

# FOREWORD

This manual covers the service procedures of the TOYOTA FORKLIFT 7FGU/7FDU15 - 32 series and 7FGCU20 - 32 series. Please use this manual for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of October **1999**. 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 Equipment 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 EQUIPMENT 4Y ENGINE  
REPAIR MANUAL (No. CE602-1)

TOYOTA INDUSTRIAL EQUIPMENT 1DZ-II ENGINE  
REPAIR MANUAL (No. CE618-1)

**TOYOTA Material Handling Company**  
A Division of TOYOTA INDUSTRIES CORPORATION

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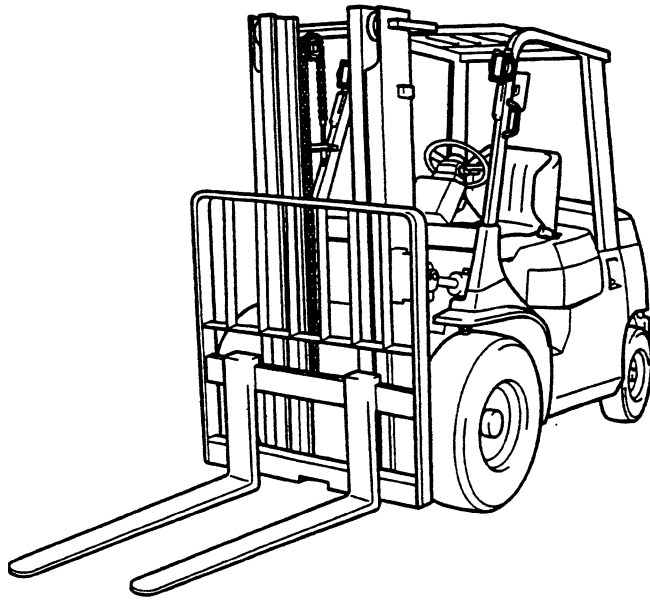
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# GENERAL

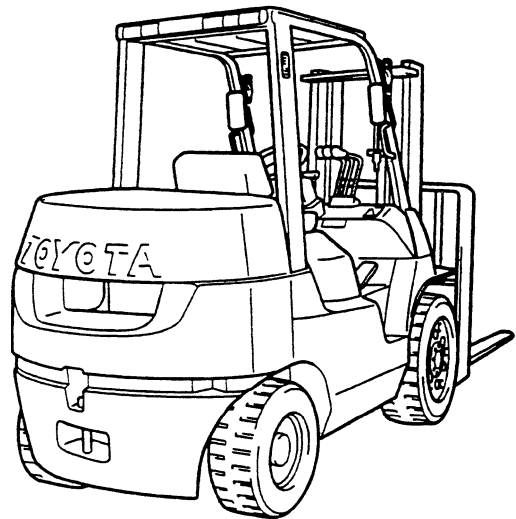
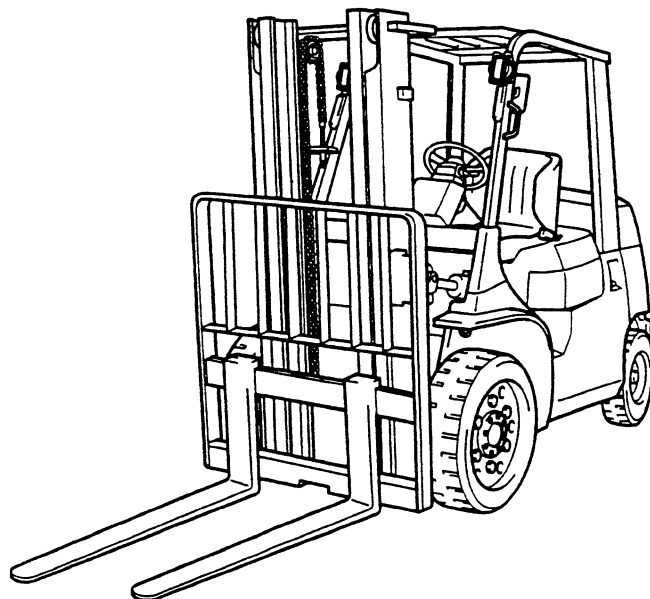
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# EXTERIOR VIEWS

Pneumatic tire model



Cushion tire model



## VEHICLE MODEL

### Pneumatic Tire Models (Pn)

Classification		Load Capacity	Vehicle Model	Transmission Type	Engine	
Series	Model					
Pn1 ton series	Pn15	3000 lbs	7FGU15	T/C	4Y	Gasoline
			7FDU15	T/C	1DZ-II	Diesel
	Pn18	3500 lbs	7FGU18	T/C	4Y	Gasoline
			7FDU18	T/C	1DZ-II	Diesel
Pn2 ton series	Pn20	4000 lbs	7FGU20	T/C	4Y	Gasoline
			7FDU20	T/C	1DZ-II	Diesel
	Pn25	5000 lbs	7FGU25	T/C	4Y	Gasoline
			7FDU25	T/C	1DZ-II	Diesel
Pn3 ton series	Pn30	6000 lbs	7FGU30	T/C	4Y	Gasoline
			7FDU30	T/C	1DZ-II	Diesel
	Pn32	6500 lbs	* 7FGU32	T/C	4Y	Gasoline
			* 7FDU32	T/C	1DZ-II	Diesel

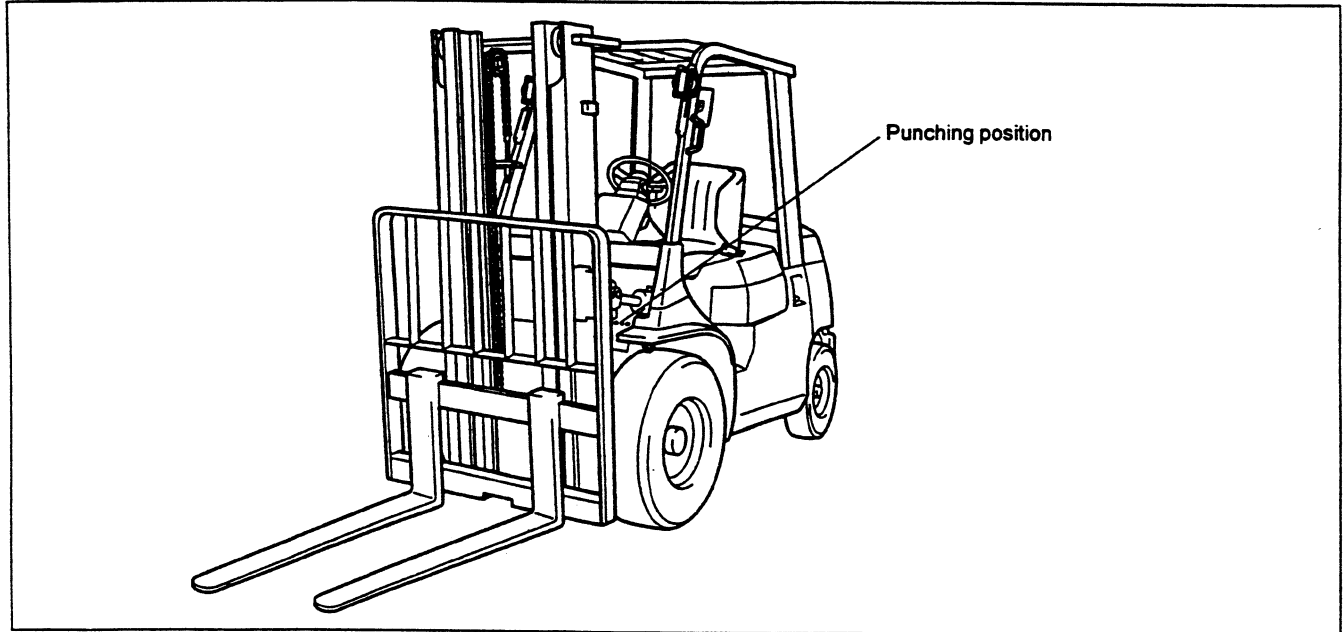
### Cushion Tire Models (Cu)

Classification		Load Capacity	Vehicle Model	Transmission Type	Engine	
Series	Model					
Cu2 ton series	Cu20	4000 lbs	7FGCU20	TIC	4Y	Gasoline
	Cu25	5000 lbs	7FGCU25	TIC	4Y	Gasoline
Cu3 ton series	Cu30	6000 lbs	7FGCU30	TIC	4Y	Gasoline
	Cu32	6500 lbs	* 7FGCU32	TIC	4Y	Gasoline

\*: USA and CANADA Only

## FRAME NUMBER

Frame No. Punching Position



	Series	Engine	Vehicle model	Punching format
Pneumatic tire	1 ton series	4Y	7FGU15	7FGU18 - 60011
			7FGU18	
		1DZ-II	7FDU15	7FDU18 - 60011
			7FDU18	
	2 ton series	4Y	7FGU20	7FGU25 - 60011
			7FGU25	
		1DZ-II	7FDU20	7FDU25 - 60011
			7FDU25	
	3 ton series	4Y	7FGU30	7FGU32 - 60011
			7FGU32	
		1DZ-II	7FDU30	7FDU32 - 60011
			7FDU32	
Cushion tire	2 ton series	4Y	7FGCU20	7FGCU25 - 60011
			7FGCU25	* 7FGCU25 @ 60011
	3 ton series	4Y	7FGCU30	7FGCU32 - 60011
			7FGCU32	* 7FGCU32 @ 60011

\*: EEC spec.

