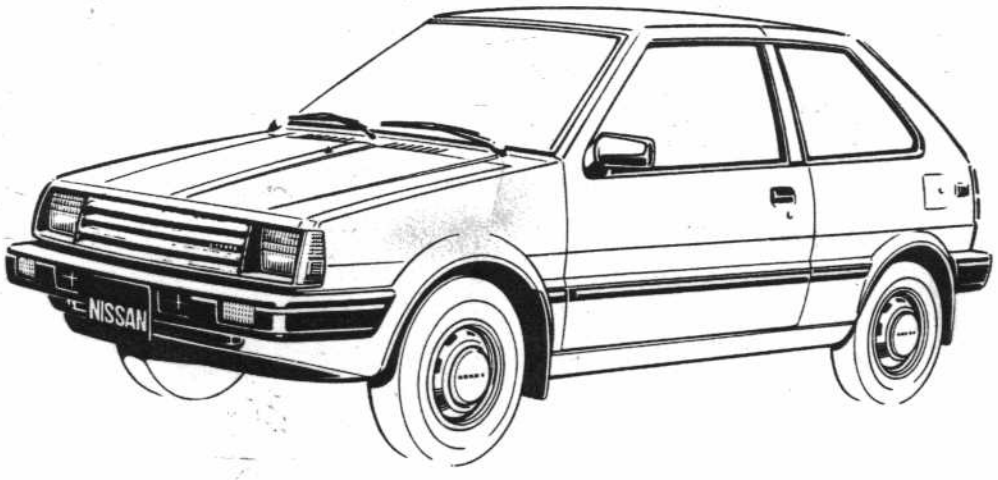
NISSAN MICRA

1987

Fram oil filters X
Purolator or



SERVICE MANUAL

QUICK REFERENCE CHART : MICRA [ ] 1987

ENGINE TUNE-UP DATA

Engine model		MA12	
		M/T	A/T
Firing order		1-3-4-2	
Ignition timing/Idle speed	(degree/rpm)	2±2° A.T.D.C./750±50 See page MA-14.	2±2° B.T.D.C./700±50 (in "D" position)
"CO"% at idle speed		2±1 See page MA-15.	2±1 (in "D" position)
Valve clearance (Hot) mm (in)	Intake	See page MA-13.	0.25 (0.010)
	Exhaust		0.30 (0.012)

Drive belt deflection (Cold)	Used belt		Set deflection of new belt
	Limit	Adjust deflection	
Alternator (Without power steering) mm (in)	19.0 (0.748)	13.5 - 16.0 (0.531 - 0.630)	12.5 - 14.0 (0.492 - 0.551)
Applied pressed force N (kg, lb)	98 (10, 22)		

Engine compression pressure kPa (kg/cm², psi)/rpm	
Standard	1,245 (12.7, 181)/350
Minimum	981 (10.0, 142)/350
Differential limit between cylinders	98 (1.0, 14)/350
Spark plug Type	BPR5ES
Gap mm (in)	0.8 - 0.9 (0.031 - 0.035)

Tightening torque	N-m	kg-m	ft-lb
Valve rocker adjusting nut	11 - 15	1.1 - 1.5	8 - 11
Manifold nut	16 - 21	1.6 - 2.1	12 - 15
Spark plug	20 - 29	2.0 - 3.0	14 - 22
Oil pan bolt	5 - 7	0.5 - 0.7	3.6 - 5.1
Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35

CLUTCH PEDAL

Unit: mm (in)

Pedal free height	198 - 208 (7.80 - 8.19)
Withdrawal lever play	2.5 - 3.5 (0.098 - 0.138)

FRONT WHEEL ALIGNMENT (Unladen *1)

Camber	degree	−25′ - 1°05′
Caster	degree	1°30 - 3°00′
Toe-in	mm (in)	2 - 4 (0.08 - 0.16)
	degree*2	12′ - 24′
Turning angle		21°06′/20°
Toe-out-turns (Inside/Outside)	degree	
Full turn (Inside/Outside)	degree	40°30′ - 43°30′/32°30′ - 35°30′

*1 Tankful of fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools, mats in designated positions.

*2 Total toe-in

REAR WHEEL BEARING

Wheel bearing axial end play	mm (in)	0 (0)
Wheel bearing starting torque (At wheel hub bolt)		
With new grease seal	N (kg, lb)	0.06 - 0.19 (0.6 - 1.9, 0.52 - 1.65)
With used grease seal	N (kg, lb)	0.06 - 0.19 (0.6 - 1.9, 0.52 - 1.65)

BRAKE

Unit: mm (in)

Brake pedal		
Pedal free height*	M/T	190 - 200 (7.48 - 7.87)
	A/T	194 - 204 (7.64 - 8.03)
Depressed height* [Under force of 490 N (50 kg, 110 lb) with engine running]		95 (3.74) or more
Disc brake		
Pad minimum thickness		2.0 (0.079)
Rotor repair limit		
Runout		0.07 (0.0028) or less
Minimum thickness		11.0 (0.433) or more
Drum brake		
Lining minimum thickness		1.5 (0.059)
Drum repair limit		
Maximum inner diameter		181.0 (7.13)
Radial runout		0.05 (0.0020) or less
Out-of-roundness		0.03 (0.0012) or less
Taper [Measured at a point 25 mm (0.98 in) from inlet]		0.04 (0.0016) or less

* Between pedal upper surface and melt sheet (floor)

WHEEL AND TIRE

Tire size	P155/80R12	P155/80D12*1
Inflation pressure*2 psi (kPa)	34 (235)	
Wheel nut tightening torque N-m (kg-m, ft-lb)	98 - 118 (10 - 12, 72 - 87)	

*1 Spare tire (Emergency use only)
*2 Tire pressure should be checked when tires are COLD.

REFILL CAPACITIES

Unit	Liter	US measure	Imp measure
Fuel tank	40	10-5/8 gal	8-3/4 gal
Coolant			
With heater	4.7	5 qt	4-1/8 qt
Without heater	4.3	4-1/2 qt	3-3/4 qt
Engine			
With oil filter	2.8	3 qt	2-1/2 qt
Without oil filter	2.6	2-3/4 qt	2-1/4 qt
Transaxle			
M/T	2.6	5-1/2 pt	4-5/8 pt
A/T	6.0	6-3/8 qt	5-1/4 qt
Windshield and rear window washer tank	3.0	3-1/8 qt	2-5/8 qt

NISSAN NISSAN MOTOR CO., LTD.
Overseas Service Department
Tokyo, Japan

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Publication No. SM7E-0K10C0

Printed in Japan

NISSAN MICRA

MODEL K10 SERIES

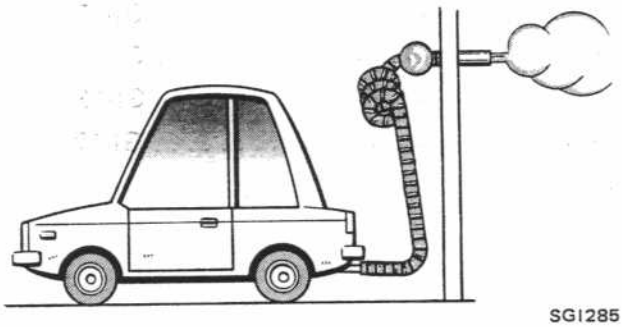
QUICK REFERENCE INDEX

SECTION GI

CONTENTS

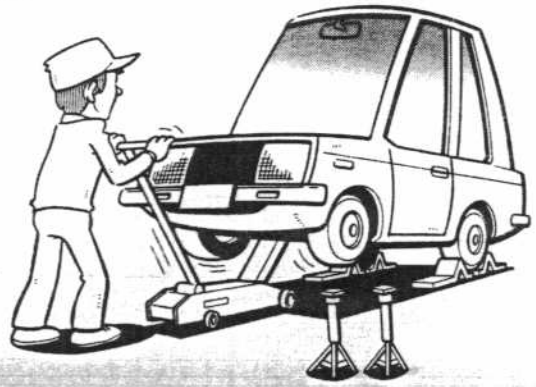
Observe the following precautions that are not described in each individual section to ensure safe and proper service operations.

1. Do not operate the engine for an extended period of time without proper exhaust ventilation.
   Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. If you are working in a pit or other enclosed area, be sure to properly ventilate before working with hazardous materials.
   Do not smoke while working on the vehicle.



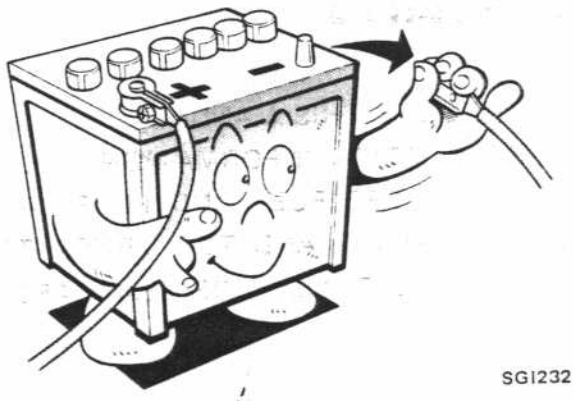
SGI285

2. Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with rigid racks at the points designated for proper lifting and towing before working on the vehicle.
   These operations should be done on a level surface.



SGI231

3. When removing a heavy component such as the engine or transaxle/transmission, take care not to lose your balance and drop it or cause it to hit against adjacent parts, especially against the brake parts such as brake tube and master cylinder.
4. Before starting repairs which do not require battery power, always turn off the ignition switch, then disconnect the ground cable from the battery to prevent accidental short circuit.

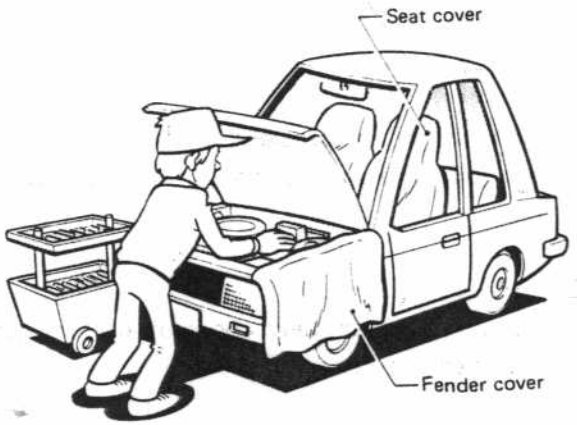


SGI232

5. To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe and muffler.
   Do not remove the radiator cap when the engine is hot.

SGI233

6. To prevent scratches and soiling, protect fenders, upholstery and carpeting with appropriate covers before starting servicing.
   Take caution that keys, buckles or buttons on your person do not scratch the paint.



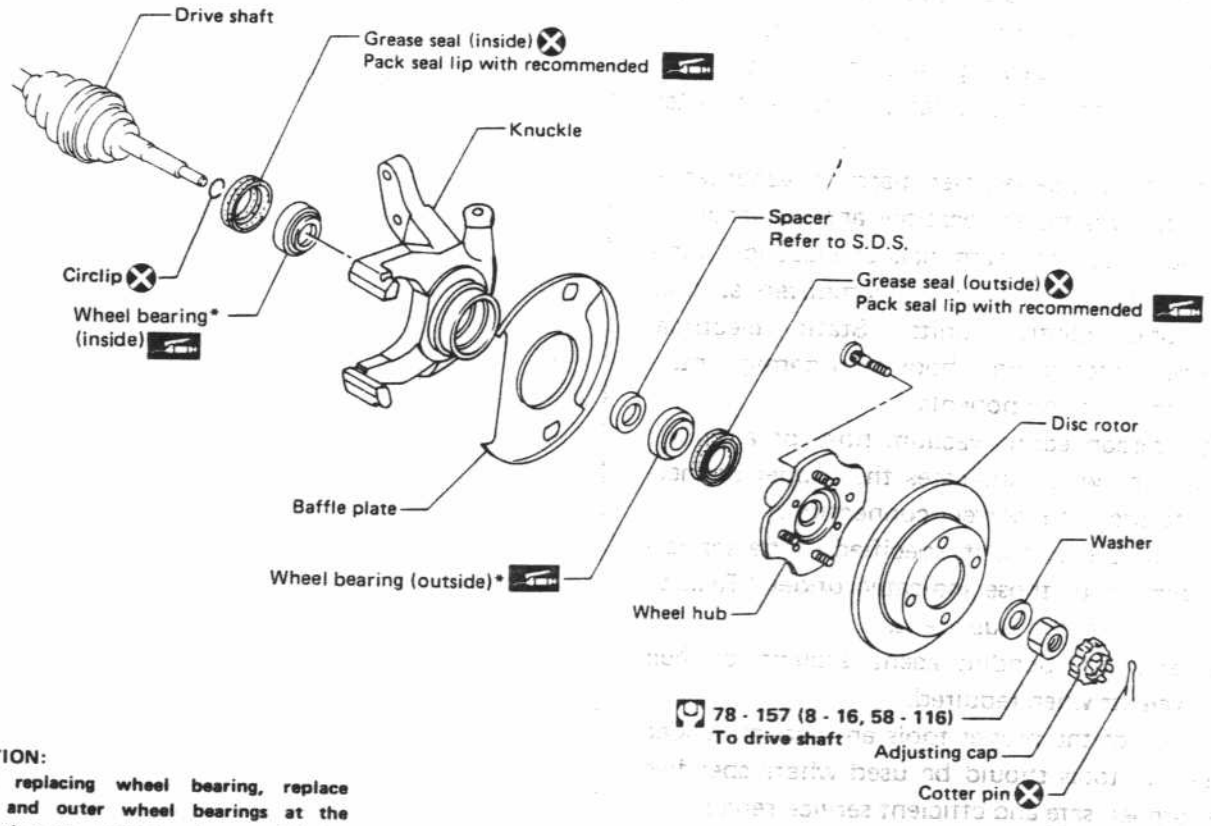
SGI234

7. Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
8. Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. as instructed and discard used ones.
9. Tapered roller bearings and needle bearings should be replaced as a set of inner and outer races.
10. Arrange the disassembled parts in accordance with their assembled locations and sequence.
11. Do not touch the terminals of electrical components which utilize microcomputers such as electronic control units. Static electrical charges stored in your body may damage internal electronic components.
12. After disconnecting vacuum hose or air hose, attach tag which indicates the proper connection to prevent incorrect connection.
13. Use only the lubricants specified in the applicable section or those indicated under "Recommended Fuel and Lubricants".
14. Use approved bonding agent, sealants or their equivalents when required.
15. The use of the proper tools and recommended essential tools should be used where specified for proper, safe and efficient service repairs.
16. When effecting repairs on the fuel, oil, water, vacuum or exhaust systems, make certain to check all affected lines for leaks.
17. Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.

1. A QUICK REFERENCE INDEX, a black tab e.g. FA is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
2. THE CONTENTS are listed on the first page of each section.
3. THE TITLE is indicated on the upper portion of each page and shows the part or system.
4. THE PAGE NUMBER of each section consists of two letters, which designate the particular section, and a number (e.g. "FA-5").
5. Illustrations in this manual should be used in reference to the service affairs only. When ordering service parts, please refer to the appropriate PARTS CATALOG.
6. THE FIRST LARGE ILLUSTRATION of each section is an exploded view and contains tightening torques, lubrication points and other information necessary to perform repairs.

"Example"

FRONT AXLE — Wheel Hub and Knuckle



•
CAUTION:
When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix use of bearings of different brands.

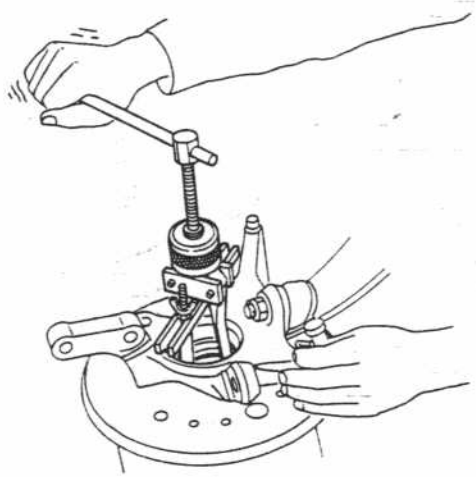
7. THE FOLLOWING SMALL ILLUSTRATION shows the important steps such as inspection, use of special tools, knacks of work and hidden or trickly steps which are not shown in the previous large illustration.
   Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

"Example"

KNUCKLE

- Remove wheel bearing outer races.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



SFA540

8. The followings **SYMBOLS AND ABBREVIATIONS** are used:

: Tightening Torque

: Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.

: Should be lubricated with oil.

: Sealing point

: Checking point

: Always replace after every disassembly.

S.D.S.:	Service Data and Specifications
L.H., R.H.:	Left-Hand, Right-Hand
M/T:	Manual Transaxle/Transmission
A/T:	Automatic Transaxle/Transmission
Tool:	Special Service Tools

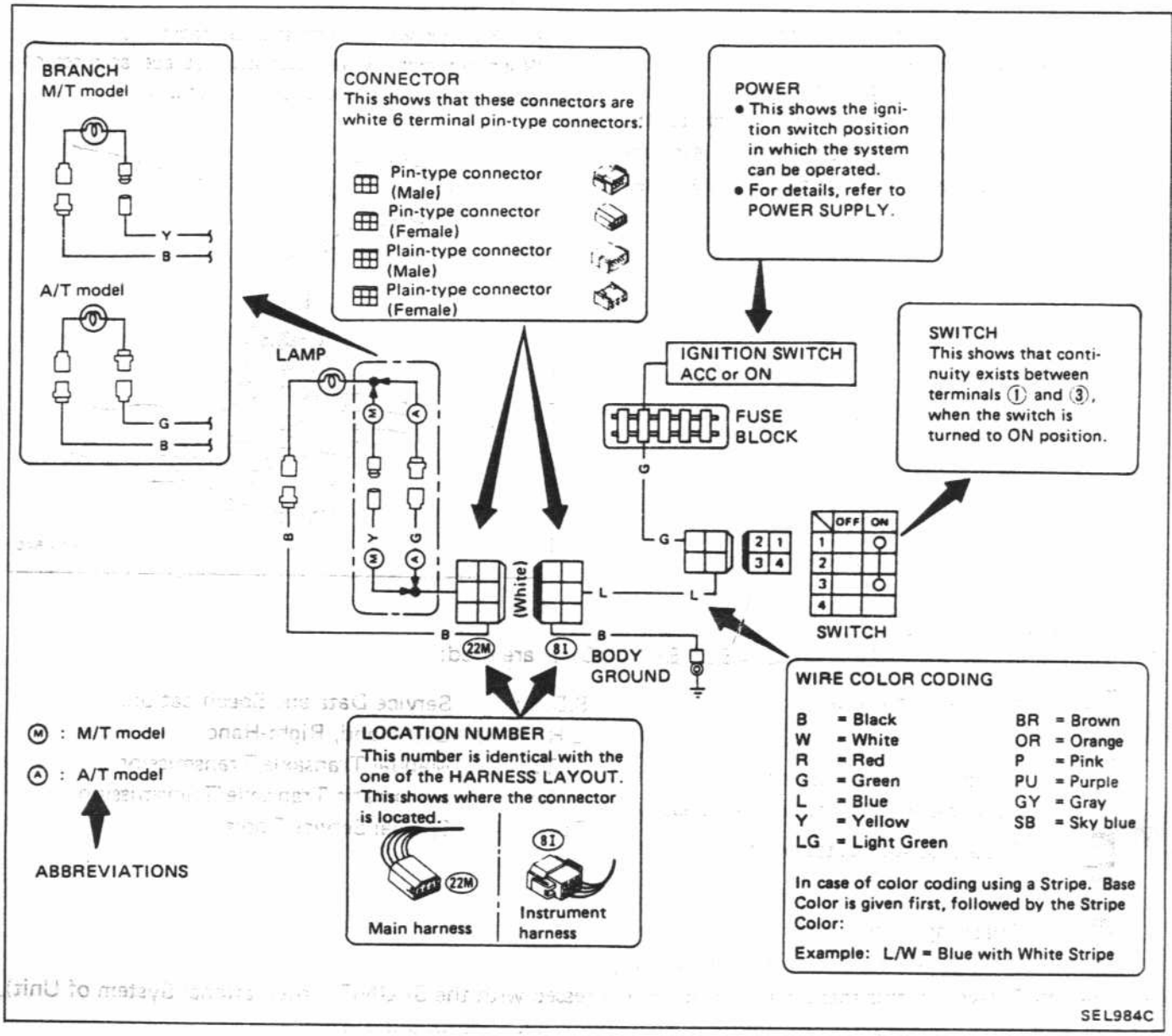
9. The **UNIT** given in this manual are primarily expressed with the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.

"Example"

Tightening torque
59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

10. Symbols used in **WIRING DIAGRAM** are shown below.

"Example"



11. **TROUBLE DIAGNOSES AND CORRECTIONS** are included in sections dealing with complicated units.
12. **SERVICE DATA AND SPECIFICATIONS** and a list of **SPECIAL SERVICE TOOLS** are contained at the end of each section for quick reference of data and special tools.
13. The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.

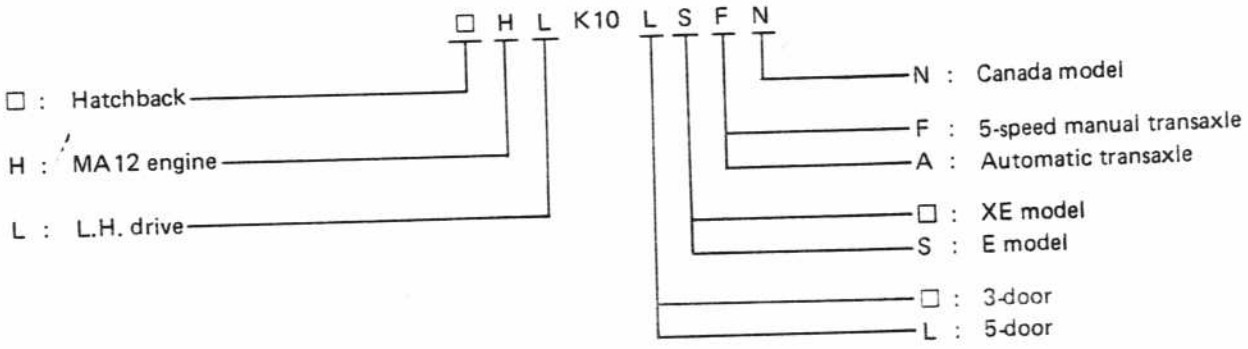
IDENTIFICATION INFORMATION

Model Variation

Destination	Class		Model	Engine	Transaxle	Road wheel size ... offset mm (in)	Tire size	PCD*3 mm (in)
Canada	3-door Hatchback	E	HLK10SFN	MA12	RS5F41A	4.50B x 12 ... 45 (1.77) 4-1/2J x 12*1 ... 45 (1.77)	P155/80R12 P155/80D12*2	100 (3.94)
			HLK10SAN		RL3F01A			
		XE	HLK10FN		RS5F41A			
			HLK10AN		RL3F01A			
	5-door Hatchback	E	HLK10LSFN		RS5F41A			
			HLK10LSAN		RL3F01A			
		XE	HLK10LFN		RS5F41A			
			HLK10LAN		RL3F01A			

*1: Aluminum (Option) *2: Spare tire *3: Pitch circle diameter

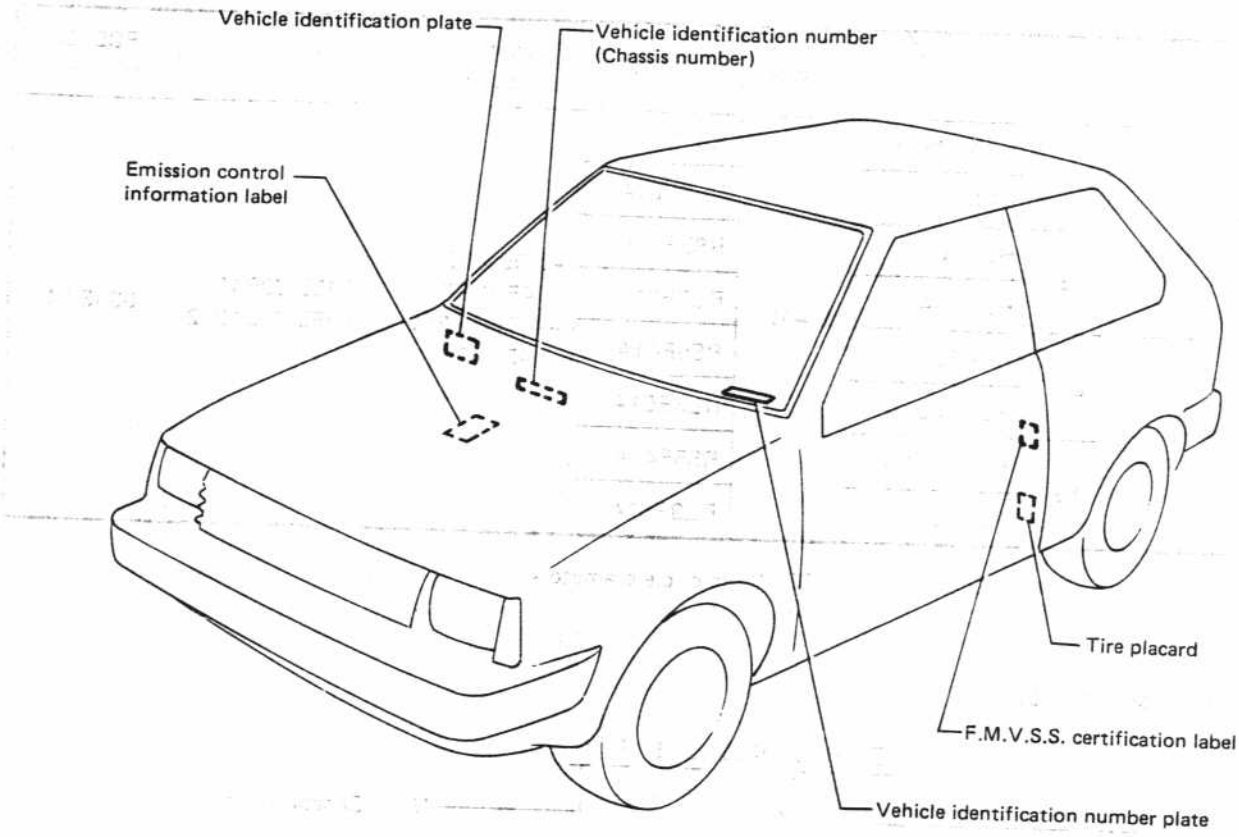
Prefix and suffix designations



□ : **means no indication.**

IDENTIFICATION INFORMATION

Identification Numbers



SGI26

VEHICLE IDENTIFICATION NUMBER (CHASSIS NUMBER)

JN1 H K O 4 S * H 5 000001

- Manufacturer
  JN1 : Nissan, Passenger vehicle
- Engine type
  H : MA12
- Vehicle line
  K : Nissan Micra
- Model change (0 to 9)
- Body type
  4 : 3-door Hatchback
  3 : 5-door Hatchback
- Restraint system
  S : Standard
- Check digit (0 to 9 or X)
  The code for the Check digit is determined by mathematical computation.
- Model year
  H : 1987 year model
- Manufacture plant
  5 : Murayama
- Vehicle serial number (Chassis number)

The 1987 models start production with the following vehicle identification numbers (Chassis numbers).

3-door Hatchback: JN1HK04S*H5010001

5-door Hatchback: JN1HK03S*H5010001

Identification Numbers (Cont'd)

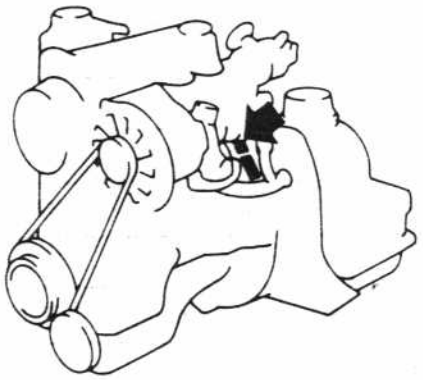
IDENTIFICATION PLATE

NISSAN MOTOR CO., LTD. JAPAN
型 式 TYPE TIPO ①
CHASSIS NO. NO. DE CHASIS ②
MODEL MODELO ③
○ カラーCOLOR TRIM トリムCOLOR GUARNICION ④ ⑤ ○
エン ENGINE ジン MOTOR ⑥ ⑦ CC
ミッション TRANS., AXLE アクスル TRANS., EJE ⑧ ⑨
工場 PLANT PLANTA
日産自動車株式会社 MADE IN JAPAN

SGI315

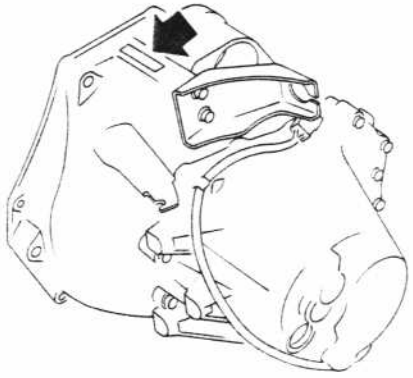
1 Type
2 Vehicle identification number (Chassis number)
3 Model
4 Body color code
5 Trim color code
6 Engine model
7 Engine displacement
8 Transaxle model
9 Axle model

ENGINE SERIAL NUMBER



SGI226

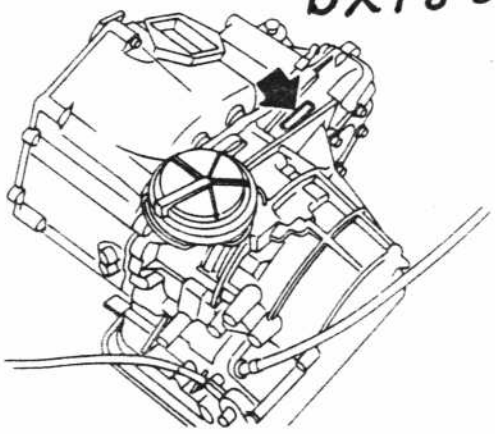
MANUAL TRANSAXLE NUMBER



SGI227

AUTOMATIC TRANSAXLE NUMBER

DX18576



SAT239

Dimension

Item \ Model			3-door Hatchback 5-door Hatchback
Overall length		mm (in)	3,785 (149.0)
Overall width		mm (in)	1,560 (61.4)
Overall height		mm (in)	1,395 (54.9)
Wheelbase		mm (in)	2,300 (90.6)
Tread	Front	mm (in)	1,345 (53.0)
	Rear	mm (in)	1,330 (52.4)
Min. ground clearance		mm (in)	165 (6.5)*
Overhang	Front	mm (in)	790 (31.1)
	Rear	mm (in)	695 (27.4)

*: Portion where compression bracket is installed [30 mm (1.18 in) backward from the center of the front tire]

RECOMMENDED FUEL AND LUBRICANTS

Fuel

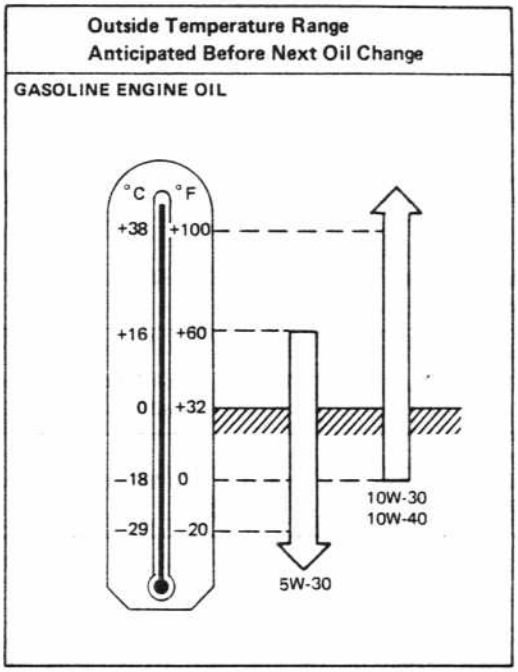
Use unleaded or leaded gasoline with an octane rating of at least 87 AKI (Anti-Knock Index) number (Research octane number 91).

Lubricants

Lubricant	Specifications	Remarks
Gasoline engine oil	API SF (Energy Conserving Oils)*	For further details, refer to the recommended SAE viscosity chart.
Manual transaxle oil	API GL-4	
Automatic transaxle fluid	Type DEXRON®	–
Multi-purpose grease	NLGI No. 2	Lithium soap base
Brake fluid	DOT 3	US FMVSS No. 116
Anti-freeze	–	Ethylene glycol base

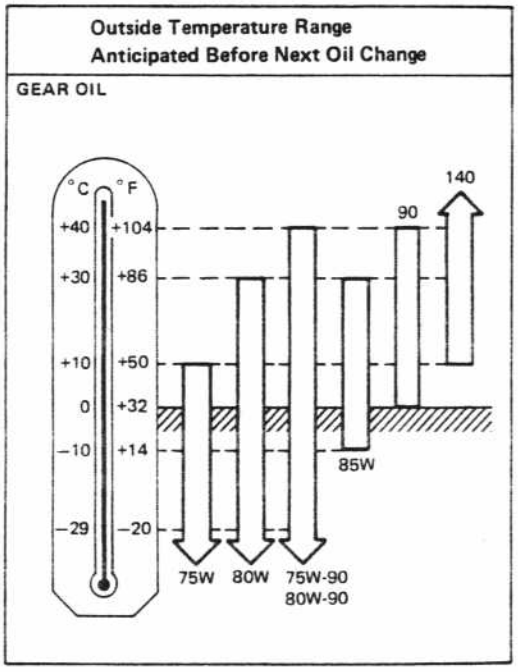
*: ENERGY CONSERVING OILS
In order to improve fuel economy and conserve energy, new lower friction engine oils have been developed. These oils are readily available and can be identified by such labels as energy conserving, energy saving, improved fuel economy, etc.

SAE Viscosity Number



TI0002

10W-30 is preferable if the ambient temperature is above −18°C (0°F). 20W-40 and 20W-50 are usable if the ambient temperature is above 10°C (50°F) for all seasons.



TI0003

80W-90 is preferable if the ambient temperature is below 40°C (104°F).

Approximate Refill Capacities

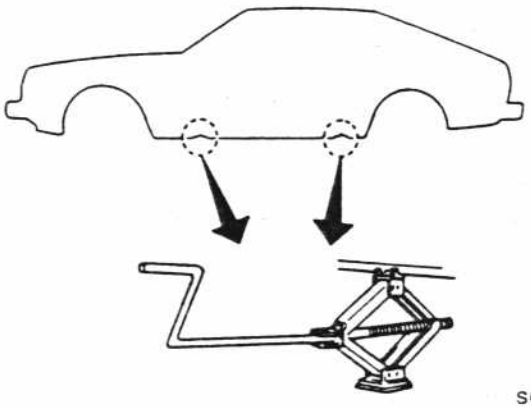
	Liter	US measure	Imp measure
Fuel tank	40	10-5/8 gal	8-3/4 gal
Coolant			
With heater	4.7	5 qt	4-1/8 qt
Without heater	4.3	4-1/2 qt	3-3/4 qt
Engine			
With oil filter change	2.8	3 qt	2-1/2 qt
Without oil filter change	2.6	2-3/4 qt	2-1/4 qt
Transaxle			
M/T	2.6	5-1/2 pt	4-5/8 pt
A/T	6.0	6-3/8 qt	5-1/4 qt
Water reservoir			
Windshield & Rear window	3.0	3-1/8 qt	2-5/8 qt

LIFTING POINTS AND TOW TRUCK TOWING

WARNING:

a. Never get under the vehicle while it is supported only by the jack. Always use safety stands to support frame when you have to get under the vehicle.
b. Place wheel chocks at both front and back of the wheel diagonally opposite the jack positon.

Pantograph Jack

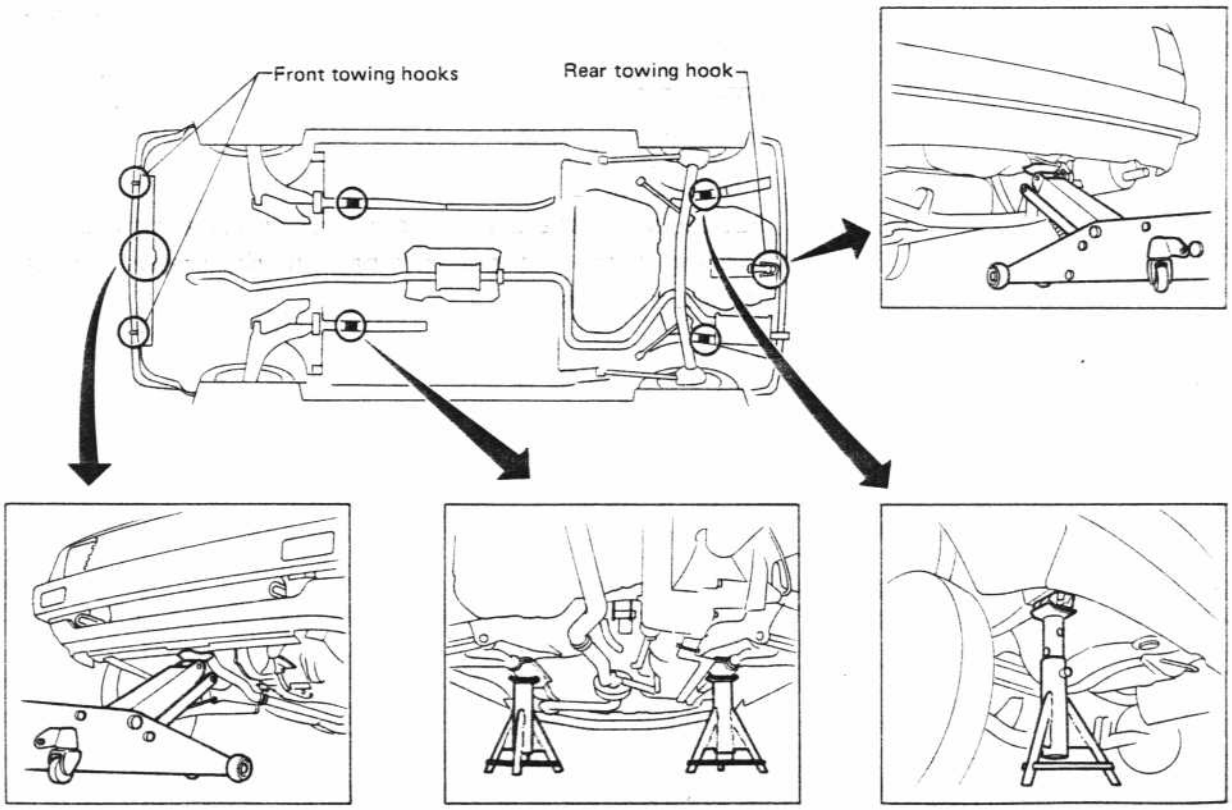


SGI154

Garage Jack and Safety Stand

CAUTION:

Place a wood or rubber block between safety stand and vehicle body when the supporting body is flat.



SGI372

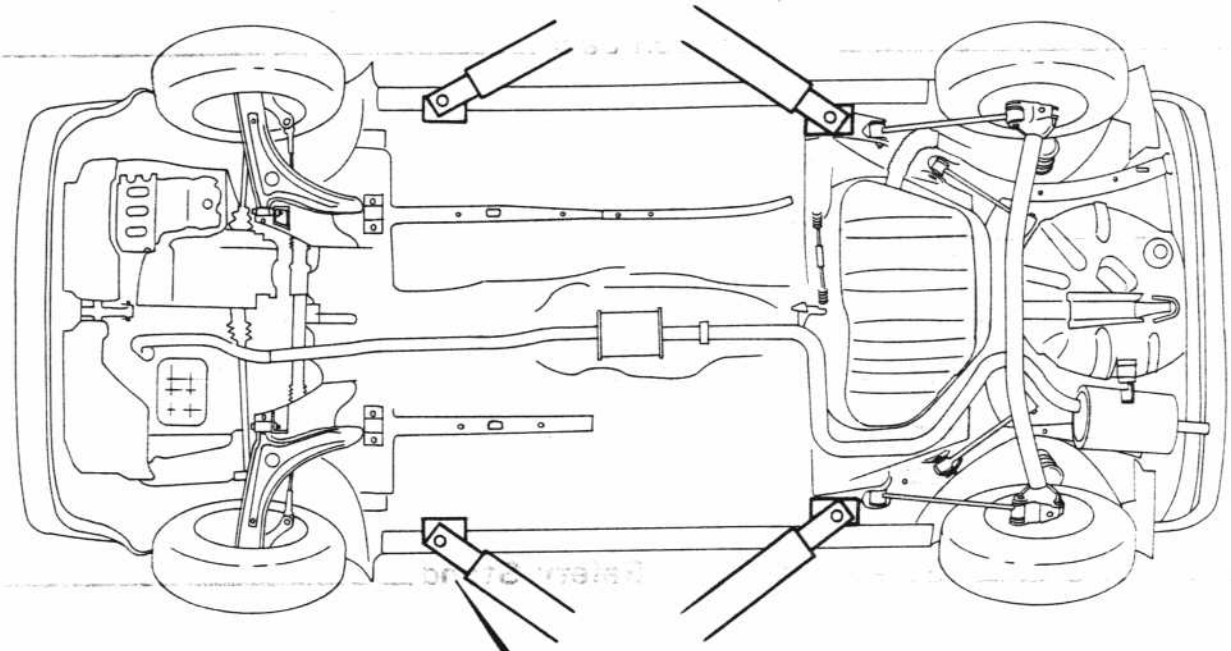
LIFTING POINTS AND TOW TRUCK TOWING

2-pole Lift

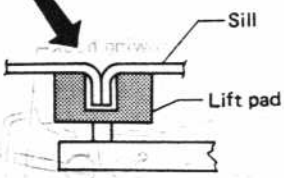
WARNING:

When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.

When setting the lift arm, do not allow the arm to contact the brake tubes and fuel lines.



Note:
Front lift-up points are the same as panto-graph jack points.



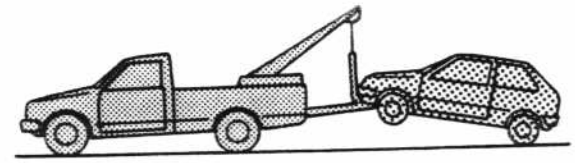
Put the sill in the slit of the lift pad to prevent the sill from deforming. If the pad does not have the slit, prepare a suitable attachment with slit.

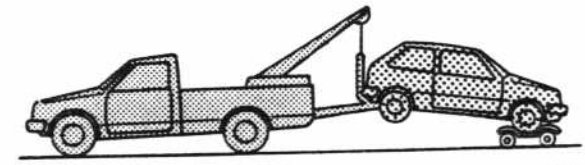
SGI458

Tow Truck Towing

CAUTION:

- All applicable State or Provincial (in Canada) laws and local laws regarding the towing operation must be obeyed.
- It is necessary to use proper towing equipment to avoid possible damage to the vehicle during a towing operation.
  Towing should be done in accordance with Towing Procedure Manual.
- Attach safety chains for all towing.
- When towing, make sure that the transaxle, steering system and power train are in good order. If any unit is damaged, a dolly must be used.
- When towing with the front wheels on the ground:
  Turn the ignition key to the "OFF" position and secure the steering wheel in a straight-ahead position with a rope or similar device. Never place the ignition key in the "LOCK" position. This will result in damage to the steering lock mechanism.
  Move the gearshift lever to the neutral ("N" position).
- When towing with the rear wheels on the ground, release the parking brake.



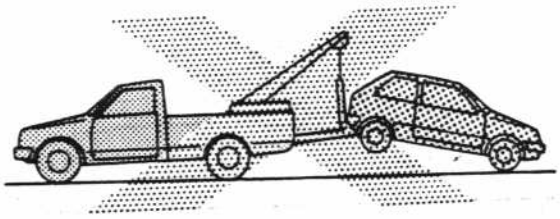


SGI366

NISSAN recommends that vehicle be towed with the driving (front) wheels off the ground as illustrated.

TOWING AN AUTOMATIC TRANSAXLE MODEL WITH REAR WHEELS RAISED
(With front wheels on ground)

Automatic transaxle model



SGI368

Never tow an automatic transaxle model with rear wheels raised (with front wheels on ground) as this may cause serious and expensive damage to the transaxle. If it is necessary to tow it with rear wheels raised, always use a towing dolly under the front wheels.

TOWING AN AUTOMATIC TRANSAXLE MODEL WITH FOUR WHEELS ON GROUND

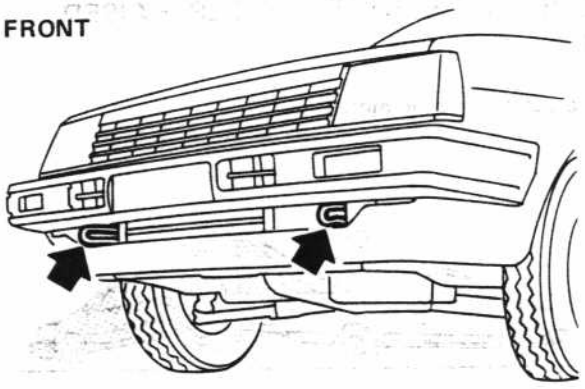
Observe the following restricted towing speeds and distances.

Speed	km/h (MPH)	Below 50 (30)
Distance	km (miles)	Less than 65 (40)

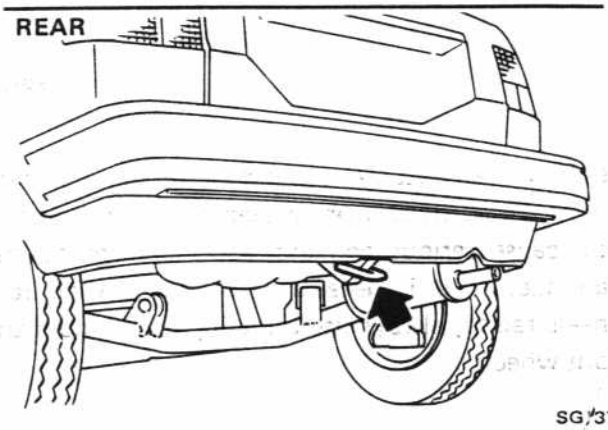
Tow Truck Towing (Cont'd)

TOWING POINT

FRONT



REAR



SGI376

- Never tow the vehicle using only the towing hooks. Use proper towing equipment when towing. Otherwise, the vehicle body will be damaged.
- Always pull the cable straight out from the vehicle. Never pull on the hook at a sideways angle.

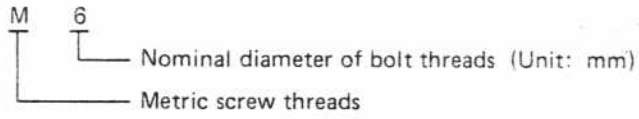
TIGHTENING TORQUE OF STANDARD BOLTS

Grade	Bolt or nut size	Bolt or nut diameter* mm	Pitch mm	Tightening torque		
				N·m	kg-m	ft-lb
4T	M6	6.0	1.0	3 - 4	0.3 - 0.4	2.2 - 2.9
	M8	8.0	1.25	8 - 11	0.8 - 1.1	5.8 - 8.0
			1.0	8 - 11	0.8 - 1.1	5.8 - 8.0
	M10	10.0	1.5	16 - 22	1.6 - 2.2	12 - 16
			1.25	16 - 22	1.6 - 2.2	12 - 16
	M12	12.0	1.75	26 - 36	2.7 - 3.7	20 - 27
			1.25	30 - 40	3.1 - 4.1	22 - 30
	M14	14.0	1.5	46 - 62	4.7 - 6.3	34 - 46
7T	M6	6.0	1.0	6 - 7	0.6 - 0.7	4.3 - 5.1
	M8	8.0	1.25	14 - 18	1.4 - 1.8	10 - 13
			1.0	14 - 18	1.4 - 1.8	10 - 13
	M10	10.0	1.5	25 - 35	2.6 - 3.6	19 - 26
			1.25	26 - 36	2.7 - 3.7	20 - 27
	M12	12.0	1.75	45 - 61	4.6 - 6.2	33 - 45
			1.25	50 - 68	5.1 - 6.9	37 - 50
	M14	14.0	1.5	76 - 103	7.7 - 10.5	56 - 76
9T	M6	6.0	1.0	8 - 11	0.8 - 1.1	5.8 - 8.0
	M8	8.0	1.25	19 - 25	1.9 - 2.5	14 - 18
			1.0	20 - 27	2.0 - 2.8	14 - 20
	M10	10.0	1.5	36 - 50	3.7 - 5.1	27 - 37
			1.25	39 - 51	4.0 - 5.2	29 - 38
	M12	12.0	1.75	65 - 88	6.6 - 9.0	48 - 65
			1.25	72 - 97	7.3 - 9.9	53 - 72
	M14	14.0	1.5	109 - 147	11.1 - 15.0	80 - 108

1. **Special parts are excluded.**
2. **This standard is applicable to bolts having the following marks embossed on the bolt head.**

Grade	Mark
4T	4
7T	7
9T	9

*: Nominal diameter



SECTION MA

CONTENTS

The following charts show the normal maintenance schedule. Under severe driving conditions, additional or more frequent maintenance will be required. Refer to **"Maintenance under severe driving conditions".**

The periodic maintenance schedule is repeated beyond the last mileage and period shown by returning to the first 15,000 miles (24,000 km) or 12 months.

EMISSION CONTROL SYSTEM MAINTENANCE

MAINTENANCE OPERATION		MAINTENANCE INTERVAL					Reference page
Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000	7.5	15	30	45	60	
	(Kilometers x 1,000)	(12)	(24)	(48)	(72)	(96)	
	Months	6	12	24	36	48	
Drive belts				I		I	MA-8
Air cleaner filter		Replace every 30,000 miles (48,000 km)					MA-8
Choke mechanism (choke valve and linkage)			I	I	I	I	MA-8
Positive crankcase ventilation (P.C.V.) filter		See NOTE (1)*.					MA-9
Vapor lines				I*		I*	MA-9
Fuel lines (hoses, piping, connections, etc.)				I*		I*	MA-9
Fuel filter		See NOTE (1)*.					MA-9
Engine coolant				R		R	MA-9
Engine oil		R	Then replace every 7,500 miles (12,000 km) or 6 months.				MA-10
Engine oil filter (Use PREMIUM type)		R	Then replace every second oil change.				MA-10
Spark plugs		Replace every 15,000 miles (24,000 km).					MA-11
Ignition wires		Inspect every 2 years*.					MA-12
Intake & exhaust valve clearance			A	A	A	A	MA-15
Ignition timing			A	A	A	A	MA-15
Idle rpm and mixture ratio	Idle rpm		A	A	A	A	MA-15
	Mixture ratio		I	I	I	I	MA-15
Automatic temperature control air cleaner		Inspect every 15,000 miles (24,000 km).					MA-12
Fuel tank vacuum relief valve				I		I	EF & EC-34
Timing belt		Replace every 60,000 miles (96,000 km).					MA-13

CHASSIS AND BODY MAINTENANCE

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000	15	30	45	60	
	(Kilometers x 1,000)	(24)	(48)	(72)	(96)	
	Months	12	24	36	48	
Brake lines & hoses		I	I	I	I	MA-24
Brake pads, discs, drums & linings		Inspect every 15,000 miles (24,000 km)				MA-24, 25
Manual and automatic transaxle gear oil		Inspect every 15,000 miles (24,000 km)				MA-18
Steering gear & linkage, axle & suspension parts & front drive shaft boots		I	I	I	I	MA-20, 23, 30
Looks, hinges & hood latch		L	L	L	L	MA-31
Front wheel bearing grease			I		I	MA-21
Exhaust system		I	I	I	I	MA-18
Seat belts, buckles, retractors, anchors & adjuster		I	I	I	I	MA-31

NOTE:

(1) If vehicle is operated under extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the fuel filters might becomes clogged. In such an event, replace them immediately.

(2) Maintenance items and intervals with "*" are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required

Abbreviations
- A = Adjust
- R = Replace
- L = Lubricate
- I = Inspect. Correct or replace if necessary.

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS

The maintenance intervals shown in the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance is required to be performed on the following items as shown in the table.

Severe driving conditions

A – Repeated short distance driving
B – Extensive idling
C – Driving in dusty conditions
D – Driving in extremely low or high ambient temperatures
E – Towing a trailer
F – Driving in areas using road salt or other corrosive materials
G – Driving on rough and/or muddy roads

Driving condition									Maintenance item	Maintenance operation	Maintenance interval	Reference page
.	.	C	.	.	.	.	.	.	Air cleaner filter	R	More frequently	MA-8
A	B	C	.	E	.	.	.	.	Engine oil & oil filter	R	Every 3,000 miles (5,000 km) or 3 months	MA-10
A	.	C	.	E	F	G	.	.	Brake pads, discs, drums & lining	I	Every 7,500 miles (12,000 km)	MA-24, 25
.	.	.	.	E	.	G	.	.	Manual and automatic trans-axle gear oil	R	Every 30,000 miles (48,000 km) or 24 months	MA-18, 19
.	.	.	.	.	.	G	.	.	Steering gear & linkage, and axle & suspension parts	I	Every 7,500 miles (12,000 km) or 6 months	MA-20, 23
.	.	.	D	.	F	G	.	.	Front drive shaft boots	I	Every 7,500 miles (12,000 km) or 6 months	MA-21
.	.	C	D	.	F	G	.	.	Steering linkage ball joints & front suspension ball joints	I	Every 7,500 miles (12,000 km) or 6 months	MA-20, 30
.	.	.	.	.	F	.	.	.	Locks, hinges & hood latch	L	Every 7,500 miles (12,000 km) or 6 months	MA-31
A	.	.	.	E	F	G	.	.	Exhaust system	I	Every 7,500 miles (12,000 km) or 6 months	MA-18

Maintenance operations: I = Inspect. Correct or replace if necessary. R = Replace L = Lubricate

GENERAL MAINTENANCE

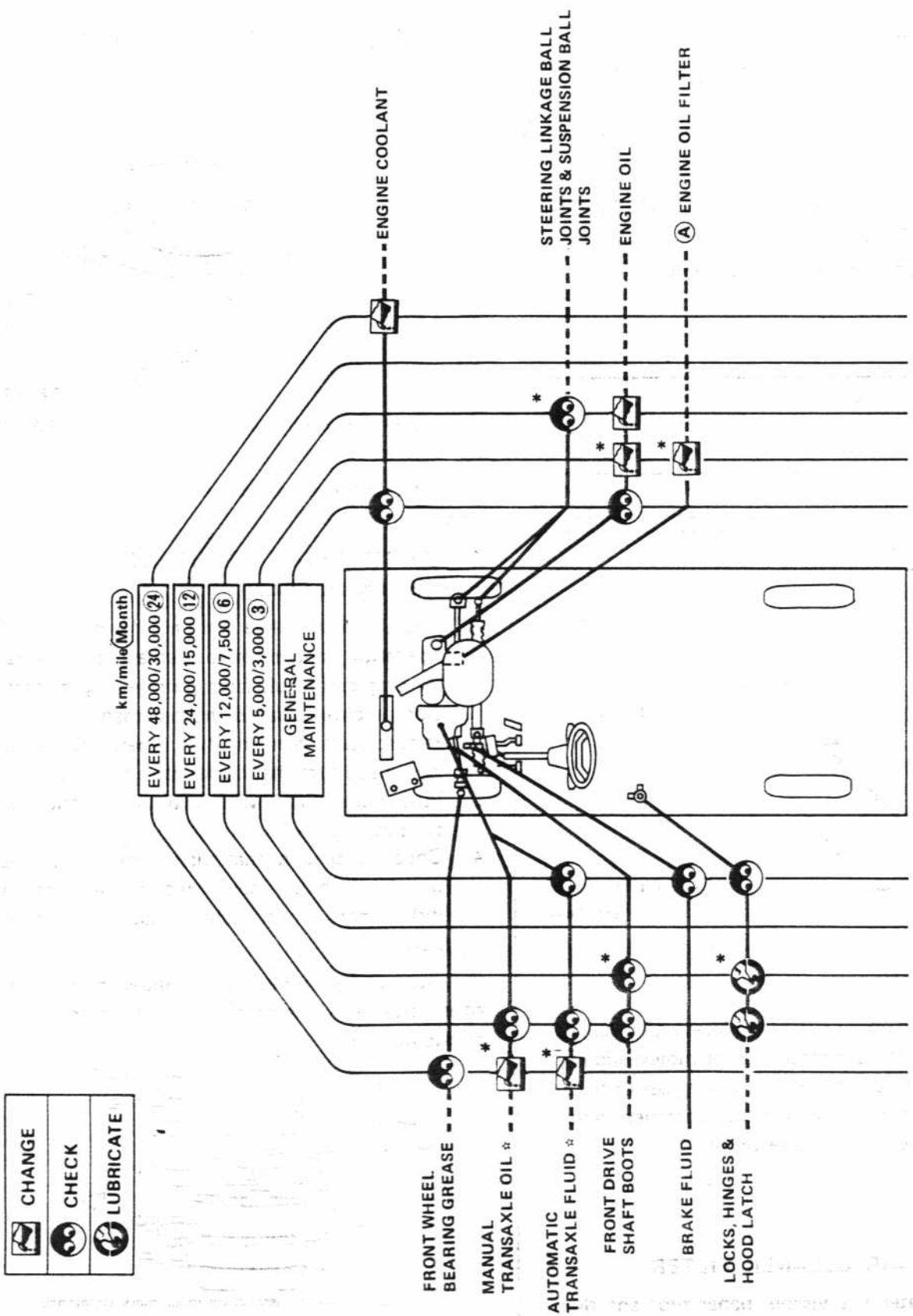
General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform the checks and inspections themselves or they can have their NISSAN/DATSUN dealers do them for a nominal charge.

Item	Reference item in MA section
OUTSIDE THE VEHICLE	
Tires Check the pressure with a gauge periodically when at a service station, including the spare, and adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	• CHECKING TIRE CONDITION
Wheel nuts When checking the tires, make sure no nuts are missing, and check for any loose nuts. Tighten if necessary.	• TIRE REPLACEMENT Wheel nut.
Tire rotation Tires should be rotated every 7,500 miles (12,000 km).	• TIRE ROTATION
Wheel alignment and balance If the vehicle should pull to either side while driving on a straight and level road, or if you detect uneven or abnormal tire wear, there may be a need for wheel alignment. If the steering wheel or seat vibrates at normal highway speeds, wheel balancing may be needed.	• CHECKING TIRE CONDITION Abnormal tire wear • CHECKING WHEEL ALIGNMENT • WHEEL INSPECTION
Windshield glass Check for abrasions or scratches.	–
Windshield wiper blades Check for cracks or wear if they do not wipe properly.	–
Doors and engine hood Check that all doors and the engine hood operate smoothly as well as the trunk lid and back hatch. Also ensure, that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released.	• BODY Lubricating locks, hinges and hood latches
INSIDE THE VEHICLE	
The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.	
Lights Make sure that the headlights, stop lights, tail lights, turn signal lights, and other lights are all operating properly and installed securely. Also check headlight aim.	–
Warning lights and buzzers/chimes Make sure that all warming lights and buzzers/chimes are operating properly.	–
Horn Make sure it operates properly.	–
Windshield wiper and washer Check that the wipers and washer operate properly and that the wipers do not streak.	–

Item	Reference item in MA section
Windshield defroster Check that the air comes out of the defroster outlets properly and in sufficient quantity when operating the heater of air conditioner.	–
Rear view mirror Make sure that it is secure.	–
Sun visors Make sure that they can be moved freely and are secure.	–
Steering wheel Check that it has the specified freeplay. Be sure to check for changes in the steering condition, such as excessive freeplay, hard steering or strange noises.	**Specification** **Free play: Less than 35 mm (1.38 in)**
Seats Check seat position controls such as seat adjusters, seatback recliner, etc. to ensure they operate smoothly and that all latches lock securely in every position. Check that the head restraints move up and down smoothly and that the locks (if so equipped) hold securely in all latched positions. Check that the latches lock securely for folding-down rear seatbacks.	–
Seat belts Check that all parts of the seat belt system e.g. buckles, anchors and retractors operate property and smoothly. Check the belt webbing for cuts, fraying, wear or damage.	• **BODY** **Checking seat belts, buckles, retractors, anchors and adjuster**
Accelerator pedal Check the pedal for smooth operation and make sure the pedal does not catch or require uneven effort.	–
Clutch pedal Make sure the pedal operates smoothly and check that it has the proper free travel.	• **CHECKING CLUTCH SYSTEM** **Checking clutch operation**
Brakes Check that the brake does not pull the vehicle to one side when applied.	–
Brake pedal Check the pedal for smooth operation and make sure it has the proper distance under it when depressed fully. Check the brake booster function.	• **CHECKING FOOT BRAKE PEDAL OPERATION** • **CHECKING BRAKE BOOSTER, VACUUM HOSES, CONNECTIONS AND CHECK VALVE**
Parking brake Check that the lever has the proper travel and confirm that the vehicle is held securely on a fairly steep hill with only the parking brake applied.	• **CHECKING PARKING BRAKE**
Automatic transaxle "Park" mechanism Check that the lock release button on the selector lever operates properly and smoothly. On a fairly steep hill check that your vehicle is held securely with the selector lever in the "P" position without applying any brakes.	–

Item	Reference Item in MA section
UNDER THE HOOD AND VEHICLE	
The maintenance items listed here should be checked periodically e.g. each time you check the engine oil or refuel.	
Windshield washer fluid Check that there is adequate fluid in the tank.	—
Engine coolant level Check the coolant level when the engine is cold.	• CHANGING ENGINE COOLANT
Radiator and hoses Check the front of the radiator and clean off any dirt, insects, leaves, etc., that may have accumulated. Make sure the hoses have no cracks, deformation, rot or loose connections.	—
Brake fluid level Make sure that the brake fluid level is between the "MAX" and "MIN" lines on the reservoir.	• CHECKING BRAKE FLUID LEVEL AND LEAKS
Engine drive belts Make sure that no belt is frayed, worn, cracked or oily.	• CHECKING DRIVE BELTS
Engine oil level Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	• CHANGING ENGINE OIL AND REPLACING OIL FILTER
Automatic transaxle fluid level Check the level on the dipstick after putting the selector lever in "P" with the engine idling.	• CHECKING A/T FLUID LEVEL
Exhaust system Make sure there are no loose supports, cracks or holes. If the sound of the exhaust seems unusual or there is a smell of exhaust fumes, immediately locate the trouble and correct it.	• CHECKING EXHAUST SYSTEM
Underbody The underbody is frequently exposed to corrosive substances such as those used on icy roads or to control dust. It is very important to remove these substances, otherwise rust will form on the floor pan, frame, fuel lines and around the exhaust system. At the end of winter, the underbody should be thoroughly flushed with plain water, being careful to clean those areas where mud and dirt can easily accumulate.	—
Fluid leaks Check under the vehicle for fuel, oil, water or other fluid leaks after the vehicle has been parked for a while. Water dripping from the air conditioner after use is normal. If you should notice any leaks or gasoline fumes are evident, check for the cause and correct it immediately.	• INSPECTING MANUAL TRANSAXLE OIL • INSPECTING AUTOMATIC TRANSAXLE FLUID • INSPECTING BRAKE LINES & HOSES

LUBRICATION CHART



CHECKING DRIVE BELT

1. Inspect for cracks fraying, wear or oiliness. Replace if necessary.

The belts should not touch the bottom of the pulley groove.

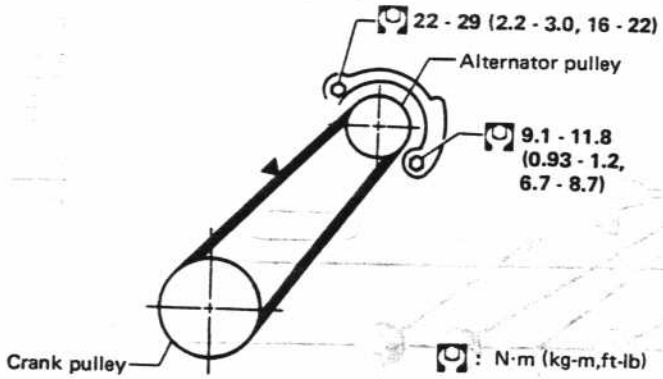
2. Check drive belt deflections by pushing midway between pulleys.

Adjust if belt deflections exceed the limit.

Unit: mm (in)

	Used belt deflection		Set deflection of new belt
	Limit	Adjust deflection	
Alternator	19.0 (0.748)	13.5 - 16.0 (0.531 - 0.630)	12.5 - 14.0 (0.492 - 0.551)

Applied pushing force: 98 N (10 kg, 22 lb)



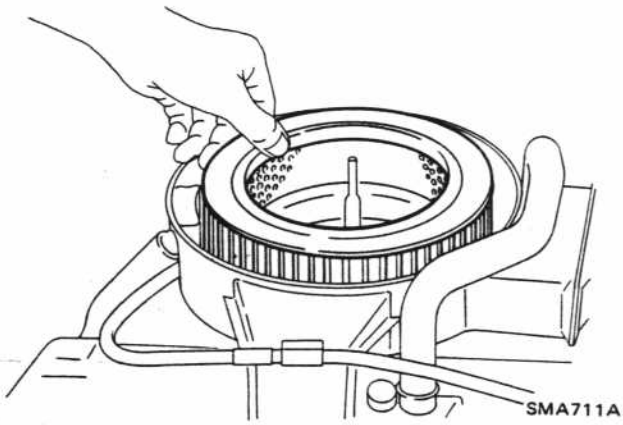
Alternator belt

1. Loosen the upper and lower alternator securing bolts until the alternator can be moved slightly.
2. Move the alternator with a prying bar until the belt deflection is within the specified range. Then tighten the bolts securely.

REPLACING AIR CLEANER FILTER

Air cleaner filter is a viscous paper type and does not require cleaning.

1. Remove air cleaner cover and remove air cleaner filter.



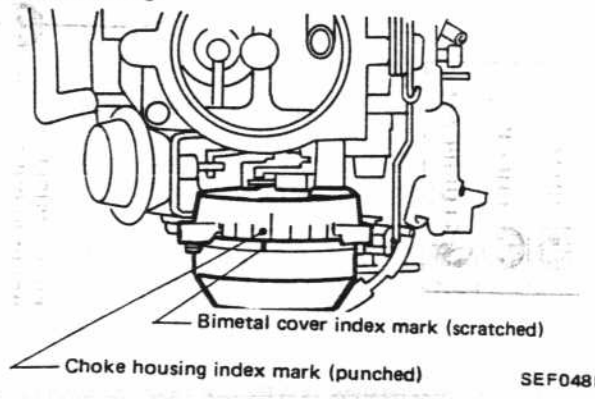
2. Install new air cleaner filter and install air cleaner cover.

Align the mark on air cleaner cover to the mark on body.

CHECKING CHOKE MECHANISM
(Choke plate and linkage)

1. Check choke valve and mechanism for free operation, and clean or replace if necessary. Binding can result from petroleum gum formation on choke shaft or from damage.
2. Before starting engine, fully open throttle valve and make sure that choke valve closes properly.
3. Push choke valve with your finger, and check for binding.
4. Check to be sure that the punched index mark on the bimetal cover meets the scratched index mark on the choke housing, as shown below.

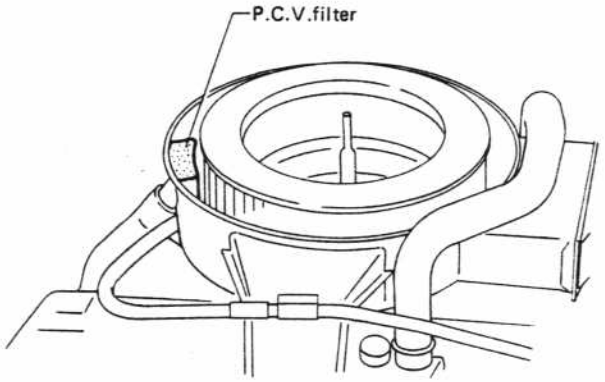
Do not set the bimetal cover index mark at any other positions except the punched mark on the choke housing.



Before Engine Starts (Cont'd)

REPLACING P.C.V. FILTER

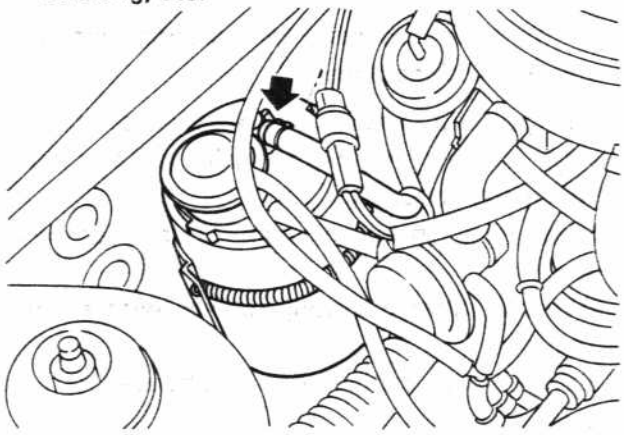
Remove air cleaner cover, and replace filter.



SMA712A

CHECKING VAPOR LINES

1. Visually inspect vapor lines for proper attachment, cracks, damage, loose connections, chafing and deterioration.
2. Check vacuum relief valve for clogging sticking, etc.

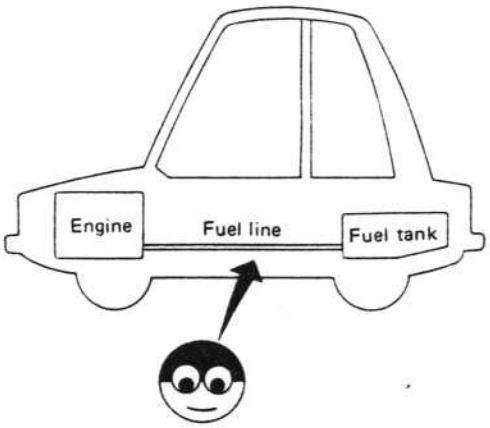


SMA147B

CHECKING FUEL LINES

(Hoses, piping, connections, etc.)

Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or deformed parts.



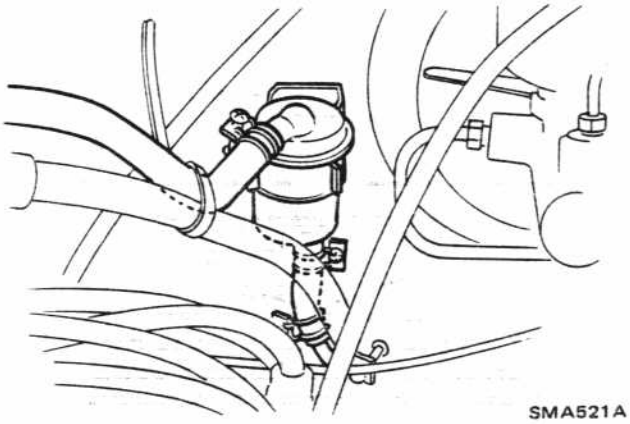
SMA803A

REPLACING FUEL FILTER

Disconnect battery cable.

Disconnect fuel hoses from fuel filter and replace it.

Plug open of fuel hoses immediately after fuel hoses have been removed from fuel filter.



SMA521A

CHANGING ENGINE COOLANT

WARNING:

To avoid being scalded, never change the coolant when the engine is hot.

When replacing engine coolant, set heater "TEMP" control lever to fully "HOT" position.

Before Engine Starts (Cont'd)

1. To flush system, open drain cock at bottom of radiator. Then thoroughly flush until clear water comes out.

CS009

2. Close drain cock.
3. Fill radiator with coolant up to specified level. Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

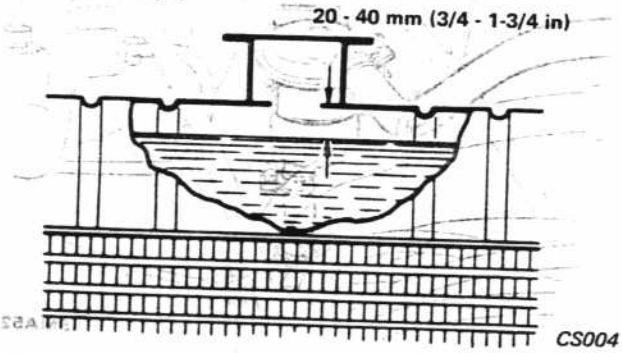
Coolant capacity:

Without heater

4.3 liters (4-1/2 US qt, 3-3/4 Imp qt)

With heater

4.7 liters (5 US qt, 4-1/8 Imp qt)



CS004

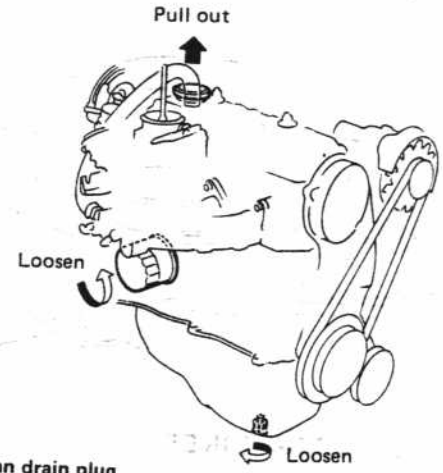
4. Run engine for a few minutes, and then check coolant level, and check drain cock and plug for any sign of leakage.

CHANGING ENGINE OIL AND REPLACING OIL FILTER

1. Start engine and warm it up until water temperature indicator points to middle of gauge, then turn off engine.
2. Remove oil filler cap and oil pan drain plug, and allow oil to drain.

WARNING:

To avoid the danger of being scalded, never attempt to change engine oil when the engine is hot.

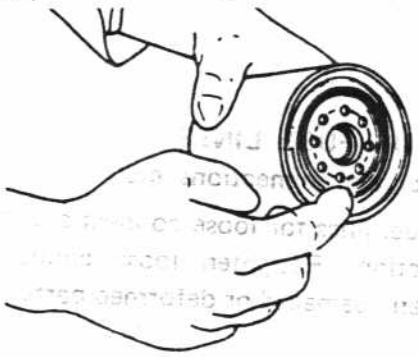


: Oil pan drain plug
35 - 47 N·m
(3.6 - 4.8 kg-m, 26 - 35 ft-lb)

SMA503A

- **A milky oil indicates the presence of cooling water. Isolate the cause and take corrective measure.**
- **An oil with extremely low viscosity indicates dilution with gasoline.**

3. Using oil filter wrench, remove oil filter.
4. After draining engine oil, wipe oil pan drain hole with a clean rag.
5. Clean and install oil pan drain plug with washer.
6. Wipe oil filter mounting surface with a clean rag.
7. Smear a little engine oil on rubber seal of new oil filter.



SMA010

8. Install new oil filter.

Screw in oil filter until a slight resistance is felt, then tighten an additional 2/3 turn.

Before Engine Starts (Cont'd)

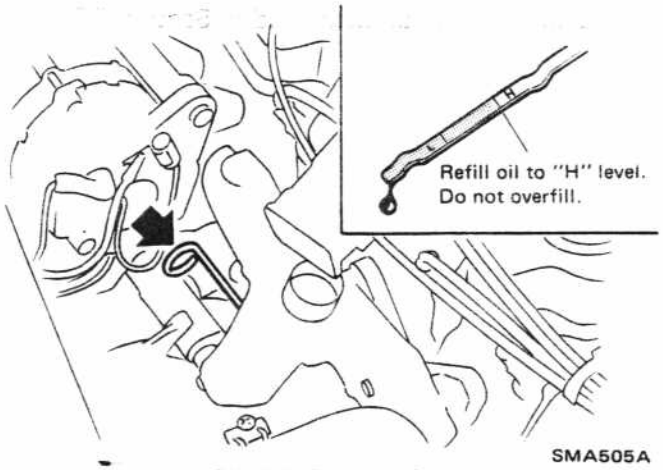
9. Refill engine with the appropriate new engine oil by referring to Recommended Lubricants. Check oil level with dipstick.

   Oil capacity (Refill):
   With oil filter
   2.8 liters (3 US qt, 2-1/2 Imp qt)
   Without oil filter
   2.6 liters (2-3/4 US qt, 2-1/4 Imp qt)

SMA504A

10. Install oil filler cap and start engine.
11. Check area around drain plug and oil filter for any sign of oil leakage.
    If leakage is evident, retighten or replace.
12. Run engine until water temperature indicator points to middle of gauge. Then turn off engine and wait several minutes. Check oil level with oil level gauge. If necessary, add engine oil.

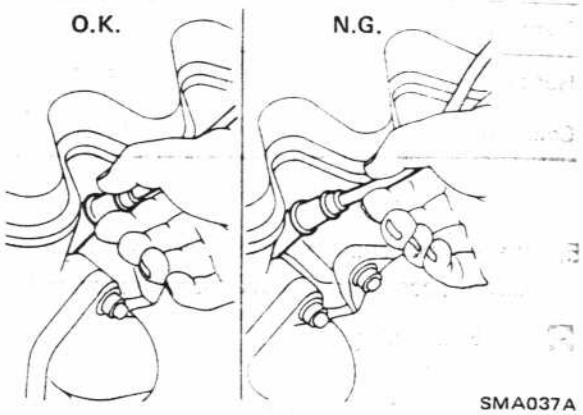
When checking oil level, park car on a level surface.



SMA505A

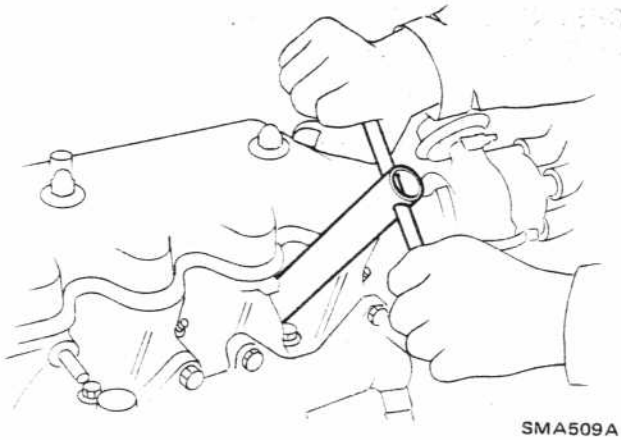
REPLACING SPARK PLUG

1. Disconnect high-tension cables at boot. Do not pull on the wires.



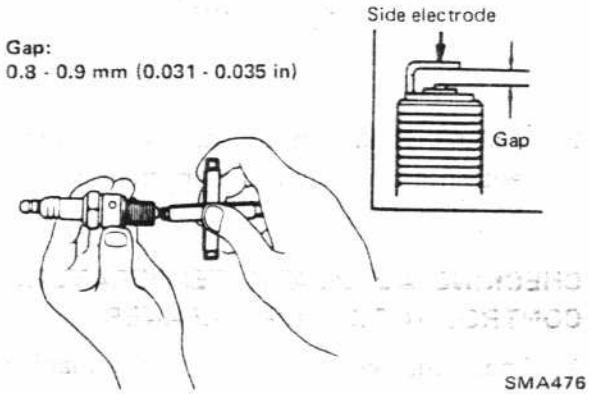
SMA037A

2. Remove spark plugs with spark plug wrench.



SMA509A

3. Inspect new spark plugs for cracks or damage.
4. Check new spark plug gap.



SMA476

Before Engine Starts (Cont'd)

Spark plug:

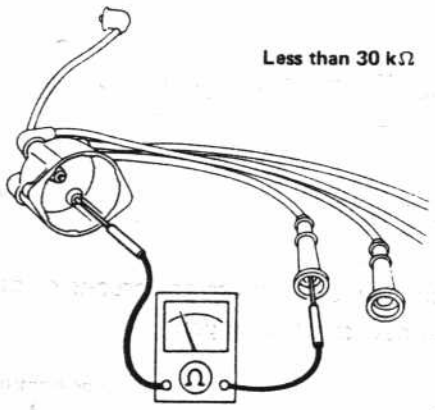
	Canada
Standard type	BPR5ES
Hot type	BPR4ES
Cold type	BPR6ES

5. Install new spark plugs. Reconnect high tension cables according to Nos. indicated on them.

: **Spark plug**
20 - 29 N·m
(2.0 - 3.0 kg-m, 14 - 22 ft-lb)

CHECKING IGNITION WIRES (HIGH-TENSION CABLES)

1. Check the high-tension cables for cracks, damage, burned terminals and proper fit.

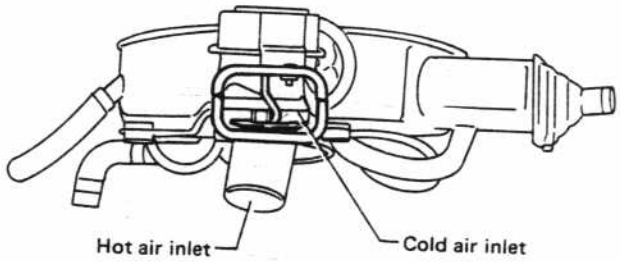


SMA015A

2. Shake the high-tension cable while measuring resistance to check for intermittent breakes.

CHECKING AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

1. Check that vacuum hoses (Intake manifold to temperature sensor, idle compensator and vacuum motor) are securely connected in correct position.
2. Check each hose for cracks or distortion.
3. Check A.T.C. system for function by proceeding as follows:
   Confirm that engine is cold before starting test.
   With engine turned off, check position of air control valve by hand or mirror.



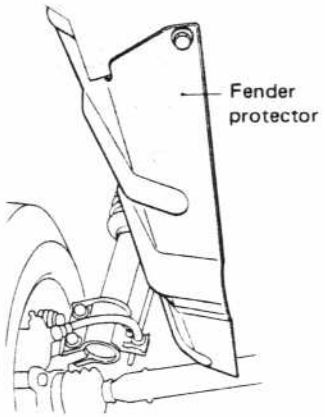
SEF328B

   Air control valve is in correct position if its cold air inlet is open and hot air inlet is closed.
4. Start engine and keep idling.
   Immediately after starting engine, air control valve is in correct position if its cold air inlet is closed and hot air inlet is open.
5. Check that air control valve gradually opens to cold air inlet side as engine warms up. When environmental temperature around temperature sensor is low, allow more time for engine warming up to facilitate smooth operation of air control valve.
   If the above test reveals any problem in the operation of air control valve, carry out the further inspection described in Section EF.

REPLACING TIMING BELT

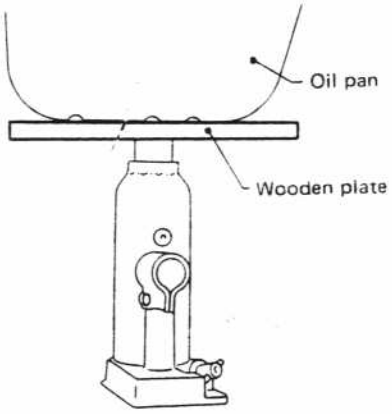
Removal

1. Jack up the vehicle.
2. Remove the right-front wheel and the right fender protector.



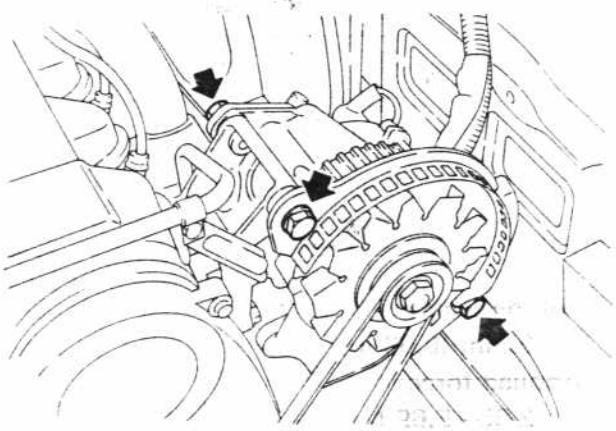
SEM023B

3. Place a jack under the oil pan.



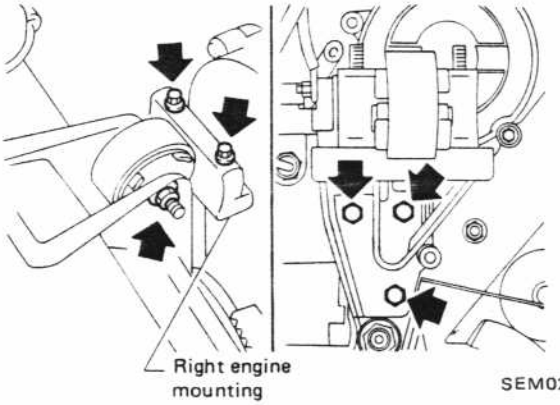
SEM968

4. Remove the alternator drive belt.



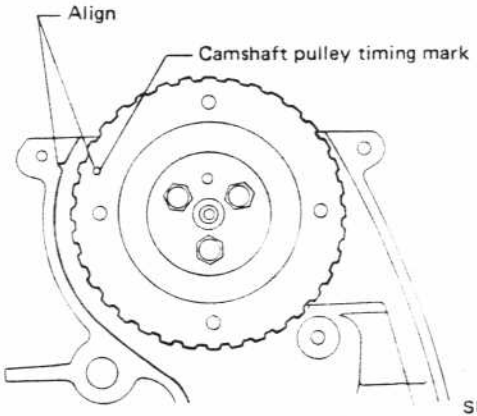
SEM024B

5. Remove the right engine mounting.



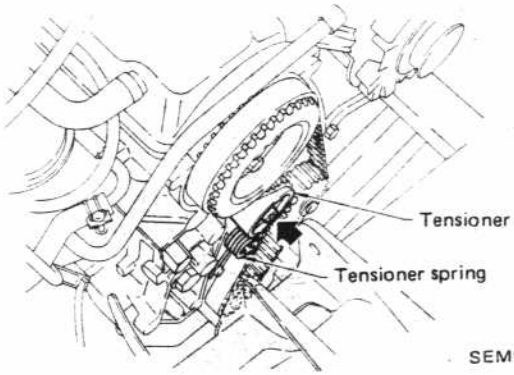
SEM025B

6. Remove the upper dust cover and gasket, then set No. 1 cylinder at T.D.C. on its compression stroke.



SEM982

7. Remove the crankshaft pulley, the lower dust cover and gasket.
8. Loosen the lock nut of the tensioner, and then remove the tensioner spring.



SEM026B

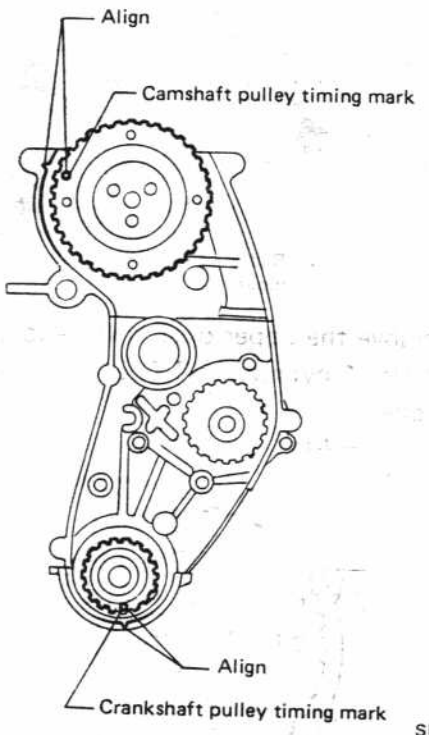
9. Remove the timing belt, and visually check it.

For details, refer to Timing Belt for Inspection (pages EM-6 & 7).

Before Engine Starts (Cont'd)

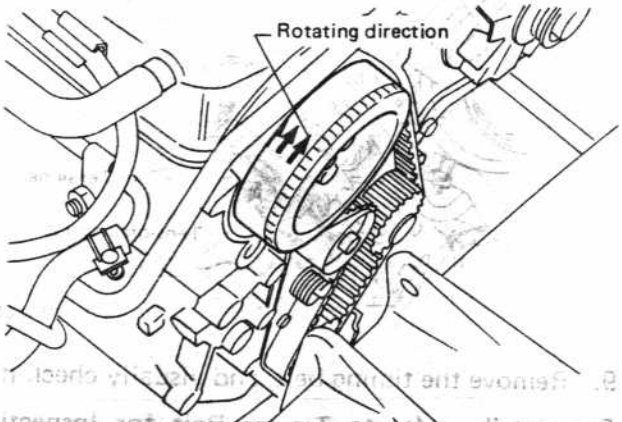
Installation

1. Confirm that No. 1 cylinder is at T.D.C. on its compression stroke.



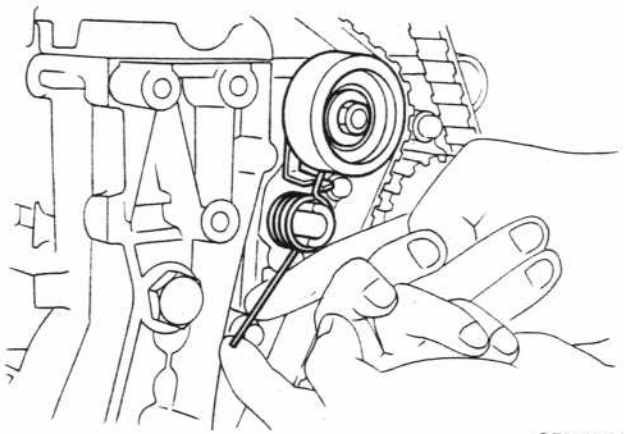
SEM974

2. Make sure both the water pump pulley and the tensioner rotate smoothly.
3. Set the timing belt.
   - Make sure the timing belt is clean.
   - Set it in the correct direction. The arrows painted on the timing belt show its direction of revolution.



SEM027B

4. Install the tensioner and the return spring.
5. Tighten the lock nut of the tensioner slightl and hook the return spring to the stopper.



SEM186A

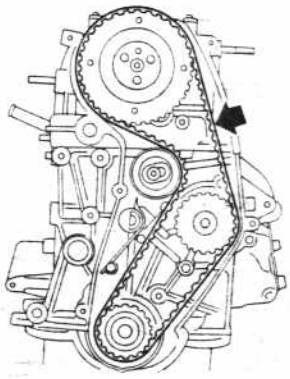
7. Install the lower dust cover and gasket.
8. Install the crankshaft pulley and tighten it.

: 69 - 88 N·m (7.0 - 9.0 kg-m, 51 - 65 ft-lb)

9. After removing all the spark plugs, rotate the crankshaft pulley at least two turns clockwise.
10. Tighten the tensioner lock nut.

: 15 - 17 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

11. Check belt tension by pushing midway between the camshaft pulley and the water pump pulley.



SEM028B

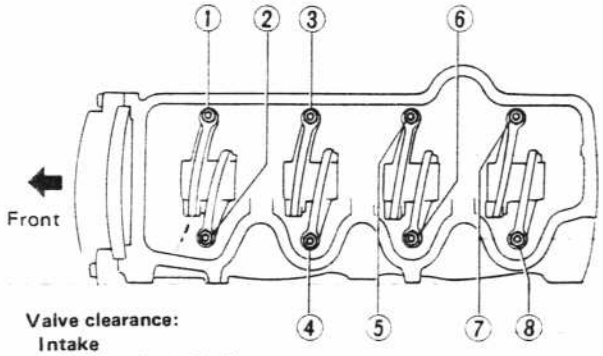
Belt deflection:
2 mm (0.08 in)
Applied force:
2.65 - 5.69 N (0.27 - 0.58 kg, 0.60 - 1.28 lb)

After Engine Warm-up

ADJUSTING INTAKE AND EXHAUST VALVE CLEARANCE

Adjustment should be made while engine is warm but not running.

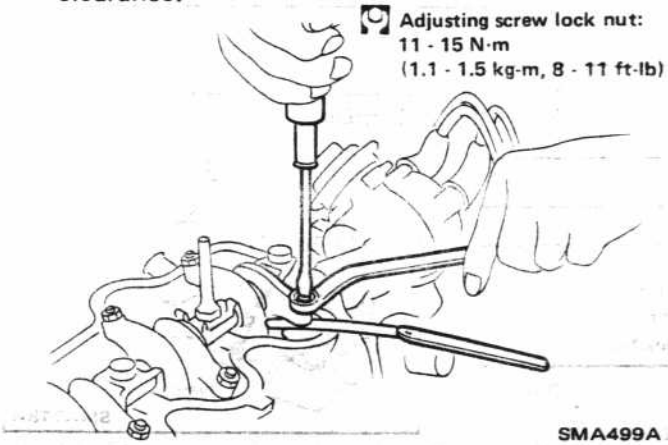
1. Start engine and warm it up until water temperature indicator points to middle of gauge. Then turn off engine.
2. Remove valve rocker cover.
3. Rotate crankshaft.
4. Set No. 1 cylinder in top dead center on its compression stroke, and adjust valve clearance ①, ②, ③ and ⑥.
5. Set No. 4 cylinder in top dead center on its compression stroke and adjust valve clearance ④, ⑤, ⑦ and ⑧.



Valve clearance:
Intake
0.25 mm (0.010 in)
Exhaust
0.30 mm (0.012 in)

SMA498A

1) Loosen valve rocker adjusting screw lock nut and turn adjusting screw until specified clearance is obtained.
2) After adjustment, tighten lock nut and recheck clearance.



Adjusting screw lock nut:
11 - 15 N·m
(1.1 - 1.5 kg-m, 8 - 11 ft-lb)

SMA499A

ADJUSTING IDLE RPM, ADJUSTING IGNITION TIMING AND CHECKING MIXTURE RATIO

Preparation

1. Make sure that the following parts are in good order.
   - Ignition system.
   - Engine oil and coolant levels
   - Valve clearance
2. Connect engine tachometer and timing light in their proper positions.
3. Make sure that these switches and units are in the following positions.
   - Headlamp switch: OFF
   - Heater blower: OFF
4. Check after the radiator cooling fan has stopped. If it is operating, wait until it stops.
5. Apply parking brake and block both front and rear wheels with chocks.
6. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

WARNING:

a. **Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.**
b. **On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.**
c. **After adjustment has been made, shift the lever to "N" or "P" position.**

After Engine Warm-up (Cont'd)

Maintenance procedure

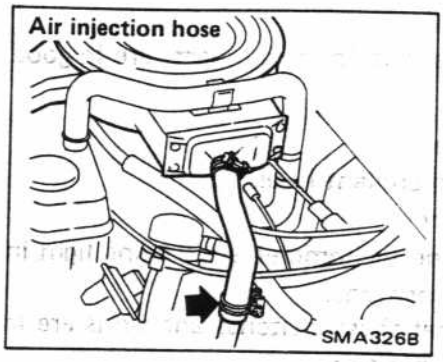
START

Start engine and warm it up until water temperature indicator points to middle of gauge and make sure that engine speed is below 1,000 rpm.

Turn off engine and open engine hood.

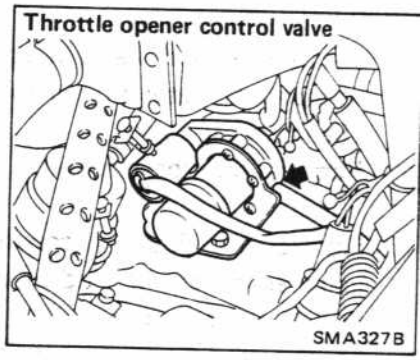
Disconnect air injection hose from air pipe and install cap on air pipe and disconnect throttle opener control valve vacuum hose at throttle opener control valve side and install blind plug to hose.

Air injection hose



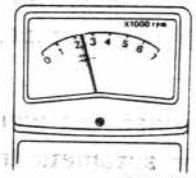
SMA326B

Throttle opener control valve



SMA327B

Start engine and run it at idle speed for 2 minutes.



SMA716A

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Check ignition timing.

IGNITION TIMING
M/T: 2±2° A.T.D.C.
A/T: 2±2° B.T.D.C.
(in "D" position)

O.K.

N.G.

Adjust ignition timing by turning distributor, loosening distributor securing bolt.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.

SMA716A

Check idle speed.

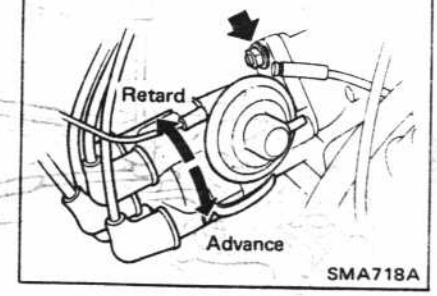
IDLE SPEED
M/T: 750±50 rpm
A/T: 700±50 rpm
(in "D" position)

N.G. → Ⓑ

O.K. → Ⓐ

Ⓒ

Distributor



SMA718A

After Engine Warm-up (Cont'd)

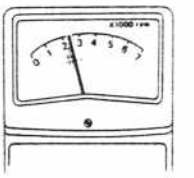
Ⓒ

Adjust idle speed by turning throttle adjusting screw.

Ⓑ

Ⓐ

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.



SMA716A

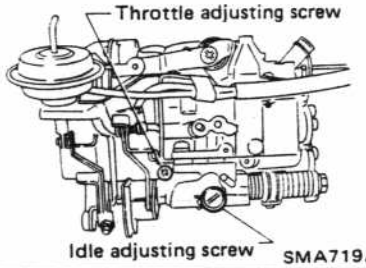
Check idle "CO"%.

IDLE "CO"%
M/T: 2.0±1.0
A/T: 2.0±1.0 (in "D" position)

N.G.

O.K.

TAS & SAS

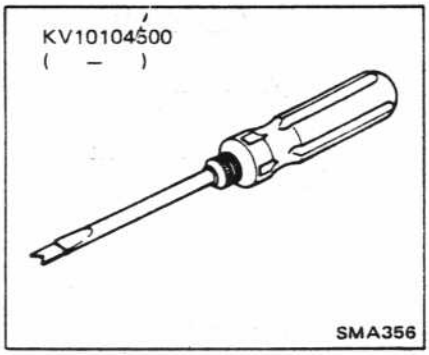


SMA719A

Adjust idle "CO"% by turning idle adjusting screw. Refer to NOTE for idle limiter cap.

Idle limiter cap

A Metal idle limiter cap has been adopted, so adjust idle adjusting screw with idle adjusting screwdriver.

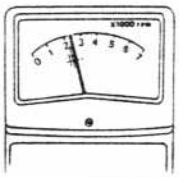


SMA356

Turn off engine and connect air injection hose to air pipe and connect throttle opener control valve hose to throttle opener control valve.

Start engine.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.



SMA716A

Check idle speed.

IDLE SPEED
M/T: 750±50 rpm
A/T: 700±50 rpm
(in "D" position)

O.K.

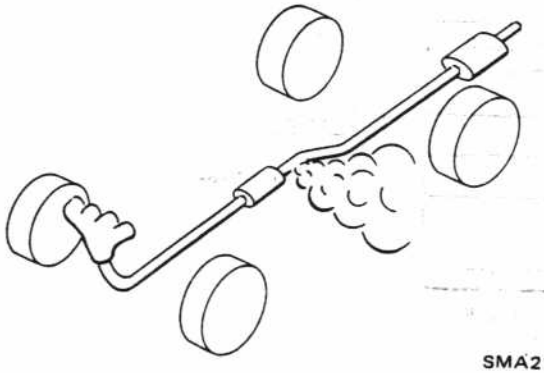
N.G.

Adjust idle speed by turning throttle adjusting screw.

END

Checking Exhaust System

Check exhaust pipes, muffler and mounting for proper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.



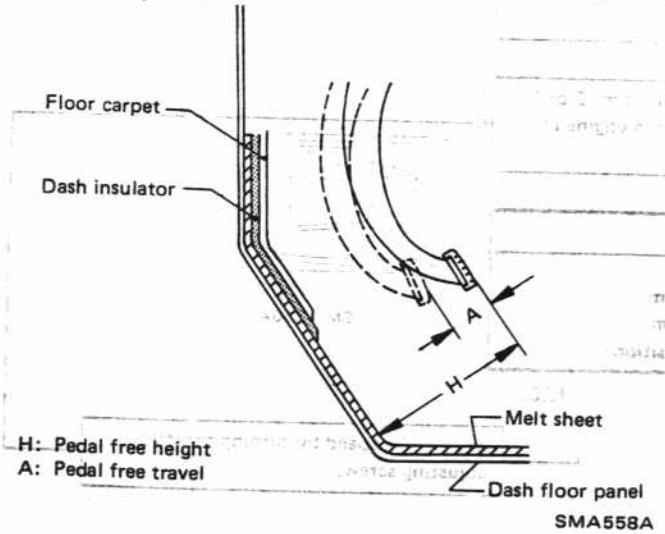
SMA211A

Checking Clutch System

Check cables, links for proper attachment, chafing, abrasion, deterioration and other damage.

CHECKING CLUTCH OPERATION

Check clutch pedal height, free travel and for smooth operation.



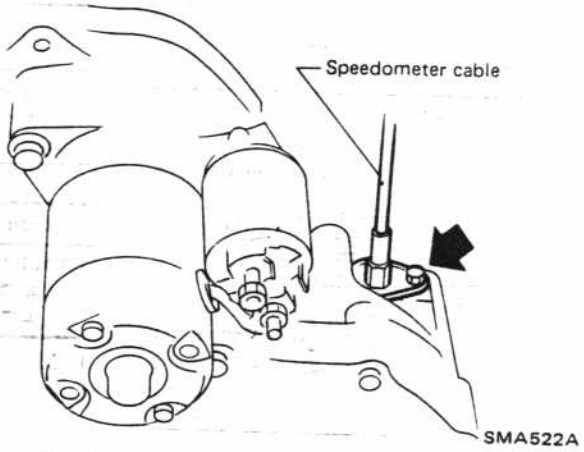
SMA558A

Pedal free height "H":
198 - 208 mm (7.80 - 8.19 in)
Pedal free travel "A": — reference data
12.5 - 17.5 mm (0.492 - 0.689 in)

If necessary, adjust clutch pedal free height and pedal free travel. Refer to section CL.

Checking M/T Oil Level

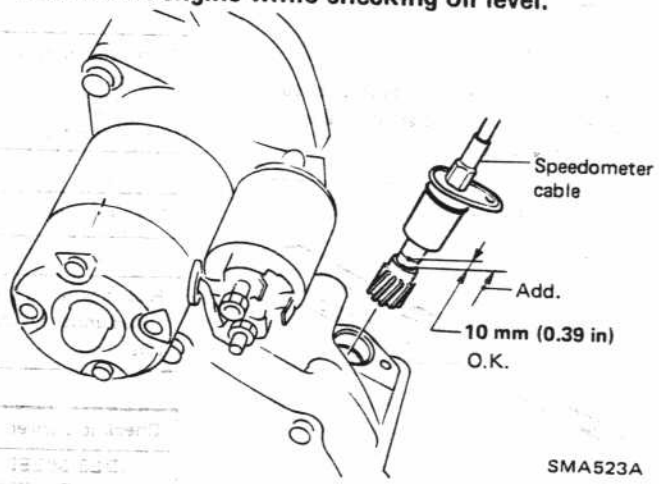
1. Check oil leaks.
2. Remove speedometer cable.



SMA522A

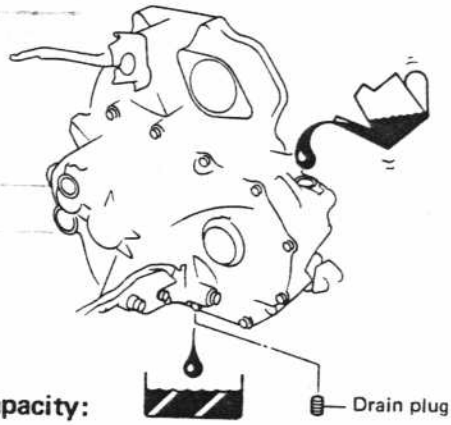
3. Check oil level.

CAUTION:
Never start engine while checking oil level.



SMA523A

Changing M/T Oil



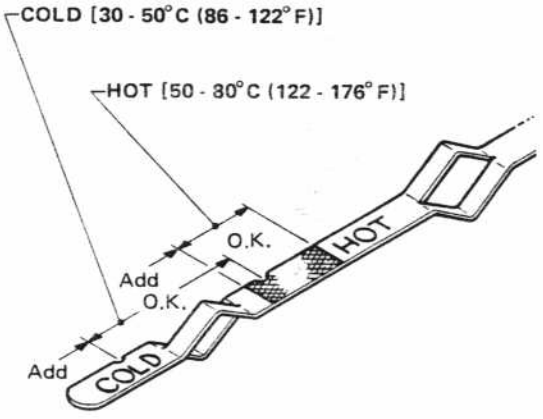
SMA524A

Oil capacity:
RS5F41A
2.6 liters (5-1/2 US pt, 4-5/8 Imp pt)

Checking A/T Fluid Level

The dipstick can check the fluid level at "HOT" fluid temperatures [50 to 80°C (122 to 176°F)] after the vehicle has been driven approximately 10 minutes. It also can check the fluid level at "COLD" fluid temperatures [30 to 50°C (86 to 122°F)].

1. Park the vehicle on a level surface and set the parking brake.
2. Start the engine and then move the selector lever through each gear range, ending in "P".
3. Check the fluid level with the engine idling. [If the vehicle has not been driven for some time and the outside temperature is below 30°C (86°F), a "COLD" fluid temperature can be obtained by warming up the engine completely.]
4. Remove the dipstick and clean it with lint-free paper. Reinsert it into the charging pipe as far as it will go.
5. Remove the dipstick and note the reading. If the fluid temperature is "HOT", the level should be in the hot range (in the shaded area). If it is "COLD", the level should be in the cold range (within the cutout portion).



SAT481

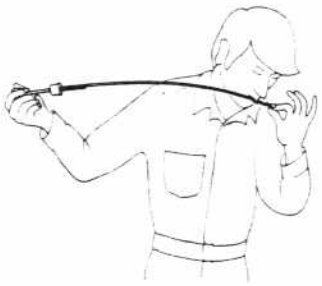
Keep the fluid at the proper level.

- **Overfilling may blow off the fluid or damage the transaxle.**
- **Underfilling may cause the clutches to slip, and finally damage them.**

Checking A/T Fluid Condition

Check fluid for contamination to determine condition of automatic transmission. If fluid is very dark or smells burned, the frictional material (clutches, band, etc.) may need replacement.

Check fluid for contamination.

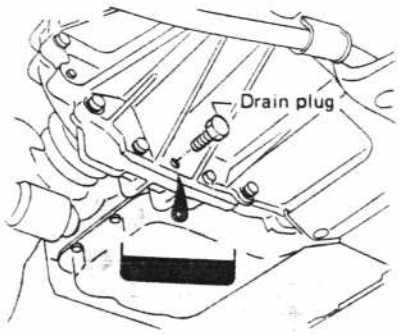


Check fluid for smell.

SMA107

Changing A/T Fluid

Oil capacity (With torque converter):
6.0 liters (6-3/8 US qt, 5-1/4 Imp qt)

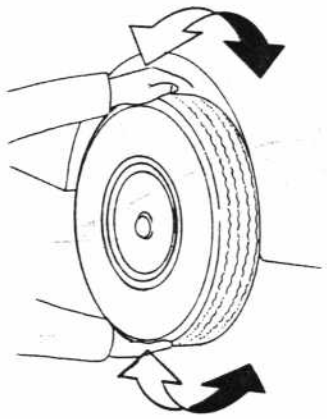


SMA503B

Checking Front Axle and Front Suspension Parts

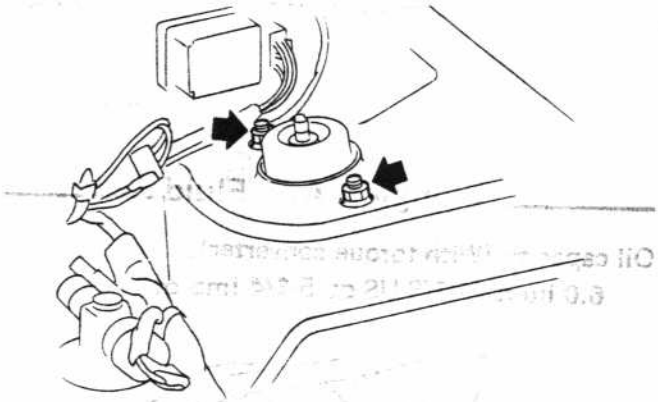
- Check axle and suspension parts for looseness, wear and damage.

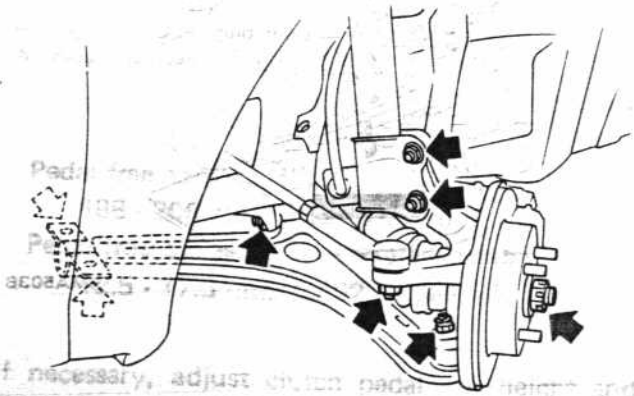
(1) Shake each front wheel.



SMA525A

(2) Retighten all nuts and bolts to the specified torque.
Refer to section FA for tightening torque.

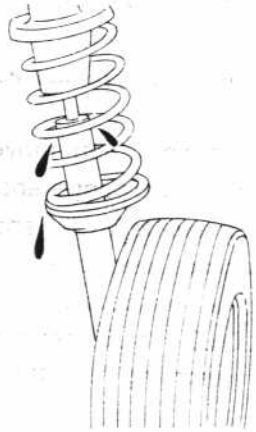




SMA526A

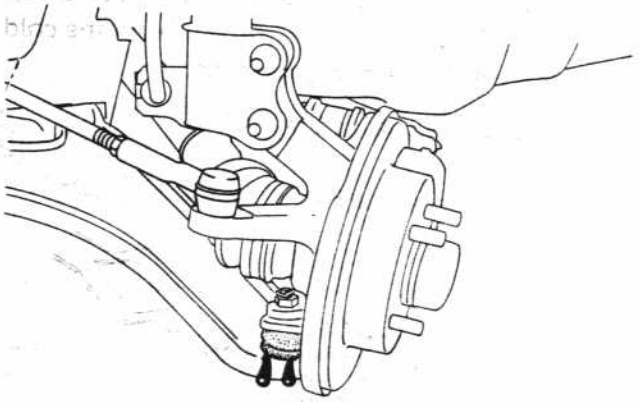
(3) Check axle and suspension parts for wea cracks or damage.

- Check strut (Shock absorber) for oil leakag or damage.



SMA113

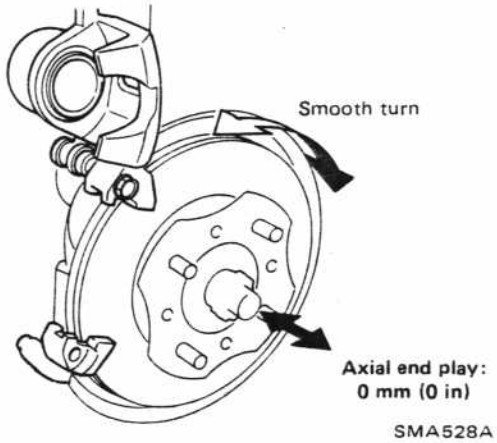
- Check suspension ball joint for grease leakage and ball joint dust cover for damage.



SMA527A

Checking Front Wheel Bearing Grease

- Check that wheel bearings operate smoothly, as well as axial end play and grease leakage.

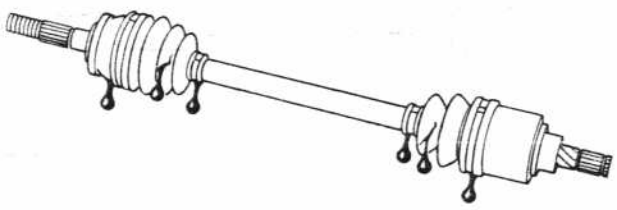


SMA528A

If necessary, adjust wheel bearing preload. Refer to section FA.

Checking Drive Shaft Boot

Check boot and drive shaft for cracks, wear, damage or grease leakage.



SMA529A

Checking Wheel Alignment

PRELIMINARY INSPECTION

- Tire pressure
- Wheel bearing axial play
- Suspension ball joint
- Steering gear housing looseness at frame
- Steering linkage and connections
- Shock absorber operation
- **Tighten front axle and suspension part.**
- **Measure vehicle height (Unladen).**
  The vehicle must be on a level surface.
- **Repair or replace the damaged portion or parts.**

"Unladen"
Fuel tank, radiator and engine oil pan are all full.
Spare tire, jack, hand tools, mats are in position.

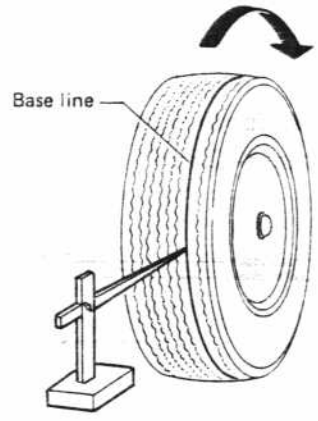
CAMBER, CASTER AND KINGPIN INCLINATION

Camber, caster and kingpin inclination are preset at factory and cannot be adjusted.

Camber:
–25′ to 1°05′
Caster:
1°30′ - 3°00′
Kingpin inclination:
12°25′ - 13°55′

TOE-IN

1. Mark a base line across the tread.

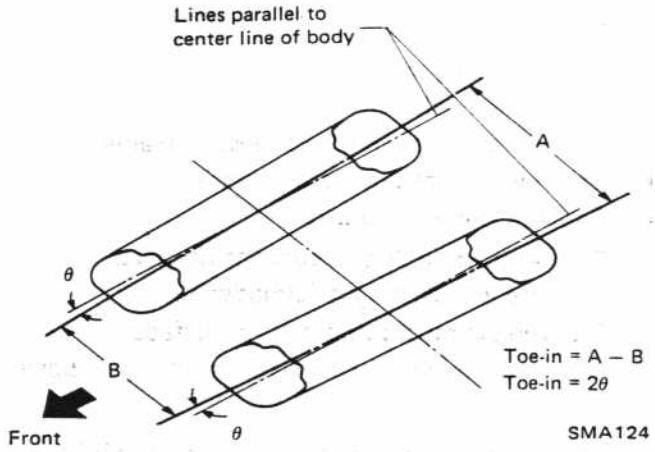


SMA123

After lowering front of vehicle, move it up and down to eliminate friction.

Checking Wheel Alignment (Cont'd)

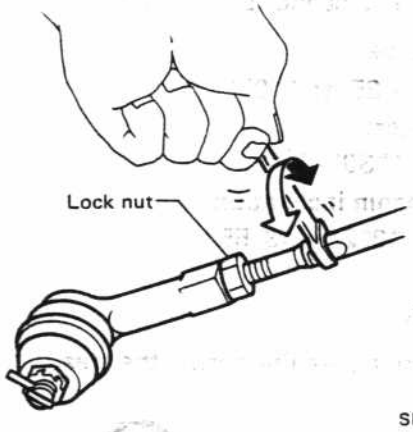
2. Measure toe-in.



SMA124

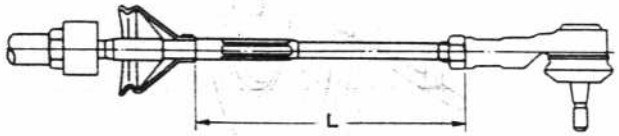
Toe-in:
2 - 4 mm (0.08 - 0.16 in)
12′ - 24′ (= 2θ)

3. Toe-in can be adjusted by varying the length of steering side rods.



SMA258A

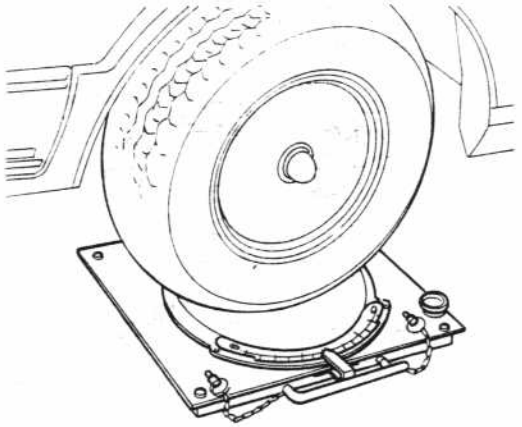
"L" dimension:
Steering gear (both sides)
107.1 mm (4.22 in)



SFA192A

FRONT WHEEL TURNING ANGLE

- Rotate steering wheel all the way right and left; measure turning angle on inner wheel.



SMA127

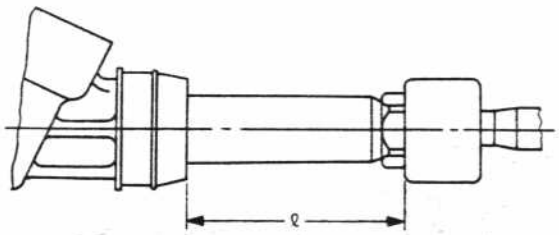
Turning angle:

Full turn	
Inside	**40°30′ - 43°30′**
Outside	**32°30′ - 35°30′**
Toe-out-turn	
Inside	**21°06′**
Outside	**20°**

- If it is not within specification, check rack stroke.

Refer to section ST.

Measure length "ℓ":
Pinion gear side
66.7 mm (2.626 in)
Opposite pinion gear side
66.7 mm (2.626 in)

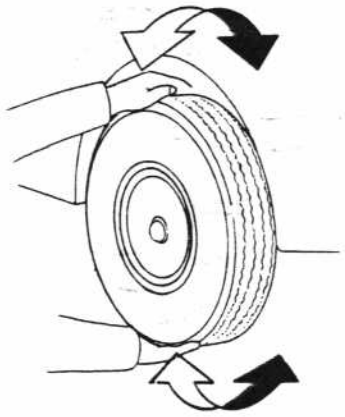


SST613A

Checking Rear Axle and Rear Suspension Parts

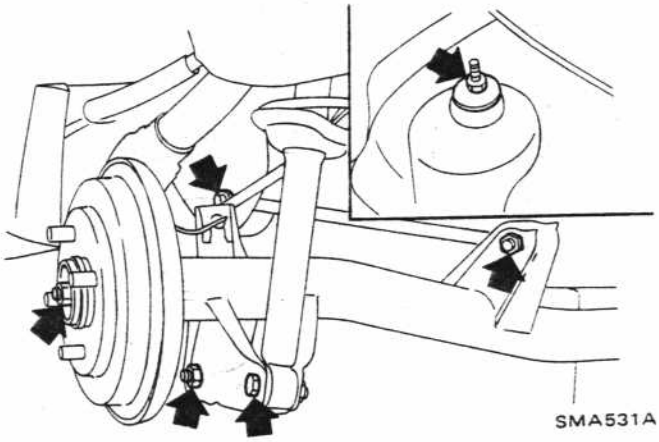
- Check axle and suspension parts for looseness, wear or damage.

(1) Shake each rear wheel.



SMA525A

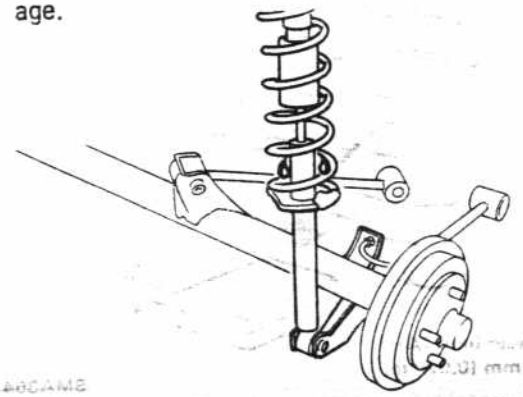
(2) Retighten all nuts and bolts to the specified torque.
Refer to section RA for tightening torque.



SMA531A

(3) Check axle and suspension parts for wear, crack or damage.

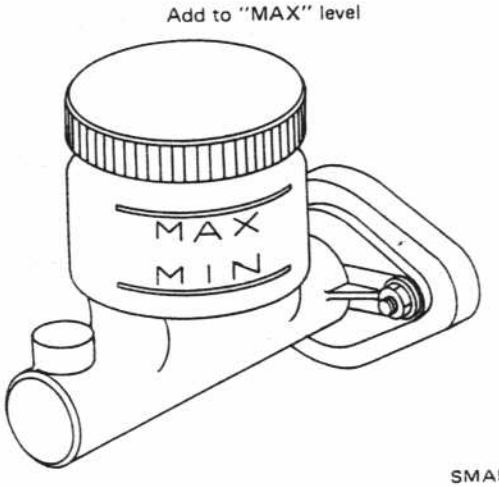
- Check shock absorber for oil leakage or damage.



SMA532A

Checking Brake Fluid Level and Leaks

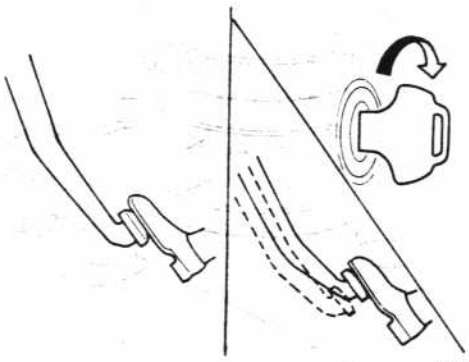
If fluid level is extremely low, check brake system for leaks.



SMA593A

Checking Brake Booster Function

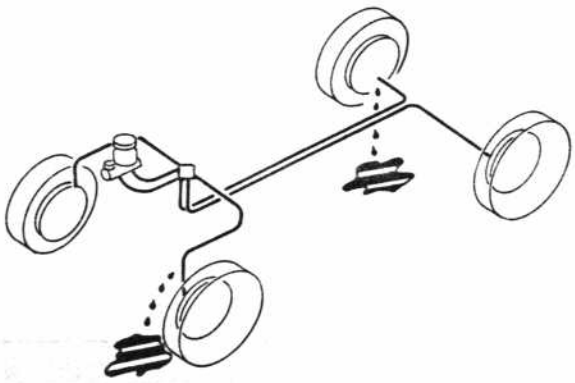
- Make sure that there is not change in pedal stroke while depressing brake pedal several times with engine off.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.



SBR002A

Checking Brake System

Check brake fluid lines and parking brake cables for proper attachment, leaks, chafing, abrasion, deterioration, etc.

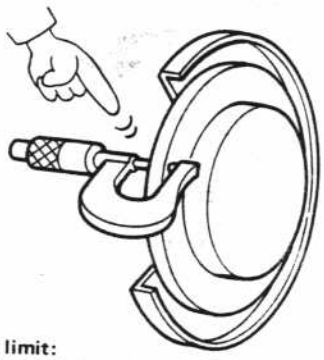


SMA139B

Checking Disc Brake

Check condition of disc brake components.

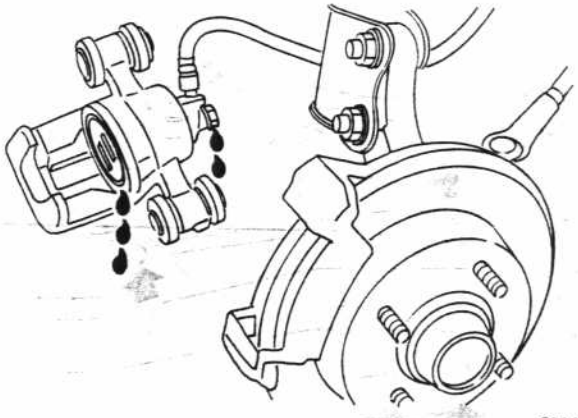
Rotor: Condition and thickness



Rotor repair limit:
11.0 mm (0.433 in)

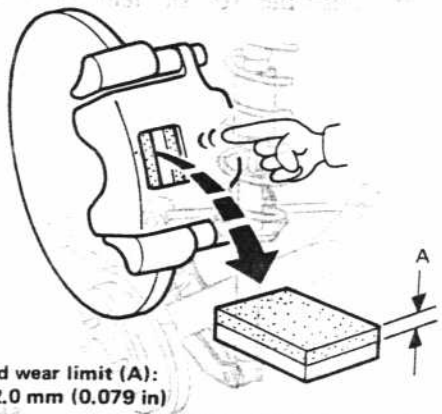
SMA260A

Caliper: Operation and leakage



SMA322B

Pad: Wear or damage



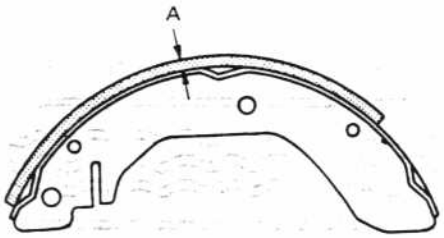
Pad wear limit (A):
2.0 mm (0.079 in)

SMA364A

Checking Drum Brake

Check condition of drum brake components.

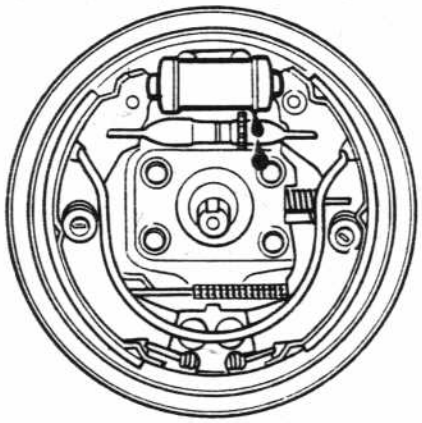
Lining: Wear or damage



Lining wear limit (A):
1.5 mm (0.059 in)

SMA138

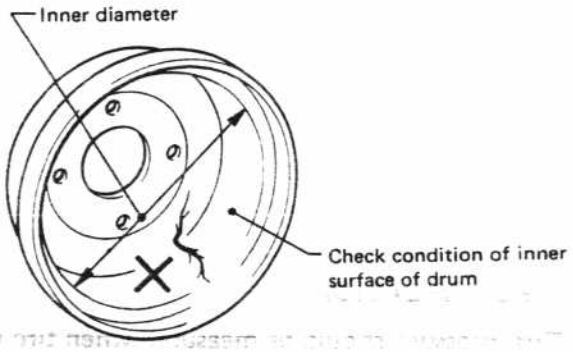
Wheel cylinder: Operation and leakage



SMA536A

Spring and pin: Yield or damaged

Drum: Condition of inner surface and inner diameter

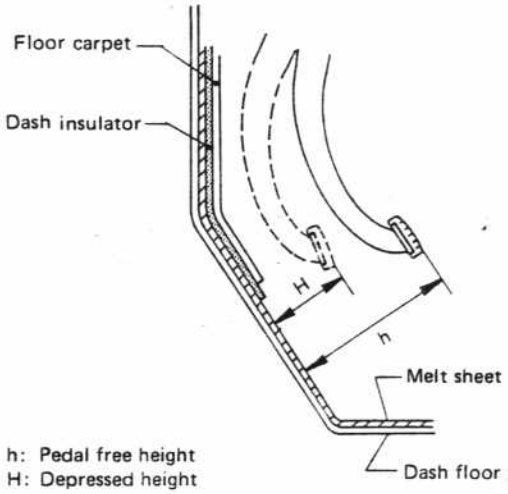


Drum repair limit (Inner diameter):
181.0 mm (7.13 in)

SMA139

Checking Foot Brake Pedal Operation

- Check brake pedal free height, depressed height and for smooth operation.



h: Pedal free height
H: Depressed height

SMA537A

Pedal free height "h":

M/T 190 - 200 mm (7.48 - 7.87 in)

A/T 194 - 204 mm (7.64 - 8.03 in)

Depressed height "H":

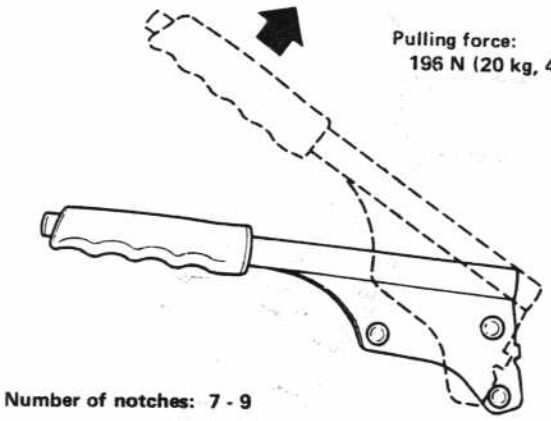
95 mm (3.74 in) or more

If necessary, adjust pedal heights.

Refer to section BR.

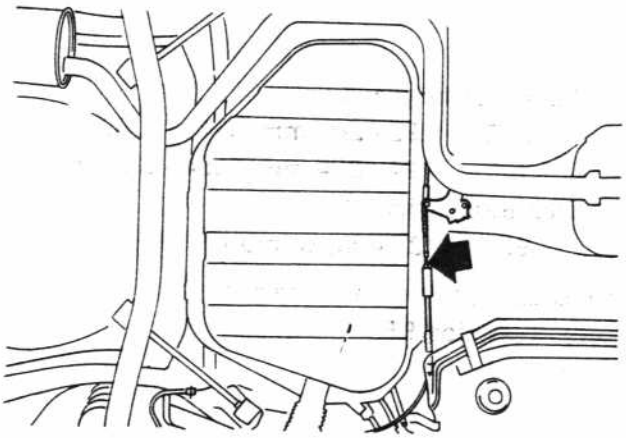
Checking Parking Brake

Pull lever with specified amount of force.
Check lever stroke and for smooth operation.



SMA436

2. Use adjuster to adjust lever stroke.



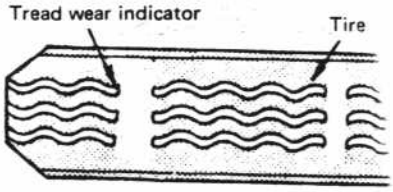
SMA538A

3. Bend parking brake warning lamp switch plate down so that brake warning light comes on when ratchet at parking brake lever is pulled one notch and goes out when fully released.

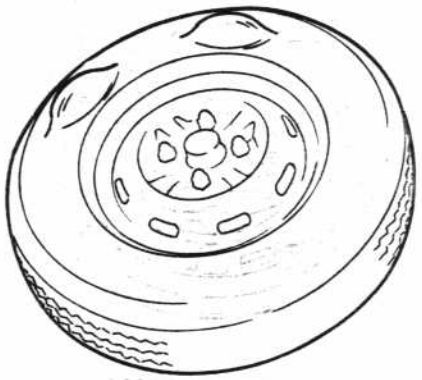
Checking Tire Con

TIRE CONDITION

- When tires wear and tread appear, replace them with new c



- Check tread and side walls for cra separation or damage.



SM

- Tire valves for air leakage.

TIRE INFLATION

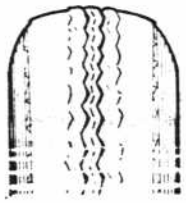
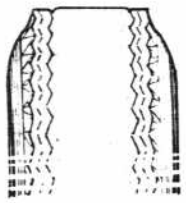
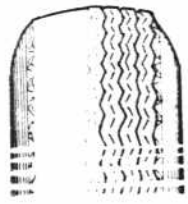
Tire pressure should be measured when tire is co

Tire pressure should be set to the specificatio on the tire placard located in the vehicle.

Checking Tire Condition (Cont'd)

Abnormal tire wear

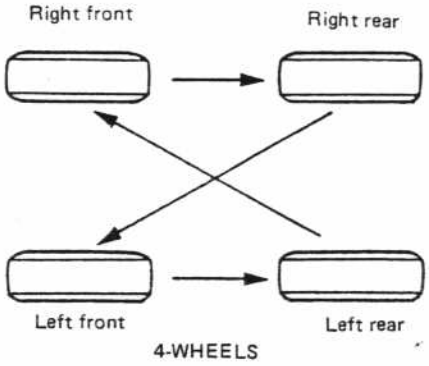
Correct abnormal tire wear according to the chart shown below.

Condition	Probable cause	Corrective action
 Shoulder wear	• Underinflation (both sides wear) • Incorrect wheel camber (one side wear) • Hard cornering • Lack of rotation	• Measure and adjust pressure. • Repair, or replace axle and suspension parts. • Reduce speed • Rotate tires.
 Center wear	• Overinflation • Lack of rotation	• Measure and adjust pressure. • Rotate tires.
Feathered edge  Toe-in or toe-out wear	• Incorrect toe	• Adjust toe-in.
 Uneven wear	• Incorrect camber or caster • Malfunctioning suspension • Unbalanced wheel • Out-of-round brake drum • Other mechanical conditions • Lack of rotation	• Repair, or replace axle and suspension parts. • Repair, replace or, if necessary, reinstall. • Balance or replace. • Correct or replace. • Correct or replace. • Rotate tires.

SMA068

Tire Rotation

Radial Tire



4-WHEELS

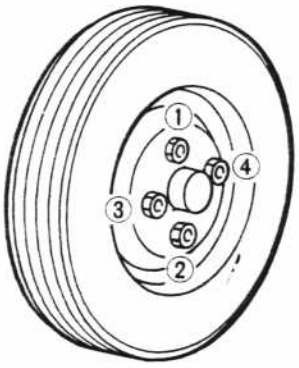
SMA650B

Tire Replacement

CAUTION:

- **Different types of tires, such as bias, bias belted and radial tires, must not be mixed under any circumstances.**
- **When replacing a tire, use a tire of the same size and type.**

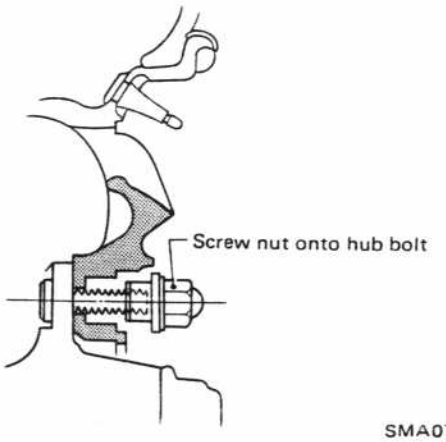
- Do not use tires and wheels other than those recommended.
- Do not mix tires of different brands, tread patterns or type (Bias, Belted or Radial).
- When replacing standard tires with those tires of an optional recommended size and of different diameter, the speedometer must be recalibrated.
- To install wheel, tighten wheel nuts in criss-cross fashion.



SMA540A

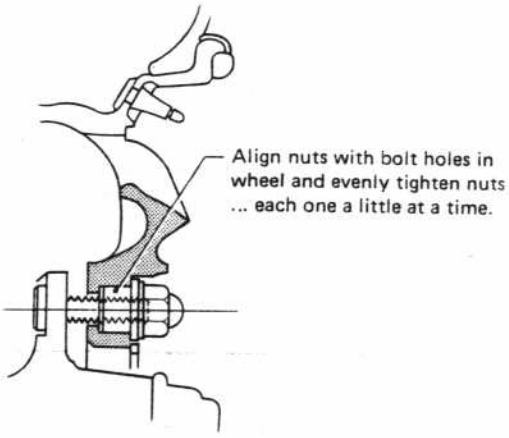
- To install an aluminum wheel, proceed as follows:

(1) Snugly tighten all nuts after the wheel is positioned.



SMA070

(2) Pull the wheel back slightly to properly align the nuts with bolt holes in the wheel, and tighten the nuts as much as possible with your fingers.



SMA071

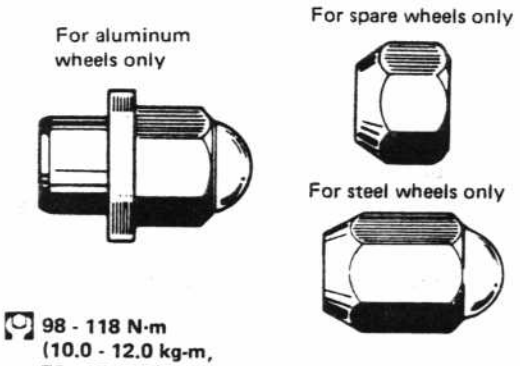
(3) Tighten wheel nuts evenly with a wheel wrench in criss-cross fashion.

Be sure to check the wheel nuts for tightness, after the aluminum wheel has been run for the first 1,000 km (600 miles) (also in the case of repairing flat tires, tire rotation, etc.).
Replace if necessary.

Wheel Nut

CAUTION:

- **Three types of wheel nuts are used; one is designed for use with steel wheels, one is designed for use with aluminum wheels and the other for use with spare wheel. Do not mix different types of wheel nuts.**
- **Be careful not to smear threaded portion of bolt and nut, and seat of nut with oil or grease.**



SMA438

Tire Repair

CAUTION:

When replacing tire, take extra care not to damage tire bead, rim-flange and bead seat.

When installing tire, note the following items:

a. **Install valve core and inflate to proper pressure. Check the locating rings of the tire to be sure they show around the rim flanges on both sides.**
b. **Check valves for leakage after inflating tires.**
c. **Be sure to tighten valve caps firmly by hand.**

WARNING:

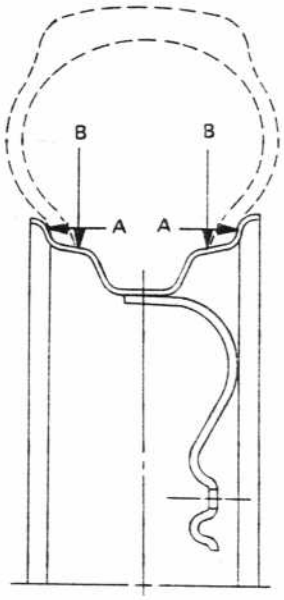
When, while tire is being inflated, bead snaps over safety hump, it might break. Thus, to avoid serious personal injury, never stand over tire when inflating it. Never inflate to a pressure greater than 40 psi (275 kPa). If beads fail to seat at that pressure, deflate the tire, lubricate it again, and then reinflate it. If the tire is overinflated, the bead might break, possibly resulting in serious personal injury.

Wheel Inspection

- Check wheel rim (especially rim flange and bead seat) for rust, distortion, cracks or other damage.
- Examine wheel rim for lateral and radial runout, using dial gauge.

Lateral runout (A) and radial runout (B):
Steel wheel ... Less than
1.0 mm (0.039 in)
Aluminum wheel ... Less than
0.5 mm (0.020 in)

Mechanical average (C) between right and left radial runout.
Steel wheel ... Less than
0.5 mm (0.020 in)
Aluminum wheel ... Less than
0.2 mm (0.008 in)

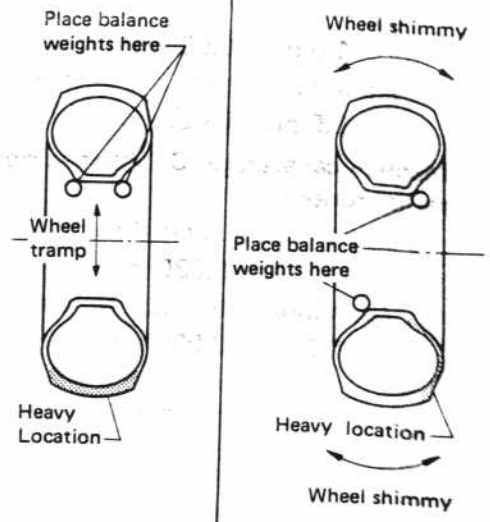


SMA140B

- Replace wheel if any of the following conditions occur.
  a. Bent, dented or heavily rusted
  b. Elongated bolt holes
  c. Excessive lateral or radial runout
  d. Air leaks through welds
  e. Wheel nuts will not stay tight

Balancing Wheels

Cause	Wheel static unbalance	Wheel dynamic unbalance
Symptom of unbalance	Wheel tramp Wheel shimmy	Wheel shimmy
Corrective action	Balance statically	Balance dynamically



SMA075

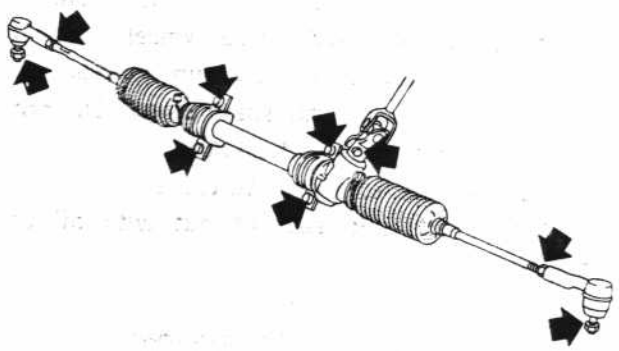
Spare Tire (P155/80 D12)

- This spare tire is designed for emergency use only. It is stored for use when there is a flat tire.
- Mounting and dismounting to and from the road wheel are carried out in the same manner as any ordinary tire.
- As soon as the tread wear indicator becomes visible, replace the tire with a new one.

CAUTION:

- **The wheel nuts for aluminum road wheels must not be used on the spare road wheel. Otherwise, the wheel may come off the axle and cause personal injury.**
- **Periodically check tire inflation pressure, and always keep it at 35 psi (240 kPa).**
- **The spare tire is restricted to a driving speed of up to a maximum of 80 km/h (50 MPH) for short distances and emergency use only.**
- **Do not use tire chains on the spare tire.**
- **Do not use the spare tire on other vehicles.**

Checking Steering Gear and Linkage



SMA541A

- Steering gear:

(1) Check gear housing and boots for looseness, damage or grease leakage.

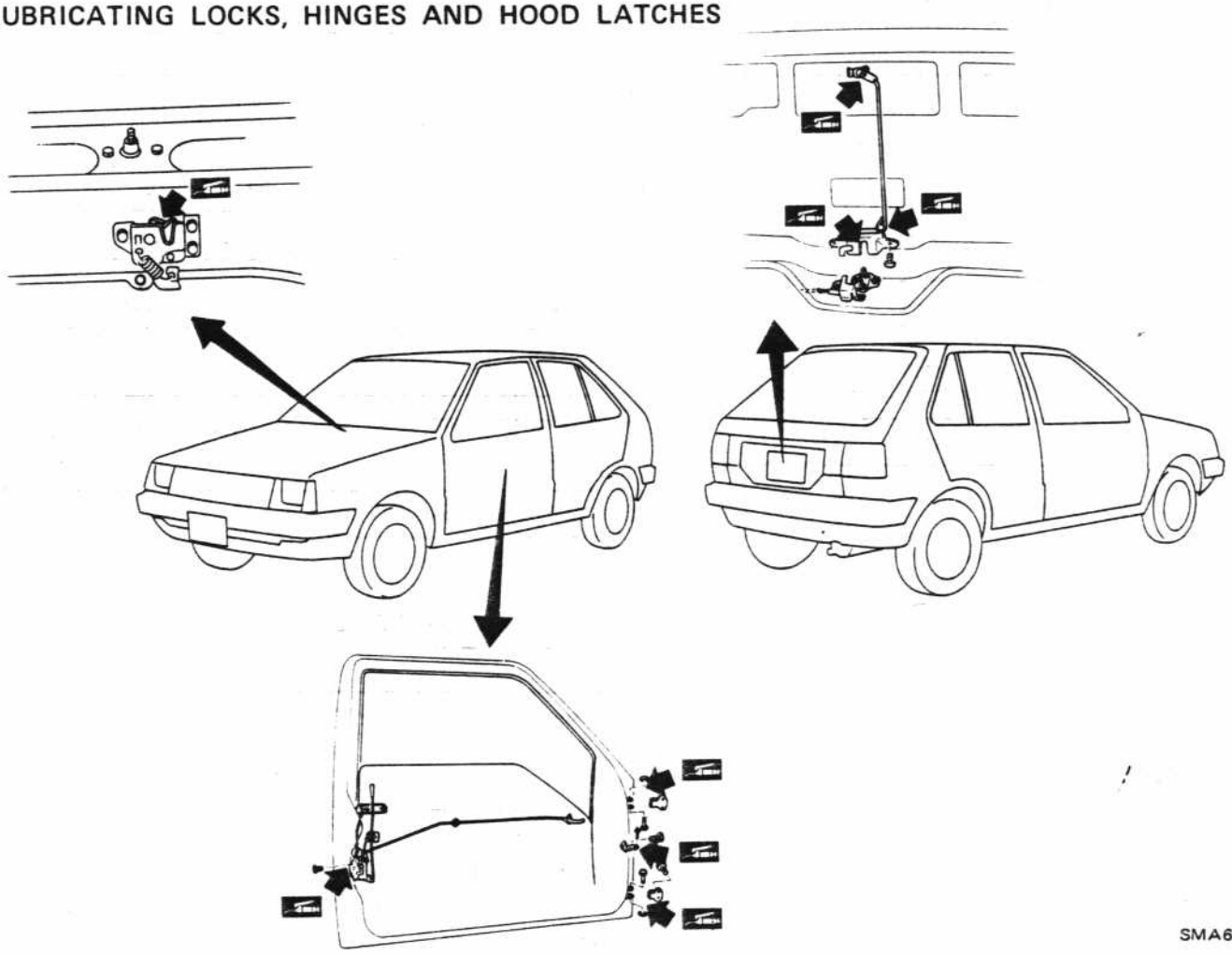
(2) Check connection with steering column for looseness.

- Steering linkage:

(1) Check ball joint, dust cover and other component parts for looseness, wear, damage or grease leakage.

(2) Check for missing parts (cotter pins, washer, etc.).

LUBRICATING LOCKS, HINGES AND HOOD LATCHES



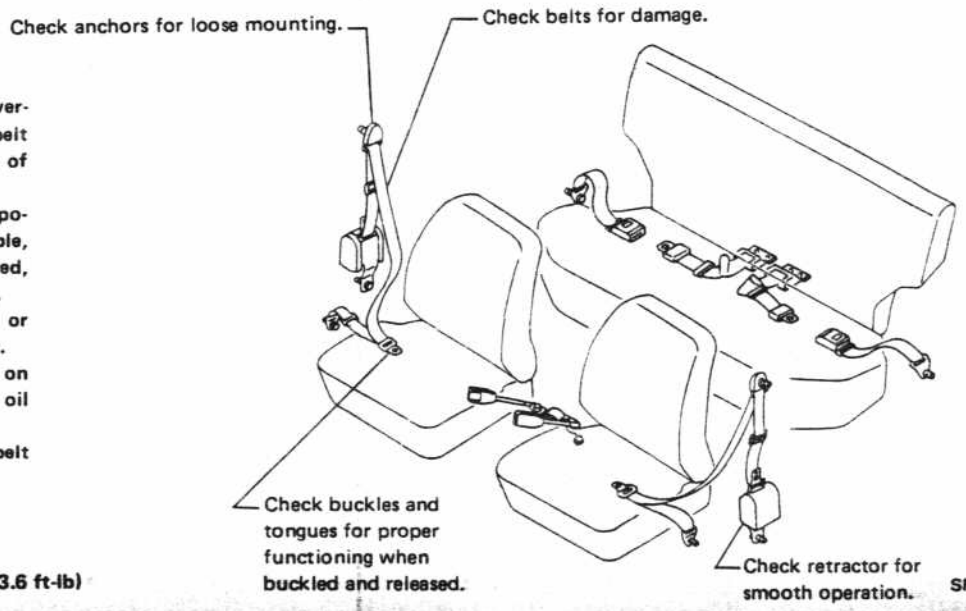
SMA640B

CHECKING SEAT BELTS, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTERS

CAUTION:

1. **If the vehicle is collided or overturned, replace the entire belt assembly, regardless of nature of accident.**
2. **If the condition of any component of a seat belt is questionable, do not have seat belt repaired, but replaced as a belt assembly.**
3. **If webbing is cut, frayed, or damaged, replace belt assembly.**
4. **Do not spill drinks, oil etc. on inner lap belt buckle. Never oil tongue and buckle.**
5. **Use a NISSAN genuine seat belt assembly.**

Anchor bolt
35.8 - 45.6 N·m
(3.65 - 4.65 kg-m, 26.4 - 33.6 ft-lb)



SMA641B

INSPECTION AND ADJUSTMENT

Basic mechanical system

Valve clearance (Hot) mm (in)	
Intake	0.25 (0.010)
Exhaust	0.30 (0.012)

Drive belt deflection — Unit: mm (in)

	Used belt deflection		Set deflection of new belt
	Limit	Adjust deflection	
Alternator	19.0 (0.748)	13.5 - 16.0 (0.531 - 0.630)	12.5 - 14.0 (0.492 - 0.551)

Applied pushing force: 98 N (10 kg, 22 lb)

Radiator cap relief pressure kPa (kg/cm², psi)	88 (0.9, 13)
Cooling system leakage testing pressure kPa (kg/cm², psi)	157 (1.6, 23)

Ignition and fuel system

Spark plug		Canada
Type	Standard	BPR5ES
	Hot	BPR4ES
	Cold	BPR6ES
Gap mm (in)		0.8 - 0.9 (0.031 - 0.035)
Distributor Air gap		Close but not touching

	M/T	A/T (in "D" position)
Ignition timing/idle speed degree/rpm	2±2° A.T.D.C./ 750±50	2±2° B.T.D.C./ 700±50
"CO"% at idle speed	2.0±1.0	

TIGHTENING TORQUE

Item	N·m	kg-m	ft-lb
Alternator securing bolt	22 - 29	2.2 - 3.0	16 - 22
Alternator to adjust bar bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Valve rocker adjusting screw lock nut	11 - 15	1.1 - 1.5	8 - 11
Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35
Spark plugs	20 - 29	2.0 - 3.0	14 - 22
Crank pulley bolt	69 - 88	7.0 - 9.0	51 - 65
Tensioner lock nut	15 - 17	1.5 - 1.7	11 - 12

INSPECTION AND ADJUSTMENT

Clutch

Unit: mm (in)

Pedal height "H"	198 - 208 (7.80 - 8.19)
Pedal free travel "A" – reference data	12.5 - 17.5 (0.492 - 0.689)

Front axle and front suspension

Wheel alignment (Unladen)*1		
Camber	degree	−25′ to 1°05′
Caster	degree	1°30′ - 3°00′
Kingpin inclination	degree	12°25′ - 13°55′
Toe-in	mm (in) degree	2 - 4 (0.08 - 0.16) 12′ - 24′*2
Side slip (Reference data)	mm/m (in/ft)	Out 3 - In 3 (Out 0.036 - In 0.036)
Standard side rod length	mm (in)	Steering gear 107.1 (4.22)
Front wheel turning angle Toe-out turns (Inside/outside)	degree	21°06′/20°00′
Full turn (Inside/Outside)	degree	40°30′ - 43°30′/ 32°30′ - 35°30′

*1 Unladen: Fill fuel tank, radiator and engine with engine oil.
*2: Total toe-in (=2θ)

Brake

Disc brake	mm (in)	
Pad minimum thickness		2.0 (0.079)
Rotor minimum thickness		11.0 (0.433) or more
Drum brake	mm (in)	
Lining minimum thickness		1.5 (0.059)
Drum maximum inner dia.		181.0 (7.13)
Pedal	mm (in)	
Free height "h"	M/T	190 - 200 (7.48 - 7.87)
	A/T	194 - 204 (7.64 - 8.03)
Depressed height "H" [Under force of 490 N (50 kg, 110 lb) with engine running]	mm (in)	95 (3.74) or more
Parking brake Number of notches [at pulling force 196 N (20 kg, 44 lb)]		7 - 9

Wheel and tire

Tire inflation

Proper tire pressures are shown on the tire placard affixed to the driver's side center pillar.

Tire pressure should be measured when tire is cold.

Wheel rim lateral and radial runout		
Steel wheel	mm (in)	Less than 1.0 (0.039)
Aluminum wheel	mm (in)	Less than 0.5 (0.020)
Mechanical average between right and left radial runout		
Steel wheel	mm (in)	Less than 0.5 (0.020)
Aluminum wheel	mm (in)	Less than 0.2 (0.008)
Wheel balance (Maximum allowable unbalance at rim flange)	g (oz)	5 (0.18)
Tire balance weight	g (oz)	5 - 60 (0.18 - 2.12) Spacing 10 (0.35)

Chassis and Body Maintenance (Cont'd)

TIGHTENING TORQUE

	N·m	kg-m	ft-lb
Clutch			
Pedal stopper lock nut	16 - 22	1.6 - 2.2	12 - 16
Cable adjuster lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Manual transaxle			
Drain plug	10 - 20	1.0 - 2.0	7 - 14
Front axle and front suspension			
Piston rod self-lock nut	31 - 42	3.2 - 4.3	23 - 31
Strut to body	25 - 30	2.6 - 3.1	19 - 22
Strut to knuckle	98 - 118	10.0 - 12.0	72 - 87
Transverse link to body (Front side)	88 - 108	9.0 - 11.0	65 - 80
Transverse link to body (Rear side)	36 - 47	3.7 - 4.8	27 - 35
Rear axle and rear suspension			
Shock absorber			
Upper end	19 - 25	1.9 - 2.6	14 - 19
Lower end	48 - 60	4.9 - 6.1	35 - 44
Upper link	77 - 98	7.9 - 10.0	57 - 72
Lower link	77 - 98	7.9 - 10.0	57 - 72
Wheel and tire			
Wheel nut	98 - 118	10.0 - 12.0	72 - 87
Brake system			
Caliper to knuckle	39 - 49	4.0 - 5.0	29 - 36
Air bleed valve	7 - 9	0.7 - 0.9	5.1 - 6.5
Brake lamp switch	12 - 15	1.2 - 1.5	9 - 11
Brake booster input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Steering system			
Tie-rod lock nut	37 - 46	3.8 - 4.7	27 - 34
Tie-rod stud to knuckle	29 - 39	3.0 - 4.0	22 - 29

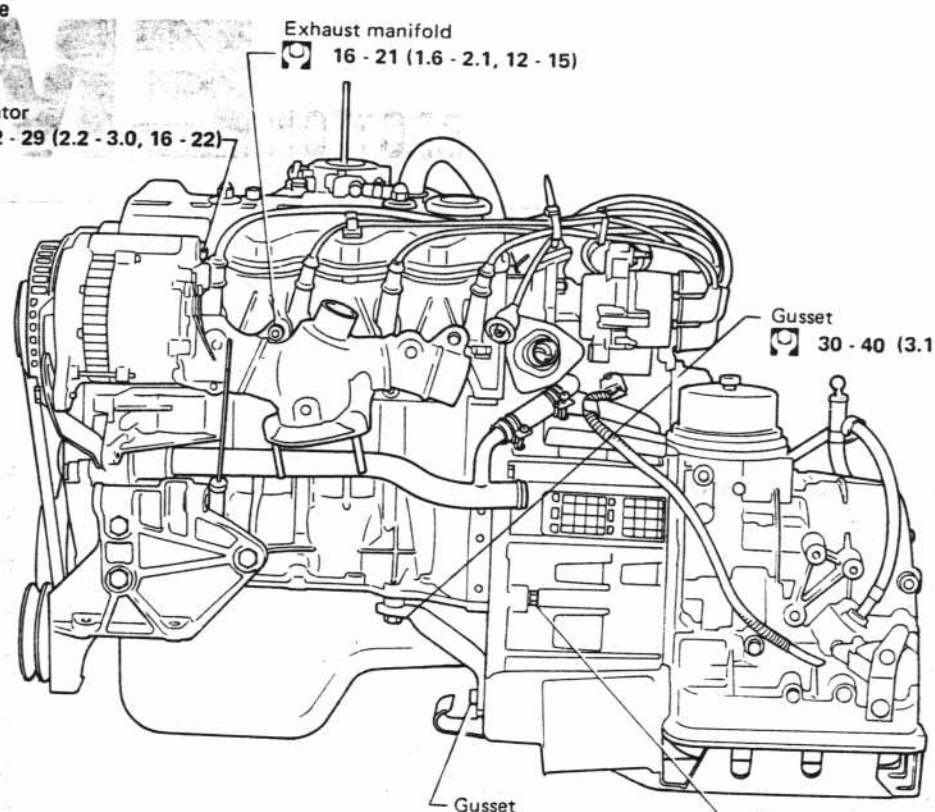
ENGINE MECHANICAL

SECTION EM

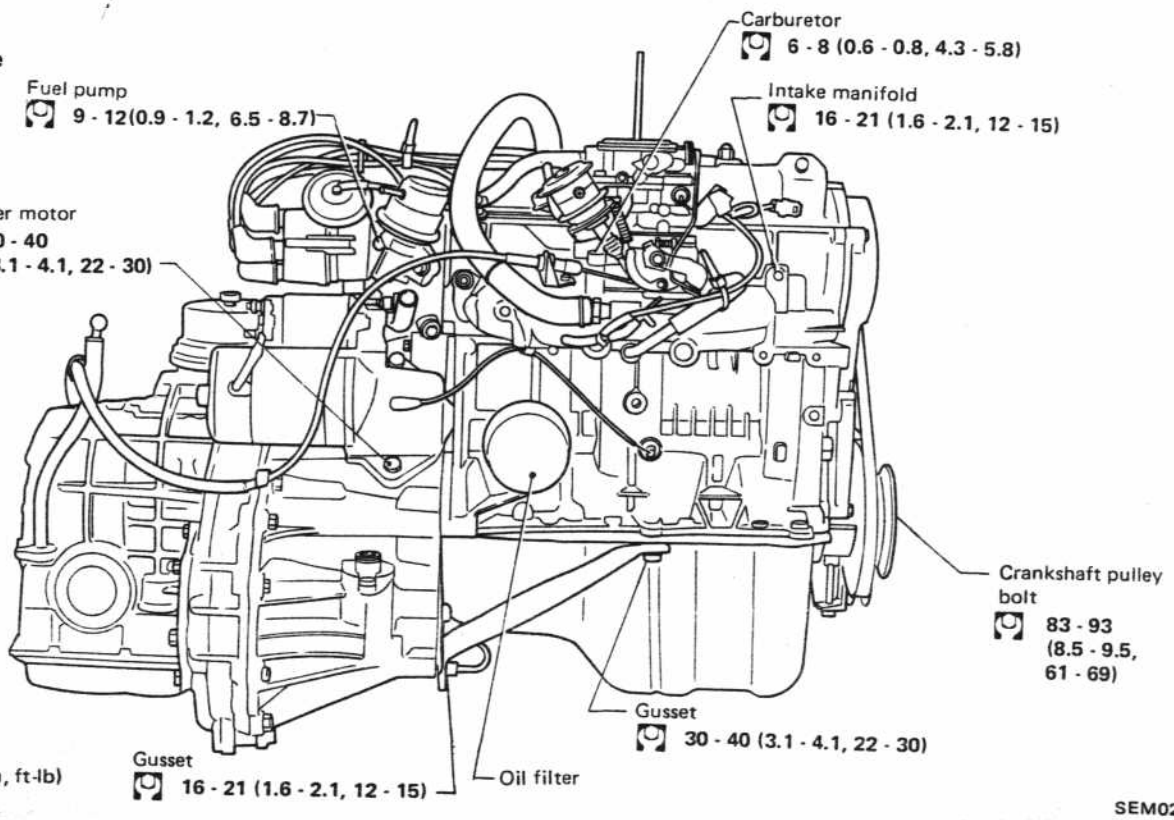
CONTENTS

ENGINE COMPONENTS —Outer Parts—

From front side



From rear side



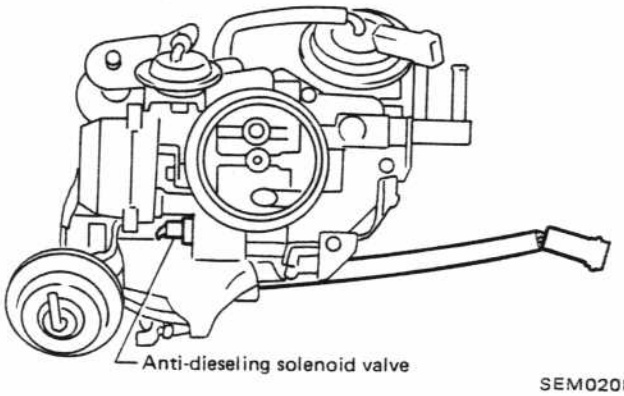
: N·m (kg-m, ft-lb)

SEM022B

COMPRESSION PRESSURE

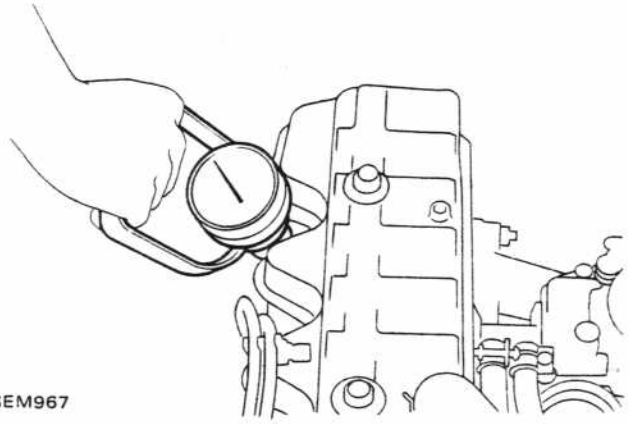
Measurement of Compression Pressure

1. Be sure the oil in the crankcase is at the proper level and the battery is properly charged.
2. Warm up the engine.
3. Turn the ignition switch off, then remove all the spark plugs.
4. Disconnect the anti-dieseling solenoid valve connector.



SEM0208

5. Install a compression tester in No. 1 cylinder.



SEM967

6. Depress the accelerator pedal fully to keep the throttle valve wide open.
7. Crank the engine and read the highest gauge indication.
8. Repeat the measurement on each cylinder as shown above.

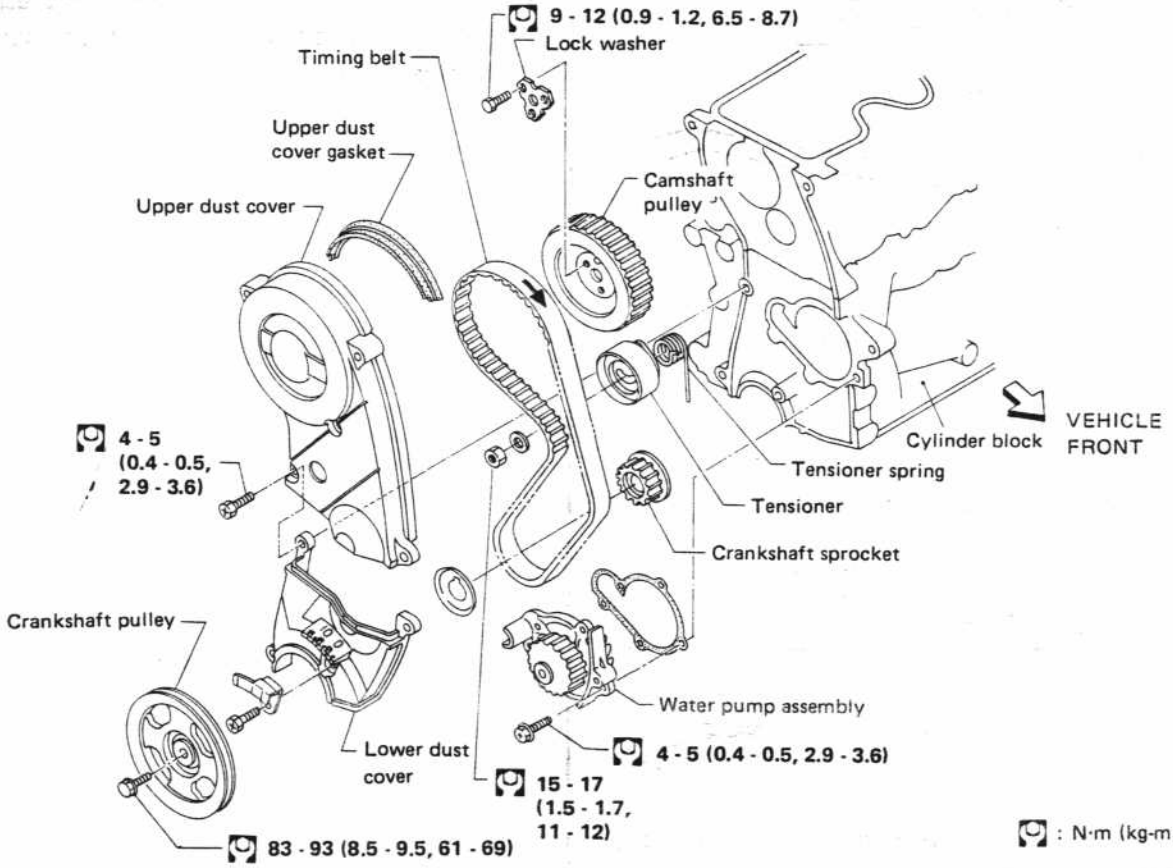
Compression pressure:
kPa (kg/cm², psi)/rpm
Standard
1,245 (12.7, 181)/350
Minimum
981 (10.0, 142)/350
Difference limit between cylinders:
98 (1.0, 14)/350

9. If one or more cylinders read low, pour small amount of engine oil into the cylinders through the spark plug holes.

- If compression improves considerably, the piston rings are worn or damaged.
- If compression does not improve, valves are sticking or seating poorly.
- If two adjacent cylinders indicate low compression pressures and pouring oil into cylinders does not increase the compression, the cause may be a cylinder head gasket leak between the cylinders.

TIMING BELT

- Do not bend or twist the timing belt.
- After removing the timing belt, do not rotate the crankshaft or the camshaft separately, or the valves will hit the pistons.
- Make sure no oil, water or dust deposits adhere to the timing belt, the pulleys and the tensioner.
- Before installing the timing belt, be sure No. 1 cylinder is at T.D.C. on its compression stroke.
- Position the timing belt in the correct direction.
- Adjust belt tension with all the spark plugs removed.

