

# WORKSHOP MANUAL

## **DAIHATSU** **F300**

[HD-ENGINE]

### FOREWORD

This workshop manual describes the maintenance and servicing procedures for Type HD engines which are mounted on the Daihatsu F300.

In this workshop manual, the entire portion is divided into 11 sections and four supplements. Each section has an index along with a table of contents at the beginning. For easier reference, the upper part of each page bears the section title concerned.

All information used in this workshop manual was in effect at the time when the manual was approved for printing. However, the specifications and procedures may be revised due to the continuing improvements in the design without advance notice and without incurring any obligation to us.

**Published in February, 1989**

**DAIHATSU MOTOR CO., LTD.**

WN88E-00001

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**NOTE:**

Type HD engine comes in two kinds: One is a carburetor-equipped engine. The other is an EFI-equipped engine.

For simplified expression, the carburetor-equipped engine is coded merely as Type HD-C engine, whereas the EFI-equipped engine is coded merely as Type HD-E engine in this Workshop Manual.

# **DAIHATSU**

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# **F300**

**GI**

[HD-ENGINE]

## **GENERAL INFORMATION**

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WN88E-GI001

## HOW TO USE THIS MANUAL

In this workshop manual, the entire portion is divided into 11 sections and four supplements. Each section has a table of contents in the beginning. For easier reference, a thumb index is provided. Also, the upper part of each page bears the section title concerned so that you may use this manual readily and fully.

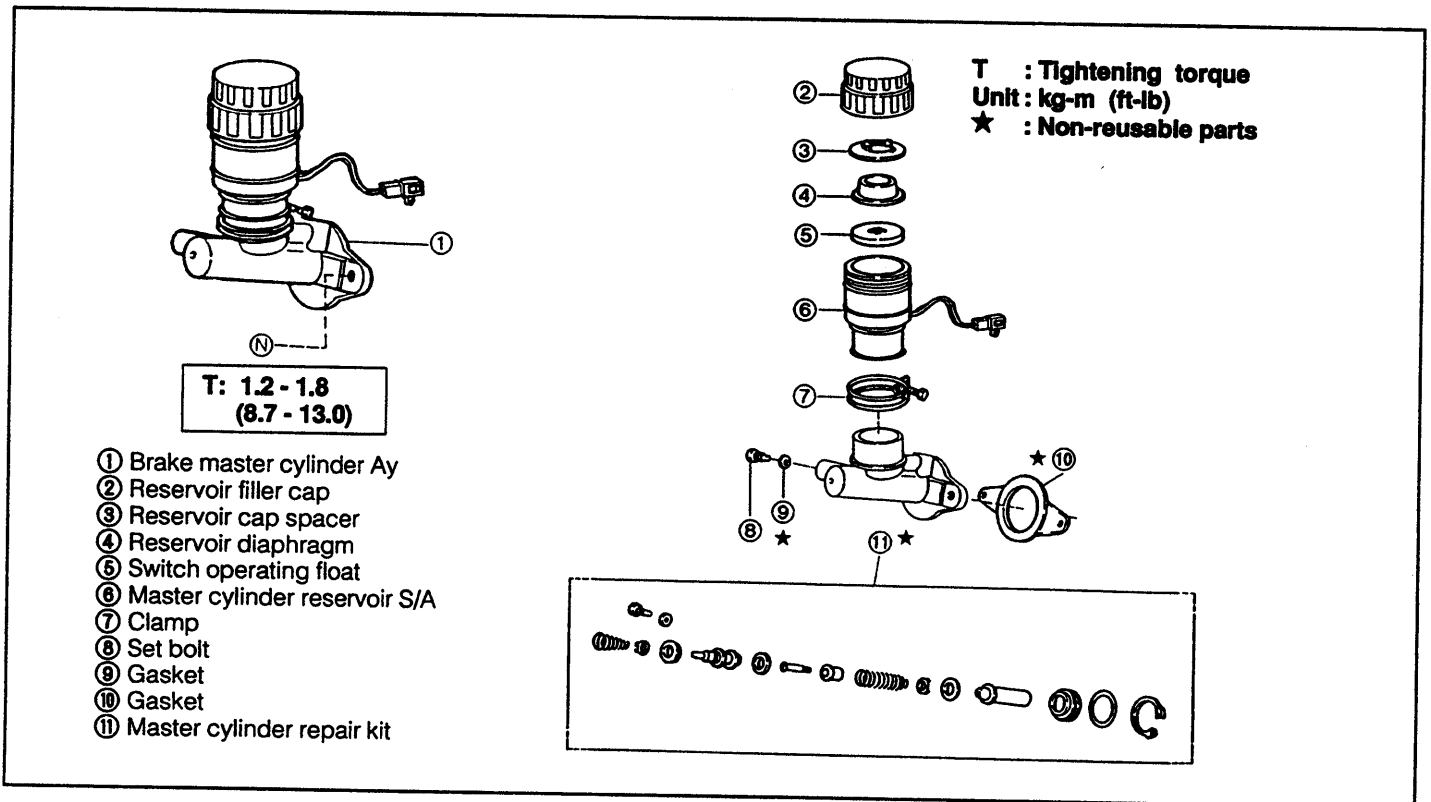
WN88E-GI002

## CONTENTS OF EXPLANATION

### 1. Schematic Diagram of Components

- (1) The schematic diagram of components that appears at the beginning of each section describes the nomenclature and installed conditions of each component. Also, the tightening torque is posted in the figure.
- (2) Those parts whose reuse is not permitted bear a "★" mark for an identification purpose. Be certain to replace these parts with new ones during the assembly.

#### (Example)



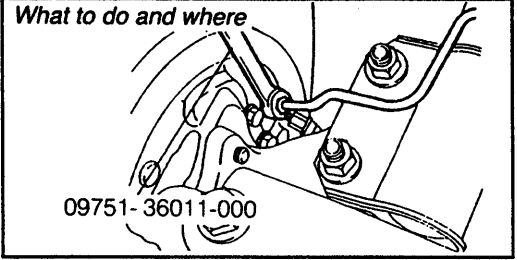
### 2. Servicing Procedure

WN88E-GI003

- (1) In principle, the servicing procedure is described in the following sequence given below: Removal → Inspection → Installation, and Disassembly → Inspection → Assembly.
- (2) The explanation covers detailed servicing methods, specifications and notes.
- (3) The main point of each item explains the servicing section and servicing procedure, using illustrations.

