

## FOREWORD

*This manual covers the service procedures of the TOYOTA FORKLIFT 5FG10-30/5FD70-30 Series. Please use this manual for providing quick, correct servicing of the corresponding forklift models.*

*These models on the market since August 1986 are subject to minor changes in September 1986. This manual deals with the models produced in the period between August 1988 and August 1989 as well as the models as of September 1989 (after minor changes).*

*Any change or modifications thereafter will be informed by Toyota Industrial Vehicles' Parts & Service News.*

*For the service procedures of the mounted engine, read the repair manuals listed below as reference together with this manual.*

*(Reference)*

*Repair manuals related to this manual are as follows:*

*TOYOTA INDUSTRIAL VEHICLE 4P ENGINE  
REPAIR MANUAL (No. CE604)*

*TOYOTA INDUSTRIAL VEHICLE 4Y ENGINE  
REPAIR MANUAL (No. CE602)*

*TOYOTA INDUSTRIAL VEHICLE 2J ENGINE  
REPAIR MANUAL (No. CE603)*

*TOYOTA INDUSTRIAL VEHICLE 1Z ENGINE  
REPAIR MANUAL (No. CE601)*

*TOYOTA INDUSTRIAL VEHICLE 5K ENGINE  
REPAIR MANUAL (No. CE677)*

*TOYOTA INDUSTRIAL VEHICLE 1DZ ENGINE  
REPAIR MANUAL (No. CE618)*

*(Note: 2-3 ton models mounted with 2J, 1DZ diesel engine are only available in designated areas.)*

**TOYOTA MOTOR CORPORATION**

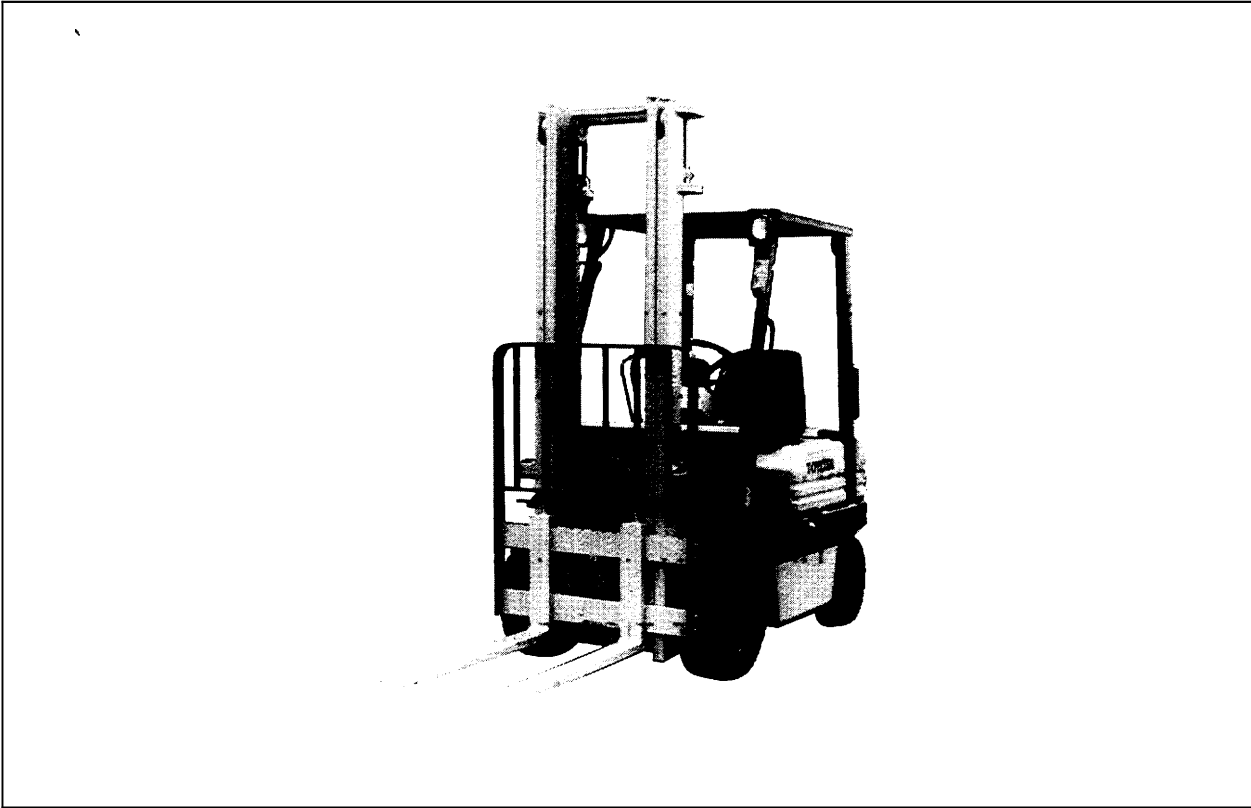
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**GENERAL**

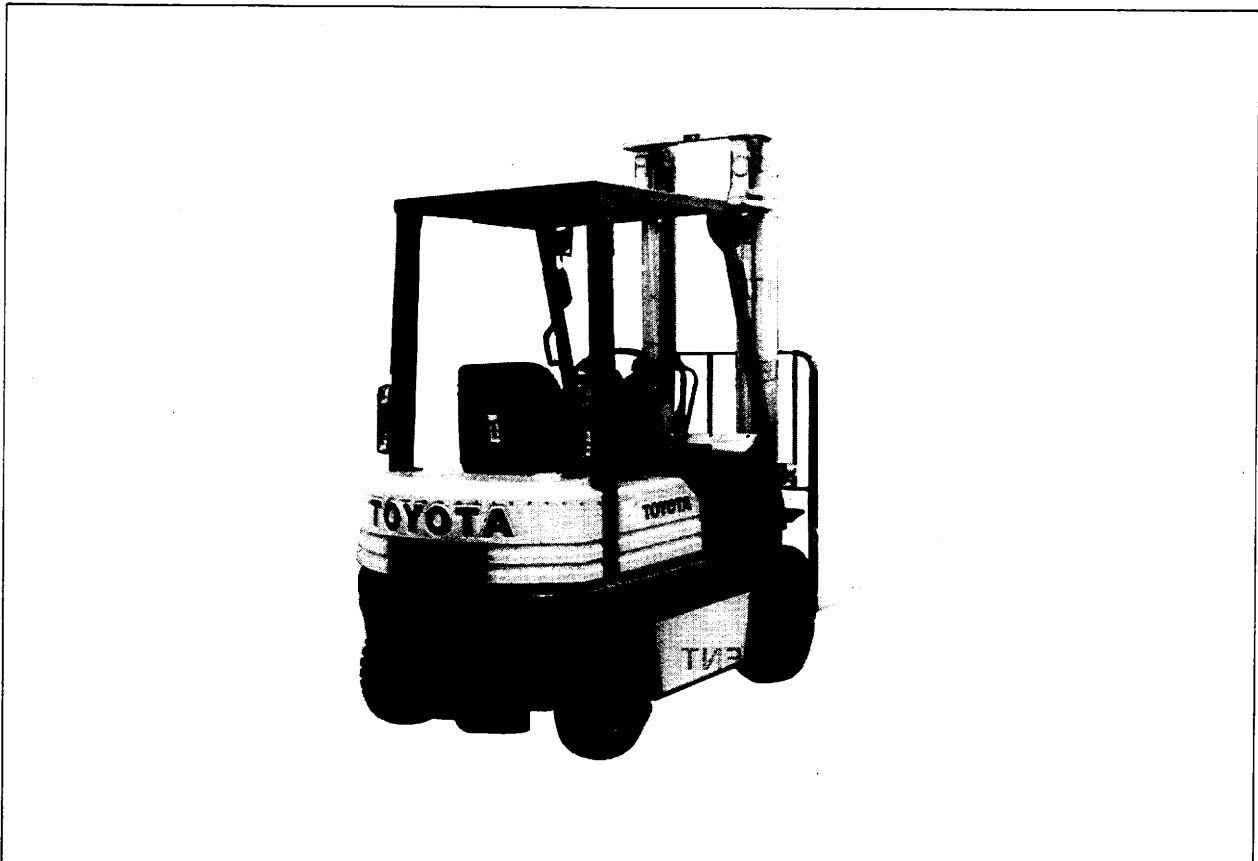
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# EXTERIOR VIEWS



Front View (5FG15)

LAT14-16



Rear View (5FG15)

LAT14-18

## VEHICLE LISTING (1986.8 ~ 1989.8)

Series	Payload	Model	Engine model	Engine type	Drive system	Remarks
1 ton series	1.0 ton	5FG10	4 P	Gasoline	11" clutch	P/S installed as standard
		02-5FG10	↑	↑	Torque converter	↑
		40-5FG10	4 Y	↑	11" clutch	↑
		42-5FG10	↑	f	Torque converter	↑
		5FD10	2 J	Diesel	11" clutch	↑
		02-5FD10	↑	↑	Torque converter	↑
	1.35 ton	5FG14	4 P	Gasoline	11" clutch	↑
		02-5FG14	f	↑	Torque converter	↑
		40-5FG14	4 Y	↑	11" clutch	↑
		42-5FG14	↑	↑	Torque converter	↑
		5FD14	2 J	Diesel	11" clutch	↑
		02-5FD14	↑	↑	Torque converter	↑
	1.5 ton	5FG15	4 P	Gasoline	11" clutch	↑
		02-5FG15	↑	↑	Torque converter	↑
		40-5FG15	4 Y	↑	11" clutch	↑
		42-5FG15	↑	↑	Torque converter	↑
		5FD15	2 J	Diesel	11" clutch	↑
		02-5FD15	↑	↑	Torque converter	f
	1.75 ton	5FG18	4 P	Gasoline	11" clutch	↑
		02-5FG18	↑	↑	Torque converter	↑
		40-5FG18	4 Y	↑	11" clutch	↑
		42-5FG18	↑	↑	Torque converter	↑
		5FD18	2 J	Diesel	11" clutch	f
		02-5FD18	↑	↑	Torque converter	↑
2 ton series	2.0 ton	5FG20	4 P	Gasoline	11" clutch	↑
		02-5FG20	↑	↑	Torque converter	↑
		40-5FG20	4 Y	↑	11" clutch	↑
		42-5FG20	↑	↑	Torque converter	↑
		5FD20	1 Z	Diesel	11" clutch	↑
		02-5FD20	↑	↑	Torque converter	↑
		60-5FD20	2 J	↑	11" clutch	↑
		62-5FD20	↑	↑	Torque converter	↑

Series	Payload	Model	Engine model	Engine type	Drive system	Remarks
2 ton series	2.25 ton	5FG23	4 P	Gasoline	11" clutch	P/S installed as standard
		02-5FG23	↑	↑	torque converter	↑
		40-5FG23	4 Y	↑	11" clutch	↑
		42-5FG23	↑	↑	Torque converter	↑
		5FD23	1 Z	Diesel	11" clutch	↑
		02-5FD23	↑	↑	Torque converter	↑
		60-5FD20	2 J	↑	11" clutch	↑
	62-5FD20	↑	↑	Torque converter	↑	
	2.5 ton	5FG25	4 P	Gasoline	11" clutch	↑
		02-5FG25	↑	↑	Torque converter	↑
		40-5FG25	4 Y	↑	11" clutch	↑
		42-5FG25	↑	↑	Torque converter	↑
		5FD25	1 Z	Diesel	11" clutch	↑
		02-5FD25	↑	↑	Torque converter	↑
60-5FD25		2 J	↑	11" clutch	↑	
62-5FD25	↑	↑	Torque converter	↑		
3 ton series	2.75 ton	5FG28	4 Y	Gasoline	11" clutch	↑
		02-5FG28	↑	↑	Torque converter	↑
		5FD28	1 Z	Diesel	11" clutch	↑
		02-5FD28	↑	↑	Torque converter	↑
		60-5FD28	2 J	↑	11" clutch	↑
	62-5FD28	↑	↑	Torque converter	↑	
	3.0 ton	5FG30	4 Y	Gasoline	11" clutch	↑
		02-5FG30	↑	↑	Torque converter	↑
		5FD30	1 Z	Diesel	11" clutch	↑
		02-5FD30	↑	↑	Torque converter	↑
		60-5FD30	2 J	↑	11" clutch	↑
62-5FD30		↑	↑	Torque converter	↑	

**VEHICLE LISTING (1989.9~ )**

Series	Load capacity	Model	Engine model	Drive system
1 ton series	1.0 ton	5FG10	5K	Clutch
		02-5FG10		Torque converter
		40-5FG10	4Y	Clutch
		42-5FG10		Torque converter
		5FD10	1DZ	Clutch
		02-5FD10		Torque converter
	1.35 ton	5FG14	5K	Clutch
		02-5FG14		Torque converter
		40-5FG14	4Y	Clutch
		42-5FG14		Torque converter
		5FD14	1DZ	Clutch
		02-5FD14		Torque converter
	1.5 ton	5FG15	5K	Clutch
		02-5FG15		Torque converter
		40-5FG15	4Y	Clutch
		42-5FG15		Torque converter
		5FD15	1DZ	Clutch
		02-5FD15		Torque converter
	1.75 ton	5FG18	5K	Clutch
		02-5FG18		Torque converter
		40-5FG18	4Y	Clutch
		42-5FG18		Torque converter
		5FD18	1DZ	Clutch
		02-5FD18		Torque converter
2 ton series	2.0 ton	5FG20	5K	Clutch
		02-5FG20		Torque converter
		40-5FG20	4Y	Clutch
		42-5FG20		Torque converter
		5FD20	1Z	Clutch
		02-5FD20		Torque converter
		60-5FD20	1DZ	Clutch
		62-5FD20		Torque converter
	2.25 ton	5FG23	5K	Clutch
		02-5FG23		Torque converter
		40-5FG23	4Y	Clutch
		42-5FG23		Torque converter

Series	Load capacity	Model	Engine model	Drive system	
2 ton series	2.25 ton	5FD23	1Z	Clutch	
		02-5FD23		Torque converter	
		60-5FD23	1DZ	Clutch	
		62-5FD23		Torque converter	
	2.5 ton	5FG25	5K	Clutch	
		02-5FG25		Torque converter	
		40-5FG25	4Y	Clutch	
		42-5FG25		Torque converter	
		5FD25	1Z	Clutch	
		02-5FD25		Torque converter	
		60-5FD25	1DZ	Clutch	
		62-5FD25		Torque converter	
	3 ton series	2.75 ton	5FG28	4Y	Clutch
			02-5FG28		Torque converter
5FD28			1Z	Clutch	
02-5FD28				Torque converter	
60-5FD28			1DZ	Clutch	
62-5FD28				Torque converter	
3.0ton		5FG30	4Y	Clutch	
		02-5FG30		Torque converter	
		5FD30	1Z	Clutch	
		02-5FD30		Torque converter	
		60-5FD30	1DZ	Clutch	
		62-5FD30		Torque converter	



## ABBREVIATIONS

Abbreviations used in this manual are as follows:

Abbreviation (Code)	Meaning	Abbreviation (Code)	Meaning
ABDC	After Bottom Dead Center	P/S	Power Steering
ASSY	Assembly	RH	Right Hand
ATDC	After Top Dead Center	SAE	Society of Automotive Engineers (USA)
ATM	Automatic Transmission	SST	Special Service Tool
BBDC	Before Bottom Dead Center	STD	Standard
LH	Left Hand	SUB-ASSY	Sub-assembly
LLC	Long Life Coolant	T =	Tightening Torque
MTM	Manual Transmission	OOT	Number of Teeth (00)
OHV	Overhead valve	U/S	Undersize
OPT	Option	w/	With
O/S	Oversize		
PS	Horsepower		

## OPERATIONAL TIPS

1. Safe operation
  - (1) Make sure that correct size wire is used for hoisting a heavy material
  - (2) After jacking up, always support with rigid racks or stands.
2. Preparation of SSTs and measuring tools
  - (1) Prepare SSTs and measuring tools before starting operation.
3. Clearing and arrangement
  - (1) Always keep the workshop neat and orderly for easy operation.
  - (2) Disassembly of hydraulic equipment shall always be done in a clean place using clean tools.
4. Genuine Toyota parts
 

Genuine Toyota parts should be used even in the replacement of packings, gaskets and O-rings.
5. Repairs on electrical system
 

Before doing any repairs on the electrical system, disconnect the cables from the battery terminals. Be sure to disconnect the negative  $\ominus$  cable first.
6. Tightening torque for installation
 

Be sure to observe the tightening torque given in this manual. If not specified, tighten to the torque listed in standard bolt & nut tightening torque.
7. Defect status grasp
 

Do not start disassembly and replacement as soon as a defect is found, but first grasp whether the defect requires disassembly and replacement. In the case of torque converter for example, do not attempt torque converter disassembly upon a failure in starting the vehicle, but first check such factors as the oil, pressure and rotation status causing the failure.

## STANDARD BOLT AND NUT TIGHTENING TORQUES


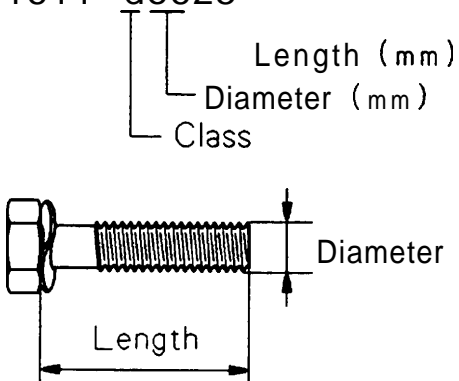


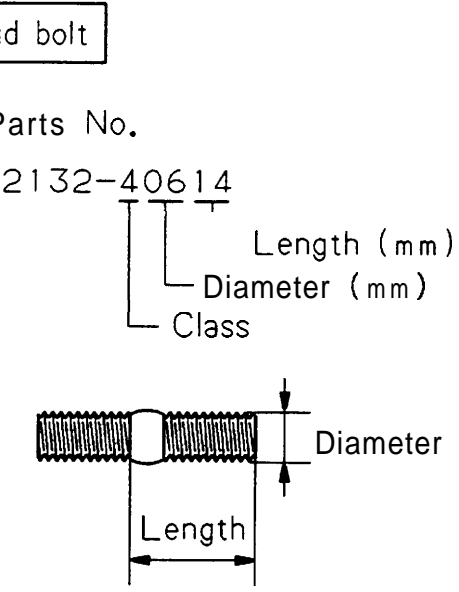



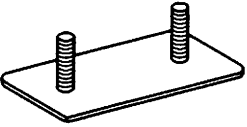
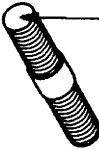
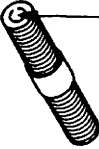
How to judge tightening torque of a standard bolt or nut.

- How to judge tightening torque of a standard bolt.  
Find out the type of the bolt from the list below.  
Then, find the bolt tightening torque from the table.
- How to judge tightening torque of a standard unit.  
The nut tightening torque can be judged from the bolt type. (See the item above.)

### LIST OF BOLT TYPES AND STRENGTH

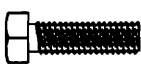

1. Judging by part

2. Judging by part No.

	Shape and class Bolt head No.	Class	Hexagon head bolt
Hexagon head bolt	 4	4=4T 5=5T 6=6T 7=7T	Parts No, 91611-do625 
	 No mark	4T	
Hexagon flange bolt	 No mark	4T	Stud bolt Parts No. 92132-40614 
Hexagon head bolt	 Two protruding lines	5T	
Hexagon flange bolt	 Two protruding lines	6T	
Hexagon head bolt	 Three protruding lines	7T	
Welded bolt		4T	
Stud bolt	 No mark	4T	
	 Grooved	6T	

KAPM5

## STANDARD BOLT TIGHTENING TORQUES

Class	Diameter mm	Pitch mm	Specified torque			
			Hexagon head bolt 		Hexagon flange bolt 	
			kg-cm	ft-lb	kg-cm	ft-lb
4T	6	1.0	55	48 in.-lb	60	52 in.-lb
	8	1.25	130	9	145	10
	10	1.25	260	19	290	21
	12	1.25	480	35	540	39
	14	1.5	760	55	850	61
	16	1.5	1150	83	—	—
5T	6	1.0	65	56 in.-lb	—	—
	8	1.25	160	12	—	—
	10	1.25	330	24	—	—
	12	1.25	600	43	—	—
	14	1.5	930	67	—	—
	16	1.5	1400	101	—	—
6T	6	1.0	80	69 in.-lb	90	78 in.-lb
	8	1.25	195	14	215	16
	10	1.25	400	29	440	32
	12	1.25	730	53	810	59
	14	1.5	—	—	1250	90
7T	6	1.0	110	8	120	9
	8	1.25	260	19	290	21
	10	1.25	530	38	590	43
	12	1.25	970	70	1050	76
	14	1.5	1500	108	1700	123
	16	1.5	2300	166	—	—

KAPS3

## PRECOAT BOLTS

(Bolts with seal lock agent coating on threads)

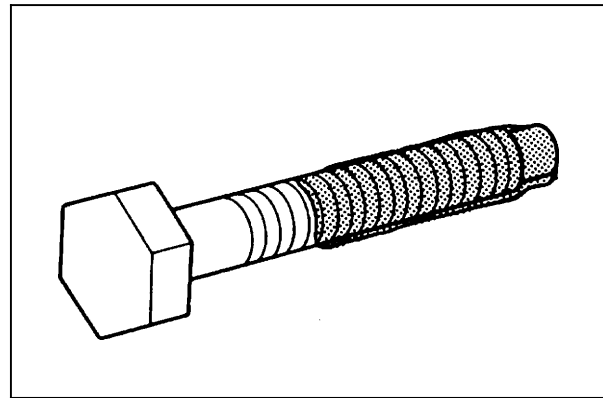
1. Do not use the precoat bolt as it is in either of the following cases:
  - (a) After it is removed.
  - (b) When the precoat bolt is moved (loosened or tightened) by tightness check, etc.

Note:

For torque check, use the lower limit of the allowable tightening torque range. If the bolt moves, retighten it according to the steps below.

2. Method for reuse of precoat bolts

(1) Wash the bolt and threaded hole. (The threaded hole must be washed even for replacement of the bolt.)



Precoat Bolts

B4460

(2) Perfectly dry the washed parts by air blowing.

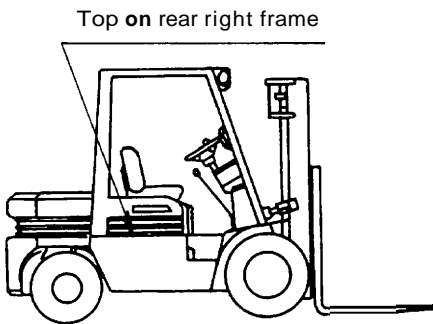
(3) Coat the specified seal lock agent to the threaded portion of the bolt.

## HIGH PRESSURE HOSE FITTING TIGHTENING TORQUE

1. When connecting a high pressure hose, wipe the hose fitting and mating nipple contact surfaces with clean cloth to remove foreign matters and dirt. Also check no dent or other damage on the contact surfaces before installation.
2. When connecting a high pressure hose, hold the hose to align the fitting with the nipple and tighten the fitting.
3. The maximum tightening torque must not exceed twice the standard tightening torque.

