

FOREWORD

This manual covers the service procedures of the TOYOTA FORKLIFT 5FD50 - 80, 5FG50·60, Series. Please use this manual for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of December 1990. Please understand that disagreement can take place between the descriptions in the manual and actual vehicles due to change in design and specifications. 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 12Z ENGINE (No. CE615-1)
REPAIR MANUAL*
- TOYOTA INDUSTRIAL VEHICLE W06E ENGINE (No. CE622)
REPAIR MANUAL*
- TOYOTA INDUSTRIAL VEHICLE 3F ENGINE (No. CE614)
REPAIR MANUAL*

TOYOTA MOTOR CORPORATION

SECTION INDEX

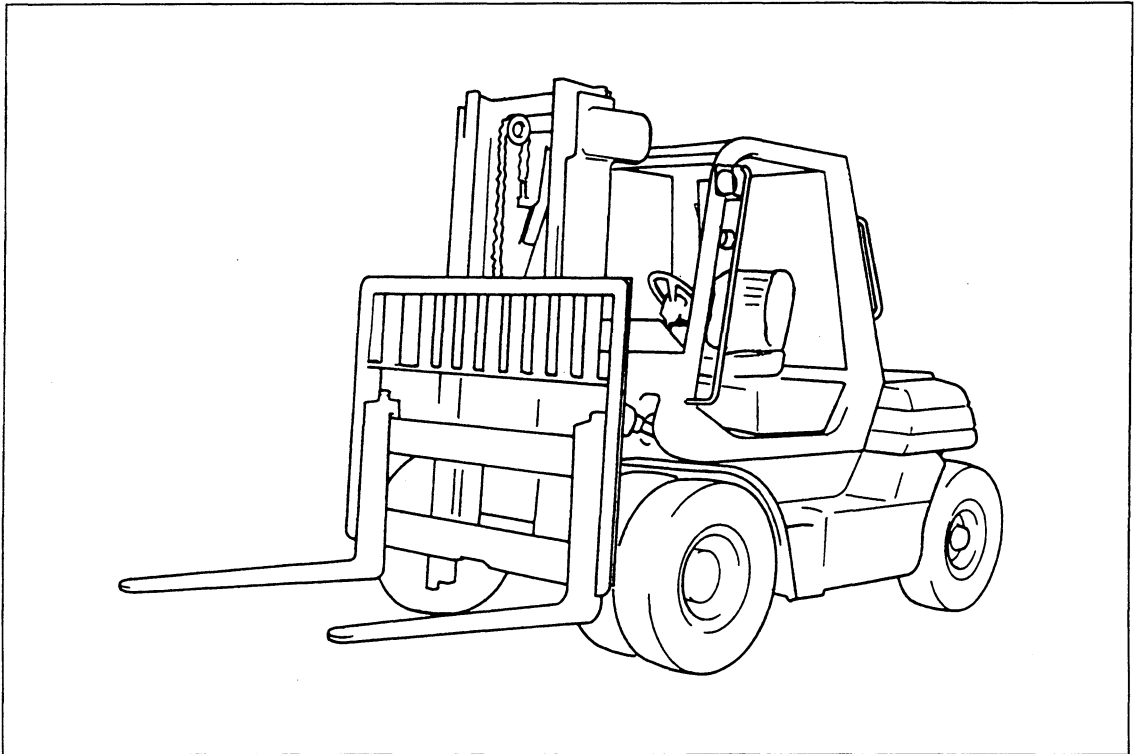
NAME	SECTION
GENERAL	0
ENGINE	1
TORQUE CONVERTER	2
PROPELLER SHAFT	3
DIFFERENTIAL	4
FRONT AXLE	5
REAR AXLE	6
STEERING	7
BRAKE	8
	.
MATERIAL HANDLING SYSTEM	10
MAST	11
CYLINDER	12
OIL CONTROL VALVE	14
HYDRAULIC PIPING	15
APPENDIX	16

GENERAL

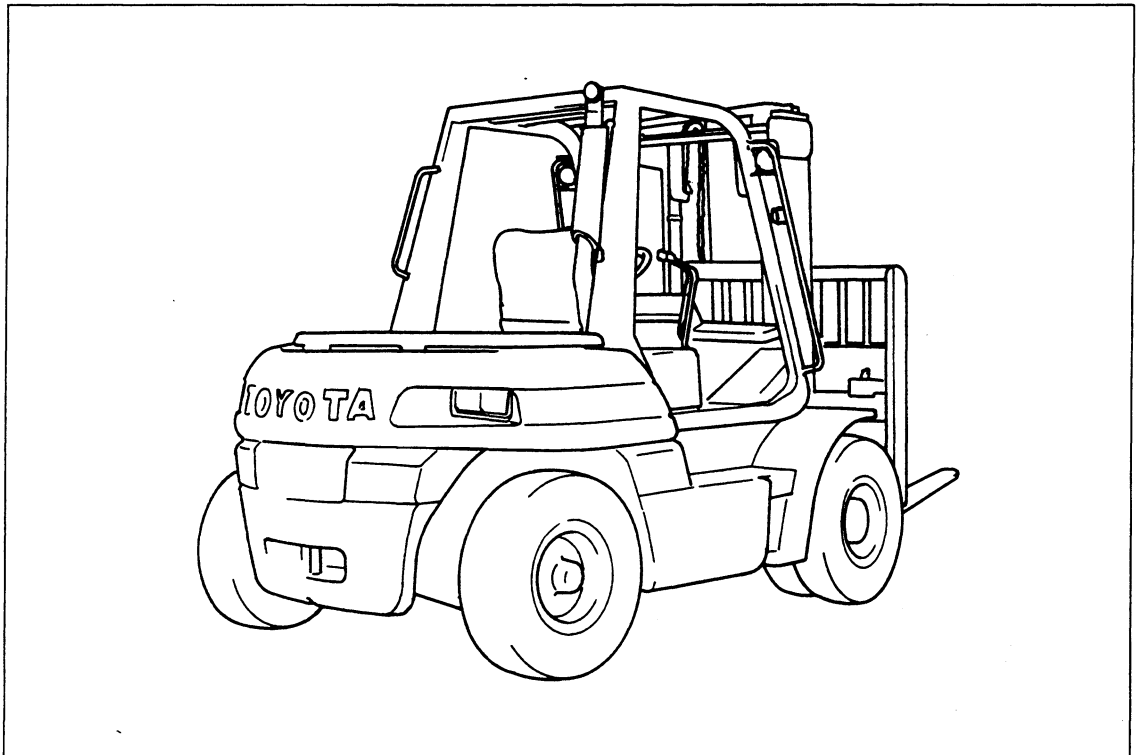
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	Page
EXTERIOR VIEWS	0-2
VEHICLE LISTING	0-3
FRAME NUMBER	0-3
HOW TO READ THIS MANUAL	0-4
EXPLANATION METHOD	0-4
TERMINOLOGY	0-5
ABBREVIATIONS	0-5
OPERATIONAL TIPS	0-6
STANDARD BOLT & NUT TIGHTENING TORQUE	0-7
BOLT STRENGTH TYPE IDENTIFICATION METHOD	0-7
TIGHTENING TORQUE TABLE	0-8
PRECOAT BOLTS	0-9
HIGH PRESSURE HOSE FITTING TIGHTENING TORQUE	0-9
WIRE ROPE SUSPENSION ANGLE LIST	0-10
SAFE LOAD FOR EACH WIRE ROPE SUSPENSION ANGLE	0-10
COMPONENTS WEIGHT	0-11
RECOMMENDED LUBRICANT QUANTITY & TYPES ...	0-12
LUBRICATION CHARTS	0-13
PERIODIC MAINTENANCE	0-14
PERIODIC REPLACEMENT LUBRICANTS & PARTS	0-20

EXTERIOR VIEWS



Front View

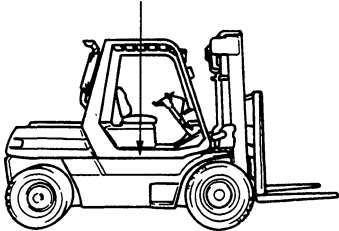


Rear View

VEHICLE LISTING

Payload	Model	Engine model and type	
5.0 ton	5FG50	3F	Gasoline
	5FD50	12Z	Diesel
6.0 ton	5FG60	3F	Gasoline
	5FD60	12Z	Diesel
7.0 ton	5FD70	12Z	Diesel
8.0 ton	5FD80	W06E	Diesel

FRAME NUMBER

Engine	Model	Punching format	Punching position
3F	5FG50	5FG60-10001	<p>Top on rear right frame</p> 
	5FG60		
12Z	5FD50	5FD70-10001	
	5FD60		
	5FD70		
W06E	5FD80	5FD80-10001	

HOW TO READ THIS MANUAL

EXPLANATION METHOD

1. Operation procedure

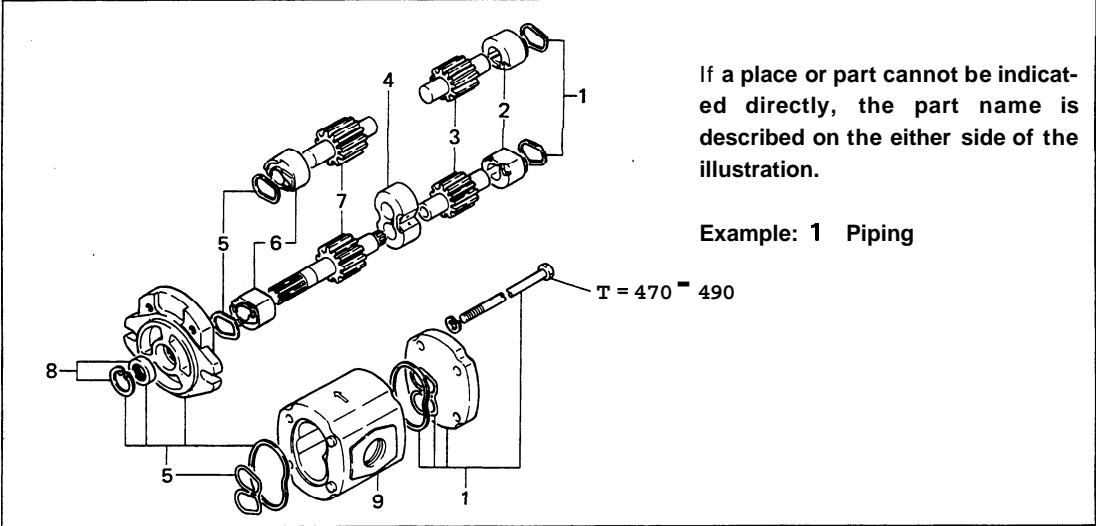
(1) The operation procedure is described in either pattern A or pattern B below.

