

Service Manual

CONQUEST

1988

Volume-1
Engine,
Chassis & Body

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

HOW TO USE THIS MANUAL

N00BAAF

CONTENTS

The preceding page contains 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

Troubleshooting 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.

Indicates tightening torque.

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

Removal steps:

The numbers before part names correspond to numbers in the illustration, and indicate the order of removal.

Disassembly steps:

The numbers before part names correspond to numbers in the illustration, and indicate the order of disassembly.

Installation steps:

This is provided if installation cannot be made in the reverse order of "Removal steps"; omitted if installation in the reverse order of "Removal steps" is possible.

Reassembly steps:

This is provided if reassembly cannot be made in the reverse order of "Disassembly steps"; omitted if reassembly in the reverse order of "Disassembly steps" is possible.

Classification of SERVICE POINTS

- ↔ Removal
- ↔ Installation
- ↔ Disassembly
- ↔ Reassembly

Page number

Group title

Section title

Indicates the incidental operation to be performed before removal or after installation.

5-44

BRAKES — Rear Brake Wheel Cylinder

**REAR BRAKE WHEEL CYLINDER
REMOVAL AND INSTALLATION**

N05VA-

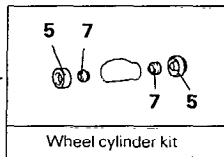
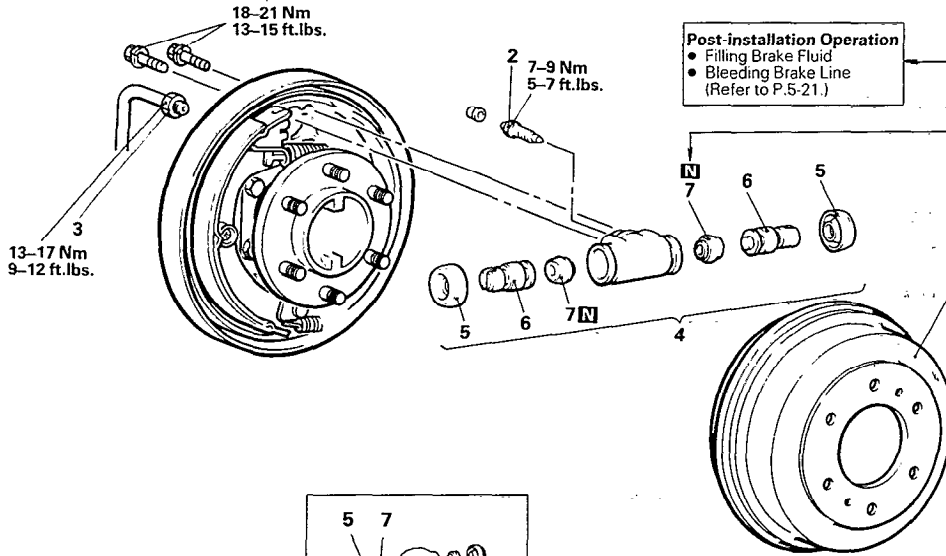
Pre-removal Operation

- Draining Brake Fluid

Post-installation Operation

- Filling Brake Fluid
- Bleeding Brake Line (Refer to P.5-21.)

Indicates non-reusable part.



Removal steps

1. Brake drum
2. Bleeder screw
3. Brake tube
- ♦♦ 4. Wheel cylinder assembly
- ♦♦ 5. Wheel cylinder boot
- ♦♦ 6. Piston assembly
- ♦♦♦ 7. Piston cup

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ♦♦: Refer to "Service Points of Removal".
- (3) ♦♦♦: Refer to "Service Points of Installation".
- (4) [N]: Non-reusable parts

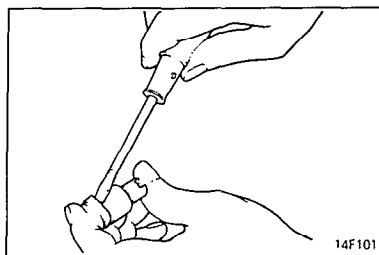
14V600

SERVICE POINTS OF REMOVAL

N05VBAA

7. REMOVAL OF PISTON CUP

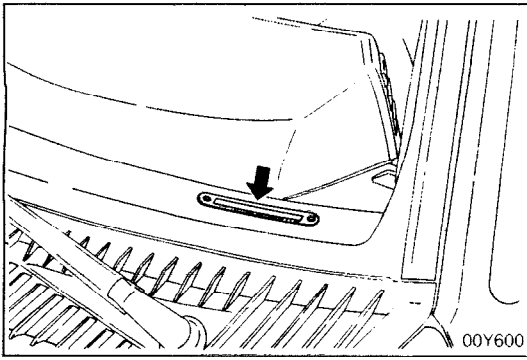
Using a screwdriver, remove the piston cup from the piston.



14F101

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

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



VEHICLE IDENTIFICATION

N00CA-

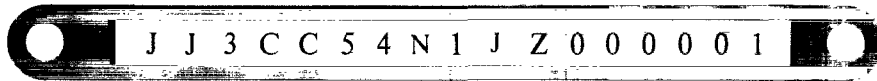
VEHICLE IDENTIFICATION NUMBER LOCATION

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

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 to 17th Digits
Country	Make	Vehicle type	Others	Line	Series	Body	Engine	*Check digits	Model year	Plant	Serial number
J- Japan	J- Chrysler	3- Passenger car	C- Passive belt	C- CONQUEST	5 Premium	4 3-door hatchback	N- 2.6 liters (155.9 C.I.D.) turbocharged engine with intercooler	0 1 2 3 9 X	J 1988	Z Okazaki plant	000001 to 999999

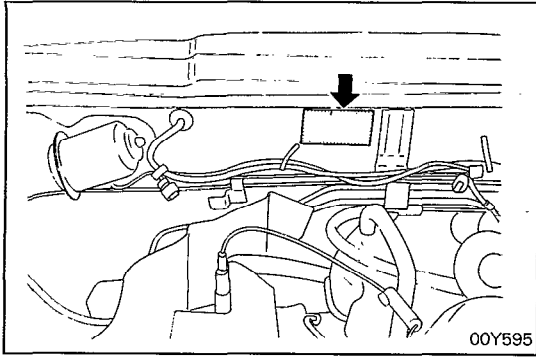
NOTE
* "Check digit" means a single number or letter X used to verify the accuracy of transcription of vehicle identification number.