# HOW TO USE 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 illustration.

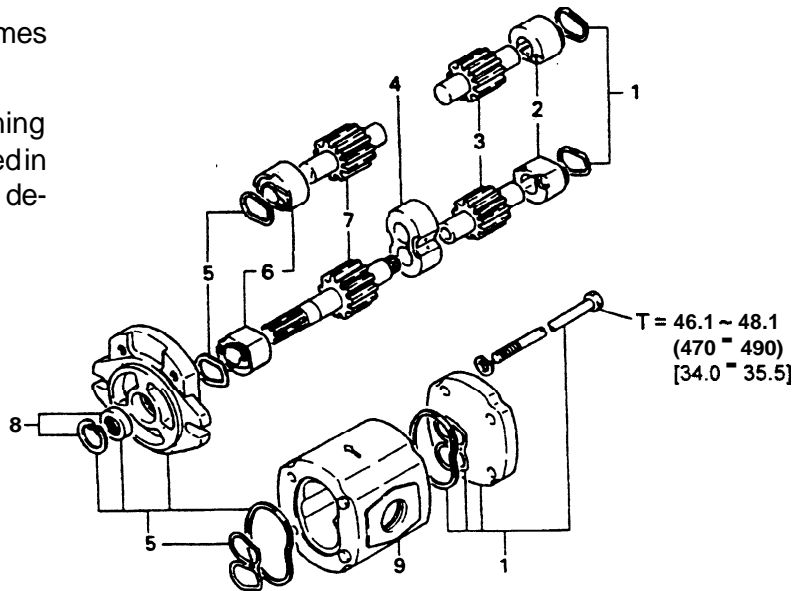
Pattern B: Explanation of operation procedure **by** indicating step numbers in one illustration, followed by explanation of cautions and notes summarized as point operations.

0

Example of description in pattern B

### DISASSEMBLY-INSPECTION-REASSEMBLY Tightening torque unit T = N·m (kgf-cm) [ft-lbf]

- Step Nos. are partially sometimes omitted in illustrations.
- When a part requiring tightening torque instruction is not indicated in the illustration, the part name is described in the illustration frame.



#### Disassembly Procedure

- 1 Remove the cover. [Point 1]
- 2 Remove the bushing [Point 2] ← Operation explained later
- 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]

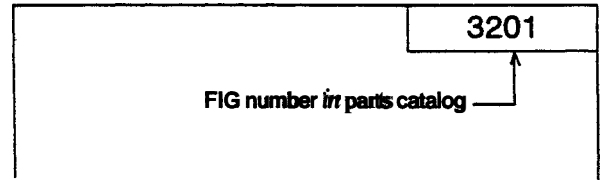
Inspection: Measure the bush inside diameter.

Limit: **19.12 mm (0.7528 in)**

## 2. How to read components figures

- (1) The components figure uses 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 negligence of which may cause physical damage. Be sure to observe them.**

**Note:**

**Important items negligence of which may cause breakage or breakdown. And 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	RH	Right hand
Cu	Cushion tire models	SAE	Society of Automotive Engineers (USA)
LH	Left hand	SAS	System of active <b>stability</b>
LLC	Long life coolant	SST	Special service tool
M/T	Manual transmission	STD	Standard
NMR	No-load maximum <b>speed</b>	T =	Tightening torque
OPT	Option	T/C	Torque converter & transmission
O/S	Oversize	O O T	Number of teeth (O O)
Pn	Pneumatic tire models	U/S	Undersize
PS	Power steering	W/	With
QFV	4-stage mast (Quadruple)	L/	Less