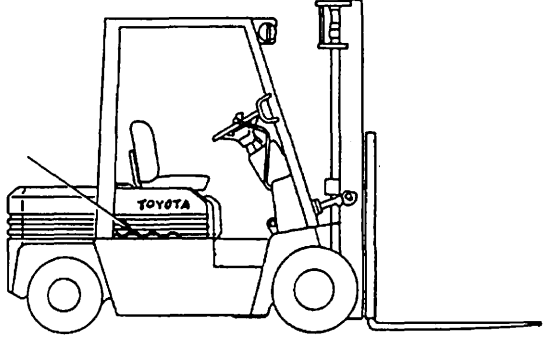
Nominal diameter of screw	Standard tightening torque kg-m (ft-lb)		Hose inside diameter (mm)
	Standard	Tightening range	
7/16 – 20UNF	2.5 ( 18.1)	2.4 ~ 2.6 (17.4 ~ 18.8)	6
9/16 – 18UNF	5.0 ( 36.2)	4.8 ~ 5.3 (34.7 ~ 38.3)	9
3/4 – 16UNF	6.0 ( 43.4)	5.7 ~ 6.3 (41.2 ~ 45.5)	12
7/8 – 14UNF	6.0 ( 43.4)	5.7 ~ 6.3 (41.2 ~ 45.5)	12
1 1/16 – 12UNF	12.0 ( 86.8)	11.4 ~ 12.6 (82.4 ~ 91.1)	19
1 5/16 – 12UNF	14.0 (101.2)	13.3 ~ 14.7 (96.2 ~ 106.3)	25
PF1/4	5.0 ( 36.2)	4.8 ~ 5.3 (34.7 ~ 38.3)	9
PF3/8	5.0 ( 36.2)	4.8 ~ 5.3 (34.7 ~ 38.3)	9
PF1/2	6.0 ( 43.4)	5.7 ~ 6.3 (41.2 ~ 45.5)	12
PF3/4	12.0 ( 86.8)	11.4 ~ 12.6 (82.4 ~ 91.1)	19
PF1	14.0 (101.2)	13.3 ~ 14.7 (96.2 ~ 106.3)	25

**FRAME NUMBER (1986.8 ~ 1989.8)**

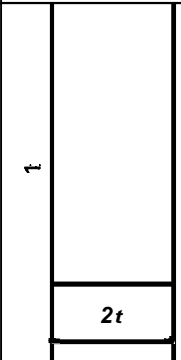
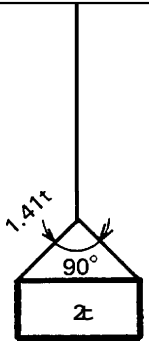
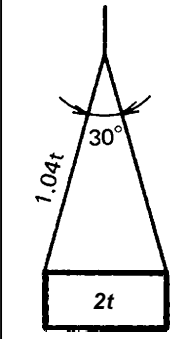
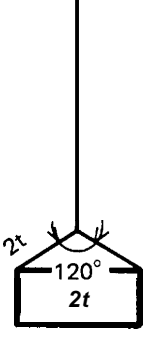
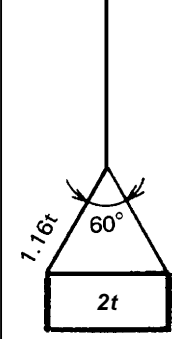
Punching position				
Vehicle series	1 ton series			
Engine model	4 P	4 Y	2 J	1 Z
Vehicle model	5FG10 02- 5FG10 5FG14 02- 5FG14 5FG15 02- 5FG15 5FG18 02- 5FG18	40- 5FG10 42- 5FG10 40- 5FG14 42- 5FG14 40- 5FG15 42- 5FG15 40- 5FG18 42- 5FG18	5FD10 02- 5FD10 5FD14 02- 5FD14 5FD15 02- 5FD15 5FD18 02- 5FD18	— — — — — — — —
Punching format	5FG18 - 10001	405FG18 - 10001	5FD18 - 10001	— —
Vehicle series	2 ton series			
Engine model	4 P	4 Y	1 Z	2 J
Vehicle model	5FG20 02- 5FG20 5FG23 02- 5FG23 5FG25 02- 5FG25	40- 5FG20 42- 5FG20 40- 5FG23 42- 5FG23 40- 5FG25 42- 5FG25	5FD20 02- 5FD20 5FD23 02- 5FD23 5FD25 02- 5FD25	60- 5FD20 62- 5FD20 60- 5FD23 62- 5FD23 60- 5FD25 62- 5FD25
Punching format	5FG25 - 10001	405FG25 - 10001	5FD25 - 10001	605FD25 - 10001

Vehicle series	3.0 ton series			
Engine model	4 P	4 Y	1 Z	2 J
Vehicle model	—	5FG28	5FD28	60-5FD28
	—	02-5FG28	02-5FD28	62-5FD28
	—	5FG30	5FD30	60-5FD30
	—	02-5FG30	02-5FD30	62-5FD30
Punching format	—	5FG30 -	5FD30 -	605FD30 -
	—	10001	10001	10001

**FRAME NUMBER (1989.9 - )**

Punching position				
<b>1 ton series</b>				
Engine model	5K	4Y	1DZ	
Vehicle model	5FG10	40-5FG10	5FD10	
	02-5FG10	42-5FG10	02-5FD10	
	5FG14	40-5FG14	5FD14	
	02-5FG14	42-5FG14	02-5FD14	
	5FG15	40-5FG15	5FD15	
	02-5FG15	42-5FG15	02-5FD15	
	5FG18	40-5FG18	5FD18	
	02-5FG18	42-5FG18	02-5FD18	
Punching format	A5FG18-40011	405FG18-40011	A5FD18-40011	
<b>2 ton series</b>				
Engine model	5K	4Y	1Z	1DZ
Vehicle model	5FG20	40-5FG20	5FD20	60-5FD20
	02-5FG20	42-5FG20	02-5FD20	62-5FD20
	5FG23	40-5FG23	5FD23	60-5FD23
	02-5FG23	42-5FG23	02-5FD23	62-5FD23
	5FG25	40-5FG25	5FD25	60-5FD25
	02-5FG25	42-5FG25	02-5FD25	62-5FD25
Punching format	A5FG25-40011	405FG25-40011	5FD25-40011	A605FD25-40011
<b>3 ton series</b>				
Engine model	4Y	1Z	1DZ	
Vehicle model	5FG28	5FD28	60-5FD28	
	02-5FG28	02-5FD28	62-5FD28	
	5FG30	5FD30	60-5FD30	
	02-5FG30	02-5FD30	62-5FD30	
Punching format	5FG30-40011	5FD30-40011	A605FD30-40011	

## WIRE ROPE SUSPENSION ANGLE LIST

Lifting angle	Tension	Compression	Suspension method	Lifting angle	Tension	Compression	Suspension method
0°	1.00 time	0 time		90°	1.41 time	1.00 time	
30°	1.04 time	0.27 time		120°	2.00 time	1.73 time	
60°	1.16 time	0.58 time					

## SAFE LOAD FOR EACH WIRE ROPE SUSPENSION ANGLE

Unit: ton (lb)

Rope diameter	Cutting load	Single-rope suspension	Two-rope suspension					Four-rope suspension			
		0°	0°	30°	60°	90°	0°	30°	60°	90°	
6 mm (0.24 in.)	2.18 ( 4807)	0.31 ( 683.6)	0.62 (1367)	0.6 (1323)	0.53 (1169)	0.44 ( 970)	1.24 (2734)	1.2 (2646)	1.06 (2337)	0.88 (1940)	
8 mm (0.32 in.)	3.21 ( 7078)	0.45 ( 992.3)	0.9 (1985)	0.87 (1918)	0.78 (1720)	0.64 (1411)	1.8 (3969)	1.74 (3937)	1.56 (3440)	1.28 (2822)	
10 mm (0.4 in.)	5.02 (11069)	0.71 (1565.6)	1.43 (3153)	1.37 (3021)	1.2 (2646)	1.0 (2205)	2.8 (6174)	2.7 (5954)	2.4 (5292)	2.0 (4410)	
12.5 mm (0.5 in.)	7.84 (17387)	1.12 (2469.5)	2.2 (4851)	2.1 (4631)	1.9 (4190)	1.5 (3308)	4.4 (9702)	4.2 (9261)	3.8 (8379)	3.0 (6615)	
14 mm (0.56 in.)	9.83 (21675)	1.4 (3087)	2.8 (6174)	2.7 (5954)	2.4 (5292)	1.9 (4190)	5.6 (12348)	5.4 (11907)	4.8 (10584)	3.8 (8379)	



**COMPONENTS WEIGHT****(1986.8~1989.8)**

unit: kg (lb)

Engine	4P		128 (282)		
	4Y		134 (295)		
	2J		214 (471)		
	1Z		237 (523)		
Transmission ASSY			78 (172)		
Torque Converter ASSY		AISIN One speed	152 (335)		
		AISIN Two speed	163 (359)		
Differential & Front		1 ton series	210 (463)	2 ton series	260 (573)
Axle (w/ Brake		3 ton series	318 (701)		
Counter Weight		1.0 ton	Approx. 430 (950)	1.35 ton	Approx. 645 (1420)
		1.5 ton	Approx. 785 (1730)	1.75 ton	Approx. 915 (2020)
		2.0 ton	Approx. 1110 (2670)	2.25 ton	Approx. 1225 (2700)
		2.5 ton	Approx. 1430 (3150)	2.75 ton	Approx. 1670 (3680)
		3.0 ton	Approx. 1860 (4100)		
Mast		1.0 ton	Approx. 400 (880)	2.0 ton	Approx. 500 (1100)
		3.0 ton	Approx. 600 (1320)		

**COMPONENTS WEIGHT (1989.9 — )**

unit: kg (lb)

Engine	5K		93 (205)
	4Y		134 (295)
	1DZ		190 (419)
	1Z		237 (523)
Transmission ASSY			78 (172)
Torque Converter ASSY	AISIN	One speed	152 (335)
		Two speed	163 (359)
Differential & Front Axle (w/ Brake)	1 ton series		210 (463)
	2 ton series		260 (573)
	3 ton series		318 (701)
Balance Weight	1.0 ton		Approx. 430 (950)
	1.35 ton		Approx. 645 (1420)
	1.5 ton		Approx. 785 (1730)
	1.75 ton		Approx. 915 (2020)
	2.0 ton		Approx. 1110 (2670)
	2.25 ton		Approx. 1225 (2700)
	2.5 ton		Approx. 1430 (3150)
	2.75 ton		Approx. 1670 (3680)
	3.0 ton		Approx. 1864 (4100)
Mast	1.0 ton		Approx. 400 (880)
	2.0 ton		Approx. 500 (1100)
	3.0 ton		Approx. 600 (1320)

## RECOMMENDED LUBRICANT QUANTITY & TYPES (1986.8 ~ 1989.8)

Description		Classification	Type	Application	Quantity
Engine	Gasoline	API SD,SE,SF	Motor oil SAE30 (SAE20 in cold area) SAE20W-40 (SAE 10W-30 in cold area)	4 P 4 Y	4.32 (1.14 US gal) 4.0 ℓ (1.06 US gal)
	Diesel	API CC,CD	Diesel engine oil SAE30 (SAE20 in cold area) SAE 10W-30	2 J 1 Z	6.9 ℓ (1.82 US gal) 9.0 ℓ (2.38 US gal)
Transmission		API GL-4 GL-5	Hypoid gear oil SAE85W-90	MTM models	4.0 2 (1.06 US gal)
Torque converter		ATF	GM Dexron® II	AISIN make	14 ℓ (3.70 US gal)
Differential		API GL-4 GL-5	Hypoid gear oil SAE85W-90	1 ton series 2 ton series 3 ton series	5.8 ℓ (1.53 US gal) 6.8 ℓ (1.80 US gal) 9.0 ℓ (2.38 US gal)
Hydraulic oil		ISO VG32	Hydraulic oil #90	1 ton series 2 ton series 3 ton series	27 ℓ (7.1 US gal) 34 ℓ (9.0 US gal) 37 ℓ (9.8 US gal)
Brake (1.0-1.75 ton models)		—	SAE J-1703 DOT-3	1 ton series	Proper quantity Reservoir Tank 0.2 ℓ (0.05 US gal)
Chassis parts			MP Grease	All models	Proper quantity
Coolant		LLC	<ul style="list-style-type: none"> <li>• "LLC 30-50% mixture (for winter or all-season)</li> <li>• Coolant with rust-inhibitor (for spring, summer and autumn)</li> </ul>	Attached Table 1 Coolant volume	
Coolant (Reservoir Tank)		↑	↑	All models	1.1 ℓ (0.3 US gal) (at Full level)

Attached Table 1 Coolant volume

unit: ℓ (US gal)

Engine	Drive method	1.0 – 1.75 ton vehicles	2.0 – 2.5 ton vehicles	2.75, 3.0 ton vehicles
4 P	MTM	9.7 (2.56)	9.9 (2.61)	—
	ATM	11.5 (3.03)	11.2 (2.95)	—
4 Y	MTM	9.7 (2.56)	9.9 (2.61)	12.2 (3.22)
	ATM	11.5 (3.03)	11.2 (2.95)	11.8 (2.92)
1 Z	MTM	—	9.3 (2.46)	9.6 (2.53)
	ATM	—	8.6 (1.01)	9.2 (2.43)
2 J	MTM	12.7 (3.35)	14.9 (3.93)	15.2 (4.01)
	ATM	14.5 (3.70)	14.2 (3.75)	14.8 (3.72)

## RECOMMENDED LUBRICANT QUANTITY & TYPES

(1989.9 ~ )

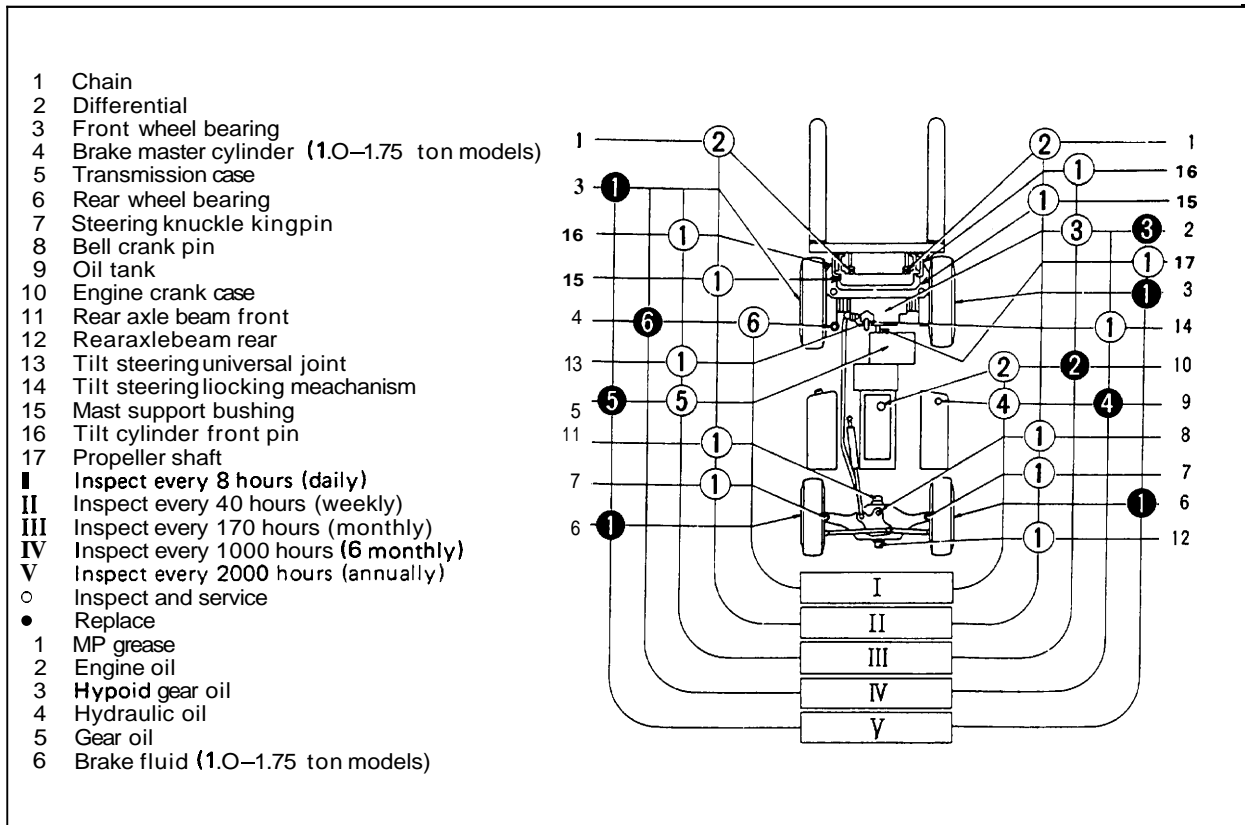
Description		Classification	Type	Application	Quantity
Engine	Gasoline	API SD,SE,SF	Motor oil SAE30 (SAE20 in cold area) SAE20W-40 (SAE10W-30 in cold area)	5K	4.0ℓ (1.06 US gal)
				4Y	4.0ℓ (1.06 US gal)
	Diesel	API CC, CD	Diesel engine oil SAE30 (SAE20 in cold area) SAE10W-30	1DZ	6.51ℓ (1.7 US gal)
				1Z	9.0ℓ (2.38 US gal)
Transmission		API GL-4 GL-5	Hypoid gear oil SAE85W-90	MTM models	4.0ℓ (1.06 US gal)
Torque converter		ATF	GM Dexron® II	AI SIN make	14.0ℓ (3.70 US gal)
Differential		API GL-4 GL-5	Hypoid gear oil SAE85W-90	1 ton series 2 ton series 3 ton series	5.8ℓ (1.53 US gal) 6.8ℓ (1.80 US gal) 9.0ℓ (2.38 US gal)
Hydraulic oil		ISO VG32	Hydraulic oil #90	1 ton series 2 ton series 3 ton series	27.0ℓ (7.1 US gal) 34.0ℓ (9.0 US gal) 37.0ℓ (9.8 US gal)
Fuel tank		/		1 ton series 2 ton series 3 ton series	45.0ℓ (11.9 US gal) 65.0ℓ (17.2 US gal) 70.0ℓ (18.5 US gal)
				1 ton series 2 ton series 3 ton series	45.0ℓ (11.9 US gal) 65.0ℓ (17.2 US gal) 70.0ℓ (18.5 US gal)
Brake (1.0-1.75 ton models)		/		SAE J-1703 DOT-3	1 ton series Proper quantity Reservoir Tank 0.2ℓ (0.05 US gal)
Chassis parts		/		MP grease	All models Proper quantity
Coolant		LLC	<ul style="list-style-type: none"> <li>● * LLC 30-50% mixture (for winter or all-season)</li> <li>● Coolant with rust-inhibitor (for spring, summer and autumn)</li> </ul>	Attached Table 1 Coolant volume	
Coolant (Reservoir Tank)		↑	↑	All models	1.1ℓ (0.3 US gal) (at Full level)

Attached Table 1 Coolant volume

unit: ℓ (US gal)

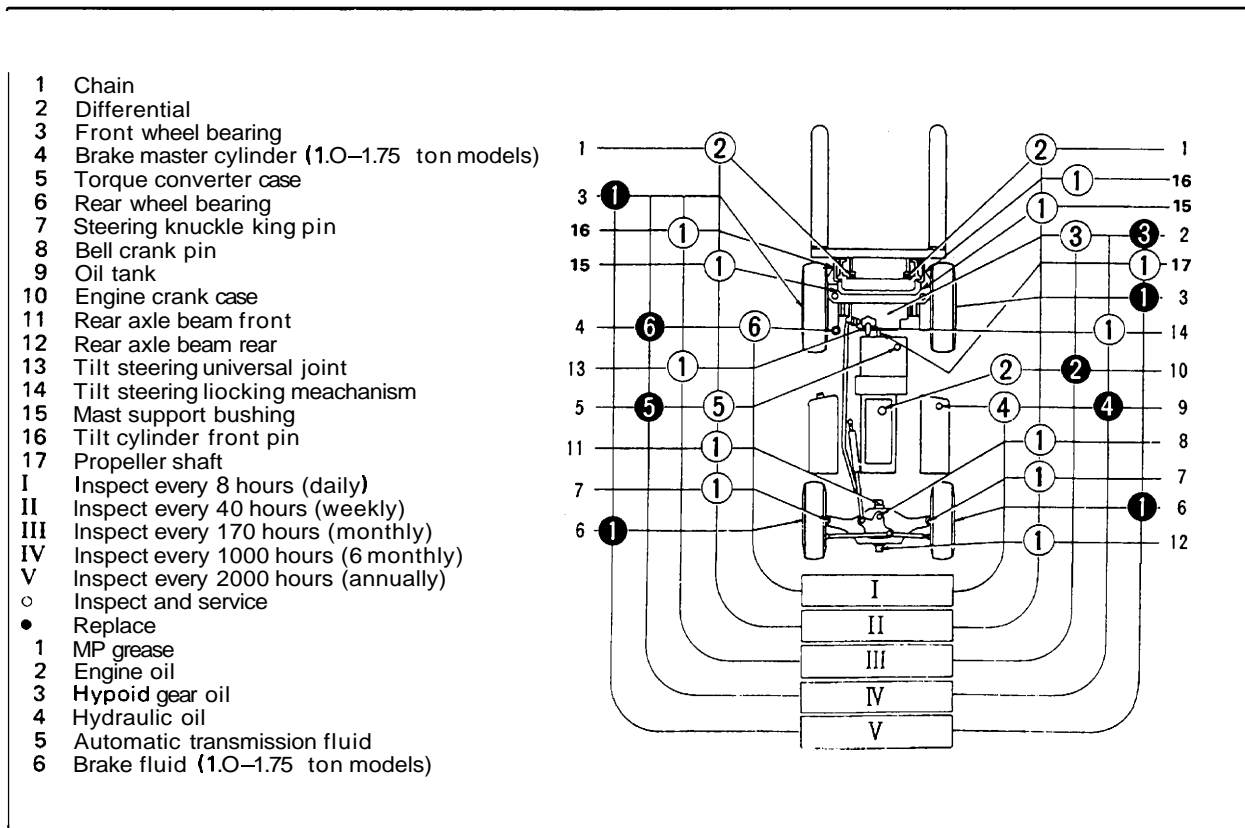
Engine	Drive method	1.0 — 1.75 ton vehicles	2.0 — 2.5 ton vehicles	2.75, 3.0 ton vehicles
5K	MTM	5.5 (1.45)	5.7 (1.50)	
	ATM	7.3 (1.93)	7.0 (1.85)	
4Y	MTM	7.5 (1.98)	7.7 (2.03)	10.0 (2.64)
	ATM	9.3 (2.46)	9.0 (2.38)	9.6 (2.53)
1Z	MTM		9.4 (2.48)	9.7 (2.56)
	ATM		8.7 (2.30)	9.3 (2.46)
1DZ	MTM	5.8 (1.53)	8.0 (2.19)	8.3 (2.19)
	ATM	7.6 (2.01)	7.3 (1.93)	7.9 (2.09)

# LUBRICATION CHARTS



Clutch Model Lubrication Chart

LAOM136



Torque Converter Model Lubrication Chart

LAOM137

## PERIODIC MAINTENANCE

### INSPECTION METHOD

I : Inspection. Repair or replacement if required.

M: Measurement. Repair or adjustment if required.

T: Retightening C: Cleaning L: Lubrication

\* : For new vehicle \*1: Soapy water \*2: Detector \*3: Flaw detector

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
<b>ENGINE</b>						
Main body	Proper starting and abnormal noise	I	○	○	○	○
	Rotating condition at idling	M	○	○	○	○
	Rotating condition during acceleration	M	○	○	○	○
	Exhaust gas condition	I	○	○	○	○
	Air cleaner element	C	○	○	○	○
	Valve clearance	M	○*			○
	Compression	M				○
	Cylinder head bolt loosening	T	○*			○
	Muffler rubber mount	I				○
PCV system	Clogging and damage in PCV valve and piping	I	○	○	○	○
Governor	No-load maximum rpm	M	○	○	○	○
Lubrication system	Oil leak	I	○	○	○	○
	Oil level	I	○	○	○	○
	Clogging and dirt of oil filter	I	○	○	○	○
Fuel system	Fuel leak	I	○	○	○	○
	Operation of carburetor link mechanism	I	○	○	○	○
	Dirt and clogging of fuel filter and element	I	○	○	○	○
	Injection timing	M			○	○
	Injection nozzle injection pressure and spray status	M				○
	Draining of sedimenter	I			○	○
Cooling system	Coolant level in radiator and leak	I	○	○	○	○
	Rubber hose degradation	I	○	○	○	○
	Radiator cap condition	I	○	○	○	○
	Fan belt tension, looseness and damage	I	○	○	○	○
	Radiator rubber mount	I				○



Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
<b>POWER TRANSMISSION SYSTEM</b>						
Clutch	Clutch pedal play	M	○	○	○	○
	Abnormal sound and functioning (connection)	I	○	○	○	○
	Clutch booster function and leak	I	○	○	○	○
	Fluid level	I	○	○	○	○
	Oil clutch mechanism function and leak	I			○	○
Transmission	Leak	I	○	○	○	○
	Fluid level	I	○	○	○	○
	Gear function and abnormal noise	I	○	○	○	○
Differential	Leak	I	○	○	○	○
	Oil level	I	○	○	○	○
	Bolt loosening	T				○
Torque converter and transmission	Leak	I	○	○	○	○
	Fluid level	I	○	○	○	○
	Operating mechanism function and looseness	I	○	○	○	○
	Control valve and clutch functions	I	○	○	○	○
	Inching valve function	I	○	○	○	○
	Stall and hydraulic pressure measurement	M			○	○
Propeller shaft and axle shaft	Loose joint	T		○	○	○
	Looseness at spline connections	I				○
	Looseness of universal joint	I				○
	Twisting and cracks of axle shaft.	I				○
<b>DRIVE SYSTEM</b>						
Wheels	Tire inflation pressure	M	○	○	○	○
	Tire cuts, damage and uneven wearing	I	○	○	○	○
	Loose rim and hub nuts	T	○	○	○	○
	tire groove depth	M	○	○	○	○
	metal chips, pebbles and other foreign matter trapped in tire grooves	I	○	○	○	○
	Rim, side bearing and disc wheel damage	I	○	○	○	○
	Abnormal sound and looseness of front wheel bearing	I	○	○	○	○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
Wheel	Abnormal sound and looseness of rear wheel bearing	I	O	O	O	O
Front axle	Cracks, damage and deformation of housing	I				O
Rear axle	Cracks, damage and deformation of beam	I				O
	Looseness of axle beam in vehicle longitudinal direction	M	O*			O
<b>STEERING SYSTEM</b>						
Steering wheel	Play and looseness	I	O	O	O	O
	Function	I	O	O	O	O
Gear box	Oil leak	I	O	O	O	O
	Looseness of mounting	T	O	O	O	O
	Clogging of relief valve filter	C			O	O
Rods, links and arm	Looseness and damage	I	O	O	O	O
	Linkage wear and mounting condition	I				O
Power steering	Oil leak	I	O	O	O	O
	Mounting and linkage looseness	I	O	O	O	O
	Damage of power steering hose	I				O
Knuckle	King pin looseness	I	O	O	O	O
	Cracks and deformation	I				O
Steering shaft	Wheel alignment	M				O
	Left and right turning angle	M				O
<b>BRAKING SYSTEM</b>						
Brake pedal	Play and reserve	M	O	O	O	O
	Braking effect	I	O	O	O	O
Parking brake	Operating force	I	O	O	O	O
	Braking effect	I	O	O	O	O
	Rod and cable looseness and damage	I	O	O	O	O
Brake pipe	Leak, damage and mounting condition	I	O	O	O	O
Reservoir tank	Leak and fluid level	I	O	O	O	O
Master cylinder or brake valve and wheel cylinder	Function, wear, damage, leak and mounting looseness	I				O

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
Brake drum and brake shoe	Clearance between drum and lining	M	O	O	O	O
	Wear of shoe sliding portion and lining	I				O
	Drum wear and damage	I				O
	Shoe operating condition	I				O
	Anchor pin rusting	I				O
	Return spring fatigue	M				O
	Automatic adjuster function	I				O
Backing plate	Deformation, cracks and damage	I				O
	Loose mounting	T				O
<b>MATERIAL HANDLING SYSTEM</b>						
Forks	Abnormality of fork and stopper pin	I	O	O	O	O
	Misalignment between left and right fork fingers	I	O	O	O	O
	Cracks at fork root and welded part	I*3				O
Mast and fork bracket	Deformation and damage of each part and crack at welded part	I	O	O	O	O
	Mast and lift bracket looseness	I	O	O	O	O
	Wear and damage of mast support bush	I				O
	Wear, damage and rotating condition of rollers	I	O	O	O	O
	Wear and damage of roller pins	I				O
	Wear and damage of mast strip	I	O	O	O	O
Chain and chain wheel	Tension, deformation and damage of chain	I	O	O	O	O
	Chain lubrication	I	O	O	O	O
	Abnormality of chain anchor bolt	I	O	O	O	O
	Wear, damage and rotating condition of chain wheel	I	O	O	O	O
Various attachments	Abnormality and mounting condition of each part	I	O	O	O	O
<b>HYDRAULIC SYSTEM</b>						
Cylinder	Loosening and damage of cylinder mounting	I	O	O	O	O
	Deformation and damage of rod, rod screw and rod end	I	O	O	O	O
	Cylinder operation	I	O	O	O	O
	Natural drop and natural forward tilt (hydraulic drift)		O	O	O	O

