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 7986 are subject to minor changes in September 7986. This manual deals with the models produced in the period between August 7988 and August 7989 as well as the models as of September 7989 (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)

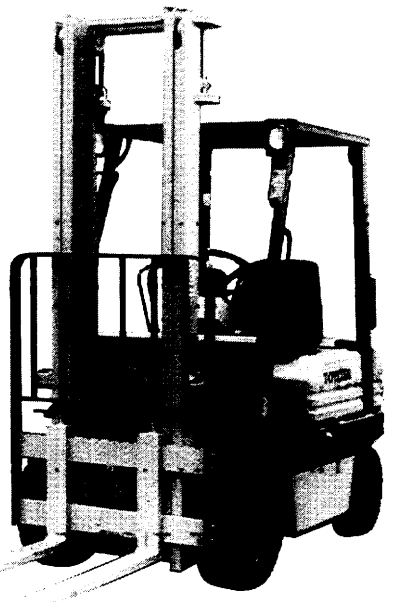
(Note: 2-3 ton models mounted with 2J, 1DZ diesel engine are only available in designated areas.)

TOYOTA MOTOR CORPORATION

SECTION INDEX

GENERAL

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	↑	↑	Torque converter	↑
		5FD10	2 J	Diesel	11'' clutch	↑
		02- 5FD10	↑	↑	Torque converter	↑
	1.35 ton	5FG14	4 P	Gasoline	11'' clutch	↑
		02- 5FG14	↑	↑	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	↑
	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	↑
		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	↑	↑	Totque 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
	3.0 ton	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		
BBDC	Before Bottom Dead Center	SST	Special Service Tool
LH	Left Hand	STD	Standard
LLC	Long Life Coolant	SUB-ASSY	Sub-assembly
MTM	Manual Transmission	T =	Tightening Torque
OHV	Overhead valve	OOT	Number of Teeth (00)
OPT	Option	U/S	Undersize
O/S	Oversize	w/	With
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 ⊖ 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 disassernbly 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.

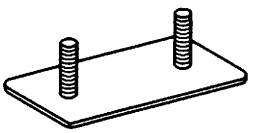
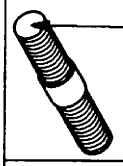
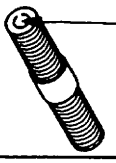
STANDARD BOLT AND NUT TIGHTENING TORQUES

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

1. 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.
2. How to judge tighting 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

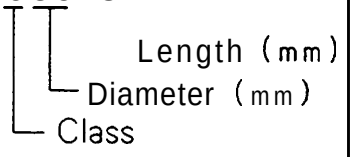
	Shape and class	Class
Hexagon head bolt		4=4T 5=5T 6=6T 7=7T
	 No mark	4T
Hexagon flange bolt	 No mark	4T
Hexagon head bolt	 Two protruding lines	5T
Hexagon flange bolt	 Two protruding lines	6T
Hexagon head bolt	 Three protruding lines	7T
Welded bolt		4T
Stud bolt	 No mark	4T
	 Grooved	6T

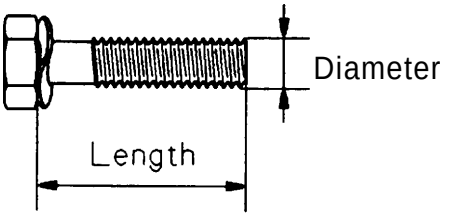
2. Judging by part No.

Hexagon head bolt

Parts No,

91611–do625

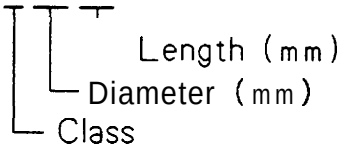


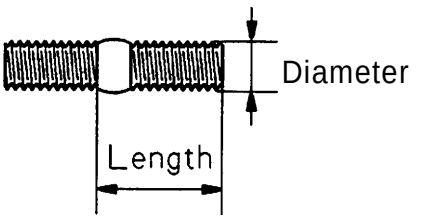


Stud bolt

Parts No.