VEHICLE IDENTIFICATION NUMBER LIST

N00CC-

V.I.N. (except sequence number)	Brand (Package)	Destination	Engine displacement	Models code
JJ3CC54H□HZ	Chrysler	Federal	2.555 liters (155.9 C.I.D.)	A187AMRFGL4
JJ3CC54H□HZ		California*		A187AMRFGL9
JJ3CC54N□HZ		Federal		A187AMNFGL4
JJ3CC54N□HZ		California*		A187AMNFGL9

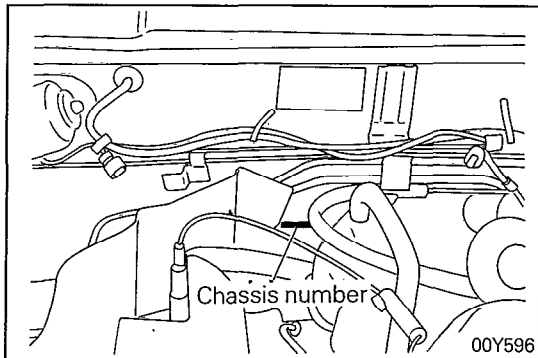
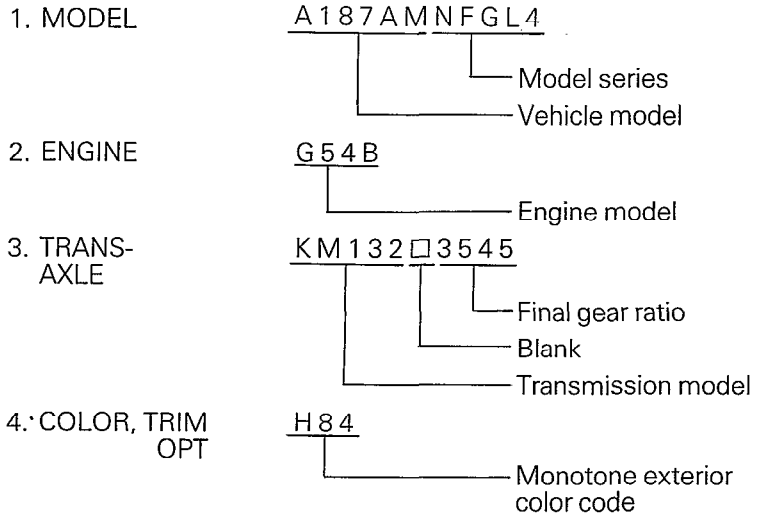
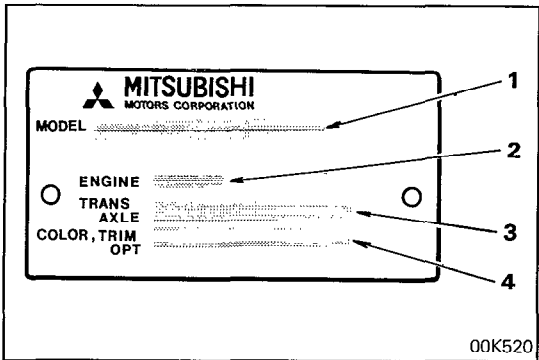
* Can also be sold in Federal states.



VEHICLE INFORMATION CODE PLATE

N00CD--

Vehicle information code plate is riveted onto the firewall in the engine compartment. The plate shows model code, engine model, transmission model, final gear ratio, and body color code.



CHASSIS NUMBER STAMPING LOCATION

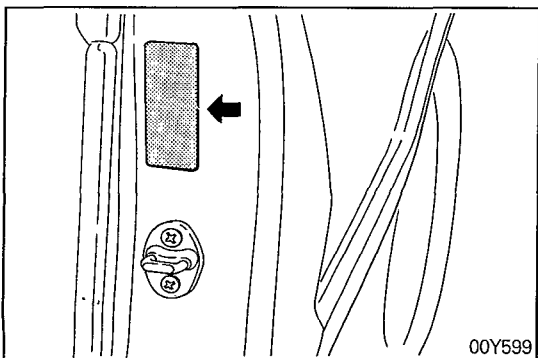
N00CE--

The chassis number is stamped on the top center of the firewall located in the engine compartment.

CHASSIS NUMBER CODE CHART

A 1 8 7 M J Z 0 0 0 0 0 1

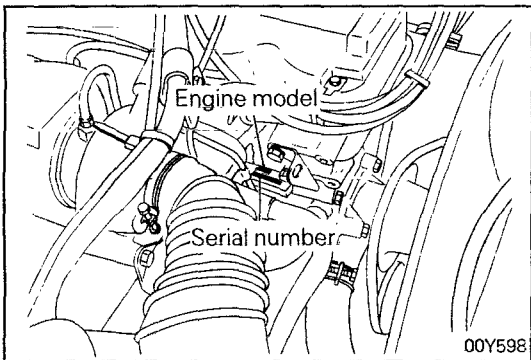
Vehicle line	Engine displacement	Body type	Refer to 10th thru 17th digits of V.I.N. plate
A18- CONQUEST	7- 2.555 liters (155.9 C.I.D.)	M- 2-door Hatchback	



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.), Gross Axle Weight Rating (G.A.W.R.) front and rear, and Vehicle Identification Number (V.I.N.).



ENGINE MODEL STAMPING

N00CG-

The engine model number is stamped at the right front side on the top edge of the cylinder block as shown in the following:

Engine model	Engine displacement
G54B	2.555 liters (155.9 C.I.D.)

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 AB0001 -----> AY9999 BA0001 -----> YY9999

BODY COLOR CODE

N00CH-

Exterior code	Body color
H84	Silver (Metallic)
R04	Red
R88	Maroon (Metallic)
T87	Blue (Metallic)
W09	White
X15	Black
Y59	Yellow

Theft protection label

For original parts

00K619

For replacement parts

00K621

THEFT PROTECTION

N00CIAA

To provide protection against theft, the vehicle identification number (V.I.N.) is stamped on or its label is affixed to the following major engine, transmission parts and body outer panels.

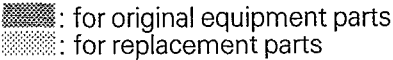
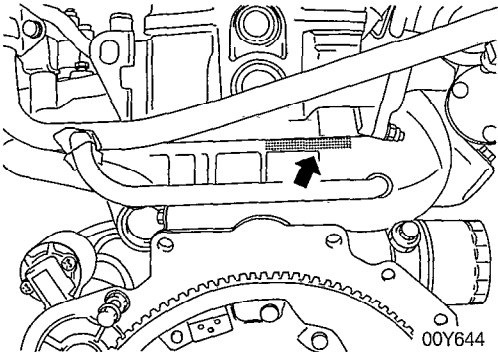
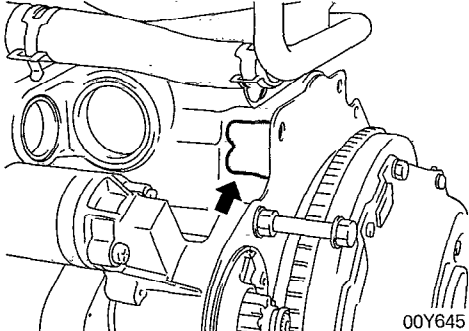
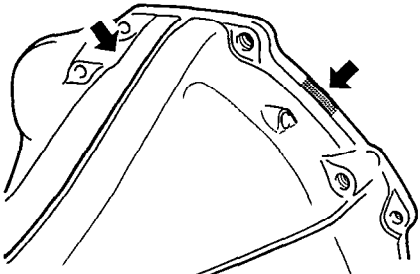
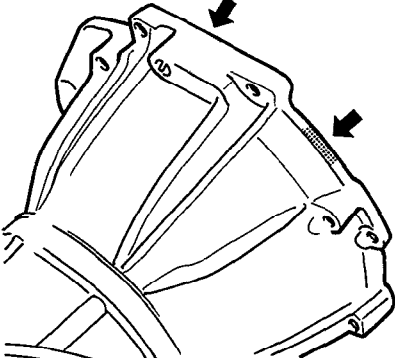
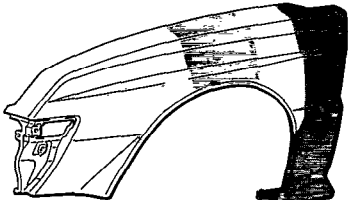
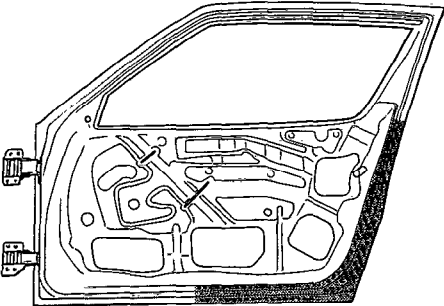
Engine cylinder block, transmission housing, fender, quarter panel, hood, rear hatch and bumpers.



