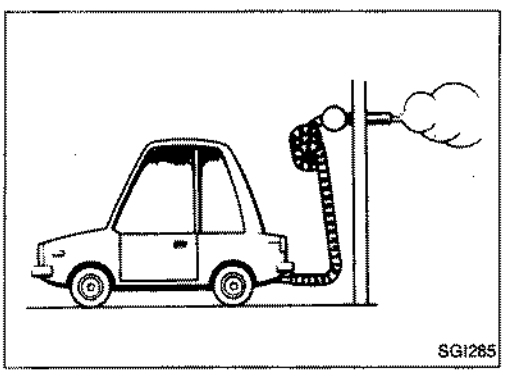
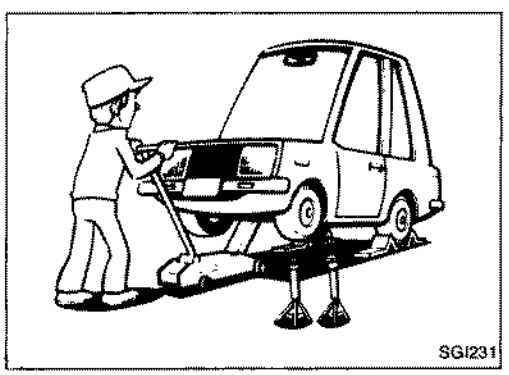
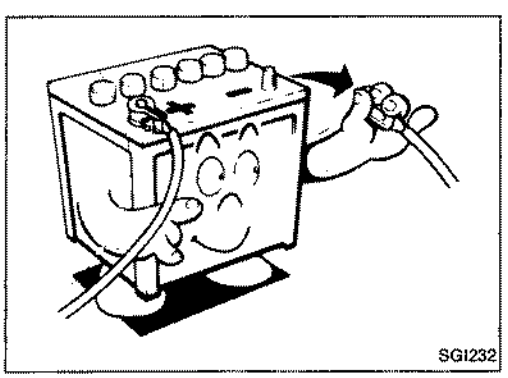
Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.


SGI285

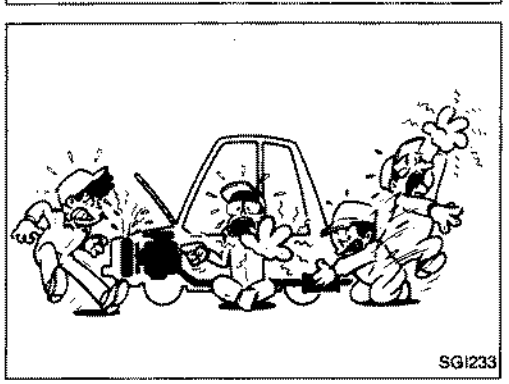
1. Do not operate the engine for an extended period of time without proper exhaust ventilation.
   Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When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


SGI231

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 safety stands at the points designated for proper lifting and towing before working on the vehicle.
   These operations should be done on a level surface.
3. When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.

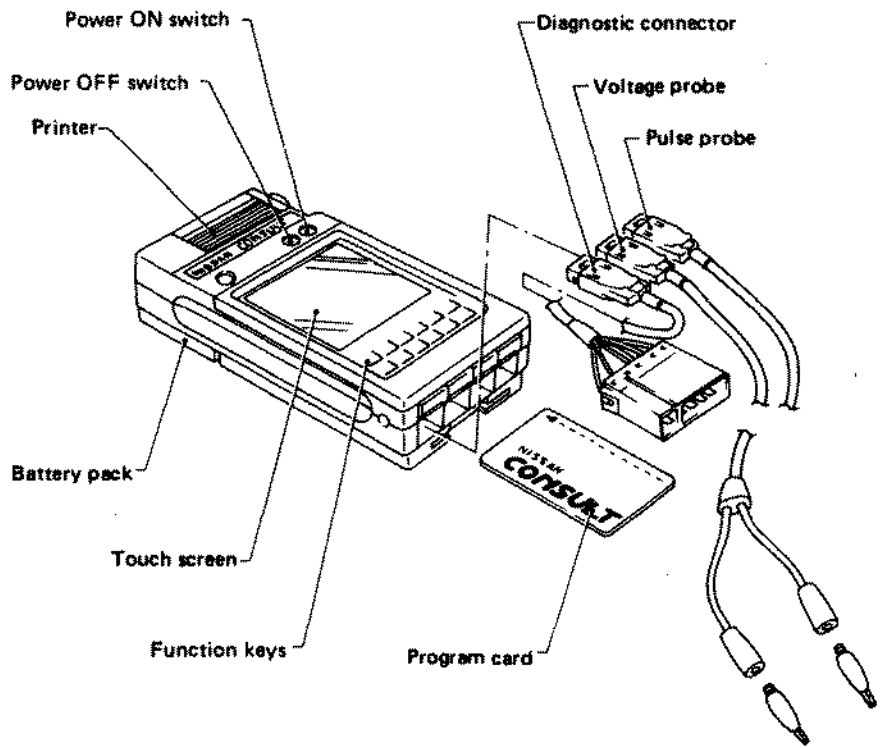

SGI232

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.


SGI233

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.

Outside View



SGI619

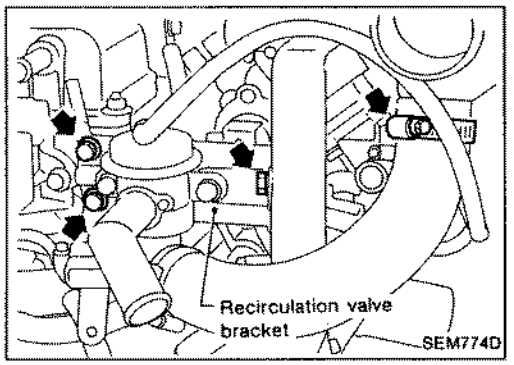
System Application

System / Diagnostic mode	E.C.C.S. (GA16DE and SR20DE engines)
Work support	X
Self-diagnostic results	X
Data monitor	X
Active test	X
E.C.U. part number	X

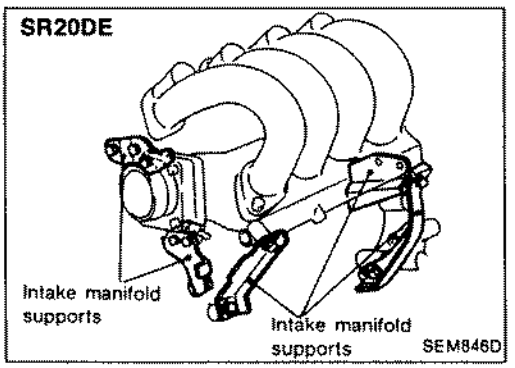
X: Applicable

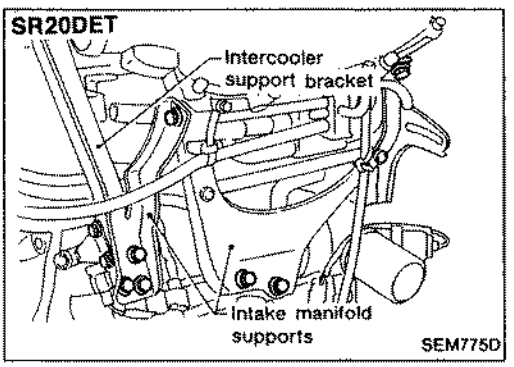
Removal

1. Release fuel pressure.
   Refer to "Releasing Fuel Pressure" in section EF & EC.
2. Drain coolant by removing cylinder block drain plug.
3. Remove air duct from intake manifold.
4. Remove intercooler cover and intercooler. (SR20DET only)
5. Remove P.C.V. hoses from rocker cover.
6. Remove vacuum hoses, fuel hoses, wires, harnesses, connectors, etc.