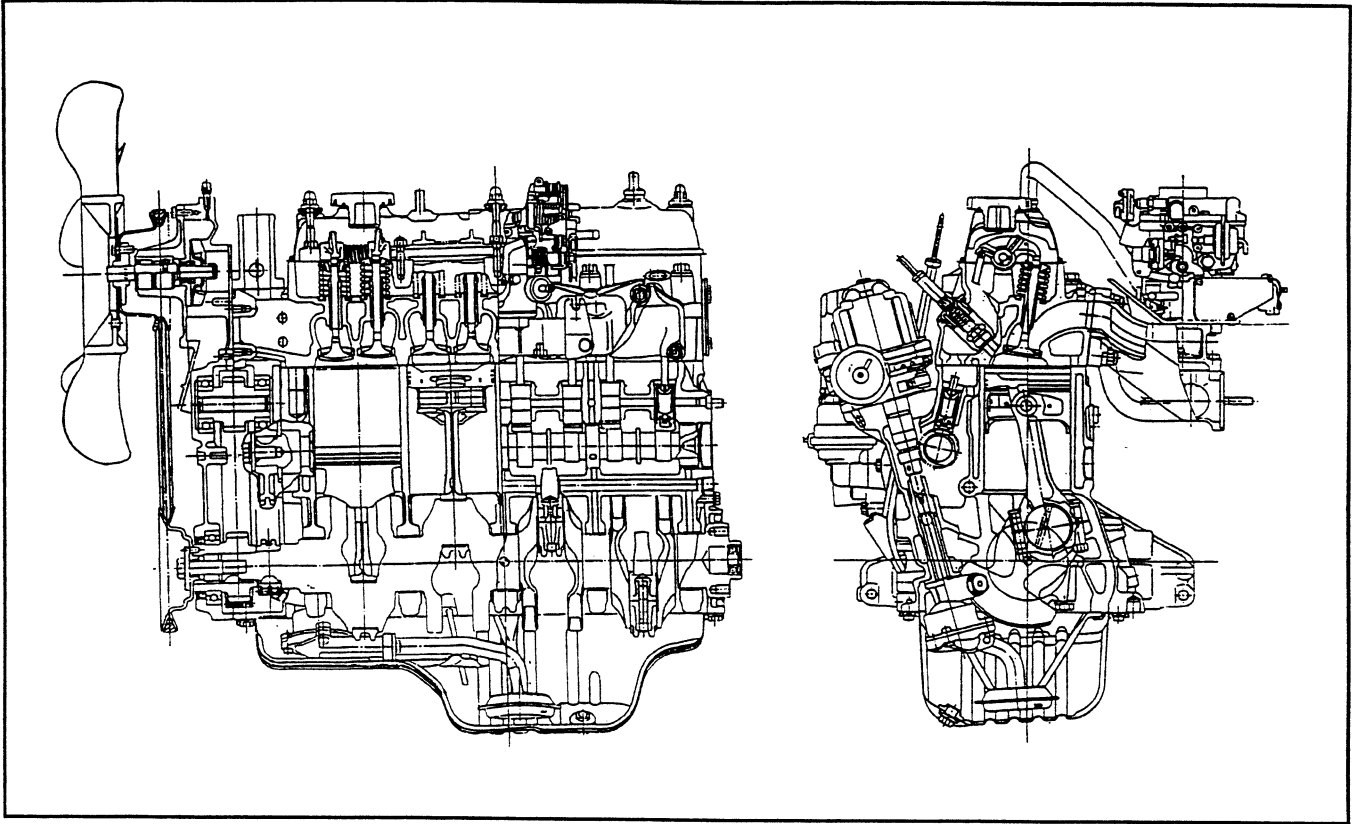


## ENGINE

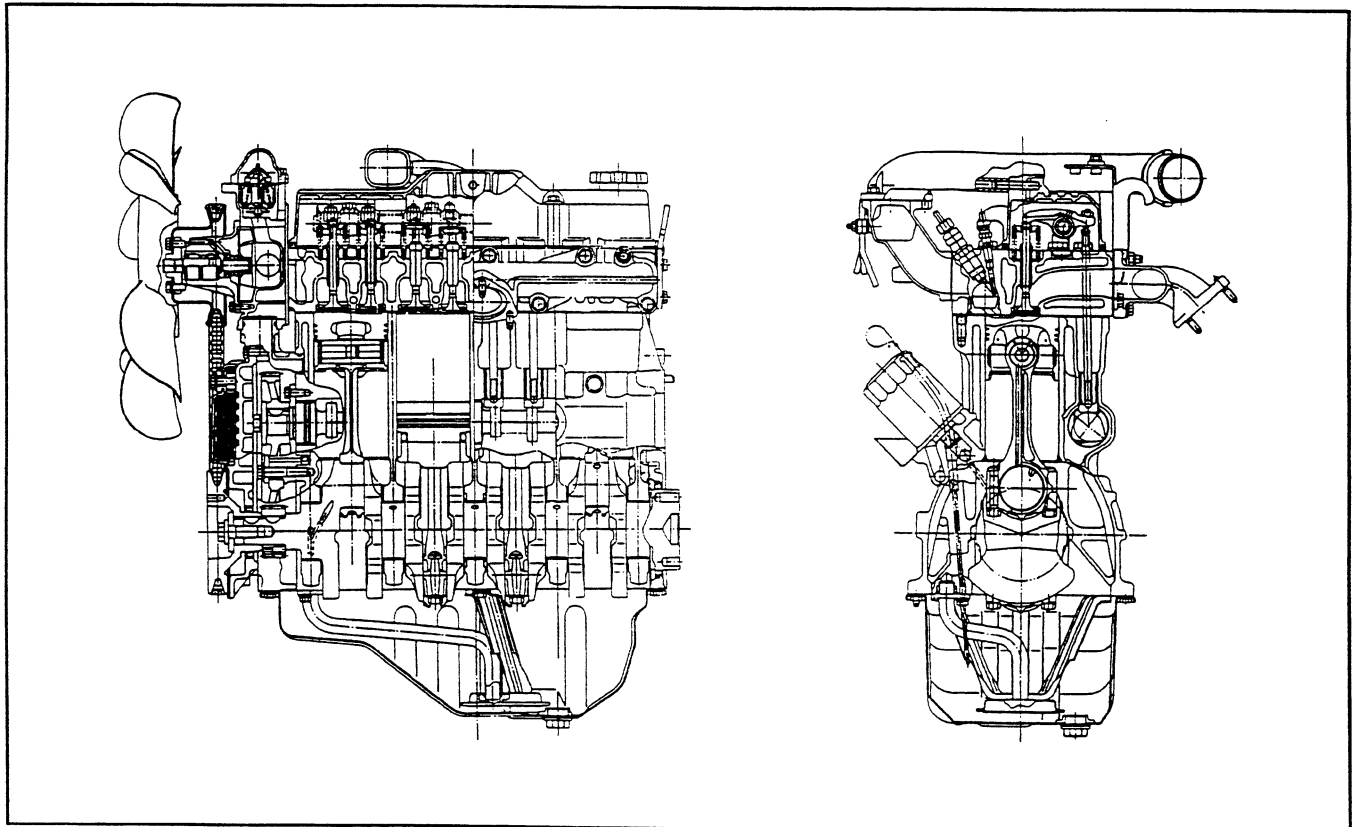
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# ENGINE SECTIONAL VIEWS

## 4Y Engine



## 1DZ-II Engine



## MAJOR SPECIFICATIONS

### Gasoline Engines

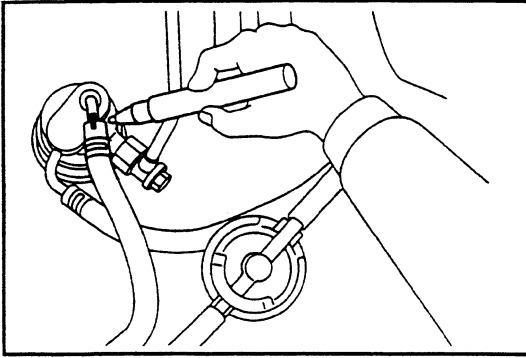
Item	Engine	4Y ( Pn1·2 ton series Cu2·3 ton series )	4Y (Pn3 ton series)
Engine type		Gasoline <b>4-cycle</b>	←
Number of cylinders and arrangement		Inline 4 cylinders longitudinal	←
Combustion chamber type		<b>Wedge type</b>	←
Valve mechanism		<b>OHV·chain-driven</b>	←
Bore x stroke	mm (in)	91.0 x 86.0 (3.583 x 3.386)	←
Total displacement	cm <sup>3</sup> (in <sup>3</sup> )	2237 (136.51)	←
Compression ratio		8.8	←
Maximum power	kW (PS)/rpm	Gasoline :40 (54)/2400 Gasoline/LPG :35 (48)/2400 LPG :37 (50)/2400	Gasoline :43 (58)/2600 Gasoline/LPG :38 (52)/2600 LPG :40 (54)/2600
Maximum torque	N·m (kgf-m)/rpm	Gasoline :162 (16.5)/1800 Gasoline/LPG :147 (15.0)/1600 LPG :157 (16.0)/1800	←
Minimum specific fuel consumption	g/kW-h (g/PS-h)/rpm	Gasoline :272 (200)/2300 Gasoline/LPG :258 (190)/2400 LPG :252 (185)/2400	←
Service weight	kg (lb)	134 (295)	←
No-load maximum rpm	rpm	2600	2800

### Diesel Engines

Item	Engine	1DZ-11 (Pn1 ton series)	1DZ-II (Pn2·3 ton series)
Engine type		Diesel 4-cycle	←
Number of cylinders and arrangement		Inline 4 cylinders longitudinal	←
Combustion chamber type		Whirl chamber type	←
Valve mechanism		OHV-geardriven	←
Bore x stroke	mm (in)	86.0 x 107.0 (3.386 x 4.213)	←
Total displacement	cm <sup>3</sup> (in <sup>3</sup> )	2486 (151.71)	←
Compression ratio		21.5	←
Maximum power	kW (PS)/rpm	40 (55)/2400	44 (60)/2600
Maximum torque	N·m (kgf-m)/rpm	167 (17.0)/1600	←
Minimum specific fuel consumption	g/kW-h (g/PS-h)/rpm	252 (185)/1400	←
Service weight	kg (lb)	162 (357)	←
No-load maximum rpm	rpm	2600	2800

Note:

For **2·3** ton series **1DZ-II** models equipped with vehicle speed control system (OPT), the spec. figures and performance curve are same with those of **1** ton series **1DZ-II** models.

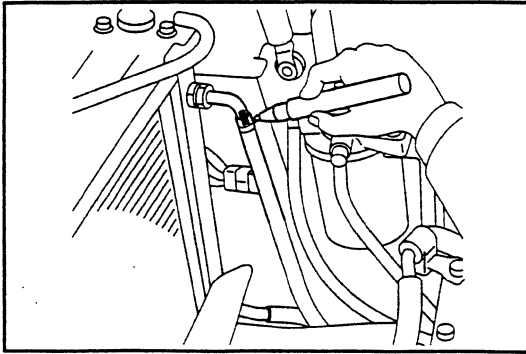


## Point Operations

### [Point 1]

Removal:

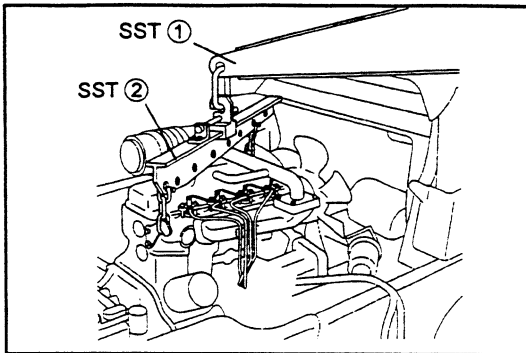
Put a match marks on the fuel hose and the coupler.



### [Point 2]

Removal:

Put a match mark on the radiator and torque converter cooler hose.