92132–40614





KAPM5

STANDARD BOLT TIGHTENING TORQUES

Class	Diameter	Pitch	Specified torque			
			Hexagon head bolt 		Hexagon flange bolt 	
	mm	mm	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	—	—

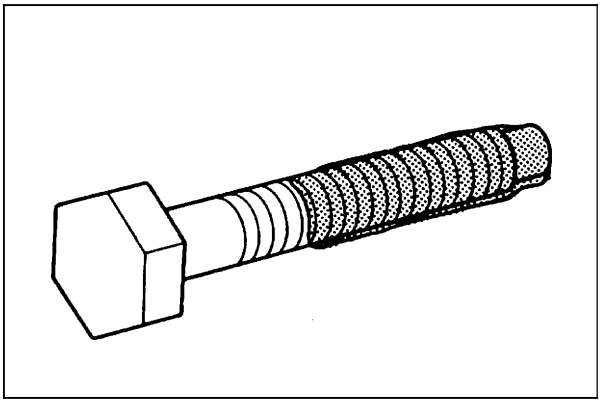
KAPS3

PRECOAT BOLTS

(Bolts with seal lock agent coating on threads)

1. Do not use the precoat bolt as itisineither 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.



Precoat Bolts B4460

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.)
   (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

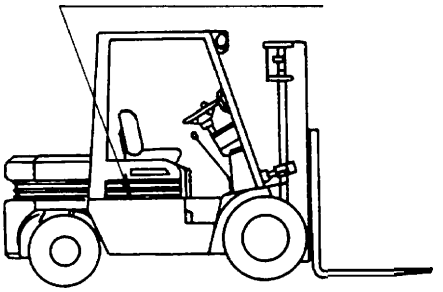
1. When connecting a high pressure hose, wipe the hose fitting and mating nipple contact surfaces with clean cloth to remove foreign matters and dirt. Also check no dent or other damage on the contact surfaces before installation.

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.

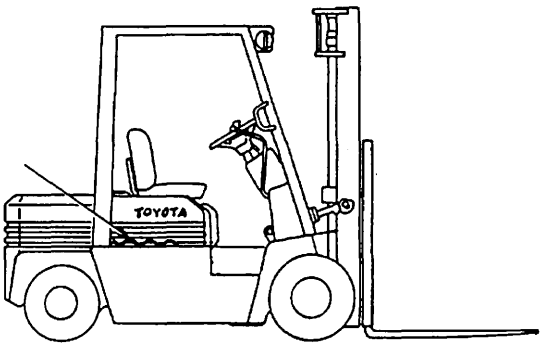
Nominal diameter of screw	Standard tightening torque kg-m (ft-lb)		Hose inside diameter (mm)
	Standard	Tightening range	
7/16 – 20UNF	2.5 (18.1)	2.4 ~ 2.6 (17.4 ~ 18.8)	6
9/16 – 18UNF	5.0 (36.2)	4.8 ~ 5.3 (34.7 ~ 38.3)	9
3/4 – 16UNF	6.0 (43.4)	5.7 ~ 6.3 (41.2 – 45.5)	12
7/8 – 14UNF	6.0 (43.4)	5.7 ~ 6.3 (41.2 ~ 45.5)	12
11/16 – 12UNF	12.0 (86.8)	11.4 ~ 12.6 (82.4 – 91.1)	19
15/16 – 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)

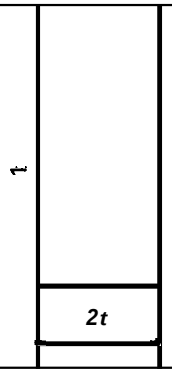
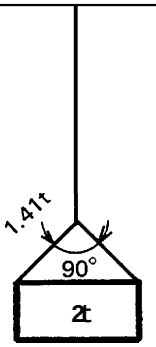
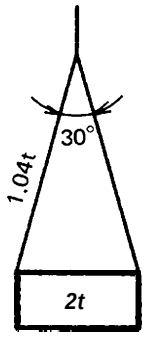
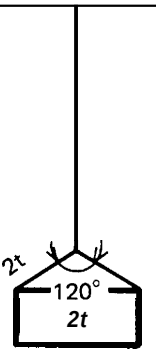
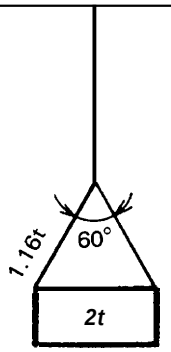
Punching position	Top on rear right frame 			
Vehicle series	1 ton series			
Engine model	4 P	4 Y	2 J	1 Z
Vehicle model	5FG10 02- 5FG10 5FG14 02- 5FG14 5FG15 02- 5FG15 5FG18 02- 5FG18	40- 5FG10 42- 5FG10 40- 5FG14 42- 5FG14 40- 5FG15 42- 5FG15 40- 5FG18 42- 5FG18	5FD10 02- 5FD10 5FD14 02 - 5FD14 5FD15 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 02- 5FG28 5FG30 02- 5FG30	5FD28 02- 5FD28 5FD30 02- 5FD30	60- 5FD28 62- 5FD28 60- 5FD30 62 - 5FD30
Punching format	– –	5FG30 - 10001	5FD30 - 10001	605FD30 - 10001