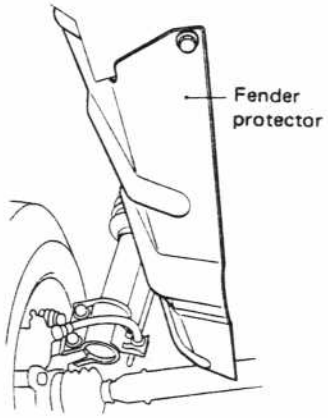


SEM429E

TIMING BELT

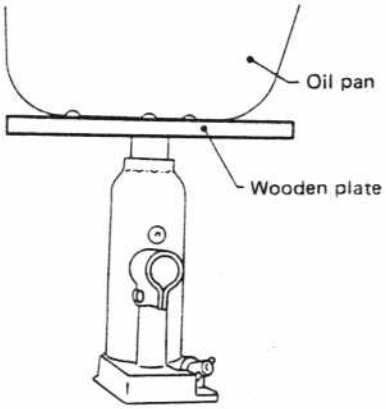
Removal

1. Jack up the vehicle.
2. Remove the right-front wheel and the right fender protector.



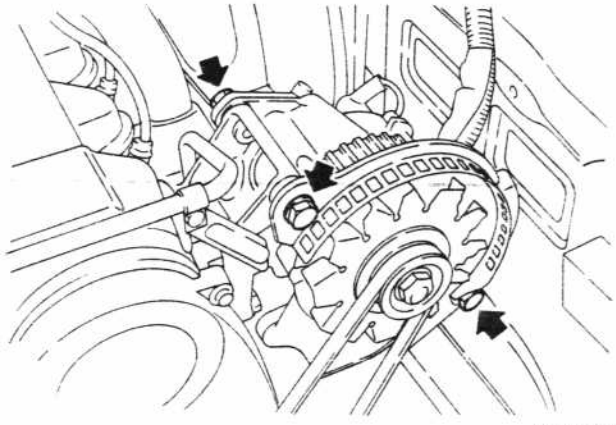
SEM023B

3. Place a jack under the oil pan.



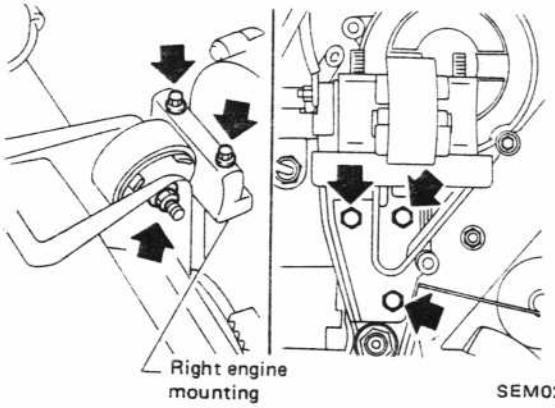
SEM968

4. Remove the alternator drive belt.



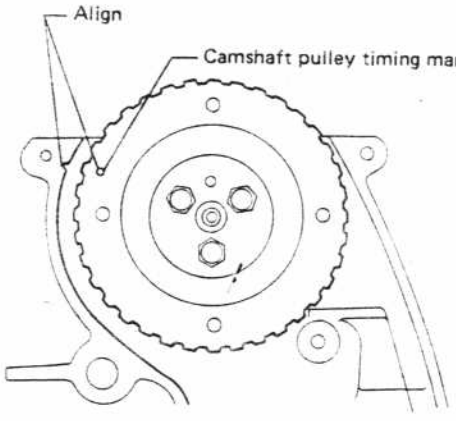
SEM024B

5. Remove the right engine mounting.



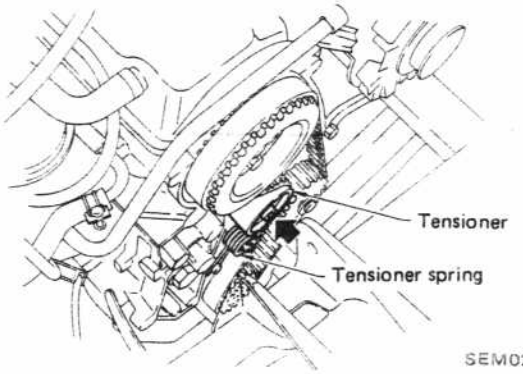
SEM025B

6. Remove the upper dust cover and gasket, then set No. 1 cylinder at T.D.C. on its compression stroke.



SEM982

7. Remove the crankshaft pulley, the lower dust cover and gasket.
8. Loosen the lock nut of the tensioner, and then remove the tensioner spring.

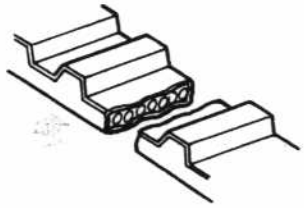
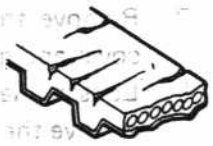


SEM026B

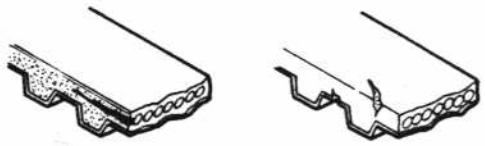
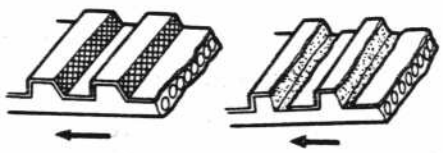
9. Remove the timing belt, and visually check it.

For details, refer to Timing Belt for Inspection (pages EM-6 & 7).

Inspection

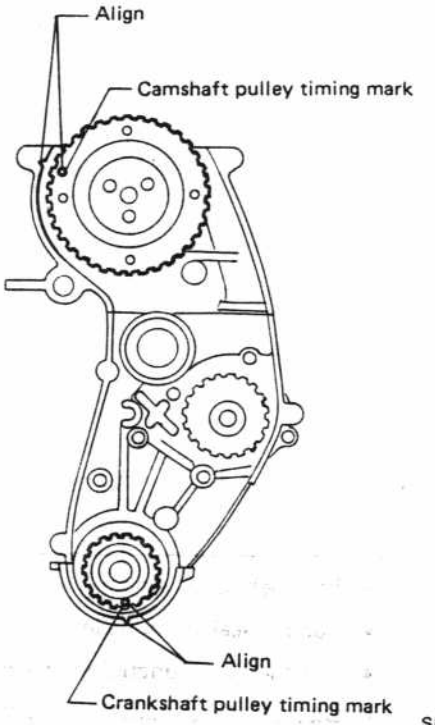
Item to check	Problem	Cause
Belt is broken.	 SEM393A	• Improper handling • Poor belt cover sealing • Coolant leakage at water pump
Tooth is broken/ tooth root is cracked.	 SEM394A	• Camshaft jamming • Distributor jamming • Damaged camshaft/crankshaft oil seal
Back surface is cracked/worn.	 SEM395A	• Tensioner jamming • Overheated engine • Interference with belt cover

Inspection (Cont'd)

Item to check	Problem	Cause
Side surface is worn.	 • Side surface of belt is worn to such an extent as original trace of its cut is unclear. • Belt corners are worn and round. • Wicks are frayed and coming out. SEM396A	• Improper installation of belt • Malfunctioning crank pulley plate/timing belt plate
Teeth are worn.	 • Canvas on tooth face is worn down. • Canvas on tooth is fluffy, rubber layer is worn down and faded white, or canvas texture is unclear. SEM397A	• Poor belt cover sealing • Coolant leakage at water pump • Camshaft not functioning properly • Distributor not functioning properly • Excessive belt tension
Oil/Coolant or water is stuck to belt.		• Poor oil sealing of each oil seal • Coolant leakage at water pump • Poor belt cover sealing

Installation

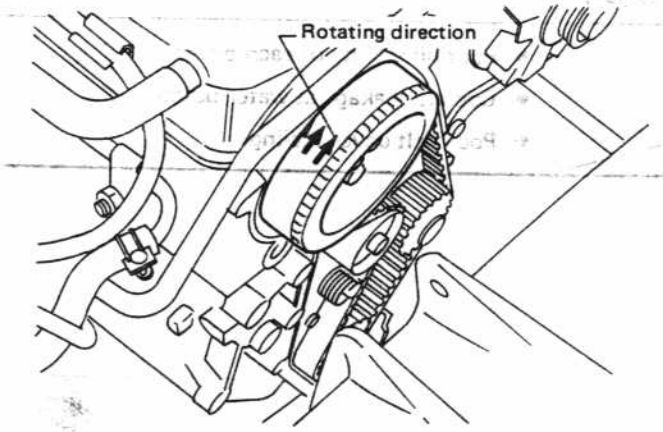
1. Confirm that No. 1 cylinder is at T.D.C. on its compression stroke.



SEM974

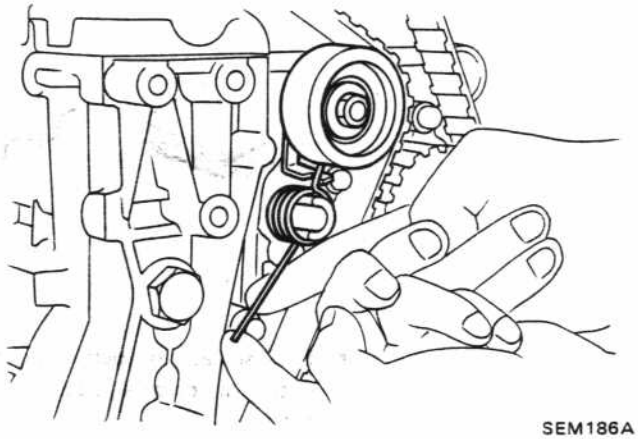
2. Make sure both the water pump pulley and the tensioner rotate smoothly.
3. Set the timing belt.

- Make sure the timing belt is clean.
- Set it in the correct direction. The arrows painted on the timing belt show its direction of revolution.



SEM027B

4. Install the tensioner and the return spring.
5. Tighten the lock nut of the tensioner slightly, and hook the return spring to the stopper.



SEM186A

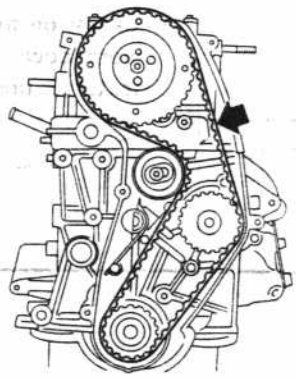
7. Install the lower dust cover and gasket.
8. Install the crankshaft pulley and tighten it.

: 69 - 88 N·m (7.0 - 9.0 kg-m, 51 - 65 ft-lb)

9. After removing all the spark plugs, rotate the crankshaft pulley at least two turns clockwise.
10. Tighten the tensioner lock nut.

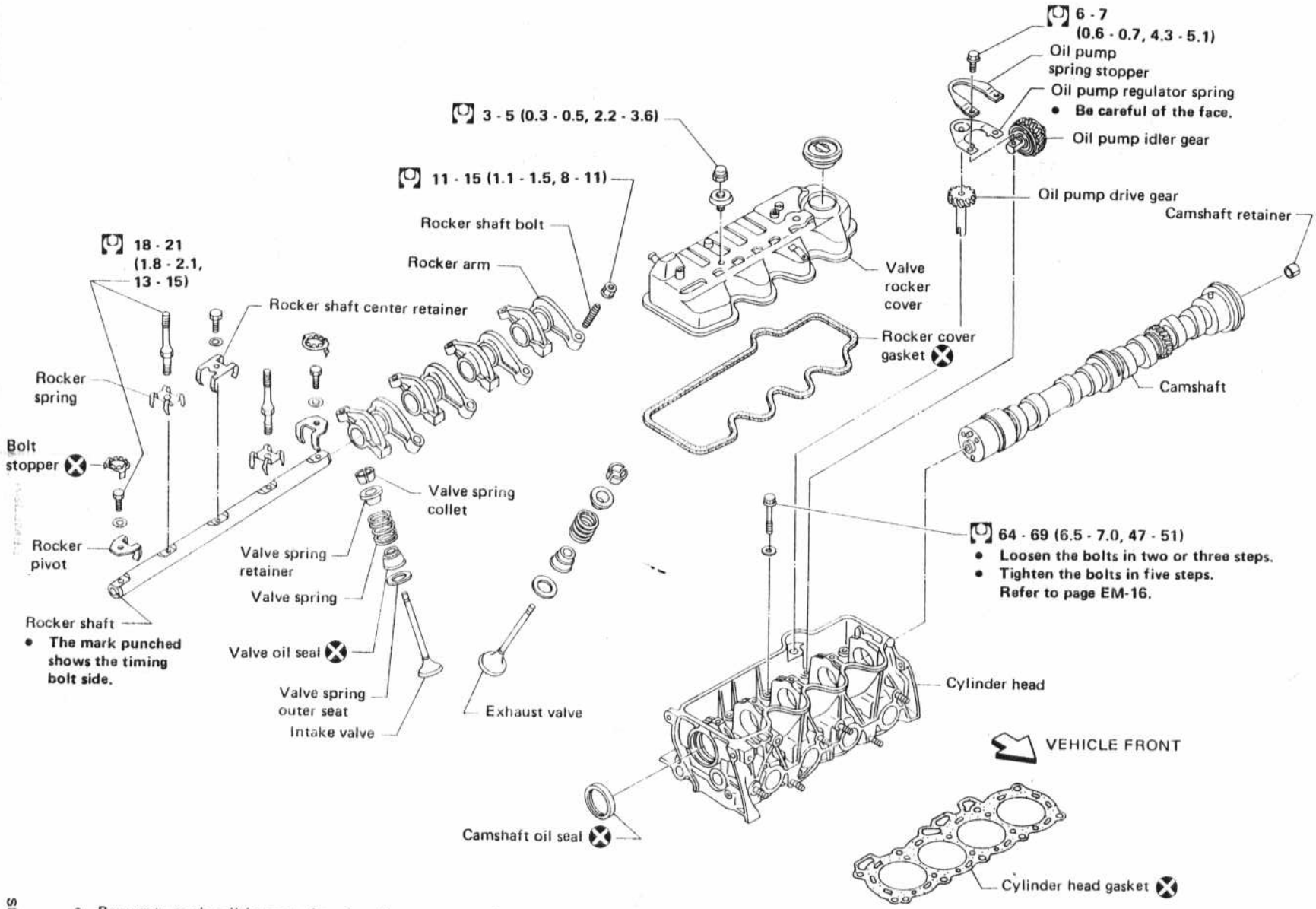
: 15 - 17 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

11. Check belt tension by pushing midway between the camshaft pulley and the water pump pulley.



SEM028B

Belt deflection:
2 mm (0.08 in)
Applied force:
2.65 - 5.69 N (0.27 - 0.58 kg, 0.60 - 1.28 lb)



SEM029B

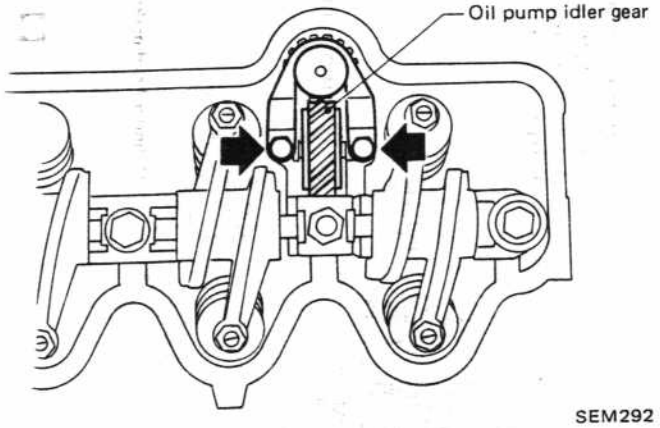
• Be sure to apply a light coat of engine oil to contact surfaces of moving parts such as camshaft and bearings when installing them.

: N·m (kg-m, ft-lb)

CYLINDER HEAD

Removal

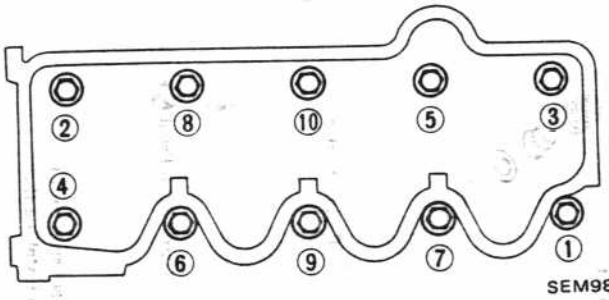
1. Remove timing belt.
   After removing timing belt, do not rotate crankshaft and camshaft separately to prevent contact between pistons and valves.
2. Remove oil pump idler gear.



SEM292

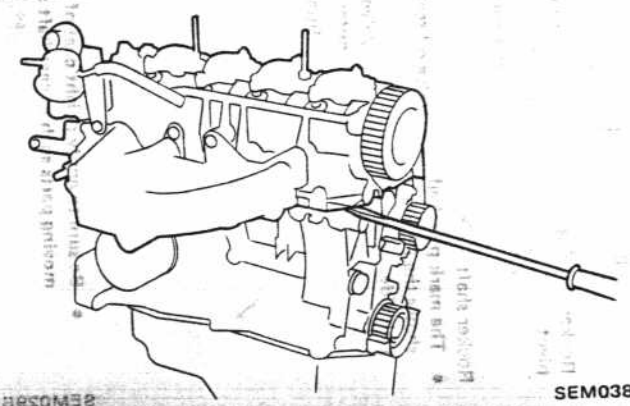
3. Remove cylinder head.

Loosen bolts in two or three steps.



SEM980

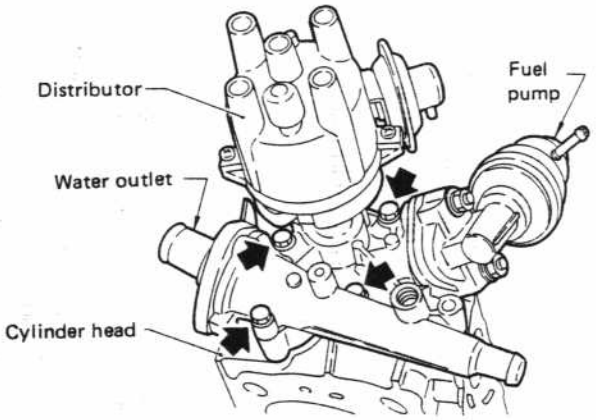
If cylinder head is difficult to separate, pry with a screwdriver between head salience and block.



SEM038A

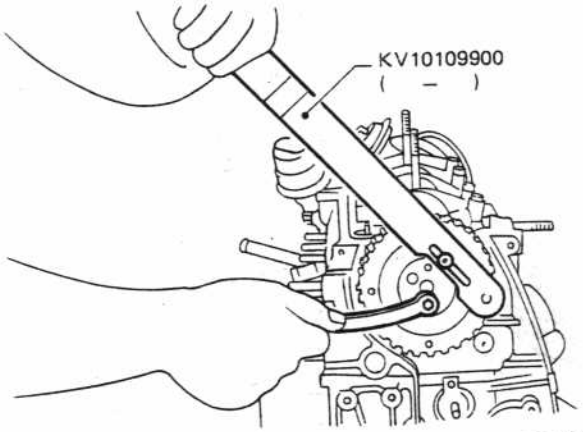
Disassembly

1. Remove thermostat housing.



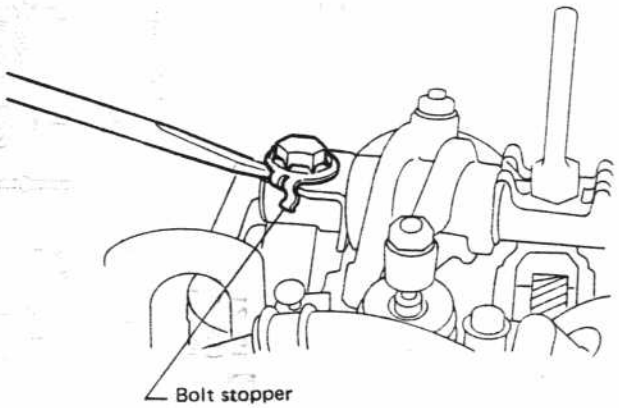
SEM030B

2. Remove camshaft pulley.



SEM034B

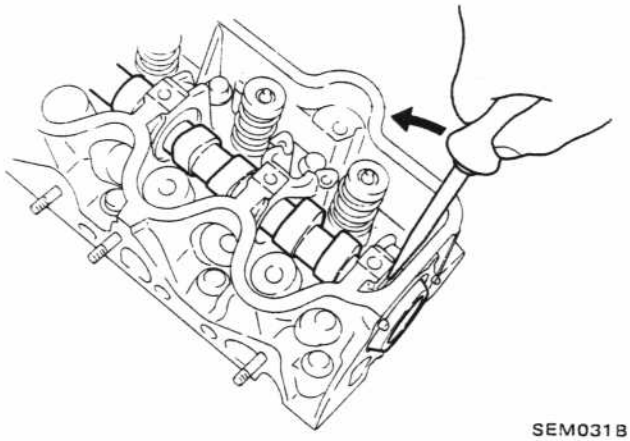
3. Remove bolt stopper.



SEM993

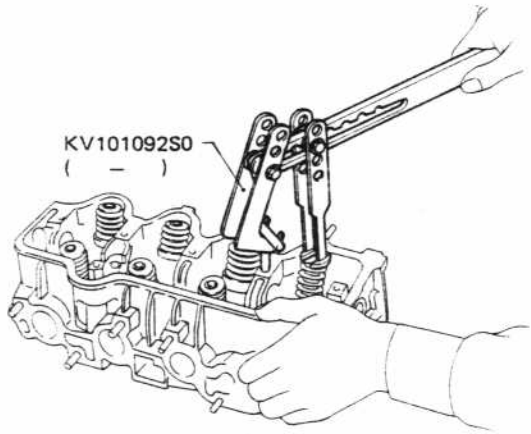
Disassembly (Cont'd)

4. Remove rocker shaft with rocker arms.
5. Remove camshaft.



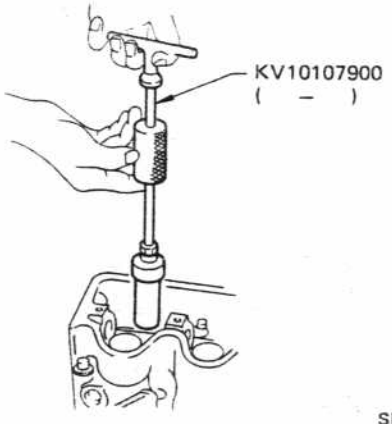
SEM031B

6. Remove valve component parts.



SEM991

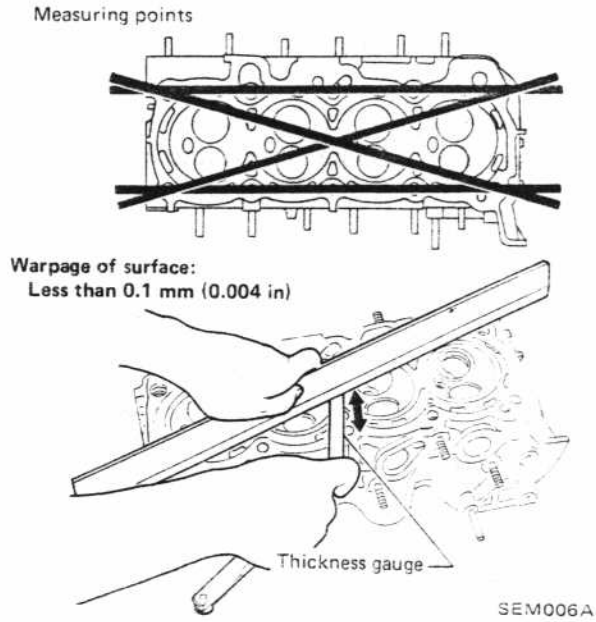
7. Remove valve oil seals.



SEM644

Inspection

CYLINDER HEAD DISTORTION



SEM006A

If beyond the specified limit, resurface it.

Resurfacing limit:

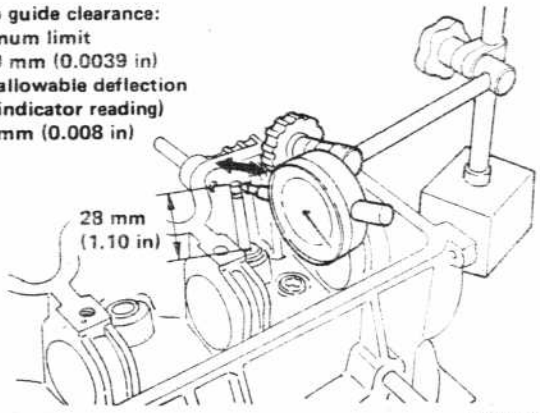
The resurfacing limit of cylinder head is determined by the cylinder block resurfacing in an engine.

Amount of cylinder head resurfacing is "A".
Amount of cylinder block resurfacing is "B".
The maximum limit is as follows:
A + B = 0.2 mm (0.008 in)

VALVE GUIDE CLEARANCE

- Valve guide clearance should be measured in parallel with rocker arm. (Generally, a large amount of wear occurs in this direction.)

Stem to guide clearance:
Maximum limit
0.10 mm (0.0039 in)
Max. allowable deflection
(Dial indicator reading)
0.2 mm (0.008 in)



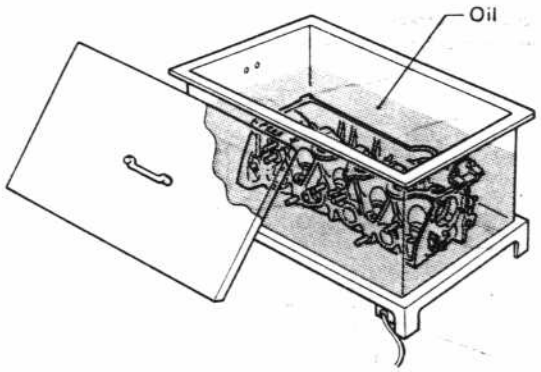
SEM005A

Inspection (Cont'd)

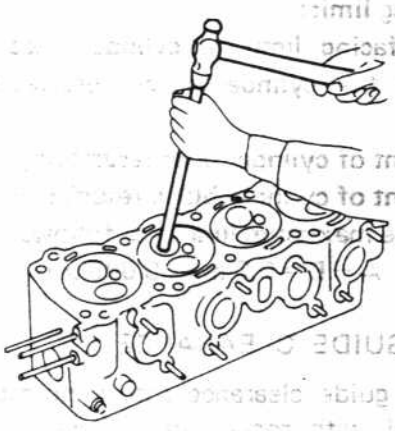
Replacement

Replace valve or valve guide.

1. Heat cylinder head to 150 to 160°C (302 to 320°F) and drive out valve guide with a press [under a 20 kN (2t, 2.2 US ton, 2.0 Imp ton) pressure] or hammer, and suitable tool.

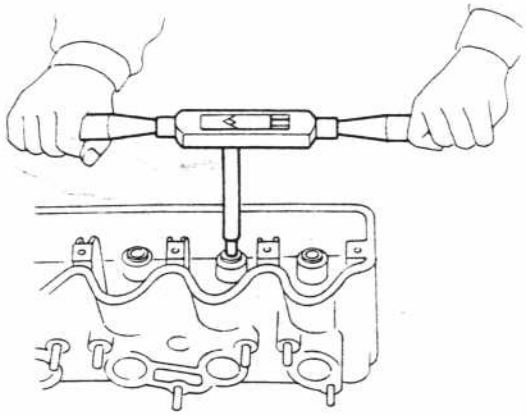


SEM008A



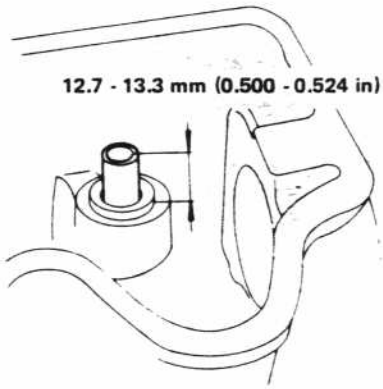
SEM647

2. Ream cylinder head valve guide hole.



SEM541

3. Heat cylinder head to 150 to 160°C (302 to 320°F) and press service valve guide into cylinder head.

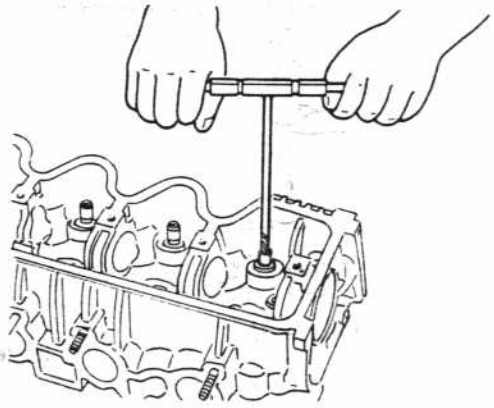


SEM542

4. Ream valve guide.

Finished size:

7.005 - 7.020 mm (0.2758 - 0.2764 in)



SEM007

Inspection (Cont'd)

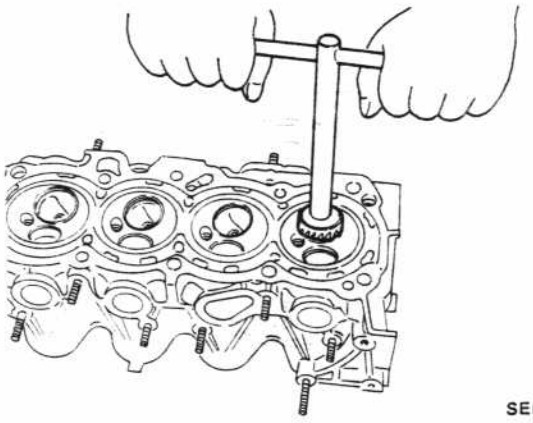
VALVE INSERTS

Check valve inserts for any evidence of pitting at valve contact surface, and reseat or replace if excessively worn out.

- **When repairing valve inserts, check valve and valve guide for wear beforehand. If worn, replace them. Then correct valve seat.**
- **Cut or grind valve inserts uniformly with both hands.**

If necessary, replace valve inserts as follows:

1. After removing valve insert, ream the cylinder head recess.
2. Heat cylinder head to a temperature of 150 to 160°C (302 to 320°F).
3. Press fit insert until it seats on the bottom, and caulk more than 4 points.
4. Cut or grind valve inserts using suitable tool to the specified dimensions as shown in S.D.S.

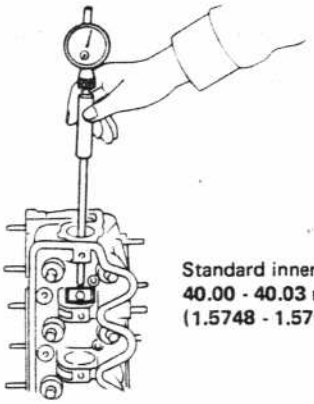


SEM009A

5. After cutting, lap valve inserts with a lapping compound.
6. Check contact condition of valve inserts.

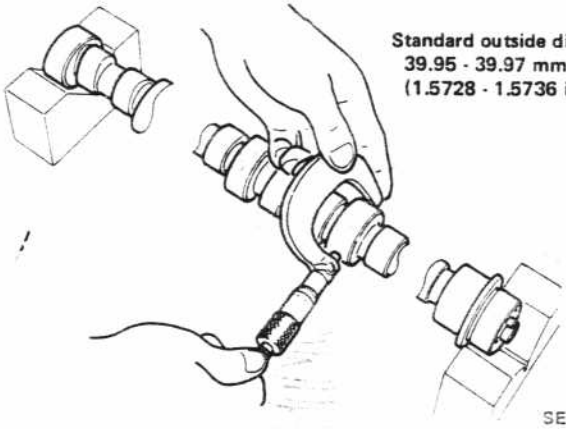
CAMSHAFT JOURNAL CLEARANCE

Wear limit:
0.15 mm (0.0059 in)



Standard inner diameter
40.00 - 40.03 mm
(1.5748 - 1.5760 in)

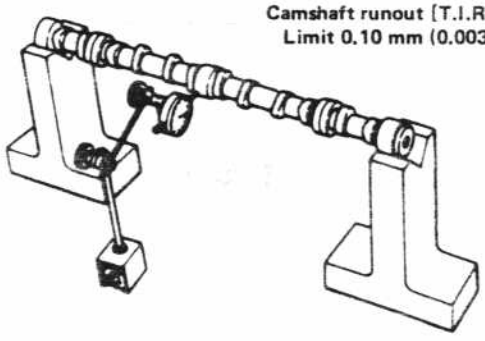
SEM544



Standard outside diameter
39.95 - 39.97 mm
(1.5728 - 1.5736 in)

SEM012A

CAMSHAFT RUNOUT



Camshaft runout [T.I.R.*]:
Limit 0.10 mm (0.0039 in)

*: Total indicator reading

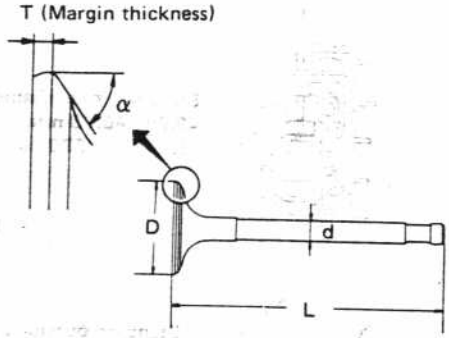
EM302

Inspection (Cont'd)

VALVE DIMENSIONS

Check dimensions in each valve. For dimensions, refer to S.D.S.

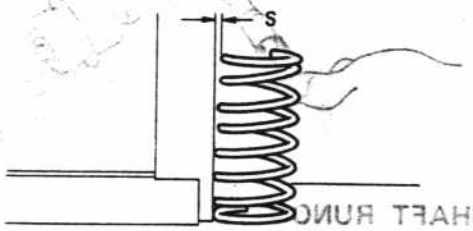
When valve head has been worn down to 0.5 mm (0.020 in) in margin thickness, replace the valve.
Grinding allowance for valve stem end surface is 0.2 mm (0.008 in) or less.



SEM188

VALVE SPRING SQUARENESS

Out of square: Less than 2.0 mm (0.079 in)



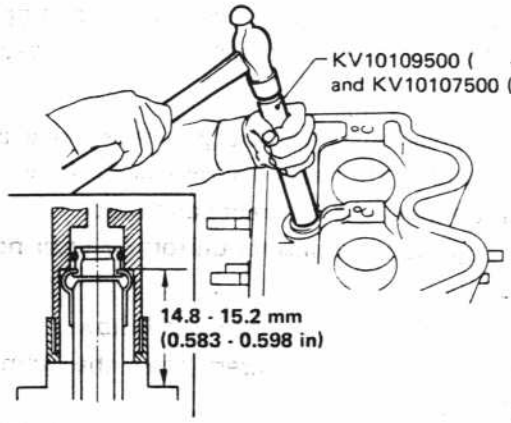
SEM288A

FREE LENGTH AND TENSION

Refer to S.D.S.

Assembly

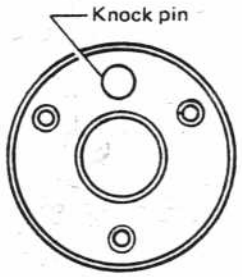
1. Install valve oil seal.



SEM994

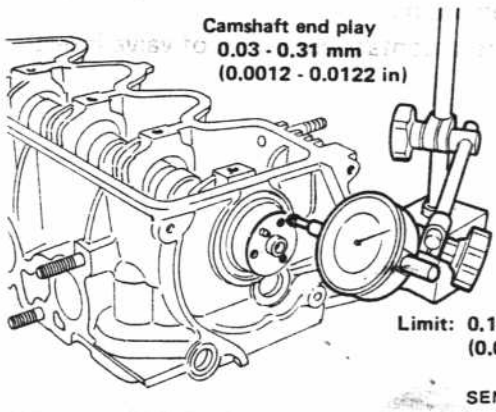
2. Install valve component parts.
3. Install camshaft oil seal.
4. Apply a light coat of engine oil to camshaft, then install it.

When No. 1 cylinder is set at T.D.C. on its compression stroke, the camshaft front face is shown below.



SEM99

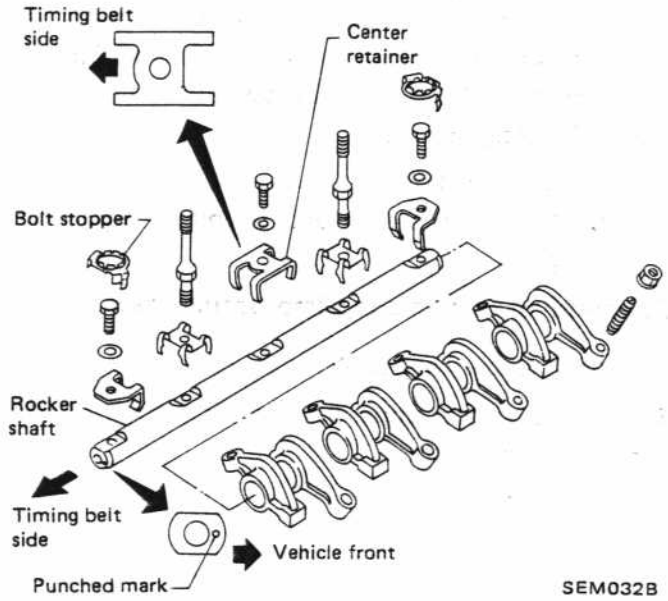
5. Measure camshaft end play with thermosta housing and gasket installed.



SEM01

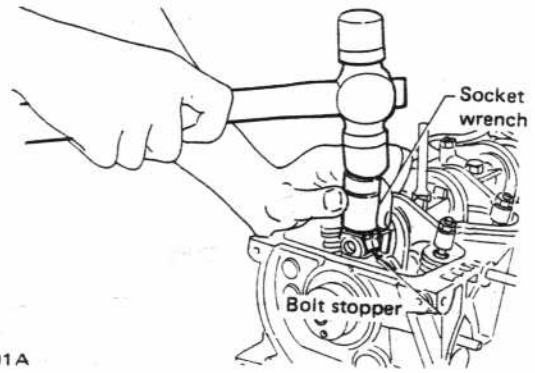
Assembly (Cont'd)

6. Install rocker shaft with rocker arms.



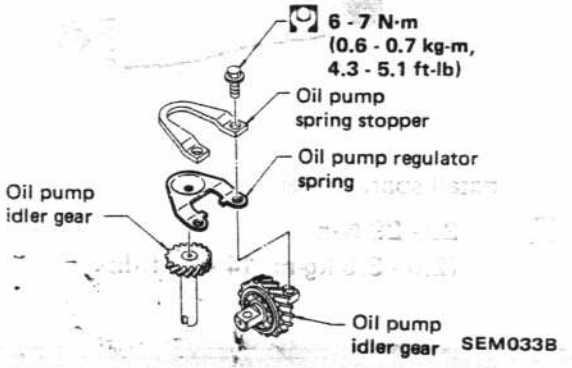
7. Hit bolt stoppers to attach them using socket wrench or equivalent.

Always replace bolt stopper with new one.



8. Install oil pump idler gear and oil regulator spring.

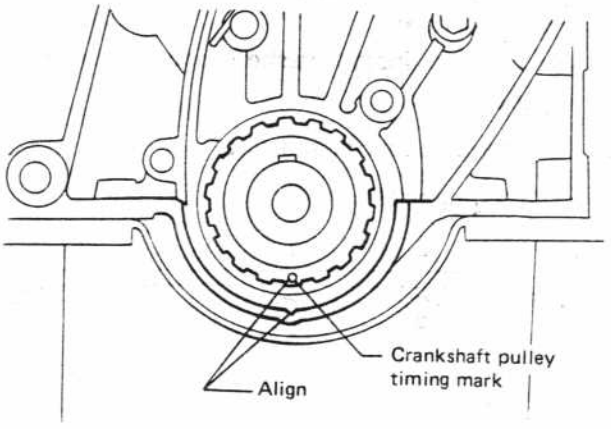
Be careful of oil regulator spring direction.



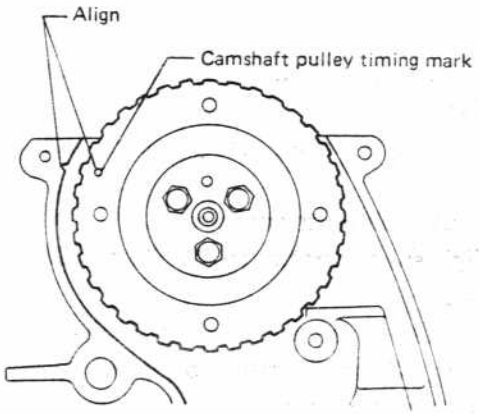
Installation

1. Set No. 1 cylinder at T.D.C. on its compression stroke as follows:

(1) Align crankshaft pulley timing mark with mark on main bearing cap.



(2) Align camshaft pulley timing mark with mark on cylinder head.



Do not rotate crankshaft and camshaft separately, because valves hit piston heads.

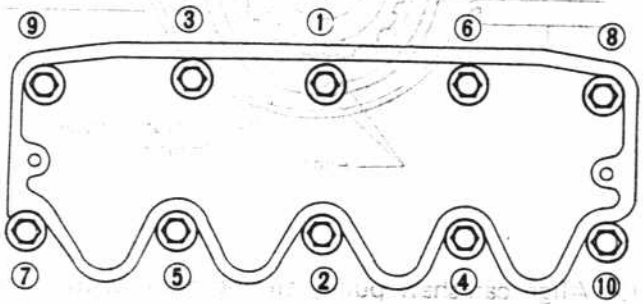
Installation (Cont'd)

2. Install cylinder head with new gasket.

a. **Always use new cylinder head gasket.**
b. **Before tightening cylinder head bolts, make sure that the oil pump drive gear can be turned freely by hand.**
c. **Be sure to install washers between bolts and cylinder head.**

3. Tighten cylinder head bolts.

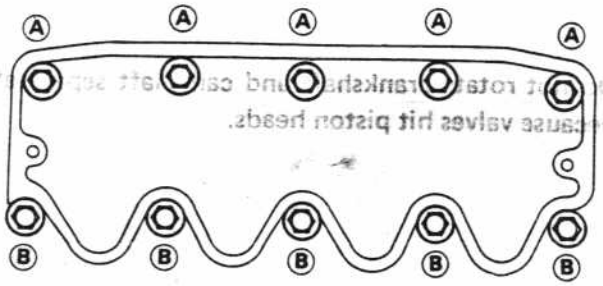
- **Tightening order**



Tighten in numerical order. SEM580

- **Tightening procedures**

(1) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb).
(2) Tighten all bolts to 64 N·m (6.5 kg-m, 47 ft-lb).
(3) Loosen all bolts completely.
(4) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb).
(5) Tighten all bolts to 64 to 69 N·m (6.5 to 7.0 kg-m, 47 to 51 ft-lb) or if you have an angle wrench, turn each bolt clockwise the specified degrees.



SEM714A

Specified degrees:
Ⓐ 80
Ⓑ 65

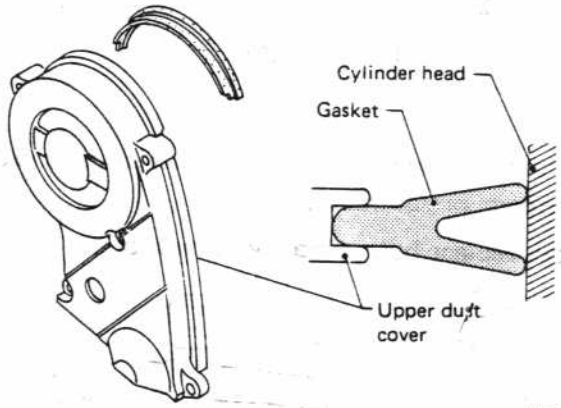
When performing normal maintenance and inspection, first loosen each cylinder head bolt slightly then tighten to a torque of 64 to 69 N·m (6.5 to 7.0 kg-m, 47 to 51 ft-lb). (This operation should be done when engine is cold).

4. Install timing belt.
5. Install oil pump idler and oil pump regulator spring.

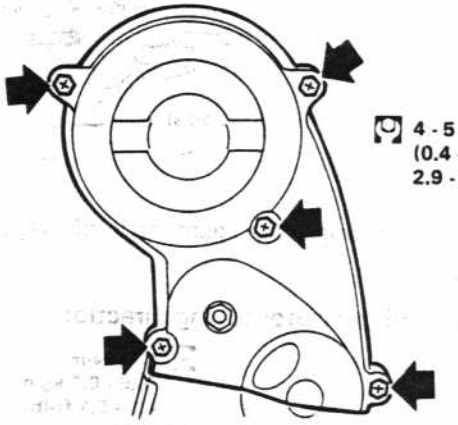
Be careful of oil pump regulator spring's face.

6. Install upper dust cover.

Be sure to attach upper dust cover gasket to cylinder head correctly.



SEM984



SEM978

7. Install spark plugs.

: 20 - 29 N·m
(2.0 - 3.0 kg-m, 14 - 22 ft-lb)

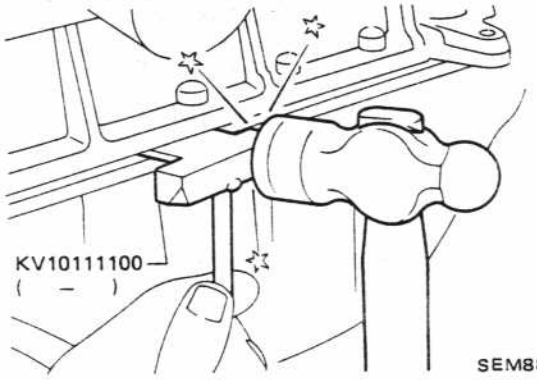
OIL PAN AND OIL PUMP

Removal

1. Drain engine oil.
2. Remove oil pan.

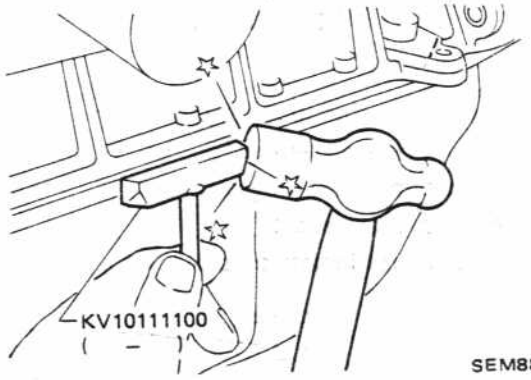
(1) Drive seal cutter (special tool) into space between cylinder block and oil pan.

- **Do not drive seal cutter into oil pump or rear oil seal retainer portion, or aluminum mating face will be damaged.**
- **Do not drive screwdriver, or oil pan flange will be deformed.**



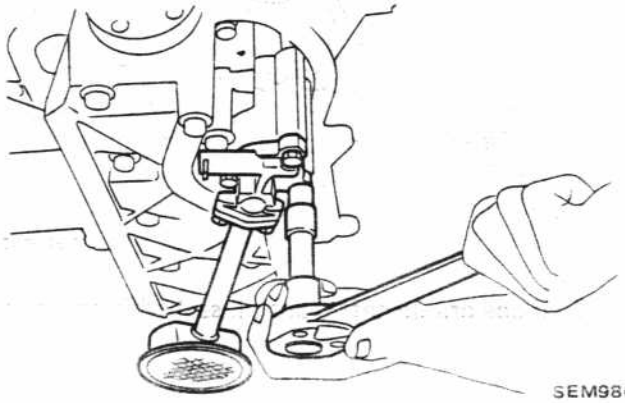
SEM883A

(2) Slide seal cutter by tapping its side with a hammer and remove oil pan.



SEM884A

3. Remove oil pump assembly with oil strainer.


SEM986

Be careful not to drop oil pump drive shaft.

Inspection

Refer to LC section.

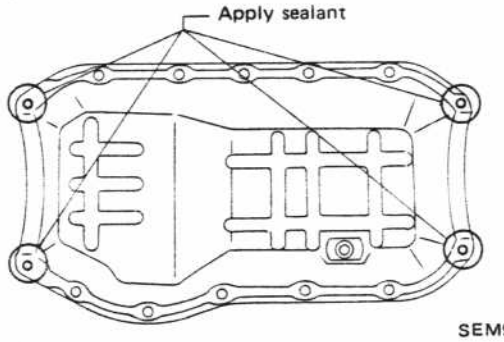
Installation

1. Install oil pump assembly.

[O] : **16 - 22 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)**

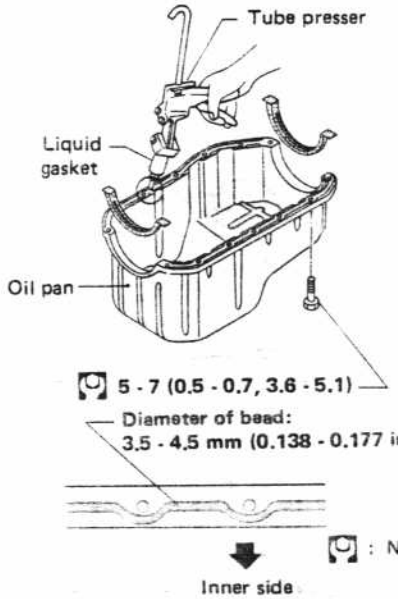
2. Before installing oil pan, remove all traces of liquid gasket from mating surface using a scraper.
- Also remove traces of liquid gasket from mating surface of cylinder block.

3. Apply sealant to oil pan.



SEM988

4. Apply a continuous bead of liquid gasket to mating surface of oil pan.
- Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in) wide.
- Attaching should be done within 5 minutes after coating.
- Wait at least 30 minutes before refilling engine oil/coolant or striking engine.

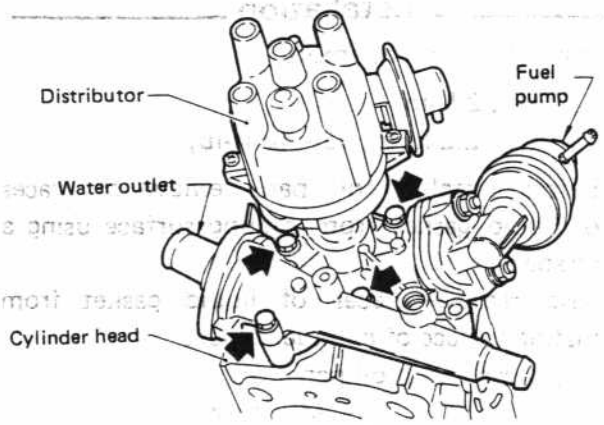


SEM427B

OIL SEAL REPLACEMENT

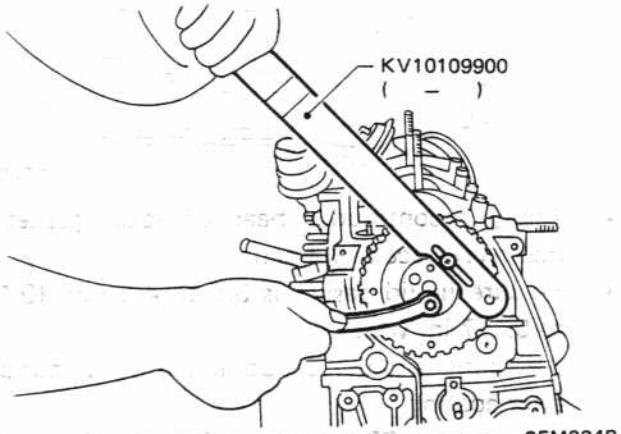
Replacement of Camshaft Oil Seal

1. Remove thermostat housing.



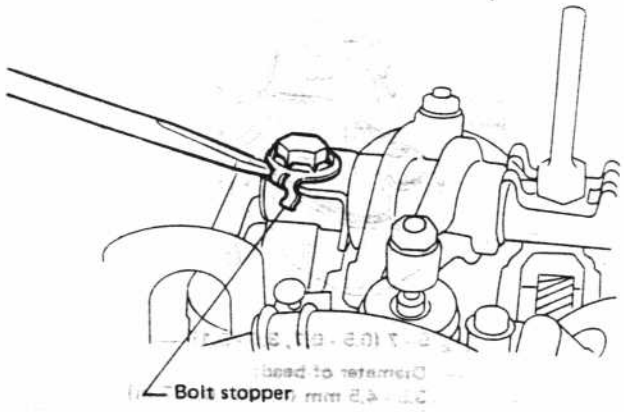
SEM030B

2. Remove camshaft pulley.



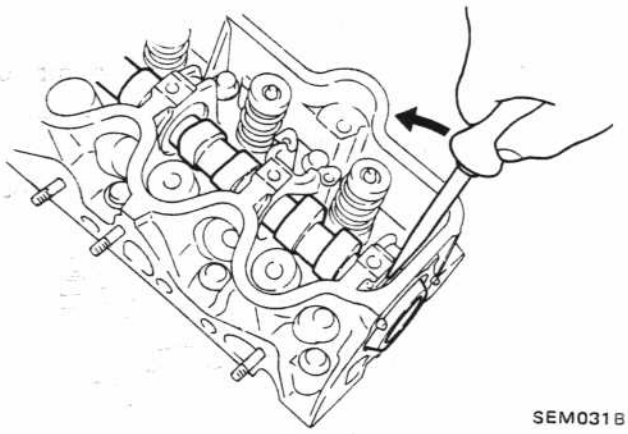
SEM034B

3. Remove bolt stopper.



SEM993

4. Remove rocker shaft with rocker arms.
5. Remove camshaft.

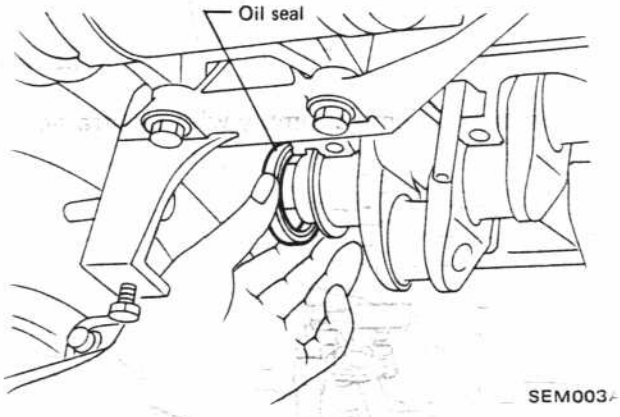


SEM031B

6. Replace camshaft oil seal with new one.

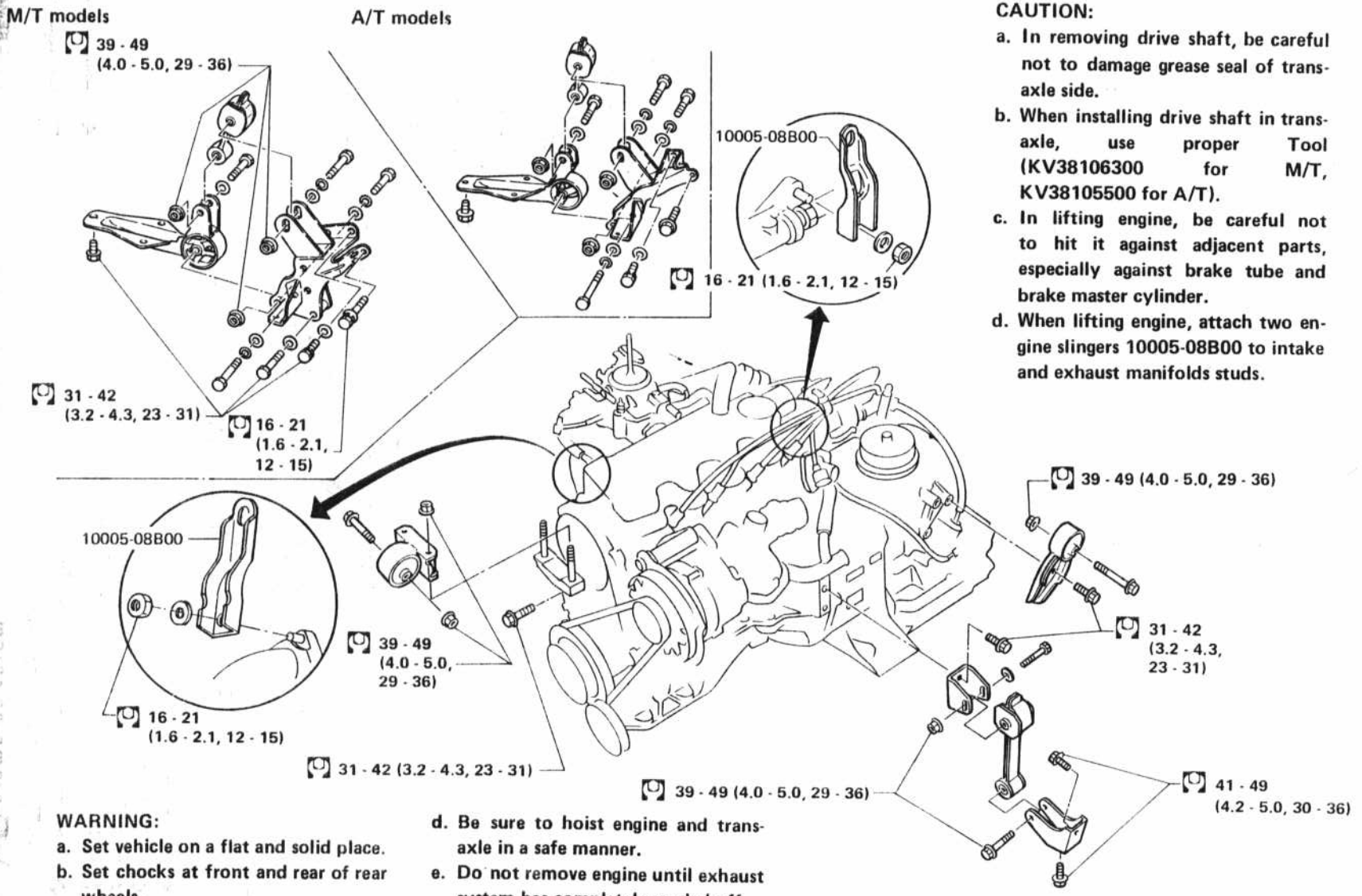
Replacement of Crankshaft Front Oil Seal

1. Remove timing belt and cover.
2. Lift engine and remove oil pan.
3. Remove main bearing cap.
   Refer to Crankshaft.
4. Remove crankshaft oil seal.



SEM003A

5. Replace crankshaft front oil seal with new one.



CAUTION:

a. In removing drive shaft, be careful not to damage grease seal of transaxle side.
b. When installing drive shaft in transaxle, use proper Tool (KV38106300 for M/T, KV38105500 for A/T).
c. In lifting engine, be careful not to hit it against adjacent parts, especially against brake tube and brake master cylinder.
d. When lifting engine, attach two engine slingers 10005-08B00 to intake and exhaust manifolds studs.

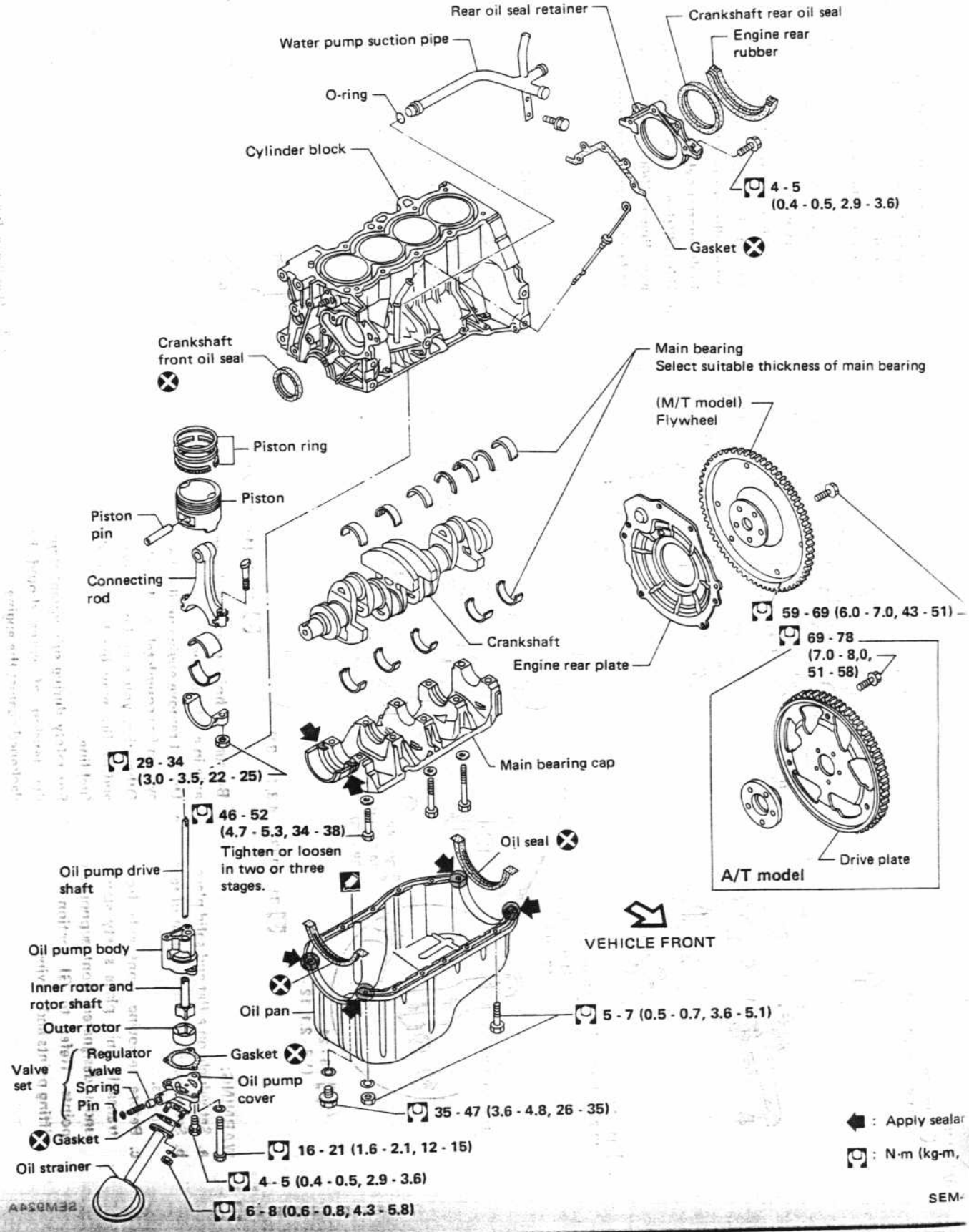
WARNING:

a. Set vehicle on a flat and solid place.
b. Set chocks at front and rear of rear wheels.
c. Before removing front axle from transaxle unit, place safety stands under designated front supporting points. Refer to GI section for lifting points and towing.
d. Be sure to hoist engine and transaxle in a safe manner.
e. Do not remove engine until exhaust system has completely cooled off. Otherwise, you may burn yourself and/or fire may break out in the fuel line.
f. For safety during subsequent steps, the tension of wires should be slackened against the engine.

: N·m (kg-m, ft-lb)

SEM924A

Cylinder Block, Crankshaft and Piston

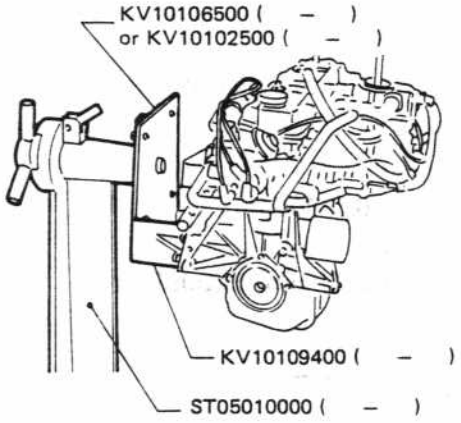


SEM-

Disassembly

PISTON

1. Place engine on work stand.



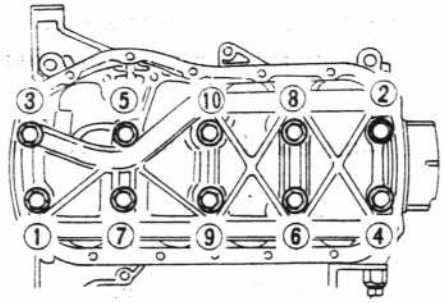
SEM016A

2. Remove timing belt cover and timing belt.
3. Remove cylinder head and oil pan.
4. Remove piston.

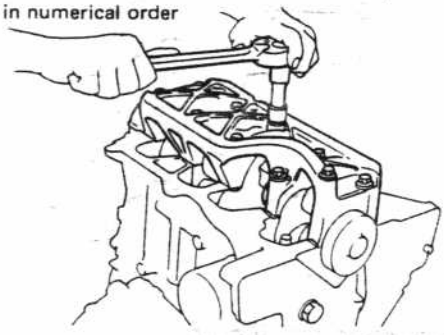
CRANKSHAFT

1. Remove crankshaft rear oil seal retainer.
2. Remove bearing cap.

The bolts should be loosened in two or three stages.



Loosen in numerical order



SEM019A

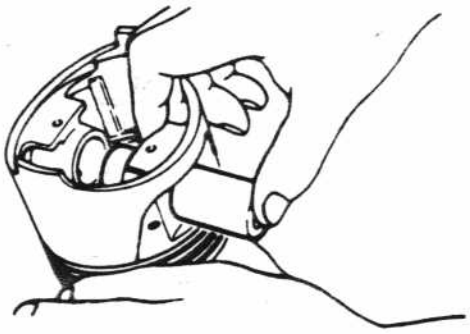
3. Remove crankshaft.

Inspection

PISTON AND PISTON PIN CLEARANCE

- Confirm the fitting of piston pin into piston pin hole to such an extent that it can be pressed smoothly by finger at room temperature.

Piston pin to piston clearance:
0.008 - 0.012 mm (0.0003 - 0.0005 in)



EM131

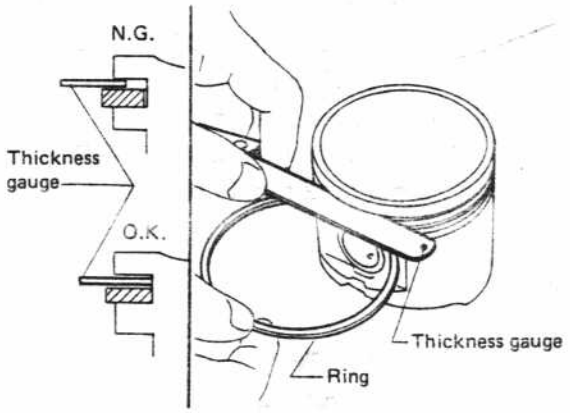
PISTON RING SIDE CLEARANCE

Side clearance:

Top ring
0.040 - 0.073 mm (0.0016 - 0.0029 in)

2nd ring
0.030 - 0.063 mm (0.0012 - 0.0025 in)

Max. tolerance of side clearance:
0.2 mm (0.008 in)

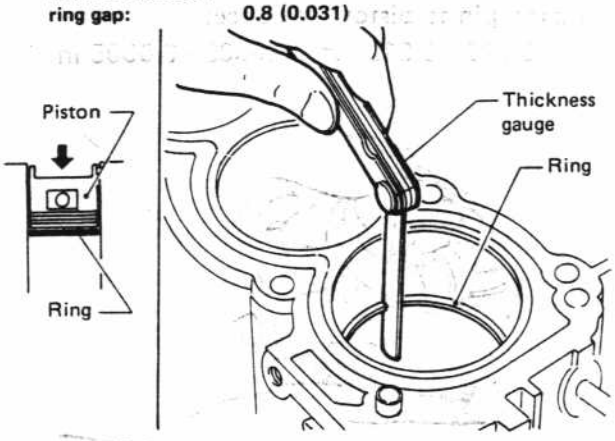


SEM024A

Inspection (Cont'd)

PISTON RING GAP

Ring gap mm (in)	
Top ring	
No. 1 grade	0.21 - 0.30 (0.0083 - 0.0118)
No. 2 and 3 grade	0.18 - 0.30 (0.0071 - 0.0118)
2nd ring	0.15 - 0.34 (0.0059 - 0.0134)
Oil ring	0.20 - 0.69 (0.0079 - 0.0272)
Max. tolerance of ring gap:	0.8 (0.031)



SEM025A

BEARING CLEARANCE

CAUTION:

- Do not turn crankshaft or connecting rod while the plastigage is being inserted.
- When bearing clearance exceeds the specified limit, make sure that a proper bearing has been installed. Then if excessive bearing clearance exists, use a thicker bearing or an undersized bearing so that the specified bearing clearance is obtained.

Bearing clearance

Main bearing

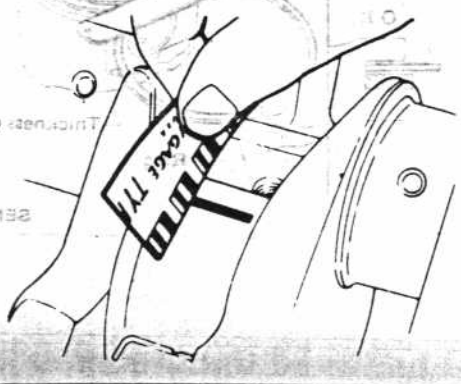
0.03 - 0.05 mm (0.0012 - 0.0020 in)

Limit 0.075 mm (0.0030 in)

Connecting rod bearing

0.02 - 0.06 mm (0.0008 - 0.0024 in)

Limit 0.12 mm (0.0047 in)



EM142

CRANKSHAFT INSPECTION

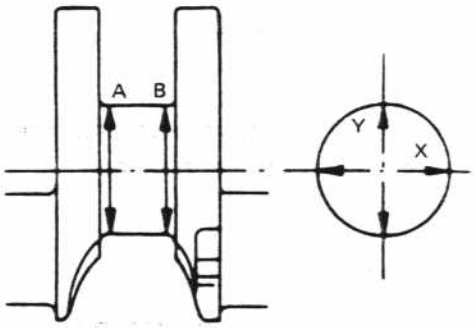
1. Check crankshaft journals for score, bias, wear or cracks. If faults are minor, correct with fine crocus cloth.
2. Check journals with a micrometer for taper and out-of-round.

Out-of-round (X-Y)

0.01 mm (0.0004 in)

Taper (A-B):

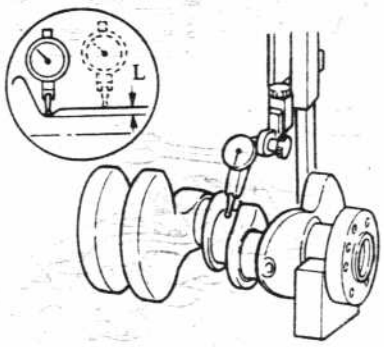
Less than 0.02 mm (0.0008 in)



EM75

a. When regrinding crank pin journal, measur "L" dimension in fillet roll. Make sure that th measurements exceed the specified limit. If th measurements are within the specified limit, d not regrind it.

L: More than 0.13 mm (0.0051 in)



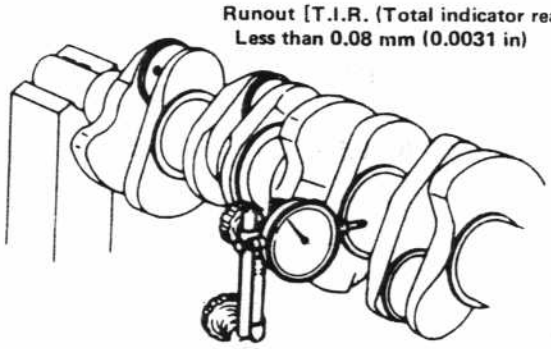
SEM18-

b. Do not grind off fillet roll.
c. Refer to S.D.S. for regrinding crankshaft an available service parts.

Inspection (Cont'd)

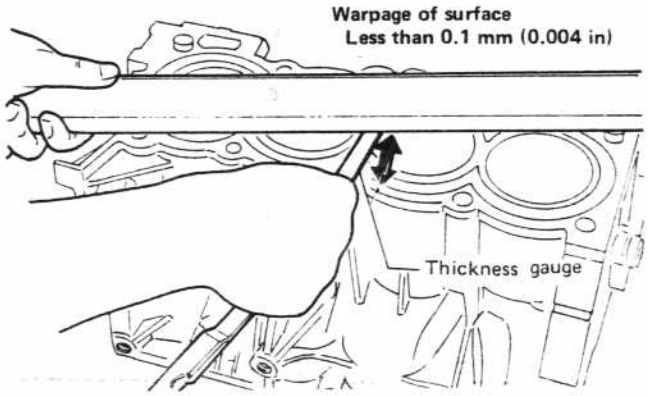
CRANKSHAFT RUNOUT

Check crankshaft runout.



SEM028A

CYLINDER BLOCK DISTORTION AND WEAR



SEM033A

If beyond the specified limit, resurface it.

Resurfacing limit:

The resurfacing limit of cylinder block is determined by the cylinder head resurfacing in an engine.

Amount of cylinder head resurfacing is "A"

Amount of cylinder block resurfacing is "B"

The maximum limit is as follows:

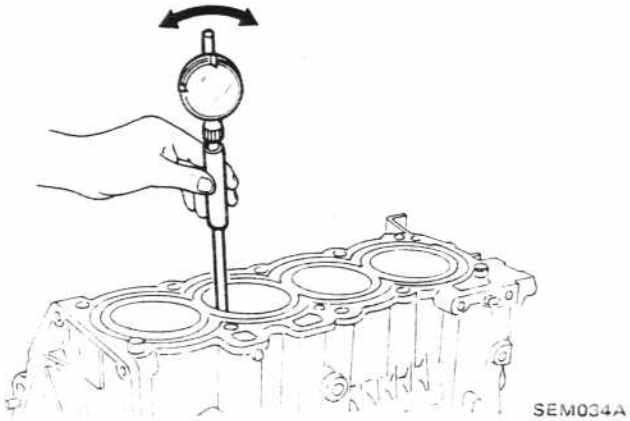
A + B = 0.2 mm (0.008 in)

When resurfacing, be careful not to cut off punched piston grade number.

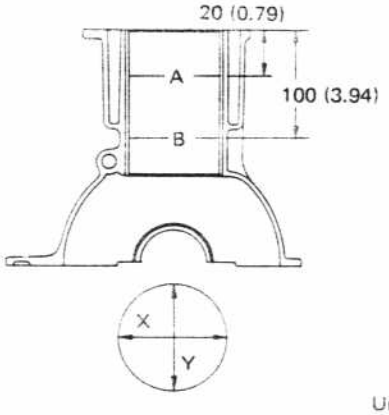
CYLINDER BORE

Using a bore gauge, measure cylinder bore for wear, out-of-round or taper.

Standard inside diameter:
71.00 - 71.03 mm
(2.7953 - 2.7965 in)
Out-of-round (X-Y) limit:
0.02 mm (0.0008 in)
Taper (A-B) limit:
0.02 mm (0.0008 in)



SEM034A



Unit: mm (in)

SEM099A

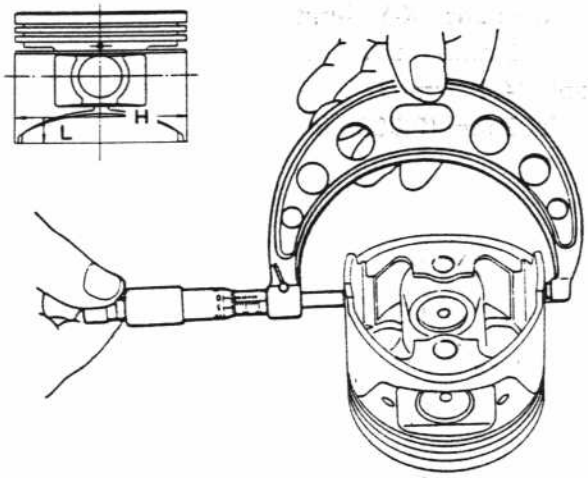
Check scratches or seizure. If seizure is found, hone it.

Inspection (Cont'd)

PISTON TO CYLINDER WALL CLEARANCE

1. Measure piston diameter.

Piston diameter "H":
Refer to S.D.S.
Measuring point "L":
9 mm (0.35 in)



SEM187A

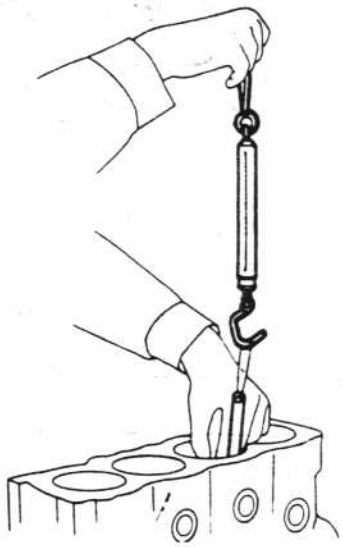
2. Check that piston clearance is within the specification.

Piston clearance:
0.023 - 0.043 mm (0.0009 - 0.0017 in)

MEASURING PISTON-TO-CYLINDER CLEARANCE

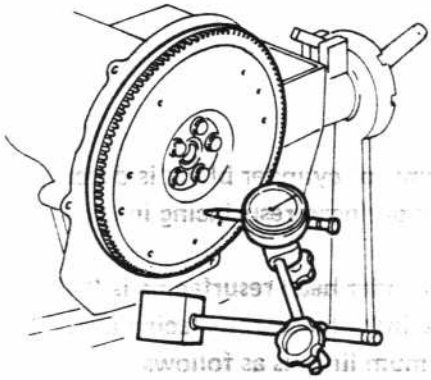
When pulling feeler gauge straight upward, measure the extracting force.

Feeler gauge thickness:
0.04 mm (0.0016 in)
Extracting force:
4.9 - 14.7 N (0.5 - 1.5 kg, 1.1 - 3.3 lb)



SEM55(

Flywheel Runout



Runout (Total indicator reading)
Less than 0.15 mm (0.0059 in)

SEM027A

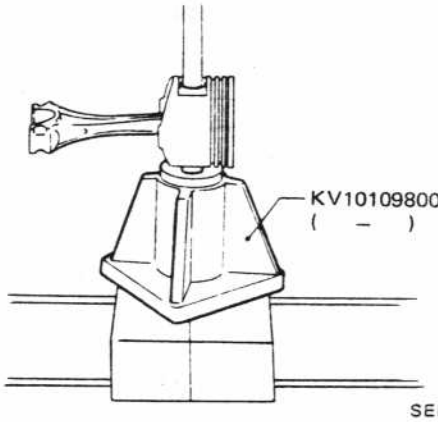
Install ring on flywheel while heating ring gear to about 180 to 220°C (356 to 428°F).

Assembly

PISTON

a. Numbers are stamped on the connecting rod and cap corresponding to each cylinder. Care should be taken to avoid a wrong combination including bearing.

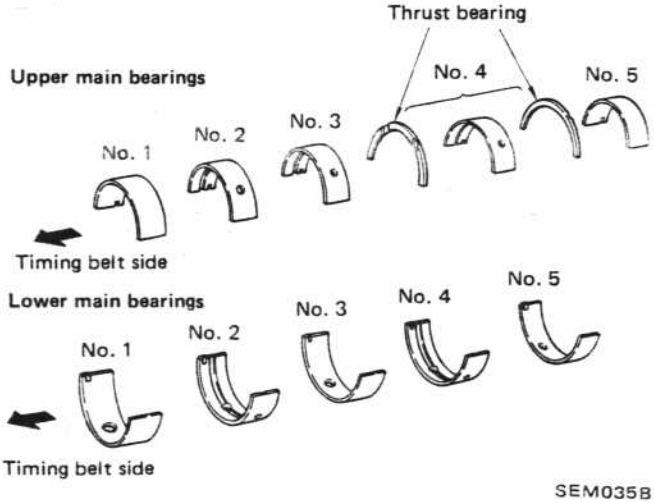
b. When pressing piston pin in connecting rod, apply engine oil to pin and small end of connecting rod.



SEM023A

CRANKSHAFT

1. Set main bearings in the proper position on cylinder block.



SEM035B

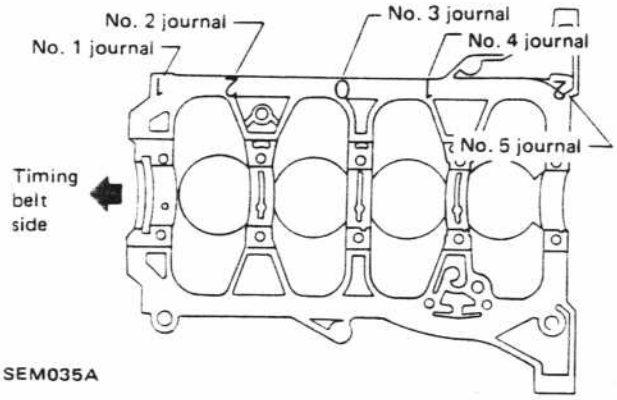
Main bearing selection

1. If all of crankshaft, cylinder block and main bearing are replaced with new ones, it is necessary to select thickness of main bearings as follows:

If either crankshaft, cylinder block or main bearing is reused again, it is necessary to measure main bearing clearance with plastigage.

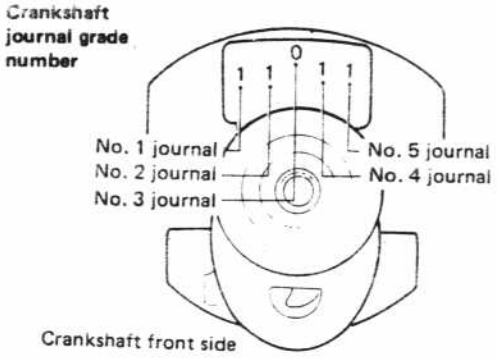
a. Each engine is punched with numbers which indicate cylinder block main journal. Each bore is measured separately.

Main journal grade number (cylinder block)

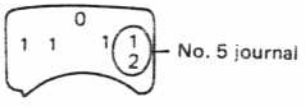


SEM035A

b. Each crankshaft is punched with numbers which indicate main journal dimensions. Each journal is measured separately.



In case No. 5 journal is grade No. 3.



SEM179A

Assembly (Cont'd)

2. Select suitable thickness of main bearing according to the following table.

		Main journal grade number			
		0	1	2	3
		Main bearing grade number			
Crankshaft journal grade number	0	0	1	2	3
	1	1	2	3	4
	2	2	3	4	5
	*3	3	4	5	6

* In case of grade number "3", number "1" and "2" are stamped in place of number "3".

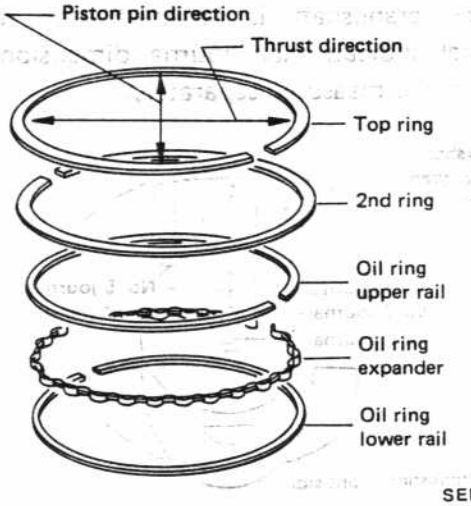
For example:

Main journal grade number: 2
Crankshaft journal grade number: 3
Main bearing grade number = 2+3
= 5

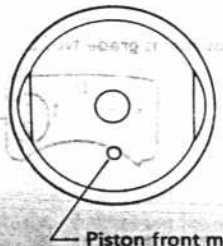
Main bearing:
Refer to S.D.S.

3. Install piston assembly.

a. Set piston rings as shown below.



SEM180A

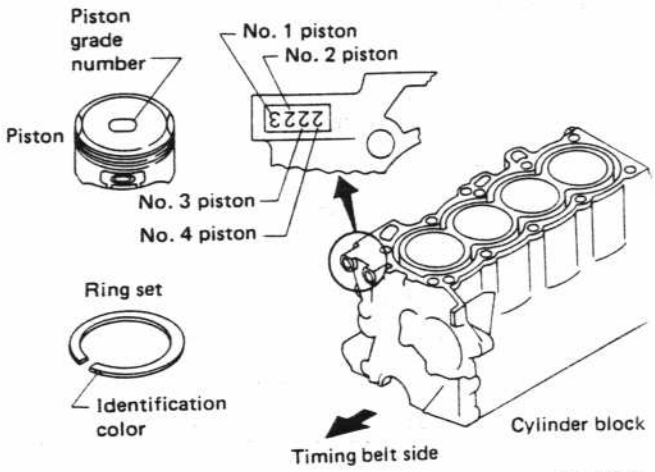


SEM724A

b. If either cylinder block or piston is replaced with new one, select piston grade number and ring set according to the table in S.D.S.

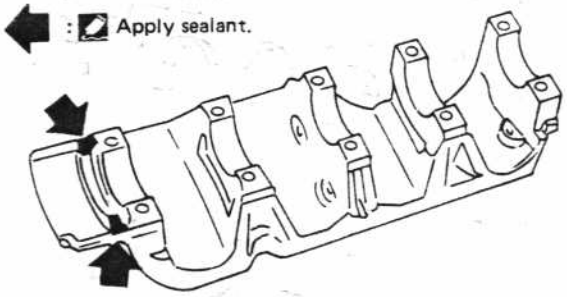
c. If only a piston ring is replaced with new one, select ring set according to the table in S.D.S.

Piston grade number and ring set



SEM181A

4. Apply sealant to main bearing cap, then install it.
Make sure if the applied sealant has hardened before starting engine.

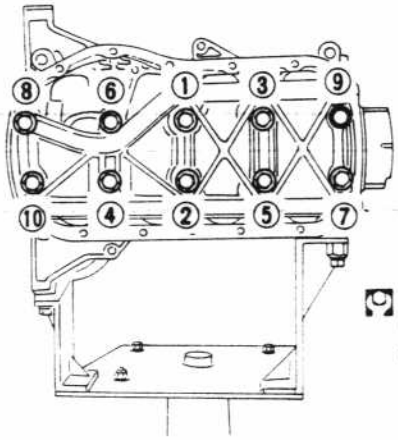


SEM012E

Assembly (Cont'd)

5. Tighten bearing cap bolts to the specified torque.

- **Tighten in two or three stages.**
- **Prior to tightening bearing cap bolts, place bearing cap in proper position by shifting crankshaft in the axial direction.**

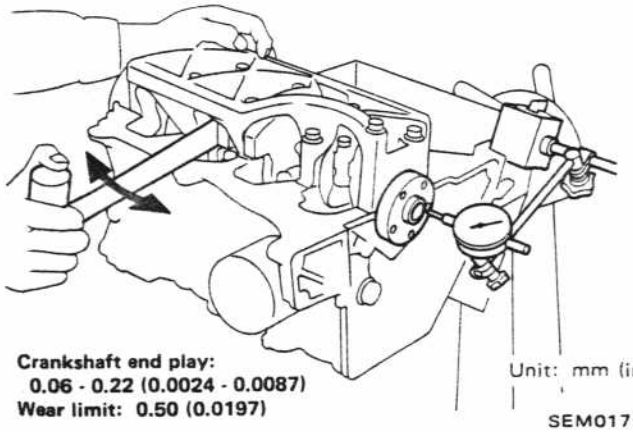


46 - 52 N·m (4.7 - 5.3 kg-m, 34 - 38 ft-lb)

SEM031A

- **After securing the bearing cap bolts, ascertain that the crankshaft turns smoothly by hand.**

5. Measure crankshaft free end play at the center bearing.



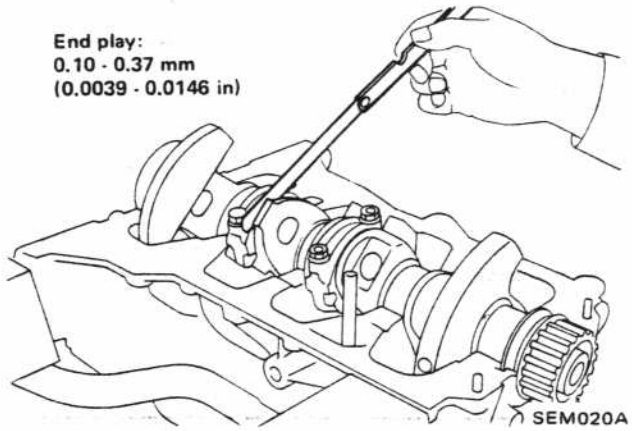
Crankshaft end play:
0.06 - 0.22 (0.0024 - 0.0087)
Wear limit: 0.50 (0.0197)

Unit: mm (in)

SEM017A

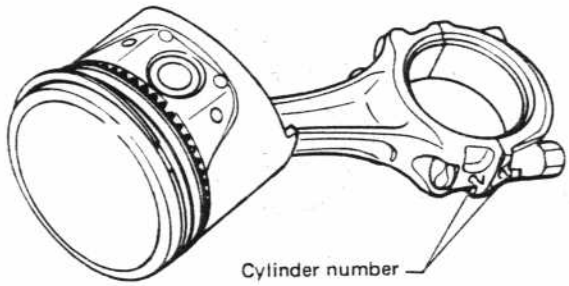
6. Measure connecting rod clearance.

End play:
0.10 - 0.37 mm
(0.0039 - 0.0146 in)



SEM020A

7. Make sure of the cylinder No. on connecting rod and cap.



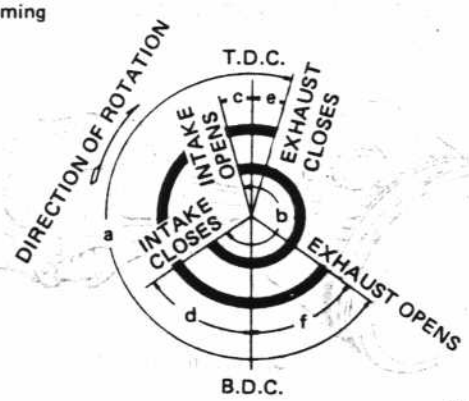
SEM723A

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Item \ Engine		MA12
Cylinder arrangement		4, in-line
Displacement	cm^3 (cu in)	1,235 (75.36)
Bore and Stroke	mm (in)	71 x 78 (2.80 x 3.07)
Valve arrangement		O.H.C.
Firing order		1-3-4-2
Number of piston rings		
Compression		2
Oil		1
Number of main bearings		5
Compression ratio		9.0

Valve timing



EM120

Unit: degree

	a	b	c	d	e	f
MA12	238°	236°	11°	45°	7°	51°

Inspection and Adjustment

COMPRESSION PRESSURE

Unit: kPa (kg/cm^2, psi)/rpr

Compression pressure	
Standard	1,245 (12.7, 181)/350
Minimum	981 (10.0, 142)/350
Differential limit between cylinders	98 (1.0, 14)/350

CYLINDER HEAD

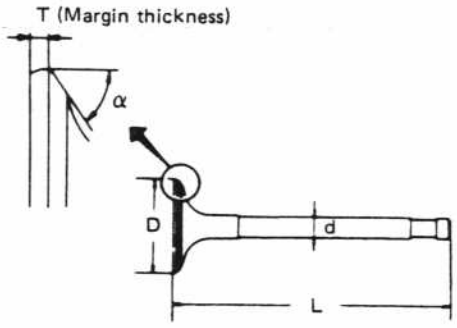
Unit: mm (ir

	Standard	Limit
Head surface flatness	Less than 0.05 (0.0020)	0.1 (0.004)

Inspection and Adjustment (Cont'd)

VALVE

Unit: mm (in)



SEM188

Item \ Engine	MA12
Valve head diameter "D"	
Intake	35 (1.38)
Exhaust	30 (1.18)
Valve length "L"	
Intake	109.4 - 110.0 (4.3071 - 4.3307)
Exhaust	108.9 - 109.5 (4.2874 - 4.3110)
Valve stem diameter "d"	
Intake	6.970 - 6.985 (0.2744 - 0.2750)
Exhaust	6.945 - 6.960 (0.2734 - 0.2740)
Valve seat angle "α"	
Intake	45°15' - 45°45'
Exhaust	
Valve margin "T" Limit	0.5 (0.020)
Valve stem end surface grinding limit	0.2 (0.008)

Valve clearance	(Hot)	(Cold)
Intake	0.25 (0.0098)	*0.18 (0.007)
Exhaust	0.30 (0.0118)	*0.25 (0.010)

* At ambient temperature 20°C (68°F). After checking valve clearance while engine is cold, also check it when engine is hot to see if it remains within the specified value. If it does not, readjust it.

Valve spring

Free height	mm (in)	46.70 (1.8386)
Pressure height	mm/N (mm/kg, in/lb)	28.5/545.3 (28.5/55.6, 1.122/122.6)
Assembled height	mm/N (mm/kg, in/lb)	37.0/161.8 (37.0/16.5, 1.457/36.4)
Out of square "S"	mm (in)	2.0 (0.079)

Valve guide

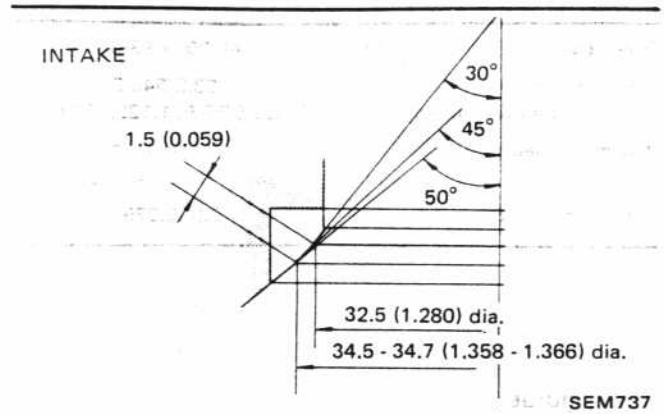
Unit: mm (in)

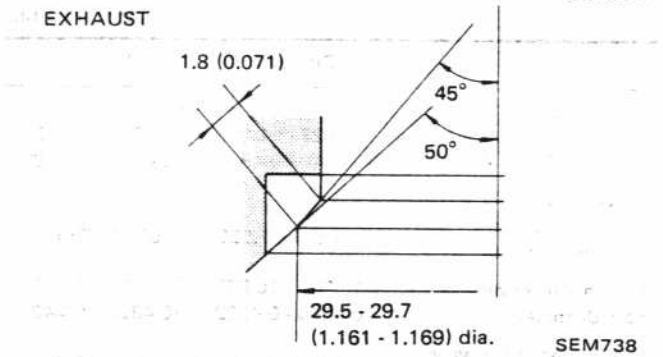
	Standard	Service
Valve guide Outer diameter	11.023 - 11.034 (0.4340 - 0.4344)	11.223 - 11.234 (0.4418 - 0.4423)
Valve guide Inner diameter [Finished size]	7.005 - 7.020 (0.2758 - 0.2764)	
Cylinder head valve guide hole diameter	10.960 - 10.978 (0.4315 - 0.4322)	11.160 - 11.178 (0.4394 - 0.4401)
Interference fit of valve guide	0.045 - 0.074 (0.0018 - 0.0029)	

	Standard	Max. tolerance
Stem to guide clearance		
Intake	0.015 - 0.045 (0.0006 - 0.0018)	0.1 (0.004)
Exhaust	0.045 - 0.075 (0.0018 - 0.0030)	
Valve deflection limit	—	0.2 (0.008)

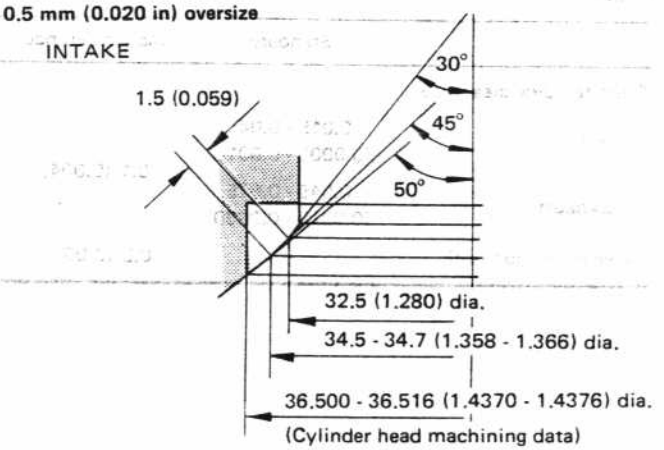
Inspection and Adjustment (Cont'd)

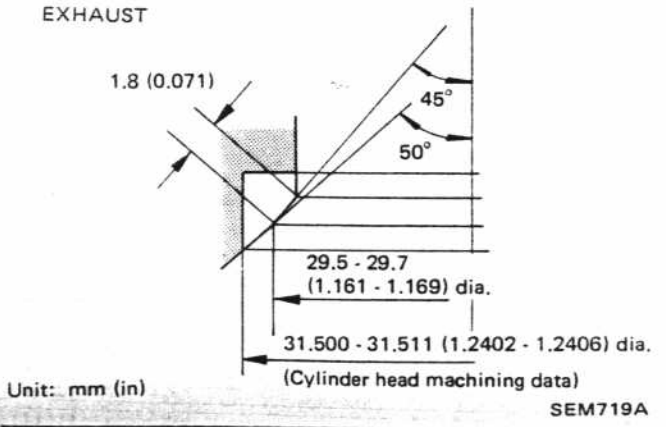
Valve seat





0.5 mm (0.020 in) oversize





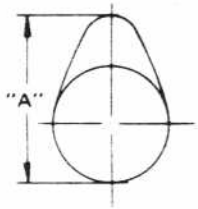
Unit: mm (in)

SEM719A

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (

	Standard	Max. tolerance
Camshaft journal to bearing clearance	0.03 - 0.07 (0.0012 - 0.0028)	0.15 (0.0059)
Inner diameter of camshaft bearing	40.00 - 40.03 (1.5748 - 1.5760)	–
Outer diameter of camshaft journal	39.95 - 39.97 (1.5728 - 1.5736)	–
Camshaft runout [T.I.R*]	Less than 0.02 (0.0008)	0.1 (0.004)
Camshaft end play	0.03 - 0.31 (0.0012 - 0.0122)	–



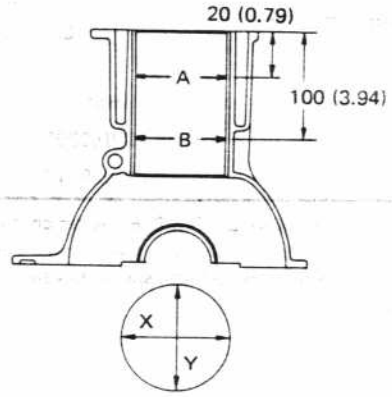
EM67

Cam height "A"	
Intake	33.77 - 34.02 (1.3295 - 1.3394)
Exhaust	33.73 - 33.98 (1.3280 - 1.3378)
Wear limit of cam height	0.2 (0.008)

*T.I.R.: Total indicator reading

CYLINDER BLOCK

Unit: mm



SEM

Surface flatness	
Standard	Less than 0.05 (0.0020)
Limit	0.10 (0.0039)
Cylinder bore	
Inner diamter: Refer to Conversion Table.	
Out-of-round (X-Y)	Less than 0.02 (0.0008)
Taper (A-B)	Less than 0.02 (0.0008)

Inspection and Adjustment (Cont'd)

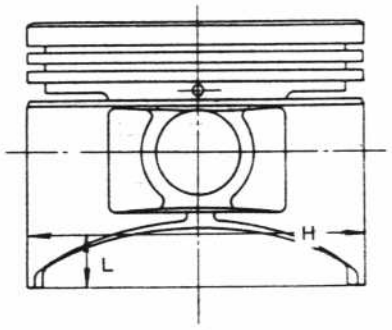
Main journal inner diameter	
Grade No. 0	49.000 - 49.004 (1.9291 - 1.9293)
Grade No. 1	49.004 - 49.008 (1.9293 - 1.9294)
Grade No. 2	49.008 - 49.012 (1.9294 - 1.9296)
Grade No. 3	49.012 - 49.016 (1.9296 - 1.9298)

Difference in inner diameter between cylinders	
Standard	Less than 0.05 (0.0020)
Wear limit	0.20 (0.0079)

PISTON, PISTON RING AND PISTON PIN

Piston

Unit: mm (in)



SEM646

Piston skirt diameter "H"	
Standard	70.967 - 71.017 (2.7940 - 2.7959)
"L" dimension	9 (0.35)
Piston pin hole diameter	17.003 - 17.012 (0.6694 - 0.6698)
Piston clearance to cylinder block	0.023 - 0.043 (0.0009 - 0.0017)

AVAILABLE PISTON: Refer to Conversion Table.

CONVERSION TABLE

Cylinder liner bore — Piston — Piston ring set

	Cylinder liner bore		Piston			Piston ring set	
	Grade number	Bore diameter mm (in)	Grade number	Piston diameter mm (in)	Part number	Part number	Top & 2nd ring identification
Standard	1	71.000 - 71.010 (2.7953 - 2.7957)	1	70.967 - 70.977 (2.7940 - 2.7944)	12010-05B01	12033-05B10	Color: Yellow
	2	71.010 - 71.020 (2.7957 - 2.7961)	2	70.977 - 70.987 (2.7944 - 2.7948)	12010-05B02	12033-05B11	—
	3	71.020 - 71.030 (2.7961 - 2.7965)	3	70.987 - 70.997 (2.7948 - 2.7952)	12010-05B03		
	—	71.030 - 71.040 (2.7965 - 2.7968)	4	70.997 - 71.007 (2.7952 - 2.7955)	12010-05B04		
		71.040 - 71.050 (2.7968 - 2.7972)	5	71.007 - 71.017 (2.7955 - 2.7959)	12010-05B05		
0.20 mm (0.0079 in) oversize	—	71.200 - 71.250 (2.8031 - 2.8051)	—	71.167 - 71.217 (2.8018 - 2.8038)	12010-05B06	12035-05B10	Number: 20

Inspection and Adjustment (Cont'd)

Piston ring

Unit: mm (in)

	Standard	Limit
Side clearance		
Top	0.040 - 0.073 (0.0016 - 0.0029)	0.2 (0.008)
2nd	0.030 - 0.063 (0.0012 - 0.0025)	
Oil	0 - 0.175 (0 - 0.0069)	–
Ring gap		
Top		
No. 1 grade	0.21 - 0.30 (0.0083 - 0.0118)	0.8 (0.031)
No. 2 and 3 grades	0.18 - 0.30 (0.0071 - 0.0118)	
No. 4 and 5 grades	0.18 - 0.36 (0.0071 - 0.0142)	1.0 (0.039)
2nd	0.15 - 0.34 (0.0059 - 0.0134)	0.8 (0.031)
Oil (rail ring)	0.20 - 0.69 (0.0079 - 0.0272)	

AVAILABLE RING SET: Refer to Conversion Table.

Piston pin

Unit: mm (in)

Piston pin outer diameter	16.995 - 17.000 (0.6691 - 0.6693)
Piston pin to piston clearance	0.008 - 0.012 (0.0003 - 0.0005)
Interference fit of piston pin to connecting rod	0.017 - 0.038 (0.0007 - 0.0015)

CONNECTING ROD

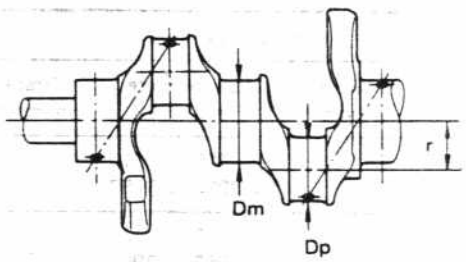
Unit: mm (in)

Center distance	121.5 (4.7835)
Bend, torsion [per 100 (3.94)]	
Limit	0.05 (0.0020)
Piston pin bore dia.	16.962 - 16.978 (0.6678 - 0.6684)
Big end play	
Standard	0.10 - 0.37 (0.0039 - 0.0146)
Limit	0.5 (0.020)

CRANKSHAFT

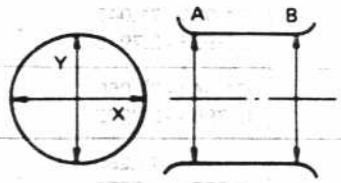
Unit: mm (in)

Main journal dia. "Dm"	
Grade No. 0	44.966 - 44.970 (1.7703 - 1.7705)
Grade No. 1	44.962 - 44.966 (1.7702 - 1.7703)
Grade No. 2	44.958 - 44.962 (1.7700 - 1.7702)
Grade No. 3	44.954 - 44.958 (1.7698 - 1.7700)
Pin journal dia. "Dp"	39.96 - 39.97 (1.5732 - 1.5736)
Center distance "r"	39.0 (1.535)
Out-of-round (X-Y)	
Standard	Less than 0.01 (0.0004)
Taper (A-B)	
Standard	0.002 (0.0001)
Runout [T.I.R.]	
Limit	0.08 (0.0031)
Free end play	
Standard	0.06 - 0.22 (0.0024 - 0.0087)
Limit	0.50 (0.0197)



SEM645

Out-of-round X-Y
Taper A-B



EM715

Inspection and Adjustment (Cont'd)

BEARING

Bearing clearance

Unit: mm (in)

Main bearing clearance	
Standard	0.03 - 0.05 (0.0012 - 0.0020)
Limit	0.075 (0.0030)
Connecting rod bearing clearance	
Standard	0.02 - 0.06 (0.0008 - 0.0024)
Limit	0.12 (0.0047)

AVAILABLE MAIN BEARING

Main bearing (with oil groove)

Grade number	Thickness mm (in)	Part number	Identification color
0	2.000 - 2.004 (0.0787 - 0.0789)	12215 - 01B10	Black
1	2.002 - 2.006 (0.0788 - 0.0790)	12215 - 01B11	Brown
2	2.004 - 2.008 (0.0789 - 0.0791)	12215 - 01B12	Green
3	2.006 - 2.010 (0.0790 - 0.0791)	12215 - 01B13	Yellow
4	2.008 - 2.012 (0.0791 - 0.0792)	12215 - 01B14	Blue
5	2.010 - 2.014 (0.0791 - 0.0793)	12215 - 01B15	Pink
6	2.012 - 2.016 (0.0792 - 0.0794)	12215 - 01B16	Red

Main bearing (without oil groove)

Grade number	Thickness mm (in)	Part number	Identification color
0	2.000 - 2.004 (0.0787 - 0.0789)	12216 - 01B10	Black
1	2.002 - 2.006 (0.0788 - 0.0790)	12216 - 01B11	Brown
2	2.004 - 2.008 (0.0789 - 0.0791)	12216 - 01B12	Green
3	2.006 - 2.010 (0.0790 - 0.0791)	12216 - 01B13	Yellow
4	2.008 - 2.012 (0.0791 - 0.0792)	12216 - 01B14	Blue
5	2.010 - 2.014 (0.0791 - 0.0793)	12216 - 01B15	Pink
6	2.012 - 2.016 (0.0792 - 0.0794)	12216 - 01B16	Red

AVAILABLE CONNECTING ROD BEARING

Connecting rod bearing undersize

Unit: mm (in)

	Crank pin journal diameter "Dp"
Standard	39.96 - 39.97 (1.5732 - 1.5736)
Undersize 0.25 (0.0098)	39.67 - 39.74 (1.5618 - 1.5646)

MISCELLANEOUS COMPONENTS

Unit: mm (in)

Flywheel	
Runout [T.I.R.]	Less than 0.15 (0.0059)

Tightening Torque

TIGHTENING TORQUE

Engine outer parts

Unit	N·m	kg-m	ft-lb
Alternator bracket bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Alternator to adjusting bar bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Alternator to bracket	22 - 29	2.2 - 3.0	16 - 22
Starter motor to transaxle	30 - 40	3.1 - 4.1	22 - 30
Engine to converter housing or clutch housing	16 - 21	1.6 - 2.1	12 - 15
Clutch cover fixing bolt	22 - 29	2.2 - 3.0	16 - 22
Engine mounting bracket to cylinder block	Refer to EM-19		
Engine mounting bracket to cylinder head	Refer to EM-19		
Fuel pump attaching nut	9 - 12	0.9 - 1.2	6.5 - 8.7
Intake & exhaust manifold nut	16 - 21	1.6 - 2.1	12 - 15
Spark plug	20 - 29	2.0 - 3.0	14 - 22
Crank pulley bolt	83 - 93	8.5 - 9.5	61 - 69
Water outlet	5 - 8	0.5 - 0.8	3.6 - 5.8
Carburetor	6 - 8	0.6 - 0.8	4.3 - 5.8
Gusset to engine	30 - 40	3.1 - 4.1	22 - 30
Gusset to transaxle	16 - 21	1.6 - 2.1	12 - 15
Engine to transaxle	16 - 21	1.6 - 2.1	12 - 15
Oil pressure switch	12.3 - 17.2	1.25 - 1.75	9.0 - 12.7

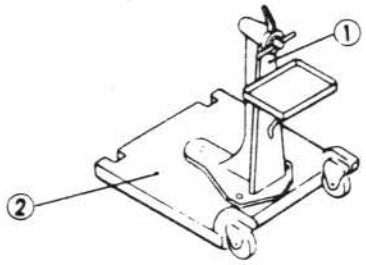
Engine internal parts

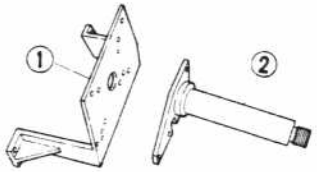
Unit	N·m	kg-m	ft-lb
Camshaft pulley bolt	9 - 12	0.9 - 1.2	6.5 - 8.7
Connecting rod nut	29 - 34	3.0 - 3.5	22 - 25
Cylinder head bolt*1	64 - 69	6.5 - 7.0	47 - 51
Dust cover	4 - 5	0.4 - 0.5	2.9 - 3.6
Flywheel bolt	59 - 69	6.0 - 7.0	43 - 51
Drive plate bolt	69 - 78	7.0 - 8.0	51 - 58
Main bearing cap bolt*2	46 - 52	4.7 - 5.3	34 - 38
Oil pan bolt	5 - 7	0.5 - 0.7	3.6 - 5.1
Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35
Oil pump securing bolt	18 - 22	1.8 - 2.2	13 - 16
Oil strainer bolt	6 - 8	0.6 - 0.8	4.3 - 5.8
Rocker shaft bolt	18 - 21	1.8 - 2.1	13 - 15
Tensioner lock nut	15 - 17	1.5 - 1.7	11 - 12
Rocker cover nut	3 - 5	0.3 - 0.5	2.2 - 3.6
Rocker arm lock nut	11 - 15	1.1 - 1.5	8 - 11
Oil pump idler gear securing bolt	6 - 7	0.6 - 0.7	4.3 - 5.1
Water pump bolt	4 - 5	0.4 - 0.5	2.9 - 3.6
Rear oil seal retainer	4 - 5	0.4 - 0.5	2.9 - 3.6

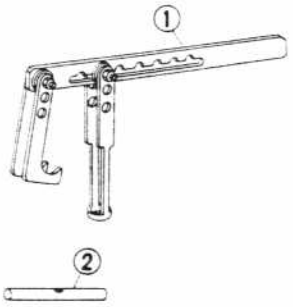
*1 Tighten after referring to EM-16.
*2 Tighten or loosen in two or three stages.

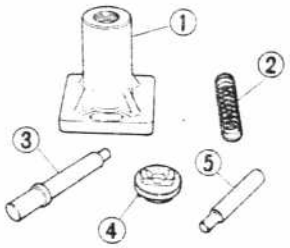
SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
ST0501S000 (–)	Engine stand assembly
① ST05011000 (–)	Engine stand
② ST05012000 (–)	Base
① KV10109400 (–)	Sub attachment
② KV10102500 (–)	Engine attachment (The same tool used on A-series engine)
KV101092S0 (–)	Valve spring compressor
① KV10109210 (–)	Compressor
② KV10109220 (–)	Adapter
① KV10109500 (–)	Valve lip seal drift attachment
② KV10107500 (–)	Valve lip seal drift
KV10109800 (–)	Piston pin press stand assembly
① ST13040020 (–)	Stand
② ST13040030 (–)	Spring
③ KV10109710 (–)	Center shaft
④ KV10109720 (–)	Cap
⑤ KV10109730 (–)	Drift

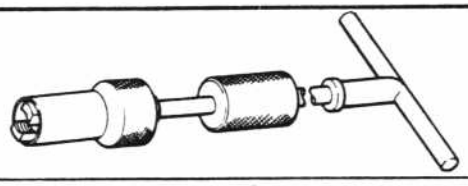
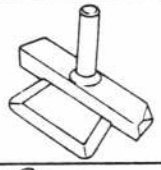
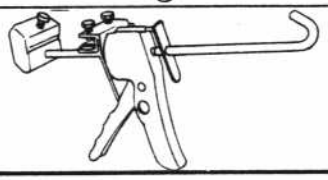








SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV10107900 (–)	Valve lip seal puller 
KV10111100 (–)	Seal cutter 
WS39930000 (–)	Tube presser 

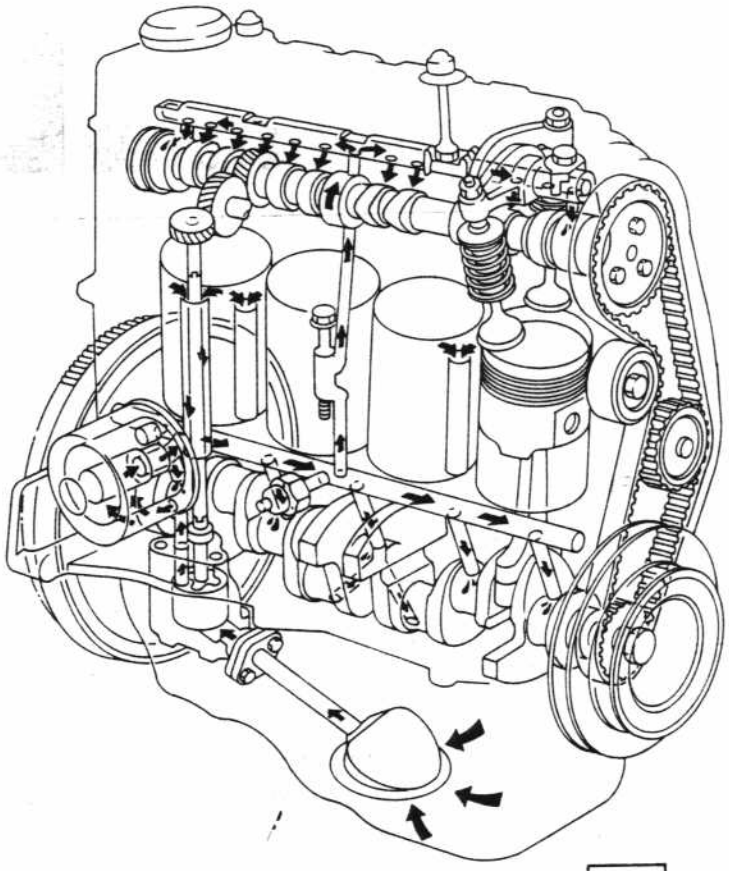
ENGINE LUBRICATION & COOLING SYSTEMS

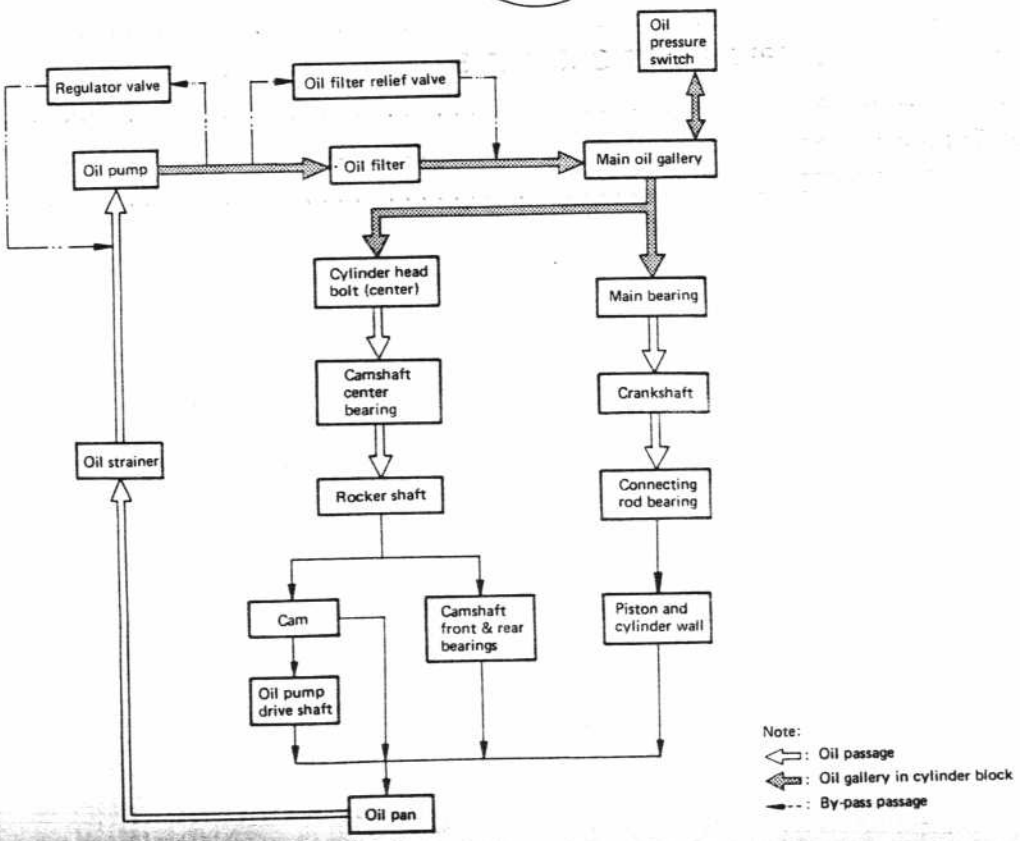
SECTION LC

CONTENTS

ENGINE LUBRICATION SYSTEM

Lubrication Circuit



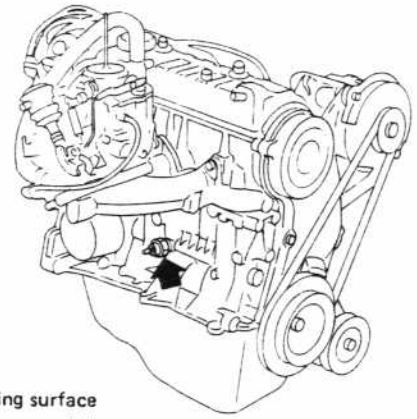


SLC4

On-vehicle Service

OIL PRESSURE CHECK

1. Warm up engine.
2. Stop engine and remove oil pressure switch.

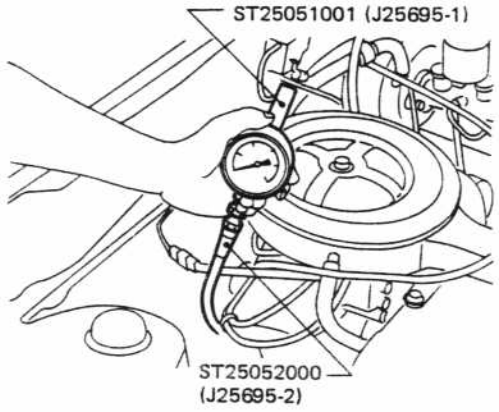


To mating surface
Oil pressure switch:
12.3 - 17.2 N·m (1.25 - 1.75 kg-m, 9.0 - 12.7 ft-lb)

SLC451

3. Install pressure gauge.
4. Start engine and check oil pressure with engine running under no-load.

Engine rpm	Discharge pressure kPa (kg/cm^2, psi)
1,200	196 (2, 28)
2,000	294 (3, 43)
4,000	392 (4, 57)



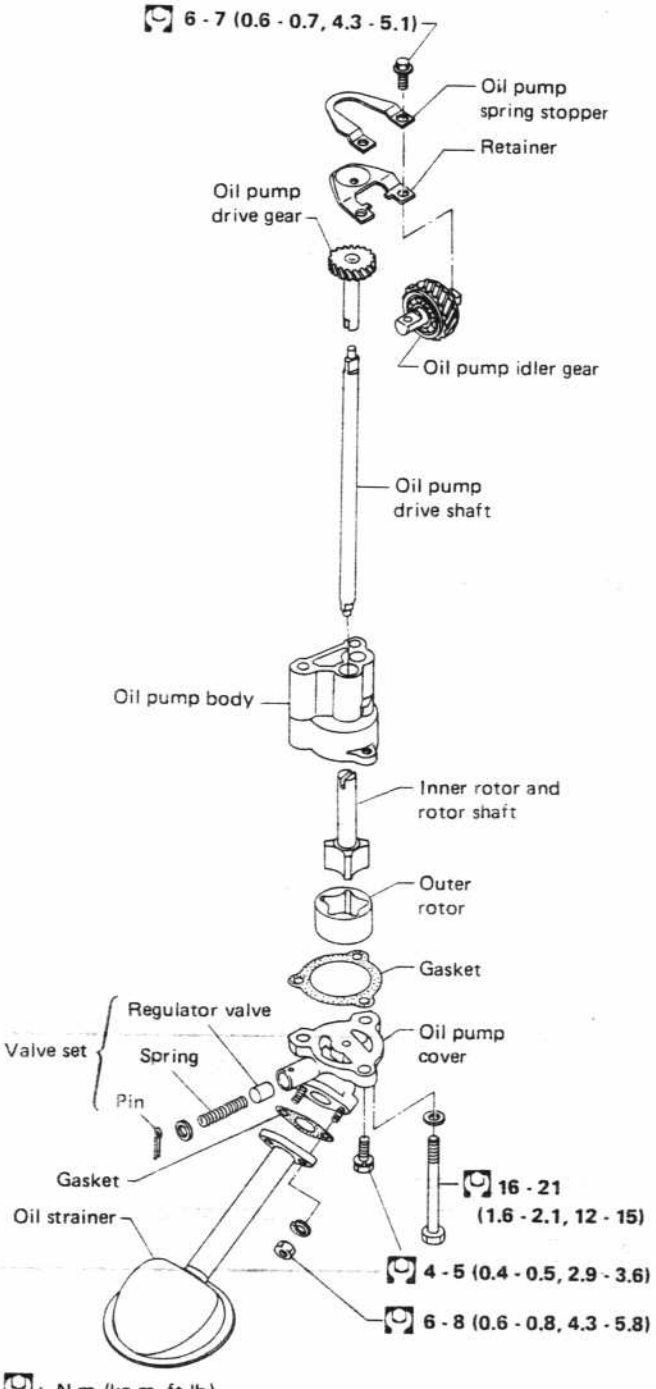
SLC452

The above table shows data tested when SAE 10W-30 oil is used and oil temperature is between 77 and 83°C (171 and 181°F). Slight difference will be found because of oil viscosity or oil temperature. If difference is extreme, check oil passage and oil pump for oil leaks.

Oil Pump

REMOVAL AND INSTALLATION

When removing oil pump, be careful not to drop oil pump drive shaft. When installing oil pump, apply engine oil to drive gear and shaft. Inner rotor and shaft cannot be disassembled. Always use new gasket.



: N·m (kg-m, ft-lb)

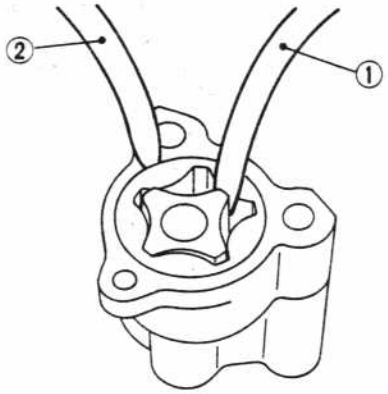
SLC794

INSPECTION

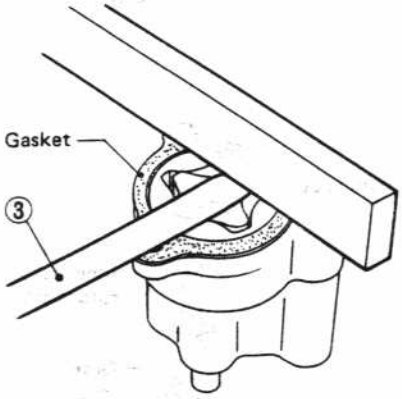
1. Visually inspect components for wear and damage.
2. Check oil pressure regulator valve sliding surface and valve spring.

If damaged, replace valve set.

3. Using a feeler gauge, check the following clearances.



SLC454



SLC455

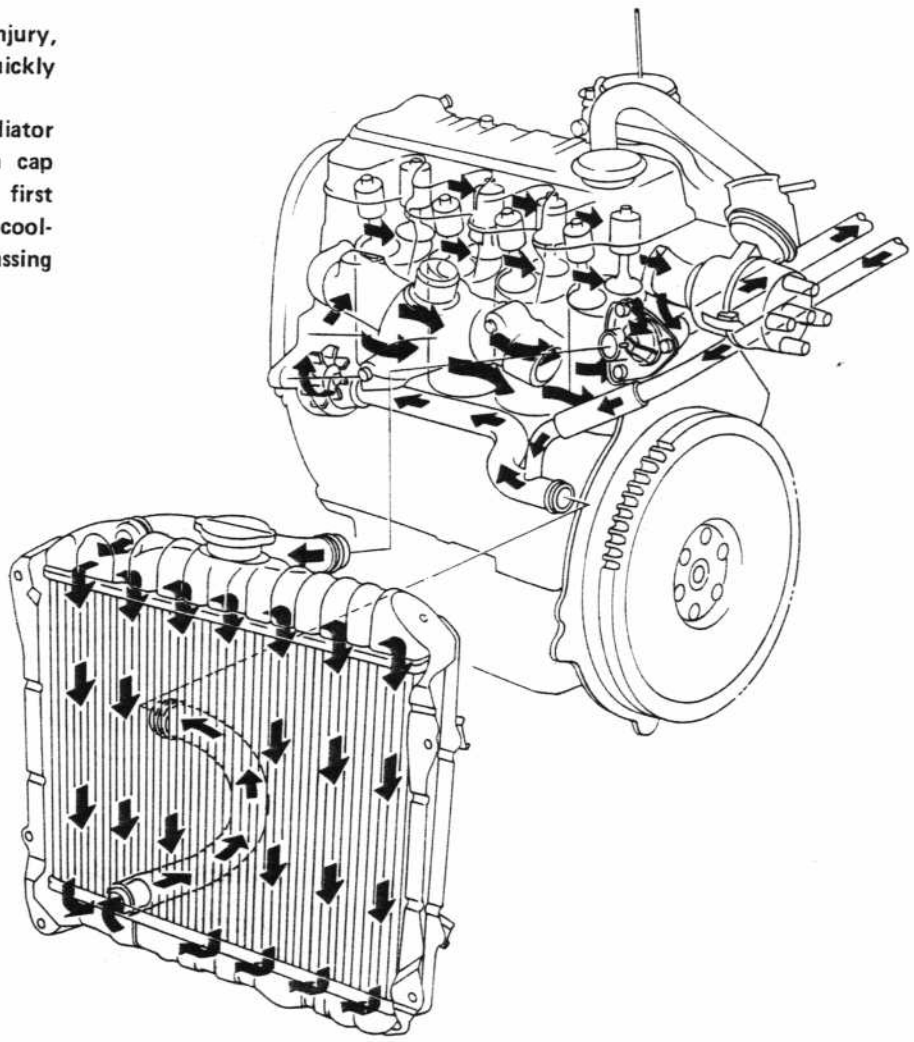
Unit: mm (in)

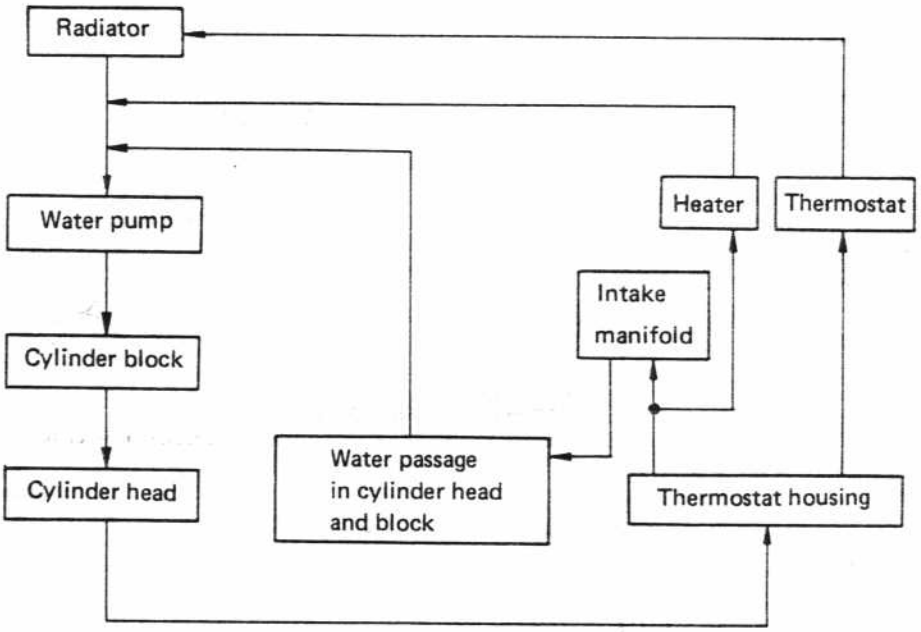
Rotor tip clearance ①	Less than 0.2 (0.008)
Outer rotor to body clearance ②	Less than 0.25 (0.0098)
Rotor to straight edge (Side clearance with gasket) ③	Less than 0.2 (0.008)

ENGINE COOLING SYSTEM

Cooling Circuit

WARNING:
To avoid serious personal injury, never remove radiator cap quickly when engine is hot.
If it is necessary to remove radiator cap when radiator is hot, turn cap slowly counterclockwise to the first stop. After all pressure in the cooling system is released, turn cap passing the stop and remove it.



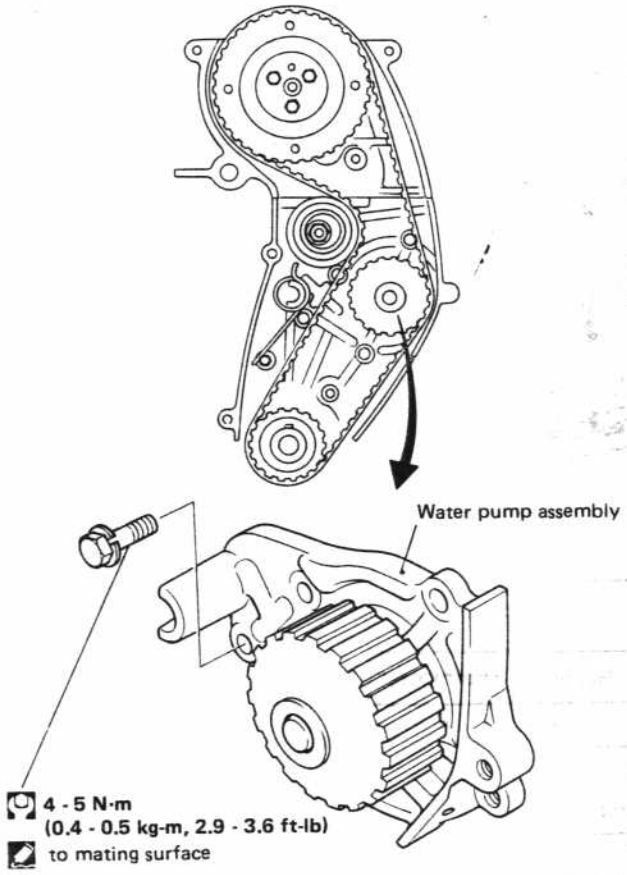


SLC561

Water Pump

REMOVAL AND INSTALLATION

- When removing water pump assembly, be careful not to get water on the adjacent part of the timing belt.
- Check for excessive end play and rough operation.
- The water pump cannot be disassembled and should be replaced as a unit.
- Bolt holes are drilled through water jackets in cylinder block. Do not forget to use a sealant and tighten the bolts.
- After installation, run engine for a few minutes, and check for leaks.



SLC795

Radiator

INSPECTION

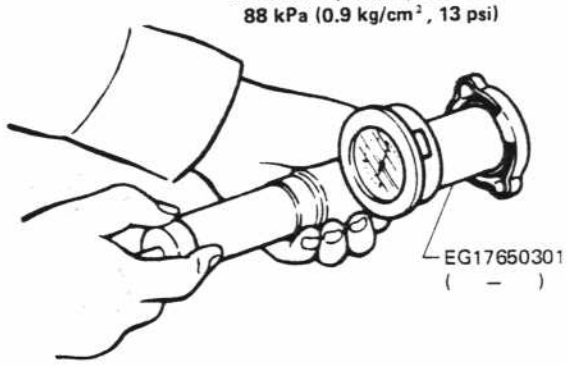
Checking cooling system hoses

Check hoses for proper attachment, leaks cracks, damage, loose connections, chafing and deterioration.

Checking radiator cap

Apply pressure to radiator cap by means of a cap tester to see if it is satisfactory.

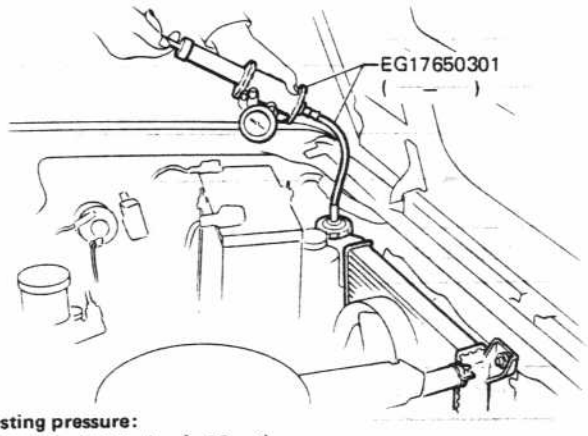
Radiator cap relief pressure:
88 kPa (0.9 kg/cm², 13 psi)



ET01

Checking cooling system for leaks

Apply pressure to the cooling system by means o a tester to check for leakage.

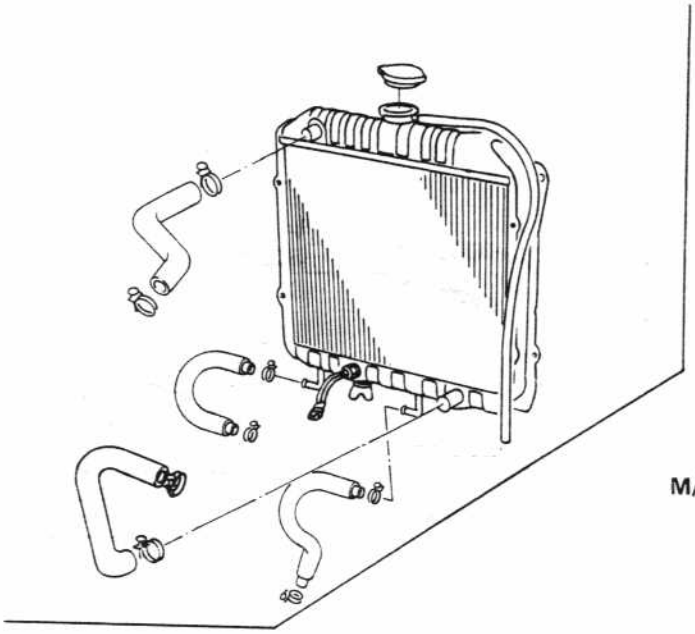


Testing pressure:
157 kPa (1.6 kg/cm², 23 psi)
CAUTION: Higher than the specified pressure may cause radiator damage.

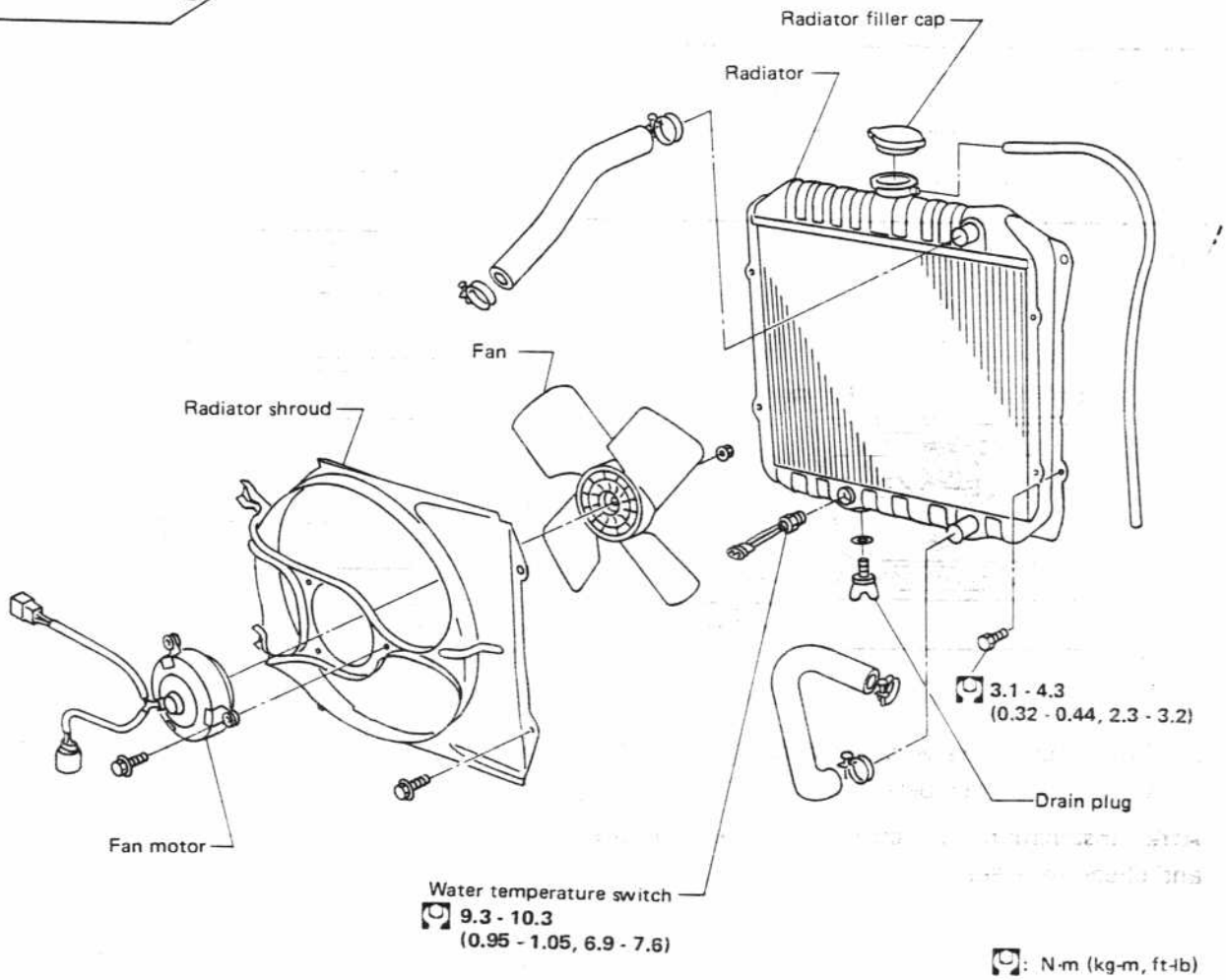
SMA50

Radiator (Cont'd)

A/T models



M/T models

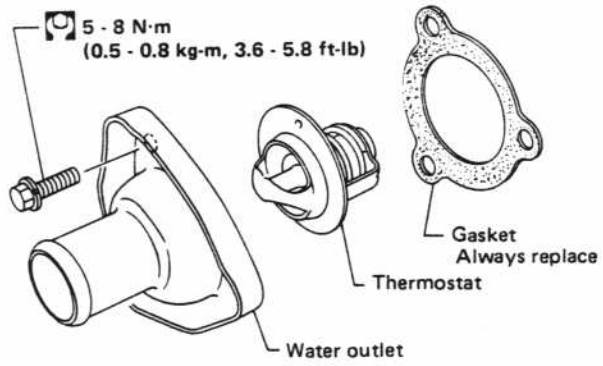


: N·m (kg-m, ft-lb)

SLC798

Thermostat

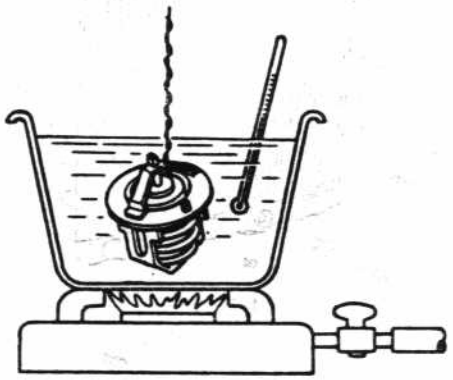
INSPECTION



SLC458

1. Check for valve seating condition at ordinary temperatures. It should seat tightly.
2. Check valve opening temperature and maximum valve lift.

Valve opening temperature °C (°F)	88 (190)
Max. valve lift mm/°C (in/°F)	8/100 (0.31/212)



SLC343

3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

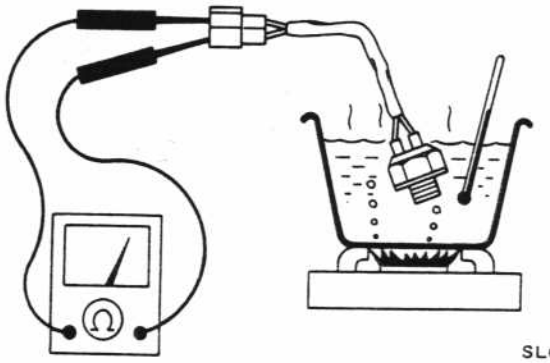
After installation, run engine for a few minutes, and check for leaks.

Electric Cooling Fan

INSPECTION

Check water temperature switch for proper operation.

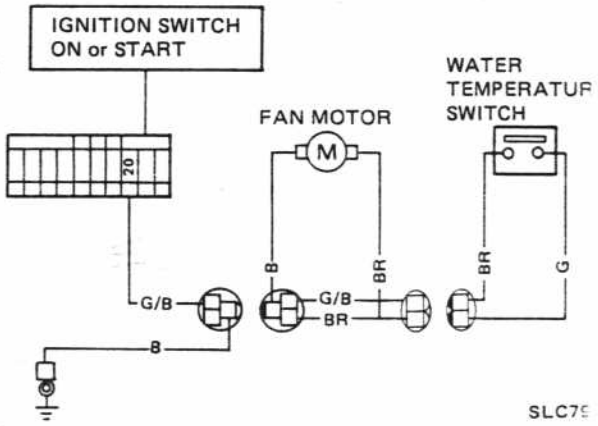
Operating temperature:
OFF → ON 90°C (194°F)



SLC46

: 9.3 - 10.3 N·m
(0.95 - 1.05 kg-m, 6.9 - 7.6 ft-lb)

WIRING DIAGRAM



SLC79

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Engine Lubrication System

Oil pressure check

Engine rpm	Discharge pressure kPa (kg/cm², psi)
1,200	196 (2, 28)
2,000	294 (3, 43)
4,000	392 (4, 57)

Oil pump unit

Unit: mm (in)

Rotor tip clearance ①	Less than 0.2 (0.008)
Outer rotor to body clearance ②	Less than 0.25 (0.0098)
Rotor to straight edge (Side clearance with gasket) ③	Less than 0.2 (0.008)

Tightening torque

Unit	N·m	kg-m	ft-lb
Oil pump securing bolt	16 - 22	1.6 - 2.2	12 - 16
Oil pump cover bolt (M6)	4 - 5	0.4 - 0.5	2.9 - 3.6
Oil pump gear spring securing bolt	6 - 7	0.6 - 0.7	4.3 - 5.1
Oil strainer nut	6 - 8	0.6 - 0.8	4.3 - 5.8
Oil pressure switch	12.3 - 17.2	1.25 - 1.75	9.0 - 12.7

Engine Cooling System

Radiator

Unit: kPa (kg/cm², psi)

Cap relief pressure	88 (0.9, 13)
Leakage test pressure	157 (1.6, 23)

Thermostat

Valve opening temperature °C (°F)	88 (190)
Max. valve lift mm/°C (in/°F)	8/100 (0.31/212)

Water temperature switch

Operating temperature OFF → ON °C (°F)	90 (194)

Tightening torque

Unit	N·m	kg-m	ft-lb
Water pump securing bolt	4 - 5	0.4 - 0.5	2.9 - 3.6
Water outlet securing bolt	5 - 8	0.5 - 0.8	3.6 - 5.8
Radiator securing bolt	3.1 - 4.3	0.32 - 0.44	2.3 - 3.2
Water temperature switch	9.3 - 10.3	0.95 - 1.05	6.9 - 7.6

SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.)	Tool name	
EG17650301 (–)	Radiator cap tester adapter	

ENGINE FUEL & EMISSION CONTROL SYSTEM

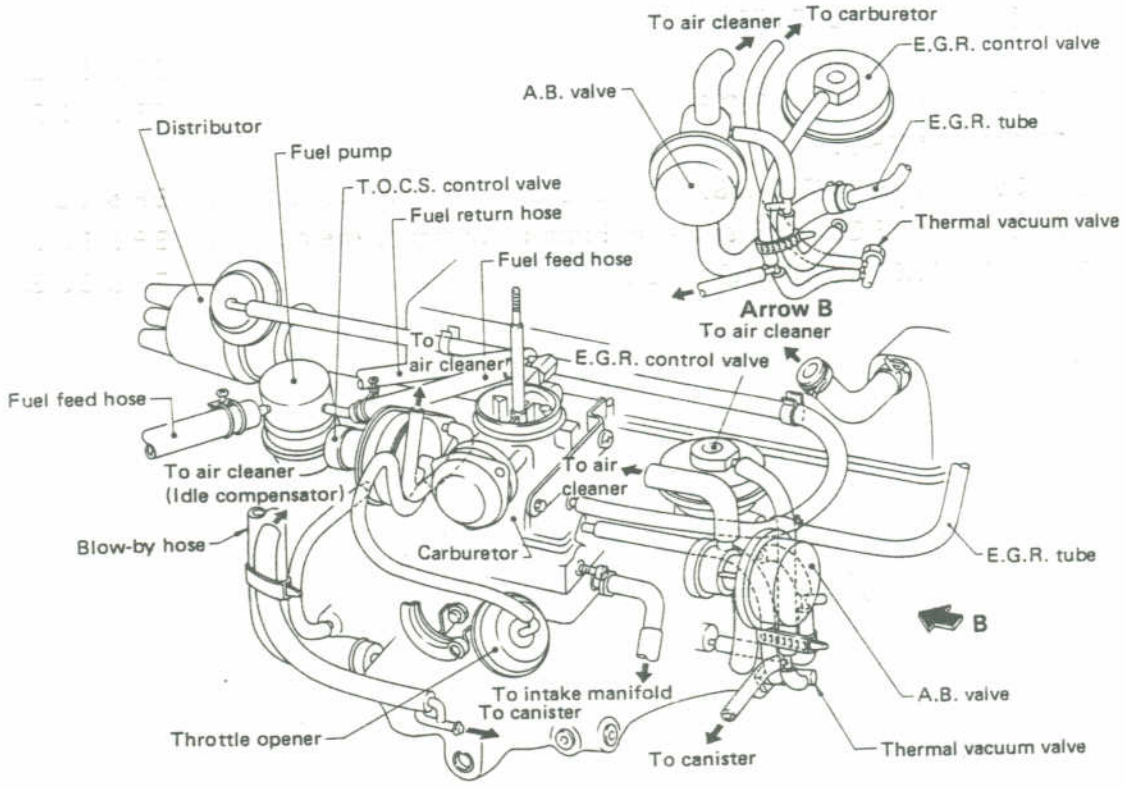
SECTION EF & EC

EF & EC

CONTENTS

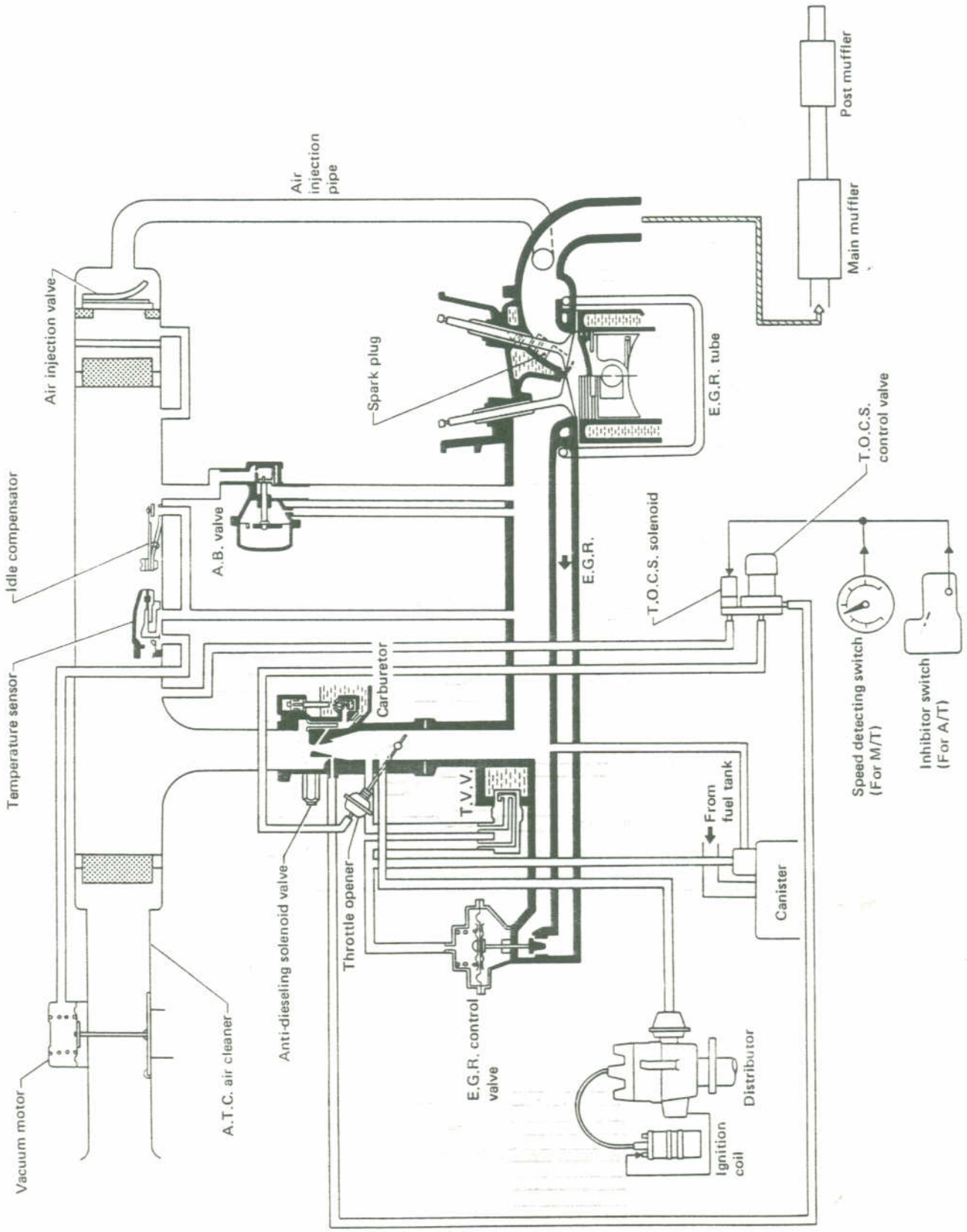
ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

System		Major unit
Engine fuel system	Air inlet system	• A.T.C. air cleaner • Idle compensator • Air temperature sensor
	Automatic choke	• P.T.C. heater
	Idle speed control system	• Idle speed control solenoid • Lighting switch • Rear defogger switch
Crankcase emission control system		• P.C.V. valve
Exhaust emission control system	Air injection valve system (A.I.V.)	• Air injection valve (1 valve) • Air injection pipe (1 pipe) • A.B. valve
	E.G.R. control system	• E.G.R. control valve • Thermal vacuum valve (2-port bimetal type)
	Throttle opener control system	• Throttle opener servo diaphragm • Throttle opener solenoid valve • Vacuum control valve • Speed detecting switch and amplifier (M/T) • Inhibitor switch (A/T)
Evaporative emission control system		• Carbon canister



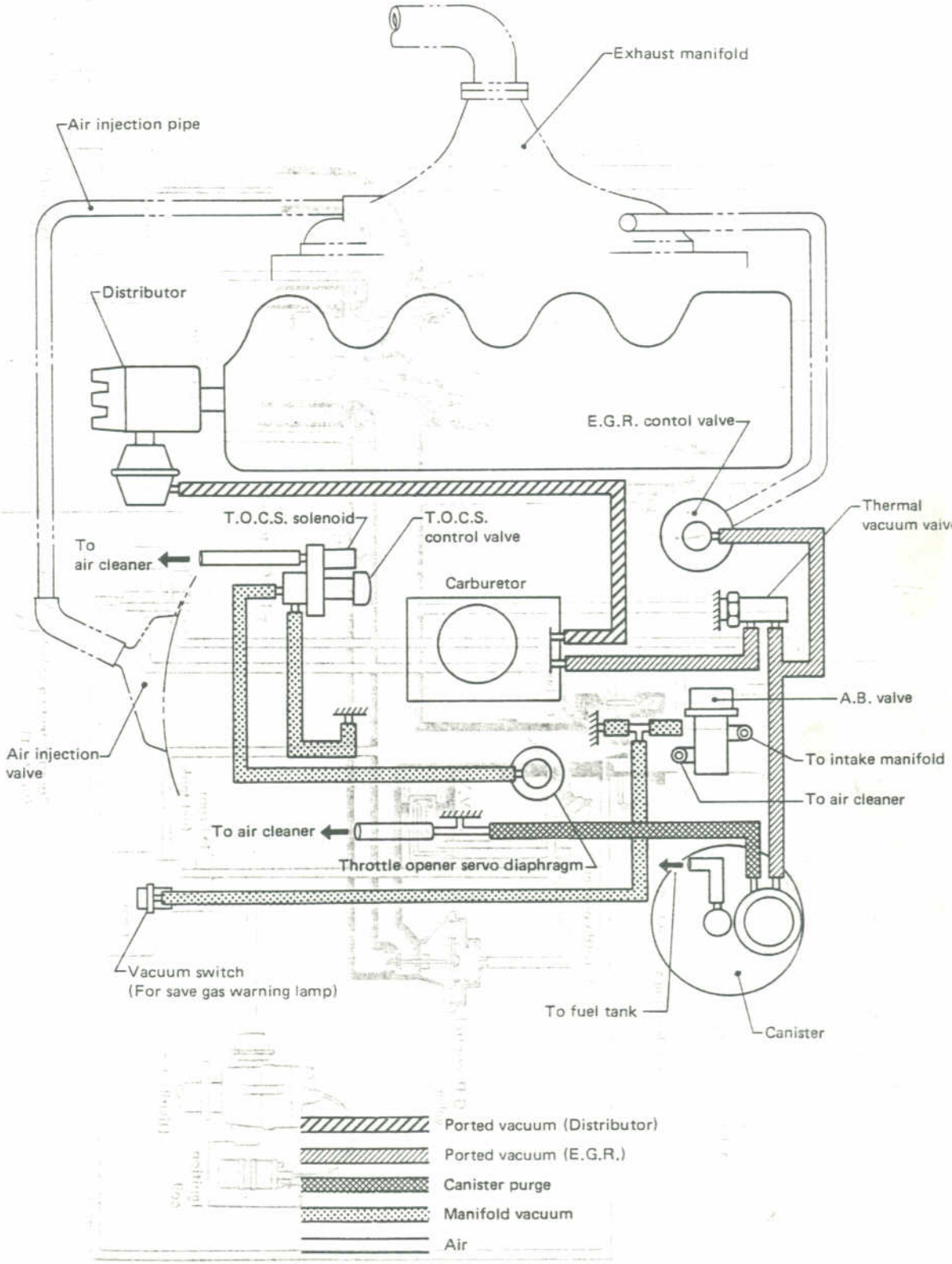
SEC53

ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM



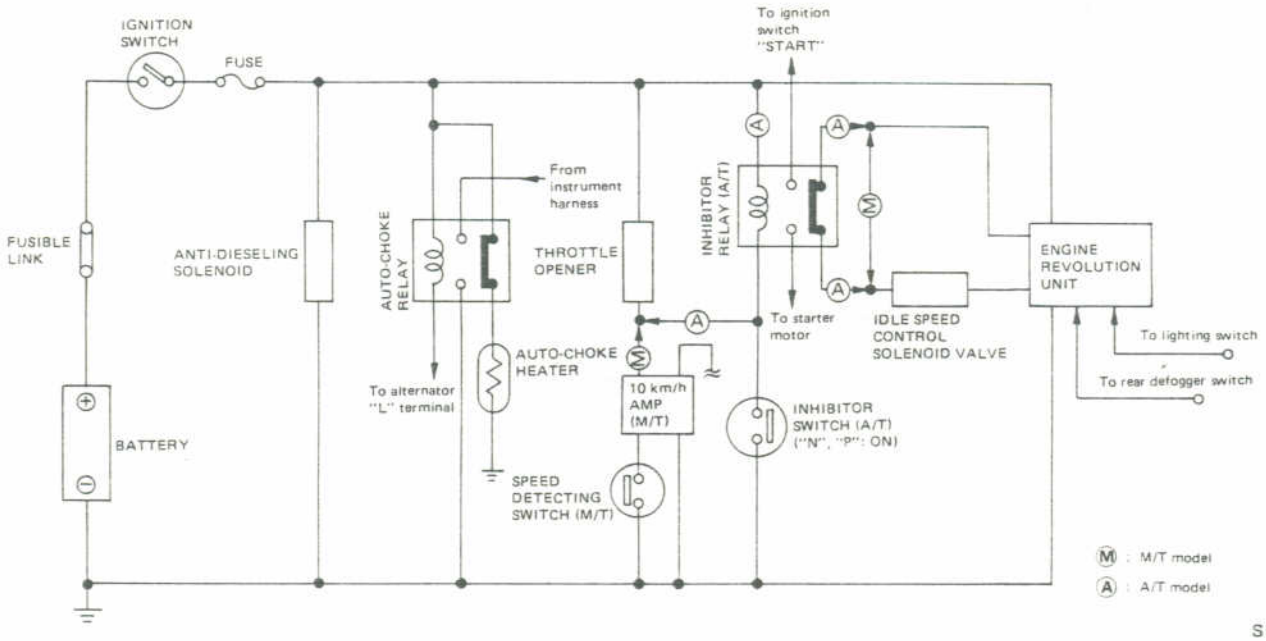
SEF323B

ENGINE AND EMISSION CONTROL SYSTEM VACUUM DIAGRAM

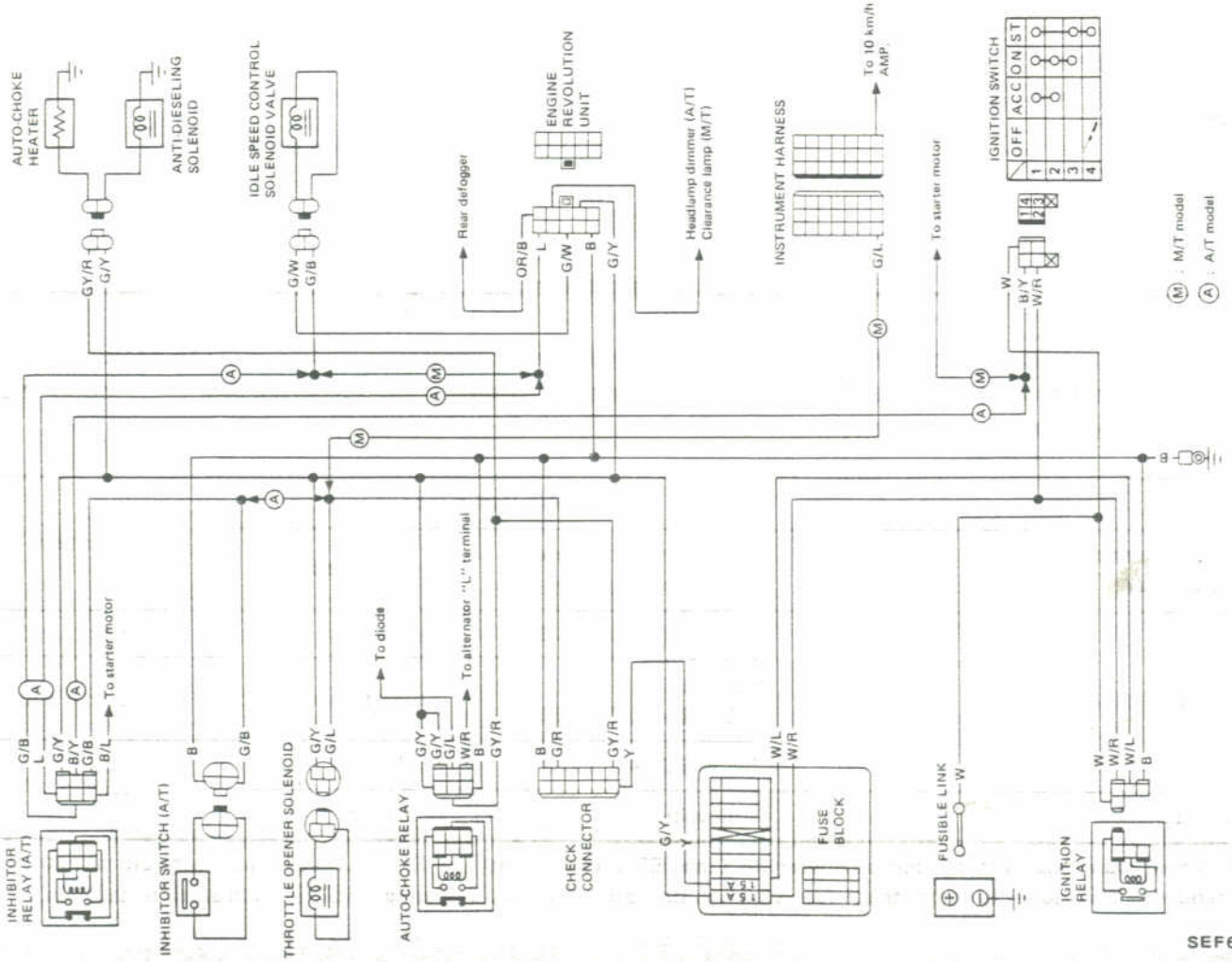


ELECTRICAL CIRCUIT DIAGRAM

Electrical Circuit of Emission Control System

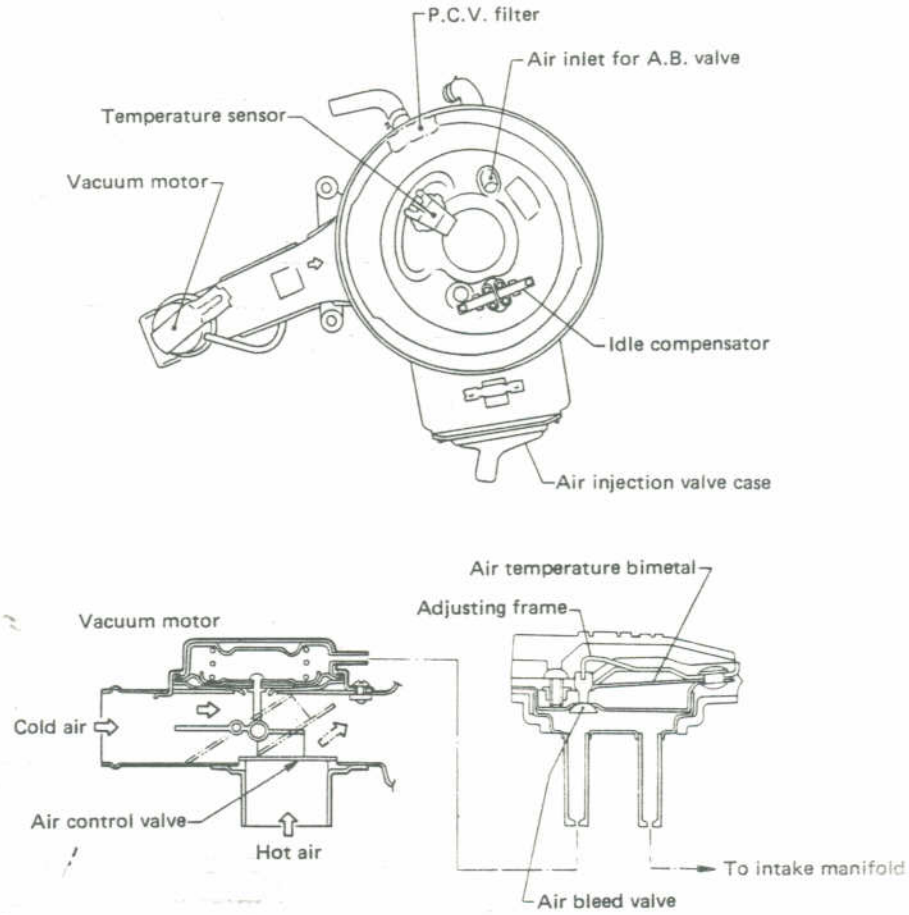


SEF045D



SEF607E

AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER



SEF32

Operation

The automatic temperature control system of the air cleaner is controlled by the inlet air temperature ar the load condition of the engine. The inlet air temperature is detected by the sensor, and the vacuum moto is actuated by the engine intake vacuum.

Temperature sensor		Vacuum motor		Inlet air
Ambient temperature around sensor °C (°F)	Operation	Intake manifold vacuum kPa (mmHg, inHg)	Operation	
Below 38 (100)	Close	Above 21.3 (160, 6.30)	Raise	Hot
		5.3 - 21.3 (40 - 160, 1.57 - 6.30)	Partially raise	Cold + Hot
		Below 5.3 (40, 1.57)	Down	Cold
Above 53 (127)	Open	Any value	Down	

The temperature sensor partially opens between 38°C and 53°C (100°F and 127°F) so that the intake manifold vacuum may be reduced. This causes the motor to activate, which in turn opens the cold air passage wide, for cold air to be taken in.

AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

Inspection

AIR CLEANER FILTER

Viscous paper type air cleaner filter does not require any cleaning operation until it is replaced periodically. Brushing or blasting operation will cause clogging and result in enrichment of carburetor mixture, and should never be conducted.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

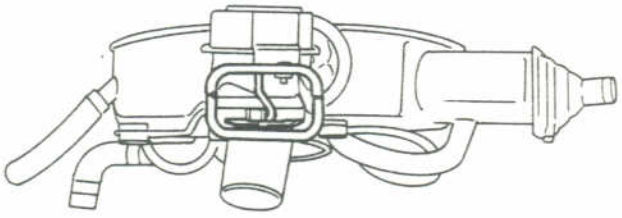
- Engine stall or hesitation
- Increase in fuel consumption
- Lack of power

If these phenomena should occur, check A.T.C. system before carrying out inspection of carburetor.

1. Check hoses for cracks, distortion and improper position.
2. Check A.T.C. system for proper function, while engine is cold. Check air control valve position.

Air control valve is correct if it is in lower position.

3. Start engine and immediately check air control valve position. If it rises, it is correct.



SEF328B

4. Make sure that air control valve rises and lowers when engine speed is quickly increased and decreased.
5. Make sure that air control valve partially rises when engine warm-up advances.

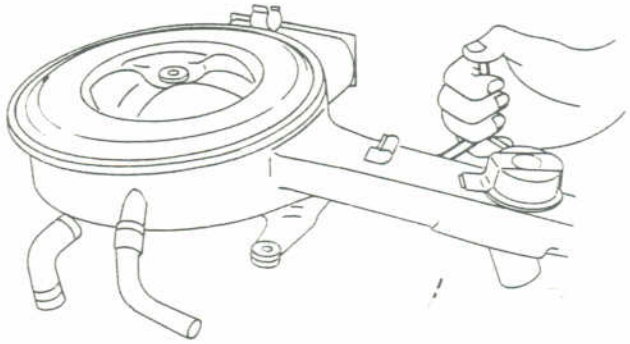
If the above test reveals any problem in the operation of air control valve, carry out the following test:

VACUUM MOTOR

Disconnect vacuum motor inlet vacuum hose, and connect another hose to the inlet to apply vacuum to vacuum motor. Then, confirm that the air control valve moves.

TEMPERATURE SENSOR

While engine is cold and idling, disconnect vacuum motor inlet vacuum hose and make sure that intake vacuum is present at end of vacuum hose. If vacuum is weak or is not present at all, check vacuum hoses for leakage. Replace temperature sensor if vacuum hoses are in good order.



SEF329B

IDLE COMPENSATOR

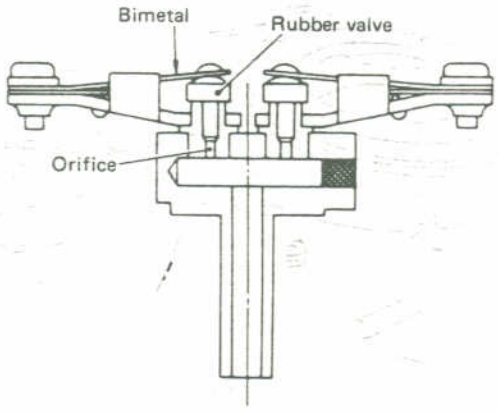
Description

The idle compensator is basically a thermostatic valve which functions to introduce the air directly from the air cleaner to the intake manifold to compensate for abnormal enrichment of mixture in high idle temperature.