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
Cylinder	Oil leak and damage	I	O	O	O	O
	Wear and damage of pin and cylinder bearing	I	O	O	O	O
	Lifting speed	M	O	O	O	O
	Uneven movement	I	O	O	O	O
Oil pump	Oil leak and abnormal sound	I	O	O	O	O
Hydraulic oil tank	Oil level and contamination	I	O	O	O	O
	Tank and oil strainer	C			O	O
	Oil leak	I	O	O	O	O
Control lever	Loose linkage	I	O	O	O	O
	Operation	I	O	O	O	O
Oil control valve	Oil leak	I	O	O	O	O
	Relief pressure measurement	M				O
	Relief valve and tilt lock valve functions	I	O	O	O	O
Hydraulic piping	Oil leak	I	O	O	O	O
	Deformation and damage	I	O	O	O	O
	Loose joint	T	O	O	O	O
<b>ELECTRICAL SYSTEM</b>						
Ignition timing	Cracks on distributor cap	I	O	O	O	O
	Spark plug burning and gap	I	O	O	O	O
	Distributor side terminal burning	I	O	O	O	O
	Distributor cap center piece wear and damage	I	O	O	O	O
	Plug cord internal discontinuity	I				O
	Ignition timing	M			O	O
Starting motor	Pinion gear meshing status	I	O	O	O	O
Charger	Charging function	I	O	O	O	O
Battery	Battery fluid level	I	O	O	O	O
	Battery fluid specific gravity	M			O	O
Electrical wiring	Damage of wiring harness	I	O	O	O	O
	Fuses	I	O	O	O	O

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
Preheater	Open-circuit in glow plug	I			O	O
	Open-circuit in intake heater	I			O	O
Engine stop- poing system	Diesel engine key stop device function	I	O	O	O	O
SAFETY DEVICES, ETC.						
Head guard	Cracks at welded portion	I	O	O	O	O
	Deformation and damage	I	O	O	O	O
Back-rest	Loosening of mounting	T	O	O	O	O
	Deformation, crack and damage	I	O	O	O	O
Lighting system	Function and mounting condition	I	O	O	O	O
Horn	Function and mounting condition	I	O	O	O	O
Direction indicator	Function and mounting condition	I	O	O	O	O
Instruments	Functions	I	O	O	O	O
Backup buzzer	Function and mounting condition	I	O	O	O	O
Rear-view mirror	Dirt, damage	I	O	O	O	O
	Rear reflection status	I	O	O	O	O
Seat	Loosening and damage of mounting	I	O	O	O	O
Body	Damage and cracks of frame, cross members, etc.	I				O
	Bolt looseness	T				O
Others	Grease up	L	O	O	O	O

# PERIODIC REPLACEMENT LUBRICANTS AND PARTS

a : Replacement

Item	Interval	1 month	3 months	6 months	12 months
		170 hours	500 hours	1000 hours	2000 hours
Engine		a	●	a	a
Engine oil filter			●	a	●
Engine coolant (every 2 years for LLC)			a	a	a
Fuel filter				a	●
Torque converter oil				a	●
Torque converter oil filter					●
Transmission oil					a
Differential oil					a
Hydraulic oil				a	a
Hydraulic oil filter		a <sup>*1</sup>		●	a
Wheel bearing grease					a
Spark plugs				a	a
Cyclone air cleaner element					a
Brake valve rubber parts					●
Cups and seals for master and wheel cylinders					a
Brake fluid				●	●
Power steering hoses					
Power steering rubbers parts					● <sup>*2</sup>
Hydraulic hoses					a <sup>*2</sup>
Reservoir tank tube					● <sup>*2</sup>
Fuel hoses					
Torque converter rubber hoses					● <sup>*2</sup>
Chains					● <sup>*3</sup>

\*1: for new vehicle \*2: Every 2 years \*3: Every 3 years

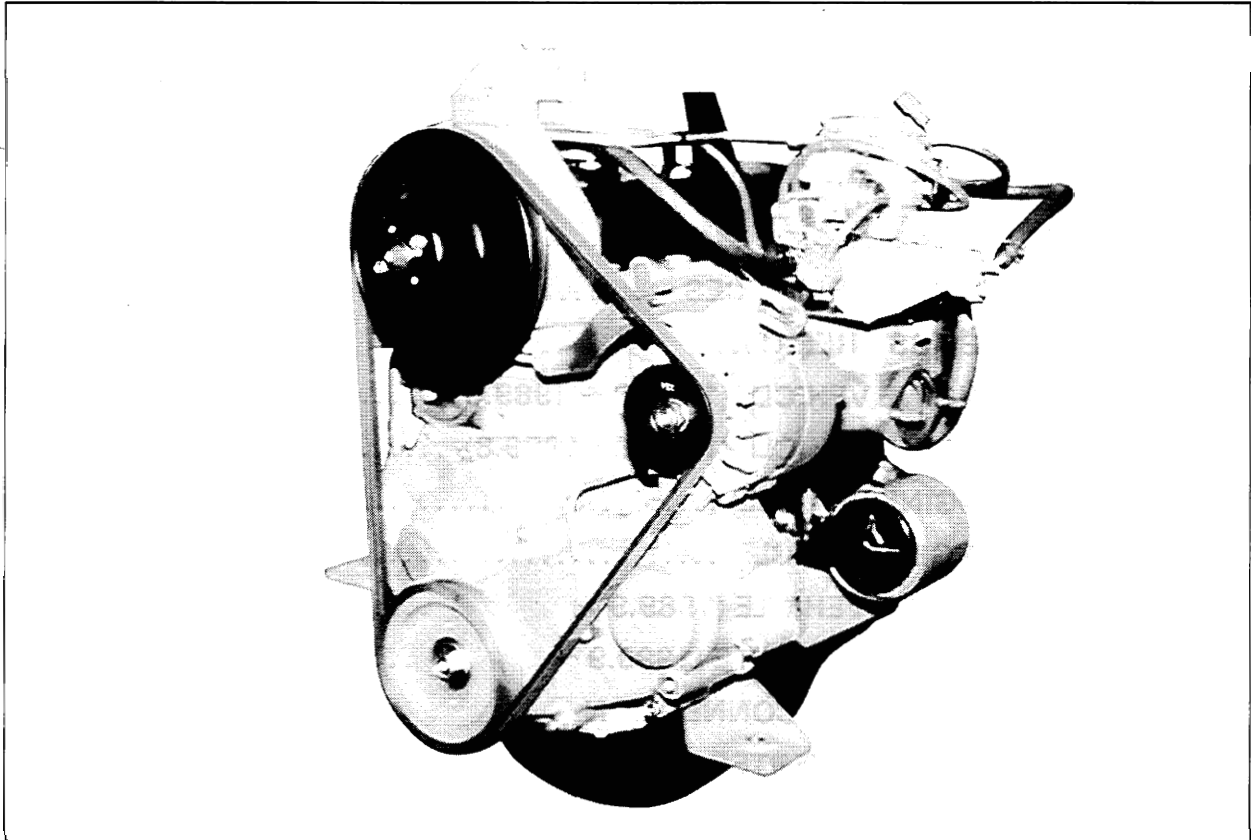
Replacement shall be made upon arrival of the operation hours or months, whichever is earlier.

## ENGINE

## 1

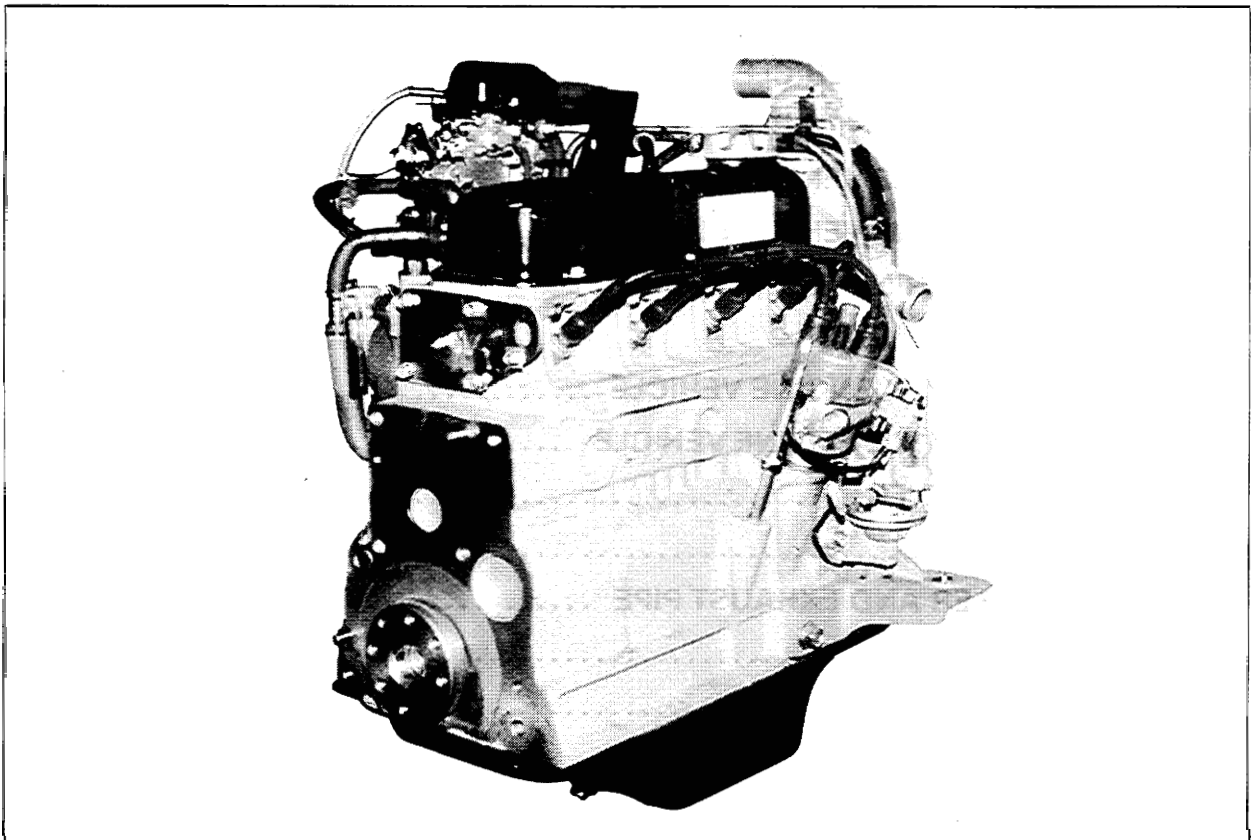
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# GENERAL



4P Engine Front View (1986.8 ~ 1989.8)

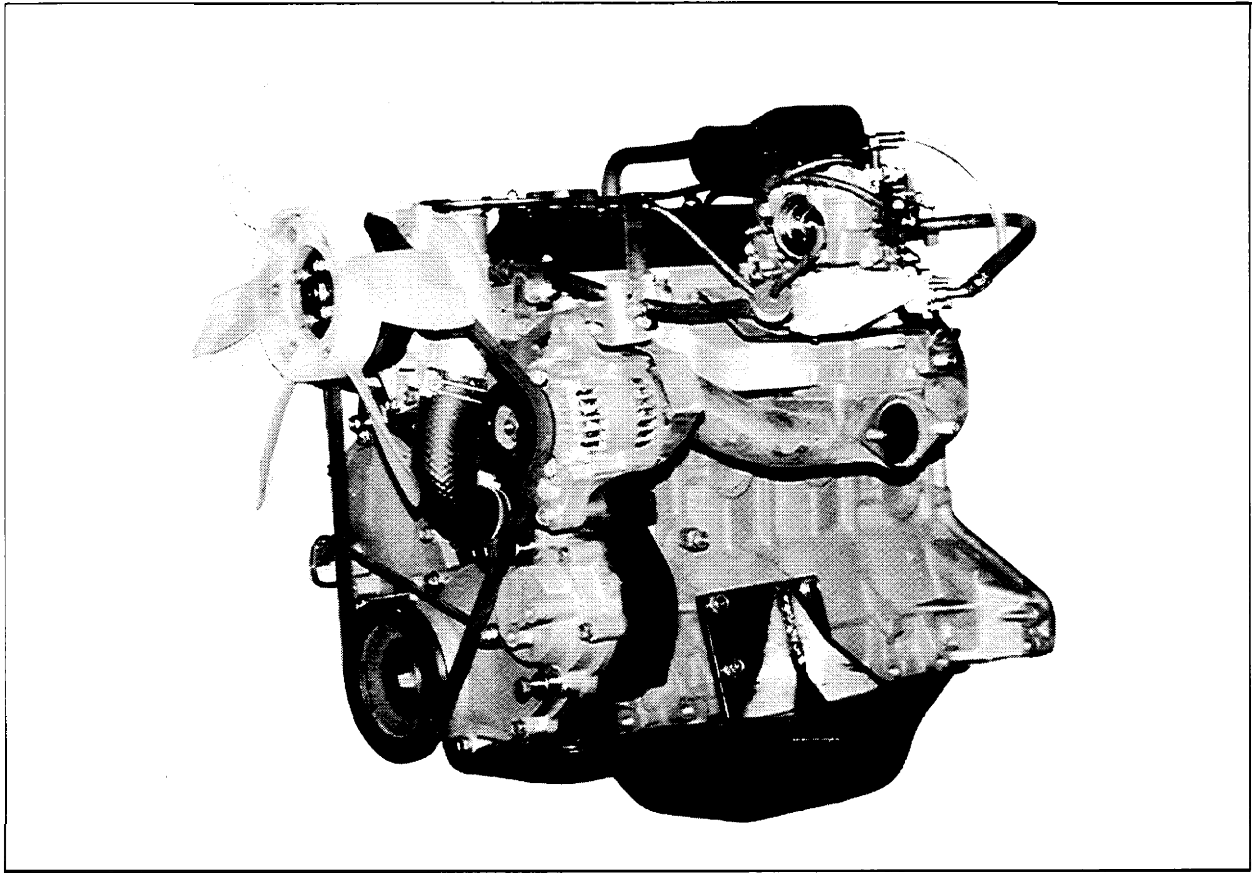
KAF1-1



4P Engine Rear View (1986.8 ~ 1989.8)

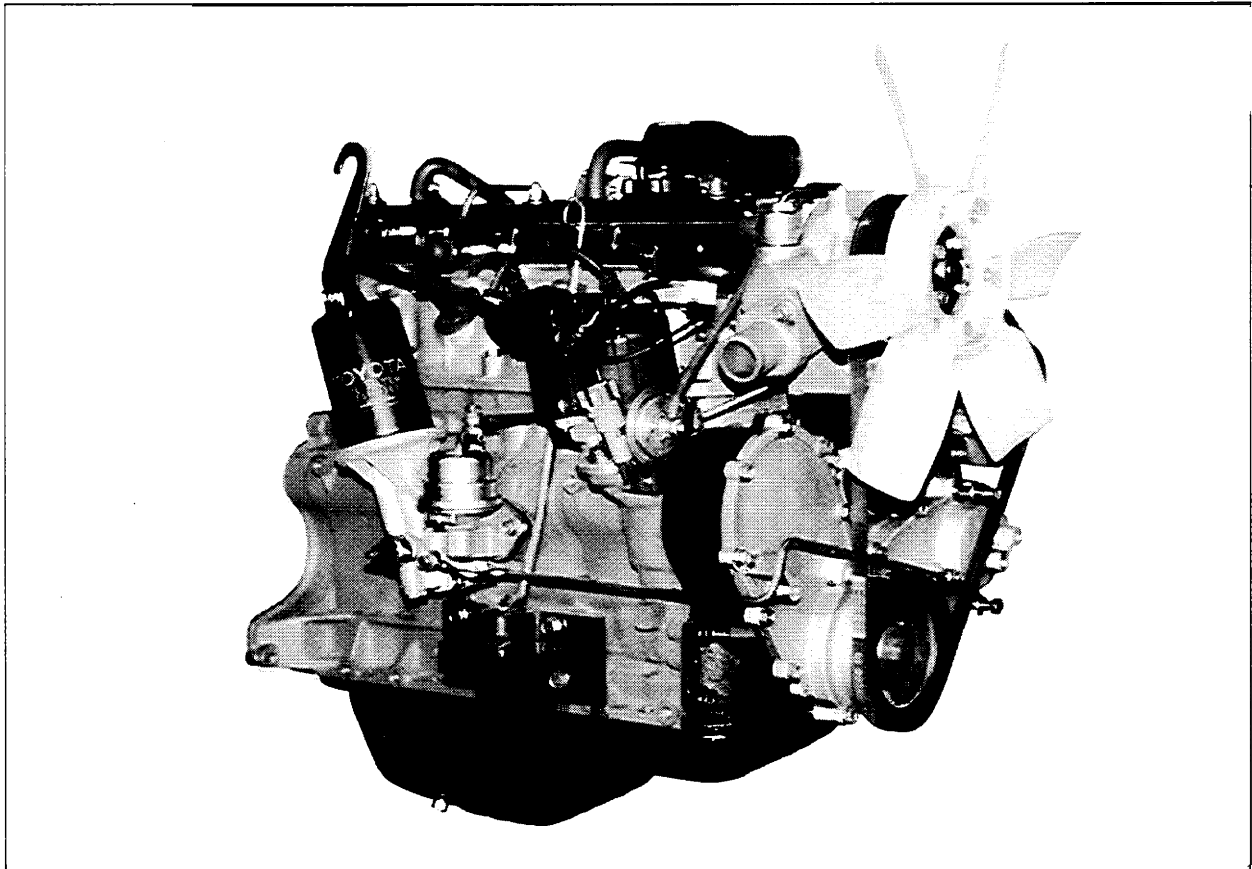
KAF25-32





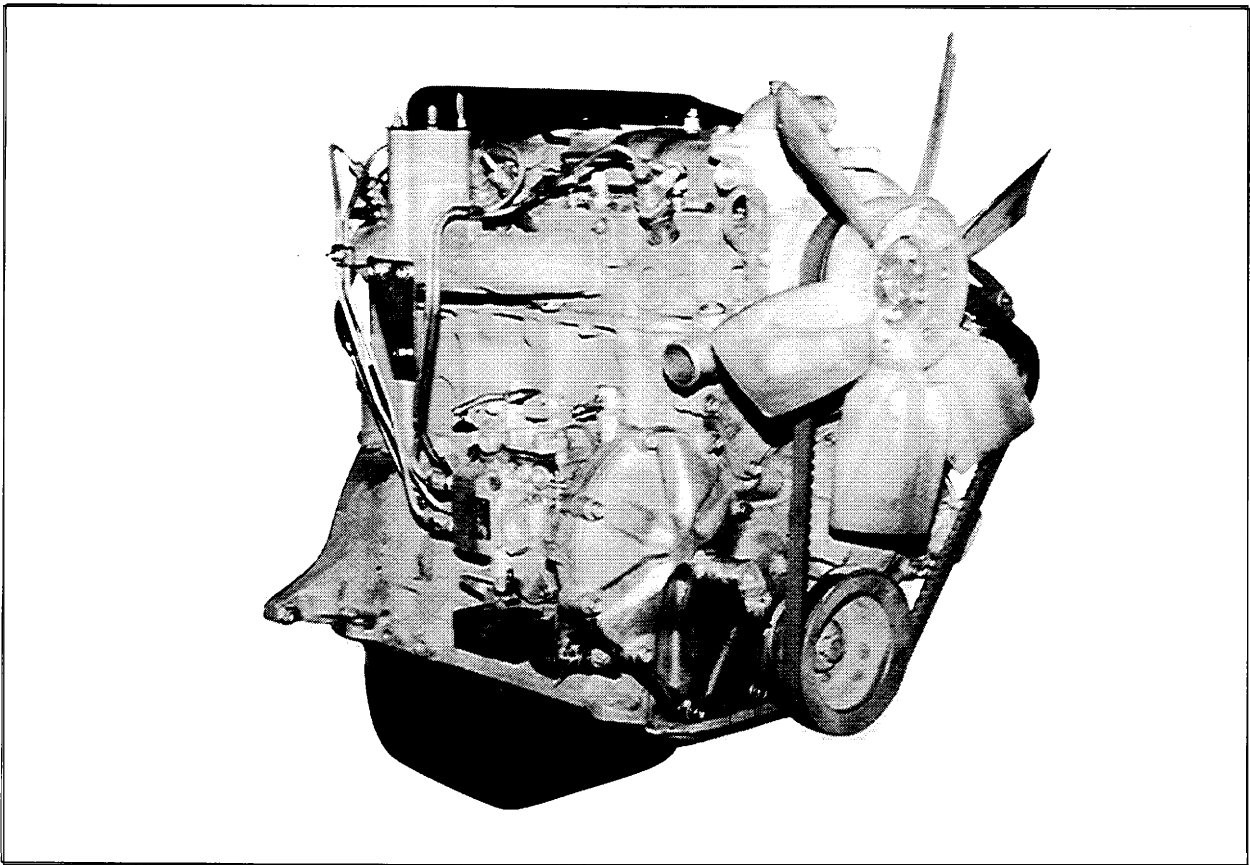
4Y Engine Front View

KAJ14-2



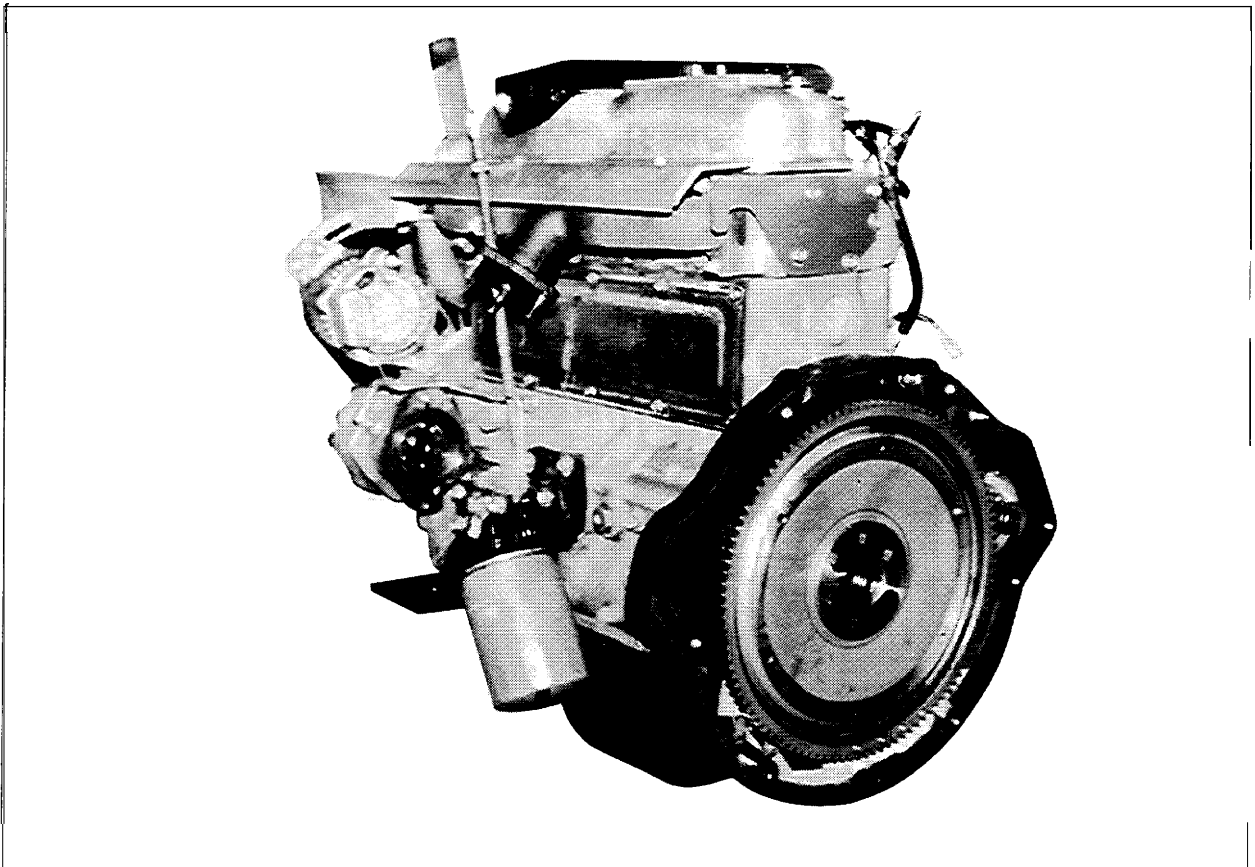
4Y Engine Front View

KAJ14-16



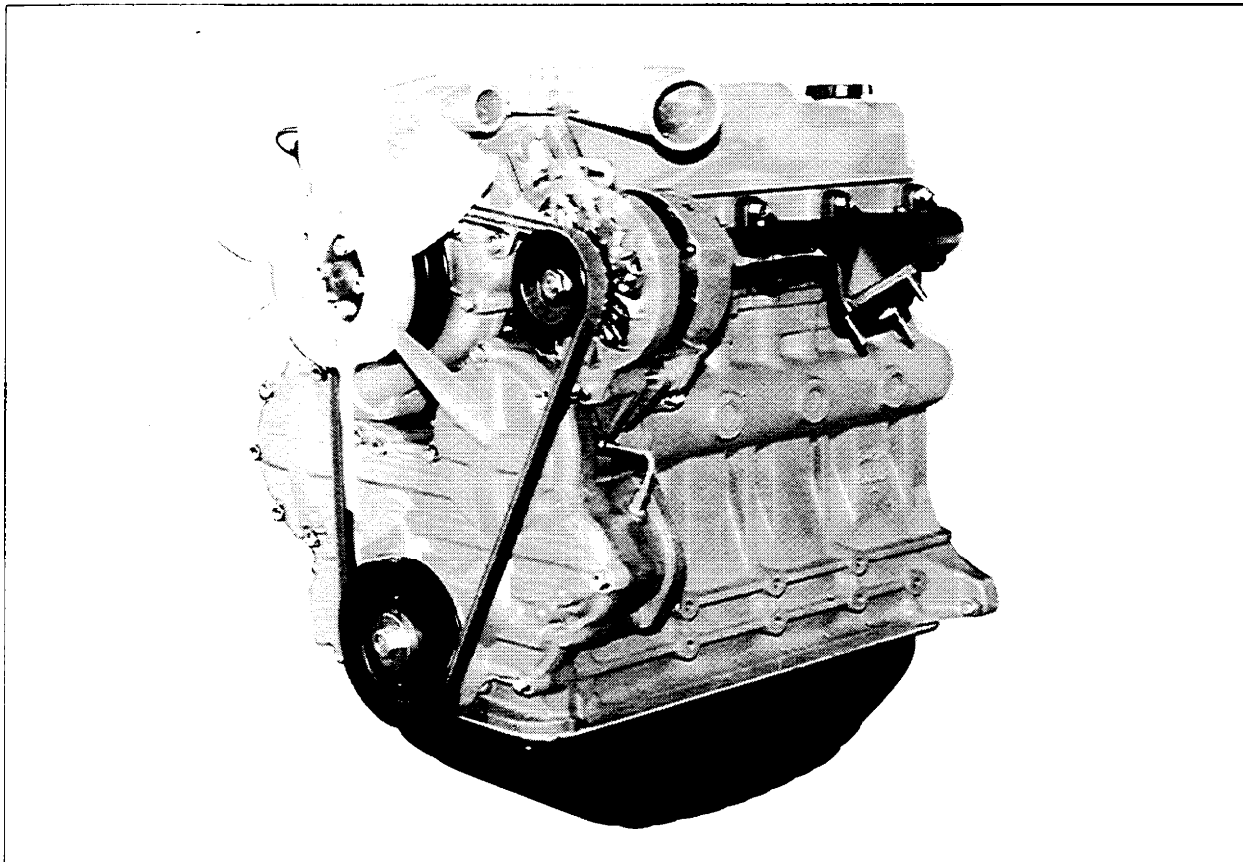
2J Engine Front View (1986.8 - 1989.8)