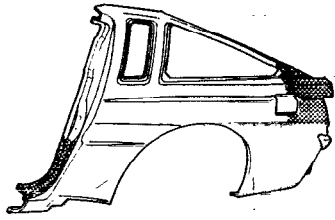
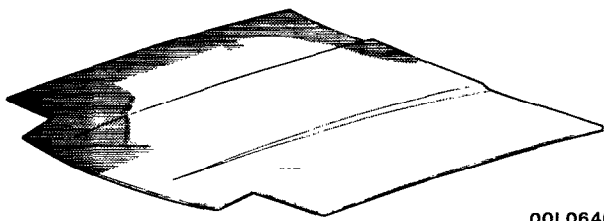
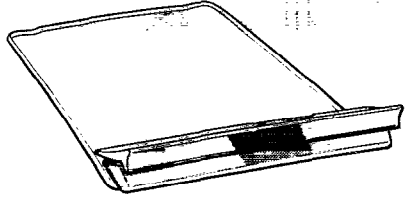
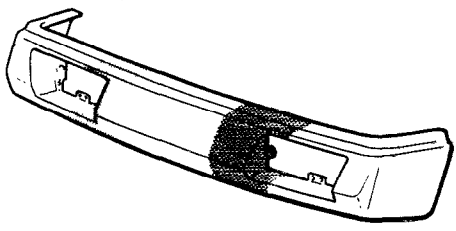
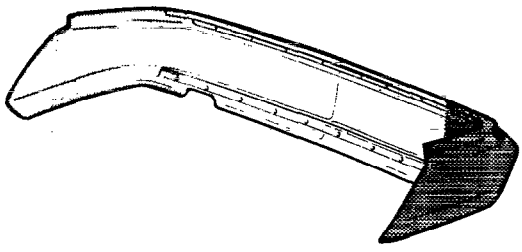
The theft protection label is also affixed to each of major body outer panels for servicing, while the same information as the theft protection label is stamped on the engine and transmission for servicing.

Caution

1. Affix masking tape to the theft protection label before repainting the original part. After painting, be sure to remove the masking tape.
2. The theft protection label on the service part has masking tape affixed to it. Therefore, paint the part as is and remove the masking tape after painting.
3. Do not remove the theft protection label from the original or service part.

LOCATIONS

Part name	Target area
Engine	<div style="text-align: right; margin-bottom: 10px;">  </div> <div style="display: flex; justify-content: space-around;">   </div>
Transmission	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Manual transmission</p>  <p>00Y643</p> </div> <div style="text-align: center;"> <p>Automatic transmission</p>  <p>00Y647</p> </div> </div>
Fender	<div style="text-align: center; margin-bottom: 10px;">  <p>00L0634</p> </div> <ul style="list-style-type: none"> ● The theft protection label is affixed to the inside surface. ● The illustration indicates left hand side, outer. Right hand side is symmetrical.
Door	<div style="text-align: center; margin-bottom: 10px;">  <p>00L0637</p> </div> <ul style="list-style-type: none"> ● The illustration indicates left hand side, outer. Right hand side is symmetrical.

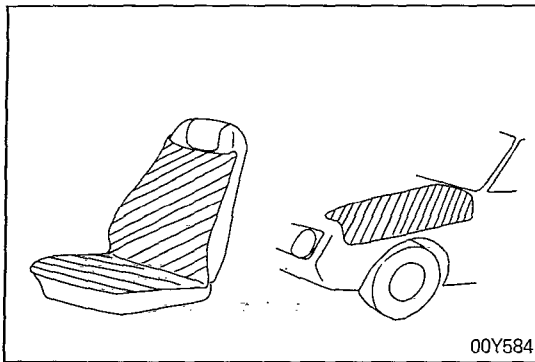
Part name	Target area
Quarter panel	<div style="text-align: right; margin-bottom: 10px;">  for original equipment parts  for replacement parts </div> <div style="text-align: center;">  <p>00L0638</p> <ul style="list-style-type: none"> ● The theft protection label is affixed to the inside surface. ● The illustration indicates left hand side, outer. Right hand side is symmetrical. </div>
Hood	<div style="text-align: center;">  <p>00L0640</p> <ul style="list-style-type: none"> ● The theft protection label is affixed to the inside surface. </div>
Rear hatch	<div style="text-align: center;">  <p>00L0639</p> <ul style="list-style-type: none"> ● The theft protection label is affixed to the inside surface. </div>
Bumpers	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Front bumper</p>  <p>00L0635</p> </div> <div style="text-align: center;"> <p>Rear bumper</p>  <p>00L0636</p> </div> </div> <ul style="list-style-type: none"> ● The theft protection label is affixed to the inside surface.

N00DAAD

PRECAUTIONS BEFORE SERVICE

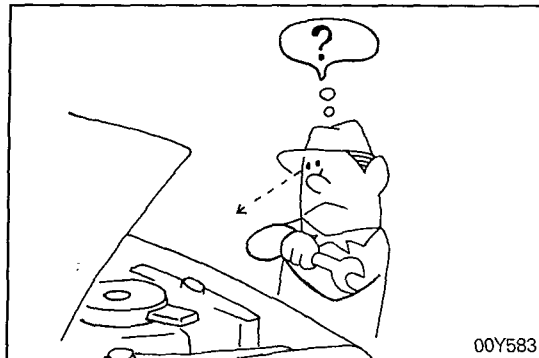
PROTECTING VEHICLE

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

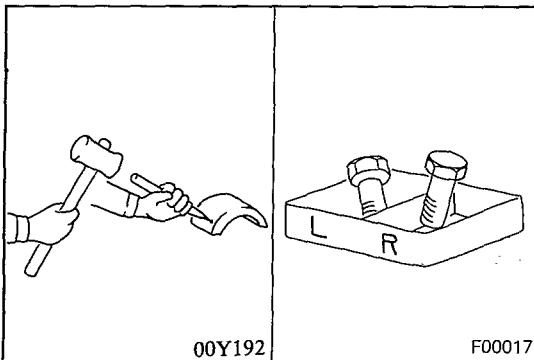
When checking a malfunction, find the cause of the problem. If it is determined that removal and/or disassembly is necessary, perform the work by following the procedures contained in this Service Manual.



