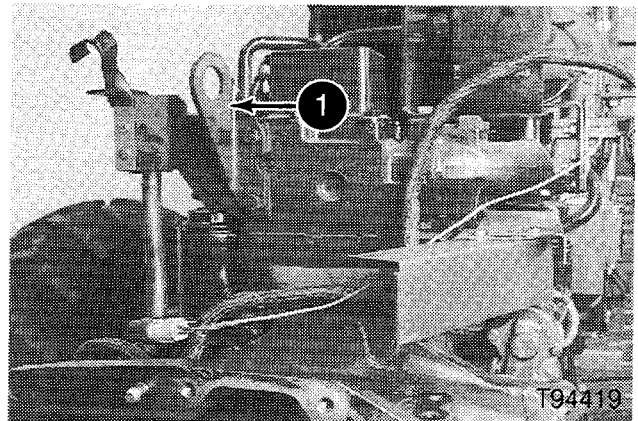
Disconnect the battery cables from the starter.

**STEP 16**



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

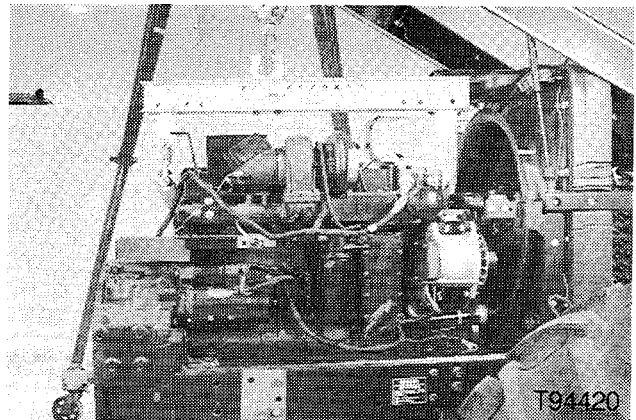
**STEP 17**



1. Lifting Bracket

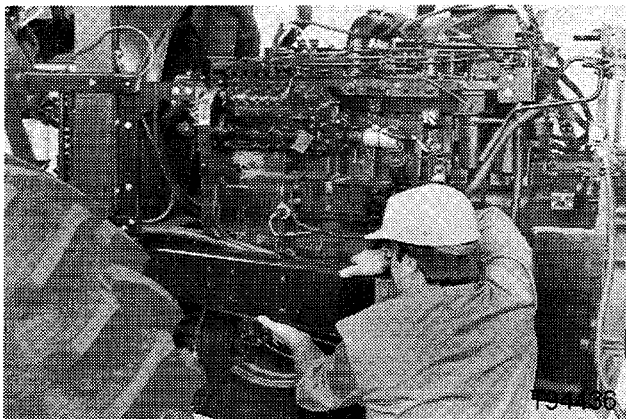
Remove the side panel latch mounting bolt from the back of the engine. Move the engine lifting bracket to a vertical position.

**STEP 18**



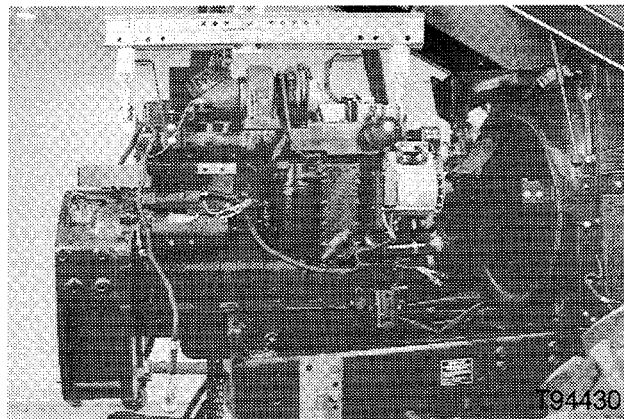
Attach a lifting sling to the engine lifting brackets and support the engine from a hoist.

**STEP 19**



Remove the side frames.