Pattern A: Explanation of each operation step with a photo or illustration.

Pattern B: Explanation of operation procedure by indicating step numbers in one illustration, followed by explanation of cautions and notes summarized as point operations.

Example of description in pattern B

DISASSEMBLY . INSPECTION . REASSEMBLY Tightening torque unit [T = kg-cm]



If a place or part cannot be indicated directly, the part name is described on the either side of the illustration.

Example: 1 Piping

Oil Pump Disassembly Procedure

DISASSEMBLY

1. Remove the cover. [Point 1]
2. Remove the bush [Point 2] ← Operation explained on a laterpage
3. Remove the gear.

POINT OPERATIONS Explanation of key point for operation with an illustration

[Point 1]

Disassembly: Put a match mark when removing the pump cover.

[Point 2]

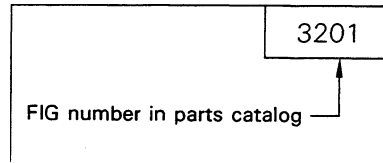
Inspection: Measure the bush inside diameter.

Bush inside diameter limit: 19.12 mm (0.7528 in.)

How to read components figures

- (1) The components figure use the illustration in the parts catalog for the vehicle model. please refer to the catalog for checking the part name.
The number at the right shoulder of each components figure indicates the Fig. number in the parts catalog.

(Example)



3. Matters omitted in this manual

- (1) This manual omits description of the following jobs, but perform them in actual operation:
 - ① Cleaning and washing of removed parts as required
 - ② visual inspection (Partially described)

TERMINOLOGY

Caution:

Important matters of which negligence may cause accidents. Be sure to observe them.

Note:

Important items of which negligence may cause accidents or matters in operation procedure requiring special attention.

Standard: Values showing allowable range in inspection and adjustment.

Limit: Maximum or minimum allowable value in inspection or adjustment.

ABBREVIATIONS

Abbreviation (code)	Meaning	Abbreviation (code)	Meaning
ASSY	Assembly	SST	Special service Tool
LH	Lifthand	STD	Standard
OPT	Option	T =	Tightening torque
O/S	Oversize	OOT	Number of teeth (OO)
PS	Power steering	UIS	Undersize
RH	Right hand	W/	With
SAE	Society of Automotive Engineers (USA)		

OPERATIONAL TIPS

1. Safe operation

- (1) After jacking up, always support with rigid stands.
- (2) When hoisting the vehicle or its heavy component, use wire rope(s) with a sufficient reserve in load capacity.
- (3) Always disconnect the battery plugs before the inspection or servicing of electrical parts.

2. Tactful operation

- (1) Prepare the mechanic tools, necessary measuring instruments (circuit tester, megger, oil pressure gauge, etc.) and SSTs before starting operation.
- (2) Before disconnecting wiring, always check the cable color and wiring state.
- (3) When overhauling functional parts, complicated portions or related mechanisms, arrange the parts neatly to prevent confusion.
- (4) When disassembling and inspecting such a precision part as the control valve, use clean tools and operate in a clean location.
- (5) Follow the described procedures for disassembly, inspection and reassembly.
- (6) Replace, gaskets, packings and O-rings with new ones each time of disassembly.
- (7) Use genuine Toyota parts for replacement.
- (8) Use specified bolt and nuts. Observe the specified tightening torque at the time of reassembly. If no tightening torque is specified, tighten the bolt or nut according to the standard tightening torque table.

3. Grasping the trouble state

When a trouble occurs, do not attempt immediate disassembly or replacement but first check if the trouble requires disassembly or replacement for remedying.

STANDARD BOLT & NUT TIGHTENING TORQUE


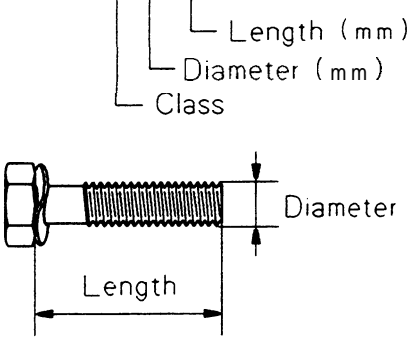
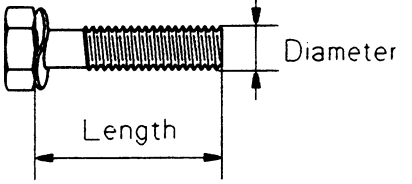





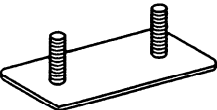
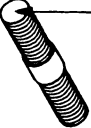
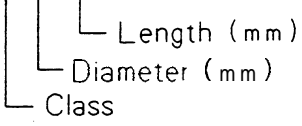
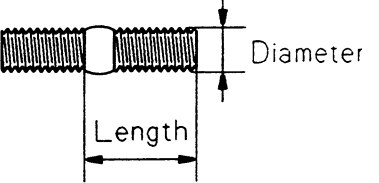
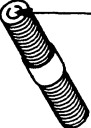
Standard bolt and tightening torques are not indicated.
Judge the standard tightening torque as shown below.

1. Find out the type of the bolt from the list below and then find the bolt tightening torque from the table.
2. The nut tightening torque can be judged from the mating bolt type.



BOLT STRENGTH TYPE IDENTIFICATION METHOD

1. Identification by bolt shape

2. Identification by part No.

	Shape and class	Class	Hexagon head bolt
Hexagon head bolt	 Bolt head No.	4=4T 5=5T 6=6T 7=7T	Parts No. 91611-40625  Length (mm) Diameter (mm) Class  Diameter Length
	 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	Stud bolt Parts No. 92132-40614  Length (mm) Diameter (mm) Class  Diameter Length
	 Grooved	6T	

TIGHTENING TORQUE TABLE

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt 			Hexagon flange bolt 		
			kg-crn	ft-lb	N-rn	kg-cm	ft-lb	N-m
4T	6	1.0	55	48 ^{in-lb}	5.4	60	52 ^{in-lb}	5.9
	8	1.25	130	9	13	145	10	14
	10	1.25	260	19	25	290	21	28
	12	1.25	480	35	47	540	39	53
	14	1.5	760	55	75	850	61	83
	16	1.5	1150	83	113	—	—	—
5T	6	1.0	65	56 ^{in-lb}	6.4			
	8	1.25	160	12	16			
	10	1.25	330	24	32			
	12	1.25	600		59		—	—
	14	1.5	930		91			
	16	1.5	1400	101	137			
6T	6	1.0	80	69 ^{in-lb}	7.8	90	78 ^{in-lb}	8.8
	8	1.25	195	14	19	215	16	21
	10	1.25	400	29	39	440	32	43
	12	1.25	730	53	72	810	59	79
	14	1.5	—	—	—	1250	90	123
7T	6	1.0	110	8	11	120	9	12
	8	1.25	260	19	25	290	21	28
	10	1.25	530	38	52	590	43	58
	12	1.25	970	70	95	1050	76	103
	14	1.5	1500	108	147	1700	123	167
	16	1.5	2300	166	226	—	—	—

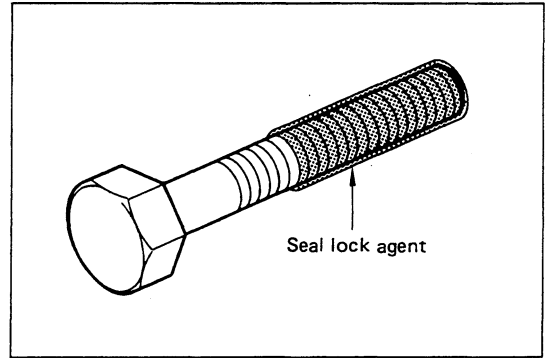
PRECOAT BOLTS

(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

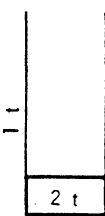
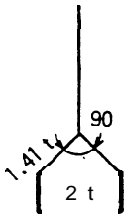
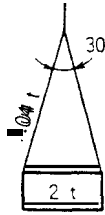
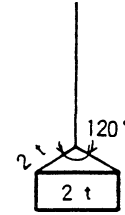
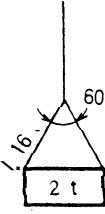
- (1) Wash the bolt and threaded hole. (The threaded hole must be washed even for replacement of the bolt.)
- (2) Perfectly dry the washed parts by air blowing.
- (3) Coat the specified seal lock agent to the threaded portion of the bolt.