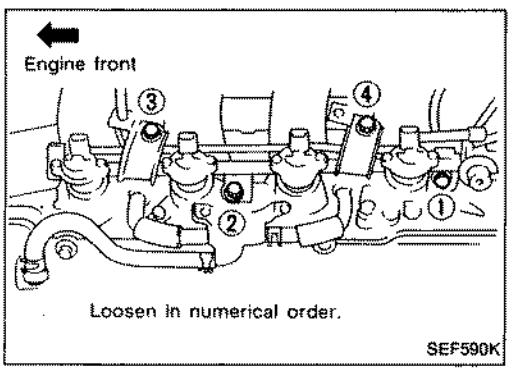


7. Remove recirculation valve bracket. (SR20DET only)



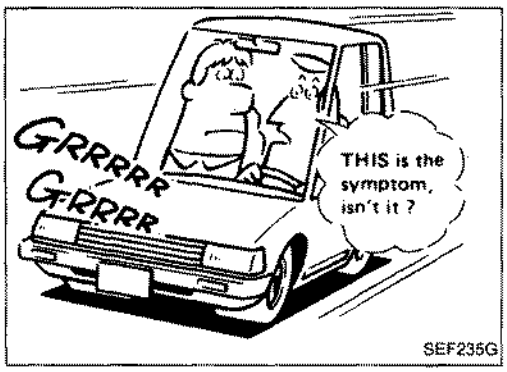


8. • SR20DE: Remove intake manifold supports.
   • SR20DET: Remove intake manifold supports and intercooler support bracket.



9. Remove fuel tube assembly. (SR20DE only)

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)



INTERMITTENT PROBLEM SIMULATION

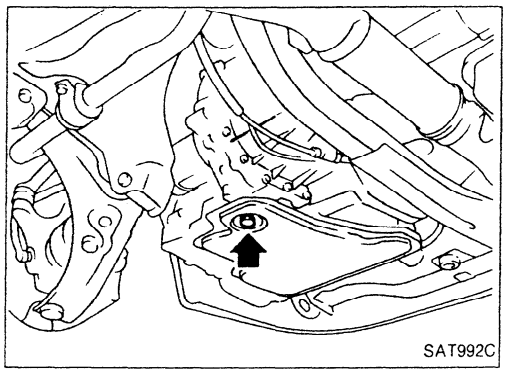
In order to duplicate an intermittent problem, it is effective to create similar conditions for component parts, under which the problem might occur.
Perform the activity listed under Service procedure and note the result.

	Variable factor	Influential part	Target condition	Service procedure
1	Mixture ratio	Pressure regulator	Made lean	Remove vacuum hose and apply vacuum.
			Made rich	Remove vacuum hose and apply pressure.
2	Ignition timing	Crank angle sensor	Advanced	Rotate distributor clockwise.
			Retarded	Rotate distributor counterclockwise.
3	Idle speed	A.A.C. valve	Raised	Turn idle adjusting screw counterclockwise.
			Lowered	Turn idle adjusting screw clockwise.
4	Electrical connection (Electric continuity)	Harness connectors and wires	Poor electrical connection or improper wiring	Tap or wiggle.
				Race engine rapidly. See if the torque reaction of the engine unit causes electric breaks.
5	Temperature	Control unit	Cooled	Cool with an icing spray or similar device.
			Warmed	Heat with a hair drier. **[WARNING: Do not overheat the unit.]**
6	Moisture	Electric parts	Damp	Wet. **[WARNING: Do not directly pour water on components. Use a mist sprayer.]**
7	Electric loads	Load switches	Loaded	Turn on headlamps, air conditioner, rear defogger, etc.
8	Idle switch condition	Control unit	ON-OFF switching	Rotate throttle sensor body.
9	Ignition spark	Timing light	Spark power check	Try to flash timing light for each cylinder.

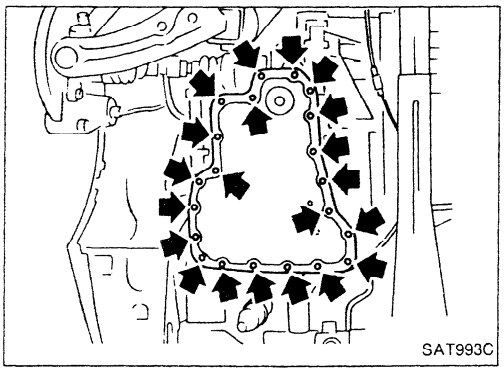
*: Models with catalyzer only

Control Valve Assembly and Accumulator

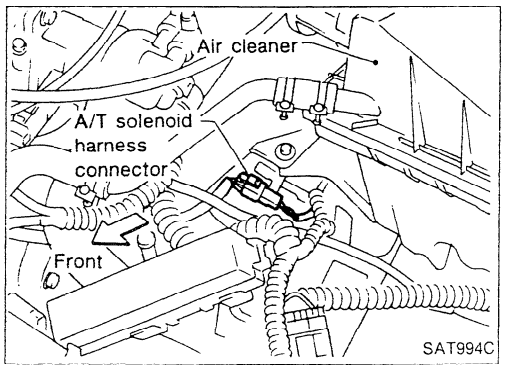
REMOVAL



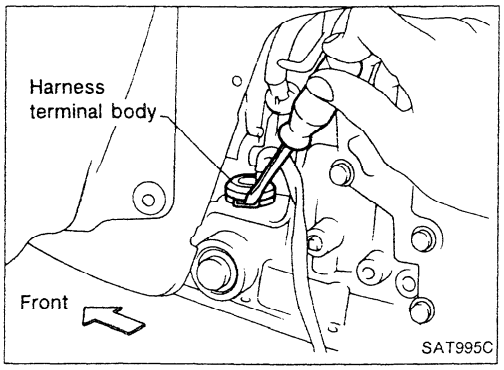
1. Drain A.T.F. from transaxle.