If punch marks or mating marks are made to avoid error in assembly and to facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearances.

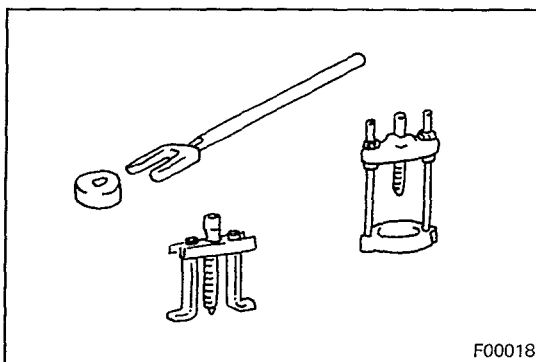
If an area having many parts, similar parts, and/or parts which are symmetrical right and left is disassembled, be sure to arrange the parts so that they do not become mixed during the assembly process.

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

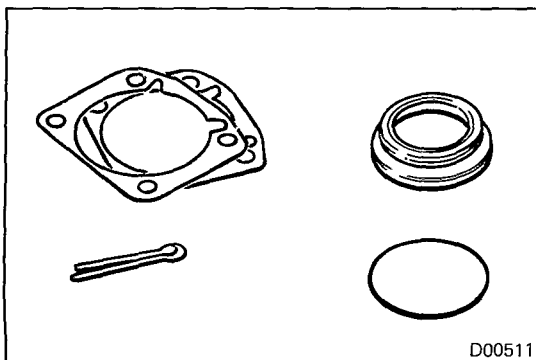
If other tools are substituted for the special tools to do service or repair work, there is the danger that vehicle parts might be damaged, or the technician might be injured; therefore, be sure to use the special tool whenever doing any work for which the use of one is specified.



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

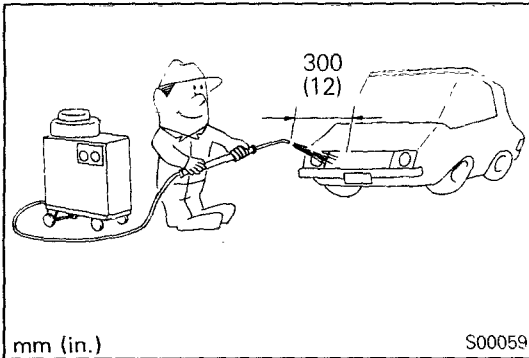


PARTS

When replacing parts, use MOPAR 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 (12 in.) from any plastic parts and all opening parts (doors, luggage compartment, sunroof, etc.).



SERVICING ELECTRICAL SYSTEM

1. When servicing the electrical system, pay attention to the following.
Never attempt to modify an electrical unit or to change wirings, which may otherwise cause not only a vehicle failure but a vehicle fire due to over-capacity load or short-circuit.
2. Before servicing the electrical system, disconnect the negative cable terminal from the battery.

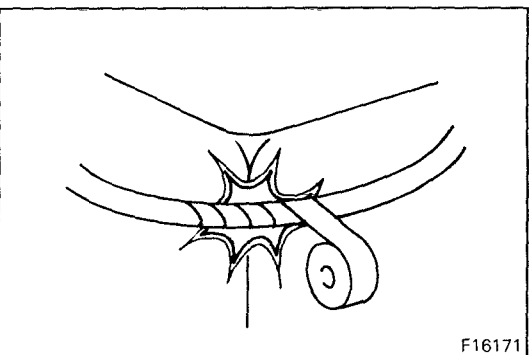
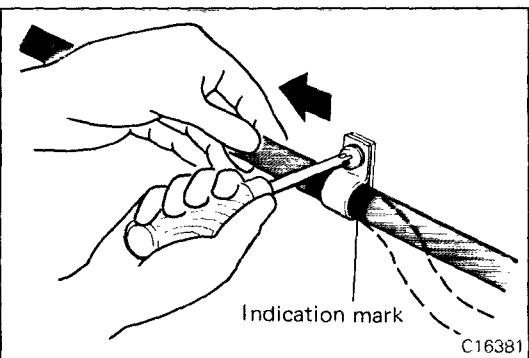
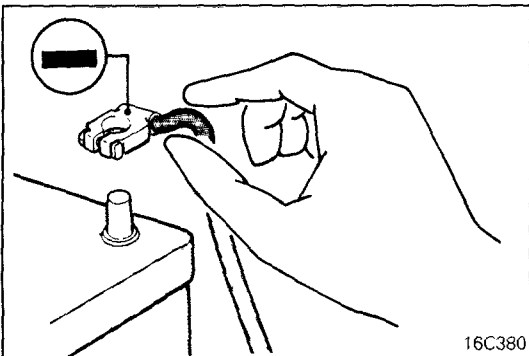
Caution

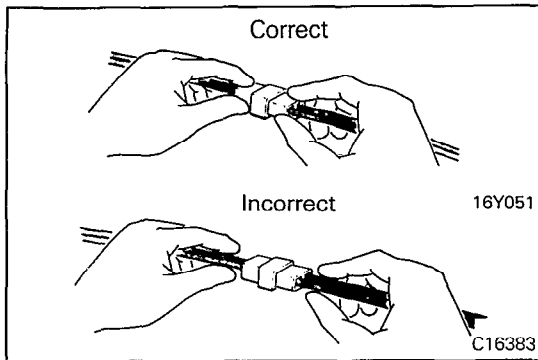
Before connecting or disconnecting the negative cable, be sure to turn off the ignition switch and the lighting switch.

(If this is not done, there is the possibility of semiconductor parts being damaged.)

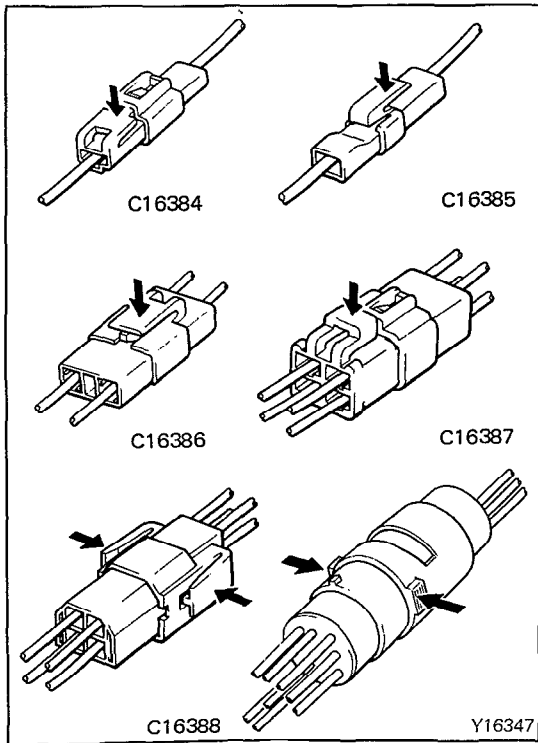
WIRING HARNESSES

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.

