# Service Manual

# MONTERO

# 1989 : Volume 1

## FOREWORD

This Service Manual has been prepared with the latest service information available at the time of publication. It is subdivided into various group categories and each section contains diagnosis, disassembly, repair, and installation procedures along with complete specifications and tightening references. Use of this manual will aid in properly performing any servicing necessary to maintain or restore the high levels of performance and reliability designed into these outstanding vehicles.


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## GROUP INDEX

N00AA-A



NOTE
For Electrical refer to ...
Volume-2 "Electrical"

# HOW TO USE THIS MANUAL

N00BAAR

## CONTENTS

The preceding page contains the GROUP INDEX which lists the group title and group number.

## PAGE NUMBERS

All page numbers consist of two sets of digits separated by a dash. The digits preceding the dash identify the number of the group. The digits following the dash represent the consecutive page number within the group. The page numbers can be found on the top left or right of each page.

## TEXT

Unless otherwise specified, each service procedure covers all models. Procedures covering specific models are identified by the model codes, or similar designation (engine type, transmission type, etc.). A description of these designations is covered in this unit under "VEHICLE IDENTIFICATION".

## TROUBLESHOOTING

Troubleshootings are classified into master troubleshooting and group troubleshooting and located as follows:
The master troubleshooting is prepared when the trouble symptom relates to two or more groups and given in MASTER TROUBLESHOOTING.
The group troubleshooting guide is prepared for causes of problems related to that individual group only; a troubleshooting guide is prepared for each appropriate group.

## SERVICE PROCEDURES

The service steps are arranged in numerical order and attentions to be paid in performing vehicle service are described in detail in SERVICE POINTS.

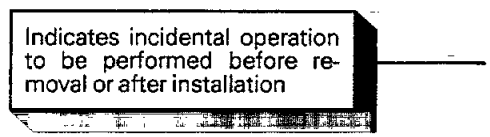
## DEFINITION OF TERMS

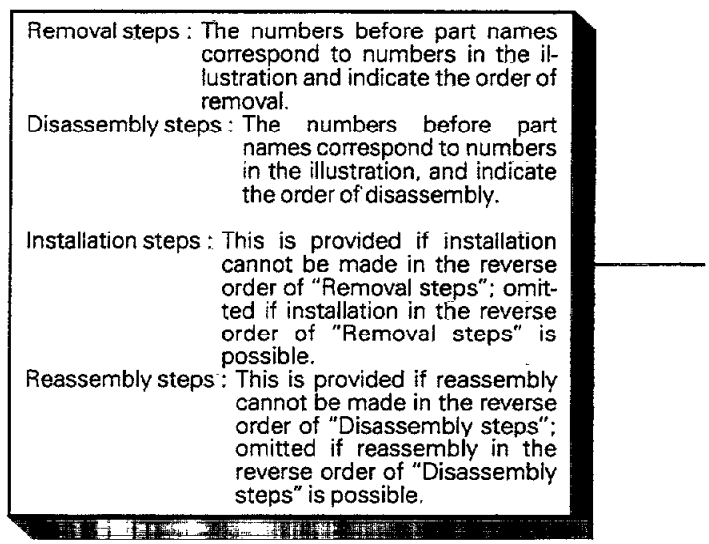
### STANDARD VALUE

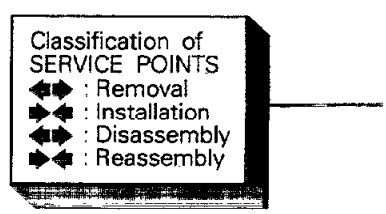
Indicates the value used as the standard for judging the quality of a part or assembly on inspection or the value to which the part or assembly is corrected and adjusted. It is given by tolerance.

### LIMIT

Shows the standard for judging the quality of a part or assembly on inspection and means the maximum or minimum value within which the part or assembly must be kept functionally or in strength. It is a value established outside the range of standard value.




## MODEL INDICATIONS

The following abbreviations are used in this manual for classification of model types.

M/T : Indicates the manual transmission, or models equipped with the manual transmission.
A/T : Indicates the automatic transmission, or models equipped with the automatic transmission.
F.B.C. : Indicates the feed back carburetor, or engines equipped with the feed back carburetor.
M.P.I. : Indicates the multi-point injection, or engines equipped with the multi-point injection.
2.6 L Engine : Indicates the 2.6 liters (155.9 cu.in.) engine, or a model equipped with such an engine.
3.0 L Engine : Indicates the 3.0 liters (181.4 cu.in.) engine, or a model equipped with such an engine.

Page number

Group title Section title



## THERMOSTAT

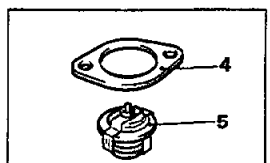
### REMOVAL AND INSTALLATION

Indicates tightening torque

**Pre-removal Operation**
- Draining of the Coolant (Refer to GROUP 0 LUBRICATION AND MAINTENANCE – Maintenance Service.)

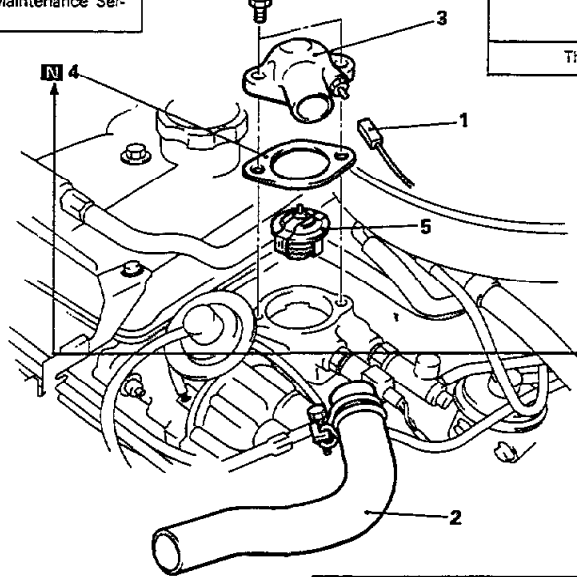
**Post-installation Operation**
- Supplying of the Coolant (Refer to GROUP 0 LUBRICATION AND MAINTENANCE – Maintenance Service.)

17–20 Nm
13–14 ft.lbs.



Thermostat kit

Repair kit or set parts are shown. (Only very frequently used parts are shown.)

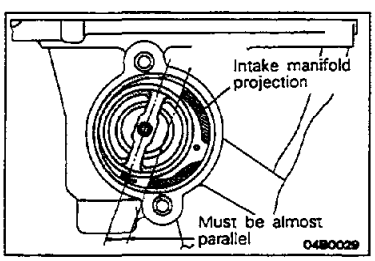



Indicates non-reusable part.

This number corresponds to the number in "Removal steps", "Disassembly steps", "Installation steps" or "Reassembly steps".

**Removal steps**
1. Connection of engine coolant temperature switch connector (Vehicles with an air conditioner)
2. Connection of radiator upper hose
3. Water outlet fitting
4. Water outlet fitting gasket
5. ◆◆ Thermostat

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Installation"
(3) N : Non-reusable parts



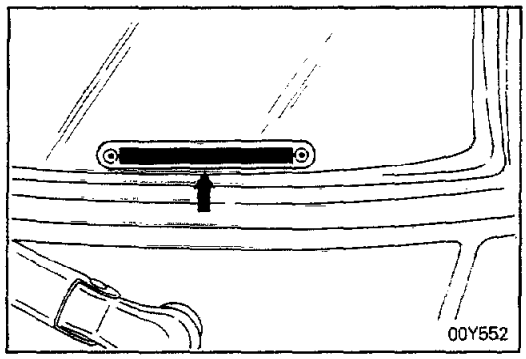

### SERVICE POINTS OF INSTALLATION

**5. INSTALLATION OF THERMOSTAT**

Install the thermostat to the intake manifold as illustrated.

**Caution**
**The thermostat flange fits over the manifold seat; ensure that the thermostat is not installed at an angle.**

An explanation of procedures, notes, etc. regarding removal, installation, disassembly and reassembly.




# VEHICLE IDENTIFICATION

## VEHICLE IDENTIFICATION NUMBER LOCATION

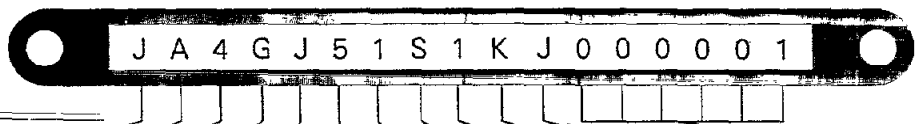
N00CA--

The vehicle identification number (V.I.N.) is located on a plate attached to the left top side of the instrument panel.

## VEHICLE IDENTIFICATION CODE CHART PLATE

N00CB--

All vehicle identification numbers contain 17 digits. The vehicle number is a code which tells country, make, vehicle type, etc.




| 1st digit | 2nd digit | 3rd digit | 4th digit | 5th digit | 6th digit | 7th digit | 8th digit | 9th digit | 10th digit | 11th digit | 12th thru 17th digit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | Make | Vehicle type | Others | Line | Price class | Body | Engine | Check digit | Model year | Plant | Serial number |
| J-<br>Japan | A-<br>Mitsu-bishi | 4-<br>Multi-purpose vehicle (MPV)<br>7-<br>Truck | F-<br>4001-5000 lbs. and with hydraulic brakes<br>G-<br>5001-6000 lbs. and with hydraulic brakes | J-<br>MON-TERO | 4-<br>High<br>5-<br>Pre-mium | 1-<br>5-door wagon<br>3-<br>3-door metal-top or van | E-<br>2.6 liters (155.9 cu.in.)<br>S-<br>3.0 liters (181.4 cu.in.) | 0<br>1<br>2<br>3<br>.<br>.<br>.<br>.<br>9<br>X | K-<br>1989 year | J-<br>Nagoya –3 | 000001 to 999999 |

NOTE

*"Check digit" means a single number or letter X used to verify the accuracy of transcription of vehicle identification number.