WN88E-GI004

**(Example)**

What to do	How to it	What to do and where
<p>3. Brake tube installation</p> <p>(1) Install the brake tube to the wheel cylinder temporarily by hands.</p> <p>(2) Tighten the brake tube to the wheel cylinder, using the following SST.</p> <p><b>SST: 09751-36011-000</b></p>		

WN88E-G1005

(4) The inspection section in this manual describes only checking operation. Therefore, if you find any malfunction, replace the defective parts with new ones.

**3. SST**

For those operations which require the use of any SST, the SST numbers concerned are given in bold letters.

Also, a table of all SSTs is collectively posted in the Appendix Data A.

**4. Service Specifications**

Service specifications are indicated in bold letters or enclosed by heavy lines. Be certain to confirm the specifications concerned.

Service specifications are collectively posted in the Appendix Data B.

**5. Tightening Torque**

For those operations which require the control of tightening torque, the relevant tightening torque is given in bold letters. Be certain to confirm the tightening torque concerned. Tightening torque specifications are collectively posted in the Appendix Data C.

**6. Definitions of Terms**

Specified Value ... A value which represents the allowable range during the inspection and adjustment.

Limit ..... A maximum or a minimum limit which the value should not exceed or fall below.

**WARNING, CAUTION & NOTE:**

All these symbols are indicated in bold letters.

**WARNING:**

This symbol means that there is a possibility of personal injury of the operator himself or the nearby workers if the operator fails to follow the operating procedure prescribed in this manual.

**CAUTION:**

This symbol means that there is a possibility of damage to the component being repaired if the operator fails to follow the operating procedure prescribed in this manual.

**NOTE:**

To accomplish the operation in an efficient manner, additional instructions concerning the operation are given in this section.

WN88E-G1006

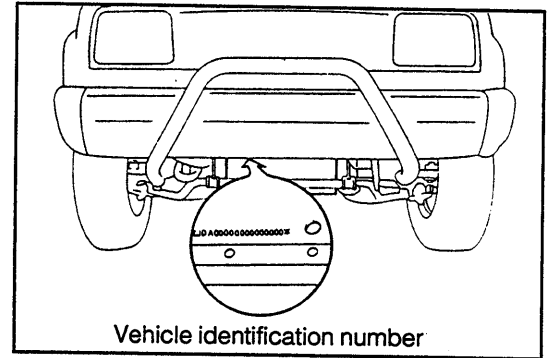
# GENERAL INFORMATION

## IDENTIFICATION INFORMATION

### VEHICLE IDENTIFICATION NUMBER

#### 1. Position of Vehicle Identification Number

The vehicle identification number is stamped on the crossmember at the vehicle front section.



WN88E-GI007

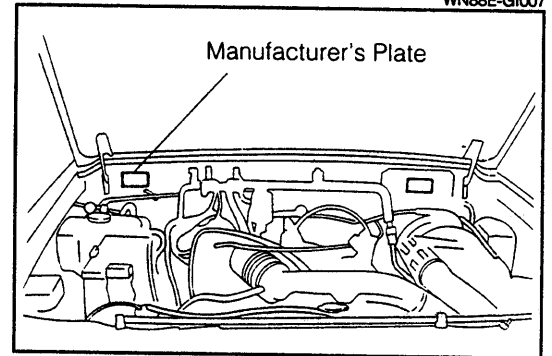
#### 2. The First Stamped Vehicle Identification Number

\* JDA00F30000000021 \*

### MANUFACTURER'S PLATE

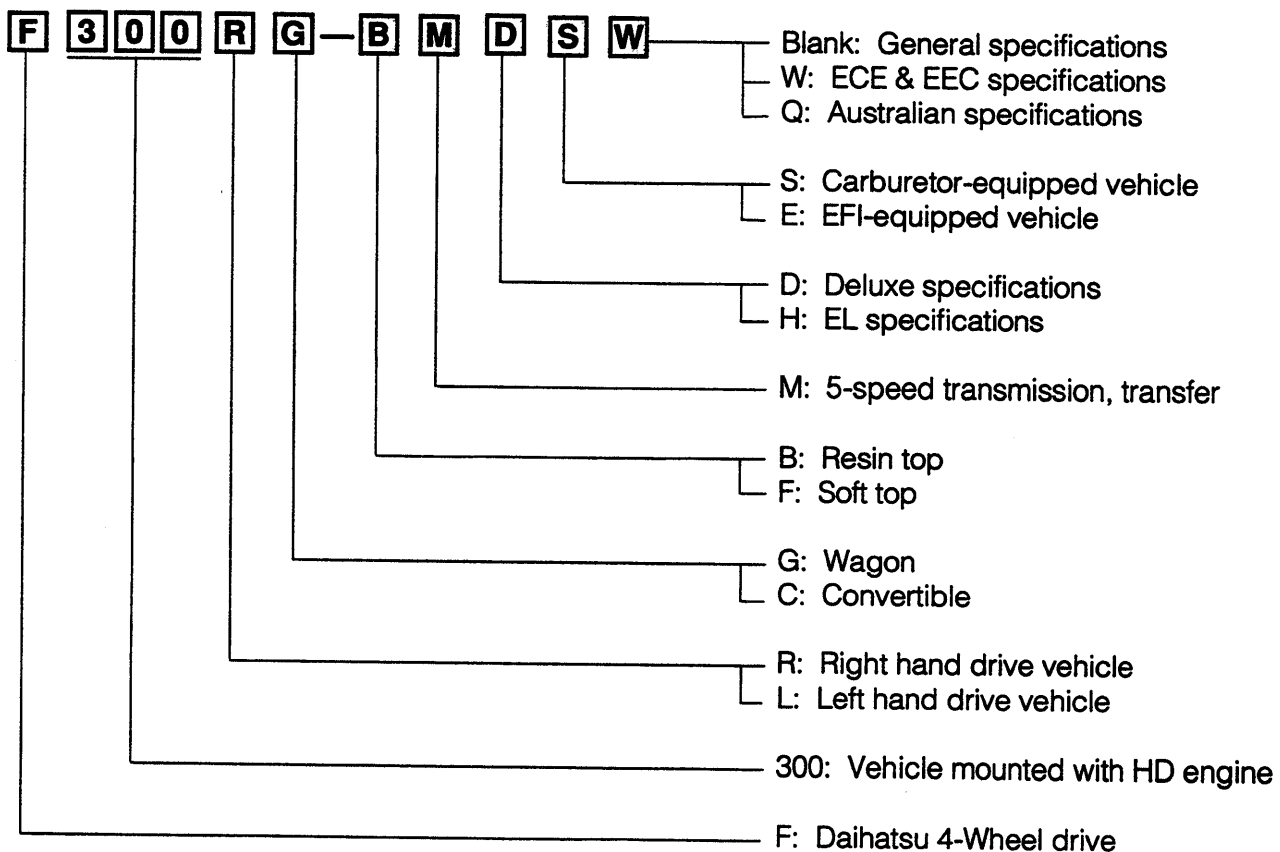
#### 1. Position of Manufacturer's Plate