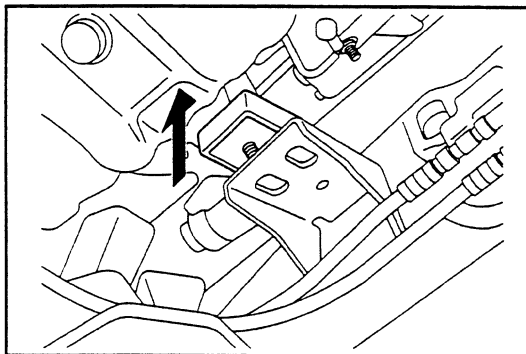


### [Point 3]

Removal-Installation:

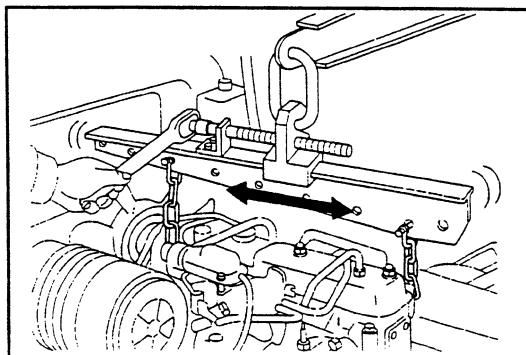
SST 09010-20111-71 — ①

09010-23320-71 --②



Removal:

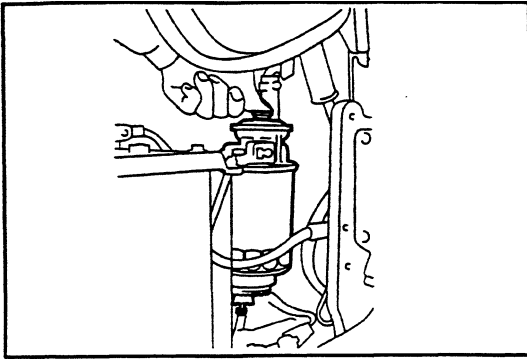
Tentatively hoist up until the mounting bolt completely comes out from the hole in the frame.



### [Point 4]

Removal:

Use a straight-edge screwdriver for separation. If the fitting is too tight, change the SST hook position and adjust the engine angle for easier separation.



## AIR BLEEDING FROM FUEL SYSTEM (DIESEL VEHICLE)

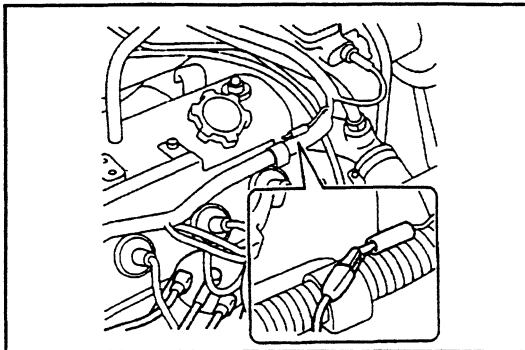
1. Operate the hand pump of the fuel filter until the pump operating force becomes heavy.

## ENGINE SPEED INSPECTION AND ADJUSTMENT

### Note:

Warm up the engine, set the vehicle to the following conditions, and conduct inspection and adjustment.

Coolant temperature: **80°C (176°F)** or more, engine oil: **70°C (158°F)** or more, operating oil temperature: **50°C (122°F)** or more, auto choke in release state (4Y engine)

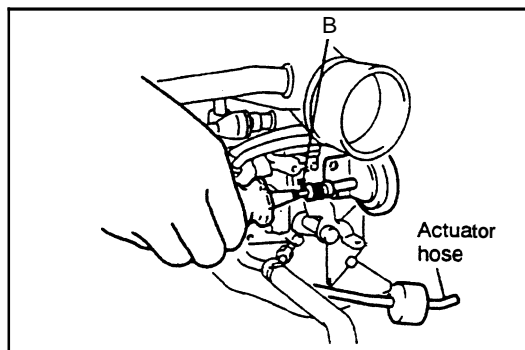


### 4Y ENGINE

Idling speed and idle up speed inspection and adjustment

<Gasoline Vehicle>

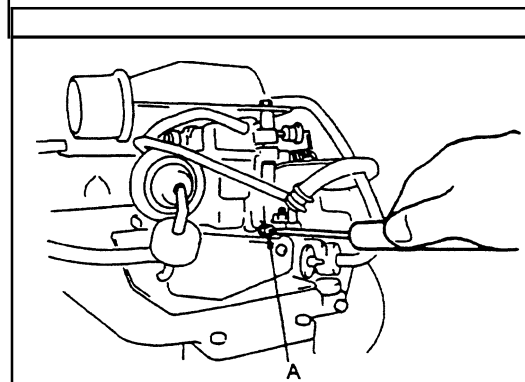
1. Install the engine speedometer.



2. Disconnect the idle up actuator and inspect the idle up speed.

Standard: 1000 a 30 rpm

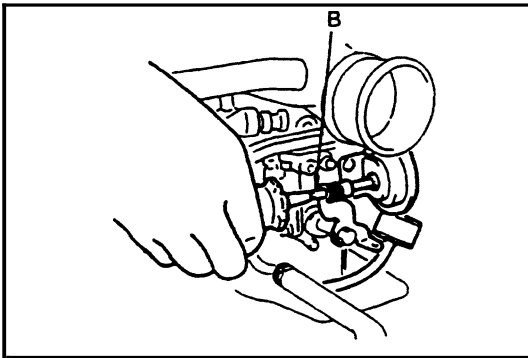
3. If the measured value is out of the specified range, adjust by turning adjusting screw B.
4. Connect the idle up actuator.



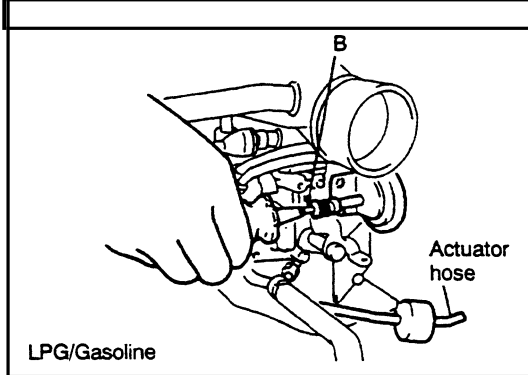
5. Check the idling speed.

Standard: 800  $\pm$  50 rpm

6. If the measured value is out of the specified range, adjust by adjusting screw A.
7. If the speed is still higher after adjustment in 3 above, adjust using the following procedure:



- (1) If the auto choke **cam** is contacting although the coolant temperature is as specified above, replace the auto choke.
- (2) If the idle up actuator rod and adjusting screw **B** are in contact with each other, turn adjusting screw **B** counterclockwise.



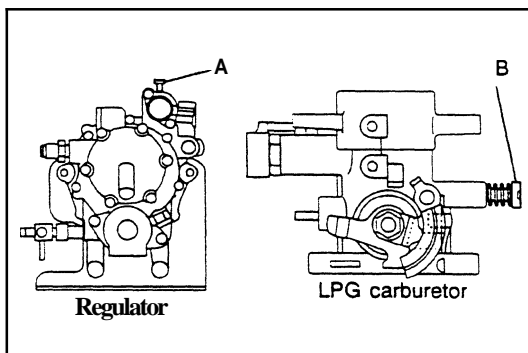
<LPG/Gasoline or LPG>

1. Install the engine speedometer.
2. Disconnect the idle up actuator and inspect the idle up speed.  
Standard:  
**LPG/Gasoline: 1000 ± 30 rpm**

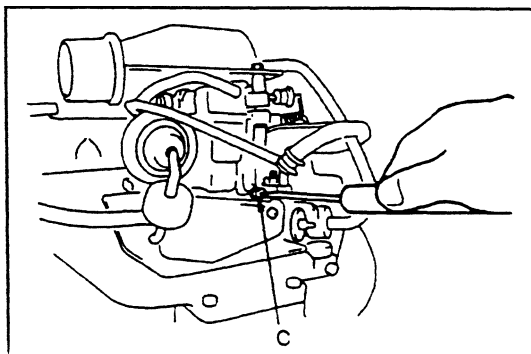
3. Check the idling speed.

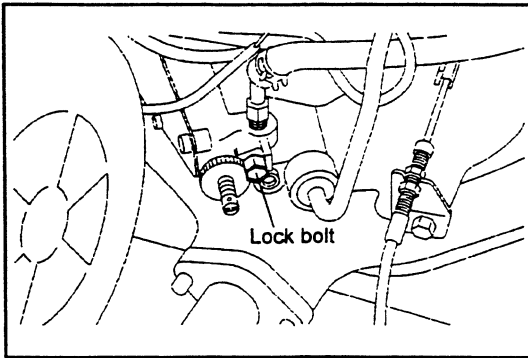
Standard:

**LPG/Gasoline: 800 ±<sup>50</sup><sub>0</sub> rpm**  
**LPG: 800 ±<sup>50</sup><sub>0</sub> rpm**



4. If the measured value is out of the specified range, make adjustment according to the following procedure:
  - (1) Make adjustment by turning adjusting screw **B** (LPG vehicle) or **C** (LPG/gasoline vehicle). (If less than the standard, turn adjusting screw **A** counterclockwise beforehand.)
  - (2) Slowly turn adjusting screw **A** clockwise or counterclockwise until the maximum speed is obtained.
  - (3) Determine the positions of adjusting screws **B** and **C** by repeating steps (1) and (2) until the value obtained in step (2) satisfies the standard.
  - (4) Slowly turn adjusting screw **A** clockwise until the CO concentration becomes 2 to 3%, and then turn it **45** degrees counterclockwise from the position where the speed begins to drop.