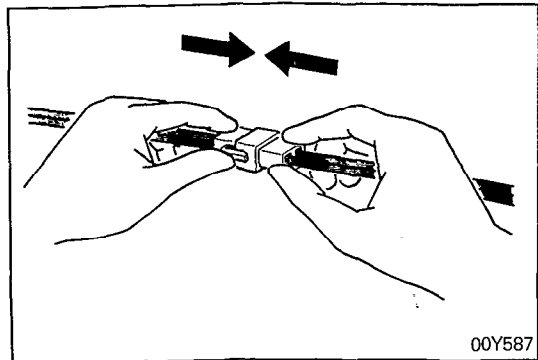




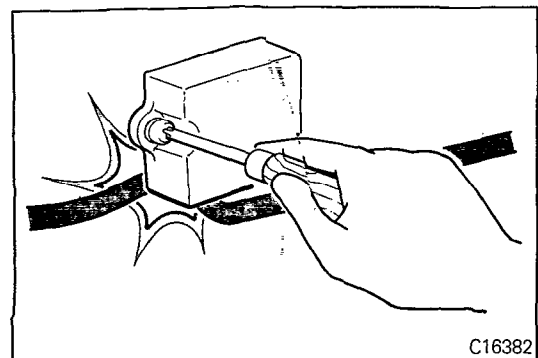
3. When disconnecting a connector, be sure to pull only the connector, not the harness.



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

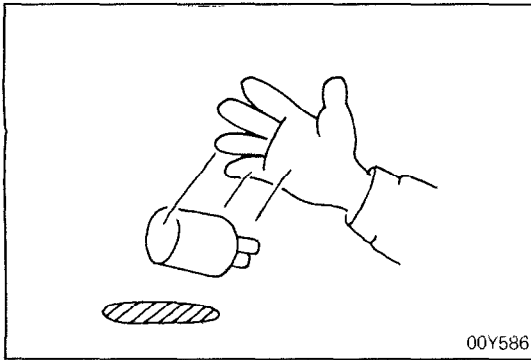


5. Connect connectors which have catches by inserting the connectors until they snap.

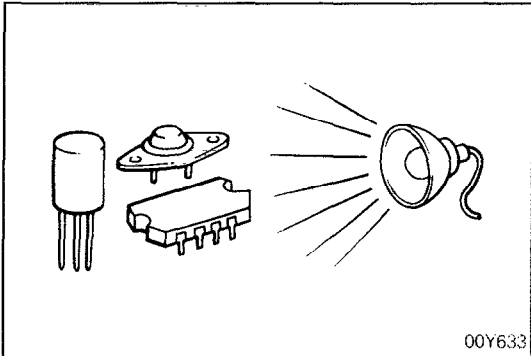


ELECTRICAL COMPONENTS

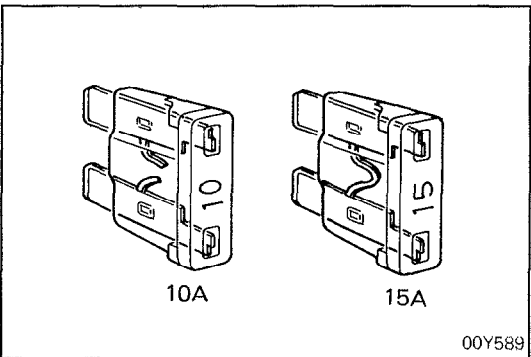
1. When installing any of the vehicle parts, be careful not to pinch or damage any of the wiring harnesses.



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

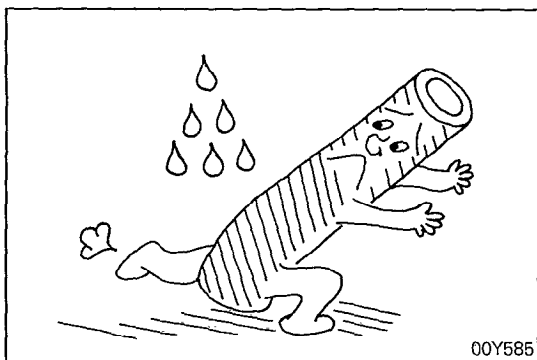
1. **If a fuse is blown-out, be sure to eliminate the cause of the problem before installing a new fuse.**

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.**

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:

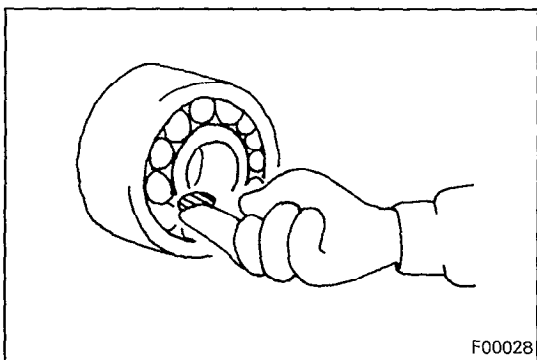
- (1) In order to avoid overloading the wiring, take the electrical current load of the optional equipment into consideration, and determine the appropriate wire size.
- (2) Where possible, route the wiring through the existing harnesses.
- (3) If an ammeter or similar instrument is to be connected to 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.

Nominal size	SAE gauge No.	Permissible current	
		In engine compartment	Other areas
0.3 mm ²	AWG 22	—	5A
0.5 mm ²	AWG 20	7A	13A
0.85 mm ²	AWG 18	9A	17A
1.25 mm ²	AWG 16	12A	22A
2.0 mm ²	AWG 14	16A	30A
3.0 mm ²	AWG 12	21A	40A
5.0 mm ²	AWG 10	31A	54A



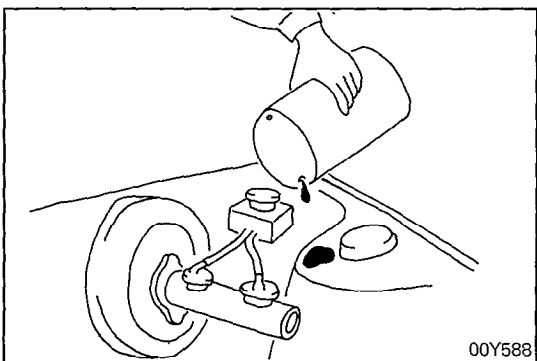
TUBES AND OTHER RUBBER PARTS

Be careful to avoid spilling any gasoline, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.