The manufacturer's plate is affixed on the cowl panel inside the engine compartment.



WN88E-GI008

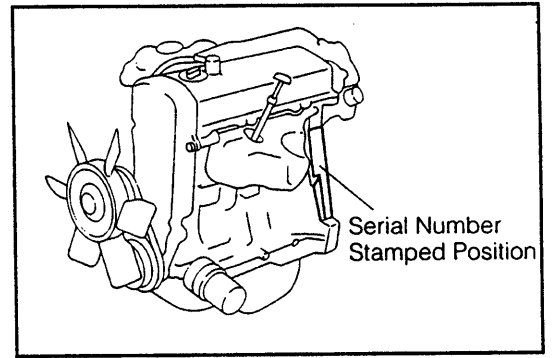
#### 2. Explanation of Vehicle Model Code



WN88E-GI009

## ENGINE NUMBER AND TYPE STAMPED POSITION

The engine number is stamped on the rear left side wall of the cylinder block and the engine type is indicated by embossed letters at near the engine number stamped position.



WN88E-GI010

### GENERAL SERVICE INSTRUCTIONS

1. Use fender covers, seat covers or floor sheets so that the vehicle may not get dirty or be scratched.
2. Jacking up
  - (1) When only the front section or rear section of the vehicle is jacked up, be sure to place chocks at the wheels so as to insure safe operations.
  - (2) When the vehicle has been jacked up, be sure to support the vehicle at the specified section using safety stands. (See page GI-9)
3. Handling instructions related to battery
  - (1) Before you start performing the electrical works, make certain to disconnect the battery cable from the negative (-) terminal of the battery.
  - (2) When it becomes necessary to disconnect the battery cables for the purpose of carrying out checks or repairs, always start at the negative (-) battery terminal which is grounded to the body.
  - (3) To avoid damaging the battery plates, after the terminal nut has been loosened, pull out the battery cable straight upward, rather than turning or prying the terminal.
  - (4) Clean the battery terminal posts or cable terminals, using a cloth. Never use a file or other adhesive agents.
  - (5) When connecting the cable terminal to the battery, first the cable terminal should be fitted onto the battery post with the attaching nut in a loose state. Then, tighten the nut. Never tap the terminal onto the battery post, using a hammer.
  - (6) As for the cover at the positive (+) terminal side, be sure to install it at the correct position.
4. Repairing of fuel system

Type HD-E engine employs a high fuel pressure. Therefore, the following notes should be observed.

  - (1) When the union bolt is removed take a measure to prevent the fuel from splashing with a cloth or the like. Slacken the union bolt gradually.
  - (2) Tighten each connecting section to the specified torque.
  - (3) Attach the specified clip to each connecting section.
5. For increased work efficiency and improved accuracy, be sure to utilize the SSTs (Special Service Tools) effectively.
6. Removal and disassembly
  - (1) When disassembling complicated components, put stamped marks or mating marks on those sections where such marks do not affect their functions so that the assembling operation may be performed easily.
  - (2) Each time a part removed, check the part for the assembled condition, deformation, breakage, roughness and scratches.
  - (3) Arrange the disassembled parts in the disassembling order. In addition, separate and arrange those parts to be replaced and those parts to be reused.
  - (4) Thoroughly clean and wash those parts to be reused.
  - (5) Inspection and measurement of part  
Perform thorough inspection and measurement on those parts to be reused, as required.
7. Installation and assembly
  - (1) Assemble those satisfactory parts, following the proper procedure and specified standards. (adjusting values and tightening torque, etc.)
  - (2) Ensure that seal packings and grease are applied to those sections where such application is needed.
  - (3) Be sure to use new packings, gaskets, cotter pins and so forth.
  - (4) Ensure that the specified bolts and nuts only be used. Moreover, where specified, make sure to employ a torque wrench to tighten bolts and nuts to the specified torque.  
Make sure to use only genuine parts for every replacement.



## 8. Adjustment and operation check

Adjust the reassembled or replaced components to the servicing specifications, using gauges and testers, as required.

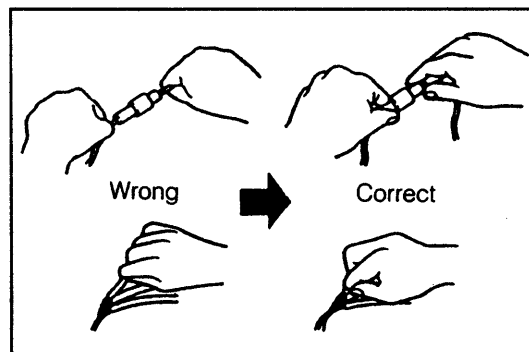
## 9. Handling of hoses, etc.

- (1) Connect fuel hoses and water hoses, etc. securely so that they exhibit no leakage.
- (2) When disconnecting fuel hoses, make sure that no fuel is splashed around the hose. (Special care must be exercised as to the engine mount rubber, etc., for there is a possibility that the rubber is deteriorated by the petrol-based liquid.)