### No-load Maximum Speed Inspection-Adjustment <Gasoline, LPG or LPG/Gasoline Vehicle>

1. Install the engine speedometer.
2. Inspect and adjust the no-load static maximum speed.
  - (1) Measure the speed when the accelerator pedal is fully depressed.

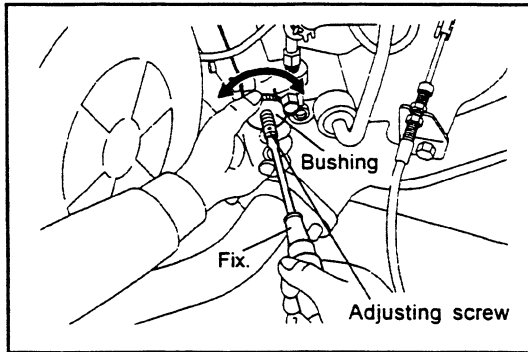
**Standard:**

**4Y engine:**

**Pn1-2 ton series: ..... 2600 ± 50 rpm**

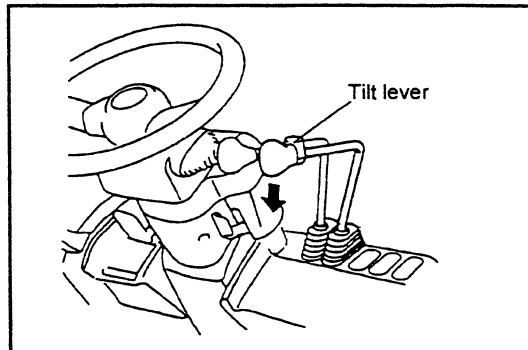
**Cu2-3 ton series: ..... 2600 ± 50 rpm**

**Pn3 ton series: ..... 2800 ± 50 rpm**



- (2) If the measured value does not satisfy the standard, make adjustment as follows:

- ① Remove the seal and loosen the lock bolt.
- ② Fully depress the accelerator pedal.
- ③ Turn the bushing for adjustment, while holding the adjusting screw of the air governor immovable with a straight-edge screwdriver.



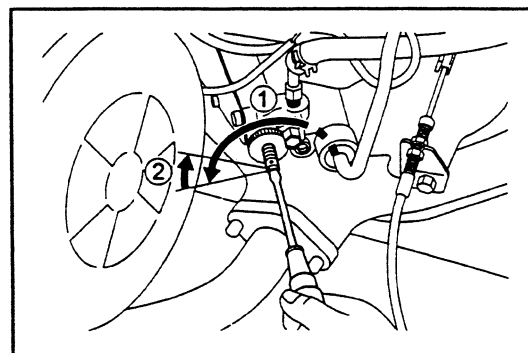
3. Check and adjust relief down.

- (1) Operate the tilt lever fully backward with the engine running at the maximum speed, and measure the decrease in speed (relief down) upon full relief.

**Standard: Within 300 rpm**

- (2) If the measured value is out of the standard range, make adjustment according to the following procedure:

- ① Turn the adjusting screw counterclockwise to decrease relief down.
- ② Return the screw by 1/10 of a turn to eliminate twisting of the spring in the air governor.
- ③ Adjust the no-load maximum speed.
- ④ Repeat steps ①, ② and ③ until the measured value satisfies the standard.

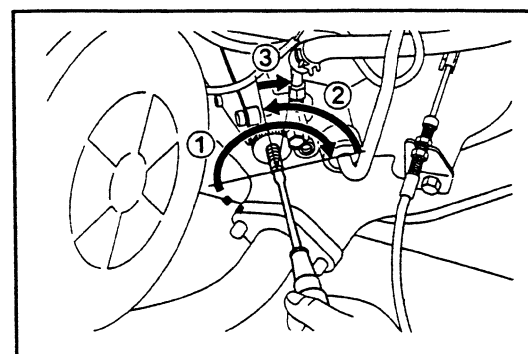


4. Check and adjust hunting.

- (1) Check for hunting upon tilt relief at the no-load maximum speed.

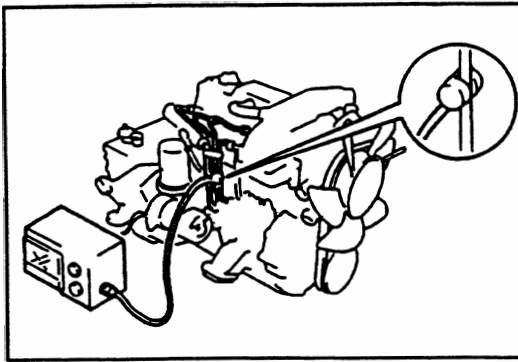
- (2) If hunting occurs a few times or more, make adjustment according to the following procedure:

- ① Turn the adjusting screw clockwise by 1/2 of a turn or more.
- ② Return the screw counterclockwise by 1/4 of a turn.
- ③ **Finally, turn it by 1/10 of a turn to eliminate twisting of the spring in the air governor.**
- ④ Adjust the no-load maximum speed.
- ⑤ Repeat steps ① through ④ until hunting occurs no more.



5. Repeat adjustments in steps 2 to 4 until respective standards are satisfied.

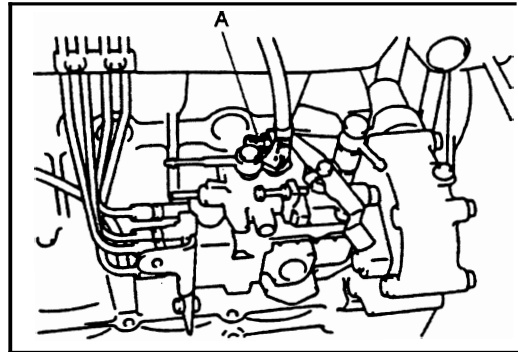
6. Seal the lock bolt.



## 1DZ-II ENGINE

### Idle Speed Inspection·Adjustment

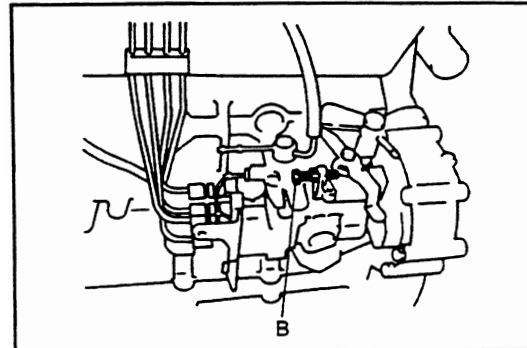
1. Install the engine speedometer.



2. Check the idle speed.

**Standard: 750 ± 25 rpm**

3. If the measured value is out of the standard, loosen the lock nut and make adjustment by turning adjusting screw A.



### No-load Maximum Speed Inspection·Adjustment

1. Install the engine speedometer.
2. Inspect and adjust the no-load maximum speed.
  - (1) Measure the speed when the accelerator pedal is fully depressed.

**Standard:**

**1DZ-II engine:**

**1 ton series: ..... 2600 ± 50 rpm**

**Vehicle speed control**

**system spec.: ..... 2600 ± 50 rpm**

**2·3 ton series: ..... 2800 ± 50 rpm**

- (2) If the measured value does not satisfy the standard, make adjustment as follows:

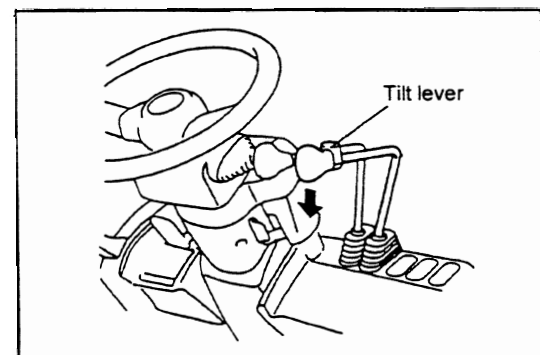
① Remove the seal and loosen the lock nut.