The bimetal attached to the idle compensator detects the temperature of intake air, and opens or closes the valve. Two idle compensators having different temperature characteristics are installed.

Idle compensator opening temperature

No. 1	60 - 70°C (140 - 158°F)
No. 2	70 - 80°C (158 - 176°F)



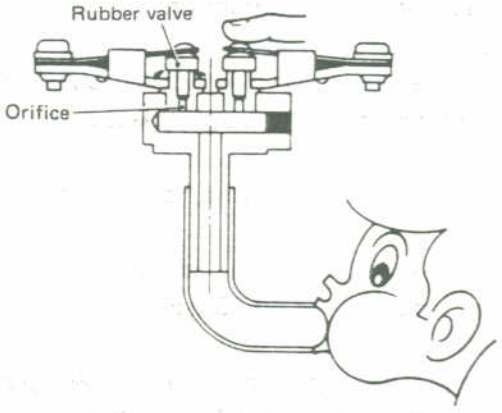
EF222

Inspection

1. Check that valve is in closed position when bimetal temperature is lower than operating temperature. To check, breathe air into tube or suck air.

If excessive air leakage is found at the valve replace idle compensator as an assembly.

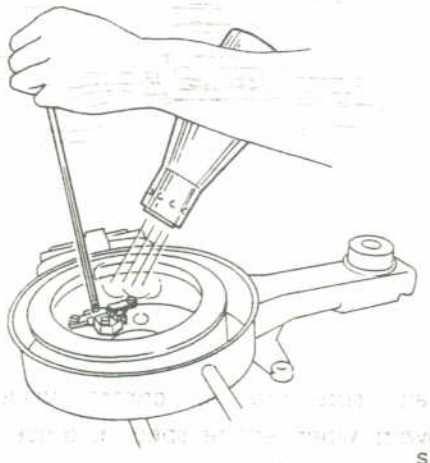
Note that two idle compensators are mounted to air cleaner, and that it is necessary to plug the valve of one of these idle compensators so as to prevent air leak while checking the other one.



EF2

2. Warm up engine.
3. Direct warm air to idle compensator.

And measure operating temperature of idle compensator.



SEF3

Place thermometer as close as possible to idle compensator sensor.

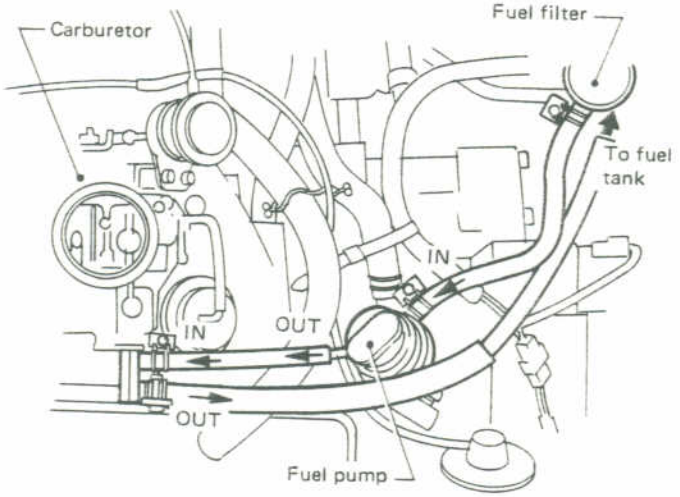
4. Idle compensator is in good order if a "hissing sound is heard when its temperature reaches operating temperature.

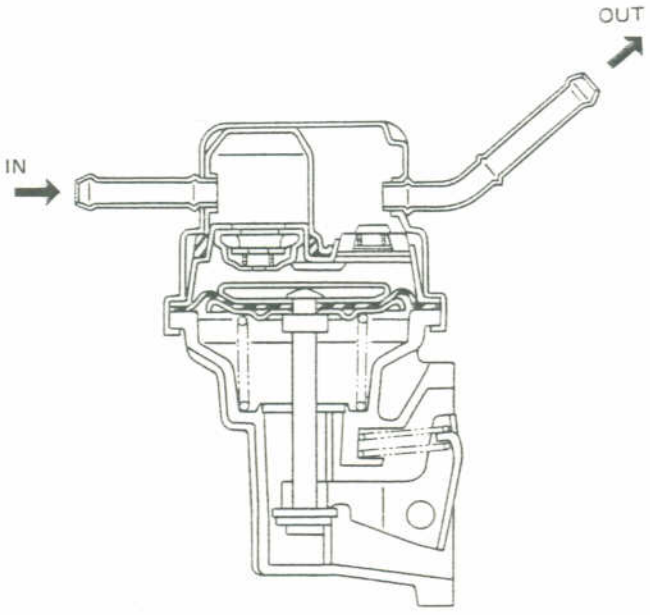
FUEL PUMP

Operating Test

WARNING:
Before starting to work on any part of fuel system, disconnect ground cable from battery.

The fuel pump can not be disassembled.





SEF863A

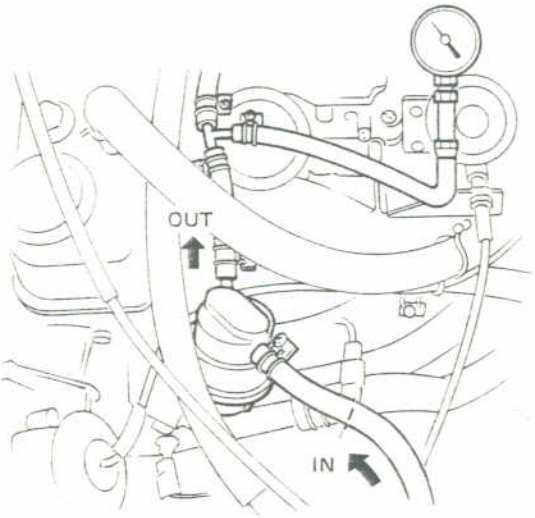
When disconnecting fuel hoses, use a container to receive fuel remaining in fuel hoses.

STATIC PRESSURE TEST

1. Connect T-connector and a suitable pressure gauge.
2. Check static fuel pressure with engine running at various speeds.

   Fuel pump static pressure:
   19.6 - 26.5 kPa
   (0.20 - 0.27 kg/cm^2, 2.8 - 3.8 psi)

If out of specification, replace fuel pump.



SEF864A

Inspection

1. Flush pump by immersing it in a fuel bath and operating rocker arm a number of times.
2. Drain fuel from fuel pump. Then block off the inlet port and check that pump arm does not move.

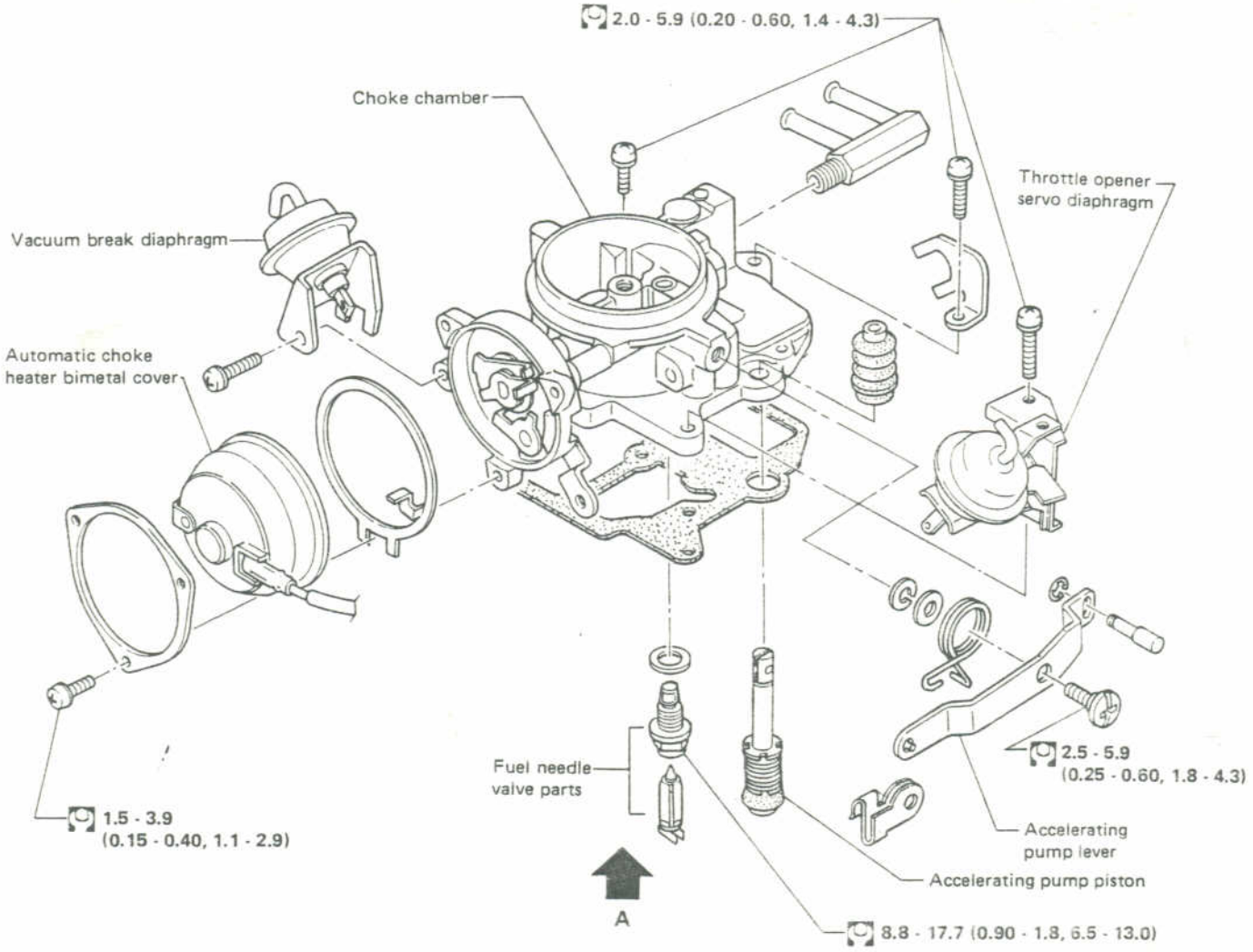
SEF881A

3. Remove your finger from the inlet port and listen for a suction sound which will confirm that a sufficient suction was produced.
4. Block off outlet port and once again operate the rocker arm. After air pressure has been built up, confirm that the pressure remains for two or three seconds after.

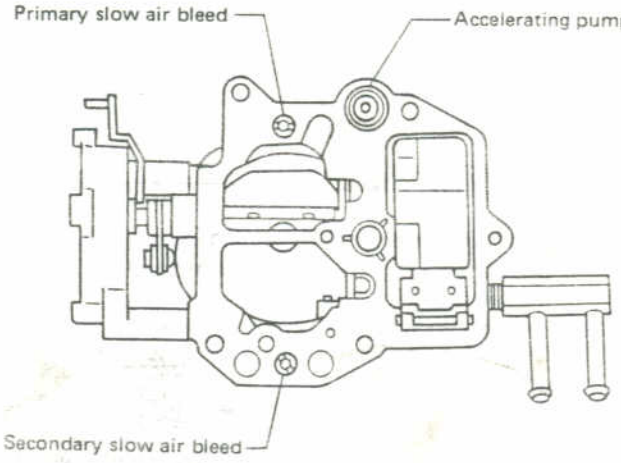
SEF867A

5. Put a finger over the outlet port and again build up pressure in the pump. Then submerse the pump in a fuel bath and check for air leaks.

Choke chamber parts



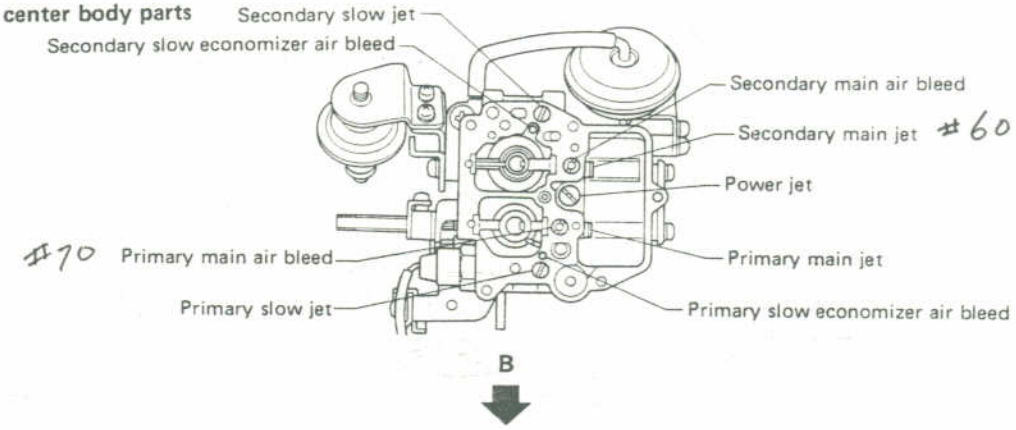
Arrow A

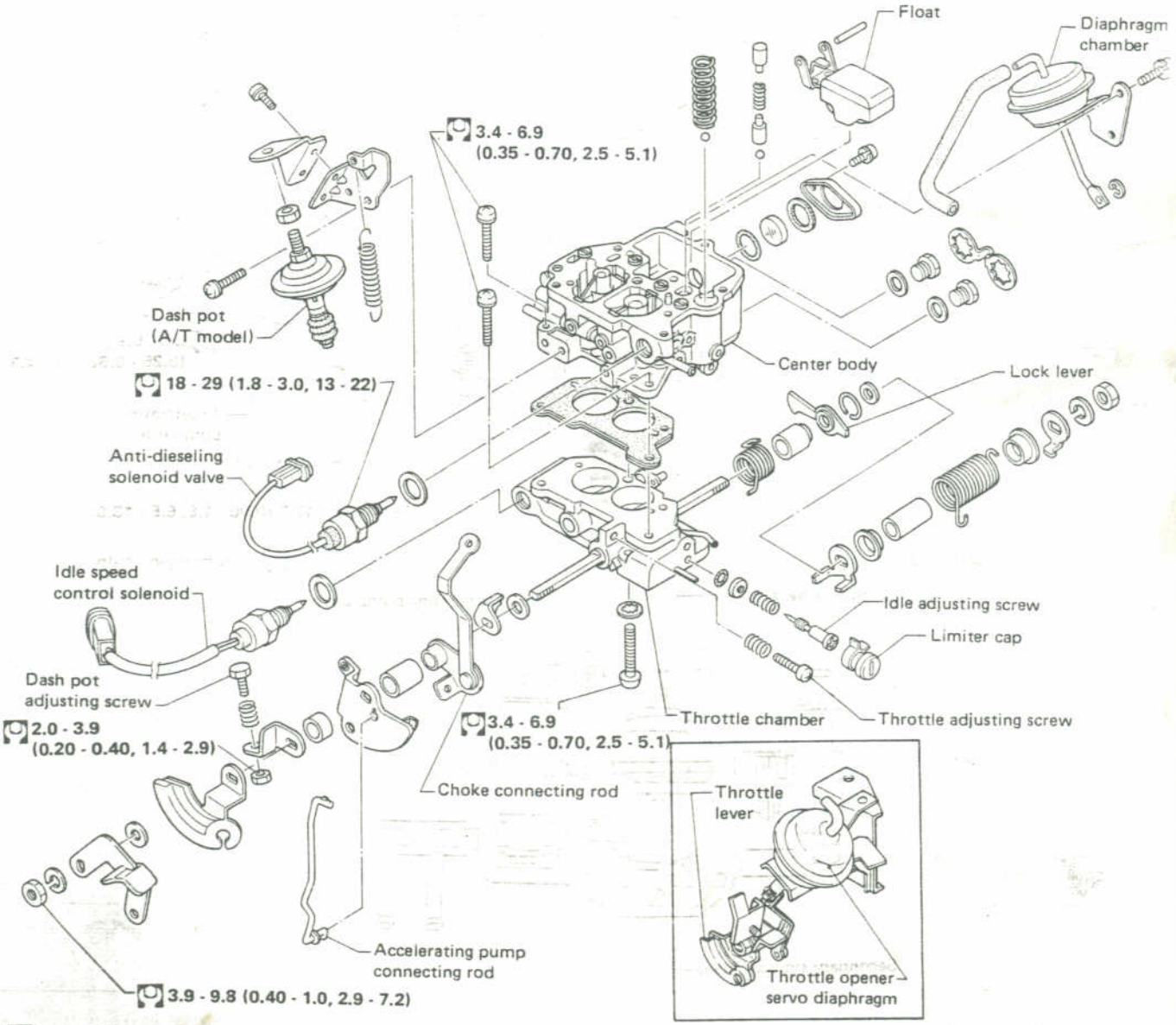


SEF046D

Throttle chamber and center body parts

Arrow B

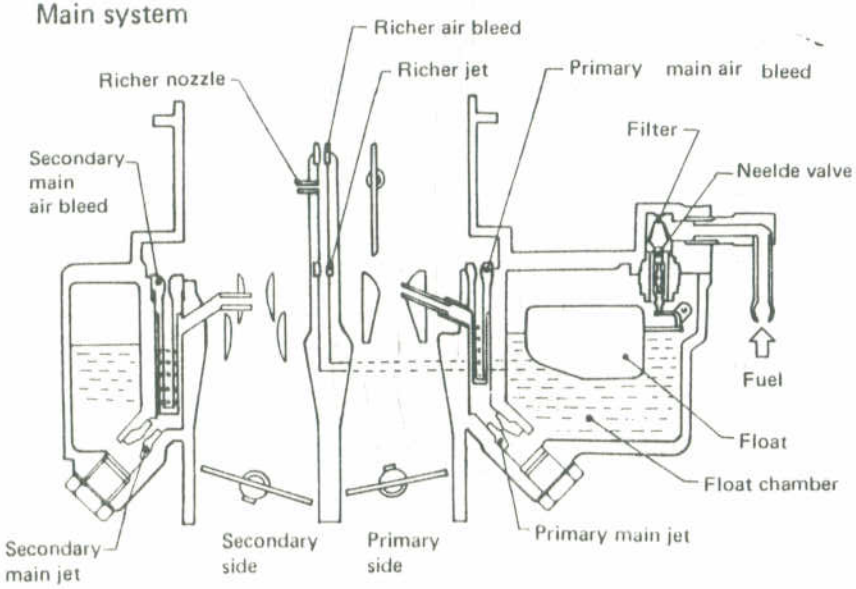




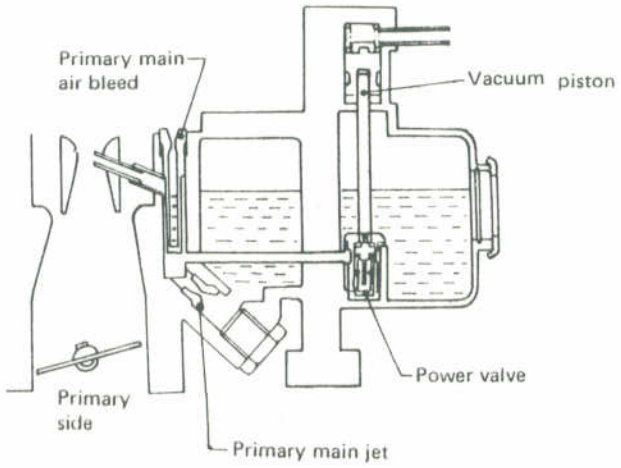
: N·m (kg-m, ft-lb)

SEF04

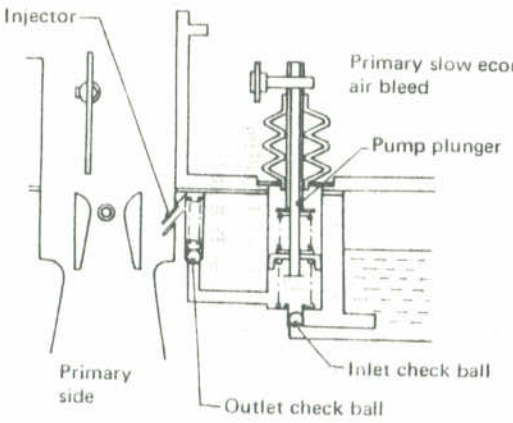
Main system



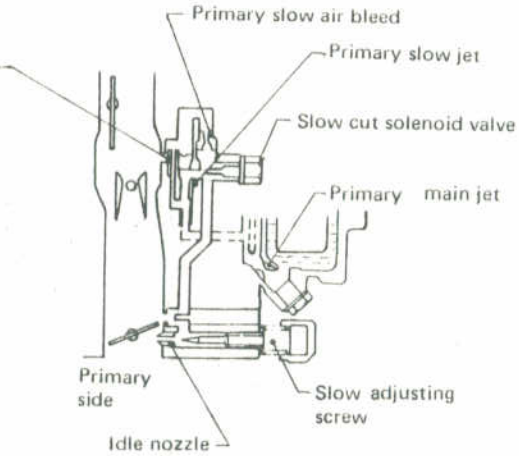
Power valve system



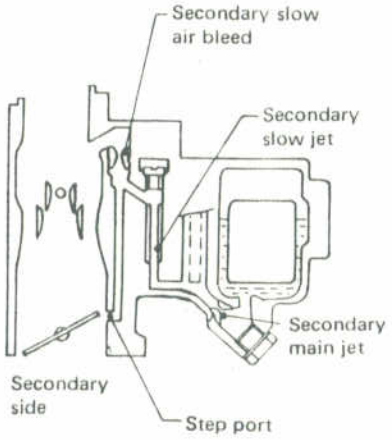
Accelerating pump system



Slow system



Step system



SEF860A

CARBURETOR

Major Service Operation

The perfectly adjusted carburetor delivers the proper fuel and air ratios at all speeds for the particular engine for which it was designed. The carburetor should be maintained in its original condition and will continue to deliver the proper ratios.

To maintain accurate carbureting through passages and discharge holes, extreme care must be taken in cleaning.

Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean or carburetor calibration will be affected.

REMOVAL

Remove carburetor from engine, taking sufficient care to the following:

PRECAUTIONS:

a. **When disconnecting fuel lines, do not spill fuel from fuel pipe.**
b. **When removing carburetor, do not drop any nut or bolt into intake manifold.**
c. **Be careful not to bend or scratch any part.**

CLEANING AND INSPECTION

Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor often results in unsatisfactory performance. For this reason, efficient carbureting depends upon careful cleaning and inspection while servicing.

Before assembling and installing the carburetor, blow all passages and castings with compressed air and blow off all parts until dry.

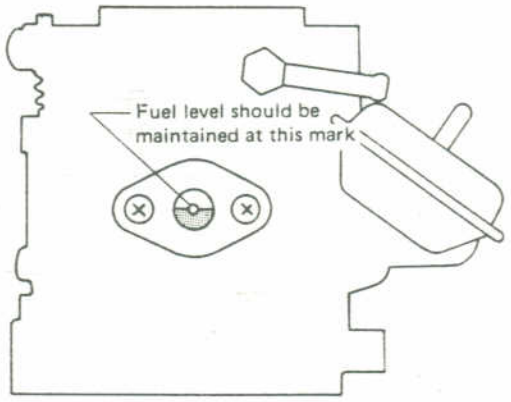
Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

Inspection and Adjustment

FUEL LEVEL

Fuel level of the carburetor float chamber shou be maintained at the center mark of the sight gla

- The vehicle should be placed on a level surfac

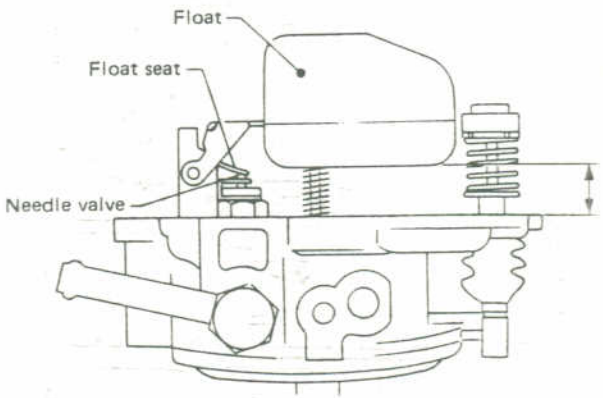


SEF8

If the fuel level is out of the center mark, ad the fuel level in the following way.

1. Remove the choke chamber, and turn it ups down.
2. Adjust "H" by bending the float seat.

"H": 16.5 - 17.5 mm (0.650 - 0.689 in)

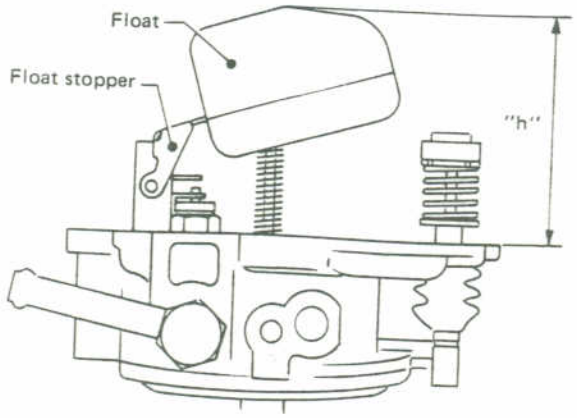


SEF

Inspection and Adjustment (Cont'd)

3. Adjust "L" by bending the float stopper.

"h": 46.5 - 47.5 mm (1.831 - 1.870 in)



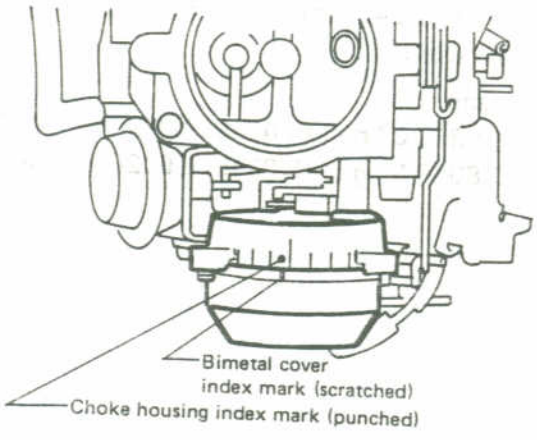
SEF879A

4. Install the choke chamber, and recheck the fuel level through the sight glass.

AUTOMATIC CHOKE

Automatic choke mechanism

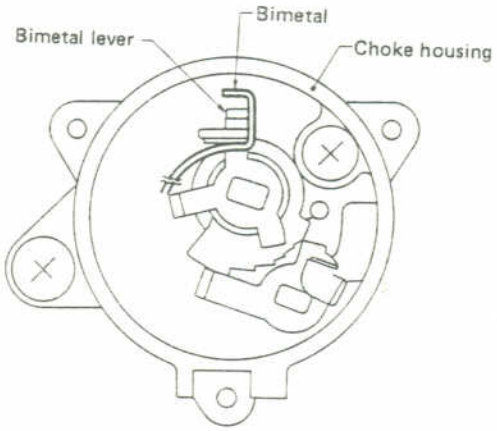
1. Before starting the engine, fully open the throttle valve and ensure that the choke valve closes properly.
2. Push the choke valve with your finger, and check it for smooth rotation.
3. Check to be sure that the punched index mark on the bimetal cover meets the scratched index mark on the choke housing, as shown below.



SEF048D

4. When the bimetal cover is removed to check the choke mechanism, install it in the following way.
   1) Close the choke valve.
   2) While setting the bimetal on the right of the bimetal lever, install the bimetal cover.
   3) Turn the bimetal cover counterclockwise to align the bimetal cover index mark and the choke housing index mark.
   4) Tighten the screws.

   : **1.5 - 3.9 N·m (0.15 - 0.40 kg-m, 1.1 - 2.9 ft-lb)**



SEF049D

- **When the bimetal cover is removed and installed, be sure that the punched index mark of the bimetal cover meets the scratched index mark of the choke housing.**
- **When installing the bimetal cover, make sure that the spring of the bimetal works well by pushing the choke valve.**

Automatic choke heater circuit

Checking heater circuit with function connector

CAUTION:

Do not attach test leads of a circuit tester to those other than designated.

1. With engine not running, check for continuity between GY/R and B.

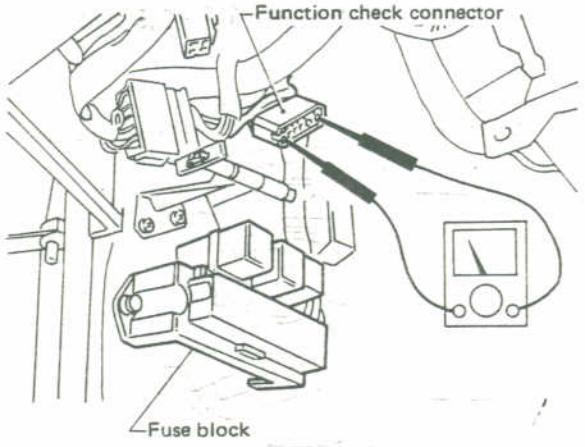
- If continuity exists, the heater is functioning properly.

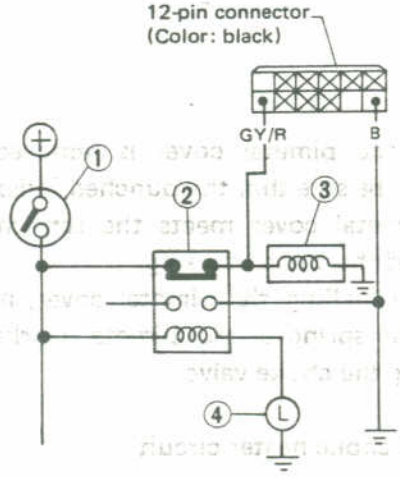
Inspection and Adjustment (Cont'd)

- If continuity does not exist, check for disconnected connector or open. P.T.C. heater circuit.

2. With engine running at idle, check for presence of voltage across GY/R and B.
- If voltmeter reading is 12 volts, heater circuit is functioning properly.
- If voltmeter reading is zero, check for disconnected connector, open circuit, or faulty automatic choke relay.

3. Replace faulty parts.





1 Ignition relay
2 Auto-choke relay
3 Auto-choke heater
4 Alternator "L" terminal

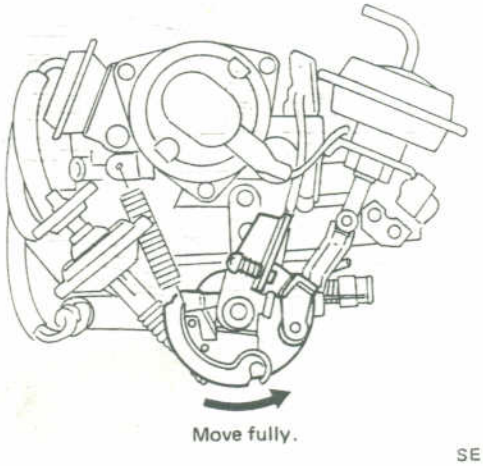
SEF332B

Automatic choke relay

1M-1B type standardized relay is used. For its location, refer to "Location of Electrical Unit" (section EL).

FAST IDLE

1. Warm up engine sufficiently, then set fast idle arm on 2nd step of fast idle cam as follows:
- Move throttle lever counterclockwise fully. In this condition, fast idle arm is set at 2nd step.



SEF3

2. Read engine speed.

Fast idle speed (at 2nd cam step):
1,800 - 2,600 rpm (M/T)
1,900 - 2,700 rpm (A/T)

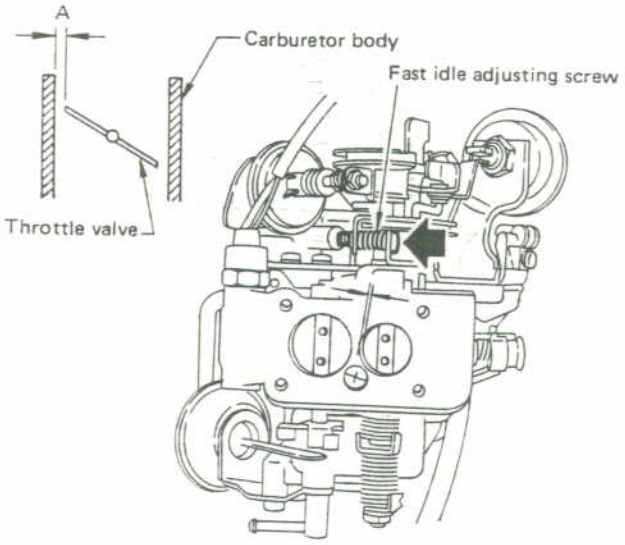
3. If out of specifications, remove carburetor from engine and make fast idle adjustments as follows:

1) Place fast idle arm on 2nd step of fast idle cam in the same manner as in step 1 above.
2) Adjust clearance "A" between primary throttle valve and inner carburetor wall by turning fast idle adjusting screw.

Clearance "A":
0.63±0.07 mm (0.0248±0.0028 in) (M/T)
0.80±0.07 mm (0.0315±0.0028 in) (A/T)

Inspection and Adjustment (Cont'd)

4. After adjusting clearance "A", install carburetor on engine and check engine speed.

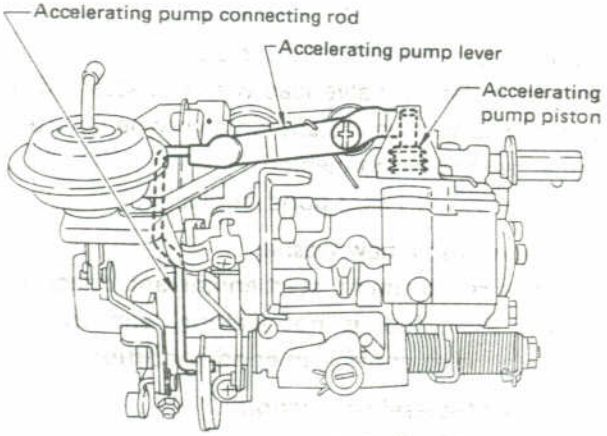


SEF050D

ACCELERATING PUMP

1. After stopping the engine, make a visual check of the accelerating pump connecting rod and lever.

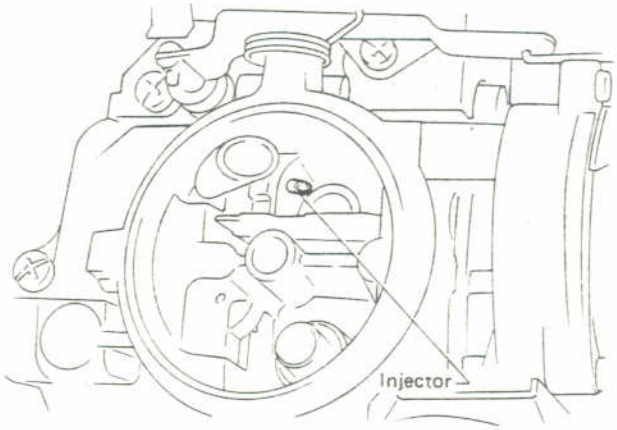
- If they are bent or twisted, replace them.



SEF051D

2. Turn the throttle lever and make sure that fuel is smoothly injected from the injector located in the primary port.

- If the accelerating pump is not functioning properly, check the pump piston. Replace it if necessary.



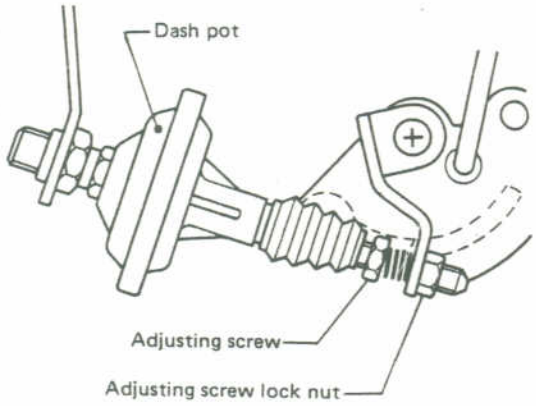
SEF052D

Inspection and Adjustment (Cont'd)

DASH POT

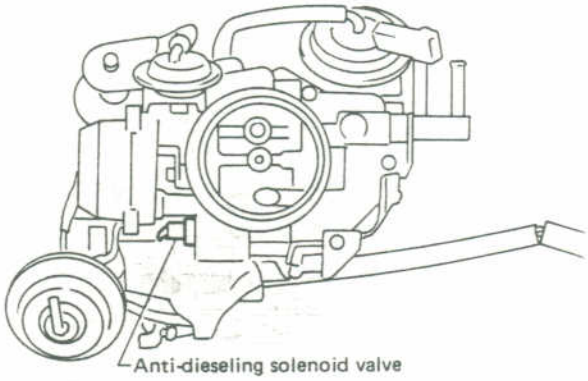
1. Idle speed engine condition is required to be well tuned up and the engine should be sufficiently warmed up.
2. Turn the throttle valve by hand, and read the engine speed when the dash pot just touches the stopper lever.

   Dash pot touch speed:
   1,800 - 2,200 rpm
3. If out of specification, adjust it by turning the adjusting screw after loosening the adjusting screw lock nut. Recheck the dash pot touch speed in the same manner as step 2. above.
4. Tighten the adjusting screw lock nut.

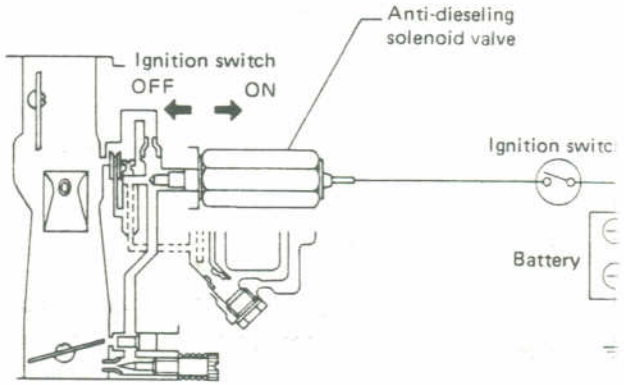


SEF053D

ANTI-DIESELING SOLENOID VALVE



SEF3



SEF5

If the engine does not stop when the lead wire disconnected, the solenoid is stuck.
Connect solenoid valve lead wire to battery. Ch "click" sound from solenoid valve when batter connected and disconnected.
If the test result is not good, replace it.

- **Always use a new washer.**
- **After replacement, start engine and check to sure that fuel is not leaking, and that a dieseling solenoid is in good condition.**

: **Anti-dieseling solenoid**
18 - 29 N·m
(1.8 - 3.0 kg-m, 13 - 22 ft-lb)

IDLE SPEED CONTROL SYSTEM

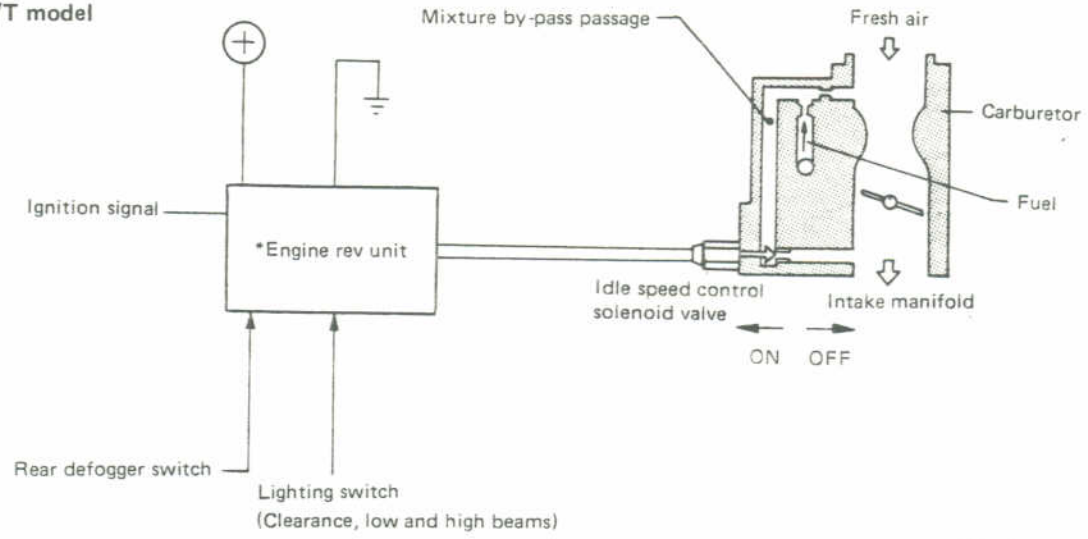
Description

This system prevents poor battery charging and erratic idling when the following units are operating:

- Clearance lamps (M/T model only)
- Headlamps
- Rear defogger

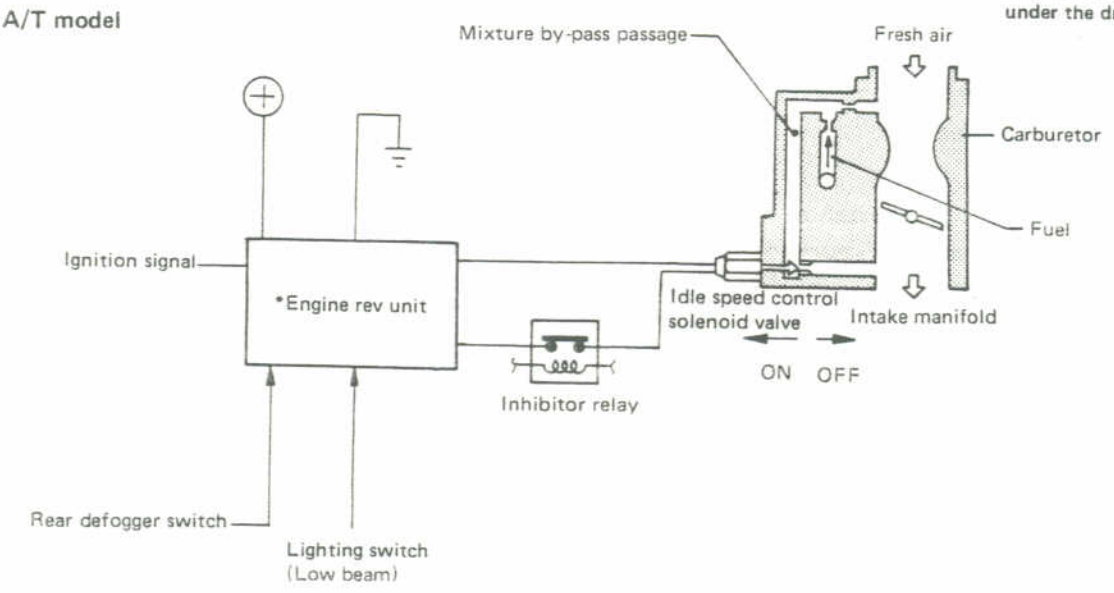
In this system, the proper fuel is added to keep a constant idle speed when solenoid valve attached to carburetor are in the "ON" position.

M/T model



A/T model

*Engine rev unit is installed under the driver's seat.



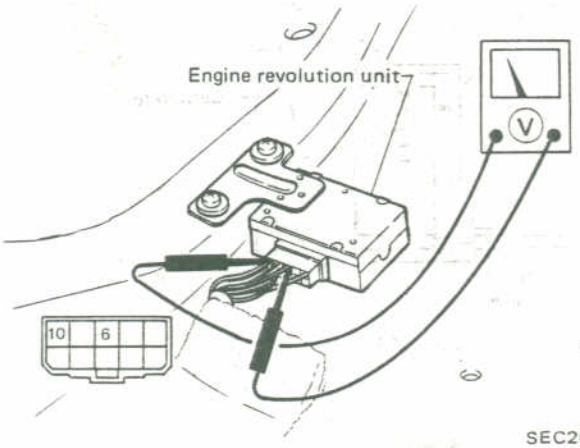
SEF054D

OPERATION:

Lighting switch M/T: Clearance, low and high beams A/T: Low beam	Rear defogger switch	Solenoid valve operation
At least one switch ON		Operates
All switches OFF		Does not operate

Inspection

1. Check if idle rpm increases 50 to 200 rpm after one of the lighting switch, or the rear defogger switch has been turned "ON".
2. If idle rpm does not increase 50 to 200 rpm in the above condition, attach tester to No. 10 (ground) and No. 6 terminals.



SEC263A

3. Set the ignition switch at "ON" position.
4. Measure the voltage between No. 10 and No. 6 terminals with either the lighting switch or rear defogger switch turned "ON".

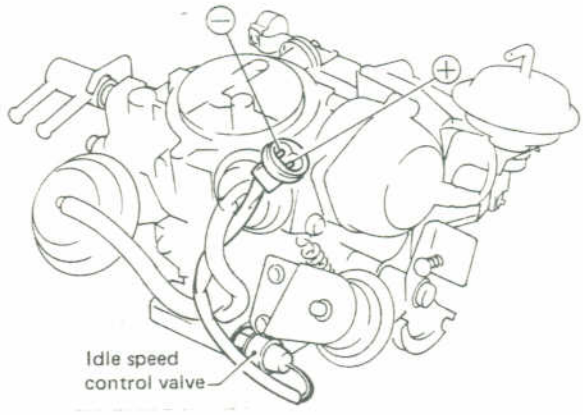
   Specified voltage:

12V	**When lighting switch or rear defogger switch is turned "ON"**
0V	**When both lighting switch and rear defogger switch are turned "OFF"**

5. If the tester does not read the specified voltage, check the solenoid valve alone.

- Check "clicking" sound from the solenoid valve when the battery is connected and disconnected.

Harness color ⊕ : **G/W**
⊖ : **G/B**



SEC26

6. If no sound is heard, replace the solenoid valve. In this case, always use a new washer.

: Idle speed control solenoid valve
18 - 29 N·m
(1.8 - 3.0 kg-m, 13 - 22 ft-lb)

CRANKCASE EMISSION CONTROL SYSTEM

Description

This system returns blow-by gas to both the intake manifold and carburetor air cleaner.

The positive crankcase ventilation (P.C.V.) valve is provided to conduct crankcase blow-by gas to the intake manifold.

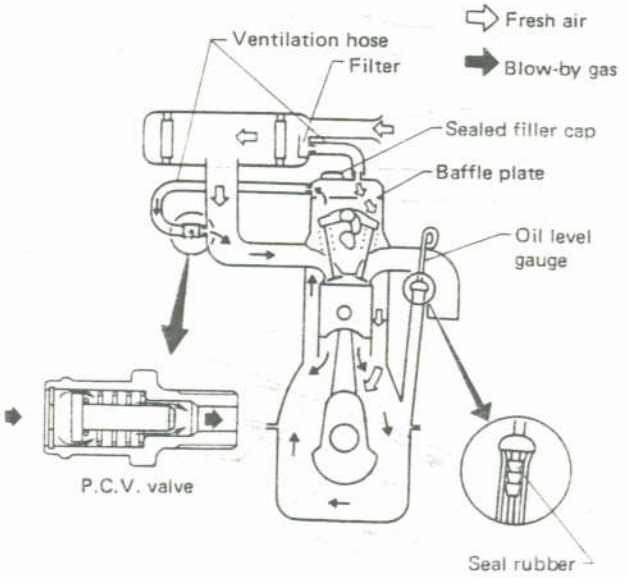
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the P.C.V. valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air cleaner, through the hose connecting air cleaner to rocker cover, into the crankcase.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by some of the flow will go through the hose connection to the carburetor air cleaner under all conditions.

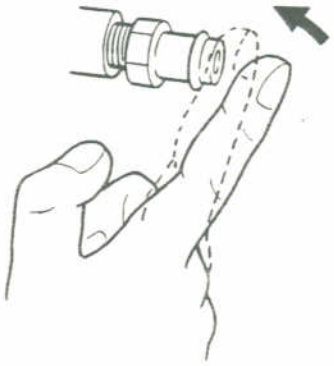


SEC535A

Inspection

P.C.V. VALVE AND FILTER

With engine idling, remove the ventilator hose from P.C.V. valve. If the valve is working, a hissing noise will be heard as air passes through the valve and a strong vacuum should be felt immediately when a finger is placed over valve inlet.



SEC137A

VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air.

   If any hose cannot be freed of obstructions, replace.

EXHAUST EMISSION CONTROL SYSTEM —Air Injection Valve (A.I.V.) System

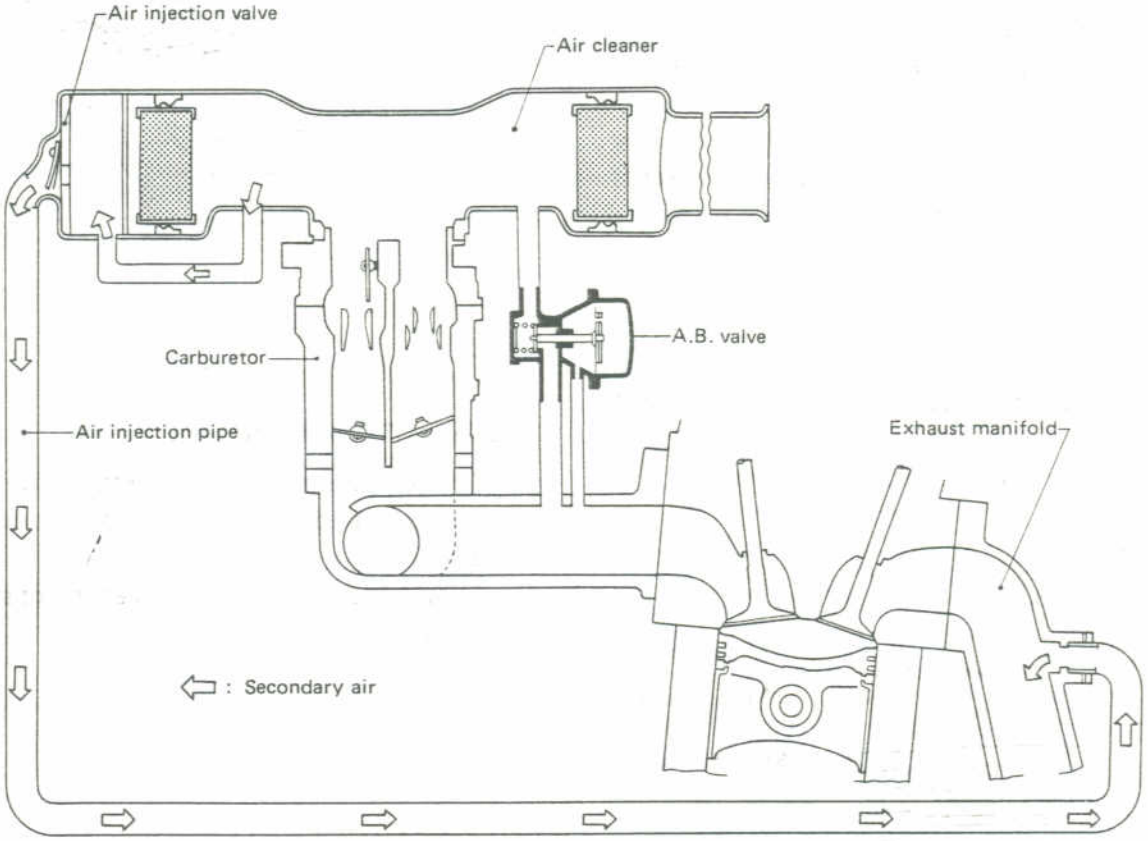
Description

The air injection valve system (A.I.V.) is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the exhaust manifold.

The exhaust pressure in the exhaust manifold usually pulsates in response to the opening and closing of the exhaust valve and it decreases below atmospheric pressure periodically.

If a secondary air intake is opened to the atmo phere under vacuum conditions, secondary a can be drawn into the exhaust manifold in propo tion to the vacuum.

Therefore, the air injection valve system (A.I.V reduces CO and HC emissions in exhaust gases.

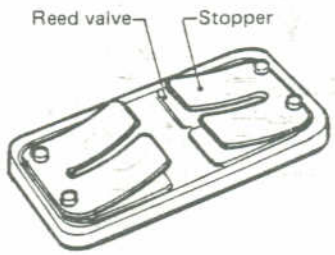


SEC

AIR INJECTION VALVE

When the exhaust pressure is below atmospheric pressure (negative pressure), secondary air is sent to the exhaust manifold.

When the exhaust pressure is above atmospheric pressure, the reed valve prevents secondary air from being sent back to the air cleaner.



SE

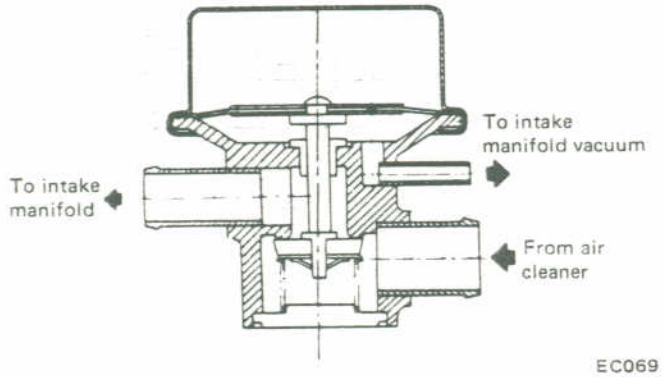
EXHAUST EMISSION CONTROL SYSTEM —Air Injection Valve (A.I.V.) System

Description (Cont'd)

A.B. VALVE

This valve is actuated by intake manifold vacuum to prevent after burning in the exhaust system at the initial period of deceleration.

At this period, the mixture in the intake manifold becomes too rich to ignite and burn in the combustion chamber and burns easily in the exhaust system with injected air in the exhaust manifold.



EC069

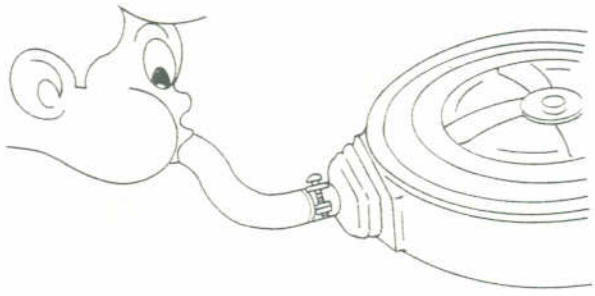
Inspection

PRELIMINARY INSPECTION

Check hose for looseness, flatting, damage or faulty connections, and each part for proper installation. If necessary, replace.

AIR INJECTION VALVE (A.I.V.) AND FILTER

1. Disconnect air injection hose at air injection pipe side. Suck or blow hose to make sure that air flows only on the air injection pipe side.

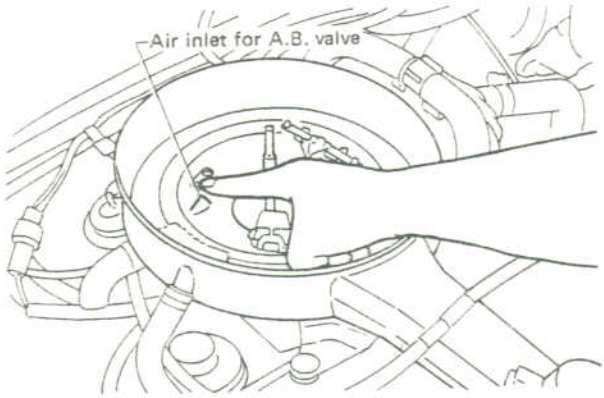


SEC249A

2. Check air injection valve for binding or damage. At the same time, check filter for damage or plugging. If necessary, replace.

A.B. VALVE

1. Warm up engine thoroughly.
2. Disconnect hose from air cleaner, and place a finger near the outlet.
3. Run engine at about 3,000 rpm under no-load, then quickly return it to idling. If you feel a pull or suction force on your finger, the A.B. valve is functioning normally. If no suction is felt, replace the A.B. valve.



SEC250A

EXHAUST EMISSION CONTROL—E.G.R. System

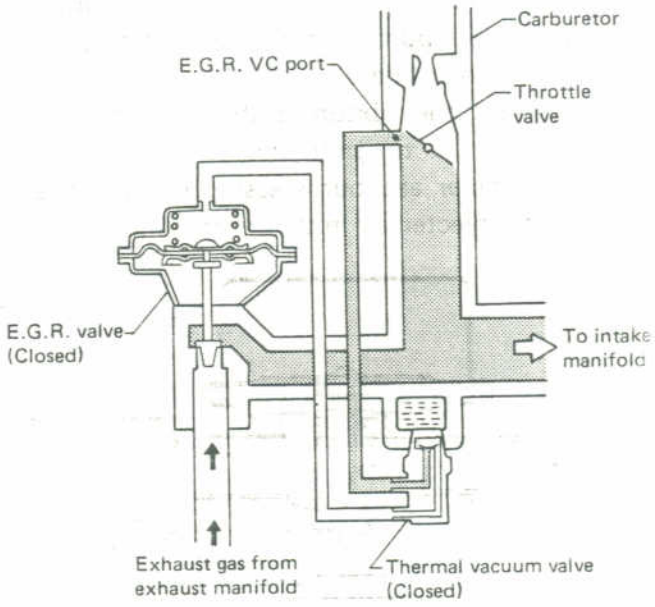
Description

The E.G.R. (Exhaust Gas Recirculation) System has exhaust gases recirculate into the combustion chamber and lowers the combustion temperature so as to reduce NOx produced in combustion process.

An E.G.R. control valve measures the amount of exhaust gases recirculating from the exhaust manifold to the intake manifold by vacuum pressure in the carburetor. The thermal vacuum valve is located midway between the vacuum passage and E.G.R. control valve. This valve is adopted to prevent engine from losing stability when the water temperature is low.

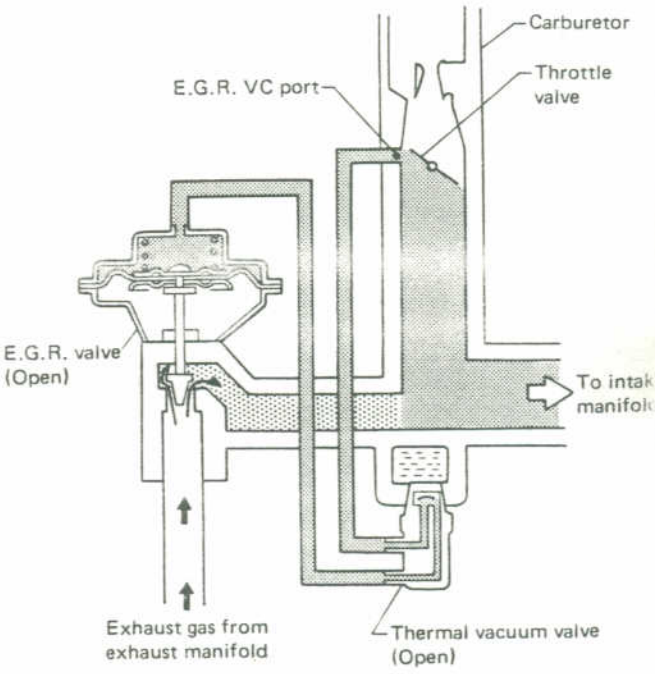
With the engine at idle or at full throttle, the E.G.R. control valve closes to deactivate the E.G.R. system regardless of water temperature (operation of the thermal vacuum valve).

Water temperature is below 50°C (122°F)



SEC138

Water temperature is above 50°C (122°F)



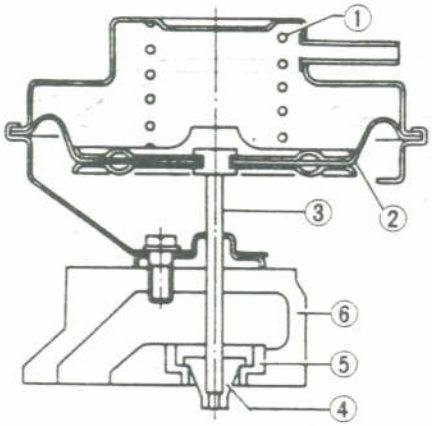
SEC139

EXHAUST EMISSION CONTROL—E.G.R. System

Description (Cont'd)

E.G.R. control valve

The E.G.R. control valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the valve connected to the diaphragm, to which vacuum is applied in response to the opening of the carburetor throttle valve.



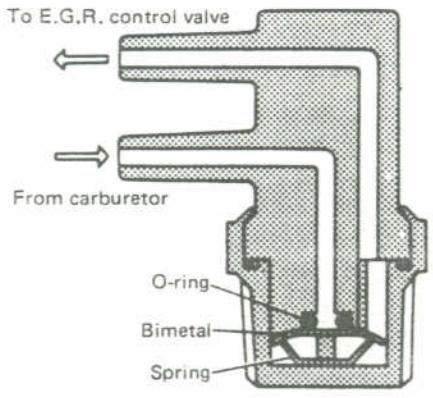
1 Diaphragm spring
2 Diaphragm
3 Valve shaft
4 Valve
5 Valve seat
6 Valve chamber

EC231

Thermal vacuum valve

This thermal vacuum valve is mounted on the right side of the intake manifold. It detects engine coolant temperature by means of a built-in bi-metal, and opens or closes the vacuum passage in the thermal vacuum valve.

When the vacuum passage is open, the carburetor vacuum signal is applied to the diaphragm of the E.G.R. control valve to actuate the taper valve connected to the diaphragm.



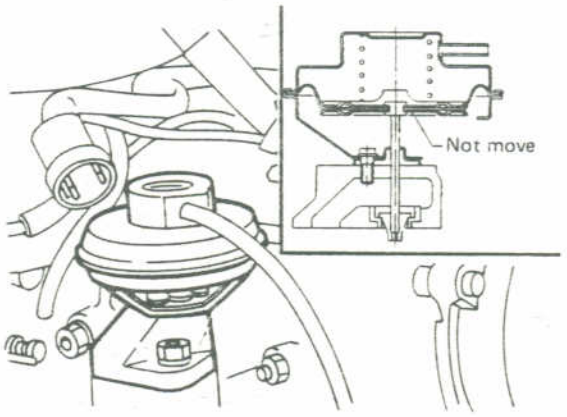
EC232

Inspection

FUNCTION OF ENTIRE SYSTEM

1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.
2. Start engine and place a finger on diaphragm of E.G.R. control valve to check for valve operation.

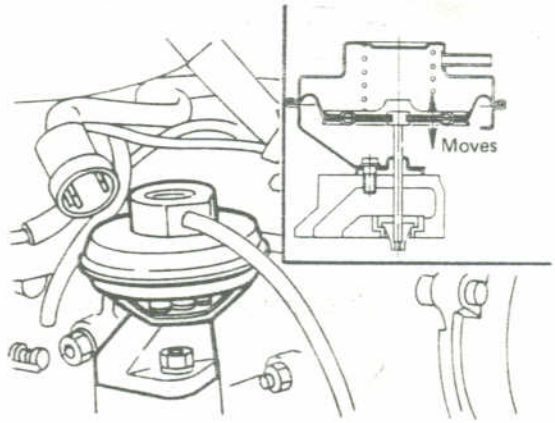
1) When engine coolant temperature is below 30°C (86°F):
Make sure that E.G.R. control valve does not operate when engine speed is increased from idling to 3,000 to 3,500 rpm.



SEC140A

If E.G.R. control valve operates, check thermal vacuum valve.

2) When engine coolant temperature is above 50°C (122°F):
Make sure that E.G.R. control valve operates when engine speed is increased from idling to 3,000 to 3,500 rpm.

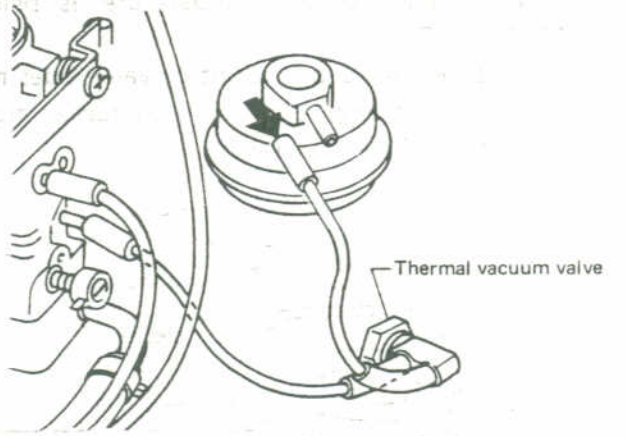


SEC141A

Inspection (Cont'd)

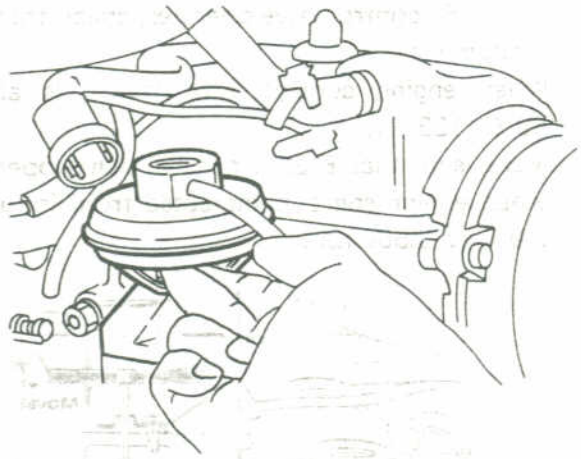
E.G.R. control system is normal if diaphragm moves upward. If not, check system as in step 3.

3. Disconnect vacuum hose from E.G.R. control valve.
   Increase engine speed from idling to 3,000 to 3,500 rpm. Confirm that thermal vacuum valve is open and that carburetor vacuum is present.



SEC142A

4. With engine running at idling speed, push up E.G.R. control valve diaphragm by manually pressing bottom dish.



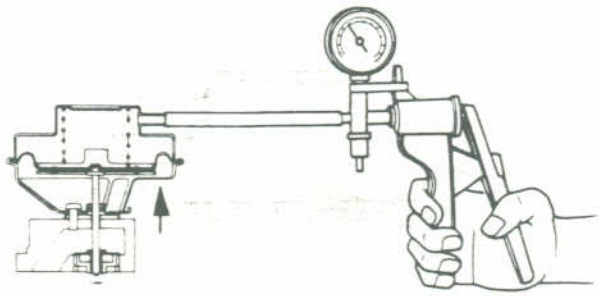
SEC143A

It is normal if engine loses stability.

E.G.R. CONTROL VALVE

1. Remove E.G.R. control valve.
2. Apply the specified vacuum.

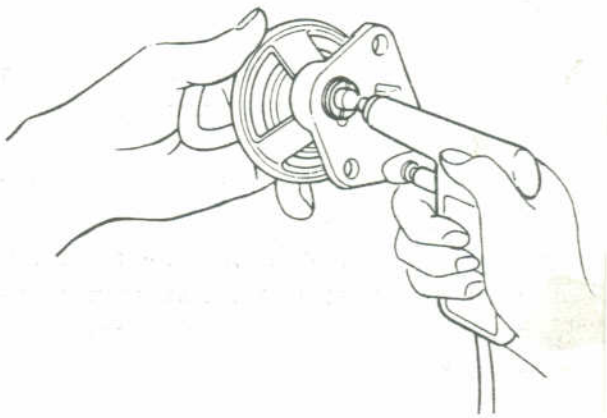
−13.3 to 14.7 kPa
(−100 to 110 mmHg, −3.94 to 4.33 inHg)



SEC1-

3. Visually inspect E.G.R. control valve for si of damage, wrinkle or otherwise deformation
4. Clean the E.G.R. control valve seat with bru and compressed air.

Always use new gasket.



SEC1

Inspection (Cont'd)

THERMAL VACUUM VALVE

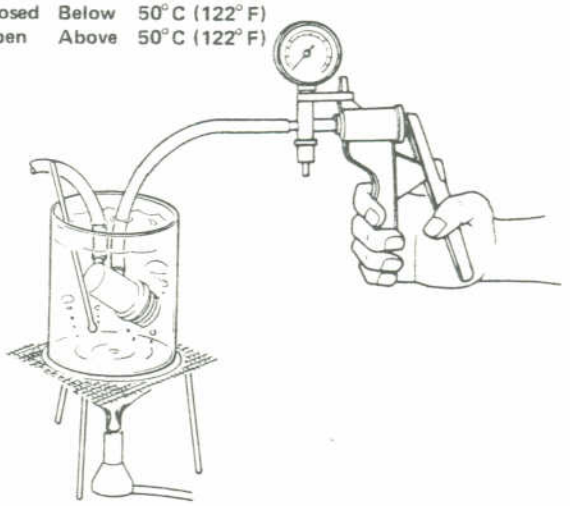
1. Disconnect vacuum hose connecting T.V.V. and E.G.R. control valve.
2. Start engine. Make sure T.V.V. is open/closed according to the coolant temperature.
3. If operation is questionable, remove switches.

Before dismounting, drain out about 1 liter (1-1/8 US qt, 7/8 Imp qt) of engine coolant.

4. Apply vacuum to thermal vacuum valve and ensure that thermal vacuum valve opens above the specified temperature conducting vacuum passage.

Do not let water enter thermal vacuum valve.

Specified temperature:
Closed Below 50°C (122°F)
Open Above 50°C (122°F)



SEC146A

5. Install T.V.V.

Be sure to apply sealer to threads of the valve prior to installing new valve.

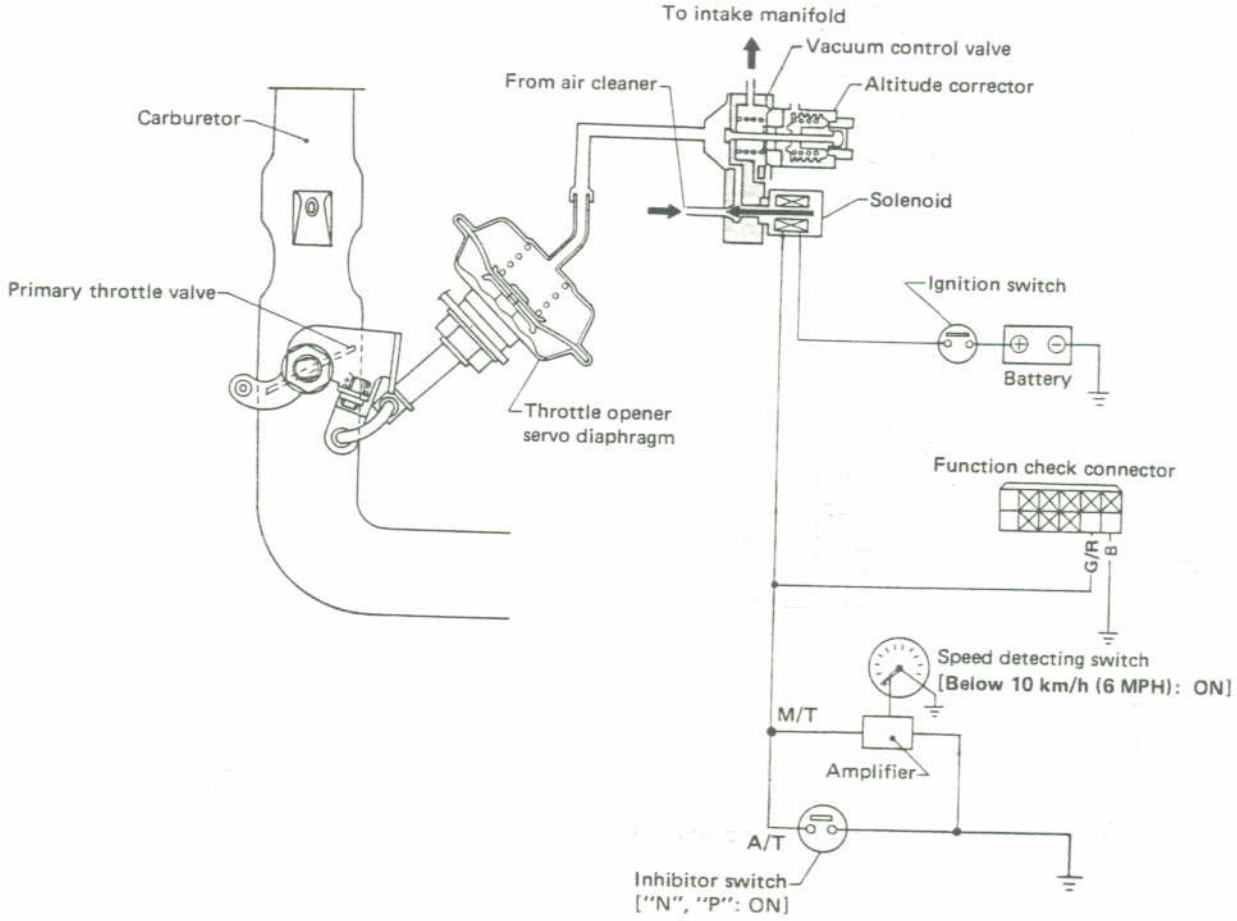
: Thermal vacuum valve
Less than 22 N·m (2.2 kg-m, 16 ft-lb)

EXHAUST EMISSION CONTROL —Throttle Opener Control System (T.O.C.S.)

Description

The function of the throttle opener is to open the throttle valve of the carburetor slightly while the vehicle is decelerating. During deceleration, the manifold vacuum rises and the quantity of mixture in the engine is not sufficient for normal combustion to continue; consequently, a great amount of unburned HC is emitted.

Carburetors equipped with the throttle opener supply the engine with an adequate charge of combustible mixture to maintain proper combustion during deceleration, resulting in a dramatic reduction in HC emission.



SEC25

OPERATION:

Transaxle	Gear position	Vehicle speed km/h (MPH)	Solenoid	T.O.C.S. operation
Manual	Any position	Below 10 (6)	ON	Not operated
		Above 10 (6)	OFF	Operated
Automatic	"N" or "P"	Any speed	ON	Not operated
	Others		OFF	Operated

EXHAUST EMISSION CONTROL —Throttle Opener Control System (T.O.C.S.)

Inspection and Adjustment

ENTIRE SYSTEM

When idling speed is too high and does not drop to idling speed, the throttle opener control system should be checked.

1. Check for continuity between "G/R" and "B" terminals specified in function check connector with ignition switch OFF.
   If continuity does not exist, solenoid may be faulty. Replace throttle opener control valve assembly.
2. Turn on ignition switch and check voltage between terminals "G/R" and "B".

M/T models

Remove speedometer cable from combination meter. Then spin speedometer in combination meter with fingers and confirm that the speedometer pointer indicates more than 10 km/h (6 MPH) temporarily. Voltage between "G/R" and "B" terminals should be changed as follows:

Above 10 km/h (6 MPH)	12V
Below 10 km/h (6 MPH)	0V

If not, amplifier or speed detecting switch may be faulty; replace parts with new ones.

A/T models

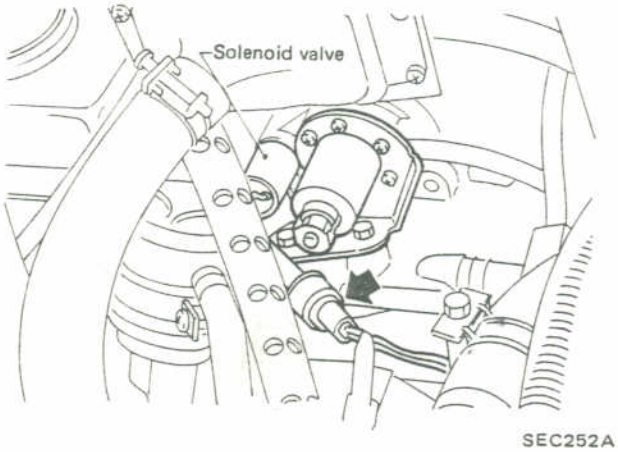
Voltage between two terminals should be changed as follows:

"N" or "P" position	0V
Other positions	12V

If not, replace inhibitor switch.

THROTTLE OPENER OPERATING PRESSURE

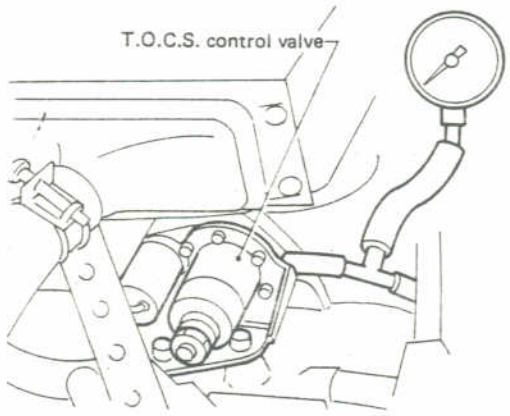
1. Remove harness of solenoid valve.



SEC252A

2. Connect rubber hose between vacuum gauge and intake manifold.

A quick-response type boost gauge such as Bourdon's type is recommended; a mercury-type manometer should not be used.



SEC253A

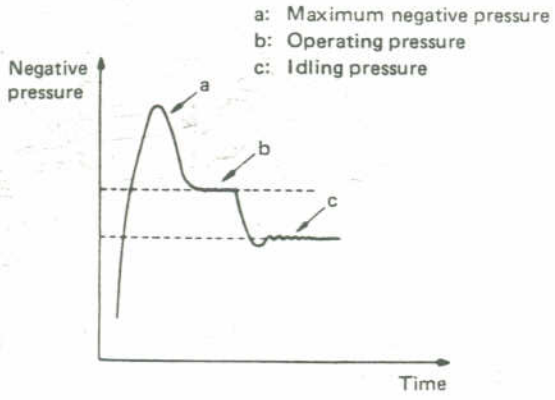
3. Warm up engine until it reaches operating temperature. Then confirm that engine idling speed is specified value.

   Engine idling speed:
   M/T: 700±50 rpm
   A/T: 700±50 rpm (in "D" position)

4. Run engine under no-load. Increase engine speed to 3,000 or 3,500 rpm, then quickly close throttle valve.

Inspection and Adjustment (Cont'd)

5. At that time, manifold vacuum pressure increase abruptly to −80.0 kPa (−600 mmHg, −23.62 inHg) or above and then decreases to the level set at idling.



EC502

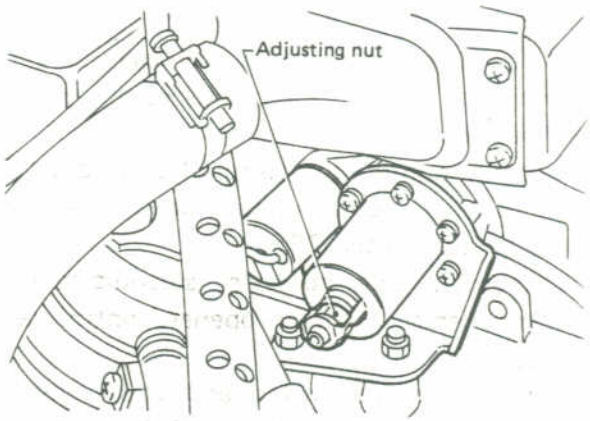
6. Check that the T.O.C.S. operating pressure is within the specified pressure.

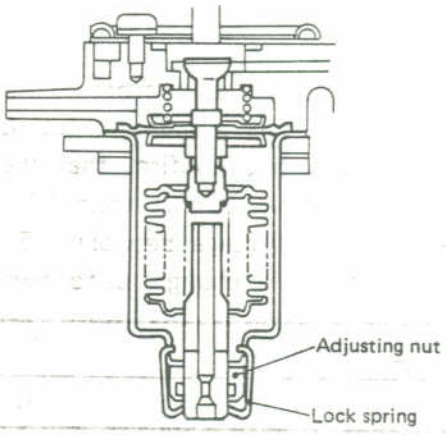
   Specified pressure [0 m (0 ft), sea level and 101.3 kPa (760 mmHg, 29.92 inHg), atmospheric pressure] :
   −73.3±0.7 kPa
   (−550±5 mmHg, −21.65±0.20 inHg)

7.

1) If it is lower than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.
   Adjusting nut: Clockwise
2) If it is higher than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.
   Adjusting nut: Counterclockwise

When adjusting T.O.C.S., turn adjusting nut in or out with lock spring in place. Always set lock spring properly to prevent changes in set pressure.





SEC

The operating pressure varies in proportion altitude.

a. When atmospheric pressure is known, opera pressure will be found by tracing the ar line "A". When altitude is known, opera pressure will be found by tracing the arrow "B".

b. When checking T.O.C.S. operating press note atmospheric pressure and elevatior which check is to be made, and determine pressure by the information furnished.
For example, if above sea level is 1,00((3,280 ft), operating pressure will then −63.3 kPa (−475 mmHg, −18.70 inHg).
In other words, T.O.C.S. operates at −63.3 (−475 mmHg, −18.70 inHg).

EXHAUST EMISSION CONTROL —Throttle Opener Control System (T.O.C.S.)

Inspection and Adjustment (Cont'd)

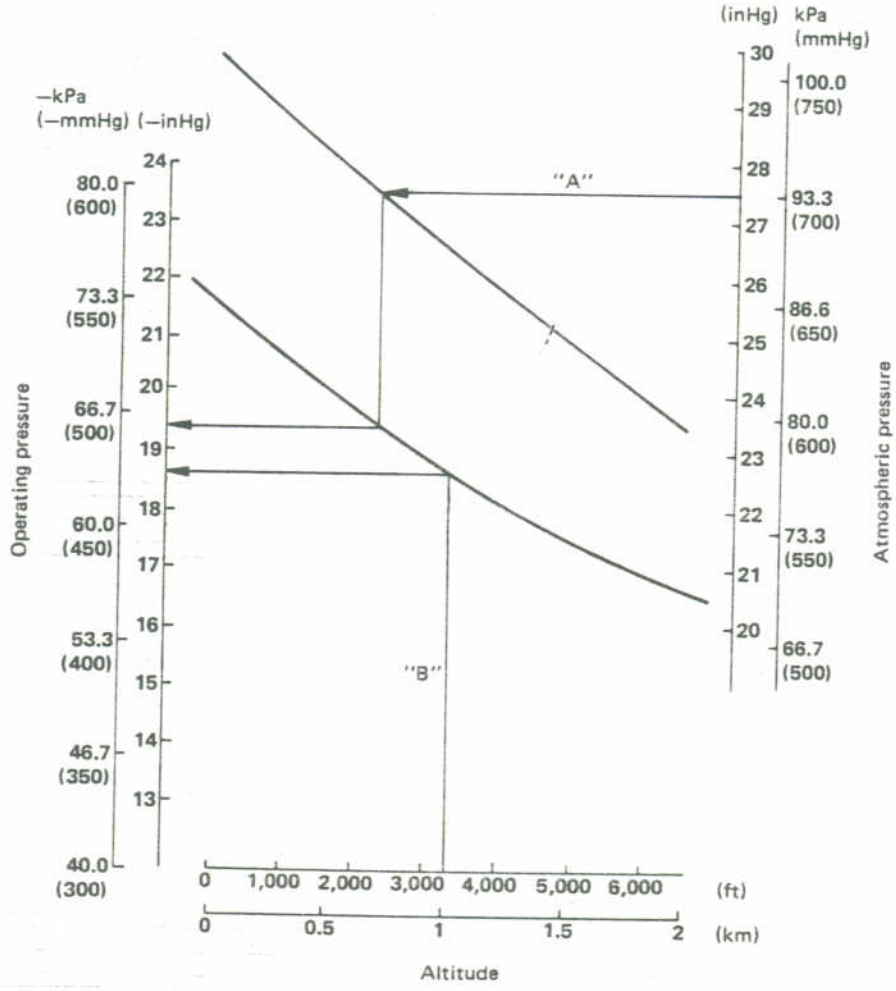
8. Race engine and check for adjustment.
9. If engine speed does not drop to idling speed when checking throttle opener operating pressure, proceed as follows:

1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side, 3.3 kPa (25 mmHg, 0.98 inHg) above the specified value.
2) Turn adjusting screw 1/4 of a turn clockwise so that throttle opener operating pressure drops by 3.3 kPa (25 mmHg, 0.98 inHg).

10. If throttle opener operating pressure cannot be observed clearly even in step 9, proceed as follows.

1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side 6.7 kPa (50 mmHg, 1.97 inHg) above the mid-point of the specified range.
2) Turn adjusting screw 1/2 of a turn clockwise.

The throttle opener operating pressure should be correctly set within the specified range after the above adjustments, even if the engine speed cannot be decreased to idling.



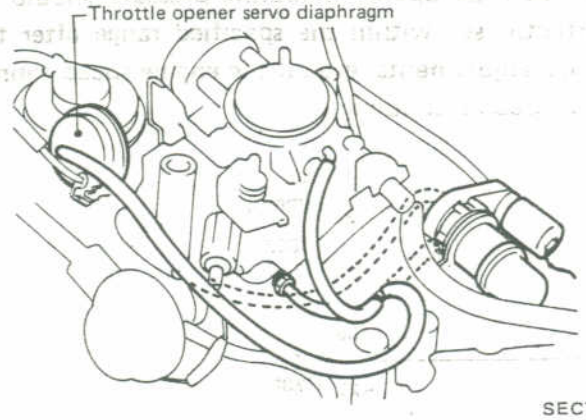
SEC259A

EXHAUST EMISSION CONTROL —Throttle Opener Control System (T.O.C.S.)

Inspection and Adjustment (Cont'd)

SERVO DIAPHRAGM STROKE

1. Connect engine tachometer.
2. Warm up engine until it reaches operating temperature.
3. Disconnect rubber hose between servo-diaphragm and vacuum control valve.
   Then, connect rubber hose to intake manifold.

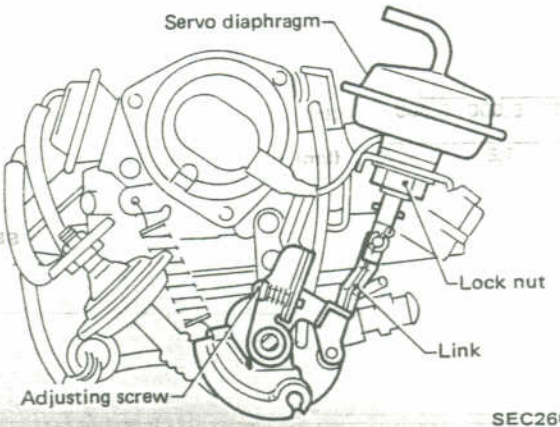


SEC724

4. Servo-diaphragm is functioning properly, if engine speed comes into the specified range.

   Specified engine speed: 1,650 - 1,850 rpm

5. If necessary, adjust engine speed until it is in the specified range, using servo-diaphragm adjusting screw.
   When engine speed is lower than the prescribed range:
   Turn adjusting screw clockwise.
   When engine speed is higher than the prescribed range:
   Turn adjusting screw counterclockwise.



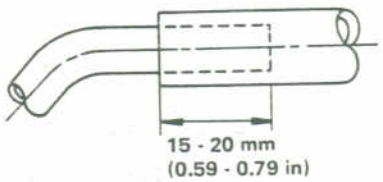
SEC260A

Vacuum Hoses

The following show the various conditions f connecting emission control vacuum hoses and hoses. Pay careful attention to the remarks belo

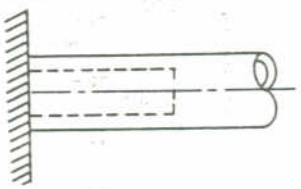
1. Hoses are colored according to their functi and purpose as shown below.
   Yellow: Vacuum line to distributor
   White: Vacuum line for E.G.R. system
   Green: Manifold vacuum line
   Pink: Atmospheric pressure
2. Insert hose into pipe as shown below.

a. When inserting tolerance is not limited.



SEC

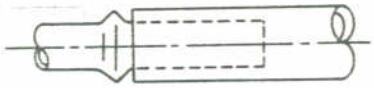
b. When stopper is equipped.
   If connector length is under 20 mm (0.79 in



Insert pipe until it stops.

SE

c. When pipe has a bulge.



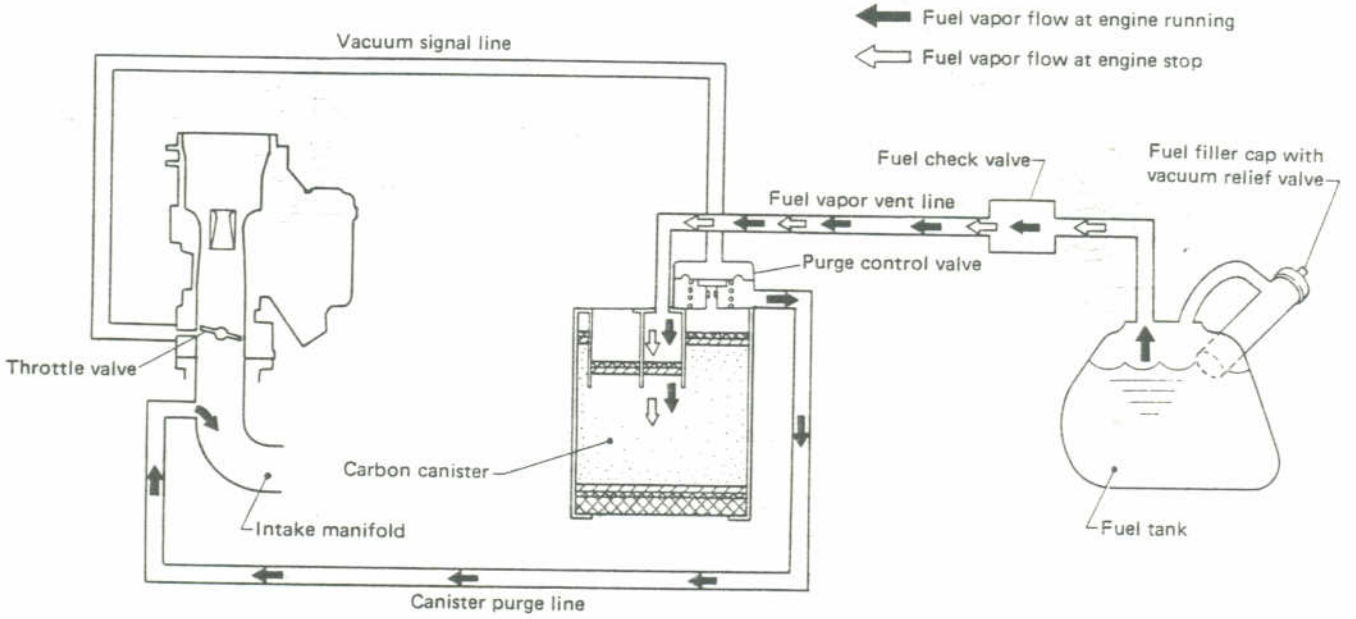
Insert hose up to bulge.

SE

EXHAUST EMISSION CONTROL —Evaporative Emission Control System

Description

The evaporative emission control system is used to reduce hydrocarbons emitted to the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.



SEC261A

Operation

AT ENGINE STOP

Fuel vapor from the sealed fuel tank is led into the carbon canister which is filled with activated carbon and stroke there.

DURING ENGINE OPERATION

The canister retains the vapor until the canister is cleaned by air drawn through the purge line to the intake manifold.

As engine speed increases, the ported vacuum rises and purge control valve opens the orifice allowing the vapor to travel through the purge line to the intake manifold.

Inspection

FUEL TANK AND VAPOR VENT LINE

Refer to MA section for inspection of fuel tank and vapor vent line.

CARBON CANISTER PURGE CONTROL VALVE

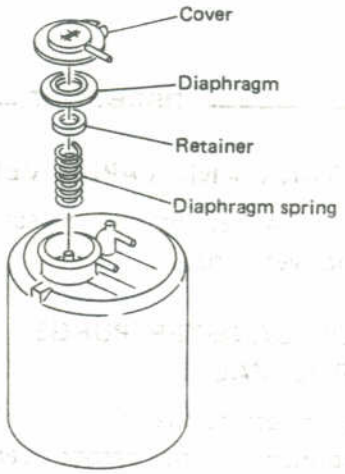
1. Disconnect rubber hose, in the line, between T-connector and carbon canister at T-connector.

Inspection (Cont'd)

2. Inhale air from the opening of the rubber hose running to the vacuum hole in the carbon canister and ensure that there is no leak.

ET349

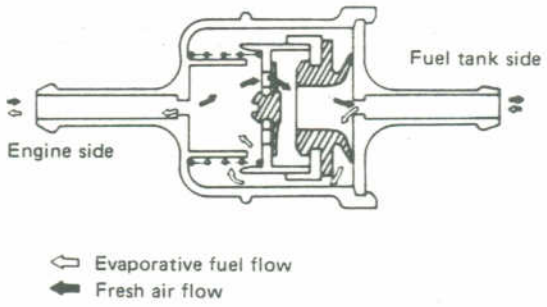
3. If there is a leak, remove top cover from purge control valve and check for dislocated or cracked diaphragm. If necessary, replace diaphragm kit (which is made up of a retainer, diaphragm and spring).



SEC262A

FUEL CHECK VALVE

1. Blow air through connector on fuel tank side. A considerable resistance should be felt at the mouth and a portion of air flow be directed toward the engine.
2. Blow air through connector on engine side. Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not being properly functioning in steps 1 and 2 above replace.

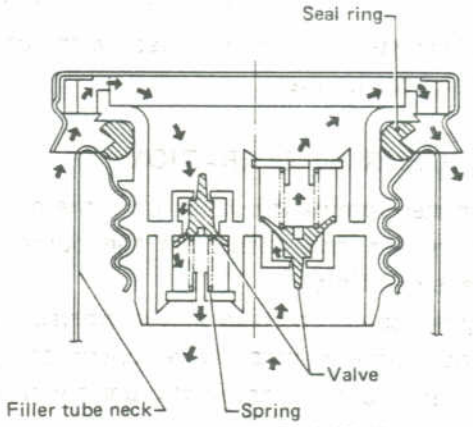


EC09C

FUEL TANK VACUUM RELIEF VALVE

Remove fuel filler cap and see it function properly.

1. Wipe clean valve housing and have it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should be disappeared when valve clicks.
3. If valve is clogged, or if no resistance is felt replace cap as an assembled unit.



SEF7

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Inspection and Adjustment

CARBURETOR

Item \ Destination / Engine / Transaxle			Canada MA12 MT	Canada MA12 AT
Carburetor model			DCZ306-44	DCZ306-45
Choke type			Automatic	Automatic
Air outlet diameter	mm (in)	P	26 (1.02)	26 (1.02)
		S	30 (1.18)	30 (1.18)
Venturi diameter	mm (in)	P	23 (0.91)	23 (0.91)
		S	27 (1.06)	27 (1.06)
Main jet		P	#100	# 99
		S	#135	#135
Main air bleed		P	# 70	# 70
		S	# 60	# 60
Slow jet		P	# 43	# 43
		S	# 75	# 75
Slow air bleed		P	#180	#180
		S	# 90	# 90
Power jet			# 40	# 40
Fuel level adjustment	mm (in)			
Gap between float and carburetor body "H"			16.5 - 17.5 (0.650 - 0.689)	16.5 - 17.5 (0.650 - 0.689)
Bottom float position "h"			46.5 - 47.5 (1.831 - 1.870)	46.5 - 47.5 (1.831 - 1.870)
Fast idle adjustment				
Clearance "A" (at 2nd cam step)	mm (in)		0.63±0.07 (0.0248±0.0028)	0.80±0.07 (0.0315±0.0028)
Fast idle speed	rpm		1,800 - 2,600	1,900 - 2,700
Dash pot adjustment				
Dash pot touch speed	rpm		1,800 - 2,200	1,800 - 2,200
Throttle opener adjustment				
Gap between throttle valve and carburetor body	mm (in)		0.41 (0.0161)	0.48 (0.0189)
Throttle opener touch speed	rpm		1,650 - 1,850	1,650 - 1,850

P: Primary S: Secondary

IDLE COMPENSATOR

Unit: °C (°F)

Idle compensator partially opens	Bimetal No. 1	60 - 70 (140 - 158)
	Bimetal No. 2	70 - 80 (158 - 176)
Idle compensator fully opens	Bimetal No. 1	Above 70 (158)
	Bimetal No. 2	Above 80 (176)

FUEL PUMP

Fuel pressure	kPa (kg/cm², psi)	19.6 - 26.5 (0.20 - 0.27, 2.8 - 3.8)
Fuel pump capacity	mℓ (US fl oz, Imp fl oz)/ at engine rpm	1,200 (40.6, 42.2)/ 3,000

ENGINE CONTROL, FUEL & EXHAUST SYSTEMS

SECTION FE

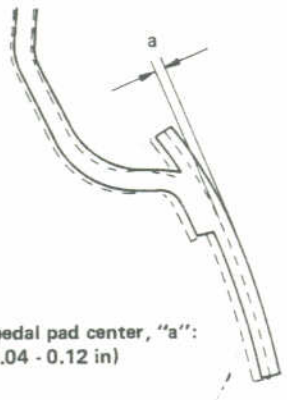
CONTENTS

Accelerator Wire

- When connecting accelerator wire, be careful not to twist or scratch its inner wire.
- Apply a light coat of recommended multi-purpose grease to all sliding or friction surfaces. Do not apply grease to wire.

INSPECTION

a. Check to see if throttle valve fully opens when accelerator pedal is fully depressed and if it returns to idle when released.
b. Check pedal free play.



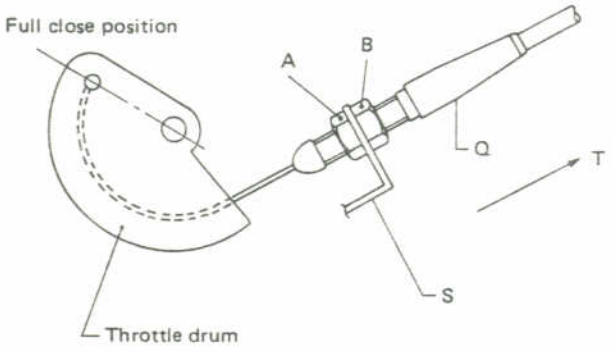
Free play at pedal pad center, "a":
1 - 3 mm (0.04 - 0.12 in)

SFE534

c. Check accelerator control parts for improper contact with any adjacent parts.

ADJUSTMENT

(1) Loosen throttle wire double nuts "A" and "B" on throttle valve side.



SFE848

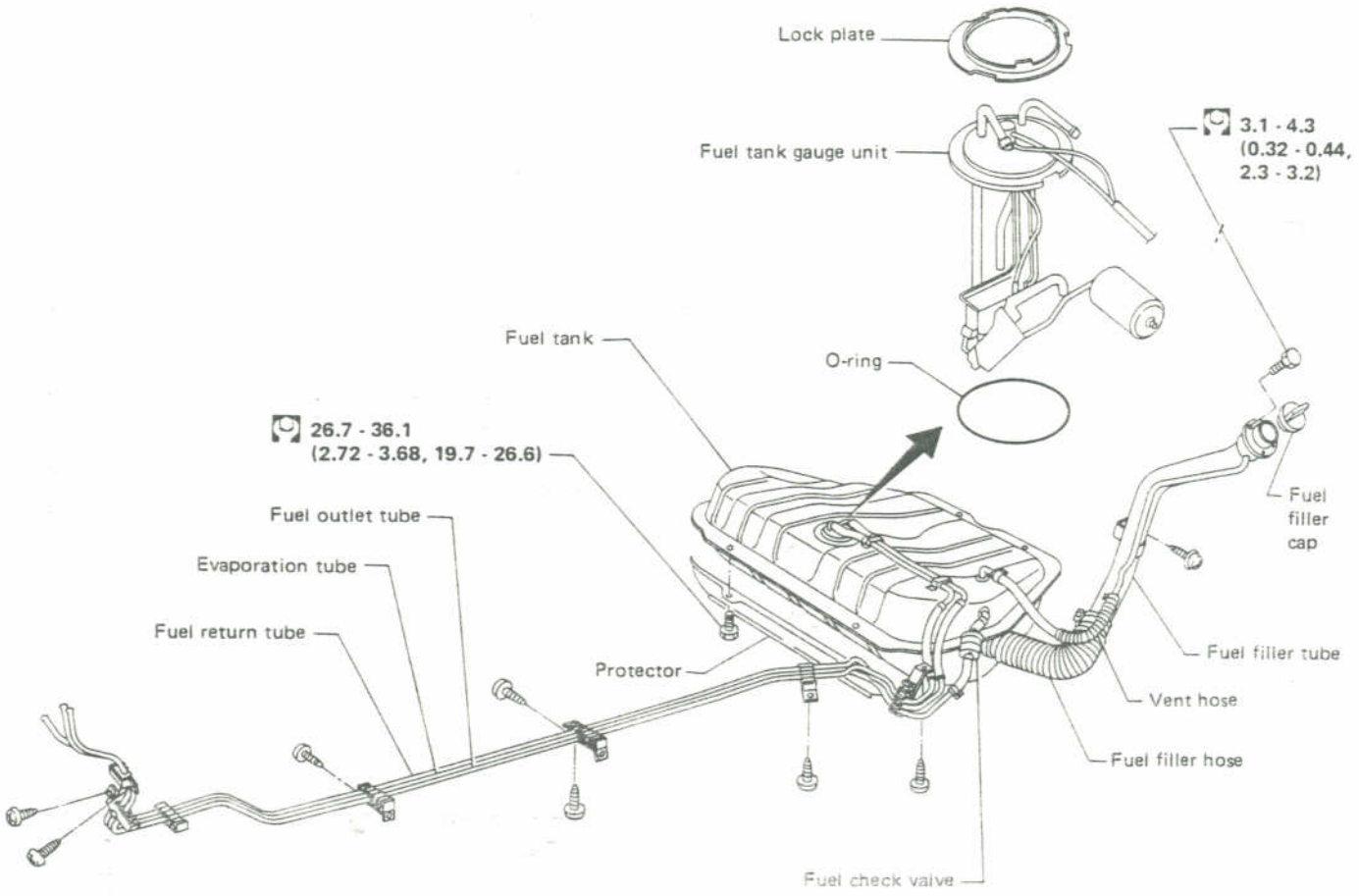
(2) With throttle drum set at full close position, pull fitting "Q" fully in direction "T" and tighten nut "B" by hand until it contacts bracket "S".
(3) Back off nut "B" 1-1/2 to 2 revolutions in direction "T", then tighten nut "A" securely. Throttle drum should be held at full close position.

WARNING:

When replacing fuel line parts, be sure to observe the following:

a. **Put a "CAUTION: INFLAMMABLE" sign in workshop with a CO_2 fire extinguisher.**
b. **Be sure to furnish the owrkshop with a CO_2 fire extinguisher.**
c. **Be sure to disconnect battery ground cable before conducting operations.**
d. **Put drained fuel in an explosion-proof container and put on lid securely.**

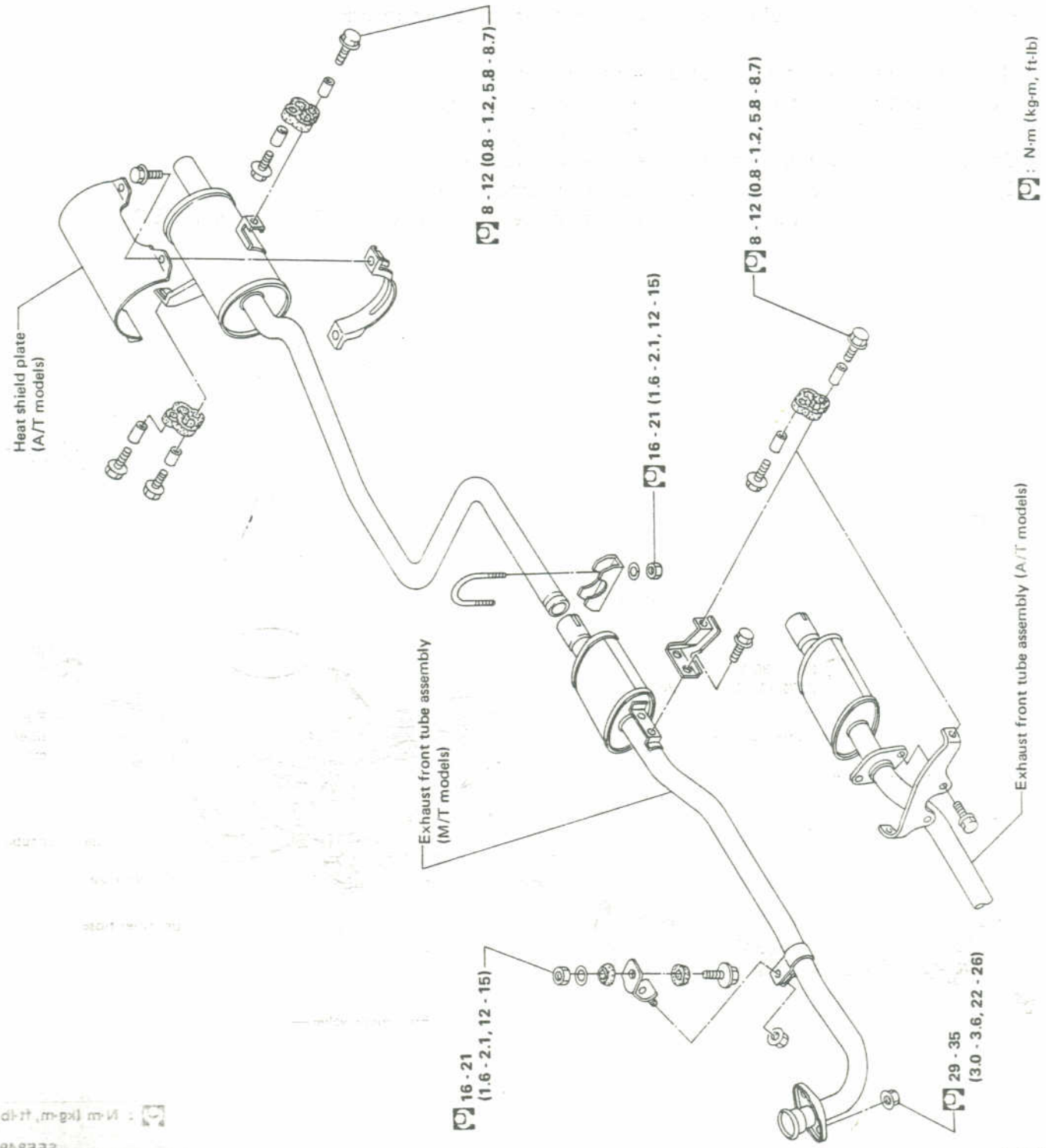
a. Do not disconnect any fuel line unless absolutely necessary.
b. Plug hose and pipe openings to prevent entry of dust or dirt.
c. Always replace O-ring and clamps with new ones.
d. Do not kink or twist hose and tube when they are installed.
e. Do not tighten hose clamps excessively to avoid damaging hoses.
f. When installing fuel check valve, be carefull of its designated direction (Refer to section EC).
g. Run the engine and check for leaks at connections.



: N·m (kg-m, ft-lb)

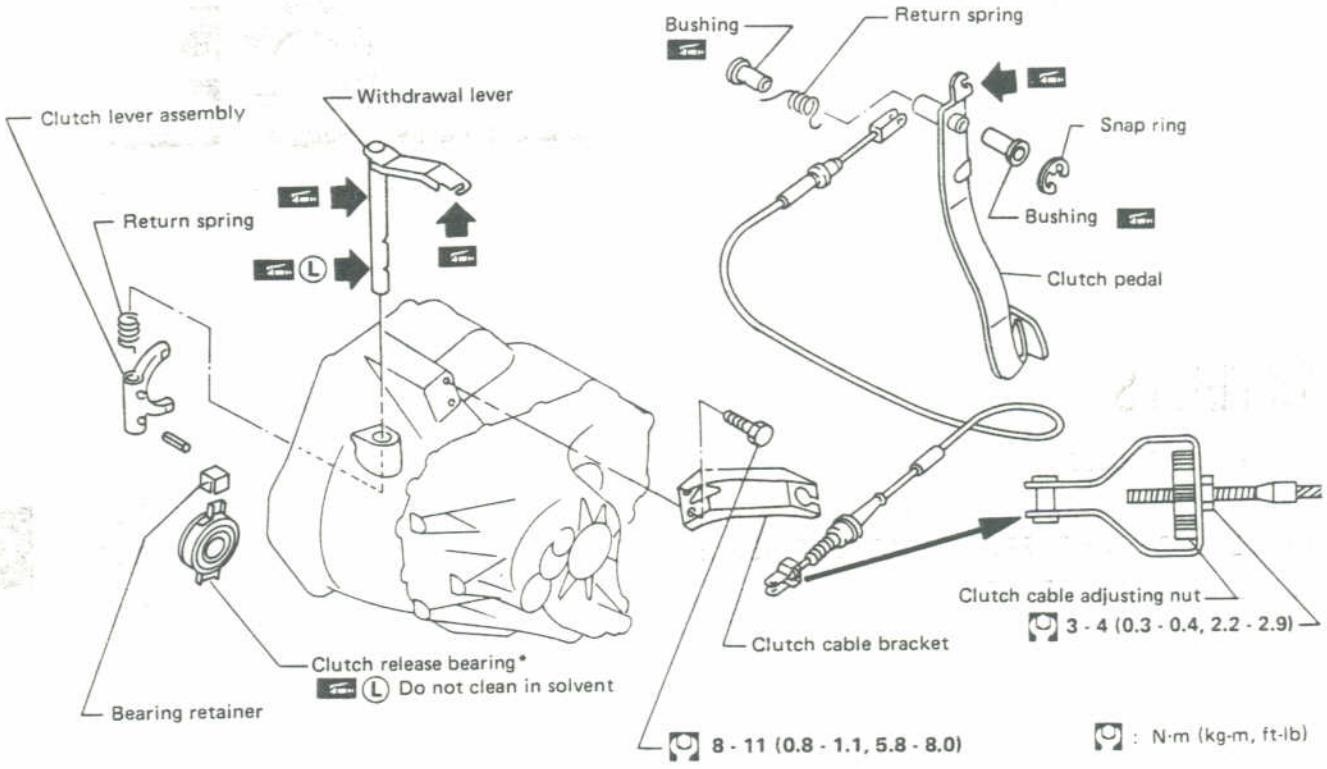
SFE849

a. When removing muffler, jack up the rear of the vehicle body to give more clearance between the floo and rear axle tube.
b. When connecting exhaust tubes, use the Genuine Nissan Sealant "Exhaust Sealant Kit 20720-N2225" o an equivalent to eliminate gas leakage at the joint.



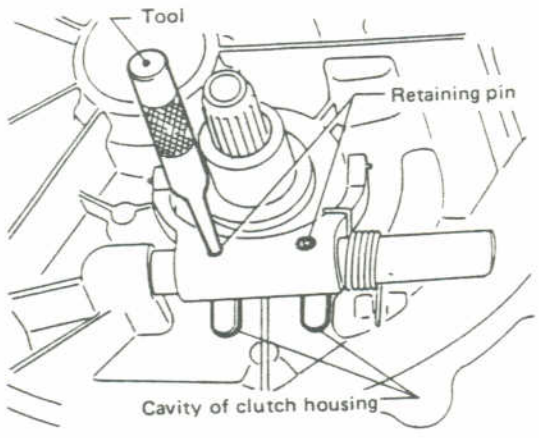
SECTION CL

CONTENTS



Removing Release Shaft

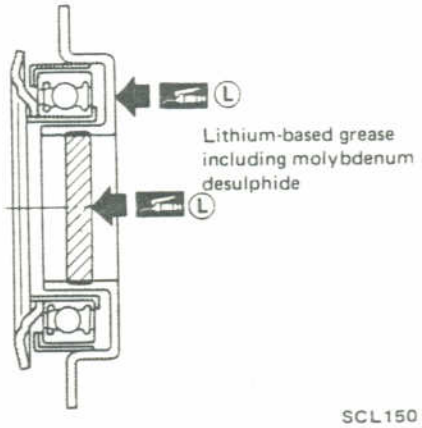
Align retaining pin with cavity of clutch housing and tap out retaining pin with Tool.



Lubricating Release Bearing

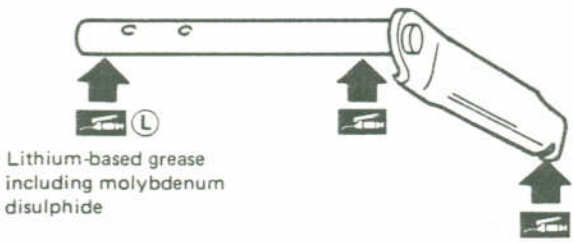
- Apply recommended grease as shown below.

Too much lubricant might cause clutch disc facing damage.



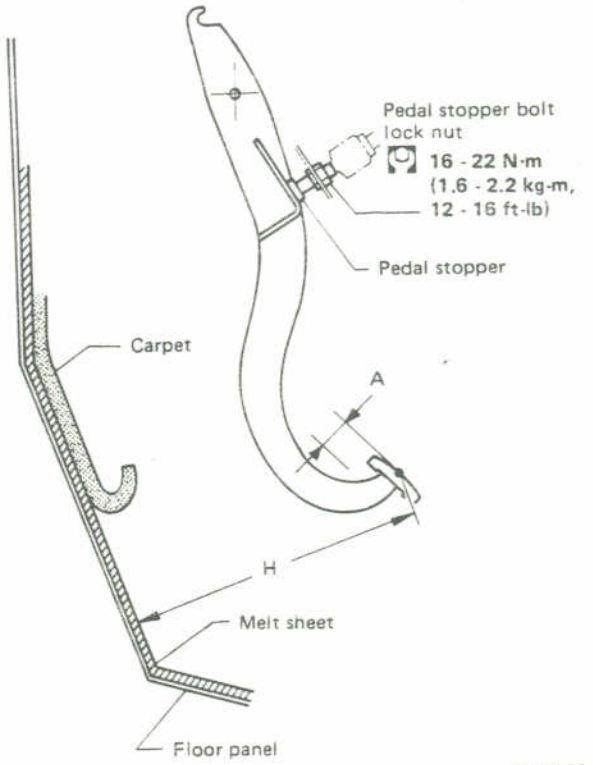
Lubricating Release Shaft

Apply recommended grease.



SCL151

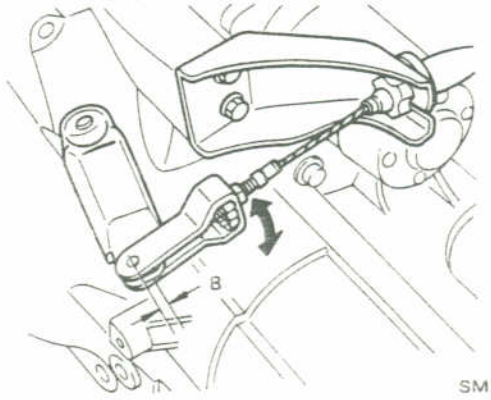
Adjusting Clutch Pedal



SCL160

Pedal height "H":
198 - 208 mm (7.80 - 8.19 in)

1. Adjust pedal height with pedal stopper.
2. Adjust withdrawal lever play "B".

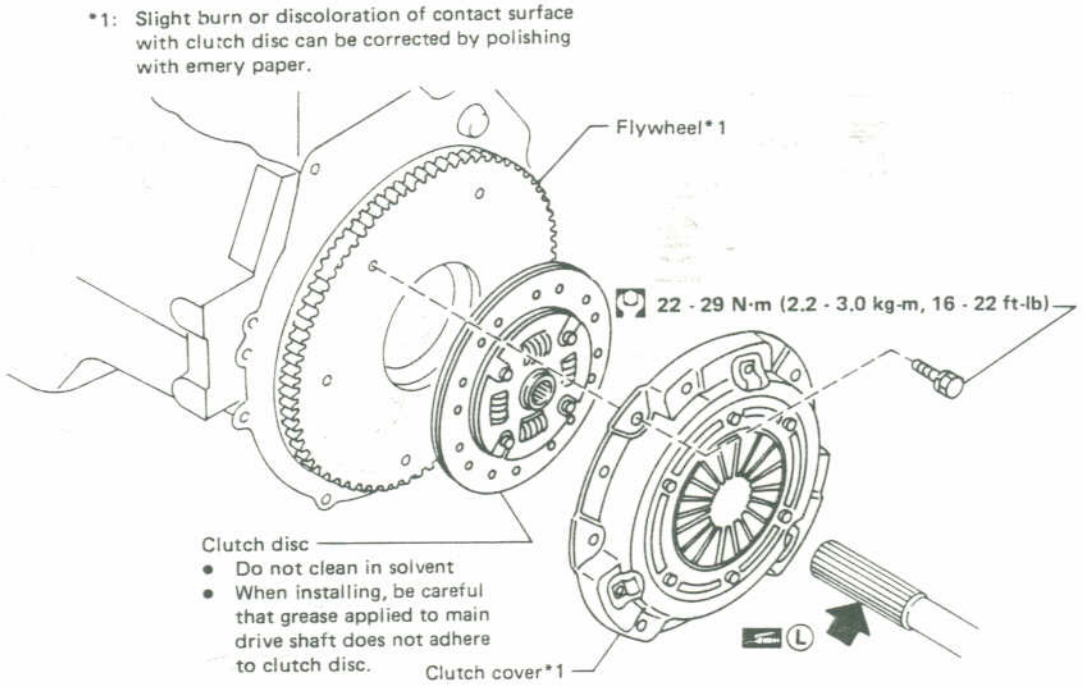


SMA316A

Withdrawal lever play "B":
2.5 - 3.5 mm (0.098 - 0.138 in)

3. As a final check, measure pedal free travel "A".

Pedal free play "A":
12.5 - 17.5 mm (0.492 - 0.689 in)

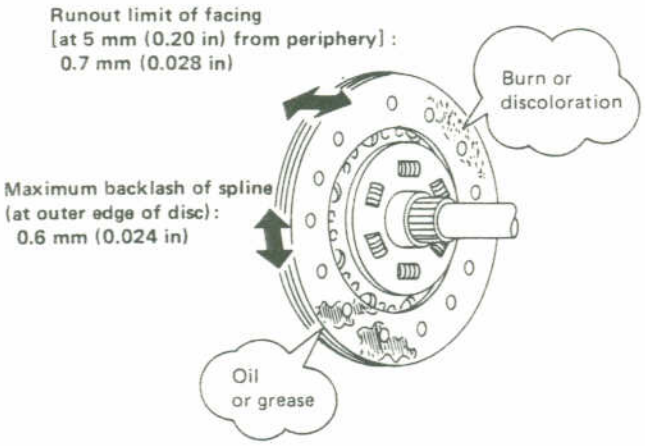


WARNING:

Clean away clutch disc dust using a dust collector after cleaning with a cloth. Do not use compressed air.

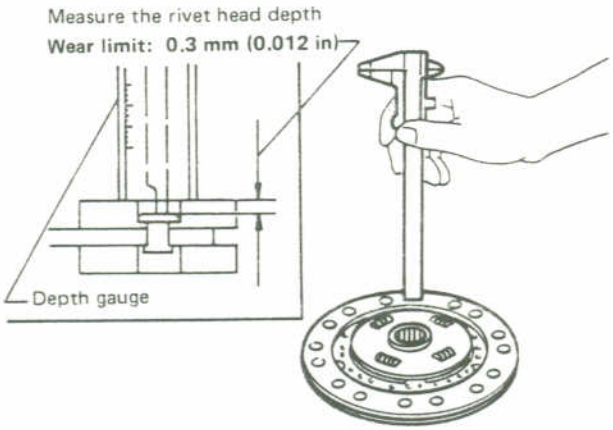
Inspecting Clutch Disc

Check clutch disc for runout, etc.



SCL153

Check clutch disc for wear.

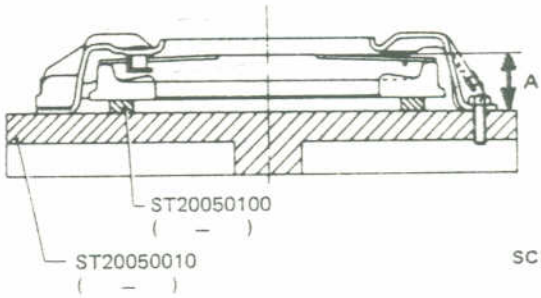


SCL159

Inspecting Clutch Cover

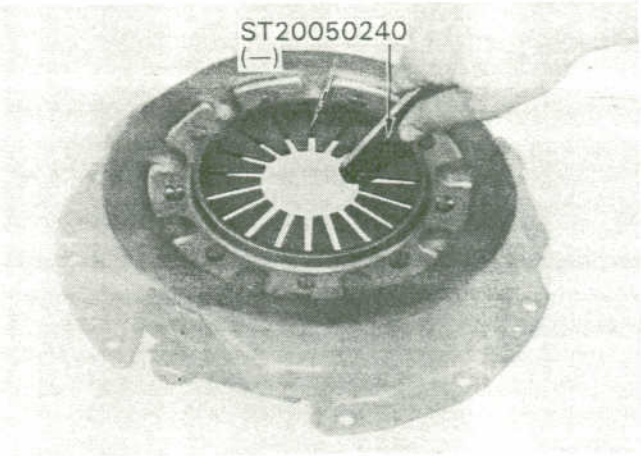
- Check height and unevenness of diaphragm spring after setting Tool.

  Diaphragm spring height "A":
  27 - 29 mm (1.06 - 1.14 in)
  Uneven limit:
  0.5 mm (0.020 in)



SCL155

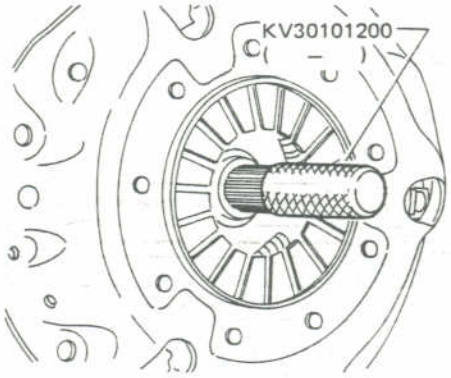
- Adjust unevenness of diaphragm spring with Tool.



- Check thrust rings for wear or damage by shaking cover assembly up and down to listen for chattering noise, or lightly hammering on rivets for a slightly cracked noise.

Installing Clutch Cover (Cont'd)

Insert Tool into clutch disc hub when installing clutch cover and disc.



SCL171

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

CLUTCH DISC

Type		160TBL
Facing size Outer dia. x Inner dia. x Thickness	mm (in)	160 x 110x 3.2 (6.30 x 4.33 x 0.126)

CLUTCH COVER

Model		D160K
Full load	N (kg, lb)	2,942 (300, 662)

Inspection and Adjustment

CLUTCH PEDAL

Unit: mm (in)

Pedal height "H"	198 - 208 (7.80 - 8.19)
Withdrawal lever play "B"	2.5 - 3.5 (0.098 - 0.138)

CLUTCH DISC

Unit: mm (in)

Model	160TBL
Wear limit of facing surface to rivet head	0.3 (0.012)
Runout limit of facing [at 5 (0.20) from periphery]	0.7 (0.028)
Maximum backlash of spline (at outer edge of disc)	0.6 (0.024)

CLUTCH COVER

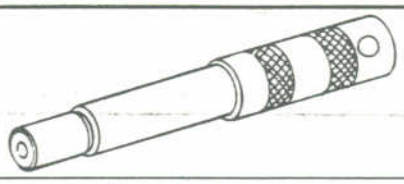
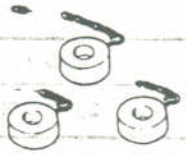
Unit: mm (in)

Model	D160K
Diaphragm spring height	27.0 - 29.0 (1.063 - 1.142)
Uneven limit of diaphragm spring toe height	0.5 (0.020)

Tightening Torque

Unit	N·m	kg-m	ft-lb
Pedal stopper bolt lock nut	16 - 22	1.6 - 2.2	12 - 16
Clutch cable adjusting lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Clutch cover securing bolt	22 - 29	2.2 - 3.0	16 - 22
Clutch cable bracket securing bolt	8 - 11	0.8 - 1.1	5.8 - 8.0

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
KV30101200 (–)	Clutch aligning bar	
ST20050100 (–)	Distance piece	
ST20050010 (–)	Base plate	
ST20050240 (–)	Diaphragm spring adjusting wrench	

MANUAL TRANSAXLE

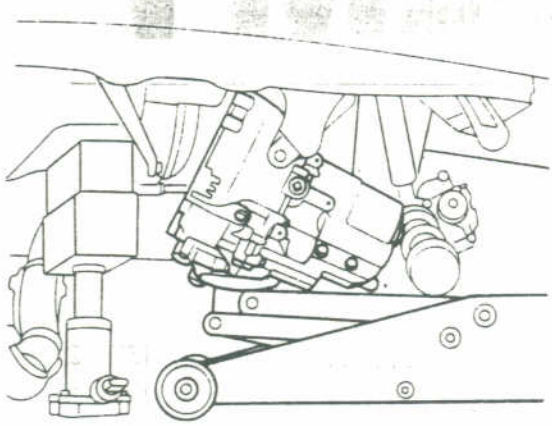
SECTION MT

CONTENTS

MT

Manual Transaxle

- Draw out drive shafts from transaxle.
  Refer to Drive Shaft (Section FA).
- Support oil pan and transaxle with jacks.



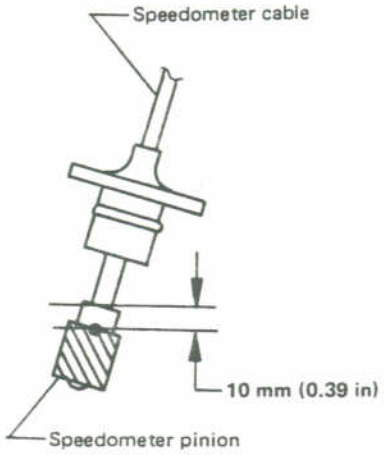
SMT687

- When installing drive shafts, refer to Drive Shaft (Section FA).
- Fill transaxle with recommended gear oil.

Oil capacity:

RS5F41A

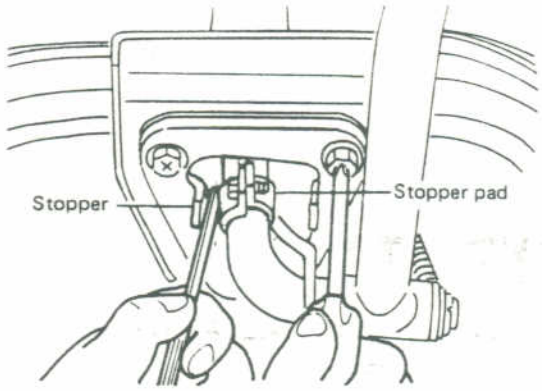
2.6 liters (5-1/2 US pt, 4-5/8 Imp pt)



SMT961

Transmission Gear Control

- Shift to 1st gear.
  Adjust the clearance between control lever and select stopper.

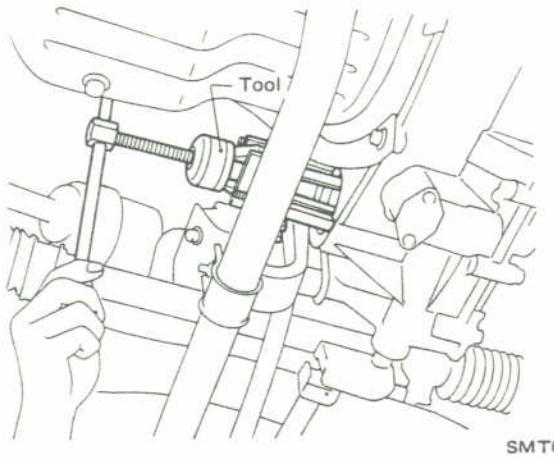


SMT793

- After adjustment, be sure to check that control lever can be shifted to all positions without binding or dragging.

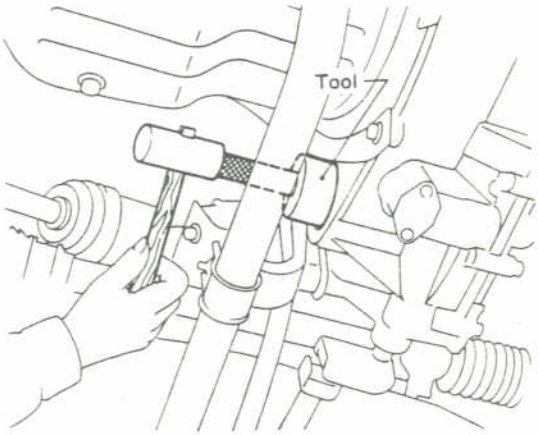
Differential Side Oil Seal

1. Pull out oil seal.



SMT621

2. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.

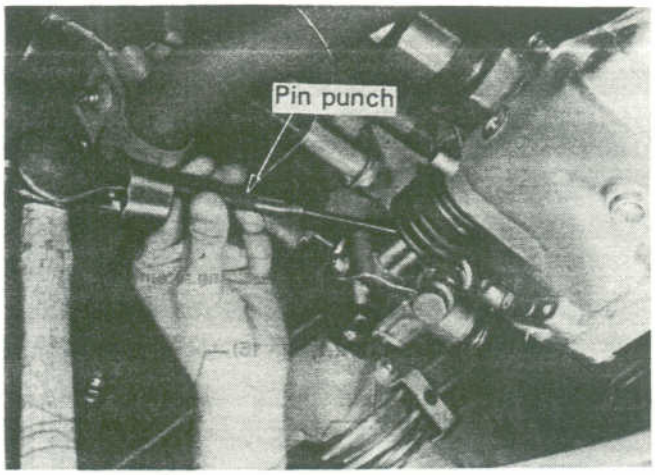


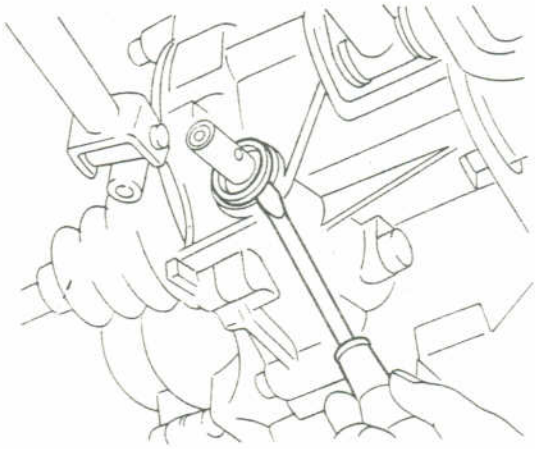
SMT622

3. Lubricate seal lip with multi-purpose grease, then install drive shafts.

Shift Control Oil Seal

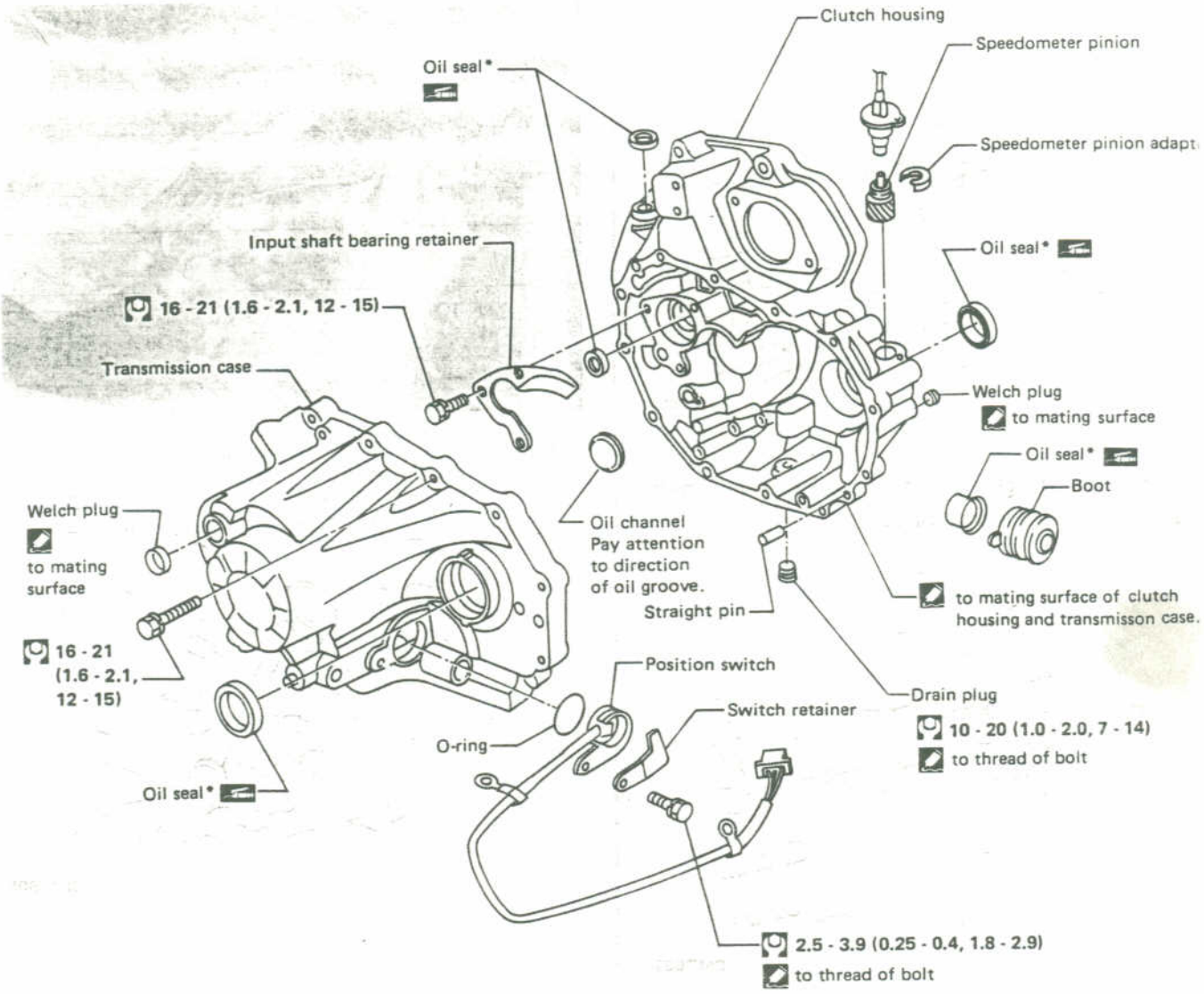
Be careful not to damage boot.





SMT806

Case Component



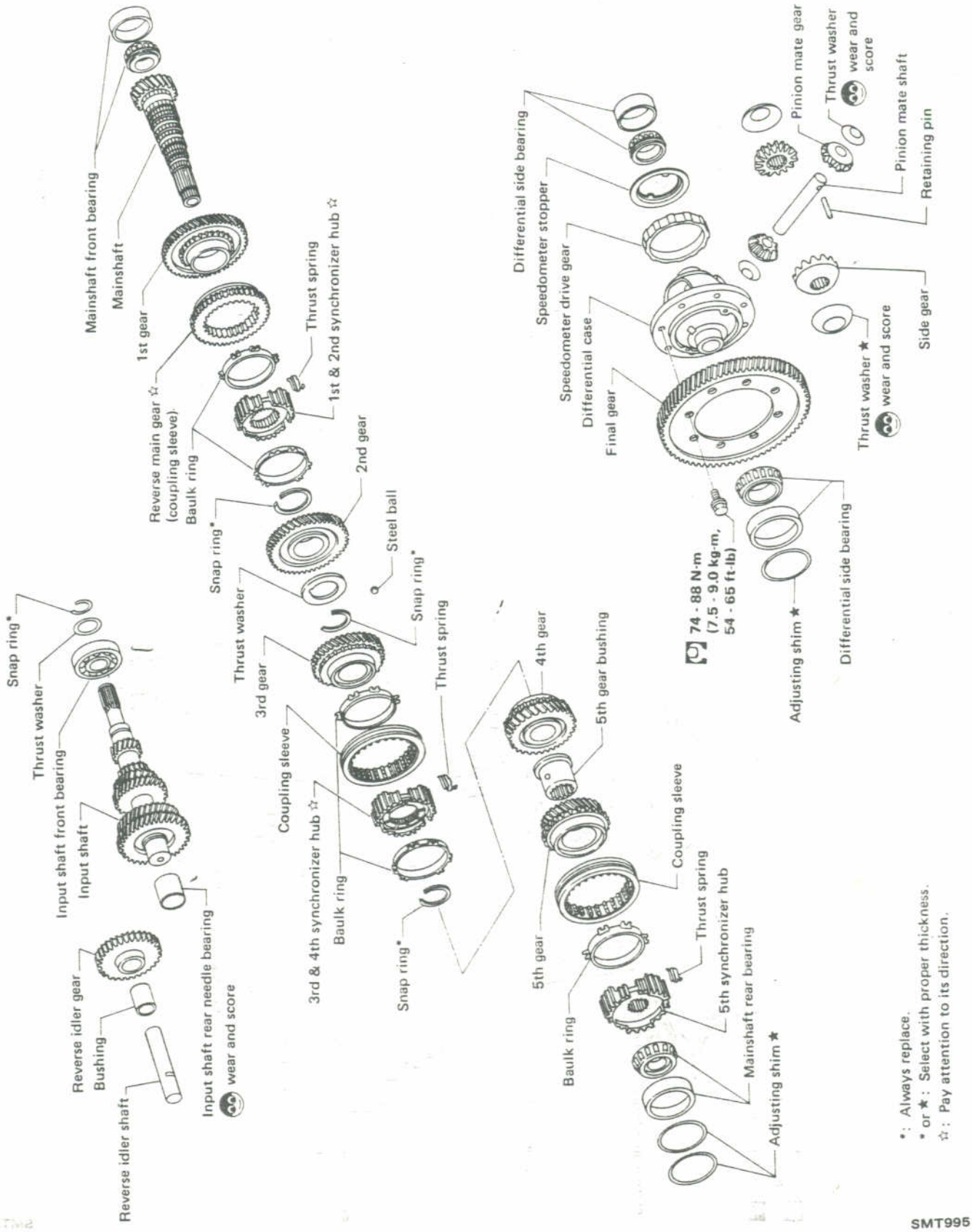
*: Always replace

: N·m (kg-m, ft-lb)

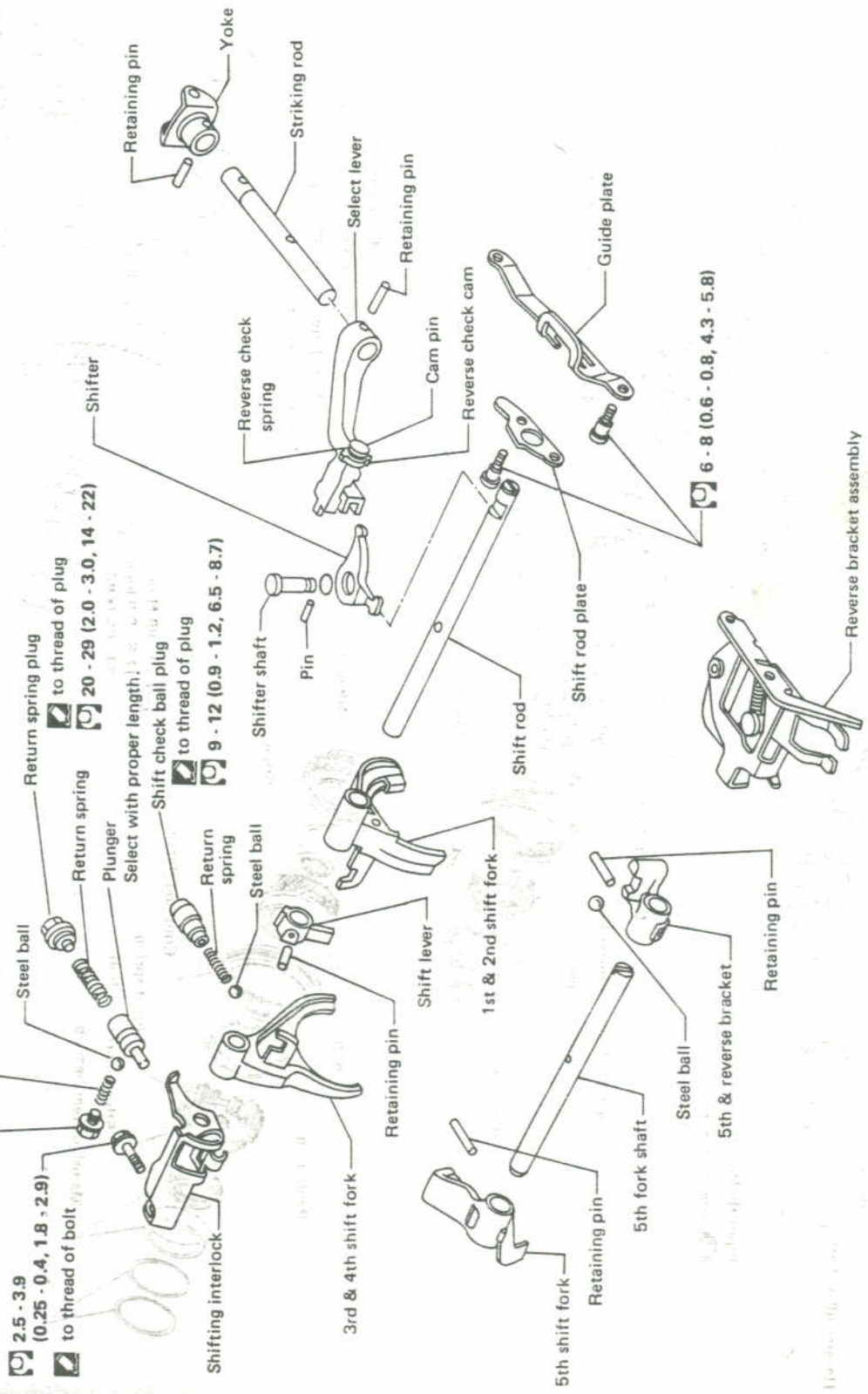
SMT879

MAJOR OVERHAUL

Gear Component



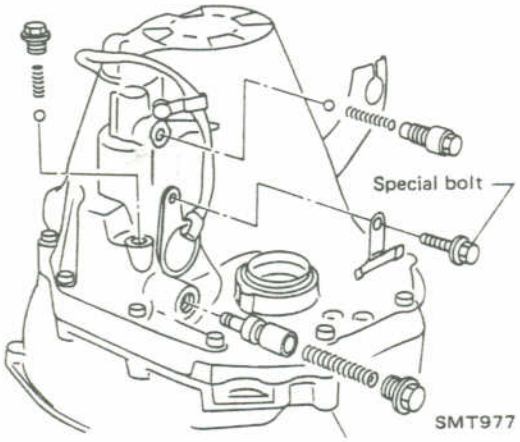
Shift Component



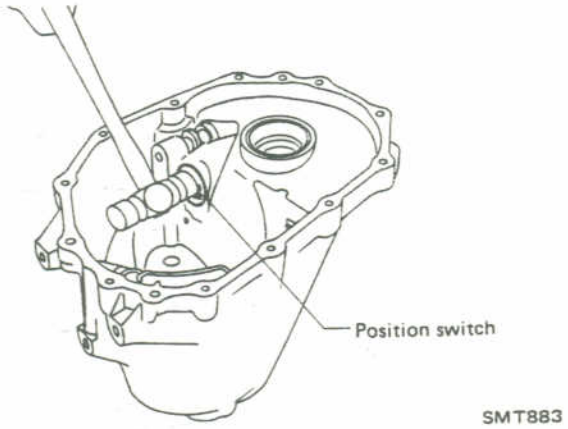
SMT996

DISASSEMBLY

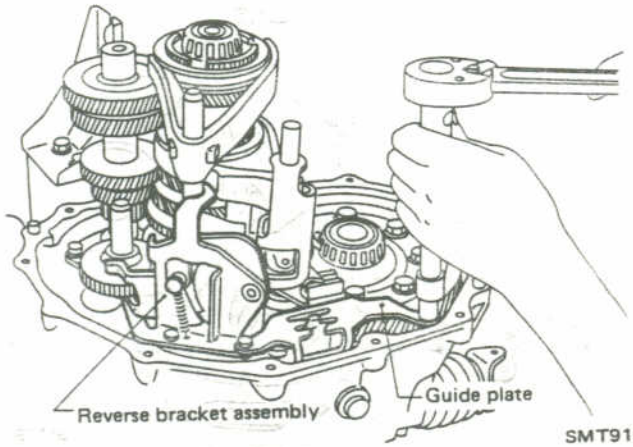
1. Before removing transaxle case, remove bolts and plugs shown below.



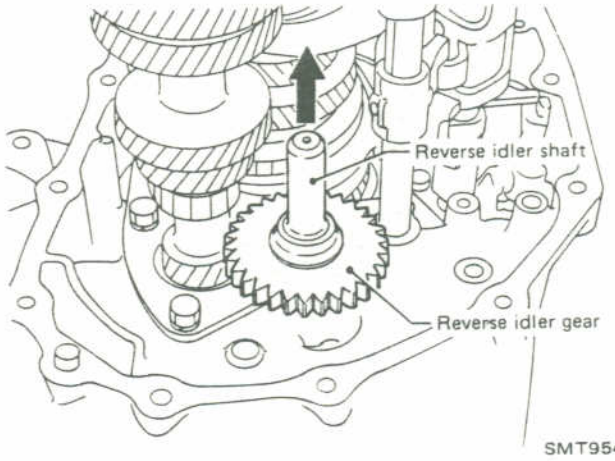
2. Remove position switch.



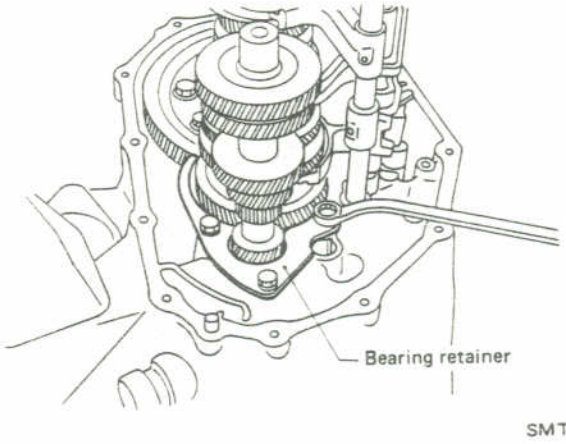
3. Take off transmission case, then remove guide plate and reverse bracket assembly.



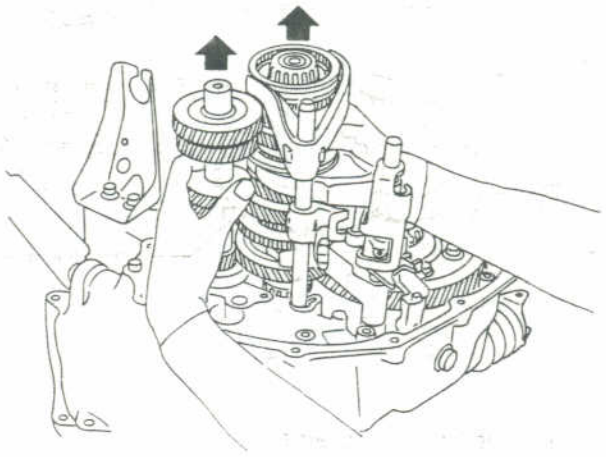
4. Remove reverse idler gear and shaft.



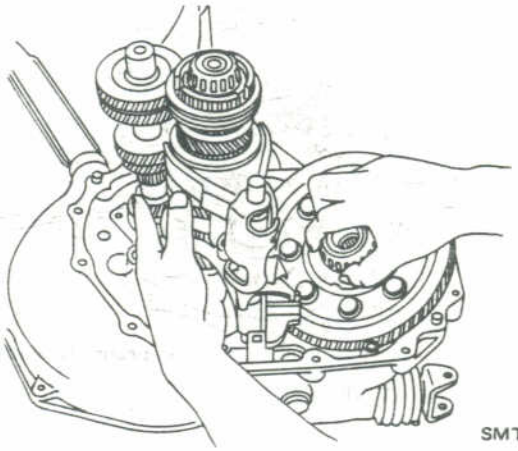
5. Remove bearing retainer.



6. Raise both input and mainshafts just enough to remove final drive assembly and withdraw final drive assembly.

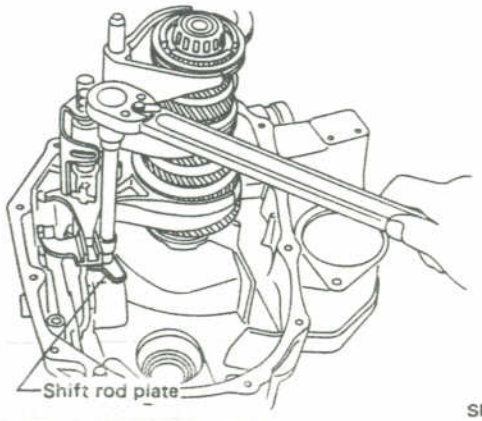


SMT884



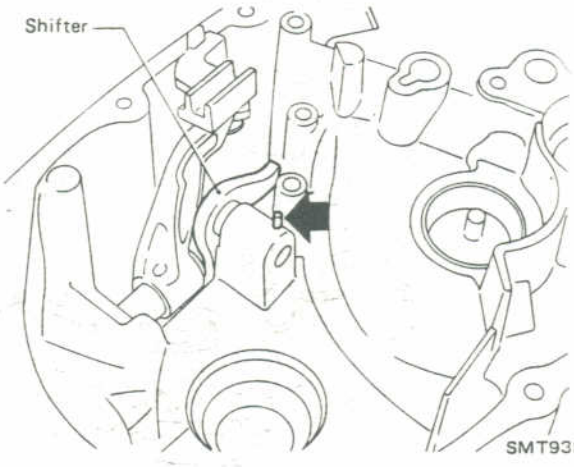
SMT885

7. Remove bolts which hold shift rod plate and detach input shaft, mainshaft, shift forks and fork rod as a unit.



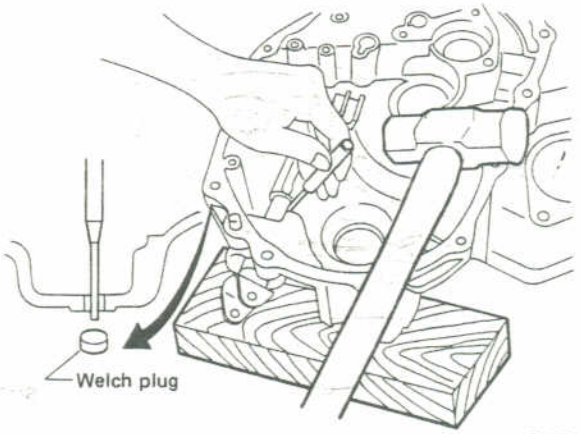
SMT933

8. Remove retaining pin and detach shifter.



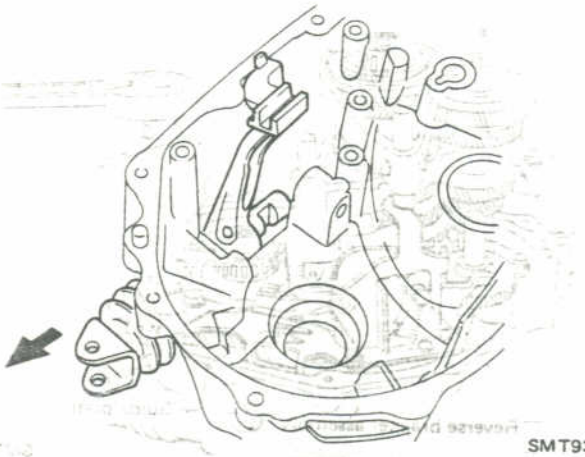
SMT93

9. Remove welch plug for convenience in removing retaining pin which holds select lever to select inner lever.



SMT936

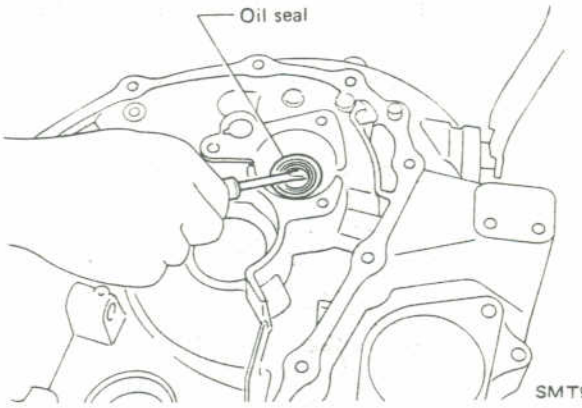
10. Withdraw select lever and striking rod.



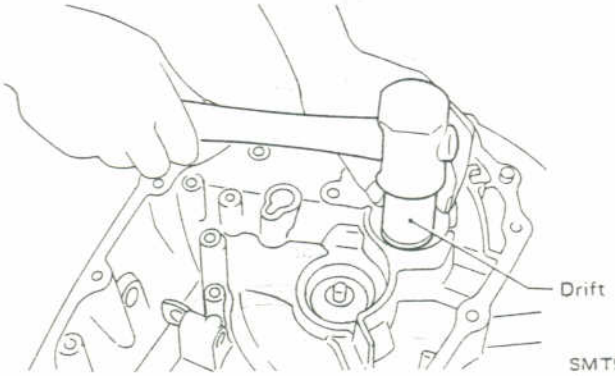
SMT937

Clutch Housing and Transmission Case

- Input shaft oil seal

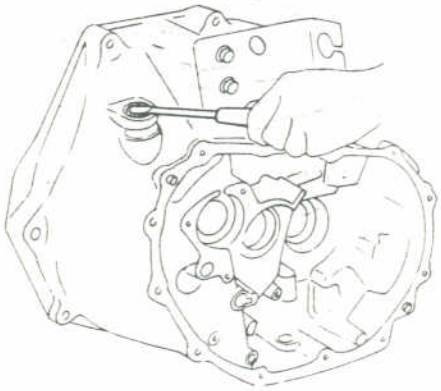


SMT939

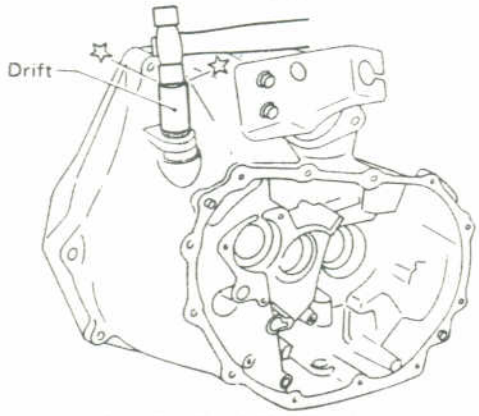


SMT940

- Clutch control shaft oil seal

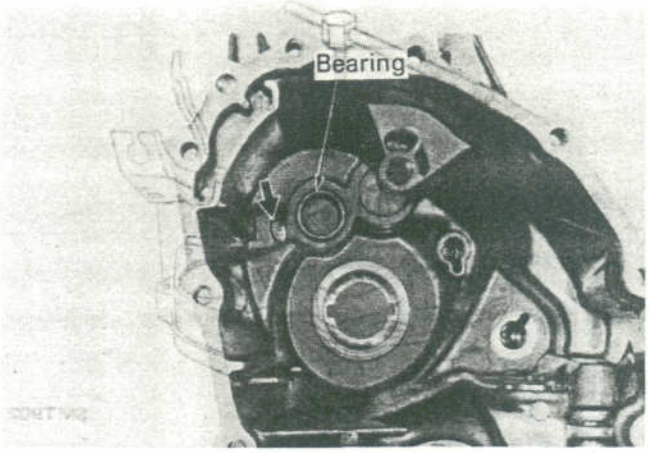


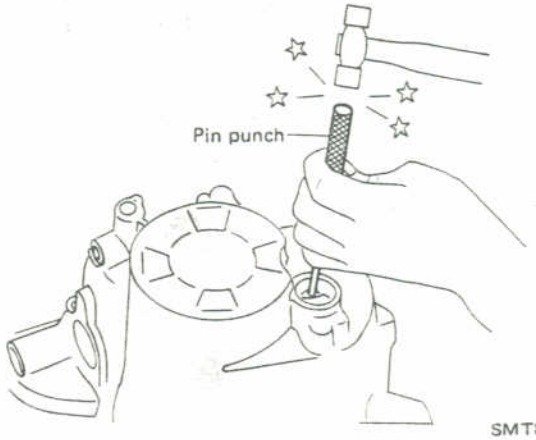
SMT941



SMT942

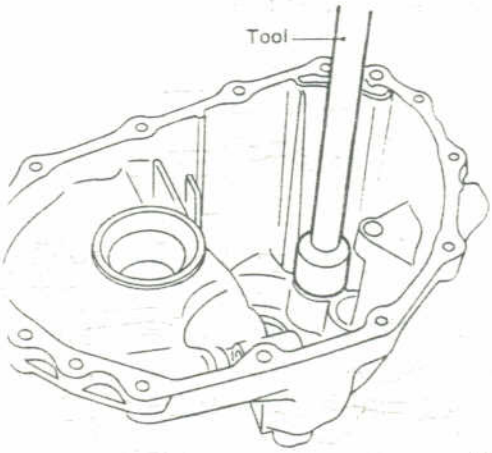
- Input shaft rear bearing.
  Remove welch plug from transmission case to detach input shaft rear bearing.





SMT899

Apply sealant to welch plug and install it on transmission case, then press fit new bearing.

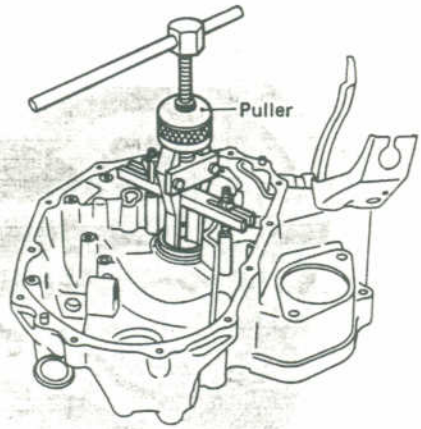


SMT900

Clutch Housing and Transmission Case (Cont'd)

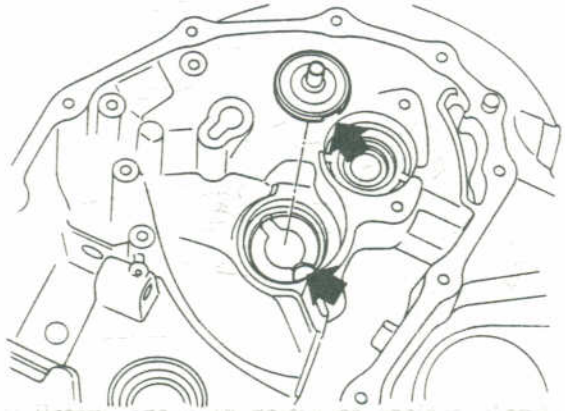
- Mainshaft front bearing outer race

(1) To avoid damaging oil channel, use a puller which has thinner pawls.



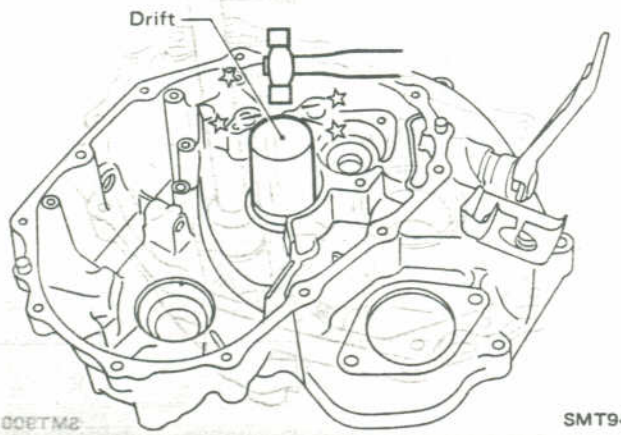
SMT902

(2) When installing new oil channel, align its cut-out portion with oil groove in transmission case.



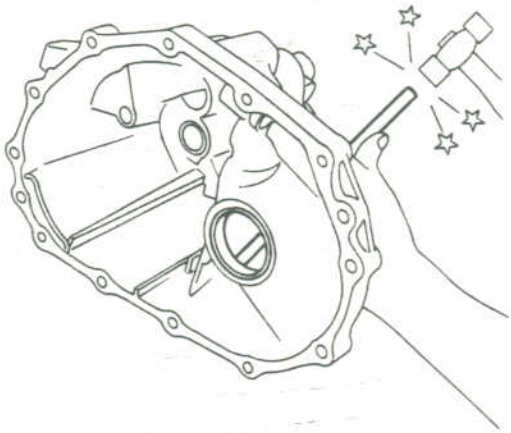
SMT903

(3) Press bearing outer race.

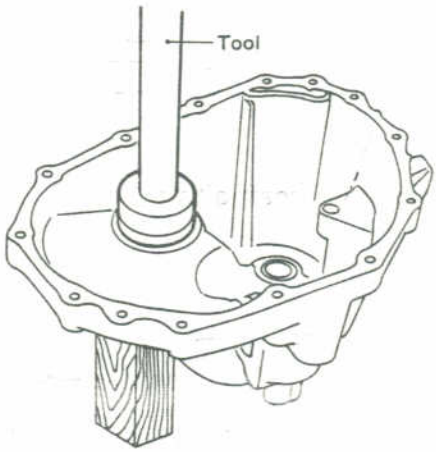


SMT943

- Mainshaft rear bearing outer race
  Refer to Mainshaft & Differential Side Bearing Preload Adjustment.
- Differential side bearing outer race



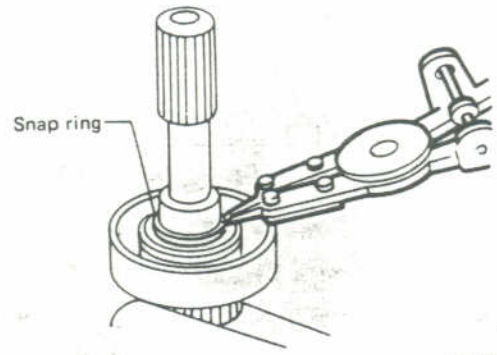
SMT907



SMT908

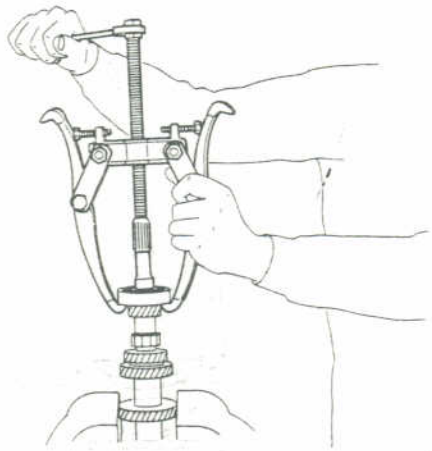
Input Shaft Front Bearing

1. Remove snap ring.



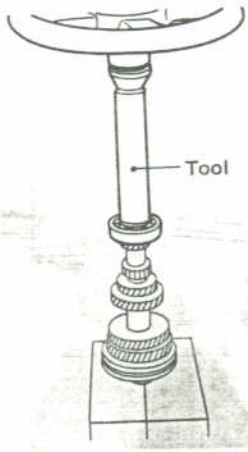
SMT629

2. Pull out input shaft front bearing.



SMT630

3. Press fit new ball bearing.



SMT631

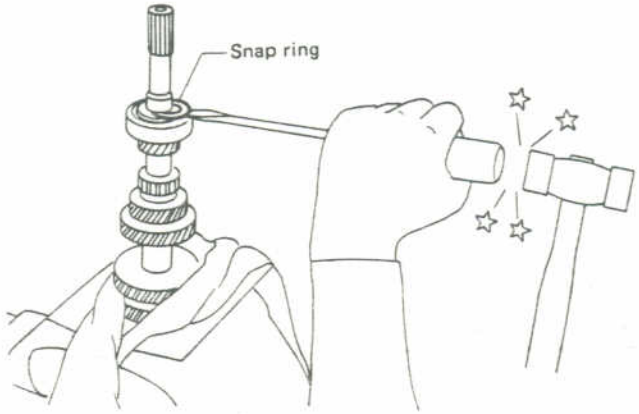
4. Install input gear spacer on front bearing and secure it with snap ring of proper thickness that will minimize clearance of groove in input shaft.

Allowable clearance of groove:
0 - 0.13 mm (0 - 0.0051 in)

Input shaft front snap ring:

mm (in)

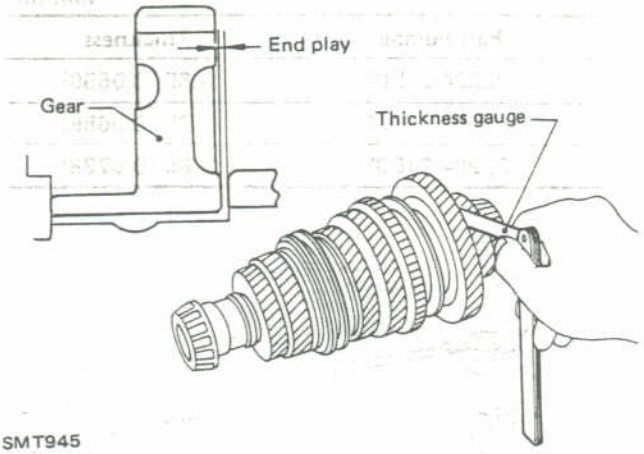
Part number	Thickness
32204-01B01	1.65 (0.0650)
32204-01B02	1.75 (0.0689)
32204-01B03	1.85 (0.0728)



SMT898

DISASSEMBLY

1. Before disassembly, measure gear end play.
- Measure end play to insure that it is within the specified limit.
- If end play is not within the specified limit, disassemble and check the parts.
- Replace any part which is worn or damaged.