## VEHICLE IDENTIFICATION NUMBER LIST

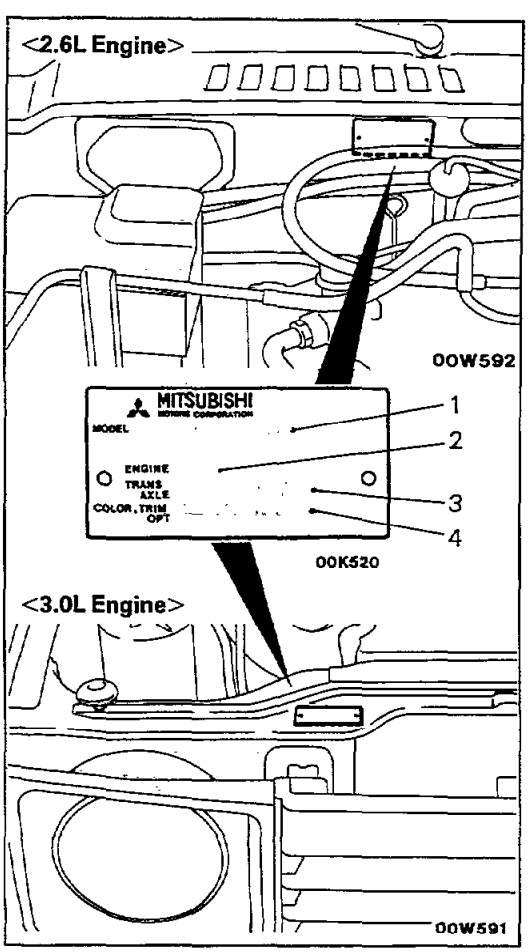
### FEDERAL

N00CC-

| VIN (except sequence number) | Brand | Engine displacement | Model code |
|---|---|---|---|
| JA7FJ43E☐KJ | MITSUBISHI MONTERO | 2.555 liters (155.9 cu.in.) | L042GTNJLF |
| JA7FJ43S☐KJ<br>JA7FJ43S☐KJ<br>JA7FJ53S☐KJ<br>JA4GJ41S☐KJ<br>JA4GJ41S☐KJ<br>JA4GJ51S☐KJ | | 2.972 liters (181.4 cu.in.) | L141GTNJLF<br>L141GTRJLF<br>L141GTRULF<br>L146GVMNJLF<br>L146GVMRJLF<br>L146GWMRULF |

### CALIFORNIA (Can also be sold in Federal states.)

| VIN (except sequence number) | Brand | Engine displacement | Model code |
|---|---|---|---|
| JA7FJ43E☐KJ | MITSUBISHI MONTERO | 2.555 liters (155.9 cu.in.) | L042GTNJLH |
| JA7FJ43S☐KJ<br>JA7FJ43S☐KJ<br>JA7FJ53S☐KJ<br>JA4GJ41S☐KJ<br>JA4GJ41S☐KJ<br>JA4GJ51S☐KJ | | 2.972 liters (181.4 cu.in.) | L141GTNJLH<br>L141GTRJLH<br>L141GTRULH<br>L146GVMNJLH<br>L146GVMRJLH<br>L146GWMRULH |




## VEHICLE INFORMATION CODE PLATE

N00CD-

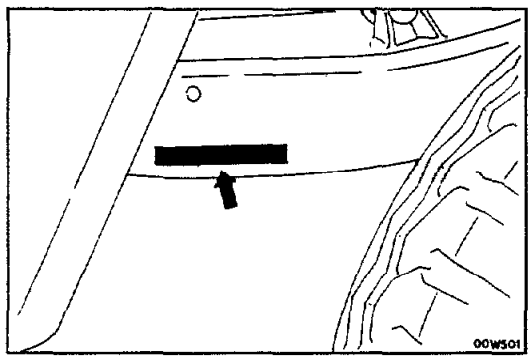
Vehicle information code plate is riveted on the cowl top outer panel (2.6L Engine) or front end upper bar (3.0L Engine) in the engine compartment.
The plate shows model code, engine model, transmission model, and body color code.

1. MODEL — **L146G VMNJLF**
   - Model series
   - Vehicle model
2. ENGINE — **6G72**
   - Engine model
3. TRANS AXLE — **V5MT1**
   - Transmission model
4. COLOR, TRIM OPT — **H84**
   - Monotone exterior color code

   **H1XH84X85**
   - Two-tone color code
   - Exterior code

   Two-tone exterior is shown by the exterior code followed by the two color codes.

TSB Revision




## CHASSIS NUMBER

### STAMPING LOCATION

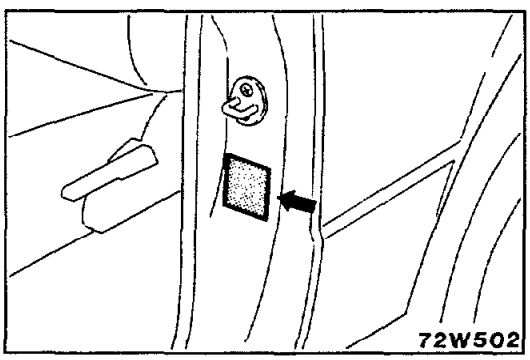
N00CE-

The chassis number is stamped on the side of the frame near the right rear wheel.

### CHASSIS NUMBER CODE CHART

L141 V KJ000001

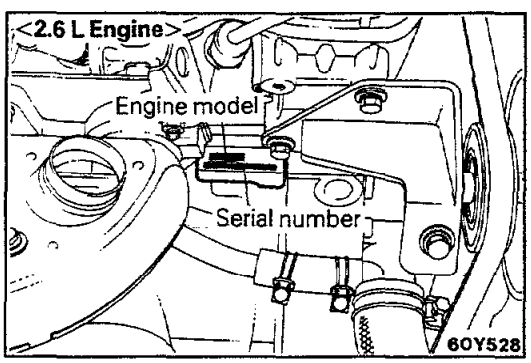
| Vehicle line | Body type | |
|---|---|---|
| L042, L141 or L146- MONTERO | V- metal-top | Refer to 10th thru 17th digits of V.I.N. plate |

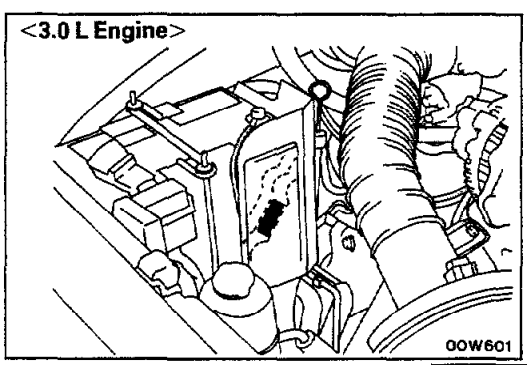



## VEHICLE SAFETY CERTIFICATION LABEL

N00CF-

The vehicle safety certification label is attached to face of left door pillar.
This label indicates the month and year of manufacture, Gross Vehicle Weight Rating (G.V.W.R.), front and rear Gross Axle Weight Rating (G.A.W.R.), and Vehicle Identification Number (V.I.N.).




## ENGINE MODEL STAMPING

N00CG-

The engine model is stamped on the right front side on the top edge of the cylinder block (for 2.6-liter engines). For 3.0-liter engines, it is stamped at the right rear of the top of the cylinder block.
*These engine model numbers are as shown in the following.*

| Engine model | Engine displacement |
|---|---|
| G54B | 2.555 liters (155.9 cu.in.) |
| 6G72 | 2.972 liters (181.4 cu.in.) |

The engine serial number is stamped near the engine model number, and the serial number cycles, as shown below.

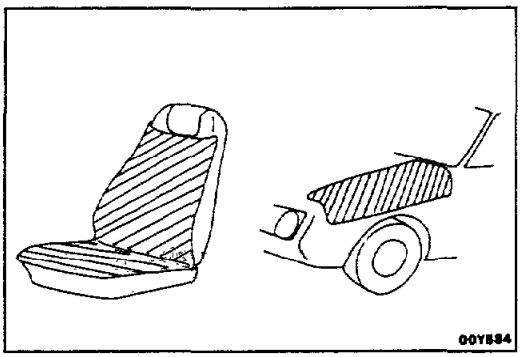
| Engine serial number | Number cycling |
|---|---|
| AA0201 to YY9999 | AA0201 ---→ AA9999<br>AB0001 ---→ AY9999<br>BA0001 ---→ YY9999 |

## BODY COLOR CODE

N00CH-

| Exterior code | Body color |
|---|---|
| Monotone | |
| C46 | Brown (M) |
| H84 | Silver (M) |
| R82 | Red |
| S55 | Beige (M) |
| T86 | Blue (M) |
| W09 | White |
| R48 | Red (M) |
| X15 | Black |
| Two-tone | |
| C1XC46X85 | Brown (M)/ Black |
| H1XH84X85 | Silver (M)/ Black |
| R2XR82X85 | Red/ Black |
| S1XS55X85 | Beige (M)/ Black |
| T6HT86H84 | Blue (M)/ Silver (M) |
| W6XW09X85 | White/ Black |
| X2HX15H84 | Black/ Silver (M) |

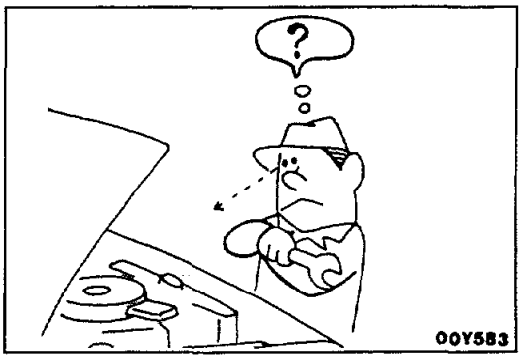
(M) : Metallic paint




# PRECAUTIONS BEFORE SERVICE

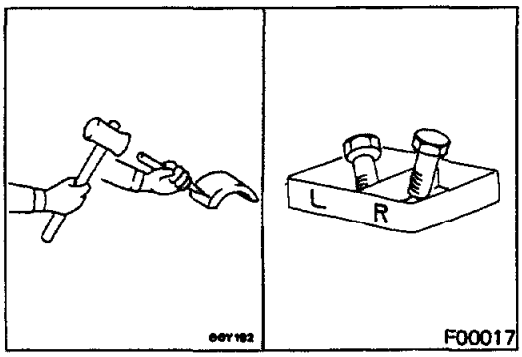
## PROTECTING THE VEHICLE N00DAAK

If there is a likelihood of damaging painted or interior parts during service operations, protect them with suitable covers (such as seat covers. fender covers, etc.).



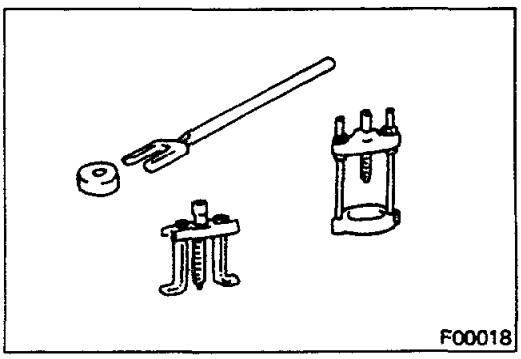

## REMOVAL AND DISASSEMBLY

When checking a malfunction, find the cause of the problem. If it is determined that removal and/or disassembly is necessary, perform the work by following the procedures contained in this Workshop Manual.