KAH2-2



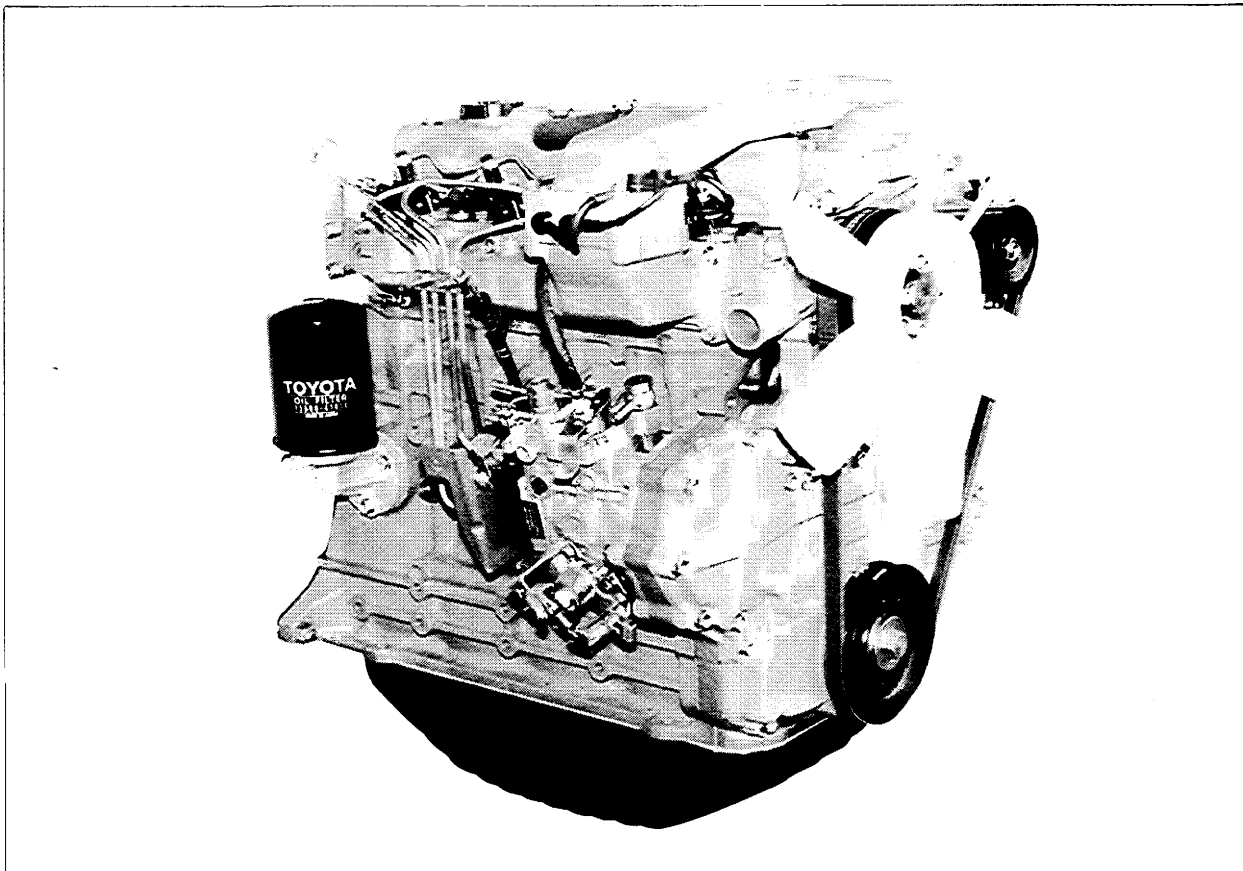
2J Engine Rear View (1986.8 - 1989.8)

KAHI-15



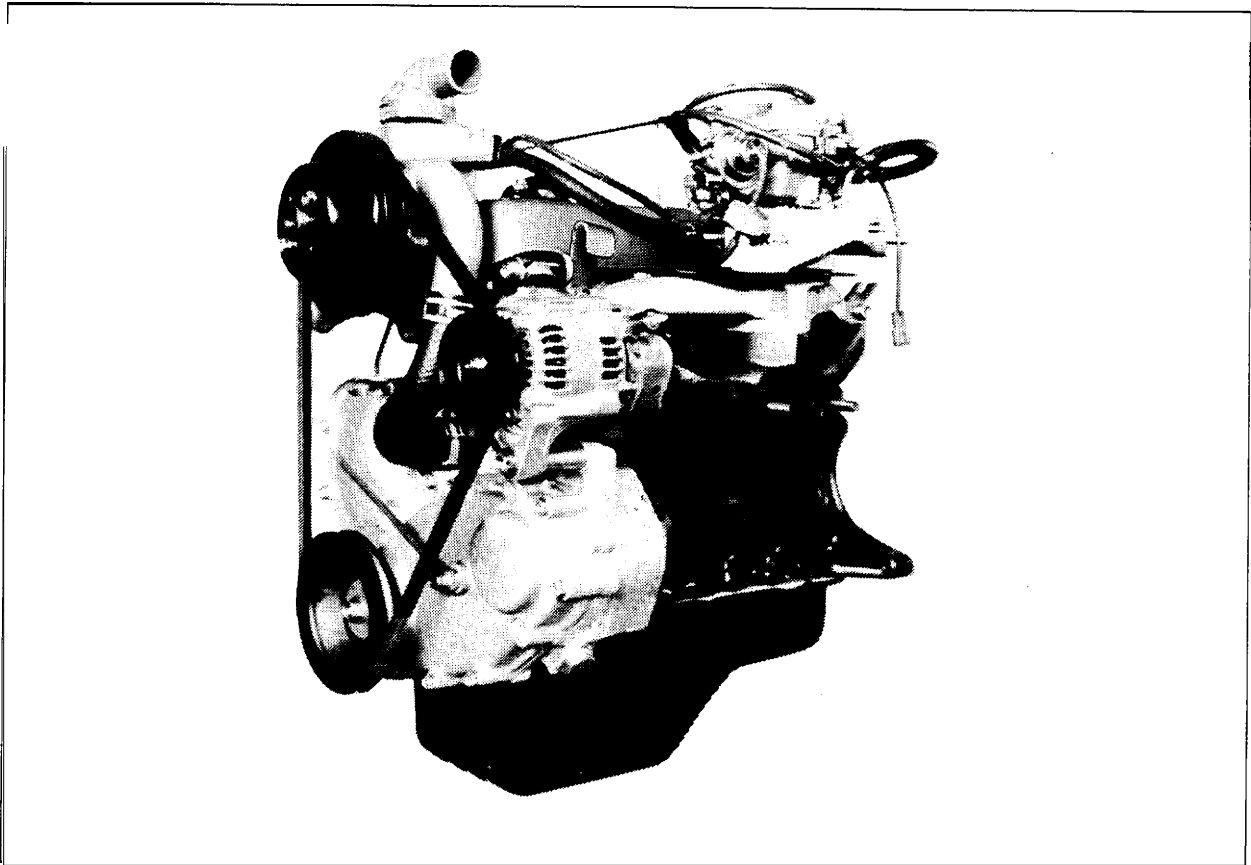
1Z Engine Front View

KAG1-14



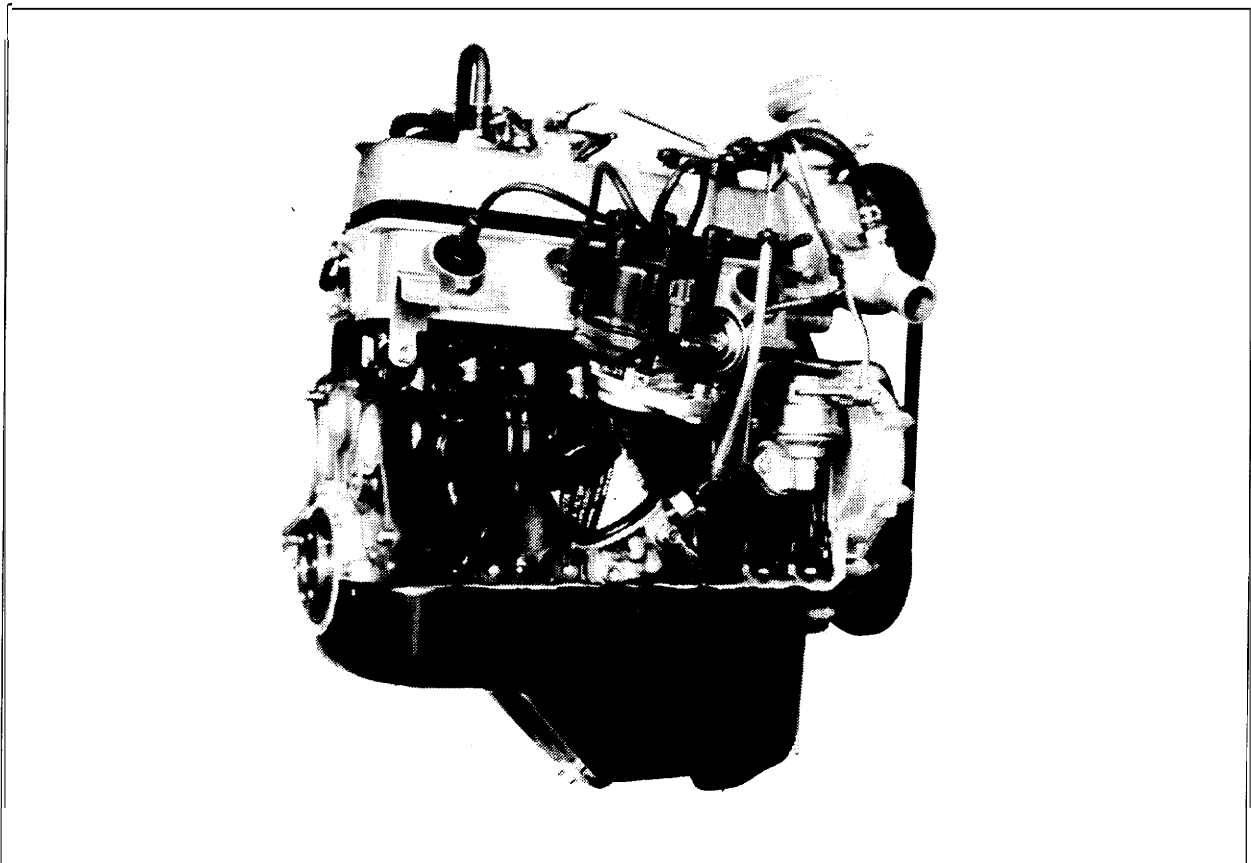
1Z Engine Front View

KAG1-15



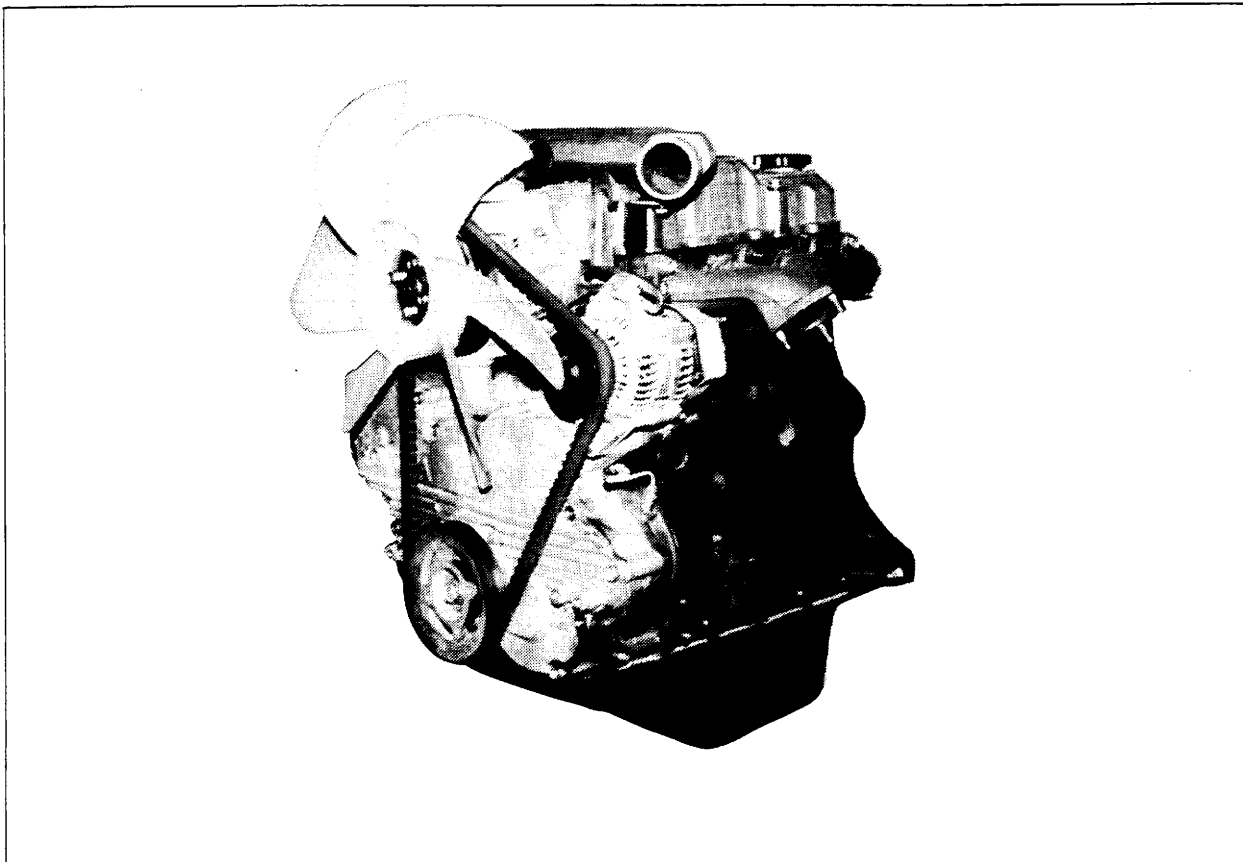
5K Engine Front View (1989.9~ )

KAPI-4



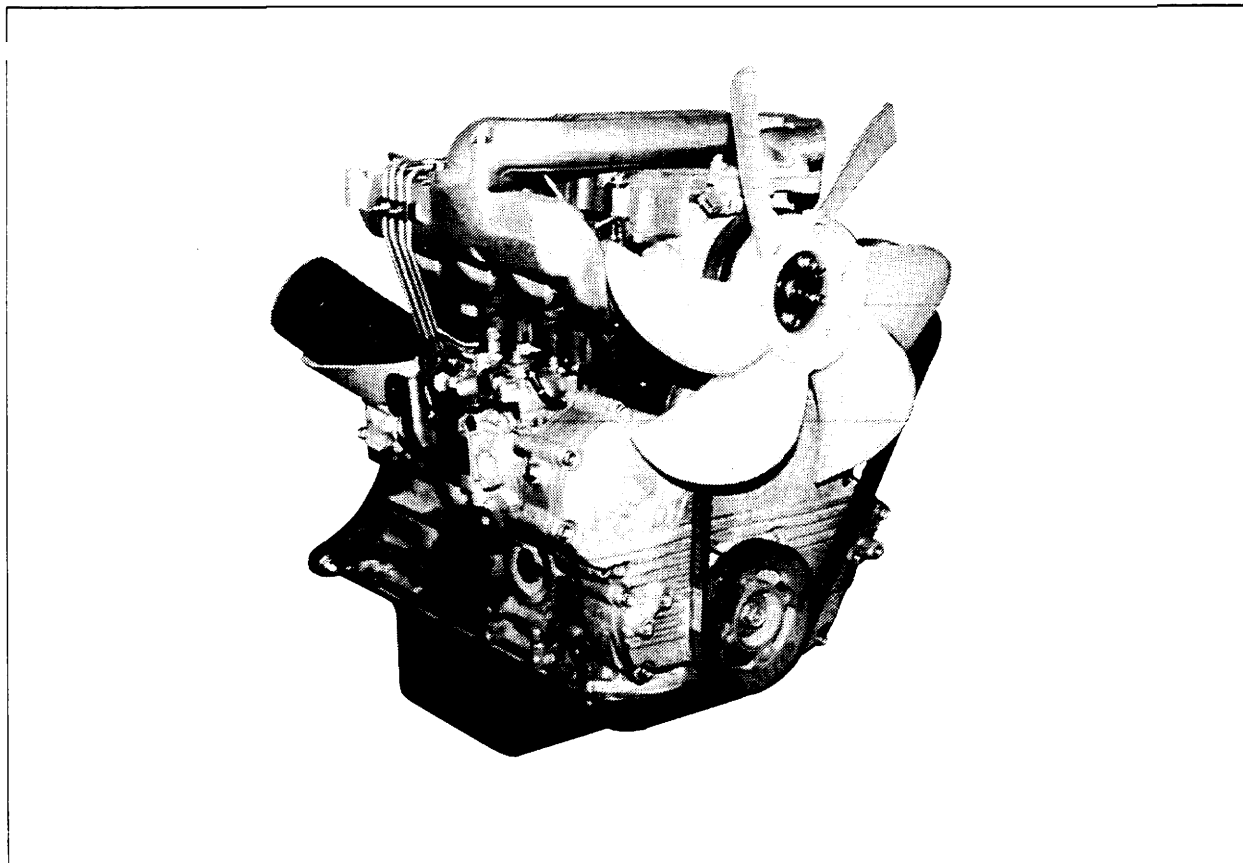
5K Engine Front View (1989.9~ )

KAPI-5



1DZ Engine Front View (1989.9 - )

KAN4-10



1DZ Engine Front View (1989.9 - )

KAN4-11

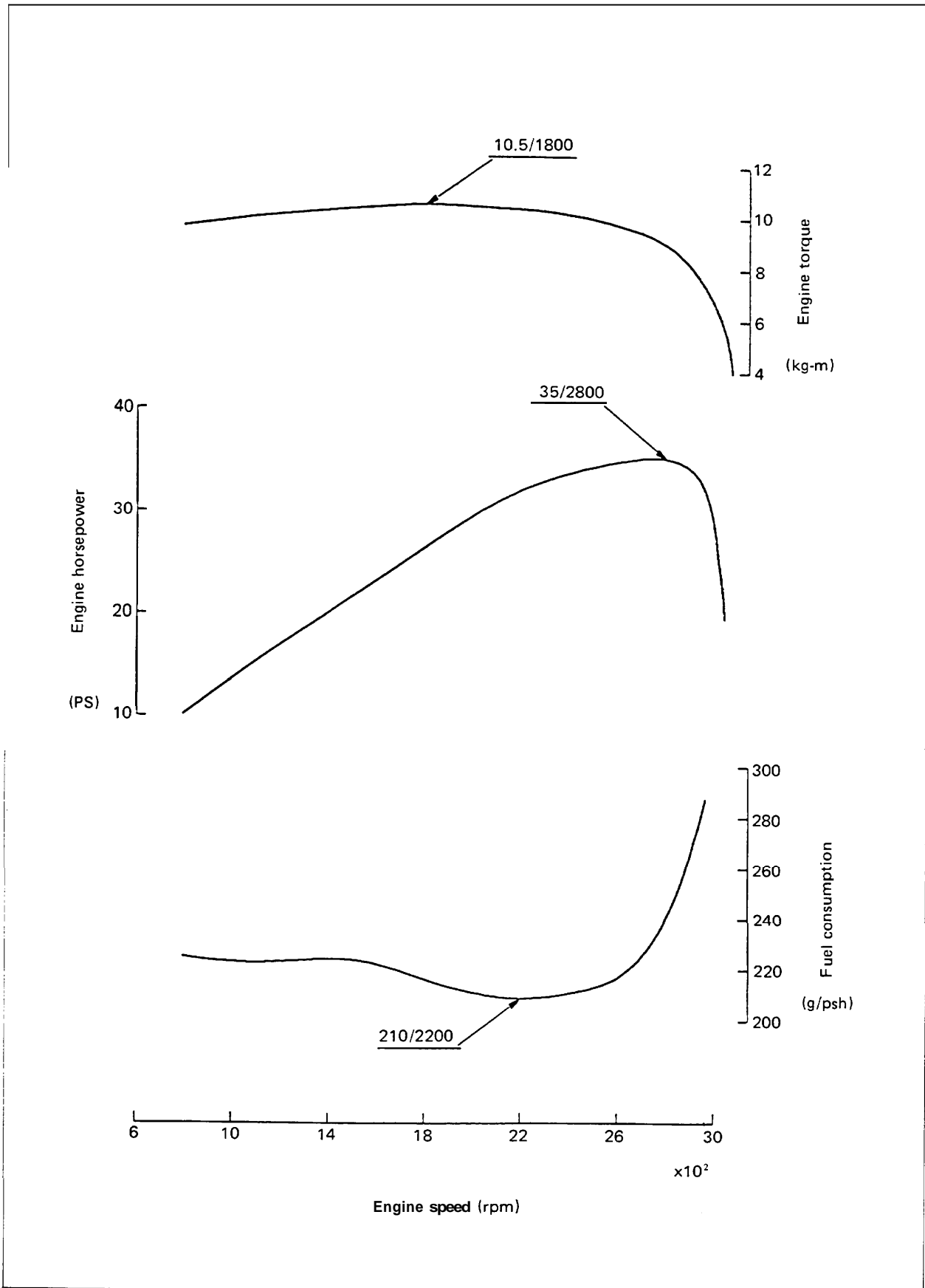
**ENGINE PERFORMANCES (1986.8 ~ 1989.8)**

	Engine model	Total displacement cc	No-load maximum governed speed rpm	Rated horsepower PS/rpm	Maximum torque kg-m/rpm
1.0 ~ 1.75 ton	4P	1493	3050	35/2800	10.5/1800
	4Y	2237	2450	45/2100	16.5/1800
	2J	2481	2300	44/2700	14.5/2000
2.0 ~ 2.5 ton	4P	1493	3050	35/2800	10.5/1800
	4Y	2237	2600	54/2400	16.5/1800
	1Z	2953	2600	60/2400	18.5/1600
	2J	2481	2600	50/2500	14.5/2200
2.75 ~ 3.0 ton	4Y	2237	2600	54/2400	16.5/1800
	1Z	2953	2600	60/2400	18.5/1600
	2J	2481	2600	50/2500	14.5/2260

**ENGINE PERFORMANCES (1989.9 - )**

	Engine model	Total displacement cc	No-load maximum governed speed rpm	Rated horsepower PS/rpm	Maximum torque kg-m/rpm
1.0 ~ 1.75 ton	5K	1486	3050	38/2800	11.5/2000
	4Y	2237	2600	54/2400	16.5/1800
	1DZ	2486	2600	55/2400	17.0/1600
2.0 ~ 2.5 ton	5K	1486	3050	38/2800	11.5/2000
	4Y	2237	2600	54/2400	16.5/1800
	1Z	2953	2600	60/2400	18.5/1600
	1DZ	2486	2600	55/2400	17.0/1600
1.75 ~ 3.0 ton	4Y	2237	2600	54/2400	16.5/1800
	1Z	2953	2600	60/2400	18.5/1600
	1DZ	2486	2600	55/2400	17.0/1600

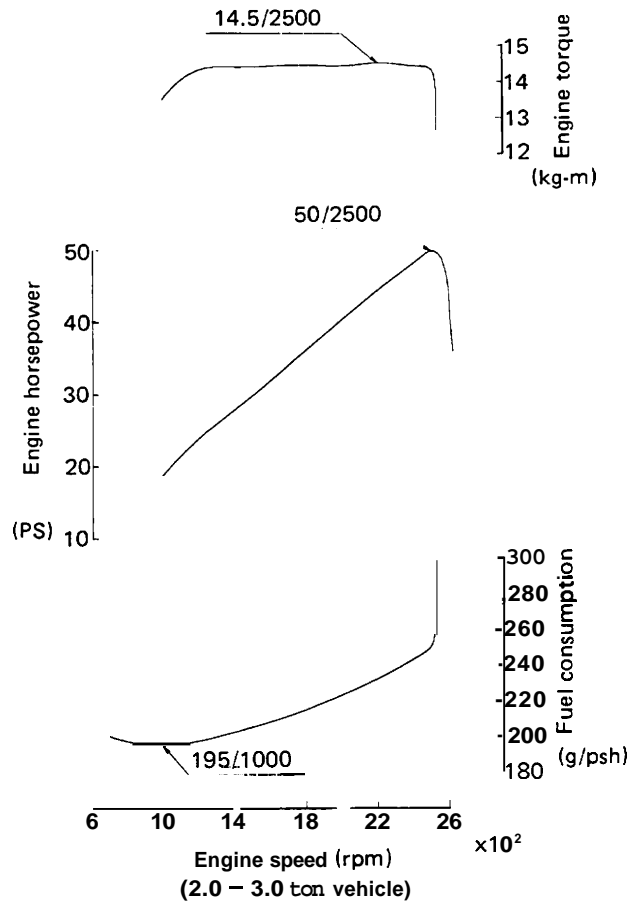
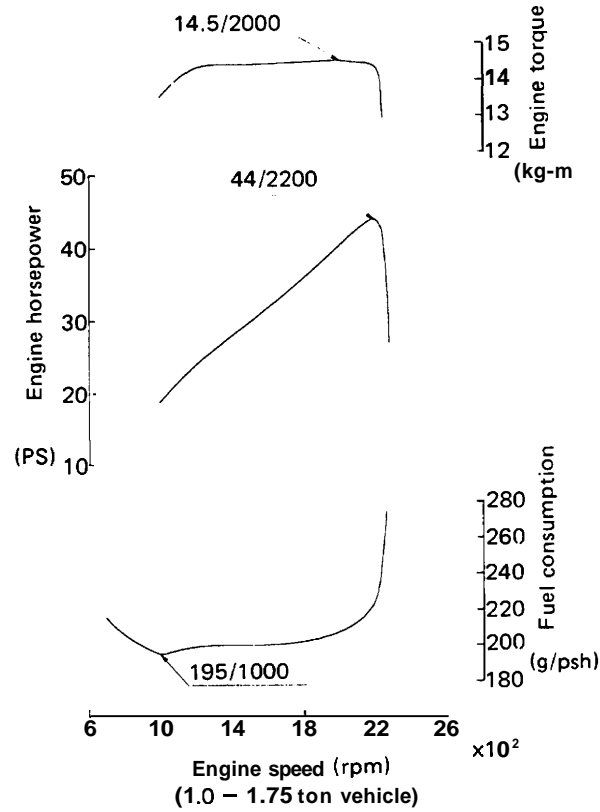
# PERFORMANCE CURVES