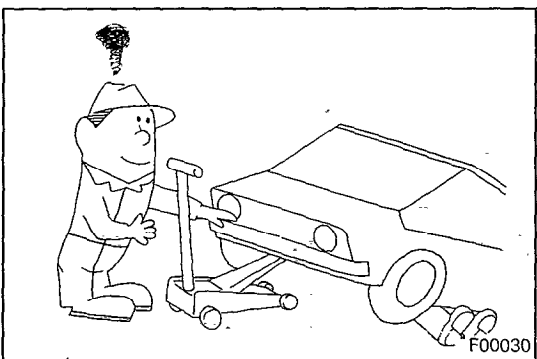
LUBRICANTS

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.

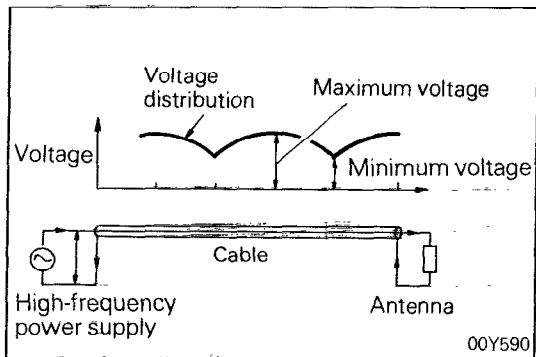
1. Install the antenna on the roof or rear bumper.
2. Because radio waves are emitted from the coaxial cable of the antenna, keep it 200 mm (8 in.) away from the computers and the wiring harness. If the cable must cross the wiring harness, route it so that it runs at right angles to the wiring harness.
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 Z_i 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.



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TOWING AND HOISTING

WRECKER TOWING

1. This vehicle cannot be towed with sling-type equipment.
2. If a vehicle is towed from the front, use wheel lift or flat bed equipment.
3. If a vehicle is towed from the rear, use flat bed equipment.

SAFETY PRECAUTIONS

1. Any loose or protruding parts of damaged vehicle such as hoods, doors, fenders, trim, etc., should be secured prior to moving the vehicle.
2. Operator should refrain from going under a vehicle such as hood, doors, fenders, trim, etc., unless the vehicle is adequately supported by safety stands.
3. Never allow passengers to ride in a towed vehicle.
4. 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. (Next page)

Conventional hydraulic hoists may be used after determining that the adapter plates will make firm contact with the front/rear crossmembers.

FLOOR JACK

A regular floor jack may be used under the front/rear crossmembers.

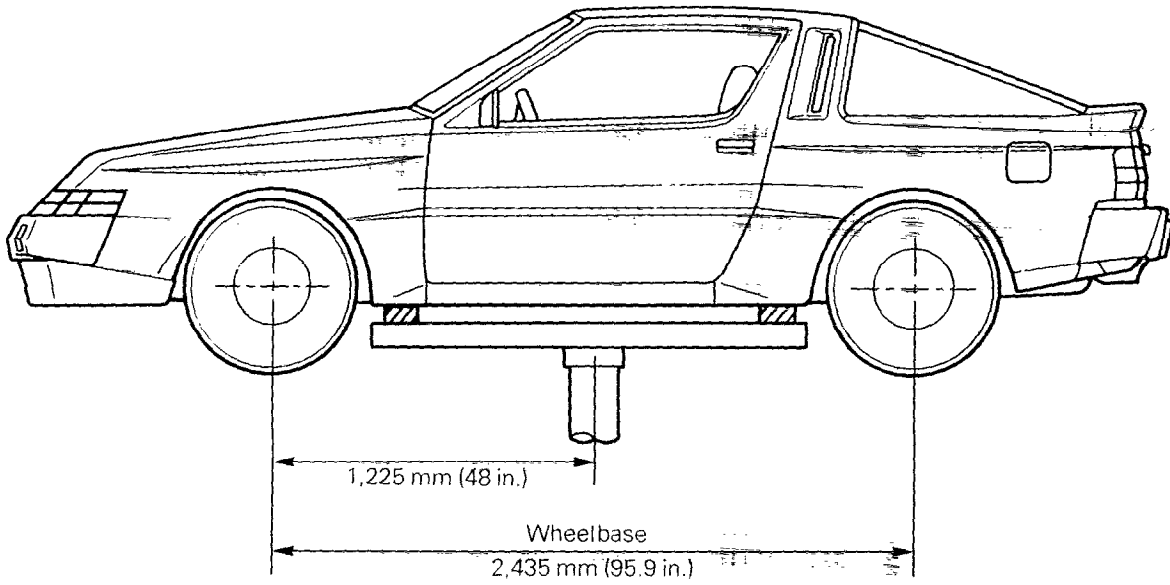
Caution

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

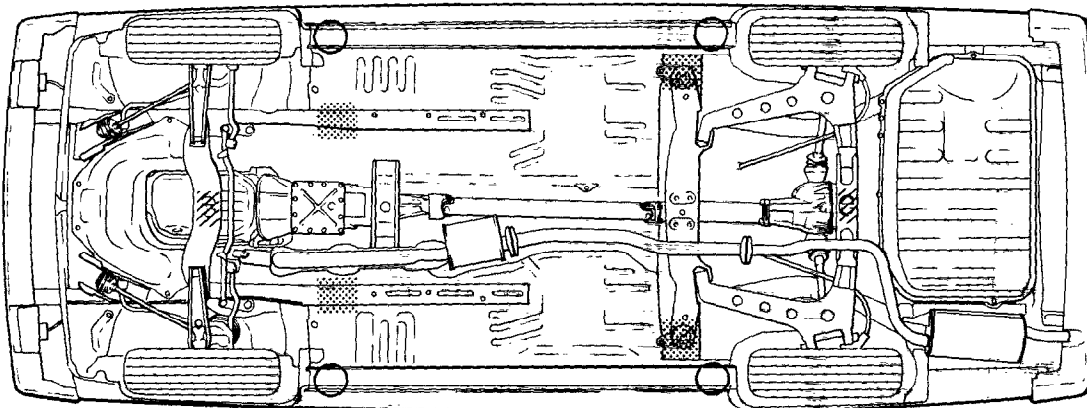
Jack receptacles are located at the body sills to accept the scissors jack supplied with the vehicle for emergency road service. Always block opposite wheels and jack on level surface.