HIGH PRESSURE HOSE FITTING TIGHTENING TORQUE

1. When connecting a high pressure hose, wipe the hose fitting and mating nipple contact 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-cm (ft-lb)		Hose inside diameter (mm)
	Standard	Tightening range	
7116 — 20 UNF	2.5 (18.1)	2.4— 2.6 (17.4— 18.8)	6
9116 — 18 UNF	5.0 (36.2)	4.8— 5.3 (34.7— 38.3)	9
3/4 — 16 UNF	6.0 (43.4)	5.7— 6.3 (41.2— 45.5)	12
7/8 — 14 UNF	6.0 (43.4)	5.7— 6.3 (41.2— 45.5)	12
1 . 1116 — 12 UNF	12.0 (86.6)	11.4—12.6 (82.4— 91.1)	19
1 . 5116 — 12 UNF	14.0 (101.2)	13.3— 14.7 (96.2—106.3)	25
PF114	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
PF112	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

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	. 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

Unit: kg (lb.) [N]

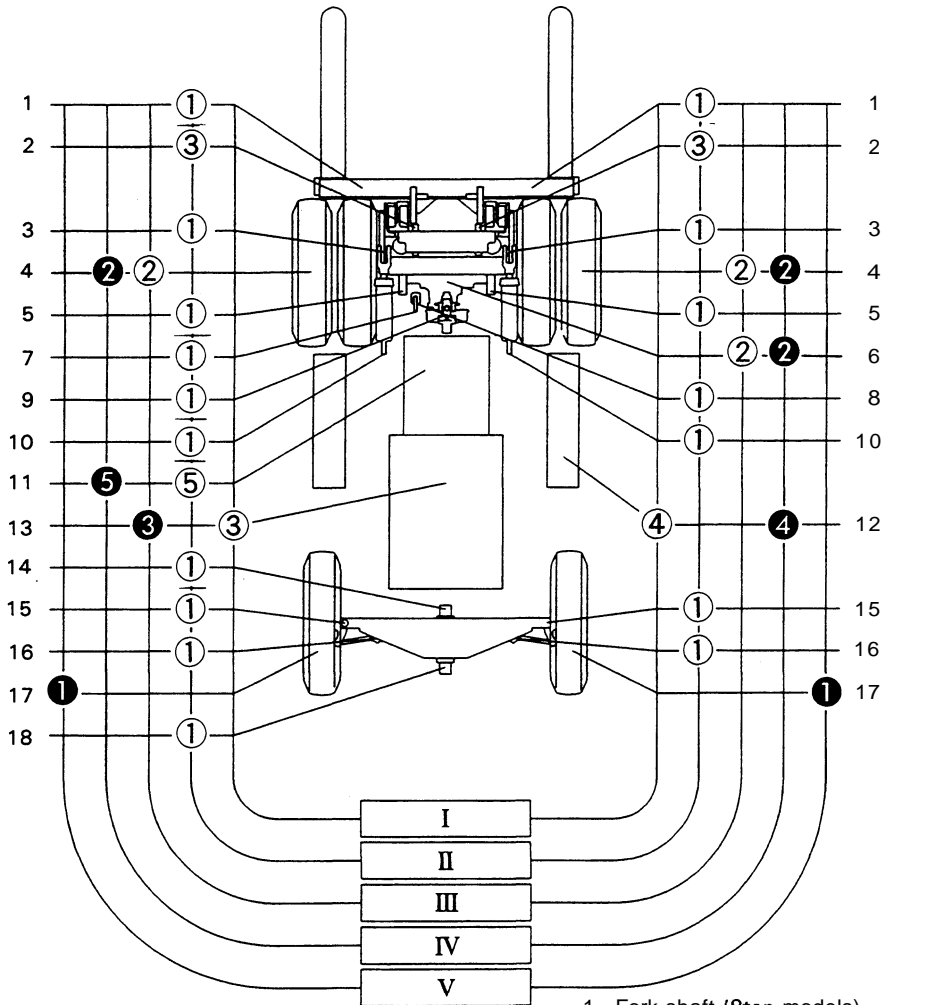
Component	Applicable vehicle	Weight
Engine	12Z	335 (739) [3285]
	W06E	490 (1080) [4805]
	3F	250 (551) [5400]
Torque convertor	Two speeds	360 (794) [3530]
	Three speeds	390 (860) [8434]
Balance weight	5-ton	Approx. 2450 (5400) [24026]
	6-ton	Approx. 3000 (6615) [29420]
	7-ton	Approx. 3700 (8159) [36280]
	8-ton	Approx. 4210 (9283) [41290]
	6-ton (M60)	Approx. 2810 (6196) [27557]
	7-ton (M70)	Approx. 3560 (7850) [34910]
Mast L/Lift Bracket	5 - 6-ton	Approx. 370 (816) [3630]
	7-ton	Approx. 430 (948) [4220]
	8-ton	Approx. 660 (1460) [6472]

RECOMMENDED LUBRICANT QUANTITY & TYPES

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)	3F	9.31 (2.46 US.gal)
	Diesel	API CC, CD	Diesel engine oil SAE30 (SAE20 in cold area) SAE10W-30	12Z W06E	12.51 (3.30 US.gal) 13.0ℓ (3.43 US.gal)
Planetary gear oil (left and right)		API GL-4 GL-5	Hypoid gear oil SAE85W-90	5FG/D50-70	1.5ℓ (0.40 US.gal)
				5FD80	2.0ℓ (0.53 US.gal)
Differential		API GL-4 GL-5	Hypoid gear oil SAE85W-90	All models	6.51 (1.72 US.gal)
Torque converter		ATF	GM Dexron® II	All models	33.01 (8.72 US.gal)
Hydraulic oil		ISO VG32	Hydraulic oil ISO VG32	Maximum fork height below 6.0 m (236 in)	901 (23.8 US.gal)
				8.0 m (315 in)	100ℓ (26.4 US.gal)
Fuel tank				All models	1401 (37 US.gal)
Chassis parts			MP Grease	All models	Proper quantity
Coolant (Excluding reserve tank)		LLC*	<ul style="list-style-type: none"> • LLC 30-50% mixture (for winter or all-season) • Coolant with rust-inhibitor (for spring, summer and autumn) 	3F	13.01 (3.4 US.gal)
				12Z	13.01 (3.4 US.gal)
				W06E	15.0ℓ (4.0 US.gal)
Coolant (Reservoir tank)		t	↑	All models	1.1ℓ (0.29 US.gal) (at Full level)

*L.L.C. = Long Life Coolant
(Appropriately diluted with fresh water)

LUBRICATION CHARTS



- 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)]

- : Check and replenish
- : Replace
- ① Multi-purpose grease
- ② Hypoid gear oil SAE 90
- ③ Engine oil
- ④ Hydraulic oil
- ⑤ Automatic transmission fluid

- 1. Fork shaft (8ton models)
- 2. Chain
- 3. Tilt cylinder front pin
- 4. Planetary gear
- 5. Mast support cap
- 6. Differential case
- 7. Tilt steering universal joint
- 8. Tilt steering locking mechanism
- 9. Universal joint
- 10. Tilt cylinder rear pin
- 11. Torque converter and transmission case
- 12. Oil tank
- 13. Engine crankshaft case
- 14. Rear axle beam front pin
- 15. Steering knuckle king pin
- 16. Tie rod end
- 17. Rear wheel bearing
- 18. Rear axle beam rear pin

PERIODIC MAINTENANCE

INSPECTION METHOD

I : Inspection. Repair or replacement 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 sediment	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				○
	Radiator screen	C	○	○	○	○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
POWER TRANSMISSION SYSTEM						
Differential	Leak	I	○	○	○	○
	Oil level	I	○	○	○	○
	Bolt loosening	T				○
Planetary gear	Oil 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	○	○	○	○
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	○			○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
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	○	○	○	○
Brake valve . Accumulator and wheel cylinder	Function, wear, damage, leak and mounting looseness	I				○
Brake drum and brake shoe	Clearence 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				○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
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	T	○	○	○	○
	Deformation and damage of rod, rod screw and rod end	I	○	○	○	○
	Cylinder operation	I	○	○	○	○
	Natural drop and natural forward tilt (hydraulic drift)	M	○	○	○	○
Cylinder	Oil leak and damage	I	○	○	○	○
	Wear and damage of pin and cylinder bearing	I	○	○	○	○
	Lifting speed	M	○	○	○	○
	Uneven movement	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	○	○	○	○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
Control level	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	○	○	○	○
	Distributor points gap	M	○	○	○	○
	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	○	○	○	○
Engine stop-ping system	Diesel engine key stop device function	I	○	○	○	○
SAFETY DEVICE, 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	○	○	○	○

Item		Inspection Period				
		Months	1	3	6	12
		Hours	170	500	1000	2000
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

● Replacement

Item	Interval	1 month	3 month	6 month	12 month
		170 hours	500 hours	1000 hours	2000 hours
Engine		●	●	●	●
Engine oil filter		● *1	●	●	●
Engine coolant (every 2 years for LLC)			●	●	●
Fuel filter				●	●
Torque convertor oil				●	●
Torque convertor oil filter				●	●
Planetary gear oil				●	●
Differential oil				●	●
Hydraulic oil				●	●
Hydraulic oil filter		● *1		●	●
Wheel bearing grease					●
Spark plug				●	●
Distributor points				●	●
Cyclone air cleaner element					●
Brake valve & accumulator rubber parts					●
Cups and seals for wheel cylinders					●
Power steering hoses					● *2
Power steering rubber parts					● *2
Hydraulic hoses					● *2
Fuel hoses					● *2
Torque converter rubber hoses					● *2
Chains					● *3