4P Engine Performance Curve (1986.8 - 1989.8)

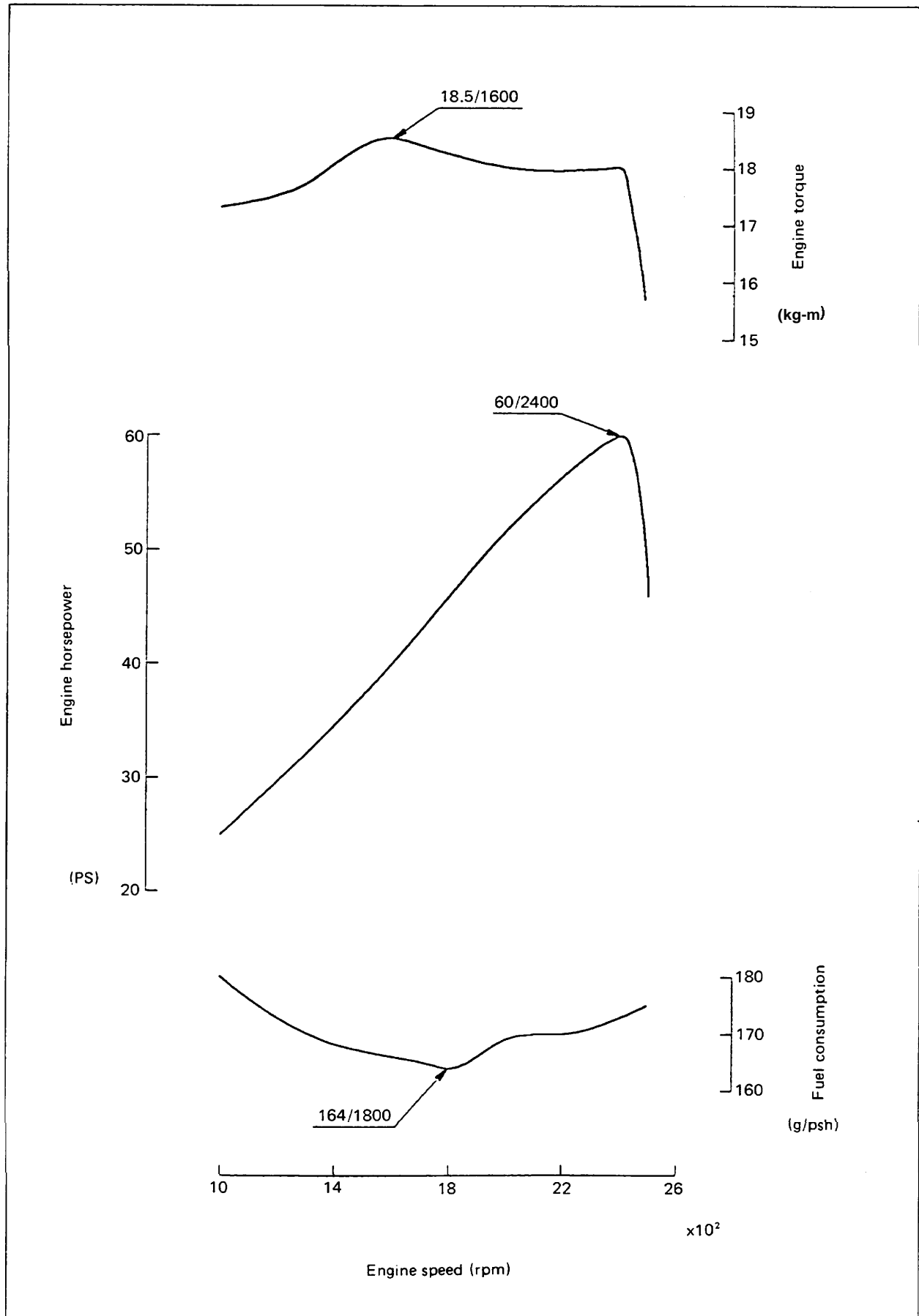
LAOM18





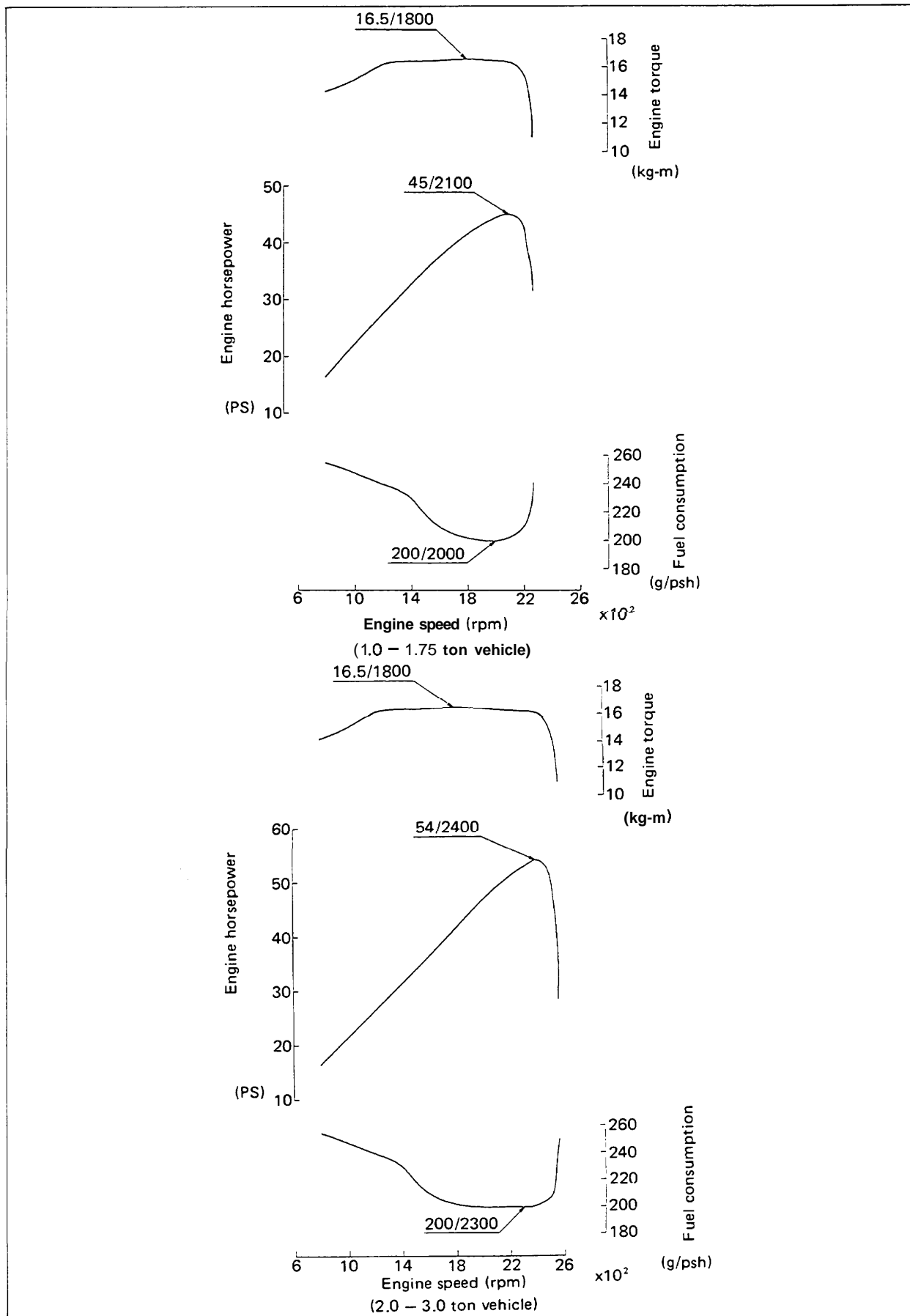
2J Engine Performance Curve (1986.8 - 1989.8)

KAOM19,20



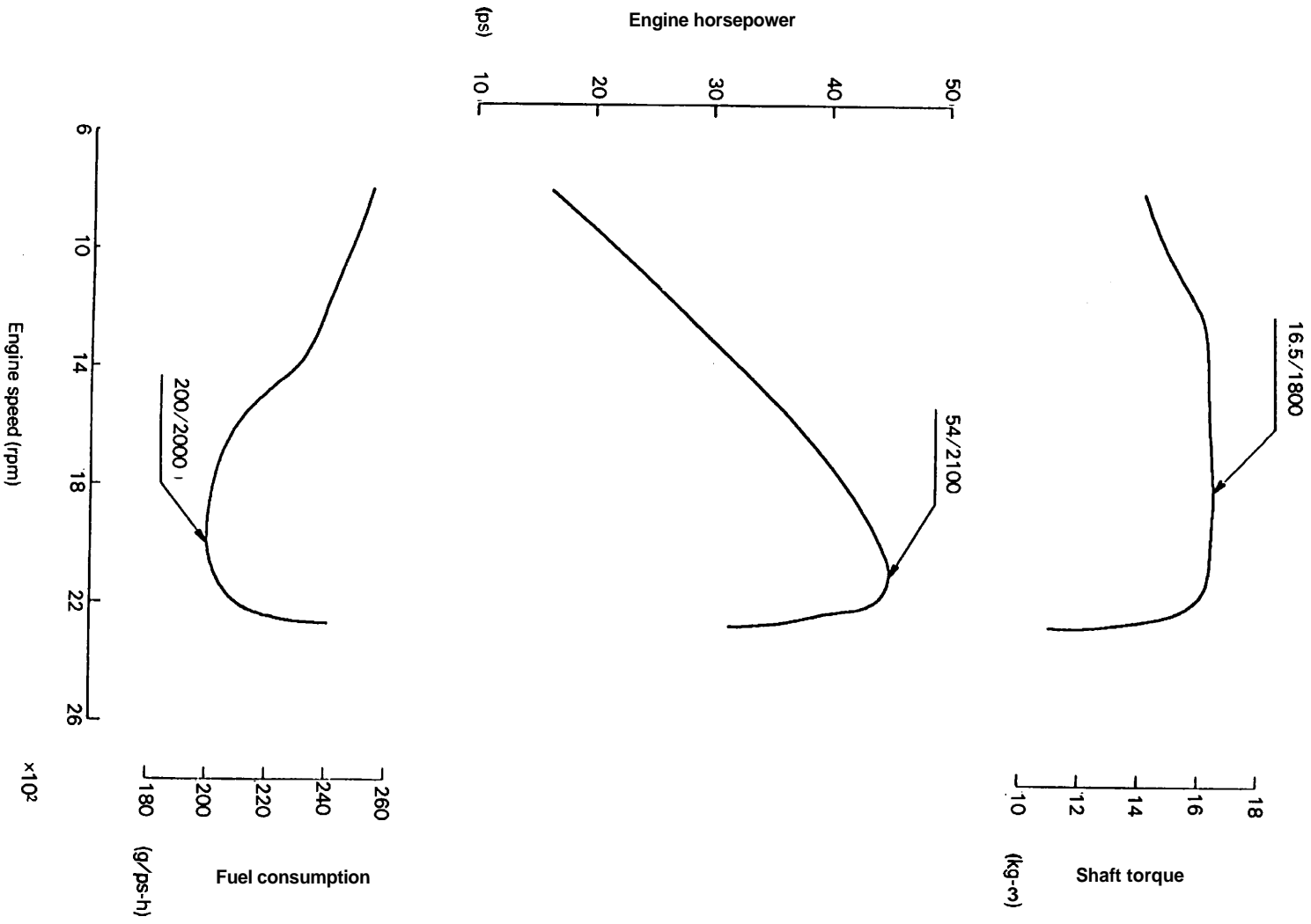
1Z Engine Performance Curve

LAOM2



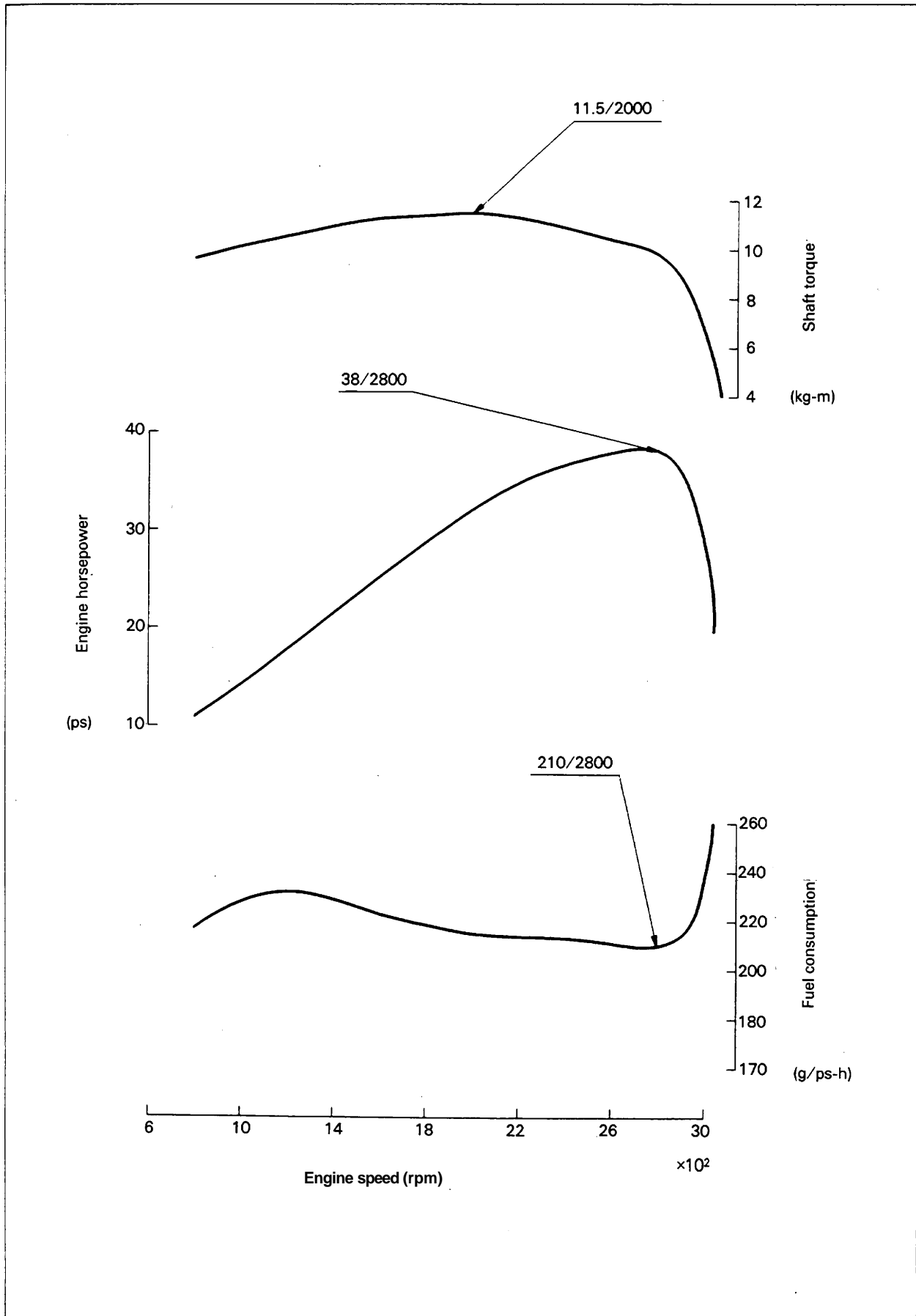
4Y Engine Performance Curve (1986.8 - 1989.8)

LAOM11,12



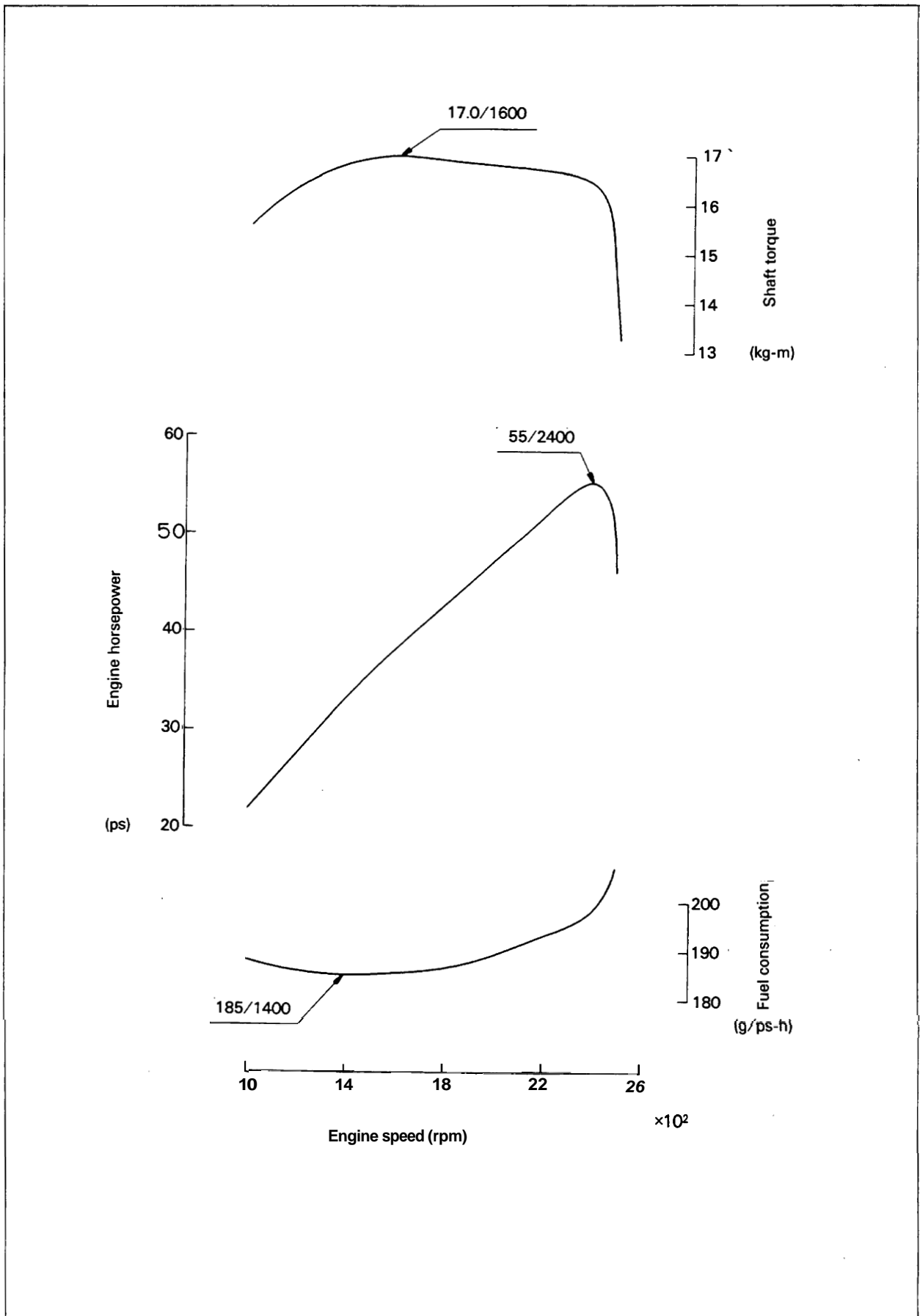
4Y Engine Performance Curve (1989.9 ~ )

LAOM12



5K Engine Performance Curve (1989.9 ~ )

LATM3



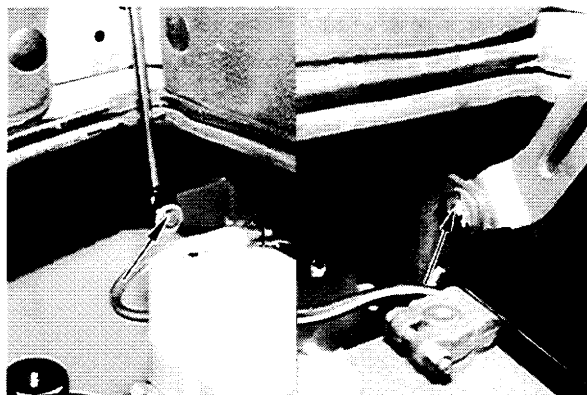
1DZ Engine Performance Curve (1989.9 ~ )

LATM6

## ENGINE ASSY REMOVAL

### 4P ENGINE VEHICLE (1986.8 ~ 1989.8)

1. Engine hood removal
  - (1) Disconnect the engine hood damper from the frame bracket.
  - (2) Disconnect the engine hood stay from the frame bracket.
  - (3) Remove engine hood hinge set screws (2 pcs. on each side), and remove the engine hood.



Removing the Engine Hood

LA064-12,13

#### Radiator cover and toe board removal

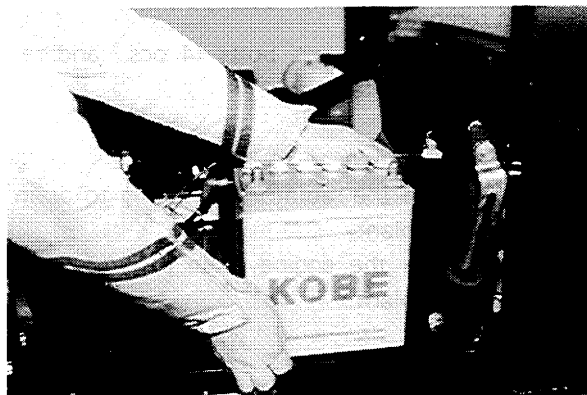
#### Battery removal

- (1) Disconnect battery terminals.

#### Caution:

Always disconnect the negative terminal first.

- (2) Remove the battery cap.
- (3) Remove the battery.



Removing the Battery

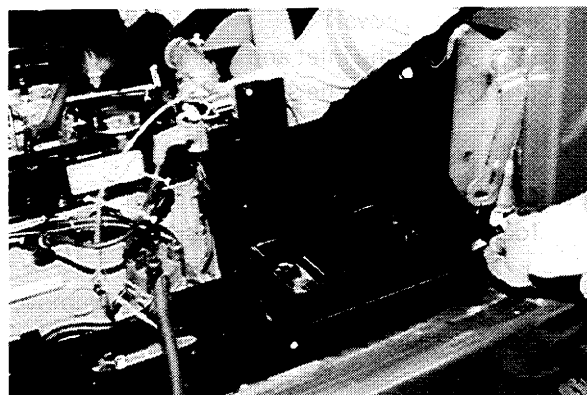
LA054-6

#### Battery case removal

- (1) Remove set bolts (3 pcs.), and remove the battery case.

#### Electrical wiring and fuel hose disconnection.

- (1) Disconnect the starting motor bond strap.
- (2) Disconnect each electrical wiring connector.
- (3) Disconnect the fuel hose.

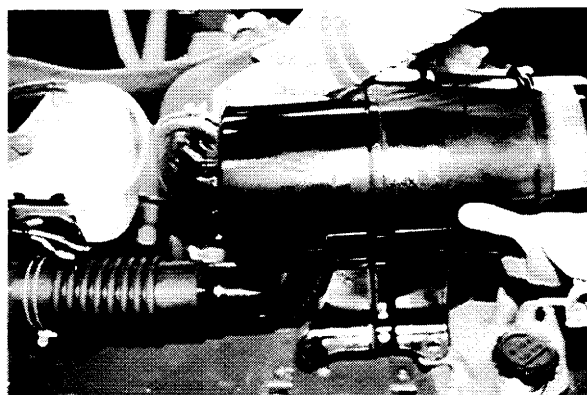


Removing the Battery Case

LA054-9

#### Air cleaner removal

- (1) Remove the hydraulic tank breather.
- (2) Loosen the hose clamp for the air cleaner hose.
- (3) Remove air cleaner case set bolts (4 pcs.) and remove the air cleaner.

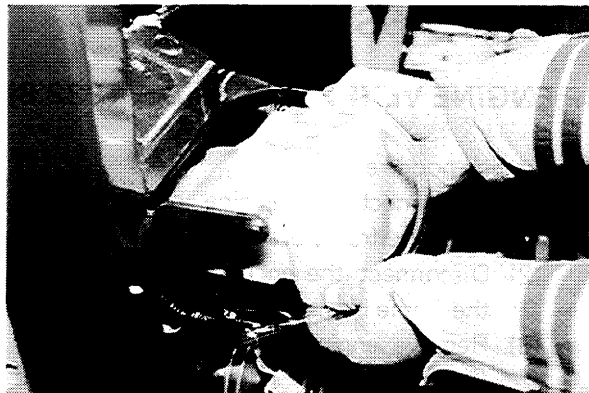


Removing the Air Cleaner

LA054-20

7. Radiator reserve tank removal

- (1) Disconnect the reserve tank hose from the radiator.
- (2) Remove the reserve tank.



Removing the Reserve Tank

LA054-23

8. Fan removal

- (1) Remove fan set bolts (4 pcs.) and remove the fan.



Removing the Fan

LA054-27

9. Coolant draining

- (1) Loosen the radiator drain plug to drain the coolant.
- (2) Loosen the engine drain plug to drain the coolant.

10. Radiator removal

- (1) Loosen the inlet and outlet hose clamps.
- (2) Disconnect the torque converter cooler hose (in torque converter vehicle).

Caution:

Identify the hose installed positions.