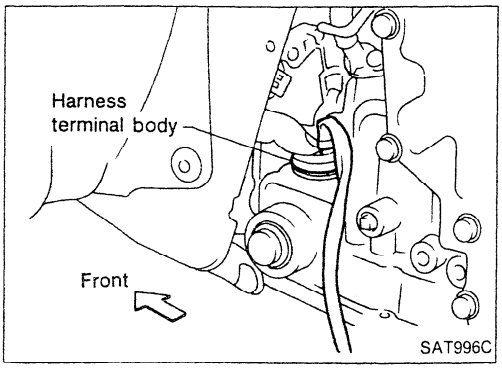
2. Remove oil pan and gasket.



3. Disconnect A/T solenoid harness connector.



4. Remove stopper ring from A/T solenoid harness terminal body.



5. Pull out A/T solenoid harness from transmission case by pushing terminal body.

Road Testing (Cont'd)

ON VEHICLE															OFF VEHICLE										
Kickdown modifier valve	1-2 accumulator valve	3-2 timing valve	1st reducing valve	Torque converter relief valve	Throttle modifier valve	4th speed cut valve	Lock-up control valve	4-2 sequence valve	Governor pressure	Governor valve	O.D. cancel solenoid	Accumulator 3-R	Accumulator N-D	Ignition switch and starter motor	O.D. control switch and wiring	Torque converter	Oil pump	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrun clutch	Low one-way clutch	Low & reverse clutch	Brake band	Parking components
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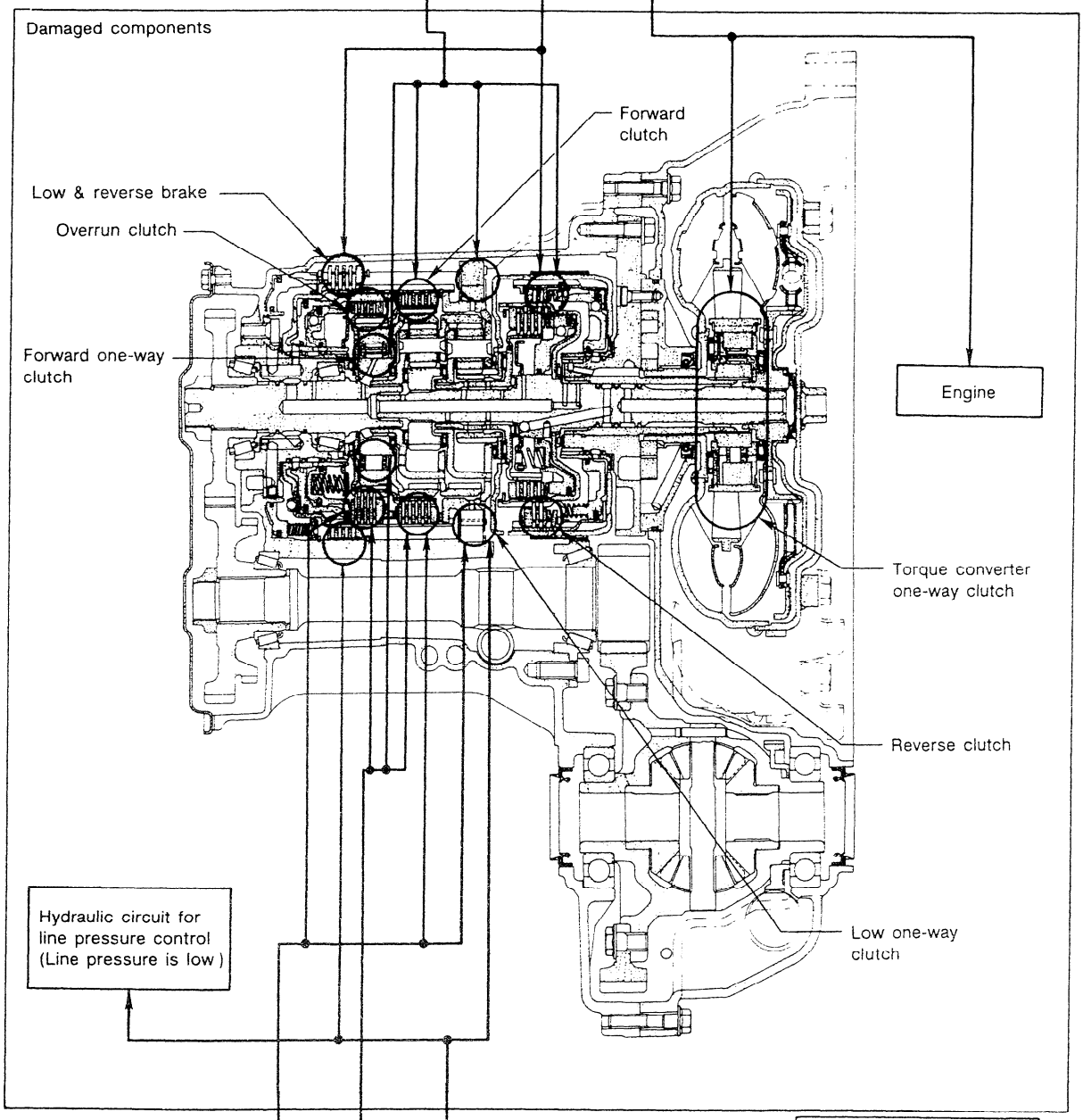
JUDGMENT OF STALL TEST

Judgement of stall test

Selector lever position	Judgment		
D	H	O	L
2	H	O	L
1	O	O	L
R	H	H	L

O : Stall revolution is normal.
H . Stall revolution is higher than specified
L : Stall revolution is lower than specified.