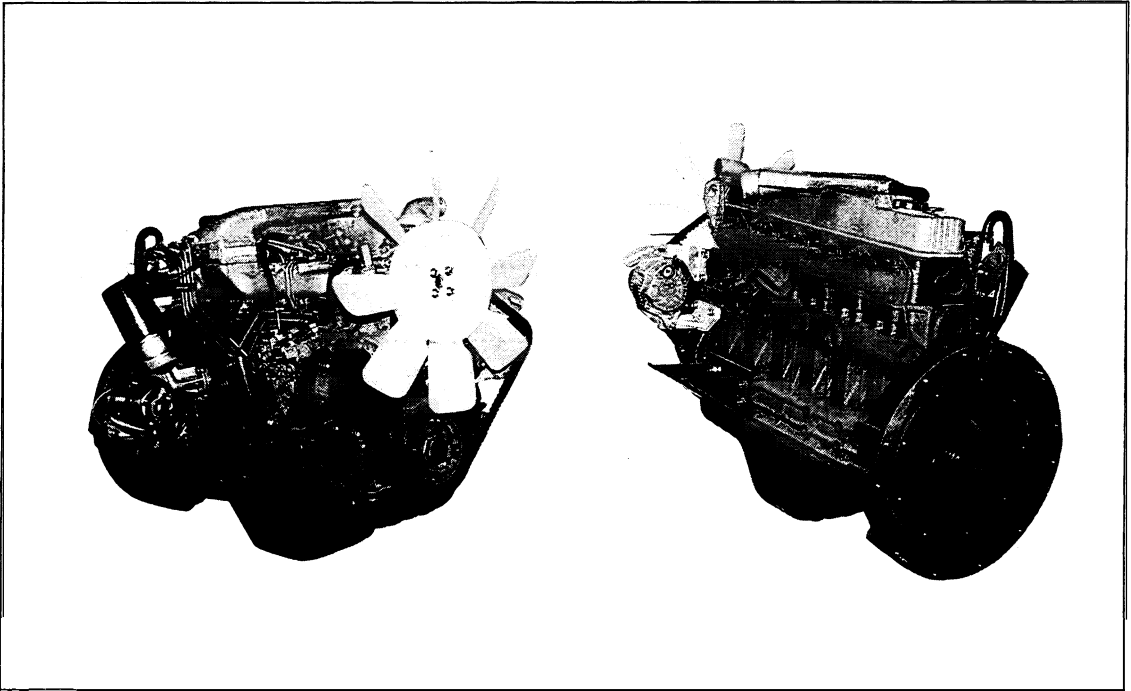
*1: for new vehicle *2: Every 2 years *3: Every 3 years

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

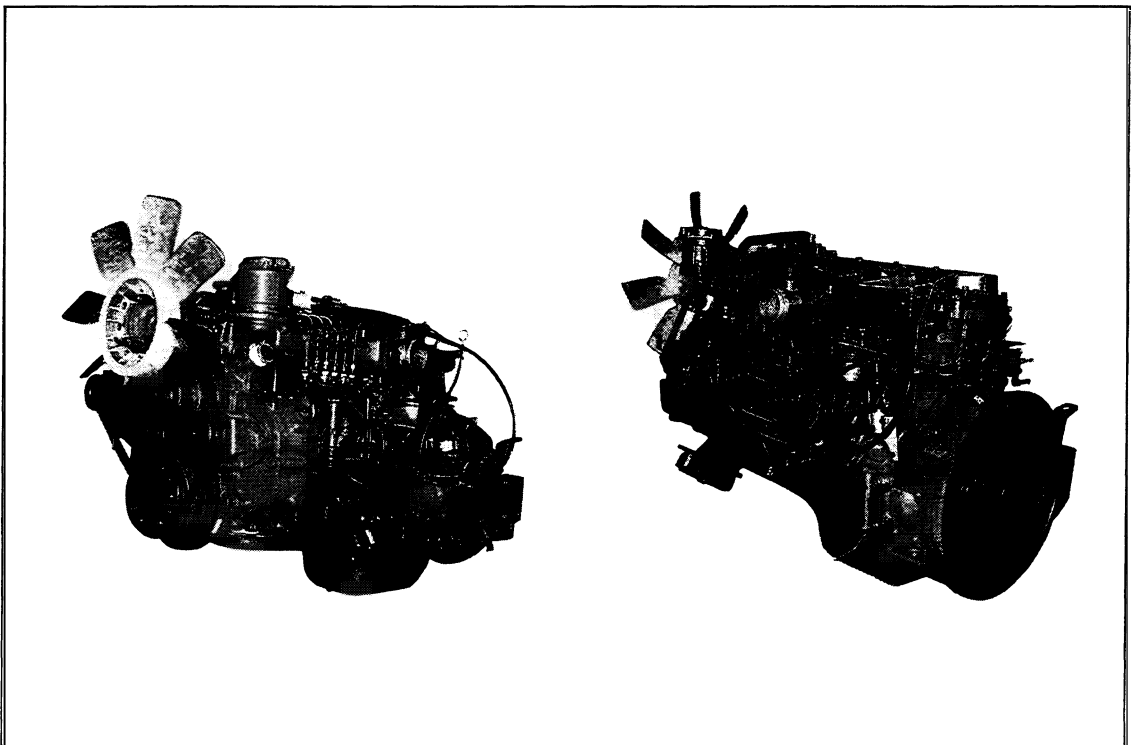
ENGINE

	Page
EXTERIOR VIEWS	1-2
ENGINE SECTIONAL VIEWS	1-4
ENGINE PERFORMANCE CURVES	1-7
ENGINE ASSY	1-10
REMOVAL . INSTALLATION	1-10
ENGINE SPEED ADJUSTMENT	1-13
AIR CLEANER	1-18
RADIATOR	1-22
MUFFLER . EXHAUST PIPE	1-23
BATTERY	1-24
STARTING MOTOR	1-26
ALTERNATOR	1-27
ACCELERATOR PEDAL	1-28