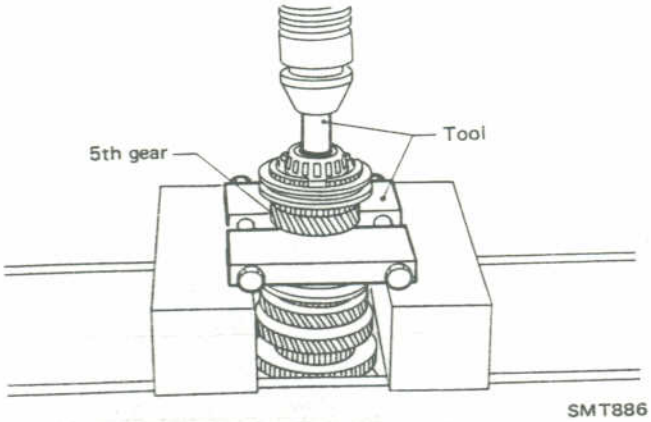
SMT945

Standard end play:

mm (in)

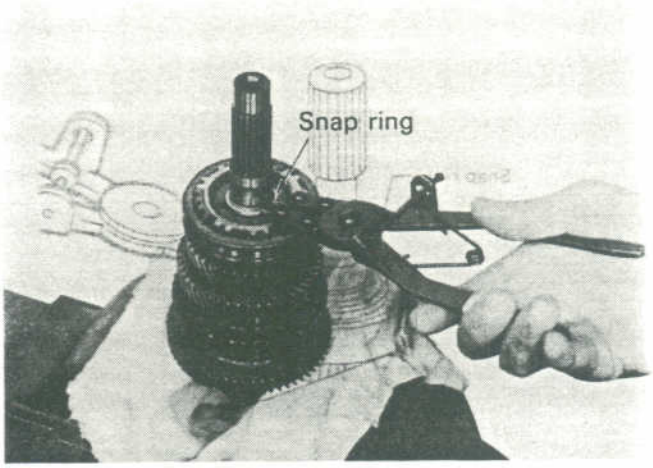
Position	
1st	0.22 - 0.44 (0.0087 - 0.0173)
2nd	0.22 - 0.54 (0.0087 - 0.0213)
3rd	0.22 - 0.49 (0.0087 - 0.0193)
4th	0.22 - 0.39 (0.0087 - 0.0154)
5th	0.22 - 0.29 (0.0087 - 0.0114)

2. Remove mainshaft bearing, 5th synchronizer and 5th gear.

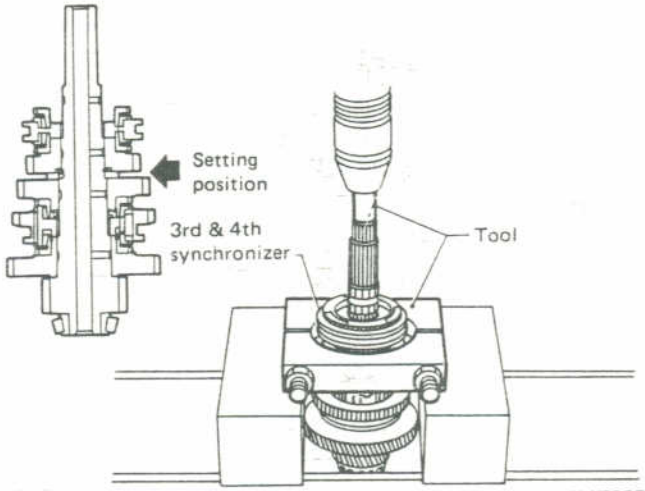


SMT886

3. Remove 5th gear bushing, 4th gear and snap ring.

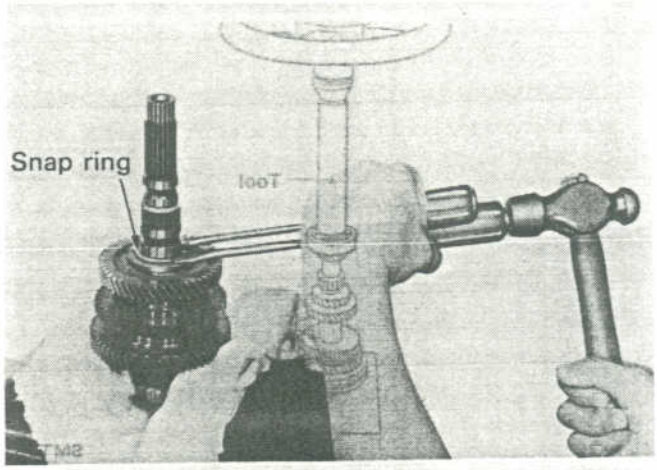


4. Remove 3rd & 4th synchronizer and 3rd gear.



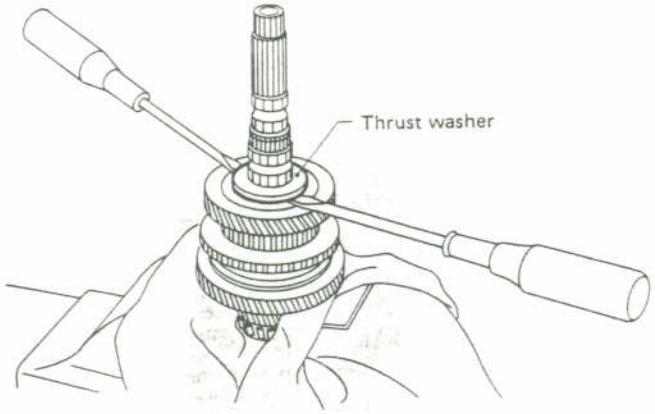
SMT887

5. Remove snap ring.



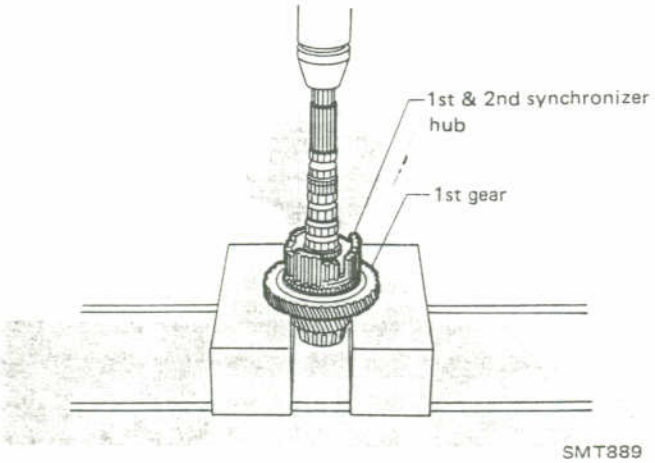
Mainshaft and Gears (Cont'd)

6. Remove thrust washer and steel ball.



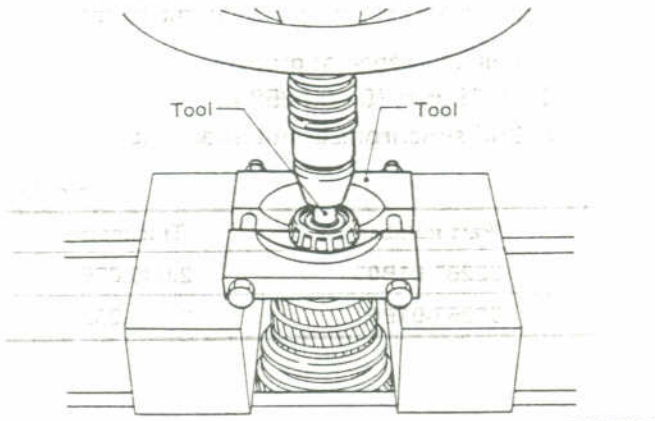
SMT888

7. Remove 2nd gear and snap ring. Then, remove 1st & 2nd synchronizer hub and 1st gear.



SMT889

8. Remove mainshaft front bearing inner race.



SMT638

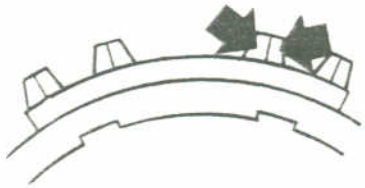
INSPECTION

Gears and shafts

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shaft for bending, crack, wear or worn spline; if necessary, replace.

Baulk ring

1. Replace baulk ring if found to be deformed, cracked or otherwise damaged excessively.



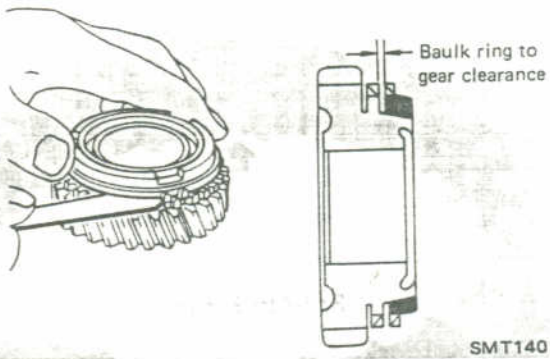
SMT911

2. Place baulk ring in position on gauge cone. While holding baulk ring against gear as far as it will go, measure gap between baulk ring and outer gear.
   If the clearance is smaller than the wear limit, discard baulk ring.

Baulk ring to gear clearance:

Standard
1.0 - 1.35 mm (0.039 - 0.0531 in)

Wear limit
Less than 0.7 mm (0.028 in)

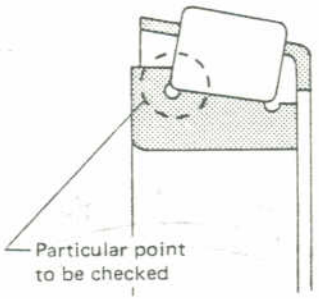


SMT140

Mainshaft and Gears (Cont'd)

Bearing

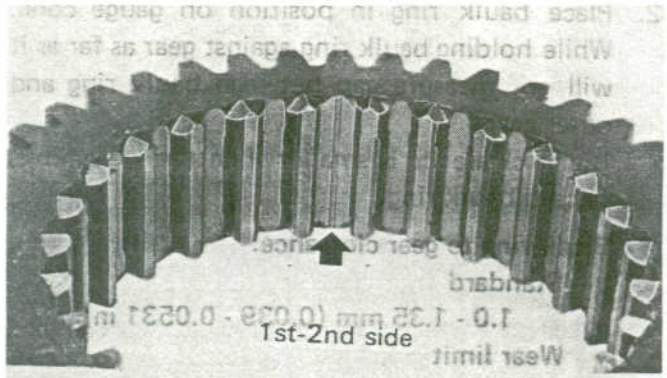
1. Thoroughly clean bearing and dry with compressed air.
2. Check bearings for wear, scratches, pitching or flaking.
   Check tapered roller bearing for a burned out portion as shown in the figure below. If damaged, replace outer and inner races as a set.

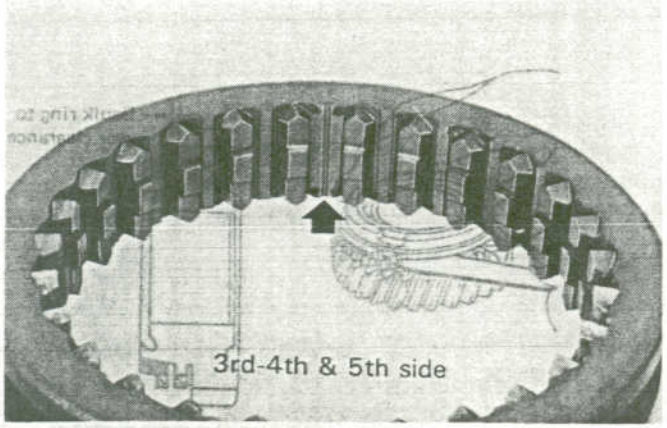


SPD458

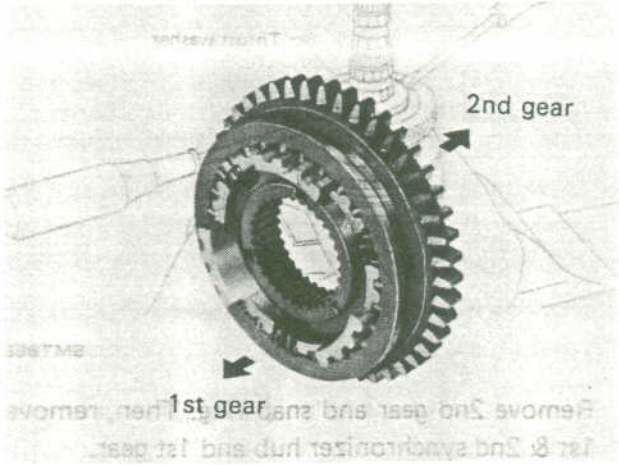
ASSEMBLY

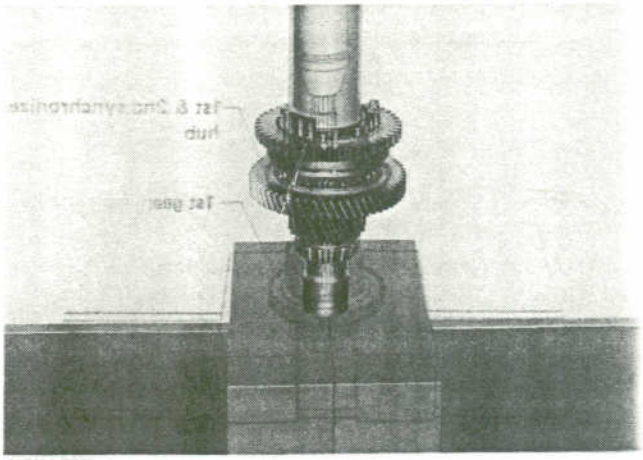
1. Place inserts in the three grooves on the coupling sleeve (1st & 2nd synchronizer, 3rd & 4th synchronizer, 5th synchronizer).





2. Apply gear oil to 1st gear inner surface, the install 1st gear and 1st baulk ring.
3. Press 1st & 2nd synchronizer hub, paying a tention to its direction.





4. Install snap ring of proper thickness that wil minimize clearance of groove in mainshaft.

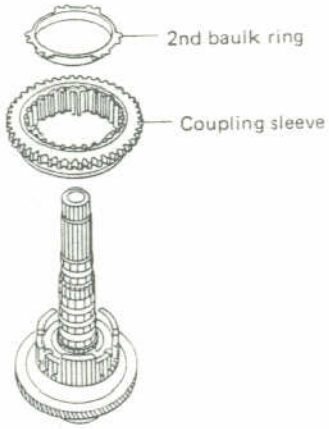
Allowable clearance of groove:
0 - 0.15 mm (0 - 0.0059 in)
1st & 2nd synchronizer hub snap ring:

mm (in)

Part number	Thickness
32257-01B00	2.0 (0.079)
32257-01B01	2.1 (0.083)

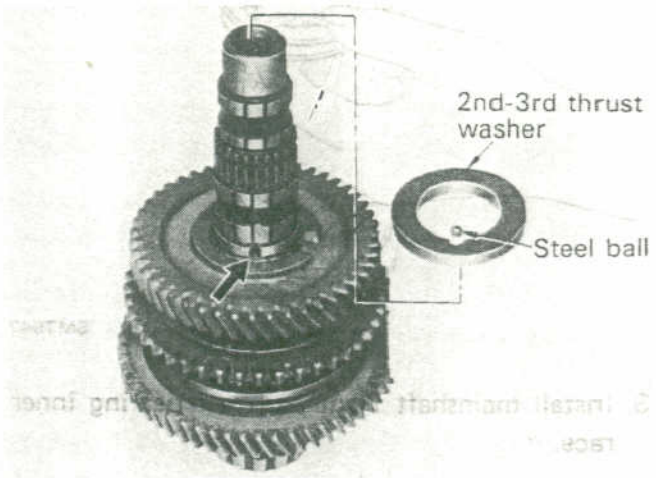
Mainshaft and Gears (Cont'd)

5. Install coupling sleeve with three inserts and 2nd baulk ring.



SMT921

6. Apply gear oil to 2nd gear inner surface, then install 2nd gear and steel ball. Press 2nd-3rd thrust washer.

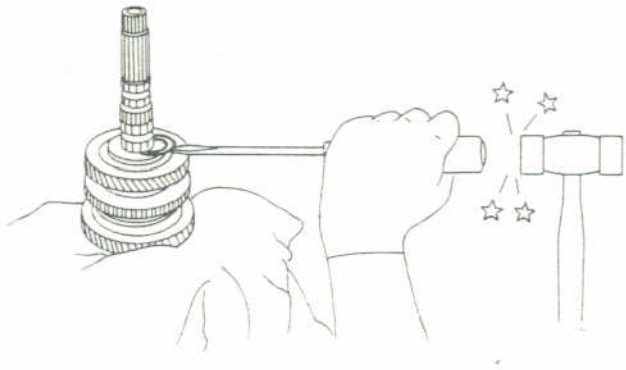


7. Install snap ring of proper thickness that will minimize clearance of groove in mainshaft.

Allowable clearance of groove:
0 - 0.15 mm (0 - 0.0059 in)
2nd gear snap ring:

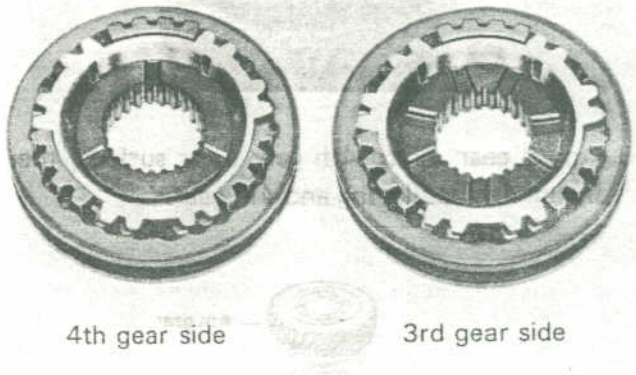
mm (in)

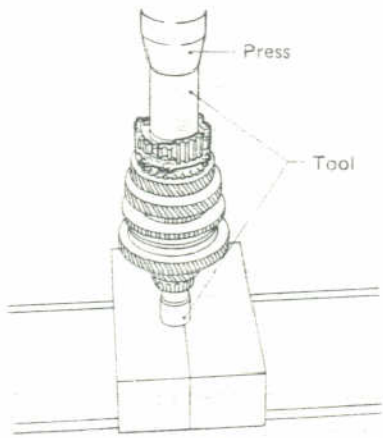
Part number	Thickness
32269-01B00	2.0 (0.079)
32269-01B01	2.1 (0.083)



SMT922

8. Apply gear oil to 3rd gear inner surface, then install 3rd gear and 3rd baulk ring, then press 3rd-4th synchronizer hub.
Pay attention to the direction of 3rd-4th synchronizer hub.





SMT923

9. Install snap ring of proper thickness that will minimize clearance of groove in mainshaft.

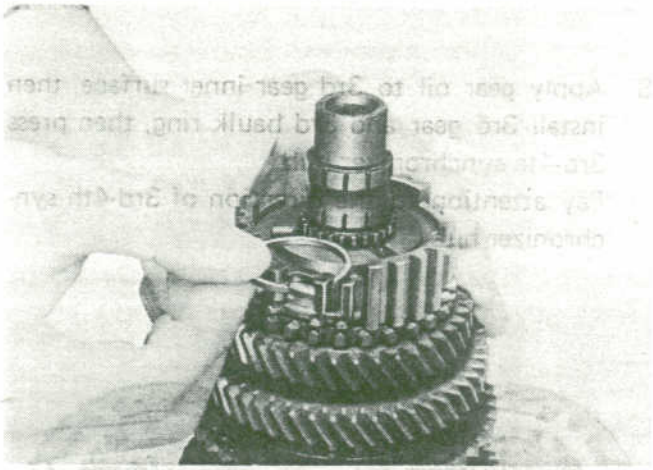
   Allowable clearance of groove:

   0 - 0.15 mm (0 - 0.0059 in)

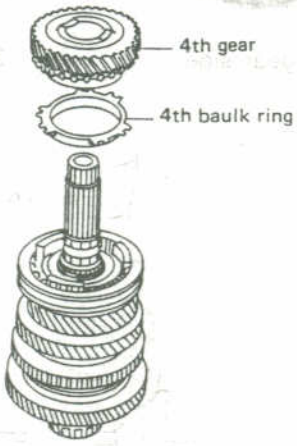
   3rd-4th synchronizer hub snap ring:

mm (in)

Part number	Thickness
32279-01B02	2.0 (0.079)
32279-01B03	2.1 (0.083)

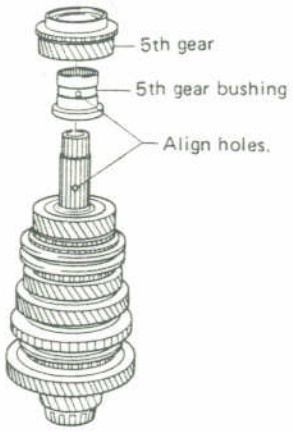


10. Apply gear oil to 4th gear inner surface, then install 4th baulk ring and 4th gear.



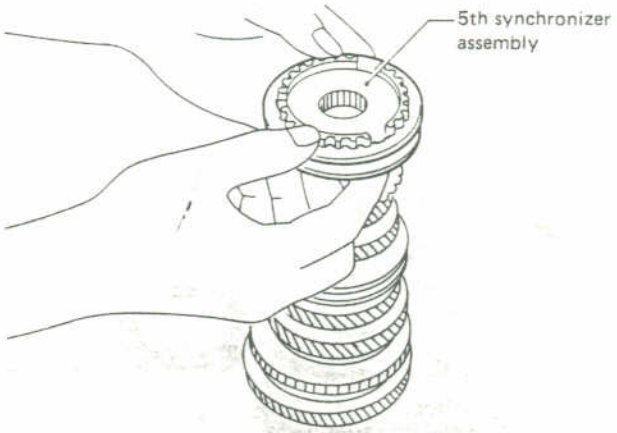
SMT924

11. Apply gear oil to inner and outer surface of 5th gear bushing, then install 5th gear bushing and 5th gear.



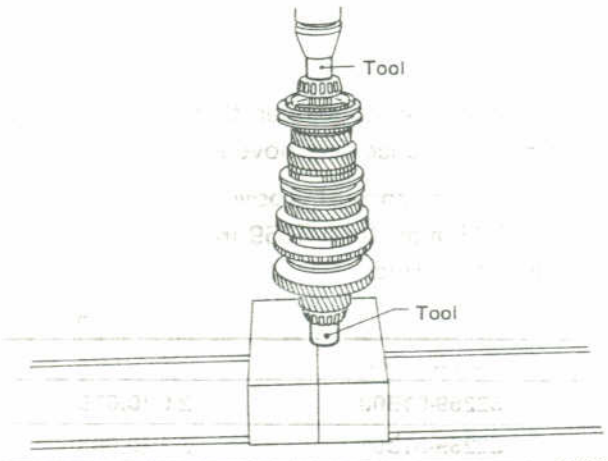
SMT946

12. Install 5th baulk ring and 5th synchronizer assembly.



SMT947

13. Install mainshaft front and rear bearing inner race.



SMT905

Mainshaft and Gears (Cont'd)

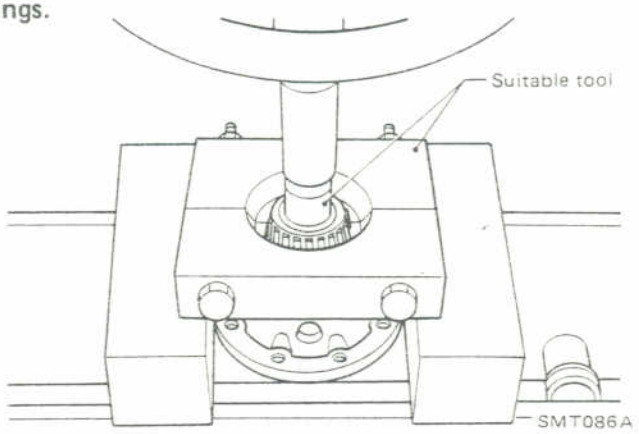
14. Measure gear end play. Regarding the description, refer to Disassembly of Mainshaft and Gears.

Final Drive

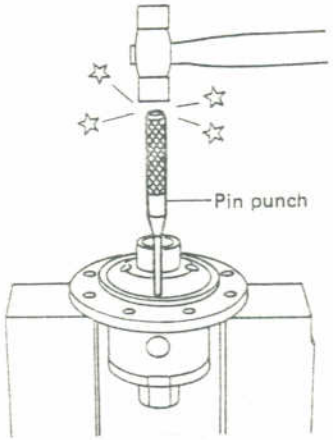
DISASSEMBLY

1. Drive out differential side bearing inner races.

Be careful not to mix up the right and left bearings.

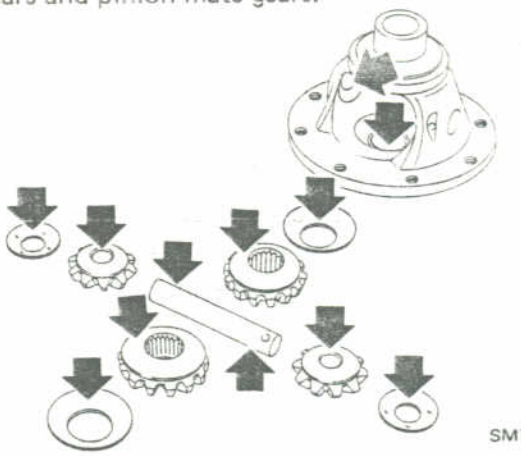


2. Drive out pinion mate shaft lock pin and draw out pinion mate shaft.



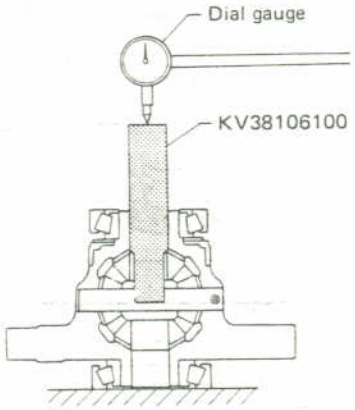
INSPECTION

1. Check mating surfaces of differential case, side gears and pinion mate gears.



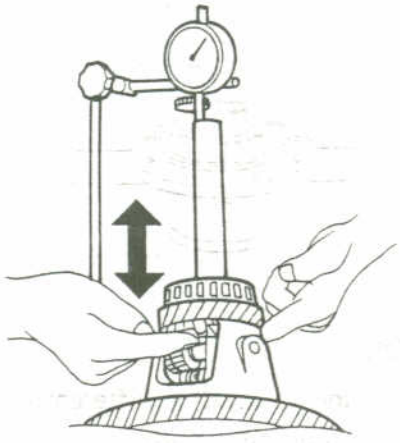
2. Check clearance between side gear and pinion mate gear following the procedure below.

(1) Set Tool and dial gauge on side gear.



SMT912

(2) Move side gear up and down to measure dial gauge deflection. Always measure gauge deflection on both side gears.

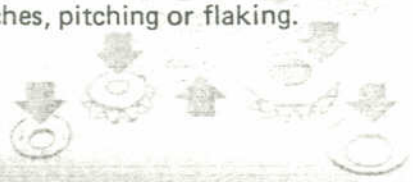


SMT913

Side gear to pinion mate clearance:
0 - 0.3 mm (0 - 0.012 in)

(3) If clearance exceeds the specified value, check for wear and replace necessary parts.

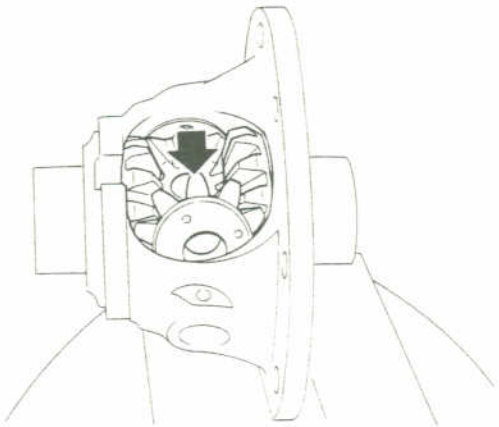
3. Check tapered roller bearings for wear, scratches, pitching or flaking.



SCPT142

ASSEMBLY

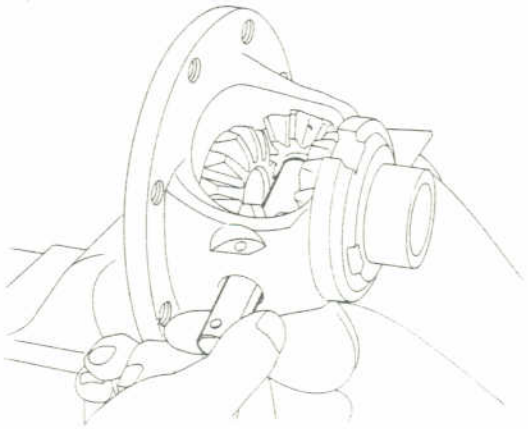
1. Fit side gear thrust washers and side gears, then install pinion mate washers and pinion mate gears in place.



SMT839

2. Insert pinion mate shaft.

When inserting, be careful not to damage pinion mate washers.



SMT84

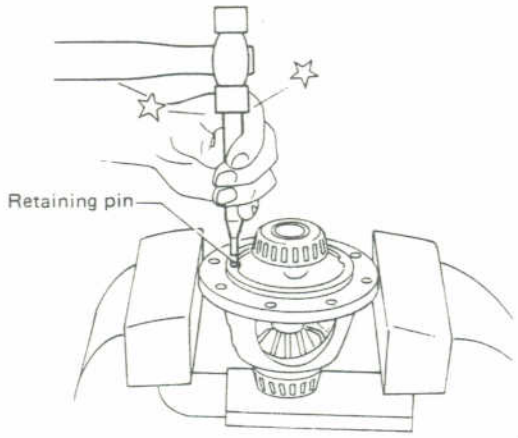
3. Measure clearance between side gear and pinion mate gear, referring to "Inspection". If necessary, adjust.

Side gear to pinion mate clearance:
0 - 0.3 mm (0 - 0.012 in)
Side gear thrust washer: Refer to S.D.S.

4. Install pinion mate shaft lock pin using a punch.

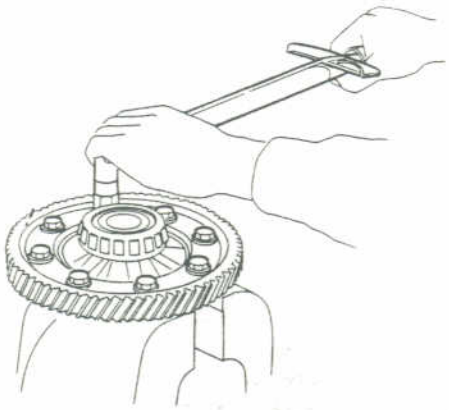
Final Drive (Cont'd)

Make sure that lock pin is flush with case.



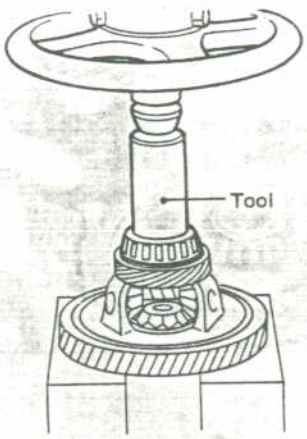
SMT916

5. Install final gear.



SMT620

6. Install speedometer drive gear and stopper.
7. Install differential side bearing inner race.



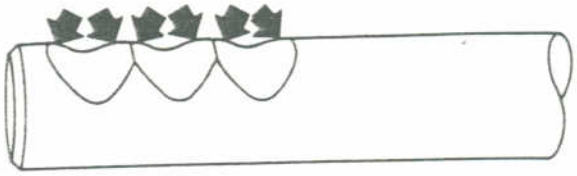
SMT648

Transmission Shift Control Mechanism

INSPECTION

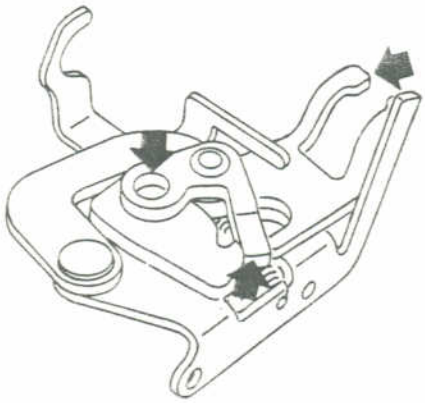
Clean with solvent and check for wear, scratches, projections, damage or other faulty conditions. Replace any part which is worn or damaged.

Fork rod



SMT909

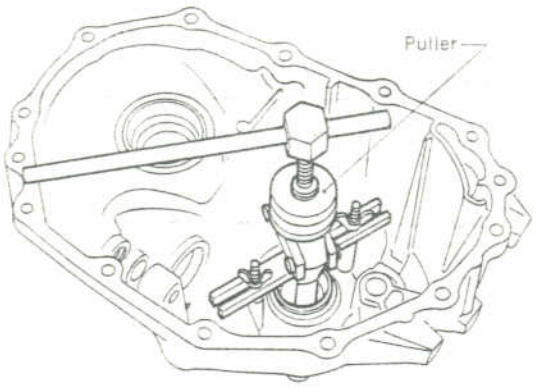
Reverse bracket



SMT925

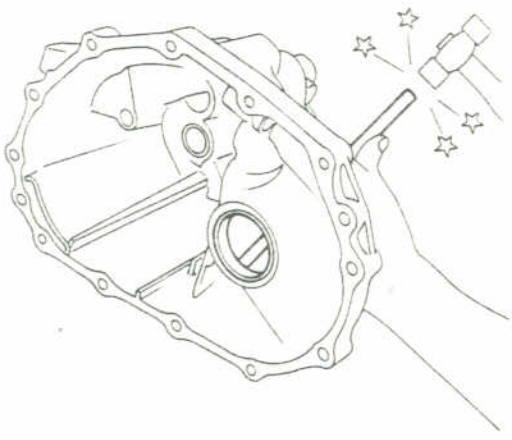
Whenever clutch housing, transmission case, mainshaft, differential case or taper roller bearing is replaced, it is necessary to select a suitable amount of shims.

1. Remove mainshaft front and rear bearing outer race, shim(s) and oil channel.



SMT906

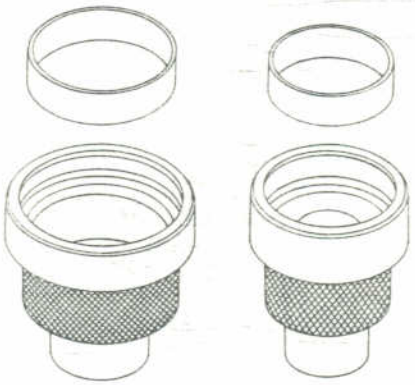
2. Install mainshaft rear bearing outer race without shim.
3. Remove differential side bearing outer race (transmission case side) and shim(s).



SMT907

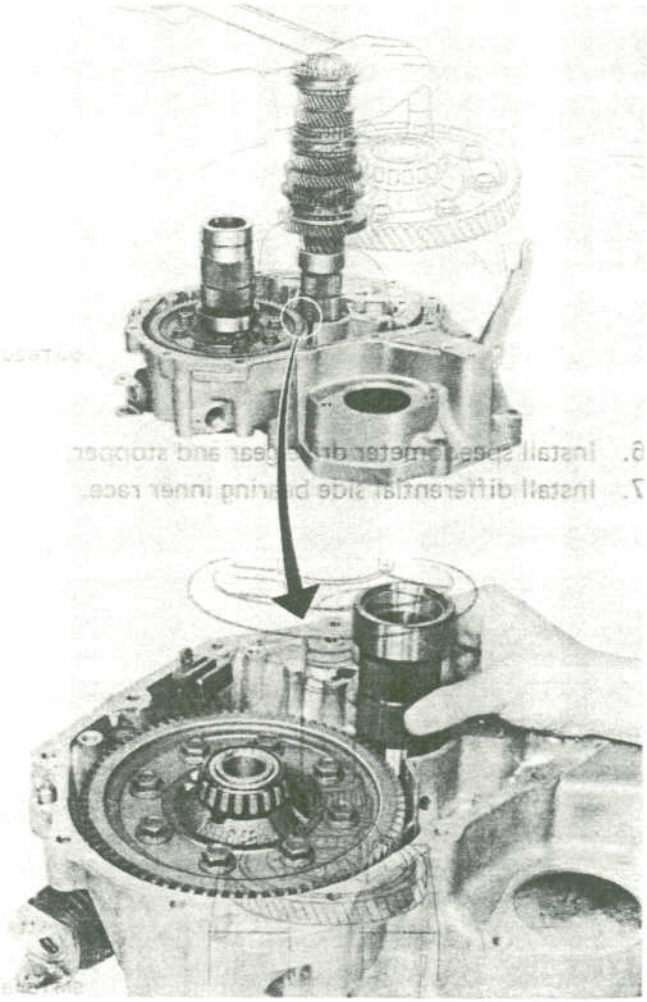
4. Place final drive assembly on clutch housing.

5. Install bearing outer races to mainshaft adjuster (A) and differential side bearing adjuster (A).

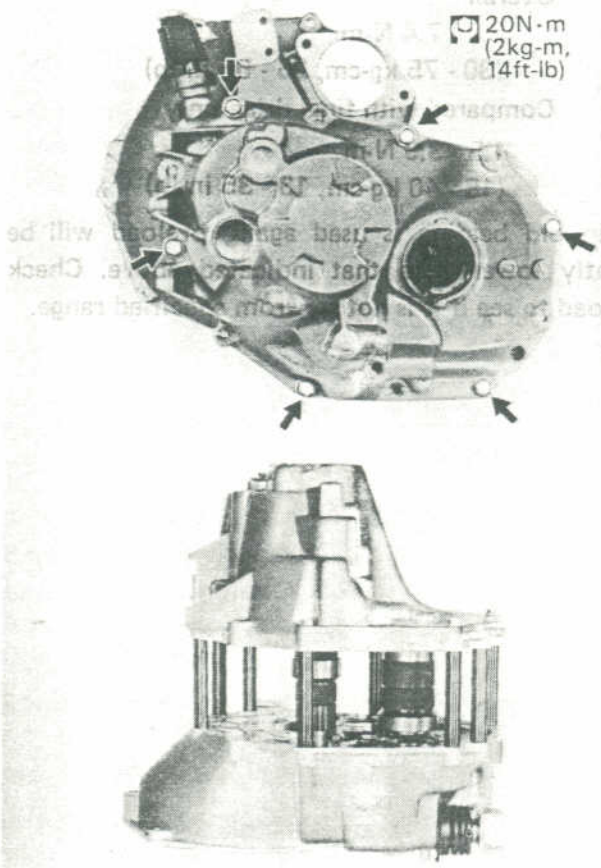


SMT935

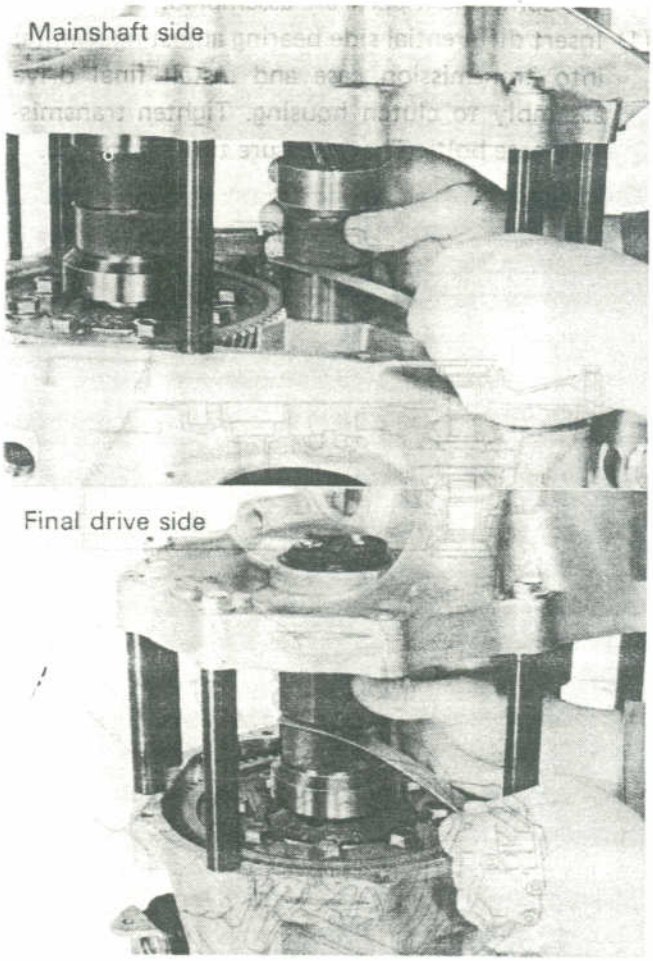
6. Set up special service tools and mainshaft assembly. Pay attention to cutout portion of mainshaft adjuster (B).



7. Position transmission case above dowel pins and collars and set collars in positions shown in figure below.



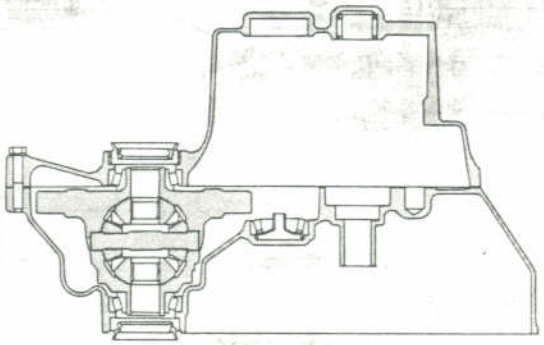
8. Using a feeler gauge, measure clearances between mainshaft adjusters (A) and (B) and between differential side bearing adjusters (A) and (B).

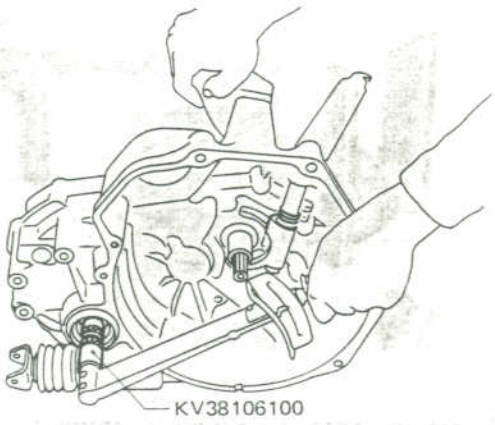


9. Determine total thickness of shims to be used at adjusters, using S.D.S. table as a guide.

10. To make sure the correct thickness of shim is selected, measure the following:
    ① Turning torque of final drive only
    ② Total turning torque (measure after all component parts are assembled.)

(1) Insert differential side bearing adjusting shim(s) into transmission case and install final drive assembly to clutch housing. Tighten transmission case bolts. Then measure turning torque.





SMT962

Final drive turning torque
(New bearing):
1.5 - 3.4 N·m
(15 - 35 kg-cm, 13 - 30 in-lb)

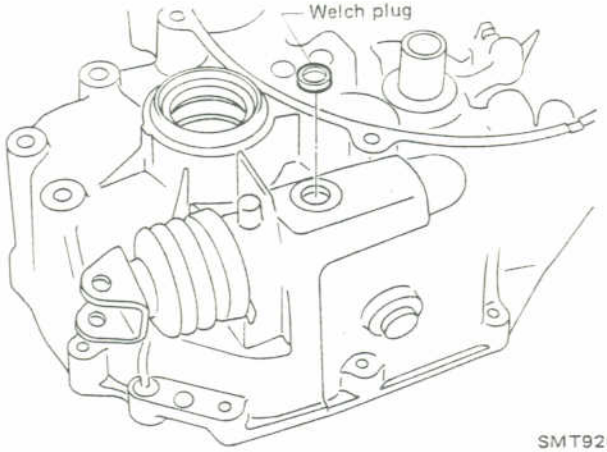
When old bearing is used again, preload will be slightly lower than that indicated above. Check preload to see if it is not far from specified range.

(2) Assemble all component parts, referring to "Reassembly".
Then measure turning torque.

Total turning torque:
Overall
2.9 - 7.4 N·m
(30 - 75 kg-cm, 26 - 65 in-lb)
Compared with final drive only
1.5 - 3.9 N·m
(15 - 40 kg-cm, 13 - 35 in-lb)

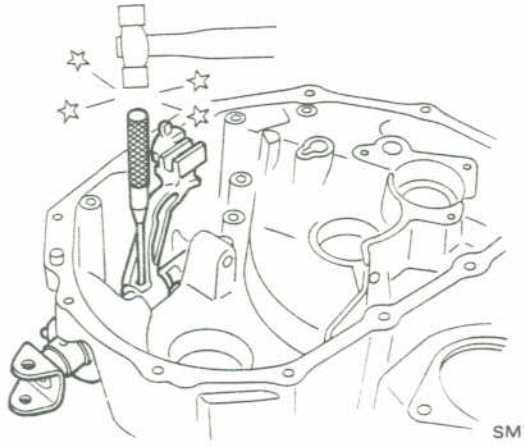
When old bearing is used again, preload will be slightly lower than that indicated above. Check preload to see if it is not far from specified range.

1. Apply sealant to welch plug and install it on clutch housing.



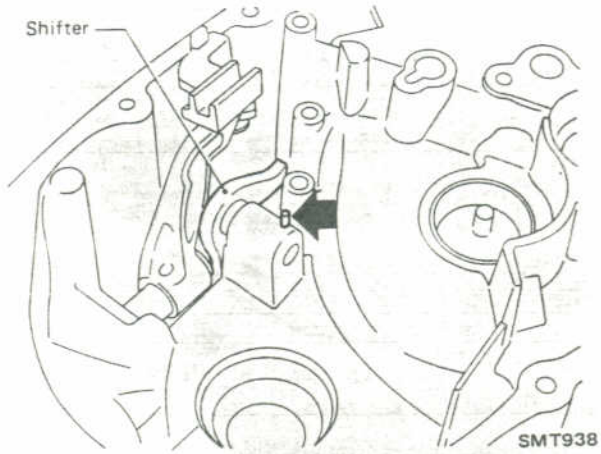
SMT926

2. Install striking lever and change shift lever.



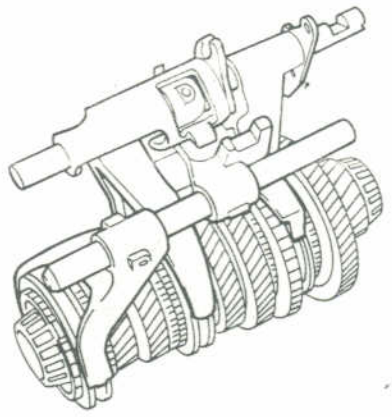
SMT927

3. Install select shifter and retaining pin.



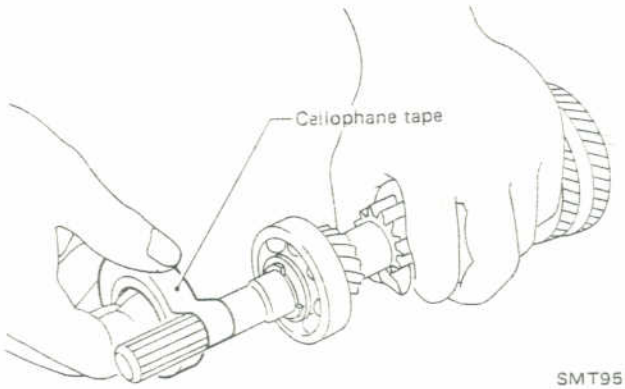
SMT938

4. Attach shift fork assembly to mainshaft.



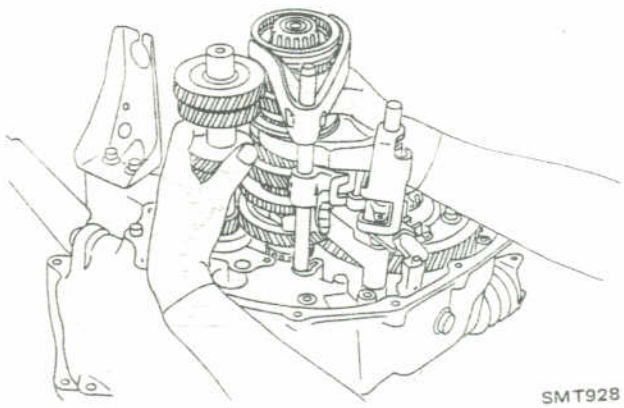
SMT950

5. Determine thickness of shims to be used when clutch housing, transmission case, mainshaft, differential case or taper roller bearing is replaced. Refer to "Adjustment".
6. Wrap a tape around splines of input shaft to avoid damaging oil seal.



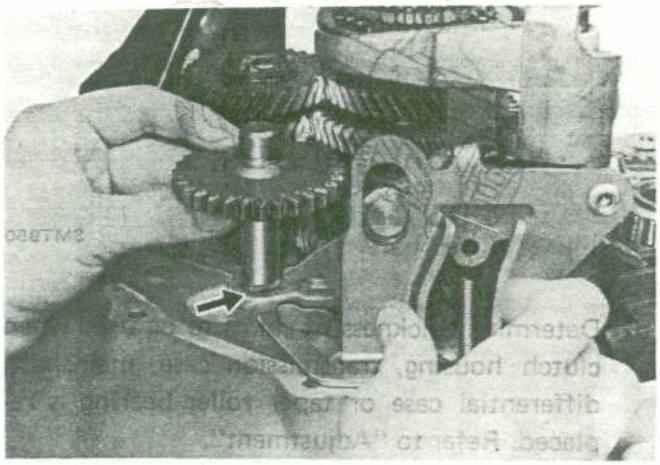
SMT951

7. Install mainshaft assembly with shift fork assembly and input shaft assembly on clutch housing as a unit.

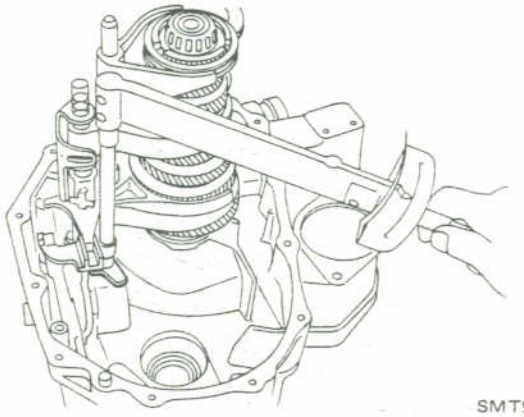


SMT928

8. Check to make sure that grooves in change shift lever and striking lever are engaged properly. Also make sure that both select inner lever and fork rod are engaged at their grooves.

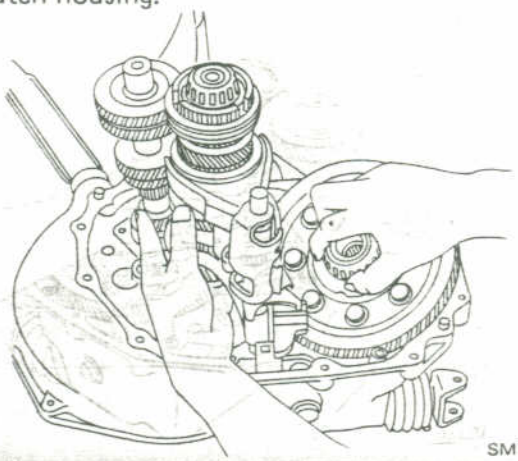


9. Secure shift rod plate with bolts.



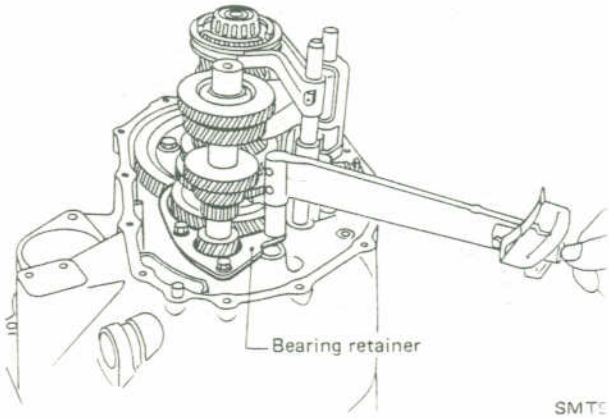
SMT932

10. Slightly raise both input shaft and mainshaft assembly and place final drive assembly into clutch housing.



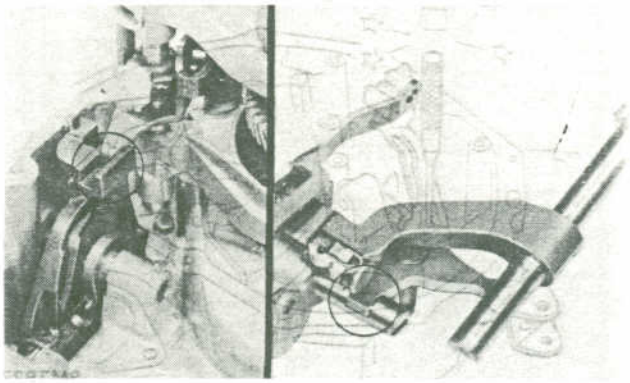
SMT885

11. Lower both input shaft and mainshaft assembly to their original positions inside clutch housing. Install bearing retainer.

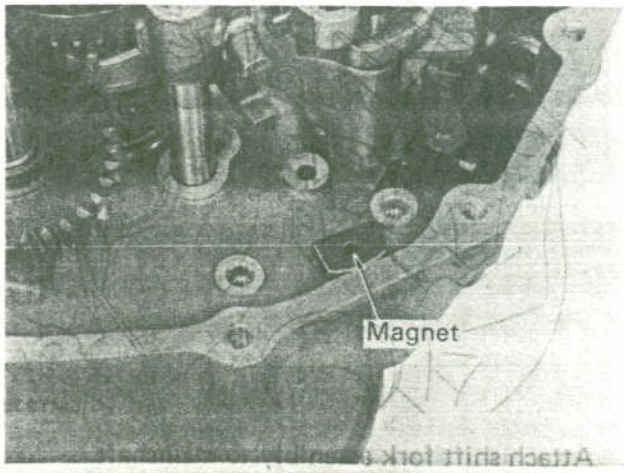


SMT9

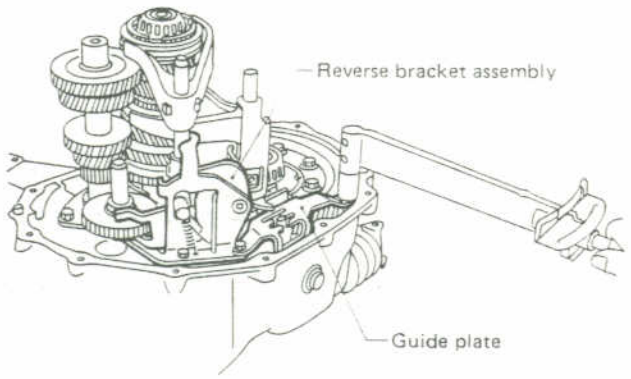
12. Install reverse idler shaft and reverse idler gear. Pay attention to cutout portions of this shaft.



13. Place magnet on clutch housing.

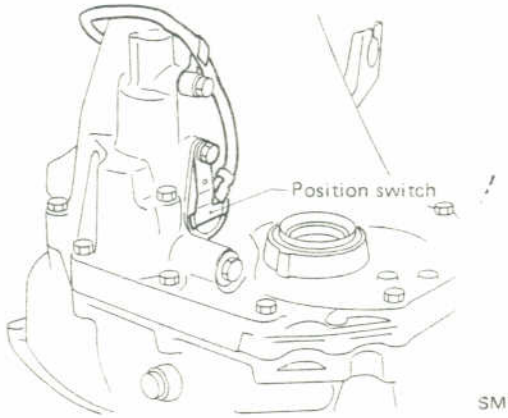


14. Install both reverse bracket assembly and guide plate.



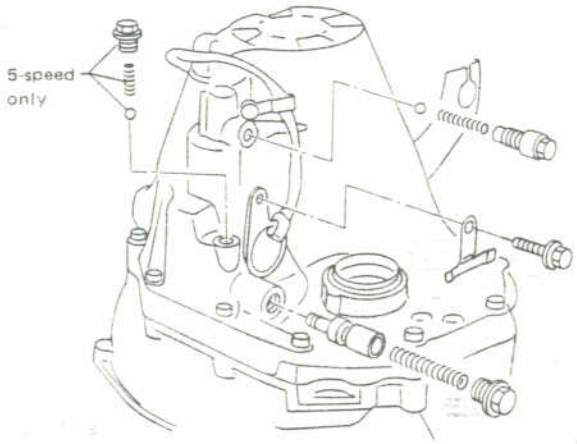
SMT930

15. Install transmission case.
16. Install position switch.



SMT931

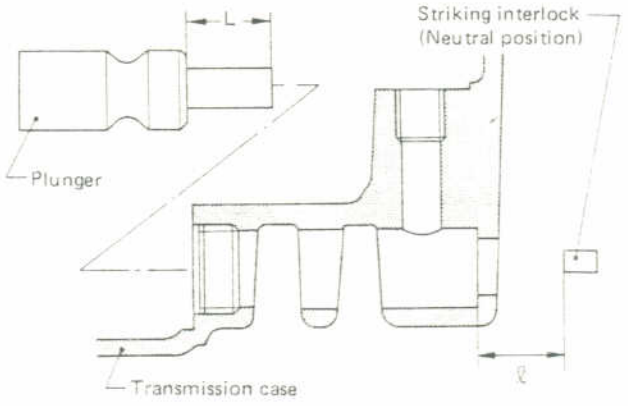
17. Install shift check, reverse check and 5th check component parts.
    Apply sealant to threads of plugs.



SMT882

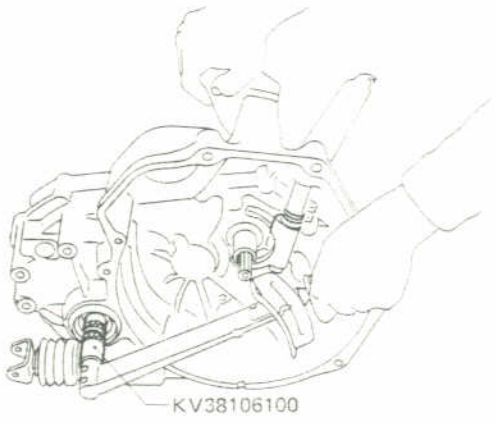
18. Shift gear position to 4th. Measure distance "ℓ" between transmission case and striking interlock, then select suitable plunger.

    Reverse check plunger:
    Refer to S.D.S.



SMT963

19. After assembly, check that you can shift into each gear smoothly.
20. Measure total turning torque.



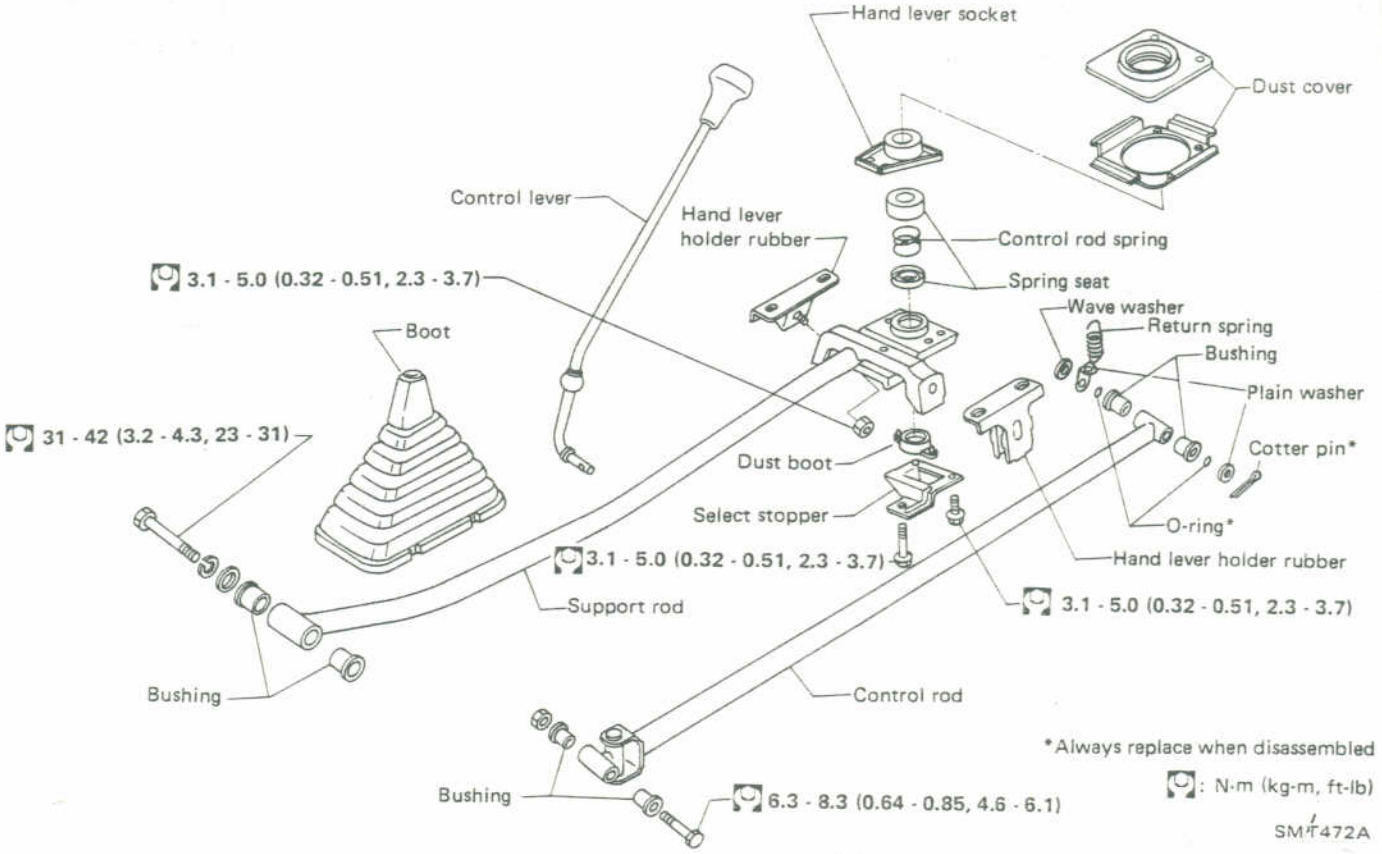
SMT934

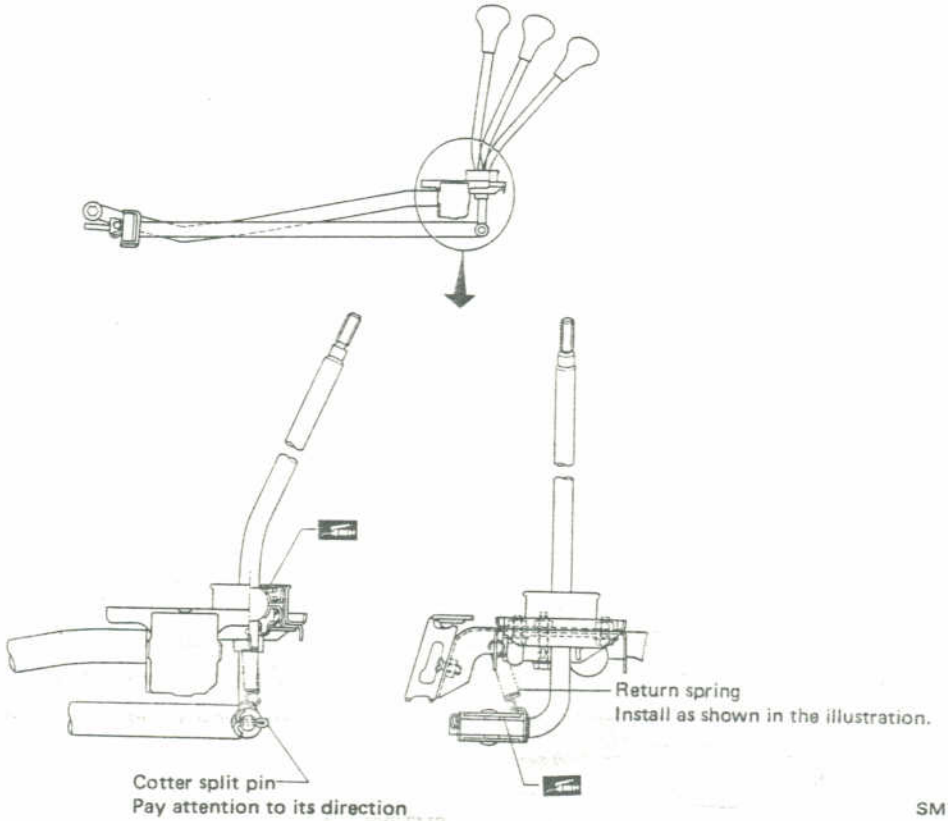
Total turning torque (New bearing):
2.5 - 5.9 N·m
(25 - 60 kg-cm, 22 - 52 in-lb)

When old bearing is used again, preload will be slightly lower than that indicated above. Check preload to see if it is not far from specified range.

TRANSMISSION GEAR CONTROL

Disassembly and Assembly

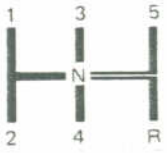




SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

TRANSAXLE

Transaxle model			RS5F41A
No. of speeds			5
Synchromesh type			Warner
Shift pattern			
Gear ratio		1st	3.412
		2nd	1.958
		3rd	1.258
		4th	0.921
		5th	0.721
		Rev.	3.385
No. of teeth	Input gear	1st	17
		2nd	24
		3rd	31
		4th	38
		5th	43
		Rev.	13
	Main gear	1st	58
		2nd	47
		3rd	39
		4th	35
		5th	31
		Rev.	44
	Reverse idler gear		30
Oil capacity liters (US pt, Imp pt)			2.6 (5-1/2, 4-5/8)

FINAL DRIVE

Transaxle model	RS5F41A
Final gear ratio	3.810
Number of teeth	
Final gear/Pinion gear	80/21
Side gear/Pinion mate gear	14/10

Inspection and Adjustment

MAIN GEAR STANDARD END PLAY

Unit: mm (in)

Position	
1st	0.22 - 0.44 (0.0087 - 0.0173)
2nd	0.22 - 0.54 (0.0087 - 0.0213)
3rd	0.22 - 0.49 (0.0087 - 0.0193)
4th	0.22 - 0.39 (0.0087 - 0.0154)
5th	0.22 - 0.29 (0.0087 - 0.0114)

CLEARANCE BETWEEN BAULK RING AND GEAR

Unit: mm (in)

Standard	1.0 - 1.35 (0.0394 - 0.0531)
Wear limit	0.7 (0.028)

ALLOWABLE CLEARANCE OF GROOVES AND SNAP RINGS

Allowable clearance of grooves

Unit: mm (in)

Position	Allowable clearance
Input shaft	0 - 0.13 (0 - 0.0051)
Mainshaft	0 - 0.15 (0 - 0.0059)

Input shaft front bearing snap ring

Unit: mm (in)

Part No.	Thickness
32204-01B01	1.65 (0.0650)
32204-01B02	1.75 (0.0689)
32204-01B03	1.85 (0.0728)

1st & 2nd synchronizer hub snap ring (At mainshaft)

Unit: mm (in)

Part No.	Thickness
32257-01B00	2.0 (0.079)
32257-01B01	2.1 (0.083)

2nd gear snap ring (At mainshaft)

Unit: mm (in)

Part No.	Thickness
32269-01B00	2.0 (0.079)
32269-01B01	2.1 (0.083)

Inspection and Adjustment (Cont'd)

3rd & 4th synchronizer hub snap ring (At mainshaft)

Unit: mm (in)

Part No.	Thickness
32279-01B02	2.0 (0.079)
32279-01B03	2.1 (0.083)

CLEARANCE BETWEEN SIDE GEAR AND PINION MATE GEAR

Unit: mm (in)

Allowable clearance	0 - 0.3 (0 - 0.012)

Side gear thrust washer

Unit: mm (in)

Part No.	Thickness
38424-01B03	0.77 (0.0303)
38424-01B04	0.82 (0.0323)
38424-01B05	0.87 (0.0343)

REVERSE CHECK PLUNGER

Unit: mm (in)

Part No.	Plunger length "L"	Distance "ℓ"
32851-01B01	17.17 (0.6760)	Less than 17.78 (0.7000)
32851-01B02	17.57 (0.6917)	17.78 - 18.18 (0.7000 - 0.7157)
32851-01B00	17.97 (0.7075)	18.18 - 18.58 (0.7157 - 0.7315)
32851-01B03	18.37 (0.7232)	More than 18.58 (0.7315)

MAINSHAFT AND DIFFERENTIAL SIDE BEARING PRELOAD AND ADJUSTING SHIM

Bearing preload

Unit: mm (in)

Mainshaft bearing	0.20 - 0.25 (0.0079 - 0.0098)
Differential side bearing	0.25 - 0.30 (0.0098 - 0.0118)

Turning torque (New bearing)

Unit: N·m (kg-cm, in-lb)

Final drive only	1.5 - 3.4 (15 - 35, 13 - 30)
Total Overall	2.9 - 7.4 (30 - 75, 26 - 65)
Compared with final drive only	1.5 - 3.9 (15 - 40, 13 - 35)

Mainshaft bearing adjusting shim

Unit: mm (in)

Part No.	Thickness
32138-01B00	0.44 (0.0173)
32138-01B01	0.48 (0.0189)
32138-01B02	0.56 (0.0220)
32138-01B03	0.60 (0.0236)
32138-01B04	0.64 (0.0252)
32138-01B05	0.68 (0.0268)
32138-01B06	0.72 (0.0283)
32138-01B07	0.76 (0.0299)
32138-01B08	0.80 (0.0315)
32138-01B09	0.84 (0.0331)
32138-01B10	0.88 (0.0346)
32138-01B11	1.20 (0.0472)

Inspection and Adjustment (Cont'd)

Table for selecting suitable shim(s) at mainshaft side

Unit: mm (in)

Measured clearance between mainshaft side adjusters	Suitable shim(s)
0.60 - 0.63 (0.0236 - 0.0248)	0.84 (0.0331)
0.64 - 0.67 (0.0252 - 0.0264)	0.88 (0.0346)
0.68 - 0.71 (0.0268 - 0.0280)	0.48 + 0.44 (0.0189 + 0.0173)
0.72 - 0.75 (0.0283 - 0.0295)	0.48 + 0.48 (0.0189 + 0.0189)
0.76 - 0.79 (0.0299 - 0.0311)	0.44 + 0.56 (0.0173 + 0.0220)
0.80 - 0.83 (0.0315 - 0.0327)	0.48 + 0.56 (0.0189 + 0.0220)
0.84 - 0.87 (0.0331 - 0.0343)	0.48 + 0.60 (0.0189 + 0.0236)
0.88 - 0.91 (0.0346 - 0.0358)	0.48 + 0.64 (0.0189 + 0.0252)
0.92 - 0.95 (0.0362 - 0.0374)	0.48 + 0.68 (0.0189 + 0.0268)
0.96 - 0.99 (0.0378 - 0.0390)	1.20 (0.0472)
1.00 - 1.03 (0.0394 - 0.0406)	0.48 + 0.76 (0.0189 + 0.0299)
1.04 - 1.07 (0.0409 - 0.0421)	0.48 + 0.80 (0.0189 + 0.0315)
1.08 - 1.11 (0.0425 - 0.0437)	0.48 + 0.84 (0.0189 + 0.0331)
1.12 - 1.15 (0.0441 - 0.0453)	0.56 + 0.80 (0.0220 + 0.0315)
1.16 - 1.19 (0.0457 - 0.0469)	0.56 + 0.84 (0.0220 + 0.0331)
1.20 - 1.23 (0.0472 - 0.0484)	0.56 + 0.88 (0.0220 + 0.0346)
1.24 - 1.27 (0.0488 - 0.0500)	0.60 + 0.88 (0.0236 + 0.0346)
1.28 - 1.31 (0.0504 - 0.0516)	0.64 + 0.88 (0.0252 + 0.0346)
1.32 - 1.35 (0.0520 - 0.0531)	0.68 + 0.88 (0.0268 + 0.0346)
1.36 - 1.39 (0.0535 - 0.0547)	0.72 + 0.88 (0.0283 + 0.0346)
1.40 - 1.43 (0.0551 - 0.0563)	0.76 + 0.88 (0.0299 + 0.0346)
1.44 - 1.47 (0.0567 - 0.0579)	0.80 + 0.88 (0.0315 + 0.0346)
1.48 - 1.51 (0.0583 - 0.0594)	0.84 + 0.88 (0.0331 + 0.0346)
1.52 - 1.55 (0.0598 - 0.0610)	1.20 + 0.56 (0.0472 + 0.0220)
1.56 - 1.59 (0.0614 - 0.0626)	1.20 + 0.60 (0.0472 + 0.0236)

Differential side bearing adjusting shim

Unit: mm (in)

Part No.	Thickness
38453-01B00	0.44 (0.0173)
38453-01B01	0.48 (0.0189)
38453-01B02	0.56 (0.0220)
38453-01B03	0.60 (0.0236)
38453-01B04	0.64 (0.0252)
38453-01B05	0.68 (0.0268)
38453-01B06	0.72 (0.0283)
38453-01B07	0.76 (0.0299)
38453-01B08	0.80 (0.0315)
38453-01B09	0.84 (0.0331)
38453-01B10	0.88 (0.0346)
38453-01B11	1.20 (0.0472)

Table for selecting suitable shim(s) at differential side

Unit: mm (in)

Measured clearance between differential career adjusters	Suitable shim(s)
0.31 - 0.34 (0.0122 - 0.0134)	0.60 (0.0236)
0.35 - 0.38 (0.0138 - 0.0150)	0.64 (0.0252)
0.39 - 0.42 (0.0154 - 0.0165)	0.68 (0.0268)
0.43 - 0.46 (0.0169 - 0.0181)	0.72 (0.0283)
0.47 - 0.50 (0.0185 - 0.0197)	0.76 (0.0299)
0.51 - 0.54 (0.0201 - 0.0213)	0.80 (0.0315)
0.55 - 0.58 (0.0217 - 0.0228)	0.84 (0.0331)
0.59 - 0.62 (0.0232 - 0.0244)	0.88 (0.0346)
0.63 - 0.66 (0.0248 - 0.0260)	0.48 + 0.44 (0.0189 + 0.0173)
0.67 - 0.70 (0.0264 - 0.0276)	0.48 + 0.48 (0.0189 + 0.0189)
0.71 - 0.74 (0.0280 - 0.0291)	0.44 + 0.56 (0.0173 + 0.0220)
0.75 - 0.78 (0.0295 - 0.0307)	0.48 + 0.56 (0.0189 + 0.0220)
0.79 - 0.82 (0.0311 - 0.0323)	0.48 + 0.60 (0.0189 + 0.0236)
0.83 - 0.86 (0.0327 - 0.0339)	0.48 + 0.64 (0.0189 + 0.0252)
0.87 - 0.90 (0.0343 - 0.0354)	0.48 + 0.68 (0.0189 + 0.0268)
0.91 - 0.94 (0.0358 - 0.0370)	1.20 (0.0472)
0.95 - 0.98 (0.0374 - 0.0386)	0.48 + 0.76 (0.0189 + 0.0299)
0.99 - 1.02 (0.0390 - 0.0402)	0.48 + 0.80 (0.0189 + 0.0315)
1.03 - 1.06 (0.0406 - 0.0417)	0.48 + 0.84 (0.0189 + 0.0331)
1.07 - 1.10 (0.0421 - 0.0433)	0.48 + 0.88 (0.0189 + 0.0346)
1.11 - 1.14 (0.0437 - 0.0449)	0.56 + 0.84 (0.0220 + 0.0331)
1.15 - 1.18 (0.0453 - 0.0465)	0.56 + 0.88 (0.0220 + 0.0346)
1.19 - 1.22 (0.0469 - 0.0480)	0.60 + 0.88 (0.0236 + 0.0346)
1.23 - 1.26 (0.0484 - 0.0496)	0.64 + 0.88 (0.0252 + 0.0346)
1.27 - 1.30 (0.0500 - 0.0512)	0.68 + 0.88 (0.0268 + 0.0346)
1.31 - 1.34 (0.0516 - 0.0528)	0.72 + 0.88 (0.0283 + 0.0346)
1.35 - 1.38 (0.0531 - 0.0543)	0.76 + 0.88 (0.0299 + 0.0346)
1.39 - 1.42 (0.0547 - 0.0559)	0.80 + 0.88 (0.0315 + 0.0346)
1.43 - 1.46 (0.0563 - 0.0575)	0.84 + 0.88 (0.0331 + 0.0346)
1.47 - 1.50 (0.0579 - 0.0591)	1.20 + 0.56 (0.0472 + 0.0220)
1.51 - 1.54 (0.0594 - 0.0606)	1.20 + 0.60 (0.0472 + 0.0236)
1.55 - 1.58 (0.0610 - 0.0622)	1.20 + 0.64 (0.0472 + 0.0252)
1.59 - 1.62 (0.0626 - 0.0638)	1.20 + 0.68 (0.0472 + 0.0268)
1.63 - 1.66 (0.0642 - 0.0654)	1.20 + 0.72 (0.0472 + 0.0283)
1.67 - 1.70 (0.0657 - 0.0669)	1.20 + 0.76 (0.0472 + 0.0299)
1.71 - 1.74 (0.0673 - 0.0685)	1.20 + 0.80 (0.0472 + 0.0315)
1.75 - 1.78 (0.0689 - 0.0701)	1.20 + 0.84 (0.0472 + 0.0331)
1.79 - 1.82 (0.0705 - 0.0717)	1.20 + 0.88 (0.0472 + 0.0346)

Tightening Torque

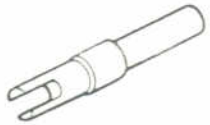
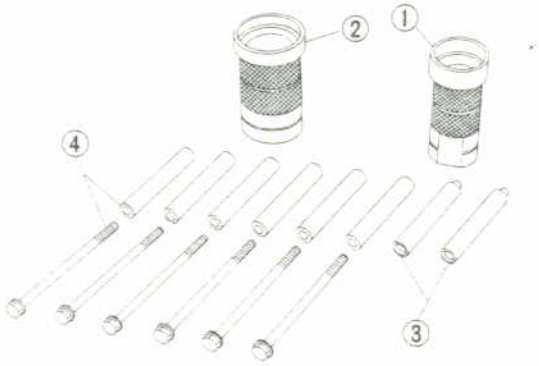
Installation

Unit	N·m	kg-m	ft-lb
Support rod to transaxle	31 - 42	3.2 - 4.3	23 - 31
Control rod to transaxle	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Select stopper bolt	3.1 - 5.0	0.32 - 0.51	2.3 - 3.7
Rubber holder nut	3.1 - 5.0	0.32 - 0.51	2.3 - 3.7
Rubber holder to body	3.1 - 5.0	0.32 - 0.51	2.3 - 3.7
Speedometer pinion gear	3 - 4	0.3 - 0.4	2.2 - 2.9

Transaxle unit

Unit	N·m	kg-m	ft-lb
Clutch housing to transmission case	16 - 21	1.6 - 2.1	12 - 15
Return spring plug	20 - 29	2.0 - 3.0	14 - 22
5th & Rev. check ball plug	16 - 21	1.6 - 2.1	12 - 15
Shift check ball plug	9 - 12	0.9 - 1.2	6.5 - 8.7
Shift rod plate to clutch housing	6 - 8	0.6 - 0.8	4.3 - 5.8
Guide plate to clutch housing	6 - 8	0.6 - 0.8	4.3 - 5.8
Reverse bracket assembly to clutch housing	6 - 8	0.6 - 0.8	4.3 - 5.8
Switch to transmission case	2.5 - 3.9	0.25 - 0.4	1.8 - 2.9
Bearing retainer to clutch housing	16 - 21	1.6 - 2.1	12 - 15
Drain plug	10 - 20	1.0 - 2.0	7 - 14
Final gear to differential case	74 - 88	7.5 - 9.0	54 - 65

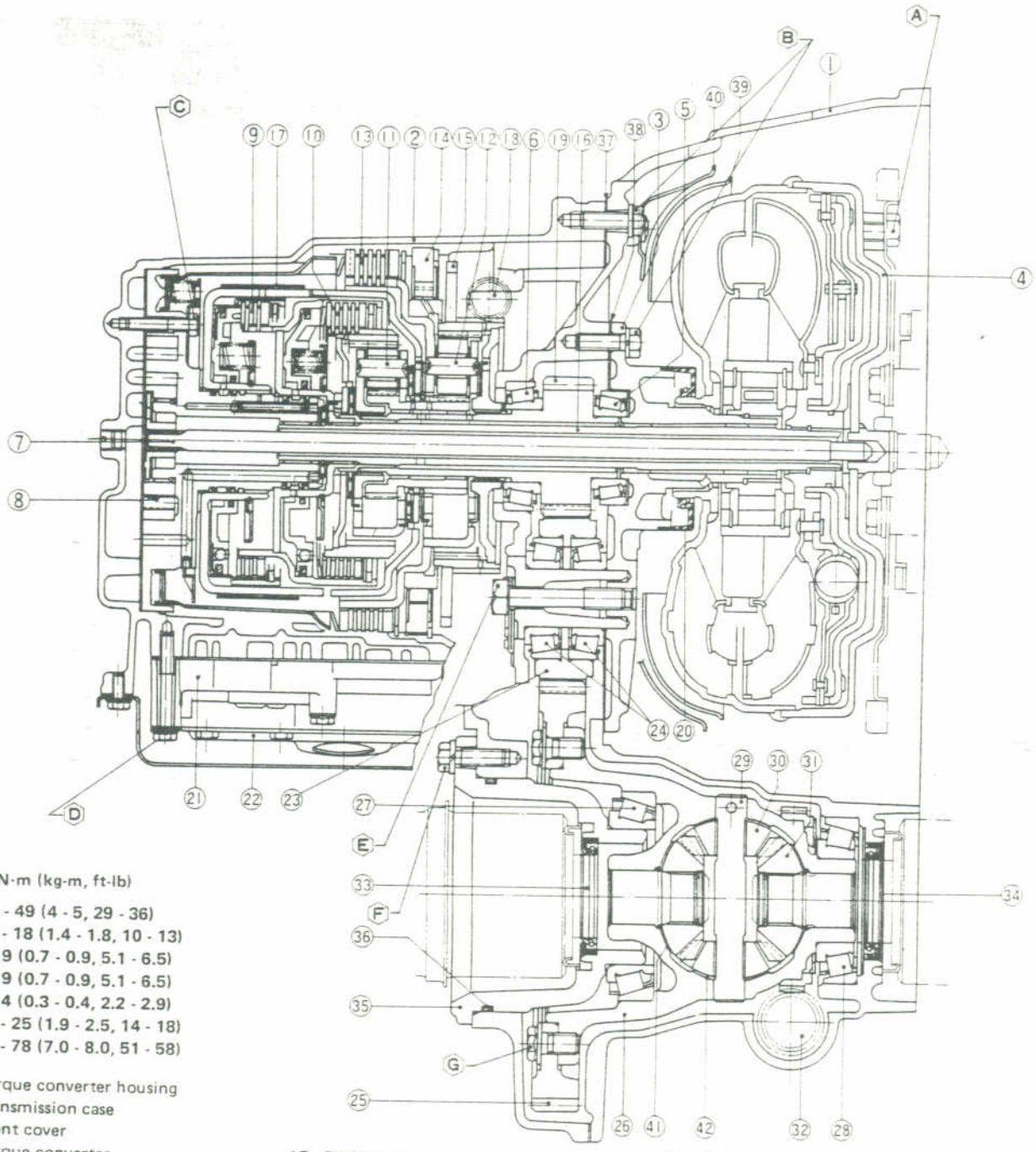
SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
KV38106100 (–)	Preload adapter	
KV381062S0 (–)	Bearing height gauge set	
① KV38106210 (–)	Main shaft dummy gauge	
② KV38106220 (–)	Diff. side bearing dummy gauge	
③ KV38106230 (–)	Knock pin collar	
④ KV38106240 (–)	Collar and bolt set	

AUTOMATIC TRANSAXLE

SECTION AT

CONTENTS



: N·m (kg-m, ft-lb)

Ⓐ 39 - 49 (4 - 5, 29 - 36)
Ⓑ 14 - 18 (1.4 - 1.8, 10 - 13)
Ⓒ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
Ⓓ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
Ⓔ 3 - 4 (0.3 - 0.4, 2.2 - 2.9)
Ⓕ 19 - 25 (1.9 - 2.5, 14 - 18)
Ⓖ 69 - 78 (7.0 - 8.0, 51 - 58)

1 Torque converter housing
2 Transmission case
3 Front cover
4 Torque converter
5 Output shaft taper roller bearing
6 Output shaft taper roller bearing
7 Oil pump shaft
8 Oil pump
9 High-reverse clutch (Front)
10 Forward clutch (Rear)
11 Front planetary gear
12 Rear planetary gear
13 Low and reverse brake
14 One-way clutch
15 Parking gear
16 Input shaft
17 Brake band
18 Governor valve shaft
19 Output shaft
20 Front cover oil seal
21 Control valve
22 Oil strainer
23 Idler gear
24 Idler gear taper roller bearing
25 Final gear
26 Differential gear case
27 Differential gear taper roller bearing
28 Differential gear taper roller bearing
29 Pinion mate shaft
30 Pinion mate gear
31 Side gear
32 Speedometer pinion gear
33 Differential gear side oil seal
34 Differential gear side oil seal
35 Bearing retainer
36 O-ring
37 Gasket
38 Gasket
39 Converter shroud
40 Shroud separator
41 Side gear thrust washer
42 Pinion mate gear thrust washer

SAT652

GENERAL SERVICE NOTES

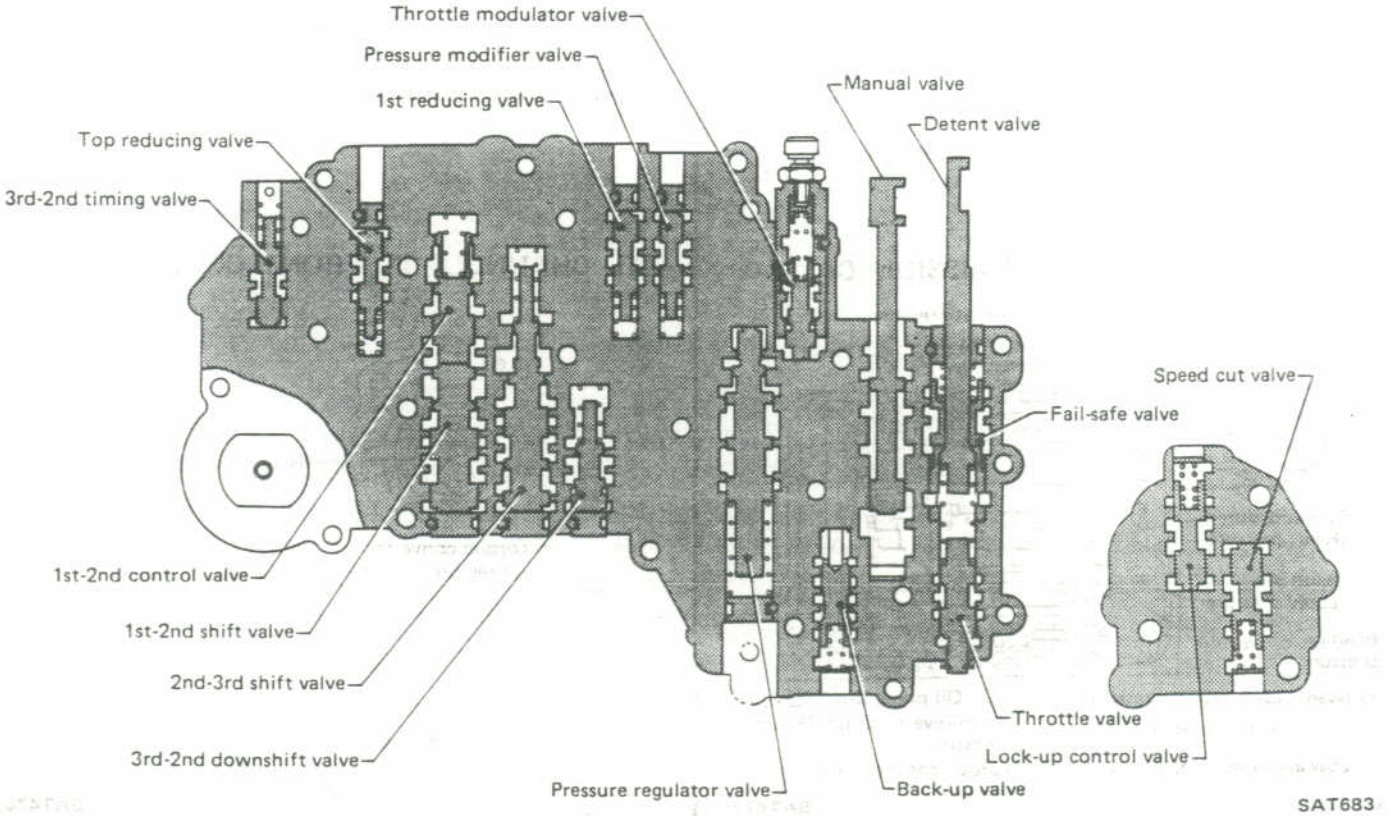
Repair Notes

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts of the transaxle from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use a nylon cloth or paper towel for wiping parts clean. Common shop rags can leave lint that might interfere with the transaxle's operation.
- When disassembling parts, be sure to place them in order in parts rack so they can be put back in the unit in their proper positions.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals, and O-rings should be replaced. It is also very important to perform functional tests whenever it is designated.
- The valve body contains many precision parts and requires extreme care when parts are removed and serviced. Place removed parts on a parts rack so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.
- Before assembly, apply a coat of recommended A.T.F. to all parts. Vaseline may be applied to O-rings and seals. Do not use any grease.
- Care should be taken to avoid damaging gaskets, seals and O-rings when assembling.

Abbreviations used throughout this section stand for the following:

- A.T.F. ..... Automatic transmission fluid
- D_1 ..... Drive range 1st gear
- D_2 ..... Drive range 2nd gear
- D_3 ..... Drive range 3rd gear
- 2_2 ..... 2 range 2nd gear
- 2_1 ..... 2 range 1st gear
- 1_2 ..... 1 range 2nd gear
- 1_1 ..... 1 range 1st gear

Control Valve

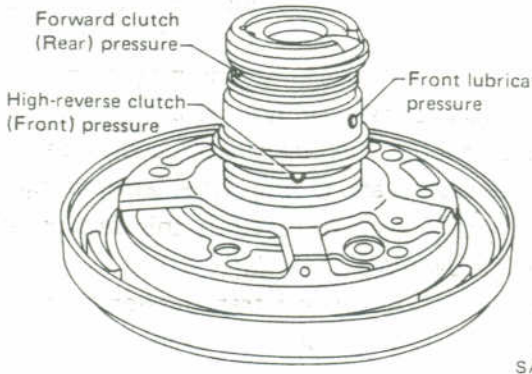


Oil Channel

Oil channels which connect components are located in areas shown below.

OIL CHANNELS IN OIL PUMP HOUSING

Oil pump housing side



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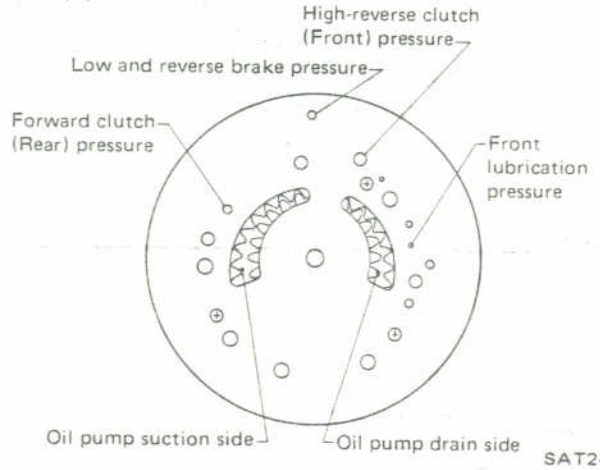
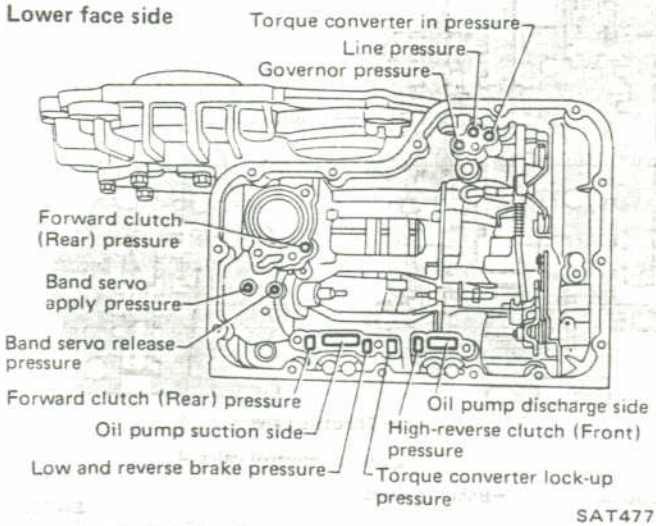
Oil pump plate side



SAT243

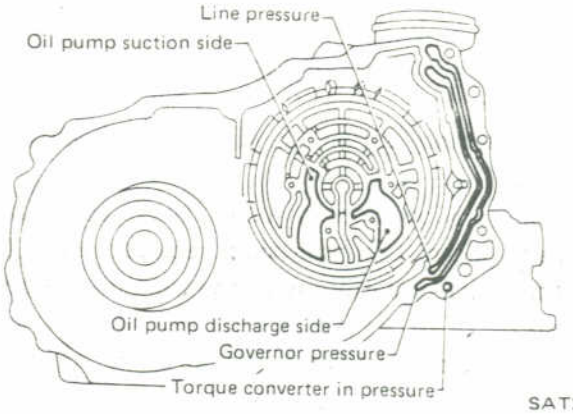
OIL CHANNELS IN TRANSMISSION CASE

Lower face side



SAT477

Converter housing attaching side



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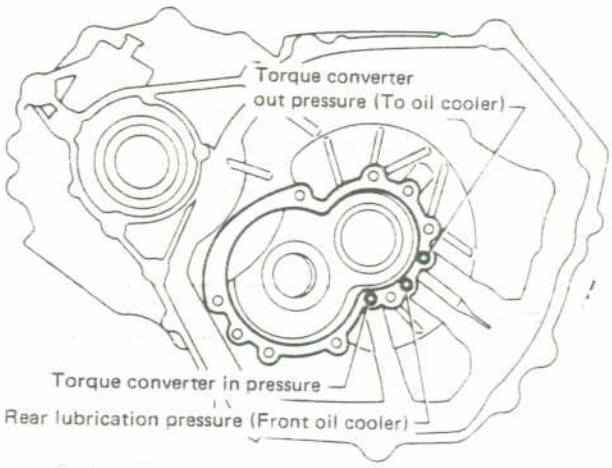
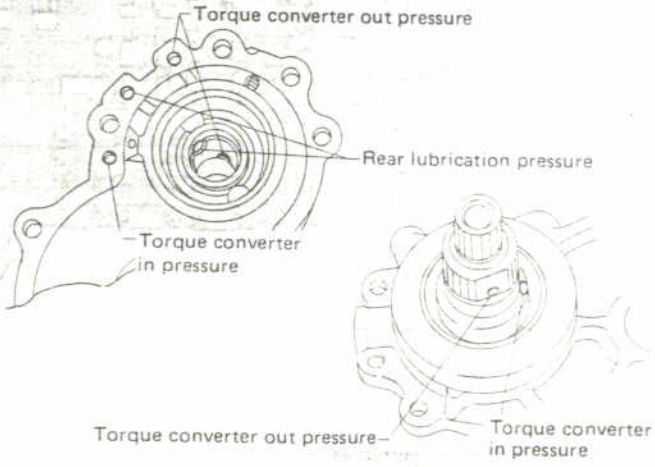
OIL CHANNELS IN CONVERTER HOUSING



SAT246

OIL CHANNELS IN FRONT COVER



SAT478

GENERAL SERVICE NOTES

Mechanical Operation

In the RL3F01A automatic transaxle, each part operates as shown in the following table at each gear select positon.

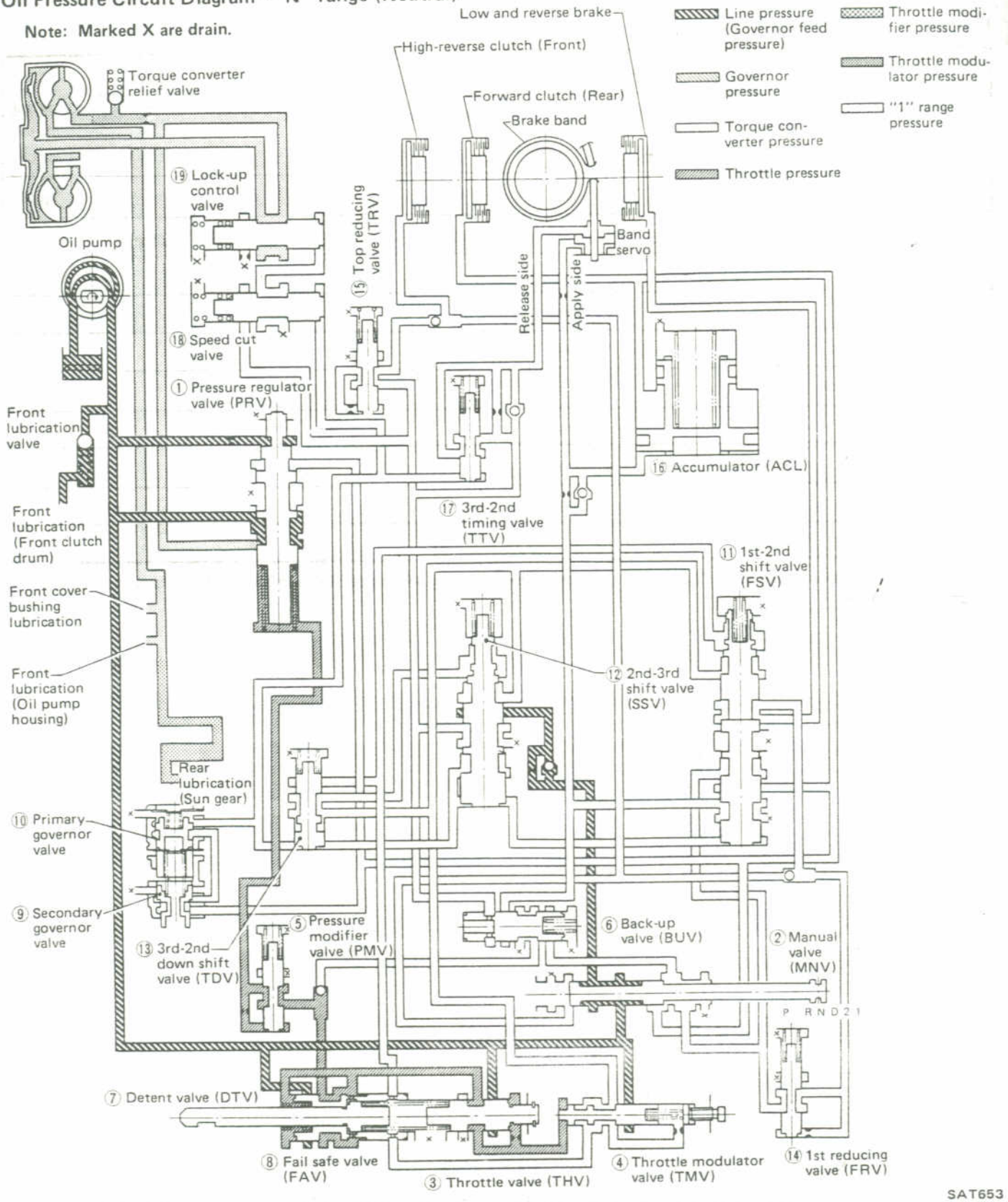
Range		Gear ratio	Clutch		Low & reverse brake	Lock-up	Band servo		One-way clutch	Parking pawl
			High-reverse clutch (Front)	Forward clutch (Rear)			Operation	Release		
Park										on
Reverse		2.364	on		on					
Neutral										
Drive	D_1 Low	2.826		on					on	
	D_2 Second	1.543		on			on			
	D_3 Top (3rd)	1.000	on	on		on	(on)	on		
2	2_1 Low	2.826		on					on	
	2_2 Second	1.543		on			on			
1	1_1 Low	2.826		on	on				on	
	1_2 Second	1.543		on			on			

The low & reverse brake is applied in "1_1" range to prevent free wheeling when coasting and allows engine braking.

Hydraulic Control Circuits

Oil Pressure Circuit Diagram - "N" range (Neutral)

Note: Marked X are drain.

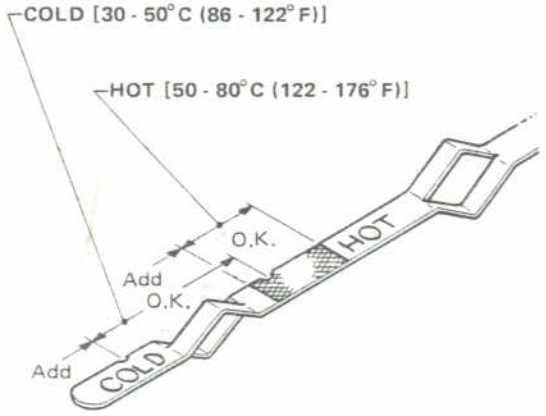


SAT653

Fluid Level

The dipstick designed to check the fluid level at "HOT" fluid temperatures [50 to 80°C (122 to 176°F)] after the vehicle has been driven approximately 10 minutes. But it can be used to check the fluid level at "COLD" fluid temperatures [30 to 50°C (86 to 122°F)].

1. Park the vehicle on a level surface and set the parking brake.
2. Start the engine and then move the selector lever through each gear range, ending in "P".
3. Check the fluid level with the engine idling. [If the vehicle has not been driven for some time and the outside temperature is below 30°C (86°F), a "COLD" fluid temperature can be obtained by warming the engine up completely.]
4. Remove the dipstick and clean it with lint-free paper. Reinsert it into the charging pipe as far as it will go.
5. Remove the dipstick and note the reading. If the fluid temperature is "HOT", the level should be in the hot range (in the shaded area). If it is "COLD", the level should be in the cold range (within the cutout portion).



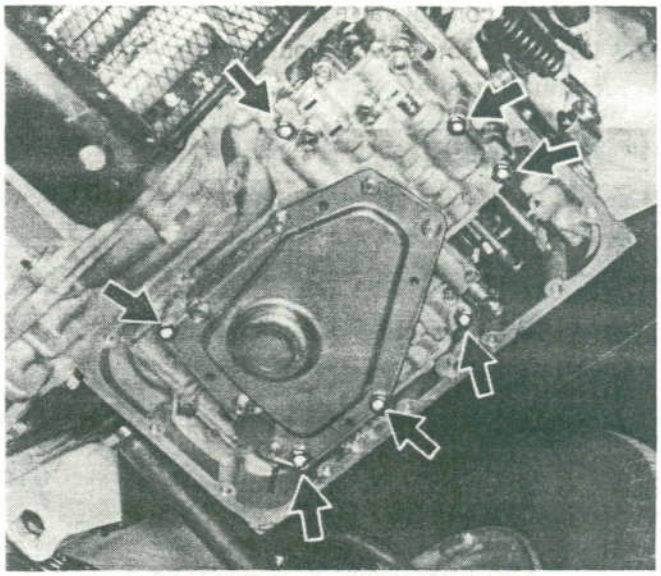
SAT481

Keep the fluid at the proper level.

- Overfilling may blow off the fluid or break the transaxle.
- Underfilling may cause the clutches to slip, and finally break them.

Control Valve

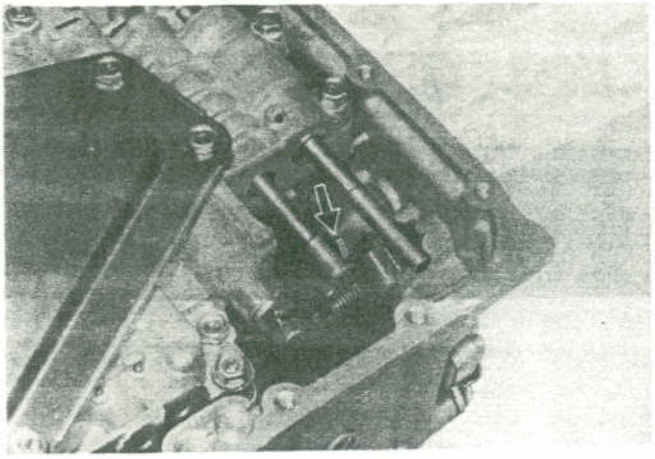
1. Remove control valve assembly.



Be careful not to drop manual valve out of valve body.

2. Disassemble, inspect and assemble control valve assembly. Refer to Control Valve Body.

- **Set manual shaft at Neutral, then align manual plate with groove in manual valve of control valve assembly.**

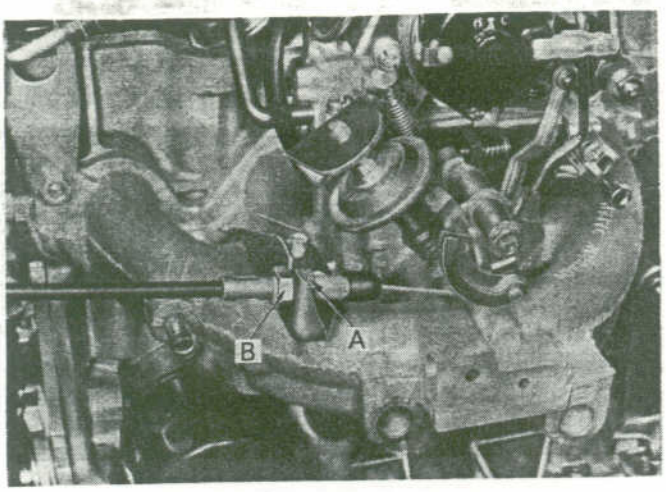


- Install detent valve with its groove facing forward.
- After installing control valve to transmission case, make sure that control lever can be moved to all positions.

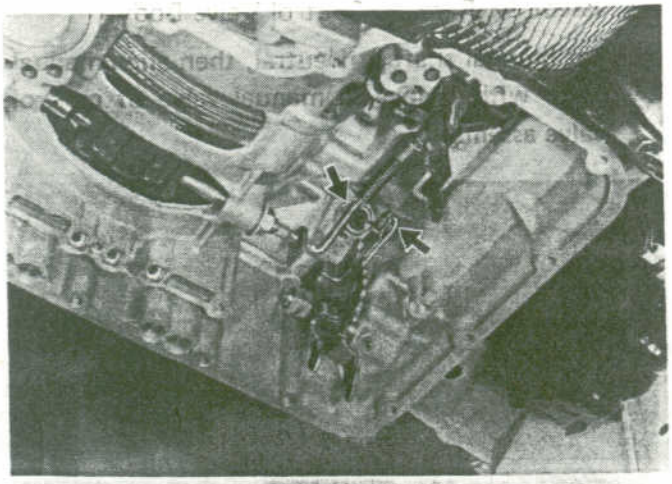
Throttle Wire

REMOVAL

1. Remove control valve assembly.
2. Loosen throttle wire double nuts A and B on carburetor side.



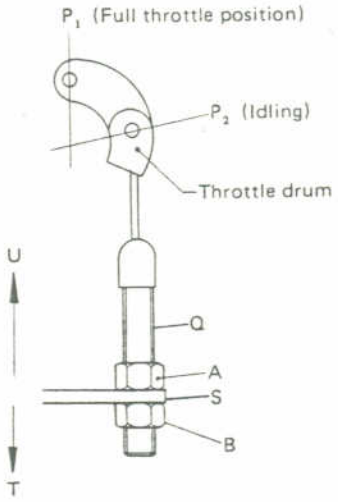
3. Disconnect the other end of throttle wire from throttle lever.
4. Remove throttle wire from transmission case.



ADJUSTMENT

Adjust throttle wire as follows.

With throttle drum set at "P_1" (fully-open), move fitting "Q" fully in direction "T" and tighten nut B by hand until it contacts bracket "S".



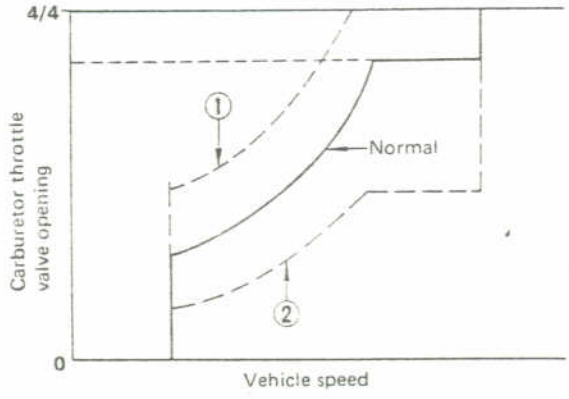
SAT358

Back off nut "B" 1 to 1-1/2 turns in direction "T", then tighten nut A securely. Throttle drum should be held at "P_1".

⟲ : **Nut A**
5 - 7 N·m
(0.5 - 0.7 kg-m, 3.6 - 5.1 ft-lb)

If throttle wire stroke is improperly adjusted, the following problems may arise.

- When full-throttle position "P_1" of throttle drum is closer to direction T, shift schedule will be as shown by ② in figure below, and kickdown range will greatly increase.



SAT411

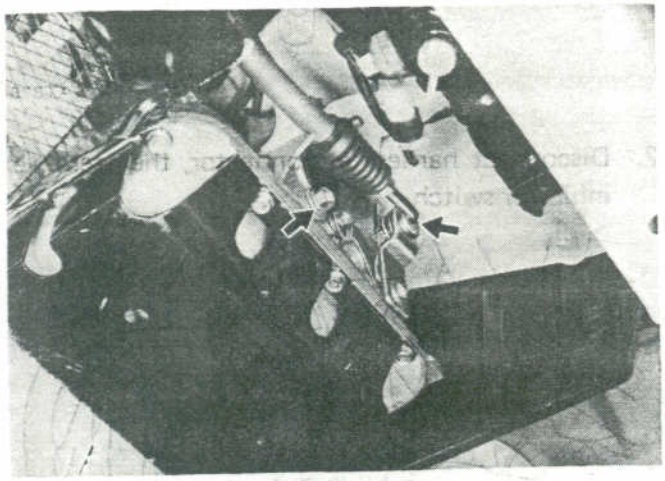
- When full-throttle position "P_1" of throttle drum is closer to direction U, shift schedule will be as shown by ① in figure above, and kick-down range will not occur.

Control Cable Adjustment

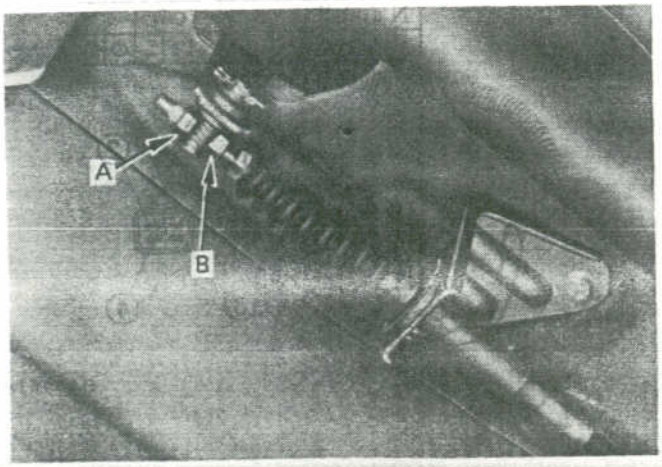
Move the shift lever from the "P" range to "1" range. You should be able to feel the detents in each range.

If the detents cannot be felt or the pointer indicating the range is improperly aligned, the control cable needs adjustment.

1. Place control lever at "P" range.
2. Connect control cable end to manual lever in transaxle unit, and tighten control cable securing bolts.

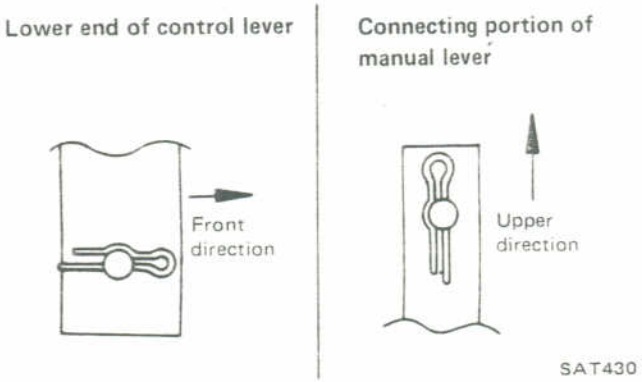


3. Move control lever from "P" range to "1" range. Make sure that control lever can move smoothly and without any sliding noise.
4. Place control lever at "P" range again.
5. Make sure that control lever locks at "P" range.
6. Remove control cable adjusting nut A and loosen nut B, then connect control cable to trunnion. Install nut A and B, then tighten them.



Control Cable Adjustment (Cont'd)

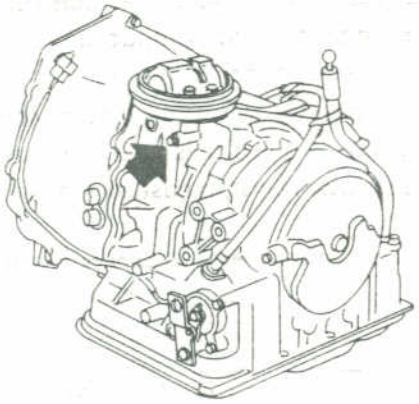
7. Move control lever from "P" range to "1" range again. Make sure that control lever can move smoothly and without any sliding noise.
8. Apply grease to spring washer.
9. After properly adjusting control cable, check spring pin to see if it is assembled as shown in figure below. If not, adjust spring pin.



SAT430

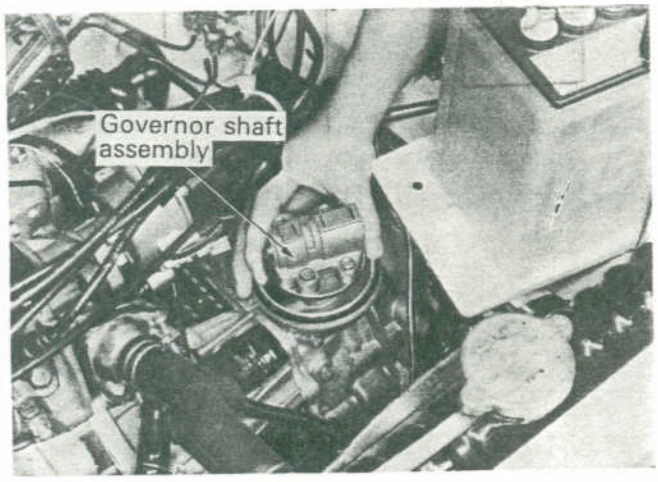
Governor Shaft

1. Remove governor cap.
2. Remove governor shaft securing bolt.



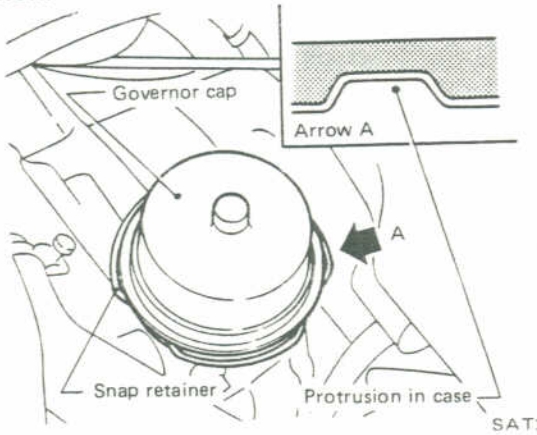
SAT373

3. Remove governor shaft assembly.



4. Disassemble, check and reassemble governor shaft assembly. Refer to Repair for Component Parts.

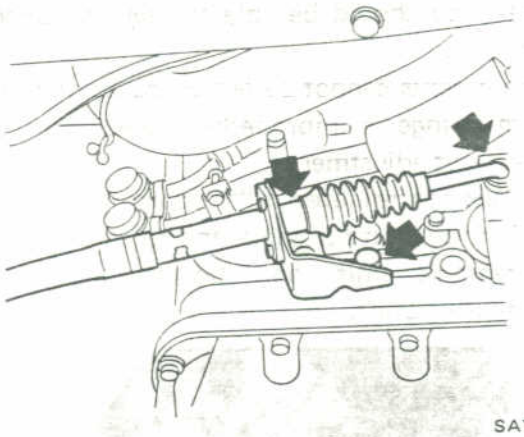
When installing governor cap, pay attention to its direction.



SAT203A

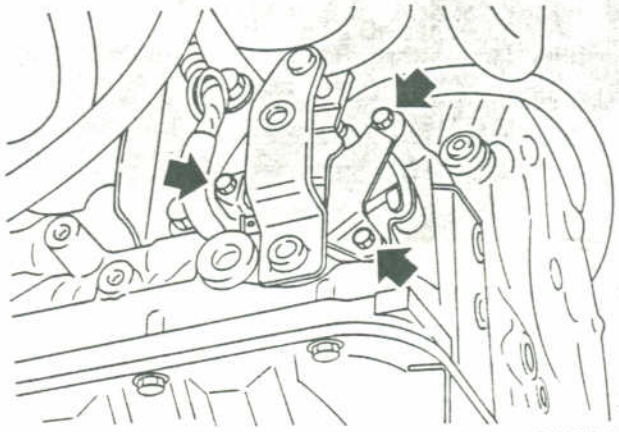
Inhibitor Switch Adjustment

1. Remove control cable end from unit.



SAT375

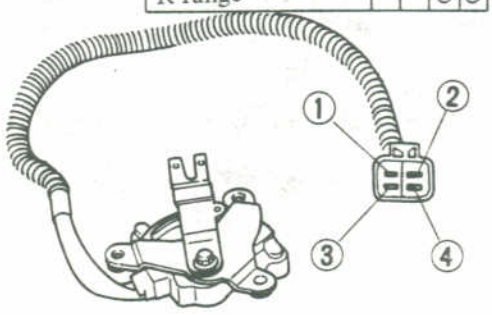
2. Disconnect harness at connector, then remove inhibitor switch.



SAT197A

- Check continuity at "N", "P" and "R" ranges.

	1	2	3	4
N and P ranges	o	o		
R range			o	o



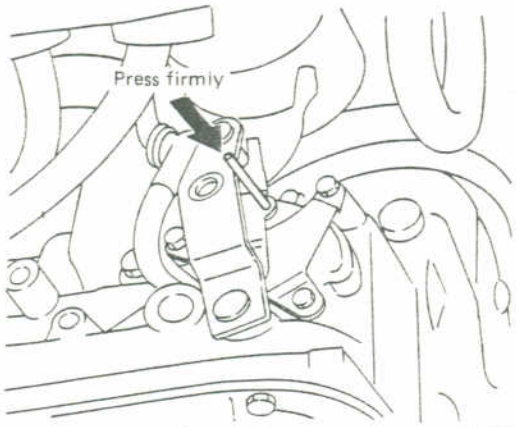
SAT151A

Inhibitor Switch Adjustment (Cont'd)

- With control lever held in "Neutral", turn manual lever an equal amount in both directions to see if current flow ranges are nearly the same. (Current normally begins to flow before manual lever reaches an angle of 1.5° in either direction.)
  If current flows outside normal range, or if normal flow range is out of specifications, properly adjust inhibitor switch.

Adjust inhibitor switch as follows:
This adjustment can be done on the vehicle.

1. Loosen attaching screws.
2. Set select lever (manual shaft) at "N" position.
3. Insert a 2.5 mm (0.098 in) dia. pin into adjustment holes in both inhibitor switch and switch lever as near vertical as possible.

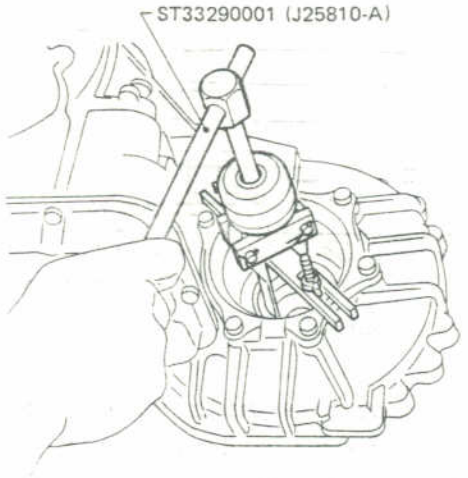


SAT200A

4. Tighten screws.
5. Recheck for continuity. If faulty replace the switch.

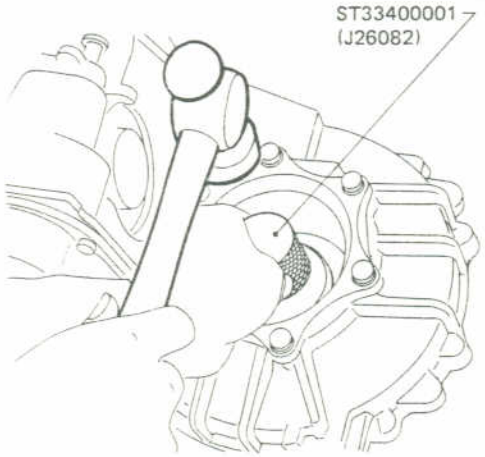
Diff. Side Oil Seal Replacement

1. Remove left drive shaft assembly. Refer to Drive Shaft in FA section.
2. Remove oil seal.



SAT377

3. Apply coat of automatic transaxle fluid to oil seal surface, then drive new seal into place.

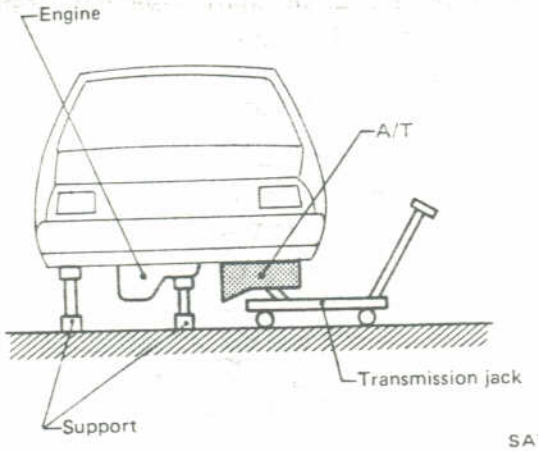


SAT378

4. Install left drive shaft assembly. Refer to Drive Shaft in FA section.

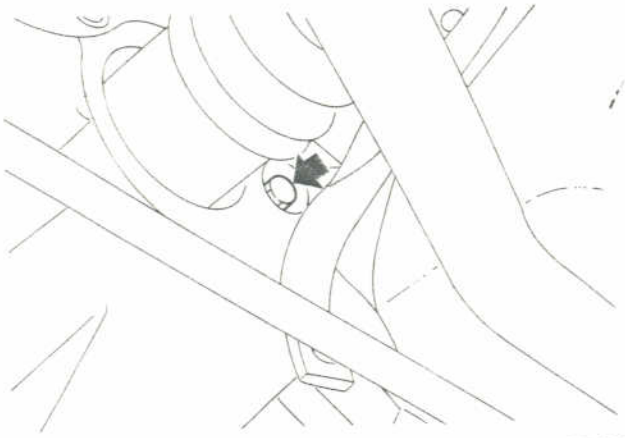
Be extremely careful not to scratch oil seal when inserting drive shaft.

Removal



SAT469

- Disconnect drive shafts. Refer to Drive shaft (Section FA) for removal.
- Remove botls securing torque converter to drive plate.



SAT204A

a. **Remove those bolts turning crankshaft.**
b. **Before removing torque converter, inscribe matching marks on two parts so that they may be replaced in their original positions during assembly.**

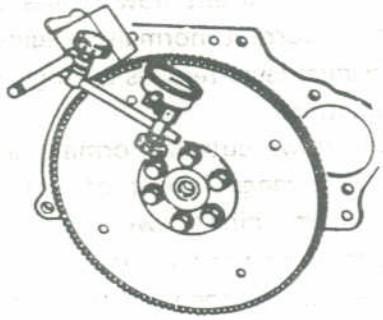
- Plug up openings such as oil charging pipe, etc.

CAUTION:
Take care when dismounting transaxle not to strike any adjacent parts.

Installation

- Drive plate runout

Maximum allowable runout:
0.5 mm (0.020 in)

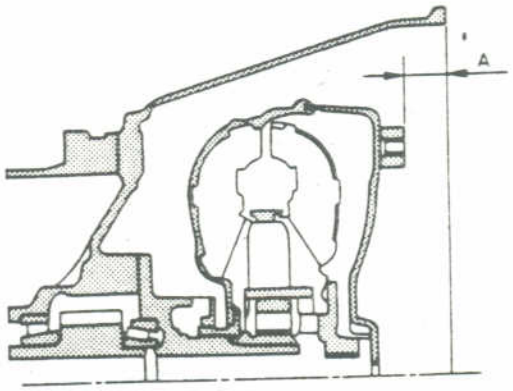


AT268

If this runout is out of allowance, replace drive plate and ring gear.

- When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

Distance "A":
More than 21.1 mm (0.831 in)



SAT416

- Bolt converter to drive plate. Refer to photograph in Removal.

a. **Align matching marks painted across both parts during disassembly.**
b. **Before installing torque converter securing bolts, apply locking sealer to threads of bolts.**

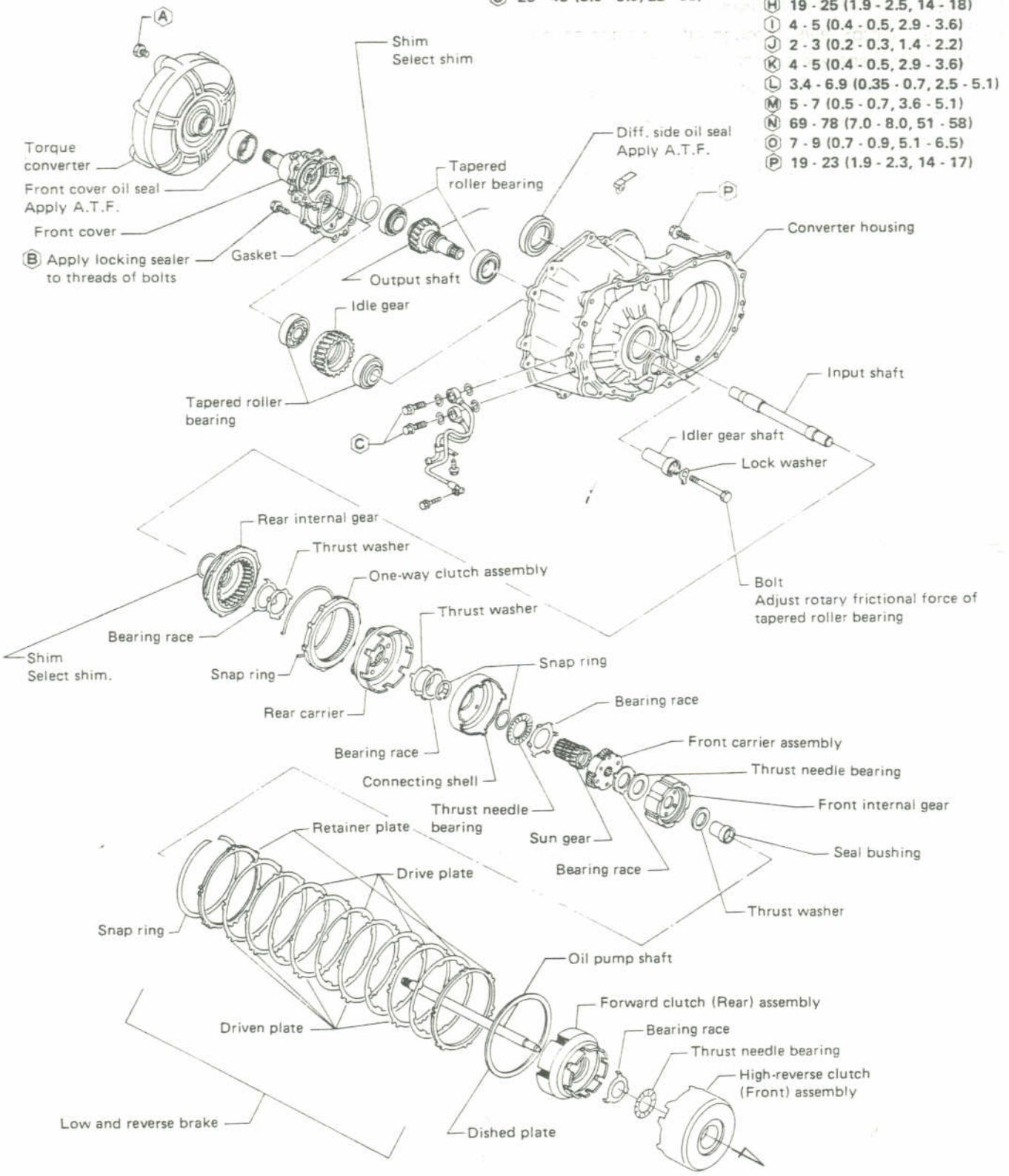
- After converter is installed, rotate crankshaft several turns and check to be sure that transaxle rotates freely without binding.

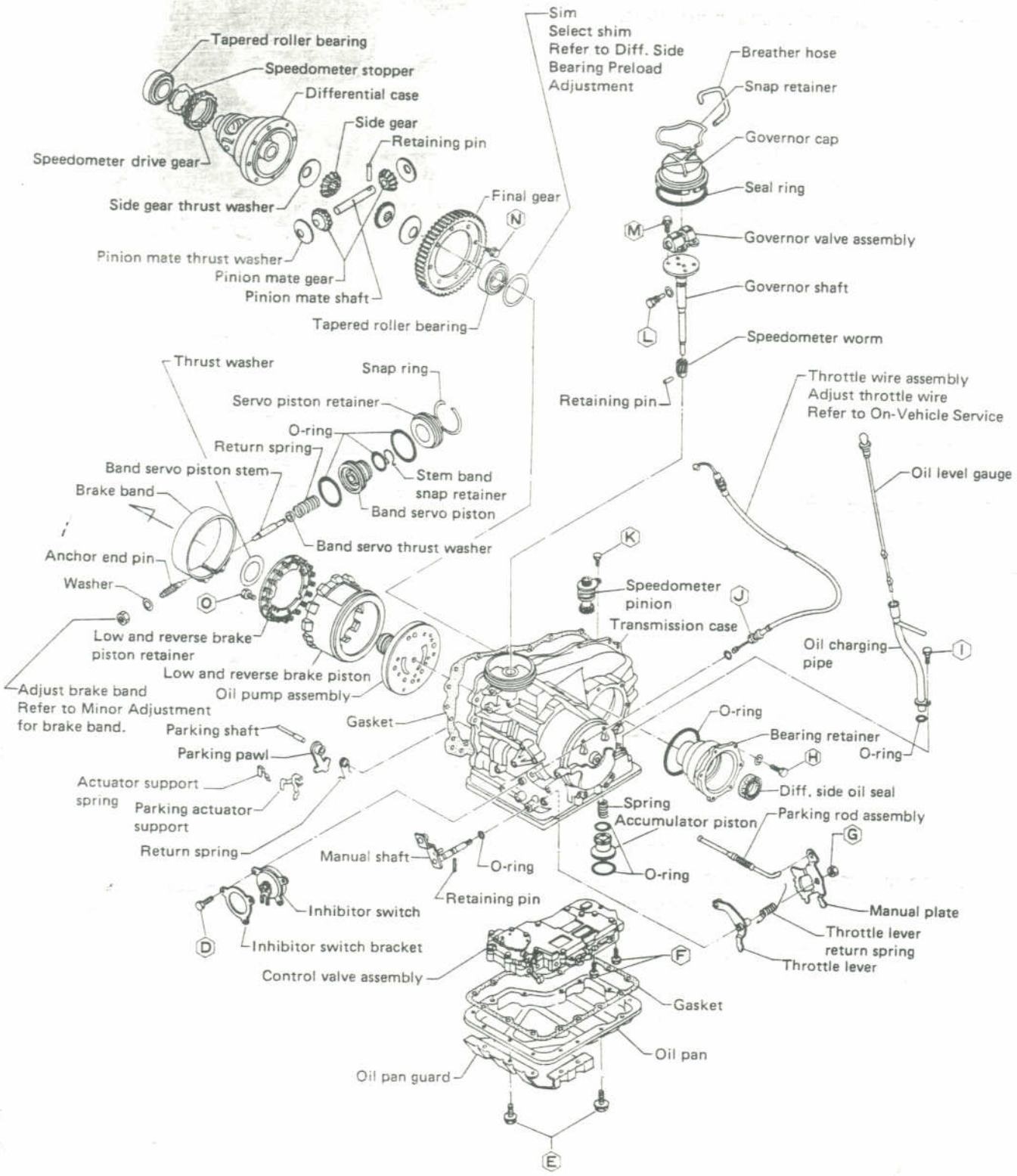
Installation (Cont'd)

- Adjust control cable. Refer to On-Vehicle-Service.
- Check inhibitor switch for operation.
- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.
  With parking brake applied, rotate engine at idling. Without disturbing the above setting, move selector lever through "N" to "D", to "2", to "1" and to "R". A slight shock should be felt by hand gripping hand lever each time transaxle is shifted.
- Check to be sure that line pressure is correct. To do this, refer to Line Pressure Test.
- Perform stall test.

Tightening torque N·m (kg-m, ft-lb)

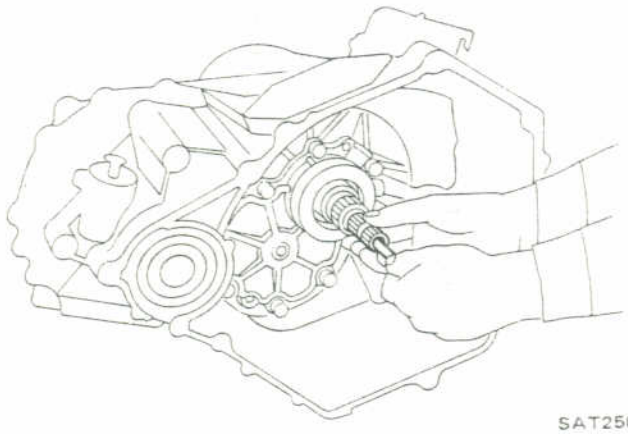
- Ⓐ 39 - 49 (4.0 - 5.0, 29 - 36)
- Ⓑ 14 - 18 (1.4 - 1.8, 10 - 13)
- Ⓒ 29 - 49 (3.0 - 5.0, 22 - 36)
- Ⓓ 2.0 - 2.5 (0.20 - 0.26, 1.4 - 1.9)
- Ⓔ 5 - 7 (0.5 - 0.7, 3.6 - 5.1)
- Ⓕ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- Ⓖ 16 - 22 (1.6 - 2.2, 12 - 16)
- Ⓗ 19 - 25 (1.9 - 2.5, 14 - 18)
- Ⓘ 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
- Ⓙ 2 - 3 (0.2 - 0.3, 1.4 - 2.2)
- Ⓚ 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
- Ⓛ 3.4 - 6.9 (0.35 - 0.7, 2.5 - 5.1)
- Ⓜ 5 - 7 (0.5 - 0.7, 3.6 - 5.1)
- Ⓝ 69 - 78 (7.0 - 8.0, 51 - 58)
- Ⓞ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- Ⓟ 19 - 23 (1.9 - 2.3, 14 - 17)




Tapered roller bearing
Speedometer stopper
Differential case
Side gear
Retaining pin
Speedometer drive gear
Side gear thrust washer
Pinion mate thrust washer
Pinion mate gear
Pinion mate shaft
Final gear
N
Tapered roller bearing
Sim
Select shim
Refer to Diff. Side Bearing Preload Adjustment
Breather hose
Snap retainer
Governor cap
Seal ring
M
Governor valve assembly
Governor shaft
L
Speedometer worm
Retaining pin
Throttle wire assembly
Adjust throttle wire
Refer to On-Vehicle Service
Oil level gauge
Thrust washer
Snap ring
Servo piston retainer
O-ring
Return spring
Band servo piston stem
Stem band snap retainer
Brake band
Band servo piston
Band servo thrust washer
Anchor end pin
Washer
O
Low and reverse brake piston retainer
Low and reverse brake piston
Oil pump assembly
Adjust brake band
Refer to Minor Adjustment for brake band.
K
Speedometer pinion
J
Transmission case
Oil charging pipe
I
Gasket
Parking shaft
Parking pawl
Actuator support spring
Parking actuator support
Return spring
O-ring
Bearing retainer
H
O-ring
Diff. side oil seal
Spring
Accumulator piston
O-ring
Parking rod assembly
G
Manual shaft
O-ring
Retaining pin
Inhibitor switch
D
Inhibitor switch bracket
Manual plate
Throttle lever return spring
Throttle lever
Control valve assembly
F
Gasket
Oil pan
Oil pan guard
E

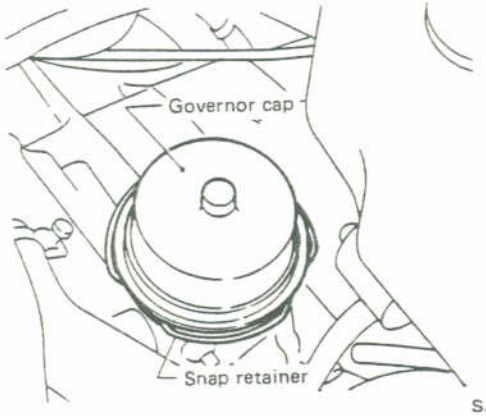
SAT130A

1. Drain transaxle fluid.
2. Remove torque converter.
3. Remove oil pump shaft and input shaft.



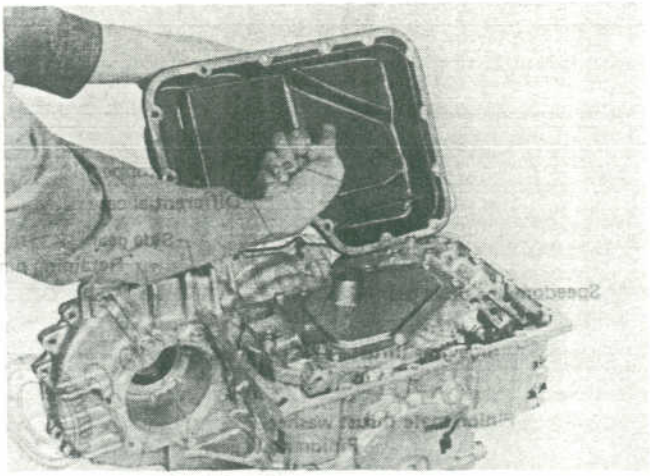
SAT250

4. Remove snap retainer, governor cap with breather hose and O-ring.

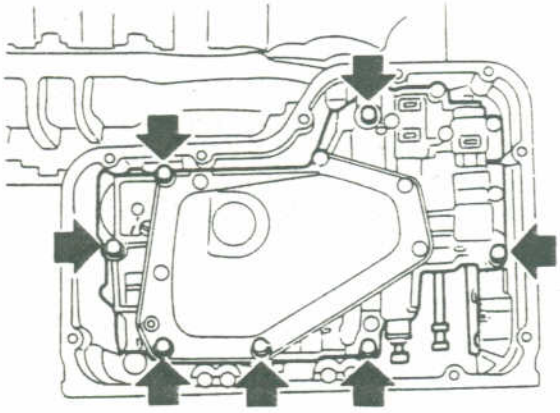


SAT202A

5. Remove oil pan guard and oil pan and inspect its contents. An analysis of any foreign matter can indicate the types of problems to look for. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up which can cause valves, servo, and clutches to stick and may inhibit pump pressure.

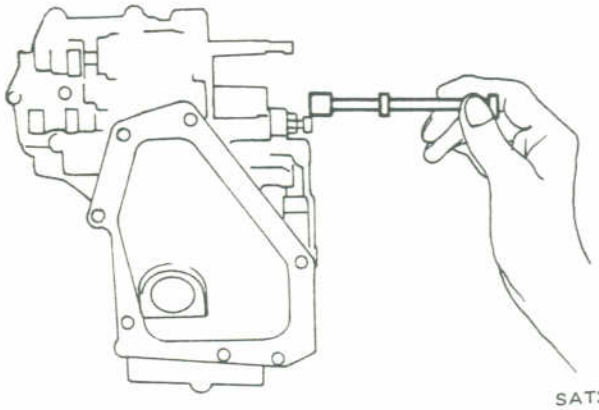


6. Remove control valve body.



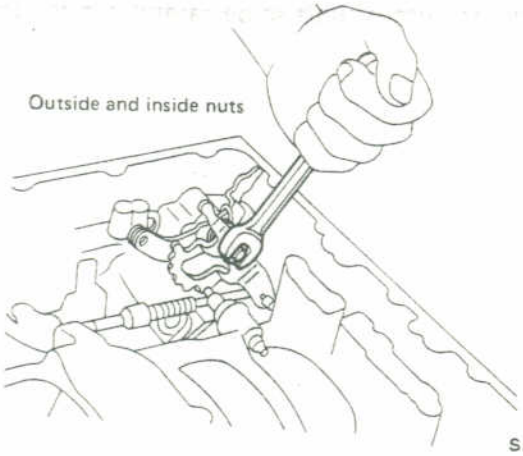
SAT383A

Remove manual valve from valve body as a precaution, to prevent valve from dropping out accidentally.



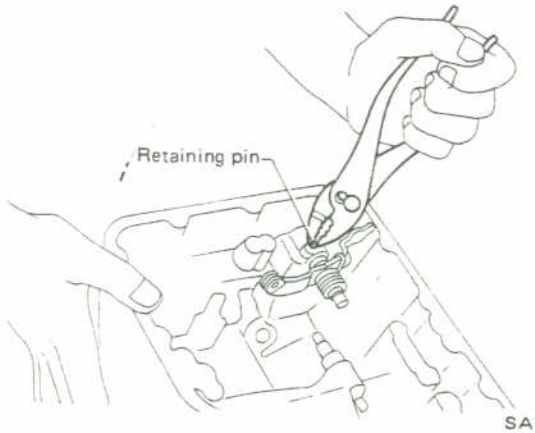
SAT254

7. Remove manual shaft securing nuts.



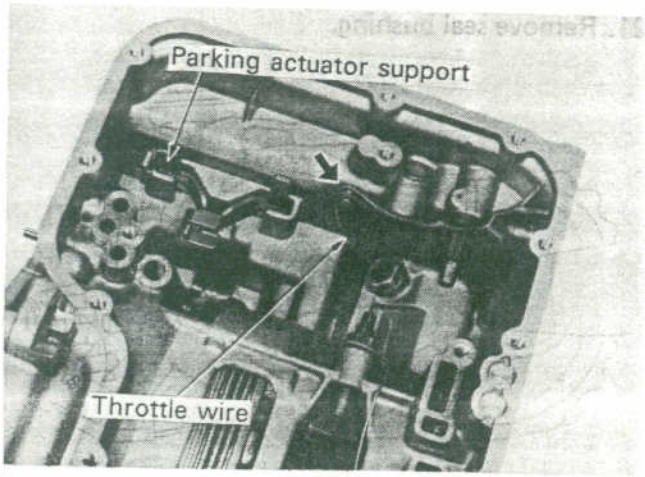
SAT255

8. Pull out retaining pin, then remove throttle lever, manual plate, manual shaft, selector range lever and parking rod assembly.

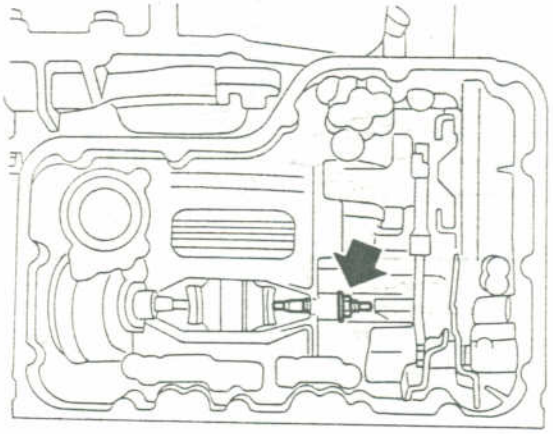


SAT256

9. Disconnect throttle wire from throttle lever, then remove throttle wire. Remove parking actuator support from transmission case.



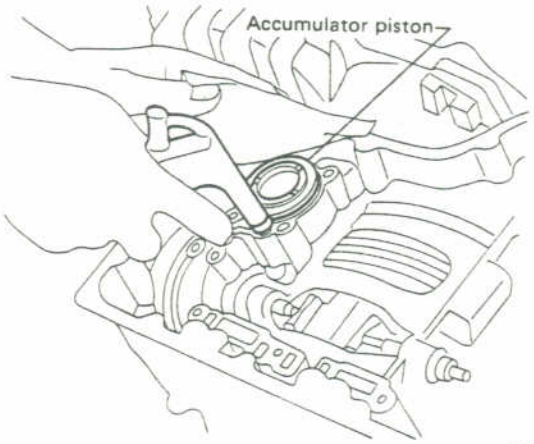
10. Loosen band brake piston stem lock nut, then back off piston stem.



SAT259

11. Remove accumulator piston with compressed air.

Be careful that accumulator piston does not jump out.



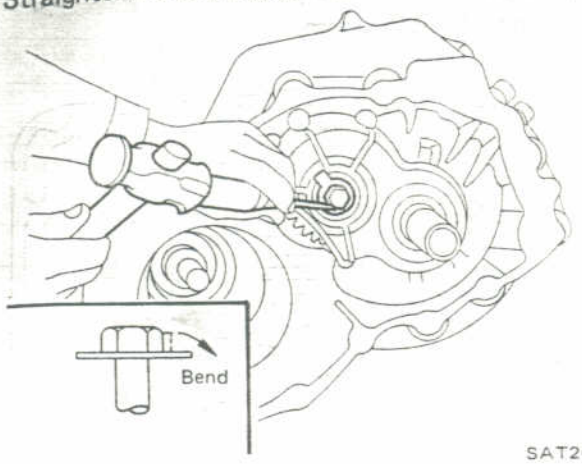
SAT260

12. Remove converter housing securing bolts.
13. Separate converter housing from transmission case by tapping it.

Be careful not to drop final drive assembly.

14. Remove final drive assembly.

15. Straighten lock washer.

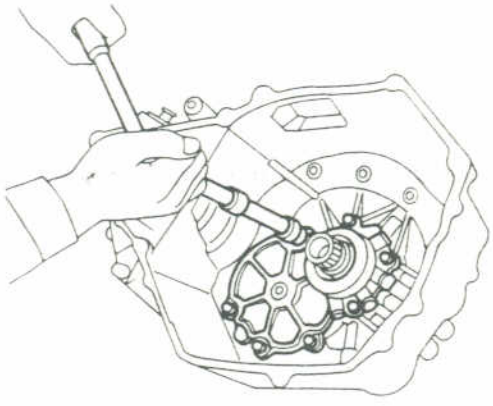


SAT263

16. Remove idler gear bolt and lock washer.

SAT264

17. Remove front cover retaining bolts.

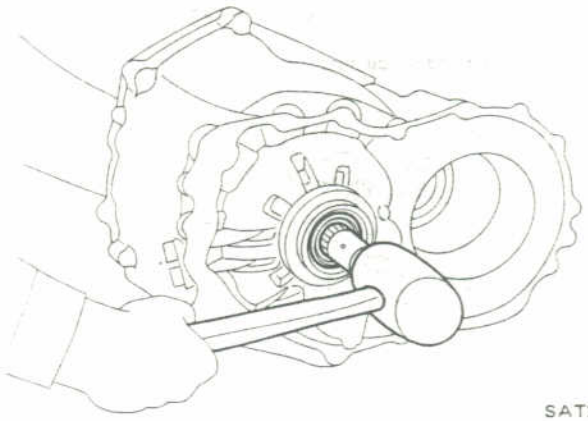


SAT265

18. Tap output shaft, then remove it together with front cover.

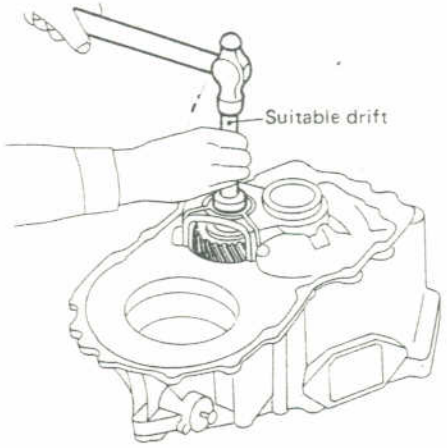
a. **When tapping output shaft, be sure to hold front cover so that it does not fall.**

b. **Adjusting shim is attached to rear internal gear side of output shaft so be careful not to lose it.**



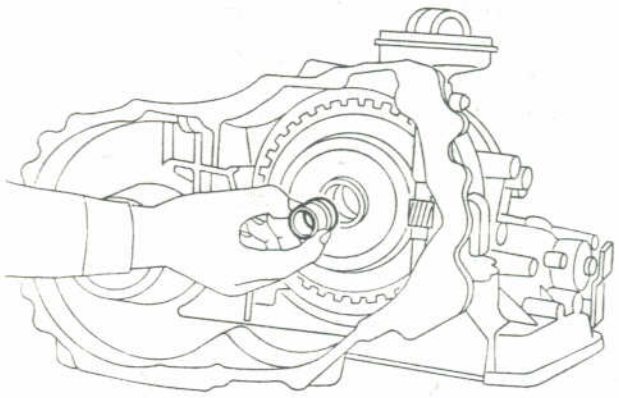
SAT266

19. Remove front cover gasket.
20. Remove idler gear, idler gear shaft and taper roller bearings by tapping idler gear shaft.



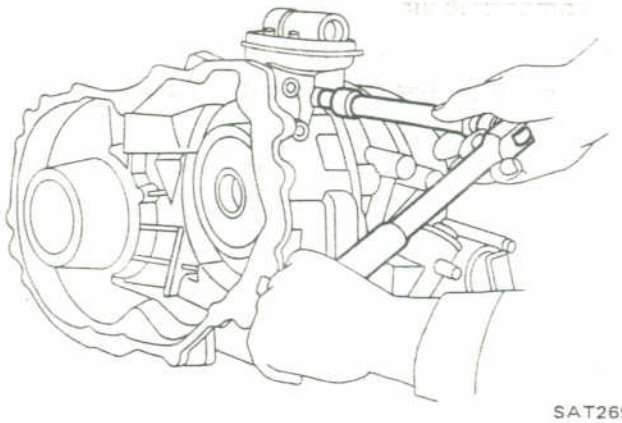
SAT267

21. Remove seal bushing.



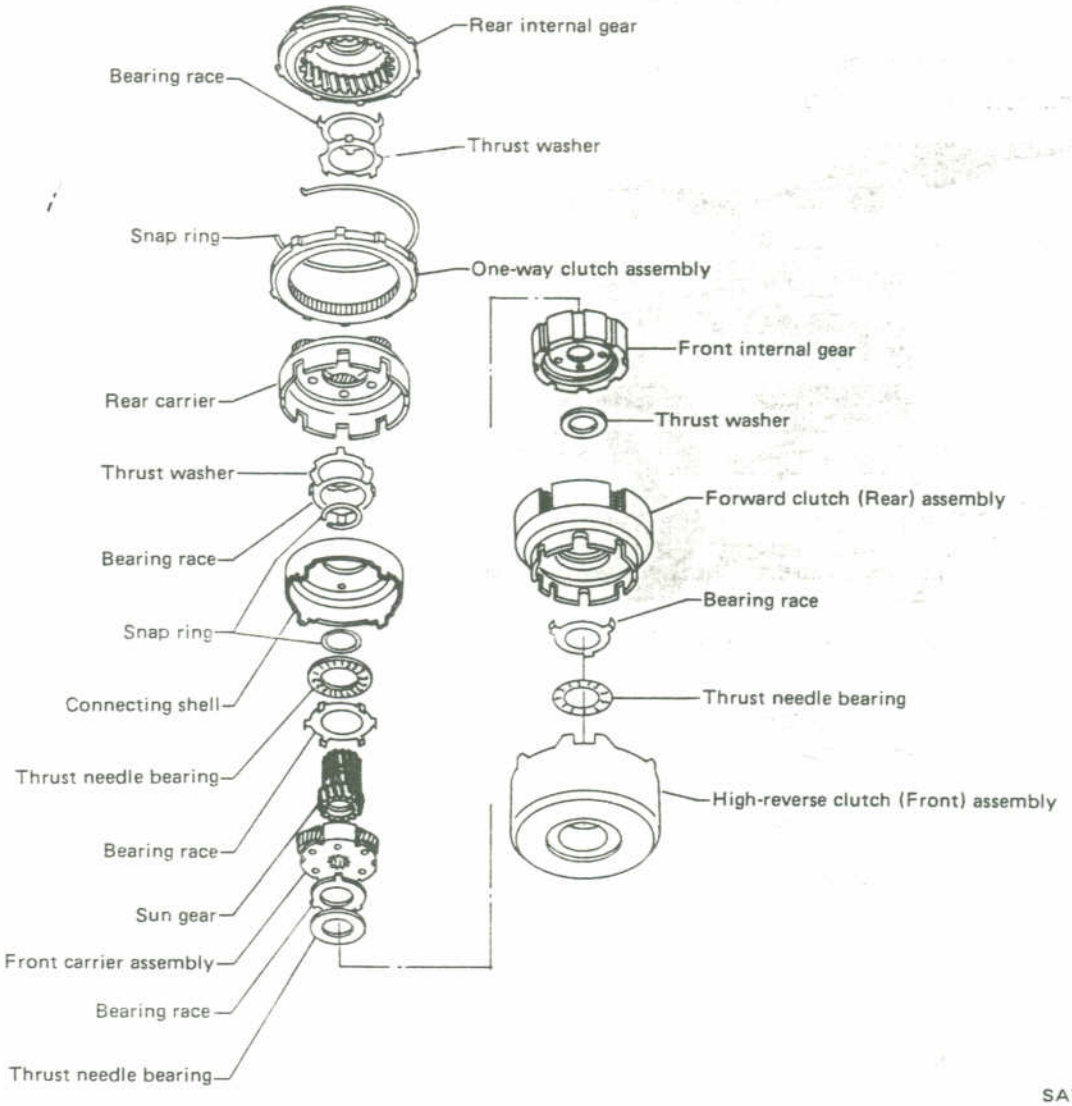
SAT268

22. Remove governor shaft retaining bolt.



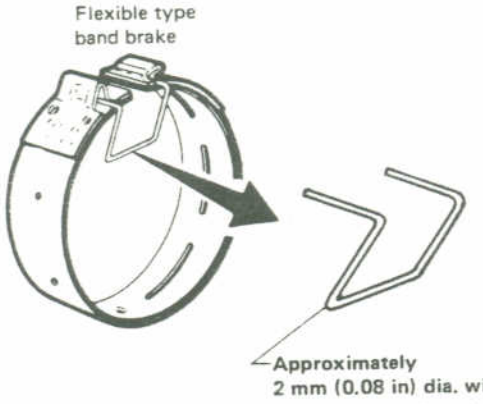
SAT269

23. Pull out governor shaft.
24. Remove the following parts.



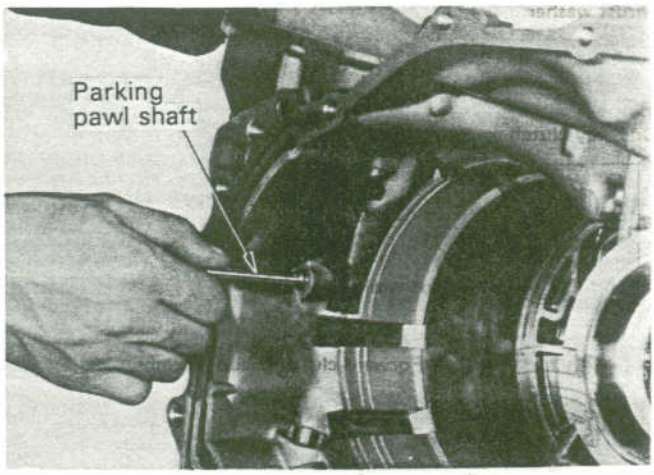
SAT655

To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. Before removing the brake band, always secure it with a clip as shown in the figure below.
Leave the clip in position after removing the brake band.

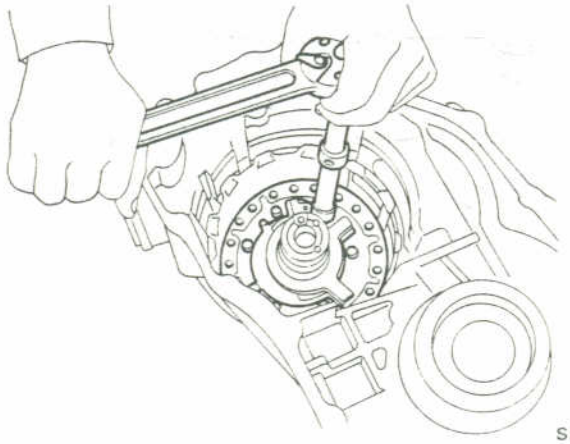


SAT656

25. Pull out parking pawl shaft, then remove parking pawl and return spring.



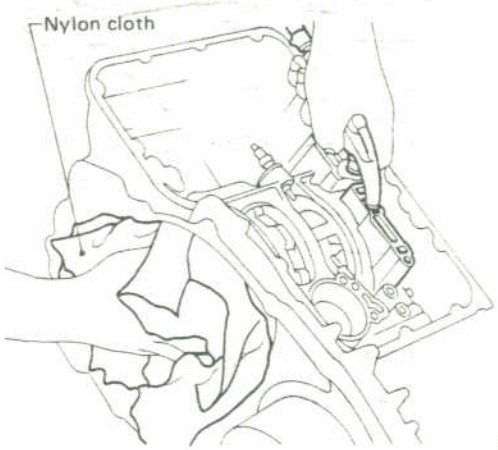
26. Remove low and reverse brake retainer.



SAT281

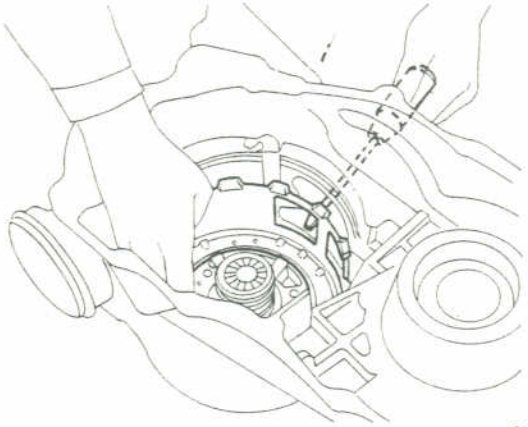
27. Remove low and reverse brake piston with compressed air.

Be sure to hold low and reverse brake piston with nylon cloth so that they do not jump out.



SAT282

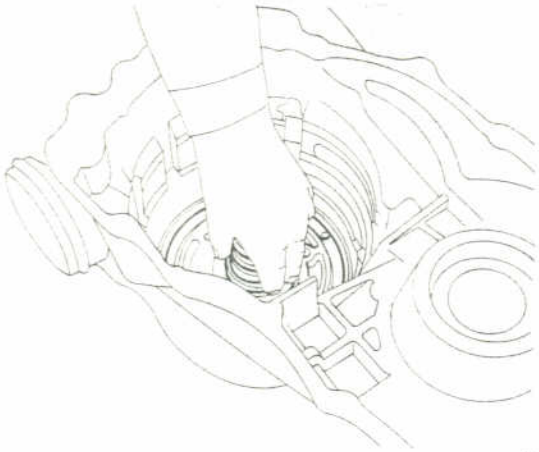
If compressed air is not available, remove it with a screwdriver.



SAT657

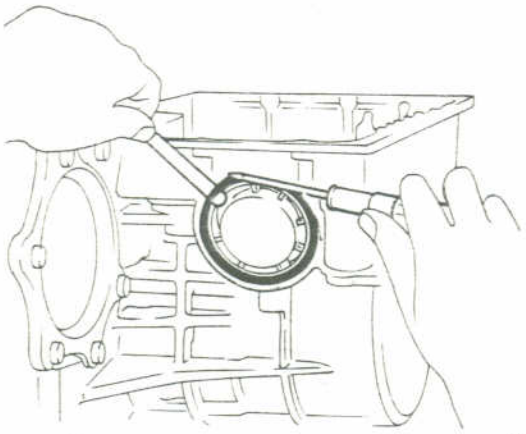
28. Remove oil pump assembly, thrust washer and thrust needle bearing.

The oil pump and transmission case fit loosely, but the clearance is very small. So always lift it straight out of transmission case.



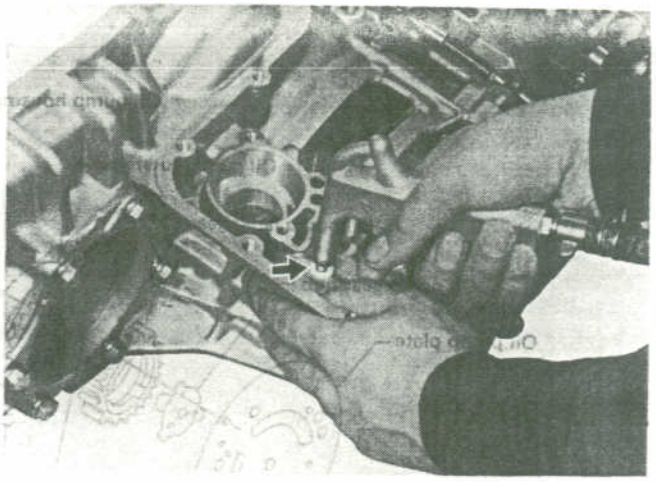
SAT284

29. Remove inhibitor switch.
30. Remove band servo piston and return spring. Then, transmission case can be removed.

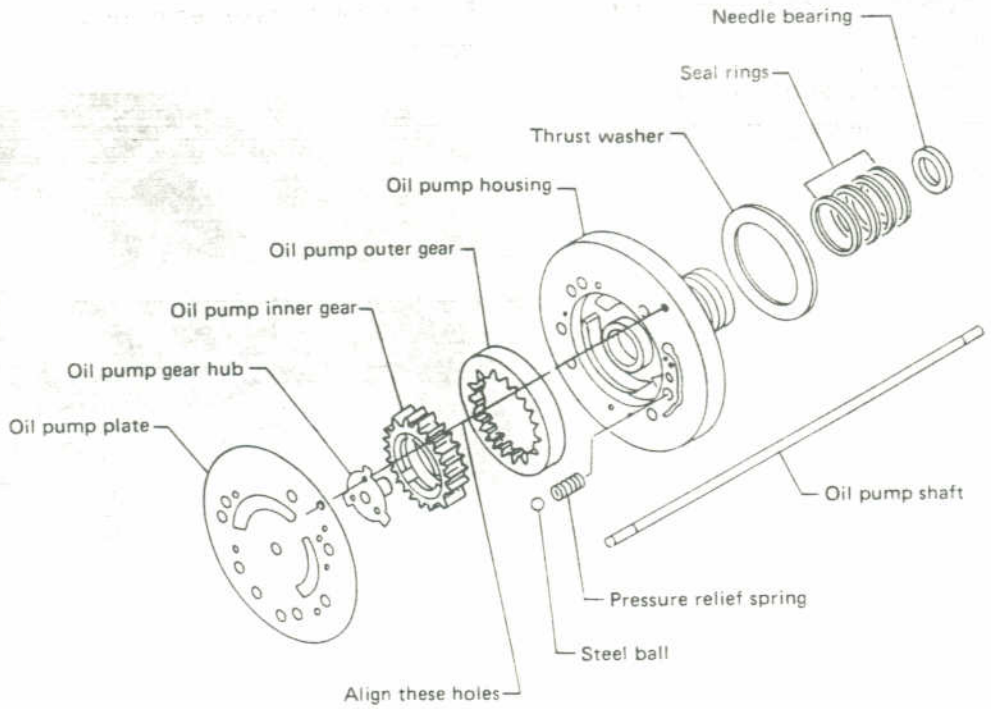


SAT424

31. Remove band brake servo, retainer and return spring.



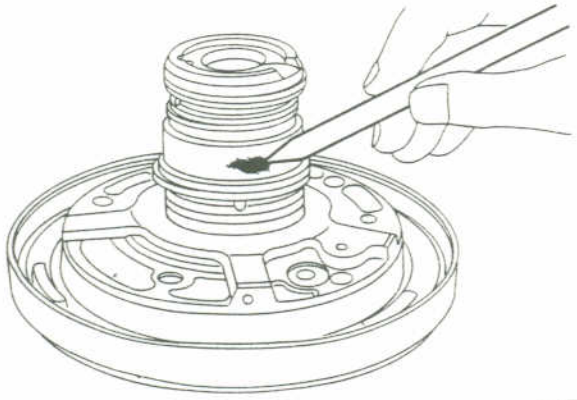
Oil Pump



SAT288

INSPECTION

1. Inspect oil pump body, oil pump shaft and ring groove areas for wear.



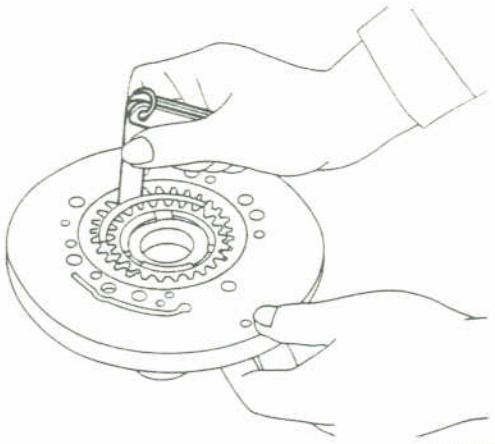
SAT289

2. Remove oil pump plate.
3. Inspect gears and all internal surfaces for faults and visible wear.
4. Measure clearance between outer gear and crescent.

   Standard clearance:

   0.20 - 0.30 mm (0.0079 - 0.0118 in)

Replace oil pump inner & outer gear and oil pump housing if the clearance exceeds 0.35 mm (0.0138 in).



SAT291

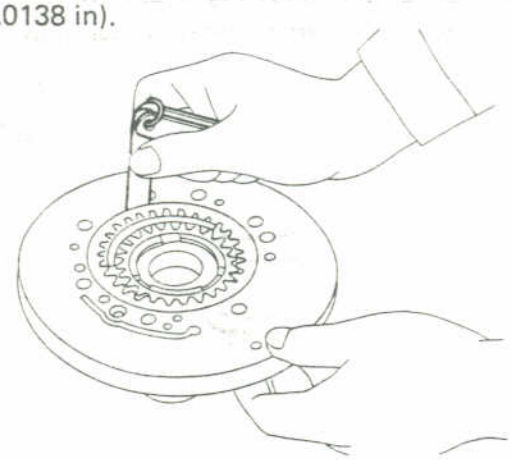
5. Measure clearance between outer gear and pump housing.

   Standard clearance:

   0.20 - 0.30 mm (0.0079 - 0.0118 in)

Oil Pump (Cont'd)

Replace oil pump inner & outer gear and oil pump housing if the clearance exceeds 0.35 mm (0.0138 in).



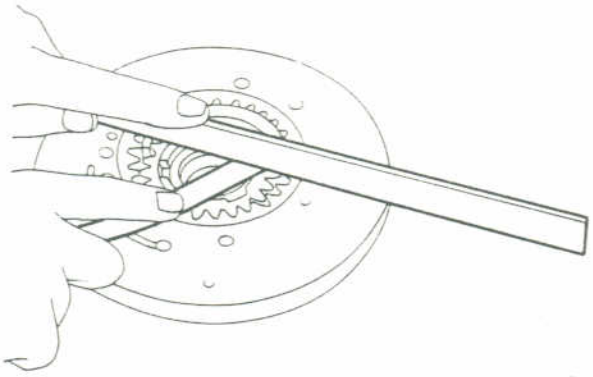
SAT292

6. Measure clearance between gears and oil pump housing.

Standard clearance:

0.02 - 0.04 mm (0.0008 - 0.0016 in)

Replace oil pump inner & outer gear and oil pump housing if the clearance exceeds 0.08 mm (0.0031 in).



SAT293

Select oil pump inner and outer gears of the proper thickness from among those in the following table before installation.

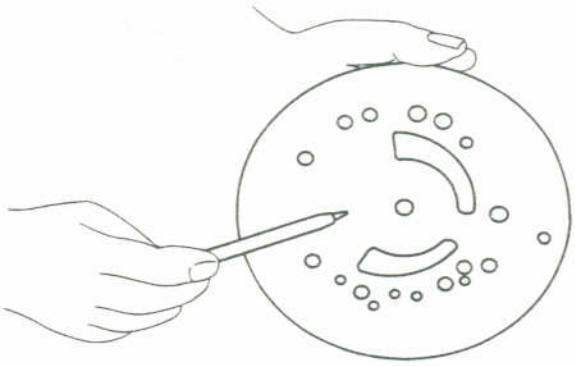
Oil pump outer gear

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31347-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31347-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31347-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31347-01X03

Oil pump inner gear

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31346-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31346-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31346-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31346-01X03

7. Check oil pump plate for scratches or bending.



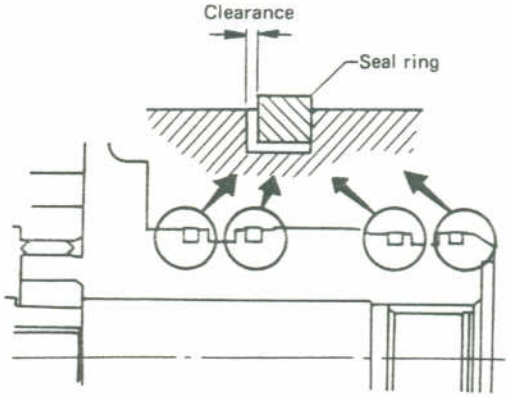
SAT658

8. Measure clearance between seal ring and ring groove.

Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Replace oil pump inner & outer gear and oil pump housing if the clearance exceeds 0.25 mm (0.0098 in).