FRAME NUMBER (1989.9 –)

Punching position	 LATS114			
1 ton series				
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	
2 ton series				
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
3 ton series				
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 Axle (w/ Brake		1 ton series 210 (463) 2 ton series 260 (573) 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 1OW-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 1OW-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.O–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	• "LLC 30-50% mixture (for winter or all-season) • Coolant with rust-inhibitor (for spring, summer and autumn)	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)	5K	4.0 ℓ (1.06 US gal)
			SAE20W-40 (SAE1OW-30 in cold area)	4Y	4.0 ℓ (1.06 US gal)
	Diesel	API CC, CD	Diesel engine oil SAE30 (SAE20 in cold area) SAE1OW-30	1DZ	6.511 (1.7 US gal)
				1Z	9.0 Q (2.38 US gal)
Transmission		API GL-4 GL-5	Hypoid gear oil SAE85W-90	MTM models	4.0 Q (1.06 US gal)
Torque converter		ATF	GM Dexron® II	AISIN make	14.0 Q (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	27.0 ℓ (7.1 US gal) 34.0 ℓ (9.0 US gal) 37.0 ℓ (9.8 US gal)
Fuel tank				1 ton series 2 ton series 3 ton series	45.0 ℓ (11.9 US gal) 65.0 ℓ (17.2 US gal) 70.0 ℓ (18.5 US gal)
				1 ton series 2 ton series 3 ton series	45.0 Q (11.9 US gal) 65.0 ℓ (17.2 US gal) 70.0 ℓ (18.5 US gal)
Brake (1.O–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	●* LLC 30-50% mixture (for winter or all-season) ● Coolant with rust-inhibitor (for spring, summer and autumn)	Attached Table 1 Coolant volume	
Coolant (Reservoir Tank)		↑	↑	All models	1.1 Q (0.3 US gal) (at Full level)

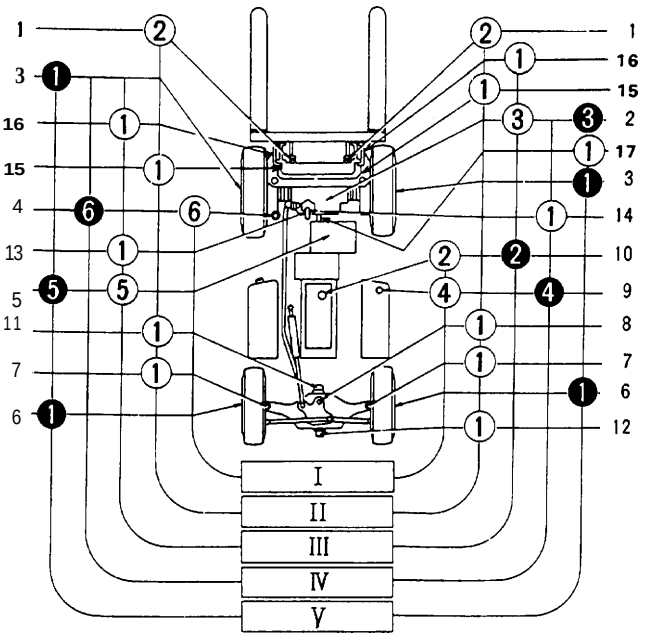
Attached Table 1 Coolant volume

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)