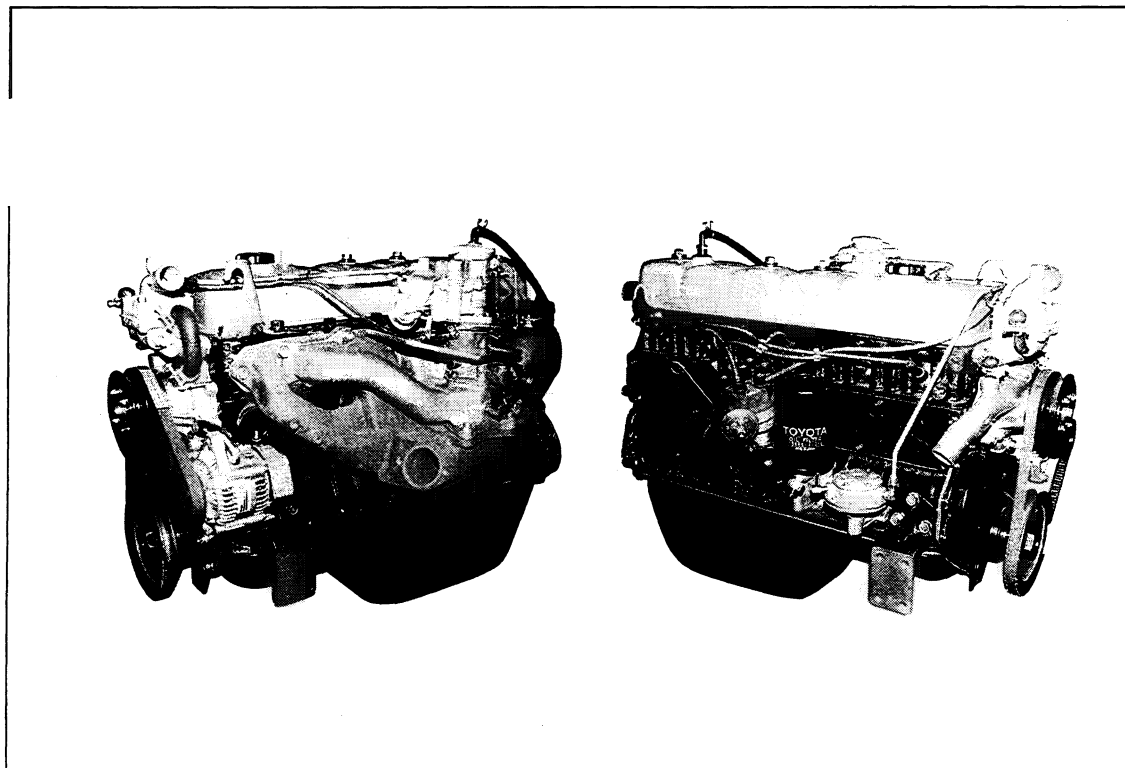
EXTERIOR VIEWS



122 Engine Exterior View

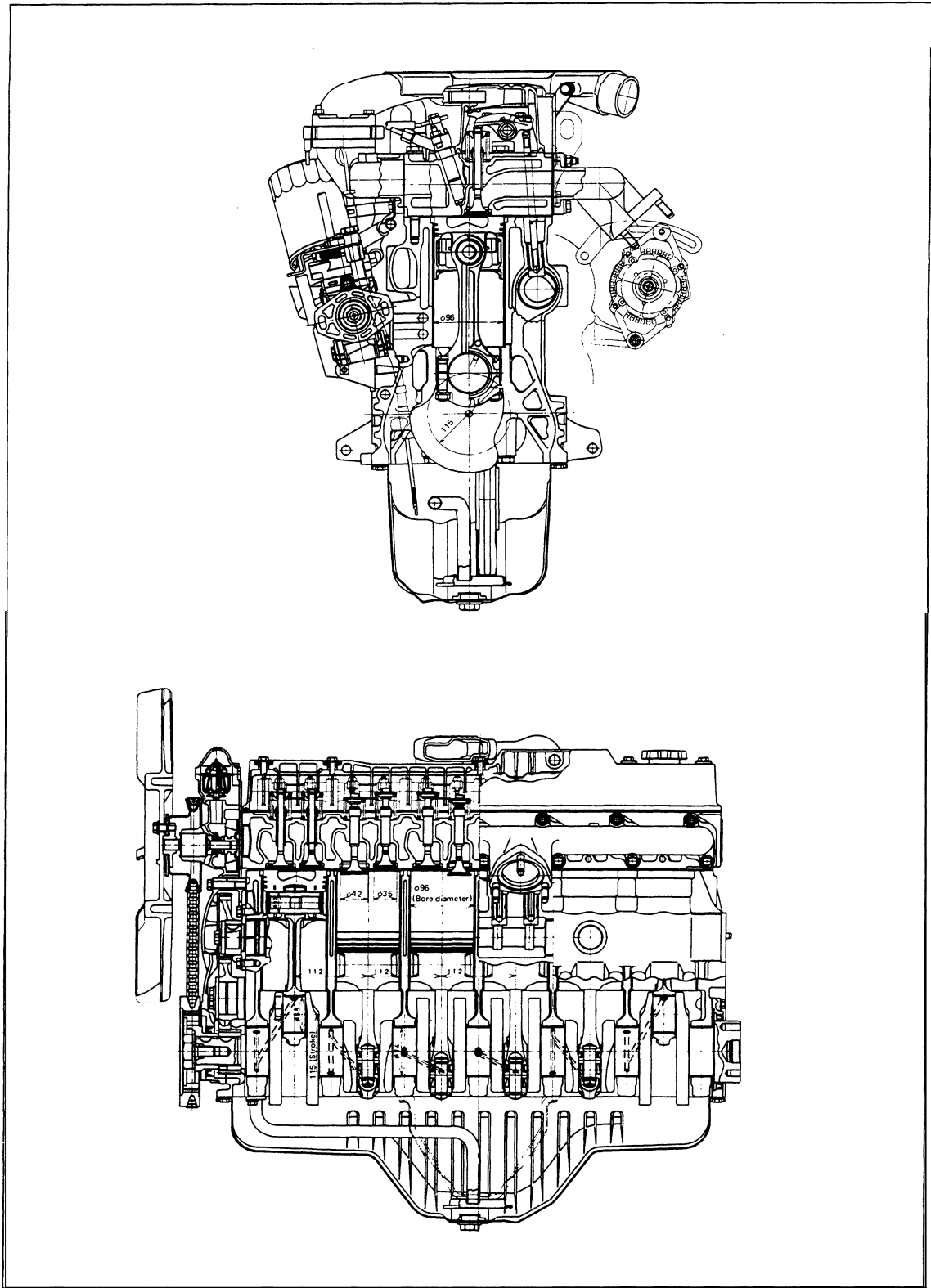


W06E Engine Exterior View

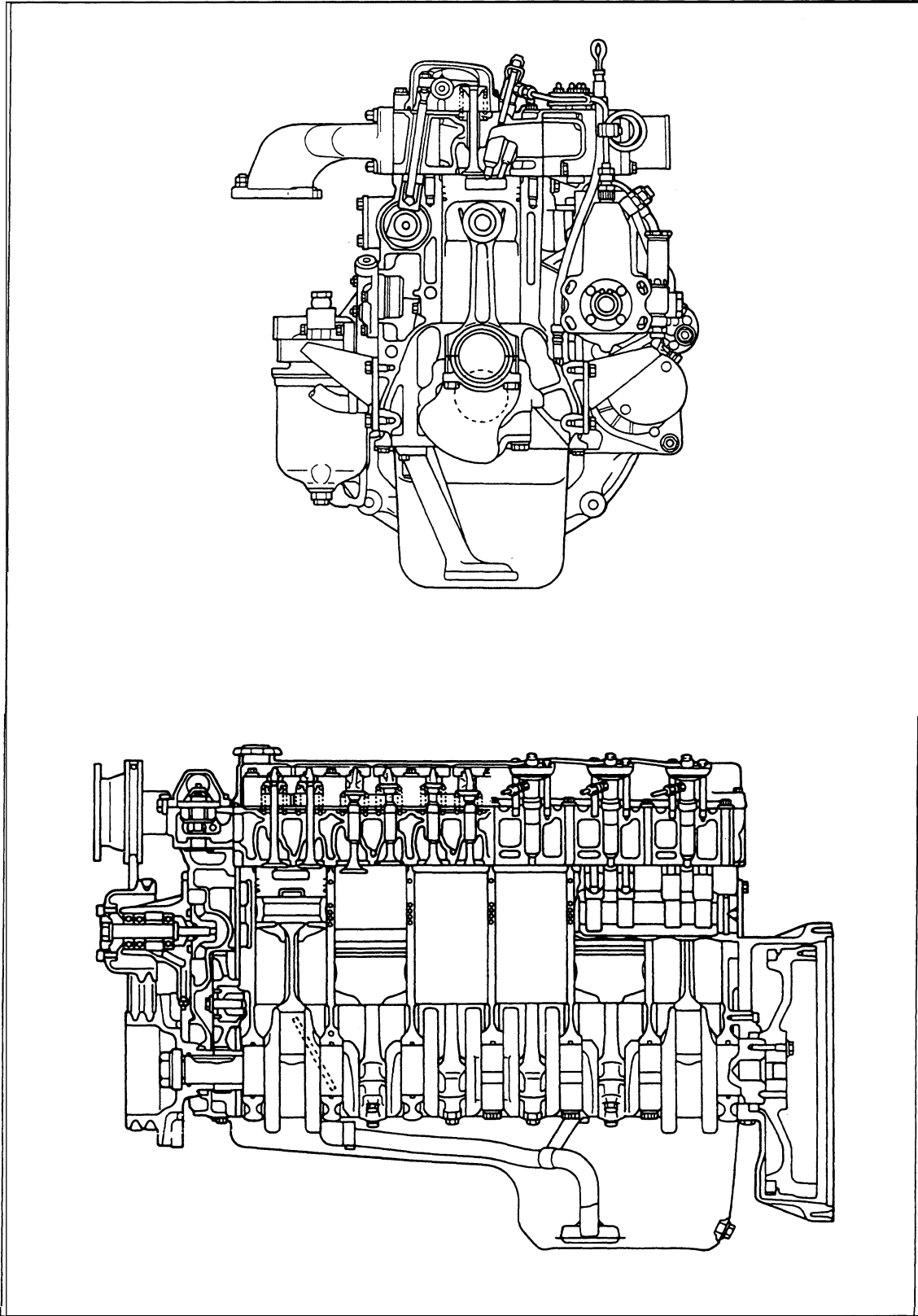


3F Engine Exterior View

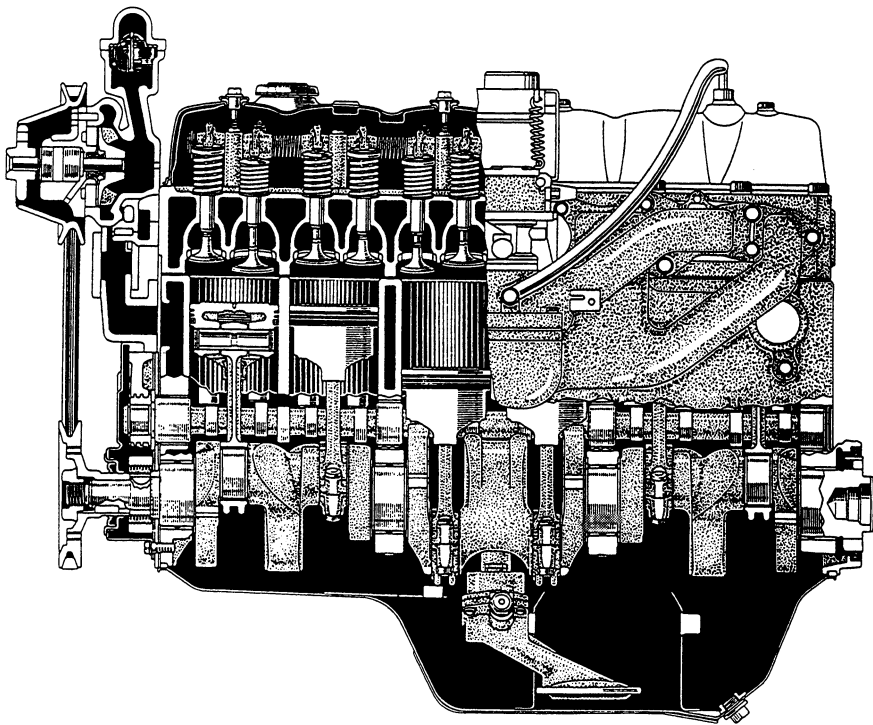
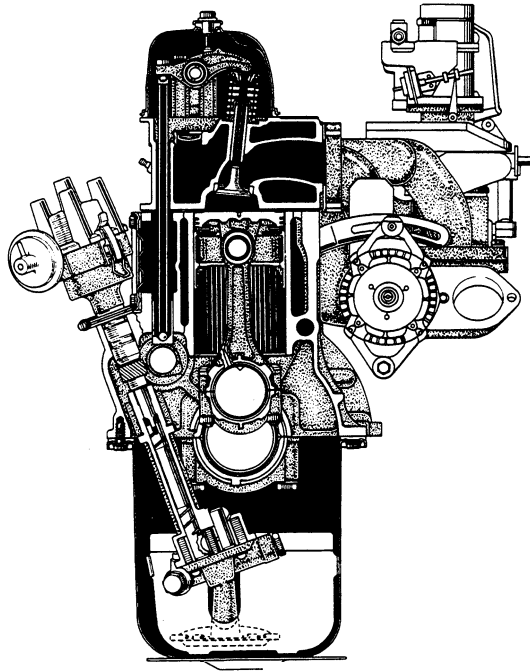
ENGINE SECTIONAL VIEWS