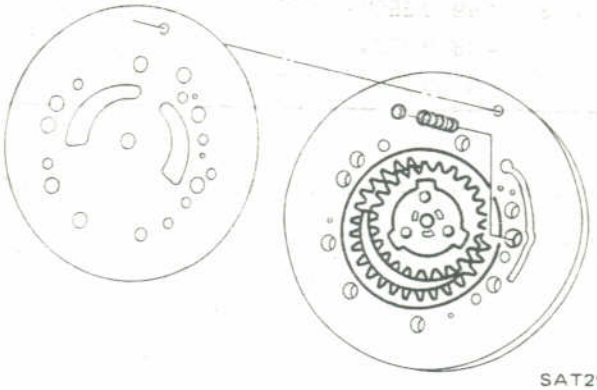


SAT659

Oil Pump (Cont'd)

ASSEMBLY

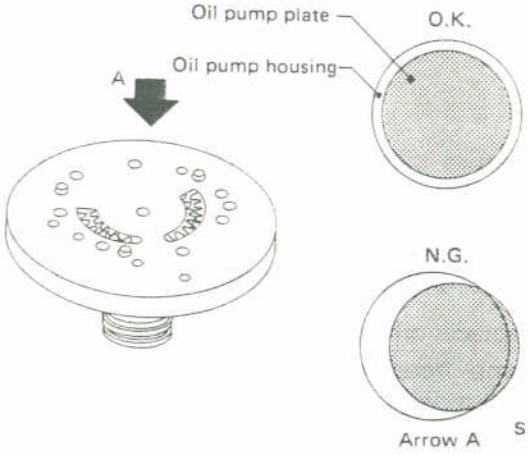
1. Install oil pump gear hub, pressure relief spring and steel ball onto oil pump housing.



SAT295

2. Install oil pump plate.

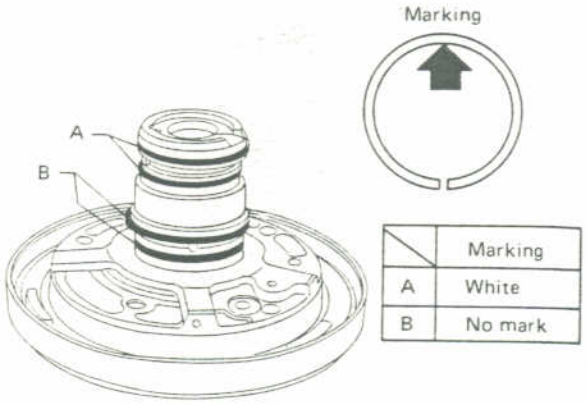
Do not allow periphery of oil pump plate to protrude beyond periphery of oil pump housing.



SAT296

3. Install seal rings.

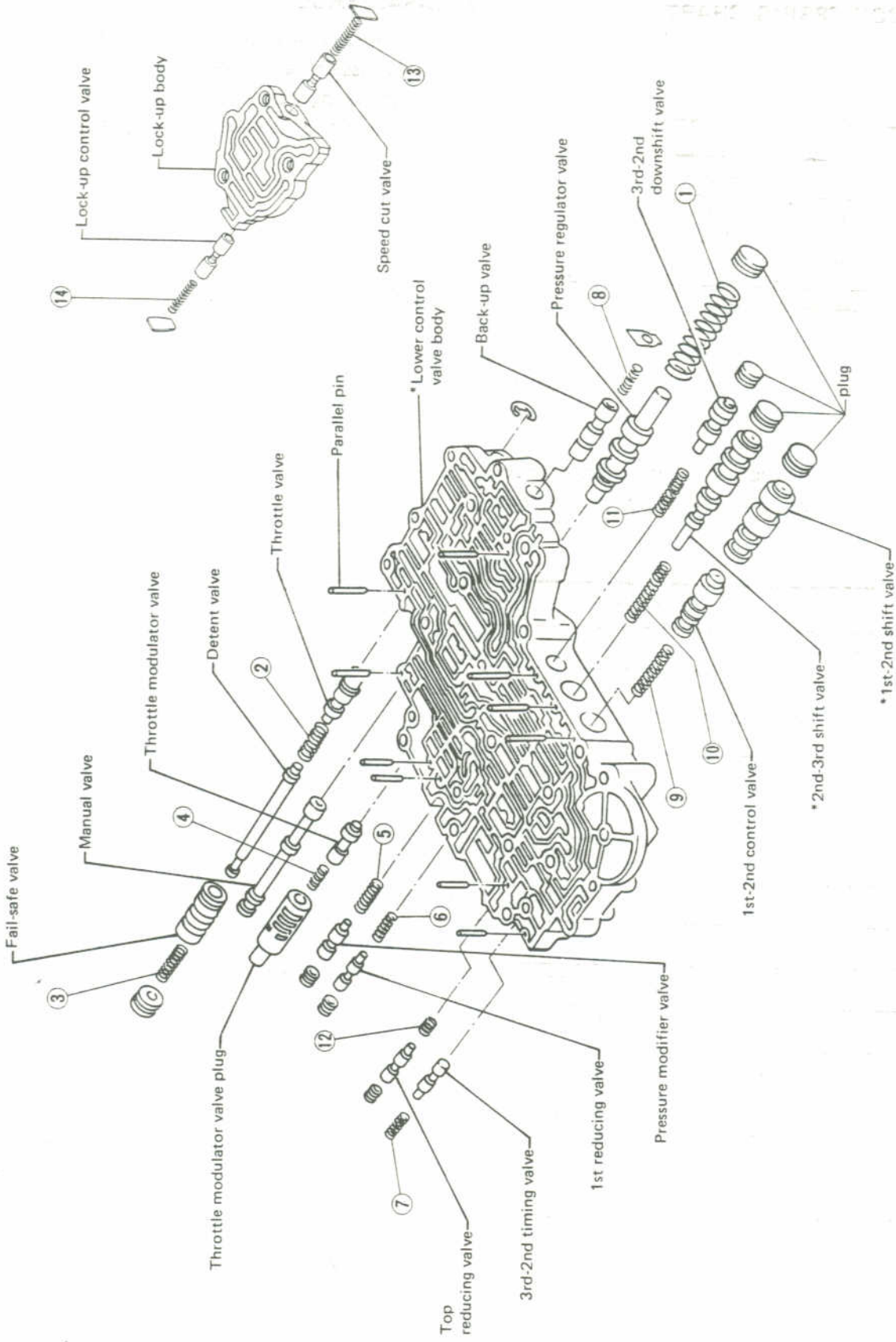
Refer to the following figure for proper locations of the two different types of seal rings.



	Marking
A	White
B	No mark

SAT300

Control Valve Body

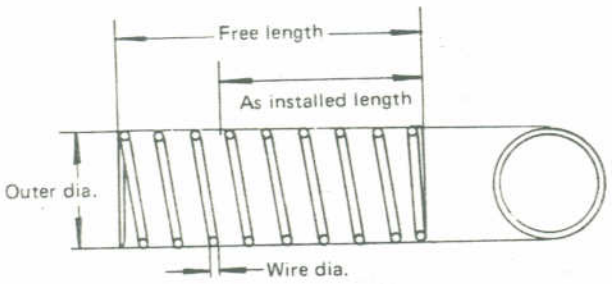


Replace part with "*" as a set.

SAT660

Control Valve Body (Cont'd)

VALVE BODY SPRING CHART



SAT039

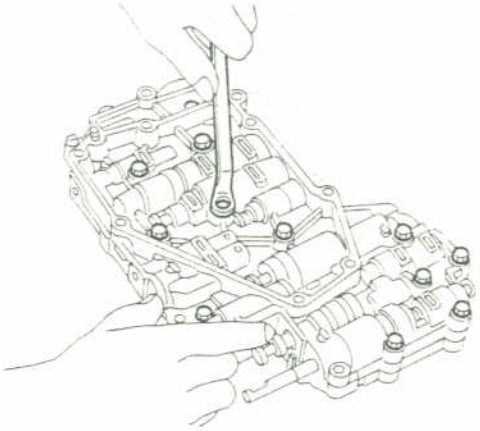
Numbers of each valve spring listed in table below are the same as those in the figure on the previous page.

Valve spring	Free length mm (in)
① Pressure regulator valve	46.4 (1.827)
② Throttle valve	33.4 (1.315)
③ Fail-safe valve	23.1 (0.909)
④ Throttle modulator valve	22.5 (0.886)
⑤ Pressure modifier valve	25.1 (0.988)
⑥ 1st reducing valve	21.4 (0.843)
⑦ 3rd-2nd timing valve	23.4 (0.921)
⑧ Back up valve	18.8 (0.740)
⑨ 1st-2nd shift valve	38.9 (1.531)
⑩ 2nd-3rd shift valve	45.7 (1.799)
⑪ 3rd-2nd downshift valve	38.9 (1.531)
⑫ Top reducing valve	20.6 (0.811)
⑬ Speed cut valve	20.6 (0.811)
⑭ Lock-up control valve	20.6 (0.811)

Ensure that the new pressure modifier valve spring is the same type as the one which was removed.

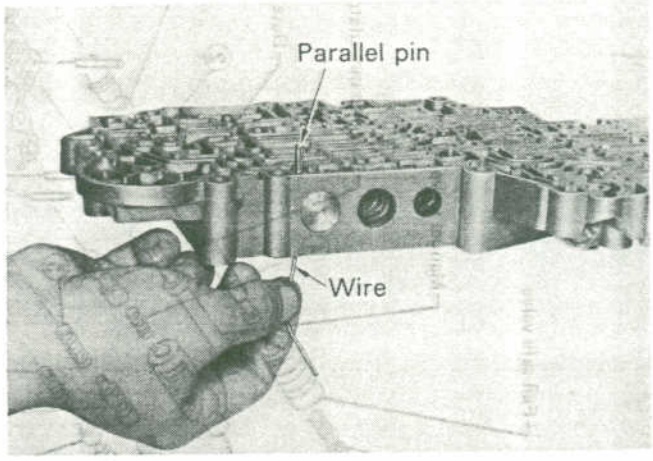
DISASSEMBLY

1. Remove oil strainer and magnet.
2. Disassemble valve body and its remaining attaching bolts and nuts to carefully separate lower body, separator plate and upper body.



SAT302

3. During valve body separation, do not lose the 6 steel balls on valve upper body.



Manual valve was removed when valve body was removed from transaxle. Include valve in subsequent inspection and service sequence.

INSPECTION

A newly manufactured valve body represents precision manufactured valves assembled with close tolerances into precision bores of the valve body.

Control Valve Body (Cont'd)

If inspection reveals excessive clearances, 0.03 mm (0.0012 in) or more, between the valves and the valve body bores, replace the entire valve body rather than attempt rework.

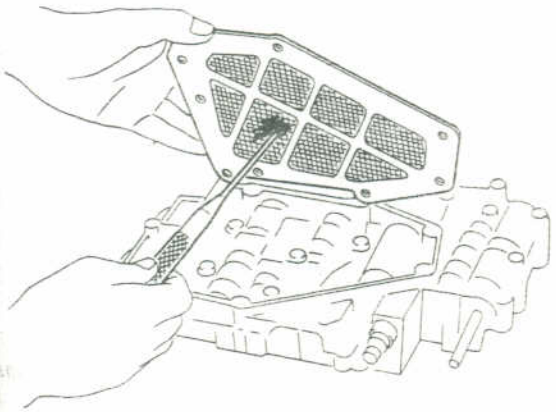
If one or more valves are sticking from varnish deposits or burns resulting from deteriorated oil or overheating, you may be able to clean the valves and valve bodies. Always use crocus cloth, which is a very fine type of cutting material. Never use emery cloth, as it is too coarse and can scratch the valves or valve bores. Scratches can lead to future deposits of varnish or foreign matter.

During cleaning, do not remove the sharp edges of the valve. When edges are rounded or scratched, entry is provided for dirt or foreign matter to work into the sides of the valves and hinder valve movement.

The valves may be cleaned using alcohol or lacquer thinner. The valve bodies can be dip cleaned with a good carburetor cleaner or lacquer thinner. Do not leave valve bodies submerged in carburetor cleaner longer than five minutes. Rinse parts thoroughly and dry.

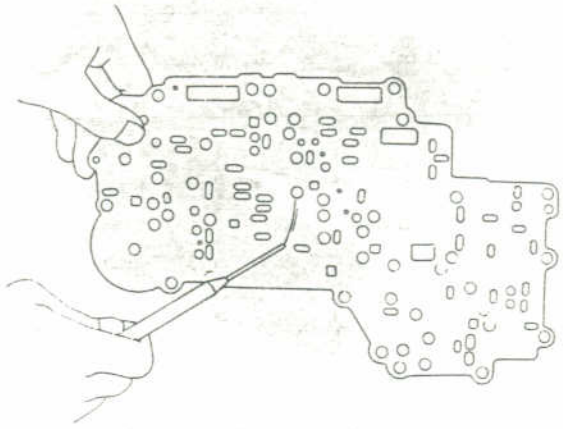
Lubricate all parts in clean A.T.F. before reassembly.

1. Check valves for signs of burning. Replace if beyond clean-up.
2. Check oil strainer for general condition. Replace if necessary.



SAT306

3. Check separator plate for scratches or damage. Replace if necessary. Scratches or score marks can cause oil to by-pass correct oil passages and result in system malfunction.

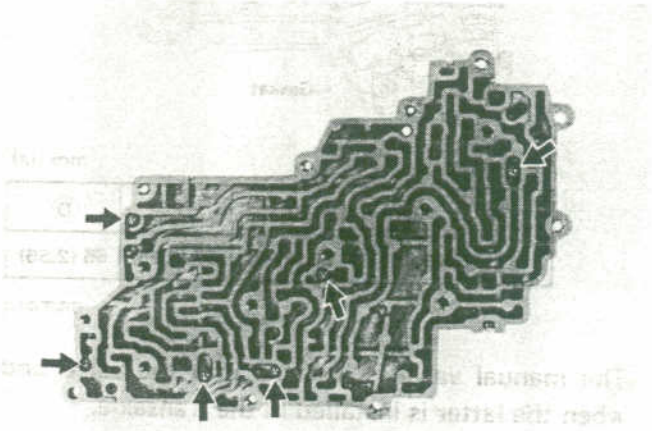


SAT307

4. Check oil passages in upper and lower valve bodies for varnish deposits, scratches or other damage that would impair valve movement. Check threaded holes and related bolts and screws for stripped threads; replace as needed.
5. Test valve springs for weakened load condition. Refer to Valve Body Spring Chart for spring specifications.

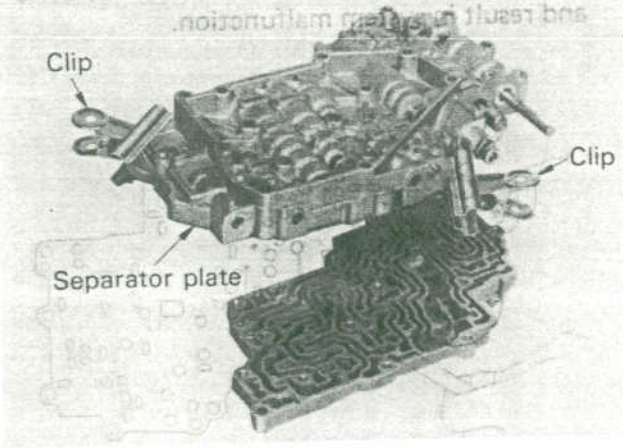
ASSEMBLY

1. Reinstall the six steel balls in upper valve body.



Control Valve Body (Cont'd)

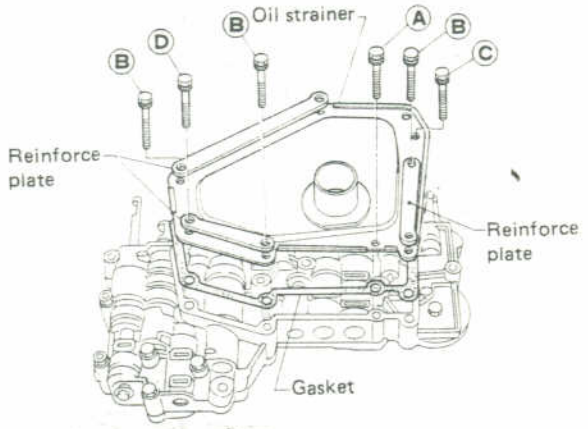
2. Assemble separator plate and lower valve body on upper valve body, then tighten bolts.



When installing these bolts, first be sure to install the two reamer bolts to their original positions.

3. Install oil strainer, oil strainer gasket, reinforce plate and magnet.

Do not reuse conical bolts that secure oil strainer.



"L" length

mm (in)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ
L	45 (1.77)	50 (1.97)	57 (2.24)	65 (2.56)

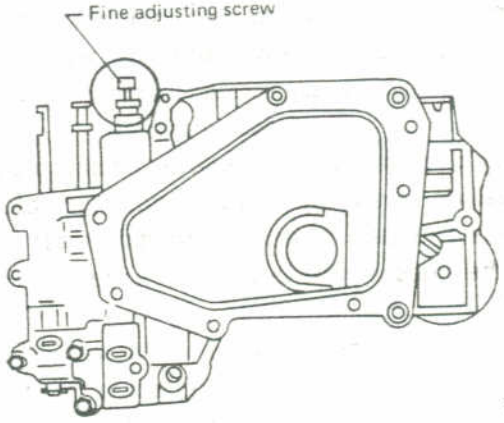
SAT414A

The manual valve is inserted into the valve body when the latter is installed in the transaxle.

4. Adjust fine adjustment of shifting point if necessary.

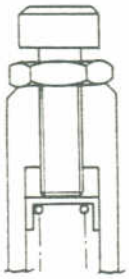
The fine adjusting screw provides a maximum fine adjustment of approximately 5 km/h (3 MPH).

Tightening it causes the shifting point to occur at a lower point, and vice versa, except in the "kickdown" range.



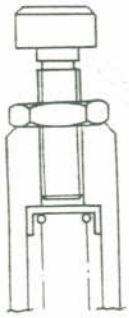
SAT428

(1) Tighten adjusting screw all the way.



SAT048A

(2) Then back off by 6 and a half turns.

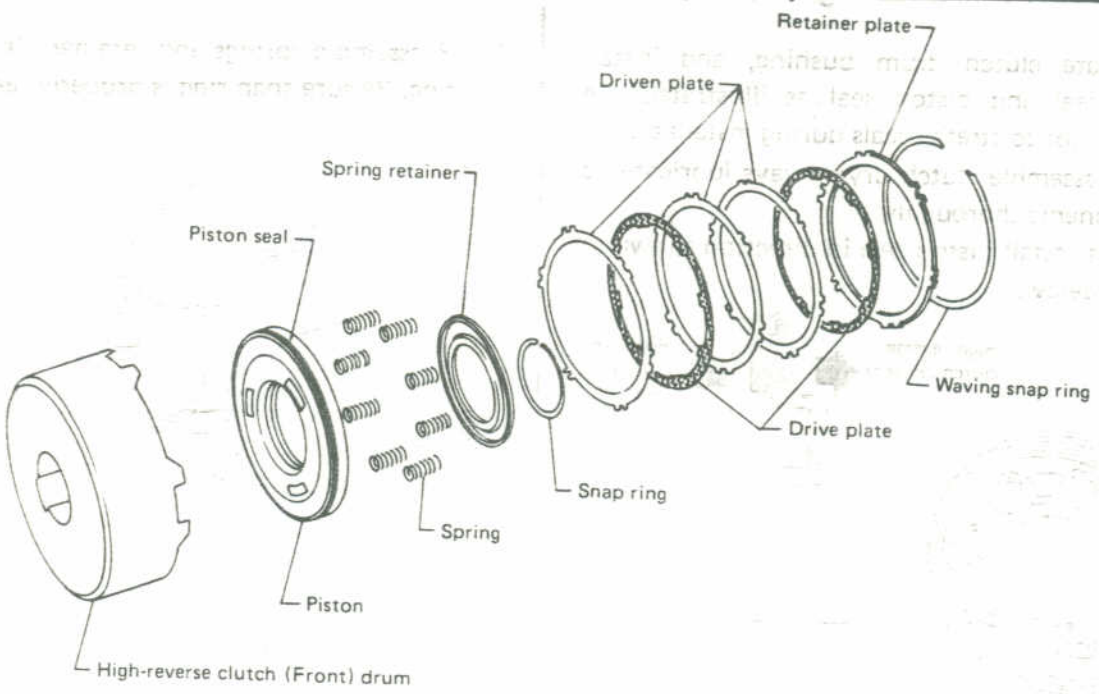


SAT049A

(3) Tighten lock nut.

: Lock nut
3.4 - 4.4 N·m
(0.35 - 0.45 kg-m, 2.5 - 3.3 ft-lb)

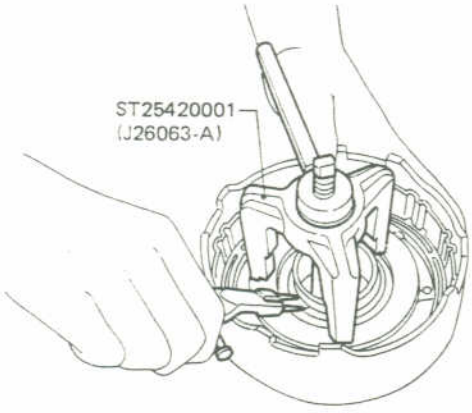
High-reverse Clutch (Front)



SAT310

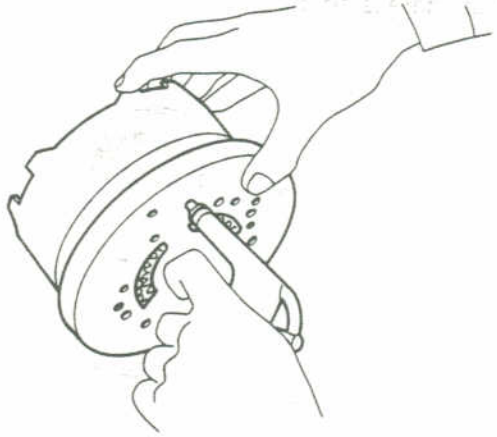
DISASSEMBLY

- Compress clutch springs and remove snap ring from spring retainer.



SAT313

- For easy removal of piston from drum, use an air gun with a tapered rubber tip to carefully apply air pressure to loosen piston from drum.



SAT315

INSPECTION AND ASSEMBLY

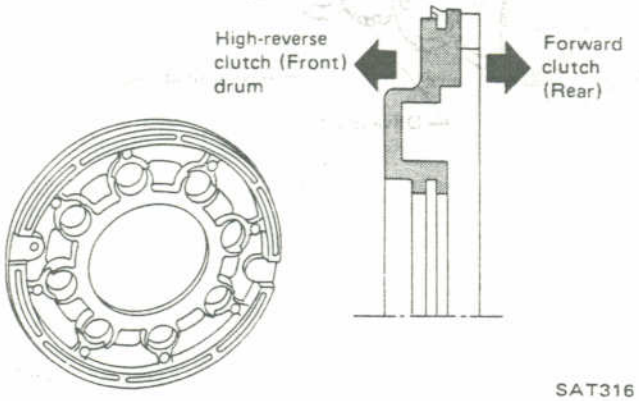
1. Check clutch drive plate facing for wear or damage. Drive plate thickness must not be less than 1.6 mm (0.063 in).

   Standard drive plate thickness:
   1.70 - 1.85 mm (0.0669 - 0.0728 in)

2. Check for wear on snap ring, weak or broken coil springs, and warped spring retainer.

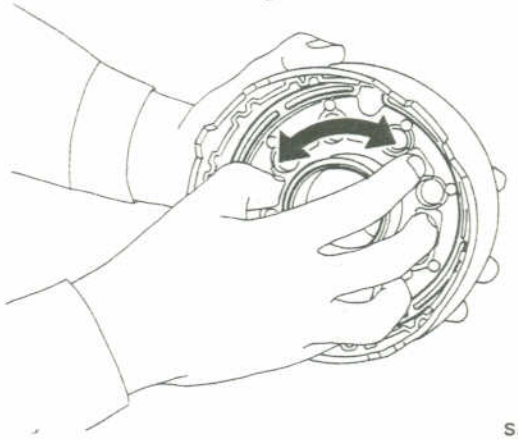
High-reverse Clutch (Front) (Cont'd)

3. Lubricate clutch drum bushing, and install inner seal and piston seal as illustrated. Be careful not to stretch seals during installation.
   - Never assemble clutch dry; always lubricate its components thoroughly.
   - Always install piston seal in direction shown in figure below.



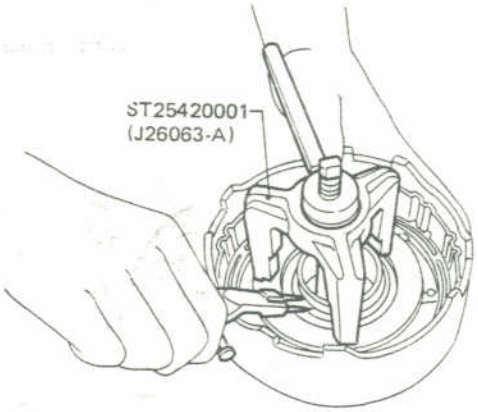
SAT316

4. Assemble piston, being careful not to allow seal to kink or become damaged during installation. After installing, turn piston by hand to ensure that there is no binding.



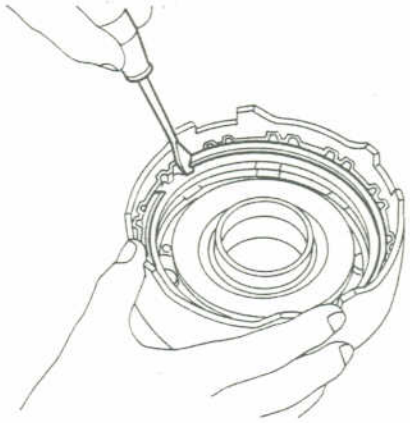
SAT317

5. Reassemble springs and retainer. Reinstall snap ring. Be sure snap ring is properly seated.



SAT313

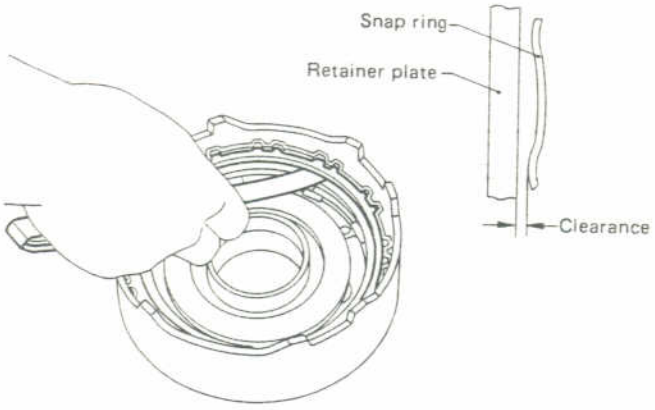
6. Install driven plates, drive plates, and secure with snap ring.



SAT311

High-reverse Clutch (Front) (Cont'd)

7. Measure clearance between retainer plate and snap ring.
   Do not compress the wave type snap ring when measuring the clutch clearance. When correctly measured, there should only be light contact.
   Specified clearance:
   Standard
   1.0 - 1.4 mm (0.039 - 0.055 in)
   Allowable limit
   2.2 mm (0.087 in)

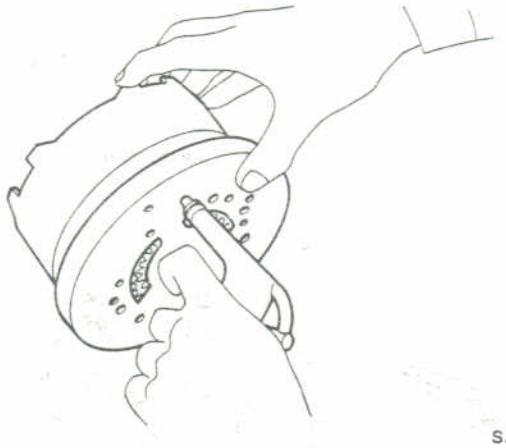


SAT320

Available retainer plate

Thickness mm (in)	Part number
3.6 (0.142)	31537-01X00
3.8 (0.150)	31537-01X01
4.0 (0.157)	31537-01X02
4.2 (0.165)	31537-01X03
4.4 (0.173)	31537-01X04

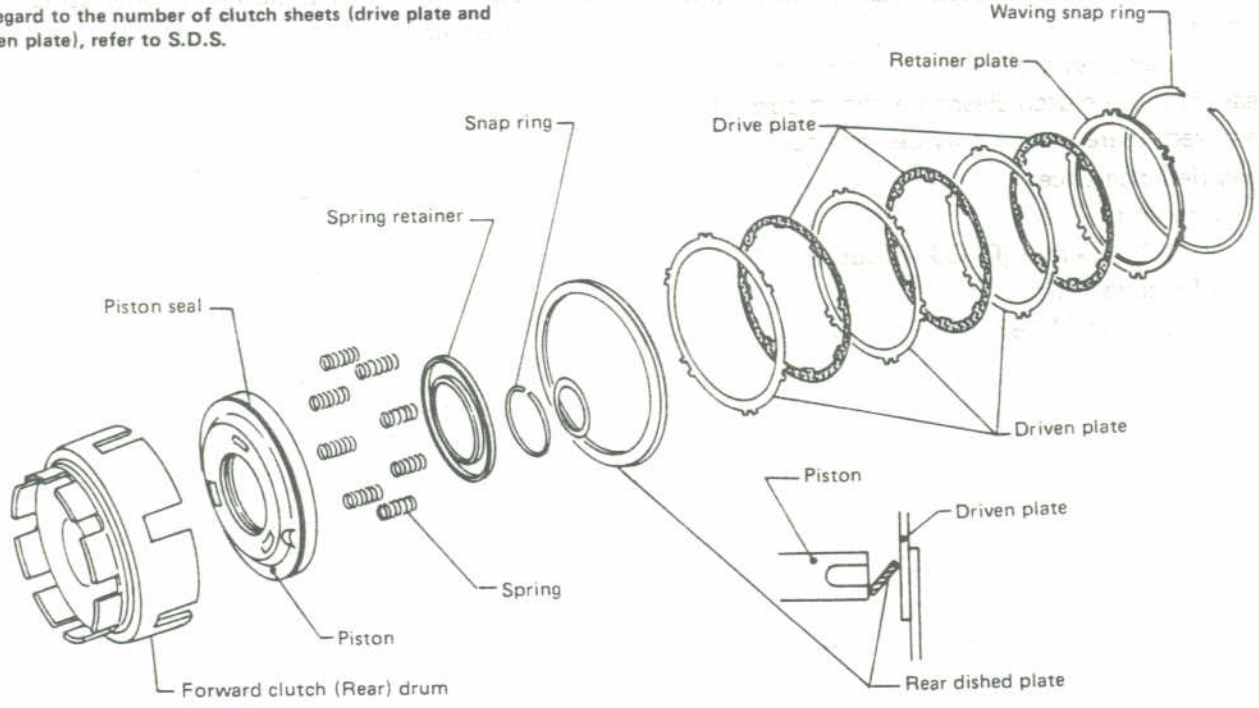
8. Testing high-reverse clutch (Front) using compressed air.



SAT315

Forward Clutch (Rear)

In regard to the number of clutch sheets (drive plate and driven plate), refer to S.D.S.



SAT459

Service procedures for forward clutch (Rear) are essentially the same as those for high-reverse clutch (Front), with the following exception:

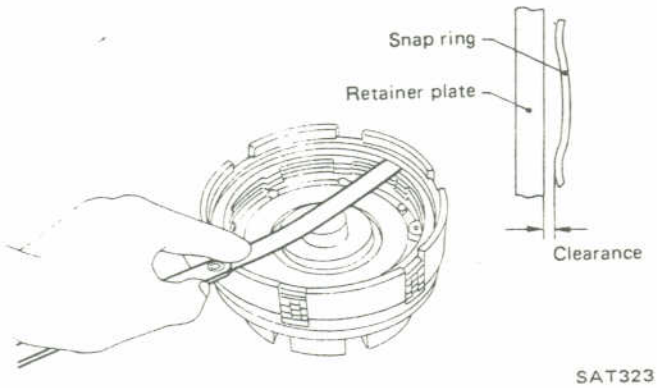
Specified clearance between retainer plate and snap ring:

Standard

0.5 - 0.8 mm (0.020 - 0.031 in)

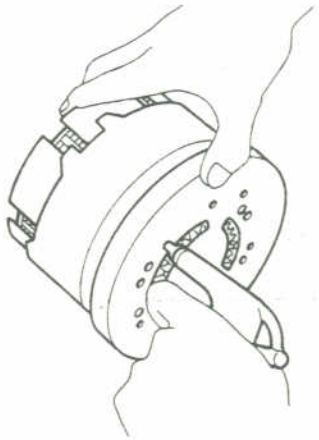
Allowable limit

2.8 mm (0.110 in)



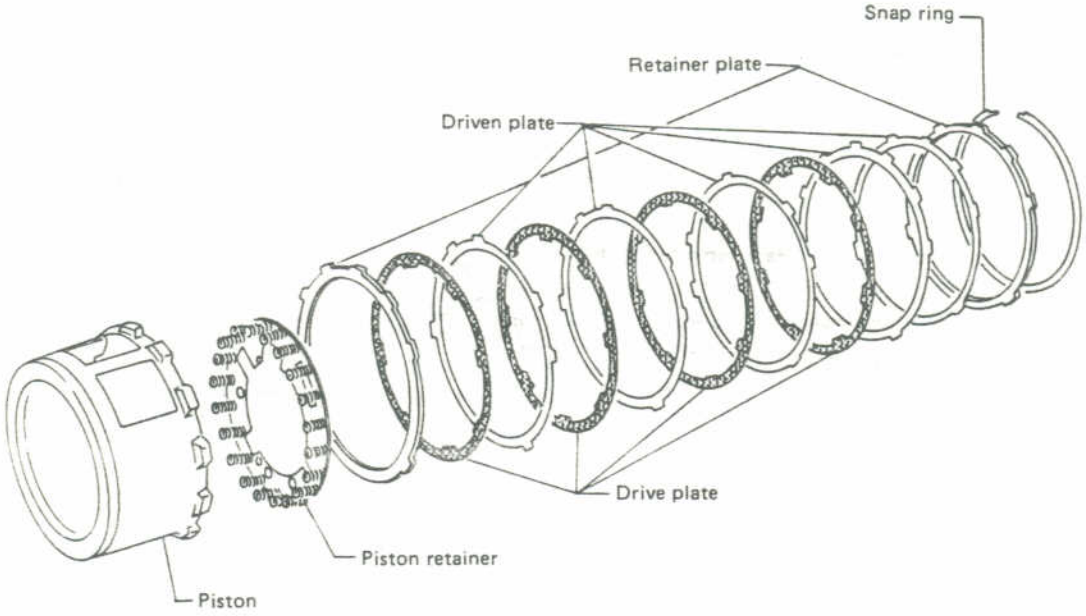
SAT323

After assembly, check the operation of clutch.



SAT324

Low & Reverse Brake



SAT325

INSPECTION

- Examine low and reverse brake for damaged clutch drive plate facing and worn snap ring.
- Check drive plate facing for wear or damage; if necessary, replace.

Drive plate thickness:

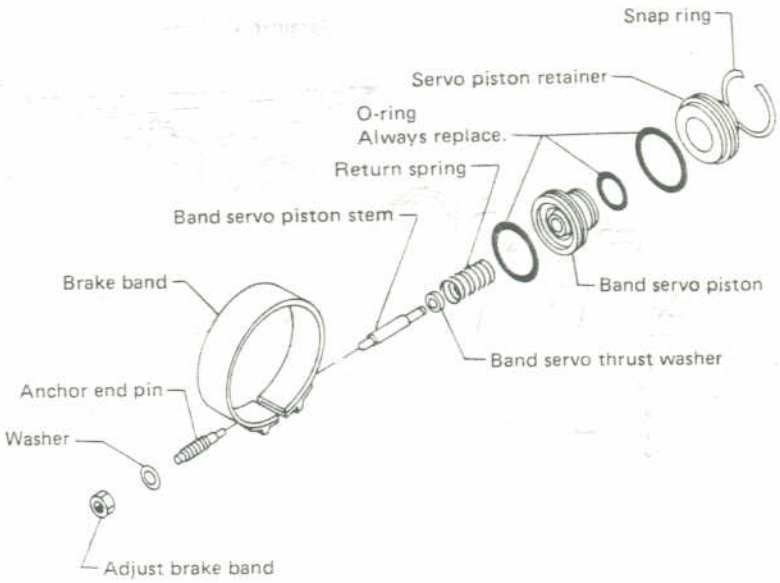
Standard

1.90 - 2.05 mm (0.0748 - 0.0807 in)

Allowable limit

1.8 mm (0.071 in)

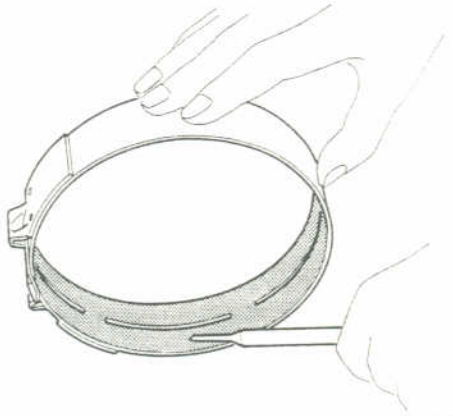
Brake Band and Band Servo



SAT460

INSPECTION

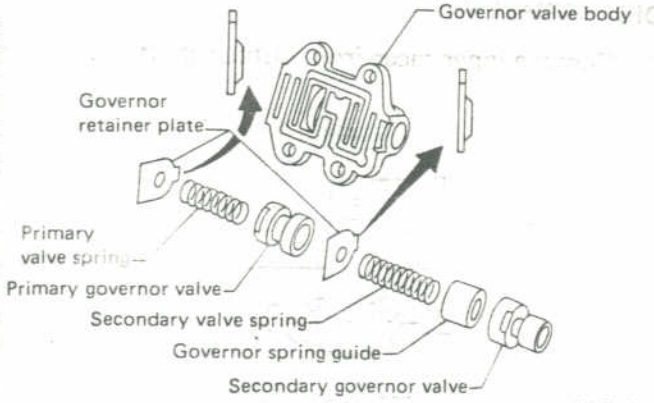
- Inspect band friction material for wear. If cracked, chipped or burnt spots are apparent, replace the band.



SAT327

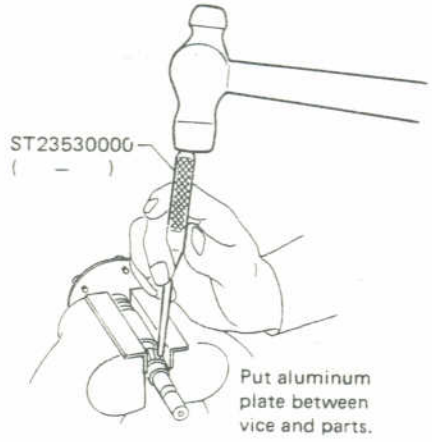
- Check brand servo components for wear and scoring.

Governor



SAT661

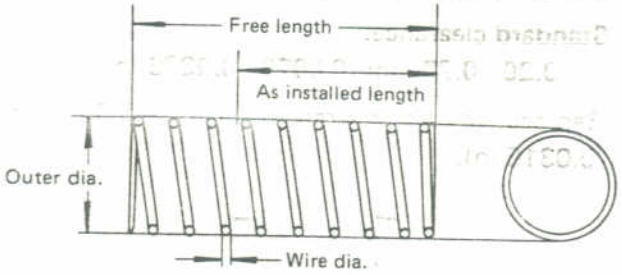
- Remove governor worm.



SAT662

- Disassemble governor and check valves for indication of burning or scratches. Inspect springs for weakness or burning. Replace parts as necessary and reassemble.

GOVERNOR VALVE SPRING CHART



SAT039

Valve spring	Free length mm (in)
Primary governor	31.7 (1.248)
Secondary governor	38.2 (1.504)

Planetary Carrier

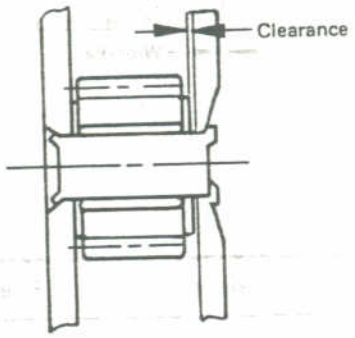
INSPECTION

- Check clearance between pinion washer and planetary carrier with a feeler.

  Standard clearance:

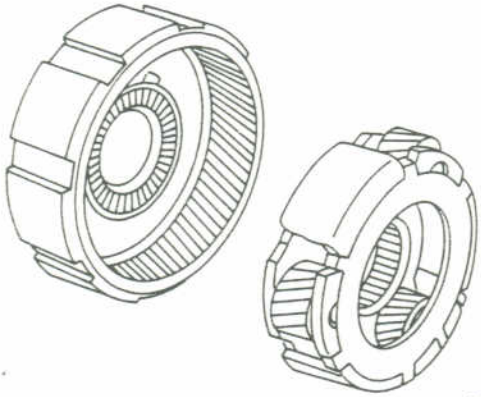
  0.20 - 0.70 mm (0.0079 - 0.0276 in)

  Replace if the clearance exceeds 0.80 mm (0.0315 in).



SAT332

- Check planetary gear sets and bearings for damaged or worn gears.

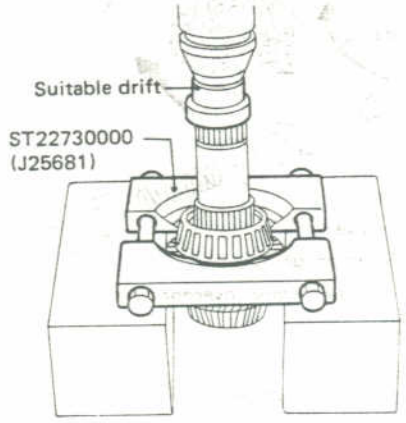


SAT333

Output Shaft and Idler Shaft

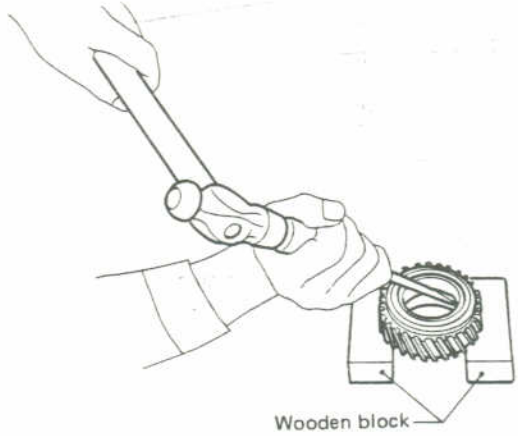
DISASSEMBLY

1. Remove inner races from output shaft.



SAT334

2. Remove outer races from idler gear.



SAT335

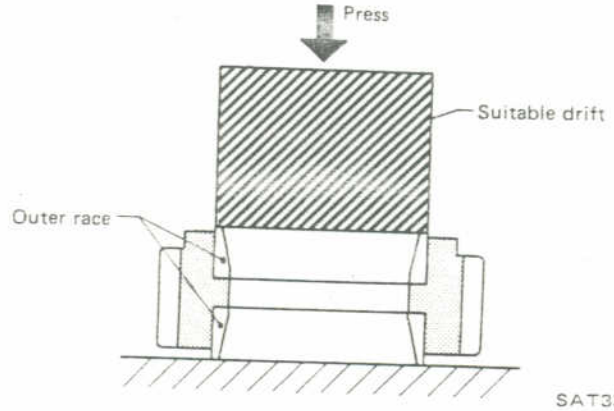
INSPECTION

- Check all gears for excessive wear, chips or cracks; replace as required.
- Check shaft for bending, crack, wear, and worn spline; if necessary, replace.
- Check bearing to see that it rolls freely and is free from noise, crack, pitting, or wear.

Output Shaft and Idler Shaft (Cont'd)

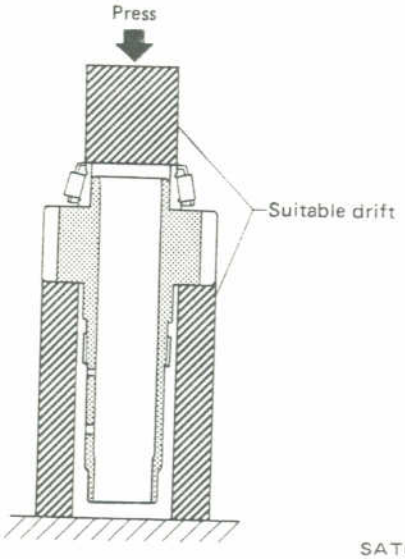
ASSEMBLY

1. Install outer races on idler gear.



SAT336

2. Install inner races on output shaft.

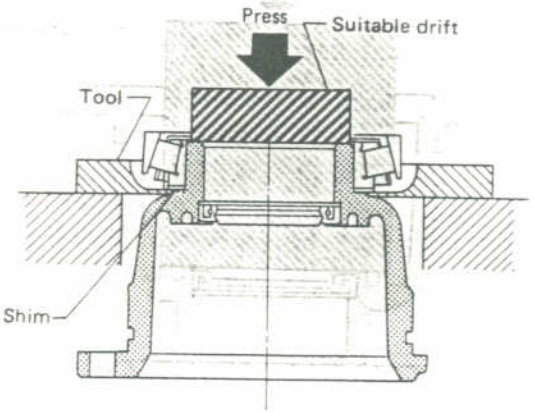


SAT685

Bearing Retainer

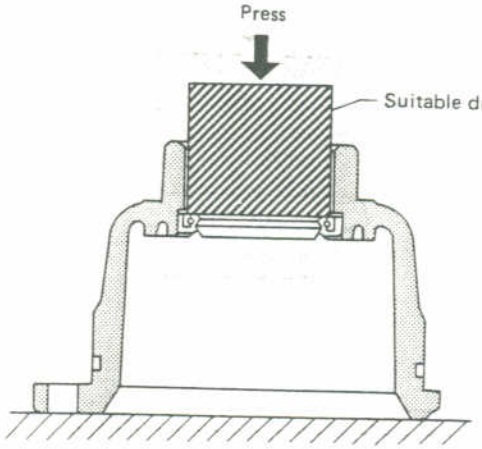
DISASSEMBLY

1. Remove bearing retainer from transmission case.
2. Remove inner race.



SAT455

3. Remove oil seal and O-ring.

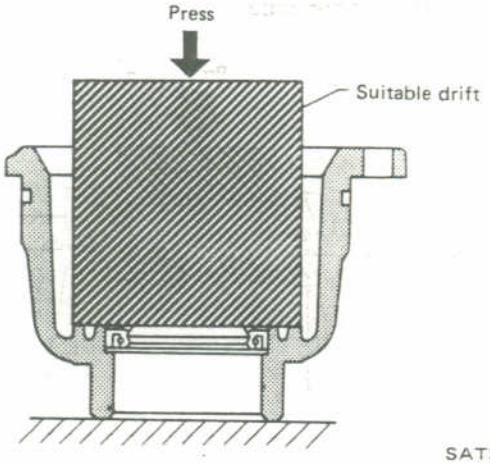


SAT340

Bearing Retainer (Cont'd)

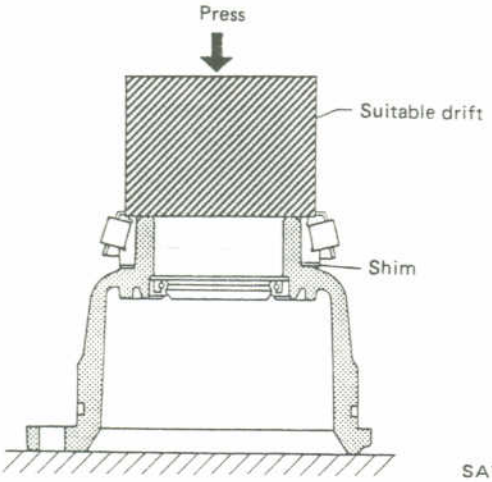
ASSEMBLY

1. Apply A.T.F. to seal surface and O-ring, then drive new seal and O-ring into place.



SAT341

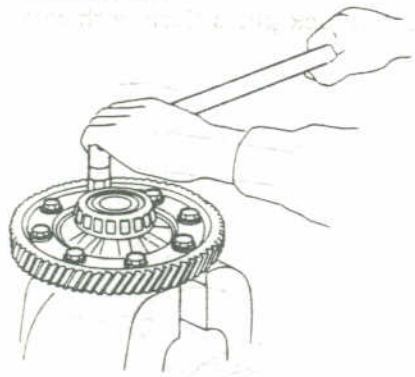
2. Install inner race with shim.



SAT342

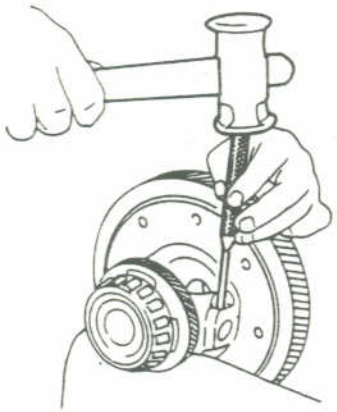
DISASSEMBLY

1. Remove final gear.



SMT610

2. Drive out pinion mate shaft lock pin and draw out pinion mate shaft.



SMT611

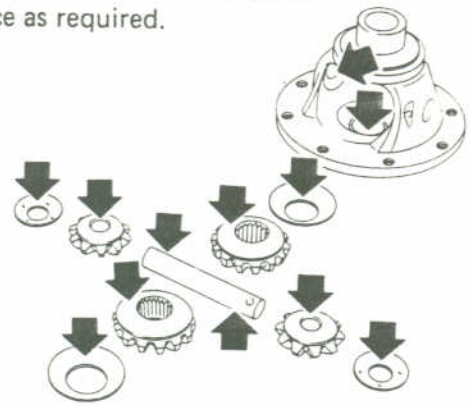
3. Drive out differential side bearing inner races.

Be careful not to confuse the right- and left-hand bearings.

INSPECTION

1. Check mating surfaces of differential case, side gears and pinion mate gears.

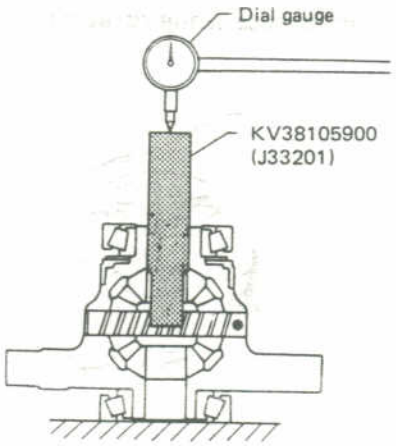
Replace as required.



SMT838

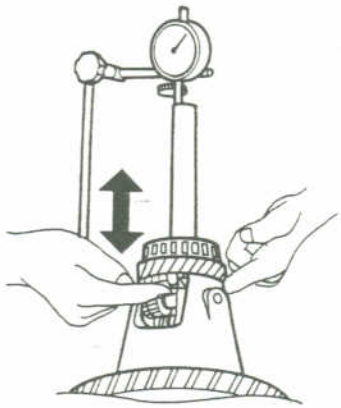
2. Check clearance between side gear and pinion mate gear following the procedure below.

(1) Set Tool and dial gauge on side gear.



SMT615

(2) Move side gear up and down to measure dial gauge deflection. Always measure gauge deflection on both side gears.

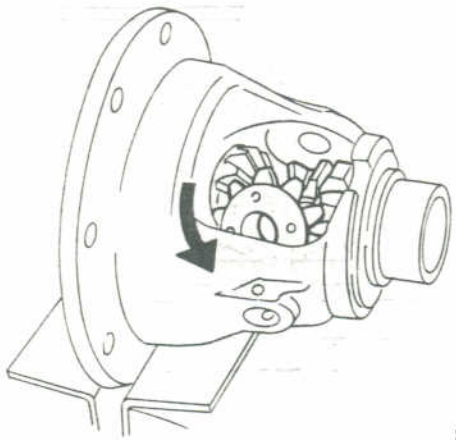


SMT616

Side gear to pinion mate clearance:
0 - 0.3 mm (0 - 0.012 in)

ASSEMBLY

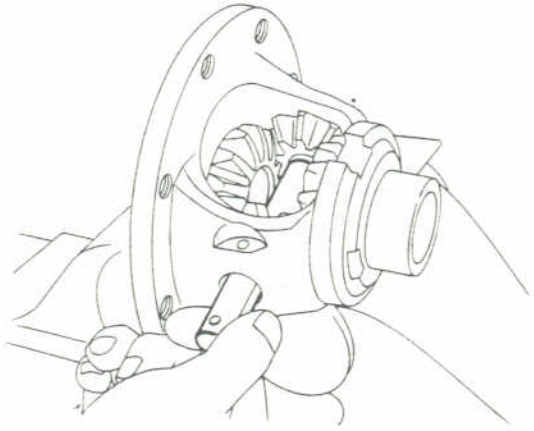
1. Install the side gear and thrust washer in the differential case.
2. Install the pinion mate gear and thrust washer in the differential case while rotating them.



SAT701

3. Insert pinion mate shaft.

When inserting, be careful not to damage pinion mate washers.



SMT840

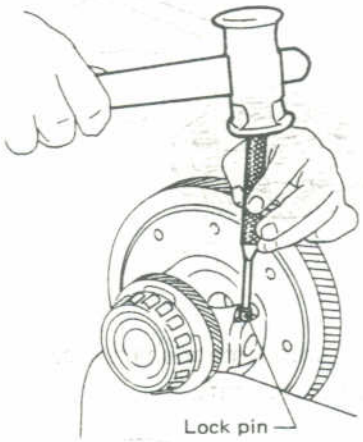
4. Measure clearance between side gear and pinion mate gear, referring to "Inspection". If necessary, adjust.

Side gear to pinion mate clearance:
0 - 0.3 mm (0 - 0.012 in)

Side gear thrust washer:
Refer to S.D.S.

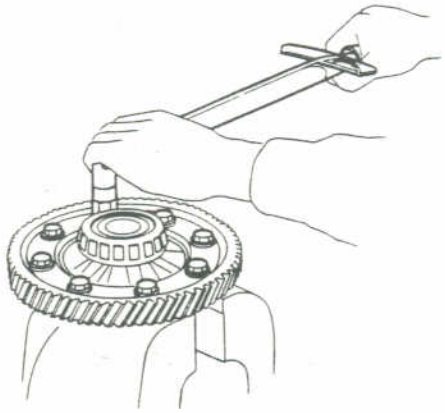
5. Install pinion mate shaft lock pin using a punch.

Make sure that lock pin is flush with case.



SMT618

6. Install speedometer worm and stopper.
7. Press on differential side bearing inner races.
8. Apply locking sealer to final gear bolts, then install final gear.



SMT620

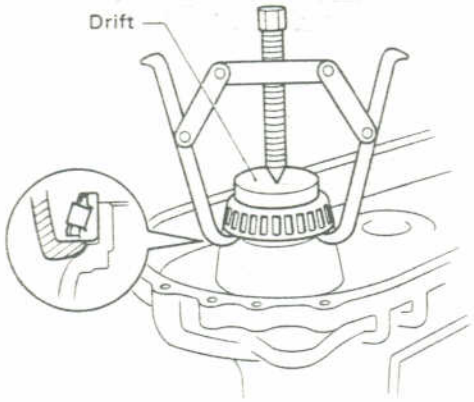
DIFF. SIDE BEARING PRELOAD ADJUSTMENT

If transmission case, bearing retainer, tapered roller bearing, differential case or converter housing is replaced, final drive should be adjusted. Preload is adjusted by selecting shims of appropriate thickness.

Two types of adjusting procedures have been established.

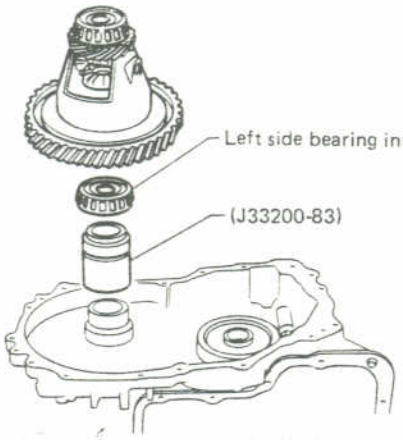
Type A

1. Remove left side bearing inner race and shim(s) from bearing retainer.



SAT990

2. Place Tool and the following parts in transmission case.



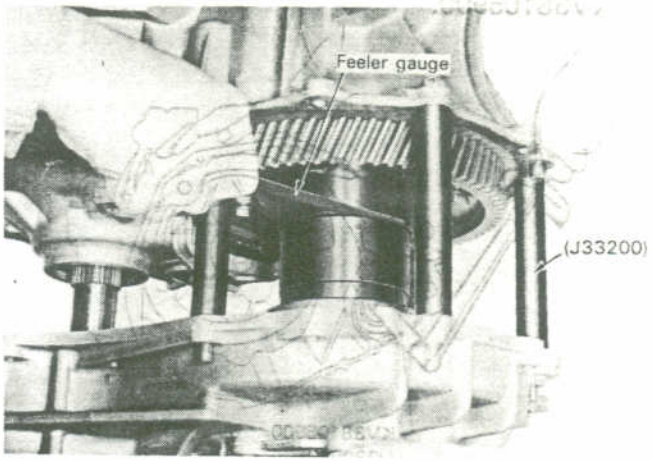
SAT950

Gasket must be installed on transmission case.

3. Position four spacers so they are evenly spaced around transmission case and install converter housing. Then tighten bolts alternately to the specified torque.

: 14 N·m (1.4 kg-m, 10 ft-lb)

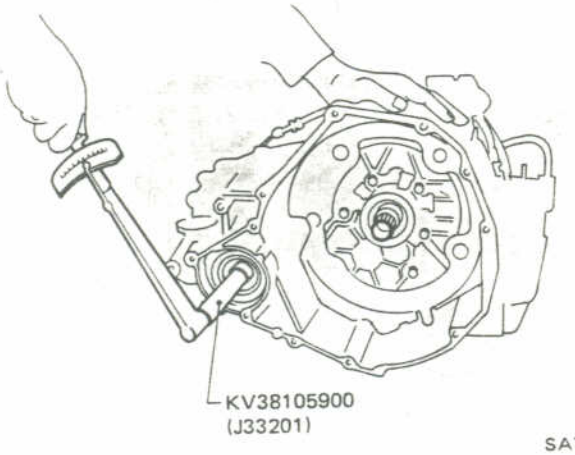
4. Rotate final drive assembly a few times to ensure proper seating.
   Using a feeler gauge, measure the widest gap G around Tool.



6. Select shim with proper thickness, using S.D.S. as a guide.
   Available shims: Refer to S.D.S.
7. Remove bearing retainer from transmission case.
8. Install shim selected in step 6 on bearing retainer and bearing inner race into it.
9. Lubricate O-ring and install it on bearing retainer.

Type A (Cont'd)

10. Install bearing retainer to transmission case.
11. Attach converter housing and gasket to transmission case. Tighten bolts to the same torque in a crisscross fashion.
12. Measure diff. side bearing preload with KV38105900.



SAT665

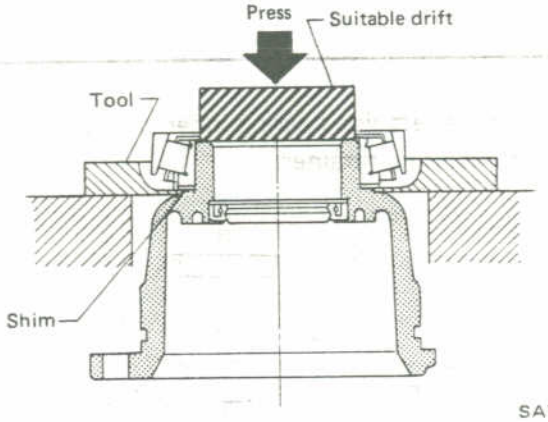
Specified diff. side bearing preload:
2.9 - 4.4 N·m (30 - 45 kg-cm, 26 - 39 in-lb)

a. Turn final drive assembly at least 10 times before measuring diff. side bearing preload.
b. Changes in diff. side bearing preload per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.
c. If any abnormalities are noted in b. above, or diff. side bearing preload is outside specified range, disassemble and reassemble again.

13. Disassemble transmission case and remove final drive assembly.

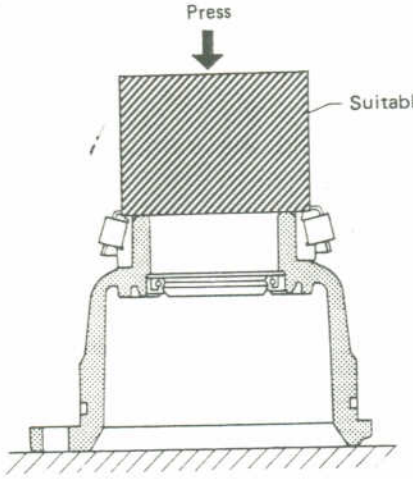
Type B

1. Remove bearing inner race on shim side only and take out shim.



SAT455

2. Press fit bearing inner race into place without shim.

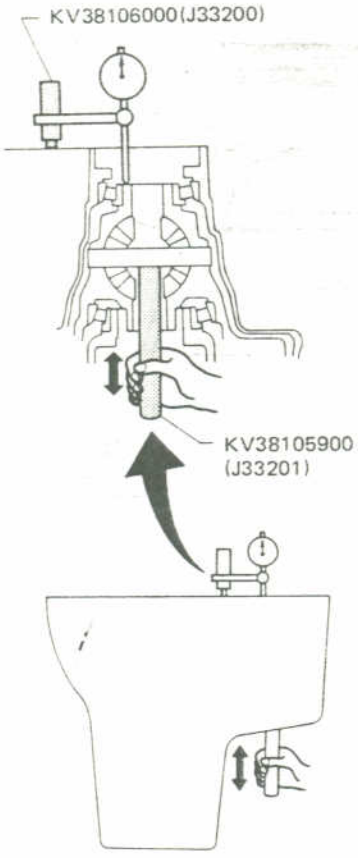


SAT456

3. Install final drive assembly on transmission case.
4. Place gasket on transmission case, then install converter housing.
   Tighten bolts to the same torque in a crisscross fashion.
5. Attach dial gauge using Tool KV38106000.
   If clamp diameter of dial gauge is too small or too large, attach dial gauge to Tool KV38106000 using a magnetic stand.

Type B (Cont'd)

6. Insert Tool KV38105900 all the way into diff. side gear. Move Tool up and down and measure dial gauge deflection "H".

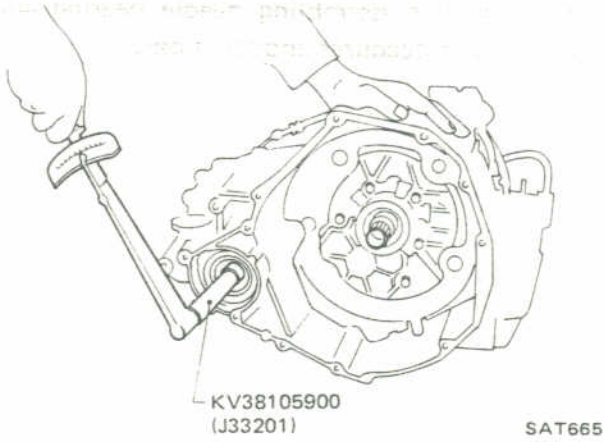


SAT454

7. Select shim with appropriate thickness, using S.D.S. as a guide.

   Available shims: Refer to S.D.S.

8. Disassemble transaxle and insert shim, then reassemble again.
9. Measure diff. side bearing preload with Tool KV38105900.

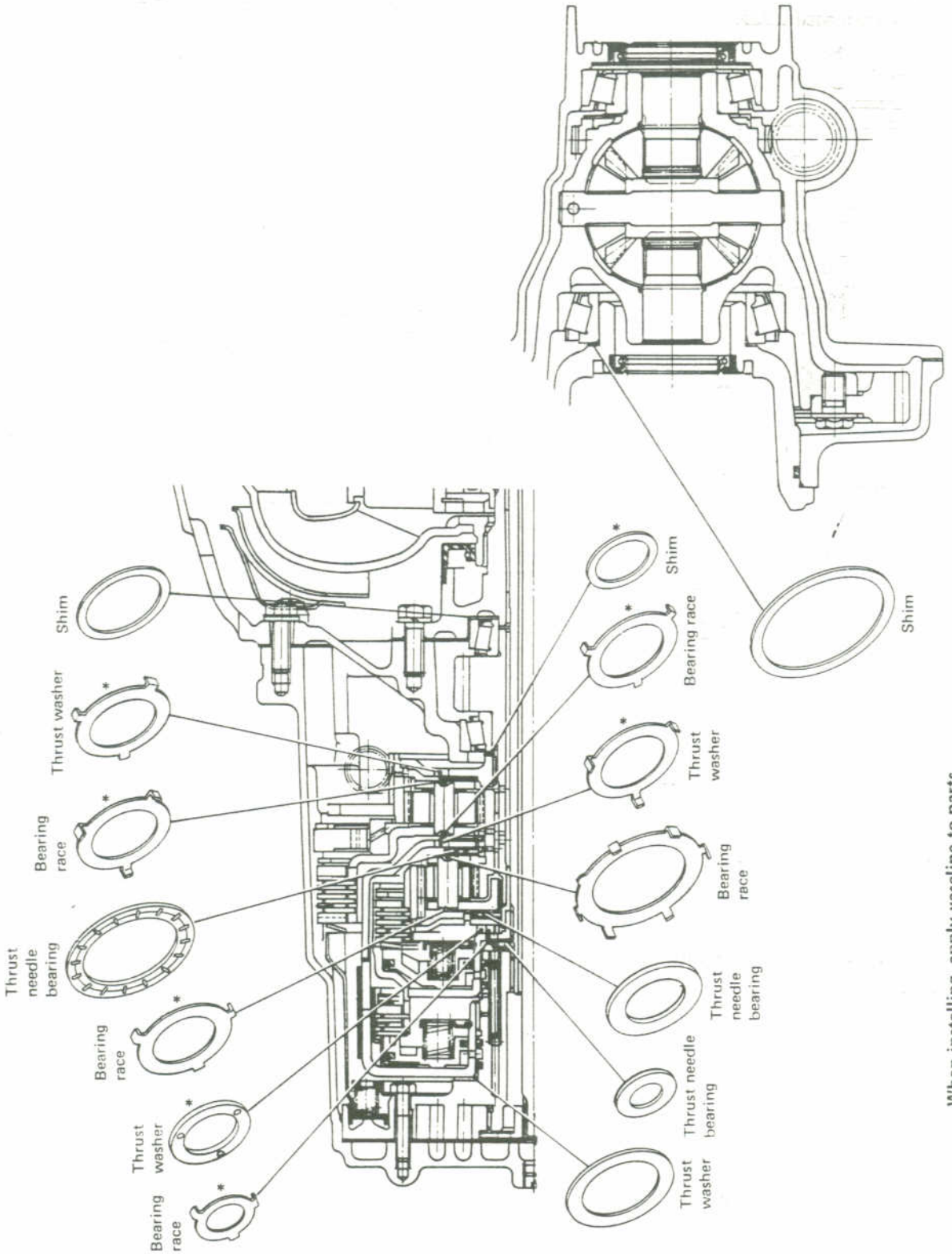


SAT665

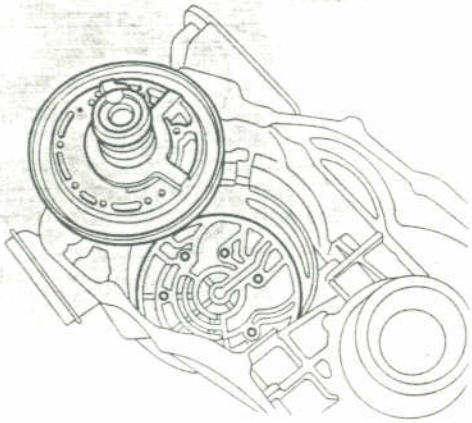
Specified diff. side bearing preload:
2.9 - 4.4 N·m (30 - 45 kg-cm, 26 - 39 in-lb)

a. Turn final drive assembly at least 10 times before measuring diff. side bearing preload.
b. Changes in diff. side bearing preload per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.
c. If any abnormalities are noted in b. above, or diff. side bearing preload is outside the specified range, disassemble and reassemble again.

When installing/assembling needle bearing and bearing race, use the following illustration as a guide to installation procedures and locations.

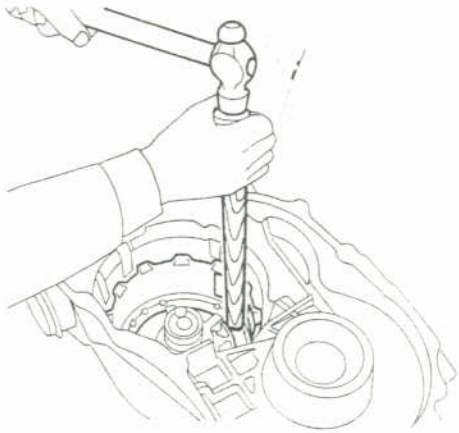


1. Lubricate outer diameter part of oil pump assembly. Install oil pump assembly and thrust bearing.



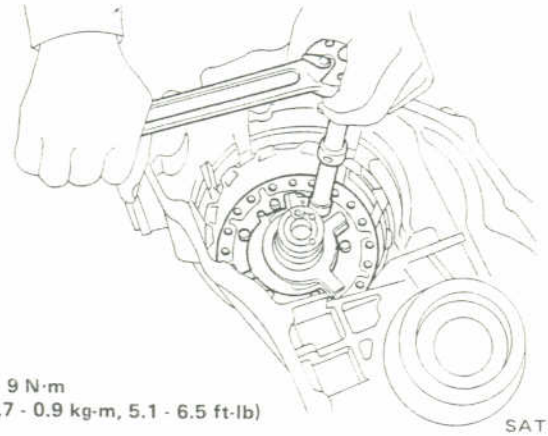
SAT383

2. Lubricate low and reverse brake piston seal then install piston by tapping it evenly using a wooden block.



SAT667

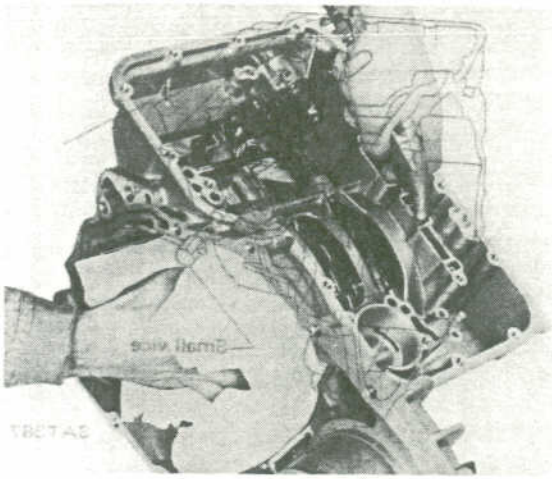
3. Install low and reverse brake piston retainer.



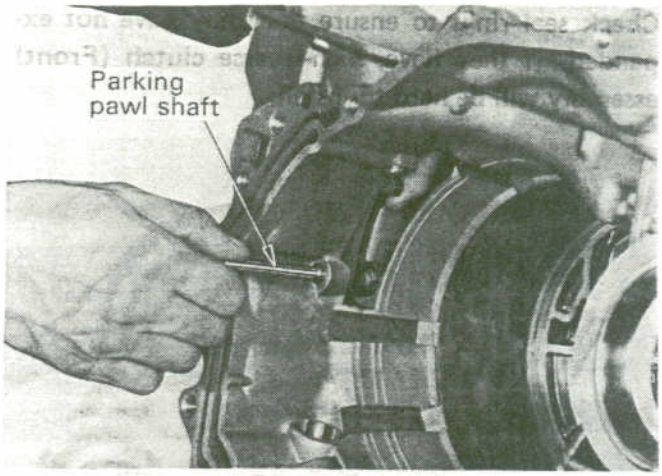
◀ 7 - 9 N·m
(0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)

SAT385

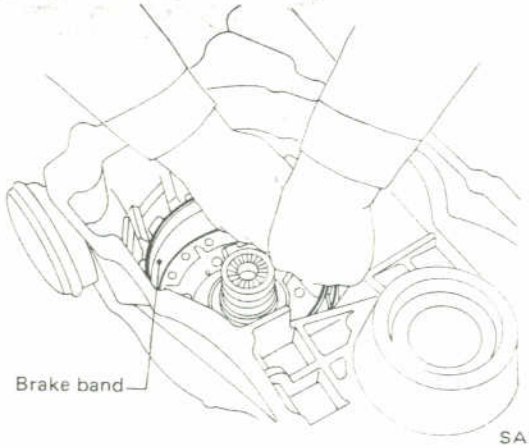
After installing piston retainer, make sure that its piston seal is not turned over by the application of air pressure to low and reverse brake circuit.



4. Install parking pawl, return spring and parking pawl shaft.

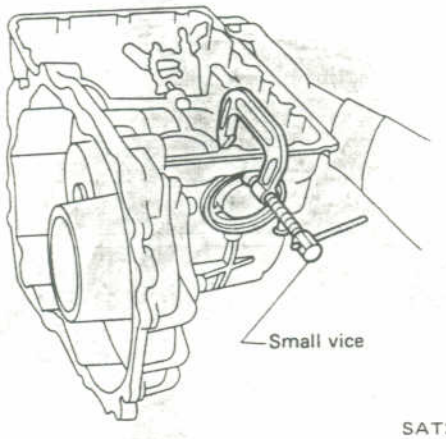


5. **Install brake band.**



SAT280

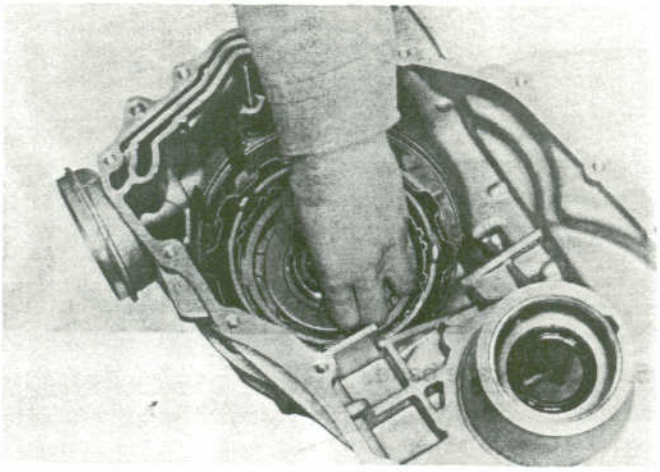
6. Lubricate band servo piston O-ring and install band servo piston O-ring, return spring and snap ring holding piston with a small vice.



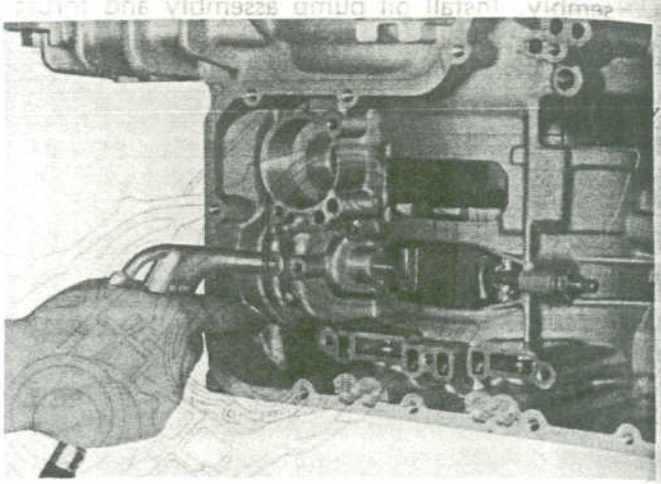
SAT387

7. Lubricate seals in oil pump housing, then install plastic thrust washer and high-reverse clutch (Front) assembly.

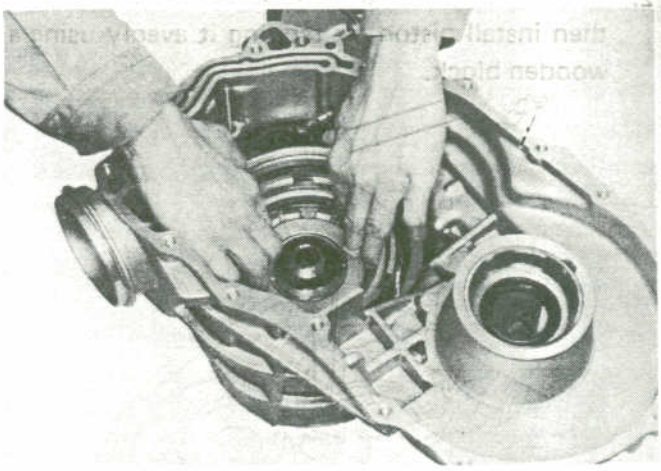
Check seal rings to ensure that they have not expanded. If they have, high-reverse clutch (Front) assembly will be hard to install.



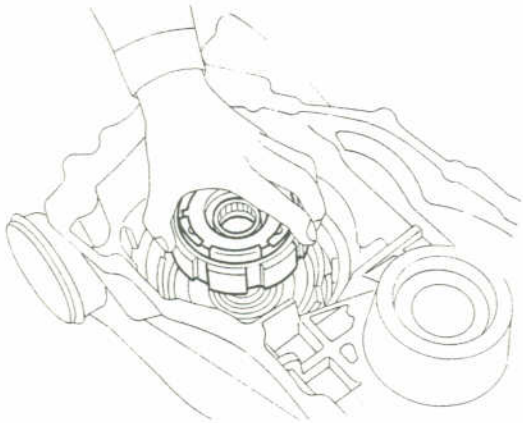
Check band servo operation using air.



8. Install thrust needle bearing & race and forward clutch (Rear) assembly.

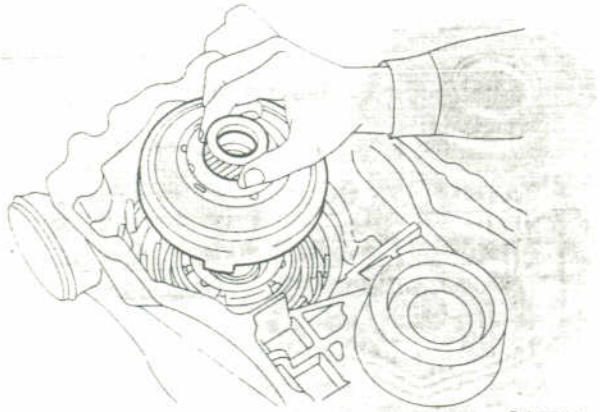


9. Install thrust washer and front carrier assembly together with front internal gear.



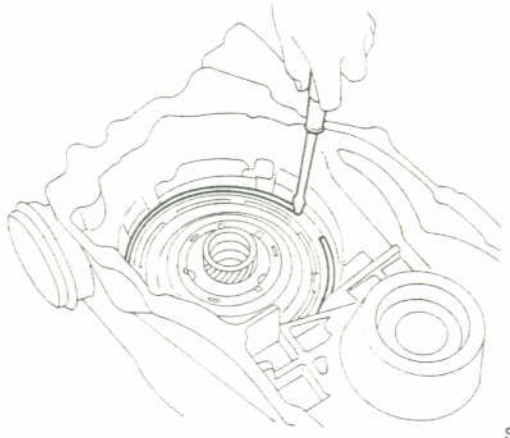
SAT276

10. Install shell & sun gear assembly, thrust needle bearing and bearing race.



SAT275

11. Install low and reverse brake driven & drive plates and retaining plate, then secure with snap ring.



SAT274

12. After low and reverse brake has been completely assembled, measure clearance between snap ring and retainer plate. If measurement exceeds specifications, it can be adjusted by replacing retainer plate with one of a different thickness.

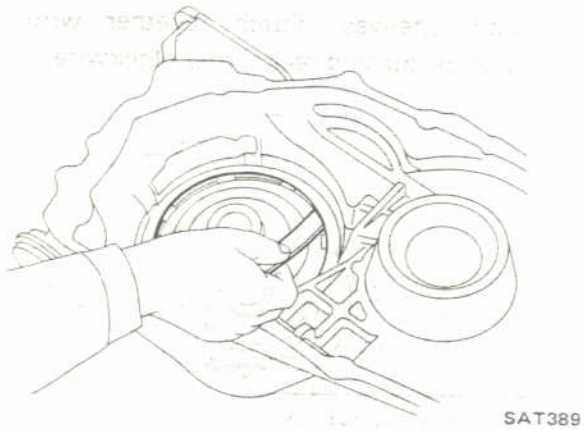
Low and reverse brake clearance:

Standard

1.90 - 2.20 mm (0.0748 - 0.0866 in)

Allowable limit

3.8 mm (0.150 in)

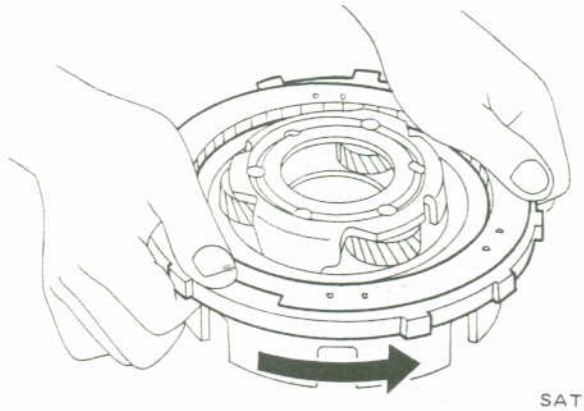


SAT389

Available retainer plate

Thickness mm (in)	Part Number
3.6 (0.142)	31667-01X00
3.8 (0.150)	31667-01X01
4.0 (0.157)	31667-01X02
4.2 (0.165)	31667-01X03
4.4 (0.173)	31667-01X04

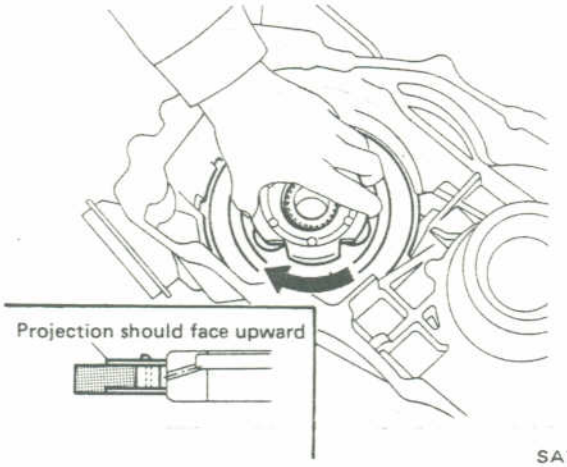
13. Install bearing race on connecting shell.
14. Install one-way clutch assembly to rear carrier.



SAT390

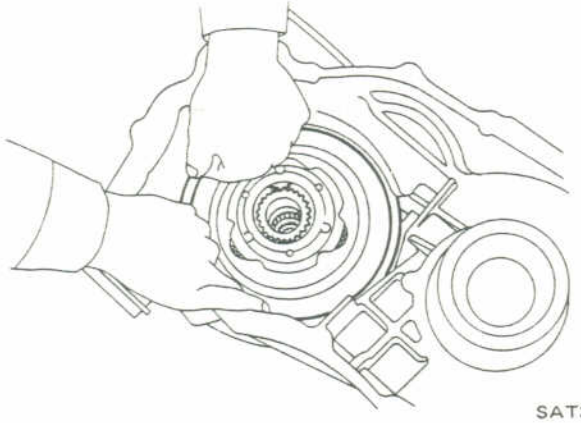
15. Install thrust washer on rear carrier.

16. Install one-way clutch together with rear carrier by turning rear carrier clockwise.



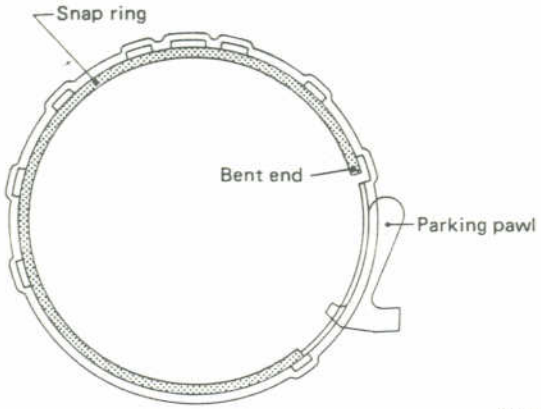
SAT391

17. Install snap ring.



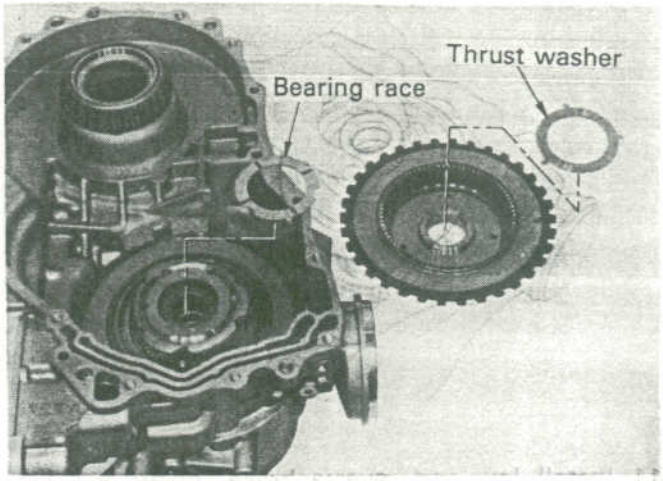
SAT392

Ensure that its bent end is positioned so that it does not interfere with parking pawl.

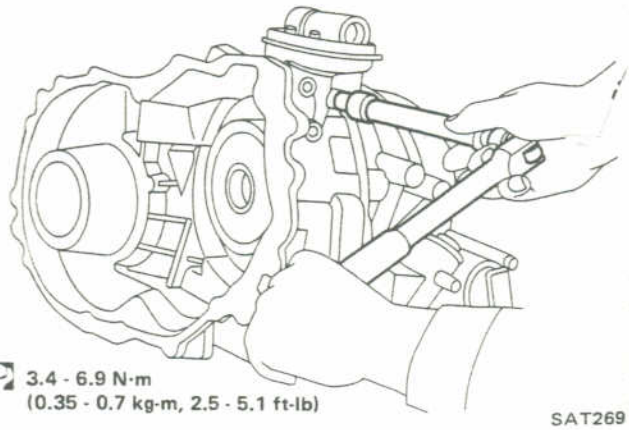


SAT393

18. Apply vaseline to bearing race, then attach it to rear internal gear.



19. Install rear internal gear, then assemble governor shaft assembly.
20. Install governor shaft retaining bolt.

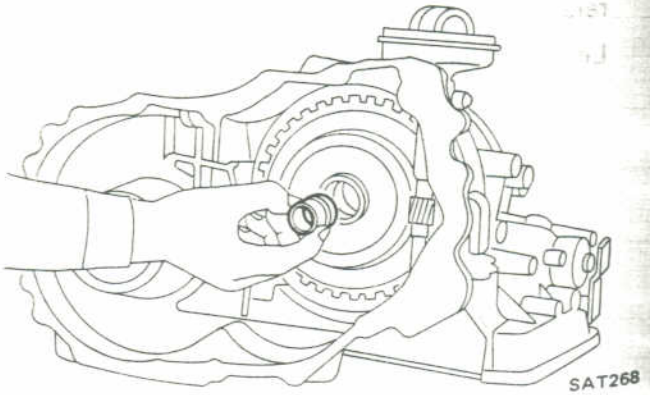


3.4 - 6.9 N·m
(0.35 - 0.7 kg-m, 2.5 - 5.1 ft-lb)

SAT269

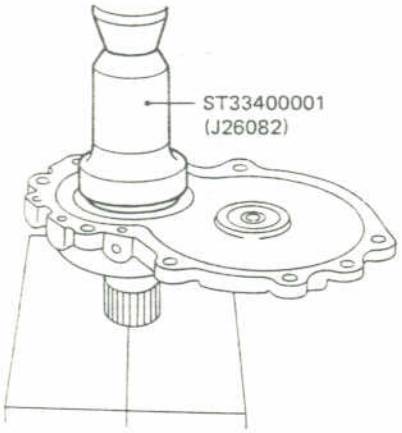
21. Install seal bushing.

Never forget to install seal bushing to prevent sun gear and output shaft from becoming jammed.



SAT268

22. If transmission case, output shaft, tapered roller bearing or front cover is replaced, output shaft should be adjusted by means of shims.
1) Lubricate bearing outer race.
2) Press bearing outer race into converter housing.
3) Install two or three shims on front cover, and press bearing outer race into front cover.

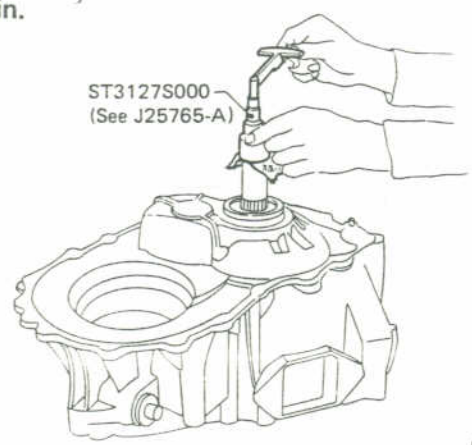


SAT350

4) Install gasket and front cover on converter housing.
5) Measure output shaft preload.

Specified output shaft bearing preload:
0.15 - 0.32 N·m
(1.5 - 3.3 kg-cm, 1.3 - 2.9 in-lb)

a. **Turn output shaft at least 10 times before measuring output shaft bearing preload.**
b. **Ensure that output shaft turns smoothly without binding.**
c. **If any abnormalities are noted in b. above, or output shaft bearing preload is outside specified range, disassemble and reassemble again.**

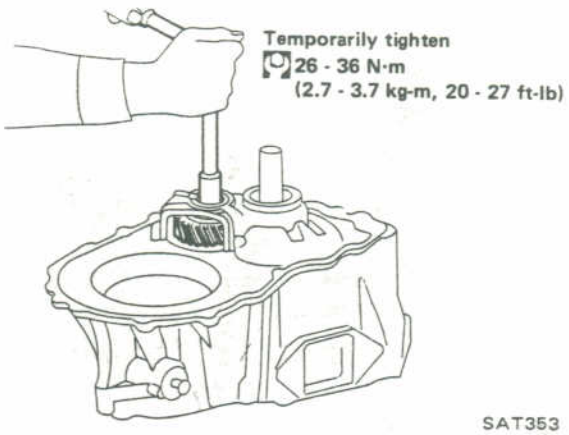


SAT352

Available shims: Refer to S.D.S.

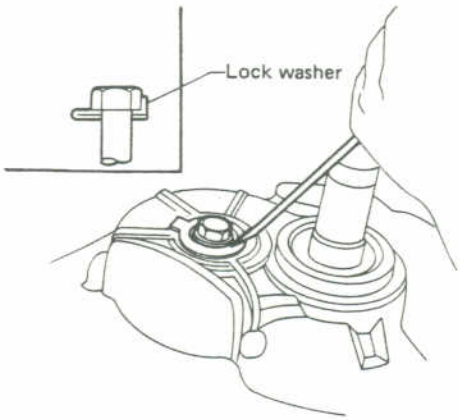
23. Adjust idler bearing preload as follows.
1) Clean threads of bolts and converter housing with solvent.
2) Apply locking sealer to threads of bolts and install them into place.
3) Install lock washer and idler gear bolt, and tighten bolt to specified torque.

Be sure to align lock washer with groove on convertor housing.



SAT353

4) After tightening bolt, turn output shaft five complete rotations. Loosen idler gear bolt, then tighten it to specified torque.
5) Bend lock washer.

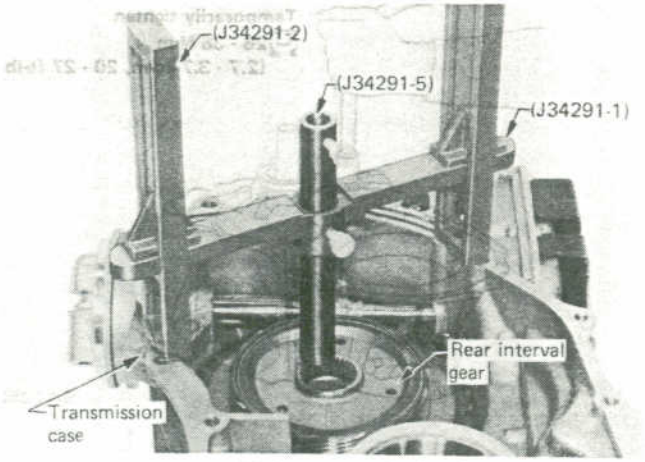


SAT354

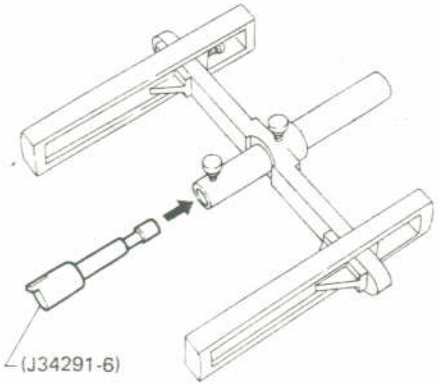
6) Turn output shaft to make sure it operates smoothly.

24. After adjusting output shaft bearing preload, adjust output shaft end play as follows.

1) Place J 34291-1 (bridge), J 34291-2 (legs) and J 34291-5 (gauging cylinder) on machined surface of transmission case (no gasket). Position bridge legs so the short ends of the legs are down, and adjust legs to fit onto housing properly. Allow gauging cylinder to rest on center machined surface of rear internal gear and lock it in place with thumbscrew.

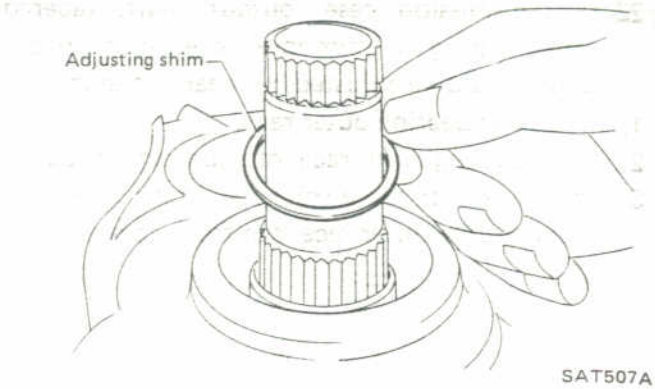


2) Insert J 34291-6 (output shaft end-play gauging plunger) into gauging cylinder. Lock gauging plunger by tightening thumbscrew.



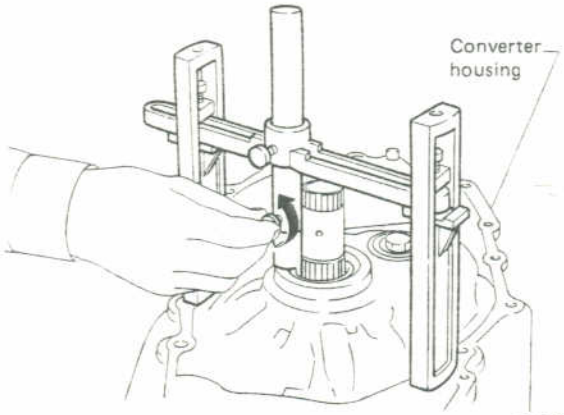
SAT506A

3) Remove output shaft end play adjusting shim at end of output shaft.



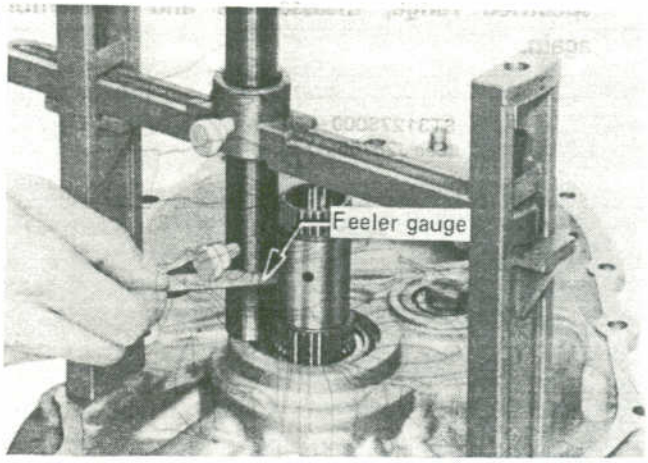
SAT507A

4) Place bridge, gauging cylinder, and gauging plunger onto machined surface of converter housing. Loosen plunger set screw and allow plunger to rest on inner bearing race of output shaft. Now lock plunger setscrew.



SAT508A

5) Use feeler gauge to measure gap between gauging cylinder and shoulder of gauging plunger.

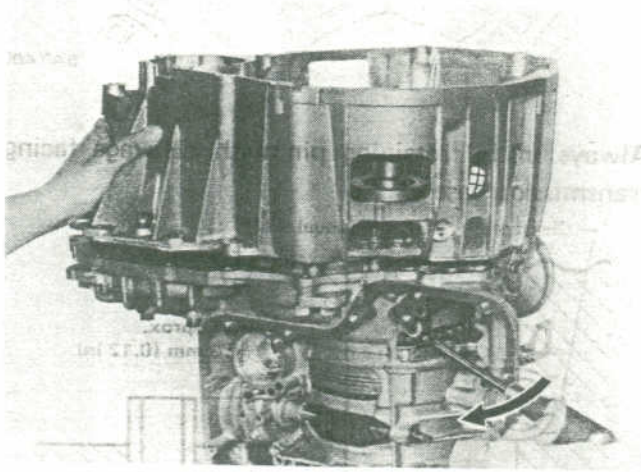


6) Use your feeler gauge measurement and following adjusting shim chart to select correct shim thickness to give you proper output shaft endplay.

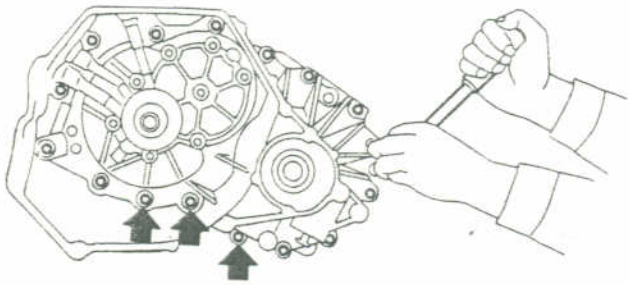
Output shaft end play adjusting shim

Thickness mm (in)	Part Number
0.3 (0.012)	31484-01X00
0.5 (0.020)	31484-01X01
0.7 (0.028)	31484-01X02
0.9 (0.035)	31484-01X03
1.1 (0.043)	31484-01X04
1.3 (0.051)	31484-01X05
1.5 (0.059)	31484-01X06
1.7 (0.067)	31484-01X07

25. Attach output shaft shim to output shaft.
26. Put gasket on transmission case.
27. Install converter housing assembly on transmission case.
28. Turn parking gear (rear internal gear) clockwise with screwdriver while supporting converter housing assembly by hand, until output shaft splines, front carrier, and rear internal gear are engaged properly.



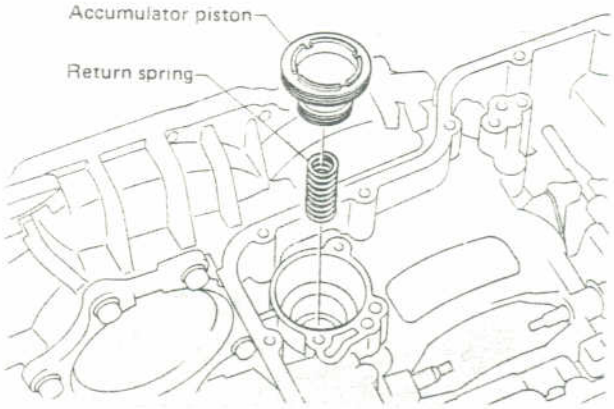
29. Tighten converter housing securing bolts to the specified torque.



SAT668

Before installing bolts marked ◀ in figure above, ensure that bolt threads are clean and that locking sealer has been applied. Also ensure that the transmission case has been cleaned with solvent.

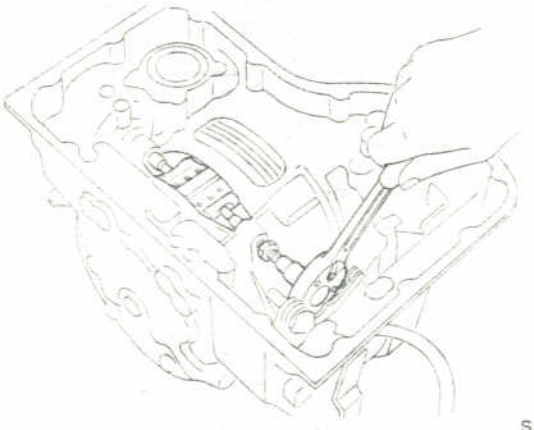
30. Apply vaseline to lathe cut ring, then install return spring and accumulator piston on transmission case.



SAT669

31. Adjust brake band as follows.
1) First torque anchor end pin.

: Anchor end pin
4 - 6 N·m
(0.4 - 0.6 kg-m, 2.9 - 4.3 ft-lb)

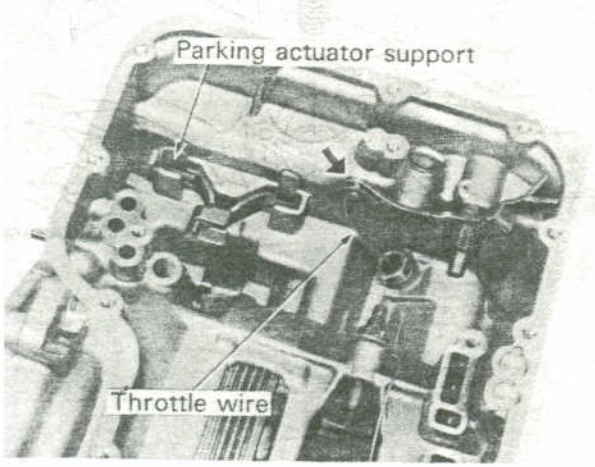


SAT468

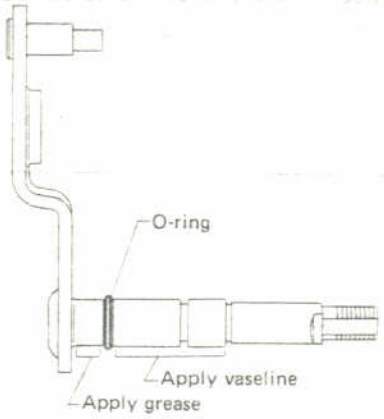
2) Back off anchor end pin lock nut 2.5 turns.
3) Tighten lock nut while holding anchor end pin lock nut stationary.

: 16 - 22 N·m
(1.6 - 2.2 kg-m, 12 - 16 ft-lb)

32. Assemble parking actuator support and throttle wire to transmission case.

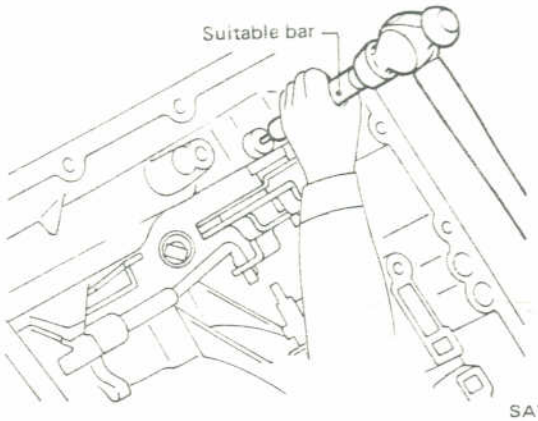


33. Apply grease and vaseline to manual shaft.



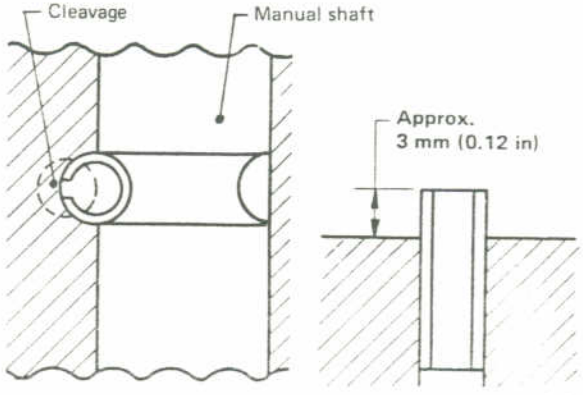
SAT670

34. Secure manual shaft with retaining pin.



SAT400

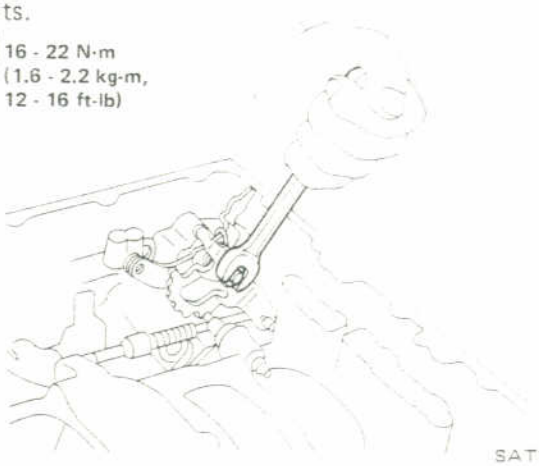
Always install retaining pin with cleavage facing transmission case.



SAT415

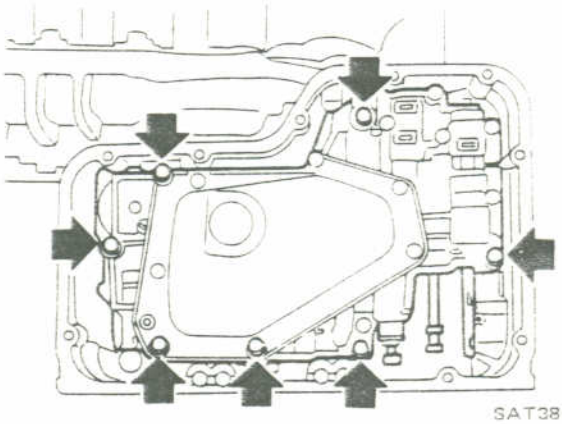
35. Install throttle lever, manual plate, manual shaft, selector range lever and parking rod assembly, then tighten manual shaft securing nuts.

16 - 22 N·m
(1.6 - 2.2 kg-m,
12 - 16 ft-lb)



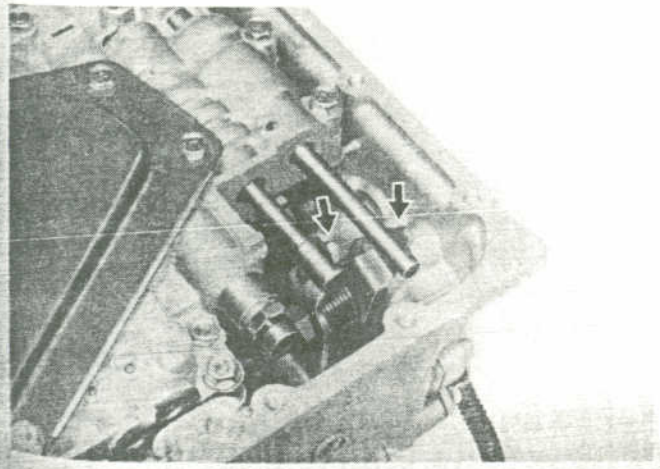
SAT255

36. Insert manual valve to control valve body, then assemble them to transmission case.

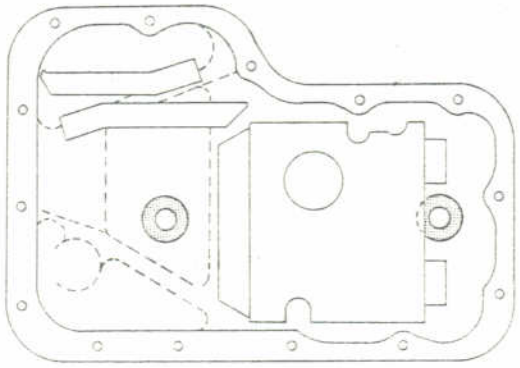


SAT383A

Pay attention to the direction of manual and detent valves' grooves.



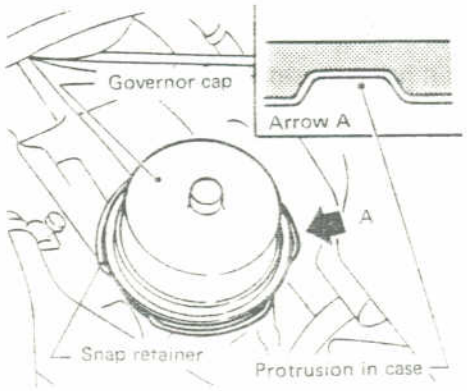
37. Before installing oil pan, check alignment and operation of manual lever and parking pawl engagement. Blow mechanism with air to clean.
38. Install two magnets into oil pan, then install oil pan with new gasket and oil pan guard.



SAT509A

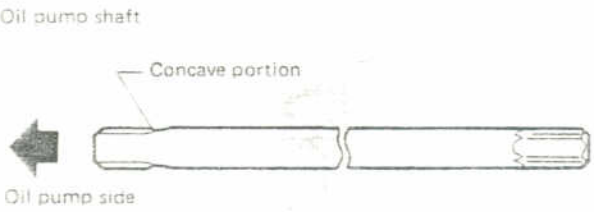
39. Install seal ring and governor cap, then secure it with snap retainer.

When installing snap retainer, pay attention to its direction.



SAT203A

40. Install oil pump shaft and input shaft.



SAT405

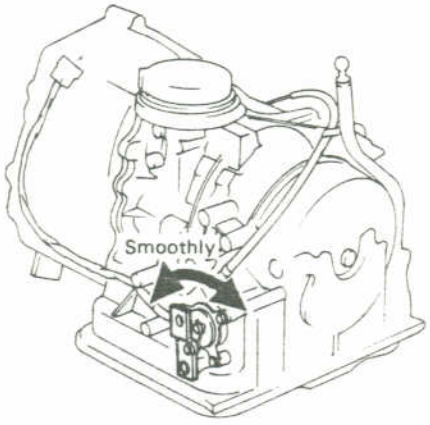
41. Carefully inspect torque converter for damage. Check converter hub for grooves caused by hardened seals. Also check bushing contact area.
42. Lubricate oil pump lip seal and converter neck before installing converter.
43. Pour approx. 2-liters (2-1/8 US qt, 1-3/4 Imp qt) of automatic transmission fluid into converter housing.

SAT672

44. Install torque converter to converter housing.

Be careful not to scratch front cover oil seal.

45. Apply sealant to threads of drain plug and install it in place.
46. Install inhibitor switch to transaxle case.
47. Adjust inhibitor switch. Refer to On-vehicle Service.
48. Make sure that manual lever operates smoothly.



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Preliminary Checks (Prior to Road Testing)

FLUID LEAKAGE

If the governor cap is suspected:

1) Open hood.
2) Remove snap retainer, governor cap and seal ring, then reinstall them. Refer to ON-VEHICLE SERVICE.
3) Clean the area around the governor cap.
4) Run the vehicle at highway speeds.
5) Check the governor cap for fresh leakage.

To detect a fluid leak:

1) Raise vehicle.
2) Clean area suspected of leaking.
3) Start engine, apply foot brake, place control lever in drive, and wait a few minutes.
4) Stop engine.
5) Check for fresh leakage.

FLUID CONDITION

Examine the A.T.F. and note its color, texture, and odor.

1) Dark of Black Fluid:
   With a burned odor
   - Worn friction material.
2) Milky Pink Fluid: Water Contamination
   - Road water entering through filler tube or breather.
3) Varnished Fluid, light to dark brown and tacky: Oxidation
   - Over or Underfilling.
   - Overheating.

Road Testing

Perform road tests using "Symptom" chart, as follows:

"P" RANGE

1. Place the control lever in "P" range and start the engine. Stop the engine and repeat the procedure in all other ranges and neutral.
2. Stop vehicle on a slight upgrade and place control lever in "P" range. Release parking brake to make sure vehicle remains locked.

"R" RANGE

1. Manually shift the control lever from "P" to "R", and note shift quality.
2. Drive the vehicle in reverse long enough to detect slippage or other abnormalities.

"N" RANGE

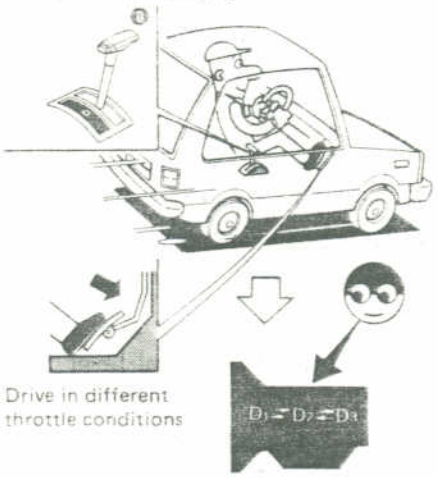
1. Manually shift the control lever from "R" and "D" to "N" and note quality.
2. Release parking brake with control lever in "N" range. Lightly depress accelerator pedal to make sure vehicle does not move. (When vehicle is new or soon after clutches have been replaced, vehicle may move slightly. This is not a problem.)

"D" RANGE

1. Manually shift the gear selector from "N" to "D" range, and note shift quality.

Road Testing (Cont'd)

2. Using the shift schedule as a reference, drive vehicle in "D" range. Record, on symptom chart, respective vehicle speeds at which upshifting (1st → 2nd and 2nd → 3rd) and downshifting (3rd → 2nd and 2nd → 1st) occur. These speeds are to be read at three different throttle positions (light, half and full), respectively. Also determine the timing at which shocks are encountered during shifting and which clutches are engaged.



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3. Next, read vehicle speed at which transmission is locked up.
4. When vehicle is being driven in the 65 to 85 km/h (40 to 50 MPH) range in "D_3" range at half to light throttle position, fully depress accelerator pedal to make sure it downshifts from 3rd to 2nd gear.
5. When vehicle is being driven in the 25 to 35 km/h (16 to 22 MPH) ("D_2" range) at half to light throttle position, fully depress accelerator pedal to make sure it downshifts from 2nd to 1st gear.

"2" RANGE

1. Shift to "2" range and check to make sure that vehicle starts to move in 1st gear.
2. Increase vehicle speed to make sure it upshifts from 1st to 2nd gear.
3. Further increase vehicle speed. Make sure it does not upshift to 3rd gear.
4. While driving vehicle at the 25 to 35 km/h (16 to 22 MPH) with throttle at half to light position ("2_2" range), fully depress accelerator pedal to make sure it downshifts from 2nd to 1st gear.
5. Allow vehicle to run idle while in 2nd gear to make sure that it downshifts to 1st gear.
6. Shift control lever to "D" range and allow vehicle to operate at 40 to 50 km/h (25 to 31 MPH). Then, shift to "2" range to make sure it downshifts to 2nd gear.

"1" RANGE

1. Shift control lever to "1" range and allow vehicle to run. Ensure that it does not upshift from 1st to 2nd gear although vehicle speed increases.
2. While vehicle is being driven in "1" range, release accelerator pedal to make sure that engine compression acts as a brake.
3. Shift control lever to "D" or "2" range and allow vehicle to run at 20 to 30 km/h (12 to 19 MPH). Then, shift control lever to "1" range to make sure the downshift to 1st gear is made.

Road Testing (Cont'd)

ROAD TEST SYMPTOM CHART

Numbers in chart below correspond with those indicated in Trouble-shooting chart.

			SHIFT QUALITY											
			ROUGH	SHIFT TIMING (Mark km/h (MPH))	NO SHIFT	SHIFT SLIPPAGE	VEHICLE WON'T MOVE	CRUISE SLIPPAGE	POOR POWER/ ACCELERATION	NOISY	ENGINE WON'T START	VEHICLE WON'T STAND STILL	NO ENGINE BRAKING	COMMENTS
PARK RANGE	ENG. START										Ⓐ			
	HOLDING									Ⓑ		Ⓒ		
"R" RANGE	Man. shift (Vehicle at halt)	P-R					Ⓤ			Ⓥ				
	REVERSE						Ⓔ·Ⓤ	Ⓔ	Ⓔ	Ⓥ				
"N" RANGE	Man. shift (Vehicle at halt)	R-N								Ⓥ				
	ENG. START										Ⓐ			
	N									Ⓑ		Ⓓ		
"D" RANGE	Man. shift	N-D	Ⓕ				Ⓖ·Ⓤ			Ⓥ				
	1st						Ⓖ·Ⓤ		Ⓘ	Ⓥ				
	Auto shift	1-2	Ⓛ		Ⓙ	Ⓝ				Ⓥ				
	2nd								Ⓟ	Ⓥ				
	Auto shift	2-3	Ⓜ		Ⓚ	Ⓞ				Ⓥ				
	3rd in lock-up "OFF"								Ⓟ	Ⓥ				
	Auto shift Lock-up "OFF" (3) → Lock-up "ON" (3)				Ⓐ2	Ⓐ3				Ⓥ				
	3rd in Lock-up "ON"								Ⓟ	Ⓥ				
	Auto shift Lock-up "ON" (3) → Lock-up "OFF" (3)									Ⓥ				
	Decel.	3-2			Ⓠ	Ⓣ				Ⓥ				
	Kickdown	3-2			Ⓠ·Ⓢ	Ⓣ				Ⓥ				
	Decel.	2-1			Ⓡ					Ⓥ				
	Kickdown	2-1			Ⓡ					Ⓥ				
"2" RANGE	Man. shift (Vehicle in operation)	D-2			Ⓦ		Ⓗ·Ⓤ			Ⓥ				
	1st						Ⓗ·Ⓤ		Ⓘ	Ⓥ				
	Auto shift	1-2	Ⓛ		Ⓙ	Ⓝ				Ⓥ				
	2nd								Ⓟ	Ⓥ				
	Decel.	2-1			Ⓡ					Ⓥ				
	Kickdown	2-1			Ⓡ					Ⓥ				
"1" RANGE	Man. shift (Vehicle in operation)	2-1	Ⓐ1		Ⓡ·Ⓩ					Ⓥ				
	Man. shift (Vehicle in operation)	D-1			Ⓡ·Ⓧ					Ⓥ				
	Acceleration						Ⓗ·Ⓤ		Ⓘ	Ⓥ				
	"1"	Engine Braking								Ⓥ			Ⓨ	

Road Testing (Cont'd)

TROUBLE-SHOOTING CHART

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

Reference		ON VEHICLE										OFF VEHICLE					
		Oil level	Control cable	Inhibitor switch and wiring	Throttle wire	Detent valve	Engine idling rpm	Line pressure	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Ignition switch and starter motor	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle one-way clutch	High-reverse clutch (Front) check ball	Park linkage
Ⓐ	Engine does not start in "N", "P" ranges.	.	2	3	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
	Engine starts in range other than "N" and "P".	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ⓑ	Transaxle noise in "P" and "N" ranges.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	③	.	.	.	.
Ⓒ	Vehicle moves when changing into "P" range or parking gear does not disengage when shifted out of "P" range.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	②
Ⓓ	Vehicle runs in "N" range.	.	1	.	.	.	.	.	3	.	.	.	2	.	.	④	.	.	.	.	.	.	.	.
Ⓔ	Vehicle will not run in "R" range (but runs in "D", "2" and "1" ranges). Clutch slips. Very poor acceleration.	1	2	.	.	.	.	3	5	.	.	6	4	.	.	⑨	⑧	.	⑦	.	⑩	.	⑪	.
	Vehicle braked when shifting into "R" range.	.	.	.	.	.	.	.	.	.	3	2	1	.	.	④	.	⑤	.	.	.	.	.	⑥
Ⓕ	Sharp shock in shifting from "N" to "D" range.	.	.	.	2	.	1	3	4	.	.	.	.	.	.	⑤	.	.	.	.	.	.	.	.
Ⓖ	Vehicle will not run in "D" range (but runs in "2", "1" and "R" ranges).	.	1	.	.	.	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	④	.	.
Ⓗ	Vehicle will not run in "D", "1", "2" ranges (but runs in "R" range). Clutch slips. Very poor acceleration.	1	2	.	.	.	.	4	5	.	.	6	3	.	7	⑧	⑩	.	.	.	⑨	.	.	.
Ⓘ	Clutches or brakes slip somewhat in starting.	1	2	.	6	.	.	3	5	.	.	7	4	.	.	.	.	.	.	⑧	⑨	.	.	.
	Excessive creep.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	No creep at all.	1	2	.	.	.	3	.	5	.	.	.	4	.	.	⑧	⑨	.	.	⑥	⑦	.	.	.
Ⓙ	Failure to change gear from "1st" to "2nd".	.	1	.	2	3	.	.	5	6	8	7	4	.	.	.	⑨	.	.	⑩	.	.	.	.
Ⓚ	Failure to change gear from "2nd" to "3rd".	.	1	.	2	3	.	.	5	6	8	7	4	.	.	.	⑨	.	.	⑩	.	⑪	.	.
	Too high a gear change point from "1st" to "2nd", from "2nd" to "3rd".	.	.	.	1	2	.	3	5	6	.	.	4	.	.	.	.	.	.	⑦	.	.	.	.
	Gear change directly from "1st" to "3rd" occurs.	.	.	.	.	.	.	.	2	4	.	3	1	.	.	.	.	⑤	.	.	⑥	.	.	.	.
	Engine stops when shifting lever into "D" range.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
		ON VEHICLE														OFF VEHICLE								

Road Testing (Cont'd)

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

Reference		ON VEHICLE										OFF VEHICLE					
		Oil level	Control cable	Throttle wire	Detent valve	Line pressure	Engine stall rpm	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle one-way clutch	High-reverse clutch (Front) check ball
Ⓛ	Too sharp a shock in change from "1st" to "2nd".	.	.	1	.	.	2	4	.	5	.	3	.	.	.	⑥	.	.	.	.	.
Ⓜ	Too sharp a shock in change from "2nd" to "3rd".	.	.	1	.	2	.	3	.	5	4	.	.	.	⑥	.	.	.	.	.	.
Ⓝ	Almost no shock or clutches slipping in change from "1st to "2nd".	1	2	3	.	4	.	6	.	8	7	5	.	.	.	⑨	.	.	⑩	.	.
Ⓞ	Almost no shock or slipping in change from "2nd" to "3rd". Engine races extremely fast.	1	2	3	.	4	.	6	.	8	7	5	.	.	⑨	.	.	.	⑩	.	⑪
	Vehicle braked by gear change from "1st" to "2nd".	.	.	.	.	.	.	2	.	.	.	1	.	.	④	.	③	.	.	⑤	.
	Vehicle braked by gear change from "2nd" to "3rd".	.	.	.	.	.	.	3	.	2	.	1	.	.	.	④	.	.	.	.	.
Ⓟ	Maximum speed not attained. Acceleration poor.	1	2	.	.	4	5	7	.	6	.	3	8	⑪	⑫	⑨	⑩	⑬	.	.	.
Ⓠ	Failure to change gear from "3rd" to "2nd".	.	.	1	.	.	.	3	4	6	5	2	.	.	⑦	⑧	.	.	⑨	.	.
Ⓡ	Failure to change gear from "2nd" to "1st" or from "3rd to "1st".	.	.	1	.	.	.	3	4	6	5	2	.	.	.	⑦	.	.	.	⑧	.
	Gear change shock felt during deceleration by releasing accelerator pedal.	.	1	2	3	4	.	5	6	.	.	.	.	.	.	.	.	.	⑦	.	.
	Too high a change point from "3rd" to "2nd", from "2nd" to "1st".	.	1	2	3	4	.	5	6	.	.	.	.	.	.	.	.	.	⑦	.	.
Ⓢ	Kickdown does not operate when depressing pedal in "3rd" within kickdown vehicle speed.	.	.	2	1	.	.	4	5	.	.	3	.	.	.	⑥	.	.	⑦	.	.
	Kickdown operates or engine overruns when depressing pedal in "3rd" beyond kickdown vehicle speed limit.	.	1	2	.	3	.	5	6	.	7	4	.	.	⑧	.	.	.	⑨	.	.
Ⓣ	Races extremely fast or slips in changing from "3rd" to "2nd" when depressing pedal.	.	.	1	.	2	.	4	.	6	5	3	.	.	⑦	⑧	.	.	⑨	.	⑩
		ON VEHICLE												OFF VEHICLE							

Road Testing (Cont'd)

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

Reference		ON VEHICLE											OFF VEHICLE									
		Oil level	Control cable	Throttle wire	Engine idling rpm	Line pressure	Engine stall rpm	Lubrication	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Forward clutch (Rear)	High reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Torque converter, one-way clutch	Transaxle one-way clutch	Park linkage	Planetary gear
(U)	Vehicle will not run in any range.	1	2	.	.	3	.	.	5	.	.	6	4	.	.	.	.	(7)	(8)	.	.	(9)	.
(V)	Transmission noise in "D", "2", "1" and "R" ranges.	1	.	.	.	2	.	.	.	.	.	.	.	(3)	.	.	.	(4)	.	.	(5)	.	(6)
(W)	Failure to change from "3rd" to "2nd" when changing lever into "2" range.	.	1	.	.	2	.	.	4	.	5	.	3	.	.	(6)	.	.	(7)	.	.	.	.
	Gear change from "2nd" to "3rd" in "2" range.	.	1	.	.	2	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	No shock at change from "1" to "2" range or engine races extremely fast.	1	2	3	4	.	5	.	7	.	.	8	6	.	.	(9)	.	(10)	.	.	.	.	.
(X)	Failure to change from "3rd" to "2nd" when shifting lever into "1" range.	.	1	.	.	2	.	.	4	5	7	6	3	.	(8)	(9)	.	.	(10)	.	.	.	.
(Y)	Engine brake does not operate in "1" range.	.	1	.	.	2	.	.	4	.	.	5	3	.	.	.	(6)	.	(7)	.	.	.	.
	Gear change from "1st" to "2nd" or from "2nd" to "3rd" in "1" range.	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	(3)	.	.	.	.
(Z)	Does not change from "2nd" to "1st" in "1" range.	1	2	.	.	.	.	.	4	5	6	7	3	.	.	.	(8)	.	(9)	.	.	.	.
(A1)	Large shock changing from "2nd" to "1st" in "1" range.	.	.	1	.	.	2	.	4	.	.	.	3	.	.	.	(5)	.	.	.	.	.	.
	Transaxle overheats.	1	.	.	.	3	4	2	6	.	8	7	5	.	(9)	(10)	(11)	(12)	(13)	(14)	.	.	(15)
	Oil shoots out during operation. White smoke emitted from exhaust pipe during operation.	1	.	3	.	5	6	2	7	.	.	8	4	.	(9)	(10)	(11)	(12)	(13)	(14)	.	.	(15)
	Offensive smell at oil charging pipe.	1	.	.	.	.	.	.	.	.	.	.	2	(3)	(4)	(5)	(6)	(7)	(8)	(9)	.	.	(10)
		ON VEHICLE												OFF VEHICLE									

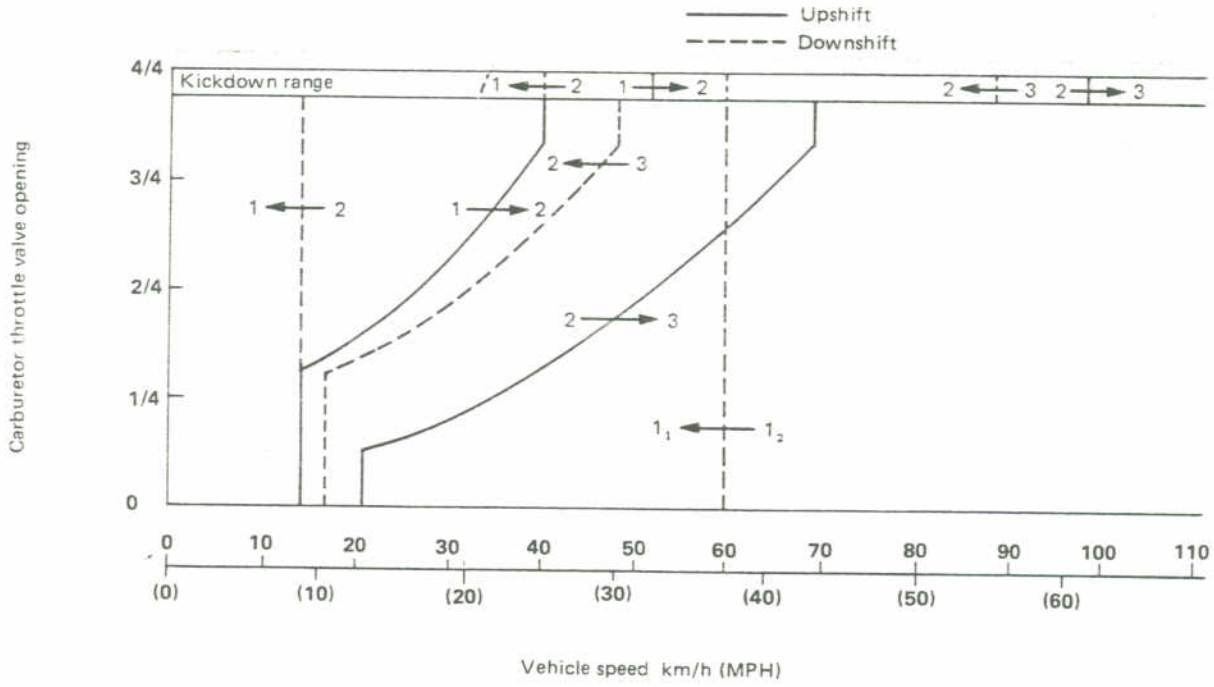
Road Testing (Cont'd)

VEHICLE SPEED AND LINE PRESSURE WHEN SHIFTING GEARS

This check should be carried out when oil temperature is between 43 to 57°C (109 to 135°F). Throttle position is determined by wire length.

Throttle position	Gearshift	Vehicle speed km/h (MPH)
Full throttle	$D_1 \rightarrow D_2$, $2_1 \rightarrow 2_2$	48 - 55 (30 - 34)
	$D_2 \rightarrow D_3$	93 - 103 (58 - 64)
	$D_3 \rightarrow D_2$	86 - 91 (53 - 57)
	$D_2 \rightarrow D_1$, $2_2 \rightarrow 2_1$	35 - 42 (22 - 26)
	$D_3 \rightarrow 2_2$, $D_3 \rightarrow 1_2$	–
	$1_2 \rightarrow 1_1$	–

SHIFT SCHEDULE



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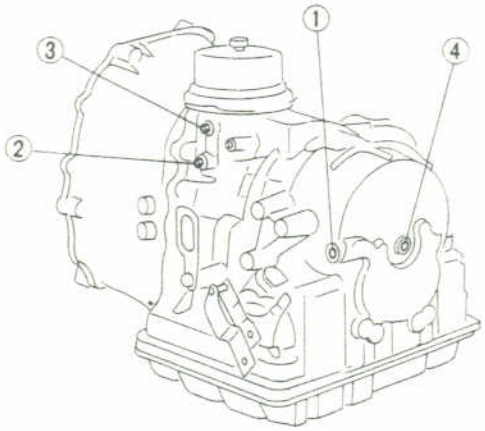
Pressure Testing



1 Line pressure
[To high-reverse clutch (Front)]
2 Line pressure
[To forward clutch (Rear)]
3 Governor pressure
4 Torque converter lock-up pressure

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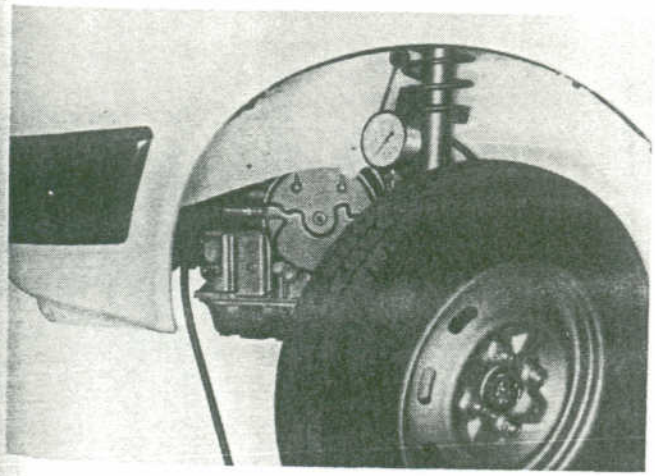
LINE PRESSURE

1. Install pressure gauge to line pressure port. (When shift lever is in "D", "2" or "1" range, install pressure gauge to port ② and when in "R" range, install pressure gauge to port ① shown above.) Locate the gauge so it can be seen by driver. Measure line pressure both of "R" and "D" range at idling and at stall test.



2. Warm up engine until engine oil and A.T.F. reach operating temperatures.

   A.T.F. temperature:
   43 - 57°C (109 - 135°F)

3. Measure line pressure at idle and at stall point while depressing brake pedal fully.

At idling

Range	Line pressure kPa (kg/cm², psi)
R	628 - 775 (6.4 - 7.9, 91 - 112)
D	245 - 343 (2.5 - 3.5, 36 - 50)
2	245 - 343 (2.5 - 3.5, 36 - 50)
1	245 - 343 (2.5 - 3.5, 36 - 50)

At stall test

- Do not perform tests for more than five seconds at any shift range.
- Do not proceed to next "range" test immediately after one "range" test is done. Wait until oil temperature decreases.

Range	Line pressure kPa (kg/cm², psi)
R	1,275 - 1,471 (13.0 - 15.0, 185 - 213)
D	618 - 696 (6.3 - 7.1, 90 - 101)
2	549 - 696 (5.6 - 7.1, 80 - 101)
1	549 - 696 (5.6 - 7.1, 80 - 101)

Judgment by measuring line pressure

1) When line pressure while idling is low at all positions, the problem may be due to:
- Wear on interior of oil pump
- Oil leakage at or around oil pump, control valve body, transmission case or governor
- Sticking pressure regulator valve
- Sticking pressure modifier valve

2) When line pressure while idling is low at a particular position, the problem may be due to the following:
- If oil leaks at or around forward clutch (rear) or governor, line pressure is low in "D", "2" or "1" range but is normal in "R" range.

Pressure Testing (Cont'd)

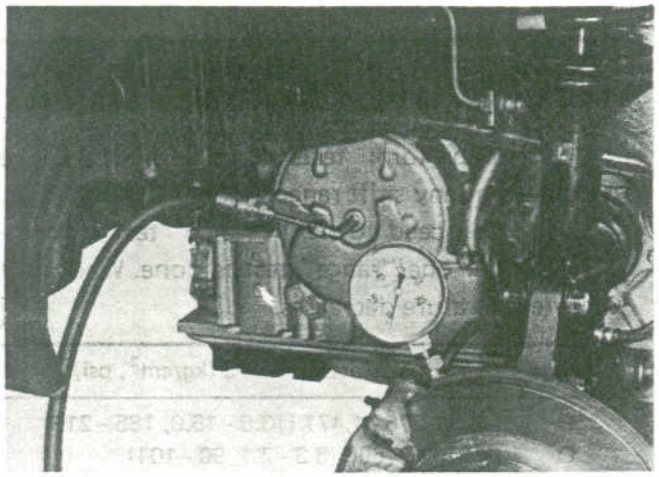
- If oil leaks at or around low and reverse brake circuit, line pressure becomes low in "R" or "P" range but is normal in "D", "2" or "1" range.

3) When line pressure is high while idling, pressure regulator valve may have stuck.

If line pressure does not rise, first check to make sure that throttle wire is connected properly.

LOCK-UP TEST

Install pressure gauge to port ④. Shift selector lever in "D" range.



If lock-up pressure, which is outlined under "Vehicle Speed and Line Pressure When Shifting Gears", is not within specifications, refer to Trouble-shooting chart (A4).

Stall Testing

The stall test is an effective method of testing clutch and band holding ability, torque converter one-way clutch operation, and engine performance. A stall test should only be performed as a last resort because of the high fluid temperature it generates and the excessive load it places on the engine and transaxle.

CAUTION:

a. **Transaxle and engine fluid levels should always be checked and fluid added as needed.**
b. **Run engine at 1,200 rpm to attain proper warm-up.**
c. **During test, never hold throttle wide-open for more than 5 seconds.**
d. **Do not test more than two gear ranges without driving vehicle to cool off engine and transaxle.**

STALL TEST PROCEDURE

1. Set parking brake and block wheels.

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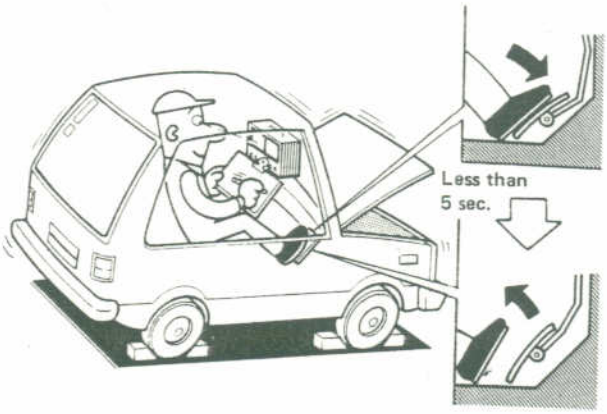
2. Install a tachometer where it can be seen by driver during test.
3. Start engine and place select lever in "D" range.
4. Apply foot brake and accelerate to wide-open throttle.
5. Quickly note the engine stall speed and immediately release throttle.

   Stall revolution:
   2,800 - 3,100 rpm



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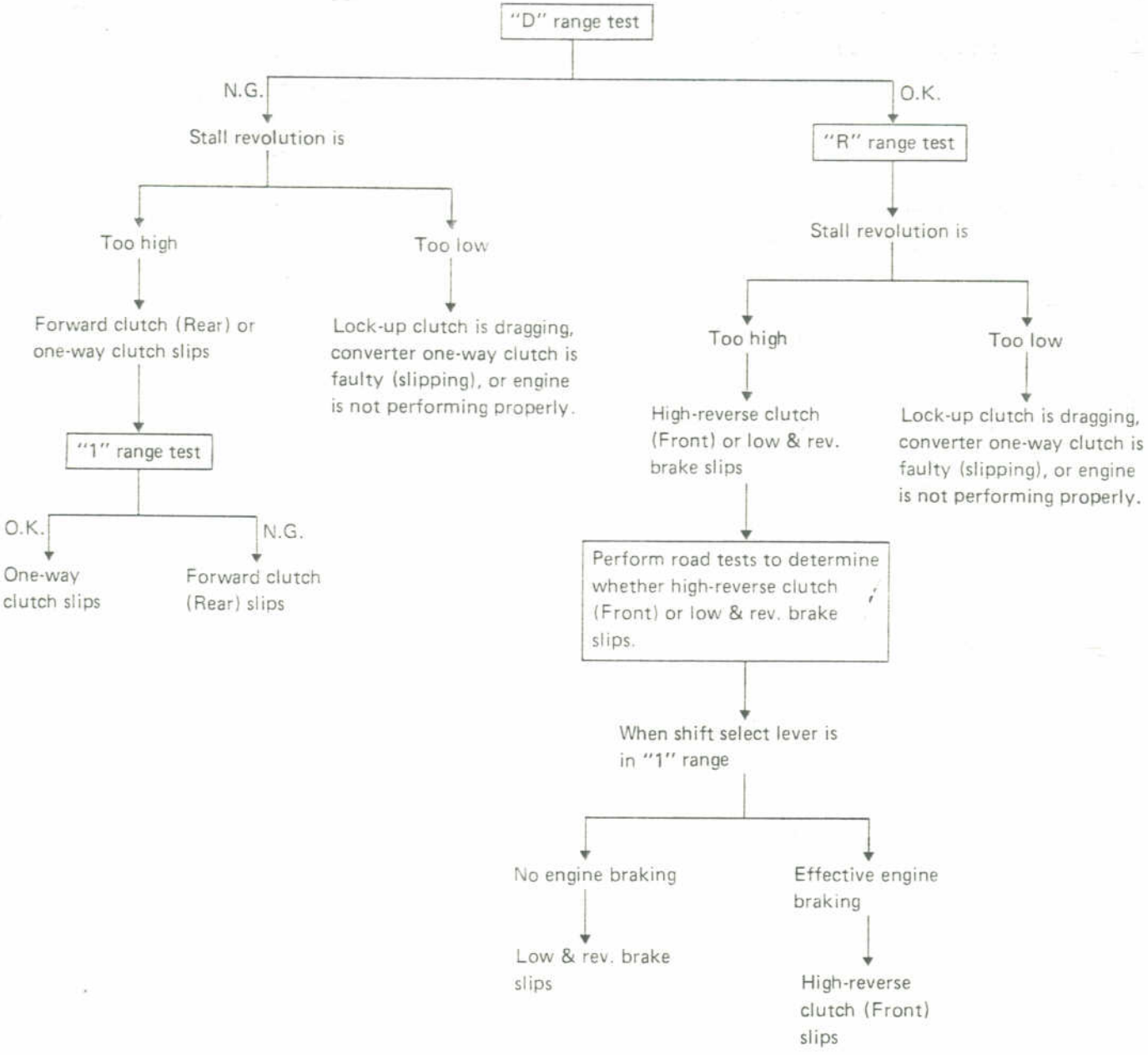
6. Shift select lever to "N".
7. Cool off transaxle fluid.
8. Perform stall tests in the same manner as in steps 3 through 7 with select lever in "1" and "R", respectively.

Stall Testing (Cont'd)

STALL TEST ANALYSIS



If converter one-way clutch is frozen, vehicle will have poor high speed performance. If converter one-way clutch is slipping, vehicle will be sluggish up to 50 or 60 km/h (30 or 40 MPH).

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Vehicle model	K10
Engine model	MA12
Automatic transaxle model	RL3F01A
Automatic transaxle assembly Model code number	15X06
Transaxle gear ratio 1st 2nd Top Reverse Final drive	 2.826 1.543 1.000 2.364 3.600
Number of teeth Output shaft Idler gear Final gear	 20 32 72
Recommended oil	Automatic transmission fluid "Dexron" type
Oil capacity ℓ (US qt, Imp qt)	6.0 (6-3/8, 5-1/4)

Specifications and Adjustment

High-reverse clutch (Front) Number of drive plates	2	
Number of driven plates	3	
Clearance mm (in) Standard Allowable limit	1.0 - 1.4 (0.039 - 0.055) 2.2 (0.087)	
Drive plate thickness mm (in) Standard Allowable limit	1.70 - 1.85 (0.0669 - 0.0728) 1.6 (0.063)	
	Thickness mm (in)	Part number
Thickness of retaining plate	3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173)	31537-01X00 31537-01X01 31537-01X02 31537-01X03 31537-01X04
Forward clutch (Rear) Number of drive plates	3	
Number of driven plates	3	
Clearance mm (in) Standard Allowable limit	0.5 - 0.8 (0.020 - 0.031) 2.8 (0.110)	
Drive plate thickness mm (in) Standard Allowable limit	1.70 - 1.85 (0.0669 - 0.0728) 1.6 (0.063)	
	Thickness mm (in)	Part number
Thickness of retaining plate	3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173)	31537-01X00 31537-01X01 31537-01X02 31537-01X03 31537-01X04

Specifications and Adjustment (Contid)

Low & reverse brake	
Number of drive plates	3
Number of driven plates	3 (7)*1
Clearance mm (in)	
Standard	1.90 - 2.20 (0.0748 - 0.0866)
Allowable limit	3.4 (0.134)
Drive plate thickness mm (in)	
Standard	1.90 - 2.05 (0.0748 - 0.0807)
Allowable limit	1.8 (0.071)

Thickness of retaining plate	Thickness mm (in)	Part number
	3.6 (0.142)	31667-01X00
	3.8 (0.150)	31667-01X01
	4.0 (0.157)	31667-01X02
	4.2 (0.165)	31667-01X03
	4.4 (0.173)	31667-01X04

Brake band	
Piston size mm (in)	
Big dia.	60 (2.36)
Small dia.	40 (1.57)
Descrimination of separator plate	BI*2
Oil pump clearance mm (in)	
Outer gear-pump housing	
Standard	0.20 - 0.30 (0.0079 - 0.0118)
Allowable limit	0.35 (0.0138)
Outer gear-crescent	
Standard	0.20 - 0.30 (0.0079 - 0.0118)
Allowable limit	0.35 (0.0138)
Gears-pump plate	
Standard	0.02 - 0.04 (0.0008 - 0.0016)
Allowable limit	0.08 (0.0031)
Seal ring-ring groove	
Standard	0.10 - 0.25 (0.0039 - 0.0098)
Allowable limit	0.25 (0.0098)
Planetary carrier mm (in)	
Clearance between pinion washer and planetary carrier	
Standard	0.20 - 0.70 (0.0079 - 0.0276)
Allowable limit	0.80 (0.0315)

*1: Figures in ( ) indicate the number of driven plates used in place of 4.0 mm (0.157 in) retaining plates

*2: Punch mark on separator plate

OUTPUT SHAFT BEARING PRELOAD

0.15 - 0.32 N·m (1.5 - 3.3 kg-cm, 1.3 - 2.9 in-lb)

OUTPUT SHAFT BEARING PRELOAD ADJUSTING SHIM

Thickness mm (in)	Part number
0.11 (0.0043)	31499-01X00
0.13 (0.0051)	31499-01X01
0.15 (0.0059)	31499-01X02
0.17 (0.0067)	31499-01X03
0.19 (0.0075)	31499-01X04
0.30 (0.0118)	31499-01X05
0.40 (0.0157)	31499-01X06
0.50 (0.0197)	31499-01X07
0.60 (0.0236)	31499-01X08
0.70 (0.0276)	31499-01X09
0.80 (0.0315)	31499-01X10
0.90 (0.0354)	31499-01X11
1.00 (0.0394)	31499-01X12

OUTPUT SHAFT END PLAY

0.25 - 0.55 mm (0.0098 - 0.0217 in)

OUTPUT SHAFT END PLAY ADJUSTING SHIM

Thickness mm (in)	Part number
0.3 (0.012)	31484-01X00
0.5 (0.020)	31484-01X01
0.7 (0.028)	31484-01X02
0.9 (0.035)	31484-01X03
1.1 (0.043)	31484-01X04
1.3 (0.051)	31484-01X05
1.5 (0.059)	31484-01X06
1.7 (0.067)	31484-01X07

Specifications and Adjustment (Cont'd)

DIFF. SIDE BEARING PRELOAD

2.9 - 4.4 N·m (30 - 45 kg-cm, 26 - 39 in-lb)

Diff. side bearing preload adjusting shim

Thickness mm (in)	Part number
0.36 (0.0142)	38454-01X73
0.40 (0.0157)	38454-01X74
0.44 (0.0173)	38454-01X60
0.48 (0.0189)	38454-01X61
0.52 (0.0205)	38454-01X62
0.56 (0.0220)	38454-01X63
0.60 (0.0236)	38454-01X64
0.64 (0.0252)	38454-01X65
0.68 (0.0268)	38454-01X66
0.72 (0.0283)	38454-01X67
0.76 (0.0299)	38454-01X68
0.80 (0.0315)	38454-01X69
0.84 (0.0331)	38454-01X70
0.88 (0.0346)	38454-01X71
0.92 (0.0362)	38454-01X72

Table for shim selection

Unit: mm (in)

Type A "G"	Type B "H"	Appropriate shim(s)
0.42 - 0.45 (0.0165 - 0.0177)	0.22 - 0.25 (0.0087 - 0.0098)	0.36 (0.0142)
0.46 - 0.49 (0.0181 - 0.0193)	0.26 - 0.29 (0.0102 - 0.0114)	0.40 (0.0157)
0.50 - 0.53 (0.0197 - 0.0209)	0.30 - 0.33 (0.0118 - 0.0130)	0.44 (0.0173)
0.54 - 0.57 (0.0213 - 0.0224)	0.34 - 0.37 (0.0134 - 0.0146)	0.48 (0.0189)
0.58 - 0.61 (0.0228 - 0.0240)	0.38 - 0.41 (0.0150 - 0.0161)	0.52 (0.0205)
0.62 - 0.65 (0.0244 - 0.0256)	0.42 - 0.45 (0.0165 - 0.0177)	0.56 (0.0220)
0.66 - 0.69 (0.0260 - 0.0272)	0.46 - 0.49 (0.0181 - 0.0193)	0.60 (0.0236)
0.70 - 0.73 (0.0276 - 0.0287)	0.50 - 0.53 (0.0197 - 0.0209)	0.64 (0.0252)
0.74 - 0.77 (0.0291 - 0.0303)	0.54 - 0.57 (0.0213 - 0.0224)	0.68 (0.0268)
0.78 - 0.81 (0.0307 - 0.0319)	0.58 - 0.61 (0.0228 - 0.0240)	0.72 (0.0283)
0.82 - 0.85 (0.0323 - 0.0335)	0.62 - 0.65 (0.0244 - 0.0256)	0.76 (0.0299)
0.86 - 0.89 (0.0339 - 0.0350)	0.66 - 0.69 (0.0260 - 0.0272)	0.80 (0.0315)

Unit: mm (in)

Type A "G"	Type B "H"	Appropriate shim(s)
0.90 - 0.93 (0.0354 - 0.0366)	0.70 - 0.73 (0.0276 - 0.0287)	0.84 (0.0331)
0.94 - 0.97 (0.0370 - 0.0382)	0.74 - 0.77 (0.0291 - 0.0303)	0.88 (0.0346)
0.98 - 1.01 (0.0386 - 0.0398)	0.78 - 0.81 (0.0307 - 0.0319)	0.44 (0.0173) + 0.48 (0.0189)
1.02 - 1.05 (0.0402 - 0.0413)	0.82 - 0.85 (0.0323 - 0.0335)	0.48 (0.0189) + 0.48 (0.0189)
1.06 - 1.09 (0.0417 - 0.0429)	0.86 - 0.89 (0.0339 - 0.0350)	0.44 (0.0173) + 0.56 (0.0220)
1.10 - 1.13 (0.0433 - 0.0445)	0.90 - 0.93 (0.0354 - 0.0366)	0.44 (0.0173) + 0.60 (0.0236)
1.14 - 1.17 (0.0449 - 0.0461)	0.94 - 0.97 (0.0370 - 0.0382)	0.44 (0.0173) + 0.64 (0.0252)
1.18 - 1.21 (0.0465 - 0.0476)	0.98 - 1.01 (0.0386 - 0.0398)	0.44 (0.0173) + 0.68 (0.0268)
1.22 - 1.25 (0.0480 - 0.0492)	1.02 - 1.05 (0.0402 - 0.0413)	0.44 (0.0173) + 0.72 (0.0283)
1.26 - 1.29 (0.0496 - 0.0508)	1.06 - 1.09 (0.0417 - 0.0429)	0.44 (0.0173) + 0.76 (0.0299)
1.30 - 1.33 (0.0512 - 0.0524)	1.10 - 1.13 (0.0433 - 0.0445)	0.44 (0.0173) + 0.80 (0.0315)
1.34 - 1.37 (0.0528 - 0.0539)	1.14 - 1.17 (0.0449 - 0.0461)	0.44 (0.0173) + 0.84 (0.0331)
1.38 - 1.41 (0.0543 - 0.0555)	1.18 - 1.21 (0.0465 - 0.0476)	0.44 (0.0173) + 0.88 (0.0346)
1.42 - 1.45 (0.0559 - 0.0571)	1.22 - 1.25 (0.0480 - 0.0492)	0.48 (0.0189) + 0.88 (0.0346)
1.46 - 1.49 (0.0575 - 0.0587)	1.26 - 1.29 (0.0496 - 0.0508)	0.68 (0.0268) + 0.72 (0.0283)
1.50 - 1.53 (0.0591 - 0.0602)	1.30 - 1.33 (0.0512 - 0.0524)	0.56 (0.0220) + 0.88 (0.0346)
1.54 - 1.57 (0.0606 - 0.0618)	1.34 - 1.37 (0.0528 - 0.0539)	0.60 (0.0236) + 0.88 (0.0346)
1.58 - 1.61 (0.0622 - 0.0634)	1.38 - 1.41 (0.0543 - 0.0555)	0.64 (0.0252) + 0.88 (0.0346)
1.62 - 1.65 (0.0638 - 0.0650)	1.42 - 1.45 (0.0559 - 0.0571)	0.68 (0.0268) + 0.88 (0.0346)
1.66 - 1.69 (0.0654 - 0.0665)	1.46 - 1.49 (0.0575 - 0.0587)	0.72 (0.0283) + 0.88 (0.0346)
1.70 - 1.73 (0.0669 - 0.0681)	1.50 - 1.53 (0.0591 - 0.0602)	0.76 (0.0299) + 0.88 (0.0346)
1.74 - 1.77 (0.0685 - 0.0697)	1.54 - 1.57 (0.0606 - 0.0618)	0.80 (0.0315) + 0.88 (0.0346)
1.78 - 1.81 (0.0701 - 0.0713)	1.58 - 1.61 (0.0622 - 0.0634)	0.84 (0.0331) + 0.88 (0.0346)
1.82 - 1.85 (0.0717 - 0.0728)	1.62 - 1.65 (0.0638 - 0.0650)	0.88 (0.0346) + 0.88 (0.0346)
1.86 - 1.89 (0.0732 - 0.0744)	1.66 - 1.69 (0.0654 - 0.0665)	0.88 (0.0346) + 0.92 (0.0362)

Specifications and Adjustment (Cont'd)

OIL PUMP OUTER GEAR

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31347-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31347-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31347-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31347-01X03

OIL PUMP INNER GEAR

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31346-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31346-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31346-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31346-01X03

SIDE GEAR THRUST WASHER

Thickness mm (in)	Part number
0.76 - 0.81 (0.0299 - 0.0319)	38424-01X03
0.81 - 0.86 (0.0319 - 0.0339)	38424-01X04
0.86 - 0.91 (0.0339 - 0.0358)	38424-01X05

STALL REVOLUTION

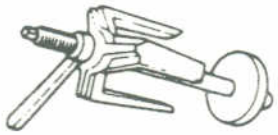
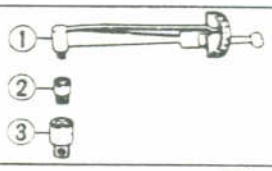
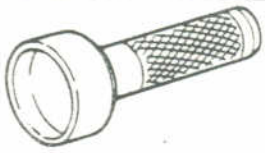
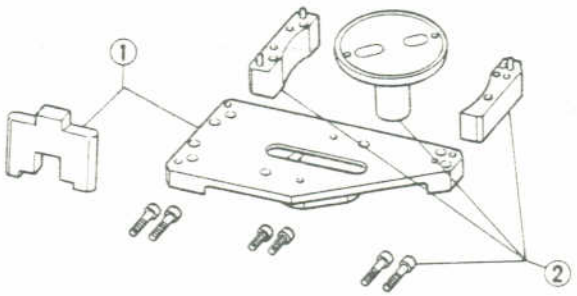
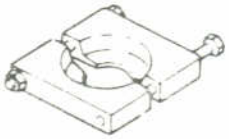
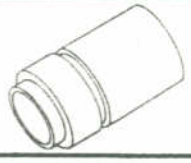
2,800 - 3,100 rpm

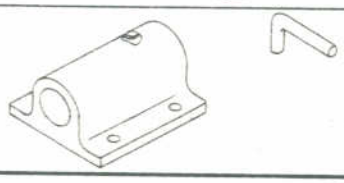
Tightening Torque

Unit	N·m	kg-m	ft-lb
Drive plate to torque converter	39 - 49	4.0 - 5.0	29 - 36
Converter housing to engine	16 - 22	1.6 - 2.2	12 - 16
Transmission case to converter housing	19 - 23	1.9 - 2.3	14 - 17
Transmission case to front cover	14 - 18	1.4 - 1.8	10 - 13
Oil pan to transmission case	5 - 7	0.5 - 0.7	3.6 - 5.1
Bearing retainer to transaxle case	19 - 25	1.9 - 2.5	14 - 18
Piston stem (when adjusting band brake)	4 - 6*	0.4 - 0.6*	2.9 - 4.3*
Piston stem lock nut	16 - 22	1.6 - 2.2	12 - 16
Low and reverse brake piston retainer	7 - 9	0.7 - 0.9	5.1 - 6.5
Control valve body to transaxle case	7 - 9	0.7 - 0.9	5.1 - 6.5
Lower valve body to upper valve body	7 - 9	0.7 - 0.9	5.1 - 6.5
Final gear bolt	69 - 78	7.0 - 8.0	51 - 58
Oil strainer to lower valve body	10 - 12	1.0 - 1.2	7 - 9
Governor valve body to governor shaft	5 - 7	0.5 - 0.7	3.6 - 5.1
Governor shaft securing nut	3.4 - 6.9	0.35 - 0.7	2.5 - 5.1
Idler gear (When adjusting turning frictional force)	26 - 36	2.7 - 3.7	20 - 27
Idler gear lock nut		**	
Throttle wire securing nut (Carburetor side)	5 - 7	0.5 - 0.7	3.6 - 5.1
Control cable securing nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Inhibitor switch to transaxle case	2.0 - 2.5	0.20 - 0.26	1.4 - 1.9
Manual shaft lock nut	16 - 22	1.6 - 2.2	12 - 16
Test plug (oil pressure inspection hole)	5 - 10	0.5 - 1.0	3.6 - 7.2
Support actuator (parking rod inserting position) to rear extension	8 - 11	0.8 - 1.1	5.8 - 8.0
Gusset to converter housing	16 - 21	1.6 - 2.1	12 - 15

* : Turn back 2.5 turns after tightening.
**: Refer to Assembly.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
ST25420001 (J26063-A) (ST25420000) (J26063-A)	Clutch spring compressor	
ST33290001 (J25810-A)	Side bearing outer race puller	
ST3127S000 (See J25765-A) ① GG91030000 (J25765-A) ② HT62940000 (–) ③ HT62900000 (–)	Preload gauge Torque wrench Socket adapter Socket adapter	
ST33400001 (J26082)	Oil seal drift	
KV381058S0 (–) ① KV38105810 (–) ② KV38105820 (–)	Differential side bearing height gauge Differential side bearing height gauge Spacer and bolts	
KV38105900 (J33201)	Preload adapter	
ST22730000 (J25681)	Bearing puller	
ST2505S001 (–)	Oil pressure gauge set	
(J33200-83)	Transaxle shim selector adapter	

Tool number (Kent-Moore No.)	Tool name
(J33200)	Differential preload shim selector 
(J34291)	Shim setting gauge set 
(J34279)	Automatic transaxle holding fixture 
(J3289-20)	Bench mount fixture 

FRONT AXLE & FRONT SUSPENSION

SECTION FA

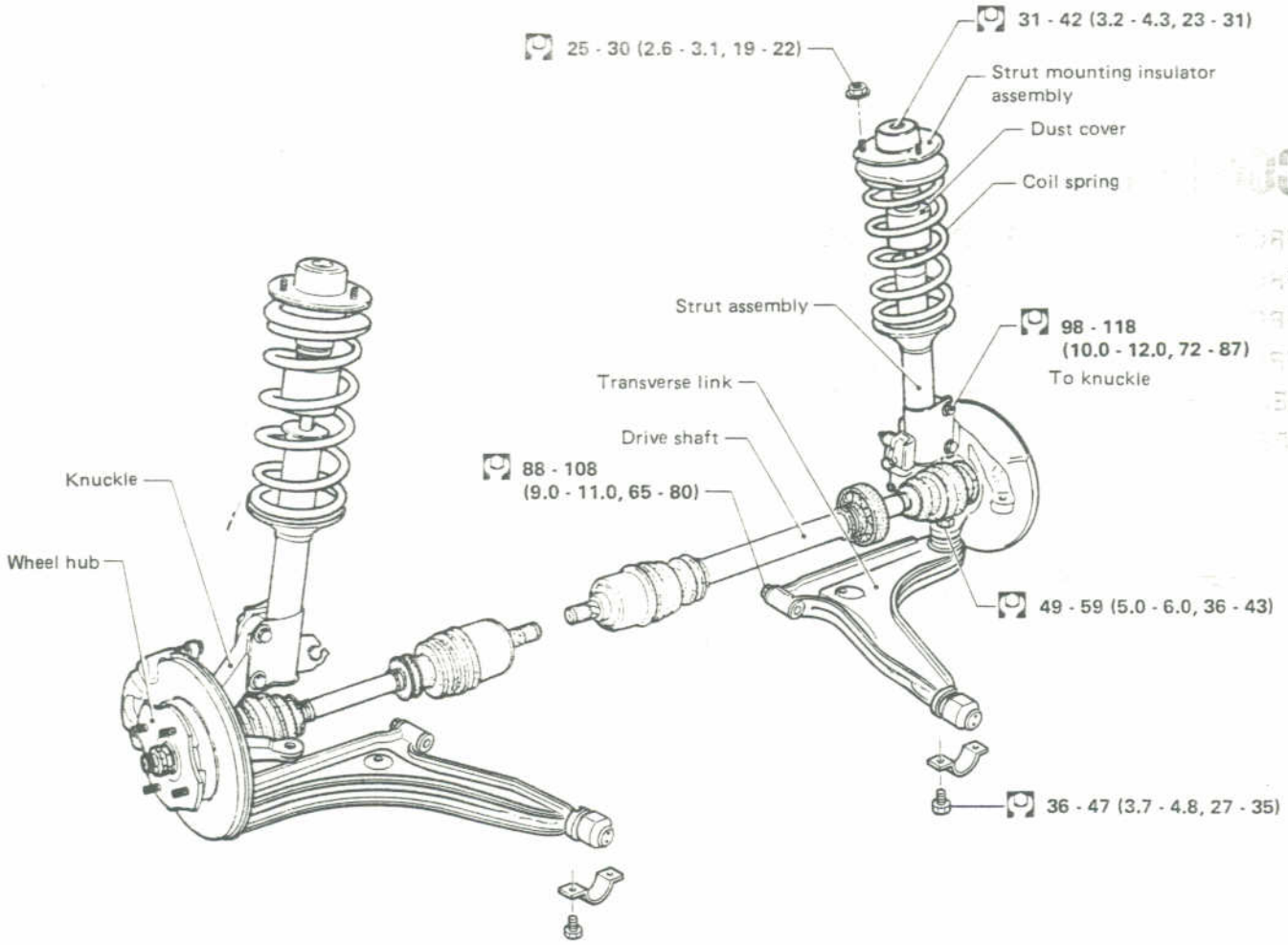
CONTENTS

Wheel alignment

- Camber, caster and kingpin inclination are preset at factory and cannot be adjusted.
- The vehicle requires only toe-in adjustments.

2 - 4 mm (0.08 - 0.16 in)
12' - 24' (Total toe-in)

Refer to Section MA for Checking Wheel Alignment.



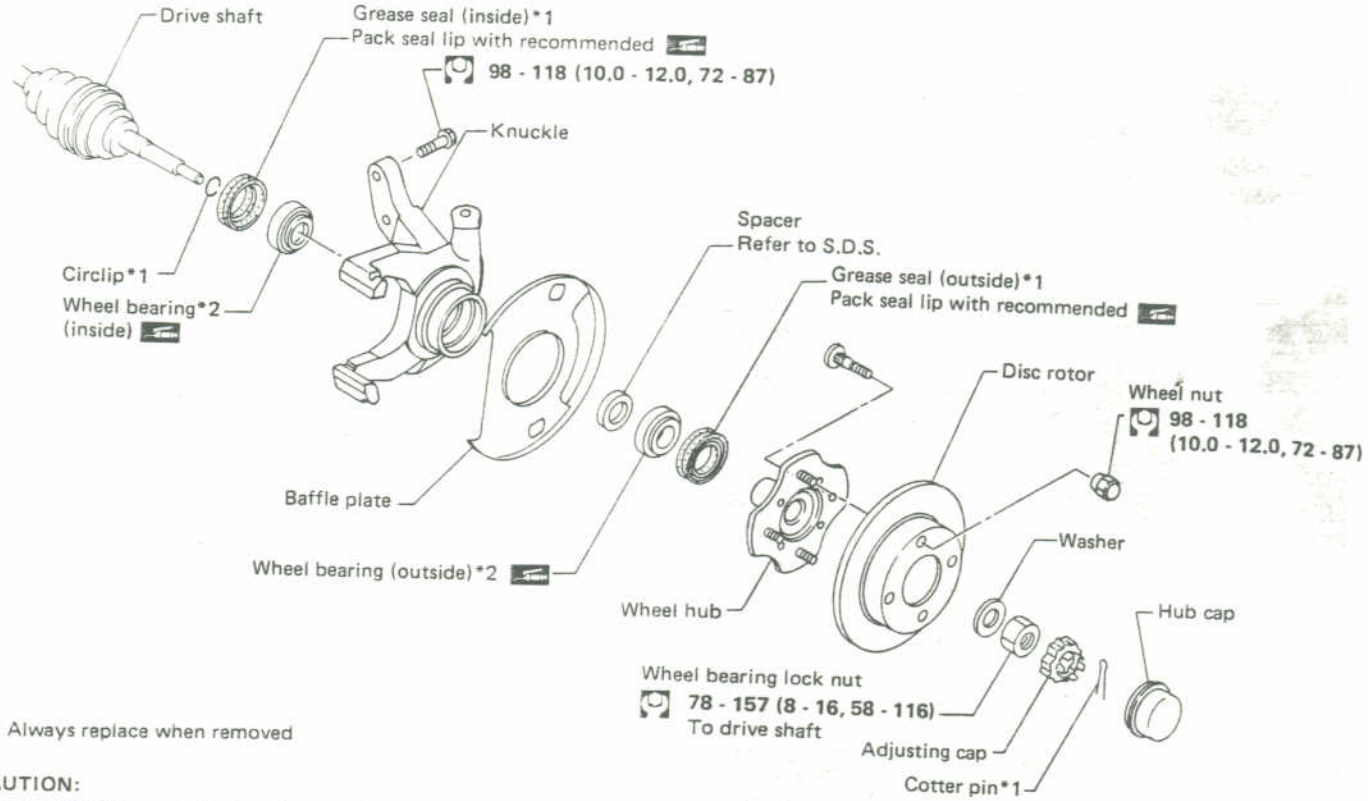
Wheel bearing

- Do not overtighten wheel bearing nuts, as this can cause wheel bearing seizure.
- **Axial play: 0 mm (0 in)**
- **78 - 157 (8 - 16, 58 - 116)**
- **Rotation starting torque (with grease seal)**
  0.8 - 2.7 N·m (8 - 28 kg-cm, 6.9 - 24.3 in-lb)
  As measured at wheel hub bolt
  15.7 - 54.9 N (1.6 - 5.6 kg, 3.5 - 12.3 lb)
  When measuring starting torque, do not include "dragging" resistance with brake pads.
- Adjust shim thickness. Refer to S.D.S.