FRAME CONTACT SUPPORT LOCATION



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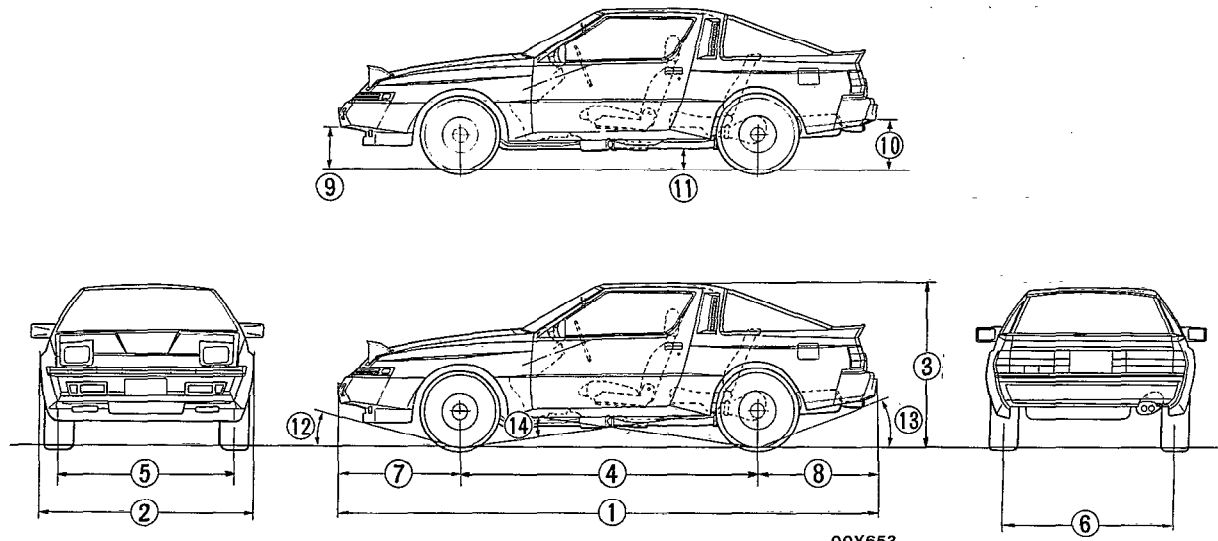
LIFTING, JACKING SUPPORT LOCATION



-  Frame contact hoist
-  Floor jack
-  Twin post hoist or scissors jack (emergency) locations

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GENERAL DATA AND SPECIFICATIONS



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00Y653

Items		A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Vehicle dimensions	mm (in.)		
Overall length	①	4,400 (173.2)	4,400 (173.2)
Overall width	②	1,735 (68.3)	1,735 (68.3)
Overall height	③	1,275 (50.2)	1,275 (50.2)
Wheel base	④	2,435 (95.9)	2,435 (95.9)
Tread	Front	⑤	1,465 (57.7)
	Rear	⑥	1,455 (57.3)
Overhang	Front	⑦	970 (38.2)
	Rear	⑧	995 (39.2)
Height at curb mass (wt.)			
Front bumper to ground	⑨	355 (14.0)	355 (14.0)
Rear bumper to ground	⑩	370 (14.6)	370 (14.6)
Minimum running ground clearance	⑪	115 (4.5)	115 (4.5)
Angle of approach	⑫	16°	16°
Angle of departure	⑬	19°	19°
Ramp breakover angle	⑭	12°	12°
Vehicle weights	kg (lbs.)		
Curb weight		1,405 (3,097)	1,375 (3,031)
Gross vehicle weight rating		1,840 (4,056)	1,840 (4,056)
Gross axle weight rating	Front	885 (1,951)	885 (1,951)
	Rear	955 (2,105)	955 (2,105)
Seating capacity		5	5

3 INTRODUCTION AND MASTER TROUBLESHOOTING — General Data and Specifications

Items	A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Engine		
Model No.	G54B with turbo	G54B with turbo
Type	In line OHC	In line OHC
Number of cylinders	4	4
Bore mm (in.)	91.1 (3.59)	91.1 (3.59)
Stroke mm (in.)	98.0 (3.86)	98.0 (3.86)
Piston displacement cm ³ (CID)	2,555 (155.9)	2,555 (155.9)
Compression ratio	7.0	7.0
Firing order	1-3-4-2	1-3-4-2
Basic ignition timing	10° BTDC	10° BTDC
Manual transmission		
Model No.	—	KM132
Type	—	5-speed manual
Gear ratio		
1st	—	3.369
2nd	—	2.035
3rd	—	1.360
4th	—	1.000
5th	—	0.856
Reverse	—	3.578
Automatic transmission		
Model No.	JM600	—
Type	4-speed automatic	—
Gear ratio		
1st	2.458	—
2nd	1.458	—
3rd	1.000	—
4th	0.686	—
Reverse	2.182	—
Final drive gear ratio	3.545	3.545
Clutch		
Type	Dry-single disc & diaphragm spring	Dry-single disc & diaphragm spring

INTRODUCTION AND MASTER TROUBLESHOOTING — General Data and Specifications

Items	A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Chassis		
Tire	Front Rear 205/55VR16 225/50VR16 or or 225/50VR16 245/45VR16 Radial Radial	Front Rear 205/55VR16 225/50VR16 or or 225/50VR16 245/45VR16 Radial Radial
Front suspension		
Type	Independent strut	Independent strut
Rear suspension		
Type	Independent strut	Independent strut
Brakes		
Type	Disc	Disc
	Front	
	Rear	Disc
Power steering		
Gear type	Integral type (Recirculating ball nut)	Integral type (Recirculating ball nut)
Gear ratio	14.3 (Constant ratio gear)	14.3 (Constant ratio gear)
Fuel tank capacity	75 liters (19.8 gals.)	75 liters (19.8 gals.)

20 INTRODUCTION AND MASTER TROUBLESHOOTING – Tightening Torque

TIGHTENING TORQUE

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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	260 – 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
Items	Nm	ft.lbs.	Remarks	
Taper thread for pipes (size)				
PT 1/8	7.9 – 12 16 – 19	5.8 – 8.7 12 – 14	Internal thread: Aluminum Internal thread: Cast iron	
PT 1/4	19 – 30 34 – 45	14 – 22 25 – 33	Internal thread: Aluminum Internal thread: Cast iron	
PT 3/8	39 – 54 58 – 73	29 – 40 43 – 54	Internal thread: Aluminum Internal thread: Cast iron	
Taper thread for dry sealed pipes (size)				
NPTF 1/16	4.9 – 7.8 7.9 – 12	3.6 – 5.8 5.8 – 8.7	Internal thread: Aluminum Internal thread: Cast iron	
NPTF 1/8	7.9 – 12 16 – 19	5.8 – 8.7 12 – 14	Internal thread: Aluminum Internal thread: Cast iron	
NPTF 1/4	19 – 30 34 – 45	14 – 22 25 – 33	Internal thread: Aluminum Internal thread: Cast iron	

MASTER TROUBLESHOOTING

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ENGINE OVERHEATS

Symptom	Probable cause	Reference page or remedy
Engine overheats	Cooling system faulty	7-6
	Incorrect ignition timing	8-144
	Water leaks <ul style="list-style-type: none"> • Loose cylinder head bolt • Damaged cylinder head gasket • Cracked cylinder block • Cracked cylinder head 	9-30, 43 9-29, 42 9-65 9-42
	Loose intake manifold bolts or leaking from gasket	11-5
	Cracked intake manifold	11-6
	Faulty automatic transmission oil cooler operation <ul style="list-style-type: none"> • Blocked or collapsed hose and pipe • Loose hose and pipe connection 	21-76 21-75