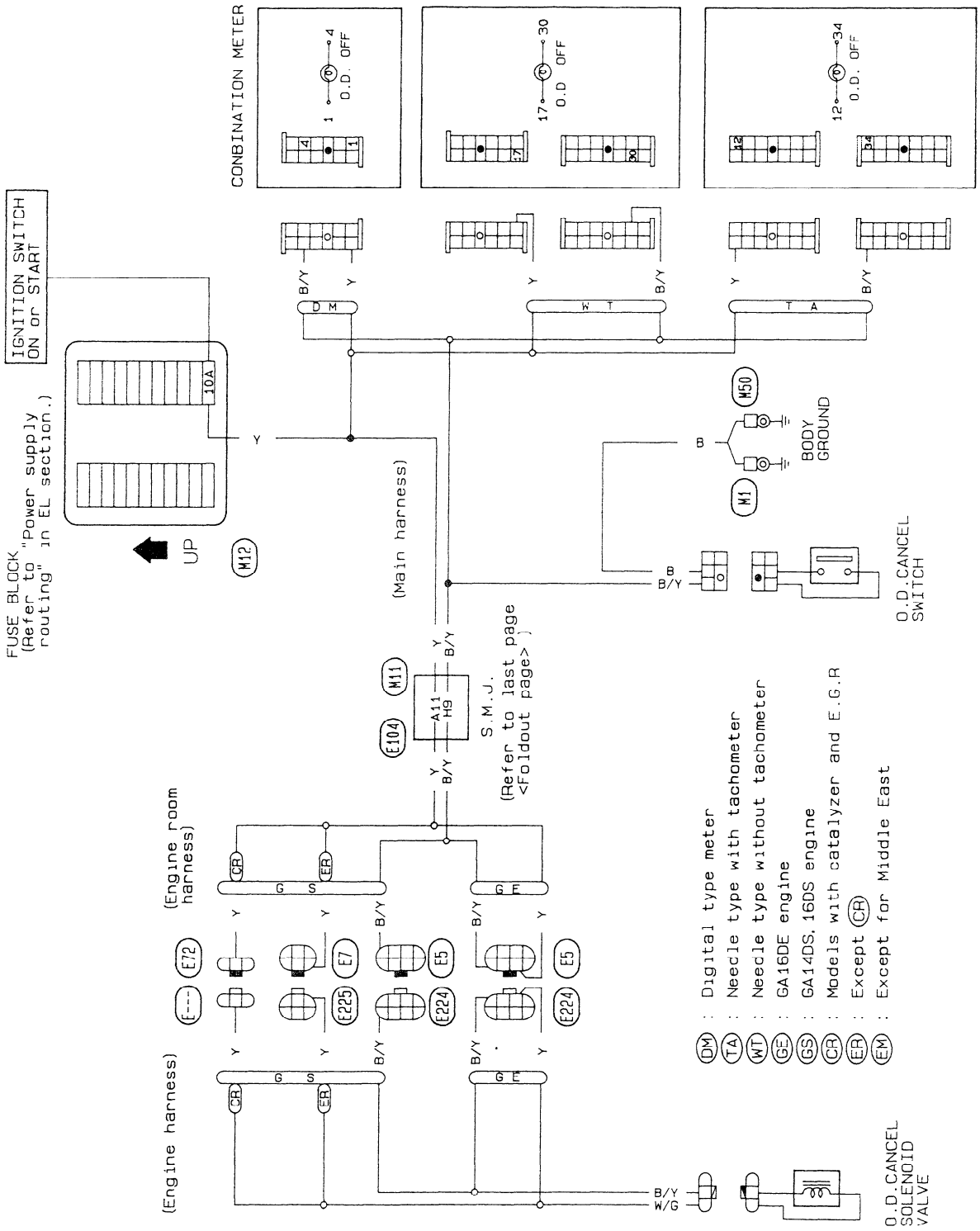
D	H	H	H	O
2	H	H	H	O
1	O	H	H	O
R	O	O	H	O
Selector lever position	Judgment			

Clutches and brakes except high clutch and brake band are O K (Condition of high clutch and brake band cannot be confirmed by stall test)

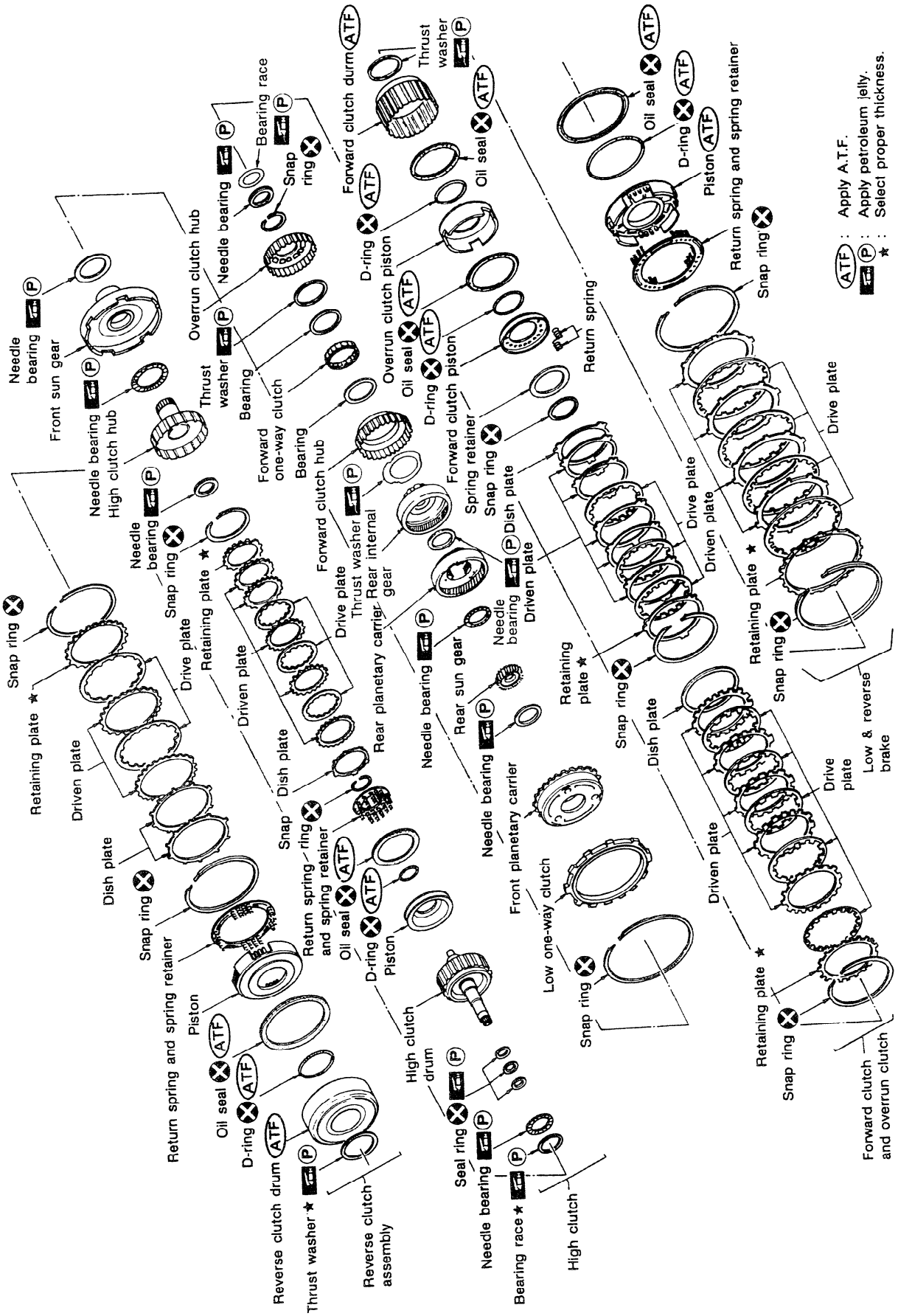
SAT236E

Wiring Diagram (Cont'd)