: N·m (kg-m, ft-lb)

SFA704

FRONT AXLE — Wheel Hub and Knuckle



*1 Always replace when removed

*2

CAUTION:

When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix-use of bearings of different brands.

: N·m (kg-m, ft-lb)

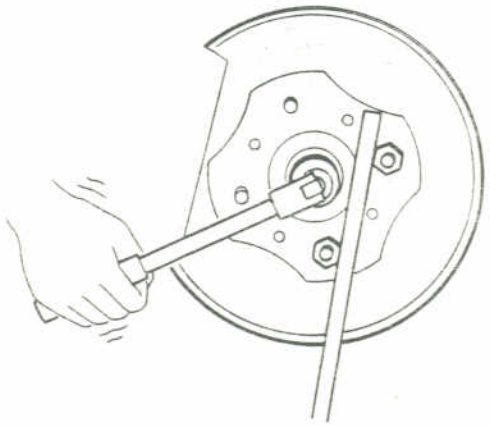
SFA559

Removal

- Loosen (not remove) wheel bearing lock nut.

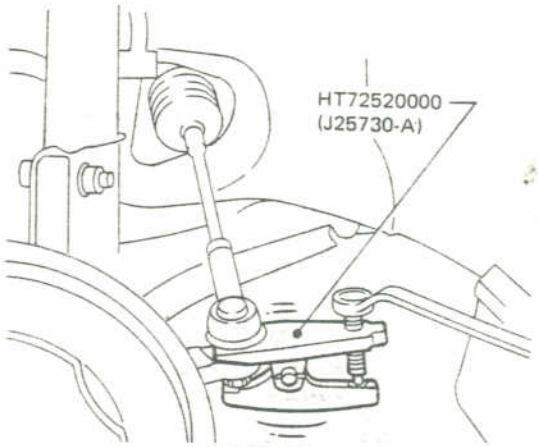
CAUTION:

Install wheel nuts so that the wheel bolts will not be damaged during above operation.



SFA495

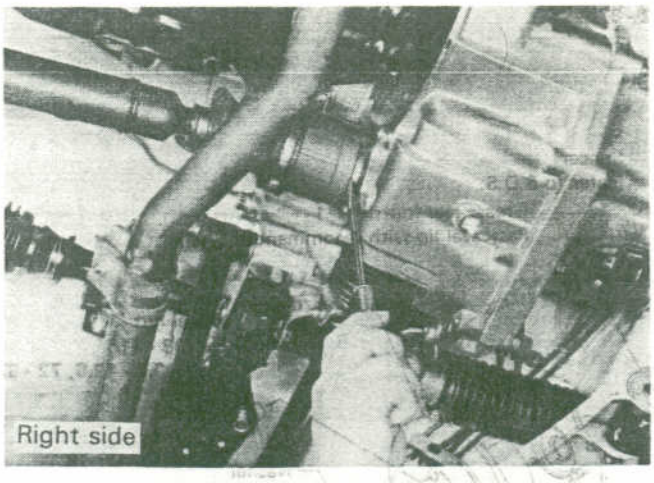
- Remove tie-rod ball joint.

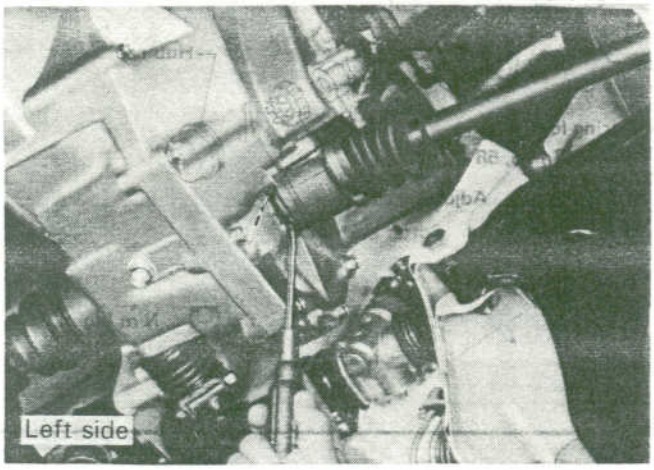


SFA372

Removal (Cont'd)

- Remove drive shaft.



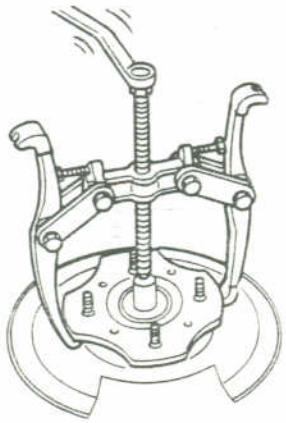


- Remove oil seal on transaxle side. Refer to section MT or AT.

CAUTION:

When removing drive shaft, replace a new oil seal.

- Remove bearing lock nut and then separate drive shaft.



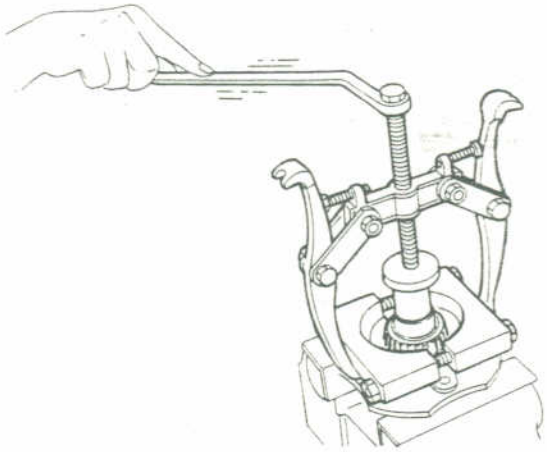
SFA496

Disassembly

WHEEL HUB

- Remove outer wheel bearing.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.

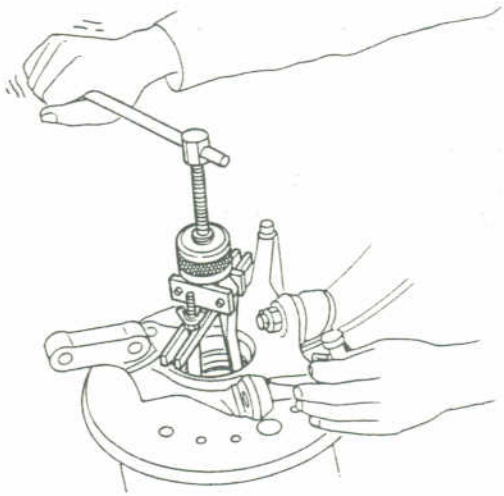


SFA380

KNUCKLE

- Remove wheel bearing outer races.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



SFA540

FRONT AXLE — Wheel Hub and Knuckle

Inspection

WHEEL BEARING

Make sure wheel bearing rolls freely and is free from noise, crack, pitting or wear.

WHEEL HUB AND KNUCKLE

Check wheel hub for cracks by using of a magnetic exploration or dyeing test, and replace if cracked.

GREASE SEAL

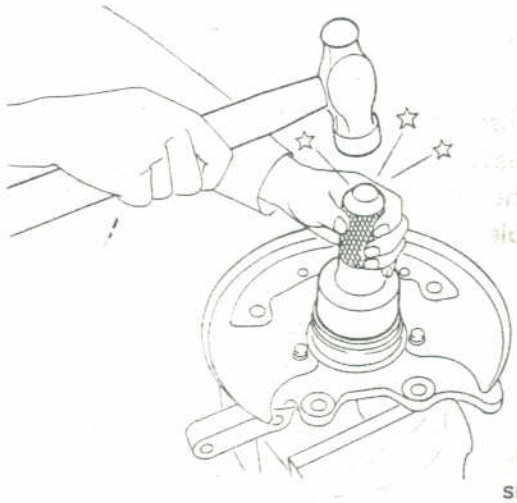
If grease leakage is detected during removal, replace grease seal. Replace grease seal at every disassembly, even if it appears good.

Assembly and Adjustment

1. Coat each bearing with recommended multi-purpose grease.
   Refer to section GI.

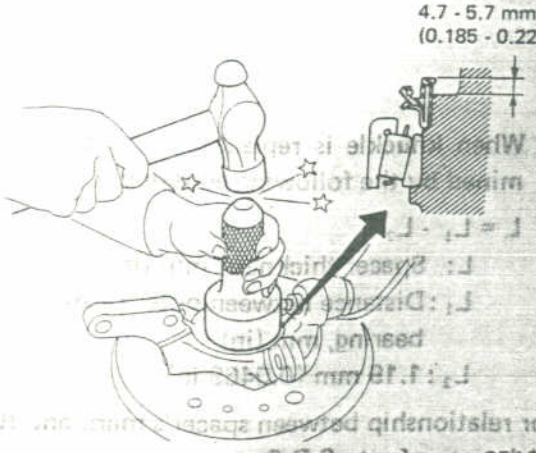
FA262

2. Press bearing outer race into each side of knuckle.



SFA452

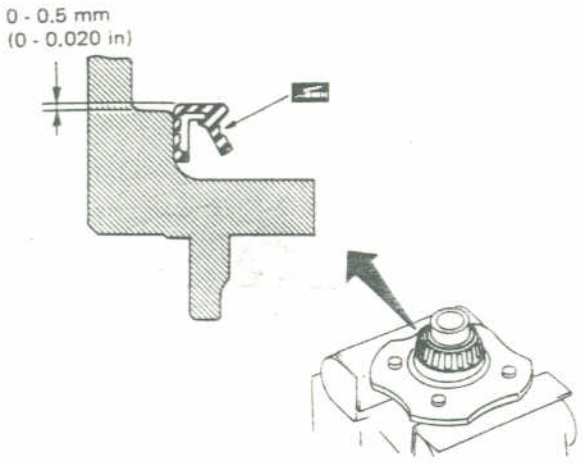
3. Install inside bearing inner race and grease seal.



SFA456

Assembly and Adjustment (Cont'd)

4. Press outside grease seal and bearing.

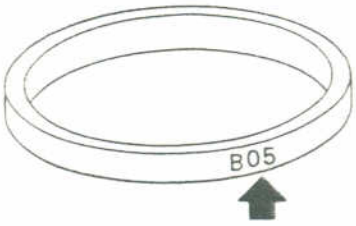


SFA718

5. Install spacer.

Select suitable spacer as follows:

a. When grease seal, bearing, or spacer is replaced, select a spacer having same mark as old one. The old spacer can be used if it is still serviceable.



SFA721

b. When knuckle is replaced, use a spacer determined by the following equation:

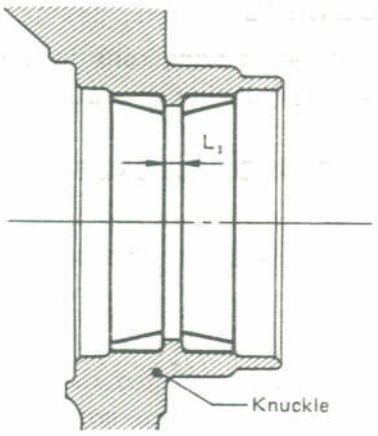
$L = L_1 - L_2$

L: Spacer thickness, mm (in)

L_1: Distance between outer races of bearing, mm (in)

L_2: 1.19 mm (0.0469 in)

For relationship between spacer's mark and its thickness, refer to S.D.S.



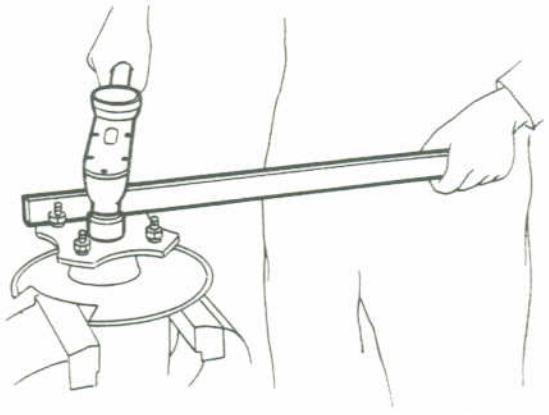
SFA386

6. Put drive shaft into knuckle, and fit drive shaft serration to wheel hub.

1) Clamp drive shaft in vise and install knuckle with bearings, spacer and wheel bearing lock nut.
2) Tighten wheel bearing lock nut.

CAUTION:

- Do not tap drive shaft.
- Install wheel nuts so as not to damage wheel bolts during above operation.



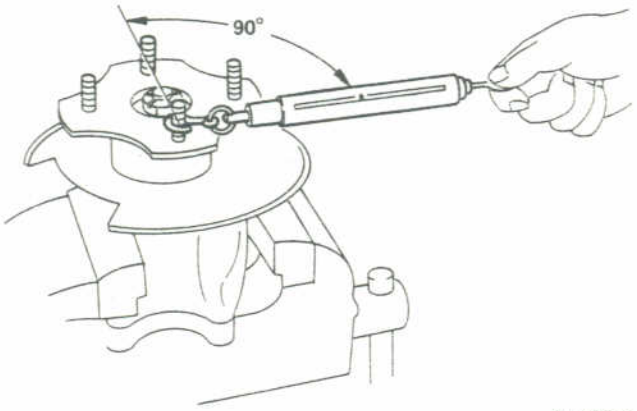
SFA498

7. Spin wheel hub several turns in both directions.

Assembly and Adjustment (Cont'd)

8. Measure bearing preload.

Rotation starting torque:
0.8 - 2.7 N·m
(8 - 28 kg-cm, 6.9 - 24.3 in-lb)
As measured at wheel bolt:
15.7 - 54.9 N
(1.6 - 5.6 kg, 3.5 - 12.3 lb)



SFA560

If bearing preload does not accord with the specification, reselect spacer as follows:

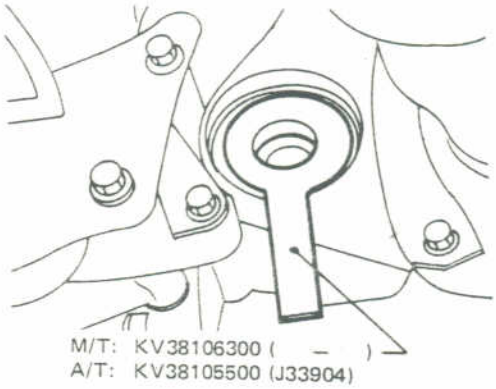
a. **When any axial end-play is present in wheel bearing, or bearing preload is lower than the specification, replace spacer with a smaller one.**
b. **When bearing preload is greater than the specification, replace spacer with a larger one.**

9. Repeat steps 6 through 8 until specified preload is obtained.
10. Insert a new cotter pin, and then bend up.

Installation

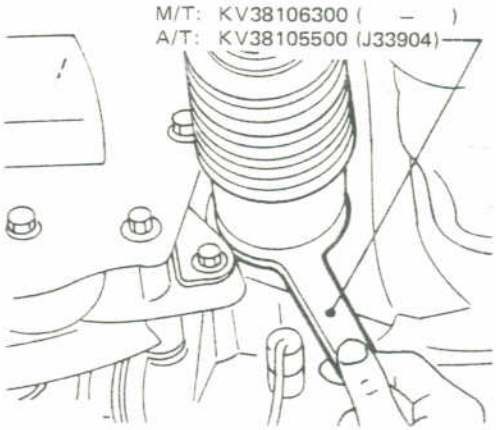
When installing drive shaft in transaxle;

1. Set Tool along the inner circumference of oil seal (transaxle side).



SFA482

2. Insert drive shaft into transaxle, be sure to properly align the serrations and then withdraw Tool.

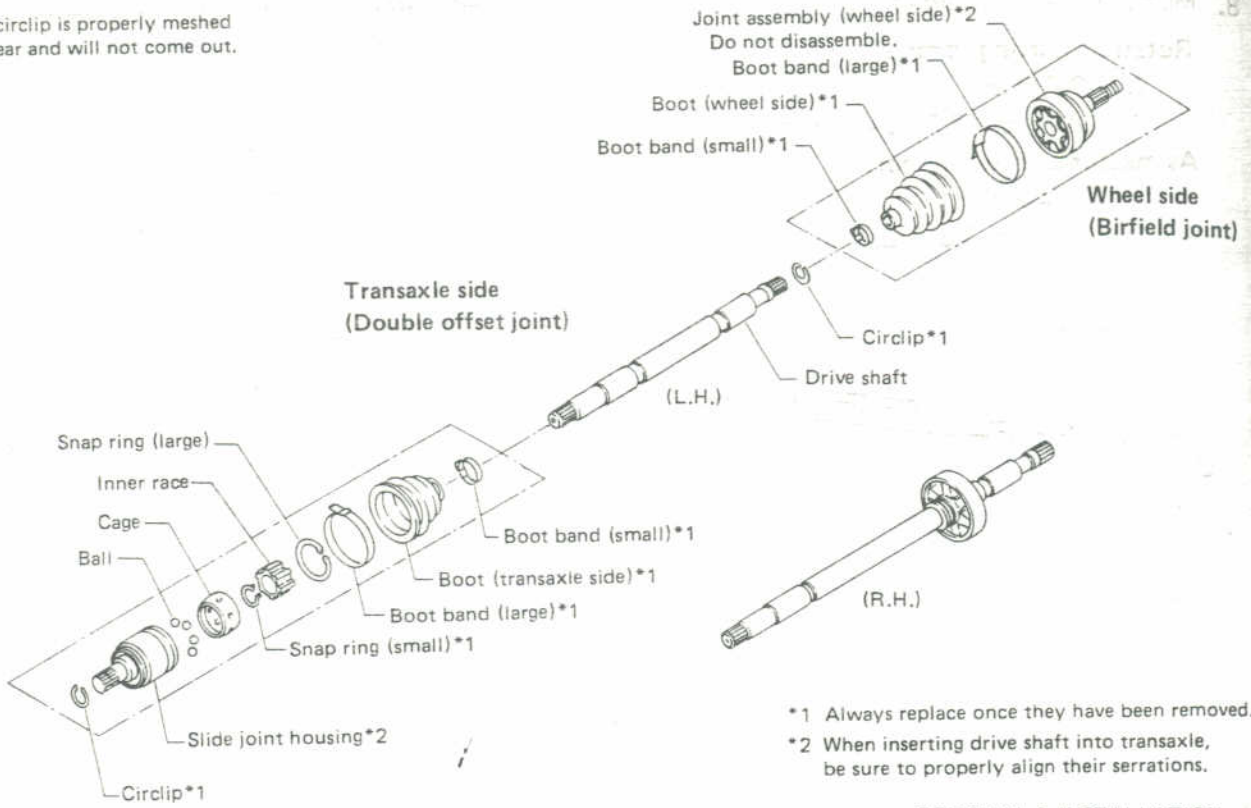


SFA483

3. Push drive shaft, then press-fit circlip on the drive shaft into circlip groove of side gear.

- **After it is inserted, try to pull flange out of slide joint by hand to make sure circlip is properly meshed with side gear and will not come out.**

Circlip:
Make sure circlip is properly meshed with side gear and will not come out.



*1 Always replace once they have been removed.
*2 When inserting drive shaft into transaxle, be sure to properly align their serrations.

REMOVAL & INSTALLATION
Refer to Wheel Hub and Knuckle.

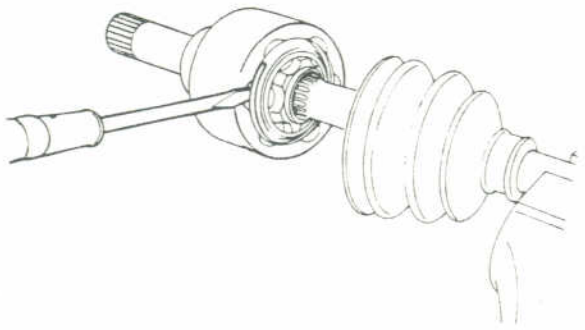
SFA719

Disassembly

CAUTION:
The joint on the wheel side cannot be disassembled .

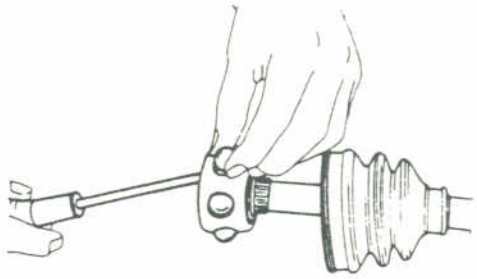
TRANSAXLE SIDE

- To disassemble joint, pry off snap ring, and pull out slide joint housing.



SFA476

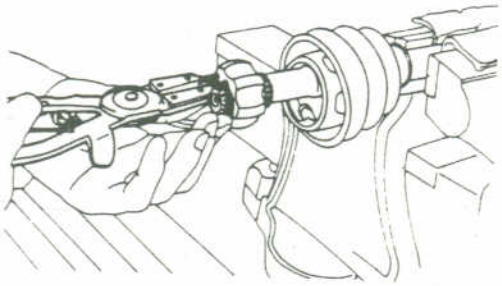
- Wipe grease off ball cage, and drive out balls. Turn cage approximately a half turn, and detach from inner race.



FA095

Disassembly (Cont'd)

- Remove snap ring, and withdraw inner race. This inner race is removed easily by lightly tapping on it with a mallet.



FA096

Before separating joint assembly, put matching marks on drive shaft and inner race.

WHEEL SIDE

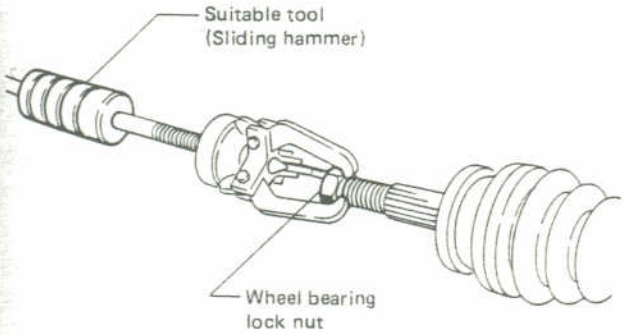
CAUTION:

The joint on the wheel side cannot be disassembled.

- Before separating joint assembly, put matching marks on drive shaft and joint assembly.
- Separate joint assembly with suitable tool.

Be careful not to damage threads on drive shaft.

- Remove boot bands.



SFA092A

Inspection

DRIVE SHAFT

Replace drive shaft if it is twisted or cracked.

JOINT ASSEMBLY (Wheel side)

Replace joint assembly if it is deformed or damaged.

DOUBLE OFFSET JOINT (Transaxle side)

Replace any parts of double offset joint which show signs of burn, rust, wear, or excessive play.
Check groove of slide joint housing for cracks, wear or deformation. Replace if necessary.

BOOT

Replace fatigued, cracked, or worn boot.

Assembly

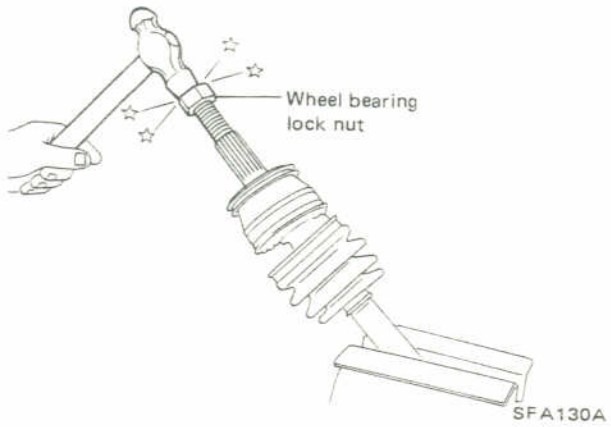
- After drive shaft has been assembled, ensure that it moves smoothly over its entire range without binding.
- Use NISSAN GENUINE GREASE or equivalent after every overhaul.

WHEEL SIDE

1. Install boot and a new small boot band to drive shaft.

Be careful not to damage boot on the edge of drive shaft.

2. Set joint assembly onto drive shaft by lightly tapping it.
   Install joint assembly securely, ensuring marks which were made during disassembly are properly aligned.

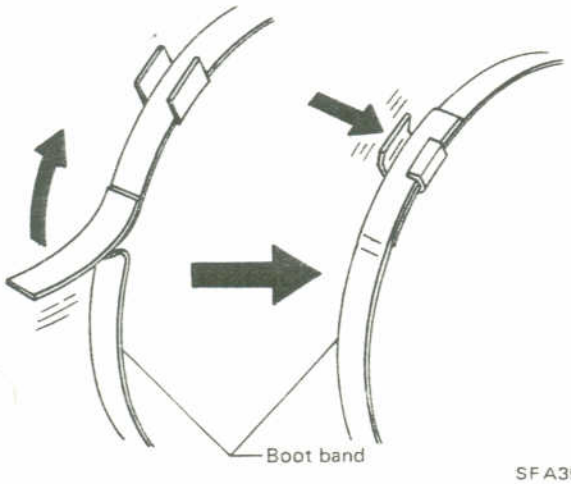


SFA130A

3. Pack drive shaft with specified amount of grease.

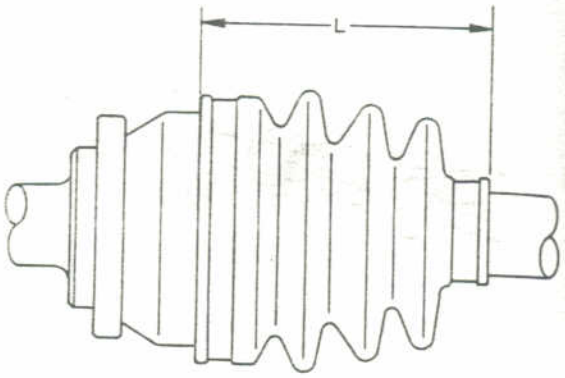
   Specified amount: 60 - 90 g (2.12 - 3.17 oz)

4. Install new larger diameter boot band.



SFA395

5. Set boot so that it does not swell and deform when its length is "L".



Length "L": 85.5 mm (3.366 in)

SFA592

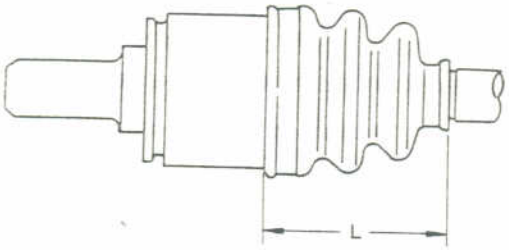
6. Lock new smaller diameter boot band.

TRANSAXLE SIDE

- Pack with grease.

  Specified amount of grease:
  60 - 90 g (2.12 - 3.17 oz)

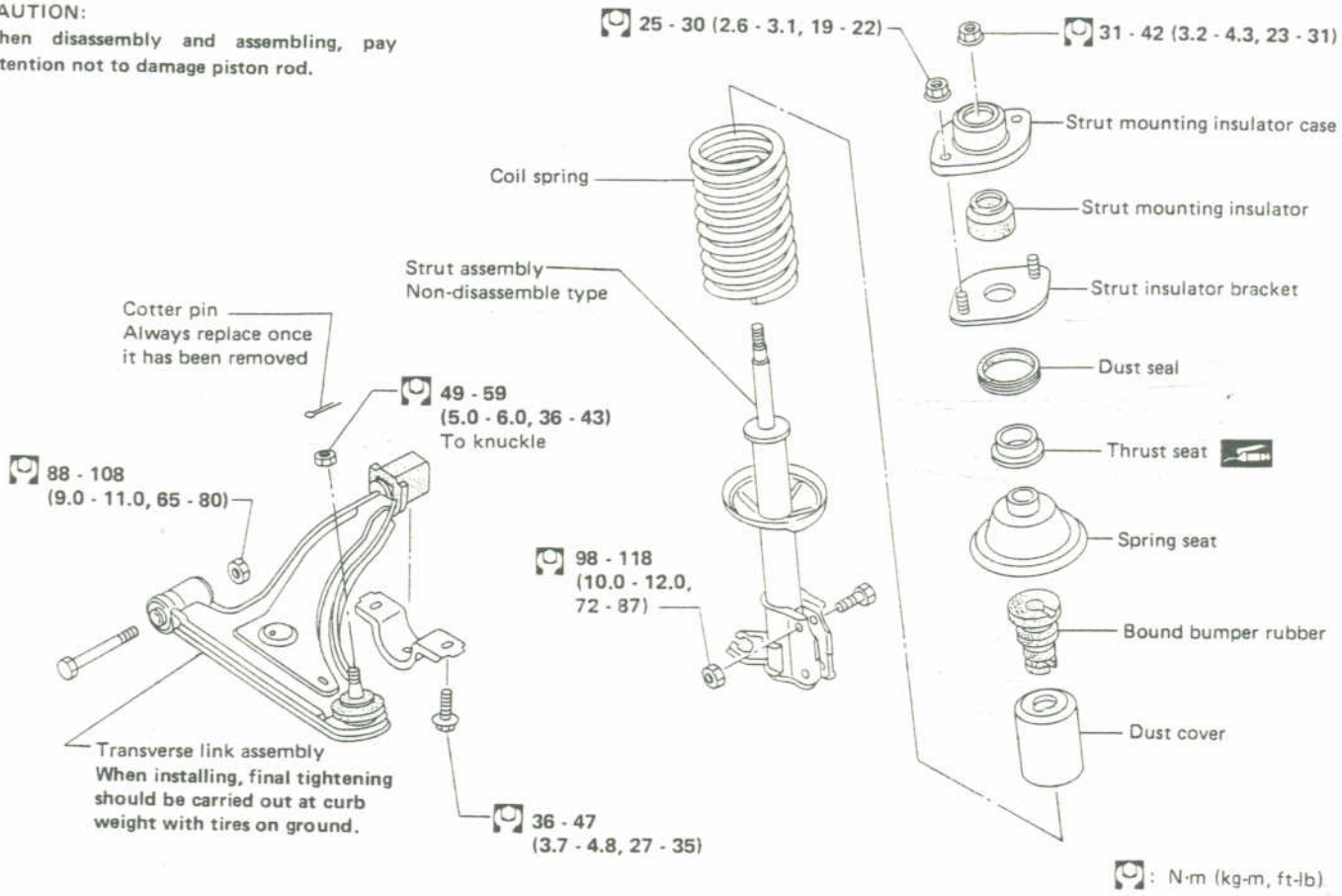
- Fasten boot bands.
  Refer to "Wheel side" joint.



Length "L": 82.5 mm (3.248 in)

SFA477

CAUTION:
When disassembly and assembling, pay attention not to damage piston rod.

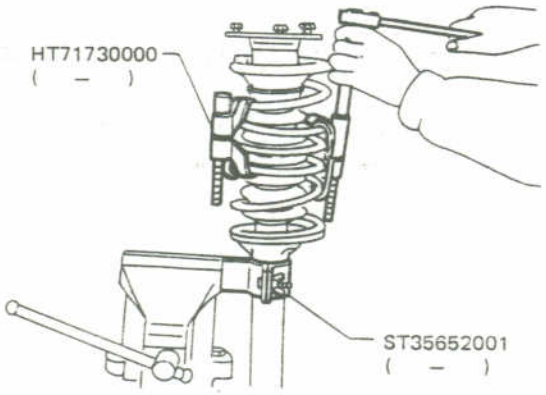


SFA501

Spring and Strut

DISASSEMBLY

Compress spring with coil spring compressor just for enough to permit turning of strut mounting insulator by hand.



SFA272

INSPECTION

Strut assembly

- If oil leakage occurs on welded and gland packing portion, replace strut assembly.
- Inspect piston rod for cracks, deformation or other damage. Replace strut assembly.
- Inspect threads for cracks or other damage. Replace strut assembly.

Strut mounting insulator

Inspect rubber bushing for damage, cracks and deformation. Replace part if necessary.

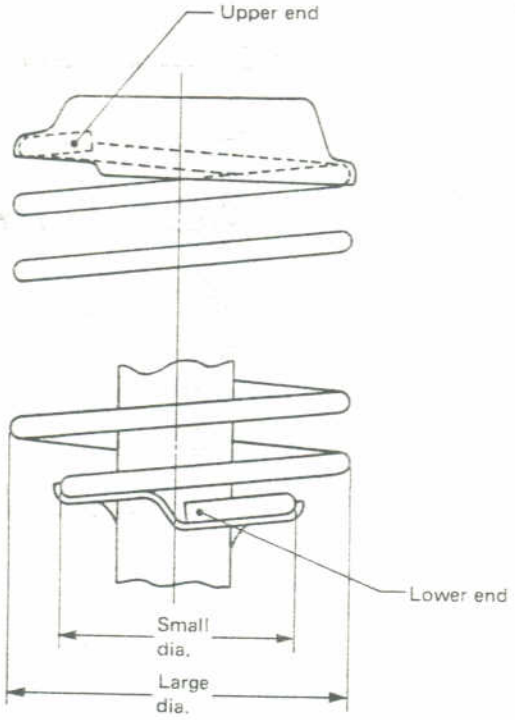
Thrust seat

Inspect thrust seat for cracks, deformation or other damage. Replace any parts if necessary.

Spring and Strut (Cont'd)

ASSEMBLY

When installing upper and lower end of coil spring on strut, it must be located and oriented as shown below.



SFA502

Transverse Link Assembly

REMOVAL

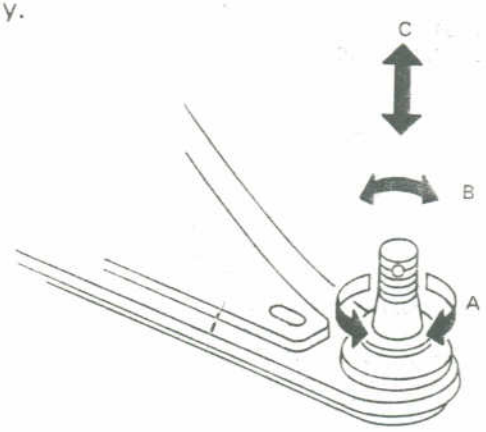
1. Remove drive shaft.

Refer to Front Axle.

2. Remove lower ball joint using Tool HT72520000 (J25730-A).

INSPECTION

- Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace transverse link assembly.



SEA561

Turning torque:

"A" 0.15 - 3.43 N·m (1.5 - 35 kg-cm, 1.3 - 30.4 in-lb)

"B" 0.15 - 3.43 N·m (1.5 - 35 kg-cm, 1.3 - 30.4 in-lb)

Axial play:

"C" 0.5 mm (0.020 in)

- Check condition of dust cover. If it is cracked excessively, replace transverse link assembly.
- Check rubber bushing for damage, cracks and deformation; replace transverse link if necessary.
- Check transverse link for damage, cracks, deformation; replace transverse link if necessary.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

COIL SPRING

Item \ Transaxle	M/T	Equipped with air conditioner (Option)	A/T
Suspension type	Independent struts with coil spring		
Wire diameter [Left/Right] mm (in)	9.3 (0.366)/9.1 (0.358)	9.3 (0.366)/9.2 (0.362)	9.5 (0.374)/9.1 (0.358)
Coil diameter mm (in)	90 (3.54)		
Free length [Left/Right] mm (in)	344.5 (13.56)/ 330 (12.99)	344.5 (13.56)/ 337.5 (13.29)	355.5 (14.00)/330 (12.99)
Spring constant N/mm (kg/mm, lb/in)	14.7 (1.5, 84)		
Identification color [Left/Right]	Orange x 1, Pink x 1/ Red x 1, Pink x 1	Orange x 1, Pink x 1/ Pink x 1, Pink x 1	Green x 1, Pink x 1/Red x 1, Pink x 1

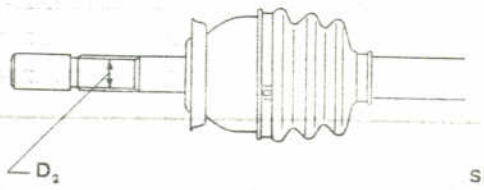
STRUT

Type	Road sensing vortex type shock absorber	
Piston diameter mm (in)	25 (0.98)	
Piston rod diameter mm (in)	16 (0.63)	
Stroke mm (in)	159 (6.26)	
Damping force [at 0.3 m (1.0 ft)/sec.]	At short stroke [2 mm (0.08 in)]	At long stroke [40 mm (1.57 in)]
Expansion N (kg, lb)	461 (47,104)	539 (55, 121)
Compression N (kg, lb)	245 (25, 55)	294 (30, 66)

DRIVE SHAFT

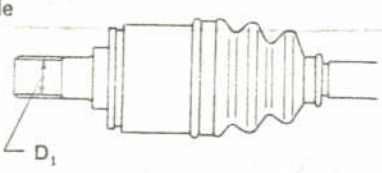
Joint type		
Transaxle side	DS69 (Double offset)	
Wheel side	BF69 (Birfield)	
Diameter mm (in)		
Transaxle side D_1	22 (0.87)	25 (0.98)
Wheel side D_2	22 (0.87)	22 (0.87)
Grease		
Name		
Transaxle side D_2	Genuine grease or equivalent	
Wheel side	Genuine grease or equivalent	
Capacity g (oz)		
Transaxle side	60 - 90 (2.12 - 3.17)	
Wheel side	60 - 90 (2.12 - 3.17)	

Wheel side



SFA703

Transaxle side



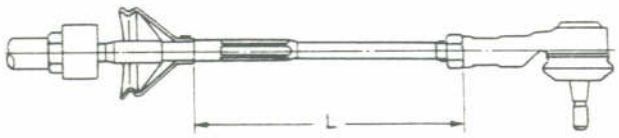
SFA563

Inspection and Adjustment

WHEEL ALIGNMENT (Unladen*1)

Camber	degree	−25′ to 1°05′
Caster	degree	1°30′ - 3°00′
Toe-in	mm (in)	2 - 4 (0.08 - 0.16)
	degree*2	12′ - 24′
Kingpin inclination	degree	12°25′ - 13°55′
Front wheel turning angle Toe-out turn Inside/Outside	degree	21°06′/20°
Full turn Inside/Outside	degree	40°30′ - 43°30′/ 32°30′ - 35°30′
Side slip	mm/m (in/ft)	Out 3 (0.036) to In 3 (0.036)
Tie-rod standard length L	mm (in)	L=107.1 (4.22)

*1: Tankful of fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools, mats in designed positions.
*2: Total toe-in



SFA192A

WHEEL BEARING

Wheel bearing axial play	mm (in)	0 (0)
Wheel bearing lock nut Tightening torque	N·m (kg-m, ft-lb)	78 - 157 (8.0 - 16.0, 58 - 116)
Wheel bearing starting torque	N·m (kg-cm, in-lb)	
With new grease seal		0.8 - 2.7 (8 - 28, 6.9 - 24.3)
With used grease seal		0.8 - 2.7 (8 - 28, 6.9 - 24.3)
At wheel hub bolt	N (kg, lb)	
With new grease seal		15.7 - 54.9 (1.6 - 5.6, 3.5 - 12.3)
With used grease seal		15.7 - 54.9 (1.6 - 5.6, 3.5 - 12.3)

LOWER BALL JOINT

Stud end play	mm (in)	0.5 (0.020)
Turning torque	N·m (kg-cm, in-lb)	0.15 - 3.43 (1.5 - 35, 1.3 - 30.4)

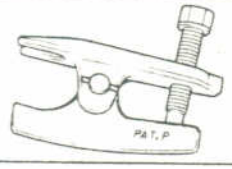
Spacer thickness

Unit: mm (in)

Mark	Thickness
B01	6.360 - 6.420 (0.2504 - 0.2528)
B02	6.421 - 6.480 (0.2528 - 0.2551)
B03	6.481 - 6.540 (0.2552 - 0.2575)
B04	6.541 - 6.600 (0.2575 - 0.2598)
B05	6.601 - 6.660 (0.2599 - 0.2622)
B06	6.661 - 6.720 (0.2622 - 0.2646)
B07	6.721 - 6.780 (0.2646 - 0.2669)
B08	6.781 - 6.840 (0.2670 - 0.2693)
B09	6.841 - 6.900 (0.2693 - 0.2717)
B10	6.901 - 6.960 (0.2717 - 0.2740)
B11	6.961 - 7.020 (0.2741 - 0.2764)
B12	7.021 - 7.080 (0.2764 - 0.2787)
B13	7.081 - 7.140 (0.2788 - 0.2811)
B14	7.141 - 7.200 (0.2811 - 0.2835)
B15	7.201 - 7.260 (0.2835 - 0.2858)
B16	7.261 - 7.320 (0.2859 - 0.2882)
B17	7.321 - 7.380 (0.2882 - 0.2906)
B18	7.381 - 7.440 (0.2906 - 0.2929)
B61	6.390 - 6.450 (0.2516 - 0.2539)
B62	6.451 - 6.510 (0.2540 - 0.2563)
B63	6.511 - 6.570 (0.2563 - 0.2587)
B64	6.571 - 6.630 (0.2587 - 0.2610)
B65	6.631 - 6.690 (0.2611 - 0.2634)
B66	6.691 - 6.750 (0.2634 - 0.2657)
B67	6.751 - 6.810 (0.2658 - 0.2681)
B68	6.811 - 6.870 (0.2681 - 0.2705)
B69	6.871 - 6.930 (0.2705 - 0.2728)
B70	6.931 - 6.990 (0.2729 - 0.2752)
B71	6.991 - 7.050 (0.2752 - 0.2776)
B72	7.051 - 7.110 (0.2776 - 0.2799)
B73	7.111 - 7.170 (0.2800 - 0.2823)
B74	7.171 - 7.230 (0.2823 - 0.2846)
B75	7.231 - 7.290 (0.2847 - 0.2870)
B76	7.291 - 7.350 (0.2870 - 0.2894)
B77	7.351 - 7.410 (0.2894 - 0.2917)

Tightening Torque

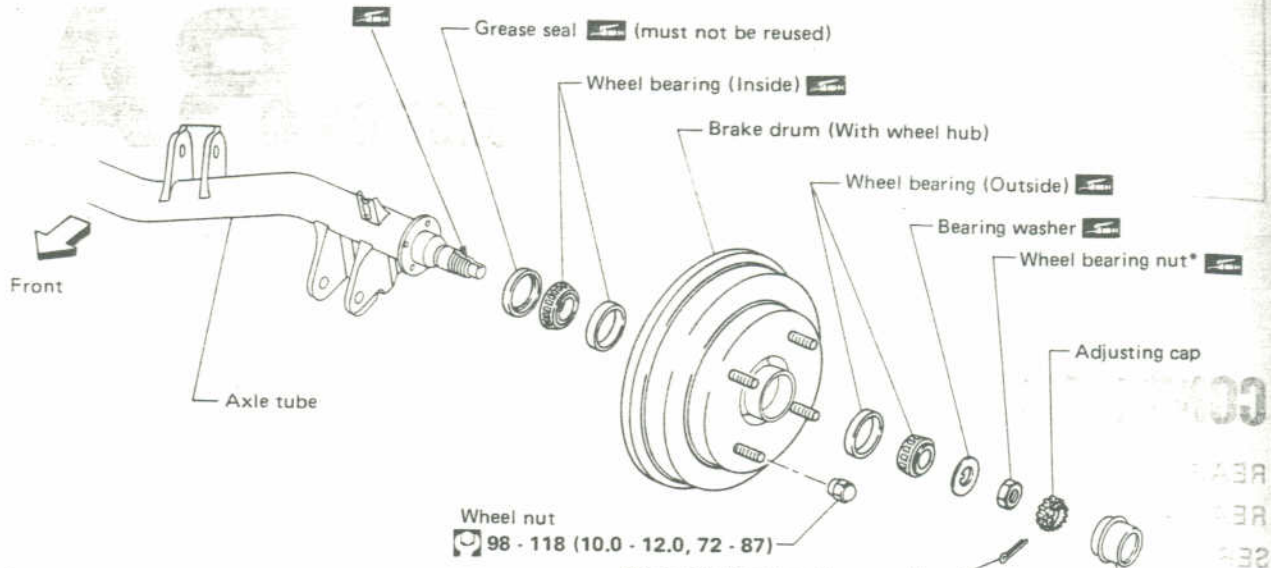
Item	N·m	kg-m	ft-lb
Wheel hub			
Wheel bearing lock nut	78 - 157	8.0 - 16.0	58 - 116
Wheel nut	98 - 118	10.0 - 12.0	72 - 87
Steering knuckle			
Knuckle to side rod	29 - 39	3.0 - 4.0	22 - 29
Knuckle to caliper	39 - 49	4.0 - 5.0	29 - 36
Knuckle to strut	98 - 118	10.0 - 12.0	72 - 87
Brake hose to caliper	17 - 20	1.7 - 2.0	12 - 14
Side rod lock nut	37 - 46	3.8 - 4.7	27 - 34
Ball joint			
Lower ball joint to knuckle	49 - 59	5.0 - 6.0	36 - 43
Strut assembly			
Piston rod self-locking nut	31 - 42	3.2 - 4.3	23 - 31
Strut to frame	25 - 30	2.6 - 3.1	19 - 22
Transverse link			
Front side	88 - 108	9.0 - 11.0	65 - 80
Rear side	36 - 47	3.7 - 4.8	27 - 35

Tool number (Kent-Moore No.)	Tool name	
HT72520000 (J25730-A)	Ball joint remover	
ST35652001 (—)	Clamp	
KV38106300 (—)	Differential side oil seal protector (For M/T)	
KV38105500 (J33904)	Differential side oil seal protector (For A/T)	
HT71730000 (—)	Spring compressor	

REAR AXLE & REAR SUSPENSION

SECTION RA

CONTENTS



*Wheel bearing nut
First tightening torque 25 - 34 (2.5 - 3.5, 18 - 25)
Tightening torque when returned 0 (0, 0) [End play 0 mm (0 in)]
Retightening torque 9 - 12 (0.9 - 1.2, 6.5 - 8.7)

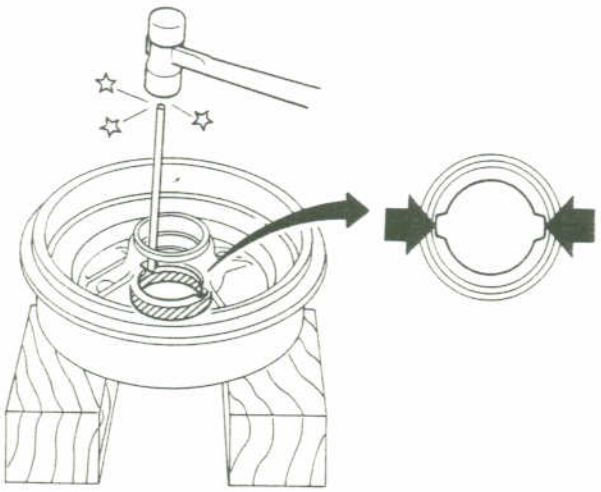
: N·m (kg-m, ft-lb)

SRA912

Adjust wheel bearing preload.
Refer to Preload Adjustment.

Removal

- Remove inside and outside wheel bearing outer races.



SRA325

Inspection

WHEEL BEARING

When race, cage or roller surfaces make a noise, or are cracked, pitted, worn, rough, or out-of-round, replace bearing assembly.

BRAKE DRUM

Check drum for cracks with magnetic exploration or dyeing test; replace if necessary. Refer to Section BR for inspection.

AXLE TUBE

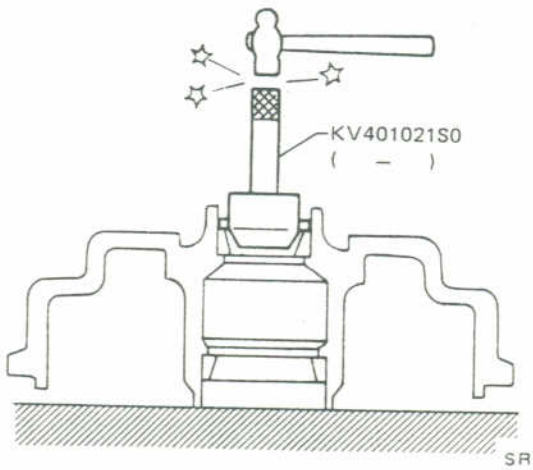
If thread is damaged, replace axle tube. Check thread and spindle surfaces for crack with magnetic exploration or dyeing test; replace axle tube. Check axle tube for damage and replace axle tube.

GREASE SEAL

If grease leakage is detected during removal, replace grease seal. Replace grease seal at every disassembly even if it appears good.

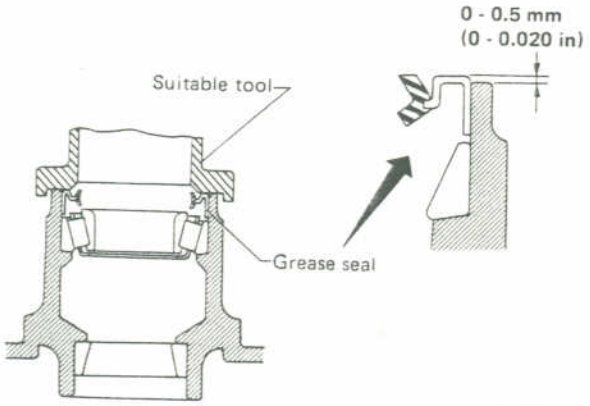
Installation

- Install bearing outer races with Tool until they seat in hub.



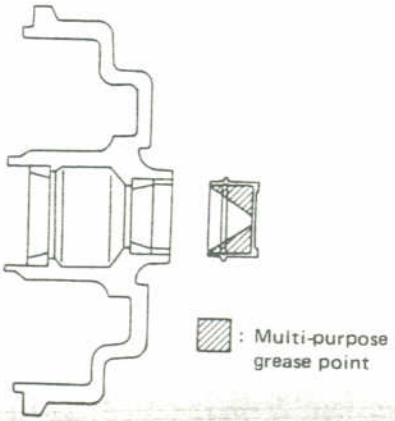
SRA326

- Place inside bearing in hub and install a new grease seal, coating sealing lips with recommended multi-purpose grease.



SRA546

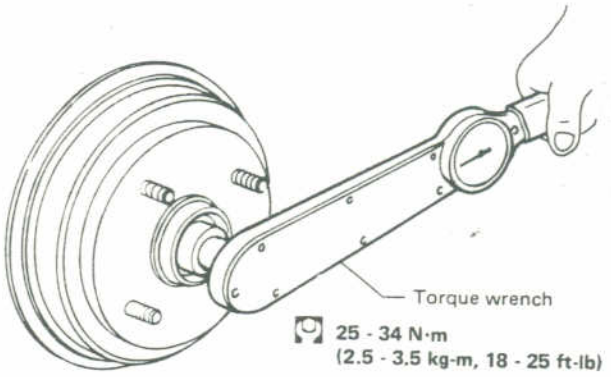
- Pack hub cap with recommended multi-purpose grease.



SRA913

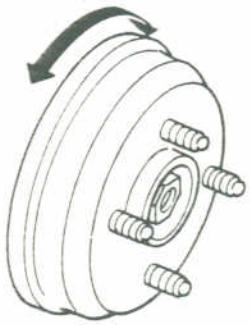
Preload Adjustment

1. Tighten wheel bearing nut.



SRA414

2. Turn wheel hub several times in both directions to seat wheel bearing correctly.



SRA415

3. Loosen wheel bearing nut so that the preload becomes 0 N·m (0 kg-cm, 0 in-lb) [Axial end play 0 mm (0 in)].
4. Tighten wheel bearing nut again.

: **9 - 12 N·m (0.9 - 1.2 kg-m, 6.5 - 8.7 ft-lb)**

5. Turn wheel hub several times in both directions.
6. Again tighten wheel bearing nut.

: **9 - 12 N·m (0.9 - 1.2 kg-m, 6.5 - 8.7 ft-lb)**

Preload Adjustment (Cont'd)

7. Install adjusting cap and align any of its slots with hole in spindle. If necessary, tighten lock nut as much as 15 degrees until the hole in spindle is aligned with any slot.

CAUTION:

Do not overtighten wheel bearing nuts, as this can cause wheel bearing seizure.

8. Turn the hub in both directions two or three times measuring if its turning torque and axial play are within the following ranges. Adjust if necessary.

Axial play: 0 mm (0 in)

Wheel bearing starting torque:

With a new grease seal

0.29 - 0.93 N·m
(3.0 - 9.5 kg-cm, 2.6 - 8.2 in-lb)
or less

When measured at the wheel hub bolt

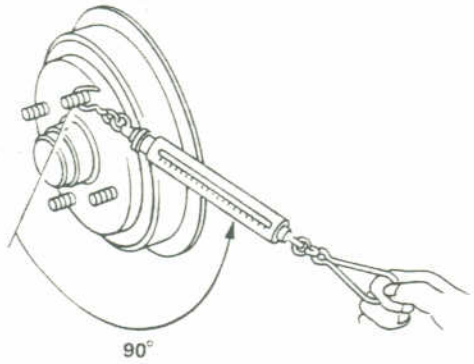
5.9 - 18.6 N
(0.6 - 1.9 kg, 1.3 - 4.2 lb)
or less

With a used grease seal

0.29 - 0.93 N·m
(3.0 - 9.5 kg-cm, 2.6 - 8.2 in-lb)
or less

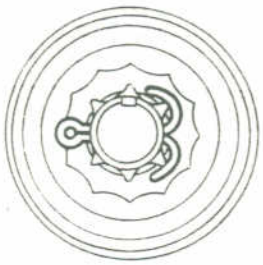
When measured at the wheel hub bolt

5.9 - 18.6 N
(0.6 - 1.9 kg, 1.3 - 4.2 lb)
or less



SRA416

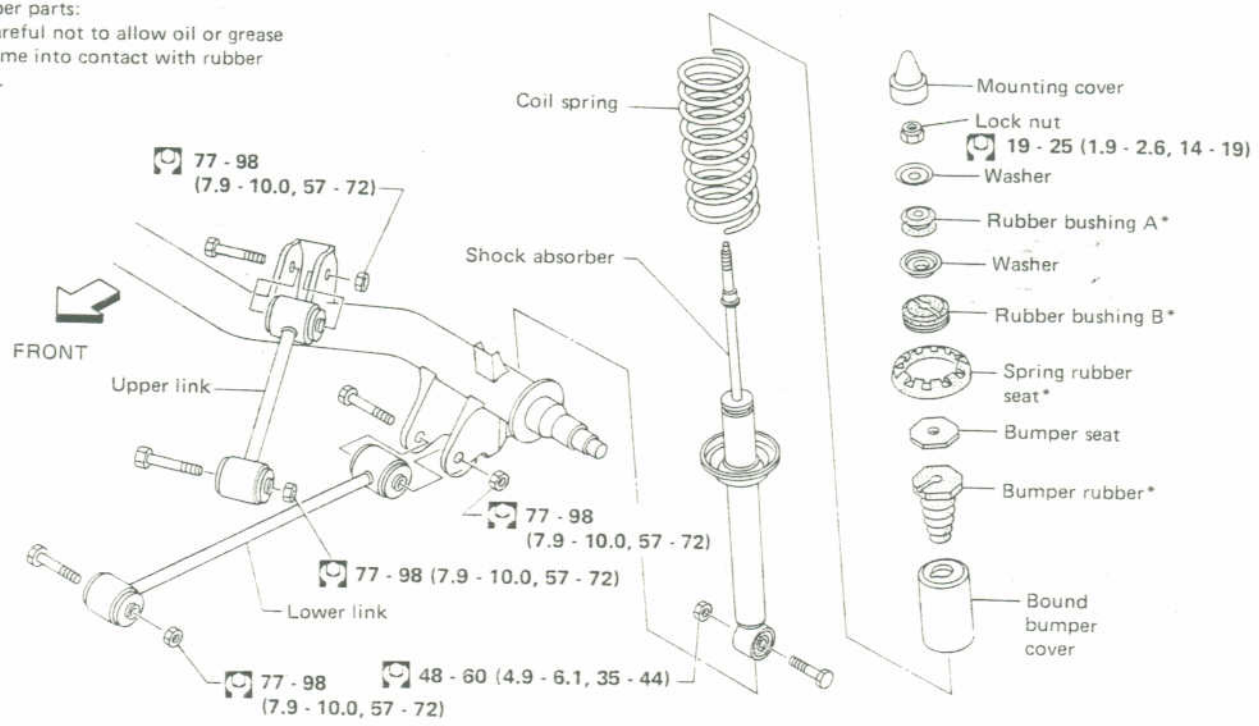
9. Correctly measure rotation starting force toward tangential direction against hub bolt.
   Above figures do not include "dragging" resistance. When measuring wheel bearing starting torque, be sure to confirm no "dragging" resistance exists.
   Any slightest wheel bearing axial play cannot be tolerated.
10. Spread cotter pin.



SRA417

Final tightening needs to be carried out at curb weight with tires on ground.

*: Rubber parts:
Be careful not to allow oil or grease to come into contact with rubber parts.

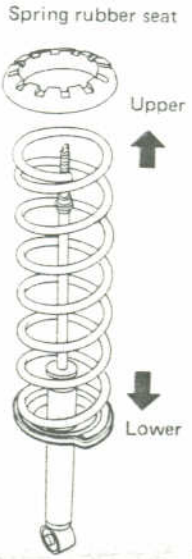


: N·m (kg-m, ft-lb)

SRA440

CAUTION:

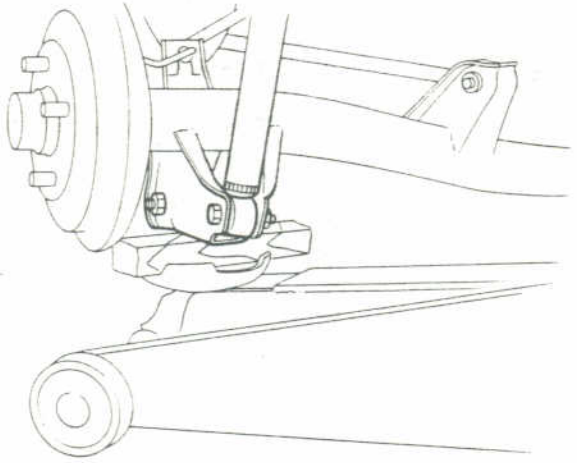
- Be careful not to damage or bend piston rod during operation.
- Correctly fit spring rubber seat on bracket of wheel house.



SRA419

Removal

- Jack up axle tube.



SRA420

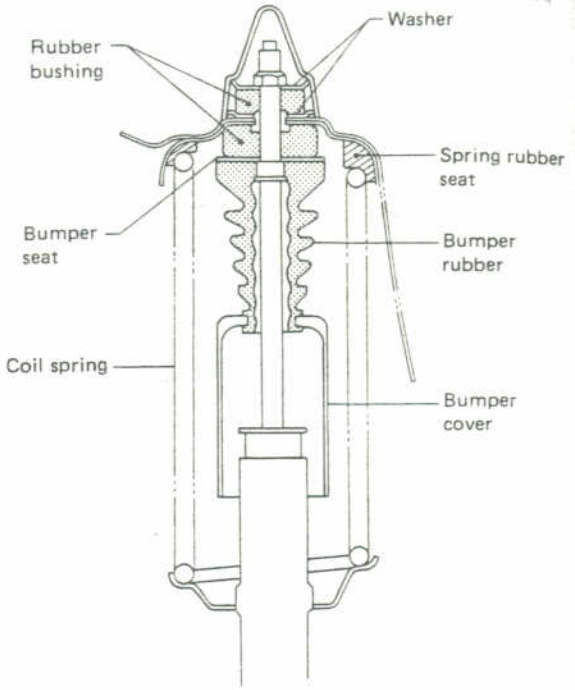
- Remove nut and bolts from shock absorber.
- Lower jack slowly. Remove shock absorber.

Inspection

- Check coil spring for deformation or cracks.
- Check all rubber parts for wear, cracks, damage or deformation. Replace if necessary.
- Test shock absorber and compare with specification in Service Data and Specifications. Replace if necessary.

Installation

When installing upper end of shock absorber, bushing and washers must be located and oriented as shown below.



SRA440

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Suspension type	4-link with coil spring	
Wire diameter mm (in)	8.8 (0.346)	
Coil diameter mm (in)	85 (3.35)	
Free length mm (in) Left/Right	322 (12.68)/322 (12.68)	
Spring constant N/mm (kg/mm, lb/in)	14.2 (1.45, 81.2)	
Identification color	White x 1	
Shock absorber type	Road sensing vortex type shock absorber	
Piston diameter mm (in)	20 (0.79)	
Piston rod diameter mm (in)	10 (0.39)	
Stroke mm (in)	194.1 (7.64)	
Damping force [at 0.3 m (1.0 ft)/sec.]	At short stroke [2 mm (0.08 in)]	At long stroke [40 mm (1.57 in)]
Expansion N (kg, lb)	314 (32, 71)	392 (40, 88)
Compression N (kg, lb)	157 (16, 35)	196 (20, 44)

INSPECTION AND ADJUSTMENT

Wheel bearing

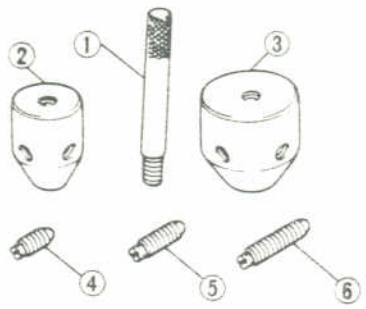
Refer to Preload Adjustment.

TIGHTENING TORQUE

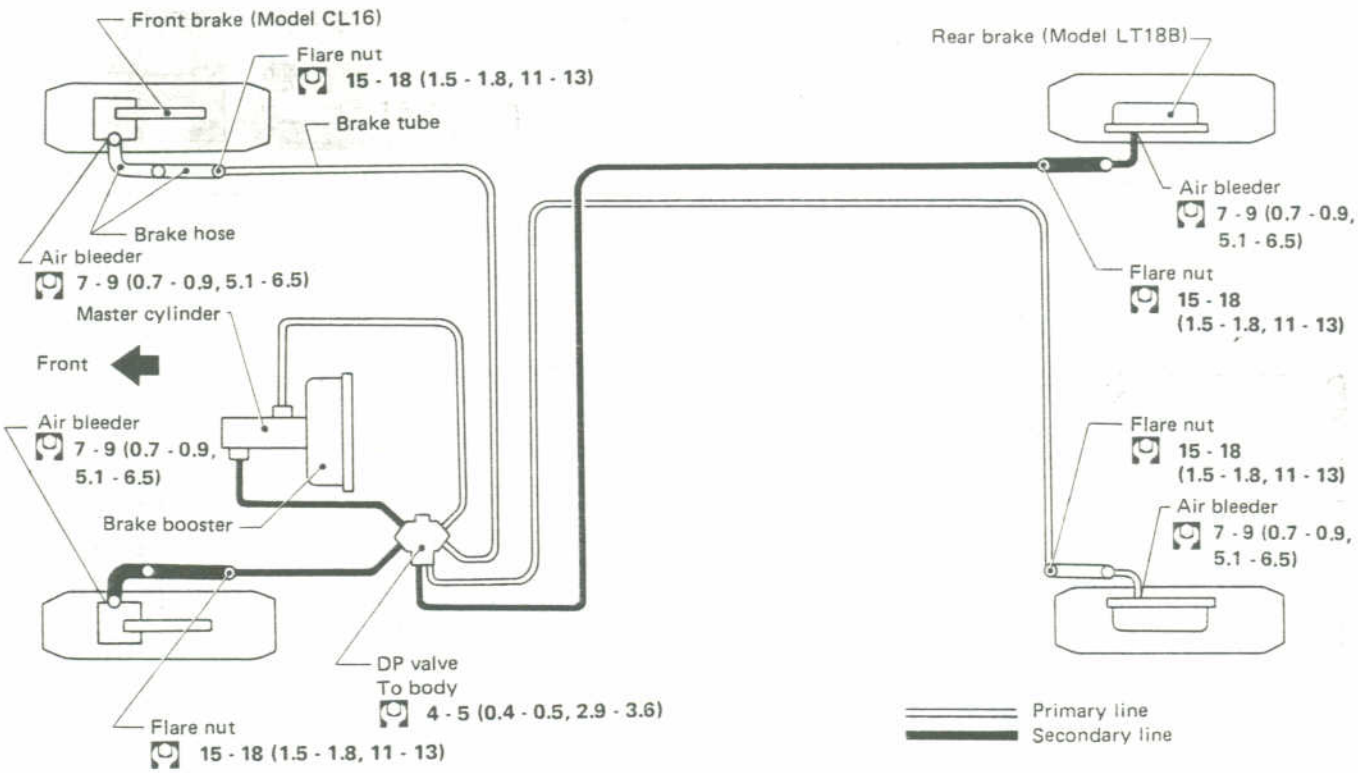
Item	N-m	kg-m	ft-lb
Wheel nut	98 - 118	10.0 - 12.0	72 - 87
Brake tube connector flare nut	15 - 18	1.5 - 1.8	11 - 13
Back plate to axle case	33 - 45	3.4 - 4.6	25 - 33
Shock absorber			
Shock absorber to body	19 - 25	1.9 - 2.6	14 - 19
Shock absorber to axle tube	48 - 60	4.9 - 6.1	35 - 44
Lower link			
Lower link to axle tube	77 - 98	7.9 - 10.0	57 - 72
Lower link to body	77 - 98	7.9 - 10.0	57 - 72
Upper link			
Upper link to axle tube	77 - 98	7.9 - 10.0	57 - 72
Upper link to body	77 - 98	7.9 - 10.0	57 - 72

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV401021S0 (—)	Bearing outer race drift set
① ST35325000 (—)	Drift bar
② KV40102110 (—)	Drift (A)
③ KV40102120 (—)	Drift (B)
④ KV40102130 (—)	Screw (A)
⑤ KV40102140 (—)	Screw (B)
⑥ KV40102150 (—)	Screw (C)



BLEEDING HYDRAULIC SYSTEM



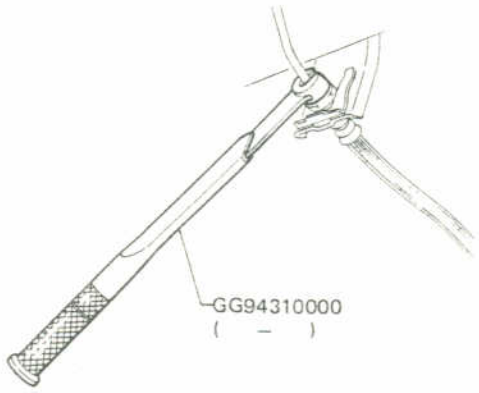
WARNING:
Clean pad and shoe dust using a dust collector after cleaning with waste cloth.

: N·m (kg-m, ft-lb)

SBR810

Precaution

- Recommended fluid is brake fluid "DOT 3".
- Carefully monitor brake fluid level at master cylinder during bleeding operation.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- When removing and installing brake tube, use Tool.



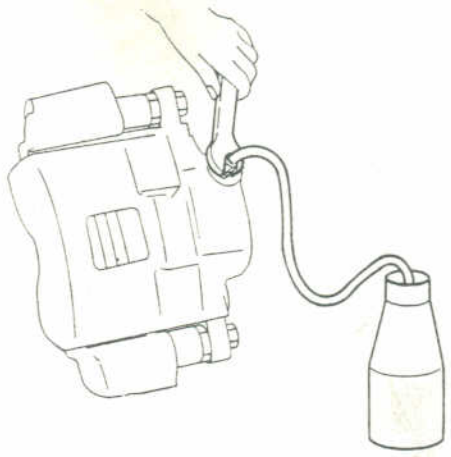
SBR500

BLEEDING HYDRAULIC SYSTEM

Bleeding Procedure

A. To bleed air out of a master cylinder equipped with fast-fill mechanism.
   1. Fill reservoir with recommended brake fluid, and make sure it is kept full at all times while bleeding air out of system.
   2. Remove primary line from master cylinder. (This is line at rear, nearest vacuum booster.)
   3. Place a container beneath master cylinder to avoid spillage of brake fluid.
   4. Depress brake pedal all the way down.
   5. Release pedal slowly.
   6. Wait five seconds.
   7. Repeat steps 4 through 6 until clear fluid comes out of primary cylinder.
   8. Replace primary line and tighten.
   9. Depress brake pedal all the way down.
   10. Loosen primary line at master cylinder to bleed remaining air out of line-junction.
   11. Tighten primary line.
   12. Release pedal slowly.
   13. Wait five seconds.
   14. Repeat steps 9 through 13 until clear fluid comes out of primary line-junction.
   15. Now, bleed secondary bore of master cylinder by removing secondary line and using same procedures outlined above. However, instead of waiting five seconds after pedal is released, **wait 20 seconds or more while bleeding secondary side. Do not pump pedal at any time while** bleeding air out of secondary system.
   16. Bleed air out of lines and wheel cylinders or calipers according to following procedure.

B. To bleed hydraulic lines and wheel cylinders/ calipers pressurized by secondary piston in master cylinder (right rear wheel cylinder and left front caliper):
   1. Top up reservoir with recommended brake fluid.
   2. Connect a transparent vinyl tube to air bleeder valve of wheel cylinder or caliper.



SBR606

   3. Depress brake pedal all the way down. Do not pump pedal.
   4. Open bleeder valve to release air.
   5. Close bleeder valve.
   6. Release brake pedal slowly.
   7. Wait 20 seconds.
   8. Repeat steps 3 through 7 above until clear brake fluid comes out of air bleeder valve.

C. To bleed hydraulic lines and wheel cylinders/ calipers pressurized by primary piston in master cylinder (left rear wheel cylinder and right front caliper):
   1. Top up reservoir with recommended brake fluid.
   2. Connect a transparent vinyl tube to air bleeder valve of wheel cylinder or caliper.
   3. Fully depress brake pedal several times.
   4. With brake pedal depressed, open bleeder valve to release air.
   5. Close bleeder valve.
   6. Repeat steps 3 through 5 above until clear brake fluid comes out of air bleeder valve.

BRAKE HYDRAULIC LINE

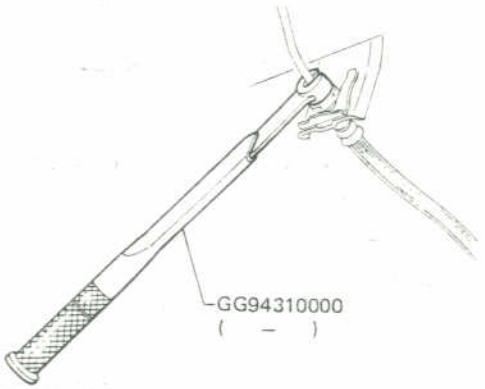
Removal and Installation

CAUTION:

a. When removing and installing brake tube, use Tool.

b. Cover openings to prevent entrance of dirt whenever disconnecting hydraulic line.

- To remove brake hose, first remove flare nut securing brake tube to hose, then withdraw lock spring. Next disconnect the other side.
  Do not twist brake hose.



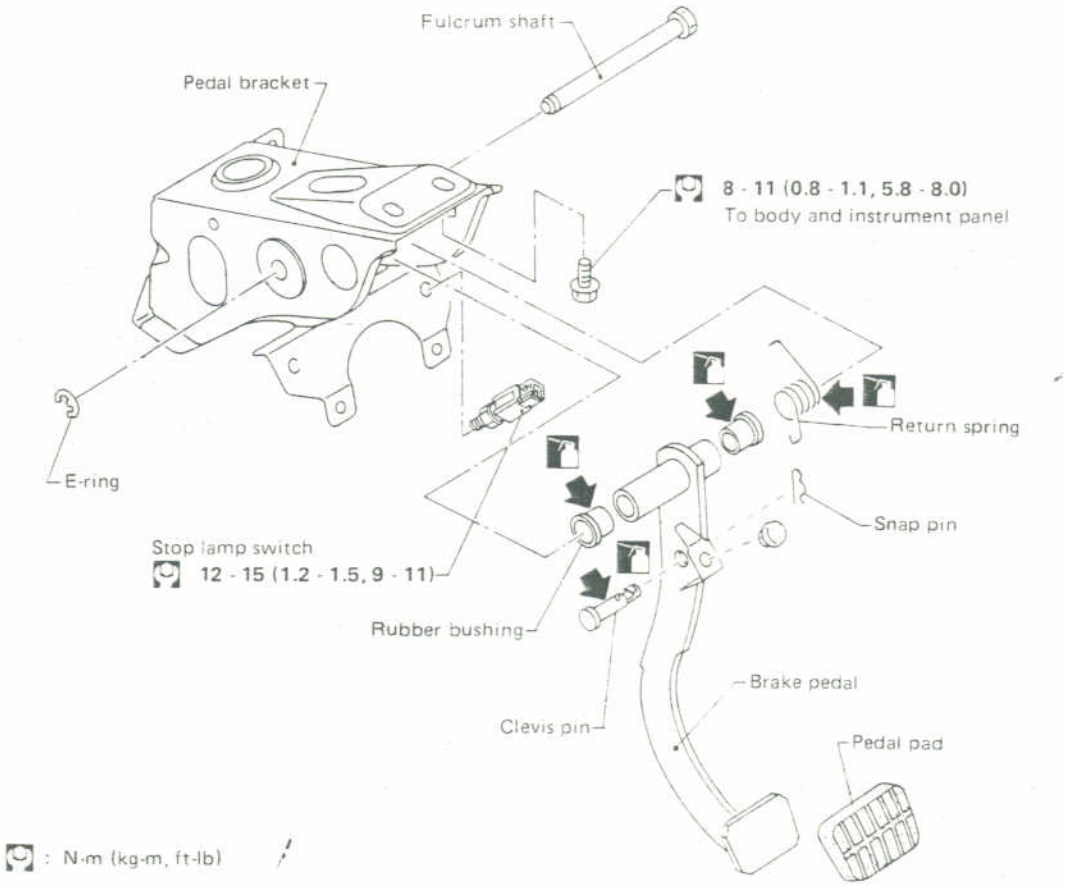
SBR500

Inspection

Check brake lines (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.

If leakage occurs around joints, re-tighten or, if necessary, replace damaged parts.

BRAKE PEDAL



SBR267A

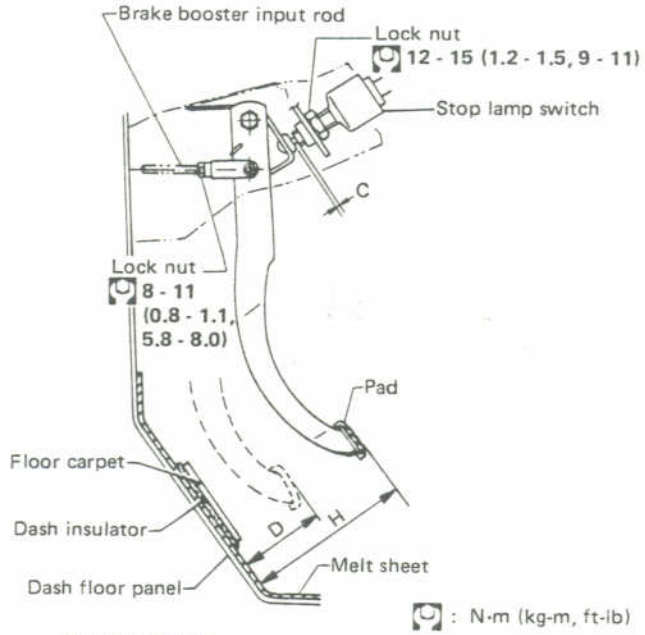
Inspection

Check brake pedal for the following items. Replace if necessary.

1. Check brake pedal for bend.
2. Check return springs for fatigue.
3. Check clevis pin for deformation and crack at welded part.

Adjustment

Check brake pedal free height from melt sheet.
Adjust if necessary.



: N·m (kg-m, ft-lb)

H : Free height
D : Depressed height
Under force of 490 N (50 kg, 110 lb) with engine running.
C : Clearance

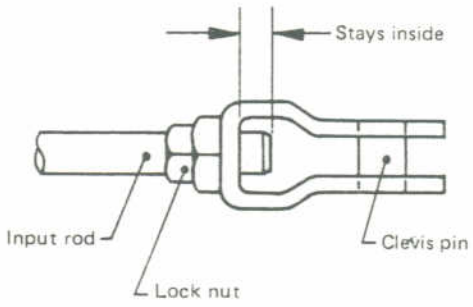
Unit: mm (in)

	H	D	C
Manual transaxle	190 - 200 (7.48 - 7.87)	95 (3.74)	0.3 - 1 (0.012 - 0.039)
Automatic transaxle	194 - 204 (7.64 - 8.03)	95 (3.74)	0.3 - 1 (0.012 - 0.039)

SBR809

(1) Adjust pedal free height with brake booster input rod. Then tighten lock nut.

Be sure that the tip of input rod stays inside.



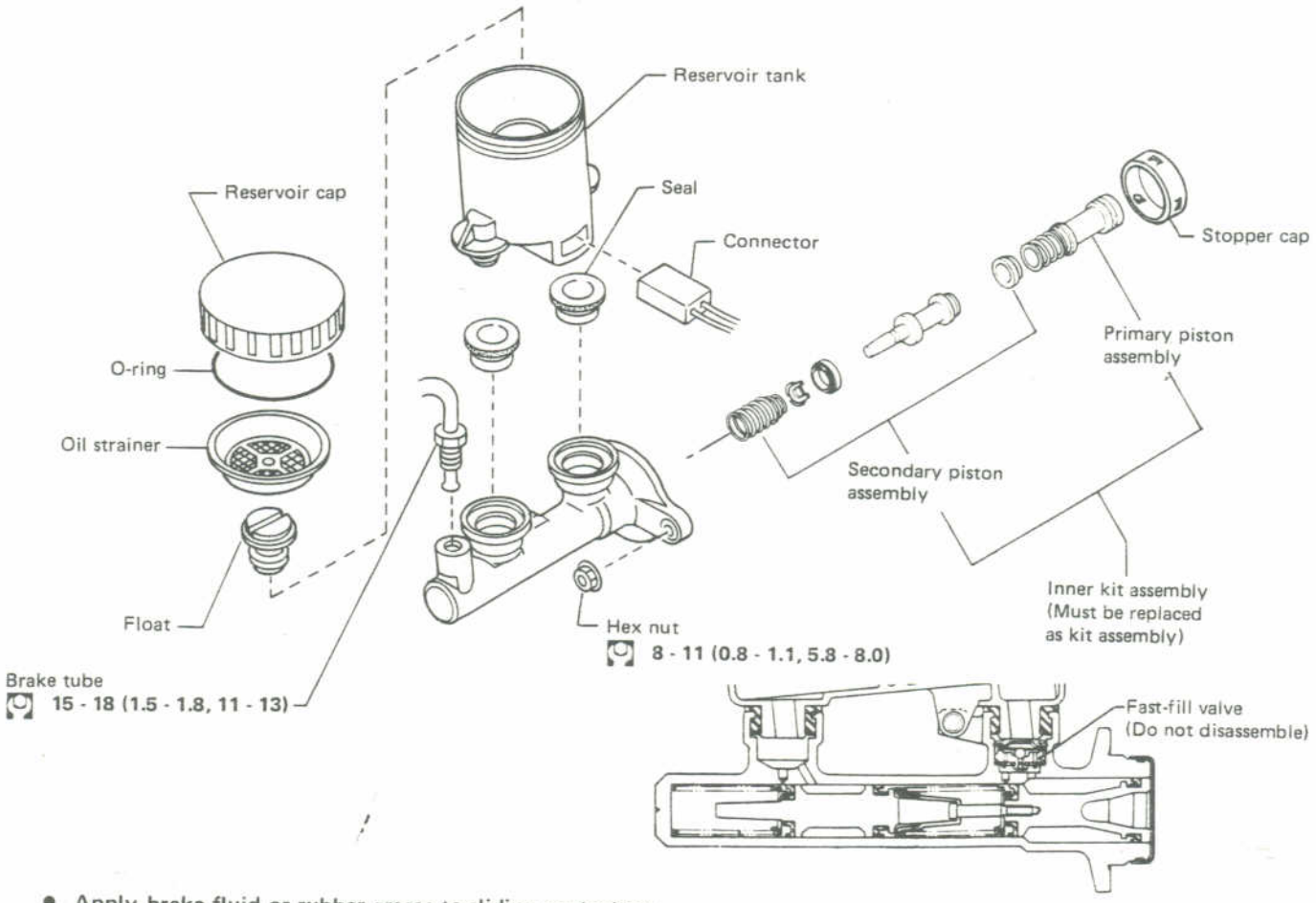
SBR930

(2) Adjust clearance "C" with stop lamp switch. Then tighten lock nut.
(3) Check pedal free play.

Make sure that stop lamp is off when pedal is released.

(4) Check brake pedal depressed height with engine running.

If depressed height is below the specified value, check brake system for leaks, accumulation of air or any damage regarding component parts (master cylinder, wheel cylinder, etc.), and make the necessary repairs.



- Apply brake fluid or rubber grease to sliding contact surface when assembling master cylinder.
- Check parts for wear or damage. Replace if any of above conditions are observed.

: N·m (kg-m, ft-lb)

SBR811

BRAKE BOOSTER

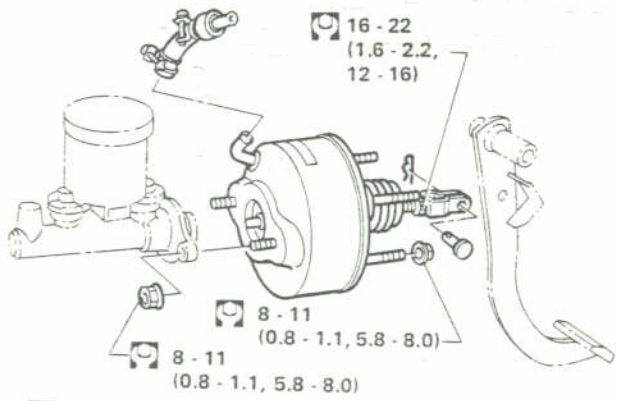
Operating Check

- Depress brake pedal several times with engine off, then check that there is not change in pedal stroke.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

Airtight Check

- Start engine, then stop it in one or two minutes. Depress brake pedal several times slowly. If pedal goes further down the first time, but gradually rises after second or third time, the booster is airtight.
- Depress brake pedal while engine is running, then stop it with pedal depressed. If there is no change in pedal stroke after holding pedal for thirty seconds, brake booster is airtight.

Removal and Installation



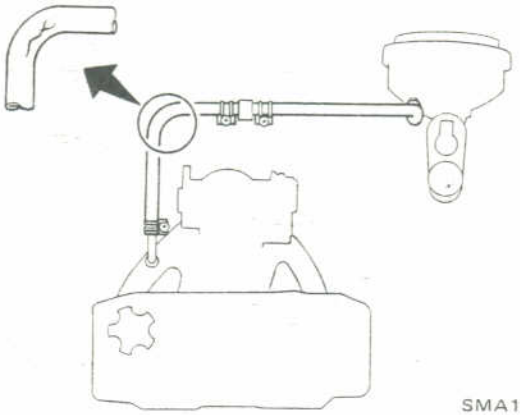
: N·m (kg-m, ft-lb)

SBR773

Inspection

HOSES AND CONNECTORS

- Check condition of vacuum hoses and connections.
- Check vacuum hoses and check valve for air tightness.

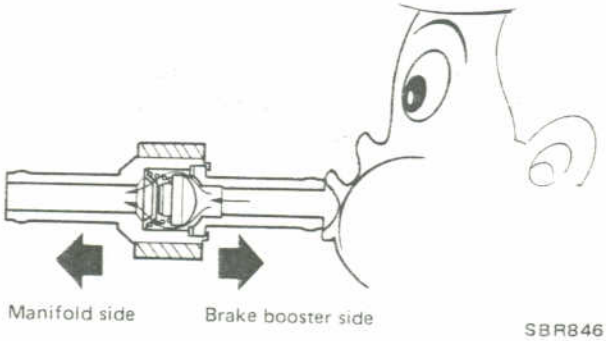


SMA157A

CHECK VALVE

- When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.

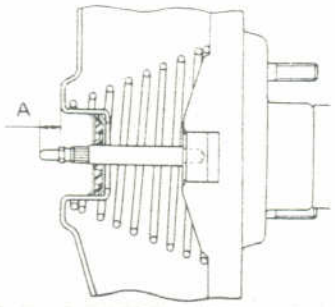
Do not apply any oil or lubricants to vacuum hose and check valve.



SBR846

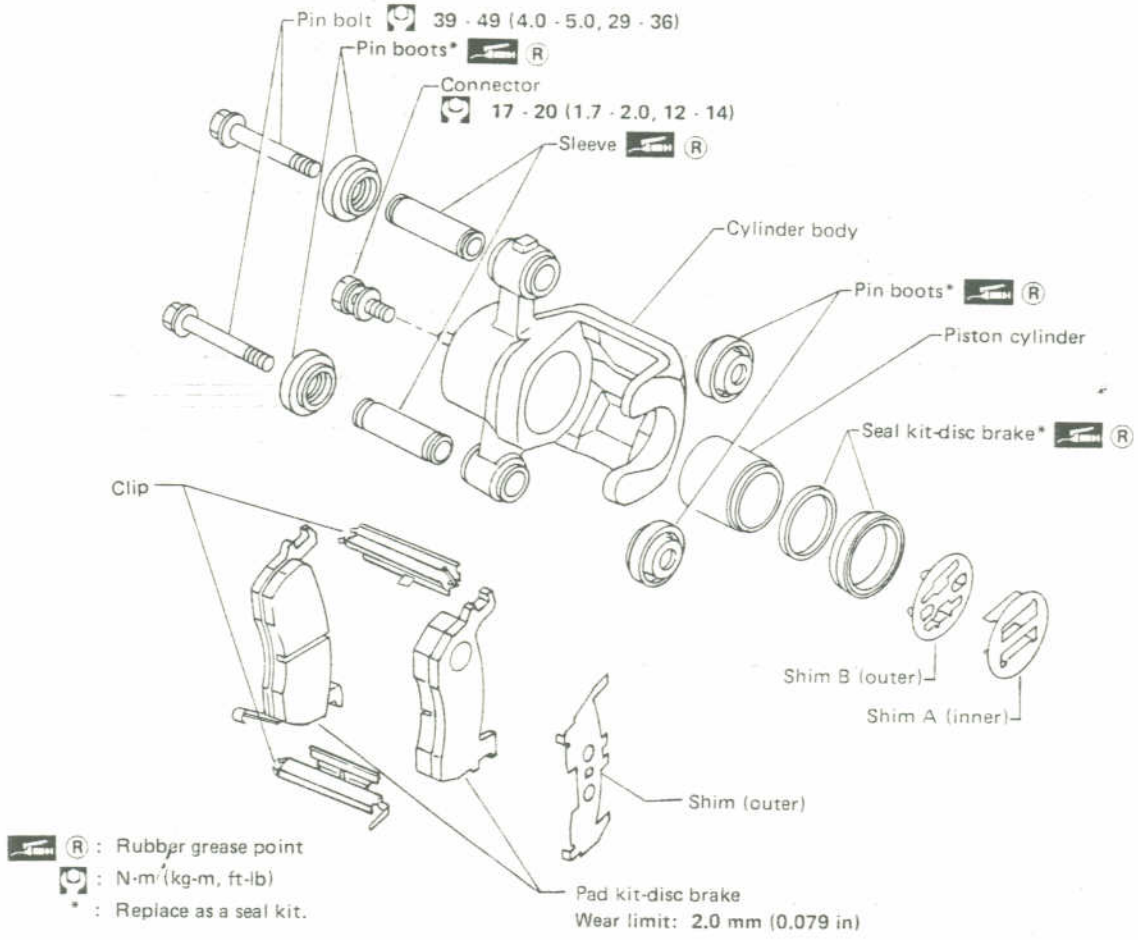
OUTPUT ROD LENGTH

Output rod length A does not require adjustment.



SBR426

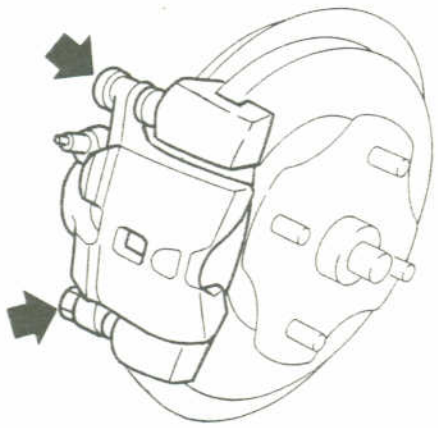
FRONT DISC BRAKE (CL16) — Caliper



SBR268A

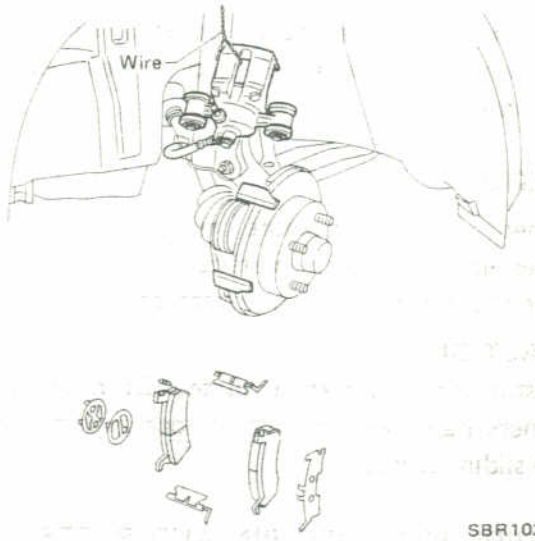
Pad Replacement

- Remove pin bolts.



SBR812

- Swing cylinder body upward. Remove clips and pads.



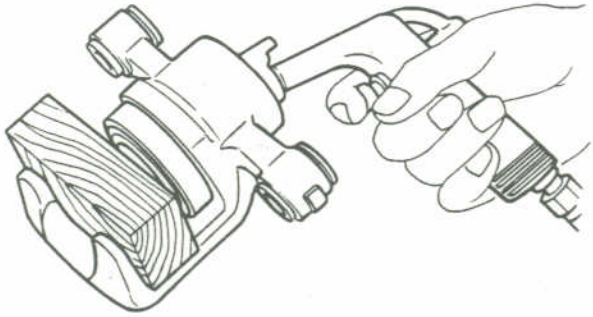
SBR102A

CAUTION:
When cylinder body is swung up, do not depress brake pedal because piston will pop out.

FRONT DISC BRAKE (CL16) — Caliper

Disassembly

Remove brake hose. Push out piston with dust seal using compressed air.



SBR772

Inspection

CAUTION:
Use brake fluid to clean. Never use mineral oil.

CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust of foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder assembly if necessary.

PISTON

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

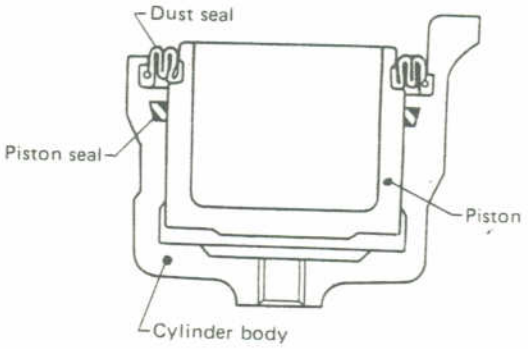
CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

GUIDE PIN, LOCK PIN AND BOOTS

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

Assembly

- With dust seal fitted to piston, insert dust seal into groove on cylinder body and install piston.
- Properly secure dust seal.
- Pay attention to direction of piston seal.



SBR574

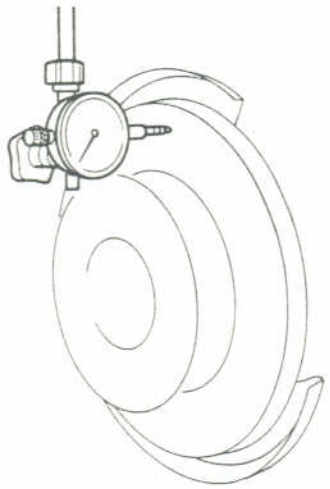
Inspection

SLIDING SURFACE

Check rotor for cracks or chips.
Repair or replace if necessary.

RUNOUT

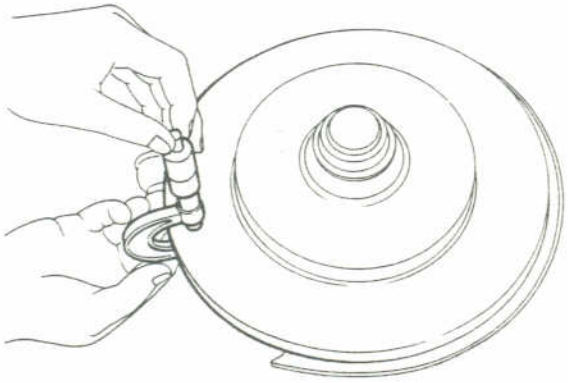
Adjust wheel bearing preload correctly.



SBR599

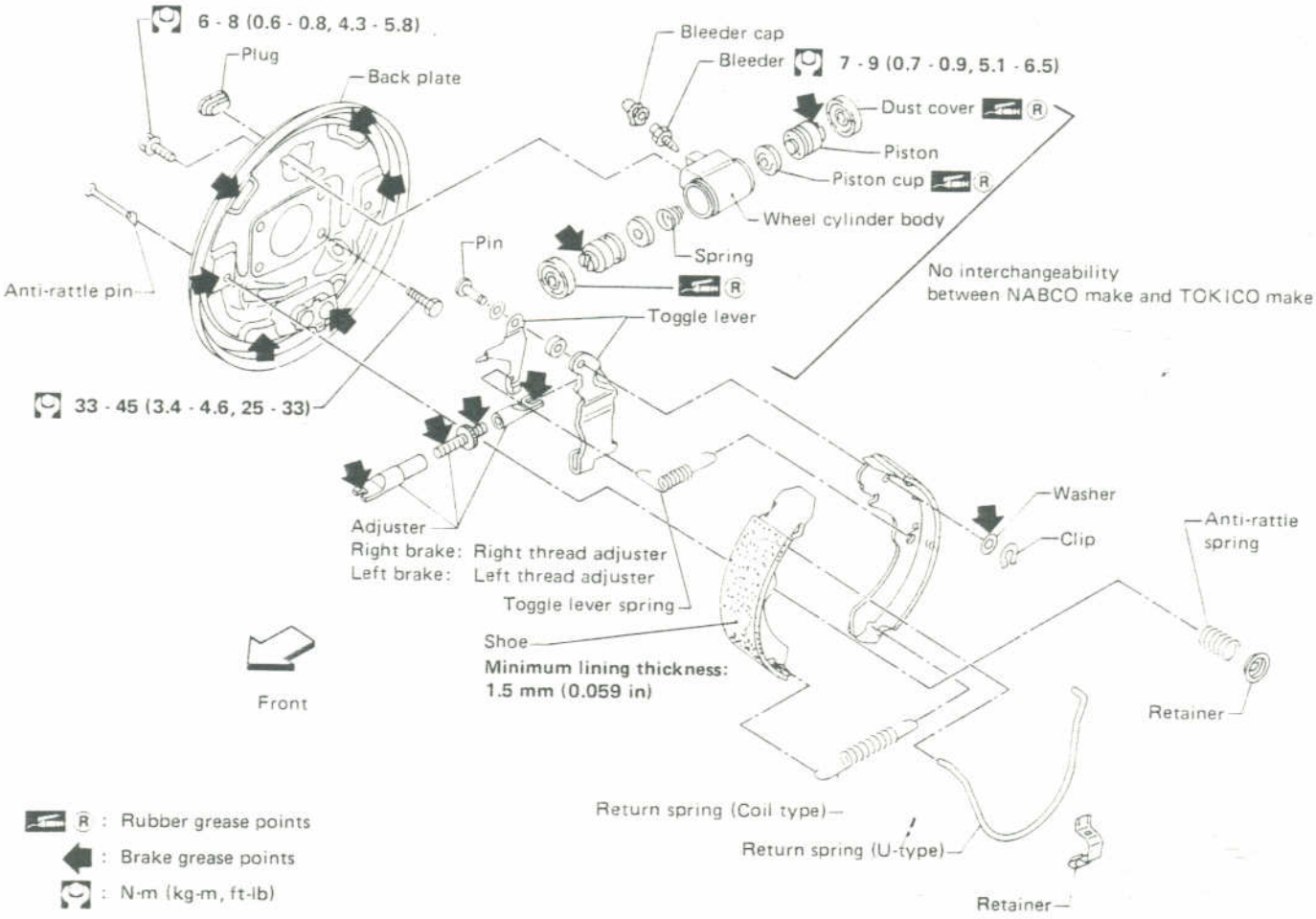
Rotor repair limit:
Maximum runout
(Total indicator reading at
center of rotor pad contact surface)
Less than 0.07 mm (0.0028 in)

THICKNESS



SBR600

Rotor repair limit:
Minimum thickness
More than 11.0 mm (0.433 in)



SBR103A

Shoe Replacement

Before installing new shoes, rotate nut until adjuster rod is at its shortest point.

After installation is completed, adjust shoe-to-drum clearance by operating parking brake several times.

Wheel Cylinder Inspection

Check parts for score, wear or damage. Replace if any of the above condtions are observed.

Removal and Installation of Adjuster

When installing, measure inner diameter of the drum and adjust so that shoe outer diameter at its center is smaller than drum inner diameter by 0.45 to 0.65 mm (0.0177 to 0.0256 in) by rotating the adjuster. Then operate parking brake lever to adjust shoe clearance.

Drum Inspection

Standard inner diameter:
180.0 mm (7.09 in)
Maximum inner diameter:
181.0 mm (7.13 in)
Out-of-roundness (ellipticity):
Less than 0.03 mm (0.0012 in)
Radial run-out (Total indicator reading):
Less than 0.05 mm (0.0020 in)

- Contact surface with which linings come into contact should be finefinished with No. 120 to 150 emery paper.
- Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial wear or stepped wear on its contact surface.
- After brake drum has been completely reconditioned or replaced, check drum and shoes for proper contact pattern.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Front brake	
Type	CL16
Cylinder diameter mm (in)	45.0 (1.772)
Pad width x thickness x length mm (in)	32.0 x 10.0 x 94.0 (1.260 x 0.394 x 3.701)
Rotor outer diameter mm (in)	214 (8.43)
Rear brake	
Type	LT18B
Cylinder diameter mm (in)	15.87 (5/8)
Lining width x thickness x length mm (in)	25.0 x 4.0 x 172.8 (0.984 x 0.157 x 6.80)
Drum inner diameter mm (in)	180 (7.09)
Master cylinder inner diameter mm (in)	
Large	23.81 (15/16)
Small	17.46 (11/16)
Brake booster type	M15
Dual proportioning valve Split point kPa (kg/cm², psi) x reducing ratio	2,942 (30, 427) x 0.4

Inspection and Adjustment

BRAKE PEDAL

Free height mm (in)	
M/T	190 - 200 (7.48 - 7.87)
A/T	194 - 204 (7.64 - 8.03)
Depressed height mm (in) [under force of 490 N (50 kg, 110 lb) with engine running]	95 (3.74)
Clearance between stop lamp switch and pedal stopper bracket mm (in)	0.3 - 1 (0.012 - 0.039)
Pedal ratio	4.2

CHECK VALVE

Maximum vacuum leakage [15 seconds after 66.7 kPa (500 mmHg, 19.69 inHg) pressure is applied] kPa (mmHg, inHg)	1.3 (10, 0.39)

BRAKE BOOSTER

Maximum vacuum leakage (15 seconds after engine is stopped) kPa (mmHg, inHg)	3.3 (25, 0.98)

FRONT DISC BRAKE

Unit: mm (in)

Pad wear limit	
Minimum thickness	2.0 (0.079)
Rotor wear limit	
Maximum runout	Less than 0.07 (0.0028)
Maximum parallelism	Less than 0.02 (0.0008)
Minimum thickness	More than 11.0 (0.433)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Inspection and Adjustment (Cont'd)

REAR BRAKE

Unit: mm (in)

Lining wear limit	
Minimum thickness	1.5 (0.059)
Drum wear limit	
Maximum inner diameter	181.0 (7.13)
Out-of-roundness	Less than 0.03 (0.0012)
Radial runout	Less than 0.05 (0.0020)
Taper [Measured at a point 25 mm (0.98 in) from inlet]	Less than 0.04 (0.0016)

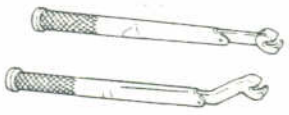
PARKING BRAKE

Type	Center lever type
Number of notches [Under force of 196 N (20 kg, 44 lb)]	7 - 9

Tightening Torque

Unit	N·m	kg-m	ft-lb
Pedal bracket to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake booster to pedal bracket	8 - 11	0.8 - 1.1	5.8 - 8.0
Master cylinder to brake booster	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake booster input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Stop lamp switch lock nut	12 - 15	1.2 - 1.5	9 - 11
DP valve mounting bolt	4 - 5	0.4 - 0.5	2.9 - 3.6
Air bleeder	7 - 9	0.7 - 0.9	5.1 - 6.5
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Cylinder body to knuckle	39 - 49	4.0 - 5.0	29 - 36
Drum brake back plate	33 - 45	3.4 - 4.6	25 - 33
Wheel cylinder to back plate	6 - 8	0.6 - 0.8	4.3 - 5.8
Parking brake control bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Parking cable to floor	3 - 4	0.3 - 0.4	2.2 - 2.9
Equalizer	8 - 11	0.8 - 1.1	5.8 - 8.0
Parking brake cable adjuster lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Cable clamp	8 - 11	0.8 - 1.1	5.8 - 8.0

SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.)	Tool name	
GG94310000 (—)	Flare nut torque wrench	

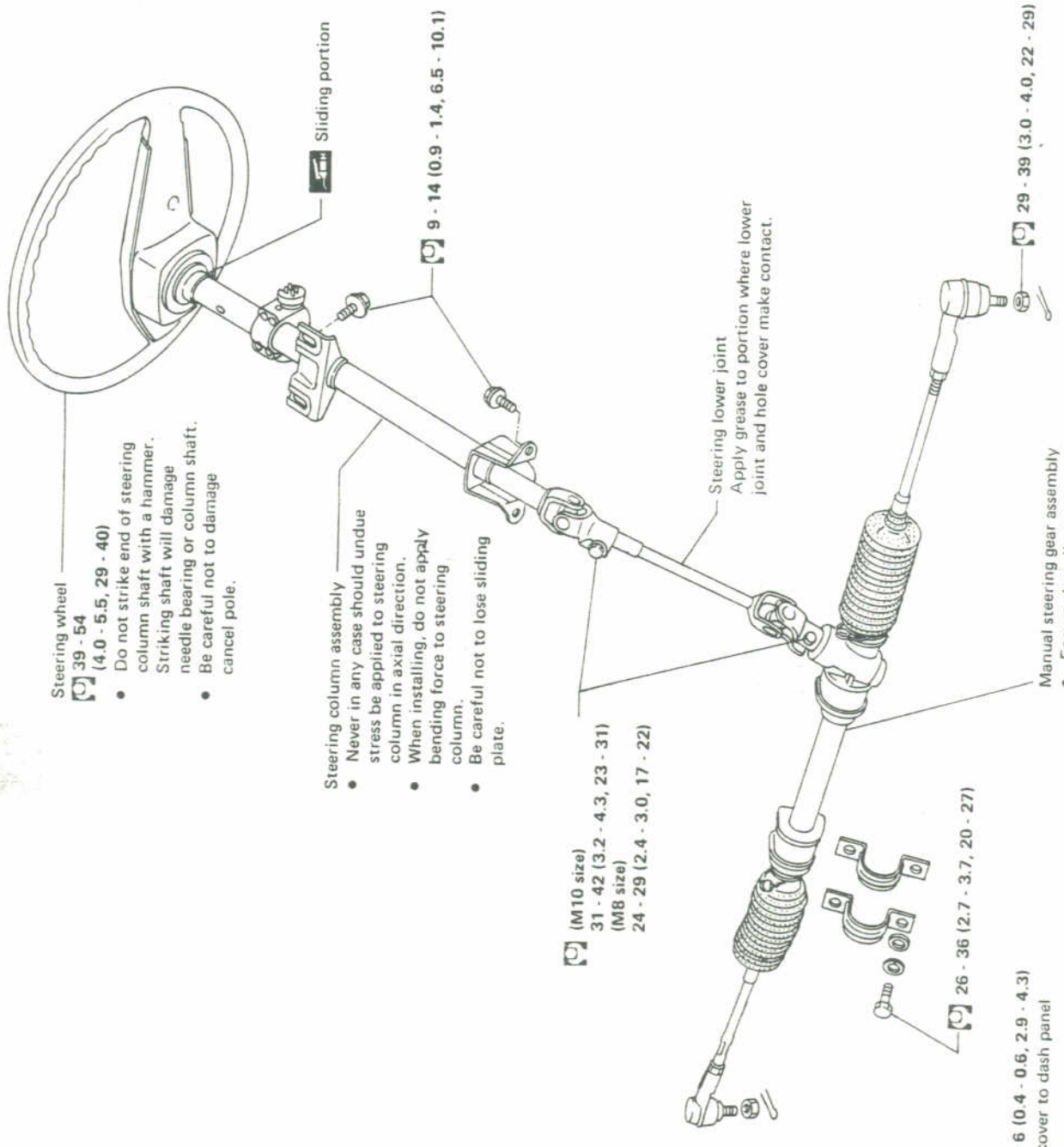
SECTION ST

CONTENTS

Refer to section MA for:

CHECKING WHEEL ALIGNMENT
- Toe-in
- Front wheel turning angle

BASIC MECHANICAL SYSTEM
- Checking drive belts


Steering wheel
39 - 54 (4.0 - 5.5, 29 - 40)
• Do not strike end of steering column shaft with a hammer. Striking shaft will damage needle bearing or column shaft.
• Be careful not to damage cancel pole.
Sliding portion
9 - 14 (0.9 - 1.4, 6.5 - 10.1)
Steering column assembly
• Never in any case should undue stress be applied to steering column in axial direction.
• When installing, do not apply bending force to steering column.
• Be careful not to lose sliding plate.
Steering lower joint
Apply grease to portion where lower joint and hole cover make contact.
29 - 39 (3.0 - 4.0, 22 - 29)
(M10 size) 31 - 42 (3.2 - 4.3, 23 - 31)
(M8 size) 24 - 29 (2.4 - 3.0, 17 - 22)
Manual steering gear assembly
• Ensure that slit position of steering lower joint is aligned with steering gear cap or spacer mark.
26 - 36 (2.7 - 3.7, 20 - 27)
4 - 6 (0.4 - 0.6, 2.9 - 4.3)
Hole cover to dash panel
: N·m (kg-m, ft-lb)

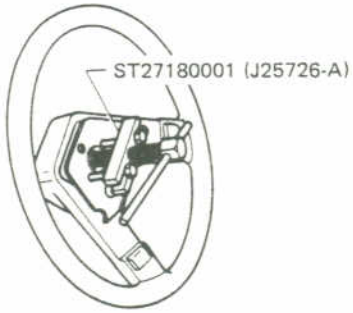
SST101A

STEERING WHEEL, LOCK AND LOWER JOINT

Removal and Installation

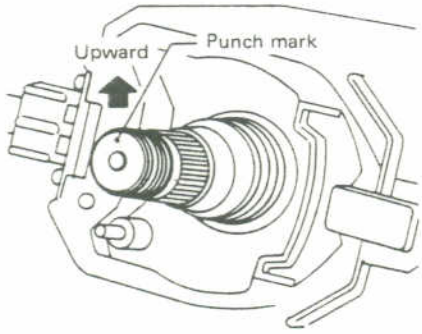
STEERING WHEEL

Remove steering wheel using Tool.



SST068

- Install steering wheel on column shaft in a straight-ahead position.

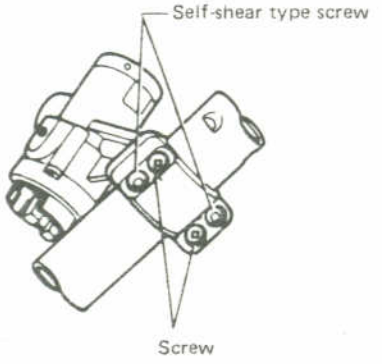


SST070

- After installing, turn steering wheel to make sure it moves smoothly and that the number of turns from the straight forward position to left and right locks are equal.

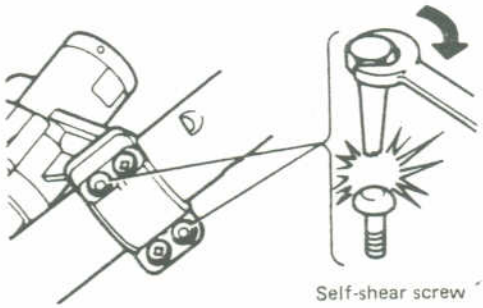
STEERING LOCK

Break self-shear type screws with a drill or other appropriate tool.



SST073

Install self-shear type screws and then cut off self-shear type screw heads.

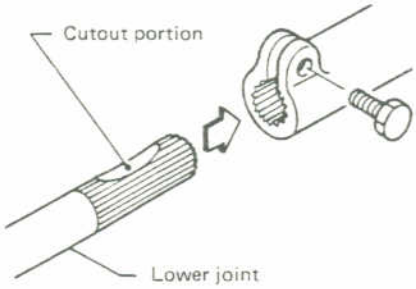


SST074

STEERING LOWER JOINT

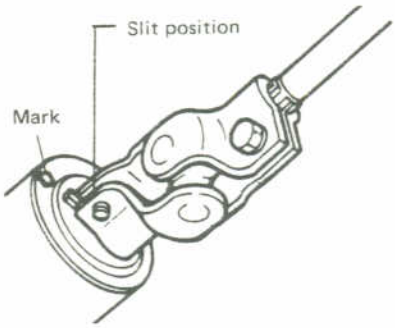
Remove hole cover if necessary.

- When fitting, be sure tightening bolt faces cutout portion perfectly.



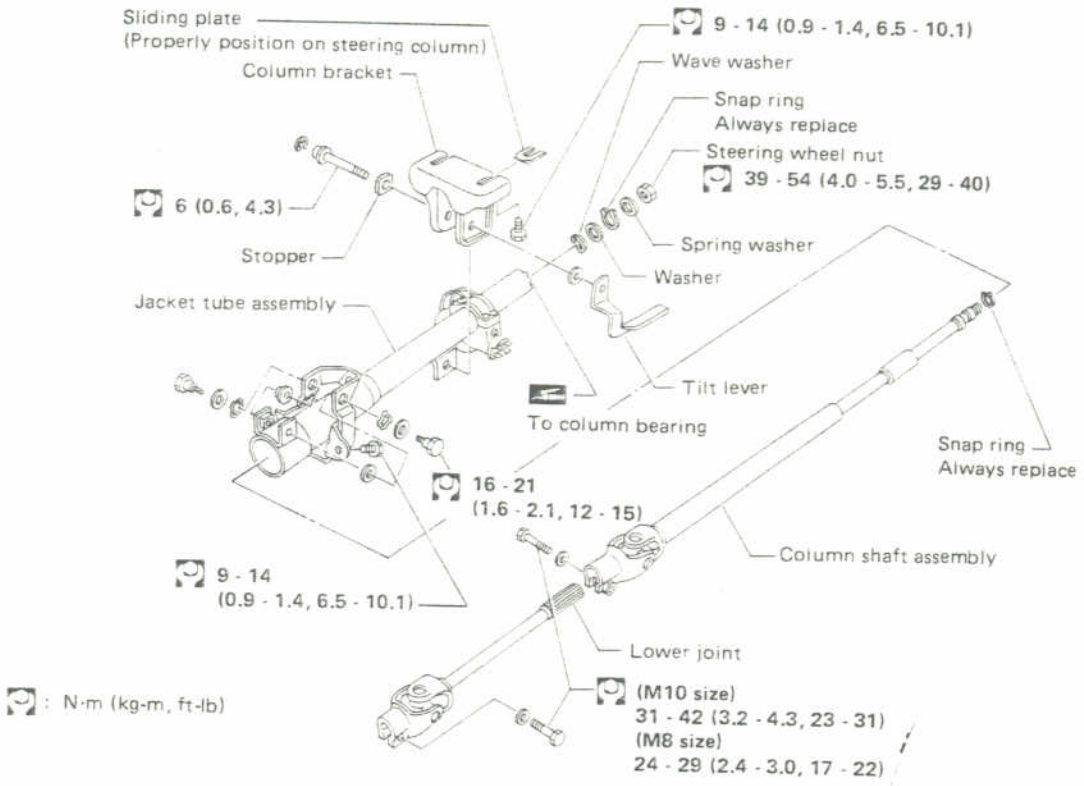
SST840

Ensure that slit position of steering lower joint is aligned with steering gear cap or spacer mark.



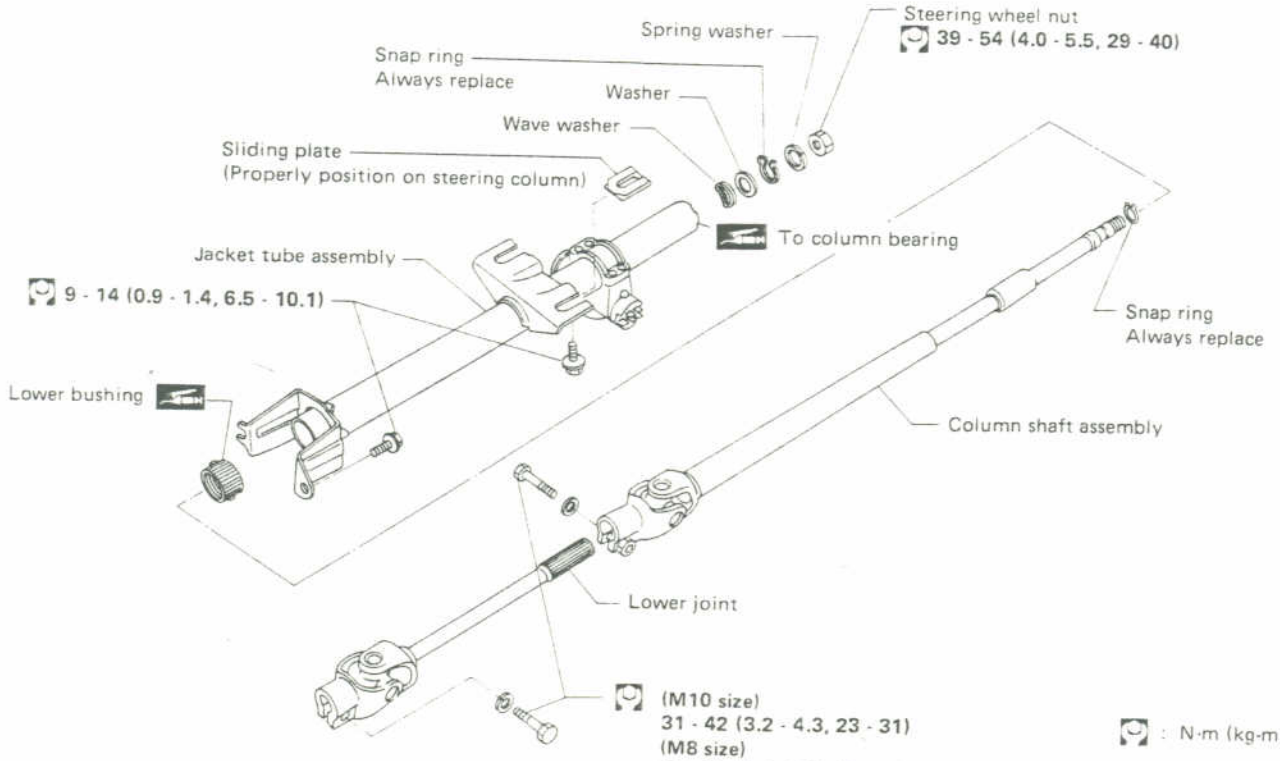
SST841

TILT TYPE



SST371A

NON-TILT TYPE



SST102A

Installation

- Loosely tighten all lower bracket and clamp retaining bolts; then retighten them securely. Make sure that undue stress is not applied to steering column.

Inspection

- When steering wheel can not be rotated smoothly, check the steering column for the following matters and replace damaged parts.

(1) Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace with a new one as a steering column assembly, if necessary.

(2) Check jacket tube for deformation or breakage. Replace if necessary.

- When the vehicle comes into light collision, check dimension "L". If it is not within specifications, replace steering column as an assembly.

Column length "L":

Non-tilt type

573.2 - 574.8 mm (22.57 - 22.63 in)

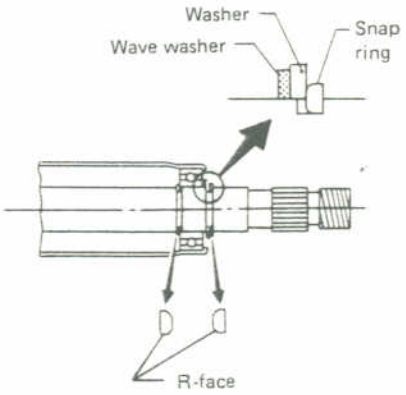
Tilt type

563.2 - 564.8 mm (22.17 - 22.24 in)

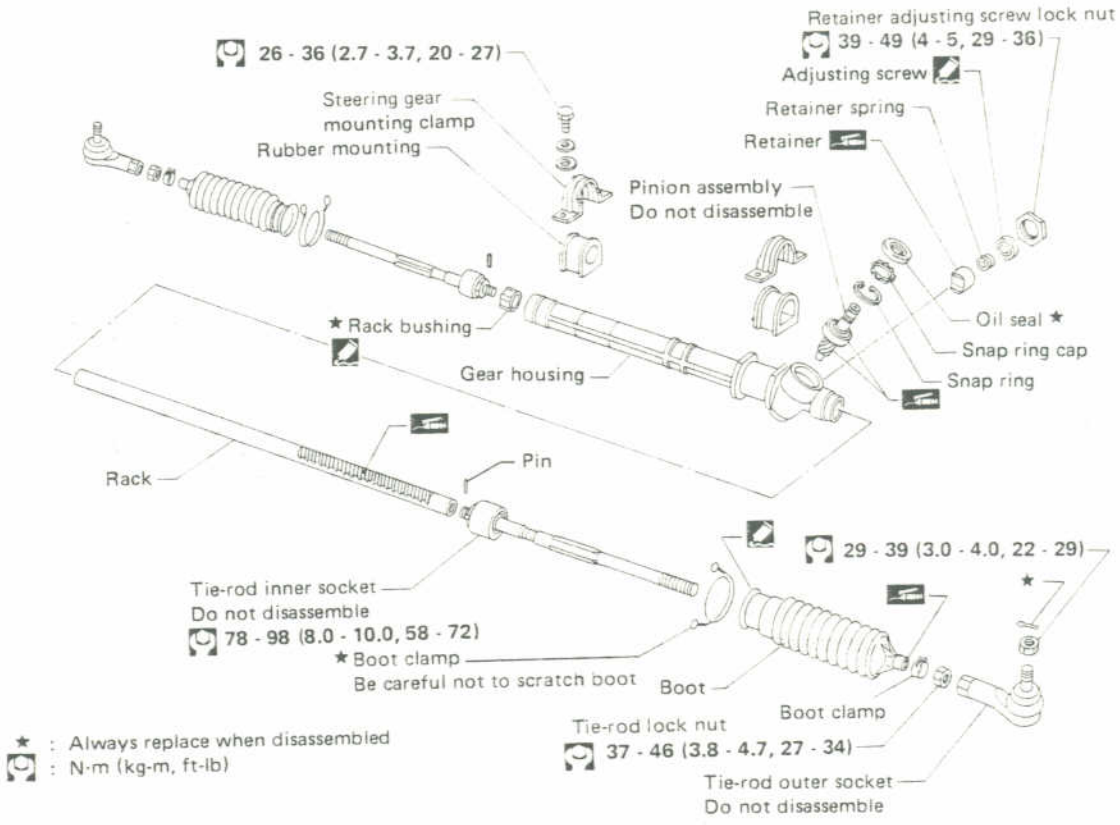
SST103A

Disassembly and Assembly

- While disassembling and assembling, unlock steering lock with a key.
- Ensure that rounded surface of snap ring faces toward bearing when snap ring is installed.



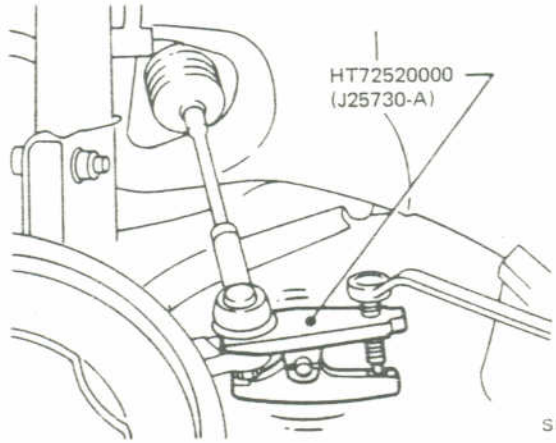
SST848



SST546A

Removal and Installation

Detach tie-rod ball studs from knuckle arms with Tool.



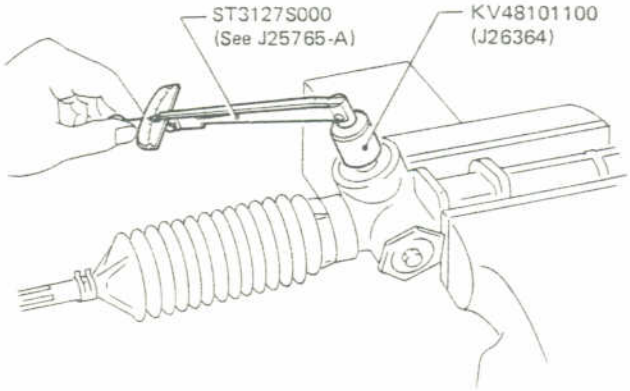
SFA372

After properly installing steering gear, check wheel alignment. Refer to section MA.

Disassembly

Before disassembling, measure pinion rotating torque as a reference.

- **Use soft jaws when holding steering gear housing. Handle it carefully as it is made of aluminum.**

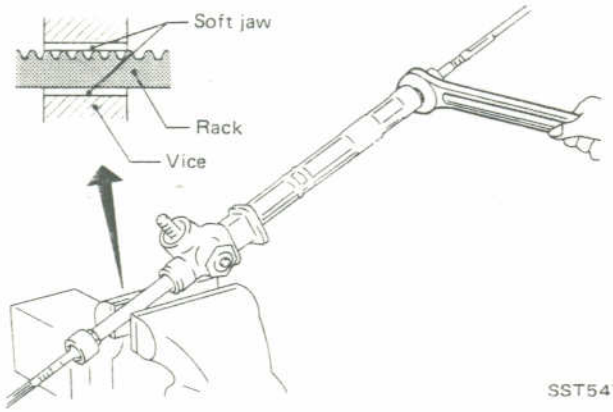


SST545A

Diassembly (Cont'd)

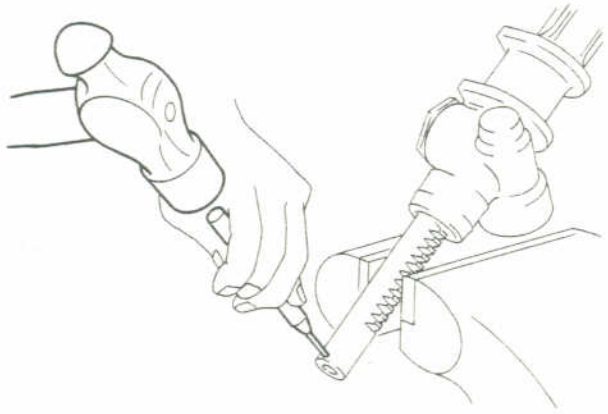
1. Remove tie-rod inner socket.

- **Be careful not to damage rack.**
- **Clamp only the rack teeth.**



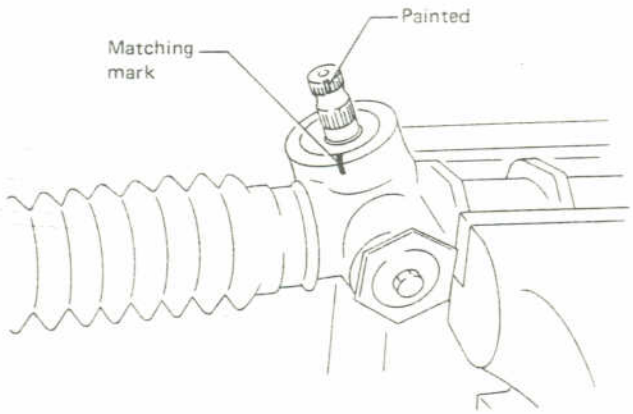
SST547A

2. Remove pin from rack.



SST548A

3. Set in neutral position and put matching mark on gear housing. Remove pinion assembly.



SST549A

Inspection

RACK

Thoroughly examine rack gear. If rack gear is damaged, cracked or worn, replace.

PINION ASSEMBLY

1. Thoroughly examine pinion gear. If pinion gear is damaged, cracked or worn, replace.
2. Inspect bearings to see that they roll freely and are free from cracked, pitted, or worn balls, rollers and races. Replace if necessary.

TIE-ROD OUTER SOCKET AND INNER SOCKET

- Check ball joint for swinging force (Measured at * point).

  Tie-rod outer ball joint:

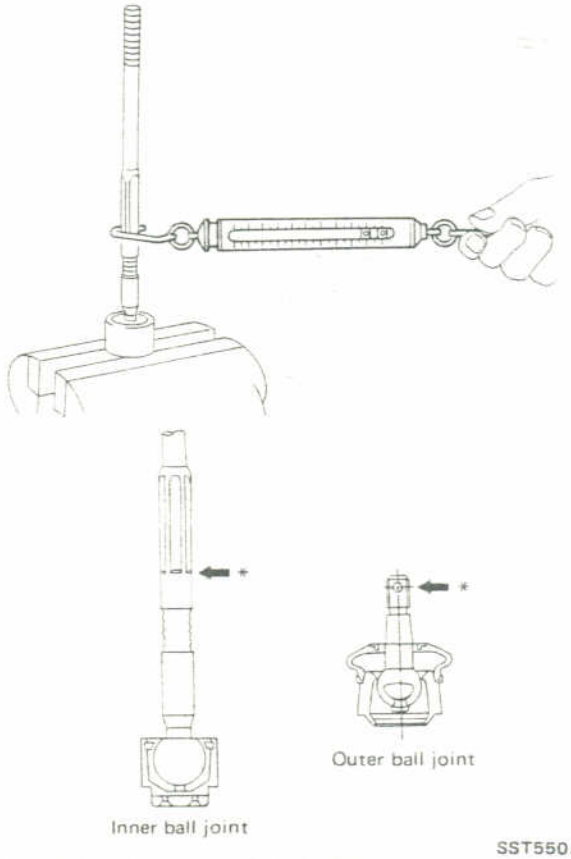
  2.26 - 68.65 N

  (0.23 - 7 kg, 0.51 - 15.44 lb)

  Tie-rod inner ball joint:

  1.18 - 60.80 N

  (0.12 - 6.2 kg, 0.26 - 13.67 lb)

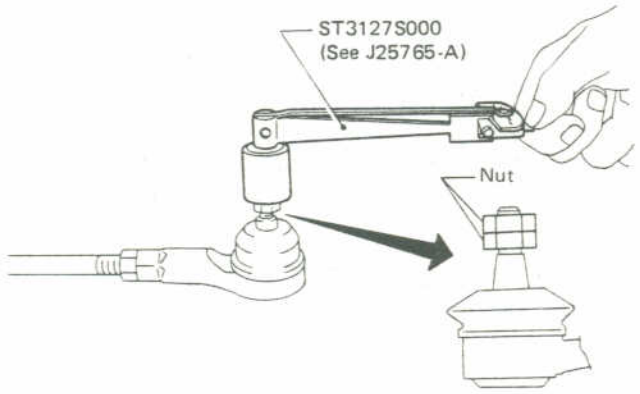


SST550A

Inspection (Cont'd)

- Check ball joint for rotating torque.

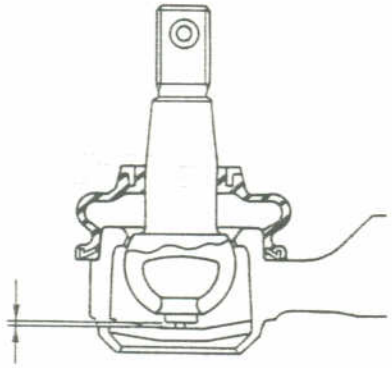
  Tie-rod outer ball joint:
  0.1 - 2.9 N·m
  (1 - 30 kg-cm, 0.9 - 26.0 in-lb)



SST551A

- Check ball joint for axial end play.

  Tie-rod outer ball joint:
  0 mm (0 in)
  Tie-rod inner ball joint:
  0 mm (0 in)



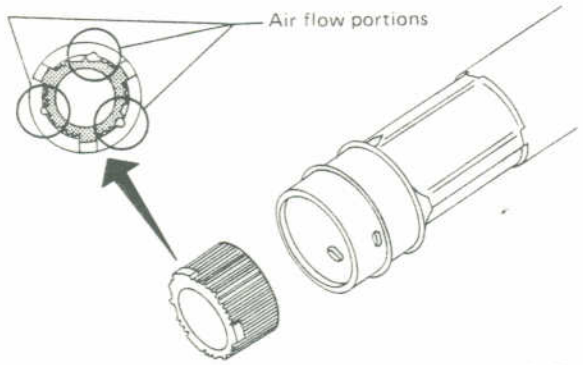
SST610A

Assembly and Adjustment

STEERING GEAR

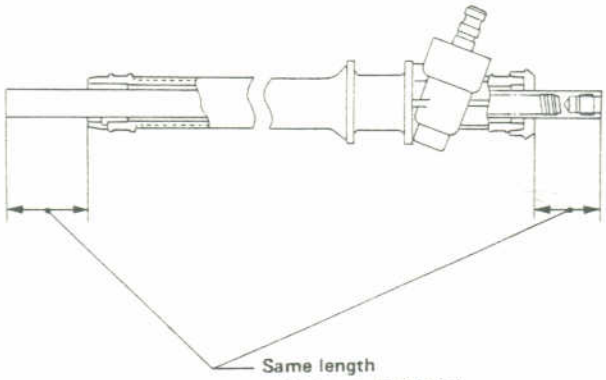
1. Install rack bushing.

Do not apply grease outside rack bushing. Grease will obstruct air flow.



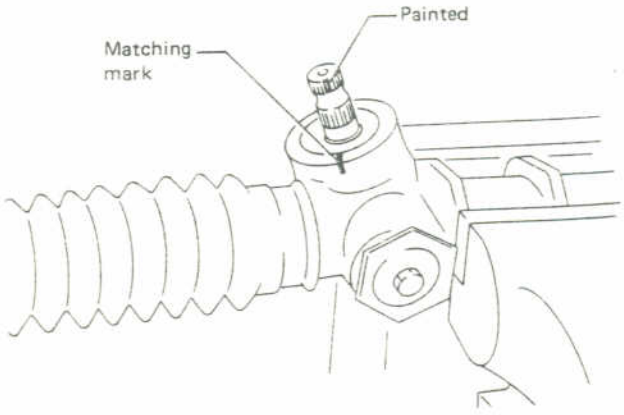
SST552A

2. Insert rack gear from gear housing side.
3. Set in neutral position.



SST553A

4. Install pinion assembly aligning with matching mark.

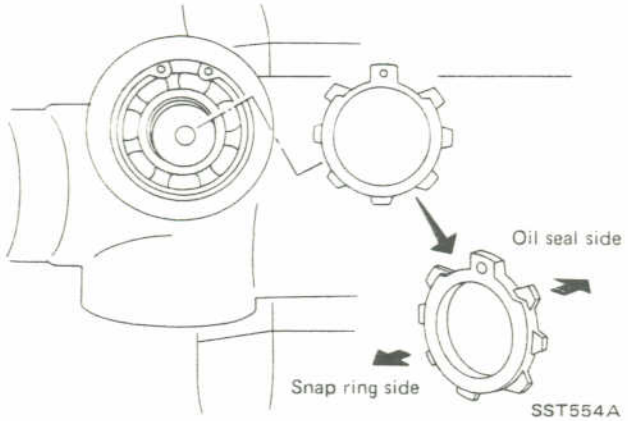


SST549A

Assembly and Adjustment (Cont'd)

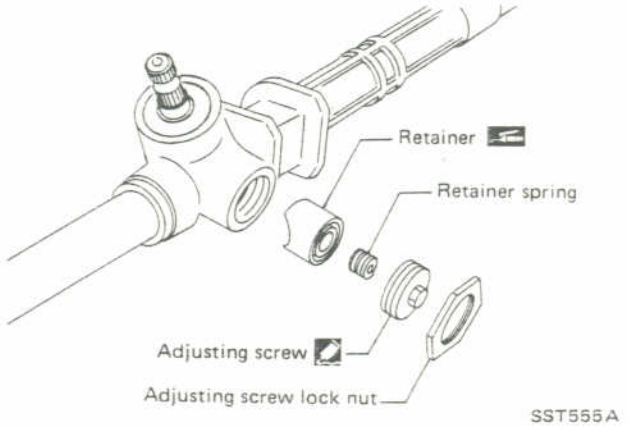
5. Install snap ring, snap ring cap and oil seal.

Pay attention to the direction of the snap ring cap.



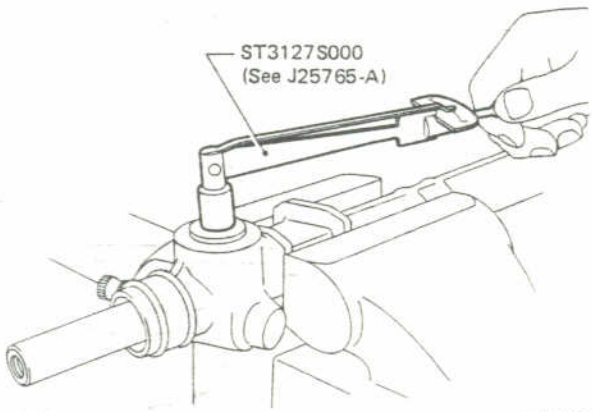
SST554A

6. Install retainer, retainer spring, adjusting screw and lock nut.



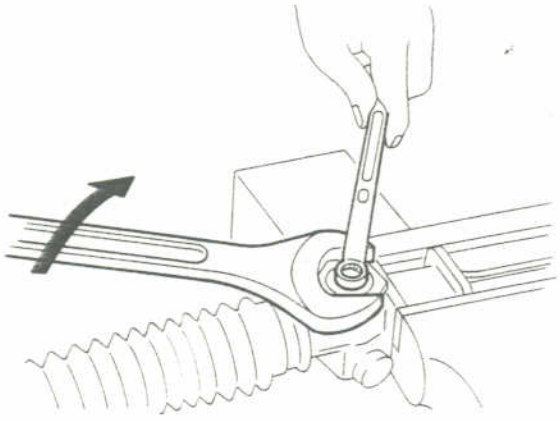
SST555A

7. Adjust pinion rotating torque as follows.
1) Set gears to Neutral position.
2) Loosen lock nut.
3) Tighten adjusting screw one or two times to a torque of 4.9 N·m (50 kg-cm, 43 in-lb).



SST556A

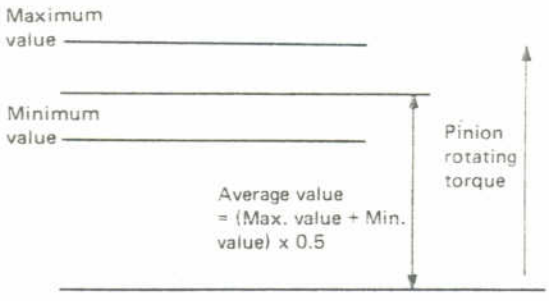
4) Rotate pinion to move rack back and forth two times, and return it to Neutral position.
5) Loosen adjusting screw and retighten it to a torque of 5.4 N·m (55 kg-cm, 48 in-lb).
6) Back the adjusting screw off 40° to 50°.
7) Prevent adjusting screw from rotating and tighten lock nut to specified torque holding adjusting screw in place.



SST557A

8) While slowly rotating pinion, make sure that its rotating torque is within the specifications.

Average value:
1.0 - 1.4 N·m
(10 - 14 kg-cm, 8.7 - 12.2 in-lb)
Maximum allowable value:
1.5 N·m (15 kg-cm, 13 in-lb)
Minimum allowable value:
0.3 N·m (3 kg-cm, 2.6 in-lb)



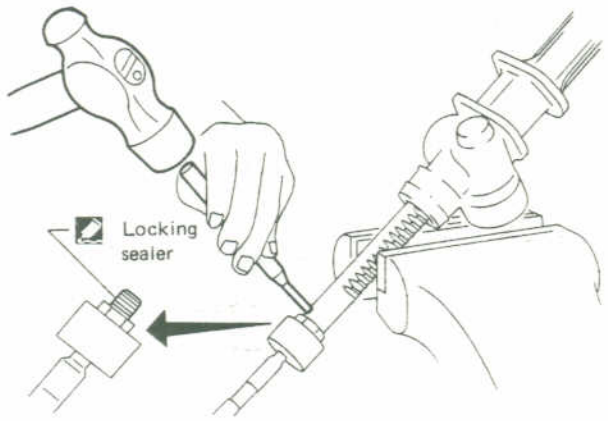
SST558A

Assembly and Adjustment (Cont'd)

9) If pinion rotating torque is out of specifications, readjust it.

TIE-ROD AND BOOT

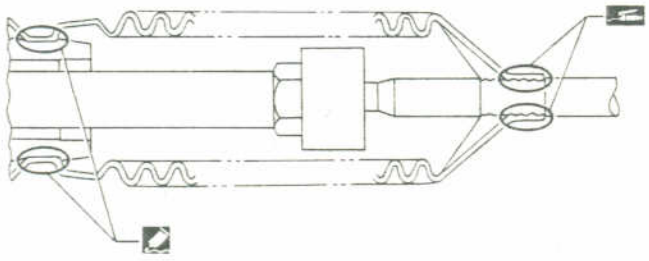
1. Apply locking sealer to threaded portion of tie-rod inner socket and fit it to rack end. Secure tie-rod inner socket to rack end with pin.



SST559A

- Do not stick pin out of rack outer diameter.

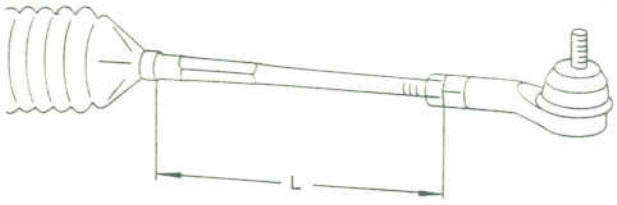
2. Install boot on tie-rod inner socket.



SST560A

3. Install lock nut and tie-rod outer socket to inner socket. Adjust tie-rod length "L" and tighten lock nut.

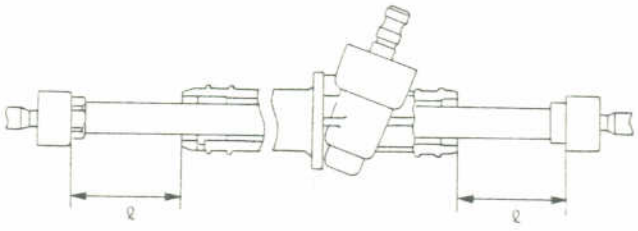
Tie-rod length "L":
107.1 mm (4.22 in)



SST561A

4. Measure rack stroke.

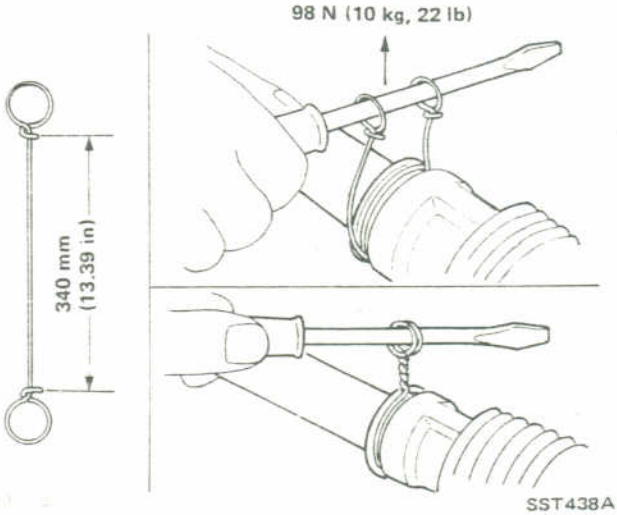
Measure length "ℓ":
66.7 mm (2.626 in)



SST562A

5. Install boot clamps.

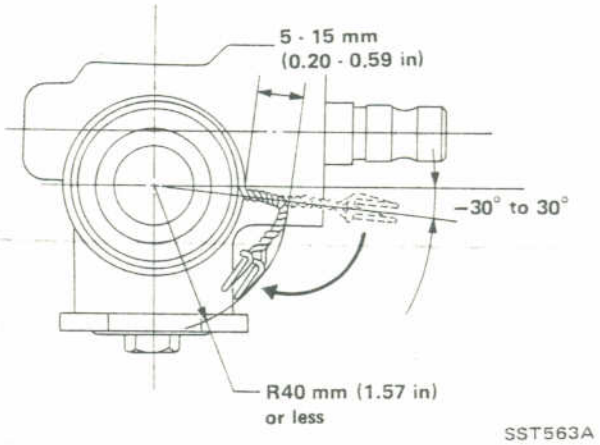
- To install, wrap boot clamp around boot groove twice. Tighten clamp by twisting rings at both ends four or four and one-half turns with screwdriver while pulling with a force of approx. 98 N (10 kg, 22 lb).



SST438A

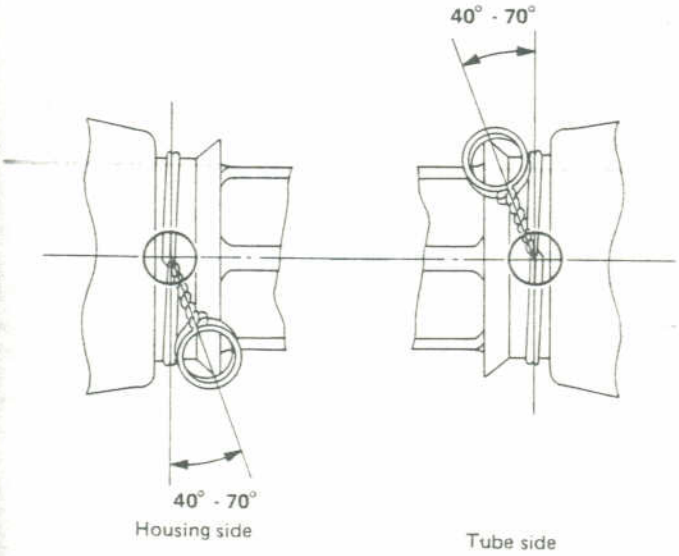
Assembly and Adjustment (Cont'd)

- Install boot clamp so that it is to the rear of the vehicle when gear housing is attached to the body. (This will avoid interference with other parts.)



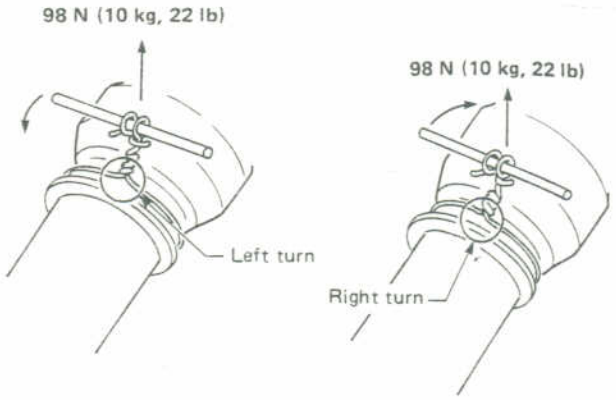
SST563A

- Cross boot clamp at the portion where clamp is twisted as shown below.



SST611A

- Twist boot clamp in the direction shown below.

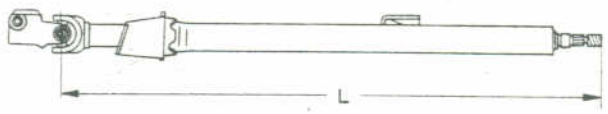


SST440A

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Steering gear type	R22T
Steering column	Collapsible
Steering column length "L" mm (in)	
Non-tilt type	573.2 - 574.8 (22.57 - 22.63)
Tilt type	563.2 - 564.8 (22.17 - 22.24)



SST103A

Turns of steering wheel (Lock to lock)	3.5
Steering overall gear ratio	18.9

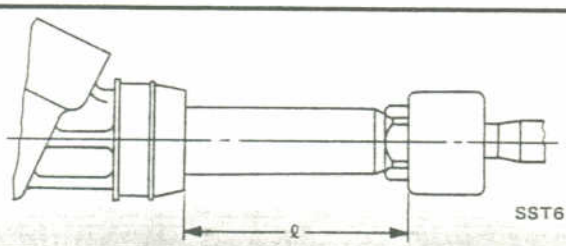
Inspection and Adjustment

GENERAL

Steering wheel axial play	mm (in)	0 (0)
Steering wheel play	mm (in)	Less than 35 (1.38)

STEERING GEAR AND LINKAGE
Model: R22T

Tie-rod outer ball joint		
Swinging force	N (kg, lb)	2.26 - 68.65 (0.23 - 7.0, 0.51 - 15.44)
Tie-rod inner ball joint		
Swinging force	N (kg, lb)	1.18 - 60.80 (0.12 - 6.2, 0.26 - 13.67)
Axial play	mm (in)	0 (0)
Measure length "ℓ" Rack stroke	mm (in)	66.7 (2.626)
Tie-rod length "L"	mm (in)	107.1 (4.22)
Pinion gear rotating torque N·m (kg-cm, in-lb)		
Average value		1.0 - 1.4 (10 - 14, 8.7 - 12.2)



SST613A

Tightening Torque

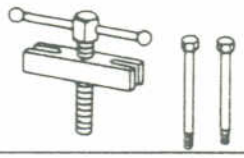
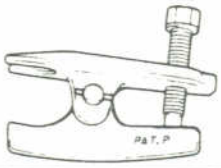
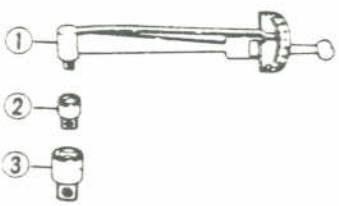
STEERING COLUMN

Unit	N·m	kg-m	ft-lb
Steering wheel nut	39 - 54	4.0 - 5.5	29 - 40
Lower joint fixing bolt			
M10 size	31 - 42	3.2 - 4.3	23 - 31
M8 size	24 - 29	2.4 - 3.0	17 - 22
Hole cover to dash panel	4 - 6	0.4 - 0.6	2.9 - 4.3
Lower bracket to pedal bracket	9 - 14	0.9 - 1.4	6.5 - 10.1
Steering column clamp to body	9 - 14	0.9 - 1.4	6.5 - 10.1

MANUAL STEERING GEAR AND LINKAGE
Model: R22T

Unit	N·m	kg-m	ft-lb
Tie-rod to knuckle	29 - 39	3.0 - 4.0	22 - 29
Tie-rod lock nut (Inner to outer)	37 - 46	3.8 - 4.7	27 - 34
Tie-rod lock nut (Inner to rack)	78 - 98	8.0 - 10.0	58 - 72
Gear mounting clamp bolt	26 - 36	2.7 - 3.7	20 - 27
Retainer adjusting screw lock nut	39 - 49	4.0 - 5.0	29 - 36

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore Tool number)	Tool name	Unit application R22T
ST27180001 (J25726-A)	Steering wheel puller 	X
HT72520000 (J25730-A)	Ball joint remover 	X
ST3127S000 (SeeJ25765-A) ① GG91030000 (J25765-A) ② HT62900000 (—) ③ HT62940000 (—)	Preload gauge Torque wrench Socket adapter (Useless) Socket adapter (Useless) 	X
KV48101100 (J26364)	Torque adapter 	X

SECTION BF

CONTENTS

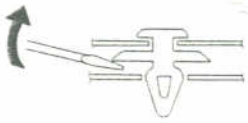
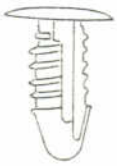
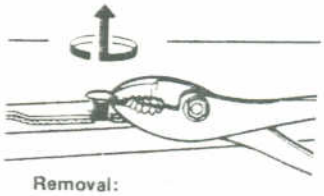
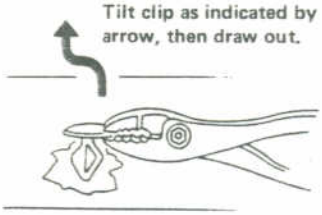
★ For seat belt, refer to MA section.

Precautions

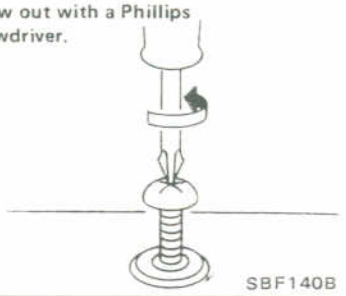
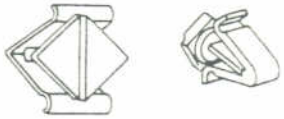
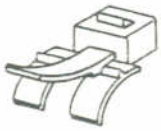
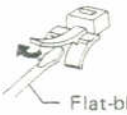
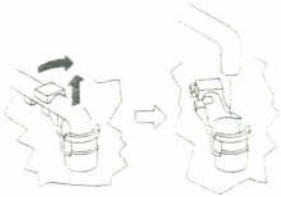
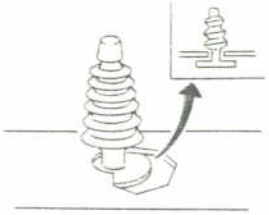
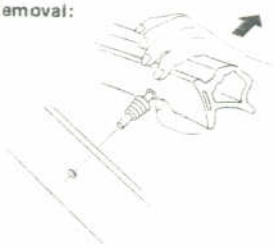
- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding, instruments, grille, etc. carefully during removing or installation. Be careful not to soil or damage them.
- Apply sealing compound where necessary while installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, members, etc.), be sure to take rust prevention measures.

Clip and Fastener

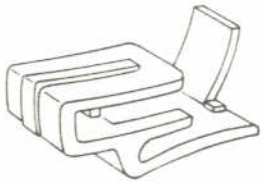
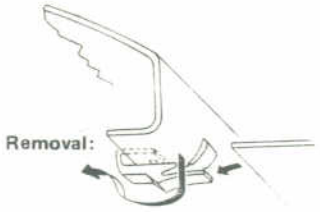
- Clips and fasteners in BF section correspond to the following numbers and symbols.
- Replace any clips and/or fasteners which are damaged during removal or installation.

No.	Symbol	Shape	Removal & Installation
C101	 SBF092B	 SBF109B	Removal: Remove by bending up with a flat-bladed screwdriver.  SBF094B
C102	 SBF113B	 SBF114B  SBF137B	 Removal: Pull up by rotating SBF115B
C105	 SBF141B	 SBF142B	Removal: Tilt clip as indicated by arrow, then draw out.  SBF143B

Clip and Fastener (Cont'd)

No.	Symbol	Shape	Removal & Installation
CS102	 SBF138B	 SBF139B	Removal: Screw out with a Phillips screwdriver.  SBF140B
CG101	 SBF144B	 SBF145B	Removal  Rotate 45° to remove.  Removal Installation  SBF085B
CG201	 SBF086B	 SBF087B	Installation  Removal  Flat-bladed screwdriver SBF088B
CR103	 SBF768B		Removal: Holder portion of clip must be spread out to remove rod.  SBF770B
CE103	 SBF103B	 SBF104B	Removal:  SBF147B

Clip and Fastener (Cont'd)

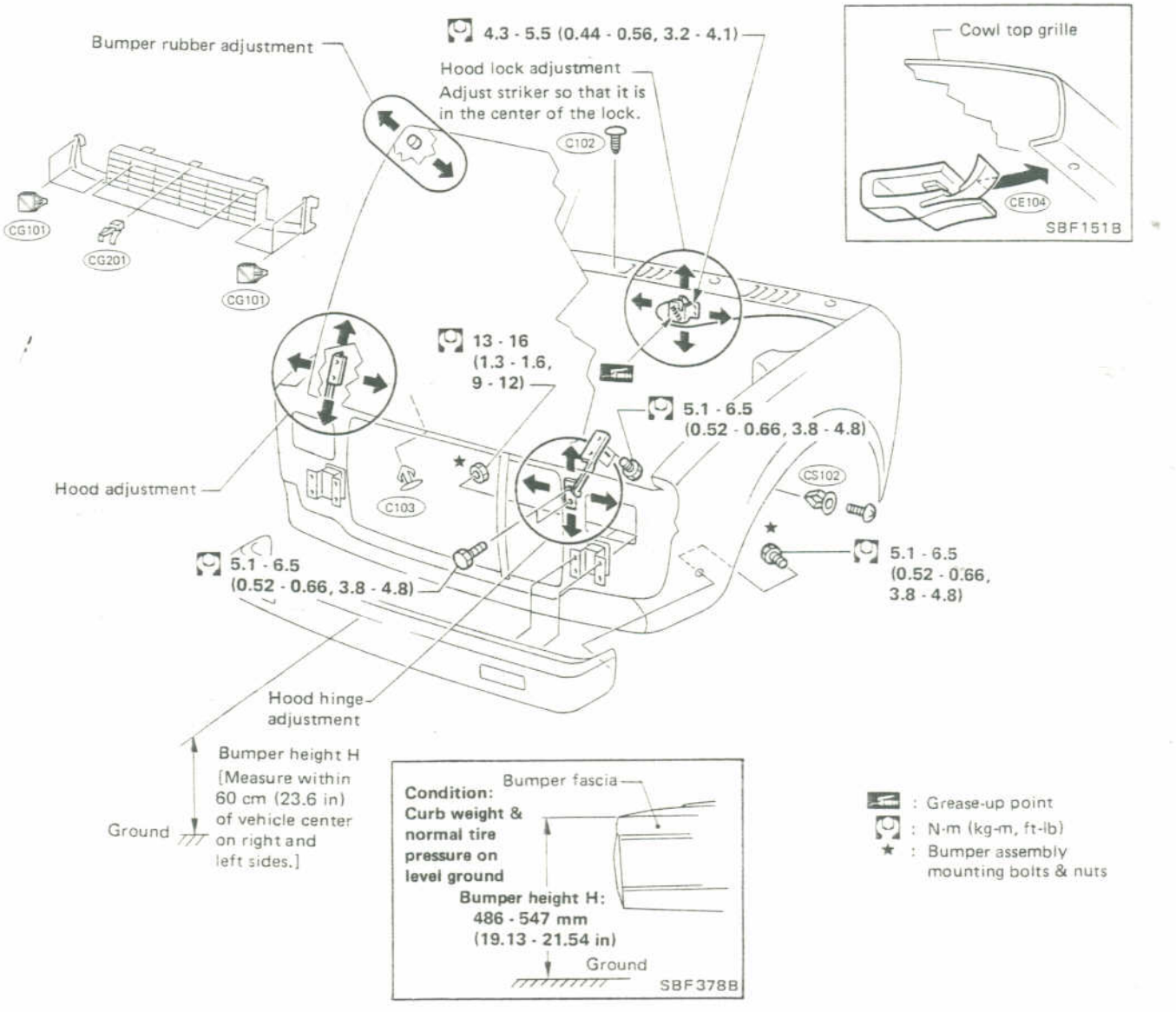
No.	Symbol	Shape	Removal & Installation
CE104		 SBF148B	 Removal: SBF149B

BODY END AND DOOR

- When removing and installing hood or back door, place a cloth or other padding on hood corners to avoid scratching vehicle body.
- When removing clip or fastener, refer to CLIP & FASTENER.
- Apply sealing compound where necessary when installing parts.

Front End

- Hood adjustment: Adjust at hinge portion.
- Hood lock adjustment: After adjusting, check hood lock control operation. Apply a coat of grease to hood locks engaging mechanism.
- Hood opener: Do not attempt to bend cable forcibly. Doing so increases effort required to unlock hood.
- Front grille: It is made of plastic, so do not use excessive force and take care to keep oil away from it.
- Bumper fascia: It is made of plastic, so do not use excessive force and take care to keep oil away from it.



SBF249D

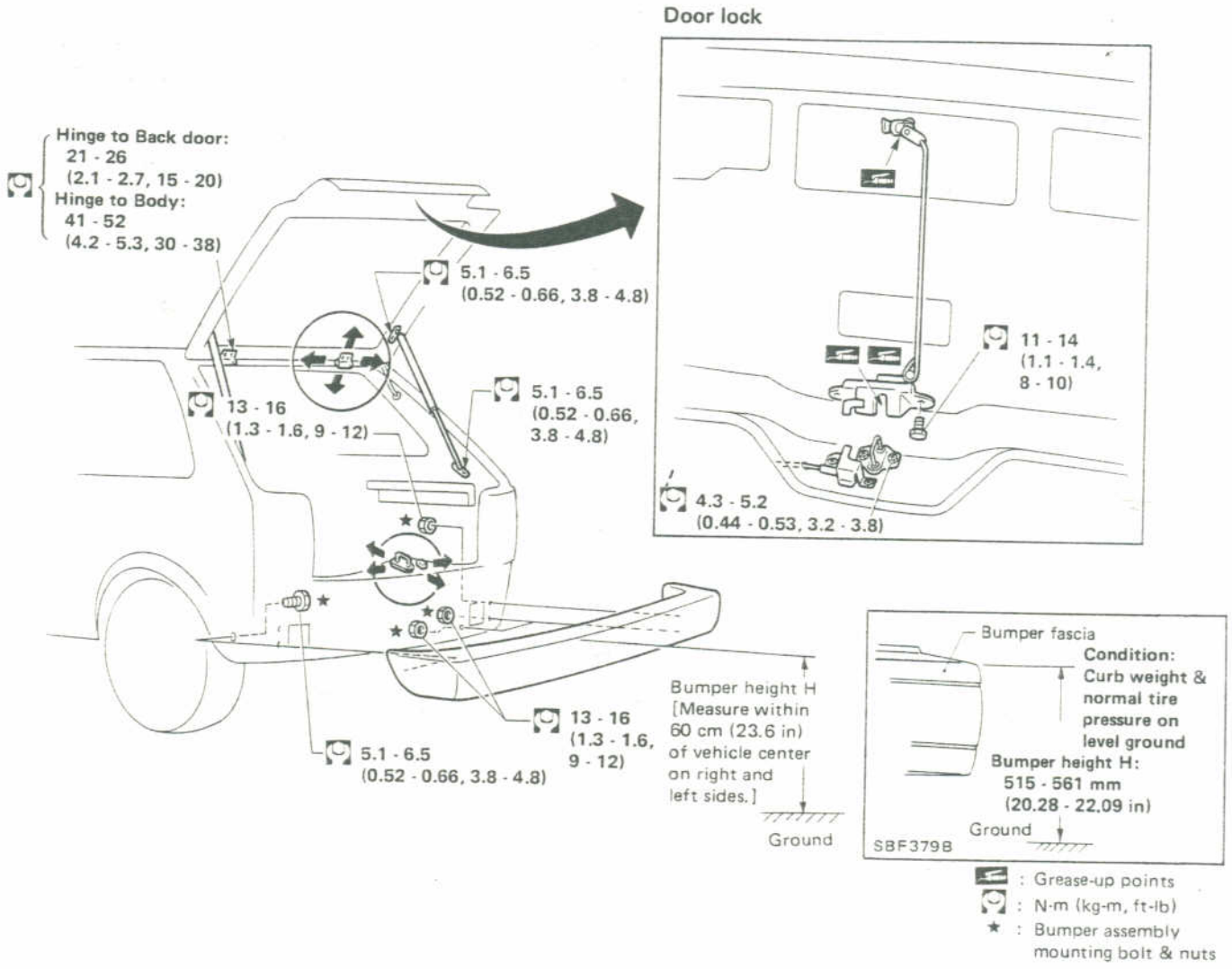
Rear End

- Back door adjustment: Adjust at hinge for proper back door fit.
- Striker: Adjust striker so that it is in the center of the lock.

WARNING:

a. Be careful not to scratch back door stay when installing back door. A scratched stay may cause gas leakage.

b. The contents of the back door stay are under pressure. Do not take apart, puncture, apply heat or allow fire near it.



SBF250D

Back Door Opener

- Opener cable: Do not attempt to bend cable using excessive force.

Opener handle adjustment

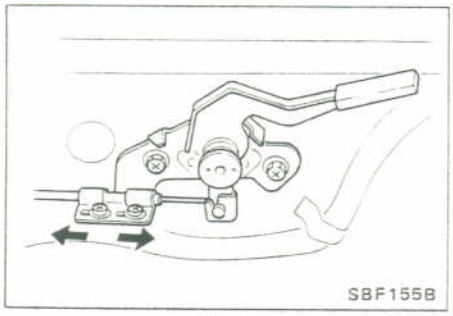


Fig. A

Opener adjustment

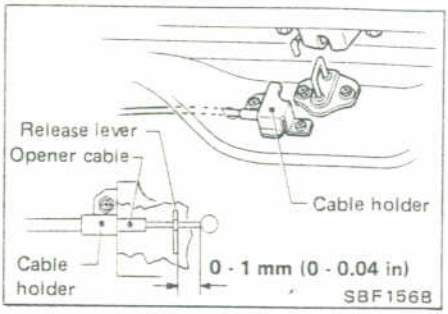
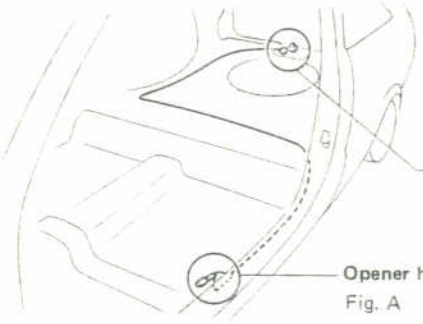


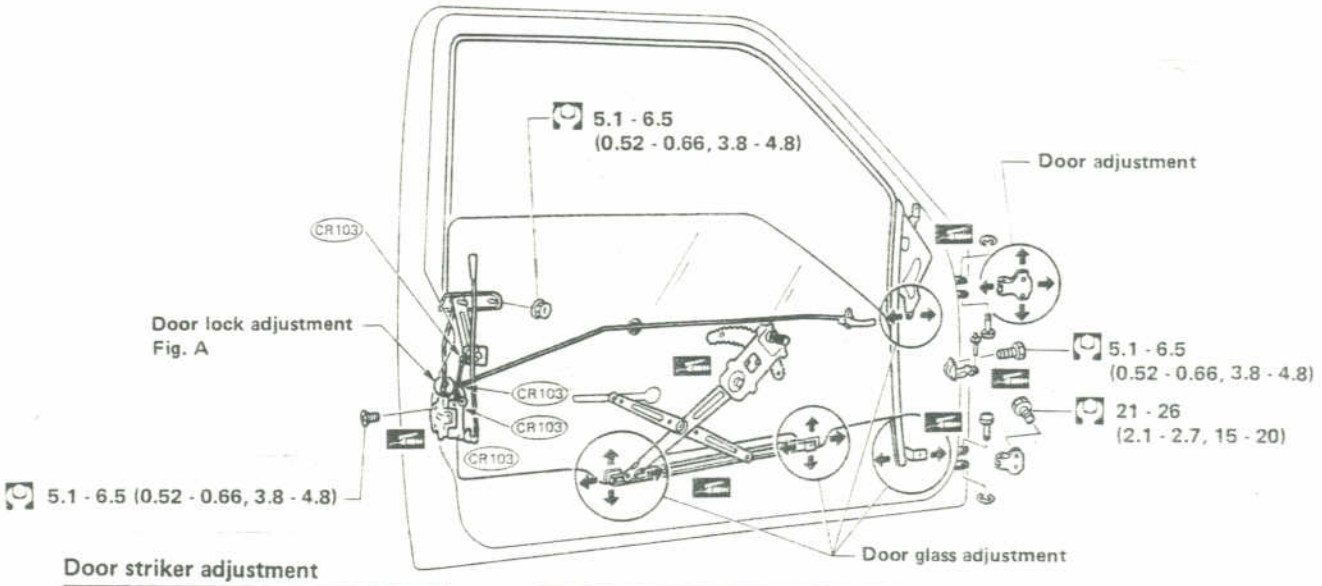
Fig. B



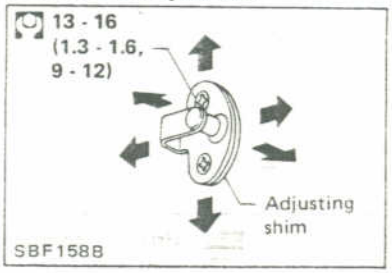
SBF271D

Front Door

- When removing door, be sure not to scratch vehicle body.
- When removing clip or fastener, refer to CLIP & FASTENER.
- After adjusting door or door lock, check door lock operation.



Door striker adjustment



Outside handle

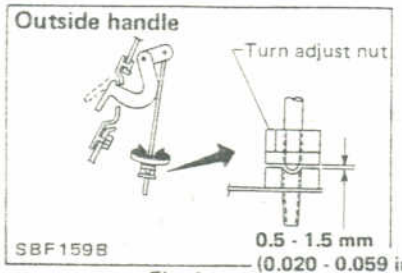


Fig. A

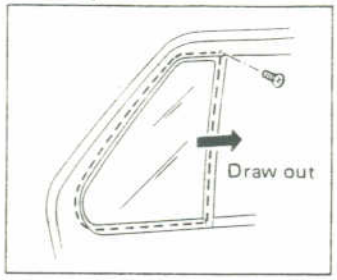
: Grease-up points
: N·m (kg-m, ft-lb)

SBF272D

Rear Door

- When removing door, be sure not to scratch vehicle body.
- After adjusting door or door lock, check door lock operation.