12Z Engine Sectional View

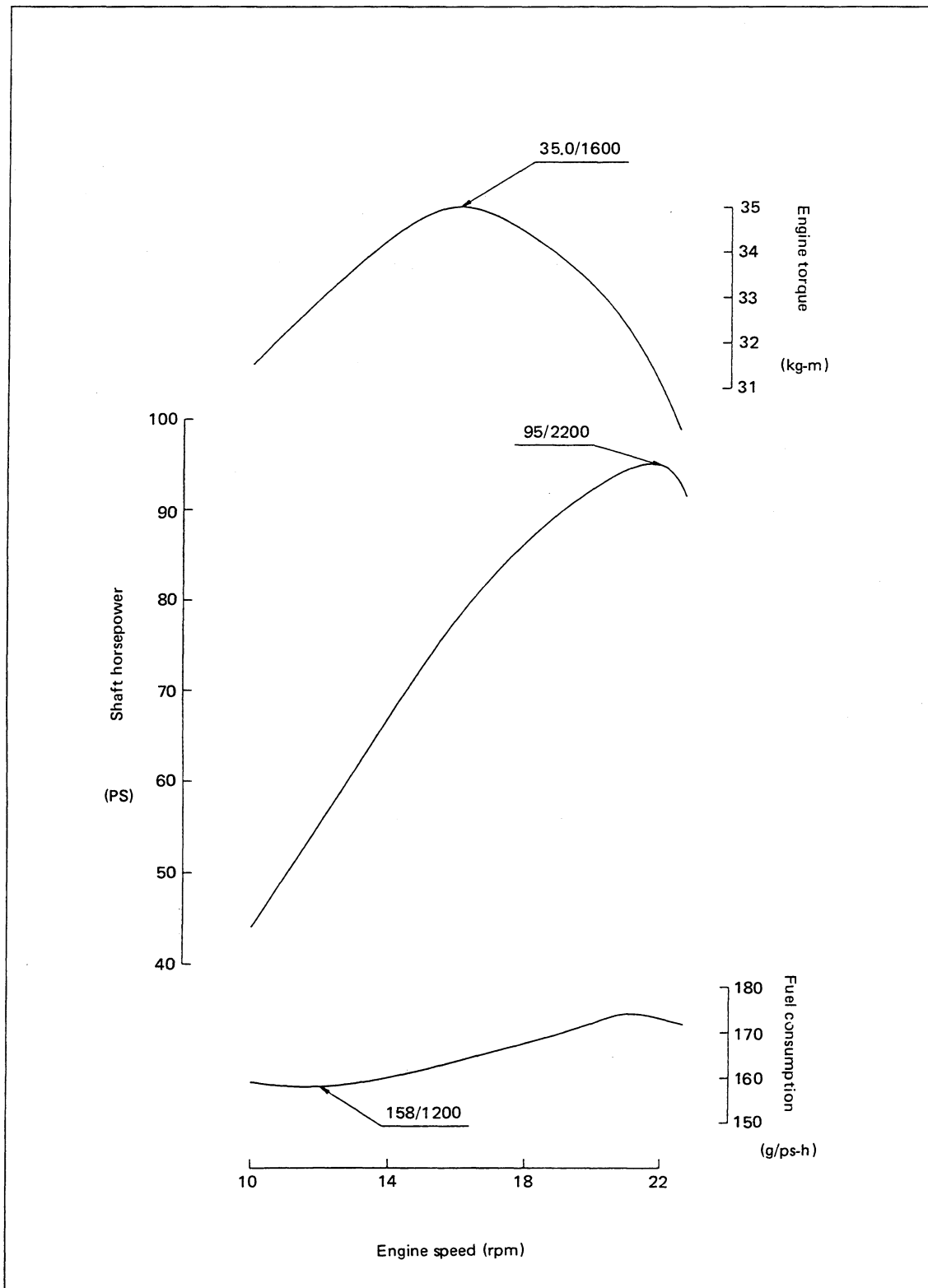


W06E Engine Sectional View

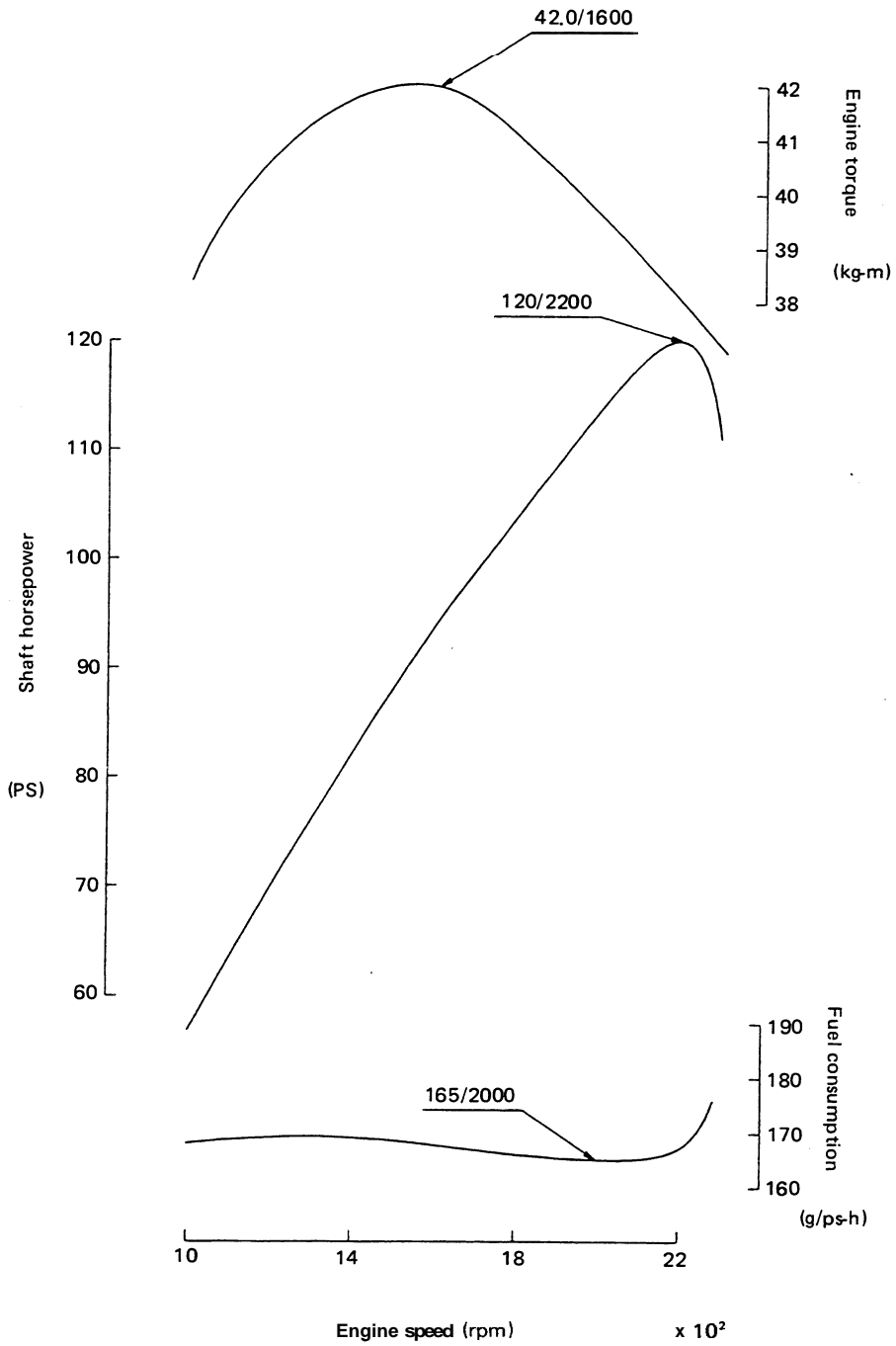


3F Engine Sectional View

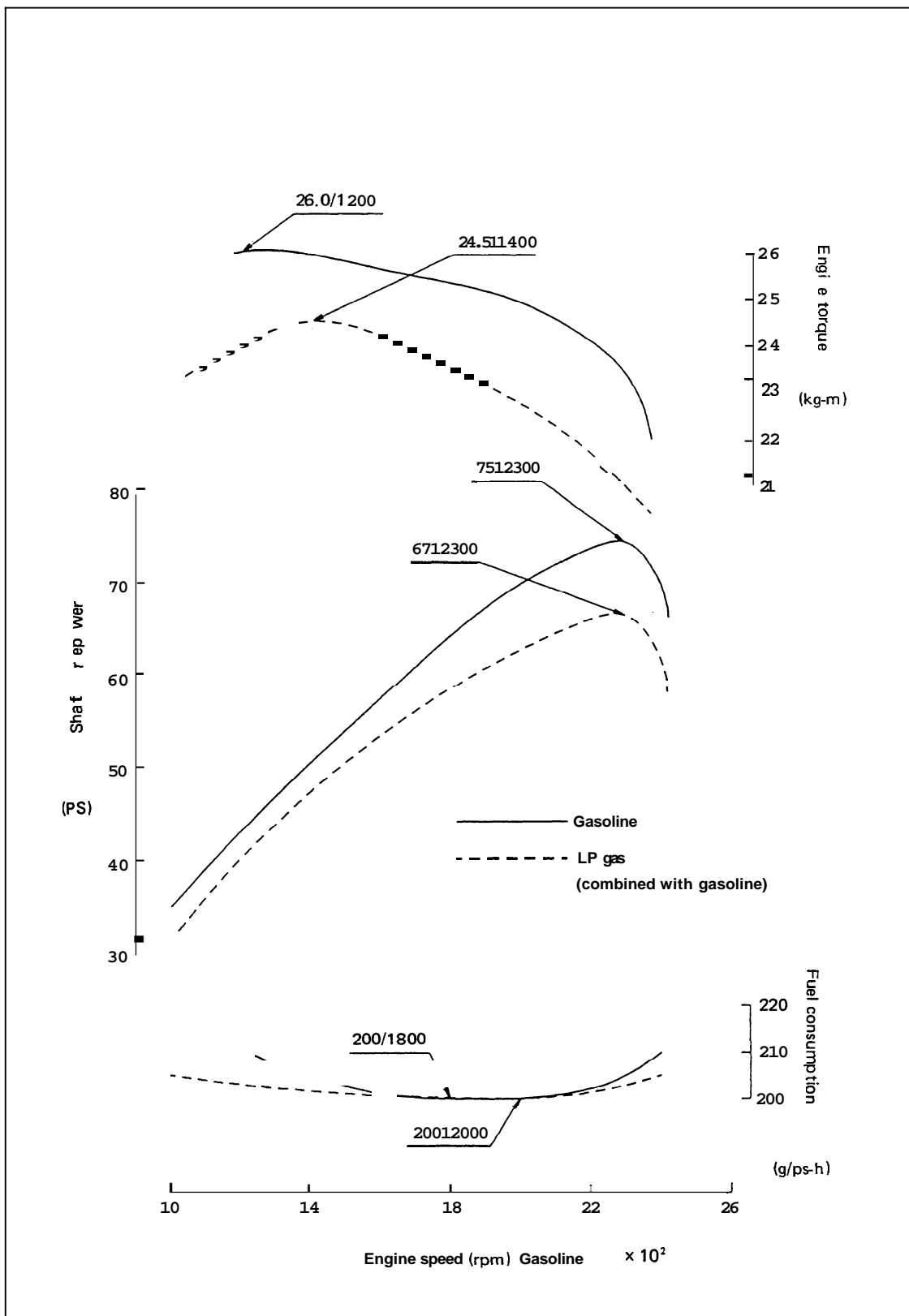
ENGINE PERFORMANCE CURVES



12Z Engine Performance Curves



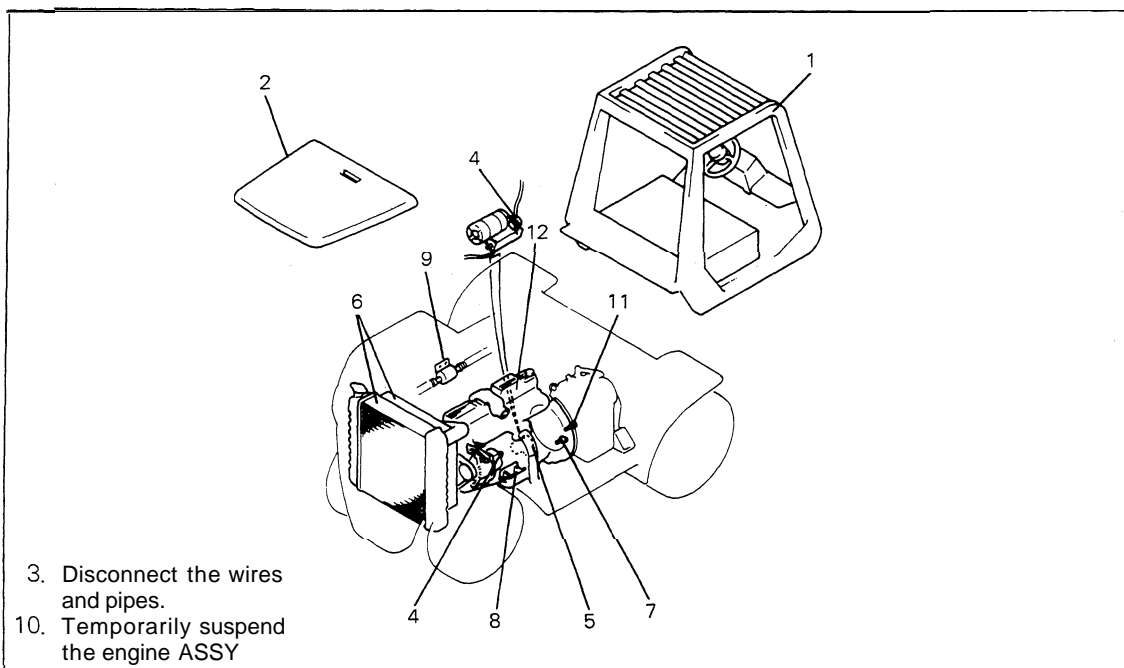
W06E Engine Performance Curves



3F Engine Performance Curves

ENGINE ASSY

REMOVAL . INSTALLATION



Engine ASSY Removal and Installation

Removal Procedure

- 1 Remove the body ASSY. [Point 1]
- 2 Drain coolant.
- 3 Disconnect the wires and fuel pipes from around the injection pump.
(Vehicle with 12Z or W06E engine)
Disconnect the wires and fuel pipes from the carburetor and air governor.
(Vehicle with 3F engine)
- 4 Disconnect the electrical wiring (including bond cable).
- 5 Remove the set bolts (or nuts) from the exhaust pipe flange (on the engine side)
- 6 Remove the radiator ASSY W/fan shroud. [Point 21]
- 7 Remove the torque converter drive plate set bolts. [Point 3]
- 8 Remove the engine mounting set nuts.
- 9 Remove the material handling oil return filter set bolt
- 10 Temporarily suspend the engine ASSY. [Point 41]
- 11 Remove the engine ASSY and torque converter housing set bolts. [Point 51]