② Make adjustment by turning adjusting screw B.

3. Check and adjust relief down.

- (1) Operate the tilt lever fully backward with the engine running at the maximum speed and measure the decrease in speed (relief down) upon full relief.

**Standard: Within 200 rpm**



4. Seal the adjusting screws after the end of adjustment.

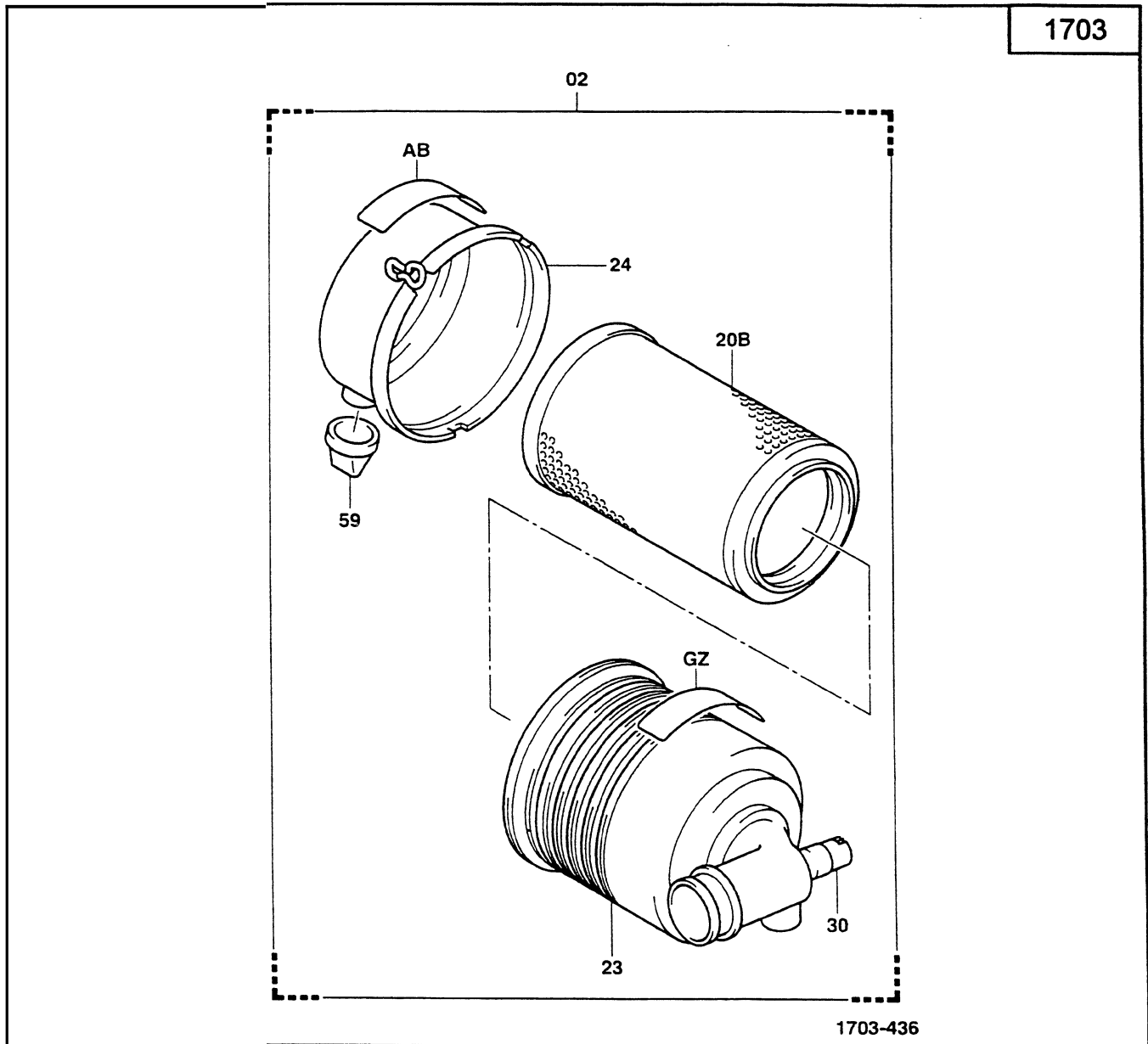


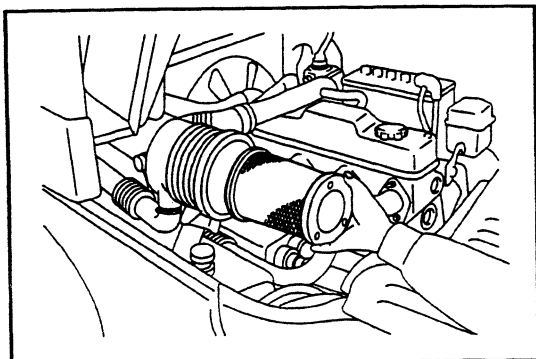
# AIR CLEANER

## SPECIFICATIONS

	Single (STD)	Double (OPT)
Type	Cyclone type	←
Size	7-inch	←
Intake type	Fresh air introduction type	←
Filtering area	cm <sup>2</sup> (in <sup>2</sup> )	18600 (2883)
		Outer: 18600 (2883) Inner: 510 (79.1)
Others	With evacuator valve	←

## COMPONENTS



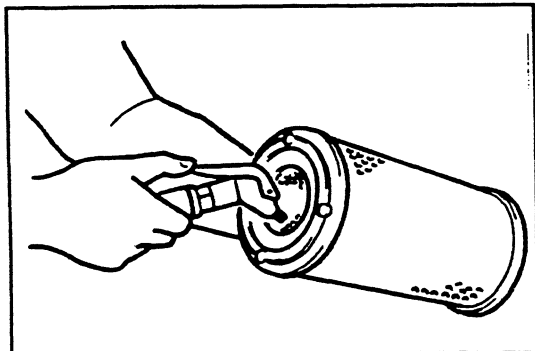


## AIR CLEANER CLEANING-INSPECTION

1. Open the engine hood.
2. Remove the element.

Note:

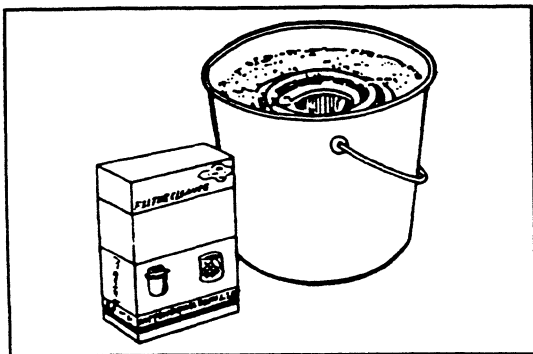
In case of the double element type (**OPT**), do not remove the inner element for other than replacement.



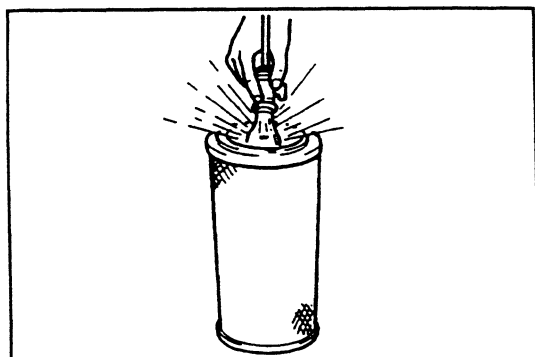
3. Clean the element.
  - (1) For ordinary cleaning, blow with compressed air [**690 kPa** ( $7\text{kgf/cm}^2$ ) [**100 psi**] or less] vertically along the pleats from the inside of the element. If heavily contaminated, washing is possible.
  - (2) Element washing method  
Dissolve neutral detergent in tepid water (approx.  $40^\circ\text{C}$  ( $104^\circ\text{F}$ )) and immerse the element in it for about 30 minutes. Then, rinse the element well with clear water. [Water pressure: **275 kPa** ( $2.8\text{kgf/cm}^2$ ) [**40 psi**] or less]  
After washing, naturally dry the element or dry the element with a dryer (cold air).

Note:

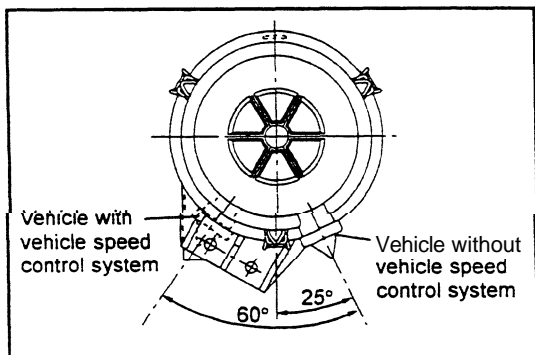
- Do not damage the element during washing.
- Never use compressed air or hot air for drying.