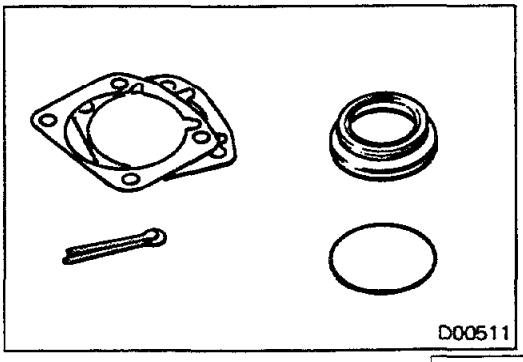

If punch marks or mating marks are made to avoid error in assembly and facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearances.
If an area having many parts, similar parts, and/or parts which are symmetrical right and left is disassembled, be sure to arrange the parts so that they do not become mixed during the assembly process.

1. Arrange the parts removed in the proper order.
2. Determine which parts are to be reused and which are to be replaced.
3. If bolts, nuts, etc., are to be replaced, be sure to use only the exact size specified.




## SPECIAL TOOLS

If other tools are substituted for the special tools to do service or repair work, there is the danger that vehicle parts might be damaged, or the mechanic might be injured; therefore, be sure to use the special tool whenever doing any work for which the use of one is specified.



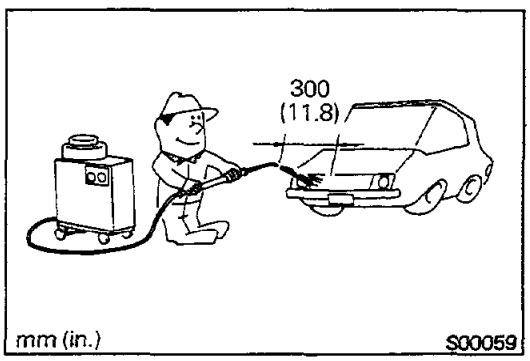

## PARTS TO BE REPLACED

If any of the following parts are removed, they must be replaced with new parts.

1. Oil seals
2. Gaskets (except rocker cover gasket)
3. Packings
4. O-rings
5. Lock washers
6. Cotter pins
7. Self-locking nuts

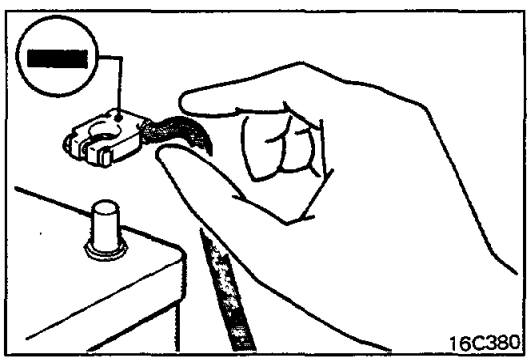
## PARTS

When replacing parts, use MITSUBISHI genuine parts.




## VEHICLE WASHING

If high-pressure car-washing equipment or steam car-washing equipment is used to wash the vehicle, be sure to maintain the spray nozzle at a distance of at least 300 mm (11.8 in.) from any plastic parts and all opening parts (doors, luggage compartment, etc.).

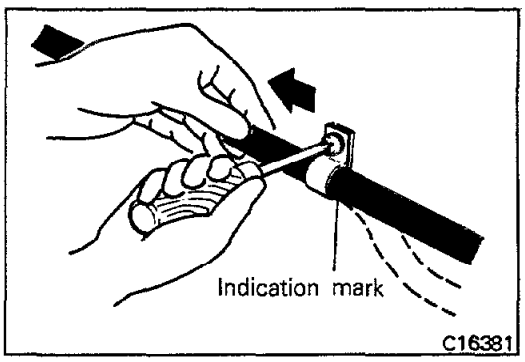



## SERVICING ELECTRICAL SYSTEM

1. Note the following before proceeding with work on the electrical system.
   Note that the following must never be done:
   Unauthorized modifications of any electrical device or wiring, because such modifications might lead to a vehicle malfunction, over-capacity or short-circuit that could result in a fire in the vehicle.
2. When servicing the electrical system, disconnect the negative cable terminal from the battery.

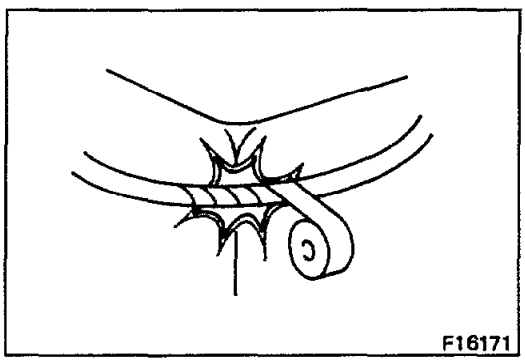
   **Caution**
   1. **Before connecting or disconnecting the negative cable, be sure to turn off the ignition switch and the lighting switch.**
      **(If this is not done, there is the possibility of semiconductor parts being damaged.)**
   2. **After completion of the work steps [when the battery's negative (–) terminal is connected], warm up the engine and allow it to idle for approximately five minutes under the conditions described below, in order to stabilize engine control conditions, and then check to be sure that the idling is satisfactory.**
      **For 3.0L Engine models: If the engine rpm is high, switch OFF the ignition switch, and then, after switching it ON again, let the engine idle for 2 or 3 minutes.**
      **This will cause the engine rpm to decrease about 100 rpm, so repeat this procedure until the prescribed idling speed is reached.**

      **Engine coolant temperature : 85°–95°C (185–203°F)**
      **Lights, accessories : OFF**
      **Transmission : neutral position**
      **(Automatic transmission models: "N" or "P")**
      **Steering wheel : neutral (center) position**

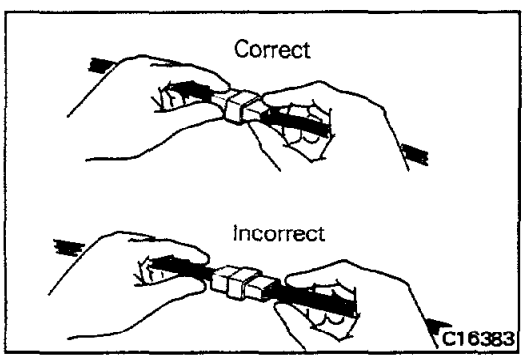



## WIRING HARNESSES

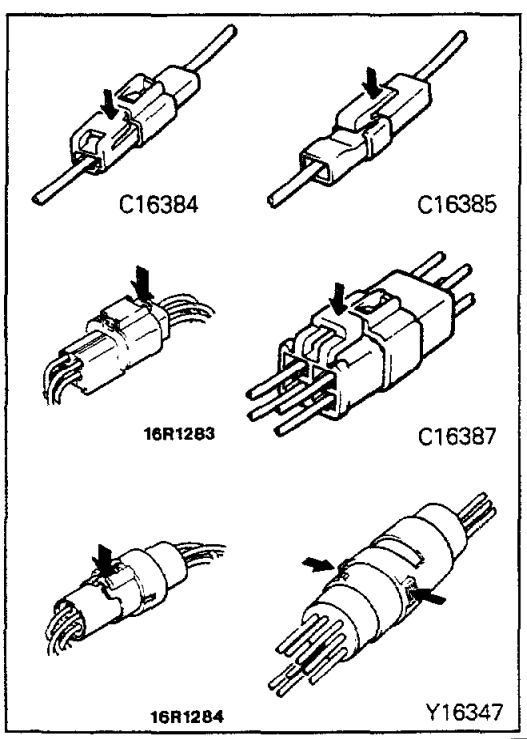
1. Secure the wiring harnesses by using clamps. However, for any harness which passes to the engine or other vibrating parts of the vehicle, allow some slack within a range that does not allow the engine vibrations to cause the harness to come into contact with any of the surrounding parts.
   Then secure the harness by using a clamp.
   In addition, if a mounting indication mark (yellow tape) is on a harness, secure the indication mark in the specified location.



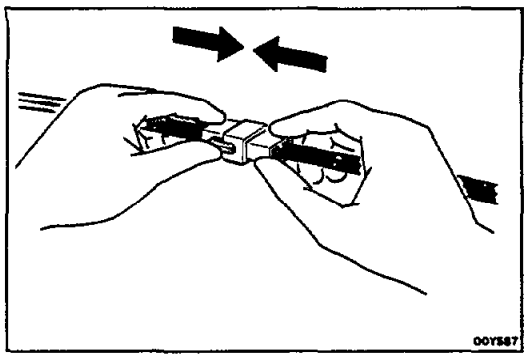

2. If any section of a wiring harness contacts the edge of a part, or a corner, wrap the section of the harness with tape or something similar in order to protect it from damage.



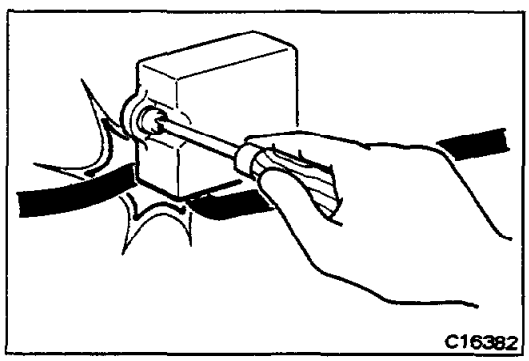

3. When disconnecting a connector, be sure to pull only the connector, not the harness.




4. Disconnect connectors which have catches by pressing in the direction indicated by the arrows in the illustration.

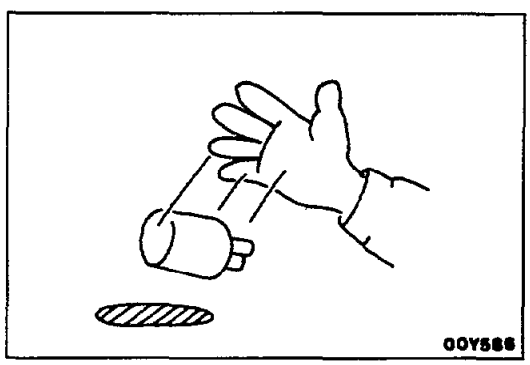



5. Connect connectors which have catches by inserting the connectors until they snap.

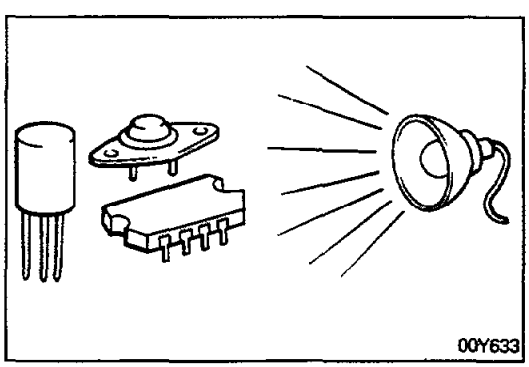



## ELECTRICAL COMPONENTS

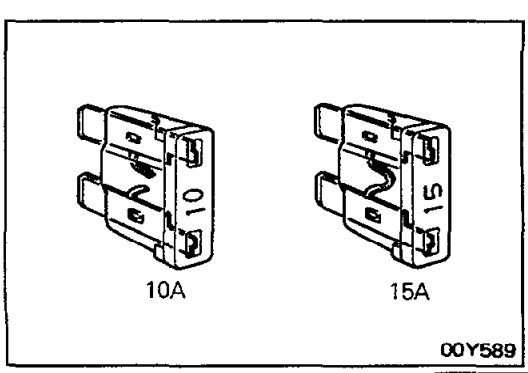
1. When installing any of the vehicle parts, be careful not to pinch or damage any of the wiring harnesses.