- (3) Remove radiator set bolts, and remove the radiator.



Removing the Radiator

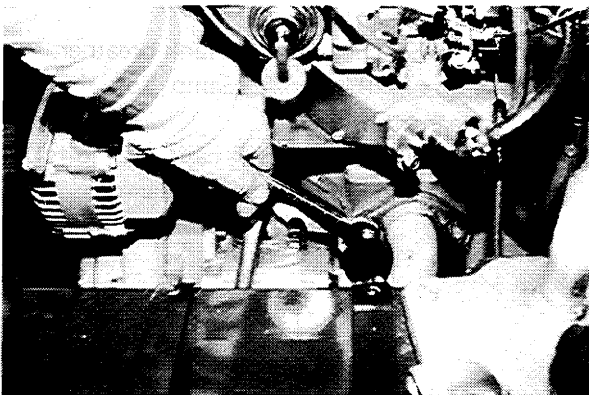
LA054-29

11. Exhaust pipe disconnection

- (1) Remove flange set nuts (2 pcs.) and remove the exhaust pipe.

12. Accelerator cable disconnection

- (1) Disconnect the accelerator cable.

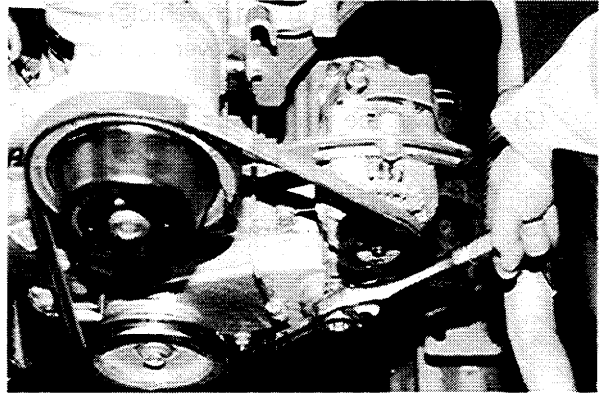


Disconnecting the Exhaust Pipe

LA054-30



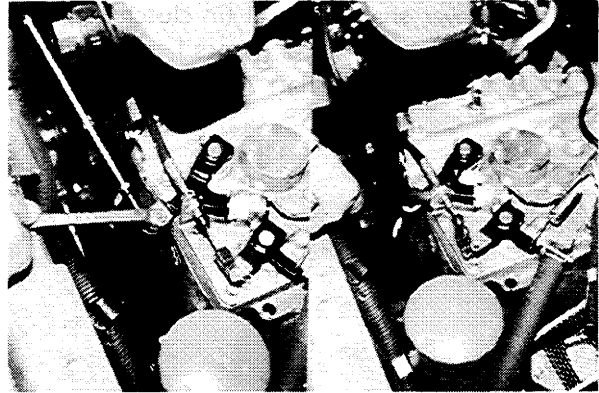
13. Oil pump disconnection
- (1) Remove oil pump set bolts (2 pcs.)
  - (2) Disconnect the oil pump from the engine.
14. Horn removal
- (1) Disconnect the horn wiring connector.
  - (2) Remove set bolts (2 pcs.), and remove the horn.



Removing the Oil Pump ASSY

LA054-32

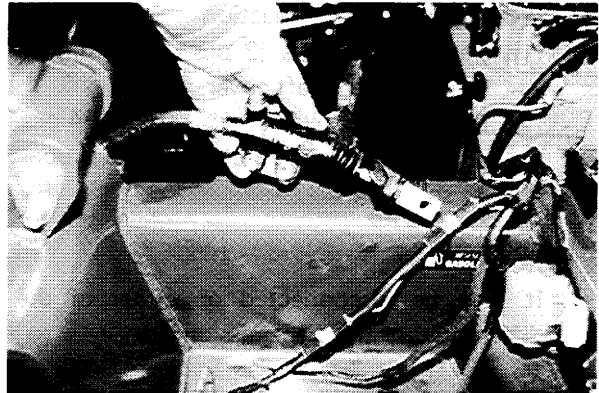
15. Torque converter shift rod and inching cable disconnection  
(in torque converter vehicle).
- (1) Remove the set nut and disconnect the shift rod.
  - (2) Disconnect the Inching Cable.



Disconnecting the Rod and Cable

LA059-26,28

16. Clutch release cylinder removal  
(in clutch vehicle)
- (1) Disconnect the clevis.
  - (2) Remove set bolts (2 pcs.) and remove the clutch release cylinder.
17. Accelerator pedal with pedal toe board removal



Removing the Clutch Release Cylinder

LA054-15

18. Oil control valve return hose removal  
(in clutch vehicle)
- (1) Loosen hose clamps at both ends of the hose and disconnect both ends.
  - (2) Remove the bracket set bolt and remove the return hose.

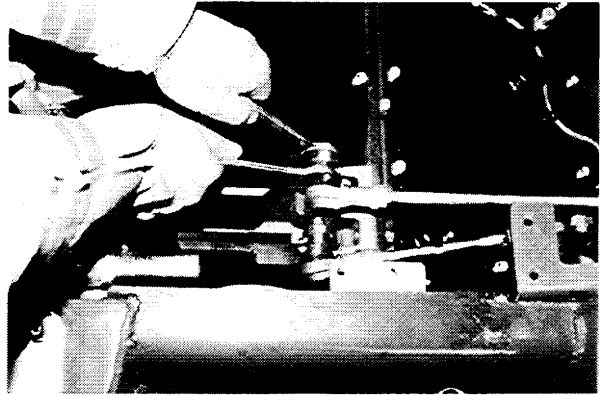


Removing the Return Hose

LA054-34

## 19 Shift lever removal (in clutch vehicle)

- (1) Disconnect the shift lever rod on the transmission side.
- (2) Remove the shift lever set plate, and remove the shift levers (forward & reverse, and speed).
- (3) Remove the plate washer and spring.



Disconnecting the Shift Lever Rod

LA055-11

## 20 Shift lever shaft removal (in clutch vehicle)

- (1) Remove set bolts (4 pcs.), and remove the shift lever shaft.



Removing the Shift Lever Shaft

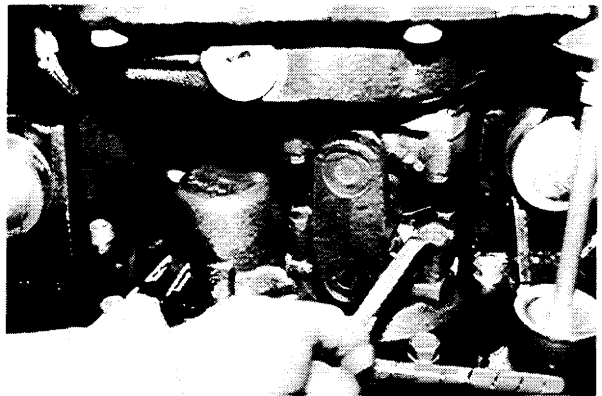
LA055-10

## 21. Propeller shaft disconnection

- (1) Remove set bolts (2 pcs.), and remove the propeller shaft cover.
- (2) Remove propeller shaft set bolts (4 pcs. on one side), and disconnect the propeller shaft.

## Note:

It may be disconnected on either of the differential or the transmission side.

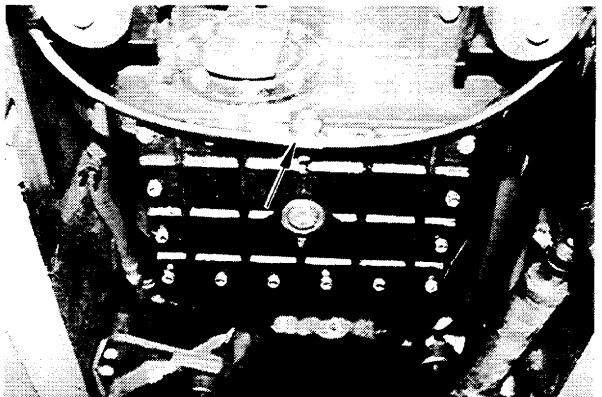


Disconnecting the Propeller Shaft ASSY

LA055-7

## 22. Parking brake cable clamp removal (in torque converter model)

- (1) Remove parking brake cable clamp set bolt, and remove the cable from the transmission case.

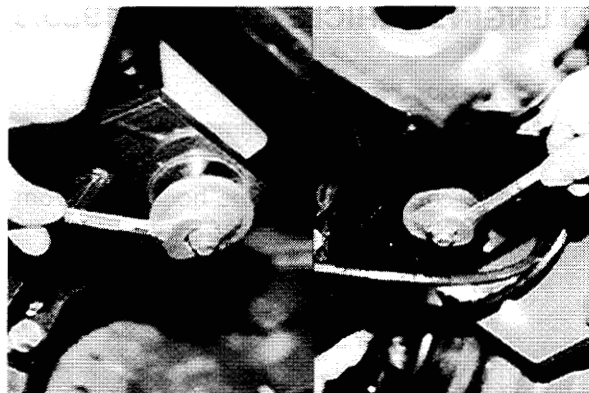


Disconnecting the Parking Brake Cable

LA063-28

## 23 Mounting set bolt removal

- (1) Remove the engine mounting set bolts left and right.
- (2) Remove the torque converter & transmission mounting set bolts (in torque converter vehicle).
- (3) Remove the transmission mounting set bolts (in clutch vehicle).



Removing the Mounting Set Bolts

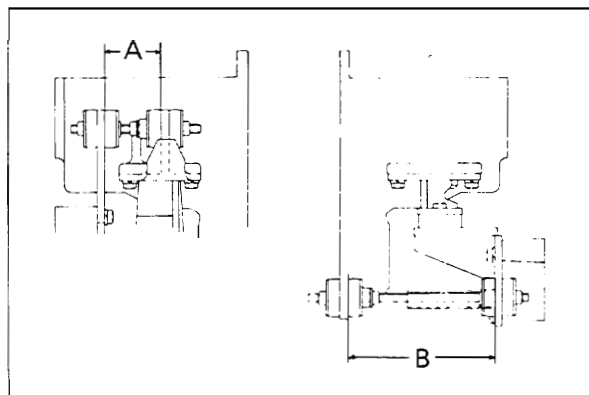
LA052-6,7

## 24. Stabilizer removal (in clutch model)

- (1) Measure the stabilizer installed dimensions. Measure and record for both the stabilizer at the upper left and the stabilizer at lower right.

Dimension A :  $83 \pm 1$  mm  
( $3.27 \pm 0.04$  in.)

Dimension B :  $198 \pm 1$  mm  
( $7.8 \pm 0.04$  in.)



Measuring the Stabilizer Installed Dimensions LAOM166

- (2) Loosen the stabilizer bar lock nut.
- (3) Remove the set nuts at both ends, and remove the cushion rubber, plate, stabilizer stopper and stabilizer bar.

## 25. Check that all electrical wiring, cables and links are disconnected.



Removing the Stabilizer

LA052-4

## 26. Engine ASSY with transmission removal

- (1) Use the SST and remove the engine ASSY with transmission.

SST 09010-20111-71

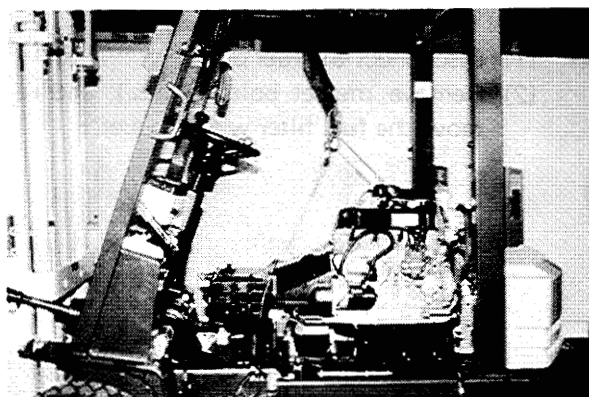
Weight of engine ASSY with transmission:

With torque converter & transmission:  
approx. 240 kg (528 lb)

With transmission:  
approx. 270 kg (594 lb)

## Caution:

Try safe operation by fully considering the center of gravity in setting the wire ropes for hoisting.



Removing the Engine with Transmission

LA052-8

**2J ENGINE VEHICLE (1986.8 ~ 1989.8)**

1. Engine hood removal
  - (1) Disconnect the engine hood damper from the frame bracket.
  - (2) Disconnect the engine hood stay from the frame bracket.
  - (3) Remove the engine hood hinge set screws (2 pcs. on one side), and remove the engine hood.



Removing the Engine Hood

LAO1-6

2. Toe board removal
3. Battery removal
  - (1) Disconnect battery terminals.

**Caution:**

Always disconnect the negative terminal first.

- (2) Remove the battery cap.
- (3) Remove the battery.



Removing the Battery

LAO1-10

4. Battery case removal
  - (1) Remove set bolts (3 pcs.), and remove the battery.
5. Electrical wiring and fuel hose disconnection.
  - (1) Disconnect the starting motor bond strap.
  - (2) Disconnect electrical wiring such as the injection pump solenoid cut wiring.
  - (3) Disconnect the fuel hose.



Disconnecting the Solenoid Cut Wiring

LAO1-20

6. Fuel filter with bracket removal
  - (1) Disconnect the fuel piping.
  - (2) Remove the set bolts (2 pcs.), and remove the fuel filter with bracket.

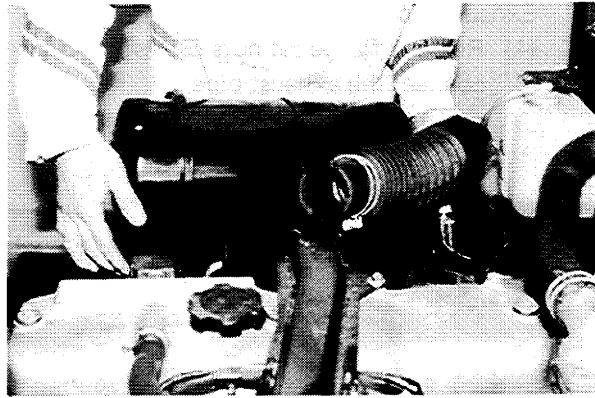


Removing the Fuel Filter with Bracket

LAO1-13

## 7. Air cleaner removal

- (1) Remove the hydraulic tank breather.
- (2) Loosen the hose clamp for the air cleaner hose.
- (3) Remove air cleaner case set bolts (4 pcs.), and remove the air cleaner.



Removing the Air Cleaner ASSY

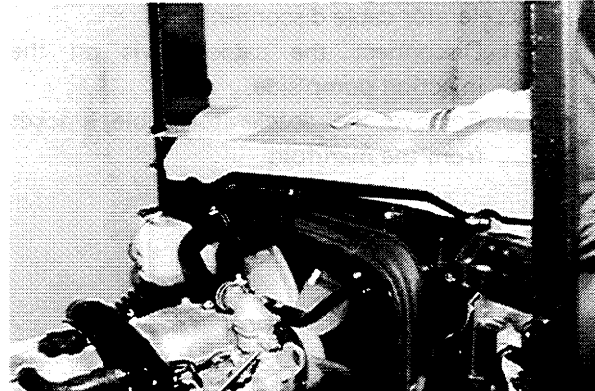
LA01-16

## 8. Radiator cover removal

- (1) Remove the set knobs, and remove the radiator cover.

## 9. Radiator reserve tank removal

- (1) Disconnect the reserve tank hose from the radiator.
- (2) Remove the reserve tank.



Removing the Radiator Cover

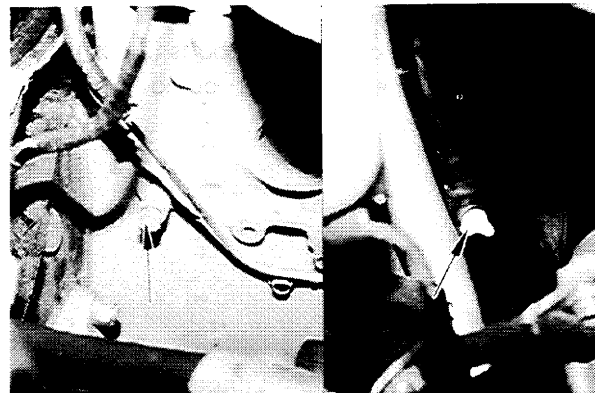
LA01-28

## 10. Radiator removal

- (1) Loosen the radiator drain plug to drain the coolant.
- (2) Loosen the engine drain plug to drain the coolant.
- (3) Disconnect the torque converter cooler hose (in torque converter model).

## Caution:

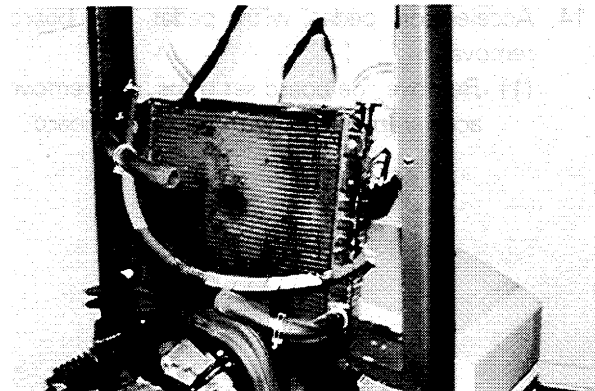
Identify the hose installed positions.



Coolant Drain Plugs

LA01-32,30

- (4) Remove the radiator set bolts and remove the radiator.

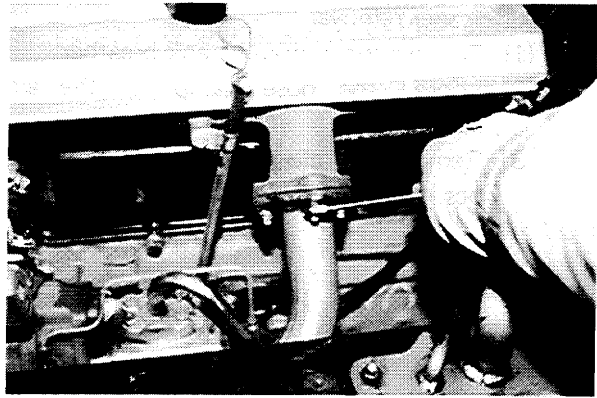


Removing the Radiator

LA04-14

11 Exhaust pipe disconnection

- (1) Remove flange set nuts (3 pcs.), and disconnect the exhaust pipe.

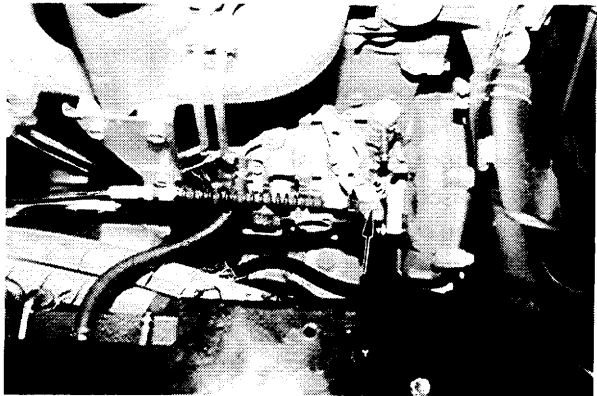


Disconnecting the Exhaust Pipe

LA02-7

12 Accelerator cable disconnection

- (1) Disconnect the cable clevis on the injection pump side.
- (2) Remove the accelerator cable bracket from the manifold.

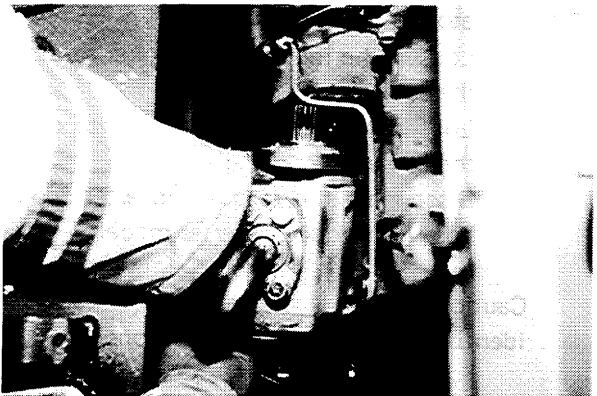


Disconnecting the Accelerator Cable

LA01-14

13. Oil pump removal

- (1) Remove oil pump set bolts (2 pcs.).
- (2) Disconnect the oil pump from the engine.

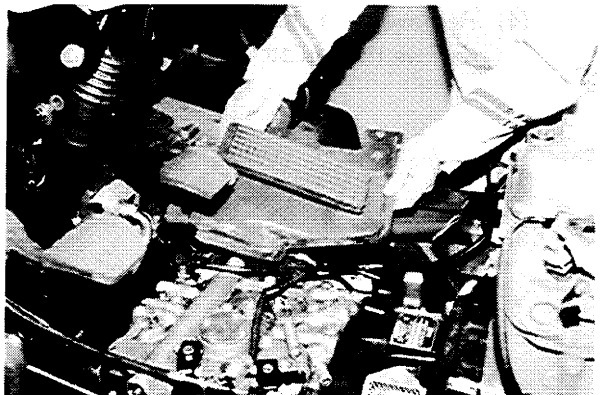


Removing the Oil Pump

LA03-3

14. Accelerator pedal with pedal toe board removal

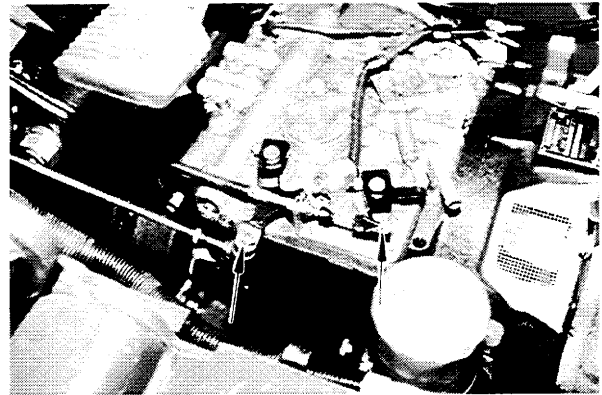
- (1) Remove toe board set bolts, and remove accelerator pedal with pedal toe board.



Removing the Pedal Toe Board

LA03-7

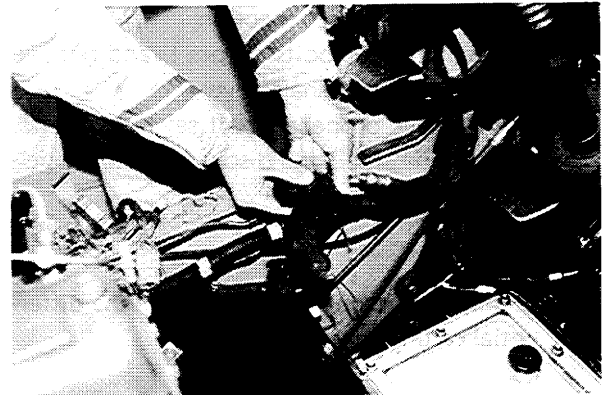
15. Torque converter shift rod and inching cable disconnection (in torque converter vehicle)
- (1) Remove the set nut, and disconnect the shift rod.
  - (2) Disconnect the clevis, loosen the cable set nut, and disconnect the inching cable.



Disconnecting the Torque Converter Link Components

LAO3-8

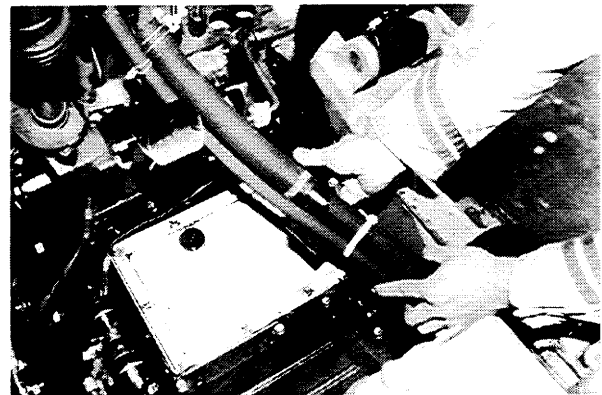
16. Clutch release cylinder removal (in clutch vehicle)
- (1) Remove set bolts (2 pcs.).
  - (2) Extract the push rod, and remove the clutch release cylinder.



Removing the Clutch Booster ASSY

LAO7-21

17. Oil control valve return hose removal (in clutch vehicle)
- (1) Loosen the hose clamps at both ends of the hose and disconnect both ends.
  - (2) Remove the hose bracket set bolt, and remove the return hose.



Removing the Valve Return Hose

LAO7-7

18. Shift lever removal (in clutch vehicle)
- (1) Disconnect the shift lever rod from the transmission.
  - (2) Remove the shift lever set plate, and remove the shift levers (forward & reverse, and speed).
  - (3) Remove the plate washer and spring.

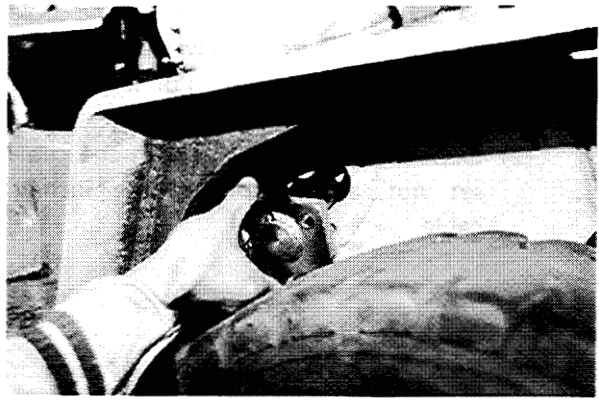


Removing the Shift Lever

LAO7-16

## 19. Shift lever shaft removal (in clutch vehicle)

- (1) Remove set bolts (4 pcs.), and remove the shift lever shaft.



Removing the Shift Lever Shaft

LA07-15

## 20. Propeller shaft disconnection

- (1) Remove set bolts (2 pcs.), and remove the propeller shaft cover.
- (2) Remove propeller shaft set bolts (4 pcs. on one side), and disconnect the propeller shaft.

## Note:

It may be disconnected on either the differential or the transmission side.