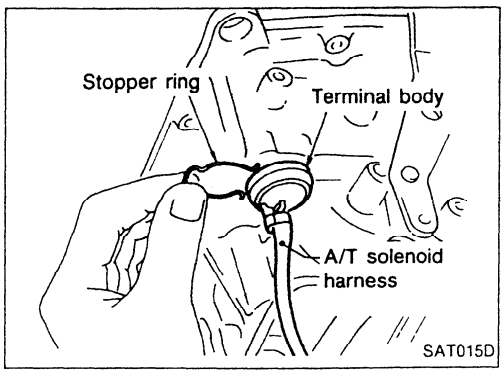
L.H.D. models



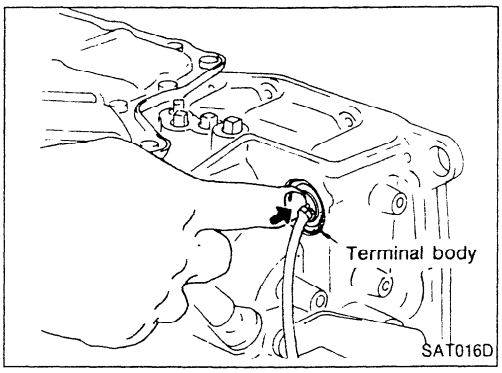
SAT268E


Needle bearing
Front sun gear
Needle bearing
High clutch hub
Needle bearing
Snap ring
Snap ring
Retaining plate ★
Driven plate
Dish plate
Snap ring
Return spring and spring retainer
Piston
Oil seal
D-ring
Reverse clutch drum
Thrust washer ★
Reverse clutch assembly
Overrun clutch hub
Needle bearing
Thrust washer
Bearing
Forward one-way clutch
Bearing
Bearing race
Snap ring
Forward clutch hub
Drive plate
Retaining plate ★
Driven plate
Dish plate
Snap ring
Return spring and spring retainer
Oil seal
D-ring
Piston
Forward clutch drum
Thrust washer
Oil seal
D-ring
Overrun clutch piston
Oil seal
D-ring
Forward clutch piston
Forward clutch hub
Thrust washer
Rear internal gear
Rear planetary carrier
Needle bearing
Rear sun gear
Needle bearing
Needle bearing
Front planetary carrier
High clutch drum
Seal ring
Needle bearing
Bearing race ★
High clutch
Return spring
Spring retainer
Snap ring
Dish plate
Driven plate
Needle bearing
Oil seal
D-ring
Piston
Return spring and spring retainer
Return spring
Snap ring
Drive plate
Driven plate
Retaining plate ★
Snap ring
Dish plate
Low one-way clutch
Snap ring
Drive plate
Driven plate
Retaining plate ★
Snap ring
Low & reverse brake
Forward clutch and overrun clutch
ATF : Apply A.T.F.
P : Apply petroleum jelly.
★ : Select proper thickness.

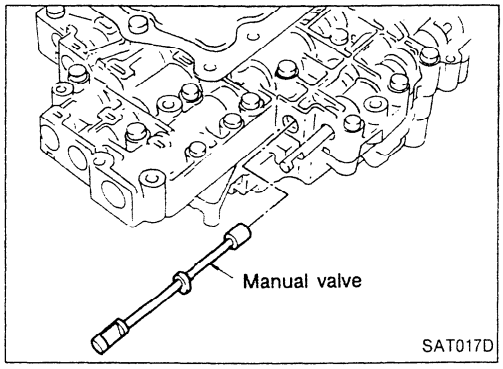
SAT023E



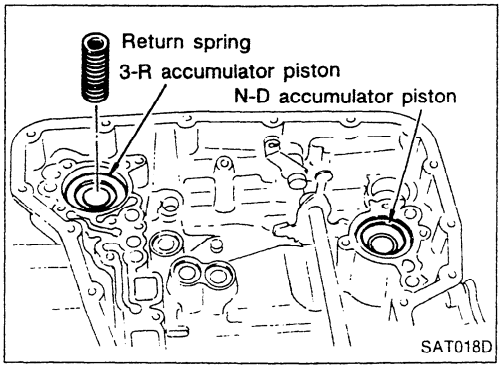
b. Remove stopper ring from terminal body.



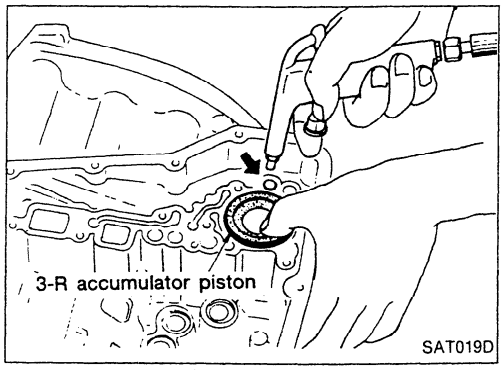
c. Push terminal body into transmission case and draw out solenoid harness.