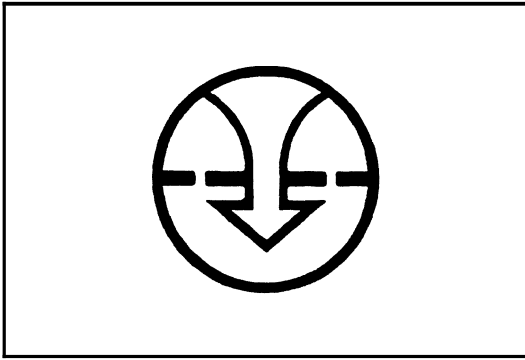
4. Clean the evacuator valve (dust discharge valve).
  - (1) Hold the tip end of the evacuator valve and discharge dust and dirt from the inside of the valve.



5. Inspect the element.
  - (1) After cleaning, place an electric bulb in the element to inspect any damage in the element. If any pinhole, tear or damage is found, replace it with a new element.
6. Element replacement  
Replace the element after it is washed six times or generally at intervals of 12 months.



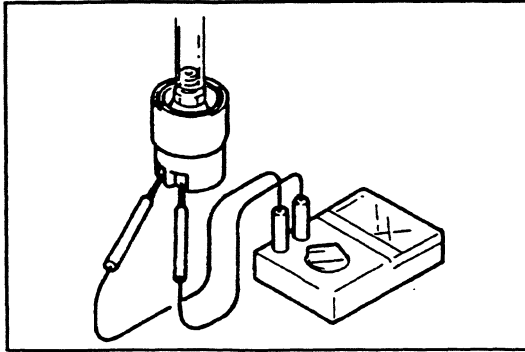
7. Install the element.
  - (1) Install the evacuator valve in the illustrated direction.



## CLOGGING WARNING SYSTEM INSPECTION

### 1. Warning lamp inspection

- (1) See that the air cleaner warning lamp comes on when the ignition switch is turned ON and goes out when the engine starts.



### 2. Individual inspection

- (1) Use a mity vac to apply a negative pressure to the vacuum switch, and inspect conduction.

#### Standard

#### Gasoline models:

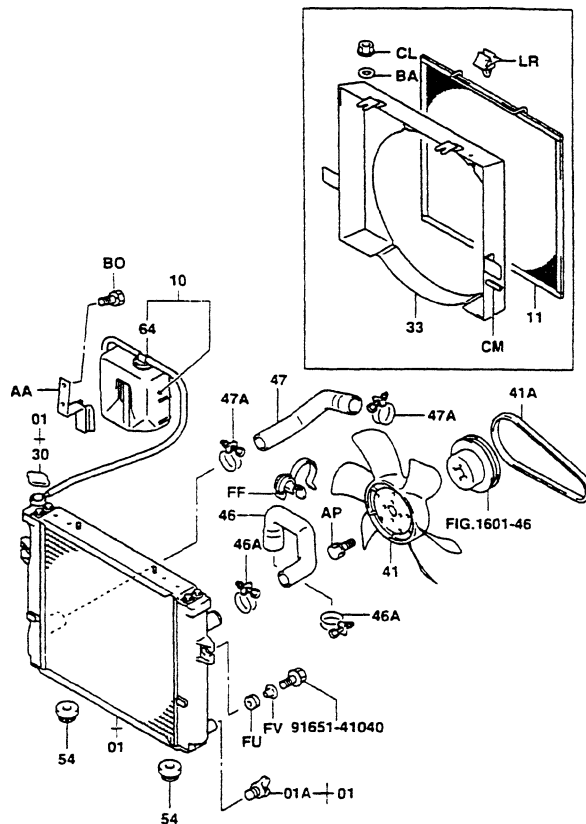
2942 ± 294 Pa (300 ± 30 mm H<sub>2</sub>O)  
 (22.1 ± 2.2 mmHg) [11.81 ± 1.18 in H<sub>2</sub>O]  
 [0.870 ± 0.087 in Hg]: Conduction

#### Diesel models:

7473 ± 569 Pa (762 ± 58 mm H<sub>2</sub>O)  
 (56.0 ± 4.3 mmHg) [30.00 ± 2.28 in H<sub>2</sub>O]  
 [2.205 ± 0.169 in Hg]: Conduction

## RADIATOR COMPONENTS

1603



1603-348A

## SPECIFICATIONS

Type		Crossflow
Fin type		Corrugated fin
Coolant capacity (in radiator)		See the table below
Cap opening pressure	kPa (kgf/cm <sup>2</sup> ) [psi]	88 ± 14.7 (0.9 ± 0.15) [13 ± 2.1]
Others		Built in torque converter cooler

## COOLANT CAPACIN AND ANTIFREEZE TABLE

Unit: ℓ (US gal)

		Radiator capacity	Total amount of coolant	LLC mixing ratio at 30% (to -15°C (5°F))	LLC mixing ratio at 50% (to -35°C (-31°F))	Antirust mixing at 5%
Pn1 ton series	4Y	2.7 (0.71)	8.5 (2.24)	2.6 (0.69)	4.3 (1.14)	0.4 (0.11)
	1DZ-II	2.7 (0.71)	8.5 (2.24)	2.6 (0.69)	4.3 (1.14)	0.4 (0.11)
Pn2-3 ton series	4Y	3.7 (0.98)	9.6 (2.53)	2.9 (0.77)	4.8 (1.27)	0.5 (0.13)
	1DZ-II	3.7 (0.98)	9.6 (2.53)	2.9 (0.77)	4.8 (1.27)	0.5 (0.13)
Cu2-3 ton series	4Y	2.7 (0.71)	8.5 (2.24)	2.6 (0.69)	4.3 (1.14)	0.4 (0.11)

### Note:

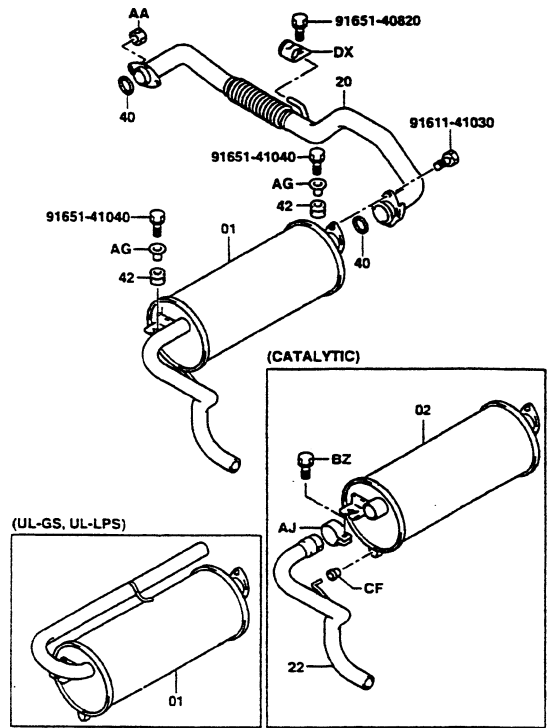
- The total amount of coolant does not include the capacity of the reservoir tank.
- Reservoir tank capacity: **0.6ℓ (0.16 US gal)** (at FULL mark position)