2. Sensors, relays, etc., are sensitive to strong impacts. Handle them with care so that they are not dropped or mishandled.




3. The electronic parts used for relays, etc., are sensitive to heat. If any service which causes a temperature of 80°C (176°F) or more is performed, remove the part or parts in question before carrying out the service.




## FUSES AND FUSIBLE LINKS

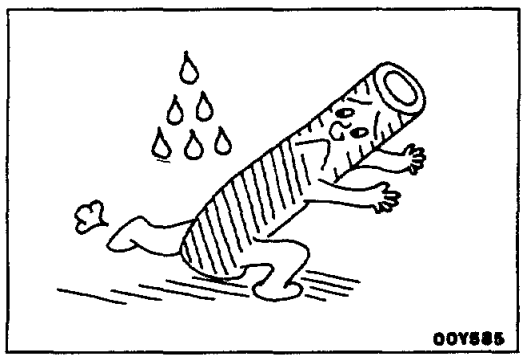
1. If a blown-out fuse is to be replaced, be sure to use only a fuse of the specified capacity. If a fuse of a capacity larger than that specified is used, parts may be damaged and the circuit may not be protected adequately.

**Caution**

1. **If a fuse is blown-out, be sure to eliminate the cause of the problem before installing a new fuse.**
2. **Check the condition of fuse holders. If rust or dirt is found, clean metal parts with a fine-grained sandpaper until proper metal-to-metal contact is made. Poor contact of any fuse holder will often lead to voltage drop or heating in the circuit and could result in improper circuit operation.**

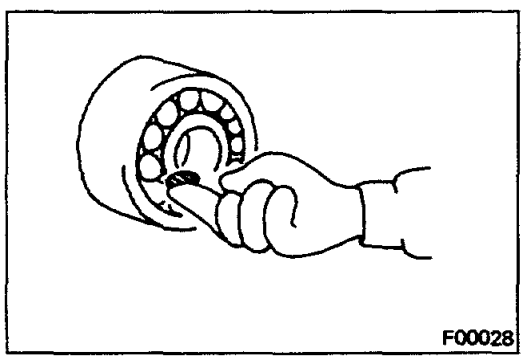
| Nominal size | SAE gauge No. | Permissible current | |
|---|---|---|---|
| | | In engine compartment | Other areas |
| 0.3 mm² | AWG 22 | – | 5A |
| 0.5 mm² | AWG 20 | 7A | 13A |
| 0.85 mm² | AWG 18 | 9A | 17A |
| 1.25 mm² | AWG 16 | 12A | 22A |
| 2.0 mm² | AWG 14 | 16A | 30A |
| 3.0 mm² | AWG 12 | 21A | 40A |
| 5.0 mm² | AWG 10 | 31A | 54A |

2. If additional optional equipment is to be installed in the vehicle, follow the procedure listed in the appropriate instruction manual; however, be sure to pay careful attention to the following points:
   (1) In order to avoid overloading the wiring, take the electrical current load of the optional equipment into consideration, and determine the appropriate wire size.
   (2) Where possible, route the wiring through the existing harnesses.
   (3) If an ammeter or similar instrument is to be connected to a live-wire circuit, use tape to protect the wire, use a clamp to secure the wire, and make sure that there is no contact with any other parts.
   (4) Be sure to provide a fuse for the load circuit of the optional equipment.



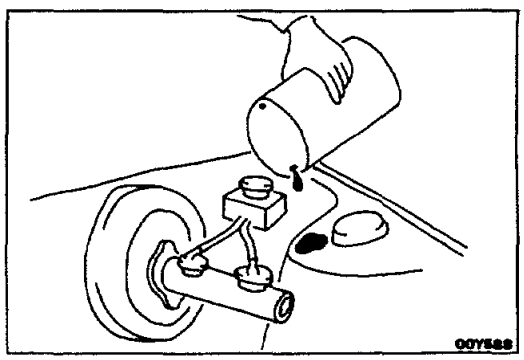

## TUBES AND OTHER RUBBER PARTS

Be careful to avoid spilling any gasoline, oil, etc., or rubber parts, they might be adversely affected.



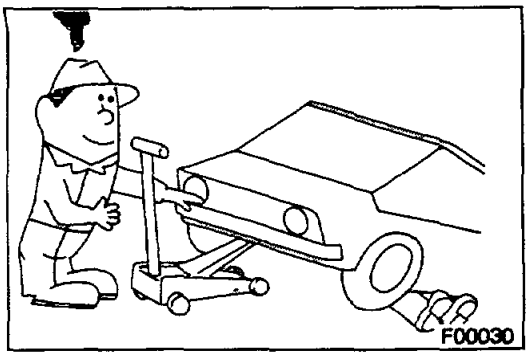

## LUBRICANTS

In accordance with the instructions in this Service Manual, apply the specified lubricants in the specified locations during assembly and installation.




## BRAKE FLUID

Be careful to avoid spilling any brake fluid on painted surfaces, because the paint coat might be discolored or damaged.



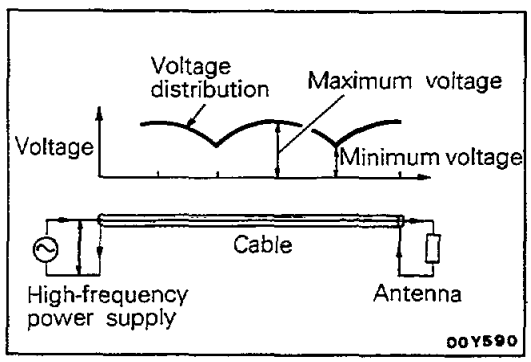

## DOING SERVICE WORK IN GROUPS OF TWO OR MORE TECHNICIANS

If the service work is to be done by two or more technicians working together, extra caution must be taken.

## NOTE ON INSTALLATION OF RADIO EQUIPMENT

N00EA-

The computers of the electronic control system has been designed so that external radio waves will not interfere with their operation.
However, if antenna or cable of amateur transceiver etc. is routed near the computers, it may affect the operation of the computers, even if the output of the transceiver is no more than 25W.
To protect each of the computers from interference by transmitter (hum, transceiver, etc.), the following should be observed.




1. Install the antenna on the roof or rear bumper.
2. Because radio waves are emitted from the coaxial cable of the antenna, keep it 200 mm (8 in.) away from the computers and the wiring harness. If the cable must cross the wiring harness, route it so that it runs at right angles to the wiring harness.
3. The antenna and the cable should be well matched, and the standing-wave ratio* should be kept low.
4. A transmitter having a large output should not be installed in the vehicle.
5. After installation of transmitter, run the engine at idle, emit radio waves from the transmitter and make sure that the engine is not affected.

### *STANDING-WAVE RATIO

If an antenna and a cable having different impedances are connected, the input impedance Zi will vary in accordance with the length of the cable and the frequency of the transmitter, and the voltage distribution will also vary in accordance with the location.
The ratio between this maximum voltage and minimum voltage is called the standing-wave ratio. It can also be represented by the ratio between the impedances of the antenna and the cable.
The amount of radio waves emitted from the cable increases as the standing-wave ratio increases, and this increases the possibility of the electronic components being adversely affected.