10. Remove manual valve from control valve assembly.

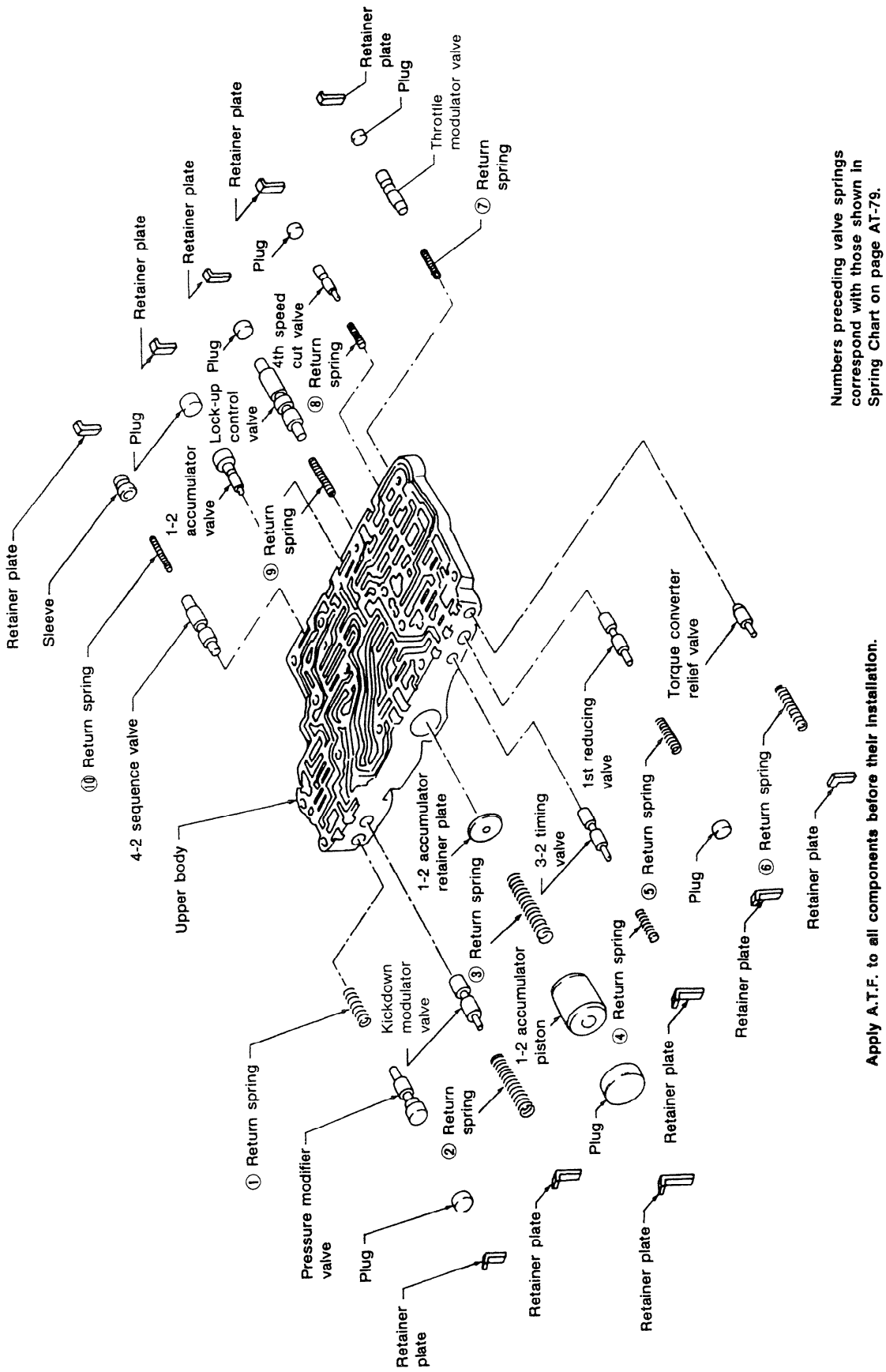


11. Remove return spring from 3-R accumulator piston.



12. Remove 3-R accumulator piston with compressed air.
13. Remove O-rings from 3-R accumulator piston.

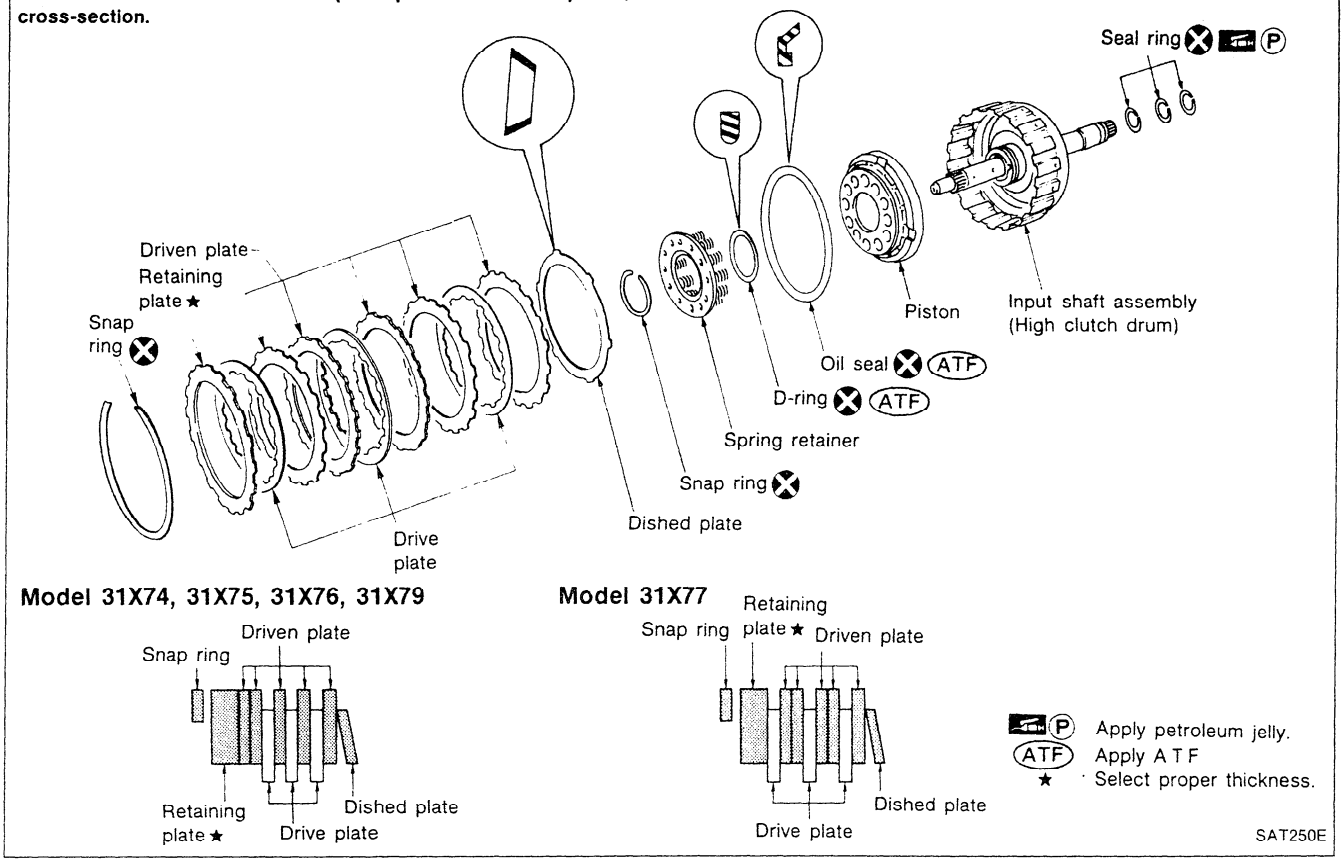
Control Valve Upper Body

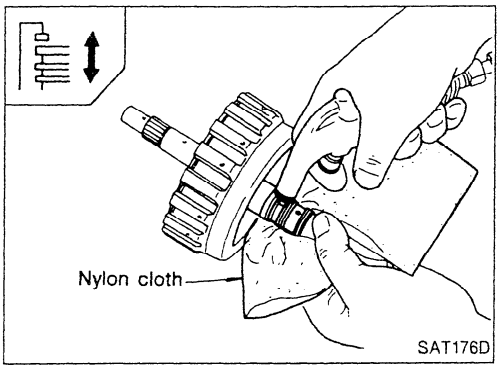


SAT233E

High Clutch

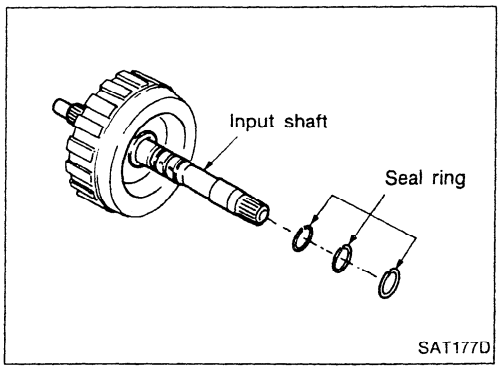
For the number of clutch sheets (drive plates and driven plates), refer to the below cross-section.