- 12 Remove the engine ASSY. [Point 61]

Installation Procedure

The installation procedure is the reverse of the removal procedure

Note:

Operate as follows after installing the engine ASSY.

Air bleeding from fuel circuit (Vehicle with 12Z or W06E engine)

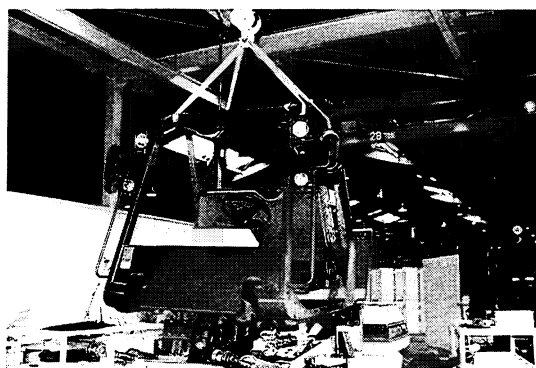
Inspection and adjustment of engine speed

Point Operations

[Point 1]

Removal . Installation:

See the removal section for the body ASSY.



Removing the Body ASSY

[Point 2]

Removal . Installation:

Remove the fan before removing the radiator ASSY W/fan shroud.

Carefully operate so as not to damage the radiator fin.

Installation:

Adjust the fan belt tension after the end of operation.

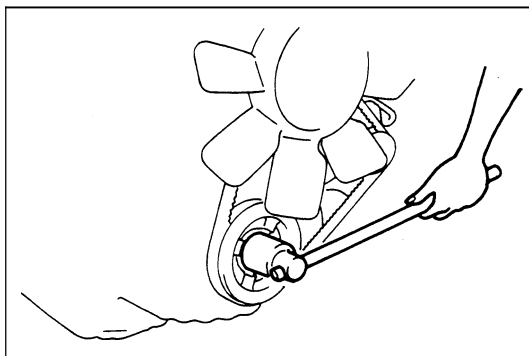


Removing the Fan

[Point 3]

Removal . Installation:

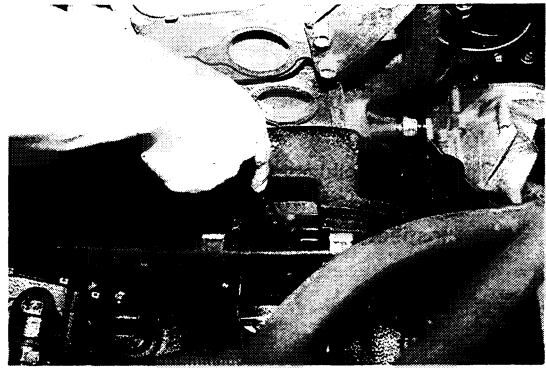
When rotating the torque converter drive plate, rotate the engine crank pulley for easy operation.



Rotating the Crank Pulley

Installation:

Carefully operate so as not to drop set bolts into the housing.



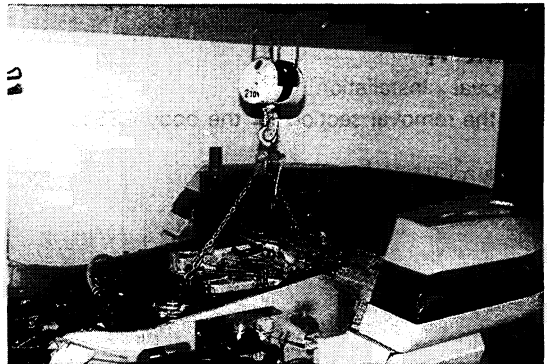
Removing the Set Bolts

[Point 41

Removal:

Temporarily suspend the engine ASSY by using the SST.