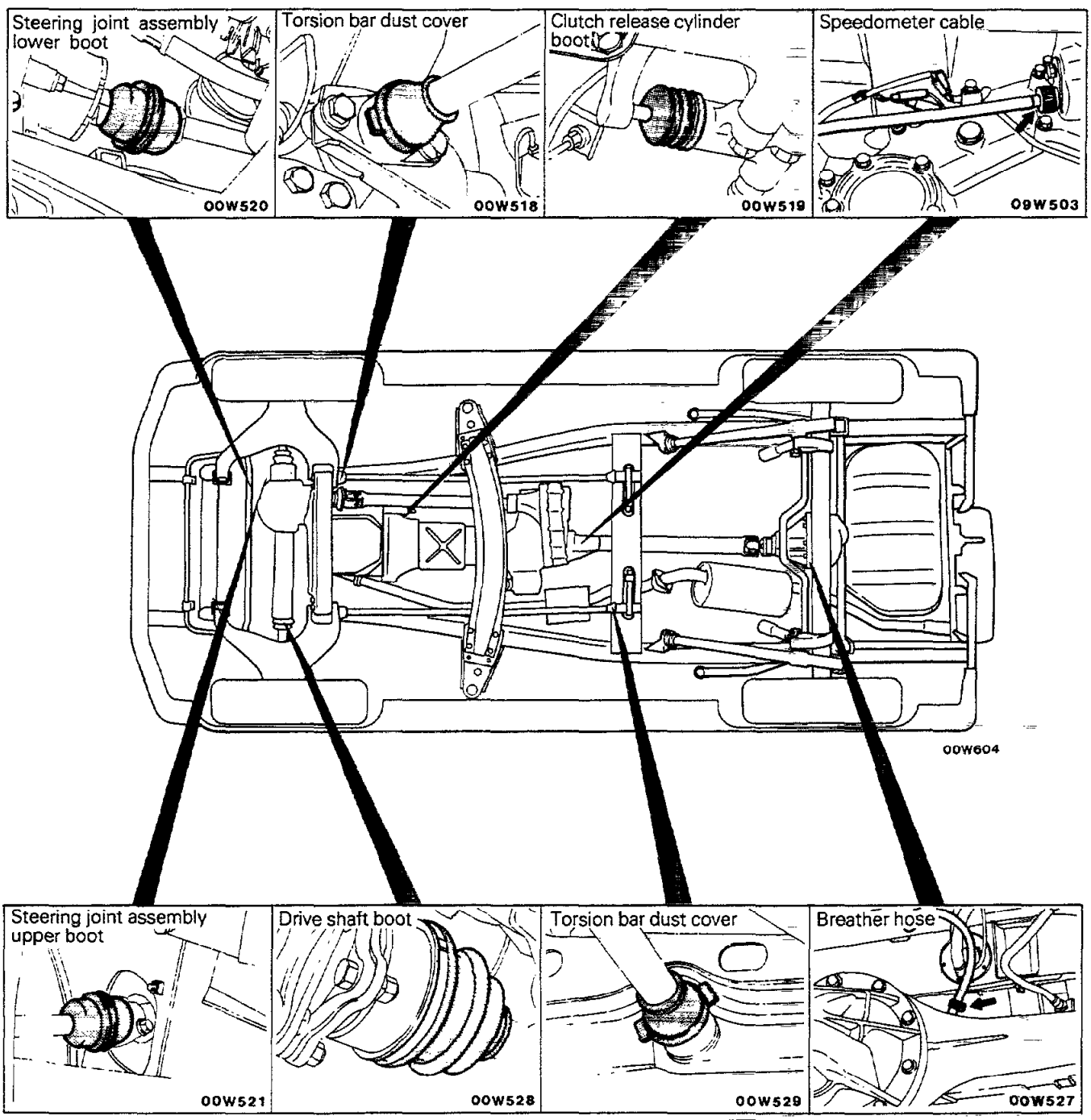
# TREATMENT BEFORE/AFTER THE FORDING OF A STREAM

## INSPECTION AND SERVICE BEFORE FORDING A STREAM

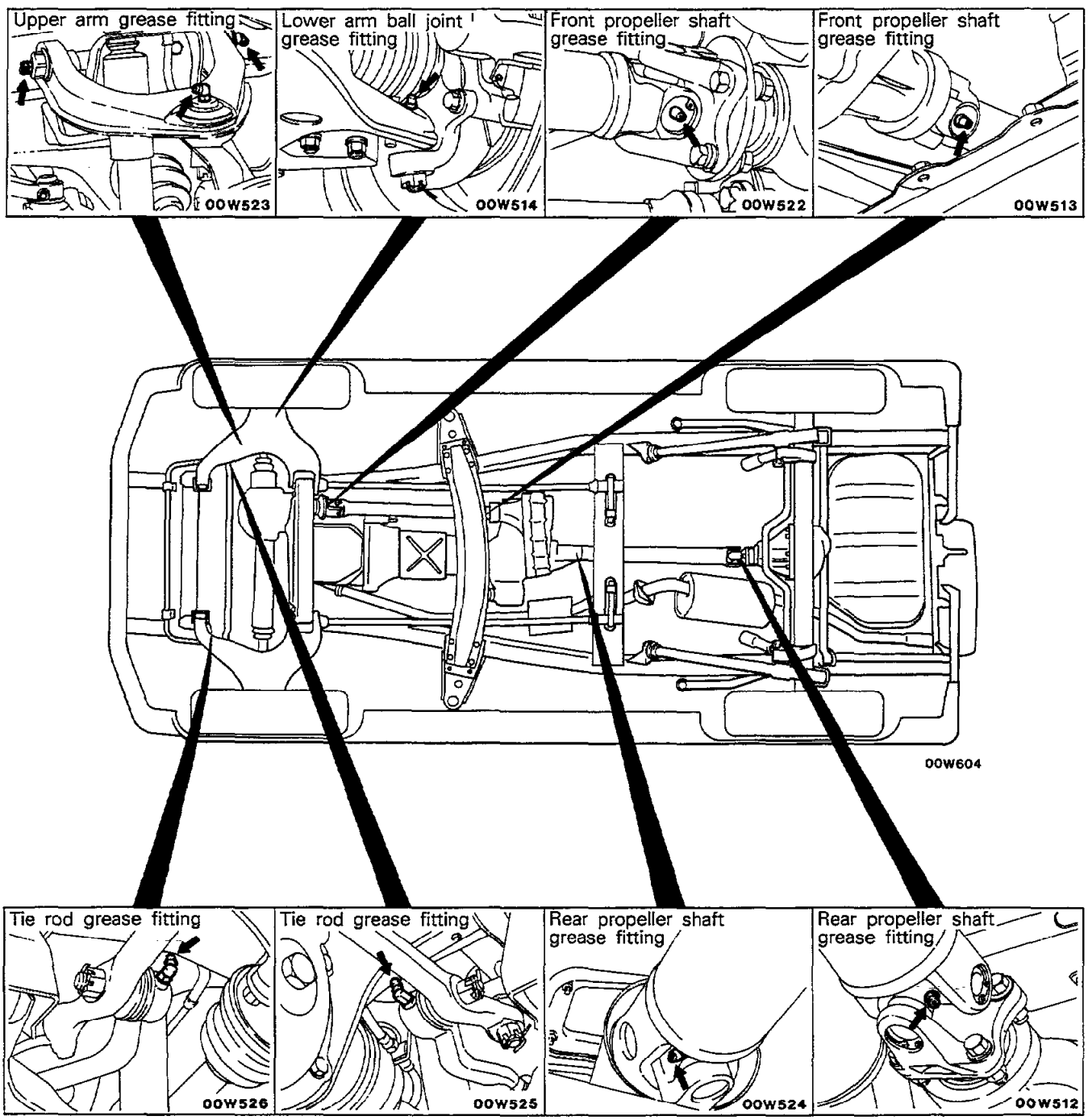
N00FA-

Vehicles which are driven through water, or which may possibly be driven through water, should be subjected to the following inspections and maintenance procedures in advance.

- Seal the speedometer cable with a water-resistant grease or tape.
- Inspect the dust boots and breather hose for cracks or damage, and replace them if cracks or damage are found.



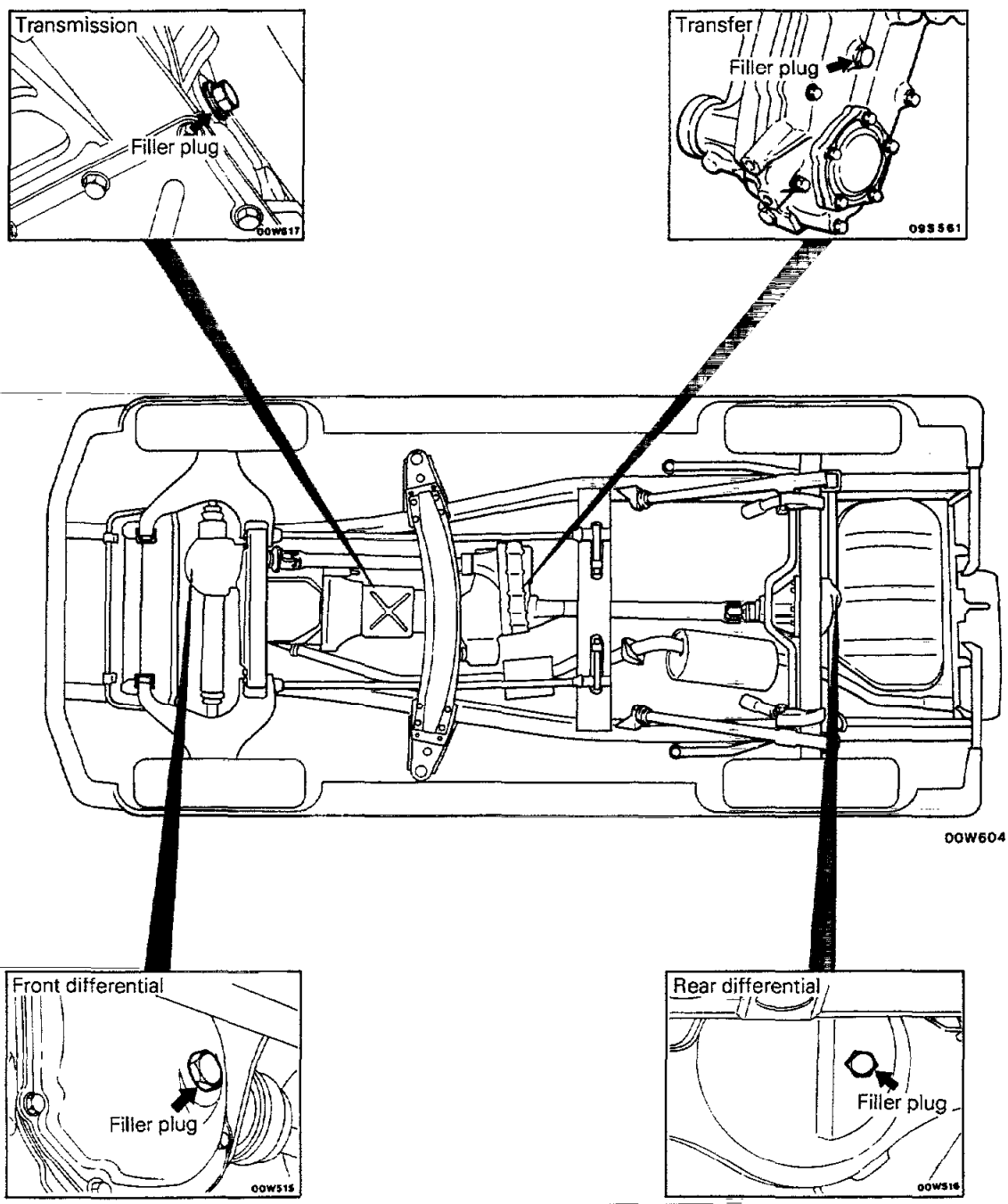
- Apply grease to the lubricating points of the front suspension, steering linkage and propeller shaft.

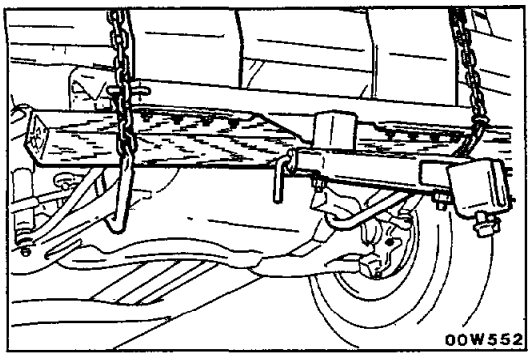


## INSPECTION AND SERVICE AFTER FORDING A STREAM

After fording a stream, check the following points. If abnormal condition is evident, clean, replace or lubricate.

- Check for water, mud, sand, etc, in the rear brake drum, clutch housing, starter motor, brake pipe and fuel pipe.
- Check for water in the fluid or oil inside the front differential, rear differential, transmission and transfer case.
- Apply grease to the lubricating points of the front suspension, steering linkage and propeller shaft.
- Check all boots and breather hoses for cracks and damage.






# TOWING AND HOISTING

N00GA–

This vehicle can only be towed from the front with conventional sling-type equipment and tow chain with grab hooks.
If a vehicle is towed from the rear, use a tow dolly.
A lumber spacer (4" x 4" x 55" wood beam) should be placed forward of under guard and under towing hook/shipping tie down hook.
Then, attach J-hook to the lower arm.
A safety chain system must be used. This system must be completely independent of the primary lifting and towing attachment. Care must be taken in the installation of safety chains to insure they do not cause damage to bumper, painted surfaces or lights.

## LIFTING-GROUND CLEARANCE

Towed vehicle should be raised until wheels are a minimum of 10 cm (4 in.) from the ground. Be sure there is adequate ground clearance at the opposite end of the vehicle, especially when towing over rough terrain or when crossing sharp rises such as curbs. If necessary, ground clearance can be increased by removing the wheels from the lifted end of the disabled vehicle and carrying the lifted end closer to the ground. A 20 cm (8 in.) ground clearance must be maintained between brake drums and ground.