# MUFFLER & EXHAUST PIPE

## COMPONENTS

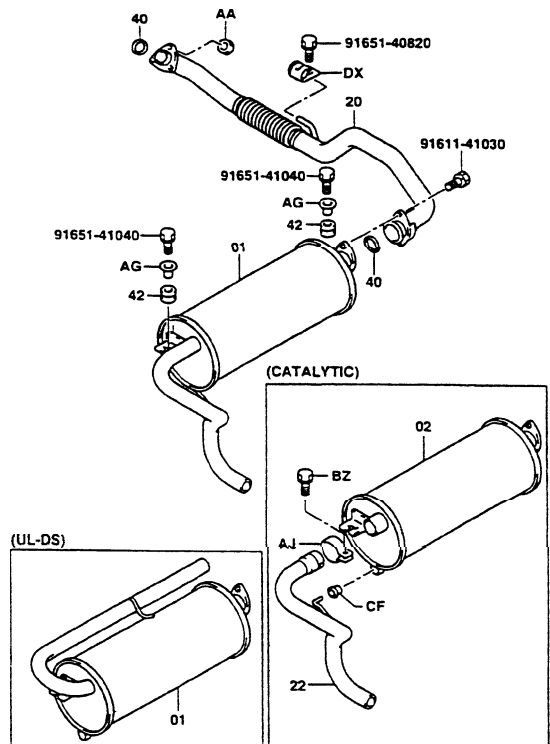
1702

Gasoline model



1702-362A

Diesel model



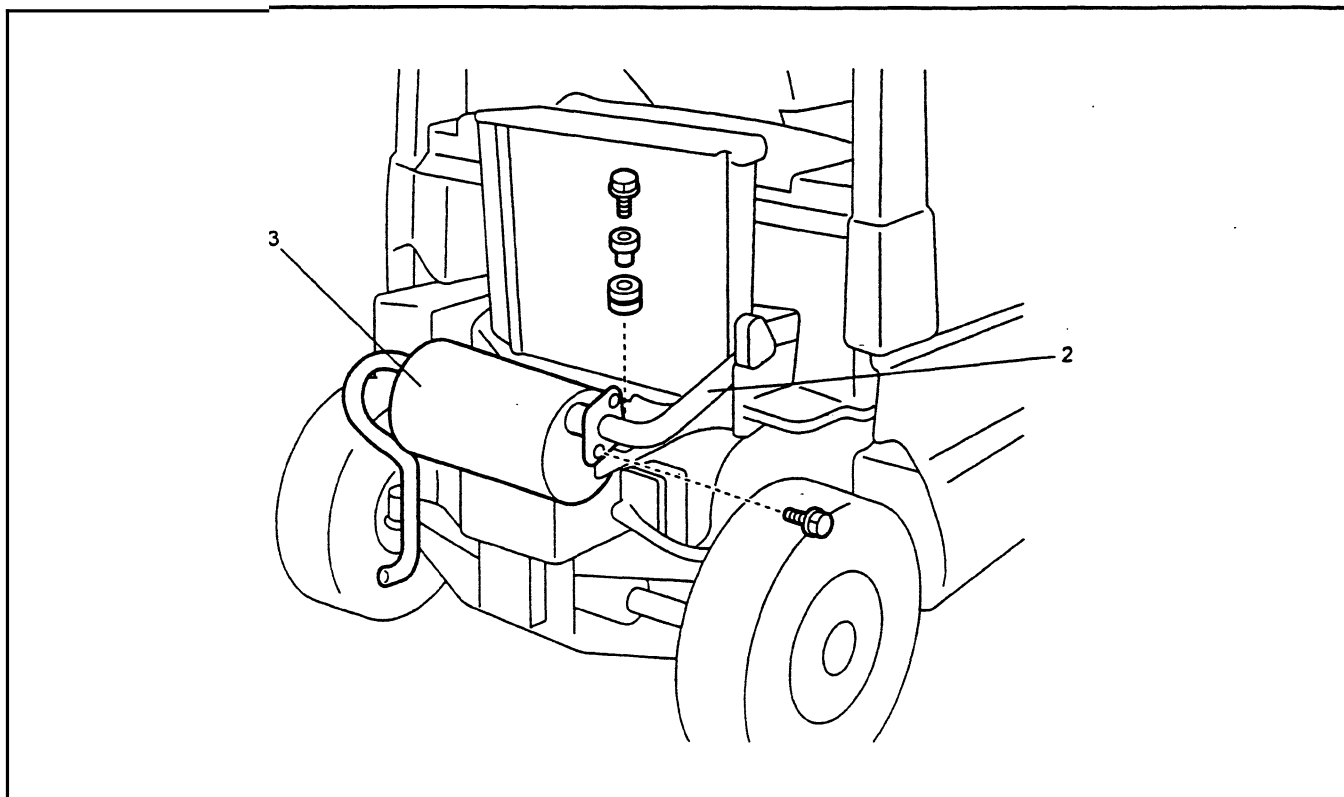
1702-361A

## REMOVAL-INSTALLATION

### Note:

The muffler can be removed by either of the two methods shown below.

- ① Remove the muffler after removing the counterweight.
  - ② Remove the muffler after removing the radiator W/counterweight.
- Here, method ① is explained.



### Removal Procedure

- 1 Remove the counterweight. (See p. 9-7.)
- 2 Disconnect the exhaust pipe.
- 3 Remove the muffler W/tail pipe.
- 4 Disconnect the tail pipe from the muffler.

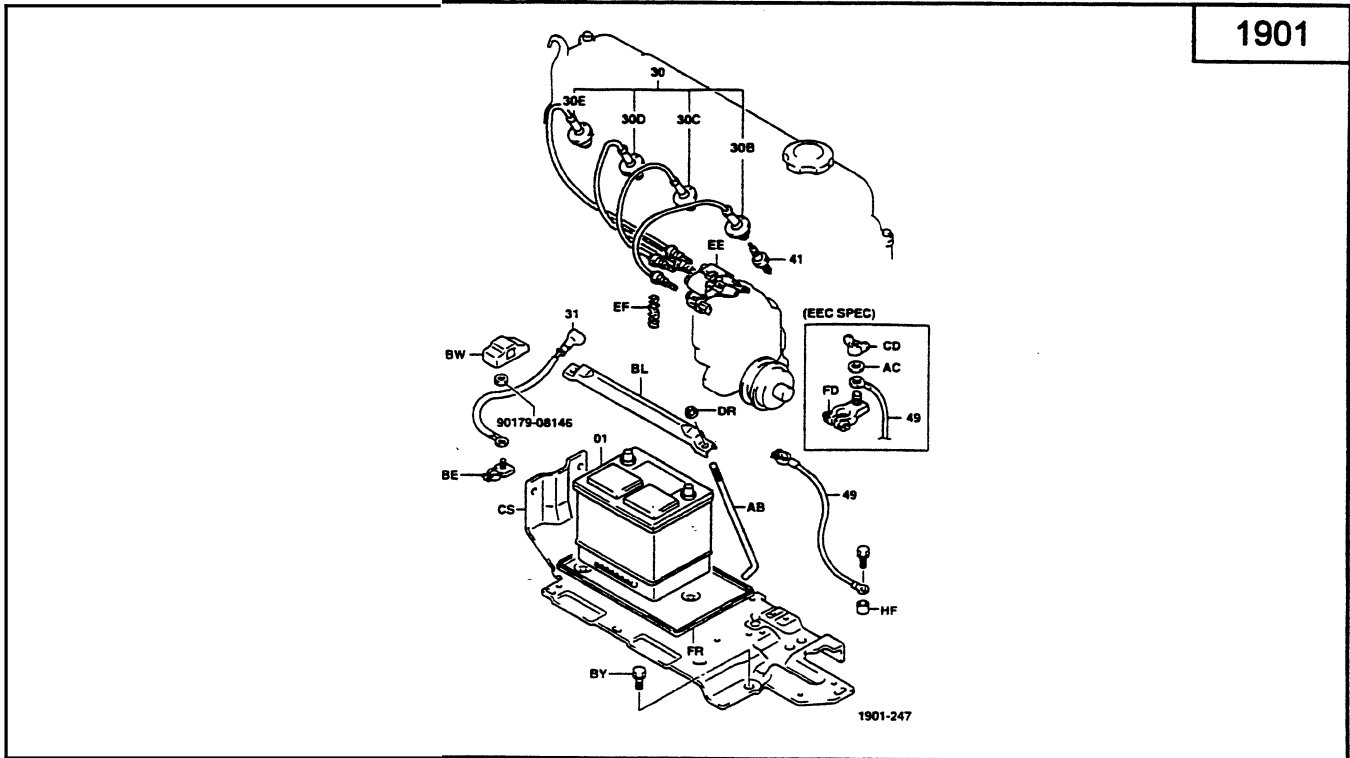
### Installation Procedure

The installation procedure is the reverse of the removal procedure.

## CATALYTIC MUFFLER MAINTENANCE

Replace the muffler ASSY every year (2000 hours) on either the gasoline or diesel engine vehicle.

# BATTERY COMPONENTS



## SPECIFICATIONS

Battery type list (The battery is selected according to the equipped engine.)

Engine	4Y	1DZ-II
Specification		
STD	GR35 (JIS55D23L)	GR24R (JIS80D26L)

Battery type	GR35 (JIS55D23L)	GR24R (JIS80D26L)
Item		
Voltage	V	12 ←
5-hour rate capacity	Ah	48 55
Specific gravity of battery fluid in use (at 20°C (68°F))	1.280	←
Battery weight	kg (lb)	16.2 (35.7) 19.0 (41.9)



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