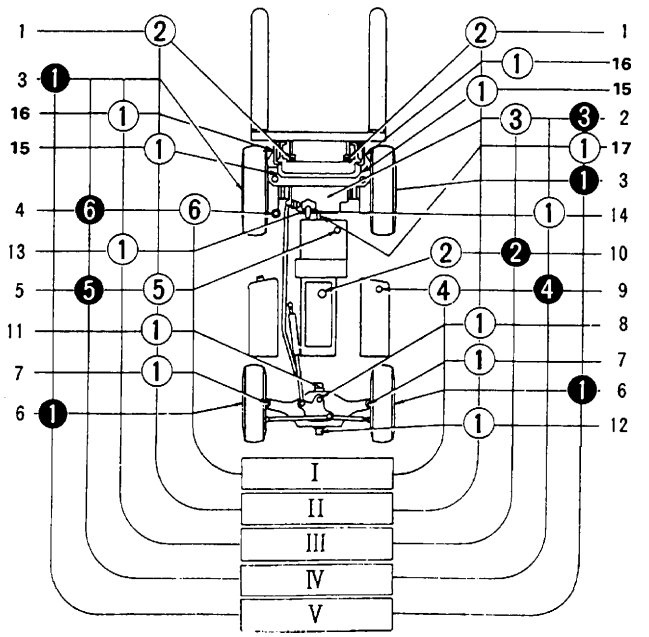
LUBRICATION CHARTS

1 Chain
2 Differential
3 Front wheel bearing
4 Brake master cylinder (1.O–1.75 ton models)
5 Transmission case
6 Rear wheel bearing
7 Steering knuckle kingpin
8 Bell crank pin
9 Oil tank
10 Engine crank case
11 Rear axle beam front
12 Rearaxlebeam rear
13 Tilt steering universal joint
14 Tilt steering liocking meachanism
15 Mast support bushing
16 Tilt cylinder front pin
17 Propeller shaft
I Inspect every 8 hours (daily)
II Inspect every 40 hours (weekly)
III Inspect every 170 hours (monthly)
IV Inspect every 1000 hours (6 monthly)
V Inspect every 2000 hours (annually)
○ Inspect and service
● Replace
1 MP grease
2 Engine oil
3 Hypoid gear oil
4 Hydraulic oil
5 Gear oil
6 Brake fluid (1.O–1.75 ton models)



Clutch Model Lubrication Chart LAOM136

1 Chain
2 Differential
3 Front wheel bearing
4 Brake master cylinder (1.O–1.75 ton models)
5 Torque converter case
6 Rear wheel bearing
7 Steering knuckle king pin
8 Bell crank pin
9 Oil tank
10 Engine crank case
11 Rear axle beam front
12 Rear axle beam rear
13 Tilt steering universal joint
14 Tilt steering liocking meachanism
15 Mast support bushing
16 Tilt cylinder front pin
17 Propeller shaft
I Inspect every 8 hours (daily)
II Inspect every 40 hours (weekly)
III Inspect every 170 hours (monthly)
IV Inspect every 1000 hours (6 monthly)
V Inspect every 2000 hours (annually)
○ Inspect and service
● Replace
1 MP grease
2 Engine oil
3 Hypoid gear oil
4 Hydraulic oil
5 Automatic transmission fluid
6 Brake fluid (1.O–1.75 ton models)



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
ENGINE						
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
POWER TRANSMISSION SYSTEM						
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				○
DRIVE SYSTEM						
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	⊙	⊙	⊙	⊙
Front axle	Cracks, damage and deformation of housing	I				⊙
Rear axle	Cracks, damage and deformation of beam	I				○
	Looseness of axle beam in vehicle longitudinal direction	M	○*			○
STEERING SYSTEM						
Steering wheel	Play and looseness	I	○	○	○	○
	Function	I	⊙	⊙	⊙	⊙
Gear box	Oil leak	I	○	○	○	○
	Looseness of mounting	T	⊙	⊙	⊙	⊙
	Clogging of relief valve filter	C			⊙	○
Rods, links and arm	Looseness and damage	I	○	○	○	○
	Linkage wear and mounting condition	I				○
Power steering	Oil leak	I	○	○	○	○
	Mounting and linkage looseness	I	○	○	○	○
	Damage of power steering hose	I				○
Knuckle	King pin looseness	I	○	○	○	○
	Cracks and deformation	I				○
Steering shaft	Wheel alignment	M				○
	Left and right turning angle	M				○
BRAKING SYSTEM						
Brake pedal	Play and reserve	M	⊙	⊙	⊙	⊙
	Braking effect	I	○	○	○	○
Parking brake	Operating force	I	⊙	⊙	⊙	⊙
	Braking effect	I	⊙	○	○	○
	Rod and cable looseness and damage	I	○	○	○	○
Brake pipe	Leak, damage and mounting condition	I	○	○	○	○
Reservoir tank	Leak and fluid level	I	○	○	○	○
Master cylinder or brake valve and wheel cylinder	Function, wear, damage, leak and mounting looseness	I				○

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

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

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

PERIODIC REPLACEMENT LUBRICANTS AND PARTS

a : Replacement

Interval / Item	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** *1		●	**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				● *2
Hydraulic hoses				**a** *2
Reservoir tank tube				● *2
Fuel hoses				
Torque converter rubber hoses				● *2
Chains				● *3

*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