## FRONT TOWING PICKUP

The vehicle may be towed on its rear wheels for extended distances, provided the parking brake is released.
Make cartain the transmission remains in "NEUTRAL".

## SAFETY PRECAUTIONS

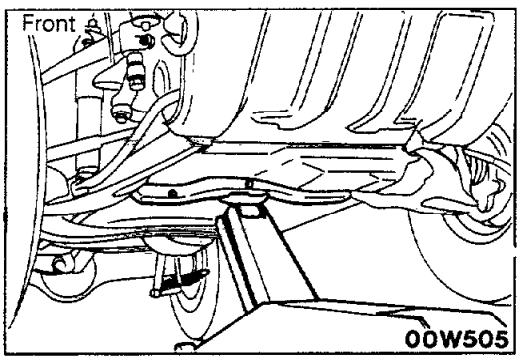
The following precautions should be taken when towing the vehicle.

1. Remove exhaust tips and any other optional equipment, that interface with the towing sling. Padding (heavy shop towel or carpeting) should be placed between the towing sling cross bar and any painted surfaces, and bumper surfaces.
2. A safety chain system completely independent of the primary lifting and towing attachment must be used.
3. Any loose or protruding parts of damaged vehicle such as hoods, doors, fenders, trim, etc., should be secured prior to moving the vehicle.
4. Operator should refrain from going under a vehicle unless the vehicle is adequately supported by safety stands.
5. Never allow passengers to ride in a towed vehicle.
6. State and local rules and regulations must be followed when towing a vehicle.

## HOISTING

### POST TYPE

Special care should be taken when raising the vehicle on a frame contact type hoist. The hoist must be equipped with the proper adapters in order to support the vehicle at the proper locations. (Shown in the illustration)
Conventional hydraulic hoists may be used after determining that the adapter plates will make firm contact with the side frame.

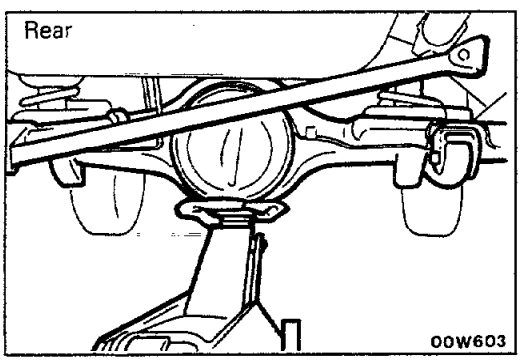



### FLOOR JACK

A regular floor jack may be used under the front crossmember or rear axle housing.

**Caution**

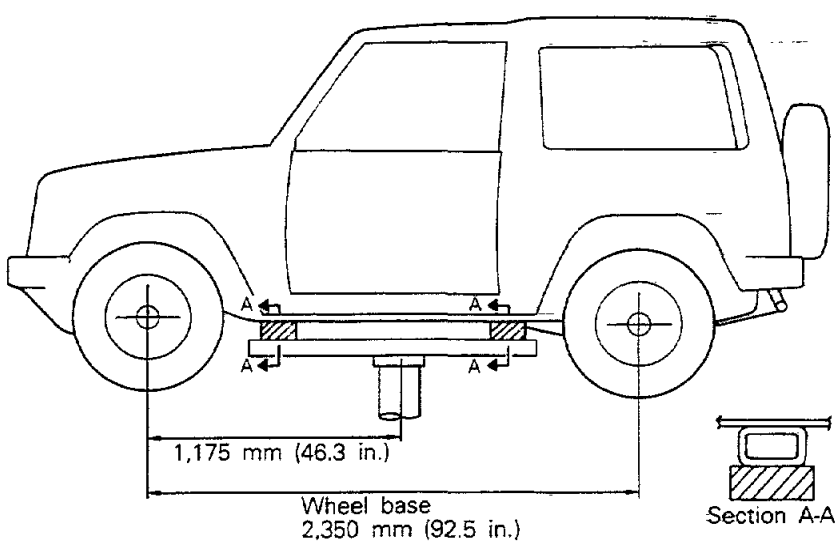
1. **A floor jack must never be used on any part of the underbody.**
2. **Do not attempt to raise one entire side of the vehicle by placing a jack midway between front and rear wheels. This practice may result in permanent damage to the body.**




### EMERGENCY JACKING

Jack receptacles are located at the No. 2 crossmember and rear axle housing to accept the jack supplied with the vehicle for emergency road service. Always block the opposite wheels and jack only on a level surface.

### FRAME CONTACT SUPPORT LOCATIONS

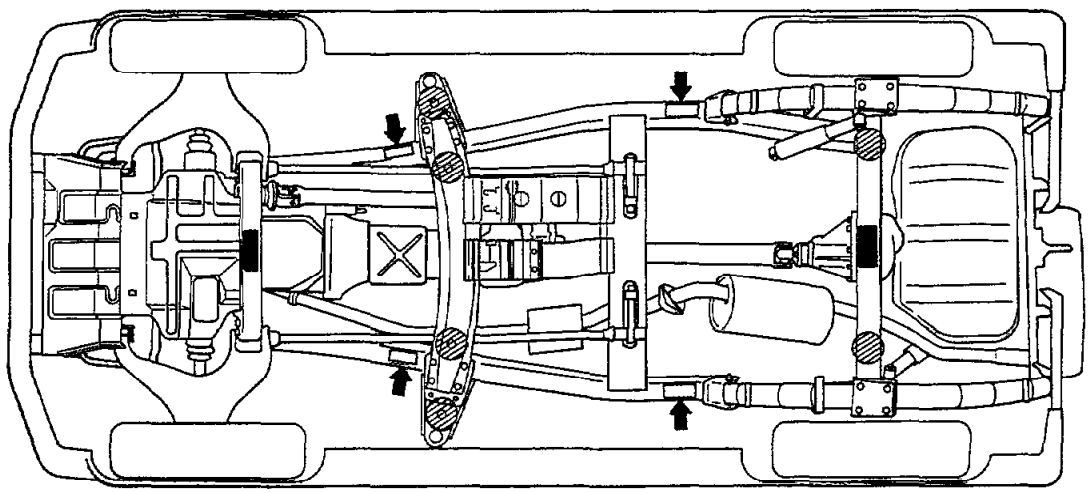



NOTE
The locations of the support point shown as Section A-A are the same as those of the twin post hoist shown in the next page.

00W553

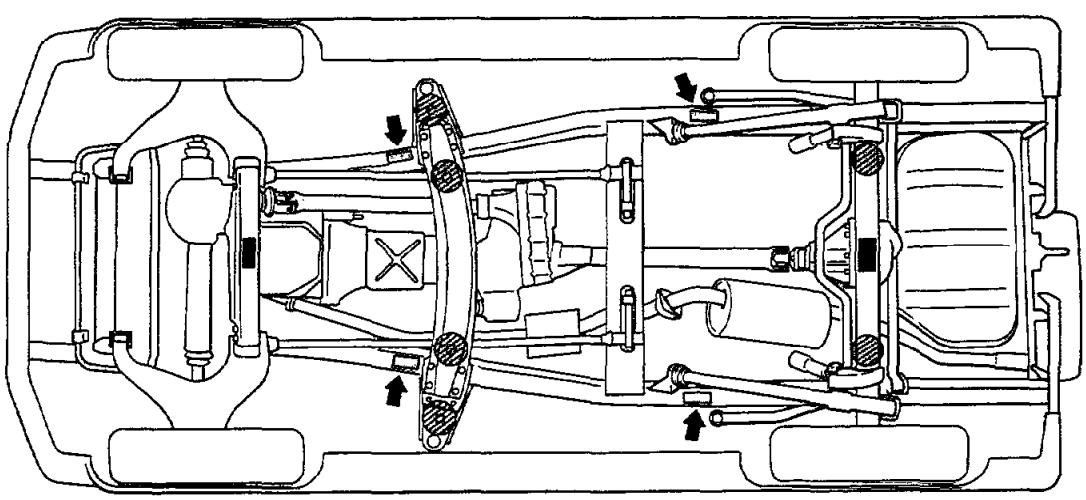
## LIFTING AND JACKING SUPPORT LOCATIONS

### <2.6L Engine>



00W588

### <3.0L Engine>

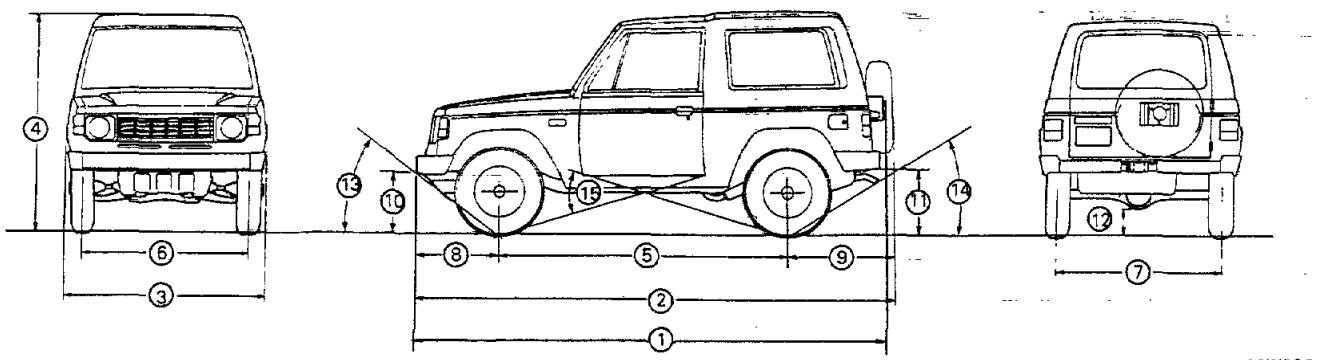


00W605

- Twin post hoist
- Floor jack
- Emergency jacking (jack supplied with the vehicle)