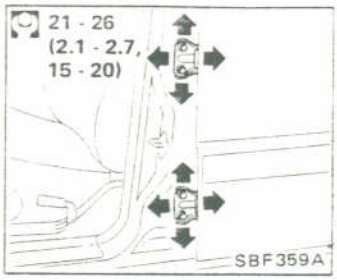
Corner glass

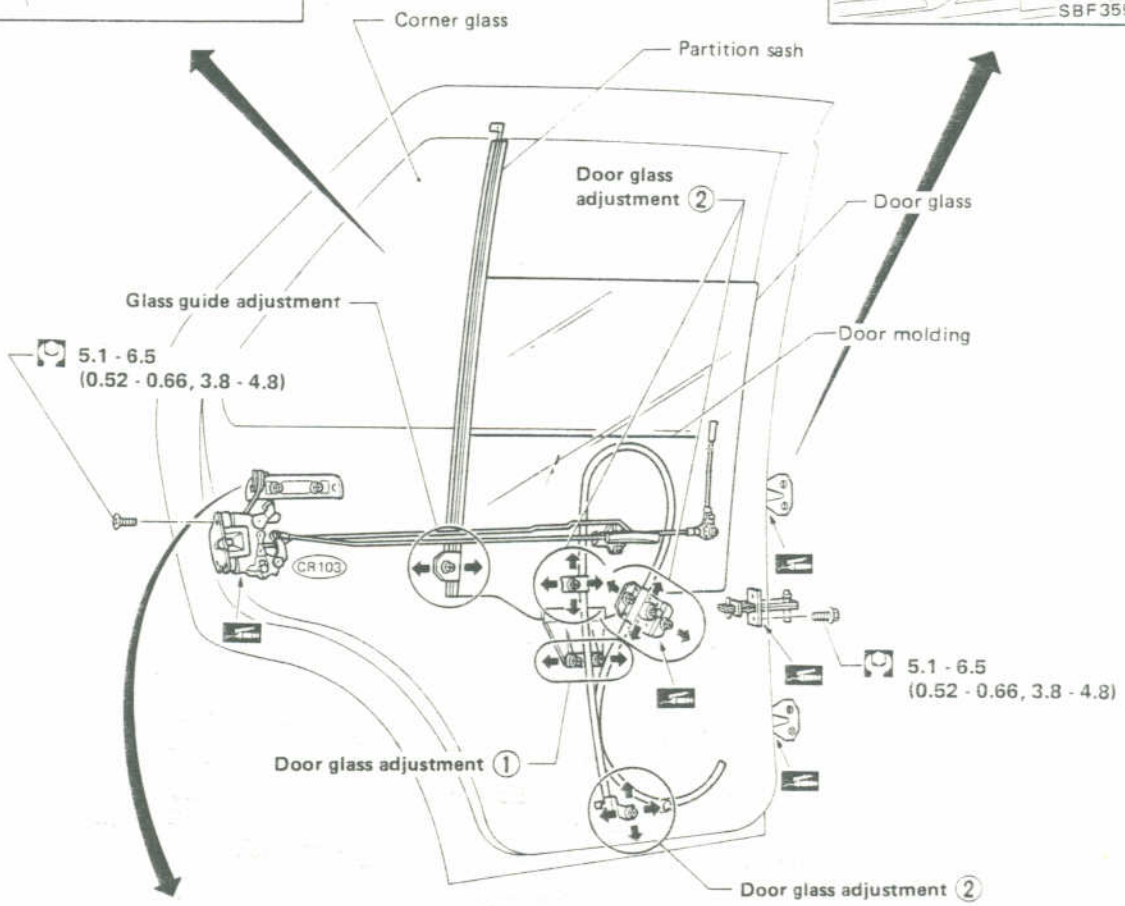


Removal

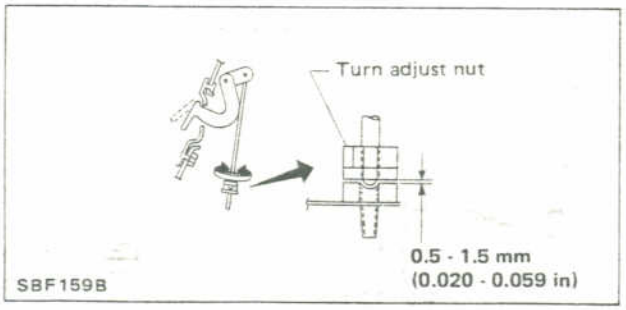
- Remove two installing bolts that secure door glass and slowly lower it inside the door.
- Remove door molding.
- Remove glass run rubber from door.
- Remove partition sash.
- Remove corner glass together with weather-strip from door by pulling them toward the front of vehicle.

Door adjustment

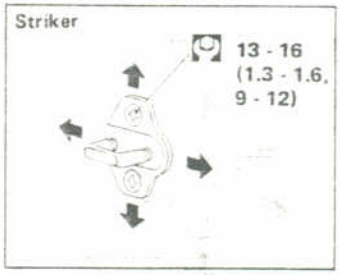




Outside handle adjustment



Door lock adjustment



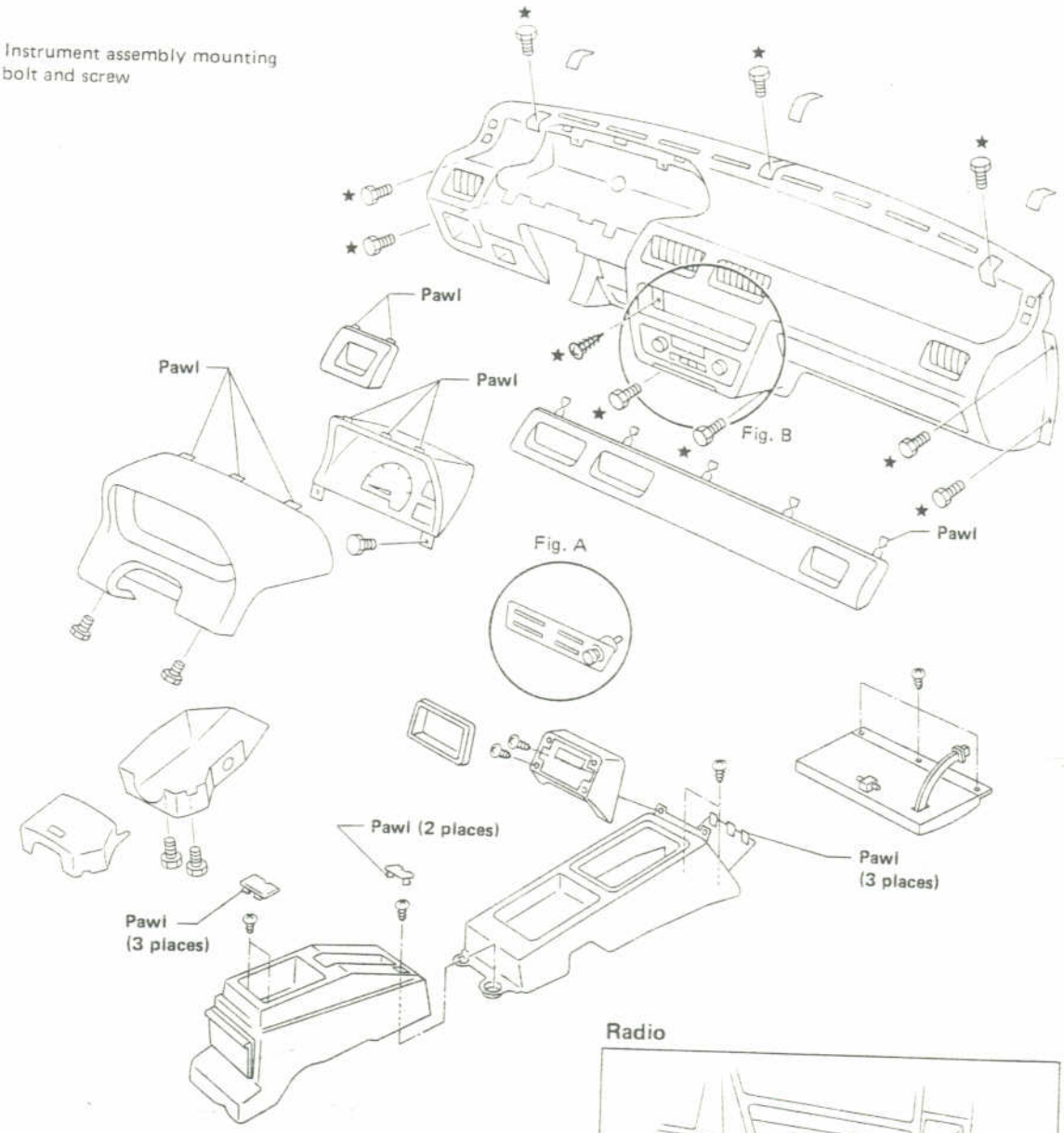
: Grease-up points
: N·m (kg-m, ft-lb)

SBF273D

Instrument

- These parts are made of plastic, so do not use excessive force and be careful not to damage them.

★: Instrument assembly mounting bolt and screw



Radio

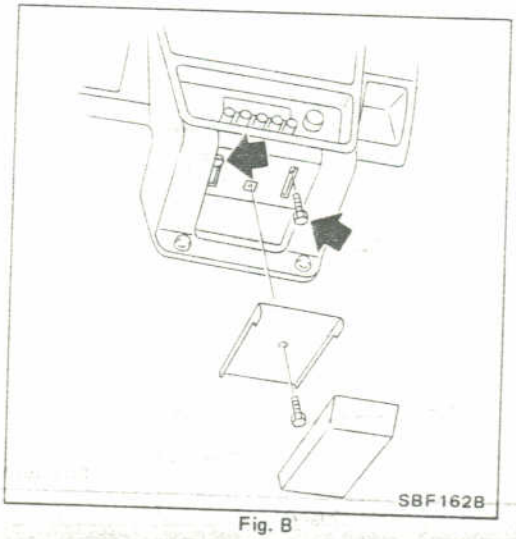


Fig. B

Heater control finisher

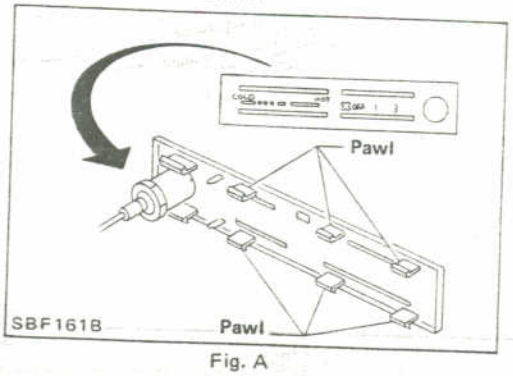
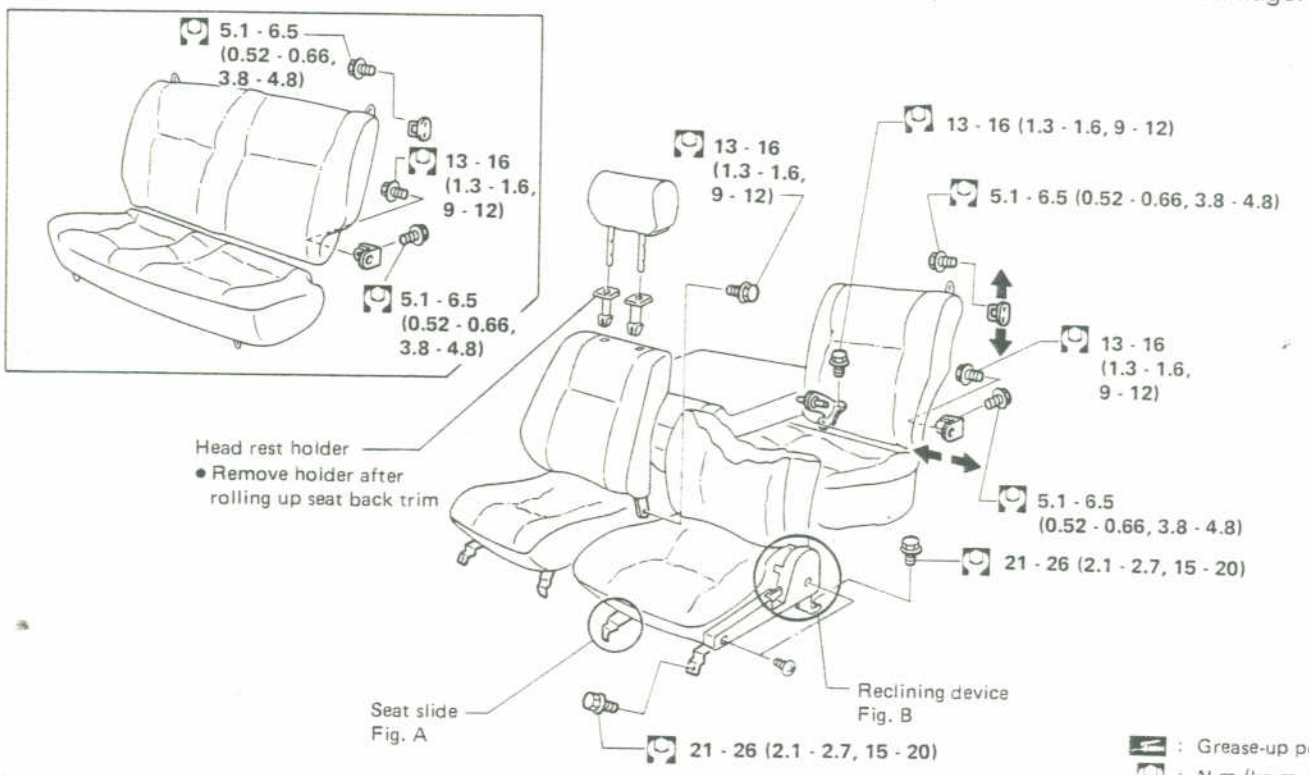


Fig. A

SBF274D

- When removing or installing the seat trim, carefully handle it to keep dirt out and avoid damage.



Seat slide

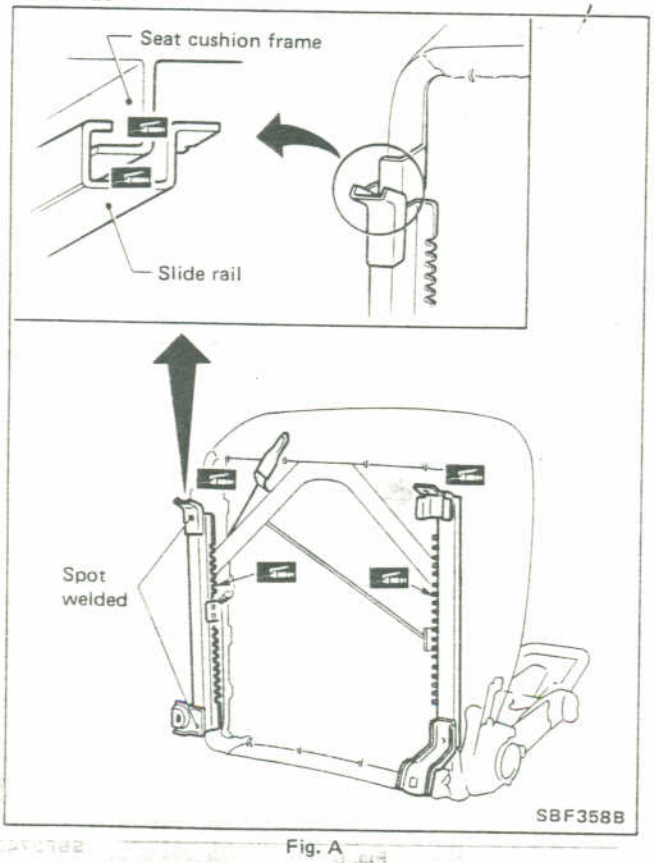


Fig. A

Reclining device

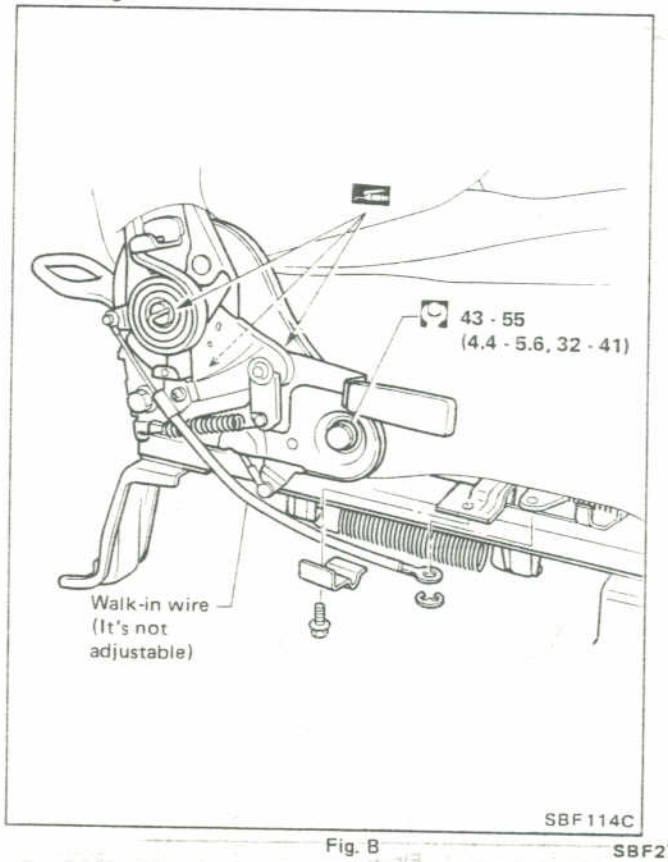


Fig. B

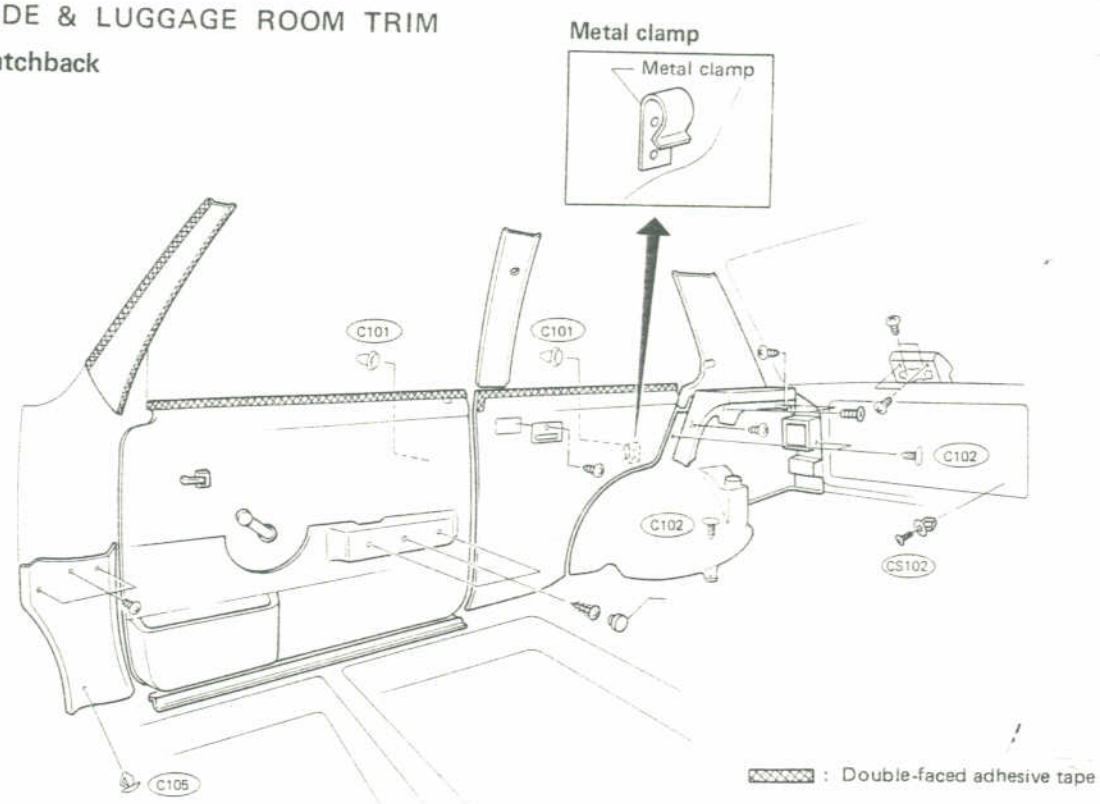
SBF275D

- When removing clip or fastener, refer to CLIP & FASTENER.
- When handling trim or molding, do not use excessive force and take care not to damage them.

Interior

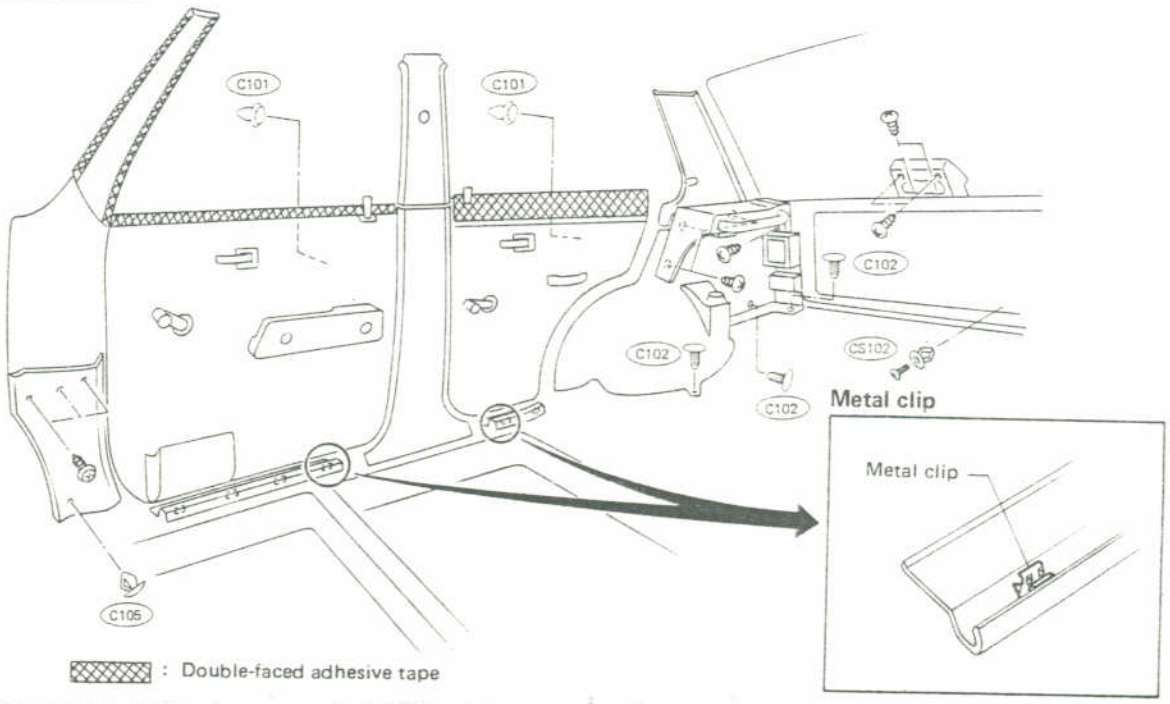
BODY SIDE & LUGGAGE ROOM TRIM

3-door Hatchback



SBF276D

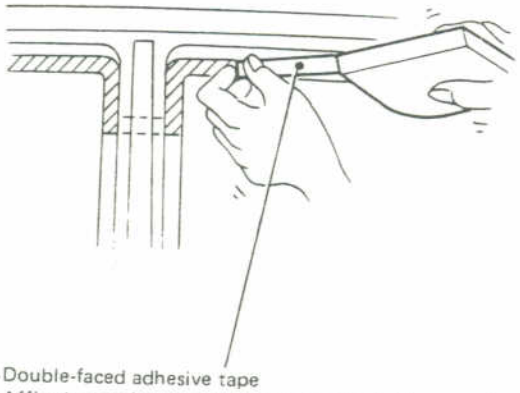
5-door Hatchback



SBF277D

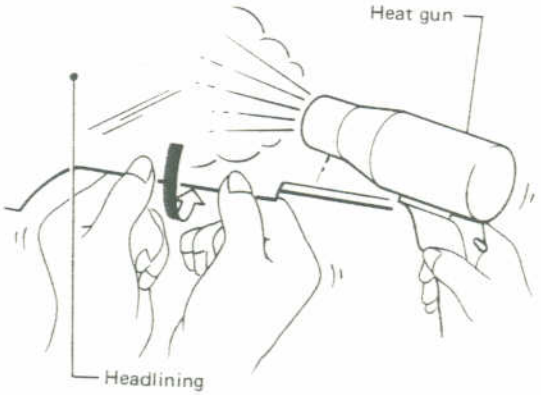
Interior (Cont'd)

ROOF TRIM INSTALLATION



Double-faced adhesive tape
Affix double-faced adhesive tape to body flange and install securely.

SBF996A

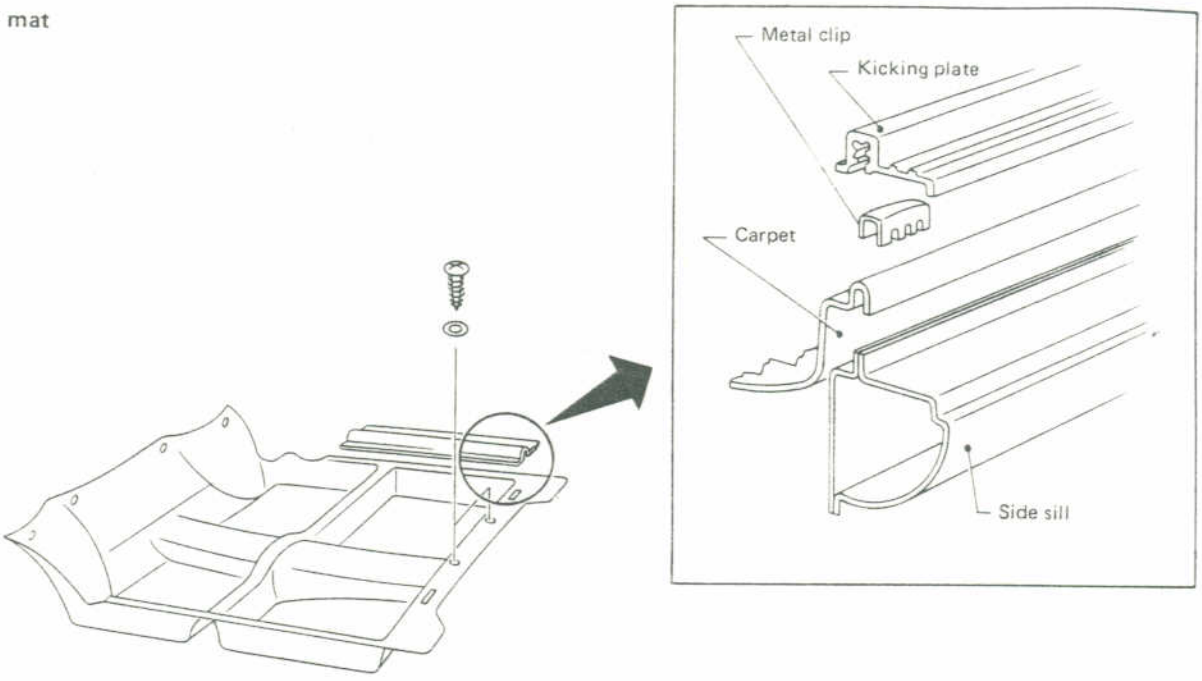


Affix headlining to body flange starting from corner portion.

SBF001B

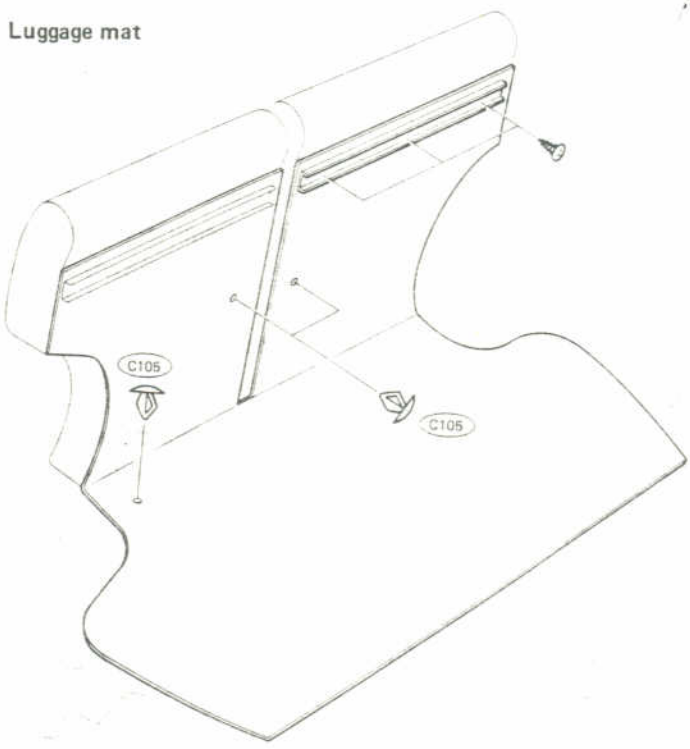
FLOOR TRIM

Floor mat



SBF406C

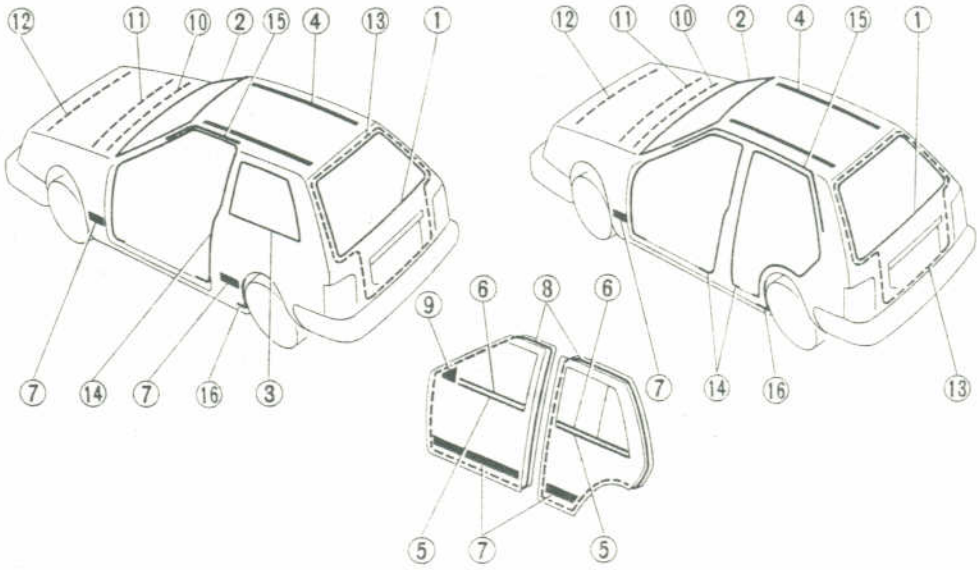
Luggage mat



SBF165B

Exterior

- Apply sealing compound where necessary while installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.

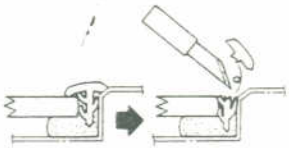


SBF280D

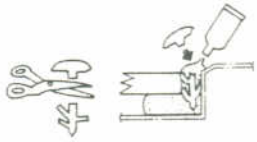
① Back door window molding

Method 1.

Cut off top portion of molding and clean glass and panel surfaces.

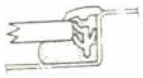


Apply sealant to top portion of molding.

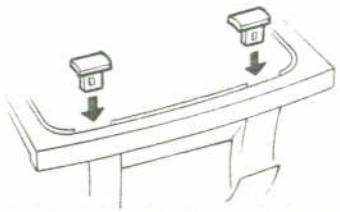


Cut off lower portion of new molding.

Finish well to give it a good appearance.



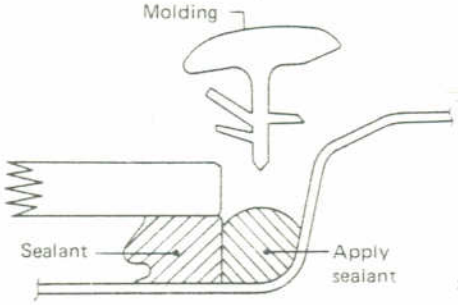
Install molding joint



SBF409C

Method 2

1. Cut off sealant at back door glass end.
2. Clean the side on which panel was mounted.



SBF809A

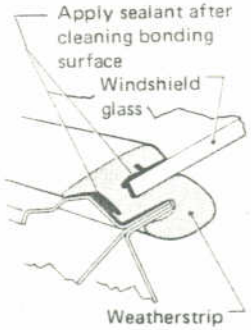
3. Install molding by aligning the molding mark located on center with vehicle center.

Be sure to install tightly so that there is no gap around the corner.

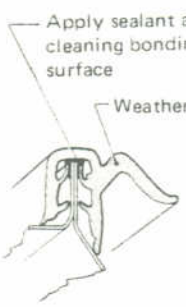
4. Install molding joint.

② ③ Windshield and side window weatherstrip

Windshield weatherstrip



Side window weatherstrip

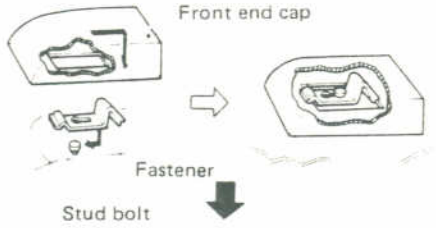


SBF168B

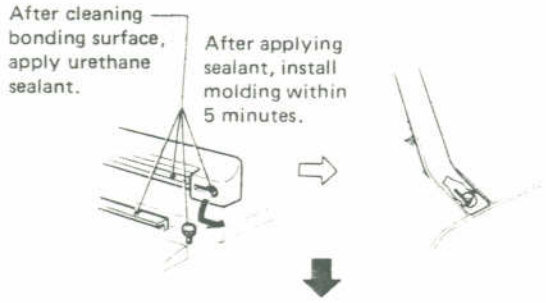
Exterior (Cont'd)

④ Roof side molding

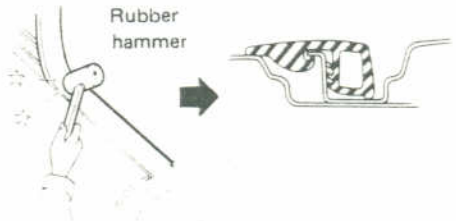
1. Install front end cap.



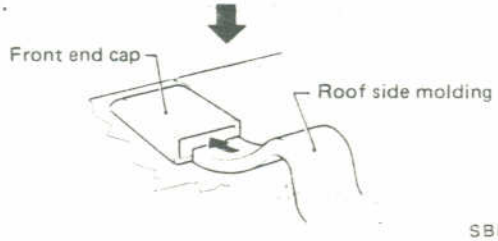
2. Install rear end of roof side molding.



3. Lightly tap molding into flange. (Be careful not to damage vehicle body.)

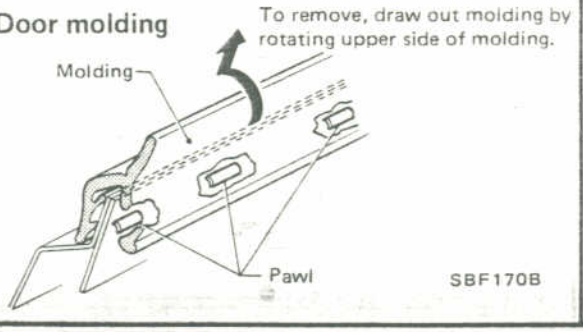


4. Insert tip of roof side molding into front end cap.



SBF169B

⑤, ⑥ Door molding

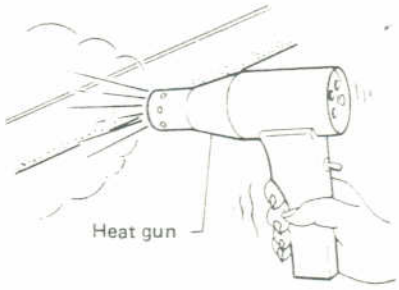


SBF170B

⑦ Side guard molding

- Side guard molding is affixed to body panel with sealant and double-faced adhesive tape. And the repair part is affixed with double-faced adhesive tape.
- Remove it only if it is necessary to do so.
- Removal:

1. Heat molding portion to 30 to 40°C (86 to 104°F) with a heat gun.



SBF455A

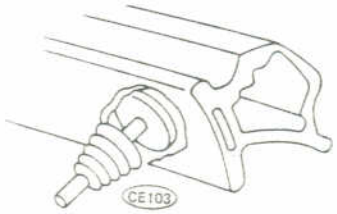
2. Raise end of molding and, while cutting off bonding agent, detach molding.

- Installation

1. Remove all traces of bonding agent from body panel. Then clean contact face of body.
2. Heat body panel and molding to 30 to 40°C (86 to 104°F) with a heat gun. Then install molding.

⑧ Door weatherstrip

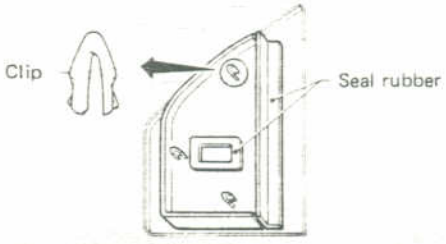
Apply butyl tape where necessary while installing the weatherstrip



SBF171B

⑨ Door corner finisher

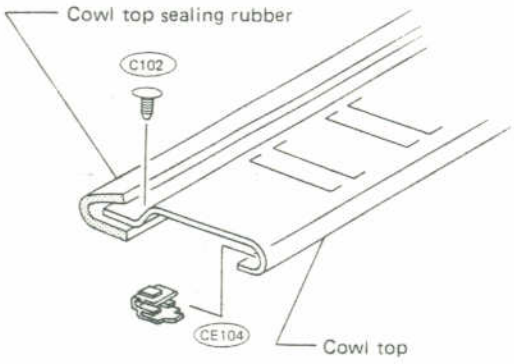
This is made of plastic, so handle with care when removing it.



SBF172B

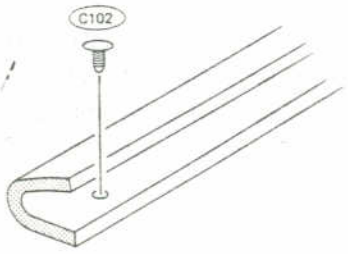
Exterior (Cont'd)

⑩ Cowl top sealing rubber



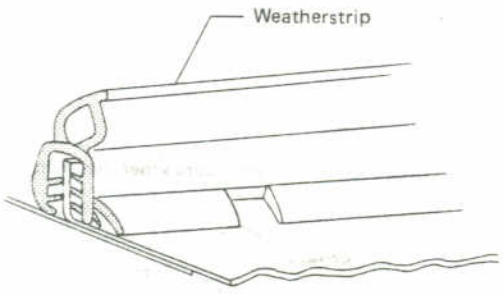
SBF281D

⑪, ⑫ Hood front sealing rubber and hood rear sealing rubber



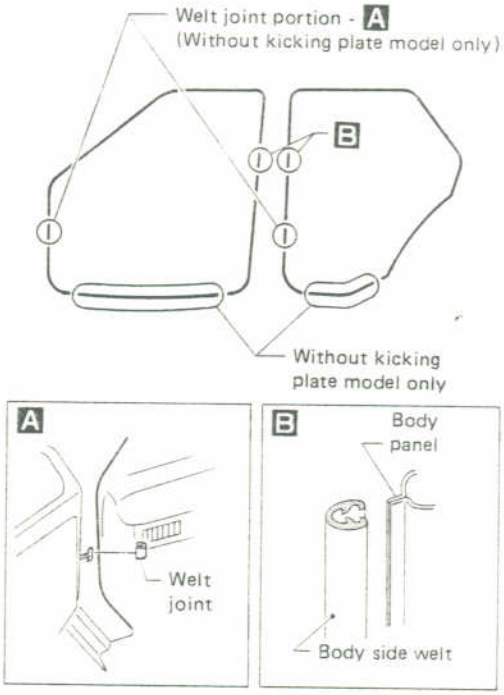
SBF282D

⑬ Back door weatherstrip



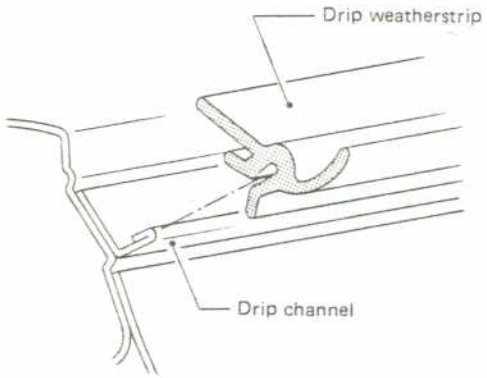
SBF412C

⑭ Body side welt



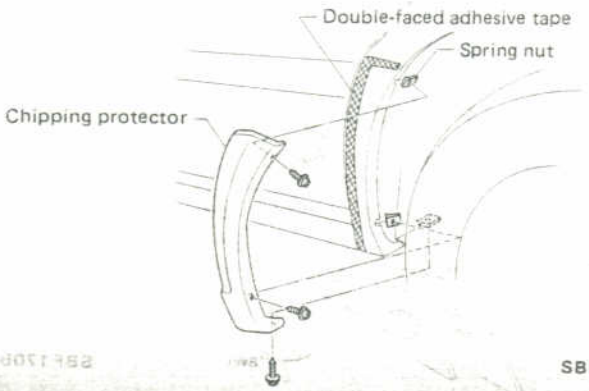
SBF306D

⑮ Drip weatherstrip



SBF307D

⑯ Chipping protector



SBF783B

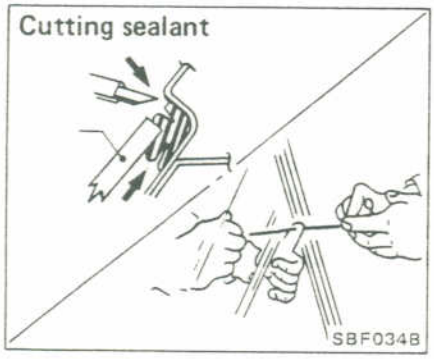
Windshield

- This portion requires sealing. When removing, cut the weatherstrip if necessary. When installing, be sure to do the sealing after cleaning off all oil. For details, refer to Exterior.
- When apply sealing compound, be careful that the sealing compound does not protrude from parts.

Back Door Window

GLASS REPLACEMENT

Removal

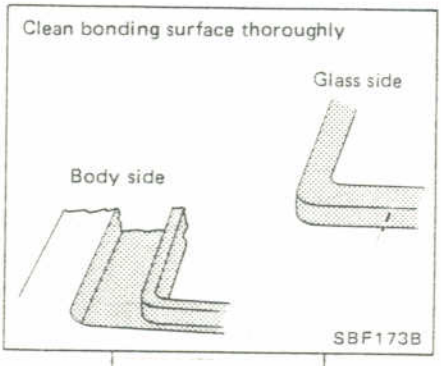


CAUTION:
Be careful not to scratch glass when removing.

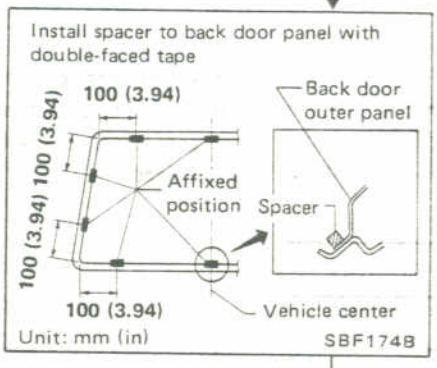
Installation

- Use genuine Nissan Sealant kit or equivalent. Follow instructions furnished with it.
- After installation, the vehicle should remain stationary for about 24 hours.
- Do not use sealant which is more than 12 months past its production date.
- Do not leave cartridge unattended with its cap open.
- Keep Primers and sealant in a cool, dry place. Ideally, sealant should be stored in a refrigerator.

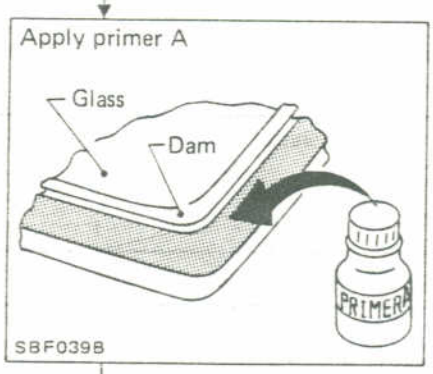
WARNING:
Keep heat or open flames away as Primers are flammable.



Body side



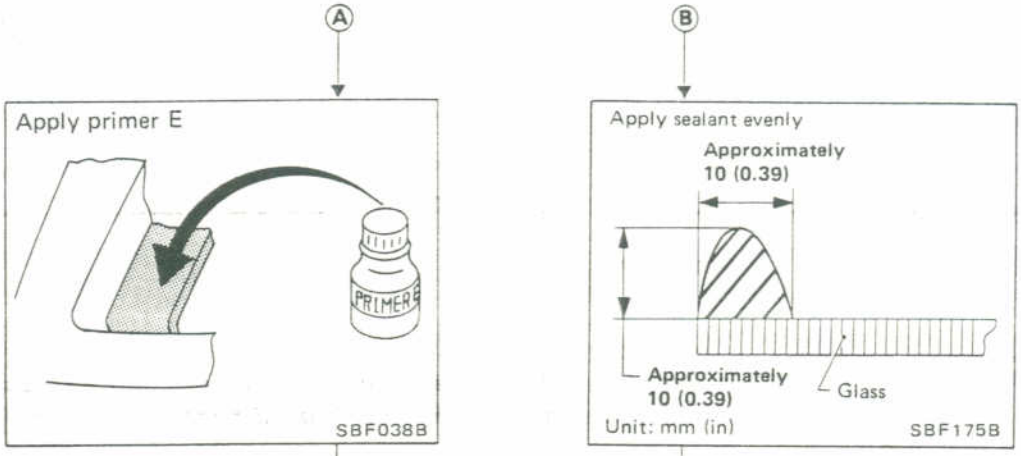
Glass side



CAUTION:
Do not apply Primer A to windshield opening flanges.

Ⓐ Ⓑ

Back Door Window (Cont'd)



CAUTION:
Allow Primers to dry for 10 to 15 minutes before proceeding to the next step.

CAUTION:
Windshield glass should be installed within 15 minutes of applying sealant: sealant starts to harden 15 minutes after it is applied.

Set glass in position and press glass lightly and evenly.

Check for water leakage.

Install molding.

Reference: Period required for sealant to dry to desired hardness.

Unit: days

Temperature °C (°F) \ Relative humidity %	90	50	25
25 (77)	1.6	2.9	6.1
5 (41)	3.5	9.1	15.0

CAUTION:
Advise the user of the fact that vehicle should not be driven on rough roads or surfaces until sealant has properly vulcanized.

Back Door Window (Cont'd)

REMOVAL AND INSTALLATION FOR UNBROKEN ORIGINAL EQUIPPED GLASS

CAUTION:

If you remove unbroken original equipped glass at the time of panel beating, painting, repairing water leakage, etc., you must leave sealant and primer as much as possible on the original glass.

If you thoroughly remove residual sealant on original equipped glass and then install the glass with sealant, the adhesive force will be reduced.
So be sure to leave original sealant and primer as much as possible on original equipped glass, when removing unbroken original glass.

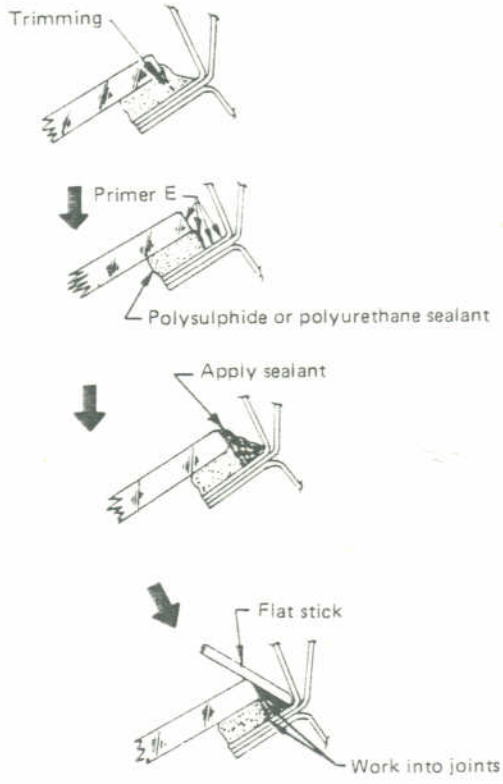
Except for this, the methods of removal and installation are the same as in GLASS REPLACEMENT.

REPAIRING LEAKS

Leaks can be repaired without removing and reinstalling glass.

If water is leaking between caulking material and body or between glass and caulking material, determine extent of leak by applying water while pushing glass outward.

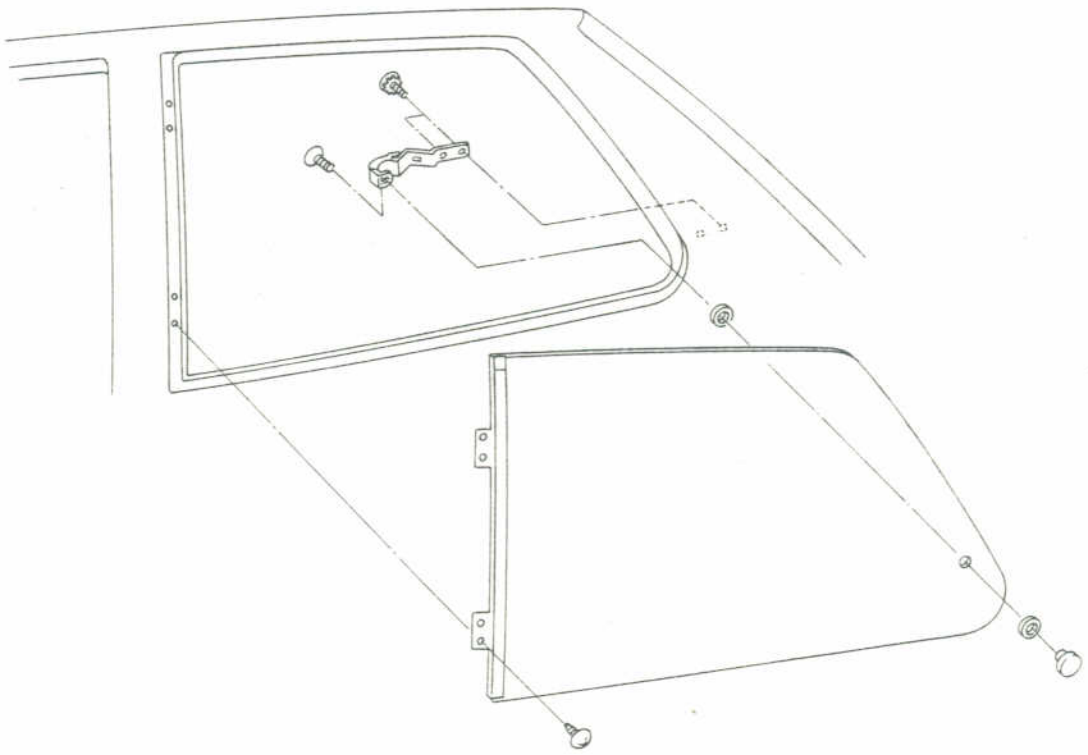
To stop the leak apply Primer and then sealant to the leak point.



SBF182B

After this, securely install moldings.

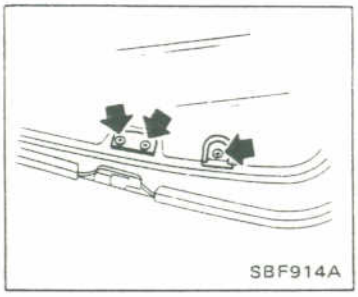
Side Window

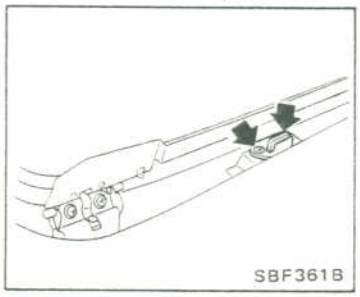


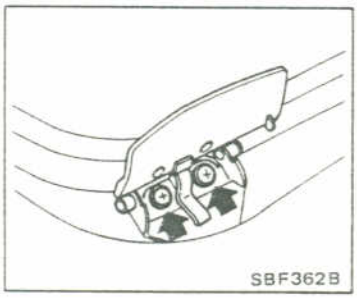
SBF279D

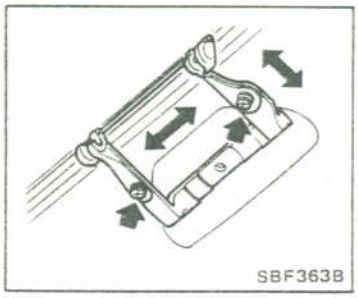
SUN ROOF

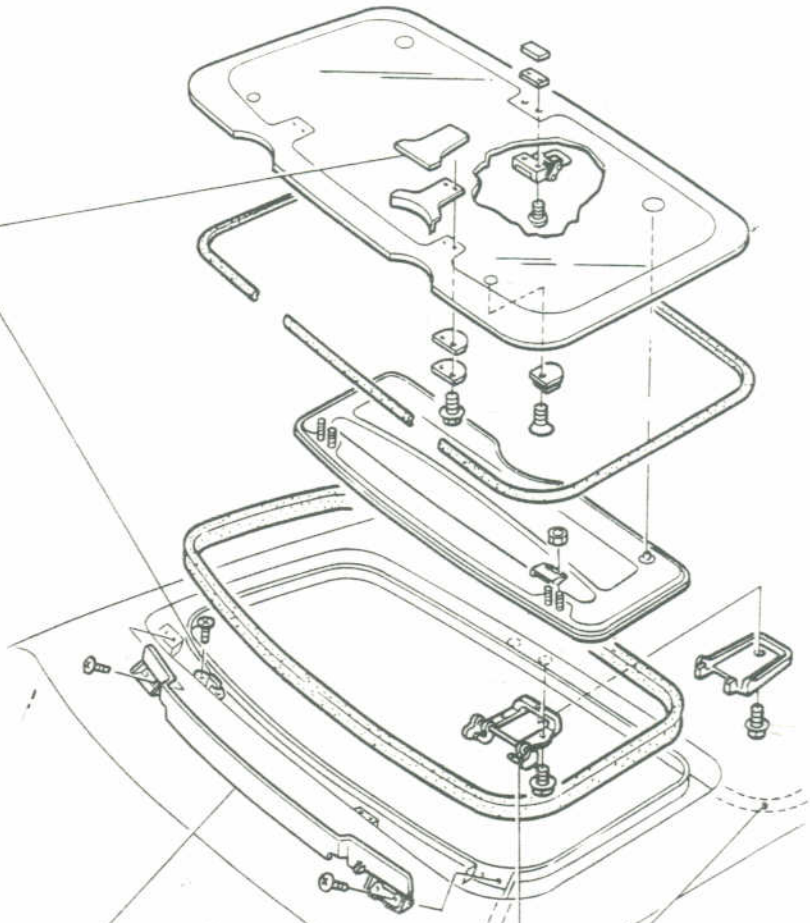
REMOVAL AND INSTALLATION


SBF914A


SBF361B


SBF362B


SBF363B



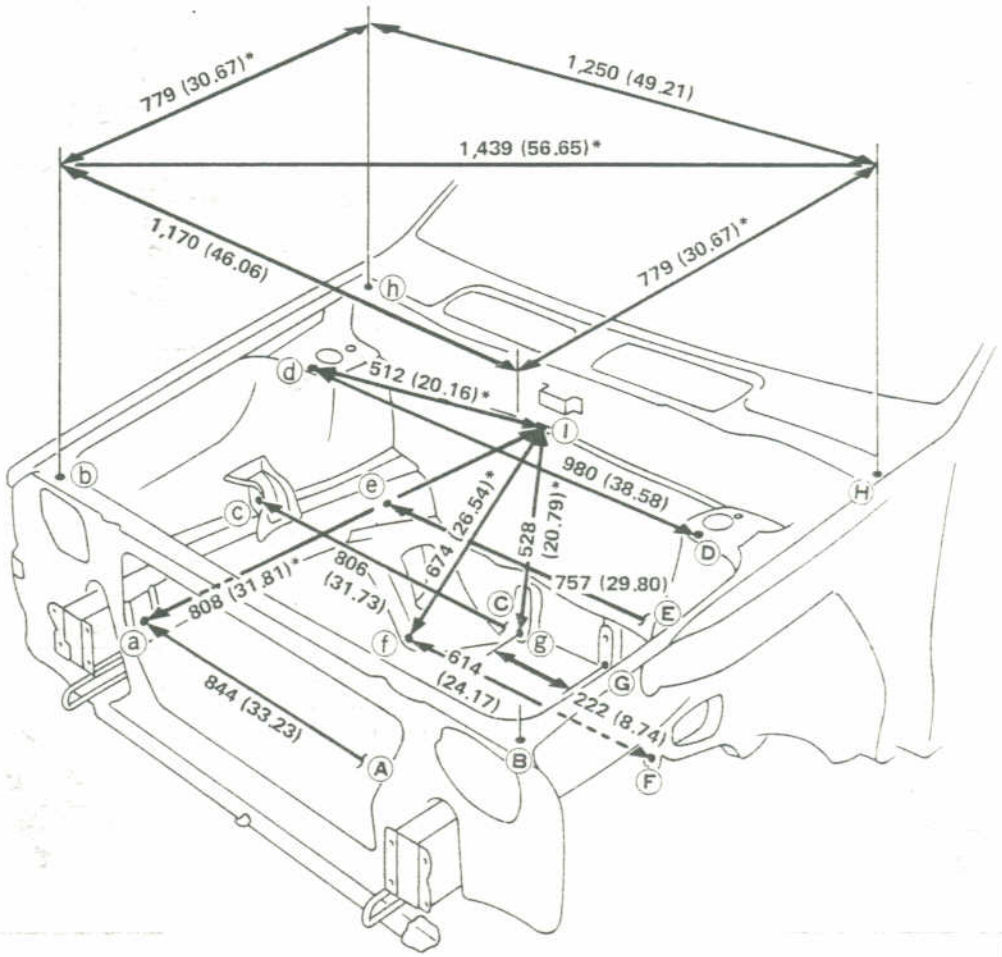
SBF306D

BODY ALIGNMENT

- All dimensions indicated in figures are actual ones.
- When a tram tracking gauge is used, adjust both pointers to equal length and check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- Measurement points
  The coordinates of the measurement points are the distances measured from the respective dimension lines in the directions of "x", "y" and "z".
  Dimension lines: "x" line – Center line of vehicle
  "y" line – Center line of front axle (Any measurement point in front of the dimension line refers to a minus "–" value.)
  "z" line – Datum line (Any measurement point under the dimension line refers to a minus "–" value.)

Engine Compartment

MEASUREMENT

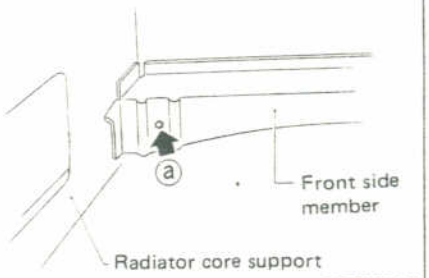
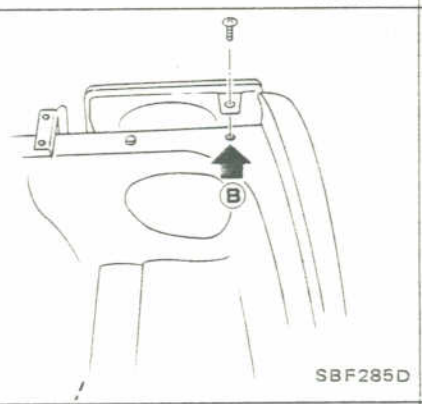
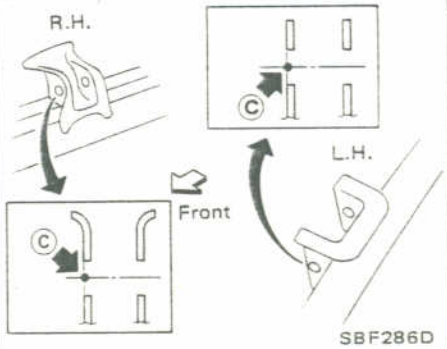
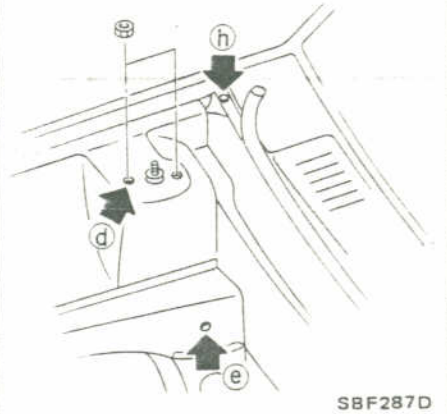


Unit: mm (in)

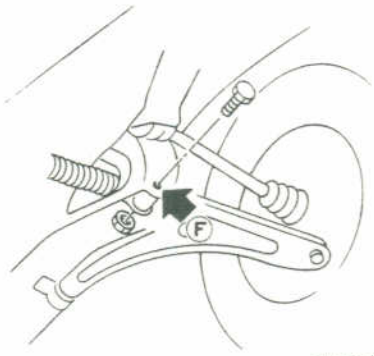
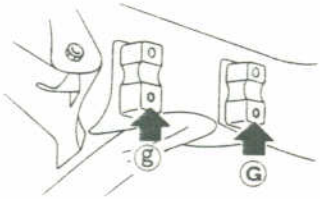
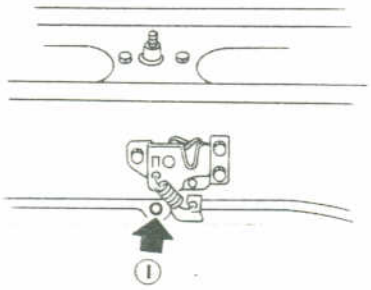
SBF283D

Engine Compartment (Cont'd)

MEASUREMENT POINTS

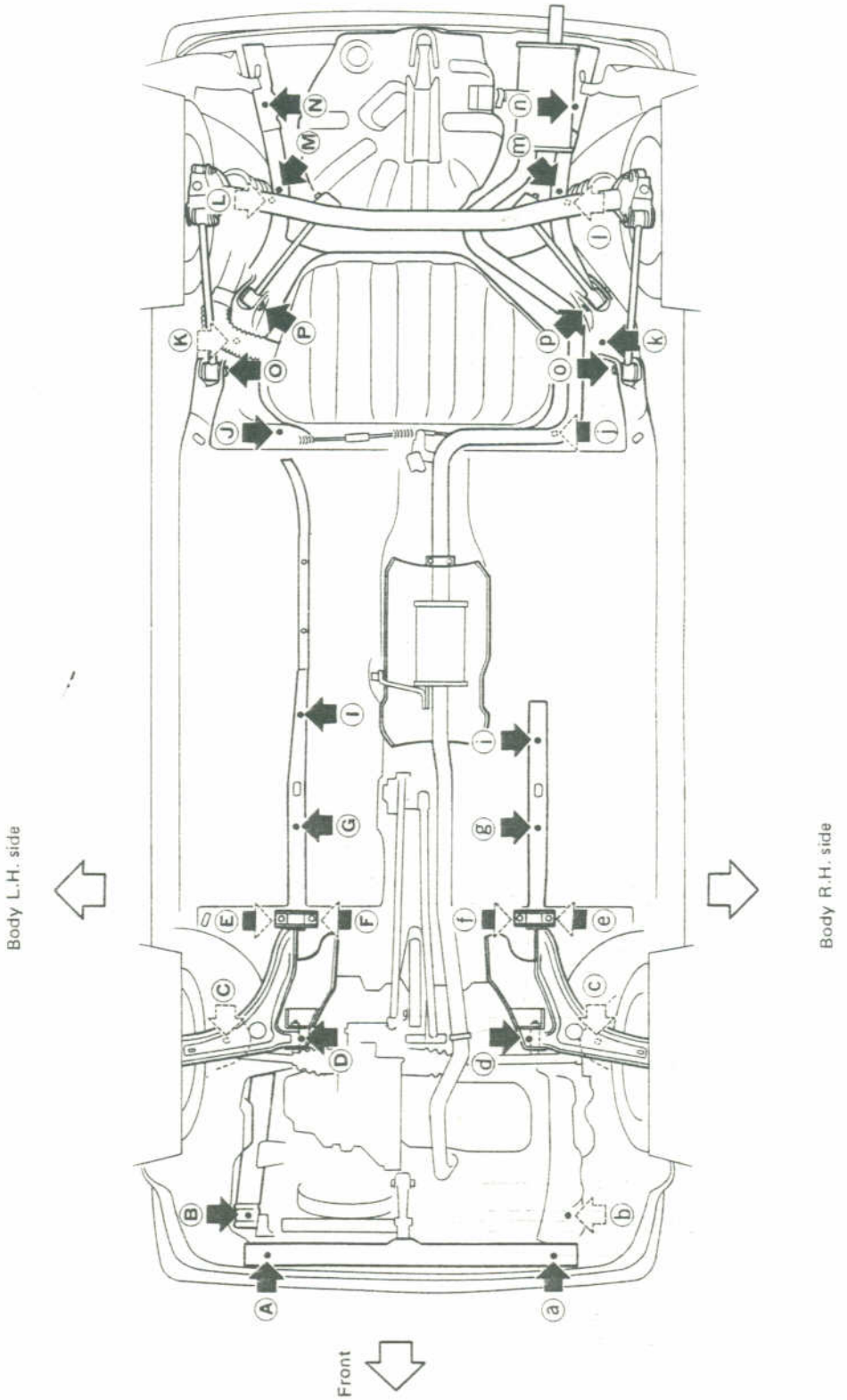
Points	Hole dia. mm (in)	Detailed points		Coordinates mm (in) "x"	"y"	"z"
Ⓐ ⓐ	20 (0.79)	 SBF304D	Hole for locating at front side member	421.8 (16.61)	−485.0 (−19.09)	220.0 (8.66)
Ⓑ ⓑ	6 (0.24)	 SBF285D	Hole for mounting headlamp bracket	585.0 (23.03)	−532.0 (−20.94)	479.7 (18.89)
Ⓒ ⓒ	10.5 (0.413)	 SBF286D	Hole for mounting engine at front side member	L.H. side 362.0 (14.25) R.H. side 420.0 (16.54)	L.H. side −345.0 (−13.58) R.H. side −200.0 (−7.87)	L.H. side 233.0 (9.17) R.H. side 366.0 (14.41)
Ⓓ ⓓ	10 (0.39)	 SBF287D	Hole for front suspension upper mounting	490.0 (19.29)	−19.5 (−0.768)	560.6 (22.07)
Ⓔ ⓔ	15 (0.59)		Hole for locating at front side member	L.H. side 376.2 (14.81) R.H. side 381.0 (15.00)	L.H. side 100.0 (3.94) R.H. side 85.0 (3.35)	L.H. side 270.0 (10.63) R.H. side 260.0 (10.24)
Ⓗ ⓗ	5 (0.20)		Hole for mounting seal rubber	625 (24.61)	231.6 (9.12)	631 (24.84)

Engine Compartment (Cont'd)

Points	Hole dia. mm (in)	Detailed points		Coordinates mm (in)		
				"x"	"y"	"z"
Ⓕ ⓕ	12 (0.47)	 SBF288D	Hole for mounting front suspension transverse link	307.2 (12.09)	15.0 (0.591)	−50 (−1.97)
Ⓖ ⓖ	13 (0.51)	 SBF305D	Hole for mounting steering gear box	111.0 (4.37)	171.0 (6.73)	25.0 (0.984)
Ⓘ	5.4 (0.213)	 SBF289D	Hole for mounting harness	0.0 (0.00)	126.0 (4.96)	539.0 (21.22)

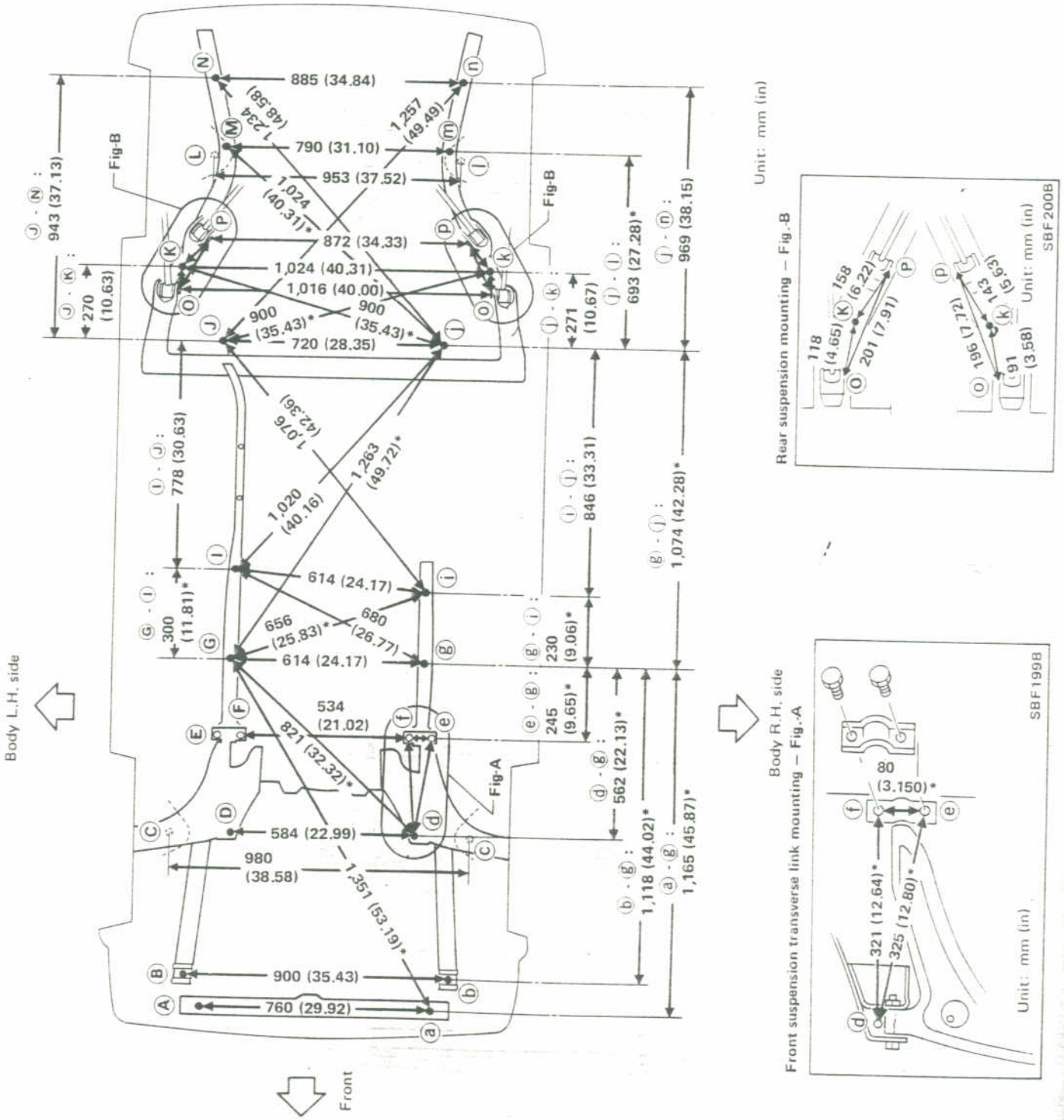
Underbody

MEASUREMENT POINTS



Underbody (Cont'd)

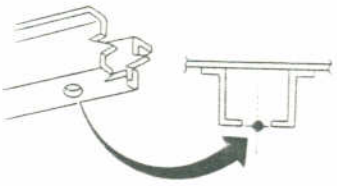
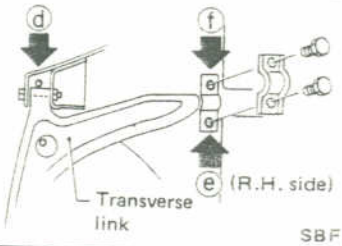
MEASUREMENT

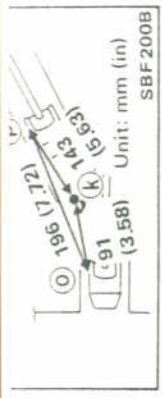


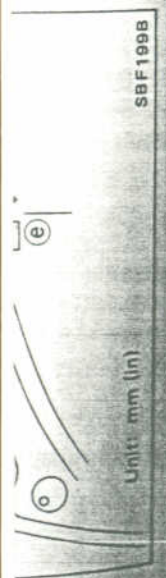
Unit: mm (in)

SBF344D

Underbody (Cont'd)

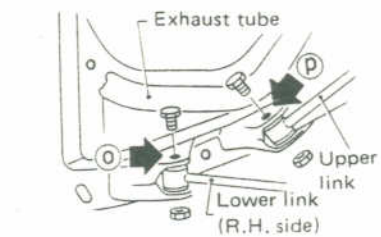
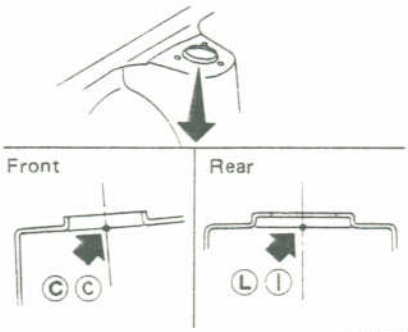
Points	Hole dia. mm (in)	Detailed points		Coordinates mm (in)		
				"x"	"y"	"z"
Ⓐ ⓐ	15 (0.59)	 SBF192B	Hole for locating at under side of member	380.0 (14.96)	−560.0 (−22.05)	15.9 (0.626)
Ⓑ ⓑ	14 (0.55)			450.0 (17.72)	−485.0 (−19.09)	162.8 (6.41)
Ⓖ ⓖ	15 (0.59)			307.2 (12.09)	600.0 (23.62)	−64.0 (−2.520)
Ⓘ ⓘ	15 (0.59)			L.H. side 303.0 (11.93) R.H. side 307.2 (12.09)	L.H. side 900.0 (35.43) R.H. side 830.0 (32.68)	−64.0 (−2.520)
Ⓙ ⓙ	12 (0.47)			360.0 (14.17)	1,665.0 (65.65)	64.0 (2.520)
Ⓚ ⓚ	10 (0.39)			512.0 (20.16)	1,888.0 (74.33)	L.H. side 76.0 (2.992) R.H. side 45.5 (1.791)
Ⓜ ⓜ	12 (0.47)			395.0 (15.55)	2,350.0 (92.52)	160.0 (6.30)
Ⓝ ⓝ	16 (0.63)			L.H. side 440.0 (17.32) R.H. side 445.0 (17.52)	L.H.side 2,600.0 (102.36) R.H. side 2,625.0 (103.35)	160.0 (6.30)
Ⓓ ⓓ	12 (0.47)	 SBF195B	Front suspension transverse link mounting	292.0 (11.50)	40.0 (1.575)	−19.7 (−0.776)
Ⓔ ⓔ	13 (0.51)			347.2 (13.67)	360.0 (14.17)	−37.0 (−1.457)
Ⓕ ⓕ	13 (0.51)			267.2 (10.52)	360.0 (14.17)	−37.0 (−1.457)





BODY ALIGNMENT

Underbody (Cont'd)

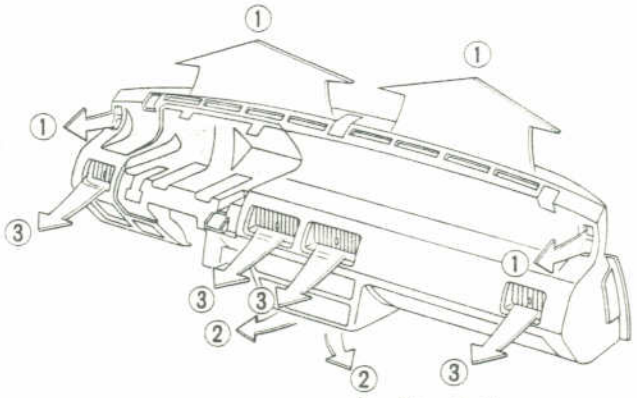
Points	Hole dia. mm (in)	Detailed points		Coordinates mm (in)		
				"x"	"y"	"z"
ⓞ ⓞ	12.5 (0.492)	 SBF343D	Rear suspension mounting	507.9 (20.00)	1,837.0 (72.32)	−30 (−1.18)
Ⓟ ⓟ	12.5 (0.492)			L.H. side 428.7 (16.88) R.H. side 443.7 (17.47)	2,012.7 (79.24)	27.0 (1.063)
Ⓒ ⓒ	56 (2.20)	 SBF092C	Front suspension upper mounting	490.1 (19.30)	27.4 (1.079)	557.5 (21.95)
Ⓛ ⓘ	15.5 (0.610)		Rear suspension upper mounting	476.7 (18.77)	2,355.0 (92.72)	392.0 (15.43)

SECTION HA

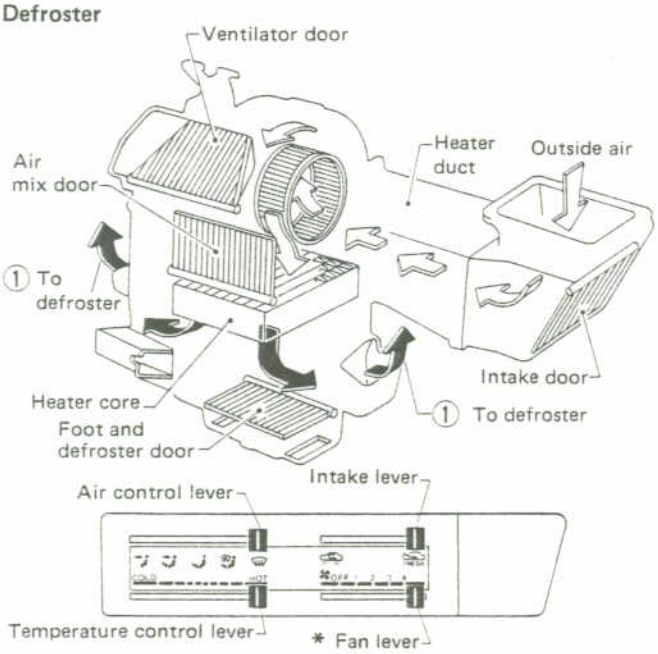
CONTENTS

AIR FLOW AND COMPONENT LAYOUT

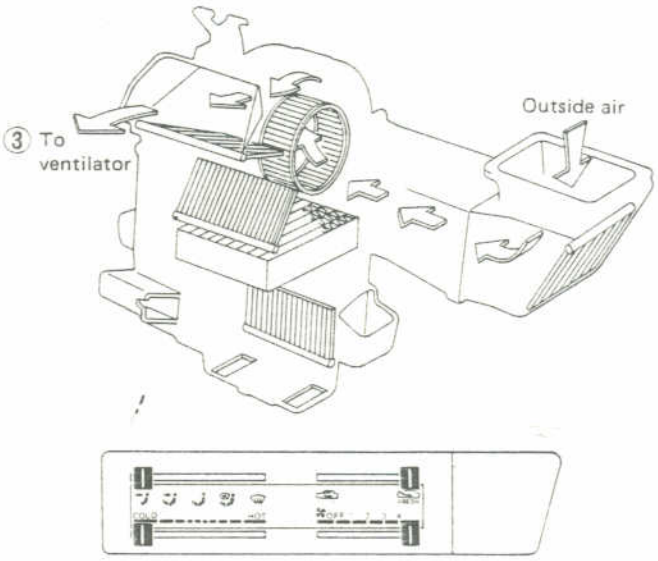
Air Flow



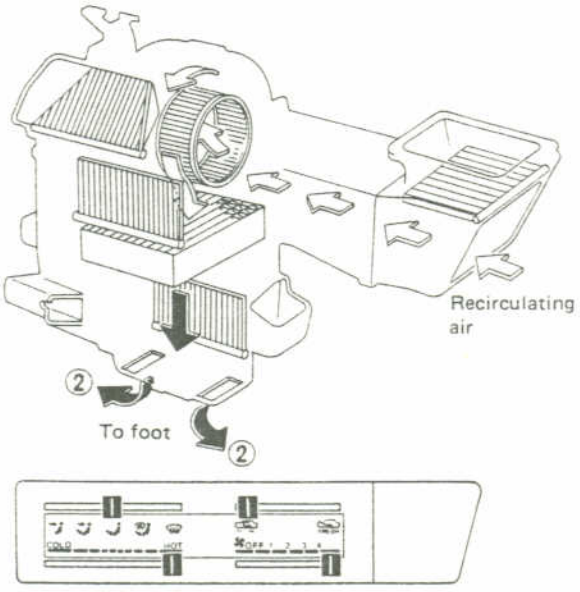
Defroster



Ventilation



Foot

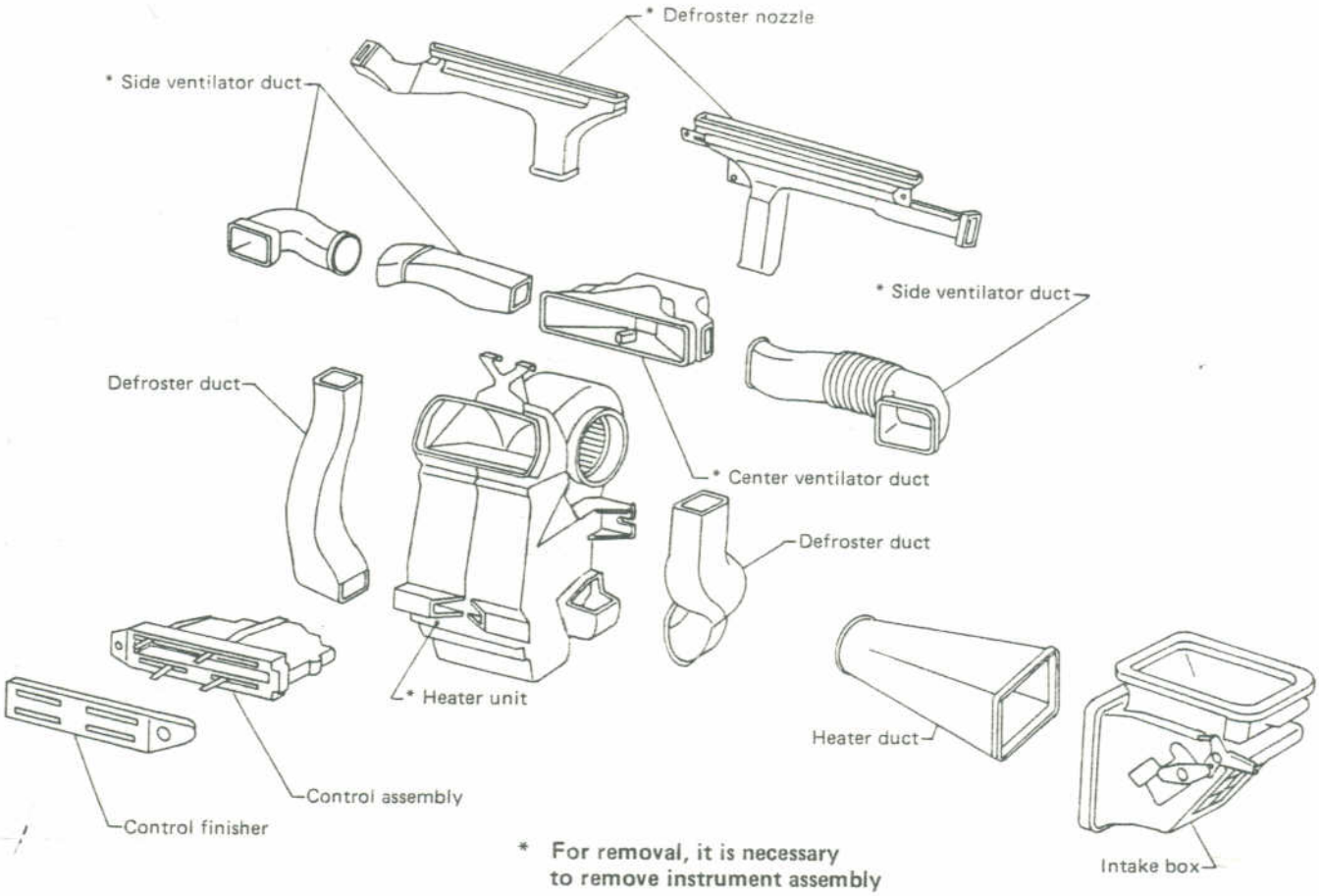


* Some switches have three speeds.

RHA001

AIR FLOW AND COMPONENT LAYOUT

Component Layout



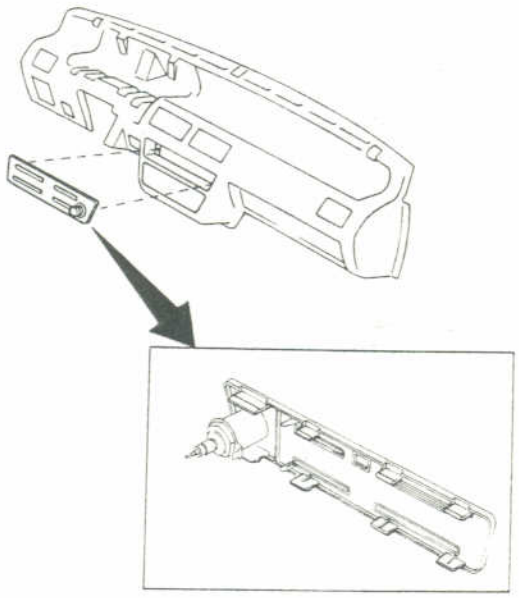
* For removal, it is necessary to remove instrument assembly

RHA002

Heater Control Removal

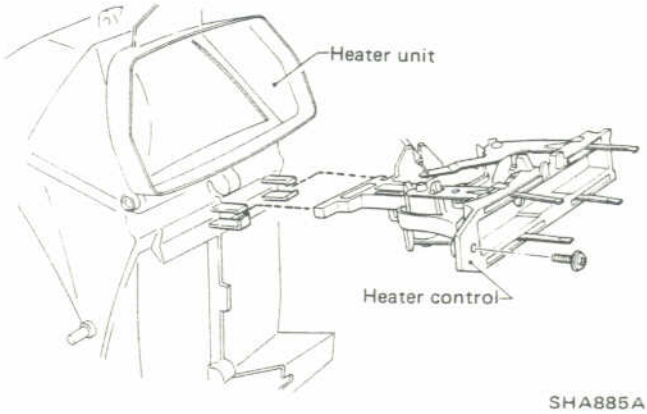
HEATER CONTROL FINISHER

- Carefully remove heater control finisher.



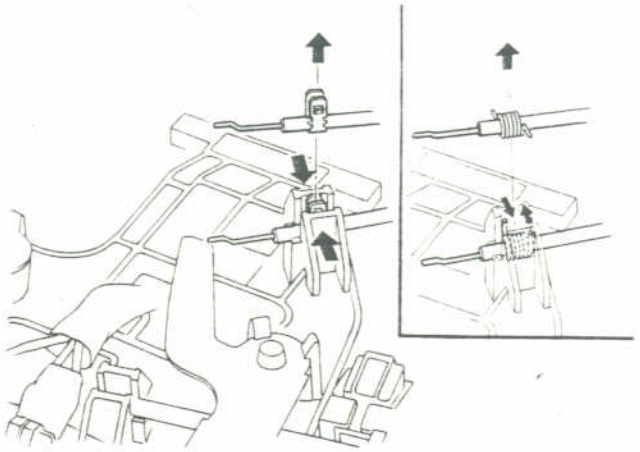
SHA884A

HEATER CONTROL TO HEATER UNIT



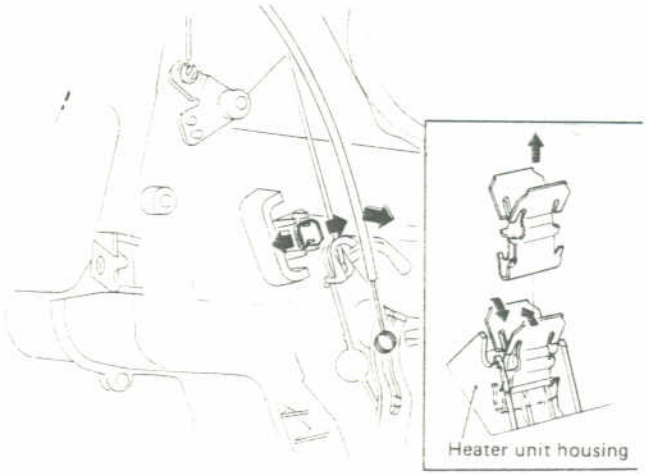
SHA885A

Control Cable Adjustment



SHA917A

- Be sure to expand control cable clip with both hands and then remove control cable from cable clip.
- Be sure to compress cable clip with both hands and then remove it from heater unit housing. Control cable should be removed in advance.

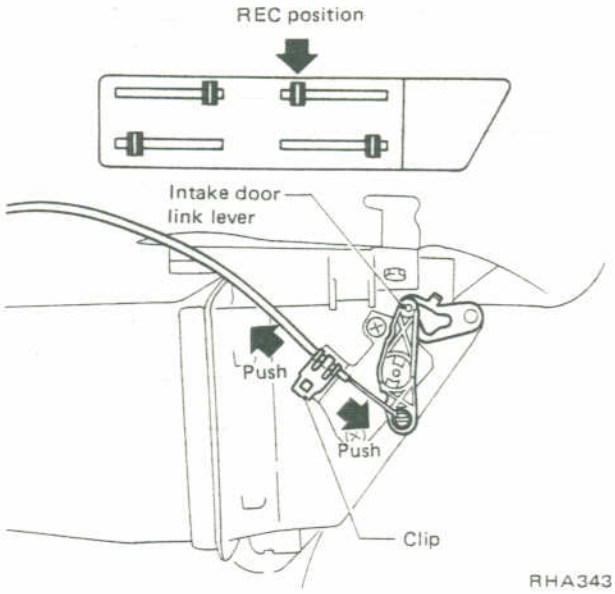


SHA918A

Control Cable Adjustment (Cont'd)

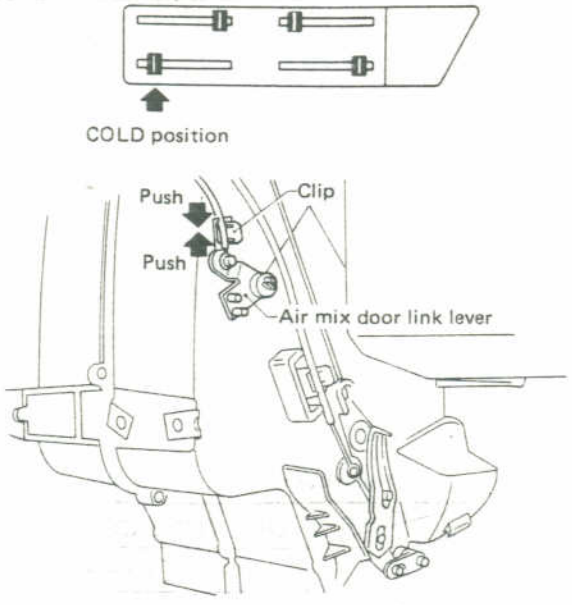
- Clamp the cable while pushing cable outer case in direction of arrow.

INTAKE DOOR CONTROL CABLE



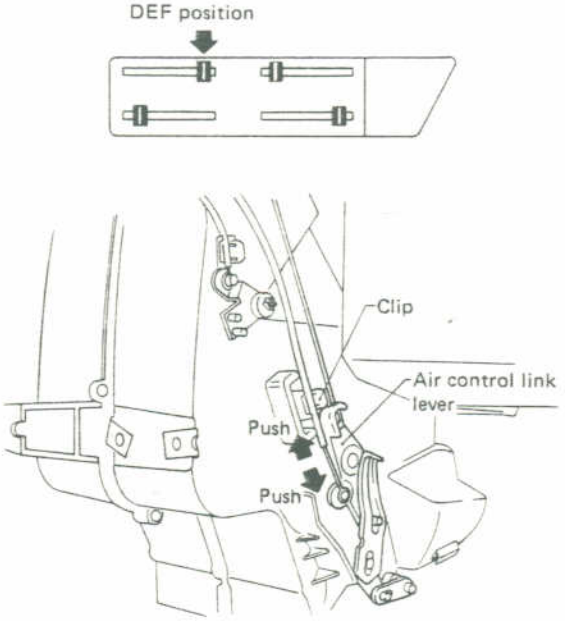
RHA343

TEMP CONTROL CABLE



SHA888A

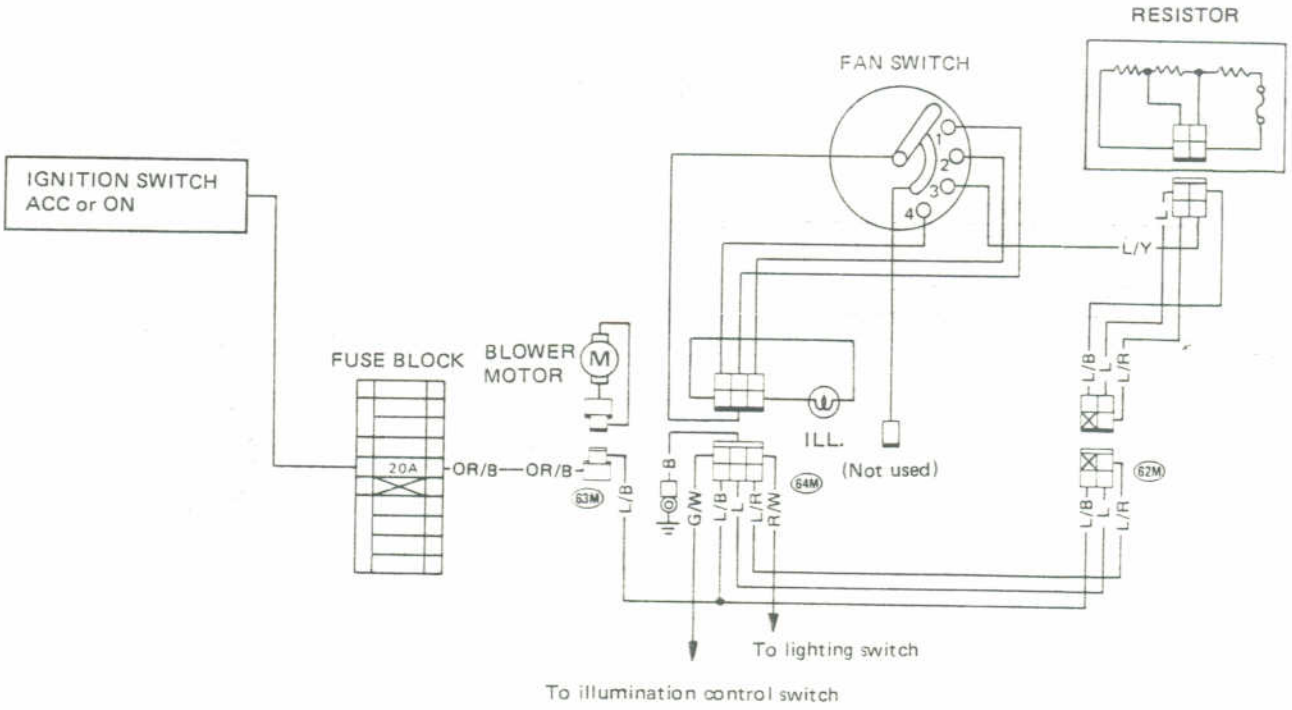
AIR CONTROL CABLE



SHA889A

HEATER ELECTRICAL CIRCUIT

Wiring Diagram

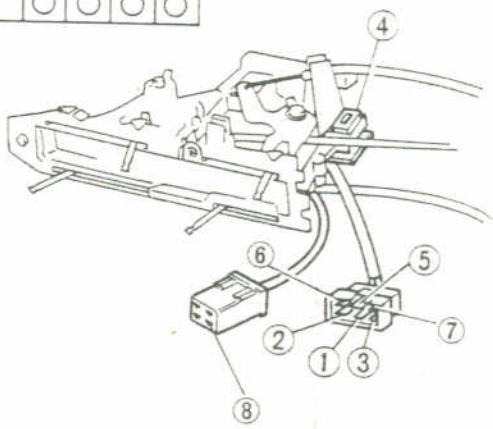


RHA677

Fan Switch

Fan switch

LEVER POSITION / TERMINAL	OFF	1	2	3	4
⑤		○	○	○	○
①		○			
②			○		
⑧				○	
③					○
④		○	○	○	○



Illumination lamp

LIGHTING SWITCH / TERMINAL	OFF	1ST, 2ND
⑥		○
⑦		○

RHA680

ELECTRICAL SYSTEM

SECTION EL

When you read wiring diagrams:
- Read GI section, "HOW TO USE THIS MANUAL".

CONTENTS

EL

WIRING DIAGRAM REFERENCE CHART

ENGINE ELECTRICAL SYSTEM	EF & EC SECTION
HEATER	HA SECTION

HARNESS CONNECTOR

Description

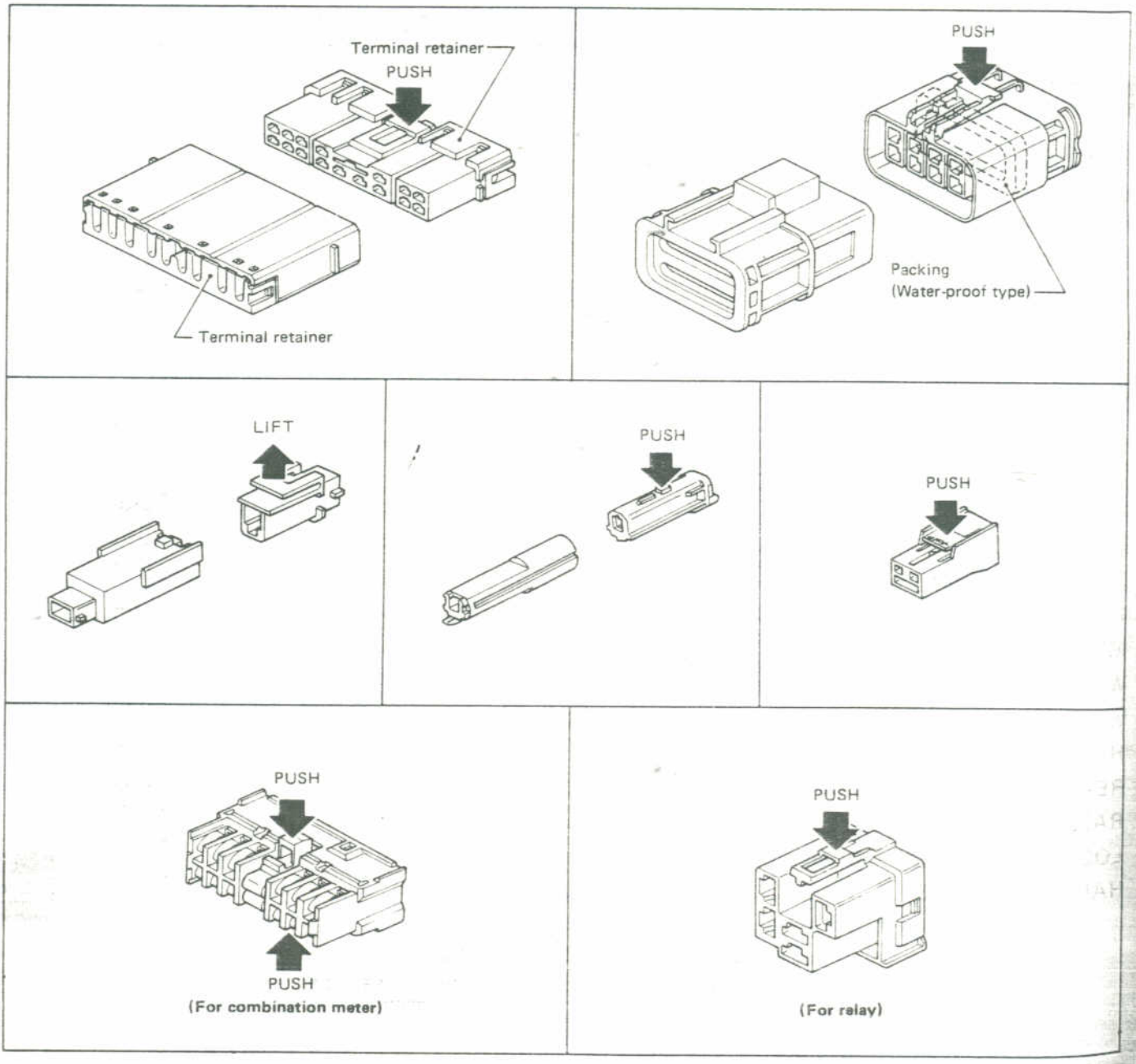
HARNESS CONNECTOR

- All harness connectors are designed so that they do not become loose or disconnected accidentally.
- The connector can be disconnected by pushing or lifting the locking section.

CAUTION:

Do not pull the harness when disconnecting the connector.

[Example]

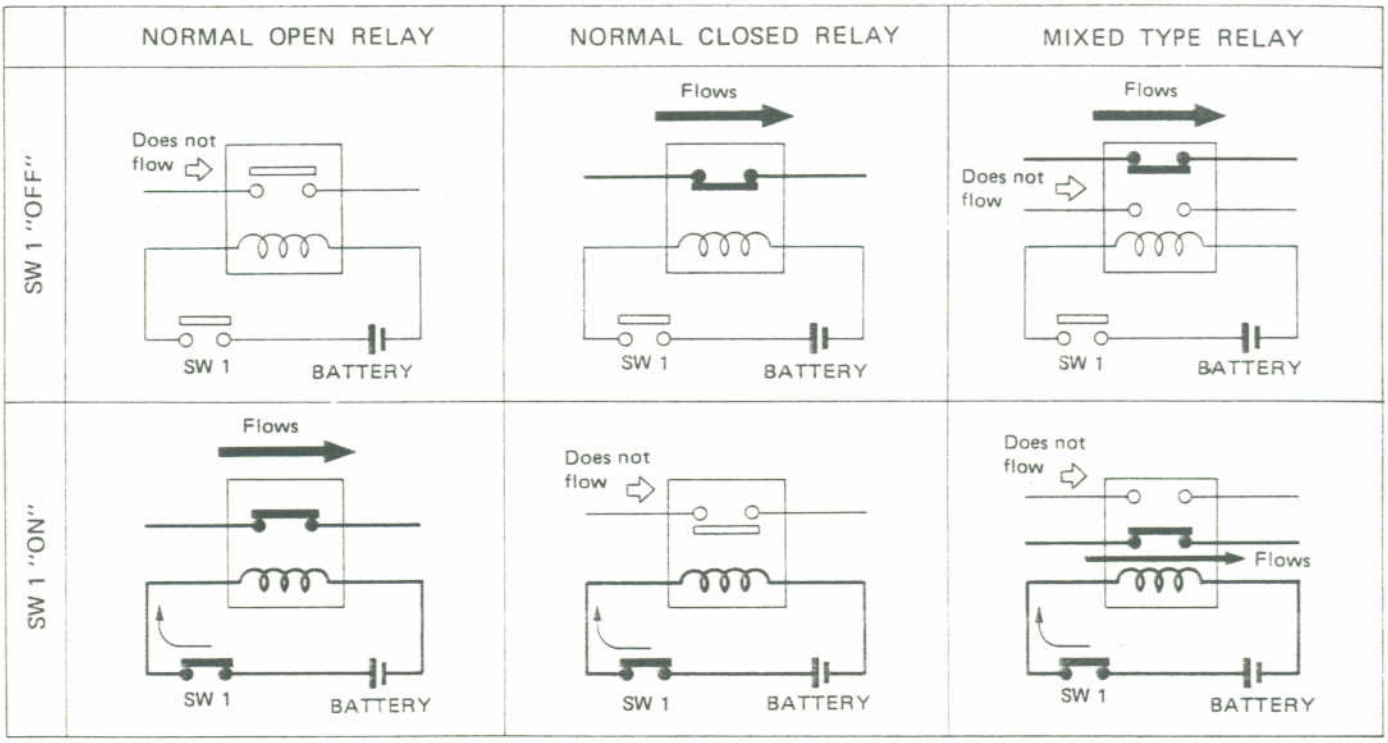


SEL769D

STANDARDIZED RELAY

Normal Open, Normal Closed and Mixed Type Relays

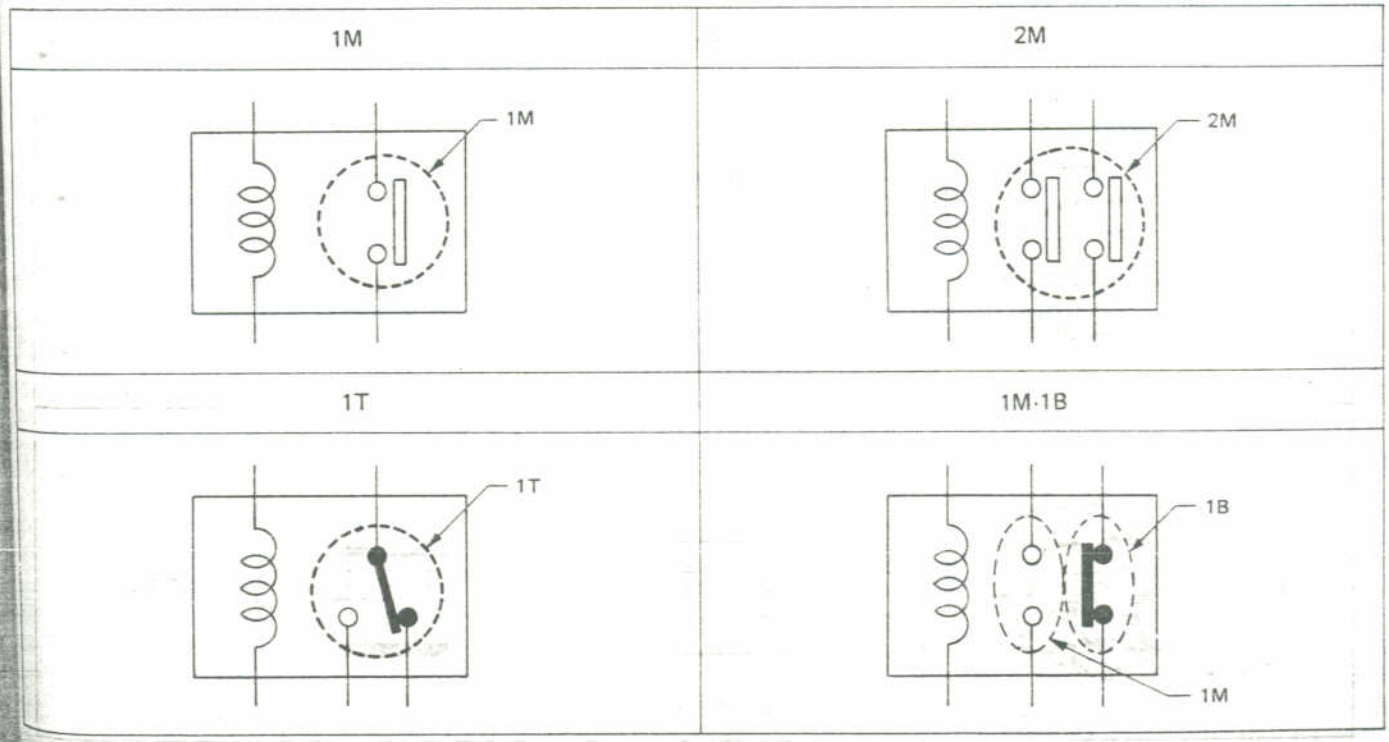
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



SEL881H

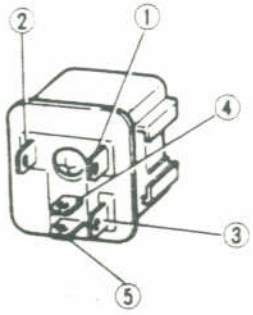
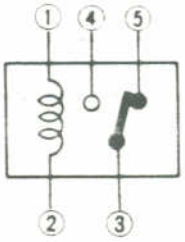
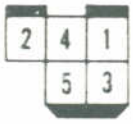
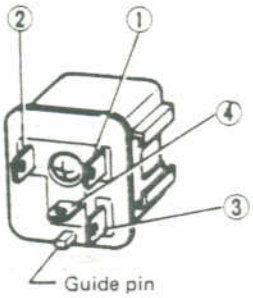
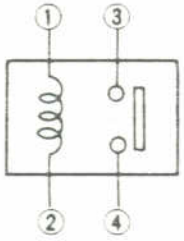
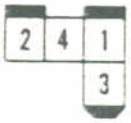
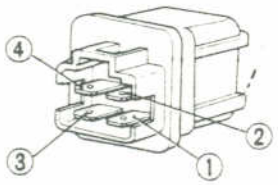
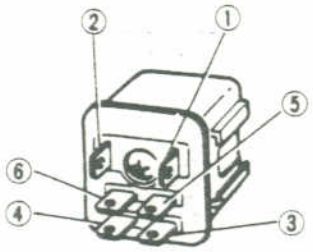
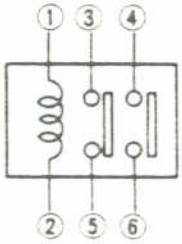
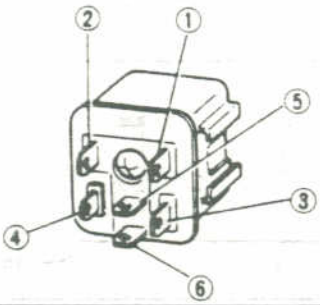
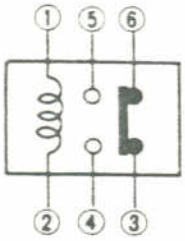
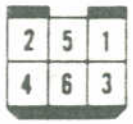
Type of Standardized Relays

1M ..... 1 Make
1T ..... 1 Transfer
2M ..... 2 Make
1M·1B ..... 1 Make 1 Break



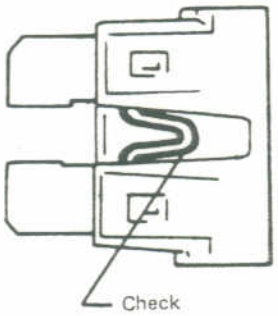
SEL882H

STANDARDIZED RELAY

Type	Outer view	Circuit	Symbols	Case color
1T				BLACK
1M				BLUE
				BLACK
2M				BROWN
1M·1B				GRAY

SEL451C

Fuse

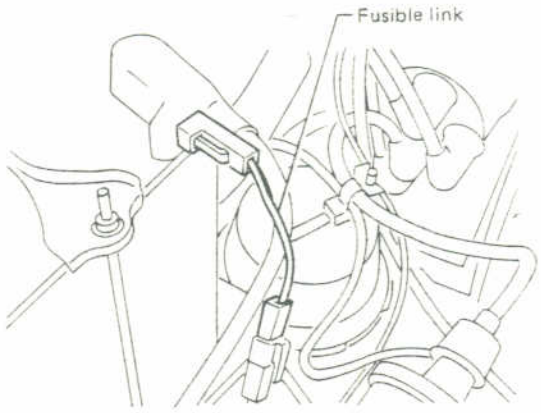


SEL276

a. If fuse is blown, be sure to eliminate cause of problem before installing new fuse.
b. Use fuse of specified rating. Never use fuse of more than specified rating.
c. Do not install fuse in oblique direction; always insert it into fuse holder properly.
d. Remove fuse for clock if vehicle is not used for a long period of time.

Fusible Link

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.



SEL027D

CAUTION:

a. If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of problem.
b. Never wrap periphery of fusible link with vinyl tape. Extreme care should be taken with this link to ensure that it does not come into contact with any other wiring harness or vinyl or rubber parts.

CAUTION:

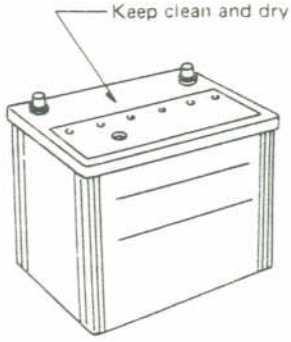
a. If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
b. After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.
c. Never add distilled water through the hole used to check specific gravity.

How to Handle Battery

METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

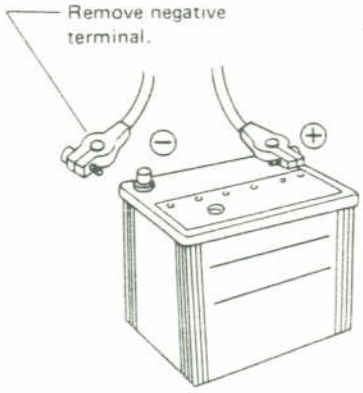
- The battery surface (particularly its top) should always be kept clean and dry.



SEL711E

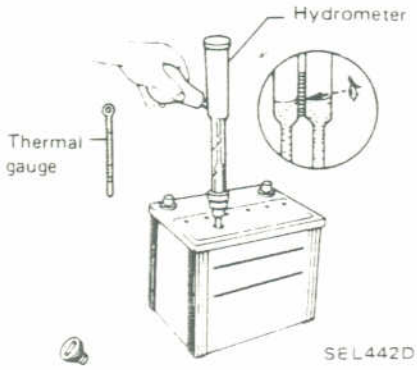
If the top surface of a battery is wet with electrolyte or water, leakage current will cause the battery to discharge. Always keep the battery clean and dry.

- When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal. (If the vehicle has an extended storage switch, turn it off.)



SEL712E

- Check the charge condition of the battery.



SEL442D

Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

WARNING:

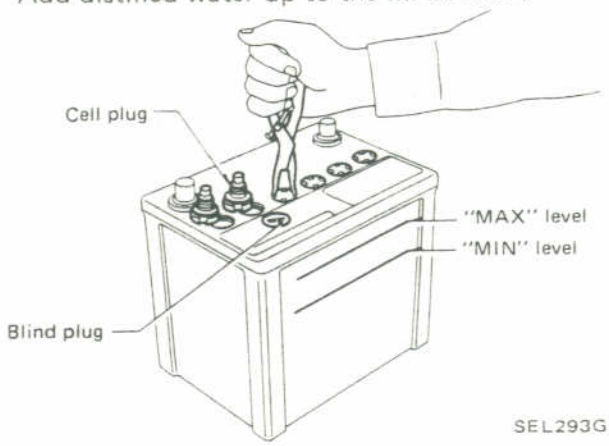
Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If the acid contacts the eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

Normally the battery does not require additional water. However, when the battery is used under severe conditions, adding distilled water may be necessary during the battery life.

To maintain serviceability, a perforated line has been added to the battery caution label.

How to Handle Battery (Cont'd)

- If the electrolyte level is low, remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.

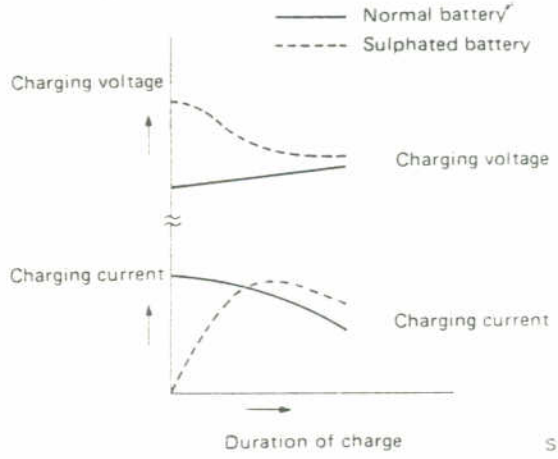


SEL293G

SULPHATION

When a battery has been left unattended for a long period of time and has a specific gravity of less than 1.100, it will be completely discharged, resulting in sulphation on the cell plates.

Compared with a battery discharged under normal conditions, the current flow in a "sulphated" battery is not as smooth although its voltage is high during the initial stage of charging, as shown in the following figure.



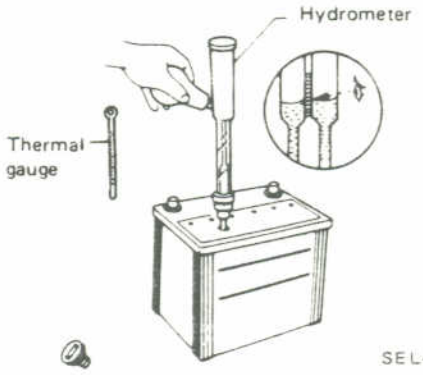
SEL709E

Specific Gravity Check

SPECIFIC GRAVITY CHECK

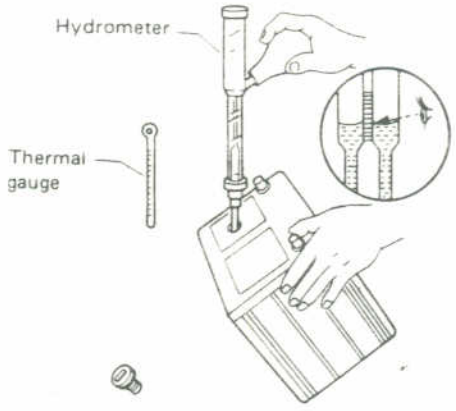
1. Read hydrometer and thermal gauge indications at eye level.

   Read top level with scale.



SEL442D

- When electrolyte level is too low, tilt battery case to raise it for easy measurement.

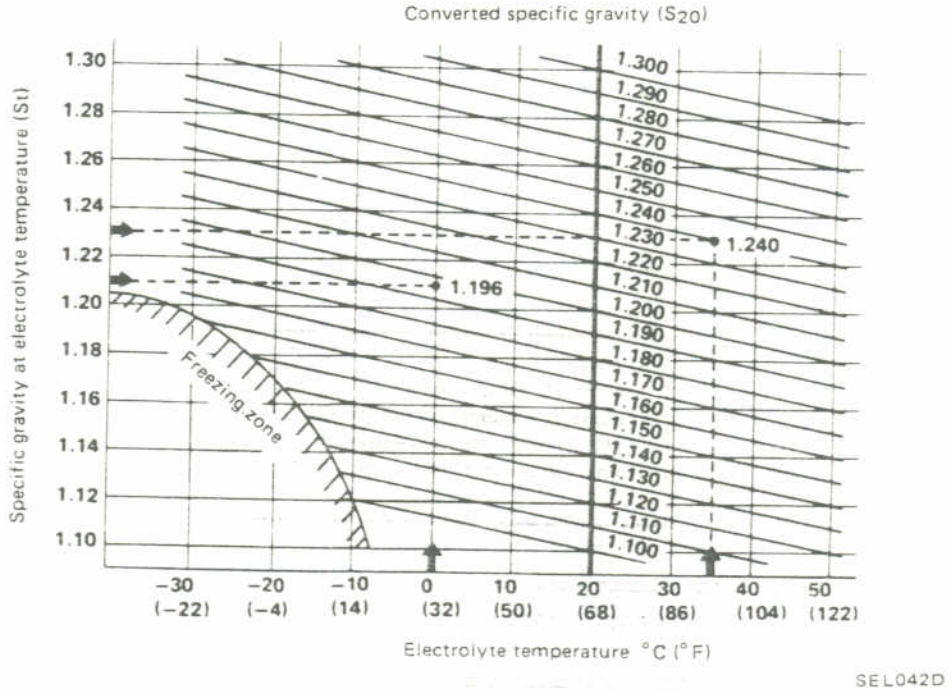


SEL710E

2. Convert into specific gravity at 20°C (68°F).

Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte is 1.230, converted specific gravity at 20°C (68°F) is 1.240.
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.



SEL042D

M.F. Battery Test and Charging Chart

Chart I

VISUAL INSPECTION
- Check battery case for cracks or bends.
- Check battery terminals for damage.
- If the difference between the max. and min. electrolyte levels in cells is within 10 mm (0.39 in), it is O.K.

N.G. → Replace battery.

O.K. →

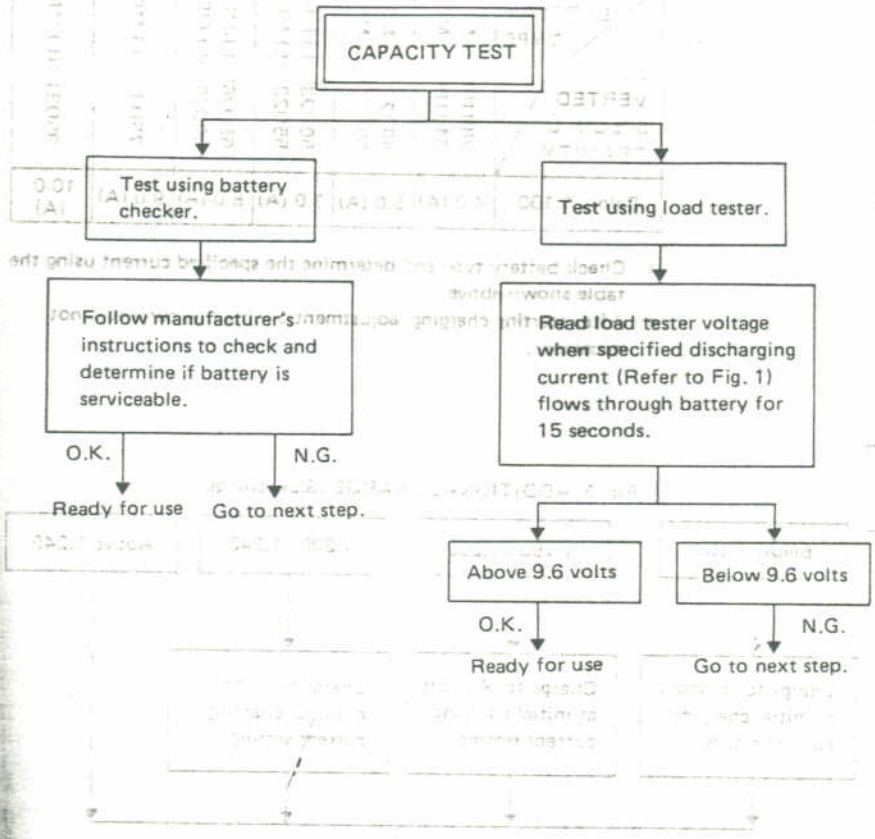
CHECKING SPECIFIC GRAVITY
Refer to "Specific Gravity Check".

- Below 1.100
  - SLOW CHARGE Refer to "A: Slow Charge".
  - CAPACITY TEST Refer to "Chart II".
    - O.K. → Ready for use
    - N.G. → Replace battery.
- 1.100 - 1.220
  - * STANDARD CHARGE Refer to "B: Standard Charge".
  - QUICK CHARGE Refer to "C: Quick Charge".
    - CAPACITY TEST Refer to "Chart II".
      - O.K. → Ready for use
      - N.G. → CHECKING SPECIFIC GRAVITY Refer to "Specific Gravity Check".
  - RECHARGE Refer to "C: Quick Charge".
    - **If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).**
  - CAPACITY TEST Refer to "Chart II".
    - O.K. → Ready for use
    - N.G. → Replace battery.
- Above 1.220
  - CAPACITY TEST Refer to "Chart II".
    - O.K. → Ready for use
      - Mount battery again and check loose terminals. Also, check other related circuits.
    - N.G. → QUICK CHARGE Refer to "C: Quick Charge".
      - **Time required: 45 min.**
      - CAPACITY TEST Refer to "Chart II".
        - O.K. → Ready for use
        - N.G. → Replace battery.

*** "STANDARD CHARGE" is recommended in case that the vehicle is in storage after charging.**

M.F. Battery Test and Charging Chart (Cont'd)

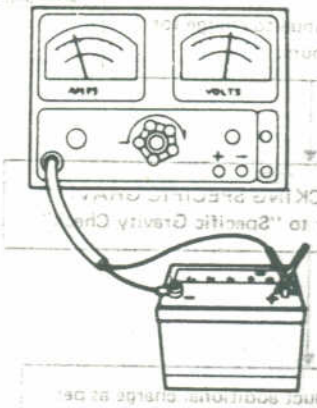
Chart II



- Check battery type and determine the specified current using the following table.

Fig. 1 DISCHARGING CURRENT (Load tester)

Type	Current (A)
28B19R(L)-MF	90
34B19R(L)-MF	99
46B24R(L)-MF	135
55B24R(L)-MF	135
50D23R(L)-MF	150
55D23R(L)-MF	180
65D26R(L)-MF	195
80D26R(L)-MF	195
75D31R(L)-MF	210
95D31R(L)-MF	240



M.F. Battery Test and Charging Chart (Cont'd)

A: SLOW CHARGE

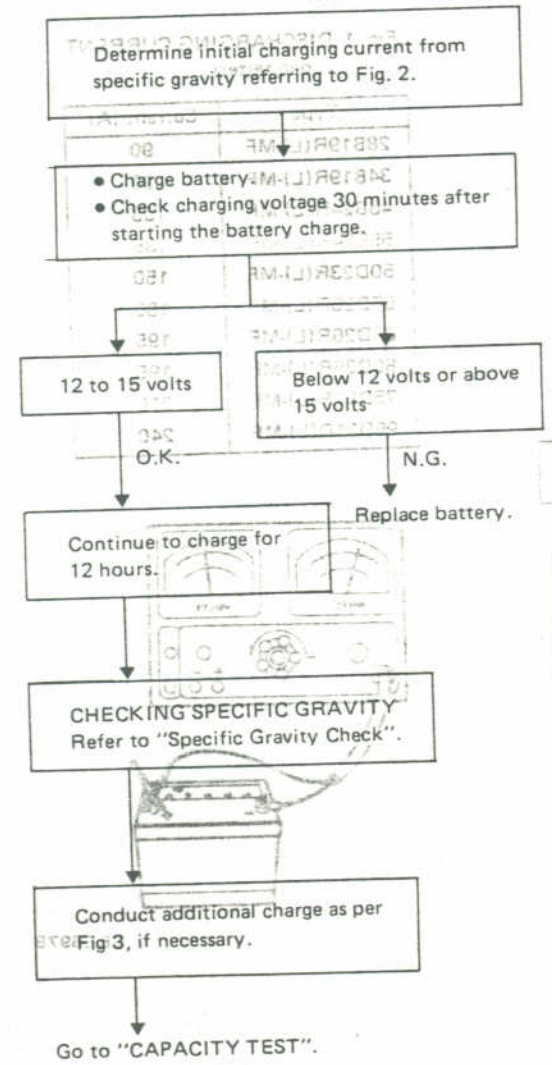
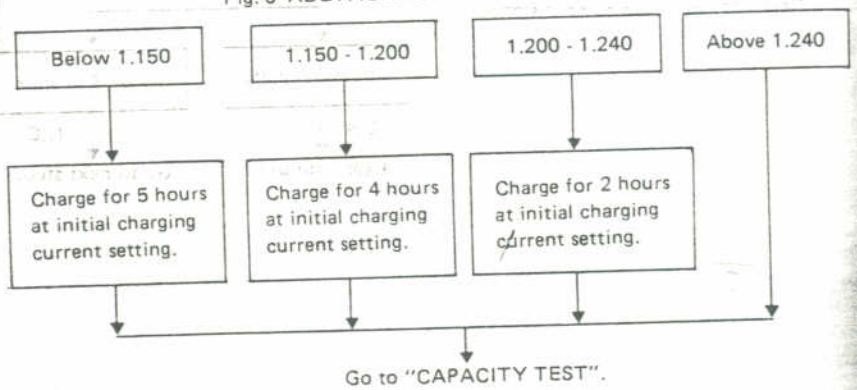


Fig. 2 INITIAL CHARGING CURRENT SETTING (Slow charge)

BATTERY TYPE / CONVERTED SPECIFIC GRAVITY	28B19R(L)-MF 34B19R(L)-MF	46B24R(L)-MF 55B24R(L)-MF	50D23R(L)-MF 55D23R(L)-MF	65D26R(L)-MF 80D26R(L)-MF	75D31R(L)-MF	95D31R(L)-MF
Below 1.100	4.0 (A)	5.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)	10.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 3 ADDITIONAL CHARGE (Slow charge)



CAUTION:

a. Set charging current to value specified in Fig. 2. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
b. Keep battery away from open flame while it is being charged.
c. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
d. If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

M.F. Battery Test and Charging Chart (Cont'd)

B: STANDARD CHARGE

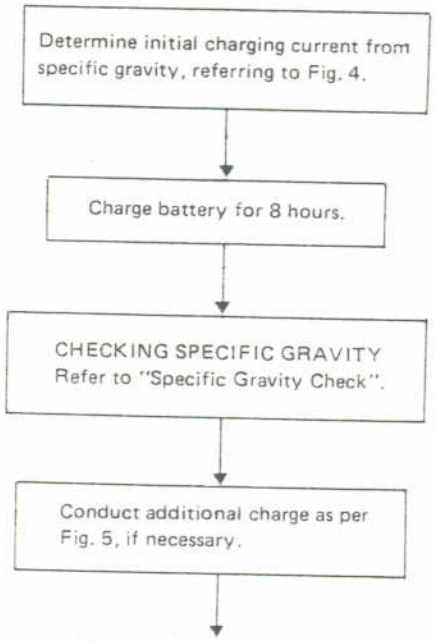
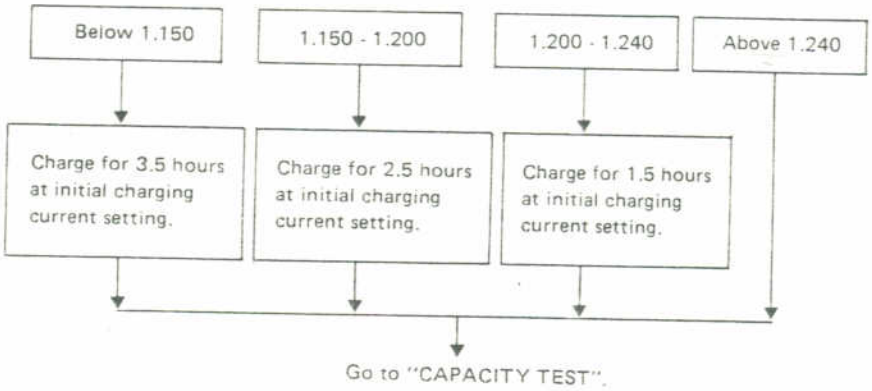


Fig. 4 INITIAL CHARGING CURRENT SETTING (Standard charge)

BATTERY TYPE / CONVERTED SPECIFIC GRAVITY	28B19R(L)-MF 34B19R(L)-MF	46B24R(L)-MF 55B24R(L)-MF	50D23R(L)-MF 55D23R(L)-MF	65D26R(L)-MF 80D26R(L)-MF	75D31R(L)-MF	95D31R(L)-MF
1.100 - 1.130	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)
1.130 - 1.160	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)
1.160 - 1.190	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)
1.190 - 1.220	2.0 (A)	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	5.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 5 ADDITIONAL CHARGE (Standard charge)



CAUTION:

a. Do not use standard charge method on a battery whose specific gravity is less than 1.100.
b. Set charging current to value specified in Fig. 4. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
c. Keep battery away from open flame while it is being charged.
d. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
e. If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

M.F. Battery Test and Charging Chart (Cont'd)

C: QUICK CHARGE

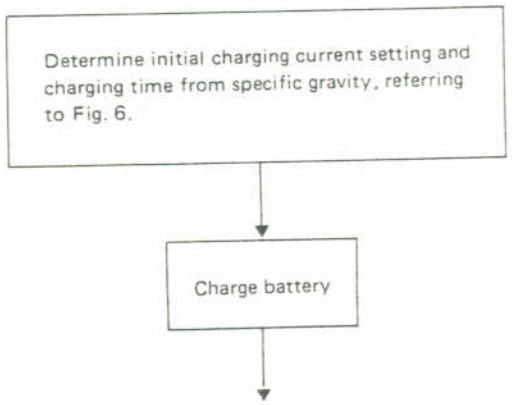


Fig. 6 INITIAL CHARGING CURRENT SETTING AND CHARGING TIME (Quick charge)

BATTERY TYPE / CURRENT [A] / CONVERTED SPECIFIC GRAVITY	28B19R(L)-MF 34B19R(L)-MF	46B24R(L)-MF 55B24R(L)-MF 50D23R(L)-MF	55D23R(L)-MF 65D26R(L)-MF 80D26R(L)-MF	75D31R(L)-MF 95D31R(L)-MF
	10 (A)	15 (A)	20 (A)	30 (A)
1.100 - 1.130	2.5 hours			
1.130 - 1.160	2.0 hours			
1.160 - 1.190	1.5 hours			
1.190 - 1.220	1.0 hours			
Above 1.220	0.75 hours (45 min.)			

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

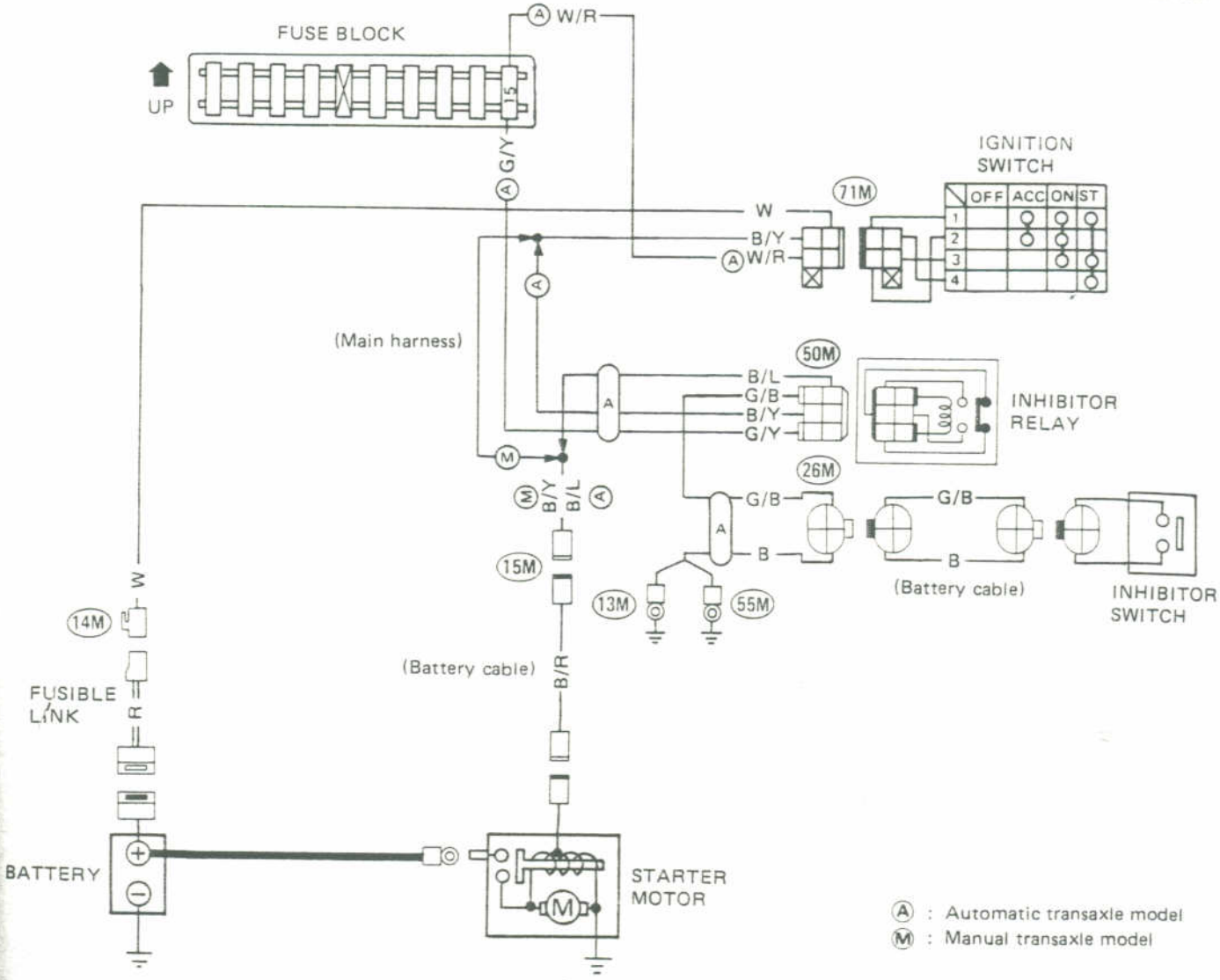
CAUTION:

a. Do not use quick charge method on a battery whose specific gravity is less than 1.100.
b. Set initial charging current to value specified in Fig. 6. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
c. Keep battery away from open flame while it is being charged.
d. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
e. Be careful of a rise in battery temperature because a large current flow is required during quick-charge operation.
   If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).
f. Do not exceed the charging time specified in Fig. 6, because charging battery over the charging time can cause deterioration of the battery.

Service Data and Specifications (S.D.S.)

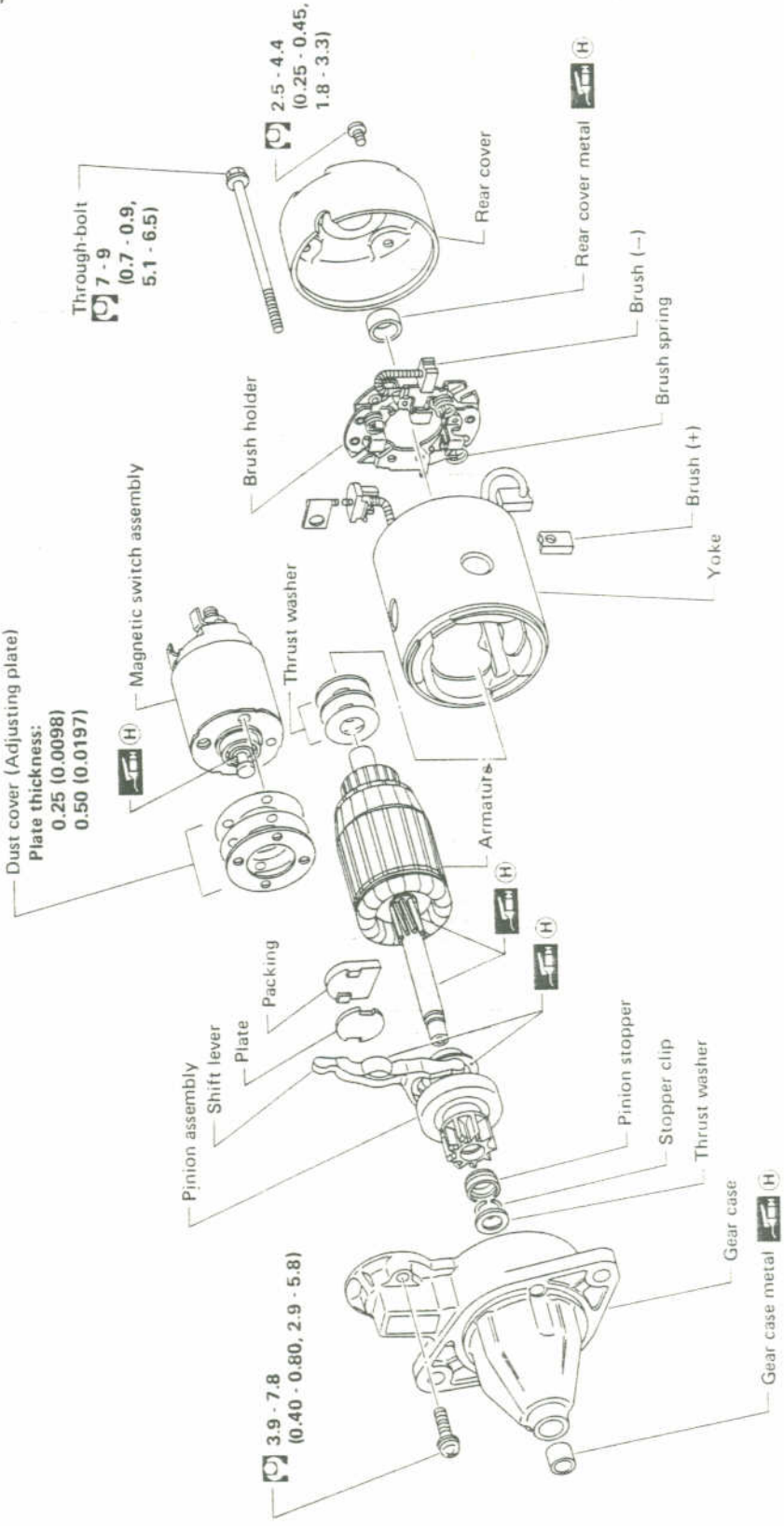
Applied model		All
Type		46B24L-MF
		Maintenance-free
Capacity	V-AH	12-45

Wiring Diagram



Construction

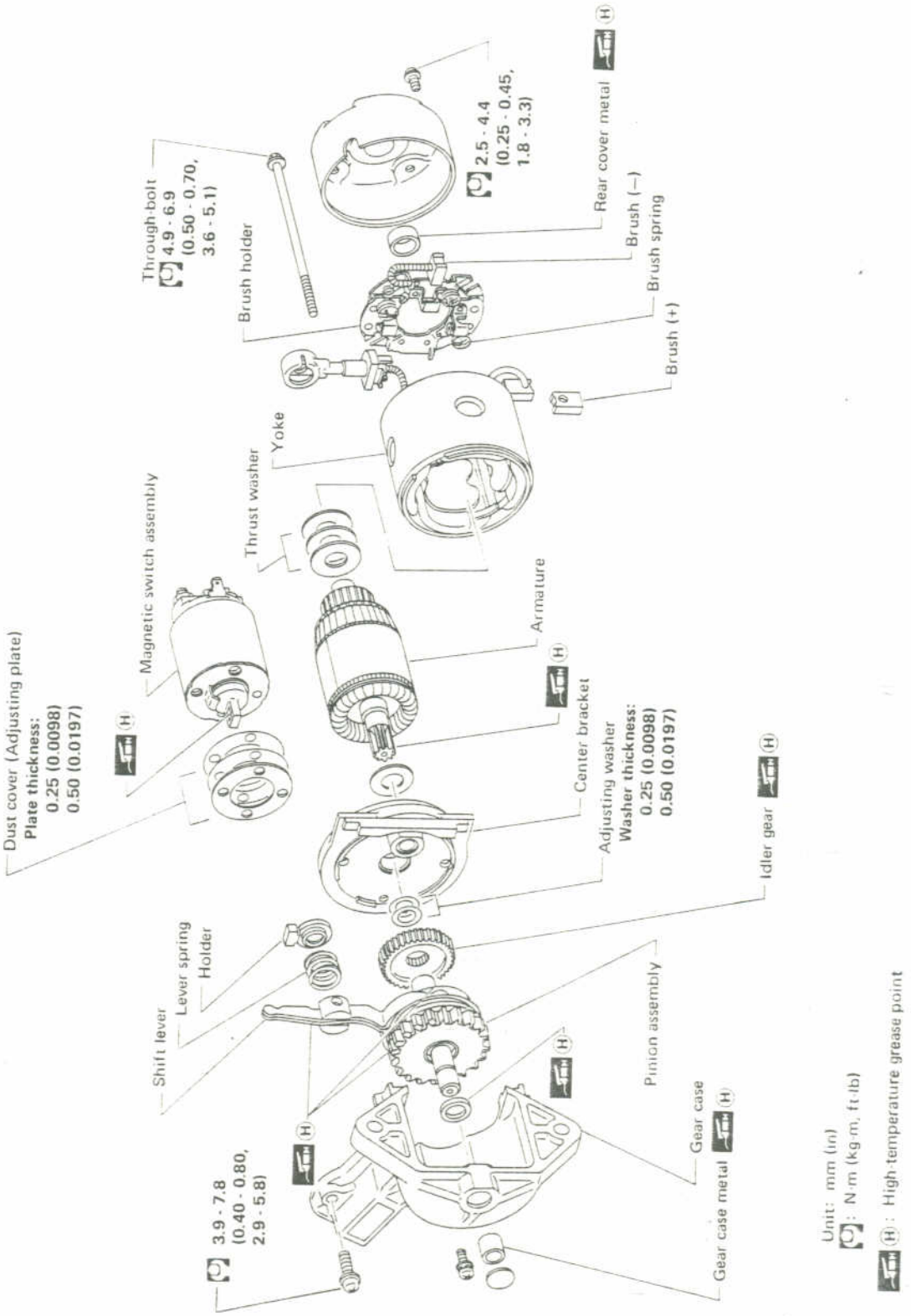
M2T37081 (M/T models)



SEL771D

Construction (Cont'd)

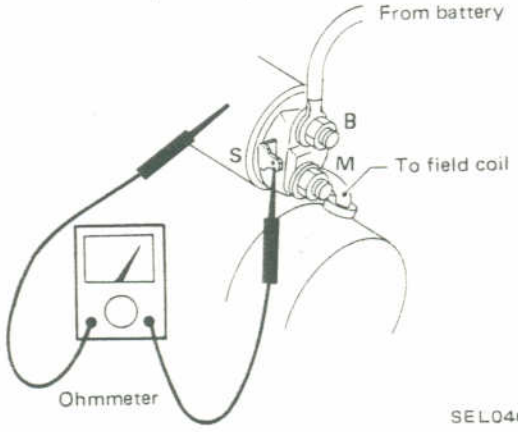
M2T23685 (A/T models)



SEL045D

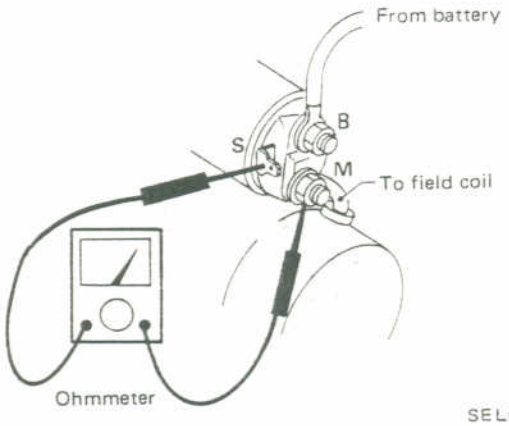
Magnetic Switch Check

1. Continuity test (between "S" terminal and switch body).
   - No continuity ... Replace.



SEL046D

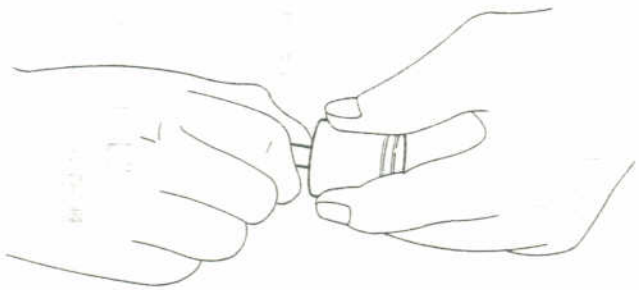
2. Continuity test (between "S" terminal and "M" terminal).
   - No continuity ... Replace.



SEL047D

Plunger Check

- Pull by hand the portion where plunger lever engages with magnet of magnetic switch to check for looseness.

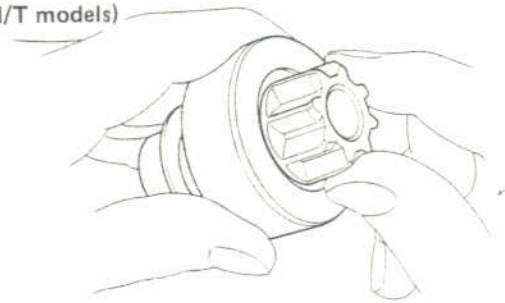


SEL772D

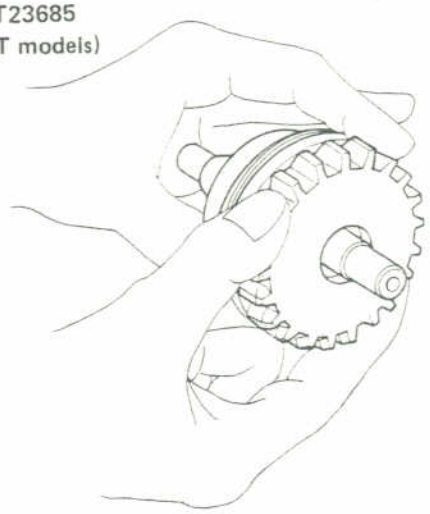
Pinion/Clutch Check

1. Check clutch.
   Check pinion to see that it locks properly when turned in "drive" direction and rotates smoothly when turned in reverse.

M2T37081
(M/T models)



M2T23685
(A/T models)



SEL048D

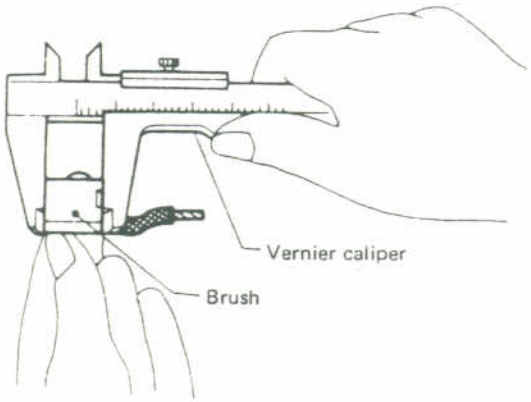
   - Pinion does not lock in either direction or unusual resistance is evident ... Replace.
2. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
3. Inspect idle gear teeth. (A/T models only)
   - Replace idle gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)

Brush Check

BRUSH

Check wear of brush.

Wear limit length: 11.5 mm (0.453 in)

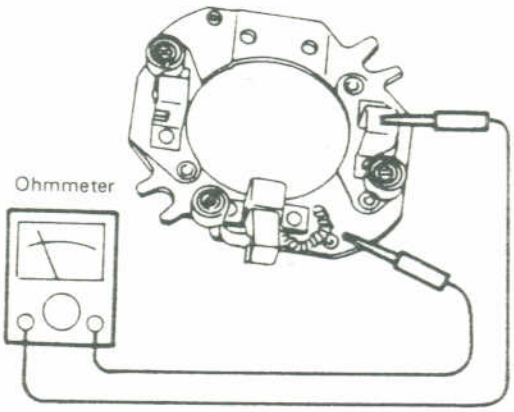


SEL626B

- Excessive wear ... Replace.

BRUSH HOLDER

1. Perform insulation test between brush holder (positive side) and its base (negative side).



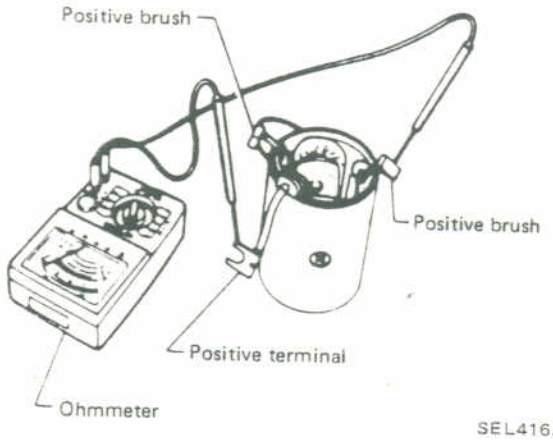
SEL627B

- Continuity exists ... Replace.

2. Check brush holder to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

Field Coil Check

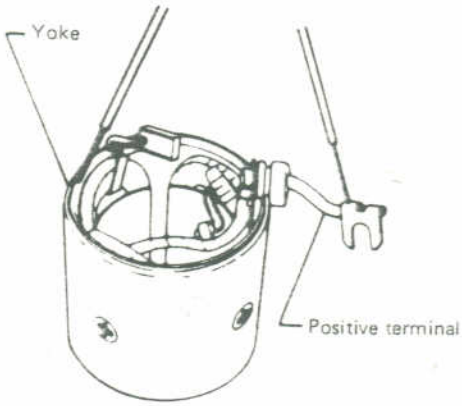
1. Continuity test (between field coil positive terminal and positive brushes).



SEL416A

- No continuity ... Replace field coil.

2. Insulation test (between field coil positive terminal and yoke).

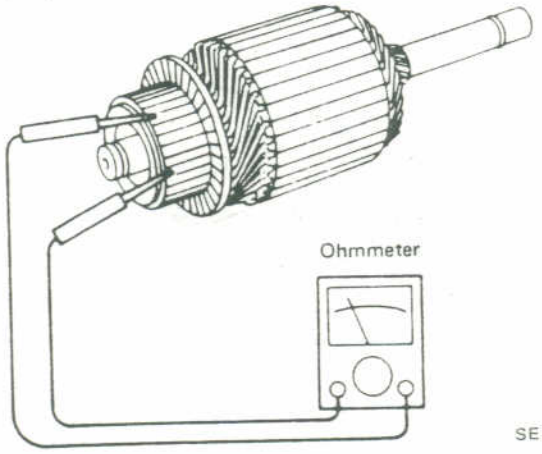


SEL417A

- Continuity exists ... Replace field coil.

Armature Check

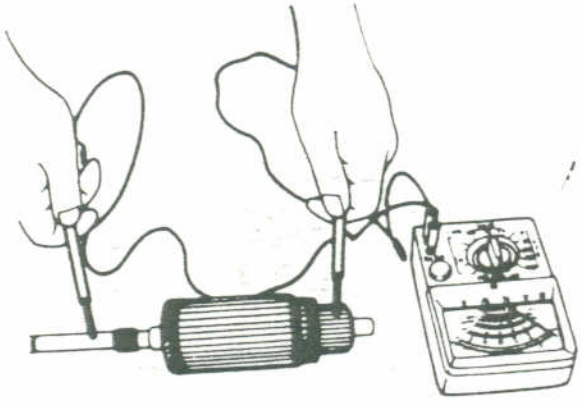
1. Continuity test (between two segments side by side).



SEL625B

- No continuity ... Replace.

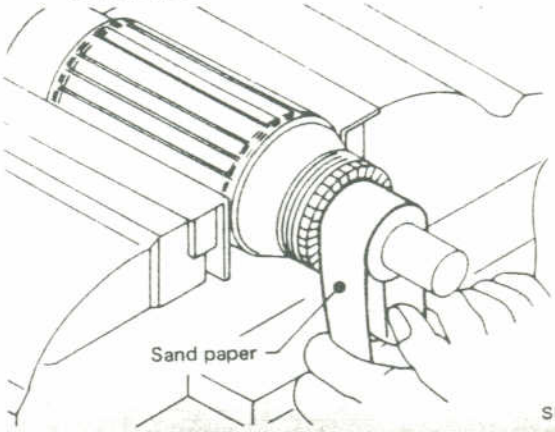
2. Insulation test (between each commutator bar and shaft).



EE022

- Continuity exists ... Replace.

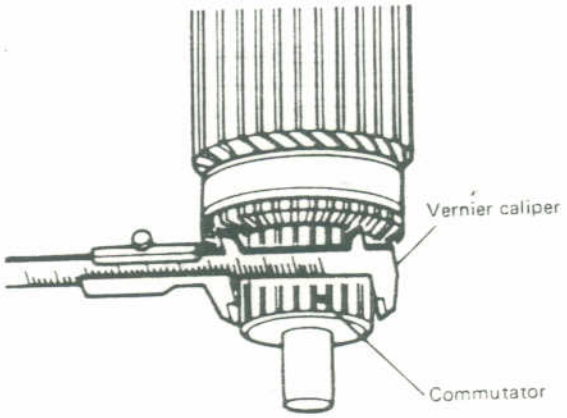
3. Check commutator surface.
   - Rough ... Sand lightly with No. 500 - 600 sandpaper.



SEL624B

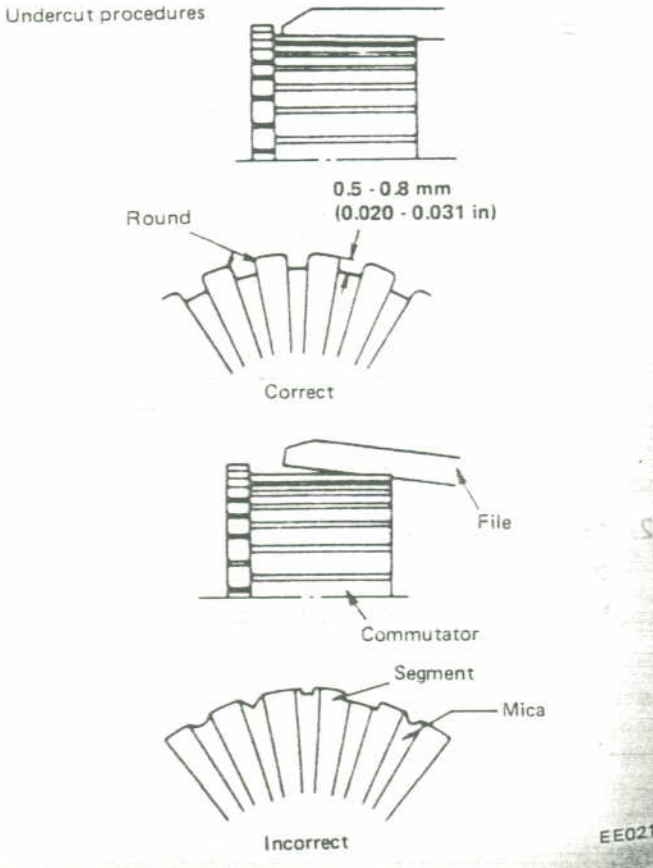
4. Check diameter of commutator.

   Commutator minimum diameter:
   31 mm (1.22 in)
   - Less than specified value ... Replace.



SEL418A

5. Check depth of insulating mica from commutator surface.
   - Less than 0.2 mm (0.008 in) ... Undercut to 0.5 - 0.8 mm (0.020 - 0.031 in)



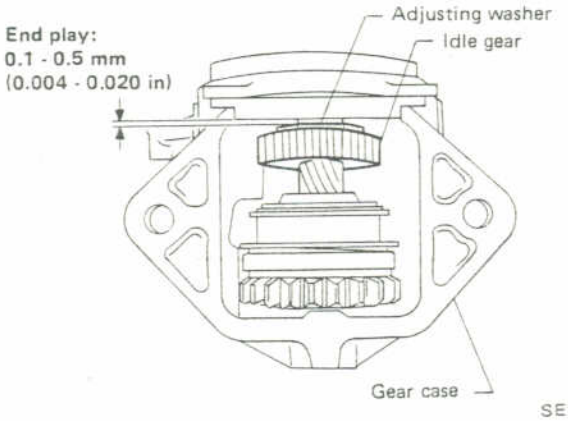
EE021

Reassembly

Carefully observe the following instructions.

a. Apply grease to:
- Rear cover metal
- Gear case metal
- Frictional surface of pinion
- Moving portion of shift lever
- Plunger of magnetic switch

b. **After assembling gear case, pinion assembly, idler gear, adjusting washers and center bracket, turn idler gear with your hand in axial direction and adjust end play to the 0.1 to 0.5 mm (0.004 to 0.020 in) range using adjusting washer(s). (A/T models only)**



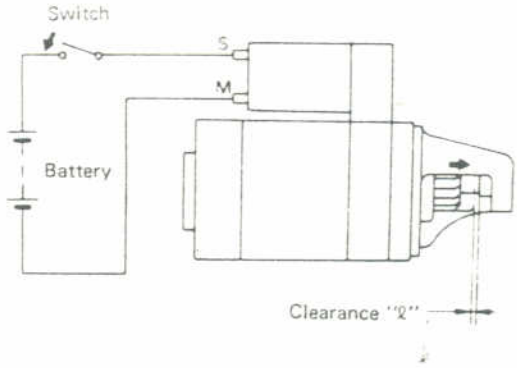
SEL049D

c. **Check pinion to see if its engagement length is correct**

M/T models

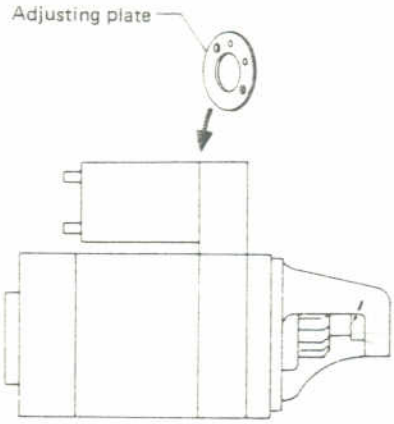
With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance "ℓ" between the front edge of the pinion and the pinion stopper.

Clearance "ℓ": 0.3 - 2.5 mm (0.012 - 0.098 in)



SEL632B

- Not in the specified value ... Adjust by adjusting plate.

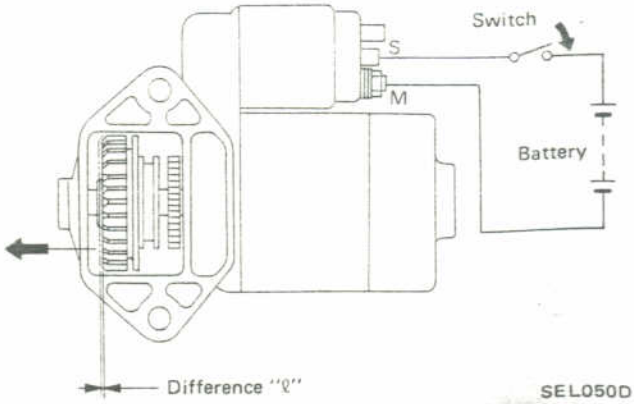


SEL633B

A/T models

Measure difference in length "ℓ" of pinion assembly front edge when pinion assembly is forced out by the magnetic switch and then when it is pulled out by hand.

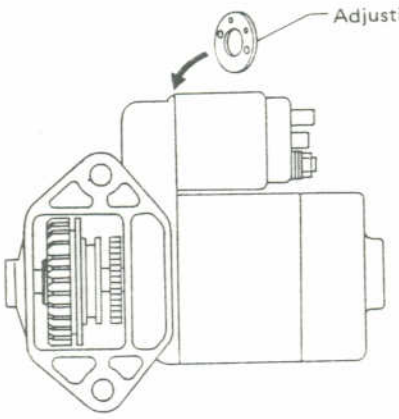
Difference "ℓ": 0.3 - 2.5 mm (0.012 - 0.098 in)



SEL050D

Reassembly (Cont'd)

- Not in the specified value ... Adjust by adjusting plate.

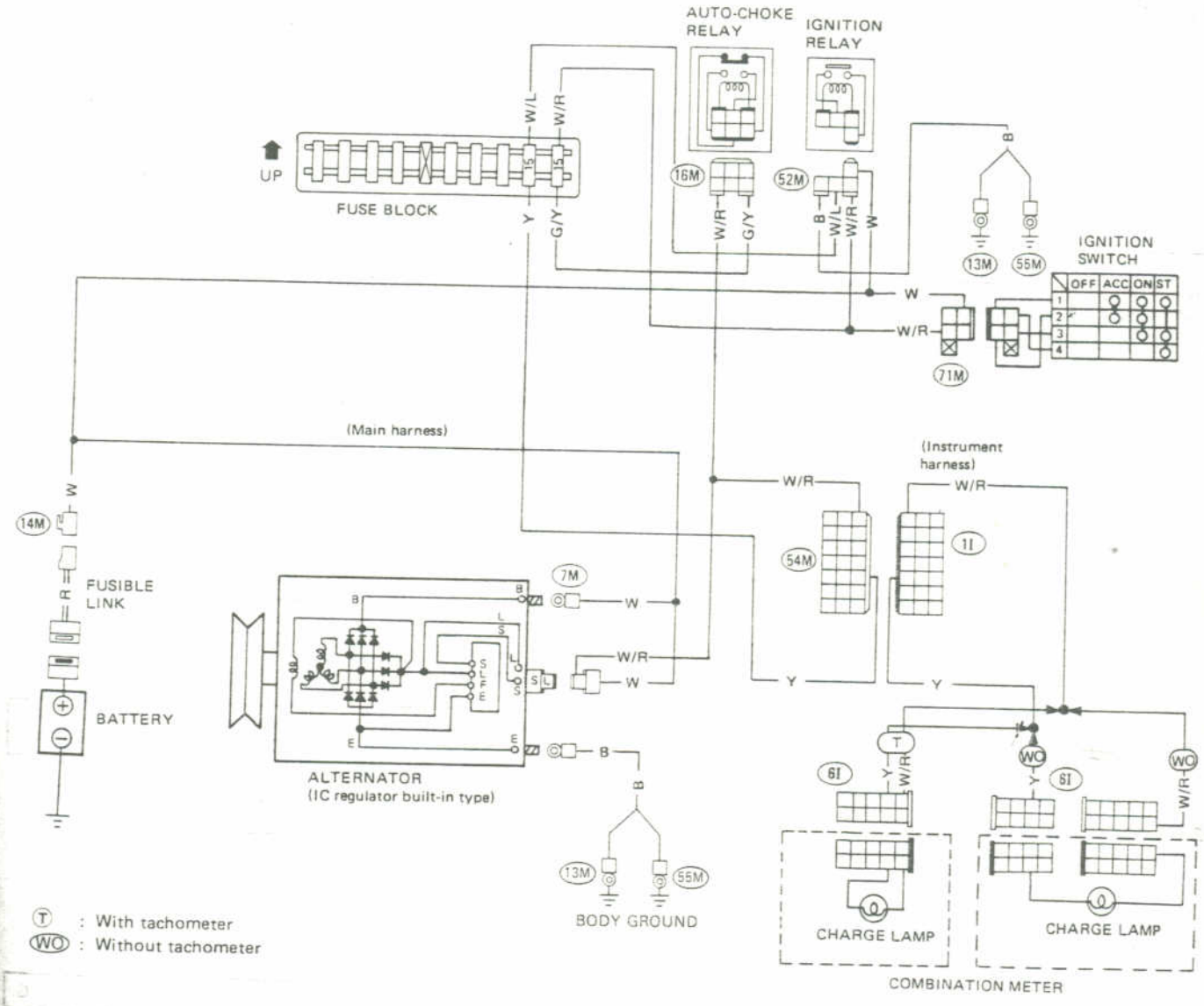


SEL051D

Service Data and Specifications (S.D.S.)

Applied model			M/T models	A/T models
Type			M2T37081	M2T23685
System voltage		V	12	
No-load	Terminal voltage	V	11.5	
	Current	A	Less than 55	Less than 65
	Revolution	rpm	More than 7,000	More than 2,000
Outer diameter of commutator		mm (in)	More than 31 (1.22)	
Minimum length of brush		mm (in)	11.5 (0.453)	
Brush spring tension		N (kg, lb)	13.7 - 25.5 (1.4 - 2.6, 3.1 - 5.7)	
Clearance "ℓ" between pinion front edge and pinion stopper		mm (in)	0.3 - 2.5 (0.012 - 0.098)	–
Difference "ℓ" in height of pinion assembly		mm (in)	–	0.3 - 2.5 (0.012 - 0.098)

Wiring Diagram

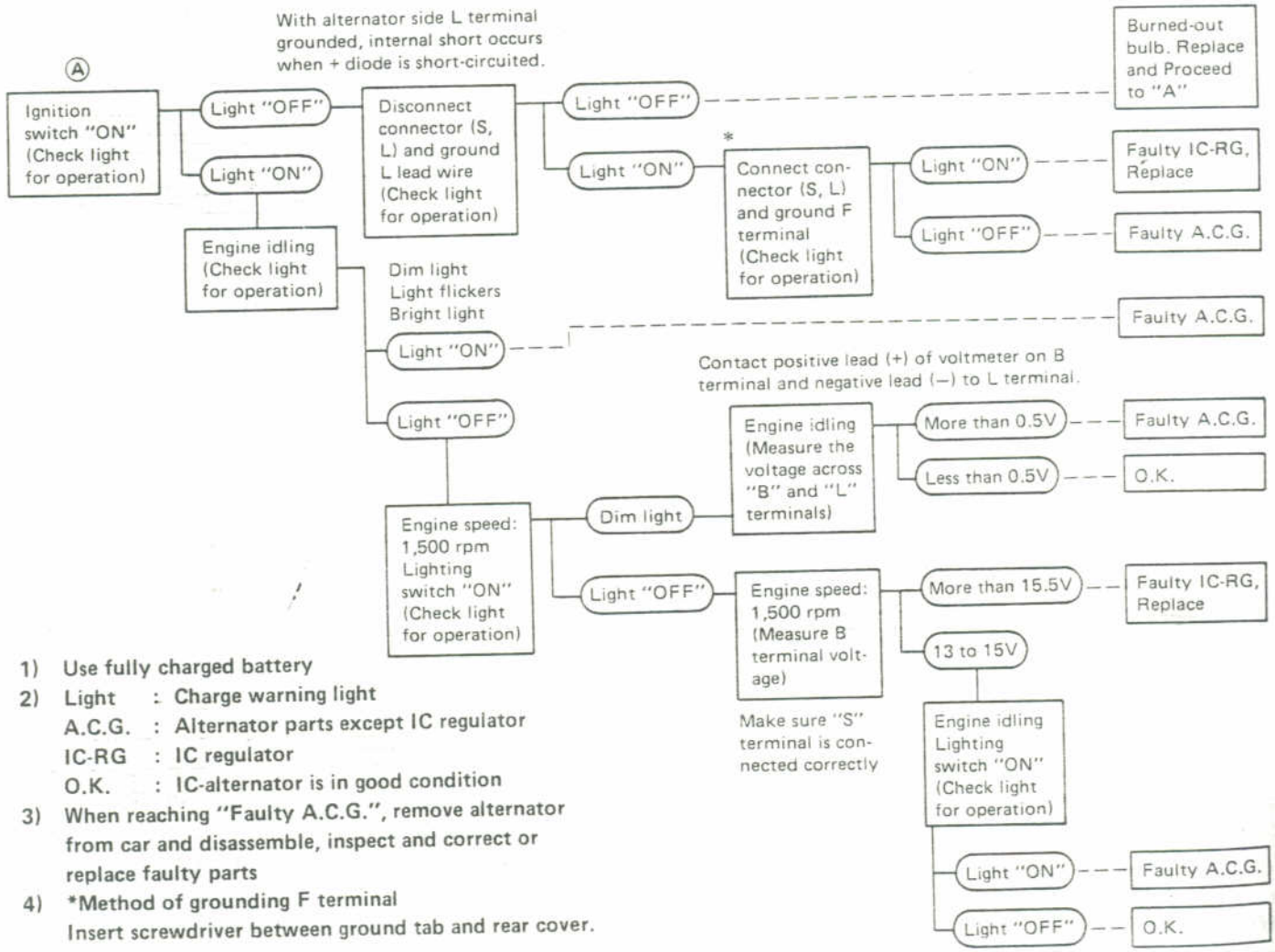


SEL506I

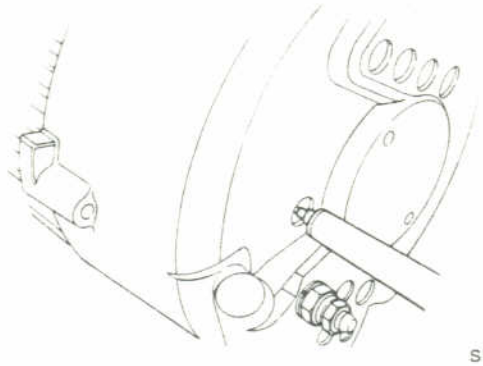
Trouble-shooting

Before conducting an alternator test, make sure that the battery is fully charged. A 30-Volt voltmeter and suitable test probes are necessary for the test. The alternator can be checked easily by referring to the Inspection Table.