ENGINE WILL NOT CRANK OR CRANKS SLOWLY

Symptom	Probable cause	Reference page or remedy
Engine will not crank or cranks slowly	Starting system faulty	8-129

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

Symptom	Probable cause	Reference page or remedy
Engine will not start or hard to start (Crank OK)	Ignition system problems	8-142
	Compression too low	9-15 (9-13)
	No fuel supply injector	14-81
	Injection system problems	14-27
	Vacuum leaks <ul style="list-style-type: none"> • Purge control valve hose • Vacuum hoses • Intake manifold • Injection mixer • EGR valve 	Repair as necessary

ROUGH IDLE OR ENGINE STALLS

Symptom	Probable cause	Reference page or remedy
Rough idle or engine stalls	Ignition system problems	8-142
	Compression too low	9-15 (9-13)
	Idle speed too low	14-30
	Fuel injection system problems	14-27
	Exhaust gas recirculation (EGR) system problems	25-27
	Vacuum leaks <ul style="list-style-type: none"> • Purge control valve hose • Vacuum hoses • Intake manifold • Injection mixer • EGR valve 	Repair as necessary
	Engine overheats	Refer to "Engine Overheats"

ENGINE HESITATES OR POOR ACCELERATION

Symptom	Probable cause	Reference page or remedy
Engine hesitates or poor acceleration	Air cleaner clogged	0-13
	Ignition system problem	8-142
	Compression too low	9-15 (9-13)
	Fuel line clogged	14-81
	Fuel injection system problem	14-27
	Emission control system problem <ul style="list-style-type: none"> • EGR valve always on 	25-27
	Vacuum leaks <ul style="list-style-type: none"> • Purge control valve hose • Vacuum hoses • Intake manifold • Injection mixer • EGR valve 	Repair as necessary
	Engine overheats	Refer to "Engine Overheats"

ENGINE DIESELING

Symptom	Probable cause	Reference page or remedy
Engine dieseling (runs after ignition switch is turned off)	Incorrect ignition timing	8-144

EXCESSIVE OIL CONSUMPTION

Symptom	Probable cause	Reference page or remedy
Excessive oil consumption	Positive crankcase ventilation line clogged	0-14
	Valve stem worn	9-45, 46
	Valve stem seal worn or damaged	9-47
	Piston ring worn or damaged	9-53
	Oil leak	Repair as necessary

POOR FUEL MILEAGE

Symptom	Probable cause	Reference page or remedy
Poor fuel mileage	Air cleaner clogged	0-13
	Brakes drag	5-19
	Clutch slips	6-5
	Ignition problems	8-142
	Compression too low	9-15 (9-13)
	Fuel injection system problems	14-30
	Tires improperly inflated	22-2
	Fuel leak	Repair as necessary

NOISE

Symptom	Probable cause	Reference page or remedy
Noise	Engine noise	9-13
	Loose bolts and nuts	Retighten as necessary

HARD STEERING

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Symptom	Probable cause	Reference page or remedy
Hard steering	Improper front wheel alignment	2-7
	Excessive turning resistance of lower arm ball joint	2-20
	Loose power steering oil pump belt	19-10
	Air in power steering system	19-11
	Sticky flow control valve	19-32
	Excessively tightened linkage ball joint	19-37
	Excessive turning resistance of tie-rod ball joint	19-38
	Low tire pressure	22-2
	Low fluid level	Refill
No lubrication to tie-rod	Lubricate	

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	2-7
	Damaged front wheel bearing	2-9, 11
	Improper tire pressure	22-2

POOR RIDING

Symptom	Probable cause	Reference page or remedy
Poor riding	Improper front or rear wheel alignment	2-7, 15, 17-7, 14
	Malfunctioning shock absorber	
	Broken or weakened stabilizer	2-15, 24, 17-11, 14
	Broken or weakened coil spring	
	Loose suspension securing bolt(s)	2-13, 20, 24, 17-8
	Worn lower arm bushing	2-22
	Improper tire pressure	22-2
	Imbalanced wheels	22-4

ABNORMAL TIRE WEAR

Symptom	Probable cause	Reference page or remedy
Abnormal tire wear	Improper front or rear wheel alignment	2-7, 17-7
	Loose wheel bearings	2-9, 10, 11, 3-20
	Malfunctioning shock absorber	2-15, 17-16
	Improper tire pressure	22-2, 4
	Imbalanced wheels	

ROAD WANDER

Symptom	Probable cause	Reference page or remedy
Road wander	Improper front or rear wheel alignment	2-7, 17-7
	Poor turning resistance of lower arm ball joint	2-20
	Loose or worn lower arm bushing	2-9, 11, 20, 22
	Loose or worn wheel bearings	
	Excessive play of steering wheel	19-9
	Improper tire pressure	22-2

VEHICLE PULLS TO ONE SIDE

Symptom	Probable cause	Reference page or remedy
Vehicle pulls to one side	Improper front or rear wheel alignment	2-7, 17-7
	Excessive turning resistance of lower arm ball joint	2-20
	Wheel bearing seizure	2-9, 11
	Deformed lower arm	2-20
	Bend drive shaft	3-25
	Imbalanced or worn tires	22-2, 4
	Uneven tire pressure	

STEERING WHEEL SHIMMY

Symptom	Probable cause	Reference page or remedy
Steering wheel shimmy	Improper front or rear wheel alignment	2-7, 17-7
	Poor turning resistance of lower arm ball joint	2-20
	Broken or weakened front or rear stabilizer	2-24, 17-13
	Worn lower arm bushing	2-22
	Malfunctioning shock absorber	2-15, 17-16
	Broken or weakened coil spring	
	Wear, play, or seizure of wheel bearing	2-9, 11
	Wear, play, or seizure of drive shaft ball joint	3-25
	Excessive play of steering wheel	19-9
	Improper tire pressure	22-2
	Imbalanced wheels	Repair

BOTTOMING

Symptom	Probable cause	Reference page or remedy
Bottoming	Broken or weakened coil spring	2-15, 17-16
	Malfunctioning shock absorber	
	Overloaded vehicle	Correct

WHEEL BEARING TROUBLESHOOTING

Trouble	Symptom	Probable cause
Pitting	Pitting occurs because of uneven rotation of race and bearing surfaces	Excessive bearing preload Excessive load
Flaking	The surface peels because of uneven rotation of the race and bearing surfaces	End of bearing life 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 Excessive load 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	Insufficient grease Excessive bearing preload Excessive load 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 Use of grease other than that specified Insufficient grease
Rust, corrosion	Appears on various areas of the bearing	Use of grease other than that specified Faulty oil seal Presence of water or moisture
Wear	Wear of surface areas caused by friction	Insufficient grease Foreign matter Rust or corrosion due to moisture Use of grease other than that specified Faulty oil seal
Discoloration	Grease discoloration results from grease deterioration which causes particles of pigment contained in grease to adhere to surfaces Heat discoloration will appear as a deep brown or purple	Use of grease other than that specified Faulty oil seal Excessive bearing preload Excessive load