SST 09090-04010



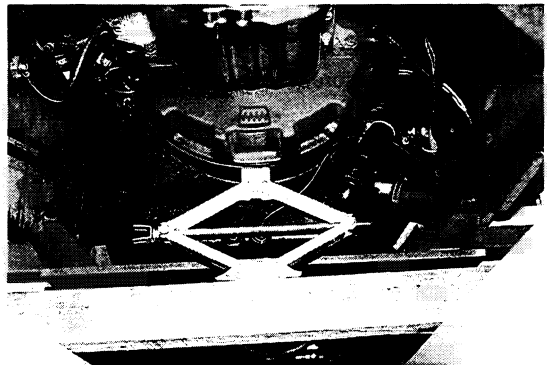
Temporarily Suspending the Engine

[Point 51

Removal . Installation:

Support the torque converter with a pantograph jack.

Alternately raise the engine side with a hoist and the torque converter side with the jack little by little until the engine ASSY is raised by approximately 10 cm (3.94 in) at the engine mount.

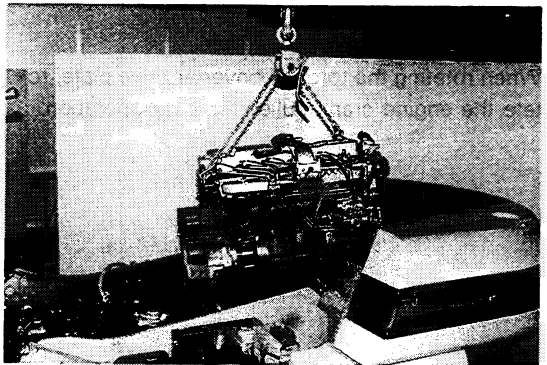


Supporting with a Jack

[Point 61

Removal . Installation:

Remove the engine ASSY after checking no wiring, hose or cable is left unconnected while paying attention to the surrounding area.



Removing the Engine ASSY

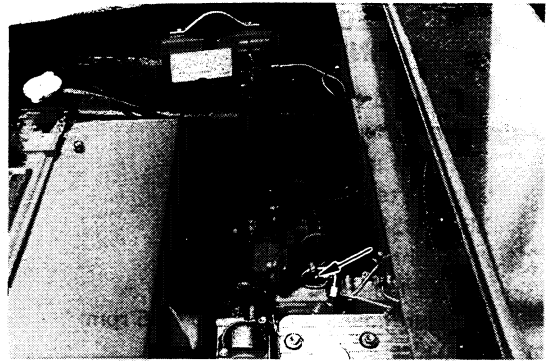
ENGINE SPEED ADJUSTMENT (122 ENGINE)

Idling Speed Inspection and Adjustment

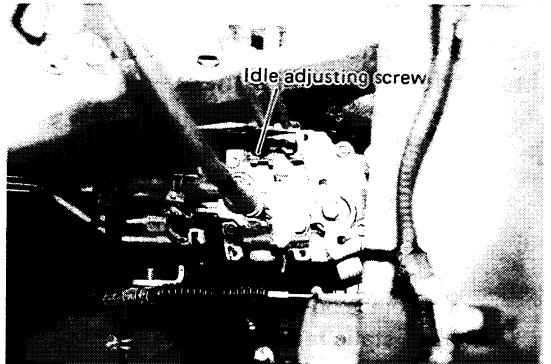
1. Warm up the engine.
Coolant temperature:
75 - 85° (167 - 185°F)
2. Install the engine tachometer.
3. Inspect the idling speed.
Standard idling speed: 750 ± 25 rpm
4. Adjust the idling speed.
 - (1) Loosen the lock nut, and turn the adjusting screw for adjustment.

No-load Static Maximum Speed Inspection and Adjustment

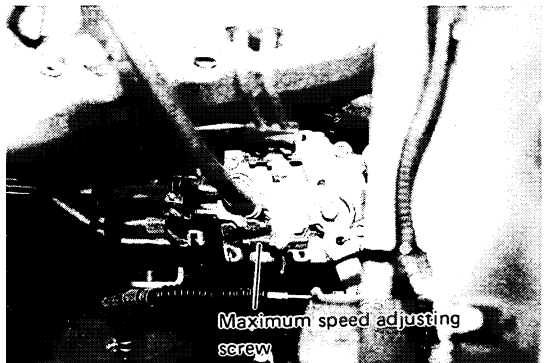
1. Warm up the engine.
Coolant temperature:
75 - 85 (167 - 185°F)
2. Install the engine tachometer.
3. Inspect the no-load static maximum speed.
 - (1) Fully depress the accelerator pedal, and inspect the no-load static maximum speed.
No-load static maximum speed:
2400 ± 50 rpm
4. Adjust the no-load static maximum speed
 - (1) Remove the seal
 - (2) Adjust the no-load static maximum speed by turning the maximum speed adjusting screw
 - (3) Operate the material handling lever when the engine is running at the maximum speed, and measure the engine speed in the full relief state. Confirm that the speed decrease (relief down) is within the limit shown below
Engine speed down at full relief:
Within 250 rpm
 - (4) Seal the adjusting screw after the adjustment.



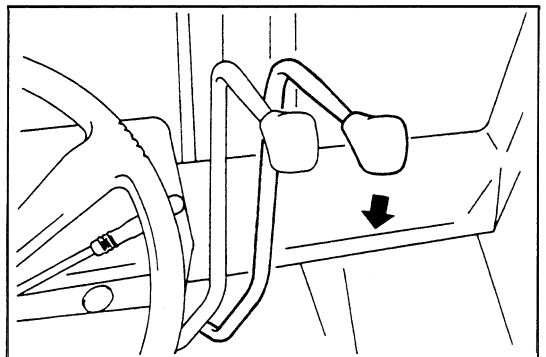
Setting the Engine Tachometer



Adjusting the Idling Speed



Adjusting the Maximum Speed

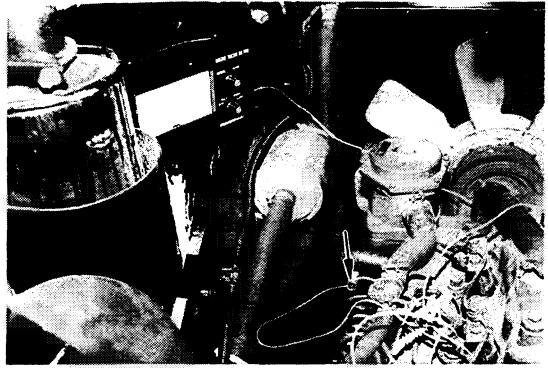


Measuring the Relief Down

ENGINE SPEED ADJUSTMENT (W06E ENGINE)

Idling Speed Inspection and Adjustment

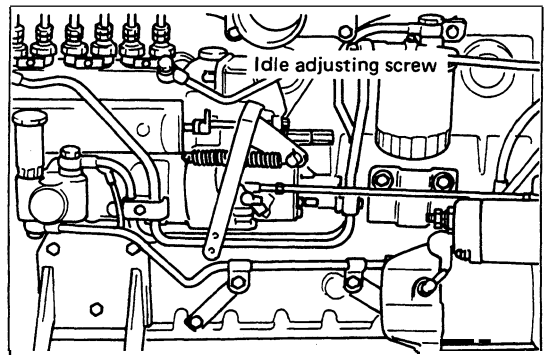
1. Warm up the engine
Coolant temperature:
75 - 85° (167 ~ 185°F)
2. Install the engine tachometer.
3. Inspect the idling speed.
Standard idling speed: 750 ± 25 rpm
4. Adjust the idling speed.
 - (1) Loosen the lock nut, and turn the adjusting screw for adjustment



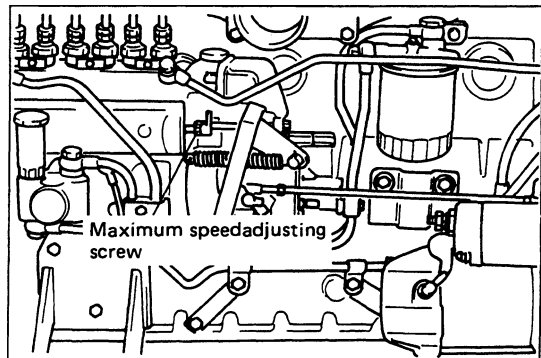
Setting the Engine Tachometer

No-load Static Maximum Speed Inspection and Adjustment

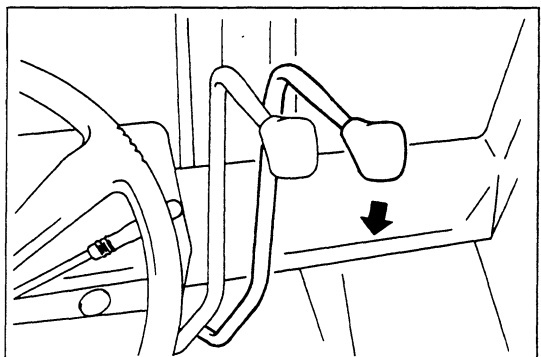
1. Warm up the engine.
Coolant temperature:
75 - 85° (167 ~ 185°F)
2. Install the engine tachometer.
3. Inspect the no-load static maximum speed.
 - (1) Fully depress the accelerator pedal, and inspect the no-load static maximum speed.
No-load static maximum speed:
2400 ± 50 rpm
4. Adjust the no-load static maximum speed.
 - (1) Remove the seal.
 - (2) Adjust the no-load static maximum speed by turning the maximum speed adjusting screw.
 - (3) Operate the material handling lever when the engine is running at the maximum speed, and measure the engine speed in the full relief state. Confirm that the speed decrease (relief down) is within the limit shown below.
Engine speed down at full relief:
Within 250 rpm
 - (4) Seal the adjusting screw after the adjustment.



Adjusting the Idling Speed



Adjusting the Maximum Speed



Measuring the Relief Down



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