WITH IC REGULATOR



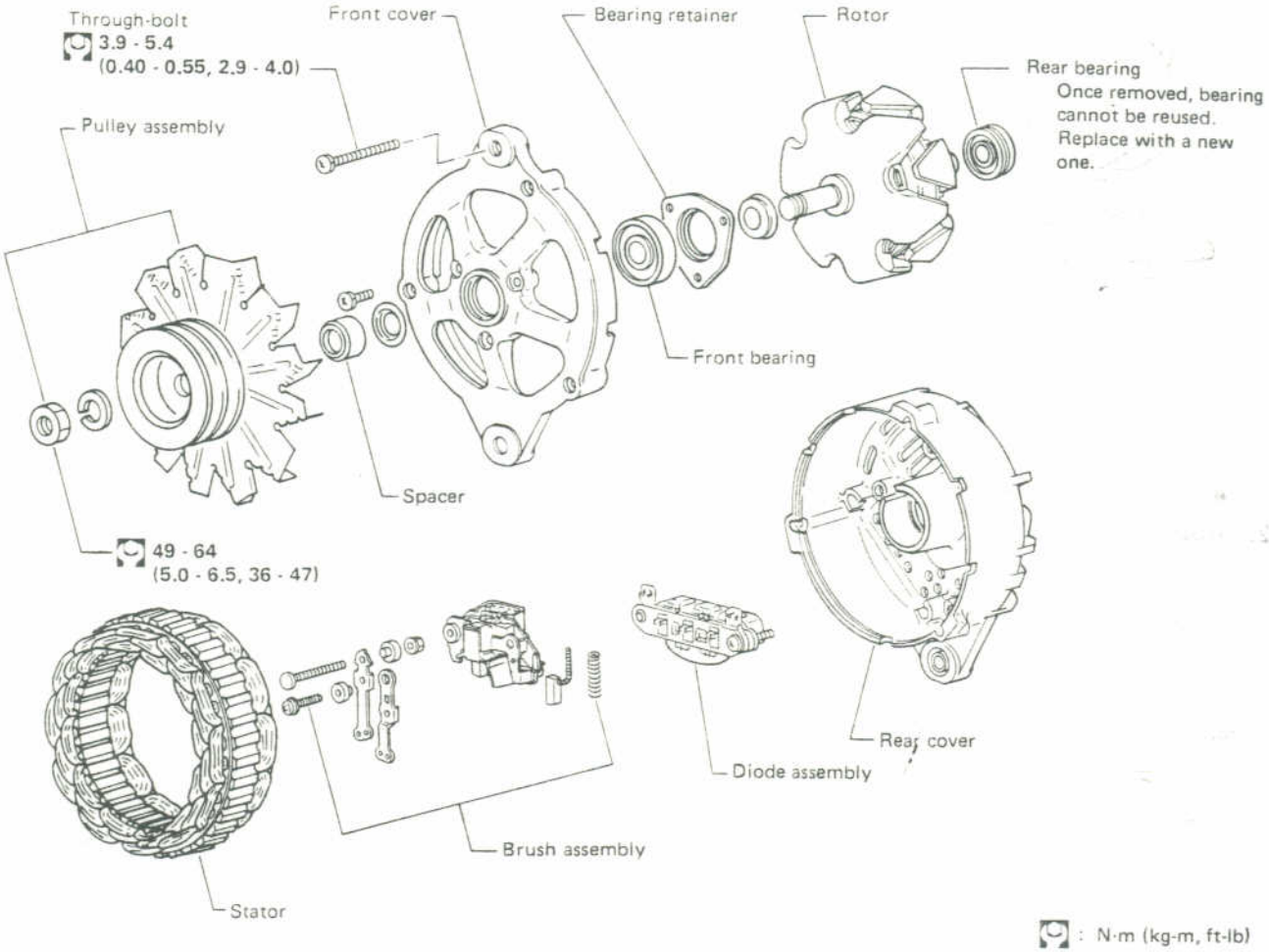
1) Use fully charged battery
2) Light : Charge warning light
   A.C.G. : Alternator parts except IC regulator
   IC-RG : IC regulator
   O.K. : IC-alternator is in good condition
3) When reaching "Faulty A.C.G.", remove alternator from car and disassemble, inspect and correct or replace faulty parts
4) *Method of grounding F terminal
   Insert screwdriver between ground tab and rear cover.



SEL890A

5) Terminals "B" and "E" are marked on rear cover of alternator.

Construction

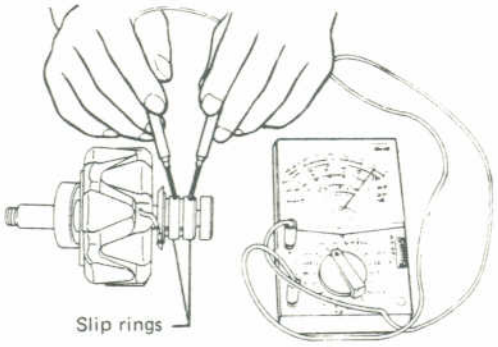


: N·m (kg-m, ft-lb)

SEL053D

Rotor Slip Ring Check

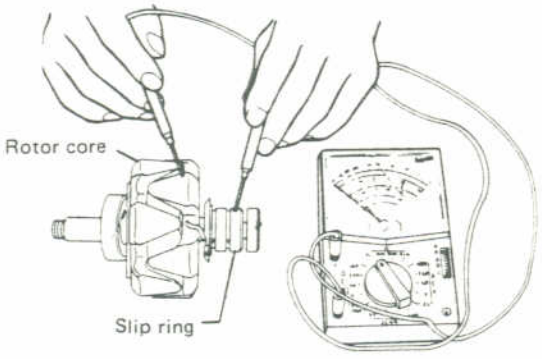
1. Continuity test



SEL589A

- No continuity ... Replace rotor.

2. Insulation test



SEL590A

- Continuity exists ... Replace rotor.

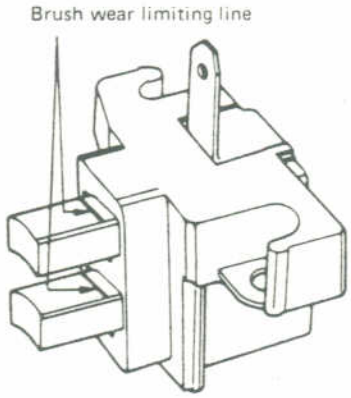
3. Check slip ring for wear.

Slip ring minimum outer diameter:
32.4 mm (1.276 in)

Brush Check

1. Check smooth movement of brush.
   - Not smooth ... Check brush holder and clean.
2. Check brush for wear.

Wear limit length: 7 mm (0.28 in)



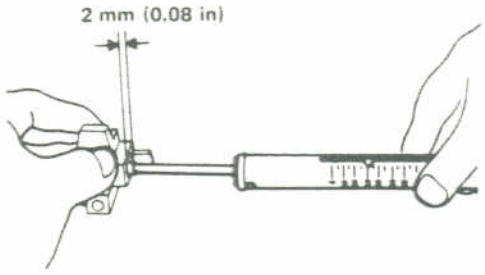
SEL988A

- Less than the specified value ... Replace.

3. Check brush pig tail for damage.
   - Damaged ... Replace.
4. Check brush spring pressure.
   Measure brush spring pressure with brush projected approximately 2 mm (0.08 in) from brush holder.

Spring pressure:
3.040 - 4.217 N
(310 - 430 g, 10.93 - 15.17 oz)

When brush is worn, pressure decreases approximately 0.196 N (20 g, 0.71 oz) per 1 mm (0.04 in) wear.



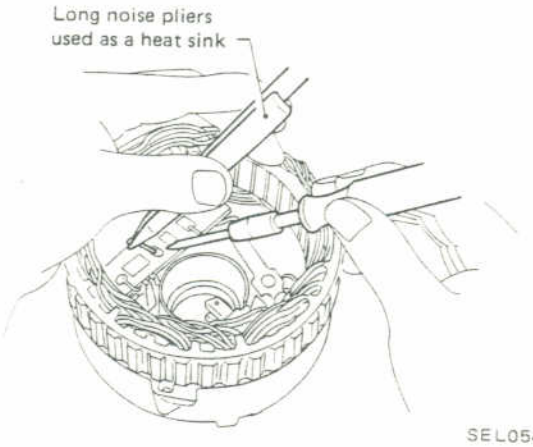
EE049

- Not in the specified value ... Replace.

Stator Check

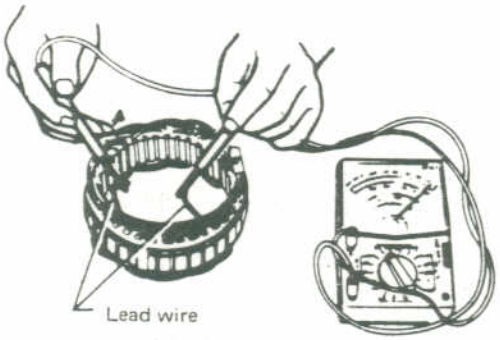
To test the startor or diode, you must separate them by unsoldering the connecting wires.

CAUTION:
Used only as much heat as required to melt solder.
Diodes will be damaged by excessive heat.



SEL054D

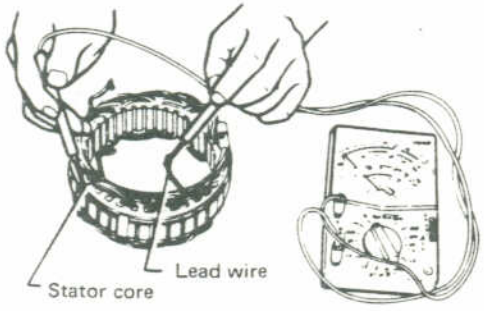
1. Continuity test



SEL070

- No continuity ... Replace stator.

2. Ground test



SEL071

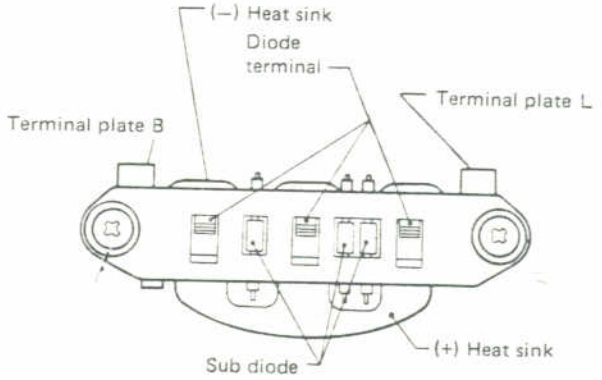
- Continuity exists ... Replace stator.

Diode Check

Diode

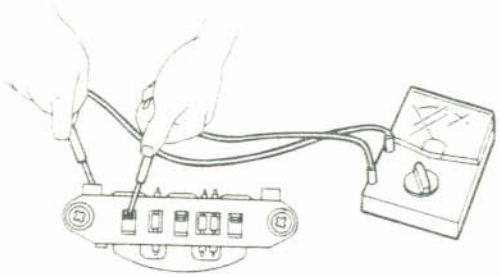
Perform a continuity test using ohmmeter.

Ohmmeter probes		Continuity
Positive	Negative	
Terminal plate (B)	Diode terminal	Yes
Diode terminal	Terminal plate (B)	No
(–) Heat sink	Diode terminal	No
Diode terminal	(–) Heat sink	Yes
Terminal plate (L)	Diode terminal	Yes
Diode terminal	Terminal plate (L)	No



SEL903A

Positive diode

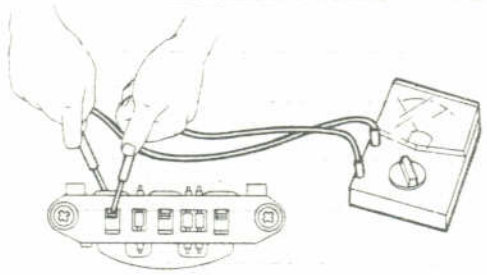


SEL904A

- Conduction test is N.G. ... Replace diode assembly.

Diode Check (Cont'd)

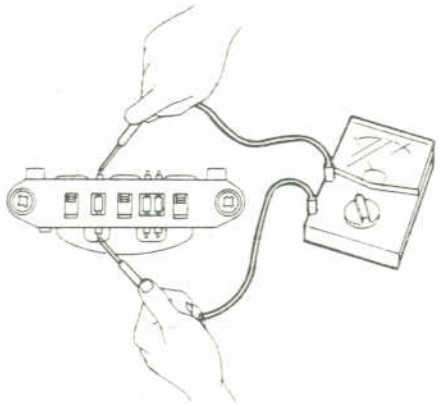
Negative diode



SEL907A

- Conduction test is N.G. ... Replace diode assembly.

Sub-diode



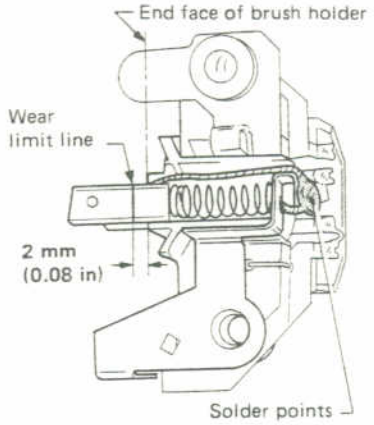
SEL910A

- Conduction is N.G. ... Replace diode assembly.

Reassembly

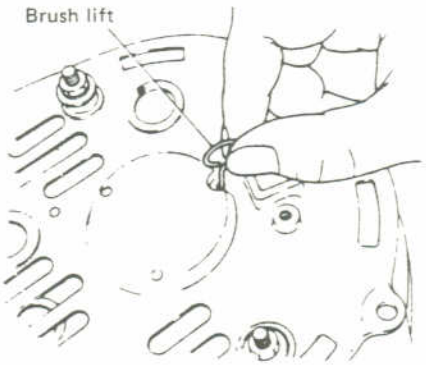
Carefully observe the following instructions.

1. When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.
2. When soldering brush lead wire, observe the following.
   - Position brush so that its wear limit line protrudes 2 mm (0.08 in) beyond end face of brush holder.



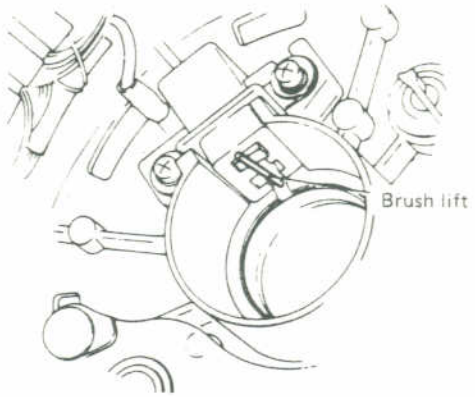
SEL055D

3. Before installing front cover with pulley and rotor with rear cover, push brush up with fingers and retain brush, by inserting brush lift into brush lift hole from outside.
   After installing, remove wire for brush lift.



EE540

Reassembly (Cont'd)



EE541

4. After installing front and rear sides of alternator, pull brush lift by pushing toward center.

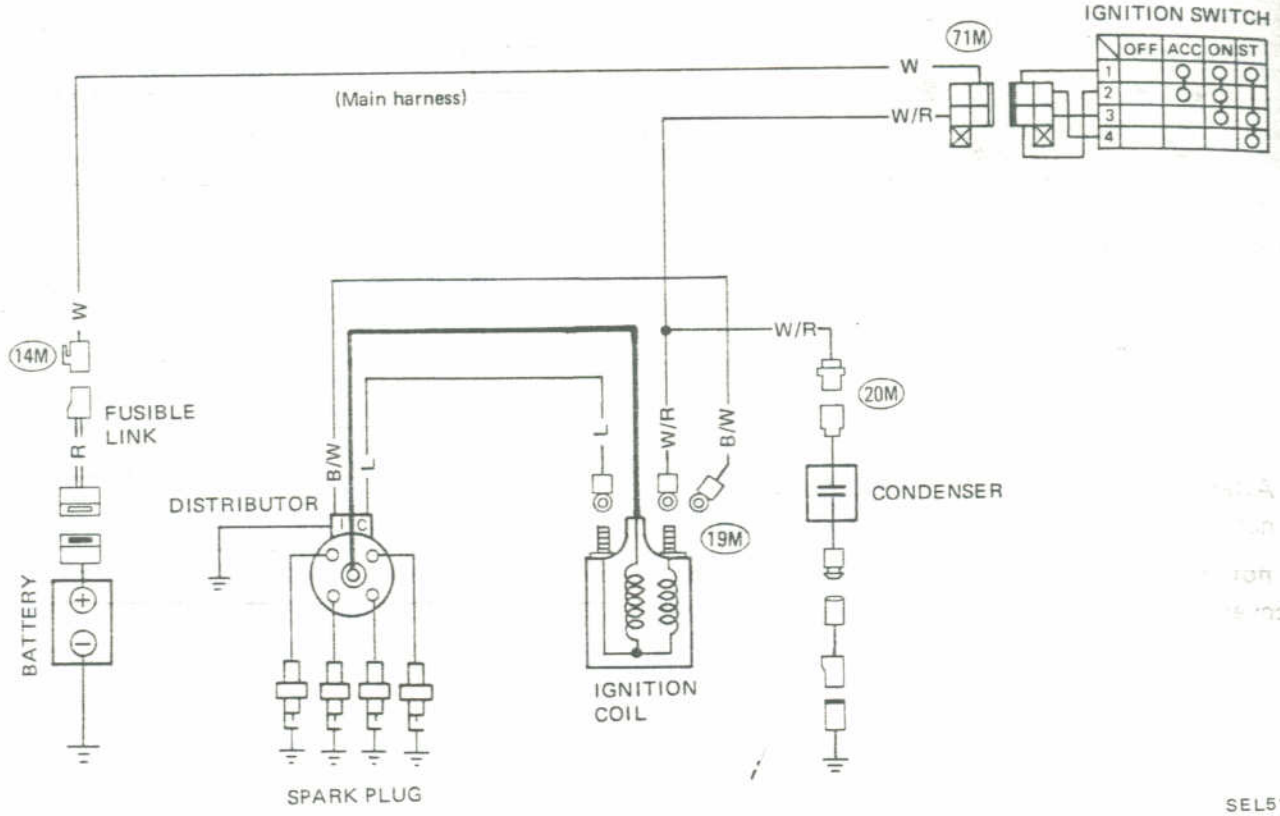
Do not pull brush lift by pushing toward outside of cover as it will damage slip ring sliding surface.

Service Data and Specifications (S.D.S.)

ALTERNATOR

Type		A5T21897
Nominal rating	V-A	12 - 50
Ground polarity		Negative
Minimum revolution under no-load (When 14 volts is applied)	rpm	Less than 1,300
Hot output current	A/rpm	More than 40/2,500 More than 50/5,000
Regulated output voltage	V	14.1 - 14.7
Minimum length of brush	mm (in)	7 (0.28)
Brush spring pressure	N (g, oz)	3.040 - 4.217 (310 - 430, 10.93 - 15.17)
Slip ring outer diameter	mm (in)	More than 32.4 (1.276)

Wiring Diagram



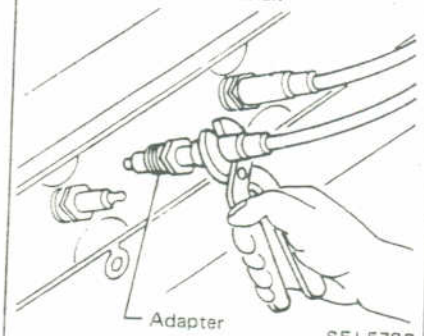
Trouble-shooting

Engine turns erratically.

Engine cranks but does not start.

Check ignition timing.
- N.G. → Adjust.
- O.K. → Attach adapter *1 to high tension cable and position tip of adapter approx. 6 mm (0.24 in) away from cylinder block. With adapter held in that position, crank engine to see if spark jumps across gaps between tip and cylinder block at regulator intervals.

Before cranking, disconnect fuel cut solenoid harness connector.
Before operation, make sure there is no inflammable material.



SEL578B

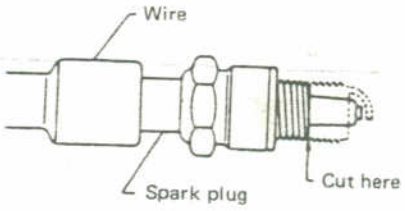
- O.K. → Check for burned or fouled spark plug.
  - N.G. → Clean or replace.
  - O.K. → Check fuel system.
- N.G. → Check IC ignition system.
  IC ignition system is checked using a volt-ohm-milliammeter (V.O.M.). Follow the steps in the sequence indicated. If a fault is in found, correct the problem before continuing. If all tests indicate "O.K." replace the IC Ignition Unit. DO NOT REPLACE THE UNIT UNTIL ALL TESTS HAVE BEEN COMPLETED AND INDICATE "O.K.".

Go to test table.

WARNING:
When current is flowing, never touch with bare hand high tension cables or any other parts with high voltage. If parts are moist, touching them could cause an electric shock, even if they are insulated. Always wear dry, well-insulated gloves or wrap affected parts with dry cloth before handling.

NOTE:
1. **When performing the following tests, use a multitester which can measure accurately in the following ranges; 0 to 20V. D.C.; 0 to 1,000Ω; 0 to 10V A.C.; 0 to 50,000Ω.**
2. **If possible, start the vehicles and let it run for 5 to 15 minutes with the hood closed. This will bring all components to normal operating temperature, and will make it easier to diagnose intermittent problems.**
3. **It is not necessary to disconnect the harness connectors when performing the tests which follow. Simply insert the meter probes into the back of appropriate connector cavity.**

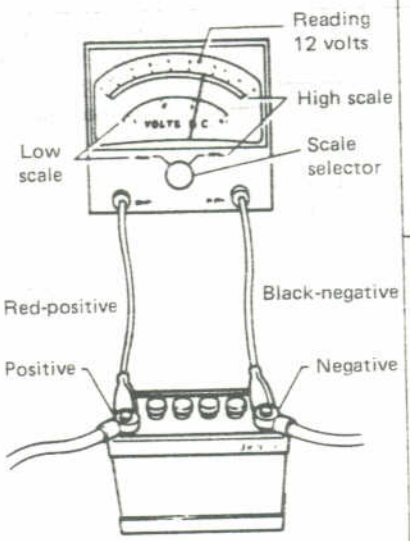
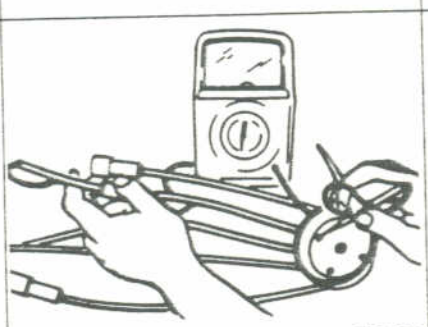
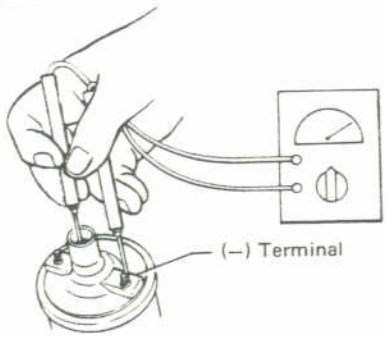
*1:
Preparation of spark plug for checking
Many things can be utilized as an adapter. However, it is recommended that a used spark plug whose threaded portion has been half cut off as shown in the figure be utilized.



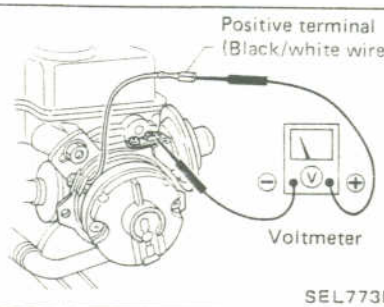
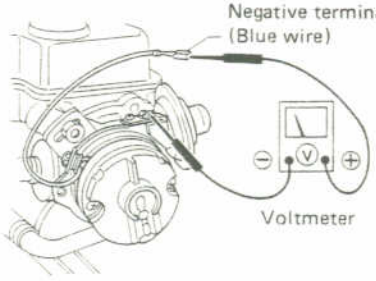
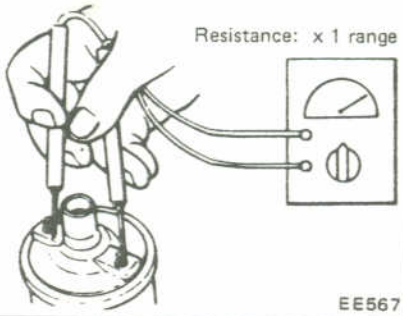
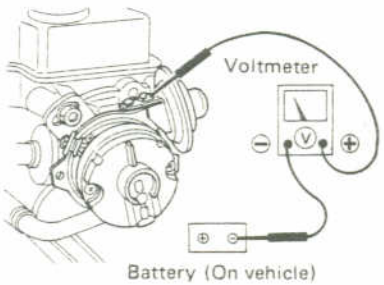
SEL581B

Trouble-shooting (Cont'd)

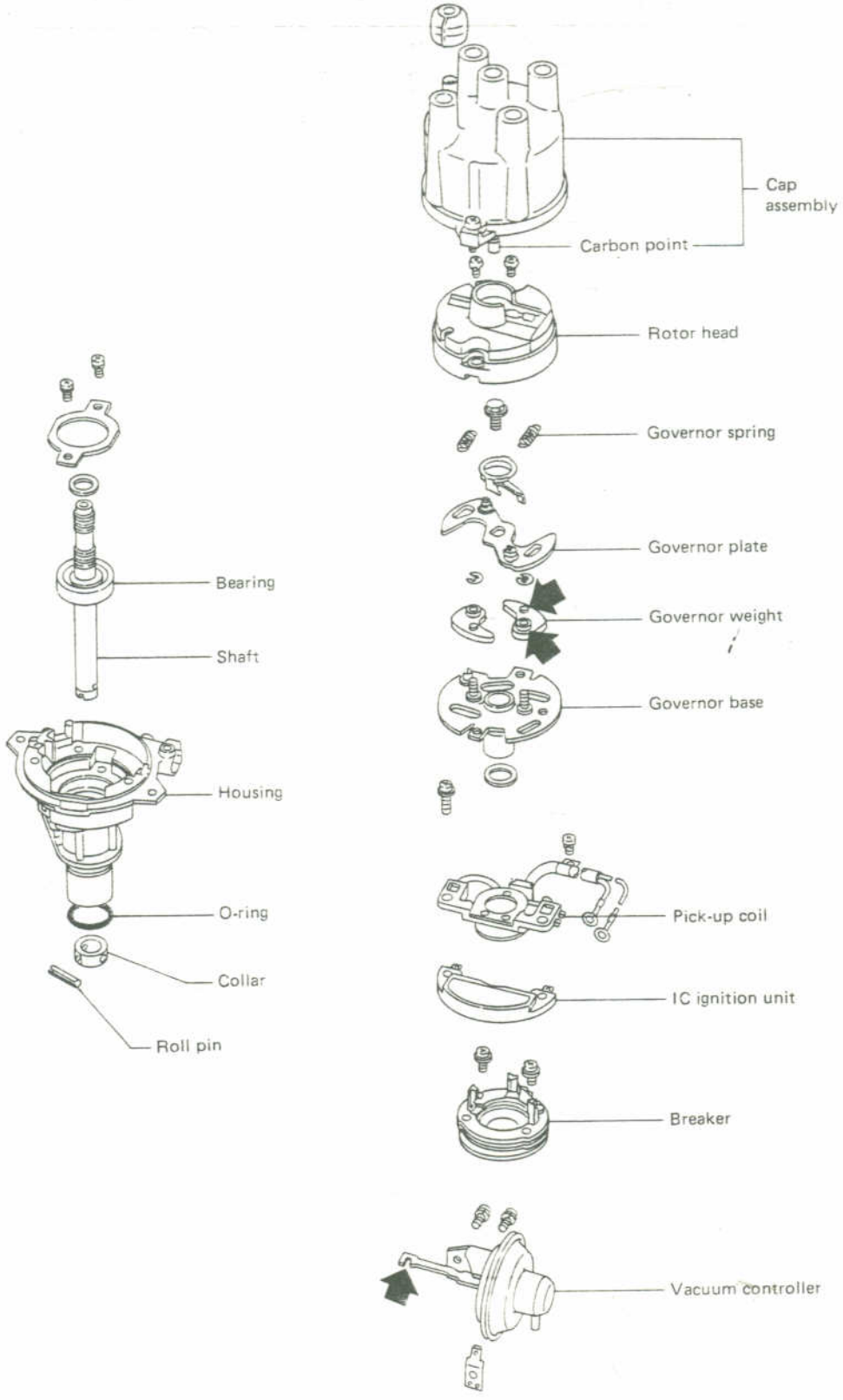
TEST TABLE

TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
1. Battery Voltage (no load)	 SEL103	1. Ignition key in "OFF" position. 2. Connect voltmeter as illustrated and set to appropriate scale. 3. Read and record battery voltage reading. Battery voltage [ ]	11.5 - 12.5 volts	Proceed to Step 2.
			Below 11.5 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
2. Battery Cranking Voltage		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Remove coil wire from distributor cap and ground it. 3. Read voltmeter while cranking engine for approximately 15 seconds. 4. Record voltage reading. Battery cranking voltage [ ]	Voltage reading greater than 9.6 volts	Battery O.K. Proceed to Step 3.
			Voltage reading less than 9.6 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
3. Secondary Wiring	 EF125	1. Connect ohmmeter as illustrated and measure the resistance of each high tension cable.	Resistance readings less than 30,000 ohms	Distributor cap and high tension cables – O.K. Proceed to Step 4.
			Resistance readings greater than 30,000 ohms	Replace high tension cable(s) and/or distributor cap as required.
4. Ignition Coil Secondary Circuit	 SEL104	1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated.	Refer to "Ignition coil resistance".	Ignition coil secondary windings – O.K. Proceed to step 5 for California.
			Not in the specified value	Faulty ignition coil – replace.

Trouble-shooting (Cont'd)

TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
5. Power Supply Circuit	 SEL773D	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Turn ignition key to "ON" position.	11.5 - 12.5 volts	Proceed to Step 6.
			Below 11.5 volts	Check wiring from ignition switch to IC unit.
6. Ignition Primary Circuit	 SEL774D	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Ignition key in "ON" position.	11.5 - 12.5 volts	Proceed to Step 8.
			Below 11.5 volts	Proceed to Step 7.
7. Ignition Coil Primary Circuit	 EE567	1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated.	Refer to "Ignition coil resistance".	Ignition coil primary winding O.K. Check ignition switch and wiring from ignition switch to coil and IC unit.
			Not in the specified value	Faulty ignition coil — replace.
8. I.C. Unit Ground Circuit	 SEL775D	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking.	0.5 volts or less 0.1 Nov 19, 04	Replace IC ignition unit assembly.
			More than 0.5 volts	Check distributor ground, wiring from chassis ground to battery including battery cable connections.

Construction



: High-temperature grease point

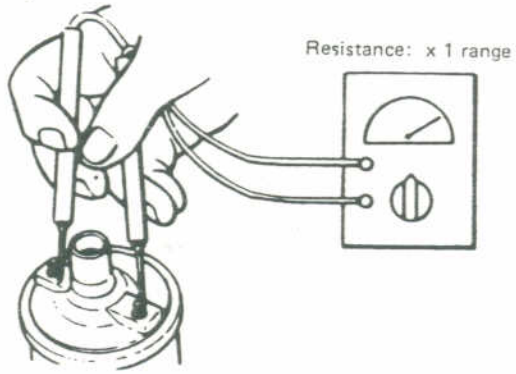
SEL545D

Ignition Coil Resistance

1. Connect ohmmeter probes across the positive and negative primary winding terminals of the ignition coil, and measure the resistance.

   Primary winding resistance at 20° C (68° F):
   1.0 - 1.3 Ω

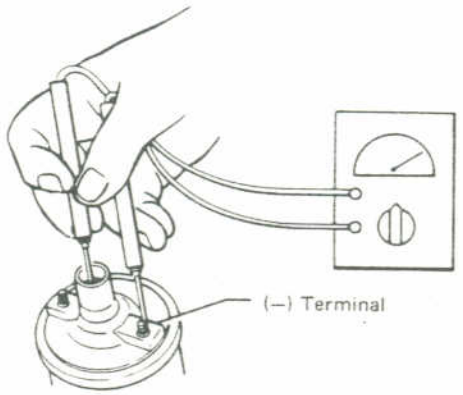
Nov. 19th 2004 2.1 @ ~ -4 °C



EE567

2. Connect ohmmeter probes to secondary winding terminal and primary winding negative terminal, and measure resistance.

   Secondary winding resistance at 20° C (68° F):
   7,300 - 11,000 Ω



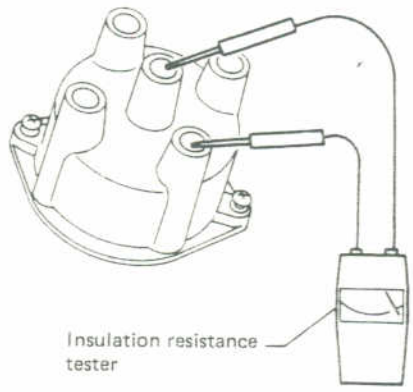
SEL104

Resistance will vary with coil temperature. Replace coil if resistance reading is outside the limits.

Cap and Rotor Head

1. Check cap and rotor head for dust, carbon deposits and cracks.
2. Measure insulation resistance between electrodes on ignition coil and side of spark plug.

Insulation resistance:
More than 50 [MΩ]

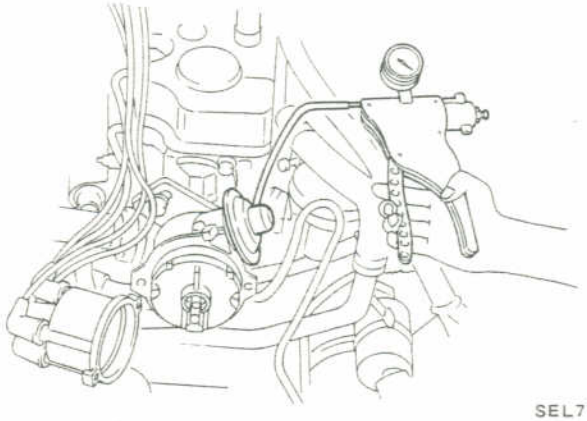


SEL656B

- Less than specified value . . . Replace.

Check Vacuum Advance

1. Connect vacuum pump to the vacuum controller and gradually draw a vacuum while watching breaker plate movement. Check for smooth operation with no evidence of binding.



SEL776D

2. Turn breaker plate right and left to check for freedom of movement.

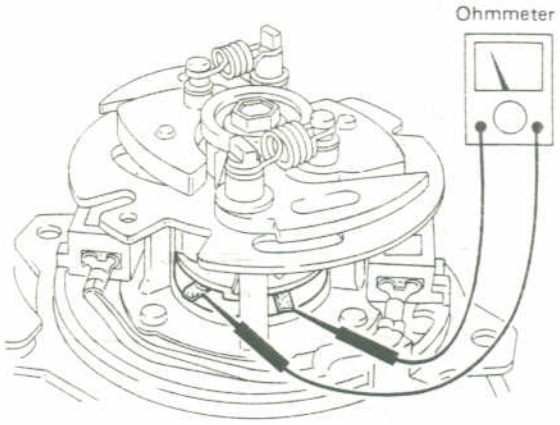
Checking Governor Advance

- Remove rotor head and check that governor weight and governor spring move smoothly.

Checking Pick-up Coil

- Check resistance between terminals of pick-up coil.

Pick-up coil resistance: 970 - 1,170 [Ω]



SEL778D

- Not in the specified value . . . Replace.

Service Data and Specifications (S.D.S.)

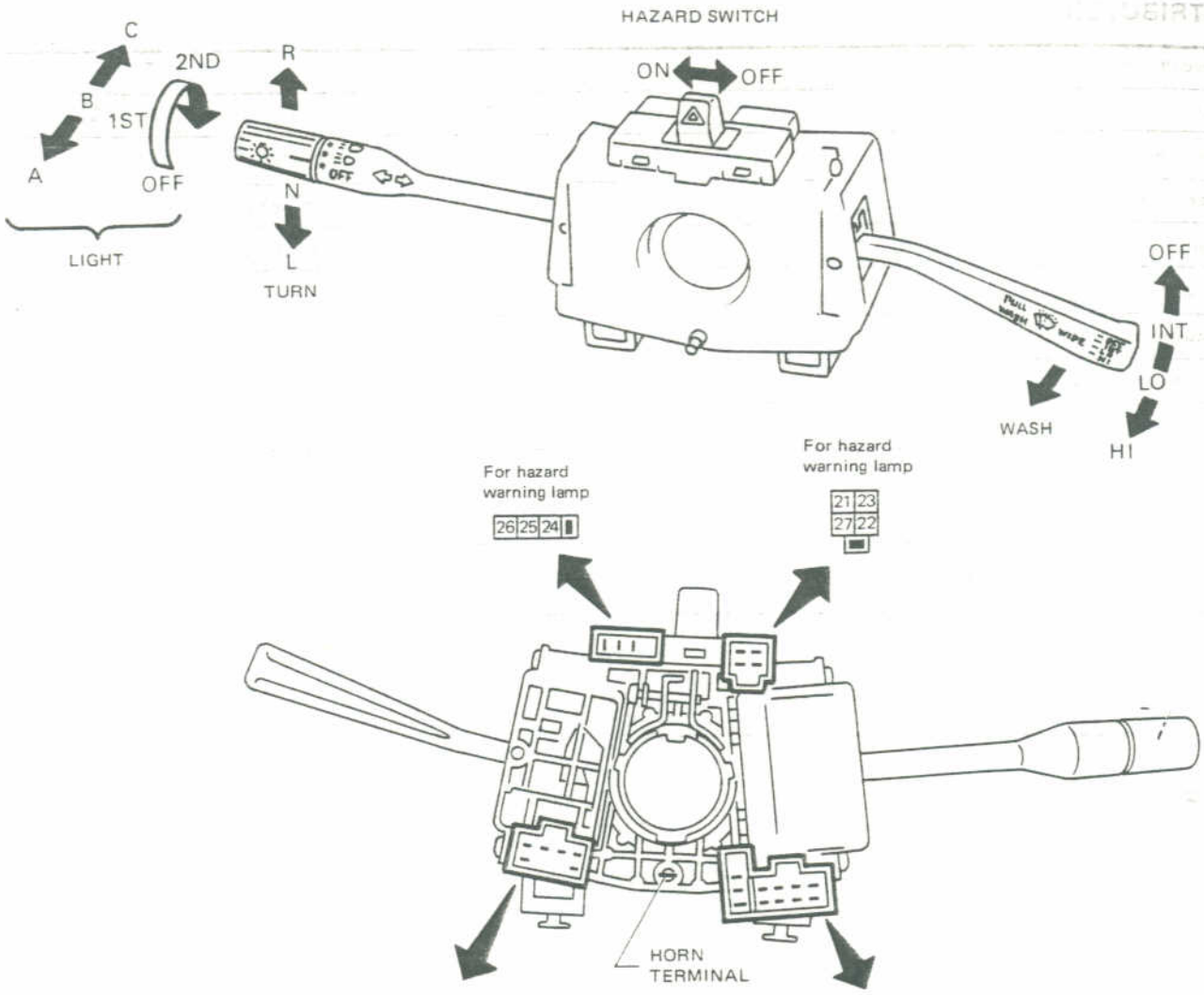
DISTRIBUTOR

Applied model		M/T models	A/T models
Type		T4T83581B	T4T83582B
Firing order		1-3-4-2	
Rotating direction		Counterclockwise	
Air gap		Close but not touching	
Pick-up coil resistance	Ω	970 - 1,170	
Cap insulation resistance	MΩ	More than 50	
Rotor head insulation resistance	MΩ	More than 50	
Cap carbon point length	mm (in)	More than 10 (0.39)	
Vacuum advance [Distributor degree/distributor kPa (mmHg, inHg)]		0°/9.3 (70, 2.76) 3.7°/16.0 (120, 4.72) 6.5°/22.7 (170, 6.69)	0°/14.0 (105, 4.13) 2°/18.7 (140, 5.51) 3.5°/24.0 (180, 7.09)
Centrifugal advance [Distributor degree/distributor rpm]		0°/600 11°/1,900	0°/800 9°/1,900

IGNITION COIL

Type		CIT-130	STC-130
Primary resistance [at 20°C (68°F)]	Ω	1.0 - 1.3	
Secondary resistance [at 20°C (68°F)]	kΩ	8.4 - 12.6	

Check



	OFF			1ST			2ND		
	A	B	C	A	B	C	A	B	C
5			○			○	○	○	○
6			○			○	○		○
7								○	
8			○			○	○	○	○
9			○			○	○		○
10								○	
11				○	○	○	○	○	○
12				○	○	○	○	○	○

LIGHTING SWITCH

(With intermittent wiper)

	OFF	INT	LO	HI	WASH
13	○	○			
14	○	○	○		
15		○			
16			○	○	
17		○	○	○	○
18					○

WIPER SWITCH

	R	N	L
1	○		○
2	○		
3			○

TURN SIGNAL SWITCH

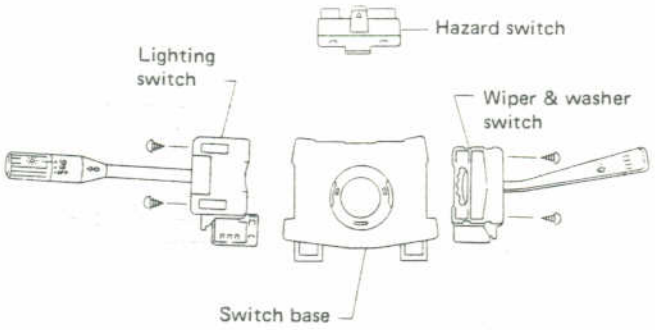
	OFF	ON
21		○
22		○
23		○
24	○	
25	○	○
26		○

HAZARD SWITCH

SEL518D

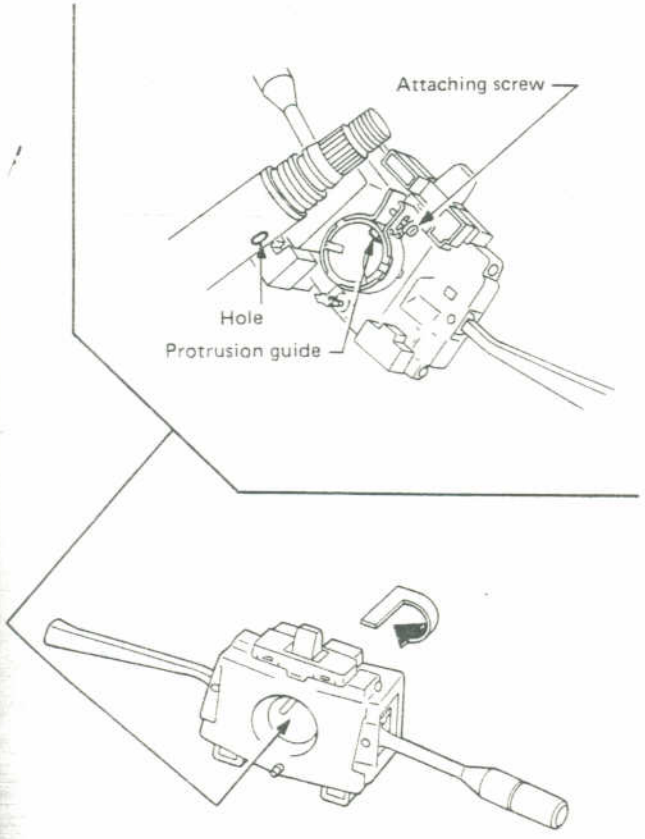
Replacement

Lighting switch, wiper & washer switch and hazard switch can be replaced without removing combination switch base.



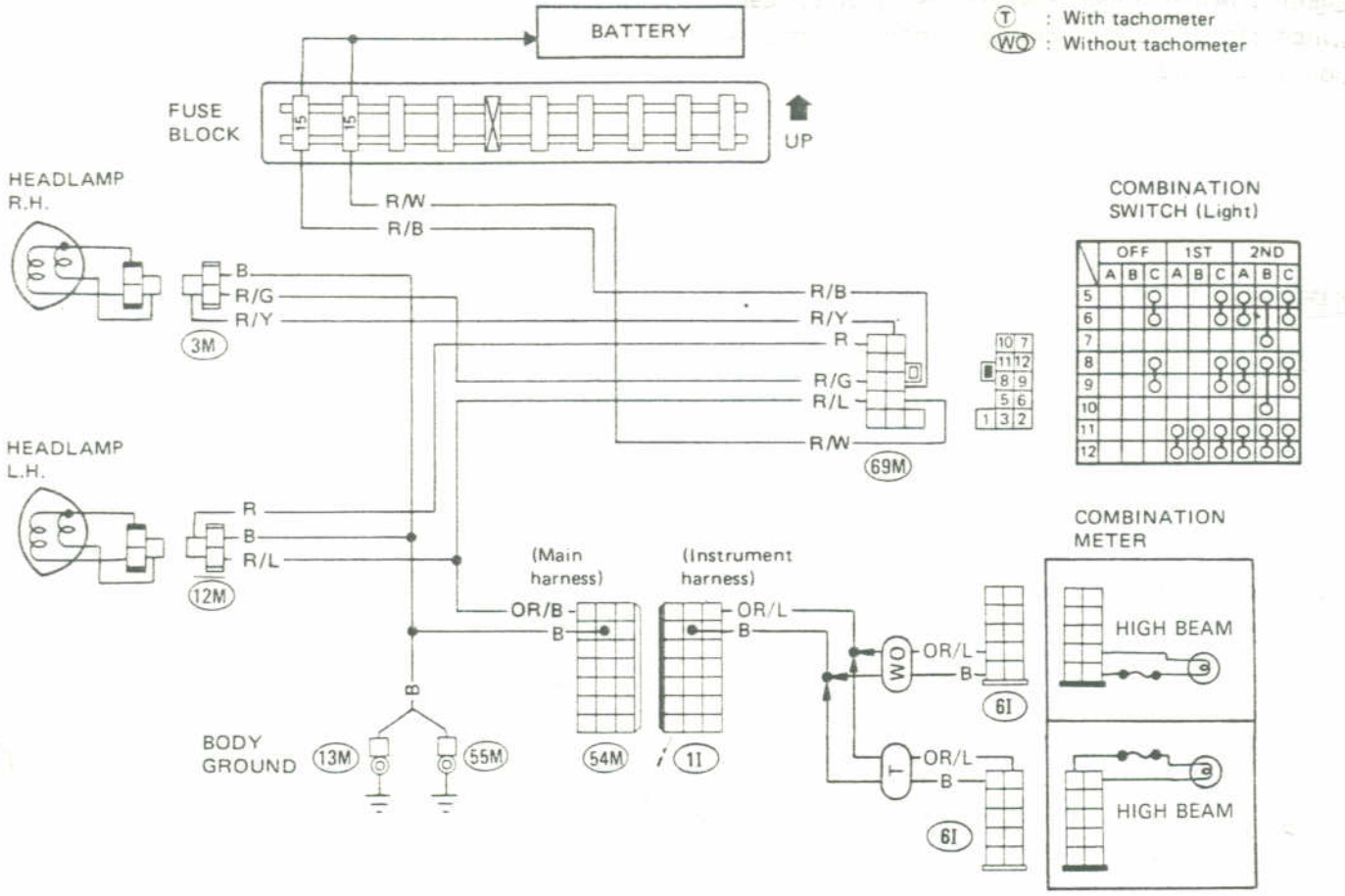
SEL977C

To remove combination switch base, remove base attaching screw and turn after pushing on it.



SEL989C

Wiring Diagram



SEL508I

Aiming Adjustment

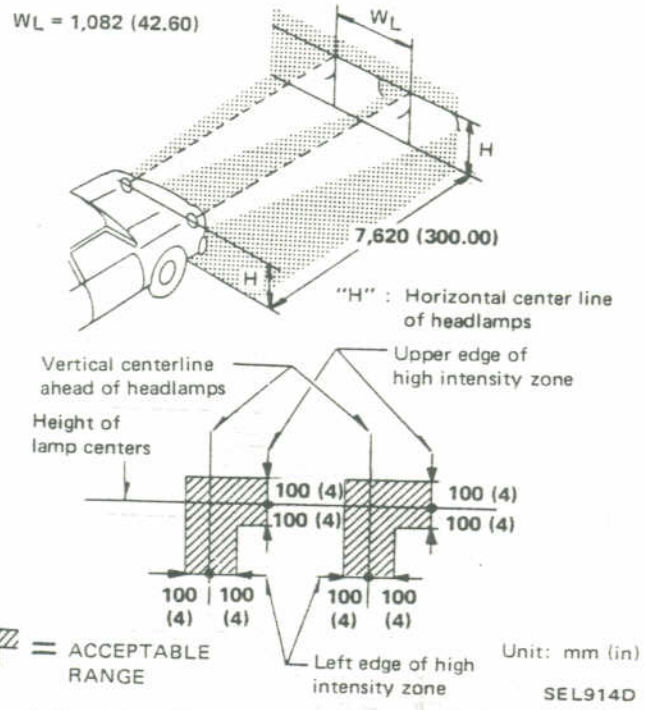
When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. For operating instructions of any aimer, it should be in good repair, calibrated and used according to respective operation manuals supplied with the unit.

If any aimer is not available, aiming adjustment can be done as follows:

For details, refer to the regulations in your own country.

CAUTION:

a. Keep all tires inflated to correct pressures.
b. Place vehicle and tester on one and same flat surface.
c. See that there is no load in vehicle (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).

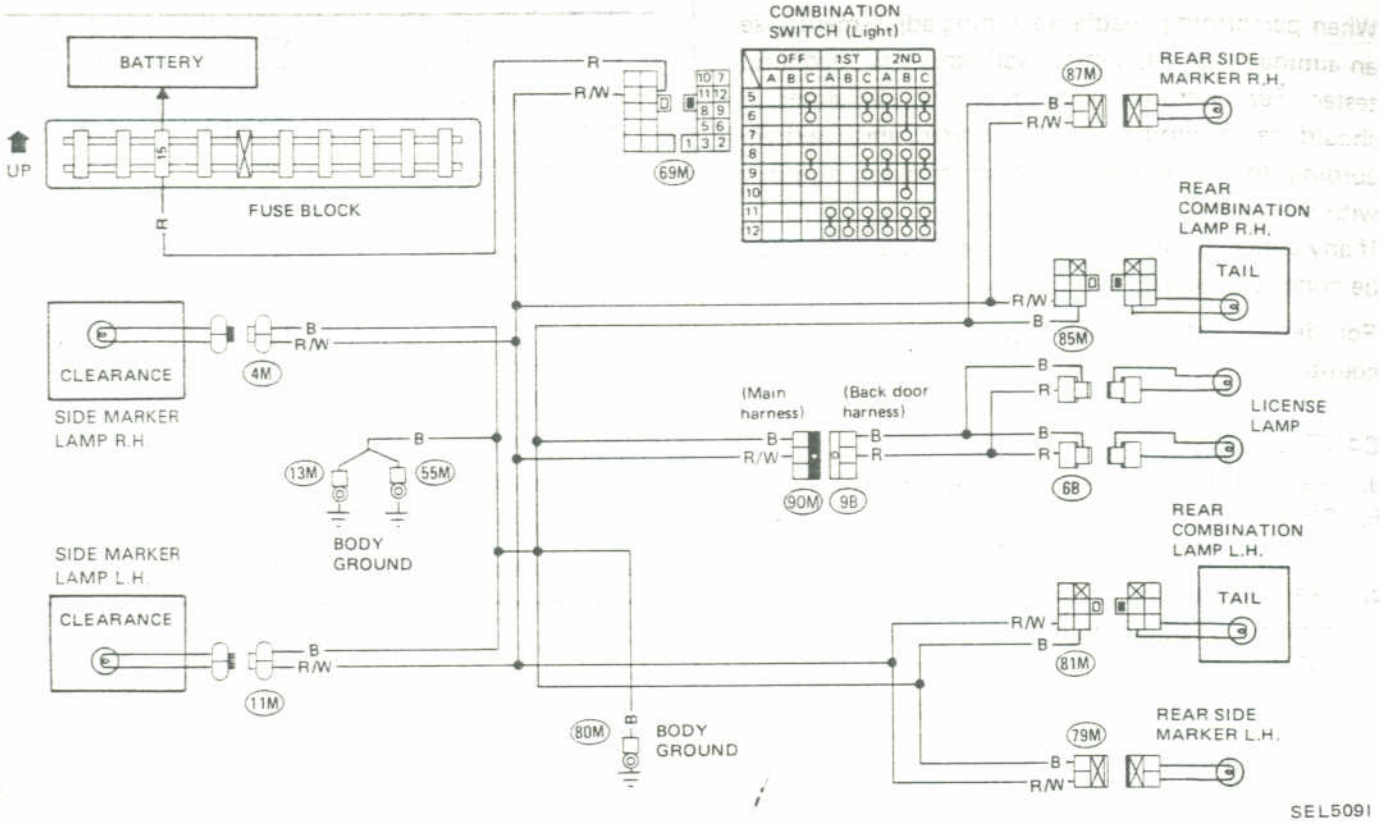


- Adjust headlamps so that upper edge and left edge of high intensity zone are within the acceptable range as shown in the figure above.
- Dotted lines in illustration show center of headlamp.

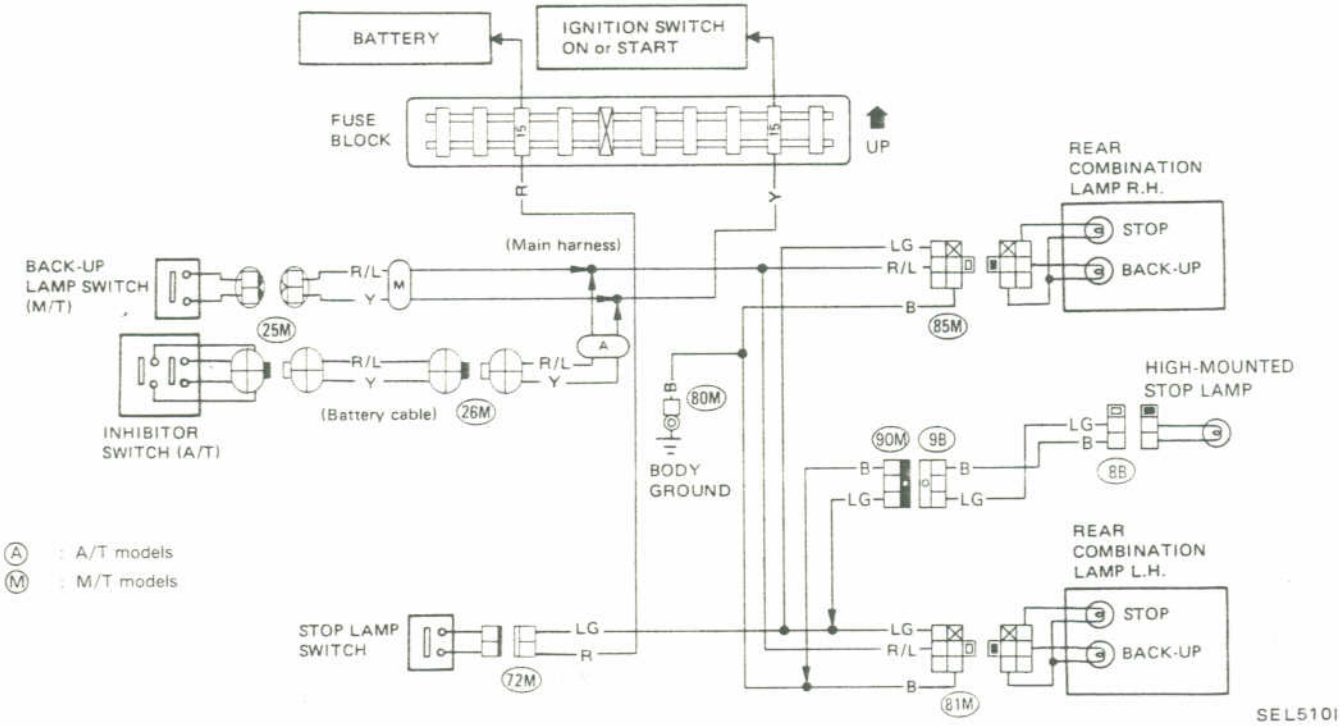
Bulb Specifications

Item	Wattage (W)	Bulb No.
Headlamp (Sealed beam)		
High/Low	65/35	H6054
Front turn signal lamp	27	1156
Front side marker lamp	3.4	158
Rear side marker lamp	3.4	158
Rear combination lamp		
Turn	27	1156
Stop/Tail	27/8	1157
Back-up	27	1156
License plate lamp	10	–
High-mounted stop lamp	27	1156
Interior lamp	5	168
Luggage compartment lamp	10	–

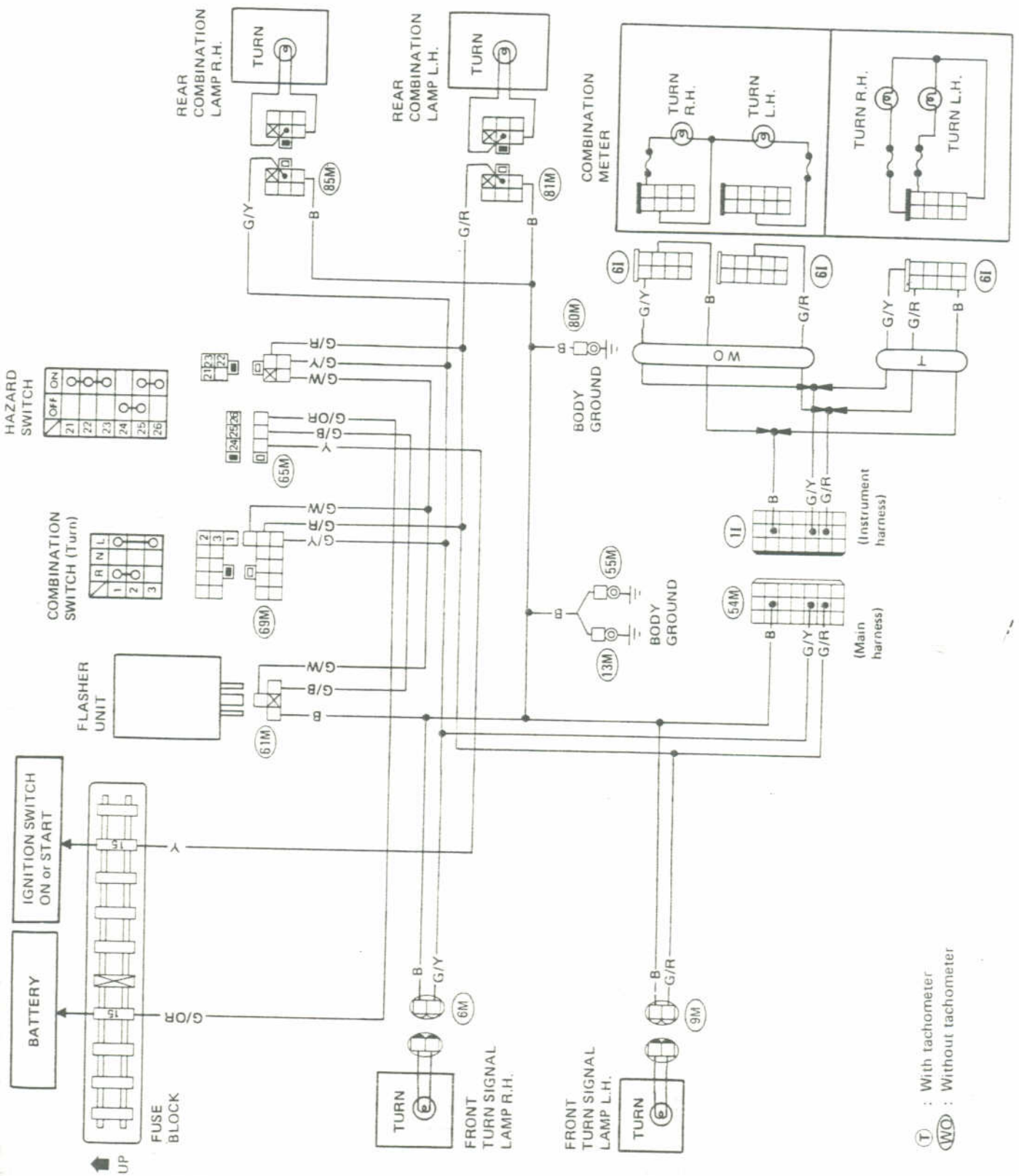
Clearance, License and Tail Lamp/Wiring Diagram



Stop and Back-up Lamp/Wiring Diagram

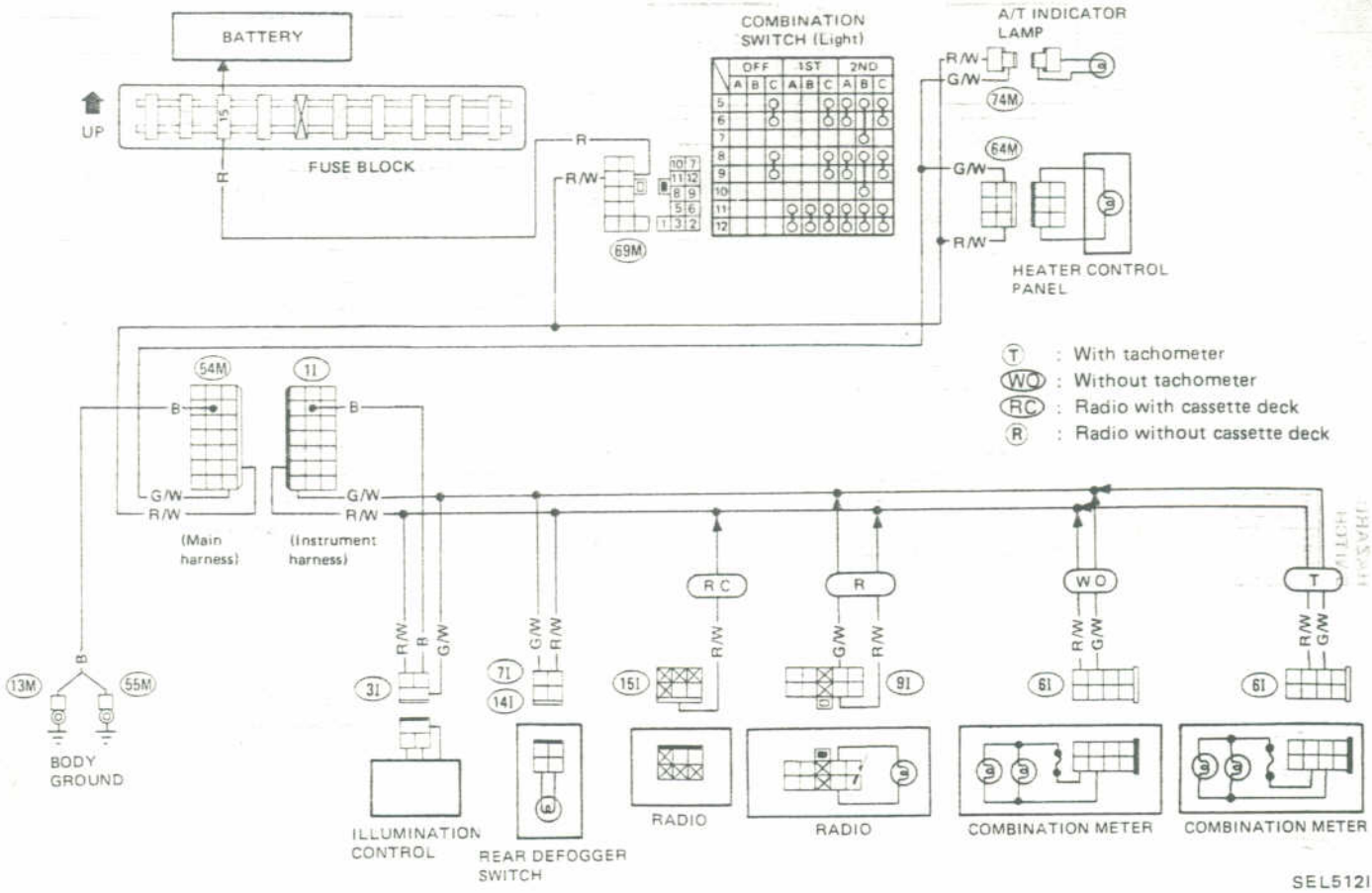


Turn Signal and Hazard Warning Lamp/Wiring Diagram



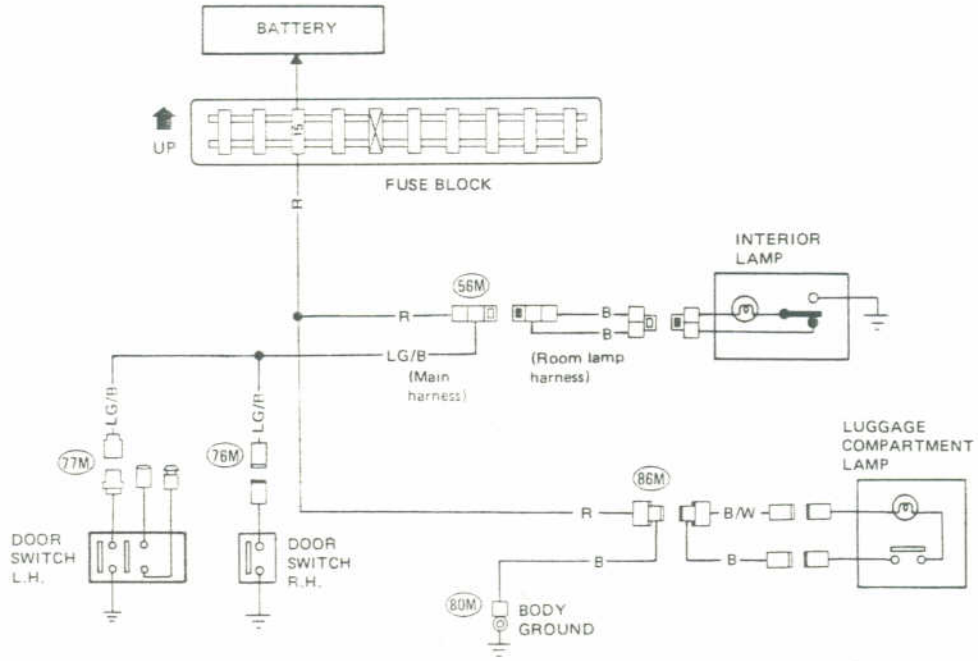
SEL511I

Illumination/Wiring Diagram



SEL512I

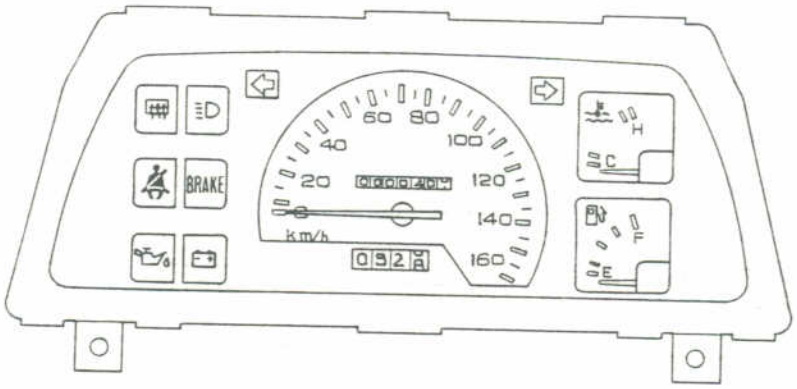
Interior and Luggage Compartment Lamp/Wiring Diagram

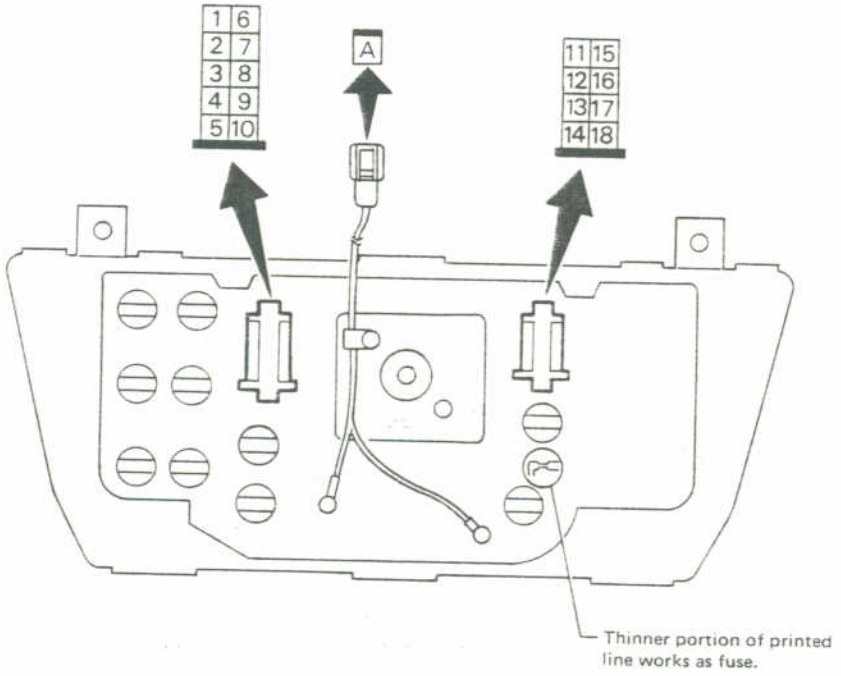


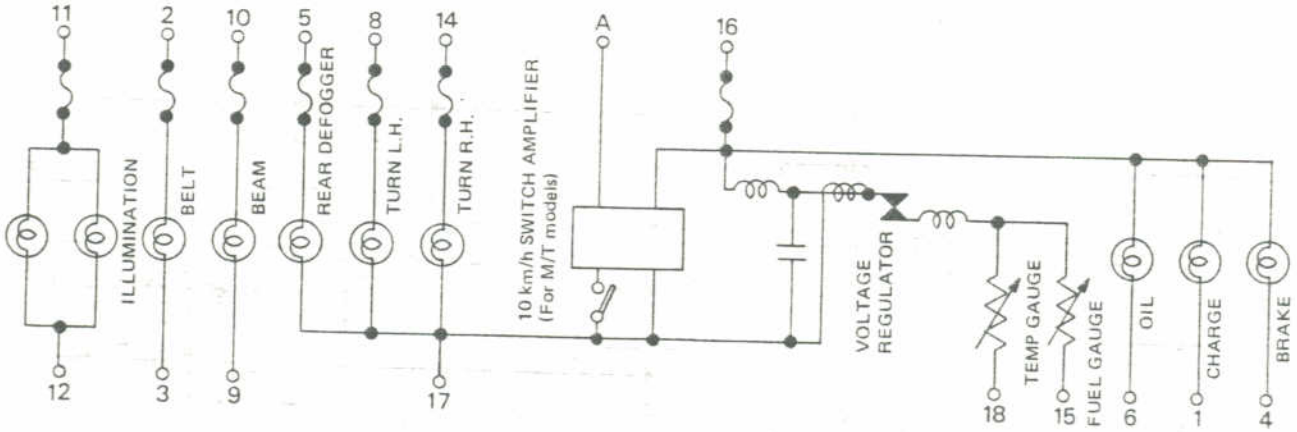
SEL513I

Combination Meter

WITHOUT TACHOMETER



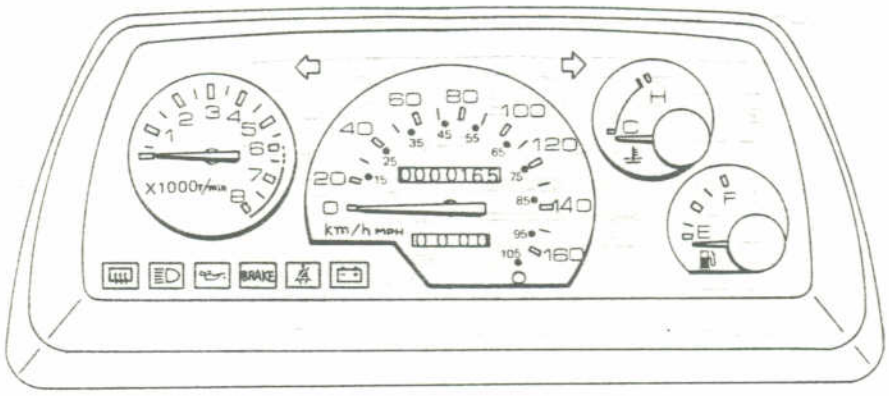


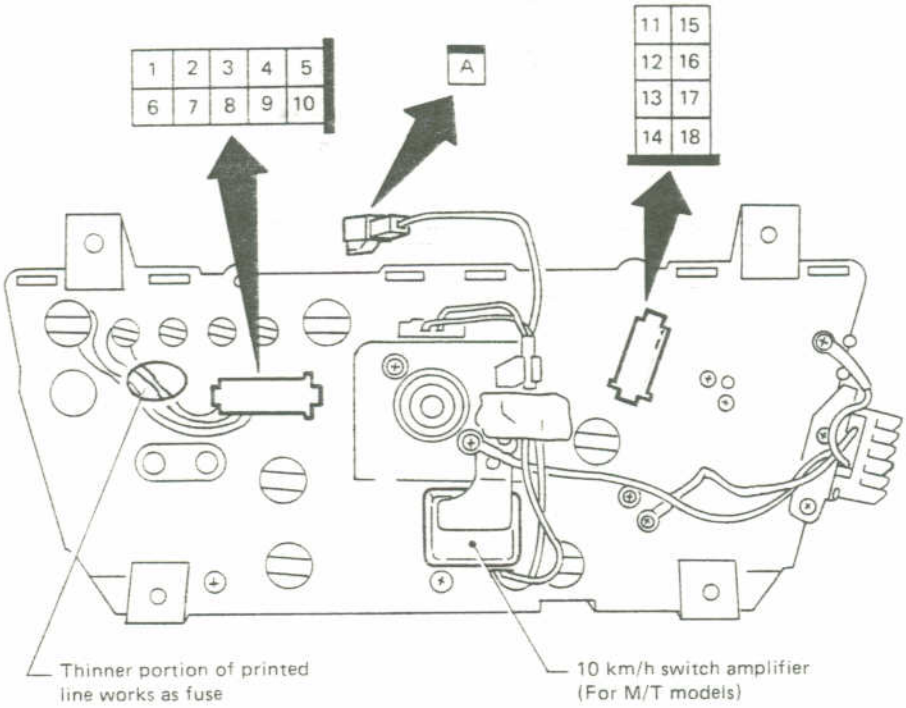


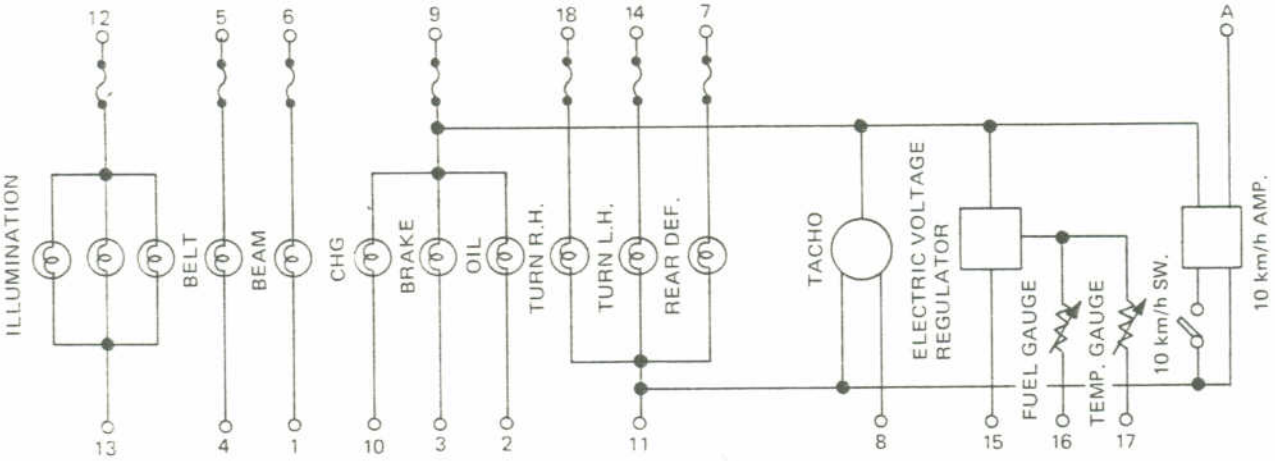
SEL525D

Combination Meter (Cont'd)

WITH TACHOMETER



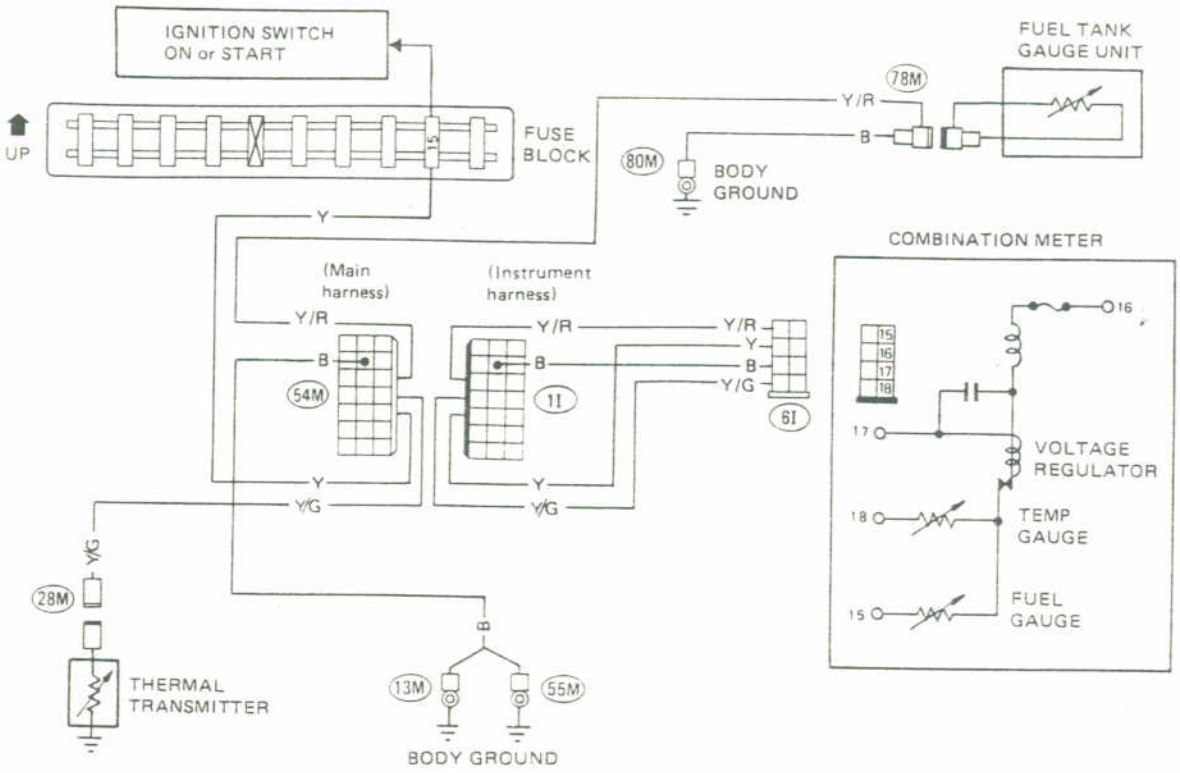




SEL405G

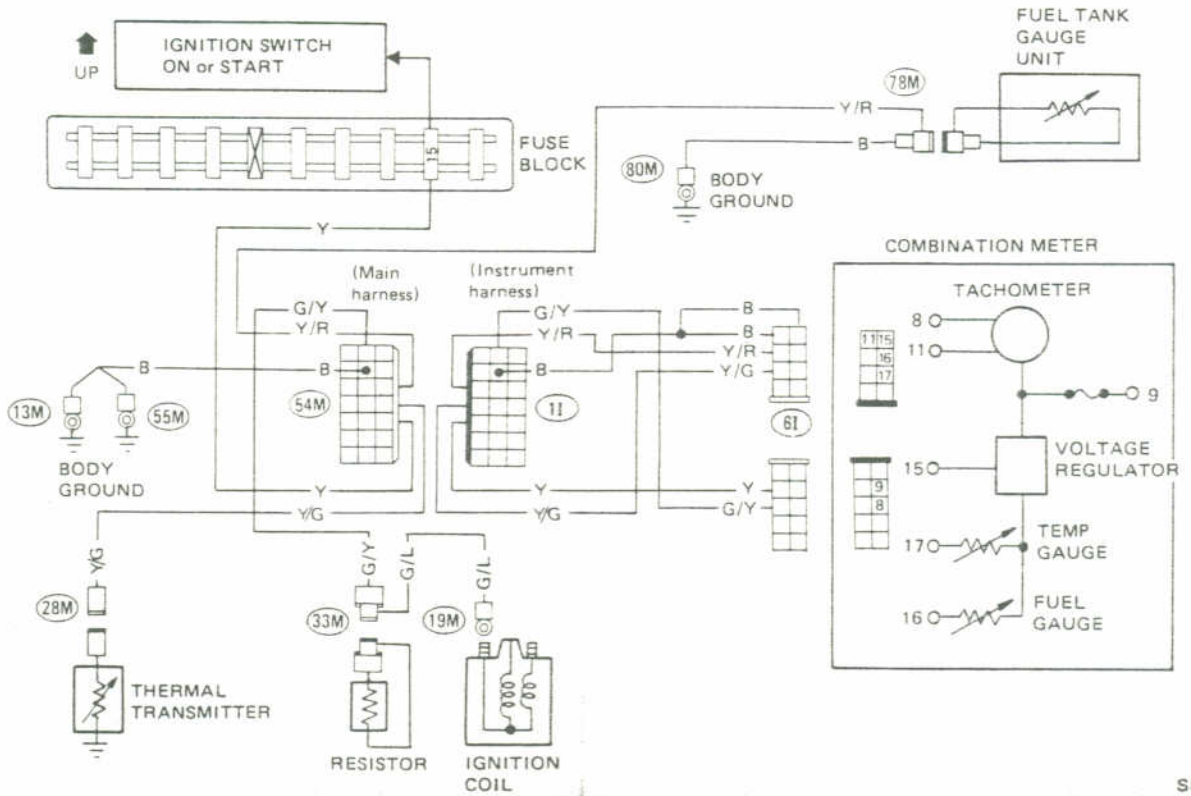
Tacho, Fuel and Temp. Gauges/Wiring Diagram

WITHOUT TACHOMETER



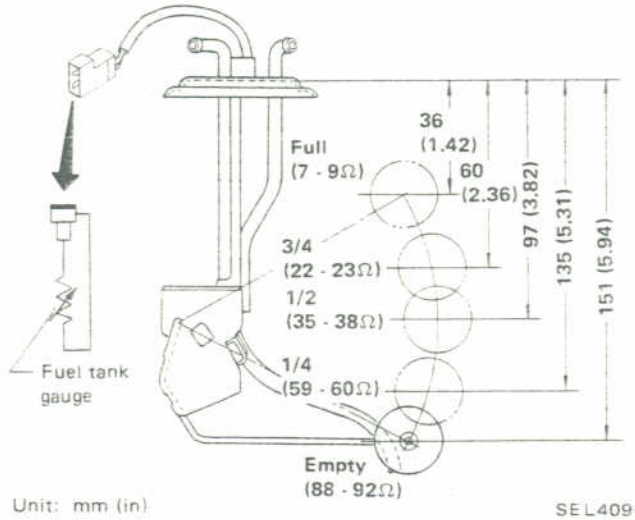
SEL514I

WITH TACHOMETER



SEL515I

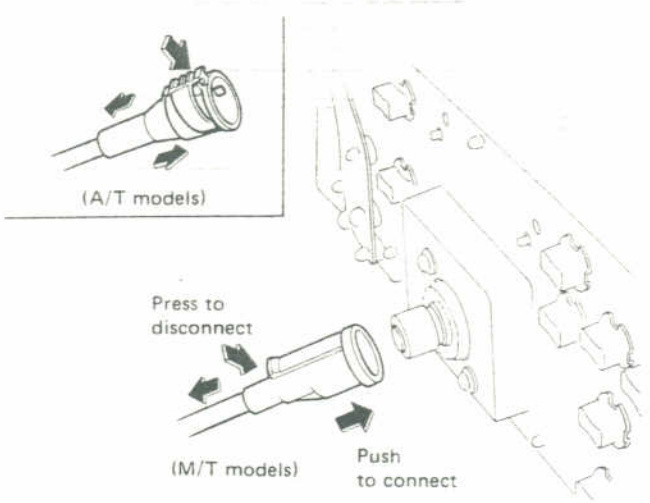
Fuel Tank Gauge Unit Check



Unit: mm (in)

SEL409G

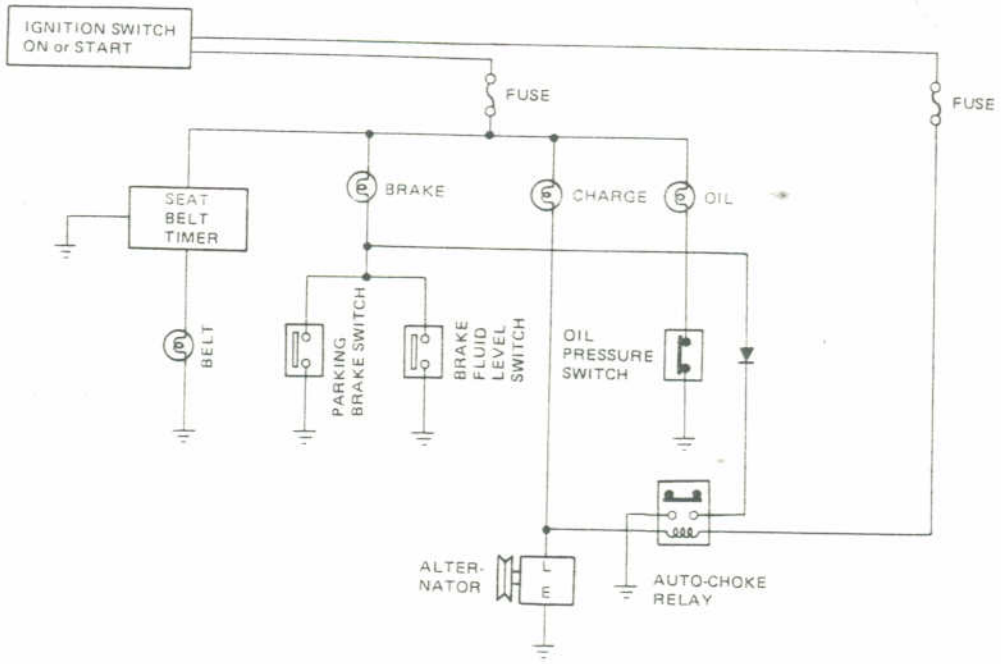
Speedometer Cable Removal



SEL976C

WARNING SYSTEM

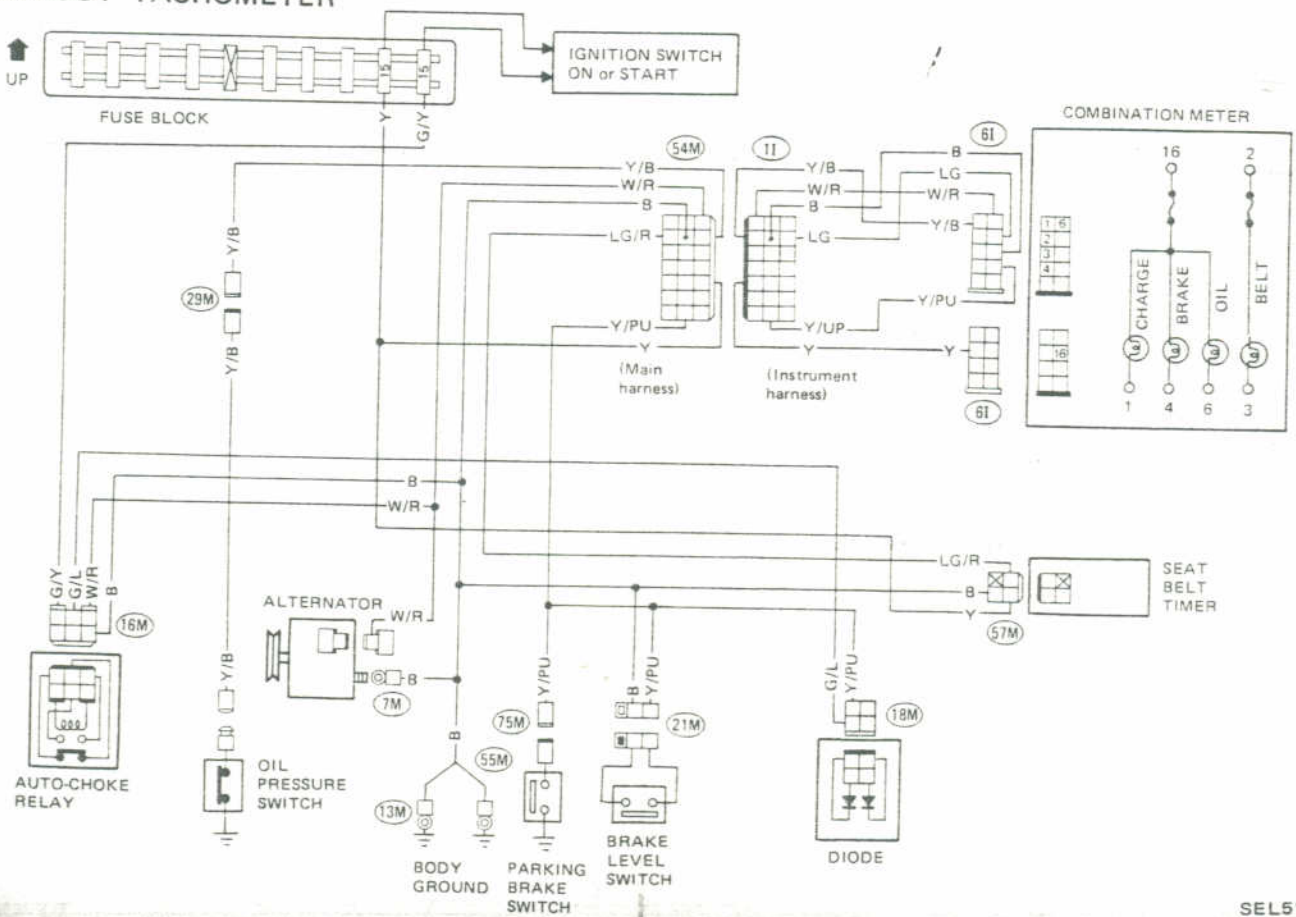
Warning Lamps/Schematic



SEL516I

Warning Lamps/Wiring Diagram

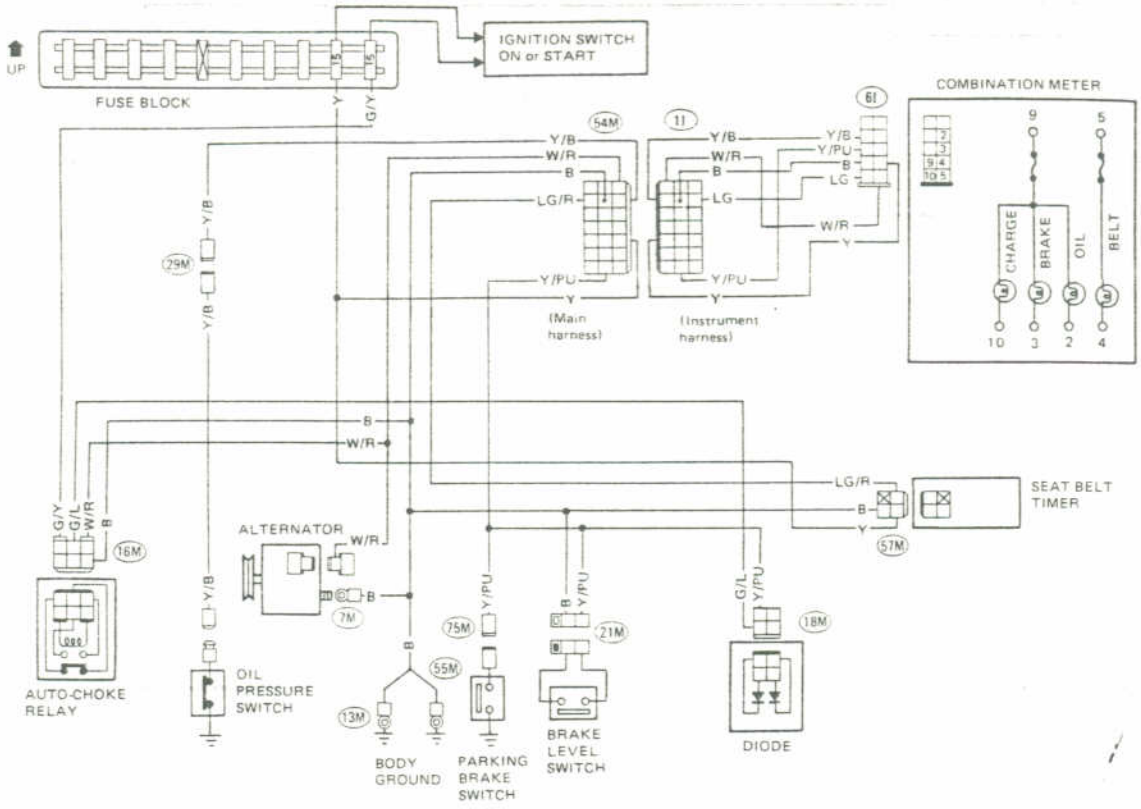
WITHOUT TACHOMETER



SEL517I

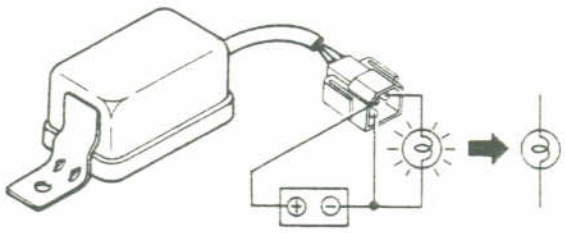
Warning Lamps/Wiring Diagram (Cont'd)

WITH TACHOMETER



SEL518I

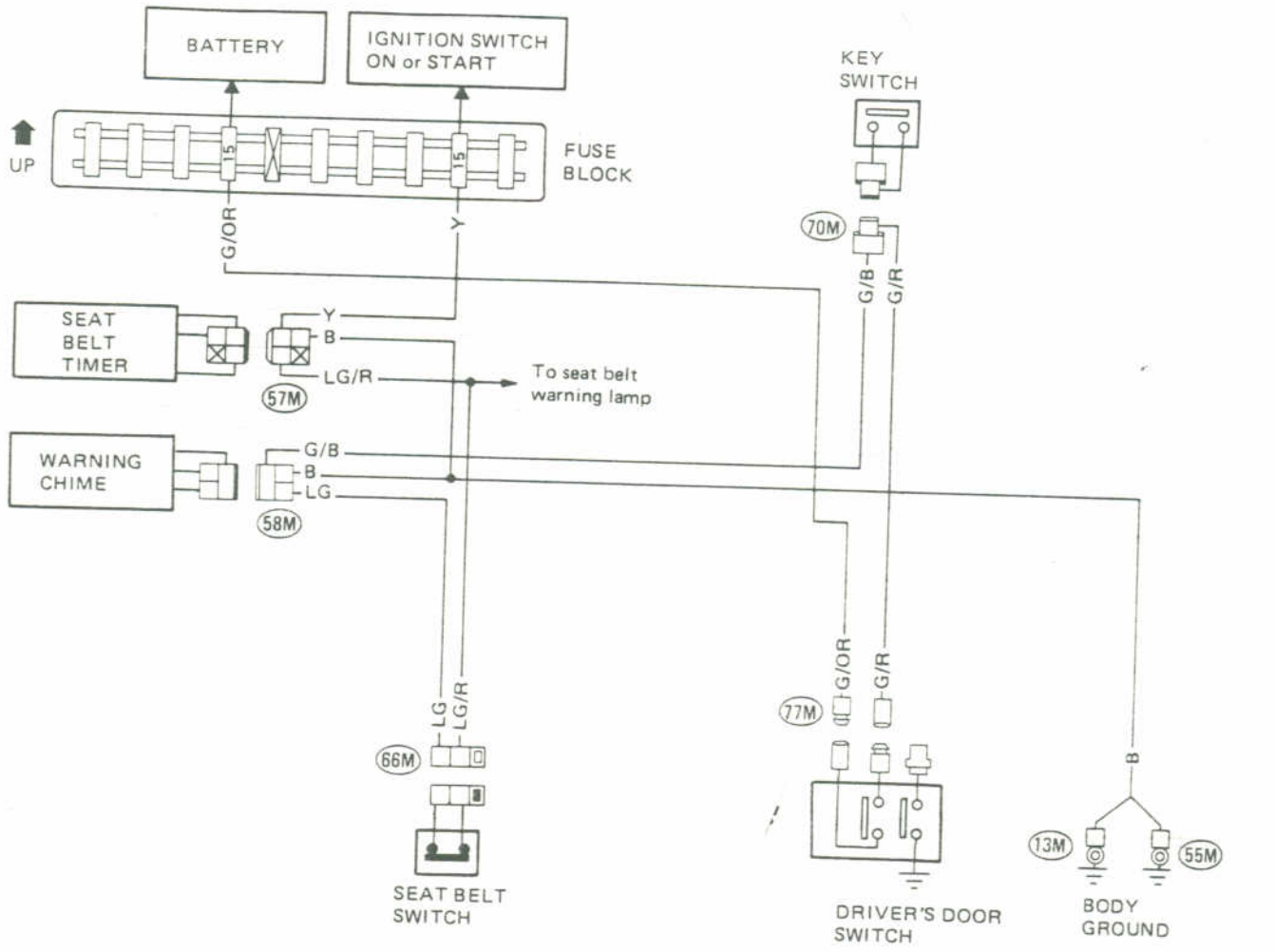
Seat Belt Warning Timer



After about 6 seconds.

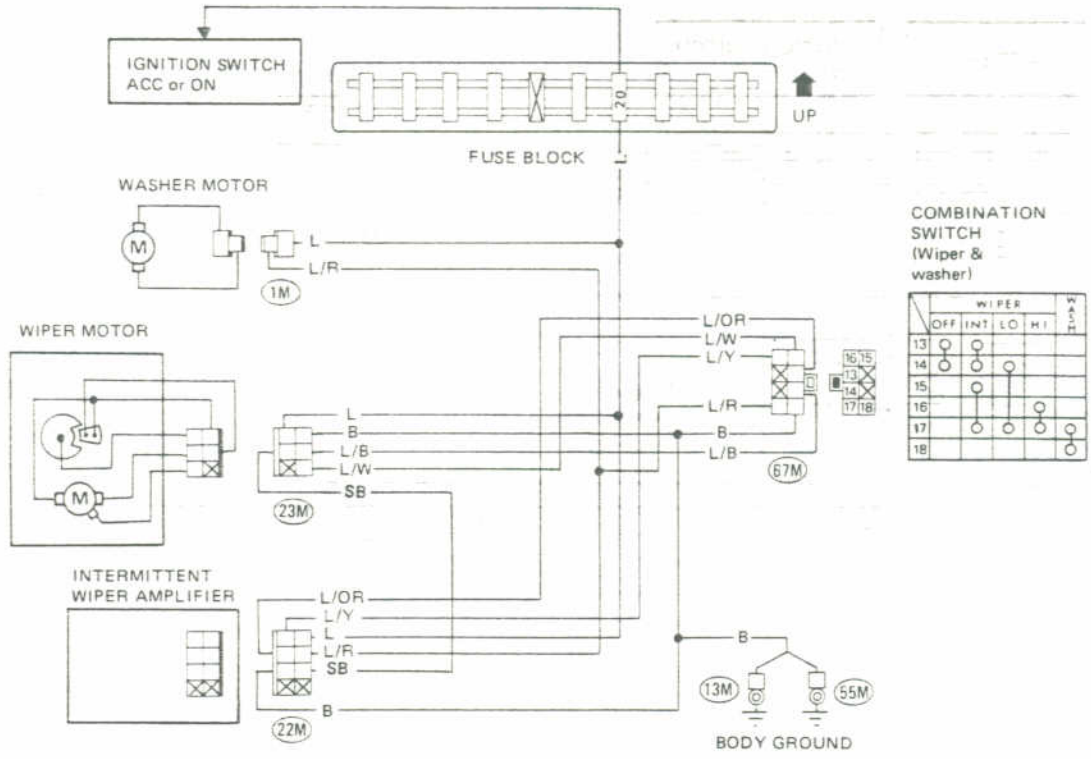
SEL419

Warning Chime/Wiring Diagram



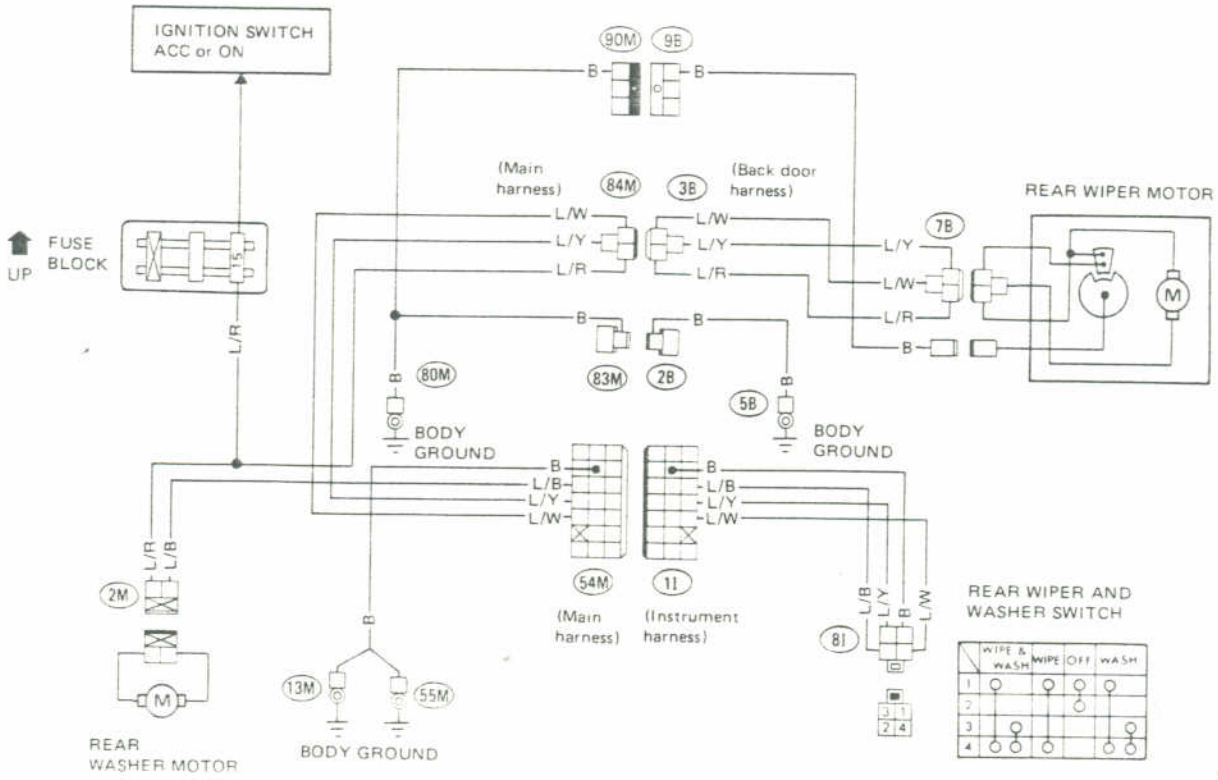
SEL519I

Windshield Wiper and Washer/Wiring Diagram



SEL520I

Rear Window Wiper and Washer/Wiring Diagram



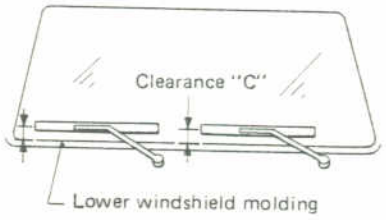
SEL521I

Front Windshield Wiper

ADJUSTMENT

1. Prior to wiper arm installation, set wiper switch to "LOW" to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Adjust wiper blades within clearance "C".
3. Eject washer fluid. Set wiper switch to "LOW" to operate wiper motor and then turn it "OFF".
4. Ensure that wiper blades stop within clearance "C".

Clearance "C": 15 - 25 mm (0.59 - 0.98 in)



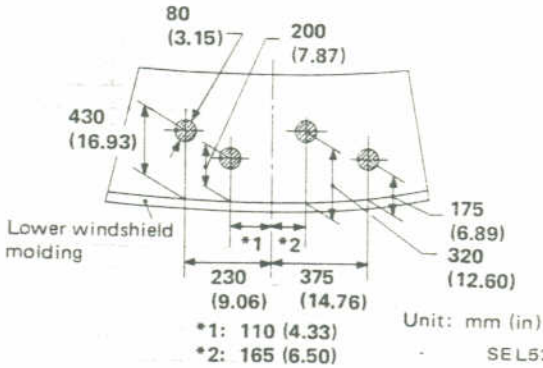
SEL355E

INSTALLATION

- Tighten windshield wiper arm nuts to specified torque.

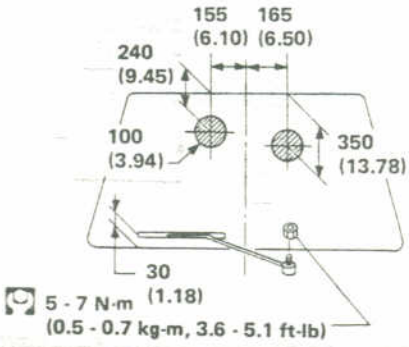
13 - 18 N·m (1.3 - 1.8 kg-m, 9 - 13 ft-lb)

WASHER NOZZLE ADJUSTMENT



SEL526G

Rear Wiper and Washer

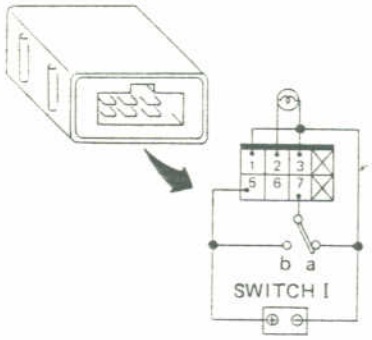


Intermittent Wiper Amplifier Check

Be careful not to connect lead wires to incorrect terminals.

Intermittent circuit check

1. Connect test lead wires.

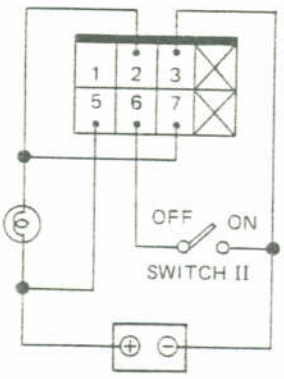


SEL406G

2. Make sure lamp comes on when switch I is connected to "b" and then goes out in a short period of time.
3. Make sure lamp comes on when switch I is connected to "a" and then to "b", and goes out in 7 seconds (approx.).

Washer circuit check

1. Connect test lead wires.

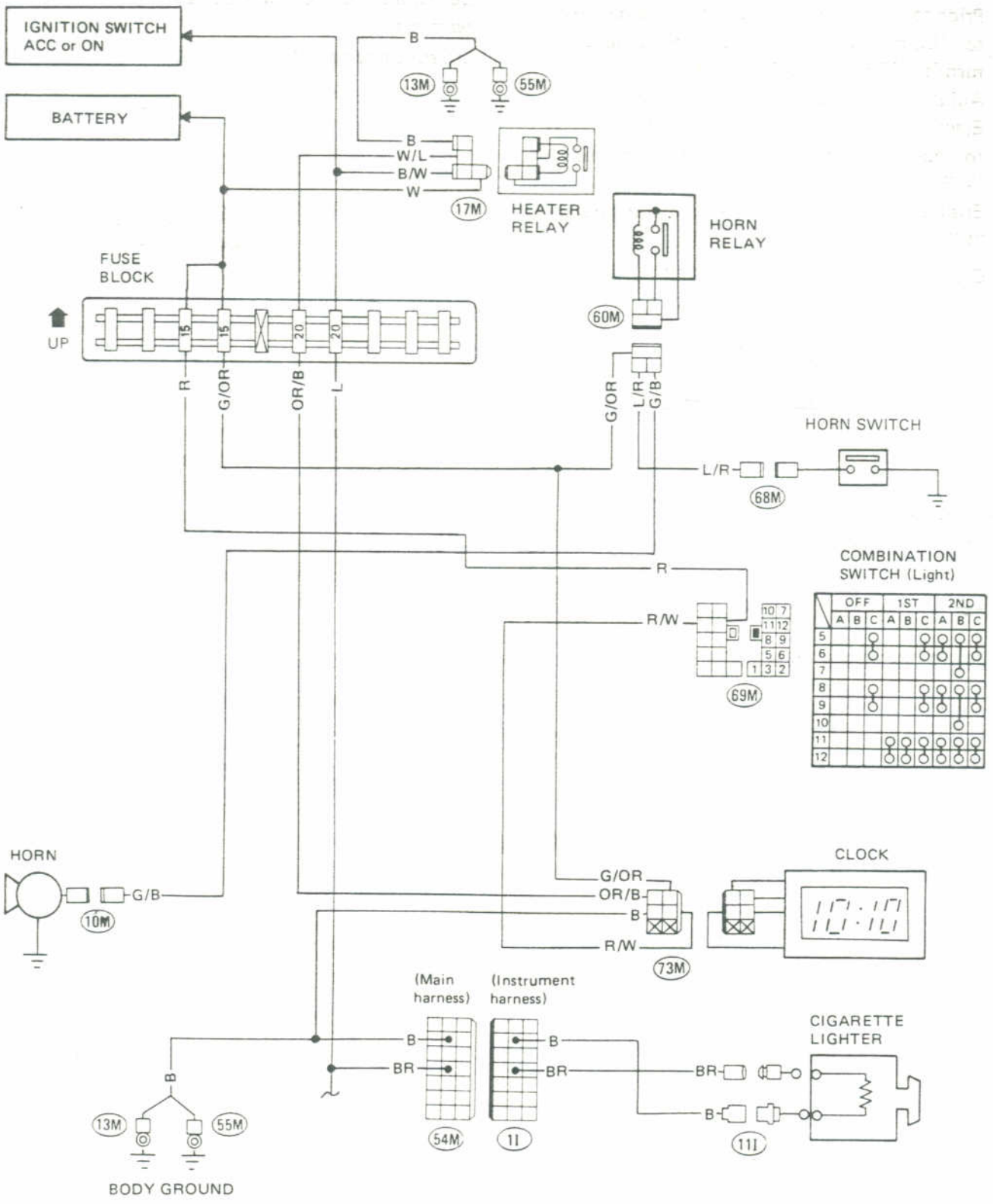


SEL135E

2. Make sure lamp comes on when switch II is turned ON.
3. Make sure lamp goes out in approx. 3 seconds after switch II is turned OFF.

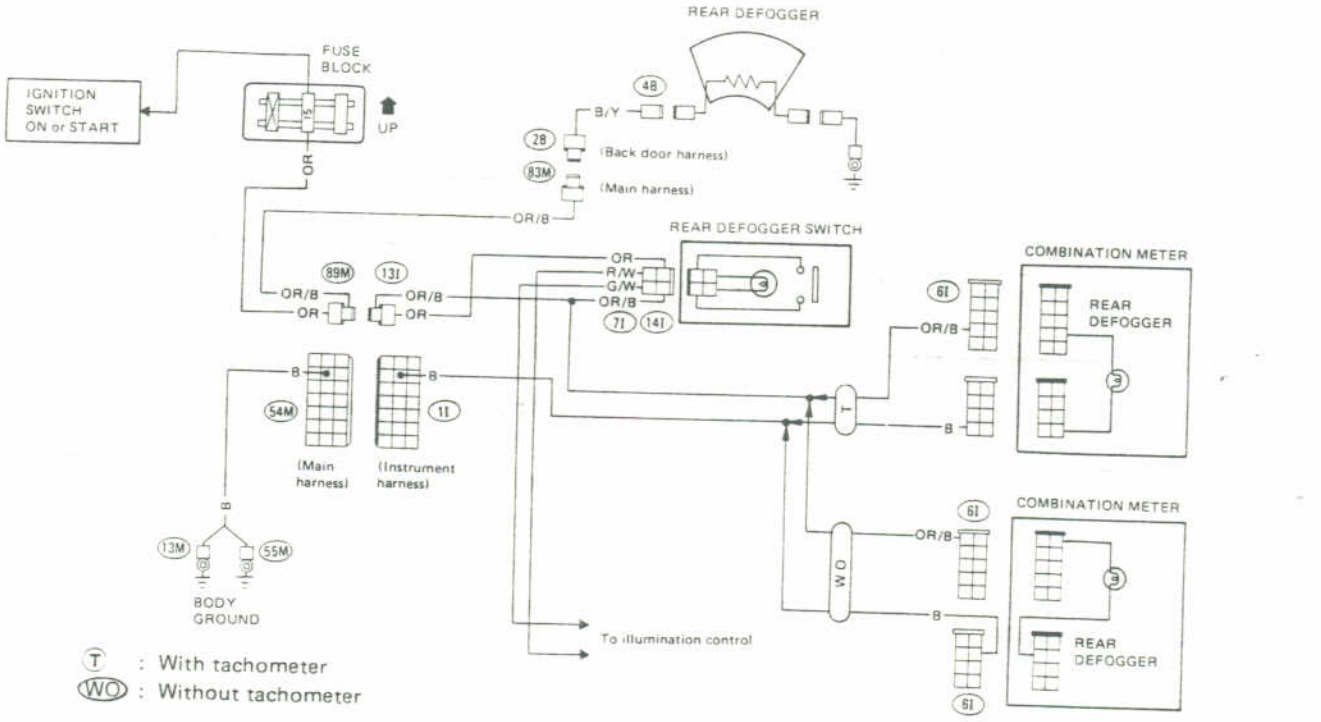
HORN, CIGARETTE LIGHTER, CLOCK

Wiring Diagram



REAR WINDOW DEFOGGER

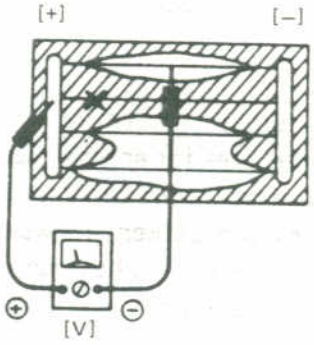
Wiring Diagram



SEL523I

Filament Check

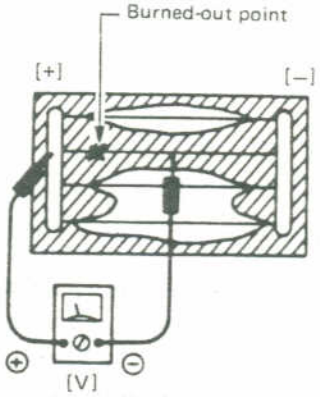
1. Attach probe circuit tester (in volt range) to middle portion of each filament.



6 volts (normal filament)

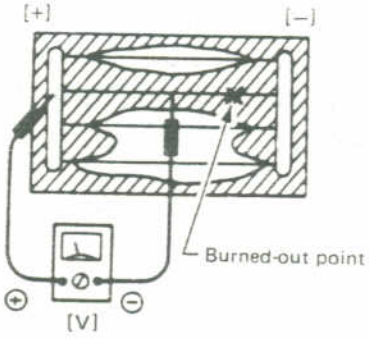
SEL263

2. If a filament is burned out, circuit tester registers 0 or 12 volts.



12 volts

SEL264

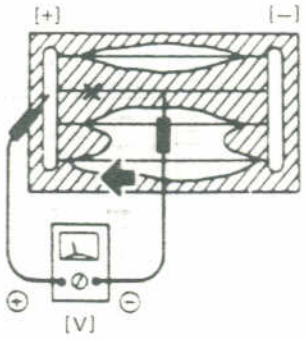


0 volts

SEL265

Filament Check (Cont'd)

3. To locate burned out point, move probe to left and right along filament to determine point where tester needle swings abruptly.



SEL266

Filament Repair

REPAIR EQUIPMENT

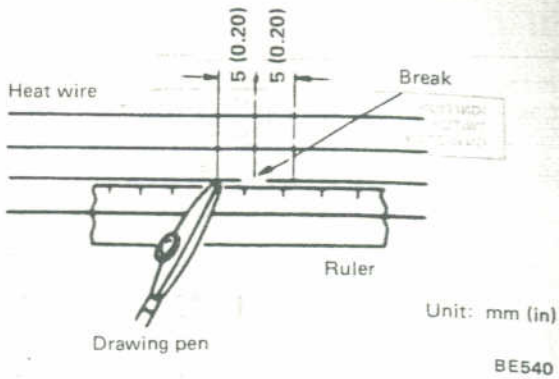
1. Conductive silver composition (Dupont No. 4817 or equivalent)
2. Ruler, 30 cm (11.8 in) long
3. Drawing pen
4. Heat gun
5. Alcohol
6. Cloth

REPAIRING PROCEDURE

1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.

Shake silver composition container before use.

3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.

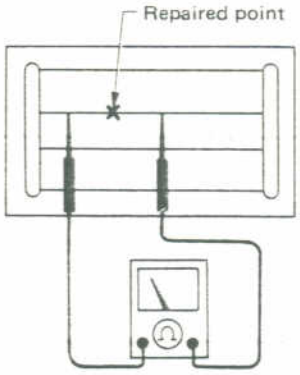


Unit: mm (in)

BE540

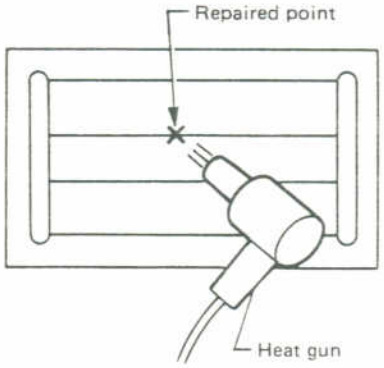
4. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.

Do not touch repaired area while test is being conducted.



SEL012D

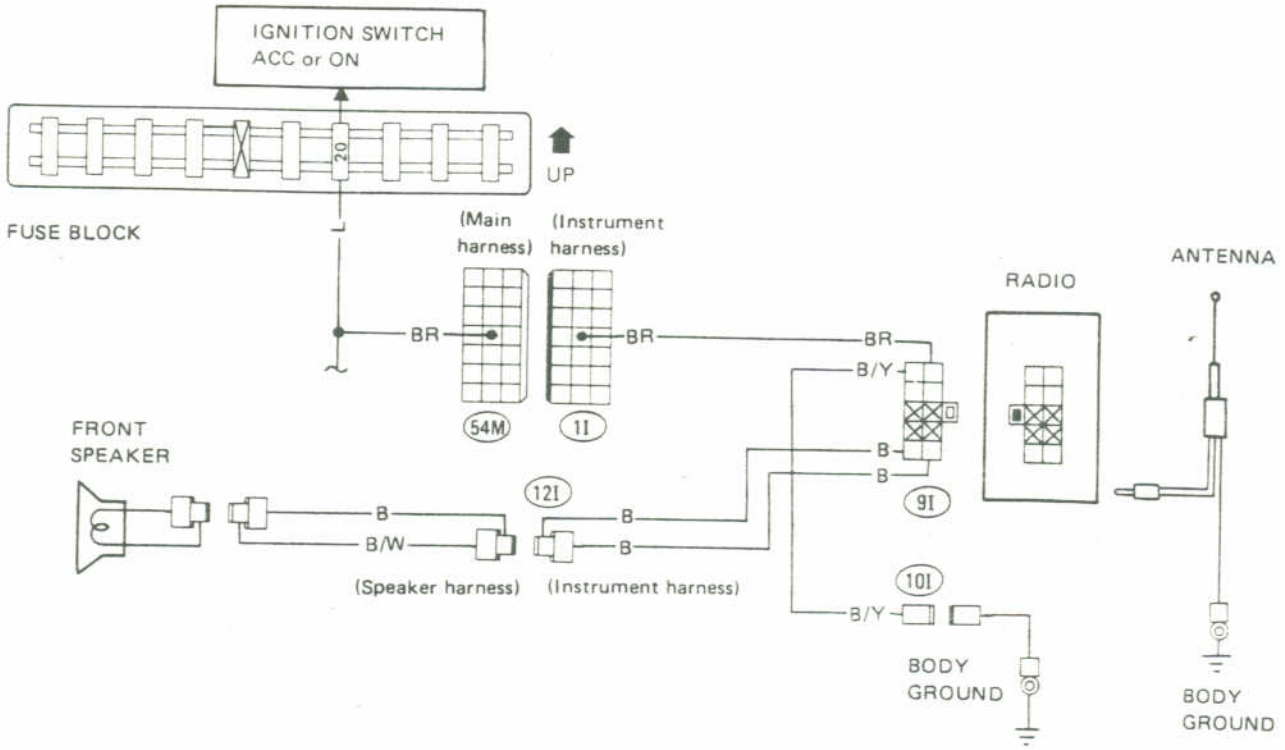
5. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet. If a heat gun is not available, let the repaired area dry for 24 hours.



SEL013D

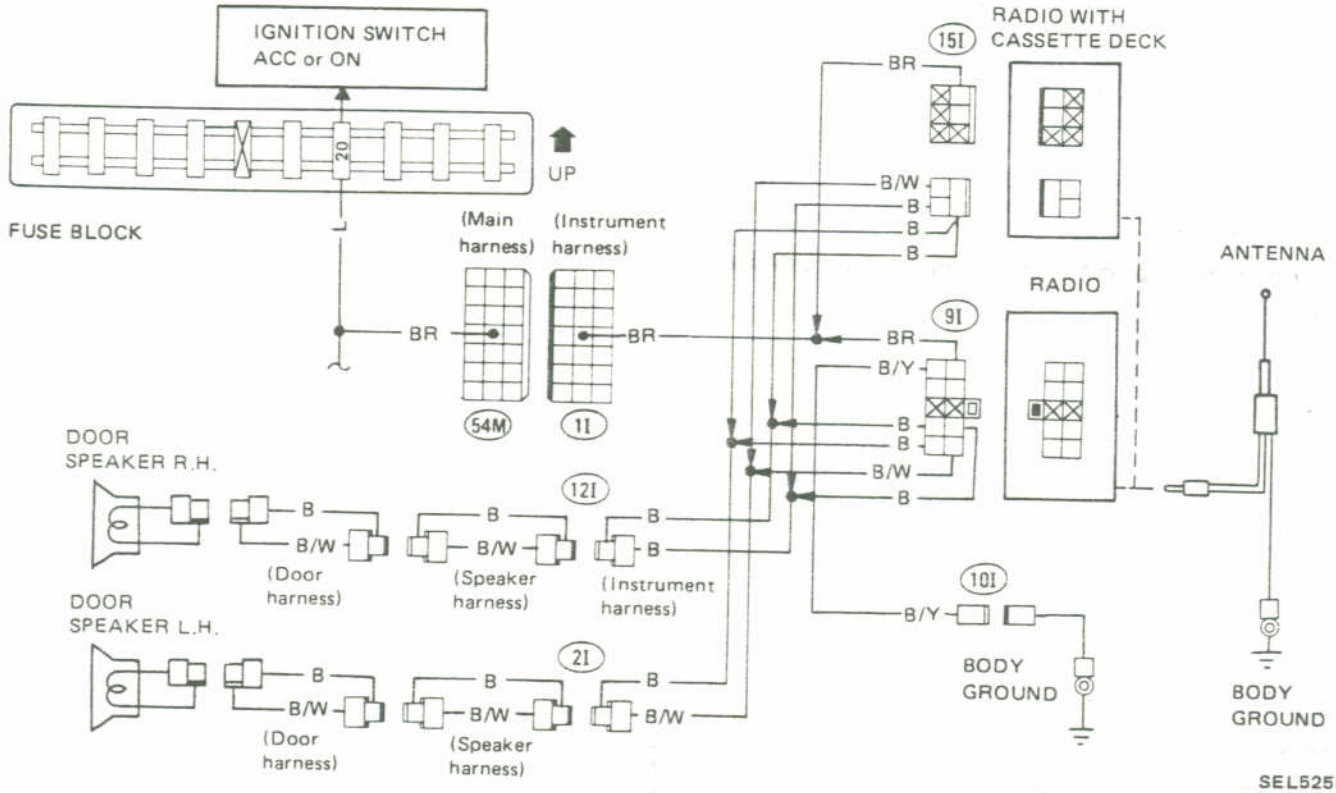
Wiring Diagram

WITHOUT CASSETTE DECK



SEL524I

WITH CASSETTE DECK



SEL525I

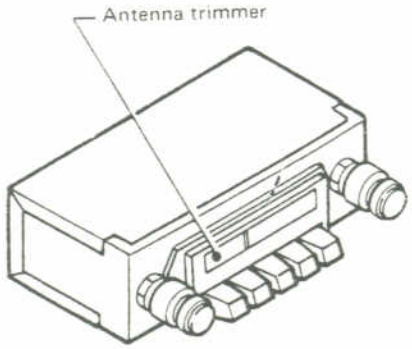
Antenna Trimmer Adjustment

The antenna trimmer should be adjusted in the following cases:

- Fading and weak MW (AM) reception.
- After installation of new antenna, feeder cable or radio receiver.

Before adjusting, be sure to check harness and antenna feeder cable connectors for proper connection.

1. Extend antenna completely.
2. Turn radio on, and turn volume control to increase speaker volume.
3. Tune in the weakest station (barely audible) on dial at the range around 14 (1,400 kHz).
4. Turn antenna trimmer to left or right slowly, and set it in the position where reception is strongest.



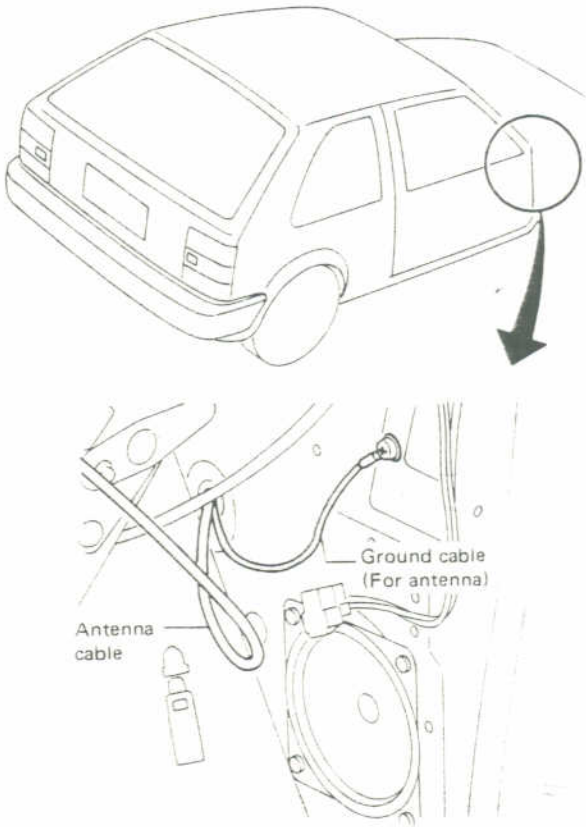
SEL217B

CAUTION:

Do not turn antenna trimmer more than one-half turn.

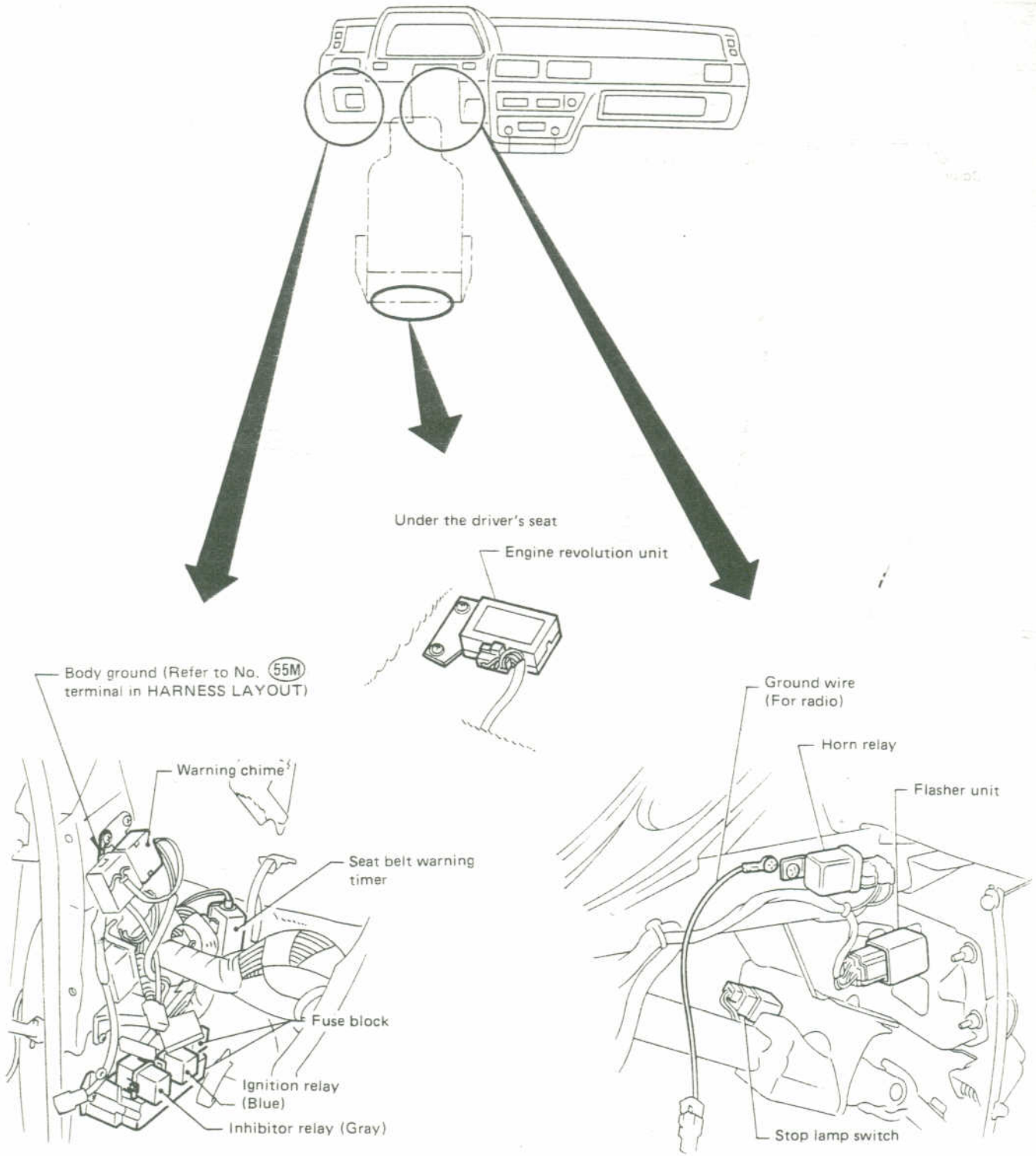
Antenna Removal

1. Remove antenna feeder cable from radio.
2. Remove ground cable.



SEL015D

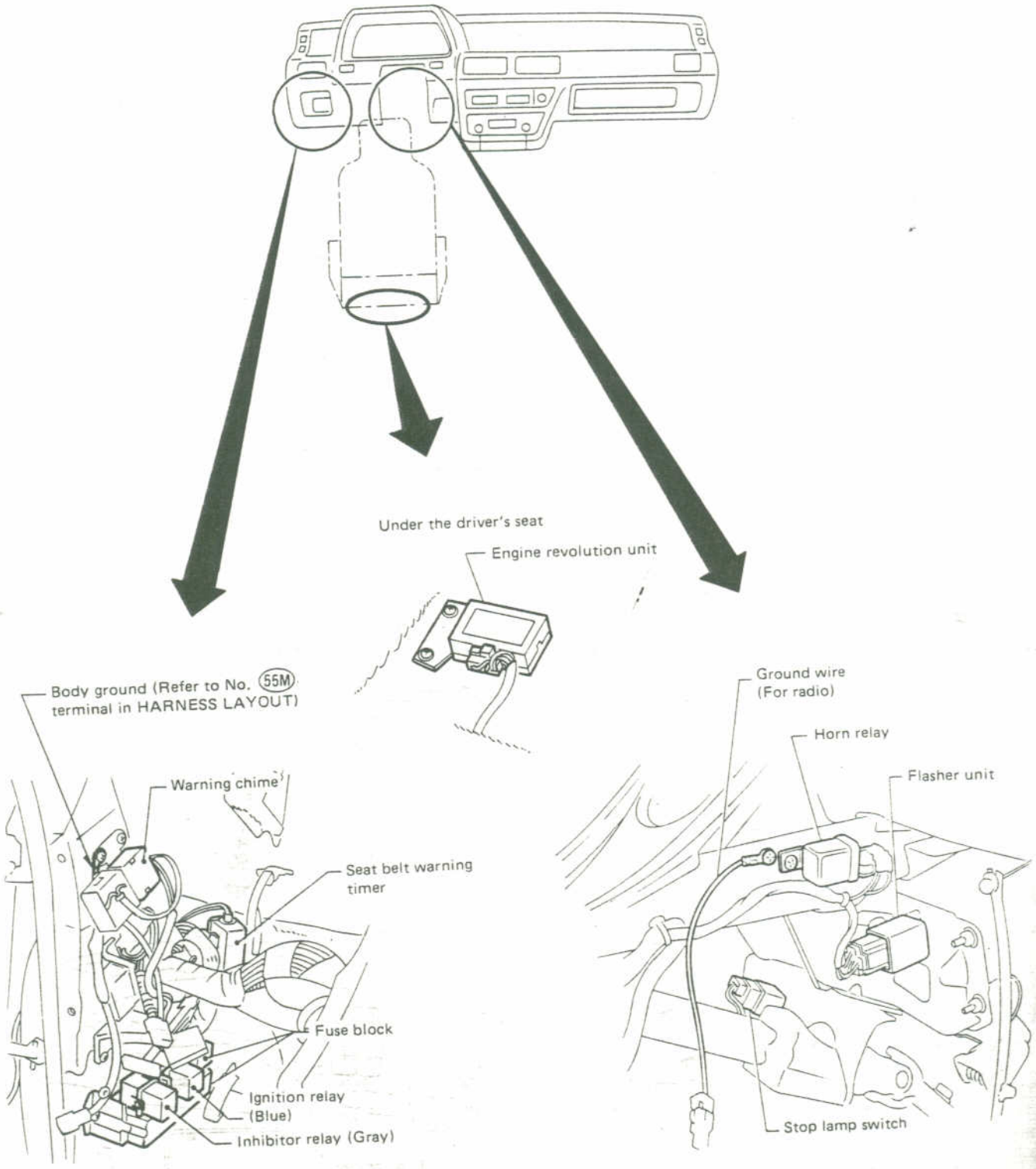
Passenger Compartment



SEL408G

LOCATION OF ELECTRICAL UNITS

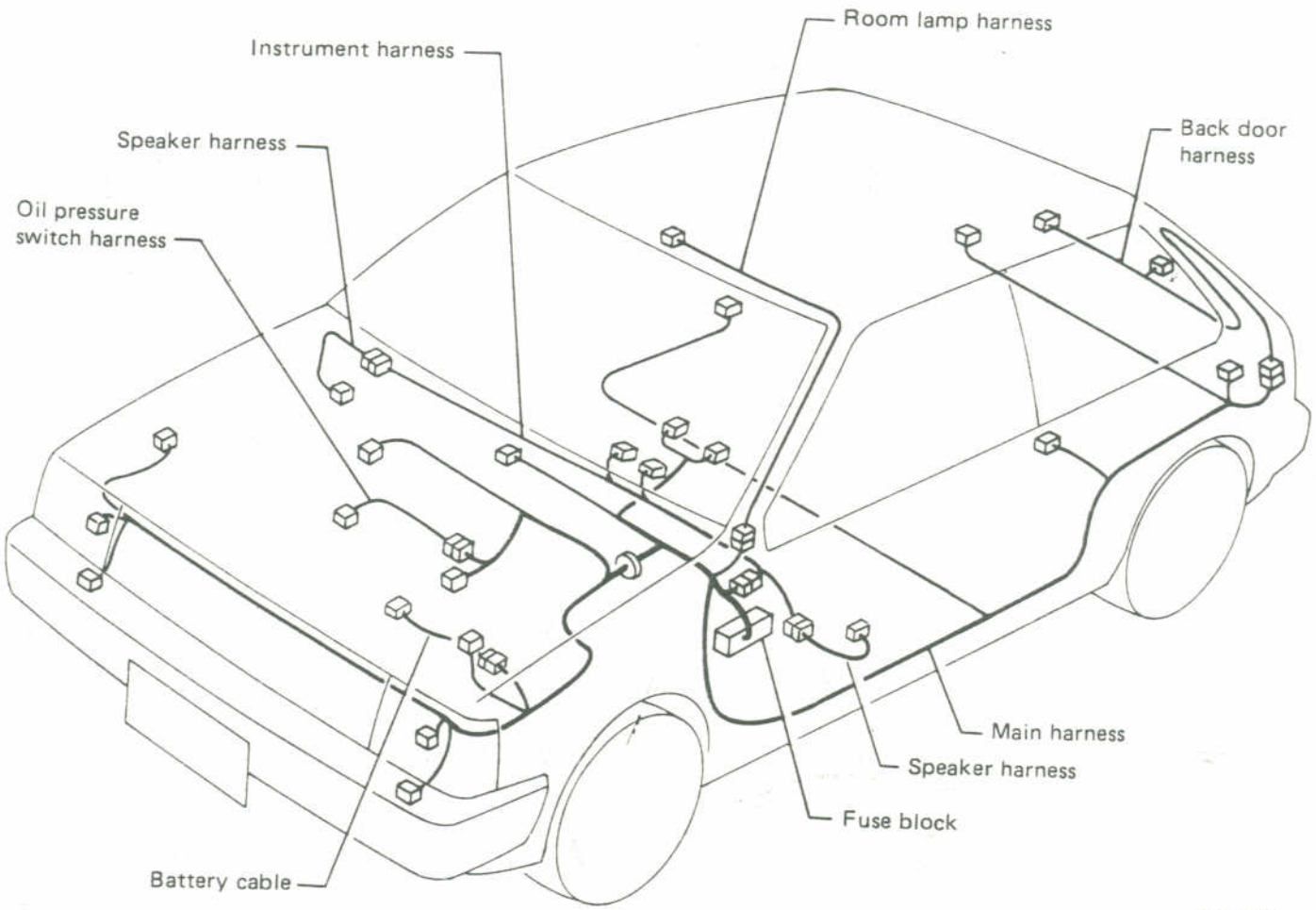
Passenger Compartment



SEL408G

HARNESS LAYOUT

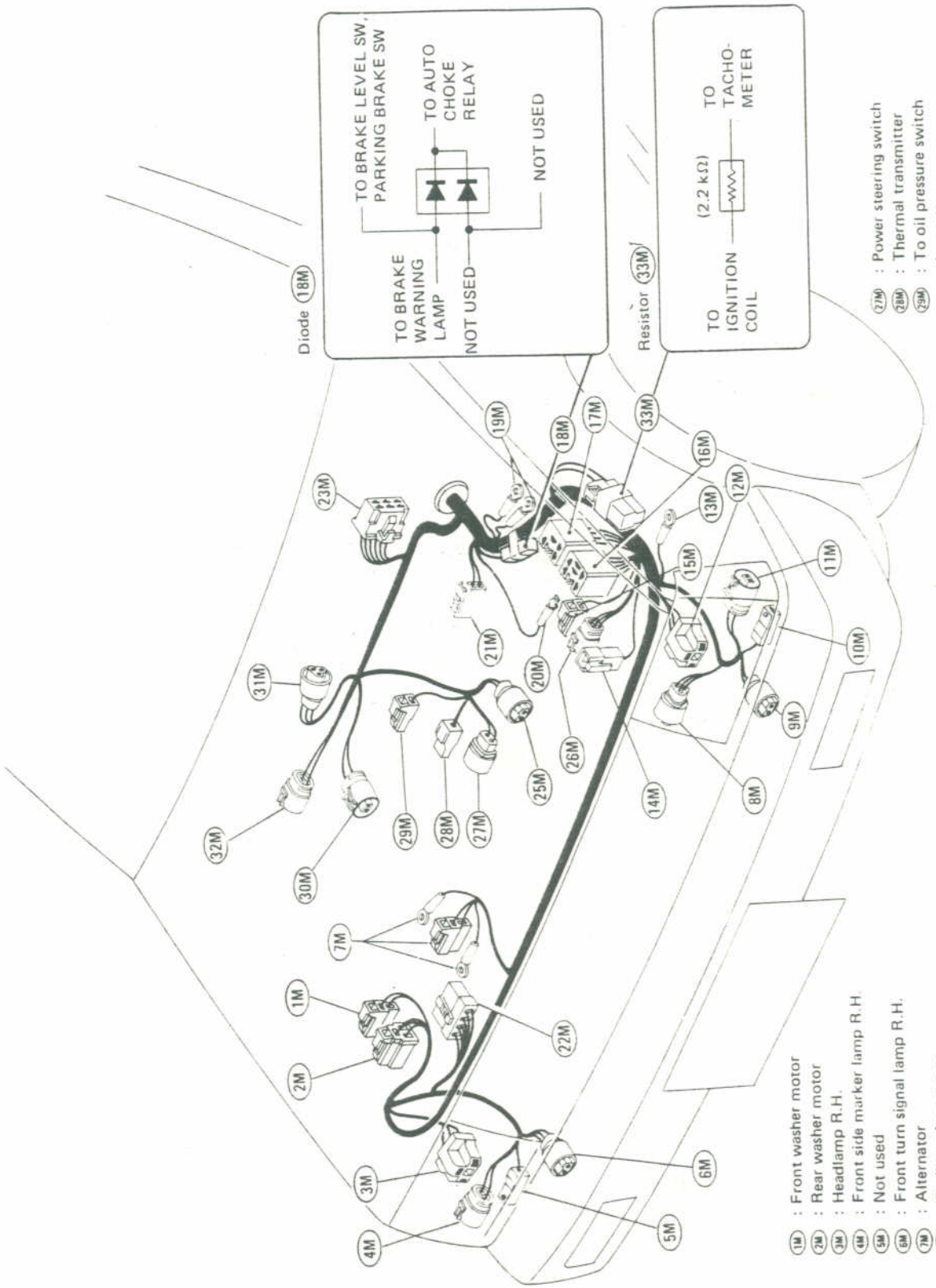
Outline



SEL400G

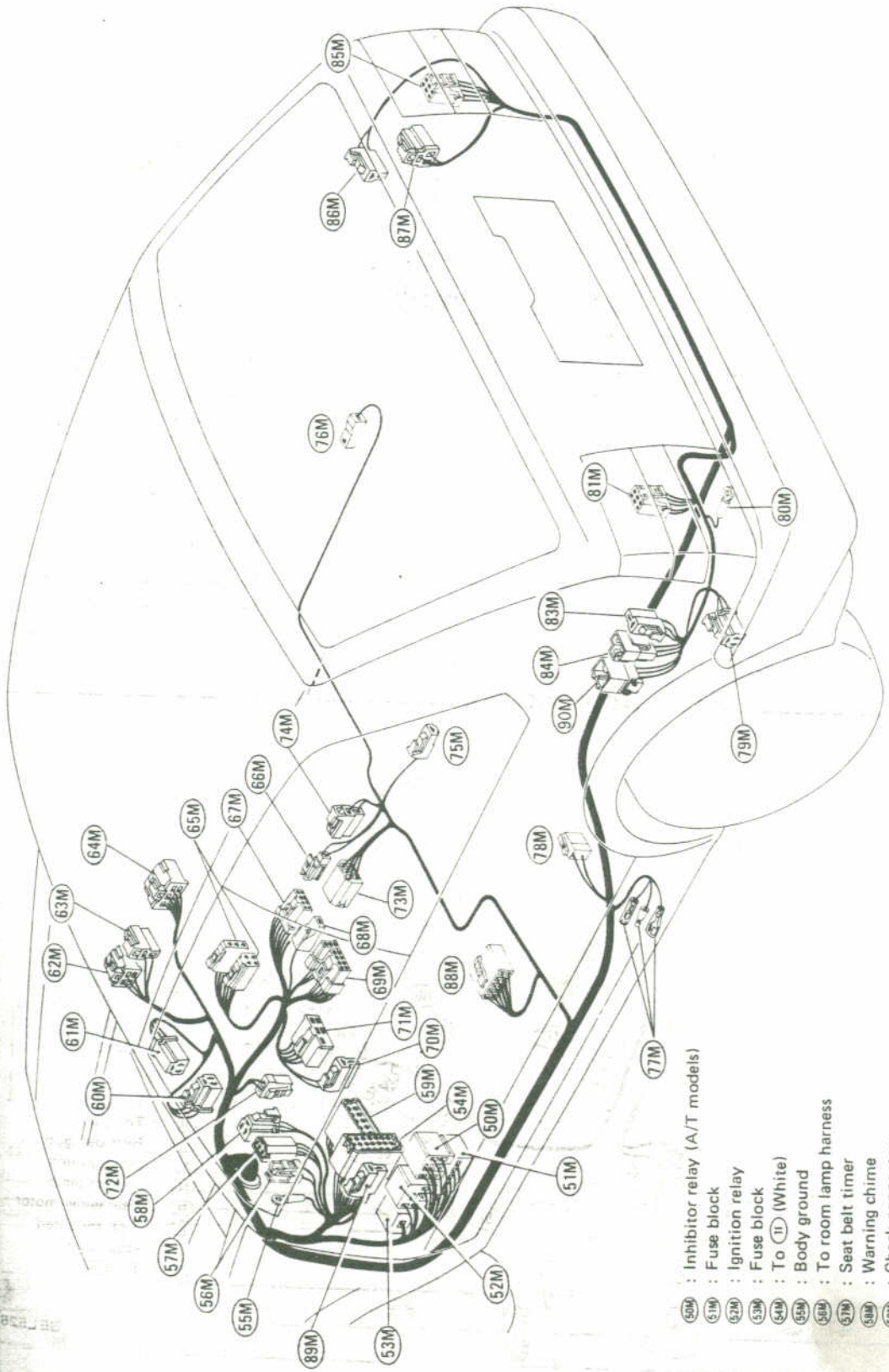
Main Harness

ENGINE COMPARTMENT



Main Harness (Cont'd)

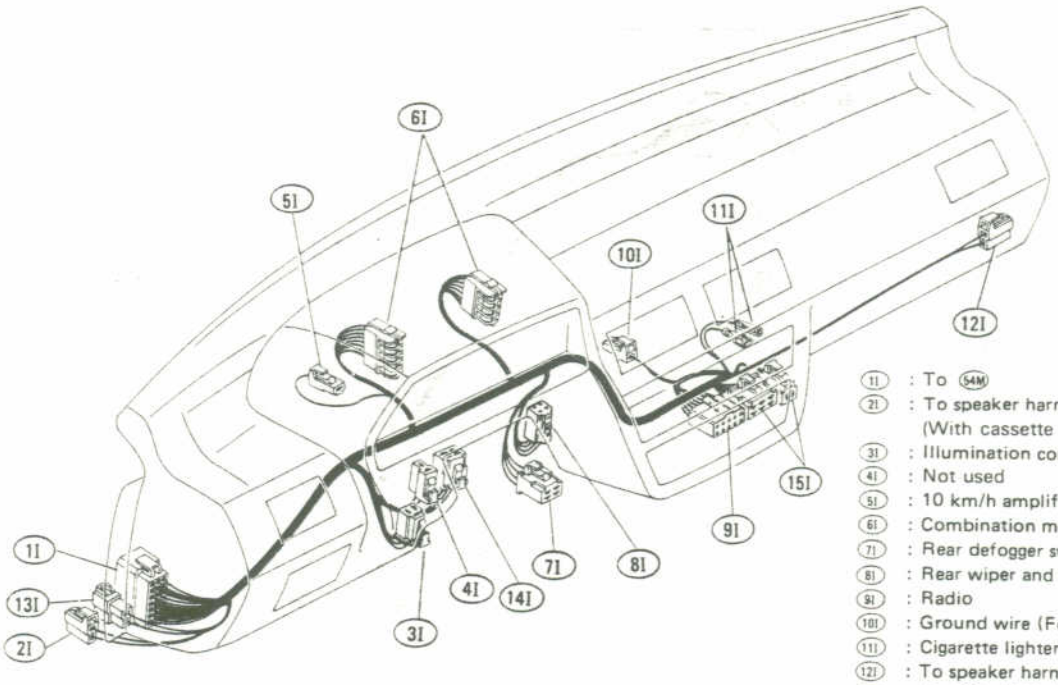
PASSENGER COMPARTMENT



(50M) : Inhibitor relay (A/T models)
(51M) : Fuse block
(52M) : Ignition relay
(53M) : Fuse block
(54M) : To (11) (White)
(55M) : Body ground
(56M) : To room lamp harness
(57M) : Seat belt timer
(58M) : Warning chime
(59M) : Check connector
(60M) : Horn relay
(61M) : Combination flasher unit
(62M) : Resistor
(63M) : Blower motor
(64M) : Heater control switch
(65M) : Hazard switch
(66M) : Seat belt switch
(67M) : Combination switch (Wiper and washer)
(68M) : Combination switch (Horn)
(69M) : Combination switch (Light & turn)
(70M) : Key switch
(71M) : Ignition switch
(72M) : Stop lamp switch
(73M) : Clock (SGL)
(74M) : A/T indicator lamp (A/T models)
(75M) : Parking brake switch
(76M) : Door switch R.H.
(77M) : Door switch L.H.
(78M) : Fuel tank gauge unit
(79M) : Rear side marker lamp L.H.
(80M) : Body ground
(81M) : Rear combination lamp L.H.
(83M) : To (2B)
(84M) : To (3B)
(85M) : Rear combination lamp R.H.
(86M) : Luggage compartment lamp
(87M) : Rear side marker lamp R.H.
(88M) : Engine revolution unit
(89M) : To (13)
(90M) : To (3B)

SEL526I

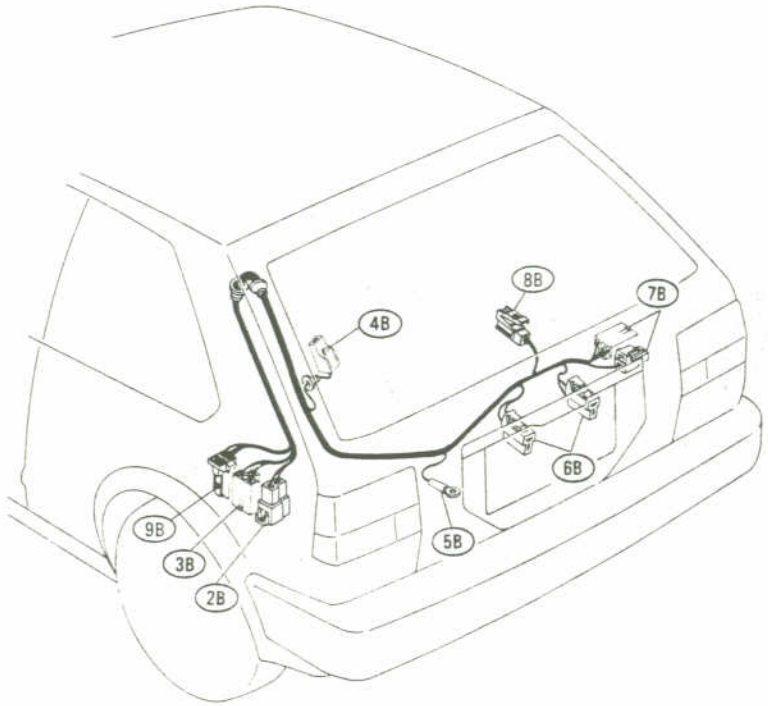
Instrument Harness



1I : To 54M
2I : To speaker harness (With cassette deck)
3I : Illumination control switch
4I : Not used
5I : 10 km/h amplifier
6I : Combination meter
7I : Rear defogger switch (GL model)
8I : Rear wiper and washer switch
9I : Radio
10I : Ground wire (For radio)
11I : Cigarette lighter
12I : To speaker harness
13I : To 89M (White)
14I : Rear defogger switch (DX model)
15I : Radio (With cassette deck)

SEL527I

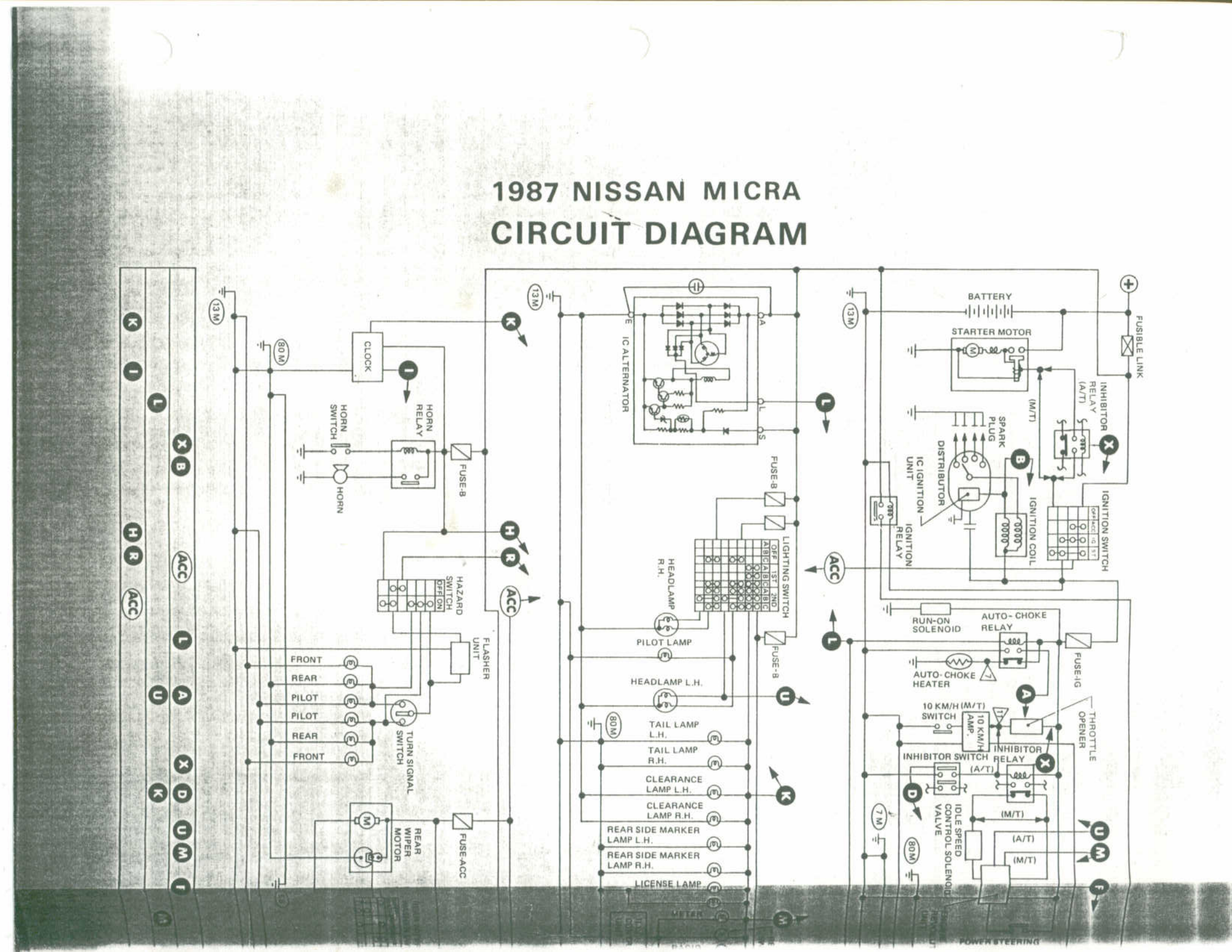
Back Door Harness

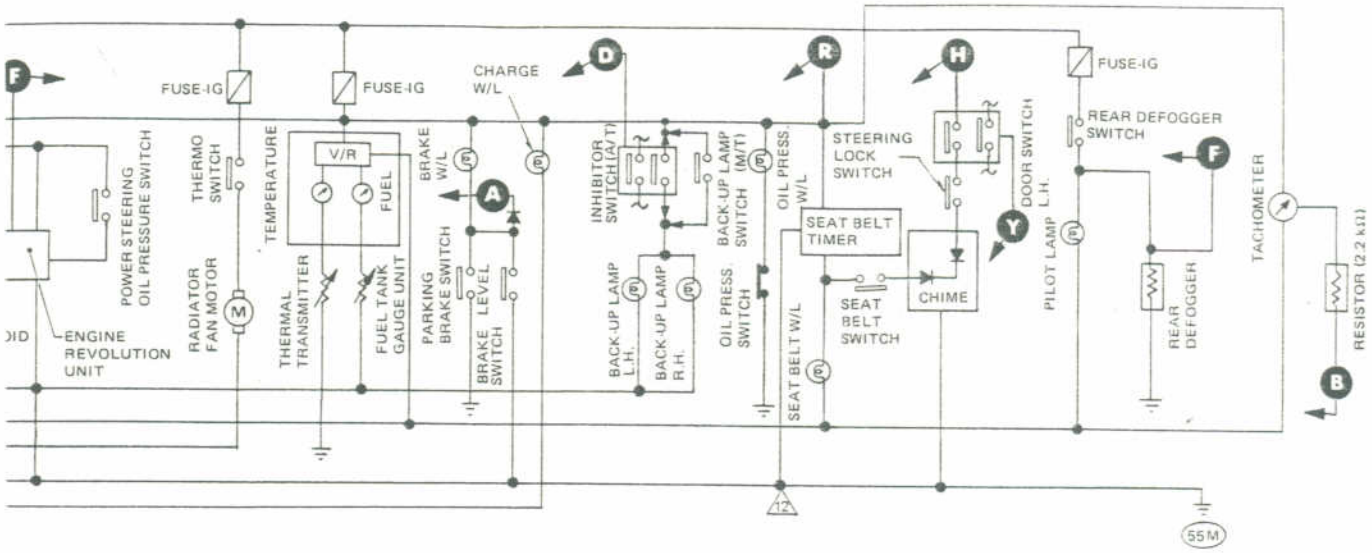


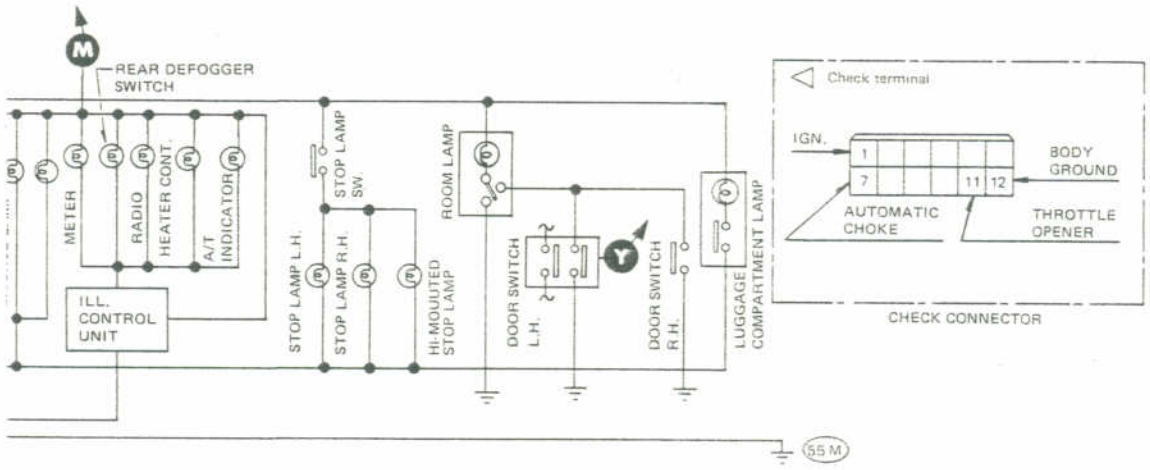
2B : To 83M
3B : To 84M
4B : Rear defogger
5B : Body ground
6B : License lamp
7B : Rear wiper motor
8B : High-mounted stop lamp
9B : To 90M

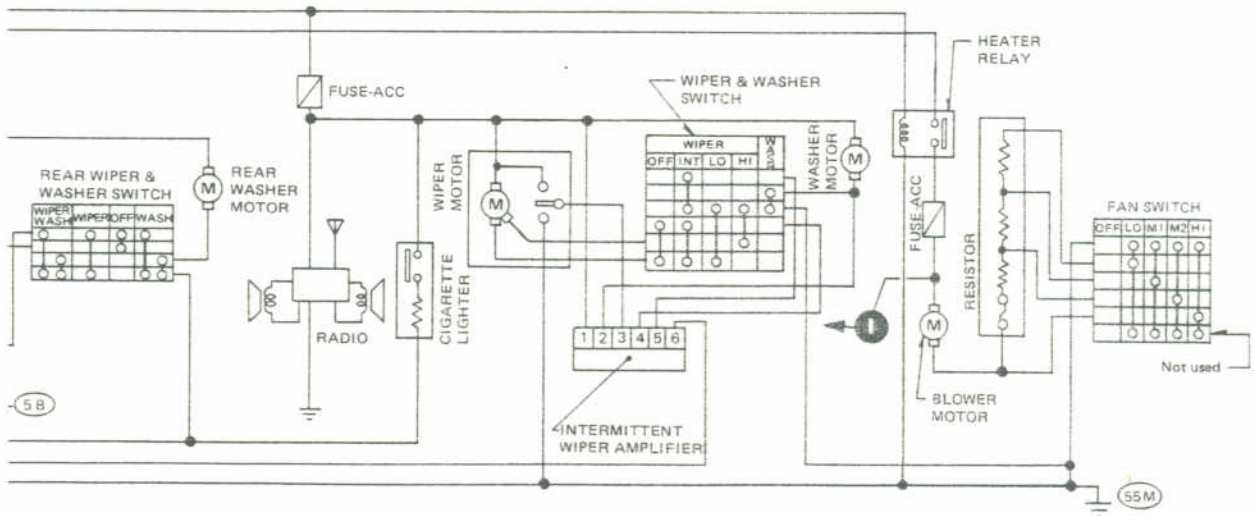
SEL528I

1987 NISSAN MICRA
CIRCUIT DIAGRAM




FUSE-IG
FUSE-IG
CHARGE W/L
INHIBITOR SWITCH (A/T)
BACK-UP LAMP (M/T)
OIL PRESS. W/L
STEERING LOCK SWITCH
DOOR SWITCH
FUSE-IG
REAR DEFOGGER SWITCH
TACHOMETER
POWER STEERING OIL PRESSURE SWITCH
THERMO SWITCH
TEMPERATURE
V/R
BRAKE W/L
SEAT BELT TIMER
PILOT LAMP L.H.
RESISTOR (2.2 kΩ)
RADIATOR FAN MOTOR
THERMAL TRANSMITTER
FUEL TANK GAUGE UNIT
PARKING BRAKE SWITCH
BRAKE LEVEL SWITCH
BACK-UP LAMP L.H.
BACK-UP LAMP R.H.
OIL PRESS. SWITCH
SEAT BELT W/L
SEAT BELT SWITCH
CHIME
REAR DEFOGGER
ENGINE REVOLUTION UNIT
55M


REAR DEFOGGER SWITCH
METER
RADIO
HEATER CONT.
A/T INDICATOR
ILL. CONTROL UNIT
STOP LAMP L.H.
STOP LAMP SW.
STOP LAMP R.H.
HI-MOUUTED STOP LAMP
ROOM LAMP
DOOR SWITCH L.H.
DOOR SWITCH R.H.
LUGGAGE COMPARTMENT LAMP
Check terminal
IGN.
BODY GROUND
AUTOMATIC CHOKE
THROTTLE OPENER
CHECK CONNECTOR
55M


FUSE-ACC
WIPER & WASHER SWITCH
HEATER RELAY
REAR WIPER & WASHER SWITCH
REAR WASHER MOTOR
WIPER MOTOR
WASHER MOTOR
FUSE-ACC
FAN SWITCH
RADIO
CIGARETTE LIGHTER
RESISTOR
Not used
INTERMITTENT WIPER AMPLIFIER
BLOWER MOTOR
58
55M