WN88E-GI012

## 10. Observe the following precautions to avoid damage to the parts.

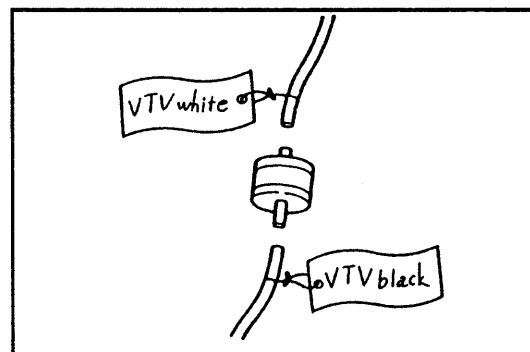
- (1) When pulling out vacuum hoses, be sure to hold the hose end, not the middle part of the hose.
- (2) When disconnecting connectors, be sure to hold the connector itself, not the wire portion.
- (3) Be very careful not to drop electrical components, such as sensors or relays, to the floor. If they are dropped, they must be replaced. Never reuse them.
- (4) When steam cleaning the engine, take precautionary measures so that no water is applied to the air filter, carburetor, distributor, ignition coil and so forth.
- (5) Never use an impact wrench to remove or install thermo switches or thermo sensors.
- (6) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (7) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.



WN88E-GI013

## 11. Tag hoses before disconnecting them:

- (1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
- (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.



WN88E-GI014

## 12. The dimensions and specified values that appear in this manual are those values at 20°C (68°F), unless otherwise specified.

## 13. As for the values other those indicated in "si" unit, such as ft, inch, lb, cu-in and gallon, they are the converted values. Therefore, there are cases where the converted values have been rounded up or down according to their use at the time of conversion.

WN88E-GI015

### HANDLING INSTRUCTIONS ON CATALYTIC CONVERTER-EQUIPPED VEHICLES

**WARNING:**

When a great amount of unburnt gas is admitted into the catalytic converter, overheating is prone to occur, resulting in a fire hazard.

To avoid such trouble in advance, be certain to observe the following precautions. Also, be sure to explain such precautions to your customers.

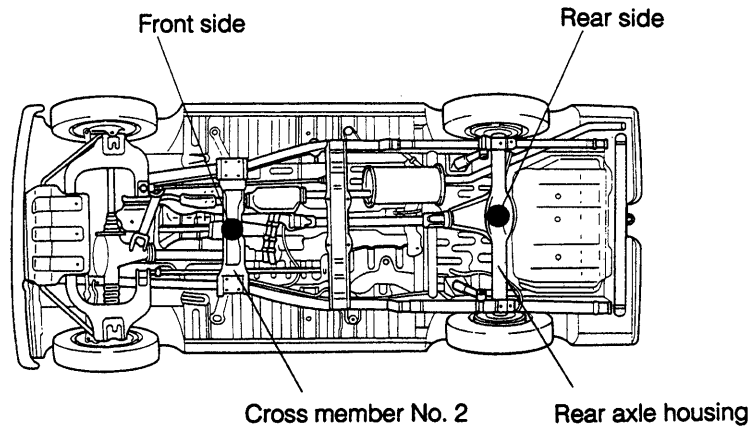
1. Use only unleaded gasoline to your vehicle.
2. Avoid idling the engine for a prolonged length of time.  
Do not run the engine continuously at the idle speed for more than 20 minutes.
3. Never perform spark jump tests.
  - (1) The spark jump test must be limited to cases where such test is absolutely necessary. Also, be sure to finish the test in the shortest possible time.
  - (2) Never race the engine during the test.
4. Do not run the engine when the fuel tank becomes nearly empty.  
Failure to observe this caution will cause misfiring. Also, it will apply excessive load to the converter, even leading to catalyst damage.
5. Do not dispose the waste catalyst along with parts contaminated with gasoline or oil.

WN88E-GI016

# JACKING POINTS & SUPPORTING POINTS OF SAFETY STANDS

• **Jacking point**

- Front side ..... Cross member No.2
- Rear side ..... Rear axle housing



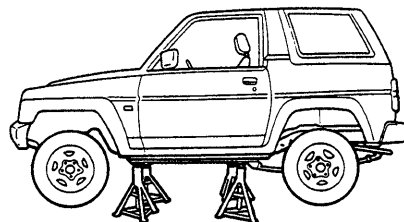
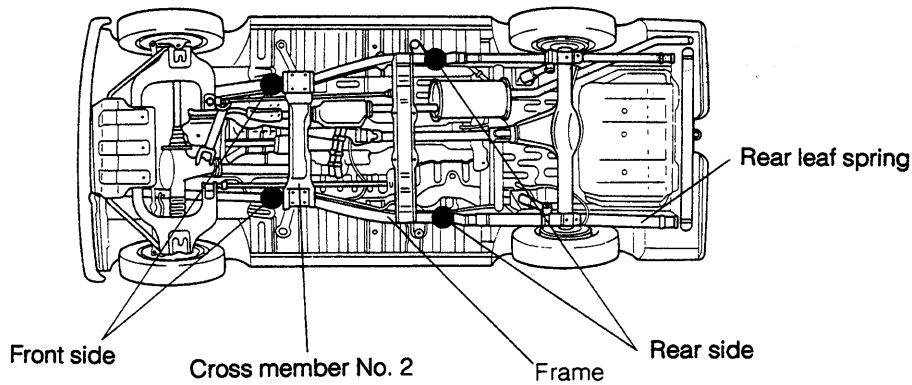
WN88E-GI017

**SUPPORTING POINTS OF TWO-POST LIFT**

Align the supporting pads of a two-post lift with the supporting points of safety stands, as indicated in the figure below.

• **Supporting points**

- Front side ..... Frame (In front of the crossmember No.2)
- Rear side ..... Frame (In front of the rear leaf speing)



WN88E-GI018

# GENERAL INFORMATION

## ABBREVIATION CODES

The abbreviation codes that appear in this workshop manual stand for the following, respectively.

A/C	Air Conditioner
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BVSV	Bimetal Vacuum Switching Valve
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
EX	Exhaust (Manifold Valve)
FL	Fusible Link
IN	Intake (Manifold, Valve)
LH	Left Hand
LHD	Left Hand Drive
LLC	Long Life Coolant
MP	Multipurpose
N.m.	Newton meter
PCV	Positive Crankcase Ventilation
PVSV	Pressure Vacuum Switching Valve
RH	Right Hand
SST	Special Service Tool
STD	Standard
TDC	Top Dead Center
TVSV	Thermostatic Vacuum Switching Valve
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
W/	With
W/O	without
4WD	Four-wheel Drive Vehicle
HIC	Hot Idle Compensator
ITC	Intake air Temperature Compensating valve
TP	Throttle positioner
TWC	Three-way catalyst
SD	Spark delay
C/B	Choke Breaker
EVAP	Fuel evaporative emission control

WN88E-GI019

The abbreviation codes that appear in the figure stand for the following, respectively.