# GENERAL DATA AND SPECIFICATIONS

N00HA--




00W606

**<2-door vehicles>**

| Description \ Models | | | L042G | L141G | | |
|---|---|---|---|---|---|---|
| | | | TNSL F/H | TNJL F/H | TRJL F/H | TRUL F/H |
| Vehicle dimensions mm (in.) | | | | | | |
| Overall length | | | | | | |
| Without spare tire | | ① | 3,900 (153.5) | 3,905 (153.7) | 3,905 (153.7) | 3,905 (153.7) |
| With spare tire | | ② | 3,935 (154.9) | 3,940 (155.1) | 3,940 (155.1) | 3,940 (155.1) |
| Overall width | | ③ | 1,680 (66.1) | 1,680 (66.1) | 1,680 (66.1) | 1,680 (66.1) |
| Overall height | | ④ | 1,840 (72.4) | 1,850 (72.8) | 1,850 (72.8) | 1,850 (72.8) |
| Wheelbase | | ⑤ | 2,350 (92.5) | 2,350 (92.5) | 2,350 (92.5) | 2,350 (92.5) |
| Tread | Front | ⑥ | 1,400 (55.1) | 1,400 (55.1) | 1,400 (55.1) | 1,400 (55.1) |
| | Rear | ⑦ | 1,375 (54.1) | 1,415 (55.7) | 1,415 (55.7) | 1,415 (55.7) |
| Overhang | Front | ⑧ | 685 (27.0) | 685 (27.0) | 685 (27.0) | 685 (27.0) |
| | Rear | ⑨ | 900 (35.4) | 905 (35.6) | 905 (35.6) | 905 (35.6) |
| Height at curb weight (wt.) | | | | | | |
| Front bumper to ground | | ⑩ | 480 (18.9) | 490 (19.3) | 490 (19.3) | 490 (19.3) |
| Rear bumper to ground | | ⑪ | 440 (17.3) | 450 (17.7) | 450 (17.7) | 450 (17.7) |
| Minimum running ground clearance | | ⑫ | 210 (8.3) | 215 (8.5) | 215 (8.5) | 215 (8.5) |
| Angle of approach | | ⑬ | 38° | 38° | 38° | 38° |
| Angle of departure | | ⑭ | 28° | 28° | 28° | 28° |
| Ramp breakover angle | | ⑮ | 21° | 21° | 21° | 21° |
| Vehicle weights kg (lbs.) | | | | | | |
| Curb weight | | | 1,455 (3,207) | 1,585 (3,494) | 1,600 (3,527) | 1,605 (3,538) |
| Gross vehicle weight rating | | | 1,910 (4,210) | 2,200 (4,850) | 2,200 (4,850) | 2,200 (4,850) |
| Gross axle weight rating | Front | | 1,100 (2,425) | 1,100 (2,425) | 1,100 (2,425) | 1,100 (2,425) |
| | Rear | | 1,450 (3,197) | 1,600 (3,527) | 1,600 (3,527) | 1,600 (3,527) |
| Seating capacity | | | 2 | 2 | 2 | 2 |

| Description \ Models | | L042G | L141G | | |
|---|---|---|---|---|---|
| | | TNSL F/H | TNJL F/H | TRJL F/H | TRUL F/H |
| Engine | | | | | |
| Model No. | | G54B | 6G72 | 6G72 | 6G72 |
| Type | | In-line OHC | V-type, OHC | V-type, OHC | V-type, OHC |
| Number of cylinders | | 4 | 6 | 6 | 6 |
| Bore | | 91.1 mm (3.59 in.) | 91.1 mm (3.59 in.) | 91.1 mm (3.59 in.) | 91.1 mm (3.59 in.) |
| Stroke | | 98.0 mm (3.86 in.) | 76.0 mm (2.99 in.) | 76.0 mm (2.99 in.) | 76.0 mm (2.99 in.) |
| Piston displacement | | 2,555 cm³ (155.9 cu.in.) | 2,972 cm³ (181.4 cu.in.) | 2,972 cm³ (181.4 cu.in.) | 2,972 cm³ (181.4 cu.in.) |
| Compression ratio | | 8.7 | 8.9 | 8.9 | 8.9 |
| Firing order | | 1-3-4-2 | 1-2-3-4-5-6 | 1-2-3-4-5-6 | 1-2-3-4-5-6 |
| Basic ignition timing | | 7°BTDC ±2° | 5°BTDC ±2° | 5°BTDC ±2° | 5°BTDC ±2° |
| Transmission & transfer case | | | | | |
| Model No. | | KM145 | V5MT1 | KM148 | KM148 |
| Type | | 5-speed manual | 5-speed manual | 4-speed automatic | 4-speed automatic |
| Gear ratio | | | | | |
| Transmission | 1st | 3.967 | 3.918 | 2.826 | 2.826 |
| | 2nd | 2.136 | 2.261 | 1.493 | 1.493 |
| | 3rd | 1.360 | 1.395 | 1.000 | 1.000 |
| | 4th | 1.000 | 1.000 | 0.688 | 0.688 |
| | 5th | 0.856 | 0.829 | – | – |
| | Reverse | 3.587 | 3.925 | 2.703 | 2.703 |
| Transfer case | High | 1.000 | 1.000 | 1.000 | 1.000 |
| | Low | 1.944 | 1.925 | 1.925 | 1.925 |
| Final ring gear ratio | | 4.625 | 4.625 | 4.625 | 4.625 |
| Clutch | | | | | |
| Type | | Dry single disc & diaphragm spring | Dry single disc & diaphragm spring | – | – |
| Chassis | | | | | |
| Tire size | | P225/75R15 | P235/75R15 | | |
| Front suspension | | | | | |
| Type | | Independent double-wishbone | Independent double-wishbone | | |
| Rear suspension | | | | | |
| Type | | Rigid axle | Rigid axle | | |
| Brakes | | | | | |
| Type | Front | Disc | Disc | | |
| | Rear | Drum (Leading and trailing) | Drum (Leading and trailing) | | |
| Power steering | | | | | |
| Gear type | | Integral type (Recirculating ball nut) | Integral type (Recirculating ball nut) | | |
| Gear ratio | | 16.4 | 16.4 | | |
| Fuel tank capacity | liters (gals.) | 60 (15.9) | 75 (19.8) | | |

**<4-door vehicles>**

| Description \ Models | | | L146G | | |
|---|---|---|---|---|---|
| | | | VMNJL F/H | VMRJL F/H | WMRUL F/H |
| Vehicle dimensions mm (in.) | | | | | |
| Overall length | | | | | |
| Without spare tire | | ① | 4,570 (179.9) | 4,570 (179.9) | 4,570 (179.9) |
| With spare tire | | ② | 4,605 (181.3) | 4,605 (181.3) | 4,605 (181.3) |
| Overall width | | ③ | 1,680 (66.1) | 1,680 (66.1) | 1,680 (66.1) |
| Overall height | | ④ | 1,890 (74.4) | 1,890 (74.4) | 1,890 (74.4) |
| Wheelbase | | ⑤ | 2,695 (106.1) | 2,695 (106.1) | 2,695 (106.1) |
| Tread | Front | ⑥ | 1,400 (55.1) | 1,400 (55.1) | 1,400 (55.1) |
| | Rear | ⑦ | 1,415 (55.7) | 1,415 (55.7) | 1,415 (55.7) |
| Overhang | Front | ⑧ | 745 (29.3) | 745 (29.3) | 745 (29.3) |
| | Rear | ⑨ | 1,165 (45.9) | 1,165 (45.9) | 1,165 (45.9) |
| Height at curb weight (wt.) | | | | | |
| Front bumper to ground | | ⑩ | 490 (19.3) | 490 (19.3) | 490 (19.3) |
| Rear bumper to ground | | ⑪ | 450 (17.7) | 450 (17.7) | 450 (17.7) |
| Minimum running ground clearance | | ⑫ | 215 (8.5) | 215 (8.5) | 215 (8.5) |
| Angle of approach | | ⑬ | 38° | 38° | 38° |
| Angle of departure | | ⑭ | 28° | 28° | 28° |
| Ramp breakover angle | | ⑮ | 18° | 18° | 18° |
| Vehicle weights kg (lbs.) | | | | | |
| Curb weight | | | 1,780 (3,924) | 1,795 (3,957) | 1,805 (3,979) |
| Gross vehicle weight rating | | | 2,400 (5,291) | 2,400 (5,291) | 2,400 (5,291) |
| Gross axle weight rating | Front | | 1,100 (2,425) | 1,100 (2,425) | 1,100 (2,425) |
| | Rear | | 1,600 (3,527) | 1,600 (3,527) | 1,600 (3,527) |
| Seating capacity | | | 5 | 5 | 5 |
| Engine | | | | | |
| Model No. | | | 6G72 | 6G72 | 6G72 |
| Type | | | V-type, OHC | V-type, OHC | V-type, OHC |
| Number of cylinders | | | 6 | 6 | 6 |
| Bore | | | 91.1 mm (3.59 in.) | 91.1 mm (3.59 in.) | 91.1 mm (3.59 in.) |
| Stroke | | | 76.0 mm (2.99 in.) | 76.0 mm (2.99 in.) | 76.0 mm (2.99 in.) |
| Piston displacement | | | 2,972 cm³ (181.4 cu.in.) | 2,972 cm³ (181.4 cu.in.) | 2,972 cm³ (181.4 cu.in.) |
| Compression ratio | | | 8.9 | 8.9 | 8.9 |
| Firing order | | | 1-2-3-4-5-6 | 1-2-3-4-5-6 | 1-2-3-4-5-6 |
| Basic ignition timing | | | 5°BTDC ±2° | 5°BTDC ±2° | 5°BTDC ±2° |

| Description \ Models | | L146G | | |
|---|---|---|---|---|
| | | VMNJL F/H | VMRJL F/H | WMRUL F/H |
| Transmission & transfer case | | | | |
| Model No. | | V5MT1 | KM148 | KM148 |
| Type | | 5-speed manual | 4-speed automatic | 4-speed automatic |
| Gear ratio | | | | |
| Transmission | 1st | 3.918 | 2.826 | 2.826 |
| | 2nd | 2.261 | 1.493 | 1.493 |
| | 3rd | 1.395 | 1.000 | 1.000 |
| | 4th | 1.000 | 0.688 | 0.688 |
| | 5th | 0.829 | – | – |
| | Reverse | 3.925 | 2.703 | 2.703 |
| Transfer case | High | 1.000 | 1.000 | 1.000 |
| | Low | 1.925 | 1.925 | 1.925 |
| Final ring gear ratio | | 4.625 | 4.625 | 4.625 |
| Clutch | | | | |
| Type | | Dry single disc & diaphragm spring | – | – |
| Chassis | | | | |
| Tire size | | P235/75 R15 | | |
| Front suspension | | | | |
| Type | | Independent double-wishbone | | |
| Rear suspension | | | | |
| Type | | Rigid axle | | |
| Brakes | | | | |
| Type | Front | Disc | | |
| | Rear | Drum (Leading and trailing) | | |
| Power steering | | | | |
| Gear type | | Integral type (Recirculating ball nut) | | |
| Gear ratio | | 16.4 | | |
| Fuel tank capacity | liter (gal.) | 92 (24.3) | | |