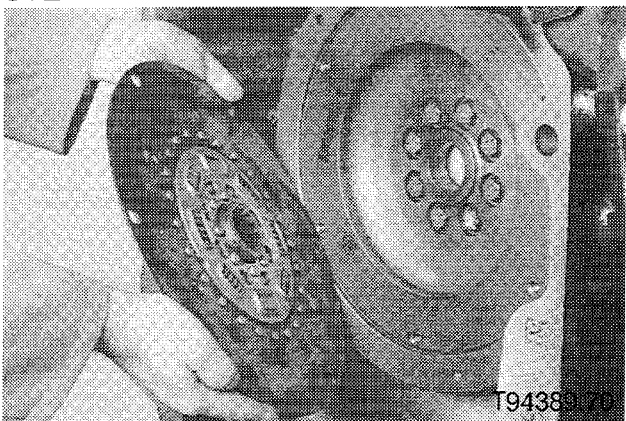
**STEP 20**



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

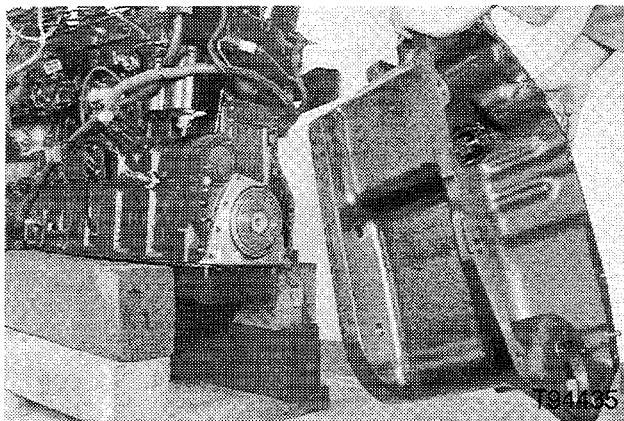
**FLYWHEEL HOUSING REMOVAL**

**STEP 21**



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

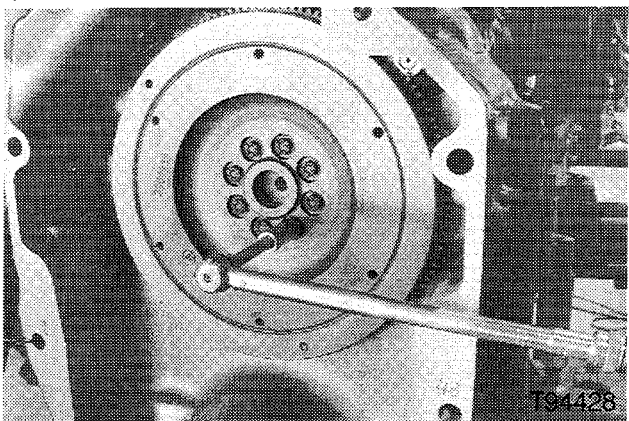
**STEP 23**



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

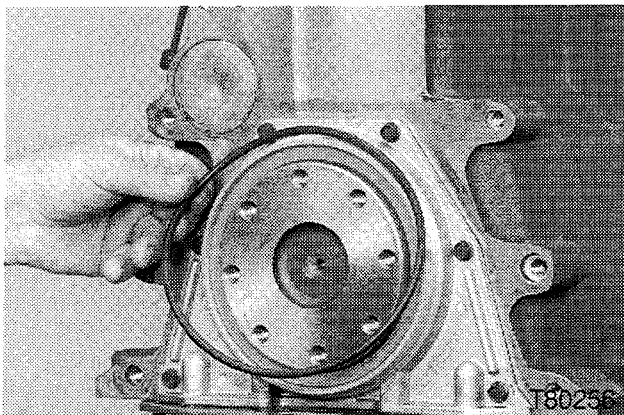
**NOTE:** *The starter can remain attached to the flywheel housing. Make sure that the engine wiring harness is removed from the starter.*

**STEP 22**



Remove the flywheel from the engine.