Ⓑ	Bolt	Ⓢ	Screw
Ⓝ	Nut	Ⓦ	Washer

WN88E-GI020

# **DAIHATSU**

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# **F300**

[HD-ENGINE]

**MA**

## **MAINTENANCE**

<b>MAINTENANCE SCHEDULE .....</b>	<b>MA-2</b>
<b>MAINTENANCE OPERATIONS .....</b>	<b>MA-3</b>
<b>COLD ENGINE OPERATIONS .....</b>	<b>MA-3</b>
<b>HOT ENGINE OPERATIONS .....</b>	<b>MA-8</b>

WN88E-MA001

# MAINTENANCE

## MAINTENANCE SCHEDULE

O ... Check ● ... Change or replacement

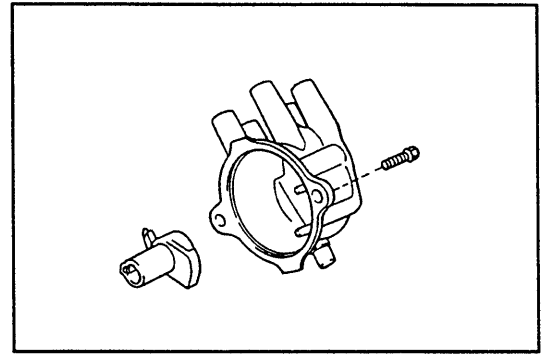
Section	Inspection	× 1,000 km	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
		× 1,000 miles	0.6	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	
		(Months) Years	—	(3)	(6)	(9)	1	(3)	(6)	(9)	2	(3)	(6)	(9)	3	(3)	(6)	(9)	4	(3)	(6)	(9)	5	
Engine electrical system	• Distributor cap, rotor	• Damage					○				○				○				○				○	
	• Spark plug	• Cleaning					○				○				○				○				○	
	• Ignition timing	• Timing					○				○				○				○				○	
	• Battery	• Electrolyte level		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	• Wire harness	• Tightness clamps • Damage		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Engine	• Air cleaner element* <sup>1</sup>	• Cleaning			○	○			○	●		○	○	○	○	○			○	●		○	○	
	• Valve clearance	• Clearance									○												○	
	• Engine oil* <sup>2</sup> (API SE or SF)	• Leakage • Level • Change (Every 10,000 km or 0.5 year)	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
	• Oil filter* <sup>2</sup>	• Change			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	• Fuel filter	• Change	• HD-C engine									●								●				
			• HD-E engine																					●
	• Fuel lines & Connections	• Damage • Crack • Tightness • Leakage		○			○				○				○					○				○
	• Carburetor (HD-C engine)	• Idle speed • Acceleration					○				○				○					○				○
	• Choke system (HD-C engine)	• Operation					○				○				○					○				○
	• Coolant	• Quantity • Leakage • Change (Long life coolant)		○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○
	• V-belt	• Tension • Crack • Damage		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	• Blow-by gas ventilation hose	• Connection • Damage										○								○				
	• Throttle positioner	• Operation					○				○				○					○				
• Spark control system	• Operation					○				○				○					○					
• Charcoal canister	• Operation					○				○				○					○				○	

\*<sup>1</sup> In case of driving on dusty roads, clean every 2,500 km (1,500 miles) and replace every 20,000 km (12,000 miles).  
 \*<sup>2</sup> In case of severe driving condition, replace every 5,000 km (3,000 miles).

# MAINTENANCE OPERATIONS

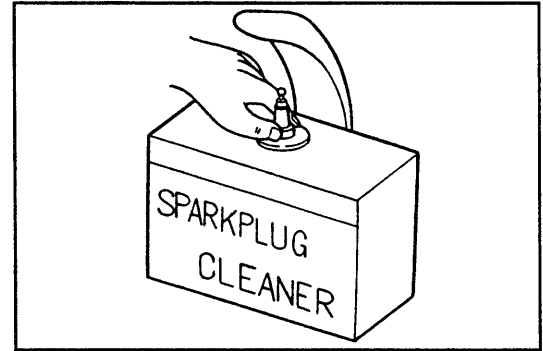
## COLD ENGINE OPERATIONS

1. Inspection of distributor cap and rotor.  
Visually inspect the distributor for cracks, wear or damage.



WN88E-MA003

2. Inspection and cleaning of spark plugs
  - (1) If there are traces of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.



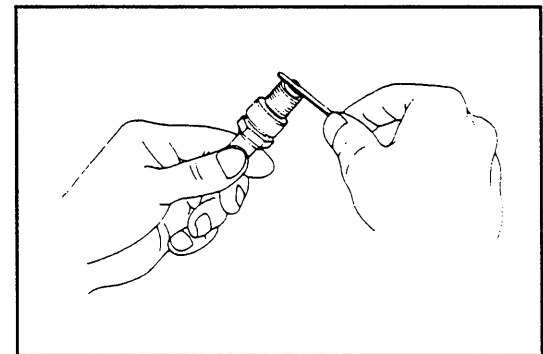
WN88E-MA004

- (2) Measure the electrode gap, using a plug gap gauge.

### Recommended a plug gap.

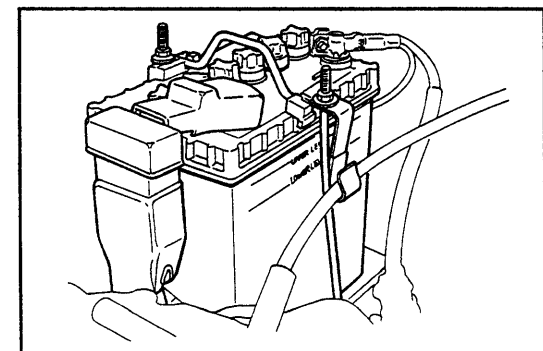
Spark plug	Air gap mm (inch)
Champion: RC9YC4	1.0 - 1.1 (0.039 - 0.043)
ND: K20PR-U11	
NGK: BKR 6E-11	

**Tightening Torque of Spark Plug: 1.5 - 2.2 kg-m  
(10.8 - 15.9 ft-lb)**



WN88E-MA005

3. Check of battery electrolyte level
  - (1) Visually check the electrolyte level between the upper line and the lower line.
  - (2) If the electrolyte level is below the lower level, replenish distilled water up to the upper level.