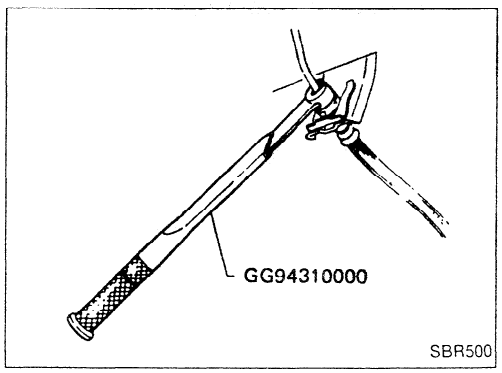


1. Check operation of high clutch.
a. Apply compressed air to oil hole of input shaft.
- **Stop up a hole on opposite side of input shaft.**

b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not move to snap ring, D-ring or oil seal may be damaged or fluid may be leaking at piston check ball.



2. Remove seal rings from input shaft.



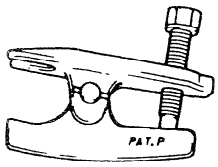
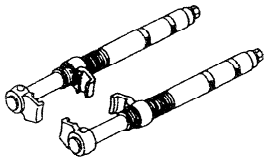
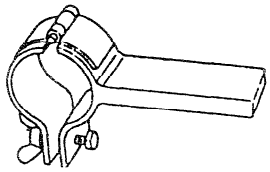
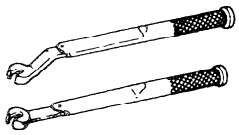
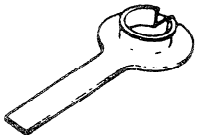
Precautions

- **When installing each rubber part, final tightening must be carried out under unladen condition* with tires on ground.**
  ***: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**
- **When removing each suspension part, check wheel alignment and adjust if necessary.**
- **Use Tool when removing or installing brake tubes.**

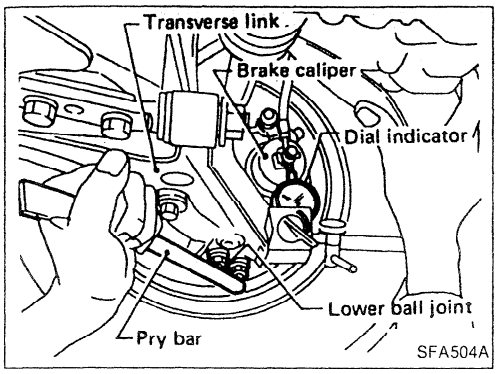
Preparation

SPECIAL SERVICE TOOLS

*: Special tool or commercial equivalent

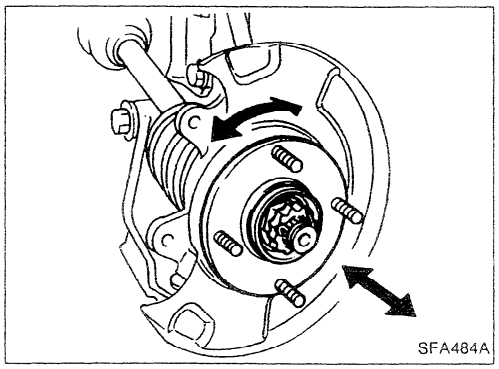
Tool number Tool name	Description	
HT72520000* Ball joint remover		Removing tie-rod outer end and lower ball joint
HT71780000* Spring compressor		Removing and installing coil spring
ST35652000* Strut attachment		Fixing strut assembly
GG94310000* Flare nut torque wrench		Removing and installing brake piping
KV38106700* KV38106800* Differential side oil seal protector	 L.H.: KV38106700 R.H.: KV38106800	Installing drive shaft

Front Axle and Front Suspension Parts (Cont'd)



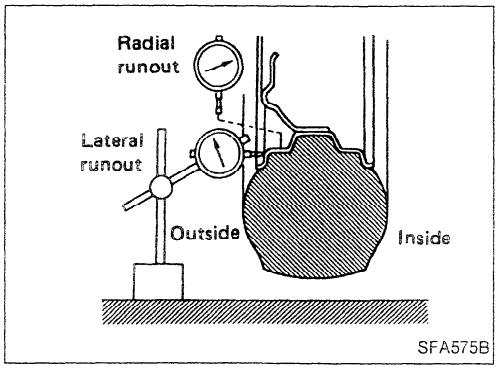
- Check suspension ball joint end play.

a. Jack up front of vehicle and set the stands.
b. Clamp dial indicator onto transverse link and place indicator tip on lower edge of brake caliper.
c. Make sure front wheels are straight and brake pedal is depressed.
d. Place a pry bar between transverse link and inner rim of road wheel.
e. While raising and releasing pry bar, observe maximum dial indicator value.
   Vertical end play:
   0 mm (0 in)
f. If ball joint movement is beyond specifications, remove and recheck it.



Front Wheel Bearing

- Check that wheel bearings operate smoothly.
- Check axial end play.
  Axial end play:
  0.05 mm (0.0020 in) or less
- If axial end play is not within specification or wheel bearing does not turn smoothly, replace wheel bearing assembly. Refer to FRONT AXLE — Wheel Hub and Knuckle.



Front Wheel Alignment

Before checking front wheel alignment, be sure to make a preliminary inspection (Unladen*).