**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**

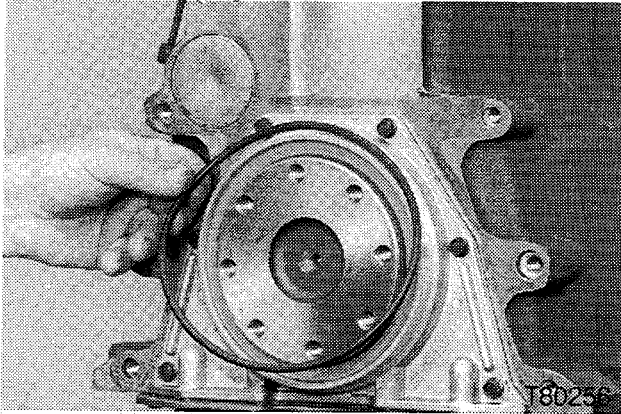
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**Thank you so much for reading**

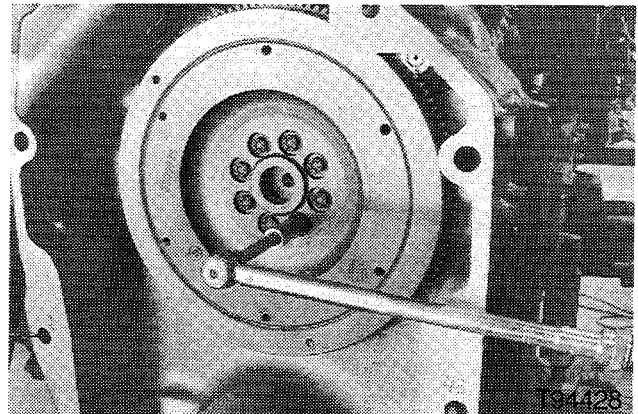
## FLYWHEEL HOUSING INSTALLATION

### STEP 25



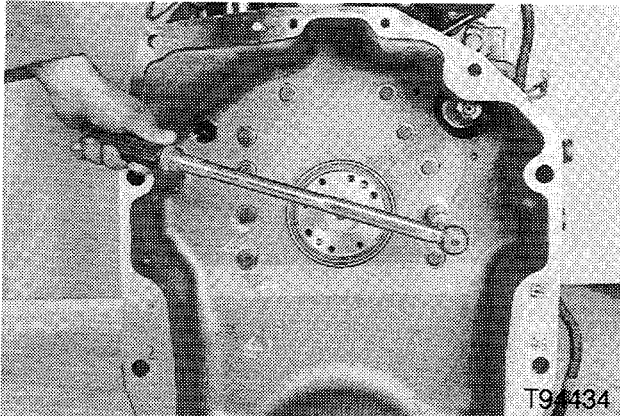
Lubricate a new o-ring with petroleum jelly and install the o-ring on the engine seal carrier.

### STEP 27



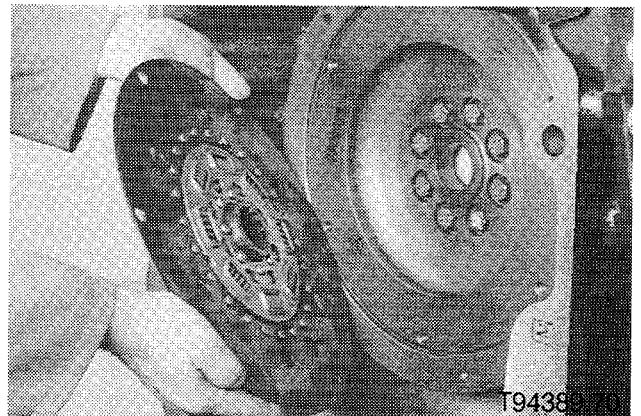
Install the flywheel on the crankshaft. Tighten the mounting bolts to a torque of 137 Nm.

### STEP 26



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

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