WN88E-MA006

# MAINTENANCE

4. Check of wiring harness clamp  
Visually check that the wiring harness is suitable clamp, damaged.

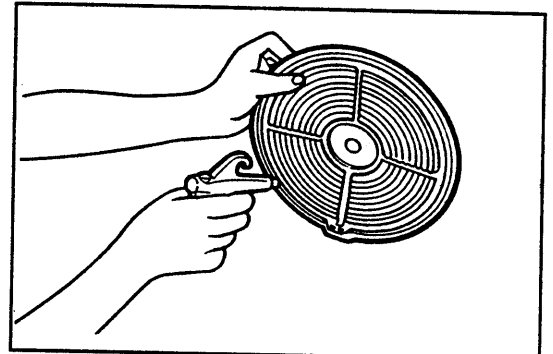
WN88E-MA007

5. Cleaning of air cleaner filter element
  - (1) Remove the air cleaner filter element from the air cleaner case.
  - (2) Clean the element with compressed air. First blow from the back side thoroughly. Then, blow off the front side of the element.

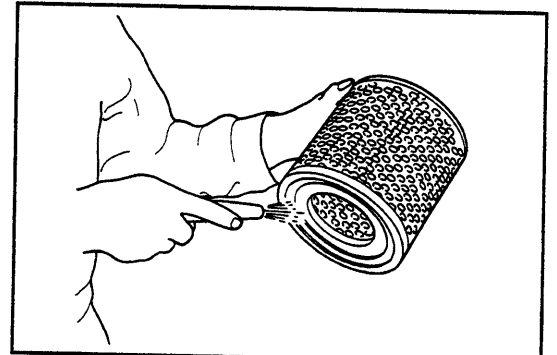
**CAUTION:**

The air pressure to be used for this cleaning operation should not exceed 4.0 kg/cm<sup>2</sup> (56.9 psi)

- (3) Install the air cleaner filter element in the air cleaner.

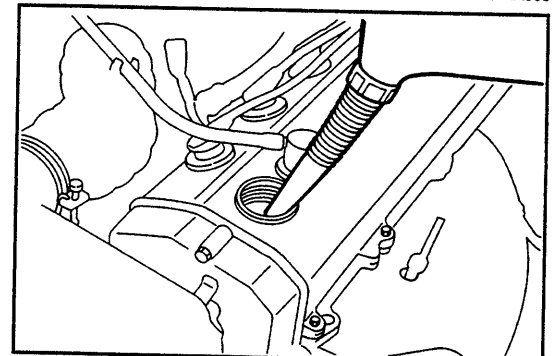


WN88E-MA008



WN88E-MA009

6. Engine oil change  
(See page LU-4)  
Recommended oil grade: API grade SE, SF  
Oil capacity  
When only engine oil is changed: 3.3 liter  
When engine oil is changed and oil filter is replaced: 3.5 liter

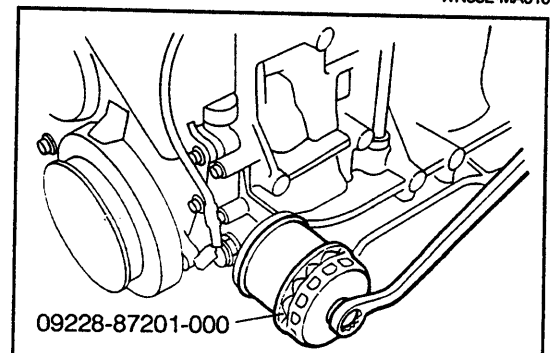


WN88E-MA010

7. Engine oil filter replacement
  - (1) Remove the oil filter, using the following SST.  
SST: 09228-87201-000

**NOTE:**  
Since the oil flows out during the replacement, receive the oil with an adequate container.

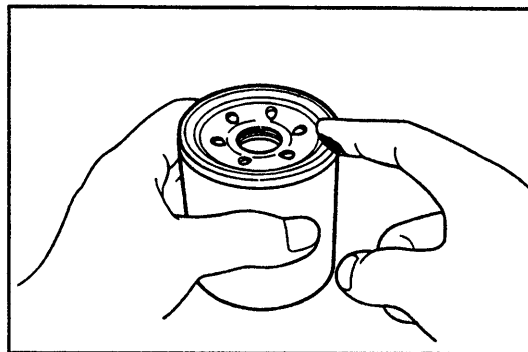
  - (2) Inspect and clean the oil filter installation surface.



WN88E-MA011

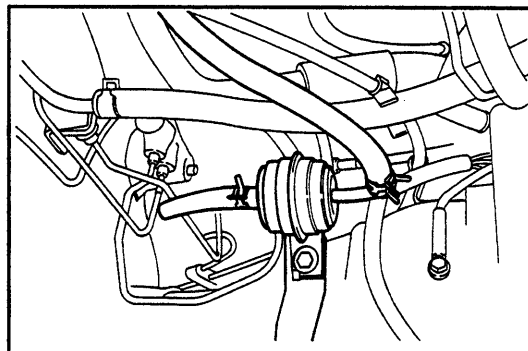


- (3) Apply clean engine oil to the gasket of a new oil filter.
- (4) Installation of oil filter  
Screw in the oil filter lightly by hand until the oil seal surface contacts the oil cooler.  
Then, tighten the oil filter one more turn, using the SST.  
SST: 09228-87201-000