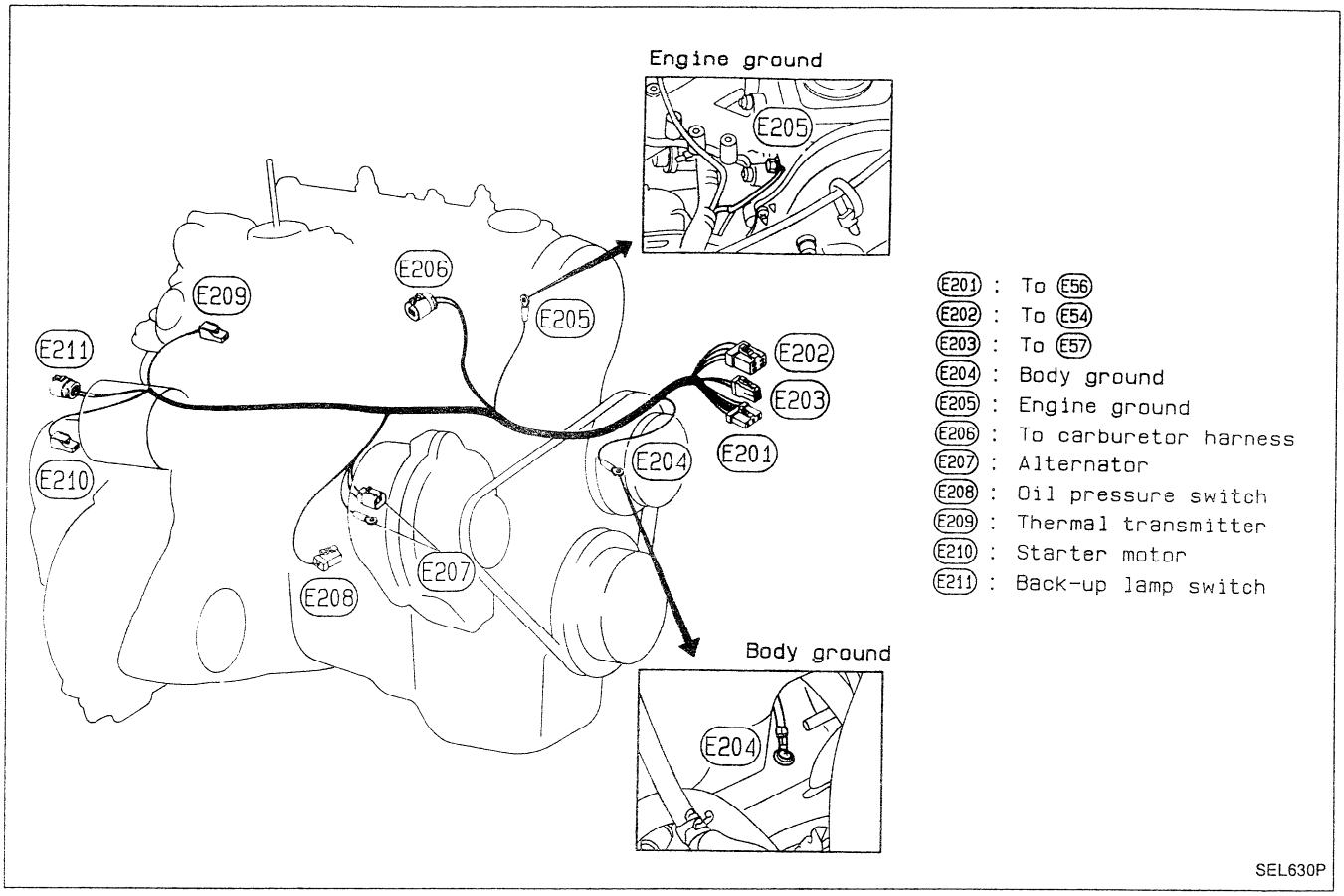
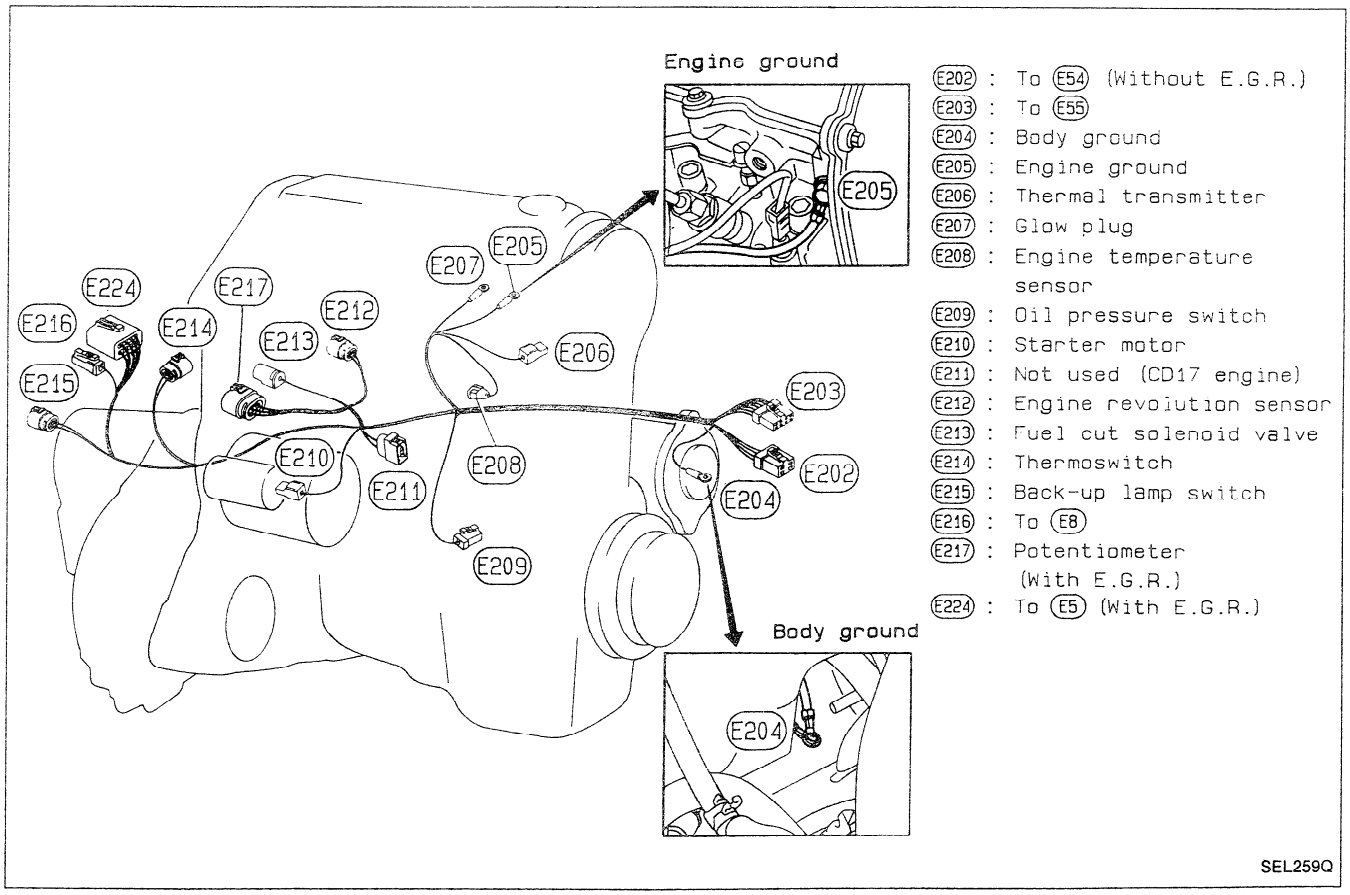
*: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

PRELIMINARY INSPECTION

1. Check tires for wear and improper inflation.
2. Check wheel runout.
   Wheel runout:
   Refer to S.D.S.
3. Check front wheel bearings for looseness.
4. Check front suspension for looseness.
5. Check steering linkage for looseness.
6. Check that front shock absorbers work properly by using the standard bounce test.
7. Check vehicle posture (Unladen).

Engine Harness (Cont'd)

E10S ENGINE



CD17 ENGINE