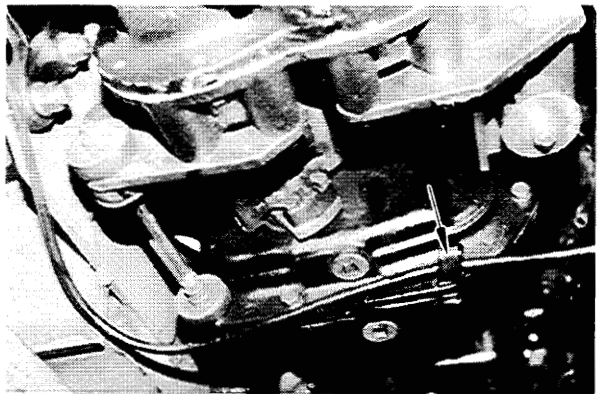


Disconnecting the Propeller Shaft

LA03-16

## 21. Parking brake cable calmp removal

- (1) Remove the parking brake clamp set bolt, and disconnect the cable from the transmission calbe.

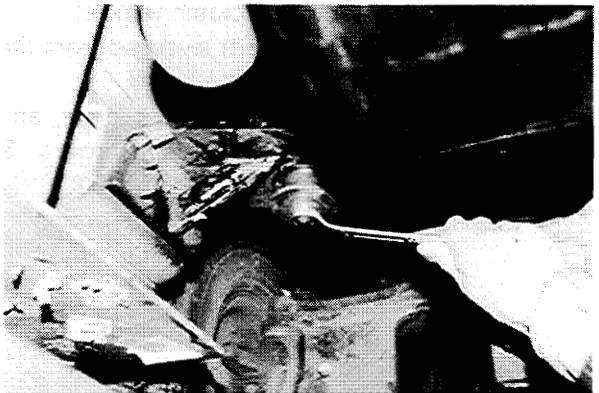


Disconnecting the Parking Brake Cable

LA0126-31

## 22. Mounting set bolt removal

- (1) Remove the engine mounting set bolts left and right.

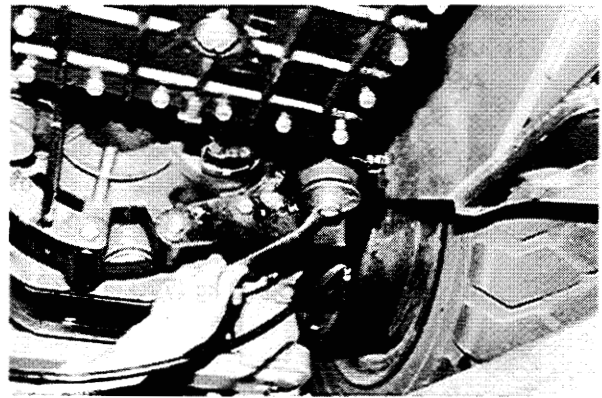


Removing the Engine Mounting Set Bolts

LA0126-32



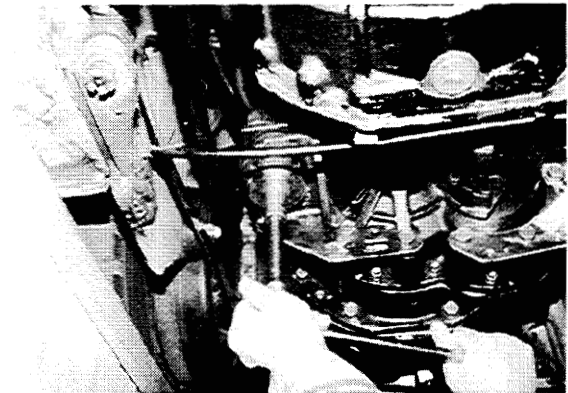
- (2) Remove the torque converter ■ transmission mounting set bolts (in torque converter vehicle).



Removing the Mounting Set Bolts (1)

LA03-22

- (3) Remove the transmission mounting set bolts (in clutch vehicle).



Removing the Mounting Set Bolts (2)

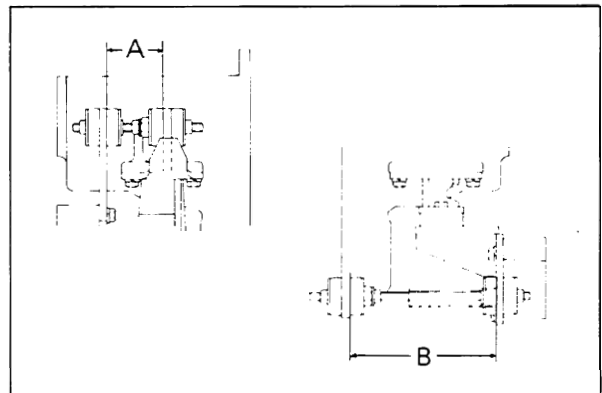
LA0126-34

### 23. Stabilizer removal (in clutch vehicle)

- (1) Measure the stabilizer installed dimensions. (measure and record for both the stabilizer at upper left and the stabilizer at lower right.)

m m (in.)

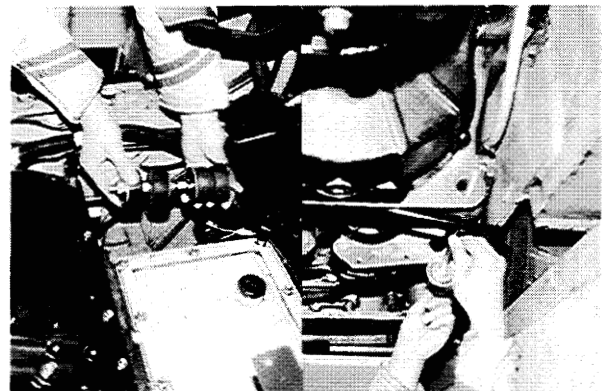
Vehicle model	Dimension A	Dimension B
1.0~2.5ton series	$83 \pm 1$ (3.27 ± 0.04)	$198 \pm 1$ (7.8 ± 0.04)
2.75-3.0or series	$90.5 \pm 1$ (3.56 ± 0.04)	$205.5 \pm 1$ (8.1 ± 0.04)



Measuring the Stabilizer Installed Dimension LAOM166

- (2) Loosen the stabilizer bar lock nut.  
 (3) Remove set nuts at both ends, and remove the cushion rubber, plate, stabilizer stopper and stabilizer bar.

### 24 Check that all electrical wiring, cables and links are disconnected.



Removing the Stabilizer

LA09-4,128-23

25. Engine ASSY with transmission removal

- (1) Use the SST and remove the engine ASSY with transmission.

SST 09010-20111-71

Weight of engine ASSY with transmission

With torque converter & transmission:

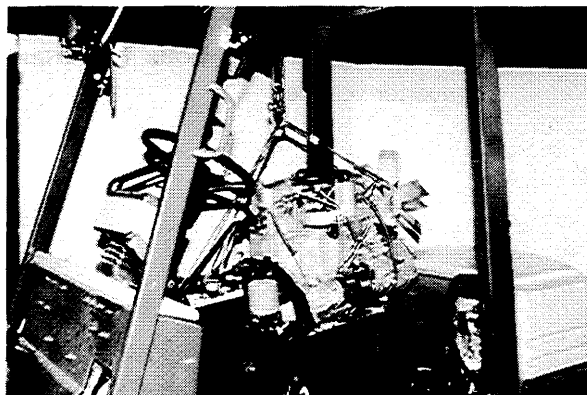
330 kg (726 lb)

With transmission:

350 kg (770 lb)

Caution:

Try safe operation by fully considering the Center of gravity in setting wire ropes for hoisting.



Removing the Engine ASSY with Transmission LAO4-9

## 1Z ENGINE VEHICLE

1. Engine hood removal
  - (1) Disconnect the engine hood damper from the frame bracket.
  - (2) Disconnect the engine hood stay from the frame bracket.
  - (3) Remove engine hood hinge set screws (2 pcs. on one side), and remove the engine hood.



Removing the Engine Hood

LA088-1

2. Radiator cover and toe board removal

3. Battery removal

- (1) Disconnect battery terminals.

**Caution:**

Always disconnect the negative terminal first.

- (2) Remove the battery cap.
- (3) Remove the battery (2 pcs.).



Removing the Battery

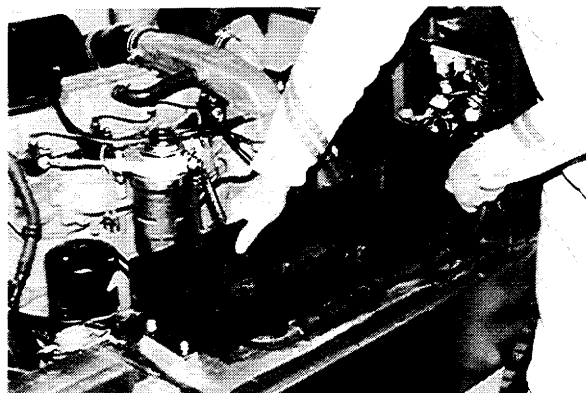
LA088-5

4. Battery case removal

- (1) Remove set bolts (3 pcs.), and remove the battery case.

5. Electrical wiring and fuel hose disconnection

- (1) Disconnect the starting motor bond strap.
- (2) Disconnect each wiring connector.
- (3) Disconnect the fuel hose.



Removing the Battery Case

LA096-4

6. Coolant draining

- (1) Loosen the radiator drain plug to drain the coolant.
- (2) Loosen the engine drain plug to drain the coolant.

**Radiator removal**

- (1) Remove the radiator reserve tank.
- (2) Remove the torque converter cooler hose (in torque converter vehicle).

**Caution:**

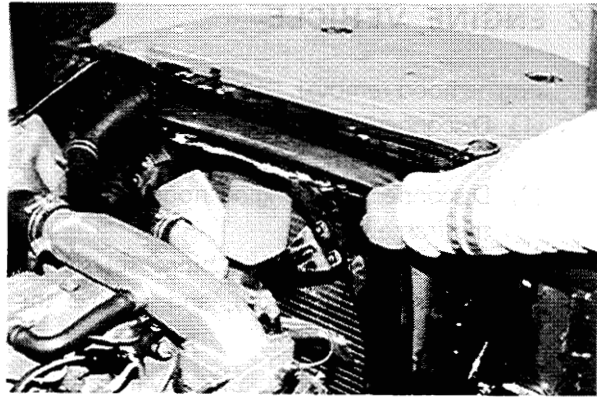
Identify the hose installed position.



Disconnecting the Torque Converter Cooler Hose

LA096-13

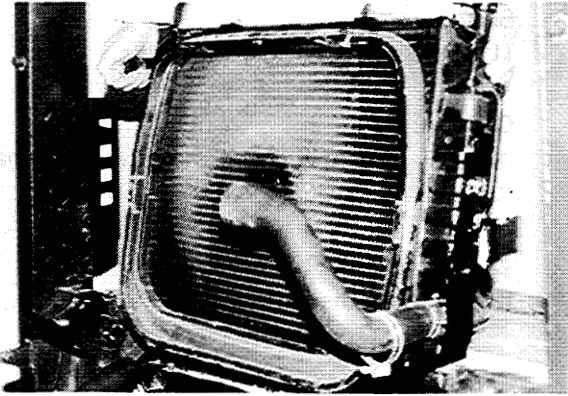
- (3) Disconnect the inlet and outlet hoses from the engine.
- (4) Disconnect the fan shroud from the radiator.



Disconnecting the Fan Shroud

LA096-14

- (5) Remove set bolts (2 pcs.), and remove the radiator.

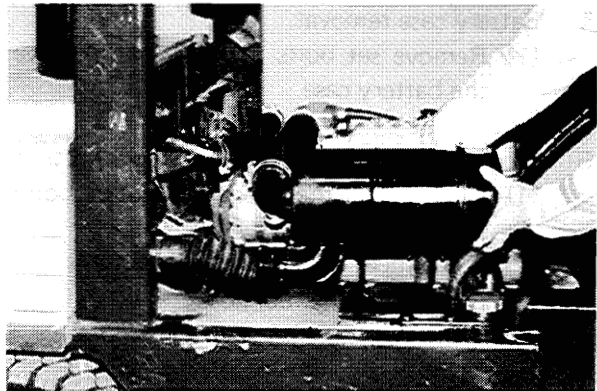


Removing the Radiator

LA096-15

**Air cleaner removal**

- (1) Remove the hydraulic tank breather.
- (2) Loosen the hose clamp for the air cleaner hose.
- (3) Remove air cleaner case set bolts (4 pcs.), and remove the air cleaner.



Removing the Air Cleaner

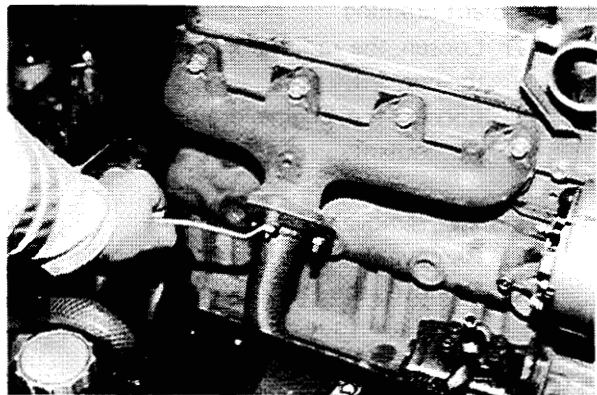
LA096-18

**Exhaust pipe disconnection**

- (1) Remove flange set nuts (3 pcs.), and disconnect the exhaust pipe.

**Accelerator cable disconnection**

- (1) Disconnect the accelerator cable from the injection pump,

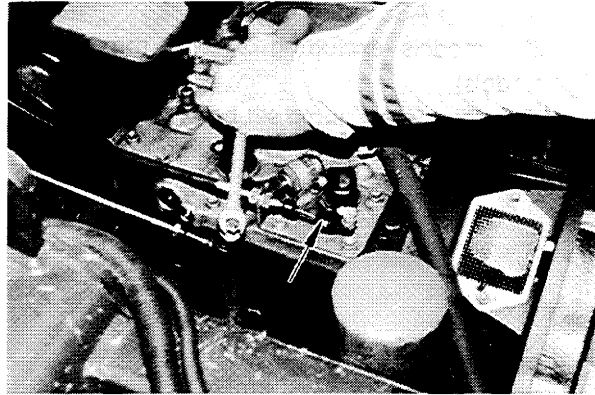


Disconnecting the Exhaust Pipe

LA096-19

11 Torque converter shift rod and inching cable disconnection (in torque converter vehicle)

- (1) Remove the set nut and disconnect the shift rod.
- (2) Disconnect the inching cable.

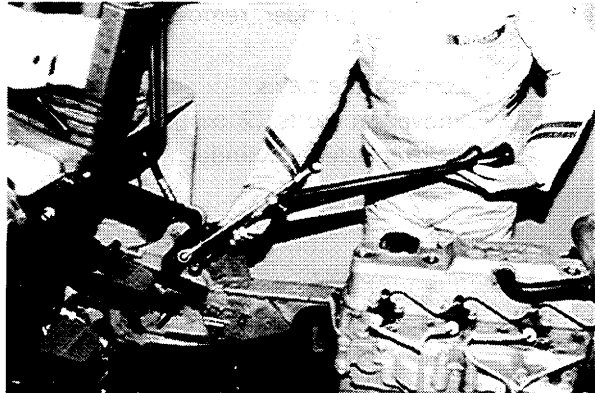


Disconnecting the Shift Rod

LA096-21

12. Shift lever removal (in clutch vehicle)

- (1) Disconnect the shift lever rod on the transmission side.
- (2) Remove the shift lever rod set nut, and remove the plate and shift levers (forward & reverse, and speed).
- (3) Remove the plate washer and spring.

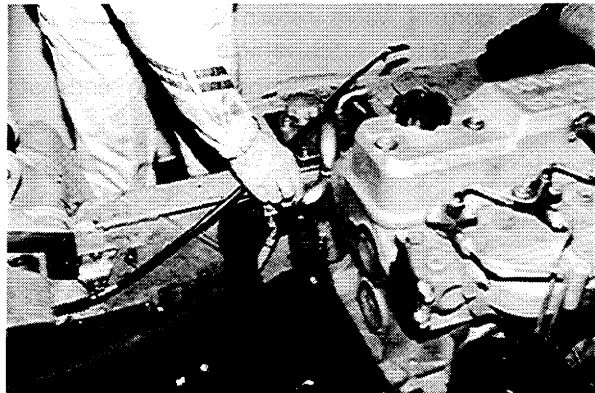


Removing the Shift Lever

LA0113-10

13. Disconnect the oil pump (tandem pump) (2-3 ton clutch model)

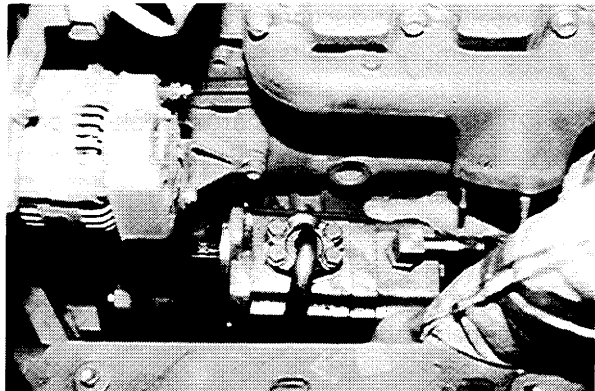
- (1) Disconnect the oil pump return hose from the hydraulic tank.



Disconnecting the Return Hose

LA0113-11

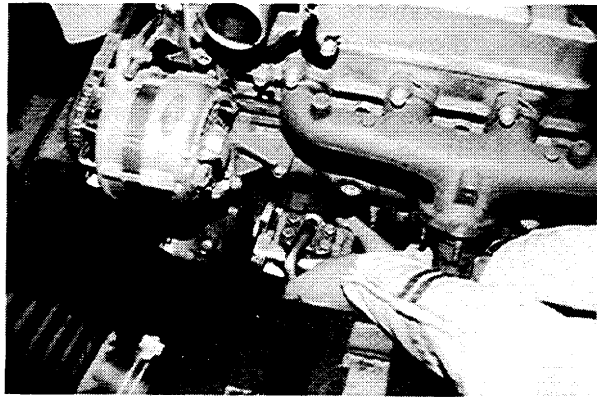
- (2) Remove oil pump set bolts (2 pcs.).
- (3) Disconnect the oil pump (tandempump) from the engine.



Disconnecting the Oil Pump ASSY

LA0113-12

14. Oil pump ASSY disconnection  
(All models excluding 2 ~ 3 ton clutch models)
- (1) Remove oil pump set bolts (2 pcs.).
  - (2) Disconnect the oil pump from the engine.



Disconnecting the Oil Pump

LAO88-19

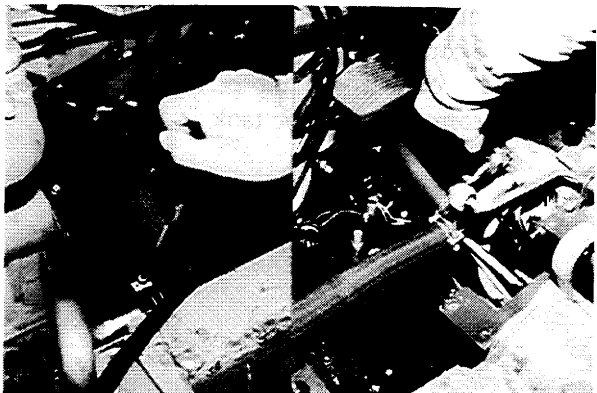
15. Clutch release cylinder removal (in clutch vehicle)
- (1) Disconnect the clevis.
  - (2) Remove set bolts (2 pcs.) and remove the clutch release cylinder.



Removing the Release Cylinder

LAO113-22

16. Oil control valve return hose removal (in 2.0 - 3.0 ton clutch vehicle)
- (1) Loosen hose clamps at both ends of the hose.
  - (2) Remove the return hose.



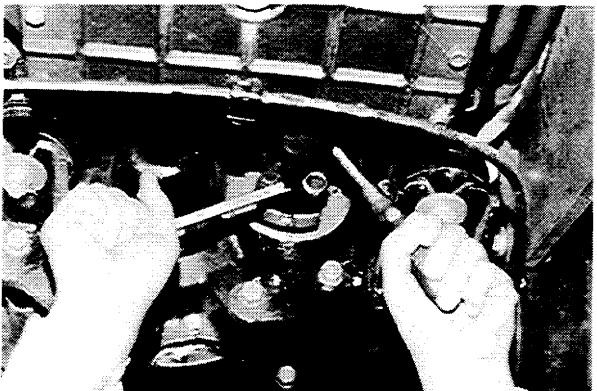
Removing the Return Hose

LAO113-13,14

17. Propeller shaft disconnection
- (1) Remove set bolts (2 pcs.), and remove the propeller shaft cover.
  - (2) Remove propeller shaft set bolts (4 pcs. on each side) and disconnect the propeller shaft.

**Note:**

It may be disconnected on either the differential or the transmission side.

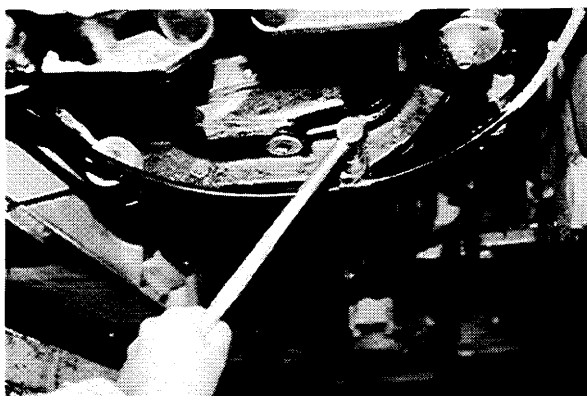


Disconnecting the Propeller Shaft

LAO96-28

## 18. Parking brake cable clamp removal

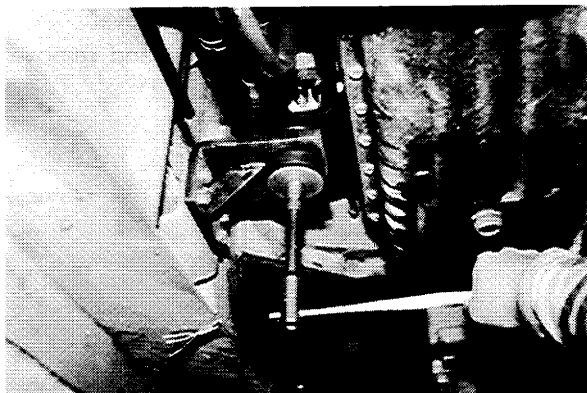
- (1) Remove the clamp set bolt at the lower part of the transmission case, and disconnect the cable from the transmission case.



Disconnecting the Parking Brake Cable LA0113-19

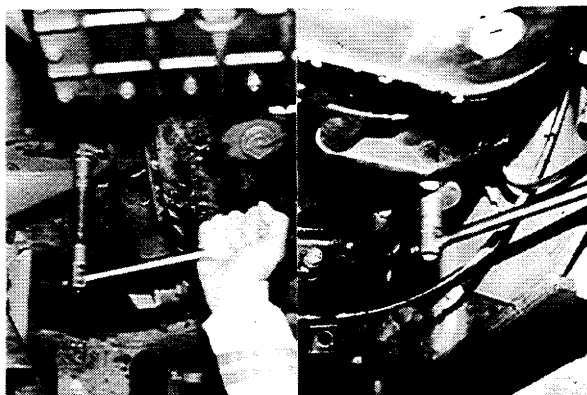
## 19 Mounting set bolts removal

- (1) Remove the engine mounting set bolts left and right.



Removing the Engine Mounting Bolts LA0113-21

- (2) Remove the torque converter & transmission mounting set bolts (in torque converter vehicle).  
 (3) Remove the transmission mounting set bolts (in clutch vehicle).



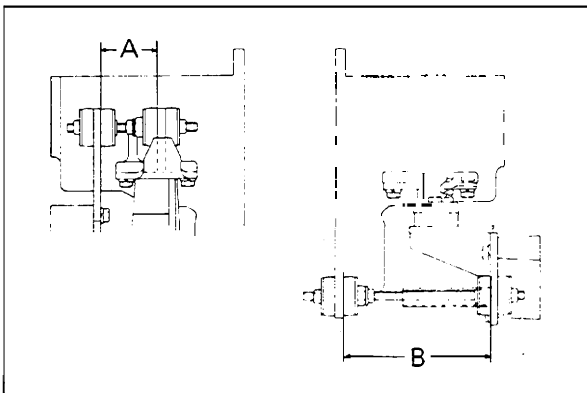
Removing the Transmission Mounting Bolts LA096-29,113-20

## 20. Stabilizer removal (in clutch vehicle)

- (1) Measure the stabilizer installed dimensions. Measure and record for both the stabilizer at the upper left and stabilizer at lower right.

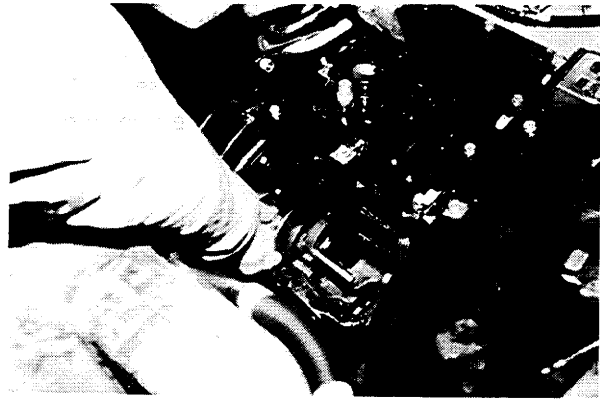
mm (in.)

Vehicle model	Dimension A	Dimension B
2.0 ~ 2.5 ton series	99.5 ± 1 (3.92 ± 0.04)	214.5 ± 1 (8.44 ± 0.04)
2.75 ~ 3.0 ton series	90.5 ± 1 (3.56 ± 0.04)	205.5 ± 1 (8.1 ± 0.04)



Measuring the Stabilizer Installed Dimension LAOM166

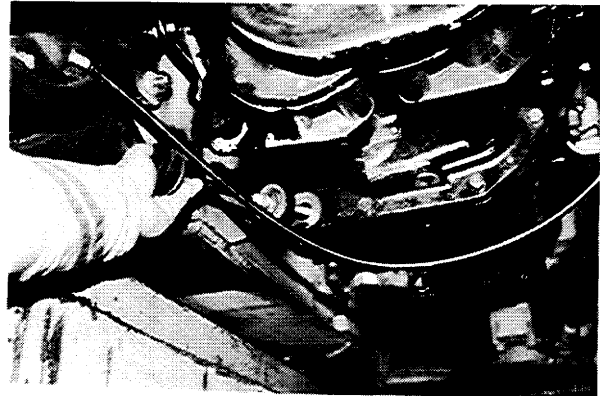
- (2) Loosen the stabilizer bar lock nut.
- (3) Remove the set nuts at both ends, and remove the cushion rubber, plate, stabilizer stopper and stabilizer bar.