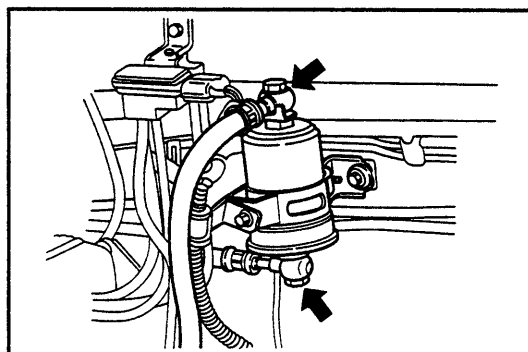
WN88E-MA012

8. Fuel filter replacement  
Carburetor installed engine:  
Disconnect the hose clamp. Then, replace the fuel filter.



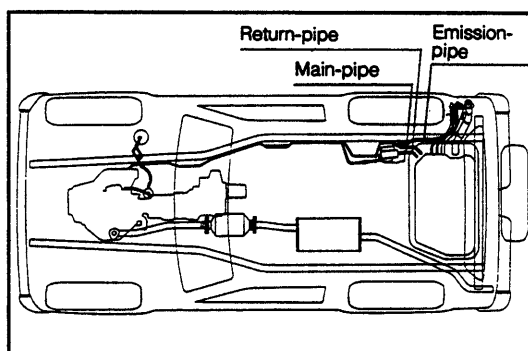
WN88E-MA013

- EFI installed engine:  
Loosen the union bolt slowly and pull it out.
- WARNING:**  
The fuel in the fuel pipe is pressurized to a pressure of  $2.55 \text{ kg/cm}^2$  (36.27 psi).  
Therefore, the union bolt should be removed slowly. Otherwise, the fuel may be splashed.



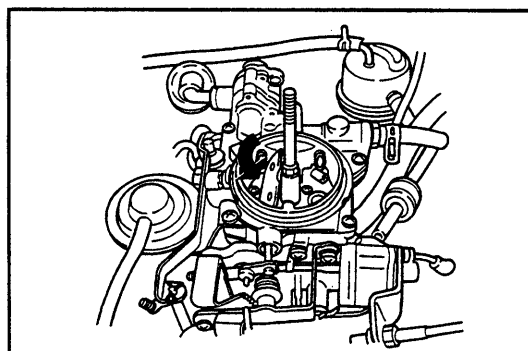
WN88E-MA014

9. Inspection of fuel lines and connections  
Visually inspect the fuel lines for cracks, leakage, loose connections, or deformation.



WN88E-MA015

10. Inspection of auto choke system (Only for HD-C)  
Check that choke valve is completely closed when cold engine.  
Then, start the engine, check that choke valve is gradually opened in accordance with the warning-up condition of the engine.



WN88E-MA016

# MAINTENANCE

## 11. Check of engine coolant

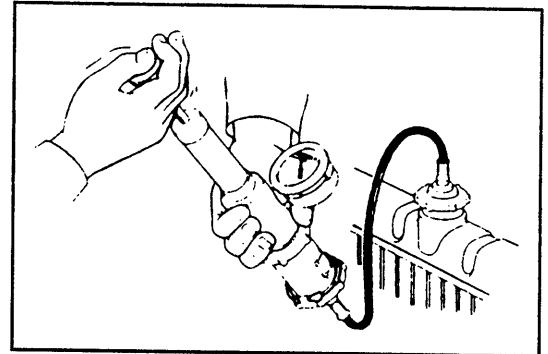
### (1) Check of cooling system for leakage

Apply a pressure of 1.2 kg/cm<sup>2</sup> (17 psi) to the cooling system by means of a radiator tester.

Ensure that the pressure does not drop.

#### WARNING:

Never remove the radiator tester when the coolant temperature is still high.

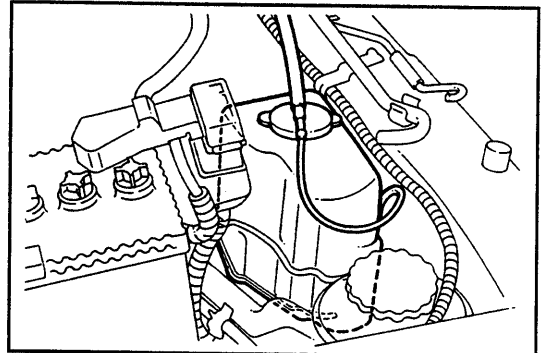


WN88E-MA017

### (2) Check of coolant level

Check to see if the coolant level is between the LOW and FULL lines of the reserve tank.

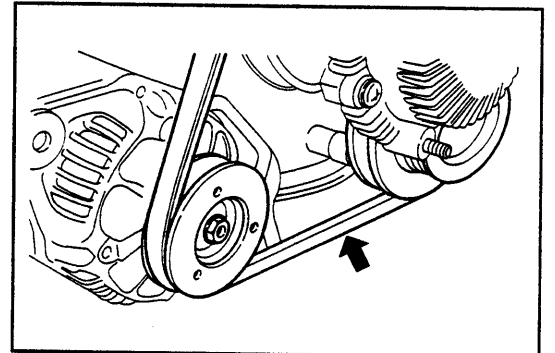
If the coolant level is near the low level or below the low level, add the coolant up to the full level.



WN88E-MA018

## 12. Inspection of drive belt

(1) Visually check the V belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs.



WN88E-MA019

(2) Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 10 kg (2.20 lb)

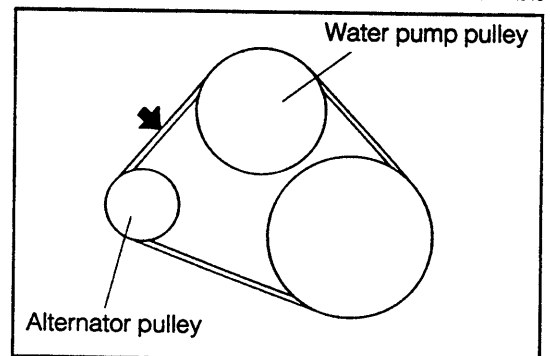
#### Specified Belt Deflection

New belt: 5.0 - 7.0 mm (0.20 - 0.28 inch)

Used belt: 6.0 - 8.0 mm (0.24 - 0.31 inch)

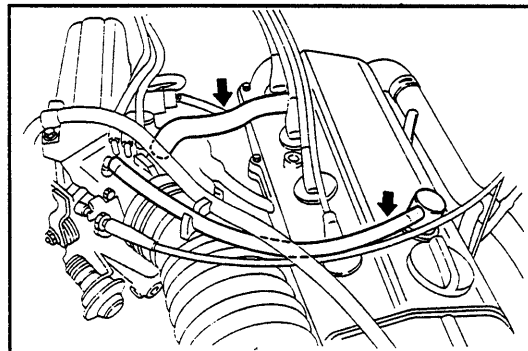
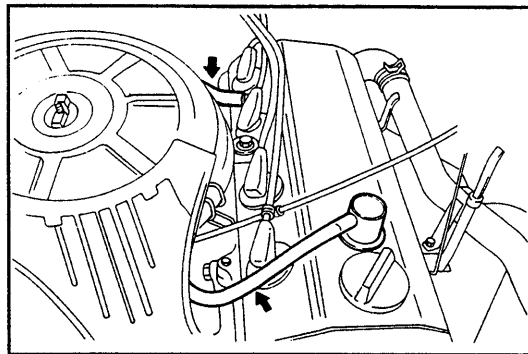
#### NOTE:

- "New belt" refers to a belt which has been used on a running engine for less than five minutes.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.