# TIGHTENING TORQUE

N00JA--

| Description | Head mark 4 | | Head mark 7 | |
|---|---|---|---|---|
| | Nm | ft.lbs. | Nm | ft.lbs. |
| Thread for general purposes (size x pitch) mm | | | | |
| 6 x 1.0 | 3.0–3.9 | 2.2–2.9 | 4.9–7.8 | 3.6–5.8 |
| 8 x 1.25 | 7.9–12 | 5.8–8.7 | 13–19 | 9.4–14 |
| 10 x 1.25 | 16–23 | 12–17 | 27–39 | 20–29 |
| 12 x 1.25 | 29–43 | 21–32 | 47–72 | 35–53 |
| 14 x 1.5 | 48–70 | 35–52 | 77–110 | 57–85 |
| 16 x 1.5 | 67–100 | 51–77 | 130–160 | 90–120 |
| 18 x 1.5 | 100–150 | 74–110 | 180–230 | 130–170 |
| 20 x 1.5 | 150–190 | 110–140 | 160–320 | 190–240 |
| 22 x 1.5 | 200–260 | 150–190 | 340–430 | 250–320 |
| 24 x 1.5 | 260–320 | 190–240 | 420–550 | 310–410 |

| Description | Nm | ft.lbs. | Remarks |
|---|---|---|---|
| Taper thread for pipes (size) | | | |
| PT 1/8 | 7.9–12 | 5.8–8.7 | Internal thread: Aluminum |
| | 16–19 | 12–14 | Internal thread: Cast iron |
| PT 1/4 | 19–30 | 14–22 | Internal thread: Aluminum |
| | 34–45 | 25–33 | Internal thread: Cast iron |
| PT 3/8 | 39–54 | 29–40 | Internal thread: Aluminum |
| | 58–73 | 43–54 | Internal thread: Cast iron |
| Taper thread for dry sealed pipes (size) | | | |
| NPTF 1/16 | 4.9–7.8 | 3.6–5.8 | Internal thread: Aluminum |
| | 7.9–12 | 5.8–8.7 | Internal thread: Cast iron |
| NPTF 1/8 | 7.9–12 | 5.8–8.7 | Internal thread: Aluminum |
| | 16–19 | 12–14 | Internal thread: Cast iron |
| NPTF 1/4 | 19–13 | 14–22 | Internal thread: Aluminum |
| | 34–45 | 25–33 | Internal thread: Cast iron |

# MASTER TROUBLESHOOTING

N00KAAG

## ENGINE OVERHEATS

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Engine overheats | Cooling system faulty | 7-4 |
| | Incorrect ignition timing | 8-147 to 149 |

## ENGINE WILL NOT CRANK OR CRANKS SLOWLY

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Engine will not crank or cranks slowly | Starting system faulty | 8-134, 135 |

## ENGINE WILL NOT START OR BE HARD TO START (CRANKS OK)

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Engine will not start or be hard to start (Cranks OK) | No fuel supply to carburetor or injection system | 14-34, 90 |
| | Carburetor or injection system problems | 14-34, 90 |
| | Ignition system problems | 8-147 to 149 |
| | Vacuum leaks<br>• Purge control valve hose<br>• Vacuum hoses<br>• Intake manifold<br>• Air intake plenum<br>• Carburetor or throttle body<br>• EGR valve | Repair as necessary |
| | Compression too low | 9-11, 65 |

## ROUGH IDLE OR ENGINE STALL

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Rough idle or engine stalls | Vacuum leaks<br>• Purge control valve hose<br>• Vacuum hoses<br>• Intake manifold<br>• Air intake plenum<br>• Carburetor or throttle body<br>• EGR valve | Repair as necessary |
| | Ignition system problems | 8-147 to 149 |
| | Idle speed set too low | 0-10, 14-62 |
| | Idle mixture too lean or too rich | 14-11 |
| | Carburetor or fuel injection system problems | 14-34, 90 |
| | Exhaust gas recirculation (EGR) system problems | 25-17, 32 |
| | Engine overheats | 7-4 |
| | Compression too low | 9-11, 65 |

## ENGINE HESITATES OR POOR ACCELERATION

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Engine hesitates or poor acceleration | Ignition system problem | 8-147 to 149 |
| | Vacuum leaks<br>• Purge control valve hose<br>• Vacuum hoses<br>• Intake manifold<br>• Air intake plenum<br>• Carburetor or throttle body<br>• EGR valve | Repair as necessary |
| | Air cleaner clogged | 11-3, 10 |
| | Fuel line clogged | 14-52, 99 |
| | Carburetor or fuel injection system problem | 14-34, 90 |
| | Auxiliary acceleration pump faulty (cold engine) | 14-23 |
| | Emission control system problem<br>• EGR system always on<br>• High-altitude compensation (HAC) system problem | 25-17, 22, 32 |
| | Engine overheats | 7-4 |
| | Compression too low | 9-11, 65 |

## ENGINE DIESELING

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Engine dieseling (runs after ignition switch is turned off) | Carburetor problems | 14-34 |
| | Incorrect ignition timing | 8-147 to 149 |

## EXCESSIVE OIL CONSUMPTION

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Excessive oil consumption | Oil leak | Repair as necessary |
| | Positive crankcase ventilation line clogged | 0-13 |
| | Valve stem seal worn or damaged | Replace |
| | Valve stem worn | Replace |
| | Piston ring worn or damaged | 9-43 |

## POOR FUEL MILEAGE

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Poor fuel mileage | Fuel leak | Repair as necessary |
| | Air cleaner clogged | 11-3, 10 |
| | Ignition problems | 8-147 to 149 |
| | Carburetor or fuel injection system problems | 14-34, 90 |
| | Compression too low | 9-11, 65 |
| | Tires improperly inflated | 22-2 |
| | Clutch slips | 6-4 |
| | Brakes drag | 5-13 |

## NOISE

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Noise | Loose bolts and nuts | Retighten as necessary |
| | Engine noise | 9-11 |

## HARD STEERING

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Hard steering | Loose power steering oil pump belt | 19-10 |
| | Low fluid level | 19-11 |
| | Air in power steering system | 19-11 |
| | Low tire pressure | 22-2 |
| | Excessive turning resistance of upper or lower ball joint | 2-27 |
| | Excessively tight linkage ball joint | 19-37 |
| | Improper front wheel alignment | 2-13 |
| | Excessive turning resistance of tie-rod ball joint | 19-38 |
| | No lubricantion of tie-rod | Lubricate |
| | Sticky flow control valve | 19-33 |
| | No lubrication of idler arm | 19-39 |

## POOR RETURN OF STEERING WHEEL TO CENTER

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Poor return of steering wheel to center | Improper front wheel alignment | 2-13 |
| | Improper tire pressure | 22-2 |
| | Damaged front wheel bearing | 2-21 |

## POOR RIDING

| | Probable cause | Reference page or remedy |
|---|---|---|
| Poor riding | Improper tire pressure | 22-2 |
| | Imbalanced wheels | 22-4 |
| | Improper front or rear wheel alignment | 2-13, 17-3, 6 |
| | Malfunctioning shock absorber | 2-27, 17-4, 8 |
| | Broken or worn stabilizer | 2-39 |
| | Broken or worn torsion bar spring | 2-36 |
| | Loose suspension securing bolt(s) | Retighten |
| | Worn lower arm bushing | 2-31 |

## ABNORMAL TIRE WEAR

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Abnormal tire wear | Improper front or rear wheel alignment | 2-13, 17-3, 6 |
| | Improper tire pressure | 22-2 |
| | Imbalanced wheels | 22-4 |
| | Loose wheel bearings | 2-19 |
| | Malfunctioning shock absorber | 2-27, 17-4,8 |

## ROAD WANDER

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Road wander | Improper front or rear wheel alignment | 2-13, 17-3, 6 |
| | Excessive play of steering wheel | 19-8 |
| | Poor turning resistance of upper ball joint | 2-27 |
| | Improper tire pressure | 22-2 |
| | Loose or worn lower arm or upper arm bushing | 2-28, 31 |
| | Loose or worn wheel bearings | 2-19 |

**TSB Revision**

## VEHICLE PULLS TO ONE SIDE

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Vehicle pulls to one side | Improper front or rear wheel alignment | 2-13, 17-3,6 |
| | Imbalanced or worn tires | 22-4 |
| | Uneven tire pressure | 22-2 |
| | Excessive turning resistance of upper ball joint | 2-27 |
| | Wheel bearing seizure | 2-21 |
| | Broken or worn torsion bar spring | 2-36 |
| | Bend front axle drive shaft | 2-40 |
| | Deformed lower arm | 2-30 |

## STEERING WHEEL SHIMMY

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Steering wheel shimmy | Improper front or rear wheel alignment | 2-13, 17-3, 6 |
| | Improper tire pressure | 22-2 |
| | Imbalanced wheels | Repair |
| | Poor turning resistance of upper ball joint | 2-27 |
| | Excessive play of steering wheel | 19-8 |
| | Broken or weak stabilizer | 2-39 |
| | Worn lower arm or upper arm bushing | 2-28,31 |
| | Malfunctioning shock absorber | 2-27 |
| | Broken or weak torsion bar spring or, leaf spring or coil spring | 2-36, 17-4, 9 |
| | Wear, play, or seizure of wheel bearing | 2-19 |

## BOTTOMING

| Symptom | Probable cause | Reference page or remedy |
|---|---|---|
| Bottoming | Overloaded vehicle | Correct |
| | Broken or weak torsion bar spring, leaf spring or coil spring | 2-36, 17-4, 9 |
| | Malfunctioning shock absorber | 2-27, 17-4, 8 |

## WHEEL BEARING TROUBLESHOOTING

| Trouble | Symptom | Probable cause |
|---|---|---|
| Pitting | Pitting occurs because of uneven rotation of race and bearing surfaces | Excessive bearing preload<br>Excessive load |
| Flaking | The surface peels because of uneven rotation of the race and bearing surfaces | End of bearing life<br>Improper bearing assembly |
| Cracking | Chipping or cracking of cage or roller edges | Impact when bearing was installed (such as being hit with a hammer) |
| Flat spotting | When large load is applied, race and roller contact surfaces compress, forming indentations | Excessive bearing preload<br>Excessive load<br>Vibration when bearings are not used, such as during shipment on freight cars, transport trucks, etc. |
| Nicks | Instead of rolling along race surface, rollers slide, thus damaging surface | Improper grease<br>Excessive bearing preload<br>Excessive load<br>Faulty oil seal |
| Smearing | Damage or wear caused by minute particles adhering to surfaces results in rough movement and such high temperatures that parts of surface melt | Excessive variation of loads on bearings<br>Use of grease other than that specified<br>Improper grease |
| Rust, corrosion | Appears on various areas of the bearing | Use of grease other than that specified<br>Faulty oil seal<br>Presence of water or moisture |
| Wear | Wear of surface areas caused by friction | Improper grease<br>Foreign matter<br>Rust or corrosion due to moisture<br>Use of grease other than that specified<br>Faulty oil eal |
| Discoloration | Grease discoloration results from grease deterioration which causes particles of pigment contained in grease to adhere to surfaces<br>Heat discoloration will appear as a deep brown or purple | Use of grease other than that specified<br>Faulty oil seal<br>Excessive bearing preload<br>Excessive load |