Removing the Stabilizer (Upper Left) LA 0113-24

21. Radiator reserve tank bracket removal

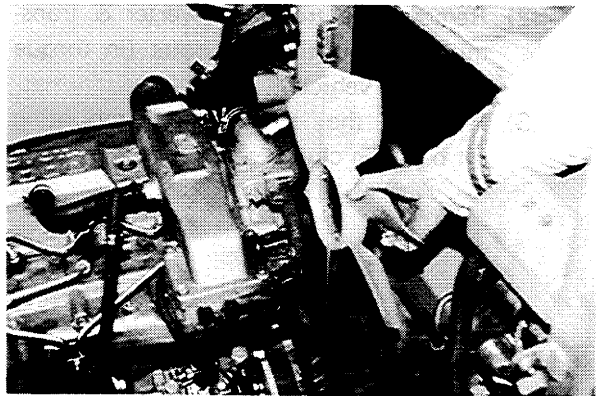
- (1) Remove set bolts (2 pcs.) and remove the reserve tank bracket.



Removing the Stabilizer (Lower Right) LAO113-27

22. Fan removal

- (1) Remove set bolts (4 pcs.), and remove the fan.



Removing the Fan LAO113-36

24 Engine ASSY with transmission removal

- (1) Use the SST and remove the engine with transmission.

SST 09010-20111-71

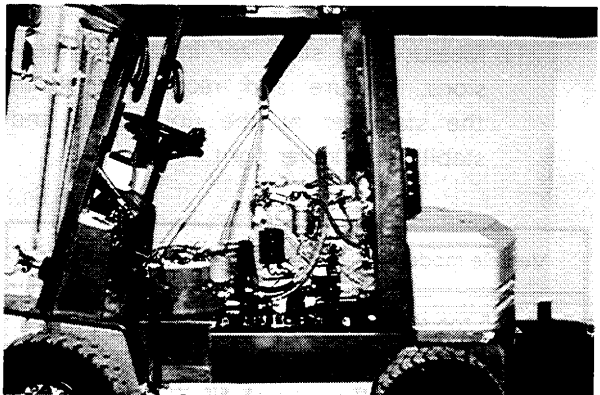
Weight of engine ASSY with transmission

With torque converter & transmission:  
approx. 350 kg (770 lb)

With transmission:  
approx. 380 kg (836 lb)

Caution:

Try safe operation by fully considering the center of gravity in setting the wire ropes for hoisting.

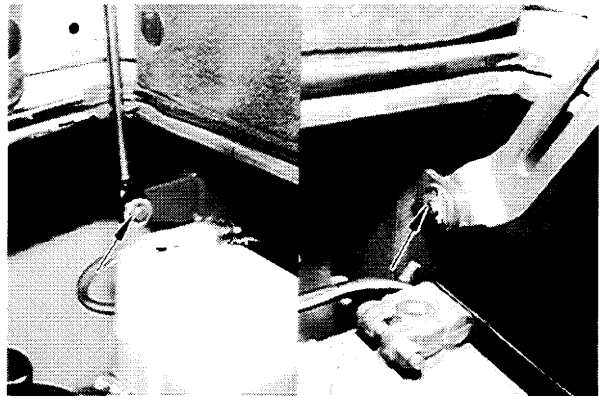


Engine ASSY with Transmission LAO97-5



## 4Y ENGINE VEHICLE

1. Engine hood removal
  - (1) Disconnect the engine hood damper from the frame bracket.
  - (2) Disconnect the engine hood stay from the frame bracket.
  - (3) Remove the engine hood hinge set screws (2 pcs. on one side), and remove the engine hood.



Removing the Engine Hood

LA064-12,13

2. Radiator cover and toe board removal

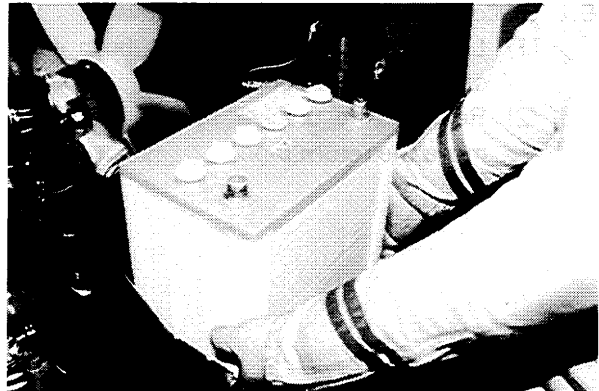
### Battery removal

- (1) Disconnect battery terminals.

### Caution:

Always disconnect the negative terminal first.

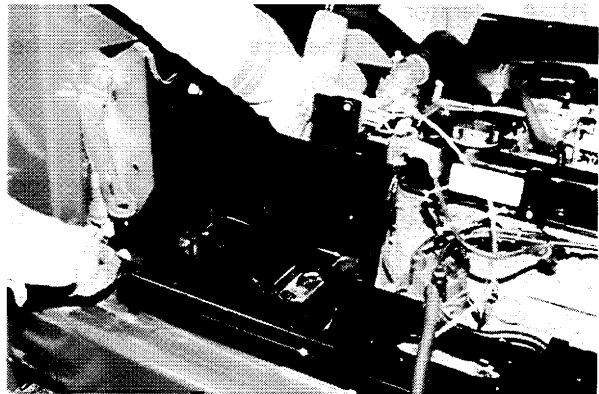
- (2) Remove the battery cap
- (3) Remove the battery.



Removing the Battery

LA064-21

4. Battery case removal
  - (1) Remove set bolts (3 pcs.), and remove the battery case.
5. Electrical wiring and fuel hose disconnection
  - (1) Disconnect the starting motor bond strap.
  - (2) Disconnect the electrical wiring connector.
  - (3) Disconnect the fuel hose.



Removing the Battery Case

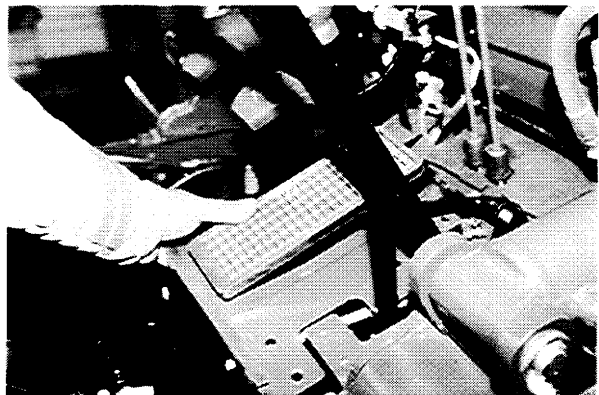
LA054-9

### Horn removal

- (1) Disconnect the wiring connector.
- (2) Remove set bolts (2 pcs.), and remove the horn.

### Accelerator pedal with pedal toe board removal

- (1) Remove toe board set bolts, and remove the accelerator pedal with pedal toe board.

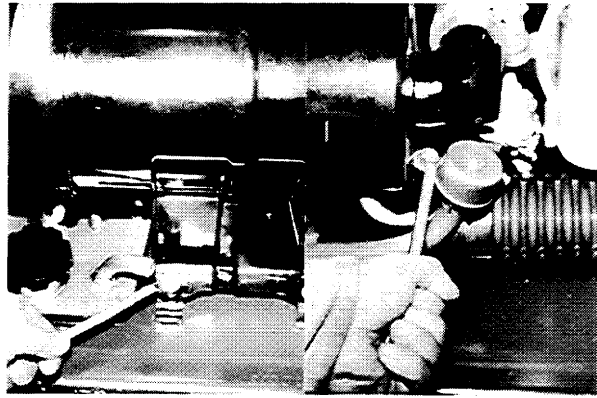


Removing the Accelerator Pedal with Toe Board

LA064-34

## Air cleaner removal

- (1) Remove the hydraulic tank breather.
- (2) Loosen the hose clamp for the air cleaner hose.
- (3) Remove air cleaner case set bolts (4 pcs.), and remove the air cleaner.

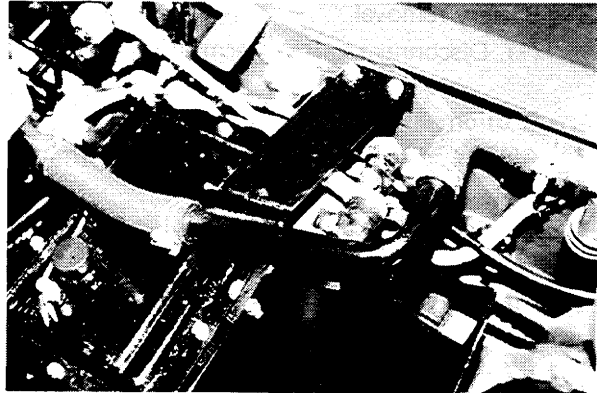


Removing the Air Cleaner ASSY

LA057-5,6

## 9. Oil control valve return pipe removal

- (1) Loosen the hose clamps at both ends of pipe, and disconnect both ends.
- (2) Remove the bracket set bolt, and remove the return pipe.

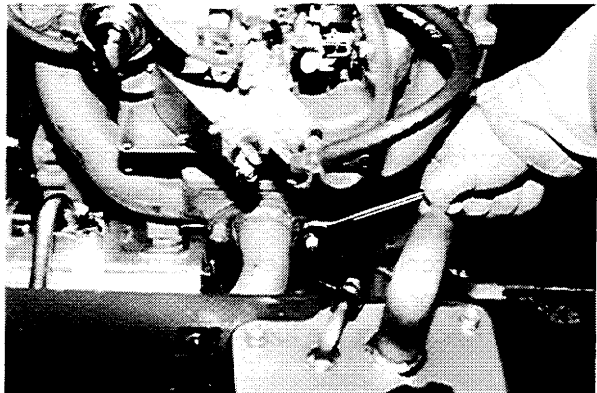


Removing the Return Pipe

LA057-3

## 10. Accelerator cable disconnection

- (1) Disconnect the accelerator cable on the carburetor side.

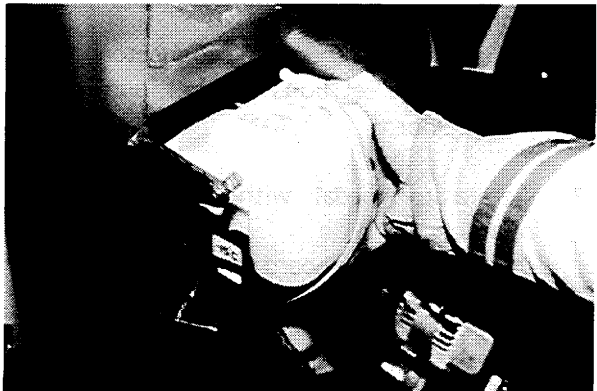


Disconnecting the Exhaust Pipe

LA057-11

## 12. Radiator reserve tank removal

- (1) Disconnect the reserve tank hose from the radiator.
- (2) Remove the reserve tank.

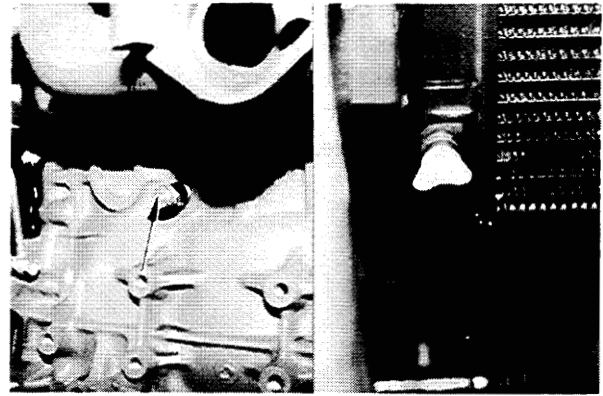


Removing the Reserve Tank

LA057-13

## 13. Coolant draining

- (1) Loosen the radiator drain plug to drain the coolant.
- (2) Loosen the engine drain plug to drain the coolant.



Draining the Coolant

LA057-21

## 14. Radiator removal

- (1) Loosen the inlet and outlet hose clamps.
- (2) Remove the radiator set bolts, and remove the radiator.

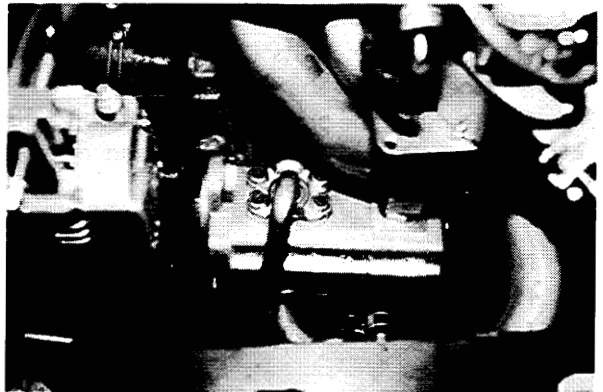


Removing the Radiator ASSY

LA058-3

15. Oil pump disconnection (tandem pump)  
(in 2.0 – 3.0 ton clutch model)

- (1) Disconnect the oil pump return hose from the hydraulic tank.
- (2) Remove oil pump set bolts (2 pcs.).
- (3) Disconnect the oil pump from the engine.



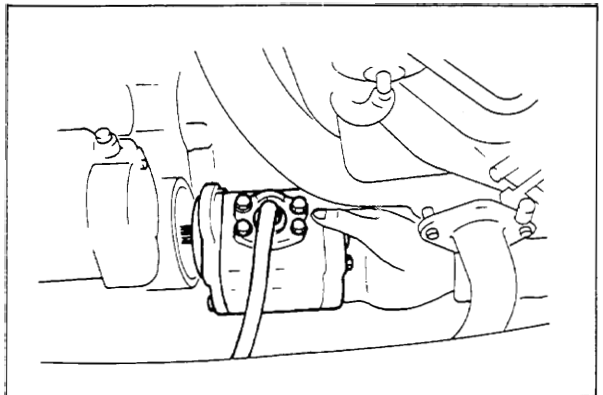
Removing the Oil Pump (Tandem Pump)

LA062-2

## 16. Oil pump disconnection

(All models excluding 2.0 – 3.0 ton clutch models)

- (1) Remove oil pump set bolts (2 pcs.).
- (2) Disconnect the oil pump from the engine.

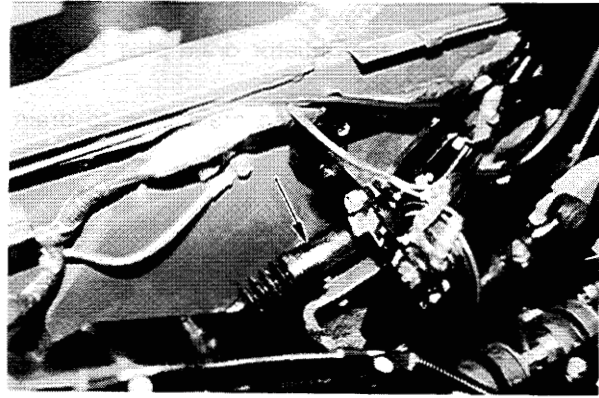


Removing the Oil Pump ASSY

LAOS428

## 17. Clutch release cylinder removal

- (1) Disconnect the clevis.
- (2) Disconnect the piping.
- (3) Remove set bolts (2 pcs.), and remove the clutch release cylinder.

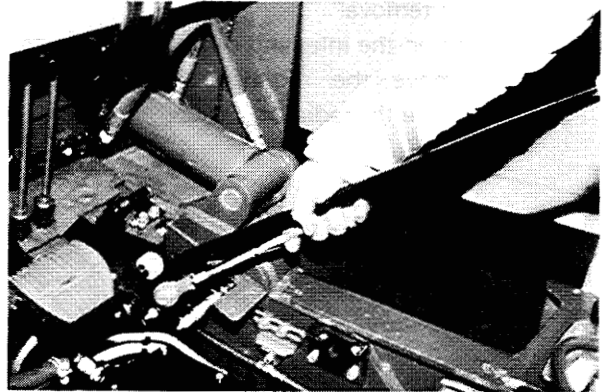


Removing the Clutch Release Cylinder

LA060-4

## 18. Shift lever removal

- (1) Disconnect the shift lever rod on the transmission side.
- (2) Remove the shift lever set plate, and remove the shift levers (forward & reverse, and speed).
- (3) Remove the plate washer and spring.



Removing the Shift Lever

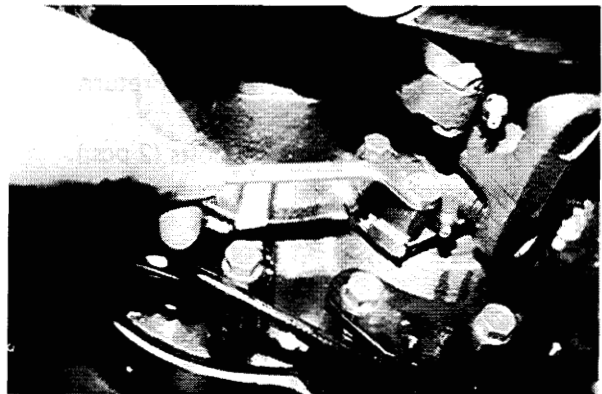
LA057-17

## 19. Propeller shaft disconnection

- (1) Remove set bolts (2 pcs.), and remove the propeller shaft cover.
- (2) Remove the propeller shaft set bolts (13 mm, 4 pcs. on each side), and disconnect the propeller shaft.

## Note:

It may be disconnected on either the differential or the transmission side.

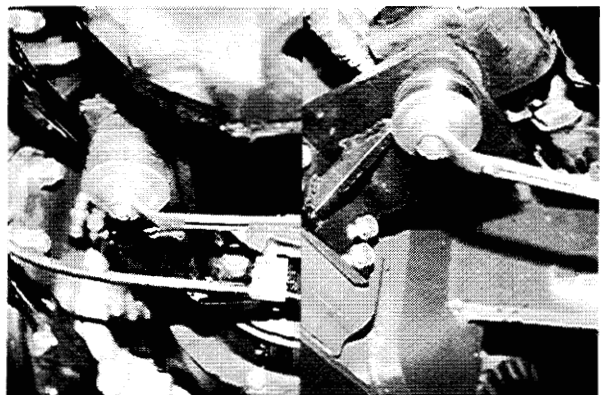


Removing the Propeller Shaft

LA058-10

## 20. Mounting set bolts removal

- (1) Remove the engine mounting set bolts left and right.
- (2) Remove the torque converter & transmission mounting set bolts.



Removing the Mounting Set Bolts

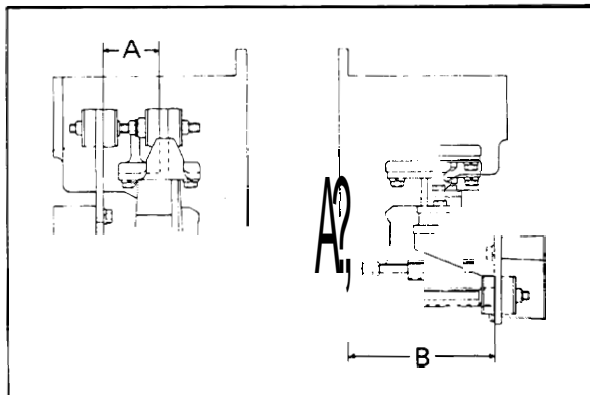
LA058-11,12

## 21. Stabilizer removal

- (1) Measure the stabilizer installed dimensions. Measure and record for both stabilizer stopper and stabilizer bar.

mm (in.)

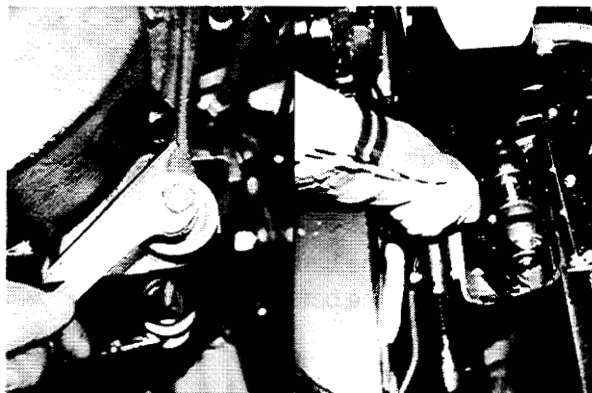
Vehicle model	Demension A	Dimension B
1.0 — 2.5 ton series	83 ± 1 (3.27 ± 0.04)	198 ± 1 (7.8 ± 0.04)
2.75 ~ 3.0 ton series	90.5 ± 1 (3.56 ± 0.04)	205.5 ± 1 (8.1 ± 0.04)



Measuring the Stabilizer Installed Dimension LAOM166

- (2) Loosen the stabilizer bar lock nut,  
 (3) Remove the, set nut from both ends, and remove the cushion rubber, plate, stabilizer stopper and stabilizer bar.

- 22 Check that all electrical wiring, cables and links are disconnected.



Removing the Stabilizer

LAO58-8,64-35

## 23. Engine ASSY with transmission removal

- (1) Use the SST and remove the engine ASSY with transmission:

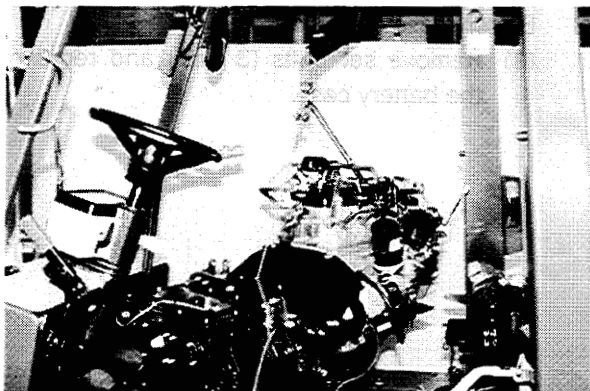
With torque converter & transmission:  
 approx. 250 kg (550 lb)

With transmission:  
 approx. 270 kg (594 lb)

SST 09010-20111-71

### Caution:

Try safe operation by fully considering the center of gravity in setting wire ropes for hoisting.

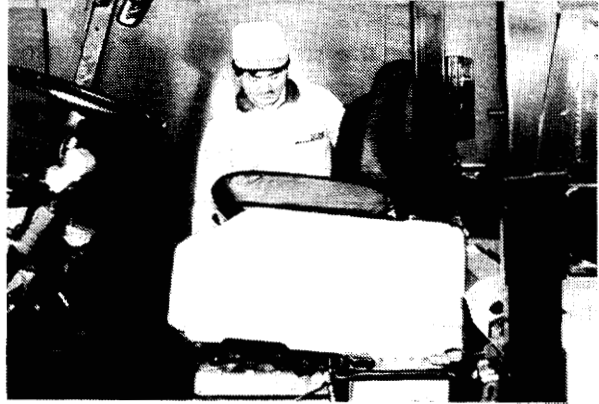


Removing the Engine with Transmission

LAO58-13

**5K ENGINE VEHICLE (1989.9 ~ )****1. Engine hood removal**

- (1) Disconnect the engine hood damper from the frame bracket.
- (2) Disconnect the engine hood stay from the frame bracket.
- (3) Remove engine hood hinge set screws (2 pcs. on each side), and remove the engine hood.



Removing the Engine Hood

LAT3-29

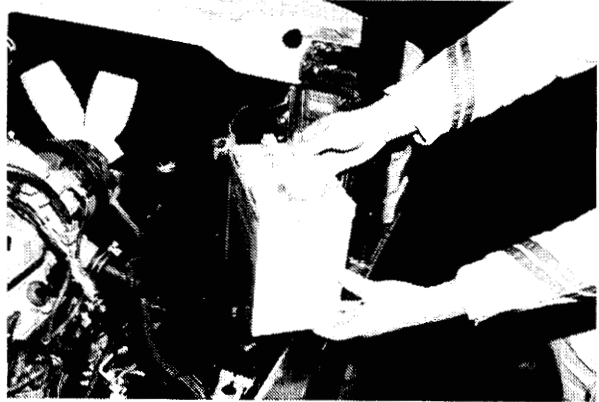
**2. Battery removal**

- (1) Disconnect the battery terminals.

**Caution:**

Always disconnect the negative terminal first.

- (2) Remove the battery cap.
- (3) Remove the battery.

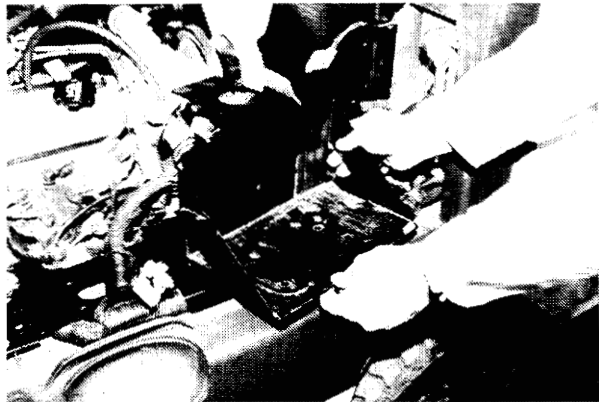


Removing the Battery

LAT4-1

**3. Battery case removal**

- (1) Remove set bolts (3 pcs.) and remove the battery case.

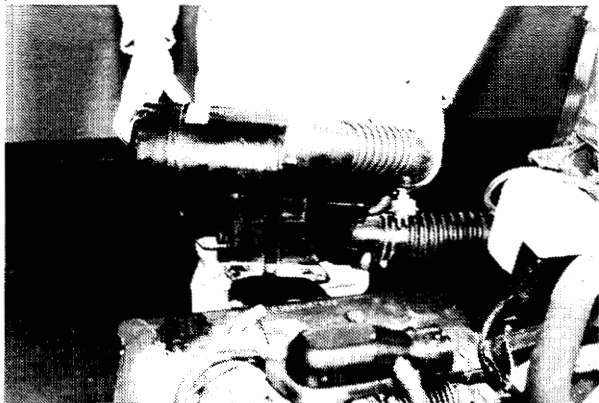


Removing the Battery Case

LAT4-2

**4. Air cleaner ASSY removal**

- (1) Remove the hydraulic tank breather.
- (2) Loosen the hose clamp for the air cleaner hose.
- (3) Remove air cleaner case set bolts (4 pcs.) and remove the air cleaner.



Removing the air cleaner

LAT4-3

**Thank you very much  
for your reading.**

**Please Click Here**

**Then            Get            More  
Information.**