WN88E-MA020

13. Inspection of blow-by gas recirculating system  
 Check the hose, connections for cracks, leak or damage.

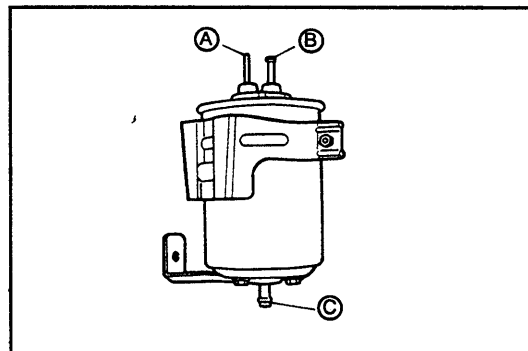


WN88E-MA021

14. Inspection of charcoal canister  
 (1) Disconnect the rubber hoses and remove the charcoal canister.

HD-E:

- (2) Blow air of  $3 \text{ kg/cm}^2$  (43 psi) into the pipe (B) while holding the pipe (A) closed.  
 Ensure that air flows smooth from the pipe (C).



WN88E-MA022

HD-C (Only for GCC Specifications)

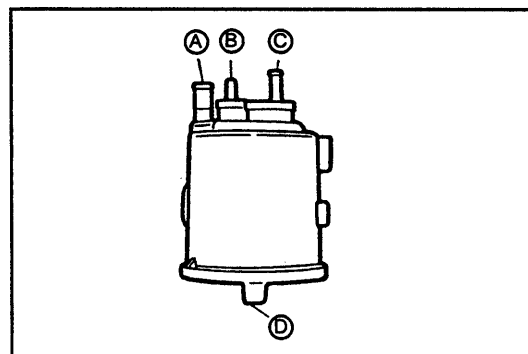
Plug the pipe (A) and (B) with your fingers and blow compressed air of  $3 \text{ kg/cm}^2$  (43 psi) through the pipe (C) (fuel tank side).

- Check that the air comes out of the bottom pipe (D).
- Check that no activated charcoal comes out.

**NOTE:**

Do not attempt to wash the charcoal canister.

- (3) Install the charcoal canister and reconnect the rubber hose.



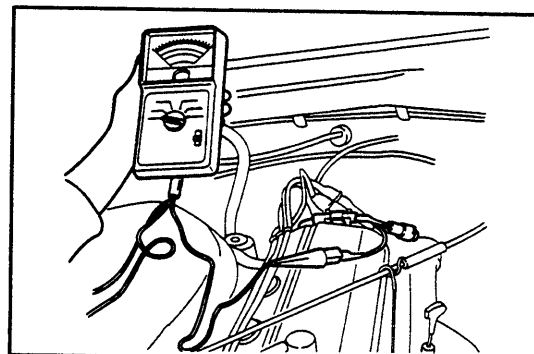
WN88E-MA023

## 15. Removal of timing belt (See page EM-21.)

WN88E-MA024

## HOT ENGINE OPERATIONS

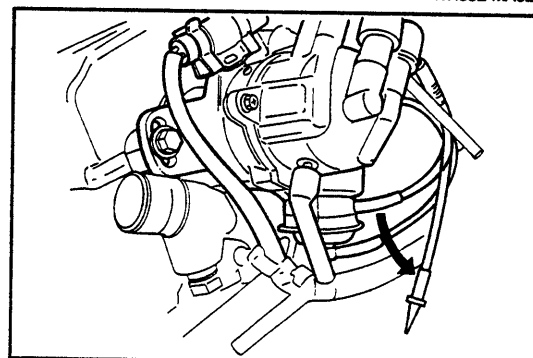
1. Adjustment of ignition timing
  - (1) Connect the tachometer to the ignition coil.
  - (2) With the engine idling as specified, use a timing light to check the timing.  
Ignition timing:  $3^{\circ} \pm 2^{\circ}$  BTDC/850 rpm
  - (3) If necessary, loosen the distributor bolts and turn the distributor to align the marks. Re-check the timing after tightening the distributor.



WN88E-MA025

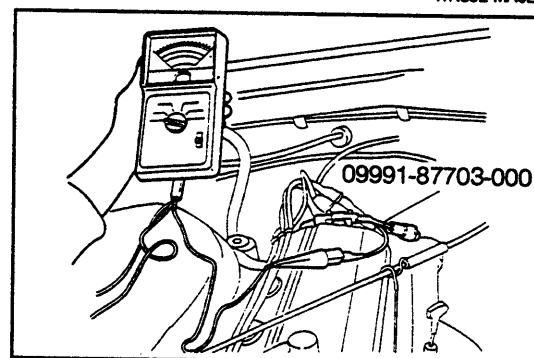
### NOTE:

- Disconnect the vacuum hose of sub-diagram from the vacuum advancer of distributor and close the vacuum hose during test.



WN88E-MA026

- The ignition coil has no terminal for external connection. Hence, insert an adequate jumper cord from the backside of the connector attached to the ignition coil. Then, connect the other end of the jumper cord to the measuring terminal of the tachometer.
- For the purpose of connecting tachometer, the SST for connecting to the distributor wire is available.  
SST: 09991-87703-000



WN88E-MA027

### CAUTION:

- Never allow the tachometer terminal to touch ground as it could result in damage to the ignitor and/or ignition coil.
- As some tachometers are not compatible with this ignition system, it is imperative to confirm the compatibility of your meter before it is used.